Town of Ayer
CONSERVATION COMMISSION

Town Hall ♦ One Main Street ♦ Ayer, MA 01432
Phone 978-772-8220 ext. 143 ♦ Fax 978-772-8208 ♦ concom@ayer.ma.us

MEETING AGENDA
Thursday, August 25, 2022

Due to the ongoing COVID-19 Pandemic, in accordance with Chapter 22 of the Acts of 2022, suspending certain provisions of the Open Meeting Law (OML), public bodies otherwise governed by the OML are temporarily relieved from the requirement that meetings be held in public places, open and physically accessible to the public, so long as measures are taken to ensure public access to the bodies' deliberations "through adequate, alternative means." This meeting will be live on Zoom. The public may participate remotely by joining Zoom **(Meeting ID# 840 4058 0886)** or by calling **(929-205-6099)**. For additional information about remote participation, please contact Conservation Commission at concom@ayer.ma.us or by calling 978-772-8220 ext. 143 prior to the meeting.

7:00 PM **GENERAL BUSINESS / OPEN SESSION**

- Approval of Meeting Minutes for August 11, 2022
- Public Input

Public Hearing: Notice of Intent (NOI) – Spectacle Pond Water Treatment Plant, between Willow Road and Nemco Way, Town of Ayer Department of Public Works, represented by Tighe & Bond, Charles Gore, MassDEP File #100-XXX, Assessors Map 24 & 17 Parcel 1& 7

Discussion – Ayer Solar II Construction Update, Rohit Garg, DEP File number 100-0444

Discussion – Final Report, Peer Review, Stratton Hill Conservation Analysis, BSC Group, Matthew Burne.

CONSERVATION OFFICE AND MEMBER UPDATES

9:00 PM **ADJOURN**

9:25am
RECEIVED
AUG 23 2022
TOWN OF AYER
TOWN CLERK

Next Scheduled Meeting: 7 PM, September 8, 2022

Town of Ayer Conservation Commission

Town Hall * One Main Street * Ayer, MA 01432 * 978-772-8249
Minutes for **8/11/2022**

Location: Remote Meeting via Zoom, accessible to public, due to ongoing COVID 19 Pandemic
Present: Jon Schmalenberger (Chair), Mark Phillips (Vice-Chair), George Bacon (Member), Jennifer Amaya (Member), Jessica Gugino (Clerk), Heather Hampson (Conservation Agent)

APAC Recorded: Yes

7:01 PM – Open Meeting

- **Confirmation of Agenda**
  - G. Bacon moved to confirm the agenda as posted; M. Phillips 2nd.
    - Motion approved unanimously by Roll Call Vote 5-0.

- **Approval of Meeting Minutes**
  - G. Bacon moved to accept the minutes for 7/28/2022 as written; M. Phillips 2nd.
    - Motion approved unanimously by Roll Call Vote 5-0.

- **Public Input**
  - None received.

- **Public Meeting: Request for Determination of Applicability (RDA) – 71 & 72 Nashua Street, Jen Amaya and Ryan Clinton.**
  - Assessor's Map 13, Parcels 42 & 41
  - As one of the applicants, J. Amaya recused herself from the Commission just for this RDA Public Meeting.
  - Ms. Amaya and Mr. Clinton, whose properties adjoin, were both present via Zoom.
    - When their houses were built as part of the Nashua Street Extension subdivision, the developer put in a shared driveway that was too narrow and only constructed with one layer of asphalt.
    - The driveway, only a few years old, is already crumbling.
  - The Clintons and the Amayas would like to redo the driveway properly, laying down a couple of inches of gravel and 2 layers of asphalt.
    - At the same time, they would like to widen the driveway 1-2 feet from the cul-de-sac to the Amaya's driveway on the left side of the road, then a little bit further along the Clinton driveway.
    - In addition, the Clinton's would like to pave the existing two turnaround areas that are currently gravel (see 7/9 and 7/23/2020 minutes for previous RDA).
  - J. Schmalenberger asked for opinions on whether this is an RDA application or should be a more formal Notice of Intent (NOI).
    - H. Hampson said replacing existing driveway counts as maintenance, and that the area for driveway expansion is already disturbed area.
    - G. Bacon said the project seemed straightforward.

        - M. Phillips was okay with the project as long as it was okay with the rest of the Commission to pave the gravel turnarounds.
    - G. Bacon moved to issue a Negative Determination of Applicability (DOA) for 71 and 72 Nashua Street, with the condition that erosion controls are to be installed and then inspected by H. Hampson prior to the start of work.; M. Phillips 2nd.
        - Motion approved unanimously by Roll Call Vote 5-0.
        - J. Schmalenberger advised as to the 10 day waiting period from issuance of the permit.

- **Public Meeting: RDA – 0 Bligh Street, Pirone Park, Kiddie Junction Playground, Grove Pond, Town of Ayer Department of Public Works**
    - Assessor's Map 34, Parcel 17
    - Present for this meeting via Zoom were Jeff Thomas, Director of the Ayer Parks Department; Dan Van Schalkwyk, Director of the Ayer Department of Public Works (DPW); and Randy Collins, of The Beta Group, Inc., the landscape architect working on this project.
    - Because of arsenic contamination and per requirement of MassDEP, Kiddie Junction Playground is to be demolished and removed, along with roughly 6-12 inches of arsenic-contaminated soils/materials within the fenced playground.
        - There is also an area extending south outside of the fencing, entering the outer buffer zone to Grove Pond, that is contaminated as well and will also have to be scraped and remediated.
        - A new playground will then be rebuilt in the second phase of the project (and which will be reviewed under a Notice of Intent filing where grading and new construction are proposed within buffer zone).
    - Beta Group is overseeing the demolition and remediation portion of the project.
        - Beta will be taking soil samples throughout the project area to determine the boundaries of the clean-up.
        - They will also do confirmatory soil samples after removal to make sure enough contaminated soil has been removed to meet State arsenic standards (below a threshold of 20 mg/kg) and that area no longer qualifies as 'hot.'
            - If contaminated material is still present, they will have to dig deeper to remove that.
            - The LSP (Licensed Site Professional) will make those calls.
    - Of necessity, most of the trees within the existing playground fencing will be removed but, in response to public feedback and concerns, there will be an effort to save three of the oak trees by vacuuming contaminated soils from around the roots and protecting the trees from dripline to trunk.
        - Outside of the fence perimeter, closer to the pond and within the buffer zone, some additional trees will be taken down in two areas as well.
            - One tree has a damaged split trunk and presents a safety hazard in an area where a playground extension is likely to be built.

        - In an area slightly to the west of that, 4 additional trees, 3 of which are inside the 100 ft. buffer zone, will be taken down at the same time, while leaving some others in place.
    - All trees to be taken down will also have their stumps removed.
    - New tree plantings (with 3 to 3-1/2 inch calipers for maples, 2 to 2-1/2 calipers for oaks) will be done here and within the playground area at the completion of the project rebuild.
  - M. Phillips questioned the cost and potential futility of trying to save trees inside the playground, but Mr.Thomas explained that this was in response to many comments received at public forums – the trees provide shade and have historical and sentimental importance to many.
    - H. Hampson spoke strongly in favor of retaining established trees, where possible, for the valuable shade they provide (and J. Gugino strongly concurred!).
    - J. Schmalenberger asked about the additional cost of removing the trees if they were to die after the new playground has been completed.
    - However, given that the area within the existing playground fence is outside of ConCom jurisdiction, this discussion was in the end terminated.
  - In response to a question from H. Hampson, Mr. Collins said all excavated/contaminated soil/material will be removed from the site and not stored there.
  - The anticipated timetable for the project is to put the demolition/remediation work for the first phase out for bid in August so that the work can begin in September.
    - Depending on the results of soil testing and clean-up results, it is possible this work could bleed into November, but ideally it would be completed earlier so that the second phase of the project could begin in late fall.
    - Proposals will be solicited prior to that for the playground rebuild contract for phase 2.
    - The goal is to have the new playground completed and able to open to the public in spring 2023.
    - If the ideal timetable does not prove feasible, H. Hampson asked about having the site prepared in such a way that it presents no hazards to the environment over the winter.
  - G. Bacon moved to issue a Negative DOA, with the condition that the site is to be inspected for over-winterization conditions by H. Hampson at the end of the construction season; M. Phillips 2nd.
    - Motion approved unanimously by Roll Call Vote 5-0.
    - The 10 day waiting period for MassDEP to appeal this decision applies.

- **Public Meeting: Requests for Certificate of Compliance (COC), Pingry Hill Subdivision**
  - Dr. Desheng Wang, of Creative Land & Water Engineering, was present via Zoom on behalf of Ridge View Realty Trust, the applicant for the COCs.
    - Dr. Wang has been the Erosion Control Specialist monitoring this site for years, per the requirement for such made of the applicant by MassDEP.

- All work has basically been completed on the development, save for some replication areas that require at least another growing season before being considered for approval.
  - H. Hampson visited the site with Dr. Wang and the developer, Duke Pointer, on July 1.
  - Dr. Wang said that, on the whole, generally there was less ground disturbance than was permitted by the Orders of Conditions, and that the whole site is now permanently stabilized.
  - Stormwater detention basins have been completed.
  - All required conservation signage is now in place.
- At the site walk, H. Hampson asked for additional signage in some locations where boulders, that had been mandated in the Orders, were not installed.
  - The purpose of the boulders, as of the signs, was to provide clear delineation of the point beyond which lawns are not permitted to encroach, with the boulders presenting physical impediments to any such actions.
  - Where boulders were missing, H. Hampson asked for additional signs, and advised that to bring in boulders now would cause more disturbance to already-stabilized areas.
  - In some cases, the missing boulders would have been located at a slope point that provides its own natural impediment as well.
- M. Phillips said the only thing he was disappointed in were the missing boulders – something as substantial as a boulder is harder to ignore than a sign – and that the boulders in some site photos seemed smaller/less substantial than the Commission wanted.
  - H. Hampson said she could put some of these locations on a list to be checked yearly to make sure no encroachment has taken place.
- That being seen as sufficient, the Commission moved on to vote on the 8 COC requests submitted:
  - **Request for COC: 169 Woodland Way, Map 36, Parcel 112, MassDEP # 100-0413**
    - G. Bacon moved to issue a COC for 100-0413; M. Phillips 2nd.
      - Motion approved unanimously by Roll Call Vote 5-0.
  - **Request for COC: 237 Woodland Way, Map 36, Parcel 118, MassDEP # 100-0417**
    - G. Bacon moved to issue a COC for 100-0417; M. Phillips 2nd.
      - Motion approved unanimously by Roll Call Vote 5-0.
  - **Request for COC: 186 Woodland Way, Map 36, Parcel 179, MassDEP # 100-0280**
    - G. Bacon moved to issue a COC for 100-0280; M. Phillips 2nd.
      - Motion approved unanimously by Roll Call Vote 5-0.
  - **Request for COC: 259 Woodland Way, Map 36, Parcel 184, MassDEP # 100-0418**
    - G. Bacon moved to issue a COC for 100-0418; M. Phillips 2nd.

- Motion approved unanimously by Roll Call Vote 5-0.

- **Request for COC: 207 Woodland Way, Map 36, Parcel 115&116, MassDEP # 100-0414**
  - G. Bacon moved to issue a COC for 100-0414; M. Phillips 2nd.
    - Motion approved unanimously by Roll Call Vote 5-0.
- **Request for COC: 219 Woodland Way, Map 36, Parcel 117, MassDEP # 100-0416**
  - G. Bacon moved to issue a COC for 100-0416; M. Phillips 2nd.
    - Motion approved unanimously by Roll Call Vote 5-0.
- **Request for COC: 252 Woodland Way, Map 36, Parcel 180, MassDEP # 100-0432**
  - G. Bacon moved to issue a COC for 100-0432; M. Phillips 2nd.
    - Motion approved unanimously by Roll Call Vote 5-0.
- **Request for COC: 10 Fox Run Drive, Map 36, Parcel 153, MassDEP # 100-0435**
  - G. Bacon moved to issue a COC for 100-0435; M. Phillips 2nd.
    - Motion approved unanimously by Roll Call Vote 5-0.

- **Discussion: Conservation Restriction (CR) – Shaker Mill Pond Subdivision**
  - A draft of the CR is in circulation, with revisions suggested by ConCom and supported by Town Counsel.
  - H. Hampson will contact Town Planner Mark Archambault to see what the next steps are to get to a final draft.
    - She also said it is good that the draft includes a provision that money be set aside by the developer for CR monitoring for a period of time.

- **Discussion: Waterways Signs Project Update**
  - M. Phillips said ConCom will have the project completed well in advance of the 9/30 deadline.
    - There are still a few signs to be installed, but most are in thanks to the herculean efforts of M. Phillips, J. Schmalenberger, G. Bacon, and J. Amaya mightily swinging that sledgehammer, over and over and over again, to drive the sign stakes deep into that hard, hard ground!
    - J. Gugino took the more delicate route of writing up the descriptions of each waterbody for the Town website that the QR code will link to.
      - IT Director Cindy Knox will handle the website.
    - H. Hampson took care of securing the road opening permits from the DPW for sign installation where needed.
  - Per the suggestion of IT Director Cindy Knox, J. Gugino said she will prepare additional waterbody descriptions for the Nashua River and Plow Shop Pond, for the website (ayer.ma.us/waterways) even though neither will have a sign.

- Both are integral links in the chain of Ayer waterbodies that begins with Long Pond and ends with the Nashua, and the website is for the waterways in general.
- There is no Nashua River sign because of the onerous restrictions that would be hard to meet for the two potential locations – one on Rte. 2A (MassDOT) and the other on MacPherson Road (Oxbow National Wildlife Refuge).
- There is no Plow Shop Pond sign because that is all private property and inaccessible to the public.

- H. Hampson will check with Accounting to ascertain the costs to date for expenses covered by the grant.
  - M. Phillips said the actual costs will be quite a bit under the estimate accompanying the grant application.
- H. Hampson will look into preparing a map graphic of the waterways to accompany each individual waterbody description, with that particular waterbody highlighted in some way for easy identification.
- Per the suggestion of G. Bacon, the Commission will pursue, some time after Labor Day, the idea of soliciting photos of each waterbody from Ayer residents, to be screened for selction prior to posting to the website as well.

- **Conservation Commission Office and Member Updates**
  - 52 Nashua Street
    - H. Hampson had another request for tree removal from an Ayer resident.
    - Here, 4 trees in the wetlands are proposed for removal, all of them dead or dying or potentially dangerous to the house or the road.
      - H. Hampson spoke to Flagg Tree Removal who said they would remove the trees using a crane set on the driveway, with minimal disturbance to the wetlands.
    - H. Hampson asked if the Commission was in agreement with allowing her to permit this through the Administrative Approval form.
      - The Commission agreed, and M. Phillips asked her to see if the homeowners were willing to leave at least some of the stump/trunk above ground, as much as possible, where it can serve as habitat.
      - H. Hampson said she had already asked that and the homeowners had no problem with doing that; she'll reiterate that in the Approval permit.
  - Mass. Association of Conservation Commissions (MACC)
    - H. Hampson recently attended an online MACC training session on Conservation Restrictions.
      - She said she learned that, while Ayer ConCom thought we were in rough shape with regards to the incomplete or unmonitored status of some of our CR properties, we are not alone, and indeed, are not in as bad shape as some other communities.
    - H. Hampson has also signed up for a training session on CR Baseline Documentation in November.

- MACC's fall conference will be on October 15.
    - This year, for the first time since the pandemic began, the conference will be in person, and in addition, it will be located this year in Devens close by.
- Also, if M. Phillips wants to complete more of MACC "Fundamentals" trainings, he was assured that there is money in ConCom's annual budget for this purpose.
- H. Hampson confirmed that ConCom's MACC membership has been renewed and is up-to-date.

o Ayer Solar II, MassDEP # 100-0403

- H. Hampson has not heard back from Rohit Garg with regard to her request for a checklist detailing all of the changes made during construction that differ significantly from the approved plans and Order of Conditions.
    - Rohit Garg is the designated contact person for the project, even though he is located in the Midwest.
- She also asked for a revised set of plans and has had no response.
- Town Planner Mark Archambault has also had difficulty getting responses from Mr. Garg lately as well.
- In addition to concerns about the culvert/stream crossing, the entrance road, and the replication areas, H. Hampson said the tree box filters are not being constructed as described in the plans.
    - Also, the plans call for 5 or 6 of them but only 3 have been put in.
    - Per M. Phillips request, H. Hampson will check the files to see if there are "before" pictures of the stream crossing to compare to.
    - The stormwater basins are essentially just dirt for now and not functional.
    - The replication areas haven't even been begun and we are reaching the end of any growing season.
- H. Hampson is worried they'll turn the power on in the solar field before they finish their other obligations for the project.
    - Her contact at MassDEP suggested a Violation Letter is in order, including notification to Mr. Garg that failure to respond could lead the Commission to issue a Violation Notice and a Cease & Desist.
    - ConCom would also have to vote on an Amended Order of Conditions – and could vote no if it chose.
- By luck, H. Hampson was up in the Building Department the other day when Solar II's request for a Certificate of Occupancy came in.
    - However, it is also the case that Solar II could turn the power on anyway without needing that Certificate from the Building Inspector.
- Changes to requirements made by NHESP (Natural Heritage and Endangered Species Program) were made as well, and while NHESP has said they were okay with the changes, H. Hampson has been unable to get written confirmation from Mr. Garg despite her request.

- ConCom members shared H. Hampson's frustration with the lack of responsiveness from the project manager.
- Per the Commission's request, H. Hampson will send Mr. Garg a Violation Notice requiring his presence (via Zoom) at ConCom's next meeting on 8/25.
    - J. Amaya said to give a deadline for Mr. Garg to respond, and then say that there could be consequences from the Commission in the form of a Cease & Desist and/or fines if the non-responsiveness continues.

- Permitting Database
    - G. Bacon asked if the permitting database created under the previous Conservation Administrator, at cost to the Commission, was being used?
    - Cindy Knox spoke up that she needs to show H. Hampson where it is in the computer system and how to use it.
        - She will try to do so next week.

- **9:02 PM – Adjourn Meeting**
    - G. Bacon moved to adjourn; M. Phillips 2nd.
        - Motion approved unanimously by Roll Call Vote 5-0.

Minutes Recorded and Submitted by Jessica G. Gugino, Clerk

Date / Signature of Approval: _____

1.

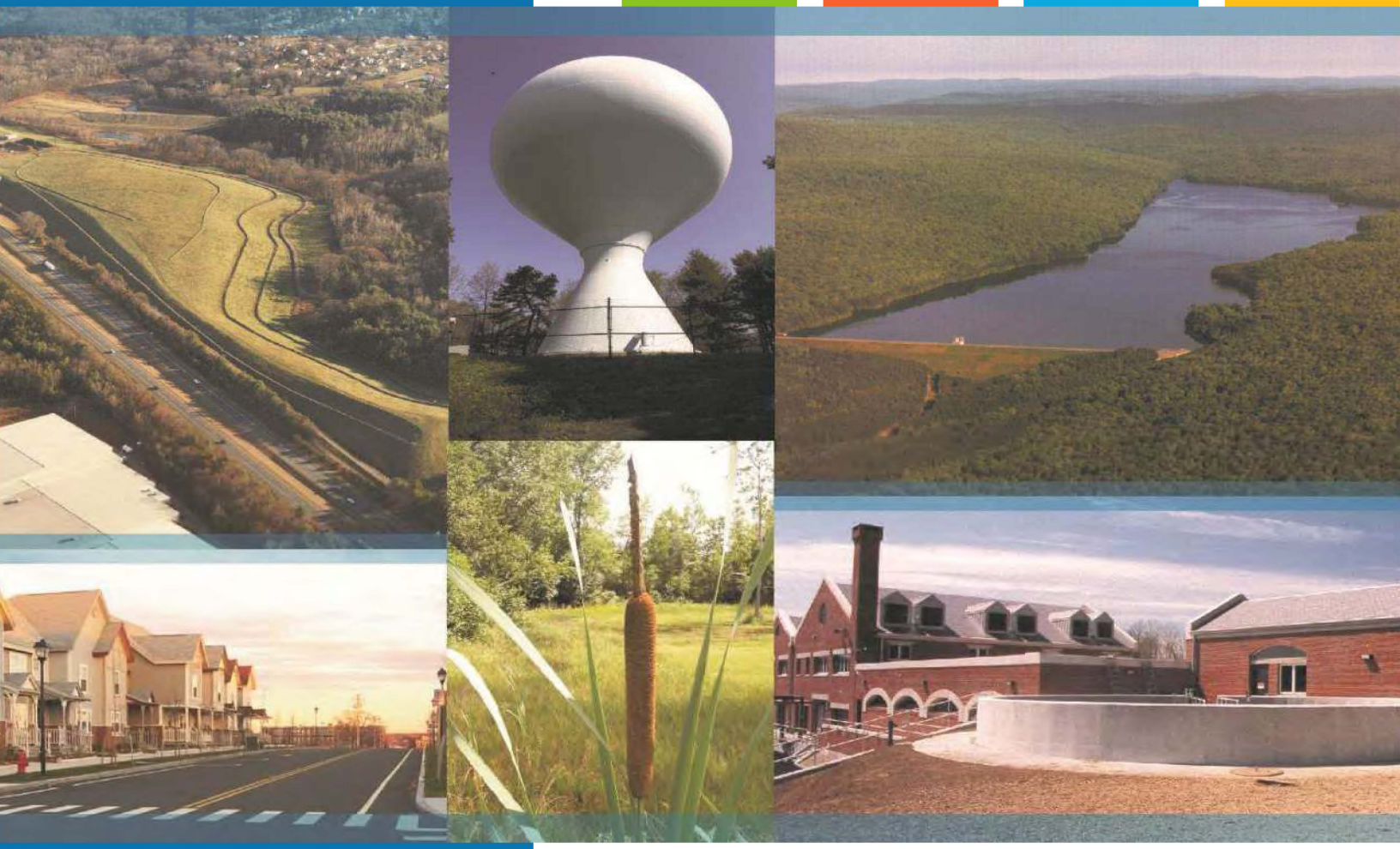
Town of Ayer

Conservation Commission

The Ayer Conservation Commission will conduct a Public Hearing on Thursday, August 25, 2022, at 7:00 p.m. using remote participation means, regarding: the petition of The Town of Ayer Department of Public Works filing a Notice of Intent (NOI) for the replacement and upgrade of an existing water main within the access road at the Spectacle Pond Water Treatment Plant in Ayer, MA 01432, subject to Protection under the Wetlands Protection Act (MGL Ch. 131, Section 40) and the Ayer Wetlands Protection Bylaw, Article XXVI. The public is invited to attend and participate remotely. Information regarding remote access to the Public Hearing will be available by contacting the IT Director at cknox@ayer.ma.us, or the Conservation Administrator at concom@ayer.ma.us or by calling 978-772-8220, x 143.

Jon Schmalenberger, Chair

Ayer Conservation Commission



Spectacle Pond Transmission Main Replacement
Ayer, Massachusetts

NOTICE OF INTENT

Town of Ayer Public Works Department

July 2022

Tighe&Bond

A-5004-013-01-04
July 28, 2022

Ayer Conservation Commission
1 Main Street
Ayer, Massachusetts 01432

Re: Notice of Intent – Spectacle Pond Transmission Main Replacement
4 Willow Road and 0 Nemco Way, Ayer, Massachusetts

Dear Members of the Commission:

On behalf of the Town of Ayer Public Works Department (the Town), Tighe & Bond respectfully submits this Notice of Intent (NOI) for a proposed water transmission main replacement project at 4 Willow Road and 0 Nemco Way in Ayer, Massachusetts. The proposed work involves the construction of an 18-inch diameter, high density polyethylene (HDPE) water main within the access road to the Spectacle Pond Water Treatment Plant. Pin hole leaks due to corrosion were discovered in this pipe in April 2021. Due to the criticality of the pipe within Ayer's water distribution system, the Town proposes a replacement of 700 linear feet of the water main.

This NOI is being filed under the Massachusetts Wetlands Protection Act (MAWPA) (M.G.L. c. 131 § 40) and the Town of Ayer Wetlands Protection Bylaw (Article XXVI; the Bylaw). Work is proposed within areas subject to protection and jurisdiction under the MAWPA and Bylaw, including within the Riverfront Areas of Bennetts Brook and an unnamed perennial stream, as well as the 100-foot Buffer Zone.

Enclosed, please find a completed application for your review, along with a project narrative, project figures and drawings, and other required materials. As this is a municipal project proposed by the Town, the project is exempt from filing fees.

We look forward to discussing this project with you and anticipate being included on the Ayer Conservation Commission's next meeting agenda on August 25, 2022. If you have any questions or require any additional information, please contact Julia Novotny at (603) 294-9210 or JNovotny@tighebond.com or me at (781) 708-9832 or CGore@tighebond.com.

Very truly yours,

TIGHE & BOND, INC.

Charles Gore, PE
Project Manager

Enclosures
Copy: MassDEP, Central Regional Office Division of Wetlands and Waterways
Natural Heritage and Endangered Species Program (NHESP) Regulatory Review
Dan Van Schalkwyk, PE, Director – Ayer Department of Public Works

J:\A\A5004 Ayer\013 Spectacle Pond Transmission Main\Permitting\NOI\Spectacle Pond Transmission Main Upgrade NOI - Cover Letter.docx

Tighe&Bond

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Section 2 Existing Environment

Section 3 Project Description

Section 4 Alternatives Analysis

Section 5 Regulatory Compliance

Appendices

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

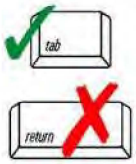
Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Ayer
City/Town

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):

a. Street Address	b. City/Town	c. Zip Code
4 Willow Road (utility easement) and 0 Nemco Way	Ayer	01432

Latitude and Longitude:

d. Latitude	e. Longitude
42.559695	-71.524813

f. Assessors Map/Plat Number	g. Parcel /Lot Number
24; 17	1; 7

2. Applicant:

a. First Name	b. Last Name
Dan	Van Schalkwyk

c. Organization: Town of Ayer Public Works Department

d. Street Address: 25 Brook Street

e. City/Town	f. State	g. Zip Code
Ayer	MA	01432

h. Phone Number	i. Fax Number	j. Email Address
(978) 772-8240		dvanschalkwyk@ayer.ma.us

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):

a. First Name	b. Last Name
Charles	Gore

c. Company: Tighe & Bond

d. Street Address: One University Avenue, Suite 100

e. City/Town	f. State	g. Zip Code
Westwood	MA	02090

h. Phone Number	i. Fax Number	j. Email address
(781) 708-9832		CGore@tighebond.com

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

a. Total Fee Paid	b. State Fee Paid	c. City/Town Fee Paid
N/A - Exempt	N/A - Exempt	N/A - Exempt

A. General Information (continued)

6. General Project Description:

The Town of Ayer is proposing to replace approximately 700 linear feet of an existing 16-inch diameter water transmission main with a new 18-inch diameter high-density polyethylene pipe due to pinhole leaks discovered in April 2021.

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(3)(d)
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)
11776 c. Book	124 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.

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	1. linear feet	2. linear feet
b. ☐ Bordering Vegetated Wetland	1. square feet	2. square feet
c. ☐ Land Under Waterbodies and Waterways	1. square feet 3. cubic yards dredged	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 — Bennetts Brook and unnamed perennial stream (Inland)
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: 19,500,000 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.
2,870	2,310	560

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.

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 _____

5. ☐ Project Involves Stream Crossings

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

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

   August 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 — 0.07 acres (Riverfront Area) (percentage/acreage)

         (b) outside Resource Area — 0.10 acres (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.

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).

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: No new impervious surfaces proposed

      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.

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.

Town of Ayer, MA Spectacle Pond Transmission Main Replacement
a. Plan Title

Tighe & Bond
b. Prepared By

Digitally signed by Charles Gore
Date: 2022.07.27 09:08:19-04'00'
c. Signed and Stamped by

7/22/2022
d. Final Revision Date

1" = 30'
e. Scale

f. Additional Plan or Document Title

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:

2. Municipal Check Number

3. Check date

4. State Check Number

5. Check date

6. Payor name on check: First Name

7. Payor name on check: Last Name

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.

Daniel Van Schalkwyk — Digitally signed by Daniel Van Schalkwyk Date: 2022.07.27 09:20:21 -04'00'	7/27/2022
1. Signature of Applicant	2. Date
3. Signature of Property Owner (if different)	4. Date
Digitally signed by Charles Gore Date: 2022.07.27 09:09:14-04'00'	7/27/2022
5. Signature of Representative (if any)	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.

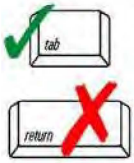
The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

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 Willow Road and 0 Nemco Way	Ayer
a. Street Address	b. City/Town
N/A - Fee Exempt	N/A - Fee Exempt
c. Check number	d. Fee amount

2. Applicant Mailing Address:

Dan		Van Schalkwyk	
a. First Name		b. Last Name	
Town of Ayer Public Works Department			
c. Organization			
25 Brook Street			
d. Mailing Address			
Ayer	MA	01432	
e. City/Town	f. State	g. Zip Code	
(978) 772-8240		dvanschalkwyk@ayer.ma.us	
h. Phone Number	i. Fax Number	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.

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

B. Fees (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
N/A - Fee Exempt			

Step 5/Total Project Fee: _____

Step 6/Fee Payments:

Total Project Fee: $0 (a. Total Fee from Step 5)

State share of filing Fee: _____ (b. 1/2 Total Fee **less** $12.50)

City/Town share of filling Fee: _____ (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.)

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SECTION 1

Section 1
Introduction

1.1 Background and Purpose

The Town of Ayer proposes the replacement and upgrade of the existing 16-inch diameter ductile iron transmission main within the narrow access road from the Spectacle Pond Water Treatment Plant (WTP) in Ayer, Massachusetts, adjacent to a newly constructed Per-and Polyfluoroalkyl Substances (PFAS) Water Treatment Facility. This transmission main has experienced pinhole leaks discovered in April 2021 due to external corrosion. Due to the criticality of the transmission main, the Town of Ayer is proposing to fully replace approximately 700 linear feet (lf) of pipe. Replacement of this corroded pipe is critical to the infrastructure of the water distribution system in Ayer.

The existing access road that contains the transmission main runs through a wetland resource area and buffer zone associated with Spectacle Pond, Bennetts Brook, and an unnamed perennial stream in Ayer. The work will consist of open-cut trench installation of a new high-density polyethylene (HDPE) pipe to a depth of approximately five (5) feet below grade within the footprint of the access road. The new main will be installed approximately eight (8) feet below grade beneath an existing culvert. This project will result in the alteration of areas subject to protection under the Massachusetts Wetlands Protection Act (MAWPA; M.G.L. c. 131 § 40), including the Riverfront Area to Bennetts Brook and an unnamed perennial stream, as well as the 100-foot Buffer Zone. Work is also proposed within the locally-regulated Adjacent Upland Resource Area (AURA). All disturbed areas will be restored in-kind post construction, and necessary erosion and sedimentation controls will be utilized between areas of disturbance and jurisdictional wetland resource areas. This Notice of Intent (NOI) qualifies as a Limited Project under 310 CMR 10.53(3)(d).

Tighe&Bond

SECTION 2

Section 2
Existing Environment

This section provides a site description and wetland characterization for the Project Site and surrounding area. Land use in the general vicinity of the Project Site was determined based on direct observations made during site inspections and a review of information available through the Massachusetts Geographic Information System (MassGIS) and the USDA Natural Resources Conservation Service (NRCS).

2.1 Project Location

The Project Locus consists of an approximately 3,960-foot narrow, unpaved access road (Spectacle Road) to the existing WTP and PFAS Water Treatment Facility. The road extends from Sandas Point Road to the WTP, with extensive wetland areas adjacent to the road, and crosses Bennetts Brook and an unnamed perennial stream, both of which flow into Spectacle Pond. Land around the access road includes impervious area, developed residential space, deciduous and evergreen forested area, commercial and industrial areas, including the Littleton Transfer Station, a rail yard, and multiple private businesses, as well as wetlands and open water. There are also active railroad tracks running north-south to the west and east-west to the north of the access road. The Project Site will be limited to the replacement of approximately 700 lf of transmission main southwest of the existing WTP.

The Project Locus is shown on the USGS Site Location Map (Figure 1) provided in Appendix A. The site and surrounding area are also shown on the MassDEP Priority Resources Map (Figure 2), and the Orthophotograph (Figure 3), also provided in Appendix A. Photographs of the site are provided in Appendix B.

2.2 Methodology of Resource Area Investigations

Tighe & Bond wetland scientists conducted a resource area investigation on April 29, 2022. Wetland resource areas were delineated adjacent to the project area in accordance with MassDEP guidelines, 310 CMR 10.00, and the United States Army Corps of Engineers Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (January 2012), and the Town of Ayer Wetlands Protection Bylaw (Article XXVI; the Bylaw). Resource area boundaries are also identified on the Project Drawings in Appendix A.

2.3 Description of Wetland Resource Areas

Wetland resource areas adjacent to the Project Site consist of inland Bank (Bennetts Brook and unnamed perennial stream), Bordering Vegetated Wetlands (BVW), Bordering Land Subject to Flooding (BLSF), and Riverfront Area (Bennetts Brook and unnamed perennial stream). Descriptions of these resource areas are provided in the following sections, and representative photographs are included in Appendix B. A summary of resource areas by flag series is presented in Table 2-1.

TABLE 2-1
Summary of Resource Areas by Flag Series

Wetland System ID	Flag Series	Resource area Type
1	1A-1 open through 1A-25 open	Bordering Vegetated Wetland (PEM/PSS)
1	1B-1 open through 1B-36 open	Bordering Vegetated Wetland (PEM/PSS)

2.3.1 Buffer Zone

Portions of the Project Site are within the 100-foot Buffer Zone to the inland Bank of Bennetts Brook and an unnamed stream, both of which are shown as perennial per the most recent USGS topographic map (Ayer, Massachusetts quadrangle, revised 1988). Buffer Zone consists of the unpaved access road, wetlands, and the existing WTP.

2.3.2 Bordering Vegetated Wetlands

2.3.2.1 Wetland 1A

Wetland 1A lies to the northwest of the access road and was demarcated with flags 1A-1 through 1A-25. This wetland is classified as a palustrine emergent (PEM) and palustrine scrub-shrub (PSS) wetland system with common reed (*Phragmites australis*; FACW), cattail (*Typha sp.*; OBL), and speckled alder (*Alnus incana*; FACW) as the dominant vegetation. Also present in this wetland and along the boundaries is red maple (*Acer rubrum*; FAC), white meadowsweet (*Spirea alba*; FACW), red-osier dogwood (*Cornus sericea*; FACW), sensitive fern (*Onoclea sensibilis*; FACW), highbush blueberry (*Vaccinium corymbosum*; FACW), multiflora rose (*Rosa multiflora*; FACU), willow (*Salix sp.*), honeysuckle (*Lonicera sp.*), and grasses and sedges. Wetland indicators present included: standing water, geomorphic position, and microtopographic relief.

2.3.2.2 Wetland 1B

Wetland 1B lies to the southeast of the access road and was demarcated with flags 1B-1 through 1B-36. This wetland is also classified as a PEM and PSS wetland system and is hydrologically connected to Wetland 1A via an existing 48-inch diameter corrugated metal pipe culvert. Dominant vegetation in this wetland was similar to that observed in Wetland 1A, but with a greater abundance of cattail. The wetland indicators present in Wetland 1B included standing water and geomorphic position on the landscape.

2.3.3 Bordering Land Subject to Flooding

According to the most recent Flood Insurance Study (FIS; Study Number 25017CV003C, Revised July 6, 2016) and Flood Insurance Rate Map (FIRM; Community Panel Number 25017C0217E, effective June 4, 2010) provided by the Federal Emergency Management Agency (FEMA), a portion of the proposed project area is within the mapped limits of 100-year flooding, with a Base Flood Elevation (BFE) of 210 feet. A FEMA FIRMette of the Project Site and surrounding area is provided in Appendix A. BLSF within the Project Locus can be characterized as impervious, commercial, developed open space, forested, open water, and delineated wetland areas. The existing gravel access road, WTP and PFAS Water Treatment Facility are adjacent to, but not within BLSF. The proposed work will not

alter the general characteristics of the area as all work is limited to the existing access road and disturbed areas will be returned to previous grades post-construction.

2.3.4 Riverfront Area

Portions of the Project Site are located within the 200-foot Riverfront Area of Bennetts Brook and an unnamed perennial stream. The Riverfront Area consists of the existing gravel access road, WTP, and delineated wetlands. A portion of the Riverfront Area totaling approximately 61,200 square feet within the subject parcels is degraded due to existing roads, the unpaved access road, and water treatment buildings.

2.4 Rare Species

The Massachusetts Natural Heritage and Endangered Species Program (NHESP) Atlas, 15th edition, effective August 1, 2021, and MassGIS online mapping data (August 1, 2021), were reviewed during the preparation of this NOI. According to these sources, the entire proposed project area is within the limits of mapped Priority Habitats of Rare Species (PH 2043) and Estimated Habitats of Rare Wildlife (EH 2043). Based on a previous review of the construction of the new PFAS Water Treatment Facility, the area was identified as Blanding's turtle (*Emydoidea blandingii*) habitat.

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SECTION 3

Section 3
Project Description

This section provides a description of the proposed transmission main upgrade, construction-period Best Management Practices (BMPs), and post-construction site restoration.

3.1 Proposed Activities

The proposed project entails the replacement of the existing 16-inch diameter ductile iron water transmission main within Spectacle Road that extends southwest from the Spectacle Pond WTP. This pipe will be replaced with a new 18-inch diameter high-density polyethylene (HDPE) pipe. Approximately 700 lf of pipe will be replaced using an open-cut installation process, resulting in the excavation of a 5-foot-wide trench to a maximum depth of approximately 9.5 feet below surface grade. Excavation support and dewatering of the area will be required. The proposed work also includes the installation of a new valve and hydrant on the southwestern end of the Project Site.

3.2 Anticipated Construction Sequence

The section below provides the anticipated sequence of construction based on Tighe & Bond's experience with past similar projects. Certain aspects of the anticipated sequence may be altered by the contractor with approval from the Owner (i.e., Applicant), except as required by permit conditions and instructions contained within the project specifications.

- Install perimeter barriers and BMPs.
- Install the new 18-inch diameter HDPE pipe via excavated trenches. The existing 16-inch diameter main will be removed and properly disposed off-site.
- Install new valves and hydrant.
- Restore roadway and stabilize disturbed area.
- Remove erosion and sediment controls following stabilization.

3.3 Construction-Period BMPs

3.3.1 Erosion Control Barriers

Wetland resource areas at the site will be protected by straw wattles (or mulch logs) at the limits of work. The limits of work have been established to restrict the contractor only to the areas necessary to conduct the work. The locations of these barriers are shown in the Project Drawings provided in Appendix A of this NOI. In addition:

- The contractor will be required to maintain a reserve supply of straw wattles and silt fence on-site and to make repairs, as necessary.
- The barriers will be inspected regularly, and accumulated silt will be removed and disposed of legally.

- Protective measures will be inspected after significant precipitation events and repaired, as needed.
- Sediment and erosion control measures will be removed and properly disposed following site stabilization and Conservation Commission authorization.

3.3.2 Dewatering Sediment Trap

During excavation, the roadway will be dewatered as necessary. Sediment-laden water that collects in excavated areas will be pumped into a filter bag within a stilling basin surrounded by strawbales and lined with filter fabric. Discharge water will be pumped into the filter bag and allowed to drain through the fabric onto relatively-flat stabilized surfaces. Filter bags used during construction will be bundled and removed for proper disposal.

3.3.3 Soil Stockpiling

A temporary material stockpile location will be designated within previously developed and maintained areas adjacent to the existing WTP. The stockpile will be surrounded with silt fencing or staked straw bales and then stabilized with vegetation or covered, as necessary.

3.3.4 Turtle Protection Barrier

Turtle protection barriers will be installed at the limits of work to prevent the migration of individuals into the project area during construction in the event work is conducted during the active season (April 15 – October 15). Barriers will be installed in accordance with the requirements of the NHESP.

3.3.5 Post-Construction Restoration

Disturbed areas within the Project Site will be restored or otherwise stabilized to match pre-construction conditions. Restoration will consist of backfilling and compacting the trench within the unpaved access road, and loaming and seeding previously vegetated areas.

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SECTION 4

Section 4
Alternatives Analysis

4.1 Alternative Actions

4.1.1 No Action

The No Action alternative would consist of making no attempts to rehabilitate or replace the existing corroded water main. Not improving the condition of this transmission main could result in pipe failure, impacting water security of those serviced by the main. The Town of Ayer intends to address the poor condition of the pipe as it is critical to the water distribution infrastructure. For these reasons, a course of "No Action" is not feasible.

4.1.2 Transmission Main Rehabilitation

4.1.2.1 Cured-In-Place Pipe (CIPP) Lining

The CIPP Lining method of rehabilitation requires a prefabricated pipe liner delivered in refrigerated trucks to the Project Site. This pipe lining would then be installed within the existing pipe without the need for trenches. Access pits would need to be excavated, however, to complete the lining. This method is not a feasible alternative because high groundwater will cause water to enter the pipe through existing pinholes, making the lining curing process less effective. Groundwater cannot be lowered along the entire pipeline to provide a dry pipe for the CIPP process. Additionally, the cost of CIPP is greater than the other alternatives explored in this analysis.

