Appendix F
Endangered Species Act Section 7 Permitting

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930

January 10, 2025

Peter S. Butler
Regional Administrator Region 1
Federal Transit Administration
U.S. Department of Transportation
Volpe Center
220 Binney Street
Floor 9-940
Cambridge, MA 02142-1026

Re: FTA North Station Draw One Bridge Replacement Boston and Cambridge, MA

Dear Mr. Butler:

We have completed our consultation under section 7 of the Endangered Species Act (ESA) in response to your letter received December 2, 2024, and revised on December 19, 2024, regarding the above-referenced proposed project. We reviewed your consultation request document and related materials. Based on our knowledge, expertise, and your materials, we concur with your conclusion that the proposed action is not likely to adversely affect any NMFS ESA-listed species or designated critical habitat. Therefore, no further consultation pursuant to section 7 of the ESA is required.

We would like to offer the following clarifications to complement your incoming request for consultation. Regarding ESA-listed species under our jurisdiction that can potentially be present in your action area, which includes all of Boston Harbor up to 7.5 miles from the project site, adult and juvenile North Atlantic right whales can be present while foraging year-round, although their occurrence is expected to be rare. As part of your biological assessment, you determined that the proposed action will not have effects on listed fin whales. Therefore, the effects of the proposed action on fin whales will not be considered further. Lastly, regarding your analysis of effects from increased vessel traffic, the proposed action will result in an increased risk of vessel strikes when added to the baseline conditions that is too small to be meaningfully measured, detected or evaluated. Therefore, the effects from an increased risk of a vessel strike to listed species are insignificant.

On July 5, 2022, the U.S. District Court for the Northern District of California issued an order vacating the 2019 regulations that were revised or added to 50 CFR part 402 in 2019 ("2019 Regulations," see 84 FR 44976, August 27, 2019) without making a finding on the merits. On September 21, 2022, the U.S. Court of Appeals for the Ninth Circuit granted a temporary stay of the district court's July 5 order. On November 14, 2022, the Northern District of California issued an order granting the government's request for voluntary remand without vacating the 2019 regulations. The District Court issued a slightly amended order two days later on November 16, 2022. As a result, the 2019 regulations remain in effect, and we are applying the 2019 regulations here. For purposes of this consultation and in an abundance of caution, we

considered whether the substantive analysis and conclusions articulated in the letter of concurrence would be any different under the pre-2019 regulations. We have determined that our analysis and conclusions would not be any different.

Reinitiation of consultation is required and shall be requested by the federal agency or by us, where discretionary federal involvement or control over the action has been retained or is authorized by law and: (a) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered in the consultation; (b) if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this consultation; or (c) if a new species is listed or critical habitat designated that may be affected by the identified action. No take is anticipated or exempted. If there is any incidental take of a listed species, reinitiation would be required. Should you have any questions about this correspondence please contact Roosevelt Mesa at (978) 281-9186 or by email at Roosevelt.Mesa@noaa.gov. For questions related to Essential Fish Habitat, please contact Alexa Cacacie with our Habitat and Ecosystem Services Division at (978) 281-9294 or by email at Alexa.Cacacie@noaa.gov.

Sincerely,

Jennifer Anderson

Jennifer Anderson
Assistant Regional Administrator
for Protected Resources

EC: Cacacie, NMFS/HESD; Schmidt, FTA
ECO: GARFO-2024-03172
File Code: H:\Section 7 Team\Section 7\Non-Fisheries\FTA\Informal\2024\FTA Draw One Bridge Replacement

Section 7 Consultation, Determination of Effects

Draw One Bridge Replacement Project

November 2024

Prepared For:

Massachusetts Bay Transportation Authority (MBTA)
10 Park Plaza
Boston, MA 02116

Federal Transportation Authority (FTA)

220 Binney Street Suite 940
Cambridge, MA 02142-1093

Prepared By:

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Lowell, MA 01854

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LIST OF ACRONYMS

Notation	Definition
BMP	Best Management Practice
^{o}C	Degrees Celsius
CCTV	Closed-circuit television
CZM	Coastal Zone Management
dB	decibels
DCR	Massachusetts Division of Conservation and Recreation
DFE	Design Flood Elevations
DMF	Massachusetts Division of Marine Fisheries
DPS	Distinct Population Segment
Draw One Bridge	Commuter rail draw bridges over the Charles River just north of North Station
EFH	Essential Fish Habitat
^{o}F	Degrees Fahrenheit
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FWCA	Fish and Wildlife Coordination Act
GARFO	Greater Atlantic Region Fisheries Office
GOM	Gulf of Maine
km	kilometers
LAA	Likely to Adversely Affect
LNG	Liquid Natural Gas
MassDEP	Massachusetts Department of Environmental Protection
MassGIS	Massachusetts Bureau of Geographic Information
MBTA	Massachusetts Bay Transit Authority
MEPA	Massachusetts Environmental Policy Act
mg/L	Milligrams per liter
MGH	Massachusetts General Hospital
MHW	Mean high water
mph	miles per hour

Notation	Definition
mS/cm	Millisiemens per centimeter
MWRA	Massachusetts Water Resources Authority
NARW	North Atlantic Right Whale
NLAA	Not Likely to Adversely Affect
NOAA Fisheries	National Oceanic and Atmospheric Administration National Marine Fisheries Service
NOAA Fisheries Tool	NOAA Fisheries Multi-Species Pile Driving Calculator
North Bank Bridge	North Bank Pedestrian and Bicycle Bridge north of the Draw One Bridge (Figures 1 and A4)
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Units
OHWM	Ordinary High Water Mark
PAHs	Polyaromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PLC	Programmable logic controller
Proposed Project	Draw One Bridge Replacement Project
Project Site	The physical location of the Draw One Bridge Replacement Project as identified in Figure 1.
PSU	practical salinity units
RMS	root mean square
ROW	Right of way; land owned by the MBTA
SAV	Submerged Aquatic Vegetation
SEL	Peak Sound Exposure Level
SEL_{cum}	Cumulative Sound Exposure Levels
SEL_{ss}	Single Strike Sound Exposure Level
SIH	Signal Instrument House
SPCC	Spill Prevention, Control and Countermeasures
SPMTs	Self-propelled modular transporters
SWPPP	Stormwater Pollution Prevention Plan
SWQS	Massachusetts Surface Water Quality Standards
T-Pad	Area owned by MTBA north of the Draw One Bridge to be used by the contractor for construction storage and staging shown on Figure A3.

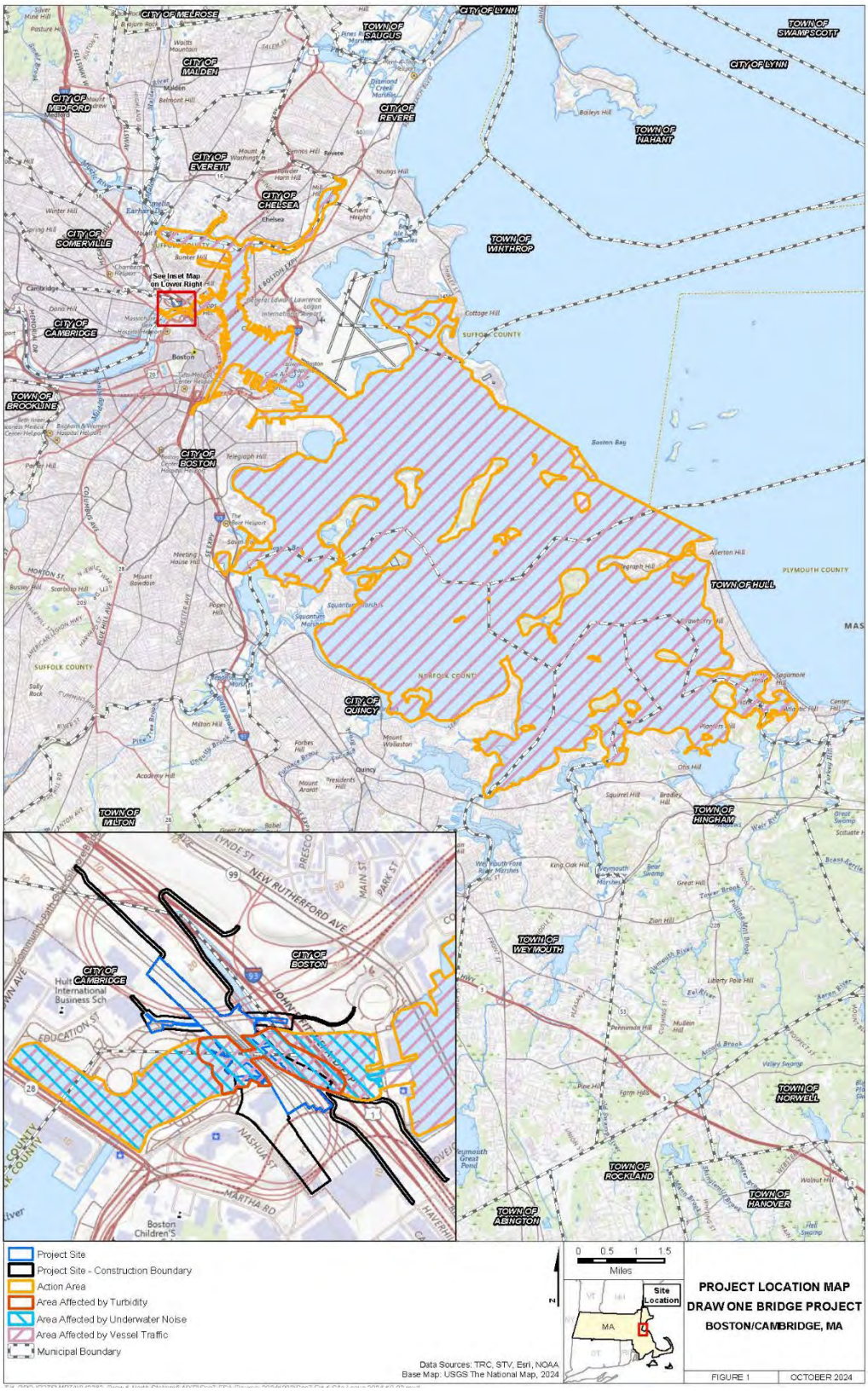
Notation	Definition
TOY	Time of Year
TRC	TRC Environmental Corporation
TSS	Total Suspended Solids
U.S.	United States
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
WOTUS	Waters of the United States
WQC	Water Quality Certificate

1.0 PROJECT PURPOSE AND OVERVIEW

The Massachusetts Bay Transit Authority (MBTA) is seeking funds to be provided through the Federal Transit Administration (FTA), as the lead federal agency for the Draw One Bridge Replacement Project (the Proposed Project). The Proposed Project would replace the existing two structures comprising the Draw One Bridge over the Charles River with three new vertical lift bridge structures. Associated activities include replacement of the adjacent Signal Tower A, replacement of the approach trestles, and related adjustments and upgrades to track alignments, and communications and signaling systems. **Figure 1** highlights the direct footprint of the work area including the temporary impacts (shown on figures as "Project Site – Construction Boundary") and permanent impact areas (shown on figures as "Project Site") for the Proposed Project. Project Site is used throughout the document to refer to the "Project Site – Construction Boundary" and "Project Site". The Project Site, comprising approximately 8 acres, is roughly located within the bounds of the Charles River (in the same area as the previous Draw One Bridge) but extends 200 feet upstream and 300 feet downstream of the existing Draw One Bridge. The purpose of the Proposed Project is to bring the Draw One Bridge into a state of good repair, improving the reliability and safety of MBTA Commuter Rail and Amtrak service. This is further detailed in Section 2 while conditions within the Action Area are described in Section 5.

Section 7(a)(2) of the Endangered Species Act (ESA) requires each federal agency to consult with National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) and United States Fish and Wildlife Service (USFWS) to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat. The Fish and Wildlife Coordination Act (FWCA) (16 USC 742, et seq.) requires federal agencies that construct, license, or permit water resource development projects to first consult with the USFWS (and NOAA in some instances) and the state fish and wildlife agency regarding the impacts on fish and wildlife resources and measures to mitigate these impacts. This document is intended to initiate consultation with NOAA under Section 7 of the ESA and coordinate under FWCA.

This consultation is used to represent all the discussions each agency has with NOAA Fisheries about the effects of a project on listed species and critical habitat. Section 7 of the ESA requires the federal agency to make a determination on the effects of the proposed project will have on listed species and critical habitat in order for NOAA Fisheries to issue their determination on the effects of the proposed action (which are explained in Section 7 of this document). If it is determined that the proposed project may affect but is Not Likely to Adversely Affect (NLAA) listed species and critical habitat, then only an informal consultation is necessary. An informal consultation must be requested by sending NOAA Fisheries a letter describing the proposed action, including any measures intended to avoid, minimize, or offset effects of the action; stating determinations that the effects on ESA listed species and/or critical habitat are extremely unlikely to occur, insignificant, or wholly beneficial; and an agency determination that the proposed project may affect but is unlikely to adversely affect any listed species and/or critical habitat.


CITY OF MELROSE
CITY OF LYNN
TOWN OF SAUGUS
TOWN OF SWAMPSCOTT
CITY OF MALDEN
CITY OF LYNN
CITY OF MEDFORD
CITY OF REVERE
TOWN OF NAHANT
CITY OF EVERETT
CITY OF CHELSEA
TOWN OF WINTHROP
CITY OF SOMERVILLE
See Inset Map on Lower Right
CITY OF CAMBRIDGE
SUFFOLK COUNTY
TOWN OF BROOKLINE
CITY OF BOSTON
Boston Bay
TOWN OF HULL
PLYMOUTH COUNTY
NORFOLK COUNTY
CITY OF QUINCY
TOWN OF HINGHAM
TOWN OF MILTON
TOWN OF WEYMOUTH
TOWN OF NORWELL
TOWN OF ROCKLAND
TOWN OF HANOVER
TOWN OF ABINGTON
NEW RUTHERFORD AVE
MAIN ST
BARK ST
LYNDE ST
EDUCATION ST
MARTHA RD
Hult International Business Sch
Boston Children S
Project Site
Project Site - Construction Boundary
Action Area
Area Affected by Turbidity
Area Affected by Underwater Noise
Area Affected by Vessel Traffic
Municipal Boundary
Data Sources: TRC, STV, Esri, NOAA
Base Map: USGS The National Map, 2024
0 0.5 1 1.5
Miles
Site Location
MA
PROJECT LOCATION MAP
DRAW ONE BRIDGE PROJECT
BOSTON/CAMBRIDGE, MA
FIGURE 1
OCTOBER 2024

If it is determined that the proposed project is Likely to Adversely Affect (LAA) listed species or NOAA Fisheries disagrees with the NLAA determination, then a formal consultation will be required. A formal consultation concludes with NOAA Fisheries issuing a biological opinion as to whether the proposed action is likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of critical habitat.

Consultation should be initiated before the applicant or applicable entities authorize, fund, or carry out the activity, but after they have determined that the proposed action may affect listed species and/or critical habitat. The information needed to initiate consultation is outlined in the implementation regulations 50 CFR Section 402.14.

1.1 Agency Correspondence

Three interagency consultation meetings have occurred between MBTA and NOAA (May 7, 2020, April 15, 2021, and February 25, 2022) to discuss the Proposed Project, likely permitting/review programs, the schedule, data needs and the permitting timeline **(Appendix A).** These interagency consultation meetings included members from MBTA, FTA, FRA, NOAA, the United States Coast Guard (USCG), Coastal Zone Management (CZM), United States Army Corps of Engineers (USACE) the Massachusetts Division of Marine Fisheries (DMF), the Massachusetts Department of Environmental Protection (MassDEP), Massachusetts Department of Conservation and Recreation (DCR), Cambridge and Boston Conservation Commission, Office and the Massachusetts Environmental Policy Act (MEPA) Office.

In response to questions asked during the interagency consultation meetings, email correspondence from Kaitlyn Shaw (NOAA) dated May 4, 2021, provided guidance on time of year (TOY) restrictions for Essential Fish Habitat (EFH) and NOAA Trust Resource Species (Section 4.1) and Best Management Practices (BMPs) (Section 4.1) to apply to the Proposed Project. Additionally, discussions during the interagency consultation meetings further guided the design and permitting process and helped confirm some of the BMPs and TOY restrictions that will be followed during the Proposed Project construction. FTA and MBTA met with the Greater Atlantic Regional Fisheries Office (GARFO) Protected Resources Division on November 26, 2024, to discuss the Proposed Project and consultation approach.

2.0 PROPOSED PROJECT

The Proposed Project would replace the existing Draw One Bridge over the Charles River, which currently comprises two bascule bridge structures, with three new vertical lift bridge structures. It would provide six, rather than the current four, tracks across the Charles River to maintain service during construction and operations. It would also replace the adjoining Signal Tower A and the approach spans and upgrade track alignments and communications and signaling systems. The purpose of the Proposed Project is to bring the Draw One Bridge into a state of good repair, improving the reliability and safety of MBTA Commuter Rail and Amtrak.

2.1 Project Components

2.1.1 Vertical Lift Bridges

The two operational bridge structures (of the original four) each carry two rail tracks over the Charles River. The Proposed Project includes the replacement of the original four bridges with three vertical lift bridge structures. Each new vertical lift bridge would support two tracks, for a total of six tracks over the Charles River.

Throughout the construction period, four tracks would remain in service. One new vertical lift bridge would be constructed to the west of the existing bridges and commissioned, then each of the existing draw spans would be replaced in succession. Once construction is complete, any one bridge could be removed from service for maintenance or repair while leaving four bridge tracks in operation.

The proposed bridges would rise 76 feet above the water level and have a 45-foot horizontal clearance, a 5.17-foot vertical clearance in the closed position, and a 32.2-foot vertical clearance when open. The existing bridges rise 51.5 feet above the water level and have a 65-foot horizontal clearance, a 5.38-foot vertical clearance in the closed position, and infinite vertical clearance when open. The new bridge structures accommodate future electrification of the rail lines by providing sufficient vertical clearance for fixed catenary when the bridge spans are fully open. The elevation of both the existing and proposed bridge structures is constrained by the elevation of adjacent track, which is at an elevation of approximately 11 feet. Although the Design Flood Elevation (DFE) for the Proposed Project is 13.1 feet, track elevations cannot be adjusted to clear this elevation as they are constrained by platform access at North Station and connections north of the Charles River.

Foundations from the two previously demolished bascule bridges would be removed. The north and south trestles of the existing structures would be replaced, as would the existing fender system. The new bridge and trestles would span the same distance of approximately 550 feet as the existing bridge infrastructure.

2.1.2 Signal Tower A Replacement

Existing operational controls would be relocated from a temporary control tower to a new Tower A building. The new building would be constructed along the seawall on the north bank of the Charles River, east of the mainline tracks, positioned to best serve operation of the proposed new three-span structure.

2.1.3 North Bank Bridge Modification

The North Bank Bridge would be raised approximately one foot to accommodate the new track alignment required with the new bridge structures. This would require the relocation of two bridge supports, the addition of one additional support, modification of the bridge truss structure, and modification and lengthening of the bridge landings in North Point Park and Paul Revere Park. Regrading of adjacent park pathways would require the relocation of an existing staircase in North Point Park. Landscaping at each end of the bridge would be replaced to tie into existing park infrastructure.

2.1.4 Track Work

Trackwork and associated signals would extend throughout the Project Site to connect the new bridge tracks to the mainline tracks north of Tower A. Trackwork, including reconstruction of direct fixation and platform modifications where required, and associated signals would be constructed to connect the new bridge tracks to station tracks.

Existing tracks would be realigned to provide consistent spacing and new special track work and signals will be installed to facilitate the track phasing required to allow the three proposed lift bridges to be constructed while maintaining connectivity of four tracks between the station and the rail lines north of the bridges. Existing track will have new ballast, ties, and rails installed as part of the project. Where new portions of track are being added to align with the third bridge or where track is constructed along a new alignment to realign to new bridges, new subgrade, drainage, ballast and track work and signals will be constructed.

2.1.5 Signal System

The Proposed Project would replace up to three sets of Signal Instrument Houses (SIHs). The microprocessor controller equipment for each of the new SIHs would support the new track and signal system configuration. All wayside devices, cables, and infrastructure (e.g., cable troughs, signal heads, railroad switches, etc.) currently located within MBTA right of way (ROW) and serving the existing Draw One Bridge would be upgraded with the Proposed Project.

2.1.6 Switch Heaters

Approximately 11 existing switch heaters would be replaced, and an additional six switch heaters would be installed to accommodate the new track alignment across the river, for a total of 17 proposed switch heaters. The types of switch heaters (e.g., gas- or electric-powered) that would be installed as part of the Proposed Project have not yet been determined.

2.1.7 Drainage System

A drainage system would be added to the north trestles to collect runoff from the proposed bridge and Tower A infrastructure and provide infiltration and detention before being returned to the Millers River at a new outfall to be installed along the west bank of the river, just south of the North Bank Bridge. Similarly, a drainage system would be added to the south trestles to collect runoff and direct it to a water quality structure that would remove sediment and other stormwater pollutants (e.g., nitrogen, phosphorous) before returning runoff to the Charles River at a new outfall to be installed along the south bank of the river within the limits of the MBTA ROW.

2.1.8 Safety and Security

Safety and security measures would be implemented in accordance with MBTA's policies and procedures and would consist of fencing, a closed-circuit television (CCTV) system, exterior lighting located along the bridge structure, and navigational lighting to meet USCG requirements. Further, MBTA would maintain controlled access locations at the bridge stair towers, Tower A doors, and pedestrian and vehicular fence gates for MBTA's situational awareness of the bridge and Tower A.

2.1.9 Resilience

The Proposed Project has been designed in accordance with MBTA's Flood Resiliency Design Directive and Drainage Design Directive. Electrical and mechanical equipment within Tower A (e.g., control desk, programmable logic controller [PLC]) would be located on the second floor, above the DFE of 13.1 feet. Flood walls and a deployable flood barrier would be provided at Tower A, and submersible equipment (e.g., junction boxes, lift span bearings, etc.) would be utilized on the bridge structure.

2.2 Construction Schedule, Sequence and Access

Based on permit/mitigation requirements that have been set forth, MBTA will include in the contract specifications parameters and requirements for the contractor, which are aligned with what is presented in the document below and will include all identified BMP's, commitments, and other measures presented. The construction methods described within the document will be followed to the extent practicable; however, actual construction methods and materials may vary slightly, depending in part on how the construction contractors choose to implement their work to be most cost effective, within the requirements set forth in this document and, in turn, the bid,

contract, and construction documents, as well as to comply with mitigation requirements. It is understood that substantial deviations from these methods would require reinitiation of consultation; such deviations are not anticipated and will be avoided.

2.2.1 Construction Schedule and Sequence

Construction is expected to begin in 2026 and be complete in 2034. Construction would be undertaken in five phases. The existing Signal Tower A would be demolished and replaced in the first phase. The new bridge span, to the west/upstream of the existing structures, would be constructed and commissioned first, then each of the existing bridge spans would be replaced in two successive stages so that four tracks across the Charles River would remain in operation at all times. In-water work would be undertaken approximately eight hours per day and five days per week; primarily during the daytime from 7am to 3pm. At certain times during the construction period, nighttime work may be performed between 3pm to 11pm and 11pm to 7am based on weather conditions and Project and contractor schedules. Work will be completed outside of the TOY restrictions, which are discussed in Table 6 below. Because barges will likely be used for material delivery and storage, work is expected to continue throughout the winter.

The contractor will determine sequencing and associated staging activities, which will be written into the contract documents. Construction will be carried out in five phases following site preparation and mobilization, which is estimated to require approximately four months, as shown in **Table 1**, below, and on **Figure A1**.

Table 1. Construction Sequence and Duration

Phase	Key Components	Estimated Duration (months)
Site Preparation & Mobilization	Signal duct banks, temporary control tower relocation, demolition of existing bridge foundations west of the bridges in use, western temporary trestle construction, early track and signal work	4
Bridge Phase 1	Demolition of Existing Tower A, Construction of Proposed Tower A, North Bank Bridge Modification, West Bridge north and south approach trestles and West Bridge vertical lift span, track and signal work in order to maintain service, one track on West Bridge brought into service	31

Table 1. Construction Sequence and Duration

Phase	Key Components	Estimated Duration (months)
Bridge Phase 2	Construction of new south approach trestles between west and center bridges, track and signal work, second track on West Bridge brought into service	5
Bridge Phase 3	Eastern temporary trestle construction, Center Bridge demolition, Center Bridge new north approach trestle and vertical lift span, track and signal work, one track on Center Bridge brought into service	20
Bridge Phase 4	Construction of new south approach trestle between center and east bridges, track and signal work, second track on Center Bridge brought into service, demolition of west temporary trestle	9
Bridge Phase 5	East Bridge demolition, construction of East Bridge north approach trestles and East Bridge vertical lift span, track and signal work, East Bridge brought into service, demolition of east temporary trestle	27
	Total	**96**
Source: STV (Jan 2023)		

Three pier foundations of the North Bank Pedestrian and Bicycle Bridge (North Bank Bridge) on MBTA right-of-way conflict with the Proposed Project construction. Existing piers 3, 4, and 5 of the North Bank Bridge are located on MBTA property, and one (Pier 3) conflicts with the Proposed Project. To allow for construction of the Proposed Project, the North Bank Bridge would be required to be raised 1 foot. This would entail relocating two bridge supports (existing Piers 3 and 4) and adding one additional support (Pier 4A), modifying the bridge truss structure, and modifying and lengthening the landings of the bridge within North Point Park and Paul Revere Park (Figure A2 on page 13 below).

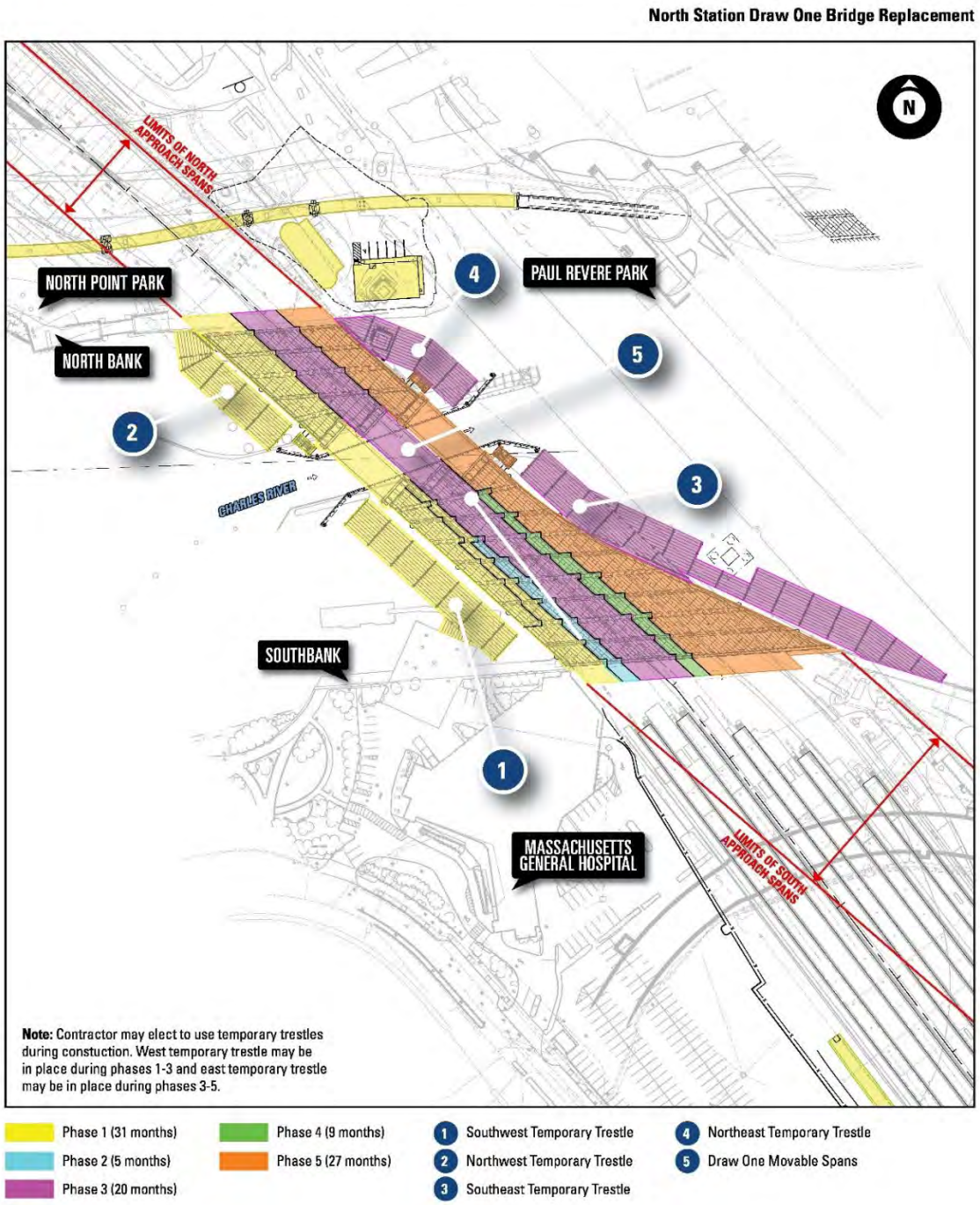


Figure A1: Bridge Construction Phases

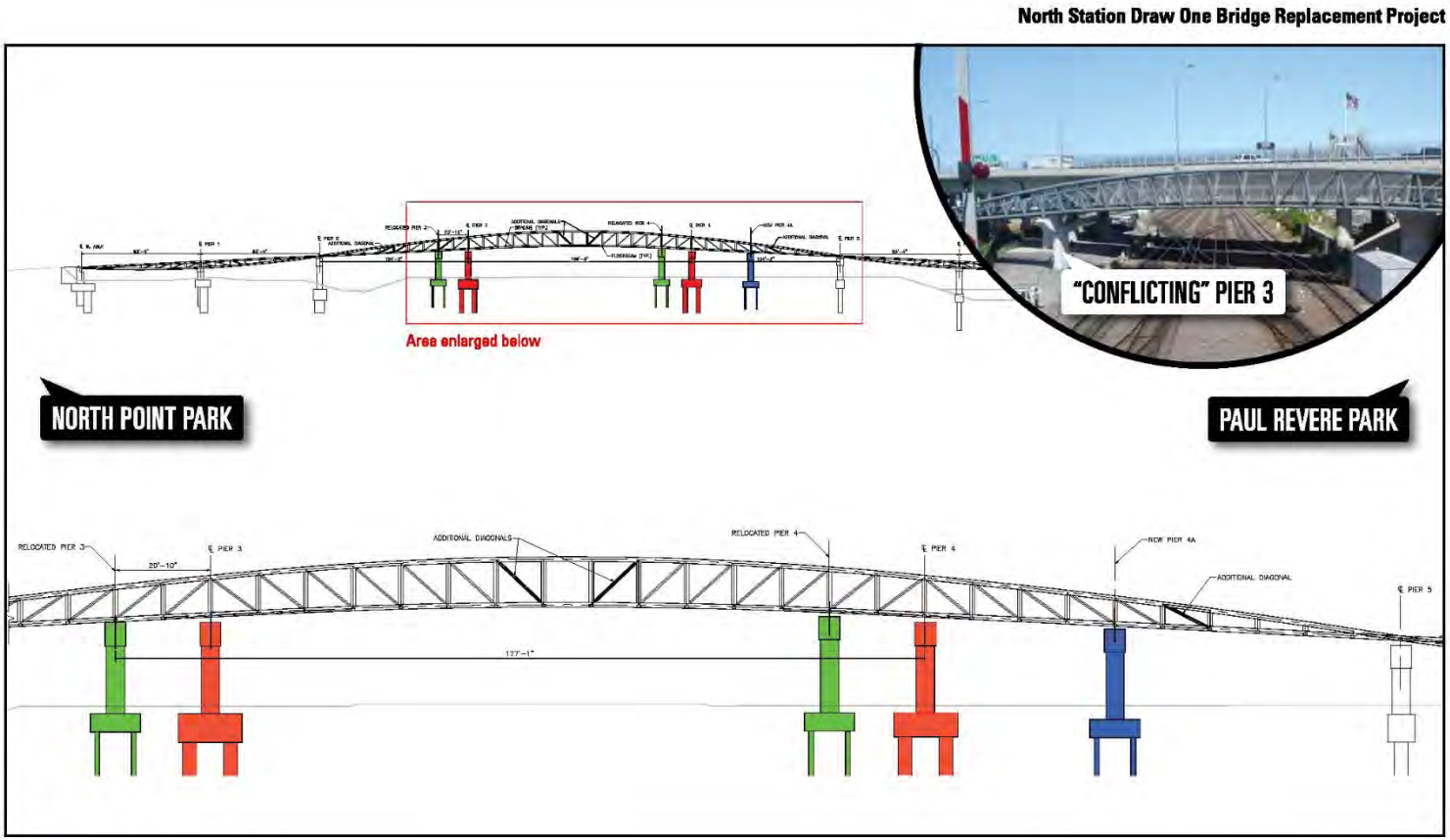


Figure A2: North Bank Bridge – Modifications

Construction activities may occur up to seven days a week. Work shifts would be primarily during the daytime from 7am to 3pm. At certain times in the construction as defined by weather and the Project and contractor's schedule, nighttime work may be performed between 3pm to 11pm and 11pm to 7am.

Various construction activities, when performed in a waterbody, disturb the sediment on the bottom of the waterbody, which mixes with the water, increasing the amount of sediment. These are referred to as "silt producing" activities. Construction activities that disturb a relatively small amount of sediment are referred to as minor silt producing activities and those that disturb a relatively large amount of sediment are referred to as major silt producing activities.

For the Proposed Project, all major silt producing activities, such as pile (timber, steel, and sheet piles) removal, dredging of the channel/riverbed to realign the navigational channel with the new bridge structures, riverbed disturbance by cutting below the mudline to remove existing piles or caissons, and removal of a bottom-laid cable used for the existing bridge would be conducted outside of the prime TOY fisheries windows (February 15 to July 15 and September 1 to November 15) or with silt curtains. Specific construction methodologies will be developed by the contractor, and until that is known, a more specific schedule is not available.

