DOCUMENT A00830

ARMY CORPS OF ENGINEERS

Permit Application

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US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
PRE-CONSTRUCTION NOTIFICATION

Ayer Road Reconstruction and Shared Use Path

Harvard, Massachusetts

Prepared for: **Town of Harvard Department of Public Works**
47 Depot Road
Harvard, MA 01451

MassDOT
10 Park Plaza, Suite 7130
Boston, MA 02116

Prepared by: **TEC, Inc.**
311 Main Street, 2nd Floor
Worcester, MA
01608

May 29, 2025

U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742
978-318-8238
cenae-r-ma@usace.army.mil

RE: Pre-Construction Notification; DOT Project #609213
Ayer Road Reconstruction & Multimodal Improvements

On behalf of the project Applicant/Owner, the Town of Harvard and MassDOT, TEC, Inc. is filing a Pre-Construction Notification for the proposed reconstruction and multimodal transportation improvements along Ayer Road (Rt 110/111) starting from approximately 100 feet north of the State Highway Layout at Route 2 to the Harvard/Ayer town line.

The project involves the construction of a 10' wide shared use path for the length of the project, as well as reconstruction of Ayer Road. The project also includes work along Gebo Lane, approximately 650-feet from its intersection with Ayer Road to its intersection with Lancaster County Road, and along Lancaster County Road approximately 550-feet between Gebo Lane and Ayer Road. The length of the project is approximately 9,200 linear feet. The shared use path is also proposed to replace Lancaster County Road between Ayer Road and Gebo Lane. The Gebo Lane/ Ayer Road intersection is also proposed to be reconstructed to provide for an improved approach closer to 90 degrees.

Wetland resource areas were evaluated and delineated by Rimmer Environmental Consulting, and a copy of the wetland evaluation and delineation report is included herein and provides in depth detail on the evaluation and methodology of delineation of resource areas.

There are resource area impacts promulgated by the proposed roadway reconstruction and shared use path associated primarily with (2) existing intermittent stream crossing modifications. Mitigation includes Wetland Replication at a ratio of 1.75:1, Stream Bank restoration, Land Under Water/ Stream Bed restoration. Further information regarding impacts and mitigation is included herein. There are no floodplains or floodways associated with the (2) intermittent streams, therefore work will not alter any base flood elevations.

The project intents to utilize USACE MA GPs 23 and 24, Linear Transportation Projects and Stream Crossings and Temporary Construction, Access, and Dewatering, respectively.

The project also requires permitting under the Massachusetts Wetlands Protection Act, for which an Order of Conditions has been issued by the Harvard Conservation Commission. The OOC will serve as the WQC under the MA General 401 WQC. Coverage under the EPA NPDES CGP will also be required.

Applicant	Co-Applicant	Agent
Dan Nason	Kevin Thompson	Peter Engle
Town Administrator	Wetlands Coordinator	Senior Project Manager
Town of Harvard DPW	MassDOT - Highway	TEC, Inc.
47 Depot Road	10 Park Plaza, Suite 7130	311 Main Street
Harvard, MA 01451	Boston, MA 02116	Worcester, MA 01608
978-456-4100	857-268-1729	774-402-0229
dnason@harvard-ma.gov	kevin.s.thompson@dot.state.ma.us	pengle@theengineeringcorp.com

The project proponent hereby certifies that all information contained herein is true, accurate, and complete to the best of my knowledge and belief. The project proponent hereby requests that the certifying authority review and take action on this CWA 401 certification request within the applicable reasonable period of time.

Please do not hesitate to contact me directly if you have any questions at 774-670-3569. Thank you for your attention to these matters.

Sincerely,

Peter Engle, P.E.
Senior Project Manager
TEC, Inc.

TABLE OF CONTENTS

PCN Checklist

PCN Application

Application Narrative

- Introduction and Purpose
- Existing Conditions & Resource Areas
- Proposed Improvements
- Authorizations/ Permitting
- Impacts
- Avoidance & Mitigation
- Stormwater Management
- Alternatives Analysis
- Construction Sequencing

PCN CHECKLIST

US Army Corps of Engineers®
New England District

APPENDIX D: PCN APPLICATION CHECKLIST

The following information shall be submitted for all PCNs for USACE to properly evaluate your application. Some applications may require more information and this checklist is offered as a tool to assist applicants with submitting a complete application.

SECTION 1: GENERAL APPLICATION INFORMATION

1. ☑ Complete the Pre-Construction Notification document (Appendix B).
2. ☑ Specify which local/state/federal authorizations are required for the project and if any have been obtained or applied for at the time of USACE application submittal.
3. ☑ Identify all funding sources the project will receive or has received to date. Provide any relevant information in the application submission.
4. ☑ Is this part of a larger project that is being implemented in phases? If so, describe the project schedule and how each phase will be implemented.
5. ☑ Describe the existing conditions on the site and the general land use in the vicinity of the project at the time application submittal.
6. ☑ Provide any historic information available that you may have of project area, e.g., existing USACE permit numbers, the names under which the permits were obtained if the permit numbers are unknown, construction dates and proof of prior existence (aerials, photos, town hall records, affidavits, state or local permits, etc.) to verify that the project predates regulation and is "vested".[19]
7. ☑ The anticipated start and end dates for construction.

SECTION 2: WETLAND DELINEATION

8. ☑ Data used to support aquatic resource boundary determinations (delineation forms, delineation map(s) that show the locations of each aquatic resource in the project area, aerial and ground photographs, LIDAR imagery, national wetland inventory maps, soil maps, national hydrography dataset maps, floodplain maps, historical imagery, etc.).
9. ☑ Photographs of the wetland(s) and/or waterway(s) where impacts are proposed. Photos at low tide are preferred for work in tidal waters.
10. ☑ Indicate the relationship of the project area to waters of the U.S., i.e., adjacent wetlands, tidal influence or hydraulic connectivity through culverts, or other conveyances, etc.
11. ☑ At minimum the delineation map/figure should include the following:
    a. Contour lines showing topography.
    b. North arrow.
    c. Bar and text scale.
    d. Legend.
    e. Drawn project boundary.
    f. High tide line, mean high water, mean low water, ordinary high water mark, and/or wetland boundaries.
    g. Captions with a unique name for each aquatic resource and the area or length of the aquatic resource within the project area.

[19] Vested is exempt (someone or something) from a new law or regulation.

h. Appropriate landmarks and features (e.g., culverts, special aquatic sites, etc.).
i. Points showing the paired upland and wetland delineation locations for tidal and non-tidal wetlands only.

SECTION 3: AVOIDANCE & MINIMIZATION

12. ☒ Describe specific measures taken to avoid impacts to aquatic resources or describe why aquatic resources could not be avoided while achieving the project purpose and need.
13. ☒ For impacts to aquatic resources that could not be avoided, describe specific considerations/ measures taken to minimize the area of proposed impacts to aquatic resources in designing the project.
14. ☒ Describe specific measures taken to avoid and minimize the proposed direct, indirect, and secondary impacts to aquatic resources and their functions through construction techniques and timing.
15. ☒ If applicable, provide a restoration plan that describes how all temporary fills and structures will be removed and the area restored to pre-impact conditions (see GC 22).
16. ☒ If applicable, provide an Invasive Species Control Plan (see GC 29). For sample control plans, see www.nae.usace.army.mil/missions/regulatory/invasive-species.
17. ☒ If applicable, describe how the proposed wetland/waterbody crossing is compliant with GC 31, Stream Work and Crossings, and Wetland Crossings.

SECTION 4A: PROJECT IMPACTS

18. ☒ Describe the overall project and the activities located in Waters of the U.S. (WOTUS) that you are seeking authorization for.
19. ☒ Identify the following for project impacts in WOTUS:
    a. ☒ Direct, indirect, secondary impacts[20] within WOTUS.
    b. ☒ The size of each impact (square feet or acres, or linear feet).
    c. ☒ For discharges of fill material (§404), specify the volume of fill material to be discharged (cubic yards).
    d. ☒ The impact duration from each activity, permanent or temporary (X days).

SECTION 4B: PROJECT PLANS

20. ☒ Submit project plans that depict all impacts in WOTUS. On the project plans, applicants shall provide:

    General Information

    a. ☒ Plan view and typical cross-section view sheets that show the existing and proposed conditions. These illustrations should each be identified with a figure number, date of the map, the project title, the name of the applicant and the type of illustration (vicinity map, plan view, or cross section).
    b. ☒ Drawings, sketches, or plans that are legible, reproducible (color is encouraged, but features must be distinguishable in black and white), drawn to scale, and no larger than 11”x17” and 10 MB when submitted in digital format. Numeric and graphic/bar scales must agree, and plan details must be measurable using a standard engineer’s scale on printed plans. Reduced plans are not acceptable.
    c. ☒ The north arrow and remove miscellaneous non-wetland or water project related features such as conduits, utility poles, guardrails, etc.

[20] See definitions section for the definitions of direct, indirect, secondary impacts.

d. ☒ Clearly draw the overall limits of work, staging areas, disposal sites, access routes, and any permittee responsible mitigation sites. These areas may include both aquatic resources and upland areas.
e. ☒ Names or numbers of all roads in the site's vicinity and ownership and numbers of abutting parcels.
f. ☒ Datum in plan and elevation views. The horizontal datum shall be in the NAD 83 Massachusetts State Plane Coordinate System (INSERT) in U.S. survey feet. The vertical data in coastal projects shall be referenced to either MLLW or the North American Vertical Datum of 1988 (NAVD 88). Both the distance and depth units shall be U.S. survey feet and specified on the project plans.

Aquatic Resources & Project Impacts

g. ☒ Delineation of all aquatic resource types on site including salt marsh; other special aquatic sites (vegetated shallows, mudflats, riffles and pools, coral reefs, and sanctuaries and refuges); other waters, such as lakes, ponds, vernal pools, natural rocky habitat (tidal only), and perennial, intermittent, and ephemeral streams.
h. ☒ Identify the substrate type (cobble/gravel, organic detritus, sand/shell, silt, mud) and the approximate percentage of each substrate type on site. Grain sizes shall be based on Wentworth grain size classification scale for granules, pebbles, cobbles, and boulders. Sediment samples with a content of 10% or more of pebble-gravel-cobble and/or boulder in the top layer (6-12 inches) should be delineated and material with epifauna/macroalgae should be differentiated from bare pebble-gravel-cobble and boulder.
i. ☐ The direction of ebb and flood in tidal waters and direction of flow in non-tidal waters.
j. ☐ In tidal waters, the project boundary distance from special aquatic sites identified in 20g above if within 25 feet from that resource.
k. ☐ USACE jurisdictional boundaries including ordinary high-water mark (OHWM), high tide line (HTL), mean high water (MHW). Other boundaries include mean low water (MLW), mean lower low water (MLLW), as applicable.
   - Non-tidal: OHWM and/or wetland boundaries.
   - Tidal (structures/work only): MHW, MLW.
   - Tidal (Fill and Structures/work): HTL, MHW, MLW.
   - Tidal (Dredging/Beach Nourishment): HTL, MHW, MLW, MLLW.
l. ☒ Identification of each aquatic resource with a unique name (ex. Wetland 1, Wetland 2, Tributary 1, Beaver Brook, Atlantic Ocean) and the size of each aquatic resource within the project area (square feet or acres).
m. ☒ Impacts to each aquatic resource with captions denoting the size of each impact (square feet, acres, or linear feet) and the duration of the impact (ex. Permanent, Temporary (X days).

SECTION 4C: PROJECT PLANS - SPECIFIC PROJECT INFORMATION

21. ☒ For projects involving Navigation, Structures, Dredging, and/or Beach Nourishment, the applicant shall also address the following:

Navigation

a. ☐ Identify the locations of adjacent Federal navigation project (FNP) and/or state/local navigation projects on the project plans.
b. ☐ Specify the distance between the FNP and proposed project boundary, the authorized depths of the FNP, and state plane coordinates of seaward end(s) of project structures near an FNP.

Structures

a. ☐ Identification of the piling type (steel, timber, concrete) and diameter to be removed and/or installed.
b. ☐ Specify the minimal height of the structures' frame over saltmarsh. To meet the SV threshold, piers must be ≤4 feet in width and this minimal height must achieve a 1.5:1 ratio (i.e., a 4-foot-wide pier is 6 feet above a saltmarsh).
c. ☐ For floats, the methods of securing them (piles, bottom anchors) and for keeping them off substrate (skids, stops) at low water. To meet the SV threshold, a minimum depth of 18-inches of water should be maintained below a floating dock/structure at lower tide levels.

Dredging

a. ☒ The area (SF, acre) and volume (CY) of material to be dredged waterward of MHW for each dredge location.
b. ☒ Dredge boundaries.
c. ☐ Bathymetry for existing, proposed, and historical (include dates and USACE permits) dredge depths.
d. ☐ The likely final angle of repose of the side cuts based on the physical characterization of the material to be dredged and based upon the high/ medium/low, wave or current energy of the location.
e. ☐ Label area whether the dredging is new, maintenance, improvement, or a combination.
f. ☐ Location of the disposal site (include location sheet). NOTE: For projects proposing open water, nearshore disposal, or beach nourishment, contact USACE as early as possible for sampling and testing protocols. Sediment testing, including physical (e.g., grain-size analysis), chemical and biological testing may be required. Sampling/testing of sediments without such contact should not occur and if done, will be at the applicant's risk.
g. ☒ The methods and areas used to retain or prevent dredged material from running back into the wetland or waterway. Provide the capacity of the storage area and points of runback, including the overflow route, into the aquatic system.
h. ☐ For open-water disposal, explain why inland or beneficial reuse sites are not practicable.
i. ☐ Show the finished top elevation of the disposal site.

Beach Nourishment

a. ☐ For beach nourishment, identify the disposal footprint, existing and proposed nourishment profiles (multiple profiles are appropriate if the site is more than 150 feet long or non-contiguous), total fill area (SF) and volume (CY), fill area and volume waterward of the HTL, and delineation of dunes, banks, existing beach vegetation, and contours.
b. ☐ For beach nourishment identify the substrate type (fine sand, sand, cobble, boulder) and/or grain-size of existing material.

SECTION 5: STRUCTURES

22. ☐ For projects with the removal of existing pilings identify the number, type (steel, timber, concrete) and diameter of pilings to be removed and the methodology for removal (cut off at mud line, pulling, vibratory, etc.).
23. ☐ For projects with the installation of new pilings identify the number, type (steel, timber, concrete) and diameter of pilings to be installed and the methodology for installation (vibratory hammer, impact hammer etc.).
24. ☐ Identify any existing structures and moorings in waters adjacent to the proposed activity, their dimensions, and the distance to the limits and coordinates of any proposed mooring field or reconfiguration zone. For reconfiguration zone and mooring fields, provide the coordinates for all

corners based on the Massachusetts State Plane Coordinate System. Specify the maximum number of slips and/or moorings within proposed reconfiguration zones or anchorage areas.

25. ☐ The dimensions of the structure or work and extent of encroachment waterward of MHW and from affixed point on the shoreline or upland.
26. ☐ Shoreline of adjacent properties and property boundary offset for structures. In narrow waterbodies, the distance to opposite shoreline, waterway width, and structures across from proposed work.
27. ☐ For new commercial boating facilities, anchorage areas or reconfiguration zones, provide a description of the type of vessels that would use the facility, and any plans for sewage pump-out facilities, fueling facilities and contingency plans for oil spills.
28. ☐ See Sections 4A-C above.

SECTION 6: AQUACULTURE

29. ☐ Identify the coordinates for lease area corners and gear configuration area on the project plans.
30. ☐ Identify the proposed aquaculture gear type (buoys, floats, racks, trays, nets, lines, tubes, cages, containers, and other structures). Provide the impacts for each aquaculture gear type (see Section 4A 19a-d).
31. ☐ For a GP 18 to be valid, applicants must have (a) their MA DMF Aquaculture Certification letter for licensed shellfish aquaculture sites, (b) documentation that the applicant has coordinated with the U.S. Coast Guard regarding USCG Private Aids to Navigation standards, (c) their MEPA Certificate (if required), and (d) documentation that the applicant has contacted their local authorities (ex. harbormaster, select board, shellfish constable) for authorization of their facility.
32. Provide information on site the operation, maintenance, and access. Will the site be accessed via boat, kayak, etc.? Will cages be removed in the winter? How often will gear be checked on? Is there an operations plan for the proposed aquaculture area?
33. ☐ See Sections 4A-C above.

SECTION 7: DREDGING

34. ☐ Sampling plan requests for new, improvement or maintenance dredging must submit completed **Dredged Material Evaluation checklist found at Dredged Material Evaluation Checklist, Sampling and Analysis Plan Requirements from Applicant (army.mil)** and identify the method of handling/transporting the dredged material.
35. ☐ Identify grain-size of material to be dredged (e.g., silty sand) and provide any existing sediment grain size and bulk sediment chemistry data from the proposed project or nearby projects. Include information on any recent spills of oil and/or other hazardous materials and/or nearby outfalls. Document the information source, e.g., EPA database, the harbormaster or fire chief. If there are none, state “none”.
36. ☐ See Section 4A, 4B and 4C, Dredging 21(a-i) above.

SECTION 8: WETLAND/WATERBODY CROSSINGS

37. ☒ For the stream crossing, identify the crossing methodology on the project plan (e.g., dam and pump, dry, wet, etc.). Submit a waterway crossing sequencing plan with the application.
38. ☐ If the project includes a permanent crossing of a tidal waterway, your project design should be modified to match the velocity, depth, cross-sectional area, and substrate of the existing waterbody adjacent to the crossing and provide documentation (hydraulic analysis including low lying property analysis) that the size of the crossing will not restrict tidal flow over the full natural tide range and will not adversely affect abutting infrastructure.

39. ☒ If the work includes a permanent crossing of a non-tidal stream, your project design should be modified to match the culvert gradient of the existing stream channel profile, provide clearance for ≥1.2 times bank full width and conveyance should be embedded ≥1-2 feet for box culverts and pipe arches or ≥1-2 feet and at least 25 percent for rounded pipes/culverts in accordance with the Massachusetts Stream Crossing Standards. Provide the basis for any variation to this requirement.
40. ☒ If the work includes a permanent crossing of a non-tidal stream, the structure should be designed to include a natural bottom substrate within the conveyance that matches the characteristics of the substrate in the natural stream channel and the character of the banks (mobility, slope, stability, confinement, grain and rock size). The conveyance should be designed with a minimum openness ratio ≥0.82-feet (0.25-meters). For how to calculate openness ratio and stream simulation ecological approach for road and stream crossings, see https://www.nae.usace.army.mil/Missions/Regulatory/Stream-and-River-Continuity/.

SECTION 9: COMPENSATORY MITIGATION

41. ☒ Does the project require Compensatory Mitigation[21] for impacts to Waters of the U.S.? (See Section V in the 2023 Massachusetts General Permit)
42. ☐ If the project requires mitigation, does the selected compensatory mitigation option (i.e., In-Lieu Fee, permittee-responsible mitigation) deviate from the order of the options presented in §332.3(b)(2)-(6)? If so, please explain why. https://www.ecfr.gov/current/title-33/chapter-II/part-332/section-332.3
43. ☐ For any compensatory mitigation that involves preservation, the applicant must use a site protection instrument to preserve the parcel in perpetuity. (Conservation Easement, Deed Restriction, etc.) https://www.mass.gov/service-details/conservation-restriction-review-program.

SECTION 10: HISTORIC PROPERTIES & NOTIFICATIONS TO SHPO, THPOs, BUAR

44. ☒ Notify the SHPO, Massachusetts Historical Commission, of the Project via Certified Mail and include proof of delivery or receipt in the application package (See Appendix A).
45. ☒ As applicable, notify the THPOs, Narragansett Indian Tribe, Wampanoag Tribe of Gay Head (Aquinnah), and Mashpee Wampanoag Tribe, of the Project via email OR mail and include proof of delivery or receipt in the application package (See Appendix A).
46. ☒ As applicable, notify the BUAR via email (*strongly preferred*) OR mail and include proof of delivery or receipt in the application package (See Appendix A).
47. ☒ Include responses to this notification in the permit application.
48. ☒ As applicable, information on historic properties (Tribal and Archaeological) within the project area should be provided in the permit application.

SECTION 11: ENDANGERED SPECIES & ESSENTIAL FISH HABITAT

49. ☒ Provide a USFWS Information for Planning and Consultation (IPaC) Official Species List from https://ecos.fws.gov/ipac and the email of the individual who generated the list (see GC 10 of the 2023 Massachusetts General Permit for more information).
50. ☒ Provide a species list from the NMFS Section 7 Endangered Species Act mapper at https://noaa.maps.arcgis.com/apps/webappviewer/index.html.
51. ☒ Provide a species list from the NMFS Essential Fish Habitat Mapper at https://www.habitat.noaa.gov/apps/efhmapper/?page=page_3.

[21] Your mitigation proposal must be consistent with the December 29, 2020 Compensatory Mitigation Standard Operating Procedures at https://www.nae.usace.army.mil/Portals/74/docs/regulatory/Mitigation/Compensatory-Mitigation-SOP-2020.pdf and 2008 Mitigation Rule.

52. ☐ If the project will generate turbidity, describe the extent of turbidity and if erosion controls will be used to contain turbidity. If turbidity controls are not operationally feasible, explain the basis for your conclusion and identify any other measures that you will implement to minimize resuspension of sediment.
53. ☐ Identify the substrate type and any aquatic resources that will be affected by the proposed action. (SAV, salt marsh, sand, silt/clay, rocky/hard bottom)
54. ☐ For projects which will include the installation of pilings/sheet-piles, identify the substrate at the project site (sand, cobble, silt/mud/clay), the installation method (vibratory hammer, impact hammer, combination) and indicate whether the following “soft start” procedures at beginning of the workday and after a 30-minute period of rest will be deployed:
    a. ☐ Vibratory Pile Installation: pile driving will be initiated for 15 seconds at reduced energy followed by a one-minute waiting period. This sequence of 15 seconds of reduced energy driving, one-minute waiting period will be repeated two additional times, followed immediately by pile-driving at full rate and energy.
    b. ☐ Impact Pile Installation: pile driving will commence with an initial set of three strikes by the hammer at 40% energy, followed by a one-minute wait period, then two subsequent 3-strike sets at 40% energy, with one-minute waiting periods, before initiating continuous impact driving.
55. ☐ If the project involves dredging, describe any dredge history, number of dredge events to be covered by the permit, erosion/sediment controls, dredge type, intake structures (mesh screen size), dredged material disposal site.
56. ☐ For project activities associated with structures, identify the number, type (drill barge, work boat, tugboat, etc.), and size of any temporary vessels that will be used. Specify measures that will be implemented to ensure vessels are not berthed in shallow water or will “ground out” at low tide.
57. ☐ For aquaculture projects identify whether any component of the gear is seasonal (will be removed annually) or will be in place year-round. If gear will be present year-round and will be variably managed (e.g., floating in summer, bottom in winter) identify month/date for such configurations.
58. ☐ For aquaculture projects identify whether the project will involve use of an existing vessel or new vessel. Identify the length for all work vessels and identify the distance round trip from vessel berthing location and aquaculture area.
59. ☐ For project activities associated with docking structures (either commercial, industrial, or recreational) identify the number, type (motorized/non-motorized, jet-ski, sailboat, kayak, canoe, other that will be berthed there and the sizes of each.
60. ☐ Information required for Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act:
    a. Results of an eelgrass survey completed per the INSERT.
    b. Essential Fish Habitat Assessment to determine project-related impacts to essential fish habitat, using guidance developed by the National Marine Fisheries Service.
61. ☐ A document containing the following information (requirements of 50 CFR §600.920(e)(3)):
    a. Description of proposed action.
    b. Analysis of potential adverse effects on essential fish habitat.
    c. Conclusions regarding the effects of the action on essential fish habitat.
    d. If applicable, proposed mitigation.
    e. Analysis of alternatives to the proposed action.
    f. Other:

PRE-CONSTRUCTION NOTIFICATION APPLICATION

U.S. Army Corps of Engineers (USACE), New England District (NAE)

PRE-CONSTRUCTION NOTIFICATION (PCN)

DATA REQUIRED BY THE PRIVACY ACT OF 1974

Authority Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332.

Principal Purpose The information provided will be used in evaluating activities under Pre-Construction Notification procedures within New England.

Routine Uses This information may be shared with other federal, state, and local government agencies during the application review process. Submission

Disclosure of requested information is voluntary. However, if information is not provided the PCN application cannot be fully evaluated nor can USACE render a permit decision.

Instructions The applicant must complete ALL required sections of this document before their submission to USACE. The PCN submission to USACE shall include one set of drawings which show the location and character of the proposed activity, statements that address each required field below, and documentation that supports each field (e.g., emails, letters, description/narrative, phone calls, surveys, reports, etc.). Electronic submissions to the following address are strongly preferred: cenae-r-ma@usace.army.mil. The email subject line shall contain the following: General Permit #, PCN, City/Town, and date submitted. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY USACE)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME

First - Dan Middle - Last - Nason

Company - Town of Harvard DPW

E-mail Address - dnason@harvard-ma.gov

6. APPLICANT'S ADDRESS:

Address- 47 Depot Road

City - Harvard State - MA Zip - 01451 Country - USA

7. APPLICANT'S PHONE NOs. with AREA CODE

a. Residence b. Business c. Fax d. Mobile

9784564100

8. AUTHORIZED AGENT'S NAME AND TITLE (*agent is not required*)

First - Peter Middle - Last - Engle

Company - TEC Inc.

E-mail Address - pengle@theengineeringcorp.com

9. AGENT'S ADDRESS:

Address- 311 Main Street

City - Worcester State - MA Zip - 01608 Country - USA

10. AGENT'S PHONE NOs. with AREA CODE

a. Residence b. Business c. Fax d. Mobile

7744020229

STATEMENT OF AUTHORIZATION

11. I hereby authorize, TEC Inc, to act on my behalf as my agent in the processing of this general permit PCN application and to furnish, upon request, supplemental information in support of this general permit PCN application.

SIGNATURE OF APPLICANT DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME or TITLE (*see instructions*)

Ayer Road Reconstruction and Shared Use Path

13. NAME OF WATERBODY, IF KNOWN (*if applicable*)

(2) Unnamed Intermittent Streams

14. PROPOSED ACTIVITY STREET ADDRESS (*if applicable*)

Ayer Road

City: Harvard State: MA Zip:

15. LOCATION OF PROPOSED ACTIVITY (*see instructions*)

Latitude: 42.52825 °N Longitude: -71.57880 °W

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (*see instructions*)

State Tax Parcel ID: Municipality: Harvard

Section: Township: Range:

17. DIRECTIONS TO THE SITE.

Route 2, Exit 109B to Rt111 North.

18. IDENTIFY THE SPECIFIC GENERAL PERMIT(S) YOU PROPOSE TO USE:

GP23, LINEAR TRANSPORTATION PROJECTS AND WETLANDS/STREAM/CROSSINGS
GP 24. TEMPORARY CONSTRUCTION, ACCESS, AND DEWATERING

19. DESCRIPTION OF PROPOSED GENERAL PERMIT ACTIVITY (*see instructions*)

Replacement of (1) existing Ayer Road (Rt111) at Gebo Lane intermittent stream culvert, removal of (1) existing Gebo Lane intermittent stream culvert and associated stream restoration, filling of 2,688 sf of vegetated wetlands associated with roadway box widening and shared use path and replication of 4,710 sf of vegetated wetlands (1.75:1 replacement), extension of (1) existing Ayer Road (Rt111) intermittent stream culvert at 294/304 Ayer Road.

20. DESCRIPTION OF PROPOSED MITIGATION MEASURES (*see instructions*)

Mitigation includes: wetland restoration, wetland replication, stream restoration. Erosion and sedimentation controls are proposed during construction.

21. PURPOSE OF GENERAL PERMIT ACTIVITY (*Describe the reason or purpose of the project, see instructions*)

Reconstruction, box widening, and shared use path construction on Ayer Road.

22. Quantity of Wetlands, Streams, or Other Types of Waters Directly Affected by Proposed General Permit Activity (*see instructions*)

Area (square feet)	Length (linear feet)	Volume (cubic yards)	Duration	Purpose
14 T / 2688 P	n/a	190 Fill	Temp / Perm	VW - Fill Associated with Culverts and SUP
4,724	n/a	n/a	Permanent	VW - Restoration / Replication
382 T / 310 P	87' T / 92' P	35 Fill	Temp / Perm	WOTUS - Stream Bed, Bank - Loss due to Crossings
820	288	15 Dredge	Permanent	WOTUS - Int. Stream Restoration Bed, Bank

Each PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site.

23. List any other GP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project on any related activity (*see instructions*)

n/a

24. If the proposed activity will result in the loss of aquatic resources that exceed those identified in the New England District Compensatory Mitigation Thresholds, explain how the compensatory mitigation requirement will be satisfied. (*see instructions*)

1.75:1 Wetland Replication
Greater than 1:1 Intermittent Stream Restoration

25. Is Any Portion of the General Permit Activity Already Complete? [ ] Yes [x] No If Yes, describe the completed work:

26. List the name(s) of any species listed as endangered or threatened under the Endangered Species Act that might be affected by the proposed GP activity or utilize the designated critical habitat that might be affected by the proposed GP activity. (*see instructions*)

Tricolored Bat, endangered. project is unlikely to affect the species.
Project is not located within priority habitats or in close proximity to known hibernaculum or roosting trees.

27. List any historic properties that have the potential to be affected by the proposed GP activity or include a vicinity map indicating the location of the historic property or properties. Attach relevant project information, along with any responses received from project notifications to this submittal. (*see instructions*)

MassHistoric Registered site (HRV164) located at 310 Ayer Road, approximately 300 feet away from the proposed culvert extension and wetland replication work zone. The property will not be effected by the proposed project(s).

No National Registry sites located in close proximity to the project.

28. For a proposed GP activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, identify the Wild and Scenic River or the "study river":

N/A

29. If the proposed GP activity also requires permission from the USACE pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, have you submitted a written request for section 408 permission from the USACE district having jurisdiction over that project? [ ] Yes [ ] No x N/A

If "yes", please provide the date your request was submitted to the USACE District:

30. Does the activity require a 401 Water Quality Certification (WQC)? If so, specify the type of 401 WQC that is required (general or individual). In cases where an individual 401 WQC is required, provide the date the 401 WQC certification request was submitted to the certifying authority and their contact information.

Yes, MassDEP General 401 WQC through Issuance of WPA Order of Conditions

31. If the terms of the GP(s) you want to use require additional information to be included in the PCN (i.e. sampling and analysis plan), please include that information in this space or provide it on an additional sheet of paper marked Block 30. (*see instructions*)

N/A

32. I certify that the information in this pre-construction notification is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE

The Pre-Construction Notification must be signed by the person who desires to undertake the proposed activity (applicant) and, if the statement in block 11 has been filled out and signed, the authorized agent.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

Instructions for Preparing a

Department of the Army

General Permit (GP) Pre-Construction Notification (PCN)

Blocks 1 through 4. To be completed by the U.S. Army Corps of Engineers.

Block 5. Applicant' Name. Enter the name and the e-mail address of the responsible party or parties. If the responsible party is an agency, company, corporation, or other organization, indicate the name of the organization and responsible officer and title. If more than one party is associated with the PCN, please attach a sheet of paper with the necessary information marked Block 5.

Block 6. Address of Applicant. Please provide the full address of the party or parties responsible for the PCN. If more space is needed, attach an extra sheet of paper marked Block 6.

Block 7. Applicant Telephone Number(s). Please provide the telephone number where you can usually be reached during normal business hours.

Blocks 8 through 11. To be completed, if you choose to have an agent.

Block 8. Authorized Agent's Name and Title. Indicate name of individual or agency, designated by you, to represent you in this process. An agent can be an attorney, builder, contractor, engineer, consultant, or any other person or organization. Note: An agent is not required.

Blocks 9 and 10. Agent's Address and Telephone Number. Please provide the complete mailing address of the agent, along with the telephone number where they can be reached during normal business hours.

Block 11. Statement of Authorization. To be completed by the applicant, if an agent is to be employed.

Block 12. Proposed General Permit Activity Name or Title. Please provide a name identifying the proposed GP activity, e.g., Windward Marina, Rolling Hills Subdivision, or Smith Commercial Center.

Block 13. Name of Waterbody. Please provide the name (if it has a name) of any stream, lake, marsh, or other waterway to be directly impacted by the GP activity. If it is a minor (no name) stream, identify the waterbody the minor stream enters.

Block 14. Proposed Activity Street Address. If the proposed GP activity is located at a site having a street address (not a box number), enter it in Block 14.

Block 15. Location of Proposed Activity. Enter the latitude and longitude of where the proposed GP activity is located. Indicate whether the project location provided is the center of the project or whether the project location is provided as the latitude and longitude for each of the "corners" of the project area requiring evaluation. If there are multiple sites, please list the latitude and longitude of each site (center or corners) on a separate sheet of paper and mark as Block 15.

Block 16. Other Location Descriptions. If available, provide the Tax Parcel Identification number of the site, Section, Township, and Range of the site (if known), and / or local Municipality where the site is located.

Block 17. Directions to the Site. Provide directions to the site from a known location or landmark. Include highway and street numbers as well as names. Also provide distances from known locations and any other information that would assist in locating the site. You may also provide a description of the location of the proposed GP activity, such as lot numbers, tract numbers, or you may choose to locate the proposed GP activity site from a known point (such as the right descending bank of Smith Creek, one mile downstream from the Highway 14 bridge). If a large river or stream, include the river mile of the proposed GP activity site if known. If there are multiple locations, please indicate directions to each location on a separate sheet of paper and mark as Block 17.

Block 18. Identify the Specific General Permit(s) You Propose to Use. List the number(s) of the General Permit(s) you want to use to authorize the proposed activity (e.g., GP 4).

Block 19. Description of the Proposed General Permit Activity. Describe the proposed GP activity, including the direct and indirect adverse environmental effects of the proposed activity. The description of the proposed activity should be sufficiently detailed for USACE to determine that the adverse environmental effects of the activity will be no more than minimal. Identify the materials to be used in construction, as well as the methods by which the work is to be done.

Provide drawings to show that the proposed GP activity complies with the terms of the applicable GP(s). Drawings should contain sufficient detail to provide an illustrative description of the proposed GP activity, but do not need to be detailed engineering plans. The written descriptions and illustrations are an important part of the application. Please describe, in detail, what you wish to do. If more space is needed, attach an extra sheet of paper marked Block 19.

Block 20: Description of Proposed Mitigation Measures. Describe any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed GP activity. The description of any proposed mitigation measures should be sufficiently detailed for USACE to determine how the measures would avoid and minimize adverse environmental effects. If adverse effects exceed the New England District compensatory mitigation thresholds, you must document how compensatory mitigation would be satisfied in Block 24.

Block 21. Purpose of General Permit Activity. Describe the purpose and need for the proposed GP activity. What will it be used for and why? Also include a brief description of any related activities associated with the proposed project. Provide the approximate dates you plan to begin and complete all work.

Block 22. Quantity of Wetlands, Streams, or Other Types of Waters Directly Affected by the Proposed General Permit Activity. For discharges of dredged or fill material into Waters of the U.S., provide the amount of wetlands, streams, or other types of waters filled, flooded, excavated, or drained by the proposed GP activity. For structures or work in Navigable Waters of the U.S. subject to Section 10 of the Rivers and Harbors Act of 1899, provide the amount of navigable waters filled, dredged, occupied by one or more structures (e.g., aids to navigation, mooring buoys) by the proposed GP activity. The area of impact includes the structures or fills with direct or indirect effects to waters of the U.S. The length of impact includes the length of a stream, including is banks, that are directly affected by the structures or fills. The duration of impact should be identified as temporary (xx days) or permanent. The impact purpose should briefly describe what structure or fill is responsible for the impact.

Block 23. Identify Any Other General Permit(s), Regional General Permit(s), or Individual Permit(s) Used to Authorize Any Part of Proposed Activity or Any Related Activity. List any other GP(s) or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. For linear projects, list other separate and distant crossings of waters and wetlands authorized by these GPs that do not require PCNs. If more space is needed, attach an extra sheet of paper marked Block 23.

Block 24. Compensatory Mitigation Statement for Losses Greater Than the New England District Compensatory Mitigation Thresholds. New England District requires compensatory mitigation at a minimum one for one replacement ratio or greater for all aquatic resource losses that require a PCN and exceed the New England District Compensatory Mitigation Thresholds, unless USACE determines in writing that either some other form of mitigation is more environmentally appropriate or the adverse environmental effects of the proposed GP activity are no more than minimal without compensatory mitigation, and provides an activity specific waiver of this requirement. Describe the proposed compensatory mitigation for wetland losses greater than the New England District Compensatory Mitigation Thresholds or provide an explanation of why USACE should not require wetland compensatory mitigation for the proposed GP activity. If more space is needed, attach an extra sheet of paper marked Block 24.

Block 25. Is Any Portion of the General Permit Activity Already Complete? Describe any work that has already been completed for the GP activity.

Block 26. List the Name(s) of Any Species Listed As Endangered or Threatened under the Endangered Species Act that Might be Affected by the General Permit Activity. If you are not a federal agency, and if any listed species or designated critical habitat might be affected or is in the vicinity of the proposed GP activity, or if the proposed GP activity is located in designated critical habitat, list the name(s) of those endangered or threatened species that might be affected by the proposed GP activity or utilize the designated critical habitat that might be affected by the proposed GP activity. If you are a Federal agency, and the proposed GP activity requires a PCN, you must provide documentation demonstrating compliance with Section 7 of the Endangered Species Act.

Block 27. List Any Historic Properties that Have the Potential to be Affected by the General Permit Activity. If you are not a federal agency, and if any historic properties have the potential to be affected by the proposed GP activity, list the name(s) of those historic properties that have the potential to be affected by the proposed GP activity. Provide all relevant documentation about these historic properties in the PCN submittal. If you are a Federal agency, and the proposed GP activity requires a PCN, you must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

Block 28. List the Wild and Scenic River or Congressionally Designated Study River if the General Permit Activity Would Occur in such a River. If the proposed GP activity will occur in a river in the National Wild and Scenic River System or in a river officially designated by Congress as a “study river” under the Wild and Scenic Rivers Act, provide the name of the river. For a list of Wild and Scenic Rivers and study rivers, please visit http://www.rivers.gov/

Block 29. General Permit Activities that also Require Permission from the USACE Under 33 U.S.C. 408. If the proposed GP activity also requires permission from the USACE under 33 U.S.C. 408 because it will temporarily or permanently alter, occupy, or use a USACE federal authorized civil works project, indicate whether you have submitted a written request for section 408 permission from the USACE district having jurisdiction over that project.

Block 30. 401 Water Quality Certification. As described above, specify if the activity requires a 401 WQC from the certifying authority.

Block 31. Other Information Required For General Permit Pre Construction Notifications. The terms of some of the General Permits include additional information requirements for preconstruction notifications:

* Maintenance – information regarding the original design capacities and configurations of the outfalls, intakes, small impoundments, and canals.
* Temporary Construction, Access, and Dewatering – a restoration plan showing how all temporary fills and structures will be removed and the area restored to pre-project conditions.
* Repair of Uplands Damaged by Discrete Events – documentation, such as a recent topographic survey or photographs, to justify the extent of the proposed restoration.
* Commercial Shellfish Aquaculture Activities – (1) a map showing the boundaries of the project area, with latitude and longitude coordinates for each corner of the project area; (2) the name(s) of the species that will be cultivated during the period this GP is in effect; (3) whether canopy predator nets will be used; (4) whether suspended cultivation techniques will be used; and (5) general water depths in the project area (a detailed survey is not required).Dredging – (1) a proposed sampling and analysis plan shall be provided to USACE for approval prior to its execution. Pre-application meetings are encouraged.
* Beach Nourishment – sediment grain size should be determined for the length of the beach where nourishment is proposed. The frequency and locations of sediment sampling shall be sufficient to identify the sediment composition of the beach profile. This data shall be consolidated to generate a sediment gradation curve for each sampled transect. Each sampled transect should also be identified on the project plans (drawings).

If more space is needed, attach an extra sheet of paper marked Box 31.

Block 32. Signature of Applicant or Agent. The PCN must be signed by the person proposing to undertake the GP activity, and if applicable, the authorized party (agent) that prepared the PCN. The signature of the person proposing to undertake the GP activity shall be an affirmation that the party submitting the PCN possesses the requisite property rights to undertake the GP activity (including compliance with special conditions, mitigation, etc.).

DELINEATION OF WETLANDS, OTHER SPECIAL AQUATIC SITES, AND OTHER WATERS

Each PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current wetland delineation manual and regional supplement published by the USACE. The permittee may ask the USACE to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the USACE does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. The 60-day PCN review period will not start until a delineation has been completed.

DRAWINGS AND ILLUSTRATIONS

General Information.

Three types of illustrations are needed to properly depict the work to be undertaken. These illustrations or drawings are identified as a Vicinity Map, a Plan View or a Typical Cross Section Map. Identify each illustration with a figure or attachment number. For linear projects (e.g. roads, subsurface utility lines, etc.) gradient drawings should also be included. Please submit one copy of all drawings on 8½ x 11 inch plain white paper (electronic submissions preferred). Use the fewest number of sheets necessary for your drawings or illustrations. Each illustration should identify the project, the applicant, and the type of illustration (vicinity map, plan view, or cross section). While illustrations need not be professional (many small, private project illustrations are prepared by hand), they should be clear, accurate, and contain all necessary information.

ADDITIONAL INFORMATION AND REQUIREMENTS

For proposed GP activities that involve discharges into waters of the United States, water quality certification from the State, Tribe, or EPA must be obtained or waived. Some States, Tribes, or EPA have issued water quality certification for one or more GPs. Please check the New England District website to see if water quality certification has already been issued for the GP(s) you wish to use. For proposed GP activities in coastal states, state Coastal Zone Management Act consistency concurrence must be obtained, or a presumption of concurrence must occur. Some States have issued Coastal Zone Management Act consistency concurrences for one or more GPs. Please check the New England District website to see if Coastal Zone Management Act consistency concurrence has already been issued for the GP(s) you wish to use.

INTRODUCTION AND PURPOSE

On behalf of the project Applicant/Owner, the Town of Harvard, TEC, Inc. is filing this Section 404 Preconstruction Notification for the proposed reconstruction and multimodal transportation improvements along Ayer Road (Rt 110/111) starting from approximately 100 feet north of the State Highway Layout at Route 2 to the Harvard/Ayer town line. The project also includes work along Gebo Lane, approximately 650-feet from its intersection with Ayer Road to its intersection with Lancaster County Road, and along Lancaster County Road approximately 550-feet between Gebo Lane and Ayer Road. The length of the project is approximately 9,200 linear feet.

The project involves the construction of a shared use path alongside Ayer Road for the length of the project, as well as reconstruction of Ayer Road itself. The shared use path is also proposed to replace Lancaster County Road between Ayer Road and Gebo Lane. The Gebo Lane/ Ayer Road intersection is also proposed to be reconstructed to provide for an approach closer to 90 degrees. There are proposed stormwater improvements along the length of the project.

The project construction is programmed on the 2025 Massachusetts State Transportation Improvement Program for the Montachusett Metropolitan Planning Organization with funding from the Federal Bipartisan Infrastructure Law. Estimated construction costs at the current time are approximately $14,000,000. Construction is expected to begin in the Summer of 2026 and end in the Summer of 2028.

In regard to Waters of the United States and the CWA Section 404, the project will require coverage under MA GPs through the Pre-Construction Notification for work related to (2) existing intermittent stream crossings along Ayer Road, along with some incidental work within vegetated wetlands. There are resource area impacts promulgated by the proposed roadway reconstruction and shared use path associated primarily with (2) existing intermittent stream crossing modifications. Mitigation includes Wetland Replication at a ratio of 1.75:1, Stream Bank restoration, Land Under Water/ Stream Bed restoration. Further information regarding impacts and mitigation is included herein. There are no floodplains or floodways associated with the (2) intermittent streams, therefore work will not alter any base flood elevations.

The project intents to utilize USACE MA GPs 23 and 24, Linear Transportation Projects and Stream Crossings and Temporary Construction, Access, and Dewatering, respectively. The project also requires permitting under the Massachusetts Wetlands Protection Act, for which an Order of Conditions has been issued by the Harvard Conservation Commission. The OOC will serve as the WQC under the MA General 401 WQC. Coverage under the EPA NPDES CGP will also be required.

EXISTING CONDITIONS & RESOURCE AREAS

Ayer Road, signed as Massachusetts State Routes 110 and 111, is a two lane, north-south, urban principal arterial roadway under the jurisdiction of the Town of Harvard. Beyond the southern project limits, Ayer Road widens to two lanes in each direction through its interchange with Route 2. Ayer Road provides a regional connection between Harvard town center and Route 2 to the south and the Town of Ayer and Route 2a to the north. Ayer Road provides a full cloverleaf interchange with Route 2. The posted regulatory speed limit along Ayer Road (Route 110/111) is 40 miles per hour (mph) south of Myrick Lane and 35 mph to the north of Myrick Lane. There are no sidewalks or designated bike lanes present along Ayer Road. Ayer Road experiences a high volume of cut-through truck traffic, often traveling at high speeds, from municipalities to the north to access Route 2 to the south. The corridor provides access to retail, office, and other commercial developments which serve as the primary commercial (non-residential or non-municipal/educational) section of the Town of Harvard.

Lancaster County Road and Poor Farm Road intersect Ayer Road (Route 110/111) to form an offset four-legged unsignalized intersection. The Ayer Road northbound and southbound approaches are free-flowing while the Lancaster County Road and the Poor Farm Road approaches are under stop-control. The Ayer Road northbound and southbound approaches both consist of a single general-purpose travel lane with directional flow separated by a marked double-yellow centerline. The Lancaster County Road approach consists of a single general-purpose lane with directional flow not delineated. The Poor Farm Road approach consists of a single general-purpose lane with directional flow separated by a single-yellow centerline. Sidewalks are not provided on either Ayer Road, Lancaster County Road, or Poor Farm Road. Crosswalks are not striped across the Ayer Road, Lancaster County Road, or Poor Farm Road approaches at the intersection. There are no traditional bicycle accommodations at the intersection.

Gebo Lane intersects Ayer Road (Route 110/111) from the west to form a three-legged unsignalized intersection. The Ayer Road northbound and southbound approaches are free flowing while the Gebo Lane approach is under stop-control. The Ayer Road northbound and southbound approaches both consist of a single general-purpose travel lane with directional flow separated by a marked double-yellow centerline. The Gebo Lane approach consists of a single general-purpose lane with directional flow not delineated. Sidewalks are not provided on either Ayer Road or Gebo Lane. Crosswalks are not striped across the Ayer Road and Gebo Lane approaches at the intersection. There are no traditional bicycle accommodations at the intersection.

Rimmer Environmental Consulting (REC) conducted a resource area evaluation and delineation of the project area in July 2019. At that time, wetland resources subject to jurisdiction under the Massachusetts Wetlands Protection Act (MGL Ch 131 §. 40) and the Town of Harvard Wetland Protection Bylaw (Chapter 119) within the project area were identified. Wetlands and waterways were delineated in accordance with the procedures established in the Mass. Wetlands Protection Act Regulations (310 CMR 10.00) and the Bylaw Regulations (chapter 147). Numbered sequences of flags or stakes were placed in the field to delineate the boundary between upland and wetland resources. The flags/ stakes were survey located and are depicted on the proposed improvements plan set. A copy of the wetland evaluation and delineation report prepared by Rimmer Environmental Consulting is attached and provides for greater detail on the evaluation and methodology of delineation. The following is a description of resource areas present along the site starting at the southern project limit and heading north to the Ayer town line:

The west side of Gebo Lane contains an unnamed, unmapped intermittent channel and associated VW. There is also a retention basin containing primarily broadleaf cattail (Typha latifolia) facing Gebo Lane adjacent to the athletic field though this area is likely a stormwater management feature and may not be a jurisdictional wetland resource area. The intermittent stream flows from west to east under Gebo Lane through an existing 30" CMP. A drainage ditch along the east side of Gebo Lane flows to the south and converges with the intermittent stream and VW. The channel contains a very narrow band of Vegetated Wetland, typically sapling red maple (Acer rubrum) honeysuckle (Lonicera tatarica) and black chokeberry (Aronia melanocarpa). The intermittent stream then flows east under Ayer Road through an existing 24" CMP. This stream is not indicated on the USGS topographic map. StreamStats indicates a watershed of less than 0.1 square miles. The channel directs surface flow generally to the south and under Ayer Road (Route 110/111) through an existing 24" CMP.

The stream continues from the 24" CMP culvert to the east side of Ayer Road and connects to a larger wetland system on the east side of Ayer Road known as Ayer Road Meadows. This Vegetated Wetland borders Bowers Brook all the way to the Bowers Brook culvert which passes back under Ayer Road. This wetland consists of an over story of red maple, with an understory of elderberry (Sambucas canadensis) and highbush blueberry (Vaccinium corymbosum). Sensitive fern (Onoclea sensibilis) and skunk cabbage (Symplocarpus foetidus) are dominant as groundcover.

Bowers Brook is indicated as a perennial stream on USGS maps and StreamStats. MAHW was determined based upon observation of bankfull indicators, including scour marks, water marks undercutting, changes in slope and changes in vegetation. Vegetated Wetland extends from Bank to the north which appears to be a man-made drainage ditch.

Bowers Brook passes back west under Ayer Road and north under Lancaster County Road and flows generally to the northwest eventually to Cold Spring Brook. Between Ayer Road and Lancaster County Road, the banks are very steep and there is an old beaver dam located close to the culvert under Ayer Road. There is a narrow VW extending from the south bank parallel to Lancaster County Road and is a dense shrub swamp. There is what appears to be a stormwater basin associated with the post office located at 215 Ayer Road. The basin is dominated by wetland plants, including cattail, common reed (Phragmites australis) and sensitive fern, however if it is determined to be constructed in accordance with MassDEP Stormwater Management Regulations it would not be considered a jurisdictional wetland resource. The basin was delineated as if it were jurisdictional. After Lancaster County Road, the brook flows away from the project site.

There is associated VW which eventually extends greater than 100' from the project site in the vicinity of 231 Ayer Road.

Under the FEMA NFIP, Bowers Brook is mapped as a regulatory floodway and has a 100 year and 500 year floodplain. The 100 year floodplain is elevated, however the elevation is not constant as it is a riverine floodplain. Floodplain is in the vicinity of the project is between elevation 246 north of Lancaster County Road and elevation 250 south of Ayer Road.

There is a small waterbody east of 6 Lancaster County Road. Wetland vegetation along its banks includes highbush blueberry and silky dogwood (Cornus amomum).

There is an unnamed intermittent stream which flows from east to west under Ayer Road, through a 36" RCP, north of 294 Ayer Road which is a tributary to Bowers Brook. This stream is not indicated on the USGS topographic map and is presumed to be intermittent. Also, USGS StreamStats indicates the drainage area is only 0.25 square miles, well under the minimum 0.5 square mile threshold for jurisdiction as a perennial stream. There was no flow at the time of inspection. There are some Vegetated Wetland extending from the banks of the stream in the vicinity of the project.

There is a small, forested wetland and roadside swale located on the east side of the project site at 320 Ayer Road across from the entrance to Doe Orchards. The portion of this wetland closest to the road was delineated. It contains small red maple, northern arrow-wood (Viburnum recognitum) and green ash (Fraxinus pennsylvanica). This wetland appears to connect to a south flowing off-site intermittent stream to the east. The wetlands and intermittent stream appear to eventually converge with the previously mentioned intermittent stream at 294 Ayer Road.

Another unnamed intermittent stream not shown on USGS topographic maps flows from east to west under Ayer Road just south of the Ayer municipal boundary through an existing 36" RCP. USGS StreamStats indicates it has a drainage area of only 0.16 square miles. This channel conveys flow west to Cold Spring Brook. Reed canary grass (Phalaris arundinacea) is growing up to the bank where it has not been mowed. The downstream side on the west side of Ayer Road contains a rocky channel. There was no flow through the culvert at the time of inspection. The banks on this side are vegetated primarily with upland vegetation, especially Japanese knotweed (Polygonum cuspidatum).

It is unknown if any prior USACE permits have been issued for the project subject area.

Neither intermittent stream is known as a cold water fishery or have essential fish habitat.

PROPOSED IMPROVEMENTS

The proposed improvements are needed to address the existing aging infrastructure, safety deficiencies regarding conflicting turning movements and lack of multi-modal accommodations. The multi-modal improvements are anticipated to include provision of bicycle and pedestrian accommodations, including bicycle lanes, curbing and sidewalk on the west side of Ayer Road, ADA/AAB compliance improvements, realignment of Gebo Lane to approximately 90-degrees approaching Ayer Road and incorporation of an improved unsignalized intersection with Gebo Lane, closure of Lancaster County Road to vehicular traffic between Gebo Lane and Ayer Road, upgrades to stormwater management infrastructure, pavement resurfacing, and new pavement markings and signs. Additionally, traffic safety features will be implemented compliant with today's industry standards in accordance with MassDOT construction specifications.

The conversion of Lancaster County Road to a shared use path/ non-motorized path would provide for an improvement to the potential vernal pool at 6 Lancaster County Road. There is no work proposed that would negatively impact the potential vernal pool at 320 Ayer Road.

The project intends to improve existing stormwater management throughout the limits of work over the existing conditions. This includes the installation of a new drainage network throughout the limits of the project including new deep sump catch basins, manholes, culverts, and stabilized stone pipe outfalls and discharges.

Specific to the CWA Section 404, (2) existing intermittent stream crossings under Ayer Road are proposed to be modified. The first intermittent stream is located at the intersection of Ayer Road and Geno Lane, where the existing crushed (50') 30" CMP culvert is proposed to be replaced with a (70') 48" equivalent reinforced concrete arch pipe. This stream crossing replacement will also include the removal of another existing 30" CMP stream crossing culvert under Gebo Lane and the restoration of approximately 120' of stream bank and 60' of stream bed. Also associated with this work is the construction of a 4,170 square foot wetland replication area to mitigate loss of wetlands associated with the project, a 1.75:1 compensation ratio. The second stream is located at 304 Ayer Road, where the existing 36" RCP will be maintained and extended approximately 14'. This work will also include a 540 square foot wetland replication area. In total, 4,710 square feet of wetland replication area is proposed. Refer to the impact/ mitigation table for more information.

AUTHORIZATIONS/ PERMITTING

Federal

USACE Section 404 PCN – In Progress

EPA NPDES CGP – NOI to be filed prior to Construction

State

MassDEP WPA NOI / OOC – Completed, NOI Filed 5/1/2024, OOC Issued 1/30/2025

MassDEP 401 WQC – Coverage under MassDEP General 401 WQC via WPA OOC

IMPACTS

Resource Area	Impacts +/-				
	Temporary	Area/ Station	Permanent	Area/ Station	Mitigation
BVW	14 s.f.	T4/ STA 65+30 R	12 s.f.	P1/ STA 19+50 L	14 s.f. restoration
			80 s.f.	P3.1/ GEBO 11+50 L	4,710 s.f. replication
			51 s.f.	P4/ STA 28+75 R	
			34 s.f.	P5/ STA 29+15 R	
			20 s.f.	P6/ STA 65+30 R	1.75:1 replication area ratio
			290 s.f.	P7/ STA 65+40 L	
			487 s.f.		
IVW			1,425 s.f.	P3.2/ GEBO 65+40 L	
			14 s.f.	P3.3/ GEBO 65+40 L	
			762 s.f.	P3.4/ GEBO 65+40 L	
			2,201		
			2,688 s.f.	TOTAL BVW+IVW	
WOTUS Stream Bank	18 l.f.	T1/ STA 20+70 R	40 l.f.	P2/ STA 20+70 L	148 l.f. restoration
	55 l.f.	T2/ STA 20+90 L	16 l.f.	P6/ STA 65+30 R	140 l.f. restoration within Ayer Road culvert at Gebo Lane
	2 l.f.	T4/ STA 65+30 R	36 l.f.	P7/ STA 65+40 L	
	12 l.f.	T5/ STA 65+40 L	92 l.f.*		
	87 l.f.				
WOTUS Stream Bed/ Land Under Water	85 s.f.	T1/ STA 20+70 R	180 s.f.	P2/ STA 20+70 L	470 s.f. restoration
	200 s.f.	T2/ STA 20+90 L	40 s.f.	P6/ STA 65+30 R	350 s.f. restoration within Ayer Road culvert at Gebo Lane
	45 s.f.	T4/ STA 65+30 R	90 s.f.	P7/ STA 65+40 L	
	52 s.f.	T5/ STA 65+40 L	310 s.f.*		
	382 s.f.				

Total Dredging for the Project within Water of the United States = 15 cf

Total Fill for the Project within Water of the United States = 225 cf

AVOIDANCE & MITIGATION

Prior to construction, erosion and sedimentation barriers (compost tubes) will be installed between the project area and resource areas to establish a limit-of-work. The erosion and sedimentation barriers will be installed and maintained throughout construction. Any dewatering will be required to be routed to a stilling basin/ dewatering bag before being discharged All disturbed areas are to be stabilized via loam and seed and maintained until sufficient vegetative growth is established.

Permanent Vegetated Wetland impacts are necessitated by the proposed change in roadway alignments, the addition of a shared use path, limits of grading, and improvements to the roadway stormwater management system. To mitigate the impacts to resource areas, Wetland replication is proposed at a ratio of 1.75:1 to meet the Harvard Wetland Protection Bylaw Requirements of 1.5:1. Additional replication area was added to mitigate impacts to bank and land under water. All wetland replication will be conducted according to the construction special provisions/ specifications approved by MassDOT, provided herein.

The Bank and Land Under Water impacts are associated with the two existing intermittent stream crossing modifications. The slight change in roadway alignment and addition of a shared use path along the west side of Ayer Road results in the necessity to elongate the existing culverts. The first culvert at Gebo Lane will be entirely replaced with an upgrade 48” reinforced concrete arch pipe. Although neither culvert will meet the stream crossing standards, the upgrading of the culvert at Gebo Lane will increase compliance with the standards and will result in an improvement over existing conditions. Included as an attachment is an alternative analysis of the culvert replacement which indicates maximum feasible compliance with the stream crossing standards.

Due to lack of available space within the roadway right-of-way, along with the existing topography, it is not feasible to eliminate impacts while also implementing the proposed project improvements, specifically the multimodal shared use path and safety improvements to the Ayer Road and Gebo Lane intersection.

STORMWATER MANAGEMENT

The proposed project will improve upon the existing stormwater management system and will incorporate additional Best Management Practices (BMPs) to the maximum extent feasible including maintaining existing drainage paths, maintaining existing vegetation to the maximum extent practicable, country drainage where feasible, grassed swales, deep sump and hooded catch basins, upgraded and properly sized drainage pipe networks, and stabilized discharge outfalls. The Stormwater Management Plan has been designed to meet the Stormwater Standards identified in the Massachusetts Stormwater Handbook and the Harvard Wetland Protection Bylaw to the maximum extent practicable. The proposed project reduces the risk of erosion and sedimentation via improvement to conveyance methods, addition of stabilized discharge outfalls, as well as ensuring revegetation of all disturbed areas within the limit of work. The upgrading of catch basins with deep sumps will result in improvement to treatment of stormwater runoff on Ayer Road as well.

ALTERNATIVE ANALYSIS

- No Build: The project purpose is to improve upon the existing condition of Ayer Road, as well as the construction of a shared use path along the length of the project. The No Build alternative would not achieve the project goal and would leave the previously disturbed and degraded Riverfront Areas in the same condition as they currently are and allow for the continued degradation of existing roadway pavement conditions. There would be no improvement to stormwater management or reduction of impervious area within the Riverfront Areas.
- Resurfacing Only: Resurfacing of Ayer Road a rather than the proposed reconstruction and multimodal transportation improvements is an alternative, however this alternative would not allow for the improvement of stormwater management along the length of the roadway and would not allow for the addition of a shared use path which is one of the project requirements/goals. This alternative is similar to the No Build alternative.
- Restoration of Riverfront Areas: An alternative to the project which would significantly improve Riverfront Area conditions would be the removal of all degraded areas and restoration of the Riverfront Area within the controlled property limits. This would require the removal of all impervious areas within 200' of Bower's Brook in each direction, which would include the removal of Lancaster County Road, Ayer Road, and the elimination of a proposed shared use path. This alternative would not meet the project purpose of improving multimodal transportation along Ayer Road and significantly impact traffic/transportation operations in the area, and therefore is not a feasible alternative.
- Preferred Alternative/ Current Proposal: The current proposal achieves the project goal of multimodal transportation improvements along the Ayer Road (Route 100/111) corridor from Route 2 to the Ayer Town Line. This proposal includes the removal of Lancaster County Road and replacement of the road with a shared use path, resulting in a reduction of impervious area (1,920 s.f.) in the Riverfront Area, along with improvements to stormwater management on Ayer Road for the length of the project. The proposal meets all other performance standards of all other resource areas as outlined herein.

CONSTRUCTION SEQUENCING

Culvert 1 – Gebo Lane Replacement

Work shall commence during a period of low or no flow.

Site Preparation

- Mobilize equipment, materials, and personnel.
- Install erosion and sedimentation control measures to protect downgradient resource areas and demarcate the limit of work.
- Install turbidity screens prior to any in-water construction activities to contain debris and sediment, if necessary.
- Employ standard control measure during culvert demolition activities to ensure debris is not released into waterway.
- Compliance with any pre-construction conditions outlined in the Order of Conditions, Army Corps General Permit, and any other permits.

Demolition

- Employ shielding as necessary to prevent debris from entering waterway.
- Employ stream diversion means and methods, water diversion pump and line suitable for 10-year precipitation event.
- Clear and grubbing of vegetation necessary for construction within project limits.
- Employ detour – Gebo Lane to Lancaster Road to Ayer Road.
- Excavate existing culvert, headwalls, embankments as necessary for new culvert installation.

Construction

- Coordinate with Gas company for hanging/ relocation of as line.
- Install crushed stone culvert base, concrete arch pipe culver, and stream substrate restoration within pipe sections.
- Install concrete headwalls, backfill to road grade.
- Final grading, roadway paving and guardrail installation.
- Remove detour – close Gebo Lane.
- Demolition of Gebo Lane, excavate existing roadway, culvert, headwalls, embankments as necessary for stream restoration and wetland replication.
- Install drainage infrastructure.
- Stabilize side slopes.
- Fine grading and placement of stream substrate, wetland soils, seeding, stabilization measures, etc.

Close-Out

- Restore work area including stabilization of all disturbed areas (seed, rip rap, etc.) as designed to prevent erosion.
- Remove erosion control devices once stabilized and approved by the local conservation commission/ Order of Conditions.
- Monitor site and make necessary repairs to observed areas of erosion.

Culvert 2 – 304 Ayer Road Extension

Work shall commence during a period of low or no flow.

Site Preparation

- Mobilize equipment, materials, and personnel.
- Install erosion and sedimentation control measures to protect downgradient resource areas and demarcate the limit of work.
- Install turbidity screens prior to any in-water construction activities to contain debris and sediment, if necessary.
- Employ standard control measure during culvert demolition activities to ensure debris is not released into waterway.
- Compliance with any pre-construction conditions outlined in the Order of Conditions, Army Corps General Permit, and any other permits.

Demolition

- Employ stream diversion means and methods, water diversion pump and line suitable for 10-year precipitation event.
- Clear and grubbing of vegetation necessary for construction within project limits.
- Employ temporary traffic management.
- Excavate headwalls, embankments as necessary for new culvert installation.

Construction

- Install compacted stone culvert base and culvert extensions.
- Install concrete headwalls, backfill to road grade.
- Install drainage infrastructure.
- Stabilize side slopes.
- Final grading, roadway paving and guardrail installation.
- Install erosion controls and excavate for wetland replication area.
- Fine grading and placement of stream restoration substrate, wetland soils, seeding, stabilization measures, etc.

Close-Out

- Restore work area including stabilization of all disturbed areas (seed, rip rap, etc.) as designed to prevent erosion.
- Remove erosion control devices once stabilized and approved by the local conservation commission/ Order of Conditions.
- Monitor site and make necessary repairs to observed areas of erosion.

SUPPORTING MAPS AND DATA

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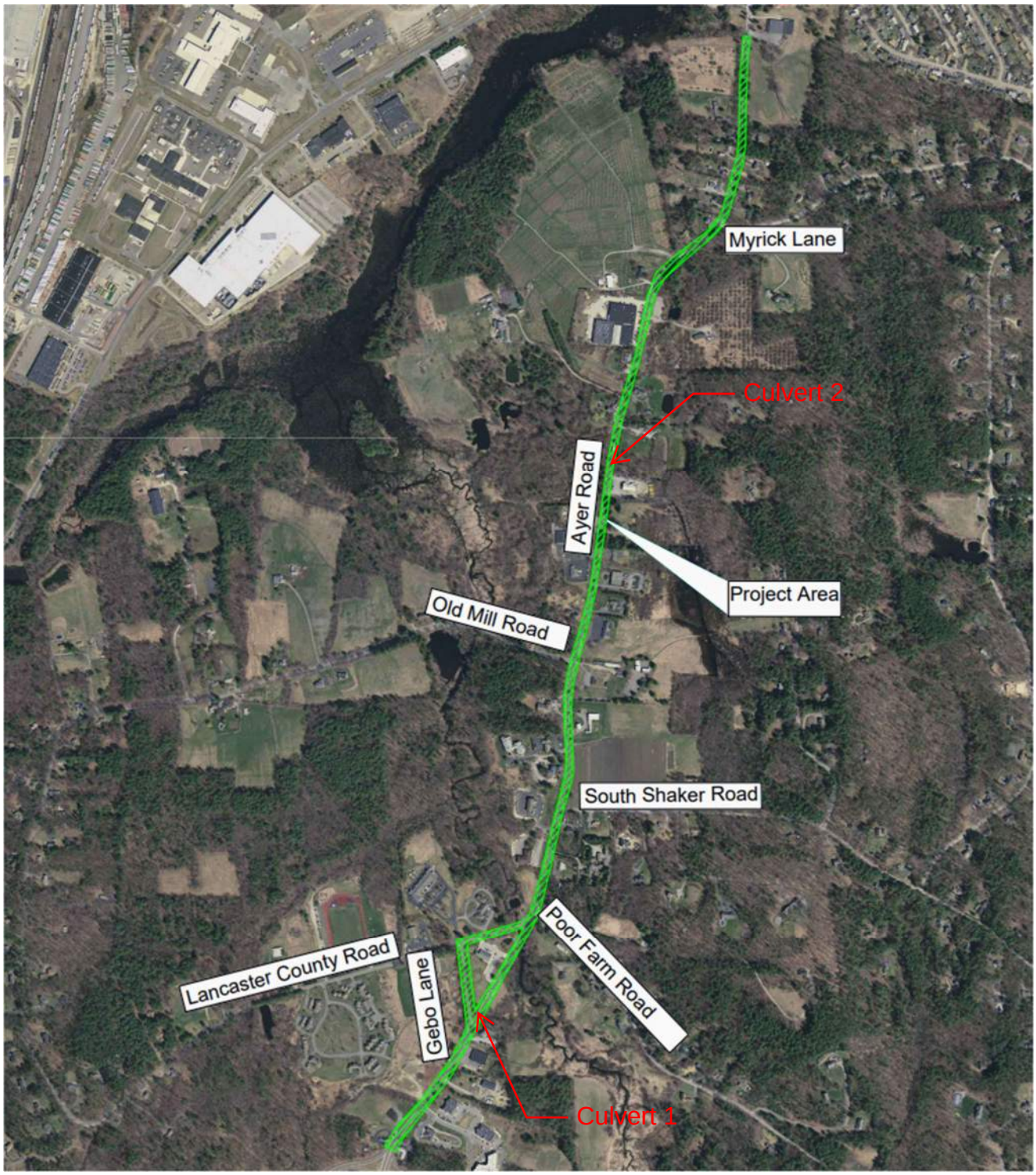
Project Location Map



Ayer Road (Route 110/111)

Town of Harvard, MA

1 inch = 1500 Feet

0 1500 3000 4500

October 4, 2023

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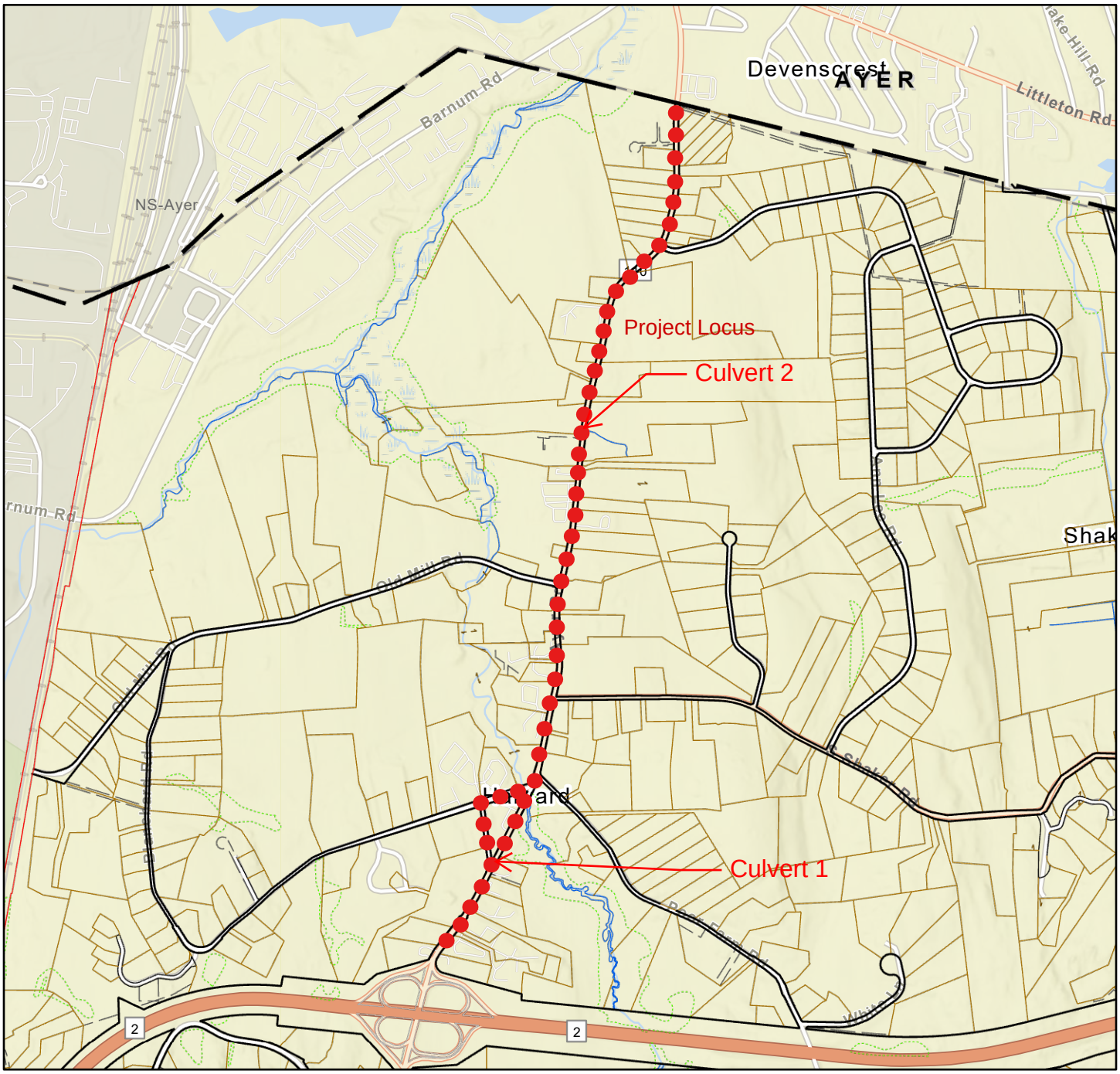

Large Scale	Property Line	Private Road ROW	Travel Way
CAI Town Line	Public Road	Right of Way	Wetland
PWater	Railroad	ROW Over	WaterLines
Private Road	Conservation Restriction	Property Hook	World Hillshade

Data shown on this map is provided for planning and informational purposes only. The municipality and CAI Technologies are not responsible for any use for other purposes or misuse or misrepresentation of this map.

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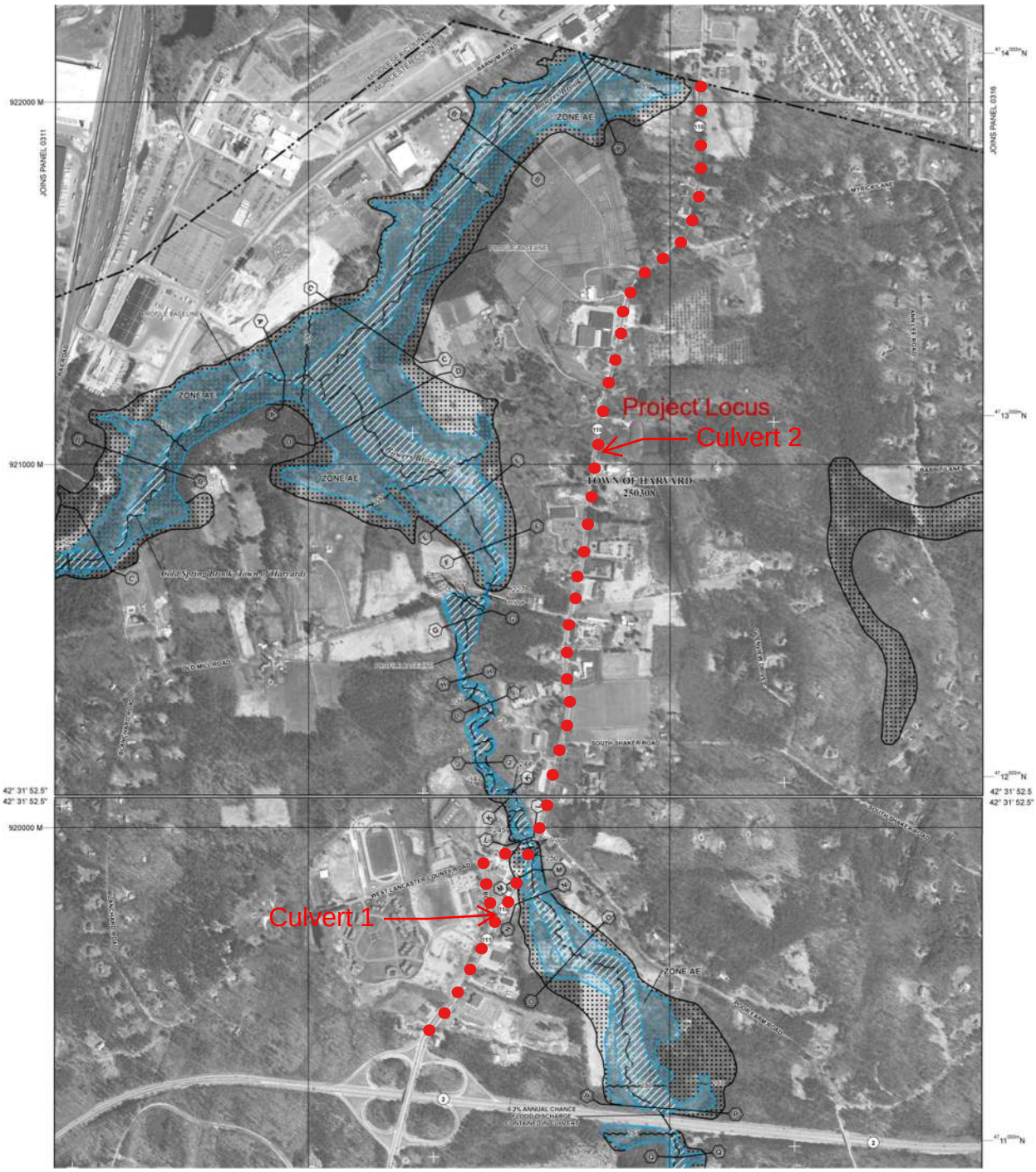
FEMA Map

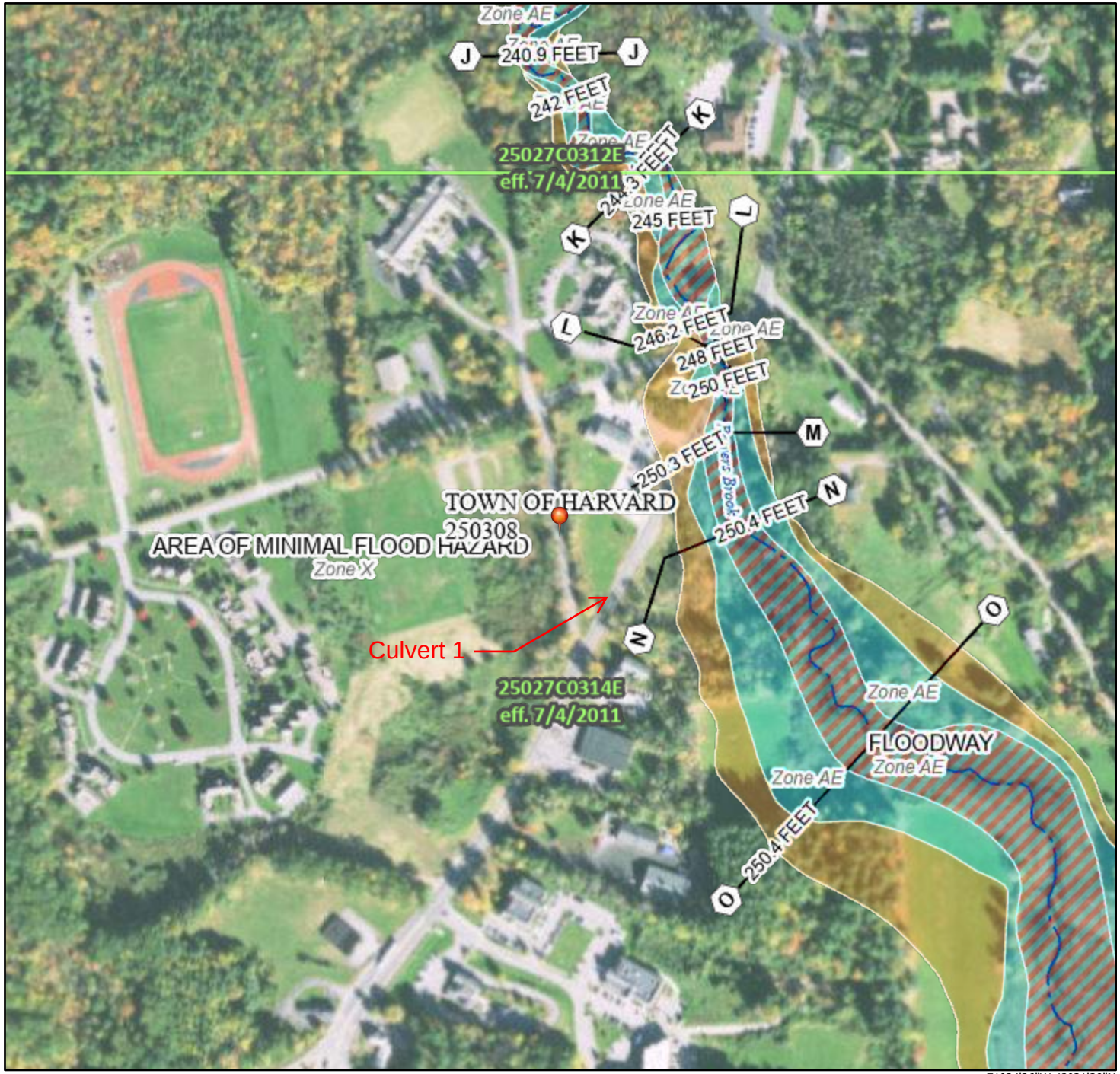


Proposal No. 619213-134927

National Flood Hazard Layer FIRMette

FEMA

71°35'4"W 42°31'57"N



71°34'26"W 42°31'30"N

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

1:6,000

A00830-39

Basemap Imagery Source: USGS National Map 2023

Legend

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

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

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

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

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

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

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

N

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

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

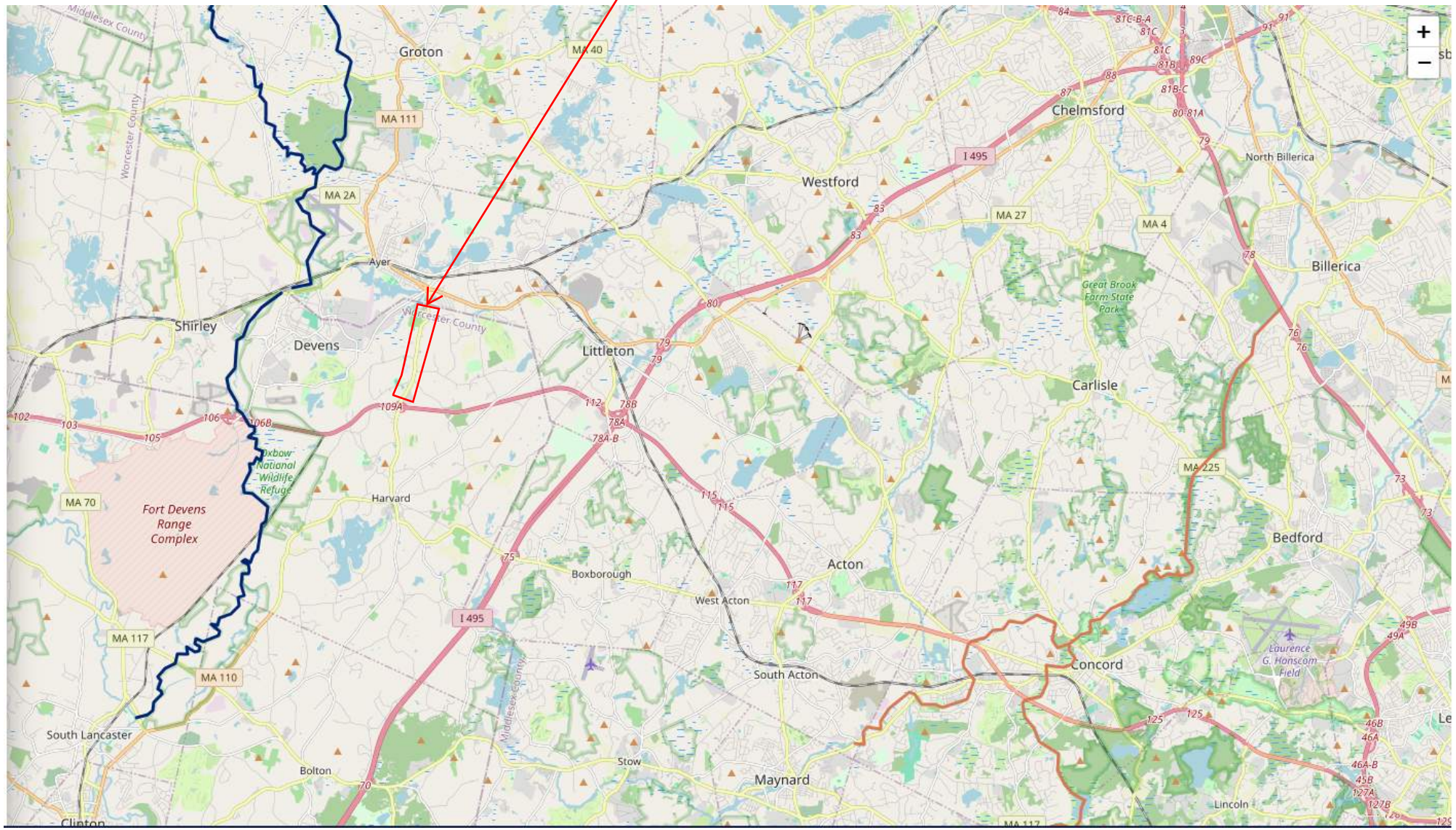
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/3/2023 at 3:26 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

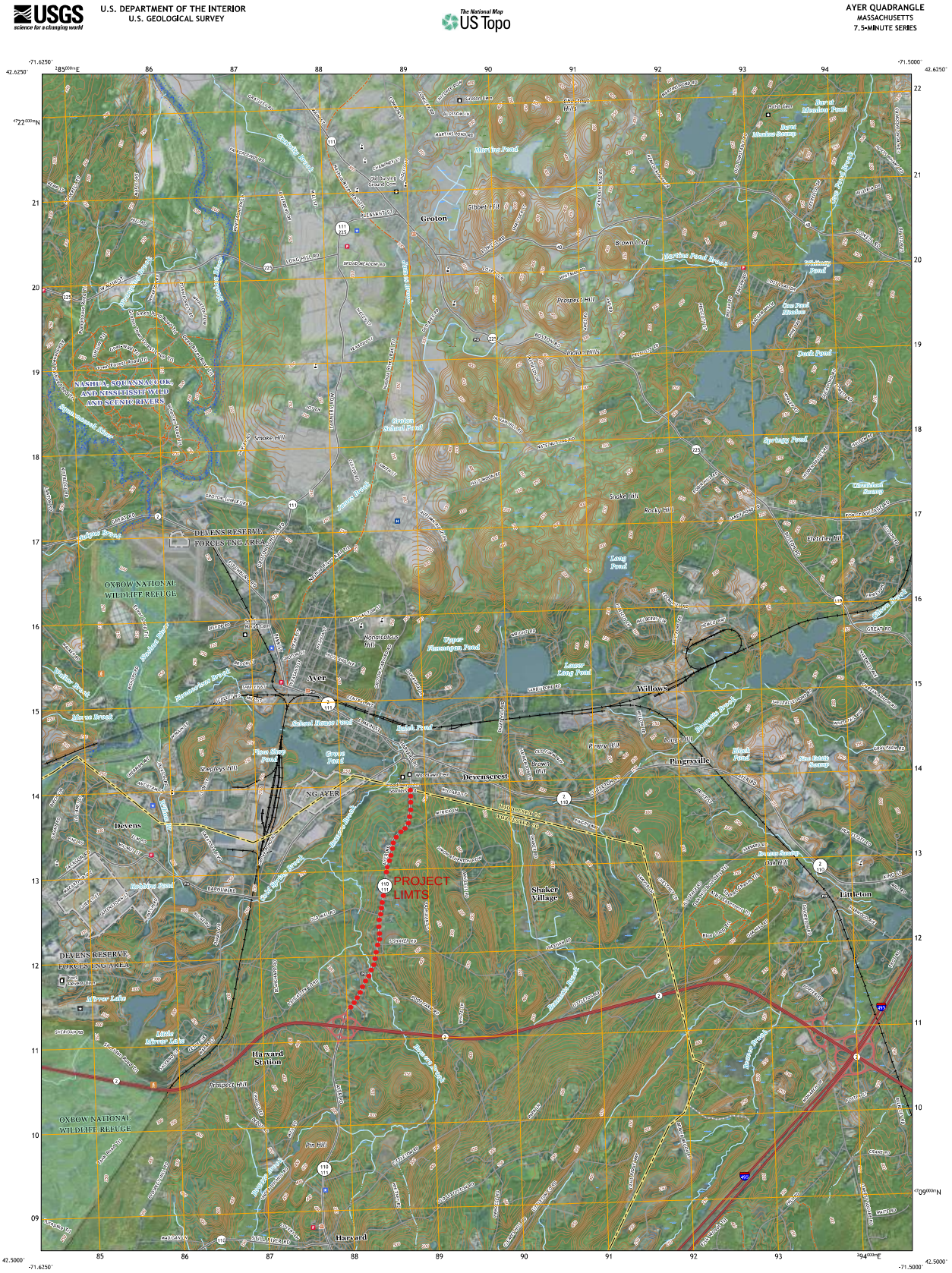
This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory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

Scenic and Wild Rivers

Designated Scenic and Wild River

Project Locus

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science for a changing world
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
The National Map
US Topo
AYER QUADRANGLE
MASSACHUSETTS
7.5-MINUTE SERIES
PROJECT LIMITS
DEVENS RESERVE FORCES TNG AREA
OXBOW NATIONAL WILDLIFE REFUGE
NASHUA, SQUANNACOOK, AND NISSITISSIT WILD AND SCENIC RIVERS
Ayer
Devens
Harvard
Harvard Station
Shaker Village
Pingryville
Willows
Littleton
Devenserest
Groton
Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid:Universal Transverse Mercator, Zone 19T
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Imagery.....NAIP, July 2016 - September 2016
Roads.....U.S. Census Bureau, 2016 - 2018
Names.....GNIS, 1974 - 2018
Hydrography.....National Hydrography Dataset, 2004 - 2017
Contours.....National Elevation Dataset, 2012
Boundaries.....Multiple sources; see metadata file 2016 - 2017
Wetlands.....FWS National Wetlands Inventory 1992 - 2008
UTM GRID AND 2019 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
SCALE 1:24 000
KILOMETERS
METERS
MILES
FEET
CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988
This map was produced to conform with the
National Geospatial Program US Topo Product Standard.
ADJOINING QUADRANGLES
1 Townsend
2 Pepperell
3 Nashua South
4 Shirley
5 Westford
6 Clinton
7 Hudson
8 Maynard
ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route
AYER, MA
2021
NGA REF NO. USGS24K1908

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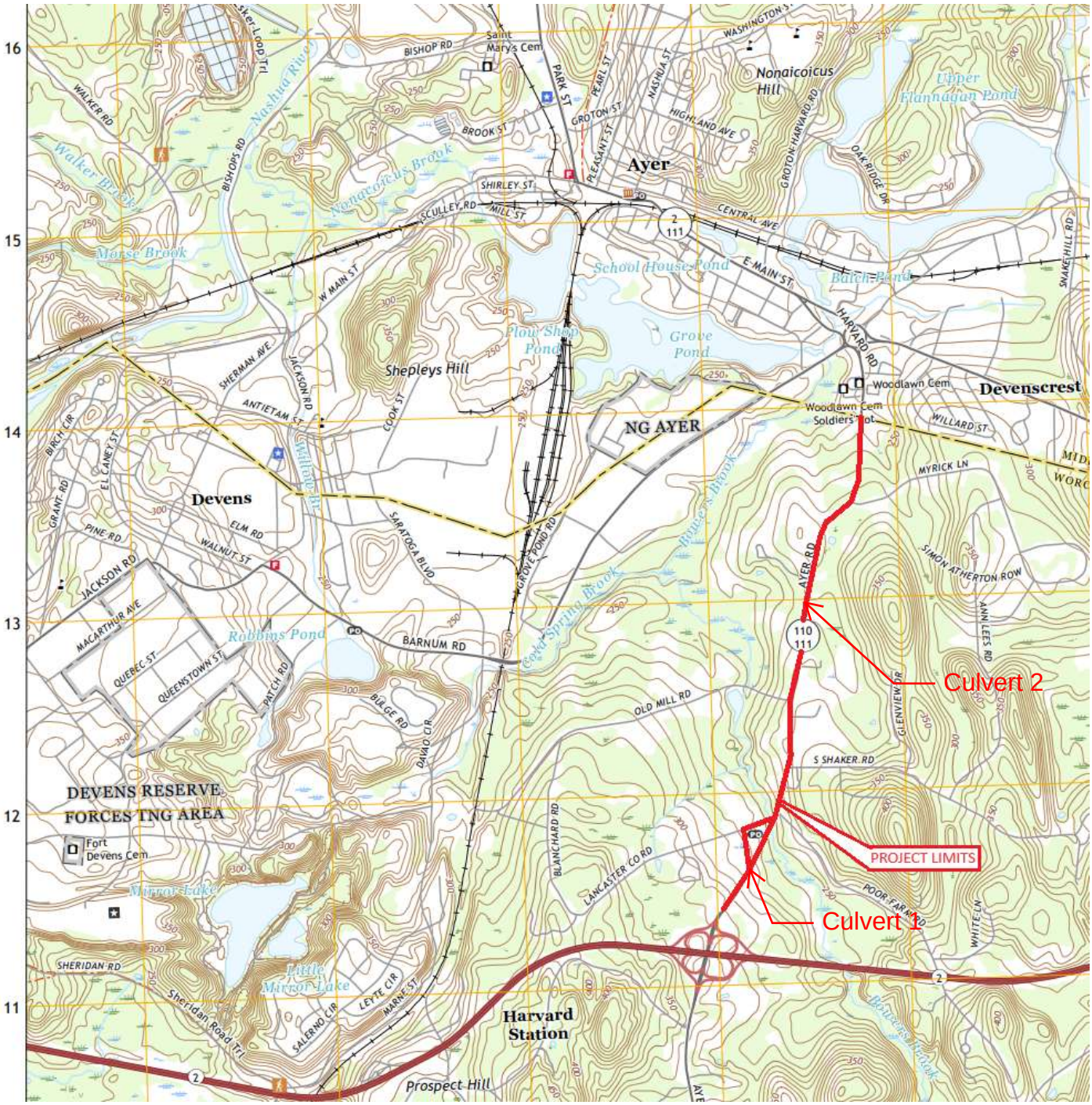
USGS Map



TEC
The Engineering Corp

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Lawrence, MA 01843
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TECHNICAL MEMORANDUM

TO: Liz Allard
Conservation Agent
Town of Harvard

DATE: November 15, 2024

FROM: Jared Duval, P.E.
Peter Engle, P.E.

PROJECT NO.: T0904

RE: Ayer Road, Harvard, MA
Gebo Lane Unnamed Intermittent Stream
Culvert Replacement Alternatives Analysis

Introduction And Purpose

TEC, Inc. (TEC), on behalf of the Town of Ayer, filed a Notice of Intent in May 2024 for the proposed reconstruction and multimodal transportation improvements along Ayer Road (Rt 110/111) starting from approximately 100 feet north of the State Highway Layout at Route 2 to the Harvard/Ayer town line.

The project involves the construction of a 10' wide shared use path for the length of the project, as well as reconstruction of Ayer Road. The project also includes work along Gebo Lane, approximately 650-feet from its intersection with Ayer Road to its intersection with Lancaster County Road, and along Lancaster County Road approximately 550-feet between Gebo Lane and Ayer Road. The length of the project is approximately 9,200 linear feet. The shared use path is also proposed to replace Lancaster County Road between Ayer Road and Gebo Lane. The Gebo Lane/Ayer Road intersection is also proposed to be reconstructed to provide for an improved approach closer to 90 degrees. As the intent of the project is for the construction of a proposed shared use/bike path and the improvement of an existing public roadway, the project qualifies as a limited project under the MA Wetlands Protection Act 310 CMR 10.53(3)(f) and 310 CMR 10.53(6). Wetland resource areas were evaluated and delineated by Rimmer Environmental Consulting, and the wetland evaluation and delineation report dated August 27, 2019 (previously submitted) provides in-depth detail on the evaluation and methodology of delineation of resource areas.

During the initial May 16, 2024 public hearing for the Notice of Intent, and subsequent working session with the Conservation Agent, Chair, and Vice Chair of the Commission, concern was raised regarding the proposed culvert replacement located at the intersection of Gebo Lane and Ayer Road. The current proposal for the culvert replacement is to replace, and slightly extend, the existing 30" degraded and deformed corrugated metal pipe (CMP) with a reinforced concrete pipe (RCP) of the same size. The Commission requested TEC prepare this Alternatives Analysis for the proposed culvert replacement/extension to evaluate whether the proposed culvert replacement meets the definition of maximum extent practicable under the Massachusetts Stream Crossing Standards. This analysis was developed in collaboration with various divisions of MassDOT over several meetings spanning June 2024 through October 2024 to consider factors for each alternative including but not limited to constructability, permitting, and cost and schedule for both design and construction. TEC evaluated six (6) total

alternatives as part of the analysis.

TEC Field Inspection and Assessment of Existing Culvert and Intermittent Stream

TEC conducted a field inspection and assessment of the existing culvert and the intermittent stream located at the intersection of Gebo Lane and Ayer Road in Harvard, MA on Wednesday, June 26, 2024. Current water levels appear to be 'normal' for the time of year in comparison to USGS Streamflow Conditions. The intermittent stream at the time of the visit had little flow, typical for a stream of this size during late June. The existing culvert is a 48' long, 30" diameter corrugated metal pipe in poor condition (Photos 1, 2). The culvert is deformed, with the culvert showing signs of ovality due to age and external pressure on the pipe from the roadway above. The pipe does not appear to be in imminent danger of collapse, however, it should be replaced as repairing the existing pipe is not practical. Fieldstone headwalls are located on both the inlet and outlet of the culvert with guardrails above. There is an existing 2" gas main located between the top of the culvert and the road. There is approximately 60" of elevation difference between the streambed and the roadway which must be considered for each potential culvert replacement alternative as the project proposes roadway resurfacing and intends to maintain existing roadway elevations throughout the corridor.

Photo 1 – 30" CMP Inlet

Photo 2 – 30" CMP Outlet

The stream is intermittent and is typically a low-flow stream. During the site visit, TEC took (4) estimated bankfull width measurements of the existing stream channel (Photos 3,4), two (2) upstream of the culvert in question, and two (2) downstream. The upstream measurements were taken approximately 10' and 20' from the culvert inlet and bankfull width measurements were 7' and 6' respectively. The downstream measurements were taken approximately 15' and 30' from the culvert outlet and bankfull width measurements were 4' and 6' respectively. Therefore, average bankfull width measurements resulted in an approximate bankfull width at the culvert of roughly 5.75'. Wider measurements upstream are likely due to the culvert being undersized and restricting higher

flows, resulting in slight widening and ponding. USGS StreamStats was also analyzed for the intermittent stream at the culvert, indicating an estimated bankfull width of 5', which generally coincides with the recorded field measurements. According to StreamStats the stream has a 50% flow rate of 0.06 cfs (27 gallons per minute) and a 100-year flood flow rate of 23.2 cfs. For reference, Bowers Brook at Ayer Road has a 50% flow rate of 8.06 cfs (3,617 gallons per minute) and a 100-year flood flow rate of 788 cfs according to StreamStats.

It should also be noted that a separate 30" corrugated metal pipe culvert is located approximately 40' upstream of the culvert in question under Ayer Road which provides for stream discontinuity in the direct vicinity of this crossing. The area between the two culverts is proposed to be altered during construction, the stream restored, and utilized for wetland replication along the banks of the restored streambed.

Photo 3 – Existing Streambed

Photo 4 – Existing Streambed

Culvert Alternatives and Massachusetts Stream Crossing Standards Assessment

The Massachusetts Division of Ecological Restoration (MassDER), a division of the Department of Fish and Game, restores and protects the Commonwealth's rivers, wetlands, and watersheds for the benefit of people and the environment. In 2005, MassDER released the 1st edition of the Massachusetts Stream Crossing Handbook, with revisions implemented in 2012 and 2018. The Stream Crossings Handbook is designed to inform and advocate for the importance of properly designed and maintained culverts and bridges for fish and wildlife passage. The guidelines are intended as a supplement, and not as a replacement, to sound engineering design of culverts and bridges. The guidelines describe minimum goals for fish and wildlife passage. River continuity is aimed at reducing impediments to movement of fish, wildlife and other aquatic life that require instream passage. The Stream Crossing Standards were developed by the River Continuity Partnership with contributions from state agencies, local and regional nonprofits, and private consultants. The U.S. Army Corps of Engineers' Massachusetts General Permit (April 2018) and the Massachusetts 401 Water Quality Certification (314 CMR 9.00, October 2014) require these, or similar standards be met. Furthermore, the Wetlands Protection Act (310 CMR 10.00, June 2014) requires all new crossings to meet the Stream Crossing Standards and all replacement crossings to meet the standards to the maximum extent practicable. The existing culvert and (5) alternatives were analyzed for compliance with the Massachusetts Stream Crossing Standards, as well as general practicality and design and construction cost/timeframe implications.

Existing Culvert – 30" CMP

As noted previously, the existing culvert is a 48' long, 30" diameter corrugated metal pipe. It appears to have been installed at the same elevation of the original stream channel with stone headwalls constructed along the edge of roadway. Table 1 indicates the conformance of the existing culvert with that of the Massachusetts Stream Crossing Standards:

Standard	Standard Requirement	Optimal Desired	Existing 30" CMP	
			Provided	Check
1. Crossing Type	Open Bottom	Bridge	Closed Pipe	Not met
2. Embedment	2 ft min.		No Embedment	Not met
3. Crossing Span	1.2 Bankfull width	1.2 Bankfull width, headroom for dry wildlife passage	Less than the measured bankfull width	Not met
4. Openness Ratio (Area/Length)	≥ 0.82ft	≥ 1.64 ft, 6' height min.	0.10	Not met
5. Substrate	Natural Substrate		Unnatural - Corrugated Metal Pipe	Not met
6. Water Depth and Velocity	Match Natural Channel		Similar to Channel	Met
7. Banks	Present matching stream channel		Unnatural Corrugated Metal Pipe	Not met

Table 1 – Existing Culvert Stream Crossing Standards Compliance

As indicated, the existing culvert only meets one standard, and that is because the stream in question has a generally small watershed, generally has low flows, and the stream channel is relatively shallow. The 50% flow rate for the stream is approximately 0.06 cfs (27 gallons per minute) and the 100-year flood flow rate is approximately 23.2 cfs as identified per USGS Streamstats, whereas the existing culvert has a flow capacity of approximately 31.8 cfs. The culvert does not currently span the streambed, nor is the culvert embedded, nor does the culvert provide for the minimal openness ratio for the passage of wildlife, nor is there natural substrate within the culvert (other than sediment deposited over time), and nor are natural stream banks located within the culvert. Due to the condition, material, and age of the pipe, and the need to extend the pipe due to the inclusion of the proposed shared use path, it is not practical to maintain the existing pipe culvert as is.