4.1.2.2 Sprayed-In-Place Pipe (SIPP) Lining

The SIPP Lining method of rehabilitation requires no prefabricated liner but consists of the application of structural spray to the existing pipe. This method also does not require trenches but requires access pits for installation. This method is not a feasible alternative because the lining is only semi-structurally independent, meaning that it will lose its structural integrity if the old pipe corrodes further. Similar to CIPP, excess water in the pipe due to pinhole leaks would make curing the spray epoxy less effective.

4.1.3 Transmission Main Replacement

4.1.3.1 Horizontal Directional Drilling (HDD) Replacement

HDD pipe replacement is a trenchless installation method that may reduce surface restoration requirements post-construction. This method involves creating a borehole through which the new pipe would be pulled. A large area would be required for the HDD drill rig and pipe pullback string setup. Additionally, suitable subsurface conditions are required for successful drilling and installation. Due to the unknown nature of the underground conditions and potential for poor fill soils, this alternative was not chosen.

4.1.3.2 Open-Cut Excavation Replacement

Open-cut trenching is the preferred alternative for upgrading the existing transmission main. This method will result in the installation of a replacement water main that is corrosion resistant. This alternative includes crossing beneath the existing 48-inch diameter corrugated metal pipe culvert. The replacement pipe will have a minimum clearance of 18-inches from the culvert. The maximum depth of the water main will be approximately 9.5 feet below surface grade.

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SECTION 5

Section 5
Regulatory Compliance

The proposed activities will occur within areas subject to protection and jurisdiction under the MAWPA and Town of Ayer Wetlands Protection Bylaw (Article XXVII; Bylaw). These areas consist of Riverfront Area, as well as state and local buffer zones. This section summarizes the project's relationship to and compliance with pertinent local, state, and federal regulations.

5.1 Massachusetts Wetlands Protection Act

5.1.1 Exemptions

The proposed water main replacement qualifies as an exempt activity under the Act (and as set forth in the MAWPA regulations at 310 CMR 10.02(2)(a)) as activities conducted to maintain, repair, or replace, but not substantially change or enlarge and existing and lawfully located structure used in the service of the public and used to provide water.

The installation of underground utilities (e.g., water) within existing paved or unpaved roadways or driveways is further exempt as a Minor Activity in Buffer Zone per 310 CMR 10.02(2)(b)(i). This exemption is further afforded to these activities when in Riverfront Area per 310 CMR 10.58(6)(b).

The proposed activities qualify for consideration as a Limited Project per 310 CMR 10.53(3)(d):

> *"The **construction**, reconstruction, operation and maintenance of underground and overhead public utilities, such as electrical distribution or transmission lines, or communication, sewer, **water,** and natural gas lines, may be permitted, in accordance with the following general conditions and any additional conditions deemed necessary by the issuing authority:*
>
> *1. the issuing authority may require a reasonable alternative route with fewer adverse effects for a local distribution or connecting line not reviewed by the Energy Facilities Siting Council;*
>
> *2. best available measures shall be used to minimize adverse effects during construction;*
>
> *3. the surface vegetation and contours of the area shall be substantially restored; and*
>
> *4. all sewer lines shall be constructed to minimize inflow and leakage."*

Limited Project status need not be invoked as the proposed work is exempt from the provisions of the MAWPA.

5.1.2 Summary of MAWPA Jurisdictional Alterations

The proposed project will result in temporary alterations to the following wetland resource areas:

- Riverfront Area

Table 5-1 below outlines the total proposed alteration and replacement area by wetland resource.

TABLE 5-1
Summary of WPA Jurisdictional Alterations by Resource Area

Resource Area	Proposed Alteration	Proposed Replacement
Riverfront Area	2,310 sf 0-100 ft / 560 sf 100-200 ft	N/A

Approximately 6,560 sf of the project is proposed within the 100-foot Buffer Zone to Bank and BVW, portions of which overlap with the work in Riverfront Area. The shortest distance between the limit of work and Bank/BVW is approximately 2.5 feet for the culvert crossing. The following sections summarize the project's compliance with the General Performance Standards (provided in italics) established in the MAWPA regulations for each resource area.

5.1.2.1 Riverfront Area

There is approximately 19,500,000 sf of Riverfront Area within the limits of the Project Locus. Approximately 61,200 sf of this Riverfront Area is degraded due to paved roads, the unpaved gravel access road, and WTP buildings. Proposed activities in Riverfront Area consist of the installation of the replacement transmission main and temporary soil stockpiling, resulting in approximately 2,310 sf of work in the first 100 feet of Riverfront Area, and 560 sf in the second 100 feet for a total of 2,870 sf. All work will occur within previously developed Riverfront Area. The Performance Standards for Redevelopment Within Previously Developed Riverfront Areas are set forth at 310 CMR 10.58(5). Although the work is exempt from the provisions of the MAWPA, below is a summary of how the proposed project meets the performance standards established for degraded Riverfront Area.

(5) Notwithstanding the provisions of 310 CMR 10.58(4)(c) and (d), the issuing authority may allow work to redevelop a previously developed riverfront area, provided the proposed work improves existing conditions. Redevelopment means replacement, rehabilitation or expansion of existing structures, improvement of existing roads, or reuse of degraded or previously developed areas. A previously developed riverfront area contains areas degraded prior to August 7, 1996, by impervious surfaces from existing structures or pavement, absence of topsoil, junkyards, or abandoned dumping grounds. Work to redevelop previously developed riverfront areas shall conform to the following criteria:

(a) At a minimum, proposed work shall result in an improvement over existing conditions of the capacity of the riverfront area to protect the interests identified in M.G.L. c. 131 § 40. When a lot is previously developed but no portion of the riverfront area is degraded, the requirements of 310 CMR 10.58(4) shall be met.

The proposed work is limited to the footprint of previously developed and degraded Riverfront Area and will not increase the amount of degraded Riverfront Area within the Project Locus.

(b) Stormwater management is provided according to standards established by the Department.

No new impervious surfaces or point source discharges will result from the proposed activities. Per the recommended final decision issued on July 29, 2016 in the Matter of Berkshire Community College Docket #WET-2015-023 from the MassDEP Office of Appeals and Dispute Resolution, it was ruled that 310 CMR 10.05(6)(k) through (q) does not apply to a project that does not propose a "point source" of "stormwater discharge" within resource areas or their Buffer Zones. Construction-period BMPs will be implemented to address potential erosion and sedimentation issues until the site has been restored and stabilized.

(c) Within 200-foot riverfront areas, proposed work shall not be located closer to the river than existing conditions or 100 feet, whichever is less, or not closer than existing conditions within 25-foot riverfront areas, except in accordance with 310 CMR 10.58(5)(f) or (g).

The proposed work will occur only within the footprint of previously degraded Riverfront Area and will not occur closer to the rivers than current conditions.

(d) Proposed work, including expansion of existing structures, shall be located outside the riverfront area or toward the riverfront area boundary and away from the river, except in accordance with 310 CMR 10.58(5)(f) or (g).

Due to the location of the existing water transmission main, the proposed work cannot be completed outside of the Riverfront Area.

(e) The area of proposed work shall not exceed the amount of degraded area, provided that the proposed work may alter up to 10% if the degraded area is less than 10% of the riverfront area, except in accordance with 310 CMR 10.58(5)(f) or (g).

The proposed work will not exceed the area of degraded Riverfront Area. Additionally, the proposed work will alter less than 1% of the total Riverfront Area within the Project Locus.

(f) When an applicant proposes restoration on-site of degraded riverfront area, alteration may be allowed notwithstanding the criteria of 310 CMR 10.58(5)(c), (d), and (e) at a ratio in square feet of at least 1:1 of restored area to area of alteration not conforming to the criteria. Areas immediately along the river shall be selected for restoration. Alteration not conforming to the criteria shall begin at the riverfront area boundary. Restoration shall include: 1. removal of all debris but retaining any trees or other mature vegetation; 2. grading to a topography which reduces runoff and increases infiltration; 3. coverage by topsoil at a depth consistent with natural conditions at the site; and 4. seeding and planting with an erosion control seed mixture, followed by plantings of herbaceous and woody species appropriate to the site;

The proposed work is limited to the footprint of previously developed and degraded Riverfront Area and will not increase the amount of degraded Riverfront Area within the Project Locus.

(g) When an applicant proposes mitigation either on-site or in the riverfront area within the same general area of the river basin, alteration may be allowed notwithstanding the criteria of 310 CMR 10.58(5)(c), (d), or (e) at a ratio in square feet of at least 2:1 of mitigation area to area of alteration not conforming to the criteria or an equivalent level of environmental protection where square footage is not a relevant measure. Alteration not conforming to the criteria shall begin at the riverfront area boundary. Mitigation may include off-site restoration of riverfront areas, conservation restrictions under M.G.L. c. 184, §§ 31 through 33 to preserve undisturbed riverfront areas that could be otherwise altered under 310 CMR 10.00, the purchase of development rights within the riverfront area, the restoration of bordering vegetated wetland, projects to remedy an existing adverse impact on the interests identified in M.G.L. c. 131, § 40 for which the applicant is not legally responsible, or similar activities undertaken voluntarily by the applicant which will support a determination by the issuing authority of no significant adverse impact. Preference shall be given to potential mitigation projects, if any, identified in a River Basin Plan approved by the Secretary of the Executive Office of Energy and Environmental Affairs.

The proposed work is limited to the footprint of previously developed and degraded Riverfront Area and will not increase the amount of degraded Riverfront Area within the Project Locus.

(h) The issuing authority shall include a continuing condition in the Certificate of Compliance for projects under 310 CMR 10.58(5)(f) or (g) prohibiting further alteration within the restoration or mitigation area, except as may be required to maintain the area in its restored or mitigated condition. Prior to requesting the issuance of the Certificate of Compliance, the applicant shall demonstrate the restoration or mitigation has been successfully completed for at least two growing seasons.

Not applicable. Mitigation not proposed.

5.1.3 Abutter Notification

Abutters were notified in accordance with the MAWPA. Copies of the list of abutters and the abutter notification form are provided in Appendix C.

5.2 Ayer Wetlands Protection Bylaw

The proposed activities are also subject to the Town of Ayer Wetlands Protection Bylaw per Section 2A as it recognizes the protections under the MAWPA. Abutters within 100 feet of the Project Locus were notified in accordance with the Bylaw. An affidavit of service is provided in Appendix C.

5.3 Other Pertinent Regulatory Programs

In addition to the MAWPA and Ayer's Wetland Protection Bylaw, the project is subject to jurisdiction and review under the following.

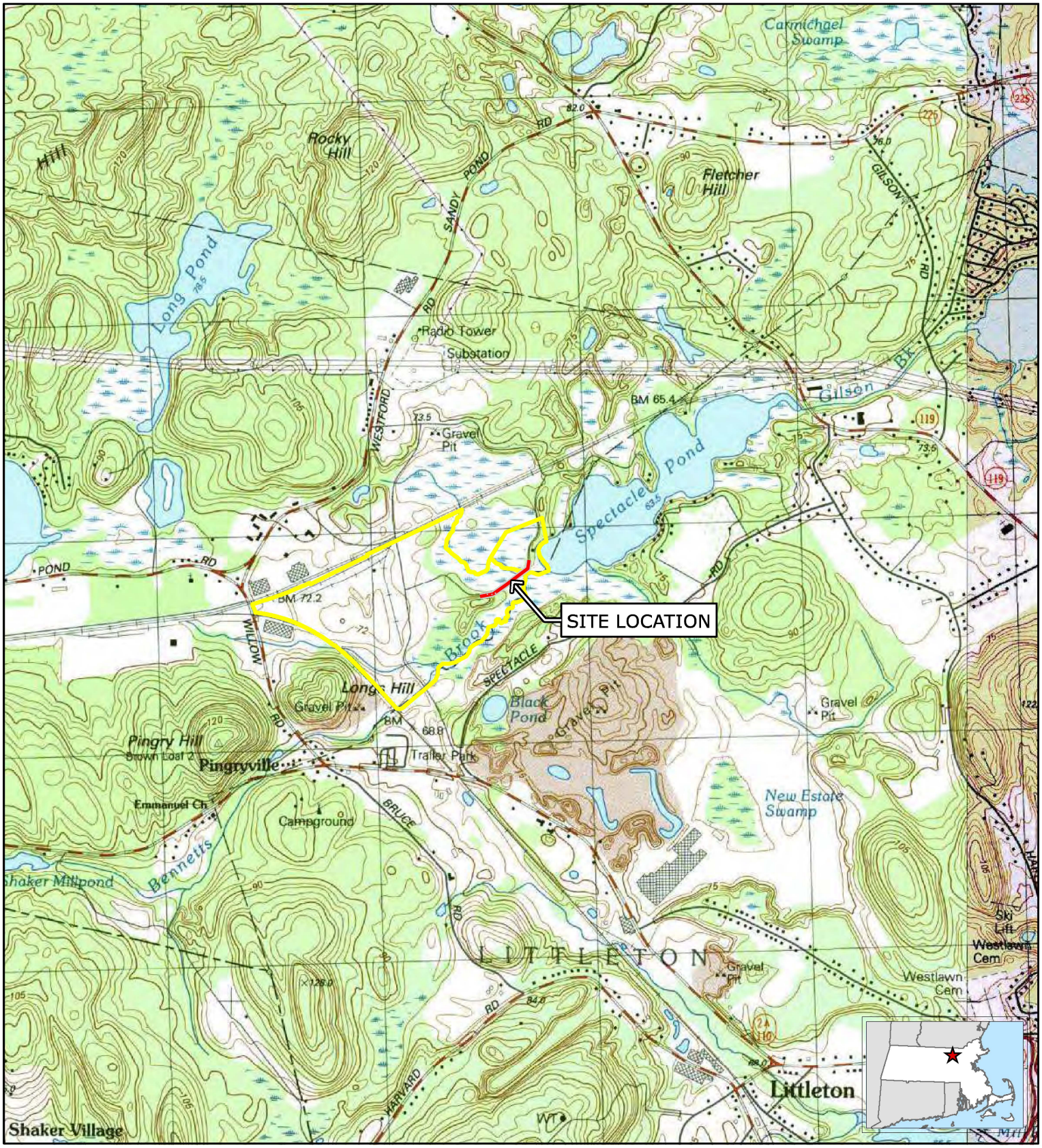
5.3.1 State Permits

5.3.1.1 Massachusetts Endangered Species Act – Project Review

As noted in Section 2.4, the Project Locus is within mapped Priority and Estimated Habitats. As such, this NOI is being submitted for NHESP review under both the MAWPA and the Massachusetts Endangered Species Act (MESA). The Town will comply with the requirements set forth by NHESP to avoid impacts to rare species. If necessary, a turtle protection plan will be implemented for all work performed between April 15 and October 15. This plan will be submitted to Massachusetts Division of Fisheries & Wildlife prior to the start of work.

Tighe&Bond

APPENDIX A



Legend

- Proposed Water Transmission Main
- Subject Parcels

Tighe&Bond

Based on USGS Topographic Map for Ayer, MA Revised 1988. Contour Interval Equals 3-Meters.

1:24,000

0 1,000 2,000

Feet

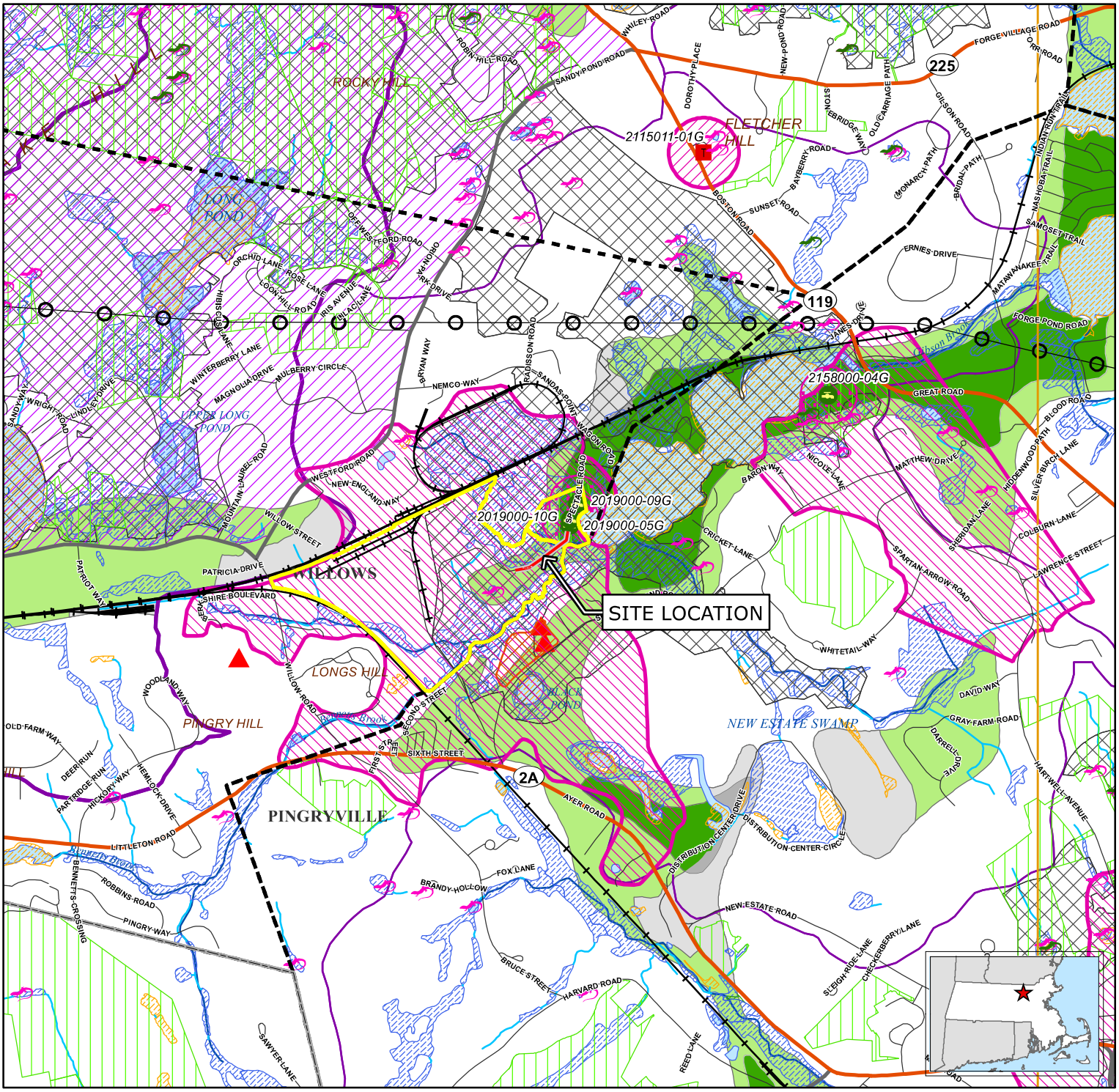
FIGURE 1
SITE LOCATION

Spectacle Pond WTP
Transmission Main Upgrade
4 Willow Road and 0 Nemco Way
Ayer, Massachusetts

June 2022

V:\Projects\A\A5004\MXD\SpectaclePondWTP_Transmission\SpectaclePondWTP_TransmissionMA_Topo.mxd [Exported By: kjw, 6/20/2022, 9:58:41 AM]

A-5004



Legend

- NHESP Certified Vernal Pools
- NHESP Potential Vernal Pools
- Non-Landfill Solid Waste Sites
- Proposed Well
- Emergency Surface Water
- Community Public Water Supply - Surface Water
- Community Public Water Supply - Groundwater
- Non-Community Non-Transient Public Water Supply
- Non-Community Transient Public Water Supply
- Limited Access Highway
- Multi-Lane Highway, NOT Limited Access
- Other Numbered Route
- Major Road - Arterials and Collectors
- Minor Street or Road
- Aqueducts
- Hydrologic Connections
- Stream/Intermittent Stream
- Powerline
- Pipeline
- Track or Trail
- Trains
- Public Surface Water Supply Protection Area (Zone A)
- DEP Approved Wellhead Protection Area (Zone I)
- DEP Approved Wellhead Protection Area (Zone II)
- DEP Interim Wellhead Protection Area (IWPA)
- Protected and Recreational Open Space
- Solid Waste Landfill
- Area of Critical Environmental Concern (ACEC)
- NHESP Priority Habitats for Rare Species
- NHESP Estimated Habitats for Rare Wildlife
- EPA Designated Sole Source Aquifer
- Major Drainage Basin
- Sub Drainage Basin
- MassDEP Open Water
- MassDEP Inland Wetlands
- MassDEP Coastal Wetlands
- MassDEP Not Interpreted Wetlands
- Public Surface Water Supply (PSWS)
- Water Bodies
- Non-Potential Drinking Water Source Area - High Yield
- Non-Potential Drinking Water Source Area - Medium Yield
- Potentially Productive Medium Yield Aquifer
- Potentially Productive High Yield Aquifer
- County Boundary
- Municipal Boundary
- USGS Quadrangle Sheet Boundary
- Proposed Water Transmission Main
- Subject Parcels

1:24,000

0 1,000 2,000

Feet

N

FIGURE 2
PRIORITY RESOURCES

Spectacle Pond WTP
Transmission Main Upgrade
4 Willow Road and 0 Nemco Way
Ayer, Massachusetts

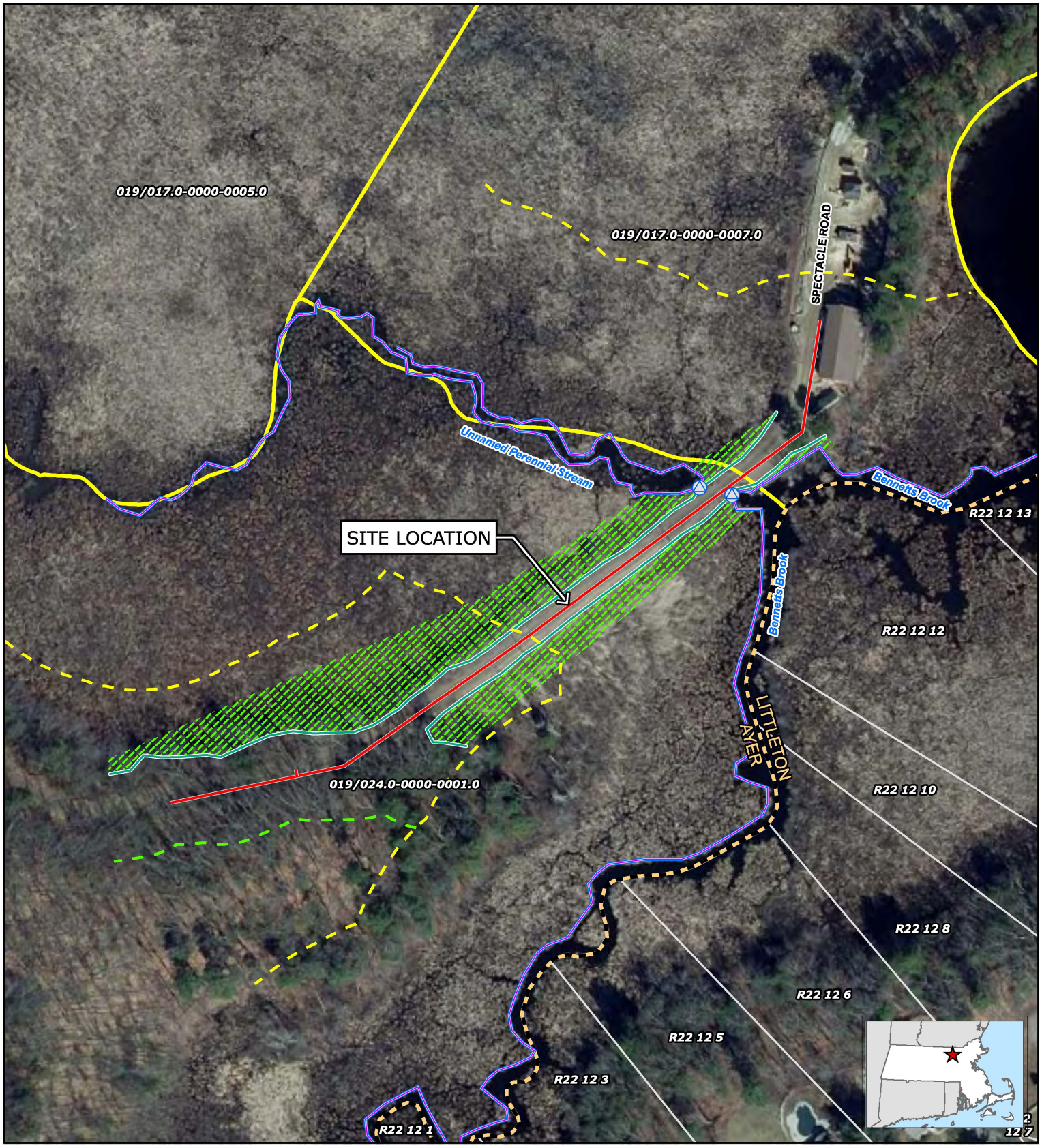
Data source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology
Data valid as of June 2022.

June 2022

Tighe&Bond

V:\Projects\A\A5004\MXD\SpectaclePondWTP_Transmission\SpectaclePondWTP_TransmissionMA_Resource.mxd [Exported By: kjw, 6/20/2022, 9:58:35 AM]

A-5004



Legend

- Culvert
- Proposed Water Transmission Main
- Mean High Water (Approx.)
- Wetland Boundary
- 100-foot Buffer Zone
- 200-foot Riverfront Area
- Wetland Area
- Parcel Boundary
- Subject Parcels
- Municipal Boundary

1:1,800

0 75 150

Feet

N

Tighe&Bond

Based on MassGIS Color Orthophotography (2021). Ayer (FY2022) and Littleton (FY2021) parcels downloaded from MassGIS and are approximate.

FIGURE 3
SITE PLAN

Spectacle Pond WTP
Transmission Main Upgrade
4 Willow Road and 0 Nemco Way
Ayer, Massachusetts

July 2022

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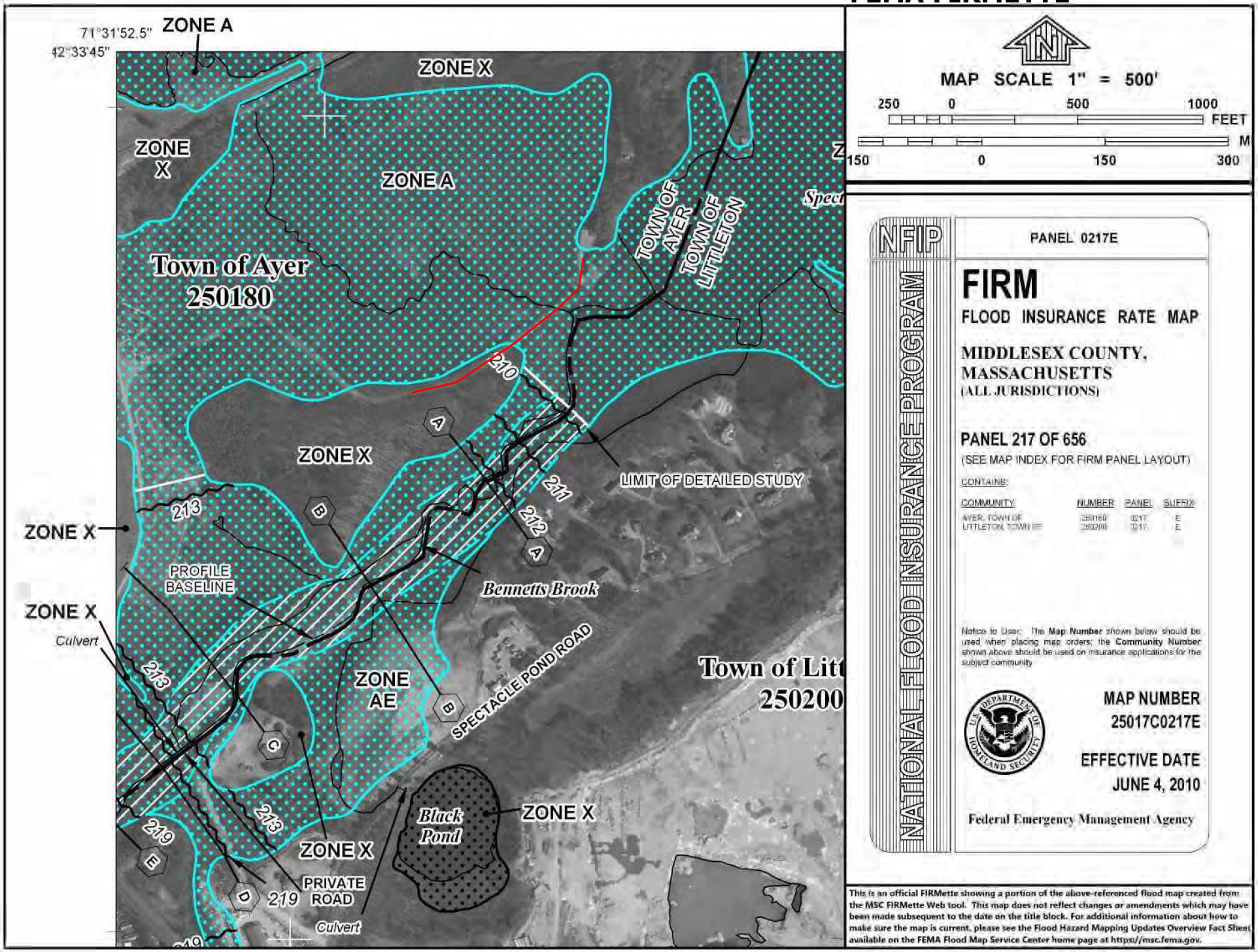
A-5004

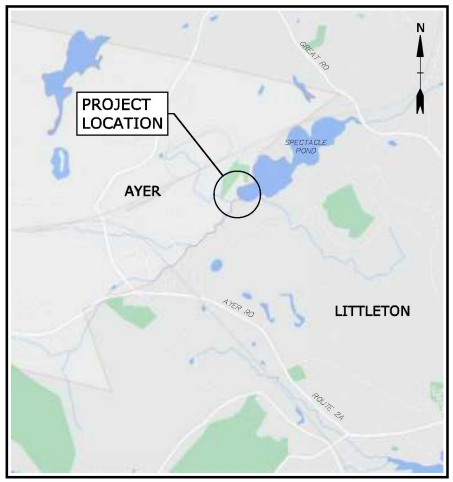
FIGURE 4
FEMA FIRMETTE



TOWN OF AYER, MA
SPECTACLE POND
TRANSMISSION MAIN REPLACEMENT
DPW PROJECT NO: 23DPW02

JULY 2022

LIST OF DRAWINGS		
SHEET NO.	DRAWING NO.	DRAWING TITLE
1	G-001	COVER SHEET AND INDEX
2	G-002	LEGENDS AND ABBREVIATIONS
3	G-003	GENERAL NOTES
4	C-101	EXISTING CONDITIONS PLAN
5	C-102	TRANSMISSION MAIN PLAN - STA. 0+00 - 7+45
6	C-501	WATER DETAILS 1
7	C-502	WATER DETAILS 2
8	C-503	EROSION AND SEDIMENTATION CONTROL DETAILS



LOCATION MAP
SCALE: 1" = 2000'

PREPARED BY:
Tighe&Bond

CHARLES GORE CIVIL No. 38598
07/27/2022

PREPARED FOR:
Town of AYER Public Works

DAN VAN SCHALKWYK, P.E., DIRECTOR
KIMBERLY ABRAHAM, WATER AND SEWER SUPERINTENDENT

PERMIT SUBMITTAL
NOT FOR CONSTRUCTION

COMPLETE SET 8 SHEETS

Last Saved: 7/27/2022
Plotted: Jul 27, 2022 - 11:38am By: MCurran
Tighe & Bond: J:\AV\A5004 Ayer\013 Spectacle Pond Transmission Main\Drawings_Figures\AutoCAD\Sheet\A5004-016-G-001.dwg

LEGEND

DESCRIPTION	EXISTING	PROPOSED
PROPERTY LINE		
RIGHT-OF-WAY LINE		
EASEMENT LINE		
LIMITS OF WORK		
INTERMEDIATE CONTOURS		
INDEX CONTOURS	25	25
SPOT GRADE	X 141.2	+ 32.0
MAGNITUDE & DIRECTION OF SLOPE		0.0%
STORM DRAIN	SD	SD
STORM UNDERDRAIN		UD
GRAVITY SANITARY SEWER	SS	SS
SANITARY SEWER FORCE MAIN	SFM	SFM
SANITARY SEWER LOW PRESSURE	SSLP	SSLP
SANITARY SEWER COMBINED	COMB	COMB
WATER SERVICE	W	W
POTABLE WATER	PW	PW
FIRE SERVICE		F
HIGH PRESSURE FIRE SERVICE		F-HP
UNDERGROUND ELECTRIC	E	E
PRIMARY ELECTRIC SERVICE	PE	PE
SECONDARY ELECTRIC	SE	SE
OVERHEAD ELECTRIC	OE	OE
TELEPHONE SERVICE	T	T
TEL-DATA SERVICE	T-D	T-D
COMMUNICATIONS SERVICE	T-C	T-C
CABLE TV SERVICE	CTV	CTV
GAS SERVICE	G	G
CHILLED WATER RETURN	CWR	CWR
CHILLED WATER SUPPLY	CWS	CWS
HOT WATER RETURN	HWR	HWR
HOT WATER SUPPLY	HWS	HWS
STEAM CONDENSATE	C	C
LOW PRESSURE STEAM	LPS	LPS
MEDIUM PRESSURE STEAM	MPS	MPS
HIGH PRESSURE STEAM	HPS	HPS
OXYGEN SERVICE		O
OVERHEAD UTILITY (UNSPECIFIED)	OHW	OHW
CURB		
EDGE OF PAVEMENT		
DIRT ROAD		
SIDEWALK		
RETAINING WALL		
STONE WALL		
FENCE - UNSPECIFIED	X X X	X X X
FENCE - CHAIN LINK		
FENCE - WOOD POST		
GUARDRAIL		
METAL BEAM RAIL		
TRAIN TRACKS		
STORM DRAIN STRUCTURES	MANHOLE, CATCH BASIN, CB	MANHOLE, AREA DRAIN, CATCH BASIN
SANITARY SEWER MANHOLE	S	S
WATER SERVICE STRUCTURES	HYDRANT, MANHOLE W, VALVE	HYDRANT, MANHOLE, W, VALVE
GAS SERVICE STRUCTURES	MANHOLE G, VALVE, GG	MANHOLE G, VALVE
ELECTRIC SERVICE STRUCTURES	UTILITY CO. POLE #, MANHOLE E, LIGHT	UTILITY CO. POLE #, MANHOLE E, LIGHT
TELECOMMUNICATIONS MANHOLE	T	T
TREELINE		
TREE	EVERGREEN, DECIDUOUS	EVERGREEN, DECIDUOUS

ABBREVIATIONS

ABDN('D)	ABANDON(ED)
AC	ASBESTOS CEMENT PIPE
BC	BITUMINOUS CURB
BFP	BACK FLOW PREVENTOR
BIT	BITUMINOUS
BL	BASELINE
BLDG	BUILDING
BM	BENCHMARK (TEMPORARY)
BND	BOUND
BOC	BOTTOM OF CURB
BOT	BOTTOM
BS	BOTTOM OF STEP
BW	BOTTOM OF WALL
BWW	BACKWASH WASTE
CATV	CABLE TELEVISION
CB	CATCH BASIN
CEM	CEMENT
CI	CAST IRON PIPE
CL	CENTERLINE
CLF	CHAIN LINK FENCE
CMP	CORRUGATED METAL PIPE
CO	CLEAN OUT
CONC	CONCRETE
CPP	CORRUGATED POLYETHYLENE PIPE
CY	CUBIC YARD
DH	DRILL HOLE
DI	DUCTILE IRON PIPE
DIA	DIAMETER
DMH	DRAIN MANHOLE
E	EAST
EF	EACH FACE
EG	EXISTING GRADE
EL/ELEV	ELEVATION
ELEC	ELECTRIC
EMH	ELECTRIC MANHOLE
EOP	EDGE OF PAVEMENT
EW	EACH WAY
EXIST	EXISTING
FES	FLARED END SECTION
FF	FINISH FLOOR
FM	FORCE MAIN
G	GAS
GFW	GREENSAND FILTERED WATER
GG	GAS GATE
GRAN	GRANITE
HC	HANDICAP
HDPE	HIGH DENSITY POLYETHYLENE
HMA	HOT MIX ASPHALT
HYD	HYDRANT
IN	INCHES
INV	INVERT
IP	IRON PIN
L	LENGTH OF CURB
LP	LIGHT POLE
LT	LEFT
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MON	MONUMENT
MJ	MECHANICAL JOINT
N	NORTH
NITC	NOT IN THIS CONTRACT
NTS	NOT TO SCALE
N/A	NOT APPLICABLE
N/F	NOW OR FORMERLY
OC	ON CENTER
OCS	OUTLET CONTROL STRUCTURE
OH	OVERHEAD
PB	PLANT BED
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PCPP	PERFORATED CORRUGATED POLYETHYLENE PIPE
PERF	PERFORATED
PI	POINT OF INTERSECTION
PRC	POINT OF REVERSE CURVATURE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POINT OF TANGENCY
PVC	POLYVINYLCHLORIDE
PVMT	PAVEMENT
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
REV	REVISION
ROW	RIGHT OF WAY
RT	RIGHT
R&D	REMOVE AND DISPOSE
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
S	SOUTH
SAN	SANITARY
SCH	SCHEDULE
SF	SQUARE FOOT
SMH	SEWER MANHOLE
SS	STAINLESS STEEL
STA	STATION
STL	STEEL
STRM	STORM
T	TANGENT LENGTH
TC	TOP OF CURB
TEL	TEL-DATA
TP	TEST PIT
TS	TOP OF STEP
TW	TREATED WATER
TW	TOP OF WALL
TYP	TYPICAL
UP	UTILITY POLE
W	WATER
WF	WETLANDS FLAG
WG	WATER GATE
WS	WATER SAMPLE LINE
WV	WATER VALVE
XFMR	TRANSFORMER

LEGEND

RESOURCE AREAS	
BORDERING VEGETATED WETLAND	
TOP OF BANK	
MEAN ANNUAL HIGH WATER	
LAND SUBJECT TO FLOODING	
100-FOOT BUFFER ZONE	
200-FOOT RIVERFRONT AREA	
WETLAND FLAG	WF--

LEGEND

DEMOLITION / GEOTECHNICAL	
EROSION & SEDIMENT CONTROL	
UTILITY TO BE ABANDONED	
UTILITY TO BE DEMOLISHED	
ITEM TO BE DEMOLISHED	
TEST PIT	
MONITORING WELL	
SOIL SAMPLE	
BORING	

Tighe&Bond

CHARLES GORE CIVIL No. 38596 REGISTERED PROFESSIONAL ENGINEER
07/27/2022

PERMIT SUBMITTAL

NOT FOR CONSTRUCTION

Spectacle Pond Transmission Main Replacement

Town of AYER Public Works

Ayer, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	A5004-013
DATE:	JULY 2022
FILE:	A5004-016-G-002-003.dwg
DRAWN BY:	MJC
DESIGNED/CHECKED BY:	ERC
APPROVED BY:	---

GENERAL NOTES

SCALE: NO SCALE

G-002
SHEET OF --

BASE PLAN NOTES

1. THE EXISTING CONDITIONS INFORMATION SHOWN ON THE DRAWINGS IS BASED ON THE FOLLOWING:
   - SURVEY DRAWINGS PROVIDED BY GOLDSMITH, PREST & RINGWALL, INC. 39 MAIN STREET, SUITE 301, AYER, MA 01432 AND DATED MAY 2022.
   - THE WETLAND RESOURCE AREA BOUNDARIES DEPICTED ON THE DRAWINGS WERE DELINEATED BY TIGHE & BOND, INC. ON APRIL 29, 2022.
   - LIMITS OF BORDERING LAND SUBJECT TO FLOODING (BLSF), THE 100-YEAR FLOOD ZONE, ARE BASED ON THE FEMA FLOOD INSURANCE RATE MAP (FIRM) COMMUNITY PANEL NUMBER 25017C0217E, EFFECTIVE JUNE 4, 2010.
2. UTILITY LOCATIONS SHOWN WERE PLOTTED FROM FIELD SURVEYS AND AS BUILT DRAWINGS. THE ACCURACY AND COMPLETENESS OF SUBSURFACE INFORMATION SHOWN ON THESE DRAWINGS IS NOT GUARANTEED. DETERMINE THE LOCATIONS AND ELEVATIONS OF ALL UTILITIES WHICH MAY AFFECT CONSTRUCTION OPERATIONS.
3. THE DRAWINGS ARE BASED ON THE FOLLOWING DATUMS: HORIZONTAL - NAD83; VERTICAL - NAVD88
4. THE EXISTING CONDITIONS SHOWN ARE APPROXIMATE. FIELD VERIFY EXISTING CONDITIONS.
5. THE PROPERTY LINES SHOWN ON THE DRAWINGS ARE APPROXIMATE AND ARE NOT BASED ON DEED OR PLAN RESEARCH.