2.2.2 Construction Access

The primary areas of construction within the Project Site are the Draw One Bridge, existing Signal Tower A, and the MBTA-owned construction materials staging area and laydown site (T-Pad) in Somerville, Massachusetts **Figure A3** below.

Access to the T-Pad is expected to occur throughout the Proposed Project and can be used for material deliveries that will utilize the existing tracks to make deliveries to the Project Site. Access to these primary construction areas will be accomplished through developed and/or disturbed areas via the following quadrants shown on **Figure 1 and Figure A1** above:

- The Southwest Quadrant – access near Massachusetts General Hospital (MGH) allows access for construction of the Draw One Bridge Phases 1 through 3, west of the bridges currently in service. This area, proposed for use as construction access, is disturbed and currently comprises of the MGH, associated parking lots, and portions of North Station. The existing MGH ramp and dock into the river are proposed to be removed and reinstalled after construction is complete.

Figure A3: Construction Laydown Area – T-Pad

- The Northwest Quadrant – access to construct the Draw One Bridge Phases 1 through 3, the west end of the North Bank Bridge, and access to the mainline tracks up through the T-Pad. This area, proposed for use as construction access, is currently comprised of walking paths, as well as mowed and landscaped areas of the North Point Park; however, it has been historically disturbed by the construction and use of the previous rail bridges and tracks.
- The Southeast Quadrant – access to construct the Draw One Bridge Phases 3 through 5 (eastern bridge). This area, proposed for use as construction access, is disturbed and currently comprises of existing roadways and parking lots associated with the Charles River Dam and Locks and North Station.
- The Northeast Quadrant – access to construct the Draw One Bridge Phases 3 through 5 (eastern bridge), the replacement Tower A, the east end of the North Bank Bridge, and access to the T-Pad. This area, proposed for use as construction access, is currently comprised of walking paths and mowed and landscaped areas of the Paul Revere Park, as well as existing roadways which has been historically disturbed by the construction and use of the previous rail bridges and tracks.

2.3 Construction Overview

2.3.1 Substructures

Construction of the bridge substructures would comprise the installation of a combination of foundation types, including spread footings along the riverbanks and the following within the river: concrete-filled pipe piles, micropiles, composite fiberglass-reinforced piles, drilled shafts, and driven H-piles. In-river foundations would include a total of 12 drilled shafts, 321 concrete-filled pipe piles, and 39 micropiles. The navigational channel fender system associated with the bridge and the navigational channel would require 207 composite piles within the river. The North Bank Bridge modifications would require 16 micropiles on land. Tower A would require 65 driven H-piles on land.

2.3.2 Cofferdams

To support the removal of eleven caissons from the demolished bridge structures to the west of the existing Draw One Bridge, two cofferdams may be installed. One cofferdam, approximately 98 feet (29 meters) long by 58 feet (18 meters) wide, would encapsulate the set of eight caissons on the north side of channel (Location 4 on **Figure A4**). A second cofferdam, approximately 104 feet (32 meters) long by 27 feet (8 meters) wide, would encapsulate the three caissons on the south side of channel, and a concrete cap would connect all three of the caissons (Location 1 on **Figure A4**). If used, it is expected that the cofferdams be in the water for approximately four months while the caissons within the cofferdams are removed. Please see Section 3.3.1.1 below for more information on caisson removal and **Table 4** below for more information on sheet piles.

Note: Contractor may elect to use Cofferdams as shown to assist in the demolition of remaining caissons and piers.

Figure A4: Potential Cofferdam Locations

2.3.3 Temporary Trestles and Barges

Construction work activities for each bridge structure would begin simultaneously at multiple locations, starting with the construction of temporary work trestles to drive piles using barge-mounted equipment. Four temporary work trestles for materials and equipment would then be constructed, two on the east side and two on the west side of the Project Site (**Figures A5 and A6**). Each trestle would be in place for approximately six years. The temporary work trestles are expected to have an overwater length of up to 1,000 feet (305 meters) in total, with individual lengths ranging from 150 feet (45 meters) to 465 feet (142 meters) and a width of 40 feet (12 meters); they would be placed as shown on **Figures A5 and A6**. Several barges would be used for the construction of the temporary trestles, drilled shafts, caps, and piers (**Figure A5 and A6**). Barges may also be used for mounted cranes, storage barges, and material delivery. Precast concrete, steel reinforcement bars, structural steel members, and machinery components may be transported to the Project Site by barge.

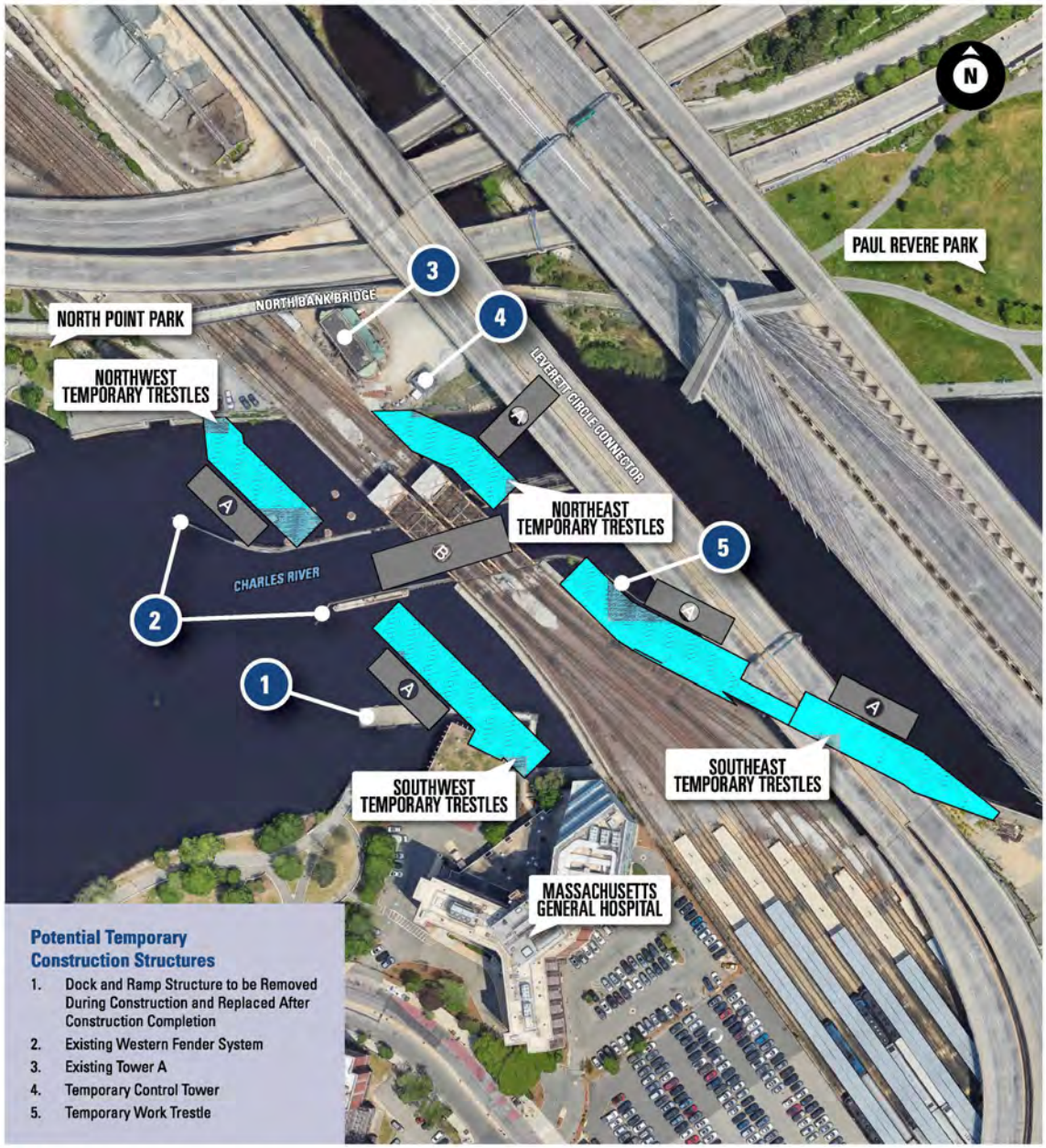
Drilled shaft construction for lift span piers could begin concurrently and be performed using barge-mounted equipment or trestle-supported equipment. The abutments and approach trestle piles would be constructed using equipment mounted on the work trestles or located on constructed portions of each proposed bridge structure.

2.3.4 Land-Side Structures

As currently contemplated, Phase 1 work activities would include demolition of the original unused Tower A, relocating the existing temporary Tower A onto the Northeast Temporary Trestle structure which will be installed in the river adjacent to the existing north bank seawall, and construction of a new Tower A (**Table 1**). Foundation work would comprise the installation of test pits to determine the extent of the existing seawall landward and the installation of driven piles with land-side equipment. Phase 1 would include the installation of a water detention system below the proposed parking lot at the new Tower A site and a new waterline utility using jack and bore methods beneath the MBTA tracks adjacent to the Tower A site.

Modification of the North Bank Bridge is assumed to start during Phase 1. New foundations for the relocated Pier 3, relocated Pier 4, and new Pier 4A would consist of micropiles from ground supported equipment. The North Bank Bridge superstructure would be raised approximately one foot in height to allow for the additional track to be constructed under this bridge. Additional work would consist of regrading the approach pathways at each end of the North Bank Bridge after it is raised and adjusting the drainage structures (**Figure A2**).

North Station Draw One Bridge Replacement

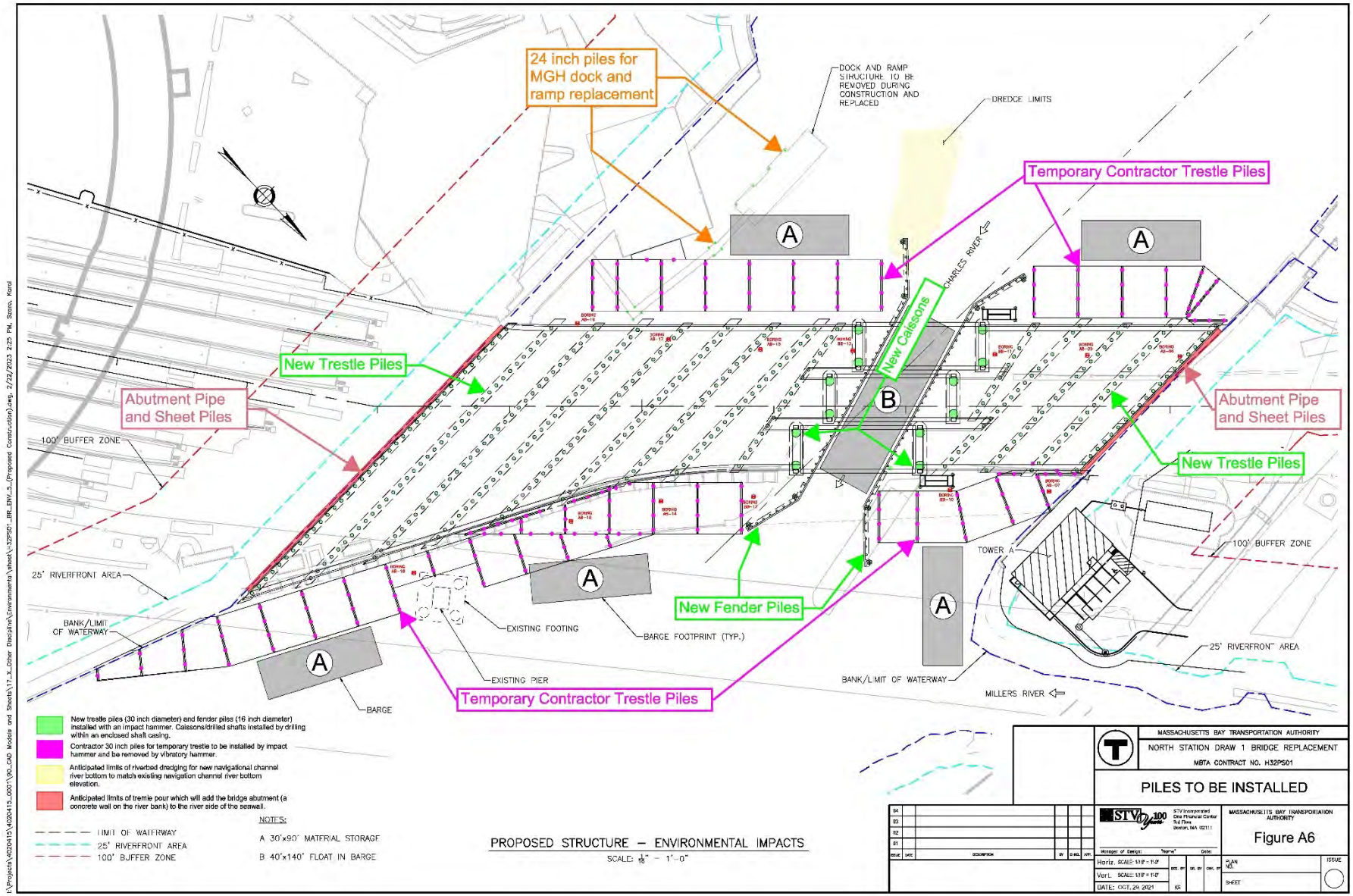


A Barge for Material Delivery and Storage

B Barge for Float-out of Existing Spans (Temporary Channel Closure)

Note: Contractor may elect to use temporary trestles and barges during construction. All of the barges and temporary trestles shown are underneath the elevated overhead structures.

Figure A5: Temporary Trestles with Barges


24 inch piles for MGH dock and ramp replacement
DOCK AND RAMP STRUCTURE TO BE REMOVED DURING CONSTRUCTION AND REPLACED
DREDGE LIMITS
Temporary Contractor Trestle Piles
CHARLES RIVER
New Caissons
New Trestle Piles
Abutment Pipe and Sheet Piles
100' BUFFER ZONE
25' RIVERFRONT AREA
BANK/LIMIT OF WATERWAY
EXISTING FOOTING
BARGE FOOTPRINT (TYP.)
EXISTING PIER
BARGE
New Fender Piles
Temporary Contractor Trestle Piles
TOWER A
MILLERS RIVER
New trestle piles (30 inch diameter) and fender piles (16 inch diameter) installed with an impact hammer. Caissons/drilled shafts installed by drilling within an enclosed shaft casing.
Contractor 30 inch piles for temporary trestle to be installed by impact hammer and be removed by vibratory hammer.
Anticipated limits of riverbed dredging for new navigational channel river bottom to match existing navigation channel river bottom elevation.
Anticipated limits of tremie pour which will add the bridge abutment (a concrete wall on the river bank) to the river side of the seawall.
LIMIT OF WATERWAY
25' RIVERFRONT AREA
100' BUFFER ZONE
NOTES:
A 30'x90' MATERIAL STORAGE
B 40'x140' FLOAT IN BARGE
PROPOSED STRUCTURE – ENVIRONMENTAL IMPACTS
SCALE: 1/8" = 1'-0"
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
NORTH STATION DRAW 1 BRIDGE REPLACEMENT
MBTA CONTRACT NO. H32PS01
PILES TO BE INSTALLED
Figure A6

2.3.5 Superstructure

Superstructures of the new bridge structures would be erected from the temporary work trestles in Phases 1, 2, 4, and 5. Phase 3, the new eastern bridge, would be constructed from a combination of the already-constructed bridge and the temporary work trestles. Materials delivery would primarily be by barge or rail; materials would be stored at the T-Pad, on barges, or on the temporary trestle system.

2.3.6 Demolition of Remaining Movable Span Structures and Tower A

Demolition of the original Tower A would include abatement of existing hazardous materials and relocation of any remaining electrical and bridge operation related services out of Tower A so existing equipment can be decommissioned. Selective demolition will be used to remove the existing Boston and Maine cast stone sign from the façade along with any other elements that may be used in the mitigation measures undertaken pursuant to Section 106 of the National Historic Preservation Act of 1966 Memorandum of Agreement. Shielding will be erected to protect the tracks, existing signal equipment, and the North Bank Bridge. Traditional demolition methods would then be used to demolish the building and foundation, which may include excavators, demolition hammers, and steel shears.

Foundations for the existing Draw One Bridge that would be demolished with the Proposed Project include 25 piers and 21 caissons, as well as the navigational channel fender system and Tower A.

Demolition of the remaining operational Draw One Bridge movable span structures would likely entail removing the counterweight and machinery room and transporting them to the existing Tower A site for demolition using self-propelled modular transporters (SPMTs), which are multi-axle trailers designed for large and heavy cargoes. The existing trusses would be cut apart and portions removed by crane, and remaining portions floated out on a barge. Existing caissons outside of the navigable channel would be demolished down to the mudline by wire saw cutting, cutting torches, or other mechanical means chosen by the contractor. Caissons within the proposed navigational channel would be demolished down to five feet below the proposed channel elevation. Caisson demolition is anticipated to be performed by wire-saw cutting and removing sections of each caisson. Alternate methods could include the use of silt curtains and demolition hammers.

Demolition of the south approach trestle would entail cutting the existing deck precast panels at the original construction joints and removing sections of the deck. Pier caps would have areas of local demolition so sections could be removed. Where original timber piles were grouted into the pier caps, the tops of piles would be cut to facilitate pile cap removal. Timber piles would be cut off at the mudline, except at locations where they would conflict with the proposed foundations, in which case they would be extracted. Approximately 1,380 timber piles would be cut off at the mudline and 20 piles would be extracted at the existing south approach trestles (**Figure A7**).

Demolition of the operational north approach trestle and navigational channel fender would consist of removal of deck timber and timber pile caps prior to cutting timber piles off at the mudline. Where timber piles conflict with the proposed foundations, the piles would be extracted. Where piles would be located in the proposed channel, the piles would be cut off five feet below the mudline. Approximately 560 piles would be cut off at or below the mudline and 50 piles would be extracted at the operational north approach trestles and existing navigational channel fender system (**Figure A7 and A8**).

2.3.7 Construction Staging Areas

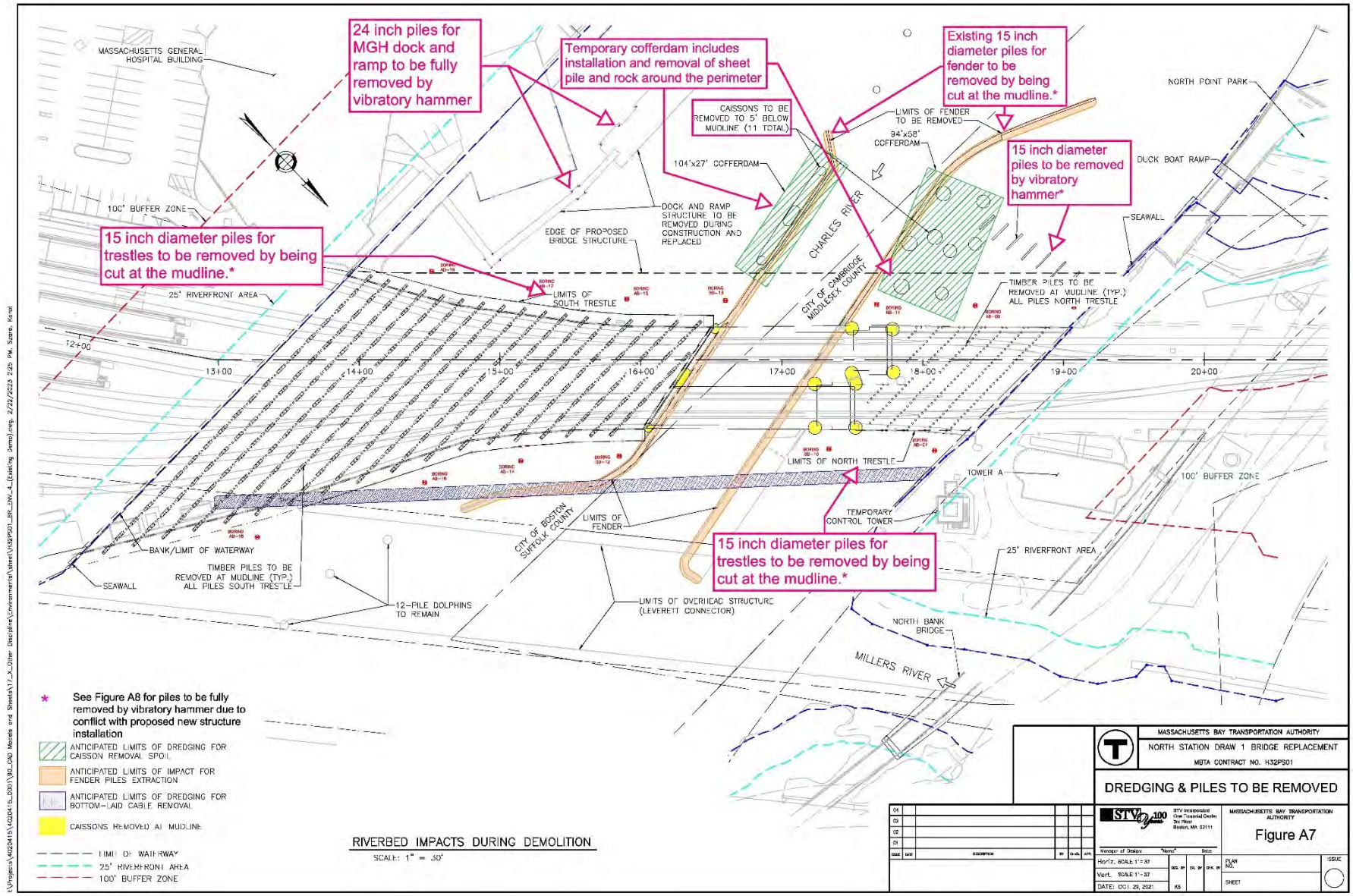
Construction staging areas, also referred to as "laydown areas," are sites used for storage of materials or equipment, assembly, or other temporary construction-related activities. Staging areas are typically fenced for security and to protect the public, have gates to allow vehicle access, take deliveries, and are often lighted for security. Staging areas of adequate size and proximity to the work activities are essential to support construction activities.

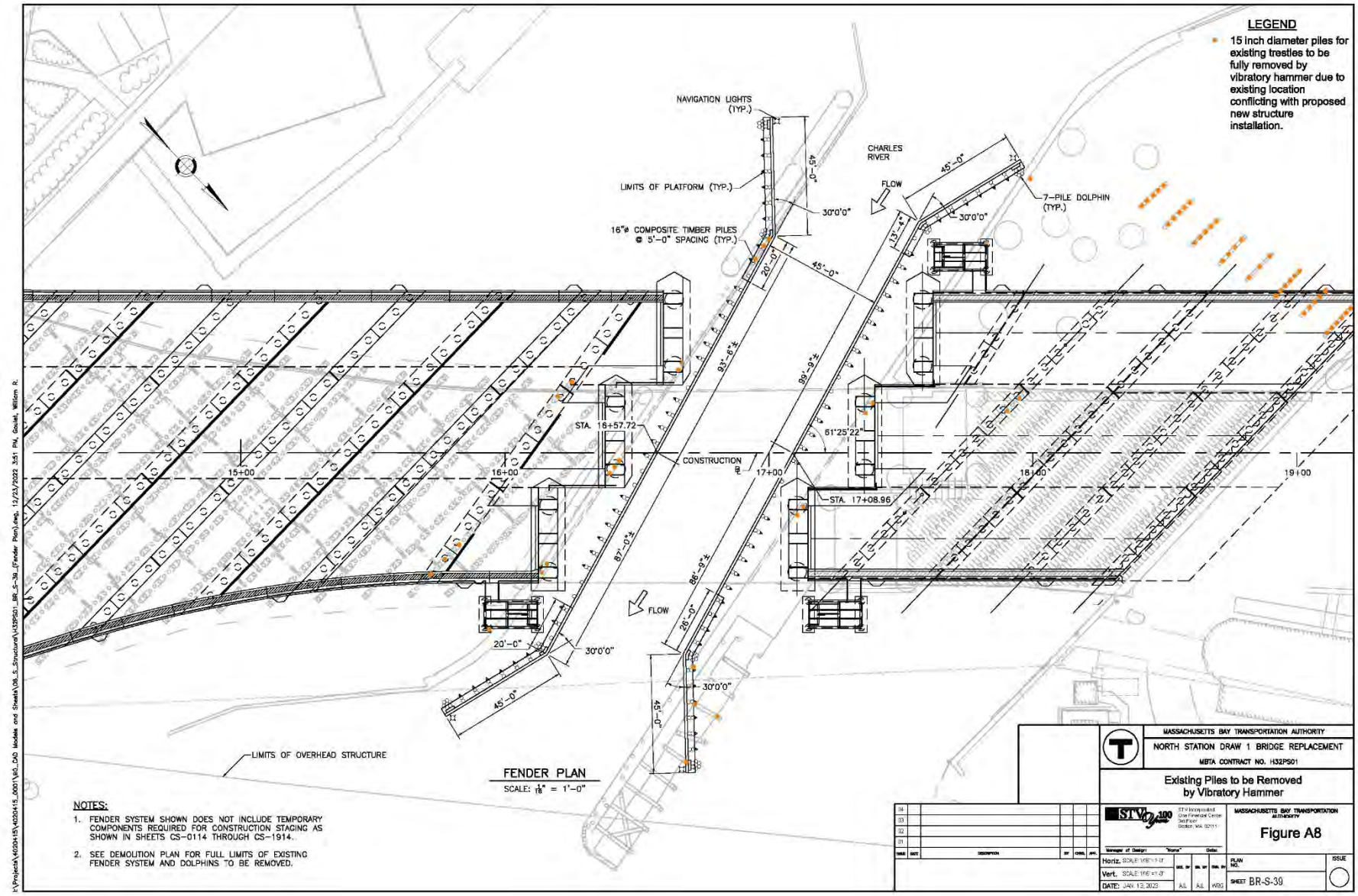
One construction staging area is an existing MBTA commuter rail material storage yard and maintenance staging area known as the "T-Pad." The T-Pad is located at 28 Inner Belt Road, in Somerville, Massachusetts, which is north approximately 5,000 feet on rail from the center of the Charles River (**Figure A3** above).

The T-Pad site currently contains a bridge and building shop as well as track material storage and MBTA Operations staging area to support MBTA Commuter Rail maintenance, but these uses would be temporarily relocated during Proposed Project construction. The T-Pad yard has a direct connection into the existing track network throughout the Project Site. The site's rail proximity would allow for equipment to get on and off rail on uncontrolled track, thereby not delaying MBTA Commuter Rail operations. This close proximity also enables ballast cars and flat cars to be loaded to move track materials from the laydown area to the project construction sites.

Additional laydown areas would be located in construction zones based on the track phasing. During the construction of the movable spans, the two tracks that connect to the bridge under construction, immediately north of the bridges, would be out of service and can be used for onsite laydown areas during each phase.

If the construction contractors choose to use staging areas that differ from those identified herein, they will be required to obtain all necessary permits and approvals from federal, state and local regulatory agencies. This would also be required for any remote staging areas for loading barges with material and equipment, or for partial preassembly.


24 inch piles for MGH dock and ramp to be fully removed by vibratory hammer
Temporary cofferdam includes installation and removal of sheet pile and rock around the perimeter
Existing 15 inch diameter piles for fender to be removed by being cut at the mudline.*
15 inch diameter piles to be removed by vibratory hammer*
15 inch diameter piles for trestles to be removed by being cut at the mudline.*
15 inch diameter piles for trestles to be removed by being cut at the mudline.*
MASSACHUSETTS GENERAL HOSPITAL BUILDING
CAISSONS TO BE REMOVED TO 5' BELOW MUDLINE (11 TOTAL)
LIMITS OF FENDER TO BE REMOVED
94'x58' COFFERDAM
104'x27' COFFERDAM
NORTH POINT PARK
DUCK BOAT RAMP
SEAWALL
100' BUFFER ZONE
DOCK AND RAMP STRUCTURE TO BE REMOVED DURING CONSTRUCTION AND REPLACED
EDGE OF PROPOSED BRIDGE STRUCTURE
CHARLES RIVER
CITY OF CAMBRIDGE MIDDLESEX COUNTY
25' RIVERFRONT AREA
LIMITS OF SOUTH TRESTLE
TIMBER PILES TO BE REMOVED AT MUDLINE (TYP.) ALL PILES NORTH TRESTLE
12+00
13+00
14+00
15+00
16+00
17+00
18+00
19+00
20+00
LIMITS OF NORTH TRESTLE
TOWER A
100' BUFFER ZONE
TEMPORARY CONTROL TOWER
CITY OF BOSTON SUFFOLK COUNTY
LIMITS OF FENDER
BANK/LIMIT OF WATERWAY
SEAWALL
TIMBER PILES TO BE REMOVED AT MUDLINE (TYP.) ALL PILES SOUTH TRESTLE
12-PILE DOLPHINS TO REMAIN
LIMITS OF OVERHEAD STRUCTURE (LEVERETT CONNECTOR)
25' RIVERFRONT AREA
NORTH BANK BRIDGE
MILLERS RIVER
* See Figure A8 for piles to be fully removed by vibratory hammer due to conflict with proposed new structure installation
ANTICIPATED LIMITS OF DREDGING FOR CAISSON REMOVAL SPOIL
ANTICIPATED LIMITS OF IMPACT FOR FENDER PILES EXTRACTION
ANTICIPATED LIMITS OF DREDGING FOR BOTTOM-LAID CABLE REMOVAL
CAISSONS REMOVED AT MUDLINE
LIMIT OF WATERWAY
25' RIVERFRONT AREA
100' BUFFER ZONE
RIVERBED IMPACTS DURING DEMOLITION
SCALE: 1" = 30'
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
NORTH STATION DRAW 1 BRIDGE REPLACEMENT
MBTA CONTRACT NO. H32PS01
DREDGING & PILES TO BE REMOVED
Figure A7


LEGEND
15 inch diameter piles for existing trestles to be fully removed by vibratory hammer due to existing location conflicting with proposed new structure installation.
NAVIGATION LIGHTS (TYP.)
LIMITS OF PLATFORM (TYP.)
16"ø COMPOSITE TIMBER PILES @ 5'-0" SPACING (TYP.)
CHARLES RIVER
FLOW
7-PILE DOLPHIN (TYP.)
45'-0"
30'0"0"
20'-0"
STA. 16+57.72
CONSTRUCTION
STA. 17+08.96
51°25'22"
15+00
16+00
17+00
18+00
19+00
26'-0"
LIMITS OF OVERHEAD STRUCTURE
FENDER PLAN
SCALE: 1/8" = 1'-0"
NOTES:
1. FENDER SYSTEM SHOWN DOES NOT INCLUDE TEMPORARY COMPONENTS REQUIRED FOR CONSTRUCTION STAGING AS SHOWN IN SHEETS CS-0114 THROUGH CS-1914.
2. SEE DEMOLITION PLAN FOR FULL LIMITS OF EXISTING FENDER SYSTEM AND DOLPHINS TO BE REMOVED.
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
NORTH STATION DRAW 1 BRIDGE REPLACEMENT
MBTA CONTRACT NO. H32PS01
Existing Piles to be Removed by Vibratory Hammer
Figure A8
SHEET BR-S-39

2.4 In-water Construction Details

The overall footprint within which bottom disturbance could occur is shown in **Figure 2** below.

2.4.1 Demolition

The existing bridge superstructure would be sequentially demolished using cranes mounted on the temporary trestle and/or barges. This section of the bridge currently above the water will be kept above the water throughout demolition. In-water demolition activities are described below.

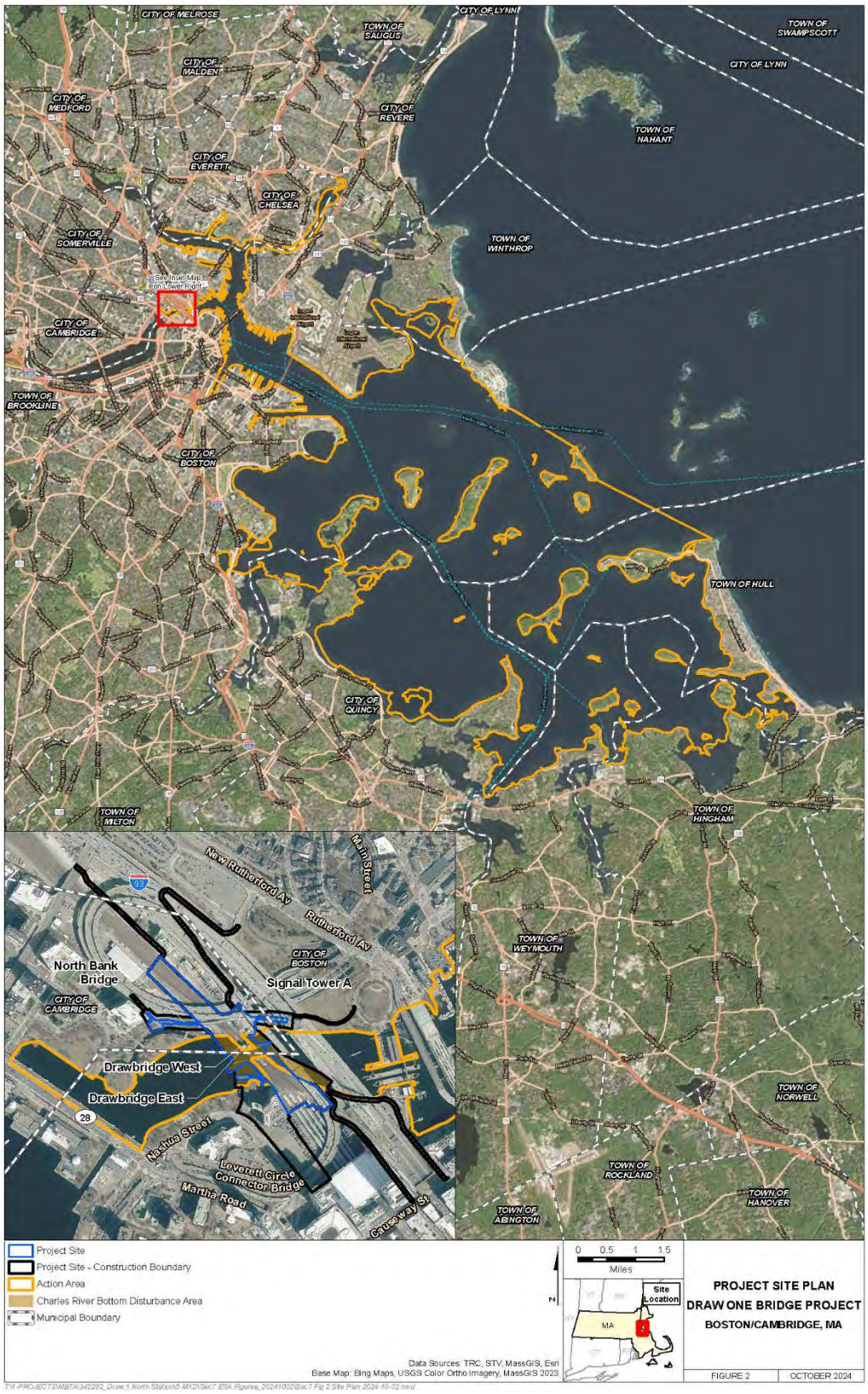
2.4.1.1 Caisson Removal

To remove the foundations/caissons of the currently unused bridge structures within the navigational channel, sediment would be excavated to a depth of five feet below mudline, while caissons at the bridge would be cut at the mudline to minimize sediment disturbance. Wire saw cutting, cutting torches, or other mechanical means would be used to cut metal and pneumatic hammers or other tools chosen by the contractor would be used to break up and remove the concrete.

