



Franklin Line Double Track Project – Phase II

Request for Determination of Applicability

Norfolk, MA

April 30, 2020

Prepared by:



Boston, MA

Prepared for:

Keolis Commuter Services, LLC
Boston, Massachusetts



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Request for Determination Application

- RDA Form
- RDA Supplemental Narrative
- Appendices



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WPA Form 1- Request for Determination of Applicability

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

A. General Information

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



1. Applicant:

<u>Clary Coutu, Keolis Commuter Services, LLC</u> Name	<u>clary.coutu@keoliscs.com</u> E-Mail Address	
<u>470 Atlantic Avenue</u> Mailing Address		
<u>Boston</u> City/Town	<u>MA</u> State	<u>02210</u> Zip Code
<u>617-222-8009</u> Phone Number	_____ Fax Number (if applicable)	

2. Representative (if any):

<u>HDR Engineering, Inc.</u> Firm		
<u>Nick Henke</u> Contact Name	<u>Nicholas.Henke@hdrinc.com</u> E-Mail Address	
<u>99 High Street, Suite 2300</u> Mailing Address		
<u>Boston</u> City/Town	<u>MA</u> State	<u>02110</u> Zip Code
<u>617-357-7705</u> Phone Number	_____ Fax Number (if applicable)	

B. Determinations

1. I request the Norfolk Conservation Commission make the following determination(s). Check any that apply:

- a. whether the **area** depicted on plan(s) and/or map(s) referenced below is an area subject to jurisdiction of the Wetlands Protection Act.
- b. whether the **boundaries** of resource area(s) depicted on plan(s) and/or map(s) referenced below are accurately delineated.
- c. whether the **work** depicted on plan(s) referenced below is subject to the Wetlands Protection Act.
- d. whether the area and/or work depicted on plan(s) referenced below is subject to the jurisdiction of any **municipal wetlands ordinance** or **bylaw** of:

Name of Municipality

- e. whether the following **scope of alternatives** is adequate for work in the Riverfront Area as depicted on referenced plan(s).



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C. Project Description

1. a. Project Location (use maps and plans to identify the location of the area subject to this request):

<u>MBTA Franklin Line Right-of-Way</u>	<u>Norfolk</u>
Street Address	City/Town
<u>N/A</u>	<u>N/A</u>
Assessors Map/Plat Number	Parcel/Lot Number

- b. Area Description (use additional paper, if necessary):

Activities associated with the Franklin Line Double Track Project (Phase II) that are covered under this RDA are located from Rockwood Road to the Norfolk/Franklin town line (approximately 2.5 miles). All work will be contained to the previously disturbed railroad ballast and embankment areas within the railroad right-of-way. No direct impact to Bordering Vegetated Wetland, Bank, Land under Water Bodies and Waterways, or Bordering Land Subject to Flooding is proposed.

- c. Plan and/or Map Reference(s):

<u>Franklin Double Track Project - Environmental Plans, (Sheets G-001, EN-01 to EN-13)</u>	<u>April 30, 2020</u>
Title	Date
<u> </u>	<u> </u>
Title	Date

2. a. Work Description (use additional paper and/or provide plan(s) of work, if necessary):

See Attached Supplemental Narrative



WPA Form 1- Request for Determination of Applicability

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

C. Project Description (cont.)

b. Identify provisions of the Wetlands Protection Act or regulations which may exempt the applicant from having to file a Notice of Intent for all or part of the described work (use additional paper, if necessary).

Impacts associated with replacement of Br. 24.43, a culvert that conveys Stream 2 beneath the railroad track and ballast, are exempted from regulation under the Wetlands Protection Act through Chapter 79 of the Acts of 2014, the Transportation Bond Bill (Bridge Exemption).

3. a. If this application is a Request for Determination of Scope of Alternatives for work in the Riverfront Area, indicate the one classification below that best describes the project.

- Single family house on a lot recorded on or before 8/1/96
- Single family house on a lot recorded after 8/1/96
- Expansion of an existing structure on a lot recorded after 8/1/96
- Project, other than a single family house or public project, where the applicant owned the lot before 8/7/96
- New agriculture or aquaculture project
- Public project where funds were appropriated prior to 8/7/96
- Project on a lot shown on an approved, definitive subdivision plan where there is a recorded deed restriction limiting total alteration of the Riverfront Area for the entire subdivision
- Residential subdivision; institutional, industrial, or commercial project
- Municipal project
- District, county, state, or federal government project
- Project required to evaluate off-site alternatives in more than one municipality in an Environmental Impact Report under MEPA or in an alternatives analysis pursuant to an application for a 404 permit from the U.S. Army Corps of Engineers or 401 Water Quality Certification from the Department of Environmental Protection.

b. Provide evidence (e.g., record of date subdivision lot was recorded) supporting the classification above (use additional paper and/or attach appropriate documents, if necessary.)



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

D. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Request for Determination of Applicability and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge.

I further certify that the property owner, if different from the applicant, and the appropriate DEP Regional Office were sent a complete copy of this Request (including all appropriate documentation) simultaneously with the submittal of this Request to the Conservation Commission.

Failure by the applicant to send copies in a timely manner may result in dismissal of the Request for Determination of Applicability.

Name and address of the property owner:

Massachusetts Bay Transportation Authority (MBTA), Attn: Holly Palmgren
 Name
 10 Park Plaza, 6th Floor
 Mailing Address
 Boston
 City/Town
 MA
 State
 02116
 Zip Code

Signatures:

I also understand that notification of this Request will be placed in a local newspaper at my expense in accordance with Section 10.05(3)(b)(1) of the Wetlands Protection Act regulations.

Clary Coutts, Dir Environmental Compliance
 Signature of Applicant
 Date 4/30/2020

[Signature]
 Signature of Representative (if any)
 Date 4/30/2020



RDA Narrative and Supporting Information



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Contents

1	Project Description	1
1.1	Project Plans	1
2	Wetland Resource Area Determination Methodology	1
2.1	Wetland Investigations	2
3	Resource Areas.....	2
3.1	Wetland Resource Areas	2
3.1.1	Bordering Vegetated Wetlands (BVW).....	2
3.1.2	Buffer Zone.....	3
3.1.3	Bank	3
3.1.4	Land under Water Bodies and Waterways (LUWW).....	3
3.1.5	Bordering Land Subject to Flooding (BLSF)	3
3.1.6	Riverfront Area (RA).....	3
3.2	Project Impacts.....	4
3.2.1	Resource Areas Impacts	4
3.2.2	Rare Species	5
3.2.3	Outstanding Resource Waters	5
3.2.4	Areas of Critical Environmental Concern	5
3.3	Project Mitigation Measures	5
3.3.1	Erosion and Sedimentation Controls.....	5
4	Summary	6

Appendices

Appendix A: Figures

Figure 1 - USGS Locus Map

Figure 2 - FEMA Map

Figure 3 - NHESP Map

Appendix B: Environmental Plans

Appendix C: Wetland Summary Report

List of Acronyms

ACEC	Area of Critical Environmental Concern
BFE	base flood elevation
BLSF	Bordering Land Subject to Flooding
BMP	Best Management Practice
BVW	Bordering Vegetated Wetland
CWA	Clean Water Act
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
HDR	HDR Engineering, Inc.
LUWW	Land under Water Bodies and Waterways
MassDEP	Massachusetts Department of Environmental Protection
MassGIS	Massachusetts Office of Geographic Information
NHESP	Massachusetts Natural Heritage and Endangered Species Program
ORW	Outstanding Resource Waters
RA	Riverfront Area
RDA	Request for Determination of Applicability
ROW	right-of-way
SFHA	special flood hazard area
sf	square feet
Supplement	Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0
USACE	U.S. Army Corps of Engineers
WPA	Massachusetts Wetlands Protection Act
WQS	Massachusetts Surface Water Quality Standards



1 Project Description

The overall Franklin Line Double Track Project (Phase II) proposed by Keolis Commuter Services/MBTA, involves constructing a second track within a 4.0 mile length of the MBTA ROW for the Franklin Branch from Norfolk station to the existing double track near Longfellow Drive in Franklin. The project proposes to restore a former second track, which was originally built in 1910 and later removed, on the existing embankment and ROW. The new track will be installed over existing and new subgrade and twelve inches of ballast. New drainage ditches or perforated underdrain pipes will be installed on the north side adjacent to the tracks in areas to collect and divert drainage to the closest existing culvert or other existing discharge points. The roadbed will be graded to meet the existing embankment. Three special trackwork crossovers will be installed connecting the two tracks. Three new signal houses will be installed. A two-track grade crossing will be constructed at Rockwood Road. Two culverts will be replaced (one in Norfolk, one in Franklin) however these activities are exempted from regulation under the Wetlands Protection Act through Chapter 79 of the Acts of 2014, the Transportation Bond Bill (Bridge Exemption).

1.1 Project Plans

Environmental Plans depicting the project limits of work and adjacent resource areas are included with this RDA in Appendix B.

2 Wetland Resource Area Determination Methodology

On March 12, 2020, a HDR Engineering, Inc. (HDR) environmental/wetland scientist, on behalf of Keolis, conducted on-site evaluations to identify, map and characterize existing wetland resource areas located within the railroad right-of-way and proximate to the planned project. Based on these investigations, HDR determined that the wetland resource areas associated with the project setting include Bordering Vegetated Wetland (BVW), Bank, Land under Water Bodies and Waterways (LUWW), Bordering Land Subject to Flooding (BLSF), and Riverfront Area (RA). The 100-foot Buffer Zone extends from the BVW and Bank boundaries, while the 200-foot RA extends from the top-of-bank line boundaries associated with the Mill River.

The extent of wetland resource areas was confirmed through observations of existing plant communities, the presence and extent of hydric and upland soils, and hydrologic indicators in accordance with the criteria for federal and state jurisdictional wetlands and watercourses pursuant to the currently accepted federal methodology provided in the United States Army Corps of Engineers (USACE) *Wetlands Delineation Manual* (Environmental Laboratory 1987), *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0* (USACE

2012), and the Massachusetts Wetlands Protection Act (WPA) and its implementing regulations.

2.1 Wetland Investigations

Following a review of available background resource information, a HDR environmental/wetland scientist performed systematic field surveys of the project limits on March 12, 2020 to identify, map, and describe the locations and extent of wetland resource areas within and immediately adjacent to the project limits. In wetland resource areas, once the approximate boundary of the resource was determined, the scientist identified the edges of the resource, shown either as an open or closed shape depending upon how extensive and far from the railroad right-of-way the wetland extended. Sequentially numbered flagging (orange for BVW and blue for Bank) were used to demarcate resource areas which were then surveyed using a sub-meter accuracy GPS.

3 Resource Areas

3.1 Wetland Resource Areas

The wetland resource areas along the project route are regulated under Federal, State and Local regulatory programs including:

- Section 404 of the Clean Water Act (CWA) which is administered by the USACE;
- Section 401 of the CWA which is overseen by the MassDEP; and
- Massachusetts WPA and 310 CMR 10.00 which is administered by the Local Conservation Commission or (upon appeal) by MassDEP.

There are several wetland resource areas or drainages that directly abut and/or cross under the Franklin Line railroad right-of-way. These areas are identified in Appendix B – Environmental Plans, and discussed in detail in Appendix C – Wetland Summary Report.

The following sections describe jurisdictional areas associated with the project.

3.1.1 Bordering Vegetated Wetlands (BVW)

As previously mentioned, a delineation of the wetland boundaries in the vicinity of the project site was completed in accordance with the criteria for federal and state jurisdictional wetlands and watercourses according to the USACE guidelines pursuant to § 404 of the CWA and the WPA and its implementing regulations. These wetlands are identified as “Wetland 1 through Wetland 9” and are depicted on the Environmental Plans located in Appendix B and are described in further detail in Appendix C, Wetland Summary Report.



3.1.2 Buffer Zone

The WPA regulations (310 CMR 10.02(2)(b)) establish a 100-foot buffer zone from the limits of BVW and Bank. In the vicinity of the project area the Buffer Zone consists of wooded, residential, and maintained areas associated with the railroad right-of-way, and its related appurtenances.

3.1.3 Bank

There is one perennial watercourse, the Mill River, and several intermittent streams within and adjacent to the project limits, which have an associated Bank.

3.1.4 Land under Water Bodies and Waterways (LUWW)

There is one perennial watercourse, the Mill River and two ponds, adjacent to the project limits, which have associated LUWW.

3.1.5 Bordering Land Subject to Flooding (BLSF)

The extent of BLSF is based on published Federal Emergency Management Agency (FEMA) base flood elevations, which estimate the elevations to which water will flood during a 100-year storm event. Any area below this elevation to the Bank of a corresponding waterway or waterbody is BLSF. Figure 2 shows the FEMA flood zones adjacent to the project location.

HDR determined flood elevations for areas subject to inundation by the 1.0% annual chance flood event using a hierarchy of data sources. For locations within special flood hazard area (SFHA) Zone AE (an area of detailed study and flood elevations are specified), HDR used the base flood elevation (BFE) specified on the FEMA Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS). BLSF areas identified adjacent the project limits are associated with the Mill River.

Per the FIRMs for the Town of Norfolk, Massachusetts, Norfolk County, Panel 25021C0321E dated July 17, 2012, and confirmed using the FEMA National Flood Hazard Layer available from MassGIS, one portion of the project is located adjacent to the 100-year floodplain. The Mill River floodplain adjacent to the project limits, has varying 100-year flood elevations ranging from 150 feet (NAVD 88) on the north side of the right-of-way to 154 feet (NAVD 88) on the south side of the right-of-way.

3.1.6 Riverfront Area (RA)

As defined in 310 CMR 10.58(2)(a)3, RA is “the area of land between a [perennial] river’s mean annual high-water line measured horizontally outward from the river and a parallel line located 200 feet away, except that the parallel line is located: 25 feet away in Boston, Brockton, Cambridge...” Based on the definition in 310 CMR 10.58(2)(a)(1)(b), streams identified as intermittent do not contain RA. The Mill River is a perennial watercourse and has associated RA.

3.2 Project Impacts

The project has been designed to avoid direct bordering vegetated wetland resource area impacts. The proposed work will not impact BVW, BLSF, LUWW, or Bank; however, work will occur in RA and Buffer Zone. Work will take place within previously degraded/disturbed/maintained areas within the railroad right-of-way. The project has been designed to improve upon existing stormwater conditions by reducing stormwater ponding and providing conveyances to existing stormwater outfall locations. There will be no increased degradation of the on-site or adjacent wetland resources or Buffer Zones.

3.2.1 Resource Areas Impacts

3.2.1.1 Bordering Vegetated Wetlands

The proposed project will not impact BVW.

3.2.1.2 Buffer Zone

Impacts in the Buffer Zone in areas of the project are unavoidable, as the Railroad right-of-way is adjacent to wetland resource areas and currently located in buffers. Therefore, avoidance of work in the Buffer Zone is not possible. Portions of the work are located within the 100-foot Buffer Zone to both BVW and Bank. Work areas within Buffer are expected to total approximately 130,000 square feet (sf) of area previously disturbed by rail bed and ballast. Erosion and sediment control Best Management Practices (BMPs) will be installed during construction to protect adjacent resource areas. These BMPs target the land disturbance within the Buffer Zone to not impact adjacent resource areas and will secure the protection of those interests.

3.2.1.3 Bank

The proposed project will affect the bank associated with Stream 2 for replacement of the culvert that conveys this stream under the tracks, however this work is exempted from regulation under the Wetlands Protection Act through Chapter 79 of the Acts of 2014, the Transportation Bond Bill (Bridge Exemption).