GENERAL NOTES

1. NOTIFY DIGSAFE AT 1-888-344-7233 AND OTHER UTILITY OWNERS IN THE AREA NOT ON THE DIGSAFE LIST AT LEAST 72 HOURS PRIOR TO ANY DIGGING, TRENCHING, ROCK REMOVAL, DEMOLITION, BORING, BACKFILLING, GRADING, LANDSCAPING, OR ANY OTHER EARTH MOVING OPERATIONS. OBTAIN TRENCH PERMIT FROM OWNER.
2. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. IN ADDITION, SOME UTILITIES MAY NOT BE SHOWN. DETERMINE THE EXACT LOCATION OF UTILITIES BY TEST PIT OR OTHER METHODS, AS NECESSARY TO PREVENT DAMAGE TO UTILITIES AND/OR INTERRUPTIONS IN UTILITY SERVICE. PERFORM TEST PIT EXCAVATIONS AND OTHER INVESTIGATIONS TO LOCATE UTILITIES, AND PROVIDE THIS INFORMATION TO THE ENGINEER, PRIOR TO CONSTRUCTING THE PROPOSED IMPROVEMENTS. LOCATE ALL EXISTING UTILITIES TO BE CROSSED BY HAND EXCAVATION.
3. NOT ALL OF THE UTILITY SERVICES TO BUILDINGS ARE SHOWN. THE CONTRACTOR SHALL ANTICIPATE THAT EACH PROPERTY HAS SERVICE CONNECTIONS FOR THE VARIOUS UTILITIES.
4. BOLD TEXT AND LINES INDICATE PROPOSED WORK. LIGHT TEXT AND LINES INDICATE APPROXIMATE EXISTING CONDITIONS.
5. TIGHE & BOND ASSUMES NO RESPONSIBILITY FOR ANY ISSUES, LEGAL OR OTHERWISE, RESULTING FROM CHANGES MADE TO THESE DRAWINGS WITHOUT WRITTEN AUTHORIZATION FROM TIGHE & BOND.
6. EXCAVATE ADDITIONAL TEST PITS TO LOCATE EXISTING UTILITIES AS DIRECTED OR APPROVED BY THE ENGINEER.
7. NOTIFY THE ENGINEER OF ANY UTILITIES IDENTIFIED DURING CONSTRUCTION THAT ARE NOT SHOWN ON THE DRAWINGS OR THAT DIFFER IN SIZE OR MATERIAL.
8. THE CONTRACTOR IS RESPONSIBLE FOR SITE SAFETY; COORDINATION WITH THE OWNER, ALL SUBCONTRACTORS, AND WITH OTHER CONTRACTORS WORKING WITHIN THE LIMITS OF WORK, THE MEANS AND METHODS OF CONSTRUCTING THE PROPOSED WORK.
9. OBTAIN, PAY FOR AND COMPLY WITH PERMITS, NOTICES AND FEES NECESSARY TO COMPLETE THE WORK. ARRANGE AND PAY FOR NECESSARY INSPECTIONS AND APPROVALS FROM THE JURISDICTIONAL AUTHORITIES.
10. SHORE UTILITY TRENCHES WHERE FIELD CONDITIONS DICTATE AND/OR WHERE REQUIRED BY LOCAL, STATE AND FEDERAL HEALTH AND SAFETY CODES.
11. FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO CONSTRUCTION. IF FIELD CONDITIONS ARE OBSERVED THAT VARY SIGNIFICANTLY FROM THOSE SHOWN ON THE DRAWINGS, IMMEDIATELY NOTIFY THE ENGINEER IN WRITING FOR RESOLUTION OF THE CONFLICTING INFORMATION.
12. PROTECT AND MAINTAIN ALL UTILITIES IN THE AREAS UNDER CONSTRUCTION DURING THE WORK. LEAVE ALL PIPES AND STRUCTURES WITHIN THE LIMITS OF THE CONTRACT IN A CLEAN AND OPERABLE CONDITION AT THE COMPLETION OF THE WORK. TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SAND AND SILT FROM DISTURBED AREAS FROM ENTERING THE DRAINAGE SYSTEM.
13. NOTIFY THE ENGINEER IN WRITING OF ANY CONFLICT, ERROR, AMBIGUITY, OR DISCREPANCY WITH THE PLANS OR BETWEEN THE PLANS AND ANY APPLICABLE LAW, REGULATION, CODE, STANDARD SPECIFICATION, OR MANUFACTURER'S INSTRUCTIONS.
14. THE CONTRACTOR IS RESPONSIBLE FOR SUPPORT OF EXISTING UTILITIES AND REPAIR OR REPLACEMENT COSTS OF UTILITIES DAMAGED DURING CONSTRUCTION, WHETHER ABOVE OR BELOW GRADE. REPLACE DAMAGED UTILITIES IMMEDIATELY AT NO ADDITIONAL COST TO THE OWNER AND AT NO COST TO THE PROPERTY OWNER.
15. TAKE NECESSARY MEASURES AND PROVIDE CONTINUOUS BARRIERS OF SUFFICIENT TYPE, SIZE, AND STRENGTH TO PREVENT ACCESS TO ALL WORK AND STAGING AREAS AT THE COMPLETION OF EACH DAYS WORK.
16. NO OPEN TRENCHES WILL BE ALLOWED OVER NIGHT. THE USE OF ROAD PLATES TO PROTECT THE EXCAVATION WILL BE CONSIDERED UPON REQUEST, BUT BACKFILLING IS PREFERRED.
17. THE CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY TRAFFIC CONTROL/SAFETY DEVICES TO ENSURE SAFE VEHICULAR AND PEDESTRIAN ACCESS THROUGH THE WORK AREA, OR FOR SAFELY IMPLEMENTING DETOURS AROUND THE WORK AREA. PERFORM TRAFFIC CONTROL IN ACCORDANCE WITH THE CONTRACTOR'S APPROVED TRAFFIC CONTROL PLAN.
18. MAINTAIN EMERGENCY ACCESS TO ALL PROPERTIES WITHIN THE PROJECT AREA AT ALL TIMES DURING CONSTRUCTION.
19. WHEN WORKING IN THE ROAD, PROVIDE THE OWNER AND LOCAL FIRE/POLICE/SCHOOL AUTHORITIES A DETAILED PLAN OF APPROACH INDICATING METHODS OF PROPOSED TRAFFIC ROUTING ON A DAILY BASIS. PROVIDE COORDINATION TO ENSURE COMMUNICATION AND COORDINATION BETWEEN THE OWNER, CONTRACTOR AND LOCAL FIRE/POLICE/SCHOOL AUTHORITIES THROUGHOUT THE CONSTRUCTION PERIOD.
20. REMOVE AND DISPOSE OF ALL CONSTRUCTION-RELATED WASTE MATERIALS AND DEBRIS IN STRICT ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL LAWS.
21. THE TERM "DEMOLISH" USED ON THE DRAWINGS MEANS TO REMOVE AND DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REQUIREMENTS.
22. THE TERM "ABANDON" USED ON THE DRAWINGS MEANS TO LEAVE IN PLACE AND TAKE APPROPRIATE MEASURES TO DECOMMISSION AS SPECIFIED OR NOTED ON THE DRAWINGS.
23. ALL PROPOSED WORK MAY BE ADJUSTED IN THE FIELD BY THE OWNER'S PROJECT REPRESENTATIVE TO MEET EXISTING CONDITIONS.

EROSION CONTROL AND RESOURCE AREA PROTECTION NOTES

1. PROVIDE ALL EROSION CONTROL MEASURES SHOWN, SPECIFIED, REQUIRED BY PERMIT, AND/OR REQUIRED BY THE ENGINEER PRIOR TO ANY CONSTRUCTION OR IMMEDIATELY UPON REQUEST. MAINTAIN SUCH CONTROL MEASURES UNTIL FINAL SURFACE TREATMENTS ARE IN PLACE AND/OR UNTIL PERMANENT VEGETATION IS ESTABLISHED. INSPECT AFTER EACH RAINSTORM AND DURING MAJOR STORM EVENTS TO CONFIRM THAT ALL SEDIMENTATION AND EROSION CONTROL MEASURES REQUIRED ARE IN PLACE AND EFFECTIVE.
2. PRIOR TO STARTING WORK, CLEARLY STAKE WORK LIMITS. DO NOT DISTURB VEGETATION AND TOPSOIL BEYOND THE PROPOSED LIMITS. COORDINATE WITH THE ENGINEER FOR LOCATIONS OF TEMPORARY STOCKPILING OF TOPSOIL DURING CONSTRUCTION.
3. INSTALL SILT SACKS OR OTHER APPROVED SEDIMENTATION BARRIERS IN/AT ALL CATCH BASINS IN THE PROJECT AREA.
4. COMPACT, STABILIZE, AND LOAM AND SEED SIDE SLOPES, SHOULDER AREAS AND DISTURBED VEGETATED AREAS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND AS REQUIRED BY PERMITS. GRADE SIDE SLOPES, SHOULDER AREAS AND DISTURBED VEGETATED AREAS TO A MAXIMUM SLOPE OF 3 HORIZONTAL TO 1 VERTICAL (3H:1V), WHERE POSSIBLE. PROVIDE BIODEGRADABLE EROSION CONTROL BLANKETS TO PREVENT EROSION WHERE SLOPES ARE STEEPER THAN 3H:1V.
5. SETTLE OR FILTER ALL SILT-LADEN WATER FROM DEWATERING ACTIVITIES IN A SEDIMENTATION OR FILTER BAG TO REMOVE SEDIMENTS PRIOR TO RELEASE USING A SEDIMENTATION OR FILTER BAG LOCATED DOWN-GRADIENT OF THE DEWATERED AREA.
6. REMOVE AND PROPERLY DISPOSE OF SILT TRAPPED AT BARRIERS IN UPLAND AREAS OUTSIDE BUFFER ZONES. REMOVE MATERIALS DEPOSITED IN ANY TEMPORARY SETTLING BASINS AT THE COMPLETION OF THE PROJECT. RESTORE ALL DISTURBED AREAS TO THEIR PRECONSTRUCTION CONDITION.
7. SWEEP, COLLECT, REMOVE AND DISPOSE OF ANY SEDIMENT TRACKED ONTO PUBLIC RIGHT-OF-WAYS AT THE END OF EACH DAY.
8. LOAM AND SEED ALL DISTURBED VEGETATED AREAS TO ESTABLISH COVER AND STABILIZATION AS SOON AS POSSIBLE FOLLOWING DISTURBANCE.
9. MAINTAIN AN ADDITIONAL SUPPLY OF EROSION CONTROL MEASURES ON-SITE FOR EMERGENCY REPAIRS.
10. STORE FUEL, OIL, PAINT, OR OTHER HAZARDOUS MATERIALS IN A SECONDARY CONTAINER AND REMOVE TO A SECURE LOCKED AND COVERED AREA DURING NON-WORK HOURS.
11. PROVIDE A SUPPLY OF ABSORBENT SPILL RESPONSE MATERIALS SUCH AS BOOMS, BLANKETS, AND OIL ABSORBENT MATERIALS AT THE CONSTRUCTION SITE AT ALL TIMES TO CLEAN UP POTENTIAL SPILLS OF HAZARDOUS MATERIALS. IMMEDIATELY REPORT SPILLS OF HAZARDOUS MATERIALS TO THE STATE ENVIRONMENTAL AGENCY AND THE MUNICIPALITY WHERE THE WORK IS OCCURRING.

SURFACE RESTORATION NOTES

1. ALL PAVEMENT DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPLACED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
2. PROVIDE SITE GRADING AT HANDICAPPED RAMPS, SIDEWALKS, AND BUILDING ENTRANCES THAT IS CONSISTENT WITH THE RELEVANT ACCESS REQUIREMENTS OF THE ARCHITECTURAL BARRIERS ACT (ABA), THE AMERICANS WITH DISABILITIES ACT (ADA), AND MA ARCHITECTURAL ACCESS BOARD REQUIREMENTS (AAB). SMALL CHANGES IN GRADE OVER RELATIVELY SHORT DISTANCES (E.G. AT PARKING SPACES, ACCESSIBLE ROUTES, AND RAMPS) MIGHT NOT BE CLEARLY DEPICTED WITHIN THE CONTOUR INTERVAL SHOWN. COMPLY WITH THE CRITERIA IN THESE STANDARDS. SELECT MAXIMUM SLOPE CRITERIA ARE REPRODUCED BELOW:
   - ACCESSIBLE PARKING STALL AND PASSENGER LOADING ZONE (ANY DIRECTION) SLOPE < 2.0%
   - LONGITUDINAL SLOPE ALONG ACCESSIBLE ROUTES < 5.0%
   - CROSS SLOPE ALONG ACCESSIBLE ROUTES < 2.0%
3. PROTECT PROJECT FEATURES (E.G., WALLS, FENCES, MAIL BOXES, SIGNS, SIDEWALKS, CURBING, STAIRS, WALKWAYS, TREES, ETC.) FROM DAMAGE DURING CONSTRUCTION, INCLUDING PROVIDING TEMPORARY SUPPORTS, WHEN APPROPRIATE.
4. IF REMOVAL OF PROJECT FEATURES IS REQUIRED IN ORDER TO PERFORM THE PROPOSED WORK, REMOVE THOSE SITE FEATURES ONLY UPON APPROVAL OF ENGINEER. REPLACE ALL REMOVED PROJECT FEATURES; NEW ITEMS SHALL BE EQUAL OR BETTER IN QUALITY AND CONDITION TO THE ITEMS REMOVED.
5. EXISTING SURVEY MONUMENTS DISTURBED BY THE CONTRACTOR SHALL BE REPLACED BY A LAND SURVEYOR LICENSED IN THE STATE IN WHICH THE WORK IS PERFORMED AT NO ADDITIONAL COST TO THE OWNER.
6. COORDINATE THE ADJUSTMENT OF EXISTING UTILITY STRUCTURES WITH EACH RESPONSIBLE UTILITY OWNER PRIOR TO RECONSTRUCTION AND/OR PAVING OPERATIONS. RAISE ALL STRUCTURES TO FINISHED GRADES PRIOR TO THE END OF THE CONSTRUCTION SEASON AND PRIOR TO FINISHED PAVING.
7. REPAIR DISTURBED PAVED SURFACES AT THE END OF EACH WORK WEEK, UNLESS OTHERWISE APPROVED/REQUIRED BY THE OWNER.
8. PLACE TEMPORARY BITUMINOUS CONCRETE PAVEMENT AT DISTURBED PORTLAND CEMENT CONCRETE SIDEWALKS AND DRIVEWAYS AT THE END OF EACH WORK WEEK, UNLESS OTHERWISE APPROVED/REQUIRED BY THE OWNER.
9. TRANSFER ALL TEMPORARY BENCHMARKS, AS NECESSARY.
10. ACCOMMODATE PEDESTRIAN TRAFFIC WHERE A SIDEWALK IS TO BE CLOSED FOR SAFETY. "SIDEWALK CLOSED HERE" SIGNS SHALL BE USED AT THE NEAREST SAFE INTERSECTION. SEE TRAFFIC CONTROL DETAILS FOR SIGN INFORMATION.
11. RESTORE ALL AREAS DISTURBED BY THE CONTRACTOR BEYOND THE PAYLINE LIMITS TO ORIGINAL CONDITIONS AT NO ADDITIONAL COST TO THE OWNER.
12. REGRADE ALL UNPAVED AREAS DISTURBED BY THE WORK AS REQUIRED. REPAIR/REPLACE PAVED SURFACES DISTURBED BY THE WORK IN-KIND, UNLESS OTHERWISE NOTED. RESTORE SURFACES TO EXISTING OR PROPOSED CONDITIONS AS INDICATED ON THE DRAWINGS.
13. PROVIDE A SMOOTH, FLUSH TRANSITION BETWEEN ALL NEW AND EXISTING PAVEMENTS AND WALKING SURFACES.

WATER SYSTEM IMPROVEMENTS NOTES

1. PROPOSED WATER MAINS SHALL BE PROVIDED IN ACCORDANCE WITH THE OWNER'S STANDARDS, AS SPECIFIED, AND AS SHOWN ON THE DRAWINGS. WHERE THERE IS A CONFLICT BETWEEN THE OWNER'S STANDARDS AND THE DRAWINGS AND SPECIFICATIONS, THE OWNER'S STANDARDS SHALL GOVERN.
2. HORIZONTAL AND VERTICAL LOCATION OF WATER MAINS MAY BE MODIFIED TO FIT EXISTING FIELD CONDITIONS, UPON APPROVAL OF THE ENGINEER.
3. WORKING PRESSURE OF WATER MAIN IN PROJECT AREA IS 100 PSI.
4. MINIMUM DEPTH OF COVER OVER PROPOSED WATER MAIN SHALL BE 5 FEET, UNLESS OTHERWISE NOTED OR APPROVED BY THE ENGINEER.
5. ALL BELOW GRADE VALVES AND FITTINGS SHALL HAVE MECHANICAL JOINT (MJ) ENDS. RESTRAIN ALL VALVE AND FITTING JOINTS WITH RETAINER GLANDS.
6. WHERE A COUPLING IS CALLED FOR ON THE DRAWINGS TO CONNECT A PROPOSED WATER MAIN TO AN EXISTING WATER MAIN PROVIDE A SOLID SLEEVE, IF POSSIBLE. RESTRAIN SOLID SLEEVE TO PIPES WITH RETAINER GLANDS. IF OUTSIDE DIAMETER OF EXISTING WATER MAIN DOES NOT ALLOW INSTALLATION OF SOLID SLEEVE, PROVIDE RESTRAINING TYPE TRANSITION COUPLING.
7. SLEEVES, NIPPLES, AND ACCESSORIES NECESSARY FOR CONNECTION BETWEEN EXISTING AND PROPOSED PIPES MAY NOT BE SHOWN ON THE DRAWINGS. PROVIDE ITEMS NECESSARY FOR CONNECTING TO EXISTING MAINS AND MAKE CONNECTIONS AS INDICATED IN THE CONTRACT DOCUMENTS.
8. RESTRAIN PIPE JOINTS IN ACCORDANCE WITH "MINIMUM RESTRAINED LENGTHS FOR DI PIPE" TABLE ON THE DRAWINGS.
9. MAINTAIN A MINIMUM HORIZONTAL DISTANCE OF 10 FEET BETWEEN THE PROPOSED WATER MAIN AND ANY EXISTING OR PROPOSED SANITARY SEWER OR STORM DRAIN. WHEN CONDITIONS PREVENT THIS, A LESSER DISTANCE WILL BE ALLOWED IF: A.) THE WATER MAIN IS IN A SEPARATE TRENCH OR B.) THE PROPOSED WATER MAIN IS LOCATED IN THE SAME TRENCH TO ONE SIDE ON A BENCH OF UNDISTURBED EARTH WITH AT LEAST 12 INCHES, AND PREFERABLY 18 INCHES, HORIZONTAL SEPARATION BETWEEN THE EDGES OF THE SEWER/DRAIN PIPE AND THE WATER MAIN. IN EITHER CASE, THE BOTTOM OF THE WATER MAIN SHALL BE 18 INCHES ABOVE THE CROWN OF THE SEWER/DRAIN PIPE.
10. WATER MAINS CROSSING SEWERS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18 INCHES BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF THE SEWER. IT IS PREFERRED THAT THE WATER MAIN CROSS ABOVE THE SEWER. AT CROSSINGS, ONE FULL LENGTH OF WATER PIPE SHALL BE LOCATED SO BOTH JOINTS WILL BE AS FAR FROM THE SEWER AS POSSIBLE.
11. WHERE THE PROPOSED WATER MAIN IS TO BE INSTALLED BELOW A DRAIN PIPE, MAINTAIN A MINIMUM OF 18 INCHES BETWEEN THE BOTTOM OF THE STORM DRAIN AND THE CROWN OF THE WATER MAIN.
12. OPERATION OF EXISTING VALVES SHALL BE BY THE WATER DISTRIBUTION SYSTEM OWNER, UNLESS OTHERWISE AUTHORIZED. COORDINATE OPERATION OF VALVES WITH THE WATER DISTRIBUTION SYSTEM OWNER.
13. THE WATER DISTRIBUTION SYSTEM OWNER DOES NOT GUARANTEE A TIGHT SHUTDOWN OF ITS EXISTING VALVES. THE CONTRACTOR IS RESPONSIBLE FOR CONTROL OF LEAKAGE AND DISPOSAL OF WATER UP TO 100 GALLONS PER MINUTE.
14. COORDINATE THE ACTIVATION AND DEACTIVATION OF WATER MAINS WITH THE WATER DISTRIBUTION SYSTEM OWNER.
15. REMOVE AND DISPOSE OF VALVE BOXES ON WATER MAIN TO BE ABANDONED, UNLESS DIRECTED OTHERWISE.
16. COVER EACH FIRE HYDRANT TAKEN OUT OF SERVICE WITH A NON-DEGRADABLE BAG SECURELY TIED. IMMEDIATELY NOTIFY FIRE DEPARTMENT WHEN HYDRANTS ARE TAKEN OUT OF SERVICE.

Tighe&Bond

COMMONWEALTH OF MASSACHUSETTS
CHARLES GORE
CIVIL
No. 38596
07/27/2022

PERMIT SUBMITTAL

NOT FOR CONSTRUCTION

Spectacle Pond Transmission Main Replacement

Town of AYER Public Works

Ayer, Massachusetts

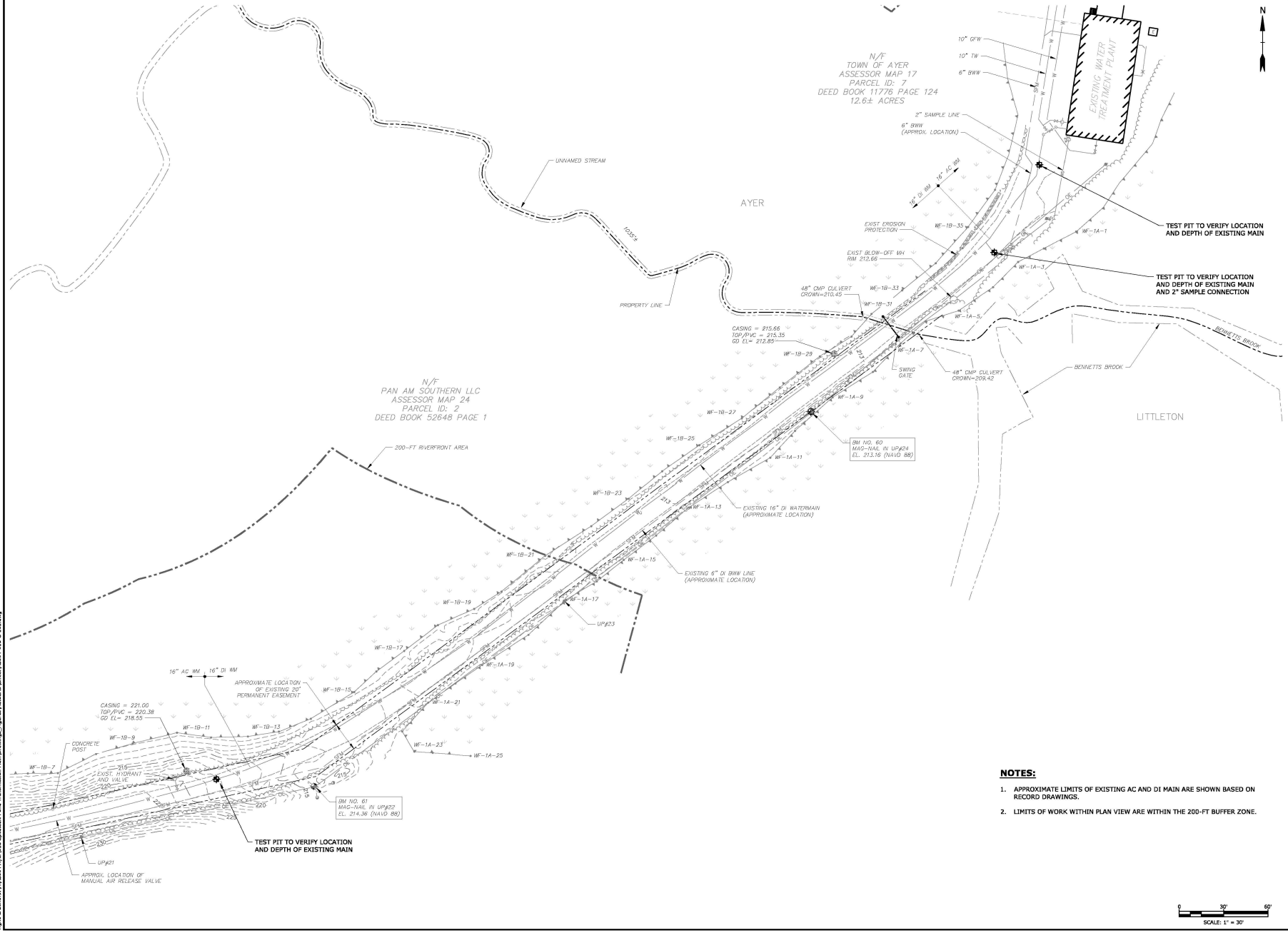
MARK	DATE	DESCRIPTION

PROJECT NO:	A5004-013
DATE:	JULY 2022
FILE:	A5004-016-G-002-003.dwg
DRAWN BY:	MJC
DESIGNED/CHECKED BY:	ERC
APPROVED BY:	---

GENERAL NOTES

SCALE: NO SCALE

G-003
SHEET OF --



NOTES:

1. APPROXIMATE LIMITS OF EXISTING AC AND DI MAIN ARE SHOWN BASED ON RECORD DRAWINGS.
2. LIMITS OF WORK WITHIN PLAN VIEW ARE WITHIN THE 200-FT BUFFER ZONE.

Tighe&Bond

CHARLES GORE CIVIL No. 38596
07/27/2022

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Spectacle Pond Transmission Main Replacement

Town of AYER Public Works

Ayer, Massachusetts

MARK	DATE	DESCRIPTION

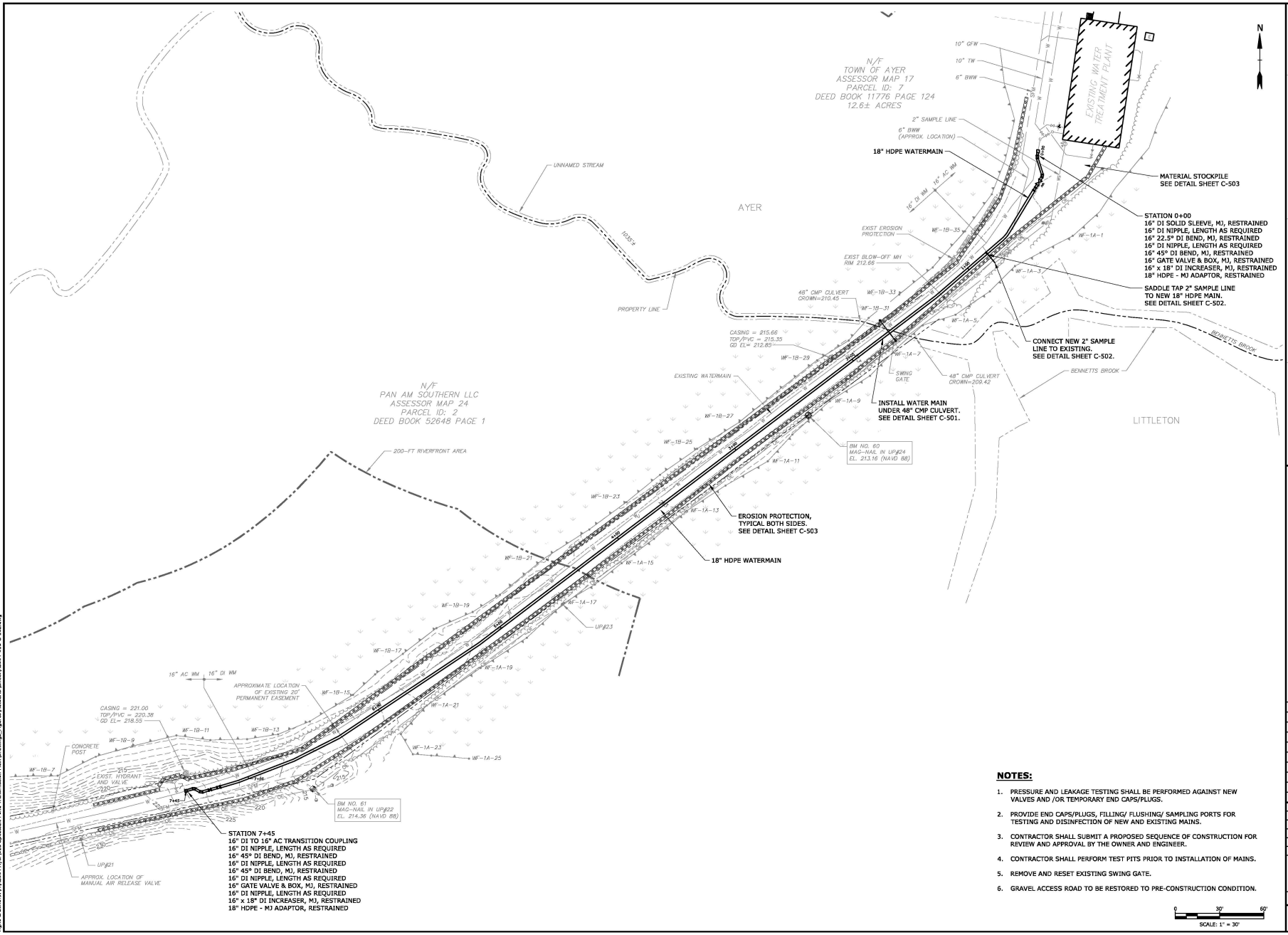
PROJECT NO:	A5004-013
DATE:	JULY 2022
FILE:	A5004-016-C-101.dwg
DRAWN BY:	MJC
DESIGNED/CHECKED BY:	EKC
APPROVED BY:	---

EXISTING CONDITIONS PLAN

SCALE: 1" = 30'

C-101
SHEET OF --

Last Saved: 7/27/2022
Plotted On: Jul 22, 2022 - 11:51am By: MCurran
Tighe & Bond: J:\A5004 Ayer\013 Spectacle Pond Transmission Main\Drawings, Figures\AutoCAD\Sheet\A5004-016-C-101.dwg



NOTES:

1. PRESSURE AND LEAKAGE TESTING SHALL BE PERFORMED AGAINST NEW VALVES AND /OR TEMPORARY END CAPS/PLUGS.
2. PROVIDE END CAPS/PLUGS, FILLING/ FLUSHING/ SAMPLING PORTS FOR TESTING AND DISINFECTION OF NEW AND EXISTING MAINS.
3. CONTRACTOR SHALL SUBMIT A PROPOSED SEQUENCE OF CONSTRUCTION FOR REVIEW AND APPROVAL BY THE OWNER AND ENGINEER.
4. CONTRACTOR SHALL PERFORM TEST PITS PRIOR TO INSTALLATION OF MAINS.
5. REMOVE AND RESET EXISTING SWING GATE.
6. GRAVEL ACCESS ROAD TO BE RESTORED TO PRE-CONSTRUCTION CONDITION.

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Spectacle Pond Transmission Main Replacement

Town of AYER Public Works

Ayer, Massachusetts

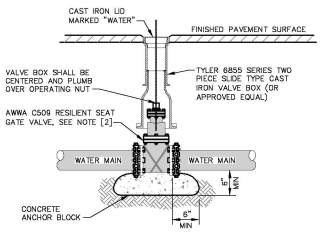
MARK	DATE	DESCRIPTION

PROJECT NO:	A5004-013
DATE:	JULY 2022
FILE:	A5004-016-C-102.dwg
DRAWN BY:	MJC
DESIGNED/CHECKED BY:	ERC
APPROVED BY:	---

TRANSMISSION MAIN PLAN
STA. 0+00 TO 7+45

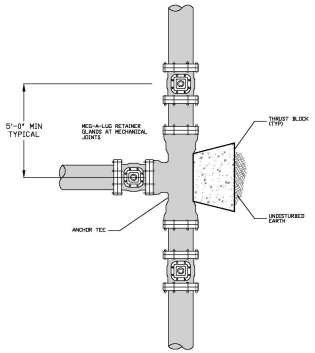
SCALE: 1" = 30'

C-102
SHEET OF ---



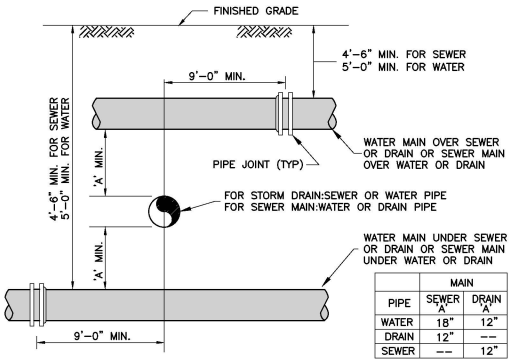
NOTES:
[1] SET LID AND CONCRETE COLLAR 1/4" TO 1/2" BELOW GRADE IN PAVEMENT OR OTHER AREAS TO BE PLOWED. SET LID 3" ABOVE FINISHED GRADE ELSEWHERE.
[2] VALVE SHALL OPEN LEFT.
[3] WRAP VALVE WITH 8 MIL POLYETHYLENE FILM AND SECURE WITH TAPE AT ALL THRUST BLOCKS

GATE VALVE AND BOX
NO SCALE



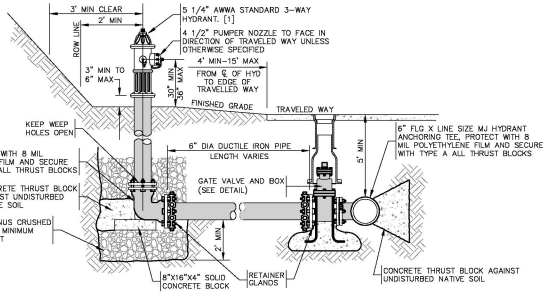
NOTES:
[1] VALVE SPACING TO BE A MINIMUM OF 5'-0" TO ALLOW PROPER SOIL COMPACTION BETWEEN VALVE BONNETS AND BOXES.
[2] MECHANICAL JOINTS WITH RETAINER GLANDS REQUIRED ON ALL FITTINGS AND VALVES, SEE CONSTRUCTION STANDARDS FOR ADDITIONAL RESTRAINTS REQUIREMENTS.
[3] SEE CONSTRUCTION STANDARD SECTION 3 FOR MATERIAL SPECIFICATIONS.

TYPICAL ANCHOR TEE INSTALLATION
NO SCALE



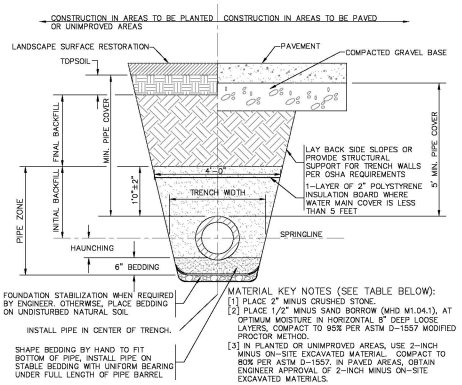
PIPE	MAIN SEWER A	MAIN DRAIN A
WATER	18"	12"
DRAIN	12"	--
SEWER	--	12"

WATER, SEWER OR DRAIN CROSSING
NO SCALE



NOTES:
[1] HYDRANT SHALL MEET ALL TOWN AND AWWA STANDARDS AND BE UL/FM APPROVED AND EQUIPPED WITH (1) 4 1/2" PUMPER NOZZLE AND (2) 2 1/2" HOSE NOZZLES.
[2] HYDRANT SHALL OPEN LEFT.
[3] WHERE HYDRANT IS SHOWN BEHIND SIDEWALK, SET CENTER OF HYDRANT 2-FEET BEHIND SIDEWALK.

FIRE HYDRANT ASSEMBLY
NO SCALE



MATERIAL KEY NOTES (SEE TABLE BELOW):
[1] PLACE 2" MINUS CRUSHED STONE.
[2] PLACE 1/2" MINUS SAND BORROW (WHO M1.04.1), AT OPTIMUM MOISTURE IN HORIZONTAL 8" DEEP LOOSE LAYERS, COMPACT TO 95% PER ASTM D-1557 MODIFIED PROCTOR METHOD.
[3] IN PLANTED OR UNIMPROVED AREAS, USE 2-INCH MINUS ON-SITE EXCAVATED MATERIAL. COMPACT TO 80% PER ASTM D-1557. IN PAVED AREAS, OBTAIN ENGINEER APPROVAL OF 2-INCH MINUS ON-SITE EXCAVATED MATERIALS.

TRENCH WIDTH:
[1] MINIMUM WIDTH OF TRENCH MEASURED AT SPRINGLINE OF PIPE, INCLUDING ANY NECESSARY SHEATHING:

PIPE I.D.	WIDTH
LESS THAN 21"	48"

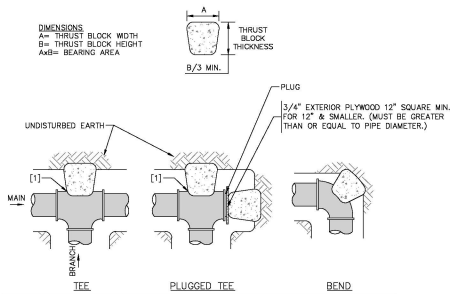
[2] PAYMENT WIDTH OF TRENCH SHALL BE 4 FEET.

MINIMUM PIPE COVER:
[1] MINIMUM SOIL COVER OVER TOP OF PIPE.

PIPE MATERIAL	HDPE, PVC	RC, DI
WATER	5' - 0"	5' - 0"
SEWER	4' - 6"	4' - 6"
DRAIN	2' - 0"	1' -0"

FOUNDATION, BEDDING AND BACKFILL MATERIALS		
PIPE MATERIAL	HDP, PVC	RC, DI
FOUNDATION STABILIZATION	[NOTE 1]	[NOTE 1]
BEDDING	[NOTE 2]	[NOTE 2]
HAUNCHING	[NOTE 2]	[NOTE 2]
INITIAL BACKFILL	[NOTE 2]	[NOTE 2]
FINAL BACKFILL	[NOTE 3]	[NOTE 3]

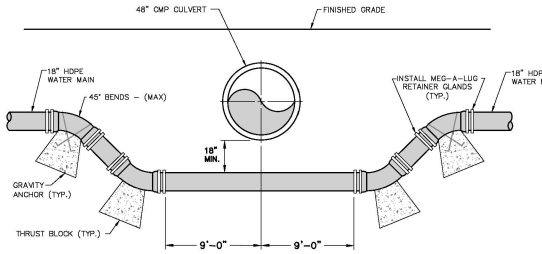
WATER MAIN PIPE TRENCH
NO SCALE



DIMENSION FOR THRUST BLOCK									
FITTING SIZES	TEES & PLUGS [2]		90° BENDS		45° BENDS & "WYE'S"		22 1/2° BENDS	
	A	B	A	B	A	B	A	B
4"	1'-8"	1'-6"	1'-6"	1'-9"	1'-3"	0'-8"	1'-0"	0'-6"
6"	2'-0"	1'-0"	2'-0"	2'-0"	1'-3"	1'-6"	1'-0"	1'-5"
8"	2'-0"	1'-6"	2'-3"	2'-3"	1'-8"	1'-8"	1'-0"	1'-3"
10"	2'-6"	2'-3"	2'-9"	2'-10"	2'-3"	1'-10"	1'-3"	2'-0"
12"	3'-0"	2'-9"	3'-6"	3'-3"	2'-6"	2'-4"	2'-0"	1'-6"
14"	3'-5"	3'-0"	4'-0"	3'-8"	3'-6"	2'-4"	2'-0"	2'-3"
16"	4'-0"	3'-6"	5'-0"	4'-0"	3'-6"	3'-0"	2'-6"	2'-3"
18"	4'-0"	4'-3"	6'-0"	4'-0"	4'-0"	3'-3"	2'-9"	2'-6"
20"	5'-0"	4'-3"	6'-0"	5'-0"	4'-3"	4'-0"	3'-0"	2'-9"
24"	6'-0"	5'-3"	8'-0"	5'-6"	6'-0"	4'-0"	4'-0"	3'-0"

NOTES:
[1] LENGTH 'B' TO BE HEIGHT OF BLOCK
[2] FOR TEE PROVIDE THRUST BLOCKING FOR BRANCH SIZE
[3] THIS TABLE IS BASED ON 200 P.S.I. MAIN PRESSURE AND 2000 P.S.F. SOIL BEARING PRESSURE. ADJUST BEARING AREAS IN ACCORDANCE WITH SOIL CONDITIONS AND PRESSURES ENCOUNTERED.
[4] WRAP PIPE IN 8 MIL POLYETHYLENE FILM AND SECURE WITH TAPE AT ALL THRUST BLOCKS.
[5] CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 2500 P.S.I. AT 28 DAYS.
[6] BLOCKING SIZE/FREQUENCY SHALL BE INCREASED IF REQUIRED BY ENGINEER.
[7] PRECAST CONCRETE THRUST BLOCKS ARE ACCEPTABLE TO THE TOWN. BLOCKS SHALL BE MINIMUM OF 6" THICK WITH STEEL REINFORCING.
[8] RETAINER GLANDS SHALL ALSO BE USED ON ALL MECHANICAL JOINT FITTINGS.

