Walk Bridge Replacement Project
Bridge No. 04288R, Norwalk Connecticut
State Project No. 0301-0176

Structures, Dredging & Fill, and Tidal Wetlands and 401 Water Quality Certificate Application
Permit No. 201909990-TWSDF

Table of Contents

Permit Application for Office of Long Island Sound Programs, DEEP-OLISP-APP-100

Supplemental Application Documentation

Part III: Project Information, Question 1 (7 pages)

Part III: Project Information, Question 2 (51 pages)

Part III: Project Information, Question 3 (3 pages)

Part III: Project Information, Question 4 (26 pages)

Part III: Project Information, Questions 5-6 (12 pages)

Part III: Project Information, Question 9 (21 pages)

Part IV: Project Information, Questions 10-12 (5 pages)

Attachment AA: Published Notice of Permit Application

Attachment A: Executive Summary (20 Pages)

Attachment B (not applicable)

Attachment C: CT NDDB Information

NDDB Determination, May 16, 2021

Attachment D: Norwalk Shellfish Commission Consultation

Shellfish Commission DEEP Permit Consultation Form

Chronology of Norwalk Shellfish Commission Coordination

Attachment E: Norwalk Harbor Management Commission Consultation

Harbor Management Commission DEEP Permit Consultation Form

Chronology of Norwalk Harbor Management Commission Consultation

Chronology of Norwalk Harbor Management Commission Correspondence

Marine Use Stakeholder Coordination Activities

Attachment F: Department of Agriculture/Bureau of Aquaculture Consultation

Attachment G (not applicable)

Attachment H (not applicable)

Attachment I: Project Permit Plates

Attachment J: Photographs Showing Existing Conditions of the Site

Attachment K: Landowner Information

Attachment L (not applicable)

Attachment M: Other Information

- **M1** NOAA/NMFS/GARFO Reviews and Approvals – Essential Fish Habitat
- **M2** NOAA/NMFS/GARFO Reviews and Approvals - Section 7 of the Endangered Species Act (SEC 7 ESA)
- **M3** CTDEEP Coordination
  - M3-1 - Coordination with Marine Fisheries Program
  - M3-2 - Coordination with Division of Wildlife
- **M4** USFWS SEC 7 ESA Determinations
  - M4-1 – SEC 7 ESA No-Effect Determination, May 8, 2021
  - M4-2 - SEC 7 ESA Verification Letter, May 17, 2021
- **M5** CTDEEP NDDB Determination, May 16, 2021
- **M6** Selected CTDOT Specifications:
  - Item # 0101135A - Disposal of Debris
  - Item # 0210300A - 021030XA – Delivery and Installation of Turbidity Control Curtains
  - Item # 0948013A – Tidal Wetland Creation
  - Item # 0949315A - Fiber Roll
  - Item # 0949875A – Wetland Plantings
  - Item # 0950202A - Shoreline Grass Establishment
  - Item # 0952051A - Control and Removal of Invasive Vegetation
  - Notice to Contractor – Invasive Plant Species

Attachment N: U.S. Army Corps of Engineers Consultation Form

- U.S. Army Corps of Engineers DEEP Permit Consultation Form
- Chronology of U.S. Army Corps of Engineers Consultation

Appendix A: Activity Specific Information (12 pages)

- Dredging and Disposal of Dredged Material
- Shoreline Erosion or Stabilization Structures, Breakwaters or Wave Attenuators

Attachment M – Other Information

M1 NOAA/NMFS/GARFO Reviews and Approvals - Essential Fish Habitat (EFH)

M2 NOAA/NMFS/GARFO Reviews and Approvals - Section 7 of the Endangered Species Act (SEC 7 ESA)

M3 CTDEEP Coordination

M3-1 - Coordination with Marine Fisheries Program

M3-2 – Coordination with Division of Wildlife

M4 USFWS SEC 7 ESA Determinations

M4-1 - SEC 7 ESA No-Effect Determination, May 8, 2021

M4-2 - SEC 7 ESA Verification Letter, May 17, 2021

M5 CTDEEP NDDB Determination, May 16, 2021

M6 Selected CTDOT Specifications:

Item # 0101135A - Disposal of Debris

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Item # 0949315A - Fiber Roll

Item # 0949875A – Wetland Plantings

Item # 0950202A - Shoreline Grass Establishment

Item # 0952051A - Control and Removal of Invasive Vegetation

Notice to Contractor – Invasive Plant Species

Attachment M1 – NOAA/GARFO Reviews and Approvals - Essential Fish Habitat

From: Samorajczyk, Christopher W
To: Hanifin, John D.
Cc: Davis, Andrew H; Lesay, Kimberly C; Joe Grilli; Bertoli, Richard; Sarah Walker; Lauren DiGovanni
Subject: Fw: CTDOT 301-176_WALK Bridge _Extra Project Area Added_Manresa Island
Date: Friday, January 8, 2021 1:13:41 PM

This should close the EFH loop for the use of Manresa Island. Let me know if there are any questions.
Chris

From: Alison Verkade - NOAA Federal <alison.verkade@noaa.gov>
Sent: Friday, January 8, 2021 10:40 AM
To: Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov>
Cc: Lauren Sager - NOAA Affiliate <lauren.m.sager@noaa.gov>; Christopher Boelke - NOAA Federal <christopher.boelke@noaa.gov>
Subject: Re: CTDOT 301-176_WALK Bridge _Extra Project Area Added_Manresa Island

EXTERNAL EMAIL: This email originated from outside of the organization. Do not click any links or open any attachments unless you trust the sender and know the content is safe.

Hi Chris,

If there is no in-water work, re-initiation would not be necessary. Please let me know if you have any questions or concerns. Thank you, Alison

Alison T. Verkade
National Marine Fisheries Service
Greater Atlantic Regional Fisheries Office
Habitat and Ecosystem Services Division
55 Great Republic Drive
Gloucester, MA 01930
Office: 978-281-9266
Email: alison.verkade@noaa.gov

On Tue, Jan 5, 2021 at 7:42 AM Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov> wrote:

> Hi Alison-
> Happy New Year-
> Hope you had a great Holiday season--just checking in again to see if you could send me a concurrence for the additional WALK Bridge staging area at Manresa Island. The Department is ready to submit the NEPA RE-evaluation now and this is the last bit that FTA

wants tied up. Let me know if you want to discuss quick--Talk soon
Thanks, Chris

Christopher W. Samorajczyk, CWB
Natural Resource Planning
Connecticut Department of Transportation
Office of Environmental Planning
Bureau of Policy & Planning
P: 860-594-2938

From: Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov>
Sent: Wednesday, December 16, 2020 8:39 AM
To: Alison Verkade <alison.verkade@noaa.gov>
Cc: Davis, Andrew H <Andrew.H.Davis@ct.gov>; Lesay, Kimberly C <Kimberly.Lesay@ct.gov>; McMillan, Mark J. <Mark.McMillan@ct.gov>
Subject: Fw: CTDOT 301-176_WALK Bridge _Extra Project Area Added_Manresa Island

Hi Alison-
Hope all is well--Back in June we spoke at length about the WALK Bridge project in Norwalk, CT and the inclusion of the extra work area located out at the mouth of the harbor known as Manresa Island. Based on our discussion and scope of work you concluded that this area and the work being added would not have any new impacts on EFH species under your review (see below email). As part of the NEPA re-evaluation process FTA is looking for your written concurrence that CTDOT does not need to reinitiation consultation for EFH for this work. If you could respond to this email that should be all I need. If you have any questions or want to discuss quick give me a call--Talk soon
Thanks, Chris

Christopher W. Samorajczyk, CWB
Natural Resource Planning
Connecticut Department of Transportation
Office of Environmental Planning
Bureau of Policy & Planning
P: 860-594-2938

From: Samorajczyk, Christopher W
Sent: Monday, June 22, 2020 12:47 PM

To: 'alison.verkade@noaa.gov' <alison.verkade@noaa.gov>
Cc: Davis, Andrew H <Andrew.H.Davis@ct.gov>; Lesay, Kimberly C <Kimberly.Lesay@ct.gov>
Subject: CTDOT 301-176_WALK Bridge _Extra Project Area Added_Manresa Island

Hi Alison-
As discussed earlier this morning there are some changes with CTDOT 301-176 the replacement of the Metro North RR Bridge over the Norwalk River- Norwalk, CT. Originally we were going to build the bridge in a staging yard close to the existing bridge but a new change has now identified the area of the old decommissioned coal plant--Manresa Island- west side of Norwalk Harbor mouth -73.41/ 41.072- to be used as the staging yard. The Departments Contractor is going to be using this area—map attached, additional work area in yellow—to do most of the staging and bridge work. This is a much better area to use –one that the Town's Shellfish and Harbor Commissions have been really pushing for. The use of this area will be extremely less detrimental to the Rivers ecosystem and really a greater fit for the oyster industry and recreational boating on a whole –due to the large mooring areas for the construction barges. The possible use of this area will require a reevaluation to the NEPA document and that's why I'm reaching out----right now this area is within the EFH mapped area. The use of the area was almost entirely accounted for in the initial consultation. The only additional area would be the actual dredged man made barge slip along the bulkhead. I believe this additional area would be covered by the consultation and design comments already in place but just wanted to double check. The initial consultation addressed barges through this area already--just not into this particular slip. There will be some barges in the barge slip tied up to the existing bulkhead and some that will be spudded down. The fabrication yard is on land and is on old fill and is not located in the intertidal at all. All work on the upland will be done with no excavation and no demo of the existing structure. Please concur that the use of Manresa Island will not have any additional effects to Essential Fish Habitat under your review. Let me know if you have any questions--
Talk soon
Thanks, Chris

Christopher W. Samorajczyk, CWB
Natural Resource Planning
Connecticut Department of Transportation
Office of Environmental Planning
Bureau of Policy & Planning
P: 860-594-2938



Proposed Staging and Storage Yard at Manresa Island

Re: CTDOT 301-176_WALK Bridge Replacement_Norwalk, CT

Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov>

Fri 6/19/2020 10:16 AM

To: Alison Verkade - NOAA Federal <alison.verkade@noaa.gov>
Cc: Christopher Boelke - NOAA Federal <christopher.boelke@noaa.gov>; Zachary Jylkka - NOAA Federal <zachary.jylkka@noaa.gov>

Hi Alison-
Understood- with such a large many seasoned project any leeway to help ensure less time / impact would be great for all resources under stress. We no not have any turbidity producing activities taking place form 2/1 through 11/30-right now. The Project has commitments to have all work between 2/1 and 11/30 to be done within marine enclosures surrounded by a Type III curtain. Would like to discuss possible alternatives--
Yes, Monday at 9 would work perfect----call your Office number? Have a great weekend--talk soon
Thanks, Chris

Christopher W. Samorajczyk, CWB
Natural Resources Planning
Connecticut Department of Transportation
Office of Environmental Planning
Bureau of Policy & Planning
P: 860-594-2938

From: Alison Verkade - NOAA Federal <alison.verkade@noaa.gov>
Sent: Friday, June 19, 2020 9:50 AM
To: Samorajczyk, Christopher W
Cc: Christopher Boelke - NOAA Federal; Zachary Jylkka - NOAA Federal
Subject: Re: CTDOT 301-176_WALK Bridge Replacement_Norwalk, CT

Hi Chris,

We actually modified our winter flounder time of year recommendation last year. It now extends from January 1 to May 31. We provided our EFH conservation recommendations to you in 2018, prior to the change, so the recommended winter flounder time of year restriction for this project is February 1 to May 31 (the full time of year restriction recommendation was through September 30 to include diadromous fish and shellfish).

We would not recommend dredging activities (either with or without turbidity curtains) occur within the provided winter flounder time of year restriction timeframe.

I have time on Monday and we can discuss further. Does Monday at 9am work for you?

Thanks, Alison
Alison T. Verkade
National Marine Fisheries Service
Greater Atlantic Regional Fisheries Office
Habitat Conservation Division
55 Great Republic Drive

Gloucester, MA 01930
Office: 978-281-9266
Email: alison.verkade@noaa.gov

On Fri, Jun 19, 2020 at 8:25 AM Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov> wrote:

> Hi Alison-
> Hope all is well---another CTDOT 301-176 potential modification I want to run by you quick----The Connecticut Department of Transportation is preparing the final Regulatory Permits for the WALK Bridge MNRR Replacement in Norwalk, CT. After analysis of the schedule we are asking for larger dredge window without marine enclosures. Currently we have dredging behind a TYPE III permeable turbidity curtain during December 1st through January 31st- in our individual consultation with your Division all other dredging was agreed to be behind a marine enclosure and turbidity curtain. The construction schedule would greatly benefit if we could extend the dredging behind a turbidity curtain only form December 1st through March 15th. I was fortunate enough to speak to NMFS PRD and CTDEEP Marine Fisheries yesterday and both Divisions were open to allowing this modification. Is this something that would be considered by the Habitat Conservation Division? Is the turbidity curtain enough to address the potential winter flounder presence? Just trying to get an idea before we proceed with changes---if you have a minute we could talk quick as well (203-410-6160)-let me know what time would work for you--talk soon
> Thanks, Chris
>
> **Christopher W. Samorajczyk, CWB**
> Natural Resources Planning
> Connecticut Department of Transportation
> Office of Environmental Planning
> Bureau of Policy & Planning
> P: 860-594-2938

From:	Samorajczyk, Christopher W
To:	Nicholas Henke
Cc:	Joe Grilli; Hanifin, John D.; Portal, Jeffrey A; georges@adicesarepc.com; Lauren DiGovanni; Davis, Andrew H; Lesay, Kimberly C
Subject:	FW: CTDOT 301-176 WALK Bridge Replacement EFH Consultation
Date:	Thursday, September 13, 2018 2:48:55 PM

Hi Nick-
Below is NMFS GARFO'S EFH conservation recommendations for the WALK Bridge. I spoke with Alison earlier today and explained our wetland mitigation approach and cleared some things up-we will still have to submit our mitigation plans for their review but we are on the right track. A few things she wanted us to consider were using coir logs/rolls in place of the existing "riprap". I explained to her that the existing rock is a more of a haphazard array of rock and not just a uniformed size. She then was interested in us possibly tumbling some of the rock to smooth out some edges a little so the living shore line didn't chink in together creating less habitat. I think we are good with the off size rocks and piling them should create many caves and crevices. Let me know if you have any questions—talk soon
Chris

From: Alison Verkade - NOAA Federal [mailto:alison.verkade@noaa.gov]
Sent: Thursday, August 30, 2018 4:13 PM
To: Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov>
Cc: leah.sirmin@dot.gov; Davis, Andrew H <Andrew.H.Davis@ct.gov>
Subject: Re: CTDOT 301-176 WALK Bridge Replacement EFH Consultation

Hi Chris,

The additional information has helped, however there are still outstanding concerns that will need to be addressed.

In particular, no mitigation plan has been included and the mitigation plan views that have been provided raise some concerns. Specifically, it is not clear why a 28" high modular sill, or 3' x 2' wide rip-rap edge have been proposed in two of the three wetland restoration areas, or why only sea lavender is proposed to be planted along a section of two of the three tidal wetland areas in a band waterward of MHW. It is also not clear if the tidal wetland mitigation area calculations include the existing tidal wetland footprint areas, or if you have only incorporated the areas that will be newly created/restored. Additionally, it appears that a large portion of Mitigation Area #3, for Phragmites control, lies above the HTL (and CJL), the objective of Phragmites control in this area should be provided.

There are also some items and areas where it does not appear that the impacts have been incorporated into your total impact calculations (e.g. sheet 3 of 24 notes "excavate as needed" in a call out pointing to tidal wetlands, but no tidal wetland impacts have been noted for the marine access trestle work, similarly this applies to each work platform where existing vegetation will be shaded versus excavated). It is also not clear what the 20, 916 SF of temporary tidal wetland "impact for marsh restoration" is referencing in the EFH Impact Breakdown table.

However, we have enough information to provide our EFH conservation recommendations.

Based upon the provided information, we have the following EFH conservation recommendations:

1) No in-water silt producing activities (e.g. dredging, pile removal, etc) should be conducted from February 1 to September 30, of any calendar year, to protect winter flounder sensitive life history stage EFH, diadromous fish passage, and shellfish resources.

2) All temporary construction access structures and fills should be removed and restored to pre-construction elevations and conditions.

3) A full mitigation plan should be submitted for our review and comment. The plan should clearly: 1) identify and quantify the project impacts; 2) identify and quantify the proposed mitigation to offset such impacts (including a detailed description of the proposed grading and planting, justification (including data support) for the incorporation of any proposed hard feature, and quantification of each mitigation area footprint), and 3) describe the proposed monitoring and adaptive management plan. This plan should also include and address the proposed restoration of temporary construction access areas and structures. The plan should include plan views that clearly identify all existing and proposed water lines (i.e. HTL, MHW, MLW) and all existing and proposed resource area footprints (e.g. SF of existing and proposed tidal wetlands).

Please let me know if you have any questions or concerns. Thank you, Alison

Alison T. Verkade
National Marine Fisheries Service
Greater Atlantic Regional Fisheries Office
Habitat Conservation Division
55 Great Republic Drive
Gloucester, MA 01930
Office: 978-281-9266
Email: alison.verkade@noaa.gov

On Tue, Jul 31, 2018 at 3:45 PM, Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov> wrote:

> Hi Alison-
> Attached you will find a revised chart with better clarification of the habitat impacts by activity type and revised plan sheets showing each of the 22 stages with impacts. Also attached is a chart detailing the time line of activities and when they occur in regards to EFH species TOYs. If you have any questions or need additional explanation/clarification let me know. As for the proposed mitigation for this project I have attached the most current plan sheets depicting this work. We are only at 30% design so there will be some minor tweaking but the concept and the impact areas are firm. If you have any questions or concerns above these activities we could easily set up a time to discuss—if needed. Talk soon—
> Thanks, Chris

Christopher W. Samorajczyk
Transportation Planner II
Office of Environmental Planning
Bureau of Policy & Planning
P: 860-594-2938 / F: 860-594-3028 / E: christopher.samorajczyk@ct.gov

From: Alison Verkade - NOAA Federal [mailto:alison.verkade@noaa.gov]
Sent: Friday, July 13, 2018 3:04 PM
To: Samorajczyk, Christopher W
Cc: leah.sirmin@dot.gov
Subject: Re: CTDOT 301-176 WALK Bridge Replacement EFH Consultation

Hi Chris,

I have completed reviewing the provided document. While the document is quite comprehensive, there is some missing/confusing information on habitat impacts by activity type and there also appear to be some inconsistencies/discrepancies between the text and the plans. For example, the EFH assessment worksheet indicates there will be 130,000 SF of impacts with 1,600 SF of these impacts being permanent, however the rest of the EFH assessment worksheet only calls out approximately 16,500 SF of these impacts (under the tidal wetlands, mudflats, and shellfish habitat sections). The remaining ~113,500 SF of impacts are not accounted for specifically in the worksheet and it is not clear where all of these impacts are occurring from the main document text. If you can please provide a table that clearly illustrates the work activities that will result in habitat impacts, and that includes the total square feet of habitat impact by activity type (e.g. excavation, dredging, filling, etc) and what habitats are affected by each activity, that would be helpful.

Regarding the text/plans discrepancies, it would be helpful to display each phase of the project on separate plan views or clearly illustrate all aspects of each phase on the provided plan view. For example, the "Marine Staging Yard Bulkhead, Trestle, and Fender Piling" text refers to a 200 foot bulkhead, but the plans call out a permanent 300 foot bulkhead to be installed at "Stage 22" (this is described in the text under the "Stage 22") but the 200 foot bulkhead does not appear to be shown on the plans anywhere. A separate plan for each phase of the 22 stages is not necessarily needed (e.g. if multiple stages will co-occur, or if it is possible to clearly illustrate all temporary construction access structures on one plan view), but each proposed phase for the stages should be clearly illustrated (e.g. existing condition, construction access structures/activities, final proposed conditions).

You have provided detailed information in the main document on the construction sequencing and timing for each stage/work activity type, but it is not clear which activities are proposed to be conducted during the recommended time of year restrictions for winter flounder (Feb 1-May 31), diadromous fish (April 1-June 30), or shellfish (May 1-Sept 30). The "Section 7 Consultation and EFH Assessment Processes for Walk Bridge" table that was provided somewhat addresses this, but what is provided in the table is not clearly illustrating what habitat impacts will, or will not occur during the time frames illustrated, or

if the "Possible Mitigation" item will or will not be required, or what the habitat impact the mitigation option is seeking to minimize. It is also not always clear what the habitat impacts for each stage/work activity type are - the table requested above will help with this, but a text description of the habitat impact should also be provided. It is also not clear what the post conditions/specifications are for the proposed existing structures and temporary structure/fill removals (e.g. will installed sheets/piles be removed in full, cut-off at the mudline, etc). We recommend that piles and sheeting be removed to a minimum of two feet below the mudline and all fills/excavated areas be restored to pre-existing conditions.

Additionally, a copy of the proposed tidal wetland and intertidal habitat mitigation plan should be provided for our review and comment. Included with the plan should be plan views depicting the proposed mitigation, including the tidal wetland sill, plantings, and proposed alternative access options.

Please let me know if you have any questions or concerns. Thank you, Alison

Alison T. Verkade
National Marine Fisheries Service
Greater Atlantic Regional Fisheries Office
Habitat Conservation Division
55 Great Republic Drive
Gloucester, MA 01930
Office: 978-281-9266
Email: alison.verkade@noaa.gov

On Wed, Jun 13, 2018 at 10:53 AM, Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov> wrote:
Hi Alison-
Attached is the Connecticut Department of Transportation's Essential Fish Habitat consultation and worksheet for project CTDOT 301-176. The project is the full replacement of the Metro North Railroad Bridge over the Norwalk River in Norwalk, Connecticut. A hard copy will follow by mail. Let me know if you require any additional information for your review.
Thanks, Chris

Christopher W. Samorajczyk
Transportation Planner II
Office of Environmental Planning
Bureau of Policy & Planning
P: 860-594-2938 / F: 860-594-3028 / E: christopher.samorajczyk@ct.gov

STATE OF CONNECTICUT

DEPARTMENT OF TRANSPORTATION

2800 BERLIN TURNPIKE, P.O. BOX 317546
NEWINGTON, CONNECTICUT 06131-7546
Phone: (860) 594-2099

NOAA - National Marine Fisheries Service
Greater Atlantic Regional Fisheries Office
Habitat Conservation Division
55 Great Republic Drive
Gloucester, MA 01930

Attn: Ms. Alison T. Verkade

Re: Walk Bridge Replacement Project, Norwalk, CT
Connecticut Department of Transportation State Project No. 0301-0176

Dear Ms. Verkade,

In cooperation with the Federal Transit Administration (FTA), the Connecticut Department of Transportation (CTDOT) proposes to replace the New Haven Line Railroad Bridge (Walk Bridge, No. 04288R) crossing the Norwalk River in Norwalk, Connecticut as described below. This letter requests Magnuson-Stevens Fishery Conservation and Management Act (MSA) concurrence from your office for the Walk Bridge Replacement Project. We have made the determination that the proposed activity may affect, but will not adversely affect the habitat, within the action area, for any fishery listed as having essential fish habitat (EFH) by NMFS under the MSA of 1976, as amended. Our supporting analysis is provided below. CTDOT, at the direction of FTA is providing the lead federal coordination role for this consultation. The FTA contact for the project is Leah Sirmin, FTA Region 1, leah.sirmin@dot.gov, 617-494-2459.

Proposed Project

The purpose of the Walk Bridge Replacement Project is to replace the existing deteriorated bridge with a resilient bridge structure which will enhance the safety and reliability of rail service, offer operational flexibility and ease of maintenance, and provide for increased capacity and efficiencies of rail transportation along the New Haven Line/Northeast Corridor, while maintaining or improving navigational capacity and dependability for marine traffic in the Norwalk River. Replacement of the Walk Bridge is needed to increase bridge reliability, incorporate bridge redundancy, and provide a sustainable bridge for significant weather events, thereby accommodating current and future rail and marine traffic.

The anticipated start date for construction of the project would be late 2019 or early 2020 with water related activities occurring for approximately four years after start and concluding by 2024. It is the Department's intent that, to the greatest extent possible, in-water activities will be

confined via silt curtains, cofferdams, marine enclosures, and/or similar turbidity controlling barriers. Unconfined channel/navigational dredging activities will be limited to a December 1st through January 31st in-water work window to effectively minimize the risk of potential effects on managed fish identified as having EFH in the project area which include pollock (*Pollachius virens*), red hake (*Urophycis chuss*), winter flounder (*Pseudopleuronectes americanus*), windowpane flounder (*Scophthalmus aquosus*), ocean pout (*Macrozoarces americanus*), Atlantic herring (*Clupea harengus*), little skate (*Leucoraja erinacea*), silver hake (*Merluccius bilineris*), winter skate (*Leucoraja ocellata*), bluefish (*Pomatomus saltatrix*), longfin inshore squid (*Loligo pealeii*), Atlantic butterfish (*Peprilus triacanthus*), Atlantic mackerel (*Scomber scombrus*), summer flounder (*Paralichthys dentatus*), scup (*Stenotomus chrysops*), black sea bass (*Centropristis striata*), sand tiger shark (*Carcharias taurus*), and smoothhound shark complex (Atlantic stock). The construction window will allow for completion of unconfined dredging work in advance of the important winter flounder spawning season beginning February 1st.

Description of Activities

The description of activities that follows includes information such as; mitigation measures, containment methods, dredging activities, pile driving activities, sediment plumes, project vessels, and construction of in-water structures. These activities are expected to encompass all aspects of the project with a potential to affect aquatic species with EFH in the project vicinity. As a means of discussing this information in the clearest way possible, it is presented chronologically by anticipated construction stages.

Stage 1

Pivot Pier Fender Removal and Dredging

Activities will begin with the removal of the fenders around the pivot pier via a crane or an excavator situated on a crane barge stabilized by spuds. Prior to removal, a siltation curtain will be installed around the work area and held stationary using anchors, barges, or existing piles. The fender system will be cut into sections with a chainsaw, removed, and loaded on a material barge. A debris shield will be deployed below the cuts to help prevent wood chips and saw dust from entering the water. The lower fender segments will be removed during low tide. The 12-inch diameter timber piles (approximately 200) will be removed with an excavator and/or crane using a vibratory pile extractor and impact hammer within bubble curtains using soft starts. When the material barge is fully loaded, it will be moved 1.3 miles upstream to Devine Brothers' yard and/or 1,000 feet south to the marine staging yard and off-loaded (see attachment A - USGS Locus Map). The work to remove the pivot pier fender system will be completed during daytime hours working 10 hours per day, 6 days per week and will take approximately 10 weeks. Pile extraction activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods.

During the winter excavation window (December and January), the areas immediately north and south of the pivot pier will be dredged using a crane on a spudded crane barge, excavating with a clamshell bucket, and loading onto material barges. An accumulated area measuring 500 feet x 125 feet will be dredged to an average depth of 5 feet resulting in a total volume of 11,350 cubic

yards (cy) and cover an area of 7,000 square yards (sy). The material barges will be modified to include side boards and containment fabric as a holding area. Water will be contained in the holding area and pumped into a sedimentation tank. When the barge is fully loaded it will be moved to either the marine staging yard 1,000 feet south or Devine Brothers' bulkhead 1.3 miles north where it will be off-loaded with an onshore crane or excavator. The material barges will be off-loaded one time per day. Unloading may occur during an extended shift. This dredging activity will be completed during daytime hours working 10-hour shifts, 6 days per week for 15 days.

The temporary fender system will be installed and will consist of floating bumpers secured to the center pier using chains and mounting plates at the pier and will be installed using a crane and a work barge during daytime hours. The fender materials will be stored on a material barge and installed as needed around the center pier. This activity will continue 6 days per week for twelve 10-hour shifts.

Vessel Mooring Relocation

The removal of the dock sections (80-foot x 10-foot and 48-foot x 9-foot) will take place on the west bank located south of the IMAX theater and will involve a crane or an excavator situated on the crane barge. The dock walkway will be hoisted onto a material barge and off-loaded at the marine staging yard, which is 700 feet south of the work area. The 12-inch diameter timber piles (approximately 30) will be removed during daytime hours with an excavator and/or crane using a vibratory pile hammer. When the material barge is fully loaded it will be moved to the marine staging yard 700 feet south and off-loaded. This work will be completed 10 hours per day, 6 days per week and take approximately 3 weeks. Pile extraction activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods, will be within bubble curtains, and employ the use of soft starts at the beginning of each shift.

A newly combined docking facility for the Aquarium and Sheffield ferry vessels, approximately 100 feet to the south, will require areas to be dredged within a silt curtain to provide sufficient depth for docking. The area dredged will measure 50 feet x 20 feet with an average depth of 3 feet resulting in 225 sy and the volume of 100 cy. Dredging will be completed using a crane on a crane barge excavating with a clamshell bucket and loading the modified material barge. When the barge is fully loaded it will be moved to either the marine staging yard (600 feet south) or Devine's bulkhead (1.4 miles north) where it will be off-loaded with an onshore crane or excavator. The removed material will be placed into water tight trucks for shipping to the waste stockpile area (WSA). The material barge will be off-loaded one time per day. This activity will be completed during the months of December and January, during daytime hours working 10 hour shifts 6 days per week for 8 days. Unloading may occur during an extended shift of 12 hours.

Construction of the new docking facility includes the installation of new wooden piles and floats. The 12-inch diameter timber piles (approximately 24) will be installed within bubble curtains using a crane and vibratory and impact hammers working from a crane barge. The replacement dock sections will be constructed at the marine staging yard and loaded onto the material barge along with the piles and moved 600 feet to the work site for installation. Driving the piles and

installing the dock sections will occur during daytime hours working 10-hour days and continuing for 2 weeks. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift.

Tidal Wetland Mitigation Site Construction

Tidal wetland mitigation activities will include three separate executions; invasive species treatment (*Phragmites australis*, approximately 29,000 sf), *Spartina alterniflora* marsh restoration (approximately 14,000 sf), and intertidal habitat/tidal wetland remediation (approximately 46,000 sf). All tidal wetland mitigation areas are within the intertidal zone of the Norwalk River and work will be timed to occur during periods of low tide and will be contained by turbidity curtains to not increase turbidity in the river (see Figure 1).

Pre-planning will be required to determine the most suitable locations and methods for the installation and removal of an access ramp. Several alternatives are being considered for the access ramp to be located north of the proposed trestle at the northeast corner of the Walk Bridge. At this location there currently exists a sloped revetment that consists of rock filled gabions. The preferred alternative will be coordinated with the City of Norwalk and CTDEEP. One alternative is to provide fill with a protective timber mat over the top of the revetment and use stone and concrete blocks to retain the fill and provide a suitable grade for vehicle and equipment access. Another alternative would be to excavate a portion of the revetment to tie in the last 40' wide bridge section, supported by 30-inch steel pipe piles (approximately 9), to the existing bank enabling access to the trestle at elevation 10.5 feet (NAVD88). The last alternative would be to grade a 40' wide approach ramp from the bank around the end of the revetment. This approach ramp would be retained by steel sheet piles (approximately 70) and would also tie in to the work platform at elevation 10.5 feet (NAVD88) and would require an additional 350 CY of temporary fill. For the last two alternatives, a stone filled access ramp contained within sheet-piles with thru-rods or concrete blocks at approximately a 15% slope will be constructed down to the existing shore adjacent to the mitigation area. This will result in a ramp approximately 75' long x 20' wide requiring 450 CY of temporary fill. Remediation planning will include restoration of areas disturbed during the installation and removal of ramps. All work areas will be enclosed in silt booms. Work will be completed while the tide is low, during daylight hours for 8 to 10-hour shifts, 5 days per week and take 15 weeks to complete. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods, will be within bubble curtains, and employ the use of soft starts at the beginning of each shift.

Areas identified for *Spartina alterniflora* marsh restoration (PA-3 and PA-7 shown in Figure 1) are accessible from land. A track excavator will remove the existing soils and place new more suitable soils. Points of access will be coordinated with the City. If the bank is too steep, a temporary access ramp will be installed for transporting vehicles such as a front-end loader or small dump truck to remove the undesirable soils and provide the replacement soils. Silt booms will be deployed around the work areas and the work will be completed during periods of low tide to avoid having water inundate the work areas. Since the soils will be replaced, wooden

mats may be used to provide stability for transport and excavation equipment. Soils will be excavated and graded with an articulating re-handling bucket. This work will be completed during daylight hours in 8-hour shifts, 5 days per week and will take 7 weeks to complete.

For areas identified for invasive species (*phragmites australis*) treatment (PA-2, PA-4, PA-6, PA-8, and PA-9 shown Figure 1), annual herbicide spraying of these areas will require walk-in access, which can be attained via adjacent walking paths or roadways. Plants will be cut and removed from the areas. The type(s) of herbicide and methods of cutting and spraying will be completed in accordance with contract specifications for control and removal of invasive vegetation. Spraying of seedlings will be completed during days when wind velocities are below 10 miles per hour (MPH) to avoid over spray.

Areas identified for intertidal habitat/tidal wetland remediation (see Figure 1) will require both land and water access and will involve removal of rip rap, regrading, excavation, replacing rip rap and planting. This work will be completed in a tidal zone, where marine enclosures will not be used, but instead silt curtains will be set around disturbed areas to minimize erosion, tidal disturbance, and turbidity. All work will be completed in accordance with contract specifications for tidal wetland creation and planting. Silt booms will be deployed around the work areas prior to starting work. Rip rap will be removed with a 20-ton excavator using a re-handling bucket. A front-end loader or 10-wheeled dump truck will be used for transport of excavated materials from the work area. Wooden mats will be set to distribute ground pressure and facilitate equipment moves. Areas inaccessible by land will require the use of a crane barge with a 200-ton crane using a clamshell bucket, and loading a material barge. The material removed will be placed within a corral on the material barge, which will then be brought to shore for off-loading two times per week. Completion of this work will require pre-planning for removing unsuitable existing soils, as well as hauling and placing planting soils, plants, and materials. Pre-planning will also be required to determine the most suitable locations and methods for the installation and removal of access ramps. Remediation planning will include restoration of areas disturbed during the installation and removal of ramps. Work will be completed while the tide is low, during daylight hours for 8 to 10-hour shifts, 5 days per week and take 15 weeks to complete.

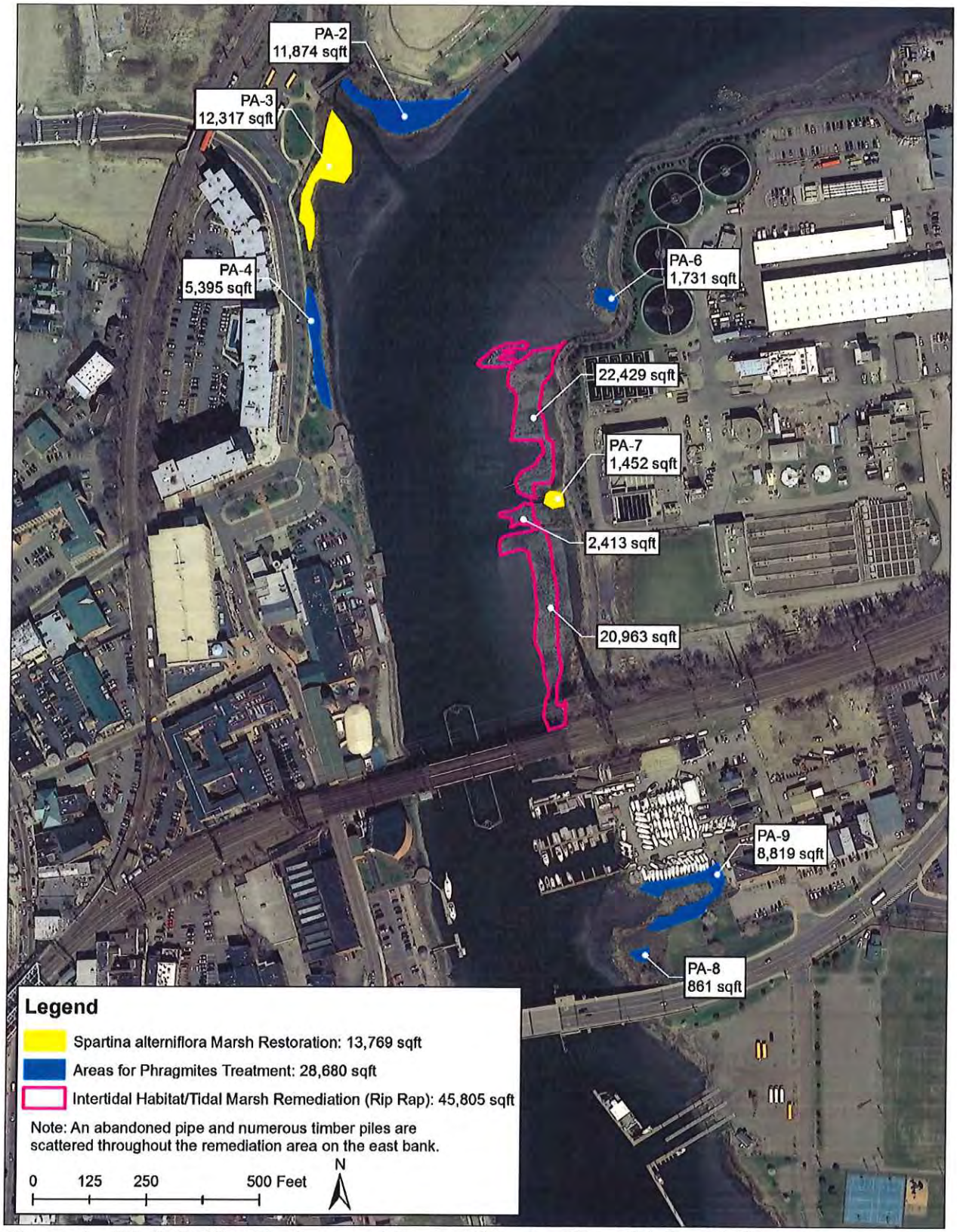

Figure 1 – Walk Bridge Replacement Project Sites for Tidal Wetland Mitigation

IMAX Theatre Demolition

The existing IMAX theater is adjacent to the Norwalk River with its easterly wall on the riverbank. The demolition of the structure will be from land and require 80-ton excavators, front-end loaders, and disposal trucks. Before starting demolition activities, erosion and sedimentation controls will be installed on the north and south side of the structure. The easterly wall of the IMAX is adjacent to tidal wetlands and will require containment. During low tides a sufficient width of stone rip rap will be removed along the bank to allow the installation of sheet piles to contain the outer wall demolition and retain a temporary crane pad. This work will include installing six 14-inch wide H-piles, a template frame and 43 steel sheet pile doubles driven with a vibratory hammer (impact hammer if necessary) within bubble curtains. These activities will be completed by working six 10-hour shifts per week and will take 15 shifts to complete. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift. East wall demolition will follow the installation of this sheet pile containment and be scheduled to coincide with periods of low tide thus eliminating the possibility of demolition debris falling into tidal waters. This work will be completed working 10-hour shifts 6 days per week and take 5 weeks to complete.

Marine Staging Yard Bulkhead, Trestle, and Fender Piling

Construction of the marine access and 8,000 sf staging trestle will be located south of the Washington Street Bridge and will involve the installation of a steel sheet-pile bulkhead, pile templates, 30-inch diameter steel pipe piles, 12-inch diameter timber fender piles, steel pile bents, steel stringers, timber mats, and timber curbing.

The sheet pile bulkhead is necessary to retain soils while the high tidal areas adjacent to the proposed bulkhead are removed for installation of the cap beams. The landside bulkhead will be above the tidal zone, extend 200 feet along the shoreline, include containment returns at the north and south limits, and be constructed of 58 sheet pile pairs driven with a vibratory hammer (impact hammer if necessary) within bubble curtains. A trench measuring 250 feet x 4 feet and an average depth of 8 feet will be excavated using a clamshell bucket to aid in bulkhead construction. Excavated sediments will total 306 cy over an area of 11 sy. The bulkhead will be installed using a 200-ton crane and a vibratory hammer working from land. A silt fence and/or silt curtain will be deployed around the work areas. The bulkhead installation will be completed by working 10-hour days, 6 days per week and be completed in 22 work days. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift.

A silt curtain will be deployed for the excavation areas at the bulkhead. Excavation activities will be completed using a 40-ton excavator with a clamshell bucket during the months of December and January. Work activities will be completed working 10-hour shifts, 6 days per week and take 2 days to complete. The area to be dredged along the bulkhead will measure 200 feet x 105 feet at an average depth of 4 feet resulting in an area of 1,025 sy and the volume of 3,150 cy.

Installation of the 14-inch diameter steel H-piles (32) and 24-inch diameter steel trestle piles (32) will be completed using a crane barge, material barge, 250-ton crane, hydraulic vibratory hammer, and impact pile hammer within bubble curtains. Productions for the 30-inch diameter piles will average up to 4 piles per day and take 250 to 500 strikes per pile. This work will be completed working 10-hour shifts, 6 days per week and take 10 days to complete. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift. The pile bents, stringers, mats, and timber curbs will also be completed from the crane barge using a 200-ton crane for hoisting. Assembly of these components involves fitting up prefabricated sections and bolting together with impact guns. This work will be completed working 10-hour shifts, 6 days per week and take 17 work days to complete.

The shallow water areas on the channel-side of the trestle will need to be lowered to allow for extended berthing depths of construction vessels. This will require dredging an area measuring 250 feet x 30 feet with an average depth of 6 feet resulting in 350 sy and 1,600 cy of excavation along the outer edge of the trestle to ensure sufficient water is available for barges. Dredging will be completed using a crane on a crane barge excavating with a clamshell bucket and loading the modified material barge and take place during the months of December and January. When the barge is fully loaded it will be moved to Devine's bulkhead (1.5 miles north) where it will be off-loaded with an onshore crane or excavator. The removed material will be placed into water tight trucks for shipping to the WSA.

A 30-foot long x 40-foot wide earth access ramp will be constructed on the land side of the bulkhead. At the ramp location, the on-shore sheet piles will be lined with a geotextile fabric filled with gravel. This will require working 10-hour shifts, 6 days per week and take 4 work days to complete.

For tidal wetland vegetation present beneath the trestle, solar powered LED lights will be placed beneath the trestle to provide daytime lighting to support viability and continued growth.

Upon completion and demobilization of the Walk Bridge site the trestle deck stringers bents, piling, access ramp and bulkhead will be removed using the same or similar equipment as required for installation. See Stage 22 for a description of removals and restoration.

Stage 2

Installation of Work Platforms

Work platform foundations will require the installation of 14-inch wide steel template H-piles (80), 30-inch diameter steel pipe piles (207), and the 24-inch diameter steel fender piles (22). At each platform, these will be installed using a 300-ton crane and hydraulic vibratory and impact pile hammers within bubble curtains. Bents, stringers, mats, and timber curbs will also be completed using a 300-ton crane for hoisting. The installation of template piles and steel will take 36 shifts and involve the same equipment as the trestle piles. The production rate for the trestle piles will average up to 4 piles per day and take 250 to 500 strikes per pile. It is expected that one pile will be driven at a time, however conditions may arise where two piles need to be

driven concurrently Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift. Assembly of the support framing will involve fitting above water prefabricated sections and bolting components together with impact guns.

Access to the northeast and southwest platforms will be by onshore bulkheads, which will include a wall parallel to shore with two returns at each end. The northeast bulkhead will be 40 feet wide x 60 feet long and the south west bulkhead will be 40 feet wide x 30 feet long. The temporary bulkheads will be constructed of either driven sheet piles or concrete blocks. The bulkheads will be lined with a geotextile fabric and filled with gravel. Since the northeast bulkhead will span a stone filled gabion revetment, piles will be driven on the east and west side of the revetment, and an elevated, 40-foot wide bridge will be provided over the revetment to access the trestle at elevation 16 ft NAVD88. This work will be completed with an excavator and crew working 10-hour days for 6 days per week. A silt curtain will be deployed around the work areas prior to starting work.

Construction of the platforms will be completed working 10-hour day shifts, 6 days per week. Expected durations at each location are as follows:

a) Northeast Platform (18,500 sf) – 18 weeks
b) Southeast Platform (21,000 sf) – 20 weeks
c) Northwest Platform (8,000 sf) – 7 weeks
d) Southwest Platform (12,000 sf) – 9 weeks

For the areas at each platform spanning vegetated tidal wetlands, solar powered LED lighting will be installed under the platform and provide lighting to support viability and continued growth for vegetation beneath the trestle. The platforms cover areas that are onshore out of water, within the tidal zone and within subtidal zones. Platforms will be in place for 3 years.

Upon completion and demobilization of the Walk Bridge site, the platform deck, stringers, bents, piling and bulkhead will be removed using the same or similar equipment as required for installation. Details of removal activities will be provided in later stages.

Lift Pier Marine Enclosures

The marine enclosures to confine the area for construction of the lift pier foundations are three-sided sheet pile structures, as depicted in Figure 2, that include north and south walls extending from the shoreline to an out-board wall parallel to the channel. To further prevent siltation outside of the marine enclosure a silt curtail will be deployed around the interior perimeter. The west marine enclosure is 110 feet long and 65 feet wide. The east marine enclosure is 110 feet long and 107 feet wide.

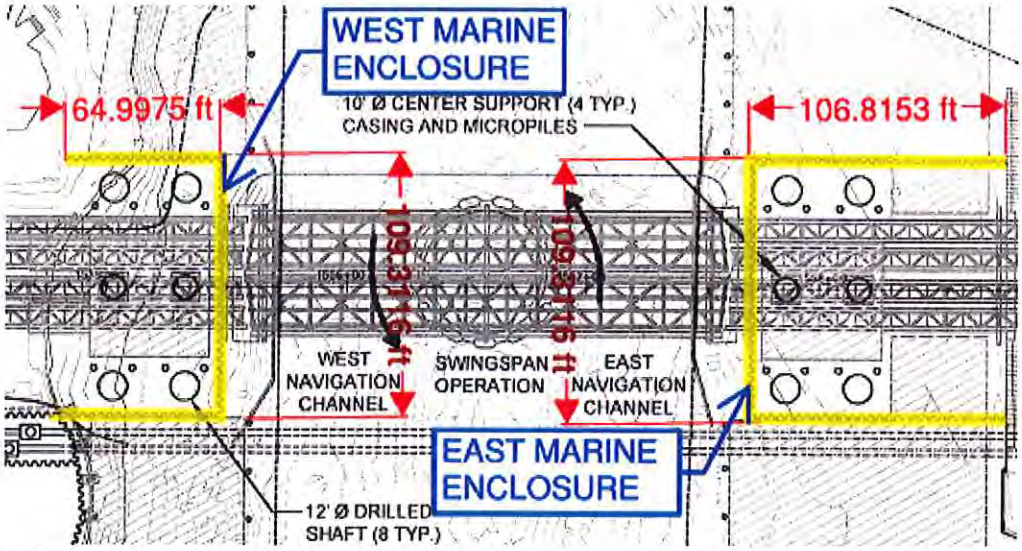

Figure 2 – East and West Marine Enclosures

The marine enclosures will involve the installation of steel templates, steel sheet piles, and bracing. Steel sheet piles will be installed as pairs which will require driving 170 pairs. Sheet pile templates will require driving 50 steel 14-inch wide H-piles that are connected with 30 horizontal members. The installation will be completed using 300-ton cranes with a vibratory hammer (impact hammer if necessary) within bubble curtains, working from the previously constructed work platforms, as well as an 80-ton crane working from the existing approach spans to complete the installation of sheeting and bracing in these areas. The installation of templates, steel sheet piles and bracing away from the approach spans will be completed during day time hours, working 10-hours per day and 6 days per week and will take 6 weeks on the east side and 4 weeks on the west side to construct. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift.

Drilled Shaft Support Trestle Installation

At the north and south ends of each lift pier, 16 temporary 30-inch diameter steel piles, 12 temporary 24" steel piles, and 12 temporary 24-inch diameter steel supports will be installed to support the drilled shaft operation. The piles and supports will be installed from the work platforms using a 300-ton crane and both vibratory and impact hammers within bubble curtains. Productions for the 30-inch diameter piles will average up to 4 piles per day and take 250 to 500 strikes per pile. Installation of this temporary support steel will involve crews working 10-hours per day and 6 days per week for 3 weeks at each platform location. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift. For access during the drill shaft construction, timber mats will be placed in the intertidal areas for equipment and personnel access. These temporary supports will be removed following the completion of work at the lift piers and approach spans and a description of that is provided in later stages.

Demolish Existing Control House

Control house demolition activities will begin by relocating swing span controls to the motor control center at the swing span, followed by removal of all furnishings and equipment from the motor control center. Debris shields will be used to catch debris and slag from control house removal.

The control house will then be detached and removed from its supporting steel platform using a 300-ton crane working from southwest work platform. The remainder of the control house and the steel platform will be removed by lifting the control house with the 300-ton crane and cutting the control house supports. This work will be completed during daytime hours working 10-hours per day, 6 days per week for 2 weeks.

Stage 3

Installation of Drilled Shafts at Each Lift Pier

The eight 12-foot diameter drilled shafts (4 per pier) will be situated at the north and south ends of the lift piers. The sequence of shaft construction will include provisions for drilling on one side of the river prior to drilling on the other side. Areas adjacent to drilling and excavation work will have a debris shield over the wood mats to provide an additional layer of protection from seepage into the waters below. The platform will be installed tight to the casing of the drilled shaft to prevent drill soils and concrete from entering the water or tidal zone below.

The drilled shafts will be installed within the marine enclosures using a 300-ton crane, hydraulic oscillator, 200-ton support crane, and sedimentation tanks. Steel casing will be drilled and set using a hydraulic oscillator within bubble curtains, and excavation within the casing will be conducted using hydraulic or mechanical means. The excavation of the drilled shafts will yield 7,000 cy of material that will be set onto the work platform, stock piled, and loaded out on trucks. Sediment will be dewatered and the water will be filtered through silt bags or treated as necessary to meet Connecticut Department of Energy and Environmental Protection (CTDEEP) discharge requirements and will be pumped back into the river.

Casings will be set into rock and the rock socket will be drilled using the oscillator. Hydraulic drill spoils will be pumped to sediment tanks or a corral on the platform or shore to allow settlement. Following the completion of settlement, the water will be pumped into one of the marine enclosures.

After completing shaft excavation, the reinforcing steel will be set into the hole, the hole will be inspected and the concrete will be placed using a tremie pipe and a concrete pump.
The drilled shafts will be completed working daytime hours 12-hours days for 6 days per week and take 2 months. Shaft drilling activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift. The longer shafts may require an extended shift to allow proper cleaning inspection and placement on the days of the concrete pours.

Installation of Center Supports at Each Lift Pier

The two lift tower piers require center pier supports to be installed beneath the existing approach spans. Each center support will include a 10-foot diameter steel casing (2 per pier) and a cluster of twenty 12-inch diameter micro piles within the casing.

Activities will begin with the construction of temporary two low head-room work platforms for the center pier supports. At each 50-foot x 50-foot platform location, sixteen 12-inch diameter steel bearing piles (32 total) will be driven within bubble curtains during nights or weekends. This work will be completed from either the lower work platform or from a high-rail platform at track level using vibratory and impact hammers. Installation of piling at each center pier foundation will take twelve 10-hour shifts if working daytime or weekend hours, and 20 shifts if working nighttime hours. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift.

The steel pile bents and stringers for the low platforms will be installed and set during nights or weekends using a small excavator working beneath the existing structure or from a high-rail platform at track level during nights or weekends.

Working within a marine enclosure and from the temporary low headroom platform, a 15-ton excavator will use a ¼ cubic yard bucket to level an area suitable for the casing installation at the proposed casing location.

Casings will be installed using a crane, fork-lift, or excavator working from the platform. The steel casings will be seated by excavating within the casing and using the digging bucket to apply pressure or bang on the top of the sleeve to seat it into place. Each casing will be installed during daytime hours and take one 10-hour shift to seat. Casing will be fixed to the platform and braced with steel angles.

Using low headroom drilling equipment, 12-inch diameter steel micro piles (40 total) will be installed within the 10-foot diameter casings working from either track level during weekends or nights or from the low headroom platform below and within bubble curtains. If this work is completed at track level it will be completed during nights or weekends and will take 6 weeks at each pier. If the work can be completed during day time hours, it will take 4 weeks to complete each pier. Center support and micro pile drilling activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift. Hydraulic spoil removal via a vac-truck will be deposited into sediment control areas, a corral located on a work platform, on shore, or on a barge. Following settlement of sediments utilizing frack tanks, the water will be pumped into one of the marine enclosures.

Upon completion of the micro piles, the loose material within each 10-foot diameter sleeve will be removed using a vac-truck. This work will take one, 10-hour day shift at each location. Following the removal of the soils, tremie concrete will be poured into the 10-foot diameter casings. This work will be completed during night time or weekend shifts and will take one shift at each location (4 shifts total).

Concrete laitance will be removed from the drilled shafts using chipping hammers during daytime hours. This work will be completed during 7, 10-hour day-time shifts at each location. Laitance removal will require a 175-ton crane and a 40-foot x 40-foot work-barge, sedimentation tanks, skip pans, and a 750 cubic foot per minute (cfm) compressor.

Construct New South Lift Span at Marine Staging Yard

The assembly of the new south lift span will be an ongoing activity requiring landside access for 20 barge deliveries for the lift span components. The lift span assembly barge will be moored at the marine staging yard trestle during assembly of the lift span. Larger assembly components will be delivered by barge to the marine staging yard trestle. Deliveries will occur every other week for about 12 weeks. The lift span assembly barge will remain at the marine staging yard until the 4-track outage.

Stage 4

Drilled Shaft Steel and Support Piling Removal

Working within the marine enclosures, support steel and support piling will be removed using a 300-ton crane and vibratory pile hammer within bubble curtains. Materials will be loaded onto a truck on the work platform. This work will involve removal of 2-3 piles per shift and be completed during daytime hours working 10-hours per day, 6 days per week and will take 2 weeks at each location. Pile extraction activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift.

Lift Pier Concrete Tub Excavation

Excavation for the precast concrete tubs will be located inside the marine enclosures at both lift piers. An 80-ton track excavator will work from adjacent work platforms with a 2-cubic yard digging bucket to excavate soils beneath each lift pier within the marine enclosures. This will require 700 cubic yards of material that will be removed and loaded directly onto water tight trucks staged on the work platforms and hauled to the WSA. This work will be completed during the day working 10-hours per day, 6 days per week and will take 1 week at each location (total of 4 weeks).

The removal of sediments around the 10-foot diameter casings beneath the mid-section of the approach spans will be completed during daytime 10-hour shifts. A small 40-ton backhoe with a digging bucket will work from the low trestle to excavate sediments beneath the lift pier center supports. This work will be completed during daytime hours working 10 hours per day and will take 5 shifts at each lift pier. All soils will be loaded onto water tight trucks and hauled to the WSA for testing and disposal.

A vac-truck will be used to remove loose soils from the casings. The soil materials will be discharged to a corral located on shore or on the work platforms. After settlement of discharge

sediments, water will be returned to one of the marine enclosures. Water will be filtered through silt bags or treated as necessary to meet Connecticut Department of Energy and Environmental Protection (CTDEEP) discharge requirements and will be pumped back into the river. All soils will be loaded onto water tight trucks and hauled to the WSA for testing and disposal.

Lift Pier Concrete Tub Set and Pour Over Drilled Shafts

The precast concrete tubs (16'x16') will be loaded at the marine staging yard (1,000 feet south of the bridge) or Devine Brothers (1.3 miles north of the bridge) and delivered to the drilled shaft locations via a material barge and off-loaded immediately onto a work platform. Each lift pier will require 4 tub deliveries (8 total) which will be completed during the day, take 1 shift per delivery, and require a 300-ton crane on the work platform, a material barge, and a push boat.

Precast concrete tubs will be set over the north and south side 12-foot diameter drilled shafts at the two lift piers (4 locations total).

Precast concrete tubs will be sealed water tight, dewatered, rebar placed and preliminary pour completed. If required an initial hydrophilic grout seal will be provided at leak locations to insure a water tight seal and avoiding concrete spillage. This work will require a 300-ton crane for setting and adjusting the precast concrete tub and setting the reinforcing steel and formwork. A concrete pump will be used to place concrete for the initial pour. Setting and securing (initial concrete pour) precast concrete tubs will be completed during daytime hours and take 30 shifts to complete the four locations. A debris shield will be placed on platform work areas to eliminate spillage of concrete into the water and facilitate clean up following the concrete pours.

Lift Pier Concrete Tub Set and Pour Over Center Supports

The permanent center supports for the two lift piers will also involve the installation of a total of 4 precast concrete tubs. These will be delivered to the lower platform by truck and a crane or excavator and will be off-loaded and set on the steel casings during a low tide. The precast concrete tubs will be sealed water tight, dewatered, rebar placed and a preliminary concrete pour completed. If required an initial hydrophilic grout seal will be provided at leak locations to insure a water tight seal and avoiding concrete spillage.