Two cofferdams may be installed to support caisson removal. One approximately 98-foot by 58-foot cofferdam would surround the set of eight caissons on north side of channel, and a second approximately 104-foot by 27-foot cofferdam would encapsulate the three caissons that supported the “rest piers” on south side of channel. Cofferdam installation using a vibratory hammer or impact hammer would be conducted from a barge prior to the construction of the temporary trestle and would take approximately one week. The cofferdams would not be dewatered, but would be closed to contain debris and disturbed sediment. Cofferdam sheet piles would also be removed via vibratory or impact hammer. As needed, silt curtains or other methods of minimizing sediment dispersal would be installed around the cofferdams during their removal. It is anticipated that each cofferdam would be in place for approximately four months during the Site Preparation and Mobilization construction phase.

2.4.1.2 Timber and Steel Pile Removal

Timber piles would be removed by cutting the piles three feet below the mudline or defined bottom channel. Full removal would be undertaken where piles conflict with the proposed structure and the remaining piles would be cut at the mudline and placed on a barge for upland disposal (**Figure A7**). A pneumatic shear would cut the pile, while an excavator or other device with a grapple would connect to the pile and lift it out of the water and onto a barge. If positioning pneumatic shear equipment for cutting steel is determined to be difficult, piles may be cut using a thermal or arc process or mechanical methods. Piles would be properly disposed of or considered for reuse (e.g., dried, chipped and used for biofuel). See **Table 2** for details on the timber and steel pile removal.



T:\Projects\MBTA\342262_Draw 1 North Station\5-MXD\Sec7 ESA Figures_20241002\Sec7 Fig 2 Site Plan 2024-10-02.mxd

Table 2. Removals by Vibratory Hammer

Figure No.	Structure (action)	Size & Diameter	Duration of Work	Technique
A7	48 Existing Bridge Trestle piles removed	• 15” diameter • timber	• 15 days to remove all ~86 piles in this table	• 3 to 6 piles per day • 30 minutes of vibratory hammer per pile
A6	22 Existing Navigational Fender piles removed	• 15” diameter • timber		
A6	16 MGH dock and ramp piles removed	• 24” diameter (conservative est.) • Steel or fiberglass		

2.4.1.3 Bottom-laid Cable Removal

While the cable comprises a bottom-laid system on the riverbed, portions of the cable may have settled into the underlying sediments. Therefore, cable removal may require excavation of any overlaying sediments to a sufficient depth to either expose the cable or allow it to be pulled out of a partially excavated trench. The removed cable would be placed on a barge for proper upland disposal or recycling.

2.4.2 Dredging

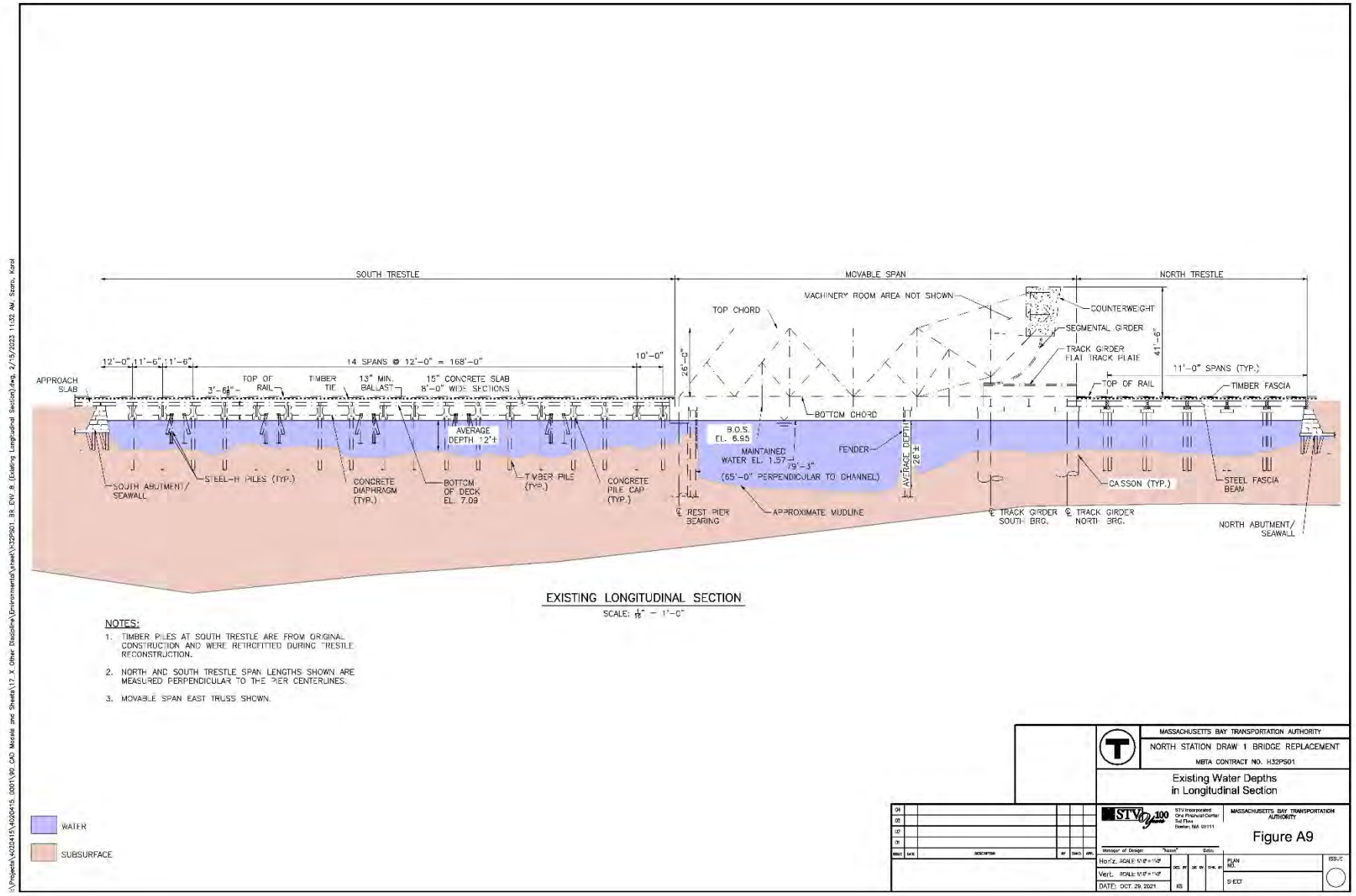
This section describes all activities that remove structures or soil from the riverbed.

Dredge volume includes the volume of existing piles and structures removed in addition to the volume of removed sediments. The estimated dredge volume associated with bridge and approach trestle demolition and construction totals 2,689 cubic yards of riverbed material (**Figures A7 and A8**). Volumes of sediment to be dredged by project stage is presented in **Table 3**. The estimated fill volume for drilled shafts is 1,487 cubic yards (**Figure A6**). The estimated total temporary surface area disturbance of the riverbed associated with Proposed Project demolition and construction is 30,912 square feet (0.71 acres), and the estimated total area of permanent fill to be placed in the riverbed from all construction activity is 11,411 square feet (0.26 acres).

Dredging would involve removing underwater sediment via barge-mounted bucket excavator or clamshell dredge. Excavated sediment would be loaded onto containment barges for proper disposal, most likely at a contained landfill suitable for receipt of contaminated soils.

Sediment-disturbing activities during Proposed Project demolition and construction would include:

1. Existing structure demolition
    a. Demolition of existing caissons (21 total: 11 for previous bridges not in service, 10 for current bridges in service), including the optional installation of temporary cofferdams around previous bridge caissons as determined by the contractor
    b. Pile extraction and/or cutting of existing MGH dock and ramp, bridge trestles, and navigational channel fender system piles (**Figures A4, A6, A7 above and A9 below**)
    c. Bottom-laid cable removal
2. Proposed structure construction
    a. Installation of temporary work trestle system
    b. Construction of proposed bridge drilled shafts and trestle piles, MGH dock and ramp replacement piles, and navigational channel fender piles
    c. Existing riverbed dredging - Dredging is proposed for areas outside of the proposed fender system that now may be in the assumed travel path for vessels traversing the channel and are no longer protected by the existing fender to ensure the required depth of the navigational channel.
    d. Construction of the king (sheet) pile abutments along the north and south seawalls
3. Proposed temporary structure demolition impacts
    a. Temporary work trestle piles extraction



EXISTING LONGITUDINAL SECTION

SCALE: 1/16" = 1'-0"

NOTES:

1. TIMBER PILES AT SOUTH TRESTLE ARE FROM ORIGINAL CONSTRUCTION AND WERE RETROFITTED DURING TRESTLE RECONSTRUCTION.
2. NORTH AND SOUTH TRESTLE SPAN LENGTHS SHOWN ARE MEASURED PERPENDICULAR TO THE PIER CENTERLINES.
3. MOVABLE SPAN EAST TRUSS SHOWN.

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

NORTH STATION DRAW 1 BRIDGE REPLACEMENT

MBTA CONTRACT NO. H32PS01

Existing Water Depths in Longitudinal Section

STV Incorporated, One Financial Center, 3rd Floor, Boston, MA 02111

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

Figure A9

Horiz. SCALE: 1/16" = 1'-0"

Vert. SCALE: 1/16" = 1'-0"

DATE: OCT. 29, 2021

A summary of the dredging and fill estimates for various Project elements is provided in **Table 3** below.

Table 3. Dredge/Excavation Volumes and Surface Area Permanent Impacts Associated with the Draw One Bridge Replacement

Figure No.	In Water Activity (Below MHW/OHW)*	Demolition (D) and Construction (C) Impacts			
		Dredge Volume (CY)	Fill Volume (CY)	Temporary Riverbed Disturbance (SF)	Perm Fill in Riverbed (SF)
Demolition					
A4 & A7	Removal of Caissons from Bridge Not In Service[1]	386	0	694	0
A7	Removal of Bridge Trestle and Fender Timber Piles (16-inch) & Trestle Steel H-piles (piles cut off)	1567	0	11,122	0
A7 & A8	Removal of Timber Trestle Piles (piles extracted)[3,5]	143	0	86	0
A4 & A7	Removal of Caissons from Bridge Not In Service with Optional Cofferdams and Bridges In Use[2]	500	0	8,260	0
A7	Bottom-Laid Cable Removal	10	0	3,800	0
A7	MGH Dock and Ramp 24-inch Pile Removal	84	0	50	0
	Total for Demolition (6 lines above)	2,689	0	24,012	0
Construction					
A6	Drilled Shafts[4]	941	1,487	0	462
A6	Micropiles for King Pile Abutment	77	96	0	35
A6	New Bridge 30-inch Trestle Piles and 16-inch Navigational Channel Fender Piles	0	1,149	0	1,865
A6	Temporary Work Trestle 30-inch Pile Installation[6]	0	900	1,600	0
A6	Riverbed Dredging to get Navigational Channel to Correct Depth	220	0	3,700	0
A6	Tremie Pour Behind King Pile Abutment North and South Seawalls[7]	0	1,200	0	9,000
A6	MGH Dock and Ramp 24-inch Pile Replacement	0	84	0	50
	Construction (7 lines above)	1,238	4,915	5,300	11,411

Table 3. Dredge/Excavation Volumes and Surface Area Permanent Impacts Associated with the Draw One Bridge Replacement

Figure No.	In Water Activity (Below MHW/OHW)*	Demolition (D) and Construction (C) Impacts			
		Dredge Volume (CY)	Fill Volume (CY)	Temporary Riverbed Disturbance (SF)	Perm Fill in Riverbed (SF)
Additional Demolition					
A6	Temporary Work Trestle 30-inch Pile Extraction[8]	900	0	1,600	0
Total Loss or Alteration of Resource Area		**4,827**	**4,915**	**30,912**	**11,411**
Combined Total		**9,742**		**42,323**	
Total with added 10% Dredge Volume and Fill Area Factor of Safety for Permitting Purposes		**10,716**		**46,555**	

[1] Cut at mudline. Existing piles and caissons not located where new construction is proposed are to be removed at the mudline (dredging impact = 0).
[2] Existing caissons within the proposed navigational channel are to be removed 5 feet below mudline at 1:3 slope.
[3] Existing piles located where new construction is proposed are to be removed using vibratory hammer extraction method.
[4] Drilled shafts assumed to extend 60 feet below mudline.
[5] Includes North & South Approach Trestles. Piles assumed to extend 25 feet below mudline.
[6] Layout of temporary work trestle may change based on contractor approach to Project construction, to be determined. Impacts are multiplied by 2 due to uncertainty in the final layout.
[7] Assumes no fill below mudline for tremie pour.
[8] Volume of temporary trestle piles removed; surface area included in Figure A7. Removal assumed to use vibratory hammer extraction method. Impacts are multiplied by 2 due to uncertainty in the final layout.

*These activities are not changing the nature of the land. The final conditions would be essentially the same as existing conditions.

2.4.2.1 Drilled Shaft Installation

The movable span would be supported on piers, which in turn would be supported on concrete drilled shafts installed through the sediment directly into bedrock. Each of the 12 drilled shafts would be 7 feet in diameter. Other than a momentary disturbance when each casing is first lowered onto the channel bottom, sediment disturbance during installation would only occur within the enclosed shaft casing. The casing is essentially the formwork for the concrete drilled shaft, and both the casing and drilled shaft would be permanent.

During drilling activity within the shaft, sediments would be moved within and up the casing to the drilling equipment and would not enter the water. As the drilling continues, the casing would continue to advance downward into the sediment until the casing is seated on bedrock. A rock socket would then be drilled into the bedrock in a similar manner. Concrete would be pumped into the casing to finish construction of the drilled shaft. Concrete placement for the proposed drilled shafts would be undertaken using a pump truck on a temporary trestle. See **Figure A10** below for the Proposed Water Depths in Longitudinal Sections.

2.4.2.2 King Pile Abutment

King pile abutment installation would comprise installing pipe piles with sheet piles between them, both driven beyond the mudline to form a wall structure. A concrete abutment cap would be cast on top of the wall created by the pipe and sheet piles and concrete would be placed between the sheet pile and pipe pile wall and abutment cap and the existing seawall using the tremie pour technique to reduce concrete washout from the surrounding water. The tremie pour will also allow concrete to fill underneath the existing seawall, extending the seawall. The extended seawall and sheet pile and pipe pile wall formed together with the concrete would comprise the abutment portion of the bridge on the riverbank. Pipe piles and sheet piles would be driven by pneumatic hammer or vibratory hammer, or a combination of both, depending on subsurface conditions. Additional information on the pipe and sheet piles for the king pile abutment is in **Table 4** and **Figure A10** below.

2.4.2.3 Fender, Trestle Piles, and Temporary Piles Installation

The proposed fender system would line both sides of the navigational channel under the bridge, acting as a "guard rail" for boats, barges, and other vessels to help avoid collisions into, or allisions with, the new bridge that would compromise its structural integrity and damage vessels. Twelve seven-foot-diameter drilled shafts are proposed for the new bridge structures. The proposed fenders would comprise 207 sixteen-inch diameter composite piles. 321 30-inch-diameter piles and 39 13-inch-diameter micropiles for the approach trestles would be driven to an adequate depth to provide the required lateral capacity for the new bridge structures. 16 24-inch steel piles would be installed to support the replacement MGH ramp and dock (**Figure A6**). A quantity of 167, thirty-inch diameter piles would be driven to provide temporary trestles for the required load capacity to support the contractor's equipment. As identified below in **Table 4**, piles will be driven either by a crane mounted pneumatic hammer or vibratory hammer. See **Table 4** for details on the installation of navigational channel fender piles, approach trestle piles, and temporary contractor trestle piles.

The temporary work trestles will be removed towards the end of construction once they are no longer required to support construction (**Figures A5** and **A6**). See **Table 5** for details on the removal of the temporary trestle piles post construction.

2.4.2.4 Pier Caps

Prefabricated steel/concrete formwork frames would be installed on the drilled shafts and act as the form for the pier caps. Concrete placement for the pier caps above mean high water (MHW) would likely be performed using a concrete pump truck.

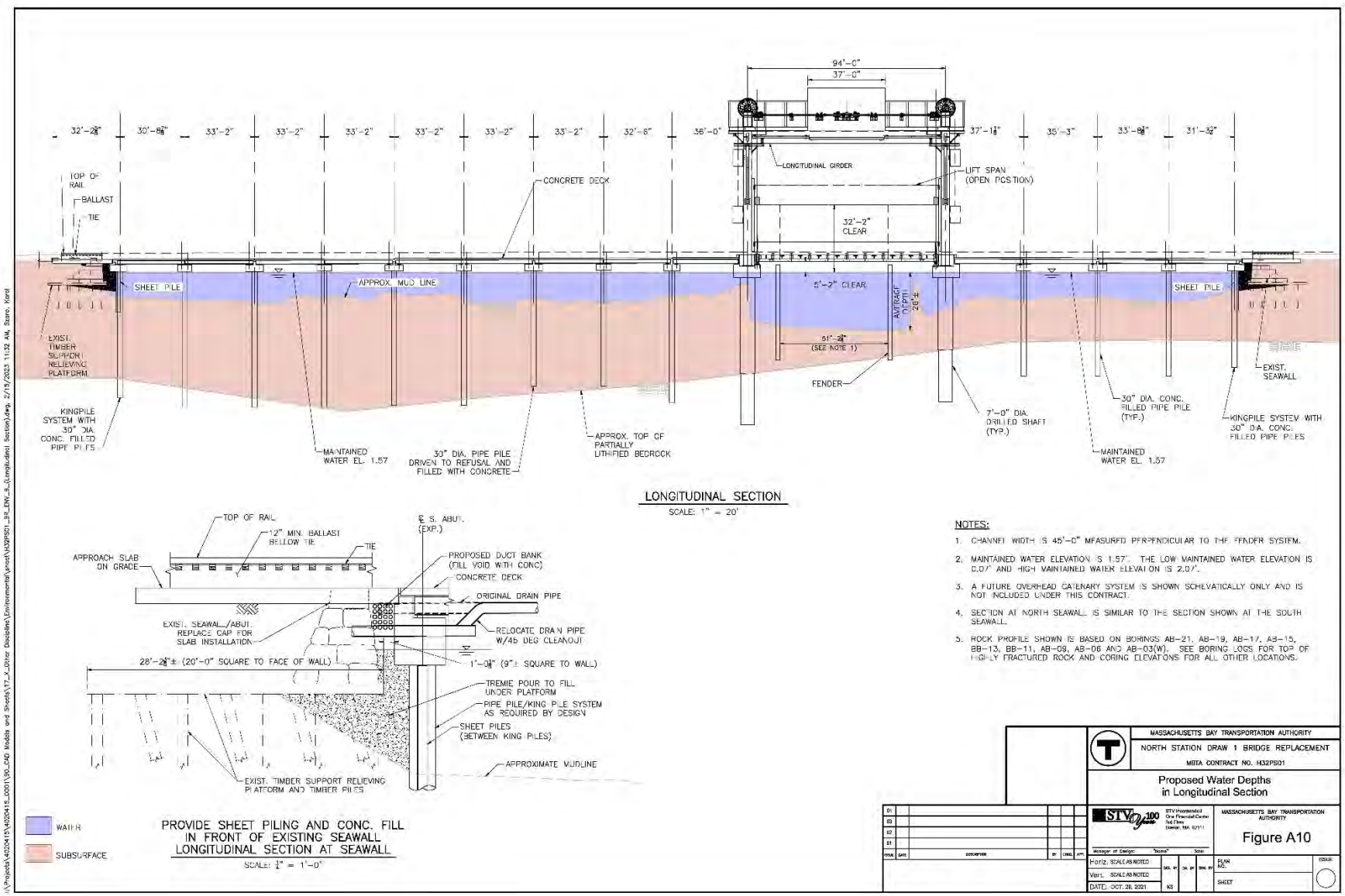

LONGITUDINAL SECTION
SCALE: 1" = 20'
TOP OF RAIL
BALLAST
TIE
CONCRETE DECK
LONGITUDINAL GIRDER
LIFT SPAN (OPEN POSITION)
32'-2" CLEAR
SHEET PILE
APPROX. MUD LINE
EXIST. TIMBER SUPPORT RELIEVING PLATFORM
KINGPILE SYSTEM WITH 30" DIA. CONC. FILLED PIPE PILES
MAINTAINED WATER EL. 1.57
30" DIA. PIPE PILE DRIVEN TO REFUSAL AND FILLED WITH CONCRETE
APPROX. TOP OF PARTIALLY LITHIFIED BEDROCK
FENDER
7'-0" DIA. DRILLED SHAFT (TYP.)
30" DIA. CONC. FILLED PIPE PILE (TYP.)
EXIST. SEAWALL
KINGPILE SYSTEM WITH 30" DIA. CONC. FILLED PIPE PILES
PROVIDE SHEET PILING AND CONC. FILL IN FRONT OF EXISTING SEAWALL
LONGITUDINAL SECTION AT SEAWALL
SCALE: 1" = 1'-0"
WATER
SUBSURFACE
NOTES:
1. CHANNEL WIDTH IS 45'-0" MEASURED PERPENDICULAR TO THE FENDER SYSTEM.
2. MAINTAINED WATER ELEVATION IS 1.57'. THE LOW MAINTAINED WATER ELEVATION IS 0.07' AND HIGH MAINTAINED WATER ELEVATION IS 2.07'.
3. A FUTURE OVERHEAD CATENARY SYSTEM IS SHOWN SCHEVATICALLY ONLY AND IS NOT INCLUDED UNDER THIS CONTRACT.
4. SECTION AT NORTH SEAWALL IS SIMILAR TO THE SECTION SHOWN AT THE SOUTH SEAWALL.
5. ROCK PROFILE SHOWN IS BASED ON BORINGS AB-21, AB-19, AB-17, AB-15, BB-13, BB-11, AB-09, AB-06 AND AB-03(W). SEE BORING LOGS FOR TOP OF HIGHLY FRACTURED ROCK AND CORING ELEVATIONS FOR ALL OTHER LOCATIONS.
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
NORTH STATION DRAW 1 BRIDGE REPLACEMENT
MBTA CONTRACT NO. H32PS01
Proposed Water Depths in Longitudinal Section
STV
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
Figure A10
Horiz. SCALE AS NOTED
Vert. SCALE AS NOTED
DATE: OCT. 26, 2021

Table 4. Installation of Piles by Impact Hammer

Structure (action)	Size & Diameter	Duration of Work	Technique
New Bridge Trestle piles (installation)	• 30” diameter • Steel	• Phase 1: 49 days • Phase 3: 19 days • Phase 4: 11 days • Phase 6: 60 days • Phase 8: 16 days • Phase 10: 121 days	• 3 to 5 piles per day • 6000 blows per day; 2000 blows per pile • 5 days a week and 8 hours per day
Contractor Temporary Trestle piles (installation) [1, 2]	• 30” diameter • Steel	• Southwest temp trestle: 22 days[1] • Northwest temp trestle: 14 days[1] • Southeast temp trestle: 25 days[2] • Northeast temp trestle: 16 days[2]	• 3 to 5 piles per day • 6000 blows per day; 2000 blows per pile • 5 days a week and 8 hours per day
New Navigational Channel Fender piles (installation)	• 16” diameter • Solid fiberglass plastic	• 35 days	• 3 to 5 piles per day • 6000 blows per day; 2000 blows per pile • 5 days a week/8 hours per day
Replacement MGH dock and ramp (replacement)	• 24” diameter (conservative) • Steel	• 16 piles, 4 days	• 3 to 5 piles per day • 6000 blows per day; 2000 blows per pile • 5 days a week and 8 hours per day

Table 4. Installation of Piles by Impact Hammer

Structure (action)	Size & Diameter	Duration of Work	Technique
Sheet Pile for King Pile Abutment	• 24” diameter (conservative) • Steel	• 132 piles, 16 days	• 6 piles per day; • 20 strikes per pile • 5 days a week and 8 hours per day • Installed alternating between pipe piles (below)
Pipe pile for King Pile Abutment	• 30” diameter (conservative) • Steel	• 49 piles, 17 days	• 3 piles per day • 6000 blows per day; 2000 blows per pile • 5 days a week and 8 hours per day • Installed alternating between sheet piles (above)
Temporary sheet piles for cofferdams[3]	• 24” diameter (conservative) • Steel • No pipe piles in the cofferdam	• 250 piles, 15 days	• 15 to 20 piles per day • 200 strikes per pile • 5 days a week and 8 hours per day

Notes:
[1] Temporary work trestles on the west side of the bridges will be in place for approximately 6 years before being removed.
[2] Temporary work trestles on the east side of the bridges will be in place for approximately 4 years before being removed.
[3] Temporary sheet piles for the cofferdams will be in place for approximately 4 months before being removed.

Table 5. Vibratory Removal of Temporary Trestle Piles

Structure (action)	Size & Diameter	Duration	Technique
Contractor Temporary trestle piles (removal)	• 30” diameter • Steel	• Southwest temp trestle: 22 days • Northwest temp trestle: 14 days • Southeast temp trestle: 25 days • Northeast temp trestle: 16 days	• 3 to 6 piles per day • 30 minutes of vibratory hammer per pile
Temporary sheet piles for cofferdams	• 24” diameter • Steel	• 250 piles, 15 days	• 15 to 20 piles per day • 20 minutes of vibratory hammer per pile

2.5 Vessel Activity

While not definitive since a construction contractor has not been selected, construction is likely to primarily involve barges and tugboats, small work boats (25 feet in length), and occasional shallow draft material supply vessels operating between staging areas and the Project Site. In most instances, construction support vessels coming from Boston Harbor are likely to move at slow speeds, less than ten knots. Transit routes are unknown at this time but are likely to be either from staging areas in East Boston or Quincy/Weymouth based on the limited number of contractors qualified to undertake work specific to a movable bridge.

In addition, Boston hosts a commercial fishing fleet and has port facilities for oil tankers, liquid natural gas (LNG) tankers, container ships, and cruise ships. While exact numbers cannot be known since vessel tracking is not performed across all vessel types, it is likely that the baseline vessel activity between potential home ports and/or staging areas in Weymouth/Quincy and Boston/East Boston and the Charles River is well in excess of several thousand transits per year. It is estimated that Project-related construction vessel transits would number in the hundreds during Proposed Project construction.

2.6 Operation

Once construction is finished, bridge operations would be similar to current operations except that there would be six tracks crossing the river on three bridge structures instead of four tracks crossing the river on two bridge structures today. The Proposed Project is intended to bring the Draw One Bridge to a state of good repair, reducing the need for in-water repair and unscheduled maintenance activities.

3.0 CONSERVATION MEASURES

3.1 Best Management Practices and Time of Year Restrictions

MBTA's construction contractor will be required to implement standard construction practices and follow TOY restrictions for certain in-water activities. Restrictions on the proposed construction activity are expected to include the following, which will be incorporated into the Project plans and specifications as contract requirements:

- Piles in the area where new portions of the bridge structures will be installed must be fully removed from the riverbed. Piles within the navigational channel are to be cut off three feet below the defined bottom of channel. However, the majority of the existing piles will be cut at the mudline rather below the mudline to minimize sediment disturbance. This activity will not be subject to TOY restrictions because it is not considered a silt-producing activity.
- NOAA Fisheries Trust Resource Species TOY restrictions for in-water construction activities would be used to protect diadromous species, enabling upstream passage for spawning and migratory fish during the Spring from February 15 to July 15 and downstream passage during the Fall out migration from September 1 to November 15, as per the Massachusetts DMF, Technical Report TR-47, *Recommended TOYs for Coastal Alteration Projects to Protect Marine Fisheries Resources in Massachusetts* (Evans et al. 2015). The activities listed in **Table 6** will be subject to TOY restrictions. Major silt-producing activities will not be allowed during the restriction periods, and minor silt-producing activities would only be allowed during those periods with the use of silt curtains or cofferdams. During the TOY restriction, allowed construction activities and associated in-water measures would be conducted to maintain fish passage through the work site, with any in-water devices not encroaching on more than 25 percent of the river corridor, pursuant to an email recommendation from NOAA Fisheries dated May 4, 2021 (**Appendix A**).

Table 6. TOY by Construction Activity

Activity	Construction method	TOY Restriction[1,2]
Major Silt-Producing Activities		
Channel dredging	Dredge	February 15 to July 15 September 1 to November 15
Remove existing caissons	Dredge around caissons and cut off/demolish as required.	February 15 to July 15 September 1 to November 15
Remove existing piles where required	Extract existing piles	February 15 to July 15 September 1 to November 15

Table 6. TOY by Construction Activity

Activity	Construction method	TOY Restriction[1,2]
Remove temporary piles for construction trestle or any sheet pile cofferdams if used.	Extract temporary piles and sheet piles	February 15 to July 15 September 1 to November 15
Minor Silt-Producing Activities		
Remove surface laid submarine cables	Lift surface laid cable	If performed February 15 through July 15 or September 1 through November 15, silt curtain or other device is required.
Install temporary piles for temporary construction trestle or sheet pile cofferdams if used.	Drive piles or sheet piles	If performed February 15 through July 15 or September 1 through November 15, silt curtain or other device is required.
Install pipe piles for approach trestles	Drive piles	If performed February 15 through July 15 or September 1 through November 15, silt curtain or other device is required.
Install sheeting and piles at abutments	Drive piles and sheet piles	If performed February 15 through July 15 or September 1 through November 15, silt curtain or other device is required.
Install Drilled Shafts for lift spans	Install drilled shaft	If performed February 15 through July 15 or September 1 through November 15, silt curtain or other device is required.
Install navigational channel fender system	Drive piles	If performed February 15 through July 15 or September 1 through November 15, silt curtain is required.
Anchoring of barges	Spud, jack-up or anchor moored barges (temporary)	None

[1]NOAA Trust Resource Species TOY restrictions for upstream passage for spawning and migratory fish known to be within the Area Affected by Turbidity (**Table 6**).
[2] TOYs were decided based on recommendation from NOAA **(Appendix A**).

- Major silt-producing activities conducted during the rest of the year (when allowed outside the TOY restrictions) will be implemented using silt curtains to minimize turbidity and siltation in the river. Minor silt-producing activities described in **Table 6** above would be undertaken using siltation control methods such as silt curtains or potential cofferdams (at the discretion of the contractor) and water quality monitoring requirements if performed during TOY restriction dates to reduce siltation. Other methods may also be used.

- MBTA will develop a Project-specific National Pollutant Discharge Elimination System (NPDES) Stormwater Pollution Prevention Plan (SWPPP) to describe BMPs that will be implemented during construction to control erosion and contain and treat stormwater runoff generated during construction. If necessary, construction dewatering will be undertaken in compliance with the NPDES requirements for these types of activities.
- To reduce and mitigate the risk of spills, boats, barges, and construction equipment will have spill kits readily available to address small accidental spills. Reporting of accidental spills will be done in accordance with state and federal regulations and a Project-specific Spill Prevention, Control, and Countermeasures (SPCC) Plan will be developed and incorporated into contract specifications.
- As currently contemplated, construction methods entail the use of an impact hammer, which may produce underwater noise levels (peak and SEL_{cum} [cumulative sound exposure levels]) that exceed the behavioral disturbance threshold for aquatic species. Therefore, ramp-up procedures for impact hammers, also known as a "soft start," shall be used before continuing with the activity. The contractor will be required to employ a ramp-up period of at least 60 seconds to gradually increase sound intensity of pile driving activities to allow sturgeon and other species to leave the work zone.

3.2 Environmental Compliance and Monitoring

MBTA is consulting with USACE and MassDEP and will continue to coordinate closely with these natural resource agencies during the permitting process. MBTA would also require the construction contractor to implement an environmental monitoring program overseen by a Construction Supervisor and an Environmental Monitor, both of whom would be responsible for daily inspections of work areas that would note any potential effects and recommend measures to address them. The Construction Supervisor, working with the Environmental Monitor, will be on site daily to perform inspections and will have "stop work" authority to address observed or reported infractions of required standards and procedures that pose a threat to aquatic habitat and potential inhabitants. The Environmental Monitor would confirm compliance with permit and other regulatory requirements and inspect the work area for sediment and erosion to minimize the potential for sediment-laden water to drain into the river and increase turbidity for fish.

Construction crews will be trained prior to the start of work to recognize and respond to changing field conditions, particularly as they relate to fisheries, and prevent sedimentation, unauthorized stormwater runoff, accidental spills, and releases of fuel, lubricant, grease, or oil.

4.0 DESCRIPTION OF THE ACTION AREA

The Action Area is defined in 50 Code of Federal Regulation 402.02 as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action”. For this Project, the Action Area has been defined to consider three primary potential effects: turbidity resulting from increased suspended sediments; hydroacoustic noise from pile driving; and construction vessel transit activity. The area affected by each of the three components was determined and all three were overlaid. This overlay, including the furthest extent of each component area, was used to determine Action Area for the Proposed Project.