THRUST BLOCK SCHEDULE
NO SCALE



NOTES:
[1] ALL FITTINGS AND JOINTS IN LOWERING AREA TO BE RESTRAINED.
[2] WATER MAIN SHALL BE ENCASED IN CONTROL DENSITY FILL FOR A DISTANCE OF 5-FT ON EITHER SIDE OF THE CROSSING.

CULVERT CROSSING DETAIL
NO SCALE

Tighe&Bond

CHARLES GORE CIVIL No. 38596
07/27/2022

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Spectacle Pond Transmission Main Replacement

Town of AYER Public Works

Ayer, Massachusetts

MARK	DATE	DESCRIPTION

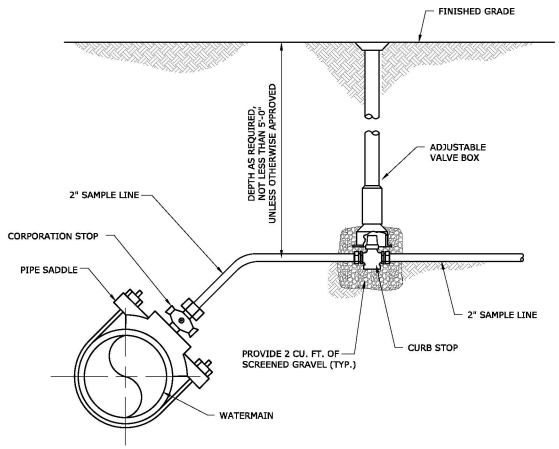
PROJECT NO:	A5004-013
DATE:	JULY 2022
FILE:	A5004-016-C-501.dwg
DRAWN BY:	MJC
DESIGNED/CHECKED BY:	EKC
APPROVED BY:	---

WATER DETAILS 1

SCALE: 1" = 30'

C-501
SHEET OF --

Last Saved: 7/27/2022
Plotted On: Jul 27, 2022 - 11:33am By: MCurran
Tighe & Bond: J:\A5004 Ayer\013 Spectacle Pond Transmission Main\Drawings_Figures\AutoCAD\Sheet\A5004-016-C-501.dwg



WATERMAIN SAMPLE LINE CONNECTION
NO SCALE

Tighe&Bond

CHARLES GORE CIVIL No. 38596
07/27/2022

PERMIT SUBMITTAL

NOT FOR CONSTRUCTION

Spectacle Pond Transmission Main Replacement

Town of AYER Public Works

Ayer, Massachusetts

MARK	DATE	DESCRIPTION

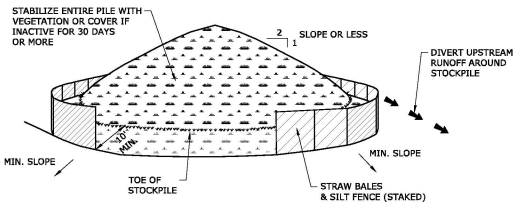
PROJECT NO:	A5004-013
DATE:	JULY 2022
FILE:	A5004-016-C-502.dwg
DRAWN BY:	MJC
DESIGNED/CHECKED BY:	EKC
APPROVED BY:	---

WATER DETAILS 2

SCALE: NO SCALE

C-502
SHEET OF ---

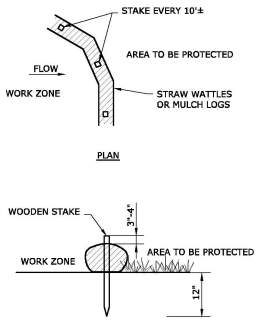
Last Saved: 7/21/2022
Plotted On: Jul 22, 2022 - 11:33am By: MCurran
Tighe & Bond: J:\A5004 Ayer\013 Spectacle Pond Transmission Main\Drawings_Figures\AutoCAD\Sheet\A5004-016-C-502.dwg



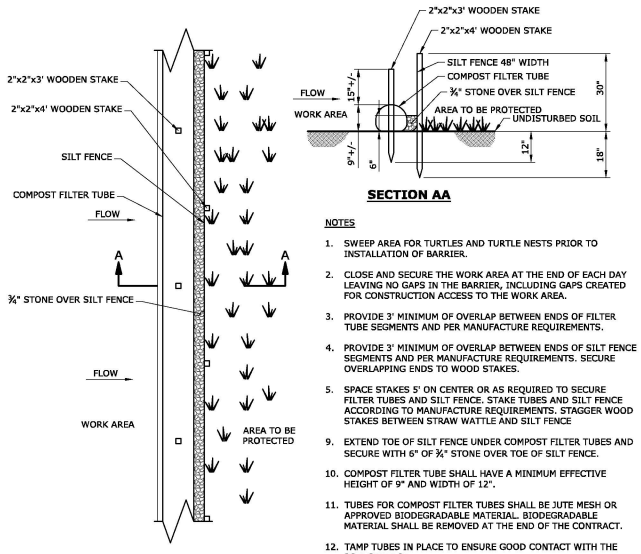
INSTALLATION NOTES:

1. AREA CHOSEN FOR STOCKPILING OPERATIONS SHALL BE DRY AND STABLE.
2. MAXIMUM SLOPE OF STOCKPILE SHALL BE 2H:1V.
3. UPON COMPLETION OF SOIL STOCKPILING, EACH PILE SHALL BE SURROUNDED WITH EITHER SILT FENCING OR STRAW BALES, THEN STABILIZED WITH VEGETATION OR COVERED.

SOIL STOCKPILING
NO SCALE



STRAW WATTLE OR MULCH LOG EROSION CONTROL BARRIER
NO SCALE

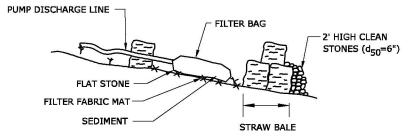


SECTION AA

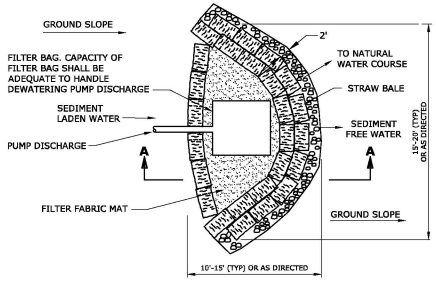
NOTES

1. SWEEP AREA FOR TURTLES AND TURTLE NESTS PRIOR TO INSTALLATION OF BARRIER.
2. CLOSE AND SECURE THE WORK AREA AT THE END OF EACH DAY LEAVING NO GAPS IN THE BARRIER, INCLUDING GAPS CREATED FOR CONSTRUCTION ACCESS TO THE WORK AREA.
3. PROVIDE 3' MINIMUM OF OVERLAP BETWEEN ENDS OF FILTER TUBE SEGMENTS AND PER MANUFACTURE REQUIREMENTS.
4. PROVIDE 3' MINIMUM OF OVERLAP BETWEEN ENDS OF SILT FENCE SEGMENTS AND PER MANUFACTURE REQUIREMENTS. SECURE OVERLAPPING ENDS TO WOOD STAKES.
5. SPACE STAKES 5' ON CENTER OR AS REQUIRED TO SECURE FILTER TUBES AND SILT FENCE. STAKE TUBES AND SILT FENCE ACCORDING TO MANUFACTURE REQUIREMENTS. STAGGER WOOD STAKES BETWEEN STRAW WATTLE AND SILT FENCE
9. EXTEND TOE OF SILT FENCE UNDER COMPOST FILTER TUBES AND SECURE WITH 6" OF ¾" STONE OVER TOE OF SILT FENCE.
10. COMPOST FILTER TUBE SHALL HAVE A MINIMUM EFFECTIVE HEIGHT OF 9" AND WIDTH OF 12".
11. TUBES FOR COMPOST FILTER TUBES SHALL BE JUTE MESH OR APPROVED BIODEGRADABLE MATERIAL. BIODEGRADABLE MATERIAL SHALL BE REMOVED AT THE END OF THE CONTRACT.
12. TAMP TUBES IN PLACE TO ENSURE GOOD CONTACT WITH THE SOIL SURFACE.

COMPOST FILTER TUBE, SILT FENCE, AND TURTLE BARRIER DETAIL
NO SCALE

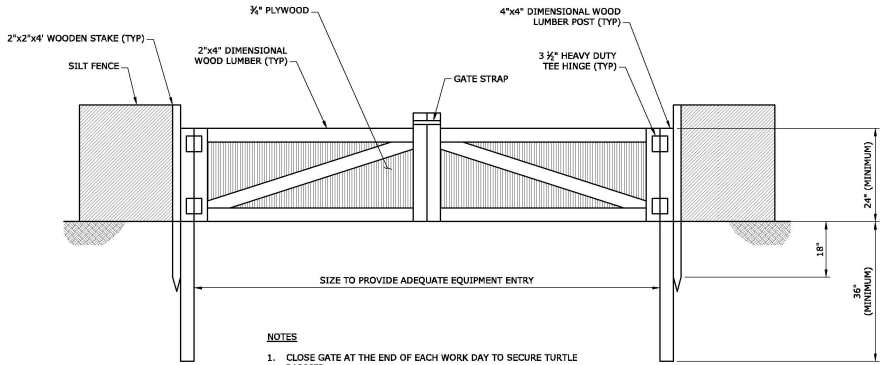


SECTION A-A



PLAN

DEWATERING SEDIMENT TRAP
NO SCALE



NOTES

1. CLOSE GATE AT THE END OF EACH WORK DAY TO SECURE TURTLE BARRIER.
2. SECURE WOOD STAKES TO GATE POST TO CREATE A CONTINUOUS TURTLE BARRIER.
3. ADJUST DIMENSIONS, FRAMING, AND BLOCKING AS NEEDED TO PROVIDE ADEQUATE EQUIPMENT ENTRY WIDTH.

TEMPORARY TURTLE BARRIER GATE DETAIL
NO SCALE

Tighe&Bond

CHARLES GORE CIVIL No. 38596
07/27/2022

PERMIT SUBMITTAL

NOT FOR CONSTRUCTION

Spectacle Pond Transmission Main Replacement

Town of AYER Public Works

Ayer, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	A5004-013
DATE:	JULY 2022
FILE:	A5004-016-C-503.dwg
DRAWN BY:	MJC
DESIGNED/CHECKED BY:	EKC
APPROVED BY:	---

EROSION AND SEDIMENT CONTROL DETAILS

SCALE: NO SCALE

C-503
SHEET OF --

Last Saved: 7/21/2022
Plotted On: Jul 22, 2022- 11:33am By: MCurran
Tighe & Bond: J:\A5004 Ayer\013 Spectacle Pond Transmission Main\Drawings_Figures\AutoCAD\Sheet\A5004-016-C-503.dwg

Tighe&Bond

APPENDIX B

Photographic Log

Tighe&Bond

Client: Town of Ayer Public Works Department **Job Number:** A-5004-013

Site: Spectacle Pond Water Transmission Main
Ayer, Massachusetts

Photograph No.: 1	**Date:** 4/29/2022	**Direction Taken:** Northeast

Description: View of the existing Water Treatment Plant and proposed soil stockpiling area (indicated by the red arrow).

Photograph No.: 2	**Date:** 4/29/2022	**Direction Taken:** Southwest

Description: Overview of the project area where the proposed transmission main replacement is to be installed.

Photographic Log

Tighe&Bond

Client: Town of Ayer Public Works Department **Job Number:** A-5004-013

Site: Spectacle Pond Water Transmission Main
Ayer, Massachusetts

Photograph No.: 3	**Date:** 4/29/2022	**Direction Taken:** Southeast
Description: Overview of Wetland 1A located to the east of the proposed transmission main replacement.		

Photograph No.: 4	**Date:** 4/29/2022	**Direction Taken:** North
Description: Overview of Wetland 1B located to the west of the proposed transmission main replacement.		

Tighe&Bond

APPENDIX C

TOWN OF AYER

REQUEST FOR CERTIFIED LIST OF ABUTTERS

THE FEE FOR PREPARING THE LIST IS $25.00

Applicant: Julia Squillace Name of Firm: Tighe & Bond
Address: 177 Corporate Drive Portsmouth, NH 03801
Contact Phone #: 203-841-8960 Please scan list and email to: JSquillace@tighebond.com

Request abutters list for:

Owner Name: Parcel 1: Town of Ayer; Parcel 2: Pan Am Southern LLC

Property Location: Parcel 1: 0 Nemco Way; Parcel 2: 4 Willow Road

Parcel ID: Parcel 1: 17-7; Parcel 2: 24-1

Date you need the list by: 6/28/2022

The Assessors' Office will generate & certify the requested **abutters list**, for the appropriate boards. Please check the appropriate departments.

Planning Board	_____	Ch 40A Sec 11 (300 feet)
" "	_____	Ch 41 Sec 81T (anr) (applicant & abutters)
Board of Appeals	_____	Ch 40A Sec 11 (300 feet)
Conservation Comm	X	Ch 131 Sec 40 (300 feet)
Select Board	_____	Ch 138 Sec 12, 15A (abutters & 500 ft if Within school, church or hosp)
Board of Health	_____	Ch 40A Sec 11 (300 feet) (aquifer protection)
Other	_____	

****Mailing labels will be provided.***

Board of Assessors
Town Hall
1 Main Street
Ayer, MA 01432

Tel: (978) 772-8220 ext. 140
Email: assessor@ayer.ma.us

June 22, 2022

ABUTTERS LIST FOR PARCEL(s): 17-7, 0 Nemco Way Off
24-1, 4 Willow Road

Owners(s): Pan Am Southern & Town of Ayer

#	Parcel ID	Stno	Stno2	Property Location	Owners Name1	Owners Name2	Address1	Address2	City/Town	State	Zip Code
1	16-13	21		WESTFORD ROAD	LEAHY FAMILY TRUST	MICHAEL W & JANICE H LEAHY - TR	79 GREAT ROAD		LITTLETON	MA	01460
2	17-10	0		NEMCO WAY (OFF)	DIVISION OF CAPITAL ASSET MANAGEMENT	& MAINTENANCE	1 ASHBURTON PLACE		BOSTON	MA	02108
3	17-11	0		NEMCO WAY (OFF)	TOWN OF AYER		1 MAIN STREET		AYER	MA	01432
4	17-13	0		NEMCO WAY (OFF)	TOWN OF AYER		1 MAIN ST		AYER	MA	01432
5	17-16	0		NEMCO WAY (OFF)	DIVISION OF CAPITAL ASSET MANAGEMENT	& MAINTENANCE	1 ASHBURTON PLACE		BOSTON	MA	02108
6	17-18	1		NEW ENGLAND WAY	NASOYA FOODS USA LLC	C/O PULMUONE FOODS USA INC	2315 MOORE AVENUE		FULLERTON	CA	92833
7	17-19	2		NEW ENGLAND WAY	SANDY POND PARTNERS LLP		2 NEW ENGLAND WAY		AYER	MA	01432
8	17-20	4		NEW ENGLAND WAY	KINGSWOOD CORP		PO BOX 1321		LITTLETON	MA	01460
9	17-23	0		STONY BROOK ROAD	TOWN OF AYER		1 MAIN ST		AYER	MA	01432
10	17-4	0		WAGON ROAD(OFF)	BOUDROT SUZANNE E		PO BOX 2245		LITTLETON	MA	01460
11	17-5	0		NEMCO WAY (OFF)	TOWN OF AYER		1 MAIN ST		AYER	MA	01432
12	17-6	0		NEMCO WAY (OFF)	TOWN OF AYER		1 MAIN ST		AYER	MA	01432
13	23-17	11		WESTFORD ROAD	TPS II LLC		20 MAIN STREET		ACTON	MA	01720
14	23-18	2		WILLOW ROAD	MUFFIN 2X LLC		351 WILLOW STREET SOUTH		NORTH ANDOVER	MA	01854
15	23-21	0		WILLOW ROAD	BOSTON & MAINE CORP	C/C GUILFORD TRANSPORTATION INDUSTI	IRON HORSE PARK	TAX DEPT- 67 HIGH STREET	N BILLERICA	MA	01862
16	23-22	11		WILLOW ROAD	PARMALEES LLC		135 BARNUM ROAD		DEVENS	MA	01434
17	23-26	12		WILLOW ROAD	CMRE LLC		12 WILLOW ROAD		AYER	MA	01432
18	23-3	6		WILLOW ROAD	WILLOW ROAD LLC		735 NORTH PRINCE STREET		LANCASTER	PA	17603
19	23-31	157		SANDY POND ROAD	DAVIS RAYMOND R - TE	QUEIDA F DAVIS	157 SANDY POND RD		AYER	MA	01432
20	23-32	3		WILLOW ROAD	TRAVIS C WINDER		3 WILLOW ROAD		AYER	MA	01432
21	23-33	4		PATRICIA DRIVE	SIEGEL III WILLIAM E	ROBERTA IRENE SIEGEL	4 PATRICIA DRIVE		AYER	MA	01432
22	23-34	6		PATRICIA DRIVE	CORBOCCIO ROBERT A		6 PATRICIA DRIVE		AYER	MA	01432
23	23-44	0		STONY BROOK LINE	BOSTON & MAINE RAILROAD	C/O GUILFORD TRANSPORTATION INDUSTI	IRON HORSE PARK	TAX DEPT - 67 HIGH STREET	N BILLERICA	MA	01862
24	30-24-1	1		LONGVIEW CIRCLE #A	CAPASSO MARY KATHLEEN		1A LONGVIEW CIRCLE		AYER	MA	01432
25	30-24-10	3		BAYBERRY LANE #A	STORTI KEVIN C - TE	SAMANTHA L STORTI	3A BAYBERRY LANE		AYER	MA	01432
26	30-24-11	3		BAYBERRY LANE #B	MCGARRY DEBORAH		3B BAYBERRY LANE		AYER	MA	01432
27	30-24-12	3		BAYBERRY LANE #C	GONGDAI LIU		3 BAYBERRY LANE #C		AYER	MA	01432
28	30-24-13	5		BAYBERRY LANE #A	RENGA VENKATA NIVEDITH	LAURA ZILCH-NIVEDITH	5 BAYBERRY LANE #A		AYER	MA	01432
29	30-24-14	5		BAYBERRY LANE #B	DRLANDELLA NICOLE M		5B BAYBERRY LANE		AYER	MA	01432
30	30-24-15	5		BAYBERRY LANE #C	HIRTLE ZACHARY M		5C BAYBERRY LANE		AYER	MA	01432
31	30-24-16	5		JUNIPER RIDGE	MUSZYNSKI ANDRZEJ	URSZULA MUSZYNSKA	5 JUNIPER RIDGE		AYER	MA	01432
32	30-24-17	7		JUNIPER RIDGE	BERG BARBARA S -TE	BARBARA S BERG 2018 LIVING TRUST	7 JUNIPER RIDGE		AYER	MA	01432
33	30-24-18	9		JUNIPER RIDGE	GOLDBLATT GARY		9 JUNIPER RIDGE		AYER	MA	01432
34	30-24-19	11		JUNIPER RIDGE	KOTFILA MARK	KARRIE KOTFILA	11 JUNIPER RIDGE		AYER	MA	01432
35	30-24-2	1		LONGVIEW CIRCLE #B	CORREA FRANCISCO C		1B LONGVIEW CIRCLE		AYER	MA	01432
36	30-24-20	34		LONGVIEW CIRCLE #A	LAHIFF CONOR T		34A LONGVIEW CIRCLE		AYER	MA	01432
37	30-24-21	34		LONGVIEW CIRCLE #B	CHOLLETI NITHIN		34B LONGVIEW CIRCLE		AYER	MA	01432
38	30-24-22	34		LONGVIEW CIRCLE #C	FITZGERALD ERIN E		34C LONGVIEW CIRCLE		AYER	MA	01432
39	30-24-23	34		LONGVIEW CIRCLE #D	CARDONE MICHELLE		34D LONGVIEW CIRCLE		AYER	MA	01432
40	30-24-24	36		LONGVIEW CIRCLE #A	FERREIRA JAMES J		36A LONGVIEW CIRCLE		AYER	MA	01432

Board of Assessors
Town Hall
1 Main Street
Ayer, MA 01432

Tel: (978) 772-8220 ext. 140
Email: assessor@ayer.ma.us

June 22, 2022

ABUTTERS LIST FOR PARCEL(s): 17-7, 0 Nemco Way Off
24-1, 4 Willow Road

Owners(s): Pan Am Southern & Town of Ayer

#	Parcel ID	Stno	Stno2	Property Location	Owners Name1	Owners Name2	Address1	Address2	City/Town	State	Zip Code
41	30-24-25	36		LONGVIEW CIRCLE #B	MILLS GLENN	DONNA J LOUGHLIN	36 LONGVIEW CIRCLE #B		AYER	MA	01432
42	30-24-26	41		LONGVIEW CIRCLE #A	HECTOR STEPHEN DANIEL		41A LONGVIEW CIRCLE		AYER	MA	01432
43	30-24-27	41		LONGVIEW CIRCLE #B	RITESH SINGH RAJPUT	MEGHNA THAKUR DHRAJ	41B LONGVIEW CIRCLE		AYER	MA	01432
44	30-24-28	41		LONGVIEW CIRCLE #C	BACHU KARTHIK	GAYATHRI KANDE	41C LONGVIEW CIRCLE		AYER	MA	01432
45	30-24-29	43		LONGVIEW CIRCLE #A	BRENDA A ALCOTT		43A LONGVIEW CIRCLE		AYER	MA	01432
46	30-24-3	1		LONGVIEW CIRCLE #C	HARRISON MALLORY G		1C LONGVIEW CIRCLE		AYER	MA	01432
47	30-24-30	43		LONGVIEW CIRCLE #B	CALLAHAN MICHAEL R		43B LONGVIEW CIRCLE		AYER	MA	01432
48	30-24-31	43		LONGVIEW CIRCLE #C	GANDHI ZINALBEN - TE	CHINTANKUMAR GANDHI	43C LONGVIEW CIRCLE		AYER	MA	01432
49	30-24-32	45		LONGVIEW CIRCLE #C	HOLDEN JANICE A		45C LONGVIEW CIRCLE		AYER	MA	01432
50	30-24-33	45		LONGVIEW CIRCLE #B	RUZYCKY MIKE		45B LONGVIEW CIRCLE		AYER	MA	01432
51	30-24-34	45		LONGVIEW CIRCLE #A	ROBIDOUX MICHELLE		45A LONGVIEW CIRCLE		AYER	MA	01432
52	30-24-35	48		LONGVIEW CIRCLE #C	JANICE CARTWRIGHT		48C LONGVIEW CIRCLE		AYER	MA	01432
53	30-24-36	48		LONGVIEW CIRCLE #B	VIEIRA LAUREN		48B LONGVIEW CIRCLE		AYER	MA	01432
54	30-24-37	48		LONGVIEW CIRCLE #A	TAVANO ALEXIS		48A LONGVIEW CIRCLE		AYER	MA	01432
55	30-24-38	46		LONGVIEW CIRCLE #C	ANTHONY J REPPUCCI		46C LONGVIEW CIRCLE		AYER	MA	01432
56	30-24-39	46		LONGVIEW CIRCLE #B	WELTON MARIANNE BREAULT		46B LONGVIEW CIRCLE		AYER	MA	01432
57	30-24-4	3		LONGVIEW CIRCLE #A	FERENCSIK ROBERT P - TE	ANDREA M AUCOIN	3A LONGVIEW CIRCLE		AYER	MA	01432
58	30-24-40	46		LONGVIEW CIRCLE #A	MACKLIN LINDA		46A LONGVIEW CIRCLE		AYER	MA	01432
59	30-24-41	44		LONGVIEW CIRCLE #C	SONTI RAVITEJA	SUDHESHNA BIDDARATI	44C LONGVIEW CIRCLE		AYER	MA	01432
60	30-24-42	44		LONGVIEW CIRCLE #B	DE LOS SANTOS LUIS A		44B LONGVIEW CIRCLE		AYER	MA	01432
61	30-24-43	44		LONGVIEW CIRCLE #A	MCCURDY VIRGINIA	DARCY MCCURDY	44A LONGVIEW CIRCLE		AYER	MA	01432
62	30-24-44	42		LONGVIEW CIRCLE #C	PATEL YAKSH	KRUPALI PATEL	42C LONGVIEW CIRCLE		AYER	MA	01432
63	30-24-45	42		LONGVIEW CIRCLE #B	NEWTON KAITLYN	GREGORY LIZOTTE	41 NEW ESTATE ROAD		LITTLETON	MA	01460
64	30-24-46	42		LONGVIEW CIRCLE #A	KAPLAN JOEL D - TE	CYNTHIA J FELTON	42A LONGVIEW CIRCLE		AYER	MA	01432
65	30-24-47	40		LONGVIEW CIRCLE #C	COHEN NOREEN L		40C LONGVIEW CIRCLE		AYER	MA	01432
66	30-24-48	40		LONGVIEW CIRCLE #B	GIULIANA AMY J		40B LONGVIEW CIRCLE		AYER	MA	01432
67	30-24-49	40		LONGVIEW CIRCLE #A	PATTERSON KAREN M		40A LONGVIEW CIRCLE		AYER	MA	01432
68	30-24-5	3		LONGVIEW CIRCLE #B	PENEDO TARSIS	ANGELINA A PENEDO	3B LONGVIEW CIRCLE		AYER	MA	01432
69	30-24-50	38		LONGVIEW CIRCLE #B	GRAHAM SCOTT R II		38B LONGVIEW CIRCLE		AYER	MA	01432
70	30-24-51	38		LONGVIEW CIRCLE #A	BOUCHARD MICHAEL D		38A LONGVIEW CIRCLE		AYER	MA	01432
71	30-24-52	38		LONGVIEW CIRCLE #C	ROBERT MONTGOMERY		38C LONGVIEW CIRCLE		AYER	MA	01432
72	30-24-53	38		LONGVIEW CIRCLE #D	OVAGINIAN JACQUELINE		38D LONGVIEW CIRCLE		AYER	MA	01432
73	30-24-54	18		LONGVIEW CIRCLE #A	CORDOBA SEBASTIAN		18A LONGVIEW CIRCLE		AYER	MA	01432
74	30-24-55	18		LONGVIEW CIRCLE #B	HOOLE CASEY M		18B LONGVIEW CIRCLE		AYER	MA	01432
75	30-24-56	36		LONGVIEW CIRCLE #E	AJAY MUMMADI	SRUTHI MODLA	36E LONGVIEW CIRCLE		AYER	MA	01432
76	30-24-57	36		LONGVIEW CIRCLE #D	PATEL SHYAM		36D LONGVIEW CIRCLE		AYER	MA	01432
77	30-24-58	36		LONGVIEW CIRCLE #C	PRASANTHI KOLLI	YESHWANTH BOPPANA	36C LONGVIEW CIRCLE		AYER	MA	01432
78	30-24-59	29		LONGVIEW CIRCLE	KUDTARKAR SANTOSH	JASHATA KUDTARKAR	29 LONGVIEW CIRCLE		AYER	MA	01432
79	30-24-6	3		LONGVIEW CIRCLE #C	TOMLIN ALISON L		3C LONGVIEW CIRCLE		AYER	MA	01432
80	30-24-60	32		LONGVIEW CIRCLE	BERMAN RONNA L		32 LONGVIEW CIRCLE		AYER	MA	01432

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June 22, 2022

ABUTTERS LIST FOR PARCEL(s): 17-7, 0 Nemco Way Off
24-1, 4 Willow Road

Owners(s): Pan Am Southern & Town of Ayer

#	Parcel ID	Stno	Stno2	Property Location	Owners Name1	Owners Name2	Address1	Address2	City/Town	State	Zip Code
81	30-24-61	30		LONGVIEW CIRCLE	KISHORE K HOTHA	JHANSI L HOTHA	30 LONGVIEW CIRCLE		AYER	MA	01432
82	30-24-62	28		LONGVIEW CIRCLE	SYLVESTER VICTORIA		28 LONGVIEW CIRCLE		AYER	MA	01432
83	30-24-63	26		LONGVIEW CIRCLE	LAM FRANKIE AHCHU - TE	WAI KWONG KO	26 LONGVIEW CIRCLE		AYER	MA	01432
84	30-24-64	24		LONGVIEW CIRCLE	TOADER ALEXANDRU		24 LONGVIEW CIRCLE		AYER	MA	01432
85	30-24-65	22		LONGVIEW CIRCLE	OU YI - TE	WEIXIANG CHEN	22 LONGVIEW CIRCLE		AYER	MA	01432
86	30-24-66	20		LONGVIEW CIRCLE	ARBOLEDA JUAN CARLOS - JT	JACQUELINNE BEDOYA	20 LONGVIEW CIRCLE		AYER	MA	01432
87	30-24-67	16		LONGVIEW CIRCLE #C	ALEXIA E IOANNOU		16C LONGVIEW CIRCLE		AYER	MA	01432
88	30-24-68	16		LONGVIEW CIRCLE #B	ADONIS BERNARD	RHODE MARTIAL-ADONIS	16B LONGVIEW CIRCLE		AYER	MA	01432
89	30-24-69	16		LONGVIEW CIRCLE #A	LORUSSO ANTHONY G - JT	SHANNON M ALEXANDER	16A LONGVIEW CIRCLE		AYER	MA	01432
90	30-24-7	1		BAYBERRY LANE #A	QUALLS BENJAMIN DAVID		1A BAYBERRY LANE		AYER	MA	01432
91	30-24-70	14		LONGVIEW CIRCLE #C	FARR DENNIS R		14C LONGVIEW CIRCLE		AYER	MA	01432
92	30-24-71	14		LONGVIEW CIRCLE #B	KOSCIAK THEODORE C	MICHELLE M KOSCIAK	14B LONGVIEW CIRCLE		AYER	MA	01432
93	30-24-72	14		LONGVIEW CIRCLE #A	CODY SUSAN A		14A LONGVIEW CIRCLE		AYER	MA	01432
94	30-24-73	12		LONGVIEW CIRCLE #C	CARROLL GARRETT G - TE	STACY M CARROLL	12C LONGVIEW CIRCLE		AYER	MA	01432
95	30-24-74	12		LONGVIEW CIRCLE #B	JOLICOEUR LISA D		12B LONGVIEW CIRCLE		AYER	MA	01432
96	30-24-75	12		LONGVIEW CIRCLE #A	OHAGAN MAUREEN M		12A LONGVIEW CIRCLE		AYER	MA	01432
97	30-24-76	10		LONGVIEW CIRCLE	SUDUIKO KATHLEEN		10 LONGVIEW CIRCLE		AYER	MA	01432
98	30-24-77	8		LONGVIEW CIRCLE	SELWOOD DEBORAH		8 LONGVIEW CIRCLE		AYER	MA	01432
99	30-24-78	6		LONGVIEW CIRCLE	HOJATTI MAHMOOD - TE	SAMIN HIRANI-HOJATTI	6 LONGVIEW CIRCLE		AYER	MA	01432
100	30-24-79	4		LONGVIEW CIRCLE	WALTERS RUSSELL H - TE	CHERYL WALTERS	4 LONGVIEW CIRCLE		AYER	MA	01432
101	30-24-8	1		BAYBERRY LANE #B	HERBST ANTONINA		1B BAYBERRY LANE		AYER	MA	01432
102	30-24-80	2		LONGVIEW CIRCLE	COLE JASON M - TE	SARA VELLA	2 LONGVIEW CIRCLE		AYER	MA	01432
103	30-24-81	2		JUNIPER RIDGE	DESAI SANJAY BHRUGU	DRASHTI BHRUGU DESAI & SANJAY P DES/	2 JUNIPER RIDGE		AYER	MA	01432
104	30-24-82	4		JUNIPER RIDGE	STAGGERS-MOSS SHARON P		4 JUNIPER RIDGE		AYER	MA	01432
105	30-24-83	6		JUNIPER RIDGE	LU LUCY		6 JUNIPER RIDGE		AYER	MA	01432
106	30-24-84	8		JUNIPER RIDGE	WALSH RYAN J - TE	NICOLE M WALSH	8 JUNIPER RIDGE		AYER	MA	01432
107	30-24-85	10		JUNIPER RIDGE	OYEKOYA OLAIDE O	KELLY A OYEKOYA-JORDAN	10 JUNIPER RIDGE		AYER	MA	01432
108	30-24-86	12		JUNIPER RIDGE	EGAN PAUL	NICOLE ROMANO	12 JUNIPER RIDGE		AYER	MA	01432
109	30-24-87	37		LONGVIEW CIRCLE	HEKKALA MAURI - TE	JOCELYN GALLEGO-HEKKALA	37 LONGVIEW CIRCLE		AYER	MA	01432
110	30-24-88	35		LONGVIEW CIRCLE	XING ANNIE		35 LONGVIEW CIRCLE		AYER	MA	01432
111	30-24-89	33		LONGVIEW CIRCLE	FOSTER MAY ELLEN		33 LONGVIEW CIRCLE		AYER	MA	01432
112	30-24-9	1		BAYBERRY LANE #C	VOSLER JEAN D		1C BAYBERRY LANE		AYER	MA	01432
113	30-24-90	31		LONGVIEW CIRCLE	WERST STEVEN D - TE	KATHLEEN M WERST	31 LONGVIEW CIRCLE		AYER	MA	01432
114	30-24-91	27		LONGVIEW CIRCLE	CELULARO ANTHONY T		27 LONGVIEW CIRCLE		AYER	MA	01432
115	30-24-92	25		LONGVIEW CIRCLE	DENNIS F COURCHAINE JR		25 LONGVIEW CIRCLE		AYER	MA	01432
116	30-24-93	23		LONGVIEW CIRCLE	SUN XIAOYONG - TE	HONG LU	23 LONGVIEW CIRCLE		AYER	MA	01432
117	30-24-94	21		LONGVIEW CIRCLE	KENAROV STANIMIR - TE	MIROSLAVA KENAROVA	21 LONGVIEW CIRCLE		AYER	MA	01432
118	30-24-95	47		LONGVIEW CIRCLE #C	SCHWABE SHEILA		47C LONGVIEW CIRCLE		AYER	MA	01432
119	30-24-96	47		LONGVIEW CIRCLE #B	BROWN DUNCAN M	CONSTANCE W BROWN	47B LONGVIEW CIRCLE		AYER	MA	01432
120	30-24-97	47		LONGVIEW CIRCLE #A	DUDLEY MARTHA M		47A LONGVIEW CIRCLE		AYER	MA	01432

Board of Assessors
Town Hall
1 Main Street
Ayer, MA 01432

Tel: (978) 772-8220 ext. 140
Email: assessor@ayer.ma.us

June 22, 2022

ABUTTERS LIST FOR PARCEL(s): 17-7, 0 Nemco Way Off
24-1, 4 Willow Road

Owners(s): Pan Am Southern & Town of Ayer

#	Parcel ID	Stno	Stno2	Property Location	Owners Name1	Owners Name2	Address1	Address2	City/Town	State	Zip Code
121	31-5	0	OFF	WILLOW ROAD	LITTLETON MOTOR COURT INC		843 WEST HOLLIS ST		NASHUA	NH	03062
122	00-0000	0		FITCHBURG DIVISION	BOSTON & MAINE RAILROAD	C/O GUILFORD TRANSPORTATION INDUS	IRON HORSE PARK	TAX DEPT - 67 HIGH STREET	N BILLERICA	MA	01862
123	00-0000	0		STONY BROOK DIVISION	BOSTON & MAINE RAILROAD	C/O GUILFORD TRANSPORTATION INDUS	IRON HORSE PARK	TAX DEPT - 67 HIGH STREET	N BILLERICA	MA	01862

Notification to Abutters per the Massachusetts Wetlands Protection Act and the Town of Ayer Wetlands Protection 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: Town of Ayer Public Works Department (c/o Dan Van Schalkwyk)

B. The name of the land owner is Town of Ayer Public Works Department (c/o Dan Van Schalkwyk)

C. The address of the lot where the resource area is located or activity is proposed is:

4 Willow Road (utility easement) and 0 Nemco Way, Ayer, MA 01432

D. The applicant has filed: (check one)

- ☑ Notice of Intent
- ☐ Abbreviated Notice of Intent
- ☐ Request for an Amendment to an Order of Conditions
- ☐ Abbreviated Notice of Resource Area Delineation

The applicant has filed the above application with the Ayer Conservation Commission and is seeking:

- ☐ confirmation of resource area delineation, or
- ☑ permission to remove, fill, dredge or alter an Area Subject to Protection under the Wetlands Protection Act (Massachusetts General Law Chapter 131, Section 40).

E. Copies of the above referenced document/filing may be examined at the Conservation Commission Office, Town Hall, 1 Main Street, Ayer, MA, between the hours of 10:00 a.m. and 1:00 p.m., Wednesdays and Fridays. Please schedule an appointment by calling (978) 772-8249.

F. Copies of the above referenced document/filing may be obtained from: (check one)

- ☐ Applicant (contact information: _____)
- ☐ Owner (contact information: _____)
- ☑ Applicant's Representative (contact information: Charles Gore, Tighe & Bond, (781) 708-9832)
- ☐ Ayer Conservation Administrator 978-772-8249 (Wednesdays & Fridays 9:30a.m.-1:30p.m.)

G. Project Description:

The Town of Ayer proposes the replacement of approximately 700 linear feet of existing 16-inch diameter water transmission main due to pinhole leaks discovered in April 2021. The replacement main will consist of an 18-inch diameter high-density polyethylene pipe installed within the existing unpaved access road to the Town's Spectacle Pond Water Treatment Plant.

H. Information regarding the date, time, and place of the hearing may be obtained from the Ayer Conservation Office by calling 978-772-8249 between the hours of 9:30 a.m. and 1:30 p.m., Wednesdays and Fridays.

Note: Notice of the public hearing, including its date, time, and place, will be published at least five (5) business days prior to the hearing date in either *The Public Spirit* or *The Lowell Sun* newspapers. Such notice will also be posted at the Ayer Town Hall no fewer than forty-eight (48) hours in advance of the meeting.

Note: You also may contact the Department of Environmental Protection Regional Office for more information about this application or the Wetlands Protection Act at (508) 792-7650.

AFFIDAVIT OF SERVICE

Under the Massachusetts Wetlands Protection Act
and
Town of Ayer Wetlands Bylaw and Regulations

To be submitted to the Massachusetts Department of Environmental Protection (MassDEP) and the Ayer Conservation Commission when filing a Notice of Intent.

I, Charles Gore, herby certify under the pains and penalties of perjury that
(Name)
on 7/29/2022 I gave notification to abutters in compliance with the second
(Date)
paragraph of the Massachusetts General Laws Chapter 131, Section 40, and the MassDEP Guide to

Abutter Notification dated April 8, 1994, in connection with the following matter:

Spectacle Pond Water Transmission Main Upgrade

The form of notification, and a list of the abutters to whom it was given and their addresses, are

attached to this Affidavit of Service.

Name (Sign)

Charles Gore
Name (Print)

7/29/2022
Date

www.tighebond.com

100% Recyclable

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 INCH = 20 FEET

TURF-REINFORCED 1.5:1 SLOPE RATHER THAN 16' TALL WALL

GUARDRAIL SHIFTS, ENDS AT END OF STEEP SLOPES

EDGE OF PAVED DRIVE SHIFTS AWAY FROM BVW

TURTLE NESTING AREA ADJUSTED TO BE AT BOTTOM OF SLOPE, ABOVE WETLANDS RATHER THAN AT TOP OF SLOPE AGAINST WALL

GRASS SWALE W/ TURN REINFORCEMENT EXTENDED TO RECEIVE DRIVEWAY RUNOFF.

TREEBOX UNDERDRAINS CONNECTED DIRECTLY TO UNDERGROUND DETENTION.

DRIVEWAY ENTRANCE TO BE CONFIGURED FOR LIMITED ACCESS SIGNED & SUITABLE PER AYER DPW & AYER FIRE

ACCESS SWING GATE AT TOP OF HILL TO ALLOW FOR VEHICULAR PULLOFF FROM WASHINGTON STREET

THREE (3) TREEBOX FILTERS (INSTEAD OF 6 PROPOSED) FOR REDUCED IMPERVIOUS AREA. TREEBOX BOTTOMS LEFT OPEN FOR CLEANED WATER LEACHING.

WQS FOR UNDERDRAIN DISCHARGES REMOVED. NEVER REQUIRED FOR MEETING WATER QUALITY OR STORMWATER MANAGEMENT REQUIREMENTS. REMOVED DUE TO DISCOVERED SITE CONSTRAINTS.