The reinforcing steel and any additional form materials will be delivered to the lower platform and hoisted into place using a small excavator or crane on the work platform. A concrete pump will be used to place concrete for the initial pour at each location during nights or weekends. The center supports for the two lift piers will be completed in 10-hour days during daytime hours and will take 22 shifts to complete.

Stage 5

Approach Span Under Bridge Work Platform Removal

During night time and weekend shifts an 80-ton crane or excavator working from a high rail platform at track level will remove the work platform decking supports and surface mounted pile

supports using impact guns to unbolt components. This material will be loaded on to a 40-foot x 40-foot barge, moved to the marine staging yard 1,000 feet south, and off-loaded. The 50-foot x 50-foot platforms will be removed from the water during night or weekend shifts and each one will take 5 shifts to complete.

Partial Marine Enclosure Removal

The partial removal of the marine enclosure steel bracing, steel piling, and steel sheeting (46 pairs) will be with a 300-ton crane and a vibratory hammer. The removed material will be staged on the work platforms and loaded onto trucks for removal from the project. The partial removal of both marine enclosures will take place during day-time hours, 6 days per week and take 10 shifts. Pile extraction activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods, will be within bubble curtains, and employ the use of soft starts at the beginning of each shift.

Stage 6

Submarine Cable Installation

A material barge will be modified to include side boards and containment fabric as a holding area for excavated material. The dredge area (see Figure 3) will be enclosed in a silt curtain prior to commencing work. During the winter excavation window (December and January), dredging for the submarine cables will be completed using a crane on a crane barge excavating with a clamshell bucket and loading the material barge.

The upper 4 feet of material with a 270-foot x 22-foot area and a depth of 4 feet (960 cy) will be excavated and loaded onto the material barge. When the barge is fully loaded, it will be moved to either the marine staging yard (1,000 feet south) or Devine's bulkhead (1.3 miles north) where it will be off-loaded with an onshore crane or excavator onto trucks for delivery to the WSA. The material barge will be off-loaded 2 to 3 times per week. Unloading may occur during an extended shift. This dredging activity will be completed during daytime hours working 10-hour shifts, 6 days per week for 10 days. Selective removal of 12-inch diameter timber fender piles (approximately 6) may be required for cable routing and will take place via vibratory hammer from the adjacent work platforms.

After the upper sediment layer has been completely removed the submarine cables will then be placed on the excavated bottom and lowered to the required depth of a minimum of 8 feet below the bottom of the navigation channel depth using the hydro fluidization method. The remaining trench will then be filled using a crane and a clam shell bucket with soils of similar structural and organic characteristics as the materials removed. To reduce flocculation of the back-fill soils, the clamshell bucket will be lowered to backfill level prior to opening.

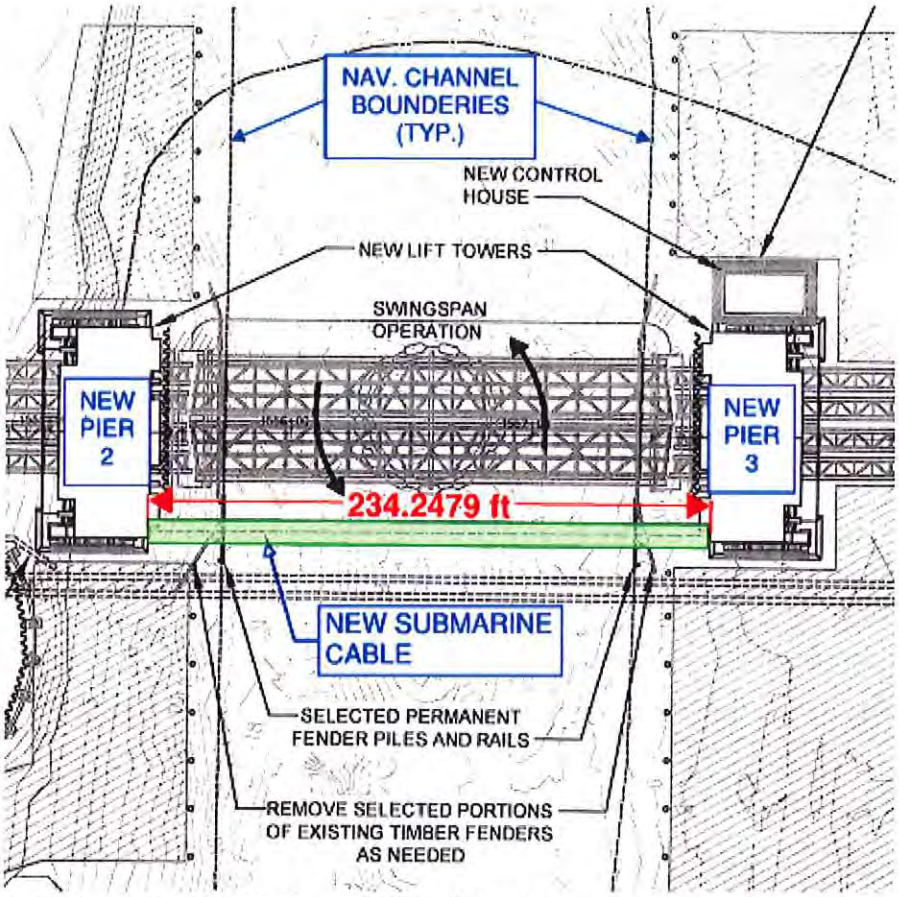

Figure 3 – New Submarine Cable Installation Location

Partial Installation of Permanent Fender Piles

During this stage, eight 14-inch diameter steel template piles, a steel template, and eight 14-inch diameter composite or steel piles for the permanent fenders on the south side of the two lift piers will be installed using a crane and vibratory and impact hammers working daytime hours from the work platforms. The piles will be delivered and stored on the work platform. The fender rails will be constructed from the work barge with a man-lift serviced by an 80-ton hydraulic crane. This will be completed by working 6 days per week, 10 hours per day and will take 10 work days. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods, will be within bubble curtains, and employ the use of soft starts at the beginning of each shift.

Installation of Fender Rails

Horizontal rails for the fender system will be installed using an 80-ton hydraulic crane. The 60 twenty-foot-long pieces of composite rail will be rigged and hoisted into position from the work platform during daytime hours. Fender material will be delivered and stored on the work platform. For each of these operations, a work barge with a man-lift, compressor, and hand tools will be utilized for access to the work. This work will be completed during daytime hours, 6 days per week for 10 hours per day and is expected to take 15 work days to complete.

Northeast Work Platform Partial Removal for Control House Construction

Partial removal (approximately 1,800 sf) of the work platform will include mats, steel pile caps, steel stringers, and steel piling (12) and will be completed with a 200-ton crane and a vibratory hammer. The removed material will be staged on the work platforms and loaded onto trucks for removal from the project. The partial removal of this section of work platform will take place during day-time hours, 6 days per week and take 10 shifts. Pile extraction activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods, will be within bubble curtains, and employ the use of soft starts at the beginning of each shift.

Stage 7

Installation of Temporary Supports for Approach Span Demolition (Spans 2 and 4)

Working from the adjacent platform, timber mats will be placed in the intertidal areas for small equipment to access mid span on the underside of the bridge. Small equipment will be placed back on the platform at the end of each shift. Six temporary shoring towers will be set up on the mats on the underside of the bridge.

Existing Approach Span Member and Section Removal

Activities include the removal of existing steel sections and members of the bridge. Bridge pieces removed will vary from several feet up to 150 feet in length. Whenever possible, sections or members will be hoisted to the work platforms. Members lowered to the mats within the tidal area will be removed prior to the return of high water. This work will be completed by using a 300-ton crane working from the adjacent work platform. A loader will be used to remove members and debris from the mats at ground level. This work will be completed during 10-hour daytime periods of low tide and will take 3 months to complete.

Stage 8

Pier Cap Construction at Lift Piers

The construction of the pier caps will be completed using a 200-ton crane on a crane barge in the channel for hoisting forms, reinforcing steel, and other construction materials. The existing work platform or material barge will be used for staging materials. Walkway platforms will be erected at work areas around the piers for access and debris containment. Forming, placing reinforcing steel, and pouring the tops of the caps will be completed using cranes on the platform and working 6 days per week working 10 hours per day and take three weeks for each cap.

Set Bearings at Lift Piers

Grinding of bearing pedestal concrete to the dimensions of the bearings will take place using a dust extraction vacuum to remove debris. The bearings will be set using a 200-ton crane on a crane barge in the channel and will take 4 days working 10 hours per day.

Excavation and Demolition of East Abutment Wall (Tracks 2 and 4)

Excavation and demolition at the south side of the east abutment will follow the removal of the east approach span for tracks 2 and 4 and the ballast behind the abutment wall. Before demolishing the abutment wall, a debris shield will be installed below the horizontal cut line and extend horizontally to the limits of the proposed demolition and end 4 feet out from the face of the wall. The shield will be suspended from either staging set on mats in the intertidal zone or brackets fastened to the abutment wall.

After excavating the soils behind the wall, the concrete cap will be removed using an excavator and a 15k ft-lb demolition hammer. This work will be completed by hammering back toward shore to minimizing the possibility of large concrete pieces falling onto the debris shield. After completing the removal of the concrete cap, excavation of the soils will continue. The excavator will remove the stone blocks by pulling them toward shore into the excavated area. The demolition hammer may be required to provide an initial break of the masonry bond.

Excavation and demolition will continue, preceding the wall removal as the stone blocks are removed to the required elevation. The excavation and demolition of the retaining wall in this stage will take 20 work days.

Stage 9

Partial Removal of Southeast Work Platform

A silt curtain will be deployed around the work area prior to starting work. Activities for removal of a 450-sf portion of platform will include removal of timber curbs, wooden mats, steel bents, steel stringers, and 30-inch diameter steel piles (12). This work will be completed from the platform with a 300-ton crane, vibratory hammer, and a man-lift for access to the work. This work will be completed during daytime hours working 6 days per week and 10 hours per day. Pile extraction activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods, will be within bubble curtains, and employ the use of soft starts at the beginning of each shift.

Construction of New East Abutment

Upon completion of excavation and demolition at the east abutment, construction of the new east abutment to support tracks 2 and 4 will be completed approximately 31 feet to the east of the existing abutment. This work will involve the use of a 150-ton support crane and will take approximately 2 months to complete. The area behind the propose abutment will be backfilled

using a 20 to 40-ton excavator and trench compactors. Backfill activities are expected to take 2 weeks to complete.

Stage 10

Set Tower Spans at Lift Piers

This work will be completed with a 200-ton crane working from a 130-foot x 50-foot crane barge situated within the channel adjacent to the pier. The tower spans (approximately 31-foot x 9-foot) will be delivered to the work platforms by trucks or barge, off-loaded, and staged on the platforms until erection. This work will be completed during daytime hours, working 10 hours per day and will take 8 work days per pier.

Set Approach Span Steel (Spans 2 and 4)

The erection of structural steel, steel diaphragms, and precast concrete deck sections will be completed using a 300-ton crane working from the adjacent work platform. Timber mats will be set in the tidal areas to allow access for a man-lift to assist with setting the diaphragms. Work that requires access within the tidal zone will be completed during low tide periods. This work will be completed during day time hours, working 10 hours per day and will take 6 weeks to complete.

Stage 11

Install Approach Span Concrete Decks and Walkways (Spans 2 and 4)

The 28 precast concrete deck sections of varying dimensions will be erected using a 300-ton crane working from the adjacent work platform. Timber mats will be set in the tidal areas beneath the spans to allow access for a man-lift to assist with forming the closure pours at the precast concrete panels. The mats will be placed using a track excavator.

The closure pours will be completed using a 200-ton crane and a 2-cubic yard concrete bucket. Concrete will be delivered to the work platform and unloaded into the concrete bucket on the work platform. A debris shield will be provided at the work area to prevent concrete from getting into the water. Work that requires access within the tidal zone will be completed during low tide periods. This work will be completed during day time hours, working 10 hours per day and will take 6 weeks to complete.

Installation of Supports Stringers, Bracing, and Rail Systems

The slide rail support system south of the bridge, as depicted in Figure 4, will consist of 18 wide-flange bents, 36 angle-cross braces, 280 linear feet of rail girder, and 280 linear feet of rail. Since these supports will be from mounted the work trestle, additional piles will not be required. These will be erected using the 300-ton crane working from the adjacent work platform or the 200-ton crane on a barge. Each of these operations will also require a work barge, a man-lift, a

compressor, and hand tools. This work will be completed during daytime hours, 6 days per week for 10 hours per day and is expected to take 23 work days to complete.

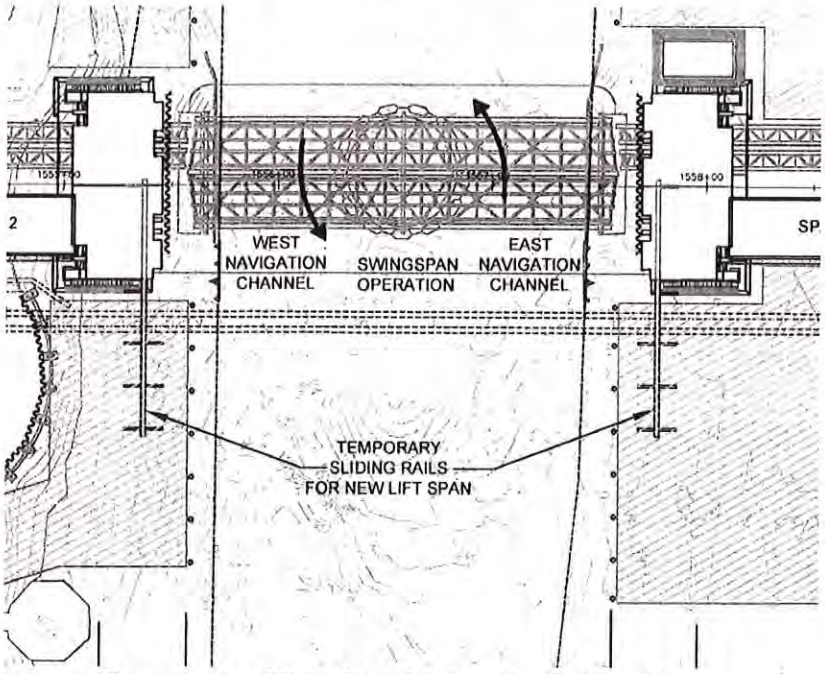

Figure 4 – Location of Temporary Slide Rail System to the South

Stage 12

Installation of Temporary Piles, Pile Caps, Girders, Bracing, and Rails

Install sixteen 14-inch diameter steel template piles and templates for pile installation. Install fifty-six 14-inch wide steel H-piles using a 200-ton crane on a crane barge with vibratory and impact hammers for the slide rail system located north of the bridge. Installation is expected to be 5 piles per day at a rate of 1 pile every 2 hours and will take place within bubble curtains. Most of this work can be completed during day time, 10-hour days, working 6 days per week. The work under the existing bridge span will be completed during nights or weekends. These activities will require a 200-ton crane on a crane barge and a material barge situated in the east or west channel and will take 4 weeks to drive all the piles. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift.

Installing the above water pile caps (14 each), longitudinal and lateral bracing (146 pieces), 30-foot stringers (10 pieces), and rail (300 linear feet) will involve the same equipment positioned in the east or west channel. Most of this work can be completed during day time 10-hour days working 6 days per week. The work under the existing bridge span will be completed during night or weekend shifts. It will take 6 weeks to install the bracing stringers and rails.

Float Lift Span into Place and Transfer Span onto Sliding Rails

A 90-foot x 180-foot float-in barge (2 if necessary) with the lift span fully assembled will be floated into place with the ends positioned over the sliding rails from the lift piers. The barge will be moved into position using tugs. The weight of the lift span will be transferred on to the sliding rails by lowering the lift span. After all weight is transferred, the barge will be removed and returned 1,000 feet to the trestle at the marine staging yard. Barge draft under load is expected to be 3-4 feet and is expected to allow a minimum of 4 feet of clearance during low tide and not come in contact with the riverbed. Floating in the lift span, finalizing alignment, transferring the weight, and relocating the barge will take 2 days.

Stage 13

Cut Away Interfering Approach Steel

Before sliding the existing swing span to the north, sections of the approach span steel at each end of that span will need to be removed. The crane barge will be positioned against the existing pier and the crane will hold each section while the section is cut for removal. It is anticipated that up to 4 sections will be removed using 300-ton cranes situated on the northeast and northwest platforms. Each of the 4 sections will have a dedicated demolition crew cutting and burning (torch cutting) simultaneously. As each section is removed, it will be set on the platform or a barge and later loaded on a truck for removal. This work will commence at the start of the 96-hour track outage and continue until all four sections are removed.

Slid Existing Swing Span to the North

After cutting and removing the approach sections for tracks 1 and 3 of the swing span, it will be raised and slid northward. This activity will take 4 hours to complete.

Slide New Lift Span to the North

After the existing swing span has been moved north onto the temporary sliding rails, the new lift span will be moved northward to its final position. The new lift span will then be jacked up, the rails beneath it removed and the new lift span set onto its permanent bearings. These activities will be completed by working multiple shifts, 24 hours per day and will take 2 days to complete. Once in place, final mechanical and electrical adjustments will be made, tested, and the lift span will be commissioned (45 Days).

Begin Construction of the New North Lift Span

After the float-in barge returns to the marine staging yard location 1,000 feet to the south, the fabrication of the new north span will begin.

Stage 14

Demolition of the Existing Swing Span

This activity will either take place on the slide rails or at an upstream mooring location to be determined at a later date. Barges will be positioned beneath the existing swing span for working and catching demolition debris. Barges will be set approximately 60 feet apart with a draft of 2-3 feet and are expected to allow a minimum of 5 feet of clearance during low tide and not come in contact with the riverbed. Removal of smaller structural components will be done with an excavator and hydraulic sheer to allow detachment of larger sections with the 300-ton crane. This work will be completed by working 10-hour shifts, working daytime hours and will be completed in 15 work days.

Installation of Temporary Supports for Approach Span Demolition (Spans 2 and 4)

Working from the adjacent platform, wooden mats will be placed for small equipment to access the underside of the bridge. Temporary shoring towers (6) will be placed on the mats and will remain in place until all demolition is completed. All equipment will be removed before the return of each high tide. If required by the demolition plan, temporary shoring towers will be set up at locations specified.

Removal of Existing Approach Span Members and Sections

Activities will begin with removal of smaller structural components to allow the removal of the larger sections with the 300-ton crane. Whenever possible, sections or members will be hoisted to the work platform. The mats and the members lowered to the mats within the tidal area will be removed prior to the return of high water. This work will be completed by using a 300-ton crane working from the adjacent work platform and a loader will be used to remove steel members and debris from the mats at ground level. This work will be completed during 10-hour daytime periods of low tide and will take 3 weeks to complete.

Existing Submarine Power and Control Cable Removal (Cable 1)

The removal of the existing submarine cable will be completed by hoisting the cable through the existing soil layers using a crane or an excavator. If this method is not successful for fully removing the cable then the following steps will be implemented.

Working during the winter excavation window (December and January), the 150-foot x 20-foot trench for the submarine cables will be dredged using a crane on a crane barge excavating with a clamshell bucket and loading the material barge. The material barge will be modified to include side boards and containment fabric as a holding area. This work will be completed within a silt curtain containment and dredging will only continue until sufficient soils are removed to allow for pulling of the cable. The upper 4 feet of material (475 cy) is assumed to be contaminated and will be excavated and loaded onto the material barge. The lower material will be placed on the material barge and reused as replacement fill below 4 feet of depth.

When the barge is fully loaded it will be moved to one of the platforms where it will be off-loaded with an onshore crane or excavator onto water tight trucks and transported to the WSA. The material barge will be off-loaded 1 time per week for a total of 2 times. This dredging activity will be completed during daytime hours working 10-hour shifts, 6 days per week for 15 shifts.

The remaining trench will then be filled with clean soils of similar structural and organic characteristics as the materials removed. The soils will be placed using a crane and clamshell bucket to lower the soils to the final elevation before opening the bucket.

Stage 15

Excavation and Demolition of East Abutment Wall (Tracks 1 and 3)

Excavation and demolition at the east abutment for tracks 1 and 3 will follow the removal of the east approach span and the ballast behind the abutment wall. Before demolishing the abutment wall, a debris shield will be installed below the horizontal cut line and extend horizontally to the limits of demolition and 4 feet out from the face of the wall. The shield will be suspended from either staging set on mats in the intertidal zone or brackets fastened to the abutment wall.

After excavating the soils behind the wall, the concrete cap will be removed using an excavator and a 15k ft-lb demolition hammer. This work will be completed by hammering back toward shore minimizing the possibility of large concrete pieces falling onto the debris shield. After completing the removal of the concrete cap excavation of the soils will continue. The excavator will remove the stone blocks by pulling them toward shore into the excavated area. The demolition hammer may be required to provide an initial break of the masonry bond.

Excavation and demolition will continue, preceding the wall removal as the stone blocks are removed to the required elevation. The excavation and demolition of the retaining wall in this stage will take 20 work days.

Removal of Sliding Rail System

Working from the southeast and southwest platforms, the sliding rail system will be removed for the new lift span. This work will involve the use of a 300-ton crane and vibratory hammer to remove the items and an excavator to process and load them onto a truck for removal. This work will be completed by working 10-hour day shifts for 16 shifts.

Working from the northeast and northwest platform and using a 300-ton crane and a vibratory hammer, the sliding rail system and piles (72 in total) will be removed to the platform and processed prior to loading the steel members and sections onto trucks for removal. This work will be completed by working 10-hour days shifts for 23 shifts. Pile extraction activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods, will be within bubble curtains, and employ the use of soft starts at the beginning of each shift.

Marine Enclosure Installation

The marine enclosures for the removal of existing piers will include the installation of forty-four 14-inch diameter steel template piles, forty 30-foot pieces of template guide frame, and 212 steel sheet pile pairs. The enclosures will be installed from a crane barge using a 300-ton crane and a vibratory hammer. This work will be completed during day time hours working 6 days per week and will take 65 shifts. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods, will be within bubble curtains, and employ the use of soft starts at the beginning of each shift.

Existing Pier Demolition

The demolition and removal of the existing piers (9,000 sf) will involve an excavator working from a crane barge and loading a material barge and yield approximately 4,600 cy of stone/concrete material. The material barge will be outfitted with a corral for containing the demolition debris. The material barge will be transported to the Devine Brothers bulkhead (1.3 miles north) and off-loaded at the Devine Brothers bulkhead using a 300-ton crane with a clamshell bucket. The barge will be moved 28 times during the work. This work will be completed working day time shifts, 6 days per week, 10 hours per day and will take 14 weeks to complete.

Upon completion of the existing pier demolition the marine enclosures will be removed and the surface around the piers will be dredged to the final channel depth. The removal of the marine enclosures will take 42 shifts and take place from a crane barge using a 300-ton crane and a vibratory hammer. The dredging activity will include a 200-ton crane with a clamshell bucket working from the crane barge and loading the material barge to one of the platforms for off-loading. The area of this work will measure 200 feet x 14 feet with an average depth of 14 feet and yield 1,550 cy of soil materials to be removed and disposed of offsite and will take approximately 30 shifts.

Existing Submarine Cable Removal (Cable 2)

A material barge will be modified to include side boards and containment fabric as a holding area. The removal of the existing submarine cable will be completed by hoisting the cable through the existing soil layers using a crane or an excavator. If this method is not successful for fully removing the cable then the steps below will be implemented.

Working within a silt curtain containment, and during the winter excavation window (December and January), the 200-foot trench of dredging for the submarine cables will be completed using a crane on a crane barge excavating with a clamshell bucket and loading the material barge. Dredging will only continue until sufficient soils are removed to allow for pulling of the cable.

An average of 8 feet of material will be excavated from an area measuring 200 feet x 12 feet (725 cy) and loaded onto the material barge. Having been backfilled with clean material during the CP-243 project, all material is considered to be clean and will be reused as replacement fill following removal of the cable.

This dredging activity will be completed during daytime hours working 10-hour shifts, 6 days per week for 10 days. The remaining trench will then be filled with soils of similar structural and organic characteristics as the materials removed. The soils will be placed using a crane and clamshell bucket to lower the soils to the final elevation before opening the bucket.

Install Permanent Fender at Southeast and Southwest Wings

Work to install the permanent fender piles will include installation of ten 14-inch wide steel template H-piles and 60 feet of template frame on each side. Sixty 14-inch diameter composite permanent fender piles will be installed using a 300-ton crane and both impact and vibratory hammers working daytime hours from the work platforms and will take 7 weeks to complete. Pile driving is expected to take 2 hours per pile and up to 4 piles will be installed per day. The fender rails (90 pcs) will be constructed from a work barge with a man-lift serviced by an 80-ton hydraulic crane on the platform. This will be completed by working 6 days per week, 10 hours per day and will take 18 work days.

Stage 16

Complete Top/Pedestal Concrete on North Half of Lift Piers

The construction of the 4 pier caps will be completed using a 300-ton crane on a crane barge in the channel for hoisting forms, reinforcing steel, and other construction materials. The existing work platform or material barge will be used for staging materials. A perimeter work platform will be installed for access and containment of construction debris. Forming, placing reinforcing steel, and pouring the cap will be completed by working 6 days per week, working 10 hours per day and take two weeks for each cap.

Stage 17

Continued Construction of North Lift Span

This work will include positioning a crane on a crane barge adjacent to the float-in barge to off-load the barges delivering materials at the marine staging yard 1,000 feet south of the bridge. A 200-ton crane on the marine staging yard trestle will be used to assemble the lift span on the float-in barge.

Partial Construction of New East Abutment

Upon completion of excavation and demolition at the east abutment, the construction of the new east abutment to support tracks 1 and 3 will be completed approximately 31 feet to the east of the existing abutment. This work will involve the use of a 200-ton support crane and will take approximately 60 days to complete. The areas behind the propose abutment will be backfilled using a 40-ton excavator and trench compactors. Backfill activities are expected to take 5 days to complete.

Stage 18

Setting of Tower Spans at Lift Piers

This work will be completed with a 200-ton crane working from a crane barge situated within the channel adjacent to the pier. The tower span steel will be delivered to the work platforms by trucks, off-loaded and staged on the platforms until erection. This work will be completed during daytime hours, working 10 hours per day and will take 8 work days per pier.

Erect Steel for Approach Spans (Spans 2 and 4)

The erection of structural steel and steel diaphragms will be completed using a 300-ton crane working from the adjacent work platform and will take 4 weeks. Timber mats will be set in the tidal areas beneath the spans to allow access for a man-lift to assist with setting the diaphragms.

Stage 19

Setting of Precast Deck Sections and Completion of Concrete Pours

Thirteen precast deck sections will be set with a 300-ton crane working from work platforms and adjacent staging areas. Forming closure pours for the approach spans (spans 2 and 4) will require access to the tidal areas below. Timber mats will be placed using an excavator in these areas to provide access for man-lifts and rubber tired backhoe/loaders. Wood mats, equipment, and materials will be removal prior to the return of high tide. The fifteen closure pours will be completed using a 200-ton crane and a 2-cubic yard concrete bucket. Concrete will be delivered and unloaded into the concrete bucket on the work platform. A debris shield will be provided at the work area to prevent concrete from getting into the water.

Walkway sections will be installed using an 80-ton hydraulic crane during track shut downs and nighttime hours, working 6 shifts per week. Since this will involve man-lift access from below, this will be performed during periods of low tide. Work that requires access within the tidal zone will be completed during low tide periods. All materials will be removed from the tidal zone prior to the return of high tide. This work will be completed during day time hours, working 10 hours per day and will take 9 weeks to complete.

Stage 20

Move North Lift Span from Marine Staging Yard

During an opening of the south lift span, the north lift span will be floated through the bridge to a temporary staging location at the northeast work platform. The navigation channel will remain open while the north lift span is staged at the northeast work platform. Final preparations will be made for the float-in.

Stage 21

Move North Lift Span into Final Position

Activities will begin by closing the navigation channel to marine traffic. A float-in barge will be moved with the north lift span into final position. Using hydraulic jacks, the lift span will be lowered down into the permanent bearings. Counterweights will be connected to north lift span. These activities will be completed working multiple shifts, 24 hours per day and will take 2 days to complete. Final mechanical and electrical connections will be made, tested, and conclude with final certification (45 days).

Stage 22

Installation of Remaining Fender Piles and Fender System

Piles for the permanent fender on the south side will be installed using a 200-ton crane and an impact hammer working daytime hours from the work platforms. The piles will be delivered and stored on the work platform. The fender rails will be erected from a work barge with a man-lift serviced by an 80-ton hydraulic crane. This will be completed by working 6 days per week, 10 hours per day and will take 36 work days

Work to install the permanent fender piles will include installing fourteen 14-inch wide steel template H-piles and 180 feet of template frame on each side. Sixty 14-inch diameter composite permanent fender piles will be installed using a 300-ton crane and impact and vibratory hammers within bubble curtains working daytime hours from the work platforms and will take 7 weeks to complete. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift. The fender rails (270 pcs) will be constructed from a work barge with a man-lift serviced by an 80-ton hydraulic crane on the platform. This will be completed by working 6 days per week, 10 hours per day and will take 9 weeks.

Removal of Work Platforms

Prior to removal of the platforms, the wooden decking will be swept clean. The removal of the work platforms including the wooden decking, the steel stringers, steel caps, 14-inch wide steel H-piles (80), 24-inch diameter steel pipe piles (22), steel sheet piles (43 pairs) and 30-inch diameter steel piles (216) will be completed from the platform using a 300-ton crane. It is expected that one pile will be extracted at a time; however, conditions may arise where two piles need to be extracted concurrently. The crane and a vibratory hammer will be used within bubble curtains to pull the piles. Pile extraction activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift. During periods of acceptable tides, a work barge with a man-lift will be used to access the platforms for rigging, burning (torch cutting), and removing bolts. The work barge will be positioned below the work area to capture materials falling from the removal activities.

Existing Submarine Cable Removal (Cable 3)

The removal of the existing submarine cable will be completed by hoisting the cable through the existing soil layers using a crane or an excavator. If this method is not successful for fully removing the cable then the following steps will be implemented.

Working within a silt curtain containment and during the winter excavation window (December and January), the 250-foot x 20-foot trench of dredging for the submarine cables will be completed using a crane on a crane barge excavating with a clamshell bucket and loading the material barge. Dredging will only continue until sufficient soils are removed to allow pulling the cable. The upper 4 feet of material (800 cubic yards) is assumed to be contaminated and will be excavated and loaded onto the material barge. The lower material will be placed on the material barge and reused as replacement fill below 4 feet of depth.

When the barge is fully loaded it will be moved to Devine Brothers' bulkhead (1.3 miles) where it will be off-loaded with an onshore crane or excavator onto water tight trucks and transported to the WSA. The material barge will be off-loaded 1 time per week for a total of 2 times. This dredging activity will be completed during daytime hours working 10-hour shifts, 6 days per week for 10 shifts. The remaining trench will then be filled with clean soils of similar structural and organic characteristics as the materials removed. The soils will be placed using a crane and clamshell bucket to lower the soils to the final elevation before opening the bucket.

Marine Staging Yard Trestle Removal

The removal of the trestle at the marine staging yard (1,000 feet south of the bridge) will include the wooden curb and decking, the steel stringers, steel pile caps, 14-inch wide steel H-piles (32), steel sheet piles (58 pairs), and 24-inch diameter steel piles (32). This work will be completed from the platform using a 200-ton crane. The crane and a vibratory hammer will be used within bubble curtains to pull the piles. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift. A work barge with a man-lift will be used to access the platforms and a 200-ton crane will be used to rig, remove steel stringers, and steel pile caps. All materials will be loaded onto trucks or material barges and removed to their destination.

Following the removal of all construction materials, the marine staging yard will be graded and surface treatments provided in accordance with the specifications and design documents. Final restoration will provide grading for proper drainage to drainage structures, haybales, silt fence, surface stabilization including topsoil, seeding, erosion matting, berms or other necessary measures to prevent erosion, runoff or dust from entering the Norwalk River or adjacent properties. As part of this work, a permanent 300-foot-long bulkhead will be installed using steel sheet piles (80 pairs) using a vibratory hammer. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods, will be within bubble curtains, and employ the use of soft starts at the beginning of each shift.

Restore IMAX Crane Pad Area to Design Condition

Activities will begin with repairing, replacing, and restoring erosion controls around the IMAX crane pad. Fill material will be removed to desired elevation and grade to drain to drainage structures. Finish surfaces or erosion matting will be applied as required by design. Sheeting will be removed as part of the removal of the southwest work trestle discussed above.

Description of the Action Area

The action area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50CFR§402.02). As discussed above, this work will take place in, adjacent to, and spanning the Norwalk River in the vicinity of Walk Bridge (see attached USGS locus map). For this project, the action area includes the project footprint comprised of the in-water, above water, and terrestrial extent of project activities, the underwater area where elevated noise and increased suspended sediment may be experienced, and the area where construction related vessels will be located including routes to and from home ports (exact location will depend on selected Contractor's means and methods). The action area for the purposes of this evaluation will include the approximately 1.3-mile distance of construction barge travel north to and from Devine Brothers Inc. and the approximately 1.5-mile distance south to Calf Pasture Point. Beyond this point, vessel mooring locations are conceptual and vessel traffic is yet to be determined. The action area limits depicted in Figure 5 below are expected to encompass all effects of the proposed project portion located within the Norwalk River. Arrival of work vessels from their respective home ports will be determined by the Contractor and are not included here.

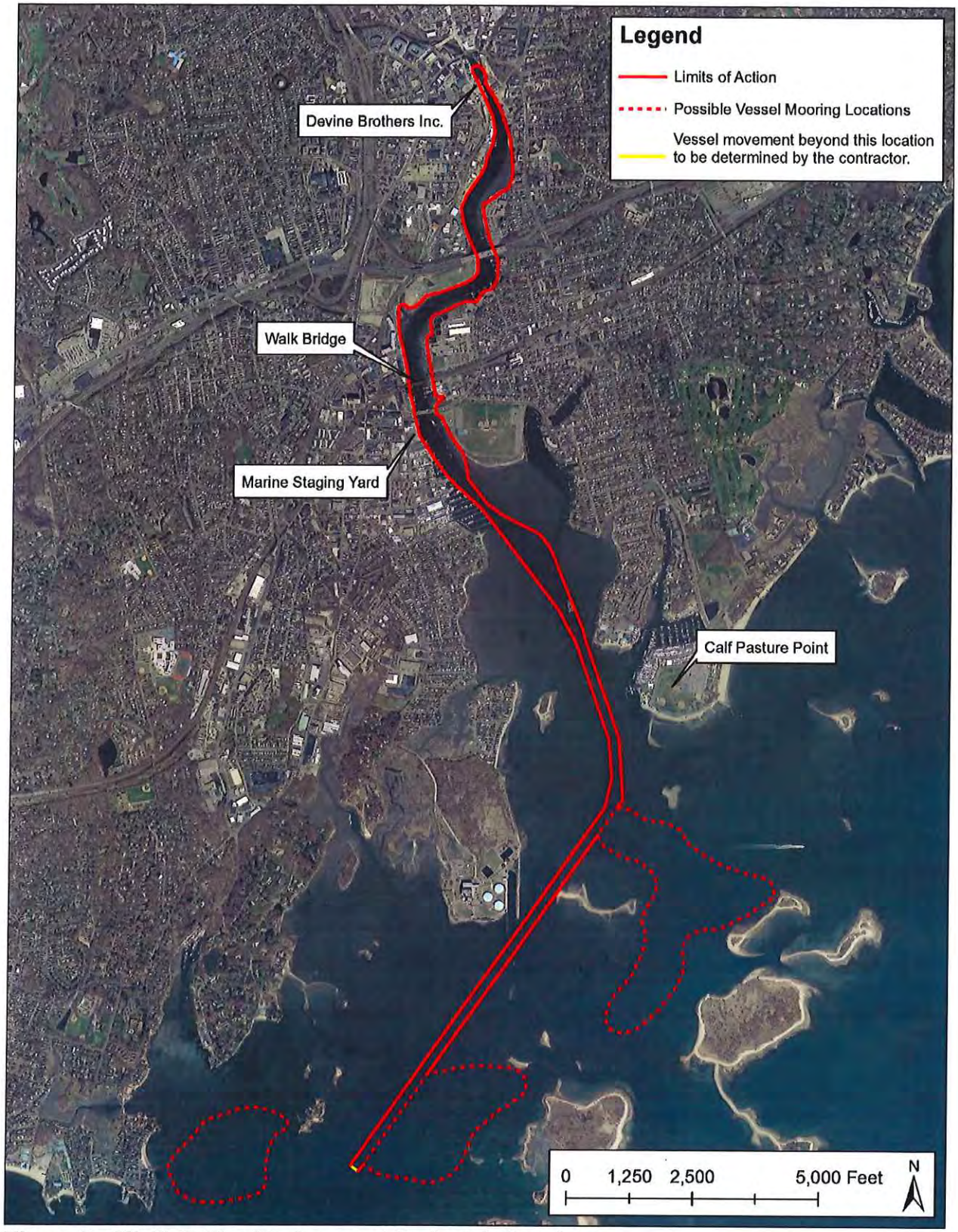

Figure 5 – Walk Bridge Replacement Project Action Area

At the project site, the subtidal zone has a sediment profile consisting of gray, dark gray, and black organic silt with shells to depths ranging from 5 to 7 feet below the river bottom. The organic silt is underlain by gray organic silty clay and fine to medium sand with shells. The intertidal zone areas that occur proximal to the river channel contain areas of mudflat, boulder, and cobble-dominated substrates. These intertidal areas are variable in size and are interspersed with boulder areas, cobble areas, riprap, patches of tidal wetland vegetation, mudflats, and historic pier pilings. No submerged vascular aquatic vegetation beds are mapped or known to occur within the Norwalk River in the project area and vicinity. Natural shellfish beds occur in the intertidal and subtidal zones adjacent to the river channel. Spatial extent and distribution of the species present in the system changes with substrate conditions. Generally, ribbed mussels (*Geukensia demissa*) occur in the upper intertidal zones growing on either side of the river associated with stands of *Spartina alterniflora* or as separate shell beds. Lower intertidal areas may contain soft-shell clams (*Mya arenaria*). Eastern Oyster (*Crassostrea virginica*) was observed growing on boulders in the intertidal zone and on the stone bridge abutments and piers of the bridge. The tidal range is 7.07 ft between MHW (3.35 ft NAVD88) and MLW (-3.72 ft NAVD88). Channel depth is reported to be 10 feet below MLLW (-3.98 ft NAVD88), according to NOAA Navigational Charts. Salinity changes with seasonal conditions but remains in the mixohaline range (approximately 26.5 PSU) since the river lies at the western end of Long Island Sound (Anderson et al.). The site experiences regular daily disturbance due to boat traffic within the channel. Boat traffic consists predominantly of recreational boating, but commercial barge traffic to upstream facilities is also present. The channel was last dredged in 2009.

Habitat Disturbance

Permanent disturbance to EFH resources will be minimal and is discussed in greater detail in the attached EFH worksheet. Disturbance is not expected to alter the use of the Norwalk River by any species listed as having EFH in the action area. Permanent impacts will largely be limited to the subtidal habitat for new bridge piers and fender system. All other impacts are considered temporary and will result primarily from work trestles, marine enclosures, staging areas, dredging, and submarine conduit excavation. Compensation for permanent impacts involves the removal of the existing Walk Bridge rest piers and central pivot pier and providing a suitable sediment substrate for the marine benthic community. Temporary impact areas will be compensated in-place through restoration of the impact areas, which also involves removal of temporary piles and providing suitable sediment substrates. Channel dredging will take place and is considered a temporary impact as no net loss of subtidal benthic habitat will occur. Impacts to tidal wetlands will be compensated for through tidal wetland restoration along the Norwalk River in the vicinity of the bridge.

Conclusions

Any adverse effects on EFH designated for red hake (*Urophycis chuss*), winter flounder (*Pseudopleuronectes americanus*), windowpane flounder (*Scophthalmus aquosus*), ocean pout (*Macrozoarces americanus*), silver hake (*Merluccius bilineris*), longfin inshore squid (*Loligo pealeii*), Atlantic butterfish (*Peprilus triacanthus*), Atlantic mackerel (*Scomber scombrus*), scup (*Stenotomus chrysops*), and smoothhound shark complex (Atlantic stock) eggs will either be no

more than minimal, temporary, and/or will be alleviated with mitigation techniques and will not be substantial.

Any adverse effects on EFH designated for red hake (*Urophycis chuss*), winter flounder (*Pseudopleuronectes americanus*), windowpane flounder (*Scophthalmus aquosus*), silver hake (*Merluccius bilineris*), Atlantic butterfish (*Peprilus triacanthus*), Atlantic mackerel (*Scomber scombrus*), scup (*Stenotomus chrysops*), and smoothhound shark complex (Atlantic stock) larvae will either be no more than minimal, temporary, and/or will be alleviated with mitigation techniques and will not be substantial.

Any adverse effects on EFH designated for pollock (*Pollachius virens*), red hake (*Urophycis chuss*), winter flounder (*Pseudopleuronectes americanus*), windowpane flounder (*Scophthalmus aquosus*), Atlantic herring (*Clupea harengus*), little skate (*Leucoraja erinacea*), winter skate (*Leucoraja ocellata*), bluefish (*Pomatomus saltatrix*), longfin inshore squid (*Loligo pealeii*), Atlantic butterfish (*Peprilus triacanthus*), Atlantic mackerel (*Scomber scombrus*), summer flounder (*Paralichthys dentatus*), scup (*Stenotomus chrysops*), black sea bass (*Centropristis striata*), sand tiger shark (*Carcharias taurus*), and smoothhound shark complex (Atlantic stock) juveniles will either be no more than minimal, temporary, and/or will be alleviated with mitigation techniques and will not be substantial.

Any adverse effects on EFH designated for pollock (*Pollachius virens*), red hake (*Urophycis chuss*), winter flounder (*Pseudopleuronectes americanus*), windowpane flounder (*Scophthalmus aquosus*), ocean pout (*Macrozoarces americanus*), Atlantic herring (*Clupea harengus*), little skate (*Leucoraja erinacea*), winter skate (*Leucoraja ocellata*), bluefish (*Pomatomus saltatrix*), longfin inshore squid (*Loligo pealeii*), Atlantic butterfish (*Peprilus triacanthus*), Atlantic mackerel (*Scomber scombrus*), summer flounder (*Paralichthys dentatus*), scup (*Stenotomus chrysops*), and smoothhound shark complex (Atlantic stock) adults will either be no more than minimal, temporary, and/or will be alleviated with mitigation techniques and will not be substantial.

Based on the analysis herein, we have determined that Walk Bridge Replacement Project will not adversely affect any EFH habitat under NMFS' jurisdiction. We certify that we have used the best scientific and commercial data available to complete this analysis. We request your concurrence with this determination.

Very truly yours,

Kimberly Lesay

Kimberly Lesay
Transportation Assistant Planning Director
Connecticut Department of Transportation
Office of Environmental Planning

cc: John Hanifin, Andrew Davis, Christopher Samorajczyk, CTDOT
Leah Sirmin, FTA Region 1

Attachments:

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EFH ASSESSMENT WORKSHEET FOR FEDERAL AGENCIES (modified 3/2016)

PROJECT NAME:

DATE:

PROJECT NO.:

LOCATION (Water body, county, physical address):

PREPARER:

Step 1: Use NOAA's EFH Mapper to generate the list of designated EFH for federally-managed species and life stages for the geographic area of interest. Use this list as part of the initial screening process to determine if EFH for those species occurs in the vicinity of the proposed action. The list can be included as an attachment to the worksheet. Make a preliminary determination on the need to conduct an EFH consultation.

1. INITIAL CONSIDERATIONS		
EFH Designations	**Yes**	**No**
Is the action located in or adjacent to EFH designated for eggs? **List the species:**		
Is the action located in or adjacent to EFH designated for larvae? **List the species:**		
Is the action located in or adjacent to EFH designated for juveniles? **List the species:**		

Is the action located in or adjacent to EFH designated for adults or spawning adults? List the species:		

If you answered 'no' to all questions above, then an EFH consultation is not required - go to Section 5.

If you answered 'yes' to any of the above questions, proceed to Section 2 and complete the remainder of the worksheet.

Step 2: In order to assess impacts, it is critical to know the habitat characteristics of the site before the activity is undertaken. Use existing information, to the extent possible, in answering these questions. Identify the sources of the information provided and provide as much description as available. These should not be yes or no answers. Please note that there may be circumstances in which new information must be collected to appropriately characterize the site and assess impacts. Project plans that show the location and extent of sensitive habitats, as well as water depths, the HTL, MHW and MLW should be provided.

2. SITE CHARACTERISTICS

Site Characteristics	Description
Is the site intertidal, sub-tidal, or water column?	
What are the sediment characteristics?	
Is there submerged aquatic vegetation (SAV) at or adjacent to project site? If so describe the SAV species and spatial extent.	
Are there wetlands present on or adjacent to the site? If so, describe the spatial extent and vegetation types.	

Is there shellfish present at or adjacent to the project site? If so, please describe the spatial extent and species present.	
Are there mudflats present at or adjacent to the project site? If so please describe the spatial extent.	
Is there rocky or cobble bottom habitat present at or adjacent to the project site? If so, please describe the spatial extent.	
Is Habitat Area of Particular Concern (HAPC) designated at or near the site? If so for which species, what type habitat type, size, characteristics?	
What is the typical salinity, depth and water temperature regime/range?	
What is the normal frequency of site disturbance, both natural and man-made?	
What is the area of proposed impact (work footprint & far afield)?	

Step 3: This section is used to describe the anticipated impacts from the proposed action on the physical/chemical/biological environment at the project site and areas adjacent to the site that may be affected.

3. DESCRIPTION OF IMPACTS

Impacts	Y	N	Description
Nature and duration of activity(s). Clearly describe the activities proposed and the duration of any disturbances.			
Will the benthic community be disturbed? If no, why not? If yes, describe in detail how the benthos will be impacted.			
Will SAV be impacted? If no, why not? If yes, describe in detail how the SAV will be impacted. Consider both direct and indirect impacts. Provide details of any SAV survey conducted at the site.			
Will salt marsh habitat be impacted? If no, why not? If yes, describe in detail how wetlands will be impacted. What is the aerial extent of the impacts? Are the effects temporary or permanent?			

Will mudflat habitat be impacted? If no, why not? If yes, describe in detail how mudflats will be impacted. What is the aerial extent of the impacts? Are the effects temporary or permanent?			
Will shellfish habitat be impacted? If so, provide in detail how the shellfish habitat will be impacted. What is the aerial extent of the impact? Provide details of any shellfish survey conducted at the site.			
Will hard bottom (rocky, cobble, gravel) habitat be impacted at the site? If so, provide in detail how the hard bottom will be impacted. What is the aerial extent of the impact?			
Will sediments be altered and/or sedimentation rates change? If no, why not? If yes, describe how.			
Will turbidity increase? If no, why not? If yes, describe the causes, the extent of the effects, and the duration.			

Will water depth change? What are the current and proposed depths?			
Will contaminants be released into sediments or water column? If yes, describe the nature of the contaminants and the extent of the effects.			
Will tidal flow, currents, or wave patterns be altered? If no, why not? If yes, describe in detail how.			
Will water quality be altered? If no, why not? If yes, describe in detail how. If the effects are temporary, describe the duration of the impact.			
Will ambient noise levels change? If no, why not? If yes, describe in detail how. If the effects are temporary, describe the duration and degree of impact.			
Does the action have the potential to impact prey species of federally managed fish with EFH designations?			

Step 4: This section is used to evaluate the consequences of the proposed action on the functions and values of EFH as well as the vulnerability of the EFH species and their life stages. Identify which species (from the list generated in Step 1) will be adversely impacted from the action. Assessment of EFH impacts should be based upon the site characteristics identified in Step 2 and the nature of the impacts described within Step 3. NOAA's EFH Mapper should be used during this assessment to determine the ecological parameters/ preferences associated with each species listed and the potential impact to those parameters.

4. EFH ASSESSMENT			
Functions and Values	**Y**	**N**	**Describe habitat type, species and life stages to be adversely impacted**
Will functions and values of EFH be impacted for:			
Spawning **If yes, describe in detail how, and for which species. Describe how adverse effects will be avoided and minimized.**			
Nursery **If yes, describe in detail how and for which species. Describe how adverse effects will be avoided and minimized.**			
Forage **If yes, describe in detail how and for which species. Describe how adverse effects will be avoided and minimized.**			
Shelter **If yes, describe in detail how and for which species. Describe how adverse effects will be avoided and minimized.**			

Will impacts be temporary or permanent? Please indicate in description box and describe the duration of the impacts.			
Will compensatory mitigation be used? If no, why not? Describe plans for mitigation and how this will offset impacts to EFH. Include a conceptual compensatory mitigation plan, if applicable.			

<u>Step 5</u>: This section provides the federal agency's determination on the degree of impact to EFH from the proposed action. The EFH determination also dictates the type of EFH consultation that will be required with NOAA Fisheries.

Please note: if information provided in the worksheet is insufficient to allow NOAA Fisheries to complete the EFH consultation additional information will be requested.

5. DETERMINATION OF IMPACT

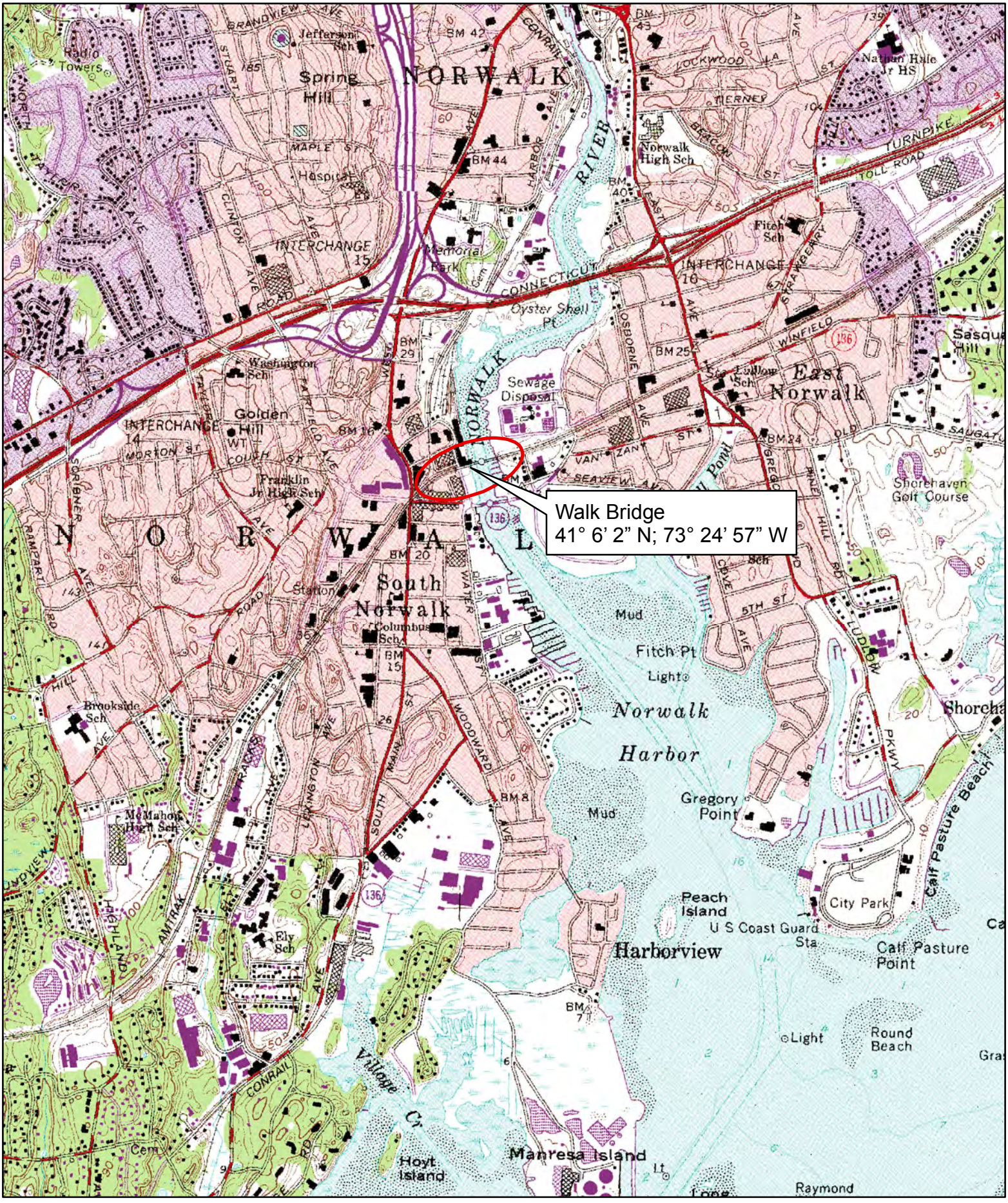
Federal Agency's EFH Determination		
Overall degree of adverse effects on EFH (not including compensatory mitigation) will be: **(check the appropriate statement)**		**There is no adverse effect on EFH or no EFH is designated at the project site.** **EFH Consultation is not required.**
		The adverse effect on EFH is not substantial. This means that the adverse effects are either no more than minimal, temporary, or that they can be alleviated with minor project modifications or conservation recommendations. **This is a request for an abbreviated EFH consultation.**
		The adverse effect on EFH is substantial. **This is a request for an expanded EFH consultation.**

Step 6: Consultation with NOAA Fisheries may also be required if the proposed action results in adverse impacts to other NOAA-trust resources, such as anadromous fish, shellfish, crustaceans, or their habitats as part of the Fish and Wildlife Coordination Act Some examples of other NOAA-trust resources are listed below. Inquiries regarding potential impacts to marine mammals or threatened/endangered species should be directed to NOAA Fisheries' Protected Resources Division.