3.2.1.4 Land under Water Bodies and Waterways (LUWW)

The proposed project will not impact LUWW.

3.2.1.5 Bordering Lands Subject to Flooding (BLSF)

The project will not result in work within BLSF associated with the Mill River and construction phase measures will take place to protect this this resource from the adjacent work.



3.2.1.6 Riverfront Area (RA)

The 200-foot RA in areas of proposed work is associated with the Mill River and consists of previously disturbed and developed areas within the existing railroad right-of-way. In accordance with the WPA (310 CMR 10.58(5)), work within previously developed RA may include ‘replacement, rehabilitation or expansion of existing structures, improvement of existing roads, or reuse of degraded or previously developed areas’. This project will result in some unavoidable construction related impacts to RA for a total of approximately 27,000 sf of impact, approximately 12,000 sf of which is in the inner 100 ft portion of the RA.

3.2.2 Rare Species

A portion of the project area is recognized by the NHESP as a BioMap2 Core Habitat for two species of conservation concern; Four-toed Salamander (*Hemidactylium scutatum*) and Spotted Turtle (*Clemmys guttata*) (NHESP 2012). NHESP has designated a portion of the project area as Estimated Habitat of Rare Wildlife (EH 727) and Priority Habitat of Rare Species (PH 896) (See Figure 3 in appendix A). Approximately half of the project area in Norfolk will occur within and adjacent to these areas, however work will be contained to the previously disturbed railroad ballast and embankment areas within the railroad right-of-way and as a result, there are no expected impacts to these habitat areas or species that may reside within.

3.2.3 Outstanding Resource Waters

Per MassGIS online data mapping, the project area is not located within any Outstanding Resource Waters (ORWs), as defined in the Massachusetts Surface Water Quality Standards (WQS), 314 CMR 4.00 (WQS).

3.2.4 Areas of Critical Environmental Concern

Per MassGIS online data mapping, the project area is not located within an Area of Critical Environmental Concern (ACEC).

3.3 Project Mitigation Measures

Keolis is proposing mitigation measures to prevent short- and long-term impacts to wetland resource areas. Mitigation measures proposed for this project include erosion and sedimentation controls to protect adjacent resource areas.

3.3.1 Erosion and Sedimentation Controls

Keolis will implement an erosion and sedimentation control program to minimize temporary impacts to wetland resource areas during the construction phase of the project. The program incorporates Best Management Practices (BMPs) specified in

guidelines developed by the MassDEP¹ and the U.S. Environmental Protection Agency (EPA)².

Proper implementation of the erosion and sedimentation control program will:

- minimize exposed soil areas through sequencing and temporary stabilization;
- place structures to manage stormwater runoff and erosion; and,
- establish a permanent vegetative cover or other forms of stabilization as soon as practicable.

In compliance with the provisions of the Clean Water Act, 33 U.S.C. §1251 et. seq., Keolis has submitted a Notice of Intent (NOI) seeking a National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges from Construction Activities (CGP). As part of this permit process, Keolis has developed a Stormwater Pollution Prevention Plan (SWPPP) with identifies, among many other things, methods for executing proper erosion and sedimentation control, as well as, procedures for inspection, maintenance, and corrective action if necessary.

4 Summary

Keolis is proposing to construct a second track within a 4.0 mile length of the MBTA ROW for the Franklin Branch from Norfolk station to the existing double track near Longfellow Drive in Franklin. The project proposes to restore a former second track, which was originally built in 1910 and later removed, on the existing embankment and ROW. The new track will be installed over existing and new subgrade and twelve inches of ballast. New drainage ditches or perforated underdrain pipes will be installed on the north side adjacent to the tracks in areas to collect and divert drainage to the closest existing culvert or other existing discharge points. The roadbed will be graded to meet the existing embankment. Three special trackwork crossovers will be installed connecting the two tracks. Three new signal houses will be installed. A two-track grade crossing will be constructed at Rockwood Road. Two WPA exempt culverts will be replaced (one in Norfolk, one in Franklin).

The project proposes work within the 200-foot RA of the Mill River and the 100-foot buffer zone to BVW and Bank. Impacts to these resources areas will be contained to the previously disturbed railroad ballast and embankment areas within the railroad right-of-way and serve to replace a second track that previously existed in these locations. Additionally, stormwater improvements are incorporated into this project to provide improvements over existing conditions.

Keolis respectfully requests that the Norfolk Conservation Commission find the proposed project and measures detailed in the RDA would not negatively affect the protected

¹ MassDEP 1997. Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas: A Guide for Planners, Designers, and Municipal Officials.

² EPA 2007. Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Sites. Office of Water. Report EPA 833-R-060-04.



resources, and is not applicable under the WPA and not in conflict with interests identified in the WPA in any way. As such, Keolis seeks a Negative Determination approving the work described in the RDA and attachments.



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Appendix A - Figures



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Project Location
 42.110481°N, 71.351791°W

LEGEND

 Project Limits

DATA SOURCE: esri, USGS



0 Miles 0.25

MAP INFORMATION WAS COMPILED FROM THE BEST AVAILABLE PUBLIC SOURCES. NO WARRANTY IS MADE FOR ITS ACCURACY AND COMPLETENESS



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Project Location
 42.110481°N, 71.351791°W

LEGEND

- Potential Vernal Pools
- Certified Vernal Pools
- Project Limits
- NHESP Estimated Habitats of Rare Wildlife and NHESP Priority Habitats of Rare Species
- Perennial Stream
- Intermittent Stream
- Shoreline
- Pond, Lake, Ocean
- Wetland

DATA SOURCE: esri, MassGIS, USGS, NHESP, MassDEP

0 Miles 0.25

MAP INFORMATION WAS COMPILED FROM THE BEST AVAILABLE PUBLIC SOURCES. NO WARRANTY IS MADE FOR ITS ACCURACY AND COMPLETENESS.



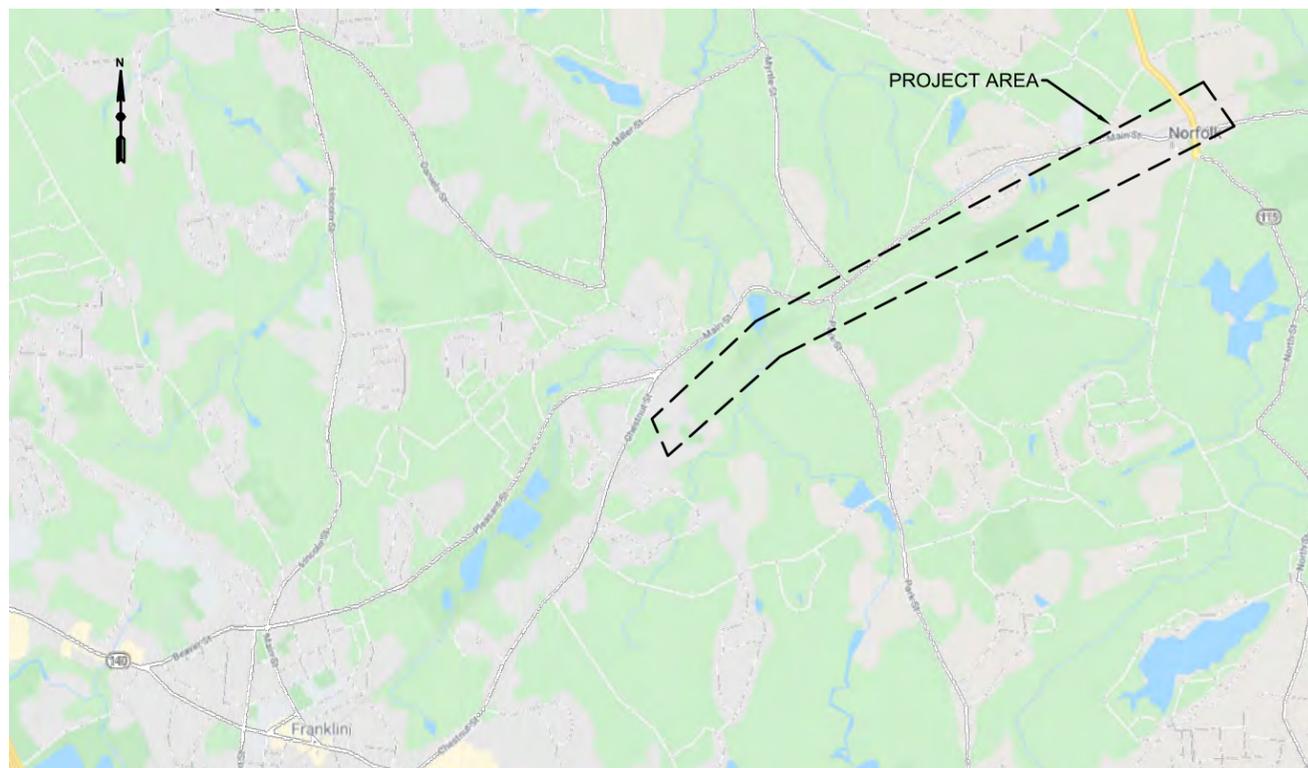
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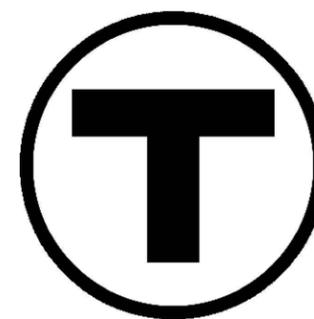
Appendix B – Environmental Plans



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LOCATION PLAN (NOT TO SCALE)



MASSACHUSETTS
BAY
TRANSPORTATION
AUTHORITY

FRANKLIN DOUBLE TRACK PROJECT

ROCKWOOD ROAD TO
NORFOLK-FRANKLIN TOWN LINE

NORFOLK, MA

ENVIRONMENTAL PLANS

APRIL 30, 2020



99 HIGH STREET
SUITE 2300
BOSTON, MA 02110-2379

EROSION & SEDIMENT CONTROL NOTES:

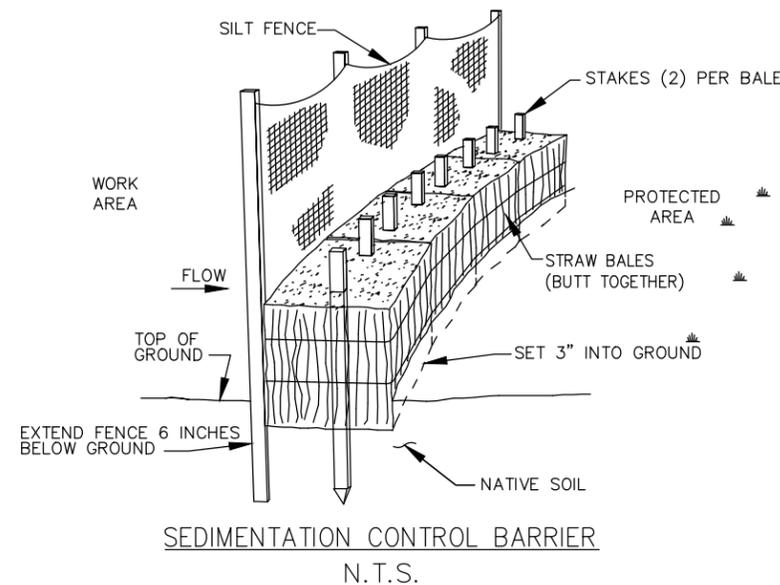
1. THE CONTRACTOR IS RESPONSIBLE FOR CONTROLLING THE EROSION AND SEDIMENT DURING THE CONSTRUCTION PROCESS. THE CONTRACTOR MUST ENSURE THAT THE PROJECT SPECIFICATIONS THAT ARE DEVELOPED IN THE FIELD MEET THE MINIMUM REQUIREMENTS OF THE ENVIRONMENTAL AGENCIES.
2. IN ORDER TO MINIMIZE EROSION AND SEDIMENT RUNOFF FROM THE SITE, THE CONTRACTOR SHOULD MAINTAIN EXISTING VEGETATION WHERE POSSIBLE AND STABILIZE THE DISTURBED PORTIONS OF THE SITE AS QUICKLY AS POSSIBLE. THIS MAY INCLUDE PHASING THE PROJECT AS NEEDED TO MINIMIZE THE SIZE OF THE DISTURBED AREAS ON THE SITE.
3. THE CONTRACTOR MUST ALSO ANTICIPATE INCREASED RUNOFF FROM STEEPER SLOPES AND DURING HIGH GROUNDWATER CONDITIONS. THIS MAY OCCUR DURING THE WET SEASON (TYPICALLY MARCH THROUGH APRIL) OR AFTER SIGNIFICANT PRECIPITATION EVENTS.
4. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION OF SILT FENCES, DRAINAGE SWALES, EARTH DIKES, TEMPORARY SETTLING BASINS, CHECK DAMS AND TEMPORARY OR PERMANENT SEDIMENT BASINS. THESE PRACTICES DIVERT FLOWS FROM EXPOSED SOILS, LIMIT RUNOFF AND THE DISCHARGE OF POLLUTANTS FROM EXPOSED AREAS OF THE SITE TO THE DEGREE ATTAINABLE.
5. THE CONTRACTOR SHALL, AT ALL TIMES, HAVE A STOCKPILE OF COMPOST FILTER TUBES ADEQUATE TO REINFORCE/REPLACE EROSION AND SEDIMENT CONTROL AS NEEDED.
6. ALL AREAS OF DISTURBANCE MUST HAVE TEMPORARY OR FINAL STABILIZATION WITHIN 14 DAYS OF THE INITIAL DISTURBANCE. AFTER THIS TIME, ANY DISTURBANCE IN THE AREA MUST BE STABILIZED AT THE END OF EACH WORK DAY. THE FOLLOWING EXCEPTIONS APPLY:
 - i) STABILIZATION IS NOT REQUIRED IF WORK IS TO CONTINUE IN THE AREA WITHIN THE NEXT 24 HOURS AND THERE IS NO PRECIPITATION FORECAST FOR THE NEXT 24 HOURS.
 - ii) STABILIZATION IS NOT REQUIRED IF THE WORK IS OCCURRING IN A SELF-CONTAINED EXCAVATION WITH A DEPTH OF 2 FEET OR GREATER.