ASPHALT SPEED HUMPS DIVERTING STEEP SLOPE DRAINAGE INTO TREEBOX FILTERS

DRIVEWAY STEEPENED TO APPROX. 12% GRADE AS SUITABLE PER AYER DPW & AYER FIRE

WATERLINE CONNECTION/EXTENSION ELIMINATED

APPROX. END OF PAVED DRIVEWAY STA. 2+45

MATCHLINE STA. 3+25

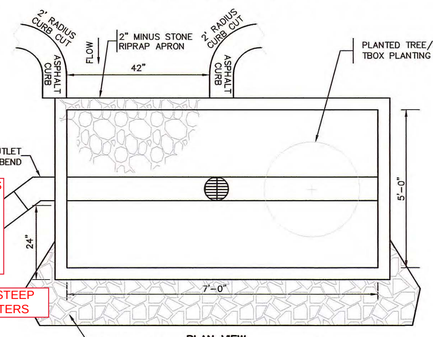
LEGEND

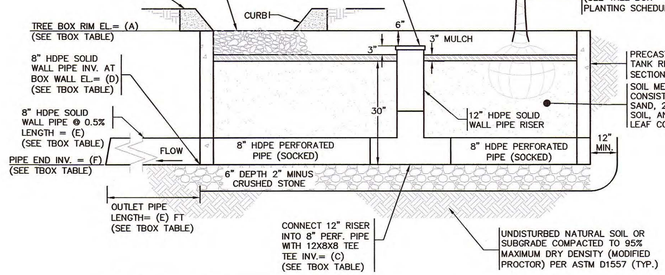
EXISTING		PROPOSED
100	ELEVATION CONTOUR	100
X100.0	SPOT GRADE	100.0 FG
	PROPERTY LINE	
WF-1	WETLAND DELINEATION	
	WETLAND BUFFER ZONE	
	EDGE OF PAVEMENT	
	CAPE COD BERM CURBING	
	GRAVEL/DIRT ROAD	
	STOCKADE FENCE	
	STONE WALL	
W	WATER MAIN	W
	WATER SERVICE	WS
	FIRE SERVICE	FS
WV	WATER VALVE	WV
FH	FIRE HYDRANT	FH
FM	FORCE MAIN	FM
SS	GRAVITY SEWER LINE	SS
S	SEWER MANHOLE	SMH
E	BURIED POWER LINE	E
OHW	OVERHEAD POWER LINE	
	UTILITY POLE	
	GUY WIRE	
	ELECTRIC BOX	E
SD	STORM DRAIN	SD
SF	SILT FENCE BARRIER W/STRAW WATTLES	
S	SIGN	S
CB	CATCH BASIN	
DMH	DRAIN MANHOLE	
199-1	DEEP SOIL OBSERVATION HOLE	
	ELEVATION BENCHMARK	
	SURFACE RUNOFF DIRECTION	

TREE BOX PLANTING SCHEDULE

SPECIES	COMMON NAME	SIZE
CEPHELANTHUS OCCIDENTALIS	BUTTONBUSH	2'-3' TALL
MYRICA PENSYLVANICA	BAYBERRY	2'-3' TALL
SYRINGA MEYERI	DWARF LILAC	2'-3' TALL

NOTES:
1. EACH TREE BOX FILTER SHALL HAVE ONE PLANTED TREE OR SHRUB, TO BE REPLACED APPROXIMATELY EVERY 5–10 YEARS OR WHEN THE PLANT DIES.
2. THE CHOICE OF TREE BOX PLANTS SHALL BE FROM THE FOLLOWING SPECIES AT THE DISCRETION OF THE CONTRACTOR FOR PRICE AND AVAILABILITY.





TREE BOX TABLE

TREE BOX ELEVATION CHART

DESCRIPTION	UNIT	DETAIL REFERENCE	TBOX #1	TBOX #2	TBOX #3	TBOX #4	TBOX #5	TBOX #6
CURB CUT CENTER EP EL.	(FT)		246.30	246.90	249.20	252.80	257.00	261.90
EL. DROP: EP TO BOX RIM	(IN)		1	1	8	8	8	8
BOX RIM EL.	(FT)	(A)	246.22	246.82	248.53	252.13	256.33	261.23
RISER RIM EL.	(FT)	(B)	245.72	246.32	248.03	251.63	255.83	260.73
TOP OF MULCH	(FT)		245.47	246.07	247.78	251.38	255.58	260.48
TOP OF SOIL	(FT)		245.22	245.82	247.53	251.13	255.33	260.23
TEE INV.	(FT)	(C)	242.72	243.32	245.03	248.63	252.83	257.73
WALL PENETRATION INV.	(FT)	(D)	242.70	243.30	245.01	248.61	252.81	257.71
OUTLET PIPE LENGTH	(FT)	(E)	73	31	44	15	18	11
PIPE END INV.	(FT)	(F)	242.00	242.70	243.30	248.54	252.72	257.66
CONNECT OUTLET TO	----		CB2	TBOX #1	TBOX #2	----	----	----

NOTES:
[1] SOIL MIX MUST BE UNIFORM, FREE OF STONES, STUMPS, ROOTS OR SIMILAR OBJECTS LARGER THAN 2 INCHES. CLAY CONTENT SHOULD NOT EXCEED 5%.
[2] SOIL pH SHOULD GENERALLY BE BETWEEN 5.5–6.5.
[3] USE SOILS WITH 1.5%–3% ORGANIC CONTENT AND MAXIMUM 500–PPM SOLUBLE SALTS.
[4] SAND COMPONENT SHOULD BE GRAVELLY SAND THAT MEETS ASTM D 422.
[5] TOPSOIL COMPONENT SHALL BE SANDY LOAM, LOAMY SAND OR LOAM TEXTURE.
[6] COMPOST COMPONENT MUST BE PROCESSED FROM YARD WASTE IN ACCORDANCE WITH MASS DEP GUIDELINES. COMPOST SHALL NOT CONTAIN BIOSOLIDS.
[7] ON–SITE SOIL MIXING OR PLACEMENT IS NOT ALLOWED IF SOIL IS SATURATED OR SUBJECT TO WATER WITHIN 48 HOURS. COVER AND STORE SOIL TO PREVENT WETTING OR SATURATION.
[8] TEST SOIL FOR FERTILITY AND MICRO–NUTRIENTS AND, ONLY IF NECESSARY, AMEND MIXTURE TO CREATE OPTIMUM CONDITIONS FOR PLANT ESTABLISHMENT AND EARLY GROWTH.
[9] GRADE THE AREA TO ALLOW A PONDING DEPTH OF 12 INCHES MAX; DEPENDING ON SITE CONDITIONS, MORE OR LESS PONDING MAY BE APPROPRIATE.
[10] COVER THE SOIL WITH 2–3 INCHES OF FINE–SHREDDED HARDWOOD MULCH.
[11] MIRROR BOX CONFIGURATION AS NEEDED BASED ON SITE PLAN CONFIGURATION.

TREE BOX FILTER (TBOX)
NOT TO SCALE

ABBREVIATIONS

EL.	ELEVATION	HDPE	HIGH DENSITY POLYETHYLENE
INV	INVERT	PVC	POLYVINYL CHLORIDE
SF	SQUARE FEET	RCP	REINFORCED CONCRETE PIPE
AC	ACRES	N/F	NOW OR FORMERLY
FT	FEET	WF	WETLAND FLAG
R	RADIUS	TW	TOP OF WALL FINISHED GRADE
DIA	DIAMETER	BW	BOTTOM OF WALL FINISHED GRADE
BIT	BITUMINOUS ASPHALT	FG	FINISH GRADE
CONC	CONCRETE	POLE	POWER/UTILITY POLE
L	LENGTH	GDRL	GUARD RAILING
S	SLOPE	WQS	WATER QUALITY SWALE
OVF	OVERFLOW	TBOX	TREE BOX FILTER
STA	STATION	VGC	VERTICAL GRANITE CURBING
HYD	FIRE/WATER HYDRANT	CCB	CAPE COD BERM (ASPHALT CURBING)
ROW	RIGHT–OF–WAY	EP	EDGE OF PAVEMENT
GVL	GRAVEL	SHLD	SHOULDER
TYP	TYPICAL	U/G	UNDERGROUND

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COMMONWEALTH OF MASSACHUSETTS — NICHOLAS M. PAULING — CIVIL — No. 47114 — REGISTERED PROFESSIONAL ENGINEER — 10/19/2020

PER 250 CMR 5.03(13), THE FOLLOWING ARE EXCLUDED FROM THE PROFESSIONAL ENGINEER'S RESPONSIBILITY: ALL BOUNDARY INFORMATION; LOCATION OF EXISTING STRUCTURES, TREES, UTILITIES, TOPOGRAPHY OR SIMILAR FEATURES; DESIGN OF RETAINING WALLS, PROPRIETARY EQUIPMENT. SEE EXISTING CONDITION NOTES.

NO.	DATE	BY	APP.	REVISION DESCRIPTION
2	10/19/20	KFB	NMP	SKEWED ARCH CULVERT
1	9/15/20	LT	KFB	PEER REVIEW COMMENTS

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SOLAR PHOTOVOLTAIC PROJECT

DRIVEWAY PLAN & PROFILE (STA. 0+00 TO 3+25)

AYER SOLAR IIB PROJECT
0 WASHINGTON STREET
AYER, MA

OWNERS:
TRIPLE AE GROUP LLC
67 HARWOOD AVE
PO BOX 2325
LITTLETON, MA 01460

COWFIELD REALTY TRUST II
C/O CALVIN E. MOORE
39 MAIN ST, STE.303
AYER, MA 01432

APPLICANT:
AYER SOLAR II LLC
2960 HEATHER WAY
SUITE 100
ANN ARBOR, MI 48104

DES. BY: KFB	DATE: FEBRUARY 2020	JOB 171002	C4.2
CHK. BY: DEM			

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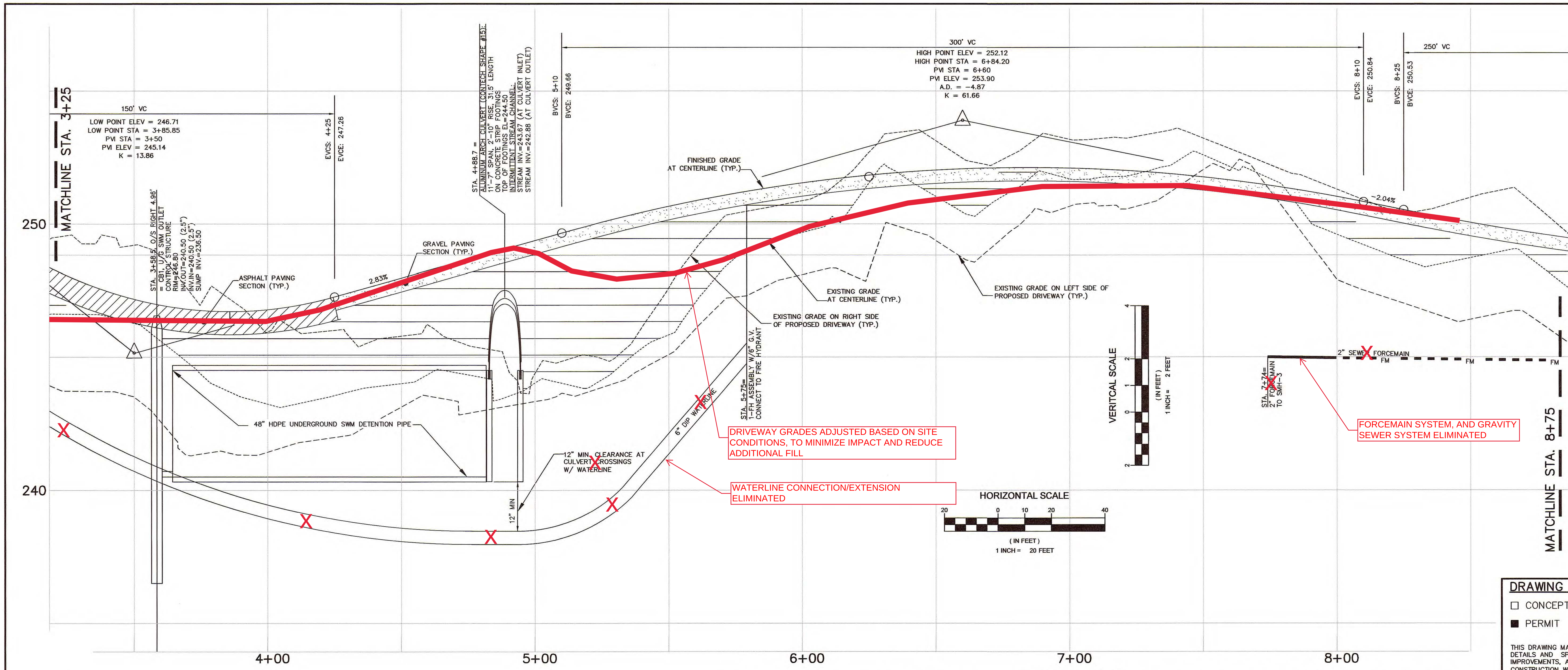
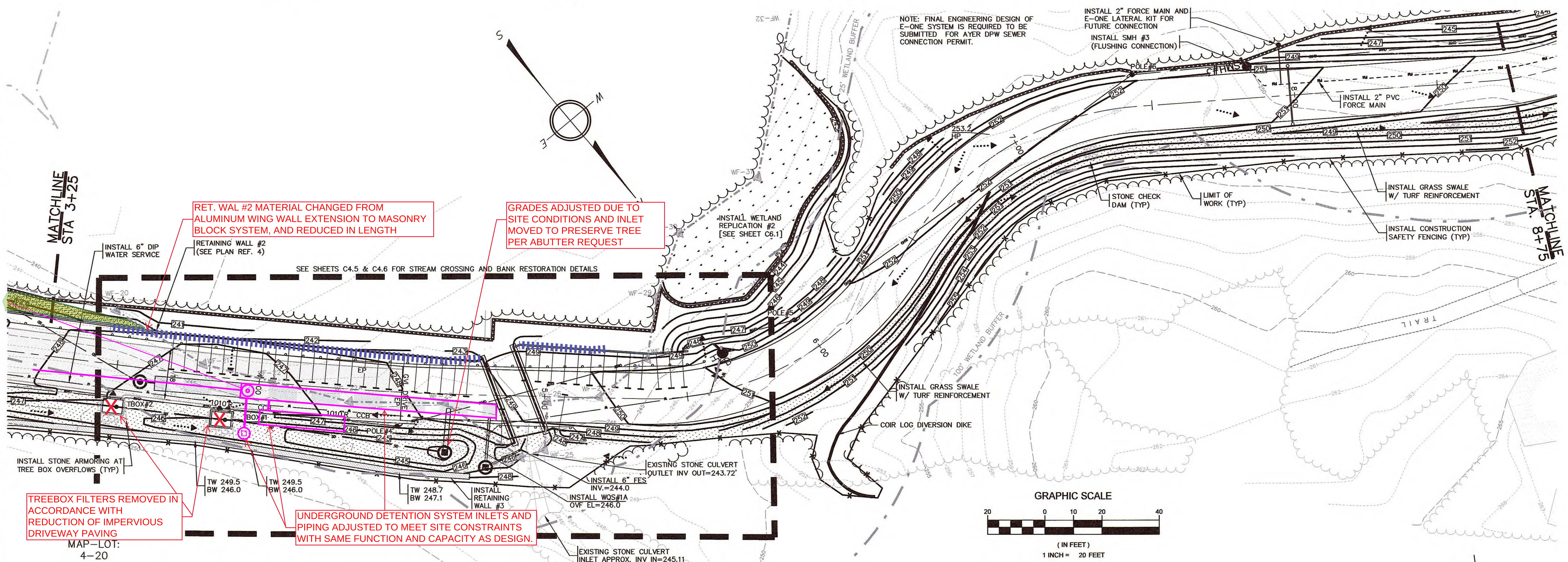

MATCHLINE STA. 3+25
150' VC
LOW POINT ELEV = 246.71
LOW POINT STA = 3+85.85
PVI STA = 3+50
PVI ELEV = 245.14
K = 13.86
EVCS: 4+25
EVCE: 247.26
BVCS: 5+10
BVCE: 249.66
300' VC
HIGH POINT ELEV = 252.12
HIGH POINT STA = 6+84.20
PVI STA = 6+60
PVI ELEV = 253.90
A.D. = -4.87
K = 61.66
EVCS: 8+10
EVCE: 250.84
BVCS: 8+25
BVCE: 250.53
250' VC
FINISHED GRADE AT CENTERLINE (TYP.)
GRAVEL PAVING SECTION (TYP.)
ASPHALT PAVING SECTION (TYP.)
2.83%
-2.04%
EXISTING GRADE AT CENTERLINE (TYP.)
EXISTING GRADE ON RIGHT SIDE OF PROPOSED DRIVEWAY (TYP.)
EXISTING GRADE ON LEFT SIDE OF PROPOSED DRIVEWAY (TYP.)
48" HDPE UNDERGROUND SWM DETENTION PIPE
12" MIN. CLEARANCE AT CULVERT CROSSINGS W/ WATERLINE
12" MIN.
6" DIP WATERLINE
2" SEWER FORCEMAIN
FM
DRIVEWAY GRADES ADJUSTED BASED ON SITE CONDITIONS, TO MINIMIZE IMPACT AND REDUCE ADDITIONAL FILL
WATERLINE CONNECTION/EXTENSION ELIMINATED
FORCEMAIN SYSTEM, AND GRAVITY SEWER SYSTEM ELIMINATED
VERITCAL SCALE
HORIZONTAL SCALE
(IN FEET)
1 INCH = 20 FEET
1 INCH = 2 FEET
250
240
4+00
5+00
6+00
7+00
8+00
MATCHLINE STA. 8+75


NOTE: FINAL ENGINEERING DESIGN OF E-ONE SYSTEM IS REQUIRED TO BE SUBMITTED FOR AYER DPW SEWER CONNECTION PERMIT.
INSTALL 2" FORCE MAIN AND E-ONE LATERAL KIT FOR FUTURE CONNECTION
INSTALL SMH #3 (FLUSHING CONNECTION)
INSTALL 2" PVC FORCE MAIN
STONE CHECK DAM (TYP)
LIMIT OF WORK (TYP)
INSTALL GRASS SWALE W/ TURF REINFORCEMENT
INSTALL CONSTRUCTION SAFETY FENCING (TYP)
MATCHLINE STA. 8+75
MATCHLINE STA 3+25
INSTALL 6" DIP WATER SERVICE
RET. WAL #2 MATERIAL CHANGED FROM ALUMINUM WING WALL EXTENSION TO MASONRY BLOCK SYSTEM, AND REDUCED IN LENGTH
RETAINING WALL #2 (SEE PLAN REF. 4)
GRADES ADJUSTED DUE TO SITE CONDITIONS AND INLET MOVED TO PRESERVE TREE PER ABUTTER REQUEST
INSTALL WETLAND REPLICATION #2 [SEE SHEET C6.1]
SEE SHEETS C4.5 & C4.6 FOR STREAM CROSSING AND BANK RESTORATION DETAILS
INSTALL GRASS SWALE W/ TURF REINFORCEMENT
COIR LOG DIVERSION DIKE
INSTALL STONE ARMORING AT TREE BOX OVERFLOWS (TYP)
TW 249.5 BW 246.0
TW 249.5 BW 246.0
TW 248.7 BW 247.1
INSTALL RETAINING WALL #3
INSTALL 6" FES INV.=244.0
INSTALL WQS#1A OVF EL=246.0
EXISTING STONE CULVERT OUTLET INV OUT=243.72'
EXISTING STONE CULVERT INLET APPROX. INV IN=245.11
TREEBOX FILTERS REMOVED IN ACCORDANCE WITH REDUCTION OF IMPERVIOUS DRIVEWAY PAVING
UNDERGROUND DETENTION SYSTEM INLETS AND PIPING ADJUSTED TO MEET SITE CONSTRAINTS WITH SAME FUNCTION AND CAPACITY AS DESIGN.
MAP-LOT: 4-20
TRAIL
GRAPHIC SCALE
(IN FEET)
1 INCH = 20 FEET

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COMMONWEALTH OF MASSACHUSETTS NICHOLAS M. PAULING CIVIL No. 47114 REGISTERED PROFESSIONAL ENGINEER
10/19/2020

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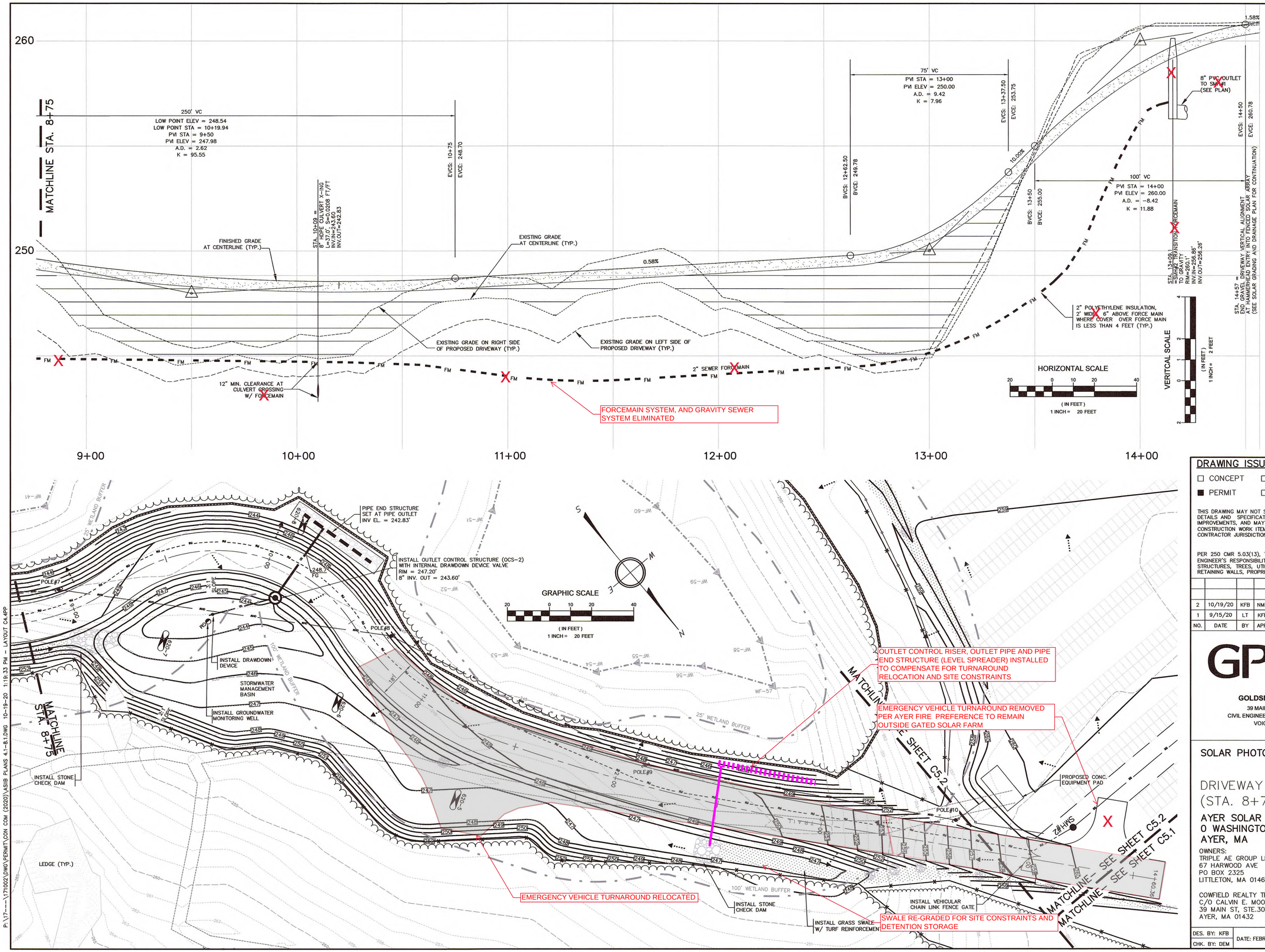
DES. BY: KFB CHK. BY: DEM	DATE: FEBRUARY 2020	JOB 171002	C4.3



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10/19/2020

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NO.	DATE	BY	APP.	REVISION DESCRIPTION
2	10/19/20	KFB	NMP	SKEWED ARCH CULVERT
1	9/15/20	LT	KFB	PEER REVIEW COMMENTS

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SOLAR PHOTOVOLTAIC PROJECT

DRIVEWAY PLAN & PROFILE (STA. 8+75 TO 14+56)

AYER SOLAR IIB PROJECT
0 WASHINGTON STREET
AYER, MA

OWNERS:
TRIPLE AE GROUP LLC
67 HARWOOD AVE
PO BOX 2325
LITTLETON, MA 01460

COWFIELD REALTY TRUST II
C/O CALVIN E. MOORE
39 MAIN ST, STE.303
AYER, MA 01432

APPLICANT:
AYER SOLAR II LLC
2960 HEATHER WAY
SUITE 100
ANN ARBOR, MI 48104

DES. BY: KFB	DATE: FEBRUARY 2020	JOB 171002	C4.4
CHK. BY: DEM			

GRAPHIC SCALE

20 0 10 20 40

(IN FEET)

1 INCH = 20 FEET

N/F
BOSTON & MAINE
RAILROAD

N/F
ANTHONY & JOYCE
McGUANE
MAP–LOT:
4–29

N/F
DAVID &
REBECCA
GARDNER
MAP–LOT:
4–28

INSTALL GRAVEL TRAIL CONNECTION

INSTALL STONE OVERFLOW WEIR EL=253.20'

INSTALL GROUNDWATER MONITORING WELL

INSTALL NORTH INFILTRATION BASIN
BOTTOM EL.=251.00'
EMBANKMENT EL.=254.00'

INSTALL CHAIN LINK GATE FOR TOWN OF AYER DPW MAINTENANCE ACCESS

INSTALL SEDIMENT FOREBAY #3 W/ CHECK DAM EL.=254.5

INSTALL DRAWDOWN DEVICE

NO STUMPING AREA

INSTALL GRASS SWALE W/ TURF REINFORCEMENT

INSTALL STONE CHECK DAMS (TYP.)

50' TREE TOPPING AREA

INSTALL SOLAR FIELD ARRAY (TYP)

259.3 HP

260.1 HP

260.5 HP

UNDERGROUND ELECTRIC WARNING SIGNS

UNDERGROUND ELECTRICAL LINE FOR SOLAR FIELD CROSSING SANITARY SEWER EASEMENT TO BE COORDINATED WITH AYER DPW AND WARNING SIGNAGE PROVIDED AT CROSSING, WARNING TAPE OVER LINE IN TRENCH.

INSTALL 8' SOLAR FARM SECURITY FENCING (TYP.)

260.7 HP

261.0 HP

INSTALL WATER QUALTIY SWALE
BOTTOM EL.=256.0'
EMBANKMENT EL=258.00'

SPREAD STOCKPILED LOAM MATERIAL WITHIN FENCED AREA AND RE–SEED DISTURBED UPLAND AREAS WITH NEW ENGLAND EROSION CONTROL MIX (FOR DRY SITES) AT 35LBS/ACRE

260.9 HP

INSTALL STONE CHECK DAM
OVERFLOW EL.=257.50'

258.5 HP

259.2 HP

MATCHLINE–– SEE SHEET C4.3

MATCHLINE–– SEE SHEET C5.2

EMERGENCY VEHICLE TURNAROUND REMOVED PER AYER FIRE PREFERENCE TO REMAIN OUTSIDE GATED SOLAR FARM

SMH#1

SMH#2

TRAIL

DRAWING ISSUED FOR:

- ☐ CONCEPT
- ☐ CONSTRUCTION
- ■ PERMIT
- ☐ CONSTRUCTION RECORD

THIS DRAWING MAY NOT SHOW CONSTRUCTION DETAILS AND SPECIFICATIONS FOR ALL PROPOSED IMPROVEMENTS, AND MAY NOT IDENTIFY ALL CONSTRUCTION WORK ITEMS/AREAS OF CONTRACTOR JURISDICTION.

COMMONWEALTH OF MASSACHUSETTS
NICHOLAS M. PAULING
CIVIL
No. 47114
REGISTERED PROFESSIONAL ENGINEER
10/19/2020

PER 250 CMR 5.03(13), THE FOLLOWING ARE EXCLUDED FROM THE PROFESSIONAL ENGINEER'S RESPONSIBILITY: ALL BOUNDARY INFORMATION; LOCATION OF EXISTING STRUCTURES, TREES, UTILITIES, TOPOGRAPHY OR SIMILAR FEATURES; DESIGN OF RETAINING WALLS, PROPRIETARY EQUIPMENT. SEE EXISTING CONDITION NOTES.

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SOLAR PHOTOVOLTAIC PROJECT

AYER SOLAR IIB SITE PLAN (NORTH)

AYER SOLAR IIB PROJECT
0 WASHINGTON STREET
AYER, MA

OWNERS:
TRIPLE AE GROUP LLC
67 HARWOOD AVE
PO BOX 2325
LITTLETON, MA 01460

COWFIELD REALTY TRUST II
C/O CALVIN E. MOORE
39 MAIN ST, STE.303
AYER, MA 01432

APPLICANT:
AYER SOLAR II LLC
2960 HEATHER WAY
SUITE 100
ANN ARBOR, MI 48104

DES. BY: KFB	DATE: FEBRUARY 2020	JOB 171002	C5.1
CHK. BY: DEM			

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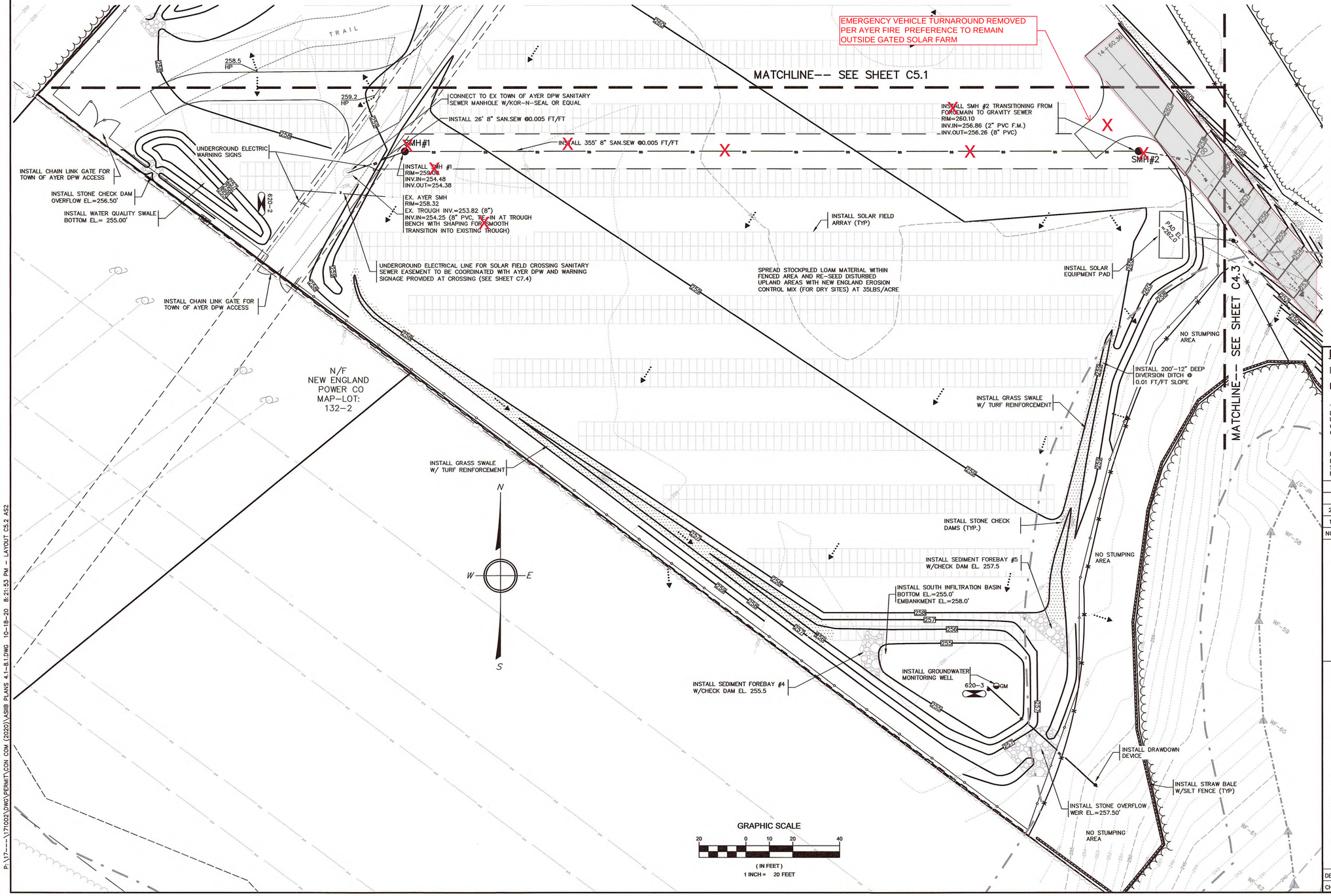

SANITARY SEWER PLACEMENT NOTES:

1. THE LOCATION OF THE SOLAR ARRAYS ARE APPROXIMATE PER THE BEST INFORMATION AVAILABLE, AND ARE SUBJECT TO FINAL ENGINEERING BY THE ELECTRICAL ENGINEER.

2. DUE TO THE POTENTIAL FOR THE FINAL SOLAR ARRAYS TO CONFLICT WITH THE DEPICTED LOCATION OF THE SANITARY SEWER, ANY CHANGES IN THE SOLAR ARRAYS REQUIRE THE REVIEW AND REVISION BY THE SITE CIVIL ENGINEER.

3. SOLAR ARRAY DESIGN CHANGES THAT WOULD PROHIBIT FUTURE EXCAVATION TO THE PROPOSED SEWER LINE AT 1:1 SLOPES WILL REQUIRE A RE-ALIGNMENT OF THE PROPOSED SANITARY SEWER.

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☐ CONCEPT ☐ CONSTRUCTION
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COMMONWEALTH OF MASSACHUSETTS — NICHOLAS M. PAULING — CIVIL — No. 47114 — REGISTERED PROFESSIONAL ENGINEER
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SOLAR PHOTOVOLTAIC PROJECT

AYER SOLAR IIB SITE PLAN (SOUTH)

AYER SOLAR IIB PROJECT
0 WASHINGTON STREET
AYER, MA

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SUITE 100
ANN ARBOR, MI 48104

DES. BY: KFB	DATE: FEBRUARY 2020	JOB 171002	C5.2
CHK. BY: DEM			

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Peer Review of Conservation Analysis
Stratton Hill Open Space Residential Subdivision
Preliminary Subdivision Plan

Town of Ayer

Conservation Commission

August 2022

Prepared for:

Ayer Conservation Commission

Prepared by:

Matt Burne, PWS
Senior Ecologist
BSC Group, Boston, MA
BSC Project No. 99017.00

BSC GROUP

Table of Contents

Conservation Analysis for the proposed Stratton Hill Subdivision Ayer, MA

1.0 Introduction

BSC Group, Inc. (BSC) is pleased to submit this report pertaining to our peer review of a Conservation Analysis for the Stratton Hill Open Space Residential Development (OSRD), the *Project*. The Conservation Analysis and supporting documentation were submitted by Dillis & Roy Civil Design Group, the *Representative*, as part of a Preliminary Subdivision Filing received by the Town of Ayer Conservation Commission on June 9, 2022 on behalf of Fox Meadow Realty Corporation and Moulton Construction Corporation, the *Applicants*, with additional representation by Attorney Robert L. Collins.

This report presents the findings and comments of a BSC Senior Ecologist relative to the Town of Ayer Conservation Commission's request for an evaluation of the above-referenced Conservation Analysis pursuant to the Ayer OSRD Regulations and Guidelines and addresses a variety of related questions and concerns expressed in the Commission's Request for Proposals, dated June 24, 2022. Specifically, the Conservation Commission has requested a review of the Conservation Analysis relative to the 18 tasks identified in the Ayer OSRD Regulations and Design Guidelines (2022) and the sufficiency of data presented by the Applicant in their analysis; a review of stormwater basins in their projected locations, especially as relates to the adjacent Long Pond, a regionally significant example of a Massachusetts Great Pond; the resultant Conservation Priority Ranking proposed by the Applicant that should ultimately direct the uses of the Site; analysis of potential impacts of blasting that may be required for the Project; review of potential ecological impacts of the proposed road crossing of the National Grid Right of Way that traverses the middle of the Site; verification of wetland delineation relative to an Order of Resource Area Delineation for the Site; and a permitting review for the Project.

BSC has conducted this Peer Review based on results of a site visit conducted on August 5, 2022 (see Attachment 1) and evaluation of materials submitted by the Applicant, Conservation Commission, and publicly available GIS data using MassGIS MassMapper, including the current USGS topographic map, Wellhead and Surface Water Protection Areas, FEMA Flood Zone maps, NHESP data, US Department of Agriculture soils data, Areas of Critical Environmental Concern (ACECs), Outstanding Resource Waters (ORWs) and public Water Supply resources.

1.1 Materials Reviewed

BSC has evaluated the following materials as part of our peer review of this Project:

- Preliminary Subdivision filing for Stratton Hill OSRD, received by the Town of Ayer, including:
  - "Preliminary Subdivision & Open Space Residential Development Plan in Ayer," last revised 7/22/2022
  - "Application Narrative," Robert L. Collins, June 1, 2022
  - "Conservation Analysis Pursuant to 10.1 of the Ayer Zoning Bylaw," Dillis & Roy Civil Design Group, June 30, 2021, revised August 18, 2021
  - "Rare Herpetofaunal Investigation, Sandy Pond Road, Groton, Massachusetts," Oxbow Associates, Inc., January 30, 2004

  - "Open Space Residential Development" letter, Dillis & Roy Civil Design Group, August 18, 2021
- "Stratton Hill Definitive Subdivision" Planning Board presentation slide deck, July 27, 2021
- Ayer OSRD Regulations and Design Guidelines, June 14, 2022
- Ayer Subdivision Regulations, March 10, 2020
- Ayer Zoning Bylaw, last amended October 28, 2019

Comment 1: BSC notes that the North Arrow on Sheet No. C1.1 of the revised Preliminary Subdivision Plan, Key Sheet, is incorrectly oriented.

1.2 Wetland Resource Areas

BSC has evaluated the wetland lines shown on the Preliminary Subdivision Plans for consistency with the delineation approved in an Order of Resource Area Delineation as represented in the "ANRAD Key Sheet, Stratton Hill (Off Wright Road), Ayer, Massachusetts," prepared by Ducharme & Dillis Civil Design Group, dated 3/20/20 and last revised 11/2/20. BSC notes no discrepancies between the resource area delineations as shown on the ANRAD plan and the Preliminary Subdivision & Open Space Residential Development Plan presently under review. We do note that the latter uses symbology that makes distinguishing wetland lines from topographic lines very difficult.

Comment 2: BSC recommends that the Preliminary Subdivision Plan set be revised to more clearly distinguish wetland lines from topographic lines as shown on plan sheets. Use of different symbology or color may help clarify information presented on final plans.

The Conservation Analysis includes a FEMA Flood Map (p15) with Flood Zone A occurring on the Site. This resource area (BLSF) does not appear to be shown on the Preliminary Subdivision Plans reviewed as part of this Peer Review. Regulatory Buffer Zones are also not apparent on the Preliminary Subdivision Plans.

Comment 3: BSC recommends that the Preliminary Subdivision Plan set be revised to clearly show BLSF and regulatory Buffer Zones.

2.0 Conservation Analysis Review

BSC has evaluated the Applicant's submission as it relates to the 18 Submittal Requirements for Conservation Analysis in the Ayer OSRD Regulations and Guidelines (2022).

CA Requirement	Evaluation

1	Site Context Map	The Applicant's Conservation Analysis provides site context mapping on pages 3 and 4 showing abutting parcel information contained in Ayer and Groton GIS data as directed in the *Guidelines*. The abutting open space areas, existing residential development are discussed in Section 1.0 Site Location and Regional Setting.
2	Topographic Analysis	Section 1.0 Site Location and Regional Setting presents the percentage of area on the Site with three slope categories, <10%, 10-20%, and >20%. The Topographic Exhibit Plan, Appendix D, (p85) graphically shows topographic areas with slopes exceeding 20%. BSC noted that in some areas of the Topographic Exhibit Plan that topography lines were not consistently represented at 2-foot intervals, in some locations showing fewer increments than required, though this does not necessarily affect the usefulness of this mapping. BSC notes that the scale identified on the Topographic Exhibit Plan is one-inch equals 150 feet. While the Submittal Requirements for Conservation Analysis state that the topographic map "should have a scale of one-inch equals 100 feet or more," we suspect that the intent of this requirement is to provide a closer view of the Site, such as 1:80 or 1:60. Mapping at this scale would have more value in assessing the data comprised of a Conservation Analysis.
3	Delineation of Soil Types	A Web Soil Survey is presented as Appendix C (p54) with an Area of Interest (AOI) defined totaling 146 acres (p57). The filing also includes USDA NRCS soil survey descriptions for each of 10 mapped soil units. The Applicant does not provide any functional evaluation of soils, such as suitability for crops, pasture, woodland, wildlife habitat, etc. as specified in the *Guidelines*. The data are presented but not analyzed in any meaningful way. A Prime Farmlands Map is presented on p12, though BSC notes that the figure in the Conservation Analysis does not match the current Prime Farmland Soils data in MassGIS as cited.
4	Wetlands and Buffer Zones	Wetlands are shown as approved by the Ayer Conservation Commission in an Order of Resource Area Delineation under MassDEP file number 100-445. See Comment 2 and 3 above.
5	Drainage Description	A Watershed Map is presented in Appendix B (p52) which includes the occurrence of wetlands and several unverified vernal pools, though they are unlabeled on this plan sheet. BSC notes there is no legend on this exhibit. Four (4) unmapped vernal pools are mentioned in Section 2.0 Water Resources. The largest drainage subbasin on the site contributes directly to Long Pond, but this is not discussed as a significant consideration in the resultant Conservation Prioritization.