In general, the underwater area approximately 200 feet upstream and 200 feet downstream of the bridge components has the highest potential for increased turbidity resulting from construction-related suspended sediments. The underwater area with potential to experience elevated hydroacoustic noise from pile driving extends further from the bridge location, from approximately 1,200 feet upstream at the Charles River Dam to approximately 800 feet downstream at the Charles River Dam and Locks. The area with the furthest extent is associated with vessel transit activity; it includes all of Boston Harbor, approximately 7.5 miles from the Project Site. The three component areas and the overall Action Area are shown on **Figure 1** and discussed in more detail below.

Area Affected by Turbidity

Within the Area Affected by Turbidity, the distance that construction-related suspended sediment concentrations are expected to travel is estimated to be 100 feet upstream/west of the Draw One Bridge, based on best professional judgement and assuming minimal currents in the area owing to the Charles River Dam and Locks. The eastern end of the Area Affected by Turbidity is defined by the Charles River Dam and Locks, which would isolate the effects of project-related construction work on the Boston Inner Harbor. The locks are approximately 700 feet (213 meters) downstream of the Project Site, and Charles River currents are relatively slow, which provides ample time for sediment suspended during dredging activities to settle. The north and south limits of the Area Affected by Turbidity are the banks of the Charles River (**Figure 1**). Silt will likely be the major component of sediment disturbed and suspended during the limited dredging activity required for construction and removal of an underwater cable.

Area Affected by Underwater Noise

The Area Affected by Underwater Noise accounts for the elevated hydroacoustic noise from construction-related pile driving activities, using both vibratory and impact hammers. It was defined for the Proposed Project using the NOAA Fisheries Multi-Species Pile Driving Calculator (NOAA Fisheries Tool) (NOAA Fisheries, 2022b) which predicted the distance from the Proposed Project in which aquatic organisms may be affected by construction noise. The NOAA Fisheries Tool predicted that a large area (4.5 miles in all directions underwater) would be affected. The NOAA Fisheries Tool model, however, assumes that construction is undertaken in an area surrounded by open water. It is assumed that for the Proposed Project, the riverbanks, the Charles River Dam and Locks, the bends in the Charles River, the Charles River Dam Road, and the

surrounding landforms would attenuate the hydroacoustic noise from pile driving activities. This assumption is explained in more detail in the hydroacoustic analysis in Section 7.2.
For this reason, the elevated Area Affected by Underwater Noise for the Proposed Project has been defined as limited to the bounds of the Charles River from Charles River Dam Road to the Charles River Dam and Locks, totaling approximately 27 acres (**Figure 1**).

Area Affected by Vessel Traffic
The Area Affected by Vessel Traffic includes the area required for project-related vessel transit and extends approximately 7.5 miles from the Project Site to the inner and outer regions of Boston Harbor. This calculation is based on potential distances that construction vessels moored in the Project Site during construction may need to travel between the Project Site, potential staging areas, and their home ports to transport equipment, supplies, or other items (**Figure 1**). Additional information on vessel transits is provided in Section 7.3.

4.1 Physical Characteristics

Figure 1 shows a map of the Action Area, the Area Affected by Underwater Noise, the Area Affected by Vessel Traffic, and Area Affected by Turbidity. The Action Area consists of a highly altered segment of the Charles River, where both riverbanks consist of man-made structures. It has been subject to many anthropogenic changes, such as dredging and filling of estuaries in the Inner Boston Harbor, while the Outer Boston Harbor has been less altered by humans. Water depths in the Action Area are an average of 10 feet (3 meters), except for the navigation channel which is 20 feet (6 meters) deep, and the river is approximately 380 feet (116 meters) wide. Current velocities near the Project Site are low, given the proximity of the locks and dam and water level management in the basin by DCR. The river bottom sediment in the Action Area is primarily loose, black organic silt with traces of sand, clay, shells and other debris to a thickness of approximately 5 to 10 feet (1.5 to 3 meters).

The Project Site is located near the mouth of the Charles River, within the Charles River Basin. The Charles River is approximately 79.5 miles long and the Project Site is approximately 0.75 miles from its confluence with Boston's Inner Harbor. The Project Site is surrounded by a densely developed urban environment characterized by limited access highways, commercial businesses, a sand and gravel facility, a rail station, a hospital, and protected open spaces, such as mowed parkland, along the Charles River. The Charles River channel is situated in an east-west orientation under the Draw One Bridge and hardened with sea walls on each bank. Charles River Dam Road, marinas, and moorings are located upstream of the Draw One Bridge, and the Charles River Dam and Locks are located downstream (**Figure 1**). Most project work would be undertaken upstream of the Charles River Dam and Locks, near the mouth of the Charles River. The only activity downstream of the dam and within Boston Harbor would be construction vessel transit to and from the home port and/or staging area to the Project Site.

The Millers River flows into the Charles River immediately north and east of the Project Site. The exposed, or daylighted, portion of the river emanates from a culvert approximately 1,200 feet (366

meters) upstream of the Draw One Bridge to the north. The modern-day Millers River is a remnant of what used to be a much longer river; owing to development most of the river now flows through culverts. The exposed portion of the river is located under the Leverett Circle Connector Bridge. Though there is some riparian corridor along the current extent of the Miller River, a majority of its extent has been hardened with riprap under overpasses and highway infrastructure. Therefore, the Action Area includes highly disturbed habitat.

The Project Site is located within the lower portion of the Charles River Basin, which separates Boston and Cambridge. Although historically tidal, this portion of the river was cut off from the ocean by the Charles River Dam and Locks, the construction of which turned the river into a basin. The water level of the portion of the Charles River Basin that contains the Project Site is controlled by DCR via the Charles River Dam and Locks and is associated with seasonal flows within the Charles River as well as stormwater flows.
The Charles River Dam and Locks were constructed in 1978 and are operated by DCR. The locks are located 700 feet (213 meters) downstream of the Project Site, just west of the North Washington Street (Route 99) Bridge. One of the three locks is wider than the other two to accommodate the occasional passing of larger vessels. These concrete and steel structures create a physical barrier largely preventing the upstream flow of water from the Boston Inner Harbor into the Charles River.

The Charles River Dam and Locks operate 24 hours a day. The locks remain closed, however, for the vast majority of any given 24-hour period. Openings occur much less frequently during winter months than during summer months, reflecting the seasonal nature of the recreational boat traffic that generates most openings.

Fish can pass through the lock system when it is opened, but the variability of opening frequency throughout the year affects fish passage, which is therefore also highly variable. A vertical slot fishway/ladder alongside the locks enables passage of migratory finfish (Brady et al., 2005). The fish ladder was installed in 1978 and modified in the early 1990s to improve its functioning. It is 170 feet (52 meters) long, with 29 slots (Brady et al., 2005). The condition of the fish ladder was considered to be “fair” and its function was deemed “not passable” in the January 2005 Technical Report TR-18 released by the DMF.

4.2 Description of the Aquatic Habitat

4.2.1 Currents and Tides

In general, Boston Harbor is well-flushed throughout by strong tidal currents; therefore, the harbor has a short average residence time. Past studies indicate that the waters of Massachusetts Bay and the rivers that discharge into the harbor replace all the harbor water every five to seven days (Taylor, 2014). In most cases, tidal currents are dominant in Boston Harbor, while wind driven currents play a larger role in water circulation patterns during storms.

The primary sources of freshwater inputs into Boston Harbor are the three major rivers that discharge into the harbor: the Charles River, Mystic River and Chelsea River. The Neponset River provides freshwater into the Dorchester Bay area and the Fore River provides freshwater into Hingham Bay. The average tidal range in Boston Harbor is 8.9 feet (2.7 meters). This tidal range results in four mid-tide, relatively high-velocity current events daily, on average, in the Action Area.

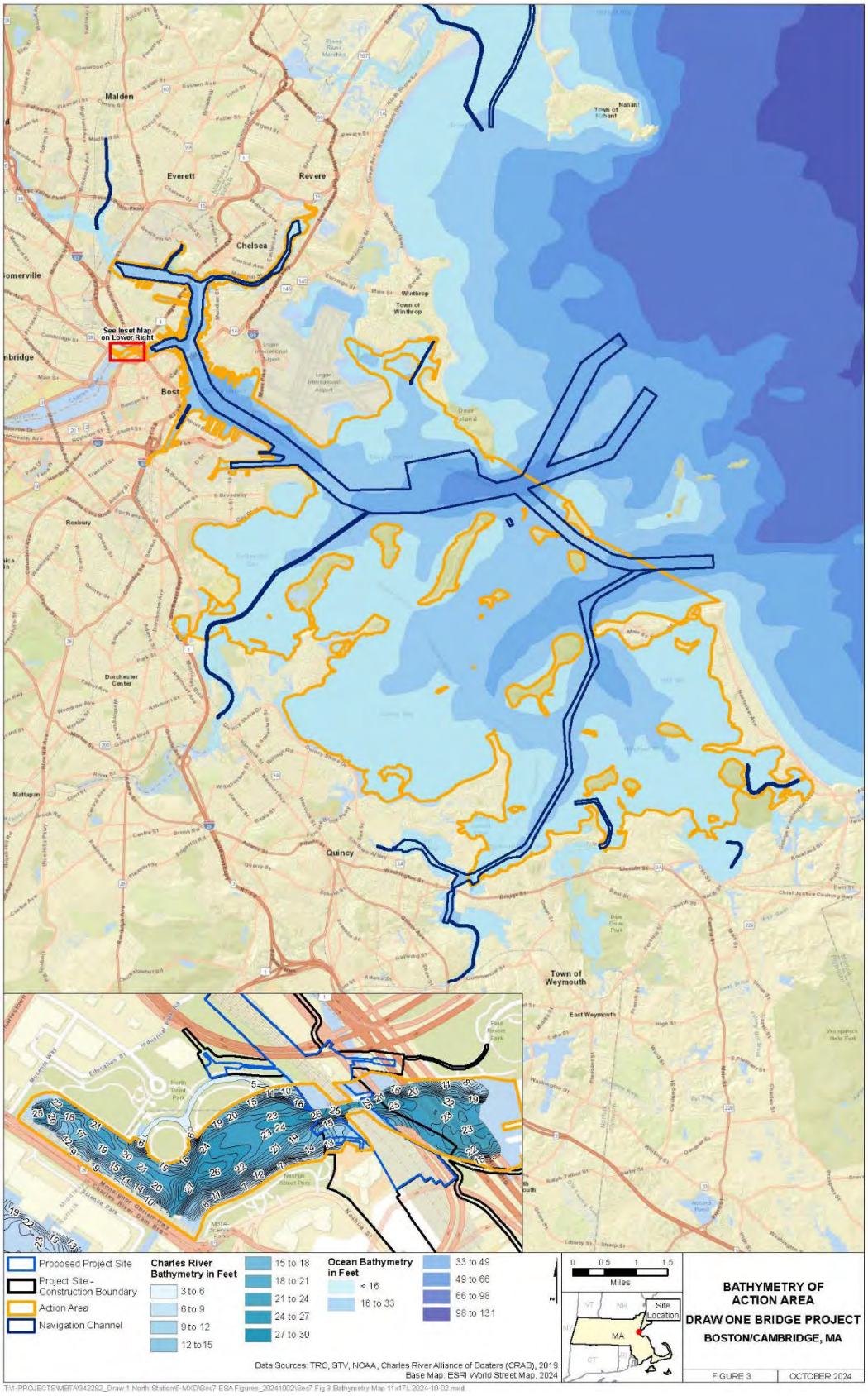
At the location where the Draw One Bridge crosses the Charles River, the River has a relatively slow-moving current. Although historically tidal, the Project Site has been cut off from the ocean by a system of locks and dams, the Charles River Dam and Locks. Currents under the bridge vary based on seasonal flow levels in the Charles River, as well as pre- and post-storm conditions, such as tides, wind, etc. Lock openings and some leakage creates a bottom-oriented salt wedge that migrates upstream into the lower Basin, but there are no reversing tidal flows upstream of the lock and dam system.

Bridge structures on the north and south banks of the Charles River are within the Federal Emergency Management Agency (FEMA) 100-year floodplain.

4.2.2 Depth and Bathymetry

The water depth zones within the larger geographic area that encompasses Boston Inner and Outer Harbor range from 0 to 16 feet (5 meters), 16 to 33 feet (10 meters), 33 to 49 feet (15 meters), and 49 to 66 feet (20 meters) (**Figure 3, Bathymetry of Action Area**). The average depth of Boston Harbor is approximately 15 feet. Depths in the Action Area range from 1 to 27 feet (8.2 meters) (MWRA, 2004 as cited in USACE 2013). However, dredged depths of United States Army Corps of Engineers (USACE) Civil Works Navigation Channels within Boston Harbor range between approximately 40 to approximately 51 feet (USACE, 2013). The USACE completed maintenance dredging in navigational channels within the Charles River and Boston Harbor and widening in selected areas were in August 2022 (USACE, 2022).

The depth of the Charles River Basin (the pool created by the Charles River Dam and Locks) is generally shallow, with an average water depth of approximately 1 to 30 feet (9 meters). Water depths at the Project Site range from 7 to 27 feet (2 to 8 meters). The deepest areas within the Project Site are in the center of the river and portions closer to the northern bank, whereas shallower water areas dominate the portions closer to the southern bank. The depth of the Charles River at the Project Site is approximately ten feet (3 meters), and the existing 65-foot-wide (20 meter) navigation channel is 25 feet (8 meters) deep. The Charles River Basin has an average width of approximately 380 feet (116 meters).


Malden
Everett
Revere
Chelsea
Winthrop
Town of Winthrop
Nahant
Town of Nahant
See Inset Map on Lower Right
Boston
Roxbury
Dorchester Center
Quincy
Town of Weymouth
East Weymouth
Proposed Project Site
Project Site - Construction Boundary
Action Area
Navigation Channel
Charles River Bathymetry in Feet
3 to 6
6 to 9
9 to 12
12 to 15
15 to 18
18 to 21
21 to 24
24 to 27
27 to 30
Ocean Bathymetry in Feet
< 16
16 to 33
33 to 49
49 to 66
66 to 98
98 to 131
Data Sources: TRC, STV, NOAA, Charles River Alliance of Boaters (CRAB), 2019
Base Map: ESRI World Street Map, 2024
0 0.5 1 1.5
Miles
Site Location
BATHYMETRY OF ACTION AREA
DRAW ONE BRIDGE PROJECT
BOSTON/CAMBRIDGE, MA
FIGURE 3
OCTOBER 2024

4.2.3 Substrates and Sediments

The Boston Basin, which underlies part of Boston Harbor, is underlain with predominant bedrock, Cambridge argillite, and mafic igneous rock, which are high in silicates. The Cambridge argillite is a layer sedimentary rock dating back to the Paleozoic age, and igneous rock are intrusive sills, creating parallel layers of cooled magma along the bedrock. The sculpted-out shape of Boston Harbor is due to the soft sedimentary bedrock layers having been eroded by the movement of glaciers, which also formed the Boston Harbor inner islands. These islands, known as drumlins, consist of glacial debris deposited during multiple rounds of retreating glacial meltwater.

The inner harbor has undergone many anthropogenic changes, such as the dredging and filling of estuaries, while the outer harbor has been less disturbed. Above the bedrock, the floor includes glacial deposits such as till, outwash, and younger glaciomarine clays such as the Boston Blue clay also found on the Charles riverbed. The harbor's topography is constantly changing due to natural and manmade actions including shoreline erosion, dredging of the shipping channel, and intense weather events such as Nor'easter storms. According to Bell et. al 2002, as cited in Thornberry-Ehrlich, T. L., 2017, the intertidal zone of the Boston Harbor islands consists of the following top three substrate groups: mixed coarse (heterogeneous continuum of rocks, boulders, cobbles, gravel, shell, and sand); mixed coarse and fine (mixed coarse and fine: heterogeneous assemblage of rocks, boulders, and coarse and fine particles); and reef, which are carbonate mound-like features (for example, oyster or mussel bars) (Thornberry-Ehrlich, T. L., 2017).

According to the Draw One Bridge Geotechnical Engineering Memorandum, subsurface conditions at the Project Site consist of historically placed fill overlying organic silt tidal estuary deposits often intermixed with fill material, overlying silty sand, marine clay (Boston Blue Clay), discontinuous strata of glaciomarine deposits and/or glacial till, weathered argillite, and argillite bedrock. The substrates on site consist of approximately 70 percent silt/mud, 20 percent sand, and ten percent pebble/gravel/cobble. The organic silt stratum primarily comprises very soft-to-hard, dark gray-to-black organic silt with up to ten percent shells. Because of the fill dumped atop this layer within the historic mud flats adjacent to the Charles River, the stratum is intermixed with up to 20 percent fine to coarse sand and debris including brick, wood, and cinders, and up to ten percent gravel (Pizzi, 2020).

Historic studies indicate that the benthic habitat of the lower Charles River is contaminated by a suite of inorganic and organic constituents, such as lead, polychlorinated biphenyls (PCBs), organochlorine pesticides, and polyaromatic hydrocarbons (PAHs) (Breault et al., 2000). During 2020, TRC Environmental Corporation (TRC) collected preliminary sediment samples from the Project Site. Data collected indicates the presence of PCBs, PAHs, and lead, among other organic and inorganic contaminants, above MassDEP and USACE reporting limits.

4.2.4 Water Quality

Since 1989, the Massachusetts Water Resources Authority (MWRA) has monitored water quality in the Boston Harbor. The most recent water quality data was reviewed to provide a general characterization of water quality in the Action Area. Results indicate that, in general, water quality has improved greatly in Boston Harbor since the mid-1990's (MWRA, 2024).

There are no tidal flows that reverse the general downstream passage of water from the Charles River upstream of the Charles River Dam and Locks, including the Project Site. However, when the locks are opened there is an upstream incursion of salt water along the bottom of the river that extends into the lower Charles River Basin to varying degrees. Water salinity varies with the tides and seasonally, depending upon the amount of freshwater outflow from the Charles River.

Under the Massachusetts Surface Water Quality Standards (SWQS) (Massachusetts Administrative Code 314 CMR 4.00), coastal and marine water is characterized as Class SA, Class SB, and SC. The state defines Boston Harbor as Class SB water, which is designated as suitable for habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth, and other critical functions, and for primary and secondary recreation. Class A, Class B, and Class C are inland water classes. The state classifies the waters past the Charles River Dam and Locks, including at the Project Site, as Class B warm water, which is designated as suitable for habitat for fish, other aquatic life, and wildlife, including for their reproduction, migration, growth, and other critical functions, and for primary and secondary recreation.

The closest MWRA monitoring station, Station 11, is located approximately 600 feet (183 meters) downstream of the Project Site, upstream of the Charles River Dam and Locks. Currently, phosphorus is the primary cause of impairment throughout the Charles, although the river is also impaired by bacterial pollutants, algal growth, excessive nutrients, and stormwater (EPA 2024a).

According to the SWQS, the following conditions are associated with Class B waters: Dissolved oxygen is not less than 5.0 milligrams per liter (mg/l) in warm-water fisheries. Temperature shall not exceed 85 degrees Fahrenheit (°F) (29 degrees Celsius [°C]). The pH shall be in the range of 6.5 to 8.3 standard units, and not more than 0.5 units outside of the natural background range. The water shall be free from floating, suspended, and settleable solids; color and turbidity; oil, grease; and taste and odor in concentration or combinations that would impair any use assigned to Class B.

Table 7 above provides water quality data recorded at MWRA's Station 11 from 2013 to 2023 (note: no data was recorded in 2020) during April to October of each year. Due to the proximity of the Project Site to the marine waters of the Boston Inner Harbor, and reflecting the operation of the locks, Charles River waters experience saltwater intrusion visible in the data collected at Station 11. Data indicates that average surface salinity is 0.82 practical salinity units (PSU), while bottom salinity averages are close to 15.14 PSU, indicating an estuarine environment exists at the Project Site (MWRA, 2024).

Table 7. Charles River Water Quality Monitoring Data, MWRA Station 11[1]

Parameter	Surface			Bottom		
	Min	Max	Average	Min	Max	Average
Temperature (°C)[2]	3.23	28.73	19.14	3.35	25.17	16.7290
Dissolved Oxygen (mg/L)[3]	4.60	13.86	8.59	0.77	12.	5.68
Turbidity (NTU)[4]	0.00	40.90	4.35	0.00	39.54	5.75
Salinity (PSU)[5]	0.22	3.18	0.82	0.27	28.34	15.14
Specific Conductance (mS/cm)[6]	0.46	5.83	1.61	0.55	43.86	24.40
pH	6.15	8.69	7.30	5.89	7.96	7.05

[1]Source: MWRA, 2024, Boston Harbor and River Monitoring Data: Charles River
[2] °C = degrees Celsius
[3]mg/L = milligrams per liter
[4]NTU = nephelometric turbidity units
[5]PSU = Practical Salinity Units
[6]mS/cm = millisiemens per centimeter

Generally, specific conductance measurements are affected by the presence of dissolved solids such as salts (EPA 2024b). At Station 11, bottom specific conductance is high, averaging at 24.40 (mS/cm) [6], likely due to the close proximity of marine waters. At Station 11, surface pH levels range from 6.15 to 8.69 and bottom pH levels range from 5.89 to 7.96. The bottom dissolved oxygen measurements average at 5.68 (mg/L) [3], lower than the surface dissolved oxygen measurements which average at 8.59 (mg/L) [3].

Surface turbidity at Station 11 ranges from 0.00 to 40.90 (NTU), with an average of 4.35 NTU, while bottom turbidity ranges from 0.00 to 39.54 NTU, with an average of 5.75 NTU. The Charles River has hundreds of stormwater outfalls and therefore the maximum measurements are likely due to very large rain events that discharge stormwater into these outfalls (EPA 2024b).

4.2.5 Benthic Community

The substrate type, such as soft sediments, well-sorted sands, rocky outcrops, gravel, cobble, and boulders or manmade structures (i.e., pilings or jetties, bridge foundations), is the habitat component that is generally most influential on species composition and distribution. The community of aquatic invertebrates attached to, resting on, or living in the bottom sediments is called the benthos.

Intertidal

Rocky intertidal areas can support a diverse and productive habitat that includes algae and macroinvertebrates (Lubchenco 1980, Mathieson et al., 1991, Menge 1976, 1978a, 1978b, 1991, as cited in Duke, 2000). The high intertidal community is composed mainly of barnacles (*Semibalanus balanoides*), with periwinkles (*Littorina* spp.), predatory gastropod (*Nucella lapillus*), green and rock crabs (*Carcinus maenas* and *Cancer irroratus*), limpets, and chitons. The high intertidal community can support shorebirds, herring gulls, and fish such as cunner (*Tautogolabrus adspersus*) at high tide. A canopy of algae appears in the mid-intertidal zone, including brown algae such as *Fucus distichus* and *Ascophyllum nodosum*, then blue mussels, join the barnacles and periwinkles found in the high intertidal zone. In the low intertidal and shallow subtidal zones, fucoids are replaced by red algae (*Chondrus crispus and Mastocarpus stellatus*), which provides a substrate for a variety of epiphytes and epifauna. The algae support herbivorous crustaceans such as *Hyale nilssoni*, snails including periwinkles and *Lacuna vincta*, limpets *(Acmaea testudinalis*), and sea urchins (*Strongylocentrotus droebachiensis*). Invertebrate predators include green, rock, and Jonah (*Cancer borealis*) crabs, starfish (*Asterias* spp.), and the gastropod *Nucella lapillus*.

At the Project Site, the benthic habitat consists of estuarine/riverine conditions, with both banks of the river consisting of granite block bulkhead walls. Substrate consists of soft bottom sediments with an absence of macroalgae or submerged aquatic vegetation (SAV). Based on the substrate characteristics, soft bottom, estuarine benthic infauna and epifauna are likely to occur to some extent, but given the extreme range of salinities, ranging at times from essentially freshwater, to a nearly marine saltwater wedge, the benthic community is likely stressed and depauperate.

Subtidal

Predominant taxa benthic infauna within the Action Area in the lower Boston Harbor includes several polychaete species, such as *Aricidea catherinae*, *Prionospio steenstrupi*, *Scoletoma fragilis*, and *Tharyx acutus*. The tube-dwelling amphipod *Ampelisca abdita* is numerically important in the region and other amphipods, such as *Orchomenella pinguis* and *Leptocheirus pinguis*, are also relatively common (USACE, 2013). Between 1993 through 2003, a dense aggregation of amphipod tubes, also called tube mats, occurred in all regions of Boston Harbor and although plentiful during 2003, *Ampelisca* tube mat densities were virtually eliminated from the Harbor in 2004 and 2005, possibly as a consequence of several severe storms that affected benthic habitats (USACE, 2013). *Ampelisca* tubemat densities have been recovering in number since 2005 (USACE, 2013). Based on USACE 2013 data, infaunal abundances described in the Boston Harbor Federal Deep Draft Navigation Improvement Project (USACE, 2013) range from medium (5,000 to 25,000/m^2) to large (25,000 to 80,000/m^2) and species numbers range from medium (15 to 25/sample) to large (25 to 40/sample).

Shellfish resources in the Action Area are include the blue mussel (*Mytilus edulis*), soft shell clam (*Mya arenaria*), European oysters (*Ostrea edulis*), razor clams (*Ensis directus*), Atlantic surf clams (*Spisula solidissima*), and ocean quahogs (*Arctica islandica*). According to the Massachusetts Bureau of Geographic Information (MassGIS), the closest portion of the Action Area suitable for shellfish is more than 2,755 feet (840 meters) away from the Project Site and occurs within waters classified as prohibited for growing shellfish (MassGIS, 2024).

Anadromous fin-fish species also present in the Action Area during in- and out- spawning migrations, including alewife (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), American shad (*Alosa sapidissima*), rainbow smelt (*Osmerus mordax*), American eel (*Anguilla rostrata*), white perch (*Morone americana*), and Atlantic tomcod (*Microgadus tomcod*). The Project site is also habitat for the spawning and juvenile development of winter flounder (*Pseudopleuronectes americanus*). In addition to shellfish and fin-fish species, lobster (*Homarus americanus*) are commonly found burrowing in the side slopes of channels and are commercially fished in Boston Harbor.

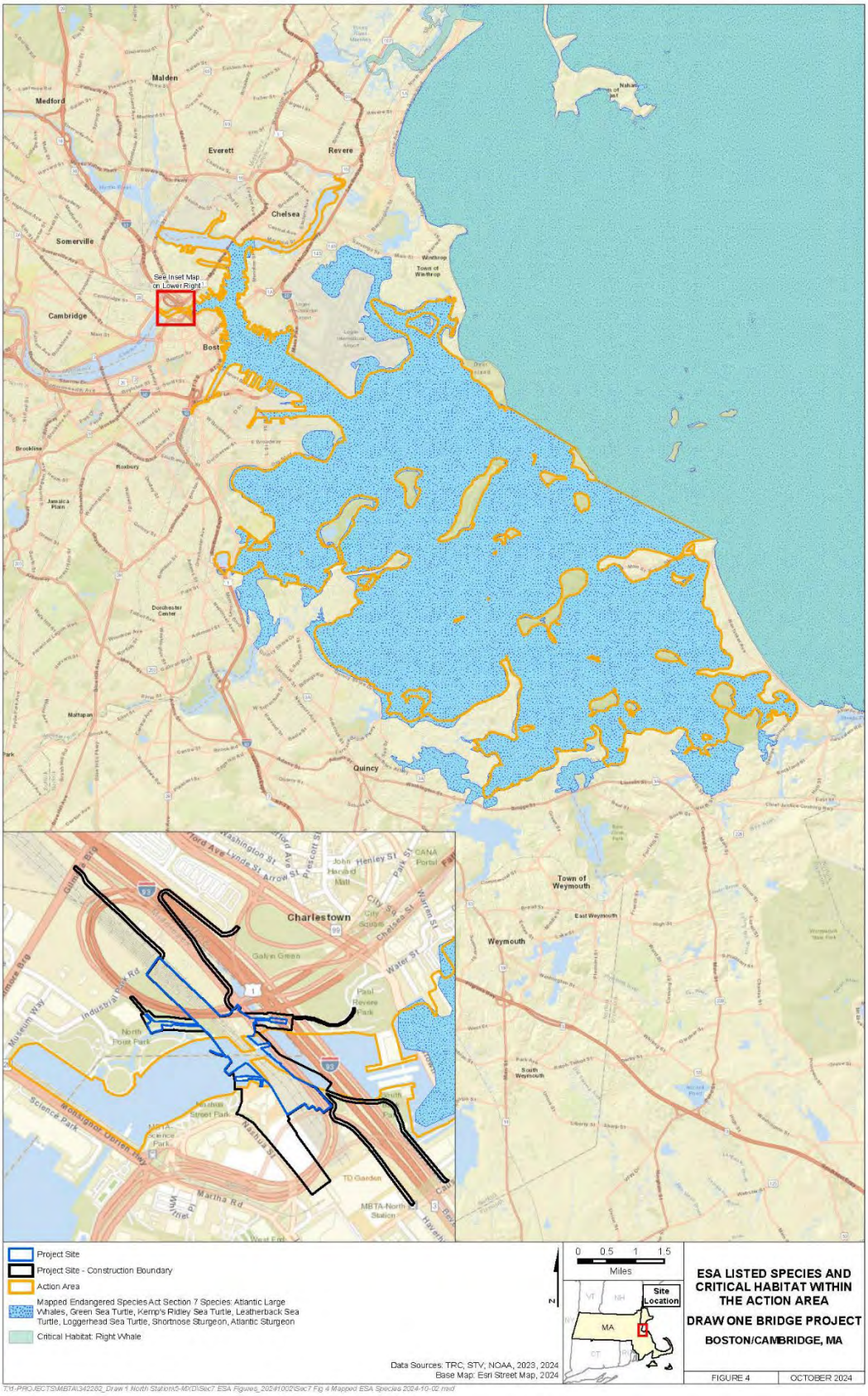
5.0 ESA LISTED SPECIES AND CRITICAL HABITAT EVALUATED IN THE ACTION AREA

To assist in the assessment of marine resources and analysis of any potential effects with the Proposed Project, TRC utilized the NOAA Fisheries Section 7 mapper to identify the potential for the presence of listed species in the Action Area and the NOAA Fisheries Critical Habitat mapper to identify critical habitat that overlaps the Action Area (NOAA Fisheries, 2022b and NOAA Fisheries, 2023a; see **Appendix B**). NOAA Fisheries' Section 7 mapper results are shown on **Figure 4.**

Within the Action Area, up to eight species protected under the ESA may potentially occur, including two fish species, two whale species, and four sea turtle species. The eight ESA-listed species evaluated were the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) and shortnose sturgeon (*Acipenser brevirostrum*) fish species; two whale species, including the North Atlantic right whale (NARW) (*Eubalaena glacialis*) and fin whale (*Balaenoptera physalus*); and four sea turtle species, including leatherback (*Dermochelys coriacea),* loggerhead (*Caretta caretta*), Kemp's ridley (*Lepidochelys kempii*), and green (*Chelonia mydas*). Critical Habitat for the NARW is adjacent to the Action Area; however, it does not overlap the Action Area and was therefore not discussed or considered further as the Project will have no effect on it.

The distribution, life history, and behaviors of these species, as well as the extent and physical and biological features of designated critical habitat, are summarized in NOAA Fisheries' Greater Atlantic Regional Fisheries Office (GARFO) Maps and Species Tables, which were used in the analysis incorporated herein.

Table 8 provides a review of listed species with potential presence in the Action Area, including their status under the ESA, life history data, final listing rules, and recovery plan references.



T:\1-PROJECTS\MBTA\342262_Draw 1 North Station\5-MXD\Sec7 ESA Figures_2024\1002\Sec7 Fig 4 Mapped ESA Species 2024-10-02.mxd

Table 8. ESA Listed Species, Status, Life History, Final Listing Rules, and Recovery Plan Information

Species	ESA Status [1]	Species Life Stages That May Be Present in the Action Area	Expected Behaviors	Expected Time of Year Species May Be Present Within the Action Area	ESA Listing Rule	Name and Date of New Recovery Plan	Notes/ References
Atlantic sturgeon *(Acipenser oxyrinchus oxyrinchus)* (all 5 DPSs[2])	E[3] (Gulf of Maine [4]) T (4 others)	Subadults; Adults	Migrating; Foraging	Year round	77 FR[5] 5880 and 77 FR 5914	Recovery Plan Outline: NOAA Fisheries 2020	Expect to remain in the 50 meter depth contour (Hilton, Ericson, and Stein as cited in NOAA Fisheries, 2023c)
Shortnose sturgeon *(Acipenser brevirostrum)*	E	Adult	Migrating; Foraging	April through November	32 FR 4001	Shortnose sturgeon recovery team 1998	Coastal migrations may occur within the 50-meter depth contour (Zydlewski as cited in NOAA Fisheries, 2023c)
North Atlantic Right Whale (*Eubalaena glacialis)*	E	Juveniles; Adults	Overwintering	December through May	73 FR 12024	NOAA Fisheries 2005	(NHESP, 2019a)
Fin Whale (*Balaenoptera physalus*	E	None	None	None	35 FR 18319	NOAA Fisheries 2010	(CETAP as cited in NOAA Fisheries, 2023c)
Leatherback Sea Turtle *(Dermochelys coriacea)*	E	Juveniles; Adults	Migrating; foraging	June through September	35 FR 849	Leatherback/ Hawksbill Turtle Recovery Team 1992	(NHESP, 2019b)

Table 8. ESA Listed Species, Status, Life History, Final Listing Rules, and Recovery Plan Information

Species	ESA Status [1]	Species Life Stages That May Be Present in the Action Area	Expected Behaviors	Expected Time of Year Species May Be Present Within the Action Area	ESA Listing Rule	Name and Date of New Recovery Plan	Notes/ References
Loggerhead Sea Turtle; Northwest Atlantic DPS (*Caretta caretta)*	T	Juveniles; Adults	Migrating; foraging	June through November	76 FR 58868	NOAA Fisheries 2008	(CETAP as cited in NOAA Fisheries 2023c)
Kemp's Ridley Sea Turtle (*Lepidochelys kempii)*	E	Juveniles; Adults	Migrating; foraging	November and December	35 FR 18319	USFWS 2011	Juvenile turtles show up on southeastern coast of Cape Cod Bay cold-stunned during this time. (NHESP, 2019d)
Green Sea Turtle; North Atlantic DPS (*Chelonia mydas)*	T	Juveniles; Adults	Migrating; foraging	June through November	81 FR 20057	Loggerhead/ Green Turtle Recovery Team 1991	Juvenile turtles show up on southeastern coast of Cape Cod Bay cold-stunned during this time. They prefer water temperatures between 68 and 73 °Fahrenheit. (NHESP, 2019e)

[1] ESA Status = Endangered Species Act Status
[2] DPS = Distinct Population Segment
[3] E= Endangered
[4] GOM = Gulf of Maine
[5] FR = Federal Register
[6] T = Threatened

5.1 Fish

Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*)

In 2012, Atlantic Sturgeon were listed as five distinct population segments (DPSs) under the ESA, of which the Gulf of Maine (GOM) DPS is listed as threatened (NOAA Fisheries, 2024a). It is unlikely, but possible, that Atlantic sturgeon from other DPSs (endangered New York Bight, Chesapeake Bay, Carolina, and South Atlantic) may be present given the proximity of the Project Site to the coast. Atlantic sturgeon are demersal, anadromous species found in rivers, estuaries, and coastal waters along the Atlantic coast of North America, between Florida and northern Maine. Atlantic sturgeon migrate from the marine environment to freshwater to spawn, typically in May and June in Massachusetts (NHESP, 2015a). Atlantic sturgeon are a slow-growing and late-maturing species that has been recorded to reach up to 16 feet in length, with a life span of up to 60 years in Canada but only 25 to 30 years in the southeastern United States (NOAA Fisheries, 2024a).