CONSTRUCTION NOTES FOR STAKED STRAW BALES:

BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF 3 INCHES. BALES SHALL BE SECURELY ANCHORED IN PLACE BY STAKES OR RE-BARS DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE SHALL BE ANGLED TOWARD PREVIOUSLY PLACED BALE TO FORCE THE BALES TOGETHER. INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS DIRECTED BY THE ENGINEER. BALES SHALL BE REMOVED WHEN THE WORK HAS BEEN COMPLETED AND OR GROUND HAS STABILIZED, AND SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

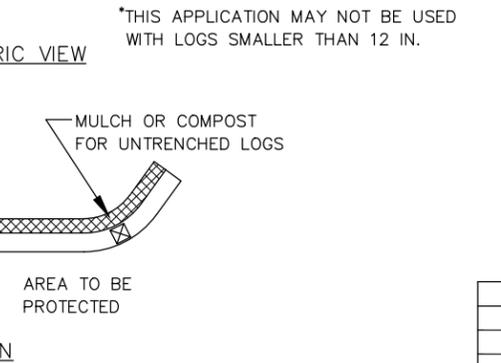
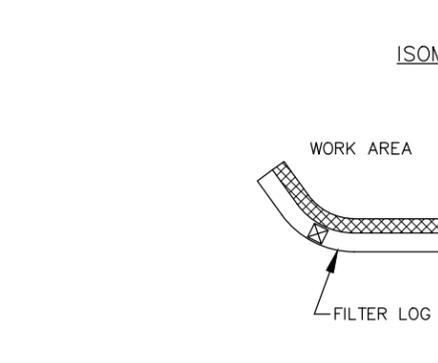
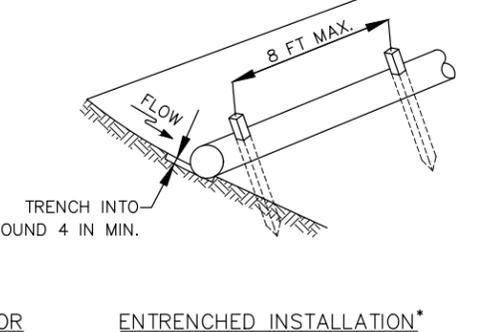
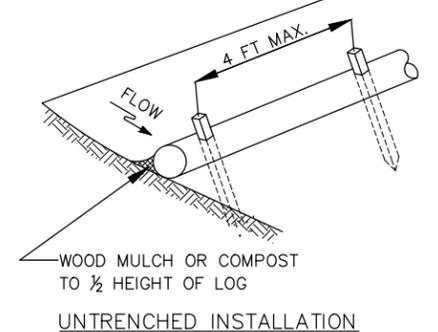
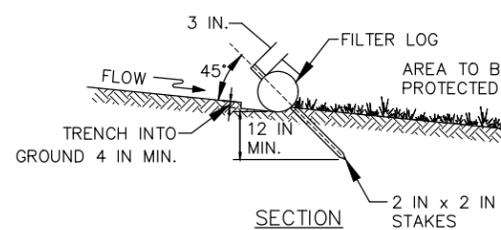
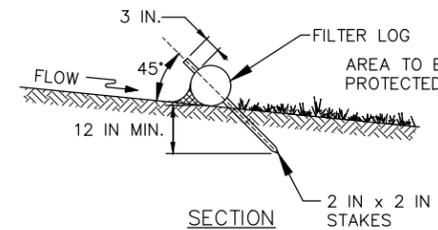
CONSTRUCTION NOTES FOR SILTATION AND EROSION CONTROL:

1. EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO INITIATING GROUND DISTURBANCE TO PREVENT SEDIMENT LADEN WATER FROM LEAVING THE SITE.
2. AREAS SUBJECT TO EROSION SHALL BE MINIMIZED IN TERMS OF TIME AND AREA.
3. IN GENERAL, WORK REQUIRING EROSION CONTROL INCLUDES EXCAVATIONS, FILLS, DRAINAGE, SWALES AND DITCHES, ROUGH AND FINISH GRADING, AND STOCKPILING OF EARTH.
4. DO NOT DISTURB VEGETATION AND TOPSOIL BEYOND THE PROPOSED LIMIT OF SILT FENCE ACTIVITIES.
5. IF DRAIN INLETS AND CATCH BASINS ARE IN THE DISTURBED AREA, STRAW BALES WILL BE PLACED AROUND EACH STRUCTURE TO PREVENT SILTATION, IF DEEMED NECESSARY BY RESIDENT ENGINEER.
6. THE CONTRACTOR SHALL REMOVE TEMPORARY SILT FENCE AND STRAW BALE DIKES AND ALL ACCUMULATED SILT AND DEBRIS AFTER COMPLETION OF CONSTRUCTION OPERATIONS. STRAW BALE DIKES SHALL BE IN PLACE AT ALL TIMES DURING CONSTRUCTION.
7. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL SILT AND DEBRIS RESULTING FROM CONSTRUCTION OPERATIONS FROM EACH DRAINAGE STRUCTURE UPON COMPLETION OF THE PROJECT.
8. OBJECTS AND/OR AREAS DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION AND ELEVATION.
9. THE CONTRACTOR SHALL REPLACE ANY SECTION OF STRAW BALES OR SILT FENCES DAMAGED DURING ANY PHASE OF CONSTRUCTION.
10. DURING THE COURSE OF CONSTRUCTION, THE CONTRACTOR SHALL ROUTINELY REMOVE ACCUMULATED SILT, SEDIMENT, AND DEBRIS AT AND ALONG THE EROSION AND SEDIMENT CONTROL MEASURES, AS DIRECTED BY THE ENGINEER. CONTRACTOR SHALL ALSO REMOVE ALL ACCUMULATED SILT, SEDIMENT, AND DEBRIS PRIOR TO STORM EVENTS FORECASTED TO HAVE A RAINFALL DEPTH OF ONE-HALF INCH OR GREATER AND FOLLOWING STORM EVENTS OF THE SAME MAGNITUDES.
11. INSPECTION OF ALL EROSION AND SEDIMENT CONTROLS IS REQUIRED ONCE EVERY 7 DAYS AND WITHIN 24-HOURS AFTER 0.25-INCH OR GREATER RAIN EVENTS.



FILTER LOG CONSTRUCTION SPECIFICATIONS

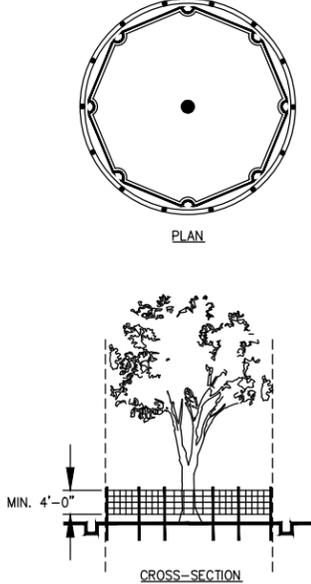
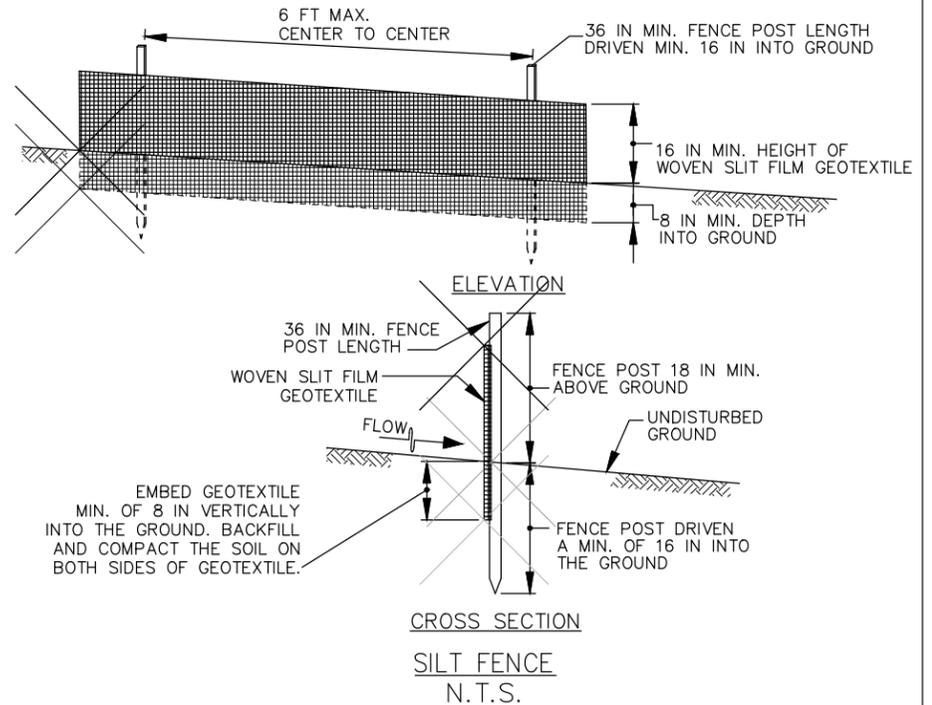
1. PRIOR TO INSTALLATION, CLEAR ALL OBSTRUCTIONS INCLUDING ROCKS, CLODS, AND DEBRIS GREATER THAN ONE INCH THAT MAY INTERFERE WITH PROPER FUNCTION OF FILTER LOG.
2. FILL LOG NETTING UNIFORMLY WITH COMPOST (IN ACCORDANCE WITH SECTION H-1 MATERIALS), OR OTHER APPROVED BIODEGRADABLE MATERIAL TO DESIRED LENGTH SUCH THAT LOGS DO NOT DEFORM.
3. INSTALL FILTER LOGS PERPENDICULAR TO THE FLOW DIRECTION AND PARALLEL TO THE SLOPE WITH THE BEGINNING AND END OF THE INSTALLATION POINTING SLIGHTLY UP THE SLOPE CREATING A "J" SHAPE AT EACH END TO PREVENT BYPASS.
4. FOR UNTRENCHED INSTALLATION BLOW OR HAND PLACE MULCH OR COMPOST ON UPHILL SIDE OF THE SLOPE ALONG LOG.
5. STAKE FILTER LOG EVERY 4 FEET OR CLOSER ALONG ENTIRE LENGTH OF LOG OR TRENCH LOG INTO GROUND A MINIMUM OF 4 INCHES AND STAKE LOG EVERY 8 FEET OR CLOSER.
6. USE STAKES WITH A MINIMUM NOMINAL CROSS SECTION OF 2X2 INCH AND OF SUFFICIENT LENGTH TO ATTAIN A MINIMUM OF 12 INCHES INTO THE GROUND AND 3 INCHES PROTRUDING ABOVE LOG.
7. WHEN MORE THAN ONE LOG IS NEEDED, OVERLAP ENDS 12 INCHES MINIMUM AND STAKE.
8. REMOVE SEDIMENT WHEN IT HAS ACCUMULATED TO A DEPTH OF 1/2 THE EXPOSED HEIGHT OF LOG AND REPLACE MULCH. REPLACE FILTER LOG IF TORN. REINSTALL FILTER LOG IF UNDERMINING OR DISLODGING OCCURS. REPLACE CLOGGED FILTER LOGS. FOR PERMANENT APPLICATIONS, ESTABLISH AND CONTINUOUSLY MEET REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.



FILTER LOG CONTROL BARRIER N.T.S.

SILT FENCE CONSTRUCTION SPECIFICATIONS

1. USE WOOD POSTS 1 1/4 X 1 1/4 ± 1/16 INCH (MINIMUM) SQUARE CUT OF SOUND QUALITY HARDWOOD. AS AN ALTERNATIVE TO WOODEN POST USE STANDARD "T" OR "U" SECTION STEEL POSTS WEIGHING NOT LESS THAN 1 POUND PER LINEAR FOOT.
2. USE 36 INCH MINIMUM POSTS DRIVEN 16 INCH MINIMUM INTO GROUND NO MORE THAN 6 FEET APART.
3. USE WOVEN SILT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS AND FASTEN GEOTEXTILE SECURELY TO UPSLOPE SIDE OF FENCE POSTS WITH WIRE TIES OR STAPLES AT TOP AND MID-SECTION.
4. PROVIDE MANUFACTURER CERTIFICATION TO THE AUTHORIZED REPRESENTATIVE OF THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT THE GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
5. EMBED GEOTEXTILE A MINIMUM OF 8 INCHES VERTICALLY INTO THE GROUND. BACKFILL AND COMPACT THE SOIL ON BOTH SIDES OF FABRIC.
6. WHERE TWO SECTIONS OF GEOTEXTILE ADJOIN: OVERLAP, TWIST, AND STAPLE TO POST IN ACCORDANCE WITH THIS DETAIL.
7. EXTEND BOTH ENDS OF THE SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SILT FENCE.
8. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN SILT FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL FENCE.



TREE PROTECTION BARRIER N.T.S.

TREE PROTECTION NOTES:

1. USE TRENCHER (I.E. DITCH WITCH) TO CUT A 4"-5" W X 18" D TRENCH ALONG DRIP LINE (LIMIT OF CLEARING) AND BACKFILL WITH SAND AND LIGHTLY COMPACT.
2. SPACE STAKES AT INTERVALS SUFFICIENT TO MAINTAIN ALL FENCING OUT OF DRIP LINE OR AS SHOWN BY ENGINEER (SET STAKES NO GREATER THAN 6 FEET ON CENTER-REBAR IS NOT TO BE USED FOR STAKES).
3. MAINTAIN FENCE BY REPAIRING AND/OR REPLACING DAMAGED FENCE. DO NOT REMOVE FENCING PRIOR TO LANDSCAPING OPERATIONS.
4. DO NOT STORE OR STACK MATERIALS, EQUIPMENT, OR VEHICLES WITHIN FENCED AREA.
5. FENCE SHALL BE ORANGE VINYL "SNOW FENCE" 4'-0" HIGH MINIMUM.
6. PROVIDE TEMPORARY IRRIGATION WHERE PRACTICAL AND FEASIBLE.
7. PROVIDE 4" DEEP ORGANIC MULCH OVER ANY UNPROTECTED ROOT ZONE.

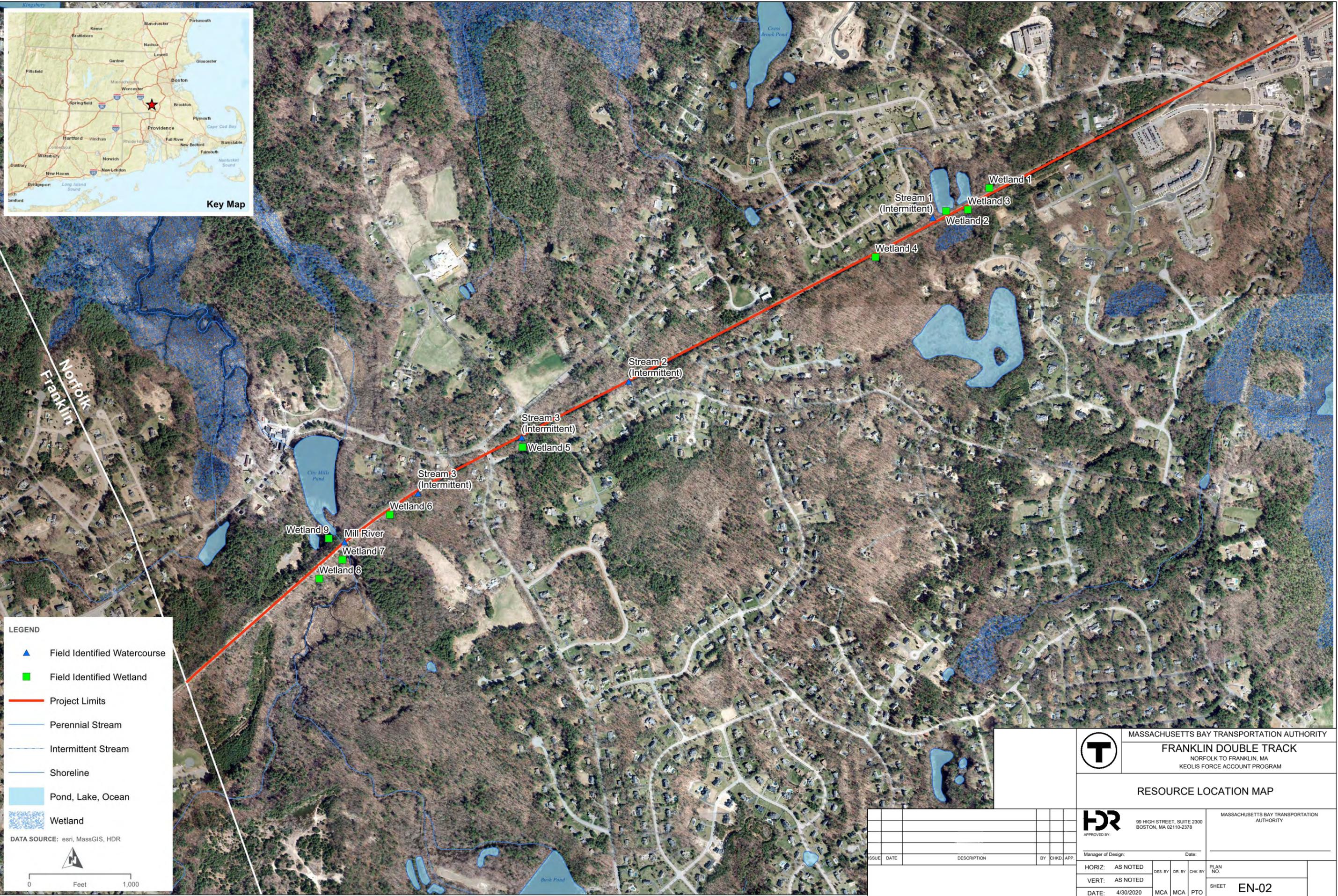
BARRIER CONSTRUCTED TO PROTECT TREE TRUNK, CROWN, AND ROOT SYSTEM FROM INJURY. BARRIERS SHALL BE LOCATED AT THE LIMITS OF THE TREE'S CRITICAL ROOT ZONE (A RADIUS OF ONE AND A HALF FEET PER INCH OF THE TREE'S DIAMETER AT BREST HEIGHT). BARRIER SHALL BE KEPT IN GOOD CONDITION FOR THE DURATION OF THE PROJECT AND IS TO REMAIN IN PLACE UNTIL THE NOTICE OF TERMINATION.