6	Land within ACEC	The entire site is located within the Petapawag ACEC, acknowledged in one sentence in Section 5.0 Environmentally Protected Areas (p7). The Applicant has not presented any information about the ACEC or its reasons for designation, which might have bearing upon the subject Conservation Analysis.
7	FEMA 100 and 500-year Floodplain	FEMA Flood Zone A occurs on the Site adjacent to Long Pond (Flood Map, p15) and is mentioned in Section 5.0. This wetland resource area is not clearly shown on Project plans and the Site boundaries are not shown on the Flood Map in the report. It is not clear what the extent of FEMA Flood Zone A is on the Site.
8	BioMap2 Data	The Application exhibits BioMap2 Critical Natural Landscape (CNL) in Section 1.0 (p5) showing nearly the entire site located within CNL with the exception of a small segment at the south of the Site. BSC has also looked at the BioMap2 Core Habitat Wetlands, Critical Natural Landscape Upland Buffer of Wetland Core, and Core Habitat Vernal Pool Core data layers, as well as BioMap2 Core Habitat Forest Habitat data layer (Figure 1). These additional data provide important information about the distribution of valuable habitats, both upland and wetland, in the context of this Site. These data should be included in any evaluation of the ecological functions and values of a property.

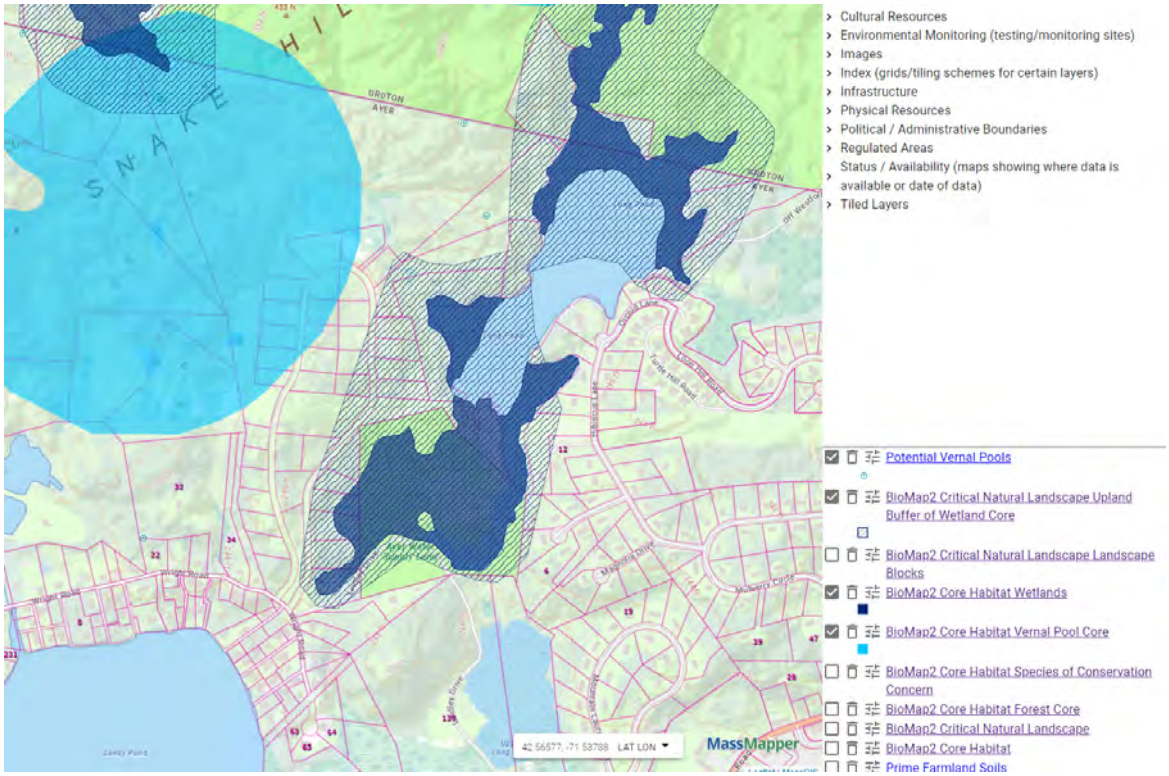


Figure 1a: NHESP BioMap2 Core Habitat Wetlands, Critical Natural Landscape Upland Buffer of Wetland Core, and Core Habitat Vernal Pool Core.

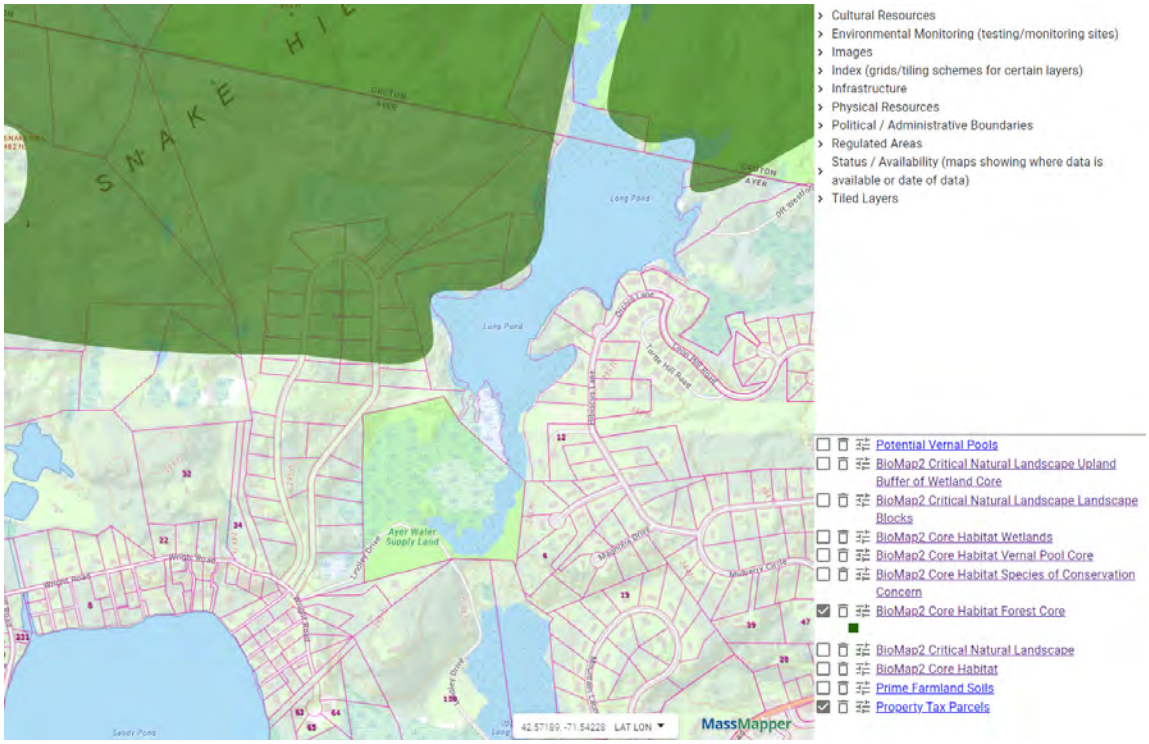


Figure 1b: NHESP BioMap2 Core Habitat Forest Habitat.

9	Wellhead/Aquifer information	The Applicant addresses the absence of Zone I, Zone II, and Interim Wellhead Protection Areas on the Site.
10	Upland Vegetation Analysis	The Conservation Analysis presents a very basic statement about the wooded nature of the Site in Section 1.0 Location & Regional Setting (p4) and an inset figure in Appendix E that shows Existing Land Cover at a scale of 1" = 500'. The Upland Vegetation Analysis is inadequate to use for drawing any conclusions about the comparative ecological value of different areas of the Site. It does not identify specimen trees, address health and condition of each vegetative type, or identify predominant species on the Site. It does not address unique or rare plant species. The inset figure showing land cover types is not useful as shown at 1:500-scale. While arguably a precise interpretation of the requirement for mapping scale in the *Guidelines*, it is not an accurate presentation of data as intended in the Conservation Analysis requirements (see general comments below).
11	Wildlife Movement Corridors	The Conservation Analysis does not address wildlife corridors or isolated natural resource areas. It does not cite (or address the lack of) any regional or local planning documents that might address wildlife habitat and corridors.
12	Wildlife Habitat	The Conservation Analysis addresses wildlife habitat in a paragraph at Section 6.0 of the report and appends the nearly 20-year old Oxbow Associates "Rare Hepetofaunal Investigation" report to address wildlife habitat values on the Site. The UMass CAPS Index of Ecological Integrity (IEI) map is included and shows the entire northern section of the Site, including the National Grid Right of Way ranking as significant to wildlife. There is no functional evaluation of wildlife habitat values on the subject Site presented by the Applicant. The Oxbow Associates report focuses on data collected well to the north of the Site on what is now MassAudubon's Rocky Hill Sanctuary. The powerline Right of Way on the Site was not part of the Oxbow study area, nor did their study include the beaver impoundment, vernal pools, or wetlands on the Site, including Long Pond and its associated wetlands. The Applicant has not addressed any of the functional values of the Site relative to wildlife. It should be noted that the Oxbow Associates herpetofaunal investigation contains data that is sensitive and should not be part of the public record. BSC recommends that the included report be removed or redacted to reduce threats to protected wildlife species. The Natural Heritage & Endangered Species Program should be consulted in regard to the inclusion of this report in any public records.
13	Scenic Vistas	The Applicant does not specifically address any potential scenic vistas. However, the varied topography, changes in elevation, and

		areas of steep slopes may provide interesting scenic vista opportunities both from the Site and from surrounding public ways.
14	Streets and Highways	This topic is not critically evaluated, but given the location of the Site, there are few options to consider under this point.
15	Future Area-wide Plans	The Applicant does not present an evaluation or analysis of potential future uses that might affect the outcome of the Conservation Ranking.
16	Other Infrastructure	Given the existing conditions of the Site, this point is adequately addressed by the Applicant.
17	Cultural and Historic Assets	BSC has verified that there are no MassHistoric Commission Inventory points or areas on or immediately adjacent to the Site. Given the proximity to a Massachusetts Great Pond, BSC recommends that the Applicant obtain an evaluation of the Site from the Massachusetts Historical Commission (MHC) for impacts to archaeological assets and assuring compliance with both federal and state statutes and regulations. Such review would be required if there is a state or federal permit required for the Project (see Project Permitting analysis below).
18	Invasive Species	The Applicant does not address invasive species in the Conservation Analysis. BSC did note the presence of invasive plant species in some locations on the Site.

3.0 Right of Way Values for Wildlife

The proposed Stratton Hill Subdivision is bisected (east to west), by a National Grid power line right-of-way (ROW). Preliminary plans suggest 16 dwelling structures proposed north of the power lines, with the ROW to be transected twice by a paved loop road as proposed. Key impacts of concern include the conversion of ROW habitat to paved roadway, the impacts of the paved roadway on habitat fragmentation, road mortality (particularly for slow-moving species such as amphibians and turtles), and the proximity of the paved roadway to Lower Long Pond and the associated wetland complexes (which are likely to be significant turtle and amphibian habitat).

3.1 Importance of transmission line ROW habitat for wildlife

Transmission line ROWs are characterized by early successional, low-growing vegetation, often dominated by mixed grasses, flowering/fruiting forbs, and scrub/shrub habitat. These conditions arise as a result of vegetation management within ROWs for compatibility with overhead electric lines (i.e. removal of trees, periodic herbicide and mechanical vegetation removal, scrub management, etc.). Within the predominantly forested habitats of New England, transmission line ROWs provide valuable early successional habitats, which are uncommon in the wider landscape. Many species benefit from these habitats; pollinating insects benefit from the higher occurrence of flowering plants found in these open successional habitats (even when the use of potentially harmful herbicides is taken into consideration)[1,2]. Birds and mammals benefit from the high occurrence of berry and fruit producing plants[3], as well as the broader variation in habitat conditions which ROWs provide. ROWs also provide important habitat for

Turtle nesting activity observed at the north road crossing of the ROW

Turtle eggshells and depredated nest

reptiles (in particular turtles), which benefit from the mixture of foraging opportunities, open bare ground suitable for nesting and basking, and adjacent forest areas (for aestivation and overwintering)[4]. While highly mobile species (birds and insects) are less likely to be impacted by the transmission line ROW being transected by the residential roadway, less mobile species (particularly turtles and amphibians), are.

[1] David L. Wagner, Kenneth J. Metzler, and Henry Frye, "Importance of Transmission Line Corridors for Conservation of Native Bees and Other Wildlife," *Biological Conservation* 235 (July 2019): 147–56, https://doi.org/10.1016/j.biocon.2019.03.042.
[2] Victoria A Wojcik and Stephen Buchmann, "POLLINATOR CONSERVATION AND MANAGEMENT ON ELECTRICAL TRANSMISSION AND ROADSIDE RIGHTS-OF-WAY: A REVIEW," *Journal of Pollination Ecology* 7, no. 3 (2012): 16–26.
[3] W.C. Bramble and W.R. Byrnes, "Thirty Years of Research on Development of Plant Cover on an Electric Transmission Right-Of-Way," *Arboriculture & Urban Forestry* 9, no. 3 (March 1, 1983): 67–74, https://doi.org/10.48044/jauf.1983.019.
[4] Mark Grgurovic and Paul R. Sievert, "Movement Patterns of Blanding's Turtles (Emydoidea Blandingii) in the Suburban Landscape of Eastern Massachusetts," *Urban Ecosystems* 8, no. 2 (June 2005): 203–13, https://doi.org/10.1007/s11252-005-4380-z; Bridget Henning and Leon Hinz, "Conservation Guidance for Blanding's Turtle (Emydoidea Blandingii) | IDEALS," INHS Technical Report (Champaign, IL: Illinois Department of Natural Resources, 2016), https://www.ideals.illinois.edu/items/98191.

3.2 Potential environmental impacts of the proposed roadway

Roadways have a number of detrimental impacts on the environment, particularly on water quality and aquatic habitats. Roads increase impervious surface area, leading to increased stormwater runoff volume, increased peak discharges, decreased response time making stormwater "flashier," and elevated flood risk[5].

Winter road salting can have highly detrimental effects on water quality and ecological status, with hazards associated with chloride-laden runoff including groundwater contamination; leaching of toxic trace metals; aquatic toxicity effects on fish, amphibians and macroinvertebrates; and impacts on water body stratification and mixing (which in turn can lead to low oxygen conditions and poor nutrient turn-over)[6,7].

Road dust (which washes off the road surface during rainfall events), can also be highly toxic to aquatic environments, containing trace metals such as copper, zinc, and platinum. In urban areas, these can frequently exceed water and sediment quality criteria in receiving waterbodies, leading to significant impacts to the health of aquatic organisms[8]. Road dust can also be a significant source of microplastic contamination, which often remains suspended (or settles extremely slowly), in constructed wetlands / detention basins, with the majority of microplastic contamination getting released into open waterbodies[9]. In waterbodies near roads, significant levels of microplastic accumulation can occur in both invertebrates and fish[10]. Road dust also contains compounds derived from rubber vehicle tires, which have been linked to mortality in a number of economically important fish species, including brook trout, rainbow trout, and some species of salmon[11]. While the road for the new subdivision will likely generate relatively low levels of contamination (due to the small size of the road, and relatively low traffic volume into the residential area), the paved driveways within the subdivision will also contribute to the contaminant load. As the toxicity effects from road runoff are cumulative, and many of the compounds involved are not effectively removed by conventional stormwater management devices, each new road and driveway adds to the cumulative water quality impacts.

Although stormwater management facilities (such as detention basins, roadside swales etc.), can mitigate for some of the above impacts, these measures rarely capture all stormwater pollution, and cannot fully mitigate for the combined impacts from road development and increased impervious surface areas[12]. The e

[5] Tony Wong, Peter Breen, and Sara Lloyd, "Water Sensitive Road Design - Design Options for Improving Stormwater Quality of Road Runoff," Technical Report (Canberra, AUS: Cooperative Research Centre for Catchment Hydrology, University of Canberra, 2000).
[6] Stuart E.G. Findlay and Victoria R. Kelly, "Emerging Indirect and Long-Term Road Salt Effects on Ecosystems," *Annals of the New York Academy of Sciences* 1223, no. 1 (2011): 58–68, https://doi.org/10.1111/j.1749-6632.2010.05942.x.
[7] J. Marsalek, "Road Salts in Urban Stormwater: An Emerging Issue in Stormwater Management in Cold Climates," *Water Science and Technology* 48, no. 9 (November 1, 2003): 61–70, https://doi.org/10.2166/wst.2003.0493.
[8] Hyun-Min Hwang et al., "Review of Pollutants in Urban Road Dust and Stormwater Runoff: Part 1. Heavy Metals Released from Vehicles," *International Journal of Urban Sciences* 20, no. 3 (September 1, 2016): 334–60, https://doi.org/10.1080/12265934.2016.1193041.
[9] Sirajum Monira et al., "Understanding the Fate and Control of Road Dust-Associated Microplastics in Stormwater," *Process Safety and Environmental Protection* 152 (August 1, 2021): 47–57, https://doi.org/10.1016/j.psep.2021.05.033.
10 Stephanie B. LaPlaca and Peter van den Hurk, "ACCUMULATION OF MICROPLASTIC AND MICRORUBBER PARTICLES IN STORMWATER POND FISH AND INVERTEBRATES," preprint (Zoology, March 4, 2022), https://doi.org/10.1101/2022.03.03.482888.
11 Markus Brinkmann et al., "Acute Toxicity of the Tire Rubber-Derived Chemical 6PPD-Quinone to Four Fishes of Commercial, Cultural, and Ecological Importance," Environmental Science & Technology Letters 9, no. 4 (April 12, 2022): 333–38, https://doi.org/10.1021/acs.estlett.2c00050.
[12] Anne J. Jefferson et al., "Stormwater Management Network Effectiveness and Implications for Urban Watershed Function: A Critical Review," *Hydrological Processes* 31, no. 23 (2017): 4056–80, https://doi.org/10.1002/hyp.11347.

fficacy of stormwater management systems declines over time, and facilities are not always managed properly to ensure ongoing functionality.

3.3 Potential wildlife/ecological impacts of the new roadway

As currently proposed, the existing transmission line ROW will be transected twice by a paved loop road, providing access to 16 residential properties on the north side of the ROW. Although it is assumed that the access road will provide vehicle access at relatively low speeds, this still provides a significant obstacle to migrating turtles and amphibians, which are likely to use both the wetland complexes to the east of the development, and the transmission line ROW to the west. Both turtles and snakes will avoid road crossings[13], resulting in disruption of their usual migration pathways, and potentially higher energy costs associated with "walking the long way round." Likely of greater impact however is the high levels of road mortality experienced by reptiles and amphibians[14], even on relatively low-speed, residential roads. Road mortality impacts on freshwater turtles can result in population level changes, particularly associated with the disproportionate road mortality risk to nesting females – female turtles tend to cross roads more frequently (in search of nest sites), and the loss of a single female turtle with eggs represents a greater population impact than the loss of a single male. The disproportionate mortality of female turtles can in turn lead to skewed sex ratios in the population, and skewed age structure (with the loss of eggs reducing the number of juvenile turtles in the population)[15].

Residential developments also pose a population risk to freshwater turtles by increasing the density of meso-predators into the area (including rats, racoons, skunks, and chipmunks)[16], direct habitat loss (paving over of areas for driveways, lawns, buildings, etc.), and habitat fragmentation (roads, driveways, and fences all block nest/breeding pond migration pathways)[17].

3.4 Recommendations Relative to the National Grid Right of Way

Comment 4: Reduce habitat fragmentation (particularly between wetlands and early-successional ROW habitats), by eliminating the section of loop road which transects the ROW. This would not only significantly improve connectivity between the ROW habitat and the wetlands to the east but would also reduce other impacts associated with the residential development (impervious surfaces, water quality impacts, habitat loss, habitat fragmentation between Lower Long Pond and the westward forest & ROW).

[13] James E. Paterson et al., "Road Avoidance and Its Energetic Consequences for Reptiles," *Ecology and Evolution* 9, no. 17 (2019): 9794–9803, https://doi.org/10.1002/ece3.5515.
[14] Frederic Beaudry, Phillip G. Demaynadier, and Malcolm L. Hunter Jr, "Identifying Hot Moments in Road-Mortality Risk for Freshwater Turtles," *The Journal of Wildlife Management* 74, no. 1 (2010): 152–59, https://doi.org/10.2193/2008-370; Chantel E. Markle et al., "The True Cost of Partial Fencing: Evaluating Strategies to Reduce Reptile Road Mortality," *Wildlife Society Bulletin* 41, no. 2 (2017): 342–50, https://doi.org/10.1002/wsb.767.
[15] David A. Steen and James P. Gibbs, "Effects of Roads on the Structure of Freshwater Turtle Populations," *Conservation Biology* 18, no. 4 (2004): 1143–48, https://doi.org/10.1111/j.1523-1739.2004.00240.x.
[16] Michael D. Knoerr, Gabrielle J. Graeter, and Kyle Barrett, "Hatch Success and Recruitment Patterns of the Bog Turtle," *The Journal of Wildlife Management* 85, no. 2 (2021): 293–302, https://doi.org/10.1002/jwmg.21989.
[17] Michael T. Jones and Paul R. Sievert, "Elevated Mortality of Hatchling Blanding's Turtles (Emydoidea Blandingii) in Residential Landscapes," *Herpet Conserv Biol* 7, no. 1 (2012): 89–94.

Comment 5: Reduce the number of crossings of the ROW with a dead-end roadway design servicing the northern section of the proposed project.

Comment 6: If the development of the loop road into a paved residential street is unavoidable, consider installation of wildlife underpasses[18,19], with well-maintained fencing along the entire perimeter[20] of the residential development. Fencing and suitable underpasses (designed to accommodate a range of wildlife), will need to be maintained in perpetuity to prevent road crossings.

Comment 7: Reduce the number of residential lots in proximity to Lower Long Pond, and/or relocate lots further away from the pond to reduce stormwater impacts, and to reduce impacts to turtle nesting and migration habitat (both direct impacts from habitat loss, and indirect impacts from residential encroachment close to turtle habitat - habitat fragmentation, increased road mortality, increased nest predation, etc.).

Comment 8: Reduce water quality and stormwater impacts from impervious areas (including the road, driveways and roofs), by implementing Low Impact Development (LID) strategies, including:

- reducing the extent of impervious surface areas (consider alternatives like gravel and porous paving for driveways);
- Installation **and maintenance** of rain gardens at each property (for roof and lot runoff);
- Installation **and maintenance** of bioretention areas, rain gardens, swales and detention ponds in shared green spaces;
- Installation **and maintenance** of oil and grease separators for pre-processing of stormwater (particularly from road and driveways, where vehicle leaks are more likely to result in these contaminants);
- Planting of trees and native vegetation (rather than lawn/turf grass), in shared green spaces.

Comment 9: Restrict the application of salt on the road and private driveways – avoid "eco-friendly" deicing products, which may in fact have a higher aquatic toxicity than normal road salt (sodium chloride - NaCl)[21].

4.0 Stormwater Management Habitat & Wildlife Impacts

The current preliminary subdivision plans include theoretical stormwater management features apparently based on the earlier subdivision conceptual plans. Basin locations are shown to be further away from road

[18] Delia R J Kaye et al., "SPOTTED TURTLE USE OF A CULVERT UNDER RELOCATED ROUTE 44 IN CARVER, MASSACHUSETTS," *ICOET Proceedings*, 2005, 8.
[19] Paul C. Heaven, Jacqueline D. Litzgus, and M. Tim Tinker, "A Unique Barrier Wall and Underpass to Reduce Road Mortality of Three Freshwater Turtle Species," *Copeia* 107, no. 1 (February 2019): 92–99, https://doi.org/10.1643/CH-18-137.
[20] Markle et al., "The True Cost of Partial Fencing."
[21] Patricia Leigh Gillis et al., "The Relative Toxicity of Road Salt Alternatives to Freshwater Mussels; Examining the Potential Risk of Eco-Friendly De-Icing Products to Sensitive Aquatic Species," *ACS ES&T Water* 1, no. 7 (July 9, 2021): 1628–36, https://doi.org/10.1021/acsestwater.1c00096.

infrastructure than is likely necessary, which would increase the overall impacts to the landscape and potentially result in harm to the environment that could be avoided. The stormwater management system has not been designed for the subdivision yet, so our review and comments are made in the abstract, with the intent to provide some insight that might guide the eventual design of such systems with a reduced impact footprint on the Site.

4.1. Potential environmental impacts of stormwater management systems

Some traditional stormwater management techniques and their possible limitations and potential ecological impacts are presented in Table 1.

***Table 1**: Common stormwater mitigation techniques, and their limitations and potential ecological impacts.*

Technique	Description	Limitations / Potential Impacts
Deep sump catch basins	Underground retention systems which trap trash, debris, and coarse sediment, and temporarily trap oil/grease.	Limited pollutant removal. Expensive to empty and maintain (which can lead to them being neglected and becoming ineffective) – it is difficult to enforce/ensure continued maintenance of these devices in the long term. Entrapment hazard for amphibians and small animals. No groundwater recharge.
Proprietary separators (various types & manufacturers)	A follow-through structure with units to remove sediment and other pollutants (depending on manufacturers specification).	Variable efficacy/reliability. Depending on the type of separator, not all pollutants will be effectively removed. Costly to maintain in good working order (which can lead to them being neglected and becoming ineffective) – it is difficult to enforce/ensure continued maintenance of these devices in the long term. No groundwater recharge.
Wet detention basins and Constructed stormwater wetlands	Both rely on water storage, followed by vegetation uptake, retention and settling.	When managed correctly (to prevent sediment accumulation and vegetation growth from filling in the basin/wetland), detention basins can be effective at removing sediments, pollutants, and reducing nutrient enrichment[22]. However, they must have sufficient size and depth to properly settle sediments and pollution[23], otherwise they may lead to increased pollution inputs to neighboring waterbodies. Wet detention ponds can provide flood water storage, and attractive habitats for wildlife (including birds and amphibians). However, they may impact bird[24] and a[25]mphibian health and breeding success through contamination – it is unclear whether detention ponds

[22] William W. Walker, "Phosphorus Removal by Urban Runoff Detention Basins," *Lake and Reservoir Management* 3, no. 1 (January 1, 1987): 314–26, https://doi.org/10.1080/07438148709354787.
[23] Peter Starzec et al., "Technical and Environmental Functioning of Detention Ponds for the Treatment of Highway and Road Runoff," *Water, Air, and Soil Pollution* 163, no. 1 (May 1, 2005): 153–67, https://doi.org/10.1007/s11270-005-0216-y.
[24] Donald W. Sparling, John D. Eisemann, and Wayne Kuenzel, "Contaminant Exposure and Effects in Red-Winged Blackbirds Inhabiting Stormwater Retention Ponds," *Environmental Management* 33, no. 5 (September 1, 2004): 719–29, https://doi.org/10.1007/s00267-003-0058-6.
[25] Matthew T. Gallagher et al., "The Role of Pollutant Accumulation in Determining the Use of Stormwater Ponds by Amphibians," *Wetlands Ecology and Management* 22, no. 5 (October 1, 2014): 551–64, https://doi.org/10.1007/s11273-014-9351-9.

		generally provide a net benefit or harm (i.e. population "source" or "sink"), for wildlife, with researchers finding mixed results across taxa. If wet detention basins are not functioning properly, they can release contaminated discharge (including sediment and heavy metals) to open waters[26], and potentially increase the risk of groundwater contamination (particularly if the basin is in a sandy area or one with a shallow water table)[27]. Constructing detention basins in a series, so that water discharged from one flows to the next (and properly maintaining all ponds), can improve both their pollution retaining potential, and the amount of habitat they provide. Similarly, ensuring that detention basin outfalls are well set back from the receiving water body, and that the outfall is naturally vegetated, can further improve discharged water quality[28].
Dry retention basins	Dry retention basins are vegetated depressions which collect stormwater runoff during high flow periods, and allow this to infiltrate into the ground. During normal operating conditions, the basin is dry, only collecting water during high flow events.	Dry retention basins have the benefit of being dry most of the time (and thus not providing breeding pools for mosquitos). However, this means that they do not provide the aquatic habitats of wet basins or constructed wetlands, and that successful planting can be more difficult (as vegetation will need to tolerate both wet and dry conditions). There is a tendency for dry basins in residential areas to just be planted with lawn grass/turf (and mown), which reduces their efficacy, and also does not provide any habitat benefits for wildlife. However, dry retention basins can provide improved water quality, even when they are not managed[29]. Similar to wet detention basins, there is an increased risk of groundwater contamination[30], particularly if the retention basin is mown and spread with fertilizer (as often happens in residential areas).

[26] David A. Lieb and Robert F. Carline, "Effects of Urban Runoff from a Detention Pond on Water Quality, Temperature and Caged Gammarus Minus (Say) (Amphipoda) in a Headwater Stream," *Hydrobiologia* 441, no. 1 (December 1, 2000): 107–16, https://doi.org/10.1023/A:1017550321076.
[27] David Fischer, Emmanuel G. Charles, and Arthur L. Baehr, "Effects of Stormwater Infiltration on Quality of Groundwater Beneath Retention and Detention Basins," *Journal of Environmental Engineering* 129, no. 5 (May 2003): 464–71, https://doi.org/10.1061/(ASCE)0733-9372(2003)129:5(464).
[28] Deonie Allen, Heather Haynes, and Scott Arthur, "Pollution from Urban Development and Setback Outfalls as a Catchment Management Measure for River Water Quality Improvement," April 1, 2016, EPSC2016-18241.
[29] Austin D. Wissler, William F. Hunt, and Richard A. McLaughlin, "Hydrologic and Water Quality Performance of Two Aging and Unmaintained Dry Detention Basins Receiving Highway Stormwater Runoff," *Journal of Environmental Management* 255 (February 1, 2020): 109853, https://doi.org/10.1016/j.jenvman.2019.109853.
[30] Fischer, Charles, and Baehr, "Effects of Stormwater Infiltration on Quality of Groundwater Beneath Retention and Detention Basins."

Bioretention basins / rain gardens	Bioretention is a technique that uses soils, plants, and microbes to treat stormwater before it is infiltrated and/or discharged. Usually, a well-drained bed of sandy soil is spread with loam, and then planted with native vegetation to adsorb and absorb sediments and pollution.	Can be effective at removing sediment (and some pollutants), reducing surface flow and increasing infiltration and groundwater recharge in small, localized areas. Can be combined with pretreatment controls (such as catch basins), to improve water quality. Effectiveness of bioretention/rain gardens will depend on the vegetation type (native species with complex above ground structures, and a mix of deep and spreading root systems, are the most effective), and maintenance of the area (if vegetation dies, or is mown back, efficacy will be significantly reduced). As well as stormwater control, rain gardens can provide habitat for wildlife, as well as enhanced aesthetic appeal. Rain gardens are most effective when carefully positioned and constructed in higher numbers to promote maximum retention and infiltration of stormwater.
Vegetated swales and drainage channels	These planted areas direct stormwater to detention basins, while also providing some stormwater services themselves (slowing the flow of runoff through vegetation, and providing some infiltration).	Most effective when planted with structurally complex (both above ground vegetation and below ground root systems), native vegetation. There is a tendency for these features (in residential areas particularly), to just be planted with lawn grass/turf (and mown), which reduces their efficacy, and also does not provide any habitat benefits for wildlife.

* *The Massachusetts Stormwater Handbook provides useful advice on the design, management, and relative efficacy of different stormwater management devices.*

4.2. Potential wildlife impacts of stormwater management systems

Stormwater management is an important strategy for mitigating many of the impacts of larger development projects, but a number of adverse impacts can result from their installation and long-term presence on the landscape. Many potential pitfalls are noted above as related to specific structure types, but BSC notes some additional generalized issues that stormwater management features can cause over longer terms.

- **Population sinks** Stormwater management basins that retain standing water during the spring and early summer can provide attractive breeding habitat for a variety of pool-breeding amphibian species. When water infiltrates, egg masses can become stranded and fail as a result. This can cause a reduction in fecundity for a breeding population of amphibians in an area.
- **Water quality** can be impacted as a result of the collection and concentration of pollutants as discussed above. Their eventual release to the environment and increasing the potential direct contact with wildlife that are attracted to stormwater management features can have adverse effects on wildlife populations.

4.3. Stormwater Management Recommendations

Comment 10: Maximize the distance between any proposed stormwater management feature and sensitive environmental resources such as Long Pond, the beaver impoundment, or other jurisdictional wetland resources.

Comment 11: Incorporate LID measures[31] (such as porous paving, rain gardens, swales, vegetated buffer strips, native plantings etc.), extensively throughout the subdivision – the more extensive the LID features, the lower the inputs to stormwater management devices will be, resulting in better performance and a reduction in the frequency with which stormwater devices need heavy maintenance. LID is also important for overall water quality, as not all pollution and runoff can be captured by stormwater management features like detention basins. Preventing the generation of stormwater in the first place is the most effective form of management.

Comment 12: Promote the incorporation of LID features which will provide both stormwater management services, while also improving the ecological integrity or wildlife habitat value of the development (for example, measures such as tree and native vegetation planting, low and no-mow areas, pond and rain garden creation, and the use of green roofs).

Comment 13: Ensure that LID and conventional stormwater management measures are sufficient to cope with expected increases in extreme weather, including periods of drought, extreme rainfall events, and more severe winter storms (due to climate change).

Comment 14: Ensure a management plan is in place to maintain all stormwater management features in perpetuity.

Comment 15: If detention basins are to be constructed (either wet or dry), ensure these are well vegetated with native vegetation, of sufficient size and depth for stormwater storage and settling of contaminants, suitably set back from receiving waters and wetlands to the maximum extent feasible on the site, and ideally have a vegetated outflow (as opposed to a riprap swale) leading to the receiving waterbody. Wet detention basins constructed in a series can also perform a similar cumulative function in reducing pollution runoff.

Comment 16: Consider the positioning of detention basins, swales and other interceptors of stormwater/runoff to not only capture runoff from impervious areas (roads, driveways, roofs, etc.), but also to intercept and filter runoff from lawns (which is often very high in nutrients from fertilizer use).

5.0 Other likely Habitat & Wildlife Impacts of the Subdivision

In addition to the short-term environmental and ecological impacts associated with construction practices (including blasting), and the long-term impacts associated with new road construction and stormwater

[31] Chandana Damodaram et al., "Simulation of Combined Best Management Practices and Low Impact Development for Sustainable Stormwater Management1," *JAWRA Journal of the American Water Resources Association* 46, no. 5 (2010): 907–18, https://doi.org/10.1111/j.1752-1688.2010.00462.x.

management, the conversion of semi-natural forest into residential subdivision will clearly have a significant ecological and environmental impact. In particular, key impacts from the residential development will include:

- Loss of habitat (both forested and scrub/shrub ROW habitats), which will be converted to residential buildings and managed yards/lawns.
- Habitat fragmentation, as the residential development will block migration pathways (particularly for relatively low-mobility animals including turtles, other reptiles, and amphibians). Lawns, driveways, roads, fences, and buildings all represent barriers of variable permeability. Some are completely unpassable (such as buildings), while others are technically passable, but may have a high deterrent effect on wildlife, or increase mortality risk. A telemetry study of Eastern box turtles found survival to be negatively impacted by time spent in suburban areas[32], although occurrence of female turtles seemed to be higher in suburban than forested areas, suggesting residential developments may act as "ecological traps". Similarly, Blanding's turtle occupancy of wetlands has been shown to be negatively related to human land disturbance, and positively related to the presence of undisturbed forest[33].
- Water quality impacts from the conversion of forested land to developed land. In addition to stormwater impacts on water quality, the development of large areas of residential lawn (close to wetlands and great ponds), is likely to result in increased nutrient and herbicide inputs to waterbodies. Herbicide inputs can significantly harm aquatic environments, including mortality of amphibians, plants, and macroinvertebrates[34]. Nutrient inputs also have a strong negative effect on waterbody health, creating algal dominated systems with low mixing, low oxygen, and low ecological value – fertilizer use is widely linked to declines in freshwater quality around the globe[35], and the proximity of residential lawns close to receiving waterbodies is widely associated with degraded water quality[36].

Given that the east side of Lower Long Pond has already been developed into low density residential areas, the west side of the pond provides important connectivity to both the forested landscape and ROW scrub-shrub/early successional habitats. Given that these open, early successional habitats are uncommon in the wider landscape, and connectivity to ROW habitats to the east of the pond is already fragmented (by Hibiscus Lane and Loon Hill Road), further fragmentation to the west of the pond may be detrimental to species which use these early successional habitat types, particularly nesting and foraging turtles.

[32] I. L. Brisbin et al., "A Long-Term Study of Eastern Box Turtles (Terrapene c. Carolina) in a Suburban Neighborhood: Survival Characteristics and Interactions with Humans and Conspecifics," *Urban Herpetology* 373 (2008): 85.
[33] Vincent K. Fyson and Gabriel Blouin-Demers, "Effects of Landscape Composition on Wetland Occupancy by Blanding's Turtles (Emydoidea Blandingii) as Determined by Environmental DNA and Visual Surveys," *Canadian Journal of Zoology* 99, no. 8 (August 2021): 672–80, https://doi.org/10.1139/cjz-2021-0004.
[34] Robert Annett, Hamid R. Habibi, and Alice Hontela, "Impact of Glyphosate and Glyphosate-Based Herbicides on the Freshwater Environment," *Journal of Applied Toxicology* 34, no. 5 (2014): 458–79, https://doi.org/10.1002/jat.2997.
[35] Bijay-Singh and Eric Craswell, "Fertilizers and Nitrate Pollution of Surface and Ground Water: An Increasingly Pervasive Global Problem," *SN Applied Sciences* 3, no. 4 (March 31, 2021): 518, https://doi.org/10.1007/s42452-021-04521-8.
[36] Syma A Ebbin, "Is the Grass Always Greener? Assessing Lawn Care Practices of Connecticut Residents," *Wrack Lines* 99 (2015).

5.1 Recommendations Pertaining to Other Wildlife Habitat Impacts

Comment 17: Restrict the development of residential plots in close proximity to wetlands and great ponds. This could help protect both water quality, and habitat connectivity for turtles and other aquatic animals.

Comment 18: Promote good lawn management practices[48], including reducing fertilizer and herbicide applications to twice a year, avoiding lawn treatment just before rain is forecast, leaving unmown or native-planted buffer edges around lawns, and using slow release and organic fertilizers.

6.0 Stratton Hill OSRD Conservation Priority Ranking

BSC finds that the Conservation Analysis presented by the Applicant does generally address the 18 requirements identified in the OSRD Regulations and Design Guidelines in terms of presenting the data requested. There are some important deficiencies, especially as relates to the evaluation of upland forest cover, wetlands and their functional values (especially Long Pond), wildlife habitat, wildlife corridors, and existing and long-term regional conservation and planning considerations.

Landscape scale data represented by available BioMap2 and UMass CAPS IEI is included in the application but does not appear to have been a factor in the resultant Conservation Priority Ranking.

A Conservation Priority Ranking for the Site is presented in Section 7.0 Areas for Conservation. While BSC agrees that in gross terms, the northern portion of the Site has great importance, the significance of the powerline Right of Way and Long Pond are not adequately addressed. It is noted that the analysis does not indicate the extent of the parcel within each identified zone in terms of simple acreage or overall percentage of the Site.

The “Low Priority” area shown on the Applicant’s Priority Conservation Areas Map appear to be too focused on the previously-delineated lot lines and road alignment, rather than an objective evaluation of conservation values based on the data. It is notable that half of the beaver impounded wetland is included in the “Low Priority” area, where that is one of the more valuable wetland features on the site. The entire powerline Right of Way is classified as Low Priority.

The Applicant does not make clear what is intended by the “Medium Priority” area. This area comprises beaver impounded wetland, vernal pools, walking trails, the steeply sloped portion of the watershed to Long Pond and its associated wetlands. These are all features with significant conservation value.

The prioritization of land within the Site does not appear to follow the *Guidelines* recommended approach of identifying Primary Conservation Areas using the data presented in the Conservation Analysis. This should include a designation of areas protected through local, state, and federal regulations and the landscape scale conservation priorities as indicated in resources such as BioMap2 and the CAPS IEI data and should address issues of relevance to conservation purposes that the Site can support.

BSC recommends that the resulting Priority Conservation Areas Map should follow the Guidelines’ approach of identifying protected areas on the Site, including natural resources and regulatory buffers as high priority areas (the beaver pond and buffers to Long Pond wetlands on the eastern side of the site are examples of features that should be included), and then identify those areas that will form important

connections to the landscape-scale resources demonstrated to be important in the variety of ecological data that is the subject of the Conservation Analysis.

7.0 General Recommendations for the OSRD Guidelines

BSC has considered the overall approach taken in the Ayer OSRD Regulations and Design Guidelines and finds that the data it requires and landscape-level analysis these data can support should provide a robust foundation for effective evaluation of a proposed project site. The actual interpretation of such data and the conclusions that the *Guidelines* seek to draw is a real challenge.