Both adult and subadult Atlantic sturgeon originating from any of the aforementioned DPSs could potentially migrate throughout the Action Area year-round. This species' subadults and adults could potentially be foraging up to the seaward side of the Charles River Dam and Locks in the Area Affected by Vessel Traffic (NOAA Fisheries, 2023b). During early life stages, this species usually remains in its natal rivers until age two, as the eggs, larvae, and juvenile Atlantic sturgeon are intolerant of saline waters. A three-foot-long juvenile Atlantic sturgeon was, however, observed in the Charles River in February 2012 (Boston Globe, February 20, 2012). Since spawning from the Charles River is not known to occur, no eggs, larvae, or juveniles are anticipated in the Action Area (NOAA Fisheries, 2024a).

Shortnose sturgeon (*Acipenser brevirostrum*)

On March 11, 1967, the Federal Register listed the shortnose sturgeon as threatened with extinction (32 FR 4001) (NOAA Fisheries, 2024b). Shortnose sturgeon, now listed as endangered under the ESA, are a slow-growing and late-maturing species that grow up to 4.5 feet in length and have typical life spans of up to 30 years. Shortnose sturgeon spend most of their lifespan in fresh water, but they do make brief trips into salt water for migratory or feeding purposes.

Shortnose sturgeon have been recorded in Provincetown as well as Ipswich Bay (Bigelow and Schroeder, 1953, and Jerome et al. 1968, as cited in Collette and Klein-MacPhee, 2002). Adult shortnose sturgeon will overwinter in rivers, so coastal migrations will happen roughly from April 1 to November 30. These migrations could occur along the 50-meter contour (Zydlewski et al. as cited in NOAA Fisheries 2022a).

Shortnose sturgeon migrate from marine waters to freshwater rivers to spawn (NOAA Fisheries, 2024b). The Charles River has an average salinity level of 0.82 PSU at the surface and 15.14 PSU at the bottom, indicating that an estuarine environment exists at the Project Site (MWRA,

2024). Shortnose sturgeon prefer to spawn in low-salinity waters (0.0 to 0.5 PSU), and the dam and locks would likely deter any fish from going further upriver.

Documented movement of shortnose sturgeon between the Connecticut River and the Merrimack, River and the capture of an individual in the Housatonic River, suggest that shortnose sturgeon may be present in nearshore coastal waters and rivers of southern New England. Although data indicate movement of the shortnose sturgeon between the Merrimack and Connecticut rivers, approximately 450 miles south of the Project Site, no occurrences of this species have recorded in the Charles River (NOAA Fisheries, 2024b) (NHESP, 2015b). Therefore, it is possible but unlikely that adult shortnose sturgeon would be found throughout the Action Area between April and November.

5.2 Whales

North Atlantic Right Whale (*Eubalaena glacialis*)

On March 6, 2008, NOAA Fisheries published a final rule to list the endangered Right whale (*Eubalaena* spp.) as two separate endangered species - the North Pacific right whale (*Eubalaena japonica*) and the North Atlantic right whale (*E. glacialis*) (NARW) (73 FR 12024).

NARW are large baleen whales with a large head (typically about 1/4 of the body length), large stocky bodies, primarily black coloration (although some have white patches on their bellies), and no dorsal fin. (NOAA Fisheries, 2024c). From December to March, there is a small concentration of NARW in Cape Cod Bay and the Great South Channel east of Nantucket Island, all south of the Project Site. During April and May, the concentration increases to feed on the large number of zooplankton present in the area. The majority of NARW in Massachusetts waters will move further offshore in the summer and fall (NHESP, 2019a), but NARW could be present year-round.

Based on data on the NOAA Fisheries Right Whale sighting “WhaleMap”, if a line is drawn between Nahant and Hull for the period between January 2010 and June 2024, there have been six NARW sightings shoreward of this line. It is in this shoreward area that project-related vessel transits would occur between the Charles River and home ports and/or staging areas in the Weymouth/Quincy or Boston/East Boston areas (Johnson et al, 2021).

NARW are not expected to be found in the Charles River due to the presence of the Charles River Dam and Locks, the small size of the river, the confined nature of the channel at the bridge location, and other factors. While unlikely, it is possible that transient individuals may enter the Boston Harbor portion of the Area Affected by Vessel Traffic during seasonal migrations, typically December through May. Generally, however, NARW are not considered resident within Boston Harbor since their planktonic feeding behavior is not suited to the ecosystem in these waters.

Fin Whale (*Balaenoptera physalus*)

On December 2, 1970, the fin whale was listed as endangered throughout its range (35 FR 18319). Currently there is no critical designated habitat specific to the fin whale. Fin whales can be found

in social groups of two to seven whales. In the north Atlantic, they are often seen feeding in large groups that include humpback whales, minke whales, and Atlantic white-sided dolphins (NOAA Fisheries, 2024d). Fin whales are the second-largest species of whale and killer whales are their only non-human predator. The species can live 80 to 90 years (NOAA Fisheries, 2024d).

Fin whales are found in deep (650 to 820 feet) offshore waters in all major oceans, primarily in temperate to polar latitudes, and less commonly in the tropics. They occur year-round in a wide range of latitudes and longitudes, but the density of individuals in any one area changes seasonally. During the summer, fin whales feed on krill, small schooling fish (e.g., herring, capelin, and sand lance), and squid by lunging into schools of prey with their mouths open, using their 50 to 100 accordion-like throat pleats to gulp large amounts of food and water. They then filter the food particles from the water using the 260 to 480 "baleen" plates on each side of the mouth. During the winter, this species will fast as they travel to warmer waters (NOAA Fisheries, 2024d). Massachusetts waters are an important feeding ground for fin whales (NHESP, 2015c); however, they are not considered a resident species within the Boston Harbor since their planktonic feeding behavior is not suited to the harbor's waters, so any species found are likely transient due to their seasonal migration pattern.

In waters deeper than 12 miles (20 km) east of Cape Cod in the Great South Channel, and in deeper waters of Boston and Cape Ann, this species is most commonly observed from April to November, but fin whales have been found throughout the year in Massachusetts waters (NHESP, 2015c). Since this species favors deeper offshore waters, its presence is not expected in the Area Affected by Vessel Traffic, which will generally remain within several miles of the Massachusetts coast (NOAA Fisheries, 2024d). Water depths in the vessel transit region, between possible home ports and/or staging areas in Weymouth/Quincy or Boston/East Boston and the mouth of the Charles River, do not exceed 60 feet (18 meters) and would generally be avoided by fin whales, which prefer deeper waters typically found more than 12 miles of the coastline. In addition, the presence of the Charles River Dam and Locks, the small size of the river, the confined nature of the channel at the bridge location, the lack of planktonic feeding foraging habitat, and other factors essentially eliminate the likelihood that fin whales would be present in other portions of the Action Area. Therefore, fin whales would not be present in the Action Area and are not evaluated further in this document.

5.3 Sea Turtles

Leatherback Turtle (*Dermochelys coriacea*)

On June 2, 1970, the leatherback turtle was listed under the Endangered Species Conservation Act, the predecessor to the ESA (35 FR 8491). When the ESA was passed in 1973, leatherbacks were listed as endangered throughout their range.

Leatherback turtles are the largest turtles, reaching up to 750 to 1,000 pounds (340 to 454 kilograms) and five to six feet (1.5 to 1.8 meters) in length. Average life expectancy ranges between 45 to 50 years and potentially longer. Leatherbacks mate in tropical waters adjacent to

nesting beaches. In United States waters, leatherbacks tend to nest in Florida, Puerto Rico, and the Virgin Islands. The nesting season in the United States is from March to July (NOAA Fisheries, 2024e). Nesting does not occur along the northern United States Atlantic coastline; therefore, egg-laying females, eggs, and hatchlings will not be present in the Action Area.

During the winter, females will travel south to nest and then migrate north to temperate waters throughout the summer. From June through September, male and female leatherback turtles will move into shallow coastal waters to feed on jellyfish. Each year, approximately 20 turtles are spotted along the Massachusetts coast, especially in southern Cape Cod Bay near the Cape Cod canal (NHESP, 2019b). The leatherback turtle can tolerate a range of temperatures, including the colder temperatures of the Action Area during the fall and winter (NHESP, 2019b).

The presence of the Charles River Dam and Locks, the small size of the river, the confined nature of the channel at the bridge location, the lack of pelagic habitats, and other factors essentially eliminate the likelihood that the leatherback turtle would be present upstream of the dam and locks. However, adults and possibly juveniles may occur in the Boston Harbor portion of the Area Affected by Vessel Traffic between June and September, although the potential is considered low.

Loggerhead Turtle (*Caretta caretta*)

In September 2011, NOAA Fisheries and USFWS listed nine DPSs of loggerhead sea turtles under the ESA (76 FR 58868). The Northeast Atlantic Ocean DPS is listed as endangered throughout its range.

This species is known for their large, heart-shaped heads, which support powerful jaws and enable them to feed on hard-shelled prey such as whelk and conch, as well as a reddish-brown carapace in adults and sub-adults. In the Atlantic, their range extends from Newfoundland to as far south as Argentina. Migration routes from foraging habitats to nesting beaches (and vice versa) are restricted to the continental shelf for some of the population, while some of the population use other routes involving crossing oceanic waters to and from the Bahamas, Cuba, and the Yucatán Peninsula. The predominant foraging areas for western North Atlantic adult loggerheads are found throughout the relatively shallow continental shelf waters of the United States, Bahamas, Cuba, and the Yucatán Peninsula, Mexico (NOAA Fisheries, 2024f).

Loggerhead turtle juveniles and adults tend to reside in the open ocean, with most of the population staying south of Cape Cod and only small numbers seasonally moving north of Cape Cod to waters between 68° and 73° Fahrenheit (NHESP, 2019c). If loggerhead turtles were to occur in the Action Area, such occurrences would be most likely during the June through November period (CETAP as cited in NOAA Fisheries, 2023b). Adults move to coastal waters and feed on benthic prey, commonly crabs. Nesting is not expected along the northern United States Atlantic coastline; therefore, egg-laying females, eggs, and hatchlings will not be present in the Action Area.

While the presence of the loggerhead turtle is not expected within the Charles River due to the lack of suitable habitat upstream of the dam and locks, adults and juveniles may occur in the Boston Harbor portion of the Area Affected by Vessel Traffic between June and November.

Kemp's Ridley Turtle (*Lepidochelys kempii*)

On December 2, 1970, NOAA Fisheries published a final rule listing the Kemp's ridley turtle (*Lepidochelys kempii*) as endangered (35 FR 18319) (NOAA Fisheries, 2024g). In addition, on February 17, 2010, NOAA Fisheries and USFWS were jointly petitioned to designate critical habitat for Kemp's ridley sea turtles on nesting beaches along the Texas coast and in marine habitats in the Gulf of Mexico and Atlantic Ocean (NOAA Fisheries, 2024g; Wild Earth Guardians, 2010). As of June 29, 2021, NOAA Fisheries issued a Notice of Initiation for the next five-year review of the plan published in July of 2015 (86 FR 34228, 2021).

Kemp's ridley turtles are considered the smallest marine turtle in the world, with adults reaching weights of approximately 70 to 100 pounds (32 to 45 kilograms) and lengths of approximately 24 inches (0.6 meter), with a grayish-green, nearly circular, carapace with a pale yellowish plastron (NOAA Fisheries, 2024g). Juveniles tend to reside in the open ocean, often in areas of floating sargassum seaweed, utilizing the sargassum as an area of refuge, rest, and/or food. This developmental drifting period is assumed to last about two years, or until the turtle reaches a carapace length of about eight inches (0.2 meter) (NWF, 2022). Adults move to coastal waters, primarily occupying nearshore coastal areas that typically contain muddy or sandy bottoms where prey can be found. Such areas are often found in estuaries, particularly in or near shallow seagrass habitats. Kemp's ridley turtles rarely venture into waters deeper than 160 feet (18 meters) (NWF, 2022). They feed on benthic prey and occasionally jellyfish and sea plants (NHESP, 2019d). They prefer crabs but will also feed on discarded by-catch (NOAA Fisheries, 2024g). The Action Area contains the turtle's preferred habitat of a muddy and sandy bottom.

Kemp's ridleys are distributed throughout the Gulf of Mexico and United States Atlantic seaboard from Florida to New England, with rare occurrences north of Cape Cod (NOAA Fisheries, 2024g). As the smallest sea turtle, they do not tolerate cold well and therefore are rarely found in colder waters. Cold-stunned juveniles have been recorded washed ashore during November and December. Adults are very rarely spotted Cape Cod Bay (NHESP, 2019d) during the summer.

Nesting does not occur along the northern United States Atlantic coastline and therefore egg-laying females, eggs, and hatchlings will not occur in the Action Area. While the presence of the Kemp's ridley turtle is not expected in the Charles River due to the lack of suitable habitat upstream of the dam and locks, adults and juveniles may occur in the Boston Harbor portion of the Area Affected by Vessel Traffic in November and December.

Green Sea Turtle (*Chelonia mydas*)

On July 28, 1978, NOAA Fisheries and USFWS listed the green sea turtle (*Chelonia mydas*) as threatened under the ESA (81 FR 20057). On April 6, 2016, NOAA Fisheries and USFWS

determined that three DPSs of green sea turtle are endangered species and eight DPSs of green sea turtle are threatened species, which superseded the 1978 ruling (81 FR 20058). The north Atlantic DPS remains listed as threatened under the ESA (NOAA Fisheries, 2024h).

Green sea turtles are the largest of all the hard-shelled sea turtles but have a comparatively small head. Adult green sea turtles reach weights of 250 to 400 pounds (113 to 181 kilograms) and reach three to four feet (1.2 meters) in length. Adult green sea turtles are unique among sea turtles in that they eat primarily plants, feeding primarily on seagrasses and algae. This diet is thought to give them greenish-colored fat, from which they take their name. After emerging from the nest, hatchlings swim to offshore areas, where they are believed to live for several years, feeding close to the surface on a variety of pelagic plants and occasionally animals. Once the juveniles reach a certain age/size range, they leave the pelagic habitat and travel to nearshore foraging grounds (NOAA Fisheries, 2024h).

Green sea turtles in Massachusetts Bay, including Boston Harbor, might occur in shallow locations with eelgrass beds, a major food source in June through November. However, over the decades, Boston Harbor has lost many of its historic eelgrass beds, so this species would tend to occur more frequently in other locations with more extensive eelgrass beds within Massachusetts Bay or Cape Cod Bay. According to MassDEP's Eelgrass viewer, the closest eelgrass beds are north and east of Boston Logan Airport and therefore conditions in the Action Area do not include the green sea turtle's preferred habitat (MassDEP, 2023). This species, especially at the juvenile stage, will experience cold shock if individuals stay north of Cape Cod during late fall and winter months, so they would not be expected in the Action Area during the months of December through May (NHESP, 2019e). It is unlikely that juveniles would remain north of Cape Cod during the late fall and winter, but rare occurrences of juveniles found washed ashore during December and January along the southeastern beaches of Cape Cod have been recorded (NHESP, 2019e).

Although nesting occurs in over 80 countries throughout the year, peak nesting throughout the southeastern United States occurs in June and July. No nesting occurs along the northern United States Atlantic coastline; therefore, egg-laying females, eggs, and hatchlings would not occur within the Action Area.

The presence of green sea turtles is not expected within the Charles River due to the presence of the locks and dam and the lack of eelgrass. From June to November, adult and juvenile green sea turtles may occur in the Boston Harbor portion of the Area Affected by Vessel Traffic.

6.0 EFFECTS ANALYSIS

In accordance with NOAA Fisheries' Section 7: Consultation Technical Guidance, TRC analyzed the proposed action (Proposed Project) and associated impacts that may occur during construction activities in the Action Area in relation to each of the listed species described in Section 6.0, above (NOAA Fisheries, 2024i).

Project activities with the potential to affect ESA-listed species with the potential to occur in the Action Area, including both sturgeon species, are presented and evaluated below. The three temporary stressors associated with the Proposed Project include:

1. Minor temporary increased turbidity related to the small amount of dredging and removal of the underwater cable. Installation and removal of pipe piles may represent an additional minor source of turbidity.
2. Temporary construction-related hydroacoustic noise associated with pile driving activities. In the analysis of potential effects, the assumed pile driving characteristics included:
    a. Approximately three to five piles will be driven per day via impact hammer. It was estimated that pile installation would result in 6,000 strikes per day (2,000 strikes per pile). It is expected that an impact hammer will be utilized for the installation of the trestle piles, the temporary trestle piles, temporary sheet piles for cofferdams (if necessary), king piles for the abutments, the fender piles, and the MGH dock and ramp replacement.
    b. Approximately three to five piles will be removed per day via vibratory hammer. It was estimated that pile removal would take 30 minutes per pile. Vibratory hammer will be utilized for the removal of the existing trestle piles, fender piles, sheet piles from the cofferdams (if necessary), and removal of the MGH dock and ramp (approximately 15 days). Additionally, vibratory hammer will be utilized for the removal of the temporary trestle piles after construction has been completed (approximately 25 days for the temporary trestle pile removal). The temporary trestle piles will be in place throughout construction for approximately six years on the west side and four years for the east side.
3. Potential vessel strikes during vessel movement to and from home ports and/or staging areas.

6.1 Turbidity

NARW, leatherback turtles, loggerhead turtles, Kemp's Ridley turtles, and green sea turtles are not expected within the Area Affected by Turbidity. Therefore, the Proposed Project will not result in turbidity-related effects to these species. This discussion focuses on potential effects to Atlantic and shortnose sturgeons, which could occur in the Area Affected by Turbidity.

Project-related turbidity effects will occur from major silt-producing activities such as dredging and minor silt-producing activities such as driving piles (impact or vibratory), installing micropiles, driving sheet piles (impact or vibratory), and installing drilled shaft casing. Multiple periods of dredging are planned to be spread out over several years of construction; therefore, no single dredging event is likely to generate a substantial amount of sediment due to the size of the piles being driven. A Project-specific NPDES SWPPP and a SPCC Plan will describe BMPs to be implemented during construction, such as sediment reduction and spill cleanup measures. In addition, TOY restrictions will be implemented to avoid dredging and major silt-producing activities during peak periods of fish movement in spring and fall, and silt curtains will be used outside these periods.

Pile driving has the potential to generate a very small amount of localized turbidity for a short period of time during pipe pile installation and removal. The riverbed in this area consists of soft bottom sediments with an absence of macroalgae or SAV. Any associated turbidity would be short-lived and settle out rapidly. Silt curtains used during minor silt producing activities will be written into contract specifications and the removal of the existing caissons (done within cofferdams in order to reduce TSS) is an option for the contractor.

Pile installation will disturb bottom sediments and may cause a temporary increase in suspended sediment in the Area Affected by Turbidity (NOAA Fisheries, 2024j). Using information collected from a project in the Hudson River, pile driving activities are estimated to produce TSS concentrations of approximately 5.0 to 10.0 mg/L above background levels within approximately 300 feet (91 meters) of the pile being driven (FHWA, 2012). Using a grapple to extract piles allows sediment attached to the pile to move vertically through the water column until gravitational forces cause it to slough off under its own weight. The small resulting sediment plume is expected to settle out of the water column within a few hours. Studies of the effects of turbid water on fish suggest that concentrations of suspended sediment can reach thousands of milligrams per liter before an acute toxic reaction is expected (Burton 1993). The TSS levels expected for pile driving or removal (5.0 to 10.0 mg/L) are below those shown to have adverse effects on fish (typically up to 1,000.0 mg/L; see summary of scientific literature in Burton 1993; Wilber and Clarke 2001) and benthic communities (390.0 mg/L [EPA, 1986]).

In other recent projects along the coast of Massachusetts, NOAA Fisheries and DMF have concurred that pile driving and removal of temporary piles produces negligible amounts of suspended sediments. Compared to other sources of suspended sediments in the shallow waters of the Action Area, such as wind-driven waves, boat wakes, storms, and stormwater runoff, the effects from the Project are too small to be meaningfully measured, detected, or evaluated.

Turbidity affects sturgeon species by stressing individuals exposed to dissolved oxygen levels lower than 1,000 mg/L, which may change typical behavior (NOAA Fisheries, 2024j). Although the TOY restriction period (February 15-July 15 and September 1-November 15) would prevent turbidity-related effects to the sturgeon for part of the year, both species could also be present

outside the restriction period. Effects to individuals, however, are unlikely based on the low potential for both species to be found in the Charles River and the insignificant increase in turbidity expected from the silt-producing activities.

Based on the information above, habitat changes from turbidity as a result of Project activities will be insignificant and the behavior changes of sturgeon will be too small to be meaningfully measured or detected, or evaluated; therefore any potential effects would be insignificant.

6.2 Hydroacoustics

NARW, leatherback turtles, loggerhead turtles, Kemp's Ridley turtles, and green sea turtles are not expected within the Area Affected by Underwater Noise. Therefore, the Proposed Project will not result in noise-related effects to these species. This discussion focuses on potential effects to Atlantic and shortnose sturgeons, which could occur in the Area Affected by Underwater Noise.

Pile-driving activities required for the Project construction have the potential to create hydroacoustic noise in the Area Affected by Underwater Noise. Pile-driving activities may generate intense underwater sound pressure waves that can adversely affect nearby marine organisms. The effects of pile driving can vary greatly depending on a species' response to sound; intense sound pressure waves can change fish behavior, or injure/kill fish through rupturing swim bladders. NOAA Fisheries' *Ocean Noise Strategy Roadmap* (NOAA Fisheries, 2016) document provides the following information:

> "Studies on fish have focused more on characterizing the physical effects such as hearing impairment, barotrauma, and death, but behavioral effects such as changes in direction, speed, or schooling patterns as well as changes in stress hormones have been documented." (NOAA Fisheries, 2016)

Pile driving is anticipated to occur only during daylight hours, five days a week and eight hours per day. This will leave 16 hours of a 24-hour period when species that happen to be in the area can use and travel within and through the Area Affected by Underwater Noise without potentially injurious noise exposure levels.

The NOAA Fisheries Tool was used to analyze the potential impacts to fish species exposed to elevated underwater noise levels caused by pile-driving activities. The NOAA Fisheries Tool uses proxy projects to estimate the peak sound exposure level (SEL), single-strike sound exposure level (SEL_{ss}), and route mean square-sound pressure level (RMS) for a pile driving scenario that is similar to the conditions for the Project. While the NOAA Fisheries Tool shows that the extent of hydroacoustic noise associated with pile driving could go far beyond the Charles River Dam and Locks, the locks, bends in the Charles River, and the geomorphology of the surrounding landforms would significantly attenuate the hydroacoustic noise, limiting potential effects to the upstream portion of the river, above the dam and locks.

Table 9 indicates the calculated Project-specific distance isopleths, by weight, where physical injury and/or behavioral impacts for ESA listed fish may occur.

Table 9. Range to Effect Isopleths for Fish

Scenario Number	Scenario	Physical Injury for Fish ≥ 2 grams		Behavior
		SEL_{cum}* (feet)	Peak* (feet)	RMS* (feet)
1	Removal of the existing 15-inch timber trestle and fender piles via vibratory hammer	-	-	207
2	Removal of the existing 24-inch steel or fiberglass piles for the MGH dock and ramp via vibratory hammer	-	-	52
3	Installation of 30-inch steel trestle and temporary trestle piles via impact hammer	2,070	61	15,228
4	Installation of 16-inch solid fiberglass plastic fender piles via impact hammer	207	0	52
5	Replacement of the 24-inch steel or fiberglass piles for the MGH dock and ramp via impact hammer	2,070	61	15,228
6	Removal of the 30-inch steel temporary trestle piles via vibratory hammer	-	-	131
7	Installation of 28-inch pile AZ sheet pile for king pile abutment via impact hammer	273	28	15,228
8	Installation of 30-inch steel pile for king pile abutment via impact hammer	2,070	61	15,228
9	Installation of 24-inch AZ sheet pile for cofferdam, via impact hammer	2,823	28	15,228
10	Removal of 24-inch AZ sheet pile for cofferdam via vibratory hammer	-	-	241

*Based only on measurement of distance from the pile and does not account for how the land, bends in the river, islands, and other structures, such as the Charles River Dam and Locks that may alter the transmission of sound during pile driving activities.

Exposure to underwater noise levels of 206 dB peak and 187 dB SELcum can result in impacts to sturgeon such as avoidance or disruption of foraging activities (NOAA Fisheries, 2024k). In addition to the peak exposure criteria that relate to the energy received from a single pile strike, the potential for injury exists for multiple exposures to noise over a period of time; this is accounted for by the SELcum. The SELcum is not instantaneous maximum noise levels but represents a

measure of the accumulated energy over a specific period of time (e.g., the period of time it takes to install a pile) (NOAA Fisheries, 2024l).

In order to reduce impacts to sturgeon species, a “soft start” will be implemented for pile driving, which is expected to direct sturgeon and other species away from the area before full-energy pile driving occurs. These species will not remain in or enter the ensonified area once full pile driving starts because they would avoid the area with behavioral sound level effects, which is much larger than the area with levels of 206 dB. Given this behavioral avoidance, sturgeon will not remain in the ensonified area long enough to accumulate enough sound energy to be injured. Further, pile driving is limited to eight hours per day, which leaves 16 hours within a 24-hour period for species to use and travel through the Area Affected by Underwater Noise without pile-driving noise.

Vessel activity required for Project construction also has the potential to create hydroacoustic noise in the Area Affected by Underwater Noise. As an example of baseline vessel activity and underwater noise, the Boston to Hingham ferry passes through the Draw One Bridge area 36 times a day, and the nearby Boston-Hull-Hingham ferry makes 39 transits a day, during weekdays (MBTA, 2024). Other commercial vessels (e.g., container ships, cruise ships, fishing vessels) and recreational vessels operating out of the many marinas within the greater Boston Harbor area add considerably more vessel activity and noise than Project related activities will. Overall, when added to baseline conditions, the underwater noise associated with construction vessels in the Area Affected by Underwater Noise would be insignificant.

Given the low probability of sturgeon occurrence in the Area Affected by Underwater Noise, the small area within the Charles River that would experience injurious noise levels, the proposed noise-reducing mitigation measures, and the insignificant increase over baseline, the potential for behavioral or injurious noise effects on Atlantic and shortnose sturgeons as a result of Project activities is unlikely.

6.3 Vessel Transit

While the location of potential staging areas and/or home ports that may be used to support the Proposed Project are not known at this time, it is assumed that there will be construction vessel transits between the East Boston or Quincy/Weymouth waterfronts and the Project Site and that barges moved by tugs, supply vessels, and work boats will operate from one or more of these locations and pass through the Charles River Dam and Locks into the Project Site. The Area Affected by Vessel Traffic is shown on **Figure 1**. In addition, it is anticipated that construction vessels will be sourced locally within Boston Harbor due to the numerous qualified contractors in the area.

The Atlantic and shortnose sturgeons, NARW, and four sea turtles could be passing through the Action Area at various times of year and could be struck by vessels used for construction if they are at or near the surface within the transit pathway. Most of the species are unlikely to occur so close to the surface, so individuals would rarely be near the vessels. Vessel collisions are also

considered unlikely because vessels transiting to and from home ports and/or staging areas will primarily be barges, either towed or self-propelled, which will be traveling at speeds of less than 10 knots. This allows time for individuals to move away from the vessel. The use of vessels and other Project-related activities would not impede movement of listed species through the Action Area, although slight adjustments to movement may be expected as the species avoid the work areas.

In addition, the use of vessels during construction will increase the risk of a vessel strike to such a small degree that the effect of the action (i.e., any increase in the risk of a strike attributable to the Proposed Project) cannot be meaningfully measured or detected. Given the large number of existing vessel movements in the Action Area, likely in excess of several thousand per year, the comparatively small number of additional Project-related vessel transits above this baseline represents an insignificant increase in potential impacts to listed species from the risk of collision. The movement of Project-related vessels will also be intermittent, temporary, and restricted to a small portion of the overall Action Area on any given day. As a result, the risk of a vessel strike in the Action Area to both sturgeon species, the NARW, the leatherback turtle, the loggerhead turtle, the Kemp's ridley turtle, and the green sea turtle is unlikely.

6.4 Habitat Modification

Habitat modification associated with the Proposed Project would be limited to the Project Site, where Atlantic and shortnose sturgeons have potential to occur. Habitat for other listed species would not be affected. Demolition activities will temporarily disturb approximately 0.5 acre (24,000 square feet) of the riverbed, and other construction activities will temporarily disturb approximately 0.1 acre (5,300 square feet) and permanently modify approximately 0.3 acre (11,400 square feet) of the riverbed.

The subsurface conditions within the Project Site consist of historically placed fill overlying organic silt tidal estuary deposits often intermixed with fill material, overlying silty sand, marine clay (Boston Blue Clay), discontinuous strata of glaciomarine deposits and/or glacial till, weathered argillite, and argillite bedrock. The substrates on site consist of approximately 70 percent silt/mud, 20 percent sand, and ten percent pebble/gravel/cobble. The organic silt stratum primarily comprises very soft to hard, dark gray-to-black organic silt with up to ten percent shells. Because of the fill dumped atop this layer within the historic mud flats adjacent to the Charles River, the stratum is intermixed with up to 20 percent fine-to-coarse sand and debris including brick, wood and cinders, and up to ten percent gravel (Pizzi, 2020). Because the dredging activities will occur within a silt curtain, sand and gravels will largely remain in place, with mainly the fines (including a portion of the fine sand) having the potential to remain in suspension and be transported beyond the silt curtain.

Project-related dredging, pile driving/removal, and cable removal activities will disturb sediment infauna, removing suitable cover, and may result in the loss of submerged aquatic vegetation, benthic infauna, and sedentary epifauna. Dredging and excavating will cause some mixing of

these sediment types, but in the end will result in similar heterogeneity as no new soil would be brought in and dredged soil would be removed. When dredging activities are completed, the excavated sediment will be loaded onto containment barges for proper disposal, most likely at a contained landfill suitable for receipt of contaminated soils.

The removal of existing bridge elements, including timber piles and caissons from the existing Draw One Bridge and the remnants of its previously demolished elements, will offset the construction of replacement bridge elements, drilled shafts and piles, such that the amount of habitat loss would be negligible within the context of available Charles River habitat. Given the stressed and likely depauperate benthic community currently in the vicinity of the bridge, these impacts would not modify quality foraging or breeding habitat for sturgeon.

The Project Site is in a low-quality migratory pathway due to the Charles River Dam Locks located between the freshwater and marine habitats that these species use during different life phases. While unlikely, habitat disturbance attributable to construction activities including dredging, pile driving/removal, and cable removal could directly impact the benthic community by reducing prey species (e.g., crustaceans, snails, small fish and macroinvertebrates) until the bottom habitat is recolonized. This will result in a temporary loss of bottom habitat for adult and juvenile sturgeon; however, benthic organisms removed by dredging activities in shallow mud and sand bottom areas typically have rapid recolonization rates through reproductive mechanisms, thereby minimizing the loss of benthic prey. In addition, abundant similar habitat exists throughout the Charles River and provides comparable feeding opportunities. The Proposed Project would not modify habitat in a way that would prevent the sturgeon and other aquatic species from using the river or moving through area, especially with TOY restrictions in place that ensure fish passage is maintained during spring and fall migrations.

Given the negligible loss of habitat and temporary nature of most habitat impacts, effects on sturgeon and their habitat would be insignificant.

7.0 EFFECTS DETERMINATION FOR ESA LISTED SPECIES

The determination of the Proposed Project's potential effects on ESA-listed species with potential occurrence in the Action Area was undertaken by evaluating the stressors associated with construction activities when added to existing or baseline conditions. Once a potential effect was identified, it was then assessed to determine the nature of the effect and to characterize the effect in terms of the categories specified in ESA implementing regulations. Effects can be insignificant in that they are so small they cannot be meaningfully measured, detected, or evaluated; extremely unlikely to occur; or wholly beneficial. The results of this assessment are summarized below in **Table 10**.

Table 10. Effects Determination Summary Table for ESA Listed Species

Species	Potential for Occurrence	Effects Determination
Atlantic Sturgeon	Extremely unlikely to occur	May affect, but not likely to adversely affect.
Shortnose Sturgeon	Extremely unlikely to occur	May affect, but not likely to adversely affect.
North Atlantic Right Whale	Extremely unlikely to occur	May affect, but not likely to adversely affect.
Fin Whale	No potential to occur	No effect.
Leatherback Turtle	Extremely unlikely to occur	May affect, but not likely to adversely affect.
Loggerhead Turtle	Extremely unlikely to occur	May affect, but not likely to adversely affect.
Kemps Ridley Turtle	Extremely unlikely to occur	May affect, but not likely to adversely affect.
Green Turtle	Extremely unlikely to occur	May affect, but not likely to adversely affect.