6. OTHER NOAA-TRUST RESOURCES IMPACT ASSESSMENT	
Species known to occur at site (list others that may apply)	**Describe habitat impact type (i.e., physical, chemical, or biological disruption of spawning and/or egg development habitat, juvenile nursery and/or adult feeding or migration habitat). Please note, impacts to federally listed species of fish, sea turtles, and marine mammals must be coordinated with the GARFO Protected Resources Division.**
alewife	
American eel	
American shad	
Atlantic menhaden	
blue crab	
blue mussel	
blueback herring	

Eastern oyster	
horseshoe crab	
quahog	
soft-shell clams	
striped bass	
other species:	

Attachment A - USGS Locus Map and Plans

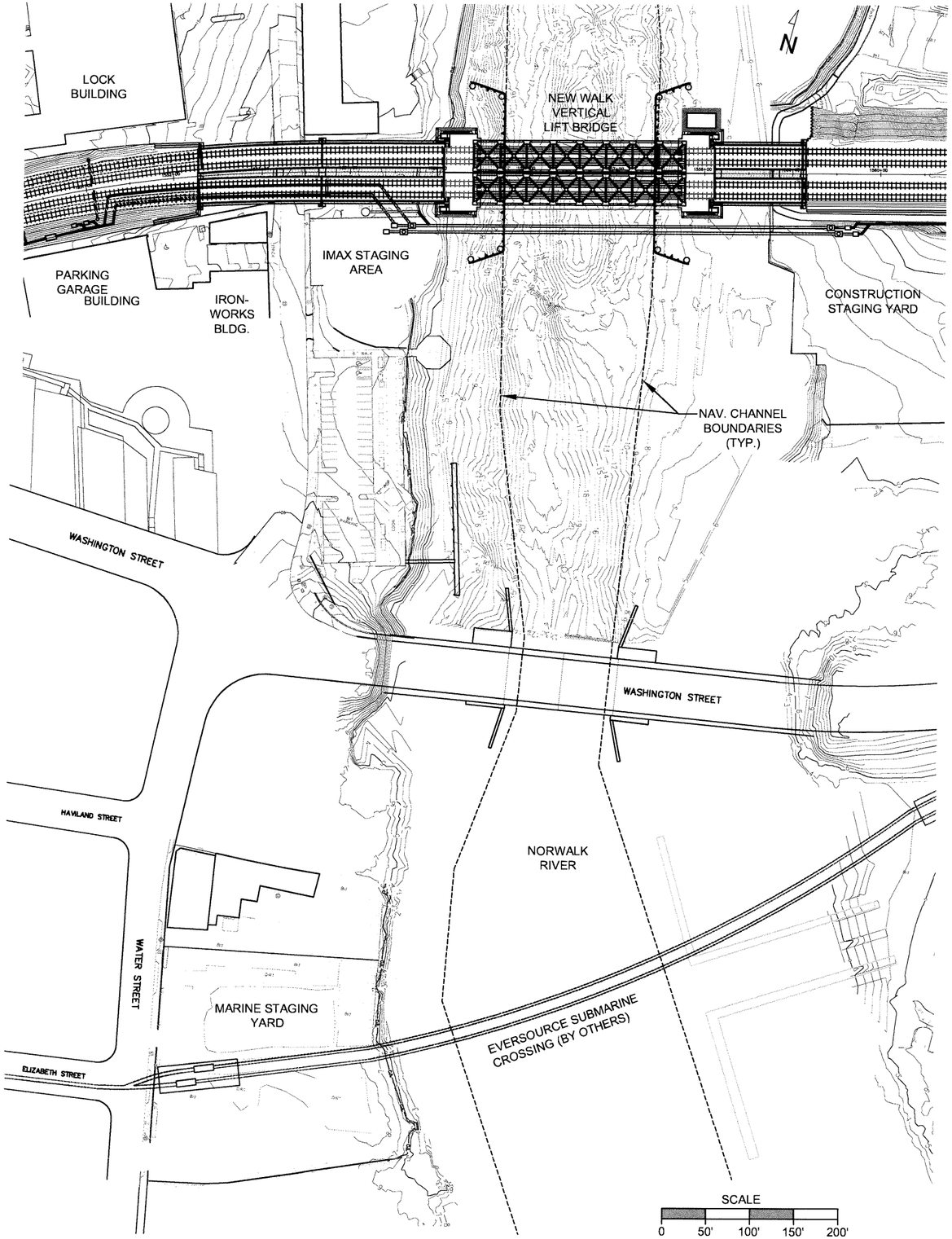


Norwalk South Quadrangle
Connecticut - Fairfield County
7.5 Minute Series
41073-A4-TF-024

Walk Bridge Replacement Project
Norwalk, Connecticut
Bridge No. 04288R
Connecticut Department of Transportation
Project No. 0301-0176

0 625 1,250 2,500 Feet

N



PROPOSED CONSTRUCTION SEQUENCE FOR WALK BRIDGE

** SELECTED ACTIVITIES (SEE NOTE 7) **

(PRELIMINARY) - 6-5-2018

NOTES AND ASSUMPTIONS FOR THIS CONSTRUCTION SEQUENCE:

1. A SOFT START WILL BE USED AT THE BEGINNING OF EACH SHIFT THAT REQUIRES PILE DRIVING AND EXTRACTION, SHAFT DRILLING, AND MICROPILE DRILLING ACTIVITIES.
2. ALL PILE DRIVING AND EXTRACTION ACTIVITY WILL BE ENCLOSED IN BUBBLE CURTAINS.
3. ALL PILE DRIVING AND EXTRACTION, SHAFT DRILLING, AND MICROPILE DRILLING ACTIVITIES WILL BE CONDUCTED DURING 12-HOUR WORK PERIODS FOLLOWED BY 12-HOUR WORK FREE PERIODS.
4. ALL PILE DRIVING AND EXTRACTION, SHAFT DRILLING, AND MICROPILE DRILLING ACTIVITIES CONDUCTED BETWEEN APRIL 1 AND JUNE 30 WILL ONLY OCCUR BETWEEN ONE HOUR AFTER SUNRISE TO ONE HOUR BEFORE SUNSET.
5. ALL PILE DRIVING AND EXTRACTION, SHAFT DRILLING, AND MICROPILE DRILLING ACTIVITIES WILL BE CONDUCTED TO ONLY OCCUPY ONE HALF OF THE RIVER AT A TIME (OR ONLY OCCUPY 50% OF THE RIVER WHEN WORKING IN THE MIDDLE).
6. ALL DREDGING WILL BE CONDUCTED BETWEEN DECEMBER 1ST AND JANUARY 31ST.
7. ACTITIVIES SHOWN ON THESE DRAWINGS ARE LIMITED TO THOSE WITH A POTENTIAL TO AFFECT ESA LISTED SPECIES.
8. CONTOUR DATUM SHOWN IS NAVD88.
9. ALL NEW CONSTRUCTION DETAILS ARE FROM HNTB PRELIMINARY DESIGN PLANS DATED 3-27-2017, EXCEPT FOR SELECTED UPDATES BASED ON MORE RECENT INFORMATION PROVIDED BY HNTB.
10. THE MEANS AND METHODS SHOWN IN THIS SEQUENCE ARE PRELIMINARY.
11. IN GENERAL, EQUIPMENT AND BARGES ARE NOT SHOWN ON THESE DRAWINGS. FOR PRELIMINARY BARGE PLACEMENT INFORMATION, SEE CMJV PRELMINARY BARGE MOORING & MOVEMENT PLAN DATED 6-5-2018.
12. THIS SEQUENCE SHOWS GENERAL STAGES ONLY. THE WORK ACTIVITIES WITHIN EACH STAGE MAY BEGIN AND END AT DIFFERENT POINTS DURING EACH STAGE, AND MAY EXTEND INTO OTHER STAGES.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

COVER SHEET

SCALE: 1" = 140'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE JV

SHEET 1 OF 24

JOB 3215103

STAGE 1

= HTL

= MHW

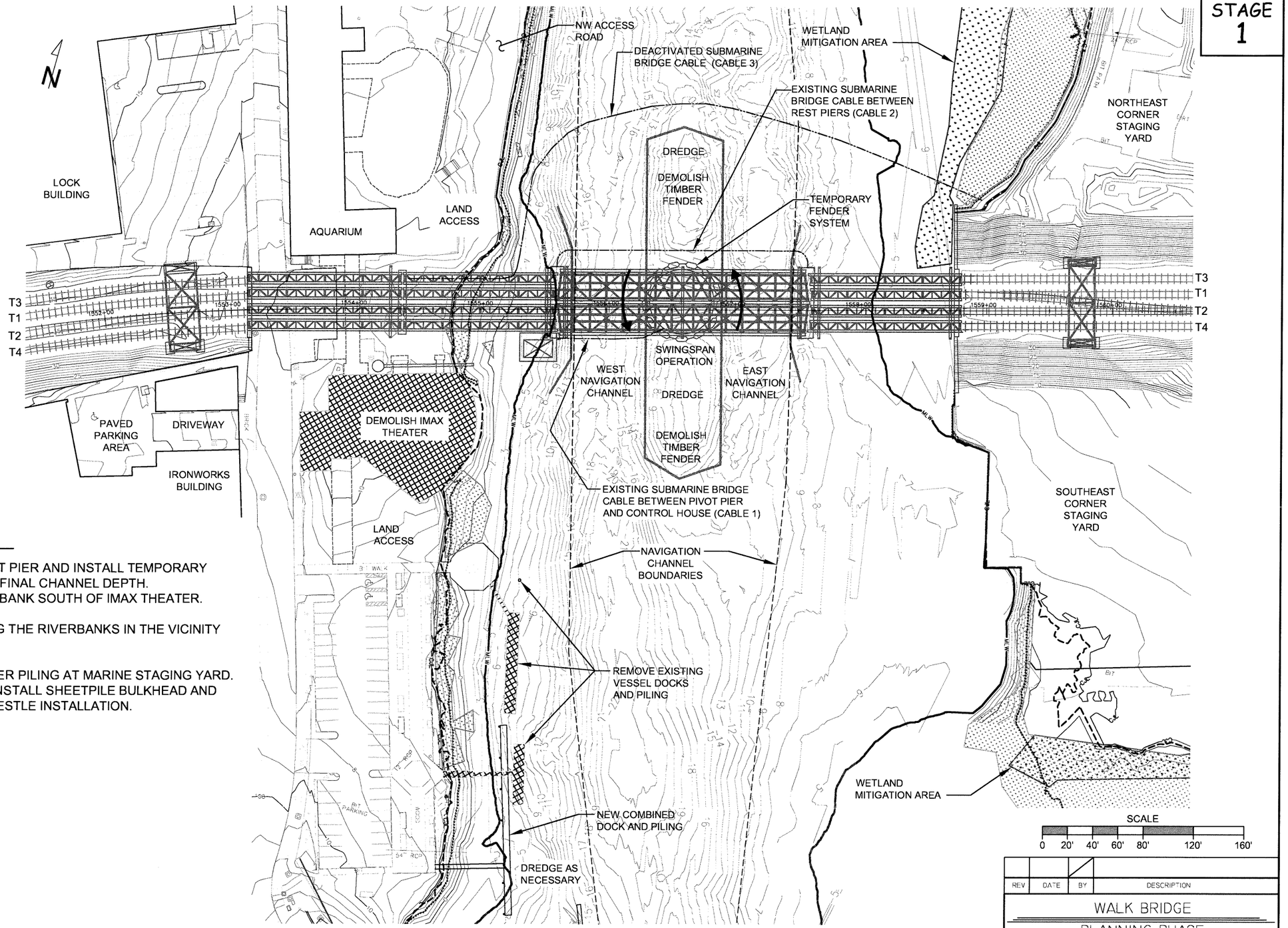
= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS

= WETLAND MITIGATION AREAS

NOTE: ADDITIONAL LOCATIONS OF WETLAND MITIGATION ARE SHOWN IN THE CMJV PRELIMINARY BARGE MOORING & MOVEMENT PLAN DATED 6-5-2018.



CONSTRUCTION ACTIVITIES

- DEMOLISH EXISTING TIMBER FENDER AT PIVOT PIER AND INSTALL TEMPORARY FENDER SYSTEM. DREDGE FENDER AREA TO FINAL CHANNEL DEPTH.
- RELOCATE VESSEL MOORING AREA ON WEST BANK SOUTH OF IMAX THEATER. DREDGE BERTHS AS NEEDED.
- PERFORM WETLAND MITIGATION WORK ALONG THE RIVERBANKS IN THE VICINITY OF THE BRIDGE.
- DEMOLISH IMAX THEATER.
- INSTALL MARINE ACCESS TRESTLE AND FENDER PILING AT MARINE STAGING YARD. DREDGE IN FRONT OF TRESTLE AS NEEDED. INSTALL SHEETPILE BULKHEAD AND EXCAVATE UPLAND AREA AS NEEDED FOR TRESTLE INSTALLATION.

NOTES:

1. VERTICAL DATUM IS NAVD88.
2. NEW CONSTRUCTION DETAILS ARE FROM HNTB PRELIMINARY DESIGN PLANS DATED 3-27-2017, WITH SELECTED UPDATES BASED ON MORE RECENT INFORMATION FROM HNTB.
3. EQUIPMENT AND BARGES NOT SHOWN. FOR BARGE PLACEMENT INFORMATION, SEE CMJV PRELIMINARY BARGE MOORING & MOVEMENT PLAN DATED 6-5-2018.
4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

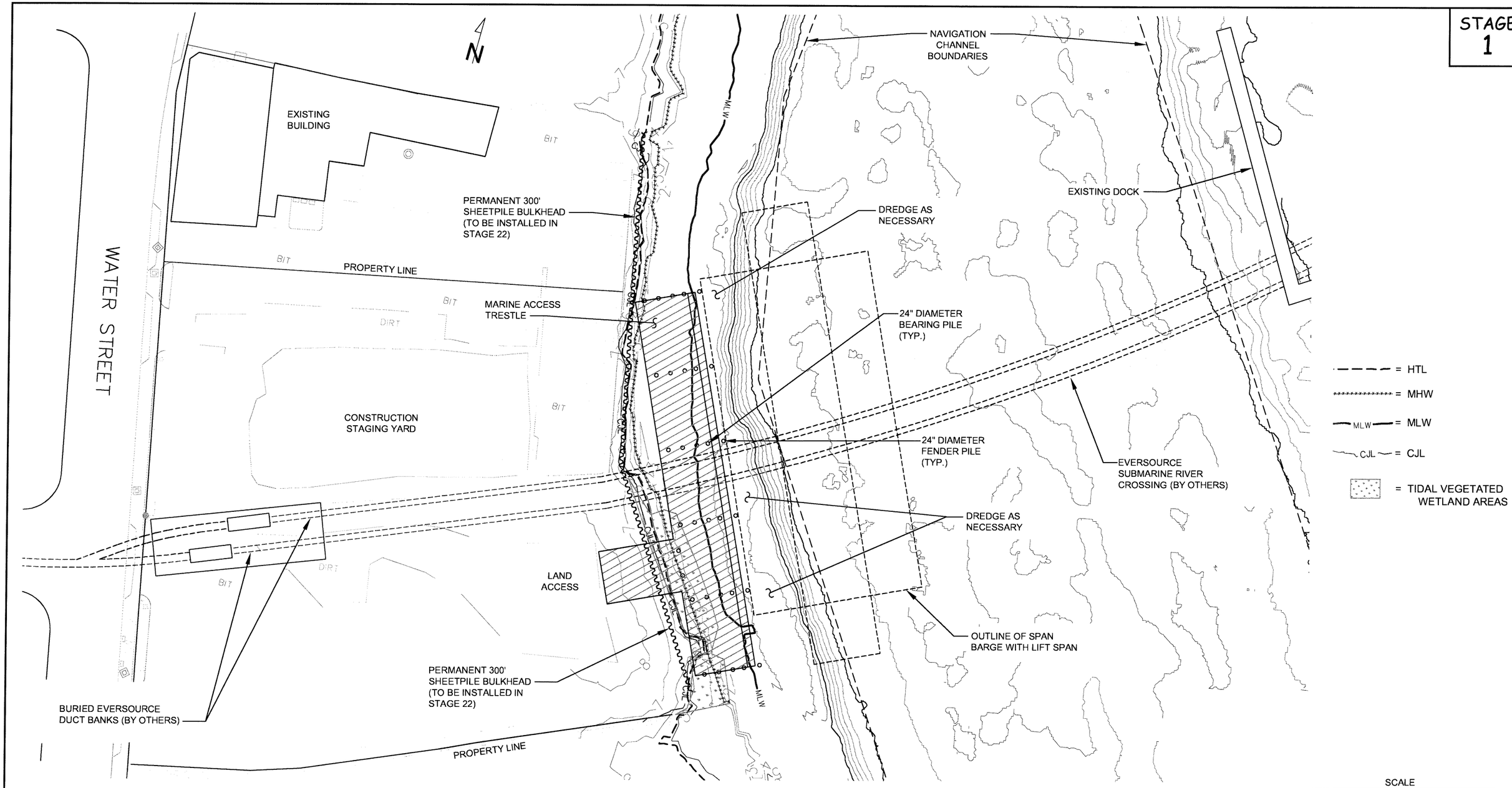
STAGE 1 - PLAN VIEW AT BRIDGE

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE LLC

SHEET 2 OF 24
JOB 3215103

STAGE 1



SEE DRAWING 24 OF 24 FOR PERMANENT BULKHEAD DETAILS

MARINE STAGING YARD

MARINE ACCESS TRESTLE:

- TRESTLE DECK AREA = 6,800 SF
- GRATED WALKWAY AREA = 800 SF
- TOTAL TRESTLE AREA = 7,600 SF
- 24" DIAMETER BEARING PILES = 26
- 24" DIAMETER FENDER PILES = 6
- DECK WORKING SURFACE ELEVATION = +10.5

NOTES:

1. VERTICAL DATUM IS NAVD88.
2. NEW CONSTRUCTION DETAILS ARE FROM HNTB PRELIMINARY DESIGN PLANS DATED 3-27-2017, WITH SELECTED UPDATES BASED ON MORE RECENT INFORMATION FROM HNTB.
3. EQUIPMENT AND SOME BARGES NOT SHOWN. FOR BARGE PLACEMENT INFORMATION, SEE CMJV PRELIMINARY BARGE MOORING & MOVEMENT PLAN DATED 6-5-2018.
4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

SCALE
0 10' 20' 30' 40' 50' 75' 100'

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 1 - PLAN VIEW AT MARINE STAGING YARD

SCALE: 1" = 50'	SHEET 3 OF 24
DATE: 6-5-18	
DRAWN: B.NICHOLS	JOB 3215103
CHECK:	

WALK BRIDGE REPLACEMENT

CIANBRO MIDDLESEX A JOINT VENTURE

STAGE 2

NORTHWEST WORK PLATFORM:

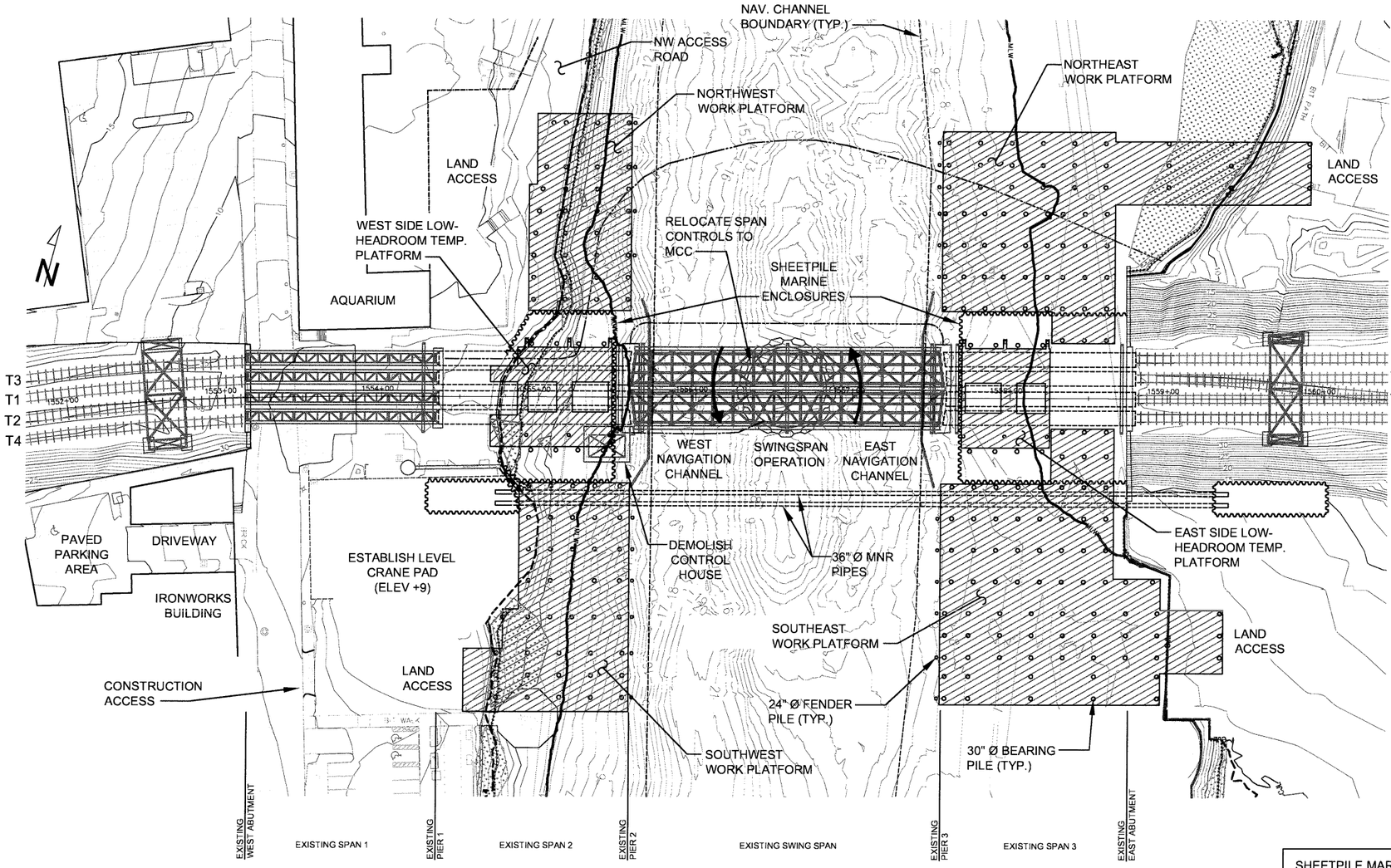
- DECK AREA = 7,900 SF
- 30" DIAMETER BEARING PILES = 32
- 24" DIAMETER FENDER PILES = 4 (NONE INSIDE MARINE ENCLOSURE)
- DECK WORKING SURFACE ELEVATION = +10.5

WEST SIDE LOW-HEADROOM TEMPORARY PLATFORM:

- DECK AREA = 3,600 SF
- 30" DIAMETER BEARING PILES FOR 12' DRILLED SHAFT WORK = 8
- 24" DIAMETER BEARING PILES FOR LIFT PIER CENTER SUPPORTS WORK = 6 (ALL INSIDE MARINE ENCLOSURE)
- DECK WORKING SURFACE ELEVATION = +5.0

SOUTHWEST WORK PLATFORM:

- DECK AREA = 11,800 SF
- 30" DIAMETER BEARING PILES = 41
- 24" DIAMETER FENDER PILES = 6 (NONE INSIDE MARINE ENCLOSURE)
- DECK WORKING SURFACE ELEVATION = +10.5



NORTHEAST WORK PLATFORM:

- DECK AREA = 18,400 SF
- 30" DIAMETER BEARING PILES = 66 (3 INSIDE MARINE ENCLOSURE)
- 24" DIAMETER FENDER PILES = 6
- DECK WORKING SURFACE ELEVATION = +10.5

EAST SIDE LOW-HEADROOM TEMPORARY PLATFORM:

- DECK AREA = 2,800 SF
- 30" DIAMETER BEARING PILES FOR 12' DRILLED SHAFT WORK = 8
- 24" DIAMETER BEARING PILES FOR LIFT PIER CENTER SUPPORTS WORK = 6 (ALL INSIDE MARINE ENCLOSURE)
- DECK WORKING SURFACE ELEVATION = +5.0

SOUTHEAST WORK PLATFORM:

- DECK AREA = 20,800 SF
- 30" DIAMETER BEARING PILES = 77 (6 INSIDE MARINE ENCLOSURE)
- 24" DIAMETER FENDER PILES = 6
- DECK WORKING SURFACE ELEVATION = +10.5

SHEETPILE MARINE ENCLOSURES:

WEST SIDE: 65' x 110'
EAST SIDE: 110' x 110'

CONSTRUCTION ACTIVITIES

- INSTALL FOUR WORK PLATFORMS WITH LAND ACCESS AND FENDER PILING AS SHOWN.
- INSTALL SHEETPILE MARINE ENCLOSURES FOR NEW LIFT PIER FOUNDATIONS ON EAST AND WEST SIDE AS SHOWN.
- INSTALL UNDER-BRIDGE LOW-HEADROOM WORK PLATFORMS FOR LIFT PIER CENTER SUPPORTS AS SHOWN.
- INSTALL PILING AND SUPPORT STEEL FOR DRILLED SHAFT OPERATION.
- MOVE SWING SPAN CONTROLS TO MCC (AT PIVOT PIER) AND DEMOLISH EXISTING BRIDGE CONTROL HOUSE.

= HTL
= MHW
= MLW
= CJL
= TIDAL VEGETATED WETLAND AREAS

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

1. VERTICAL DATUM IS NAVD88.
2. NEW CONSTRUCTION DETAILS ARE FROM HNTB PRELIMINARY DESIGN PLANS DATED 3-27-2017, WITH SELECTED UPDATES BASED ON MORE RECENT INFORMATION FROM HNTB.
3. EQUIPMENT AND BARGES NOT SHOWN. FOR BARGE PLACEMENT INFORMATION, SEE CMJV PRELIMINARY BARGE MOORING & MOVEMENT PLAN DATED 6-5-2018.
4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE
PLANNING PHASE
PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)
STAGE 2 - PLAN VIEW AT BRIDGE

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE LLC

SHEET 4 OF 24
JOB 3215103

STAGE 3

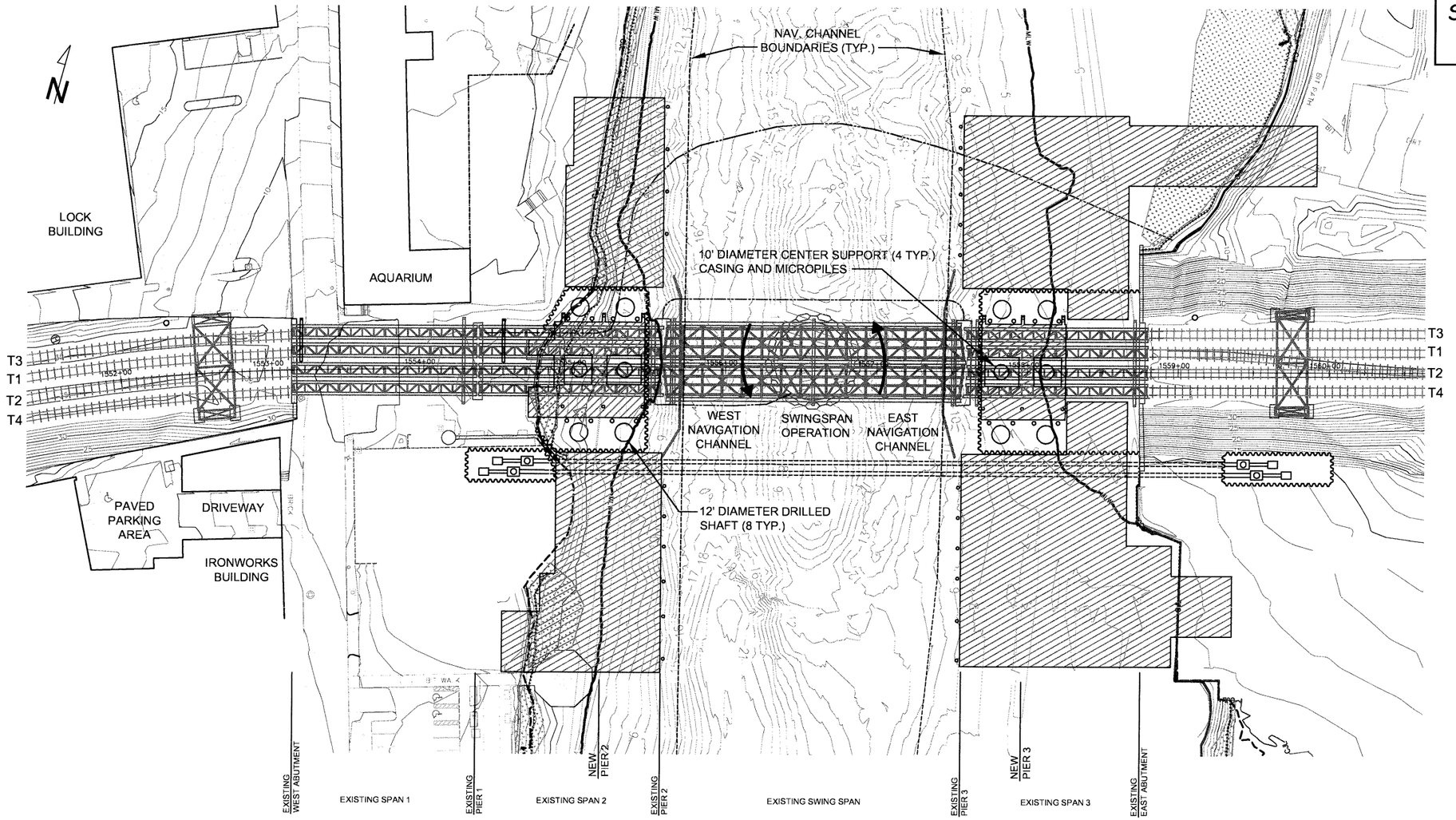
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- INSTALL (8) 12 FT. DIAMETER DRILLED SHAFTS FOR LIFT PIERS (WITHIN MARINE ENCLOSURES).
- CONSTRUCT (4) 10 FT. DIAMETER CENTER SUPPORTS FOR LIFT PIERS (WITHIN MARINE ENCLOSURES).
- BEGIN CONSTRUCTION OF NEW SOUTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 3 - PLAN VIEW

SCALE: 1" = 80'	WALK BRIDGE REPLACEMENT	SHEET 5 OF 24
DATE: 6-5-18	CIANBRO MIDDLESEX A JOINT VENTURE BY	JOB 3215103
DRAWN: B.NICHOLS		
CHECK:		

STAGE 4

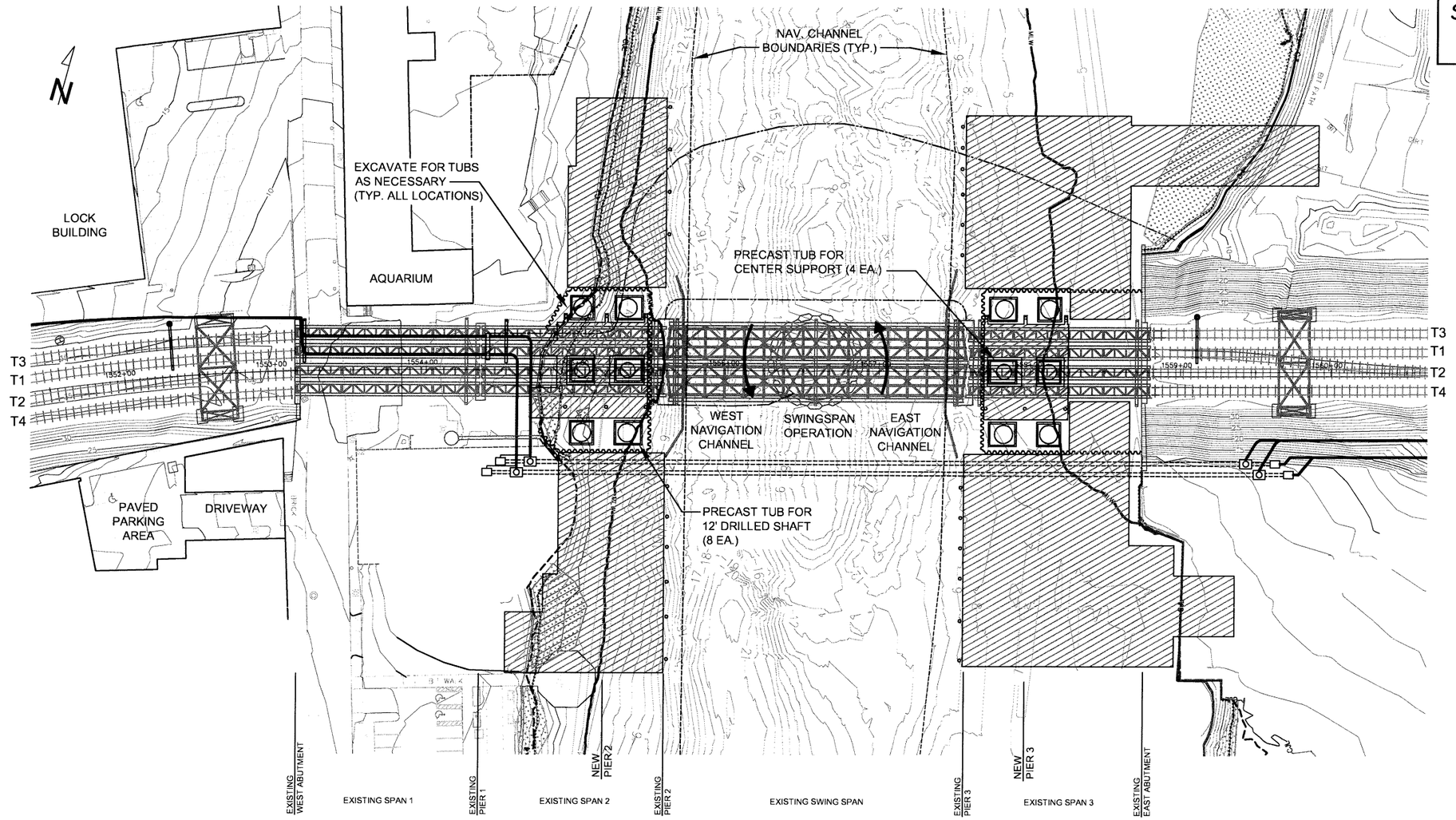
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- REMOVE SUPPORT PILING AND STEEL FOR 12 FT. DIAMETER DRILLED SHAFTS (WITHIN MARINE ENCLOSURES).
- EXCAVATE FOR LIFT PIER PRECAST TUBS AS NECESSARY (WITHIN MARINE ENCLOSURES).
- SET PRECAST TUBS ON 12 FT. DIAMETER DRILLED SHAFTS, SEAL, DEWATER, CUT OFF CASINGS, INSTALL REBAR, AND POUR THE BOXES.
- SET PRECAST TUBS ON 10 FT. DIAMETER CENTER SUPPORTS, SEAL, DEWATER, CUT OFF CASINGS, INSTALL REBAR, AND POUR THE BOXES.
- CONTINUE CONSTRUCTION OF NEW SOUTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 4 - PLAN VIEW

SCALE: 1" = 80'	WALK BRIDGE REPLACEMENT	SHEET 6 OF 24
DATE: 6-5-18		
DRAWN: B.NICHOLS		JOB 3215103
CHECK:	CIANBRO MIDDLESEX A JOINT VENTURE JV	

STAGE 5

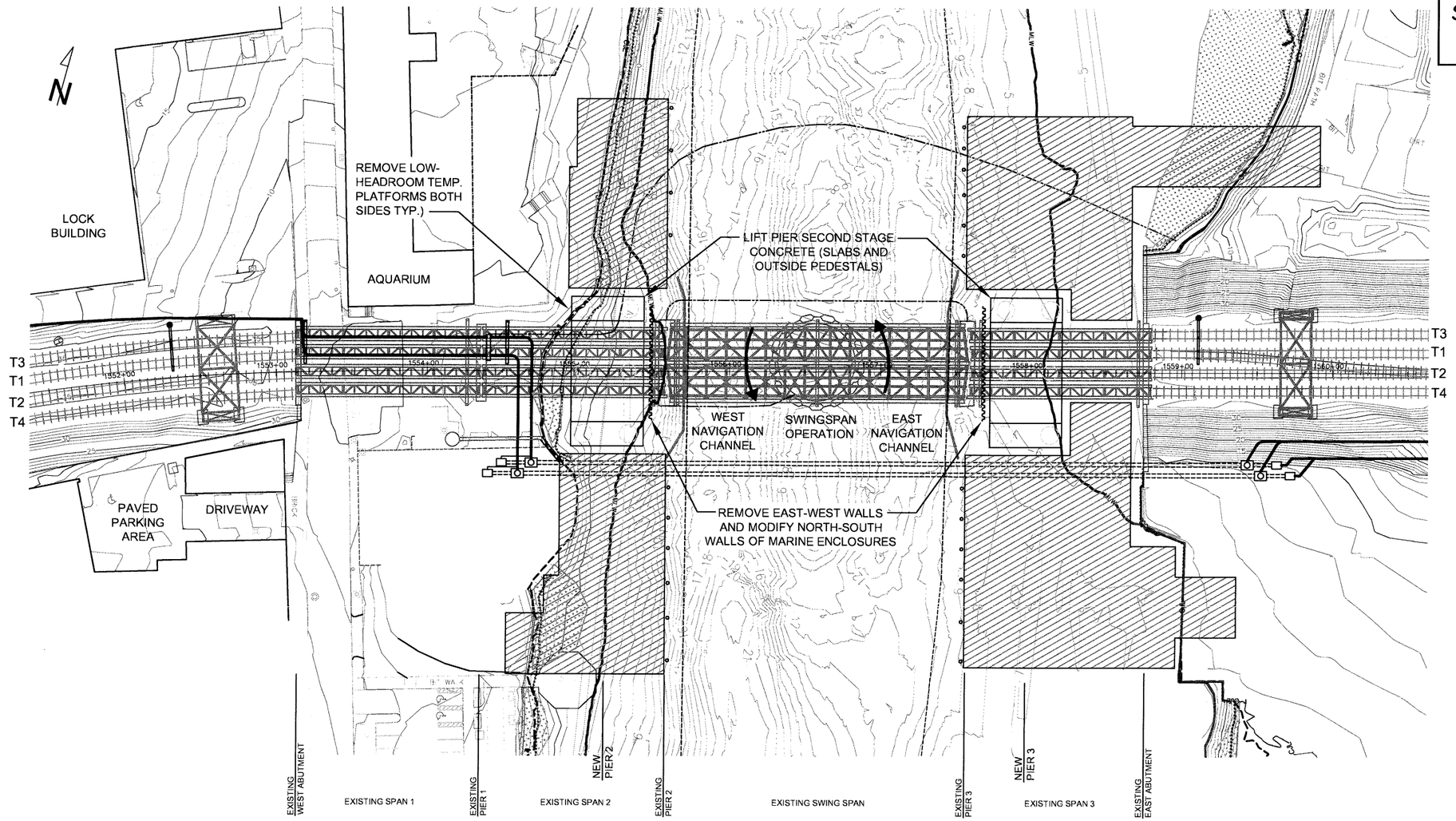
= HTL

= MHW

MLW = MLW

CJL = CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- CONSTRUCT PIER SLABS AND OUTSIDE PEDESTALS AT BOTH LIFT PIERS USING EITHER PRECAST OR CAST-IN-PLACE METHODS. WHEN COMPLETE, THE STRUCTURE UNDER THE BRIDGE WILL BE AT ELEVATION +15.0, AND THE STRUCTURE OUTSIDE OF THE BRIDGE WILL BE AT ELEVATION 24.0 AND READY FOR TOWER CONSTRUCTION.

- REMOVE UNDER-BRIDGE LOW-HEADROOM WORK PLATFORMS AND SUPPORT PILES BELOW THE EAST AND WEST APPROACH SPANS.
- REMOVE EAST-WEST WALLS OF MARINE ENCLOSURES AND SHORTEN NORTH-SOUTH WALLS AS SHOWN
- CONTINUE CONSTRUCTION OF NEW SOUTH LIFT SPAN AT MARINE STAGING YARD.

NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

SCALE
0 20' 40' 60' 80' 120' 160'

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 5 - PLAN VIEW

SCALE: 1" = 80'	WALK BRIDGE REPLACEMENT	SHEET 7 OF 24
DATE: 6-5-18		
DRAWN: B.NICHOLS		JOB 3215103
CHECK:	CIANBRO | MIDDLESEX A JOINT VENTURE LV	

STAGE 6

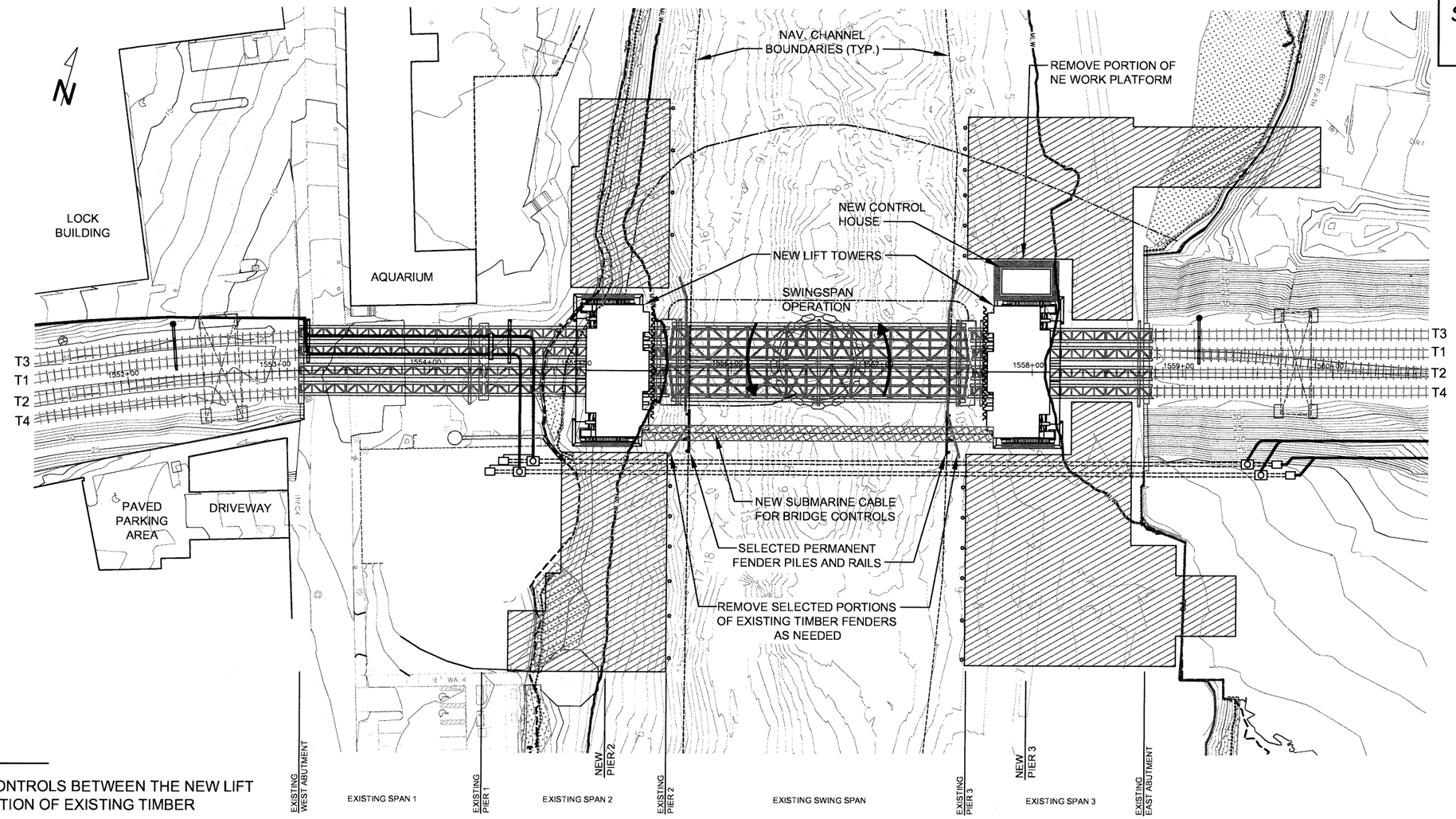
= HTL

= MHW

MLW = MLW

CJL = CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- INSTALL SUBMARINE CABLE FOR BRIDGE CONTROLS BETWEEN THE NEW LIFT PIERS ON THE SOUTH SIDE. DEMOLISH PORTION OF EXISTING TIMBER FENDERS AS NEEDED FOR INSTALLATION.
- INSTALL SELECTED PERMANENT FENDER PILES AND RAILS ON SOUTH SIDE OF BRIDGE AS SHOWN.
- ERECT (2) NEW LIFT TOWERS, INCLUDING COUNTERWEIGHT BOXES, SHEAVES, SHEAVE ROPES, MACHINERY, AND ROOF/HOOD STRUCTURES.

  TOWER ERECTION IS RESTRICTED TO ELEVATION +124 UNTIL HIGH TOWER WIRES ARE COMPLETELY REMOVED. AFTER HIGH TOWER WIRES ARE REMOVED, TOWER ERECTION CAN PROCEED TO FINAL ELEVATION.

- REMOVE PORTION OF NE WORK PLATFORM AS SHOWN.
- BEGIN CONSTRUCTION OF NEW BRIDGE CONTROL HOUSE ON NORTH SIDE.
- CONTINUE CONSTRUCTION OF NEW SOUTH LIFT SPAN AT MARINE STAGING YARD.

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

SCALE
0 20' 40' 60' 80' 120' 160'

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 6 - PLAN VIEW

SCALE: 1" = 80'	SHEET 8 OF 24
DATE: 6-5-18	
DRAWN: B.NICHOLS	JOB 3215103
CHECK:	

WALK BRIDGE REPLACEMENT
CIANBRO | MIDDLESEX a JOINT VENTURE

STAGE 7

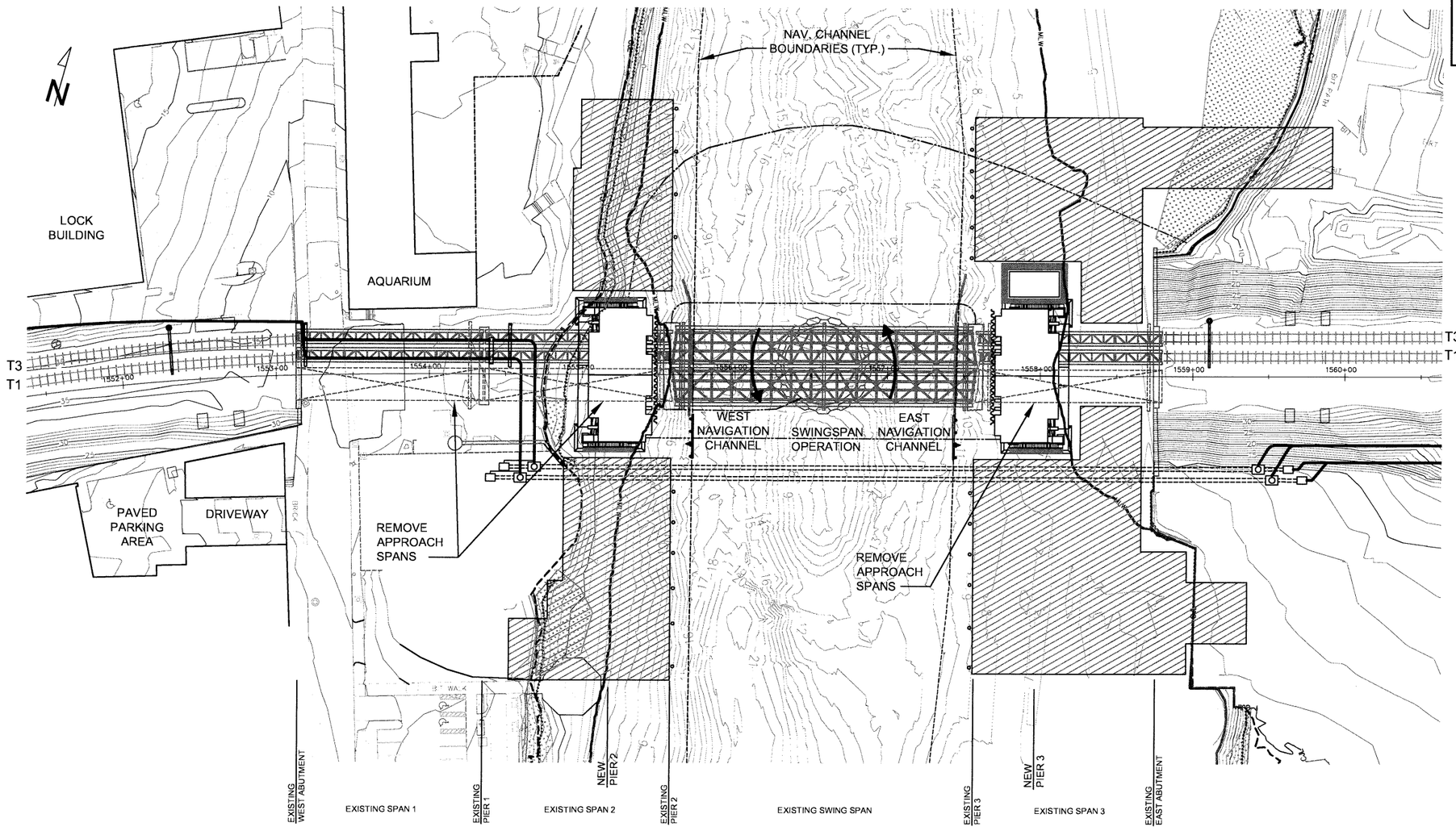
= HTL

= MHW

MLW = MLW

CJL = CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- CLOSE TRACKS 2 & 4 TO RAIL TRAFFIC.
- REMOVE EAST AND WEST APPROACH SPANS FOR TRACKS 2 & 4 (SIX 1-TRACK SPANS TOTAL).
- CONTINUE CONSTRUCTION OF NEW BRIDGE CONTROL HOUSE.
- CONTINUE CONSTRUCTION OF NEW SOUTH LIFT SPAN AT MARINE STAGING YARD.

SCALE

0 20' 40' 60' 80' 120' 160'

NOTES:

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PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 7 - PLAN VIEW

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE LLC

SHEET 9 OF 24

JOB 3215103

STAGE 8

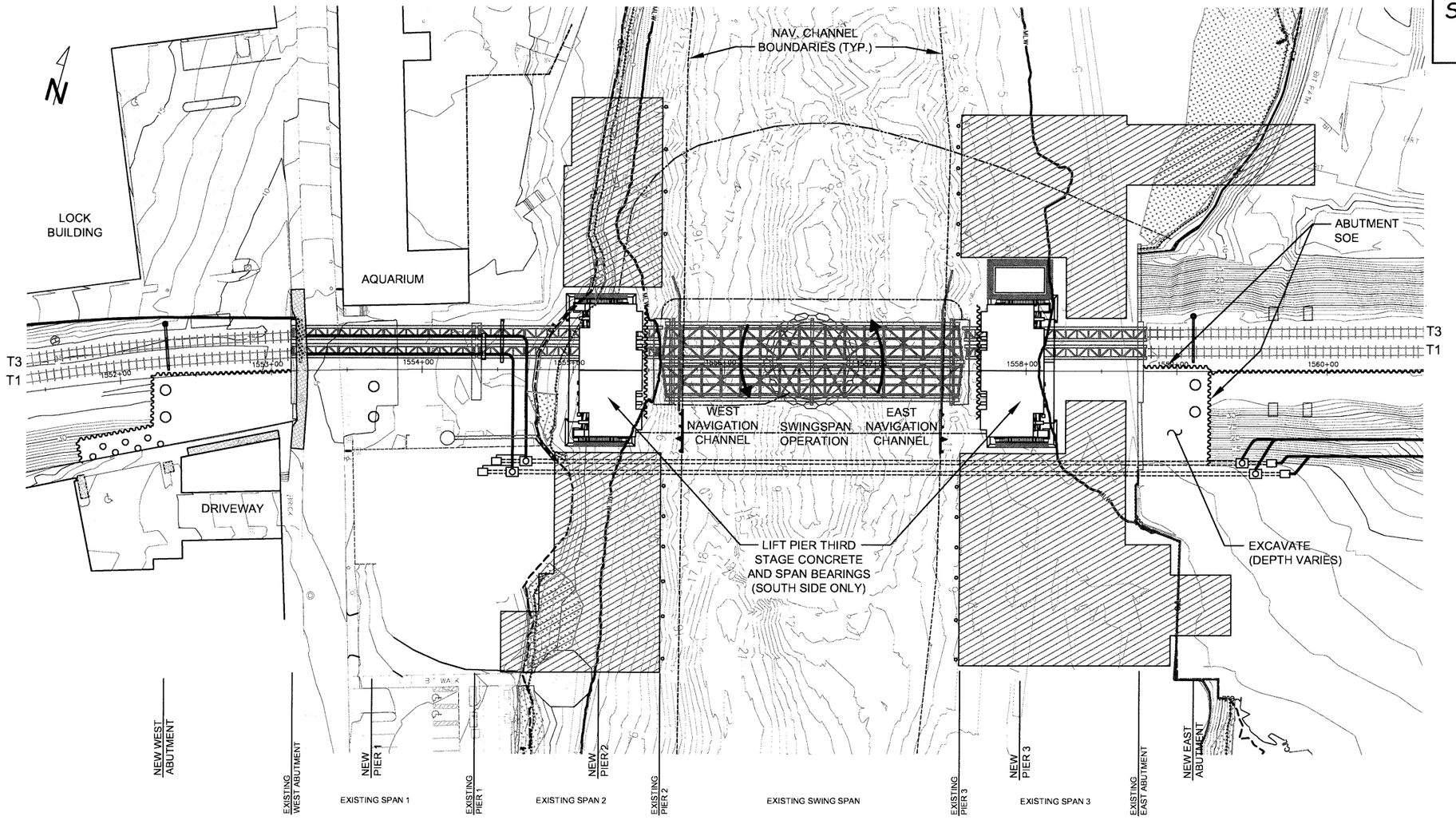
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- FORM, REBAR, AND POUR THE THIRD STAGE CONCRETE ON THE SOUTH SIDE OF BOTH LIFT PIERS AND INSTALL THE NEW SPAN BEARINGS.
- CONTINUE CONSTRUCTION OF NEW BRIDGE CONTROL HOUSE.
- CONTINUE CONSTRUCTION OF NEW SOUTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 8 - PLAN VIEW

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO | MIDDLESEX A JOINT VENTURE, LLC

SHEET 10 OF 24
JOB 3215103

STAGE 9

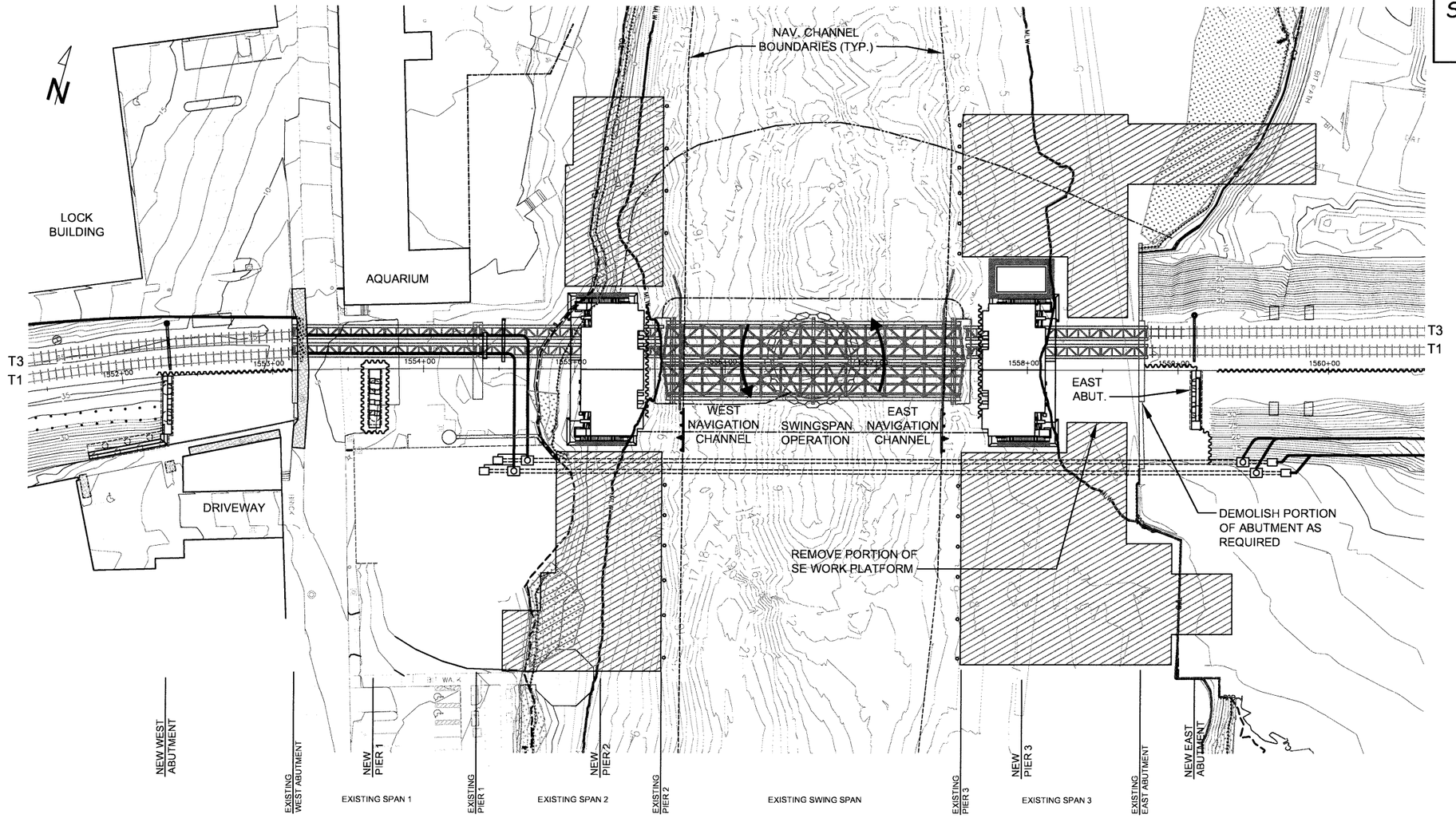
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- BUILD SOUTH HALF OF EAST ABUTMENT. BACKFILL BEHIND STRUCTURE WHEN COMPLETE.
- DEMOLISH PORTIONS OF EXISTING ABUTMENTS AS NEEDED TO MAKE ROOM FOR NEW TRACK 2 AND TRACK 4 SUPERSTRUCTURE.
- REMOVE PORTION OF SE WORK PLATFORM AS SHOWN.
- CONTINUE CONSTRUCTION OF NEW BRIDGE CONTROL HOUSE.
- CONTINUE CONSTRUCTION OF NEW SOUTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 9 - PLAN VIEW

SCALE: 1" = 80'	SHEET 11 OF 24
DATE: 6-5-18	
DRAWN: B.NICHOLS	JOB 3215103
CHECK:	

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE

STAGE 10

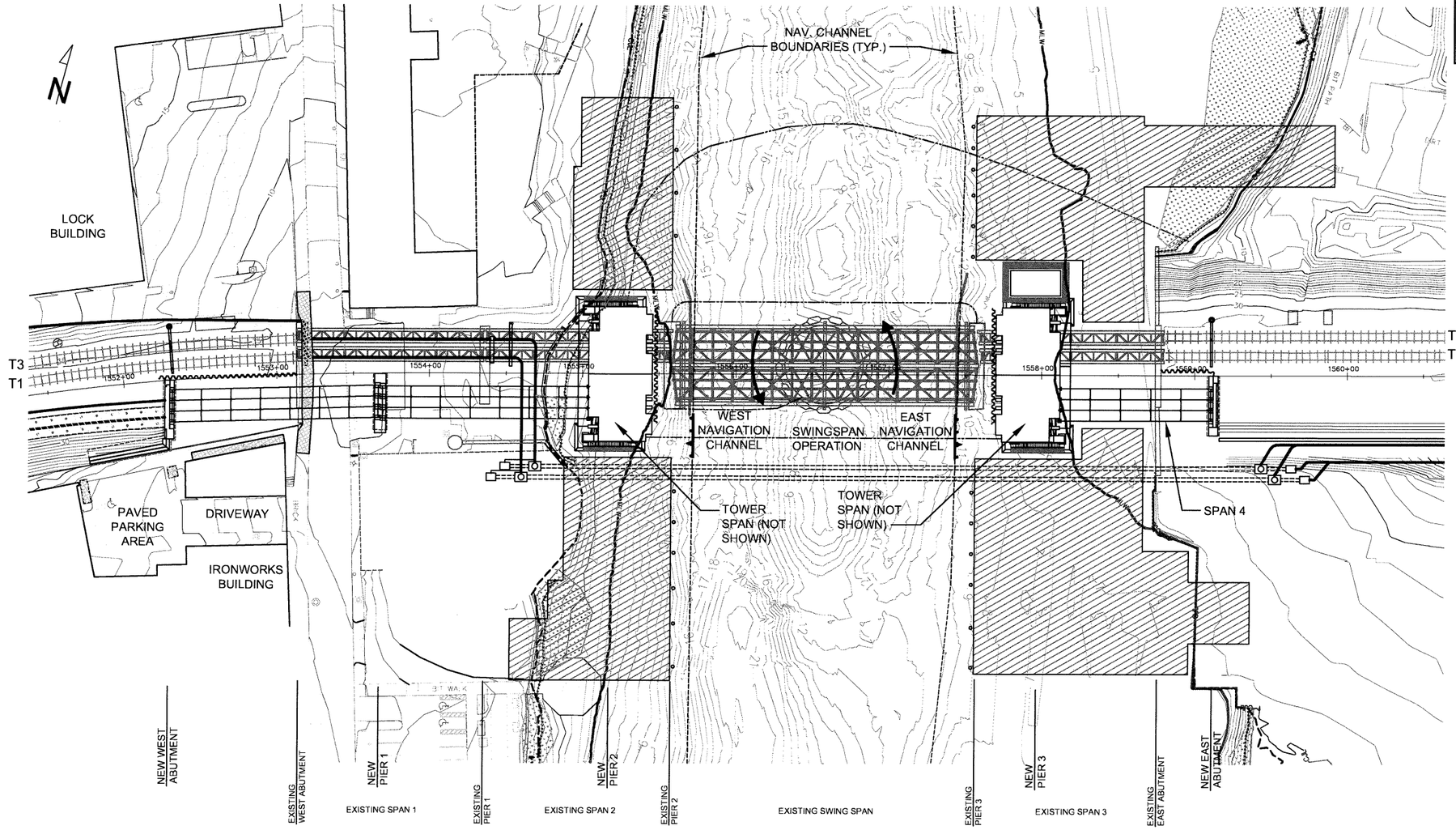
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- SET TOWER SPANS FOR TRACKS 2 & 4 AT LIFT PIERS.
- SET APPROACH SPAN 1, SPAN 2, AND SPAN 4 FOR TRACKS 2 & 4.
- CONTINUE CONSTRUCTION OF NEW BRIDGE CONTROL HOUSE.
- CONTINUE CONSTRUCTION OF NEW SOUTH LIFT SPAN AT MARINE STAGING YARD.