T	MASSACHUSETTS BAY TRANSPORTATION AUTHORITY	
	FRANKLIN DOUBLE TRACK NORFOLK TO FRANKLIN, MA KEOLIS FORCE ACCOUNT PROGRAM	
EROSION CONTROL DETAILS		
HDR APPROVED BY:	99 HIGH STREET, SUITE 2300 BOSTON, MA 02110-2378	
	MASSACHUSETTS BAY TRANSPORTATION AUTHORITY	
Manager of Design:	Date:	
HORIZ: AS NOTED	DES. BY:	DR. BY:
VERT: AS NOTED	MCA	MCA
DATE: 4/30/2020	MCA	PTO
PLAN NO.		EN-01

ISSUE	DATE	DESCRIPTION	BY	CHKD.	APP.



Key Map



LEGEND

- ▲ Field Identified Watercourse
- Field Identified Wetland
- Project Limits
- Perennial Stream
- - - Intermittent Stream
- Shoreline
- Pond, Lake, Ocean
- Wetland

DATA SOURCE: esri, MassGIS, HDR

T MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
FRANKLIN DOUBLE TRACK
 NORFOLK TO FRANKLIN, MA
 KEOLIS FORCE ACCOUNT PROGRAM

RESOURCE LOCATION MAP

HDR 99 HIGH STREET, SUITE 2300
 BOSTON, MA 02110-2378

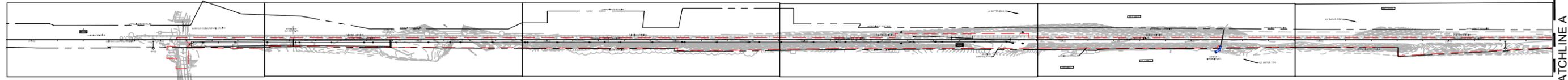
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Manager of Design: _____ Date: _____

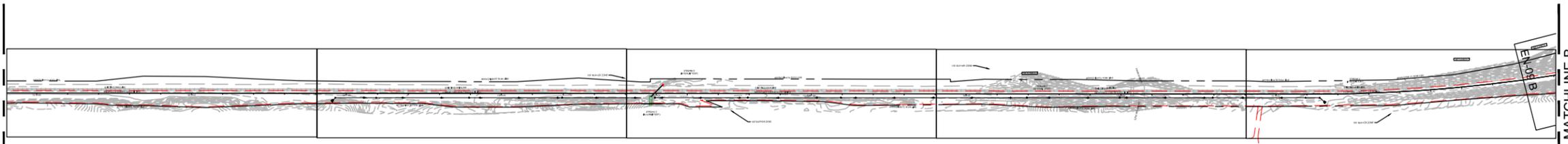
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VERT:	AS NOTED	MCA	MCA	PTO	SHEET EN-02
DATE:	4/30/2020	MCA	MCA	PTO	

ISSUE	DATE	DESCRIPTION	BY	CHKD.	APP.

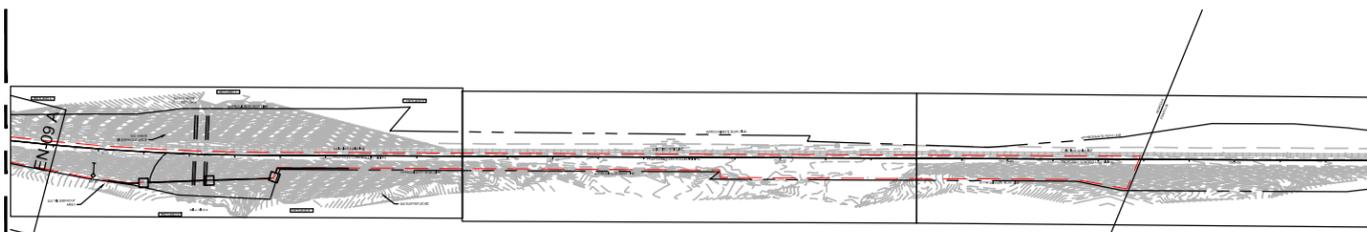
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EN-04 A EN-04 B EN-05 A EN-05 B EN-06 A EN-06 B



EN-07 A EN-07 B EN-08 A EN-08 B EN-09 A



EN-09 B EN-10 A EN-10 B

T MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
FRANKLIN DOUBLE TRACK
 NORFOLK TO FRANKLIN, MA
 KEOLIS FORCE ACCOUNT PROGRAM

KEY PLAN



99 HIGH STREET, SUITE 2300
 BOSTON, MA 02110-2378

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

ISSUE	DATE	DESCRIPTION	BY	CHKD.	APP.

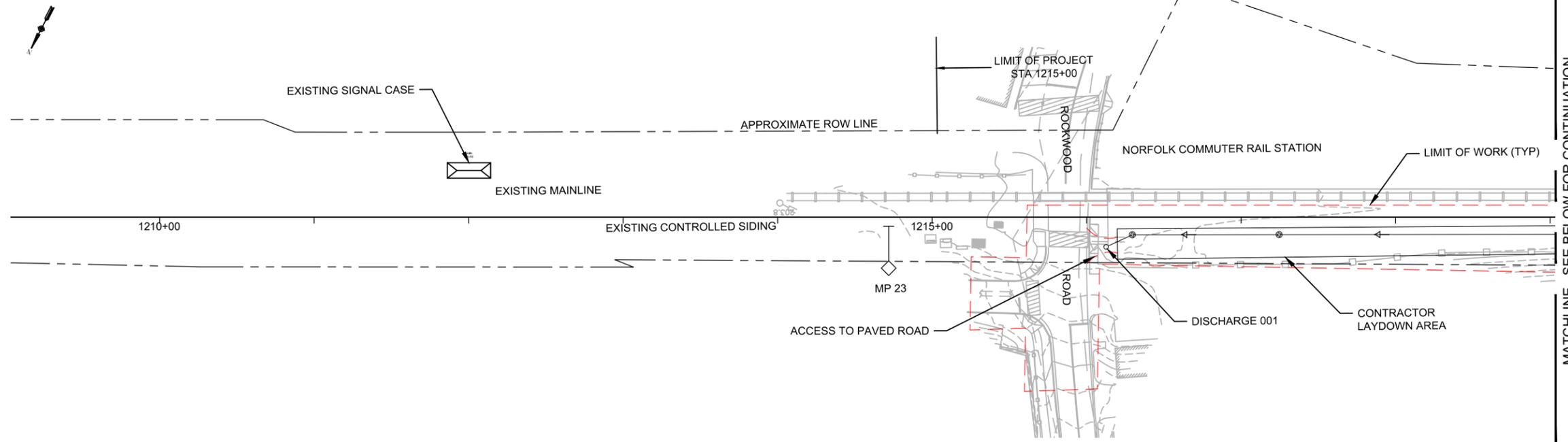
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 DATE: 4/30/2020 MCA MCA PTO

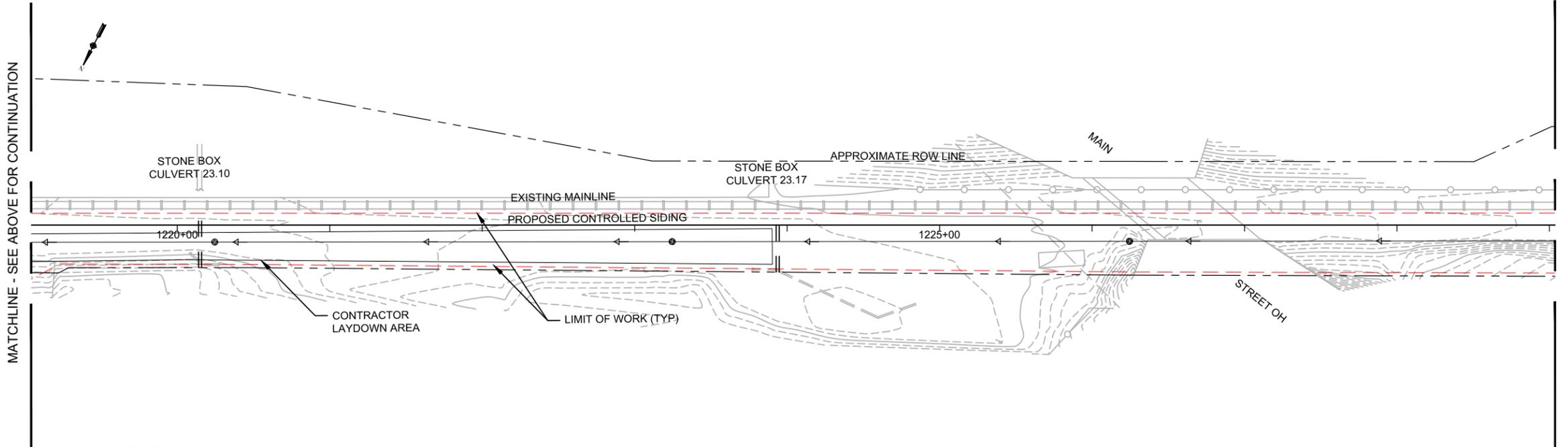
PLAN NO.
 SHEET **EN-03**

← TO BOSTON

TO FRANKLIN →



MATCHLINE - SEE BELOW FOR CONTINUATION



MATCHLINE - SEE ABOVE FOR CONTINUATION

MATCHLINE - SEE NEXT SHEET FOR CONTINUATION

LEGEND

- - - LIMITS OF WORK
- EROSION CONTROL
- - - BANK B52
- - - BANK
- - - WETLAND 167
- - - WETLAND
- PERFORATED UNDERDRAIN
- INNER 100' RIVERFRONT AREA
- OUTER 100' RIVERFRONT AREA
- 100' BUFFER ZONE
- INNER 100' RIVERFRONT IMPACTS
- OUTER 100' RIVERFRONT IMPACTS
- 100' BUFFER IMPACTS

		MASSACHUSETTS BAY TRANSPORTATION AUTHORITY	
FRANKLIN DOUBLE TRACK		NORFOLK TO FRANKLIN, MA KEOLIS FORCE ACCOUNT PROGRAM	
PLAN			
STA 1209+00 TO 1229+00			
		MASSACHUSETTS BAY TRANSPORTATION AUTHORITY	
99 HIGH STREET, SUITE 2300 BOSTON, MA 02110-2378		APPROVED BY:	
Manager of Design:		Date:	
HORIZ: AS NOTED	DES. BY: MCA	DR. BY: MCA	CHK. BY: PTO
VERT: AS NOTED			PLAN NO.
DATE: 4/30/2020			SHEET EN-04



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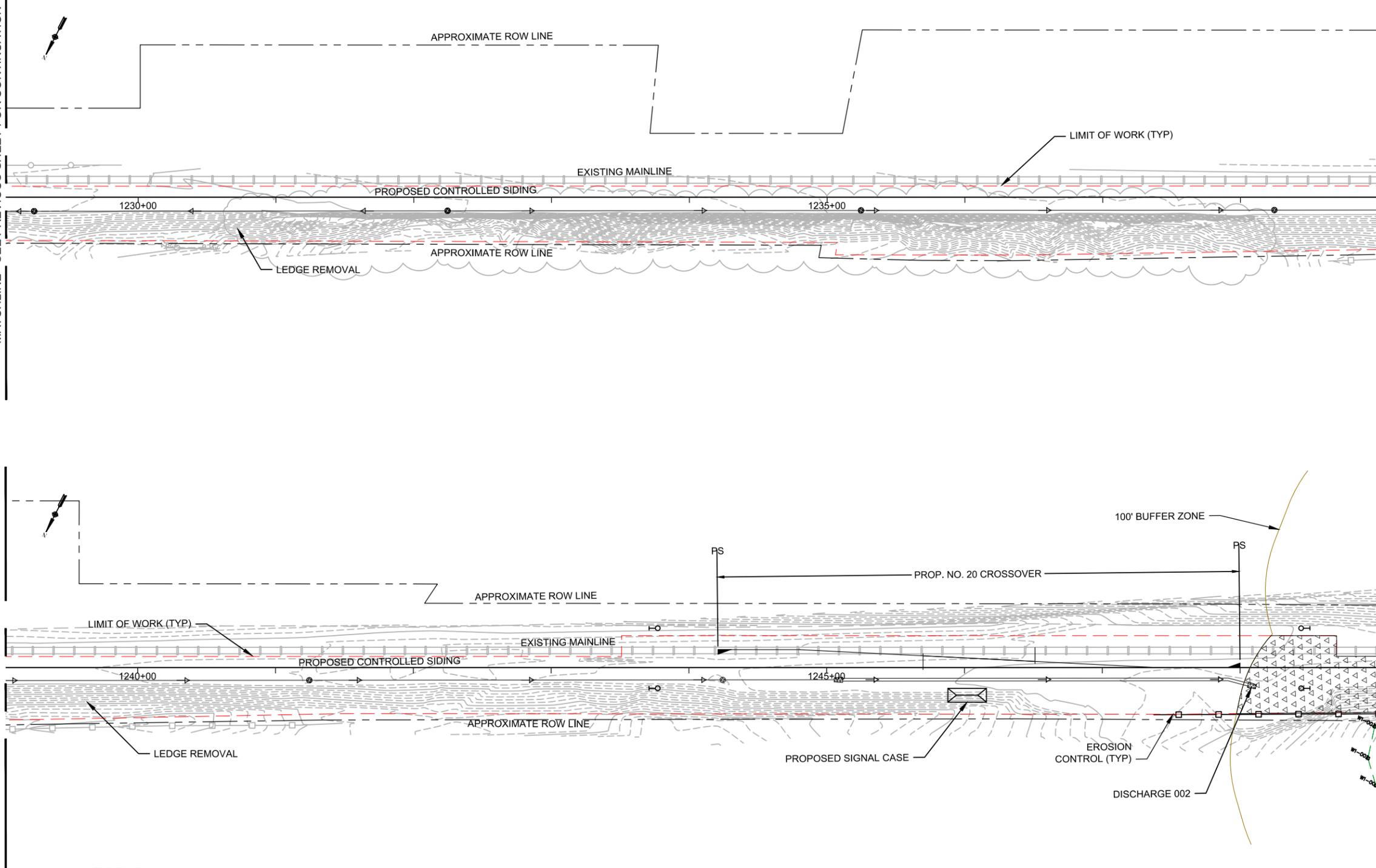
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MATCHLINE - SEE PREVIOUS SHEET FOR CONTINUATION