Based on the analysis presented above, the Proposed Project may affect, but is not likely to adversely affect, seven of the eight listed species considered in this document. The Proposed Project will have no effect on the fin whale because it would not occur in the Action Area. Supporting rationale for the effects includes the following:

- Only the Atlantic and shortnose sturgeons have potential to occur throughout the Action Area, and the potential for occurrence is unlikely due to the generally low quality of the aquatic habitat. The NARW and four sea turtles would not occur above the Charles River Dam and Locks and are unlikely to occur in the Boston Harbor or downstream areas, although transient individuals could be present.
- The quality of aquatic habitat in the Charles River is not suitable for breeding activities and is marginally suitable for foraging. The sturgeons could use the river for migration or movement and potentially foraging, but would not breed or lay eggs in the river.
- Potential effects from the Proposed Project relate to increased turbidity during in-water construction activities; noise generated by pile driving and other construction activities;

vessel strikes in the Boston Harbor and upstream into the river; and habitat modification from dredging, demolition activities, and installation of new bridge components in the river. The multi-year schedule for construction would spread out some of the effects, and various conservation measures, such as TOY restrictions and sediment control, would minimize or avoid some effects. Overall, these effects would be insignificant and discountable with little potential to adversely affect the listed species that could be found in the Action Area.

8.0 REFERENCES

Breault, R.F., Barlow, L.K., Reisig, K.D., and Parker, G.W. 2000. Spatial Distribution, Temporal Variability, and Chemistry of the Salt Wedge in the Lower Charles River. https://www.researchgate.net/publication/255623337_Spatial_Distribution_Temporal_Variability_and_Chemistry_of_the_Salt_Wedge_in_the_Lower. Accessed June 2024.

Burton, W.H. 1993. Effects of bucket dredging on water quality in the Delaware River and the potential for effects on fisheries resources. Versar, Inc., 9200 Rumsey Road, Columbia, Maryland 21045.

Collette, Bruce B., and Grace Klein-Macphee. Fishes of the Gulf of Maine. 2002. Smithsonian Institution. Accessed March 2024.

Duke, Algonquin Gas Transmission Company. 2000. HubLine Project, FERC Resource Report 3, Vegetation and Wildlife. pp 1-112. Accessed January 2024.

[EPA] Environmental Protection Agency. 1986. Quality Criteria for Water. EPA 440/5-86-001.

[EPA] United States Environmental Protection Agency. 2024a. Environmental Challenges for the Charles River. https://www.epa.gov/charlesriver/environmental-challenges-charles-river. Accessed February 2024.

[EPA] United States Environmental Protection Agency. 2024b. Urban Waters – The Charles River. https://www.epa.gov/charlesriver. Accessed February 2024.

[FHWA] Federal Highway Administration. 2012. Tappan Zee Hudson River Crossing Project. Final Environmental Impact Statement. August 2012.

[Leatherback/Hawksbill Turtle Recovery Team] Leatherback/Hawksbill Turtle Recovery Team. 1992. Recovery plan for leatherback turtles in the U.S. Caribbean, Atlantic, and Gulf of Mexico (*Dermochelys coriacea*). Accessed January 2024. https://repository.library.noaa.gov/view/noaa/15994.

Johnson H, Morrison D, Taggart C (2021). WhaleMap: a tool to collate and display whale survey results in near real-time. Journal of Open Source Software, 6(62), 3094, https://joss.theoj.org/papers/10.21105/joss.03094. Accessed June 2024.

[MassDEP] Massachusetts Department of Environmental Protection. 2023. MassDEP Eelgrass Viewer. Accessed June 2024. https://masseoeea.maps.arcgis.com/apps/webappviewer/index.html?id=07f8d48c714f4f81bec49864ecf252da.

[MIT] Massachusetts Institute of Technology. 2002. “Welcome to the Charles River Dam”, Metropolitan District Commission. Accessed July 2024. https://ocw.mit.edu/courses/1-012-introduction-to-civil-engineering-design-spring-2002/pages/readings/charles_river_dam_metro_dist_comm/.

[MWRA] Massachusetts Water Resources Authority. 2024. Boston Harbor and River Monitoring Data: Charles River. https://www.mwra.com/harbor/html/wq_data.htm. Accessed July 2024.

[MBTA] Massachusetts Bay Transit Authority. 2024. Ferry Schedule. Accessed October 2024. https://www.mbta.com/schedules/ferry. Accessed June 2024.

[NHESP] Natural Heritage Endangered Species Program. Atlantic Sturgeon. Massachusetts Division of Fisheries and Wildlife. 2015a. Accessed March 2024. https://www.mass.gov/files/documents/2016/08/wi/acipenser-oxyrinchus.pdf.

[NHESP] Natural Heritage Endangered Species Program. Shortnose Sturgeon. Massachusetts Division of Fisheries and Wildlife. 2015b. Accessed March 2024. https://www.mass.gov/files/documents/2016/08/qd/acipenser-brevirostrum.pdf.

[NHESP] Natural Heritage Endangered Species Program. Fin Whale. Massachusetts Division of Fisheries and Wildlife. 2015c. Accessed December 2023. https://www.mass.gov/files/documents/2016/08/tl/balaenoptera-physalus.pdf.

[NHESP] Natural Heritage Endangered Species Program. North Atlantic Right Whale. Massachusetts Division of Fisheries and Wildlife. 2019a. Accessed March 2024. https://www.mass.gov/doc/north-atlantic-right-whale/download

[NHESP] Natural Heritage Endangered Species Program. Leatherback Turtle. Massachusetts Division of Fisheries and Wildlife. 2019b. Accessed March 2024. https://www.mass.gov/doc/leatherback-sea-turtle/download

[NHESP] Natural Heritage Endangered Species Program. Loggerhead Turtle. Massachusetts Division of Fisheries and Wildlife. 2019c. Accessed March 2024. https://www.mass.gov/doc/loggerhead-sea-turtle/download

[NHESP] Natural Heritage Endangered Species Program. Kemps Ridely Turtle. Massachusetts Division of Fisheries and Wildlife. 2019d. Accessed March 2024. https://www.mass.gov/doc/kemps-ridley-sea-turtle/download

[NHESP] Natural Heritage Endangered Species Program. Green Sea Turtle. Massachusetts Division of Fisheries and Wildlife. 2019e. Accessed March 2024. https://www.mass.gov/doc/green-sea-turtle/download.

[NOAA Fisheries] National Marine Fisheries Service, Office of Protected Resources. 2005. Recovery plan
for the north Atlantic right whale (*Eubalaena glacialis*). Accessed January 2024. https://repository.library.noaa.gov/view/noaa/3411

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2008. Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle (*Caretta Caretta*). Accessed December 2023. https://www.fisheries.noaa.gov/resource/document/recovery-plan-northwest-atlantic-population-loggerhead-sea-turtle-caretta-caretta.

[NOAA Fisheries] National Marine Fisheries Service, Office of Protected Resources. 2010. Final recovery plan for the fin whale (*Balaenoptera physalus*). Accessed January 2024. https://repository.library.noaa.gov/view/noaa/4952.

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration.
2016. Ocean Noise Strategy Roadmap. Accessed February 2024. https://oceannoise.noaa.gov/roadmap-implementation.

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration.
Recovery Outline for the Atlantic Sturgeon Distinct Population Segments. 2020. Accessed January 2024. www.fisheries.noaa.gov/resource/document/recovery-outline-atlantic-sturgeon-distinct-population-segments.

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration. ESA Section 7 Mapper. 2022a. Accessed April 2024. https://noaa.maps.arcgis.com/apps/webappviewer/index.html?id=a85c0313b68b44e0927b51928271422a.

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration.
2022b. Section 7 Consultations in the Greater Atlantic Region. Accessed June 2024. https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-effects-analysis-acoustics-greater-atlantic-region

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration.
2022c. Summary of Marine Mammal Protection Act Acoustic Thresholds. Accessed February 2024.

https://www.fisheries.noaa.gov/s3/2023-06/MMAcousticThresholds508secureMay2022-3-.pdf

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2023a. Critical Habitat Mapper. https://www.fisheries.noaa.gov/resource/map/national-esa-critical-habitat- mapper. Accessed August 8, 2022.

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2023b. Section 7 Species Presence Table: Atlantic Sturgeon in the Greater Atlantic Region Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*). https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-species-presence-table-atlantic-sturgeon-greater. Accessed March 2024.

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2023c. Section 7: Citations and References for All Species in the Greater Atlantic Region. https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-citations-and-references-all-species-greater. Accessed June 2024.

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2024a. Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*). https://www.fisheries.noaa.gov/species/atlantic-sturgeon. Accessed February 2024.

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2024b. Shortnose Sturgeon (*Acipenser brevirostrum*). https://www.fisheries.noaa.gov/species/shortnose- sturgeon. Accessed June 2024.

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2024c. North Atlantic Right Whales (*Eubalaena glacialis*). https://www.fisheries.noaa.gov/species/north-atlantic-right-whale. Accessed June 2024.

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2024d. Fin Whale (*Balaenoptera physalus*). https://www.fisheries.noaa.gov/species/fin-whale. Accessed June 2024.

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2024e. Leatherback Turtle (*Dermochelys coriacea*). https://www.fisheries.noaa.gov/species/leatherback- turtle. Accessed June 2024.

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2024f. Loggerhead Turtle (*Caretta caretta*). https://www.fisheries.noaa.gov/species/loggerhead-turtle. Accessed August 8, 2022.

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2024g. Kemp's Ridley Turtle (*Lepidochelys kempii*). https://www.fisheries.noaa.gov/species/kemps- ridley-turtle. Accessed June 2024.

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration.
2024h. Green Turtle (*Chelonia mydas*). https://www.fisheries.noaa.gov/species/green-turtle. Accessed on August 8, 2022.

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration.
2024i. Section 7: Consultation Technical Guidance in the Greater Atlantic Region. Accessed January 2024. https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-consultation-technical-guidance-greater-atlantic.

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration.
Section 7 Effects Analysis: Turbidity in the Greater Atlantic Region. 2024j. Accessed May 2024. https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-effects-analysis-turbidity-greater-atlantic-region.

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2024k. Marine Mammals: Underwater Noise. Accessed February 2024. http://www.noaa.gov/marine-mammals-underwater-noise.

[NOAA Fisheries] National Marine Fisheries Service, National Oceanic and Atmospheric Administration.
Marine Mammal Acoustic Technical Guidance. 2024l. Accessed January 2024. www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance.

[NWF] National Wildlife Federation. Kemp's Ridley Sea Turtle. 2022 Kemp's Ridley Sea Turtle | National Wildlife Federation (nwf.org) Accessed June 2024.

Purser, J. & Radford, A.N. 2011. Acoustic Noise Induces Attention Shifts and Reduces Foraging Performance in Three-Spined Sticklebacks (*Gasterosteus aculeatus*). PLoS ONE 6(2): e17478. https://doi.org/10.1371/journal.pone.0017478. Accessed August 8, 2022.

Shortnose Sturgeon Recovery Team (U.S.). 1998. Final recovery plan for the shortnose sturgeon (*Acipenser brevirostrum*). Accessed January 2024. https://repository.library.noaa.gov/view/noaa/15971.

Stadler, H. & Woodbury, D.P. 2009. Assessing the effects to fishes from pile driving: Application of new hydroacoustic criteria. Inter-noise 2009, innovations in piratical noise control. Ottawa, Canada.

Thornberry-Ehrlich, T. L. 2017. Boston Harbor Islands National Recreation Area: Geologic resources inventory report. Natural Resource Report NPS/NRSS/GRD/NRR—2017/1404. National Park Service, Fort Collins, Colorado. Accessed October 2024. https://irma.nps.gov/DataStore/DownloadFile/568082

[USACE] United States Army Corps of Engineers and the Massachusetts Port Authority. 2013. Final Supplemental Environmental Impact Statement and Final Environmental Impact Report (EOEA# 12958) for the Federal Deep Draft Navigation Improvement Project Boston Harbor, Massachusetts. Appendix X: Marine Mammals in Boston Harbor and Massachusetts Bay. Accessed January 2024. https://www.nae.usace.army.mil/portals/74/docs/topics/bostonharbor/deepdraftfseis2013.pdf.

[USACE] United States Army Corps of Engineers: New England District. USACE Announces Boston Harbor Project Completed Four Months Ahead of Schedule. 2022. Accessed February 2024. http://www.nae.usace.army.mil/Media/News-Releases/Article/3137591/usace-announces-boston-harbor-project-completed-four-months-ahead-of-schedule/

[USFWS] United States Fish and Wildlife Service. 2011. Bi-national recovery plan for the Kemp's ridley turtle (*Lepidochelys kempii*). Accessed January 2024. https://repository.library.noaa.gov/view/noaa/4368.

Wilber, D.H., and Clarke, D.G. 2001. Biological effects of suspended sediments: A review of suspended sediment impacts on fish and shellfish with relation to dredging activities in estuaries. North American Journal of Fisheries Management 21(4):855-875.

WildEarth Guardians. Petition to Designate Critical Habitat for the Kemp's Ridley Sea Turtle (*Lepidochelys kempii*). February 17, 2010. https://pdf.wildearthguardians.org/site/DocServer/Critical_Habitat_Petition_Kemp_Ridley_Sea_ Turtle.pdf?docID=630&AddInterest=1103. Accessed August 8, 2022.

Wysocki, L.E., Davidson, III, J.W., Smith, M.E., Frankel, A.S., Ellison, W.T., Mazik, P.M., Popper, A.N., & Bebak, J. 2007. Effects of aquaculture production noise on hearing, growth, and disease resistance of rainbow trout, *Oncorhynchus mykiss*. Aquaculture 272: 687-697. https://doi.org/10.1016/j.aquaculture.2008.11.037. Accessed August 8, 2022.

FR References

[FR] Federal Register, Vol. 32, No. 4001. 1967. Native Fish and Wildlife. Endangered Species. Accessed March 2024. https://archives.federalregister.gov/issue_slice/1967/3/11/4000-4002.pdf#page=2.

[FR] Federal Register, Vol. 35, No. 8491. 1970. Conservation of Endangered Species and Other Fish or Wildlife. Accessed January 2024. https://archives.federalregister.gov/issue_slice/1970/6/2/8487-8498.pdf#page=5.

[FR] Federal Register, Vol. 35, No. 18319. 1970. Conservation of Endangered Species and Other Fish or Wildlife. https://archives.federalregister.gov/issue_slice/1970/12/2/18313-18322.pdf#page=7. Accessed June 2024.

[FR] Federal Register, Vol. 73, No. 12024. 2008. Endangered Status for North Pacific and North Atlantic Right Whales. Accessed June 2024. https://www.federalregister.gov/documents/2008/03/06/E8-4376/endangered-and-threatened- species-endangered-status-for-north-pacific-and-north-atlantic-right.

[FR] Federal Register, Vol. 76, No. 58868. 2011. Endangered and Threatened Species; Determination of Nine Distinct Population Segments of Loggerhead Sea Turtle as Endangered or Threatened. Accessed June 2024. https://www.govinfo.gov/content/pkg/FR-2011-09-22/pdf/FR-2011-09-22.pdf#page=159.

[FR] Federal Register, Vol. 77, No. 5880. 2012. Endangered and Threatened Wildlife and Plants; Threatened and Endangered Status for Distinct Population Segments of Atlantic Sturgeon in the Northeast Region. Accessed March 2024. https://www.federalregister.gov/documents/2012/02/06/2012-1946/endangered-and-threatened-wildlife-and-plants-threatened-and-endangered-status-for-distinct.

[FR] Federal Register, Vol. 77. No. 5914. 2012. Endangered and Threatened Wildlife and Plants; Final Listing Determinations for Two Distinct Population Segments of Atlantic Sturgeon (Acipenser oxyrinchus oxyrinchus) in the Southeast. Accessed August 8, 2022.https://www.federalregister.gov/documents/2012/02/06/2012-1950/endangered-and-threatened- wildlife-and-plants-final-listing-determinations-for-two-distinct.

[FR] Federal Register, Vol. 81, No. 4837 (see 81 FR 4838). 2016. Critical habitat for Endangered North Atlantic Right Whale. Accessed June 2024. https://www.gpo.gov/fdsys/pkg/FR-2016-01-27/pdf/2016-01633.pdf.

[FR] Federal Register, Vol. 81, No. 20057 (see FR 20058). 2016. Final Rule to List Eleven Distinct Population Segments of the Green Sea Turtle (*Chelonia mydas*) as Endangered or Threatened and Revision of Current Listings Under the Endangered Species Act. Accessed June 2024. https://www.gpo.gov/fdsys/pkg/FR-2016-04-06/pdf/2016-07587.pdf.

[FR] Federal Register, Vol. 82, No. 39160. 2017. Designation of Critical Habitat for the Endangered New York Bight, Chesapeake Bay, Carolina and South Atlantic Distinct Population Segments of Atlantic Sturgeon and the Threatened Gulf of Maine Distinct Population Segment of Atlantic Sturgeon. Accessed June 2024. https://www.gpo.gov/fdsys/pkg/FR-2017-08-17/pdf/2017-17207.pdf.

[FR] Federal Register, Vol. 86, No. 34228. 2021. Endangered and Threatened Species; Notice of Initiation of a 5-Year Review of the Kemp's Ridley Sea Turtle. Accessed January 2024. https://www.federalregister.gov/documents/2021/06/29/2021-13768/endangered-and-threatened-species-notice-of-initiation-of-a-5-year-review-of-the-kemps-ridley-sea.

Appendix A: Interagency Consultation Meeting Minutes

USACE Interagency Consultation Meeting #1
Meeting Minutes

Meeting Date: May 7, 2020
Client: MBTA
Project Name: Draw 1 North Station Bridge Replacement
Designer: STV Incorporated
Meeting Place: Virtual
Prepared by: Colin Duncan (CD) and Sam Moffett (SM), TRC
Attendees: Amelia Croteau (AC), Boston ConCom
Nick Moreno (NM), Boston ConCom
Jennifer Letourneau (JL), Cambridge ConCom
Eric Papetti (EP), FTA
Leah Sirmin (LS), FTA
Kristin Wood (KW), FTA
Michelle Muhlanger (MM), FRA
Alan Anachecka-Naseman (A A-N), ACOE
Ed Reiner (ER), EPA
Mike Johnson (MJ), NOAA fisheries
Jeff Stieb (JS), USCG
Sean Casey (SC), DCR
Rob Lowell (RL), DCR
Bill Gode (BG), DCR
Daniel Padien (DP), DEP Chapter 91
Phil DiPietro (PD), DEP
Tay Evans (TE), DMF
Holly Palmgren (HP), MBTA
Karl Eckstrom (KE), MBTA
Kris Kretch (KK), MBTA
Mark Ennis (ME), STV
Tamia Burkett (TB), STV
Diane Stallings (DS), TRC

Introduction – HP and SM

- *MBTA Environmental informed the group that the project has been recently federalized and the Design Team will be working with FTA on MEPA. MBTA also informed the team that there have been preliminary meetings with historic agencies as well to introduce the project.*

Discussion Items/Topics – ME presented project slides to group

- **Project Overview**
  - *Overview using presentation provided by STV Design Team ME & SM*
  - Continuity of Rail Operations throughout Construction

  - Type Study – June 2020
    - *This document will provide a recommendation on the best structure type & recommend best configuration of tracks that provides a long-term solution for MBTA ridership in & out of North Station*
- **Bridge Components and Type Study**
  - Spans
  - North and South Trestles
  - Control Tower
  - Rail System/North Station Platforms
  - Channel width change
  - Pedestrian Bridge, *DCR to weigh in*
  - Stormwater
  - Climate Resilience
- **Project Location and Jurisdictional Resource Areas**
  - Charles River and Millers River
  - Filled/Flowed Tidelands
  - Floodplain
  - Historical Structures
- **Likely Permit/Review Programs –** Presented by Colin Duncan, TRC
  - FTA – NEPA – CoA TBD
    - Section 106 NHPA
  - USACE – Section 404/10/14 (no 408)
    - Consultation: EPA, NOAA NMSF, FWS, DMF, DFW NHESP
    - BUAR
  - US Coast Guard – Navigation Impact Report and Preliminary Navigation Determination
    - *Bridge Permit TBD*
    - *Design team informed agencies that DCR has primary control at the project site location in collaboration with the Coast Guard*
    - *Navigation impact report produced by the Design Team will lead to preliminary navigation determination*
      - *USCG confirmed that they will lean on DCRs input for changes to vertical and horizontal clearance, including closed vertical clearance*
  - DCR – Project Consultation
  - MEPA – ENF
  - MassDEP – Chapter 91 License Modification
  - MassDEP – Section 401 Water Quality Certification
  - Boston and Cambridge Conservation Commissions – MWPA NOIs
  - MWRA - 8(m)
  - TBD: MA CZM CD; Others
- **Project Schedule**
- **Permitting Data Needs**
- **Permitting Timeline**
  - Individual Agency Pre-Application Consultations
  - Application Filings

Future Agency Meetings/Consultations

The next meetings will be by either permit or topic area. Might need another full agency meeting in the future.

Other Issues

- *If any construction in floodplain/way – it was suggested to the Design Team to review Section 60.3 of the National Insurance Program Regulations*

Q&A

BG – Is sidewalk on downstream side of project?

ME replied the depiction on the slide is an old. Discussions have advanced and walkways along the trestle are no longer planned.

Tower A still in place?

ME – Yes, and demo might be first step in the project.
SM, conclusion that there is not a track configuration that will allow tower A to be retained, but STV cannot be said with certainty.
ME, tower A structure and condition is more relevant.
KE also said current ops being done in temporary structure. Tower A mostly houses old equipment at this point and building had essentially been abandoned

PD –Are we in flood way of Charles River?

CD – We believe so

PD - Any dredging?

CD, yes in terms of removing old timber and associated with drilling

A A-N – Don't we also need USCG input?

SM, yes and Coast Guard is present at this meeting
Above Charles river DAM DCR is primary moderator with some USCG. Need Navigational Impact Study report for this

JS – yes report will lead to preliminary nav determination and horizontal and vertical clearances. In mid permit stage a CG permit will be required

AC – MEPA process in the future. Questions regarding floodplain, is Tower A only building to be removed?

SM – Tower A only Building but south trestle and bridge spans will also be removed and replaced. North Trestle will be altered. Will require disturbance of river bed.

AC- Are buildings considered historic?

SM - We are in active discussions currently to decide on trajectory for an MOA to allow this to proceed.

AC – Fill in floodway urge Section 60.3 regulations review.

SM Physical constraints make grading options difficult to revise. Not much option to change heights, etc.

DP from DEP waterways – Slide indicate Chapter 91 license mod. Are we going to ask for a mod or new license?

SM – not sure yet, dependent on how design evolves. Idea or MBTA is to seek mod of existing license. We think this will be suitable for Chapter 91 licensing. Waterways is ready to assist with this project and MBTA. Mod will be dependent on what alternative is selected. Dan confident we will get to a license.

A A-N needs to leave meeting – we are on right track and need to look at alternatives He is confident that project will have least amount of environmental impacts. Is he or FTA Lead applicant?

HP – thinking to federalize, FTA will be lead agency for this.

FTA – good presentation – can team talk about track work on North side?

ME – challenge to project tracks from the west and North come into North Station, need to access the BET for storage and maintenance. Tracks cross a lot to the north and looking at optimal configuration of track

FTA - Is there the potential for track and switch replacement?

ME- 90% of track work will happen will be within MBTA ROW in that area

FTA – how will to the north affect service north of project area? There could be interception of future projects to the north. Do we know plans of other projects?

ME- we do know that NH RR there is a design project to replace that bridge future expansion for areas is under discussion with RR ops

KE. – MBTA is revamping signal system from analog to programable, this will be done before and is in place before Draw 1 project is design. Part of phase project.

SM – Any fisheries?

MJ to everyone:

I have another call at 11, so need to drop off. But wanted to mention that the River is important for diadromous fish (river herring, shad, rainbow smelt, American eel) migratory and spawning. A winter-spring TOY restriction will likely be necessary, and potentially a fall restriction, as well. Also, interested in seeing how projected sea level rise is being addressed, especially the vertical clearance from the river for new bridge height. Thanks for presentation.

HP to everyone:
thanks Mike we will be in touch to discuss further

ER – corps dam regulates water levels at this site at about MSL. He is confused about flood plain and sea level rise. Is Corps dam going to regulate sea level rise?

SM – team engaged with DCR we developed better understanding of how WL is managed by DCR. Scenario is where dam is overtopped rather than day-to-day.

How is flood plain defined on both sides of Dam? How does that work?

SM – we are looking at options for an approach to this and will work with the team as design advances

ER – kayakers go through opening in trestle – in future, will this be improved? This should be taken into consideration? Is there section 10 or 404 Corps work?

PD – did not understand P bridge in vicinity of Spaulding rehab

HP – DCR has proposed bridge. A 3rd pedestrian bridge spanning entire river, details being discussed with DCR.

BG – good presentation – comments will be e-mailed to HP. On permitting with DCR construction access permit required. HP – they will be in touch

USACE Interagency Consultation Meeting #2
Meeting Minutes

Meeting Date: April 15, 2021
Client: MBTA
Project Name: Draw 1 North Station Bridge Replacement
Designer: STV Incorporated
Meeting Place: Virtual - Webex
Prepared by: Colin Duncan and Diane Stallings, TRC
Attendees: Alan Anachecka-Naseman, USACE
Jennifer Letourneau, Cambridge Conservation Commission
Rachel Croy, EPA
Ed Reiner, EPA
Ryan Bartlett, FTA
Leah Sirmin, FTA
Kristin Wood, FTA
Karl Eckstrom, MBTA
Holly Palmgren, MBTA
Tess Paganelli, MBTA
Erikk Hokenson, MassDEP
David Wong, MassDEP
Kaitlyn Shaw, NOAA
Mark Ennis, STV
Preethi Sreeraj, STV
Karol Szaro, STV
Diane Stallings, TRC
Annie Cornell, TRC

Safety Moment – TRC, Distracted Driving

Introductions
HP, USCG not in attendance today but have been involved to date.

Discussion Items/Topics

Presentation provided by Mark Ennis, STV, Sam Moffett, TRC and Colin Duncan, TRC

- Project Overview and Status
- Project Schedule
- Anticipated Construction Approach and Impacts

- Pedestrian Bridge Considerations
- Anticipated Permits/Reviews and Schedule
- Consultation and Data Needs

Future Agency Meetings/Consultations

Discussion, Q&A

Ed Reiner, EPA:

- Cutting piles at/above mudline is not standard approach for bridge replacement. SM: comment acknowledged; approach advantages to be fully discussed.
  - David Wong concurs with EPA's assessment.
  - STV and MBTA design based on functionality but some adjustments can be made later in the design process.
  -
- What is the minimum vertical clearance under fixed trestles, for boat passage? SM: clearance will be very close to existing.
- Proposed bridge looks ugly. ME: function and longevity are primary concerns for design. MBTA seeking inputs from multiple stakeholders including historical agencies.
- Will new wider area of bridge & trestles increase shading of river? SM: area will be larger but waterway will maintain same water column for fish passage. MBTA will be conducting EFH & Fisheries studies & consult with NOAA & DMF for fisheries issues.
- Will cutting piles at mudline vs. removing altogether interfere with new piles? Could old piles, which contain creosote, be removed? ME: new piles will be offset from existing so that they will not interfere below mudline. Approximate ratio of old piles to new will be 1:3. Removing piles altogether could cause issues with settlement of sediments that is more problematic. Piles for fender system will be pulled altogether.
- Will small vessels such as kayaks be able to pass under trestles? ME: the existing passage is very tight even for small vessels and there will not be an appreciable difference.

David Wong, MassDEP Ch. 91

- For new bridge design, Charles River represents Massachusetts, which should be considered for appearance.
- DEP considers removal of all materials below mudline in tidal waters as fill and part of dredging calculation under Section 401. SM: acknowledged. ER: everybody knows that

Charles is dammed with constant water level and no longer considered tidal. (Also see Alan A-N comment)

- A WQC must be tied to a MEPA filing (ENF and/or EIR).

Alan Anachecka-Naseman, USACE

- Piles in waterway are considered as structures under 404, not fill.
- Permitting: As lead federal agency, FTA will coordinate fisheries ESA review with NMFS and DMF, etc. Also, Section 106, consulting Tribes will be Aquinnah Wampanoags, Mashpee Wampanoags, and Narragansetts.
- Alternatives to be considered appear to be No Action and proposed replacement, which seems to be acceptable.
- Mitigation will likely be In Lieu Fee.

Kaitlyn Shaw, NOAA

- Appreciates the presentation; will review presentation for impacts including fish passage.

Stallings, Diane

From: Palmgren, Holly <HPalmgren@MBTA.com>
Sent: Tuesday, May 4, 2021 9:41 AM
To: Moffett, Samuel; Duncan, Colin; Stallings, Diane
Cc: Eckstrom, Karl; Paganelli, Tess; John M. Ennis
Subject: [EXTERNAL] Fwd: MBTA Draw 1 and Tower A Interagency Coordination Meeting #2

FYI

617-875-3807
Sent from my iPhone

Begin forwarded message:

> **From:** Kaitlyn Shaw - NOAA Federal <Kaitlyn.shaw@noaa.gov>
> **Date:** May 4, 2021 at 9:11:18 AM EDT
> **To:** "Palmgren, Holly" <HPalmgren@mbta.com>
> **Subject: Re: MBTA Draw 1 and Tower A Interagency Coordination Meeting #2**
>
> Hi Holly,
> I wanted to circle back on this. While I can provide pre-app technical assistance, an EFH assessment will still need to be provided by FTA. Because adverse effects associated with removal will be minimized through the preferred method of cutting at the mudline, we would not have major concerns with cutting the pilings at the mudline rather than below. I would anticipate a TOY under FWCA for diadromous species; ie. controls (e.g., cofferdams) should not encroach: >25% from OHW during the TOY restriction. We would refer to the TOY restrictions in Mass DMF TR-47 in this instance for trust species (Spring: Feb 15 to July 15 and downstream passage maintained during the Fall out migration from September 1 to November 15). Of course I understand this project has many overlapping requirements, so additional coordination on timing can be discussed during the consultation process. Please let me know if you have any questions.
> Best,
> **Kaitlyn Shaw**
> Marine Resources Management Specialist
> Habitat and Ecosystem Services Division
> NOAA/ National Marine Fisheries Service
> Gloucester, MA
> Office: 978-282-8457
> Pronouns: she/her/hers
> kaitlyn.shaw@noaa.gov
> www.nmfs.noaa.gov
>
> On Thu, Apr 22, 2021 at 2:23 PM Palmgren, Holly <HPalmgren@mbta.com> wrote:

Attached are the slides from the interagency coordination meeting on North Station Draw which was held on 4/15/2021. Please feel free to send any questions or comments along to me.

Thanks

Holly

-----Original Appointment-----
From: Duncan, Colin <CDuncan@trccompanies.com>
Sent: Wednesday, March 17, 2021 5:00 PM
To: Duncan, Colin; 'Alan.R.Anacheka-nasemann@nae02.usace.army.mil'; Padien, Daniel (DEP); Grafe, Jerome (DEP); Worrall, Eric (DEP); Wong, David W (DEP); Bartlett, Ryan (FTA); Nicholas Moreno; Letourneau, Jennifer; Reiner.Ed@epa.gov; Boeri, Robert (EEA); Evans, Tay (FWE); 'Sirmin, Leah (FTA)'; Wood, Kristin (FTA); Hopps, Christine (DEP); kaitlyn.shaw@noaa.gov; james.l.rousseau2@uscg.mil; Palmgren, Holly; Eckstrom, Karl; Paganelli, Tess; Ennis, John M.; Moffett, Samuel; Stallings, Diane; jeffrey.d.stieb@uscg.mil; Cornell, Annie
Cc: Anacheka-Nasemann, Alan R CIV USARMY CENAE (USA); Hokenson, Erikk (ENV)
Subject: MBTA Draw 1 and Tower A Interagency Coordination Meeting #2
When: Thursday, April 15, 2021 11:00 AM-12:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Webex Virtual Meeting

All,

Due to a change in project topics on Alan's interagency call, we are changing the Draw 1 meeting date to April 15, same time. Sorry for any inconvenience and we hope to see you there. Thank you.

Greetings,

On behalf of MBTA, TRC is inviting you to participate in the next virtual interagency coordination meeting for the MBTA's North Station Draw and Tower A project. The initial meeting was held in May 2020.

This project is intending to use federal funding, and MBTA has begun coordinating with the FTA as the lead federal agency.

We would like to use this meeting to update the scope of the project and discuss permitting requirements and any concerns or issues the agencies might have.

Thank you and we hope you can join us on April 1, 2021 at 11 am.

Colin Duncan

TRC Environmental

617-549-8506

-- Do not delete or change any of the following text. --

Colin Duncan is inviting you to a Webex Personal Room meeting.

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Join by meeting number
Meeting number (access code): 132 071 4637

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Join by phone

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Global call-in numbers

Join from a video conferencing system or application
Dial cduncan.trcenvironmentalcorp.my@webex.com You can also dial 173.243.2.68 and enter your meeting number.

If you are the host, you can also enter your host PIN in your video conferencing system or application to start the meeting.

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Interagency Consultation Meeting #3
Meeting Minutes

Meeting Date: February 25, 2022
Client: MBTA
Project Name: Draw 1 North Station Bridge Replacement
Designer: STV Incorporated
Meeting Place: Virtual - Webex
Prepared by: Colin Duncan and Diane Stallings, TRC
Attendees: Alex Hammond, FTA
Chrissy Hopps, MassDEP Ch. 91
Christina Szczepanski, TRC
Cindy Martin, TRC
Dan Driscoll, DCR
David Wong, MassDEP
Eric Papetti, FTA
Jeff Parenti, DCR
Jeffrey Stieb, USCG
Jennifer Letourneau, Cambridge Conservation Commission
Kaitlin Shaw, NOAA
Karl Eckstrom, MBTA
Karol Szaro, STV
Katelyn Rainville, USACE
Kyle Lally, MassDEP
Marissa Murphy, TRC
Mark Ennis, STV
Meg Langley, City Point Partners
Michael Stroman, MassDEP
Nicholas Moreno, Boston Conservation Commission
Page Czepiga, MEPA
Bob Boeri, MA CZM
Ruth Helfeld, DCR
Ryan Bartlett, FTA
Sean Barry, STV
Sean Casey, DCR
Sam Moffett, TRC
Tamia Burkett, STV
Tess Paganelli, MBTA
Tori Kim, MEPA

Safety Moment – TRC, Safety during Snow Events

Introductions
Karl Eckstrom.