Alternative #1 - 30" RCP in-kind replacement

Alternative #1, which is the current design proposal, evaluates replacing the existing metal pipe culvert with a reinforced concrete pipe of the same size and location. The current proposal of a direct replacement was determined to be the most practical proposal at the time of project scoping and given budget considerations that aligned with the overarching project goals to accommodate multimodal travel and resurface Ayer Road. Alternate #1 is the least costly alternative. The project has since expanded in scope and cost as the project has progressed through MassDOT's design development process for projects seeking funding through the State Transportation Improvement Program (TIP) over the past five (5 +/-) years since project inception. Due to the inclusion of the proposed shared use path along Ayer Road, the culvert will need to be lengthened to 70'..Table 2 indicates the conformance of the proposed replacement and extension of the culvert with a reinforced concrete pipe of the same size as it pertains to the Massachusetts Stream Crossing Standards:

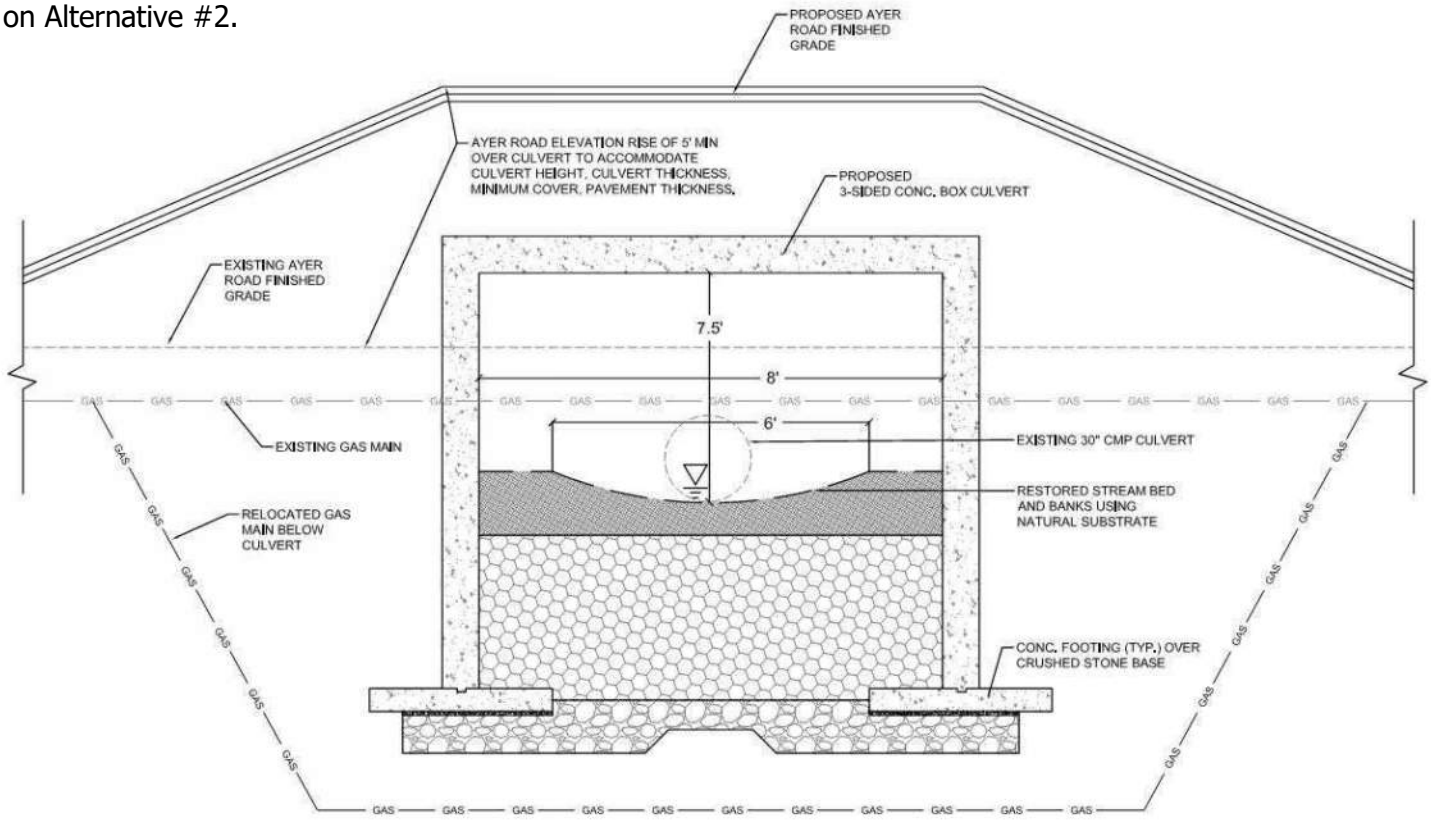
Standard	Standard Requirement	Optimal Desired	30" RCP	
			Provided	Check
1. Crossing Type	Open Bottom	Bridge	Closed Pipe	Not Met
2. Embedment	2 ft min.		No Embedment	Not Met
3. Crossing Span	1.2 Bankfull width	1.2 Bankfull width, headroom for dry wildlife passage	Less than the measured bankfull width	Not Met
4. Openness	Ratio ≥ 0.82ft	Ratio ≥ 1.64 ft, 6' height min.	0.07	Not Met
5. Substrate	Natural Substrate		Unnatural - Corrugated Metal Pipe	Not Met
6. Water Depth and Velocity	Match Natural Channel		Similar to Channel	Met
7. Banks	Present matching stream channel		Unnatural Corrugated Metal Pipe	Not Met

Table 2 – Alternative 1 Stream Crossing Standards Compliance

As indicated, replacing the culvert with a reinforced concrete pipe of the same size still only meets one standard, which is because the stream in question has a generally small watershed, generally has low flows, and the stream channel is relatively shallow (see Page 4). This alternative slightly reduces the openness ratio compared to existing conditions due to the requirement of the culvert to be extended to 70' long for the inclusion of the shared use path. This alternative does not provide for the spanning of the streambed, does not provide for embedment, does not improve openness for the passage of wildlife over present conditions, does not provide a natural substrate within the culvert, and does not provide for natural stream banks located within the culvert. This alternative is practical as it has the shortest construction duration, is the least costly for final design and construction, and maintains existing hydraulics of the culvert and stream at Ayer Road while restoring structural integrity of the culvert via MassDOT standard materials (i.e. RCP). Also, this alternative likely has the least likelihood of affecting up or down stream flows and resource areas. This alternative also allows the existing gas main to be maintained in its current location above the culvert and does not require relocation. Lastly, this alternative requires no additional engineering design or changes to the current roadway design, and costs associated thereto.

Alternative #2 – 8′ Wide by 7.5′ High 3-Sided Box Culvert

Alternative #2 evaluates the replacement of the existing 30" CMP with a 3-sided precast concrete box culvert which would achieve full compliance with the stream crossing standards. Since the average bankfull width estimated by the site investigation approximates 5.75′, the minimum span for the culvert to meet the Standards is 6.9′ (1.2 x bankfull width), therefore an 8′ wide span was chosen for this fully compliant alternative. This box culvert would provide for adequate embedment due to the requirement for footings to be installed below the frost line, a spangreater than 1.2 times the bankfull width, an openness ratio greater than 0.82, a height greater than 6′, and the restoration of natural stream banks and streambed within the culvert allowing for water depths and velocities equal to that of the natural stream channel. As noted previously, there is currently approximately 60" or 5′ of elevation change from the streambed to the roadway grade. This alternative would require the raising of Ayer Road at the culvert at least 5′ to provide adequate cover over the culvert, as well as relocation of the existing gas main below the culvert. The "Alternative 2 Culvert Section" sketch below provides additional detail on Alternative #2.



Alternative 2 Culvert Section – 8′ Wide X 7.5′ High 3-Sided Box Culvert

Table 3 indicates the conformance of the proposed replacement and extension of the culvert with an 8' wide by 7.5' high 3-sided box culvert as it pertains to the Massachusetts Stream Crossing Standards:

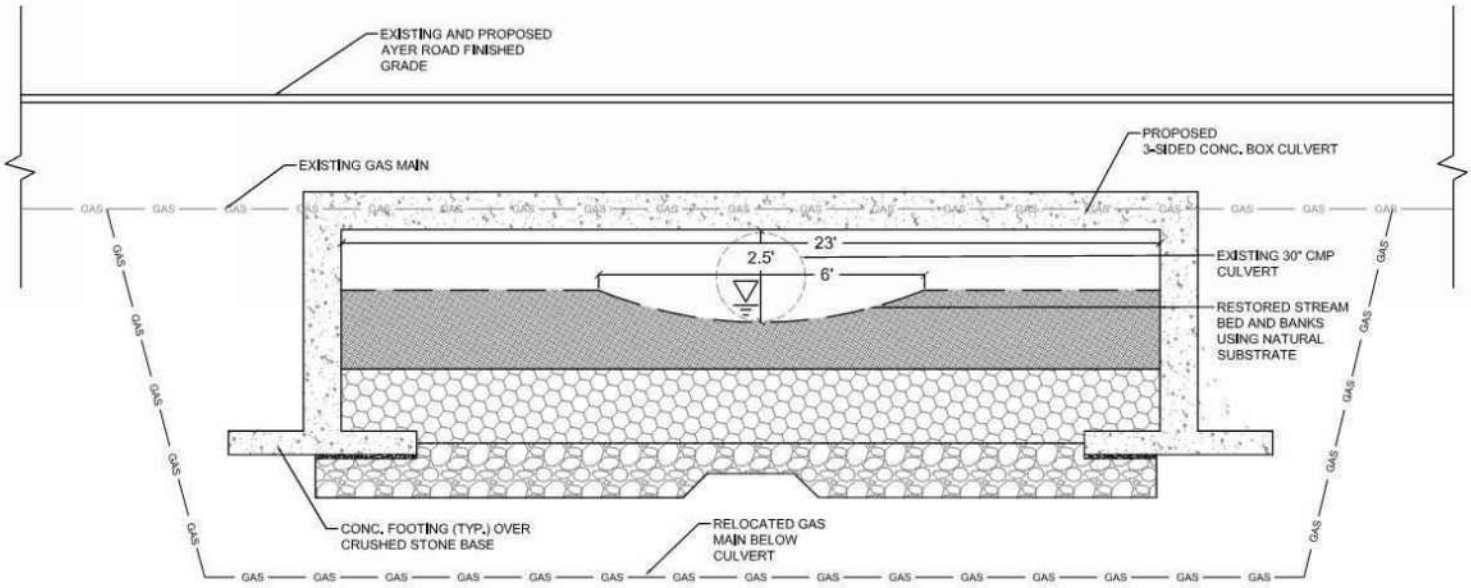
Standard	Standard Requirement	Optimal Desired	8'x7.5' 3-Sided Box	
			Provided	Check
1. Crossing Type	Open Bottom	Bridge	Open Bottom Box	Met
2. Embedment	2 ft min.		4' Embedment	Met
3. Crossing Span	1.2 Bankfull width	1.2 Bankfull width, headroom for dry wildlife passage	1.4 Bankfull Width	Met
4. Openness	Ratio ≥ 0.82ft	Ratio ≥ 1.64 ft, 6' height min.	0.85, 7.5' Height	Met
5. Substrate	Natural Substrate		Restored Natural Streambed	Met
6. Water Depth and Velocity	Match Natural Channel		Match Natural Channel	Met
7. Banks	Present matching stream channel		Restored Natural Stream Banks	Met

Table 3 – Alternative 2 Stream Crossing Standards Compliance

As indicated, this alternative would meet all Stream Crossing Standards, however this alternative would require considerable engineering design, including additional data collection, hydrologic and hydraulic assessments, geotechnical exploration, and structural design for foundations and retaining walls. As noted previously, there is currently approximately 60" or 5' of elevation change from the streambed to the roadway grade and this alternative would require the raising of Ayer Road at the culvert at least 5' to provide for adequate cover over the culvert, as well as relocation of the existing gas main below the culvert. The expanded limits of excavation may also result in the need for utility pole relocations and additional public shade tree removal that would trigger the MEPA process and add significant duration to the design and construction schedule. This would result in significant, costly changes to the roadway design and construction, and lengthy delays in design, permitting, and construction due to the presence of the intersection with Gebo Lane and the existing development of abutting properties in the vicinity of the culvert, therefore it is TEC's opinion that this alternative is not practical.

Alternative #3 – 23′ Wide by 2.5′ High Bridge

Alternative #3 evaluates an additional culvert option which would achieve full compliance with the stream crossing standards, yetnegates the requirement to raise and significantly adjust the Ayer Road roadway profile at the culvert. This structure would be considered a small bridge (per MGL Chapter 85 Section 35) as the culvert would have a span greater than 10′ and therefore would fall under the jurisdiction of MassDOT. This alternative would provide for adequate embedment due to the required footings, a span of the stream greater than 1.2 times the bankfull width, would provide for an openness ratio greater than 0.82, and the restoration of natural stream banks and streambed within the culvert allowing for water depths and velocities equal to that of the natural stream channel. As noted previously, there is currently approximately 60″ or 5′ of elevation change from the streambed to the roadway grade, so in order to maintain the existing roadway profile, the culvert must be limited to a maximum height of 2.5′, therefore, in order to meet the openness ratio of 0.82 feet, the culvert would need to be widened to 23′ minimum. The "Alternative 3 Culvert Section" sketch below provides additional detail on Alternative #3.



Alternative 3 Culvert Section – 23′ Wide X 2.5′ High 3-Sided Box Culvert

Table 4 indicates the conformance of the proposed replacement and extension of the culvert with a 23' wide by 2.5' high bridge as it pertains to the Massachusetts Stream Crossing Standards:

Standard	Standard Requirement	Optimal Desired	23'x2.5' Bridge	
			Provided	Check
1. Crossing Type	Open Bottom	Bridge	Bridge	Met
2. Embedment	2 ft min.		4' Embedment	Met
3. Crossing Span	1.2 Bankfull width	1.2 Bankfull width, headroom for dry wildlife passage	4.0 Bankfull Width	Met
4. Openness	Ratio ≥ 0.82 ft	Ratio ≥ 1.64 ft, 6' height min.	0.82 ft	Met
5. Substrate	Natural Substrate		Restored Natural Streambed	Met
6. Water Depth and Velocity	Match Natural Channel		Match Natural Channel	Met
7. Banks	Present matching stream channel		Restored Natural Stream Banks	Met

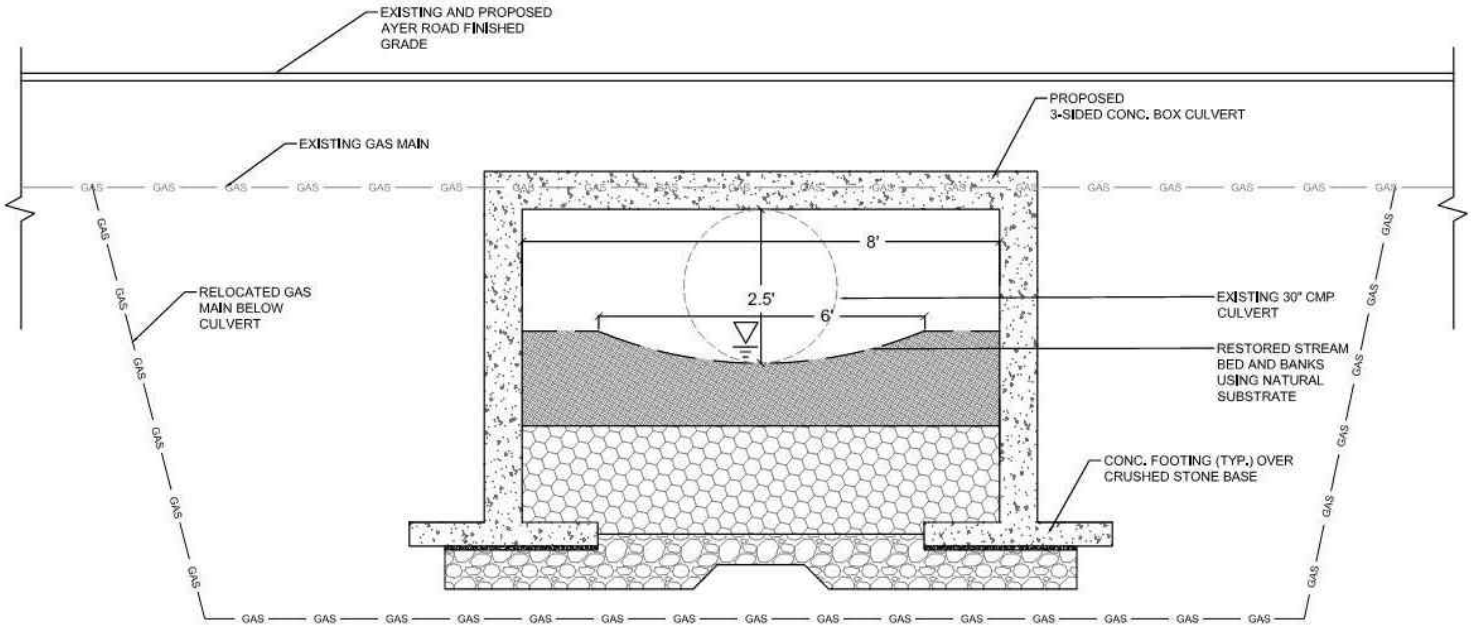
Table 4 – Alternative 3 Stream Crossing Standards Compliance

As indicated, this alternative would again meet all Stream Crossing Standards, however this alternative would require considerable engineering design, including additional data collection, hydrologic and hydraulic assessments, geotechnical exploration, and structural design for foundations and retaining walls. As noted previously, currently there is approximately 60" or 5' of elevation change from the streambed to the roadway grade. In order to maintain the existing roadway profile, the culvert must be limited to a maximum height of 2.5', therefore in order to meet the openness ratio of 0.82 feet, the culvert would need to be 23' wide. This would require data collection, design development, and MassDOT review subject to MGL Chapter 85 Section 35 since any culvert 10' wide or greater is considered a bridge structure, adding significant design and construction costs as well as significantly extended timelines for project review and approval. The expanded limits of excavation may also result in the need for utility pole relocations and additional public shade tree removal that would trigger the MEPA process and add significant duration to the design and construction schedule. To put Alternative #3 into perspective, this alternative would provide a bridge structure similar in size to the bridge structure at the Bowers Brook crossing, a bridge spanning a perennial stream less than 700' north from this culvert which has a

50% flow rate approximately 130 times that of the intermittent stream in question, therefore it is TEC's opinion that Alternative #3 is not practical.

Alternative #4 – 8′ Wide by 2.5′ High 3-Sided Box Culvert

Alternative #4 evaluates a 3-sided precast concrete box culvert which would provide for an improvement over existing conditions as it relates to the Stream Crossing Standards but does not achieve full compliance in order to maintain the existing roadway profile while avoiding the requirement for a bridge structure which would fall under the jurisdiction of MassDOT for design, review, and approval (i.e. span < 10′). This box culvert would provide for adequate embedment due to the requirement of footings to be installed below the frost line, a span of the stream greater than 1.2 times the bankfull width, and the restoration of natural stream banks and streambed within the culvert allowing for water depths and velocities equal to that of the natural stream channel. The "Alternative 4 Culvert Section" sketch below provides additional detail on Alternative #4.



Alternative 4 Culvert Section – 8 Wide X 2.5′ High 3-Sided Box Culvert

Table 5 indicates the conformance of the proposed replacement and extension of the culvert with an 8' wide by 2.5' high 3-sided box culvert with that of the Massachusetts Stream Crossing Standards:

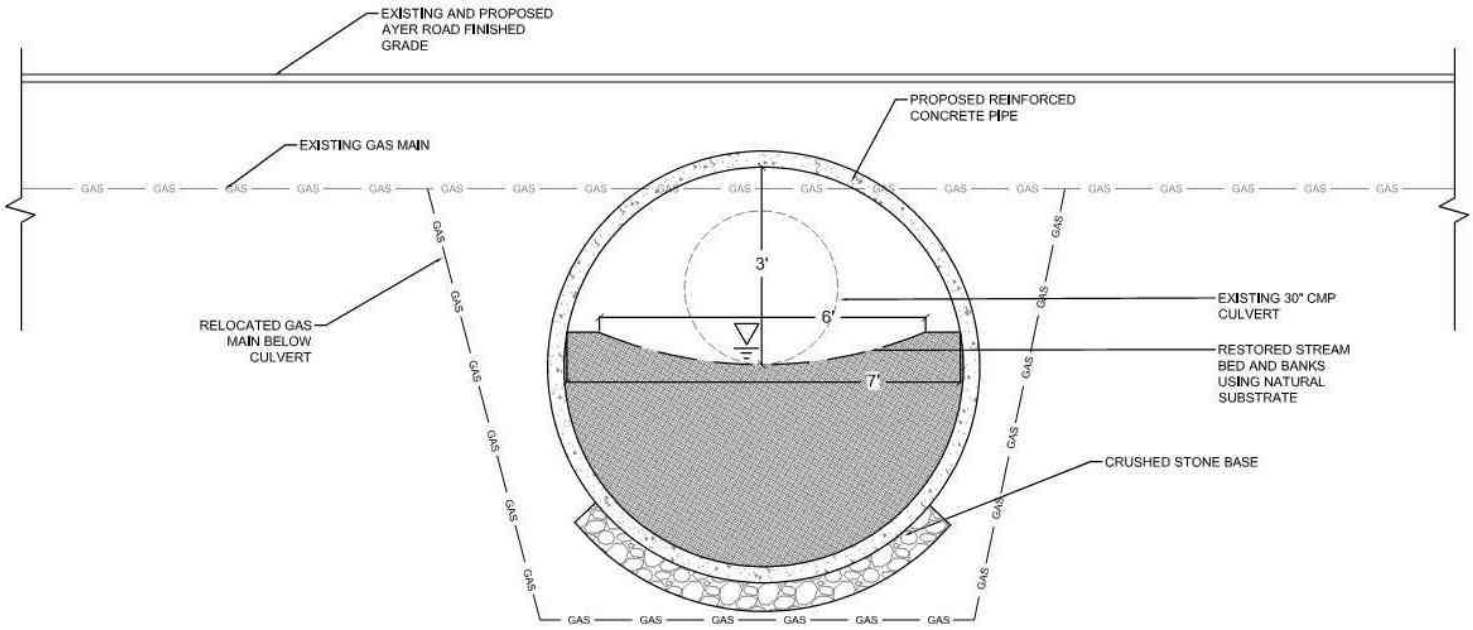
Standard	Standard Requirement	Optimal Desired	8'x2.5' 3-Sided Box	
			Provided	Check
1. Crossing Type	Open Bottom	Bridge	Open Bottom Box	Met
2. Embedment	2 ft min.		4' Embedment	Met
3. Crossing Span	1.2 Bankfull width	1.2 Bankfull width, headroom for dry wildlife passage	1.4 Bankfull Width	Met
4. Openness	Ratio ≥ 0.82ft	Ratio ≥ 1.64 ft, 6' height min.	0.29 ft	Not Met
5. Substrate	Natural Substrate		Restored Natural Streambed	Met
6. Water Depth and Velocity	Match Natural Channel		Match Natural Channel	Met
7. Banks	Present matching stream channel		Restored Natural Stream Banks	Met

Table 5 – Alternative 4 Stream Crossing Standards Compliance

As indicated, this alternative would meet all Stream Crossing Standards except for the openness ratio and would provide for a significant improvement over existing conditions as it relates to the Stream Crossing Standards, however this alternative would require considerable additional engineering design, including additional data collection, hydrologic and hydraulic assessments, geotechnical exploration, and structural design for foundations and retaining walls, which would add considerable cost and time to incorporate this alternative into the current design. While this alternative would avoid significant changes to the roadway profile design and reconstruction as it would eliminate the necessity to raise the roadway elevation in order to maintain adequate cover, the expanded limits of excavation needed for box culvert installation may result in the need for utility pole relocations and additional public shade tree removal that would trigger the MEPA process and add significant duration to the design and construction schedule. Alternative #4 would result in significant impacts in terms of additional design time and cost, result in significant construction related land disturbance which may result in additional right-of-way acquisition, utility relocation and tree removal, and be the most difficult to install resulting in higher construction cost and time, therefore it is TEC's opinion that this is alternative is not practical.

Alternative #5 – 7' Diameter Embedded RCP Culvert

Alternative #5 evaluates a backfilled large diameter reinforced concrete pipe. This alternative would provide for significant improvement over existing conditions as it relates to the Stream Crossing Standards but does not achieve full compliance in order to maintain the existing roadway profile. This alternative would provide for adequate embedment (>2'), a span greater than 1.2 times the bankfull width, and the restoration of natural stream banks and streambed within the culvert allowing for water depths and velocities equal to that of the natural stream channel. The "Alternative 5 Culvert Section" sketch below provides additional detail on Alternative #5.



Alternative 5 Culvert Section – Embedded 7' Diameter RCP

Table 6 indicates the conformance of the proposed replacement and extension of the culvert with a large diameter backfilled reinforced concrete pipe as it pertains to the Massachusetts Stream Crossing Standards:

Standard	Standard Requirement	Optimal Desired	7' Diameter Backfilled RCP	
			Provided	Check
1. Crossing Type	Open Bottom	Bridge	Embedded Pipe	Not Met
2. Embedment	2 ft min.		4'+/- Embedment	Met
3. Crossing Span	1.2 Bankfull width	1.2 Bankfull width, headroom for dry wildlife passage	1.2 Bankfull Width	Met
4. Openness	Ratio ≥ 0.82ft	Ratio ≥ 1.64 ft, 6' height min.	0.23 ft	Not Met
5. Substrate	Natural Substrate		Restored Natural Streambed	Met
6. Water Depth and Velocity	Match Natural Channel		Match Natural Channel	Met
7. Banks	Present matching stream channel		Restored Natural Stream Banks	Met

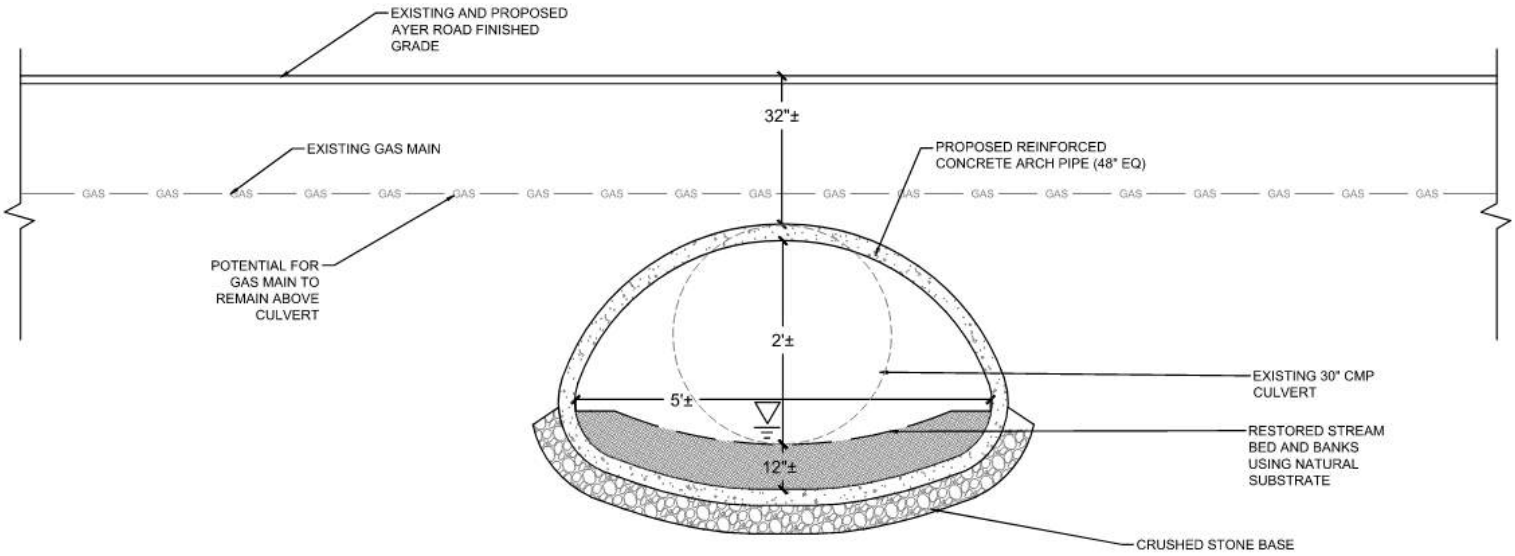
Table 6 – Alternative 5 Stream Crossing Standards Compliance

As indicated, this alternative would meet all Stream Crossing Standards except for the optimal open bottom structure and the openness ratio. Although the alternative does not provide for an open bottom, since the pipe diameter is large enough, it would allow for the pipe to be backfilled with substrate similar to that of the existing natural stream channel and would allow for the restoration of the stream channel and banks within the pipe while providing a span of 1.2 times the bankfull width. This alternative would provide significant improvement over existing conditions as it relates to the Stream Crossing Standards as the cross-sectional area of the culvert (a semicircle 7' wide x 3' high, approximately 16 square feet) would be greater than 3 times that of the existing culvert (2.5' diameter circle). This alternative would require the second least amount of additional engineering design and data collection. Due to the depth of embedment, it would require geotechnical exploration to determine feasible bury depth and if any refusal would be encountered. While this alternative would avoid the necessity for significant, costly changes to the roadway profile and associated construction as it would allow the current roadway profile and design to remain, it still requires the relocation of the existing gas main and significant open-cut excavation of the roadway and/or temporary shoring for pipe installation that will add significant construction cost and duration to the construction schedule. The expanded limits of excavation may also result in the need for utility pole relocations and additional public shade tree removal that would trigger the MEPA process and add significant duration to the design and construction schedule. In consideration of the significant

excavation required for installation, as well as anticipated gas main and utility pole relocation, MEPA implications and in comparison to Alternative #6 presented to the Conservation Commission at their meeting on September 5, 2024, this alternative is not practical in TEC's opinion.

Alternative #6 – 4' Equivalent Diameter Embedded Reinforced Concrete Arch Culvert

Alternative #6, the final alternative analyzed, evaluates a backfilled large diameter reinforced concrete arch pipe. The arch pipe is constructed so that the width of the pipe opening is less than the height of the pipe opening, allowing for a wider span with a shallow embedment. This alternative is another option which would provide for significant improvement over existing conditions as it relates to the Stream Crossing Standards but does not achieve full compliance in order to maintain the existing roadway profile, however this option also allows for the potential to maintain the existing gas main and minimize excavation efforts. This alternative would provide for some embedment, a span just about equal to bankfull width, and increase in openness over the existing culvert, and the restoration of natural stream banks and streambed within the culvert allowing for water depths and velocities equal to that of the natural stream channel. The "Alternative 6 Culvert Section" sketch below provides additional detail on Alternative #6.



Alternative 6 Culvert Section – Embedded 4' Equivalent RC Arch Culvert

Table 7 indicates the conformance of the proposed replacement and extension of the culvert with a large diameter backfilled reinforced concrete pipe as it pertains to the Massachusetts Stream Crossing Standards:

Standard	Standard Requirement	Optimal Desired	4' EQ Diameter Backfilled RCAP	
			Provided	Check
1. Crossing Type	Open Bottom	Bridge	Embedded Arch Pipe	Not Met
2. Embedment	2 ft min.		1.5'+/- Embedment	Not Met
3. Crossing Span	1.2 Bankfull width	1.2 Bankfull width, headroom for dry wildlife passage	Approx. Bankfull Width	Not Met
4. Openness	Ratio ≥ 0.82ft	Ratio ≥ 1.64 ft, 6' height min.	0.11 ft	Not Met
5. Substrate	Natural Substrate		Restored Natural Streambed	Met
6. Water Depth and Velocity	Match Natural Channel		Match Natural Channel	Met
7. Banks	Present matching stream channel		Restored Natural Stream Banks	Met

Table 7 – Alternative 6 Stream Crossing Standards Compliance

As indicated, this alternative would not meet all stream crossing standards but would provide for an improvement of all standards over existing conditions while providing for the least amount of disturbance next to the 30" RCP in kind replacement. The arch pipe would still allow for the pipe to be backfilled with substrate similar to that of the existing natural stream channel and would allow for the restoration of the stream channel and banks within the pipe while providing a span approximately equal to bankfull width. This alternative would provide significant improvement over existing conditions as it relates to the Stream Crossing Standards as the cross-sectional area of the culvert opening (approximately 7 square feet) would be about 3 times that of the existing culvert (2.5' diameter circular pipe). This alternative would require the least amount of additional engineering design or data collection and would avoid the need for geotechnical exploration and structural design for foundations as the embedded pipe acts as its own foundation. This alternative would avoid the necessity for significant, costly changes to the roadway profile and associated construction as it would allow the current roadway profile and design to remain without the need to raise the roadway elevation and would allow for the potential to avoid relocation of the existing gas main. This alternative also avoids more significant open-cut roadway excavation and temporary shoring associated with Alternative #5 and therefore avoids the need for utility pole relocations and additional public shade tree removal that would trigger the MEPA process and add significant duration to the design and construction schedule. This alternative is practical, and in comparison to the larger diameter embedded pipe (Alternative #5), this alternative would be less costly in terms of additional design and associated

construction, would result in less overall construction disturbance, therefore it is TEC's opinion that Alternative #6 is the preferred and most practical alternative.

Culvert Alternatives Comparison

Design

In terms of design implications, each alternative would require a different level of redesign effort to to advance through MassDOT's design development process and reach construction level documentation. In terms of level of resdesign effort, the alternatives would be ranked as follows in ascending order (i.e. least to greatest level of effort):

1. Alternative 1 (30" RCP) – Practical

No redesign necessary as this is the current design proposal.

2. Alternative 6 (4' EQ Diameter Embedded RCAP) - Practical

Plan redesign would be required, however additional data collection is not anticipated. Additional design fees would approximate $25,000-$35,000. Delay (Estimated 4-8 weeks) with final design development and 100% design document submittal to MassDOT. Potential for current design development schedule to be met, however right-of-way acquisition may be delayed until 100% design submission is finalized, and review and approved by MassDOT.

3. Alternative 5 (7' Embedded RCP) – Not Practical

Plan redesign would be required, as well as some additional data collection (geotechnical exploration) anticipated. Additional design fees would approximate $40,000-$50,000. Delay (Estimated 10-14 weeks) with final design development and 100% design document submittal to MassDOT. Delay in design schedule would be significantly longer than 8-12 weeks if utility pole relocation and/or additional public shade tree removal is required which would trigger the MEPA process. Unlikely the current design development schedule would be met, right-of-way acquisition delayed until 100% design submission is finalized, and review and approved by MassDOT.

4. Alternative 4 (8'w x 2.5'h 3-sided box) – Not Practical

Additional data collection including hydrologic and hydraulics assessment, field survey, and geotechnical exploration would be required prior to any engineering and redesign. Additional design fees would approximate $75,000-$100,000. Anticipated delay (estimated 3-6 months) with final design development and 100% design document submittal to MassDOT, resulting in project construction delays.

5. Alternative 3 (23'w x 2.5'h bridge) – Not Practical

Same additional data collection as Alternative 4 would be required, with additional stream survey required. Also, would require MassDOT Ch. 85 review. Additional design fees would approximate $100,000-$150,000. Delay (12-18 months) with final design development and 100% design document submittal to MassDOT, resulting in significant design development delays.

6. Alternative 2 (8'w x 7.5h 3-sided box) – Not Practical

Same additional data collection as Alternative 4 would be required. Although the culvert wouldn't fall under MassDOT jurisdiction under MGL Ch.85, this Alternative would require significant redesign of Ayer Road and Gebo Lane in addition to culvert design. Additional design fees would approximate $125,000-$175,000. Delay (12-18

months) with final design development and 100% design document submittal to MassDOT, resulting in significant design development delays.

Permitting/ Approvals

In terms of project approvals and required permitting for each alternative, in addition to a valid Order of Conditions being issued for the project, all alternatives will need to be considered by MassDOT as the project is projected to be funded under the State Transportation Improvement Program. Only Alternative 3 would require additional review and approval by MassDOT pursuant to MGL Chapter 85 Section 35 as the span would be over 10' wide. All alternatives will also require coverage under an Army Corps General Permit for compliance with the Clean Water Act Section 404 and coverage under a MassDEP 401 Water Quality Certificate (likely under the Army Corps general 401 Water Quality Certificate) for compliance with the Clean Water Act Section 401. Alternative 2 would result in significant rereview by MassDOT as it would result in complete roadway redesign of Ayer Road and Gebo Lane at the intersection, of which the current design has been reviewed for at least 5 years now. In ascending order (least to greatest) in level of effort in terms of additional approvals and permitting, the alternatives would be ranked in the following:

1. Alternative 1 (30" RCP) – Practical

No redesign/rereview necessary as this is the current design proposal. TEC would continue to advance 100% design documents for submission to MassDOT following local permitting, generally in alignment with our current design schedule, depending on overall duration of local permitting process.

2. Alternative 6 (4' EQ Diameter Embedded RCAP) – Practical

Some level of rereview by MassDOT due to changes in design. Slight delay (4-8 weeks) with 100% design document submittal to MassDOT. Potentially able to stay on current schedule for final design development and project advertisement, however risks the project advertising and bidding date being delayed to the next federal fiscal year due to delays in 100% design package submission, approval of right of way plans for acquisition, and completion of right of way acquisition process. MassDOT and the regional MPO would need to approve reprograming the project in a subsequent year of the TIP.

3. Alternative 5 (7' Embedded RCP) – Not Practical

Rereview by MassDOT and National Grid due to changes in design. Significant delay (10-14 weeks) with 100% design document submittal to MassDOT. Likely unable to stay on current schedule for final design development and project advertisement. Delay in design/permitting schedule would be significantly longer than (10-14) weeks if utility pole relocation and/or additional public shade tree removal is required which would trigger the MEPA process. Significant risk the project advertising and bidding date being delayed to the next federal fiscal year due to delays in 100% design package submission, approval of right of way plans for acquisition, and completion of right of way acquisition process. MassDOT and the regional MPO would need to approve reprograming the project in a subsequent year of the TIP.

4. Alternative 4 (8'w x 2.5'h 3-sided box) – Not Practical

Some level of rereview by MassDOT and National Grid due to changes in design. Due to additional data collection and design effort, it is unlikely this would allow the project to stay on the current schedule for final design development and project advertising (delay of 3-6 months). The project advertisement date would most certainly be pushed into the next federal fiscal year and require MassDOT/regional MPO approval.

5. Alternative 3 (23'w x 2.5'h bridge) – Not Practical

This alternative would require MassDOT Ch. 85 review and approval as well as review National Grid due to changes in utility design. This alternative would significantly delay final design development and project advertisement(12-18 months).

6. Alternative 2 (8'w x 7.5h 3-sided box) – Not Practical

As stated previously this would require significant rereview of the roadway design by MassDOT. Would significantly delay final design development and project advertisement (12-18 months).

Construction

In terms of construction related impacts, all alternatives other than Alternative 1 will have impacts to construction cost and duration. Alternative 5 would result in the lowest cost and time loss impacts, whereas Alternative 3 and 2 would result in significant delays and costs which would require reprogramming on the TIP, and potential TIP amendment due to projected project cost increases. Currently, the project is anticipated to begin construction in the Spring of 2026 with a total estimated construction cost of approximately $11,000,000. It is anticipated that construction of the project in its entirety will take approximately 2 years., The alternatives would be ranked as follows in terms of construction related impacts (in ascending order - least to greatest):

1. Alternative 1 (30" RCP) – Practical

No impacts to current construction documents, estimates, or anticipated construction duration. Current construction estimate for culvert replacement approximates $50,000+/-.

2. Alternative 6 (4' EQ Diameter Embedded RCAP) – Practical

Least impactful compared to the current proposal. Roadway opening of approximately 20'. Potential to avoid gas line relocation below culvert. Additional construction costs would approximate $150,000+/- (200% increase over direct 30" RCP replacement cost). Additional construction duration is estimated at 1 month.

3. Alternative 5 (7' Embedded RCP) – Not Practical

More impactful compared to Alternative 6. Roadway opening of 30' versus 15' (current proposal) which would likely require temporary shoring, utility pole relocation and potentially additional public shade tree removal. Requires gas line relocation below culvert. Additional construction costs would approximate $200,000+/- (300% increase over direct 30" RCP replacement cost). Additional construction duration is estimated at 2-4 months.

4. Alternative 4 (8'w x 2.5'h 3-sided box) – Not Practical

Most impactful practical alternative. Roadway opening of 30'. Requires gas line relocation below culvert. Additional construction costs would approximate $800,000+/- (7% increase in total project construction cost). Additional construction time would approximate 3-6 months.

5. Alternative 3 (23'w x 2.5'h bridge) – Not Practical

Significant impact on construction costs and duration. Roadway opening of 40'. Requires gas line relocation below culvert. Bridge construction will have significant costs in excess of $2,000,000+/- (20% increase in total project construction cost). Additional construction time would approximate 6-12 months.

6. Alternative 2 (8'w x 7.5h 3-sided box) – Not Practical

Significant impact on construction costs and duration. Roadway opening of 30'. Requires gas line relocation below culvert. Culvert and roadway reconstruction due to elevated roadway grade 5' at intersection with Gebo Lane will have significant costs in excess of $3,000,000+/- (30% increase in total project construction cost). Additional construction time would approximate 6-12 months.

Conclusion

In conclusion, of the six (6) alternatives evaluated, two (2) of them are, in TEC's professional opinion, practical solutions as it relates to the Stream Crossing Standards for the replacement of the existing 30" CMP culvert carrying a low flow intermittent stream at the intersection of Gebo Lane and Ayer Road: direct replacement with a 30" RCP culvert and replacement with a backfilled 4' equivalent diameter RCAP with a 5' wide x 2' high arch opening. The direct replacement with 30" RCP is the least costly and complex alternative, with the shortest construction duration while restoring the structural integrity of the crossing, however, provides for the least ecological improvement to the stream crossing compared to other alternatives. The backfilled 4' diameter RCAP with a 5' wide x 2' high arch opening provides enhanced Stream Crossing Standard compliance over existing conditions, with the least amount of additional design and construction cost and schedule impacts, and therefore, in TEC's opinion, would be the preferred alternative in the event the Commission deems the direct 30" RCP replacement culvert inadequate for the subject crossing.

It is worth noting once more that although the culvert replacement alternatives evaluated herein aim to improve ecological value and stream continuity to the maximum extent practicable, as is stated in the prologue of the Massachusetts Stream Crossing Standards Handbook, the stream in question is a low-flow intermittent stream which provides for uncertain ecological value (discontinuity issues, small watershed, low flow, not within or near a critical area, not within or near mapped NHESP or BioMap areas, etc.), and which is also constricted by a separate 30" CMP culvert approximately 40' upstream (under Gebo Lane). As part of this analysis and through TEC's discussion with MassDOT and the Harvard Conservation Commission, the design will incorporate the removal of the existing upstream CMP and restoration of the stream channel for increased stream continuity in relation to upgrading the Ayer Road at Gebo lane culvert.

WETLAND RESOURCE AREA DELINEATION REPORT

Wetland Resource Delineation Report
Ayer Road
Harvard, MA
August 27, 2019
Rev. November 6, 2024

The project site is the location of proposed improvements along Ayer Road between the Route 2 westbound ramps and the Ayer town line, including portions of Gebo Lane and Lancaster County Road as shown in Figure 1 below.

Fig. 1: USGS Site Locus

Rimmer Environmental Consulting (REC) conducted a field inspections of the project area on July 11 and 15, 2019 and revisited the Gebo Lane wetlands to re-flag on October 24, 2024. Wetland resources subject to jurisdiction under the Massachusetts Wetlands Protection Act (MGL Ch 131 §. 40) and the Town of Harvard Wetland Protection Bylaw (Chapter 119) within the project area were identified. Wetlands were delineated in accordance with the procedures established in the Mass. Wetlands Protection Act Regulations (310 CMR 10.00) and the Bylaw Regulations (chapter 147). Numbered sequences of flags or stakes were placed in the field to delineate the boundary between upland and wetland resources.

The following is a description of resource areas present beginning at the south end of the project site and heading north:

Gebo Lane

There is a swale along the east side and parallel to Gebo Lane. The swale contains two isolated and disconnected pockets of wetland vegetation separated by areas of upland vegetation and upland soil. There is no visible channel connecting these areas or connecting to the lower wetland near Ayer Road. The upper isolated wetland nearest Lancaster Road was delineated by flags G5-G21 and consists of largely wet meadow vegetation including purple loosestrife, goldenrods, asters and grasses. The adjacent upland consists of mowed lawn surrounding the Post Office. The lower isolated wetland delineated by flags G1-G2-G2.1 and X1-3 consist of scrub shrub vegetation, especially pussy willow, northern arrow-wood and sensitive fern. Again, the upland is mowed lawn. These two wetland systems were determined to be jurisdictional under the Harvard Wetland Bylaw only as they are isolated and do not border on a water body or waterway.

Near the intersection with Ayer Road, there is a culvert which directs flow under Geob Lane and into a channel containing a stone retaining wall. Flow is then directed to a second culvert which directs flow under Ayer Road (Route 110/111) to the A-series wetland described below. This stream section from Gebo Lane to Ayer Road was flowing at a trickle a the time of the first observation in July 2019 and contained no flow at the inspection in October 2024. Flags A1-A5 delineate the east bank and flags A5-A7 delineate the west bank of this channel. There is a small amount of Bordering Vegetated Wetland along the east side of the channel including sapling red maple (*Acer rubrum*) honeysuckle (*Lonicera tatarica*) and black chokeberry (*Aronia melanocarpa*).

The west side of Gebo Lane also contains an unnamed, unmapped intermittent channel and was delineated by flags G37-G54. The side of a retention basin containing primarily broadleaf cattail (*Typha latifolia*) facing Gebo Lane adjacent to the athletic field was delineated by flags G11-G23, though this area is likely a stormwater management feature and not a jurisdictional wetland resource.

Ayer Road Meadows to Bowers Brook

On the east side of Ayer Road across from Gebo Lane the stream continues near 206 Ayer Road and connects to a larger wetland system on the east side of Ayer Road known as Ayer Road Meadows. This Bordering Vegetated Wetland (BVW) was delineated on the south side by flags A8-A12 ending at the headwall on the road shoulder, and the north side by flags B1-B26 ending at the Bowers Brook culvert. This wetland consists of an over story of red maple, with an understory of elderberry (*Sambucas canadensis*) and highbush blueberry (*Vaccinium corymbosum*). Sensitive fern (*Onoclea sensibilis*) and skunk cabbage (*Symplocarpus foetidus*) are dominant as groundcover.

Bowers Brook – East Side of Ayer Road

Bowers Brook is indicated as a perennial stream and is therefore presumed to contain a 200-foot Riverfront Area extending from mean annual high water (MAHW). MAHW was determined based upon observation of bankfull indicators, including scour marks, water marks undercutting,

changes in slope and changes in vegetation. MAHW on the east side of Ayer Road, on the southern bank of Bowers Brook, was delineated by flags RF A1-RF A12 and on the north side by flags RFA13-RFA16. Bordering Vegetated Wetland extending from Bank was delineated by flags B1-B7 as well as BB1-BB12 which delineates a man-made drainage ditch which appears to receive runoff from Poor Farm Road to the north.

The FEMA Flood Map (see Figure 2 below) indicates Bowers Brook is a regulatory floodway and contains a 100-year flood elevation of 250 feet (NAVD88) on the east side of Ayer Road. The area from the limit of BVW to elevation 250 is regulated as Bordering Land Subject to Flooding (BLSF).

<u>Bowers Brook – West Side of Ayer Road to Lancaster County Road</u>

Flags RF B1-RF B3 and RF B4-RF B6 delineate MAHW of Bowers Brook from Ayer Road to Lancaster County Road. The banks at this location are very steep and there is an old beaver dam located close to the culvert under Ayer Road. There is a narrow BVW extending from the south bank parallel to Lancaster County Road which was delineated by flags D1-D8. This wetland is a dense shrub swamp. Flags D9-D23 are hydrologically isolated from D1-D8 and delineate what appears to be a stormwater basin associated with the commercial building at 215 Ayer Road. The basin is dominated by wetland plants, including cattail, common reed (*Phragmites australis*) and sensitive fern, however if it is determined to be constructed in accordance with MassDEP Stormwater Management Regulations it would not be considered a jurisdictional wetland resource.

The FEMA Flood Map below indicates Bowers Brook contains a 100-year flood elevation of 248 between Ayer Road and Lancaster County Road, and 246.2 north of Lancaster County Road. The flood zone between the limit of MAHW or BVW is regulated as Bordering Land Subject to Flooding.

Fig. 2: FEMA Flood Map

Bowers Brook – Lancaster County Road

There is a small waterbody east of 6 Lancaster County Road. At approximately 6,000 square feet, it is too small to be regulated as a pond under 310 CMR 10.00; however there is no size limit under the Town of Harvard Wetland Bylaw. Wetland vegetation along its banks includes highbush blueberry and silky dogwood (*Cornus amomum*). The south side facing the road was delineated by flags E1-E5.

Bowers Brook continues under Lancaster County Road, past the small pond and away from the project site limits. MAHW was delineated by flags RF C1 to RF C4 on the west side of the Brook and RF C5 to RF C19 on the east side.
Extending from MAHW is a forested wetland delineated by flags F1 to F5 on the west side and F6-F21 on the east side ending in the vicinity of 231 Ayer Road where the wetland extends more than 100 feet from the project site limits.

Intermittent Stream between Solar Design Associates and Doe Orchards

There is an unnamed intermittent stream which flows under Ayer Road, north of 294 Ayer Road. It is a tributary to Bowers Brook. This stream is not indicated on the USGS topographic map and is presumed to be intermittent. Also, USGS StreamStats indicates the drainage area is only 0.2 square miles, well under the minimum 0.5 square mile threshold for jurisdiction as a perennial stream. There was no flow at the time of inspection. Its upstream banks were delineated by flags H1-H6 and H7-H9 on the east side of Ayer Road, and downstream banks by flags H10-H11 and H12-H15 on the west side. There was no Bordering Vegetated Wetland extending from the banks.

Across from Doe Orchards

A small forested wetland and roadside swale located on the east side of the project site at 320 Ayer Road across from the entrance to Doe Orchards. The portion of this wetland closest to the road was delineated by flags J1-J22. It contains small red maple, northern arrow-wood (*Viburnum recognitum*) and green ash (*Fraxinus pennsylvanica*). This wetland appears to connect to an intermittent stream off-site to the east and qualifies as BVW.

Harvard/Ayer Town Line

Another unnamed, unmapped intermittent stream crosses under Ayer Road just south of the Ayer municipal boundary. USGS StreamStats indicates it has a drainage area of only 0.16 square miles. This channel conveys flow west to Cold Spring Brook. It begins on the east side of Ayer Road in an agricultural field and discharges to a culvert close to the Town line. It was delineated by flags K1-K3 on the northeast bank and K4-K8 on the southeast bank. Reed canary grass (*Phalaris arundinacea*) is growing up to the bank where it has not been mowed.

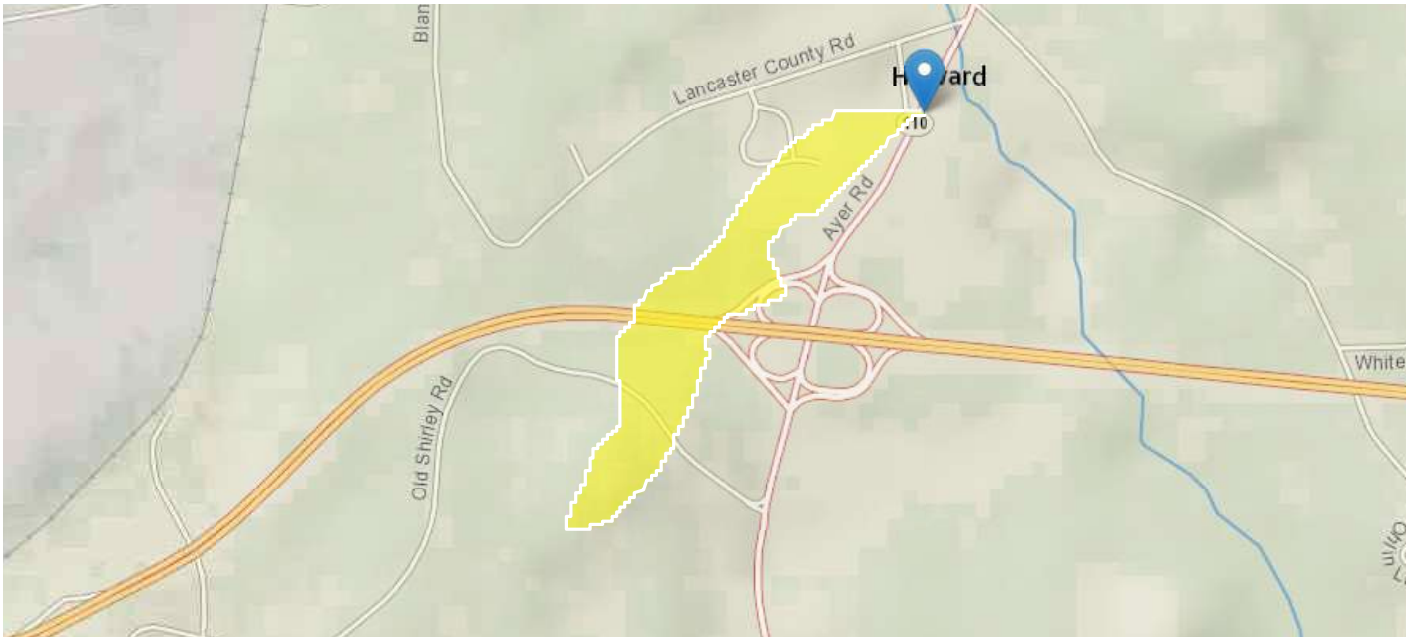
The downstream side on the west side of Ayer Road contains a rocky channel. There was no flow through the culvert at the time of inspection. The banks on this side are vegetated primarily with upland vegetation, especially Japanese knotweed (*Polygonum cuspidatum*).

Other Resources

The project site is not located within Estimated Habitat of Rare Wetland Wildlife or Priority Habitat and does not contain certified vernal pools as established by the Division of Fisheries and Wildife Natural Heritage and Endangered Species Program and published by MassGIS.

StreamStats Report

Region ID: MA
Workspace ID: MA20231128143033484000
Clicked Point (Latitude, Longitude): 42.52823, -71.57872
Time: 2023-11-28 09:30:54 -0500



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLDEM250	Mean basin slope computed from 1:250K DEM	3.178	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	-100000	square mile per mile
DRNAREA	Area that drains to a point on a stream	0.0645	square miles
ELEV	Mean Basin Elevation	346	feet
LC06STOR	Percentage of water bodies and wetlands determined from the NLCD 2006	5.27	percent
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless

Peak-Flow Statistics

Peak-Flow Statistics Parameters [Peak Statewide 2016 5156]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0645	square miles	0.16	512

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
ELEV	Mean Basin Elevation	346	feet	80.6	1948
LC06STOR	Percent Storage from NLCD2006	5.27	percent	0	32.3

Peak-Flow Statistics Disclaimers [Peak Statewide 2016 5156]

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

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

Statistic	Value	Unit
50-percent AEP flood	4.78	ft^3/s
20-percent AEP flood	8.31	ft^3/s
10-percent AEP flood	11.2	ft^3/s
4-percent AEP flood	15.6	ft^3/s
2-percent AEP flood	19.3	ft^3/s
1-percent AEP flood	23.2	ft^3/s
0.5-percent AEP flood	27.6	ft^3/s
0.2-percent AEP flood	34	ft^3/s

Peak-Flow Statistics Citations

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

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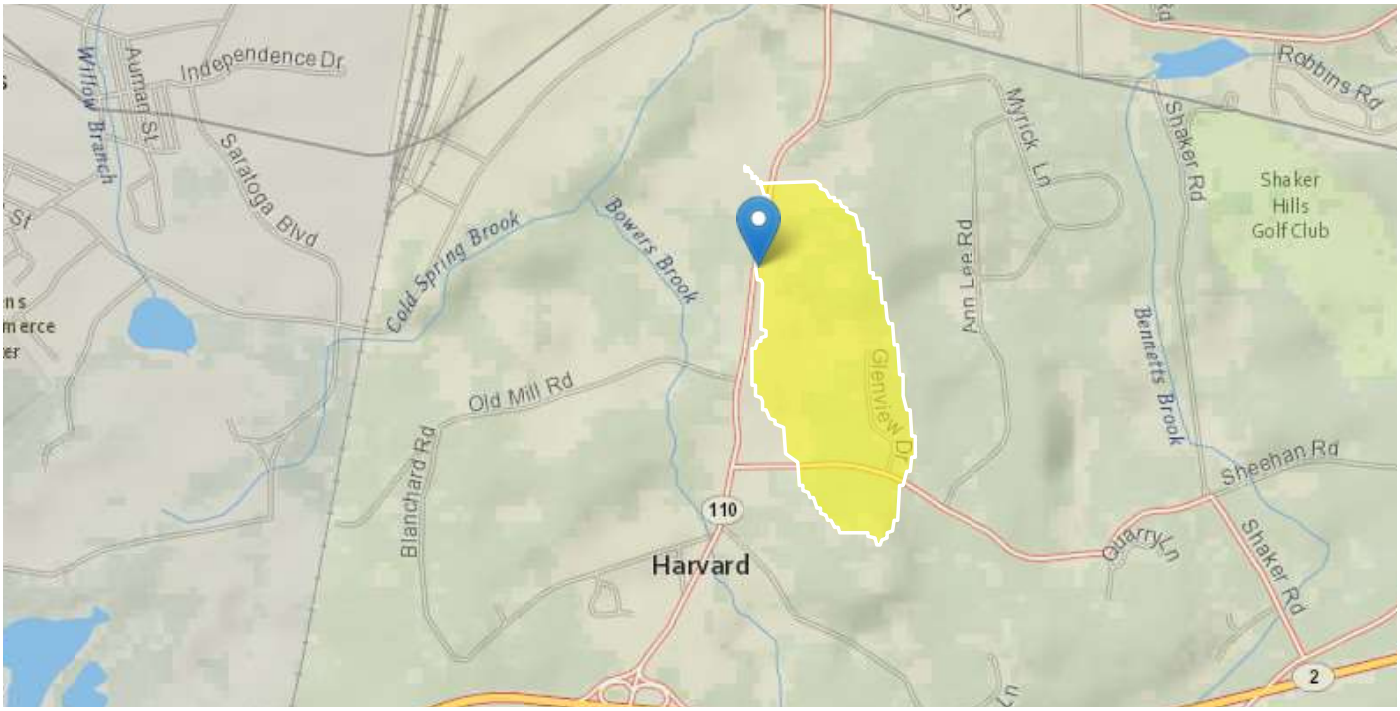
USGS Product Names Disclaimer: Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Application Version: 4.18.1
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

StreamStats Report

Region ID: MA
Workspace ID: MA20231128145236806000
Clicked Point (Latitude, Longitude): 42.53977, -71.57558
Time: 2023-11-28 09:52:58 -0500



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLDEM250	Mean basin slope computed from 1:250K DEM	4.954	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0	square mile per mile
DRNAREA	Area that drains to a point on a stream	0.25	square miles
ELEV	Mean Basin Elevation	313	feet
LC06STOR	Percentage of water bodies and wetlands determined from the NLCD 2006	7.45	percent
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless

General Disclaimers

Parameter values have been edited, computed flows may not apply.

Peak-Flow Statistics

Peak-Flow Statistics Parameters [Peak Statewide 2016 5156]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.25	square miles	0.16	512
ELEV	Mean Basin Elevation	313	feet	80.6	1948
LC06STOR	Percent Storage from NLCD2006	7.45	percent	0	32.3

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

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PIL	PIU	ASEp
50-percent AEP flood	13.2	ft^3/s	6.65	26.2	42.3
20-percent AEP flood	22.5	ft^3/s	11.2	45.4	43.4
10-percent AEP flood	30.2	ft^3/s	14.6	62.5	44.7
4-percent AEP flood	41.4	ft^3/s	19.3	88.8	47.1
2-percent AEP flood	50.8	ft^3/s	22.9	113	49.4
1-percent AEP flood	60.9	ft^3/s	26.6	140	51.8
0.5-percent AEP flood	72	ft^3/s	30.5	170	54.1
0.2-percent AEP flood	88.1	ft^3/s	35.5	219	57.6

Peak-Flow Statistics Citations

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

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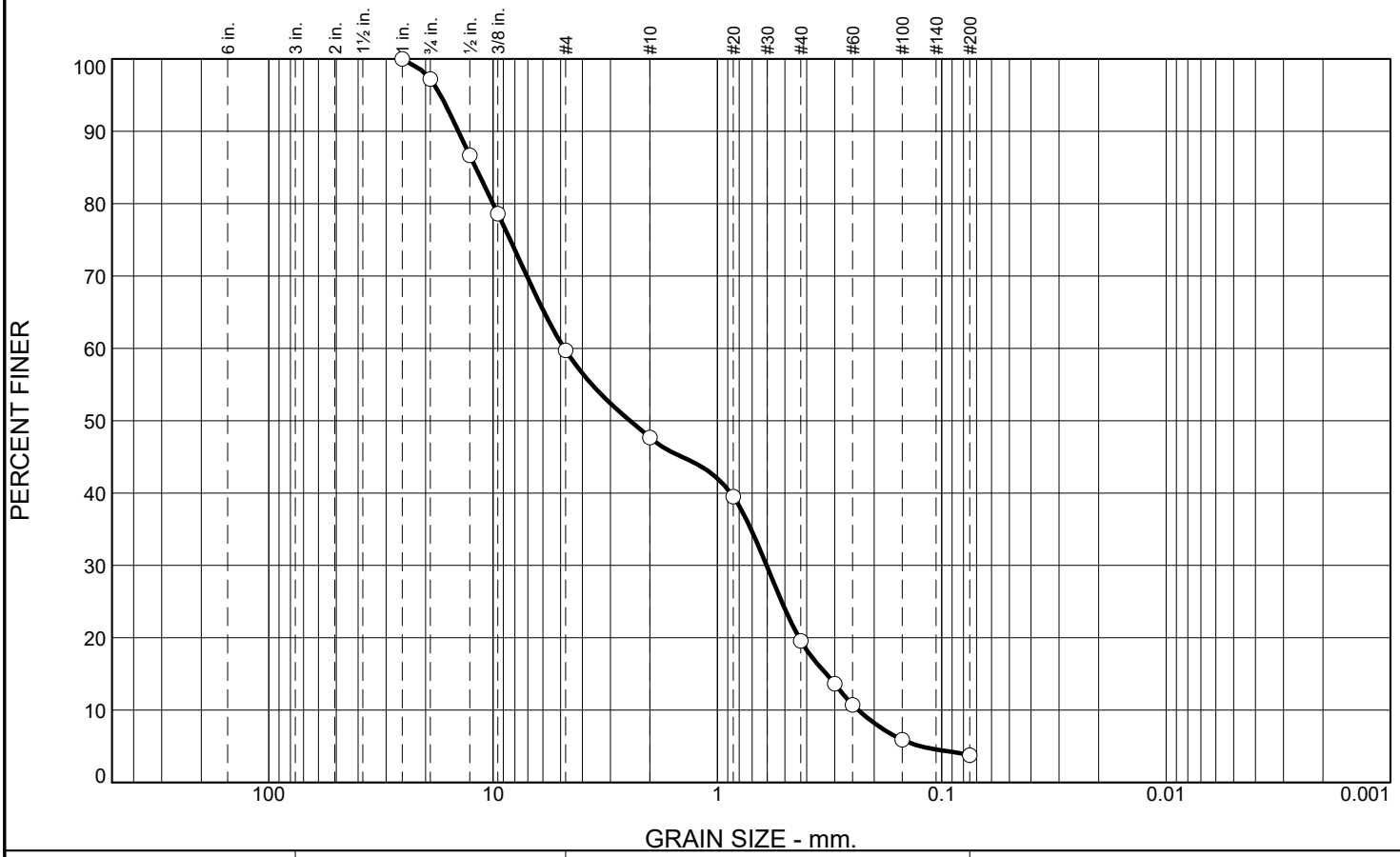
Proposal No. 619213-134927

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.8	37.5	12.0	28.1	15.8	3.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	97.2		
1/2"	86.7		
3/8"	78.6		
#4	59.7		
#10	47.7		
#20	39.5		
#40	19.6		
#50	13.7		
#60	10.7		
#100	5.9		
#200	3.8		

* (no specification provided)

Material Description

Dark brown 1" max sand and gravel trace silt

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{85}= 11.9521 D_{60}= 4.8139 D_{50}= 2.4511
D_{30}= 0.6037 D_{15}= 0.3270 D_{10}= 0.2358
C_u= 20.42 C_c= 0.32

Classification

USCS= SP AASHTO= A-1-a

Remarks

Sample submitted by client on 10/23/24
No soil specs provided

Sample No.: L-35477 **Source of Sample:** Gebo Lane Streambed, Harvard MA **Date:** 10/30/24
Location: Gebo Lane/ Ayer Road, Harvard MA **Elev./Depth:** submitted

YANKEE ENGINEERING & TESTING, INC.

Client: The Engineering Corp (TEC)
Project: The Engineering Corp
Various Projects / Sites
Project No: 2024-111

Tested By: AK **Checked By:** SMM

MASS WPA ORDER OF CONDITIONS

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 - Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
MassDEP File #:177-0751
eDEP Transaction #:1867015
City/Town:HARVARD

A. General Information

1. Conservation Commission: HARVARD
2. Issuance: a. ☑ OOC b. ☐ Amended OOC

3. Applicant Details

a. First Name		b. Last Name			
c. Organization	TOWN OF HARVARD - DEPARTMENT OF PUBLIC WORKS				
d. Mailing Address	47 DEPOT ROAD				
e. City/Town	HARVARD	f. State	MA	g. Zip Code	01451

4. Property Owner

a. First Name		b. Last Name			
c. Organization	TOWN OF HARVARD - DEPARTMENT OF PUBLIC WORKS				
d. Mailing Address	47 DEPOT ROAD				
e. City/Town	HARVARD	f. State	MA	g. Zip Code	01451

5. Project Location

a.Street Address	AYER ROAD		
b.City/Town	HARVARD	c. Zip Code	01451
d. Assessors Map/Plat#	N/A	e. Parcel/Lot#	N/A
f. Latitude	42.53275N	g. Longitude	71.57666W

6. Property recorded at the Registry of Deed for:

a. County	b. Certificate	c. Book	d. Page
WORCESTER		N/A	N/A

7.Dates

a. Date NOI Filed : 5/1/2024 b. Date Public Hearing Closed: 12/19/2024 c. Date Of Issuance: 1/30/2025

8.Final Approved Plans and Other Documents

a. Plan Title:	b. Plan Prepared by:	c. Plan Signed/Stamped by:	d. Revised Final Date:	e. Scale:
EXISTING CONDITIONS PLAN OF LAND IN HARVARD, MASSACHUSETTS PROJECT NO.: 22634 (11 SHEETS)	HANCOCK ASSOCIATES	JASON A. ELLIS	11/5/24	1" = 20'

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 - Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
MassDEP File #:177-0751
eDEP Transaction #:1867015
City/Town:HARVARD

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION PLAN AND PROFILE OF AYER ROAD (ROUTE 110/111) IN THE TOWN OF HARVARD WORCESTER COUNTY WPA NOI SUBMITTAL (80 SHEETS) PROJECT NO. T0904	THE ENGINEERING CORP	JARED DUVAL	December 12, 2024	1" = 1000
AYER ROAD (ROUTE 110/111) TRANSPORTATION IMPROVEMENTS DRAINAGE STUDY AND HYDROCAD MODEL SUBMITTED AS PART OF THE NOTICE OF INTENT DATED 4/8/2024	THE ENGINEERING CORP	N/A	10.3.23	N/A
CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION CONTROL AND SEDIMENTATION CONTROL PLAN AYER ROAD (ROUTE 110/111) IMPROVEMENTS HARVARD, MA SUBMITTED AS PART OF THE NOTICE OF INTENT DATED 4/8/2024	THE ENGINEERING CORP	N/A	April 1, 2024	N/A
TYPICAL WETLAND REPLICATION AREA PROTOCOLS AND SPECIFICATIONS/SPECIAL PROVISIONS; TYPICAL SECTION AT WETLAND REPLICATION AREA; AND TYPICAL SECTION AT INT. STREAM RESTORATION AREA SUBMITTED AS PART OF THE NOTICE OF INTENT DATED 4/8/2024	THE ENGINEERING CORP	N/A	N/A	NOT TO SCALE

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 - Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
MassDEP File #:177-0751
eDEP Transaction #:1867015
City/Town:HARVARD

INLAND WETLAND REPLICATION AREA, ITEM 755.35, 755.45, 755.75 & 76, 756, 756.411, 765.413, 765.553, 765.635, 767.121, 983.521 -522, PROJECT NO. 609213 AS SUBMITTED AS PART OF THE NOTICE OF INTENT	MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION	N/A	N/A	N/A

B. Findings

1.Findings pursuant to the Massachusetts Wetlands Protection Act
Following the review of the the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act.

Check all that apply:

a. ☐ Public Water Supply	b. ☐ Land Containing Shellfish	c. ☑ Prevention of Pollution
d. ☑ Private Water Supply	e. ☐ Fisheries	f. ☐ Protection of Wildlife Habitat
g. ☑ Ground Water Supply	h. ☑ Storm Damage Prevention	i. ☐ Flood Control

2. Commission hereby finds the project, as proposed, is:

Approved subject to:

a. ☑ The following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.

Denied because:

b. ☐ The proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect interests of the Act, and a final Order of Conditions is issued. **A description of the performance standards which the proposed work cannot meet is attached to this Order.**

c. ☐ The information submitted by the applicant is not sufficient to describe the site, the work or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the interests of the Act , and a final Order of Conditions is issued. **A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c).**

3. ☐ Buffer Zone Impacts:Shortest distance between limit of project disturbance and the wetland resource area specified in 310CMR10.02(1)(a). _____ a. linear feet

Inland Resource Area Impacts:(For Approvals Only):

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 - Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
MassDEP File #:177-0751
eDEP Transaction #:1867015
City/Town:HARVARD

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
4. ☑ Bank	92 a. linear feet	92 b. linear feet	288 c. linear feet	288 d. linear feet
5. ☑ Bordering Vegetated Wetland	487 a. square feet	487 b. square feet	4724 c. square feet	4724 d. square feet
6. ☑ Land under Waterbodies and Waterways	310 a. square feet	310 b. square feet	820 c. square feet	820 d. square feet
	0 e. c/y dredged	f. c/y dredged		
7. ☑ Bordering Land Subject to Flooding	175 a. square feet	175 b. square feet	175 c. square feet	175 d. square feet
Cubic Feet Flood Storage	0 e. cubic feet	f. cubic feet	50 g. cubic feet	50 h. cubic feet
8. ☐ Isolated Land Subject to Flooding	a. square feet	b. square feet		
Cubic Feet Flood Storage	c. cubic feet	d. cubic feet	e. cubic feet	f. cubic feet
9. ☑ Riverfront Area	58125 a. total sq. feet	58125 b. total sq. feet		
Sq ft within 100 ft	27050 c. square feet	27050 d. square feet	920 e. square feet	920 f. square feet
Sq ft between 100-200 ft	31075 g. square feet	31075 h. square feet	1000 i. square feet	1000 j. square feet

Coastal Resource Area Impacts:

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
10. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below			
11. ☐ Land Under the Ocean	a. square feet	b. square feet		
	c. c/y dredged	d. c/y dredged		
12. ☐ Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes below			
13. ☐ Coastal Beaches	a. square feet	b. square feet	c. c/y nourishment	d. c/y nourishment
14. ☐ Coastal Dunes	a. square feet	b. square feet	c. c/y nourishment	d. c/y nourishment
15. ☐ Coastal Banks	a. linear feet	b. linear feet		

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 - Order of Conditions
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Provided by MassDEP:
MassDEP File #:177-0751
eDEP Transaction #:1867015
City/Town:HARVARD

16. ☐ Rocky Intertidal Shores
a. square feet b. square feet

17. ☐ Salt Marshes
a. square feet b. square feet c. square feet d. square feet

18. ☐ Land Under Salt Ponds
a. square feet b. square feet
c. c/y dredged d. c/y dredged

19. ☐ Land Containing Shellfish
a. square feet b. square feet c. square feet d. square feet

20. ☐ Fish Runs
Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above
c. c/y dredged d. c/y dredged

21. ☐ Land Subject to Coastal Storm Flowage
a. square feet b. square feet

22.
☐ Restoration/Enhancement (For Approvals Only)
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.5.c & d or B.17.c & d above, please entered the additional amount here.

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

23.
☑ Streams Crossing(s)
If the project involves Stream Crossings, please enter the number of new stream crossings/number of replacement stream crossings.

0	2
a. number of new stream crossings	b. number of replacement stream crossings

C. General Conditions Under Massachusetts Wetlands Protection Act

The following conditions are only applicable to Approved projects

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
   a. the work is a maintenance dredging project as provided for in the Act; or
   b. the time for completion has been extended to a specified date more than three years, but less than five

years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.

5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order.
6. If this Order constitutes an Amended Order of Conditions, this Amended Order of Conditions does not exceed the issuance date of the original Final Order of Conditions.
7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.
8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.
9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work..
10. A sign shall be displayed at the site not less then two square feet or more than three square feet in size bearing the words,

" Massachusetts Department of Environmental Protection"
[or 'MassDEP"]
File Number :"177-0751"

11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before Mass DEP.
12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.
13. The work shall conform to the plans and special conditions referenced in this order.
14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.
15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.
16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.
17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.
18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that

occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.

NOTICE OF STORMWATER CONTROL AND MAINTENANCE REQUIREMENTS

19. The work associated with this Order(the "Project") is (1) ☑ is not (2)☐ subject to the Massachusetts Stormwater Standards. If the work is subject to Stormwater Standards, then the project is subject to the following conditions;

a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollutant Discharge Elimination System Construction General Permit as required by Stormwater Standard 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.

b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that: *i.* all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures; *ii.*. as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized; *iii.* any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10; *iv.* all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition; *v.* any vegetation associated with post-construction BMPs is suitably established to withstand erosion.

c) The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 19(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement") for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following: i.) the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and ii.) the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.

d) Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollutant Discharge Elimination System Multi-Sector General Permit.

e) Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 19(f) through 19(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 19(f) through 19(k) with respect to that BMP shall be a violation

of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.

f) The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.

g) The responsible party shall:
   1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
   2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
   3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.

h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.

i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.

j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.

k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.

l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

Special Conditions:

SEE ATTACHED SPECIAL CONDITIONS PAGE 9A - 9I

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 - Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
MassDEP File #:177-0751
eDEP Transaction #:1867015
City/Town:HARVARD

D. Findings Under Municipal Wetlands Bylaw or Ordinance

1. Is a municipal wetlands bylaw or ordinance applicable? ☑ Yes ☐ No

2. The Conservation Commission hereby(check one that applies):

a. ☐ DENIES the proposed work which cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw specifically:

1. Municipal Ordinance or Bylaw _____ 2. Citation _____

Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order or Conditions is issued. Which are necessary to comply with a municipal ordinance or bylaw:

b. ☑ APPROVES the proposed work, subject to the following additional conditions.

1. Municipal Ordinance or Bylaw: WETLAND PROTECTION BYLAW

2. Citation: CHAPTER 119

3. The Commission orders that all work shall be performed in accordance with the following conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.

The special conditions relating to municipal ordinance or bylaw are as follows:
THE COMMISSION APPROVED THE FOLLOWING WAIVERS UNDER CHAPTER 147 WETLAND PROTECTION BYLAW REGULATIONS: 1) ?147-7C HARVARD FILING FEES; 2) ?147-13 50' NO DISTURBANCE ZONE SETBACK ; 100' VERNAL POOL NO DISTURBANCE ZONE SETBACK; AND 75' ROADWAY SETBACK; 3) ?147-15C(1) STORMWATER MANAGEMENT - PEAK FLOW AND VOLUME 5% REDUCTION; 4) ?147-29M WETLAND REPLICATION BONDING; AND 5) ?147-37A PERFORMANCE GUARANTY/ BONDING SEE ATTACHED "SPECIAL CONDITIONS PAGE 9A - 9I

Docusign Envelope ID: E5236727-6047-4B69-9624-E143F7824B03

Ayer Road (Route 110/111) Improvements - SPECIAL CONDITIONS
DEP File: #177-751
Harvard: #0524-01

TABLE OF CONTENTS

PRE-ACTIVITY CONDITIONS 9b

EROSION AND SEDIMENTATION CONTROL 9c

WETLAND REPLICATION PROTOCOLS & SPECIFICATIONS 9e

STORM WATER MANAGEMENT 9e

DURING CONSTRUCTION 9f

PLACEMENT OF RIP-RAP EMBANKMENTS 9g

GRADING, STABILIZATION AND SLOPE 9h

AFTER CONSTRUCTION/IN PERPETUITY 9h

These special conditions are written to cause the Town of Harvard Department of Public Works or designee to take steps that will result in having only clean water leave the work site and in maintaining the integrity of the wetlands. With advance notice and coordination with the MassDOT Resident Engineer, the Conservation Commission and its agents shall have the right to inspect the site before, during and after all site work/construction to ensure compliance with this Order. This Order is also issued as a **Permit.**

PRE-ACTIVITY CONDITIONS

1. Prior to any activity on site, the limits of wetland resource areas shall be flagged with surveyor's tape and the flags shall remain in place during construction. The Agent for the Harvard Conservation Commission shall review the line prior to the start of construction.
2. The contractor(s) employed to execute filling and/or grading activities within the Resource Areas or the Buffer Zone must be provided with a copy of this Order of Conditions (OOC) and thereafter said contractor(s) will be held jointly responsible for any violation and the penalties under the law for such violation.
3. This OOC shall be incorporated into all construction contracts for this project. All contractors working at the site shall be made aware of the provisions contained within this OOC and shall adhere to the special provisions contained herein.
4. This OOC shall apply to any persons or entity in partial or full control, whether by ownership or otherwise, and to any successor in control or successor in interest, of the property described in the Notice of Intent (NOI) and accompanying plans and any revisions thereof.
5. At least 21-days prior to the commencement of any activity on this site the Applicant shall arrange a Pre-Activity meeting coordinated by the Applicant between a member of the Conservation Commission and/or the Conservation Agent, the Design Engineer, Erosion Control Monitor, Representative, Contractor, Town Representative, to review the Conditions of this OOC and to ensure understanding and compliance therewith.
6. Prior to any activity on site, the limit of work shall be clearly marked with erosion control and stakes or flags, and shall be confirmed and evaluated as sufficiently visible by the Conservation Commission or the Conservation Agent. Such controls shall be checked, replaced, and augmented as necessary and shall be maintained until all construction is complete. Workers shall be shown the limit of work and informed that no tree cutting, use of machinery, storage of machinery or materials, stockpiling of soil, or construction activity is to occur beyond this line at any time.
7. Prior to the Pre-Activity Meeting and commencement of any activity on this site the approved erosion control shall be installed as indicated on the Approved Plan, dated December 12, 2024.
8. Prior to the Pre-Activity Meeting and any work commencing on the site, the Applicant shall display the Department of Environmental Protection (DEP) file number for this OOC on a sign with minimum dimensions of two feet by two feet at a location clearly visible from the street. The sign shall remain in place and visible until a Certificate of Compliance (COC) is issued for the activity.
9. Prior to the start of any work the Applicant or its Contractor shall submit for the Conservation Commission's approval a detailed, Baseline Schedule.
10. At any time before, during, or after construction, and until the issuance of a COC, the Conservation Commission or the Conservation Agent in consultation with the *with* advance notice

to the MassDOT Resident Engineer may require the Applicant to modify, augment, restore, or maintain erosion control measures associated with the activity that is the subject of this OOC.

11. The Applicant shall provide the Conservation Commission a copy of National Pollutant Discharge Elimination System (NPDES) permit and proof that the Environmental Protection Agency (EPA) NOI has been filed with the EPA.

12. Applicant shall submit the Stormwater Pollution Prevention Plan (SWPPP) to Conservation Commission prior to the start of any work and any updates to the Conservation Commission for review within 24 hours of the change.

13. No clearing of vegetation, including trees, or disturbance of soil shall occur prior to the Pre-Activity Meeting. Minimal disturbance of shrubs and herbaceous plants may be allowed prior to the Pre-Activity Meeting if absolutely necessary in order to place erosion control marker stakes where required.

14. Erosion controls shall be installed with minimal disturbance to vegetation. Where possible, erosion controls should go around trees, shrubs, and other vegetation, on the uphill side.

15. Immediately after installation of erosion controls, the Contractor shall call the Conservation Agent at (978) 456-4100 Extension 421, for inspection and approval to proceed. Please allow 5 working days for scheduling an inspection. No other work may be undertaken until this approval is complete. The inspection will also include other preconstruction conditions such as the posting of the DEP file number.

16. The Conservation Agent will be notified one week prior to any clearing to confirm whether the site conditions are suitable for this activity.

17. The Conservation Commission requires a wetland scientist be retained through MassDOT's usual contracting procedures.

EROSION AND SEDIMENTATION CONTROL

1. Appropriate erosion control devices, indicated on the Approved Plans, dated December 12, 2024, shall be in place prior to the beginning of any phases of construction, and shall be maintained during construction in the wetland areas and buffer zone. The erosion control specifications provided in the NOI and the erosion control provision in the OOC will be the minimum standards for this project. Additional or modified erosion control measures may be required by the Conservation Commission or its Agents at any time before, during, and after construction. These will be maintained until a member of the Commission or Conservation Agent agree that they are no longer needed, at which time they will be removed, using mutually satisfactory removal procedures.

2. If required, dewatering activities shall be monitored daily to ensure that sediment-laden water is appropriately settled prior to discharge toward the wetland resource areas. No discharge of water is allowed directly into an area subject to jurisdiction of the Wetlands Protection Act.

3. The Applicant shall submit a contingency plan to the Conservation Commission for approval, which provides in an emergency for pumped water to be contained in a settling basin prior to discharge into a resource area.

4. A more than adequate stockpile of erosion control materials shall be on site at all times for emergency or routine replacement and shall include materials to repair or replace silt fences, Silt Socks, erosion control blankets, stone rip-rap, filter berms, or any other devices planned for use during construction.

5. The Conservation Commission or Conservation Agent, in consultation with the MassDOT Resident Engineer and/or the District Environmental Engineer, reserves the right to impose additional conditions on portions of this project to mitigate any impacts which could result from site erosion, or any noticeable degradation of surface water quality discharging from the site.

6. The area of construction shall remain in a stable condition during construction and at the close of each construction day. Erosion controls should be inspected at this time, and repaired, cleaned, reinforced, or replaced as necessary. Erosion control devices shall remain in place until such time as stabilization of all areas that may impact resource areas is permanent. No erosion control devices shall be removed until all exposed soils have been stabilized with final vegetative cover and the Conservation Commission and/or the Conservation Agent has authorized their removal.

7. All existing and proposed catch basins and oil traps along Ayer Road or on the streets adjacent to the project shall be protected by Silt Socks or other device deemed appropriate by the Conservation Commission to prevent sediment from entering the drainage system. Silt Socks or other devices shall be maintained and regularly cleaned of sediments until all areas associated with the work permitted by this OOC have been permanently stabilized and the Conservation Commission or the Conservation Agent has formally approved their removal.

8. All exposed soil finish grade surfaces, disturbed areas, slopes and proposed landscape areas shall be immediately landscaped and stabilized, or loamed, seeded and mulched with a one-inch (1") layer of straw or equivalent material or through the use of erosion control blankets or other approved means. All disturbed areas will be graded, loamed and seeded prior to October 1 of each year, if necessary, at the discretion of the Conservation Agent and/or Conservation Commission. Where necessary, the loam and seeding shall be held in place with jute matting. Outside of the growing season, exposed soil finish grade surfaces shall be stabilized with a three-inch (3") layer of straw or equivalent material

   until climate conditions allow for seeding. During construction, any area of exposed soils that will be left idle for more than fourteen (14) days shall be stabilized with a layer of straw or equivalent material or other means approved by the Conservation Commission.

   In general, material will be applied so that 80 to 90% of the ground is covered and will be reapplied as needed to maintain this coverage. Temporary stabilization methods may include, but not be limited to, hydro-seeding, straw mats, jute netting, sod, or other Conservation Commission approved methods. No disturbed areas or stockpiled material will be left unprotected or without erosion controls during the winter.

9. Prior to any work on the site, the site engineer or a construction foreman shall be designated as the erosion control monitor to oversee the placement of erosion controls and/or the regular inspection or replacement of erosion and sedimentation control devices. The name and phone number of this person must be provided to the Conservation Commission so that person can be contacted in the event of an emergency at the site, during any 24-hour period, including weekends. This person shall be given the authority to stop construction for erosion control

purposes. The erosion control monitor will be required to inspect all such controls and devices and to oversee cleaning and the proper disposal of sediment and waste products.

10. The erosion control monitor shall provide brief written reports to the Conservation Commission monthly.

11. Prior to any forecasted rain event and/or immediately after each rain storm, within one (1) day, the erosion barrier shall be inspected and replaced or repaired as needed. Any material accumulated behind the barrier shall be removed promptly and placed appropriately in the work area, not in the wetland or buffer zone, or trucked off site and deposited in an approved upland fill site. Any accidental damage to the erosion barrier must be repaired immediately, within one (1) day, and no work may proceed on the site until damage to the barrier is corrected.

12. Silt socks other equivalent means and erosion control barriers shall be securely double-staked (using 1" X 1" wooden stakes) with their ends butted one against another without leaving appreciable space for sediment to travel through the barrier as indicated on the Approved Plans, dated December 12, 2024.

13. Following erosion barrier approval, no storage of materials, tree or brush cuttings, or any construction activity may take place on the wetlands side of the limit of work area. Downgrade of the erosion control barrier is considered the "limit of disturbance and activity ".

WETLAND REPLICATION PROTOCOLS & SPECIFICATIONS

1. With native topsoil found below the fill material within Wetland Replication Area B hand dug test pit shall be performed prior to undertaking the earthwork therein to understand underlying soil conditions and depths.

2. The "Inland Wetland Replication Area", Item 755.35, 755.45, 755.75 & 76, 756, 756.411, 765.413, 765.553, 765.635, 767.121, 983.521 -522, as prepared by Massachusetts Department of Transportation Highway Division and submitted as part of the NOI shall supersede the provisions under Article VIII Wetland Replication of Chapter 147 within the Code of the Town of Harvard.

STORM WATER MANAGEMENT

1. The Commission acknowledges the proposed activity is a redevelopment project and is only subject to the requirements of MA Stormwater Standards 2,3, 4, 5 and 6 to the maximum extent practicable. The project fully meets MA Stormwater Standards 1, 7, 8, 9 and 10.

2. All construction and post-construction storm water management shall be conducted in accordance with supporting documents submitted with the Notice of Intent, the Department of Environmental Protection's *Storm Water Management Policy,* and as approved by the Conservation Commission in this OOC.

3. All storm water best management practices shall be maintained as specified in the Operation and Maintenance Plan submitted with the NOI and incorporated in the OOC. Evidence of maintenance of the storm water management system shall be provided to the Conservation Commission on an annual basis, no later than December 31st of each year. **This condition shall be noted on the Certificate of Compliance and shall continue in perpetuity.**

4. Catch basins shall be inspected and cleaned on a semi-annual basis, typically one inspection and cleaning in the spring and one inspection and cleaning in the fall. If inspections are not conducted in the Spring and Fall, written justification for the timing of those inspections shall be included in the report. The Conservation Commission and/or the Conservation Agent may require additional inspections if deemed necessary on their sole discretion, which will be conducted within one (1) month of the request. After each inspection and cleaning, the inspector shall provide to the Conservation Commission written confirmation that the inspection and cleaning were conducted. **This condition shall be noted on the Certificate of Compliance and shall continue in perpetuity.**
5. During construction, all drainage structures shall be inspected regularly and cleaned as necessary as outlined in the SWPPP.
6. There shall be no sedimentation from the site into wetlands or water bodies from discharge pipes or surface runoff created from the project leaving the site.
7. Immediately upon the construction of all catch basins and oil traps, Silt Socks or other equivalent means shall be set around the inlet to prevent sediment from entering the drainage system. Immediately upon the installation of the headwalls and rip-rap, Silt Socks shall be staked around the inlet to prevent sediments from entering the drainage system.
8. The Town of Harvard Department of Public Works and/or assignees shall maintain all culverts, collection basins, traps, retention and detention ponds, outlet structures, and other elements of drainage systems in order to avoid blockages and siltation which might cause failure of the system and/or detrimental impacts to on-site and/or off-site resource areas, and shall maintain the integrity of vegetative cover on the site as designed and indicated on the Approved Plans dated December 12, 2024.
9. The project shall conform to the storm water checklist submitted to the Conservation Commission under the NOI and approved under the OOC.

DURING CONSTRUCTION

1. The Applicant and any person involved in the activity that is the subject of this OOC shall notify the Conservation Commission or the Conservation Agent immediately upon discovery of any matter related to this OOC that may affect any area within the jurisdiction of the Conservation Commission.
2. During construction for this project, the on-site foreman, directing engineer, designated construction manager and environmental professional shall have been provided with a copy of the OOC and the plans referenced to herein, shall familiarize themselves with the conditions of this permit, and shall adhere to said conditions.
3. All equipment shall be inspected regularly for leaks. Any leaking hydraulic lines, cylinders, or any other components shall be fixed immediately. Equipment must be maintained to prevent leakage or discharge of such pollutants. Every effort shall be made with equipment for fuel storage and refueling operations to be located outside all areas within the jurisdiction of the Conservation Commission. Equipment that needs to be refueled that cannot easily be moved outside of areas within the jurisdiction of the Commission may be refueled in place with extra care and attention to the adjacent resources to avoid spills. Any spills that occur during refueling shall be remediated

immediately. The SWPPP shall indicate the location of the mechanical equipment and fuel storage.

4. All equipment shall be operated, parked, and maintained to limit alterations of wetlands and buffer zones to those areas clearly identified on the plans and demarcated in the field by the flagging and construction barriers installed pursuant to Condition 15 under Pre-Activity Conditions. No equipment is to enter or cross wetland resource areas at any time. Construction material and equipment shall be stored in a manner and location that will minimize the compaction of soils, and the concentration of runoff and/or siltation. The SWPPP shall indicate the location of the mechanical equipment storage.
5. In case of emergencies, problems, or the need to discuss site conditions with the Conservation Commission, please contact the Conservation Commission through the Conservation Agent during business hours at 978- 456-4100 Extension 421.
6. There shall be no disturbance (such as removal of trees) within the 100-foot buffer zone beyond the limits of construction shown on the plans, unless approved by the Conservation Commission and/or the Conservation Agent and indicated on the Approved Plans dated December 12, 2024.
7. Due to the site constraints, every effort possible shall be made to mitigate an adverse impact from overnight storage of excavated material, fill, debris, stumps, building materials, etc. within 100-feet of the wetland boundary by providing a suitable to prevent sediment from surface runoff from entering the wetlands.
8. At no time shall any debris, waste products, construction materials, or other material be burned, buried, or disposed of on the site other than fill permitted explicitly in this OOC. The burial of stumps is prohibited.
9. Used petroleum products resulting from the maintenance of construction equipment, and construction debris, shall be collected and properly disposed of off-site. No on-site disposal of these items is allowed.
10. The fording of streams with equipment is prohibited. All haul roads and temporary access roads shall not be within any wetland or on the wetland side of any erosion barrier.

PLACEMENT OF RIP-RAP EMBANKMENTS

1. Rip-rap material shall be clean and free of trash, tree stumps, roots, and other deleterious material.
2. No vehicular traffic shall enter the wetland resource areas.

GRADING, STABILIZATION AND SLOPE

1. Site grading and construction shall be scheduled to avoid periods of high surface water. Once begun, grading and construction shall continue in an expeditious manner to minimize the opportunity for erosion.
2. Grading shall be accomplished so that runoff shall not be directed to the property of others, except as indicated on the Approved Plan dated November 16, 2023.
3. During construction, any areas containing soil stockpiles shall be contained if the stockpiles remain in place for more than 2 weeks.
4. The seed stock to be used to restore disturbed areas shall complement or contain native flora and be of proven value to local wildlife and shall be approved by the Conservation Commission prior to its use on the project.
5. Fill within 100 feet of the wetland shall be stabilized by one of the following methods:
   - Topsoil and seeding.
   - If not in growing season, by jute mesh.
6. All exposed areas shall be stabilized at the discretion of the Conservation Agent to stabilize soil.
7. Upon completion of each phase of the project all disturbed areas shall be permanently stabilized with rapidly growing cover with sufficient topsoil to assure long term stabilization of disturbed areas.

AFTER CONSTRUCTION/IN PERPETUITY

1. Upon completion of construction and final soil stabilization, the Applicant shall submit the following to the Conservation Commission to request a COC:
   a. A completed Request for a COC form (WPA Form 8A or other form if required by the Conservation Commission at the time of request).
   b. A COC shall not be issued until all non-biodegradable erosion control has been removed from the site.
   c. A letter from a registered professional engineer certifying compliance with this OOC, and detailing any deviations that exist, and their potential effect on the project. A statement that the work is in "substantial compliance" without detailing of the deviations shall not be accepted.
   d. An "As-Built" plan signed and stamped by a registered professional engineer or land surveyor showing post-construction conditions within all areas under the jurisdiction of the Wetlands Protection Act. This plan shall include at a minimum:
      i. All wetland resource area boundaries with associated buffer zones and regulatory setback areas taken from the plan(s) approved in this OOC.
      ii. Location and elevations of all storm water management conveyances, structures and best management designs constructed under this OOC within any wetland resource area or buffer zone.
      iii. A line delineating the limit of work – "work" includes any filling, excavating and/or disturbance of soils or vegetation approved under this OOC.

2. The Town of Harvard Department of Public Works or designee shall maintain culverts and on-site drainage systems to ensure serviceability during operation as designed. The maintenance or repair of detention basins, supporting drainage systems, or storm water management best management practices shall be the responsibility of the Town of Harvard Department of Public Works or designee. The design capacity, storm water management treatment capacity, and structural integrity of these facilities must be maintained along with the maintenance of obstruction-free flowage easements.

3. Stabilized slopes shall be maintained as designed and constructed by the Town of Harvard Department of Public Works or designee, whether "bioengineered" or mechanically-stabilized slopes.

4. Subject to the submission by the Town of Harvard Department of Public Works or designee, and approval by the Conservation Commission, of a maintenance plan for storm water management systems, including Best Management Practices, no additional filing will be required to conduct maintenance of the above referenced structures.

5. All storm water best management practices shall be maintained as specified in the Operation and Maintenance Plan submitted with the NOI and incorporated in the OOC. Evidence of maintenance of the storm water management system shall be provided to the Conservation Commission on an annual basis, no later than December 31st of each year. **This condition shall be noted on the Certificate of Compliance and shall continue in perpetuity.**

6. The use of fertilizers/herbicides within the 100- foot wetland buffer zone shall be used a in a manner that is not inconsistent with its labeling or other restrictions imposed by M.G.L. Chapter 132B and its regulations promulgated at 333 CMR. **This condition shall be noted on the Certificate of Compliance and shall continue in perpetuity.**

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 - Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
MassDEP File #:177-0751
eDEP Transaction #:1867015
City/Town:HARVARD

E. Signatures

This Order is valid for three years from the date of issuance, unless otherwise specified pursuant to General Condition #4. If this is an Amended Order of Conditions, the Amended Order expires on the same date as the original Order of Conditions.

1/30/2025
1. Date of Original Order

Please indicate the number of members who will sign this form. This Order must be signed by a majority of the Conservation Commission.

7
2. Number of Signers

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office, if not filing electronically, and the property owner, if different from applicant.

Signatures: Signed by: Ben Wittenberg 9D5EF5... Signed by: Ben Kittler CBE283F62A... Signed by: Janet S. Waldron 5787F514C32D44E... Signed by: Jim Burns 08F9590DDB964C7... Signed by: Jessie Parker 919E11758C8743D... Signed by: Mark Shaw CBD364E011644A1... DocuSigned by: John Lee 52B722ADD424446...

[X] by hand delivery on

Date January 30, 2025

[ ] by certified mail, return receipt requested, on

Date

F. Appeals

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

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

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

G. Recording Information

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

HARVARD

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 - Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
MassDEP File #:177-0751
eDEP Transaction #:1867015
City/Town:HARVARD

Conservation Commission

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

To:

HARVARD
Conservation Commission

Please be advised that the Order of Conditions for the Project at:

AYER ROAD — Project Location
177-0751 — MassDEP File Number

Has been recorded at the Registry of Deeds of:

County — Book — Page

for:

Property Owner

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

Book — Page

In accordance with the Order of Conditions issued on:

Date

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

Instrument Number

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

Document Number

Signature of Applicant

Rev. 4/1/2010

ENDANGERED SPECIES ACT

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To: 05/28/2025 13:05:51 UTC
Project Code: 2025-0102137
Project Name: Harvard Ayer Road

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

Updated 4/12/2023 - *Please review this letter each time you request an Official Species List, we will continue to update it with additional information and links to websites may change.*

About Official Species Lists

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Federal and non-Federal project proponents have responsibilities under the Act to consider effects on listed species.

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested by returning to an existing project's page in IPaC.

Endangered Species Act Project Review

Please visit the "**New England Field Office Endangered Species Project Review and Consultation**" website for step-by-step instructions on how to consider effects on listed

species and prepare and submit a project review package if necessary:

https://www.fws.gov/office/new-england-ecological-services/endangered-species-project-review

NOTE Please do not use the **Consultation Package Builder** tool in IPaC except in specific situations following coordination with our office. Please follow the project review guidance on our website instead and reference your **Project Code** in all correspondence.

Northern Long-eared Bat - (**Updated 4/12/2023**) The Service published a final rule to reclassify the northern long-eared bat (NLEB) as endangered on November 30, 2022. The final rule went into effect on March 31, 2023. You may utilize the **Northern Long-eared Bat Rangewide Determination Key** available in IPaC. More information about this Determination Key and the Interim Consultation Framework are available on the northern long-eared bat species page:

https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis

For projects that previously utilized the 4(d) Determination Key, the change in the species' status may trigger the need to re-initiate consultation for any actions that are not completed and for which the Federal action agency retains discretion once the new listing determination becomes effective. If your project was not completed by March 31, 2023, and may result in incidental take of NLEB, please reach out to our office at newengland@fws.gov to see if reinitiation is necessary.

Additional Info About Section 7 of the Act
Under section 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether projects may affect threatened and endangered species and/or designated critical habitat. If a Federal agency, or its non-Federal representative, determines that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Federal agency also may need to consider proposed species and proposed critical habitat in the consultation. 50 CFR 402.14(c)(1) specifies the information required for consultation under the Act regardless of the format of the evaluation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/service/section-7-consultations

In addition to consultation requirements under Section 7(a)(2) of the ESA, please note that under sections 7(a)(1) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Please contact NEFO if you would like more information.

Candidate species that appear on the enclosed species list have no current protections under the ESA. The species' occurrence on an official species list does not convey a requirement to

consider impacts to this species as you would a proposed, threatened, or endangered species. The ESA does not provide for interagency consultations on candidate species under section 7, however, the Service recommends that all project proponents incorporate measures into projects to benefit candidate species and their habitats wherever possible.

Migratory Birds

In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see:

https://www.fws.gov/program/migratory-bird-permit

https://www.fws.gov/library/collections/bald-and-golden-eagle-management

Please feel free to contact us at **newengland@fws.gov** with your **Project Code** in the subject line if you need more information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat.