MATCHLINE - SEE BELOW FOR CONTINUATION

MATCHLINE - SEE ABOVE FOR CONTINUATION

MATCHLINE - SEE NEXT SHEET FOR CONTINUATION



LEGEND

- - - LIMITS OF WORK
- EROSION CONTROL
- - - BANK B52
- - - BANK
- - - WETLAND 167
- - - WETLAND
- PERFORATED UNDERDRAIN
- INNER 100' RIVERFRONT AREA
- OUTER 100' RIVERFRONT AREA
- 100' BUFFER ZONE
- INNER 100' RIVERFRONT IMPACTS
- OUTER 100' RIVERFRONT IMPACTS
- 100' BUFFER IMPACTS

		MASSACHUSETTS BAY TRANSPORTATION AUTHORITY	
FRANKLIN DOUBLE TRACK		NORFOLK TO FRANKLIN, MA KEOLIS FORCE ACCOUNT PROGRAM	
PLAN			
STA 1229+00 TO 1249+00			
		99 HIGH STREET, SUITE 2300 BOSTON, MA 02110-2378	
APPROVED BY:		DATE:	
Manager of Design:		Date:	
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VERT: AS NOTED			PLAN NO.
DATE: 4/30/2020			SHEET EN-05



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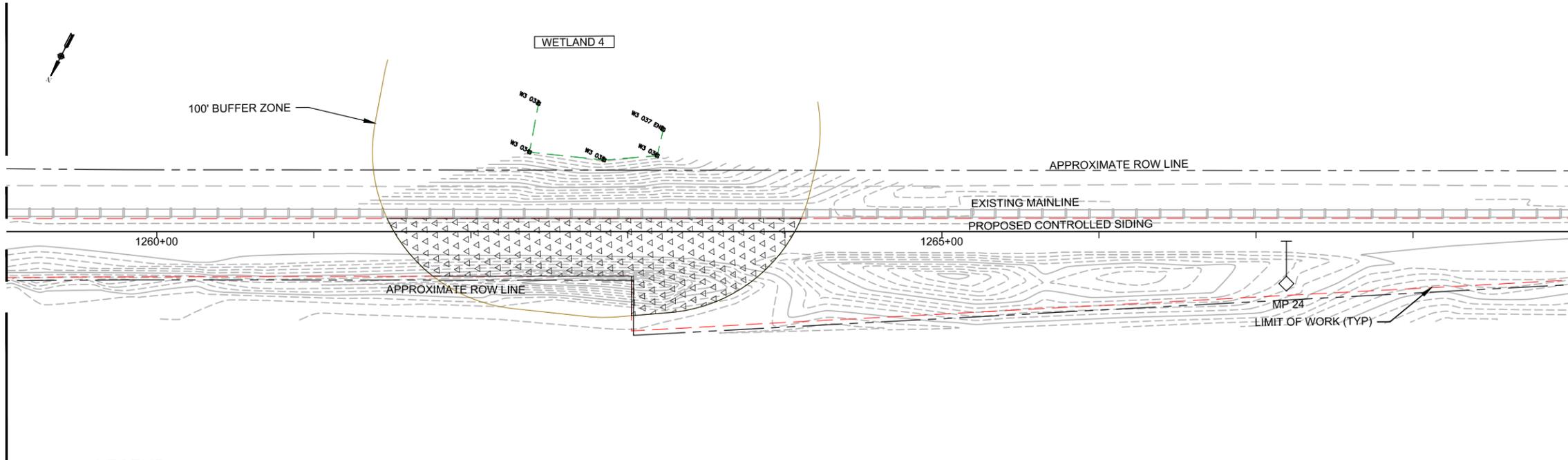
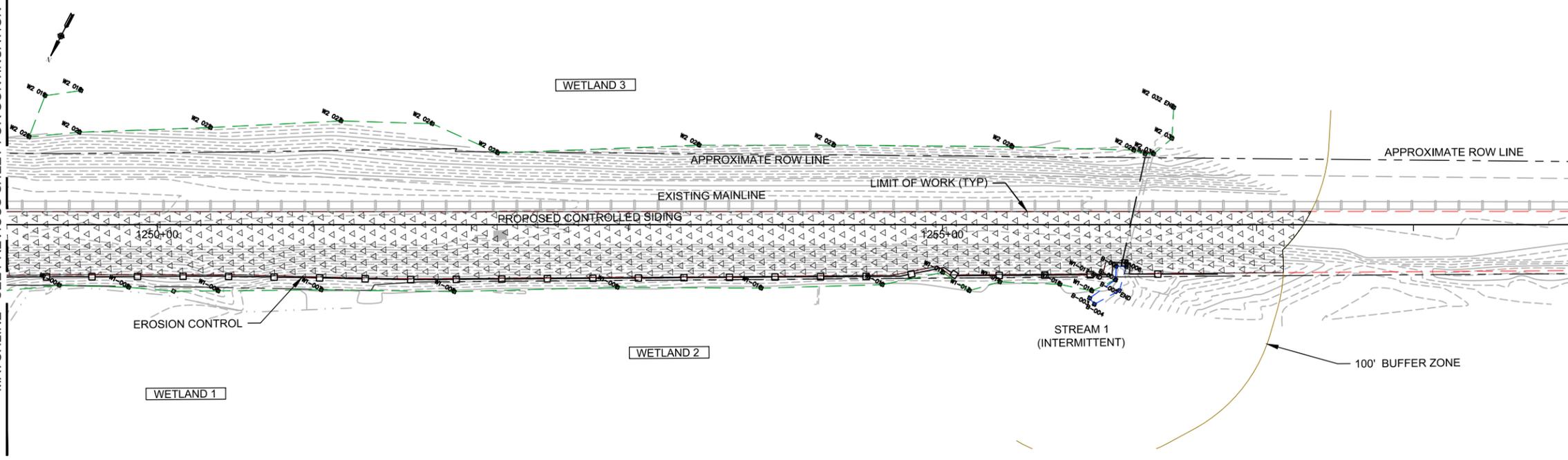
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MATCHLINE - SEE PREVIOUS SHEET FOR CONTINUATION

MATCHLINE - SEE BELOW FOR CONTINUATION

MATCHLINE - SEE ABOVE FOR CONTINUATION

MATCHLINE - SEE NEXT SHEET FOR CONTINUATION



LEGEND

- LIMITS OF WORK
- EROSION CONTROL
- BANK B52
- BANK
- WETLAND 167
- WETLAND
- PERFORATED UNDERDRAIN
- INNER 100' RIVERFRONT AREA
- OUTER 100' RIVERFRONT AREA
- 100' BUFFER ZONE
- INNER 100' RIVERFRONT IMPACTS
- OUTER 100' RIVERFRONT IMPACTS
- 100' BUFFER IMPACTS

		MASSACHUSETTS BAY TRANSPORTATION AUTHORITY FRANKLIN DOUBLE TRACK NORFOLK TO FRANKLIN, MA KEOLIS FORCE ACCOUNT PROGRAM	
		PLAN STA 1249+00 TO 1269+00	
99 HIGH STREET, SUITE 2300 BOSTON, MA 02110-2378 MASSACHUSETTS BAY TRANSPORTATION AUTHORITY		APPROVED BY:	
Manager of Design:		Date:	
HORIZ: AS NOTED	DES. BY:	DR. BY:	CHK. BY:
VERT: AS NOTED	DATE: 4/30/2020	MCA	PTO
SCALE IN FEET 			PLAN NO. SHEET EN-06

← TO BOSTON

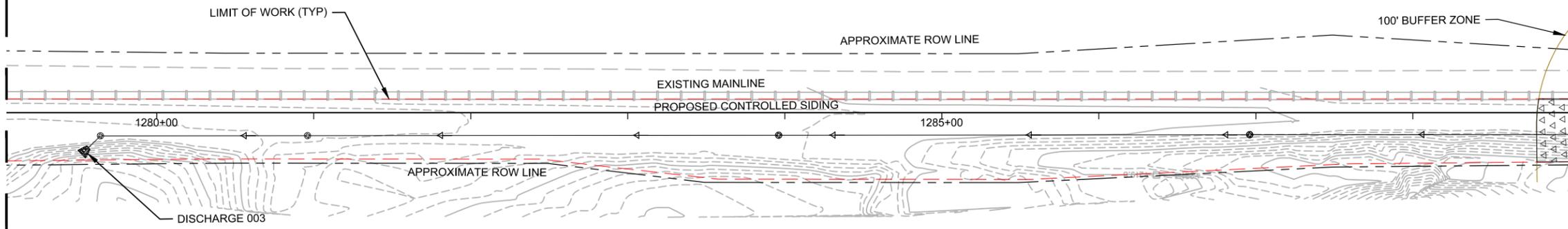
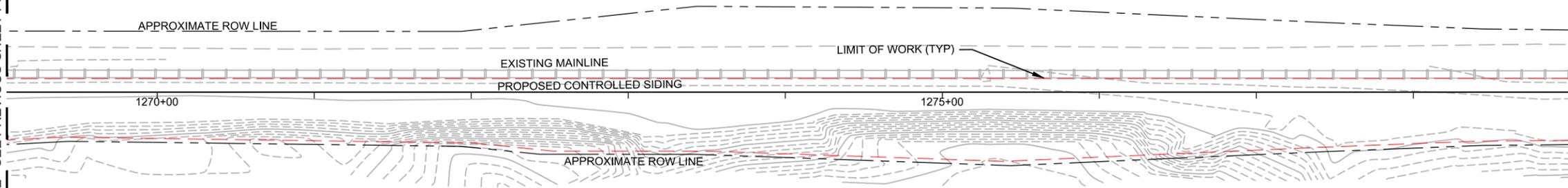
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MATCHLINE - SEE PREVIOUS SHEET FOR CONTINUATION

MATCHLINE - SEE BELOW FOR CONTINUATION

MATCHLINE - SEE ABOVE FOR CONTINUATION

MATCHLINE - SEE NEXT SHEET FOR CONTINUATION



LEGEND

- - - LIMITS OF WORK
- EROSION CONTROL
- - - BANK B52
- - - BANK
- - - WETLAND 167
- - - WETLAND
- PERFORATED UNDERDRAIN
- INNER 100' RIVERFRONT AREA
- OUTER 100' RIVERFRONT AREA
- 100' BUFFER ZONE
- INNER 100' RIVERFRONT IMPACTS
- OUTER 100' RIVERFRONT IMPACTS
- 100' BUFFER IMPACTS

		MASSACHUSETTS BAY TRANSPORTATION AUTHORITY	
FRANKLIN DOUBLE TRACK		NORFOLK TO FRANKLIN, MA KEOLIS FORCE ACCOUNT PROGRAM	
PLAN			
STA 1269+00 TO 1289+00			
		99 HIGH STREET, SUITE 2300 BOSTON, MA 02110-2378	
APPROVED BY:		DATE:	
Manager of Design:		Date:	
HORIZ: AS NOTED	DES. BY	DR. BY	CHK. BY
VERT: AS NOTED	MCA	MCA	PTO
DATE: 4/30/2020			PLAN NO.
SHEET			EN-07



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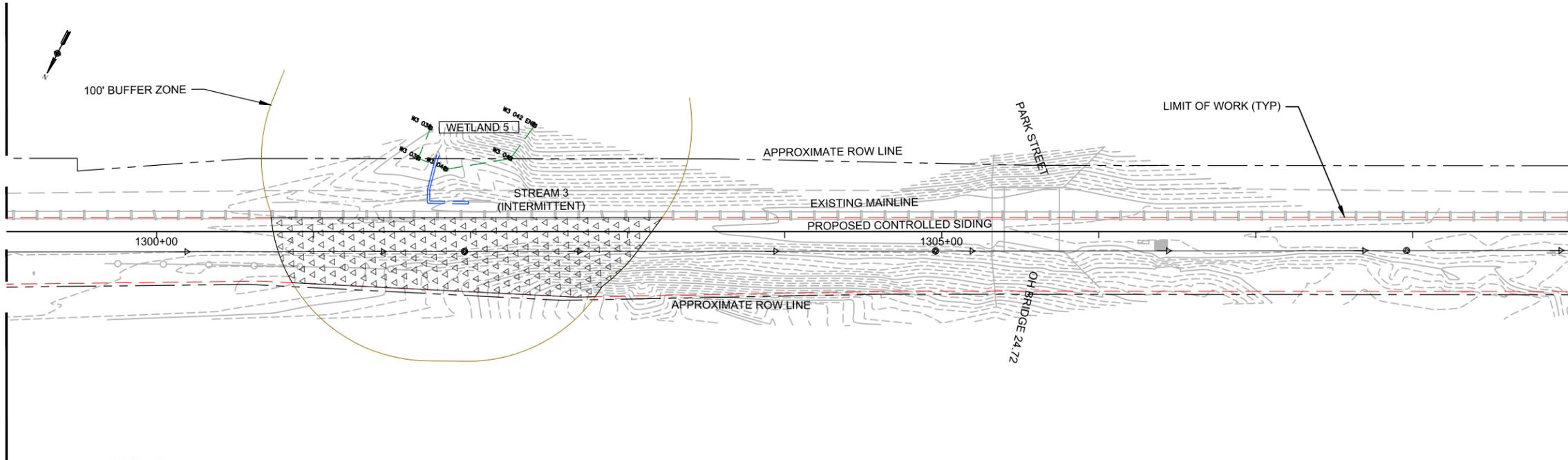
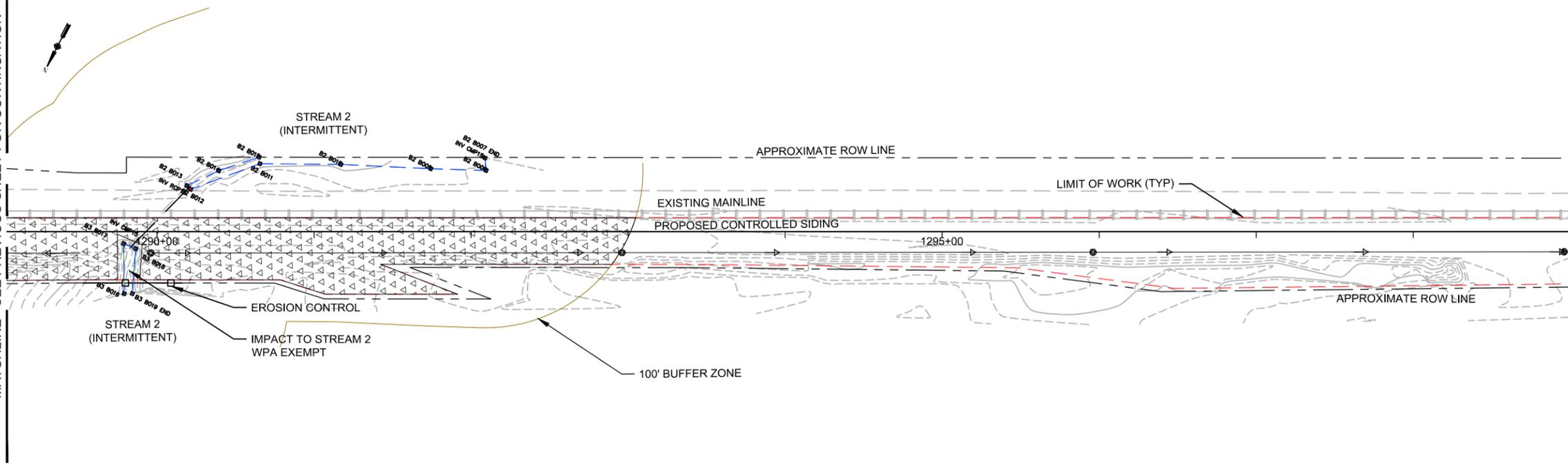
TO FRANKLIN →