Discussion Items/Topics

Presentation provided by Sam Moffett, TRC and Colin Duncan, TRC

- Introductions
- Project Overview/Tour
- Project Schedule
- Project Approach
- Footbridges
- Schedule
- Q&A

Future Agency Meetings/Consultations
To be set up as individual Agency meetings in the near future.

Discussion, Q&A

Dan Driscoll (DD), DCR

- DD expressed concerns about the viability of the South Bank Bridge construction. There is concern that construction of the South Bank Bridge will not be possible. Suggests the team think of alternatives to allow for pedestrian and bike travel in the vicinity of Causeway or Nashua streets
- Add DCR Construction Access Permit to permit list because bridge dismantling will need a permit and will trigger other issues.

Eric Papetti, FTA

- Once the Annotated Outline (AO) of the Environmental Assessment (EA) is approved, the project will be on NEPA dashboard and EA will need to be completed in 1-year.
- The AO should provide details documenting the coordination between MBTA and MassDCR relative to the footbridges and how this pertains to Section 4(f). The FTA will want to understand to understand all processes, etc. of the bridges before there is an approval. The footbridge is on a critical path and FTA will want to see details regarding MBTA engagement with MassDCR on the footbridge

Mark Ennis, STV

- Over a year ago, the design team presented concepts of the footbridge conflict to DCR, and understands the stress that the idea has generated. All feedback is being considered. A new plan is being developed to move and relocate the footbridge bridge so the period of closure will be greatly reduced.

Karl Eckstrom, MBTA

- MBTA looks forward to having more opportunities to meet with DCR in the near future

Kaitlyn Shaw NOAA Fisheries

- An email was sent to MBTA (May 4, 2021 at 9:11 am) agreeing that the preferred method of cutting piles at the mudline is ok
- The presence of winter flounder triggers time of year restrictions from Jan 15 to July 15 for diadromous resources. Any filling activities should be done outside of time of year restrictions

Nick Moreno, Boston Conservation Commission

- For resource areas on the figures, add Area Subject to Flooding which occurs on the trestle and North Station platform.

David Wong, MASSDEP

- Suggest an e-mail or letter from MA DMF for time of year restrictions to get the 401 approved.
- This project falls into a major dredging category due to the volume of dredging/disturbance shown on the matrix of >5,000 CY. DW suggests be WW-08, not a WW-07. Dredging includes all sediment removal and repositioning of sediment that occurs below the Mean High Tide line
- Quantification should include any material repositioned below the mean high tide line, inclusive of existing piles would be considered dredged material, cassions, etc.
- SAMP needs to be submitted to DEP for reviewed and approval prior to submittal of 401 application.

Page Czepiga, MEPA

- MEPA regulations were recently revised on January 1, 2022. This project will be required to file a mandatory EIR because the project is located within a mile of an EJ area.
- All MEPA meetings are remote and TRC can set a meeting online.

Mike Stroman, MassDEP

- Has anyone considered Article 97 for changing use of public properties?
  - Sam Moffett, design team understands need to look at Article 97 but it might not fit the project.
  - Dan Driscoll, does not anticipate Article 97 review since no land currently under Art. 97 jurisdiction is proposed to be taken or impacted for D1. If footbridge impacted (location, etc.), Art. 97 could be triggered.

Comments received via e-mail following the meeting

Jeffrey Stieb, USCG

Today's project update was very helpful. The next step for the CG would be the submission of a Project Initiation letter for the replacement bridges. Guidance regarding the Initiation Letter is in the Bridge Program Application Guide (BPAG) The initiation letter need not be exhaustive, a page or two with a project timeline and a conceptual drawing should work.

An additional important next step is to address the removal requirements the navigation centric agencies (CG, Army Corps, State Police Marine Unit and DCR) have for the removal of pilings, etc. of the old bridge. Removal "to the mudline" should work for water under elevated RR tracks which vessels cannot transit over. However below the mudline might be required for parts of the old bridge that vessels can transit over. From my perspective the best approach is for the MBTA to develop a proposal then get the agencies concerned with vessel transits and water bottoms on a Teams meeting to discuss. Seems this needs to be done before approaching the resource agencies.

After the Initiation letter is the development of a set of CG plans to precede or accompany the CG permit application. Attached is a guide to preparing the CG plans, a CG permit application template, and a recent plan sheet prepared for an Amtrak bridge in CT as an example. We should schedule a short meeting before the MBTA starts completing the CG permit application template.

William Gode, DCR

… a next step is to seek input from relevant agencies regarding work to remove pilings. Among these agencies are DCR and the MSP Marine Unit. For DCR I expect a Construction Access Permit (CAP) will be

the appropriate path with review coming to me and others inside the agency. A CAP can be applied for online here.

The MSP Marine Unit is commanded by Det. Lt. David Twomey, cc'd hereto. I suggest reaching out to him regarding plans as they are devolved so he may provide relevant feedback.

Katelyn Rainville, USACE

Prior to the meeting on Thursday February 24, 2022, KR requested TRC provide the project location, to help confirm if a 408 is needed or not. Based on the information USACE concluded " *the project is located outside any USACE projects".*

PRESENTATION

MBTA CONTRACT NO. H32PS01

Interagency Consultation Meeting

February 25, 2022

ENGINEERING SERVICES FOR

NORTH STATION DRAW 1 BRIDGE REPLACEMENT

AND ASSOCIATED TRACK AND SIGNALS UPGRADES

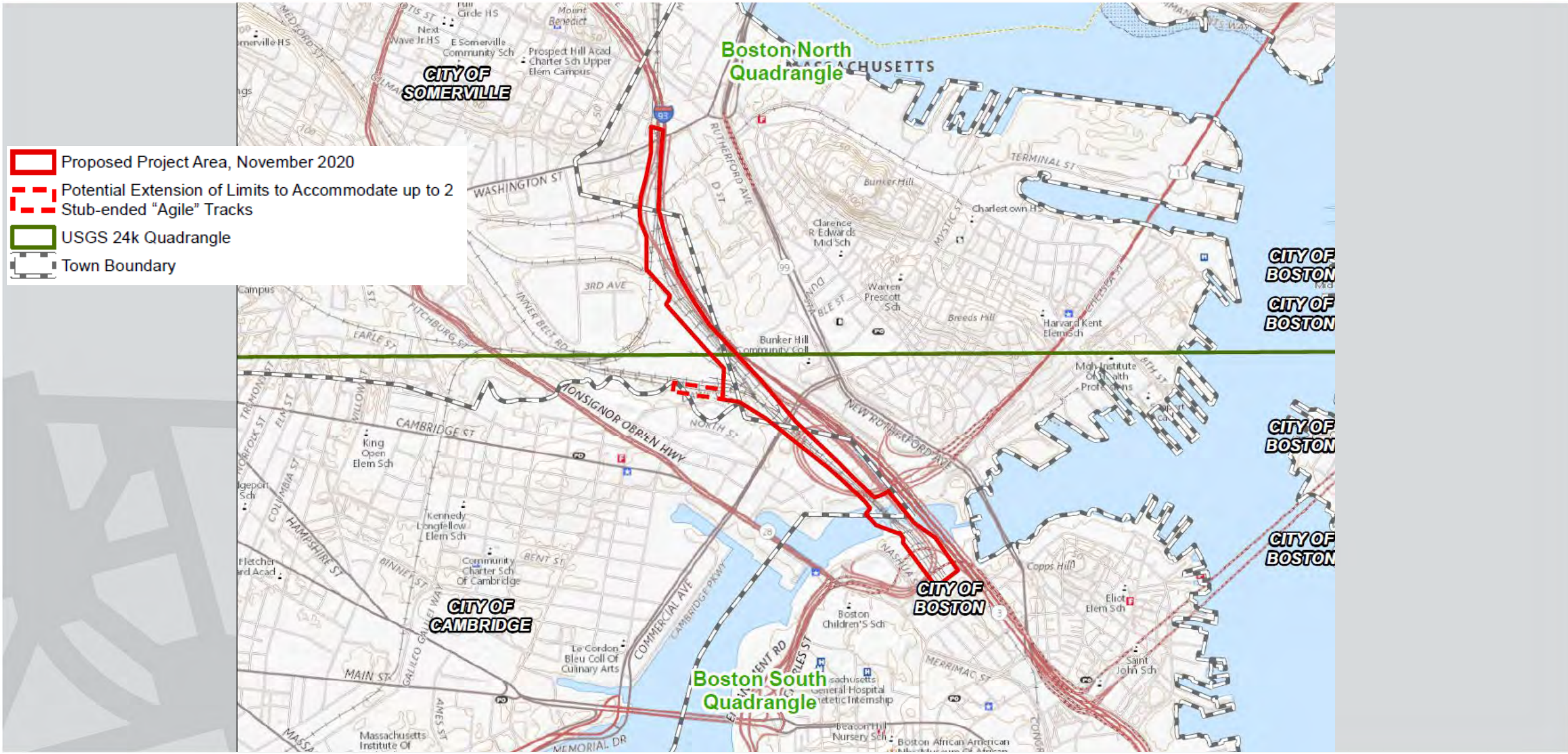
STV 100 Years

AGENDA

- INTRODUCTIONS
- PROJECT OVERVIEW/TOUR
- PROJECT SCHEDULE
- PROJECT APPROACH/PLANS
  - *Demolition Approach (Removal of In-water Structures)*
  - *Dredge and Fill (Fisheries Considerations)*
  - *Riverbank Sheetpile/Tremie Pour*
- FOOTBRIDGES
- PERMITTING
- SCHEDULE
- Q&A

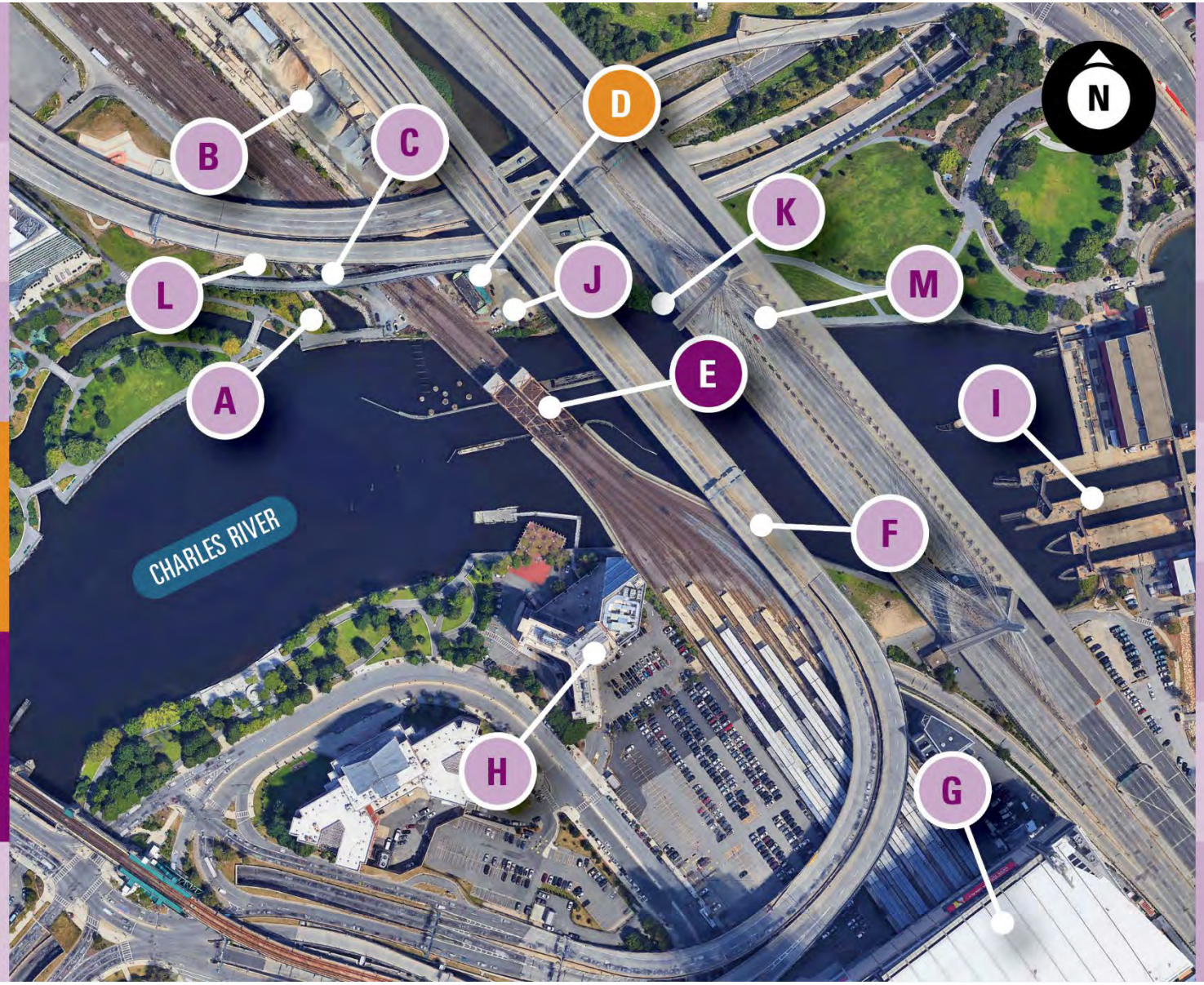
PROJECT OVERVIEW

PROJECT AREA



Existing Site Overview

- A — DCR PARK
- B — BOSTON SAND & GRAVEL
- C — NORTH BANK BRIDGE
- D — TOWER A
- E — DRAW 1 BRIDGES
- F — LEVERETT CIRCLE CONNECTOR BRIDGE

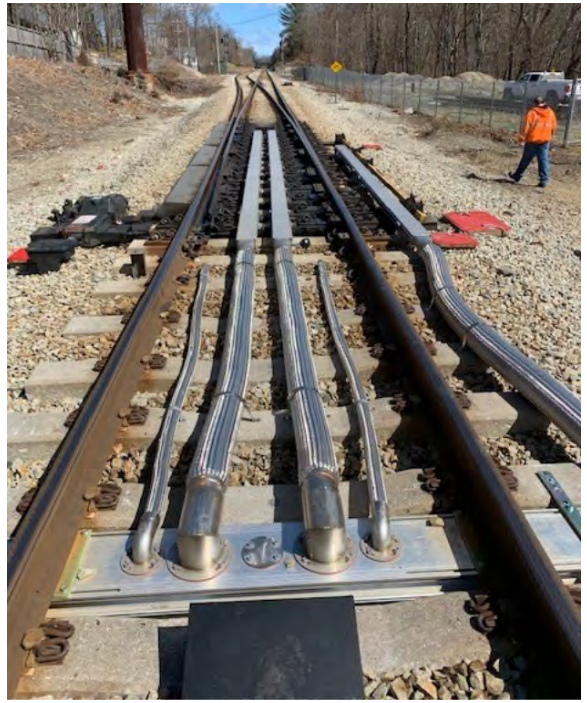


- G — NORTH STATION
- H — MGH BUILDING (FORMERLY SPAULDING REHAB)
- I — CHARLES RIVER DAM
- J — TEMPORARY STEEL FRAME CONTROL TOWER
- K — MILLERS RIVER
- L — DUCK BOAT RAMP
- M — ZAKIM BRIDGE

Project Scope – Additional Considerations

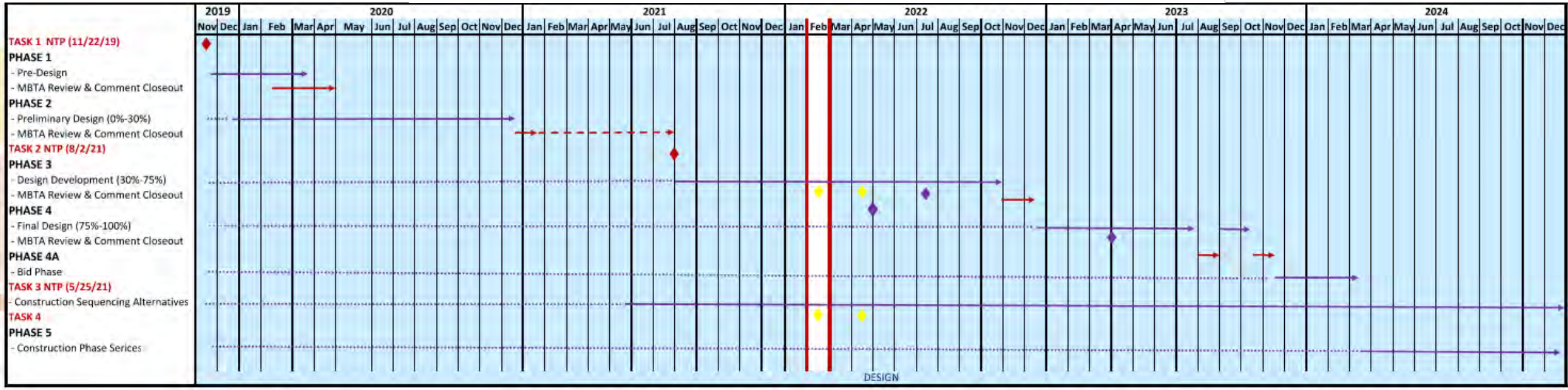
- **A minimum of four active tracks over the river during construction**
- **A minimum of ten active tracks at North Station during construction (six on weekends)**
- Signal control system upgrade using new microprocessor technology
- Local manned bridge control structure with provision for remote operation
- Pedestrian connection to walkways on each bank of the Charles River
- Environmental approvals & permits
- Agency & stakeholder coordination & public outreach
- Provisions for future electrification

Switch Heaters



Current Project Status – Schedule at Start of Task 2 & 3

	Milestone	Duration	Cumulative	Date	
	Task 1 NTP (11/22/2019)			*11/22/2019*	
Task 1	*Phase 1 Including MBTA Review*	*5.0 Mo*	*5.0 Mo*	*4/12/2020*	
Task 1	*Phase 2 Including MBTA Review*	*9.0 Mo*	*14.0 Mo*	*1/22/2021*	All Phase 1 and Phase 2 Deliverables submitted
	Task 2 NTP (8/2/2021)			*8/2/2021*	
Task 2	*Phase 3*	*15.0 Mo*	*15.0 Mo*	*11/1/2022*	
Task 2	*Phase 3 MBTA Review*	*1.5 Mo*	*16.5 Mo*	*12/16/2022*	
Task 2	*Phase 4*	*10.0 Mo*	*26.5 Mo*	*10/17/2023*	
Task 2	*Phase 4 MBTA Review*	*1.0 Mo*	*27.5 Mo*	*11/16/2023*	
Task 2	*Phase 4A (previously termed Phase 5)*	*4.0 Mo*	*31.5 Mo*	*3/17/2024*	
	Task 3 NTP (5/25/2021)			*5/25/2021*	
Task 3	*Construction Sequencing Alternative*	*concurrent with Phases 3, 4, and 5*		*11/11/2026*	
	Task 4				
	Phase 5	*72.0 Mo*	*103.5 Mo*	*11/11/2026*	



Legend

- Notice-to-Proceed Milestone
- Constructability Charettes (tentative dates)

Draw 1 - Project Status

Project Timeline

- Effort on Design commenced in November 2019
- 30% Design submitted for MBTA review in December 2020 (Task 1 Complete)
- 75% Design to be submitted in November 2022
- PS&E submission to be submitted in Fall 2023
- Construction begins Spring 2024
- Construction Duration 72 months +/-

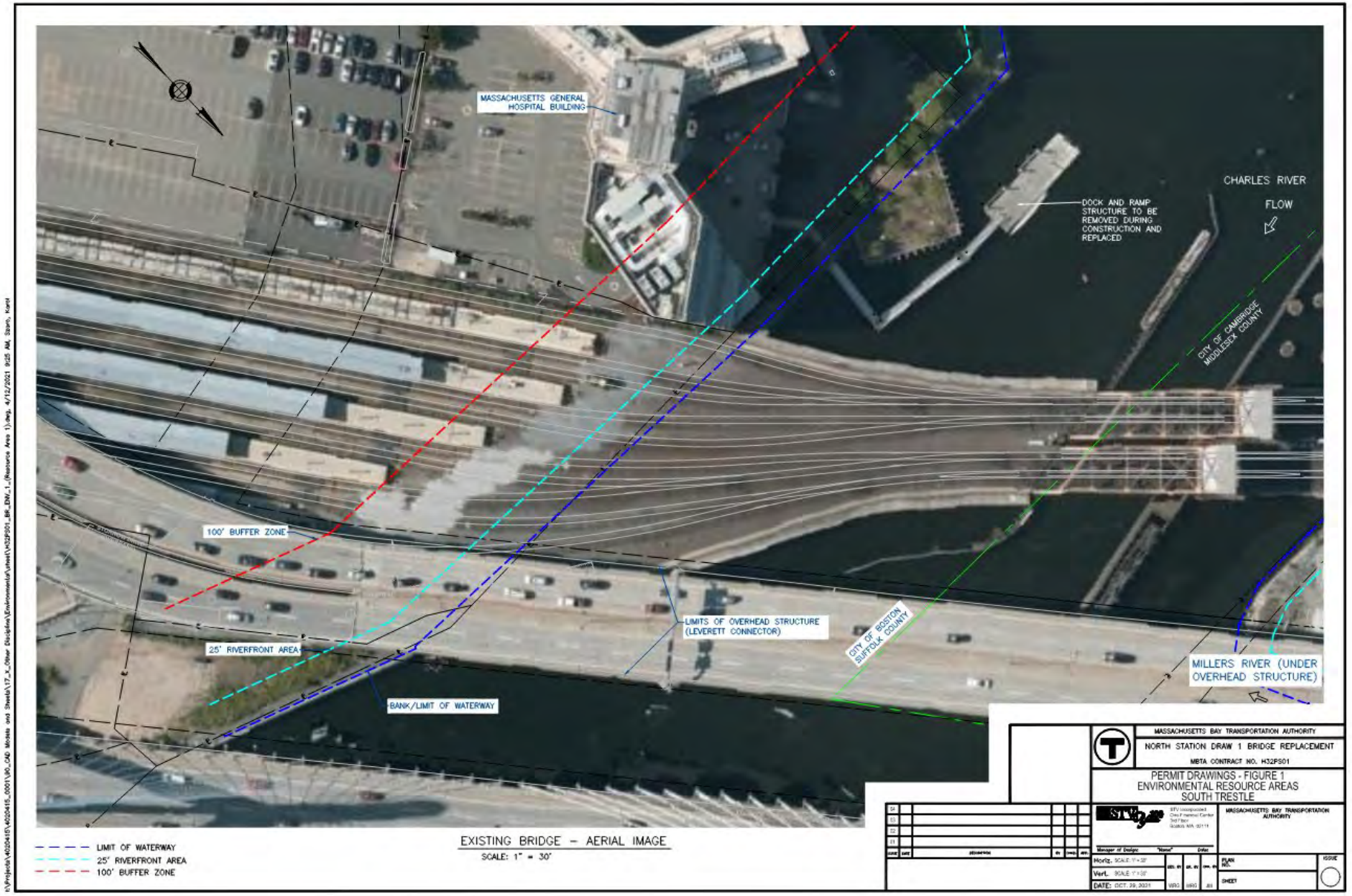
Project Drivers

- Bridge Deterioration
- Accommodation for Electrification
- Construction Staging

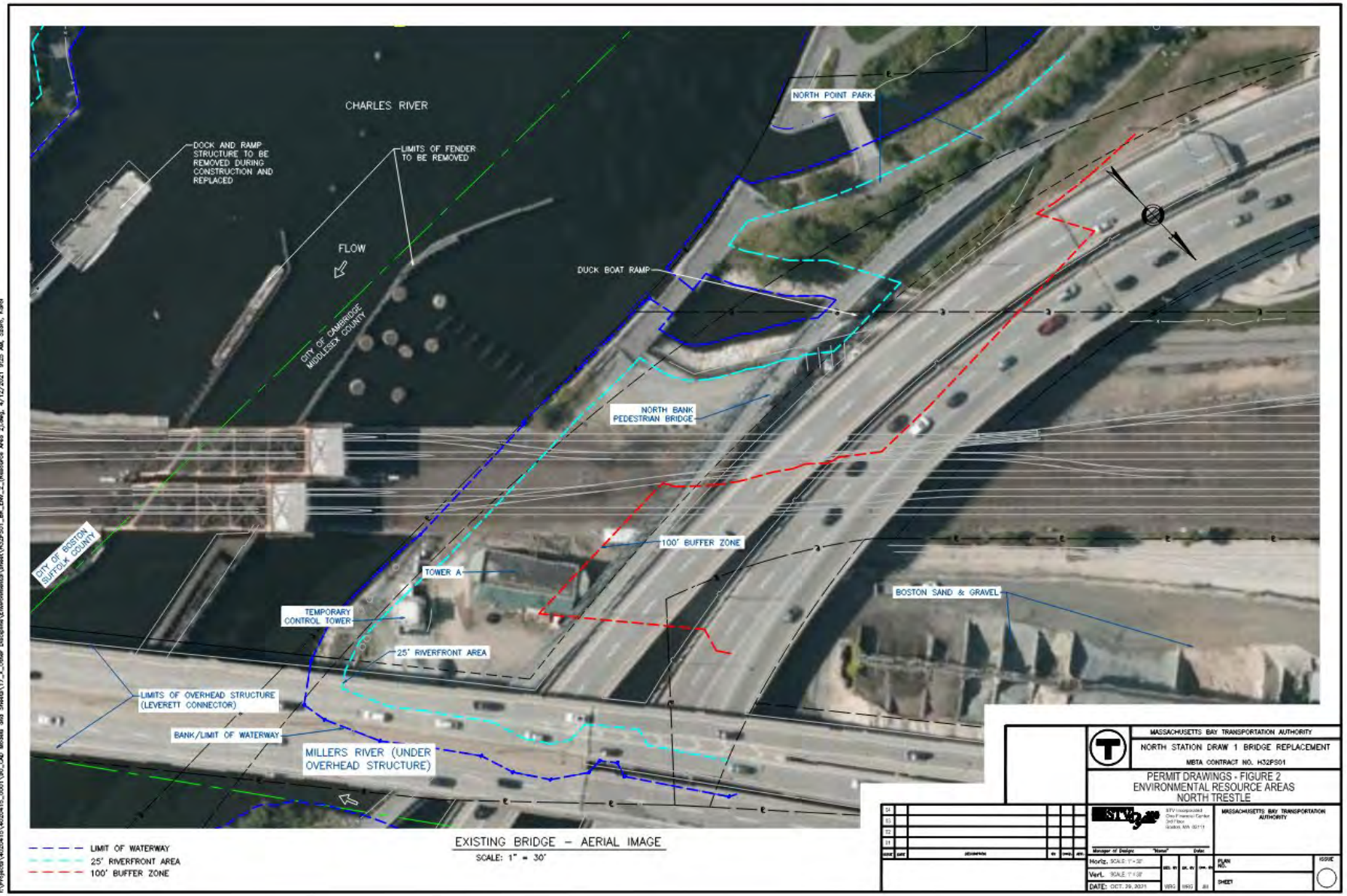
Rendered Model – Design Team Update

North Station Rail Bridge - Virtual Tour (123bim.com)