SCALE

0 20' 40' 60' 80' 120' 160'

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 10 - PLAN VIEW

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE LLC

SHEET 12 OF 24

JOB 3215103

NOTES:

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PRELIMINARY

STAGE 11

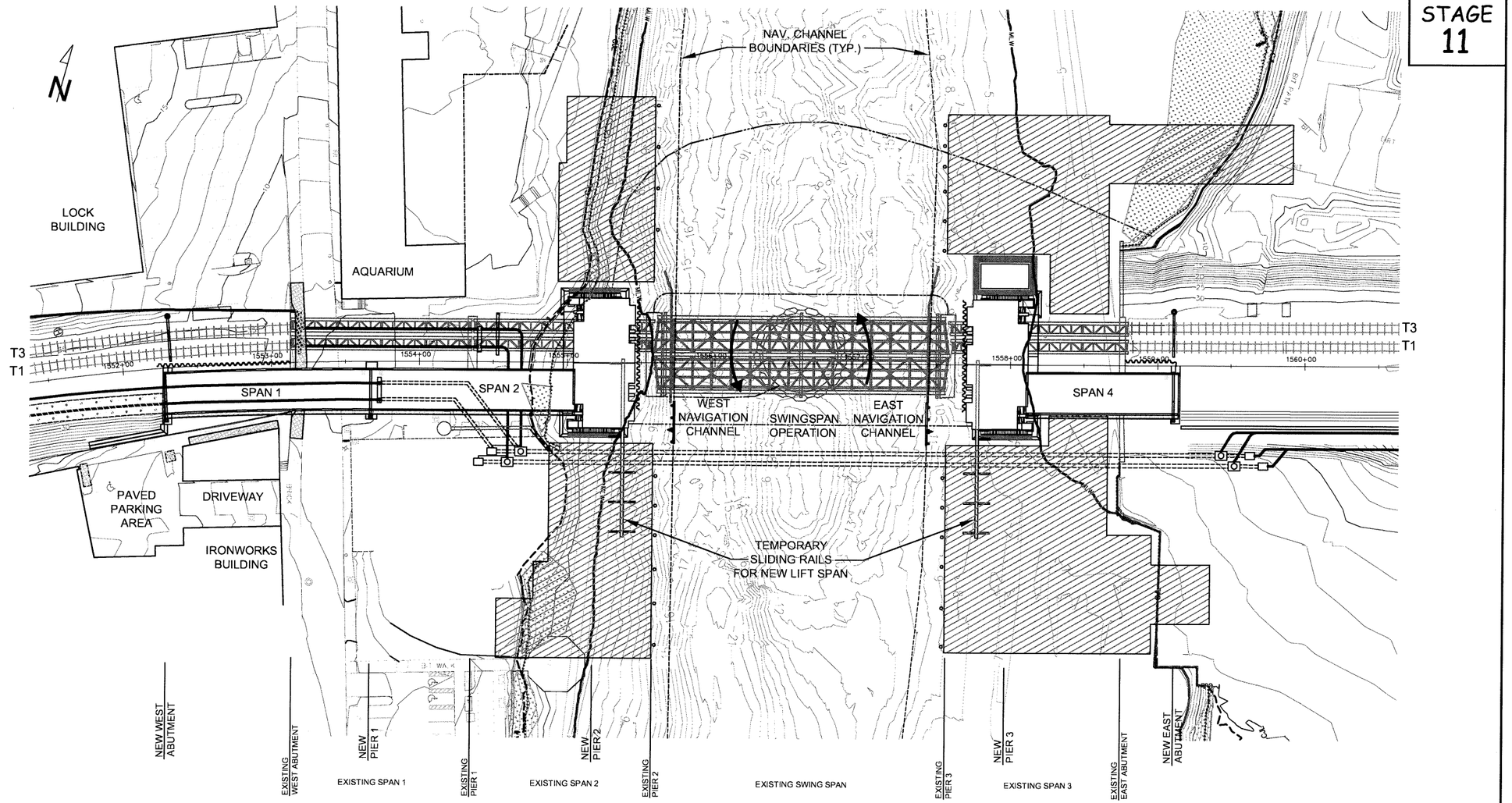
= HTL

= MHW

MLW = MLW

CJL = CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- INSTALL CONCRETE DECKS AND WALKWAYS FOR NEW APPROACH SPANS 1, 2, AND 4 AND NEW TOWER SPANS.
- BUILD SLIDING RAILS FOR NEW SOUTH LIFT SPAN INSTALLATION OPERATION.
- COMPLETE CONSTRUCTION OF NEW SOUTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE II - PLAN VIEW

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE LLC

SHEET 13 OF 24
JOB 3215103

STAGE 12

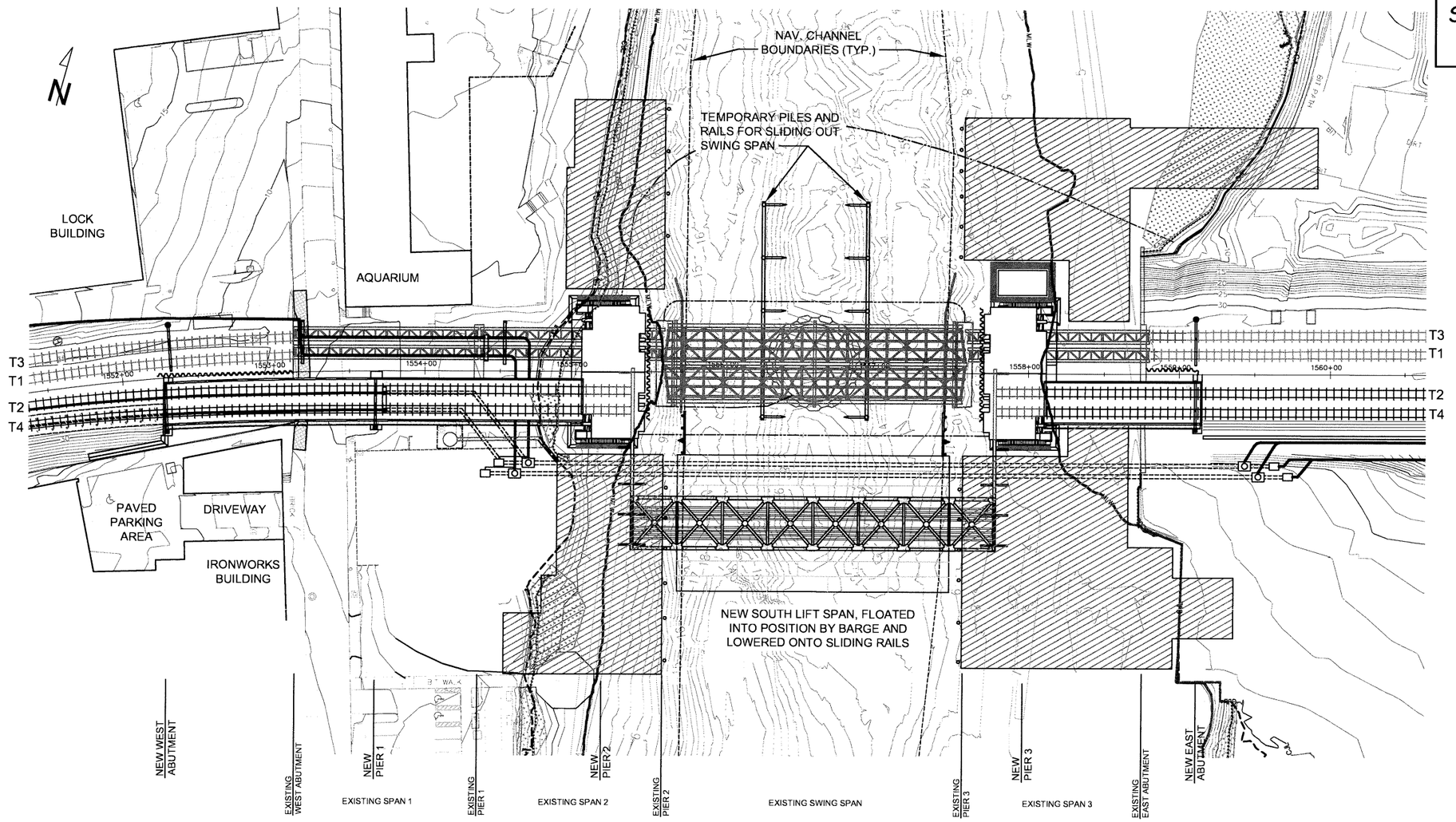
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- CLOSE BOTH NAVIGATION CHANNELS AND INSTALL PILING AND RAILS FOR SWING SPAN SLIDE-OUT OPERATION (OPEN SWING SPAN AS NEEDED TO INSTALL PILING BENEATH IT).
- FLOAT BARGE WITH NEW SOUTH LIFT SPAN INTO PLACE SOUTH OF BRIDGE, AND TRANSFER SPAN TO SLIDING RAILS. REMOVE BARGE.

TEMPORARY PILING FOR SWING SPAN SLIDE-OUT :

10 EACH 30" DIAMETER BEARING PILES
8 EACH HP14 BATTER PILES

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 12 - PLAN VIEW

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE LLC

SHEET 14 OF 24
JOB 3215103

STAGE 13

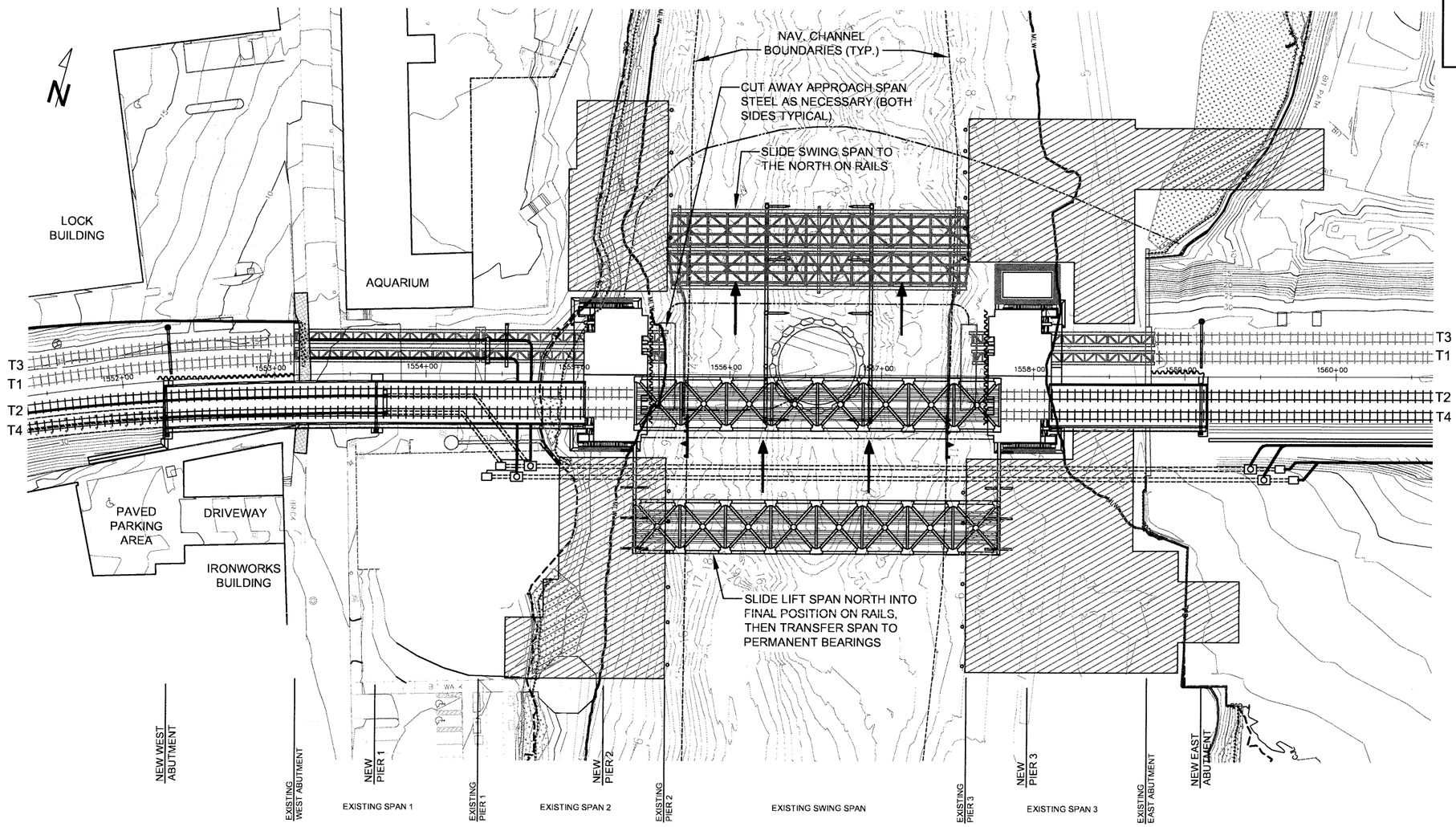
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- BEGIN 96-HOUR 4-TRACK SHUTDOWN BY CLOSING TRACKS 1 & 3 TO RAIL TRAFFIC.
- CUT AWAY APPROACH STEEL THAT INTERFERES WITH SWING SPAN SLIDEOUT.
- SLIDE SWING SPAN TO THE NORTH ON RAILS AS SHOWN.
- SLIDE NEW LIFT SPAN TO THE NORTH ON RAILS UNTIL IT IS DIRECTLY ABOVE FINAL POSITION, THEN JACK THE SPAN UP, REMOVE RAILS BELOW IT, AND SET SPAN DOWN ONTO THE PERMANENT BEARINGS.
- OPEN TRACKS 2 & 4 TO RAIL TRAFFIC.
- BEGIN CONSTRUCTION OF NEW NORTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 13 - PLAN VIEW

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO | MIDDLESEX A JOINT VENTURE

SHEET 15 OF 24
JOB 3215103

STAGE 14

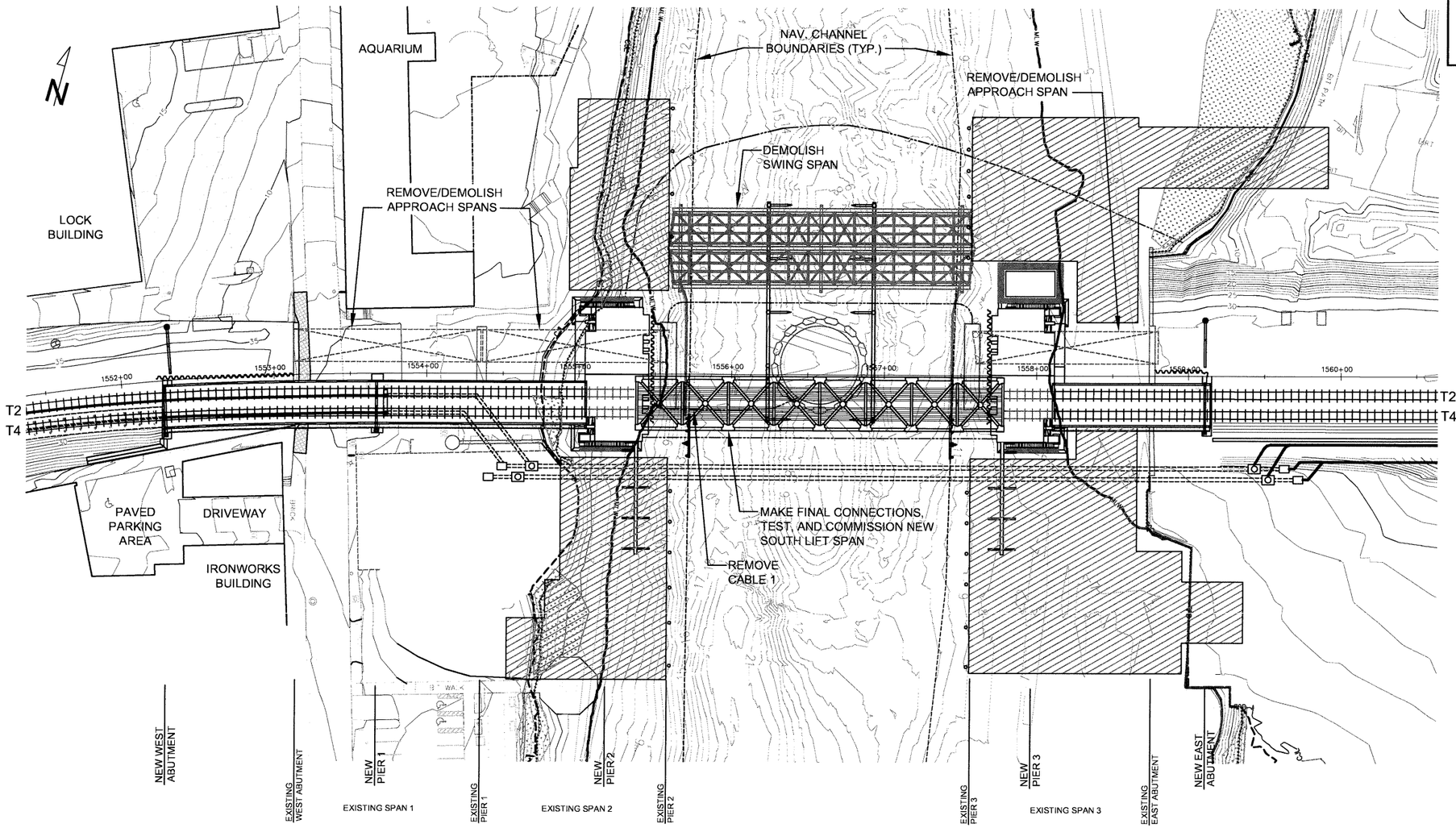
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- REMOVE DEACTIVATED SUBMARINE BRIDGE CABLE ON THE SOUTH SIDE (CABLE 1).
- CONNECT COUNTERWEIGHTS TO SOUTH LIFT SPAN.
- MAKE FINAL MECHANICAL AND ELECTRICAL CONNECTIONS TO LIFT SPAN. ALIGN, TEST, AND COMMISSION SPAN.
- DEMOLISH SWING SPAN IN PLACE ON RAILS, USING CRANES OR EXCAVATORS ON WORK PLATFORMS.
- REMOVE EAST AND WEST APPROACH SPANS FOR TRACKS 1 & 3 (SIX 1-TRACK SPANS TOTAL).
- CONTINUE CONSTRUCTION OF NEW NORTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

1. VERTICAL DATUM IS NAVD88.
2. NEW CONSTRUCTION DETAILS ARE FROM HNTB PRELIMINARY DESIGN PLANS DATED 3-27-2017, WITH SELECTED UPDATES BASED ON MORE RECENT INFORMATION FROM HNTB.
3. EQUIPMENT AND BARGES NOT SHOWN. FOR BARGE PLACEMENT INFORMATION, SEE CMJV PRELIMINARY BARGE MOORING & MOVEMENT PLAN DATED 6-5-2018.
4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 14 - PLAN VIEW

SCALE: 1" = 80'	WALK BRIDGE REPLACEMENT	SHEET 16 OF 24
DATE: 6-5-18	CIANBRO | MIDDLESEX A JOINT VENTURE NY	JOB 3215103
DRAWN: B.NICHOLS		
CHECK:		

STAGE 15

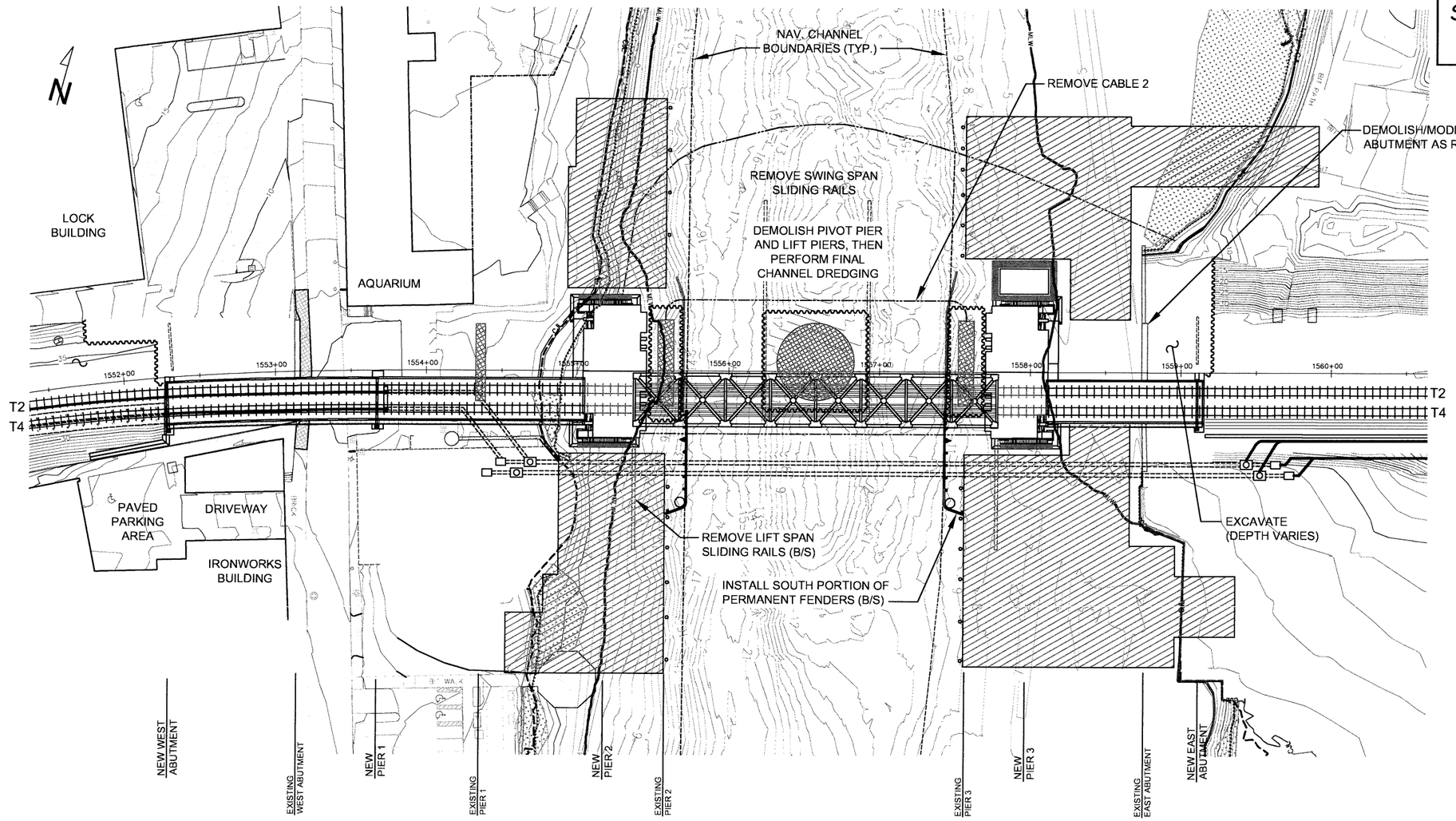
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- REMOVE SWING SPAN SLIDING RAILS AND LIFT SPAN SLIDING RAILS.
- INSTALL MARINE ENCLOSURES AROUND RIVER PIERS.
- DEMOLISH PIVOT PIER, BOTH REST PIERS, AND EXISTING PIER 1. REMOVE MARINE ENCLOSURES WHEN FINISHED, AND DREDGE CHANNEL TO FINAL DEPTH.
- REMOVE/DEMOLISH SUBMARINE CABLE 2.
- DEMOLISH EXISTING ABUTMENTS TO EXTENTS REQUIRED.
- INSTALL AS MUCH OF THE SOUTH PORTION OF THE PERMANENT FENDER SYSTEM AS POSSIBLE.
- CONTINUE CONSTRUCTION OF NEW NORTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

1. VERTICAL DATUM IS NAVD88.
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3. EQUIPMENT AND BARGES NOT SHOWN. FOR BARGE PLACEMENT INFORMATION, SEE CMJV PRELIMINARY BARGE MOORING & MOVEMENT PLAN DATED 6-5-2018.
4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 15 - PLAN VIEW

SCALE:	1" = 80'
DATE:	6-5-18
DRAWN:	B.NICHOLS
CHECK:	

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE LLC

SHEET 17 OF 24

JOB 3215103

STAGE 16

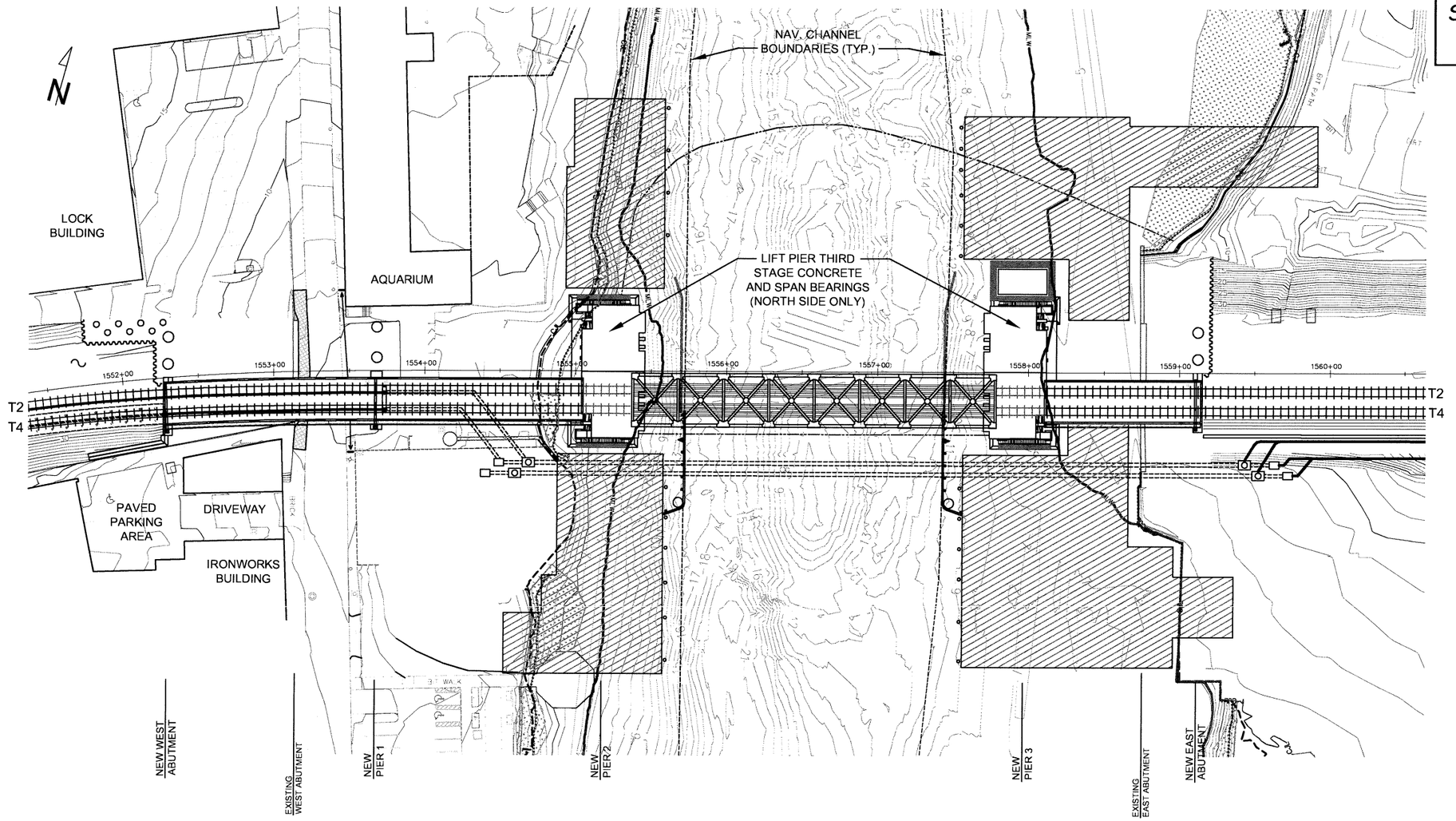
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- OPEN NEW FULL-WIDTH NAVIGATION CHANNEL.
- FORM, REBAR, AND POUR THE THIRD STAGE CONCRETE ON THE NORTH SIDE OF BOTH LIFT PIERS AND INSTALL THE NEW SPAN BEARINGS.
- CONTINUE CONSTRUCTION OF NEW NORTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

1. VERTICAL DATUM IS NAVD88.
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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE FOR IN-WATER WORK ONLY

STAGE 16 - PLAN VIEW

SCALE:	1" = 80'
DATE:	6-5-18
DRAWN:	B.NICHOLS
CHECK:	

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE LLC

SHEET 18 OF 24

JOB 3215103

STAGE 17

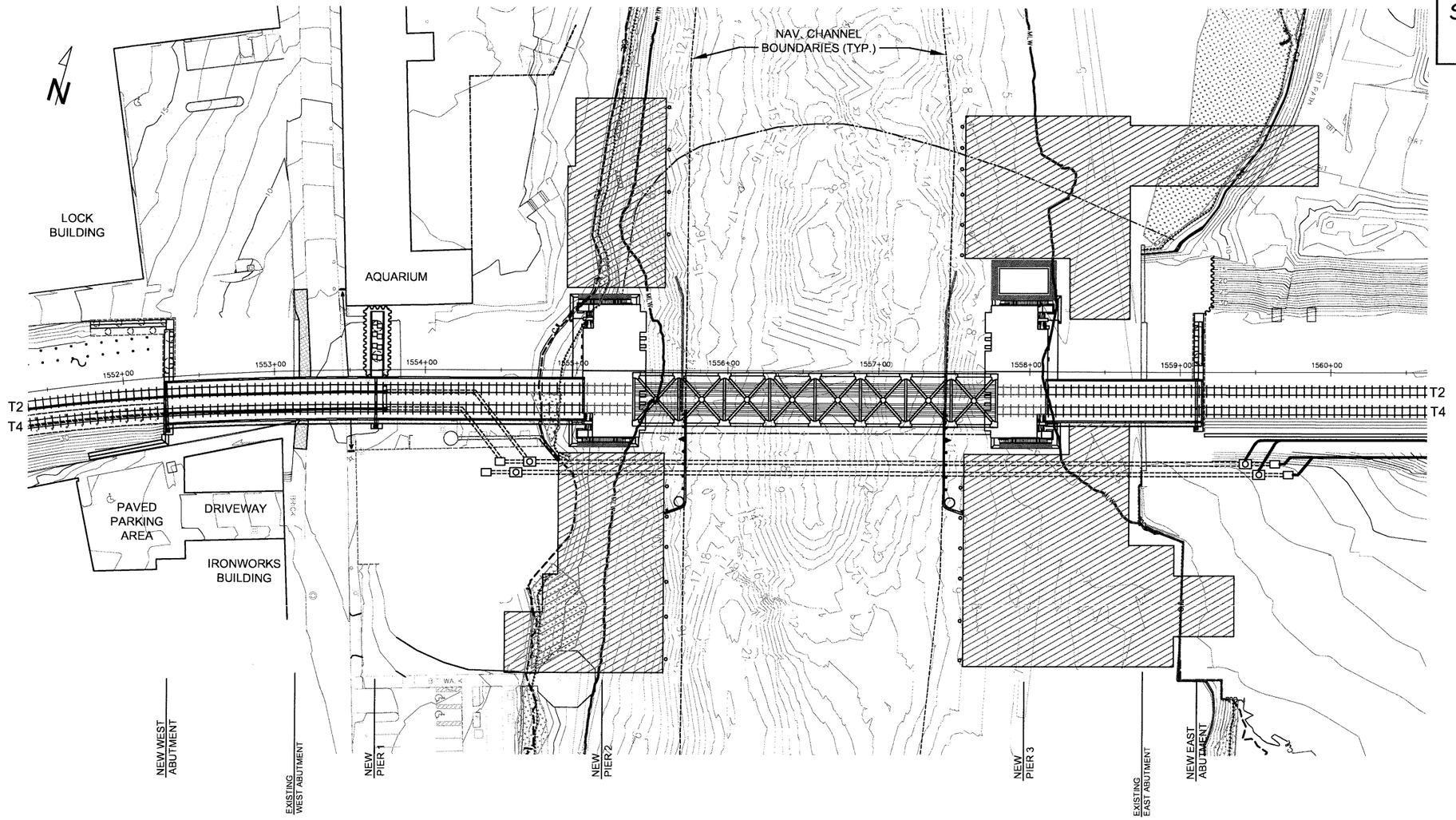
= HTL

= MHW

MLW = MLW

CJL = CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- BUILD NORTH HALF OF EAST ABUTMENT. BACKFILL BEHIND STRUCTURE WHEN COMPLETE.
- CONTINUE CONSTRUCTION OF NEW NORTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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2. NEW CONSTRUCTION DETAILS ARE FROM HNTB PRELIMINARY DESIGN PLANS DATED 3-27-2017, WITH SELECTED UPDATES BASED ON MORE RECENT INFORMATION FROM HNTB.
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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 17 - PLAN VIEW

SCALE: 1" = 80'	WALK BRIDGE REPLACEMENT	SHEET 19 OF 24
DATE: 6-5-18		
DRAWN: B.NICI-OLS	CIANBRO MIDDLESEX A JOINT VENTURE LLC	JOB 3215103
CHECK:		

STAGE 18

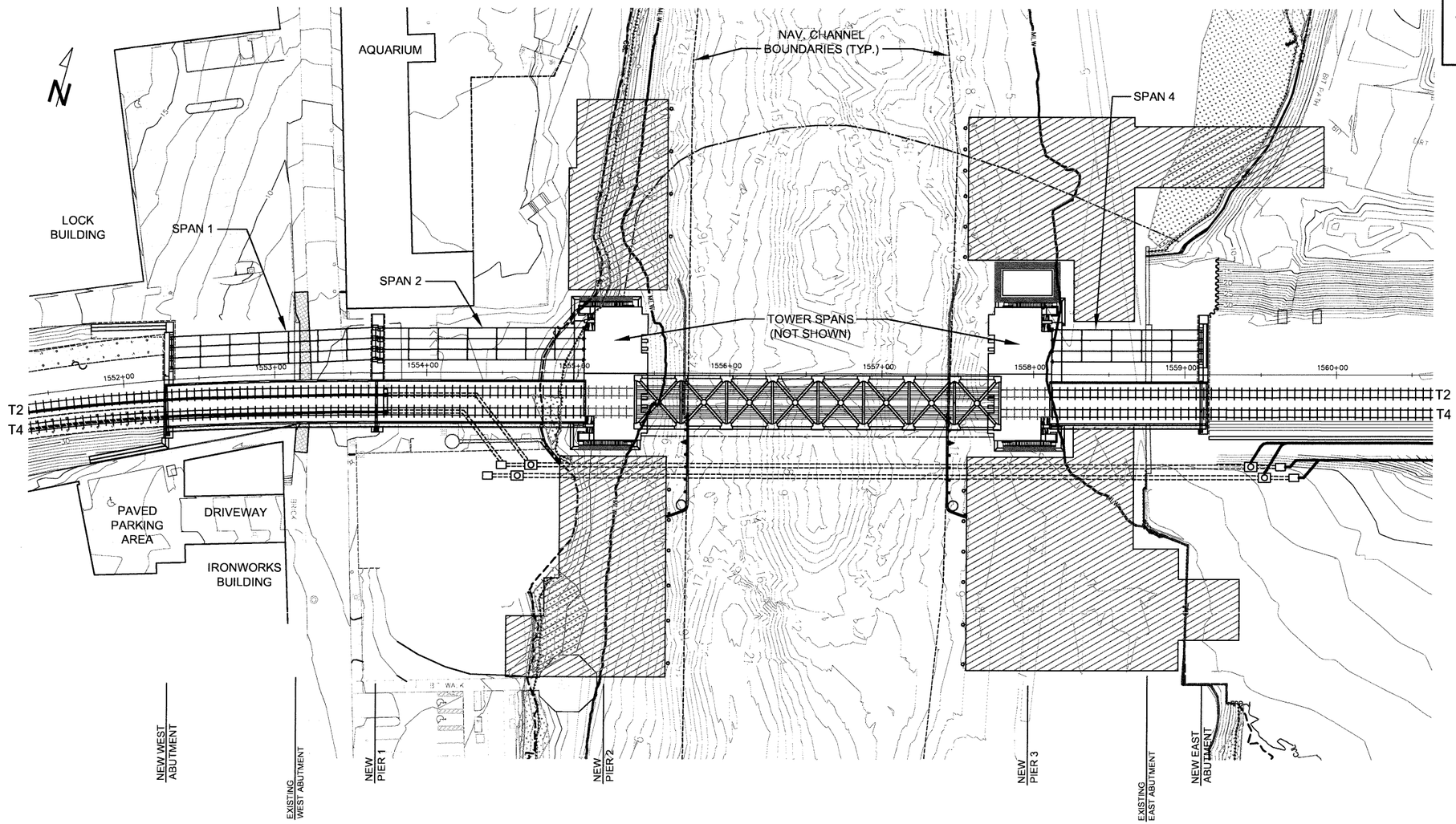
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- SET TOWER SPANS FOR TRACKS 1 & 3 AT LIFT PIERS.
- SET APPROACH SPAN 1, SPAN 2, AND SPAN 4 FOR TRACKS 1 & 3.
- CONTINUE CONSTRUCTION OF NEW NORTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

1. VERTICAL DATUM IS NAVD88.
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3. EQUIPMENT AND BARGES NOT SHOWN. FOR BARGE PLACEMENT INFORMATION, SEE CMJV PRELIMINARY BARGE MOORING & MOVEMENT PLAN DATED 6-5-2018.
4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 18 - PLAN VIEW

SCALE: 1" = 80'	SHEET 20 OF 24
DATE: 6-5-18	
DRAWN: B.NICHOLS	JOB 3215103
CHECK:	

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE, LLC

STAGE 19

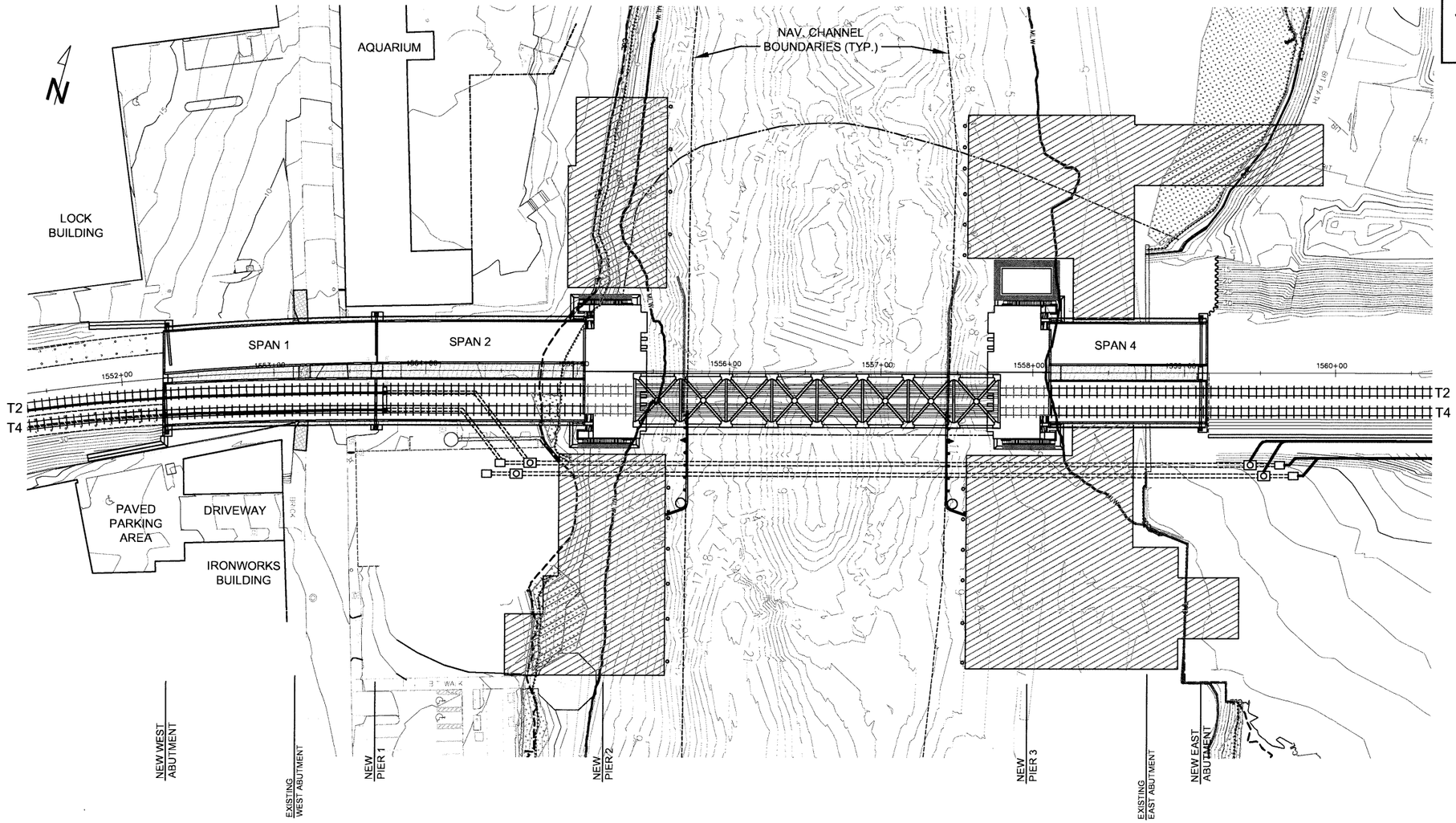
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- INSTALL CONCRETE DECKS AND WALKWAYS FOR NEW APPROACH SPANS 1, 2, AND 4 AND NEW TOWER SPANS.
- COMPLETE CONSTRUCTION OF NEW NORTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

1. VERTICAL DATUM IS NAVD88.
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3. EQUIPMENT AND BARGES NOT SHOWN. FOR BARGE PLACEMENT INFORMATION, SEE CMJV PRELIMINARY BARGE MOORING & MOVEMENT PLAN DATED 6-5-2018.
4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 19 - PLAN VIEW

SCALE: 1" = 80'	SHEET 21 OF 24
DATE: 6-5-18	
DRAWN: B.NICHOLS	JOB 3215103
CHECK:	

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE JV

STAGE 20

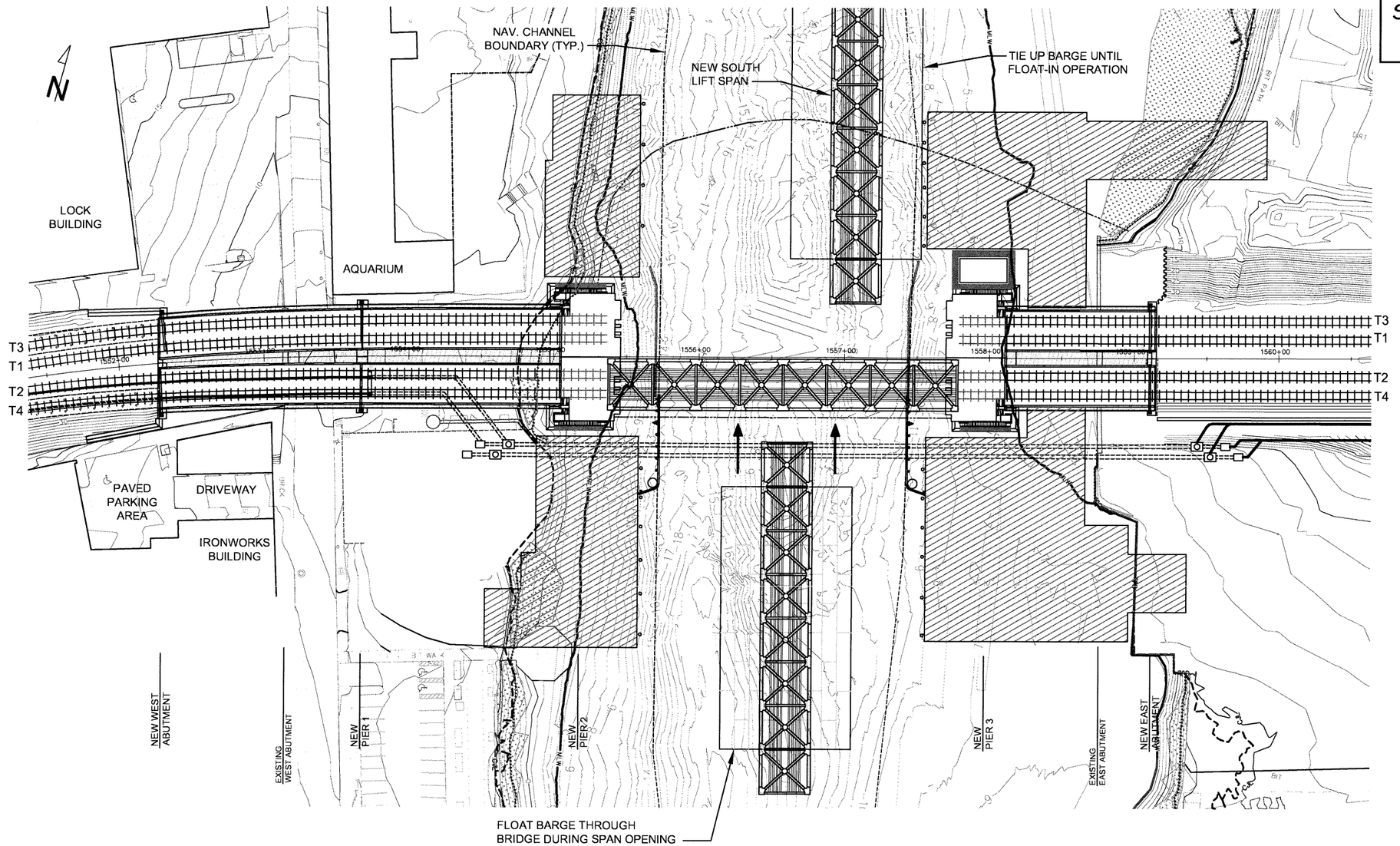
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- FLOAT BARGE WITH NEW LIFT SPAN THROUGH BRIDGE DURING SPAN OPENING AND TIE BARGE UP TEMPORARILY AT NE WORK PLATFORM.
- USE JACKING TOWERS TO RAISE LIFT SPAN (ON BARGE) TO HEIGHT NEEDED FOR FLOAT-IN OPERATION.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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3. EQUIPMENT AND BARGES NOT SHOWN. FOR BARGE PLACEMENT INFORMATION, SEE CMJV PRELIMINARY BARGE MOORING & MOVEMENT PLAN DATED 6-5-2018.
4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 20 - PLAN VIEW

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE, LLC

SHEET 22 OF 24
JOB 3215103

STAGE 21

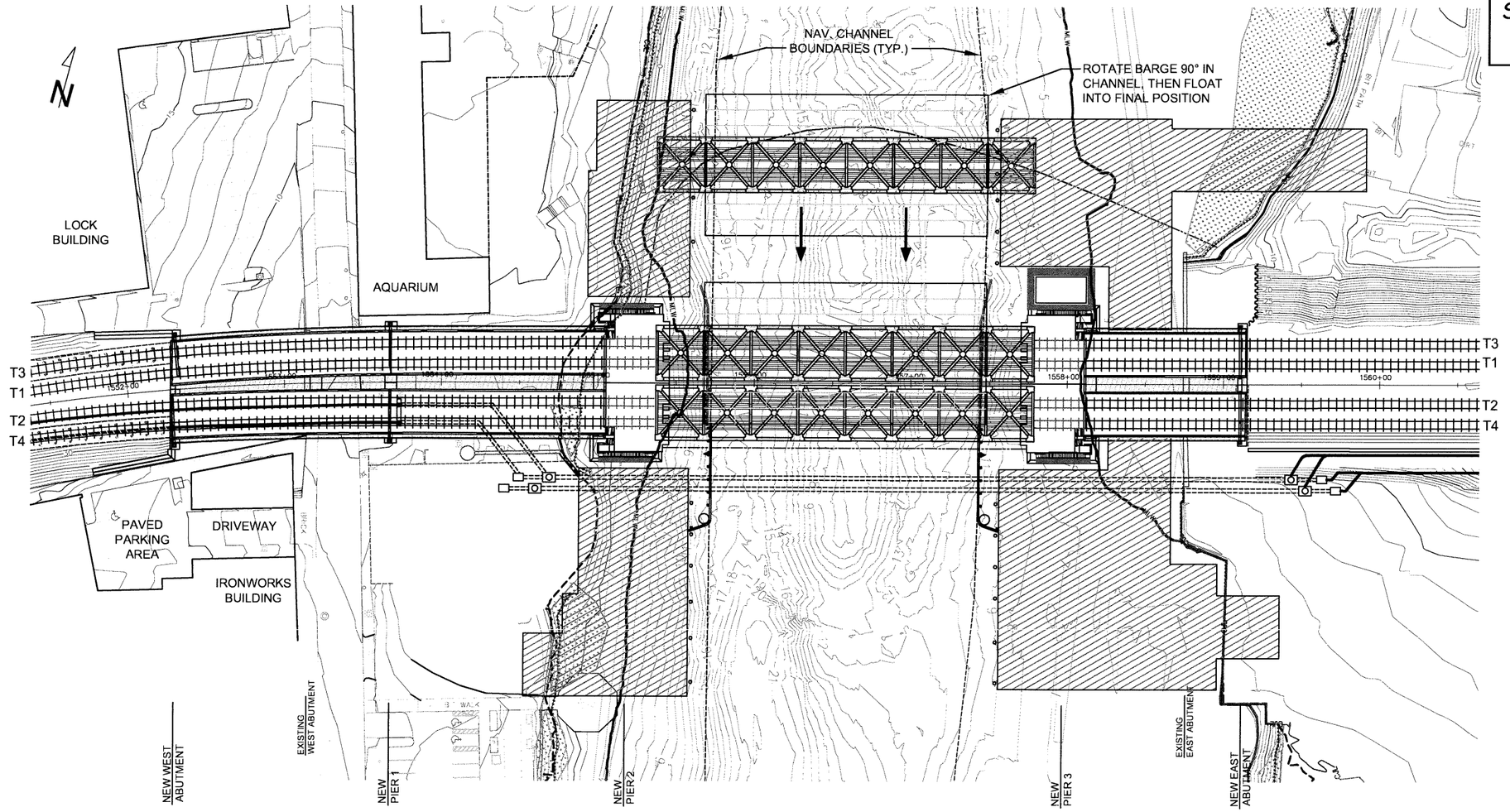
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- FLOAT LIFT SPAN BARGE INTO DEEP WATER CHANNEL NORTH OF THE BRIDGE, ROTATE IT 90°, THEN FLOAT IT BETWEEN NEW PIERS UNTIL LIFT SPAN IS IN FINAL POSITION.
- JACK LIFT SPAN DOWN ONTO PERMANENT BEARINGS AND REMOVE BARGE.
- CONNECT COUNTERWEIGHTS TO NORTH LIFT SPAN.
- MAKE FINAL MECHANICAL AND ELECTRICAL CONNECTIONS TO NORTH LIFT SPAN. ALIGN, TEST, AND COMMISSION SPAN.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

1. VERTICAL DATUM IS NAVD88.
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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 21 - PLAN VIEW

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE

SHEET 23 OF 24
JOB 3215103

STAGE 22

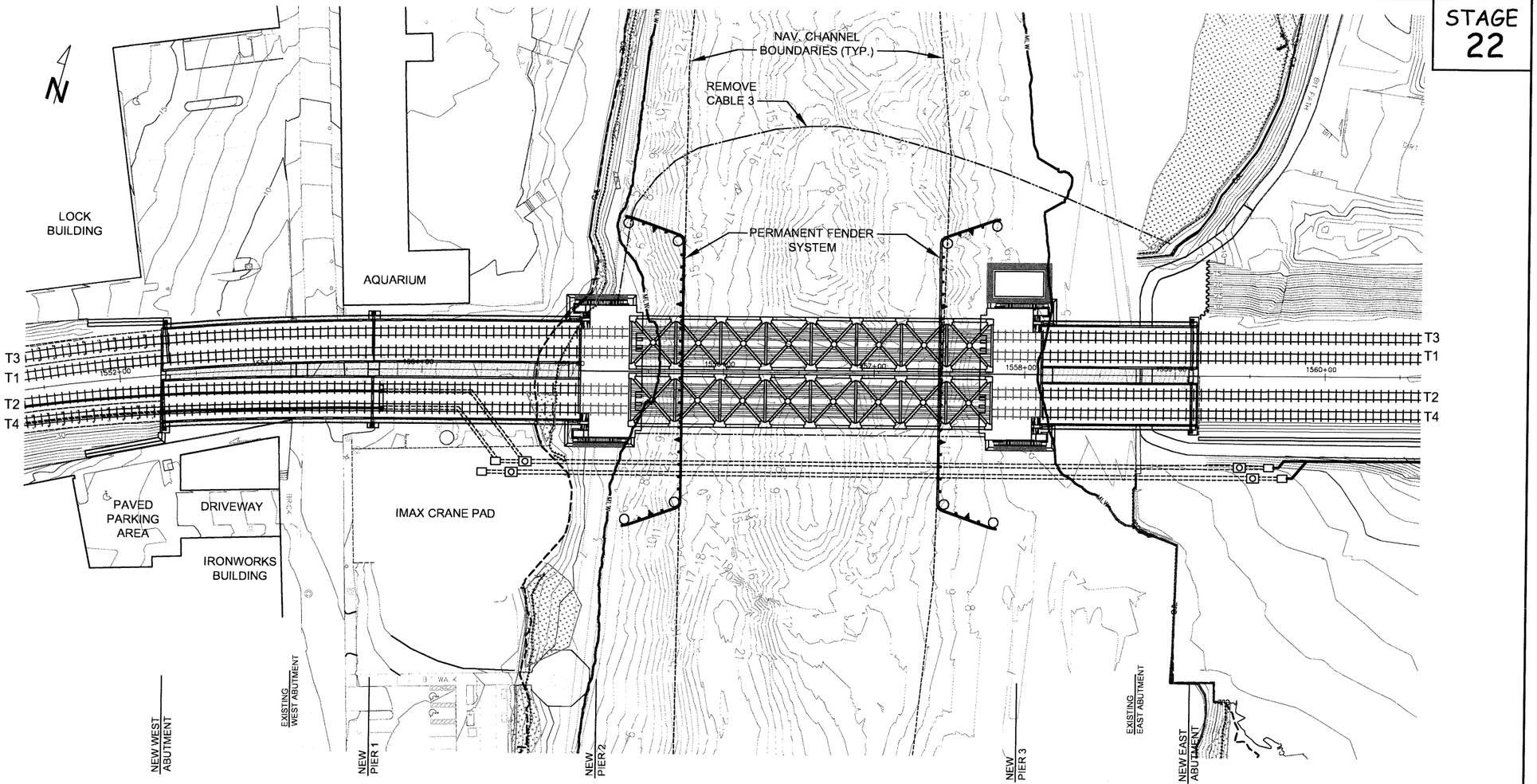
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- COMPLETE INSTALLATION OF PERMANENT FENDER SYSTEM.
- REMOVE DEACTIVATED SUBMARINE BRIDGE CABLE ON THE NORTH SIDE (CABLE 3).
- DEMOBILIZE ALL EQUIPMENT FROM WORK PLATFORMS AND REMOVE PLATFORMS.
- DEMOBILIZE ALL EQUIPMENT FROM MARINE STAGING YARD, INSTALL PERMANENT BULKHEAD (80 PZ35 SHEETPILES), AND REMOVE TRESTLE. (SEE DRAWING 3 OF 24 FOR APPROXIMATE LOCATION OF PERMANENT BULKHEAD).
- RESTORE IMAX CRANE PAD TO CONDITION REQUIRED.

NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

SCALE
0 20' 40' 60' 80' 120' 160'

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 22 - PLAN VIEW

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO | MIDDLESEX A JOINT VENTURE LLC

SHEET 24 OF 24
JOB 3215103

AQUARIUM

POTENTIAL CARGO BARGE MOORING LOCATIONS

NW WORK PLATFORM

NE WORK PLATFORM

HTL

SW WORK PLATFORM

SE WORK PLATFORM

CARGO BARGES WILL NOT BE MOORED AT EAST AND WEST CHANNEL SIMULTANEOUSLY

POTENTIAL CARGO BARGE MOORING LOCATIONS

CJL

HTL

RELOCATED VESSEL DOCK

NAV. CHANNEL BOUNDARY

BARGE MOVEMENTS

BARGE MOVEMENTS

NAV. CHANNEL BOUNDARY

TIDAL VEGETATED WETLAND AREAS

MHW

DRAFT

WASHINGTON STREET

MHW

MLW

MLW

CJL

POTENTIAL CARGO BARGE MOORING LOCATION (IN PLACE OF FLOAT-IN BARGE)

MARINE STAGING YARD

POTENTIAL CARGO BARGE MOORING LOCATION (SHORT TERM ONLY)

NAV. CHANNEL BOUNDARY

ACCESS TRESTLE

LIFT SPAN ASSEMBLY & FLOAT-IN BARGE: 90' x 180'

NORWALK RIVER

TYPICAL POTENTIAL CARGO BARGES

NOTE: THIS PLAN SHOWS POSSIBLE BARGE MOVEMENTS FOR ALL CONSTRUCTION STAGING EXCEPT STAGES 12, 20 & 21.

WALK BRIDGE CONSTRUCTION PRELIMINARY BARGE MOORING & MOVEMENT PLAN 6 - 5 - 2018

TYPICAL CARGO BARGE SIZES

- 72' x 54'
- 90' x 30'
- 110' x 30'
- 110' x 40'
- 120' x 40'
- 120' x 50' (shown here)
- 140' x 40'
- 150' x 40'
- 160' x 54'
- 180' x 54'
- 200' x 40'
- 250' x 54'
- 280' x 54'

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIMINARY BARGE MOORING/MOVEMENT LAYOUT

TYPICAL POTENTIAL CARGO BARGES

SCALE:	1" = 100'
DATE:	6-5-18
DRAWN:	D. MALLEN
CHECK:	

WALK BRIDGE REPLACEMENT

CIANBRO MIDDLESEX A JOINT VENTURE XV

SHEET BARGE-1

JOB 3215103

AQUARIUM

POTENTIAL CARGO BARGE MOORING LOCATIONS

NW WORK PLATFORM

NE WORK PLATFORM

POTENTIAL RESPECT BARGE MOORING LOCATION

SW WORK PLATFORM

SE WORK PLATFORM

CARGO BARGE (USED FOR EITHER MOORING LOCATION)

CJL

HTL

POTENTIAL RESPECT BARGE MOORING LOCATION

HTL

NAV. CHANNEL BOUNDARY

BARGE MOVEMENTS

NAV. CHANNEL BOUNDARY

MHW

RELOCATED VESSEL DOCK

TIDAL VEGETATED WETLAND AREAS

WASHINGTON STREET

MHW

MLW

MLW

BARGE MOVEMENTS

CJL

POTENTIAL CARGO BARGE MOORING LOCATION

NAV. CHANNEL BOUNDARY

MARINE STAGING YARD

LIFT SPAN ASSEMBLY & FLOAT-IN BARGE: 90' x 180'

ACCESS TRESTLE

NORWALK RIVER

NOTE: THIS PLAN SHOWS POSSIBLE BARGE MOVEMENTS FOR CONSTRUCTION STAGES 3, 18 & 22.

POTENTIAL LOCATIONS FOR RESPECT BARGE

DRAFT

RESPECT BARGE:

200' x 74' BARGE WITH 4100 RINGER CRANE

CARGO BARGES:

SEE SHEET BARGE-1 FOR TYPICAL CARGO BARGE SIZES

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIMINARY BARGE MOORING/MOVEMENT LAYOUT

RESPECT BARGE WITH RINGER CRANE

SCALE: 1" = 100'
DATE: 6-5-18
DRAWN: D. MALLEN
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE XV

SHEET BARGE-2

JOB 3215103

TO DEVINE BROS. BULKHEAD

PA-2 AREA OF PHRAGMITES TREATMENT (NO BARGES)

NOTE: SEE DWG. 7 FOR LOCATION OF DEVINE BROS. BULKHEAD

PA-3 SPARTINA ALTERNIFLORA MARSH RESTORATION (NO BARGES)

PA-4 AREA OF PHRAGMITES TREATMENT (NO BARGES)

MLW

PA-6 AREA OF PHRAGMITES TREATMENT (NO BARGES)

MLW

CJL

PA-7 SPARTINA ALTERNIFLORA MARSH RESTORATION (NO BARGES)

CJL

INTERTIDAL HABITAT/ TIDAL MARSH REMEDIATION (RIPRAP) AREA

AQUARIUM

EQUIPMENT BARGE

MATERIAL BARGE

POTENTIAL BARGE MOVEMENTS

HTL

EXISTING WALK RR SWING BRIDGE

GOLDSTEIN PLACE

NORWALK RIVER

NAV. CHANNEL BOUNDARY

NAV. CHANNEL BOUNDARY

PA-9 AREA OF PHRAGMITES TREATMENT (NO BARGES)

LIBERTY SQUARE

HTL

MHW

WASHINGTON STREET

MHW

PA-8 AREA OF PHRAGMITES TREATMENT (NO BARGES)

TO MARINE STAGING YARD (IF AVAILABLE)

DRAFT

THIS PLAN ASSUMES THAT THE WETLAND MITIGATION WORK WILL BE AN INITIAL ACTIVITY ALONG WITH THE INSTALLATION OF THE WORK TRESTLES AT THE BRIDGE SITE.

EQUIPMENT BARGE:

40' x 50' FLEXIFLOAT BARGE
OR
40' x 30' FLAT DECK BARGE

NOTE: EQUIPMENT BARGE WILL HAVE SPUD ANCHORS

MATERIAL BARGE:

SEE SHEET BARGE-1 FOR TYPICAL CARGO BARGE SIZES

POTENTIAL BARGES FOR WETLAND MITIGATION

NOTE: THIS PLAN SHOWS POSSIBLE BARGE MOVEMENTS FOR CONSTRUCTION STAGE 3

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIMINARY BARGE MOORING/MOVEMENT LAYOUT

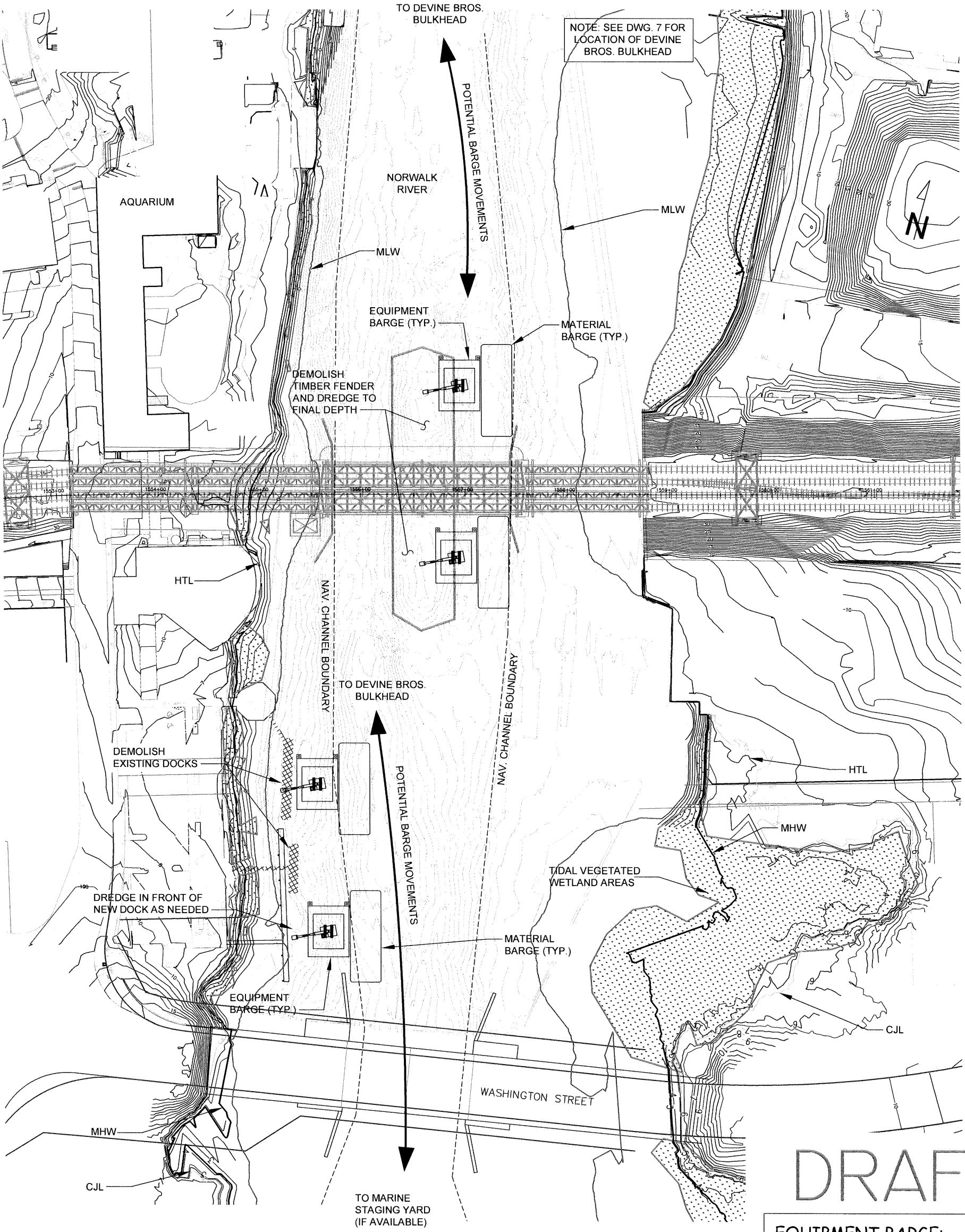
POTENTIAL BARGES FOR WETLAND MITIGATION WORK

SCALE:	N/A
DATE:	6-5-18
DRAWN:	D. MALLEN
CHECK:	

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX
A JOINT VENTURE XV

SHEET BARGE-3

JOB 3215103



DRAFT

THE EARLY DREDGING WORK OCCURS BEFORE THE WORK TRESTLES ARE INSTALLED AT THE BRIDGE SITE.

BARGES WILL BE USED TO STORE DEMOLITION MATERIAL AND DREDGED MATERIAL, AND TO DECANT WATER FROM DREDGED SOIL.

NOTE: THIS PLAN SHOWS POSSIBLE BARGE MOVEMENTS FOR CONSTRUCTION STAGE 1.

POTENTIAL BARGES FOR EARLY DEMO/DREDGING

EQUIPMENT BARGE:

40' x 50' FLEXIFLOAT BARGE
OR
40' x 30' FLAT DECK BARGE

NOTE: EQUIPMENT BARGE WILL HAVE SPUD ANCHORS

MATERIAL BARGE:

SEE SHEET BARGE-1 FOR TYPICAL CARGO BARGE SIZES

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIMINARY BARGE MOORING/MOVEMENT LAYOUT

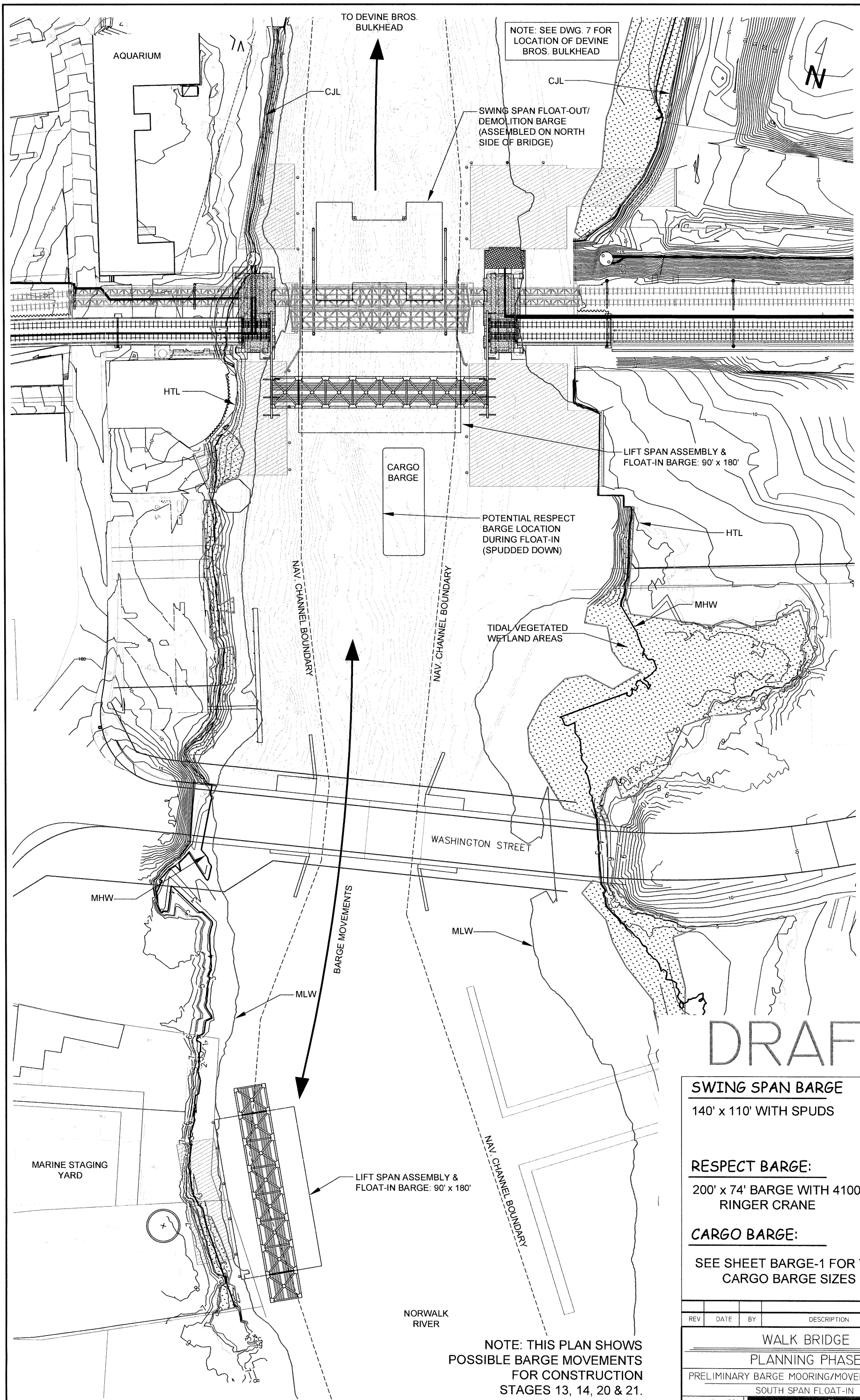
POTENTIAL BARGES FOR EARLY DEMO/DREDGING WORK

SCALE:	1" = 100'
DATE:	6-5-18
DRAWN:	D. MALLEN
CHECK:	

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE XV

SHEET BARGE-4

JOB 3215103



DRAFT

NOTE: THIS PLAN SHOWS POSSIBLE BARGE MOVEMENTS FOR CONSTRUCTION STAGES 13, 14, 20 & 21.

SWING SPAN BARGE

140' x 110' WITH SPUDS

RESPECT BARGE:

200' x 74' BARGE WITH 4100 RINGER CRANE

CARGO BARGE:

SEE SHEET BARGE-1 FOR TYPICAL CARGO BARGE SIZES

REV	DATE	BY	DESCRIPTION

SOUTH SPAN FLOAT-IN OPERATION

WALK BRIDGE

PLANNING PHASE

PRELIMINARY BARGE MOORING/MOVEMENT LAYOUT

SOUTH SPAN FLOAT-IN

SCALE:	1" = 100'
DATE:	6-5-18
DRAWN:	D. MALLEN
CHECK:	

WALK BRIDGE REPLACEMENT

CIANBRO MIDDLESEX A JOINT VENTURE XV

SHEET BARGE-5

JOB 3215103

AQUARIUM

TO DEVINE BROS. BULKHEAD

POTENTIAL BARGE MOVEMENTS

NOTE: SEE DWG. 7 FOR LOCATION OF DEVINE BROS. BULKHEAD

N

CJL

EQUIPMENT BARGE

CJL

MATERIAL BARGE

MATERIAL BARGE

HTL

SHEETPILE MARINE ENCLOSURES

MATERIAL BARGE

HTL

MHW

TIDAL VEGETATED WETLAND AREAS

NAV. CHANNEL BOUNDARY

POTENTIAL BARGE MOVEMENTS

NAV. CHANNEL BOUNDARY

WASHINGTON STREET

MHW

MLW

MLW

TO MARINE STAGING YARD (IF AVAILABLE)

NAV. CHANNEL BOUNDARY

MARINE STAGING YARD

POSSIBLE LIFT SPAN ASSEMBLY & FLOAT-IN BARGE: 90' x 180'
OR
TRESTLE AVAILABLE FOR DREDGING MATERIAL BARGES

NORWALK RIVER

NOTE: THIS PLAN SHOWS POSSIBLE BARGE MOVEMENTS FOR CONSTRUCTION STAGE 15.

RIVER PIER DEMOLITION OPERATION

DRAFT

EQUIPMENT BARGE:

50' x 100' FLEXIFLOAT BARGE

NOTE: EQUIPMENT BARGE WILL HAVE SPUD ANCHORS

MATERIAL BARGES:

SEE SHEET BARGE-1 FOR TYPICAL CARGO BARGE SIZES

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIMINARY BARGE MOORING/MOVEMENT LAYOUT

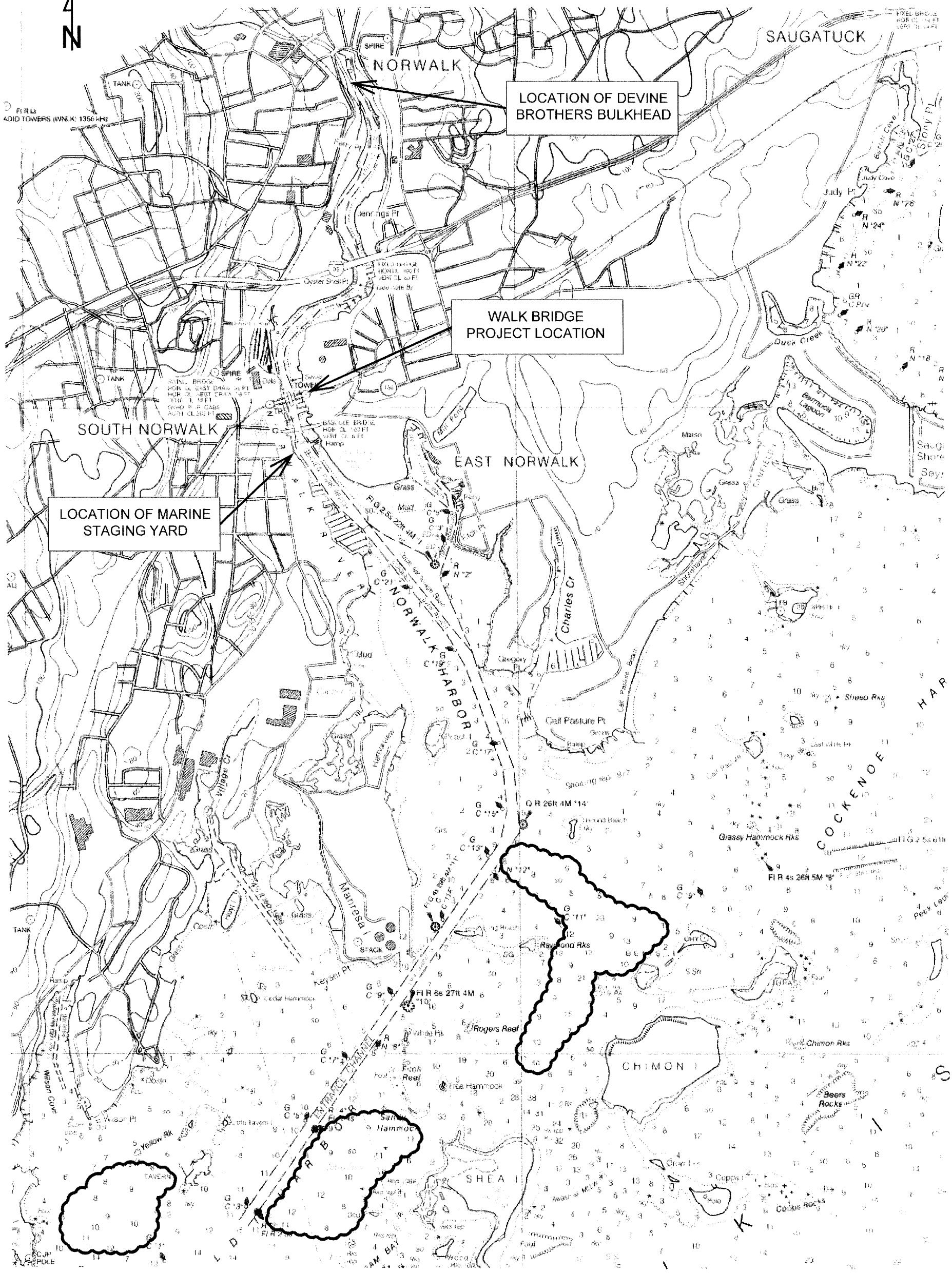
RIVER PIER DEMOLITION

SCALE:	1" = 100'
DATE:	6-5-18
DRAWN:	D. MALLEN
CHECK:	

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX
A JOINT VENTURE XV

SHEET BARGE-6

JOB 3215103



A MINIMUM OF (2) MOORING BUOYS WILL BE INSTALLED WITHIN EACH AREA FOR THE DURATION OF THE WALK BRIDGE CONSTRUCTION.

LOCATION OF THE BUOYS TO BE DETERMINED WITH COAST GUARD APPROVAL.

= POSSIBLE GENERAL AREA OF MOORING BUOY INSTALLATION.

POTENTIAL MOORING BUOY LOCATIONS

DRAFT

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

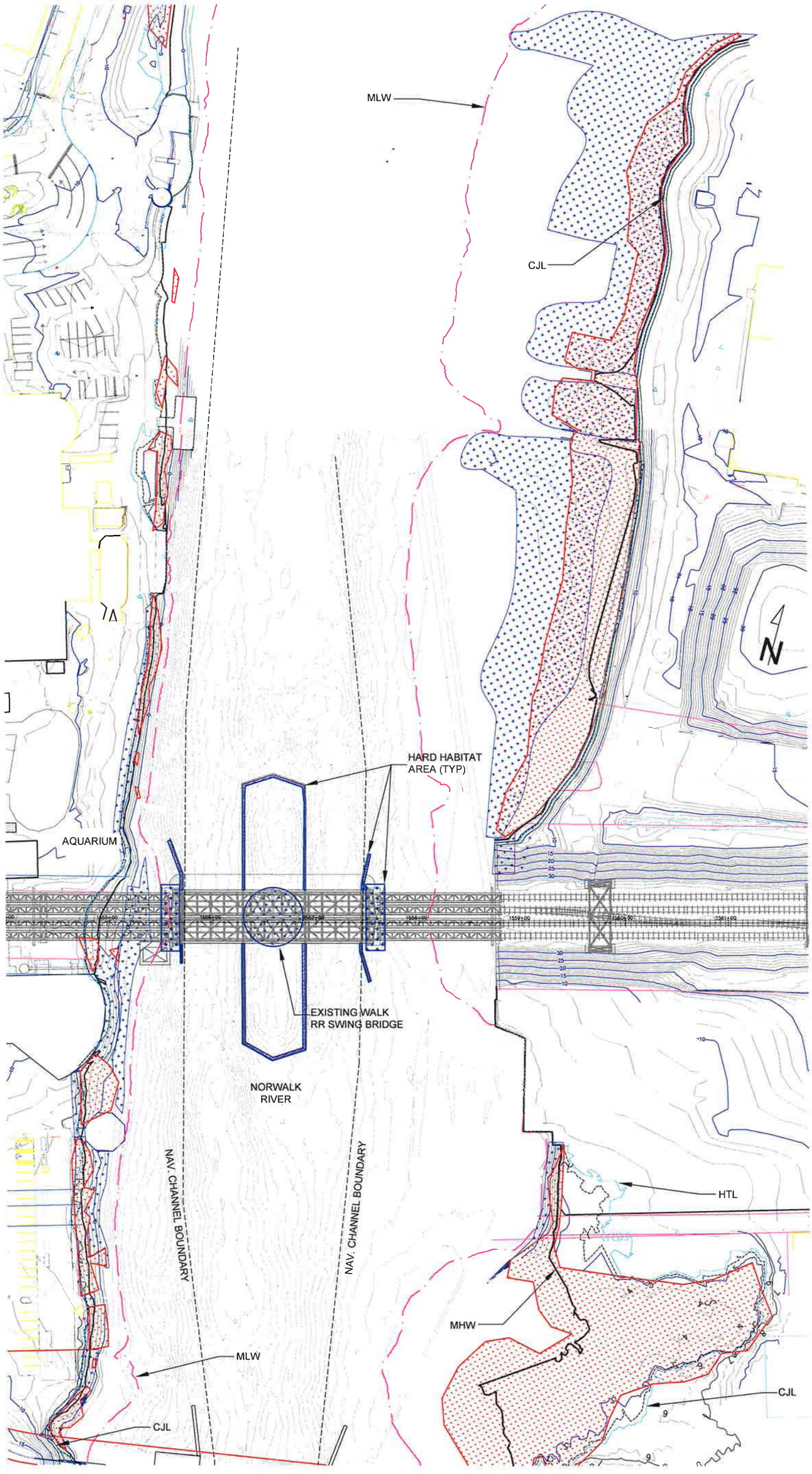
PLANNING PHASE

PRELIMINARY BARGE MOORING/MOVEMENT LAYOUT

POTENTIAL MOORING BUOY LOCATIONS

SCALE: N.T.S.	WALK BRIDGE REPLACEMENT	SHEET BARGE-7
DATE: 6-5-18		
DRAWN: D. MALLEN	CIANBRO MIDDLESEX A JOINT VENTURE JV	JOB 3215103
CHECK:		

Attachment B – Hard Habitat and Tidal Wetland Maps



= MLW

= MHW

= HTL

= CJL

= HARD HABITAT AREA

= TIDAL VEGETATED WETLAND AREAS

HARD HABITATS

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

HARD HABITAT LOCATIONS

SCALE:	N/A
DATE:	6-6-18
DRAWN:	A. BALLAS
CHECK:	

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE LLC

SHEET: HABITAT

JOB: 3215103


Norwalk
7
95
NHML
Norwalk Harbor
Walk Bridge
Legend
Tidal Wetlands - State and Federal Field Delineated
Wetland delineation completed by Fitzgerald & Halliday, Inc. (FHI) between May 26th and May 28th 2015, Nov. 3rd 2015, and March 9, 2016. Delineated Flags surveyed and provided by ConnecticutDepartment of Transportation (CTDOT) 2015 - 16.
N
0
75
150
300 Feet

Attachment C – EFH Location Query Results

Location of Interest: 41° 6’ 2” N; 73° 24’ 57” W

Species	Eggs	Larvae	Juveniles	Adults	Data Source
pollock (*Pollachius virens*)			X	X	NOAA EFH Data Inventory - New England
red hake (*Urophycis chuss*)	X	X	X	X	NOAA EFH Data Inventory - New England
winter flounder (*Pseudopleuronectes americanus*)	X	X	X	X	NOAA EFH Data Inventory - New England
windowpane flounder (*Scophthalmus aquosus*)	X	X	X	X	NOAA EFH Data Inventory - New England
ocean pout (*Macrozoarces americanus*)	X			X	NOAA EFH Data Inventory - New England
Atlantic herring (*Clupea harengus*)			X	X	NOAA EFH Data Inventory - New England
little skate (*Leucoraja erinacea*)			X	X	NOAA EFH Data Inventory - New England
silver hake (*Merluccius bilineris*)	X	X			NOAA EFH Data Inventory - New England
winter skate (*Leucoraja ocellata*)			X	X	NOAA EFH Data Inventory - New England
bluefish (*Pomatomus saltatrix*)			X	X	NOAA EFH Mapper - Location Query, NOAA EFH Data Inventory - Mid Atlantic
longfin inshore squid (*Loligo pealeii*)	X		X	X	NOAA EFH Mapper - Location Query, NOAA EFH Data Inventory - Mid Atlantic
Atlantic butterfish (*Peprilus triacanthus*)	X	X	X	X	NOAA EFH Mapper - Location Query, NOAA EFH Data Inventory - Mid Atlantic
Atlantic mackerel (*Scomber scombrus*)	X	X	X	X	NOAA EFH Mapper - Location Query, NOAA EFH Data Inventory - Mid Atlantic
summer flounder (*Paralichthys dentatus*)			X	X	NOAA EFH Mapper - Location Query, NOAA EFH Data Inventory - Mid Atlantic
scup (*Stenotomus chrysops*)	X	X	X	X	NOAA EFH Mapper - Location Query, NOAA EFH Data Inventory - Mid Atlantic
black sea bass (*Centropristis striata*)			X		NOAA EFH Mapper - Location Query, NOAA EFH Data Inventory - Mid Atlantic
sand tiger shark (*Carcharias taurus*)			X		NOAA EFH Mapper - Location Query, NOAA EFH Data Inventory - Atlantic Highly Migratory
smoothhound shark complex (Atlantic stock)	X	X	X	X	NOAA EFH Mapper - Location Query, NOAA EFH Data Inventory - Atlantic Highly Migratory

Attachment D – Contractor's Workplan Matrix

Section 7 Consultation and EFH Assessment Processes for Walk Bridge

Stage 1- Site Preparation

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES					SCHEDULE	
Staging Task	Activity ID	Task	ITEM	QTY	UNIT	Equipment/Vessels Used (SEE CODES BELOW)	DAYS USED	Barge Moves On Site (times/ day)	Barge Moves Off Site	Shift D- Day, N- Night T- Tide	Daily Intensity (Hours)	Possible Mitigation	Early Start	Early Finish
A.		RMOVE FENDERS AT PIVOT PIER, INSTALL TEMPORARY FENDER SYSTEM AND DREDGE TO FINAL DEPTH												
A.1	A22530 & A28470	REMOVE FENDERS AT THE PIVOT PIER, INSTALL TEMPORARY FENDER SYSTEM	12" Wooden Piles Removed	200	EA	BGC, BGM, BGW, C2, BCS, E48, VW, VP, HP, HE	25	3	3x /WK 1.3 m To Devine	D		Bubble Curtain	16-Dec-19	21-Feb-20
A.2	A22570 & A22480	DREDGE TO FINAL DEPTH Average (500 Feet L X 125 Feet W X 5 Feet D)	Dredging	11,350	CY		51	4	4 times / wk- 1.3 m Devine	D		n/a	13-Dec-19	29-Jan-20
			Dredge Area	7,000	SY								2-Dec-19	13-Dec-19
B		RELOCATE EXISTING VESSEL MOORING, DREDGE NEW BERTHING AREAS REMOVE EXISTING DOCK AND PILING												
1	A28450	Remove dock section and piling	Remove 12" Wood Piles	30	EA	BGC, BGM, BCS, E48, VW, VP, HV	10	3	Unload onsite	D		n/a	13-Dec-19	26-Dec-19
2	A28490	DREDGE NEW DOCKING AREA Average (50 feet L X 20 Feet W X 3 Feet D)	Soils	100	CY	BGC, BGM, BGW, C2, BCS, E48, VW, VP,	10	2	1 Ld , 1.3m to Devine	D		n/a	2-Dec-19	13-Dec-19
3	A28460	Construct new dock - Drive PILES	Drive 12" Wooden Piles	24	EA	BGC, BGM, BCS, E48, VW, VP, HV, HP	7	4	n/a	D		Bubble Curtain	4-Jan-20	11-Jan-20
	A28460	Construct new dock- Set Floats	Floats & Ramp	12	EA	BGC, BGM, BCS, E48, VW, VP,	3	8	n/a	D		n/a	12-Jan-20	15-Jan-20
C		TIDAL WETLAND MITIGATION - ALONG THE RIVERBANKS NORTH OF THE WALK BRIDGE .												
1	A28520	Establish Access to Staging Area off Smith Rd North of Bridge via Ramp fromTrestle	30" Diameter Piles	9	EA	E30, E46, (2)TT, C2, HV, HI	10	n/a	n/a	D		n/a	16-Nov-19	27-Nov-19
		Install temporary sheet piles for access ramp	Avg 40' PZ35 Sheet Piles	70	EA	HV,E30,L4,TT,C175	24	n/a	n/a	D		n/a	16-Nov-19	16-Dec-19
		Construct access to mitigation area from Northeast platform	Temporary Fill	800	CY	HV,E30,L4,TT,C175	24	n/a	n/a	D		n/a	16-Nov-19	16-Dec-19
WM 1-4	A28530	Perform Environmental Mitigation on East River Bank North of Bridge	n/a	n/a	n/a	E30, E46, (2)TT,	60	n/a	n/a	D / T		n/a	2-Dec-19	13-Feb-20

D.		REMOVAL OF THE IMAX THEATER											
1.a.	A22560	Protect Existing Pump Station & RCP Outfall	n/a	n/a	n/a	ELR	15	n/a	n/a	D	10 hour shifts, 6 days per week	n/a	16-Nov-19	6-Dec-19
1.b.	A22530	Prep IMAX Theater for Demolition	n/a	n/a	n/a	ELR	5	n/a	n/a	D		n/a	16-Nov-19	12-Dec-19
1.c.		Erosion and Sedimentation controls	n/a	n/a	n/a	ELR	3	n/a	n/a	D		n/a		
1.d.		Remove Stone Rip Rap	n/a	n/a	n/a	EX48	4	n/a	n/a	D		work at low tide		
1.d.		Install Sheet Pile Template	14" Steel H Piles	6	EA	300 Ton Crane, Vibratory Hammer (Impact Hammer only if required)	2	n/a	n/a	D		work at low tide		
1.d.		Drive Sheet piles	PZ35 Sheetpiles	43	Dbls	300 Ton Crane, Vibratory Hammer (Impact Hammer only if required)	12	n/a	n/a	D		Bubble Curtain		
2	A22520	Demolish IMAX Theater	n/a	n/a	n/a	E48, M60	30	n/a	n/a	D			22-Jan-20	27-Feb-20
E		INSTALL SHEETPPILE BULKHEAD, DREDGE AND CONSTRUCT MARINE ACCESS TRESTLE AT MARINE STAGING YARD												
1		Pretrench / Dredge for Sheet Pile	Soils	306	CY	E48, TT, BCS	3	n/a	n/a	D		n/a		
		Average Dredge Area 250' Lx 4' Wx 8' D	Area	111	SY									
2	A24910	Install Sheetpile Bulkhead	PZ35 Sheetpiles	58	Dbls	C2, HV, HI vibratory hammer , (Impact hammer only if required) .	22	n/a	n/a	D		Bubble Curtain	27-Dec-19	21-Jan-20
3	A24920	Excavate water side of Bulkhead	Soils	3,150	CY	E48, TT, BGC, BGM, C2B, BCS	20	6	18 Ld , 1.3m to Devine	T		n/a	13-Dec-19	5-Jan-20
		Average Dredge Area 200 feet L x 105 Feet W x 4 feet D	Dredge Area	1,025	SY									
4	A24630	Drive 14 inch Steel H Piles/Template	14 inch H Piles	32	EA	BGC, BGM, C2B, M60, HV,Vibatory Hammer & Impact Hammer	25	8	n/a	D		Bubble Curtain	3-Dec-20	25-Feb-21
		Drive 24 inch Steel Trestle Piles	24 inch Piles	32	EA			8	n/a	D		Bubble Curtain		
5	A24630	Install pile bents, stringers, mats and timber curbs	n/a	n/a	n/a	BGC, BGM, C2B, M60,	30	5	1 x / wk	D		n/a	3-Dec-20	26-Feb-21
6	A258540	Dredge Water Side of Trestle	Soils removed	1600	CY	BGC, BGM, C2B, M60, BCS	10	6	18 Ld , 1.3m to Devine	D		n/a	2-Dec-19	13-Dec-19
		Average Dredge Area 250 feet long x 30 Feet W x 6 feetD	Dredge Area	350	SY									
7	A24630	Place earthen ramp for trestle access	Soils Placed	300	CY	E48, TT	10	n/a	n/a	D		n/a	3-Dec-20	26-Feb-21
8		Provide LED lights below trestle	Lights	1000	LF	C2	15	n/a	n/a	T		n/a	26-Feb-21	19-Mar-21

Stage 2 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES					SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/Vessels Used (SEE CODES BELOW)	DAYS USED	Barge Moves On Site (times/ day)	Barge Moves Off Site	Shift D-Day, N-Night T-Tide	Daily Intensity (Hours)	Possible Mitigation	Early Start	Early Finish
A		INSTALL WORK PLATFORMS WITH LAND ACCESS AND FENDER PILING									10 hour days, 6 days per week			
1 THRU 4	A2440, A680, A11490, A11470, A28620, A28660	Access & Trestle Construction (North East, North West, South East, South West & Marine Staging Yard)	30" Dia Piles	207	EA	Crane Barge with Spuds 200' x 74' Material Barge (2) 100' x 30' Work Barge 40' x 40' Crane 200 Ton Man-lift 60 Ft Track Excavator 40 – 80 Ton Aluminum Work Boat / push boat Vibratory and impact pile hammers	241	6	2 times /week to Devine 1.3 miles	D/N		Bubble Curtains	16-Dec-19	7-Oct-20
			24" Dia Steel Piles	22	EA					D				
			14" Steel H Piles	80	EA					D				
		Excavate and Fill onshore bulkheads Excavation all above HTL/CJL	Soils	1200	CY		15	n/a	n/a	D		Erosion & Sedimentation Control	13-Jan-20	29-Jan-20
		Install LED lights under platform	Lights	4000	LF	C2, M60,	60	n/a	n/a	T		n/a		
B		INSTALL MARINE ENCLOSURES AT LIFT PIER FOUNDATIONS												
1 thru 6	A28710	Template steel H Piles for marine enclosure	14" Steel H Piles	50	EA	Crane Barge with Spuds 200' x 74' Material Barges 100' x 30' Crane on barge 200 Ton Crane on Platform 300 Ton Man-lift 60 Ft Track Excavator 40-80 Ton Rubber tire backhoe/loader Aluminum Work Boat / Push Boat Vibratory pile hammer Impact Hammer (if required)	15	n/a	n/a	D		Bubble Curtain	20-Jun-20	9-Jul-20
	A28710	Construct Pier 2 Marine Enclosure Wall - North of Bridge - (work completed from platform)	Cold Rolled Sheets	20	Dbls		15			D/N		Bubble Curtain	20-Jun-20	9-Jul-20
	A28700	Construct Pier 2 Marine Enclosure Wall - South of Bridge - (work completed from platform)	Cold Rolled Sheets	20	Dbls		15			D		Bubble Curtain	5-Aug-20	21-Aug-20
	A28720	Construct Pier 2 Marine Enclosure Wall - Under Bridge	Cold Rolled Sheets	33	Dbls		30	6	1 time / wk to Devine 1.3	D		Bubble Curtain	23-Oct-20	30-Nov-20
	A28680	Construct Pier 3 Marine Enclosure Wall - North of Bridge - (work completed from platform)	Cold Rolled Sheets	32	Dbls		15	n/a	n/a	D		Bubble Curtain	20-May-20	8-Jun-20
	A28370	Construct Pier 3 Marine Enclosure Wall - South of Bridge - (work completed from platform)	Cold Rolled Sheets	32	Dbls		15			D		Bubble Curtain	22-May-20	10-Jun-20
	A28690	Construct Pier 3 Marine Enclosure Wall - Under Bridge	Cold Rolled Sheets	33	Dbls		30	6	1 time / wk to Devine 1.3	D		Bubble Curtain	20-Jul-20	22-Aug-20
		Deploy Silt Curtain inside the marine enclosures	Silt Curtains	2	EA	Work Barge-40x40, 200 ton Crane, Push Boat	4	n/a	n/a	D		n/a	7-May-20	26-May-20
C		INSTALL PILES AND SUPPORT STEEL FOR THE DRILLED SHAFT OPERATION - (Additional Trestle construction to build around installed cans)												
	A28740-A28750	Install Temporary 30" Support Piles	30" Steel Piles	16	EA	Crane - Shafts 300 Ton Crane – Support 175 Ton Hydraulic Crane 80 Ton Man-lift 60 Ft Work Barge 40' x 40' Low headroom drill Hydraulic & Impact Hammers Excavator 15 ton Concrete Pump	30	2	n/a	D		Bubble Curtain	9-Jun-20	27-Aug-20
		Install Temporary 24" Support Piles	24" Steel Piles	12	EA			2	n/a	D		Bubble Curtain	9-Jun-20	27-Aug-20
	A21540-A22600	Install Support Steel	24" Shapes	12	Pcs		15	1	n/a	N		n/a	24-Aug-20	11-Dec-20
		Install Mats	Timber Mats	70	EA		15	1	n/a	D		n/a	11-Aug-20	27-Aug-20
D		Demolish Existing Control House	Remove	1	EA	C2, M60, E48	10	1	n/a	D		Debris Shield	27-Dec-19	9-Jan-20

Section 7 Consultation and EFH Assessment Processes for Walk Bridge

Stage 3 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES					SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/Vessels Used (SEE CODES BELOW)	DAYS USED	Barge Moves On Site (times/ day)	Barge Moves Off Site	Shift D-Day, N-Night T-Tide	Daily Intensity (Hours)	Possible Mitigation	Early Start	Early Finish
A		INSTALL 4 EACH 12 FOOT DIAMETER DRILLED SHAFTS AT EACH LIFT PIER												
1 THRU 7	A26970 A27000	Install Drilled Shaft - Pier 2 - Northside - Platform	12'Dia Shafts	2	EA	200 ton Crane, 300 toncrane, 80 Ton Hydraulic Crane, 80 foot Manlift, Work Barge 40x40, Hydraulic Oscillator, Excavator 30 Tons, Concrete Pumps	76	n/a	n/a	D	10 hour days, 6 days per week	Bubble Curtain	16-Jan-21	2-Feb-21
	A27030 AA27060	Install Drilled Shaft - Pier 2 - Southside - Platform	12'Dia Shafts	2	EA		75	n/a	n/a	D		Bubble Curtain	16-Feb-21	5-Mar-21
	A26910 A26940	Install Drilled Shaft - Pier 3 - Northside - Platform	12'Dia Shafts	2	EA		76	n/a	n/a	D		Bubble Curtain	2-Nov-20	18-Nov-20
	A22700 A26880	Install Drilled Shaft- Pier 3 - Southside - Platform	12'Dia Shafts	2	EA		75	n/a	n/a	D		Bubble Curtain	5-Oct-20	21-Oct-20
B		INSTALL 2 EACH 10 FOOT DIAMETER CENTER SUPPPORTS AT EACH LIFT PIER												
		Install 50' x 50' low head room platform under bridge next to pier 2	12" Steel Bearing Pile	16	Ea	DLH, HV, HP, E30	10	n/a	n/a	D	10 hour days, 6 days per week	Bubble Curtain	2-Jan-21	12-Jan-21
		Install 50' x 50' low head room platform under bridge next to pier 3	12" Steel Bearing Pile	16	Ea	DLH, HV, HP, E30	10	n/a	n/a	D	10 hour days, 6 days per week	Bubble Curtain	14-Aug-20	24-Aug-20
1 THRU 12	A28810 A28840	Install Casings & Micro Piles at Center of Pier 2	12" Micro Piles	20	EA	C2, C3, BH80, M60, BGW, DLH, E30, PC	70	1	n/a	D/N	10 hour days, 6 days per week	Bubble Curtain	12-Jan-21	29-Jan-21
	A28900 A28870	Install Casings & Micro Piles at Center of Pier 3	12" Micro Piles	20	EA		53	1	n/a	D/N		Bubble Curtain	24-Aug-20	6-Oct-20
	A24890	Directional drill Pipes across River WBridge-6D/W MNRR (C&S)	n/a	n/a	n/a	No in-water activity	88	n/a	n/a	D		n/a	29-Apr-20	13-Aug-20
C	A23680 A27770	Begin construction of new south lift span at marine staging yard	n/a	n/a	n/a	C2, BGM, BH80	180	1	Material Delivery Barges = 2 lds / Month	D	10 hour days, 6 days per week	n/a	24-May-21	5-Mar-22

Section 7 Consultation and EFH Assessment Processes for Walk Bridge

Stage 4 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T-Tide	Daily Intensity (Hours)	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	Barge Moves On Site (times/ day)	Barge Moves Off Site				Early Start	Early Finish
A	A29410 A29420	REMOVE SUPPORT PILING & STEEL FOR 12 FOOT DIAMETER DRILLED SHAFTS (Work From Platform)	14" H piles	24	EA	300 Ton Crane , Material Barge 100x30, Vibratory Hammer	12	n/a	n/a	D	10 hour days, 6 days per week	Work From Platform & Bubble Curtain	8-Feb-21	12-Mar-21
B	A29870 A29880	EXCAVATE FOR LIFT PIER PRECAST CONCRETE TUBS (Work From Platform) 12 Locations: 25" x 25": Avg Depth 2.5'	Soils AREA	700 900	CY SY	Excavator 80 Ton, Triaxle Truck, Digging Bucket (Inside sheet pile enclosure)	12	n/a	n/a	D	16 hours/ Day	Work From Platform & Bubble Curtain	11-Feb-21	5-Feb-21
C	1012.5	SET PRECAST TUBS ON 12 FOOT DIAMETER SHAFTS AND POUR (PIERS 2 & 3)												
1 THRU 4	A29010 A29090	Pier 2 -- Precast TUB (AB,CD)	Tubs	4	EA	C3, BGM, HV,	48	1	n/a	D/N	10 hour days, 6 days per week	Work from platform at Low Tide	4-Jan-21	28-Apr-21
	A29450 A29640	Pier 3 --Precast TUB (AB,CD)	Tubs	4	CF		48	1	n/a	D/N		Work from platform at Low Tide	19-Aug-20	5-Feb-21
D		SET PRECAST TUBS ON 10 FOOT DIAMETER SHAFTS AND POUR (PIERS 2 & 3)												
1 THRU 4	A29220 A29400	Pier 2 -- Precast TUB (E,F)	Tubs	2	EA	C3, BGM, HV,	24	1	n/a	D/N	10 hour days, 6 days per week	Work Low Tide on Low Platform	17-Feb-21	14-May-21
	A29660 A29840	Pier 3 -- Precast TUB (E,F)	Tubs	2	EA		24	1	n/a	D/N		Work Low Tide on Low Platform	23-Nov-20	19-Jan-21

Stage 5 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES					SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	Barge Moves On Site (times/ day)	Barge Moves Off Site	Shift D- Day, N- Night T- Tide	Daily Intensity (Hours)	Possible Mitigation	Early Start	Early Finish
A		REMOVE LOW HEADROOM WORK PLATFORMS												
	A30010	REMOVE LOW HEADROOM WORK PLATFORM- PIER 2 (50'x50')	Supports 12" bearing piles	3 16	EA EA	BGW, CH80,BGM	40	n/a	n/a	D/N	6 dys /wk 8 hours/ day	Work from Platform, Silt curtain & Low Tide	24-Mar-21	21-May-21
	A30020	REMOVE LOW HEADROOM WORK PLATFORM- PIER 3 (50'x50')	Supports 12" bearing piles	3 16	EA EA	BGW, CH80,BGM	40	4	n/a	D/N	6 dys /wk 8 hours/ day	Work from Platform, Silt curtain & Low Tide	5-Dec-20	6-Feb-21
B		PARTIAL REMOVAL OF MARINE ENCLOSURES												
	A30030 A29980	Shorten/Remove Pier 2 Marine Enclosure Northside, Southside & under bridge.	Sheets Removed	23	Dbls	C3, BGW,HV, ML60, VW, VP	10	n/a	n/a	D	6 dys /wk 8 hours/ day	Work from Platform, Silt curtain & Low Tide	12-Nov-20	25-Jan-21
	A30040 A30000	Shorten/Remove Pier 3 Marine Enclosure Northside, Southside & under bridge.	Sheets Removed	23	Dbls		10	n/a	n/a	D	6 dys /wk 8 hours/ day	Work from Platform, Silt curtain & Low Tide	12-Nov-20	25-Jan-21

Stage 6 - CMJV Draft Estimate 30%

2.4	ACTIVITY		MATERIALS			EQUIPMENT		Barge Moves					SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/Vessels Used (SEE CODES BELOW)	DAYS USED	On Site (times/ day)	Off Site	Shift D-Day, N-Night T-Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	Early Start	Early Finish
A	**A300090**	**INSTALL SUBMARINE CABLES BETWEEN PIERS 2 AND 3 (270 FT x 22 FT) = Avg Depth 4 feet**	Dredge Soils Area(SY)	960 **600**	CY SY	BGC, BGM, E48, BCS	60	4	n/a	D	7 days 12 hours	Off Season Work, Silt Curtain	1-Dec-21	13-Jan-22
	A23320	Construct New Control House - Pier 3 (MATERIALS MAY BE DELIVERED BY BARGE)	n/a	n/a	n/a	Deck Barges 100x30 300 Ton Crane on Platform	190	2	Delivery 2 loads / wk	D	6 days/week 12 hours/day	Work from Platform	30-Jun-21	24-Feb-22
	A23010	Erect New Lift Tower - Pier 2 (MATERIALS MAY BE DELIVERED BY BARGE)	n/a	n/a	n/a		72	2	Delivery 2 loads / wk	D		Work from Platform	1-Sep-21	29-Nov-21
	A23020	Erect New Lift Tower - Pier 3 (MATERIALS MAY BE DELIVERED BY BARGE)	n/a	n/a	n/a		72	2	Delivery 2 loads / wk	D		Work from Platform	16-Jun-21	30-Nov-21
	A25880	Install Mechanical Room Sheaves and Machinery - Pier 2	n/a	n/a	n/a	Deck Barges 100x30 300 Ton Crane on Platform, **Vibratory Hammer**	54	2	Delivery 2 loads / wk	D	6 days / week and 10 hours / day	Work from Platform	8-Feb-22	13-Apr-22
	A25900	Install Tower & Mechanical Room Electrical - Pier 2	n/a	n/a	n/a		30	2	Delivery 2 loads / wk	D		Work from Platform	4-Jun-22	11-Jul-22
	A25840	Install Mechaincal Room Sheaves and Machinery - Pier 3	n/a	n/a	n/a		54	2	Delivery 2 loads / wk	D		Work from Platform	5-Nov-21	17-Jan-22
	A25890	Install Tower & Mechanical Room Electrical - Pier 3	n/a	n/a	n/a		30	2	Delivery 2 loads / wk	D		Work from Platform	8-Mar-22	11-Apr-22
	A30100	Selective Demo of Existing Pier Fenders for Submarine Cable Installation	Remove 12" Dia Timber Piles	6	EA		5	2	Delivery 2 loads / wk	D		n/a	25-Sep-21	30-Sep-21
B & C		INSTALL PERMANENT FENDER PILES & RAILS												
	A30110	Install Template Piles	14" H Piles	8	Ea	Vibratory Hammer, (Impact Hammer if necessary)	2	n/a	n/a	D	10 Hrs/Day 6 days/ Wk	Work from Platform	30-Sep-21	1-Oct-21
	A30110	Install New Fender Piles at Submarine Cable Location	14" Composite Pipe Piles	16	EA	Material Barges 100x30 300 Ton Crane on Platform, Vibratory Hammer, Impact Hammer	5	n/a	n/a	D	6 days/wk - 10 hrs/ day	Work from Platform	1-Oct-21	6-Oct-21
	A30120	Install New Fender Rails at Submarine Cable Location	n/a	n/a	n/a		10	n/a	n/a	D		Work from Platform	12-Jan-22	22-Jan-22
D	A26820	REMOVE SECTION OF NORTHEAST WORK PLATFORM - For Control House Construction (1800SF)	Remove 30" steel pipe piles and 14" H Piles	12	EA	200 Ton Crane, Excavator 80 Ton, Triaxle Truck,Vibratory Hammer	10	n/a	n/a	D	10 Hrs/Day 6 days/ Wk	Work from Platform	15-Jul-21	6-Aug-21

Section 7 Consultation and EFH Assessment Processes for Walk Bridge

Stage 7 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		Barge Moves		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
		REMOVE TRACKS 2 AND 4, EAST AND WEST APPROACH SPANS												
A		Install Temporary Supports for Approach Spans 2 and 4	Shoring Towers	6	EA	Excavator / Loader Rubber Tired	20	n/a	n/a	D	10 hrs /day 6 days/ wk	Work Low Tide	1-Mar-21	29-Mar-21
B	A24550 A27660	Remove Tracks 2 and 4, East & West Approach Spans	n/a	n/a	n/a	Deck Barge 100 x 30 Crane 300 ton Excavator 40-80 ton	52	3	n/a	D	8 hrs/day 6	n/a	19-Aug-20	30-Apr-21