Attachment(s): Official Species List

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

PROJECT SUMMARY

Project Code: 2025-0102137
Project Name: Harvard Ayer Road
Project Type: Road/Hwy - Maintenance/Modification
Project Description: Extension and replacement of two existing stream crossings over Bower's Brook along Ayer Road
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@42.5370334,-71.57574886328055,14z

Counties: Worcester County, Massachusetts

ENDANGERED SPECIES ACT SPECIES

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

FLOWERING PLANTS

NAME	STATUS
Small Whorled Pogonia *Isotria medeoloides* Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1890	Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

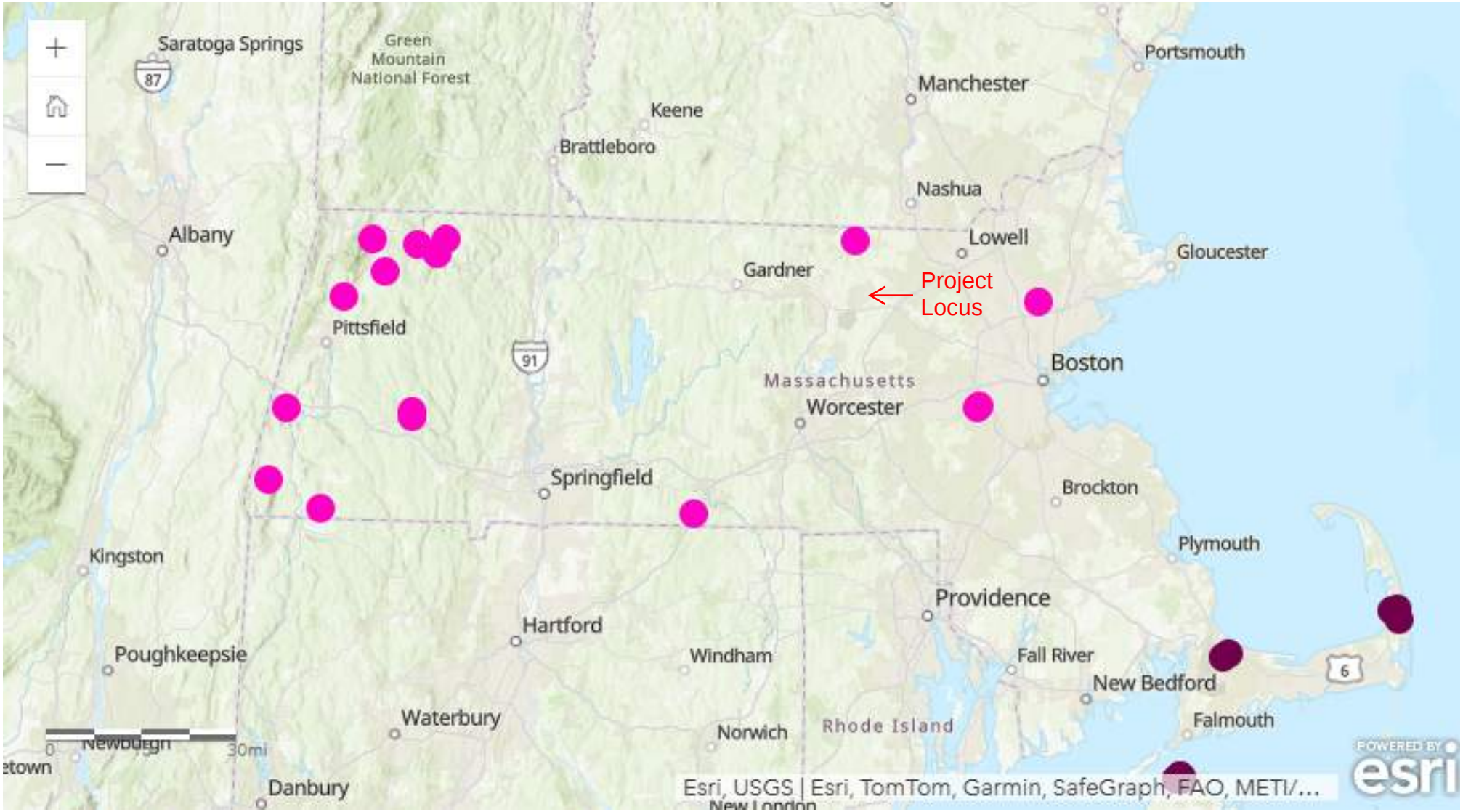
YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Jenna Marinelli
Address: 311 Main Street, Suite 201
City: Worcester
State: MA
Zip: 01608
Email jmarinelli@theengineeringcorp.com
Phone: 7747010550

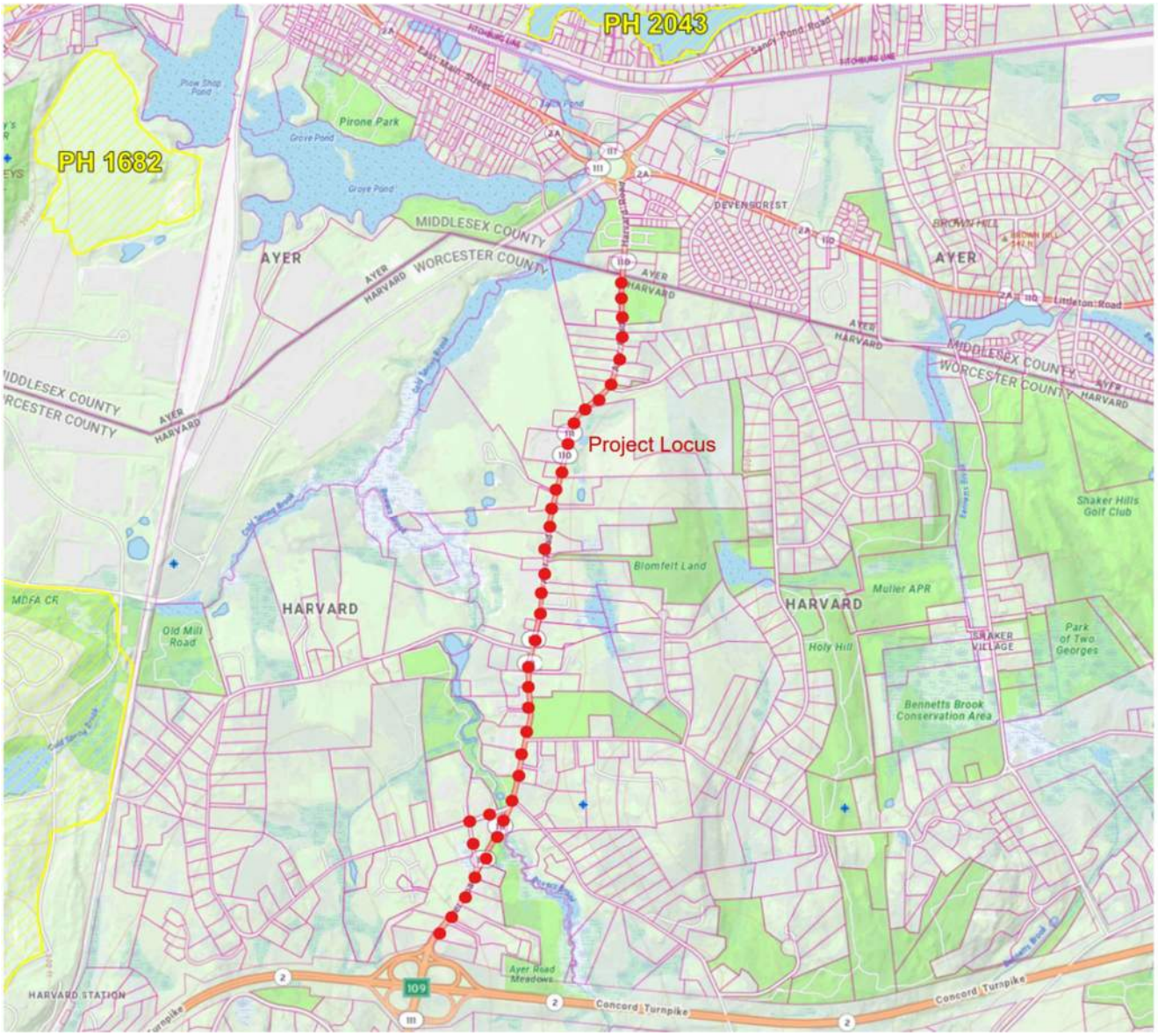
LEAD AGENCY CONTACT INFORMATION

Lead Agency: Massachusetts Department of Transportation


Saratoga Springs
87
Green Mountain National Forest
Keene
Brattleboro
Manchester
Portsmouth
Nashua
Albany
Lowell
Gloucester
Gardner
Project Locus
Pittsfield
91
Boston
Massachusetts
Worcester
Springfield
Brockton
Plymouth
Kingston
Providence
Hartford
Poughkeepsie
Windham
Fall River
New Bedford
6
Waterbury
Norwich
Rhode Island
Falmouth
Newburgh
0
30mi
Danbury
Esri, USGS | Esri, TomTom, Garmin, SafeGraph, FAO, METI/...
POWERED BY esri

311 Main Street, Suite 201
Worcester, MA 01608
774.701.0550
TheEngineeringCorp.com
Create | Design | Innovate

NHESP Map

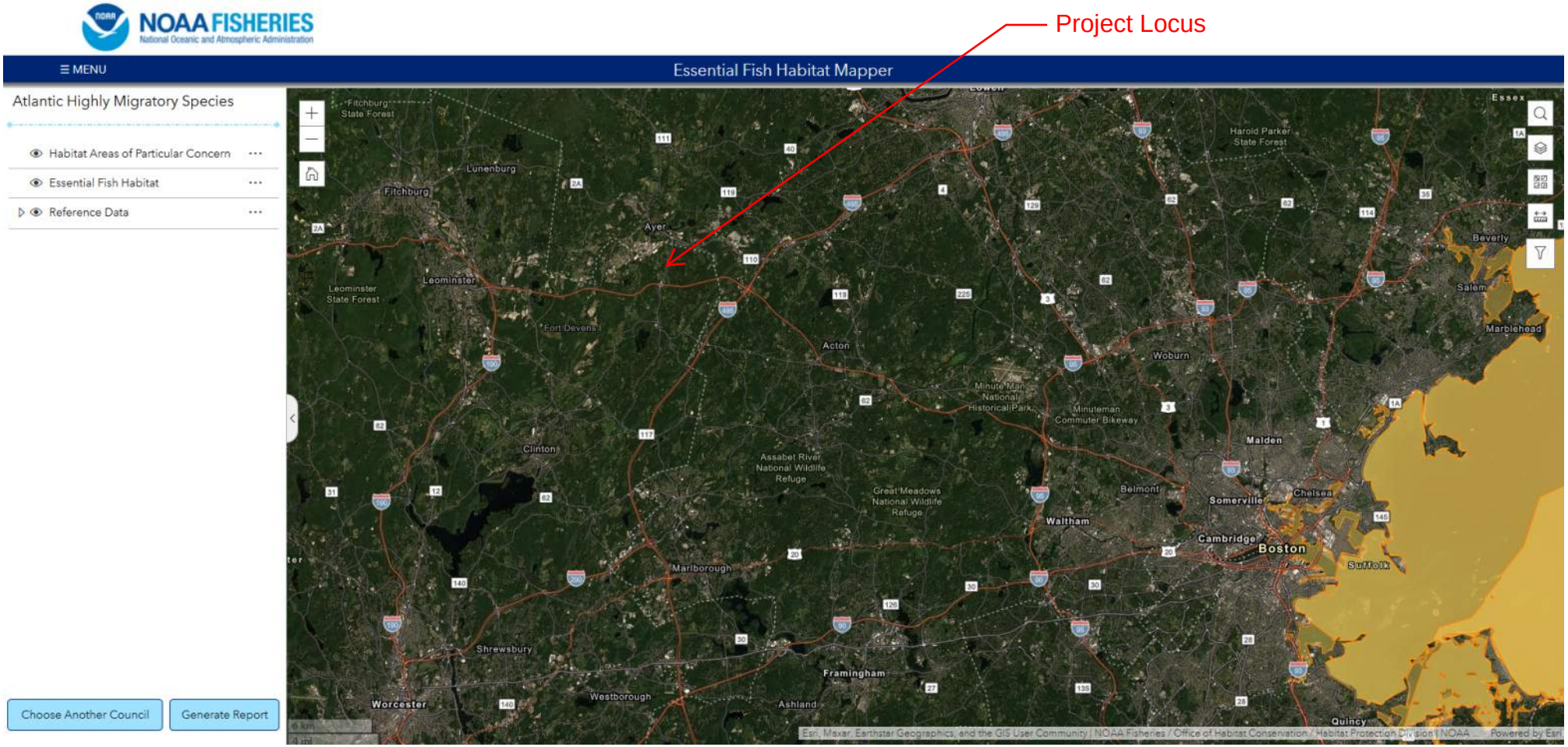


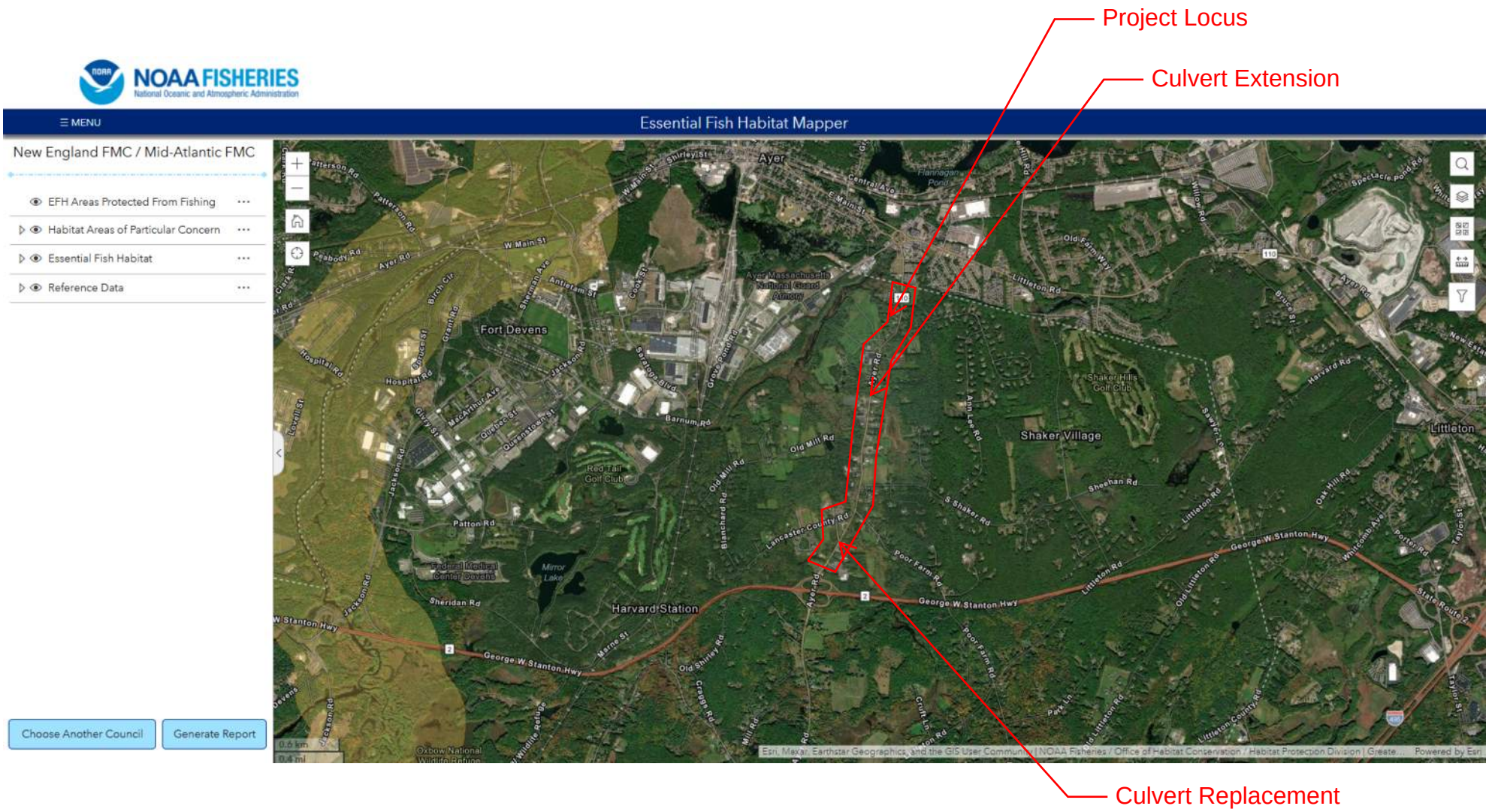
NHESP Certified Vernal Pools

NHESP Priority Habitats of Rare Species

NHESP Estimated Habitats of Rare Wildlife

N


NOAA FISHERIES
National Oceanic and Atmospheric Administration
Project Locus
☰ MENU
Essential Fish Habitat Mapper
Atlantic Highly Migratory Species
Habitat Areas of Particular Concern
Essential Fish Habitat
Reference Data
Choose Another Council
Generate Report
Fitchburg State Forest
Lunenburg
Fitchburg
Ayer
Leominster
Leominster State Forest
Fort Devens
Acton
Clinton
Assabet River National Wildlife Refuge
Great Meadows National Wildlife Refuge
Marlborough
Shrewsbury
Framingham
Westborough
Worcester
Ashland
Harold Parker State Forest
Essex
Beverly
Salem
Marblehead
Woburn
Minute Man National Historical Park
Minuteman Commuter Bikeway
Malden
Belmont
Somerville
Chelsea
Waltham
Cambridge
Boston
Suffolk
Quincy
Esri, Maxar, Earthstar Geographics, and the GIS User Community | NOAA Fisheries / Office of Habitat Conservation / Habitat Protection Division | NOAA
Powered by Esri


Project Locus
Culvert Extension
Culvert Replacement
NOAA FISHERIES
National Oceanic and Atmospheric Administration
☰ MENU
Essential Fish Habitat Mapper
New England FMC / Mid-Atlantic FMC
EFH Areas Protected From Fishing
Habitat Areas of Particular Concern
Essential Fish Habitat
Reference Data
Choose Another Council
Generate Report
Ayer
Fort Devens
Shaker Village
Harvard Station
Littleton
Red Tail Golf Club
Shaker Hills Golf Club
Mirror Lake
Federal Medical Center Devens
Oxbow National Wildlife Refuge
Esri, Maxar, Earthstar Geographics, and the GIS User Commun... | NOAA Fisheries / Office of Habitat Conservation / Habitat Protection Division | Greate... Powered by Esri

EFH Mapper Report

EFH Data Notice

Essential Fish Habitat (EFH) is defined by textual descriptions contained in the fishery management plans developed by the regional fishery management councils. In most cases mapping data can not fully represent the complexity of the habitats that make up EFH. This report should be used for general interest queries only and should not be interpreted as a definitive evaluation of EFH at this location. A location-specific evaluation of EFH for any official purposes must be performed by a regional expert. Please refer to the following links for the appropriate regional resources.

Greater Atlantic Regional Office
Atlantic Highly Migratory Species Management Division

Query Results

Degrees, Minutes, Seconds: Latitude = 42º 31' 33" N, Longitude = 72º 25' 5" W
Decimal Degrees: Latitude = 42.526, Longitude = -71.582

The query location intersects with spatial data representing EFH and/or HAPCs for the following species/management units.

*** W A R N I N G ***

Please note under "Life Stage(s) Found at Location" the category "ALL" indicates that all life stages of that species share the same map and are designated at the queried location.

EFH

No additional Essential Fish Habitats (EFH) were identified at the report location.

Pacific Salmon EFH

No Pacific Salmon Essential Fish Habitat (EFH) were identified at the report location.

Atlantic Salmon

No Atlantic Salmon were identified at the report location.

HAPCs

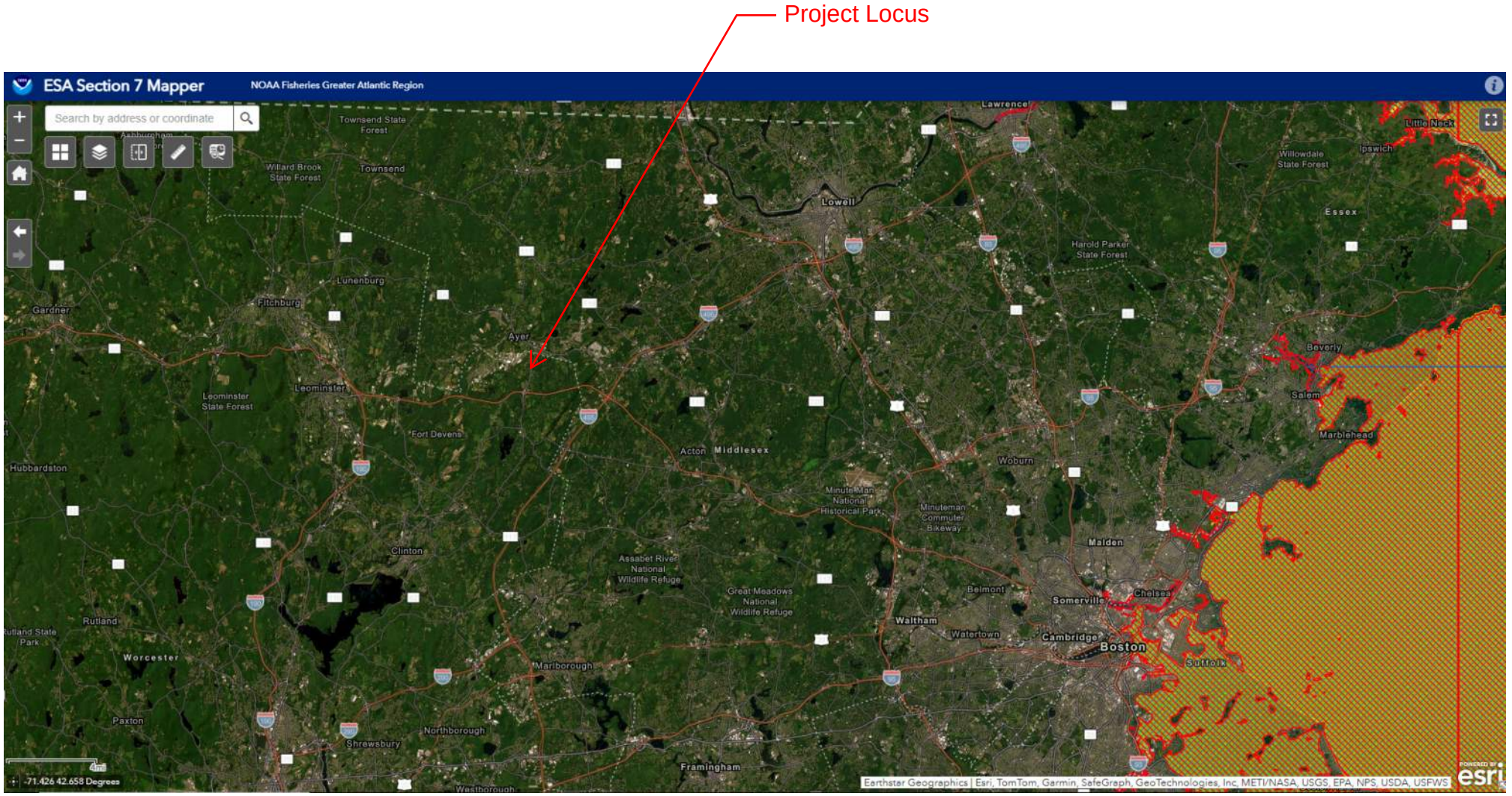
No Habitat Areas of Particular Concern (HAPC) were identified at the report location.

EFH Areas Protected from Fishing

No EFH Areas Protected from Fishing (EFHA) were identified at the report location.

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data. ****For links to all EFH text descriptions see the complete data inventory: open data inventory -->**
All EFH species have been mapped for the Greater Atlantic region, **Atlantic Highly Migratory Species EFH**, Bigeye Sand Tiger Shark, Bigeye Sixgill Shark,

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data. **For links to all EFH text descriptions see the complete data inventory: open data inventory -->
Caribbean Sharpnose Shark, Galapagos Shark, Narrowtooth Shark, Sevengill Shark, Sixgill Shark, Smooth Hammerhead Shark, Smalltail Shark


Project Locus
ESA Section 7 Mapper
NOAA Fisheries Greater Atlantic Region
Search by address or coordinate
Townsend State Forest
Willard Brook State Forest
Townsend
Lawrence
Lowell
Willowdale State Forest
Ipswich
Essex
Harold Parker State Forest
Lunenburg
Fitchburg
Gardner
Ayer
Leominster
Leominster State Forest
Fort Devens
Acton
Middlesex
Hubbardston
Woburn
Minute Man National Historical Park
Minuteman Commuter Bikeway
Beverly
Salem
Marblehead
Malden
Clinton
Assabet River National Wildlife Refuge
Great Meadows National Wildlife Refuge
Belmont
Somerville
Chelsea
Waltham
Watertown
Cambridge
Boston
Suffolk
Rutland
Rutland State Park
Worcester
Marlborough
Paxton
Shrewsbury
Northborough
Framingham
Westborough
-71.426 42.658 Degrees
Earthstar Geographics | Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, USFWS
esri
GARFO S7 Service Area
Atlantic Sturgeon
Shortnose Sturgeon
Atlantic Salmon
Sea Turtles
Atlantic Large Whales
In or Near Critical Habitat

HISTORIC

950 CMR: OFFICE OF THE SECRETARY OF THE COMMONWEALTH

APPENDIX A

MASSACHUSETTS HISTORICAL COMMISSION
220 MORRISSEY BOULEVARD
BOSTON, MASS. 02125
617-727-8470, FAX: 617-727-5128

PROJECT NOTIFICATION FORM

Project Name: Ayer Road Reconstruction and Shared Use Path

Location / Address: Ayer Road, Gebo Lane, Lancaster County Road

City / Town: Harvard, MA

Project Proponent

Name: Town of Harvard DPW

Address: 47 Depot Road

City/Town/Zip/Telephone: Harvard, MA 01451; 9784564100

Agency license or funding for the project (list all licenses, permits, approvals, grants or other entitlements being sought from state and federal agencies).

Agency Name	Type of License or funding (specify)
USACE	Section 404 GP Pre-Construction Notification
MassDOT	State Transportation Improvement Program
EPA	NPDES CGP

Project Description (narrative):

Reconstruction, box widening, and shared use path construction of Ayer Road from Rt 2 to Ayer Town Line.

Does the project include demolition? If so, specify nature of demolition and describe the building(s) which are proposed for demolition.

Demolition of existing roadway. No building demolition proposed.

Does the project include rehabilitation of any existing buildings? If so, specify nature of rehabilitation and describe the building(s) which are proposed for rehabilitation.

No work on buildings is proposed.

Does the project include new construction? If so, describe (attach plans and elevations if necessary).

Yes, reconstruction, box widening, and shared use path construction of Ayer Road from Rt 2 to Ayer Town Line.

950 CMR: OFFICE OF THE SECRETARY OF THE COMMONWEALTH

APPENDIX A (continued)

To the best of your knowledge, are any historic or archaeological properties known to exist within the project's area of potential impact? If so, specify.

One historic site at 310 Ayer Road, HRV164

What is the total acreage of the project area?

Woodland	<0.1+/- acres	Productive Resources:	
Wetland	<0.1+/- acres	Agriculture	n/a acres
Floodplain	<0.1+/- acres	Forestry	n/a acres
Open space	<0.1+/- acres	Mining/Extraction	n/a acres
Developed	10+/- acres	Total Project Acreage	10+/- acres

What is the acreage of the proposed new construction? 10+/- acres

What is the present land use of the project area?

Ayer Road, Gebo Lane, Lancaster County Road - Public Municipal Owned Roadways

Please attach a copy of the section of the USGS quadrangle map which clearly marks the project location.

This Project Notification Form has been submitted to the MHC in compliance with 950 CMR 71.00.

Signature of Person submitting this form: _____ Date: _____

Name: Peter Engle, PE

Address: TEC, Inc. ; 311 Main Street

City/Town/Zip: Worcester, MA 01608

Telephone: 7744020229

REGULATORY AUTHORITY

950 CMR 71.00: M.G.L. c. 9, §§ 26-27C as amended by St. 1988, c. 254.

9589 0710 5270 1832 6112 63

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☐ Return Receipt (electronic)	$0.00
☐ Certified Mail Restricted Delivery	$0.00
☐ Adult Signature Required	$0.00
☐ Adult Signature Restricted Delivery	$
Postage	$9.35
$	
Total Postage and Fees	$14.20
$	

0101 47

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06/09/2025

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City, State, ZIP+4®: Boston, Ma 02125

PS Form 3800, January 2023 PSN 7530-02-000-9047 See Reverse for Instructions

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WORCESTER, MA 01613-9998
www.usps.com

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TRACKING NUMBERS
9589 071C 5270 1832 6112 63

TRACK STATUS OF ITEMS WITH THIS CODE
(UP TO 25 ITEMS)

TRACK STATUS BY TEXT MESSAGE
Send tracking number to 28777 (2USPS)
Standard message and data rates may apply

TRACK STATUS ONLINE
Visit https://www.usps.com/tracking
Text and e-mail alerts available

PURCHASE DETAILS

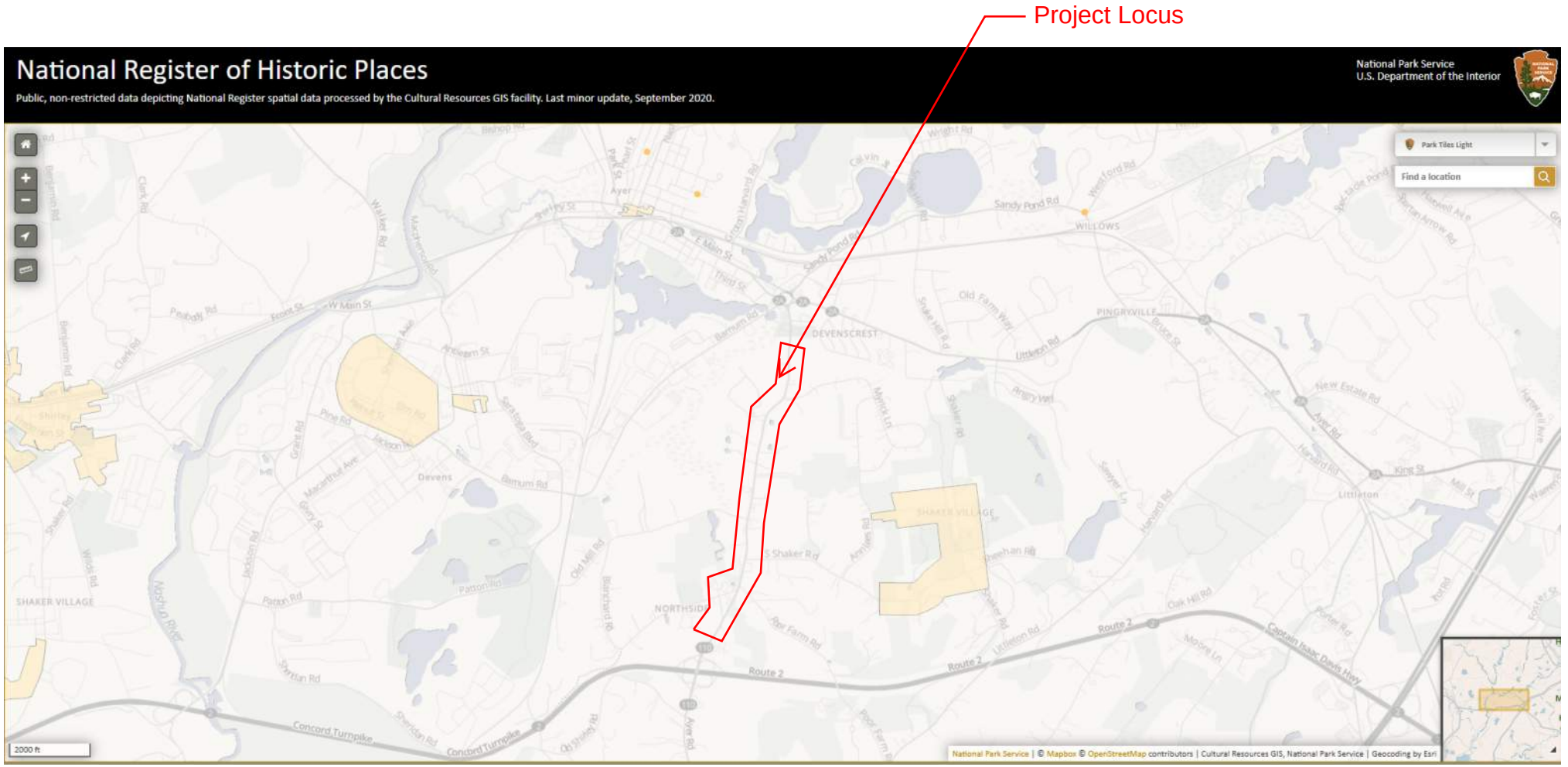
Product	Qty	Unit Price	Price
Priority Mail®	1		$9.35
Dorchester, MA 02125			
Weight: 0 lb 14.60 oz			
Expected Delivery Date			
Wed 06/11/2025			
Insurance			$0.00
Up to $100.00 included			
Certified Mail®			$4.85
Tracking #:			
9589 0710 5270 1832 6112 63			
Total			$14.20
Grand Total:			$14.20
Credit Card Remit			$14.20
Card Name: VISA			
Account #: XXXXXXXXXXXX7203			
Approval #: 06683D			
Transaction #: 768			
AID: A0000000C31010 Contactless			
AL: VISA CREDIT			

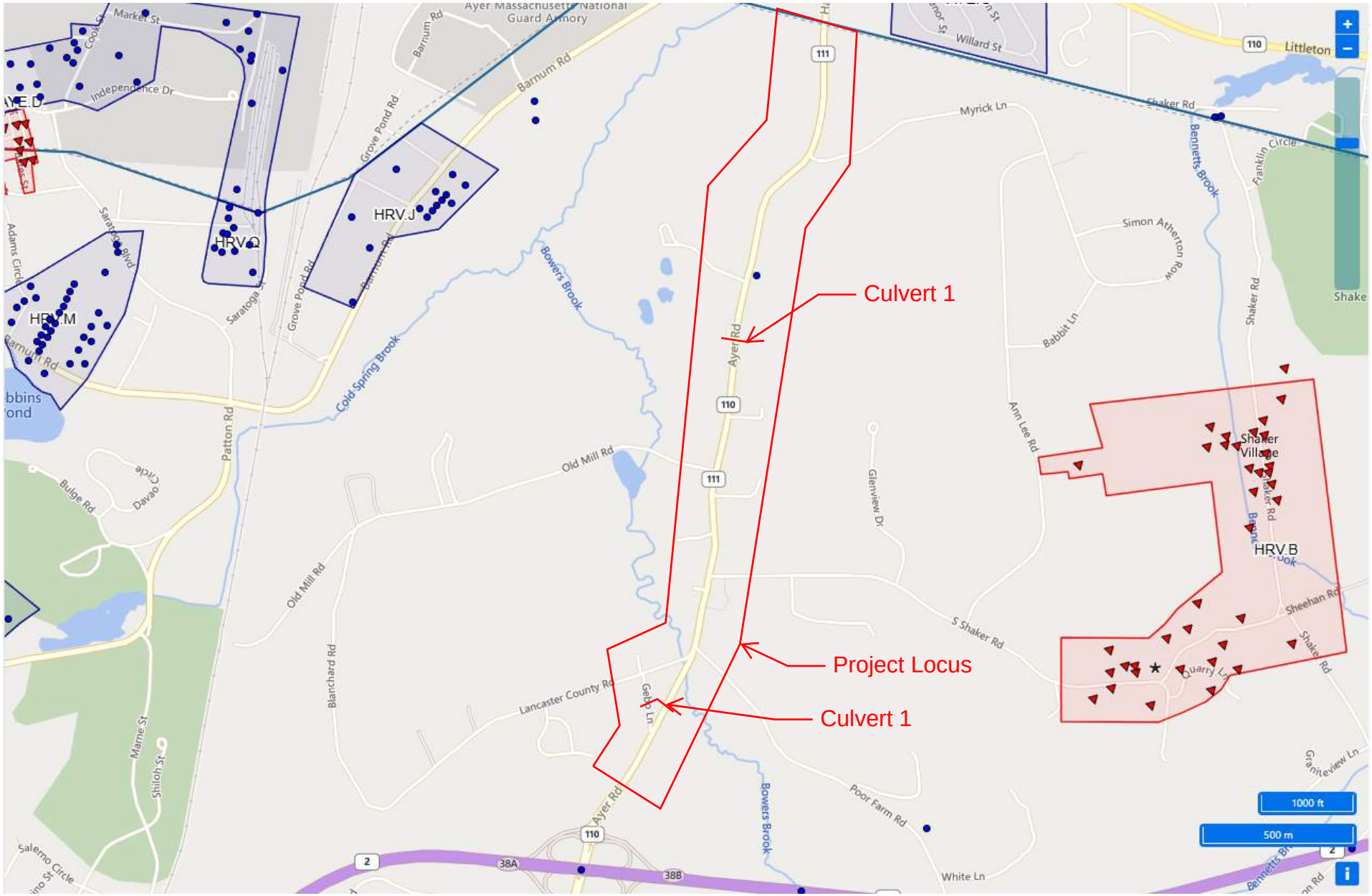
Pete Engle

From: Pete Engle
Sent: Friday, June 6, 2025 12:00 PM
To: 'david.s.robinson@mass.gov'; 'thpo@wampanoagtribe-nsn.gov'; '106review@mwtribe-nsn.gov'; 'tashtesook@aol.com'
Cc: 'David.weeden@mwtribe-nsn.gov'; Jared Duval; 'mhc@sec.state.ma.us'
Subject: MHC PNF - Ayer Road Reconstruction, Harvard, MA
Attachments: 3_Proposed Plans.pdf; 1_MHC PNF_Compiled.pdf; 2_Existing Conditions Plan Set.pdf

Good Afternoon, please find attached Project Notification Form for the proposed roadway reconstruction and shared use path construction for Ayer Road in Havard, MA.
A hard copy has been sent via certified mail to the MHC.
Thanks.
Pete

Peter Engle, P.E.
Worcester Regional Project Manager
The Engineering Corp., Inc.
T 978.794.1792 **C** 774.402.0229
pengle@theengineeringcorp.com


Project Locus
National Register of Historic Places
Public, non-restricted data depicting National Register spatial data processed by the Cultural Resources GIS facility. Last minor update, September 2020.
National Park Service
U.S. Department of the Interior
Park Tiles Light
Find a location
Ayer
Sandy Pond Rd
WILLOWS
E Main St
Third St
Barnum Rd
DEVENSCREST
Old Farm Way
PINGRYVILLE
Bruce St
Littleton Rd
New Estate Rd
Ayer Rd
Harvard Rd
King St
Littleton
W Main St
Front St
Peabody Rd
Benjamin Rd
Clark Rd
Walker Rd
Merrimack Ave
Andrews St
Pine Rd
Jackson St
Grant Rd
MacArthur Ave
Gary St
Devens
Barnum Rd
Sherman Rd
Old Mill Rd
Patton Rd
Nashua River
Wilder Rd
Jackson Rd
SHAKER VILLAGE
Shaker Rd
Shaker Hill Rd
Myrtle Ln
Angry Wet
Sawyer Ln
Andrews Rd
Dunham Rd
NORTHSIDE
Pilot Farm Rd
Route 2
Oak Hill Rd
Morse Ln
Captain Isaac Davis Hwy
Porter Rd
Port Rd
Sheridan Rd
Concord Turnpike
Old Shirley Rd
Ayer Rd
2000 ft
National Park Service | © Mapbox © OpenStreetMap contributors | Cultural Resources GIS, National Park Service | Geocoding by Esri


Culvert 1
Project Locus
Culvert 1
HRV.J
HRV.Q
HRV.M
HRV.B
Ayer Massachusetts National Guard Armory
Littleton
Shaker Village
Bowers Brook
Cold Spring Brook
Bennetts Brook
Ayer Rd
Barnum Rd
Grove Pond Rd
Old Mill Rd
Lancaster County Rd
Poor Farm Rd
S Shaker Rd
Shaker Rd
Myrick Ln
Simon Atherton Row
Babbit Ln
Ann Lee Rd
Glenview Dr
Sheehan Rd
Granieview Ln
White Ln
Patton Rd
Blanchard Rd
Gebo Ln
Marne St
Shiloh St
Bulge Rd
Davao Circle
Saratoga Blvd
Saratoga St
Adams Circle
Salerno Circle
Independence Dr
Market St
Willard St
Franklin Circle
Quarry Ln
1000 ft
500 m

Massachusetts Cultural Resource Information System
Scanned Record Cover Page

Inventory No:	HRV.164
Historic Name:	Park, John House - Bacon, John W. Poultry Farm
Common Name:	Rockwood, C. House - Maynard, George Inn
Address:	310 Ayer Rd
City/Town:	Harvard
Village/Neighborhood:	
Local No:	4-31;
Year Constructed:	C 1860
Architectural Style(s):	Greek Revival; Victorian Eclectic;
Use(s):	Agricultural; Hotel or Inn; Other Recreational; Poultry Farm; Single Family Dwelling House;
Significance:	Agriculture; Architecture; Commerce; Recreation;
Area(s):	
Designation(s):	
Building Materials:	Roof: Slate; Wall: Wood; Wood Clapboard; Foundation: Granite; Stone, Cut;
Demolished	No

The Massachusetts Historical Commission (MHC) has converted this paper record to digital format as part of ongoing projects to scan records of the Inventory of Historic Assets of the Commonwealth and National Register of Historic Places nominations for Massachusetts. Efforts are ongoing and not all inventory or National Register records related to this resource may be available in digital format at this time.

The MACRIS database and scanned files are highly dynamic; new information is added daily and both database records and related scanned files may be updated as new information is incorporated into MHC files. Users should note that there may be a considerable lag time between the receipt of new or updated records by MHC and the appearance of related information in MACRIS. Users should also note that not all source materials for the MACRIS database are made available as scanned images. Users may consult the records, files and maps available in MHC's public research area at its offices at the State Archives Building, 220 Morrissey Boulevard, Boston, open M-F, 9-5.

Users of this digital material acknowledge that they have read and understood the MACRIS Information and Disclaimer (http://mhc-macris.net/macrisdisclaimer.htm)

Data available via the MACRIS web interface, and associated scanned files are for information purposes only. THE ACT OF CHECKING THIS DATABASE AND ASSOCIATED SCANNED FILES DOES NOT SUBSTITUTE FOR COMPLIANCE WITH APPLICABLE LOCAL, STATE OR FEDERAL LAWS AND REGULATIONS. IF YOU ARE REPRESENTING A DEVELOPER AND/OR A PROPOSED PROJECT THAT WILL REQUIRE A PERMIT, LICENSE OR FUNDING FROM ANY STATE OR FEDERAL AGENCY YOU MUST SUBMIT A PROJECT NOTIFICATION FORM TO MHC FOR MHC'S REVIEW AND COMMENT. You can obtain a copy of a PNF through the MHC web site (www.sec.state.ma.us/mhc) under the subject heading "MHC Forms."

Commonwealth of Massachusetts
Massachusetts Historical Commission
220 Morrissey Boulevard, Boston, Massachusetts 02125
www.sec.state.ma.us/mhc

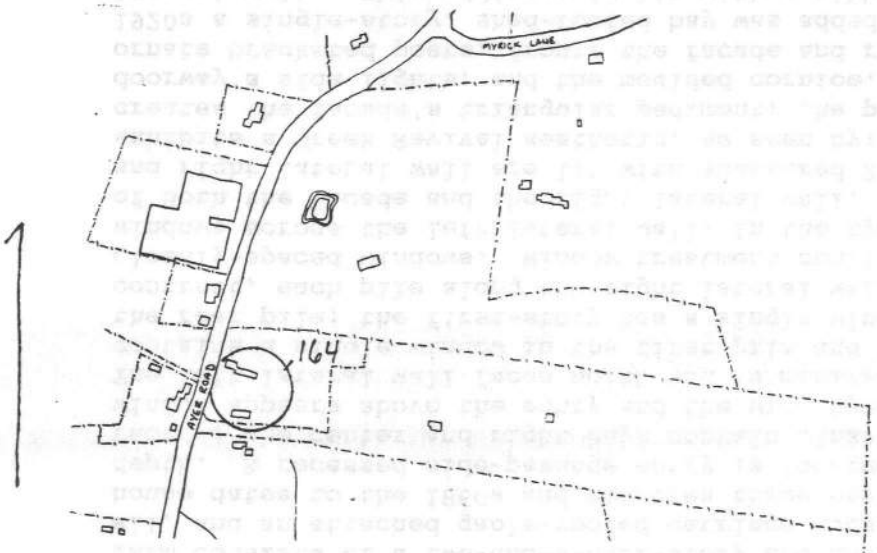
This file was accessed on: Friday, May 30, 2025 at 10:40 AM

HRV.164

Sec 1 A

FORM B - BUILDING | Assessors # 4-31 | USGS quad Ayer | area outlying

Massachusetts Historical Commission
80 Boylston Street
Boston MA 02116



form # 164

Town Harvard

Place outlying

Address

310 Ayer Road

Historic Name

Park Farm

Use: Present residence
Original farm

Date of construction ca. 1860?

Source appearence

Style Victorian Eclectic

Form end house

Architect N/A

Exterior Material:

Roof slate
Wall/trim clapboard
Foundation granite

Outbuildings barn,chick.coop
See rear of form for detailed description

Alterations ell
See rear of form for detailed description

Condition good

Moved no

Acreage 3.82 acres

Setting rural
See rear of form for detailed description

Recorded by: Dempsey & FitzPatrick

Organization: Harvard Historical Commission

Date: March 1994

RECEIVED
JUN 15 1994
MASS. HIST. COMM.

HRV.164

BUILDING FORM 310 Ayer Road, Outlying

ARCHITECTURAL DESCRIPTION x **see continuation sheet**

The Park Farm is located on the east side of Ayer Road, in the northern section of Harvard, historically referred to as the "Old Mill district." The farm consists of a two-and-a-half-story end house, a two-story rear gabled ell, and an attached gable-roofed carriage house. The clapboard-sheathed end house dates to the 1860s and measures three bays in width and two piles in depth. A recessed side-passage entry is located in the left bay of the facade; the center and right bays contain closely-spaced windows. A single window appears above the entry and the wide tympanum accommodates two windows. The left lateral wall faces north and is minimally lit; the second-story contains a single window in the first pile and two closely-spaced windows in the rear pile; the first-story has a single window in the rear pile. In contrast, each pile along the right lateral wall was originally lit with two closely-spaced windows. Window treatment consists of shuttered 6/6 sash windows across the left lateral wall, in the tympanum, and in the second-story of both the facade and the right lateral wall. The first-story of the facade and right lateral wall are lit with shuttered 2/1 sash windows. The house exhibits a Greek Revival aesthetic, as seen by: the wide band of trim which creates the facade's triangular pediment; the plain corner boards; the doorway's side lights; and the moulded cornice. A Victorian-era porch, with ornate bracketed posts, fronts the facade and right lateral wall. In the 1920s a single-story, shed-roofed bay was added to the rear pile of the right lateral wall. This addition is lit with a ribbon of triple-hung sash windows.

HISTORICAL NARRATIVE

Originally encompassing 70 acres, this farm was one of several 19th-century poultry farms located in the northern section of Harvard. The farm was owned by John Park in the 1830s. Park moderated the 1821 meeting to create the First Congregational Church of Harvard. He served as an assessor from 1834 to '36. The 1857 Walling Map indicates that the property was acquired by the Bacon Family. John Willard Bacon owned several farms in this northern section of Harvard; he also operated a glue factory on the Cold Spring Brook which was destroyed by fire in 1888. This farm passed from Bacon ownership to C. Rockwood, circa 1870. In the 1890s, the property was used as a summer inn by its new owner George Maynard. Savage reported, "For a number of years Mr. and Mrs. Maynard catered to a high class of summer boarders, she being a most desirable hostess" (Savage, 1924:40).

REFERENCES

Nourse, *History of Harvard*, 1894.
Savage, *Memoirs of Old Harvard Days*, 1924.
Holman, *Map of Harvard*, 1831.
Beers, *Atlas of Worcester County*, 1870.
Richards, *Atlas of Worcester County*, 1898.
Walling, *Map of Worcester County*, 1857.

___Recommended for listing in the National Register of Historic Places.

HRV.164

INVENTORY FORM CONTINUATION SHEET | Community: Harvard | Property Address: 310 Ayer Road, Outlying

Massachusetts Historical Commission
80 Boylston Street
Boston, Massachusetts 02116

ARCHITECTURAL DESCRIPTION (continued)

A late-19th-century photo of this property reveals a connected-farm structure; the end house's image is nearly identical to its current appearance. A 1921 fire destroyed the farm's large English barn and back house; the rear ell required renovations which resulted in its current appearance. Both the photo and a discussion with the current owner suggest that the ell pre-dated the end house. The one-and-a-half-story, center-chimney ell measured four bays in width; it was sited perpendicular to the road, its facade facing north. According to the current owner, the ell's original soap-stone hearths survived the fire. The renovated ell retains its original size and height, although the gable roof was broadened. Its left lateral wall contains an off-center entry with a braced door hood and is lit with shuttered 6/6 sash windows. The ell's right lateral wall is fenestrated with 2/1 sash and two modern polygonal bay windows project from the third and fourth bay of the first-story. A granite step, a remnant of the original residence, is situated beneath these bay windows. The attached rear carriage house was constructed following the fire. Two hinged batten barn doors mark its left lateral wall; the right lateral wall contains a recessed entry and two hinged barn doors. Knee-wall windows light the carriage house's right lateral wall.

The house is fronted by a manicured lawn and a circular drive is situated to the right. A dry laid stone wall, interrupted in front of the house, segregates the lateral lawns from the road. A New England barn, constructed in 1986, stands to the right and rear of house. A long and low, gable-roofed chicken coop is situated to the right of the house. This circa-1920 coop, sheathed in vertical siding, has a 200 chicken capacity. A path leads to the wooded area and small pond at the rear of the property.

HRV.164

Massachusetts Historical Commission
80 Boylston Street
Boston, Massachusetts 02116

Community **Harvard**

Property Address **310 Ayer Road**

Area

Form # **164**

National Register of Historic Places Criteria Statement Form

Check all that apply:

_X_ Individually eligible.
__ Contributing to a potential district.
__ Eligible only in a historic district.
__ Potential historic district.

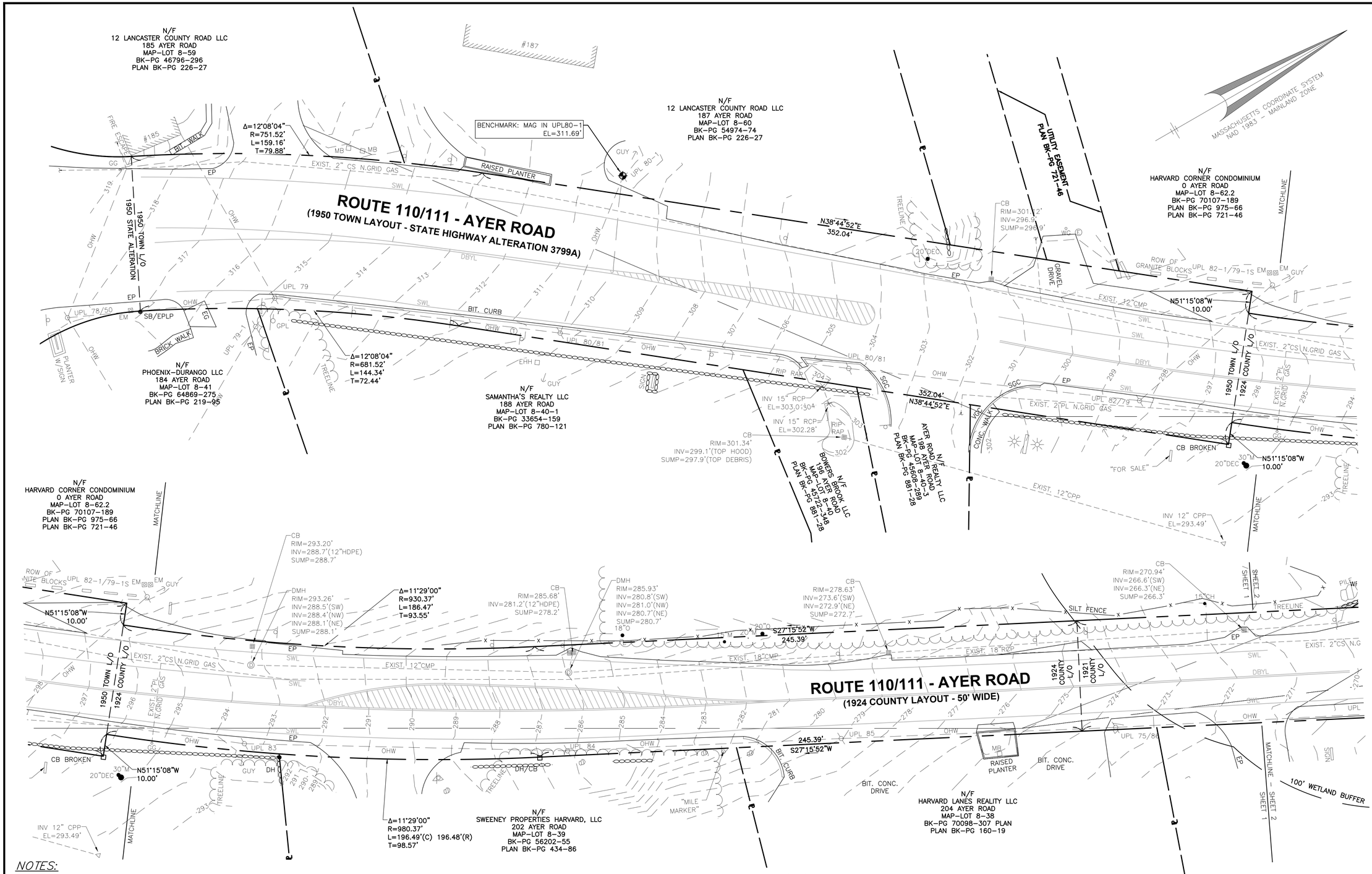
Criteria: _X_ A ___ B _X_ C ___ D

Criteria Considerations: __ A __ B __ C __ D __ E __ F __ G

Statement of Significance by **Claire W. Dempsey**.

The Park Farm is a well-preserved farmstead that retains its agricultural outbuildings and a small portion of its surrounding farm land. The farm was established as a poultry farm in the middle of the of the 19th century and was later well-known as a summer boarding house. The house is an ample end house, with a rear ell which may pre-date the remainder, one of a group of houses that testify to the area's continued prosperity in the mid-19th century. The Park Farm meets criteria A and C at the local level. It retains integrity of location, setting, design, materials, workmanship, feeling, and association.

CONSTRUCTION PLANS



NOTES:

1) THE HORIZONTAL DATUM FOR THIS SURVEY IS THE MASSACHUSETTS COORDINATE SYSTEM, NAD 1983, MAINLAND ZONE. SAID HORIZONTAL DATUM WAS ESTABLISHED VIA GPS OBSERVATIONS UTILIZING REALIZATION NAD83(2011) AND GEOID 12A.

2) THE PROJECT SOURCE BENCHMARKS ARE MASSACHUSETTS GEODETIC SURVEY (MAGS) POINT ID'S 18370 (STATION 6640) AND 18371 (STATION 6641). SAID BENCHMARKS ARE BRASS RIVETS IN LEDGE, AND ARE SHOWN AS BENCHMARKS ON THIS PLAN. THE ELEVATION OF SAID BENCHMARKS ARE 278.26' AND 284.80', RESPECTFULLY, AND ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ELEVATIONS SHOWN HEREON REFER TO SAID NAVD88.

3) UNDERGROUND UTILITIES ARE SHOWN HEREON FROM FIELD LOCATIONS OF SURFACE VISIBLE STRUCTURES AND FROM AVAILABLE RECORD INFORMATION ON FILE AT THE TOWN OF HARVARD PUBLIC WORKS AND PRIVATE UTILITY COMPANIES. OTHER UNDERGROUND UTILITIES MAY EXIST. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATION, SIZE & ELEVATION OF ALL UTILITIES WITHIN THE AREA OF PROPOSED WORK AND TO CONTACT "DIG-SAFE" AT 811 AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION, DEMOLITION OR CONSTRUCTION.

4) THE LIMIT OF BORDERING VEGETATED WETLANDS SHOWN HEREON WAS DELINEATED BY RIMMER ENVIRONMENTAL CONSULTING, LLC AND LOCATED VIA FIELD SURVEY BY HANCOCK ASSOCIATES.

5) THIS PLAN IS THE RESULT OF AN ON-THE-GROUND INSTRUMENT SURVEY PERFORMED BY HANCOCK ASSOCIATES IN JULY AND AUGUST OF 2019, AND APRIL, 2024.

6) THE HARVARD/AYER TOWN LINE IS SHOWN APPROXIMATELY HEREON FROM THE MASSACHUSETTS BUREAU OF GEOGRAPHIC INFORMATION (MASSGIS).

7) ABUTTING PROPERTY LINES HAVE BEEN COMPILED FROM RECORD INFORMATION.

REFERENCES:

1921 WORCESTER COUNTY LAYOUT OF AYER ROAD
1924 WORCESTER COUNTY LAYOUT OF AYER ROAD
1942 WORCESTER COUNTY LAYOUT OF OLD MILL ROAD
1950 STATE HIGHWAY ALTERATION NO. 3799A
1935 MIDDLESEX COUNTY LAYOUT OF EAST MAIN STREET AND HARVARD ROAD

SCALE: 1" = 20'

0 20 40 80

SITE ADDRESS:

ROUTE 110/111 (AYER ROAD)

Harvard, Massachusetts

PREPARED FOR:

TEC, INC.

282 Merrimack Street, 2nd Floor
Lawrence, Massachusetts 01843

HANCOCK ASSOCIATES

Civil Engineers

Land Surveyors

Wetland Scientists

34 CHELMSFORD ST., CHELMSFORD, MA 01824
VOICE (978) 244-0110, FAX (978) 244-1133
WWW.HANCOCKASSOCIATES.COM

COMMONWEALTH OF MASSACHUSETTS
JASON A. ELLIS
No. 49052
REGISTERED LAND SURVEYOR

NO.	BY	APP	DATE	ISSUE/REVISION DESCRIPTION
4	JML	JAE	11/5/24	ADD'L WETLANDS (G SERIES)
3	JML	JAE	4/26/24	TOPO./ABUTTER UPDATES
2	JSJ	GGG	9/9/20	SHEET 1 LAYOUT INFORMATION
1	JSJ	GGG	12/11/19	TEC COMMENTS/UTIL UPDATES

DATE: 8/30/19 DRAWN BY: JSJ
SCALE: 1" = 20' CHECK BY: GGG

EXISTING CONDITIONS PLAN OF LAND IN HARVARD, MASSACHUSETTS

PLOT DATE: Nov 13, 2024 1:42 pm
PATH: G:\Users\JEVAS-1\AppData\Local\Temp\AcPublish_28368\

DWG: 22634sv-24.dwg
LAYOUT: EC1
SHEET: 1 OF 11
PROJECT NO.: 22634

MASSACHUSETTS COORDINATE SYSTEM
NAD 1983 - MAINLAND ZONE

MATCHLINE - SHEET 3
SHEET 2

N/F
INHABITANTS OF THE TOWN OF HARVARD
0 LANCASTER COUNTY ROAD
MAP-LOT 8-62.4
BK-PG 21051-25
PLAN BK-PG 721-46

GEBO LANE
(PUBLIC - VARIABLE WIDTH)

N/F
APIF - MASSACHUSETTS, LLC
215 AYER ROAD
MAP-LOT 8-61
BK-PG 65530-161
PLAN BK-PG 299-81
PLAN BK-PG 365-118

N/F
HARVARD CORNER CONDOMINIUM
0 AYER ROAD
MAP-LOT 8-62.2
BK-PG 70107-189
PLAN BK-PG 975-66
PLAN BK-PG 721-46

ROUTE 110/111 - AYER ROAD
(1921 COUNTY LAYOUT - 50' WIDE)

N/F
206 AYER ROAD CONDOMINIUM ASSOCIATES
206 AYER ROAD
MAP-LOT 8-37
BK-PG 11540-1
PLAN BK-PG 434-70

N/F
INHABITANTS OF THE TOWN OF HARVARD
204 AYER ROAD
MAP-LOT 8-36
BK-PG 6223-264
PLAN BK-PG 434-86

BENCHMARK: NAIL UPL71/105-5
EL=257.20'

100' WETLAND BUFFER

200' RIVERFRONT AREA

SCALE: 1" = 20'
0 20 40 80

SITE ADDRESS:

ROUTE 110/111 (AYER ROAD)

Harvard, Massachusetts

PREPARED FOR:

TEC, INC.

282 Merrimack Street, 2nd Floor
Lawrence, Massachusetts 01843

HANCOCK ASSOCIATES

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Land Surveyors

Wetland Scientists

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JASON A. ELLIS
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2	JML	JAE	4/26/24	TOPO./ABUTTER UPDATES
1	JSJ	GGG	12/11/19	TEC COMMENTS/UTIL UPDATES

DATE: 8/30/19 DRAWN BY: JSJ
SCALE: 1" = 20' CHECK BY: GGG

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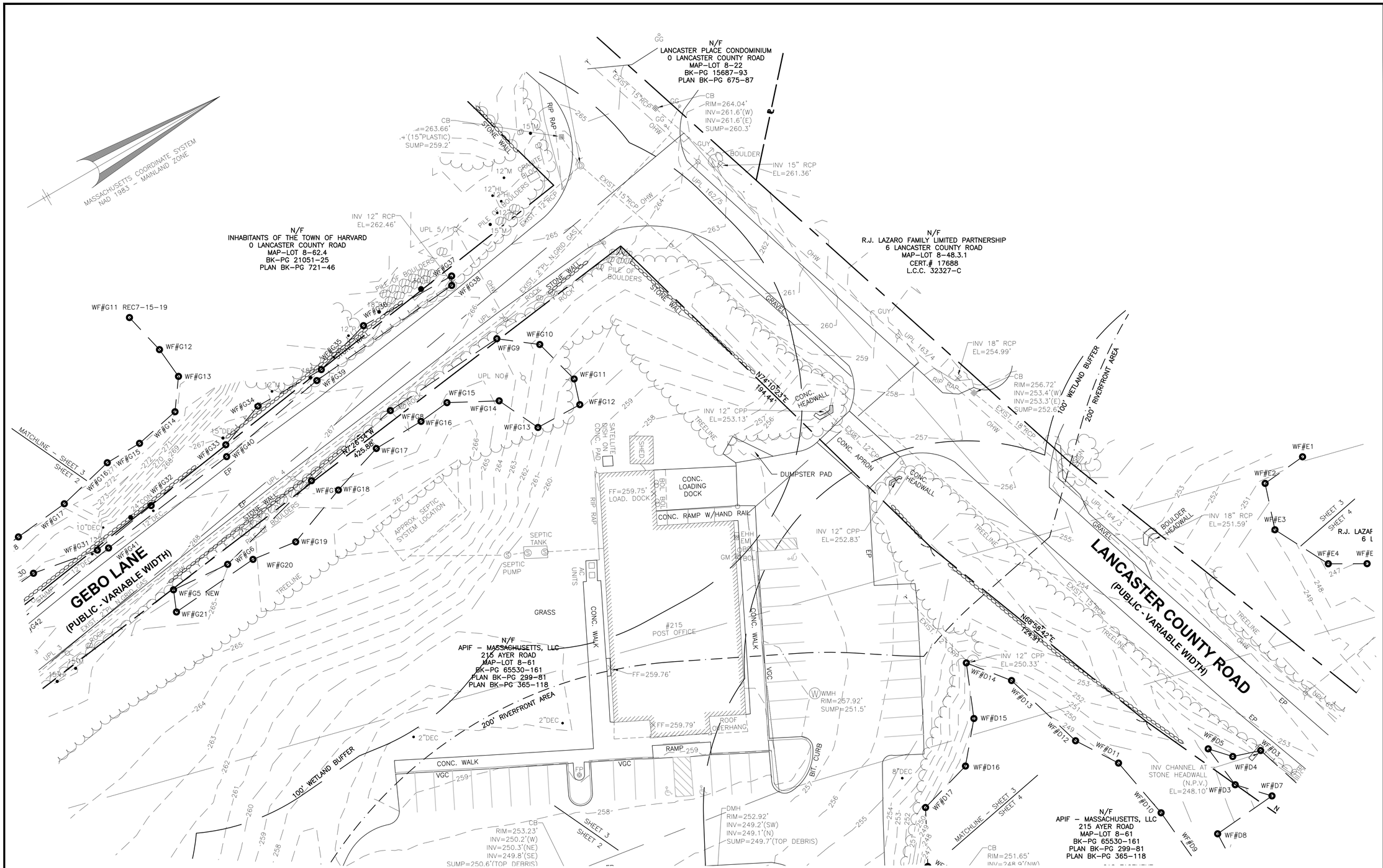
PLOT DATE: Nov 13, 2024 1:42 pm
PATH: C:\Users\JEVANS-1\AppData\Local\Temp\AcPublish_28368\

DWG: 22634sv-24.dwg
LAYOUT: EC2
SHEET: 2 OF 11
PROJECT NO.: 22634



SITE ADDRESS:

ROUTE 110/111 (AYER ROAD)

Harvard, Massachusetts

PREPARED FOR:

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DATE: 8/30/19 DRAWN BY: JSJ
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PLOT DATE: Nov 13, 2024 11:42 pm
PATH: C:\Users\JEVAS~1\AppData\Local\Temp\AcPublish_28368\

DWG: 22634sv-24.dwg
LAYOUT: EC3
SHEET: 3 OF 11
PROJECT NO.: 22634

MASSACHUSETTS COORDINATE SYSTEM
NAD 1983 - MAINLAND ZONE

LANCASTER COUNTY ROAD
(PUBLIC - VARIABLE WIDTH)

ROUTE 110/111 - AYER ROAD
(1921 COUNTY LAYOUT - 50' WIDE)

POOR FARM ROAD
(PUBLIC - VARIABLE WIDTH)

"BOWERS BROOK"

N/F
PIF - MASSACHUSETTS, LLC
215 AYER ROAD
MAP-LOT 8-61
BK-PG 65530-161
PLAN BK-PG 299-81
PLAN BK-PG 365-118

#215
POST OFFICE

200' RIVERFRONT AREA

100' WETLAND BUFFER

N/F
APIF - MASSACHUSETTS, LLC
215 AYER ROAD
MAP-LOT 8-61
BK-PG 65530-161
PLAN BK-PG 299-81
PLAN BK-PG 365-118

GAS EASEMENT
DEED BOOK 4726, PAGE 527
PLAN BOOK 305, PLAN 118

N/F
R.J. LAZARO FAMILY LIMITED PARTNERSHIP
6 LANCASTER COUNTY ROAD
MAP-LOT 8-48.3.1
CERT.# 17688
L.C.C. 32327-C

N/F
TOWN OF HARVARD
(CONSERVATION COMMISSION)
0 LANCASTER COUNTY ROAD
MAP-LOT 4-48.3.4
CERT.# 11358
L.C.C. 32327-C

N/F
LAURA A. CLARAGE
129 POOR FARM ROAD
MAP-LOT 8-35
BK-PG 64304-359

N65°58'42"E 124.97'

N65°19'22"E 98.82'

N62°55'42"E 64.15'

S27°15'52"W 1037.38'

Δ=14°52'00"
R=691.78'
L=179.50'
T=90.26'

Δ=14°52'00"
R=741.78'
L=192.47'
T=96.78'

SCALE: 1" = 20'
0 20 40 80

SITE ADDRESS:

ROUTE 110/111
(AYER ROAD)

Harvard, Massachusetts

PREPARED FOR:

TEC,
INC.

282 Merrimack Street, 2nd Floor
Lawrence, Massachusetts 01843

HANCOCK
ASSOCIATES

Civil Engineers

Land Surveyors

Wetland Scientists

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JASON A. ELLIS
No. 49052
REGISTERED PROFESSIONAL LAND SURVEYOR

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SCALE: 1" = 20' CHECK BY: GGG

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PLOT DATE: Nov 13, 2024 1:42 pm
PATH: G:\Users\JEVAS-1\AppData\Local\Temp\AcPublish_28368\

DWG: 22634sv-24.dwg
LAYOUT: EC4
SHEET: 4 OF 11
PROJECT NO.: 22634

MASSACHUSETTS COORDINATE SYSTEM
NAD 1983 - MAINLAND ZONE

BENCHMARK: RIVET IN LEDGE (STATION 6640)
EL=278.26'

ROUTE 110/111 - AYER ROAD
(1921 COUNTY LAYOUT - 50' WIDE)

POOR FARM ROAD
(PUBLIC - VARIABLE WIDTH)

SOUTH SHAKER ROAD
(PUBLIC - VARIABLE WIDTH)

N/F
SCHOOL HOUSE 1870 TRUST
231 AYER ROAD
MAP-LOT 4-48.2
CERT.# 17941
L.C.C. 32327-B

N/F
TOWN OF HARVARD
(CONSERVATION COMMISSION)
0 LANCASTER COUNTY ROAD
MAP-LOT 4-48.3.4
CERT.# 11358
L.C.C. 32327-C

N/F
BRYAN & REBECCA KELLEY
204 AYER ROAD
MAP-LOT 8-23
BK-PG 57957-89

N/F
ROBERT A. & JANET N. WILLIAMS
206 AYER ROAD
MAP-LOT 4-47
BK-PG 6101-81
PLAN BK-PG 347-77

N/F
DAVID M. & MARTIN D. POUTRY
242 AYER ROAD
MAP-LOT 4-46
BK-PG 27509-388
PLAN BK-PG 246-69

N/F
BLANCHARD HOUSE OFFICE PARK CONDOMINIUM
249 AYER ROAD
MAP-LOT 4-49-1
BK-PG 11133-350
PLAN BK-PG 592-115

N/F
JEFFERY P. & ALEXANDRA H. MCKEARNEY
132 POOR FARM ROAD
MAP-LOT 8-24
BK-PG 67692-264
PLAN BK-PG 772-113

N/F
SHAKER PLACE OFFICES, LLC
233 AYER ROAD
MAP-LOT 4-48-1
BK-PG 34484-146
PLAN BK-PG 548-46

N/F
HARVARD CONSERVATION TRUST
AYER ROAD
MAP-LOT 5-70
BK-PG 64099-20

Δ=15°12'00"
R=453.34'
L=120.27'
T=60.49'

Δ=15°12'00"
R=503.34'
L=133.53'
T=67.16'

973.23'
S12°23'52"W

MATCHLINE - SHEET 4
SHEET 5

MATCHLINE - SHEET 6
SHEET 5

SHEET 4
SHEET 5

SHEET 6
SHEET 5

SCALE: 1" = 20'
0 20 40 80

SITE ADDRESS:

ROUTE 110/111 (AYER ROAD)

Harvard, Massachusetts

PREPARED FOR:

TEC, INC.

282 Merrimack Street, 2nd Floor
Lawrence, Massachusetts 01843

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EXISTING CONDITIONS PLAN OF LAND IN HARVARD, MASSACHUSETTS

PLOT DATE: Nov 13, 2024 11:43 am
PATH: C:\Users\JELLIS-1\AppData\Local\Temp\AcPublish_28368\

DWG: 22634sv-24.dwg
LAYOUT: EC5
SHEET: 5 OF 11
PROJECT NO.: 22634

MASSACHUSETTS COORDINATE SYSTEM
NAD 1983 - MAINLAND ZONE

MATCHLINE

ROUTE 110/111 - AYER ROAD
(1921 COUNTY LAYOUT - 50' WIDE)

OLD MILL ROAD
(1942 COUNTY LAYOUT - WIDTH VARIES)

N/F
OFFICE AT 257 AYER RD, LLC
257 AYER ROAD
MAP-LOT 4-49-LOT 2-UNIT 2
BK-PG 64619-93
PLAN BK-PG 659-120

N/F
FOXGLOVE HOUSING ASSOCIATES LIMITED PARTNERSHIP
257 AYER ROAD UNIT 1
MAP-LOT 4-49-LOT 2-UNIT 1
BK-PG 14748-25
PLAN BK-PG 659-120
LAND COURT #10646
CERT. #32327-B
L.C.C. #32327-B

N/F
256 AYER ROAD, LLC
256 AYER ROAD
MAP-LOT 4-41
BK-PG 59556-235
PLAN BK-PG 281-117

N/F
RDJ REALTY COMPANY
285 AYER ROAD
MAP-LOT 4-25
BK-PG 31418-201
PLAN BK-PG 335-6

N/F
HARVARD CONSERVATION TRUST
AYER ROAD
MAP-LOT 5-70
BK-PG 64099-20

N/F
REM REALTY TRUST
AYER ROAD
MAP-LOT 4-52-2
BK-PG 56380-389

N/F
WELCH COMMERCIAL ENTERPRISES, INC.
259 AYER ROAD
MAP-LOT 4-51
BK-PG 50547-7
PLAN BK-PG 462-72

N/F
THREE SEASONS TREESCAPE, LLC
264 AYER ROAD
MAP-LOT 4-39
BK-PG 64293-91
PLAN BK-PG 379-10-11

N/F
DMP REALTY, LLC
262 AYER ROAD
MAP-LOT 4-40
BK-PG 61126-124

INV 18" CPP
EL=285.98'

INV 18" CPP
EL=286.59'

INV 12" PLASTIC(TOP PIPE-DEBRIS)
EL=287.15'

INV 12" PLASTIC
EL=286.91'

EXIST. 18"CPP

EXIST. 12"PLASTIC

REC. VERIZON TELEPHONE

EXIST. 8"PL N.GRID GAS

EXIST. 2"CS N.GRID GAS

489.91'
S2°48'06"E

S17°56'52"W
111.76'

100.99'

Δ=14°45'00"
R=598.69'
L=154.12'
T=77.49'

Δ=15°12'00"
R=503.34'
L=133.53'
T=67.16'

Δ=14°45'00"
R=548.69'
L=141.25'(C) 141.26'(R)
T=71.02'

"NO ACCESS TO DEVENS"
"NO ACCESS TO DEVENS"

"ENTER"
"EXIT"

"THREE SEASONS LANDSCAPE"
LANDSCAPED AREA
LANDSCAPED AREA
GROUND LIGHT

RAISED PLANTER W/SIGN
STONE RET.WALL
STONE WALL
CB BROKEN/LEANING
6" TRIANGLE POST
CONC. POST
RIP RAP
LEDGE
BOULDER
#249
#256

SHEET 6
SHEET 5
MATCHLINE - SHEET 6
SHEET 5
MATCHLINE - SHEET 7
SHEET 6
SHEET 6
SHEET 7

SCALE: 1" = 20'
0 20 40 80

SITE ADDRESS:

ROUTE 110/111 (AYER ROAD)

Harvard, Massachusetts

PREPARED FOR:

TEC, INC.

282 Merrimack Street, 2nd Floor
Lawrence, Massachusetts 01843

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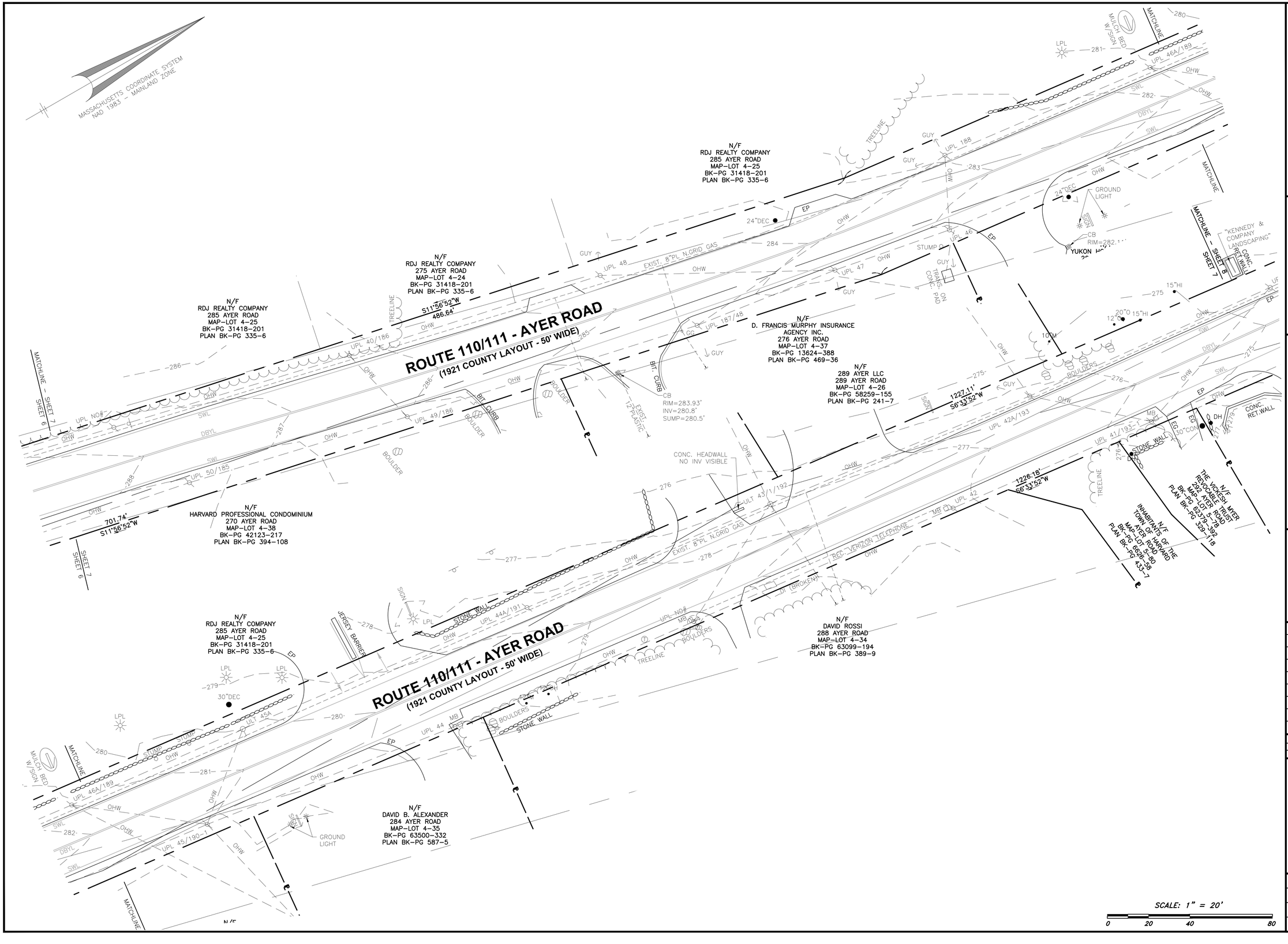
SCALE: 1" = 20' CHECK BY: GGG

EXISTING CONDITIONS PLAN OF LAND IN HARVARD, MASSACHUSETTS

PLOT DATE: Nov 13, 2024 11:43 pm
PATH: C:\Users\JELLIS-1\AppData\Local\Temp\AcPublish_28368\

DWG: 22634sv-24.dwg
LAYOUT: EC6
SHEET: 6 OF 11
PROJECT NO.: 22634



SITE ADDRESS:

ROUTE 110/111 (AYER ROAD)

Harvard, Massachusetts

PREPARED FOR:

TEC, INC.

282 Merrimack Street, 2nd Floor
Lawrence, Massachusetts 01843

HANCOCK ASSOCIATES

Civil Engineers

Land Surveyors

Wetland Scientists

34 CHELMSFORD ST., CHELMSFORD, MA 01824
VOICE (978) 244-0110, FAX (978) 244-1133
WWW.HANCOCKASSOCIATES.COM

JASON A. ELLIS No. 49052 REGISTERED PROFESSIONAL LAND SURVEYOR COMMONWEALTH OF MASSACHUSETTS

NO.	BY	APP	DATE	ISSUE/REVISION DESCRIPTION
4	JML	JAE	11/5/24	ADD'L WETLANDS (G SERIES)
2	JML	JAE	4/26/24	TOPO./ABUTTER UPDATES
1	JSJ	GGG	12/11/19	TEC COMMENTS/UTIL UPDATES

DATE: 8/30/19 DRAWN BY: JSJ
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PLOT DATE: Nov 13, 2024 1:43 pm
PATH: G:\Users\JEVAS-1\AppData\Local\Temp\AcPublish_28368\

DWG: 22634sv-24.dwg
LAYOUT: EC7
SHEET: 7 OF 11
PROJECT NO.: 22634

MASSACHUSETTS COORDINATE SYSTEM
NAD 1983 - MAINLAND ZONE

ROUTE 110/111 - AYER ROAD
(1921 COUNTY LAYOUT - 50' WIDE)

N/F
BERWIND BROTHERS LLC
AYER ROAD
MAP-LOT 4-28
BK-PG 42857-287
PLAN BK-PG 357-100

N/F
STEVEN & CAROLYN H. FADER
304 AYER ROAD
MAP-LOT 4-32-1
BK-PG 54408-186

N/F
AYER ROAD, LLC
294 AYER ROAD
MAP-LOT 4-33
BK-PG 52481-269

N/F
FEDERICO RAFFA & MELISA L. CUNNINGHAM
313 AYER ROAD
MAP-LOT 4-30
BK-PG 50759-247
PLAN BK-PG 383-64

N/F
LDPL, LLC
327 AYER ROAD
MAP-LOT 1-2
BK-PG 45146-305

N/F
DRB ACRES, LLC
307 AYER ROAD
MAP-LOT 4-29
BK-PG 52809-26
PLAN BK-PG 357-100

N/F
AYER ROAD PROPERTY OWNER, LLC
320 AYER ROAD
MAP-LOT 2-74
BK-PG 66687-230
PLAN BK-PG 37-16
PLAN BK-PG 550-61

N/F
JOHN J. & MARISA D. IACOMINI
310 AYER ROAD
MAP-LOT 4-31
BK-PG 59087-319
PLAN BK-PG 424-96

N/F
MCCARTHY REALTY TRUST
306 AYER ROAD
MAP-LOT 5-79
BK-PG 18243-138
PLAN BK-PG 302-23

BENCHMARK: MAG IN UPL 33
EL=283.12'

SCALE: 1" = 20'
0 20 40 80

SITE ADDRESS:

ROUTE 110/111 (AYER ROAD)

Harvard, Massachusetts

PREPARED FOR:

TEC, INC.

282 Merrimack Street, 2nd Floor
Lawrence, Massachusetts 01843

HANCOCK ASSOCIATES

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Land Surveyors

Wetland Scientists

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COMMONWEALTH OF MASSACHUSETTS
JASON A. ELLIS
No. 49052
PROFESSIONAL LAND SURVEYOR

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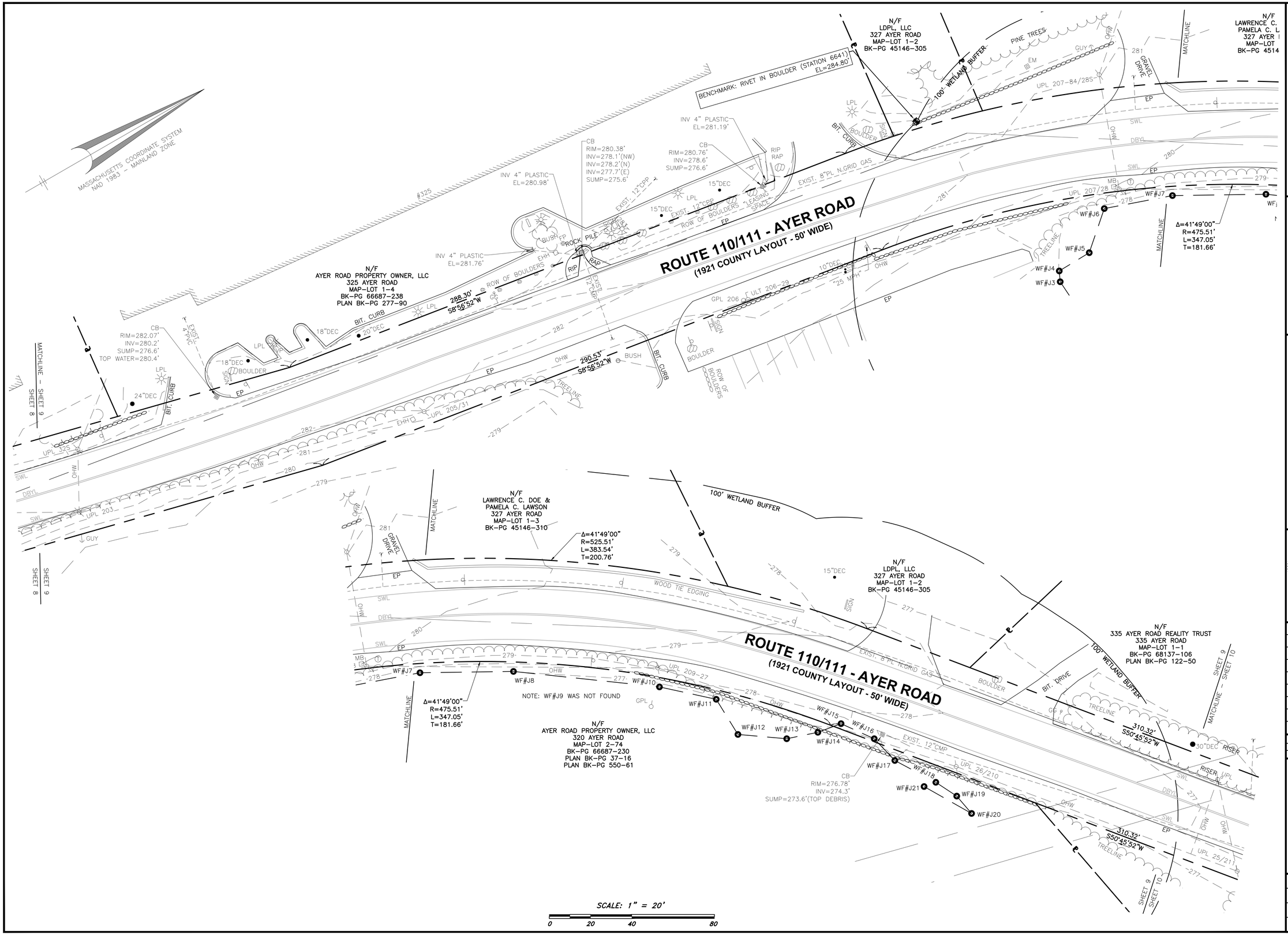
DATE: 8/30/19
SCALE: 1" = 20'
DRAWN BY: JSJ
CHECK BY: GGG

EXISTING CONDITIONS PLAN OF LAND IN HARVARD, MASSACHUSETTS

PLOT DATE: Nov 13, 2024 1:43 pm
PATH: C:\Users\LEEVAS~1\AppData\Local\Temp\AcPublish_28368\

DWG: 22634sv-24.dwg
LAYOUT: EC8
SHEET: 8 OF 11
PROJECT NO.: 22634



SITE ADDRESS:

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Harvard, Massachusetts

PREPARED FOR:

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DWG: 22634sv-24.dwg
LAYOUT: EC9
SHEET: 9 OF 11
PROJECT NO.: 22634

MATCHLINE
30"DEC RISER
RISER
UPL
BIT. CONC. DRIVE
6' STOCKADE
N/F
CARMELO HOLDINGS, LLC
341 AYER ROAD
MAP-LOT 2-1
BK-PG 65800-126
#341
MASSACHUSETTS COORDINATE SYSTEM
NAD 1983 - MAINLAND ZONE
N/F
KATHLEEN M. DECOT
343 AYER ROAD
MAP-LOT 2-2
BK-PG 50213-223
PLAN BK-PG 122-50
N/F
GEOFFREY O. & JENNIFER K. GILLARD
345 AYER ROAD
MAP-LOT 2-3
BK-PG 57294-103
PLAN BK-PG 122-50
44"X24"X36" STONE POST
GRAVEL DRIVE
ROW OF BOULDERS
HEDGE
SWL
DBYL
OHW
EP
UPL 25/211
MB
277
SHEET 9
SHEET 10
TREELINE
EXIST. 8"PL N.GRID GAS
GG
S/M WALL
Δ=37°22'00"
R=475.51'
L=310.12'
T=160.80'
LEDGE
GUY
3' WOOD
UPL 213
UPL 214
UPL 215
EXIST. 12"CMP
UPL 24/212
UPL 22
UPL 23
UPL 21
EG
EXIST. 4"PVC
STUMP
8"DEC
CB
RIM=270.47'
INV=265.3'(SW)
INV=266.4'(S)
INV=263.9'(NE)
SUMP=263.5'
DH
N/F
FRANK, JR. & BARBARA S. HEIM
346 AYER ROAD
MAP-LOT 2-11
BK-PG 4971-277
PLAN BK-PG 329-92
N/F
JAMES R. & SIBLEY A. HANNIGAN
6 MYRICK LANE
MAP-LOT 2-73
BK-PG 6485-19
PLAN BK-PG 351-116
CB
RIM=274.66'
INV=270.6'(SW)
INV=270.5'(NE)
SUMP=269.8'
CB
S82°48'09"W
37.21'
DH/CB
24"C
Δ=37°22'00"
R=525.51'
L=342.73'(C) 342.74'(R)
T=177.71'
N19°36'47"W
36.40'
N/F
KATIE ELIZABETH & NATHAN J. BERG
344 AYER ROAD
MAP-LOT 2-12
BK-PG 59619-196
PLAN BK-PG 393-112
SHEET 11
SHEET 10
36"DEC
LP
BIT. CONC. DRIVE
S0°47'08"E
583.28'
GRAVEL
N/F
TOWN OF HARVARD
MAP-LOT 2-7-3
BK-PG 5297-435
PLAN BK-PG 349-42
ELECTRIC VAULT
N/F
ROBERT J., JR. & YULING L. DIPIETRO
355 AYER ROAD
MAP-LOT 2-6
BK-PG 23343-164
PLAN BK-PG 122-50
DMH
RIM=259.84'
INV=254.2'(SE)
INV=254.0'(S)
INV=254.0'(SW)
INV=254.0'(NE)
SUMP=254.0'36"CON
12"CON
40"DEC
HEDGE
CB
RIM=260.09'
INV=255.1'
SUMP=255.1'
32"CON
CB
N/F
YELLOW BOOTS REALTY TRUST
351 AYER ROAD
MAP-LOT 2-5
BK-PG 64062-141
PLAN BK-PG 122-50
Δ=14°11'00"
R=691.78'
L=171.25'
T=86.06'
EXIST. 12"RCP
EXIST. 12"BCP
BOULDER
BIT. BINDER
MC
CB/EPLP
36"DEC
24"CON
BENCHMARK: CB/EPLP TOP CENTER
EL=261.38'
CB
RIM=259.84'
INV=254.3'(12"RCP)
SUMP=254.3'(TOP DEBRIS)
N/F
WILSON NOMINEE TRUST
0 AYER ROAD
MAP-LOT 2-8-1
BK-PG 61239-194
PLAN BK-PG 143-89
LIMIT OF CONSTRUCTION
MATCHLINE - SHEET 11
SHEET 10
#349
N/F
CHRISTOPHER & ELIZABETH HORNE
349 AYER ROAD
MAP-LOT 2-4
BK-PG 56424-146
PLAN BK-PG 122-50
STONE WALL
GRAVEL DRIVE
DMH
RIM=265.01'
INV=259.2'(SE-12"RCP)
INV=258.8'(SW)
INV=258.7'(N)
SUMP=259.0'(TOP DEBRIS)
EXIST. 8"PL N.GRID GAS
#345
N/F
GEOFFREY O. & JENNIFER K. GILLARD
345 AYER ROAD
MAP-LOT 2-3
BK-PG 57294-103
PLAN BK-PG 122-50
ROW OF BOULDERS
HEDGE
332.03'
S13°23'52"W
EXIST. 12"RCP
"WLF MARKER"
8"CON
12"CON
24"CON
GRASS
12X12X48" STONE POST
CB
RIM=265.01'
INV=260.1'(E)
INV=259.4'(NW-12"RCP)
SUMP=259.4'
N/F
LISA MCATEER
350 AYER ROAD
MAP-LOT 2-10
BK-PG 63929-220
N/F
GILLIAN D. PRICE & CHRISTOPHER KRUEGLER
354 AYER ROAD
MAP-LOT 2-9
BK-PG 32703-258
SCALE: 1" = 20'
0 20 40 80

SITE ADDRESS:

ROUTE 110/111 (AYER ROAD)

Harvard, Massachusetts

PREPARED FOR:

TEC, INC.

282 Merrimack Street, 2nd Floor
Lawrence, Massachusetts 01843

HANCOCK ASSOCIATES

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Land Surveyors

Wetland Scientists

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COMMONWEALTH OF MASSACHUSETTS
JASON A. ELLIS
No. 40052
PROFESSIONAL LAND SURVEYOR

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EXISTING CONDITIONS PLAN OF LAND IN HARVARD, MASSACHUSETTS

PLOT DATE: Nov 13, 2024 1:44 pm
PATH: C:\Users\JEVANS-T\AppData\Local\Temp\AcPublish_28368\

DWG: 22634sv-24.dwg
LAYOUT: EC10
SHEET: 10 OF 11
PROJECT NO.: 22634

MASSACHUSETTS COORDINATE SYSTEM
NAD 1983 - MAINLAND ZONE

N/F
CRAFTSMAN VILLAGE–HARVARD, LLC
5 BALDWIN COURT
MAP–LOT 2–7–1
BK–PG 67486–268
PLAN BK–PG 912–50

N/F
CRAFTSMAN VILLAGE–HARVARD, LLC
BALDWIN COURT
MAP–LOT 2–7–1
BK–PG 67486–268
PLAN BK–PG 912–50

ROUTE 110/111 - AYER ROAD
(1921 COUNTY LAYOUT - 50' WIDE)

ROUTE 110/111 - HARVARD ROAD
(1935 MIDDLESEX COUNTY LAYOUT - WIDTH VARIES)

N/F
JOHN E. SWANSON, III, &
LISA A.R. SHAW
361 AYER ROAD
MAP–LOT 2–7
BK–PG 60577–356
PLAN BK–PG 904–84

N/F
WILSON NOMINEE TRUST
AYER ROAD
MAP–LOT 2–8
BK–PG 62439–134
PLAN BK–PG 143–89

N/F
29 HARVARD ROAD, LLC.
29 HARVARD ROAD
MAP–LOT 35–22
BK–PG 71496–PAGE 87 (MIDDLESEX)

N/F
CRAFTSMAN VILLAGE–HARVARD, LLC
5 BALDWIN COURT
MAP–LOT 2–7–1
BK–PG 67486–268
PLAN BK–PG 912–50

N/F
MAXANT INDUSTRIES, INC.
28 HARVARD ROAD
MAP–LOT 35–53
BK–PG 12183–272 (MIDDLESEX)
PLAN NO. 273 OF 1972

N/F
WILSON NOMINEE TRUST
AYER ROAD
MAP–LOT 2–8
BK–PG 62439–134
PLAN BK–PG 143–89

MATCHLINE
MATCHLINE SHEET 11
SHEET 10
SHEET 11
℄ LIMIT OF ℄
100' WETLAND BUFFER
NEW ENGLAND TELEPH
MIDDLESEX COUNTY
TOWN OF AYER (SEE NOTE 6)
TOWN OF HARVARD
WORCESTER COUNTY
1935 MIDDLESEX COUNTY L/O
1921 COUNTY L/O
"RIGHT TO FARM"
"BIKELANE"
"NO TRUCKS"
"STOP"
"25 MPH"
N2°25'02"E 252.14'
S5°30'12"W 269.64'
S0°47'06"E 580.45'
N5°41'52"E 267.91'
N5°41'52"E 258.24'
CONC. HEADWALL
GUARDRAIL
RIP RAP
STUMP
CANOPY
DHSB
DHCB
DMH RIM=249.82' *UNABLE TO OPEN*
CB RIM=250.09' INV=244.8'(12"RCP) SUMP=244.8'
DMH RIM=240.60'
DMH RIM=238.45'
INV 36" RCP EL=230.05'
INV 36" RCP EL=230.61'
WF#K1 WF#K2 WF#K3 WF#K4 WF#K5 WF#K6 WF#K7 WF#K8 WF#K9 WF#K10 WF#K11 WF#K12 WF#K13 WF#K14
DIRT
BIT. CONC. DRIVE
ROCK
EXIST. 8"D NATGRID GAS
EXIST. 8" PL NATGRID GAS
24"CON
20"CON
36"DEC
12"P
8"P
TREELINE
GUY
MW
VGC
VGL
OHW
EP
SWL
DBYL
UPL 10-1/2
UPL 11
UPL 12
UPL 13
UPL 14
UPL 220
UPL 222
UPL 223
UPL 224
UPL 225
UPL 226
UPL NO#
P.O.B.
CB
CONC. STRIP DRAIN
SCALE: 1" = 20'
0 20 40 80

SITE ADDRESS:

ROUTE 110/111 (AYER ROAD)

Harvard, Massachusetts

PREPARED FOR:

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DWG: 22634sv-24.dwg
LAYOUT: EC11
SHEET: 11 OF 11
PROJECT NO.: 22634

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	1	195
PROJECT FILE NO.	609213		

TITLE SHEET & INDEX

PLAN AND PROFILE OF

AYER ROAD (ROUTE 110/111)

IN THE TOWN OF

HARVARD

WORCESTER COUNTY

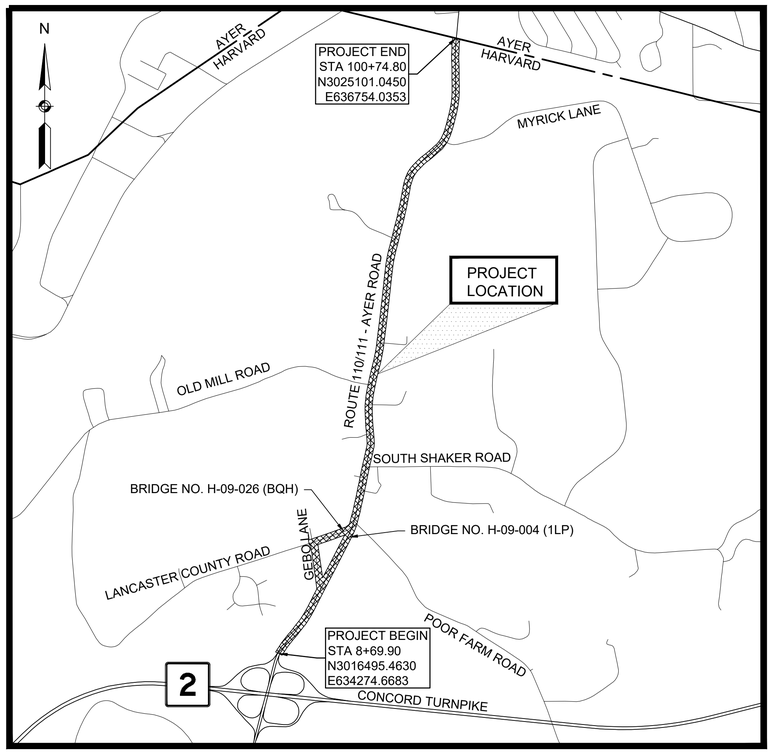
FEDERAL AID PROJECT NO.

100% SUBMITTAL

THESE PLANS ARE SUPPLEMENTED BY THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK.

INDEX

SHEET NO.	DESCRIPTION
1	TITLE SHEET & INDEX
2	LEGEND & ABBREVIATIONS
3	CONSTRUCTION NOTES
4	KEY PLAN
5-6	TYPICAL SECTIONS & PAVEMENT NOTES
7-23	CONSTRUCTION PLANS
24-34	PROFILES
35-51	CURB TIE AND GRADING PLANS
52-68	TRAFFIC SIGN & PAVEMENT MARKING PLANS
69	TRAFFIC SIGN SUMMARY
70-73	TEMPORARY TRAFFIC CONTROL PLANS
74-90	UTILITY PLANS
91-109	LANDSCAPE PLANS AND DETAILS
110-112	CONSTRUCTION DETAILS
113-114	PEDESTRIAN CURB RAMP DETAILS
115	DRIVEWAY DETAILS
116-195	CROSS SECTIONS



0 1000 2000 3000 4000

SCALE: 1' = 1000'

LENGTH OF PROJECT = 9,204.90 FEET = 1.743 MILES

DESIGN DESIGNATION (AYER ROAD)

DESIGN SPEED	45 MPH
ADT (2019)	14,227
ADT (2029)	17,173
K	8.1%
D	57.3% NB
T (PEAK HOUR)	2.9%
T (AVERAGE DAY)	3.6%
DHV	1397
DDHV	800
FUNCTIONAL CLASSIFICATION	URBAN ARTERIAL

DATE	DESCRIPTION	REV #
2/12/2025	100% SUBMITTAL	2
1/6/2023	75% SUBMITTAL	1
2/12/2021	25% SUBMITTAL	-

TEC The Engineering Corp
282 Merrimack St, 2nd Floor, Lawrence, MA 01843, 978-794-1792
311 Main Street, 2nd Floor, Worcester, MA 01608, 508-868-5104
169 Ocean Blvd, PO Box 249, Hampton, NH 03842, 603-601-8154
www.TheEngineeringCorp.com

massDOT Massachusetts Department of Transportation Highway Division

APPROVED

CHIEF ENGINEER **DATE**

609213_HD1(TITLE SHEET).DWG Plotted on 11-Feb-2025 4:47 PM

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
JB	JB	JERSEY BARRIER
CB	CB/GI	CATCH BASIN OR GUTTER INLET
	CBCI/GICI	CATCH BASIN OR GUTTER INLET W/ CURB INLET
FP	FP	FLAG POLE
GP	GP	GAS PUMP
MB	MB	MAIL BOX
		POST SQUARE
		POST CIRCULAR
WELL	WELL	WELL
EHH	EHH	ELECTRIC HANDHOLE
		FENCE GATE POST
GG	GG	GAS GATE
BHL #	BHL #	BORING HOLE
MW #	MW #	MONITORING WELL
TP #	TP #	TEST PIT
		HYDRANT
		LIGHT POLE
CO.BD.		COUNTY BOUND
		GPS POINT
		CABLE MANHOLE
		DRAINAGE MANHOLE
		ELECTRIC MANHOLE
		GAS MANHOLE
		MISC MANHOLE
		SEWER MANHOLE
		TELEPHONE MANHOLE
		WATER MANHOLE
MHB	MHB	MASSACHUSETTS HIGHWAY BOUND
MON		MONUMENT
SB		STONE BOUND
TB		TOWN OR CITY BOUND
		TRAVERSE OR TRIANGULATION STATION
		TREE PROTECTION
TPL or GUY	TPL or GUY	TROLLEY POLE OR GUY POLE
HTP		TRANSMISSION POLE
UFB	UFB	UTILITY POLE W/ FIREBOX
UPDL	UPDL	UTILITY POLE WITH DOUBLE LIGHT
ULT	ULT	UTILITY POLE W / 1 LIGHT
UPL	UPL	UTILITY POLE
		BUSH
SIZE & TYPE		TREE
		STUMP
		SWAMP / MARSH
WG	WG	WATER GATE
WSO	WSO	WATER SHUTOFF/CURB STOP
PM	PM	PARKING METER
		OVERHEAD CABLE/WIRE
		CURBING
99		CONTOURS (ON-THE-GROUND SURVEY DATA)
100 99		CONTOURS (PHOTOGRAMMETRIC DATA)
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)
		BALANCED STONE WALL
		GUARD RAIL - STEEL POSTS
		GUARD RAIL - WOOD POSTS
x	x	CHAIN LINK OR METAL FENCE
		WOOD FENCE
		SEDIMENT CONTROL BARRIER
		TREE LINE
		EDGE OF PAVEMENT
		SAWCUT LINE
		TOP OR BOTTOM OF SLOPE
		LIMIT OF EDGE OF MICROMILLING AND OVERLAY
		BANK OF RIVER OR STREAM
		BORDER OF WETLAND
		100 FT WETLAND BUFFER
		200 FT RIVERFRONT BUFFER
		STATE HIGHWAY LAYOUT
		TOWN OR CITY LAYOUT
		COUNTY LAYOUT
		RAILROAD SIDELINE
		TOWN OR CITY BOUNDARY LINE
℄		PROPERTY LINE OR APPROXIMATE PROPERTY LINE
		EASEMENT

TRAFFIC SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		CONTROLLER CABINET, FOUNDATION
		CONTROLLER CABINET, FOUNDATION, CONC. PAD
		MAST ARM FOUNDATION (SCALE OF BLOCK = DIAMETER IN INCHES)
		MAST ARM (LENGTH NOTED)
		EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT
		VEHICULAR SIGNAL HEAD
		PEDESTRIAN SIGNAL HEAD
		MAST ARM OR TS POLE MOUNTED SIGN
		EMERGENCY PRE-EMPTION RECEIVER
		EMERGENCY PRE-EMPTION CONFIRMATION STROBE
		PEDESTRIAN PUSH BUTTON
		YAGI ANTENNA
		BICYCLE WIRE LOOP DETECTOR (SIZE AS NOTED)
		WIRE LOOP DETECTOR (SIZE AND TYPE NOTED)
		TRAFFIC SIGN (1 POST)
		TRAFFIC SIGN (2 POST)
		PULL BOX 12"x12" (OR AS NOTED)
		ELECTRIC HANDHOLE 12"x24" (OR AS NOTED)
		TRAFFIC SIGNAL CONDUIT

PAVEMENT MARKINGS SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
ONLY	ONLY	LEGEND "ONLY" - WHITE
		BIKE LANE LEGEND - WHITE
	SL	STOP LINE
	CW	CROSSWALK
	SWL	SOLID WHITE LINE
	SYL	SOLID YELLOW LINE
	BWL	BROKEN WHITE LINE
	BYL	BROKEN YELLOW LINE
	DWL	DOTTED WHITE LINE
	DYL	DOTTED YELLOW LINE
	DWLEx	DOTTED WHITE LINE EXTENSION
	DYLEx	DOTTED YELLOW LINE EXTENSION
	DBWL	DOUBLE WHITE LINE
	DBYL	DOUBLE YELLOW LINE

ABBREVIATIONS

GENERAL

AADT	ANNUAL AVERAGE DAILY TRAFFIC
ABAN	ABANDON
ADJ	ADJUST
APPROX.	APPROXIMATE
A.C.	ASPHALT CONCRETE
ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE
AP	ANGLE POINT
BIT.	BITUMINOUS
BC	BOTTOM OF CURB
BD.	BOUND
BL	BASELINE
BLDG	BUILDING
BM	BENCHMARK
BO	BY OTHERS
BOS	BOTTOM OF SLOPE
BR.	BRIDGE
BVW	BORDERING VEGETATED WETLANDS
CB	CATCH BASIN
CBCI	CATCH BASIN WITH CURB INLET
CC	CEMENT CONCRETE
CCM	CEMENT CONCRETE MASONRY
CEM	CEMENT
CI	CURB INLET
CIP	CAST IRON PIPE
CLF	CHAIN LINK FENCE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CSP	CORRUGATED STEEL PIPE
CO.	COUNTY
CONC	CONCRETE
CONT	CONTINUOUS
CONST	CONSTRUCTION
CR GR	CROWN GRADE
DHV	DESIGN HOURLY VOLUME
DI	DROP INLET
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DW	STEADY DON'T WALK - PORTLAND ORANGE
DWP	DETECTABLE WARNING PANEL
DWY	DRIVEWAY
ELEV (or EL.)	ELEVATION
EMB	EMBANKMENT
EOP	EDGE OF PAVEMENT
EXIST (or EX)	EXISTING
EXC	EXCAVATION
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FDN.	FOUNDATION
FLDSTN	FIELDSTONE
GAR	GARAGE
GC	GRANITE CURB
GCC	GRANITE CURB CORNER
GD	GROUND
GG	GAS GATE
GI	GUTTER INLET
GIP	GALVANIZED IRON PIPE
GRAN	GRANITE
GRAV	GRAVEL
GRD	GUARD
HDWL	HEADWALL
HMA	HOT MIX ASPHALT
HOR	HORIZONTAL
HP	HIGH POINT
HYD	HYDRANT
INT	INTERMITTENT
INV	INVERT
JCT	JUNCTION
L	LENGTH OF CURVE
LB	LEACH BASIN
LOG	LIMIT OF GRADING
LP	LIGHT POLE / LOW POINT
LSA	LANDSCAPE AREA
L&S	LOAM AND SEED
LT	LEFT
LUW	LAND UNDER WATER
MAX	MAXIMUM
MB	MAILBOX
MH	MANHOLE
MHB	MASSACHUSETTS HIGHWAY BOUND
MIN	MINIMUM
NIC	NOT IN CONTRACT
NO.	NUMBER
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PCR	PEDESTRIAN CURB RAMP
P.G.L.	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
POC	POINT ON CURVE
POT	POINT ON TANGENT
PRC	POINT OF REVERSE CURVATURE
PROJ	PROJECT
PROP	PROPOSED

ABBREVIATIONS (cont.)