The task of evaluating those data and the resultant assignment of comparative value to portions of a site or among various sites is complex and will benefit by skilled and seasoned interpretation of all the various factors brought to light in the Conservation Analysis.

Comment 19: BSC recommends that the Conservation Commission provide significant guidance on how to assess all of the data requested as part of the Conservation Analysis process or that ecological professionals be required to contribute (at least) to the final analysis and ranking.

One example of relatively subjective measure pertains to the identification of specimen trees as part of the Upland Vegetation Analysis (Requirement 10).

Comment 20: "Specimen Tree" is not precisely defined, and BSC recommends providing more specific parameters pertaining to the designation for non-specialists to employ, or requiring a horticultural, arboreal, or ecological expert to contribute to such an evaluation.

Given the complicated nature of ecological evaluations that are the basis of the Conservation Analysis, BSC recommends that the Conservation Commission require a trained ecologist with suitable expertise and experience to certify the results of the procedures leading to the prioritization of conservation areas within a large development site.

8.0 Project Permitting Assessment

BSC has considered the project as currently proposed and previous permitting history of the proposed Project and finds the following:

Massachusetts Endangered Species Act (MESA)

The Project Site is located within a Natural Heritage & Endangered Species Program (NHESP) Priority Habitat (PH2043) and a similar proposed subdivision was subject to a Conservation and Management Permit (CMP) in 2005 (Conservation Permit No. 03-11701) based on a finding that the combined Rocky Hill & Stratton Hill Residential Developments as proposed at the time would result in the "Take" of four (4) state-listed species. It was also found that the Project would not result in the "Take" of two additional state-listed species known to occur in the vicinity of the Site.

General Condition 1 of the 2005 CMP stated that the work authorized therein "shall be completed within seven (7) years from the date of issuance. If necessary, the Permit Holder shall submit a written request to the Division [of Fisheries & Wildlife] for an extension, at which time the Division will review the Proposed Project pursuant to MESA for impacts to any state-protected rare wildlife or plant species found subsequent to issuance date of the Conservation and Management Permit."

The work permitted under Conservation Permit No 03-11701 was not completed within the permit timeframe established in Condition 1, and BSC has not been made aware of any request for extension of the state CMP being sought for the Site or Project. In the intervening years, two (2) of the four species for which the Division issued the permit have been removed from the state list of rare species. Further, the data underlying the Division's review are constantly updated with new sightings and revisions to mapped habitat, and records upon which earlier permitting decisions were made may have expired. The Agency findings and resultant actions that occurred in 2005 are informative, but do not constitute a current review of the Project.

Comment 21: The Applicant should demonstrate that a new filing has been made with the Division of Fisheries and Wildlife for the proposal currently under review. The Commission should be provided proof of filing of a MESA Project Review Checklist or dated correspondence from the Division stating the Division's disposition toward the Project relative to a Conservation and Management Permit.

Massachusetts Environmental Policy Act (MEPA)

This Project will be subject to review under the Massachusetts Environmental Policy Act (MEPA) and its regulations (301 CMR 11.00 *et seq.*) if there is an "Agency Action" such as an NHESP Conservation and Management Permit (CMP) or any other state permit requirement. MEPA sets project review thresholds that determine the level of review required by the Secretary of the Executive Office of Energy and Environmental Affairs (EOEEA) when there is a state permit that triggers MEPA review if a project exceeds certain thresholds.

The results of a MESA review as discussed above is one determinant of whether there is an Agency Action that will trigger review under MEPA, and the Applicant should verify to the Commission that there are no other state permits required for the Project (a Notice of Intent, if required, does not constitute a state permit in this context). The Project does exceed the Review Threshold at 301 CMR 11.03(11) and may exceed Review Thresholds at 11.03(1) and (2).

301 CMR 11.03(1) sets Review Thresholds for conversion of land. When MEPA review is required for a project, the regulations identify the filing requirements for a project as an ENF and Mandatory EIR if there is direct alteration of 50 or more acres of land or creation of 10 or more acres of impervious surface. An ENF and other MEPA review may be required at the Secretary's discretion if a project proposes direct alteration of 25 or more acres of land or the creation of 5 or more acres of impervious surface.

Comment 22: The Applicant should demonstrate the extent of direct alteration of land, measured in acres, that the project will require to determine which, if any, review threshold is exceeded under 301 CMR 11.03(1).

301 CMR 11.03(2) sets Review Thresholds for projects that propose work within the habitat of state-listed species. When MEPA review is required for a project, the regulations identify the filing requirements for a project as an ENF and other MEPA review if required by the Secretary for projects that propose greater than two acres of disturbance of designated Priority Habitat that results in a take of a state-listed species.

Comment 23: The project as proposed meets the review threshold at 301 CMR 11.03(2) if the Division of Fisheries & Wildlife find that a "Take" will occur for the project as currently proposed and if they require a CMP.

301 CMR 11.03(3) establish the Review Thresholds for projects that propose work within Wetlands, Waterways and Tidelands, though it appears that the Project may not exceed this threshold.

Comment 24: The Applicant should affirm that there are no state permits required associated with wetland alteration that would exceed the review threshold at 301 CMR 11.03(3). This would include an individual Water Quality Certification, for instance.

301 CMR 11.03(11) sets the Review Threshold for projects that propose work within Areas of Critical Environmental Concern. This project located within Petapawag ACEC and therefore exceeds this threshold. MEPA review would include an ENF and other MEPA review if required by the Secretary for any project within a designated ACEC, unless the project consists solely of one single family dwelling.

Comment 25: The Project as proposed meets the review threshold at 301 CMR 11.03(11).

Massachusetts Historical Commission (MHC)

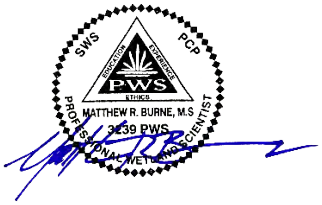
Similar to MEPA review, any "state action" such as a CMP will result in a project review by the Massachusetts Historical Commission (MHC) under 950 CMR 71. Any new construction projects that require funding, licenses, or permits from any state or federal governmental agencies must be reviewed by the MHC for impacts to historic and archaeological properties. Such review is conducted in compliance with M.G.L. Ch 9, §26-27C.

If the Project requires any state or federal permits, a Project Notification Form (PNF) will need to be filed with MHC for this review.

It has been our pleasure to review the Conservation Analysis relative to the Preliminary Subdivision Plan for the Stratton Hill Open Space Residential Subdivision in the Town of Ayer. Please do not hesitate to contact me at 617-896-4594 (office), 857-234-2476 (cell), or at mburne@bscgroup.com with any questions or concerns you may have. BSC appreciates the opportunity to be of assistance to the Commission in this matter.

Sincerely,

BSC Group, Inc.



Matt Burne, PWS
Senior Ecologist

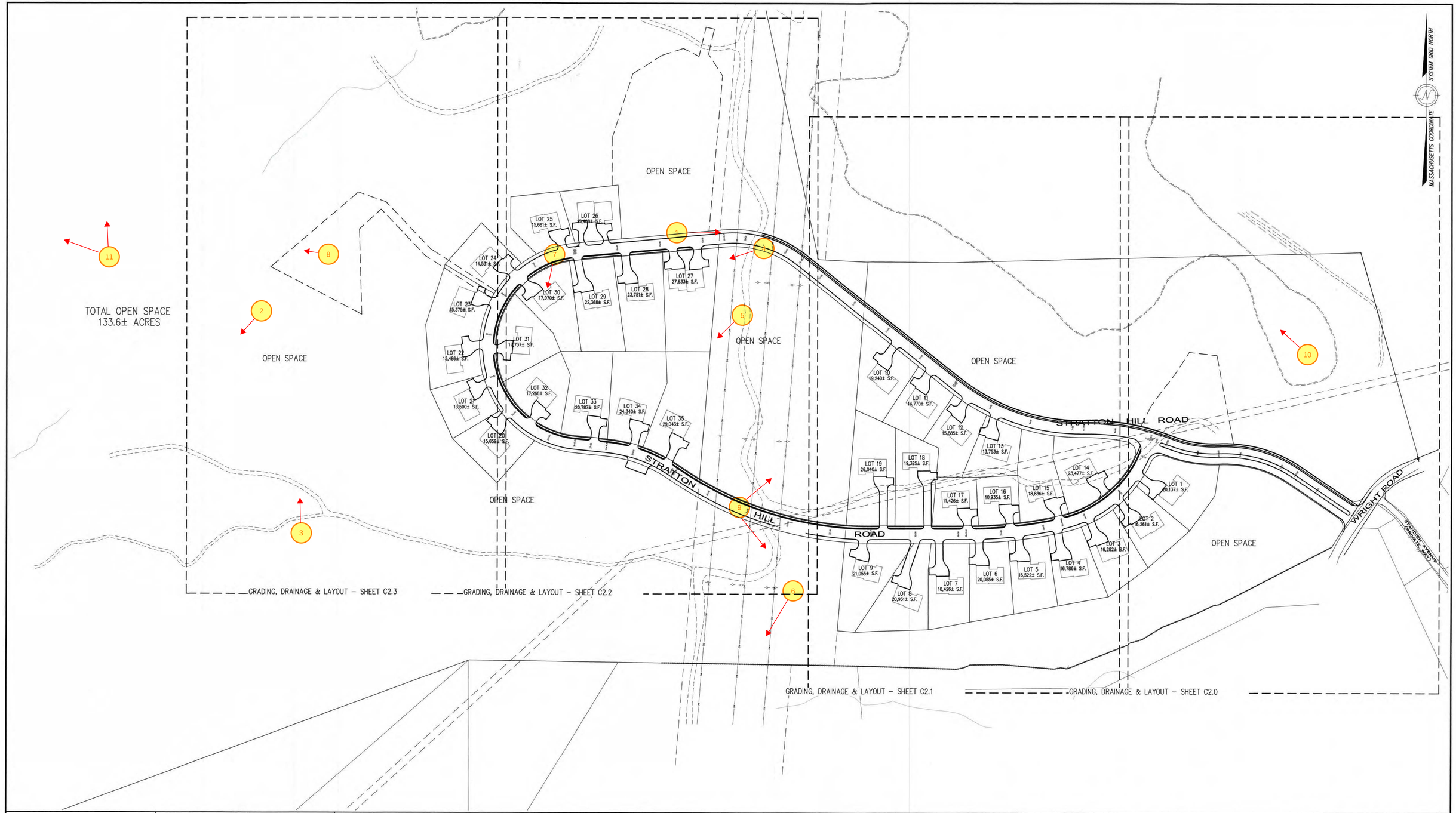
Appendix A

Peer Review of Conservation Analysis
Stratton Hill Open Space Residential Subdivision
Preliminary Subdivision Plan

SITE PHOTOGRAPHS KEY MAP

SITE PHOTOS

BSC GROUP



RESERVED FOR REGISTRY USE

APPROVAL REQUIRED UNDER
THE SUBDIVISION CONTROL LAW
AYER PLANNING BOARD

BEING A MAJORITY
DATE APPROVED: _____
DATE ENDORSED: _____

BSC Group, Inc
Peer Review of Conservation Analysis
Location of Site Photographs
8/5/2022
Matt Burne, PWS

I CERTIFY THAT THIS PLAN CONFORMS TO THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS

COMMONWEALTH OF MASSACHUSETTS STANLEY R. DILLIS No. 33182 PROFESSIONAL LAND SURVEYOR

PROFESSIONAL LAND SURVEYOR DATE

COMMONWEALTH OF MASSACHUSETTS FRANCIS M. MCPARTLAN CIVIL No. 49572 REGISTERED PROFESSIONAL ENGINEER

PROFESSIONAL ENGINEER DATE

DILLIS & ROY
CIVIL DESIGN GROUP
CIVIL ENGINEERS LAND SURVEYORS WETLAND CONSULTANTS
1 MAIN STREET, SUITE 1
LUNENBURG, MA 01462
PHONE: (978) 779-6091
www.dillisandroy.com

PLAN REVISIONS

NO.	DATE:	DESCRIPTION:	BY:
1	7/6/22	GENERAL REVISIONS	SRD
2	7/22/22	REVISE ENTRANCE	SRD

PRELIMINARY SUBDIVISION PLAN
AYER, MASSACHUSETTS
KEY SHEET
STRATTON HILL

DESIGN BY:	DRAWN BY:	CHECKED BY:	SHEET NO.
FMM	SRD	FMM	C1.1
DATE: 7/6/2022	JOB NUMBER: 6083	DRAWING NO. 6083-KEY	

Photo #1: Existing loop road condition with early successional tree growth to the east and mature mixed conifers and hardwoods to the west. *Photo looking south at Lot 27.*

Photo #2: At the far end of the existing loop road, overlooking the isolated wetland (to the right). A sandy spoil pile just beyond the wetland is used extensively by turtles for nesting (inset). *Photo looking north-west.*

Photo #3: Vernal pool (dry) located in the northern portion of the site, to the west of the beaver impounded wetland. *Photo looking east.*

Photo #4: Existing eastern loop road at National Grid Right of Way. Turtle nesting activity observed in bare patch located in center of photo. Turtle nests (inset) *Photo looking south.*

Photo #5: High quality scrub-shrub habitat located on Right of Way. *Photo looking north-west.*

Photo #6: Large vernal pool located in the Right of Way just west of the project Site *Photo looking west.*

Photo #7: Early successional mixed tree and shrub cover along existing loop road at lots 25 and 30. *Photo looking west-north-west.*

Photo #8: Center of proposed detention basin at north of Site. Locating flag (inset). *Photo looking north.*

Photo #9: Existing western loop road at National Grid Right of Way, looking toward Lot 9. *Photo looking south.*

Photo #10: Wetland adjacent to existing stormwater management structures at south end of project Site. Potential vernal pool function but could not be evaluated during site visit. Round basin (inset). *Photo looking north.*

Photo #11a: Beaver impounded wetland north of proposed project. *Photo looking north.*

Photo #11b: Beaver impounded wetland north of proposed project. *Photo looking east.*

Appendix B

Peer Review of Conservation Analysis
Stratton Hill Open Space Residential Subdivision
Preliminary Subdivision Plan

BLASTING IMPACTS

BSC GROUP

Appendix B

Blasting and Habitat / Wildlife Impacts

1.1 *Environmental regulations pertaining to blasting in Massachusetts*

There is little in state regulation pertaining to the protection of wildlife and wildlife habitat from the effects of blasting, beyond material storage, handling, and transport safety.

1.2 *Potential environmental impacts of blasting*

Potential environmental impacts from construction blasting predominantly relate to soil or groundwater contamination. This may include:

- **Chemical contamination of soil or water**: As well as possible perchlorate contamination, if commercial explosives are spilled on the ground or left undetonated at a blast site, they can result in ammonium and nitrate leaching into the soil and/or groundwater[1].
- **Sedimentation / Turbidity:** Impacts to surface waters due to sediment inputs resulting from agitation of the subsurface[2].
- In September 2008, MassDEP issued a memorandum that perchlorate contamination (which is harmful to human health), had been detected in some drinking water supplies in MA, and that this may be linked to near-by blasting operations. As a result, MassDEP recommends that perchlorate-containing explosives should be avoided (where possible) during blasting [3]. More information on perchlorate is available in Clayton Trumpolt et al, 2005[4].

As well as the ecological implications of impacts to water quality, blast vibration damage to water supply wells can impacts drinking water quality and is a common cause of complaints for blasting contractors[5]. *Facts About Blasting for Massachusetts Property Owners*, MA Department of Fire Services 2018 (attached) provides information pertaining to requesting a review of blasting activities for property owners that believe damage has resulted from blasting activity (527 CMR 1.00, § 65.9.18).

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[1] Expert Civil, "Effects of Blasting on Environment," August 13, 2018, https://expertcivil.com/effects-of-blasting-on-environment/.
[2] Brandon Kernen, "Rock Blasting and Water Quality Measures That Can Be Taken To Protect Water Quality and Mitigate Impacts" (NHDES, 2010).
[3] MassDEP, "Potential Environmental Contamination from the Use of Perchlorate-Containing Explosive Products" (MassDEP, September 15, 2008).
[4] Clayton Trumpolt et al., "Perchlorate: Sources, Uses, and Occurrences in the Environment - University of York," *Remediation* 16, no. 1 (2005): 65–89.
[5] G. M. Matheson and D. K. Miller, "Blast Vibration Damage to Water Supply Well - Water Quality and Quantity," May 1, 1997, https://www.osti.gov/biblio/469029-blast-vibration-damage-water-supply-well-water-quality-quantity.

1.3 *Potential wildlife and ecological impacts of blasting*

BSC found very few studies specifically on the impacts of blasting on wildlife, and of these, most relate to large-scale quarrying and mining activities (as opposed to construction blasting). As such, it may be more helpful to consider the individual and cumulative impacts associated with blasting activities on wildlife.

Impacts commonly associated with blasting activities are described below, and those most likely to have a negative impact on wildlife in the surrounding area are highlighted in bold (for further discussion). Direct impacts can include:

- **Ground vibrations** (which can damage structures, trees, and disturb wildlife);
- **Noise** (has a wide range of impacts on wildlife, including scaring animals away from an area, impacting territorial behavior, disrupting breeding, etc.)
- Airblast (change in air pressure during the blast – this will generally have a very small effect area, and is likely of less concern with regard to environmental/ecological impacts),
- Flyrock (stray material can damage buildings and trees and can cause injury to people and wildlife – again, this will have a limited effect area, and would be controlled as part of site safety).
- Generation of fumes and dust (if not properly managed, these could have direct impacts on wildlife, as well as indirect impacts through water quality impacts, smothering vegetation, etc.).

1.3.1 Impacts of Ground Vibrations

Vibration impacts on fish: Construction activities occurring adjacent to water bodies have potential to impact aquatic species by altering conditions in ambient pressure and particle motion in water. While research in the impacts of blasting on fish has only been completed for a small number of species[6], factors to consider include susceptibility to pressure changes (particularly for fish with swim bladders), susceptibility to noise disturbance (for fish which rely on hearing to locate prey), and physical effects of pressure changes (barotrauma).

Unfortunately, little is known about the impacts of blasting on fish, and studies have produced widely differing results as to the distance and pressure thresholds at which physical or behavioral impacts are suggested. It is also hypothesized that vibrations from blasting could negatively impact fish eggs and embryos, but the amplitude of blast induced vibrations at which negative effects may occur is unknown. Many studies into possible vibration impacts on fish have been conducted in lab settings, and do not necessarily represent real-world effects of blasting. Similarly, there is a lack of research on the distance effects of blasting near water.

[6] Federal Highway Administration, "Managing the Impacts of Blast-Induced Vibration and Overpressure on Fish and Fish Habitat," White Paper (US DOT, January 2019).

1.3.2 Impacts of Noise

Many animals (in particular birds[7,8], bats[10, 11]), are sensitive to noise disturbance, particularly during breeding/nesting.

Noise impacts on birds: Impacts of noise on birds can include physiological stress, hearing impairment, and interference with communication (i.e. masking the sound of display or territory calls). Pile driving and blasting (≋100 dBA at 15 m), can potentially cause temporary or permanent hearing impairment in birds[5], while even highway noise as low as 45 dBA can potentially mask acoustic communication and modify breeding and other behaviors in many species. Numerous studies have suggested that many bird species will avoid nesting near noisy areas (such as gas well compressors), and that noise disturbance may affect egg production, incubation, brooding, and nest abandonment (although results are species-specific, with some species highly negatively impacted by noise disturbance, while others appear to be attracted to noisy areas[6,9]. As such, it seems likely that construction blasting activities may impact bird behavior, although impacts are likely to be short-term, and limited to the duration of blasting activity. If blasting was to occur during the bird nesting season, it is possible that birds may be deterred from returning to nest sites in subsequent years (depending on species and nest site fidelity).

Noise impacts on bats: Bats are known to be extremely sensitive to noise, particularly due to their reliance on echolocation for foraging. Traffic noise has a negative impact on bat activity and feeding behavior[10,11], including for Northern long-eared bats *Myotis septentrionalis*. Given that blasting activities are likely to be limited to the daytime (due to zoning regulations on noise disturbance to people), blasting is unlikely to impact bat foraging behavior (which occurs predominantly during dusk). During the daytime, noise impacts may affect roosting bats in the surrounding area, although there is a lack of field research in this area.

Noise impacts on Reptiles and Amphibians: Unfortunately, very little research on noise impacts on reptiles or amphibians exists. While some studies have been done on the impacts of noise on sea turtles, this is generally in relation to seismic refraction or shipping noise and does not translate well into possible noise impacts on freshwater turtles. Similarly, research on noise impacts on amphibians is lacking – laboratory studies and some field observations have suggested that amphibian calling may be impacted by traffic/road noise[12], but the potential for other types of sound to impact amphibians (such as blasting), remains unexplored.

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[7] Catherine Ortega, "Chapter 2: Effects of Noise Pollution on Birds: A Brief Review of Our Knowledge," *Ornithological Monographs* 74, no. 1 (July 2012): 6–22, https://doi.org/10.1525/om.2012.74.1.6.
[8] Edward W. West et al., "Noise Impacts on Birds: Assessing Take of Endangered Species," *The Journal of the Acoustical Society of America* 122, no. 5 (November 2007): 3082–3082, https://doi.org/10.1121/1.2943006.
[9] Tracy I Mulholland et al., "Effects of Experimental Anthropogenic Noise Exposure on the Reproductive Success of Secondary Cavity Nesting Birds," *Integrative and Comparative Biology*, July 20, 2018, https://doi.org/10.1093/icb/icy079.
[10] Domhnall Finch, Henry Schofield, and Fiona Mathews, "Traffic Noise Playback Reduces the Activity and Feeding Behaviour of Free-Living Bats," *Environmental Pollution* 263 (August 1, 2020): 114405, https://doi.org/10.1016/j.envpol.2020.114405.
[11] Andrea Schaub, Joachim Ostwald, and Björn M. Siemers, "Foraging Bats Avoid Noise," *Journal of Experimental Biology* 211, no. 19 (October 1, 2008): 3174–80, https://doi.org/10.1242/jeb.022863.
[12] Andrea Megela Simmons and Peter M. Narins, "Effects of Anthropogenic Noise on Amphibians and Reptiles," in *Effects of Anthropogenic Noise on Animals*, ed. Hans Slabbekoorn et al., Springer Handbook of Auditory Research (New York, NY: Springer, 2018), 179–208, https://doi.org/10.1007/978-1-4939-8574-6_7.

1.4 *Actionable Recommendations for the Town of Ayer*

- BSC has found no clear recommendations in the literature pertaining to the proximity of blasting activity and impacts to aquatic habitats. However, when blasting is being conducted near water, BSC recommends that it be conducted outside of fish spawning/migration periods to minimize the risk of impacts to fisheries resources.
- Blasting should be conducted outside of active breeding bird season, to reduce the risk of negative impacts on bird behavior (i.e reduced foraging success, avoidance of noisy areas, and possible nest abandonment).

Department of Fire Services
Commonwealth of Massachusetts

Facts About Blasting

for Massachusetts Property Owners

www.mass.gov/dfs

Department of Fire Services
Division of Fire Safety
P. O. Box 1025 - State Road
Stow, Massachusetts 01775
978-567-3375 • Fax 978-567-3199

Blasting Facts

- The Institute of Makers of Explosives (IME) reports that in 2012 over 12 million pounds of commercial explosives were sold for use in Massachusetts.
- Explosives are used directly or indirectly in almost every aspect of our lives. Car, trucks, roads, bridges, homes, and office buildings are all built with products that had their origins with explosives. Even baby powder has its origin with explosives!
- Mining and construction are the two most common uses of explosives.

Blasting Regulations

Commercial explosives and the blasting industry are regulated by a number of state and federal agencies. In Massachusetts, 527 CMR 1.00 is the primary regulation that applies to explosives licensing, permitting, storage, sales, use, transportation, and manufacture. 527 CMR 1.00 is administered through the Department of Fire Services, Division of Fire Safety.

Federal agencies that regulate explosives include:

- Alcohol, Tobacco, Firearms and Explosives (ATF) – sales and storage
- Department of Transportation (DOT) – transportation
- Occupational Safety and Health Administration (OSHA) – construction use and handling
- Mining Safety and Health Administration (MSHA) – mining use and handling

Massachusetts Regulations

527 CMR 1.00
Key Parts of the Regulation

Section 1.12.8.39.1 Licenses, Permits, Certificates

Certificate of Competency
Explosives Users Certificate
Use and Handling Permit
Sale of Explosive Material

Section 65.9.1 Storage

Section 65.9.1 Transportation

Section 65 Use of Explosive Materials (Blasting)

Blast Analysis
Blast Design Plan
Allowable Limits of Effects of Blasting
Preblast Inspection Surveys
Blasting Damage Complaint

Section 65.9.15.1.8 - 65.9.15.1.10 Pre/Post Blast Inspection Waiver

Section 65.9.18 Blasting Regulatory Review Form (FP-296)

Important parts of 527 CMR 1.00 for the homeowner to be aware of:

Section 65.9.8 Blast Analysis

A document from the blasting company considering the effects of blasting on adjacent properties.

Section 65.9.8.3 Blast Design Plan

The blast design plan describes the design of the initial blasts and all the necessary safety precautions that will be taken.

Massachusetts Regulations (continued)

Section 65.9.15 Preblast Inspection Surveys

When blasting takes place within 250 feet of a property not owned or controlled by the project, a free survey must be offered to the property owner.

NFPA 495, 2013 Edition Warnings

The blaster must sound warnings when ready to fire a blast.

NFPA 495, 2013 Edition, Chapter 11
Allowable Limits of Effects of Blasting

Limits that are set for vibration and noise that result from a blast. 527 CMR 1.00 Section 65.9.14.4 contains the requirements for the use of a seismograph.

Section 65.9.18 Blasting Regulatory Review

If a property owner thinks that damage occurred as a result of blasting, they should file a regulatory review form with the fire department within 30 days of the blasting.

A Few Things To Remember

If a blasting project is planned near your property, take a close look at your home or business. You may be surprised at how many cracks in walls, floors, and ceilings already exist just from seasonal changes in humidity, age, and normal wear and tear. Most property owners don't notice these cracks until after blasting has started and mistake them for blasting damage.

The limits set for blasting noise and vibration are conservative and are below the threshold of where damage is known to occur.

The limits set in 527 CMR 1.00 are the result of years of study and research by universities and the Federal Government. The United States Bureau of Mines (USBM) RI 8507 Report is the primary source for establishing noise and vibration damage levels.

Who Do You Contact?

In Massachusetts there are two places to go for blasting help.

Local fire departments issue a ***Permit to Blast***. The permit is issued only if all the correct planning has taken place and all other conditions of 527 CMR 1.00 have been met.

Through the Department of Fire Services, the Division of Fire Safety issues ***Blasting Certificates of Competency*** and ***Explosives Users Certificates*** to blasters and blasting companies. Local fire departments will not issue a blasting permit without these documents. The certificates document that the blaster is competent to conduct blasting operations, and that his company has shown evidence of both bonding and the required insurance.

Other Blasting Information

How is blasting noise and vibration measured?

A seismograph is used to measure blasting noise and vibration. Seismographs are set up next to the closest structure to the blast site. The machines record the ground vibration and noise generated by the blast. The information is used to determine if the blast has exceeded limits set in the regulations.

Does the blaster keep records?

The blaster is required to keep detailed records of each blast. The records contain the size, time, and location of the blast, the amount of explosives used, and the results of the seismograph monitoring.

Will you hear or feel the blast?

You may hear or feel a blast depending on your distance from the blasting site. Humans are sensitive to noise and sound. What you feel does not necessarily mean that damage is occurring. Let the blasting company know if you are being startled or if you have other concerns about what is taking place.

What if I am sure that blasting damage has occurred?

If you feel that damage has occurred to your property, fill out a ***Blasting Regulatory Review Form***. The form (FP-296) is available from the local fire department (and on the DFS website under ***Fire Prevention Forms***), and must be submitted to the local fire department within 30 days of the blasting incident. The blasting company will then be required to submit records to the fire department for the blasts in question. The records will be reviewed by both the fire department and the Division of Fire Safety for any violations of the regulations. The blasting company, or its insurance company, is also required to respond to the claimant and to investigate the claim.

What precautions can be taken before blasting starts?

If you are offered a preblast survey, accept the offer. The survey is an inventory of existing conditions of the property. It is also an opportunity for the property owner to ask questions and the blasting company to educate citizens. If you have any concerns or questions, raise them during the preblast survey. The blasting company should be ready and willing to answer questions and address concerns.

Useful Numbers

Department of Fire Services - Stow Headquarters
P. O. Box 1025 – State Road, Stow, MA 01775
(978) 567-3100
www.mass.gov/dfs

Department of Fire Services - Springfield Campus
P. O. Box 51025 - 100 Grochmal Avenue
Springfield, MA 01151-1055
(978) 567-3100, Fax (978) 567-3819

Division of Fire Safety
Main Telephone: (978) 567-3375, Fax: (978) 567-3199

- Code Compliance & Enforcement Unit - Stow
  Telephone: (978) 567-3375, Fax: (978) 567-3199
- Code Compliance & Enforcement Unit - Springfield
  Telephone: (978) 567-3813, Fax: (978) 567-3819

Contact your local fire department at:

www.mass.gov/dfs

Division of Fire Safety
P. O. Box 1025 - State Road
Stow, Massachusetts 01775
978-567-3375 • Fax 978-567-3199

Appendix C

Peer Review of Conservation Analysis
Stratton Hill Open Space Residential Subdivision
Preliminary Subdivision Plan

CONSERVATION RESTRICTION BASELINE DOCUMENTATION

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Appendix C

Conservation Restriction Baseline Documentation

The Ayer OSRD Conservation Analysis (OSRD CA) establishes a robust approach to evaluating a parcel (or parcels) of land to identify those portions of a Site that are most significant to the conservation of natural resources relative to both the parcel itself and the surrounding landscape context. This function is related but somewhat different from the purposes of a Conservation Restriction Baseline Document Report (BDR). Where the OSRD CA is a tool to help identify the most valuable conservation assets on a site and minimize impacts of development, the BRD serves to document existing conditions at the moment that a Conservation Restriction is approved so that future changes are discernable and so that violations of the CR can be enforced.

The eighteen (18) Submittal Requirements for Conservation Analysis provide an effective roadmap for data collection that will be used in a Conservation Restriction BDR. There are additional data collection tasks that should be included in a complete BDR, but a well-performed Conservation Analysis should be an excellent starting point.

Chapter 4 of the Massachusetts Conservation Restriction Stewardship Manual (Massachusetts Audubon Society, March 2006) provides a detailed review of the materials that should be included in a BDR. This manual has been vetted by the state agency responsible for approval of Conservation Restrictions and by the Massachusetts Association of Conservation Commissions and is widely used by land trusts across Massachusetts. There are other, similar manuals and guides available from sources such as the Land Trust Alliance and The Trustees of Reservations (nee The Trustees).

Many of the mapping requirements of the Conservation Analysis should be components of a complete BDR, including the Site Context map, topographic and soils mapping, and natural resources mapping, aerial photographs and site plans.

A critically important component of a BDR is a collection of Baseline Photographs along with a Photo point Map, table of photo point locations, photo log, and Photographer’s Affidavit. These provide a visual record of conditions across the entire site, tied to a physical location (GPS point) at the time that the Conservation Restriction is established. When the holder of a CR attempts to enforce its provisions in the event of a violation or seeks to effectively monitor natural changes over time, photographic evidence of initial conditions are extremely important. Photographs also document the important natural and human-made features of the site for which the CR has been developed.

There are additional recommendations for contents of a comprehensive BDR that are not required in the Ayer OSRD Conservation Assessment Guidelines. These contents are specific to Conservation Restrictions and the documents and procedures required for obtaining state approval of a CR. These include an Abstract, or summary, of the CR, CR history and chronology, executed CR, EOEEA Application, and affidavits of the preparer, Grantor, and Grantee. BDR should also contain a property conditions report narrative that may take a somewhat different form than what is required in the Ayer Conservation Analysis guidelines, but certainly could be compiled or extracted from the required documentation.

Chapter 4 of the Conservation Restriction Stewardship Manual has been attached to this report for reference.

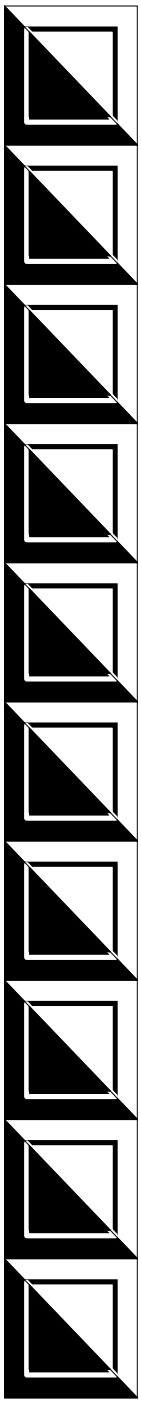
A copy of the Massachusetts Land Trust Coalition, Massachusetts Easement Defense Subcommittee *Conservation Restriction Enforcement Policy Guidelines*, revised April 2006, is also attached for reference.

Section 4
The Baseline Documentation Report

A. Preparing the Baseline Documentation Report

Much of the information required to prepare a Baseline Documentation Report may have been gathered as part of the pre-acquisition review of a conservation restriction The Baseline Documentation Report can be prepared by either a trained staff person or volunteer for the conservation organization or public agency, or by a hired consultant. Typically, preparation of a "basic" Baseline Documentation Report requires a day in the field to verify boundaries, take photographs and document the resources found on the site. Additional time is needed to gather all of the various information that is incorporated into the report. Large or complicated properties will take more time. It is generally preferable to prepare the report when there is no snow cover and when the leaves are off the trees. Such conditions make it easier to find and photograph property boundaries and to locate man-made features like trails and roads.

As conservation organizations and agencies consider how best to ensure that Baseline Documentation Reports are prepared in a timely fashion – and weigh the option of having them done "in house" versus hiring a consultant — factors to take into consideration include the availability of funds, volunteer suitability, staff capacity and the desirability of having such reports prepared in a consistent format. If an organization or agency prepares many Baseline Documentation Reports each year, it may make sense to have a trained staff person who will do this and acquire the needed equipment. Where the need for baselines is occasional, contracting this work to a consultant or a seasonal intern (such as a teacher or graduate student during the summer) may be more efficient. Whatever the approach, it is important to consider preparation of a baseline as an essential part of the project — just as with legal review or survey work. This subject is discussed further in Section 6.



B. Contents of the Baseline Documentation Report

The Baseline Documentation Report is a comprehensive record of each conservation restriction. A sample table of contents appears below and a sample report is included in Appendix B:

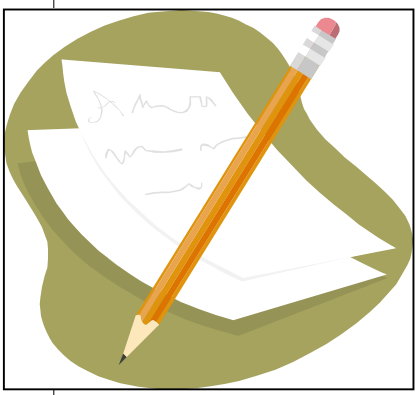
1. Conservation Restriction Abstract
2. Directions to Site
3. Conservation Restriction History and Chronology
4. Property Conditions Report
5. Site Maps
   - USGS Topographical Map
   - Survey or Plan
   - Assessors' or Tax Map
   - Aerial Photograph
   - Navigation Map
6. Baseline Photographs
   - Photopoint Map
   - Table of Photopoint Locations
   - Photolog
   - Photographer's Affidavit
7. Executed Conservation Restriction
8. EOEA Application
9. Preparer's Affidavit
10. Landowner (Grantor) Affidavit
11. Holder (Grantee Affidavit)

This Section describes the process of preparing for a baseline documentation site visit, navigating around the property, taking and documenting photographs and gathering data to be used in the Baseline Documentation Report. It also includes a discussion of how to compile the report. Appendix A contains more detail on the use of Global Positioning Systems (GPS) receivers, Geographic Information Systems (GIS), and aerial photographs.

C. The Baseline Documentation Site Visit — Preparation

It is important that the Baseline Documentation Report be tailored to the specific terms of the conservation restriction. The purposes and prohibitions listed in the conservation restriction may give rise to particular baseline documentation requirements. For example, a prohibition against construction of any kind requires that all existing structures on the property be documented. Without this information it may be difficult to determine if a structure pre-dated or post-dated the conservation restriction — and thus to determine whether its construction is a violation of the terms of the conservation restriction. Similarly, a prohibition against the construction of new roads requires that all existing roads be mapped and the size and type documented. If the purpose is to "protect views of the Charles River from Washington Street", then the Baseline Documentation Report should contain representative photographs and diagrams of these views. If the purpose is to protect one of the few occurrences of an endangered plant species, then photographs of the areas of the property where these plants occur — and of the actual plants — should be included, along with maps and information on how best to find and monitor the local population of this species. If the restriction limits expansion of an existing structure, it is important to document the exterior of the structure and its dimensions, so that when the property is monitored in the future there is a reliable baseline for what existed at the time the restriction was imposed. Similarly any reserved building envelopes should also be documented.

Creating a Conservation Restriction Abstract: The purpose of the Conservation Restriction Abstract is to summarize the information contained in the restriction into one or two pages that can easily be referred to in the field. A completed Conservation Restriction Abstract can be found in the Sample Baseline Documentation Report in Appendix B. Some organizations and agencies find this to be a very helpful and convenient reference, while others prefer to skip this step and always refer to the full conservation restriction when conducting field work.



For baseline documentation and monitoring, the key sections of the conservation restriction are 1) the purposes of the conservation restriction, 2) the identification of the conservation values to be protected, and 3) the prohibited and permitted uses of the property and reserved rights. These key sections should be summarized and entered in the "Summary of Restrictions" section of the Conservation Restriction Abstract.

The purposes may be enumerated in a separate "Purposes" section of the conservation restriction, or contained in the first few paragraphs of the document. The purposes section lays out the essential intent of the restriction, such as "The grantors, in order to insure preservation of the property in its natural, open and scenic condition, hereby grant to the Land Trust of Arlington, a Massachusetts not-for-profit corporation having its principal office in Arlington, Middlesex County, Massachusetts, a perpetual conservation restriction pursuant to Chapter 184, Section 31 et seq. of the General Laws of Massachusetts". In this case the purposes include "preservation of the property in its natural, open and scenic condition."

The conservation values of the conservation restriction, often included in the description of the purposes or listed just below, are the specific features of the property that the conservation restriction is designed to protect. These may be specific resources on the property (e.g., "The Premises include two areas identified as BioMap Core Habitat by the state's Natural Heritage and Endangered Species Program…"), or the public benefit to be derived from the protection of the premises (e.g., "Conservation of the Premises will contribute to the protection of the scenic landscape which is visible from Piedmont Street.").

The prohibited and permitted uses section of a conservation restriction spells out a) activities and uses that are prohibited by the conservation restriction (e.g., destruction of vegetation, construction of any kind), b) permitted uses that would otherwise be prohibited by the terms of the restriction (e.g., cutting of vegetation to maintain trails, or construction of a shed not to exceed 800 square feet in footprint) and c) specific uses that require the prior review

and approval of the holder (e.g., commercial forestry pursuant to an approved forest cutting plan, or construction of an accessory garage within the building envelope shown on the attached plan).

As you prepare for the field visit to the property, make a list of areas to visit such as important natural features, boundaries, and reserved areas for new construction (generally referred to as building envelopes) and note them in the Suggestions for Key Locations/Features to Inspect section of the Conservation Restriction Abstract.

The "Site Visit Notice" section of the Abstract should summarize the amount of notice (if any) that must be given to the landowner for monitoring the conservation restriction (this may be spelled out in a section titled "Access" or contained elsewhere in the conservation restriction). There may be special access provisions, such as the right of the landowner or his/her representative to be present during property inspections. If the conservation restriction is silent on this subject, note the fact that notice is not required (although as noted in Section 5, it is always a good idea to advise the landowner even if notice is not expressly required by the Conservation Restriction).

Directions: Consult a map (e.g. Yahoo Maps or Mapquest) for detailed driving instructions to the property. Use the property maps or plans to locate a corner of the property near the road. Use this information to prepare **Directions to Site** (see Sample Directions in Appendix B).

Property Maps: Gather existing maps of the property that will help you understand the features of the property and its boundaries, including any available survey plans and assessors maps. Draw the property boundaries (by hand or using mapping software, such as GIS) on a recent **aerial photograph** and **USGS topographical map**, and prepare a navigation map showing the corner monuments and the distances and directions of all boundary lines. When you visit the property, follow these directions and make sure they are clear. For more information on USGS maps, aerial photographs and mapping property boundaries, see Appendix A.