Stage 8 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT			Barge Moves		Shift D-Day, N-Night T-Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/Vessels Used	(SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A25070 A25090	Lift Pier2 - Form & Pour Pedestals -	n/a	n/a	n/a	Crane Barge with Spuds Material Barge Crane on platform Crane Man-lift Aluminum Work Boat Push Boat	200’ x 74’ 100’ x 30’ 300 Ton 200 Ton 60 Ft	31	2	n/a	D	6 days /wk 8 hrs /day	Debris Shield	11-Sep-2021	16-Oct-2021
A	A25400 A25420	Lift Pier3 - Form & Pour Pedestals - South Side	n/a	n/a	n/a			31	2	n/a	D		Debris Shield	28-Jun-2021	5-Aug-2021
B	OA.OC.OA1360	Set Bearings at Pier Caps 2 and 3	n/a	n/a	n/a	Crane Barge with Spuds Crane Aluminum Work Boat Push Boat	200’ x 74’ 200 Ton	4	2	n/a	D		Debris Shield	2-Jun-2021	4-Jun-2021
C	A23160	Excavation and demo of the East Abutment	n/a	n/a	n/a	Track Excavator 40-80TN		20	n/a	n/a	D		Debris Shield	23-Jun-2021	19-Jul-2021

Stage 9 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A30130	Remove (50SY) Section of SE Work Platform for Approach Steel Erection	30" Dia Steel Piles	12	EA	Crane 300 Ton Man-lift 60 Ft Vibratory Hammer	15	n/a	n/a	D	6 dys/wk 8 hrs/dy	Platform work, silt Curtain	30-Jul-21	16-Aug-21
A	A30130	Remove Support Steel	W24 - W 36 Steel Sections	6	EA	Crane 300 Ton Man-lift 60 Ft Track Excavator 40-80 Ton	15	n/a	n/a	D	6 dys/wk 8 hrs/dy	Platform work, silt Curtain	30-Jul-21	16-Aug-21
B	A23380	Construction of New East Abutment	n/a	n/a	n/a	Track Excavator 40TN Crane 300TN	60	n/a	n/a	D	6 dys/wk 8 hrs/dy	Debris Shield	5-Aug-21	4-Oct-21

Stage 10 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A		SET TOWER SPANS AT PIERS 2 AND 3												
	A27710 A24540	Preassemble Tower Span - Pier 2/ Erect Tower Span - Pier 2	n/a	n/a	n/a	Crane Barge with Spuds 200'x74' Material Barge 100' x 30' Crane on platform 200 Ton	150	1	n/a	D	10 HRS/ DAY 6 DAYS/WK	Pre-Assembling Spans	24-Apr-21	23-Oct-21
	A27720 A25800	Preassemble Tower Span - Pier 3/ Erect Tower Span - Pier 3	n/a	n/a	n/a	Crane on platform 300 Ton Man-lift 60 Ft Track Excavator 40 – 80 Ton Aluminum Work Boat / Push Boat	105	1	n/a	D	10 HRS/ DAY 6 DAYS/WK	Pre-Assembling Spans	7-Apr-21	12-Aug-21
B		SET APPROACH SPANS AT PIERS 2 AND 4												
	A27730 A23390	Preassemble Span 1 - Southside / Erect Span 1 - Southside	n/a	n/a	n/a	Crane Barge with Spuds 200'x74' Material Barge 100' x 30' Crane on platform 200 Ton Crane on platform 300 Ton Man-lift 60 Ft Track Excavator 40 – 80 Ton Aluminum Work Boat / Push Boat	24 12	1	n/a	D	6 dys/wk 10 hrs/dy	Pre-Assembling Spans	18-Jan-22	7-Feb-22
	A27740 A23410	Preassemble Span 2 - Southside / Erect Span 2 - Southside	n/a	n/a	n/a		24 12	1	n/a	D		Pre-Assembling Spans	9-Jul-21	9-Oct-21
	A27750 A23470	Preassemble Span 4 - Southside/ Erect Span 4 - Southside	n/a	n/a	n/a		24 12	1	n/a	D		Pre-Assembling Spans	7-Apr-21	2-Aug-21

Section 7 Consultation and EFH Assessment Processes for Walk Bridge

Stage 11 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T-Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A		INSTALL CONCRETE DECKS & WALKWAYS AT APPROACH SPANS 2 AND 4												
	A23480	Set precast deck span 4 Southside	Deck Panels Closure Pours	7 8	EA EA	C3, BGC, BGM, BGW, C2, M60,E48,VW, VP	24	2	1	D	6 day (8 hours per day)	Erect From Platform	23-Oct-21	5-Nov-21
	A23420	Set precast deck span2 Southside	Deck Panels Closure Pours	6 7	EA EA		24	2	1	D		Erect From Platform	3-Mar-22	16-Mar-22
B		INSTALL SUPPORT, STRINGERS, BRACING & RAIL SYSTEM												
	A23630	A23630 Install New Slide Rails at Pier 2 and 3 - Southside - East	n/a	n/a	n/a	C3, BGC, BGM, BGW, C2, M60,E48,VW, VP, HP, HV	24	n/a	n/a	D	6 day (8 hours per day)	Erect From Platform		
	A23630	A23630 Install New Slide Rails at Pier 2 and 3 - Southside - West	n/a	n/a	n/a		24	n/a	n/a	D		Erect From Platform	14-Apr-22	13-Jun-22

Stage 12 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A25580	INSTALL TEMPORARY PILES, PILE CAPS, GIRDERS, BRACING AND RAILS FOR SLIDING - Existing Bridge	14" Steel Template Piles	16	EA	BGC, BGM, C2, M60, VW, VP, HP, HV	20	4	2	D	6 days /week 8 Hrs/day	Bubble Curtain	21-Jul-22	17-Aug-22
			14" Steel H Piles	56	EA									
	L11220	Close both navigation channels and install piling, support steel and rails for swing span slide out. (OPEN SWING SPAN AS NEEDED TO INSTALL PILING BENEATH IT).	n/a	n/a	n/a	n/a	36	2	2	D		n/a	21-Jul-21	17-Aug-22
B	A23690	FLOAT LIFT SPAN INTO PLACE AND TRANSFER SPAN ONTO SLIDING RAILS	n/a	n/a	n/a	3-VT, 2-VP, 2-BGF	6	1	1	D	6 days / week 10 hours / days	n/a	8-Jul-22	14-Jul-22

Stage 13 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A23770	96Hr Outage - Demo Existing Swing Span Approach Steel & Prep for Slide	n/a	n/a	n/a	Cranes 300 Ton Material Barge 100'x30' Work Barge 40'x40' Man-lifts 60 Ft Aluminum Work Boat / Push Boat	1	4	2	D	1 day (24 hours per day)	Catch Barges	18-Aug-22	18-Aug-22
B C	A26220	96Hr Outage - Slide Existing Swing Span out & New Southside Lift Span In	n/a	n/a	n/a		2	4	2	D	2days (24 hours per day)	n/a	20-Aug-22	21-Aug-22
	A26230	96Hr Outage - Make Final Track, OCS, & C&S Connections & Test Track	n/a	n/a	n/a		1	4	2	D	1 day (24 hours per day)	n/a	22-Aug-22	22-Aug-22
	A26440	MNRR to Perform Required Testing prior to Activation	n/a	n/a	n/a		1	n/a	n/a	D	1 day (24 hours per day)	n/a	23-Aug-22	23-Aug-22
D	A27800	Begin construction north lift span at marine staging yard and continue until float-in.	n/a	n/a	n/a	Cranes 200 Ton Material Barge 100x30 Delivery Barges Varies Man-lifts 60 Ft	180	1	Material Delivery Barges = 2 lds / Month	D	6 days (8 hours per day)	n/a	27-Sep-22	9-May-23

Section 7 Consultation and EFH Assessment Processes for Walk Bridge

Stage 14 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T-Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A26260	DEMOLISH EXISTING SWING SPAN FROM EXISTING PLATFORMS	n/a	n/a	n/a	300 Ton Crane Material	10	4	n/a	D	6 DAYS / WEEK --- 10 HRS/DAY	Catch Barges	15-Sep-22	26-Sep-22
B	A26260	INSTALL TEMPORARY SUPPORTS FOR APPROACH SPANS 2 AND 4 DEMOLITION	Shoring Towers	6	EA	Barge 100x30, Track	10	n/a	n/a	D		Work Low Tide	15-Sep-22	26-Sep-22
C	A23760	Remove Existing Approach Superstructure - Span 3 - Tracks 1 & 3	n/a	n/a	n/a	Excavator 60 ton, 36"	6	4	n/a	D		n/a	21-Sep-22	27-Sep-22
C	A23750	Remove Existing Approach Superstructure - Span 2 - Tracks 1 & 3	n/a	n/a	n/a	Hydraulic Shear, 25k ft-lb	30	4	n/a	D		n/a	21-Sep-22	25-Oct-22
C	A27910	Transport & Process Superstructure - Span 1 - Tracks 1 & 3	n/a	n/a	n/a	Hydraulic Hammer	6	n/a	n/a	D		n/a	26-Oct-22	1-Nov-22
C	A27920	Transport & Process Superstructure - Span 3 - Tracks 1 & 3	n/a	n/a	n/a		6	4	n/a	D		Catch Barges	2-Nov-22	8-Nov-22
C	A27930	Transport & Process Superstructure - Span 2 - Tracks 1 & 3	n/a	n/a	n/a	4 CY Loader,	6	n/a	n/a	D		n/a	9-Nov-22	15-Nov-22
C	A23780	Remove Remaining Swing Span Sections to Platform for Demo	n/a	n/a	n/a	Work Boat,	5	4	n/a	D	6 day (8 hours per day)	Catch Barges	9-Sep-22	14-Sep-22
D		Remove Old Power & Control Cables (150 Ft x 20 Ft) Avg Depth =4Ft	Dredge Soils AREA	475 560	CY SY	Push Boat BCS	15	1	n/a	D	6 day (8 hours per day)	Catch Barges	15-Dec-22	15-Jan-23

Section 7 Consultation and EFH Assessment Processes for Walk Bridge

Stage 15 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T-Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A26300 A26450	Remove Temporary Fender from around Pivot Pier/ - Remove Slide Rails North of Bridge/ - Remove Slide Rails South of Bridge/	Remove 14" Steel H Piles	72	EA	Cranes 300 Ton Crane Barge w/ Spuds 200 x 74 Material Barge 100x30 Work Barge 40' x 40' Impact and vibratory hammers Excavator Hydraulic Crane 80 Ton Man-lifts 60 Ft BCS	50	4	n/a	D	6 dy/wk 10 hrs/ dy		22-Aug-22	28-Dec-22
B / C		Install marine enclosures around river piers and demolish pivot pier and both rest piers.												
B / C	A23840 & A23860	EXISTING PIERS 2 & 3 Marine Enclosure Template piles	14" Steel H Piles	22	EA		40	4	n/a	D	6 day (10 hours per day)	Marine Enclosure	29-Dec-22	9-May-23
		Install Marine Enclos. Sheeting Existing Piers 2 & 3	Pz35 Sheetpiles	124	Dbls			4	n/a	D		n/a		
	A23850 & A23870	Demolish Existing Piers 2 and 3 (2000 SF Each)	Stone/Conc	1320	CY		24	6	2/wk to Devine 1.3 Miles	D		Marine Enclosure		
	A26330 & A26310	Remove Marine Enclosure at Piers 2 and 3	Pz35 Sheetpiles	124	Dbls		26	2	n/a	D		n/a		
		Remove Template Piles- Piers 2 and 3	14" Steel H Piles	22	EA			4	n/a	D		n/a		
B / C	A23880	EXISTING PIVOT PIER - Marine Enclosures-Template Piles	14" Steel H Piles	22	Piles		32	4	n/a	D		Silt Curtain	29-Sep-22	24-Jan-23
		Pivot Pier-Marine Enclosure - Install Sheets	Pz35 Sheetpiles	88	Dbls			4	n/a	D		Silt Curtain		
	A23890	Pivot Pier-Marine Enclosure - Demo (5000 SF)	Stone/Conc	3275	CY		60	6	2/wk to Devine 1.3 Miles	D		Silt Curtain		
	A26320	Pivot Pier-Marine Enclosure - Remove Sheets	Pz35 Sheetpiles	88	Dbls		18	2	n/a	D		n/a		
		Remove template Pile - Pivot Pier						4	n/a	D		n/a		
	A30160	Dredge channel to final depth round Pivot Pier (Area includes 200 feet around the pivot x Pier 14 feet wide) Depth = 14 Feet	Soils Area	1550 320	CY SY		30	4	n/a	D		Silt Curtain		
D	A30170	Remove submarine cables for CP243 Average (200 feet x 12 feet x 8 feet)	Soils	725	CY		15	8	n/a	D		Silt Curtain	9-Jan-24	15-Jan-24
E	A30180 & A30190	Modify Southeast and Southwest Work Platforms for Installation of Fenders	n/a	n/a	n/a	300 Ton Crane on Platform, Work Barge, Material Barge, Impact Hammer, Vibratory Hammer	50	n/a	n/a	n/a		n/a	13-Oct-22	13-Dec-22
	A30200 & A30210	Install South East Fender System Install South West Fender System	14" Steel H Template Piles	10	EA			5	n/a			n/a		
			14" Diameter Composite Fender Piles	60	EA			5				n/a		
F	A26410 & A26430	Excavation and demo of the East Abutment	n/a	n/a	n/a	Track Excavator 40-80TN	20	n/a	n/a	D	D	Debris Shield	12-Oct-22	14-Nov-22

Stage 16 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A26510	Form & Rebar Pedestals for Lift Pier 3 - Northside	n/a	n/a	n/a	Cranes 300 Ton Crane on Barge 200 Ton Crane Barge w/ Spuds 200x74 Material Barge 100x30	36	4	n/a	D	6 day /wk 10 hours /day	Debris shield aournd perimeter	28-Sep-22	8-Nov-22
	A26520	Place Pedestals for Lift Pier 3 - Northside	n/a	n/a	n/a									
	A26530	Cure Pedestals for Lift Pier 3 - Northside	n/a	n/a	n/a									

Stage 17 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T-Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A27800 A27820	CONTINUE CONSTRUCTION ON THE NORTH LIFT SPAN	n/a	n/a	n/a	Cranes 200 Ton Material Barge 100x30 Delivery Barges Varies Man-lifts 60 Ft	n/a	n/a	n/a	D	6 Days/ Week --- 10 Hours/Day	n/a	27-Sep-22	9-May-23
B	A24220 & A26630	Construction of New East Abutment	n/a	n/a	n/a	Track Excavator 40TN Crane 200TN	65	n/a	n/a	D	6 Days/ Week --- 10 Hours/Day	Debris Shield	21-Jan-23	11-Apr-23

Stage 18 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	Days Used	On Site Daily	Off Site				Early Start	Early Finish
A	A28070 A26730	SET PIER 2 TOWER SPANS NORTHSIDE	Tower Spans	2	EA	300 ton Crane -Platform 200 Ton Crane-Barge Material Barge 100x30 Crane Barge w/ Spuds Manlift 60 Ft	10	1	n/a	D	6 days / week 10 hours / day	n/a	7-Mar-23	27-Mar-23
	A30340 A30360	SET PIER 3 TOWER SPANS NORTHSIDE	Tower Spans	2	EA		10	1	n/a	D		n/a	11-Sep-22	2-Dec-22
B	A27840 A24250	Preassemble Span 2-Northside Erect Span 2 - Northside	n/a	n/a	n/a	300 ton Crane -Platform 200 Ton Crane-Barge Material Barge 100x30 Crane Barge w/ Spuds Manlift 60 Ft	24	1	n/a	D	6 days / week 10 hours / day	n/a	7-Mar-23	12-Apr-23
	A27870 A24310	Preassemble Span 4 - Northside Erect Span 4 - Northside	n/a	n/a	n/a		24	1	n/a	D		n/a	04-Apr-23	26-Apr-23

Stage 19 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A24260	Set & Secure Precast Deck Slab & Curb - Span 2 - Northside	Deck Panels Closure Pours	7 8	EA EA	Crane 300 Ton Cranes 200 Ton Crane 80 Ton Excavator 40 Ton Man-lifts 60 Ft	24	2	n/a	D	6 days / week ----------10 hours / day	n/a	13-Apr-23	26-Apr-23
A	A24230	Set & Secure Precast Deck & Curb - Span 4 - Northside.	Deck Panels Closure Pours	6 7	EA EA		24	2	n/a	D		n/a	9-May-23	22-May-23

Stage 20 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A24490	Float Northside Lift Span to Northside of Bridge	n/a	n/a	n/a	Float-in Barge 90'x180' Crane 175 Ton Man-lift 60 Ft Aluminum Work Boat	2	1	1	D/N	6 days/week, 10 hours / day	n/a	8-Jul-23	10-Jul-23
	A24500	Prep Northside Lift Span for Installation & Jack Up to Required Float In Elevation	n/a	n/a	n/a		5	n/a	n/a	D/N		n/a	11-Jul-23	15-Jul-23

Stage 21 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A		Float new north lift span into place												
		CLOSE CHANNEL TO MARINE TRAFFIC AND MOVE THE NORTH LIFT SPAN FROM THE NORTHEAST PLATFORM TO IT'S FINAL POSITION.												
	A24480	Float-In & Secure Northside Lift Span	n/a	n/a	n/a	Tug Boats Aluminum Work Boat Push Boats Hydraulic Jacks	2	2	n/a	D/N	7 days/ week, 10 hours / day	n/a	17-Jul-23	18-Jul-23
	A26800	Activate New Northside Lift Span	n/a	n/a	n/a		5	2	n/a	D		n/a	19-Jul-23	24-Jul-23
	A30250	Make Final Mechanical & Electrical Connections for Lift Span - Northside	n/a	n/a	n/a		5	2	n/a	D		n/a	19-Jul-23	24-Jul-23
	A30260	Connect Counterweight Ropes to Lift Span - Northside	n/a	n/a	n/a		2	2	n/a	D		n/a	19-Jul-23	20-Jul-23
	30670	Release Counterweight & Tension Ropes Prior to Operation - Northside	n/a	n/a	n/a		3	2	n/a	D		n/a	21-Jul-23	24-Jul-23
	A30270	Perform Final Alignment & Balancing of Lift Span - Northside	n/a	n/a	n/a		20	n/a	n/a	D		n/a	25-Jul-23	16-Aug-23
	A30280	Commission Lift Span - Northside	n/a	n/a	n/a		10	n/a	n/a	D		n/a	17-Aug-23	28-Aug-23
	A26840	Make Final Track, OCS, & C&S Connections & Test Track s 1 & 3	n/a	n/a	n/a		1	n/a	n/a	D		n/a	8-Dec-23	8-Dec-23

Section 7 Consultation and EFH Assessment Processes for Walk Bridge

Stage 22 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T-Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
	A30300	Modify NE Work Platform for Installation of the Northeast Fender (No in-water Work)	n/a	n/a	n/a	Crane Barge with Spuds 200x74 Material Barge 100' x 30' Work Barge 40' x 40' Excavator 40 ton Crane 200 Ton Man-lift 60 Ft Hydraulic crane 80 Ton Aluminum Work Boat Vibratory pile hammer	10	n/a	n/a	D	6 day (8 hours per day)	n/a	19-Jul-23	29-Jul-23
	A30320	Install North East Fender System	14" Composite Pipe Piles 14" H Piles	30 7	EA EA		20	4	n/a	D		Bubble Curtain	31-Jul-23	22-Aug-23
	A24510	Remove Trestle & Piles - NE	30'' Pipe Piles	66	EA		56	2	n/a	D		Bubble Curtain	23-Aug-23	28-Oct-23
			24" Pipe Piles	6	Ea		56	2	n/a	D		Bubble Curtain	23-Aug-23	28-Oct-23
			14" Steel H Piles	20	Ea		56	2	n/a	D		Bubble Curtain	23-Aug-23	28-Oct-23
	A30740	Perform Restoration - NE	n/a	n/a	n/a		36	n/a	n/a	D		n/a	22-Nov-23	11-Jan-24
	A30310	Modify NW Work Platform for Installation of the North West Fender (No in-water Work)	n/a	n/a	n/a		10	n/a	n/a	D		n/a	31-Jul-23	10-Aug-23
	A30330	Install North West Fender System	14" Composite Pipe Piles 14" H Piles	30 7	EA EA		20	4	n/a	D		Bubble Curtain	23-Aug-23	16-Sep-23
	A24530	Remove Trestle & Piles - NW	30'' Pipe Piles	32	EA		56	2	n/a	D		Bubble Curtain	22-Nov-23	11-Jan-24
			24" Pipe Piles	4	Ea		56	2	n/a	D		Bubble Curtain	22-Nov-23	11-Jan-24
			14" Steel H Piles	20	Ea		56	2	n/a	D		Bubble Curtain	22-Nov-23	11-Jan-24
	A30730	Perform Restoration - NW	n/a	n/a	n/a		36	n/a	n/a	D		n/a	12-Jan-24	24-Feb-24
	A30760	Perform Wetland Mitigation - NW	n/a	n/a	n/a		15	n/a	n/a	D		n/a	12-Jan-24	29-Jan-24
	A24520	Remove Trestle & Piles - SE	30'' Pipe Piles	77	EA		56	2	n/a	D		Bubble Curtain	1-Dec-22	10-Feb-23
			24" Pipe Piles	6	Ea		56	2	n/a	D		Bubble Curtain	23-Aug-23	28-Oct-23
			14" Steel H Piles	20	Ea		56	2	n/a	D		Bubble Curtain	23-Aug-23	28-Oct-23
	A30720	Perform Restoration - SE	n/a	n/a	n/a		36	n/a	n/a	D		n/a	11-Feb-23	27-Mar-23
	A24580	Remove Trestle & Piles Span - SW	30" Pipe Piles	128	EA		48	2	n/a	D		Bubble Curtain	21-Apr-23	17-Jun-23
	A24580	Remove Trestle & Piles Span - SW	30'' Pipe Piles	41	EA		48	2	n/a	D		Bubble Curtain	21-Apr-23	17-Jun-23
			24" Pipe Piles	6	Ea		48	2	n/a	D		Bubble Curtain	21-Apr-23	17-Jun-23
			14" Steel H Piles	20	Ea		48	2	n/a	D		Bubble Curtain	21-Apr-23	17-Jun-23
			PZ35 Sheetpiles	43	Dbls		48	2	n/a	D		Bubble Curtain	21-Apr-23	17-Jun-23
	A30710	Perform Restoration - SW	n/a	n/a	n/a		36	n/a	n/a	D		n/a	19-Jun-23	31-Jul-23
	A30750	Reverse Vessel Relocation - SW	n/a	n/a	n/a		15	4	n/a	D		n/a	19-Jun-23	6-Jul-23
	A30680	Remove Trestle & Piles Span - Storage Yard	24" Pipe Piles Sheets 14" H Piles	32 58 32	EA Dbls EA		48	2	n/a	D		Bubble Curtain	28-Jul-23	23-Sep-23
		Install permanent bulkhead along marine staging yard	PZ35 Sheetpiles	80	Dbls		30	n/a	n/a	D		Bubble Curtain	28-Jul-23	1-Oct-23
	A30700	Perform Restoration - Storage Yard	n/a	n/a	n/a		36	n/a	n/a	D		n/a	25-Sep-23	4-Nov-23
		Remove Old Signal & Control Cables (250 Ft x 20 Ft) Avg Depth =4Ft	Dredge Soils AREA	800	560 CY SY		15	1	n/a	D	6 day (8 hours per day)	Catch Barges	15-Dec-22	15-Jan-23

EQUIPMENT		
Code	**Type**	**Description**
BCS	Buckets	Clam Shell Bucket
BE	Buckets	Digging Bucket
BGC	Barge	Crane Barge w/ Spuds 200 x 74
BGD	Barge	Delivery Barges
BGF	Barge	Float-in Barges 90 x 180
BGK	Barge	Deck Barge 100 x 30
BGM	Barge	Material Barge 100 x 30
BGW	Barge	Work Barge 40x40
C175	Crane	175 Ton Crane
C2	Crane	Crane 200 Ton
C2B	Crane	200 Ton Crane on a Barge
C3	Crane	Crane 300 Ton on Platform
CH80	Crane	80 Hydraulic Crane
DEH	Demo Equipment	Hydraulic Hammer
DES	Demo Equipment	Hydraulic Shear
DLH	Drill	Drill Low Headroom
E30	Excavator	Excavator 30 Tons
E46	Excavator	Track Excavator 40-60 Ton
E48	Excavator	Track Excavator 40-80 Ton
ELR	Excavator	Excavator Loader Rubber Tired
HE	Hammer	Hammer / Extractor
HP	Hammer	Pile Impact Hammer
HV	Hammer	Vibratory Hammer
JH	Jacks/Lifts	Hydraulic Jacks
L4	Loaders	Loader 4 CY
M60	Lifts	Manlift 60 Ft
OSC	Oscillator	Hydraulic Oscillator
PC	Concrete Pump	Concrete Pump
TT	Truck	Triaxle Truck
VP	Vessel	Push Boat
VT	Vessel	Tug Boat
VW	Vessel	Work Boat

Attachment M2 – ESA Section 7 Informal Consultation Approval

From:	Lesay, Kimberly C
To:	Sarah Walker
Cc:	Hanifin, John D.; Fallon, James A; Samorajczyk, Christopher W; Davis, Andrew H; "Bertoli, Richard"
Subject:	FW: CTDOT 301-176 WALK Bridge_Project Changes
Date:	Thursday, June 18, 2020 8:46:31 PM

Sarah – please see correspondence below for inclusion into our re-evaluation for Manresa Island from NMFS. We still need concurrence from the EFH side of the shop, but this closes our loop on concurrence from the ESA side that re-initiation is not necessary due to the inclusion of utilizing Manresa for staging and storage.

Kimberly Lesay
Transportation Assistant Planning Director
Office of Environmental Planning
2800 Berlin Turnpike
Newington, CT
Office: (860) 594-2931
Cell: (860) 992-9759
Kimberly.Lesay@ct.gov

From: Zachary Jylkka - NOAA Federal <zachary.jylkka@noaa.gov>
Sent: Thursday, June 18, 2020 5:08 PM
To: Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov>
Cc: Davis, Andrew H <Andrew.H.Davis@ct.gov>; Lesay, Kimberly C <Kimberly.Lesay@ct.gov>; Alison Verkade - NOAA Federal <alison.verkade@noaa.gov>
Subject: Re: CTDOT 301-176 WALK Bridge_Project Changes

Hi Chris,

Thank you for the email. We agree with your review of the reinitiation triggers and concur that the project modifications you described do not require reinitiation of consultation at this time.

Regards,
Zach

On Thu, Jun 18, 2020 at 12:55 PM Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov> wrote:

Hi Zach-

The Connecticut Department of Transportation has recently added a new staging and storage yard to CTDOT 301-176 Replacement of the Metro North RR Bridge over the Norwalk River in Norwalk, CT. The addition of this area located at -73.41/ 41.072-west side of Norwalk Harbor mouth is referred to as Manresa Island. This area has a deep water barge slip along side a decommissioned coal plant. The deep water slip connects directly to the dredged navigation channel. This is a much better area to use –one that the Town's Shellfish and Harbor Commissions have been really pushing for. The use of this area will be extremely less detrimental to the Rivers ecosystem and really a greater fit for the oyster industry and recreational boating on a whole –due to the large mooring areas for the construction barges. As well as the addition of the new staging area the Department also is implementing a longer dredge window for dredging outside of a marine enclosure. The new dredge window will be from December 1st through March 31st and will be within a TYPE III permeable turbidity curtain.

The addition of this new staging area and longer dredge window will not require re-initiation of project CTDOT 301-176 due to the following:

-The new information does not reveal effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered.

-The identified actions are subsequently modified in a manner that does not cause an effect to the listed species or critical habitat that was considered in the biological opinion or written concurrence.

-No new species have been listed or critical habitat designated that may be affected by the identified action.

The Department requests concurrence that the addition of Manresa Island and the turbidity curtain only dredge window Time of Year extension form 12/1-3/31 does not require reinitiation under Section 7 ESA. If there are any questions or concerns please do not hesitate to contact me -Talk soon

Thanks, Chris

Christopher W. Samorajczyk, CWB

Natural Resources Planning

Connecticut Department of Transportation

Office of Environmental Planning

Bureau of Policy & Planning

P: 860-594-2938

--
Zach Jylkka
Fisheries Biologist
Protected Resources Division
Greater Atlantic Regional Fisheries Office
NOAA Fisheries
Gloucester, MA 01930
zachary.jylkka@noaa.gov
office: (978) 282-8467
Pronouns: (he/him/his)

For additional ESA Section 7 information and Critical Habitat guidance, please see: https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-consultation-technical-guidance



From:	Christian Brown
To:	Thomas Adinolfi; Van Robbins; Joe Grilli; Sarah Walker; Michael Turgeon
Cc:	Nicholas Wild; Todd Sanders
Subject:	FW: CTDOT 301-176 WALK Bridge Replacement_Norwalk CT
Date:	Tuesday, August 20, 2019 5:19:27 PM
Attachments:	image001.png image002.png

Please see below - - it looks like hoe rams above HT are permissible. We will need to re-word the note on the plans accordingly.

Thanks.

Christian J. Brown, PE
HNTB Corporation
913.221.3327

From: Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov>
Sent: Tuesday, August 20, 2019 3:24 PM
To: Christian Brown <CBROWN@HNTB.com>
Cc: JROIG@middlesexco.com; Hanifin, John D. <John.Hanifin@ct.gov>; Davis, Andrew H <Andrew.H.Davis@ct.gov>; Piraneo, Andrew <Andrew.Piraneo@ct.gov>
Subject: FW: CTDOT 301-176 WALK Bridge Replacement_Norwalk CT

Good news---In regards to the center pier removal work *above* HT—hoe ramming will not have any adverse effect to ESA listed species and can/will be allowed—see below. Obviously, none of the debris can fall into the River or splash down into the water in the marine enclosure if this causes large splashing outside the turbidity curtain. Change Note 5 on CA14-2 to reflect this. Let me know if there are any questions.
Chris

Christopher W. Samorajczyk
Wildlife Biologist
Connecticut Department of Transportation
Office of Environmental Planning
Bureau of Policy & Planning
P: 860-594-2938 / F: 860-594-3028 / E: christopher.samorajczyk@ct.gov

From: Zachary Jylkka - NOAA Federal <zachary.jylkka@noaa.gov>
Sent: Tuesday, August 20, 2019 3:59 PM

To: Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov>
Cc: Davis, Andrew H <Andrew.H.Davis@ct.gov>; Alison Verkade - NOAA Affiliate <alison.verkade@noaa.gov>
Subject: Re: CTDOT 301-176 WALK Bridge Replacement_Norwalk CT

Hi Chris,

No, no concerns from the ESA perspective regarding the hoe ram work above HT in either case. Thanks for checking.

Zach

On Tue, Aug 20, 2019 at 12:15 PM Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov> wrote:

> Hi Zach-
> Hope your summer is going well---We are in the final push of Permit preparation for CTDOT 301-176 WALK Bridge replacement and something new has come up that I want to run by you. As part of the new bridge Project we are removing the old center pier form the Norwalk River. This removal will be within a marine enclosure and a Type III Turbidity Curtain. The removal was originally anticipated to be done using an excavator and thumb—see note 5 of the attached Permit Plate. In discussion with the Contractor they indicated that they thought this note was only for the part of the structure that was in water not the 20 feet above the HT. Also, on top of this pier is a 60 foot diameter cement cap that they want to remove using a hoe ram. This cap removal would take approximately 2-3 days. The question I have is would you be concerned with the above HT work being done with a hoe ram or perhaps just the cap removal or would either one of these activities result in an adverse effect to the ESA listed species? Let me know if you have any questions--Talk soon
> Thanks, Chris

Christopher W. Samorajczyk
Wildlife Biologist
Connecticut Department of Transportation
Office of Environmental Planning
Bureau of Policy & Planning
P: 860-594-2938 / F: 860-594-3028 / E: christopher.samorajczyk@ct.gov



From:	Samorajczyk, Christopher W
To:	Lauren DiGovanni
Cc:	Davis, Andrew H; Hanifin, John D.; Joe Grilli; Sarah Walker; Michael Turgeon; Lesay, Kimberly C; Fallon, James A
Subject:	FW: CTDOT 301-176 WALK Bridge Replacement_Norwalk CT
Date:	Thursday, January 28, 2021 10:40:19 AM
Attachments:	image001.png image003.png WALK ESA Update 2019_No Reinitiation (1).docx

Attached is the final / approved ESA submittal with email concurrence (below) for the WALK Bridge modifications. There is no need for ESA Section 7 reinitiation from NMFS PRD at this time. Of course, if future modifications may affect ESA listed species and/or critical habitat reinitiation may possibly be needed at that time. This concludes consultation for ESA Section 7 for CTDOT 301-176. Let me know if there are any questions.
Thanks, Chris

Christopher W. Samorajczyk
Wildlife Biologist
Connecticut Department of Transportation
Office of Environmental Planning
Bureau of Policy & Planning
P: 860-594-2938 / F: 860-594-3028 / E: christopher.samorajczyk@ct.gov



From: Zachary Jylkka - NOAA Federal <zachary.jylkka@noaa.gov>
Sent: Thursday, August 01, 2019 3:59 PM
To: Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov>
Cc: Davis, Andrew H <Andrew.H.Davis@ct.gov>; Alison Verkade - NOAA Affiliate <alison.verkade@noaa.gov>
Subject: Re: CTDOT 301-176 WALK Bridge Replacement_Norwalk CT

Hi Chris,

Based on the information you have provided, we concur with your determination that proposed modifications to the Norwalk Walk Bridge project will not introduce any new effects to ESA-listed species that were not already addressed in the July 17, 2018 consultation. Therefore, reinitiation is not required at this time.

Regards,
Zach

On Thu, Aug 1, 2019 at 1:40 PM Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov> wrote:

> Thanks Zach—
> There will be a slight increase in the net area temporary or permanently affected from this Project. The additional increase will be associated with the Duct Bank Installation. This was previously a directional drilling activity, but due to a more in-depth look at the substrate in the area of the Bridge it was determined the drilling methodology would have a high probability of frack out –creating a very high risk of impact to the resources we are trying to protect. The area being further impacted by this activity will be done behind a marine enclosure with a turbidity curtain so will result in a discountable effect on any ESA listed species that may happen upon this area. Due to the duration of this Project almost all of the impacts where categorized as permanent even though most of these impacts will be removed/restored at the completion of the Project. I reworded the Updated ESA Word Doc to include your requests related to reinitiation—I hope this is sufficient. Let me know if you need anything else or if you think we should chat quick —Talk soon
> Thanks, Chris
>
> **From:** Zachary Jylkka - NOAA Federal <zachary.jylkka@noaa.gov>
> **Sent:** Thursday, August 01, 2019 10:43 AM
> **To:** Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov>
> **Subject:** Re: CTDOT 301-176 WALK Bridge Replacement_Norwalk CT
>
> Hi Chris,
>
> Thanks for the reminder. I did have a chance to read through - the Word Doc describing the updates and comparing to the original proposal was very helpful. My only question is, will there be a net increase/decrease in temporary/permanently affected habitat because of the proposed changes?
>
> As for the conclusion at the bottom - what I would like to see is a recognition of the 4 ESA section 7 reinitiation triggers, a sentence clarifying which of those triggers apply in this case, and then a concluding statement that it is your determination that that trigger has not been met, reinitiation of consultation is not required at this time, and you request our concurrence. Does that make sense? You can find the reinitiation language at the bottom of our July 17, 2018 letter you attached (the fourth trigger is that take allowed under the ITS has been exceeded - since this is an informal without an ITS, that one doesn't apply). Let me know if you haev any questions about that approach.
>
> Cheers,
> Zach
>
> On Thu, Aug 1, 2019 at 9:48 AM Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov> wrote:
>
> > Hi Zach-
> > Did you have a chance to look at this Project again? Let me know if you want to discuss or need

any additional information----Talk soon
Thanks, Chris

Christopher W. Samorajczyk
Wildlife Biologist
Connecticut Department of Transportation
Office of Environmental Planning
Bureau of Policy & Planning
P: 860-594-2938 / F: 860-594-3028 / E: christopher.samorajczyk@ct.gov



From: Zachary Jylkka - NOAA Federal <zachary.jylkka@noaa.gov>
Sent: Monday, July 22, 2019 3:56 PM
To: Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov>
Cc: Davis, Andrew H <Andrew.H.Davis@ct.gov>
Subject: Re: CTDOT 301-176 WALK Bridge Replacement_Norwalk CT

Hi Chris,

Great to finally meet you in person. Thanks for the summary of the proposed changes. I'll take a look in the next day or two and get back to you with any thoughts/comments on how I think we should proceed.

Best,
Zach

On Fri, Jul 19, 2019 at 2:15 PM Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov> wrote:

> Hi Zach-
> Great meeting and talking quick with you yesterday---
> As I mentioned yesterday, and we have spoken about over the winter, we have changed a few construction methodologies to CTDOT 301-176 WALK Bridge replacement, Norwalk, CT since PRD's insignificant finding dated July 17, 2018 (attached). The Department, on behalf of FTA, believes that the new construction methodologies will still be insignificant to ESA listed species that may occur within the Project area. For your convenience I have attached a word document outlining the changes. The Construction activity Permit Plates are referenced in the narrative but they are large and I'm not sure that they add more to your review so I didn't attach them—but can if you would like to take a look. Also attached are CTDOT's pile driving results from this past November. Maybe a quick call would help—Didn't mean to dump a bunch of documents on you but thought sending this information could give you the complete

picture to concur on these changed activities---again if you need anything else please let me know. I should be available next week Monday through Wednesday—if you want to talk through any of this –have a great weekend—talk soon
Thanks, Chris

Christopher W. Samorajczyk
Wildlife Biologist
Connecticut Department of Transportation
Office of Environmental Planning
Bureau of Policy & Planning
P: 860-594-2938 / F: 860-594-3028 / E: christopher.samorajczyk@ct.gov

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From: Samorajczyk, Christopher W
Sent: Thursday, December 27, 2018 9:26 AM
To: 'Zachary Jylkka - NOAA Federal' <zachary.jylkka@noaa.gov>
Cc: Davis, Andrew H <Andrew.H.Davis@ct.gov>
Subject: CTDOT 301-176 WALK Bridge Replacement_Norwalk CT

Hi Zach-
Happy Holidays- Not sure if you guys are in the Office -if not hope your enjoying your time off. Anyway –when you get chance let me know I want to talk quick about the WALK Bridge and some activities we are changing and some we have tweaked due to the Contractors take and understanding of the commitments we had agreed to. Basically, we have too many consultants/ people working on this job and not everyone was on the same page. We also completed our acoustic and turbidity testing so I wanted to run that by you as well before we reinitiate consultation—talk soon
Thanks, Chris

Christopher W. Samorajczyk
Wildlife Biologist
Connecticut Department of Transportation
Office of Environmental Planning
Bureau of Policy & Planning
P: 860-594-2938 / F: 860-594-3028 / E: christopher.samorajczyk@ct.gov

--

Revisions to Construction Activities

Most activities described in the original Section 7 ESA documentation remain unchanged. However, four activities (Lift Pier Construction, Existing Pier Demolition, Cut and Cover Cable and Duct Bank Installation, and Marine Staging Yard Bulkhead) have been modified and are described below.

Lift Pier Construction

Current Means and Methods

Each lift tower (Pier 2 (CA9-1 through CA9-7) and Pier 3 (CA10-1 through CA10-7)) will be supported by 4 drilled shafts and two micro pile clusters constructed within marine enclosures. The west tower foundations will be constructed in the tidal zone between low and high tide elevations. The four drilled shafts and the casings for the micropile clusters are each 12 feet in diameter and consist of a minimum 1-inch thick permanent round casing that extends from above the high-water line at the top to a bottom seated and sealed into rock. The casing is seated a few feet into rock and has a water tight seal keeping the water inside the casing separate from any outside water. This is a crucial step in being able to maintain a head of water higher inside the casing than outside. Since the drilled shaft casing is sealed into bedrock, the water within the drilled shaft rock socket and casing will be separate and independent of any river water. Water will be pumped in and out of the drilled shaft in a closed system that facilitates removal of drill cuttings. The fluid in the closed system will be contained and disposed of properly under CTDEEP statute and the Department Form 817.

After drilling of the rock socket, the shaft is cleaned by circulating clean water to remove the debris on the bottom and the suspended solids in the fluid contained in the sealed casing. A reinforcing cage is assembled and lowered to the bottom of the shaft. A water tight tremie pipe is inserted to the bottom of the shaft and concrete is continuously placed from the bottom displacing water to the top. The water is pumped out of the drilled shaft casing and returned to the holding tanks.

The four shafts in each group are surrounded by a sheet pile marine enclosure. Each steel sheet is interlocked with the adjacent sheet and forms an almost water tight barrier. Water levels within the marine enclosure will lag behind the rising and falling tidal water in the river, producing a minor flow, or seepage, through the walls of the enclosure. This seepage will transmit little to no sediment and will not create a turbid condition. As added protection to the drilled shaft casing and marine enclosure, a turbidity curtain will surround all sides of the enclosure and rise and fall with the outside water levels.

Once the group of drilled shaft foundations within the marine enclosure is complete, there may be excavation within the marine enclosure to construct the concrete caps spanning the tops of the drilled shafts. Contaminated water removed from the marine enclosure will be stored in tanks and transported offsite for disposal at an approved location. Turbid water from within the enclosure will be managed by pumping to holding tanks for decanting prior to testing and returning the clean water to the river.

Any excavation within the marine enclosure will be backfilled with original organic material to the original ground surfaces.

Comparison to Previous Means and Methods

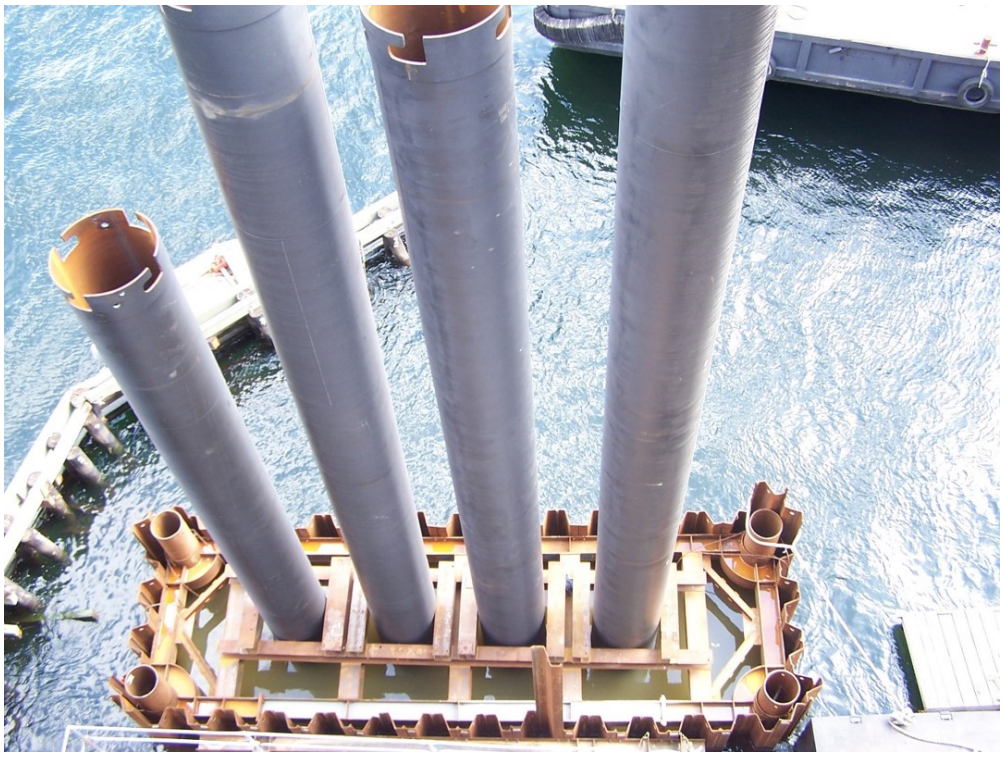
Overall means and methods for lift pier construction within marine enclosures remain the same with the intent to confine activities without being sealed watertight, working in wet conditions. Current means

and methods stipulate turbidity curtains are now intended to surround the marine enclosures from the outside rather than the interior perimeter. It is anticipated that turbidity generated by activities within the marine enclosures will not affect the river outside of the marine enclosure, and therefore would not be bound by TOY restrictions on silt producing activities.

Representative Photos from Different Projects



Typical Marine Enclosure



Typical drilled shaft casing within a marine enclosure



Typical drilled shaft within a marine enclosure, covered platform



Drilled shaft casings surrounded with turbidity curtain

Existing Pier Demolition

Current Means and Methods

The existing pivot pier and rest piers 2 and 3 (CA14-1 through CA14-8) are to be removed to below the mudline. All piers are constructed of a perimeter of dimension stone which contains a core filling of unreinforced rubble stone and concrete. Marine enclosures surrounding each existing pier will be constructed in a similar manner as those surrounding the drilled shafts (interconnecting steel sheet pile walls). The marine enclosure will separate the water outside from the water within. A floating turbidity curtain will also surround each marine enclosure. Since the piers are constructed of unreinforced stone blocks with a rubble stone core, they are anticipated to be dismantled with a track hoe located on a barge. The individual blocks will be taken apart with the force of the track hoe and bucket/thumb attachment. The blocks and rubble stone will be loaded into a barge and hauled off site. The dismantling will keep the blocks intact and not require breaking with a hoe ram or jack hammer type equipment. Turbid water from within the enclosure will be managed by pumping to holding tanks for decanting prior to testing and returning the clean water to the river.

Comparison to Previous Means and Methods

Overall means and methods for existing pier demolition within marine enclosures remain the same with the intent to confine activities without being sealed watertight, working in wet conditions. Turbidity curtains are now intended to surround the marine enclosures from the outside rather than the interior perimeter. It is anticipated that turbidity generated by activities within the marine enclosures will not affect the river outside of the marine enclosure, and therefore would not be bound by TOY restrictions on silt producing activities. Additionally, current means and methods for pier demolition will not

employ the use of hoe ram or jackhammer equipment, and as a result, activities are not expected to rise above ESA listed species noise impact thresholds.

Representative Photo from Different Project



Track hoe with grapple

Cut and Cover Cable and Duct Bank Installation

Current Means and Methods

The installation of the traction power cables, communication cables, and signal cables across the channel for the Walk Bridge Replacement Project will be performed utilizing a three-stage cut and cover process within marine enclosures and turbidity curtains as depicted in the attached drawings numbered CA2-1 through CA2-4. The cut and cover option for the cable crossing is a traditional construction method of placing the pipe at the desired elevation by excavating and removing material to create a trench, placing the pipes and then backfilling the trench.

All work that could result in sedimentation within the water will be completed inside a turbidity curtain and marine enclosure. Underwater noise associated with pile driving activities exceed behavioral and physiological thresholds. Impacts associated with underwater noise will be mitigated for by starting each shift with a soft start for all pile driving activities that are conducted outside the November 1st – March 15th timeframe, per ACOE guidance.

The work to install the ducts for the cables will be performed in the following sequence to adhere to the channel restriction of less than 50% blockage:

Stage 1

- Set turbidity curtain (east side of channel), install sheet piles for support of excavation and marine enclosure
- Excavate trench collecting excavate in the hopper barge
- Install ducts
- Backfill trench and remove marine enclosure

Stage 2

- Restrict navigation to one channel, mobilize barges to closed channel
- Reset turbidity curtain and install marine enclosure
- Excavate trench
- Install Ducts
- Backfill trench and remove marine enclosure

Stage 3

- Restrict navigation to one channel, mobilize barges to closed channel
- Reset turbidity curtain and install marine enclosure
- Excavate trench
- Install Ducts
- Backfill trench and remove marine enclosure
- Pull cables through Ducts

Comparison to Previous Means and Methods

Previous means and methods included cut and cover options without the marine enclosure installed and horizontal directional drilling (HDD). The cut and cover without a marine enclosure option has been abandoned to avoid the time of year restriction for silt producing activities. The HDD option was abandoned due to risks associated with obstructions and the potential for leakage of drilling fluid.

HDD is a construction method that uses guided drill rigs to install pipe underground. This method reduces excavation and backfill and can potentially avoid obstacles by drilling beneath the obstacle. The drill route is constrained by:

- Available staging and pipe laydown area
- Adjacent construction activities
- Soil density and stratification
- Soil cover above the pipe path
- Reasonable entry angles
- Distance to existing obstructions
- Distance to utilities
- Minimum drill radius
- Minimum pipe bend radius
- Existing soil fissures such as boring holes or removed piles

The HDD vertical route is constrained by the available space for drilling, the soil stratification, and the obstacles in the channel. HDD operations are most successful when routed through compact soil layers. If the soil is too soft or there isn't enough confining overburden pressure, then it is harder to steer the drill and the risk for leaking drilling fluid also increases. This is

referred to as frac-out. Soil layers with cobbles and boulders are more difficult to drill through. There is a layer of alluvial soils at the bottom of the channel. This layer is soft and light weight, increasing the risk of frac-out through this layer. Under the alluvial layer is a layer of glacial till. This soil layer is suitable for the HDD route because the till is compacted material with adequate overburden pressure for confinement and does not contain significant cobbles or boulders. However, as indicated from the soil borings, the material below the glacial till layer is a layer of glacial till with cobbles and boulders. The boundary between the two layers is at varying depths increasing the risk of encountering an obstacle. Below the layer of cobbles and boulders is bedrock.

The HDD option has several risk factors related to construction including:

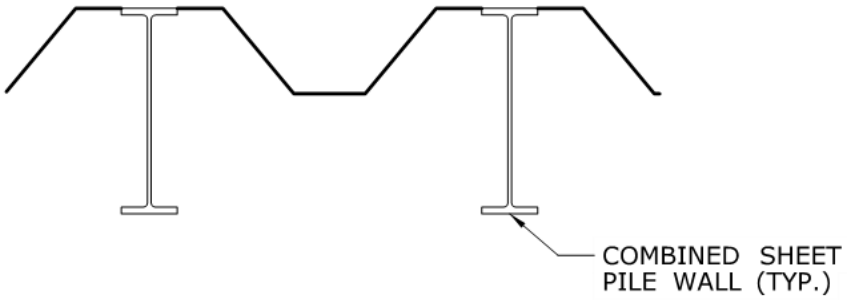
- Narrow band of acceptable soil layers for the HDD route to cross under the channel
- Uncertainty where the glacial till and cobbles layer starts
- Steerability of the drill rig, i.e. how accurate the path is
- Frac-out due to obstructions, lack of overburden, or soil fissures

The largest risk for the HDD option is for frac-out. If the drilling fluid pressure can't be reestablished for a bore hole, the hole will have to be abandoned. Due to the constraints for the horizontal layout, abandoning a bore hole will have significant impact on the constructability. There is no room to relocate a pipe to the north. Pushing one of the pipes south will increase the risk of hitting the existing trestle piles, which in turn increases the risk for another frac-out.

Marine Staging Yard Combination Pile Bulkhead and Elimination of Trestle

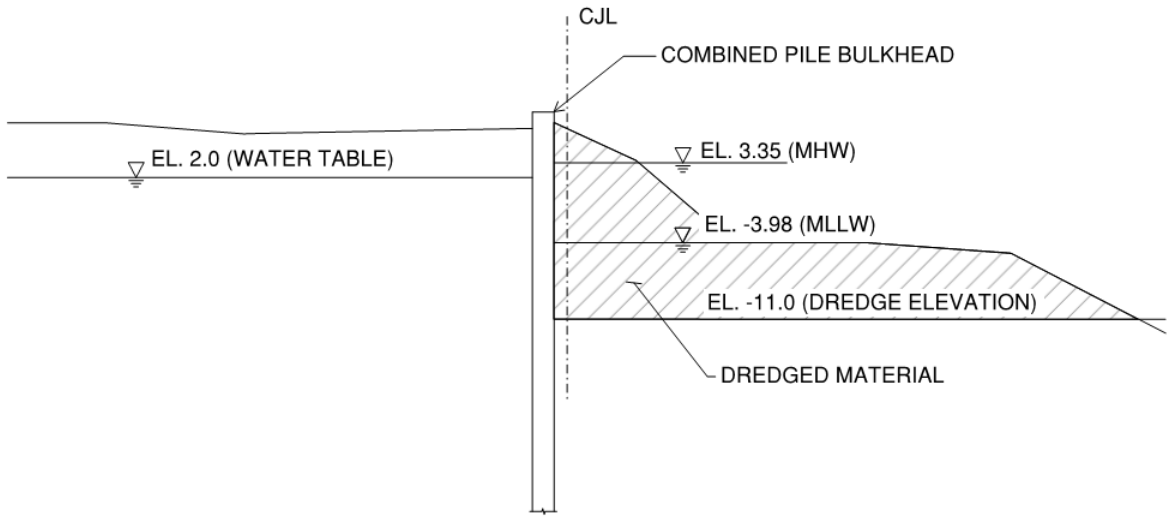
Current Means and Methods

The Marine Staging Yard bulkhead (CA4-1 through CA4-4) will be constructed as a combination pile bulkhead. The construction of the permanent bulkhead and the associated dredging will eliminate the need for the trestle proposed in the original documentation. A combination pile wall is a system that uses sheet piles that are reinforced with pipe or W-shape piles. A typical combination pile section is shown below.



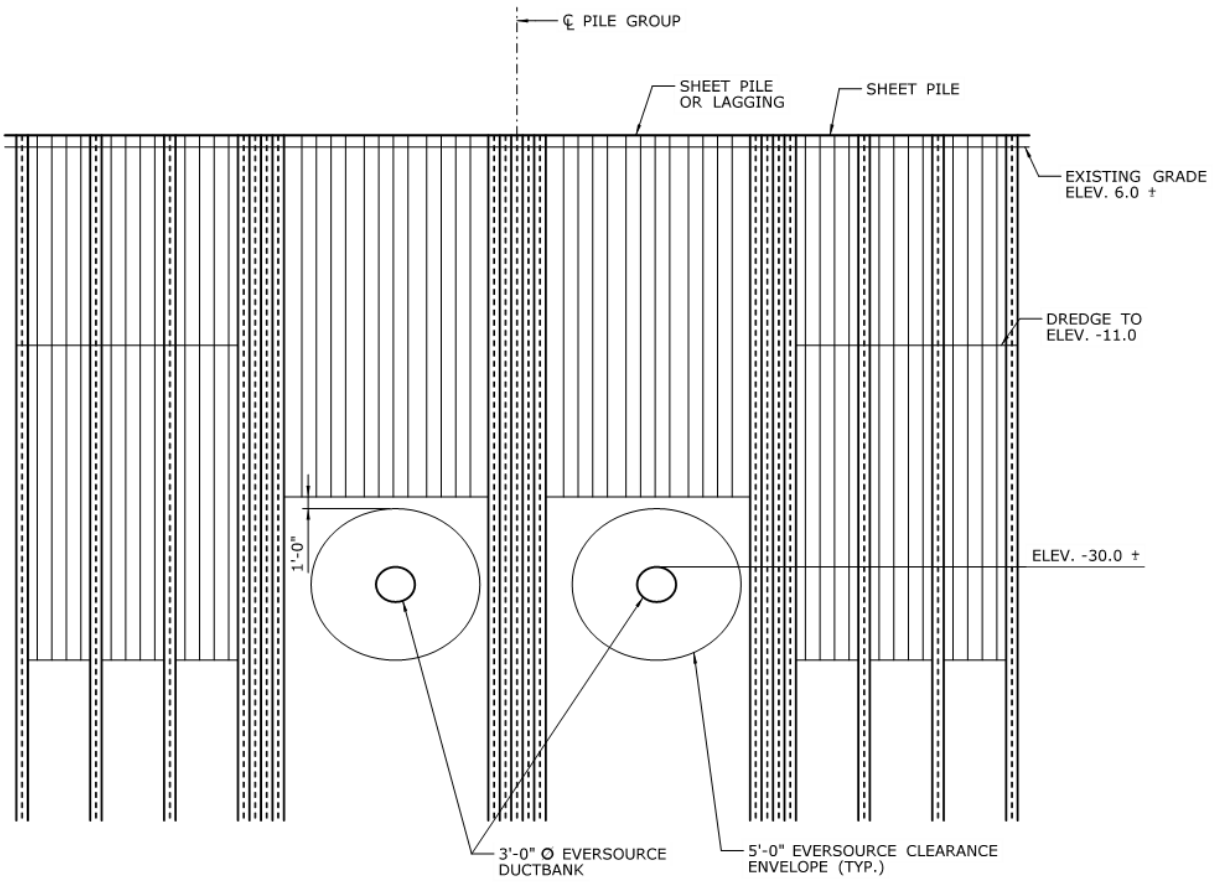
Combination pile section

The reinforcing piles provide greater stiffness and bending capacity of the system compared to a sheet pile bulkhead. This allows for a cantilevered bulkhead without anchors. Reinforcing piles must be driven deeper than the sheet piles to ensure adequate embedment to develop the full pile capacity. This design has a larger steel quantity in the bulkhead but does not require anchors, wales, or dead man sheet piles as illustrated below.