GENERAL

PSB	PLANTABLE SOIL BORROW
PT	POINT OF TANGENCY
PUE	PUBLIC UTILITY EASEMENT
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
PVMT	PAVEMENT
PWW	PAVED WATERWAY
R	RADIUS OF CURVATURE
R&D	REMOVE AND DISPOSE
RCP	REINFORCED CONCRETE PIPE
RCAP	REINFORCED CONCRETE ARCH PIPE
RD	ROAD
RDWY	ROADWAY
REM	REMOVE
REP	REPLICATION
RET	RETAIN
RET WALL	RETAINING WALL
ROW	RIGHT OF WAY
RR	RAILROAD
RRFB	RECTANGULAR RAPID FLASHING BEACON
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RT	RIGHT
SB	STONE BOUND
SGE	SLOPED GRANITE EDGING
SHLD	SHOULDER
SHLO	STATE HIGHWAY LAYOUT LINE
SMH	SEWER MANHOLE
ST	STREET
STA	STATION
SSD	STOPPING SIGHT DISTANCE
SUP	SHARED USE PATH
SW	SIDEWALK
T	TANGENT DISTANCE OF CURVE/TRUCK %
TAN	TANGENT
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TYP	TYPICAL
UPL	UTILITY POLE
VAR	VARIES
VERT	VERTICAL
VC	VERTICAL CURVE
WCR	WHEEL CHAIR RAMP
WG	WATER GATE
WIP	WROUGHT IRON PIPE
WM	WATER METER/WATER MAIN
X-SECT	CROSS SECTION

TRAFFIC SIGNAL ABBREVIATIONS

CAB	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
DW	STEADY UPRAISED HAND
FDW	FLASHING UPRAISED HAND
FR	FLASHING CIRCULAR RED
FRL	FLASHING RED LEFT ARROW
FRR	FLASHING RED RIGHT ARROW
FY	FLASHING CIRCULAR YELLOW
FYL	FLASHING YELLOW LEFT ARROW
FYR	FLASHING YELLOW RIGHT ARROW
G	STEADY CIRCULAR GREEN
GL	STEADY GREEN LEFT ARROW
GR	STEADY GREEN RIGHT ARROW
GSL	STEADY GREEN SLASH LEFT ARROW
GSR	STEADY GREEN SLASH RIGHT ARROW
GV	STEADY GREEN VERTICAL ARROW
OL	OVERLAP
PED	PEDESTRIAN
PTZ	PAN, TILT, ZOOM
R	STEADY CIRCULAR RED
RL	STEADY RED LEFT ARROW
RR	STEADY RED RIGHT ARROW
TR SIG	TRAFFIC SIGNAL
TSC	TRAFFIC SIGNAL CONDUIT
W	STEADY WALKING PERSON
Y	STEADY CIRCULAR YELLOW
YL	STEADY YELLOW LEFT ARROW

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	2	195
PROJECT FILE NO.	609213		

LEGEND & ABBREVIATIONS

609213_HD2(LEGEND).DWG Plotted on 11-Feb-2025 4:47 PM

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	3	195
PROJECT FILE NO.		609213	

CONSTRUCTION NOTES

CONSTRUCTION NOTES:

1. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
2. ALL MUNICIPALLY OWNED UTILITY STRUCTURES (CATCH BASINS, DRAIN MANHOLES, WATER GATES, ETC.) SHALL BE ADJUSTED BY THE CONTRACTOR TO FINISHED GRADE UNLESS DIRECTED OTHERWISE.
3. ALL PRIVATELY OWNED UTILITY STRUCTURES (GAS GATES, ELECTRIC /TELEPHONE MANHOLES, ETC.) SHALL BE ADJUSTED TO FINISHED GRADE BY THE PRIVATE UTILITY COMPANY, UNLESS DIRECTED OTHERWISE. THE CONTRACTOR SHALL COORDINATE WITH PRIVATE UTILITY COMPANIES FOR THE ALTERATION AND ADJUSTMENT, AS NECESSARY.
4. PROPOSED LATERAL DRAIN PIPES SHALL BE INSTALLED WITH A PITCH OF 1.0% (MINIMUM) UNLESS OTHERWISE NOTED.
5. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.
6. ALL DISTURBED AREAS OUTSIDE THE CURBLINE SHALL BE STABILIZED WITH 4" LOAM AND SEED, UNLESS OTHERWISE NOTED.
7. THE TERM "PROPOSED" (PROP) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE AND RESET" (R&R), AS APPROVED BY THE ENGINEER.
8. THE TERM "MEET EXIST" MEANS TO MEET BOTH THE EXISTING ALIGNMENT AND ELEVATION.
9. ALL EXISTING TREES WITHIN THE PROJECT LIMITS SHALL BE RETAINED AND PROTECTED WITH TREE PROTECTION UNLESS INDICATED OTHERWISE ON THE DRAWINGS. ALL PROVIDED DIMENSIONS REFER TO THE DIAMETER AT BREAST HEIGHT.
10. AN UNOBSTRUCTED PATH OF TRAVEL WITH A MINIMUM WIDTH OF 3'-0" (EXCLUDING THE WIDTH OF CURB) SHALL BE MAINTAINED PAST ALL OBSTRUCTIONS (UTILITY POLES, LIGHT POLES, SIGNS, MAILBOXES, ALONG DRIVEWAY OPENINGS, ETC.)
11. ALL OBJECTS SHALL BE A MINIMUM DISTANCE OF 2'-0" (EXCLUDING THE WIDTH OF CURB) FROM THE SHARED USE PATH (UTILITY POLES, LIGHT POLES, SIGNS, MAILBOXES, ALONG DRIVEWAY OPENINGS, ETC.)
12. DETECTABLE WARNING PANELS ARE REQUIRED ON ALL PROPOSED PEDESTRIAN CURB RAMPS AND SHALL BE INSTALLED IN ACCORDANCE WITH MASSDOT CONSTRUCTION STANDARDS.
13. IN INSTANCES WHERE AN EXISTING MANHOLE, HANDHOLE, OR OTHER "SURFACE" TYPE STRUCTURE THAT IS NOT CALLED OUT TO BE REMOVED OR RESET IS WITHIN THE PROPOSED OR EXISTING (IF RECIPROCAL OR WITHIN PROJECT LIMITS) ACCESSIBLE SURFACE, THE STRUCTURE SHALL BE CAREFULLY ADJUSTED SUCH THAT THE TOP MOST SURFACES OR THE STRUCTURE COVER SHALL BE FLUSH WITH THE CURB RAMP SURFACE.
14. RUMBLE STRIPS SHALL BE INSTALLED ON ALL CENTERLINES ON AYER ROAD. ALL CENTERLINE RUMBLE STRIPS SHALL BE SINUSOIDAL (TYPE C).
15. IN AREAS OF EXISTING ROADWAY / SIDEWALK WHERE LOAM AND SEED IS PROPOSED, THE CONTRACTOR SHALL REMOVE EXISTING ROADWAY / SIDEWALK AND SUBBASE, AND REPLACE WITH SUITABLE EXCAVATED MATERIAL AND PROPOSED 4" LOAM AND SEED TO MEET FINAL GRADE.

SURVEY NOTES:

1. THE HORIZONTAL DATUM FOR THIS SURVEY IS THE MASSACHUSETTS COORDINATE SYSTEM, NAD 1983, MAINLAND ZONE. SAID HORIZONTAL DATUM WAS ESTABLISHED VIA GPS OBSERVATIONS UTILIZING REALIZATION NAD83(2011) AND GEOID 12A.
2. THE PROJECT SOURCE BENCHMARKS ARE MASSACHUSETTS GEODETIC SURVEY (MAGS) POINT ID'S 18370 (STATION 6640) AND 18371 (STATION 6641). SAID BENCHMARKS ARE BRASS RIVETS IN LEDGE, AND ARE SHOWN AS BENCHMARKS ON THIS PLAN. THE ELEVATION OF SAID BENCHMARKS ARE 278.26' AND 284.80', RESPECTFULLY, AND ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ELEVATIONS SHOWN HEREON REFER TO SAID NAVD88.
3. UNDERGROUND UTILITIES ARE SHOWN HEREON FROM FIELD LOCATIONS OF SURFACE VISIBLE STRUCTURES AND FROM AVAILABLE RECORD INFORMATION ON FILE AT THE TOWN OF HARVARD PUBLIC WORKS AND PRIVATE UTILITY COMPANIES. OTHER UNDERGROUND UTILITIES MAY EXIST. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATION, SIZE & ELEVATION OF ALL UTILITIES WITHIN THE AREA OF PROPOSED WORK AND TO CONTACT "DIG-SAFE" AT 811 AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION, DEMOLITION OR CONSTRUCTION. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
4. THE LIMIT OF BORDERING VEGETATED WETLANDS SHOWN HEREON WAS DELINEATED BY THE ENGINEERING CORP AND RIMMER ENVIRONMENTAL CONSULTING, LLC AND LOCATED VIA FIELD SURVEY BY HANCOCK ASSOCIATES.
5. THIS PLAN IS THE RESULT OF AN ON-THE-GROUND INSTRUMENT SURVEY PERFORMED BY HANCOCK ASSOCIATES IN JULY AND AUGUST OF 2019, AND APRIL, 2024.
6. THE HARVARD/AYER TOWN LINE IS SHOWN APPROXIMATELY HEREON FROM THE MASSACHUSETTS BUREAU OF GEOGRAPHIC INFORMATION (MASSGIS).
7. ABUTTING PROPERTY LINES HAVE BEEN COMPILED FROM RECORD INFORMATION.

609213_HD2(LEGEND).DWG Plotted on 11-Feb-2025 4:47 PM

NOTE:
SHARED USE PATH BASELINE NOT SHOWN FOR CLARITY.

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	4	195
PROJECT FILE NO.	609213		

KEY PLAN

PROJECT BEGIN
STA 8+69.90
N3016495.4630
E634274.6683

29+81.00 AYER ROAD=
120+00.00 POOR FARM ROAD

21+29.95 AYER ROAD=
110+00.00 GEBO LANE

GEBO LANE
LANCASTER COUNTY ROAD
AYER ROAD
POOR FARM ROAD
SOUTH SHAKER ROAD
OLD MILL ROAD
MYRICK LANE
HARVARD
AYER

CONTINUED BELOW
CONTINUED ABOVE

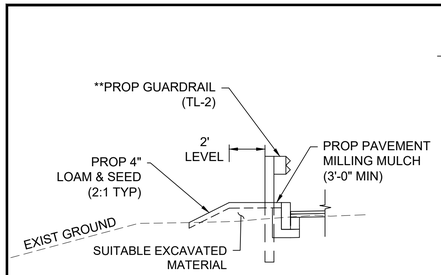
LEGEND

- (X) CONSTRUCTION PLANS
- (X) PROFILES
- (X) PROFILES - SIDE STREETS
- (X) PROFILES - SHARED USE PATH
- (X) CURB TIE & GRADING PLANS
- (X) TRAFFIC SIGN & PAVEMENT MARKING PLANS
- [X] UTILITY PLANS
- [X] LANDSCAPE PLANS AND DETAILS

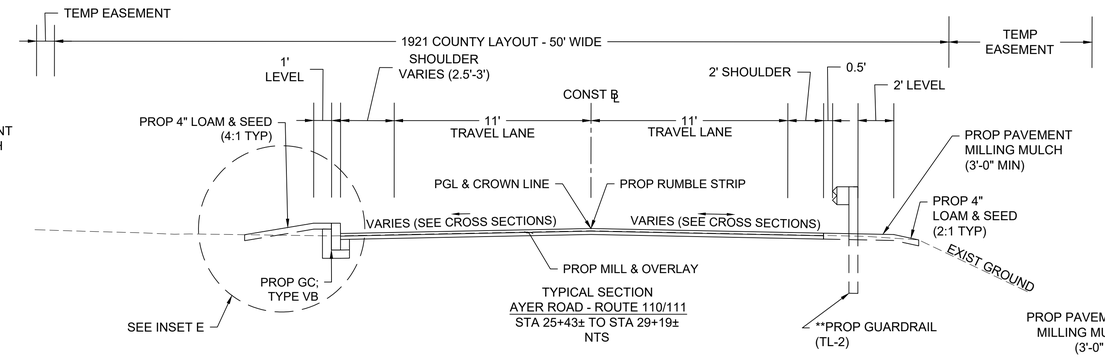
PROJECT END
STA 100+74.80
N3025101.0471
E636754.0355

0 150 300 450 600
SCALE: 1" = 150'

609213_HD3(KEY PLAN).DWG Plotted on 11-Feb-2025 4:48 PM

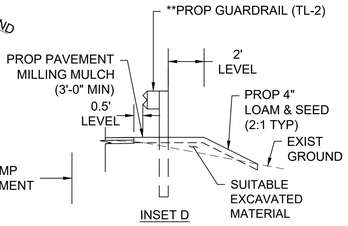


INSET E
STA 26+39± TO STA 27+60±

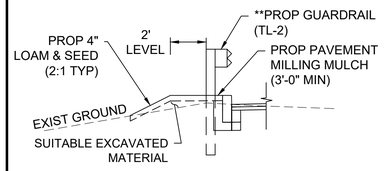


TYPICAL SECTION
AYER ROAD - ROUTE 110/111
STA 25+43± TO STA 29+19±
NTS

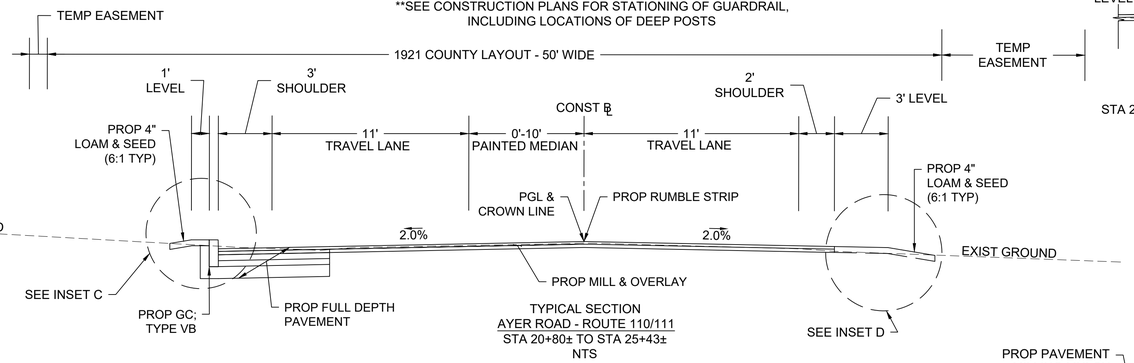
*TOLERANCE FOR CONSTRUCTION = ± 0.5%
**SEE CONSTRUCTION PLANS FOR STATIONING OF GUARDRAIL, INCLUDING LOCATIONS OF DEEP POSTS



INSET D
STA 20+80± TO STA 21+39±

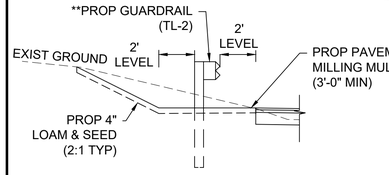


INSET C
STA 20+80± TO STA 21+00±

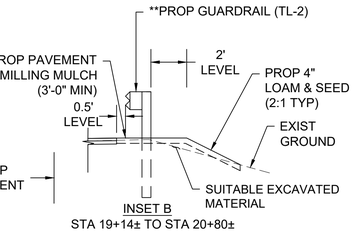


TYPICAL SECTION
AYER ROAD - ROUTE 110/111
STA 20+80± TO STA 25+43±
NTS

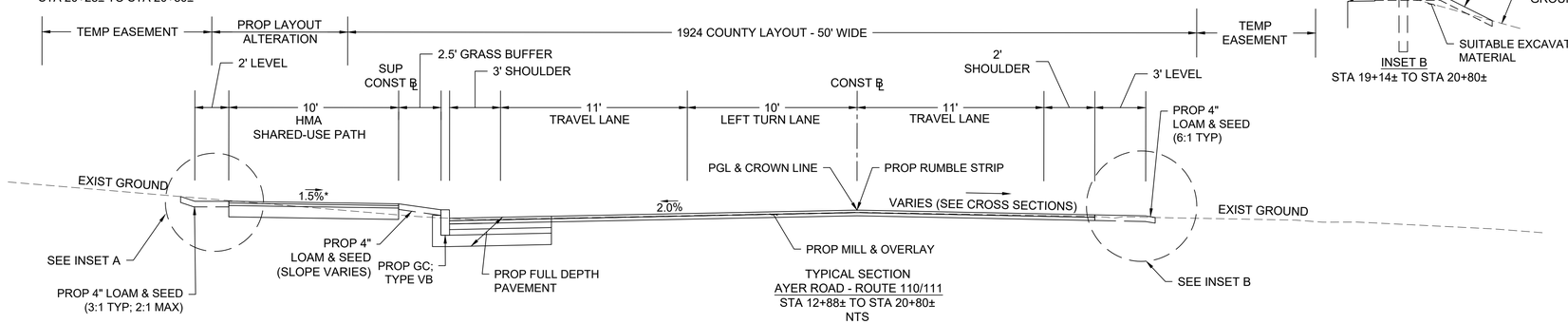
*TOLERANCE FOR CONSTRUCTION = ± 0.5%
**SEE CONSTRUCTION PLANS FOR STATIONING OF GUARDRAIL, INCLUDING LOCATIONS OF DEEP POSTS



INSET A
STA 20+28± TO STA 20+80±

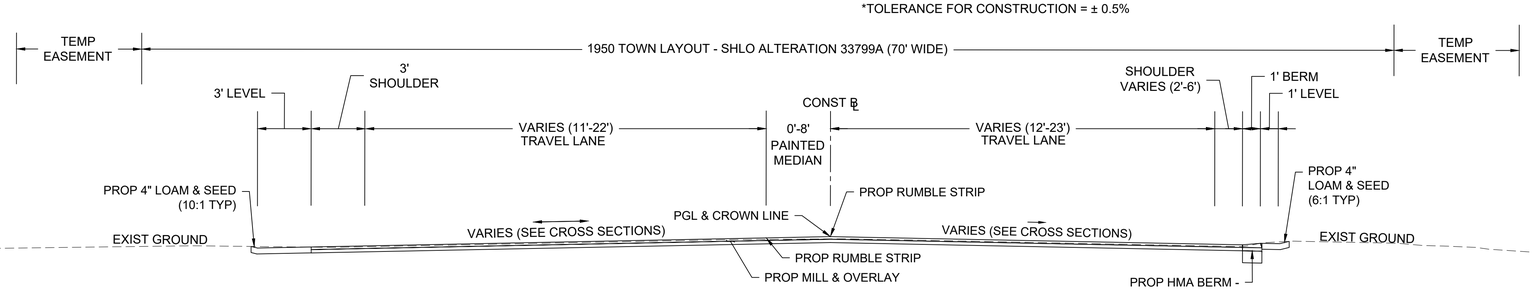


INSET B
STA 19+14± TO STA 20+80±



TYPICAL SECTION
AYER ROAD - ROUTE 110/111
STA 12+88± TO STA 20+80±
NTS

*TOLERANCE FOR CONSTRUCTION = ± 0.5%



TYPICAL SECTION
AYER ROAD - ROUTE 110/111
STA 8+70± TO STA 12+88±
NTS

*TOLERANCE FOR CONSTRUCTION = ± 0.5%

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	5	195
PROJECT FILE NO.	609213		

TYPICAL SECTIONS & PAVEMENT NOTES - 1 OF 2

PAVEMENT NOTES

PROPOSED HMA MILL & OVERLAY

SURFACE: 1¾" SUPERPAVE SURFACE COURSE - 12.5 POLYMER (SSC - 12.5 - P) OVER
2¼" SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC - 19.0) OVER
2¼" (MIN) PAVEMENT FINE MILLING

PROPOSED HMA MILL & OVERLAY TRANSITIONS

SURFACE: 1¾" SUPERPAVE SURFACE COURSE - 12.5 POLYMER (SSC - 12.5 - P) OVER
1¾" PAVEMENT FINE MILLING

PROPOSED FULL DEPTH PAVEMENT

SURFACE: 1¾" SUPERPAVE SURFACE COURSE - 12.5 POLYMER (SSC - 12.5 - P) OVER
2¼" SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC - 19.0) OVER

BASE: 4" SUPERPAVE BASE COURSE - 37.5 (SBC - 37.5) OVER

SUBBASE: 4" DENSE GRADED CRUSHED STONE
8" GRAVEL BORROW, TYPE b

PROPOSED FULL DEPTH PAVEMENT LESS THAN 4' WIDE

SURFACE: 1¾" SUPERPAVE SURFACE COURSE - 12.5 POLYMER (SSC - 12.5 - P) OVER
2¼" SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC - 19.0) OVER

BASE: 6" HIGH EARLY STRENGTH CEMENT CONCRETE BASE COURSE OVER

SUBBASE: 8" GRAVEL BORROW, TYPE b

PROPOSED PERMANENT PAVEMENT TRENCH PATCH

SURFACE: 1¾" SUPERPAVE SURFACE COURSE - 12.5 POLYMER (SSC - 12.5 - P) OVER
2¼" SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC - 19.0) OVER
VARIABLE DEPTH SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC - 19.0)
(COMPACTED IN 2" (MAX) LIFTS) TO MATCH EXISTING PAVEMENT THICKNESS

PROPOSED TEMPORARY PAVEMENT TRENCH PATCH

SURFACE: 3½" HMA FOR TEMPORARY ASPHALT PATCHING

BASE: EXISTING MATERIAL SUITABLE FOR RE-USE (SEE VARIOUS TRENCH DETAILS)

PROPOSED HMA DRIVEWAY (TO MATCH EXISTING) - RESIDENTIAL

SURFACE: 1½" SUPERPAVE SURFACE COURSE - 9.5 (SSC - 9.5) OVER
2½" SUPERPAVE SURFACE COURSE - 12.5 (SSC - 12.5) OVER

BASE: 8" SUITABLE EXISTING GRAVEL;
ADD GRAVEL BORROW, TYPE b AS REQUIRED

PROPOSED HMA DRIVEWAY (TO MATCH EXISTING) - COMMERCIAL

SURFACE: 1½" SUPERPAVE SURFACE COURSE - 12.5 (SSC - 12.5) OVER
2½" SUPERPAVE SURFACE COURSE - 12.5 (SSC - 12.5) OVER

BASE: 8" SUITABLE EXISTING GRAVEL;
ADD GRAVEL BORROW, TYPE b AS REQUIRED

PROPOSED HMA SHARED USE PATH

SURFACE: 1½" SUPERPAVE SURFACE COURSE - 9.5 (SSC - 9.5) OVER
2½" SUPERPAVE SURFACE COURSE - 12.5 (SSC - 12.5) OVER

BASE: 8" GRAVEL BORROW, TYPE b

PROPOSED HMA SHARED USE PATH - STA 154+76 TO STA 158+31

SURFACE: 1½" SUPERPAVE SURFACE COURSE - 9.5 (SSC - 9.5) OVER
2½" SUPERPAVE SURFACE COURSE - 12.5 (SSC - 12.5) OVER

BASE: 12" GRAVEL BORROW, TYPE b

PROPOSED CEMENT CONCRETE SIDEWALKS / PEDESTRIAN CURB RAMPS

SURFACE: 4" CEMENT CONCRETE (AIR ENTRAINED, 4000 PSI, ¾", 610)

BASE: 8" GRAVEL BORROW, TYPE b

GENERAL PAVEMENT NOTES:

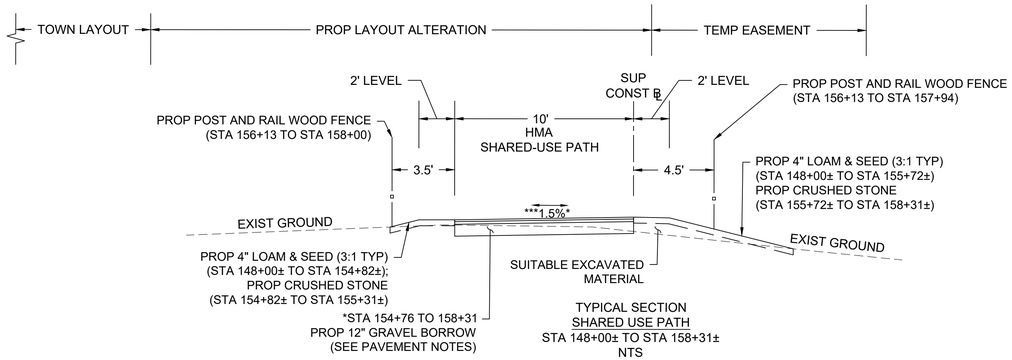
1. ASPHALT EMULSION FOR TACK COAT SHALL BE APPLIED BETWEEN ALL ASPHALT SURFACES AND SAWCUT JOINTS BEFORE PAVING. HMA JOINT ADHESIVE SHALL BE APPLIED TO ALL COLD JOINTS (LONGITUDINAL AND TRANSVERSE) BEFORE PAVING SURFACE COURSE. ASPHALT EMULSION FOR TACK COAT SHALL BE APPLIED AT A RATE CONSISTENT WITH STANDARD SPECIFICATION 450.43G2. ALL SURFACES SHALL BE CLEAN OF ALL ORGANICS, DEBRIS, AND SAND PRIOR TO PAVING.
2. ALL HMA SHALL BE IN ACCORDANCE WITH SECTION 450.
3. ASPHALT EMULSION FOR TACK COAT SHALL BE RS-1H TO RESIST TRACKING OF TACK BY HAUL VEHICLES.
4. HMA FOR WALKS AND DRIVEWAYS SHALL BE IN ACCORDANCE WITH SECTION 700.
5. ALL GRAVEL BORROW MEETING SPECIFICATION SHALL BE RETAINED IN PLACE, COMPACTED, AND LEVELED AS REQUIRED.

609213_HD4(TYPICAL SECTIONS).DWG Plotted on 11-Feb-2025 4:48 PM

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	6	195
PROJECT FILE NO.	609213		

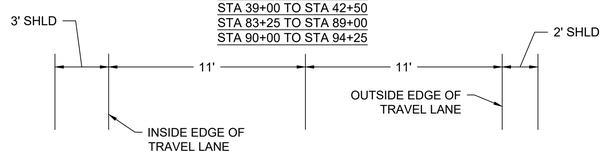
TYPICAL SECTIONS & PAVEMENT NOTES - 2 OF 2

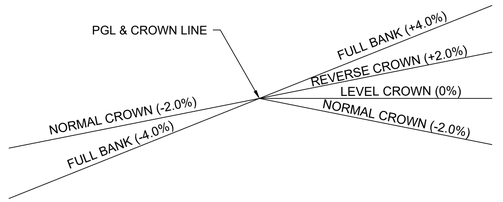


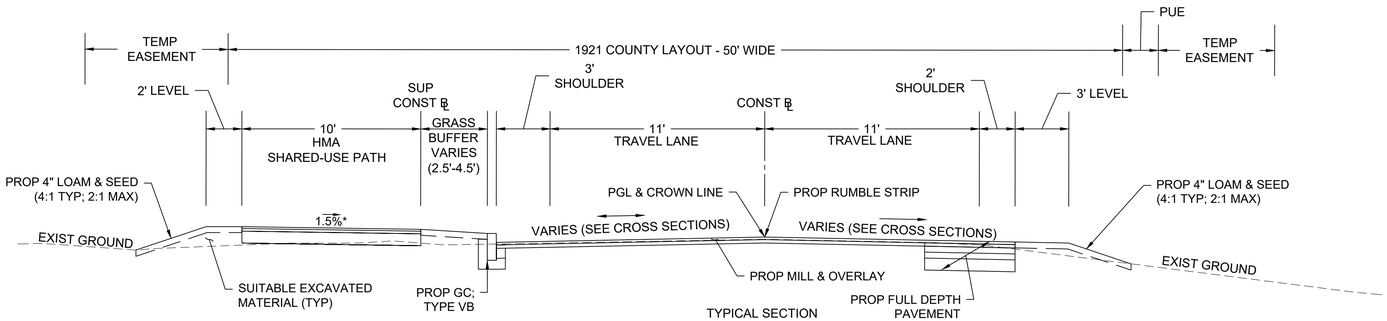
TYPICAL SECTION
SHARED USE PATH
STA 148+00± TO STA 158+31±
NTS

*TOLERANCE FOR CONSTRUCTION = ± 0.5%
***SEE CURB TIE AND GRADING PLANS AND CROSS SECTION FOR DIRECTION OF SUP CROSS SLOPE

METHOD OF BANKING
AYER ROAD (ROUTE 110/111)
STA 27+25 TO STA 31+75
STA 39+00 TO STA 42+50
STA 83+25 TO STA 89+00
STA 90+00 TO STA 94+25



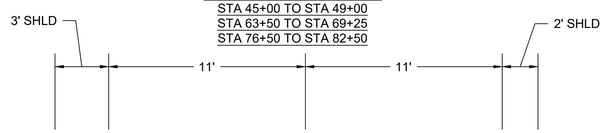


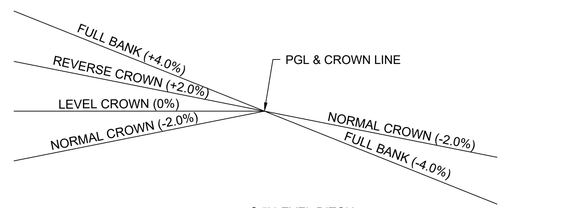


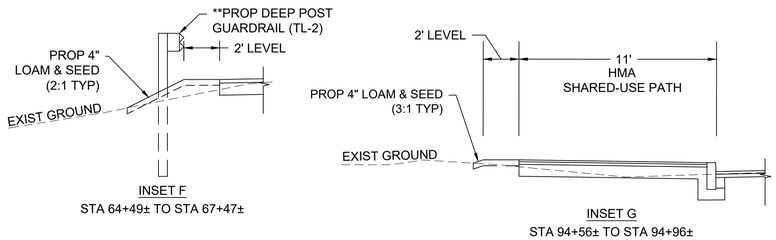
TYPICAL SECTION
AYER ROAD - ROUTE 110/111
STA 72+05± TO STA 81+37±
NTS

*TOLERANCE FOR CONSTRUCTION = ± 0.5%

METHOD OF BANKING
AYER ROAD (ROUTE 110/111)
STA 45+00 TO STA 49+00
STA 63+50 TO STA 69+25
STA 76+50 TO STA 82+50

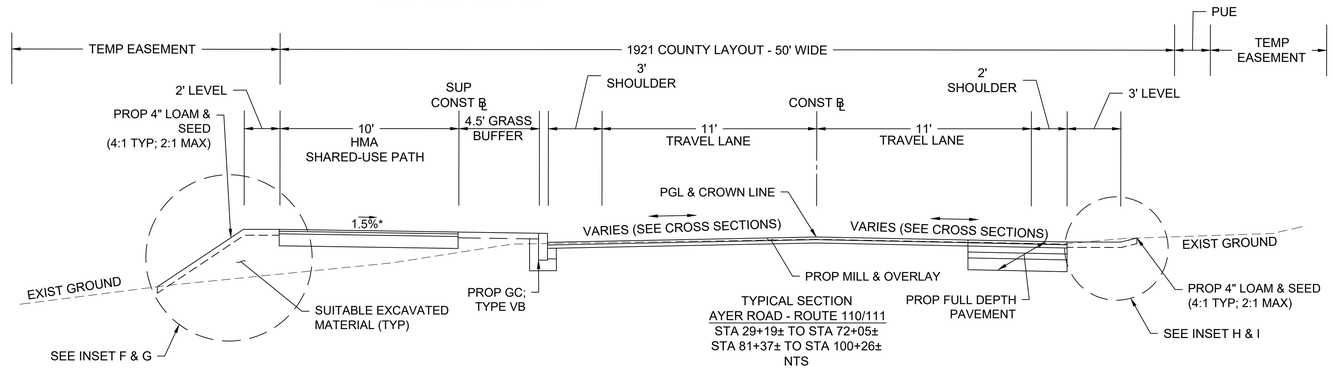






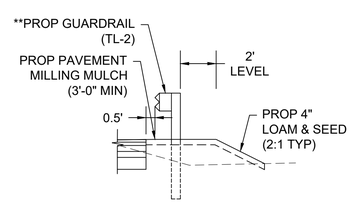
INSET F
STA 64+49± TO STA 67+47±

INSET G
STA 94+56± TO STA 94+96±

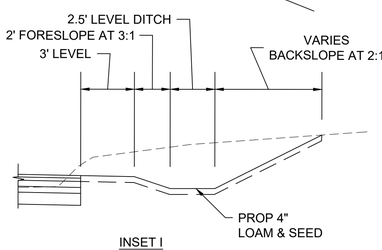


TYPICAL SECTION
AYER ROAD - ROUTE 110/111
STA 29+19± TO STA 72+05±
STA 81+37± TO STA 100+26±
NTS

*TOLERANCE FOR CONSTRUCTION = ± 0.5%
**SEE CONSTRUCTION PLANS FOR STATIONING OF GUARDRAIL, INCLUDING LOCATIONS OF DEEP POSTS



INSET H
STA 67+09± TO STA 66+09±



INSET I
STA 38+73± TO STA 45+22±

609213_HD4(TYPICAL SECTIONS).DWG Plotted on 11-Feb-2025 4:48 PM

GUARDRAIL DETAILS	TRAFFIC SIGNAL CONDUIT	WATER SUPPLY ALTERATIONS	DRAINAGE DETAILS
NONE	NONE	NONE	SEE SHEET 74

LEGEND

△# = DRIVEWAY NUMBER

□# = PEDESTRIAN CURB RAMP NUMBER

NOTE:
PROPOSED OVERHEAD WIRES AND PROPOSED DRAINAGE PIPES ARE NOT SHOWN ON CONSTRUCTION PLANS FOR CLARITY.

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	7	195
PROJECT FILE NO.	609213		

CONSTRUCTION PLANS - 1 OF 17

ROUTE 110/111 - AYER ROAD
(1950 TOWN LAYOUT - STATE HIGHWAY ALTERATION 33799A)

12 LANCASTER COUNTY ROAD LLC
185 AYER ROAD
MAP-LOT 8-59
BK-PG 46796-296
PLAN BK-PG 226-27

12 LANCASTER COUNTY ROAD LLC
187 AYER ROAD
MAP-LOT 8-60
BK-PG 54974-74
PLAN BK-PG 226-27

HARVARD CORNER CONDOMINIUM
0 AYER ROAD
MAP-LOT 8-62.2
BK-PG 70107-189
PLAN BK-PG 975-66
PLAN BK-PG 721-46

PHOENIX-DURANGO LLC
184 AYER ROAD
MAP-LOT 8-41
BK-PG 64869-275
PLAN BK-PG 219-95

SAMANTHA'S REALTY LLC
188 AYER ROAD
MAP-LOT 8-40-1
BK-PG 33654-159
PLAN BK-PG 780-121

BOWERS BROOK LLC
196 AYER ROAD
MAP-LOT 8-40
BK-PG 45722-348
PLAN BK-PG 881-28

AYER ROAD REALTY LLC
198 AYER ROAD
MAP-LOT 8-40-3
BK-PG 45608-289
PLAN BK-PG 881-28

HARVARD OFFICE PARK LLC
200 AYER ROAD
MAP-LOT 8-40-2
BK-PG 28957-72
PLAN BK-PG 780-121

1950 STATE ALTERATION | 1950 TOWN LAYOUT

1950 TOWN LAYOUT | 1924 COUNTY LAYOUT

RET HMA WALK
RET FIRE ESCAPE STEPS
MEET EXIST DWY (SAWCUT)
PROP TEMP EASEMENT
R&R MB (2)
PROP TEMP EASEMENT
MEET EXIST DWY (SAWCUT)
PROP HMA DWY (TYP)
BENCHMARK: MAG IN UPL80-1 EL=311.69'
RET PLANTER
RET BOULDERS
RET SGE
REM EXIST PVMT; PROP 4" L&S
8+00
9
R=760.00'
L=222.12'
10
PT +22.12
PROJECT BEGIN
STA 8+69.90
N3016495.4630
E634274.6683
RET FLASHER
LIMIT OF HMA MILL & OVERLAY
BEGIN HMA BERM TYPE A - MODIFIED
PROP CONST ℄
11
PROP HMA MILL & OVERLAY
PROP HMA BERM TYPE A - MODIFIED
PROP TEMP EASEMENT
MEET EXIST DWY (SAWCUT)
APPROX LOG (TYP)
PROP TEMP EASEMENT
1950 TOWN LAYOUT – STATE HIGHWAY ALTERATION 33799A
RET EXIST RIP RAP
PROP DRAINAGE SEDIMENT REMOVAL
PROP TEMP EASEMENT
PROP HMA DWY
MEET EXIST DWY (SAWCUT)
PROP 4" L&S (TYP)
RET TREE; PROP TREE PROTECTION
PROP FULL DEPTH PVMT
RET POST
PROP EOP
PROP GC; TYPE VB AT 7" REVEAL
N39°07'50"E
293.12'
12
PROP HMA DWY
PROP BIKE RAMP
PROP 2.5' GRASS BUFFER
RET SGE
PROP CC PCR W/ DWP
13
PROP SAWCUT (TYP)
PC +15.24
PROP 0" REVEAL
PROP EOP
14
PROP PB (TYP)
PROP RRFB (TYP)
PROP 5.5' CEM CONC SW
MEET EXIST SW AND GC
PROP TEMP EASEMENT
PROP 3" ELEC CONDUIT (TYP)
RET STONE WALL
RET WALL
PROP TEMP EASEMENT
MEET EXIST GRAV DWY
APPROX LOG (TYP)
PROP 10' HMA SHARED USE PATH
R&S GRANITE BLOCKS (TYP)
140+00
PC +16.54
PROP GC; TYPE VB (TYP)
141
PROP LAYOUT ALTERATION
UTILITY EASEMENT PLAN BK-PG 721-46
UPL 80-1 W/ RISERS
UPL 82/79 W/ RISER
UPL 78/50
UPL 79
UPL 80/81
BIT. CURB
RAISED PLANTER
6" TRIANGLE CONC POST
TREELINE
CB BROKEN
20"DEC
30"M
1
2

CONTINUED ON SHEET NO. 8

0 20 50 100
SCALE: 1" = 20'

FOR PROFILE: SEE SHEET NO. 24 & 30

609213_HDS\CONSTRUCTION PLANS\.DWG Plotted on 11-Feb-2025 4:48 PM

GUARDRAIL DETAILS	TRAFFIC SIGNAL CONDUIT	WATER SUPPLY ALTERATIONS	DRAINAGE DETAILS
STA 19+14 RT TO STA 19+39 RT TANGENT END TREATMENT, TL-2 STA 19+39 RT TO STA 21+14 RT GUARDRAIL, TL-2	NONE	NONE	SEE SHEET 75

LEGEND

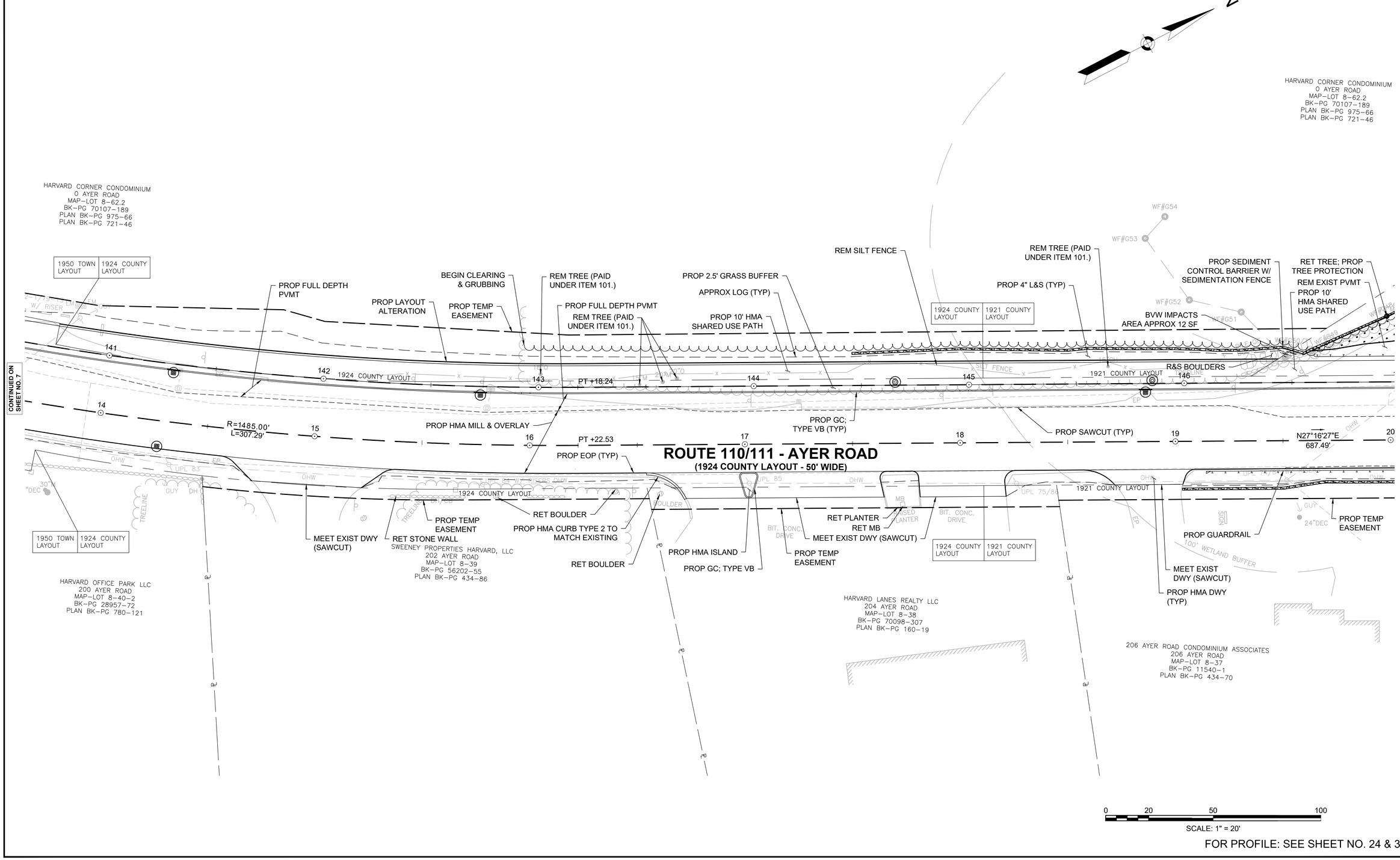
△# = DRIVEWAY NUMBER

[#] = PEDESTRIAN CURB RAMP NUMBER

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	8	195
PROJECT FILE NO.	609213		

CONSTRUCTION PLANS - 2 OF 17



FOR PROFILE: SEE SHEET NO. 24 & 30

609213_HDS\[CONSTRUCTION PLANS].DWG Plotted on 11-Feb-2025 4:48 PM

GUARDRAIL DETAILS

STA 19+14 RT TO STA 19+39 RT TANGENT END TREATMENT, TL-2
STA 19+39 RT TO STA 21+14 RT GUARDRAIL, TL-2
STA 21+14 RT TO STA 21+39 RT TANGENT END TREATMENT, TL-2

STA 20+28 LT TO STA 20+38 LT TRAILING ANCHORAGE
STA 20+38 LT TO STA 21+00 LT GUARDRAIL, TL-2 (DEEP POST)
STA 110+39 LT TO STA 111+34 LT GUARDRAIL - CURVED, TL-2
STA 111+34 LT TO STA 111+57 LT TANGENT END TREATMENT, TL-2

STA 24+13 RT TO STA 24+38 RT TANGENT END TREATMENT, TL-2
STA 24+38 RT TO STA 27+00 RT GUARDRAIL, TL-2

TRAFFIC SIGNAL CONDUIT

SEE BELOW

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

SEE SHEET 76

CONTINUED ON SHEET NO. 10

LEGEND

(#) = DRIVEWAY NUMBER
[#] = PEDESTRIAN CURB RAMP NUMBER

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	9	195
PROJECT FILE NO.	609213		

CONSTRUCTION PLANS - 3 OF 17

N/F INHABITANTS OF THE TOWN OF HARVARD
0 LANCASTER COUNTY ROAD
MAP-LOT 8-62.4
BK-PG 21051-25
PLAN BK-PG 721-46

HARVARD CORNER CONDOMINIUM
0 AYER ROAD
MAP-LOT 8-62.2
BK-PG 70107-189
PLAN BK-PG 975-66
PLAN BK-PG 721-46

APIF - MASSACHUSETTS, LLC
215 AYER ROAD
MAP-LOT 8-61
BK-PG 65530-161
PLAN BK-PG 299-81
PLAN BK-PG 365-118

206 AYER ROAD CONDOMINIUM ASSOCIATES
206 AYER ROAD
MAP-LOT 8-37
BK-PG 11540-1
PLAN BK-PG 434-70

INHABITANTS OF THE TOWN OF HARVARD
(CONSERVATION COMMISSION)
204 AYER ROAD
MAP-LOT 8-36
BK-PG 6223-264
PLAN BK-PG 434-86
(PARCEL IS SUBJECT TO ARTICLE 97 RESTRICTIONS)

GEBO LANE
(PUBLIC - VARIABLE WIDTH)

ROUTE 110/111 - AYER ROAD
(1921 COUNTY LAYOUT - 50' WIDE)

PROP SEDIMENT CONTROL BARRIER W/ SEDIMENTATION FENCE
PROP WETLAND REP. AREA (TYP) SEE SHEET 109
TEMP LUW/BANK IMPACTS AREA APPROX 200 SF SEE SHEET 109
PROP FULL DEPTH PVMT
RET TREE; PROP TREE PROTECTION
PROP STONE FOR PIPE ENDS
PROP WETLAND REP AREA (TYP) SEE SHEET 109
RET BOULDERS
RET TREE; PROP TREE PROTECTION
REM EXIST PVMT
PROP 10' HMA SHARED USE PATH
PROP INT. STREAM RESTORATION (TYP) SEE SHEET 109
R&S STONE WALL
PROP CLEARING & GRUBBING
RET TREE; PROP TREE PROTECTION
RET STONE WALL
IVW IMPACTS AREA APPROX 1,425 SF
LIMIT OF HMA MILL & OVERLAY STA 112+30
PROP HMA MILL & OVERLAY TRANSITION
BVW IMPACTS AREA APPROX 80 SF
LIMIT OF FULL DEPTH PVMT
PROP EOP PT +80.14
END CLEARING & GRUBBING
PC +32.26
PROP 4" L&S
IVW IMPACTS AREA APPROX 14 SF
PROP LAYOUT ALTERATION
PROP TEMP EASEMENT
PROP 10' HMA SHARED USE PATH
PT +24.05
APPROX LOG (TYP)
PROP CLEARING & GRUBBING
PC +72.44
PT +30.45
PROP TREE PROTECTION FENCE (TYP)
PROP CLEARING & GRUBBING
PROP 4" L&S
PC +68.77
REM STUMP
APPROX LOG (TYP)
110+27 GEBO LANE= 148+25.66 SUP
PROP TEMP EASEMENT
REM EXIST PAVEMENT
PROP TEMP EASEMENT
MEET EXIST DWY (SAWCUT)
RET SIGN
PROP HMA DWY
RET EXIST CURB
REM EXIST CURB
RET TREE; PROP TREE PROTECTION
PROP GC; TYPE VB (TYP)
PROP CC HDWL (E 206.4.0)
PROP CC HDWL (SEE SHEET 110)
REM EXIST GUARDRAIL
PROP 2.5' GRASS BUFFER
LUW/BANK IMPACTS AREA APPROX 180 SF
PROP CC PCR W/ DWP (TYP)
R&S CONC POST
PC +73.39
PROP FULL DEPTH PVMT
PROP PB (TYP)
PROP CONST ℄
PROP EOP (TYP)
PROP HMA MILL & OVERLAY
PROP SAWCUT (TYP)
PT +04.31
REM EXIST GUARDRAIL
PROP TEMP EASEMENT
PROP PERM EASEMENT
PROP GUARDRAIL (TYP)
PROP CC HDWL (SEE SHEET 110)
TEMP LUW/BANK IMPACTS AREA APPROX 85 SF
PROP TS CONDUIT FOR FUTURE SIGNAL (TYP)
21+29.95 AYER ROAD= 110+00.00 GEBO LANE
PROP SEDIMENT CONTROL BARRIER (TYP)
PROP TEMP EASEMENT
BENCHMARK: NAIL UPL71/105-5 EL=257.20'
BEGIN CLEARING & GRUBBING

N27°16'27"E 687.49'
N26°33'14"E 241.06'
R=7500.00' L=94.29'

CONTINUED ON SHEET NO. 8
CONTINUED ON SHEET NO. 11

SCALE: 1" = 20'

FOR PROFILE: SEE SHEET NO. 24, 29, & 30

609213_HDS(CONSTRUCTION PLANS).DWG Plotted on 11-Feb-2025 4:49 PM

GUARDRAIL DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

SEE SHEET 77

LEGEND

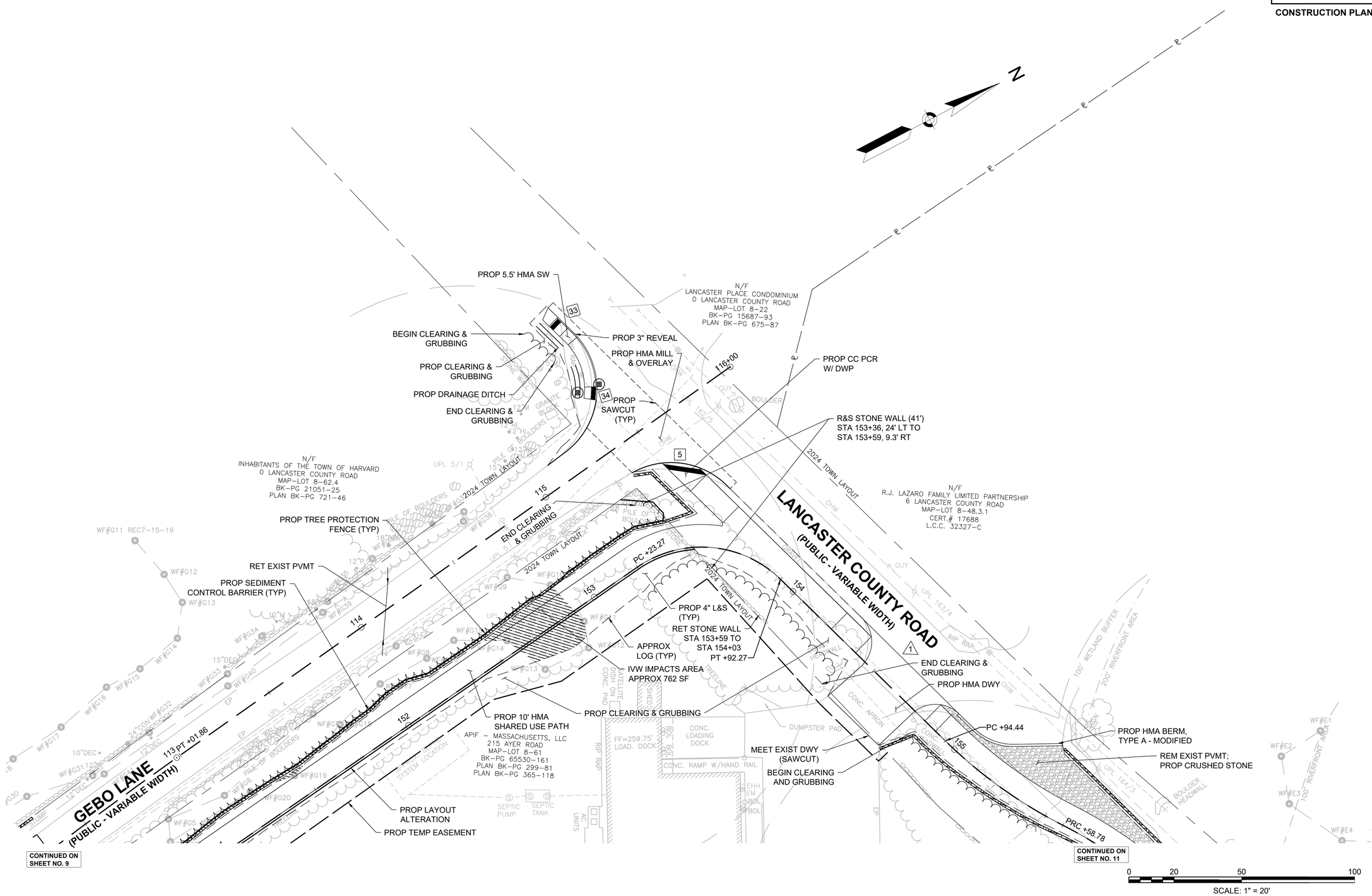
△# = DRIVEWAY NUMBER

□# = PEDESTRIAN CURB RAMP NUMBER

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	10	195
PROJECT FILE NO.	609213		

CONSTRUCTION PLANS - 4 OF 17



CONTINUED ON SHEET NO. 9

CONTINUED ON SHEET NO. 11

0 20 50 100

SCALE: 1" = 20'

FOR PROFILE: SEE SHEET NO. 29 & 30

609213_HDS(CONSTRUCTION PLANS).DWG Plotted on 11-Feb-2025 4:49 PM

GUARDRAIL DETAILS	TRAFFIC SIGNAL CONDUIT	WATER SUPPLY ALTERATIONS	DRAINAGE DETAILS
STA 24+38 TO STA 27+00 RT GUARDRAIL, TL-2 STA 27+00 TO STA 27+35 RT MODIFIED TRANSITION TO BRIDGE RAIL STA 26+39 LT TO STA 26+64 LT TANGENT END TREATMENT, TL-2 STA 26+64 LT TO STA 27+26 LT GUARDRAIL, TL-2 STA 27+26 LT TO STA 27+60 LT MODIFIED TRANSITION TO BRIDGE RAIL STA 27+57 RT TO STA 27+91 RT MODIFIED TRANSITION TO BRIDGE RAIL STA 27+91 RT TO STA 29+15 RT GUARDRAIL, TL-2 (DEEP POST) STA 29+15 RT TO STA 29+41 RT FLARED END TREATMENT, TL-2 STA 27+82 LT TO STA 28+16 LT MODIFIED TRANSITION TO BRIDGE RAIL STA 28+16 LT TO STA 28+41 LT GUARDRAIL, TL-2 STA 28+41 LT TO STA 28+66 LT FLARED END TREATMENT, TL-2	NONE	NONE	SEE SHEET 78

LEGEND

△# = DRIVEWAY NUMBER

[#] = PEDESTRIAN CURB RAMP NUMBER

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	11	195
PROJECT FILE NO.	609213		

CONSTRUCTION PLANS - 5 OF 17

CONTINUED ON SHEET NO. 10

PC +94.44
PROP HMA BERM, TYPE A - MODIFIED
MEET EXIST DWY (SAWCUT)
BEGIN CLEARING AND GRUBBING
REM EXIST PVMT; PROP CRUSHED STONE
PRC +58.78
PROP 10' HMA SHARED USE PATH
PROP SEDIMENT CONTROL BARRIER (TYP)
PROP POST AND RAIL WOOD FENCE
END CLEARING & GRUBBING
PT +12.77
LANCASTER COUNTY ROAD (PUBLIC - VARIABLE WIDTH)
RET
2024 TOWN LAYOUT
REM EXIST PVMT; PROP CRUSHED STONE
REM EXIST CONCRETE GUARDRAIL
N/F
R.J. LAZARO FAMILY LIMITED PARTNERSHIP
6 LANCASTER COUNTY ROAD
MAP-LOT 8-48.3.1
CERT.# 17688
L.C.C. 32327-C
TOWN OF HARVARD
(CONSERVATION COMMISSION)
0 LANCASTER COUNTY ROAD
MAP-LOT 4-48.3.4
CERT.# 11358
L.C.C. 32327-C
(PARCEL IS SUBJECT TO ARTICLE 97 RESTRICTIONS)
"BOWERS BROOK"
100' RIVERFRONT AREA
100' WETLAND BUFFER
PROP TEMP EASEMENT
MEET EXIST DWY (SAWCUT)
PROP HMA DWY
PROP TEMP EASEMENT
LINE OF EXIST GAS EASEMENT
GAS EASEMENT DEED BOOK 4726, PAGE 527 PLAN BOOK 305, PLAN 118
N/F
APIF - MASSACHUSETTS, LLC
215 AYER ROAD
MAP-LOT 8-61
BK-PG 65530-161
PLAN BK-PG 299-81
PLAN BK-PG 365-118
PC +88.95
RET SIGN
PROP HMA DWY
APPROX LOG (TYP)
PROP GC; TYPE VB (TYP)
1921 COUNTY LAYOUT
PROP SAWCUT (TYP)
N26°33'14"E 241.06'
PROP CONST ℄
PC +45.37
R=3500.00' L=110.76'
PROP GUARDRAIL (TYP)
ROUTE 110/111 - AYER ROAD
(1921 COUNTY LAYOUT - 50' WIDE)
REM EXIST GUARDRAIL
PT +56.12
PROP HMA MILL & OVERLAY
REM EXIST PVMT; PROP CRUSHED STONE
N28°22'02"E 85.19'
PC +41.32
PROP HMA BERM TYPE A - MODIFIED
PROP TRANSITION TO HMA BERM
PROP EOP (TYP)
PROP TEMP EASEMENT
END CLEARING & GRUBBING
PROP CC HDWL (E 206.4.0)
PROP STONE FOR PIPE ENDS
PROP PERM EASEMENT
TEMP BLSF IMPACT AREA APPROX 50 SF
PROP FULL DEPTH PVMT LESS THAN 4'
BVW IMPACTS AREA APPROX 51 SF
LAURA A. CLARAGE
129 POOR FARM ROAD
MAP-LOT 8-35
BK-PG 64304-359
PROP TEMP EASEMENT
MEET EXIST DWY (SAWCUT)
PROP HMA DWY
R&R SIGN (BO)
PROP 10' HMA SHARED USE PATH
PROP 4" L&S
PROP 4.5' GRASS BUFFER
R&S POST
PT +93.00
N12°23'44"E 961.28'
PROP 3" ELEC CONDUIT (TYP)
PCC +74.23
PROP GC; 30 TYPE VB (TYP)
PT +40.35
PROP CRUSHED STONE
R=714.00' L=199.03'
REM EXIST PVMT; PROP 4" L&S
PROP PUE
PROP CC PCR W/ DWP
PROP PB (TYP)
PROP RRFB (TYP)
PROP TEMP EASEMENT
REM EXIST PVMT; PROP 4" L&S
PROP 5.5' HMA SW
PC +40.76
PT +64.21
29+81.00 AYER ROAD=
120+00.00 POOR FARM ROAD
PROP PERM EASEMENT
PROP LAYOUT ALTERATION
LIMIT OF HMA MILL & OVERLAY STA 120+75.81
121+00
JEFFERY P. & ALEXANDRA H. MCKEARNEY
132 POOR FARM ROAD
MAP-LOT 8-24
BK-PG 67692-264
PLAN BK-PG 772-113
POOR FARM ROAD
(PUBLIC - VARIABLE WIDTH)
2024 TOWN LAYOUT
200' RIVERFRONT AREA
PROP PUE
N
0 20 50 100
SCALE: 1" = 20'

CONTINUED ON SHEET NO. 9
CONTINUED ON SHEET NO. 12
FOR PROFILE: SEE SHEET NO. 24-25, 29, & 30-31

609213_HDS(CONSTRUCTION PLANS).DWG Plotted on 11-Feb-2025 4:49 PM

GUARDRAIL DETAILS	TRAFFIC SIGNAL CONDUIT	WATER SUPPLY ALTERATIONS	DRAINAGE DETAILS
NONE	NONE	NONE	SEE SHEET 79

LEGEND

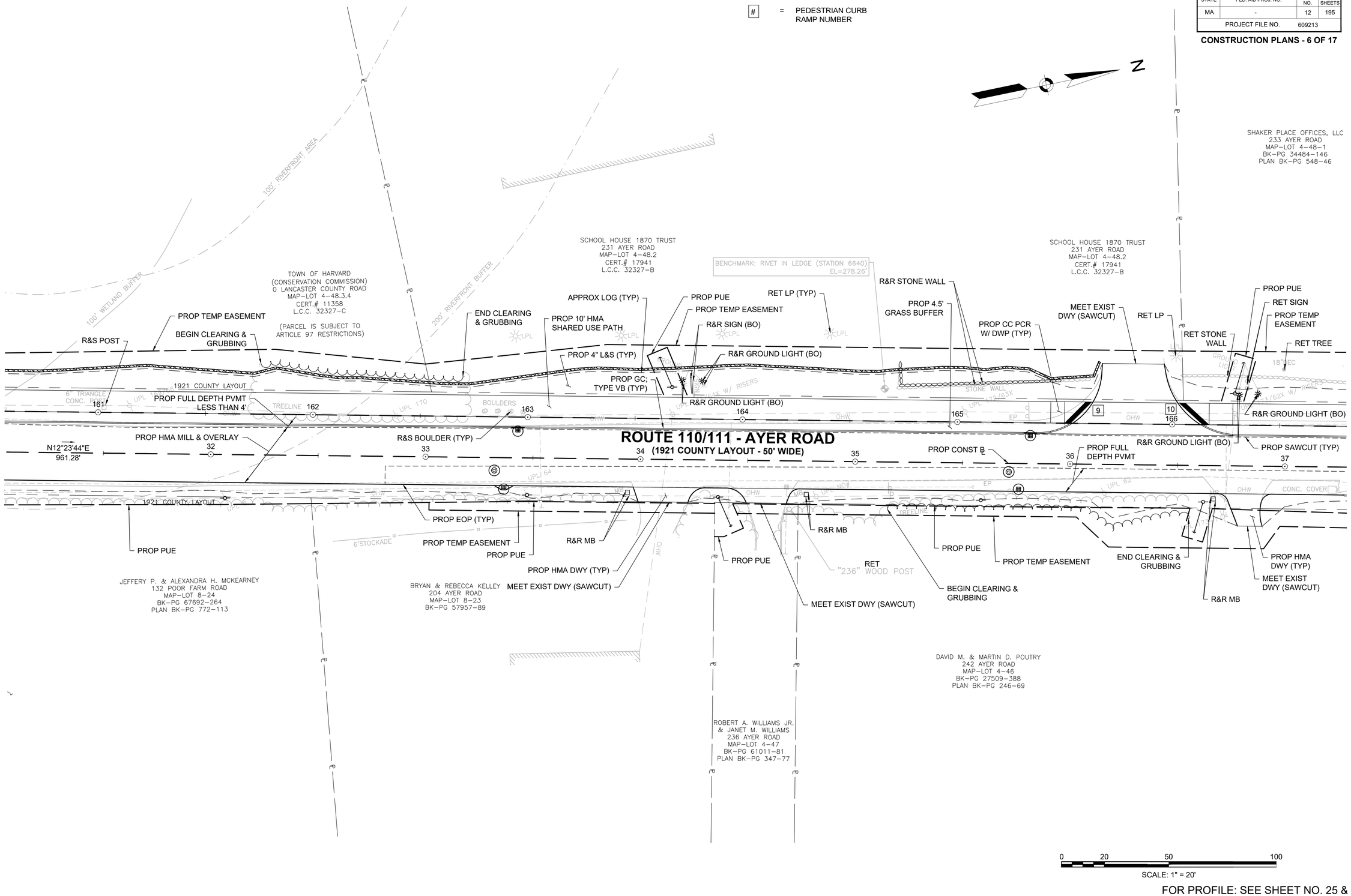
△# = DRIVEWAY NUMBER

[#] = PEDESTRIAN CURB RAMP NUMBER

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	12	195
PROJECT FILE NO.	609213		

CONSTRUCTION PLANS - 6 OF 17



FOR PROFILE: SEE SHEET NO. 25 & 31

609213_HDS\CONSTRUCTION PLANS\.DWG Plotted on 11-Feb-2025 4:49 PM

GUARDRAIL DETAILS	TRAFFIC SIGNAL CONDUIT	WATER SUPPLY ALTERATIONS	DRAINAGE DETAILS
NONE	NONE	NONE	SEE SHEET 80

LEGEND

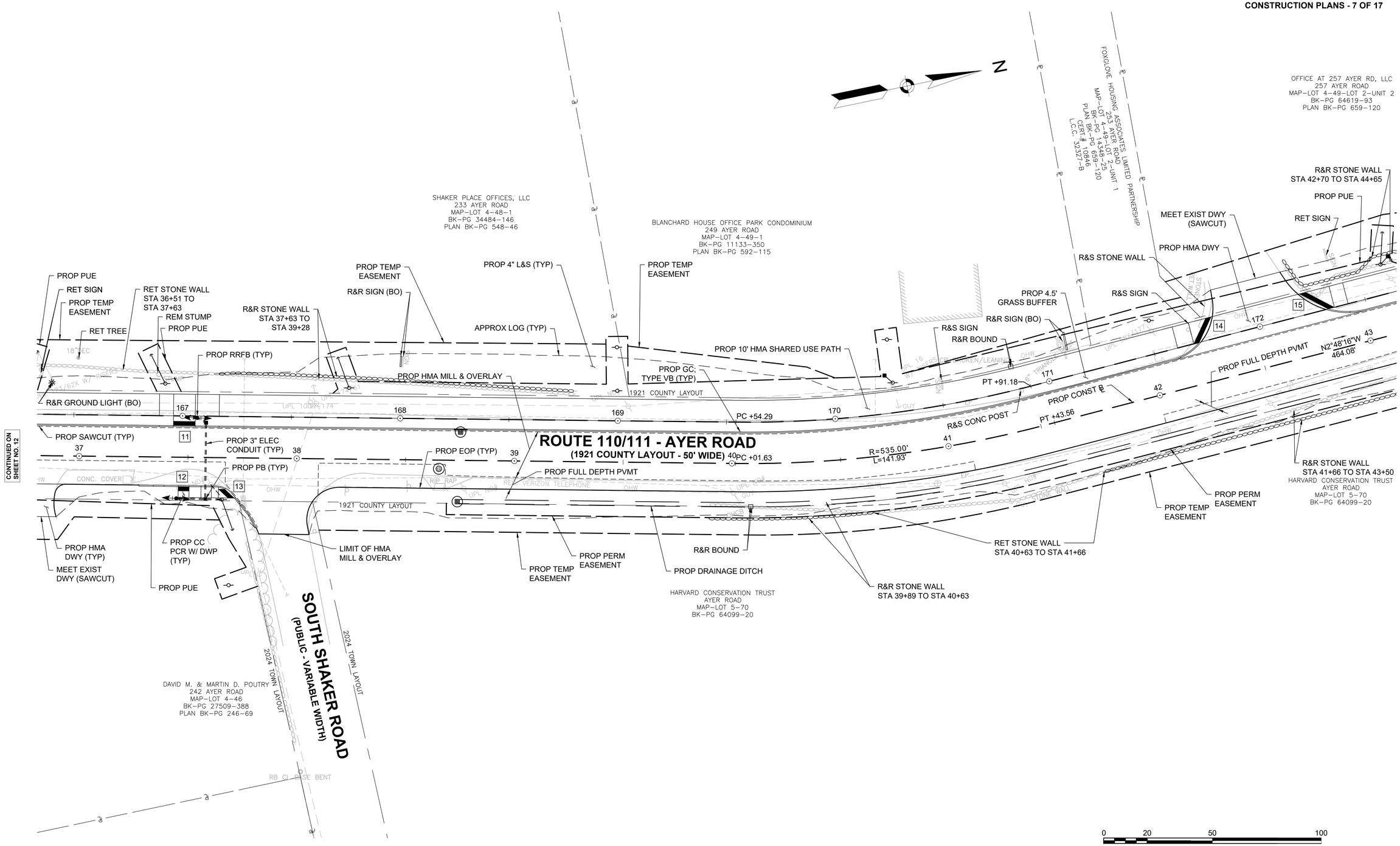
△# = DRIVEWAY NUMBER

□# = PEDESTRIAN CURB RAMP NUMBER

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	13	195
PROJECT FILE NO.	609213		

CONSTRUCTION PLANS - 7 OF 17



0 20 50 100

SCALE: 1" = 20'

FOR PROFILE: SEE SHEET NO. 25 & 31

609213_HDS(CONSTRUCTION PLANS).DWG Plotted on 11-Feb-2025 4:50 PM

GUARDRAIL DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

SEE SHEET 81

LEGEND

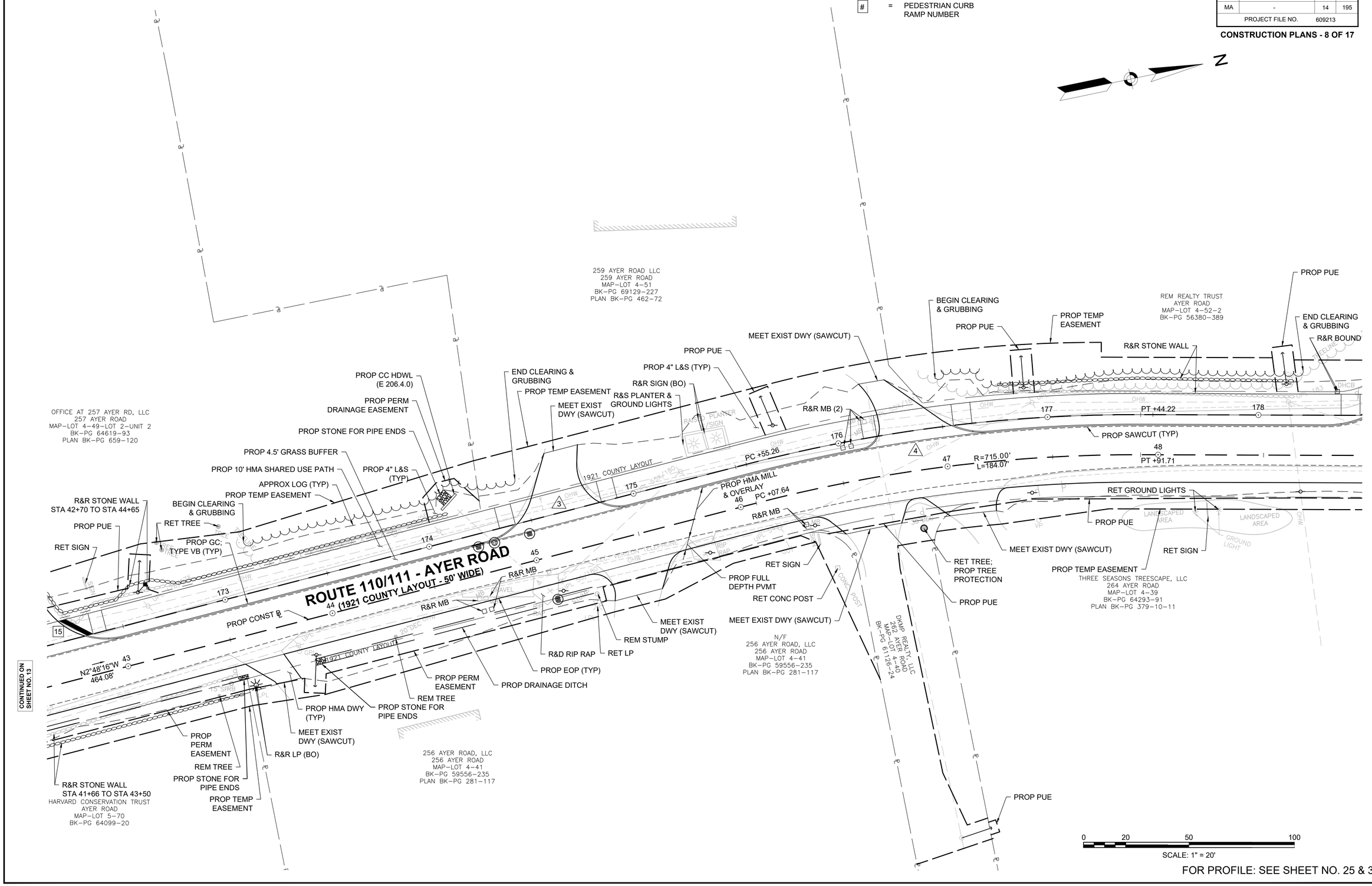
△# = DRIVEWAY NUMBER

□# = PEDESTRIAN CURB RAMP NUMBER

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	14	195
PROJECT FILE NO.	609213		

CONSTRUCTION PLANS - 8 OF 17



FOR PROFILE: SEE SHEET NO. 25 & 31

609213_HDS\CONSTRUCTION PLANS\.DWG Plotted on 11-Feb-2025 4:50 PM

GUARDRAIL DETAILS	TRAFFIC SIGNAL CONDUIT	WATER SUPPLY ALTERATIONS	DRAINAGE DETAILS
NONE	NONE	NONE	SEE SHEET 82

LEGEND

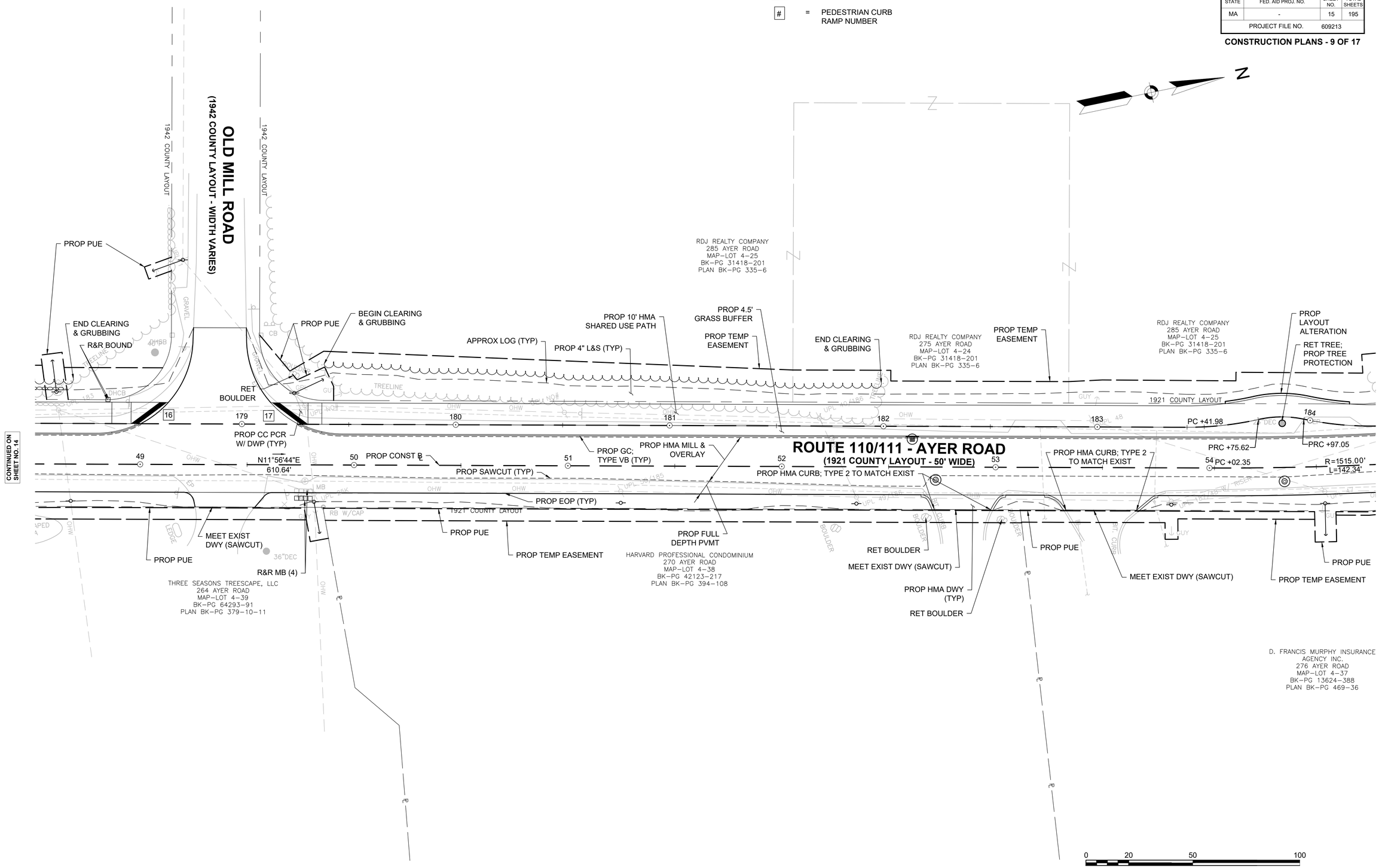
△# = DRIVEWAY NUMBER

[#] = PEDESTRIAN CURB RAMP NUMBER

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	15	195
PROJECT FILE NO.	609213		

CONSTRUCTION PLANS - 9 OF 17



FOR PROFILE: SEE SHEET NO. 25-26 & 32

609213_HDS(CONSTRUCTION PLANS).DWG Plotted on 11-Feb-2025 4:50 PM

GUARDRAIL DETAILS	TRAFFIC SIGNAL CONDUIT	WATER SUPPLY ALTERATIONS	DRAINAGE DETAILS
NONE	NONE	NONE	SEE SHEET 83

LEGEND

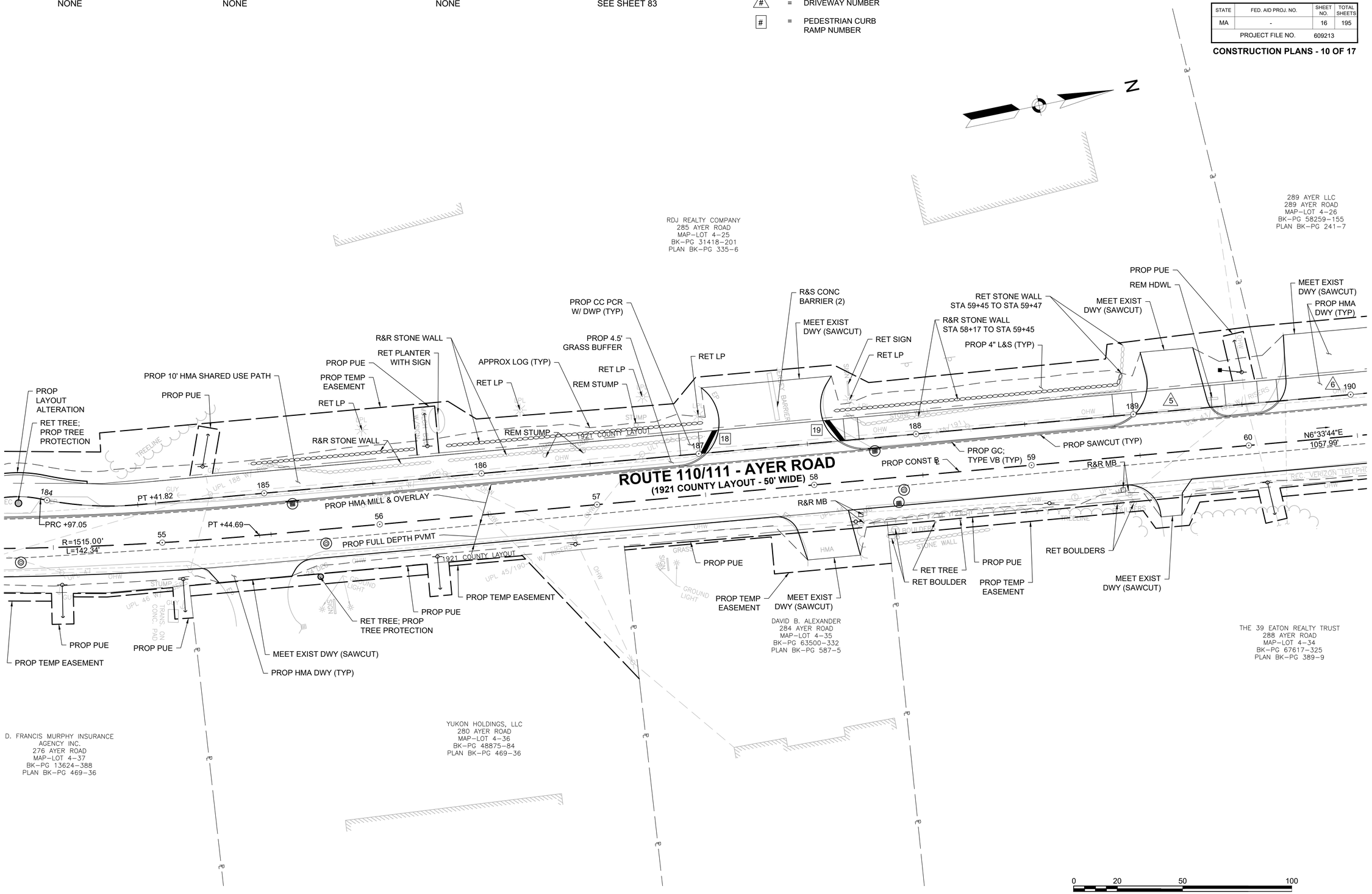
△# = DRIVEWAY NUMBER

[#] = PEDESTRIAN CURB RAMP NUMBER

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	16	195
PROJECT FILE NO.	609213		

CONSTRUCTION PLANS - 10 OF 17



0 20 50 100

SCALE: 1" = 20'

FOR PROFILE: SEE SHEET NO. 26 & 32

609213_HDS(CONSTRUCTION PLANS).DWG Plotted on 11-Feb-2025 4:50 PM

GUARDRAIL DETAILS

STA 64+09 RT TO 64+34 RT TANGENT END TREATMENT, TL-2
STA 64+34 RT TO 65+84 RT GUARDRAIL, TL-2 (DEEP POST)
STA 65+84 RT TO 66+09 RT TANGENT END TREATMENT, TL-2

STA 64+49 LT TO 64+59 LT TRAILING ANCHORAGE
STA 64+59 LT TO 67+22 LT GUARDRAIL, TL-2 (DEEP POST)
STA 67+22 LT TO 67+47 LT TANGENT END TREATMENT, TL-2

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

SEE SHEET 84

LEGEND

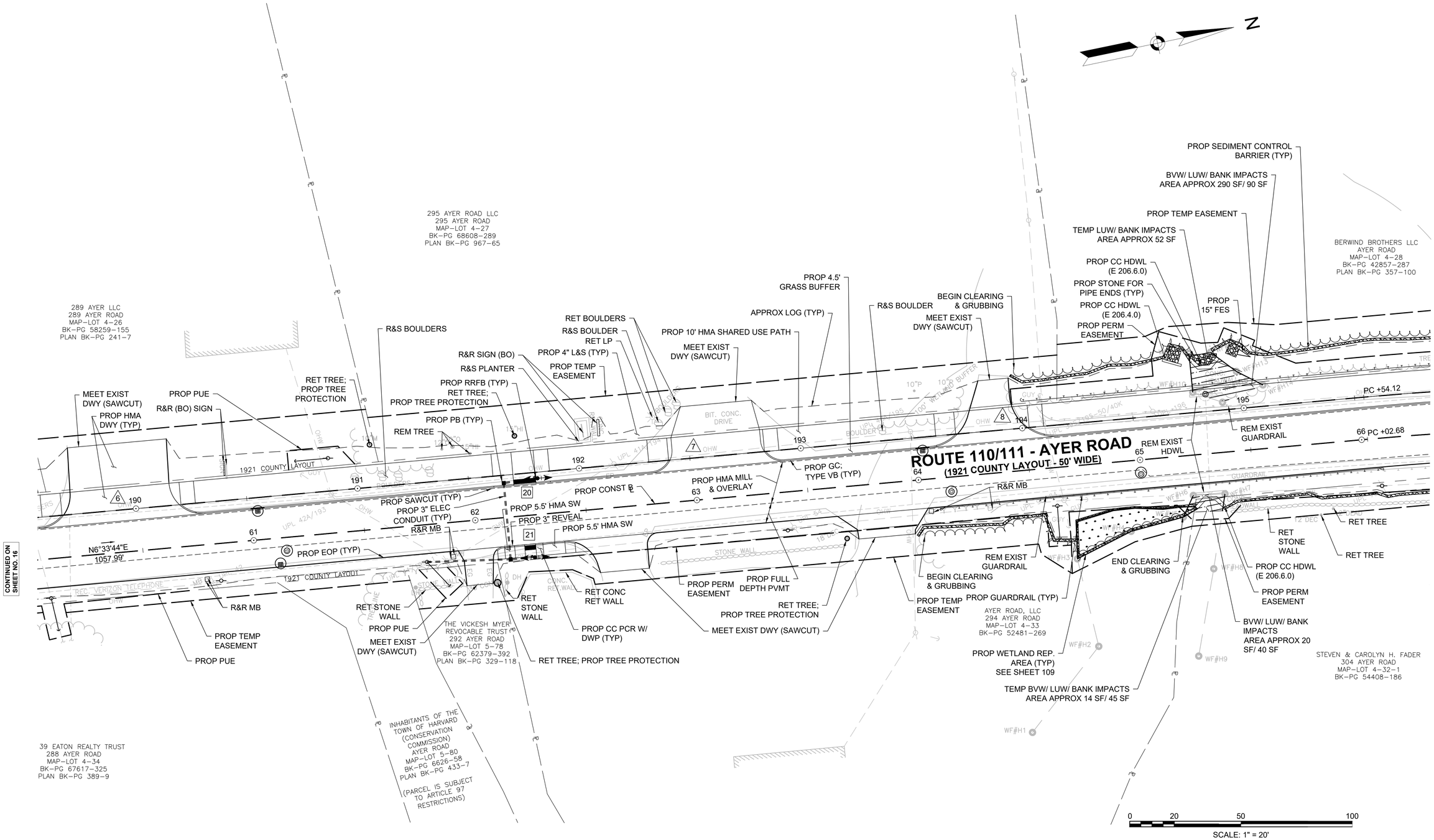
△# = DRIVEWAY NUMBER

□# = PEDESTRIAN CURB RAMP NUMBER

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	17	195
PROJECT FILE NO.	609213		

CONSTRUCTION PLANS - 11 OF 17



FOR PROFILE: SEE SHEET NO. 26 & 32

609213_HDS\CONSTRUCTION PLANS\.DWG Plotted on 11-Feb-2025 4:51 PM

GUARDRAIL DETAILS

STA 64+09 RT TO 64+34 RT TANGENT END TREATMENT, TL-2
STA 64+34 RT TO 65+84 RT GUARDRAIL, TL-2 (DEEP POST)
STA 65+84 RT TO 66+09 RT TANGENT END TREATMENT, TL-2

STA 64+49 LT TO 64+59 LT TRAILING ANCHORAGE
STA 64+59 LT TO 67+22 LT GUARDRAIL, TL-2 (DEEP POST)
STA 67+22 LT TO 67+47 LT TANGENT END TREATMENT, TL-2

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

SEE SHEET 85

LEGEND

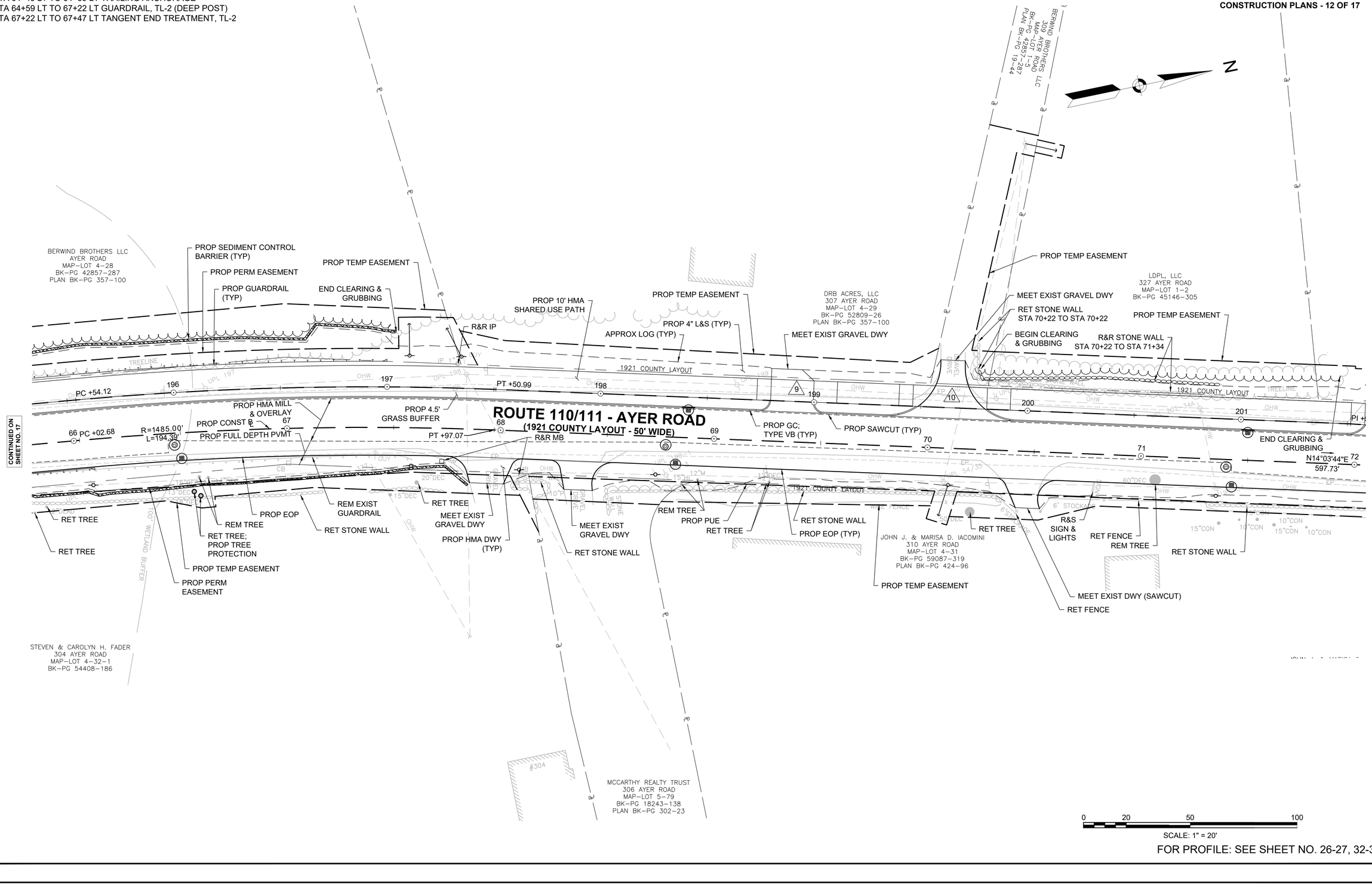
△# = DRIVEWAY NUMBER

□# = PEDESTRIAN CURB RAMP NUMBER

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	18	195
PROJECT FILE NO.	609213		

CONSTRUCTION PLANS - 12 OF 17



0 20 50 100

SCALE: 1" = 20'

FOR PROFILE: SEE SHEET NO. 26-27, 32-33

609213_HDS\CONSTRUCTION PLANS\.DWG Plotted on 11-Feb-2025 4:51 PM

GUARDRAIL DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

SEE SHEET 86

LEGEND

△# = DRIVEWAY NUMBER

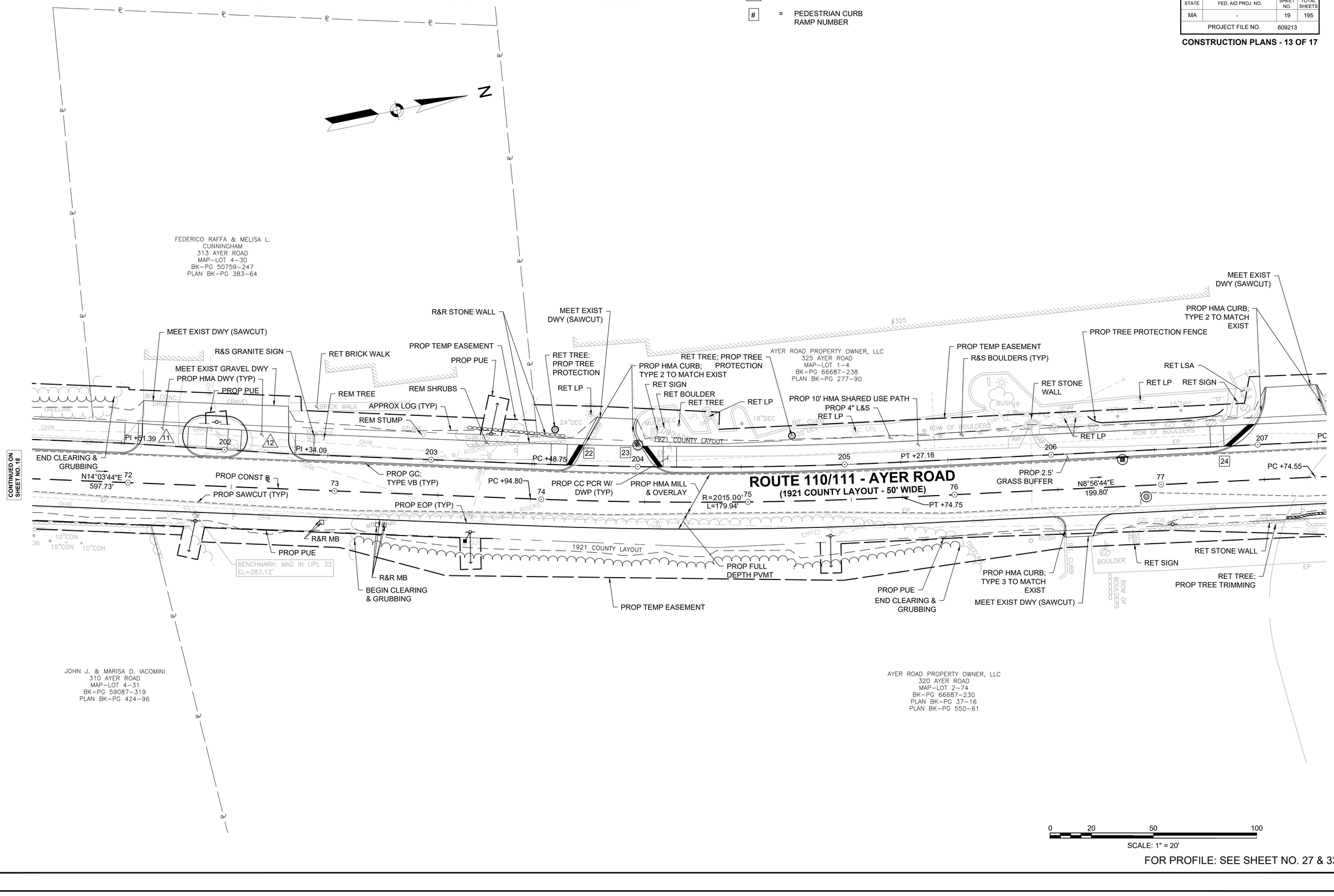
[#] = PEDESTRIAN CURB RAMP NUMBER

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	19	195
PROJECT FILE NO.	609213		

CONSTRUCTION PLANS - 13 OF 17

609213_HDS\CONSTRUCTION PLANS\.DWG Plotted on 11-Feb-2025 4:51 PM



FOR PROFILE: SEE SHEET NO. 27 & 33

GUARDRAIL DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

SEE SHEET 87

LEGEND

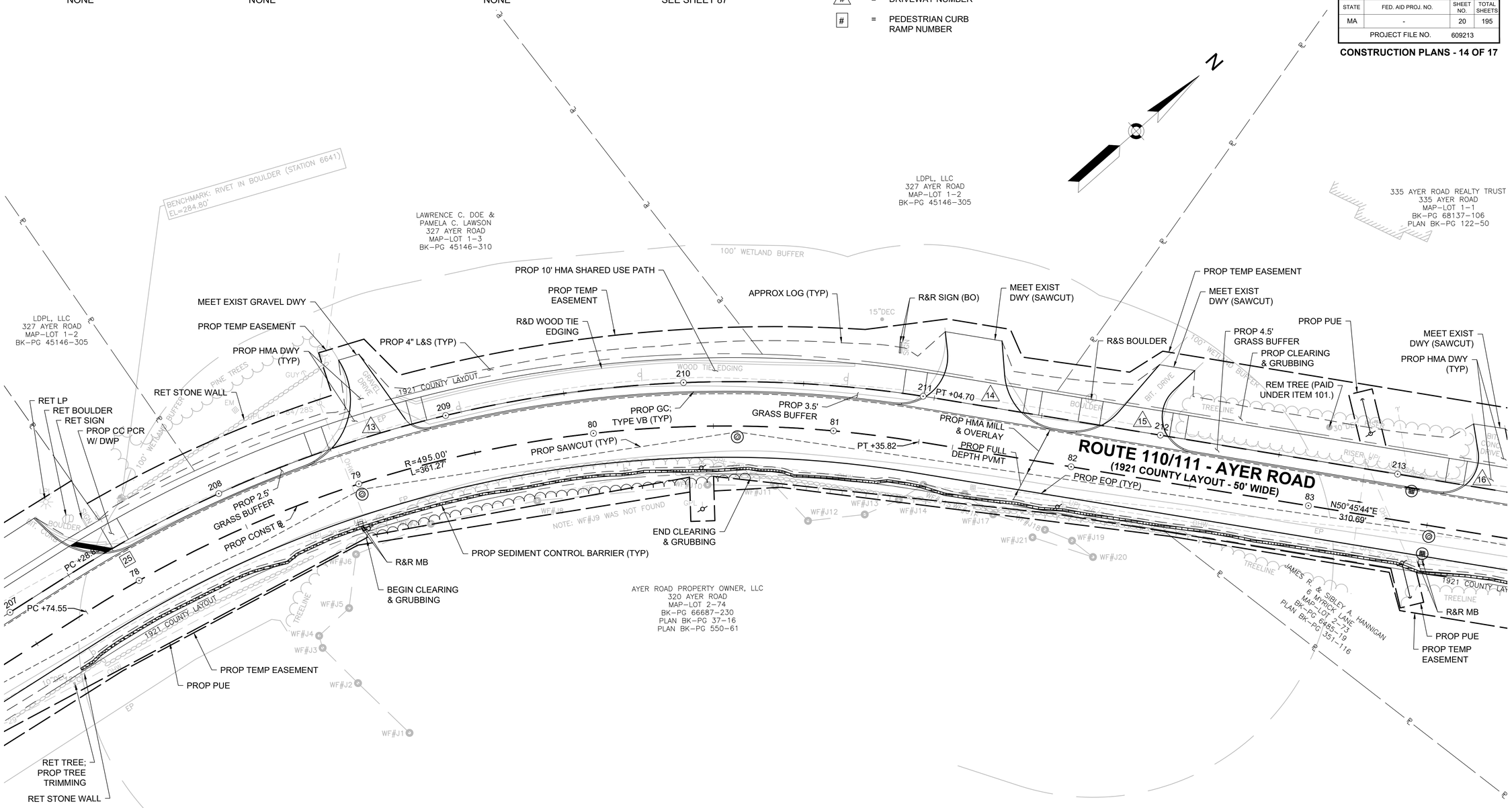
△# = DRIVEWAY NUMBER

□# = PEDESTRIAN CURB RAMP NUMBER

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	20	195
PROJECT FILE NO.	609213		

CONSTRUCTION PLANS - 14 OF 17



0 20 50 100

SCALE: 1" = 20'