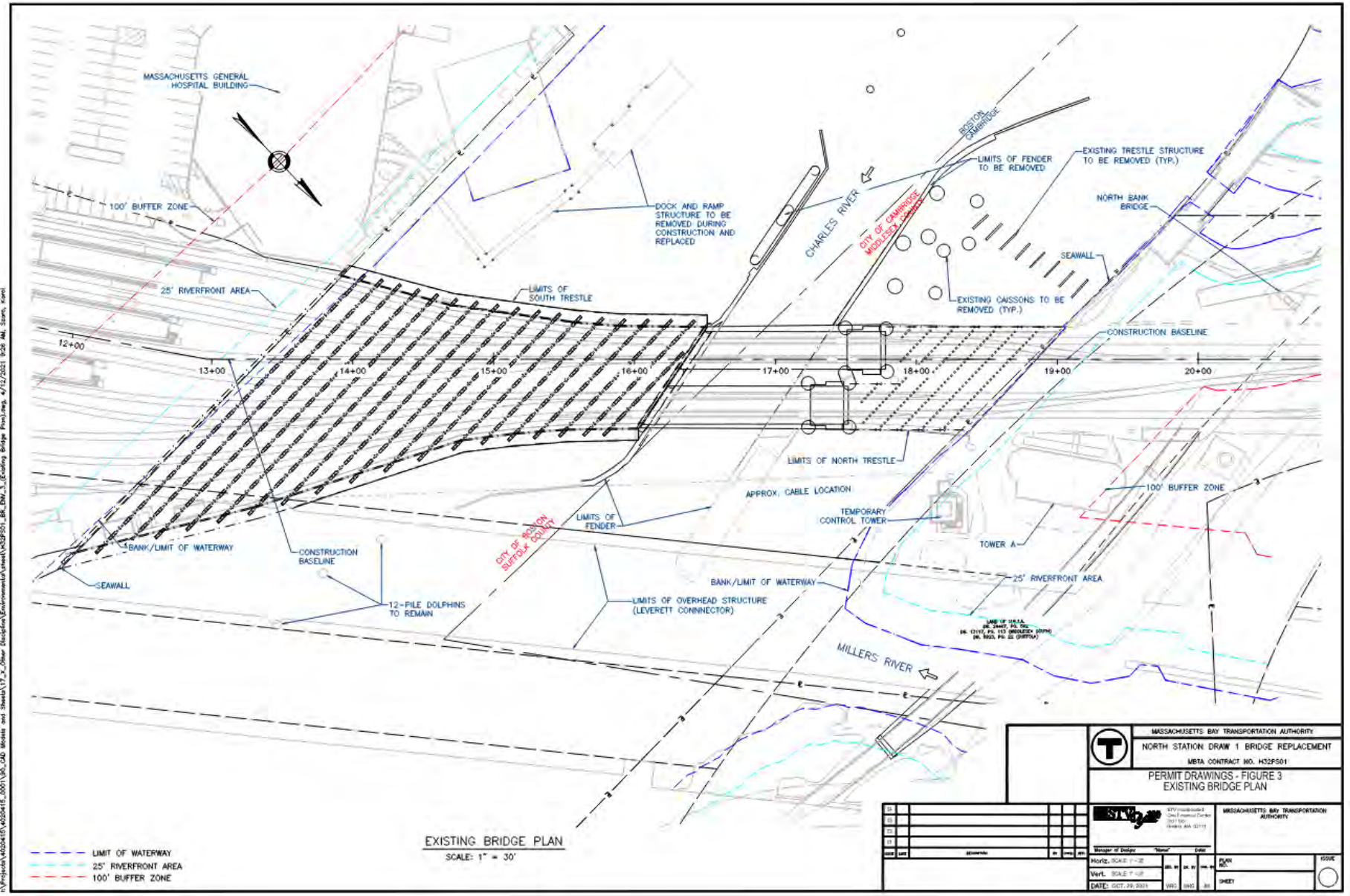
ENVIRONMENTAL RESOURCE AREAS – SOUTH TRESTLE



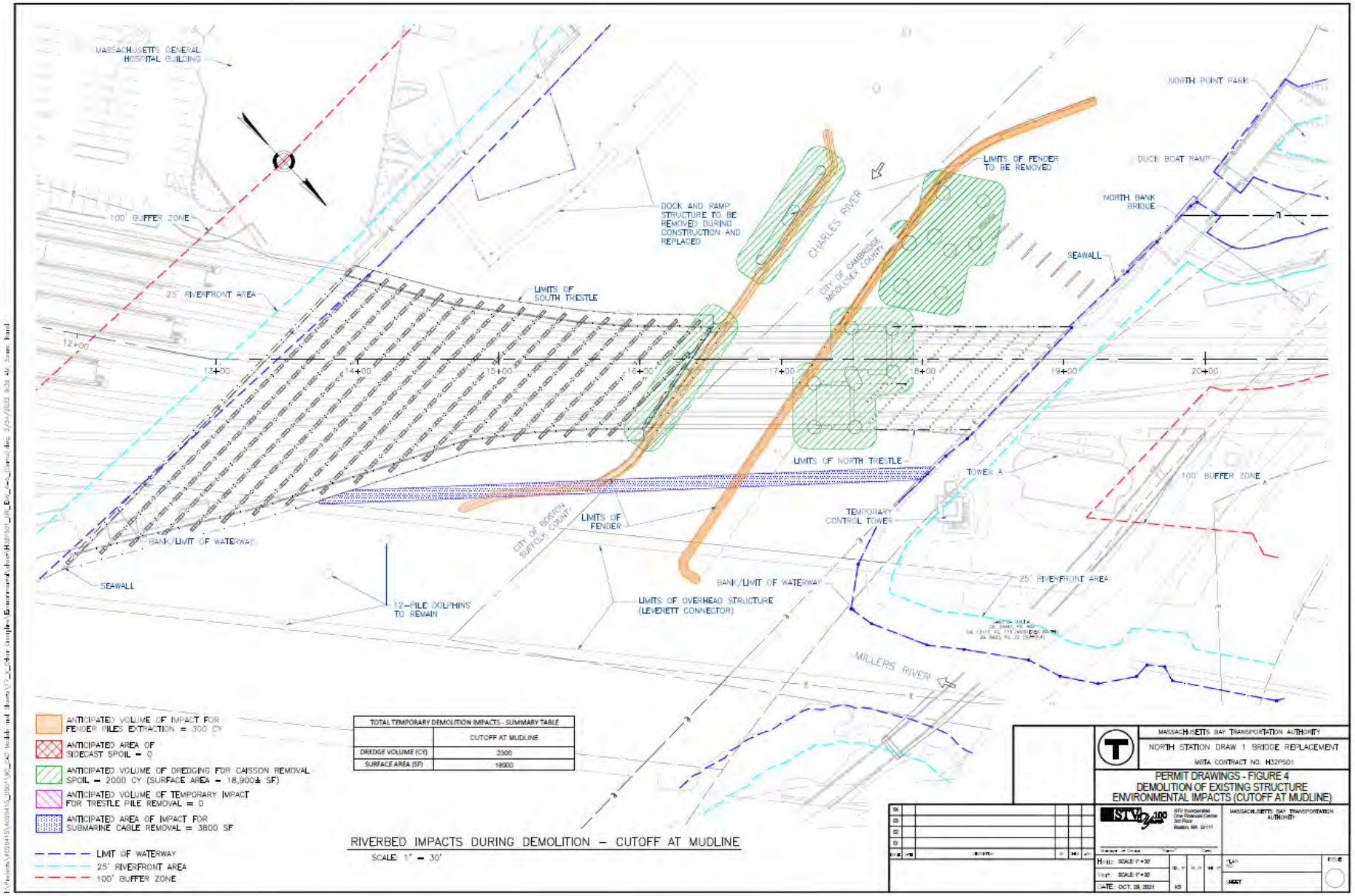
ENVIRONMENTAL RESOURCE AREAS – NORTH TRESTLE



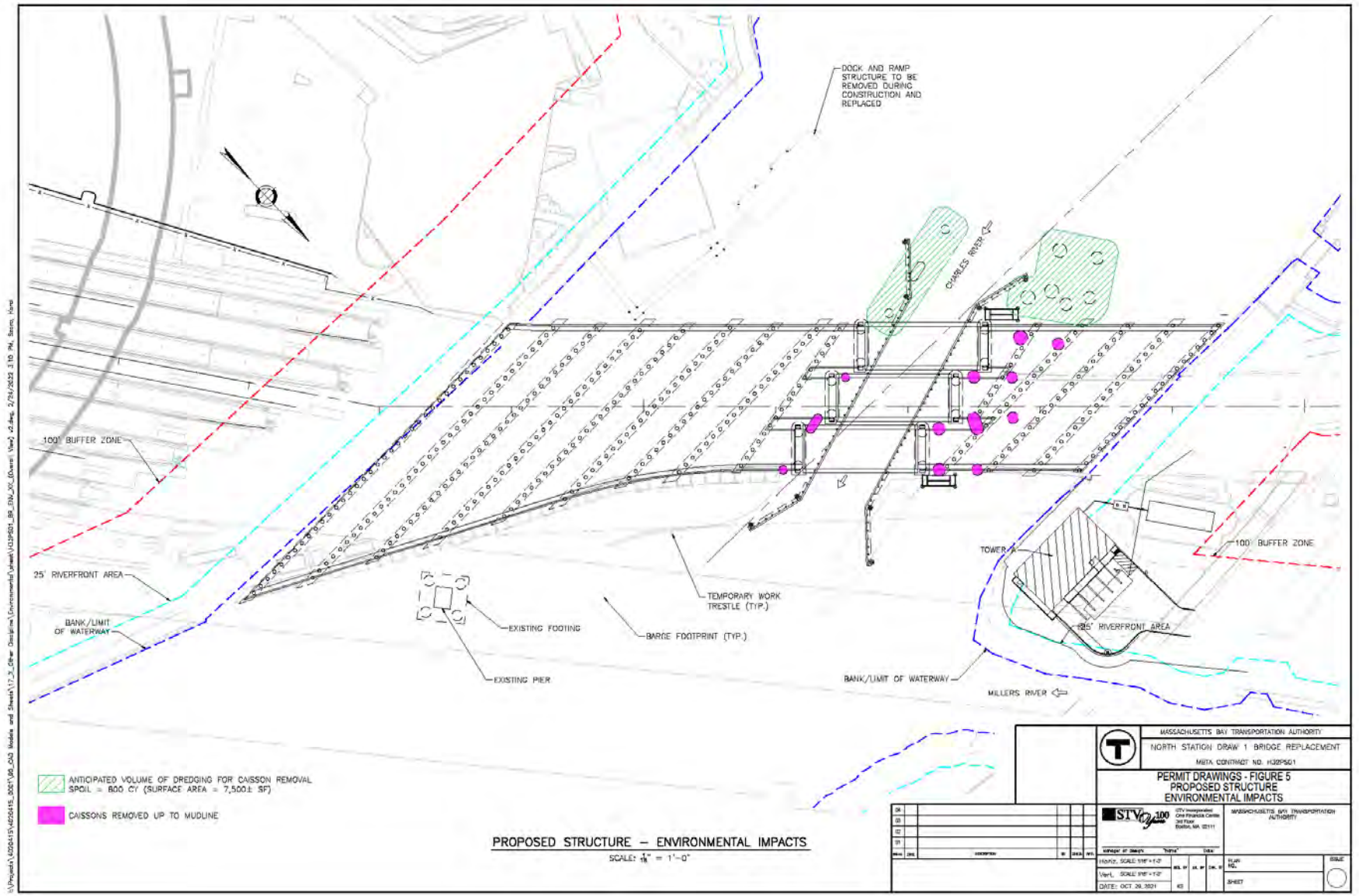
PERMIT DRAWINGS – EXISTING BRIDGE PLAN



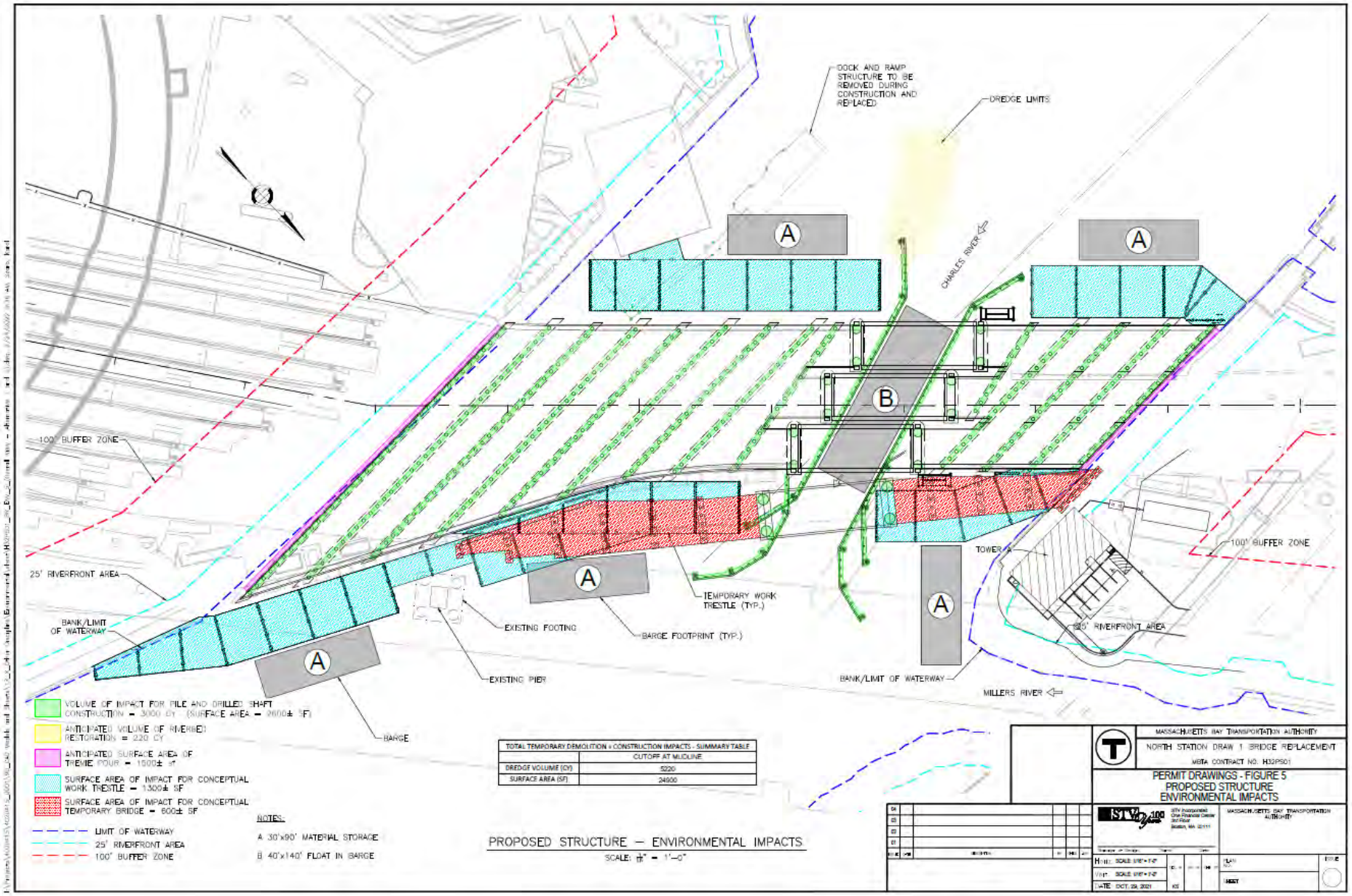
PERMIT DRAWINGS – DEMOLITION OF EXISTING STRUCTURE (CUTOFF AT MUDLINE)



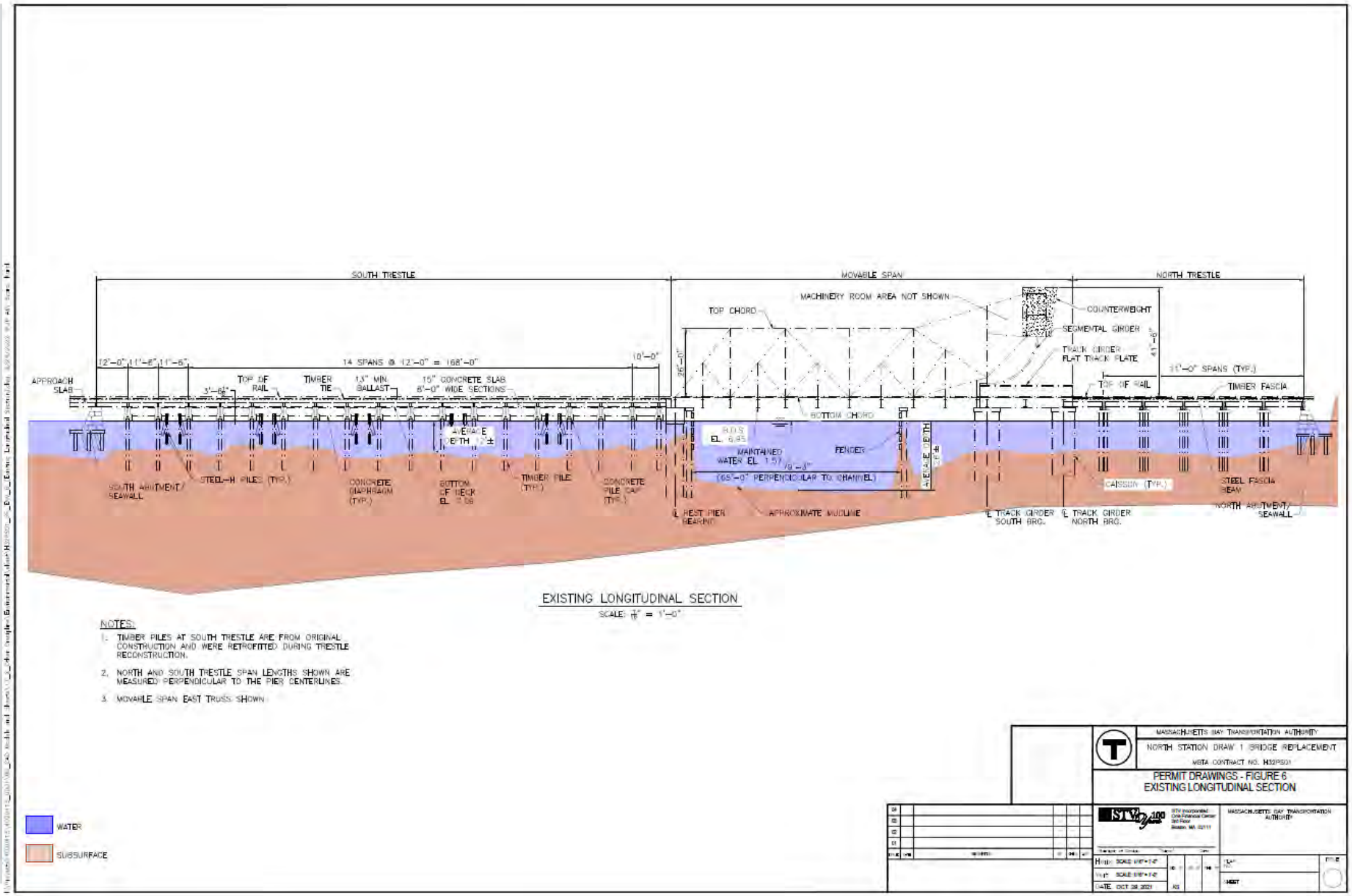
PERMIT DRAWINGS – PROPOSED STRUCTURE AND EXISTING CAISSONS



PERMIT DRAWINGS – CONSTRUCTION AND PERMANENT ENVIRONMENTAL IMPACTS



PERMIT DRAWINGS – EXISTING LONGITUDINAL SECTION



EXISTING LONGITUDINAL SECTION

SCALE: 1/8" = 1'-0"

NOTES:

1. TIMBER PILES AT SOUTH TRESTLE ARE FROM ORIGINAL CONSTRUCTION AND WERE RETROFITTED DURING TRESTLE RECONSTRUCTION.
2. NORTH AND SOUTH TRESTLE SPAN LENGTHS SHOWN ARE MEASURED PERPENDICULAR TO THE PIER CENTERLINES.
3. MOVABLE SPAN EAST TRUSS SHOWN.

WATER

SUBSURFACE

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

NORTH STATION DRAW 1 BRIDGE REPLACEMENT

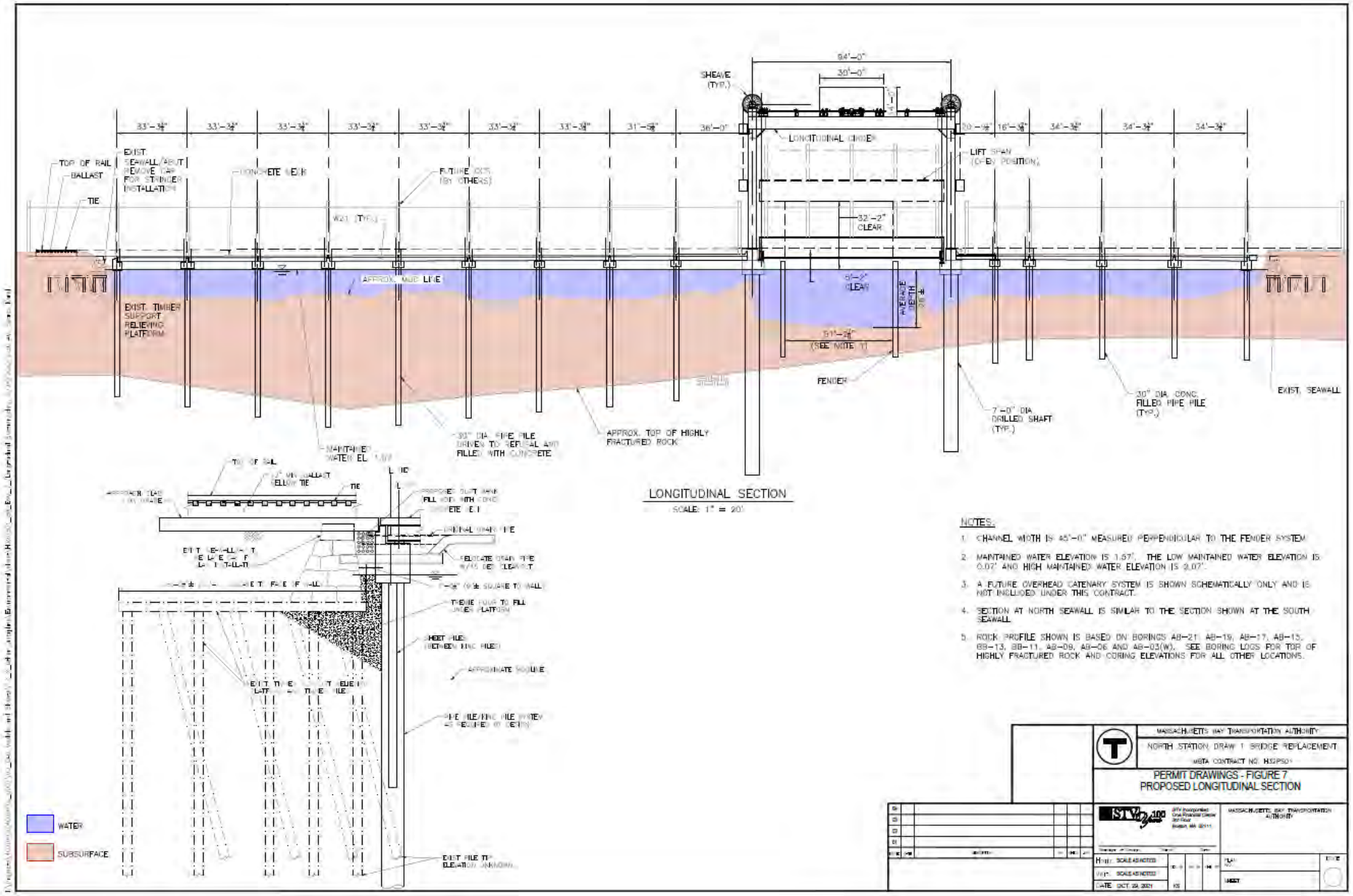
MBTA CONTRACT NO. H32P501

PERMIT DRAWINGS - FIGURE 6
EXISTING LONGITUDINAL SECTION

STV

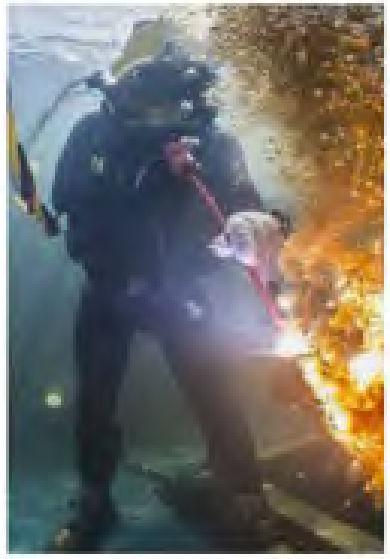
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

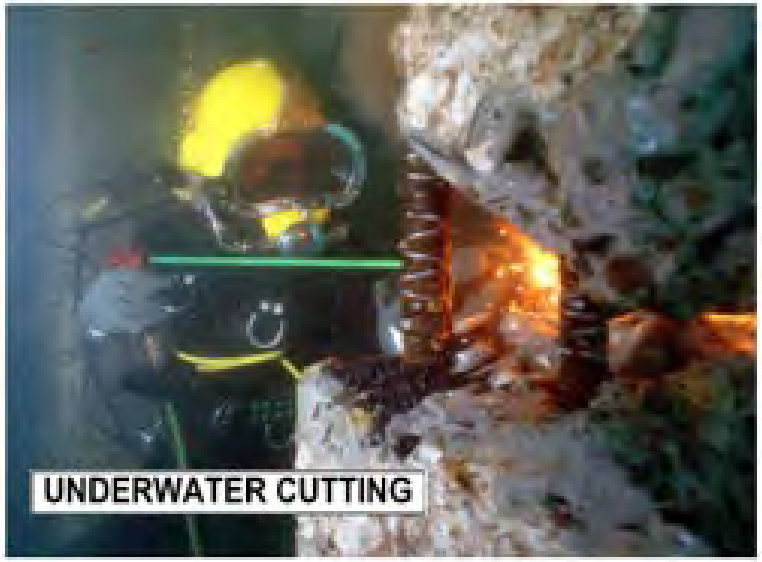
PERMIT DRAWINGS – PROPOSED LONGITUDINAL SECTION



Construction Activities & Equipment

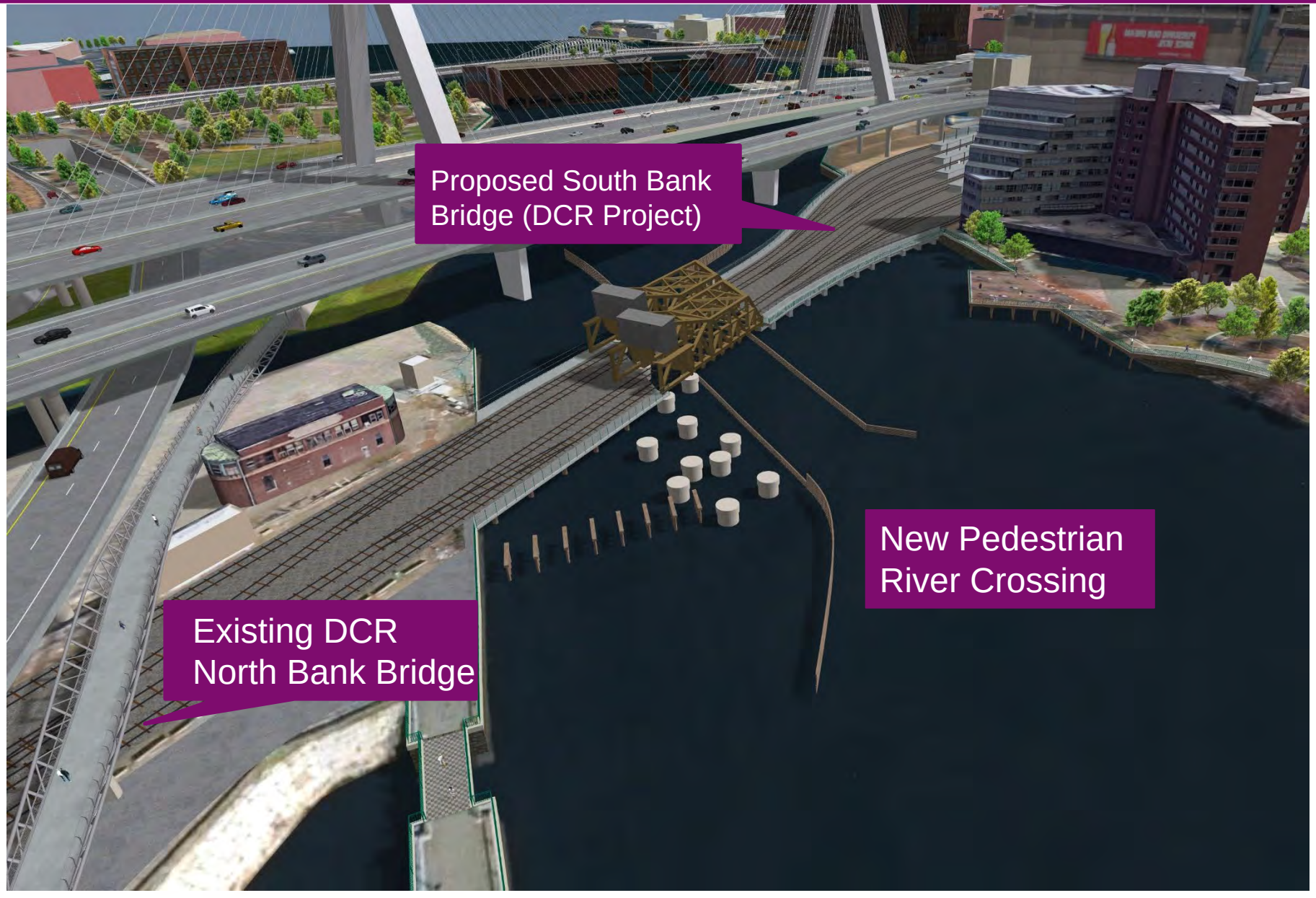
TIMBER PILES





STEEL PILES

Pedestrian Bridge Discussion



Environmental Permitting – Federal

Agency	Permit/Review Program	Trigger	Relevant Project Impacts	Likely Permit Required (w/Thresholds)
Federal				
US Army Corps of Engineers	Section 10/404 Permit Individual Permit or General Permit 10	Discharge of Dredged or Fill to WOUS	Construct with Piles Cut At Mudline: TEMP + PERM: 24,900 SF (0.57 AC)	General Permit 10 (5,000 SF – 1 AC)
Federal Transit Administration	NEPA Categorical Exclusion or Env. Assess.	Action using federal funding (initiated 4/20)	Federal Action	Environmental Assessment
FTA, State Historic Preservation Office (Massachusetts Historical Commission), BLC, CHC, and BUAR	Section 106 and 4(f) reviews or Finding of Adverse Impact; Inter-agency Memorandum of Agreement	Finding of Adverse Effect on NRHP-eligible structures	Potential Adverse Effect	MOA
Massachusetts Division of Marine Fisheries, US Fish and Wildlife Service, and US EPA	Section 7 Fisheries and Wildlife Consultations, Federal Permit Review Consultation	CWA Sections 10/404 and 401 permitting	Work in Waterway	Section 7 Consultation submittals
US Environmental Protection Agency	National Pollutant Discharge Elimination System – Construction General Permit	Disturbance of 1 or more acres of land	>1 AC total land disturbance	NPDES CGP via NOI and preparation of Stormwater Pollution Prevention Plan

Environmental Permitting – State and Local

Agency	Permit/Review Program	Trigger	Relevant Project Impacts	Likely Filing/Permit Required
State				
Massachusetts Department of Environmental Protection	Section 401 Water Quality Certification	Dredging	Construct with Piles Cut At Mudline: 5,520 CY	WQC Major WW07 (>5,000 CY)
		Fill/Excavation	Pile & Drilled Shafts; Tremie pour bulkhead stabilization in riverbed: PERM: 4,100 SF TEMP & PERM: 24,900 SF	WQC Minor WW11 (<5,000 SF) or Major WW10 (>5,000 SF)
Executive Office of Environmental Affairs/ MEPA Unit	MEPA Review	Construction in Wetlands, Waterways, and Tidelands requiring state permits <1 mile from EJ Community	Expansion Solid Fill Structure: 4,100 SF Alteration of Bank: 517 LF	Environmental Notification Form (Expanded) (>1,000 SF structure; >500 LF bank); Environmental Impact Report?
MassDEP	Chapter 91 Waterways License/Modification	Construction and occupation of Commonwealth Waterway	Bridge and Trestle crossing with existing license(s)	Chapter 91 License or Modification
Massachusetts Water Resources Authority	8(m) Permit	Crossing of MWRA facilities	Track modifications over MWRA facilities	8(m) Permit
Local				
Boston and Cambridge Conservation Commission	Wetlands Protection Act Notices of Intent	Construction in Areas Subject to Jurisdiction under Wetlands Protection Act	Alteration of Land Under Waterway: PERM: 4,100 SF TEMP + PERM: 24,900 SF Alteration of Bank: 517 LF Alteration Riverfront Area: TBD SF Alteration of Buffer Zone: TBD SF	Order of Conditions >5,000 SF LUW >50 LF Bank Work in RA Work in Buffer Zone

Other Environmental Considerations

Environmental Site Assessment

To identify soil and groundwater management constraints and approach/specs for construction

Building and Hazardous Materials Assessment

To identify building and hazardous materials constraints and approach/specs for construction

Environmental Permitting – Current Schedule

Permitting Schedule		
Permit Agency/Program	**Activity**	**Approximate Timeframe***
FTA - NEPA Environmental Assessment	Prepare Annotated Outline/Section 106 & Section 7 Consultations	Winter - Spring 2022
	Submit EA	Summer 2022
USACE - Section 10/404 General Permit	Inter-Agency Consultations – MDFW, NOAA NMFS, US EPA, US FWS	Spring 2022 - Ongoing
	Submit General Permit	Summer 2022
MassDEP – Section 401 Water Quality Certification WW08 Dredging and WW11 or WW10 Fill	Review of Sediment & Water Sampling Program	Spring 2022- Ongoing
	Pre-application Consultation	Spring 2022
	Submit 401 WQC Applications	Summer 2022
MassDEP – Chapter 91 Waterways License	Pre-application Consultation	Spring 2022
	Submit Ch. 91 Application	Summer 2022
MEPA	Pre-Submittal Consultation	Spring 2022
	Submit MEPA Filing	Summer 2022
Boston and Cambridge Conservation Commissions	Submit Notice of Intent Applications	Fall 2022
MWRA 8(M) Permit	Pre-application Consultation	Summer 2022
	Submit Application	Fall 2022
NPDES Construction General Permit NOI	Prepare SWPPP and Submit eNOI	14 days prior to construction
*Based on current Project design timeline		

PRESENTATION

MBTA CONTRACT NO. H32PS01

QUESTIONS & ANSWERS

THANK YOU

STV 100 Years

Conclusion and Key Issue for Discussion

Dredging and Riverbed Impacts

- *Proposed cutting of piles above mudline will significantly reduce riverbed dredging volumes and area impacts*

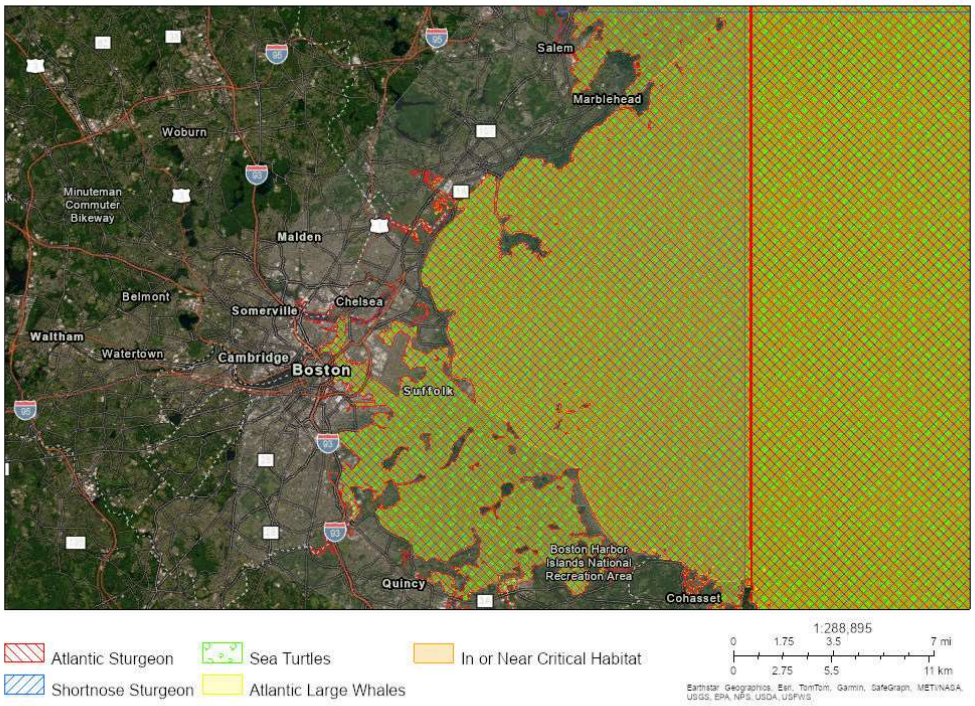
Appendix B: ESA Mapper Results

Drawn Action Area & Overlapping S7 Consultation Areas

Area of Interest (AOI) Information

Area : 229,235.65 acres

Oct 14 2024 12:13:43 Eastern Daylight Time



Summary

Name	Count	Area(acres)	Length(mi)
Atlantic Sturgeon	4	255,106.32	N/A
Shortnose Sturgeon	3	127,553.77	N/A
Atlantic Salmon	0	0	N/A
Sea Turtles	4	499,393.10	N/A
Atlantic Large Whales	4	498,127.64	N/A
In or Near Critical Habitat	1	88,888.92	N/A

Atlantic Sturgeon

#	Feature ID	Species	Lifestage	Behavior	Zone	From	Until	From (2)	Until (2)	Area(acres)
1	ANS_C50_SUB_MAF	Atlantic sturgeon	Subadult	Migrating & Foraging	N/A	01/01	12/31	N/A	N/A	127,552.79
2	ANS_C50_ADU_MAF	Atlantic sturgeon	Adult	Migrating & Foraging	N/A	01/01	12/31	N/A	N/A	127,553.53

Shortnose Sturgeon

#	Feature ID	Species	Life Stage	Behavior	Zone	From	Until	From (2)	Until (2)	Area(acres)
1	SNS_C50_ADU_MAF	Shortnose sturgeon	Adult	Migrating & Foraging	N/A	04/01	11/30	N/A	N/A	127,553.77

Sea Turtles

#	Feature ID	Species	Life Stage	Behavior	Zone	From	Until	From (2)	Until (2)	Area(acres)
1	GRN_STN_AJV_MAF	Green sea turtle	Adults and juveniles	Migrating & Foraging	Maine to Massachusetts (N of Cape Cod)	6/1	11/30	*No Data*	*No Data*	124,848.27
2	KMP_STN_AJV_MAF	Kemp's ridley sea turtle	Adults and juveniles	Migrating & Foraging	Maine to Massachusetts (N of Cape Cod)	6/1	11/30	*No Data*	*No Data*	124,848.27
3	LTR_STN_AJV_MAF	Leatherback sea turtle	Adults and juveniles	Migrating & Foraging	Maine to Massachusetts (N of Cape Cod)	6/1	11/30	*No Data*	*No Data*	124,848.27
4	LOG_STN_AJV_MAF	Loggerhead sea turtle	Adults and juveniles	Migrating & Foraging	Maine to Massachusetts (N of Cape Cod)	6/1	11/30	*No Data*	*No Data*	124,848.27

Atlantic Large Whales

#	Feature ID	Species	Lifestage	Behavior	Zone	From	Until	From (2)	Until (2)	Area(acres)
1	RIT_WRN_AJV_FOR	North Atlantic right whale	Adults and juveniles	Foraging	Northeast (ME to Cape Cod, MA)	1/1	12/31	*No Data*	*No Data*	124,531.91
2	RIT_WRN_AJV_WIN	North Atlantic right whale	Adults and juveniles	Overwintering	Northeast (ME to Cape Cod, MA)	11/1	1/31	*No Data*	*No Data*	124,531.91
3	FIN_WFN_AJV_WIN	Fin whale	Adults and juveniles	Overwintering	Northeast (ME to Cape Cod, MA)	11/1	3/31	*No Data*	*No Data*	124,531.91
4	FIN_WFN_AJV_FOR	Fin whale	Adults and juveniles	Foraging	Northeast (ME to Cape Cod, MA)	1/1	12/31	*No Data*	*No Data*	124,531.91

In or Near Critical Habitat

#	Species	In or Near Critical Habitat	Area(acres)
1	North Atlantic Right Whale	Critical Habitat Unit 1: Feeding Area	88,888.92