Typical combined pile bulkhead

The combined pile bulkhead structural system at the marine staging yard must be customized to accommodate the clearance requirements for the proposed Eversource HDD duct bank. The Eversource ductbank is a separate project to be submitted by Eversource for review and permits. It is anticipated that the new Eversource HDD ductbank will be installed by Eversource before work by CTDOT on the Walk Bridge Replacement begins. Due to the Eversource clearance envelope, pile embedment is limited above the pipes and no piles may be located within 5’ of the pipe in the horizontal direction. A system of pile groups and sheet pile or lagging will be used to span over the HDD pipes. Pile groups will be located outside of the clearance envelopes to the north and south of the pipes and one pile group will be located between the HDD pipe. An elevation view of the bulkhead at the Eversource pipe is shown next.



Elevation view at the Eversource HDD pipes

The figure shown has the combined pile bulkhead alternate shown at the typical section. The sheet pile or lagging that spans between the pile groups will be determined in final design. This area of the bulkhead may require wales to span between the pile groups.

All work that could result in sedimentation within the water will be completed inside a turbidity curtain and marine enclosure. Underwater noise associated with pile driving activities exceed behavioral and physiological thresholds. Impacts associated with underwater noise will be mitigated for by starting each shift with a soft start for all pile driving activities that are conducted outside the November 1st – March 15th timeframe, per ACOE guidance.

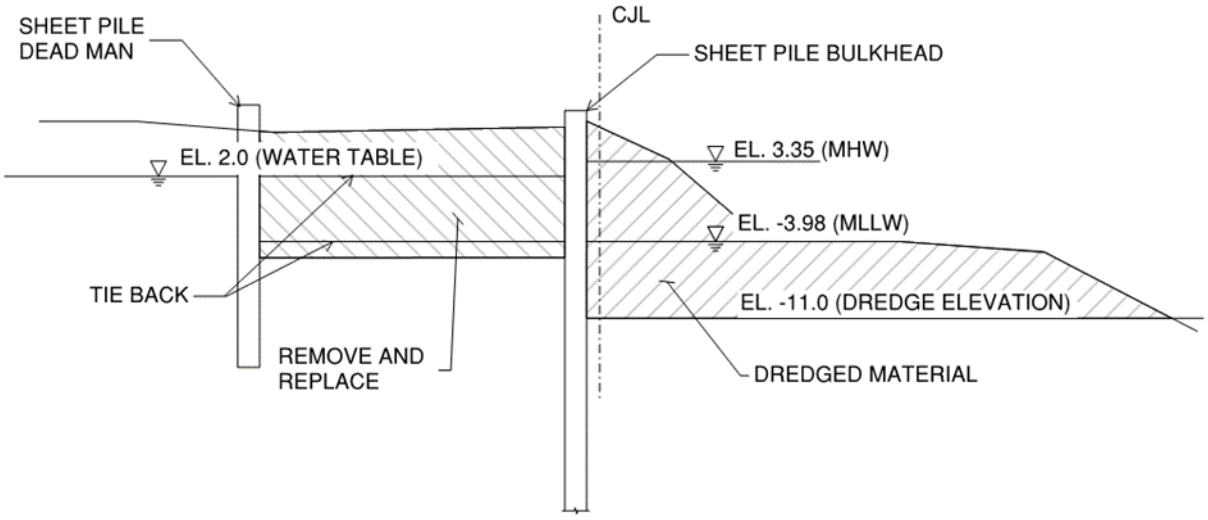
The work to construct the combined pile bulkhead will be performed in the following sequence:

- Site preparation for access
- Placement of barges and turbidity curtain
- Installation of marine enclosure
- Installation of combined pile bulkhead
- Dredging to elevation -11 between the bulkhead and the marine enclosure
- Removal of the marine enclosure

Please see attached Drawings numbered CA4-1 to CA4-4 for details on the current design and methods.

Comparison to previous means and methods

The previous method for constructing the bulkhead called for the installation of an anchored sheet pile bulkhead. As shown below, two rows of wales and anchors were required. The lower anchor force was approximately 20 kip / foot along the wall. A second sheet pile wall would be installed 30' inland from the bulkhead to act as a dead man for the anchors. The material between the two sheet piles must be removed and replaced to allow for construction and installation of the anchors and wales. Soil in this area is considered hazardous and had additional environmental requirements for material handling and disposal.



Typical sheet pile bulkhead section

Contractor Temporary Work Trestle and Test Pile Noise and Sediment Analysis Program

The contractor plans to construct several phases of the bridge from work trestles in the river consisting of 30-inch diameter pipe piles driven to bearing on rock and caped with steel beams and timber decking. This will allow movement of cranes and material about the trestles without the need to accommodate work from barges limited by depth and/or tides.

In order to simulate conditions during installation of the piles for the work trestles, a test pile program was planned and executed for the project. The program consisted of driving 30-inch diameter pipe piles and pairs of 40' long sheet piles at 8 different locations across the site.

The intent of the program was to measure pile capacity and pile length, for cost estimates and constructability. Additionally, as part of this program, noise and vibration levels were measured in the adjacent air and water. Vibration effects on adjacent historic structures and the existing bridge were also measured. Turbidity created by pile driving was measured as well.

Results from turbidity testing came back negligible with less than an increase of 5 ntu measured 30 feet or less from the test pile location. These results agree with the Department's understanding that NMFS

does not consider pile driving to be silt producing work and would not be bound to the Feb. 1st – Sept. 30th no unconfined silt producing work time-of-year restriction. Underwater noise results confirmed those presented in the EFH/Section 7 documents that behavioral and physiological thresholds will be exceeded during pile driving activities. To account for these threshold exceedances, the Department proposes starting each shift with a soft start for all pile driving activities that are conducted outside the November 1st – March 15th timeframe, per ACOE guidance.

Representative Photo from the Walk Bridge Test Pile Program



Test Pile Operation at Walk Bridge

Water Quality Monitoring

Results from turbidity testing indicate that the turbidity impacts due to pile driving and removal are minimal; very little or no increase (less than 2 NTUs) was recorded at any of the test gauges during or after the pile driving activity. Per the Connecticut Water Quality Standards (effective October 10, 2013), Class SB Waters do not have a minimum turbidity threshold, "other than of natural origin except as may result from…construction activity…dredging activity or discharge of dredged of fill materials provided all reasonable controls and Best Management Practices are used to control turbidity and none exceeding levels necessary to protect and maintain all designated uses." However, CTDOT will implement water quality monitoring during in-water demolition, removal, and pile driving construction activities, including monitoring for turbidity and contaminants, as required by CTDEEP. It is anticipated that turbidity monitoring will be conducted on a continuous basis throughout the Project with all readings readily available to the Norwalk Shellfish and Harbor Commissions. Monitoring will be conducted upstream for baseline control and downstream of marine enclosures/turbidity curtains for changes associated with construction activities, during the time of year restriction for sediment producing activities. If spikes are encountered downstream of the marine enclosures/turbidity curtains due to construction activities, the resident engineer will be notified, and additional best management practices will be implemented in

coordination with the contractor. The contractor will monitor for turbidity, dissolved oxygen, conductivity, and pH as required in CTDOT specifications 1.10.

Bubble Curtains

The original EFH documentation included the use of bubble curtains as a component to the resource protection strategy for both turbidity and noise. As the design progressed CTDOT has had further discussions with the contractor regarding constructability. One of the concerns raised by the contractor is the use of bubble curtains. They indicated that the use of bubble curtains has been problematic in their experience, leading to increased turbidity levels. CTDOT maintains that limiting turbidity in the waterway is a priority and the potential resuspension of contaminants through the use of bubble curtains poses an unnecessary risk to the expansive shellfish beds located downstream.

CTDOT is confident that the use of marine enclosures inside of turbidity curtains as described in this letter will prevent turbidity impacts within the River. CTDOT maintains that including bubble curtains for noise abatement would be inappropriate due the increase in risk for the resuspension of contaminants. The Department would like to propose eliminating the use of bubble curtains on this project and rely on the use of soft starts for pile driving and/or extraction work that falls outside the November 1st – March 15th timeframe per ACOE guidance.

Additional Environmental Preclusions

The Department would like to propose limiting the time frame in which work would not exceed 12-hour work periods and be followed by 12-hour work free periods to April 1st – June 30th. This timeframe would coincide directly with the CTDEEP Marine Fisheries requirements for diadromous fish runs to not perform work during the time period from 1-hour before sunset to 1-hour after sunrise.

Conclusions

This Project has been previously reviewed for Section 7 of the Endangered Species Act and concurred with on July 17, 2108. Based on consultation it was stated that reinitiation would be required if any of the following are met with changes to the Design of this Project:

(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.

The Department has provided analysis of the changes in Design of this Project and, although, some construction methodologies have changed, the commitments to protect ESA listed species have not, therefore reasoning for reinitiation has not been met under this this requirement.

(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 the previous consultation.

The Department has provided analysis of the modifications in Design of this Project and, although, some construction methodologies have changed, the commitments to protect ESA listed species have not, therefore reasoning for reinitiation has not been met under this this requirement.

(c) If a new species is listed or critical habitat designated that may be affected by the identified action.

No new species that may/could occur in the Project area have been listed. No critical habitat has been designated within the Project area.

(d) Take allowed under the ITS has been exceeded.

This consultation was informal without an ITS-therefore this does not apply

Based on this further analysis and the refined environmental precautions presented above, it is the Department's belief that all effects of the proposed action when added to the existing conditions will be insignificant and/or discountable, and that the Walk Bridge Replacement Project is not likely to adversely affect any ESA listed species, under NMFS' jurisdiction. We certify that we have used the best scientific and commercial data available to complete this analysis. The Department believes Reinitiation of this Project is not required at this time and request your concurrence.

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 01930-2276

JUL 17 2018

Kimberly Lesay
Transportation Assistant Planning Director
Connecticut Department of Transportation
Bureau of Policy and Planning
2800 Berlin Turnpike
Newington, CT 06111

Re: CT DOT Walk Bridge Replacement (No. 0301-0176) Norwalk, CT

Dear Ms. Lesay:

We have completed our consultation under section 7 of the Endangered Species Act (ESA) in response to your letter received June 15, 2018, with additional information provided July 9, 2018, 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 National Marine Fisheries Service (NMFS) ESA-listed species or designated critical habitat. Therefore, no further consultation pursuant to section 7 of the ESA is required.

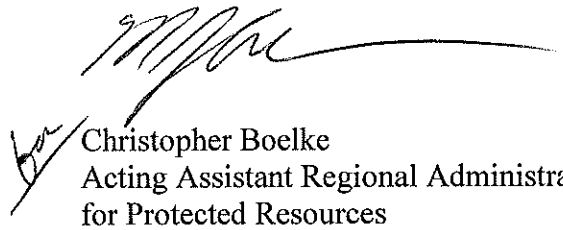
We would like to offer the following clarifications to compliment your incoming request for consultation. In your description of the action area, you indicate that the action area includes the project footprint and includes all in-water and terrestrial work. We would like to clarify that the legal definition of the action area under the ESA is "all areas that may be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." In your effects analysis, within the discussion of habitat structure and disturbance (p. 42) and ESA-listed species' prey quality and quantity (p. 46), there is no quantification of the total area of temporary and permanent impacts. In an email sent July 9, 2018, Andrew Davis informed us that temporary impacts of approximately 215,000 square feet (sf) will result from dredging, temporary trestle piles, marine enclosure and bulkhead sheeting, tidal wetland mitigation construction, and submarine cable installation and removal. Permanent impacts will result in a net gain of benthic habitat of approximately 3,000 sf resulting from installation of drilled shafts for the lift piers, installation of piles for the protective fender systems, and removal of the existing pivot and rest piers. Furthermore, at MHW, the river width available for fish passage once the proposed bridge is constructed (approximately 337 ft) will result in a net gain of approximately 38 ft over the river width available for fish passage at the existing bridge (approximately 299 ft). In areas where benthic invertebrates experience adverse effects from temporary disturbances, we expect unaffected individuals from similar nearby habitats to recolonize impacted areas within a period of 1-11 months (Wilber and Clarke 2007). We only expect rare and transient sturgeon and sea turtles to forage in these areas, and large areas of potential foraging habitat within the action area, which extends through Norwalk Harbor into

Long Island Sound, will be unaffected by the action. Therefore, any effects to ESA-listed species from temporary losses in foraging opportunities will be too small to be meaningfully measured or detected, and are insignificant.

Also, in your analysis of the effects of dredging capture on ESA-listed species (p. 42), we agree that effects are extremely unlikely to occur. Therefore, they are discountable. Lastly, we agree that any increase in vessel strike risk on ESA-listed species from the temporary addition of project vessels, when added to baseline conditions (established on p. 31), are too small to be meaningfully measured or detected. Therefore, the effects are insignificant.

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 Zach Jylkka at (978) 282-8467 or by email at Zachary.Jylkka@noaa.gov. For questions related to Essential Fish Habitat, please contact Alison Verkade with our Habitat Conservation Division at (978) 281-9266 or by email at Alison.Verkade@noaa.gov.

Sincerely,



Christopher Boelke
Acting Assistant Regional Administrator
for Protected Resources

EC: Verkade, NMFS/HCD
Davis, CTDOT
Samorajczyk, CTDOT
Sirmin, FTA
PCTS: NER-2018-14954
File Code: H:\Section 7 Team\Section 7\Non-Fisheries\FHWA_State DOTs\Informals\CT DOT\Walk Bridge Replacement Norwalk, CT

STATE OF CONNECTICUT

DEPARTMENT OF TRANSPORTATION

2800 BERLIN TURNPIKE, P.O. BOX 317546
NEWINGTON, CONNECTICUT 06131-7546
Phone: (860) 594-2099

NOAA - National Marine Fisheries Service
Protected Resources Division
55 Great Republic Drive
Gloucester, MA 01930

Attn: Ms. Julie E. Crocker

Re: Walk Bridge Replacement Project, Norwalk, CT
Connecticut Department of Transportation State Project No. 0301-0176

Dear Ms. Crocker,

In cooperation with the Federal Transit Administration (FTA), the Connecticut Department of Transportation (CTDOT) proposes to replace the New Haven Line Railroad Bridge (Walk Bridge, Bridge No. 04288R) crossing the Norwalk River in Norwalk, Connecticut as described below. This letter is to request Endangered Species Act (ESA) concurrence from your office for the Walk Bridge Replacement Project. We have made the determination that the proposed activity may affect, but is not likely to adversely affect, any species listed as threatened or endangered by NMFS under the ESA of 1973, as amended. Our supporting analysis is provided below. CTDOT, at the direction of FTA is providing the lead federal coordination role for this consultation. The FTA contact for the project is Leah Sirmin, FTA Region 1, leah.sirmin@dot.gov, 617-494-2459.

Proposed Project

The purpose of the Walk Bridge Replacement Project is to replace the existing deteriorated bridge with a resilient bridge structure which will enhance the safety and reliability of rail service, offer operational flexibility and ease of maintenance, and provide for increased capacity and efficiencies of rail transportation along the New Haven Line/Northeast Corridor, while maintaining or improving navigational capacity and dependability for marine traffic in the Norwalk River. Upgrades to the Walk Bridge, through replacement, are needed to increase bridge reliability, incorporate bridge redundancy, and provide a sustainable bridge for significant weather events, thereby accommodating current and future rail and marine traffic.

The anticipated start date for construction of the project would be late 2019 or early 2020 with water related activities occurring for approximately four years after start and concluding by 2024. It is the Department's intent that, to the greatest extent possible, in water activities will be confined via silt curtains, cofferdams, marine enclosures, and/or similar turbidity controlling

barriers. Unconfined channel/navigational dredging activities will take place between a December 1st through January 31st in-water work window to effectively minimize the risk of potential effects on shortnose sturgeon (*Acipenser brevirostrum*) and Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), loggerhead turtle (*Caretta caretta*), Kemp's ridley turtle (*Lepidochelys kempii*), leatherback turtle (*Dermochelys coriacea*), green turtle (*Chelonia mydas*), and managed fish identified as having Essential Fish Habitat (EFH), and/or critical habitats in the project area. The construction window will allow time for unconfined, turbidity producing activities to be conducted while avoiding to the greatest extent possible, potential impacts to Section 7 sturgeon and sea turtle species, and completing unconfined dredging work in advance of the important winter flounder (*Pseudopleuronectes americanus*) spawning season beginning February 1st.

Description of Activities

The description of activities that follows includes information such as; mitigation measures, containment methods, dredging activities, pile driving activities, sediment plumes, project vessels, and construction of in-water structures. These activities are expected to encompass all aspects of the project with a potential to affect these ESA listed aquatic species. As a means of discussing this information in the clearest way possible, it is presented chronologically by anticipated construction stages. Each of the 22 stages is discussed separately and any overlapping activity between stages is evaluated concurrently in the Effects Determination portion of this evaluation. Additional reference materials can be found in the attachments section and consist of:

- Attachment A – Effects Determination Stages 1-22
- Attachment B – Staging Schedule
- Attachment C – USGS Locus Map
- Attachment D – Project Plans
- Attachment E – Contractors Workplan Matrix
- Attachment F – Tidal Wetland Creation and Planting Specifications

Stage 1

Pivot Pier Fender Removal and Dredging

Activities will begin with the removal of the fenders around the pivot pier via a crane or an excavator situated on a crane barge stabilized by spuds. Prior to removal, a siltation curtain will be installed around the work area and held stationary using anchors, barges, or existing piles. The fender system will be cut into sections with a chainsaw, removed, and loaded on a material barge. A debris shield will be deployed below the cuts to help prevent wood chips and saw dust from entering the water. The lower fender segments will be removed during low tide. The 12" timber piles (approximately 200) will be removed with an excavator and/or crane using a vibratory pile extractor and impact hammer within bubble curtains using soft starts. When the material barge is fully loaded, it will be moved 1.3 miles upstream to Devine Brothers' yard and/or 1,000 feet south to the marine staging yard and off-loaded (see attachment C - USGS

Locus Map). The work to remove the pivot pier fender system will be completed during daytime hours working 10 hours/day, 6 days/week and will take approximately 10 weeks. Pile extraction activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods.

During the winter excavation window (December and January), the areas immediately north and south of the pivot pier will be dredged using a crane on a spudded crane barge, excavating with a clamshell bucket, and loading onto material barges. An accumulated area measuring 500 feet x 125 feet will be dredged to an average depth of 5 feet resulting in a total volume of 11,350 cubic yards (cy) and cover an area of 7,000 square yards (sy). The material barges will be modified to include side boards and containment fabric as a holding area. Water will be contained in the holding area and pumped into a sedimentation tank. When the barge is fully loaded it will be moved to either the marine staging yard 1,000 feet south or Devine Brothers' bulkhead 1.3 miles north where it will be off loaded with an onshore crane or excavator. The material barges will be off-loaded one time per day. Unloading may occur during an extended shift. This dredging activity will be completed during daytime hours working 10-hour shifts, 6 days per week for 15 days.

The temporary fender system will be installed and will consist of floating bumpers secured to the center pier using chains and mounting plates at the pier and will be installed using a crane and a work barge during daytime hours. The fender materials will be stored on a material barge and installed as need around the center pier. This activity will continue 6 days per week for twelve 10-hour shifts.

Vessel Mooring Relocation

The removal of the dock sections (80-foot x 10-foot and 48-foot x 9-foot) will take place on the west bank located south of the IMAX theater and will involve a crane or an excavator situated on the crane barge. The dock walkway will be hoisted onto a material barge and off loaded at the marine staging yard, which is 700 feet south of the work area. The 12" timber piles (approximately 30) will be removed during daytime hours with an excavator and/or crane using a vibratory pile hammer. When the material barge is fully loaded it will be moved to the marine staging yard 700 feet south and off-loaded. This work will be completed 10 hours/day, 6 days/week and take approximately 3 weeks. Pile extraction activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods, will be within bubble curtains, and employ the use of soft starts at the beginning of each shift.

A newly combined docking facility for the Aquarium and Sheffield ferry vessels, approximately 100 feet to the south, will require areas to be dredged within a silt curtain to provide sufficient depth for docking. The area dredged will measure 50 feet x 20 feet with an average depth of 3 feet resulting in 225 sy and the volume of 100 cy. Dredging will be completed using a crane on a crane barge excavating with a clamshell bucket and loading the modified material barge. When the barge is fully loaded it will be moved to either the marine staging yard (600 feet south) or Devine's bulkhead (1.4 miles north) where it will be off loaded with an onshore crane or excavator. The removed material will be placed into water tight trucks for shipping to the waste stockpile area (WSA). The material barge will be off-loaded one time per day. This activity will

be completed during the months of December and January, during daytime hours working 10 hour shifts 6 days per week for 8 days. Unloading may occur during an extended shift of 12 hours.

Construction of the new docking facility includes the installation of new wooden piles and floats. The 12" timber piles (approximately 24) will be installed within bubble curtains using a crane and vibratory and impact hammers working from a crane barge. The replacement dock sections will be constructed at the marine staging yard and loaded onto the material barge along with the piles and moved 600 feet to the work site for installation. Driving the piles and installing the dock sections will occur during daytime hours working 10-hour days and continuing for 2 weeks. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift.

Tidal Wetland Mitigation Site Construction

Tidal wetland mitigation activities will include three separate executions; invasive species treatment (*Phragmites australis*, approximately 29,000 square feet (sf)), *Spartina alterniflora* marsh restoration (approximately 14,000 sf), and intertidal habitat/tidal wetland remediation (approximately 46,000 sf). All tidal wetland mitigation areas are within the intertidal zone of the Norwalk River and work will be timed to occur during periods of low tide and will be contained by turbidity curtains to not increase turbidity in the river (see Figure 1).

Pre-planning will be required to determine the most suitable locations and methods for the installation and removal of an access ramp. Several alternatives are being considered for the access ramp to be located north of the proposed trestle at the northeast corner of the Walk Bridge. At this location there currently exists a sloped revetment that consists of rock filled gabions. The choice of alternative will be coordinated with the City of Norwalk and the Connecticut Department of Energy and Environmental Protection (CTDEEP). One alternative is to provide fill with a protective timber mat over the top of the revetment and filling the slope with stone and concrete blocks to retain the fill and provide a suitable grade for vehicle and equipment access. Another alternative would be to excavate a portion of the revetment to tie in the last 40' wide bridge section, supported by 30-inch steel pipe piles (approximately 9), to the existing bank enabling access to the trestle at elevation 10.5 feet (NAVD88). The last alternative would be to grade a 40' wide approach ramp from the bank around the end of the revetment. This approach ramp would be retained by steel sheet piles (approximately 70) and would also tie in to the work platform at elevation 10.5 feet (NAVD88) and would require an additional 350 CY of temporary fill. For the last two alternatives, a stone filled access ramp contained within sheet-piles with thru-rods or concrete blocks at approximately a 15% slope will be constructed down to the existing shore adjacent to the mitigation area. This will result in a ramp approximately 75' long x 20' wide requiring 450 CY of temporary fill. Remediation planning will include restoration of areas disturbed during the installation and removal of ramps. All work areas will be enclosed in silt booms. Work will be completed while the tide is low, during daylight hours for 8 to 10-hour shifts, 5 days per week and take 15 weeks to complete. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods, will be within bubble curtains, and employ the use of soft starts at the beginning of each shift.

Areas identified for *Spartina alterniflora* marsh restoration (PA-3 and PA-7 shown in Figure 1) are accessible from land. A track excavator will remove the existing soils and place the new more suitable soils. Points of access will be coordinated with the city. If the bank is too steep, a temporary access ramp will be installed for transporting vehicles such as a front-end loader or small dump truck to remove the undesirable soils and provide the replacement soils. Silt booms will be deployed around the work areas and the work will be completed during periods of low tide to avoid having water inundate the work areas. Since the soils will be replaced, wooden mats may be used to provide stability for transport and excavation equipment. Soils will be excavated and graded with an articulating re-handling bucket. This work will be completed during daylight hours in 8-hour shifts, 5 days per week and will take 7 weeks to complete.

For areas identified for invasive species (*phragmites australis*) treatment (PA-2, PA-4, PA-6, PA-8, and PA-9 shown Figure 1), annual herbicide spraying of these areas will require walk-in access, which can be attained via adjacent walking paths or roadways. Plants will be cut and removed from the areas. The type(s) of herbicide and methods of cutting and spraying will be completed in accordance with contract specifications for control and removal of invasive vegetation. Spraying of seedlings will be completed during days when wind velocities are below 10 MPH to avoid drift and over spray.

Areas identified for intertidal habitat/tidal wetland remediation (see Figure 1) will require both land and water access and will involve removal of rip rap, regrading, excavation, replacing rip rap and planting. This work will be completed in a tidal zone, where marine enclosures will not be used, but instead silt curtains will be set around disturbed areas to minimize erosion, tidal disturbance, and turbidity. All work will be completed in accordance with contract specifications for tidal wetland creation and planting (see Attachment F). Silt booms will be deployed around the work areas prior to starting work. Rip rap will be removed with a 20-ton excavator using a re-handling bucket. A front-end loader or 10-wheeled dump truck will be used for transport of excavated materials from the work area. Wooden mats will be set to distribute ground pressure and facilitate equipment moves. Areas inaccessible by land will require the use of a crane barge with a 200-ton crane using a clamshell bucket, and loading a material barge. The material removed will be placed within a corral on the material barge, which will then be brought to shore for off-loading two times per week. Completion of this work will require pre-planning for removing unsuitable existing soils, as well as hauling and placing planting soils, plants, and materials. Pre-planning will also be required to determine the most suitable locations and methods for the installation and removal of access ramps. Remediation planning will include restoration of areas disturbed during the installation and removal of ramps. Work will be completed while the tide is low, during daylight hours for 8 to 10-hour shifts, 5 days per week and take 15 weeks to complete.

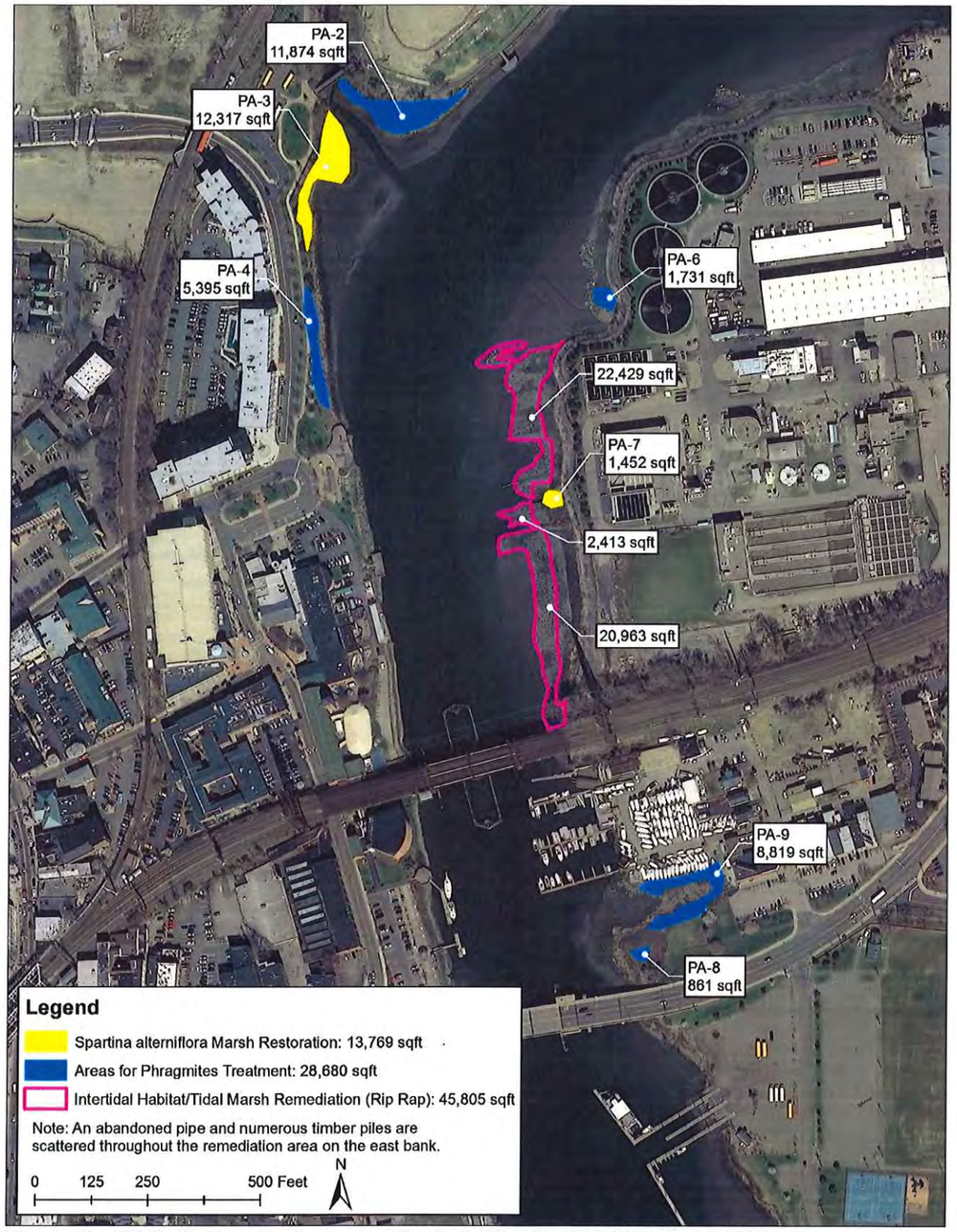


Figure 1 – Walk Bridge Replacement Project Sites for Tidal Wetland Mitigation

IMAX Theatre Demolition

The existing IMAX theater is adjacent to the Norwalk River with its easterly wall on the riverbank. The demolition of the structure will be from land and require 80-ton excavators, front-end loaders, and disposal trucks. Before starting demolition activities, erosion and sedimentation controls will be installed on the north and south side of the structure. The easterly wall of the IMAX is adjacent to tidal wetlands and will require containment. During low tides a sufficient width of stone rip rap will be removed along the bank to allow the installation of sheet piles to contain the outer wall demolition and retain a temporary crane pad. This work will include installing six 14" H-piles, a template frame and 43 steel sheet pile doubles driven with a vibratory hammer (impact hammer if necessary) within bubble curtains. These activities will be completed by working six 10-hour shifts per week and will take 15 shifts to complete. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift. East wall demolition will follow the installation of this sheet pile containment and be scheduled to coincide with periods of low tide thus eliminating the possibility of demolition debris falling into tidal waters. This work will be completed working 10-hour shifts 6 days per week and take 5 weeks to complete.

Marine Staging Yard Bulkhead, Trestle, and Fender Piling

Construction of the marine access and 8,000 sf staging trestle will be located south of the Washington St Bridge and will involve the installation of a steel sheet-pile bulkhead, pile templates, 30" diameter steel pipe piles, 12" diameter timber fender piles, steel pile bents, steel stringers, timber mats, and timber curbing.

The sheet pile bulkhead is necessary to retain soils while the high tidal areas adjacent to the proposed bulkhead are removed for installation of the cap beams. The landside bulkhead will be above the tidal zone, extend 200 feet along the shoreline, include containment returns at the north and south limits, and be constructed of 58 sheet pile pairs driven with a vibratory hammer (impact hammer if necessary) within bubble curtains. A trench measuring 250 feet x 4 feet and an average depth of 8 feet will be excavated using a clamshell bucket to aid in bulkhead construction. Excavated sediments will total 306 cy over an area of 11 sy. The bulkhead will be installed using a 200-ton crane and a vibratory hammer working from land. A silt fence and/or silt curtain will be deployed around the work areas. The bulkhead installation will be completed by working 10-hour days, 6 days per week and be completed in 22 work days. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift.

A silt curtain will be deployed for the excavation areas at the bulkhead. Excavation activities will be completed using a 40-ton excavator with a clamshell bucket during the months of December and January. Work activities will be completed working 10-hour shifts, 6 days per week and take 2 days to complete. The area to be dredged along the bulkhead will measure 200 feet x 105 feet at an average depth of 4 feet resulting in an area of 1,025 sy and the volume of 3,150 cy.

Installation of the 14" steel H-piles (32) and 24" steel trestle piles (32) will be completed using a crane barge, material barge, 250-ton crane, hydraulic vibratory hammer, and impact pile hammer within bubble curtains. Productions for the 30" piles will average up to 4 piles per day and take 250 to 500 strikes per pile. This work will be completed working 10-hour shifts, 6 days per week and take 10 days to complete. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift. The pile bents, stringers, mats, and timber curbs will also be completed from the crane barge using a 200-ton crane for hoisting. Assembly of these components involves fitting up prefabricated sections and bolting together with impact guns. This work will be completed working 10-hour shifts, 6 days per week and take 17 work days to complete.

The shallow water areas on the channel-side of the trestle will need to be lowered to allow for extended berthing depths of construction vessels. This will require dredging an area measuring 250 feet x 30 feet with an average depth of 6 feet resulting in 350 sy and 1,600 cy of excavation along the outer edge of the trestle to ensure sufficient water is available for barges. Dredging will be completed using a crane on a crane barge excavating with a clamshell bucket and loading the modified material barge and take place during the months of December and January. When the barge is fully loaded it will be moved to Devine's bulkhead (1.5 miles north) where it will be off loaded with an onshore crane or excavator. The removed material will be placed into water tight trucks for shipping to the WSA.

A 30-foot long x 40-foot wide earth access ramp will be constructed on the land side of the bulkhead. At the ramp location, the on-shore sheet piles will be lined with a geotextile fabric filled with gravel. This will require working 10-hour shifts, 6 days per week and take 4 work days to complete.

For tidal wetland vegetation present beneath the trestle, solar powered LED lights will be placed beneath the trestle to provide daytime lighting to support viability and continued growth for vegetation beneath the trestle.

Upon completion and demobilization of the Walk Bridge site the trestle deck stringers bents, piling, access ramp and bulkhead will be removed using the same or similar equipment as required for installation. See Stage 22 for a description of removals and restoration.

Stage 2

Installation of Work Platforms

Work platform foundations will require the installation of 14" steel template H-piles (80), 30" diameter steel pipe piles (207), and the 24" diameter steel fender piles (22). At each platform, these will be installed using a 300-ton crane and hydraulic vibratory and impact pile hammers within bubble curtains. Bents, stringers, mats, and timber curbs will also be completed using a 300-ton crane for hoisting. The installation of template piles and steel will take 36 shifts and involve the same equipment as the trestle piles. The production rate for the trestle piles will average up to 4 piles per day and take 250 to 500 strikes per pile. It is expected that one pile will be driven at a time, however conditions may arise where two piles need to be driven

concurrently. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift. Assembly of the support framing will involve fitting above water prefabricated sections and bolting components together with impact guns.

Access to the northeast and southwest platforms will be by onshore bulkheads, which will include a wall parallel to shore with two returns at each end. The northeast bulkhead will be 40 feet wide x 60 feet long and the south west bulkhead will be 40 feet wide x 30 feet long. The temporary bulkheads will be constructed of either driven sheet piles or concrete blocks. The bulkheads will be lined with a geotextile fabric and filled with gravel. Since the northeast bulkhead will span a stone filled gabion revetment, piles will be driven on the east and west side of the revetment, and an elevated, 40-foot wide bridge will be provided over the revetment to access the trestle at elevation 16. This work will be completed with an excavator and crew working 10-hour days for 6 days per week. A silt curtain will be deployed around the work areas prior to starting work.

Construction of the platforms will be completed working 10-hour day shifts, 6 days per week. Expected durations at each location are as follows:

a) Northeast Platform (18,500 sf) – 18 weeks
b) Southeast Platform (21,000 sf) – 20 weeks
c) Northwest Platform (8,000 sf) – 7 weeks
d) Southwest Platform (12,000 sf) – 9 weeks

For the areas at each platform spanning vegetated tidal wetlands, solar powered LED lighting will be installed under the platform and provide lighting to support viability and continued growth for vegetation beneath the trestle. The platforms cover areas that are onshore out of water, within the tidal zone and within subtidal zones. Platforms will be in place for 3 years.

Upon completion and demobilization of the Walk Bridge site, the platform deck, stringers, bents, piling and bulkhead will be removed using the same or similar equipment as required for installation. Details of removal activities will be provided in later stages.

Lift Pier Marine Enclosures

The marine enclosures to confine the area for construction of the lift pier foundations are three-sided sheet pile structures, as depicted in Figure 2, that include north and south walls extending from the shoreline to an out-board wall parallel to the channel. To further prevent siltation outside of the marine enclosure a silt curtain will be deployed around the interior perimeter. The west marine enclosure is 110 feet long and 65 feet wide. The east marine enclosure is 110 feet long and 107 feet wide.

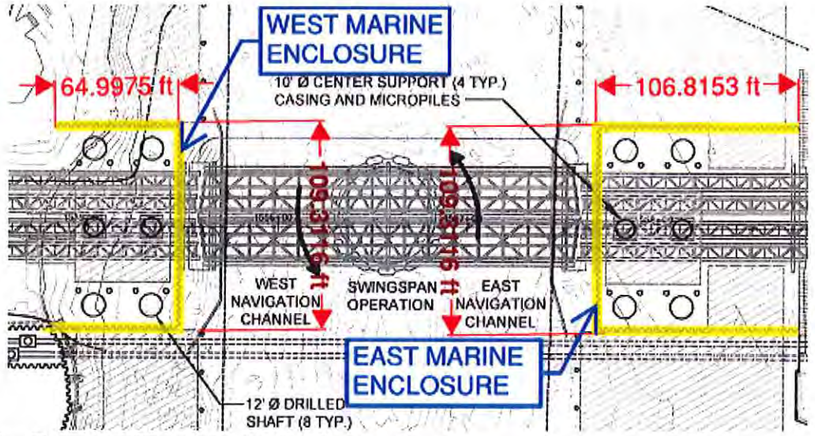


Figure 2 – East and West Marine Enclosures

The marine enclosures will involve the installation of steel templates, steel sheet piles, and bracing. Steel sheet piles will be installed as pairs which will require driving 170 pairs. Sheet pile templates will require driving 50 steel 14" H-piles and connected with 30 horizontal members. The installation will be completed using 300-ton cranes with a vibratory hammer (impact hammer if necessary) within bubble curtains, working from the previously constructed work platforms, as well as an 80-ton crane working from the existing approach spans to complete the installation of sheeting and bracing in these areas. The installation of templates, steel sheet piles and bracing away from the approach spans will be completed during day time hours, working 10-hours per day and 6 days per week and will take 6 weeks on the east side and 4 weeks on the west side to construct. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift.

Drilled Shaft Support Trestle Installation

At the north and south ends of each lift pier, 16 temporary 30" diameter steel piles, 12 temporary 24" steel piles, and 12 temporary 24" steel supports will be installed to support the drilled shaft operation. The piles and supports will be installed from the work platforms using a 300-ton crane and both vibratory and impact hammers within bubble curtains. Productions for the 30" piles will average up to 4 piles per day and take 250 to 500 strikes per pile. Installation of this temporary support steel will involve crews working 10-hours per day and 6 days per week for 3 weeks at each platform location. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift. For access during the drill shaft construction, timber mats will be placed in the intertidal areas for equipment and personnel access. These temporary supports will be removed following the completion of work at the lift piers and approach spans and a description of that is provided in later stages.

Demolish Existing Control House

Control house demolition activities will begin by relocating swing span controls to the motor control center at the swing span, followed by removal of all furnishings and equipment from the motor control center. Debris shields will be used to catch debris and slag from control house removal.

The control house will then be detached and removed from its supporting steel platform using a 300-ton crane working from southwest work platform. The remainder of the control house and the steel platform will be removed by lifting the control house with the 300-ton crane and cutting the control house supports. This work will be completed during daytime hours working 10-hours per day, 6 days per week for 2 weeks.

Stage 3

Installation of Drilled Shafts at Each Lift Pier

The eight 12-foot diameter drilled shafts (4 per pier) will be situated at the north and south ends of the lift piers. The sequence of shaft construction will include provisions for drilling on one side of the river prior to drilling on the other side. Areas adjacent to drilling and excavation work will have a debris shield over the timber mats to provide an additional layer of protection from seepage into the waters below. The platform will be installed tight to the casing of the drilled shaft to prevent drill soils and concrete from entering the water or tidal zone below.

The drilled shafts will be installed within the marine enclosures using a 300-ton crane, hydraulic oscillator, 200-ton support crane, and sedimentation tanks. Steel casing will be drilled and set using a hydraulic oscillator within bubble curtains, and excavation within the casing will be conducted using hydraulic or mechanical means. The excavation of the drilled shafts will yield 7,000 cy of material that will be set onto the work platform, stock piled, and loaded out on trucks. Sediment will be dewatered and the water will be filtered through silt bags or treated as necessary to meet CTDEEP discharge requirements and will be pumped back into the river.

Casings will be set into rock and the rock socket will be drilled using the oscillator. Hydraulic drill spoils will be pumped to sediment tanks or a corral on the platform or shore to allow settlement. Following the completion of settlement, the water will be pumped into one of the marine enclosures.

After completing shaft excavation, the reinforcing steel will be set into the hole, the hole will be inspected and the concrete will be placed using a tremie pipe and a concrete pump.
The drilled shafts will be completed working daytime hours 12-hours days for 6 days per week and take 2 months. Shaft drilling activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift. The longer shafts may require an extended shift to allow proper cleaning inspection and placement on the days of the concrete pours.

Installation of Center Supports at Each Lift Pier

The two lift tower piers require center pier supports to be installed beneath the existing approach spans. Each center support will include a 10-foot diameter steel casing (2 per pier) and a cluster of twenty 12-inch diameter micro piles within the casing.

Activities will begin with the construction of two temporary low head-room work platforms for the center pier supports. At each 50-foot x 50-foot platform location, sixteen 12" steel bearing piles (32 total) will be driven within bubble curtains during nights or weekends. This work will be completed from either the lower work platform or from a high-rail platform at track level using vibratory and impact hammers. Installation of piling at each center pier foundation will take 12 shifts if working daytime or weekend hours and 20 shifts if working nighttime hours. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift.

The steel pile bents and stringers for the low platforms will be installed and set during nights or weekends using a small excavator working beneath the existing structure or from a high-rail platform at track level during nights or weekends.

Working within a marine enclosure and from the temporary low headroom platform, a 15-ton excavator will use a ¼ cubic yard bucket to level an area suitable for the casing installation at the proposed casing location.

Casings will be installed using a crane, fork-lift, or excavator working from the platform. The steel casings will be seated by excavating within the casing and using the digging bucket to apply pressure or bang on the top of the sleeve to seat it into place. Each casing will be installed during daytime hours and take 1 shift to seat. Casing will be fixed to the platform and braced with steel angles.

Using low headroom drilling equipment, 12-inch diameter steel micro piles (40 total) will be installed within the 10-foot diameter casings working from either track level during weekends or nights or from the low headroom platform below and within bubble curtains. If this work is completed at track level it will be completed during nights or weekends and will take 6 weeks at each pier. If the work can be completed during day time hours, it will take 4 weeks to complete each pier. Center support and micro pile drilling activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift. Hydraulic spoil removal via a vac-truck will be deposited into sediment control areas, a corral located on a work platform, on shore, or on a barge. Following settlement of sediments utilizing frack tanks, the water will be pumped into one of the marine enclosures.

Upon completion of the micro piles, the loose material within each 10-foot diameter sleeve will be removed using a vac-truck. This work will take one, 10-hour day shift at each location. Following the removal of the soils, tremie concrete will be poured into the 10-foot diameter casings. This work will be completed during night time or weekend shifts and will take one shift at each location (4 shifts total).

Concrete laitance will be removed from the drilled shafts using chipping hammers during daytime hours. This work will be completed during 7, 10-hour day-time shifts at each location. Laitance removal will require a 175-ton crane and a 40-foot x 40- foot work-barge, sedimentation tanks, skip pans, and a 750 cubic foot per minute (cfm) compressor.

Construct New South Lift Span at Marine Staging Yard

The assembly of the new south lift span will be an ongoing activity requiring landside access for 20 barge deliveries for the lift span components. The lift span assembly barge will be moored at the marine staging yard trestle during assembly of the lift span. Larger assembly components will be delivered by barge to the marine staging yard trestle. Deliveries will occur every other week for about 12 weeks. The assembly barge will remain at the marine staging yard until the 4-track outage.

Stage 4

Drilled Shaft Steel and Support Piling Removal

Working within the marine enclosures, support steel and support piling will be removed using a 300-ton crane and vibratory pile hammer within bubble curtains. Materials will be loaded onto a truck on the work platform. This work will involve removal of 2-3 piles per shift and be completed during daytime hours working 10-hours per day, 6 days per week and will take 2 weeks at each location. Pile extraction activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift.

Lift Pier Concrete Tub Excavation

Excavation for the precast concrete tubs will be located inside the marine enclosures at both lift piers. An 80-ton track excavator will work from adjacent work platforms with a 2-cubic yard digging bucket to excavate soils beneath each lift pier within the marine enclosures. This will require 700 cubic yards of material that will be removed and loaded directly onto water tight trucks staged on the work platforms and hauled to the WSA. This work will be completed during the day working 10-hours per day, 6 days per week and will take 1 week at each location (total of 4 weeks).

The removal of sediments around the 10-foot diameter casings beneath the mid-section of the approach spans will be completed during daytime 10-hour shifts. A small 40-ton backhoe with a digging bucket will work from the low trestle to excavate sediments beneath the lift pier center supports. This work will be completed during daytime hours working 10 hours per day and will take 5 shifts at each lift pier. All soils will be loaded onto water tight trucks and hauled to the WSA for testing and disposal.

A vac-truck will be used to remove loose soils from the casings. The soil materials will be discharged to a corral located on shore or on the work platforms. After settlement of discharge sediments, water will be returned to one of the marine enclosures. Water will be filtered through

silt bags or treated as necessary to meet CTDEEP discharge requirements and will be pumped back into the river. All soils will be loaded onto water tight trucks and hauled to the WSA for testing and disposal.

Lift Pier Concrete Tub Set and Pour Over Drilled Shafts

The precast concrete tubs (16'x16') will be loaded at the marine staging yard (1,000 feet south of the bridge) or Devine Brothers (1.3 miles north of the bridge) and delivered to the drilled shaft locations via a material barge and off loaded immediately onto a work platform. Each lift pier will require 4 tub deliveries (8 total) which will be completed during the day, take 1 shift per delivery, and require a 300-ton crane on the work platform, a material barge, and a push boat.

Precast concrete tubs will be set over the north and south side 12-foot diameter drilled shafts at the two lift piers (4 locations total).

Precast concrete tubs will be sealed water tight, dewatered, rebar placed and preliminary pour completed. If required an initial hydrophilic grout seal will be provided at leak locations to insure a water tight seal and avoiding concrete spillage. This work will require a 300-ton crane for setting and adjusting the precast concrete tub and setting the reinforcing steel and formwork. A concrete pump will be used to place concrete for the initial pour. Setting and securing (initial concrete pour) precast concrete tubs will be completed during daytime hours and take 30 shifts to complete the four locations. A debris shield will be placed on platform work areas to eliminate spillage of concrete into the water and facilitate clean up following the concrete pours.

Lift Pier Concrete Tub Set and Pour Over Center Supports

The permanent center supports for the two lift piers will also involve the installation of a total of 4 precast concrete tubs. These will be delivered to the lower platform by truck and a crane or excavator and will be off loaded and set on the steel casings during a low tide. The precast concrete tubs will be sealed water tight, dewatered, rebar placed and a preliminary concrete pour completed. If required an initial hydrophilic grout seal will be provided at leak locations to insure a water tight seal and avoiding concrete spillage.

The reinforcing steel and any additional form materials will be delivered to the lower platform and hoisted into place using a small excavator or crane on the work platform. A concrete pump will be used to place concrete for the initial pour at each location during nights or weekends. The center supports for the two lift piers will be completed in 10-hour days during daytime hours and will take 22 shifts to complete.

Stage 5

Approach Span Under Bridge Work Platform Removal

During night time and weekend shifts an 80-ton crane or excavator working from a high rail platform at track level will remove the work platform decking supports and surface mounted pile supports using impact guns to unbolt components. This material will be loaded on to a 40-foot x

40-foot barge, moved to the marine staging yard 1,000 feet south, and off loaded. The 50-foot x 50-foot platforms will be removed from the water during night or weekend shifts and each one will take 5 shifts to complete.

Partial Marine Enclosure Removal

The partial removal of the marine enclosure steel bracing, steel piling, and steel sheeting (46 pairs) will be with a 300-ton crane and a vibratory hammer. The removed material will be staged on the work platforms and loaded onto trucks for removal from the project. The partial removal of both marine enclosures will take place during day-time hours, 6 days per week and take 10 shifts. Pile extraction activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods, will be within bubble curtains, and employ the use of soft starts at the beginning of each shift.

Stage 6

Submarine Cable Installation

A material barge will be modified to include side boards and containment fabric as a holding area for excavated material. The dredge area (see Figure 3) will be enclosed in a silt curtain prior to commencing work. During the winter excavation window (December and January), dredging for the submarine cables will be completed using a crane on a crane barge excavating with a clamshell bucket and loading the material barge.

The upper 4 feet of material with a 270-foot x 22-foot area and a depth of 4 feet (960 cy) will be excavated and loaded onto the material barge. When the barge is fully loaded, it will be moved to either the marine staging yard (1,000 feet south) or Devine's bulkhead (1.3 miles north) where it will be off-loaded with an onshore crane or excavator onto trucks for delivery to the WSA. The material barge will be off-loaded 2 to 3 times per week. Unloading may occur during an extended shift. This dredging activity will be completed during daytime hours working 10-hour shifts, 6 days per week for 10 days. Selective removal of 12" timber fender piles (approximately 6) may be required for cable routing and will take place via vibratory hammer from the adjacent work platforms.

After the upper sediment layer has been completely removed the submarine cables will then be placed on the excavated bottom and lowered to the required depth of a minimum of 8 feet below the bottom of the navigation channel depth using the hydro fluidization method. The remaining trench will then be filled using a crane and a clam shell bucket with soils of similar structural and organic characteristics as the materials removed. To reduce flocculation of the back-fill soils, the clamshell bucket will be lowered to backfill level prior to opening.

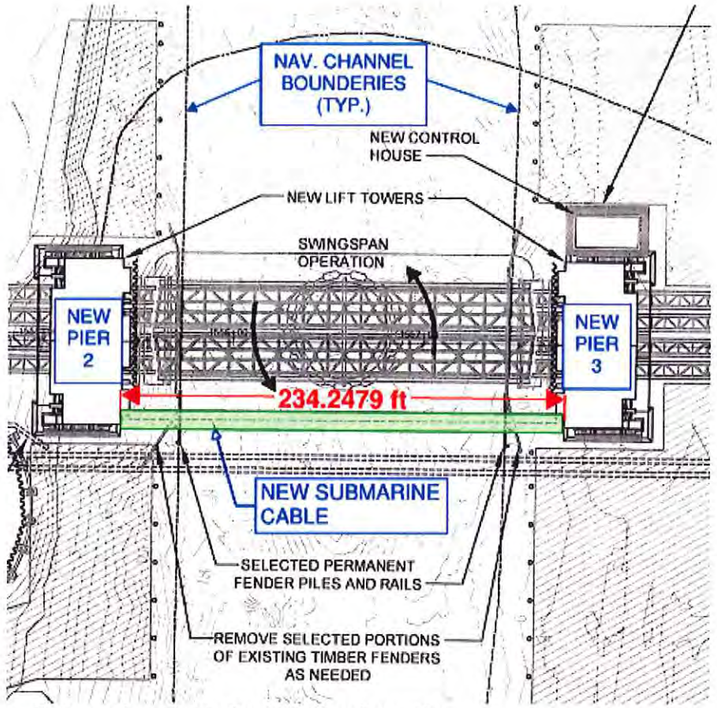


Figure 3 – New Submarine Cable Installation Location

Partial Installation of Permanent Fender Piles

During this stage, eight 14" steel template piles, a steel template, and eight 14" composite or steel piles for the permanent fenders on the south side of the two lift piers will be installed using a crane and vibratory and impact hammers working daytime hours from the work platforms. The piles will be delivered and stored on the work platform. The fender rails will be constructed from the work barge with a man-lift serviced by an 80-ton hydraulic crane. This will be completed by working 6 days per week, 10 hours per day and will take 10 work days. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods, will be within bubble curtains, and employ the use of soft starts at the beginning of each shift.

Installation of Fender Rails

Horizontal rails for the fender system will be installed using an 80-ton hydraulic crane. The 60 twenty-foot-long pieces of composite rail will be rigged and hoisted into position from the work platform during daytime hours. Fender material will be delivered and stored on the work platform. For each of these operations, a work barge with a man-lift, compressor, and hand tools will be utilized for access to the work. This work will be completed during daytime hours, 6 days per week for 10 hours per day and is expected to take 15 work days to complete.

Northeast Work Platform Partial Removal for Control House Construction

Partial removal (approximately 1,800 sf) of the work platform will include mats, steel pile caps, steel stringers, and steel piling (12) and will be completed with a 200-ton crane and a vibratory hammer. The removed material will be staged on the work platforms and loaded onto trucks for removal from the project. The partial removal of this section of work platform will take place during day-time hours, 6 days per week and take 10 shifts. Pile extraction activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods, will be within bubble curtains, and employ the use of soft starts at the beginning of each shift.

Stage 7

Installation of Temporary Supports for Approach Span Demolition (Spans 2 and 4)

Working from the adjacent platform, timber mats will be placed in the intertidal areas for small equipment to access mid span on the underside of the bridge. Small equipment will be placed back on the platform at the end of each shift. Six temporary shoring towers will be set up on the mats on the underside of the bridge.

Existing Approach Span Member and Section Removal

Activities include the removal of existing steel sections and members of the bridge. Bridge pieces removed will vary from several feet up to 150 feet in length. Whenever possible, sections or members will be hoisted to the work platforms. Members lowered to the mats within the tidal area will be removed prior to the return of high water. This work will be completed by using a 300-ton crane working from the adjacent work platform. A loader will be used to remove members and debris from the mats at ground level. This work will be completed during 10-hour daytime periods of low tide and will take 3 months to complete.

Stage 8

Pier Cap Construction at Lift Piers

The construction of the pier caps will be completed using a 200-ton crane on a crane barge in the channel for hoisting forms, reinforcing steel, and other construction materials. The existing work platform or material barge will be used for staging materials. Walkway platforms will be erected at work areas around the piers for access and debris containment. Forming, placing reinforcing steel, and pouring the tops of the caps will be completed using cranes on the platform and working 6 days per week working 10 hours per day and take three weeks for each cap.

Set Bearings at Lift Piers

Grinding of bearing pedestal concrete to the dimensions of the bearings will take place using a dust extraction vacuum to remove debris. The bearings will be set using a 200-ton crane on a crane barge in the channel and will take 4 days working 10 hours per day.

Excavation and Demolition of East Abutment Wall (Tracks 2 and 4)

Excavation and demolition at the south side of the east abutment will follow the removal of the east approach span for tracks 2 and 4 and the ballast behind the abutment wall. Before demolishing the abutment wall, a debris shield will be installed below the horizontal cut line and extend horizontally to the limits of the proposed demolition and end 4 feet out from the face of the wall. The shield will be suspended from either staging set on mats in the intertidal zone or brackets fastened to the abutment wall.

After excavating the soils behind the wall, the concrete cap will be removed using an excavator and a 15k ft-lb demolition hammer. This work will be completed by hammering back toward shore to minimizing the possibility of large concrete pieces falling onto the debris shield. After completing the removal of the concrete cap, excavation of the soils will continue. The excavator will remove the stone blocks by pulling them toward shore into the excavated area. The demolition hammer may be required to provide an initial break of the masonry bond.

Excavation and demolition will continue, preceding the wall removal as the stone blocks are removed to the required elevation. The excavation and demolition of the retaining wall in this stage will take 20 work days.

Stage 9

Partial Removal of Southeast Work Platform

A silt curtain will be deployed around the work area prior to starting work. Activities for removal of a 450-sf portion of platform will include removal of timber curbs, wooden mats, steel bents, steel stringers, and 30" steel piles (12). This work will be completed from the platform with a 300-ton crane, vibratory hammer, and a man-lift for access to the work. This work will be completed during daytime hours working 6 days per week and 10 hours per day. Pile extraction activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods, will be within bubble curtains, and employ the use of soft starts at the beginning of each shift.

Construction of New East Abutment

Upon completion of excavation and demolition at the east abutment, construction of the new east abutment to support tracks 2 and 4 will be completed approximately 31 feet to the east of the existing abutment. This work will involve the use of a 150-ton support crane and will take approximately 2 months to complete. The area behind the propose abutment will be backfilled using a 20 to 40-ton excavator and trench compactors. Backfill activities are expected to take 2 weeks to complete.