FOR PROFILE: SEE SHEET NO. 27 & 33

609213_HDS(CONSTRUCTION PLANS).DWG Plotted on 11-Feb-2025 4:51 PM

GUARDRAIL DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

SEE SHEET 88

LEGEND

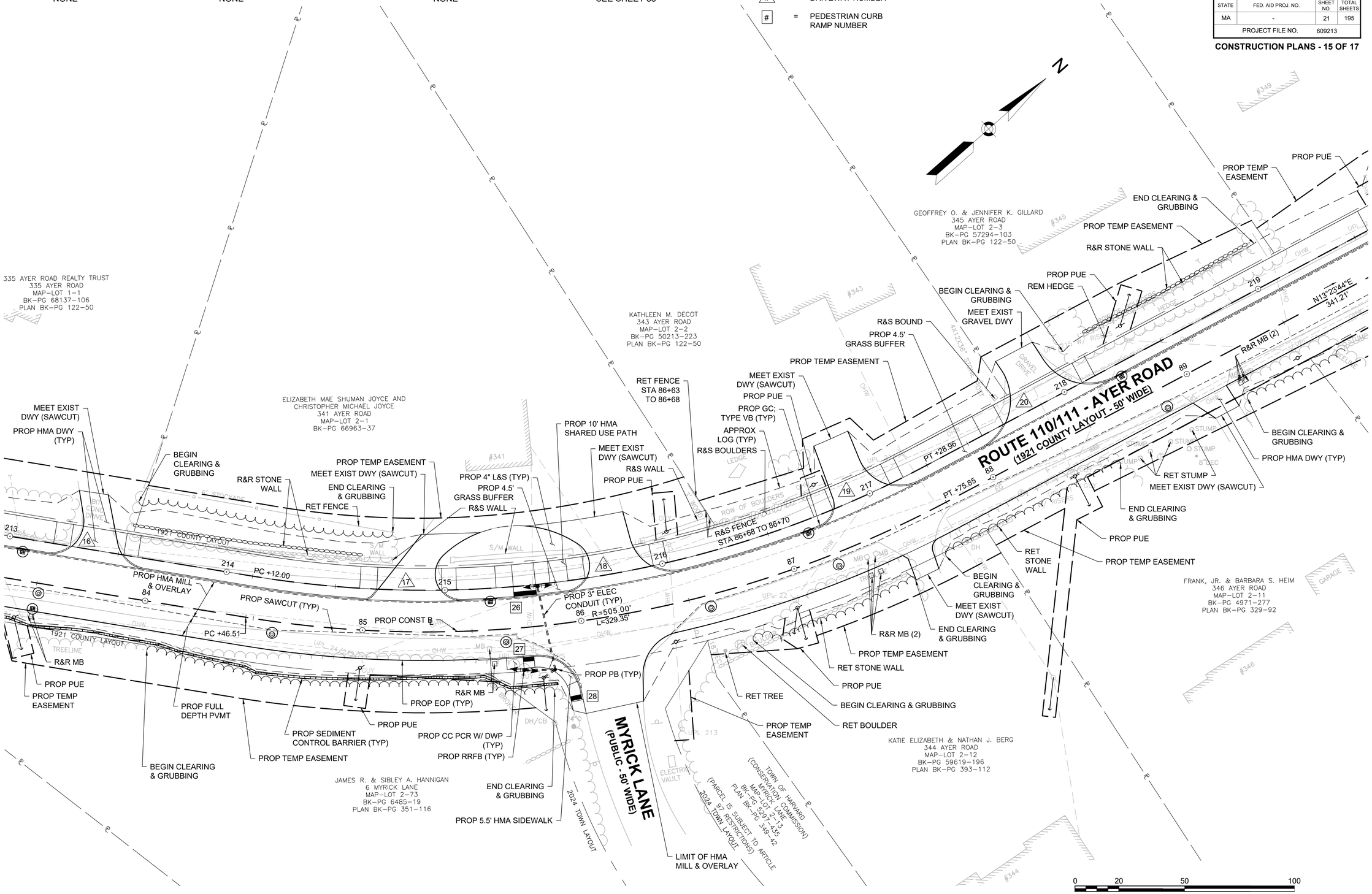
△# = DRIVEWAY NUMBER

□# = PEDESTRIAN CURB RAMP NUMBER

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	21	195
PROJECT FILE NO.	609213		

CONSTRUCTION PLANS - 15 OF 17



FOR PROFILE: SEE SHEET NO. 27 & 33-34

609213_HDS\[CONSTRUCTION PLANS\].DWG Plotted on 11-Feb-2025 4:52 PM

GUARDRAIL DETAILS	TRAFFIC SIGNAL CONDUIT	WATER SUPPLY ALTERATIONS	DRAINAGE DETAILS
NONE	NONE	NONE	SEE SHEET 89

LEGEND

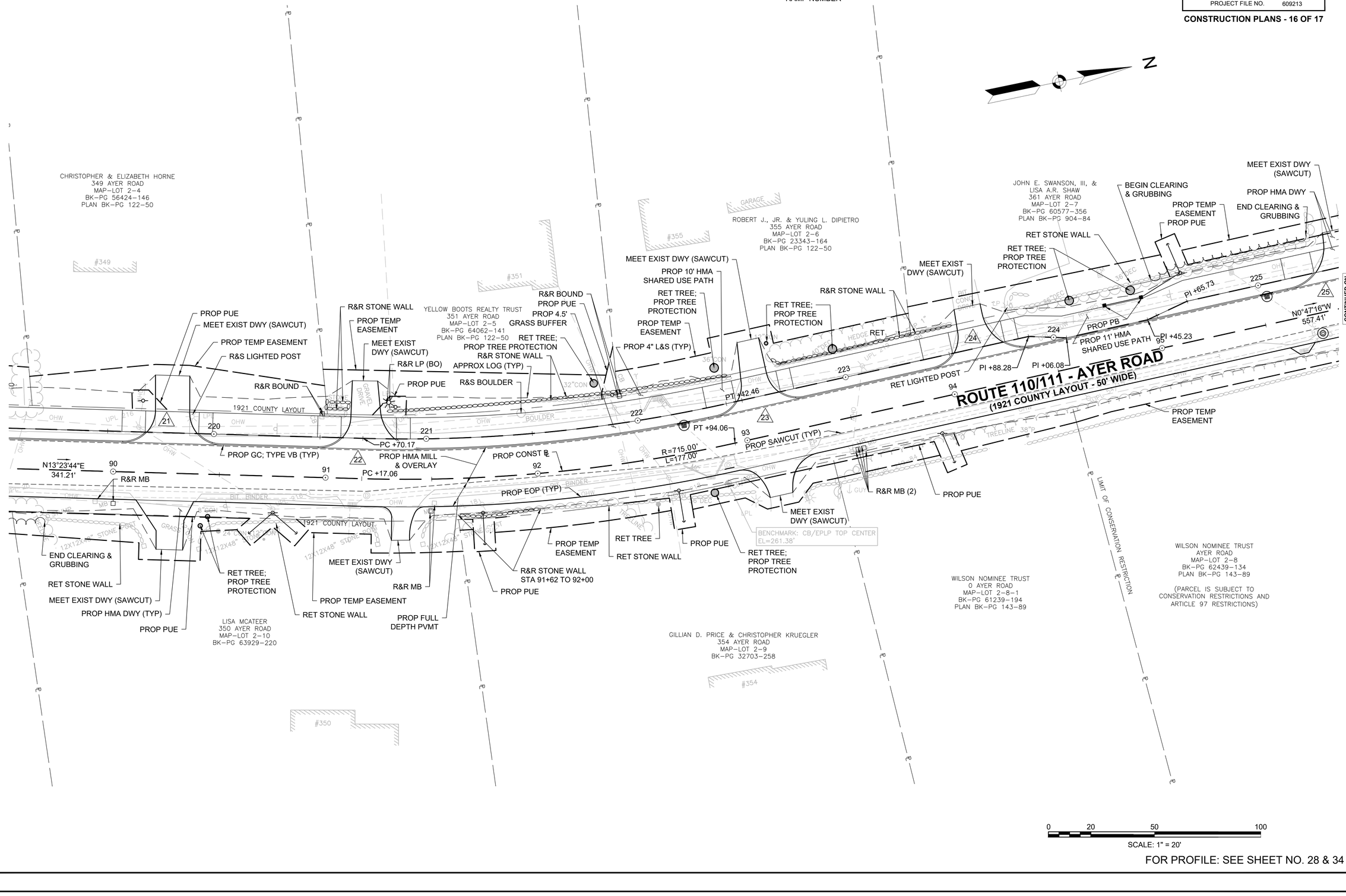
△# = DRIVEWAY NUMBER

[#] = PEDESTRIAN CURB RAMP NUMBER

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	22	195
PROJECT FILE NO.	609213		

CONSTRUCTION PLANS - 16 OF 17



FOR PROFILE: SEE SHEET NO. 28 & 34

609213_HDS\CONSTRUCTION PLANS\.DWG Plotted on 11-Feb-2025 4:52 PM

GUARDRAIL DETAILS	TRAFFIC SIGNAL CONDUIT	WATER SUPPLY ALTERATIONS	DRAINAGE DETAILS
NONE	NONE	NONE	SEE SHEET 90

LEGEND

△# = DRIVEWAY NUMBER

□# = PEDESTRIAN CURB RAMP NUMBER

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	23	195
PROJECT FILE NO.	609213		

CONSTRUCTION PLANS - 17 OF 17

609213_HDS(CONSTRUCTION PLANS).DWG Plotted on 11-Feb-2025 4:52 PM

CRAFTSMAN VILLAGE–HARVARD CONDOMINIUM AYER ROAD MAP–LOT 2–7C BK–PG 67486–268 PLAN BK–PG 954–18

CRAFTSMAN VILLAGE–HARVARD CONDOMINIUM AYER ROAD MAP–LOT 2–7C BK–PG 67486–268 PLAN BK–PG 954–18

N/F 29 HARVARD ROAD, LLC. 29 HARVARD ROAD MAP–LOT 35–22 BK–PG 71496–PAGE 87 (MIDDLESEX)

CORTLAND LANE

ROUTE 110/111 - AYER ROAD (1921 COUNTY LAYOUT - 50' WIDE)

RET ROCK
END CLEARING & GRUBBING
PROP TEMP EASEMENT
MEET EXIST DWY (SAWCUT)
BEGIN CLEARING & GRUBBING
PROP HMA DWY
END CLEARING & GRUBBING
RET STONE WALL STA 96+86 TO STA 97+73
MEET EXIST DWY (SAWCUT)
MEET EXIST SW
PROP HMA SW
REM EXIST RAMP
BEGIN CLEARING & GRUBBING
RET STONE WALL STA 96+86 TO STA 100+08
END CLEARING & GRUBBING
APPROX LOG (TYP)
PROP TEMP EASEMENT
PROP 4.5' GRASS BUFFER
PROP 10' HMA SHARED USE PATH
PROP PUE
PROP LAYOUT ALTERATION
PROP 4" L&S (TYP)
PROP RRFB (TYP)
PROP BIKE RAMP
RET GUARDRAIL
PROJECT END STA 100+74.80 N3025101.0471 E636754.0355
PC +00.95
PROP CONST ℄
R=1813.00'
L=186.60'
PROP 3" ELEC CONDUIT (TYP)
PT +38.06 N5°06'33"E 61.94'
101+00
LIMIT OF MILL & OVERLAY STA 100+72.80
229+72.05
PC +51.47
PROP GC; TYPE VB (TYP)
PROP HMA MILL & OVERLAY
PROP SAWCUT (TYP)
PROP FULL DEPTH PVMT
RET STONE WALL
PROP CC PCR W/ DWP (TYP)
PROP PB (TYP)
PROP SEDIMENT CONTROL BARRIER (TYP)
RET GUARDRAIL
N0°47'16"W 557.41'
1921 COUNTY LAYOUT
PROP TEMP EASEMENT
CONTINUED ON SHEET NO. 22

WILSON NOMINEE TRUST
AYER ROAD
MAP–LOT 2–8
BK–PG 62439–134
PLAN BK–PG 143–89

(PARCEL IS SUBJECT TO CONSERVATION RESTRICTIONS AND ARTICLE 97 RESTRICTIONS)

NEW ENGLAND TELEPHONE AND TELEGRAPH COMPANY RIGHT–OF–WAY

TOWN OF HARVARD WORCESTER COUNTY

MIDDLESEX COUNTY TOWN OF AYER

LIMIT OF CONSERVATION RESTRICTION

N/F
MAXANT INDUSTRIES, INC.
28 HARVARD ROAD
MAP–LOT 35–53
BK–PG 12183–272 (MIDDLESEX)
PLAN NO. 273 OF 1972

100' WETLAND BUFFER

0 20 50 100

SCALE: 1" = 20'

FOR PROFILE: SEE SHEET NO. 28 & 34

HARVARD
AYER ROAD (ROUTE 110/111)

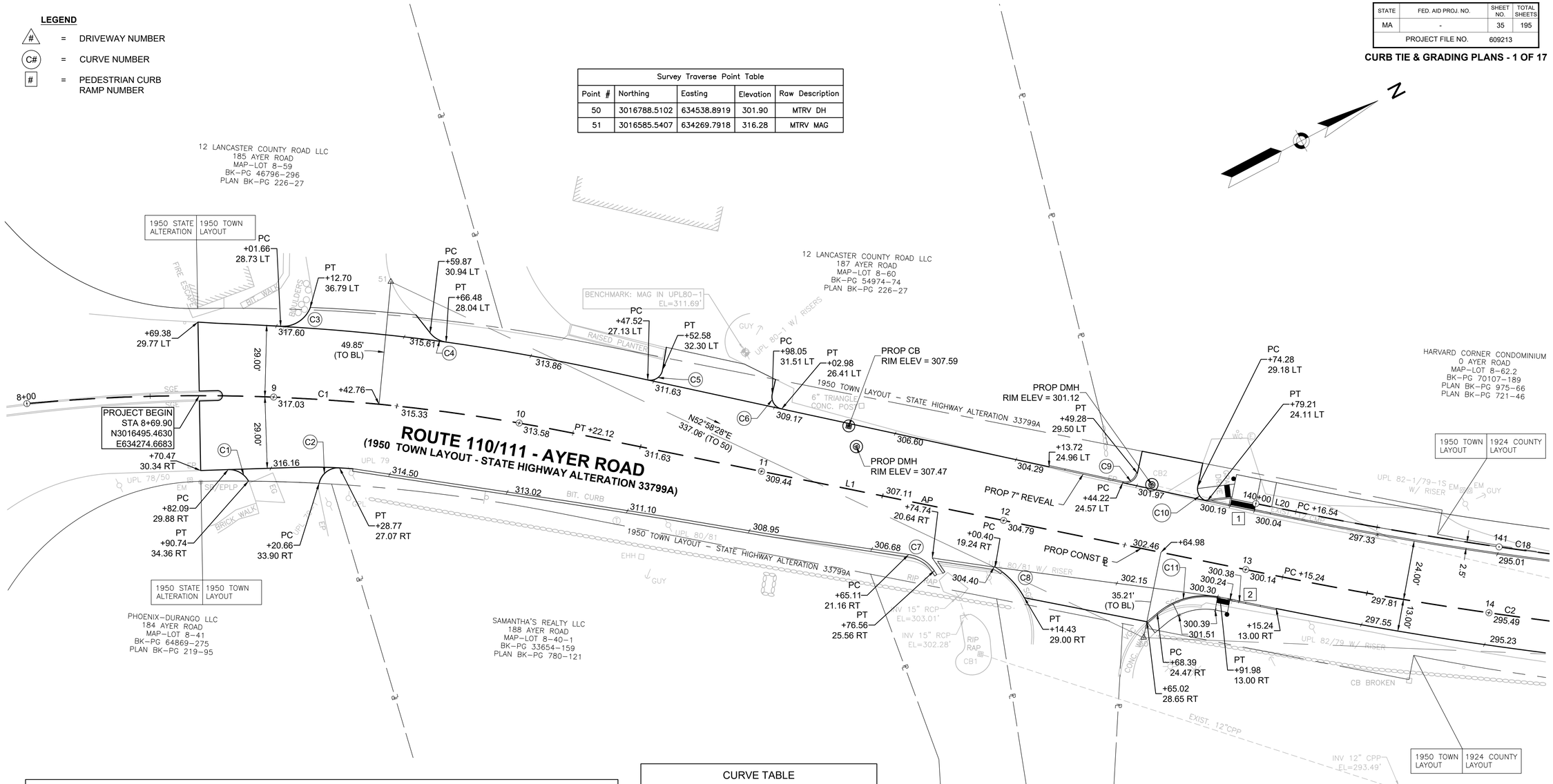
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	35	195
PROJECT FILE NO.	609213		

CURB TIE & GRADING PLANS - 1 OF 17

LEGEND

- △# = DRIVEWAY NUMBER
- C# = CURVE NUMBER
- [#] = PEDESTRIAN CURB RAMP NUMBER

Survey Traverse Point Table				
Point #	Northing	Easting	Elevation	Raw Description
50	3016788.5102	634538.8919	301.90	MTRV DH
51	3016585.5407	634269.7918	316.28	MTRV MAG



AYER ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C1	8+00.00	3016432.1448	634245.1154	R=760.00' Δ=16°44'43" L=222.12' T=111.86'		10+22.12	3016622.3403	634358.3055
L1	10+22.12	3016622.3403	634358.3055		N39°07'50"E 293.12'	13+15.24	3016849.7147	634543.2891
C2	13+15.24	3016849.7147	634543.2891	R=1485.00' Δ=11°51'23" L=307.29' T=154.20'		16+22.53	3017106.3809	634711.2623

SUP CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L20	140+00.00	3016853.9249	634511.9076		N39°07'50"E 16.54'	140+16.54	3016866.7541	634522.3450
C18	140+16.54	3016866.7541	634522.3450	R=1458.00' Δ=11°51'23" L=301.71' T=151.39'		143+18.24	3017118.7536	634687.2641

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C1	63° 04' 03"	9.00	9.91	5.52
C2	80° 37' 51"	8.00	11.26	6.79
C3	71° 39' 34"	12.00	15.01	8.66
C4	43° 42' 07"	10.00	7.63	4.01
C5	92° 39' 23"	5.00	8.09	5.24
C6	90° 22' 13"	5.00	7.89	5.03
C7	48° 16' 22"	15.00	12.64	6.72
C8	30° 55' 50"	32.00	17.27	8.85
C9	89° 59' 39"	5.00	7.85	5.00
C10	89° 59' 49"	5.00	7.85	5.00
C11	50° 57' 41"	30.00	26.68	14.30

609213_HD6(CURB TIE & GRADING).DWG Plotted on 11-Feb-2025 4:55 PM

AYER ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C2	13+15.24	3016849.7147	634543.2891	R=1485.00' Δ=11°51'23" L=307.29' T=154.20'		16+22.53	3017106.3809	634711.2623
L2	16+22.53	3017106.3809	634711.2623		N27°16'27"E 687.49'	23+10.02	3017717.4371	635026.3047

SUP CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C18	140+16.54	3016866.7541	634522.3450	R=1458.00' Δ=11°51'23" L=301.71' T=151.39'		143+18.24	3017118.7536	634687.2641
L21	143+18.24	3017118.7536	634687.2641		N27°16'27"E 555.14'	148+73.39	3017612.1792	634941.6596

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C12	39° 38' 52"	10.00	6.92	3.60
C13	37° 25' 59"	10.00	6.53	3.39
C14	60° 30' 15"	20.00	21.12	11.66
C15	106° 15' 37"	2.00	3.71	2.67
C16	147° 28' 47"	2.00	5.15	6.86
C17	106° 15' 37"	2.00	3.71	2.67
C18	102° 24' 04"	3.00	5.36	3.73
C19	85° 30' 40"	3.00	4.48	2.77
C20	95° 20' 35"	5.00	8.32	5.49
C21	46° 59' 24"	20.00	16.40	8.69
C22	71° 18' 49"	5.00	6.22	3.59

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	36	195
PROJECT FILE NO.	609213		

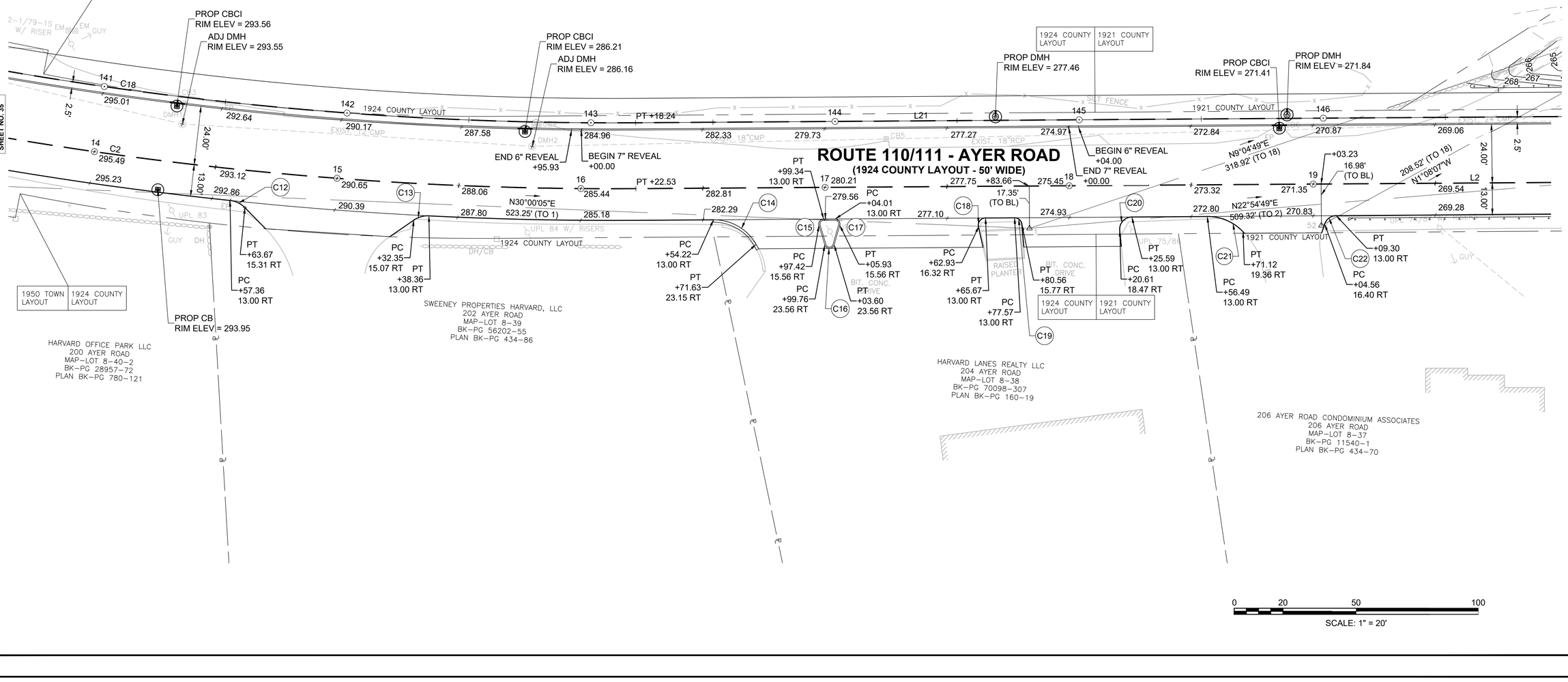
CURB TIE & GRADING PLANS - 2 OF 17

Survey Traverse Point Table				
Point #	Northing	Easting	Elevation	Raw Description
1	3017241.6498	634800.5271	275.11	MTRV MAG
52	3017348.0910	634854.9899	270.91	MTRV MAG

HARVARD CORNER CONDOMINIUM
0 AYER ROAD
MAP-LOT 8-62.2
BK-PG 70107-189
PLAN BK-PG 975-66
PLAN BK-PG 721-46

LEGEND

(#) = DRIVEWAY NUMBER
(C#) = CURVE NUMBER
[#] = PEDESTRIAN CURB RAMP NUMBER



609213_HD6(CURB TIE & GRADING).DWG Plotted on 11-Feb-2025 4:56 PM

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	37	195
PROJECT FILE NO.	609213		

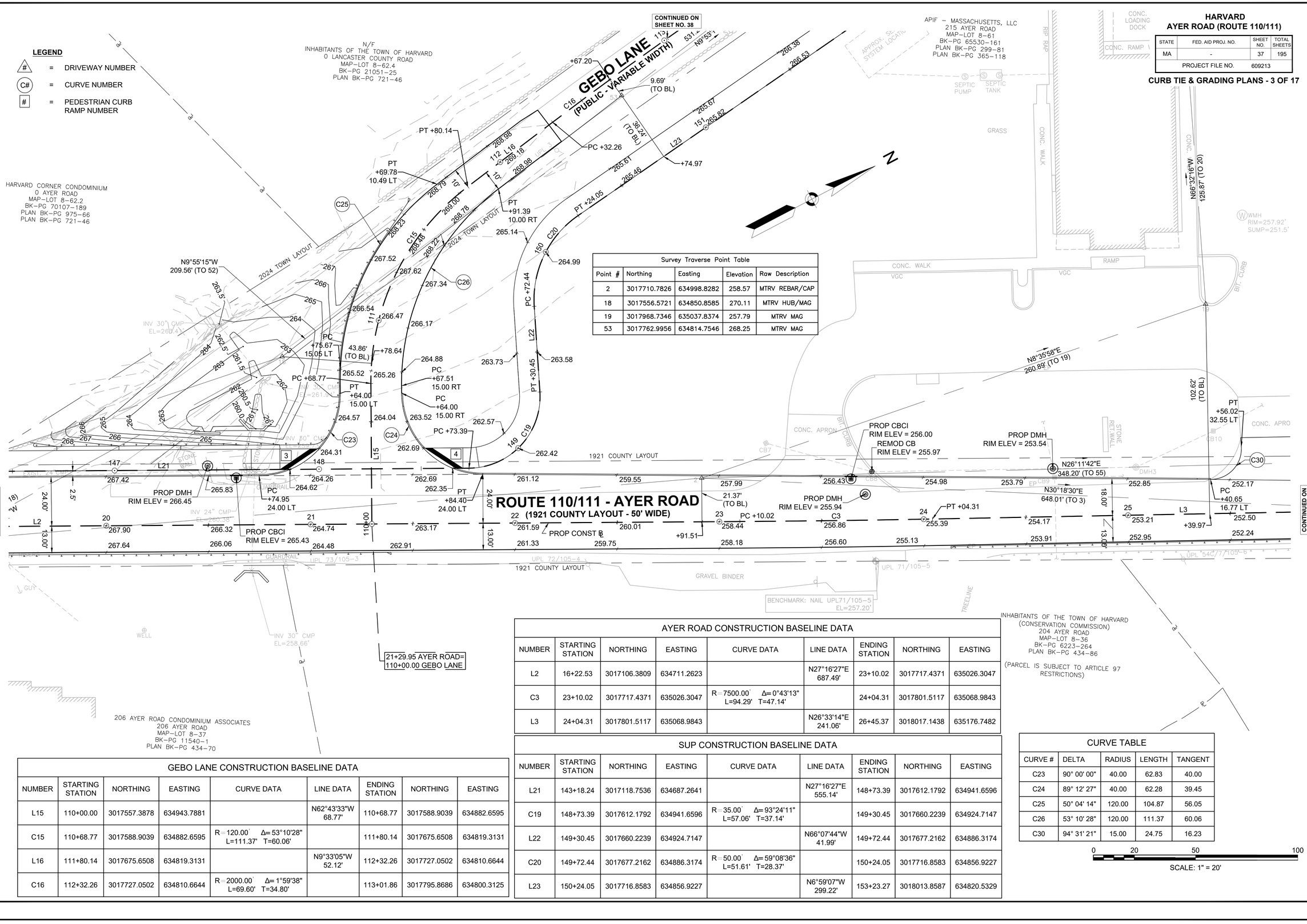
CURB TIE & GRADING PLANS - 3 OF 17

LEGEND

△# = DRIVEWAY NUMBER

C# = CURVE NUMBER

= PEDESTRIAN CURB RAMP NUMBER



Survey Traverse Point Table				
Point #	Northing	Easting	Elevation	Raw Description
2	3017710.7826	634998.8282	258.57	MTRV REBAR/CAP
18	3017556.5721	634850.8585	270.11	MTRV HUB/MAG
19	3017968.7346	635037.8374	257.79	MTRV MAG
53	3017762.9956	634814.7546	268.25	MTRV MAG

GEBO LANE CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L15	110+00.00	3017557.3878	634943.7881		N62°43'33"W 68.77'	110+68.77	3017588.9039	634882.6595
C15	110+68.77	3017588.9039	634882.6595	R=120.00' Δ=53°10'28" L=111.37' T=60.06'		111+80.14	3017675.6508	634819.3131
L16	111+80.14	3017675.6508	634819.3131		N9°33'05"W 52.12'	112+32.26	3017727.0502	634810.6644
C16	112+32.26	3017727.0502	634810.6644	R=2000.00' Δ=1°59'38" L=69.60' T=34.80'		113+01.86	3017795.8686	634800.3125

AYER ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L2	16+22.53	3017106.3809	634711.2623		N27°16'27"E 687.49'	23+10.02	3017717.4371	635026.3047
C3	23+10.02	3017717.4371	635026.3047	R=7500.00' Δ=0°43'13" L=94.29' T=47.14'		24+04.31	3017801.5117	635068.9843
L3	24+04.31	3017801.5117	635068.9843		N26°33'14"E 241.06'	26+45.37	3018017.1438	635176.7482

SUP CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L21	143+18.24	3017118.7536	634687.2641		N27°16'27"E 555.14'	148+73.39	3017612.1792	634941.6596
C19	148+73.39	3017612.1792	634941.6596	R=35.00' Δ=93°24'11" L=57.06' T=37.14'		149+30.45	3017660.2239	634924.7147
L22	149+30.45	3017660.2239	634924.7147		N66°07'44"W 41.99'	149+72.44	3017677.2162	634886.3174
C20	149+72.44	3017677.2162	634886.3174	R=50.00' Δ=59°08'36" L=51.61' T=28.37'		150+24.05	3017716.8583	634856.9227
L23	150+24.05	3017716.8583	634856.9227		N6°59'07"W 299.22'	153+23.27	3018013.8587	634820.5329

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C23	90° 00' 00"	40.00	62.83	40.00
C24	89° 12' 27"	40.00	62.28	39.45
C25	50° 04' 14"	120.00	104.87	56.05
C26	53° 10' 28"	120.00	111.37	60.06
C30	94° 31' 21"	15.00	24.75	16.23

0 20 50 100

SCALE: 1" = 20'

609213_HD6(CURB TIE & GRADING).DWG Plotted on 11-Feb-2025 4:57 PM

LEGEND

△# = DRIVEWAY NUMBER

(C#) = CURVE NUMBER

[#] = PEDESTRIAN CURB RAMP NUMBER

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	38	195
PROJECT FILE NO.	609213		

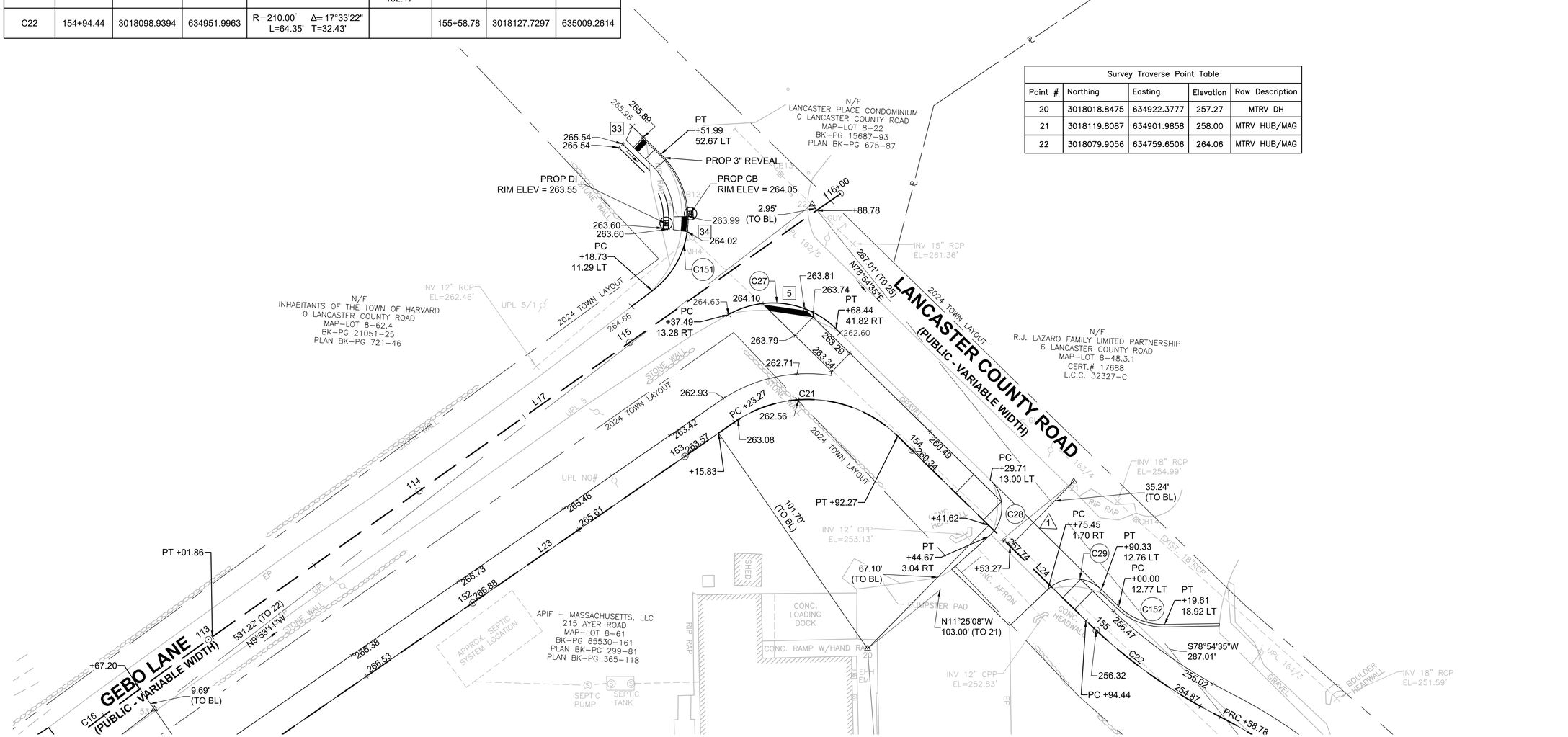
CURB TIE & GRADING PLANS - 4 OF 17

GEBO LANE CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C16	112+32.26	3017727.0502	634810.6644	R=2000.00' Δ=1°59'38" L=69.60' T=34.80'		113+01.86	3017795.8686	634800.3125
L17	113+01.86	3017795.8686	634800.3125		N7°33'27"W 298.14'	116+00.00	3018091.4178	634761.1003

SUP CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L23	150+24.05	3017716.8583	634856.9227		N6°59'07"W 299.22'	153+23.27	3018013.8587	634820.5329
C21	153+23.27	3018013.8587	634820.5329	R=50.00' Δ=79°04'20" L=69.00' T=41.27'		153+92.27	3018067.5157	634854.7830
L24	153+92.27	3018067.5157	634854.7830		N72°05'13"E 102.17'	154+94.44	3018098.9394	634951.9963
C22	154+94.44	3018098.9394	634951.9963	R=210.00' Δ=17°33'22" L=64.35' T=32.43'		155+58.78	3018127.7297	635009.2614

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C27	73° 56' 45"	35.00	45.17	26.35
C28	93° 58' 05"	15.00	24.60	16.08
C29	87° 30' 30"	15.00	22.91	14.36
C151	98° 39' 00"	35.00	60.26	40.73
C152	45° 00' 01"	25.00	19.64	10.36

Survey Traverse Point Table				
Point #	Northing	Easting	Elevation	Raw Description
20	3018018.8475	634922.3777	257.27	MTRV DH
21	3018119.8087	634901.9858	258.00	MTRV HUB/MAG
22	3018079.9056	634759.6506	264.06	MTRV HUB/MAG



CONTINUED ON SHEET NO. 37

CONTINUED ON SHEET NO. 39

0 20 50 100

SCALE: 1" = 20'

609213_HD6(CURB TIE & GRADING).DWG Plotted on 11-Feb-2025 4:57 PM

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	39	195
PROJECT FILE NO.	609213		

CURB TIE & GRADING PLANS - 5 OF 17

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C30	94° 31' 21"	15.00	24.75	16.23
C31	60° 35' 20"	45.00	47.59	26.29
C32	91° 25' 02"	10.00	15.96	10.25
C33	49° 43' 17"	30.00	26.03	13.90
C34	41° 05' 49"	25.00	17.93	9.37
C35	91° 44' 32"	10.00	16.01	10.31
C36	91° 31' 58"	30.00	47.93	30.81
C37	13° 51' 05"	43.00	10.40	5.22
C38	14° 09' 26"	50.00	12.35	6.21
C39	11° 07' 56"	67.00	13.02	6.53
C40	83° 13' 22"	35.00	50.84	31.09

AYER ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L3	24+04.31	3017801.5117	635068.9843		N26°33'14"E 241.06'	26+45.37	3018017.1438	635176.7482
C4	26+45.37	3018017.1438	635176.7482	R=3500.00' Δ=1°48'47" L=110.76' T=55.38'		27+56.12	3018115.4179	635227.8205
L4	27+56.12	3018115.4179	635227.8205		N28°22'02"E 85.19'	28+41.32	3018190.3795	635268.2965
C5	28+41.32	3018190.3795	635268.2965	R=714.00' Δ=15°58'17" L=199.03' T=100.17'		30+40.35	3018376.3473	635337.3884
L5	30+40.35	3018376.3473	635337.3884		N12°23'44"E 961.28'	40+01.63	3019315.2225	635543.7376

SUP CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C22	154+94.44	3018098.9394	634951.9963	R=210.00' Δ=17°33'22" L=64.35' T=32.43'		155+58.78	3018127.7297	635009.2614
C23	155+58.78	3018127.7297	635009.2614	R=190.00' Δ=16°16'45" L=53.98' T=27.18'		156+12.77	3018152.4311	635057.0587
L25	156+12.77	3018152.4311	635057.0587		N70°48'35"E 176.18'	157+88.95	3018210.3418	635223.4462
C24	157+88.95	3018210.3418	635223.4462	R=100.00' Δ=48°51'56" L=85.29' T=45.43'		158+74.23	3018267.1603	635283.5718
C25	158+74.23	3018267.1603	635283.5718	R=695.00' Δ=9°47'29" L=118.77' T=59.53'		159+93.00	3018380.4258	635318.8313
L26	159+93.00	3018380.4258	635318.8313		N12°23'44"E 961.28'	169+54.29	3019319.3011	635525.1805

Survey Traverse Point Table				
Point #	Northing	Easting	Elevation	Raw Description
3	3018270.2272	635325.8509	256.11	MTRV MAG
23	3018399.4185	635322.8127	260.81	MTRV HUB/MAG
25	3018135.1128	635041.2979	253.63	MTRV HUB/MAG
54	3018262.0071	635133.9479	245.65	MTRV HUB/MAG
55	3018023.2186	635152.5322	251.36	MTRV HUB/MAG
59	3018365.0292	635313.6252	256.11	MTRV HTS

POOR FARM ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L18	120+00.00	3018318.9796	635322.2560		S72°50'31"E 40.76'	120+40.76	3018306.9543	635361.2045
L19	120+64.21	3018295.5395	635381.4855		S48°24'48"E 35.79'	121+00.00	3018271.7855	635408.2529

LEGEND

△# = DRIVEWAY NUMBER
(C#) = CURVE NUMBER
▯# = PEDESTRIAN CURB RAMP NUMBER

CONTINUED ON SHEET NO. 38
CONTINUED ON SHEET NO. 37
CONTINUED ON SHEET NO. 40

LANCASTER COUNTY ROAD (PUBLIC - VARIABLE WIDTH)
ROUTE 110/111 - AYER ROAD (1921 COUNTY LAYOUT - 50' WIDE)
POOR FARM ROAD (PUBLIC - VARIABLE WIDTH)
"BOWERS BROOK"
1921 COUNTY LAYOUT
2024 TOWN LAYOUT

N/F R.J. LAZARO FAMILY LIMITED PARTNERSHIP 6 LANCASTER COUNTY ROAD MAP-LOT 8-48.3.1 CERT.# 17688 L.C.C. 32327-C

N/F APIF - MASSACHUSETTS, LLC 215 AYER ROAD MAP-LOT 8-61 BK-PG 65530-161 PLAN BK-PG 299-81 PLAN BK-PG 365-118

TOWN OF HARVARD (CONSERVATION COMMISSION) 0 LANCASTER COUNTY ROAD MAP-LOT 4-48.3.4 CERT.# 11358 L.C.C. 32327-C (PARCEL IS SUBJECT TO ARTICLE 97 RESTRICTIONS)

LAURA A. CLARAGE 129 POOR FARM ROAD MAP-LOT 8-35 BK-PG 64304-359

JEFFERY P. & ALEXANDRA H. MCKEARNEY 132 POOR FARM ROAD MAP-LOT 8-24 BK-PG 67692-264 PLAN BK-PG 772-113

0 20 50 100
SCALE: 1" = 20'

609213_HD6(CURB TIE & GRADING).DWG Plotted on 11-Feb-2025 4:57 PM

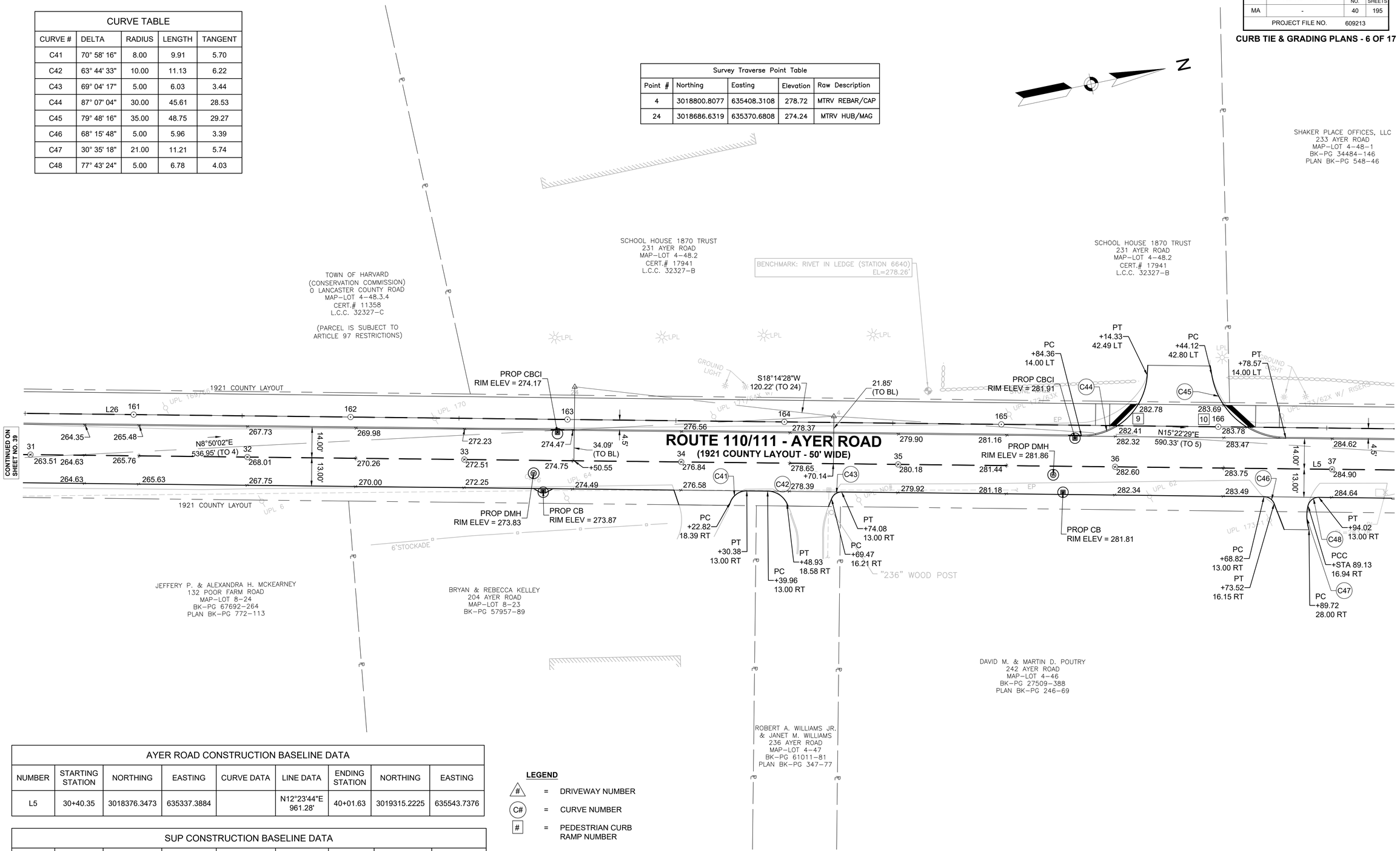
HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	40	195
PROJECT FILE NO.	609213		

CURB TIE & GRADING PLANS - 6 OF 17

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C41	70° 58' 16"	8.00	9.91	5.70
C42	63° 44' 33"	10.00	11.13	6.22
C43	69° 04' 17"	5.00	6.03	3.44
C44	87° 07' 04"	30.00	45.61	28.53
C45	79° 48' 16"	35.00	48.75	29.27
C46	68° 15' 48"	5.00	5.96	3.39
C47	30° 35' 18"	21.00	11.21	5.74
C48	77° 43' 24"	5.00	6.78	4.03

Survey Traverse Point Table				
Point #	Northing	Easting	Elevation	Raw Description
4	3018800.8077	635408.3108	278.72	MTRV REBAR/CAP
24	3018686.6319	635370.6808	274.24	MTRV HUB/MAG



AYER ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L5	30+40.35	3018376.3473	635337.3884		N12°23'44"E 961.28'	40+01.63	3019315.2225	635543.7376

SUP CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L26	159+93.00	3018380.4258	635318.8313		N12°23'44"E 961.28'	169+54.29	3019319.3011	635525.1805

LEGEND

- △# = DRIVEWAY NUMBER
- (C#) = CURVE NUMBER
- [#] = PEDESTRIAN CURB RAMP NUMBER

609213_HD6(CURB TIE & GRADING).DWG Plotted on 11-Feb-2025 4:58 PM

AYER ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L5	30+40.35	3018376.3473	635337.3884		N12°23'44"E 961.28'	40+01.63	3019315.2225	635543.7376
C6	40+01.63	3019315.2225	635543.7376	R=535.00' Δ=15°12'00" L=141.93' T=71.38'		41+43.56	3019456.2415	635555.5683
L6	41+43.56	3019456.2415	635555.5683		N2°48'16"W 464.08'	46+07.64	3019919.7653	635532.8624

SUP CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L26	159+93.00	3018380.4258	635318.8313		N12°23'44"E 961.28'	169+54.29	3019319.3011	635525.1805
C26	169+54.29	3019319.3011	635525.1805	R=516.00' Δ=15°12'00" L=136.89' T=68.85'		170+91.18	3019455.3119	635536.5911
L27	170+91.18	3019455.3119	635536.5911		N2°48'16"W 464.08'	175+55.26	3019918.8357	635513.8851

LEGEND

- # = DRIVEWAY NUMBER
- C# = CURVE NUMBER
- # = PEDESTRIAN CURB RAMP NUMBER

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C48	77° 43' 24"	5.00	6.78	4.03
C49	50° 20' 31"	10.00	8.79	4.70
C50	101° 19' 47"	15.00	26.53	18.30
C51	85° 45' 55"	25.00	37.42	23.22
C52	70° 43' 33"	35.00	43.20	24.84

Survey Traverse Point Table				
Point #	Northing	Easting	Elevation	Raw Description
5	3019370.0131	635564.8262	291.97	MTRV REBAR/CAP

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	41	195
PROJECT FILE NO.	609213		

CURB TIE & GRADING PLANS - 7 OF 17

609213_HD6(CURB TIE & GRADING).DWG Plotted on 11-Feb-2025 4:58 PM

SHAKER PLACE OFFICES, LLC
233 AYER ROAD
MAP-LOT 4-48-1
BK-PG 34484-146
PLAN BK-PG 548-46

BLANCHARD HOUSE OFFICE PARK CONDOMINIUM
249 AYER ROAD
MAP-LOT 4-49-1
BK-PG 11133-350
PLAN BK-PG 592-115

FOXGLOVE HOUSING ASSOCIATES LIMITED PARTNERSHIP
253 AYER ROAD
MAP-LOT 4-49-LOT 2-UNIT 1
BK-PG 14348-120
PLAN BK-PG 659-120
CERT # 107946
L.C.C. 32327-B

OFFICE AT 257 AYER RD, LLC
257 AYER ROAD
MAP-LOT 4-49-LOT 2-UNIT 2
BK-PG 64619-93
PLAN BK-PG 659-120

HARVARD CONSERVATION TRUST
AYER ROAD
MAP-LOT 5-70
BK-PG 64099-20

DAVID M. & MARTIN D. POUTRY
242 AYER ROAD
MAP-LOT 4-46
BK-PG 27509-388
PLAN BK-PG 246-69

ROUTE 110/111 - AYER ROAD
(1921 COUNTY LAYOUT - 50' WIDE)

SOUTH SHAKER ROAD
(PUBLIC - VARIABLE WIDTH)

1921 COUNTY LAYOUT
2024 TOWN LAYOUT

PROP CBCI
RIM ELEV = 288.34

PROP DMH
RIM ELEV = 288.35

PROP DI
RIM ELEV = 287.59

PROP CONST ℄

PC +54.29
PT +91.18
PC +01.63
PT +43.56
PC +68.80
37.38 LT
PT +34.38
37.15 LT
PC +09.45
14.00 LT
PT +01.89
14.00 LT
+58.51
11.92' (TO BL)
N6°51'09"W
433.89' (TO 6)
PT +94.02
13.00 RT
PCC +STA 89.13
16.94 RT
PC +89.72
28.00 RT
PC +62.92
13.00 RT
PT +70.61
16.62 RT
AP +78.54
26.18 RT
+81.77
31.87 RT
PT +19.95
13.00 RT
PC +05.25
30.95 RT

CONTINUED ON SHEET NO. 40
CONTINUED ON SHEET NO. 42

0 20 50 100
SCALE: 1" = 20'

AYER ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L6	41+43.56	3019456.2415	635555.5683		N2°48'16"W 464.08'	46+07.64	3019919.7653	635532.8624
C7	46+07.64	3019919.7653	635532.8624	R=715.00' Δ=14°45'00" L=184.07' T=92.55'		47+91.71	3020102.7405	635547.4896
L7	47+91.71	3020102.7405	635547.4896		N11°56'44"E 610.64'	54+02.35	3020700.1545	635673.8810

SUP CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L27	170+91.18	3019455.3119	635536.5911		N2°48'16"W 464.08'	175+55.26	3019918.8357	635513.8851
C27	175+55.26	3019918.8357	635513.8851	R=734.00' Δ=14°45'00" L=188.96' T=95.00'		177+44.22	3020106.6732	635528.9011
L28	177+44.22	3020106.6732	635528.9011		N11°56'44"E 597.76'	183+41.98	3020691.4910	635652.6275

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C52	70° 43' 33"	35.00	43.20	24.84
C53	59° 28' 20"	30.00	31.14	17.14
C54	106° 35' 49"	20.00	37.21	26.83
C55	107° 15' 41"	10.00	18.72	13.58
C56	59° 17' 42"	10.00	10.35	5.69
C57	50° 49' 28"	10.00	8.87	4.75
C58	85° 59' 32"	10.00	15.01	9.32
C59	39° 58' 42"	33.00	23.03	12.00
C60	65° 25' 06"	5.00	5.71	3.21
C61	43° 20' 17"	5.00	3.78	1.99
C62	31° 09' 42"	15.00	8.16	4.18
C63	40° 07' 41"	35.00	24.51	12.78
C64	61° 40' 03"	5.00	5.38	2.98
C65	87° 47' 00"	45.00	68.94	43.29

Survey Traverse Point Table				
Point #	Northing	Easting	Elevation	Raw Description
6	3019800.8047	635513.0573	289.07	MTRV REBAR/CAP

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	42	195
PROJECT FILE NO.	609213		

CURB TIE & GRADING PLANS - 8 OF 17

609213_HD6(CURB TIE & GRADING).DWG Plotted on 11-Feb-2025 4:58 PM

259 AYER ROAD LLC
259 AYER ROAD
MAP-LOT 4-51
BK-PG 59129-227
PLAN BK-PG 462-72

REM REALTY TRUST
AYER ROAD
MAP-LOT 4-52-2
BK-PG 56380-389

OFFICE AT 257 AYER RD, LLC
257 AYER ROAD
MAP-LOT 4-49-LOT 2-UNIT 2
BK-PG 64619-93
PLAN BK-PG 659-120

HARVARD CONSERVATION TRUST
AYER ROAD
MAP-LOT 5-70
BK-PG 64099-20

256 AYER ROAD, LLC
256 AYER ROAD
MAP-LOT 4-41
BK-PG 59556-235
PLAN BK-PG 281-117

N/F
256 AYER ROAD, LLC
256 AYER ROAD
MAP-LOT 4-41
BK-PG 59556-235
PLAN BK-PG 281-117

DKMP REALTY, LLC
262 AYER ROAD
MAP-LOT 4-40
BK-PG 61126-24

THREE SEASONS TREESCAPE, LLC
264 AYER ROAD
MAP-LOT 4-39
BK-PG 64293-91
PLAN BK-PG 379-10-11

ROUTE 110/111 - AYER ROAD
(1921 COUNTY LAYOUT - 50' WIDE)

CONTINUED ON SHEET NO.41

CONTINUED ON SHEET NO.43

LEGEND

△# = DRIVEWAY NUMBER
(C#) = CURVE NUMBER
[#] = PEDESTRIAN CURB RAMP NUMBER

0 20 50 100
SCALE: 1" = 20'

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	43	195
PROJECT FILE NO.	609213		

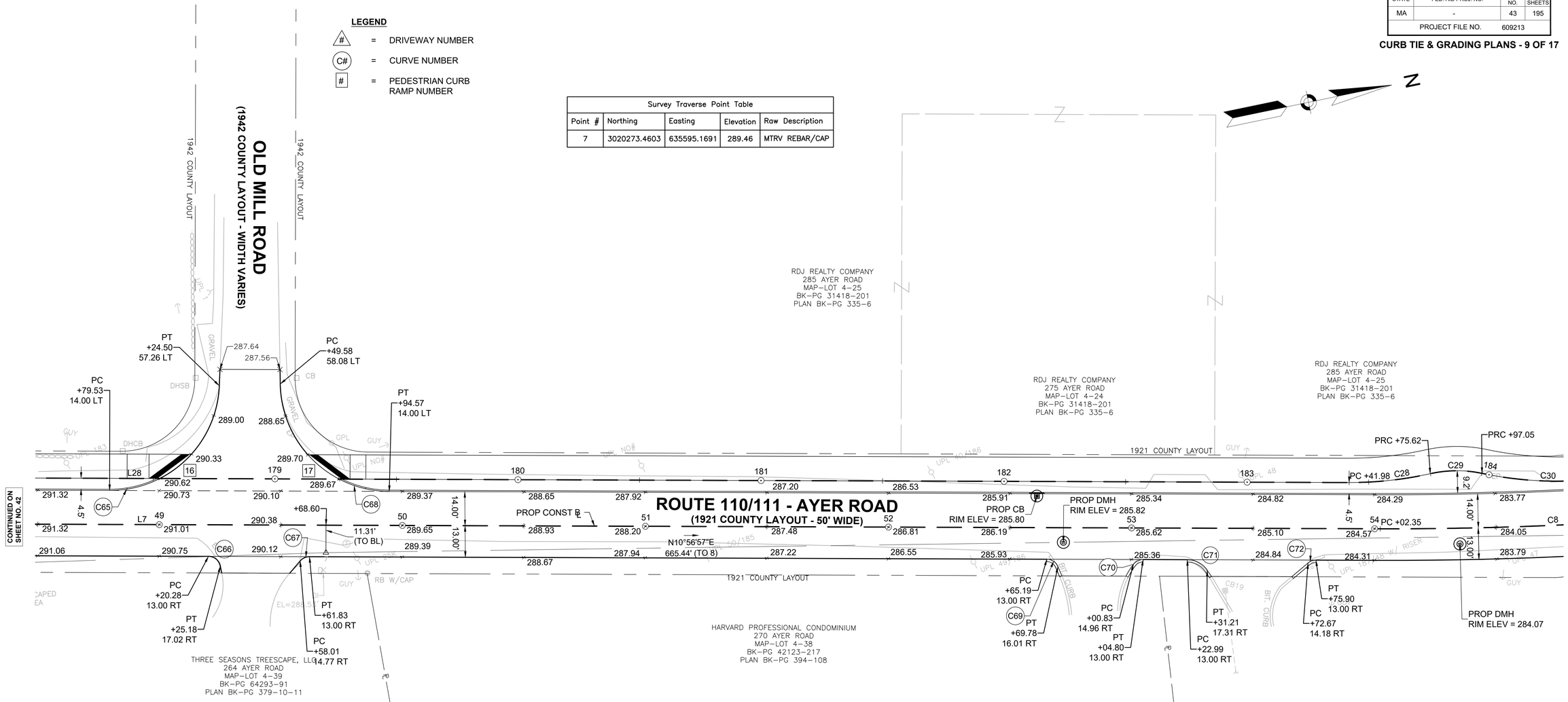
CURB TIE & GRADING PLANS - 9 OF 17

609213_HD6(CURB TIE & GRADING).DWG Plotted on 11-Feb-2025 4:59 PM

LEGEND

- # = DRIVEWAY NUMBER
- C# = CURVE NUMBER
- # = PEDESTRIAN CURB RAMP NUMBER

Survey Traverse Point Table				
Point #	Northing	Easting	Elevation	Raw Description
7	3020273.4603	635595.1691	289.46	MTRV REBAR/CAP



CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C65	87° 47' 00"	45.00	68.94	43.29
C66	78° 38' 22"	5.00	6.86	4.10
C67	49° 45' 24"	5.00	4.34	2.32
C68	88° 49' 37"	45.00	69.76	44.09
C69	66° 35' 32"	5.00	5.81	3.28
C70	52° 34' 16"	5.00	4.59	2.47
C71	55° 19' 01"	10.00	9.65	5.24
C72	40° 15' 35"	5.00	3.51	1.83

AYER ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L7	47+91.71	3020102.7405	635547.4896		N11°56'44"E 610.64'	54+02.35	3020700.1545	635673.8810
C8	54+02.35	3020700.1545	635673.8810	R=1515.00' Δ=5°23'00" L=142.34' T=71.22'		55+44.69	3020840.5950	635696.7630

SUP CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L28	177+44.22	3020106.6732	635528.9011		N11°56'44"E 597.76'	183+41.98	3020691.4910	635652.6275
C28	183+41.98	3020691.4910	635652.6275	R=150.00' Δ=12°50'55" L=33.64' T=16.89'		183+75.62	3020724.9023	635655.8572
C29	183+75.62	3020724.9023	635655.8572	R=50.00' Δ=24°33'50" L=21.44' T=10.89'		183+97.05	3020745.7564	635660.0541
C30	183+97.05	3020745.7564	635660.0541	R=150.00' Δ=17°05'55" L=44.76' T=22.55'		184+41.82	3020788.8123	635671.6808

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	44	195
PROJECT FILE NO.	609213		

CURB TIE & GRADING PLANS - 10 OF 17

AYER ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C8	54+02.35	3020700.1545	635673.8810	R=1515.00' Δ=5°23'00" L=142.34' T=71.22'		55+44.69	3020840.5950	635696.7630
L8	55+44.69	3020840.5950	635696.7630		N6°33'44"E 1057.99'	66+02.68	3021891.6571	635817.6733

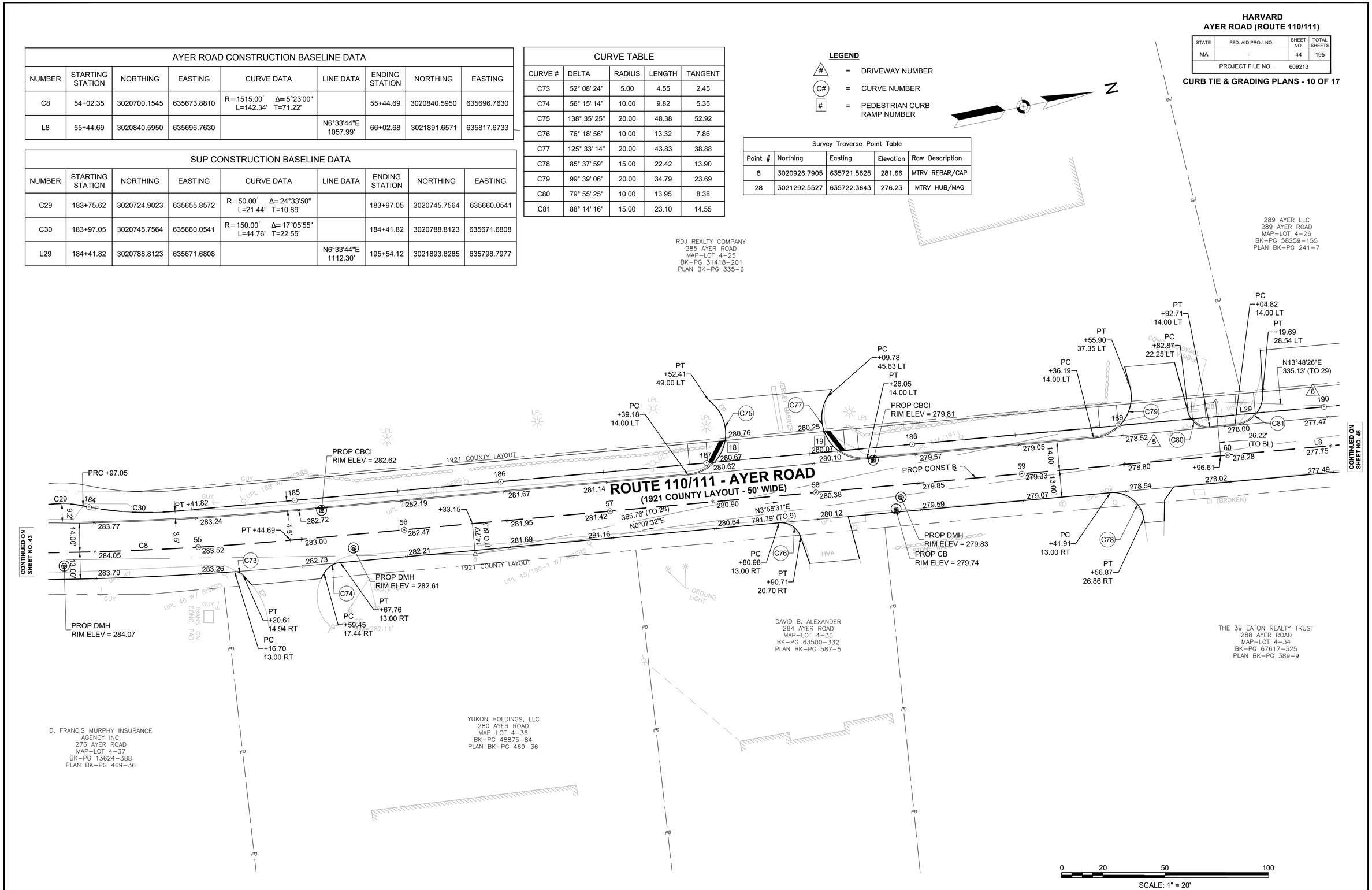
SUP CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C29	183+75.62	3020724.9023	635655.8572	R=50.00' Δ=24°33'50" L=21.44' T=10.89'		183+97.05	3020745.7564	635660.0541
C30	183+97.05	3020745.7564	635660.0541	R=150.00' Δ=17°05'55" L=44.76' T=22.55'		184+41.82	3020788.8123	635671.6808
L29	184+41.82	3020788.8123	635671.6808		N6°33'44"E 1112.30'	195+54.12	3021893.8285	635798.7977

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C73	52° 08' 24"	5.00	4.55	2.45
C74	56° 15' 14"	10.00	9.82	5.35
C75	138° 35' 25"	20.00	48.38	52.92
C76	76° 18' 56"	10.00	13.32	7.86
C77	125° 33' 14"	20.00	43.83	38.88
C78	85° 37' 59"	15.00	22.42	13.90
C79	99° 39' 06"	20.00	34.79	23.69
C80	79° 55' 25"	10.00	13.95	8.38
C81	88° 14' 16"	15.00	23.10	14.55

LEGEND

- (#) = DRIVEWAY NUMBER
- (C#) = CURVE NUMBER
- [#] = PEDESTRIAN CURB RAMP NUMBER

Survey Traverse Point Table				
Point #	Northing	Easting	Elevation	Raw Description
8	3020926.7905	635721.5625	281.66	MTRV REBAR/CAP
28	3021292.5527	635722.3643	276.23	MTRV HUB/MAG



609213_HD6(CURB TIE & GRADING).DWG Plotted on 11-Feb-2025 4:59 PM

LEGEND

△# = DRIVEWAY NUMBER

(C#) = CURVE NUMBER

[#] = PEDESTRIAN CURB RAMP NUMBER

AYER ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L8	55+44.69	3020840.5950	635696.7630		N6°33'44"E 1057.99'	66+02.68	3021891.6571	635817.6733
C9	66+02.68	3021891.6571	635817.6733	R=1485.00' Δ=7°30'00" L=194.39' T=97.33'		67+97.07	3022082.7667	635852.4460

SUP CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L29	184+41.82	3020788.8123	635671.6808		N6°33'44"E 1112.30'	195+54.12	3021893.8285	635798.7977
C31	195+54.12	3021893.8285	635798.7977	R=1504.00' Δ=7°30'00" L=196.87' T=98.58'		197+50.99	3022087.3832	635834.0153

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C81	88° 14' 16"	15.00	23.10	14.55
C82	91° 43' 07"	15.00	24.01	15.46
C83	84° 20' 19"	5.00	7.36	4.53
C84	76° 42' 15"	15.00	20.08	11.87
C85	89° 34' 27"	5.00	7.82	4.96
C86	90° 00' 00"	10.00	15.71	10.00
C87	90° 00' 00"	10.00	15.71	10.00
C88	68° 46' 57"	20.00	24.01	13.69
C89	90° 46' 21"	20.00	31.69	20.27

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	45	195
PROJECT FILE NO.	609213		

CURB TIE & GRADING PLANS - 11 OF 17

Survey Traverse Point Table				
Point #	Northing	Easting	Elevation	Raw Description
9	3021716.7231	635775.7653	272.31	MTRV REBAR/CAP
26	3021812.3115	635819.0430	271.69	MTRV HUB/MAG
29	3021617.9939	635802.3440	273.84	MTRV HUB/MAG

NOTE: SEE SHEET 109 FOR WETLAND REPLICATION AREA GRADING

295 AYER ROAD LLC
295 AYER ROAD
MAP-LOT 4-27
BK-PG 68608-289
PLAN BK-PG 967-65

289 AYER LLC
289 AYER ROAD
MAP-LOT 4-26
BK-PG 58259-155
PLAN BK-PG 241-7

BERWIND BROTHERS LLC
AYER ROAD
MAP-LOT 4-28
BK-PG 42857-287
PLAN BK-PG 357-100

ROUTE 110/111 - AYER ROAD
(1921 COUNTY LAYOUT - 50' WIDE)

PROP DMH
RIM ELEV = 272.81

PROP CBCI
RIM ELEV = 276.93

PROP CB
RIM ELEV = 276.86

PROP DMH
RIM ELEV = 276.95

PROP CBCI
RIM ELEV = 272.88

PROP DMH
RIM ELEV = 272.73

PROP DMH
RIM ELEV = 271.96

PROP CONST ℄

3" REVEAL

CONTINUED ON SHEET NO. 44

CONTINUED ON SHEET NO. 46

THE VICKESH MYER REVOCABLE TRUST
292 AYER ROAD
MAP-LOT 5-78
BK-PG 62379-392
PLAN BK-PG 329-118

AYER ROAD, LLC
294 AYER ROAD
MAP-LOT 4-33
BK-PG 52481-269

STEVEN & CAROLYN H. FADER
304 AYER ROAD
MAP-LOT 4-32-1
BK-PG 54408-186

39 EATON REALTY TRUST
288 AYER ROAD
MAP-LOT 4-34
BK-PG 67617-325
PLAN BK-PG 389-9

INHABITANTS OF THE TOWN OF HARVARD (CONSERVATION COMMISSION)
AYER ROAD
MAP-LOT 5-80
BK-PG 6626-58
PLAN BK-PG 433-7
(PARCEL IS SUBJECT TO ARTICLE 97 RESTRICTIONS)

0 20 50 100
SCALE: 1" = 20'

609213_HD6(CURB TIE & GRADING).DWG Plotted on 11-Feb-2025 6:15 PM

LEGEND

△# = DRIVEWAY NUMBER

(C#) = CURVE NUMBER

[#] = PEDESTRIAN CURB RAMP NUMBER

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C90	73° 26' 10"	10.00	12.82	7.46
C91	68° 12' 33"	5.00	5.95	3.39
C92	77° 24' 26"	5.00	6.76	4.01
C93	96° 01' 13"	10.00	16.76	11.11
C94	90° 00' 00"	5.00	7.85	5.00
C95	89° 59' 57"	5.00	7.85	5.00
C96	92° 15' 17"	25.00	40.25	26.00
C97	87° 12' 34"	25.00	38.05	23.81
C98	64° 50' 21"	5.00	5.66	3.18
C99	111° 06' 59"	9.00	17.45	13.12
C100	92° 10' 11"	10.00	16.09	10.39

Survey Traverse Point Table				
Point #	Northing	Easting	Elevation	Raw Description
10	3022405.7763	635942.4652	279.72	MTRV REBAR/CAP
30	3022053.5486	635865.7761	272.07	MTRV HUB/MAG
31	3022235.4286	635859.4796	274.68	MTRV HUB/MAG

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	46	195
PROJECT FILE NO.	609213		

CURB TIE & GRADING PLANS - 12 OF 17

609213_HD6(CURB TIE & GRADING).DWG Plotted on 11-Feb-2025 5:00 PM

BERWIND BROTHERS LLC
AYER ROAD
MAP-LOT 4-28
BK-PG 42857-287
PLAN BK-PG 357-100

BERWIND BROTHERS LLC
308 AYER ROAD
MAP-LOT 1-5
BK-PG 42857-287
PLAN BK-PG 19-44

DRB ACRES, LLC
307 AYER ROAD
MAP-LOT 4-29
BK-PG 52809-26
PLAN BK-PG 357-100

LDPL, LLC
327 AYER ROAD
MAP-LOT 1-2
BK-PG 45146-305

JOHN J. & MARISA D. IACOMINI
310 AYER ROAD
MAP-LOT 4-31
BK-PG 59087-319
PLAN BK-PG 424-96

MCCARTHY REALTY TRUST
306 AYER ROAD
MAP-LOT 5-79
BK-PG 18243-138
PLAN BK-PG 302-23

1921 COUNTY LAYOUT

ROUTE 110/111 - AYER ROAD
(1921 COUNTY LAYOUT - 50' WIDE)

CONTINUED ON SHEET NO. 45

CONTINUED ON SHEET NO. 47

AYER ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C9	66+02.68	3021891.6571	635817.6733	R=1485.00' Δ=7°30'00" L=194.39' T=97.33'		67+97.07	3022082.7667	635852.4460
L9	67+97.07	3022082.7667	635852.4460		N14°03'44"E 597.73'	73+94.80	3022662.5869	635997.6807

SUP CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C31	195+54.12	3021893.8285	635798.7977	R=1504.00' Δ=7°30'00" L=196.87' T=98.58'		197+50.99	3022087.3832	635834.0153
L30	197+50.99	3022087.3832	635834.0153		N14°03'44"E 400.40'	201+51.39	3022475.7853	635931.3032

0 20 50 100

SCALE: 1" = 20'

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	47	195
PROJECT FILE NO.	609213		

CURB TIE & GRADING PLANS - 13 OF 17

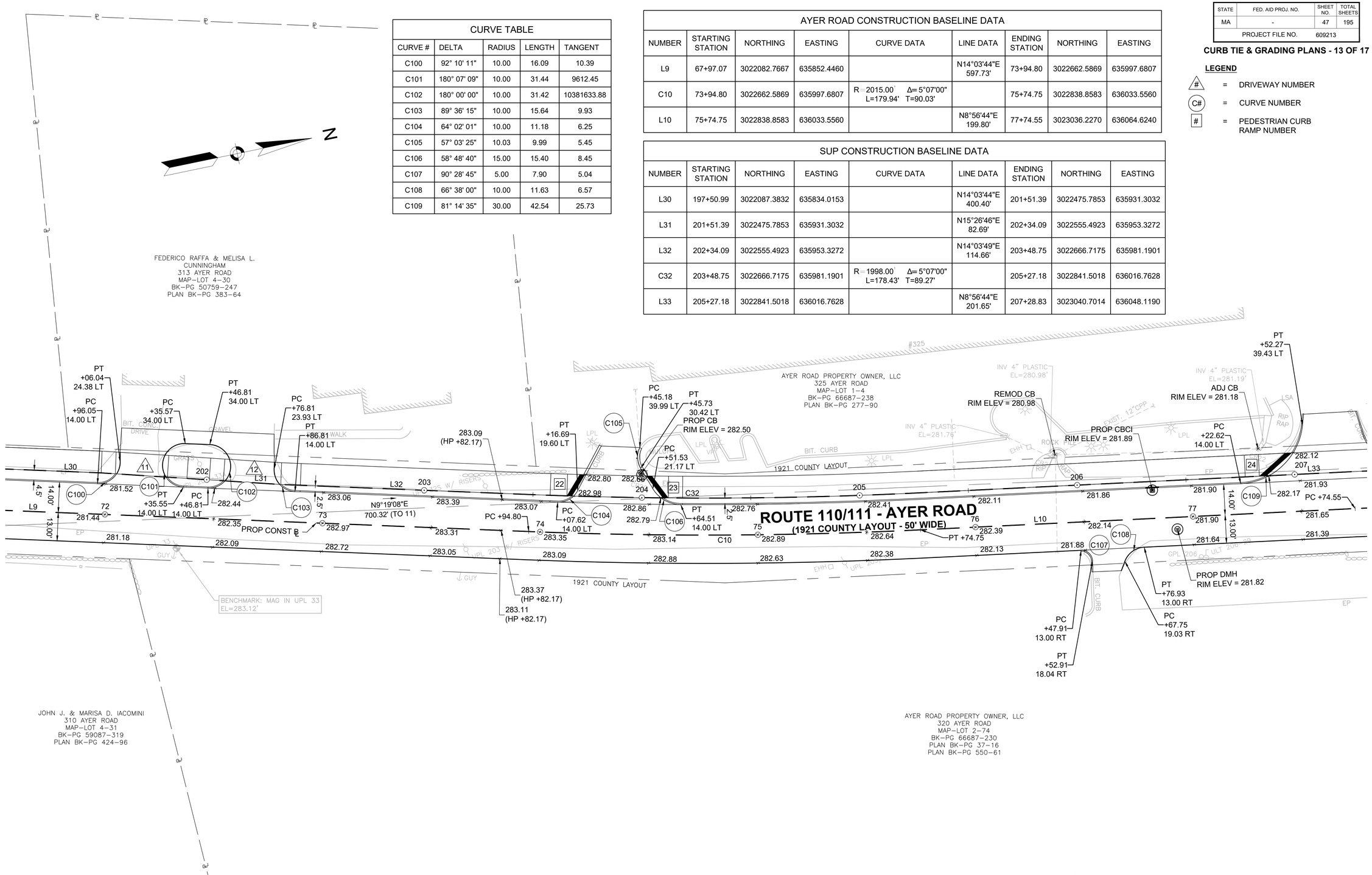
LEGEND

△# = DRIVEWAY NUMBER
C# = CURVE NUMBER
□# = PEDESTRIAN CURB RAMP NUMBER

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C100	92° 10' 11"	10.00	16.09	10.39
C101	180° 07' 09"	10.00	31.44	9612.45
C102	180° 00' 00"	10.00	31.42	10381633.88
C103	89° 36' 15"	10.00	15.64	9.93
C104	64° 02' 01"	10.00	11.18	6.25
C105	57° 03' 25"	10.03	9.99	5.45
C106	58° 48' 40"	15.00	15.40	8.45
C107	90° 28' 45"	5.00	7.90	5.04
C108	66° 38' 00"	10.00	11.63	6.57
C109	81° 14' 35"	30.00	42.54	25.73

AYER ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L9	67+97.07	3022082.7667	635852.4460		N14°03'44"E 597.73'	73+94.80	3022662.5869	635997.6807
C10	73+94.80	3022662.5869	635997.6807	R=2015.00' Δ=5°07'00" L=179.94' T=90.03'		75+74.75	3022838.8583	636033.5560
L10	75+74.75	3022838.8583	636033.5560		N8°56'44"E 199.80'	77+74.55	3023036.2270	636064.6240

SUP CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L30	197+50.99	3022087.3832	635834.0153		N14°03'44"E 400.40'	201+51.39	3022475.7853	635931.3032
L31	201+51.39	3022475.7853	635931.3032		N15°26'46"E 82.69'	202+34.09	3022555.4923	635953.3272
L32	202+34.09	3022555.4923	635953.3272		N14°03'49"E 114.66'	203+48.75	3022666.7175	635981.1901
C32	203+48.75	3022666.7175	635981.1901	R=1998.00' Δ=5°07'00" L=178.43' T=89.27'		205+27.18	3022841.5018	636016.7628
L33	205+27.18	3022841.5018	636016.7628		N8°56'44"E 201.65'	207+28.83	3023040.7014	636048.1190



609213_HD6(CURB TIE & GRADING).DWG Plotted on 11-Feb-2025 5:00 PM

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	48	195
PROJECT FILE NO.	609213		

CURB TIE & GRADING PLANS - 14 OF 17

609213_HD6(CURB TIE & GRADING).DWG Plotted on 11-Feb-2025 5:01 PM

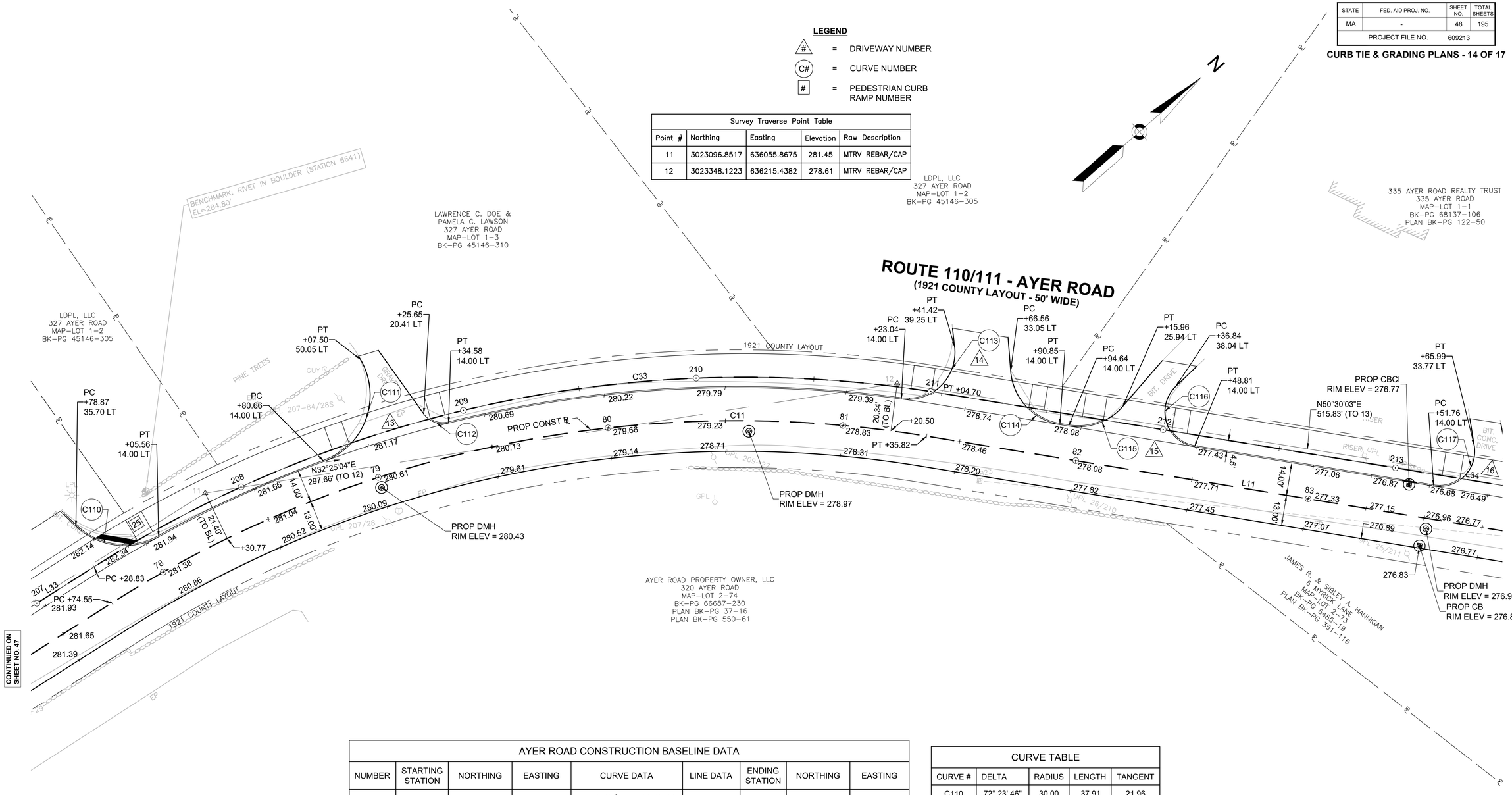
LEGEND

△# = DRIVEWAY NUMBER

(C#) = CURVE NUMBER

[#] = PEDESTRIAN CURB RAMP NUMBER

Survey Traverse Point Table				
Point #	Northing	Easting	Elevation	Raw Description
11	3023096.8517	636055.8675	281.45	MTRV REBAR/CAP
12	3023348.1223	636215.4382	278.61	MTRV REBAR/CAP



AYER ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C11	77+74.55	3023036.2270	636064.6240	R=495.00' Δ=41°49'00" L=361.27' T=189.10'		81+35.82	3023342.6476	636240.4959
L11	81+35.82	3023342.6476	636240.4959		N50°45'44"E 310.69'	84+46.51	3023539.1706	636481.1329

SUP CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L33	205+27.18	3022841.5018	636016.7628		N8°56'44"E 201.65'	207+28.83	3023040.7014	636048.1190
C33	207+28.83	3023040.7014	636048.1190	R=515.00' Δ=41°49'00" L=375.87' T=196.75'		211+04.70	3023359.5027	636231.0968
L34	211+04.70	3023359.5027	636231.0968		N50°45'44"E 307.31'	214+12.00	3023553.8866	636469.1146

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C110	72° 23' 46"	30.00	37.91	21.96
C111	100° 04' 29"	30.00	52.40	35.80
C112	68° 25' 08"	10.00	11.94	6.80
C113	104° 16' 08"	20.00	36.40	25.72
C114	76° 14' 19"	25.00	33.27	19.62
C115	58° 30' 41"	25.00	25.53	14.00
C116	127° 03' 21"	15.00	33.26	30.12
C117	108° 32' 30"	15.00	28.42	20.85

NOTE: NO CURVE #118

0 20 50 100

SCALE: 1" = 20'

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	49	195
PROJECT FILE NO.	609213		

CURB TIE & GRADING PLANS - 15 OF 17

AYER ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L11	81+35.82	3023342.6476	636240.4959		N50°45'44"E 310.69'	84+46.51	3023539.1706	636481.1329
C12	84+46.51	3023539.1706	636481.1329	R=505.00' Δ=37°22'00" L=329.35' T=170.77'		87+75.85	3023813.3123	636652.9611
L12	87+75.85	3023813.3123	636652.9611		N13°23'44"E 341.21'	91+17.06	3024145.2390	636732.0102

SUP CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L34	211+04.70	3023359.5027	636231.0968		N50°45'44"E 307.31'	214+12.00	3023553.8866	636469.1146
C34	214+12.00	3023553.8866	636469.1146	R=486.00' Δ=37°22'00" L=316.96' T=164.34'		217+28.96	3023817.7141	636634.4781
L35	217+28.96	3023817.7141	636634.4781		N13°23'44"E 341.21'	220+70.17	3024149.6408	636713.5271

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C117	108° 32' 30"	15.00	28.42	20.85
C119	91° 13' 34"	18.00	28.66	18.39
C120	54° 54' 14"	5.00	4.79	2.60
C121	138° 56' 01"	12.00	29.10	32.04
C122	22° 22' 41"	50.00	19.53	9.89
C123	83° 27' 41"	20.00	29.13	17.84
C124	23° 59' 37"	50.00	20.94	10.62
C125	138° 57' 14"	12.00	29.10	32.06
C126	78° 23' 54"	20.00	27.37	16.31
C127	88° 28' 35"	20.00	30.88	19.48
C128	88° 35' 16"	10.00	15.46	9.76
C129	94° 58' 34"	20.00	33.15	21.82
C130	82° 07' 49"	5.00	7.17	4.36
C131	96° 21' 17"	25.00	42.04	27.94
C132	85° 10' 57"	25.00	37.17	22.98

Survey Traverse Point Table				
Point #	Northing	Easting	Elevation	Raw Description
13	3023676.2219	636613.4672	274.78	MTRV MAG
32	3023949.4761	636661.9158	269.24	MTRV HUB/MAG

LEGEND

- (#) = DRIVEWAY NUMBER
- C# = CURVE NUMBER
- # = PEDESTRIAN CURB RAMP NUMBER

335 AYER ROAD REALTY TRUST
335 AYER ROAD
MAP-LOT 1-1
BK-PG 68137-106
PLAN BK-PG 122-50

ELIZABETH MAE SHUMAN JOYCE AND
CHRISTOPHER MICHAEL JOYCE
341 AYER ROAD
MAP-LOT 2-1
BK-PG 66963-37

KATHLEEN M. DECOT
343 AYER ROAD
MAP-LOT 2-2
BK-PG 50213-223
PLAN BK-PG 122-50

GEOFFREY O. & JENNIFER K. GILLARD
345 AYER ROAD
MAP-LOT 2-3
BK-PG 57294-103
PLAN BK-PG 122-50

FRANK, JR. & BARBARA S. HEIM
346 AYER ROAD
MAP-LOT 2-11
BK-PG 4971-277
PLAN BK-PG 329-92

KATIE ELIZABETH & NATHAN J. BERG
344 AYER ROAD
MAP-LOT 2-12
BK-PG 59619-196
PLAN BK-PG 393-112

JAMES R. & SIBLEY A. HANNIGAN
6 MYRICK LANE
MAP-LOT 2-73
BK-PG 6485-19
PLAN BK-PG 351-116

ROUTE 110/111 - AYER ROAD
(1921 COUNTY LAYOUT - 50' WIDE)

MYRICK LANE
(PUBLIC - 50' WIDE)

TOWN OF HARVARD
(CONSERVATION COMMISSION)
MYRICK LANE
MAP-LOT 2-73
BK-PG 5297-345
PLAN BK-PG 345-42
(PARCEL IS SUBJECT TO ARTICLE 97 RESTRICTIONS)
2024 TOWN LAYOUT

2024 TOWN LAYOUT

PROP CBCI ELEV = 276.77
PT +65.99 33.77 LT
PC +51.76 14.00 LT
PC +80.92 32.39 LT
PT +98.91 14.00 LT
PROP CBCI RIM ELEV = 274.87
PC +55.90 44.63 LT
PT +04.21 16.11 LT
PC +99.99 14.00 LT
PCC +37.62 34.98 LT
PC +83.83 45.03 LT
PCC +03.59 34.98 LT
PC +29.27 33.04 LT
PT +50.67 14.00 LT
PROP CBCI RIM ELEV = 273.46
PC +18.21 14.00 LT
PT +28.70 23.65 LT
PC +01.27 14.00 LT
PT +26.23 41.66 LT
PC +45.37 36.90 LT
PT +70.28 14.00 LT
PROP CBCI RIM ELEV = 270.35
PT +69.52 14.00 LT
PC +48.09 35.31 LT
PC +95.13 14.00 LT
PT +46.09 14.00 LT
PC +35.19 13.32' (TO BL)
PROP CONST ℄
PT +41.51 13.00 RT
PC +22.99 29.34 RT
PC +77.09 13.00 RT
PT +95.81 31.09 RT
PC +60.40 17.34 RT
PT +65.19 13.00 RT
PC +46.51
PT +75.85
PT +28.96
PROP DMH RIM ELEV = 276.91
PROP CB RIM ELEV = 276.84
PROP DMH RIM ELEV = 276.34
PROP DMH RIM ELEV = 275.59
PROP DMH RIM ELEV = 274.10
PROP DMH RIM ELEV = 274.88
PROP DMH RIM ELEV = 270.26
602.06' (TO 14)
1921 COUNTY LAYOUT
6" STOCKADE
BIT. CONC. DRIVE
S/M WALL
GRAVEL DRIVE
UPL 215 W/ RISERS
UPL 212
UPL 213
UPL 217
UPL 22
CB BROKEN
ELECTRIC VAULT
GUY
DH/CB
C117 C119 C120 C121 C122 C123 C124 C125 C126 C127 C128 C129 C130 C131 C132 C34
L35 L12
#341 #343 #345 #346 #349

CONTINUED ON SHEET NO. 48

CONTINUED ON SHEET NO. 50

0 20 50 100
SCALE: 1" = 20'

609213_HD6(CURB TIE & GRADING).DWG Plotted on 11-Feb-2025 5:01 PM

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	50	195
PROJECT FILE NO.	609213		

CURB TIE & GRADING PLANS - 16 OF 17

609213_HD6(CURB TIE & GRADING).DWG Plotted on 11-Feb-2025 5:01 PM

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C133	91° 35' 37"	15.00	23.98	15.42
C134	88° 27' 31"	15.00	23.16	14.60
C135	89° 17' 57"	15.00	23.38	14.82
C136	85° 21' 45"	20.00	29.80	18.44
C137	89° 36' 33"	5.00	7.82	4.97
C138	29° 13' 10"	26.00	13.26	6.78
C139	63° 44' 51"	5.00	5.56	3.11
C140	55° 57' 39"	10.00	9.77	5.31
C141	83° 53' 52"	15.00	21.96	13.48
C142	34° 05' 05"	20.00	11.90	6.13
C143	89° 58' 30"	15.00	23.56	14.99
C144	77° 08' 04"	15.00	20.19	11.96
C145	86° 31' 39"	15.00	22.65	14.12
C146	90° 19' 33"	20.00	31.53	20.11
C147	83° 37' 08"	20.00	29.19	17.89

LEGEND

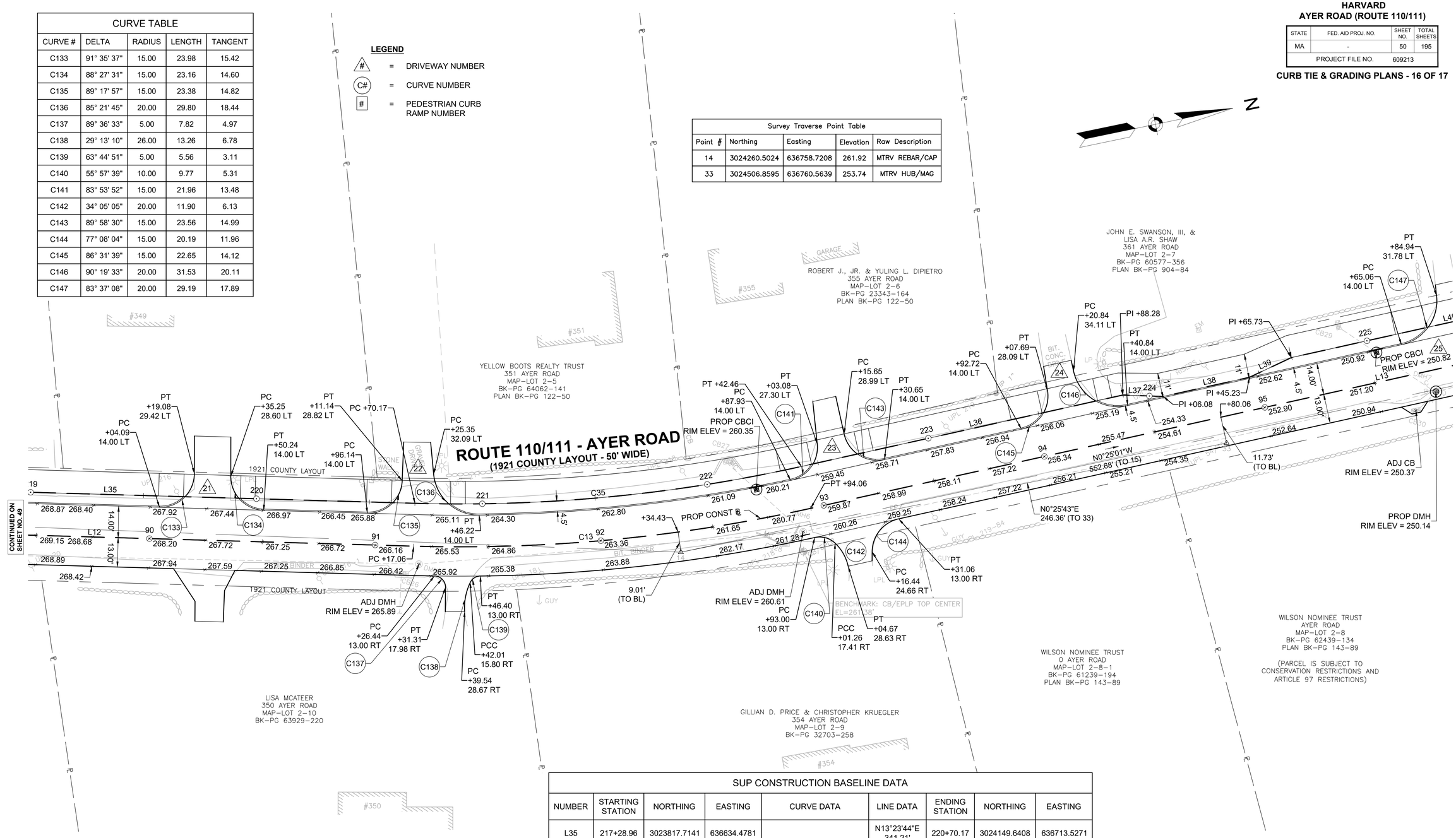
△# = DRIVEWAY NUMBER

(C#) = CURVE NUMBER

[#] = PEDESTRIAN CURB RAMP NUMBER

Survey Traverse Point Table				
Point #	Northing	Easting	Elevation	Raw Description
14	3024260.5024	636758.7208	261.92	MTRV REBAR/CAP
33	3024506.8595	636760.5639	253.74	MTRV HUB/MAG

N



AYER ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L12	87+75.85	3023813.3123	636652.9611		N13°23'44"E 341.21'	91+17.06	3024145.2390	636732.0102
C13	91+17.06	3024145.2390	636732.0102	R=715.00' Δ=14°11'00" L=177.00' T=88.95'		92+94.06	3024320.7153	636751.3951
L13	92+94.06	3024320.7153	636751.3951		N0°47'16"W 557.41'	98+51.47	3024878.0720	636743.7316

SUP CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L35	217+28.96	3023817.7141	636634.4781		N13°23'44"E 341.21'	220+70.17	3024149.6408	636713.5271
C35	220+70.17	3024149.6408	636713.5271	R=696.00' Δ=14°11'00" L=172.29' T=86.59'		222+42.46	3024320.4540	636732.3969
L37	223+88.28	3024466.2652	636730.3920		N13°51'45"E 17.79'	224+06.08	3024483.5394	636734.6549
L38	224+06.08	3024483.5394	636734.6549		N0°47'16"W 39.16'	224+45.23	3024522.6929	636734.1166
L39	224+45.23	3024522.6929	636734.1166		N13°28'05"W 20.50'	224+65.73	3024542.6292	636729.3420
L40	224+65.73	3024542.6292	636729.3420		N0°47'16"W 335.21'	228+00.95	3024877.8108	636724.7334

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	51	195
PROJECT FILE NO.	609213		

CURB TIE & GRADING PLANS - 17 OF 17

609213_HD6(CURB TIE & GRADING).DWG Plotted on 11-Feb-2025 5:02 PM

AYER ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L13	92+94.06	3024320.7153	636751.3951		N0°47'16"W 557.41'	98+51.47	3024878.0720	636743.7316
C14	98+51.47	3024878.0720	636743.7316	R=1813.00' Δ=5°53'49" L=186.60' T=93.38'		100+38.06	3025064.4536	636750.7637
L14	100+38.06	3025064.4536	636750.7637		N5°06'33"E 61.94'	101+00.00	3025126.1449	636756.2795

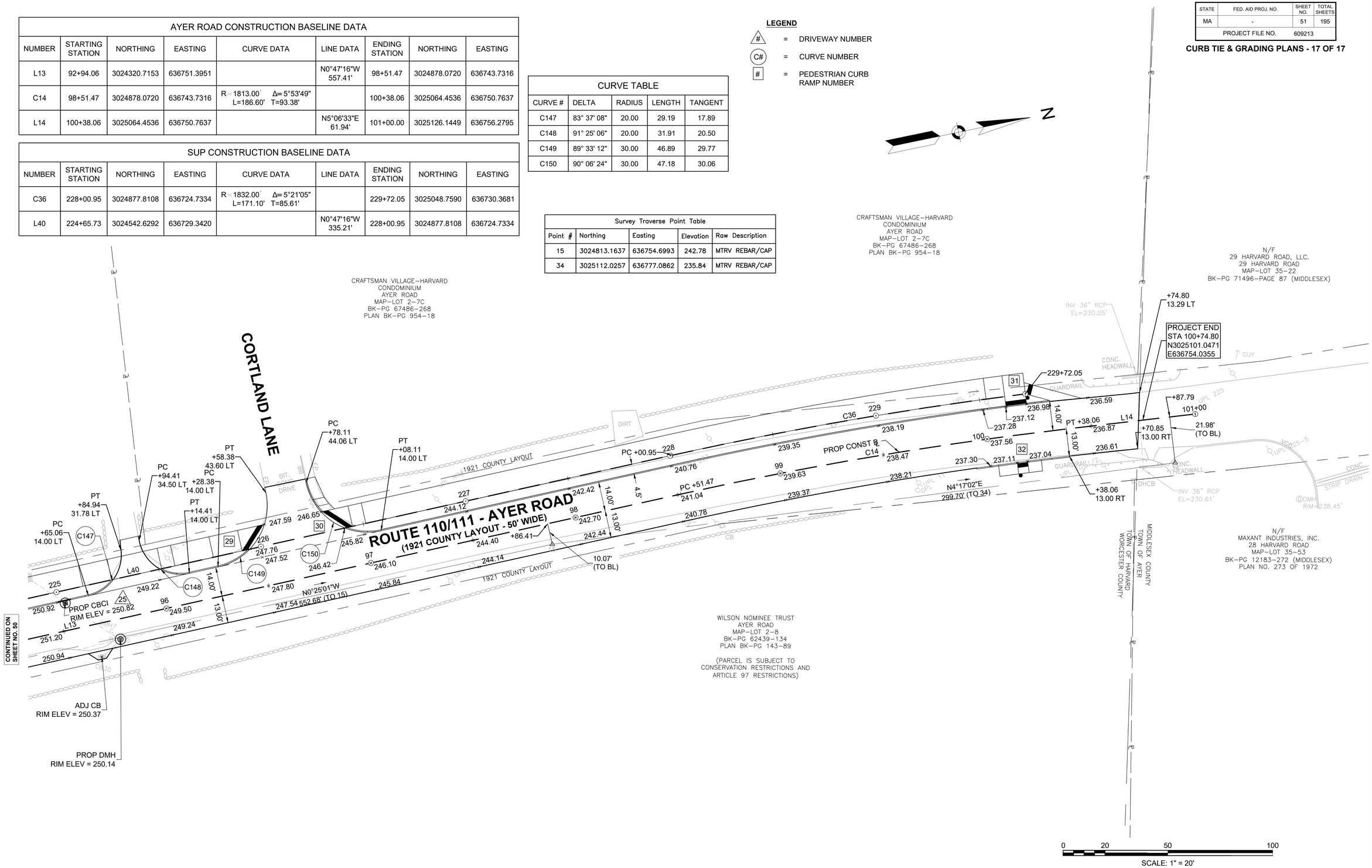
SUP CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C36	228+00.95	3024877.8108	636724.7334	R=1832.00' Δ=5°21'05" L=171.10' T=85.61'		229+72.05	3025048.7590	636730.3681
L40	224+65.73	3024542.6292	636729.3420		N0°47'16"W 335.21'	228+00.95	3024877.8108	636724.7334

LEGEND

- (#) = DRIVEWAY NUMBER
- C# = CURVE NUMBER
- # = PEDESTRIAN CURB RAMP NUMBER

CURVE TABLE				
CURVE #	DELTA	RADIUS	LENGTH	TANGENT
C147	83° 37' 08"	20.00	29.19	17.89
C148	91° 25' 06"	20.00	31.91	20.50
C149	89° 33' 12"	30.00	46.89	29.77
C150	90° 06' 24"	30.00	47.18	30.06

Survey Traverse Point Table				
Point #	Northing	Easting	Elevation	Raw Description
15	3024813.1637	636754.6993	242.78	MTRV REBAR/CAP
34	3025112.0257	636777.0862	235.84	MTRV REBAR/CAP



HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	74	195
PROJECT FILE NO.	609213		

UTILITY PLANS - 1 OF 17

609213_HD10(UTILITY PLANS).DWG Plotted on 11-Feb-2025 5:06 PM

DRAINAGE STRUCTURE TABLE							
NO.	TYPE	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
1	PROP CB	11+30.99	25.0 LT	307.59		I=302.09' (2)	OFFSET TOP
2	PROP DMH	11+35.65	17.5 LT	307.48	I=301.99' (1)	I=302.39' (2A)	
2A	PROP DMH	12+55.95	26.1 LT	301.72	I=296.15' (2)	I=296.05' (5)	

12 LANCASTER COUNTY ROAD LLC
185 AYER ROAD
MAP-LOT 8-59
BK-PG 46796-296
PLAN BK-PG 226-27

12 LANCASTER COUNTY ROAD LLC
187 AYER ROAD
MAP-LOT 8-60
BK-PG 54974-74
PLAN BK-PG 226-27

HARVARD CORNER CONDOMINIUM
0 AYER ROAD
MAP-LOT 8-62.2
BK-PG 70107-189
PLAN BK-PG 975-66
PLAN BK-PG 721-46

PHOENIX-DURANGO LLC
184 AYER ROAD
MAP-LOT 8-41
BK-PG 64869-275
PLAN BK-PG 219-95

SAMANTHA'S REALTY LLC
188 AYER ROAD
MAP-LOT 8-40-1
BK-PG 33654-159
PLAN BK-PG 780-121

BOWERS BROOK LLC
196 AYER ROAD
MAP-LOT 8-40
BK-PG 45722-348
PLAN BK-PG 881-28

AYER ROAD REALTY LLC
198 AYER ROAD
MAP-LOT 8-40-3
BK-PG 45608-289
PLAN BK-PG 881-28

HARVARD OFFICE PARK LLC
200 AYER ROAD
MAP-LOT 8-40-2
BK-PG 28957-72
PLAN BK-PG 780-121

1950 STATE ALTERATION | 1950 TOWN LAYOUT

PROJECT BEGIN
STA 8+69.90
N3016495.4630
E634274.6683

PROP TEMP EASEMENT

RET UP

RET TMH

1950 TOWN LAYOUT – STATE HIGHWAY ALTERATION 33799A

5' - 12" PIPE OPTION

PROP PERM TRENCH PATCH (TYP)

117' - 12" RCP

ROUTE 110/111 - AYER ROAD

REM EXIST CB

PROP TEMP EASEMENT

PROP PB (TYP)

PROP LAYOUT ALTERATION

1950 TOWN LAYOUT | 1924 COUNTY LAYOUT

UTILITY EASEMENT PLAN BK-PG 721-46

REM EXIST 12" CMP

173' - 12" RCP

PROP 3" ELEC CONDUIT (TYP)

PROP AC-POWERED RRFB (ITEM 824.211) (TYP)

RET UP; PROP SERVICE CONNECTION W/ RISER, WEATHERHEAD, & DISCONNECT (PAID FOR UNDER ITEM 824.211)

PROP DRAINAGE SEDIMENT REMOVAL

PROP TEMP EASEMENT

PROP TEMP EASEMENT

PROP TEMP EASEMENT

CONTINUED ON SHEET NO. 75

CB1
RIM=301.34'
INV=299.1' (TOP HOOD)
SUMP=297.9' (TOP DEBRIS)

CB2
RIM=301.12'
INV=296.9'
SUMP=296.9'

NOTES:
1. CONTRACTOR SHALL PERFORM TREE TRIMMING / CLEARING TO PROVIDE 10' CLEAR OFF THE BACK OF UTILITY POLES.
2. ALL PROPOSED CATCH BASINS SHALL HAVE 4' SUMPS UNLESS OTHERWISE NOTED.
3. VERIZON DUCT BANK LOCATIONS ARE APPROXIMATE ONLY. TEST PITS SHALL BE CONDUCTED TO DETERMINE ACTUAL LOCATIONS.