MATCHLINE - SEE PREVIOUS SHEET FOR CONTINUATION

MATCHLINE - SEE BELOW FOR CONTINUATION

MATCHLINE - SEE ABOVE FOR CONTINUATION

MATCHLINE - SEE NEXT SHEET FOR CONTINUATION



LEGEND

- - - LIMITS OF WORK
- - - EROSION CONTROL
- - - BANK B52
- - - BANK
- - - WETLAND 167
- - - WETLAND
- - - PERFORATED UNDERDRAIN
- - - INNER 100' RIVERFRONT AREA
- - - OUTER 100' RIVERFRONT AREA
- - - 100' BUFFER ZONE
- INNER 100' RIVERFRONT IMPACTS
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		MASSACHUSETTS BAY TRANSPORTATION AUTHORITY	
FRANKLIN DOUBLE TRACK		NORFOLK TO FRANKLIN, MA KEOLIS FORCE ACCOUNT PROGRAM	
PLAN			
STA 1289+00 TO 1309+00			
		MASSACHUSETTS BAY TRANSPORTATION AUTHORITY	
99 HIGH STREET, SUITE 2300 BOSTON, MA 02110-2378		APPROVED BY:	
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VERT: AS NOTED	MCA	MCA	PTO
DATE: 4/30/2020			PLAN NO.
			SHEET EN-08



TO BOSTON

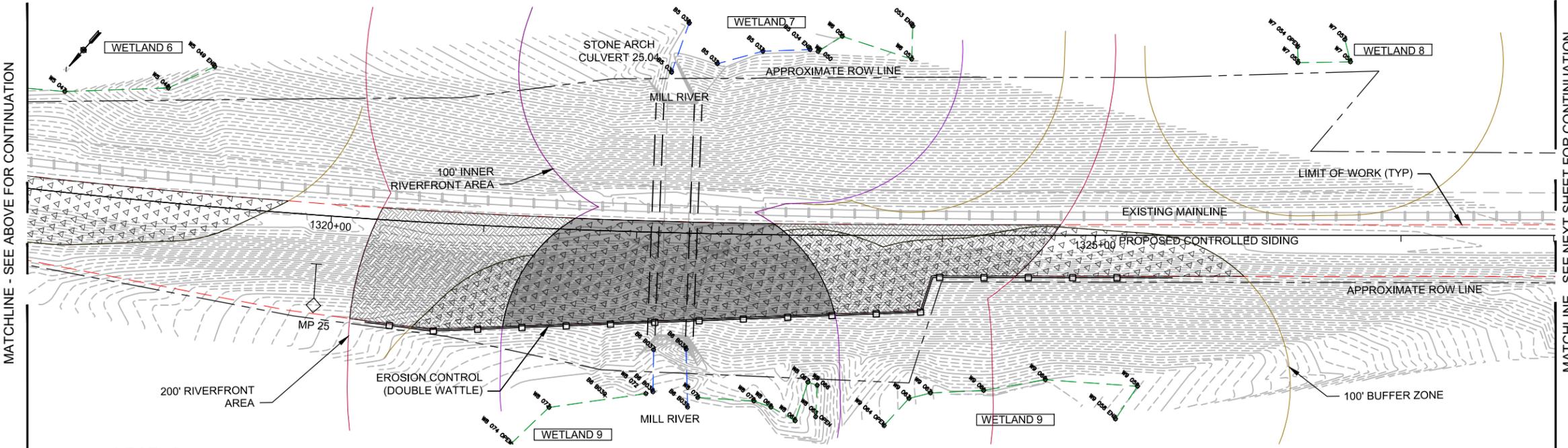
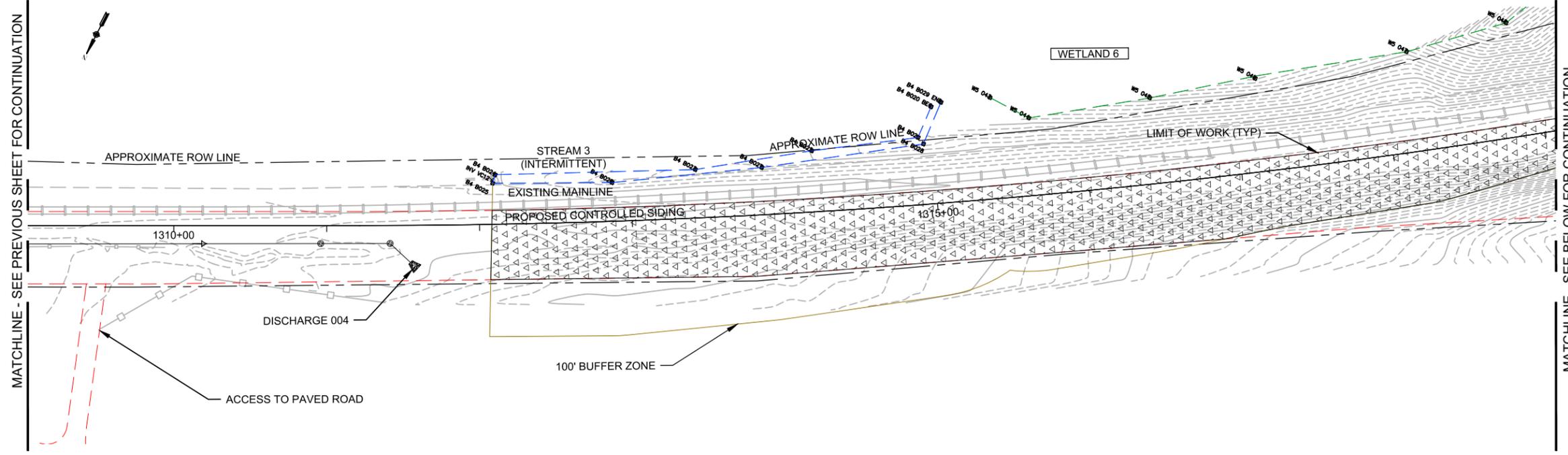
TO FRANKLIN

MATCHLINE - SEE PREVIOUS SHEET FOR CONTINUATION

MATCHLINE - SEE BELOW FOR CONTINUATION

MATCHLINE - SEE ABOVE FOR CONTINUATION

MATCHLINE - SEE NEXT SHEET FOR CONTINUATION



LEGEND

- - - LIMITS OF WORK
- EROSION CONTROL
- - - BANK B52
- - - BANK
- - - WETLAND 167
- - - WETLAND
- PERFORATED UNDERDRAIN
- INNER 100' RIVERFRONT AREA
- OUTER 100' RIVERFRONT AREA
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- INNER 100' RIVERFRONT IMPACTS
- OUTER 100' RIVERFRONT IMPACTS
- 100' BUFFER IMPACTS

		MASSACHUSETTS BAY TRANSPORTATION AUTHORITY	
FRANKLIN DOUBLE TRACK		NORFOLK TO FRANKLIN, MA KEOLIS FORCE ACCOUNT PROGRAM	
PLAN			
STA 1309+00 TO 1328+00			
		MASSACHUSETTS BAY TRANSPORTATION AUTHORITY	
99 HIGH STREET, SUITE 2300 BOSTON, MA 02110-2378		APPROVED BY:	
Manager of Design:		Date:	
HORIZ: AS NOTED	DES. BY	DR. BY	CHK. BY
VERT: AS NOTED	MCA	MCA	PTO
DATE: 4/30/2020			PLAN NO. EN-09

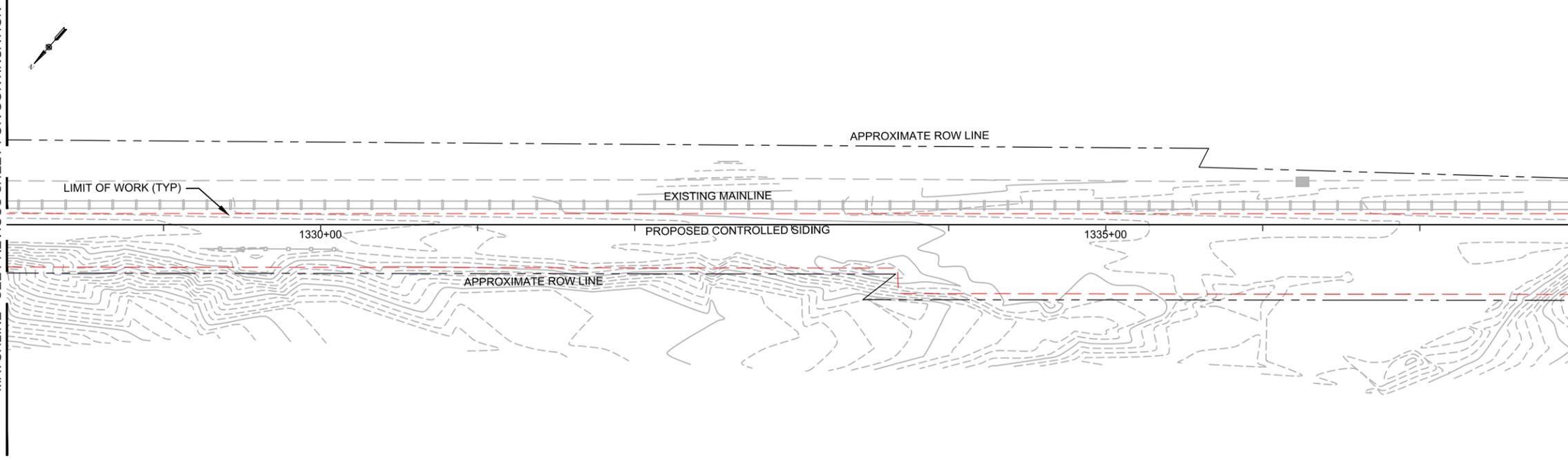


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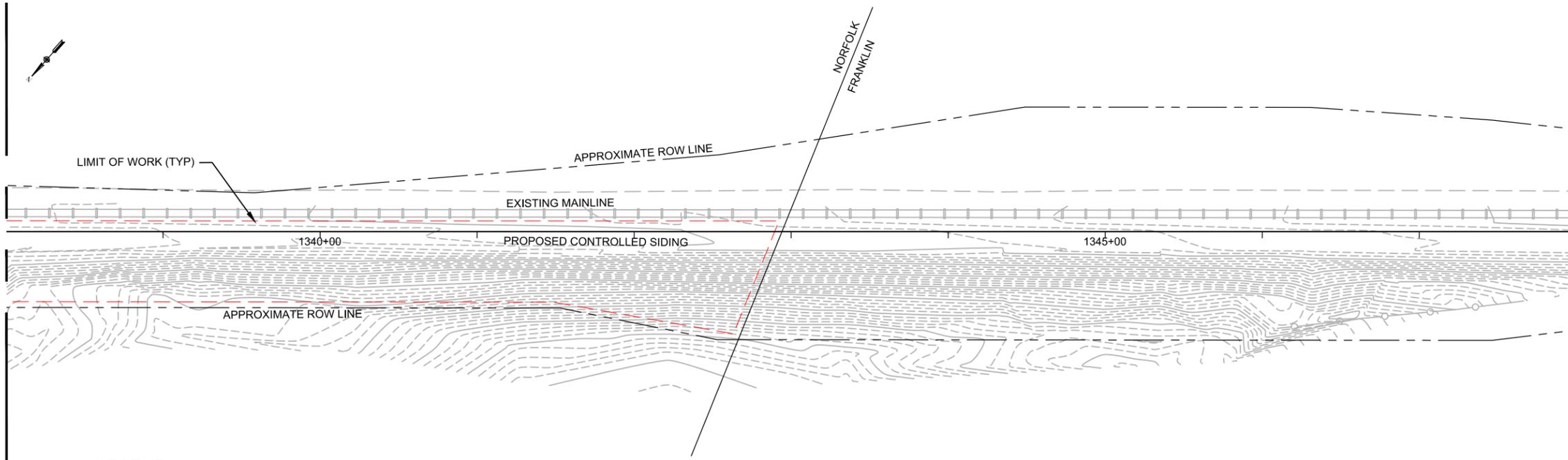
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MATCHLINE - SEE PREVIOUS SHEET FOR CONTINUATION

MATCHLINE - SEE BELOW FOR CONTINUATION



MATCHLINE - SEE ABOVE FOR CONTINUATION

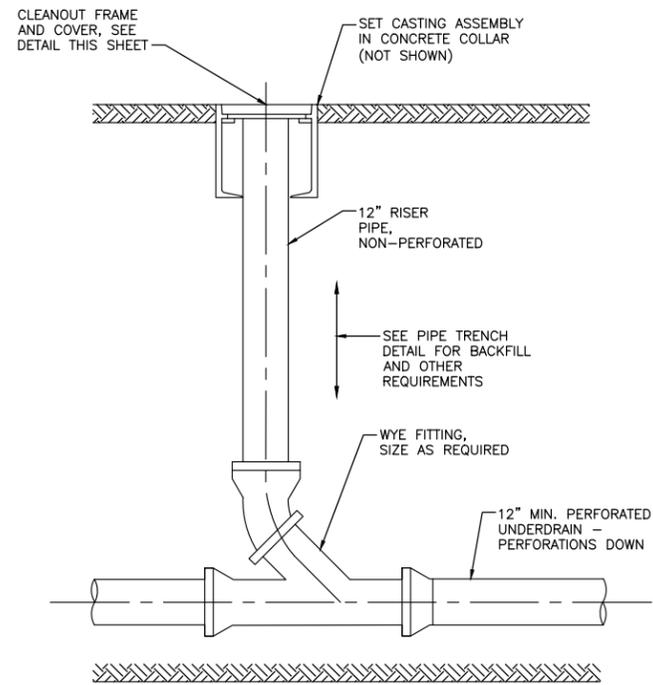


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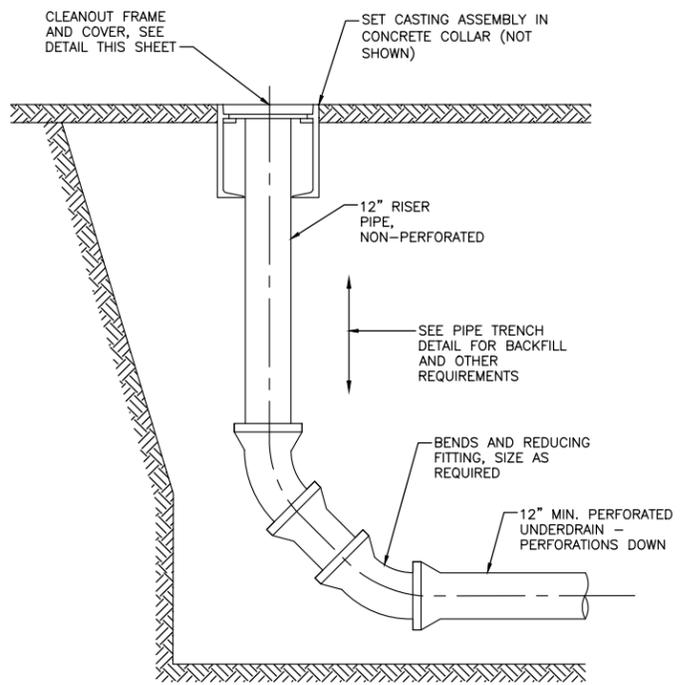
- - - LIMITS OF WORK
- EROSION CONTROL
- - - BANK B52
- - - BANK
- - - WETLAND 167
- - - WETLAND
- PERFORATED UNDERDRAIN
- INNER 100' RIVERFRONT AREA
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		MASSACHUSETTS BAY TRANSPORTATION AUTHORITY	
FRANKLIN DOUBLE TRACK		NORFOLK TO FRANKLIN, MA KEOLIS FORCE ACCOUNT PROGRAM	
PLAN			
STA 1328+00 TO 1348+00			
		MASSACHUSETTS BAY TRANSPORTATION AUTHORITY	
99 HIGH STREET, SUITE 2300 BOSTON, MA 02110-2378		APPROVED BY:	
Manager of Design:		Date:	
HORIZ: AS NOTED	DES. BY	DR. BY	CHK. BY
VERT: AS NOTED	MCA	MCA	PTO
DATE: 4/30/2020			PLAN NO. EN-10