What to Bring in the Field

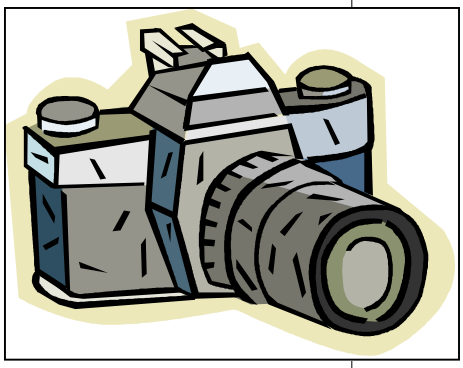
- ☑ Directions to the site
- ☑ A reduced survey plan or other map of the boundaries and monuments with distances and directions of boundary lines. Property descriptions for any areas that are in question.
- ☑ A recent aerial photograph and USGS topographical map with the property boundaries drawn by hand or digitized using GIS (see Appendix A)
- ☑ Compass & 100 foot measuring tape
- ☑ Clipboard, paper, and writing instruments.
- ☑ Plastic sleeves for any important documents
- ☑ If available, GPS with external antenna, fully charged batteries and chart of satellite availability throughout the day of the visit.
- ☑ Camera with charged batteries and film or memory cards
- ☑ Boundary flagging or a pointer
- ☑ A copy of the CR and/or CR Abstract

Contacting the Landowner: Prior to visiting the property to gather information in the field for the Baseline Documentation Report, you should contact the landowner by either letter or telephone to let the landowner know that you will be doing the Baseline Documentation Report, when you will be there, and what kind of information you will be gathering. Find out in advance whether the landowner would like to accompany you on the site. In most cases, the landowner will be in the process of finalizing the terms of the conservation restriction and so they are likely to be able to be of assistance in pointing out areas of the property that require special documentation (e.g., building envelopes or areas where future clearing is proposed). Be aware however, that landowners may not always be clear on the exact locations of property boundaries. When in doubt always check measurements against the survey plan or property description.

D. Photography & Note-Taking in the Field

Photographs are a visual record of the property conditions at or near the time a conservation restriction is recorded. The Baseline Documentation Report should include photographs of the boundary of the property as well as the conservation values to be protected and any man-made features. All images should be in color, using either digital or traditional film photography. Digital photography is discussed in Appendix A.

As you prepare for your property visit, plan a route of travel that will encompass the list of specific areas in the "Suggestions for Key Locations/Features to Inspect" section of the Conservation Restriction Abstract and as much of the boundary as possible. Try to organize your route in a logical sequence. This will make it easier to keep photographs organized and for future monitors to relocate your photopoints.



All photographs should be tied to accurate GPS points (see Appendix A) or permanent features to allow them to be reliably relocated by property monitors in the future. If GPS coverage is not being used, or is temporarily unavailable due to terrain (e.g., deep ravines or dense tree cover), establish photopoints at physical fea-

tures that can easily be located and identified such as intersections of stonewalls, trails, boundary markers or large trees.

For efficiency, take several photographs at each photopoint. For example, take photographs in opposing directions along the boundary line, and then one or more into the restricted area from the same point. Find the compass bearing of each photograph by pointing the compass in the direction the picture was taken, and then moving the bezel to align the north arrow with 0 degrees. Read the azimuth (or compass bearing) at the mark along the centerline of the compass while it is in line with the center of the photograph. For more information on how to use a compass in the field see Appendix A.

Photographs: If the boundary is not marked or well monumented, locate and photograph the boundary first, then move on to photograph other areas. When following a boundary without line markers such as a fence or blazes, locate two boundary markers and then go back and take photographs of the property boundary between them. These techniques will insure that all photographs are taken within the subject property. See Appendix A for information on boundary location.

Boundary photographs should be spaced to give an accurate *representation* of the property conditions along the boundary. One need not document the entire boundary with a series of overlapping photographs. In open areas, one photograph can document several hundred feet. In dense cover or hilly areas, look for vantage points that will allow each photograph to contain as much of the boundary line as possible.

Be sure to document areas of the boundary where future encroachment is likely such as along public roads, where woods roads and trails enter the property, and where an abutting property is actively used up to or near the boundary. Remember that lands that are undeveloped today may be subdivided in the future, so unless abutting land is protected, it is reasonable to assume that encroachments may occur in the future.

Take photographs of the interior to give an accurate representation of the undeveloped portions of the property, to show man-

made features such as buildings, roads and bridges, and to document any of the conservation values identified in the conservation restriction.

Also note and photograph any areas where encroachments from adjacent properties or dumping has occurred on the property. Where appropriate, follow up with the landowner to make sure that they are aware of the situation and will take steps to eliminate the problem.

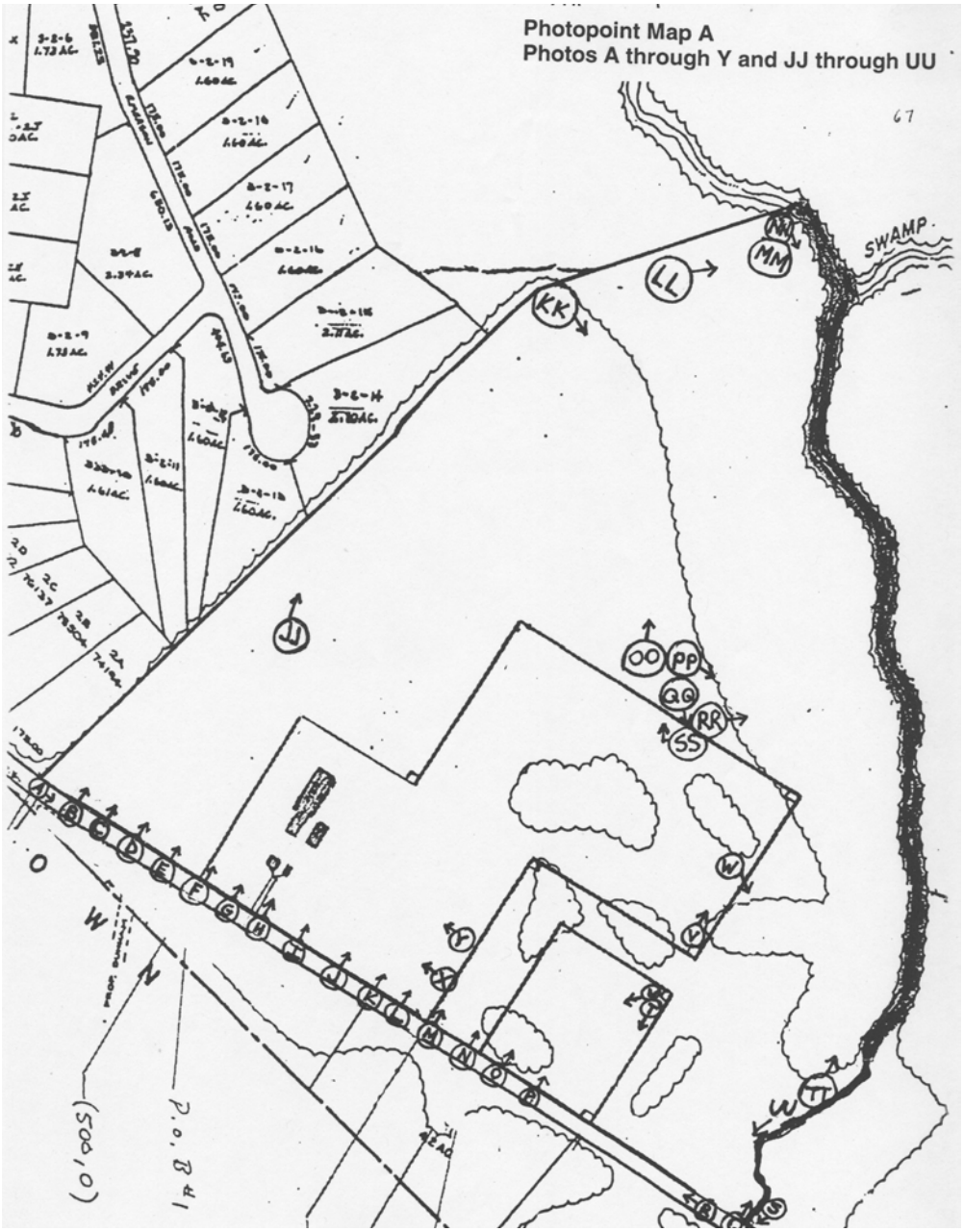
As you take photographs, in some locations it may be helpful to mark the boundary or a particular item of interest in the photograph with a pointer or flagging tape so that it may be more clearly seen in the photograph.

Photography Field Notes: For each photograph, record the date, a photopoint number (i.e., the waypoint number if using GPS), the photograph number (the JPEG number if using a digital camera; roll number and photograph number if using a film camera), azimuth or compass bearing of the photograph, and any nearby boundary marker such as a corner pin or bound, wall, blaze or fence. Some holders take pictures of boundary monuments with enough context in the photo to make them easier to locate next time, especially if GPS is not being used.

Baseline preparers who are not using GPS and GIS will want to annotate a map of the property with photopoint numbers and arrows showing the direction of each photograph. The goal is to have a reference map that allows future property monitors to easily relocate the point from which each photograph was taken in the field. A sample hand-drawn map can be found in Exhibit A.

Write a brief but detailed annotation for each photograph or if your camera permits sound recording, record a brief annotation for each photograph as you take the picture. For example, a photograph along a boundary might be labeled “View north-northeast along boundary back toward corner, restricted area is to the right of the tree blaze in the photograph”. Such details facilitate error checking and correction during the creation of the Photolog. It is critical to make these notes in the field as

Exhibit A—Hand Drawn Photopoint Map*



*Note that the locations of all photopoints are documented in detail on a separate page, allowing them to be relocated in the field.

the photographs are taken, otherwise deciphering the contents of each photo in the office can be extremely challenging, particularly if you are taking photographs in the woods. It may be helpful to bring along a partner to assist in note taking.

When walking the property, take note of the dominant tree and shrub species and any wildlife sightings. This information will be used in the Property Conditions Report to provide information on the habitats found on the property.

E. Wrapping Up the Field Visit:

Depending upon the terms of the conservation restriction, additional field work may be needed. For example, if there are structures included in the restricted area, you may want to photograph and measure the dimensions of the structure, particularly if the CR prohibits or limits any expansion. You should find and photograph any building envelopes that will be included within the CR.

Before leaving the property, make note of any items that will be helpful as you write up your report. Include items such as: wildlife observed, interesting features to visit in the future, boundary conditions (e.g. “the northeast boundary line follows a wire fence for most of its length” or “the northeast corner needs permanent identification”), or information gleaned from discussions with the landowner or neighbors. Other potential items include areas of concern due to current land use or likelihood of future encroachments.

If the landowner lives on the property you should consider stopping by to let the owner know that you have completed your work for the day and see if they have any questions or concerns regarding your site visit.

Make sure to sit down and organize field notes, photopoints, and photographs as soon as possible after the field visit, while the property is fresh in your mind.

F. Compiling the Baseline Documentation Report

Once the Field Visit is complete, the next step is to write and compile the remaining sections of the Baseline Documenta-

tion Report. The following sections are keyed to the sample Table of Contents in the beginning of this section.

The ***Conservation Restriction Abstract*** and ***Directions to Site*** are generally prepared prior to the Baseline Documentation Site Visit, as already discussed above.

The ***Conservation Restriction History and Chronology*** should be prepared by someone familiar with the history of the negotiation of the terms of the conservation restriction. The intent of the History and Chronology is to provide context by chronicling key milestones in the development of the conservation restriction from first contact with the landowner to final negotiations over the terms of the conservation restriction. It is helpful in documenting the intent of the landowner and the holder, and the resolution of any issues that may have come up in the course of the negotiations. It is also a good place to record the rationale behind any unusual provisions in the document. Some preparers also like to include information about the history of the land and its use in this section of the report.

NOTE: As you work your way through this section of the Manual, it may be helpful to refer to the Sample Baseline Documentation Report contained in Appendix B.

The ***Property Conditions Report*** is a narrative description of the property and its condition at the time of the recording. This information should be tailored to the specific purposes and conservation values of the conservation restriction. The *Introduction* briefly describes the subject property and the circumstances of the grant of the conservation restriction. The *Regional Setting* section places the property into the appropriate Ecoregion and Subecoregion (Ecoregions are areas of relatively homogeneous topography, geology, soils, plant and animal habitats as designated by the Massachusetts Ecological Regions Project for the US Environmental Protection Agency and the Massachusetts Department of Environmental Protection). More information is available at: http://www.epa.gov/wed/pages/ecoregions/mactri_eco.htm. *Manmade Features* lists and describes any significant construction, roads, utilities, clearings fences, stone walls, and the boundary monuments.

The *Water Resources* section of the Report describes lakes, ponds, streams or wetlands on the property or fed by its drain-

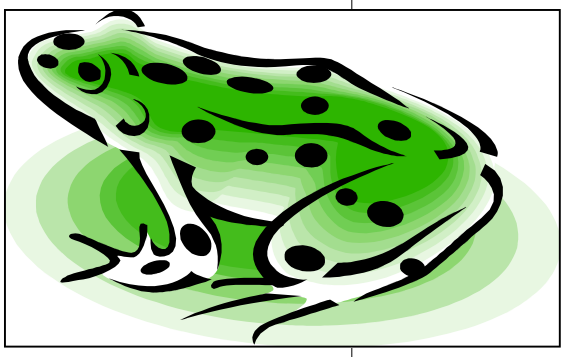
Further Reading:

Classification of the Natural Communities of Massachusetts, Patricia C. Swain and Jennifer B. Kearsley, 2001, Natural Heritage and Endangered Species Program, Massachusetts Department of Fisheries and Wildlife, Westborough, MA

age, as well as drinking water resources. The *Geology, Topography and Soils* section describes the topography and aspect of the site, as well as soils capabilities. *Land Use* characterizes the use of the property itself and that of surrounding lands, and may include references to nearby scenic lands or protected and recreational open space.

Using the information above and the dominant tree and shrub species recorded during the site visit, it may be possible to classify the property into one or more *Natural Communities* based on the classification of the natural communities of Massachusetts prepared by the Natural Heritage and Endangered Species program of the Massachusetts Division of Fisheries and Wildlife (http://www.mass.gov/dfwele/dfw/nhesp/nhclass.htm). By classifying the property into these communities, it is possible to identify plant and animal species that may be present, particularly if the rare species or habitats are present on the property. For example, the Calcareous Rocky Summit/Rock Outcrop Natural Community found on ridge tops and mid-slope ledges in the Western New England Marble Valleys Ecoregion may be home to devil's-bit (*Chamaelirium luteum*), hairy honeysuckle (*Lonicera hirsute*), northern prickly rose (*Rosa acicularis*) and false pennyroyal (*Trichostema brachiatum*), all listed as Endangered by the Commonwealth.

Finally, the *Important Habitat* section highlights those attributes of the property that are the most critical for habitat, including rare plant and animal species. If you need more information on the habitat significance of a particular property, especially if it is mapped as rare species or priority habitat, you can contact the Natural Heritage and Endangered Species Program for more information. They will often request a copy of a topographic map with the property delineated on it. In addition, the landowner may have a listing of species that occur on the property or there may be good natural resources inventory data available that is available to the holder. Include this information in this section of the Baseline Documentation Report. If invasive species are present that could threaten the conservation values of the



property this is a good place to note the species that pose a potential threat to the property and any management recommendations if these species could threaten the conservation values of the property.

The Baseline Documentation Report should contain several different types of ***Site Maps***, including:

- ☑ a map showing the parcel boundaries (drawn digitally or by hand) on a USGS topographical map
- ☑ a map of the boundaries over an aerial photograph taken near the date of the recording of the restriction
- ☑ any available surveys or site plans, or a navigation map that shows the corner monuments and the distances and directions of all boundary lines.

In addition to these maps, there may be other site-specific maps of the property that should be included including forest cover maps, floodplain maps and other resource information.

Photopoint Map: The Photopoint Map shows the location of each photopoint and may also include the direction of each photograph. A sample Photopoint Map made using GPS and GIS appears in Appendix B. If using GPS, the photopoint locations can be exported from the GPS receiver to GIS and then printed over a USGS topographical map or aerial photograph. Photopoints that were not recorded using the GPS receiver but were tied to boundary monuments can be added using the survey measurements and GIS measuring tools. A sample hand-drawn photopoint map for those not using GIS and GPS is found in Exhibit A.

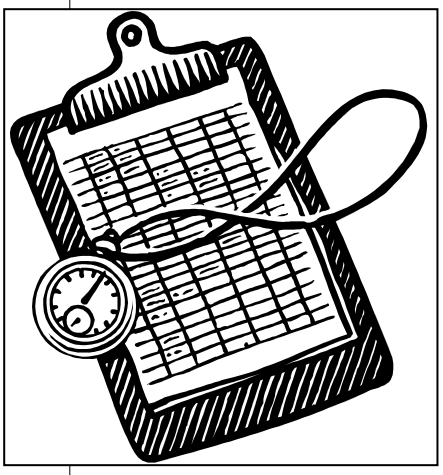


Table of Photopoint Locations: If Photopoints have been gathered using a GPS unit, print out a list of Photopoint Locations in latitude and longitude or Universal Transverse Mercator (UTM) coordinates so that the photopoints can be manually entered into a GPS receiver and relocated in the future. If the photopoints have been exported to GIS, save a copy of the file so that these points can be easily up-

loaded to a GPS receiver for future monitoring.

Photolog: The Photolog is comprised of the baseline visit site photographs captioned with the photopoint number, photograph number (if digital, JPEG), compass bearing, and a brief description. The first page of the Photolog should bear the legend "All photographs taken on (date) by (name), (title)". A photograph caption might read: "Photopoint 7, JPEG 32, Azimuth 50 Degrees: View northeast along boundary wall, showing woods road entering property from the west. The restricted area is to the left of the wall" An example of Photolog can be found in the sample Baseline Documentation Report in Appendix B.

If digital photographs were taken, the Photolog may be prepared by importing the digital image files (e.g., JPEGs) into a word processing program, then adding a caption to each. Digital image files should be downloaded from the camera directly into a folder with the property name, and then written to a non-rewriteable compact disk signed by the photographer. This compact disk should be stored along with the archived original Baseline Documentation Report (see subsection H below**).** Complete and sign the Photographer's Affidavit as well (see example in Appendix B).

If film photography is used, one set of prints should be made for each copy of the Baseline Documentation Report. Every print of each photograph must be annotated with the roll and negative number, and arranged in an archival quality protective photo sleeve. The negatives should be protected in archival quality negative sleeves, labeled with roll and photo number, signed and dated, and placed into the Archive copy of the Baseline Documentation Report (discussed under Baseline Documentation Report Distribution and Storage, below). Complete and sign the Photographer's Affidavit (see sample in Appendix B).

Copies of the ***Executed Conservation Restriction*** and ***EOEA Application and Approval Letter*** are included in the Report for ease of reference.

Affidavits: An affidavit is a written statement, generally sworn to in the presence of someone authorized to administer an oath

such as a notary public. Affidavits are signed by the preparer of the Baseline Documentation Report, the photographer, the landowner and the holder, so that all parties have acknowledged the accuracy of the Baseline Documentation Report. They attest that the materials in the report accurately depict the condition of property at the time of the recording of the conservation restriction. Affidavits may be used to support the validity of a Baseline Documentation Report in future litigation especially if the grantor, preparer or photographer are not available to testify. Sample Affidavits appear in Appendix B.

G. Internal Review and Approval Process

Before the Baseline Documentation Report is sent for the landowner's or grantor's signature, each section should be thoroughly reviewed by another individual conversant with conservation restrictions and familiar with the property. Any errors or inconsistencies in the report, however minor, may be used to undermine its authority in the event of litigation over a violation. It is particularly important to review the Photolog and Photopoint Map to see that the captions accurately describe the location and direction of the photographs. It is also important to ensure that any Conservation Restriction Abstract is a complete and accurate summary of the terms of the restriction itself, as monitors will rely on the Abstract as a reference during future fieldwork.

After internal review, send the draft Baseline Documentation Report to the landowner(s) for review and signature. The holder's, preparer's and photographer's affidavits contained in the draft should be signed and notarized to demonstrate that the holder is willing to be held to the same standards. Enclosing a self-addressed stamped envelope will increase the likelihood that the document will be signed and returned quickly. Follow up on any outstanding reports to be sure they are returned in a timely manner, and if the landowner refuses to acknowledge the report, try to find out why, and include that in the report (of course, if the landowner points out a deficiency or error, it should be corrected). If the landowner refuses to sign the report, try to find another individual that will attest to the accuracy of the document.

H. Baseline Documentation Report Distribution and Storage

Once the Baseline Documentation Report has been completed and signed, it should be retained permanently by the holder of the conservation restriction. To ensure that it is not accidentally lost, the original signed document should be printed on archival paper and stored in a secure waterproof, fireproof file cabinet. In addition, an electronic copy of the Baseline Documentation Report should be written to a non-rewritable CD or other electronic media and placed – along with the original CD of digital photographs or film negatives – in a separate but similarly secure storage area. Copies should be sent to the landowner and any co-holders of the conservation restriction. A *Field Notebook Copy* of the final Baseline Documentation Report should be kept by the holder in a three-ring binder for use in future monitoring. Using plastic sleeves, arrange the pages back to back so that they are easily accessible in the field. The copy of the conservation restriction itself is seldom used in the field and may be fitted in to a single sleeve. As discussed in the next Section of the Manual, this Field Notebook serves as dynamic record of the property, and will be updated from time to time with monitoring reports, additional photographs taken during monitoring visits, and documentation of various landowner contacts.

I. Creating Baseline Documentation Reports for Older Conservation Restrictions

In the past, the importance of preparing such comprehensive baseline documentation for conservation restrictions was not so widely recognized and little information was gathered beyond that needed for review and approval by the EOEA Division of Conservation Services. With the increased emphasis on the importance of this information to long-term stewardship of conservation restrictions, many holders of conservation restrictions have recently completed, or are in the process of completing, baseline documentation for restrictions that were recorded in the past. These reports take advantage of historical aerial photos and various affidavits to establish – as best as possible – the conditions of the land at the time the conservation restriction was recorded.

If the Baseline Documentation Report was not completed at the time of the recording of the conservation restriction and the property has not been transferred or sold in the meantime, then the landowner should be asked to sign an affidavit attesting to the fact that the report is an accurate description as of the date of the recording and as of the date of the report, and describing changes that have occurred in the property (if any).

The report should include an aerial photograph taken near the date of the original grant. Other plans may also be helpful in establishing the original condition of the property, including older plans recorded at the Registry of Deeds, farm or forest management plans, and similar documents.

If the property has been sold or transferred since the date of the recording, it still may be possible to obtain an affidavit from the original grantor, if they can be found and are willing to sign such an affidavit. As an alternative, the current landowner should be asked to sign an affidavit attesting that the Report is an accurate description as of the date they took title to the property. If the signature of the original grantor of the conservation restriction cannot be obtained, someone with knowledge of the property around the time the conservation restriction was recorded (e.g., a neighbor or town conservation commissioner) should be asked to sign an affidavit attesting that the Report is accurate as of the date of the recording.

Massachusetts Easement Defense Subcommittee
Conservation Restriction Enforcement Policy Guidelines
Revised, April 2006

I. Why Adopt an Enforcement Policy?

Enforcement of conservation restrictions (CRs) is a fundamental activity of land trusts and public agencies that hold such conservation restrictions. The purpose of an Enforcement Policy is to define the procedures that a conservation restriction holder will follow to ensure that apparent violations are promptly and thoroughly investigated, documented, and acted on in an effective manner that will survive legal scrutiny. A formally adopted Enforcement Policy helps ensure that violations are addressed fairly and consistently in light of all circumstances. Such a policy also demonstrates that the conservation restriction holder takes its responsibilities seriously and is prepared to enforce the terms of restrictions against future violations.

In recognition of the importance of a clear Enforcement Policy, both the Land Trust Alliance and the Massachusetts Easement Defense Subcommittee have recommended that every organization and agency that holds conservation restrictions adopt a written Enforcement Policy. [1]

Recognizing that Enforcement Policies must be tailored to the capacity and methods of operation of an individual agency or organization, the level of their existing conservation restriction stewardship expertise and the types of lands that they steward, *this memorandum is not intended to be a sample Enforcement Policy, but rather an outline of the issues that an organization or agency needs to address in its development of its CR Enforcement Policy.* A variety of sample policies are available from LTA's resource library, www.ltanet.org.

II. Enforcement Principles

A. Preparation for Enforcement – Avoiding and Addressing Violations

- Assemble and maintain baseline documentation reports
- Identify the resources necessary to monitor and enforce CRs, including financial resources and expertise dedicated to CR stewardship
- Foster and maintain positive working relationships with landowners
- Monitor regularly and maintain CR and monitoring documentation
- Maintain procedures to discover and resolve potential violations including training, response checklists, documentation and decision-making protocols
- Train staff and board in resolution of enforcement matters

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[1] Standard 11 E -- Enforcement of Easements in the LTA Standards & Practices (adopted Sept. 2004) states:
Enforcement of Easements. The land trust has a written policy and/or procedure detailing how it will respond to a potential violation of an easement, including the role of all parties involved (such as board members, volunteers, staff and partners) in any enforcement action. The land trust takes necessary and consistent steps to see that violations are resolved and has available, or has a strategy to secure, the financial and legal resources for enforcement and defense

The Operating Principles of the Massachusetts Easement Defense Subcommittee (adopted by MLTC's Steering Committee on 10/7/05) state:
5. *Land trusts, state agencies, and municipalities should have an enforcement policy that ensures that conservation purposes and values are maintained and the property restored.*

B. Objectives of Enforcement

- Defend the purposes and terms of the CR, the conservation values of the property, and the intent of the original parties
- Prevent or stop ongoing environmental harm
- Restore land to the extent feasible or remediate conservation values
- Discourage any windfall or financial gain accruing to perpetrator of violation
- Maintain and enhance public/donor confidence in organization and land conservation
- Avoid negative precedents
- Evaluate the situation to prevent similar violations
- Maintain positive relationships to extent possible.

III. The Enforcement Policy Components

A. Identify a clear plan for organizational response to reported violations that includes the following elements:

- Name and contact information for the organization's enforcement officer (Executive Director, Stewardship Director, or other person as directed in the Enforcement Policy, as well as an emergency contact if the primary contact is unavailable and swift action is needed).
- Assess reported violations, including whether immediate action is required: Is there ongoing damage or irreparable harm? Is the source reporting the violation credible? What are the risks of inaction?
- Initiate and document contacts with the landowner (and violator if different); verify details of the violation, determine the facts, review the CR and any applicable laws affected by the violation or potential remediation
- Contact any necessary public authority (e.g., Conservation Commission)
- Document specific action steps taken (correspondence, site visit reports, phone calls, attempts to contact owner); include facts (sources, photos, reports) and opinions (interpretations, excuses, assessments) with attention to maintaining credibility and possible evidentiary needs

B. Identify guidelines to assess reported violations: Is it a clear violation or is the CR ambiguous? Is it a willful violation or an accidental one? Are there minor or significant impacts? Is the violation precedent setting? Is it a repeat violation? If you are considering legal action, how strong is your case? What proof do you have? What are the violator's potential defenses?

C. Consider whether "Major" and "Minor" violations will be handled differently in terms of procedures. Note that major violations should be reported to MLTC and/or MACC.

D. Assess organization's or agency's range of potential actions which best achieve the objectives of enforcement. Is affordable legal advice available? What resources are available to seek redress? What

are the violator's resources and defenses? What are the precedential implications for a win or loss? Will the landowner benefit financially for the violation (private inurement)? What are the public relations implications? What other organizations or agencies might assist with enforcement? (including EOEA, the Attorney General, MLTC, other land trusts, etc.)

E. Consider alternatives for resolution, including written warning, written acknowledgement of violation by landowner, CR amendment (see sample policy) or formal interpretation ("discretionary consent"), pre-litigation settlement (by agreement, mediation, or arbitration), or litigation. Any final resolutions must be in accordance with the organization's or agency's adopted Enforcement Policy and signed by an individual with delegated authority.

F. Evaluate remediation goals, as feasible and achievable, including remediation of the violation, alternative improvements of parcel to offset damage, alternative conservation benefits (land, program, finance), clarification or amendment of CR (with due consideration for accountability and future enforcement, avoiding negative precedents and publicity, and avoiding private inurement).

G. Implement the final action, including as necessary final documentation and archiving, legal approval of documentation, ratification by Board or their designee, public relations statement, etc.

H. Throughout enforcement process, strive to maintain positive relationships – assume good intentions (hope for the best), but document adequately (prepare for the worst).

Appendix D

Peer Review of Conservation Analysis
Stratton Hill Open Space Residential Subdivision
Preliminary Subdivision Plan

LITERATURE CITED

BSC GROUP

Appendix D

Literature Cited

Allen, Deonie, Heather Haynes, and Scott Arthur, “Pollution from Urban Development and Setback Outfalls as a Catchment Management Measure for River Water Quality Improvement,” April 1, 2016, EPSC2016-18241.

Annett, Robert, Hamid R. Habibi, and Alice Hontela, “Impact of Glyphosate and Glyphosate-Based Herbicides on the Freshwater Environment,” *Journal of Applied Toxicology* 34, no. 5 (2014): 458–79, https://doi.org/10.1002/jat.2997.

Beaudry, Frederic, Phillip G. Demaynadier, and Malcolm L. Hunter Jr, “Identifying Hot Moments in Road-Mortality Risk for Freshwater Turtles,” *The Journal of Wildlife Management* 74, no. 1 (2010): 152–59, https://doi.org/10.2193/2008-370;

Markle, Chantel E. et al., “The True Cost of Partial Fencing: Evaluating Strategies to Reduce Reptile Road Mortality,” *Wildlife Society Bulletin* 41, no. 2 (2017): 342–50, https://doi.org/10.1002/wsb.767.

Bijay-Singh and Eric Craswell, “Fertilizers and Nitrate Pollution of Surface and Ground Water: An Increasingly Pervasive Global Problem,” *SN Applied Sciences* 3, no. 4 (March 31, 2021): 518, https://doi.org/10.1007/s42452-021-04521-8.

Brinkmann, Markus et al., “Acute Toxicity of the Tire Rubber-Derived Chemical 6PPD-Quinone to Four Fishes of Commercial, Cultural, and Ecological Importance,” *Environmental Science & Technology Letters* 9, no. 4 (April 12, 2022): 333–38, https://doi.org/10.1021/acs.estlett.2c00050.

Brisbin, I. L. et al., “A Long-Term Study of Eastern Box Turtles (Terrapene c. Carolina) in a Suburban Neighborhood: Survival Characteristics and Interactions with Humans and Conspecifics,” *Urban Herpetology* 373 (2008): 85.

Bramble, W.C. and W.R. Byrnes, “Thirty Years of Research on Development of Plant Cover on an Electric Transmission Right-Of-Way,” *Arboriculture & Urban Forestry* 9, no. 3 (March 1, 1983): 67–74, https://doi.org/10.48044/jauf.1983.019.

Damodaram, Chandana et al., “Simulation of Combined Best Management Practices and Low Impact Development for Sustainable Stormwater Management1,” *JAWRA Journal of the American Water Resources Association* 46, no. 5 (2010): 907–18, https://doi.org/10.1111/j.1752-1688.2010.00462.x.

Ebbin, Syma A, “Is the Grass Always Greener? Assessing Lawn Care Practices of Connecticut Residents,” *Wrack Lines* 99 (2015).Expert Civil, “Effects of Blasting on Environment,” August 13, 2018, https://expertcivil.com/effects-of-blasting-on-environment/.

Federal Highway Administration, “Managing the Impacts of Blast-Induced Vibration and Overpressure on Fish and Fish Habitat,” White Paper (US DOT, January 2019).

Finch, Domhnall, Henry Schofield, and Fiona Mathews, “Traffic Noise Playback Reduces the Activity and Feeding Behaviour of Free-Living Bats,” *Environmental Pollution* 263 (August 1, 2020): 114405, https://doi.org/10.1016/j.envpol.2020.114405.

Findlay, Stuart E.G. and Victoria R. Kelly, “Emerging Indirect and Long-Term Road Salt Effects on Ecosystems,” *Annals of the New York Academy of Sciences* 1223, no. 1 (2011): 58–68, https://doi.org/10.1111/j.1749-6632.2010.05942.x.

Fischer and Baehr, “Effects of Stormwater Infiltration on Quality of Groundwater Beneath Retention and Detention Basins.”

Fischer, David, Emmanuel G. Charles, and Arthur L. Baehr, “Effects of Stormwater Infiltration on Quality of Groundwater Beneath Retention and Detention Basins,” *Journal of Environmental Engineering* 129, no. 5 (May 2003): 464–71, https://doi.org/10.1061/(ASCE)0733-9372(2003)129:5(464).

Fyson, Vincent K. and Gabriel Blouin-Demers, “Effects of Landscape Composition on Wetland Occupancy by Blanding’s Turtles (Emydoidea Blandingii) as Determined by Environmental DNA and Visual Surveys,” *Canadian Journal of Zoology* 99, no. 8 (August 2021): 672–80, https://doi.org/10.1139/cjz-2021-0004.

Gallagher, Matthew T. et al., “The Role of Pollutant Accumulation in Determining the Use of Stormwater Ponds by Amphibians,” *Wetlands Ecology and Management* 22, no. 5 (October 1, 2014): 551–64, https://doi.org/10.1007/s11273-014-9351-9.

Gillis, Patricia Leigh et al., “The Relative Toxicity of Road Salt Alternatives to Freshwater Mussels; Examining the Potential Risk of Eco-Friendly De-Icing Products to Sensitive Aquatic Species,” *ACS ES&T Water* 1, no. 7 (July 9, 2021): 1628–36, https://doi.org/10.1021/acsestwater.1c00096.

Grgurovic, Mark and Paul R. Sievert, “Movement Patterns of Blanding’s Turtles (Emydoidea Blandingii) in the Suburban Landscape of Eastern Massachusetts,” *Urban Ecosystems* 8, no. 2 (June 2005): 203–13, https://doi.org/10.1007/s11252-005-4380-z; Bridget Henning and Leon Hinz, “Conservation Guidance for Blanding’s Turtle (Emydoidea Blandingii) | IDEALS,” INHS Technical Report (Champaign, IL: Illinois Department of Natural Resources, 2016), https://www.ideals.illinois.edu/items/98191.

Heaven, Paul C. Jacqueline D. Litzgus, and M. Tim Tinker, “A Unique Barrier Wall and Underpass to Reduce Road Mortality of Three Freshwater Turtle Species,” *Copeia* 107, no. 1 (February 2019): 92–99, https://doi.org/10.1643/CH-18-137.

Hwang, Hyun-Min et al., “Review of Pollutants in Urban Road Dust and Stormwater Runoff: Part 1. Heavy Metals Released from Vehicles,” *International Journal of Urban Sciences* 20, no. 3 (September 1, 2016): 334–60, https://doi.org/10.1080/12265934.2016.1193041.

Jefferson, Anne J. et al., “Stormwater Management Network Effectiveness and Implications for Urban Watershed Function: A Critical Review,” *Hydrological Processes* 31, no. 23 (2017): 4056–80, https://doi.org/10.1002/hyp.11347.

Jones, Michael T. and Paul R. Sievert, “Elevated Mortality of Hatchling Blanding’s Turtles (Emydoidea blandingii) in Residential Landscapes,” *Herpet Conserv Biol* 7, no. 1 (2012): 89–94.

Kaye, Delia R J et al., “SPOTTED TURTLE USE OF A CULVERT UNDER RELOCATED ROUTE 44 IN CARVER, MASSACHUSETTS,” *ICOET Proceedings*, 2005, 8.

Knoerr, Michael D., Gabrielle J. Graeter, and Kyle Barrett, “Hatch Success and Recruitment Patterns of the Bog Turtle,” *The Journal of Wildlife Management* 85, no. 2 (2021): 293–302, https://doi.org/10.1002/jwmg.21989.

Kernen, Brandon. “Rock Blasting and Water Quality Measures That Can Be Taken To Protect Water Quality and Mitigate Impacts” (NHDES, 2010).

LaPlaca, Stephanie B. and Peter van den Hurk, “ACCUMULATION OF MICROPLASTIC AND MICRORUBBER PARTICLES IN STORMWATER POND FISH AND INVERTEBRATES,” preprint (Zoology, March 4, 2022), https://doi.org/10.1101/2022.03.03.482888.

Lieb, David A. and Robert F. Carline, “Effects of Urban Runoff from a Detention Pond on Water Quality, Temperature and Caged Gammarus Minus (Say) (Amphipoda) in a Headwater Stream,” *Hydrobiologia* 441, no. 1 (December 1, 2000): 107–16, https://doi.org/10.1023/A:1017550321076.

MassDEP, “Potential Environmental Contamination from the Use of Perchlorate-Containing Explosive Products” (MassDEP, September 15, 2008).

Marsalek, J. “Road Salts in Urban Stormwater: An Emerging Issue in Stormwater Management in Cold Climates,” *Water Science and Technology* 48, no. 9 (November 1, 2003): 61–70, https://doi.org/10.2166/wst.2003.0493.

Matheson, G. M. and D. K. Miller, “Blast Vibration Damage to Water Supply Well - Water Quality and Quantity,” May 1, 1997, https://www.osti.gov/biblio/469029-blast-vibration-damage-water-supply-well-water-quality-quantity.

Monira, Sirajum et al., “Understanding the Fate and Control of Road Dust-Associated Microplastics in Stormwater,” *Process Safety and Environmental Protection* 152 (August 1, 2021): 47–57, https://doi.org/10.1016/j.psep.2021.05.033.

Mulholland, Tracy I et al., “Effects of Experimental Anthropogenic Noise Exposure on the Reproductive Success of Secondary Cavity Nesting Birds,” *Integrative and Comparative Biology*, July 20, 2018, https://doi.org/10.1093/icb/icy079.

Ortega, Catherine, “Chapter 2: Effects of Noise Pollution on Birds: A Brief Review of Our Knowledge,” *Ornithological Monographs* 74, no. 1 (July 2012): 6–22, https://doi.org/10.1525/om.2012.74.1.6.

Paterson, James E. et al., “Road Avoidance and Its Energetic Consequences for Reptiles,” *Ecology and Evolution* 9, no. 17 (2019): 9794–9803, https://doi.org/10.1002/ece3.5515.

Schaub, Andrea, Joachim Ostwald, and Björn M. Siemers, “Foraging Bats Avoid Noise,” *Journal of Experimental Biology* 211, no. 19 (October 1, 2008): 3174–80, https://doi.org/10.1242/jeb.022863.

Simmons, Andrea Megela, and Peter M. Narins, “Effects of Anthropogenic Noise on Amphibians and Reptiles,” in *Effects of Anthropogenic Noise on Animals*, ed. Hans Slabbekoorn et al., Springer Handbook of Auditory Research (New York, NY: Springer, 2018), 179–208, https://doi.org/10.1007/978-1-4939-8574-6_7.

Sparling, Donald W., John D. Eisemann, and Wayne Kuenzel, “Contaminant Exposure and Effects in Red-Winged Blackbirds Inhabiting Stormwater Retention Ponds,” *Environmental Management* 33, no. 5 (September 1, 2004): 719–29, https://doi.org/10.1007/s00267-003-0058-6.

Steen, David A. and James P. Gibbs, “Effects of Roads on the Structure of Freshwater Turtle Populations,” *Conservation Biology* 18, no. 4 (2004): 1143–48, https://doi.org/10.1111/j.1523-1739.2004.00240.x.

Starzec, Peter et al., “Technical and Environmental Functioning of Detention Ponds for the Treatment of Highway and Road Runoff,” *Water, Air, and Soil Pollution* 163, no. 1 (May 1, 2005): 153–67, https://doi.org/10.1007/s11270-005-0216-y.

Trumpolt, Clayton et al., “Perchlorate: Sources, Uses, and Occurrences in the Environment - University of York,” *Remediation* 16, no. 1 (2005): 65–89.

Wagner, David L., Kenneth J. Metzler, and Henry Frye, “Importance of Transmission Line Corridors for Conservation of Native Bees and Other Wildlife,” *Biological Conservation* 235 (July 2019): 147–56, https://doi.org/10.1016/j.biocon.2019.03.042.

Walker, William W. “Phosphorus Removal by Urban Runoff Detention Basins,” *Lake and Reservoir Management* 3, no. 1 (January 1, 1987): 314–26, https://doi.org/10.1080/07438148709354787.

West, Edward W. et al., “Noise Impacts on Birds: Assessing Take of Endangered Species,” *The Journal of the Acoustical Society of America* 122, no. 5 (November 2007): 3082–3082, https://doi.org/10.1121/1.2943006.

Wissler, Austin D, William F. Hunt, and Richard A. McLaughlin, “Hydrologic and Water Quality Performance of Two Aging and Unmaintained Dry Detention Basins Receiving Highway Stormwater Runoff,” *Journal of Environmental Management* 255 (February 1, 2020): 109853, https://doi.org/10.1016/j.jenvman.2019.109853.

Wojcik, Victoria A and Stephen Buchmann, “POLLINATOR CONSERVATION AND MANAGEMENT ON ELECTRICAL TRANSMISSION AND ROADSIDE RIGHTS-OF-WAY: A REVIEW,” *Journal of Pollination Ecology* 7, no. 3 (2012): 16–26.

Wong, Tony, Peter Breen, and Sara Lloyd, “Water Sensitive Road Design - Design Options for Improving Stormwater Quality of Road Runoff,” Technical Report (Canberra, AUS: Cooperative Research Centre for Catchment Hydrology, University of Canberra, 2000).