0 20 50 100
SCALE: 1" = 20'

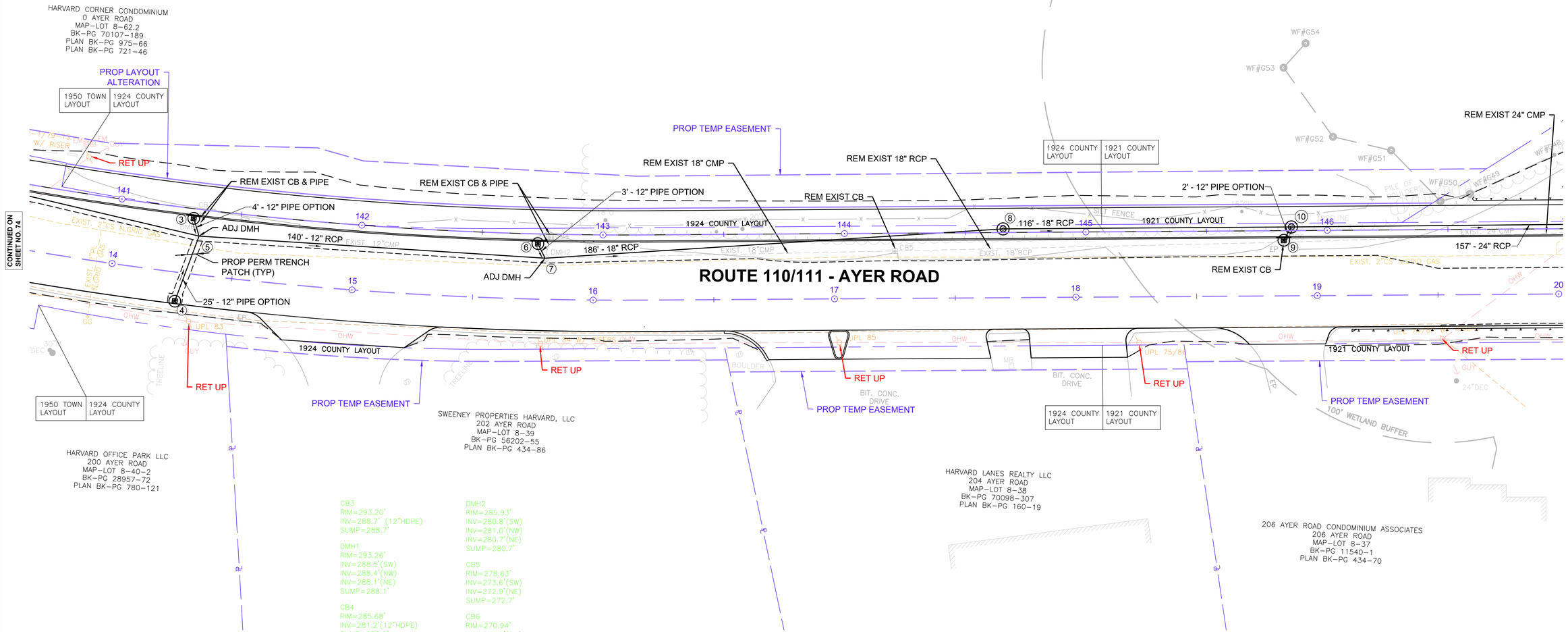
HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	75	195
PROJECT FILE NO.	609213		

UTILITY PLANS - 2 OF 17

609213_HD10(UTILITY PLANS).DWG Plotted on 11-Feb-2025 5:07 PM

DRAINAGE STRUCTURE TABLE							
NO.	TYPE	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
3	PROP CBCI	14+31.29	23.0 LT	293.56		I=288.60' (5)	
4	PROP CB	14+27.70	12.0 RT	293.95		I=289.45' (5)	
5	EXIST DMH	14+34.41	16.0 LT	293.55	I=288.50' (2A) I=288.50' (4) I=288.50' (3)	I=288.10' (7)	
6	PROP CBCI	15+76.56	23.0 LT	286.21		I=281.21' (7)	
7	EXIST DMH	15+79.72	17.0 LT	286.16	I=280.80' (5) I=281.00' (6)	I=280.70' (8)	
8	PROP DMH	17+70.00	28.5 LT	277.46	I=272.44' (7)	I=272.34' (10)	
9	PROP CBCI	18+86.26	23.0 LT	271.41		I=267.41' (10)	
10	PROP DMH	18+89.43	28.5 LT	271.84	I=267.34' (8) I=267.34' (9)	I=267.24' (12)	



NOTES:
1. CONTRACTOR SHALL PERFORM TREE TRIMMING / CLEARING TO PROVIDE 10' CLEAR OFF THE BACK OF UTILITY POLES.
2. ALL PROPOSED CATCH BASINS SHALL HAVE 4' SUMPS UNLESS OTHERWISE NOTED.
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HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	76	195
PROJECT FILE NO.	609213		

UTILITY PLANS - 3 OF 17

CONTINUED ON SHEET NO. 77

CONTINUED ON SHEET NO. 75

CONTINUED ON SHEET NO. 78

ROUTE 110/111 - AYER ROAD

GEBO LANE

2024 TOWN LAYOUT

1921 COUNTY LAYOUT

CB7
RIM=254.76'
INV=250.7'
SUMP=248.6'

CB8
RIM=255.42'
INV=250.5'(SW)
INV=250.4'(NE)
SUMP=250.6'(TOP DEBRIS)

DMH3
RIM=252.92'
INV=249.2'(SW)
INV=249.1'(N)
SUMP=249.7'(TOP DEBRIS)

CB9
RIM=253.23'
INV=250.2'(W)
INV=250.3'(NE)
INV=249.8'(SE)
SUMP=250.6'(TOP DEBRIS)

CB10
RIM=252.00'
INV=*NPV*
SUMP=249.8'(TOP DEBRIS)
(UNABLE TO OPEN)

N/F
INHABITANTS OF THE TOWN OF HARVARD
0 LANCASTER COUNTY ROAD
MAP-LOT 8-62.4
BK-PG 21051-25
PLAN BK-PG 721-46

HARVARD CORNER CONDOMINIUM
0 AYER ROAD
MAP-LOT 8-62.2
BK-PG 70107-189
PLAN BK-PG 975-66
PLAN BK-PG 721-46

APIF - MASSACHUSETTS, LLC
215 AYER ROAD
MAP-LOT 8-61
BK-PG 65530-161
PLAN BK-PG 299-81
PLAN BK-PG 365-118

206 AYER ROAD CONDOMINIUM ASSOCIATES
206 AYER ROAD
MAP-LOT 8-37
BK-PG 11540-1
PLAN BK-PG 434-70

INHABITANTS OF THE TOWN OF HARVARD
(CONSERVATION COMMISSION)
204 AYER ROAD
MAP-LOT 8-36
BK-PG 6223-264
PLAN BK-PG 434-86
(PARCEL IS SUBJECT TO ARTICLE 97 RESTRICTIONS)

RET UP
RELOCATE UP (BO)
PROP GAS RELOCATION (BO-NGRID)
PROP CL OF INT. STREAM RESTORATION SEE SHEET 109
PROP LAYOUT ALTERATION
REM EXIST 30" CMP
REM EXIST 24" CMP
RET UP; PROP TEMPORARY SUPPORT (BO)
15' - 24" RCP
157' - 24" RCP
11' - 12" PIPE OPTION
COORDINATE WITH NGRID PRIOR TO PIPE REPLACEMENT
REM EXIST 30" CMP
PROP 3" TS CONDUIT (TYP)
PROP PB (TYP)
70' - 48" EQ RCAP CULVERT SEE DETAILS ON SHEET 109
RET UP; PROP TEMPORARY SUPPORT FOR EXCAVATION OF HEADWALL (BO)
PROP TEMP EASEMENT
PROP PERM EASEMENT
PROP TEMP EASEMENT
RET EXIST CB
PROP GAS RELOCATION (BO-NGRID)
REMOD CB; R&D F&G PROP F&C
6' - 12" PIPE OPTION
RET EXIST CB
RET EXIST DMH
295' - 12" RCP CLASS IV
REM CB
ABAN EX PIPE
REM EX PIPE
RET UP

100' WETLAND BUFFER
100' RIVERFRONT AREA
EXIST. 2"CS N.GRID GAS
EXIST. 2"PL N.GRID GAS
OHW
EP
CONC. WALK
CONC. APRON
GRAVEL - BINDER
SEPTIC PUMP
SEPTIC TANK
APPROX. SEPTIC SYSTEM LOCATION
FF=259.75'
LOAD. DOCK
FF=259.76'
FF=259.79'
INV 12" CPF
EL=252.83
WMH
RIM=257.92'
SUMP=251.5'

NOTES:
1. CONTRACTOR SHALL PERFORM TREE TRIMMING / CLEARING TO PROVIDE 10' CLEAR OFF THE BACK OF UTILITY POLES.
2. ALL PROPOSED CATCH BASINS SHALL HAVE 4' SUMPS UNLESS OTHERWISE NOTED.
3. VERIZON DUCT BANK LOCATIONS ARE APPROXIMATE ONLY. TEST PITS SHALL BE CONDUCTED TO DETERMINE ACTUAL LOCATIONS.

DRAINAGE STRUCTURE TABLE

NO.	TYPE	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
11	PROP CBCI	20+63.78	23.0 LT	265.43		I=262.43' (12)	
12	PROP DMH	20+49.78	28.9 LT	266.45	I=262.25' (10) I=262.25' (11)	I=262.15' (13)	
13	PROP HDWL	20+49.79	45.7 LT		I=262.00' (12)		REFER TO MASSDOT STANDARD DRAWING E 206.5.0
14	PROP HDWL	20+73.58	46.3 LT			I=259.00' (15)	REFER TO CONSTRUCTION DETAIL SHEET 110
15	PROP HDWL	20+71.01	22.8 RT		I=257.60' (14)		REFER TO CONSTRUCTION DETAIL SHEET 110
17	PROP CBCI	23+64.69	20.3 LT	256.00		I=251.50' (18)	
18	PROP DMH	23+71.59	12.7 LT	255.94	I=251.40' (17)	I=251.30' (21)	
92	PROP DMH	24+63.63	23.5 LT	253.54	I=249.60' (EX CB8)	I=250.30' (EX 8 INCH CPP) I=249.55' (EX DMH3)	

NOTE: NO DRAINAGE STRUCTURE #16

0 20 50 100
SCALE: 1" = 20'

609213_HD10\UTILITY PLANS\.DWG Plotted on 11-Feb-2025 5:08 PM

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	77	195
PROJECT FILE NO.	609213		

UTILITY PLANS - 4 OF 17

CB12
RIM=263.66'
INV=260.4'(15" PLASTIC)
SUMP=259.2'

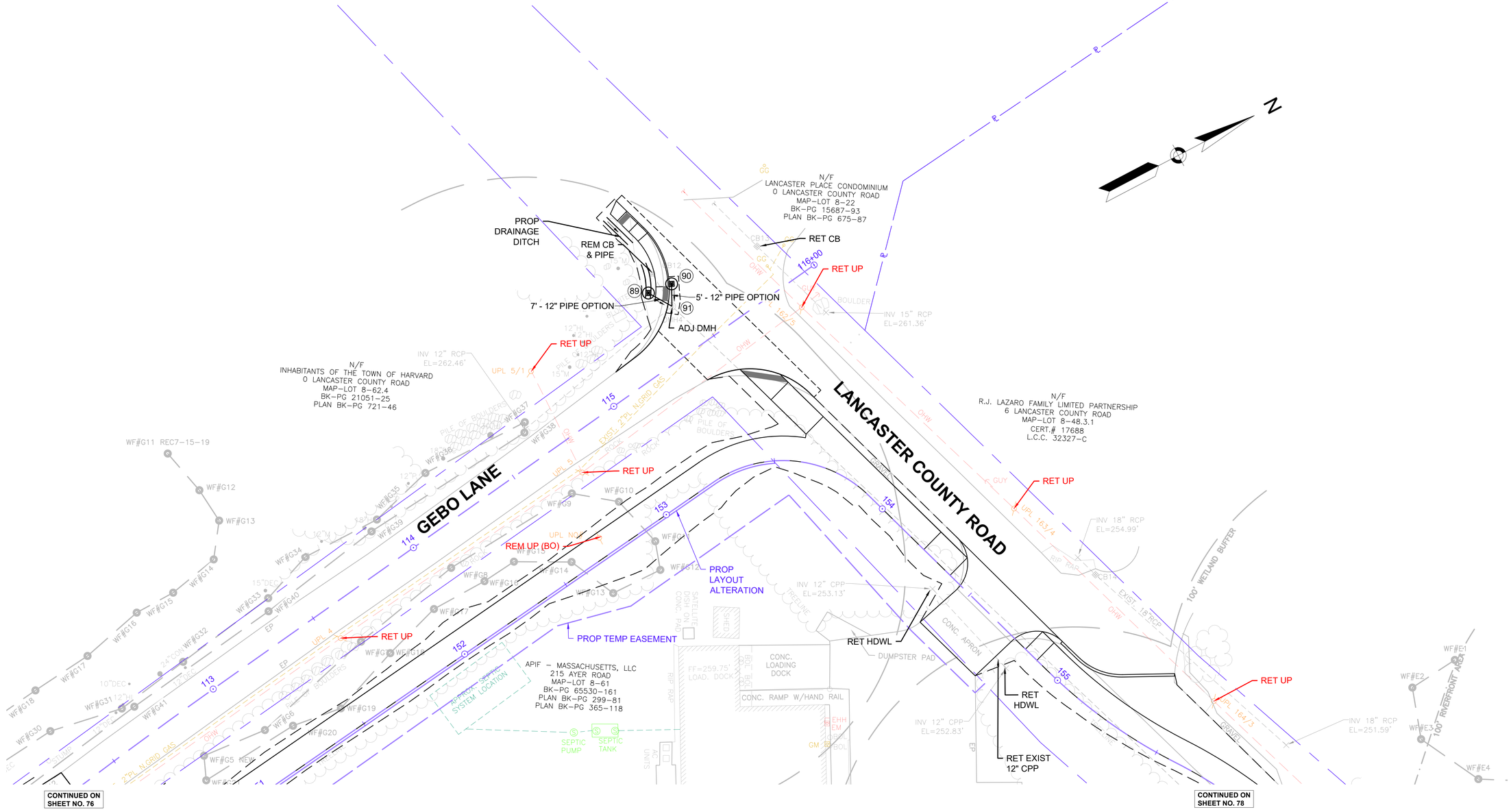
DMH4
RIM=264.23'
INV=259.5'(W)
INV=259.5'(E)
INV=259.7'(S)
SUMP=259.0'

CB13
RIM=264.04'
INV=261.6'(W)
INV=261.6'(E)
SUMP=260.3'

CB14
RIM=256.72'
INV=253.4'(W)
INV=253.3'(E)
SUMP=252.6'

DRAINAGE STRUCTURE TABLE

NO.	TYPE	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
89	PROP DI	115+38.18	29.6 LT	263.55		I=259.70' (91)	TYPE DF
90	PROP CB	115+48.09	27.2 LT	264.05		I=259.95' (91)	
91	EXIST DMH	115+42.93	19.7 LT	264.23	I=259.60' (89) I=259.60' (90)	I=259.70' (EX 12 INCH RCP) I=259.50' (EX 15 INCH RCP)	



NOTES:
1. CONTRACTOR SHALL PERFORM TREE TRIMMING / CLEARING TO PROVIDE 10' CLEAR OFF THE BACK OF UTILITY POLES.
2. ALL PROPOSED CATCH BASINS SHALL HAVE 4' SUMPS UNLESS OTHERWISE NOTED.
3. VERIZON DUCT BANK LOCATIONS ARE APPROXIMATE ONLY. TEST PITS SHALL BE CONDUCTED TO DETERMINE ACTUAL LOCATIONS.

0 20 50 100
SCALE: 1" = 20'

609213_HD10(UTILITY PLANS).DWG Plotted on 11-Feb-2025 5:08 PM

DRAINAGE STRUCTURE TABLE							
NO.	TYPE	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
24	PROP HDWL	29+15.24	23.8 RT		I=252.22' (25)		REFER TO MASSDOT STANDARD DRAWING E 206.4.0
25	PROP DMH	29+54.31	20.8 RT	257.70	I=252.66' (26)	I=252.66' (24)	
26	PROP DMH	30+51.29	9.1 RT	261.58	I=257.08' (27) I=256.68' (28)	I=256.58' (25)	
27	PROP CBCI	30+62.60	13.0 LT	261.50		I=257.50' (26)	

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	78	195
PROJECT FILE NO.	609213		

UTILITY PLANS - 5 OF 17

CONTINUED ON SHEET NO. 77

CONTINUED ON SHEET NO. 76

CONTINUED ON SHEET NO. 79

LANCASTER COUNTY ROAD

ROUTE 110/111 - AYER ROAD

POOR FARM ROAD

RET UP

RET HDWL

RET EXIST 12" CPP

RET EXIST CB

INV 12" CPP EL=252.83'

INV 12" CPP EL=250.33'

INV 12" CPP EL=248.78'

INV 18" RCP EL=251.59'

INV CHANNEL AT STONE HEADWALL (N.P.V.) EL=248.10'

INV 18" CMP EL=252.22'

WMH RIM=257.92' SUMP=251.5'

CONC. WALK

CONC. APRON

TREELINE

GRAVEL

EP

OHW

GUY

100' RIVERFRONT AREA

100' WETLAND BUFFER

2024 TOWN LAYOUT

1921 COUNTY LAYOUT

N/F
R.J. LAZARO FAMILY LIMITED PARTNERSHIP
6 LANCASTER COUNTY ROAD
MAP–LOT 8–48.3.1
CERT.# 17688
L.C.C. 32327–C

TOWN OF HARVARD
(CONSERVATION COMMISSION)
0 LANCASTER COUNTY ROAD
MAP–LOT 4–48.3.4
CERT.# 11358
L.C.C. 32327–C
(PARCEL IS SUBJECT TO ARTICLE 97 RESTRICTIONS)

N/F
APIF – MASSACHUSETTS, LLC
215 AYER ROAD
MAP–LOT 8–61
BK–PG 65530–161
PLAN BK–PG 299–81
PLAN, BK–PG 365–118

LINE OF EXIST GAS EASEMENT

GAS EASEMENT
DEED BOOK 4726, PAGE 527
PLAN BOOK 305, PLAN 118

LAURA A. CLARAGE
129 POOR FARM ROAD
MAP–LOT 8–35
BK–PG 64304–359

JEFFERY P. & ALEXANDRA H. MCKEARNEY
132 POOR FARM ROAD
MAP–LOT 8–24
BK–PG 67692–264
PLAN BK–PG 772–113

PROP GAS RELOCATION (BO-NGRID)

PROP TEMP EASEMENT

PROP PERM TRENCH PATCH (TYP)

PROP PERM EASEMENT

PROP TEMP EASEMENT

PROP AC-POWERED RRFB (ITEM 824.212) (TYP)

21' - 12" PIPE OPTION

5' - 12" PIPE OPTION

11' - 12" PIPE OPTION

14' - 12" PIPE OPTION

41' - 18" RCP

295' - 12" RCP CLASS IV

277' - 12" RCP

96' - 18" RCP

39' - 18" RCP

ADJ CB

REM UP & GUY (BO)

REM UP & PUSH BRACE (BO)

PROP 3" ELEC CONDUIT (TYP)

ADJ TMH (BO-VERIZON)

REM EXIST 12" CMP

UPGRADE UP (BO)

PROP GUY (BO)

REM EXIST CB

REM EXIST 18" CMP

PROP PUE

PROP SERVICE CONNECTION W/ RISER, WEATHERHEAD, & DISCONNECT (PAID FOR UNDER ITEM 824.212)

TEST PIT PRIOR TO RELOCATING POLE

RELOCATE UP (BO)

PROP GUY WIRE (BO)

PROP LAYOUT ALTERATION

RELOCATE UP & GUY WIRE (BO)

PROP PUE

PROP UP & GUY WIRES (BO)

CB10
RIM=252.00'
INV=*NPV*
SUMP=249.8'(TOP DEBRIS)
(UNABLE TO OPEN)

CB11
RIM=251.65'
INV=248.9'(NW)
SUMP=246.5'
TOP WATER=248.5'

CB15
RIM=258.96'
INV=255.7'(S)
INV=*NPV*(N)
SUMP=255.0'(TOP DEBRIS)

DRAINAGE STRUCTURE TABLE							
NO.	TYPE	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
19	PROP CBCI	26+64.70	12.7 LT	251.56		I=248.06' (21)	
20	PROP CB	26+64.71	12.0 RT	251.55		I=248.05' (21)	
21	PROP SPECIAL DMH	26+70.58	5.5 LT	251.73	I=247.63' (18) I=247.73' (19) I=247.73' (22) I=247.73' (20)	I=247.13' (23)	6' DIAMETER
22	PROP CBCI	26+84.62	12.4 LT	251.59		I=248.09' (21)	
23	PROP HDWL	27+03.46	22.4 RT		I=246.72' (21)		REFER TO MASSDOT STANDARD DRAWING E 206.4.0

NOTES:
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2. ALL PROPOSED CATCH BASINS SHALL HAVE 4' SUMPS UNLESS OTHERWISE NOTED.
3. VERIZON DUCT BANK LOCATIONS ARE APPROXIMATE ONLY. TEST PITS SHALL BE CONDUCTED TO DETERMINE ACTUAL LOCATIONS.

0 20 50 100
SCALE: 1" = 20'

609213_HD10(UTILITY PLANS).DWG Plotted on 11-Feb-2025 5:09 PM

DRAINAGE STRUCTURE TABLE							
NO.	TYPE	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
28	PROP DMH	33+32.05	6.0 RT	273.83	I=269.33' (30) I=269.23' (29) I=268.93' (31)	I=268.83' (26)	
29	PROP CB	33+36.52	14.0 RT	273.87		I=269.37' (28)	OFFSET TOP
30	PROP CBCI	33+42.81	13.0 LT	274.17		I=270.17' (28)	OFFSET TOP
31	PROP DMH	35+71.52	4.0 RT	281.86	I=277.36' (33) I=277.36' (32) I=276.96' (34)	I=276.86' (28)	
32	PROP CB	35+76.12	12.0 RT	281.81		I=277.81' (31)	
33	PROP CBCI	35+81.36	13.0 LT	281.91		I=277.91' (31)	

CB16
RIM=273.39'
INV=268.3'(N)
INV=267.4'(S)
SUMP=266.6'

CB17
RIM=278.75'
INV=273.9'(N)
INV=276.7'(E)
INV=273.9'(E)
INV=273.7'(S)
SUMP=273.5'

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	79	195
PROJECT FILE NO.		609213	

UTILITY PLANS - 6 OF 17

609213_HD10(UTILITY PLANS).DWG Plotted on 11-Feb-2025 5:09 PM

CONTINUED ON SHEET NO. 78

CONTINUED ON SHEET NO. 80

ROUTE 110/111 - AYER ROAD

100' WETLAND BUFFER

100' RIVERFRONT AREA

TOWN OF HARVARD
(CONSERVATION COMMISSION)
0 LANCASTER COUNTY ROAD
MAP-LOT 4-48.3.4
CERT.# 11358
L.C.C. 32327-C

(PARCEL IS SUBJECT TO ARTICLE 97 RESTRICTIONS)

SCHOOL HOUSE 1870 TRUST
231 AYER ROAD
MAP-LOT 4-48.2
CERT.# 17941
L.C.C. 32327-B

SCHOOL HOUSE 1870 TRUST
231 AYER ROAD
MAP-LOT 4-48.2
CERT.# 17941
L.C.C. 32327-B

JEFFERY P. & ALEXANDRA H. MCKEARNEY
132 POOR FARM ROAD
MAP-LOT 8-24
BK-PG 67692-264
PLAN BK-PG 772-113

BRYAN & REBECCA KELLEY
204 AYER ROAD
MAP-LOT 8-23
BK-PG 57957-89

ROBERT A. WILLIAMS JR.
& JANET M. WILLIAMS
236 AYER ROAD
MAP-LOT 4-47
BK-PG 61011-81
PLAN BK-PG 347-77

DAVID M. & MARTIN D. POUTRY
242 AYER ROAD
MAP-LOT 4-46
BK-PG 27509-388
PLAN BK-PG 246-69

1921 COUNTY LAYOUT

REM UP (BO)

REM UP (BO)

PROP GAS RELOCATION (BO-NGRID)

PROP TEMP EASEMENT

PROP PUE

PROP GUY WIRE (BO)

RELOCATE UP (BO); ELECTRIC RISER RELOCATION LOCATION NO. 1

REM UP (BO)

RET LP

PROP PUE

PROP GUY WIRE (BO)

RELOCATE UP (BO); ELECTRIC RISER RELOCATION LOCATION NO. 2

PROP PERM TRENCH PATCH (TYP)

18' - 12" PIPE OPTION

277' - 12" RCP

5' - 12" PIPE OPTION

236' - 12" RCP

REM EXIST CB

REM EXIST PIPE

16' - 12" PIPE OPTION

REM EXIST DI; PLUG AND ABAN ANY EXIST PIPES

5' - 12" PIPE OPTION

290' - 12" RCP

REM EXIST 12" CMP

UPGRADE UP (BO)

TEST PIT

REM EXIST CB

UPGRADE UP (BO)

PROP PUE

PROP TEMP EASEMENT

PROP TEMP EASEMENT

PROP GUY WIRE (BO)

PROP PUE

RELOCATE UP (BO)

PROP PUE

PROP TEMP EASEMENT

PROP UP (BO)

TEST PIT

PROP GUY WIRE (BO)

RELOCATE UP (BO)

REM UP (BO)

PROP PUE

PROP TEMP EASEMENT

6' STOCKADE

"236" WOOD POST

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0 20 50 100
SCALE: 1" = 20'

DRAINAGE STRUCTURE TABLE							
NO.	TYPE	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
34	PROP DMH	38+65.34	4.0 RT	288.35	I=283.65' (35) I=283.15' (36)	I=283.05' (31)	
35	PROP CBCI	38+75.15	13.0 LT	288.34		I=283.84' (34)	
36	PROP DI	38+74.00	19.0 RT	287.59		I=283.26' (34)	TYPE DF

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	80	195
PROJECT FILE NO.	609213		

UTILITY PLANS - 7 OF 17

609213_HD10(UTILITY PLANS).DWG Plotted on 11-Feb-2025 5:10 PM

CB18
RIM=286.27'
INV=284.0'(E)
INV=284.0'(W)
SUMP=284.2'(TOP DEBRIS)

SHAKER PLACE OFFICES, LLC
233 AYER ROAD
MAP-LOT 4-48-1
BK-PG 34484-146
PLAN BK-PG 548-46

SHAKER PLACE OFFICES, LLC
233 AYER ROAD
MAP-LOT 4-48-1
BK-PG 34484-146
PLAN BK-PG 548-46

BLANCHARD HOUSE OFFICE PARK CONDOMINIUM
249 AYER ROAD
MAP-LOT 4-49-1
BK-PG 11133-350
PLAN BK-PG 592-115

FOXGLOVE HOUSING ASSOCIATES LIMITED PARTNERSHIP
253 AYER ROAD UNIT 1
MAP-LOT 4-49-LOT 2-UNIT 1
BK-PG 14348-125
PLAN BK-PG 659-120
CERT. # 10846
L.C.C. 32327-B

OFFICE AT 257 AYER RD, LLC
257 AYER ROAD
MAP-LOT 4-49-LOT 2-UNIT 2
BK-PG 64619-93
PLAN BK-PG 659-120

PROP PUE
PROP GUY WIRE (BO)
RELOCATE UP (BO); ELECTRIC RISER RELOCATION LOCATION NO. 2
PROP PUE
PROP UP & GUY WIRE (BO)
PROP AC-POWERED RRFB (ITEM 824.213) (TYP)
PROP TEMP EASEMENT
PROP GUY WIRE (BO)
PROP PUE
RELOCATE UP (BO)
PROP TEMP EASEMENT
PROP PUSH BRACE (BO)
PROP PUE
PROP PUSH BRACE (BO)
PROP PB ON EXIST CONDUIT; PROP 5' 2-4" CONDUIT (BO-NGRID)
RELOCATE UP (BO); RELOCATE ELECTRIC RISER (BO-NGRID)
RELOCATE UP (BO)
PROP GUY WIRE (BO)
RELOCATE UP (BO); RELOCATE ELECTRIC RISER (BO-NGRID)

1921 COUNTY LAYOUT
EXIST. 2"CS N.GRID GAS
EXIST. 8"PL N.GRID GAS
EXIST. 2"CS N.GRID GAS
EXIST. 8"PL N.GRID GAS
UPL 100RX12
UPL 16
UPL 16
UPL 16

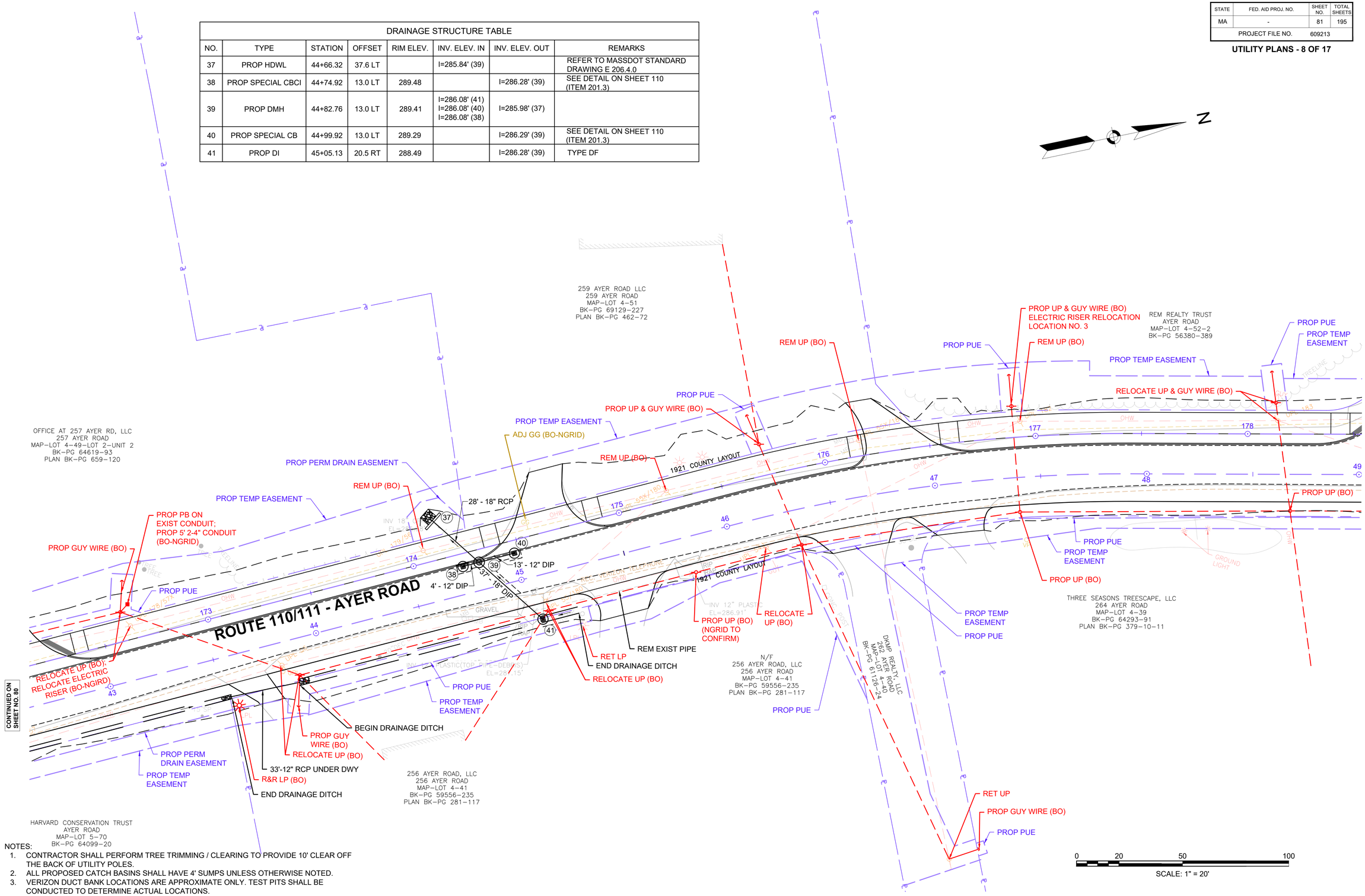
HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	81	195
PROJECT FILE NO.	609213		

UTILITY PLANS - 8 OF 17

609213_HD10(UTILITY PLANS).DWG Plotted on 11-Feb-2025 5:10 PM

DRAINAGE STRUCTURE TABLE							
NO.	TYPE	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
37	PROP HDWL	44+66.32	37.6 LT		I=285.84' (39)		REFER TO MASSDOT STANDARD DRAWING E 206.4.0
38	PROP SPECIAL CBCI	44+74.92	13.0 LT	289.48		I=286.28' (39)	SEE DETAIL ON SHEET 110 (ITEM 201.3)
39	PROP DMH	44+82.76	13.0 LT	289.41	I=286.08' (41) I=286.08' (40) I=286.08' (38)	I=285.98' (37)	
40	PROP SPECIAL CB	44+99.92	13.0 LT	289.29		I=286.29' (39)	SEE DETAIL ON SHEET 110 (ITEM 201.3)
41	PROP DI	45+05.13	20.5 RT	288.49		I=286.28' (39)	TYPE DF



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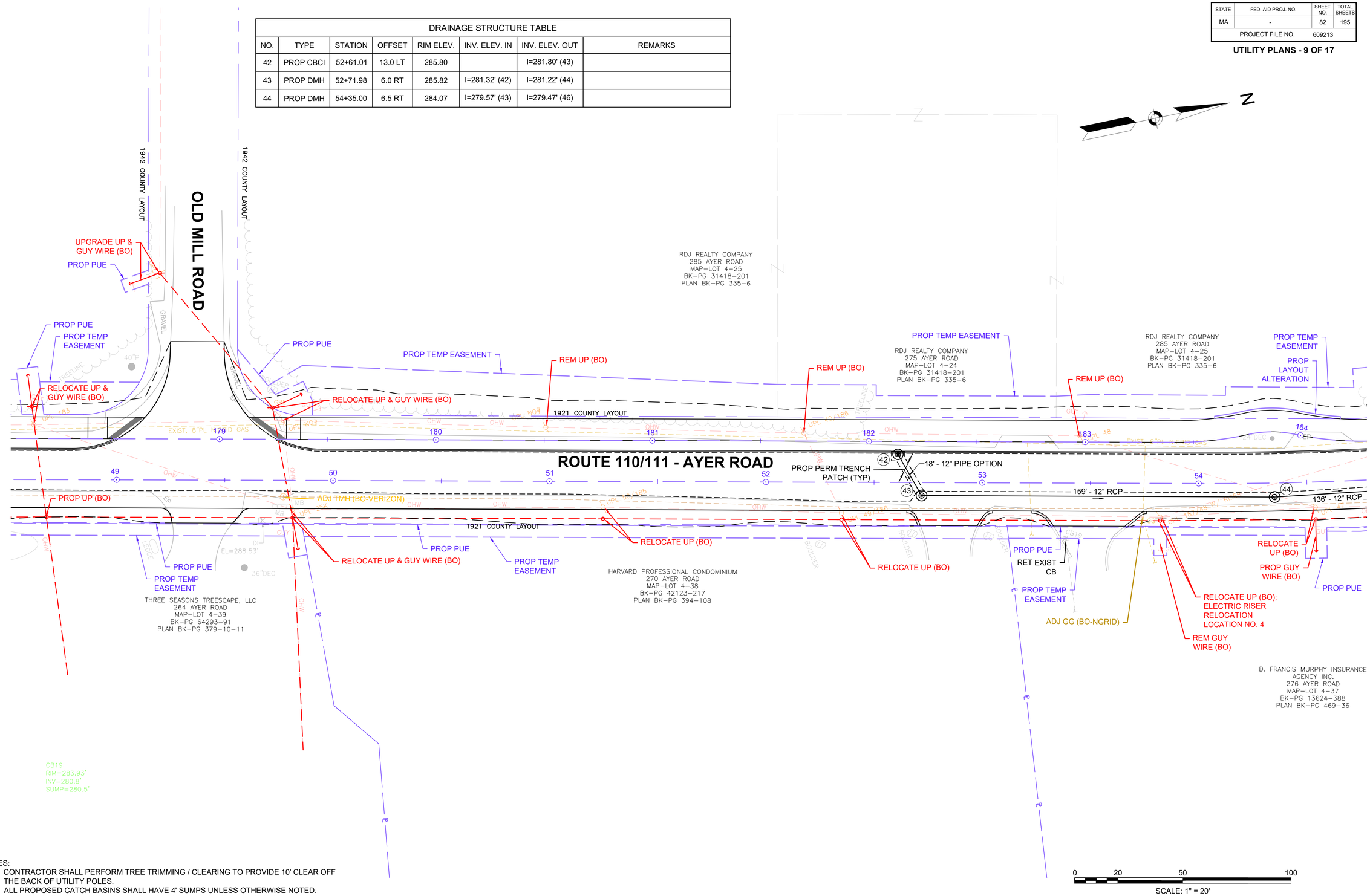
HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	82	195
PROJECT FILE NO.	609213		

UTILITY PLANS - 9 OF 17

609213_HD10(UTILITY PLANS).DWG Plotted on 11-Feb-2025 5:11 PM

DRAINAGE STRUCTURE TABLE							
NO.	TYPE	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
42	PROP CBCI	52+61.01	13.0 LT	285.80		I=281.80' (43)	
43	PROP DMH	52+71.98	6.0 RT	285.82	I=281.32' (42)	I=281.22' (44)	
44	PROP DMH	54+35.00	6.5 RT	284.07	I=279.57' (43)	I=279.47' (46)	



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HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	83	195
PROJECT FILE NO.	609213		

UTILITY PLANS - 10 OF 17

DRAINAGE STRUCTURE TABLE							
NO.	TYPE	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
45	PROP CBCI	55+61.05	13.0 LT	282.62		I=278.62' (46)	
46	PROP DMH	55+74.76	6.5 RT	282.61	I=278.11' (44) I=278.21' (45)	I=278.01' (49)	
47	PROP CBCI	58+29.05	13.0 LT	279.81		I=275.81' (49)	
48	PROP CB	58+37.91	12.0 RT	279.74		I=275.74' (49)	OFFSET TOP
49	PROP DMH	58+40.79	6.0 RT	279.83	I=275.23' (46) I=275.53' (48) I=275.53' (47)	I=275.13' (52)	

N

RDJ REALTY COMPANY
285 AYER ROAD
MAP–LOT 4–25
BK–PG 31418–201
PLAN BK–PG 335–6

289 AYER LLC
289 AYER ROAD
MAP–LOT 4–26
BK–PG 58259–155
PLAN BK–PG 241–7

ROUTE 110/111 - AYER ROAD

PROP TEMP EASEMENT
PROP LAYOUT ALTERATION
PROP GUY WIRE (BO)
RELOCATE UP (BO); ELECTRIC RISER RELOCATION LOCATION NO. 5
PROP PUE
1921 COUNTY LAYOUT
20' - 12" PIPE OPTION
PROP PERM TRENCH PATCH (TYP)
136' - 12" RCP
RELOCATE UP (BO)
PROP GUY WIRE (BO)
PROP PUE
PROP GUY WIRE (BO)
PROP TEMP EASEMENT
RET LP
R&R FLOOD LIGHT (BO)
RELOCATE UP (BO); ELECTRIC RISER RELOCATION LOCATION NO. 6
PROP PUE
PROP TEMP EASEMENT
RET LP
REM UP (BO)
1921 COUNTY LAYOUT
262' - 15" RCP
RELOCATE UP (BO)
PROP UP & GUY WIRE (BO)
CB RIM=282.11'
RET CB
PROP PUE
PROP TEMP EASEMENT
PROP PUE
PROP TEMP EASEMENT
UPGRADE UP (BO)
REM UP (BO)
PROP PUE
PROP GUY WIRE (BO)
PROP PB ON EXIST CONDUIT; PROP 10' 2-4" CONDUIT (BO-NGRID)
RELOCATE UP (BO); ELECTRIC RISER RELOCATION LOCATION NO. 7
18' - 12" PIPE OPTION
3' - 12" PIPE OPTION
TEST PIT
PROP TEMP EASEMENT
PROP PUE
REM EXIST DI; PLUG AND ABAN EXIST PIPES
RELOCATE UP (BO)
270' - 15" RCP
PROP UP & GUY WIRE (BO)

CONTINUED ON SHEET NO. 82

CONTINUED ON SHEET NO. 84

D. FRANCIS MURPHY INSURANCE AGENCY INC.
276 AYER ROAD
MAP–LOT 4–37
BK–PG 13624–388
PLAN BK–PG 469–36

YUKON HOLDINGS, LLC
280 AYER ROAD
MAP–LOT 4–36
BK–PG 48875–84
PLAN BK–PG 469–36

DAVID B. ALEXANDER
284 AYER ROAD
MAP–LOT 4–35
BK–PG 63500–332
PLAN BK–PG 587–5

THE 39 EATON REALTY TRUST
288 AYER ROAD
MAP–LOT 4–34
BK–PG 67617–325
PLAN BK–PG 389–9

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0 20 50 100
SCALE: 1" = 20'

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HARVARD
AYER ROAD (ROUTE 110/111)

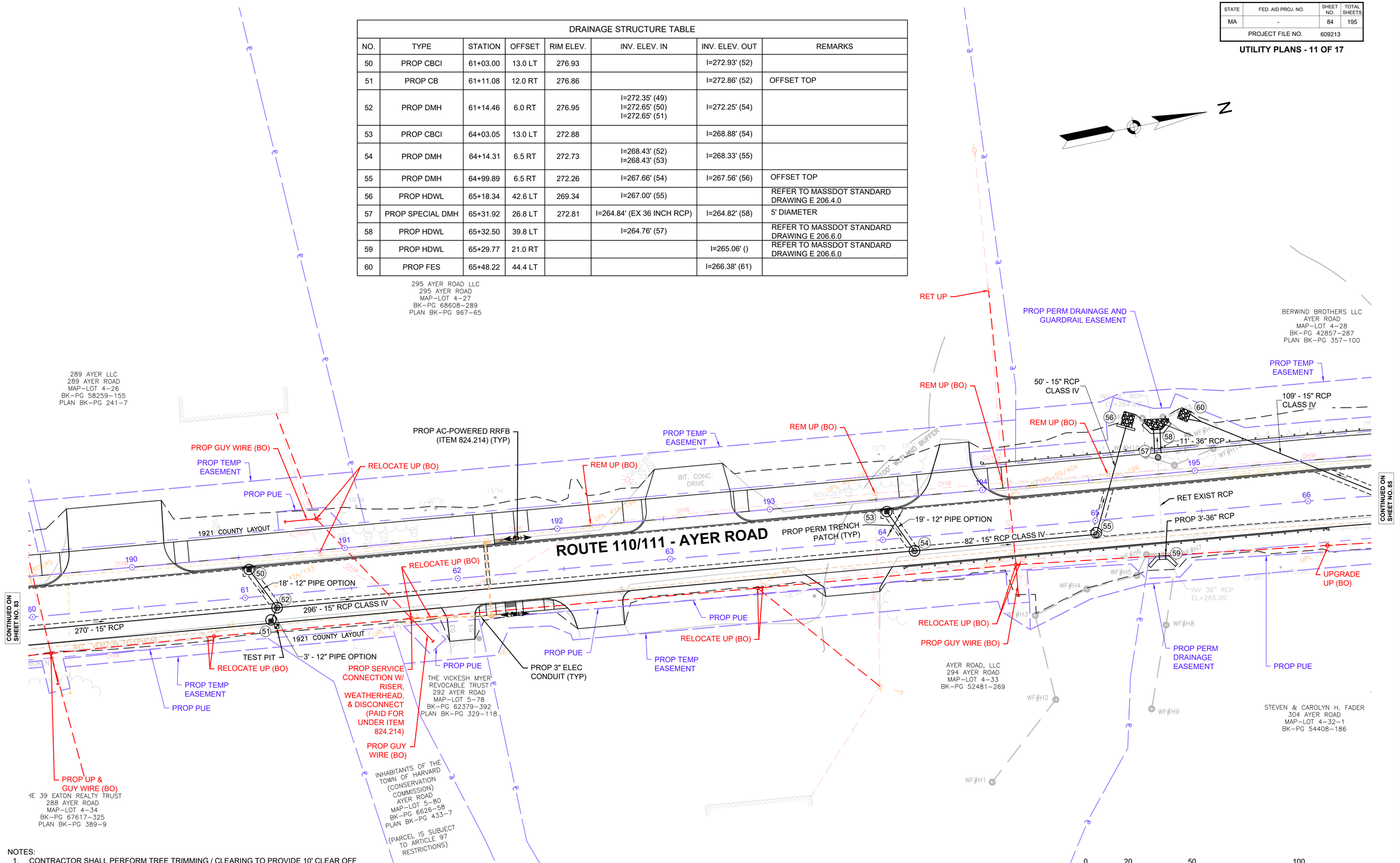
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	84	195
PROJECT FILE NO.	609213		

UTILITY PLANS - 11 OF 17

609213_HD10(UTILITY PLANS).DWG Plotted on 11-Feb-2025 5:12 PM

DRAINAGE STRUCTURE TABLE

NO.	TYPE	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
50	PROP CBCI	61+03.00	13.0 LT	276.93		I=272.93' (52)	
51	PROP CB	61+11.08	12.0 RT	276.86		I=272.86' (52)	OFFSET TOP
52	PROP DMH	61+14.46	6.0 RT	276.95	I=272.35' (49) I=272.65' (50) I=272.65' (51)	I=272.25' (54)	
53	PROP CBCI	64+03.05	13.0 LT	272.88		I=268.88' (54)	
54	PROP DMH	64+14.31	6.5 RT	272.73	I=268.43' (52) I=268.43' (53)	I=268.33' (55)	
55	PROP DMH	64+99.89	6.5 RT	272.26	I=267.66' (54)	I=267.56' (56)	OFFSET TOP
56	PROP HDWL	65+18.34	42.6 LT	269.34	I=267.00' (55)		REFER TO MASSDOT STANDARD DRAWING E 206.4.0
57	PROP SPECIAL DMH	65+31.92	26.8 LT	272.81	I=264.84' (EX 36 INCH RCP)	I=264.82' (58)	5' DIAMETER
58	PROP HDWL	65+32.50	39.8 LT		I=264.76' (57)		REFER TO MASSDOT STANDARD DRAWING E 206.6.0
59	PROP HDWL	65+29.77	21.0 RT			I=265.06' ()	REFER TO MASSDOT STANDARD DRAWING E 206.6.0
60	PROP FES	65+48.22	44.4 LT			I=266.38' (61)	



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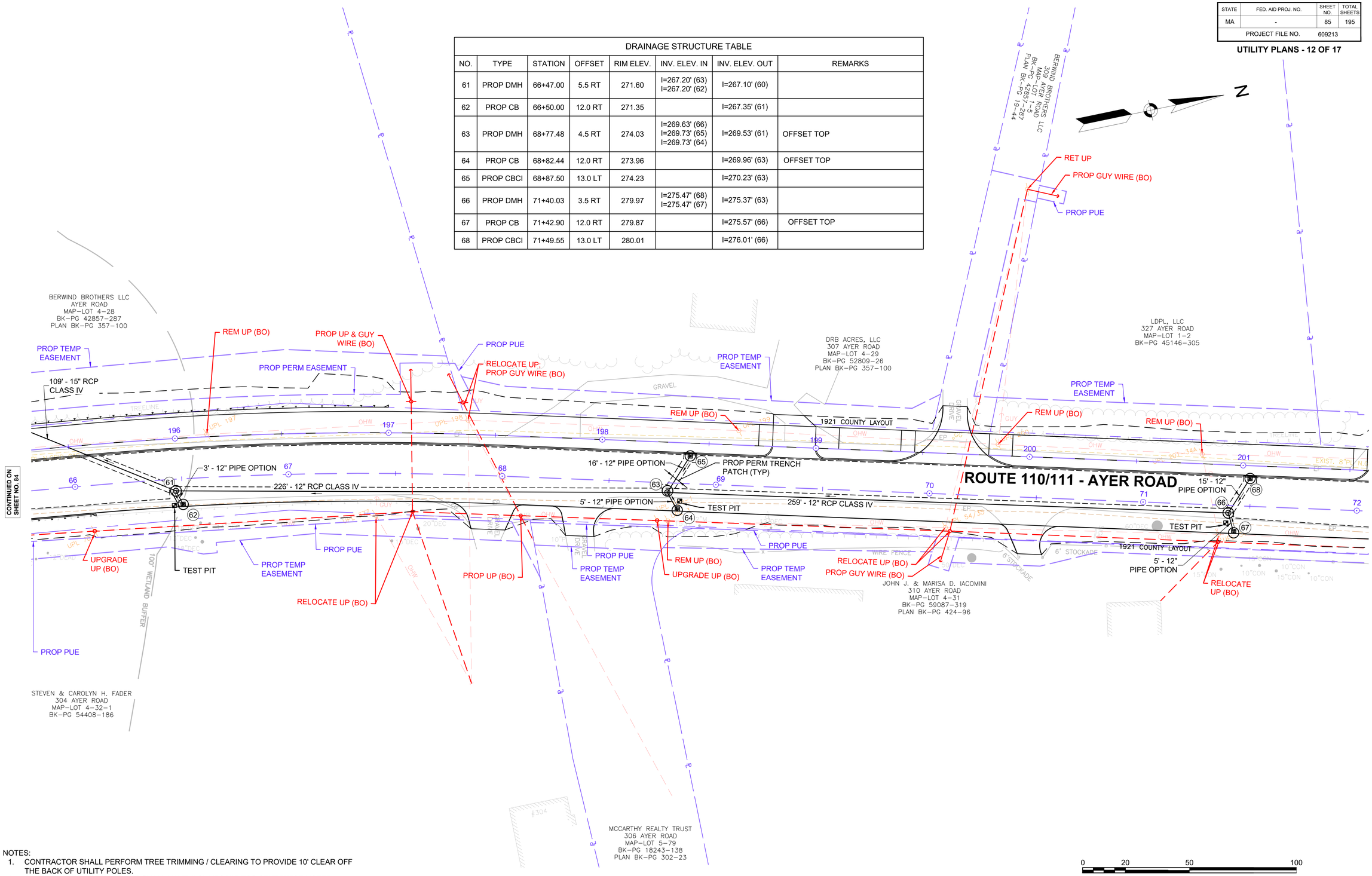
HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	85	195
PROJECT FILE NO.	609213		

UTILITY PLANS - 12 OF 17

DRAINAGE STRUCTURE TABLE							
NO.	TYPE	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
61	PROP DMH	66+47.00	5.5 RT	271.60	I=267.20' (63) I=267.20' (62)	I=267.10' (60)	
62	PROP CB	66+50.00	12.0 RT	271.35		I=267.35' (61)	
63	PROP DMH	68+77.48	4.5 RT	274.03	I=269.63' (66) I=269.73' (65) I=269.73' (64)	I=269.53' (61)	OFFSET TOP
64	PROP CB	68+82.44	12.0 RT	273.96		I=269.96' (63)	OFFSET TOP
65	PROP CBCI	68+87.50	13.0 LT	274.23		I=270.23' (63)	
66	PROP DMH	71+40.03	3.5 RT	279.97	I=275.47' (68) I=275.47' (67)	I=275.37' (63)	
67	PROP CB	71+42.90	12.0 RT	279.87		I=275.57' (66)	OFFSET TOP
68	PROP CBCI	71+49.55	13.0 LT	280.01		I=276.01' (66)	



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0 20 50 100
SCALE: 1" = 20'

609213_HD10\UTILITY PLANS\.DWG Plotted on 11-Feb-2025 5:12 PM

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	86	195
PROJECT FILE NO.	609213		

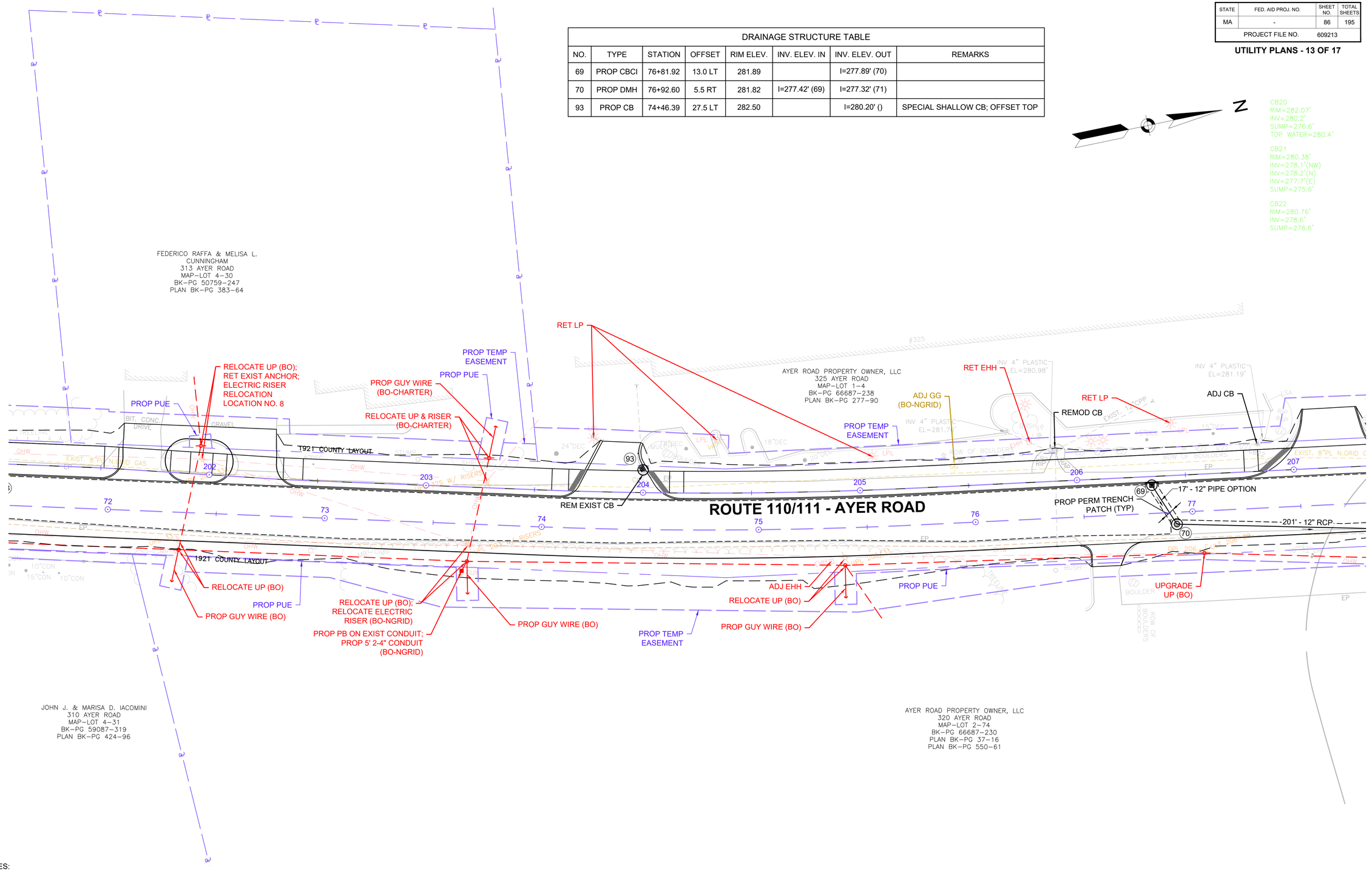
UTILITY PLANS - 13 OF 17

DRAINAGE STRUCTURE TABLE							
NO.	TYPE	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
69	PROP CBCI	76+81.92	13.0 LT	281.89		I=277.89' (70)	
70	PROP DMH	76+92.60	5.5 RT	281.82	I=277.42' (69)	I=277.32' (71)	
93	PROP CB	74+46.39	27.5 LT	282.50		I=280.20' ()	SPECIAL SHALLOW CB; OFFSET TOP

CB20
RIM=282.07'
INV=280.2'
SUMP=276.6'
TOP WATER=280.4'

CB21
RIM=280.38'
INV=278.1'(NW)
INV=278.2'(N)
INV=277.7'(E)
SUMP=275.6'

CB22
RIM=280.76'
INV=278.6'
SUMP=276.6'



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0 20 50 100
SCALE: 1" = 20'

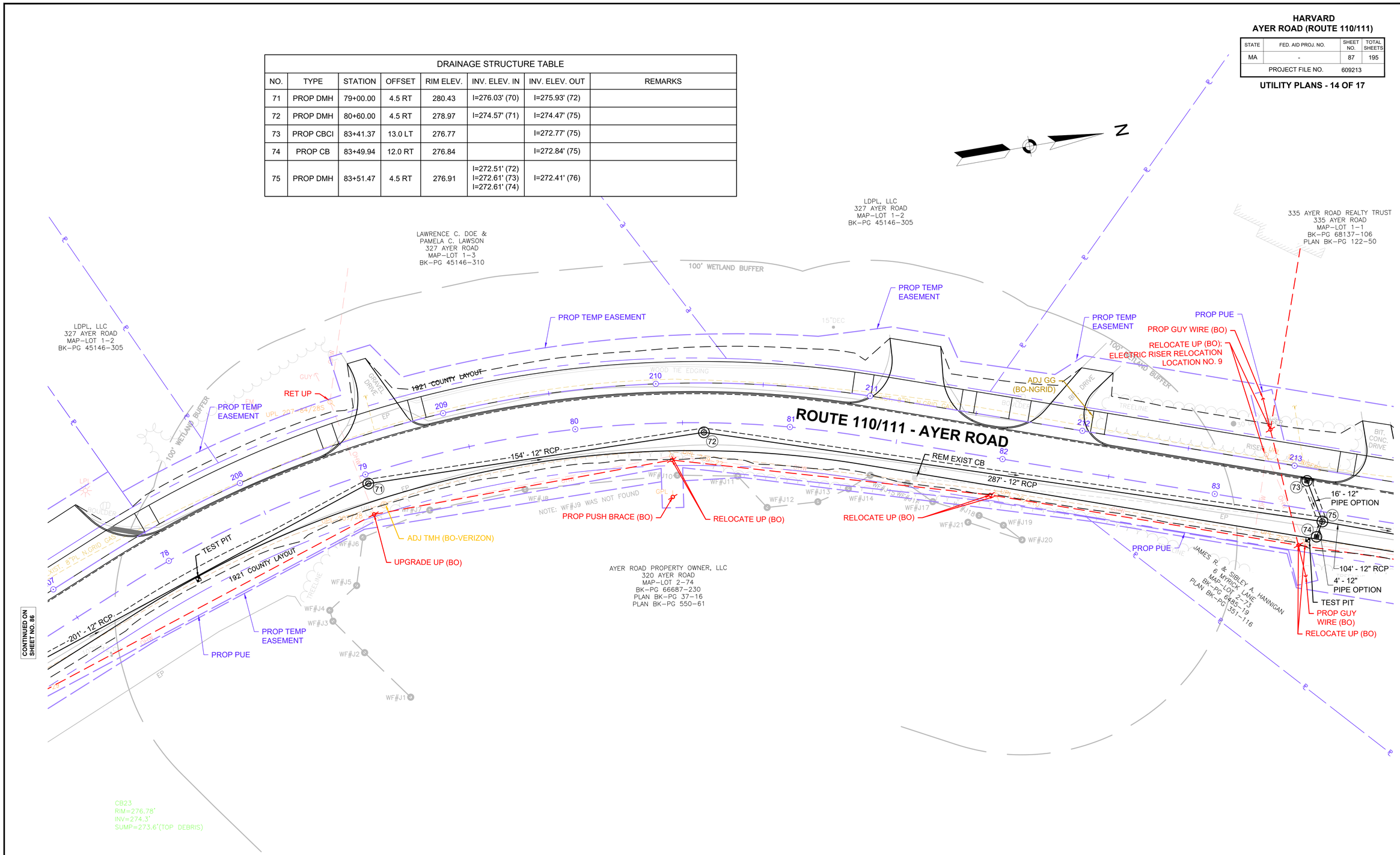
609213_HD10\UTILITY PLANS\.DWG Plotted on 11-Feb-2025 5:13 PM

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	87	195
PROJECT FILE NO.	609213		

UTILITY PLANS - 14 OF 17

DRAINAGE STRUCTURE TABLE							
NO.	TYPE	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
71	PROP DMH	79+00.00	4.5 RT	280.43	I=276.03' (70)	I=275.93' (72)	
72	PROP DMH	80+60.00	4.5 RT	278.97	I=274.57' (71)	I=274.47' (75)	
73	PROP CBCI	83+41.37	13.0 LT	276.77		I=272.77' (75)	
74	PROP CB	83+49.94	12.0 RT	276.84		I=272.84' (75)	
75	PROP DMH	83+51.47	4.5 RT	276.91	I=272.51' (72) I=272.61' (73) I=272.61' (74)	I=272.41' (76)	



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0 20 50 100
SCALE: 1" = 20'

609213_HD10(UTILITY PLANS).DWG Plotted on 11-Feb-2025 5:14 PM

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	88	195
PROJECT FILE NO.	609213		

UTILITY PLANS - 15 OF 17

609213_HD10(UTILITY PLANS).DWG Plotted on 11-Feb-2025 5:14 PM

DRAINAGE STRUCTURE TABLE							
NO.	TYPE	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
76	PROP DMH	84+59.36	6.0 RT	276.34	I=271.84' (75)	I=271.74' (78)	OFFSET TOP
77	PROP CBCI	85+59.13	13.0 LT	274.87		I=271.37' (78)	
78	PROP DMH	85+65.11	6.0 RT	275.59	I=271.09' (76) I=271.19' (77)	I=270.99' (79)	
79	PROP DMH	86+58.93	6.0 RT	274.88	I=270.38' (78)	I=270.28' (81)	OFFSET TOP
80	PROP CBCI	87+11.94	13.0 LT	273.46		I=269.96' (81)	
81	PROP DMH	87+19.61	6.0 RT	274.10	I=269.60' (79) I=269.70' (80)	I=269.50' (83)	OFFSET TOP
82	PROP CBCI	88+73.30	13.0 LT	270.35		I=266.35' (83)	
83	PROP DMH	88+85.13	9.6 RT	270.26	I=265.75' (81) I=265.85' (82)	I=265.65' (84)	OFFSET TOP

CB24
RIM=274.66'
INV=270.6'(SW)
INV=270.5'(NE)
SUMP=269.8'

CB25
RIM=270.47'
INV=265.3'(SW)
INV=266.4'(S)
INV=263.9'(NE)
SUMP=263.5'

335 AYER ROAD REALTY TRUST
335 AYER ROAD
MAP-LOT 1-1
BK-PG 68137-106
PLAN BK-PG 122-50

ELIZABETH MAE SHUMAN JOYCE AND
CHRISTOPHER MICHAEL JOYCE
341 AYER ROAD
MAP-LOT 2-1
BK-PG 66963-37

KATHLEEN M. DECOT
343 AYER ROAD
MAP-LOT 2-2
BK-PG 50213-223
PLAN BK-PG 122-50

GEOFFREY O. & JENNIFER K. GILLARD
345 AYER ROAD
MAP-LOT 2-3
BK-PG 57294-103
PLAN BK-PG 122-50

FRANK, JR. & BARBARA S. HEIM
346 AYER ROAD
MAP-LOT 2-11
BK-PG 4971-277
PLAN BK-PG 329-92

KATIE ELIZABETH & NATHAN J. BERG
344 AYER ROAD
MAP-LOT 2-12
BK-PG 59619-196
PLAN BK-PG 393-112

JAMES R. & SIBLEY A. HANNIGAN
6 MYRICK LANE
MAP-LOT 2-73
BK-PG 6485-19
PLAN BK-PG 351-116

TOWN OF HARVARD
(CONSERVATION COMMISSION)
MYRICK LANE
MAP-LOT 2-13
BK-PG 5297-435
PLAN BK-PG 349-42
(PARCEL IS SUBJECT TO ARTICLE 97 RESTRICTIONS)

ROUTE 110/111 - AYER ROAD

MYRICK LANE

2024 TOWN LAYOUT

1921 COUNTY LAYOUT

CONTINUED ON SHEET NO. 87

CONTINUED ON SHEET NO. 89

16' - 12" PIPE OPTION
4' - 12" PIPE OPTION
104' - 12" RCP
103' - 12" RCP
91' - 12" RCP
57' - 12" RCP
16' - 12" PIPE OPTION
16' - 12" PIPE OPTION
22' - 12" PIPE OPTION
231' - 12" RCP
162' - 12" RCP

REM EXIST PIPE
REM EXIST 12" CMP
REM EXIST CB
REM EXIST 12" RCP
REM EXIST CB
REM EXIST 4" PVC

PROP AC-POWERED RRFB (ITEM 824.215) (TYP)
PROP 3" ELEC CONDUIT (TYP)
PROP SERVICE CONNECTION W/ RISER, WEATHERHEAD, & DISCONNECT (PAID FOR UNDER ITEM 824.215)

PROP TEMP EASEMENT
PROP PUE
PROP GUY WIRE (BO)
RELOCATE UP (BO); ELECTRIC RISER RELOCATION LOCATION NO. 10
PROP UP (BO)
REM UP (BO)
RELOCATE UP (BO)
RELOCATE UP; PROP GUY WIRE (BO)
RELOCATE UP & RISER (BO)
RELOCATE UP, RISER, & GUY WIRE (BO)
PROP GUY WIRE (BO)
PROP GUY WIRES (BO)
RET UP
RET TMH
ADJ GG (BO-NGRID)
ADJ TMH (BO-VERIZON)
TEST PIT

NOTES:
1. CONTRACTOR SHALL PERFORM TREE TRIMMING / CLEARING TO PROVIDE 10' CLEAR OFF THE BACK OF UTILITY POLES.
2. ALL PROPOSED CATCH BASINS SHALL HAVE 4' SUMPS UNLESS OTHERWISE NOTED.
3. VERIZON DUCT BANK LOCATIONS ARE APPROXIMATE ONLY. TEST PITS SHALL BE CONDUCTED TO DETERMINE ACTUAL LOCATIONS.

0 20 50 100
SCALE: 1" = 20'

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	89	195
PROJECT FILE NO.	609213		

UTILITY PLANS - 16 OF 17

DRAINAGE STRUCTURE TABLE							
NO.	TYPE	STATION	OFFSET	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
84	EXIST DMH	91+19.60	7.9 RT	265.89	I=258.80' (83)	I=258.70' (86)	
85	PROP CBCI	92+72.01	13.0 LT	260.35		I=255.35' (86)	
86	EXIST DMH	92+88.60	9.4 RT	260.61	I=254.00' (85) I=254.00' (84)	I=253.90' (88)	
87	PROP CBCI	95+53.48	13.0 LT	250.82		I=246.44' (88)	
88	PROP DMH	95+75.45	9.6 RT	250.14	I=244.45' (EX CB30) I=244.23' (87) I=244.28' (86)	I=244.01' (EX)	

CHRISTOPHER & ELIZABETH HORNE
349 AYER ROAD
MAP-LOT 2-4
BK-PG 56424-146
PLAN BK-PG 122-50

YELLOW BOOTS REALTY TRUST
351 AYER ROAD
MAP-LOT 2-5
BK-PG 64062-141
PLAN BK-PG 122-50

ROBERT J., JR. & YULING L. DIPIETRO
355 AYER ROAD
MAP-LOT 2-6
BK-PG 23343-164
PLAN BK-PG 122-50

JOHN E. SWANSON, III, &
LISA A.R. SHAW
361 AYER ROAD
MAP-LOT 2-7
BK-PG 60577-356
PLAN BK-PG 904-84

LISA MCATEER
350 AYER ROAD
MAP-LOT 2-10
BK-PG 63929-220

GILLIAN D. PRICE & CHRISTOPHER KRUEGLER
354 AYER ROAD
MAP-LOT 2-9
BK-PG 32703-258

WILSON NOMINEE TRUST
AYER ROAD
MAP-LOT 2-8
BK-PG 62439-134
PLAN BK-PG 143-89

(PARCEL IS SUBJECT TO CONSERVATION RESTRICTIONS AND ARTICLE 97 RESTRICTIONS)

WILSON NOMINEE TRUST
0 AYER ROAD
MAP-LOT 2-8-1
BK-PG 61239-194
PLAN BK-PG 143-89

#349 #350 #351 #354 #355

ROUTE 110/111 - AYER ROAD

1921 COUNTY LAYOUT

231' - 12" RCP

167' - 12" RCP

283' - 12" RCP

24' - 12" PIPE OPTION

28' - 12" PIPE OPTION

PROP PUE
PROP TEMP EASEMENT
PROP GUY WIRE (BO)
PROP PB
PROP 39' 2-4" CONDUIT (BO-NGRID)
PROP PB ON EXIST CONDUIT
RELOCATE UP (BO)
RELOCATE UP & GUY WIRE (BO)
RELOCATE UP (BO); ELECTRIC RISER RELOCATION LOCATION NO. 11
REM UP (BO)
REM EXIST CB & PIPE
REM EXIST PIPE
REM EXIST CB
REM EXIST CB & 12" RCP
ABAN EXIST PIPE
ADJ DMH
ADJ CB; RET PIPE
REM EXIST DMH
TEST PIT
R&S LIGHTED POST
LIMIT OF CONSERVATION RESTRICTION

CB26
RIM=265.01'
INV=260.1'(E)
INV=259.4'(NW-12"RCP)
SUMP=259.4'

DMH5
RIM=265.01'
INV=259.2'(SE-12"RCP)
INV=258.8'(SW)
INV=258.7'(N)
SUMP=259.0'(TOP DEBRIS)

CB27
RIM=260.09'
INV=255.1'
SUMP=255.1'

CB28
RIM=259.84'
INV=254.3'(12"RCP)
SUMP=254.3'(TOP DEBRIS)

DMH6
RIM=259.84'
INV=254.2'(SE)
INV=254.0'(S)
INV=254.0'(SW)
INV=254.0'(NE)
SUMP=254.0'

CB29 (BURIED DOUBLE BASIN)
RIM=251.29'
INV=246.34'

CB30
RIM=250.09'
INV=244.8'(12"RCP)
SUMP=244.8'

DMH7
RIM=249.82'
INV=244.45' (A)
INV=244.28' (B)
INV=244.23' (C)
INV=244.01' (D)

CONTINUED ON SHEET NO. 88

CONTINUED ON SHEET NO. 90

NOTES:
1. CONTRACTOR SHALL PERFORM TREE TRIMMING / CLEARING TO PROVIDE 10' CLEAR OFF THE BACK OF UTILITY POLES.
2. ALL PROPOSED CATCH BASINS SHALL HAVE 4' SUMPS UNLESS OTHERWISE NOTED.
3. VERIZON DUCT BANK LOCATIONS ARE APPROXIMATE ONLY. TEST PITS SHALL BE CONDUCTED TO DETERMINE ACTUAL LOCATIONS.

0 20 50 100
SCALE: 1" = 20'

609213_HD10(UTILITY PLANS).DWG Plotted on 11-Feb-2025 5:15 PM

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	90	195
PROJECT FILE NO.	609213		

UTILITY PLANS - 17 OF 17

609213_HD10(UTILITY PLANS).DWG Plotted on 11-Feb-2025 5:15 PM

CRAFTSMAN VILLAGE–HARVARD CONDOMINIUM AYER ROAD MAP–LOT 2–7C BK–PG 67486–268 PLAN BK–PG 954–18

CRAFTSMAN VILLAGE–HARVARD CONDOMINIUM AYER ROAD MAP–LOT 2–7C BK–PG 67486–268 PLAN BK–PG 954–18

N/F 29 HARVARD ROAD, LLC. 29 HARVARD ROAD MAP–LOT 35–22 BK–PG 71496–PAGE 87 (MIDDLESEX)

CORTLAND LANE

ROUTE 110/111 - AYER ROAD

PROP SERVICE CONNECTION W/ RISER, WEATHERHEAD, & DISCONNECT (PAID FOR UNDER ITEM 824.216)

PROP SIDEWALK ANCHOR GUY WIRE (BO)

RELOCATE UP (BO)

PROP LAYOUT ALTERATION

PROP TEMP EASEMENT

PROP GUY WIRE (BO)

RELOCATE UP (BO)

PROP TEMP EASEMENT

RELOCATE UP (BO)

PROP PUE

RELOCATE UP (BO); RELOCATE ELECTRIC RISER (BO-NGRID)

PROP PB ON EXIST CONDUIT; PROP 5' 2-4" CONDUIT (BO-NGRID)

28' - 12" PIPE OPTION

TEST PIT

ADJ CB; RET PIPE

REM EXIST DMH

REM UP (BO)

PROP TEMP EASEMENT

REM UP (BO)

RELOCATE UP (BO)

PROP SIDEWALK ANCHOR GUY (BO)

PROP AC-POWERED RRFB (ITEM 824.216) (TYP)

PROP GUY WIRE (BO)

PROP 3" ELEC CONDUIT (TYP)

RET UP

RET UP

RET UP

1921 COUNTY LAYOUT

PROJECT END
STA 100+74.80
N3025101.0471
E636754.0355

WILSON NOMINEE TRUST
AYER ROAD
MAP–LOT 2–8
BK–PG 62439–134
PLAN BK–PG 143–89

(PARCEL IS SUBJECT TO CONSERVATION RESTRICTIONS AND ARTICLE 97 RESTRICTIONS)

N/F
MAXANT INDUSTRIES, INC.
28 HARVARD ROAD
MAP–LOT 35–53
BK–PG 12183–272 (MIDDLESEX)
PLAN NO. 273 OF 1972

NEW ENGLAND TELEPHONE AND TELEGRAPH COMPANY RIGHT–OF–WAY

TOWN OF HARVARD WORCESTER COUNTY

TOWN OF AYER MIDDLESEX COUNTY

LIMIT OF CONSERVATION RESTRICTION

100' WETLAND BUFFER

CB30
RIM=250.09'
INV=244.8'(12"RCP)
SUMP=244.8'

DMH7
RIM=249.82'
INV=244.45' (A)
INV=244.28' (B)
INV=244.23' (C)
INV=244.01' (D)

CONTINUED ON SHEET NO. 89

NOTES:
1. CONTRACTOR SHALL PERFORM TREE TRIMMING / CLEARING TO PROVIDE 10' CLEAR OFF THE BACK OF UTILITY POLES.
2. ALL PROPOSED CATCH BASINS SHALL HAVE 4' SUMPS UNLESS OTHERWISE NOTED.
3. VERIZON DUCT BANK LOCATIONS ARE APPROXIMATE ONLY. TEST PITS SHALL BE CONDUCTED TO DETERMINE ACTUAL LOCATIONS.

0 20 50 100
SCALE: 1" = 20'

SEEDING AND MULCH LEGEND

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR ROADSIDES

= NATIVE SHORT GRASSLAND MIX (ITEM 765.415)

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	91	195
PROJECT FILE NO.	609213		

LANDSCAPE PLANS AND DETAILS - 1 OF 19

609213_HD111(LANDSCAPE PLANS).DWG Plotted on 11-Feb-2025 5:16 PM

ROUTE 110/111 - AYER ROAD
(1950 TOWN LAYOUT - STATE HIGHWAY ALTERATION 33799A)

12 LANCASTER COUNTY ROAD LLC
185 AYER ROAD
MAP-LOT 8-59
BK-PG 46796-296
PLAN BK-PG 226-27

12 LANCASTER COUNTY ROAD LLC
187 AYER ROAD
MAP-LOT 8-60
BK-PG 54974-74
PLAN BK-PG 226-27

HARVARD CORNER CONDOMINIUM
0 AYER ROAD
MAP-LOT 8-62.2
BK-PG 70107-189
PLAN BK-PG 975-66
PLAN BK-PG 721-46

1950 STATE ALTERATION | 1950 TOWN LAYOUT

1950 TOWN LAYOUT | 1924 COUNTY LAYOUT

8+00

PROJECT BEGIN
STA 8+69.90
N3016495.4630
E634274.6683

140+00

141

PHOENIX-DURANGO LLC
184 AYER ROAD
MAP-LOT 8-41
BK-PG 64869-275
PLAN BK-PG 219-95

SAMANTHA'S REALTY LLC
188 AYER ROAD
MAP-LOT 8-40-1
BK-PG 33654-159
PLAN BK-PG 780-121

BOWERS BROOK LLC
196 AYER ROAD
MAP-LOT 8-40
BK-PG 45722-348
PLAN BK-PG 881-28

AYER ROAD REALTY LLC
198 AYER ROAD
MAP-LOT 8-40-3
BK-PG 45608-289
PLAN BK-PG 881-28

HARVARD OFFICE PARK LLC
200 AYER ROAD
MAP-LOT 8-40-2
BK-PG 28957-72
PLAN BK-PG 780-121

CONTINUED ON SHEET NO. 92

0 20 50 100
SCALE: 1" = 20'

SEEDING AND MULCH LEGEND

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR ROADSIDES

= NATIVE SHORT GRASSLAND MIX (ITEM 765.415)

= PAVEMENT MILLING MULCH (ITEM 769.)

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	92	195
PROJECT FILE NO.	609213		

LANDSCAPE PLANS AND DETAILS - 2 OF 19

N

HARVARD CORNER CONDOMINIUM
0 AYER ROAD
MAP-LOT 8-62.2
BK-PG 70107-189
PLAN BK-PG 975-66
PLAN BK-PG 721-46

HARVARD CORNER CONDOMINIUM
0 AYER ROAD
MAP-LOT 8-62.2
BK-PG 70107-189
PLAN BK-PG 975-66
PLAN BK-PG 721-46

CONTINUED ON SHEET NO. 91

1950 TOWN LAYOUT | 1924 COUNTY LAYOUT

1924 COUNTY LAYOUT | 1921 COUNTY LAYOUT

PROP SEDIMENT CONTROL BARRIER W/ SEDIMENTATION FENCE

WF#G54
WF#G53
WF#G52
WF#G51

2-1/79-1S EM
W/ RISER
EM
GUY

141 142 143 144 145 146

14 15 16 17 18 19 20

SILT FENCE
TREELINE
EP
OHW
UPL 85
UPL 75/85
30"M
"DEC
GUY
DH
TREELINE
DH/CB
BOULDER
MB
RAISED PLANTER
BIT. CONC. DRIVE
SIGN
24"DEC
100' WETLAND BUFFER

1950 TOWN LAYOUT | 1924 COUNTY LAYOUT

1924 COUNTY LAYOUT | 1921 COUNTY LAYOUT

HARVARD OFFICE PARK LLC
200 AYER ROAD
MAP-LOT 8-40-2
BK-PG 28957-72
PLAN BK-PG 780-121

SWEENEY PROPERTIES HARVARD, LLC
202 AYER ROAD
MAP-LOT 8-39
BK-PG 56202-55
PLAN BK-PG 434-86

HARVARD LANES REALTY LLC
204 AYER ROAD
MAP-LOT 8-38
BK-PG 70098-307
PLAN BK-PG 160-19

206 AYER ROAD CONDOMINIUM ASSOCIATES
206 AYER ROAD
MAP-LOT 8-37
BK-PG 11540-1
PLAN BK-PG 434-70

ROUTE 110/111 - AYER ROAD
(1924 COUNTY LAYOUT - 50' WIDE)

CONTINUED ON SHEET NO. 93

0 20 50 100

SCALE: 1" = 20'

609213_HD111(LANDSCAPE PLANS).DWG Plotted on 11-Feb-2025 5:16 PM

SEEDING AND MULCH LEGEND

- = STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR LAWNS
- = STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR ROADSIDES
- = NATIVE SHORT GRASSLAND MIX (ITEM 765.415)
- = PAVEMENT MILLING MULCH (ITEM 769.)
- = WETLAND SEED - RIPARIAN MIX (ITEM 765.553)

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	93	195
PROJECT FILE NO.	609213		

LANDSCAPE PLANS AND DETAILS - 3 OF 19

CONTINUED ON SHEET NO. 10

N/F
INHABITANTS OF THE TOWN OF HARVARD
0 LANCASTER COUNTY ROAD
MAP-LOT 8-62.4
BK-PG 21051-25
PLAN BK-PG 721-46

ARVARD CORNER CONDOMINIUM
0 AYER ROAD
MAP-LOT 8-62.2
BK-PG 70107-189
PLAN BK-PG 975-66
PLAN BK-PG 721-46

MAP-LOT 8-
BK-PG 65530-
PLAN BK-PG 25
PLAN BK-PG 360-110

GEBO LANE
(PUBLIC - VARIABLE WIDTH)

NATIVE SHORT GRASSLAND MIX

PROP SEDIMENT CONTROL BARRIER W/ SEDIMENTATION FENCE

PROP INT. STREAM REST. AREA SEE SHEET 109

PROP WETLAND REP. AREA, TYP. SEE SHEET 109

EXISTING VEGETATION TO BE PRESERVED WITHIN LIMITS SHOWN

POTENTIAL STAGING AREA. SEE CONSTRUCTION NOTES #8 AND #9 ON SHEET 3.

ROUTE 110/111 - AYER ROAD
(1921 COUNTY LAYOUT - 50' WIDE)

CONTINUED ON SHEET NO. 92

CONTINUED ON SHEET NO. 94

PROP INT. STREAM REST. AREA SEE SHEET 109

PROP SEDIMENT CONTROL BARRIER (TYP)

206 AYER ROAD CONDOMINIUM ASSOCIATES

INHABITANTS OF THE TOWN OF HARVARD
(CONSERVATION COMMISSION)
204 AYER ROAD
MAP-LOT 8-36
BK-PG 6223-264
PLAN BK-PG 434-86

(PARCEL IS SUBJECT TO ARTICLE 97 RESTRICTIONS)

0 20 50 100
SCALE: 1" = 20'

609213_HD111(LANDSCAPE PLANS).DWG Plotted on 11-Feb-2025 5:16 PM

SEEDING AND MULCH LEGEND

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR LAWNS

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR ROADSIDES

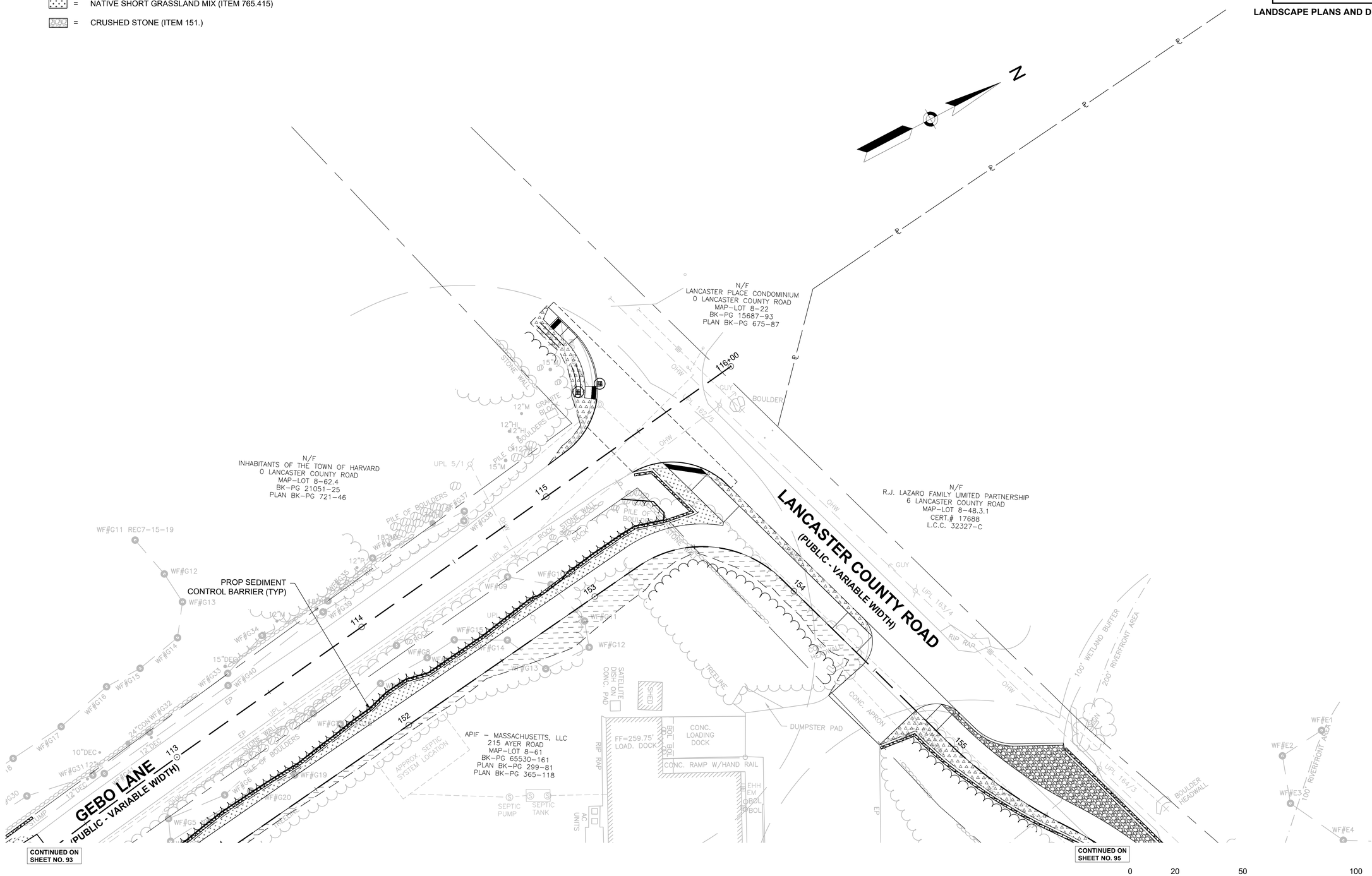
= NATIVE SHORT GRASSLAND MIX (ITEM 765.415)

= CRUSHED STONE (ITEM 151.)

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	94	195
PROJECT FILE NO.	609213		

LANDSCAPE PLANS AND DETAILS - 4 OF 19



609213_HD11(LANDSCAPE PLANS).DWG Plotted on 11-Feb-2025 5:17 PM

SEEDING AND MULCH LEGEND

- = STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR LAWNS
- = STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR ROADSIDES
- = NATIVE SHORT GRASSLAND MIX (ITEM 765.415)
- = PAVEMENT MILLING MULCH (ITEM 769.)
- = CRUSHED STONE (ITEM 151.)

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	95	195
PROJECT FILE NO.	609213		

LANDSCAPE PLANS AND DETAILS - 5 OF 19

CONTINUED ON SHEET NO. 10

CONTINUED ON SHEET NO. 94

CONTINUED ON SHEET NO. 96

N/F
R.J. LAZARO FAMILY LIMITED PARTNERSHIP
6 LANCASTER COUNTY ROAD
MAP-LOT 8-48.3.1
CERT.# 17688
L.C.C. 32327-C

PROP SEDIMENT CONTROL BARRIER (TYP)

LANCASTER COUNTY ROAD
(PUBLIC - VARIABLE WIDTH)

TOWN OF HARVARD
(CONSERVATION COMMISSION)
0 LANCASTER COUNTY ROAD
MAP-LOT 4-48.3.4
CERT.# 11358
L.C.C. 32327-C
(PARCEL IS SUBJECT TO ARTICLE 97 RESTRICTIONS)

LINE OF EXIST GAS EASEMENT

GAS EASEMENT
DEED BOOK 4726, PAGE 527
PLAN BOOK 305, PLAN 118

N/F
APIF - MASSACHUSETTS, LLC
215 AYER ROAD
MAP-LOT 8-61
BK-PG 65530-161
PLAN BK-PG 299-81
PLAN BK-PG 365-118

ROUTE 110/111 - AYER ROAD
(1921 COUNTY LAYOUT - 50' WIDE)

POOR FARM ROAD
(PUBLIC - VARIABLE WIDTH)

JEFFERY P. & ALEXANDRA H. MCKEARNEY
132 POOR FARM ROAD
MAP-LOT 8-24
BK-PG 67692-264
PLAN BK-PG 772-113

LAURA A. CLARAGE
129 POOR FARM ROAD
MAP-LOT 8-35
BK-PG 64304-359

"BOWERS BROOK"

100' RIVERFRONT AREA

200' RIVERFRONT AREA

100' WETLAND BUFFER

SCALE: 1" = 20'

609213_HD111(LANDSCAPE PLANS).DWG Plotted on 11-Feb-2025 5:17 PM

SEEDING AND MULCH LEGEND

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR LAWNS

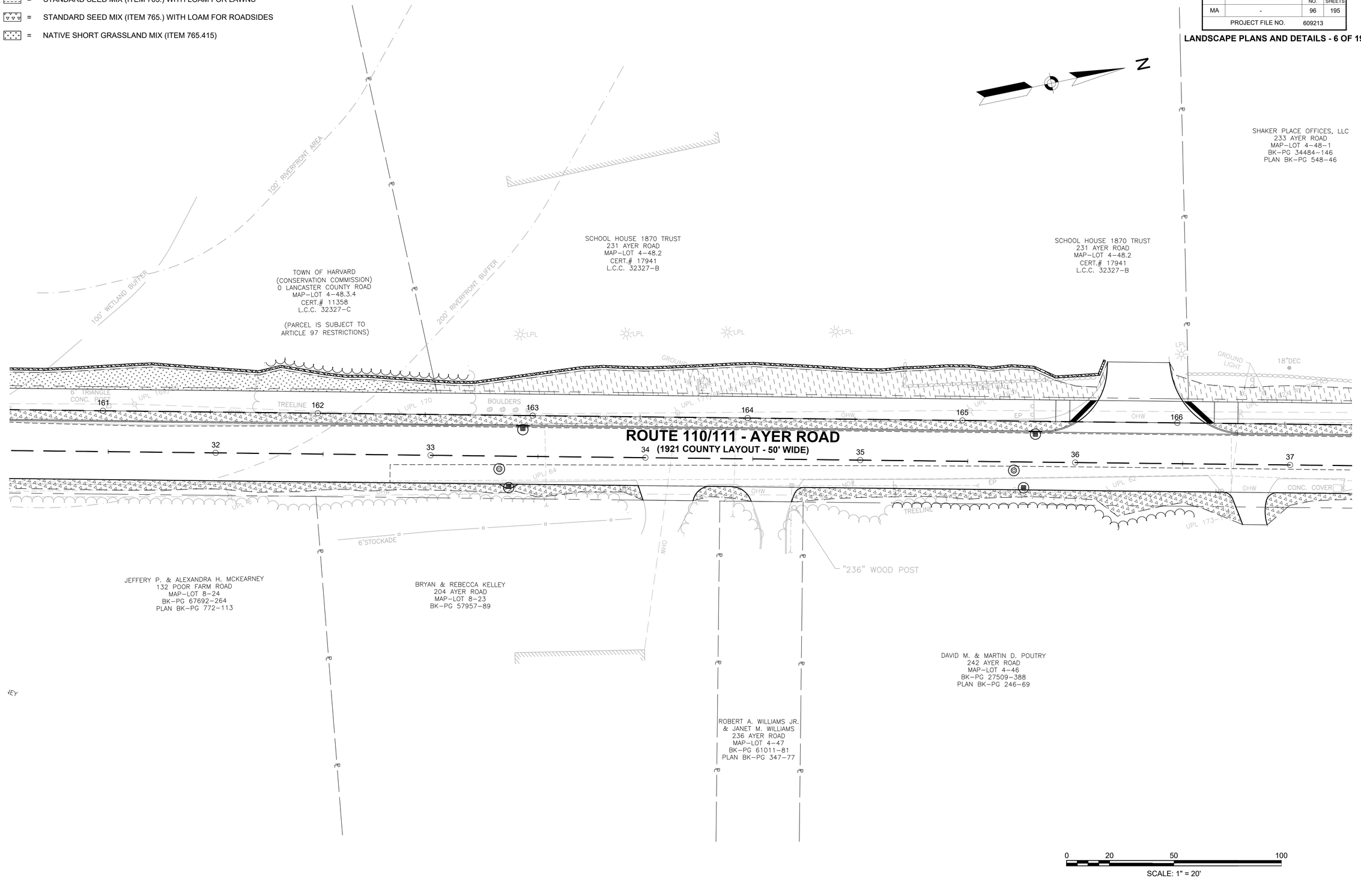
= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR ROADSIDES

= NATIVE SHORT GRASSLAND MIX (ITEM 765.415)

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	96	195
PROJECT FILE NO.	609213		

LANDSCAPE PLANS AND DETAILS - 6 OF 19



609213_HD111(LANDSCAPE PLANS).DWG Plotted on 11-Feb-2025 5:17 PM

SEEDING AND MULCH LEGEND

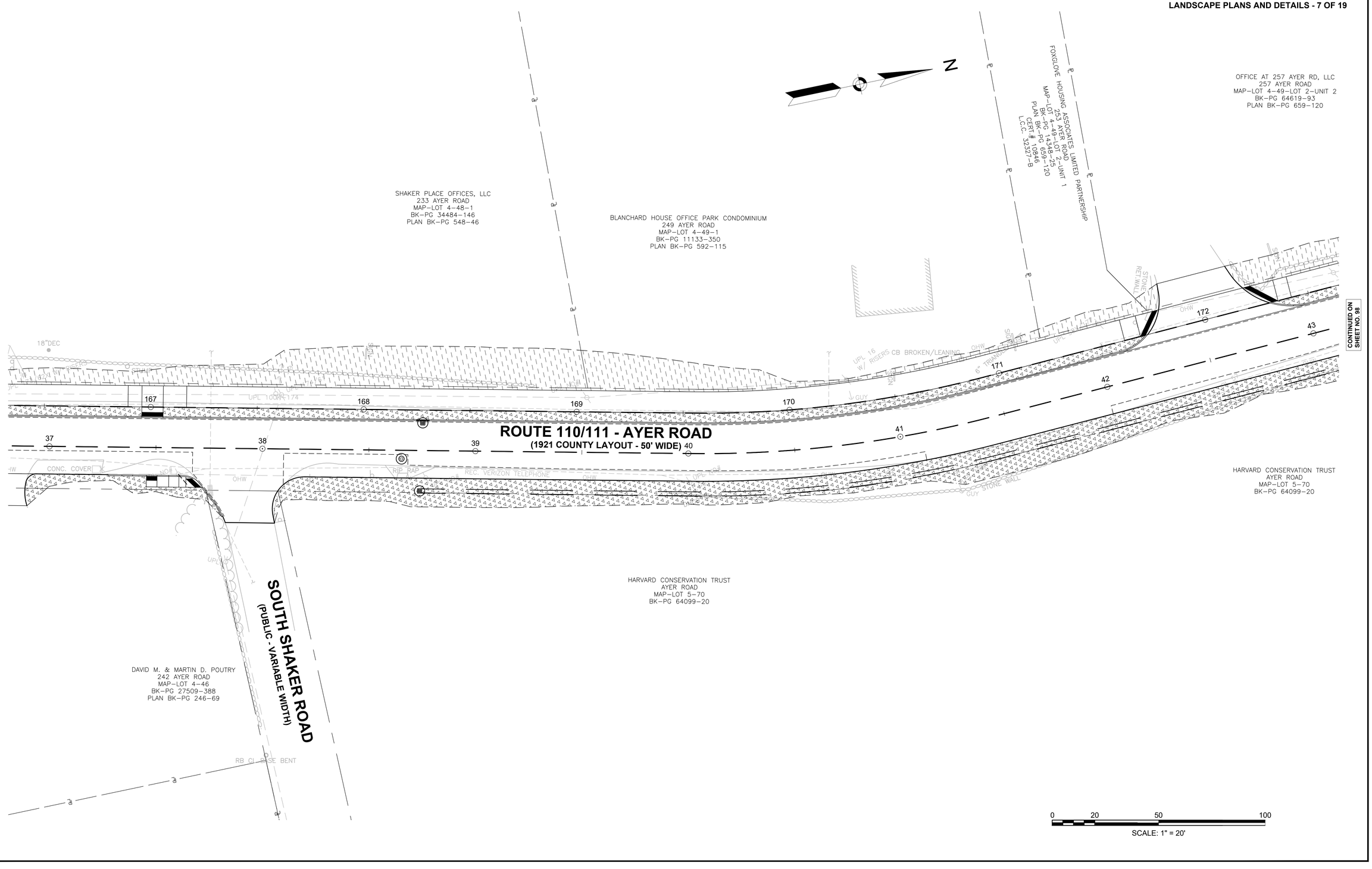
= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR LAWNS

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR ROADSIDES

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	97	195
PROJECT FILE NO.	609213		

LANDSCAPE PLANS AND DETAILS - 7 OF 19



609213_HD111(LANDSCAPE PLANS).DWG Plotted on 11-Feb-2025 5:17 PM

SEEDING AND MULCH LEGEND

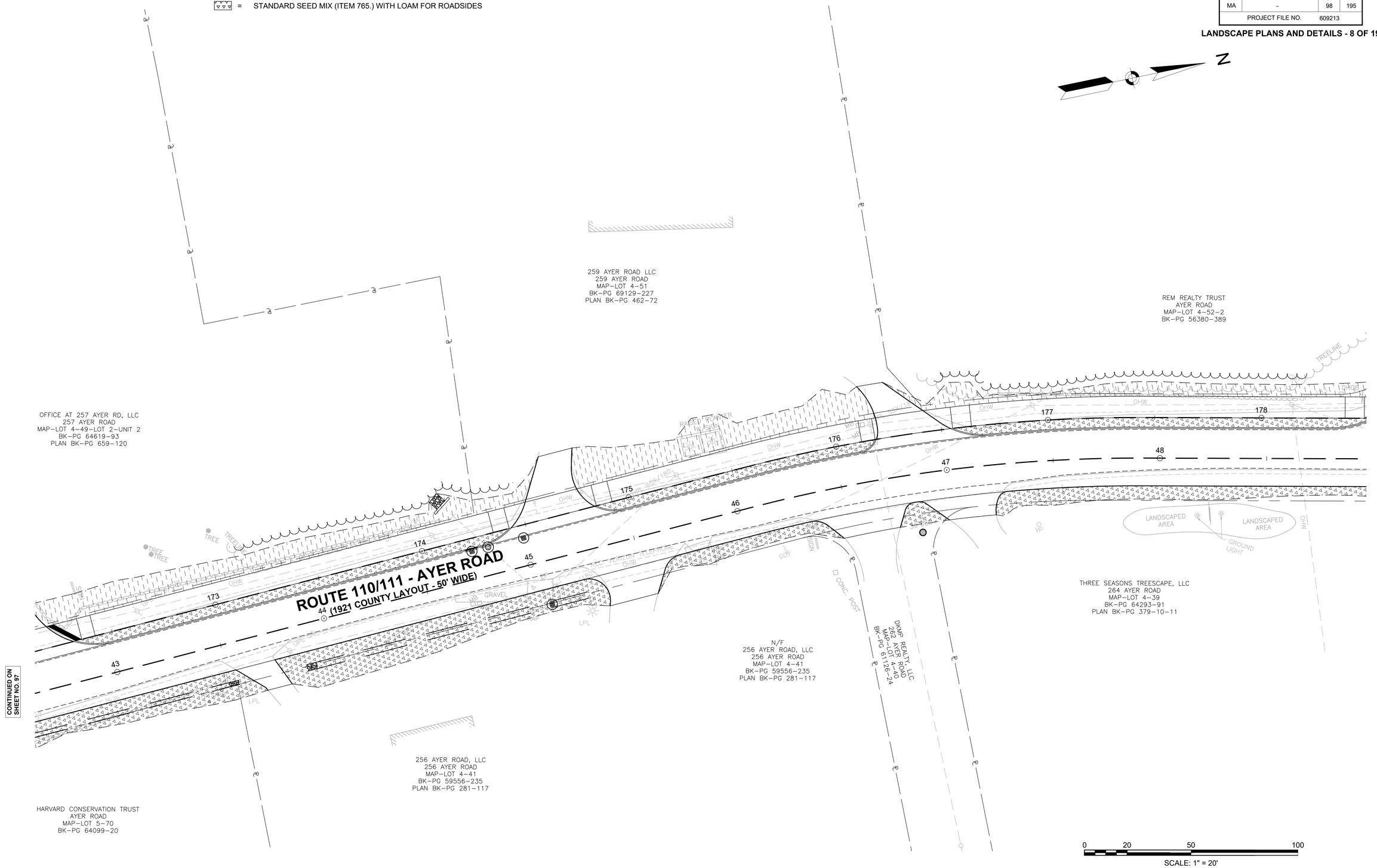
= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR LAWNS

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR ROADSIDES

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	98	195
PROJECT FILE NO.	609213		

LANDSCAPE PLANS AND DETAILS - 8 OF 19



609213_HD11(LANDSCAPE PLANS).DWG Plotted on 11-Feb-2025 5:17 PM

SEEDING AND MULCH LEGEND

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR LAWNS

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR ROADSIDES

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	99	195
PROJECT FILE NO.	609213		

LANDSCAPE PLANS AND DETAILS - 9 OF 19

609213_HD111(LANDSCAPE PLANS).DWG Plotted on 11-Feb-2025 5:18 PM

CONTINUED ON SHEET NO. 98

CONTINUED ON SHEET NO. 99

ROUTE 110/111 - AYER ROAD

(1921 COUNTY LAYOUT - 50' WIDE)

OLD MILL ROAD
(1942 COUNTY LAYOUT - WIDTH VARIES)

RDJ REALTY COMPANY
285 AYER ROAD
MAP–LOT 4–25
BK–PG 31418–201
PLAN BK–PG 335–6

RDJ REALTY COMPANY
275 AYER ROAD
MAP–LOT 4–24
BK–PG 31418–201
PLAN BK–PG 335–6

RDJ REALTY COMPANY
285 AYER ROAD
MAP–LOT 4–25
BK–PG 31418–201
PLAN BK–PG 335–6

THREE SEASONS TREESCAPE, LLC
264 AYER ROAD
MAP–LOT 4–39
BK–PG 64293–91
PLAN BK–PG 379–10–11

HARVARD PROFESSIONAL CONDOMINIUM
270 AYER ROAD
MAP–LOT 4–38
BK–PG 42123–217
PLAN BK–PG 394–108

D. FRANCIS MURPHY INSURANCE AGENCY INC.
276 AYER ROAD
MAP–LOT 4–37
BK–PG 13624–388
PLAN BK–PG 469–36

SCALE: 1" = 20'

SEEDING AND MULCH LEGEND

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR LAWNS

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR ROADSIDES

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	100	195
PROJECT FILE NO.	609213		

LANDSCAPE PLANS AND DETAILS - 10 OF 19

609213_HD11(LANDSCAPE PLANS).DWG Plotted on 11-Feb-2025 5:18 PM

RDJ REALTY COMPANY
285 AYER ROAD
MAP-LOT 4-25
BK-PG 31418-201
PLAN BK-PG 335-6

289 AYER LLC
289 AYER ROAD
MAP-LOT 4-26
BK-PG 58259-155
PLAN BK-PG 241-7

ROUTE 110/111 - AYER ROAD
(1921 COUNTY LAYOUT - 50' WIDE)

CONTINUED ON SHEET NO. 100

CONTINUED ON SHEET NO. 101

D. FRANCIS MURPHY INSURANCE AGENCY INC.
276 AYER ROAD
MAP-LOT 4-37
BK-PG 13624-388
PLAN BK-PG 469-36

YUKON HOLDINGS, LLC
280 AYER ROAD
MAP-LOT 4-36
BK-PG 48875-84
PLAN BK-PG 469-36

DAVID B. ALEXANDER
284 AYER ROAD
MAP-LOT 4-35
BK-PG 63500-332
PLAN BK-PG 587-5

THE 39 EATON REALTY TRUST
288 AYER ROAD
MAP-LOT 4-34
BK-PG 67617-325
PLAN BK-PG 389-9

SCALE: 1" = 20'

SEEDING AND MULCH LEGEND

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR LAWNS

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR ROADSIDES

= NATIVE SHORT GRASSLAND MIX (ITEM 765.415)

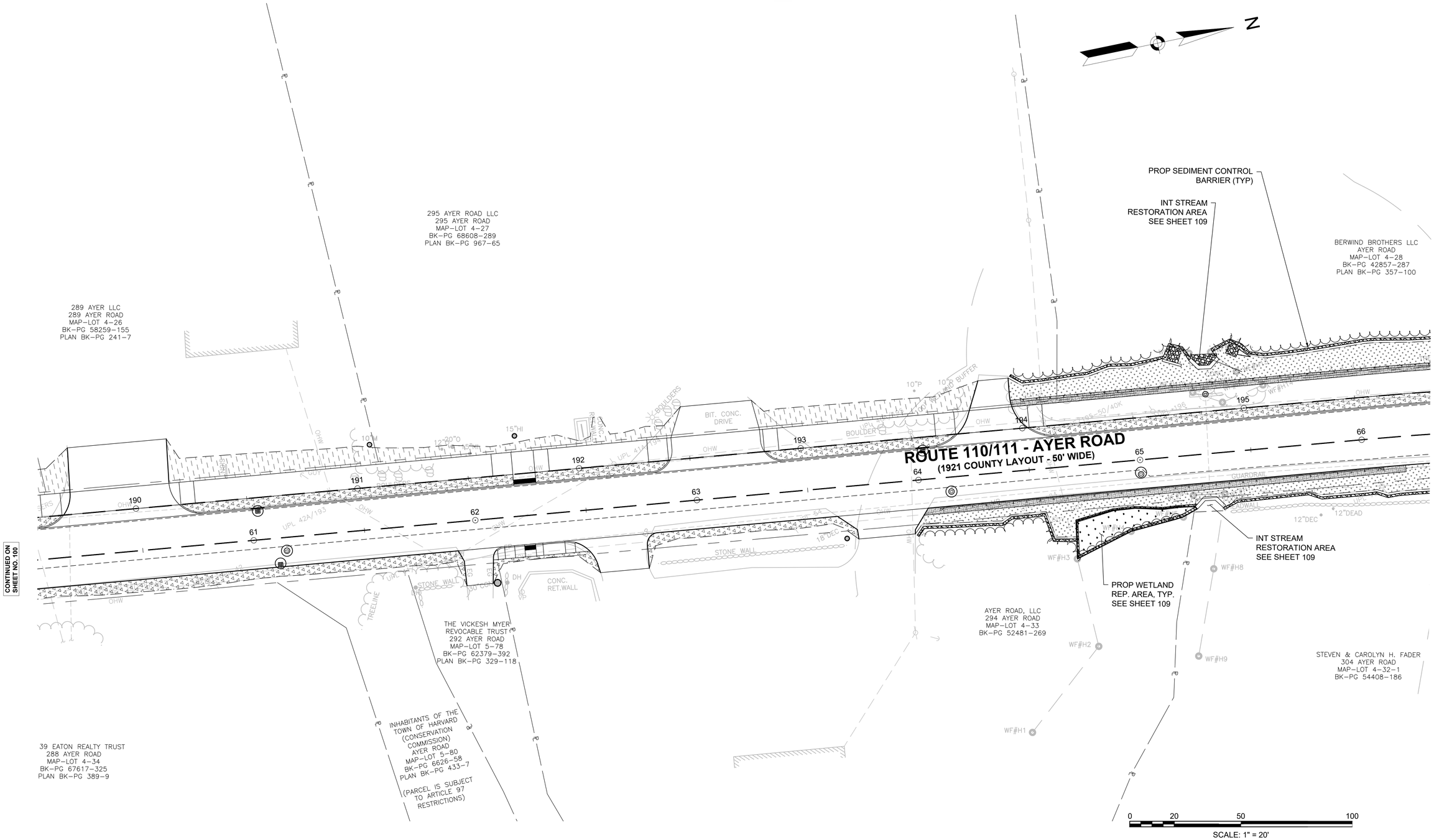
= PAVEMENT MILLING MULCH (ITEM 769.)