IN LINE CLEANOUT

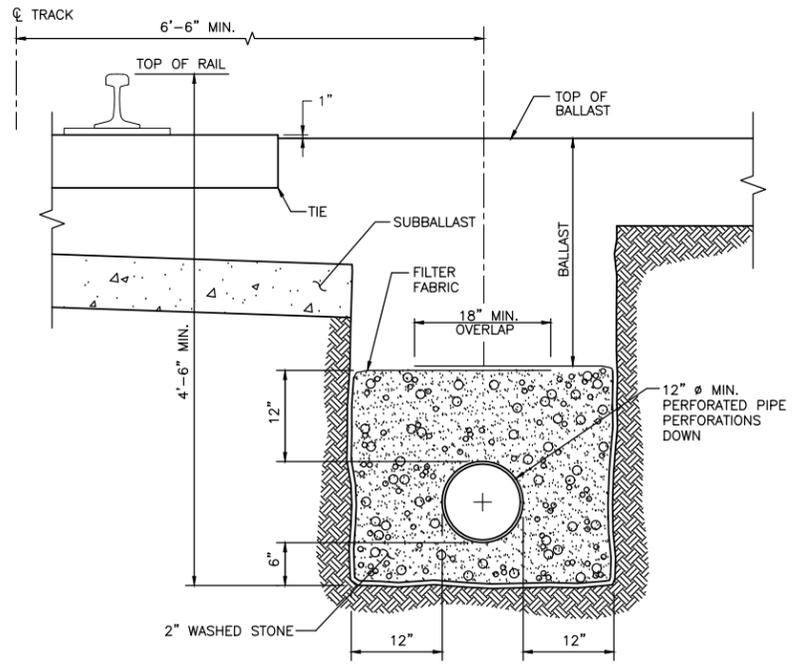


END OF LINE CLEANOUT

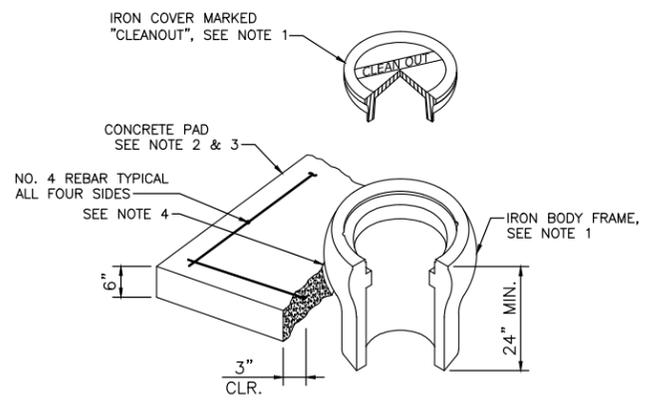
NOTES

1. CONSTRUCT CLEANOUTS AT ALL UNDERDRAIN UPSTREAM ENDS AND AT MAXIMUM 300' INTERVALS ALONG UNDERDRAINS.
2. CLEANOUT RISER TOP SHALL BE ENCLOSED IN CASTING AND/OR FABRICATED COVER ASSEMBLY.

TRACK UNDERDRAIN CLEANOUT
NOT TO SCALE



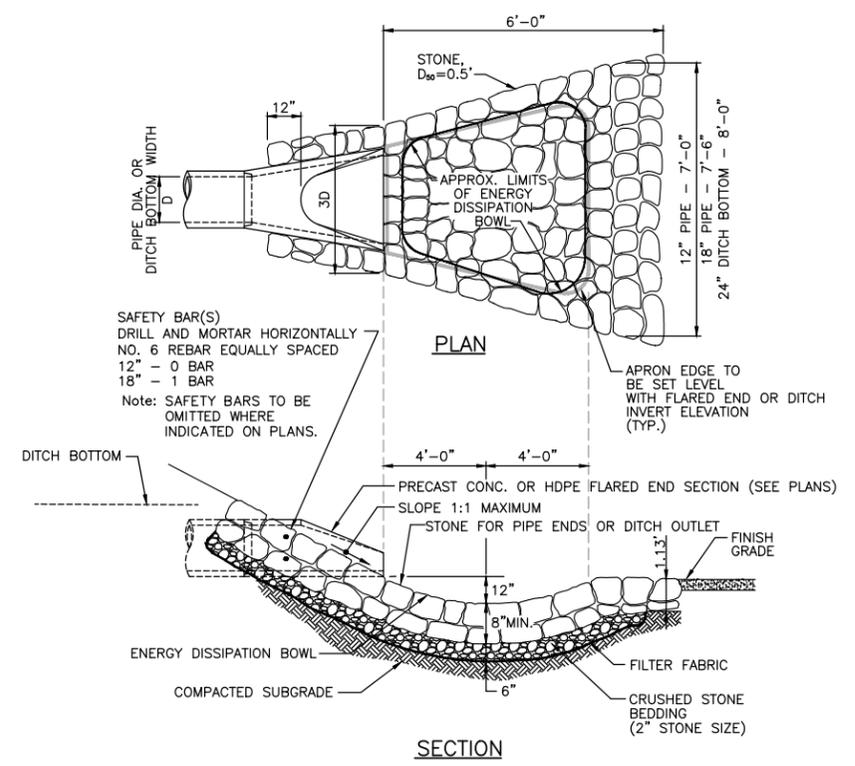
UNDERDRAIN (UD)
NOT TO SCALE



CLEANOUT ACCESS CASTING
NOT TO SCALE

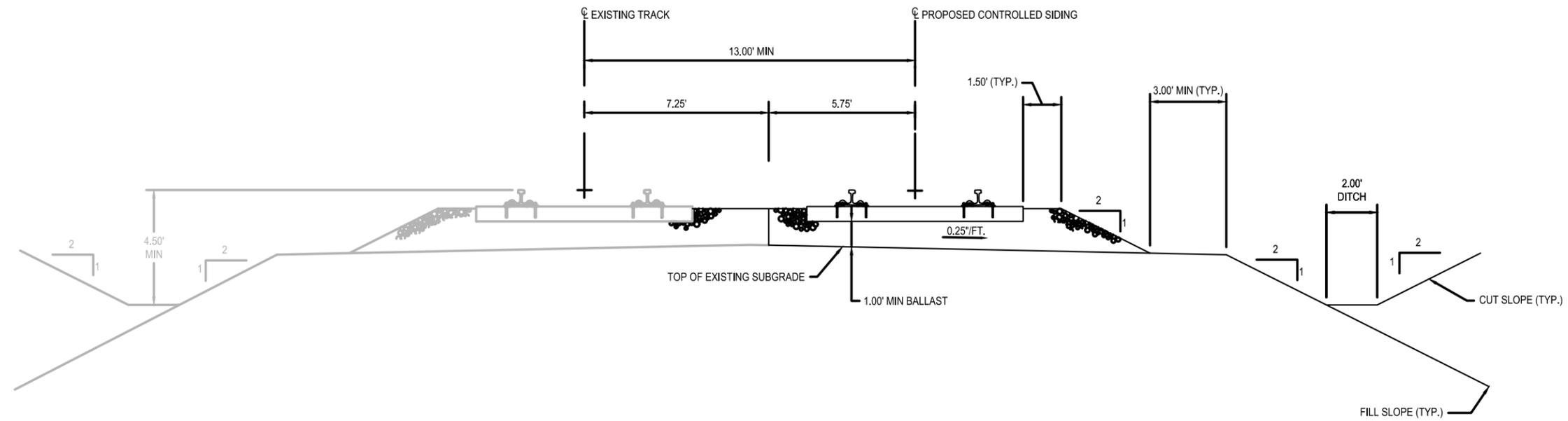
NOTES

1. CAST OR DUCTILE IRON BODY FRAME AND COVER, TRAFFIC RATED IN ACCORDANCE WITH AASHTO HS-20. FRAME DIAMETER SHALL PROVIDE MINIMUM 2" CLEARANCE BETWEEN CLEANOUT RISER O.D. AND FRAME I.D.
2. PROVIDE 6" THICK REINFORCED CONCRETE PAD AROUND CLEANOUT BOX LOCATED IN UNPAVED AREAS. PAD MINIMUM PLAN DIMENSIONS SHALL BE 18" GREATER THAN FRAME O.D. PERIMETER OF PAD SHALL BE FLUSH WITH GRADE AND WITH THE CLEAN OUT RISER PIPE CENTERED.
3. PROVIDE SUFFICIENT SLOPING IN THE CONCRETE PAD OR SURROUNDING PAVEMENT TO PROVIDE DRAINAGE AWAY FROM CLEANOUT BOX AND COVER.
4. FORM BODY FRAME OPENING 1/2" GREATER DIAMETER THAN FRAME OD, FILL ANNULAR FULL DEPTH WITH JOINT SEALANT.



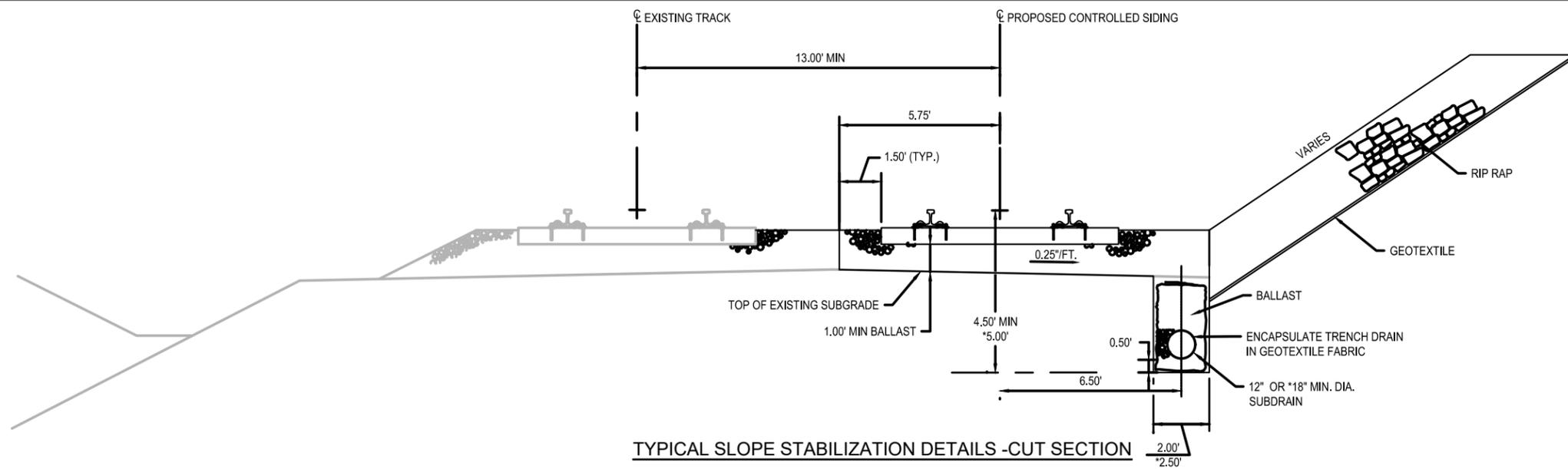
FLARED END SECTION (FES) OR DITCH OUTLET WITH STONE PROTECTION
NOT TO SCALE

		MASSACHUSETTS BAY TRANSPORTATION AUTHORITY FRANKLIN DOUBLE TRACK NORFOLK TO FRANKLIN, MA KEOLIS FORCE ACCOUNT PROGRAM	
		DRAINAGE DETAILS	
		99 HIGH STREET, SUITE 2300 BOSTON, MA 02110-2378 MASSACHUSETTS BAY TRANSPORTATION AUTHORITY	
APPROVED BY:		Manager of Design: _____ Date: _____	
HORIZ: AS NOTED		DES. BY: _____ DR. BY: _____ CHK. BY: _____	
VERT: AS NOTED		PLAN NO. _____	
DATE: 4/30/2020		SHEET EN-11	

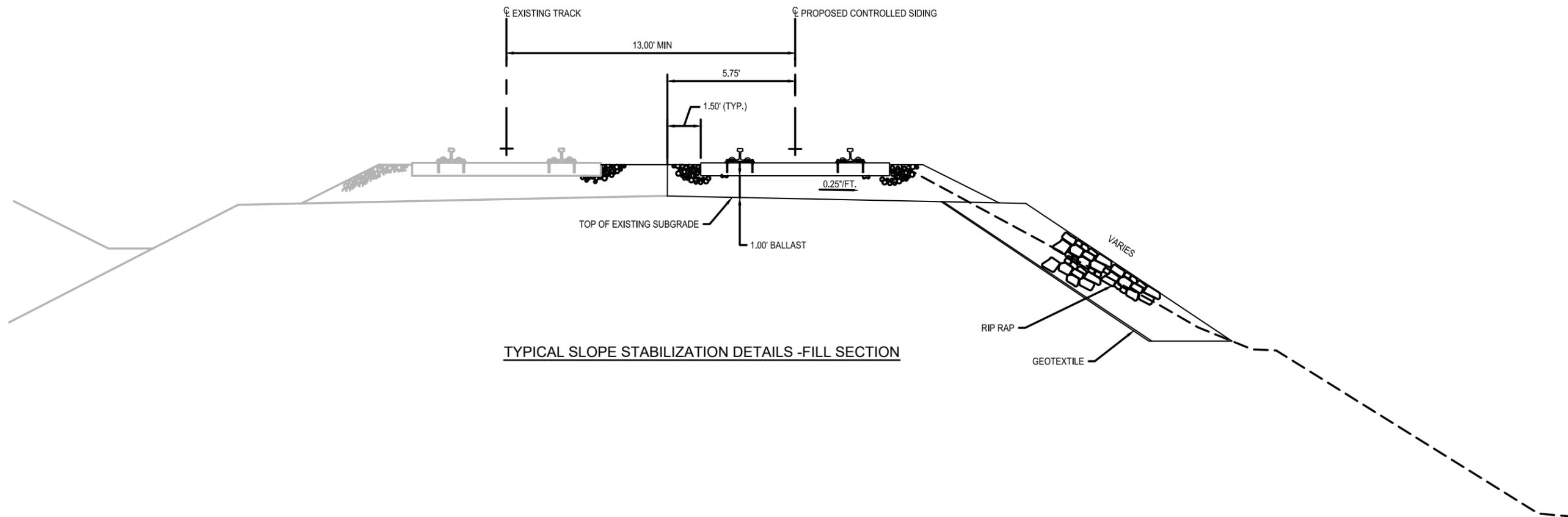


STANDARD SECTION FOR DOUBLE TRACK ON TANGENT

		 MASSACHUSETTS BAY TRANSPORTATION AUTHORITY FRANKLIN DOUBLE TRACK NORFOLK TO FRANKLIN, MA KEOLIS FORCE ACCOUNT PROGRAM				
				TYPICAL TRACK SECTION		
		 99 HIGH STREET, SUITE 2300 BOSTON, MA 02110-2378 MASSACHUSETTS BAY TRANSPORTATION AUTHORITY				
		APPROVED BY: _____ Date: _____ Manager of Design: _____ Date: _____				
ISSUE	DATE	DESCRIPTION	BY	CHKD	APP.	
		HORIZ: AS NOTED VERT: AS NOTED DATE: 4/30/2020		DES. BY	DR. BY	CHK. BY
		MCA MCA PTO		PLAN NO. SHEET EN-12		



TYPICAL SLOPE STABILIZATION DETAILS -CUT SECTION



TYPICAL SLOPE STABILIZATION DETAILS -FILL SECTION

		MASSACHUSETTS BAY TRANSPORTATION AUTHORITY FRANKLIN DOUBLE TRACK NORFOLK TO FRANKLIN, MA KEOLIS FORCE ACCOUNT PROGRAM	
		TYPICAL SLOPE STABILIZATION SECTIONS	
		MASSACHUSETTS BAY TRANSPORTATION AUTHORITY	
		99 HIGH STREET, SUITE 2300 BOSTON, MA 02110-2378	
APPROVED BY:		Date:	
Manager of Design:		Date:	
HORIZ: AS NOTED		DES. BY	DR. BY
VERT: AS NOTED		CHK. BY	PLAN NO.
DATE: 4/30/2020		MCA	MCA
		PTO	SHEET
			EN-13

ISSUE	DATE	DESCRIPTION	BY	CHKD	APP.