= WETLAND SEED - RIPARIAN MIX (ITEM 765.553)

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	101	195
PROJECT FILE NO.	609213		

LANDSCAPE PLANS AND DETAILS - 11 OF 19



609213_HD111(LANDSCAPE PLANS).DWG Plotted on 11-Feb-2025 5:18 PM

SEEDING AND MULCH LEGEND

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR LAWNS

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR ROADSIDES

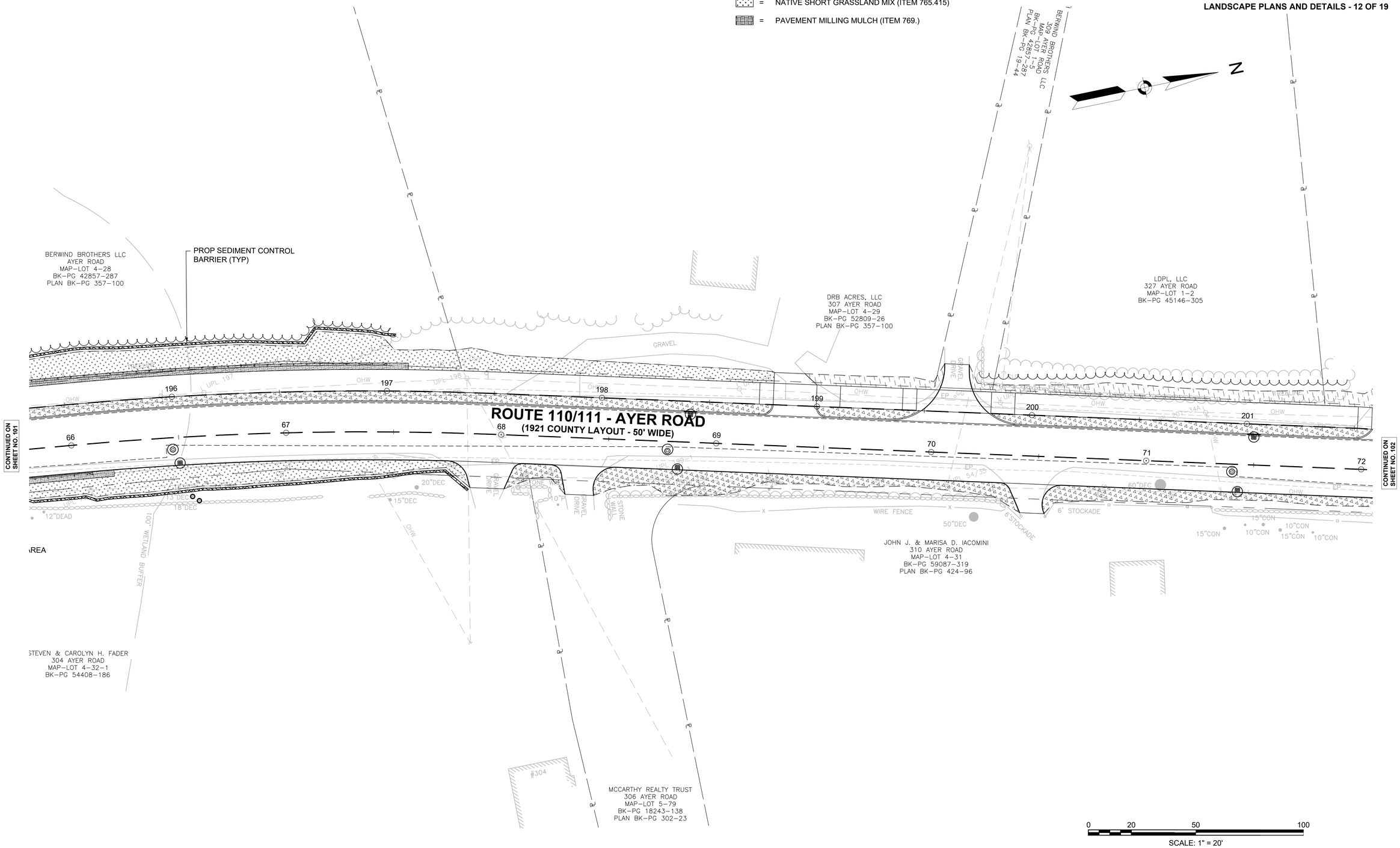
= NATIVE SHORT GRASSLAND MIX (ITEM 765.415)

= PAVEMENT MILLING MULCH (ITEM 769.)

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	102	195
PROJECT FILE NO.	609213		

LANDSCAPE PLANS AND DETAILS - 12 OF 19



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SEEDING AND MULCH LEGEND

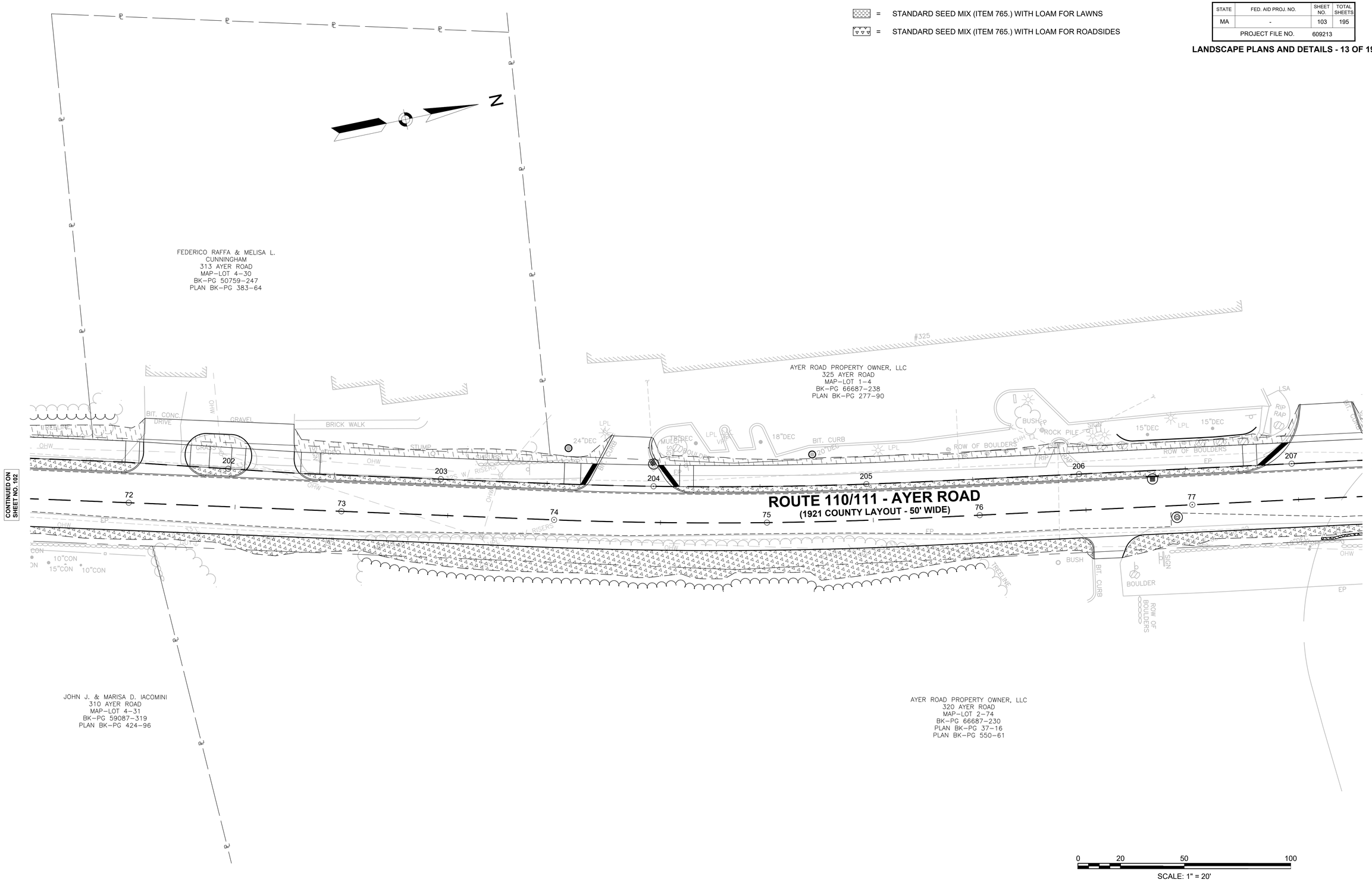
= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR LAWNS

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR ROADSIDES

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	103	195
PROJECT FILE NO.	609213		

LANDSCAPE PLANS AND DETAILS - 13 OF 19



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SEEDING AND MULCH LEGEND

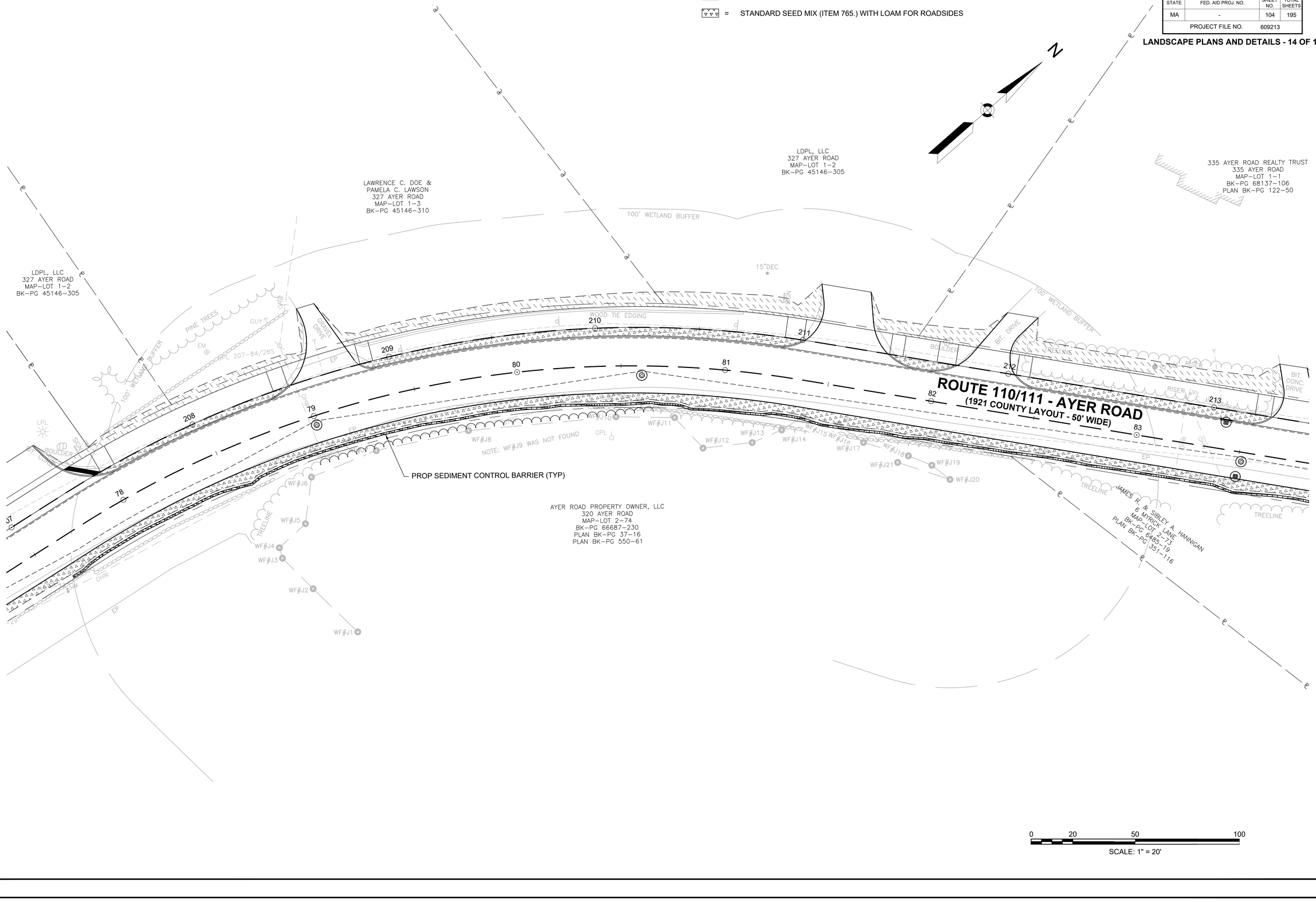
= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR LAWNS

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR ROADSIDES

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	104	195
PROJECT FILE NO.	609213		

LANDSCAPE PLANS AND DETAILS - 14 OF 19



609213_HD11(LANDSCAPE PLANS).DWG Plotted on 11-Feb-2025 5:19 PM

SEEDING AND MULCH LEGEND

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR LAWNS

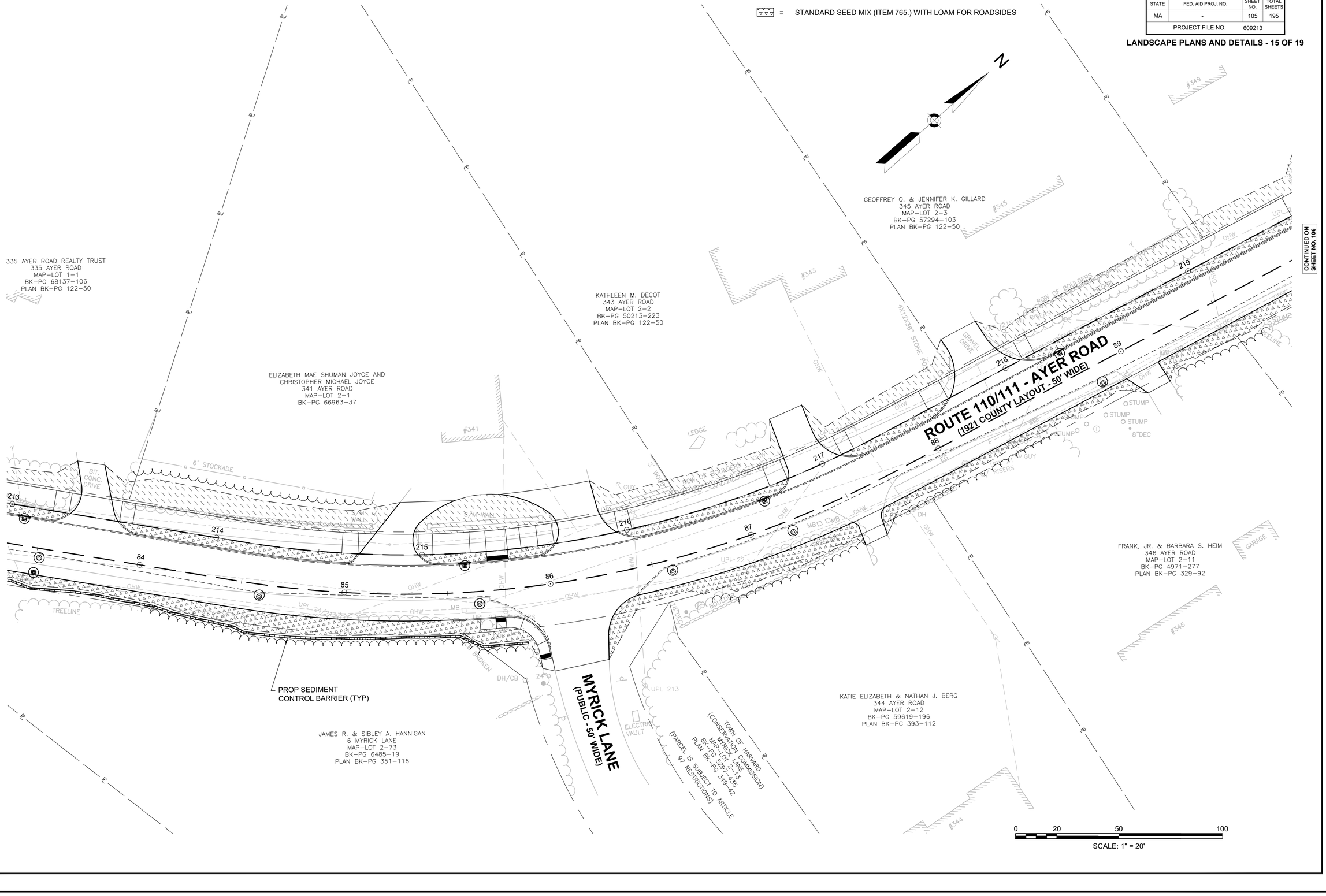
= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR ROADSIDES

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	105	195
PROJECT FILE NO.	609213		

LANDSCAPE PLANS AND DETAILS - 15 OF 19

609213_HD11(LANDSCAPE PLANS).DWG Plotted on 11-Feb-2025 5:19 PM



SEEDING AND MULCH LEGEND

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR LAWNS

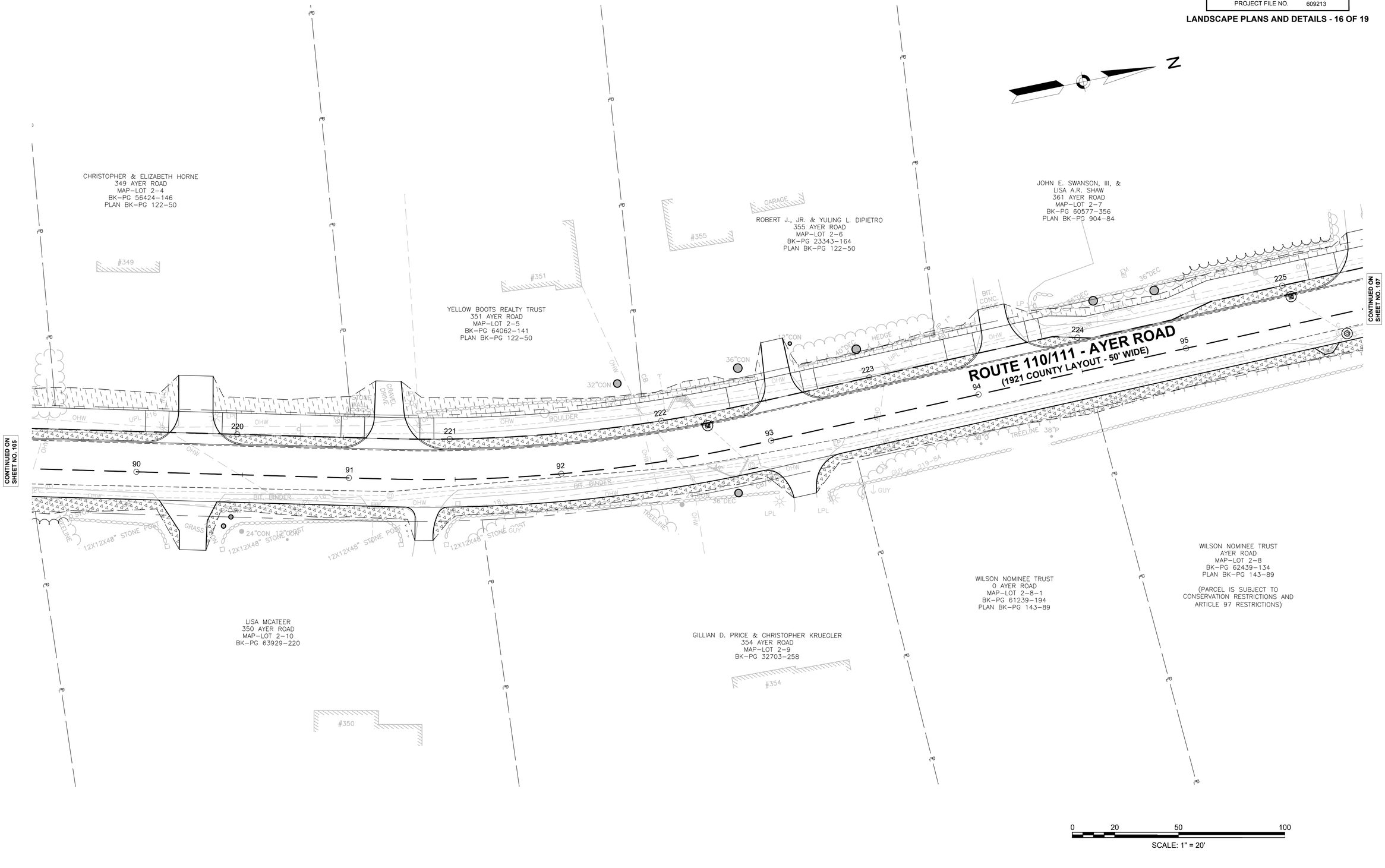
= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR ROADSIDES

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	106	195
PROJECT FILE NO.	609213		

LANDSCAPE PLANS AND DETAILS - 16 OF 19

609213_HD111(LANDSCAPE PLANS).DWG Plotted on 11-Feb-2025 5:19 PM



SEEDING AND MULCH LEGEND

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR LAWNS

= STANDARD SEED MIX (ITEM 765.) WITH LOAM FOR ROADSIDES

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	107	195
PROJECT FILE NO.	609213		

LANDSCAPE PLANS AND DETAILS - 17 OF 19

609213_HD111(LANDSCAPE PLANS).DWG Plotted on 11-Feb-2025 5:19 PM

N

CRAFTSMAN VILLAGE–HARVARD
CONDOMINIUM
AYER ROAD
MAP–LOT 2–7C
BK–PG 67486–268
PLAN BK–PG 954–18

CRAFTSMAN VILLAGE–HARVARD
CONDOMINIUM
AYER ROAD
MAP–LOT 2–7C
BK–PG 67486–268
PLAN BK–PG 954–18

N/F
29 HARVARD ROAD, LLC.
29 HARVARD ROAD
MAP–LOT 35–22
BK–PG 71496–PAGE 87 (MIDDLESEX)

CORTLAND LANE

ROUTE 110/111 - AYER ROAD
(1921 COUNTY LAYOUT - 50' WIDE)

PROJECT END
STA 100+74.70
N3025100.9454
E636754.0264

PROP SEDIMENT
CONTROL BARRIER (TYP)

WILSON NOMINEE TRUST
AYER ROAD
MAP–LOT 2–8
BK–PG 62439–134
PLAN BK–PG 143–89

(PARCEL IS SUBJECT TO
CONSERVATION RESTRICTIONS AND
ARTICLE 97 RESTRICTIONS)

N/F
MAXANT INDUSTRIES, INC.
28 HARVARD ROAD
MAP–LOT 35–53
BK–PG 12183–272 (MIDDLESEX)
PLAN NO. 273 OF 1972

MIDDLESEX COUNTY
TOWN OF AYER
TOWN OF HARVARD
WORCESTER COUNTY

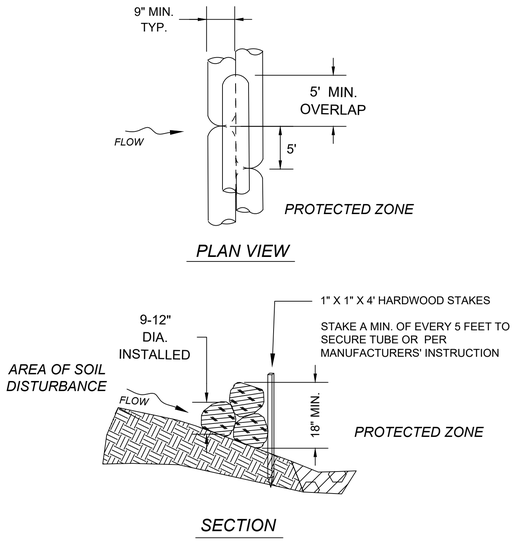
100' WETLAND BUFFER

CONTINUED ON SHEET NO. 106

0 20 50 100

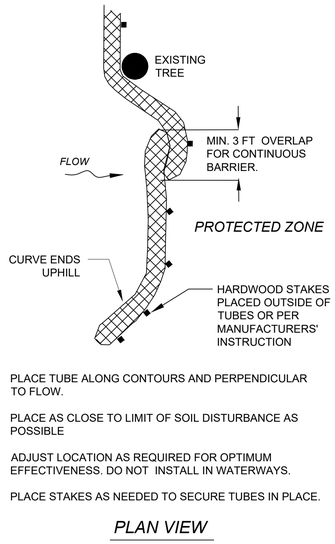
SCALE: 1" = 20'

609213_HD11(CONSTRUCTION DETAILS).DWG Plotted on 11-Feb-2025 5:20 PM



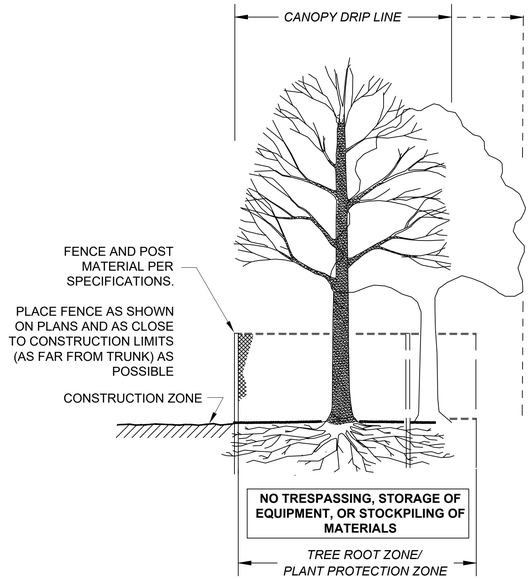
COMPOST FILTER TUBE BERM (SLOPES 2:1 OR STEEPER)

NOT TO SCALE

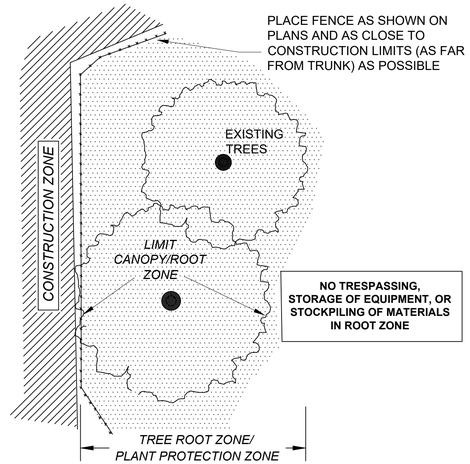


COMPOST FILTER TUBE

NOT TO SCALE



SECTION - FENCE PROTECTION OF ROOT ZONE



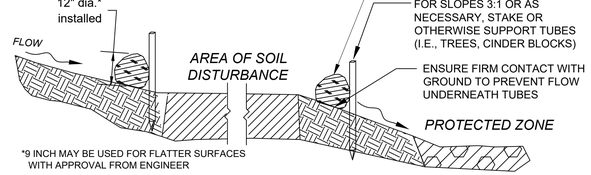
PLAN VIEW - FENCE PROTECTION OF ROOT ZONE

TREE PROTECTION - ROOT ZONE

NOT TO SCALE

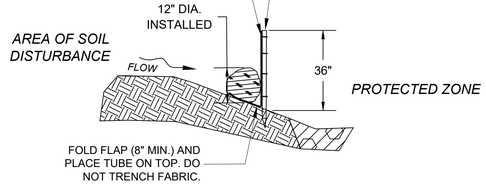
REDUCE HIGH WATER FLOW ONTO WORK ZONE

CAPTURE SEDIMENT AND PREVENT FLOW OFF SITE



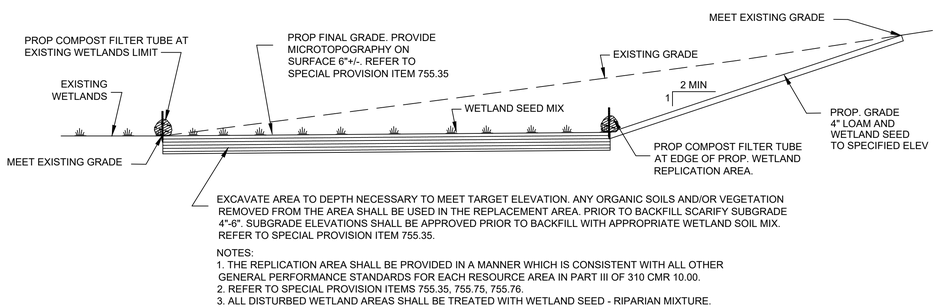
SEDIMENT BARRIER - COMPOST FILTER TUBES

NOT TO SCALE



COMPOST FILTER TUBE & SEDIMENTATION FENCE

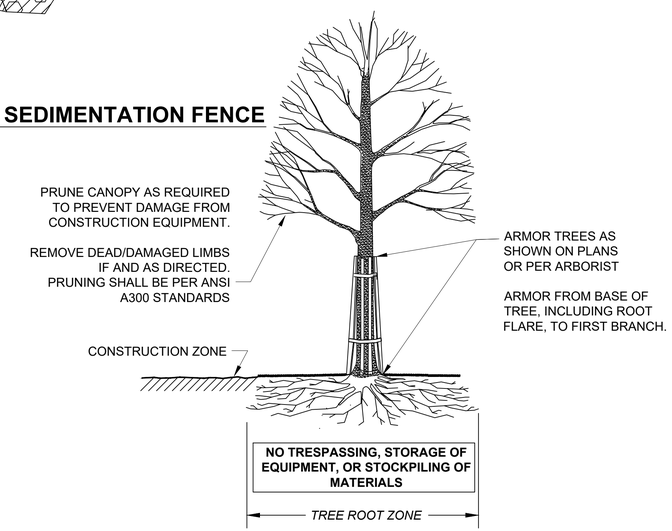
NOT TO SCALE



NOTES:
1. THE REPLICATION AREA SHALL BE PROVIDED IN A MANNER WHICH IS CONSISTENT WITH ALL OTHER GENERAL PERFORMANCE STANDARDS FOR EACH RESOURCE AREA IN PART III OF 310 CMR 10.00.
2. REFER TO SPECIAL PROVISION ITEMS 755.35, 755.75, 755.76.
3. ALL DISTURBED WETLAND AREAS SHALL BE TREATED WITH WETLAND SEED - RIPARIAN MIXTURE.

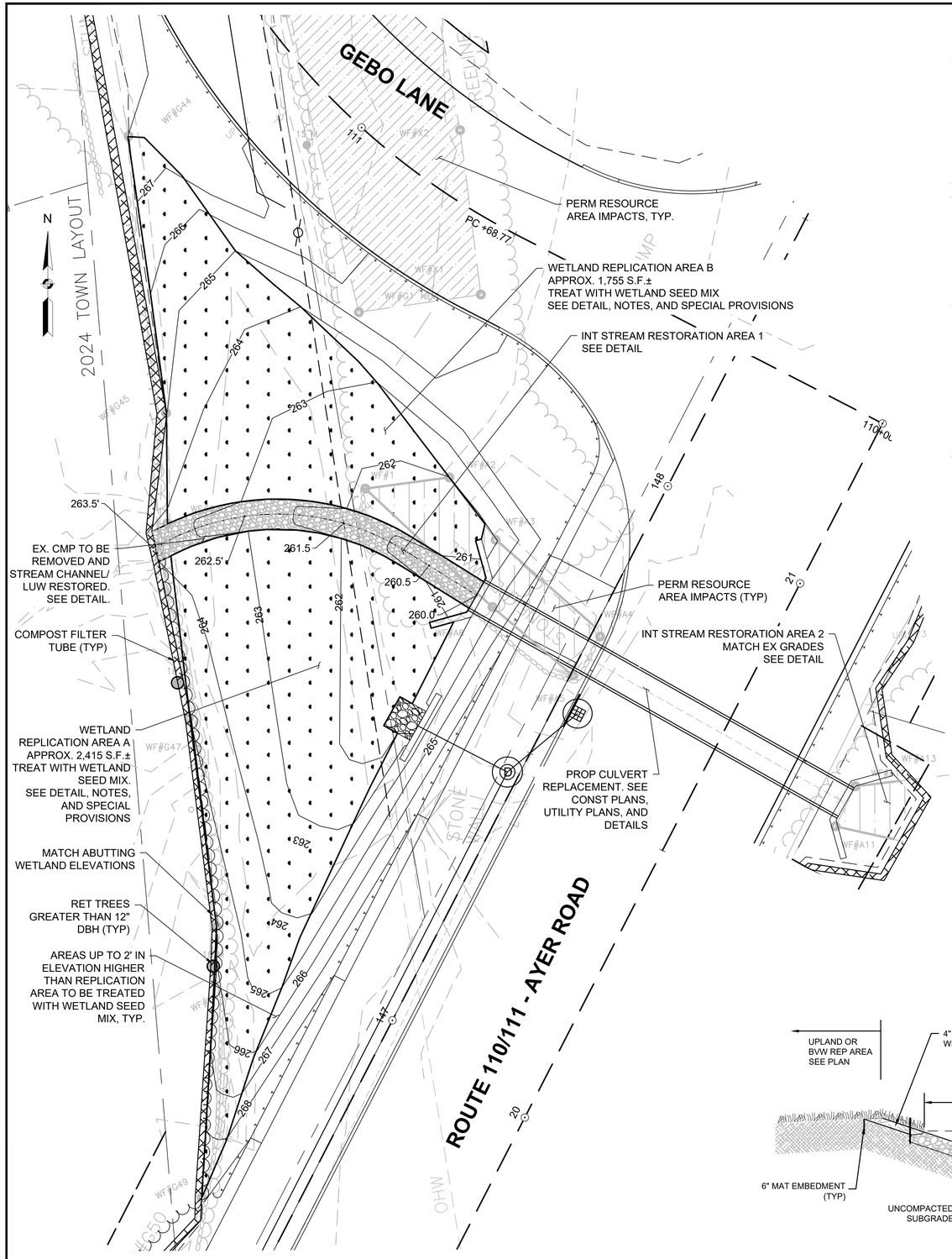
TYPICAL SECTION AT WETLAND REPLICATION AREA

NOT TO SCALE



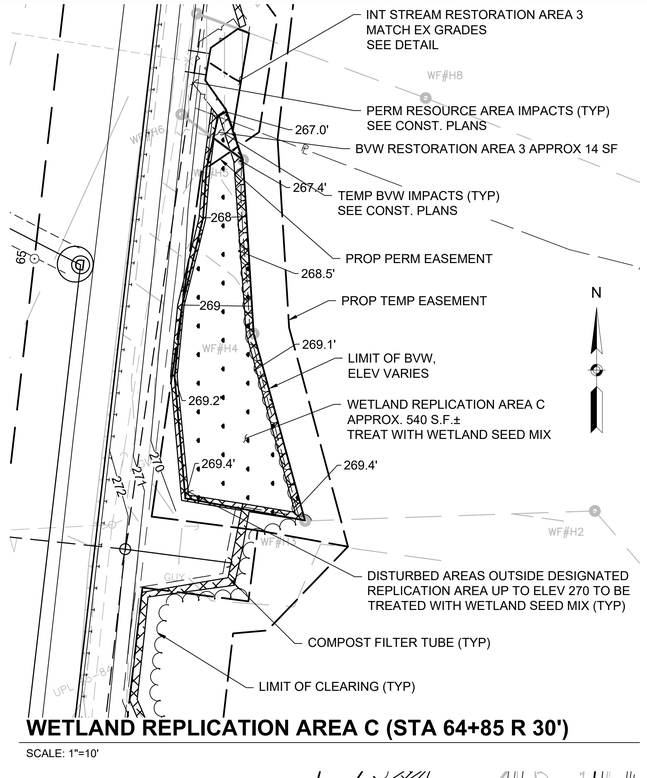
SECTION - TRUNK ARMORING & PRUNING

TREE PROTECTION - TRUNK



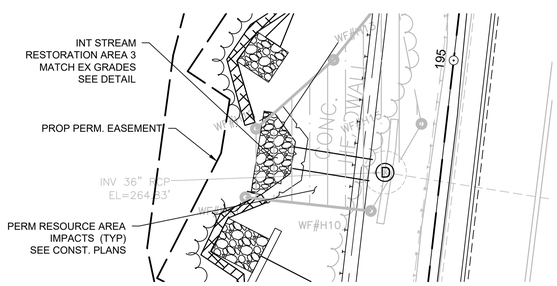
WETLAND REPLICATION AREAS A & B (STA 20+85 L 65')

SCALE: 1"=10'



WETLAND REPLICATION AREA C (STA 64+85 R 30')

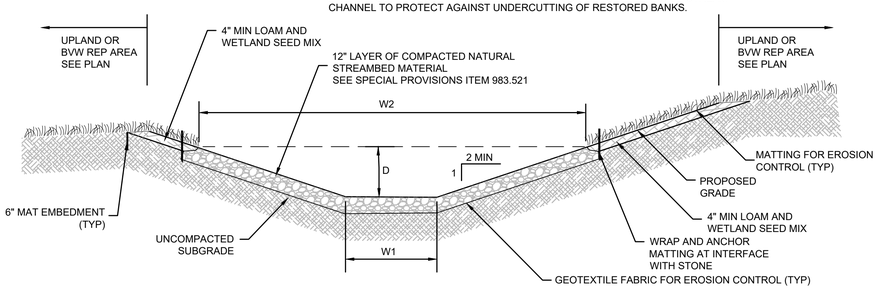
SCALE: 1"=10'



INT. STREAM RESTORATION AREA 4 (STA 64+85 L 40')

SCALE: 1"=10'

NOTES:
1. REFER TO SPECIAL PROVISION ITEM 983.521.
2. MATCH EXISTING GRADES UNLESS OTHERWISE NOTED.
3. 12" DIA COIR LOGS MAY BE KEYED INTO BANK ON OUTSIDE BENDS OF STREAM CHANNEL TO PROTECT AGAINST UNDERCUTTING OF RESTORED BANKS.



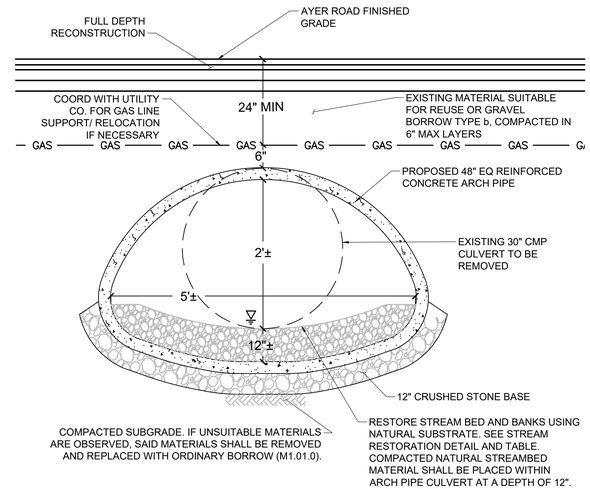
TYPICAL SECTION AT INT. STREAM RESTORATION AREA

NOT TO SCALE

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	109	195
PROJECT FILE NO.		609213	

LANDSCAPE PLANS AND DETAILS - 19 OF 19



AYER ROAD AT GEBO LANE CULVERT REPLACEMENT (STA 20+72)

NOT TO SCALE

RESOURCE AREA MITIGATION		
AREA	**RESOURCE AREA**	**MITIGATION**
REP A	BVW	2,415 SF
REP B	BVW	1,755 SF
REP C	BVW	540 SF
REST 1	LUW	638 SF*
REST 1	BANK	256 LF*
REST 2	LUW	85 SF
REST 2	BANK	18 LF
REST 3	LUW	45 SF
REST 3	BANK	2 LF
REST 3	BVW	14 SF
REST 4	LUW	52 SF
REST 4	BANK	12 LF

*RESTORATION AREA 1 MITIGATION INCLUDES BANK & LUW ASSOCIATED WITH CULVERT REPLACEMENT

WETLAND/STREAM REPLICATION/RESTORATION NOTES

1. REPLICATION AREA LOCATIONS AND ELEVATIONS ARE APPROXIMATE. PRIOR TO CONSTRUCTION, EXACT LOCATION OF THE REPLICATION AREAS WILL BE DETERMINED BY THE WETLANDS SCIENTIST.
2. THE CONTRACTOR SHALL PLAN AND EXECUTE OPERATIONS IN A MANNER MINIMIZING THE AMOUNT OF EXCAVATED AND EXPOSED FILL OR OTHER FOREIGN MATERIALS THAT COULD BE WASHED OR OTHERWISE CARRIED INTO REPLICATION AREA AND NEARBY RESOURCE AREAS.
3. CONSTRUCTION OF AND ACCESS TO THE REPLICATION AREA SHALL MINIMIZE DAMAGE TO EXISTING VEGETATION AND SOILS.
4. THE REPLICATION AREA SHALL BE PROVIDED IN A MANNER WHICH IS CONSISTENT WITH ALL OTHER GENERAL PERFORMANCE STANDARDS FOR EACH RESOURCE AREA IN PART III OF 310 CMR 10.00.
5. ALL DISTURBED WETLAND AREAS SHALL BE TREATED WITH WETLAND SEED MIXTURE.
6. SEDIMENT BARRIERS SHALL BE INSTALLED ALONG THE DOWNSLOPE PERIMETER OF THE REPLICATION AREA BEGINNING AND ENDING IN THE SURROUNDING UPLAND SO THAT NO EXCAVATED MATERIAL OR DISTURBED SOIL CAN ENTER ADJACENT WETLANDS OR WATERS. THE CONTRACTOR SHALL ENSURE THAT ALL SEDIMENT BARRIERS FUNCTION AS INTENDED AND AT ALL TIMES PER THE SPECIFICATIONS OF THOSE RESPECTIVE ITEMS.
7. SEE SPECIAL PROVISION ITEMS 755.35, 755.45, 755.75, 755.76, 983.521.

STREAM RESTORATION AREA TABLE

AREA	D	W1	W2
1	6"	36"	60"
2	6"	36"	60"
3	12"	18"	66"
4	12"	18"	66"

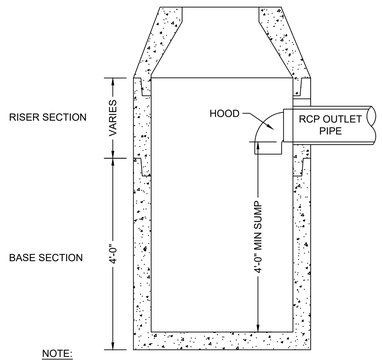
609213_HD11(CONSTRUCTION DETAILS).DWG Plotted on 11-Feb-2025 5:21 PM

HARVARD
AYER ROAD (ROUTE 110/111)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	110	195
PROJECT FILE NO.	609213		

CONSTRUCTION DETAILS - 1 OF 3

609213_HD11(CONSTRUCTION DETAILS).DWG Plotted on 11-Feb-2025 5:22 PM

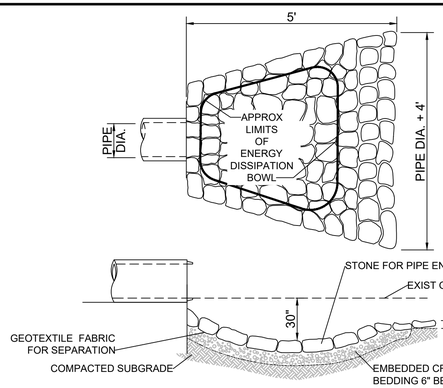


NOTE:

ALL CATCH BASINS SHALL CONFORM TO MASSDOT CONSTRUCTION STANDARD E 201.4.0 EXCEPT FOR 4' SUMP DEPTH AS SHOWN

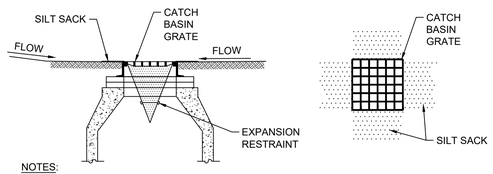
DEEP SUMP CATCH BASIN WITH HOOD

N.T.S.



STONE FOR PIPE ENDS

N.T.S.

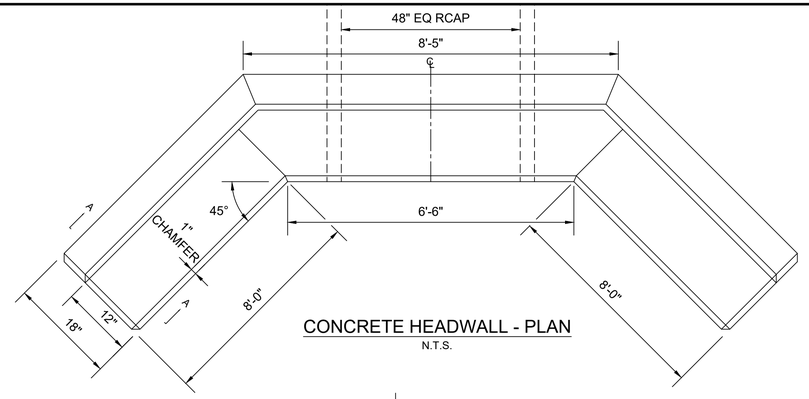


NOTES:

1. INSTALL SILT SACK IN EXISTING CATCH BASINS BEFORE COMMENCING WORK, AND IN NEW CATCH BASINS IMMEDIATELY AFTER INSTALLATION OF STRUCTURE. MAINTAIN UNTIL INTERMEDIATE COURSE PAVING IS COMPLETE OR A PERMANENT STAND OF GRASS HAS BEEN ESTABLISHED.
2. GRATE TO BE PLACED OVER SILT SACK.
3. SILT SACK SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS AND CLEANING OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED.

INLET PROTECTION SILT SACK IN CATCH BASIN

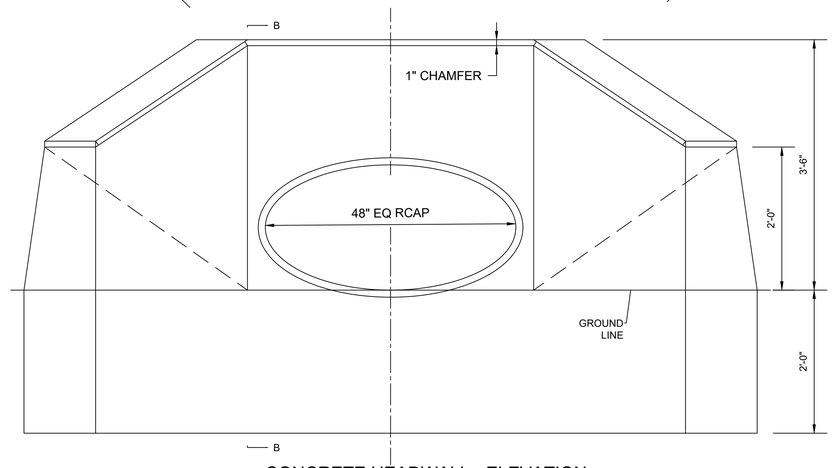
N.T.S.



CONCRETE HEADWALL - PLAN

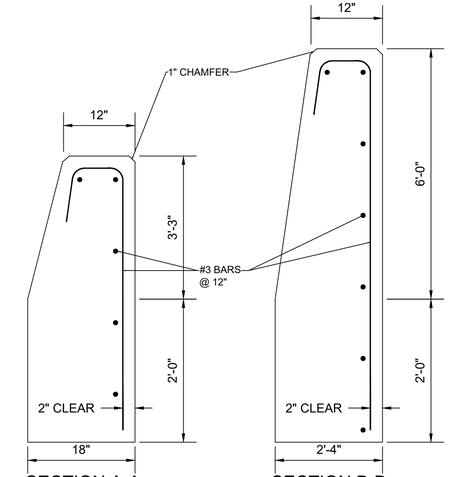
N.T.S.

NOTE:
HEADWALL SHALL BE PRECAST CONCRETE AND CONSTRUCTED IN ACCORDANCE WITH E 206.6.0 AND THE MASSDOT STANDARD SPECIFICATIONS.



CONCRETE HEADWALL - ELEVATION

N.T.S.

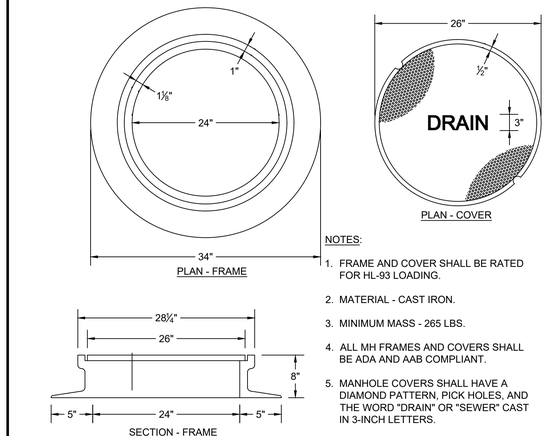


SECTION A-A

N.T.S.

SECTION B-B

N.T.S.

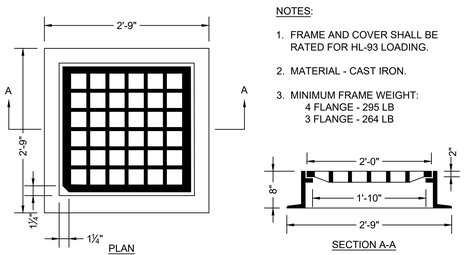


NOTES:

1. FRAME AND COVER SHALL BE RATED FOR HL-93 LOADING.
2. MATERIAL - CAST IRON.
3. MINIMUM MASS - 265 LBS.
4. ALL MH FRAMES AND COVERS SHALL BE ADA AND AAB COMPLIANT.
5. MANHOLE COVERS SHALL HAVE A DIAMOND PATTERN, PICK HOLES, AND THE WORD "DRAIN" OR "SEWER" CAST IN 3-INCH LETTERS.

MANHOLE FRAME & COVER

N.T.S.

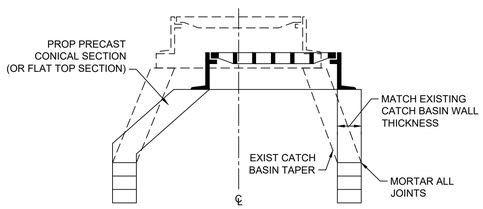


NOTES:

1. FRAME AND COVER SHALL BE RATED FOR HL-93 LOADING.
2. MATERIAL - CAST IRON.
3. MINIMUM FRAME WEIGHT:
   4 FLANGE - 295 LB
   3 FLANGE - 264 LB

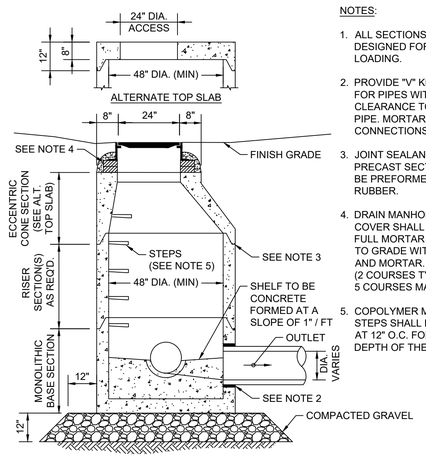
CATCH BASIN FRAME & GRATE (MUNICIPAL STANDARD)

N.T.S.



CATCH BASIN REMODEL

N.T.S.

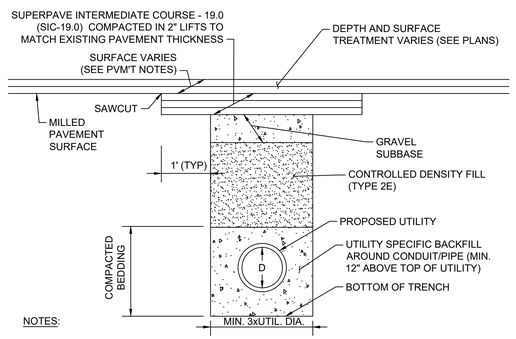


DRAIN MANHOLE

N.T.S.

NOTES:

1. ALL SECTIONS SHALL BE DESIGNED FOR HL-93 LOADING.
2. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 2" MAX CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS.
3. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.
4. DRAIN MANHOLE FRAME AND COVER SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR. (2 COURSES TYP 5 COURSES MAX)
5. COPOLYMER MANHOLE STEPS SHALL BE INSTALLED AT 12" O.C. FOR THE FULL DEPTH OF THE STRUCTURE.

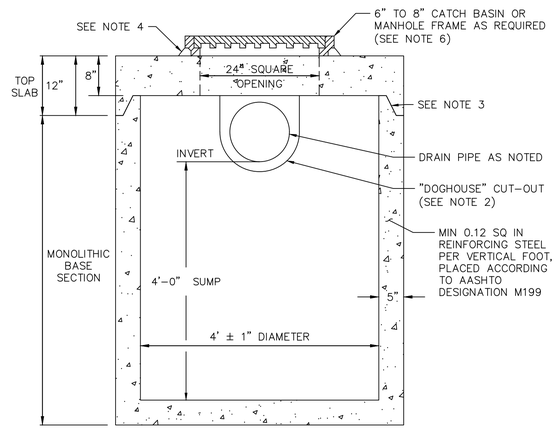


NOTES:

1. IF A TEMPORARY PATCH IS TO BE USED, THE CDF SHALL BE PLACED TO THE ELEVATION OF THE ADJOINING SUBGRADE, THEN GRAVEL SHALL BE PLACED AND COMPACTED TO WITHIN 3 ½ INCHES OF THE FINISHED GRADE. THE LAST 3 ½ INCHES SHALL BE HOT MIX ASPHALT PLACED IN TWO LAYERS: 1 ¾" SURFACE COURSE OVER 2" INTERMEDIATE COURSE.
2. MATERIAL WHICH MEETS THE SPECIFICATION FOR GRAVEL BORROW TYPE C (M1.03.0 TYPE C), PLACED AND COMPACTED IN LAYERS NO GREATER THAN 6", MAY BE USED IN PLACE OF THE CDF WITH APPROVAL FROM THE DISTRICT HIGHWAY DIRECTOR.
3. THE EXPOSED EDGES OF ALL LONGITUDINAL AND TRANSVERSE SAW CUT JOINTS SHALL BE TREATED WITH HOT POURED RUBBERIZED ASPHALT JOINT SEALANT MEETING MASSDOT SPECIFICATIONS.
4. YELLOW METAL FOIL MARKING TYPE SHALL BE PLACED 18" OVER THE CONDUIT (METAL MARKING TAPE/WIRE SHOULD BE USED FOR NON-METALLIC CONDUIT).
5. FOR ROADS WITH AN EXISTING CEMENT CONCRETE BASE, A REINFORCED, HIGH EARLY STRENGTH AIR ENTRAINED, CLASS "F" CEMENT CONCRETE SLAB SHALL BE CAST IN PLACE TO MEET THE EXISTING PAVEMENT. SPECIFIC JOINT DETAILS WITH THE EXISTING PAVEMENT SHALL BE APPROVED DEPENDENT ON THE EXISTING SITE CONDITIONS.
6. ALL TRENCH DIMENSIONS SHALL BE IN ACCORDANCE WITH SUB-SECTION 140.80 OF THE MASSDOT STANDARDS AND SPECIFICATIONS FOR HIGHWAYS AND BRIDGES

UTILITY TRENCH

N.T.S.



SPECIAL CATCH BASIN (SHALLOW)

N.T.S.

NOTES:

1. ALL SECTIONS SHALL BE DESIGNED FOR HL-93 LOADING.
2. PROVIDE DOGHOUSE OPENING FOR PIPE WITH 2" MAX CLEARANCE TO OUTSIDE OF PIPE. TOP SLAB SHALL NOT REST DIRECTLY ON PIPE. GROUT ALL PIPE CONNECTIONS WITH NON-SHRINK GROUT.
3. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.
4. CATCH BASIN FRAMES SHALL BE SET IN FULL MORTAR BED.
5. FRAME ELEVATION SHALL BE INSTALLED AT FINISH GRADE USING VARIABLE FRAME DEPTHS AND VARIABLE HEIGHT BRICK COURSES.

CONSTRUCTION SPECIFICATIONS

ITEM 102.3 HERBICIDE TREATMENT OF INVASIVE PLANTS HOUR

This work must be performed by persons who meet the qualifications below and are approved by the Landscape Design Section.

Work under this item consists of herbicide treatment of invasive plants currently existing within the project limits and as directed. An Invasive Plant Management Strategy (IPMS) shall be submitted to the Engineer for review and approval and the IPMS shall be implemented on-site. The IPMS shall be measured and paid for under Item 102.33 Invasive Plant Management Strategy.

Work under this item shall be coordinated with work and schedule for Selective Clearing, Clearing and Grubbing, Mowing, Tree Removal, Planting, and Wetland Mitigation items.

Payment is per hour on-site and shall be compensation for a minimum crew of 2 licensed applicators, 2 back-pack sprayers and mist-blowers, a properly equipped spray truck with spray hoses, and a tank with sufficient capacity for a full day of work. If there is only one applicator, hourly payment shall be adjusted to 50 percent of the unit price. This item is not intended for manual removal of plants.

Management of plants determined to have been introduced to the site via imported loam, compost, mulch, plants, equipment, or other construction activities will be the Contractor's responsibility and at the Contractor's expense.

Herbicide shall be applied during daytime hours only.

Measures to prevent the introduction of invasive plant species to the site and to address introduction due to construction-related activities shall be covered under the Standard Specifications, Division I - Subsections 7.01(D) Plant Pest Control and 7.13 Protection and Restoration of Property as amended in these Special Provisions.

Plant species targeted for management under this item shall be as determined in the field per the site walk and as specified in the IPMS.

The definition of invasive plant species shall be as described by Massachusetts Invasive Plant Advisory Group (MIPAG): "non-native species that have spread into native or minimally managed plant systems in Massachusetts, causing economic or environmental harm by developing self-sustaining populations and becoming dominant and/or disruptive to those systems."

Control of invasive plants shall begin immediately with the initiation of construction activities and prior to any clearing or site disturbance. Treatment areas shall include stockpile locations and may, upon approval of the Engineer, extend outside the project limit. Treatment shall be done each consecutive year for the duration of the contract unless specified otherwise in the IMPS or unless directed otherwise by the MassDOT invasive species contact. Work shall be done during the growing season from May – October unless otherwise specified in the IPMS.

ITEM 102.3 (Continued)

Areas identified for vegetation control measures shall be as shown on the plans and as determined in the field by the Engineer and a MassDOT Landscape Architect. Contact at MassDOT Landscape Design Section may be contacted at: tara.mitchell@dot.state.ma.us.

QUALIFICATIONS

The applicators shall submit and meet the qualifications outlined below. A list of contractors specializing in invasive management and approved by MassDOT Landscape Design Section is available on the following website: https://www.mass.gov/lists/landscape-design-and-roadside-maintenance under Invasive Plant Management.

Requirements

1. Company must provide proof of qualifications by providing the following:
    a. Narrative describing company, its expertise and experience with invasive plant control.
    b. Demonstrate experience with herbicide treatment as part of restorations and in sensitive areas.
    c. Describe company's technical qualifications and past performance.

2. Company must meet licensing requirements:
    a. All crew applicators must have a Massachusetts Commercial Applicator License (CORE).
    b. At least one or more applicator must have a ROW certification, if required for work.
    c. Company must provide name(s) of applicator(s) and Applicator License/Certification number for all contractor crew leaders working on the project.
    d. Company must provide documentation of any warnings, penalties or fines received in the last three (3) years.

3. Company must provide proof of experience with invasive plant control and include following:
    a. At least five (5) references from prior invasive plant control work completed in last five (5) years. Provide contact information including address, phone number and email.
    b. Provide a summary of each of these projects including nature of the problem, specific invasive vegetation treated, dates and period of treatment, methodologies used, and summary of success or not in terms of meeting performance objectives. Include summary of equipment used.
    c. Photo documentation of these projects.
    d. GPS coordinates of project locations, if available.

4. Crew leader must have expertise with invasive plant control and provide the following:
    a. Have held Core license for at least five (5) years.
    b. Resume listing five (5) or more years of experience applying pesticides with the company or with another company specializing in vegetation management.

ITEM 102.3 (Continued)

SUBMITTALS

No work shall begin without approval of the submittals.

Submittals include the following items:

Invasive Plant Management Strategy (IPMS)

At least thirty (30) days prior to proposed treatment the IPMS shall be submitted for approval by the Engineer and MassDOT Landscape Architect. All chemicals, methods and work done under this item shall be consistent with the IPMS. The IPMS shall be as described under Item 102.33.

Herbicide Use Report

Within two (2) weeks after each application, the Contractor shall provide to the Engineer a completed and signed MassDOT Herbicide Use Report.

Photo Documentation

Digital photos with date and time of herbicide application work may be required and shall be submitted upon request.

MATERIALS

All proposed herbicides shall be as approved in the IPMS. Herbicides shall be labeled for the method of treatment and shall meet all federal, state and local regulation requirements. Application rates will depend on herbicide proposed and shall be per the manufacturer's label for specific application.

METHODS

All methods used shall be as approved in the IPMS which shall be determined during the Initial Site Walk as described under Item 102.33 Invasive Plant Management Strategy.

The Contractor shall be responsible for marking delineated areas and plants to be preserved, removed, or otherwise treated. Fencing or other materials needed for marking and delineating protected areas shall be incidental to this item.

The Contractor shall notify the Engineer a minimum of 3 days prior to date of expected herbicide application. Applicators shall notify the Engineer upon arriving on-site and upon leaving the site.

Herbicide Applications

All herbicide application shall conform to Massachusetts Pesticide Laws and Regulations per the Massachusetts Department of Agricultural Resources (MDAR) Pesticide Bureau.

ITEM 102.3 (Continued)

Mixing, applying and/or disposing of herbicides shall always be in accordance with instructions on their labels and all applicable federal, state, and local regulations. Mixing shall not occur within sensitive areas, wetlands, or buffer zones.

Contractor shall not spray 2 hours prior to precipitation, during rain, or during windy conditions. The Contractor shall be responsible for monitoring weather conditions and adjusting the work schedule as appropriate for the herbicide and application method to be used.

Targeted vegetation shall be identified and marked prior to treatment. Plants treated by foliar spray, injection or glove application or other methods that leave standing vegetation, as opposed to cut-stump application, shall remain clearly marked for identification through the contract period.

Desirable vegetation shall be protected from both spray and other physical damage.

Contractor is responsible for any damage to vegetation not designated for removal or treatment. Vegetation damaged shall be restored. Cost of replacement plants and/or restoration shall be borne by the Contractor.

Contractor shall ensure that the public does not enter a work area while herbicide application or spraying is underway.

Disposal Of Invasive Plant Material

All material to be cleared shall become the property of the Contractor. The satisfactory disposal of all cleared plant material (seeds, roots, woody vegetation, associated soils, etc.) shall be the Contractor's responsibility.

The Contractor shall take measures to prevent viable plant material from leading to further infestations (seeds, roots, woody material, etc.) while stockpiled, in transit, or at final disposal locations. All precautions shall be taken to avoid contamination of natural landscapes with invasive plants or invasive plant material.

Chipping, shredding, or on-site burning of plant material must be approved by the Engineer and included in the IMPS.

For plant material taken to an incinerating facility per the IPMS, a receipt from that facility shall be submitted to the Engineer as proof of disposal.

Where feasible, it is preferable to dispose of plants on-site or to bury them on-site with on-going monitoring for re-sprouting. Disposal locations and methods must be approved and included in the IPMS. Site work such as grading and seeding to stabilize and restore disposal area shall be incidental to this item.

The Contractor shall be responsible for treating or otherwise managing areas of re-growth due to improper disposal. Treatment shall be at the Contractor's expense.

ITEM 102.3 (Continued)

Follow-Up Treatment

Plants and areas shall be re-treated as necessary and as appropriate to the time of year. Treatment shall be for the duration of the contract and per the IPMS.

MEASURE OF SUCCESS

The expectation is a minimum of 85-95 percent control achieved after the first treatment, depending on plants targeted and extent of population, and based on the expectations laid out in the IPMS. The expectation for the contract duration is 95-100% eradication by the end of the treatment period, unless otherwise specified in the IPMS.

METHOD OF MEASUREMENT

Item 102.3 will be measured for payment by the Hour of crew time spent on the project doing actual herbicide application work. A crew shall be defined as a minimum of two licensed applicators each equipped with (at minimum) back-pack sprayer and mist blower. The crew shall also have a properly equipped spray truck with hoses and a tank with sufficient capacity for a full day of work.

BASIS OF PAYMENT

Item 102.3 will be paid at the contract unit price per Hour, which price shall include all labor, materials, equipment, tools, and all incidentals required to complete the work.

Payment will be based upon time spent on the project doing actual work and shall not include travel time to and from the Contractor's place of business and shall also not include time for investigative field trips.

If there is only one applicator, hourly payment shall be adjusted to 50 percent of the unit price.

The Invasive Plant Management Strategy will be paid for under Item 102.33.

ITEM 102.33 INVASIVE PLANT MANAGEMENT STRATEGY HOUR

This item consists of providing an Invasive Plant Management Strategy (IPMS) for the control of invasive plants currently existing on the project site and/or as directed and shall be coordinated with Item 102.3 Herbicide Treatment of Invasive Plants. The IPMS shall be submitted for review and approval and the IPMS shall be implemented on-site.

Herbicide treatment for invasive plants shall be as described under Item 102.3 Herbicide Treatment of Invasive Plants and shall be compensated per that Item.

Work under this item shall be coordinated with work and schedule for Selective Clearing, Clearing and Grubbing, Mowing, Tree Removal, Planting, and Wetland Mitigation as relevant to the project.

Individual attending the site walk and determining the Invasive Plant Management Strategy must demonstrate expertise with vegetation management and invasive plant control and submit qualifications as described below.

QUALIFICATIONS

Individual shall be from the same company as that providing services for Item 102.3 Herbicide Treatment of Invasive Plants and shall submit the following, if not submitted under Item 102.3:

- Submit copy of current Core license.
- Submit a resume listing five (5) or more years of experience managing invasive plants with a company specializing in vegetation management.
- References shall be submitted if requested.

SUBMITTALS

Task Summary & Reports

For measurement of payment, the contractor shall submit the total sum and a breakdown of hours for the tasks performed. At a minimum, the tasks shall include the Initial Site Walk, the IPMS Written Report, and if necessary to accommodate project or site changes, a Follow-up Site Inspection and accompanying IPMS Amendment.

Interim Site Monitoring Reports and/or a Final Report shall be submitted if requested by the MassDOT Landscape Design contact. The MassDOT Landscape Design contact must be notified to attend the final walk through when a Final Report has been requested.

Invasive Plant Management Strategy (IPMS)

At least thirty (30) days prior to construction activities and/or any proposed treatment, submit a written IPMS proposal for approval by the Engineer and MassDOT Landscape Architect. All chemicals and methods proposed shall be consistent with applicable Massachusetts Wetlands Protection Act Order of Conditions.

ITEM 102.33 (Continued)

The IPMS shall be completed in coordination with the Roadway Contractor and the Engineer and shall include the following as appropriate to the project:

I. Project Information

a. Company writing IPMS and performing herbicide application.
b. Date of site walk
c. Attendees at site walk
d. Expected end date of contract and expected last treatment (month/season)

II. Brief Description of Conditions

a. Provide a free-hand sketch on construction plans or aerial image showing species, location, and as relevant, show or note extent of population as relevant to Strategy (i.e., population extends off ROW preventing eradication, small population and eradication deemed feasible within contract schedule, etc.).

III. Coordination with Roadway Contractor regarding other work

a. Tree Work: Note coordination to be implemented with tree removal, clearing, and clearing and grubbing as applicable to the project.
b. Wetland Mitigation - Include management proposed for wetland mitigation areas in the IPMS, if and as required.
c. Planting: If there will be planting in areas proposed for treatment, propose treatment and schedule to avoid herbicide damage to plants.
d. Mowing: If coordination is required with state mowers, note need in IPMS.

IV. Soil Management

a. Provide specifics on how soil with invasive plant roots (in particular) or seeds will be handled (i.e., separate stockpiles, plant material will be buried on-site, re-used on-site, disposed off site and if so, where?).
b. Show stockpile locations on plan and include treatment schedule.
c. Note measures that will be implemented to avoid spread through equipment, including how and where equipment will be cleaned.

V. Invasive Plant Treatment & Management

a. Proposed chemical and methods of treatment for each species or area.
b. Time of treatment based on target plant species.
c. Submit product label including application methods and rates (entire MSDS information need not be submitted if available online).
d. Proposed performance metrics or measure of treatment success if different from that specified under Item 102.3.
e. Method for disposing invasive plant material. This includes material that may result in spread (i.e., seeds, roots) and material that has been treated and/or is not viable (foliage, dead wood, etc.). Methods may include grinding in place, stockpiling and treating, and incinerating offsite.
f. Expected follow-up treatment for duration of contract.

VI. **Monitoring Schedule** if requested by MassDOT.

ITEM 102.33 (Continued)

Note: The IPMS is critical for identifying pre-construction conditions as well as strategies for minimizing import or spread of invasive plants. Failure to provide an approved IPMS may jeopardize this item, in which case, the contractor will be responsible for management of invasive plants found on-site at no cost to the contract.

Photo Documentation

Digital photos with date and time verification shall be provided with the IPMS and with any follow-up monitoring or reporting.

METHODS

Initial Site Walk

Prior to any construction activities and soil disturbance, the Contractor shall walk the site with the Engineer and the MassDOT Landscape Architect to determine the IPMS. During the site walk the Contractor shall identify limits of work and, as necessary, mark locations of areas designated for treatment and individual plants targeted for treatment or removal. The Contractor shall be responsible for marking delineated areas and plants to be preserved, removed, or otherwise treated. Fencing or other materials needed for marking and delineating protected areas shall be incidental to this item.

IPMS Follow-up Amendment

The IPMS may be amended to address additional concerns or adjust to conditions if required by the MassDOT Landscape Architect. The amended IPMS shall be submitted to the Engineer and MassDOT Landscape Architect for approval at least fourteen (14) days prior to any proposed treatment.

Interim Site Monitoring Inspection Reports

If required by the MassDOT Landscape Architect and Engineer, Interim Site Monitoring and an accompanying report shall be conducted.

Final Inspection

A final inspection and report documenting the status of the invasive control may be required for regulatory purposes or for instances where control will be continued by others. The report shall include photo documentation of pre-construction (existing) and post-treatment conditions, notations on a plan or aerial image of area treated, summary of treatment performed, and control achieved.

ITEM 102.33 (Continued)

METHOD OF MEASUREMENT

Item 102.33 will be measured for payment by the Hour. The basis for measurement shall be per the completion of tasks as approved under the Task Summary submittal.

BASIS OF PAYMENT

Item 102.33 will be paid at the contract unit price per Hour, which price shall include all labor, materials, equipment, tools, and all incidentals required to complete the work.

Payment shall not include travel time to and from the Contractor's place of business.

ITEM 102.511 TREE PROTECTION – ARMORING & PRUNING EACH

The work under this item shall conform to the relevant provisions of Sections 771 of the Standard Specifications and the following:

Tree protection – armoring and pruning shall be used for instances where construction activity (the use of heavy equipment), comes within proximity to potentially damage tree trunk(s) or limbs.

The work shall include the furnishing and installing of temporary tree trunk protection, minor limb pruning, or removal of lower tree limbs to prevent injury to the tree from construction equipment and activities; as shown on the Drawings; and/or as required by the Engineer.

REFERENCES

If requested, the Contractor shall provide to the Engineer one copy of the latest edition of the American National Standards Institute (ANSI) A300 Standard Practices for Tree, Shrub, and Other Woody Plant Maintenance: Part 1-Pruning and Part 5-Construction Management Standard. Provision of reference shall be incidental to this item.

MATERIALS

Trunk armoring shall be such that it prevents damage to the trunk from construction equipment. Material used for trunk armoring or mounting shall be such that installation and removal shall not damage the trunk.

Acceptable trunk armoring materials shall include two by four (2x4) wood cladding, mounted with wire or metal strapping, or when duration of construction activities is less than three months, slotted corrugated plastic pipe, mounted with duct tape. Eight (8) once untreated burlap shall be used to wrap the tree trunk prior to installation of cladding.

Alternative armoring methods or materials may be acceptable if approved by the Engineer.

The height of tree trunk cladding shall be measured from the base of the tree (including root flare) to the bottom of the first branch, or to a height of eight (8) feet, or as may be required by the Engineer.

METHODS OF WORK

Prior to construction activities, the Engineer, Contractor, and the Arborist (if item is included in the contract), shall review trees noted on the Drawings to be protected. Final decision and selection of trees to be armored and/or pruned shall be per the Engineer.

ITEM 102.511 (Continued)

Care shall be taken to avoid damage to the bark during installation and removal of armoring. Trunk armoring shall be maintained such that it is effective for as long as required or replaced when materials are found to be damaged or ineffective, as determined by the Engineer. Replacement, if required, shall be incidental to the work. Armoring shall be removed immediately upon completion of work activities adjacent to the protected tree(s).

Pruning of limbs shall conform to the techniques and standards of the most recent ANSI A300 standards.

DAMAGES OR LOSS

If trees designated for protection under this item are damaged, including root damage from unapproved trespassing onto the root zone, the Contractor shall, at his own expense, secure the services of an Arborist, described in Item 102.55. The Arborist shall be approved by MassDOT.

If, based on the recommendation of the Arborist, the Engineer determines that damages can be remedied by corrective measures, such as repairing trunk or limb injury; soil compaction remediation; pruning; soil injection fertilization; and/or watering; the damage shall be repaired as soon as possible, within the appropriate season for such work and according to industry standards.

If, based on the recommendation of the Arborist, the Engineer determines that damages are irreparable, or that the damages are such that the tree is sufficiently compromised to pose a future safety hazard, the tree shall be removed. Tree removal shall include cleanup of all wood, grinding of the stump to a depth sufficient to plant a replacement tree or plant, removal of all chips from the stump site, and filling the resulting hole with topsoil. Such tree removal(s), grinding, debris removal, and topsoil filling, shall be at the Contractor's expense.

Tree removal from improper or inadequate tree protection shall result in the Engineer assessing the Contractor monetary damages consistent with industry standards for assessed value and/or replacement.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 102.511 will be measured and paid at the contract unit price per EACH tree to be armored and pruned. This will include full compensation for all labor, equipment, materials, and incidentals for the satisfactory completion of the work and the subsequent removal and satisfactory disposal of the protective materials upon completion of the contract or as required by the Engineer.

ITEM 102.511 (Continued)

Payment for work under this item will be scheduled as follows:

- 40% of the value shall be paid upon installation of trunk armoring and completion of pruning work, if required.

- 60% of the value shall be paid at the end of construction operations that would potentially damage the tree and after protection materials have been removed and properly disposed of by the Contractor. In the event of repairable damages, payment shall be made after the completion of remediation measures.

No separate payment will be made for costs of remedial actions, including Arborist services, tree removal, but all costs in connection therewith shall be included in the Contract unit price bid.

Tree damages assessed, due to lack of or improper tree and plant protective measures being taken, shall be deducted from the contract price of the work.

ITEM 102.521 TREE AND PLANT PROTECTION FENCE FOOT

The work under this Item shall conform to the relevant provisions of Sections 644 and 771 of the Standard Specifications and the following:

Work under this item shall consist of furnishing, installing, and maintaining tree and plant protection fence(s) in a vertical and taut position; removing and resetting fencing as may be required; and final removal of protection fence(s) at the completion of construction activities, or as otherwise required by the Engineer.

The purpose of the fencing is to signify a construction work-free zone and physical barrier, thereby preventing damage to tree roots, tree trunks, soil, and all other vegetation within this delineated Tree and Plant Protection Zone (TPPZ), as shown on the Drawings, as required by the Engineer, and as described herein.

Protection shall be for the duration of the construction activities unless otherwise required by the Engineer.

MATERIALS

Tree and plant protection fence(s) shall provide a minimum forty-eight (48) inch tall barrier, that remains vertical and taut. The Fence shall be orange plastic safety fence (recommended where high visibility is necessary), or wooden snow fencing, or other approved material. Posts and anchoring materials shall be incidental to the work.

Per requirements of the Engineer, additional posts, deeper post depths, and/or additional attachments shall be used if the fabric or fence sags, leans or otherwise is not providing visible or physical protection to the TPPZ.

REFERENCES

If requested, the Contractor shall provide to the Engineer one copy of the American National Standards Institute (ANSI) A300 Standard Practices for Tree, Shrub, and Other Woody Plant Maintenance Part 1, Pruning and Part 5, Construction Management Standard. Provision of reference shall be incidental to this item.

ESTABLISHMENT OF THE TPPZ

Fencing shall be used to delineate and establish the TPPZ, adjacent to construction areas, staging areas, stockpile areas, as shown on the Drawings, and/or as required by the Engineer.

Fencing shall be located as close to the work zone limit and as far from tree trunk(s) and plants as possible to maximize the area to be protected. Fence shall run parallel and adjacent to construction activity to create a barrier between the work zone and the root zone or designated limit of plants and soils to be protected.

ITEM 102.521 (Continued)

When construction activities surround (or have the potential to surround) trees or plants to be protected, a circular enclosure shall be used. In these instances, the TPPZ limit shall be the drip line of each tree or as close as possible to the drip line, and/or as shown on the Drawings. The drip line is defined as the outermost limit of tree canopy.

The Contractor shall not engage in any construction activity within the TPPZ without the approval of the Engineer. Activities may including operating, moving, or storing equipment, supplies, or materials; and locating temporary facilities, including trailers or portable toilets, Accessing or traversing the TPPZ shall not be permitted.

METHOD OF WORK

TPPZ fencing shall be installed prior to any construction work or staging activities. Fence(s) shall be repositioned where and as necessary for optimum tree and plant protection. Repositioning shall be incidental to this item. TPPZ fencing shall not be moved without prior approval by the Engineer.

The TPPZ shall be protected at all times from compaction of the soil; damage of any kind to trunks, bark, branches, leaves, and roots of all plants; and contamination of the soil with construction materials, debris, silt, fuels, oils, and any chemicals substance.

After construction activities are completed, or when required by the Engineer, fencing, stakes, and other anchoring materials, if any, shall be removed and disposed off-site by the Contractor.

REQUIRED WORK WITHIN THE TPPZ

In the event that grading, trenching, utility work, or storage is unavoidable within the TPPZ, the Engineer shall be notified. Measures may be required for tree protection and preservations, including air spading; the use of six (6) inch depth of wood chips or approved matting for root protection; pruning of branches; and/or trunk protection. These protection measures shall be paid under applicable contract items.

Landscaping work specified within the TPPZ shall be accomplished by hand tools. Where handwork is not feasible, with permission of the Engineer, work shall be conducted with the smallest mechanized equipment necessary.

TREE AND PLANT INJURY OR LOSS

If the TPPZ is encroached by construction activity without approval, at the discretion of the Engineer, the Contractor may be required to provide a more durable barrier (e.g., Jersey Barriers, chain link fence (if not already in use) to secure the area. Costs of furnishing and installing additional or more durable barrier(s) shall be borne by the Contractor.

In such cases of encroachment, soils shall be considered compacted and tree root injury will be assumed. Action shall be taken as specified below.

ITEM 102.521 (Continued)

In the event that trees designated for protection under this item are injured, including root injury from unapproved trespassing onto the root zone, the Contractor shall, at his own expense, secure the services of an Arborist, described under Item 102.55. The Arborist shall be approved by MassDOT.

In the event of spills, compaction or injury, the Contractor shall take corrective action immediately using methods approved by the Engineer, in coordination with the Arborist.

If, based on the recommendations of the Arborist, the Engineer determines that injuries can be remedied by corrective measures, such as repairing trunk or limb injury, soil compaction remediation, pruning, and/or watering; the injury shall be repaired as soon as possible, within the appropriate season for such work, and according to industry standards.

If, based on the recommendations of the Arborist, the Engineer determines that injuries are irreparable, or that the injuries are such that the tree is sufficiently compromised to pose a future safety hazard, the tree shall be removed. Tree removal shall include cleanup of all wood, grinding of the stump to a depth sufficient to plant a replacement tree or plant, removal of all chips from the stump site, and filling the resulting hole with topsoil. Such tree removal(s), grinding, debris removal, and filling, shall be at the Contractor's expense.

Tree removal from improper or inadequate protection of the TPPZ shall result in the Engineer assessing the Contractor monetary damages consistent with industry standards for assessed value and/or replacement.

Shrubs removals from improper or inadequate protection of the TPPZ shall be replaced with plants of similar species and equal size or the largest size plants reasonably available. The Engineer shall approve the size, quality, and quantity of the replacement plant(s). Each replacement shall include a minimum of one year of watering and establishment care, specified under Section 771.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Tree and Plant Protection Fence will be measured by the FOOT, complete in place, by the length along the top of the fence.

Tree and plant protection fence will be paid for under the contract unit price per FOOT, complete in place and shall include all materials, labor, and equipment required to furnish, install, anchor, maintain, and remove the fence upon completion, as described herein. Posts, temporary footings, anchoring and removal upon completion, shall be incidental to this item.

No separate payment will be made for costs of remedial actions, including addition of more durable barriers, Arborist services, tree or plant removal, shrub replacement and establishment, but all costs in connection therewith shall be included in the Contract unit price bid.

Tree damages assessed, due to lack of or improper tree and plant protective measures being taken, shall be deducted from the contract price of the work.

ITEM 102.521 (Continued)

Payment for work under this item will be scheduled as follows:

- Forty (40) percent of the value payment will be made upon installation of fencing.

- Sixty (60) percent of the value payment will be made when fencing materials have been maintained to function as specified, for the intended duration, and removed and disposed off-site at the completion of protection measure requirement.

ITEM 102.55 **ARBORIST** **HOUR**

DESCRIPTION

The work under this Item is for the services of a Certified Arborist. Arborist shall be an International Society of Arboriculture (ISA) Certified Arborist or a Massachusetts Certified Arborist. The Arborist shall have at least 10 years of experience in tree care, including tree protection during construction, and shall demonstrate a familiarity with the American National Standards Institute (ANSI) A300 Standard Practices for Tree, Shrub, and Other Woody Plant Maintenance Part 1Pruning, Part 5 Construction Management Standards, and Part 9 Tree Risk Assessment.

The Arborist's general responsibilities include protecting high priority trees within and adjacent to the project limits, stating areas, and access routes; recommending removal of diseased, damaged or otherwise unhealthy trees that pose a potential safety hazard; evaluating effects of construction on future health of trees close to proposed work; and recommending and/or overseeing tree work amd care.

The Arborist for this item shall not be from the same company as the company responsible for selective clearing or tree removal work.

For projects with multiple phases, projects where construction activities (work or stockpiling) shifts, or when otherwise required by the Engineer, the Arborist shall re-evaluate conditions and provide follow-up recommendations.

SUBMITTALS

- Contractor shall submit to the Engineer for approval by MassDOT Landscape Design the qualifications and experience of the Arborist. Submittal shall include copy of current certification and a resume summarizing specific construction experience (including relevant MassDOT projects) for a minimum of five projects.
- Arborist's Report documenting recommendations shall be submitted to the Engineer and an electronic copy forwarded to MassDOT Landscape Design Section. Report shall include the following:

ITEM 102.55 (Continued)

SCOPE OF WORK

The Arborist shall be responsible for the following tasks:

- Initial Evaluation and Report
  - review and modify, if necessary, tree protection measures shown on the drawings
  - review and mark limits of protective fencing for trees and groups of trees to be retained;
  - review and recommend protection measures for high priority trees;
- Oversight
  - direct or execute pruning of branches and/or roots, air spading, and/or other tree care operations
- Monitoring and Inspections
  - periodically inspect fencing and ensure root zones are properly protected and clear of equipment and materials as required by the Engineer
- Special Care
  - oversee tree pruning for health and aesthetics

METHODS

Prior to any work, the Arborist shall walk the site with the Contractor, the Engineer, the Town Tree Warden, and, if specified, the MassDOT Landscape Architect, to review trees, limits of construction activities, and other concerns. Where required for proper assessment of tree impacts, limits of work shall be staked or otherwise marked in the field prior to the site walk.

Trees to be removed shall be painted or otherwise marked.

Trees to be retained shall be marked such that it does not mar or damage the tree and such that marker is not easily removed. As applicable to the work and scope of the project, trees designated for removal or to be retained shall be noted on the plan and/or in the arborist's report and photographed.

Trees designated to remain that are damaged or removed by construction activities shall be noted and photographed for inclusion in inspection reports submitted to the Engineer.

ITEM 102.55 (Continued)

MEASUREMENT AND BASIS OF PAYMENT

Arborist will be measured for payment by the Hour of time spent onsite.

Arborist will be paid at the contract unit price per hour upon submittal and acceptance of Reports described above.

ITEM 148.01 DREDGING AND STOCKPILING OF MATERIAL CUBIC YARD

The work under this item shall include dredging of approved native streambed material to be stockpiled for re-use as shown on the Plans and as directed by the Engineer.

All work to be done under this Item shall conform to the relevant provisions of Section 148 of the MassDOT Standard Specifications, the Plans and the following:

Streambed material may be stockpiled on site at a location determined by the Contractor. The stockpiled material will be reused on site for streambed restoration. The placement of this material will be paid for under Item 983.521.

When the Contractor is not actively working with the dredged streambed material, it shall be covered with a tarp, as shown on the Plans. Providing, installing, adjusting, and all other work required to cover the stockpiled material, shall be considered incidental to this Item.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Dredging and Stockpiling of Material will be measured and paid for at the Contract unit price per Cubic Yard of material dredged and stockpiled and covered, as measured above, which price shall include all labor, materials, equipment, and incidental costs required to complete the work.

Pay limits will extend from the bottom of proposed excavation to the top of the existing bank as shown on the plans.

ITEM 697.1 SILT SACK EACH

Work under this item shall conform to the relevant provisions of Subsections 227 and 670 of the Standard Specifications and the following:

The work under this item includes the furnishing, installation, maintenance and removal of a reusable fabric sack to be installed in drainage structures for the protection of wetlands and other resource areas and the prevention of silt and sediment from the construction site from entering the storm water collection system. Devices shall be sourced from ACF Environmental (800)-448-3636; Reed & Graham, Inc. Geosynthetics (888)-381-0800; The BMP Store (800)-644-9223; or approved equal.

CONSTRUCTION

Silt sacks shall be installed in retained existing and proposed catch basins and drop inlets within the project limits and as required by the Engineer.

The silt sack shall be manufactured to fit the opening of the drainage structure under regular flow conditions, and shall be mounted under the grate. The insert shall be secured from the surface such that the grate can be removed without the insert discharging into the structure. The filter material shall be installed and maintained in accordance with the manufacturer's written literature and as required by the Engineer.

Silt sacks shall remain in place until the placement of the pavement overlay or top course and the graded areas have become permanently stabilized by vegetative growth. All materials used for the filter fabric will become the property of the Contractor and shall be removed from the site.

The Contractor shall inspect the condition of silt sacks after each rainstorm and during major rain events. Silt sacks shall be cleaned periodically to remove and disposed of accumulated debris as required. Silt sacks, which become damaged during construction operations, shall be repaired or replaced immediately at no additional cost to the Department.

When emptying the silt sack, the Contractor shall take all due care to prevent sediment from entering the structure. Any silt or other debris found in the drainage system at the end of construction shall be removed at the Contractor's expense. The silt and sediment from the silt sack shall be legally disposed of offsite. Under no condition shall silt and sediment from the insert be deposited on site and used in construction.

All curb openings shall be blocked to prevent stormwater from bypassing the device.

All debris accumulated in silt sacks shall be handled and disposed of as specified in Section 227 of the Standard Specifications

ITEM 697.1 (Continued)

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Silt Sack will be measured and paid for at the Contract unit price per each, complete in place, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for removal and disposal of the sediment from the

insert, regardless of the frequency of removal and disposal, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 698.3 GEOTEXTILE FABRIC FOR SEPARATION SQUARE YARD

The work under this item shall conform to the requirements of Materials Subsection M9.50.0 and the following:

The work under this item includes the furnishing and installation of geotextile fabric for separation, class 1 in areas of stone for pipe ends (see plans – Construction Details).

The geotextile fabric shall be installed per the manufacturer's instructions and AASHTO M-288, whichever is more stringent.

At locations of fabric installation, the subgrade shall first be graded and compacted. All rocks, vegetation, and other obstructions shall be removed before placement of fabric. The fabric shall be installed and fastened in place in conformance with the manufacturer's recommendations for installation on slopes.

Sewn seams shall be lapped a minimum of four inches and double sewn. The thread used to sew the seam shall be nylon or polypropylene.

Overlapped seams shall have a minimum overlap of 18 inches.

All seams shall be subject to the approval of the Engineer.

Geotextile that becomes torn or damaged shall be replaced or patched. The patch shall extend 3 feet beyond the perimeter of the tear or damage.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Geotextile Fabric for Separation will be measured and paid for at the Contract unit price per Square Yard, which price shall include all labor, materials, equipment, sewing, and all incidental costs required to complete the work.

No separate payment will be made for material required for overlap areas, but all costs in connection therewith shall be included in the square yard price bid.

ITEM 698.31 **GEOTEXTILE FABRIC FOR TEMPORARY SOIL PROTECTION** **SQUARE YARD**

The work under this item shall conform to the requirements of Materials Subsection M9.50.0 and the following:

The work under this item shall include furnishing and placement of geotextile fabric for temporary soil protection as shown on the plans and/or as required by the Engineer. All work shall be done in conformance with the applicable sections of the Standard Specifications.

Geotextile Fabric for Temporary Soil protection shall conform to the requirements of AASHTO M 288 and shall be listed on the Qualified Construction Material's List and be approved for Separation.

Six inches of crushed stone shall be placed over the fabric prior to placement of fill. Stone shall meet M2.01.1.

Following completion of construction work, fill, stone, and fabric shall be removed and properly disposed off-site or as required by the Engineer.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 698.31 will be measured and paid for at the Contract unit price bid per Square Yard, which prices shall include the fabric, all labor, tools, materials, stone, any necessary incidental items to provide complete in place installation, and removal and disposal of stone and fill. Overlapped matting will not be measured for payment.

Crushed stone and removal of fabric and stone will be incidental to this item.

ITEM 698.4 GEOTEXTILE FABRIC FOR PERMANENT EROSION CONTROL SQUARE YARD

The work under this item shall consist of furnishing and placement of geotextile fabric for permanent erosion control at the locations shown on the Plans or as directed by the Engineer.

This work shall include the installation of geotextile fabric between the interface of the natural soil layer and the proposed streambed restoration as indicated on the Plans.

The geotextile fabric shall be handled and installed per the manufacture's recommendations.

Materials

The geotextile fabric shall be selected from the MassDOT Qualified Construction Materials List. The geotextile fabric shall conform to the requirements of Subsection M9.50.0 of the Standard Specifications and AASHTO M 288, Class 3, for fabric used for permanent erosion control. Construction and installation shall be in accordance with AASHTO M 288 including Appendix A and the following.

Methods

Atmospheric exposure of the geotextile fabric to the elements following lay down shall be limited to a maximum of 14 days.

For seams that are sewn in the field, the Contractor shall provide at least a six-foot length of sample sewn seam for the approval of the Engineer before the geotextile fabric is installed. The seams sewn for sampling shall be sewn using the same type of equipment and procedures as will be used for the production seams. If seams are sewn in both the machine and cross machine direction, samples of seams for both directions shall be provided. The seam assembly description shall be submitted by the Contractor along with the seam samples. This description shall include the seam type, stitch type, sewing thread, and stitch density. If the Contractor elects to sew seams instead of overlap, colored thread must be used.

Geotextile shall be placed in direct contact with soils without wrinkles or folds and shall be anchored on a smooth graded surface approved by the Engineer. The geotextile shall be placed in such a manner that placement of the overlaying materials will not excessively stretch or tear it.

Adjacent geotextile sheets shall be joined by either sewing or overlapping. At roll ends, overlapped seams shall overlap a minimum of 12 inches, except when placed under water, where they shall overlap a minimum of 3 feet. Adjacent rolls shall overlap a minimum of 12 inches.

Care shall be taken during installation to prevent damage to the geotextile as a result of the installation process. Should the geotextile be damaged, a geotextile patch shall be placed over the damaged area extending a minimum of 3 feet beyond the limits of the damage.

ITEM 698.4 (Continued)

Care shall be taken during the placement of crushed stone and riprap to avoid stretching and subsequent tearing of the geotextile. Stones shall not be dropped from a height exceeding 3 feet.

Field monitoring shall be performed to verify that the crushed stone and riprap placement does not damage the geotextile.

Any section of fabric that is damaged shall be repaired in accordance with the manufacturer's requirements and AASHTO M 288 and to the satisfaction of the Engineer or it shall be replaced at the Contractor's expense.

If during construction, including any time prior to final acceptance of the project by MassDOT, the slope shall exhibit signs of failure, the slope shall be repaired and the geotextile fabric reinstalled or replaced by the Contractor, as required by the Engineer, at Contractor's expense.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Geotextile Fabric for Permanent Erosion Control will be measured for payment by the Square Yard, complete in place as shown on the Plans or as directed by the Engineer. Overlapping for seams and joints shall me measured as one layer of fabric. Any embedment or wrapping at the toe or top of slope, applied per manufacturer's installation recommendations or the Engineer direction shall be measured for payment.

Geotextile Fabric for Permanent Erosion Control will be paid for at the Contract unit price per Square Yard, which price shall include all labor, materials, equipment and incidental costs required to complete the work as indicated on the Contract Documents, as specified herein and as required by the Engineer.

ITEM 751.7 COMPOST BLANKET CUBIC YARD

The work under this Item shall conform to the relevant provisions of Subsection 751 and M1.06.0 Compost of the Standard Specifications and the following:

Work shall consist of furnishing and pneumatically applying compost as a thin mulch blanket (1/2-1 inch depth) over prepared soil to provide temporary soil stabilization and organic matter for plant growth.

SUBMITTALS AND MATERIALS

No materials shall be delivered until the required submittals have been approved by the Engineer. Delivered materials shall match the approved samples. Approval of test results does not constitute final acceptance.

Contractor shall submit to the Engineer samples and certified test results no sooner than 60 days prior to application of compost. Vender certification that material delivered meets the test results shall be submitted if requested.

Compost shall meet the requirements for M1.06.0: Compost, Type 2, as referenced in the MassDOT– Highway Division Standard Specifications for Highways and Bridges, Division III: Materials Specifications, latest edition.
The Engineer shall approve the Contractor's equipment for application.

CONSTRUCTION METHODS

Application of compost material shall not begin until the Engineer has approved the site and soil conditions. Soil preparation shall be as specified under the applicable item for soil placement or for seeding. The Contractor shall notify the Engineer when areas are ready for inspection and application of compost.

Compost blanket shall be pneumatically applied (blown on) to a minimum depth of one half to one inch. Where shown on the plans or when directed by the Engineer depth may be increased to provide berms for sediment control or to otherwise prevent slope erosion.

When compost blanket is proposed with seeding, seed shall be broadcast and shall occur in conjunction with compost blanket, as specified under the relevant item for seeding.

When compost blanket is proposed for areas with planting, compost (and seed if applicable) shall be applied after planting. If compost and seed occur prior to planting, areas shall be regraded and compost and seed reapplied to the satisfaction of the Engineer and at the Contractor’s expense.

ITEM 751.7 (Continued)

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 751.7 will be measured and paid for at the Contract unit price per Cubic Yard which price shall include all labor, materials, equipment, and all incidental costs required to complete the work of pneumatically applying compost.

Surface preparation of substrate receiving compost blanket shall be compensated under the applicable item for placement of loam, sand, ordinary borrow, wetland soil, topsoil rehandled and spread, tilled existing soil, or other specified substrate.

Seeding, if utilized, will be compensated for under the appropriate seeding items.

ITEM 755.35 INLAND WETLAND REPLICATION AREA LUMP SUM

The work under this item shall conform to the relevant provisions of Sections 120, 770, 771 of the Standard Specifications and the following:

Work under this item shall include furnishing material and the construction and maintenance of inland wetland replication areas as shown on the drawings and as required by the Engineer. Inland Wetland Replication Area shall hereafter be referred to as Replication Area. All work shall be in coordination with an approved Wetland Specialist as specified under that item.

Wetland Restoration work shall be as specified and compensated under that item. Construction of tidal wetlands shall be as specified under the appropriate item for tidal wetland mitigation.

The Replication Area shall be constructed prior to wetland impacts unless otherwise approved by the Engineer, specified herein, or specified in permit conditions and approvals. Construction schedule shall be appropriate to planting and seeding season (see below). Changes to this schedule will require written approval from the Engineer.

DESCRIPTION OF WORK

Construction of the Replication Area shall be completed as shown on the drawings at the following location(s):

Area A (STA 20+50 L 65'): 2415 s.f.+/-
Area B (STA 20+85 L 85'): 1755 s.f.+/-
Area C (STA 64+85 R 30'): 540 s.f.+/-

Replication Area shall be constructed to meet the requirements of all associated permits and certifications, including relevant performance standards of the Massachusetts Wetlands Protection Act (MGL C. 131, s40) and U.S. Army Corps of Engineers Permit. The Town of Harvard Order of Conditions shall be considered and all conditions of the permit must be fully met by the Contractor.

The Contractor is responsible for protection and preservation of natural areas adjacent to the Replication Area both within and outside the project limits and for the duration of the Contract; including but not limited to damage to soils or vegetation due to erosion, sedimentation, compaction, trampling, vehicles, storage of materials, or other negligence shall be repaired to the satisfaction of the Engineer and at the Contractor's expense.

The Wetland Specialist overseeing the Wetland Replication construction work shall not be from the same company as that which is performing planting, seeding, or participating in any aspect of the Wetland Replication construction. The wetland scientist credentials shall be submitted to the Engineer prior to construction.

ITEM 755.35 (Continued)

SUBMITTALS - DOCUMENTS

Request for Conditional Acceptance: As specified below, a letter requesting Conditional Acceptance of the work and the site conditions shall be submitted to the Engineer.

Request for Certificate of Compliance (Partial or Full): As specified below, shall be submitted to the Engineer for distribution to appropriate regulatory agencies.

Request for Final Acceptance: As specified below, a letter requesting Final Acceptance of the work and the site conditions shall be submitted to the Engineer.

Monitoring Reports: Reports shall be submitted to the Engineer as specified below. Reports shall be compensated under Item 755.75 and 755.76.

SUBMITTALS - MATERIAL

Soil and Amendments

No soil, compost, or other soil amendment imported to the work site shall contain seeds, roots, stems, or other viable parts of invasive plants or other noxious plants.

At least sixty (60) days prior to installation and prior to ordering, the Contractor shall submit for approval sources of soil, compost, and amendments. Submittal shall include the supplier and location of the source. Off-site sources shall be identified and available for inspection by the Wetland Specialist prior to transport of material to the site to verify that they are likely to be free of invasive plant species, including all viable plant parts.

Samples of tested and approved wetland soil and soil amendments for soil texture, organic carbon content or other routine soil analysis parameters (e.g., pH, Cation Exchange Capacity, Percent Base Saturation) and Soil Organic Matter Analysis will be required if requested by the Engineer. The grab samples shall be collected by the Contractor or Wetland Specialist from multiple representative locations in the wetland topsoil mix following the "Umass Soil and Plant Tissue Testing Laboratory Sampling and Collection Protocols" (or equivalent certification paperwork provided by the soil supplier). The lab analysis shall be provided to the Engineer along with written certification from the Contractor or Wetland Specialist that the wetland topsoil was collected per the referenced protocol and meets the desired specification. The analysis and written certification of same shall be provided to the Engineer prior to placing the wetland topsoil in the Replication Area.

Seed Mix

Certificate of Materials from the supplier shall be submitted 30 days prior to seeding and must be approved prior to ordering materials. Seed species listed on the certificate shall include ecotype region (i.e., *Asclepias incarnata*, PA Ecotype).

ITEM 755.35 (Continued)

Seed tag from the bag of seed used shall be submitted to the Engineer at the time of seeding. Seed tag shall include ecotype region and species, guaranteed percentages of purity, weed content and germination of the seed, and the net weight. Seed tag shall match the Certificate of Materials, include the name of the supplier, and date material was sent.

Bill of lading or notarized Certificate of Compliance from the Supplier serving as proof of purchase shall be submitted if requested by the Engineer. Document shall include date of sale, quantity, lot number, and address of Supplier. This shall match the seed tag. Notary shall not work for either the contractor or seed supplier.

Plant Certification

Plant Certification shall be per the applicable requirements of Subsection 771, PLANTING TREES, SHRUBS AND GROUNDCOVER, of the Standard Specifications. The nursery source shall certify the provenance or origin of all plants.

Other Material: Submittals shall be per the respective item.

MATERIALS

Sediment Control Barrier and Erosion Prevention Measures
Sediment control barriers shall be per Item 767.121.

Erosion prevention measures for disturbed areas adjacent to the Replication Area shall include but not necessarily be limited to compost blankets, jute mesh, seeding, and/or combinations thereof as approved by the Engineer.

Sediment controls and erosion prevention devices and measures shall be compensated under the respective items.

Wetland Soil

Soil appropriate for the Replication Area may be either hydric soil excavated from the impacted wetland, a manufactured mix of compost and on-site borrow, or a combination thereof, as approved by the Engineer.

Hydric soil from the impacted wetland area may be spread on the surface of the constructed Replication Area as an inoculant or can be placed in a bulk fashion in a roughly 1:1 ratio of area and depth. Soil shall be handled such that the original soil structure is preserved and shall not be compacted, screened, or otherwise processed.

Hydric soil from the impacted wetland that is infested with invasive plant species identified on the Massachusetts Invasive Plant Advisory Group (MIPAG) shall not be used in the Replication Area unless approved by the Wetland Specialist and Engineer. To the extent possible, infested soil shall be disposed of within the project limits in an upland area outside of regulated areas and as approved by the Invasive Plant Management Strategy item (if in the contract) or by the Engineer.

ITEM 755.35 (Continued)

A manufactured mix suitable for wetlands shall consist of on-site borrow from the proposed Replication Area (if approved by the Wetland Specialist and Engineer) thoroughly mixed with compost to achieve a target organic carbon content of 10-12% (up to 21% percent organic matter) by dry weight. The organic material used for mixing shall be well or partially decomposed. Clean leaf compost is the preferred soil amendment to achieve these standards though other materials may be used if approved by the Wetland Specialist and Engineer. Note that "clean" refers both to a negligible amount (<1%) of physical contaminants such as plastic and to the lack of chemical contaminants that might pose a hazard to plants or animals. Off-site borrow may be used for mixing if approved in advance by the Engineer.

No soil or soil amendment shall be brought on site without approval of the material source by the Wetland Specialist and the Engineer. Soils used in the replacement area shall be free of rocks greater than 4 inches in diameter.

Plants

Plant material shall conform to the applicable requirements of Section 771, PLANTING TREES, SHRUBS AND GROUNDCOVER, of the latest edition of the Standard Specifications and as amended below.

Plants shall be native species, not cultivars. To the extent possible, plants shall originate from the applicable EPA Level III Ecoregion.

Plant species and sizes to be included in the Replication Area shall be as specified on the plans (TBD at next design stage).

Requests for substitutions shall be submitted in writing to the Engineer for review by the Wetland Specialist, MassDOT Landscape Architect, and, if required, the relevant regulatory agency at least thirty (30) days prior to planting. All proposed substitutes shall be in conformance with the requirements herein and suitable for the site conditions.

Transplanting and plant material collected from the wild is prohibited unless approved in writing by the Engineer. Plants shall be selected from certified nurseries that have been inspected by state and/or federal agencies.

Seed Mix

Seeding shall conform to the Standard Specifications Section M6, ROADSIDE DEVELOPMENT MATERIALS.

Wetland Seed Mix shall be per Item 765.553

Fertilizers shall not be used.

ITEM 755.35 (Continued)

Water

The Contractor shall provide water and all equipment required at no extra cost. Water shall be suitable for irrigation and free from ingredients harmful to plants and wildlife. Water from the adjacent water bodies or waterways shall not be utilized. It is the Contractor's responsibility to correct injury or damage due to the lack of water, too much water, or use of contaminated water.

Mulch/Compost Blanket for Seeding

Hydromulch shall be per the manufacturer's recommendations and shall be wood fiber or straw mulch only. Mulch shall be incidental to seeding.

Compost Blanket may be used in lieu of mulch for seeding. Compost Blanket shall meet the material and submittal requirements of that Item and shall be applied as specified below. Compost Blanket shall be compensated under that item.

CONSTRUCTION METHODS & SEQUENCE

Site Protection Measures

Minimizing Damage

The Contractor shall plan and execute operations in a manner minimizing the amount of excavated and exposed fill or other foreign materials that could be washed or otherwise carried into the Replication Area and nearby resource areas.

Construction of and access to the Replication Area shall minimize damage to existing vegetation and soils as specified herein. Damage to soils or vegetation shall be repaired to the satisfaction of the Engineer and at the Contractor's expense. If required for soil remediation, tilling and the addition of compost shall be at the Contractor's expense.

Wetland topsoil shall be deposited and graded in the Replication Area in a manner that minimizes travel and subsequent compaction of the subgrade (including any specified pit and mound topography) to the extent practicable, including use of track mounted excavators as appropriate. Should soils be compacted, they shall be loosened by a method such as disking, spring-tooth harrowing and/or rototilling. The Contractor shall use boards, timber or composite mats, or other approved materials as necessary, to protect existing and/or new wetlands from compaction due to heavy foot traffic or if equipment is required to travel over wetland soil. All labor and materials required for protection and preservation of site shall be incidental to this item.

ITEM 755.35 (Continued)

Stockpiling of Soil

Stockpiling of soil, including hydric soil for replication, shall be at least 100 feet from the edge of the bordering and isolated vegetated wetlands and inland banks, unless approved otherwise by the Engineer. Stockpiled soils shall be securely stabilized and contained. Any areas of exposed soil or stockpiles within and adjacent to the Replication Area that will remain inactive for more than 7 calendar days shall be sown with a mix of rapid germinating annual grasses (e.g., annual rye) covered with a layer of straw mulch applied at a rate of 90 pounds per 1,000 square feet. As necessary, the mulch shall be anchored with a tacking coat (non-tar) applied by a hydro seeder or other method recommended by the Wetland Specialist in consultation with the Engineer. In the event that there is excess borrow, it shall be disposed of under Excavation, Item 120.1.

Sediment Barriers

Placement: Sediment barriers shall be installed along the downslope perimeter of the Replication Area beginning and ending in the surrounding upland so that no excavated material or disturbed soil can enter adjacent wetlands or waters. Where construction work is immediately upgradient of the wetland, barriers shall be located so as to protect the Replication Area until slopes are stabilized. Sediment barriers shall be in place and approved by the Engineer prior to excavation work. No work shall take place outside the barriers.

Maintenance: The Contractor shall ensure that all sediment barriers function as intended and at all times per the specifications of those respective items.

Existing Trees to Remain

Tree protection shall be per the relevant specifications and as shown on the plans or as required by the Engineer. To protect root systems of existing trees to remain, the limits of the Replication Area may be adjusted, but, the total area of replication required by the permits shall not be reduced. Access route may be adjusted as required.

Trees to be retained as snags (upright dead or dying trees left for wildlife habitat) within or adjacent to the Replication Area shall be as shown on the plans or as directed by the Wetland Specialist or Landscape Architect during the initial site walk. Trees to remain as snags shall be clearly marked prior to clearing. Trees that pose a potential fall hazard (i.e., are near a roadway) should have limbs and trunk cut such that the tree does not pose a fall hazard.

Coarse woody debris in the form of cut trees, stumps, logs, and brush shall be incorporated as shown on the plans or as directed by the Wetland Specialist or Landscape Architect. On-site material shall be selected and marked by the Wetland Specialist, retained on the project site, and placed as specified below under Placement of Coarse Woody Debris.

All trees, stumps, or brush not specified to remain shall be removed and shall not be stockpiled in the wetland resource areas while awaiting disposal.

Work shall be coordinated with Clearing or Tree Removal Item and compensated under that Item.

ITEM 755.35 (Continued)

Pre-Wetland Construction Site Walk

Delineating the Replication Area and Access Route. The Contractor shall stake out the Replication Area boundaries and the intended access route and set grade stakes for approval by the Wetland Specialist and Engineer. Following staking and demarcation of areas, the Engineer and Wetland Specialist shall approve or modify as necessary the limits of work, the access route, final location and configuration of replication, grade stake elevations, proposed location of sediment barriers, and review proposed construction methods.

As part of the delineation and approval process, the Wetland Specialist shall mark trees to be converted to snags, select course woody debris to be retained for re-use, and select rocks or other elements to be used for habitat features.

Invasive Plants: As part of the initial site walk, the wetland to be impacted and the proposed replication site shall be inspected for the presence of invasive plants. If invasive plants are found they shall be addressed as described herein under Invasive Plants.

Soil Work

Final grades in the Replication Area shall meet the target elevations as shown on the Plans or as adjusted by the Wetland Specialist to achieve the desired hydrology and micro-habitat. If adjustments are required, a Request for Information (RFI) shall be submitted to the Engineer for approval. Adjustments shall be documented and included in the As-Built plans (if required) and/or other applicable required documents.

Excavation & Grading

When required by permits, the Wetland Specialist shall notify MADEP and the ACOE (as applicable) at least 72 hours prior to excavation.

Soil in the proposed wetland areas that must be removed for grades to conform to the proposed elevations shall be stripped and disposed of, or used if suitable for reuse. The soils for reuse shall be removed and placed in the prepared replication area within (1) day. If not possible, the soils shall be stockpiled in an approved location for the minimum amount of time feasible and kept loosely covered and moist at all time. Each day any soils are stockpiled, the contractor shall notify the Conservation Commission in writing of the stockpiling, the volume of soils stockpiled, the reason for stockpiling, and the expected duration of stockpiling. The notification shall contain a certificate signed by the wetland scientist that they have inspected the stockpile that day and that it is loosely covered and moist. Procedures for maintaining appropriate moisture levels shall be documented by the Wetland Specialist and provided to the Engineer and the Contractor.

Replication area shall be excavated as shown on the drawings. Where replication area is adjacent to existing reference wetland, finish grade of replication shall generally match existing grades and micro-topography, notwithstanding any deviations that are necessary to achieve the desired hydrology and habitat in the Replication Area.

ITEM 755.35 (Continued)

Prior to placement of backfill, scarify subgrade to a depth of 4 to 6 inches.

The Contractor shall survey cross sections of the excavation prior to backfill and prepare an interim as-built plan, certified by a Massachusetts Registered Professional Land Surveyor, depicting sub-grade contours (1-foot intervals with representative spot elevations in plan view and section views), and limits of grading. The interim as-built shall include a calculation confirming that sufficient surface area has been provided (excluding side slopes), as per environmental permit requirements. Locations of cross-sections should be indicated on the plan view.

Placement of Wetland Soil

Following excavation, scarification, and grading of sub-grade, and after the sub-grade elevations are approved by the Wetland Specialist, suitable soil previously removed or an evenly mixed organic/mineral soil created on-site shall be spread to the design depth and thickness over the proposed wetland areas as shown on the plans and as directed by the Wetland Specialist.

Vehicles used to transport soil from offsite shall be washed or cleaned with air pressure to prevent exotic or invasive seeds or root fragments from contaminating the Replication Area.

Final Grading

The finished grade of the Replication Area shall be at an elevation that will provide an unrestricted hydrologic connection between the Replication Area and adjacent resource areas. The hydrologic connection should be in keeping with restoring the intended function of the replacement wetland relative to the impacted reference wetland. The Contractor shall verify that this elevation is not at a level that could negatively alter the hydrology of an adjacent wetland. Microtopography in the form of hummocks, pits and mounds shall be as shown on the plans or as adjusted by the Wetland Specialist. Final elevations and grading of wetland soil shall be approved by the Wetland Specialist and the Engineer.

To avoid compaction once soil has been placed, no heavy equipment shall travel across placed soil and no work shall occur in wet or moist soil. Soil that is compacted due to construction activities shall be replaced with soil as specified herein and at the Contractor's expense.

The finished surface shall be surveyed by a registered surveyor prior to planting and a plan of the surveyed subgrades and final grades submitted to MADEP and other regulatory agencies as appropriate (e.g., Corps), within 30 days of final soil placement, to ensure that the correct topography and hydrology are met.

Cross sections shall also be submitted of sufficient number to represent the proposed locations of each different plant community, estimated seasonal average, high, and low groundwater elevations provided with the variance documents or observed prior to soil placement. The Wetland Specialist shall assist with the establishment of these elevations and shall certify that the excavated elevations are suitable for success of the proposed plant species.

ITEM 755.35 (Continued)

Following placement of topsoil, a minimum of (48) hours shall pass prior to planting of vegetation to allow for rebound of buried or compacted peat.

Installation of Monitoring Wells in Replication Area

For a constructed Replication Area over 1,000 square feet, a representative number of monitoring wells shall be installed in locations as shown on the Plans. Monitoring wells shall include data loggers. For purposes of this specification, a data logger refers to a battery powered device that records groundwater level. Data shall be collected by the Wetland Specialist and submitted with Monitoring Reports and as required by applicable permits. Wells shall be installed immediately following completion of construction of the Wetland Replication Area. Wells shall be installed in accordance with USDA/NRCS technical report entitled: "Sprecher, S.W. 2008. Installing monitoring wells in soils (Version 1.0). National Soil Survey Center, Natural Resources Conservation Service, USDA, Lincoln, NE." or equivalent methodology approved by Engineer.

Restoring Vegetation

Placement of Coarse Woody Material

If specified within this Contract or if directed by the Wetland Specialist or Landscape Architect during the initial site walk, woody debris shall be placed in the Replication Area and/or adjacent upland buffer. Material shall be placed as shown on the plans or as directed following placement of wetland soil and prior to application of compost and/or seed. Woody material shall cover a minimum of 5-20 percent of the Replication Area, depending on whether it is a meadow or woodland wetland and how much wood is available from construction clearing. Where trees are cut for construction purposes, logs of a minimum length of 8 feet must comprise a minimum of 50% of the woody material left on site. Brush shall be included along with logs and stumps as directed. Woody material shall be placed in a deliberate and naturalistic manner.

Planting

Following placement of wetland soil and approval of final grade and conditions, Replication Area shall be planted. Planting shall conform to SECTION 771 PLANTING TREES, SHRUBS AND GROUNDCOVER of the Division I Standard Specifications and as amended below.

Planting Season shall be May 15-June 15 and September 1-November 1 unless otherwise specified in applicable permit conditions.

Prior to planting, the Wetland Specialist shall approve the condition of the plant material and the method of installation and shall oversee the planting work. Replication Area shall be planted in the dry. Plants shall be placed according to the planting details and within the range of target elevations and at the spacing shown on the Plans or, if spacing is not indicated on the Plans, at the direction of the Wetland Specialist. Unless otherwise noted on the Plans, final plant locations shall be determined on site and located with regard to expected hydrology, plant growth characteristics, habitat desired, and water protection.

ITEM 755.35 (Continued)

Plant material shall be installed as soon as possible after delivery. Plants stored on-site prior to installation shall be stored in the shade and watered twice daily up until time of installation. Plants showing signs of stress or compromised health may be rejected by the Engineer or Wetland Specialist and shall be replaced at the Contractor's expense.

Plant material shall be furnished and installed as indicated including all labor, materials, plants, equipment, incidentals, re-setting of plants (frost heaves, etc.), irrigation, re-planting and clean up. If previously approved species are not available at the time of planting, the Wetland Specialist may propose substitutions relative to species, size, and quantities for review and approval by the MassDOT Landscape Architect. Upon approval by MassDOT, substitutions shall be approved by the regulating authority, if and as necessary. Provisions shall be made for a growth warranty of at least two (2) calendar years from the date of Conditional Acceptance as described below or as required by permits.

Seeding

Following placement of wetland soil and planting (if included), the Replication Area shall be seeded using one of the following methods:

- Broadcast by hand or with a hand-held spreader followed by application of straw mulch. If necessary, seed shall be lightly raked to insure good seed-to-soil contact.
- Hydro-seeded with hydro mulch per the Standard Specifications and per the manufacturer's directions.
- Hand broadcast seed with Compost Blanket pneumatically applied at the same time to ensure light cover of soil topdressing over seed.

If spring conditions are drier than usual, supplemental watering may be required. If sowing during the summer months, supplemental watering will likely be required until germination.

If required, seeding limits for different seed mixes shall be determined by the Wetland Specialist.

Plant Establishment and Invasive Management

Plants shall be watered as necessary to maintain healthy establishment. Plants that fail by September 1 after spring planting or by May 15 after fall planting shall be replaced within the immediate or next planting period and at the Contractor's expense.

Seeding that fails to establish according to the conditions of acceptance below shall be over-seeded as required by the Engineer. Washouts and channels shall be repaired and stabilized prior to overseeding. Excessive weed growth shall be pulled out by the roots or, with approval from the Engineer, cut prior to over-seeding. Soil repair and weed control are incidental to this item.

Invasive Plants: Corrective measures shall be taken to remove or treat invasive plant species in the Replication Areas. Invasive plants shall include those listed as invasive by Massachusetts Invasive Plant Advisory Group (MIPAG) and the US Army Corp of Engineer's New England District's Compensatory Mitigation Guidance.

ITEM 755.35 (Continued)

If chemical treatment of invasive plants is necessary, the strategy for treatment shall be as determined under Item 102.33 Invasive Plant Management Strategy. That strategy shall be coordinated with the Wetland Specialist and all applicable permits and permitting agencies. Chemical application under 102.3 Herbicide Treatment of Invasive Plants shall be compensated under that item and shall be for the duration of the contract only.

Conditional Acceptance of Work

Conditional Acceptance shall indicate approval of the wetland construction work and agreement that work has been done according to plan or modified as approved.

Upon completion of construction, the Contractor shall submit a Request for Conditional Acceptance that includes a brief narrative from the Wetland Specialist demonstrating that the wetland replication construction work was done according to plans (or how modified) and meets required permit conditions. The narrative shall include photo-documentation of pre-construction conditions as well as soil work, planting, and seeding. Seed tags shall be submitted as part of the Request for Conditional Acceptance.

Upon receipt of a Request for Conditional Acceptance, the Engineer, the Wetland Specialist, and regulatory representative (if required) shall assess the Replication Area and surrounding areas. At a minimum, the following conditions shall be included in the narrative and reviewed as part of the on-site assessment of whether:

- The final finished target elevations have been met and maintained relative to the approved plans and reference wetland. Areas that are too high or too low should be identified along with suggested corrective measures.
- Hydrology meets performance standards.
- Specified seed mix has been seeded. If inspected 30 or more days after seeding, seeded species in the wetland and adjacent upland shall show signs of good germination and healthy growth.
- Planted woody and herbaceous species meet specifications and are establishing well.
- Soils are stabilized and there is no sediment in the wetland and no channeling of slopes.
- There are no invasive plants visible in the replication area.

Upon approval that the work meets the above conditions, MassDOT will issue a letter of Conditional Acceptance. If the Wetland Replication work is not approved, MassDOT will issue a rejection letter requiring corrective actions. The Wetland Specialist shall recommend corrective actions. Work not approved shall be addressed by the Contractor at no extra cost.

Wetland Specialist shall be compensated under Item 755.75.

Erosion of adjacent slopes or the flow of sediments into the wetland between Conditional and Final Acceptance shall be immediately addressed by the Contractor.

ITEM 755.35 (Continued)

Request for Certificate of Compliance

If required, a request for a Certificate of Compliance (Partial or Full) pursuant to the Massachusetts Wetlands Protection Act regulations shall be prepared and submitted to MassDOT within 30 days following Conditional Acceptance.

The Request for Certificate of Compliance shall include the following:

- A brief narrative of the work on company letterhead signed by the Wetland Specialist. Narrative shall be prepared as a MS Word document and shall include substantive explanation that demonstrates compliance with EACH relevant permit condition. Narrative shall note variations from the originally permitted design.

- As-built Drawings signed by the Contractor's PE registered in the Commonwealth of Massachusetts. As-built drawings shall show hydrologic conditions, status of plantings and seeding, and shall include a narrative and minimum of 4 photographs documenting site conditions. Plans should note variations from the originally permitted design.

  When required, drawings shall meet the Army Corp of Engineer's New England District's Compensatory Replication Guidance, including: scale in the range of 1"=20' to 1" = 100', contours at 1' intervals, spot elevations for intermediate elevations, and polygons outlining each Replication Area, and, as applicable, plant community types. The As-built Drawings shall be provided to the Engineer electronically in Portable Document Format (PDF). If requested by the Engineer, the Drawings shall be provided in printed paper format (11" x 17" sheets, unless otherwise directed). Drawings must be scalable.

- Other documents as required.

FINAL ACCEPTANCE OF WORK

Following one full growing season, the Contractor shall submit a Request for Final Acceptance. Submittal shall include a brief narrative of conditions. Upon receiving the Request, the Engineer, Contractor, Wetland Specialist and regulatory representative (if required) shall assess the Replication Area. Final Acceptance will initiate the start of the Wetland Monitoring Period.

The following conditions shall be inspected and approved for acceptance and payment.

- Hydrology is functioning as intended.
- The desired seeded species are establishing well and cover at least 95 percent of the Replication Area, excluding areas of open water areas or planned bare soil.
- No sediments have entered the wetland.
- Adjacent slopes are stabilized with desirable vegetation.
- All planted species (if included) are living and establishing well.
- There are no visible invasive plants.
- Silt fence and non-biodegradable sediment barrier materials have been removed.

ITEM 755.35 (Continued)

If the mitigation work does not meet the above condition and is not approved, MassDOT will issue a rejection letter requiring corrective action. The Wetland Specialist shall recommend corrective actions. Work not approved will be addressed by the Contractor at no extra cost.

Wetland Specialist shall be compensated under Item 755.75.

Monitoring Reports for Regulatory Compliance

Post wetland construction Monitoring Reports shall be completed and submitted by the Wetland Specialist as specified and compensated under Item 755.76 Wetland Monitoring Reports.

Generally, the following conditions shall be met upon each inspection:

- Hydrology is functioning as intended.
- The desired seeded species are establishing well and cover 95 percent of the area, excluding areas of open water areas or planned bare soil.
- No sediments have entered into wetland.
- Adjacent slopes are stabilized with desirable vegetation.
- All planted species (if included) are living and establishing well.
- There are no visible invasive plants.

If, at the end of the required monitoring period, the requirements have not been met and success of the wetland replication area has not been achieved as determined by the Monitoring Reports, the Contractor shall provide corrective measures. All costs associated with corrective measures and plant replacement shall be incidental to this item with no additional compensation.

BASIS OF PAYMENT

Inland Wetland Replication Area will be paid for at the Contract unit price per Lump Sum, which price shall include all labor, materials, equipment, submittals, maintenance, all required soil, site preparation, grading, wetland seeding, planting, mulching, watering, monitoring wells, registered surveyor, as-built plans, Request for Certificate of Compliance, and all incidental costs necessary to complete the work as required.

Payment shall be as follows:

- 60% upon Conditional Acceptance.
- 20% after receipt and acceptance of Certificate of Compliance by the Engineer and once all permit construction requirements have been met and approved.
- 20% upon Final Acceptance.

Excavation will be paid under Item 120.1
Sediment Control Barrier will be paid under Item 767.121
Wetland Seed Mix will be paid under Item 765.553
Wetland Specialist will be paid under Item 755.75
Wetland Monitoring Reports for follow-up monitoring will be paid under Item 755.76

ITEM 755.45 WETLAND RESTORATION SQUARE YARD

DESCRIPTION

The work under this item shall conform to the relevant provisions of Subsections 120, 751, 765, 767, and 771 of the Standard Specifications and the following:

The work under this item shall include all labor and furnishing of materials to complete the work specified herein to protect and restore existing inland wetland areas that will be temporarily impacted as shown on the drawings and as required by the Engineer.

Inland Wetland Replication work shall be as specified and compensated under that item. Tidal wetland mitigation shall be as specified under the appropriate item for tidal wetlands.

Restoration Area shall be constructed to meet the requirements of all associated permits and certifications, including relevant performance standards of the Massachusetts Wetlands Protection Act (MGL C. 131, s40), Section 401 Water Quality Certification, and Section 404, U.S. Army Corps of Engineers General Permit.

All work shall be in coordination with an approved Wetland Specialist. Wetland Specialist qualifications and requirements shall be per Item 755.75, Wetland Specialist.

SUBMITTALS – DOCUMENTS

Request for Conditional Acceptance: As specified below, a letter requesting Conditional Acceptance of the work and the site conditions shall be submitted to the Engineer.

Request for Final Acceptance: As specified below, a letter requesting Final Acceptance of the work and the site conditions shall be submitted to the Engineer.

Request for Certificate of Compliance (Partial or Full): If applicable, request for a Certificate of Compliance shall be submitted to the Engineer for distribution to appropriate regulatory agencies as specified below.

Monitoring Reports: Reports shall be submitted to the Engineer as specified below. Reports shall be compensated under Item 755.76 Wetland Monitoring Reports.

ASSOCIATED ITEMS AND MATERIALS

Geotextile Fabric for Temporary Soil Protection shall be as specified under that item.

Compost shall be in accordance with Subsection 751 and M1.06.0 Organic Soil Additives of the Standard Specifications. Compost shall not contain seeds, roots, stems, or other viable parts of invasive plants or other noxious plants. Off-site sources shall be identified and available for inspection prior to transport of material to the site to verify that they are likely to be free of invasive plant species, including all viable plant parts.

ITEM 755.45 (Continued)

Compost Blanket shall be as specified under that item.

Seed Mix shall be as specified under that item.

Required submittals include:

- Certificate of Materials from the supplier shall be submitted and approved 30 days prior to ordering seed. Seed species listed on the certificate shall include ecotype region (i.e., *Asclepias incarnata*, PA Ecotype).

- Seed tag from the bag of seed used shall be submitted to the Engineer at the time of seeding. Seed tag shall include ecotype region and species, guaranteed percentages of purity, weed content and germination of the seed, and the net weight. Seed tag shall match the Certificate of Materials, include the name of the supplier, and date material was sent.

- Bill of lading or a notarized Certificate of Compliance from the Supplier serving as proof of purchase shall be submitted if requested by the Engineer. Document shall include date of sale, quantity, lot number, and address of Supplier. This shall match the seed tag. Notary shall not work for either the contractor or seed supplier.

Fertilizers shall not be used.

Straw mulch or hydromulch shall be per Section M6 of the Standard Specifications.

Water

The Contractor shall provide water and all equipment required at no extra cost. Water shall be suitable for irrigation and free from ingredients harmful to plants and wildlife. Water from the adjacent water bodies or waterways shall not be utilized. It is the Contractor's responsibility to correct injury or damage due to the lack of water, too much water, or use of contaminated water.

CONSTRUCTION METHODS & SEQUENCE

Site Protection Prior to Impacts

Prior to any land work, as part of the initial site-walk, the Wetland Specialist shall photo-document the site and provide a summary report of existing conditions as outlined under Item 755.75 Wetland Specialist.

Where and as required vegetation shall be cut flush and area surveyed to establish pre-construction elevations.

Following the cutting and surveying, temporary separation fabric or timber matting shall be placed as required to protect soil and vegetation from compaction, contamination, and/or other damages. Fabric and timber mats shall be placed as specified under the respective items and the Engineer shall approval placement.

ITEM 755.45 (Continued)

Restoration Upon Completion of Roadway Construction Work

Sediment Barriers

If required for sediment control during Restoration work (i.e, tilling is required to restore soil), sediment barriers shall be installed along the downslope perimeter of the Restoration Area beginning and ending in the surrounding upland so that no disturbed soil can enter adjacent wetlands or waters. Sediment barriers shall be in place and approved by the Engineer prior to any soil disturbance. No work shall take place outside the barriers.

Removal of Fill and Grading

Fill and temporary separation fabric or mats shall be removed and disposed of as specified under the respective items.

If required, grades shall be restored to pre-construction elevations as shown in the baseline survey or as required by the Engineer and Wetland Specialist to restore hydrologic functions. Final elevations shall be approved by the Engineer prior to soil preparation and seeding. Grading shall be incidental to this item.

Following approval of grading to elevations required, soil shall be prepared and seeded as follows.

Soil Scarification
Compacted soil shall be scarified with equipment approved by the Engineer. Upon approval of soil scarification, the area shall ***be seeded with mulch or seeded with Compost Blanket*** as specified below. Seeding shall immediately follow soil preparation.

Soil Tilling with Compost
Two inches of compost shall be applied over the impacted area and soil shall be tilled to a depth of 4 inches below the existing grade. Following tilling, soil shall be raked relatively smooth, or as directed. Upon approval of prepared soil, area shall be seeded and hydromulched.

Seeding with Mulch
Upon approval of prepared soil, area shall be seeded. Seeding shall be hand broadcast with straw mulch applied per the Standard Specifications and per the manufacturer's directions. Hydromulch shall be straw or wood fiber only and shall be per the manufacturer's recommendations.

Seeding with Compost Blanket
Application of compost blanket and seed shall be done as one application and shall not begin until the Engineer has approved the site and soil conditions. The Contractor shall notify the Engineer when raked areas are ready for inspection and application of compost blanket and seed.

Compost shall be pneumatically applied (blown on) to a depth of one half to one inch at the same time that seed is broadcast such that seed is covered by a light application of compost.

ITEM 755.45 (Continued)

When planting occurs on projects with compost blankets and seed application, planting shall occur prior to application of compost and seed. Otherwise, compost and seed shall be re-applied to the satisfaction of the Engineer and at not cost to the contract.

Seed tags shall be submitted at time of seeding.

PLANT AND SEED ESTABLISHMENT

Seeding that fails to establish according to the conditions of acceptance below shall be over-seeded as required by the Engineer. Washouts and channels shall be repaired and stabilized prior to overseeding. Excessive weed growth shall be pulled out by the roots or, with approval from the Engineer, cut prior to over-seeding. Soil repair and weed control are incidental to this item.

CONDITIONAL ACCEPTANCE OF WORK

Conditional Acceptance shall indicate approval of the wetland restoration work and agreement that work has been done according to plan or modified as approved.

Upon completion of construction, the Contractor shall submit a Request for Conditional Acceptance that includes a brief narrative from the Wetland Specialist (if applicable to project) demonstrating that the wetland restoration work was done according to plans (or how modified) and meets required permit conditions (if applicable). The narrative shall include, photo-documentation of pre-construction conditions as well as soil work, planting, and seeding. Seed tags shall be submitted as part of the Request for Conditional Acceptance.

Upon receipt of a Request for Conditional Acceptance, the Engineer, the Wetland Specialist, and regulatory representative (if required) shall assess the Restoration Area and the surrounding areas. At a minimum, the following conditions shall be included in the narrative and reviewed as part of the on-site assessment of whether:

- The target elevations have been restored per the survey or adjusted per the Engineer. Areas that are too high or too low should be identified along with suggested corrective measures.
- Soil compaction has been mitigated.
- Soils are stabilized and there is no sediment in the wetland and no channeling of slopes.
- Hydrology meets performance standards and has been adequately restored.
- Specified seed mix has been seeded and seeded species in the wetland and adjacent upland show signs of good germination and healthy growth.
- Planted woody and herbaceous species (if included) meet specifications and are establishing well.
- There are no invasive plants visible in the restored wetland area.
- Silt fence and non-biodegradable sediment barrier materials have been removed.

Upon approval that the work meets the above conditions, MassDOT will issue a letter of Conditional Acceptance. If the Wetland Restoration work is not approved, MassDOT will issue a rejection letter requiring corrective actions. Work not approved shall be addressed by the Contractor at no extra cost.

ITEM 755.45 (Continued)

Erosion of adjacent slopes or the flow of sediments into the wetland between Conditional and Final Acceptance shall be immediately addressed by the Contractor.

FINAL ACCEPTANCE OF WORK

Following one full growing season, the Contractor shall submit a Request for Final Acceptance. Submittal shall include a brief narrative of conditions. Upon receiving the Request, the Engineer, Wetland Specialist and regulatory representative (if required) shall assess the Restoration Area. Final Acceptance will initiate the start of the Monitoring Period (if required).

The following conditions shall be inspected and approved for acceptance and payment:

- Hydrology is functioning as intended.
- The desired seeded species are establishing well and cover 100 percent of the restoration area, excluding areas of open water, large boulders or planned bare soil.
- No sediments have entered the wetland.
- Adjacent slopes are stabilized with desirable vegetation.
- Planted woody and herbaceous species (if included) meet specifications and are establishing well.
- There are no visible invasive plants.

If the restoration work is not approved, MassDOT will issue a rejection letter requiring corrective action. All costs associated with corrective measures and plant replacement shall be incidental to this item with no additional compensation. Work not approved shall be addressed by the Contractor at no extra cost.

MONITORING REPORTS FOR REGULATORY COMPLIANCE

Post wetland construction Monitoring Reports shall be completed and submitted by the Wetland Specialist as specified and compensated under Item 755.76 Wetland Monitoring Reports.

Generally, the following conditions shall be met upon each inspection:

- Hydrology is functioning as intended, relative to the preexisting condition of the restored wetland.
- Seeded species are establishing well and cover 100 percent of the area, excluding areas of open water areas or planned bare soil.
- No sediments have entered into wetland.
- Adjacent slopes are stabilized with desirable vegetation.
- All planted species (if included) are living and establishing well.
- There are no visible invasive plants.

If, at the end of the required monitoring period, the requirements have not been met and success of the wetland replication area has not been achieved as determined by the Monitoring Reports, the Contractor shall provide corrective measures. All costs associated with corrective measures and plant replacement shall be incidental to this item with no additional compensation.

ITEM 755.45 (Continued)

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 755.45 will be paid for at the Contract unit price per Square Yard, which price shall include all labor, materials, compost and amendments, seed, mulch, equipment, submittals, maintenance, grading, and incidental costs necessary to complete the work as required.

Payment shall be as follows:

- 50% upon completion of soil preparation and seeding
- 25% upon Conditional Acceptance
- 25% upon Final Acceptance or approval of the Engineer

Excavation of temporary fill will be paid under Item 120.1
Geotextile Fabric for Temporary Soil Protection will be paid under Item 698.31
Sediment Control Barrier will be paid under Item 767.121
Compost Blanket will be paid under Item 751.7
Wetland Specialist will be paid under Item 755.75
Wetland Monitoring Reports for follow-up monitoring will be paid under Item 755.76
Plants/seed will be paid under the respective items.

ITEM 755.75 WETLAND SPECIALIST HOUR

Work under this Item shall be for services of a Wetland Scientist, Wetland Ecologist, Restoration Ecologist, or other professional with similar qualifications hereafter referred to as the "Wetland Specialist."

"Wetland Mitigation" shall be used herein for applicable wetland work. For this project, applicable wetland work is for: Item 755.35: Inland Wetland Replication Area.

The Wetland Specialist shall demonstrate knowledge and expertise to coordinate and oversee all work associated with the Wetland Mitigation as defined herein, as shown on the Plans, as required by permits, and as specified under the relevant Wetland Mitigation items.

Regulatory monitoring reports following Final Acceptance of the Wetland Mitigation shall be per Item 755.76, Wetland Monitoring Reports.

For all onsite work, the Wetland Specialist shall sign in and sign out with the Engineer.

The Wetland Specialist shall not be from the same company as the company responsible for planting, seeding, and/or maintaining the wetland.

QUALIFICATIONS

The Wetland Specialist shall have a minimum of five (5) years of experience with construction and monitoring of wetland mitigation areas similar in size, type, and complexity to the Contract mitigation. When required by permits, at least ten (10) years of experience may be required. The Wetland Specialist shall be thoroughly versed in the Commonwealth of Massachusetts Wetlands Protection Act (MGL C.131, s.40), U.S. Army Corps of Engineers New England District Compensatory Mitigation Guidance, and all other relevant regulations of the Massachusetts Department of Environmental Protection and the U.S. Army Corps of Engineers New England District.

SUBMITTALS - QUALIFICATION

Within sixty (60) days following the Notice to Proceed, the Contractor shall provide proof of qualifications for the Wetland Specialist to the Engineer for approval. Submittals shall include, but not be limited to, the following:

- Resume of the individual on-site implementing the Wetland Specialist work. If the Wetland Specialist changes over the course of the project, the new individual shall submit resume and qualifications for approval 30 days prior to doing any work on-site.
- Resume of any personnel working on-site in place of the Wetland Specialist. Individual shall be approved prior to work on-site.
- Narrative describing the company, its expertise, technical qualifications and experience with wetland construction.

ITEM 755.75 (Continued)

- At least three (3) references from prior work of a similar nature completed in the last five (5) years and by the individuals who will perform the work. Provide contact information for each reference including address, phone number and email.
- A summary of each reference project including nature of the work, project size, dates, and period of construction and monitoring, methodologies used, and summary of success (or not) in terms of meeting performance objectives. Summary shall include a minimum of one before and one after photo for each project.

SUBMITTALS – DOCUMENTATION AND REPORTS

Wetland Construction Oversight

Wetland Specialist shall provide documentation of pre-existing conditions and wetland construction as specified below and as part of fulfilling the Scope of Work described below. Documentation shall include photos that are clear and legible. Photos are incidental to this item.

- *Site Walk Prior to Disturbance and Construction of Wetlands:* Provide brief assessment with photos, including documentation of the existing wetlands to be impacted (both permanent and temporary), proposed wetland replication area, and reference/model wetland areas (typically an adjacent undisturbed wetland or the existing wetland to be impacted). Photos of existing wetlands that will be temporarily impacted shall include a view from at least 3 angles.
- *Excavation and Grading:* Documentation shall include minimum of two photos of the excavated wetland and two photos after final grading prior to planting and seeding. For restoration areas, photos shall show soil preparation (i.e, tilling and grading), if applicable.
- *Approval of Subgrades:* The Wetland Specialist shall inspect the sub-grade of the Replication Area to ensure that proper hydrology is likely to be established and shall provide the Engineer with written confirmation and photographs upon completion of subgrade excavation work. Written confirmation shall include recommended field adjustments, based on field observations, to achieve the desired hydrology and designed wetland system.
- *Planting and Seeding:* Provide assessment and photos of vegetation upon completion of planting and seeding work.
- *Data logger output from Monitoring Wells* shall be submitted with reports, if applicable and requested.

Wetland construction documentation and reports shall be submitted with Request for Conditional Acceptance and for the Order of Conditions, Water Quality Certifications, and other regulatory permits as required.

ITEM 755.75 (Continued)

Requests for Acceptance of Work & Regulatory Compliance

The Wetland Specialist shall submit the following documents if and as specified herein and under Item the relevant Wetland Mitigation items:

- Request for Conditional Acceptance.
- Request for Certificate of Compliance (Partial or Full) when applicable.

- Request for Final Acceptance.

SCOPE OF WORK

In the event of discrepancies with the applicable permits, the Wetland Specialist shall submit a Request for Information (RFI) to the Engineer.

General

The Wetland Specialist shall be responsible for the following:

- Review and have a comprehensive knowledge of the environmental permits relevant to the specific mitigation work being done so as to ensure compliance throughout the duration of the contract.
- Identify and inform the Contractor and Engineer of unique site conditions which may require adjustments to the schedule, design, or construction methods. For example, wildlife nesting, illegal dumping, or rare species.
- Identify and inform the Contractor and Engineer of any sediment or erosion control problems observed within mitigation areas.
- Advise so as to avoid impacts to adjacent areas and regulated wetland resources.
- Participate in necessary meetings as required by permits and when requested by the Engineer.

Inspections & Construction Oversight

The Wetland Specialist shall be responsible for, but not limited to, the following:

- Pre-Construction Site Walk
    - Following surveying, flagging, and staking of all relevant boundaries and elevations by the Contractor, the Wetland Specialist shall walk the site with the Engineer and the Contractor to review existing and proposed conditions, recommend changes if necessary, and approve the following: location and boundaries of the Mitigation Area, target elevations and grades, location of tree protection associated with the Mitigation Area, and final layout and limits of clearing for access route.
    - Select and mark snags, logs, and woody material to be retained for placement in the Wetland Mitigation, as appropriate.
    - Note invasive plants in and adjacent to Wetland Mitigation.
    - Provide summary report if and as specified under Wetland Mitigation items.

ITEM 755.75 (Continued)

- Excavation, Soil Placement, Grading for Replication Areas
    - Approve excavated depth and grading for appropriate wetland hydrology, subsoil preparation, and finished grade of placed wetland soil.
    - Adjust grades as required and approve microtopography. If grades need to be adjusted, submit an RFI to the Engineer.
    - If requested by the Engineer, the Wetland Specialist shall inspect stockpiled wetland soil for moisture content and signs of undesirable weeds.
- Soil Protection and Restoration Measures for Restoration Areas
    - Review and approve methods of soil protection and restoration if required.
    - Confirm decompaction will adequately restore appropriate wetland hydrology. If decompaction measures need to be adjusted, submit an RFI to the Engineer.

- Re-vegetation of Mitigation Area
    - Placement of woody material to be re-used.
    - Verify seed used complies with specifications and site conditions, determine limits for wetland seeding based on elevations, approve seeding and mulching methods, and collect seed tags to submit with Request for Conditional Acceptance.
    - Review planting methods (if applicable) prior to installation and oversee layout of wetland plants.

The wetland specialist shall visit the replication areas weekly following planting and seeding for the duration of the first growing season to determine the need for irrigation and additional fertilization and to inform the contractor of these requirements.

Conditional Acceptance

Upon completion of construction of the wetland, as part of the Request for Conditional Acceptance, the Wetland Specialist shall provide a brief narrative demonstrating that the wetland construction work was done according to plans (or how modified) and meets the conditions required for acceptance as specified under the Wetland Mitigation items. Submittal shall include a report and photo documentation of pre-construction conditions, construction work, seeding, planting, and other work as specified under the Wetland Mitigation items. Photos of completed Wetland Restoration areas shall include the same views as the pre-construction reference photos.

Upon receipt of a Request for Conditional Acceptance, the Engineer, the Wetland Specialist and regulatory representative (if required) shall assess the Wetland Mitigation and surrounding area to ensure that it meets the conditions specified under the Wetland Mitigation items.

Upon approval, MassDOT will issue a letter of Conditional Acceptance. If the Wetland Mitigation work is not approved, MassDOT will issue a rejection letter requiring corrective action. The Wetland Specialist shall recommend corrective actions.

ITEM 755.75 (Continued)

Request for Certificate of Compliance

If required, a Request for Certificate of Compliance shall be prepared and submitted to the Engineer immediately following Conditional Acceptance. Request shall be as specified under the relevant Wetland Mitigation items.

Request for Final Acceptance

Following one full growing season, the Wetland Specialist shall provide a brief narrative of the status of the Wetland Mitigation to be submitted with the Request for Final Acceptance.

Upon receipt of the Request, the Engineer, the Wetland Specialist and regulatory representative (if required) shall assess the Wetland Mitigation and surrounding area to ensure that it meets the conditions specified under the relevant Wetland Mitigation items.

If the Wetland Mitigation is not approved, MassDOT will issue a rejection letter requiring corrective action. The Wetland Specialist shall recommend corrective actions.

METHOD OF MEASUREMENT

Wetland Specialist will be measured per hour for on-site service provided by the Wetland Specialist.

Work shall include all inspections, photos, submittals, and associated tasks for construction and restoration oversight, narratives for Conditional and Final Acceptance, Request for Certificate of Compliance (Partial or Full) if required, documentation required for permits, and all other work specified above. Payment shall not include travel time or time spent off-site on reports. Decimal Pay Limits will be 0.25 hours.

BASIS OF PAYMENT

Wetland Specialist will be paid at the Contractor bid price for each hour, or fraction thereof, spent on-site to perform the work as described above. Reports and photo documentation are required for payment.

Post wetland construction reports shall be per Item 755.76, Wetland Monitoring Reports.

ITEM 755.76 WETLAND MONITORING REPORTS LUMP SUM

Work under this item shall be for the submittal of Wetland Monitoring Reports following the completion of wetland construction and shall include all inspections, photos, and other work required to complete those reports as specified herein.

"Wetland Mitigation" shall be used herein for applicable wetland work, whether Wetland Replication (creation of a new wetland) and/or Wetland Restoration (restoration after temporary impacts).

The Contractor shall retain the services of a Wetland Scientist, Wetland Ecologist, Restoration Ecologist, or other professional with similar qualifications, hereafter referred to as the "Wetland Specialist," to complete the Wetland Monitoring reports. Wetland Specialist shall meet requirements specified under Item 755.75 Wetland Specialist.

All on-site Wetland Specialist services required to complete the construction and revegetation of the wetland replication, including preparation and submission of monitoring reports during construction, shall be per Item 755.75 Wetland Specialist.

SCOPE OF WORK

Post-Construction Wetland Monitoring Reports

Final Acceptance of the wetland construction work as specified under item 755.35 shall initiate the beginning of the Monitoring Period.

Inspections and reports shall be performed to ensure compliance with mitigation requirements defined under the relevant Wetland Mitigation items and with all applicable environmental permits. Monitoring reports shall cover the following:

- Identification of all plant species present
- Percent cover for each plant species and overall percent surface area cover by indigenous wetland plant species for replication area and upland
- Description of the viability, health, and vigor of installed plants as well as volunteer plant species within the replication areas
- Description of remedial measures taken to ensure criteria are met
- Depth to apparent water table and/or depth of surface inundation, both as measured from the soil surface and data loggers, as appropriate.
- A conclusion regarding the success of the wetland mitigation area relative to the performance standards at 310 CMR 10.55(4)(b) (unless varied), the design plans, and performance criteria established by MADEP in the variance conditions (when applicable), and the reference wetland.
- Recommendation for a corrective plan of action if needed.

ITEM 755.76 (Continued)

Reports shall be submitted to the Engineer as a digital copy in Portable Document Format (PDF) unless otherwise requested. Hard copies shall be provided as requested by the Engineer. All reports shall be marked with the applicable permit numbers and identifying information as required in the permits. Reports shall include photo documentation of the wetland/s being monitored and shall include a minimum of 3 views from different orientations. Views shall be labeled.

Spring Reports, when required, shall be submitted to the Engineer by July 1 for dispersal to the appropriate permitting agencies.

End of Year Reports (which may serve as the Fall Report) shall be based on inspections that occur prior to October 15th. Reports shall be submitted to the Engineer no later than November 1 of each year.

Monitoring Reports shall be as follows for **2** years (to be confirmed after permits are filed):

- *MassDEP: 2 Reports - (1 spring and 1 end of year).*
- *ACOE: 2 Reports (1 spring and 1 end of year).*
- *Conservation Commission: 2 Reports (1 late spring and 1 mid to late summer).*

BASIS OF PAYMENT

Wetland Monitoring Reports and associated inspections shall be at the Contract unit price per Lump Sum and shall include all labor, materials, equipment, and all incidental costs required to complete the work. Lump Sum will be paid in equal installments of the Lump Sum divided by the number of reports submitted. Payment shall be upon submittal and acceptance of each report, based on the following schedule:

- Year 1 = ***2 Reports***
- Year 2 = ***2 Reports***

ITEM 756. NPDES STORMWATER POLLUTION PREVENTION PLAN LUMP SUM

This Item addresses the preparation and implementation of a Storm Water Pollution Prevention Plan required by the National Pollutant Discharge Elimination System (NPDES) and applicable Construction General Permit (CGP) issued by the U.S. Environmental Protection Agency (EPA).

Pursuant to the Federal Clean Water Act, construction activities which disturb one acre or more are required to apply to the EPA for coverage under the NPDES General Permit for Storm Water Discharges from Construction Activities. The Contractor shall be fully responsible for compliance with the most recently issued CGP and any subsequent revisions. Should a fine or penalty be assessed against it, or MassDOT, as a result of a local, state, or federal enforcement action due to non-compliance with the CGP, the Contractor shall take full responsibility.

The NPDES CGP requires the submission of a Notice of Intent (NOI) to the EPA prior to the start of construction (defined as any activity which disturbs land, including clearing and grubbing). There is a fourteen (14) day review period commencing from the date on which EPA enters the Notice into their database. Based on the review of the NOI, EPA may require additional information, including but not limited to, the submission of the Storm Water Pollution Prevention Plan (SWPPP) for review. Work may not commence on the project until final authorization has been granted by EPA. Any additional time required by EPA for review of submittals will not constitute a basis for claim of delay.

In addition, if the project discharges to an Outstanding Resource Water, vernal pool, or is within a coastal ACEC as identified by the Massachusetts Department of Environmental Protection (DEP), a separate notification to DEP is required. DEP may also require submission of the Storm Water Pollution Prevention Plan for review and approval. Filing fees associated with the notification to DEP and, if required, the SWPPP filing to DEP shall be paid by the Contractor.

The CGP also requires the preparation and implementation of a SWPPP in accordance with the afore-mentioned statutes and regulations. The Plan will include the CGP conditions and detailed descriptions of controls of erosion and sedimentation to be implemented during construction. The contractor shall prepare the SWPPP and update it as necessary. The Contractor shall submit the Plan to the Engineer for approval at least four (4) weeks prior to any site activities. It is the responsibility of the Contractor to comply with the CGP conditions and the conditions of any state Wetlands Protection Act Order, Water Quality Certification, Corps of Engineers Section 404 Permit and other environmental permits applicable to the project and to include in the SWPPP the methods and means necessary to comply with applicable conditions of said permits.

ITEM 756. (Continued)

It is the responsibility of the Contractor to complete the SWPPP in accordance with the 2022 EPA CGP, provide all information required, and obtain any and all certifications as required by the CGP. Any amendments to the SWPPP required by site conditions, schedule changes, revised work, regulations, construction methodologies, and the like are the responsibility of the Contractor. Amendments will require the approval of the Engineer prior to implementation.

Included in the CGP conditions is the requirement for inspection of all erosion controls and site conditions on a weekly basis as well as after each incidence of rainfall exceeding 0.25 inches in twenty-four hours. For multi-day storms, EPA requires that an inspection must be performed during or after the first day of the event and after the end of the event. The CGP requires that inspections be performed by a qualified individual as outlined in the CGP. MassDOT requires proof of completion of a 4 hour minimum sedimentation and erosion control training class current to the latest CGP. This individual can be, but not limited to, someone that is either a certified inspector, certified professional, or certified storm water inspector. The documentation shall be included as an appendix in the SWPPP. The inspector's qualifications shall be submitted to the Engineer for approval prior to beginning any work. This individual shall be on-site during construction to perform these inspections. In addition, if the Engineer determines at any time that the inspector's performance is inadequate, the Contractor shall provide an alternate inspector. Written weekly inspection forms, storm event inspection forms, and Monthly Summary Reports must be completed and provided to the Engineer. Monthly Summary Reports must include a summary of construction activities undertaken during the reporting period, general site conditions, erosion control maintenance and corrective actions taken, the anticipated schedule of construction activities for the next reporting period, any SWPPP amendments, and representative photographs.

The Contractor is responsible for preparation of the Plan, all SWPPP certifications, inspections, reports and any and all corrective actions necessary to comply with the provisions of the CGP. The Standard Specifications require adequate erosion control for the duration of the Contract. All control measures must be properly selected, installed, and maintained in accordance with manufacturer specifications and good engineering practices. If periodic inspections or other information indicates a control has been used inappropriately or is no longer adequate, it is the responsibility of the Contractor to replace or modify the control for site conditions at no additional cost to the Department. Contractor must maintain all control measures and other protective measures in effective operating condition and shall consider replacement of erosion controls for each construction season.

This Item addresses acceptable completion of the SWPPP, any revisions/amendments required during construction, and preparation of monthly reports. In addition, any erosion controls beyond those specified in bid items which are selected by the Contractor to facilitate and/or address the Contractor's schedule, methods and prosecution of the work shall be considered incidental to this item.

ITEM 756. (Continued)

The CGP provides specific requirements for temporary and final stabilization. This shall be incorporated into the project schedule. The permit defines specific deadline requirements for Initial Stabilization ("immediately", i.e., no later than the end of the next work day following the day when earth-disturbing activities have temporarily or permanently ceased) and for Complete Stabilization Activities (no later than 14 calendar days after the initiation of stabilization). Stabilization criteria for vegetative and non-vegetative measures are provided in the CGP.

The CGP requires the submission of a Notice of Termination (NOT) from all operators when final stabilization has been achieved, as well as removal and proper disposal of all construction materials, waste and waste handling devices, removal of all equipment and construction vehicles, removal of all temporary stormwater controls, etc. Approval of final stabilization by the Engineer and confirmation of submission of the NOT will be required prior to submission of the Resident Engineer's Final Estimate. The permittee shall use EPA's website to prepare and submit the NOT.

COMPENSATION

Payment for all work under this Item shall be made at the contract unit price, lump sum, which shall include all work detailed above, including Plan preparation, required revisions, revisions/addenda during construction, monthly reports and filing fees.

Payment of fifty (50) % of the contract price shall be made upon acceptance of the NPDES Stormwater Pollution Prevention plan. Payment of forty (40) % of the contract price shall be made in equal installments over the expected duration of stormwater pollution prevention measures. Payment of the final ten (10) % of the contract price shall be paid upon satisfactory submissions of a Notice of termination (NOT) when final stabilization has been achieved.

ITEM 765.21 ANNUAL COVER CROP FOR NATIVE SEEDING POUND

Work under this item shall be in accordance with Subsection 765 of the Standard Specifications and the following.

DESCRIPTION

Work consists of furnishing and applying the appropriate annual grass to be seeded as a cover crop in conjunction with upland native seeding and at the rate specified herein.

A cover crop shall be used for following conditions:

- when specified under Application Rate for the permanent native upland seed mix
- for slopes 2:1 or steeper and an annual is not already specified as part of the permanent mix
- when seeding out of season and the native seed mix does not already specify an annual
- as required to prevent erosion until the permanent seed establishes.

A cover crop is not necessary for wetland seeding and is not typically necessary for soil stabilization when seeding in conjunction with a compost blanket application.

Annual rye (*Lolium multiflorum*) will not be accepted as an annual cover crop.

Using annual rye or exceeding the application rate such that a dense stand of annual grasses prevents germination of the native grasses will require mowing of annual grasses. In this instance, mowing of cover crop will be incidental to this item.

Seed and Application Rate

Add 30 pounds/acre of the following seed based on seeding season:

Avena sativa (Grain Oats):	1 January to 31 July
Cecale cereale (Grain Rye):	1 August to 31 December

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Annual Cover Crop and Native Seeding will be measured for payment per pound of seed per pound of seed, complete in place.

Annual Cover Crop and Native Seeding will be paid at the contract unit price per pound upon approval of seed bag tags or other documentation of correct application rate and species, and upon acceptance of a satisfactory stand of annual grasses three weeks following seeding.

Application and care of cover crop will be paid for separately under Item 735.635 Native Seeding and Establishment

ITEM 765.415	**NATIVE SHORT GRASSLAND MIX**	**POUND**
ITEM 765.553	**WETLAND SEED – RIPARIAN MIX**	**POUND**

Work under these items shall consist of furnishing the mixes specified below in the required quantity.

SUBMITTALS

1) Pre-Verification of Seed Availability. Within 30 days after the Notice to Proceed, the Contractor shall submit to the Engineer the supplier's verification of availability of seed species in the required quantities and for the anticipated date of seeding. Verification shall be on the supplier's letterhead and notarized by the supplier's notary. Species not expected to be available should be noted and substitutions recommended.

2) Final Verification of Seed Availability. No earlier than 21 days prior to ordering, the Contractor shall submit to the Engineer the supplier's verification of availability of seed species and in the required quantities. Verification shall be on the supplier's letterhead and notarized by the supplier's notary. A copy of this submittal shall be forwarded to the MassDOT Landscape Design Section. Substitutions or changes in the mix at this time must be approved by MassDOT Landscape Design Section.

3) Seed Worksheet provided herein shall be submitted to the Engineer prior to ordering seed to determine the number of pounds of Pure Live Seed required.

4) Seed Tags. The contractor shall submit original seed tags from each bag of seed used on the project or ensure that each tag is photo documented by the Engineer while on the unopened bag.

   Number of tags submitted must correspond to number of bags delivered.

   Species listed on the seed tag shall match the Final Verification of Seed Availability (Submittal #2) unless approved otherwise. Tag must include: variety and species name; lot number; purity; percentage of inert matter; percentage of weeds, noxious seeds, and other crop seeds; germination, dormant or hard seed; total viability; origin of seed; germination test date, net weight, and name and address of seller. The origin of seed must be listed on the seed tag for all species in the mix to provide verification of original (generation 0) seed source. The smallest known geographic area (township, county, ecotype region, etc.) shall be listed. Ecotypes and cultivars shall be as close to Massachusetts as possible and appropriate to the site conditions.

   A copy of this submittal shall be forwarded to the MassDOT Landscape Design Section.

5) Verification of Seed Delivery. Prior to payment, contractor shall submit the Seed Delivery Verification form contained within the contract or the Supplier's Verification on company letterhead or a bill of lading. Supplier verification must include all information requested on the Verification form within this contract. The bill of lading must include variety and species name, lot number, net weight shipped, date of sale, invoice, project or seeding location, and name and address of Supplier. All information must be filled in and complete for acceptance. Information must match the seed tags and quantity of seed used on the job. A copy of this submittal shall be forwarded to the MassDOT Landscape Design Section.

ITEMS 765.415 & 765.553 (Continued)

6) Seed Sample. If requested or if seed is from a previously opened bag, the contractor may be asked to submit to the Engineer a sample of seed from the seed bag (1-2 cups) at the time of seeding.

Seeding Season

The appropriate seeding seasons are:

Spring: April 1 - May 15
Fall: October 1 - December 1 for dormant seeding

Permanent Seed Mix(es)

Calculating Pure Live Seed (PLS)

Quantities specified are PURE LIVE SEED. Greater quantities of ordered seed may be required to achieve actual specified seeding rates.

Pure Live Seed (PLS) is defined as a percentage calculated by multiplying the percent of pure seed by the percent of viable seed (total germination, hard seed, and dormant seed). For example:

If a seed label indicates 90% purity, 78% germination, 10% hard seed, and 2% dormancy, it is calculated to be 90% x [78 + 10 + 2]% = 81% PLS.

Therefore, each pound of PLS would need 1 pound / 0.81 = 1.2 pounds of seed with a 90% purity and 90% total germination

Seed Mixes shall be as specified below. Ecotypes and cultivars shall be as close to Massachusetts as possible and appropriate to the site conditions.

ITEMS 765.415 & 765.553 (Continued)

765.415 Native Short Grassland Mix

	Botanical Name	Common Name	% PLS by Weight
Grass	Schizachyrium scoparium	Little Bluestem	54.5%
	Elymus virginicus	Virginia Wild Rye	27.2%
	Dichanthelium clandestinum 'Tioga'	Deertongue grass 'Tioga'	4.0%
	Eragrostis spectabilis 'RI Ecotype'	Purple Lovegrass 'RI Ecotype'	3.0%
	Agrostis perennans	Upland Bentgrass	1.5%
	Juncus tenuis	Path Rush	1.0%
			91.2%
Herb/Forb	Chamaecrista fasciculata	Partridge Pea	4.0%
	Zizia aurea	Golden Alexanders	2.0%
	Penstemon digitalis	Beard-tongue	1.0%
	Achillea millefolium	Common Yarrow	0.5%
	Solidago nemoralis	Grey Goldenrod	0.3%
	Pycnanthemum tenuifolium	Slender Mountain Mint	0.2%
	Aster laevis NY Ecotype	Smooth Aster NY Ecotype	0.2%
	Solidago bicolor	White Goldenrod	0.2%
	Aster lateriflorus	Calico Aster	0.2%
	Euthamia graminifolia	Grass-leaved Goldenrod	0.1%
	Aster pilosus	Heath Aster	0.1%
			8.8%
			100.00%

ITEMS 765.415 & 765.553 (Continued)

765.553 Wetland Seed – Riparian Mix

	Botanical Name	Common Name	% PLS By Weight
Grass			
	Sorghastrum nutans NY Eco	Indiangrass NY Ecotype	14.00%
	Schizachyrium scoparium	Little Blue Stem	14.00%
	Elymus riparius	Riverbank Wild Rye	10.00%
	Elymus virginicus	Virginia Wild Rye	10.00%
	Panicum clandestinum 'Tioga'	Deer Tongue 'Tioga'	9.00%
	Andropogon gerardii NY Eco	Big Bluestem NY Eco	8.00%
	Carex vulpinoidea	Fox Sedge	7.00%
	Panicum virgatum	Switchgrass	3.00%
	Juncus effusus	Soft Rush	2.00%
	Agrostis perennans	Upland Bentgrass	2.00%
	Scirpus atrovirens	Green Bulrush	1.00%
			80.00%
Herb/Forb			
	Chamaecrista fasciculata	Partridge Pea	3.00%
	Verbena hastata	Blue Vervain	3.00%
	Asclepias incarnata	Swamp Milkweed	3.00%
	Heliopsis helianthoides	Ox-Eye Sunflower	2.00%
	Eupatorium perfoliatum	Boneset	2.00%
	Aster umbellatus	Flat Topped White Aster	1.00%
	Aster prenanthoides	Zig Zag Aster	1.00%
	Aster puniceus	Aster – Swamp	1.00%
	Aster novae-angliae	New England Aster	1.00%
	Eupatorium maculatum	Joe-pye Weed	1.00%
	Monarda fistulosa	Wild Bergamot	1.00%
	Vernonia noveboracensis	New York Ironweed	1.00%
			20.00%
			100.00%

ITEMS 765.415 & 765.553 (Continued)

Application Rate

765.415: Native Short Grassland Mix: 15 lbs/acre PLS. In addition, apply 30 pounds of cover crop (grain oats or grain rye) as appropriate to the season.

765.553: Wetland Seed – Riparian Mix: 20 lbs/acre PLS. In addition, apply 30 pounds of cover crop (grain oats or grain rye) as appropriate to the season.

50% Increase Adjustment for Field Conditions

Seeding under the following conditions requires a 50% increase in the permanent mix at the time of construction:

- Seeding out of season
  OR
- Seeding after Compost Blanket has been applied (unless already increased for out of season).

ITEMS 765.415 & 765.553 (Continued)

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Native Short Grassland Mix and Wetland Seed – Riparian Mix, will be measured by the pound of Pure Live Seed delivered and complete in place.

Native Short Grassland Mix and Wetland Seed – Riparian Mix will be paid at the contract unit price per pound of Pure Live Seed delivered upon approval of all Seed Submittal Documentation. Overseeding required to correct poor germination or establishment shall be incidental to the item.

Cover crop not included as part of the permanent mix composition will be paid for under Item 765.21, Annual Cover Crop for Native Seeding.

Application and care of native seed mix will be paid for separately under Item 765.635, Native Seeding and Establishment.

ITEM 765.635 NATIVE SEEDING AND ESTABLISHMENT SQUARE YARD

Work shall conform to the relevant provisions of Subsections 765 and 767 of the Standard Specifications and the following:

The work under this item shall consist of seeding, mowing, and other care to establish a stand of grass in the areas shown on the plans or as required by the Engineer. For the purposes of these specifications, the term "grass" shall apply to all the forbs, grasses, sedges, and rushes included in the materials.

QUALIFICATIONS

Seeding shall be done by a company having a minimum of five years of experience with native seed establishment. Prior to beginning work, the seeding Contractor shall furnish proof of qualifications to the Engineer for approval. Proof of qualifications shall include providing documentation (photos and contacts) to demonstrate knowledge and expertise with native seeding and establishment and proof of having completed successful native seeding projects.

SEEDING SEASON

Seeding seasons for native mixes is April 1 - May 15 and October 1 - December 1 for dormant seeding. Written approval must be obtained for seeding outside the seeding season and, if approved, the permanent seed rate shall be increased by 50%.

Seeding season for cover crops shall be grain oats January 1 – July 31 and grain rye August 1 – December 1.

MATERIAL AND SUBMITTALS

Seed Mixes and Submittals shall be per the item(s) for permanent and annual (cover crop) seed mixes.

Compost Blanket, if used, shall meet the material and submittal requirements for that item.

Hydromulch shall be wood fiber or straw applied per the Standard Specifications and at the rates specified below and per the manufacturer.

A certified statement shall be furnished, prior to start of work, to the Engineer by the Contractor as to the number of pounds of hydromulch, tackifier, and seed, per 100 gallons of water and as applicable to products used. This statement should also specify the number of square yards of seeding that can be covered with the solution specified above.

Fertilizer

No fertilizers shall be applied.

ITEM 765.635 (Continued)

Water

Water, including hose and all other watering equipment required for the work, shall be furnished by the Contractor to the site at no additional cost. Water shall be suitable for irrigation and free from ingredients harmful to plant life. All plants injured or work damaged due to the lack of water or the use of too much water shall be the Contractor's responsibility to correct.

Seeding

Hand broadcast method shall be used for all areas smaller than half an acre and when specified on the plans for areas over half an acre.

Seeding shall occur within 72 hours of placement of loam and final grading or the Contractor shall propose a reasonable, alternative schedule that shall be approved by the Engineer.

Surface Preparation

No seeding or soil preparation shall be done if soils are muddy or dry and compacted. Bare soils shall be raked to remove large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter. Ruts and depressions shall be filled with additional loam or compost and the soil shall be re-graded to a relatively smooth finish corresponding to the required grades.

When seeding over existing or compacted soil or soil that has sat bare for more than 30 days, surface will be prepared by tilling or raking to a minimum depth of 2 inches prior to seeding and prior to Compost Blanket application (when applied).

Surface preparation shall be compensated for under for loam placement or topsoil rehandled and spread as appropriate to the project.

Jute or coir mesh, when specified in the contract, shall be placed after seeding and per the Standard Specifications and the manufacturer’s instruction.

Surface preparation shall be approved by the Engineer prior to seeding.

Seeding over Various Substrates

Loam: Seeding shall occur within 72 hours of loam placement to prevent loss of topsoil. Seed shall be manually broadcast for areas less than half an acre (each area, not cumulative area) and when specified on the plans. Broadcasting shall be immediately followed by hydromulching as specified below. When not specified on the plans, larger areas may be hydroseeded as specified below.

Compost Blanket: Compost Blanket shall be applied as specified under that item. Seed should be hand broadcast at the same time as compost application to ensure a thin cover of compost over seed.

ITEM 765.635 (Continued)

When seeding is done after application of Compost Blanket the rate shall be increased by 50%. If the Compost Blanket is applied after December 1, seed shall be broadcast or hydroseeding over the compost in the Spring and the rate increased by 50% specified under Seed Application.

Compost Mulch over Modified Rock: Compost Mulch and seed shall be applied as specified under that item. No hydromulch is required.

Cover Crop

Cover crop shall be used when seeding out of season, when specified with the permanent native seed mix under that item, and as required to prevent erosion until the permanent seed establishes.
A cover crop should not be used with a steep slope mix or other permanent mix which already contains either cereal rye or oats in the composition of the mix. A cover crop is not necessary for wetland seeding and is not typically necessary for soil stabilization when seeding in conjunction with a compost blanket application.

Seed Application

All seed shall be mulched as specified herein.

Seed application shall be by broadcast seeding or by hydroseeding as described below.

Broadcast Seeding

Seed shall be broadcast spread using a cyclone or whirlwind seeder or hand broadcast. Small or light-seeded species such as bluestem may be mixed with approved filler to achieve an even distribution. Seed shall not be broadcast when wind velocities are greater than 15 mph.

Broadcast seeding shall be undertaken in two separate passes at ninety degrees to each other. One-half the seeding rate shall be applied in each direction (horizontally and vertically). To ensure seed to soil contact with broadcasting of seed, seeding shall be followed by rolling or tracking with equipment approved by the Engineer.

Broadcast seed shall be mulched with weed-free straw mulch unless seeding is done as part of Compost Blanket in which case it shall be as specified above under seeding with Compost Blanket application. Hydromulching shall be as specified under Hydromulching.

Hydroseeding and Hydromulching

Hydroseed and mulching shall be per the manufacturer's directions and as follows.

Hydroseeding shall only be used for sites over half an acre in size or with permission of the Engineer.

Tank and hoses shall be cleaned from all previous hydroseeding and hydromulching projects. Seed shall be mixed into the slurry immediately before application and slurry applied within 30 minutes

ITEM 765.635 (Continued)

after seeds have been placed in the tank. Once seed has been placed in the tank, tank shall be agitated only enough to mix the seeds and keep slurry from separating.
A 2-step process shall be used for seeding in conjunction with hydromulch. Seed shall be applied with 500 lbs/acre of hydromulch in the first pass. A second pass with 1,000 lbs/ acre of hydromulch shall be applied in a second pass. Each pass shall be applied in a different direction.

Once the seed has been added to the tank mixture a one-hour time limit is set for spreading the mixture on the soil. Once the one hour has passed the excess mixture must be discarded.

For broadcast seeding, hydromulch shall be applied immediately following seeding at a rate of 1,000 lbs/acre. Tank shall be cleaned from any previous hydroseeding.

Care During Germination and Establishment

Contractor shall care for seeded areas as necessary for successful germination. Care will include watering and weed control as necessary to achieve establishment of the specified seeded species after one growing season as specified below.

The contractor shall maintain the stand of grasses to ensure healthy growth of the seeded species. Work shall include mowing or weed-whacking for weed control, watering if necessary, and removal of invasive plants.

Watering shall be sufficient to achieve soil moisture to a depth of 2 inches or more and such moisture is uniform. Method of watering shall not erode or damage soil or grassed surfaces.

General Weed Control: Unless otherwise directed, mowing shall be as specified under Mowing for Weed Control for seed establishment. Weeds shall be mowed prior to weeds setting seed (by the end of July unless otherwise approved).

Control of Invasive and Aggressive Weeds: Invasive and aggressive weeds, including but not limited to mugwort, ragweed, knapweed, foxtail, crabgrass, and chicory must be cut or treated prior to going to seed. Herbicide treatment must be coordinated with MassDOT. Undesired species (such as chicory) introduced due to use of incorrect seed mix shall be removed at the Contractor's expense.

Mowing for Weed Control

Mowing for weed control shall be completed after weeds have sprouted and show leaf and bud growth, but prior to setting seed, generally between July 7th and August 1st, unless directed otherwise by the MassDOT Landscape Architect and the Engineer.

Mowing height shall be as needed for weed control, generally to a height of 8 inches and not below 4 inches, unless directed otherwise. Mowing shall be with a brush hog mower or string trimmer other approved equipment. Conventional lawn mowers which cannot achieve the appropriate cut shall not be used.

ITEM 765.635 (Continued)

Contractor shall give 48-hour notice prior to mowing work. Mowing shall only occur in dry sunny weather. Litter pickup should occur prior to mowing in all areas. If required, cut grass shall be raked and removed. Litter pickup and raking and removal of grass shall be incidental to the work.

Mowing equipment shall be approved by the Engineer prior to work.

Over-Seeding

Areas of bare ground greater than 2-3 feet in diameter shall be over-seeded with the specified mix during the appropriate season for seeding. Where required for overseeding mowing shall be as close to the soil as possible. Soil that is compacted shall be raked or otherwise roughened prior to over-seeding.

Over-seeding rates and methods shall those specified above under Materials and Methods. Following over-seeding, soil shall be lightly tamped to ensure seed to soil contact and areas shall be mulched with straw mulch and watered with a fine mist to moisten soil to a depth of at least 2 inches.

Over-seeding, mulch, watering, and all work for over-seeding shall be incidental.

Determining Satisfactory Grass Establishment

A well-established stand of the specified seeded species as determined by the Engineer and the MassDOT Landscape Architect will be required for Final Acceptance. The expectation is that an acceptable number and variety of the desired permanent seeded species (not the cover crop) will be visible. Generally:

- A minimum of 75% coverage by the specified permanent seeded species after one growing season. Of that percentage, generally, depending on the mix species:
    - At least 3 types of the permanent seeded grass species shall be visible.
    - At least 3 species of wildflowers shall be visible.
- There will be no significant gaps or bare soil (generally 2-3 feet in diameter or greater).
- There will be no more than 25% coverage by weed species.
- All soil shall be stabilized and there shall be no channeling or erosion.
- There will be no invasive or aggressive species within the stand at the time of acceptance.
- There shall be no evidence of seed from non-native mixes (i.e., clover) due to failure to clean the hydroseeding tank or using incorrect mix.

Invasive and aggressive weeds (such as mugwort, ragweed, knapweed, and chicory) must be cut or treated prior to going to seed for Interim Acceptance. Herbicide treatment must be coordinated with MassDOT.

A warm-season grass mix with perennials will not have uniform growth. A uniform stand of grass may indicate use of an incorrect mix.

ITEM 765.635 (Continued)

Acceptance of Seeding and Establishment Work

Conditional Acceptance shall be based on proper application of seed as specified herein.

Interim Acceptance of Care. Seeding will be inspected by mid-July to assess germination and Establishment conditions as described above. When necessary for Interim Acceptance, areas shall be mowed prior to weed species producing seed and as specified above under Weed Control. ***Areas requiring weed control that are not mowed prior to weed seed dispersal will not be approved for Interim Acceptance.*** Seeding that shows good germination and is determined by the Engineer and Landscape Architect to not require weed control at time of inspection shall be accepted for Interim Acceptance payment.

Final Acceptance of Establishment shall be given upon satisfactory Establishment as described above.

If the seeded area fails to meet the requirements of Establishment by the end of the growing season, contractor shall propose and implement remediations and site shall be inspected during the following growing season after July 1st. All remediation shall be at the contractor's expense.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Native Seeding and Establishment will be measured for payment by the square yard, complete in place.

Native Seeding and Establishment will be paid at the Contract unit price by the square yard upon Conditional, Interim, and Final Acceptances as described above. This price shall include all submittals, seeding, rolling to ensure seed-to-soil contact, weed control other than mowing, water, over-seeding, labor, materials, equipment, and all incidental costs required to complete the work of establishing a satisfactory stand of grass.

Native seed and cover crop mixes shall be compensated under the respective items.

Site preparation, including raking, tilling, removal of debris and stones, and other work to the prepare site for seeding shall be compensated under loam placement or topsoil rehandled and spread as relevant to the project.

Mowing for weed control will be incidental to this item.

Schedule of payment shall be as follows:

30% upon Conditional Acceptance

20% upon Interim Acceptance of Care, except this amount will be reduced to zero and final payment will be reduced accordingly when areas requiring weed control are not mowed as specified in the Interim Acceptance criteria.

50% upon Final Acceptance of Establishment

ITEM 767.121 SEDIMENT CONTROL BARRIER FOOT

The work under this item shall conform to the relevant provisions of Subsections 670, 751 and 767 of the Standard Specifications and shall include the furnishing and placement of a sediment control barrier. Sediment control barrier shall be installed prior to disturbing upslope soil.

The purpose of the sediment control barrier is to slow runoff velocity and filter suspended sediments from storm water flow. Sediment barrier may be used to contain stockpile sediments, to break slope length, and to slow or prevent upgradient water or water off road surfaces from flowing into a work zone. The contractor shall be responsible for ensuring that barriers fulfill the intent of adequately controlling siltation and runoff.

Twelve-inch diameter (after installation) compost filter tubes with biodegradable natural fabric (i.e., cotton, jute, burlap) are intended to be the primary sedimentation control barrier. Photo-biodegradable fabric shall not be used.

For small areas of disturbance with minimal slope and slope length, the Engineer may approve the following sediment control methods:

- 9-inch compost filter tubes
- Straw bales which shall be trenched

No straw wattles may be used. Additional compost filter tubes (adding depth or height) shall be used at specific locations of concentrated flow such as at gully points, steep slopes, or identified failure points in the sediment capture line.

When required by permits, additional sediment barrier shall be stored on-site for emergency use and replacement for the duration of the contract.

Where shown on the plans or when required by permits, sedimentation fence shall be used in addition to compost filter tubes and straw bales and shall be compensated under that item.

Sediment control barriers shall be installed in the approximate location as shown on the plans and as required so that no excavated or disturbed soil can enter mitigation areas or adjacent wetlands or waterways. If necessary to accommodate field conditions and to maximize effectiveness, barrier locations may be shifted with approval from the Engineer. Barriers shall be in place prior to excavation work. No work shall take place outside the barriers.

MATERIALS AND CONSTRUCTION

Prior to initial placement of barriers, the Contractor and the Engineer shall review locations specified on the plans and adjust placement to ensure that the placement will provide maximum effectiveness.

ITEM 767.121 (Continued)

Barriers shall be staked, trenched, and/or wedged as specified herein and according to the Manufacturer's instructions. Barriers shall be securely in contact with existing soil such that there is no flow beneath the barrier.

Compost Filter Tube

Compost material inside the filter tube shall meet M1.06.0, except for the following: no peat, manure or bio-solids shall be used; no kiln-dried wood or construction debris shall be allowed; material shall pass through a 2-inch sieve; and the C:N ratio shall be disregarded.

Outer tube fabric shall be made of 100% biodegradable materials (i.e., cotton, hemp or jute) and shall have a knitted mesh with openings that allow for sufficient water flow and effective sediment capture.

Tubes shall be tamped, but not trenched, to ensure good contact with soil. When reinforcement is necessary, tubes shall be stacked as shown on the detail plans.

Straw Bales

Straw bales shall be used if shown on the plans or when specified by Orders of Condition or other permit requirements.

Bales should be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. All bales should be either wire-bound or string-tied. Straw bales should be installed so that bindings are oriented around the sides (rather than along the tops and bottoms) of the bales in order to prevent deterioration of the bindings.

The barrier should be entrenched and backfilled. A trench should be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. The trench must be deep enough to remove all grass and other material which might allow underflow. After the bales are staked and chinked (filled by wedging), the excavated soil should be backfilled against the barrier. Backfill soil should conform to the ground level on the downhill side and should be built up to 4 inches against the uphill side of the barrier.

Each bale should be securely anchored by at least 2 stakes or re-bars driven through the bale. The first stake in each bale should be driven toward the previously laid bale to force the bales together. Stakes or re-bars should be driven deep enough into the ground to securely anchor the bales. For safety reasons, stakes should not extend above the bales but should be driven in flush with the top of the bale.

The gaps between the bales should be chinked (filled by wedging) with straw to prevent water from escaping between the bales. Loose straw scattered over the area immediately uphill from a straw bale barrier tends to increase barrier efficiency. Wedging must be done carefully in order not to separate the bales.

ITEM 767.121 (Continued)

When used in a swale, the barrier should be extended to such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale to assure that sediment-laden runoff will flow either through or over the barrier but not around it.

Sedimentation Fence

Materials and Installation shall be per Section 670.40 and 670.60 of the Standard Specifications and the following:

Sedimentation fence shall only be used at specific locations shown on the plans or when specified by Orders of Condition or other permit requirements.

When used with compost filter tubes, the tube shall be placed on a minimum of 8 inches of folded fabric on the upslope side of the fence. Fabric does not need to be trenched.

When used with straw bales, an 8-inch deep and 4-inch wide trench or V-trench shall be dug on the upslope side of the fence line. One foot of fabric shall be placed in the bottom of the trench followed by backfilling with compacted earth or gravel. Stakes shall be on the down slope side of the trench and shall be spaced such that the fence remains vertical and effective.

Width of fabric shall be sufficient to provide a 36-inch high barrier after fabric is folded or trenched. Sagging fabric will require additional staking or other anchoring.

MAINTENANCE

Maintenance of the sediment control barrier shall be per Section 670.60 of the Standard Specifications or per the Stormwater Pollution Prevention Plan (SWPPP), whichever is more restrictive.

The contractor shall inspect the sediment barrier in accordance with relevant permits. At a minimum, barriers shall be inspected at least once every 7 calendar days and after a rain event resulting in 0.25 inches or more of rainfall. Contractor shall be responsible for ensuring that an effective barrier is in place and working effectively for all phases of the Contract.

Barriers that decompose such that they no longer provide the function required shall be repaired or replaced as directed. If the resulting berm of compost within the fabric tube is sufficiently intact (despite fabric decay) and continues to provide effective water and sediment control, barrier does not necessarily require replacement.

DISMANTLING & REMOVING

Barriers shall be dismantled and/or removed, as required, when construction work is complete and upslope areas have been permanently stabilized and after receiving permission to do so from the Engineer.

ITEM 767.121 (Continued)

Regardless of site context, nonbiodegradable material and components of the sediment barriers, including photo-biodegradable fabric, plastic netting, nylon twine, and sedimentation fence, shall be removed and disposed off-site by the Contractor.

For naturalized areas, biodegradable, natural fabric and material may be left in place to decompose on-site. In urban, residential, or other locations where aesthetics is a concern, the following shall apply:

- Compost filter tube fabric shall be cut and removed, and compost shall be raked to blend evenly (as would be done with a soil amendment or mulch). No more than a 2-inch depth shall be left on soil substrate.
- Straw bales shall be removed and disposed off-site by the Contractor. Areas of trenching shall be raked smooth and disturbed soils stabilized with a seed mix matching adjacent seeding or existing grasses (i.e., lawn or native grass mix).
- Sedimentation fence, stakes, and other debris shall be removed and disposed off-site. Site shall be restored to a neat and clean condition.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Sediment Control Barrier will be measured and paid for at the contract unit price per foot of sediment control barrier which price shall include all labor, equipment, materials, maintenance, dismantling, removal, restoration of soil, and all incidental costs required to complete the work.

Additional barrier, such as double or triple stacking of compost filter tubes, will be paid for per foot of tube installed.

Barriers that have been driven over or otherwise damage by construction activities shall be repaired or replaced as required by the Engineer at the Contractors expense.

Sedimentation fence used in conjunction with compost filter will be measured and paid for separately under Standard Item 697, Sedimentation Fence.

ITEM 767.122 SEDIMENT BARRIER – COIR LOG FOOT

The work under this item shall conform to the relevant provisions of Subsections 101, 120, 170, and 751 of the Standard Specifications and the following:

Sediment Barrier - Coir Log shall be used in wet locations where the barrier will not require removal; when barrier is placed immediately adjacent to existing wetlands; as a check dam in swales; in locations as shown on the Drawings; and/or in locations required by the Engineer.

Permits, Codes and Regulations: The Contractor shall comply with all rules, regulations, laws and ordinances of the City/Town and State, and all other authorities having jurisdiction over the Project site. All labor, materials, equipment, and services necessary to make the work comply with such requirements shall be provided by the Contractor without additional cost to the Department.

MATERIALS

Coir Log: Coir Log shall be biodegradable coir fiber cylindrical bundles. Inner core shall be 100 percent unsorted, well-cleaned, coir fiber uniformly distributed along the length of the log. The stuffed density of the coir fiber shall be a minimum of 9 pounds per cubic foot.

Outer netting shall be constructed from a minimum 3-ply high strength coir bristle twine. The netting shall have 2-inch by 2-inch rhombic openings with hand-knotted junctions. The average breaking strength of the coir twine shall be a minimum of 80 pounds. Production tolerance for all the above parameters shall not exceed plus or minus 10 percent.

Coir log diameter shall be sized as shown on the drawings. Typical lengths are supplied in 10 foot or 20-foot increments. Coir logs or coir netting may not be cut to decrease length and shall maintain the physical properties as supplied by the Manufacturer.

Notched Wood Stakes: Stakes shall be oak or southern pine with dimensions as shown on the Drawings. Stakes shall be free from knots and other defects which would cause splitting and shall have a downward-angled notch as shown in the drawing.

Coconut Fiber Cord: Coconut fiber cord shall be two-ply braided cord with a breaking strength of 80 pounds, minimum 0.25-inch diameter.

Delivery, Storage and Handling: Protect materials from deterioration during delivery and while stored at site.

CONSTRUCTION METHODS

General: Prior to initial placement of the coir log sediment barrier, the Contractor and the Engineer shall review locations specified on the plans and adjust placement, if required, to ensure that the coir log positioning and configuration will provide maximum sediment capture. Coir log sediment barrier(s) shall be in place prior to excavation work and no work shall take place outside the coir log barrier(s).

ITEM 767.122 (Continued)

Installation: Coir logs shall be staked and secured as shown on the Drawings, as specified herein, and/or as recommended by the Manufacturer. The Contractor shall remove all underlying vegetation or debris to ensure that each coir log is securely in contact with soil, such that there is no flow beneath the log.

When used as a check dam barrier in a swale, the coir log shall be centered in the low point of the swale, perpendicular to the flow, with ends extending upslope. The log check dam barrier shall extend such that the log top elevation at the center of the swale is lower than the lowest elevation at the end log, to ensure that sediment-laden runoff will flow either through or over the coir log but not around it. The coir log check dam barrier shall have length such that no seams occur in the swale.

Notched wood stakes shall be driven parallel on both sides of the coir log at a typical spacing of 5 feet on center, unless site conditions warrant a closer spacing distance to ensure logs are firmly secured to the underlying soil. Stakes shall not extend more than 1 foot beyond the top of the log. Coir twine shall lash the logs to notched stakes in a cross-lashing fashion between stakes, throughout the length of the log barrier.

When utilizing multiple logs for sediment control, each coir log shall be laced together end-to-end (creating a seam) with coir twine to create a continuous length. End-to-end lacing may be completed before or after placement, to facilitate handling.

Maintenance: Maintenance of the coir log sediment barrier shall be per the Stormwater Pollution Prevention Plan (SWPPP).

The contractor shall inspect the sediment barrier in accordance with relevant permits. At a minimum, barriers shall be inspected at least once every 7 calendar days and after a rain event resulting in 0.25 inches or more of rainfall. The Contractor shall be responsible for ensuring that an effective barrier is in place and working effectively for all phases of the Contract. Under no condition shall sediment be allowed to accumulate more than 4 inches above the original ground line.

If a breach or other failure of the barrier occurs, the barrier shall be immediately restored. Repair shall include replacement of entire defective segments or for short breaches, revetment with additional coir logs, set directly adjacent to the downslope side of the breech. Revetment coir logs must overlap breech by a minimum of 2 feet on each side. The Engineer must approve breech repair means and methods as well as outcome.

If the coir log sediment barrier is damaged by equipment or undergoes a significant washout or other major failure, the Contractor shall replace the component in its entirety, at the discretion and approval of the Engineer. Any delay in maintaining the barrier shall be cause to immediately suspend the work as provided for in Subsection 8.09: Delay and Suspension of Work.

Disposition/Removal: For naturalized areas, coir logs and wooden stakes may be left in place to decompose on-site. For areas where, in the determination of the Engineer, aesthetics are a concern, logs, errant coir fiber material, and stakes may require removal.

ITEM 767.122 (Continued)

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 767.122 Sediment Barrier - Coir Log will be measured for payment by the FOOT, complete in place and will be paid for at the Contract unit price per FOOT, which price shall include all labor, materials, equipment, and incidental costs required to complete the work.

No separate payment will be made for coir log(s) follow-up maintenance and repairs, or disposal (if required), but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 983.521 STREAMBED RESTORATION CUBIC YARD

The work under this item shall consist of restoring the disturbed streambed and stream bank using both new material and existing material stockpiled during dredging operations. This work shall occur at locations and to the lines and grades indicated on the Plans, as stipulated herein, and/or as required by the Engineer.

The work to be done under this item shall conform to the relevant provisions of Section 983 of the Standard Specifications and the following.

This work shall consist of furnishing and placing natural streambed material, riprap, and crushed stone, and geotextile fabric for permanent erosion control on the streambed and bank to set a desired channel profile, maintain a natural bed appearance, and maintain aquatic organism passage. The placement of these materials shall be as specified herein and on the Plans. The ultimate product will replicate the function and appearance of the existing stream, to the extent possible.

Materials

The streambed restoration areas shall be comprised of the following:

- 12” layer of natural streambed (previously dredged and stockpiled under Item 148.01 or new material as described in this Item) over
- Geotextile fabric for permanent erosion control (paid under Item 698.4)

The dredging and stockpiling of natural streambed material will be paid for under Item 148.01 – Dredging and Stockpiling of Material. This material shall be completely re-used prior to the Contractor bringing in any new materials for the natural streambed layer, at the discretion of the Engineer. Additional graded materials, described below, may be used to improve the stability during high-velocity storms.

Any gravel, cobble, or boulders excavated and stockpiled from the existing streambed (as part of Item 148.01) shall be reused for streambed restoration, provided the excavated stone is characteristic of the existing stream material upstream and downstream of the work area, or meets the below criteria. The elevations and conditions of the existing streambed adjacent to the project site shall be maintained to the maximum extent practicable. The Engineer reserves the right to direct the Contractor to supplement or replace the previously excavated material, as needed to meet the existing streambed characteristics. New boulders brought in by the Contractor shall meet the Component 1 description herein.

ITEMS 983.521 (Continued)

If at the discretion of the Engineer, the previously dredged and stockpiled material is not suitable for re-use or there is not enough material, the Contractor shall bring in new material to be used for the natural streambed layer. New streambed material shall be locally sourced, rounded river stone that matches the composition of the native streambed. The following gradation shall be used as a guide.

Component 1: 18"to 24" natural, rounded, locally sourced boulders
Component 2: Streambed material with gradation similar to the natural streambed at the site. Approximate gradation noted provided in the below table:

Stone/Sieve Size	% Finer
12 in.	95-99
Cobble (2.5 in.- 10 in.)	85-95
Gravel (0.2 in.- 2.5 in.)	60-85
No. 4	5-60
No. 200	1-5

Any new streambed restoration material that will be required shall be approved by the Engineer prior to use.

Construction Methods

The streambed material and geotextile fabric shall be placed as detailed on the plans and as described in this specification. The initial placement of streambed material shall include the random placement of natural boulders (Component 1) on top of the geotextile fabric. The boulders shall be placed randomly throughout, approximately 10'-0" apart. After boulders (Component 1) are installed, the natural streambed material (previously dredged and stockpiled – Item 148.01, or new streambed material described above as Component 2) shall be spread as shown on the plans

ITEMS 983.521 (Continued)

to a 12" depth. Boulders (Component 1) shall be flush or extend up approximately 6" above and through the 12" layer of natural streambed. Natural streambed material shall be tamped down. Fill voids by hand tamping with metal tamping rods, by shaking stone with the teeth of an excavator bucket, and/or by spraying water to settle fines between large stones. Plate compactors shall not be used. Streambed material shall be installed in 6" to achieve the full depth of stream bed restoration shown on the Plans.

A 12" layer of natural streambed material shall be installed on top of the geotextile fabric to restore streambed habitat and aesthetics. The material shall be installed during dewatered conditions behind cofferdams in accordance with the environmental permits. Where appropriate based on existing conditions at the site, a higher proportion of larger native boulders from the natural streambed material mix shall be placed along the edge of the channel to protect the banks or structures. Larger material shall also be installed in the channel to maintain a natural level of hydraulic roughness and re-establish fish habitat.

Once all material has been placed in the stream channel and approved by the Engineer, the Contractor shall remove the cofferdams in such a way to slowly wet the stream to minimize the initial sediment pulse. Every attempt shall be made to minimize the downstream movement of sediment.

The final streambed shall look natural, shall match nearby reaches, and there shall be minimal to no subsurface flow upon final inspection by the Engineer.

The Contractor shall submit to the Engineer for approval prior to the start of operations, a placement plan and method of placement.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Streambed Restoration will be measured and paid for by the Cubic Yard of natural streambed/boulders re-laid or new streambed material/boulders installed, complete in place, which price shall include all labor, materials, equipment, and incidental costs required to place the natural streambed layer as indicated on the Contract Documents, as specified herein and as required by the Engineer.

Compensation for the dredging and stockpiling of materials will be paid for under Item 148.01 – Dredging and Stockpiling of Material.

Compensation for furnishing and installing the geotextile fabric layer (as shown in the Contract Documents) shall be paid under Items 698.4.

Compensation for control of water will be paid for under Item 999.1 – Control of Water.

ITEM 991.11 CONTROL OF WATER – LOCATION NO. 1 LUMP SUM
ITEM 991.12 CONTROL OF WATER – LOCATION NO. 2 LUMP SUM

All work to be done under these Items shall conform to the relevant provisions of Sections 140.60 of the MassDOT Standard Specifications, the Plans and the following:

The work under these items shall consist of all work and dewatering necessary to control water during the excavation and demolition of the existing structure and the construction of the proposed structure at the following locations:

Location 1: Culvert construction at STA 27+72
Location 2: Culvert extension at STA 65+30

Water shall be diverted and controlled in such a way that all existing and proposed elements are removed and constructed completely in the dry.

The operations of Control of Water neither shall cause the accumulation of siltation nor any adverse effect to the water or the environment. As much work as possible shall be conducted from outside the stream banks.

All work-in-water operations shall be completed in accordance all applicable environmental permits.

The temporary control of water systems shall be non-permanent, which does not harm the ecology of the brook, land under water, and surrounding land and shall be comprised bulk sand bags or portable cofferdams or other approved impervious curtains, and dewatering to facilitate construction activities. Operations of Control of Water shall not adversely affect the quality of the required construction.

Work under this Item also includes pumping operations, sandbags, portable cofferdams, filter fabrics, stone, sedimentation/retention tanks and all other means to collect, settle, and discharge water during construction.

As part of the work under this item, it is the responsibility of the Contractor to determine the need and extent of dewatering required.

Special care shall be given to minimize disturbance to the brook and adjacent banks.

ITEM 991.11 and 991.12 (Continued)

Submittals

Prior to the commencement of any work at the site, the Contractor shall submit to the Engineer for review and approval, a detailed plan for water control. The submittals shall include working drawings and calculations. Detailing the methods and materials proposed to account for all anticipated loads and construction conditions necessary to permit the work while maintaining a safe work area and protecting property from damage.

The Water Control Plan shall include a Sedimentation and Erosion Control Plan and a Water Flow Diversion and Containment Plan. The plans shall be adequate in detail to define specifics regarding materials, sizes, connections and incidental items associated with the work. The furnishing of such plans shall not serve to relieve the Contractor's responsibility for the safety of the work or his/her responsibility for the successful completion of the project.

The Contractor shall make his/her own evaluation of existing conditions, groundwater level, water flow, the effects of his/her proposed temporary works and construction methods, and shall provide in his/her design for all loads and construction conditions necessary to permit construction of the specified structures while maintaining public safety, and protecting completed work and all third party property from damage due to his operations.

Sedimentation and Erosion Control Plan:

The Contractor shall submit to the Engineer, plans and details of the intended sedimentation/retention tank system that will be used along with dewatering techniques, and its location at the bridge site. All discharge resulting from dewatering activities shall be directed to temporary sedimentation/retention tank at locations approved by the Engineer. At no time shall said discharge be directly released into the resource areas. The proposed plan shall include methods and equipment necessary to discharge water from the sedimentation treatment basins. Sedimentation/retention tank shall be sized appropriately to adequately dewater from the proposed work zone while allowing sufficient time for sediments to settle out of the water, and with a depth such that a minimum of 18 inches of freeboard is maintained throughout its use.

ITEM 991.11 and 991.12 (Continued)

Water Flow Diversion and Containment Plan:

The Contractor shall submit plans and details along with a complete description showing any proposed systems for control of water and dewatering plan to the Engineer for his approval prior to the start of the work. The proposed plan shall include methods and equipment necessary to perform the work and shall include water discharge methods and equipment to bring water from the work zone to sedimentation/retention tank.

Methods

This work shall also include dewatering the existing culverts as needed to conduct the work.

The system shall be designed so that there are no adverse effects on the adjacent properties. The control of water system shall be sized in such a way that the system is overtopped with elevated brook water before any adjacent properties are inundated.

Where sandbags are used, the bags shall not decay nor rip or tear during the installation, its service life within the waterway, or during the removal process. The Contractor shall not disturb the stream bed in order to avoid migration of silts and sands further downstream. All in-stream work required to install, adjust and remove the control of water system must be performed by hand or by hoisting equipment positioned upland. The Contractor is responsible for researching the seasonal groundwater levels and flow characteristics of the stream to determine appropriate details.

Measures to control the discharge of sediment or pollutants into the water resource areas shall include, but not be limited to the following:

1. Site construction areas outside the buffer zones and on relatively flat ground.
2. Management of construction operations involving hazardous materials, such as refueling and maintenance of equipment within the resource areas.
3. Formulation of contingency plans to control accidental spillage from potentially hazardous materials.
4. Installation and continuous maintenance of water control measures throughout the project.
5. Treatment of all discharge resulting from dewatering activities through a sedimentation/retention tank to control turbidity. At no time shall the discharge from dewatering activities be directly released into a resource area.
6. Perform as much work as possible outside the stream banks.
7. Scheduling of work within the resource areas to avoid periods of high flood (e.g., spring floods) and inclement weather.

These measures shall be maintained for the duration of the contract.

ITEM 991.11 and 991.12 (Continued)

The locations of any sedimentation/retention tank will be determined by the Contractor based on the selected methods of construction. Placement of the tank shall be in an upland area that is within the existing right of way and temporary easements.

A sumping basin shall be constructed to collect any stream waters able to bypass the diversion system that may enter any work areas. The basin shall be equipped with a pump to convey waters to a sedimentation/retention tank. Water shall be discharged downstream after passing through the sumping basin and sedimentation/retention tank. No waters pumped from the work areas shall be discharged back to the brook until sediment is filtered using the sedimentation/retention tank.

All dewatering and related water control work shall be conducted in such a manner as to prevent siltation or contamination of the waterway. At a minimum, the sedimentation/retention tank shall be constructed of an earthen berm lined with geotextile fabric and surrounded by staked hay bales. The tank shall meet or exceed the following criteria:

1. The size and location of the tank shall be determined based on the size of the Contractor's pump and the anticipated groundwater levels.
2. The outlet/weir of the sedimentation/retention tank shall not cause erosion of the surrounding area. An approved method of controlling erosion, such as an erosion control blanket, stone, etc., shall be used at the outlet of the tank.
3. The Contractor shall not allow any sediment within the sedimentation/retention tank to accumulate to a depth of greater than 12 inches at any point in the tank, nor shall the water level be allowed to rise to a height of more than 24 inches.
4. The sedimentation/retention tank shall be designed with a minimum of 18 inches of freeboard, which must be maintained at all times.
5. The Contractor shall inspect the sedimentation/retention tank at least daily when in operation.
6. Damages shall be repaired immediately.
7. The sedimentation/retention outlet shall be cleaned daily.
8. The sediments within the sedimentation/retention tank shall be disposed of as approved by the Engineer.

Upon completion of water control, the materials and equipment used to maintain the cofferdam(s) (if needed) and sumping basin(s) and sedimentation/retention tank (including the temporary riprap for dewatering discharge) shall become the property of the Contractor and shall be removed by the Contractor from the site. The area affected shall be restored to its natural condition in a manner subject to the Engineer's approval.

The Contractor is advised that the effectiveness of the water control method used will vary based on the field conditions and the time at which the actual excavation work is being performed. The Engineer has the right to order the Contractor to stop all excavation operations when in his judgment the Contractor's water control operations are failing to produce adequate results or are posing a threat to the environment.

ITEM 991.11 and 991.12 (Continued)

BASIS OF PAYMENT

Control of Water will be paid for at the Contract unit price per LUMP SUM, which shall include all labor, materials, equipment, engineering and incidental costs required to complete the work as indicated on the Contract Documents. Any riprap used for dewatering discharge shall be considered incidental to the work and shall be paid for under this Item.

In general, the payment method for Item 991.11 and 991.12 is partial progressive payment of the LUMP SUM Contract Bid Price of this Item. The partial payment schedule will be as follows:

- The first payment of Item 991.11 (60% of the Item 991.11 Lump Sum bid price) will be made upon complete installation of the water control system for stream restoration Area 1/2 to the satisfaction and approval of the Engineer.
- The first payment of 991.12 (60% of the Item 991.12 Lump Sum bid price) will be made upon complete installation of the water control system for stream restoration Area 3/4 to the satisfaction and approval of the Engineer.
- The final payments of Item 991.11 and 991.12 (40% of the respective Lump Sum bid prices) will be made upon the satisfactory removal of the water control systems after construction is complete.

All adjustments and repositioning of water control shall be considered as included under this item.

No separate payment will be made for the removal and disposal of the sediment material collected from the dewatering systems, but all costs in connection therewith shall be included in the Contract unit price bid.

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