Appendix C – Wetland Summary Report



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Wetland Descriptions based upon February 18, 2020 observations from rail bed, and March 12 on-site delineation. See figure showing approximate locations.

BORDERING VEGETATED WETLANDS

Wetland 1 (Flags 001-008)

Wetland 1 is a small depression to the north of and adjacent to the rail bed, south of Main Street, and immediately west of the slight hill where the rail passes through a rock cut. This red maple (*Acer rubrum*) swamp wetland was ponded at the time of observation, and rather shallow, but has features that may provide vernal-pool like functions. Upright (tussock) sedge (*Carex stricta*) was dominant in the herbaceous stratum and skunk cabbage (*Symplocarpus foetidus*) was evident throughout. Wood frog (*Lithobates sylvaticus*; aka *Rana sylvatica*) egg masses were noted in the pooled area of the Wetland during the March 12 inspection.

Wetland 2 (Flags 008-017)

Wetland 2 is a depressional system located to the north of the rail bed, west of and adjacent to Wetland 1. The prominent characteristic of Wetland 2 are two open ponded water areas, roughly two acres in size for the western pond, and 0.5 acre for the eastern pond. A mature red maple swamp extends between the two ponds, and east toward Wetland 1. Vegetation includes highbush blueberry (*Vaccinium corymbosum*) shrubs and dense herbaceous vegetation, comprised of upright and other sedges, ferns such as cinnamon fern (*Osmunda cinnamomea*), and also common throughout with skunk cabbage. The open water portion of the wetland is surrounded by mature wooded cover. Wetland 2 and Wetland 1 are connected by a very narrow wetland band; likely a ditch from when the railroad was constructed, and located at the toe of slope of the railroad embankment. At the far western end of the wetland is a very short reach of intermittent stream (Stream 1) which exits a culvert beneath the railroad and drains northeasterly toward Wetland 2. The stream channel dissipates and fades into subsurface flow toward the wetland.

Wetland 3 (Flags 018-032)

This wetland is a large depressional feature to the south of the rail line, opposite Wetlands 1 and 2, and likely part of a larger wetland system that was bisected during the original construction of the rail line. The wetland is a forested cover type, dominated by red maple, eastern white pine (*Pinus strobus*), and a well-established shrub understory of highbush blueberry, spicebush (*Lindera benzoin*), azalea (*Rhododendron sp.*), and dogwood (*Cornus sp.*). Emergent vegetation includes sedges (*Carex sp.*) and ferns such as cinnamon fern and sensitive fern (*Onoclea sensibilis*), skunk cabbage, and sphagnum moss (*Sphagnum sp.*). Portions of the wetland have a high degree of interspersions of water and vegetation.

Wetland 4 (Flags 033-037)

Wetland 4 is located adjacent to the rail embankment and at the toe of a slight hill to the south of the rail road track. Wetland 4 is a depression within a wooded area dominated by oak (*Quercus sp.*), and was ponded at the time of the assessment. Wetland 4 appears to have buttonbush (*Cephalanthus occidentalis*) emerging from the water, and has characteristics that infer vernal pool-like features. Wood frog egg masses were noted in the pooled area of the Wetland during the March 12 inspection.

Wetland 5 (Flags 038-042)

This small wetland is located between Grove Street to the south, and the rail bed to the north, and approximately 150 feet to the east of the Park Street bridge over the rail bed. The wetland is comprised of a forested cover type dominated by red maple, swamp white oak (*Quercus bicolor*), with plentiful honeysuckle (*Lonicera sp.*) shrubs at the northern edge of the wetland, notable amounts of poison ivy in the herb stratum (*Toxicodendron radicans*), and bittersweet vines. A small intermittent stream (Stream 3) exits the wetland on its north side and cascades over and through a riprap slope and into a ditch within the rail right-of-way.

Wetland 6 (Flags 042-049)

This large slope wetland occurs on the south side of rail line, and is associated with outfall of Stream 3. The terrain slopes westward toward Mill Brook. The wetland is forested, dominated by red maple, green ash (*Fraxinus pennsylvanica*), poplar (*Populus sp.*), and with a shrub stratum containing spicebush, winterberry (*Ilex verticillata*), bittersweet vines, sensitive fern, unidentified asters, and goldenrods (*Solidago sp.*) in the herb stratum.

Wetland 7 (Flags 050-053)

This is an extensive riparian wetland located on the south side of rail line and directly fringing Mill River. There is a Riverfront Area and Bordering Land Subject to Flooding associated with the Mill River at this location. The wetland is predominantly emergent with a transitional fringe of shrubs then trees. Most notable vegetation are cattails (*Typha latifolia*), water willow/swamp loosestrife (*Decodon verticillatus*), purple loosestrife (*Lythrum salicaria*), and common reed (*Phragmites australis*). The shrub fringe vegetation includes highbush blueberry, sweet pepperbush (*Clethra alnifolia*), azalea, and winterberry. Nearby trees include red maple and white pine. The wetland was noted to have several wetland dependent wildlife such as beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), waterfowl and wading birds, and likely several types of fish.

Wetland 8 (Flags 054-057)

This is a very small depressional wetland on the south side of rail line, to the west of Mill Brook. It does not have characteristics of a vernal pool. Common vegetation includes red maple trees, winterberry shrubs, highbush blueberry, and skunk cabbage.

Wetland 9 (Flags 058-074)

Wetland 9 is on the north side of rail line and directly associated with Mill River, and very similar to Wetland 7. The railroad crossing of the Mill River bisected the original associated wetland complex, and with nearly identical hydraulic characteristics and vegetation as Wetland 7, Wetland 9 is similar. There is a Riverfront Area and Bordering Land Subject to Flooding associated with the river at this location. Vegetation is predominantly emergent with cattails, water willow/swamp loosestrife, purple loosestrife, and common reed. The shrub fringe vegetation includes highbush blueberry, sweet pepperbush, azalea, and winterberry.



STREAMS

Stream 1 (Flags B01-B06) (Intermittent)

Stream 1 is a very short intermittent water course on the north side of the rail embankment, and originating at the outlet of a culvert passing under the rail line. The stream drains to Wetland 2, and it derives its water from Wetland 3. Although flowing at the time of the assessment, it appears Stream 1 is intermittent. The wetted channel width is approximately 18 inches.

Stream 2 South (Flags B07-B15) (Intermittent)

Stream 2 is shown as an intermittent stream that originates at the outlet of corrugated metal pipe behind homes on Grove Street. It was not flowing at either observation dates, but alluvial deposits are indicative of intermittent flows. This feature may be entirely derived from storm water from Grove Street but not known or confirmed at this time. The short segment of stream enters a culvert beneath the rail line and drains to the north, existing at a stone headwall in the existing rail ballast and access road. From there it is defined as Stream 2 North. No bordering vegetated wetlands were identified at this feature.

Stream 2 North (Flags B16-B19) (Intermittent)

Stream 2 is a constructed channel cut into the ground at the outlet of the culvert described above for Stream 2 South. Flow indications are less pronounced in this segment of the feature, likely attributed to high infiltration rate in the well-drained soils through which the channel passes. There were not bordering vegetated wetlands identified at this feature.

Stream 3 East (no Flags – on riprap) (Intermittent)

The stream originates from Wetland 5, located on the south side of the rail track, approximately 150 feet to the east of Park Street. Stream 3 was flowing at the time of the assessment, but has characteristics that indicate it is likely an intermittent stream. It discharges to the north from Wetland 5 through a channel ranging between roughly 12 inches and 24 inches wide, and cascades over a back slope and into the railroad ballast area. From there the water flows in and amongst the railroad ballast to the west, then into a pipe culvert. The water flows westward in the pipe running parallel to the rail, passes under Park Street, and daylight at a masonry “U-shaped” headwall approximately 350 feet to the west, then flows to Wetland 6 on the south of the rail line.

Stream 3 West (Flags B20-B29) (Intermittent)

Stream 3 West starts at the culvert outlet west of Park Street overpass and flows in a narrow well-defined channel to Wetland 6. At the time of observation, the stream was flowing at upper (easternmost) reaches but was dry at lower (western) reach. Similar to Stream 2 described previously, it is likely that the well-drained soils through which it passes provide infiltration capacity for much of the low flow water. Evidence of flows extending further into Wetland 6 were noted, likely occurring during higher and peak flow periods.

Mill River (Flags B30-B38) (Perennial)

Mill River is a large perennial watercourse that drains northward, and passes through a granite arch structure supporting the railroad embankment. A Riverfront Area and floodplain is defined for this watercourse.



LEGEND

- Bank Flags
- BVW Flags
- Bank
- BVW
- 100 ft Buffer Zone Boundary
- 100 ft Buffer Zone

DATA SOURCE: esri, HDR





WETLANDS FLAG SERIES 53-57

LEGEND

- BVW Flags
- BVW
- 100 ft Buffer Zone Boundary
- 100 ft Buffer Zone

DATA SOURCE: esri, HDR

0 Feet 100



Key Map

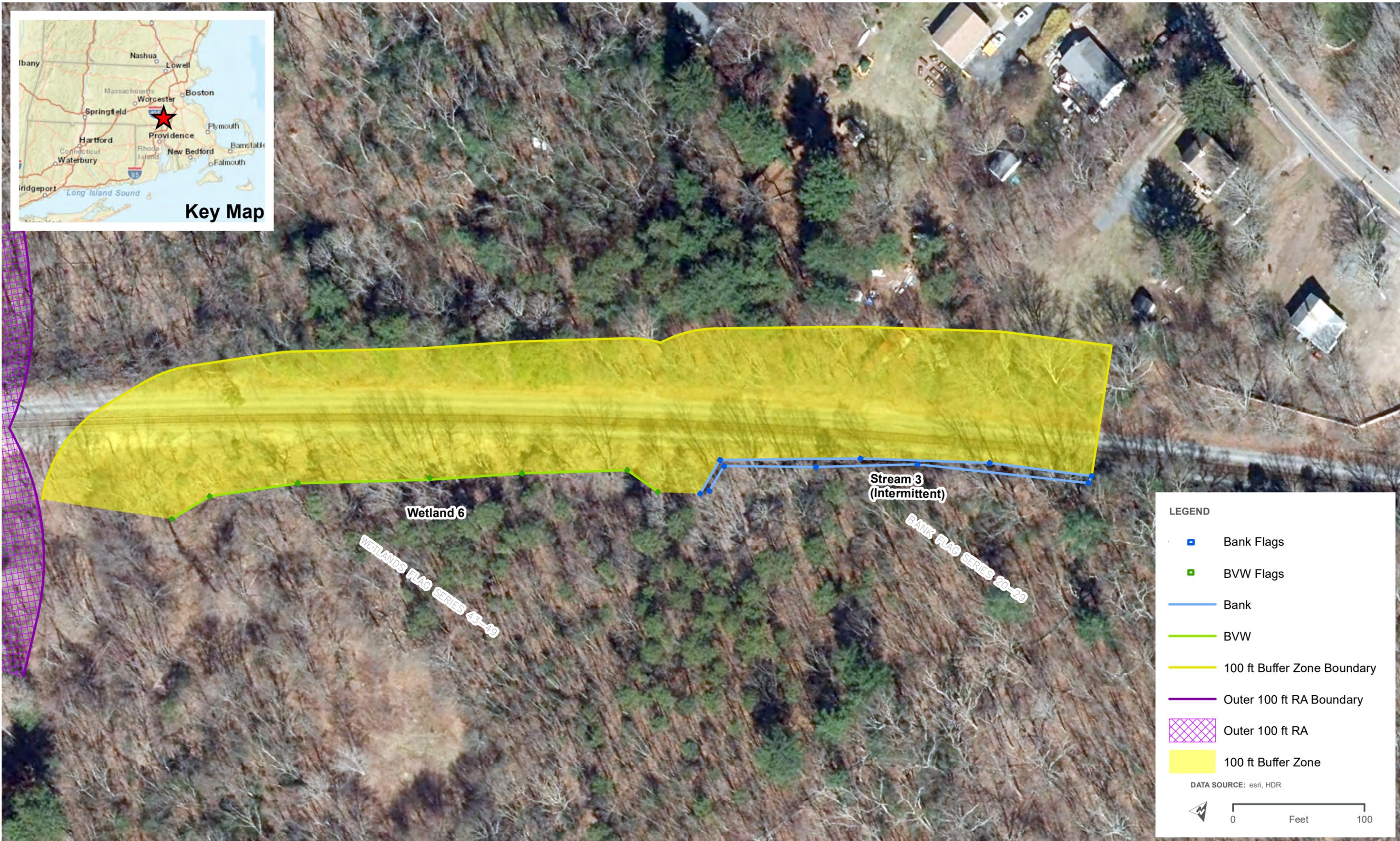


LEGEND

- Bank Flags
- Bank
- 100 ft Buffer Zone Boundary
- 100 ft Buffer Zone

DATA SOURCE: esri, HDR





LEGEND

- Bank Flags
- BVW Flags
- Bank
- BVW
- 100 ft Buffer Zone Boundary
- Outer 100 ft RA Boundary
- Outer 100 ft RA
- 100 ft Buffer Zone

DATA SOURCE: esri, HDR

0 Feet 100



LEGEND

- Bank Flags
- BVW Flags
- Bank
- BVW
- 100 ft Buffer Zone Boundary
- Inner 100 ft RA Boundary
- Outer 100 ft RA Boundary
- Inner 100 ft RA
- Outer 100 ft RA
- 100 ft Buffer Zone

DATA SOURCE: esri, HDR

0 Feet 100





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