Stage 10

Set Tower Spans at Lift Piers

This work will be completed with a 200-ton crane working from a 130-foot x 50-foot crane barge situated within the channel adjacent to the pier. The tower spans (approximately 31-foot x 9-foot) will be delivered to the work platforms by trucks or barge, off loaded, and staged on the platforms until erection. This work will be completed during daytime hours, working 10 hours per day and will take 8 work days per pier.

Set Approach Span Steel (Spans 2 and 4)

The erection of structural steel, steel diaphragms, and precast concrete deck sections will be completed using a 300-ton crane working from the adjacent work platform. Timber mats will be set in the tidal areas to allow access for a man-lift to assist with setting the diaphragms. Work that requires access within the tidal zone will be completed during low tide periods. This work will be completed during day time hours, working 10 hours per day and will take 6 weeks to complete.

Stage 11

Install Approach Span Concrete Decks and Walkways (Spans 2 and 4)

The 28 precast concrete deck sections of varying dimensions will be erected using a 300-ton crane working from the adjacent work platform. Timber mats will be set in the tidal areas beneath the spans to allow access for a man-lift to assist with forming the closure pours at the precast concrete panels. The mats will be placed using a track excavator.

The closure pours will be completed using a 200-ton crane and a 2-cubic yard concrete bucket. Concrete will be delivered to the work platform and unloaded into the concrete bucket on the work platform. A debris shield will be provided at the work area to prevent concrete from getting into the water. Work that requires access within the tidal zone will be completed during low tide periods. This work will be completed during day time hours, working 10 hours per day and will take 6 weeks to complete.

Installation of Supports Stringers, Bracing, and Rail Systems

The slide rail support system south of the bridge, as depicted in Figure 4, will consist of 18 wide-flange bents, 36 angle-cross braces, 280 linear feet of rail girder, and 280 linear feet of rail. Since these supports will be from mounted the work trestle, additional piles will not be required. These will be erected using the 300-ton crane working from the adjacent work platform or the 200-ton crane on a barge. Each of these operations will also require a work barge, a man-lift, a compressor, and hand tools. This work will be completed during daytime hours, 6 days per week for 10 hours per day and is expected to take 23 work days to complete.

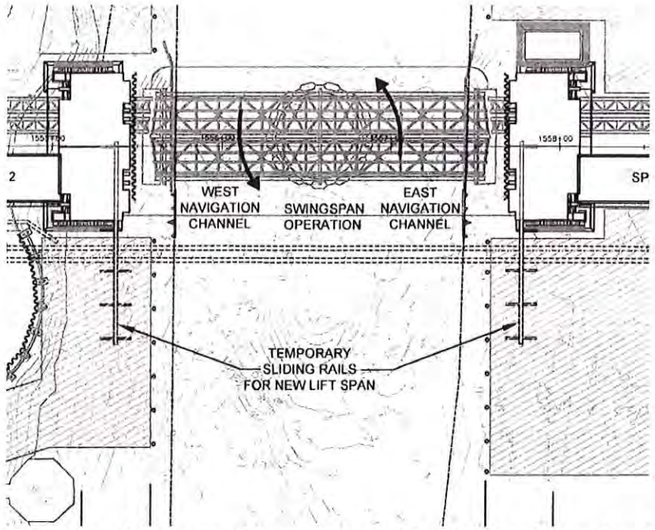


Figure 4 – Location of Temporary Slide Rail System to the South

Stage 12

Installation of Temporary Piles, Pile Caps, Girders, Bracing, and Rails

Install sixteen 14" steel template piles and templates for pile installation. Install fifty-six 14" steel H-piles using a 200-ton crane on a crane barge with vibratory and impact hammers for the slide rail system located north of the bridge. Installation is expected to be 5 piles per day at a rate of 1 pile every 2 hours and within bubble curtains. Most of this work can be completed during day time 10-hour days working 6 days per week. The work under the existing bridge span will be completed during nights or weekends. These activities will require a 200-ton crane on a crane barge and a material barge situated in the east or west channel and will take 4 weeks to drive all the piles. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift.

Installing the above water pile caps (14 each), longitudinal and lateral bracing (146 pieces), 30-foot stringers (10 pieces), and rail (300 linear feet) will involve the same equipment positioned in the east or west channel. Most of this work can be completed during day time 10-hour days working 6 days per week. The work under the existing bridge span will be completed during night or weekend shifts. It will take 6 weeks to install the bracing stringers and rails.

Float Lift Span into Place and Transfer Span onto Sliding Rails

A 90-foot x 180-foot float-in barge (2 if necessary) with the lift span fully assembled will be floated into place with the ends positioned over the sliding rails from the lift piers. The barge will be moved into position using tugs. The weight of the lift span will be transferred on to the

sliding rails by lowering the lift span. After all weight is transferred, the barge will be removed and returned 1,000 feet to the trestle at the marine staging yard. Barge draft under load is expected to be 3-4 feet and is expected to allow a minimum of 4 feet of clearance during low tide and not come in contact with the riverbed. Floating in the lift span, finalizing alignment, transferring the weight, and relocating the barge will take 2 days.

Stage 13

Cut Away Interfering Approach Steel

Before sliding the existing swing span to the north, sections of the approach span steel at each end of that span will need to be removed. The crane barge will be positioned against the existing pier and the crane will hold each section while the section is cut for removal. It is anticipated that up to 4 sections will be removed using 300-ton cranes situated on the northeast and northwest platforms. Each of the 4 sections will have a dedicated demolition crew cutting and burning simultaneously. As each section is removed, it will be set on the platform or a barge and later loaded on a truck for removal. This work will commence at the start of the 96-hour track outage and continue until all four sections are removed.

Slid Existing Swing Span to the North

After cutting and removing the approach sections for tracks 1 and 3 of the swing span, it will be raised and slid northward. This activity will take 4 hours to complete.

Slide New Lift Span to the North

After the existing swing span has been moved north onto the temporary sliding rails, the new lift span will be moved northward to its final position. The new lift span will then be jacked up, the rails beneath it removed and the new lift span set onto its permanent bearings. These activities will be completed by working multiple shifts, 24 hours per day and will take 2 days to complete. Once in place, final mechanical and electrical adjustments will be made, tested, and the lift span will be commissioned (45 Days).

Begin Construction of the New North Lift Span

After the float-in barge returns to the marine staging yard location 1,000 feet to the south, the fabrication of the new north span will begin.

Stage 14

Demolition of the Existing Swing Span

This activity will either take place on the slide rails or at an upstream mooring location to be determined at a later date. Barges will be positioned beneath the existing swing span for working and catching demolition debris. Barges will be set approximately 60 feet apart with a draft of 2-3 feet and are expected to allow a minimum of 5 feet of clearance during low tide and

not come in contact with the riverbed. Removal of smaller structural components will be done with an excavator and hydraulic sheer to allow detachment of larger sections with the 300-ton crane. This work will be completed by working 10-hour shifts, working daytime hours and will be completed in 15 work days.

Installation of Temporary Supports for Approach Span Demolition (Spans 2 and 4)

Working from the adjacent platform, wooden mats will be placed for small equipment to access the underside of the bridge. Temporary shoring towers (6) will be placed on the mats and will remain in place until all demolition is completed. All equipment will be removed before the return of each high tide. If required by the demolition plan, temporary shoring towers will be set up at locations specified.

Removal of Existing Approach Span Members and Sections

Activities will begin with removal of smaller structural components to allow the removal of the larger sections with the 300-ton crane. Whenever possible, sections or members will be hoisted to the work platform. The mats and the members lowered to the mats within the tidal area will be removed prior to the return of high water. This work will be completed by using a 300-ton crane working from the adjacent work platform and a loader will be used to remove steel members and debris from the mats at ground level. This work will be completed during 10-hour daytime periods of low tide and will take 3 weeks to complete.

Existing Submarine Power and Control Cable Removal (Cable 1)

The removal of the existing submarine cable will be completed by hoisting the cable through the existing soil layers using a crane or an excavator. If this method is not successful for fully removing the cable then the following steps will be implemented.

Working during the winter excavation window (December and January), the 150-foot x 20-foot trench for the submarine cables will be dredged using a crane on a crane barge excavating with a clamshell bucket and loading the material barge. The material barge will be modified to include side boards and containment fabric as a holding area. This work will be completed within a silt curtain containment and dredging will only continue until sufficient soils are removed to allow pulling the cable. The upper 4 feet of material (475 cy) is assumed to be contaminated and will be excavated and loaded onto the material barge. The lower material will be placed on the material barge and reused as replacement fill below 4 feet of depth.

When the barge is fully loaded it will be moved to one of the platforms where it will be off loaded with an onshore crane or excavator onto water tight trucks and transported to the WSA. The material barge will be off-loaded 1 time per week for a total of 2 times. This dredging activity will be completed during daytime hours working 10-hour shifts, 6 days per week for 15 shifts.

The remaining trench will then be filled with soils of similar structural and organic characteristics as the materials removed. The soils will be placed using a crane and clamshell bucket to lower the soils to the final elevation before opening the bucket.

Stage 15

Excavation and Demolition of East Abutment Wall (Tracks 1 and 3)

Excavation and demolition at the east abutment for tracks 1 and 3 will follow the removal of the east approach span and the ballast behind the abutment wall. Before demolishing the abutment wall, a debris shield will be installed below the horizontal cut line and extend horizontally to the limits of demolition and 4 feet out from the face of the wall. The shield will be suspended from either staging set on mats in the intertidal zone or brackets fastened to the abutment wall.

After excavating the soils behind the wall, the concrete cap will be removed using an excavator and a 15k ft-lb demolition hammer. This work will be completed by hammering back toward shore minimizing the possibility of large concrete pieces falling onto the debris shield. After completing the removal of the concrete cap excavation of the soils will continue. The excavator will remove the stone blocks by pulling them toward shore into the excavated area. The demolition hammer may be required to provide an initial break of the masonry bond.

Excavation and demolition will continue, preceding the wall removal as the stone blocks are removed to the required elevation. The excavation and demolition of the retaining wall in this stage will take 20 work days.

Removal of Sliding Rail System

Working from the southeast and southwest platforms, the sliding rail system will be removed for the new lift span. This work will involve the use of a 300-ton crane and vibratory hammer to remove the items and an excavator to process and load them onto a truck for removal. This work will be completed by working 10-hour day shifts for 16 shifts.

Working from the northeast and northwest platform and using a 300-ton crane and a vibratory hammer, the sliding rail system and piles (72 in total) will be removed to the platform and processed prior to loading the steel members and sections onto trucks for removal. This work will be completed by working 10-hour days shifts for 23 shifts. Pile extraction activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods, will be within bubble curtains, and employ the use of soft starts at the beginning of each shift.

Marine Enclosure Installation

The marine enclosures for the removal of existing piers will include the installation of fourty-four 14" steel template piles, forty 30-foot pieces of template guide frame, and 212 steel sheet pile pairs. The enclosures will be installed from a crane barge using a 300-ton crane and a vibratory hammer. This work will be completed during day time hours working 6 days per week and will take 65 shifts. Pile driving activities will not exceed 12-hour work periods and will be

followed by 12-hour work free periods, will be within bubble curtains, and employ the use of soft starts at the beginning of each shift.

Existing Pier Demolition

The demolition and removal of the existing piers (9,000 sf) will involve an excavator working from a crane barge and loading a material barge and yield approximately 4,600 cy of stone/concrete material. The material barge will be outfitted with a corral for containing the demolition debris. The material barge will be transported to the Devine Brothers bulkhead (1.3 miles north) and off loaded at the Devine Brothers bulkhead using a 300-ton crane with a clamshell bucket. The barge will be moved 28 times during the work. This work will be completed working day time shifts, 6 days per week, 10 hours per day and will take 14 weeks to complete.

Upon completion of the existing pier demolition the marine enclosures will be removed and the surface around the piers will be dredged to the final channel depth. The removal of the marine enclosures will take 42 shifts and take place from a crane barge using a 300-ton crane and a vibratory hammer. The dredging activity will include a 200-ton crane with a clamshell bucket working from the crane barge and loading the material barge to one of the platforms for off-loading. The area of this work will measure 200 feet x 14 feet with an average depth of 14 feet and yield 1,550 cy of soil materials and will take approximately 30 shifts.

Existing Submarine Cable Removal (Cable 2)

A material barge will be modified to include side boards and containment fabric as a holding area. The removal of the existing submarine cable will be completed by hoisting the cable through the existing soil layers using a crane or an excavator. If this method is not successful for fully removing the cable then the steps below will be implemented.

Working within a silt curtain containment, and during the winter excavation window (December and January), the 200-foot trench of dredging for the submarine cables will be completed using a crane on a crane barge excavating with a clamshell bucket and loading the material barge. Dredging will only continue until sufficient soils are removed to allow pulling the cable.

An average of 8 feet of material will be excavated from an area measuring 200 feet x 12 feet (725 cy) and loaded onto the material barge. Having been backfilled with clean material during the CP-243 project, all material is considered clean and will be reused as replacement fill following removal of the cable. This dredging activity will be completed during daytime hours working 10-hour shifts, 6 days per week for 10 days. The remaining trench will then be filled with soils of similar structural and organic characteristics as the materials removed. The soils will be placed using a crane and clamshell bucket to lower the soils to the final elevation before opening the bucket.

Install Permanent Fender at Southeast and Southwest Wings

Work to install the permanent fender piles will include installation of ten 14" steel template H-piles and 60 feet of template frame on each side. Sixty 14" composite permanent fender piles will be installed using a 300-ton crane and both impact and vibratory hammers working daytime hours from the work platforms and will take 7 weeks to complete. Pile driving is expected to take 2 hours per pile and up to 4 piles will be installed per day. The fender rails (90 pcs) will be constructed from a work barge with a man-lift serviced by an 80-ton hydraulic crane on the platform. This will be completed by working 6 days per week, 10 hours per day and will take 18 work days.

Stage 16

Complete Top/Pedestal Concrete on North Half of Lift Piers

The construction of the 4 pier caps will be completed using a 300-ton crane on a crane barge in the channel for hoisting forms, reinforcing steel, and other construction materials. The existing work platform or material barge will be used for staging materials. A perimeter work platform will be installed for access and containment of construction debris. Forming, placing reinforcing steel, and pouring the cap will be completed by working 6 days per week, working 10 hours per day and take two weeks for each cap.

Stage 17

Continued Construction of North Lift Span

This work will include positioning a crane on a crane barge adjacent to the float-in barge to off load the barges delivering materials at the marine staging yard 1,000 feet south of the bridge. A 200-ton crane on the marine staging yard trestle will be used to assemble the lift span on the float-in barge.

Partial Construction of New East Abutment

Upon completion of excavation and demolition at the east abutment, the construction of the new east abutment to support tracks 1 and 3 will be completed approximately 31 feet to the east of the existing abutment. This work will involve the use of a 200-ton support crane and will take approximately 60 days to complete. The areas behind the propose abutment will be backfilled using a 40-ton excavator and trench compactors. Backfill activities are expected to take 5 days to complete.

Stage 18

Setting of Tower Spans at Lift Piers

This work will be completed with a 200-ton crane working from a crane barge situated within the channel adjacent to the pier. The tower span steel will be delivered to the work platforms by

trucks, off loaded and staged on the platforms until erection. This work will be completed during daytime hours, working 10 hours per day and will take 8 work days per pier.

Erect Steel for Approach Spans (Spans 2 and 4)

The erection of structural steel and steel diaphragms will be completed using a 300-ton crane working from the adjacent work platform and will take 4 weeks. Timber mats will be set in the tidal areas beneath the spans to allow access for a man-lift to assist with setting the diaphragms.

Stage 19

Setting of Precast Deck Sections and Completion of Concrete Pours

Thirteen precast deck sections will be set with a 300-ton crane working from work platforms and adjacent staging areas. Forming closure pours for the approach spans (spans 2 and 4) will require access to the tidal areas below. Timber mats will be placed using an excavator in these areas to provide access for man-lifts and rubber tired backhoe/loaders. Wood mats, equipment, and materials will be removal prior to the return of high tide. The fifteen closure pours will be completed using a 200-ton crane and a 2-cubic yard concrete bucket. Concrete will be delivered and unloaded into the concrete bucket on the work platform. A debris shield will be provided at the work area to prevent concrete from getting into the water.

Walkway sections will be installed using an 80-ton hydraulic crane during track shut downs and nighttime hours, working 6 shifts per week. Since this will involve man-lift access from below, this will be performed during periods of low tide. Work that requires access within the tidal zone will be completed during low tide periods. All materials will be removed from the tidal zone prior to the return of high tide. This work will be completed during day time hours, working 10 hours per day and will take 9 weeks to complete.

Stage 20

Move North Lift Span from Marine Staging Yard

During an opening of the south lift span, the north lift span will be floated through the bridge to a temporary staging location at the northeast work platform. The navigation channel will remain open while the north lift span is staged at the northeast work platform. Final preparations will be made for the float-in.

Stage 21

Move North Lift Span into Final Position

Activities will begin by closing the navigation channel to marine traffic. A float-in barge will be moved with the north lift span into final position. Using hydraulic jacks, the lift span will be lowered down into the permanent bearings. Counterweights will be connected to north lift span. These activities will be completed working multiple shifts, 24 hours per day and will take 2 days

to complete. Final mechanical and electrical connections will be made, tested, and conclude with final certification (45 days).

Stage 22

Installation of Remaining Fender Piles and Fender System

Piles for the permanent fender on the south side will be installed using a 200-ton crane and an impact hammer working daytime hours from the work platforms. The piles will be delivered and stored on the work platform. The fender rails will be erected from a work barge with a man-lift serviced by an 80-ton hydraulic crane. This will be completed by working 6 days per week, 10 hours per day and will take 36 work days.

Work to install the permanent fender piles will include installing fourteen 14" steel template H-piles and 180 feet of template frame on each side. Sixty 14" composite permanent fender piles will be installed using a 300-ton crane and impact and vibratory hammers within bubble curtains working daytime hours from the work platforms and will take 7 weeks to complete. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift. The fender rails (270 pcs) will be constructed from a work barge with a man-lift serviced by an 80-ton hydraulic crane on the platform. This will be completed by working 6 days per week, 10 hours per day and will take 9 weeks.

Removal of Work Platforms

Prior to removal of the platforms, the wooden decking will be swept clean. The removal of the work platforms including the wooden decking, the steel stringers, steel caps, 14" steel H-piles (80), 24" steel pipe piles (22), steel sheet piles (43 pairs) and 30" steel piles (216) will be completed from the platform using a 300-ton crane. It is expected that one pile will be extracted at a time, however conditions may arise where two piles need to be extracted concurrently. The crane and a vibratory hammer will be used within bubble curtains to pull the piles. Pile extraction activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift. During periods of acceptable tides, a work barge with a man-lift will be used to access the platforms for rigging, burning, and removing bolts. The work barge will be positioned below the work area to capture materials falling from the removal activities.

Existing Submarine Cable Removal (Cable 3)

The removal of the existing submarine cable will be completed by hoisting the cable through the existing soil layers using a crane or an excavator. If this method is not successful for fully removing the cable then the following steps will be implemented.

Working within a silt curtain containment and during the winter excavation window (December and January), the 250-foot x 20-foot trench of dredging for the submarine cables will be completed using a crane on a crane barge excavating with a clamshell bucket and loading the

material barge. Dredging will only continue until sufficient soils are removed to allow pulling the cable. The upper 4 feet of material (800 cubic yards) is assumed to be contaminated and will be excavated and loaded onto the material barge. The lower material will be placed on the material barge and reused as replacement fill below 4 feet of depth.

When the barge is fully loaded it will be moved to Devine Brothers' bulkhead (1.3 miles) where it will be off loaded with an onshore crane or excavator onto water tight trucks and transported to the WSA. The material barge will be off-loaded 1 time per week for a total of 2 times. This dredging activity will be completed during daytime hours working 10-hour shifts, 6 days per week for 10 shifts. The remaining trench will then be filled with soils of similar structural and organic characteristics as the materials removed. The soils will be placed using a crane and clamshell bucket to lower the soils to the final elevation before opening the bucket.

Marine Staging Yard Trestle Removal

The removal of the trestle at the marine staging yard (1,000 feet south of the bridge) will include the wooden curb and decking, the steel stringers, steel pile caps, 14" steel H-piles (32), steel sheet piles (58 pairs), and 24" steel piles (32). This work will be completed from the platform using a 200-ton crane. The crane and a vibratory hammer will be used within bubble curtains to pull the piles. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods and employ the use of soft starts at the beginning of each shift. A work barge with a man-lift will be used to access the platforms and a 200-ton crane will be used to rig, remove steel stringers, and steel pile caps. All materials will be loaded onto trucks or material barges and removed to their destination.

Following the removal of all construction materials, the marine staging yard will be graded and surface treatments provided in accordance with the specifications and design documents. Final restoration will provide grading for proper drainage to drainage structures, haybales, silt fence, surface stabilization including topsoil, seeding, erosion matting, berms or other necessary measures to prevent erosion, runoff or dust from entering the Norwalk River or adjacent properties. As part of this work, a permanent 300-foot-long bulkhead will be installed using steel sheet piles (80 pairs) using a vibratory hammer. Pile driving activities will not exceed 12-hour work periods and will be followed by 12-hour work free periods, will be within bubble curtains, and employ the use of soft starts at the beginning of each shift.

Restore IMAX Crane Pad Area to Design Condition

Activities will begin with repairing, replacing, and restoring erosion controls around the IMAX crane pad. Fill material will be removed to desired elevation and grade to drain to drainage structures. Finish surfaces or erosion matting will be applied as required by design. Sheeting will be removed as part of the removal of the southwest work trestle discussed above.

Description of the Action Area

The action area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50CFR§402.02). As discussed above, this work will take place in, adjacent to, and spanning the Norwalk River in the vicinity of Walk Bridge (see Attachment C - USGS locus map). For this project, the action area includes the project footprint comprised of the in water, above water, and terrestrial extent of project activities, the underwater area where elevated noise and increased suspended sediment may be experienced, and the area where construction related vessels will be located including routes to and from home ports (exact location will depend on selected Contractor's means and methods). The action area for the purposes of this evaluation will include the approximately 1.3-mile distance of construction barge travel north to and from Devine Brothers Inc. and the approximately 1.5-mile distance south to Calf Pasture Point, from where beyond, vessel mooring locations are conceptual and vessel traffic is yet to be determined. The action area limits depicted in Figure 5 below are expected to encompass all effects of the proposed project portion located within the Norwalk River. Arrival of work vessels from their respective home ports will be determined by the Contractor and are not included here.

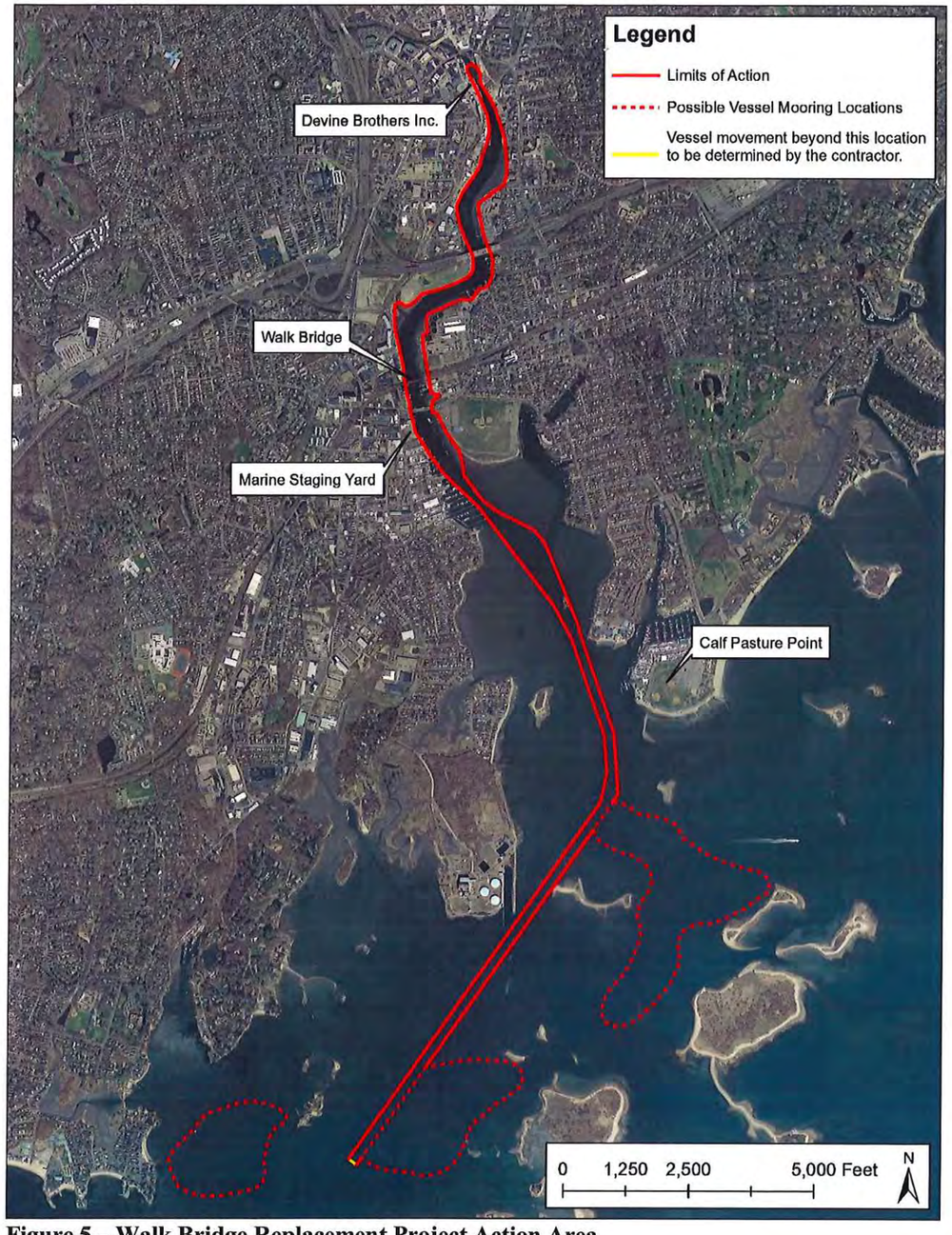


Figure 5 – Walk Bridge Replacement Project Action Area

At the project site, the subtidal zone has a sediment profile consisting of gray, dark gray, and black organic silt with shells to depths ranging from 5 to 7 feet below the river bottom. The organic silt is underlain by gray organic silty clay and fine to medium sand with shells. The intertidal zone areas that occur proximal to the river channel contain areas of mudflat, boulder, and cobble-dominated substrates. These intertidal areas are variable in size and are interspersed with boulder areas, cobble areas, riprap, patches of tidal wetland vegetation, mudflats, and historic pier pilings. No submerged vascular aquatic vegetation beds are mapped or known to occur within the Norwalk River in the project area and vicinity. Natural shellfish beds occur in the intertidal and subtidal zones adjacent to the river channel. Spatial extent and distribution of the species present in the system changes with substrate conditions. Generally, ribbed mussels (*Geukensia demissa*) occur in the upper intertidal zones growing on either side of the river associated with stands of *Spartina alterniflora* or as separate shell beds. Lower intertidal areas may contain soft-shell clams (*Mya arenaria*). Eastern Oyster (*Crassostrea virginica*) was observed growing on boulders in the intertidal zone and on the stone bridge abutments and piers of the bridge. The tidal range is 7.07 ft between MHW (3.35 ft NAVD88) and MLW (-3.72 ft NAVD88). Channel depth is reported to be 10 feet below MLLW (-3.98 ft NAVD88), according to NOAA Navigational Charts. Salinity changes with seasonal conditions but remains in the mixohaline range (approximately 26.5 PSU) since the river lies at the western end of Long Island Sound (Anderson et al.). The site experiences regular daily disturbance due to boat traffic within the channel. Boat traffic consists predominantly of recreational boating, but commercial barge traffic to upstream facilities is also present. The channel was last dredged in 2009.

NMFS Listed Species and Critical Habitat in the Action Area

Sea Turtles

Loggerhead turtle (*Caretta caretta*)
(76 FR 58868; Recovery plan: NMFS & USFWS 2008)
Northwest Atlantic DPS for juvenile, sub-adult, and adult presence in Long Island Sound and the associated bays and estuaries expected for the purposes of foraging between the months of May and November. Juveniles are omnivorous foragers on both pelagic and benthic surfaces while the sub-adults and adults forage on benthic invertebrates along the coast.

Kemp's ridley turtle (*Lepidochelys kempii*)
(35 FR 18319; Recovery plan: NMFS et al. 2011)
Juvenile presence in Long Island Sound and the associated bays and estuaries expected for the purposes of foraging between the months of May and November. Juveniles forage on benthic invertebrates on protected coastal areas.

Leatherback turtle (*Dermochelys coriacea*)
(35 FR 8491; Recovery plan: NMFS & USFWS 1992a)
Juvenile and adult presence in Long Island Sound and the associated bays and estuaries expected for the purposes of foraging between the months of May and November. Both juveniles and adults prey primarily on jellyfish in offshore oceanic or coastal neritic areas.

Green turtle (*Chelonia mydas*)
(81 FR 20057; Recovery plan: NMFS & USFWS 1991)
North Atlantic DPS for Juvenile and adult presence in Long Island Sound and the associated bays and estuaries expected for the purposes of foraging between the months of May and November. Juveniles are omnivorous foragers along the coasts and in protected bays and lagoons while adults are herbivorous foragers in nearshore areas.

Fish

Shortnose sturgeon (*Acipenser brevirostrum*)
(32 FR 4001; Recovery plan: NMFS 1998a)
GARFO master ESA species tables do not indicate the presence of shortnose sturgeon within the Norwalk River, however adults can be found the length of Long Island, including Norwalk Harbor, for the purposes of foraging. Correspondence directly with NOAA GARFO on the neighboring Saugatuck River has revealed that coastal migrations and movements between rivers has been documented in rivers associated with Long Island Sound, therefore there is a possibility of adult shortnose sturgeon occurring within the action area between the months of April through November for its potential foraging areas. The most likely river these species may stray from based on proximity would be the Housatonic River, located approximately 16 miles east of the Norwalk River. The Housatonic River hosts adult shortnose sturgeon who have used the river historically for spawning and potentially use it currently for foraging. Because work will be taking place year-round in the Norwalk River, and shortnose sturgeon typically overwinter in water that is more brackish-to-fresh than present in the action area, it is unlikely they will overwinter in the action area. Furthermore, because of the higher salinity and softer substrate within the action area, no spawning, early life stages, or juveniles will be anticipated.

Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*)
(77 FR 5880 and 77 FR 5914)
Sub-adults and adults can be found throughout Long Island Sound and associated accessible waterways typically from late Spring through early Fall for the purposes of foraging and migration. During migration activities, Atlantic sturgeon are typically found at depths of 10-50 meters, yet where suitable forage is present, the majority of Atlantic sturgeon found in Long Island Sound occur over mud/transitional bottoms of 27-37 meters deep in the central basin. This species is believed to be extirpated from the project area and CT waters in general as a breeding species (Jacobs and O'Donnell, 2009) however, the Norwalk River may be used by transient adult and sub-adult individuals as potential foraging areas due to the relatively shallow depth of the estuaries at these locations. Because work will be taking place year-round in the Norwalk river, and Atlantic sturgeon typically overwinter in deeper, offshore marine environments, it is unlikely they will overwinter in the action area. Furthermore, because of the higher salinity and softer substrate within the action area, no spawning, early life stages, or juveniles will be anticipated.

Critical Habitat

Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*)
(81 FR 35701 and 81 FR 36077)
The Housatonic River mentioned above as a possible source of migrating sturgeon, is designated Critical Habitat for Atlantic sturgeon. The actions of this project will have no effect on this Critical Habitat and therefore will not be discussed any further in this evaluation.

Effects Determination

Below resents a project summary of the effects determination analysis. For a stage by stage analysis see Attachment A.

Sound

Barge placement and construction activities are expected to allow adequate zones of passage to be maintained throughout the action area. The Norwalk River measures approximately 383 feet wide at the bridge during MHW. All barge placement, clamshell bucket, excavation, and pile driving and extraction activities will be coordinated to allow ample room for passage at all times. Furthermore, during construction operations, the construction barges will be anchored by spuds and negligibly disturb (28 sf per spudded barge) a portion of the bottom. Dredging activities will include dredging with a clamshell bucket or backhoe dredge/excavation bucket at various places throughout the river. Clamshell buckets' peak contact pressure levels of 124.0 dB re 1 µPa-m (measured at 150 meters, Dickerson et al., 2001) will not exceed the behavioral and/or physiological injury thresholds for ESA listed sturgeon or sea turtle species. Backhoe dredge peak contact pressure levels of 143.2 dB re 1 µPa-m (measured at 60 meters, Reine et al., 2012) will not exceed the behavioral and/or physiological injury thresholds for ESA listed sturgeon or sea turtle species. The use of a generator and on a barge for hydro-fluidization technique (ex. 125 kW diesel generator) would yield approximately 148.0 dB re 1 µPa (OGP, 2008, eNoise Control) which remains below the behavioral and/or physiological injury thresholds for these species. The use of a compressor would yield approximately 147.0 dB re 1 µPa (OGP, 2008, WorkSafe) which also remains below the behavioral and/or physiological injury thresholds for these species.

The use of a grinder would yield approximately 159.0 dB re 1 µPa (OGP, 2008, WorkSafe) which is above the behavioral threshold for sturgeon species. The use of an of excavator with a jackhammer/rock breaker attachment will yield approximately 173.0 dB re 1 µPa (OGP, 2008, Melbourne Metro Rail Project, 2016) which is above the behavioral threshold for sturgeon and sea turtle species. The use of an impact gun would yield approximately 162.0 dB re 1 µPa (OGP, 2008, Hytorc) which is above the behavioral threshold for sturgeon species. Shaft drilling may yield approximately 174.0 dB re 1 µPa (Tappan Zee Constructors, LLC, 2017) which is above the behavioral threshold for sturgeon and sea turtle species. Micropile drilling is may generate sounds similar to those of geotechnical drilling with peak sound pressure levels of 151.0 dB re 1 µPa (WSDOT 2007) which will be just above the behavioral thresholds for sturgeon species. It

is extremely unlikely for these species to be affected as they will be expected to adjust course away from the ensonified area and use the multitude of available foraging opportunities throughout the Norwalk River, Norwalk Harbor, and nearby Long Island Sound.

The project will involve pile driving and extraction activities including driving of 30" steel pipe piles, 24" steel piles, 12" timber piles, 12" steel bearing piles, 14" composite pipe piles, 14" steel H-piles and sheeting in various places throughout the river. The four tables listed below (Tables 1-4) identify the acoustical results from proxy projects of similar conditions using GARFO's in-house data spreadsheet tool. Sound pressure levels resulting from select pile work may rise above the behavioral and physiological injury thresholds for the above identified ESA listed species. Sturgeon and sea turtle behavioral thresholds of 150 and 166 dB re 1 µPa RMS respectively and physiological thresholds of 206 and 180 dB re 1 µPa RMS respectively will at times not be met. For these species to be affected, they will have to be within relative distances (listed in Tables 3 and 4) of the activity and remain there for a prolonged period of time. This is extremely unlikely to occur as sturgeon and sea turtle species will be expected to move away from the pile driving and/or extraction activity upon exposure to these sound pressure levels.

Overlapping timeframes for activities with a potential of resulting in sound pressure levels elevated above behavioral and/or physiological thresholds for ESA listed species are presented in Figure 6. If a situation arises where multiple piles need to be driven simultaneously or various equipment is being used concurrently, the sounds pressure levels presented in this evaluation could rise as much as 3 dB re 1 µPa RMS above the highest individual sound pressure level being produced at that time (WSDOT, 2018). To avoid adversely affecting listed species to the greatest extent possible, all pile driving/extraction and shaft and micropile drilling activities will be coordinated to ensure activities are only taking place on one half (or occupy only 50% when working in the middle of the river) of the river at a time, only during predetermined daily time windows (ex. 12-hour work periods followed by 12-hour work free periods), and otherwise conducted in a manner that makes a portion of the river accessible to fish passage. Additionally, bubble curtains will be deployed during pile driving/extraction and shaft and micropile drilling activities as a mitigative measure to attenuate sound, and soft starts will be used at the beginning of each shift. Other activities requiring equipment with a potential of resulting in elevated sound pressure levels will be conducted above and/or out of the waterway and will not be expected to exceed physiological thresholds for ESA listed species. During the time periods when these species may be present, individuals will be expected to adjust course away from the ensonified area and use the multitude of available foraging opportunities throughout the Norwalk River, Norwalk Harbor, and nearby Long Island Sound. Based on the analysis above, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Table 1 – Proxy Projects for Estimating Underwater Noise

Project Location	Water Depth (m)	Pile Size (inches)	Pile Type	Hammer Type	Attenuation rate (dB/10m)
Alameda, CA - San Francisco Bay	2-4	12-14"	Timber	Cushioned Impact	5
Norfolk, VA	12.2	12-16"	Timber	Vibratory	5
Not Available	6	14"	Steel H-Type	Impact	5
Fort Bragg, CA	2	12"	Steel H-Type	Vibratory	5
Florence, OR - Siuslaw River	3	30"	Steel Pipe	Impact	5
Florence, OR - Siuslaw River	3	30"	Steel Pipe	Vibratory	5
Martinez, CA - Carquinez Straits	15	24"	Steel Pipe	Impact	5
Rodeo, CA - San Francisco Bay, CA	5	24"	Steel Pipe	Vibratory	3
Not Available	15	24"	AZ Steel Sheet	Impact	5
Not Available	15	24"	AZ Steel Sheet	Vibratory	5
Not Available	10	13"	Plastic	Impact	5
Not Available	15	14"	Steel Pipe	Impact	5
San Rafael, CA - San Francisco Bay	>15	14"	Steel Pipe	Vibratory	2
Sausalito, CA - Richardson Bay	2	12"	Steel Pipe	Impact	5
Sausalito, CA - Richardson Bay	2	12"	Steel Pipe	Vibratory	5

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 2 - Proxy-Based Estimates for Underwater Noise

Type of Pile	Hammer Type	Estimated Peak Noise Level (dB_{Peak})	Estimated Pressure Level (dB_{RMS})	Estimated Single Strike Sound Exposure Level (dB_{sSEL})
12-14" Timber	Cushioned Impact	180	170	160
12-16" Timber	Vibratory	176	165	165
14" Steel H-Type	Impact	208	193	177
12" Steel H-Type	Vibratory	169	155	144
30" Steel Pipe	Impact	210	190	177
30" Steel Pipe	Vibratory	200	180	167
24" Steel Pipe	Impact	207	194	178
24" Steel Pipe	Vibratory	193	179	168
24" AZ Steel Sheet	Impact	205	190	180
24" AZ Steel Sheet	Vibratory	182	165	165
13" Plastic	Impact	177	153	152
14" Steel Pipe	Impact	200	184	174
14" Steel Pipe	Vibratory	186	170	160
12" Steel Pipe	Impact	203	191	178
12" Steel Pipe	Vibratory	193	181	168

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 3 - Estimated Distances to Sturgeon Injury and Behavioral Thresholds

Type of Pile	Hammer Type	Distance (m) to 206dB$_{Peak}$ (injury)	Distance (m) to sSEL of 150 dB (surrogate for 187 dBcSEL injury)	Distance (m) to Behavioral Disturbance Threshold (150 dB$_{RMS}$)
12-14" Timber	Cushioned Impact	NA	30.0	50.0
12-16" Timber	Vibratory	NA	39.0	39.0
14" Steel H-Type	Impact	14.0	64.0	96.0
12" Steel H-Type	Vibratory	NA	NA	40.0
30" Steel Pipe	Impact	18.0	64.0	90.0
30" Steel Pipe	Vibratory	NA	44.0	70.0
24" Steel Pipe	Impact	12.0	66.0	98.0
24" Steel Pipe	Vibratory	NA	70.0	106.7
24" AZ Steel Sheet	Impact	NA	70.0	90.0
24" AZ Steel Sheet	Vibratory	NA	40.0	40.0
13" Plastic	Impact	NA	14.0	16.0
14" Steel Pipe	Impact	NA	58.0	78.0
14" Steel Pipe	Vibratory	NA	70.0	120.0
12" Steel Pipe	Impact	NA	66.0	92.0
12" Steel Pipe	Vibratory	NA	46.0	72.0

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected.
Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 4 - Estimated Distances to Sea Turtle Injury and Behavioral Thresholds

Type Pile	Hammer Type	Distance (m) to 180 dB RMS (injury)	Distance (m) to 166 dBRMS (behavior)
12-14" Timber	Cushioned Impact	NA	18.0
12-16" Timber	Vibratory	NA	NA
14" Steel H-Type	Impact	36.0	64.0
12" Steel H-Type	Vibratory	NA	NA
30" Steel Pipe	Impact	30.0	58.0
30" Steel Pipe	Vibratory	10.0	38.0
24" Steel Pipe	Impact	38.0	66.0
24" Steel Pipe	Vibratory	NA	53.3
24" AZ Steel Sheet	Impact	30.0	58.0
24" AZ Steel Sheet	Vibratory	NA	NA
13" Plastic	Impact	NA	NA
14" Steel Pipe	Impact	18.0	46.0
14" Steel Pipe	Vibratory	NA	40.0
12" Steel Pipe	Impact	32.0	60.0
12" Steel Pipe	Vibratory	12.0	40.0

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

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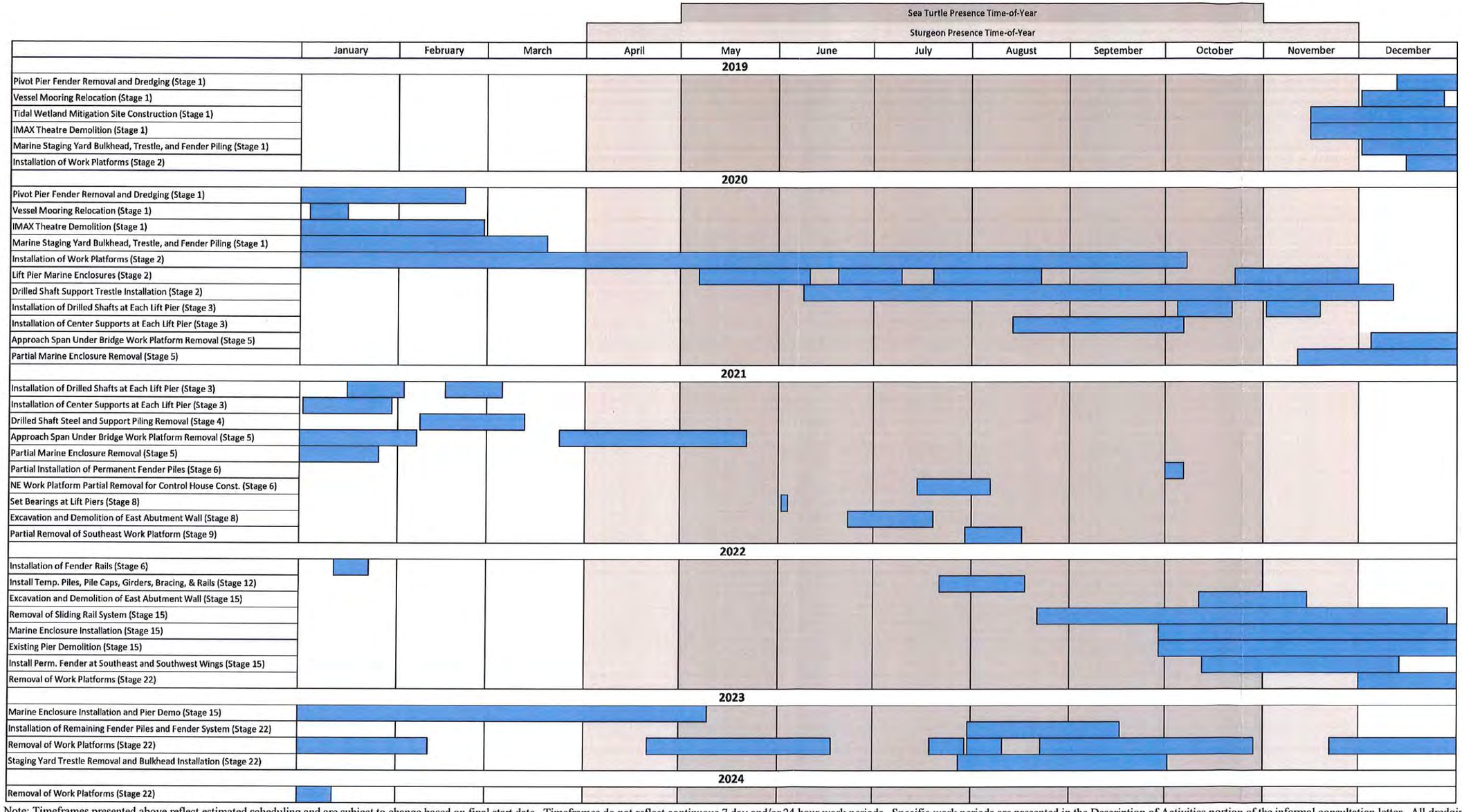

Note: Timeframes presented above reflect estimated scheduling and are subject to change based on final start date. Timeframes do not reflect continuous 7 day and/or 24 hour work periods. Specific work periods are presented in the Description of Activities portion of the informal consultation letter. All dredging activities will be conducted during the months of December and January.

Figure 6 – Timeline for Activities with a Potential of Producing Sound Pressure Levels Above Behavioral and/or Physiological Thresholds

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Habitat Structure and Disturbance

This project will consist of in water structure addition, removal, and dredging activities. In water structure removal activities will include the existing pivot pier and rest piers and the removal of submarine cables at 3 locations from beneath the riverbed. In water structures to be added for this project will consist of eight 12-foot diameter drilled shafts (4 at each lift pier) and four 10-foot diameter center supports (2 at each lift pier), as well as the addition of submarine cables at one location beneath the riverbed. Depths will change following removal of the pivot pier and associated fender system to match adjacent navigation channel depths, at the location for ferry vessel relocation, and at the marine staging yard. The changes in water depths during this project will not be expected to alter use of the areas by any of the sturgeon or sea turtle species and the underlying substrates will allow for recolonization by algae and benthic organisms from adjacent communities, given the proximity to colonizing biota nearby in the river and harbor (Rhoads and Germano, 1982). Recruitment rates by algae and benthic fauna are tied to light penetration into the water column, water chemistry and temperature, substrate characteristics, and other factors such as wave or tidal energy, and bathymetry. All other habitat disturbing elements as part of this project will be temporary and removed before project completion and vacating the action area. The final condition following this project will result in a slight change in horizontal clearance layout at the bridge, and an insignificant change in the habitat available for fish or sea turtle use downstream at the relocated ferry vessel dock. Any effects resulting from cumulative change of in water structures will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Dredging (Capture)

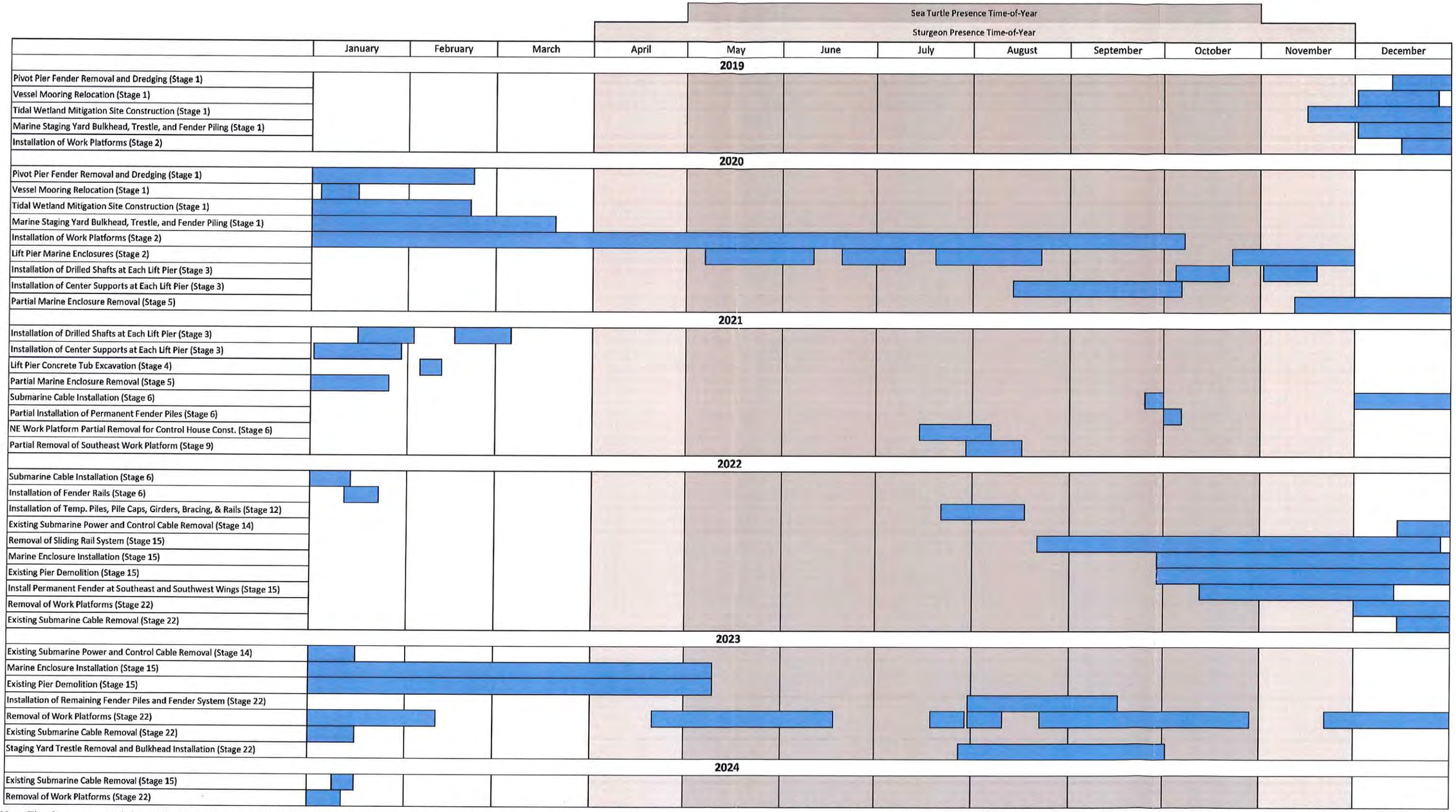
This project will employ the use of a mechanical dredge (clamshell bucket and excavator/backhoe bucket) and interactions with the above listed species are extremely unlikely to occur. For an individual to be impacted by a clamshell bucket they would likely need to be directly below the bucket as it reaches the riverbed and remain motionless as the bucket scoops or closes. The physical extents of the dredging portions if this project, as a fraction of the entire width of the river at each location, allow ample room for avoidance. All dredging activities will take place within a two-month time period (December 1st through January 31st) when none of the above identified listed species are expected to be present within the action area or within marine enclosures which will exclude species access to the excavation site. Capture incidents from this project, when added to existing conditions, are discountable since the project will employ the use of a mechanical dredge (clamshell bucket and excavator/backhoe bucket), at times contained within turbidity curtains and interactions with the above listed species are extremely unlikely to occur.

Water Quality

Temporary localized increases in turbidity/suspended sediment for the entire project will result from the clamshell excavation work, pile/sheet driving and extraction, shaft and micropile drilling, 2 cy bucket excavation, pier demolition, and marsh restoration regrading. Additionally, invasive species will receive herbicide treatment. All type(s) of herbicide and methods of spraying will be completed in accordance with contract specifications for control and removal of

invasive vegetation, which includes the stipulation that all chemical/adjuvant formulation applied must be approved for aquatic environments. Additionally, spraying of herbicides will occur on days when winds velocities are below 10 MPH to avoid over spray.

Total suspended solids (TSS) for unconfined clamshell bucket excavation range from 105 mg/L up to 445 mg/L (ACOE, 2001) with turbidity levels between 15 mg/L and 191 mg/L up to 2,000 feet from the excavation site (Burton, 1993). TSS concentrations for unconfined pile driving and extraction, of approximately 5.0 to 10.0 mg/L above background levels, can be expected within approximately 300 feet of the pile being driven or extracted (FHWA 2012) and are well below those shown to have adverse effects on fish (Burton 1993) and benthic communities (EPA 1986). As presented in Figure 7, there will be times when activities with a potential of producing elevated TSS concentrations will happen concurrently. To mitigate against water quality concerns, these turbidity producing activities will take place within turbidity curtains (pile driving/extraction and clamshell excavation activities, bulkhead installation, and marsh restoration activities), above MLW during low tide (marsh restoration), within marine enclosures (shaft and micropile drilling, 2 cy bucket excavation, and pier demolition), and/or during the winter months (clamshell excavation will be during December and January) such that no impairment of movement of the above listed species will be expected or any other effect that can be meaningfully measured, detected, or evaluated. Any effects resulting from a change in water quality during this project will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.



Note: Timeframes presented above reflect estimated scheduling and are subject to change based on final start date. Timeframes do not reflect continuous 7 day and/or 24 hour work periods. Specific work periods are presented in the Description of Activities portion of the informal consultation letter. All dredging activities will be conducted during the months of December and January.

Figure 7 – Timeline for Activities with a Potential for Affecting Water Quality

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Prey Quantity/Quality

It is expected that only a minor and/or temporary reduction in available benthic prey species may be expected and limited to the locations of the excavation, intertidal regrading, shaft drilling, and pile driving. No significant permanent reduction in the abundance, availability, accessibility, and quality of prey is expected. It is anticipated that the project will result in insignificant changes in foraging behavior. Of the listed species identified above, only the loggerhead turtle, Kemp's ridley turtle, Atlantic sturgeon, and shortnose sturgeon maintain a diet that consists, at least in some part, of benthic invertebrates (Bigelow and Schroeder, 1953, Seney and Musick, 2007, Witzell and Schmid, 2005, Dadswell et al.). At the project location, the nearby foraging areas typically provide a great density of benthic invertebrates, making a significant loss of foraging opportunity highly unlikely. The opportunity for benthic invertebrates to recolonize the excavated areas and regraded tidal marsh sediments will immediately (within days to weeks) follow this work, reestablishing and increasing foraging habitat, and therefore any effects on prey quantity and quality resulting from this project will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Vessels

For this analysis, three elements were considered: (1) the existing baseline conditions, (2) the action and what it adds to existing baseline conditions, and (3) new baseline conditions (the existing baseline conditions and the action together). It has been determined that vessel traffic, when added to baseline conditions, as a result of the proposed project is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time may include a crane barge, a work barge, a material barge, a deck barge and/or a float in barge. These vessels will either employ the use of spuds, be tied to a barge using spuds or to a work platform, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers onsite. Barges will be complimented by a push boat (mini tug boat), a work boat, and/or a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement, bubble curtain placement, and turbidity curtain placement adjustments. The increase in traffic associated with the proposed project is extremely small. During the project, a minimal number (0-6) of project vessels per activity will be added to the baseline at any given time with Stage 21 having a potential of requiring up to 9 vessels onsite during lifting the north lift span into position. The addition of project vessels will be intermittent, temporary, and restricted to small portions of the overall action area on any given day. As such, any increased risk of a vessel strike caused by the project will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

This project will consist of both in water structure addition and removal. In water structure removal activities will include the existing pivot pier and rest piers and the removal of submarine cables at 3 locations from beneath the riverbed. In water structures to be added for this project will consist of eight 12-foot diameter drilled shafts (4 at each lift pier) and four 10-foot diameter center supports (2 at each lift pier), as well as the addition of submarine cables at one location beneath the riverbed. All other in water elements as part of this project will be temporary and removed before project completion and vacating the action area. The final condition following this project will result in a slight change in horizontal clearance layout at the bridge, and an insignificant change in the area available for fish or sea turtle passage downstream at the relocated ferry vessel dock. Any effects resulting from cumulative change of in water structures will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Conclusions

Based on the analysis that all effects of the proposed action when added to the existing conditions will be insignificant and/or discountable, we have determined that Walk Bridge Replacement Project is not likely to adversely affect any listed species or critical habitat under NMFS' jurisdiction. We certify that we have used the best scientific and commercial data available to complete this analysis. We request your concurrence with this determination.

Very truly yours,

Kimberly Lesay

Kimberly Lesay
Transportation Assistant Planning Director
Connecticut Department of Transportation
Office of Environmental Planning

cc: John Hanifin, Andrew Davis, Christopher Samorajczyk, CTDOT
Leah Sirmin, FTA Region 1

Attachments:

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Walk Bridge Replacement Project

Walk Bridge, Norwalk River
Bridge No. 04288R
Norwalk, Connecticut

Connecticut Department of Transportation
Project Number 0301-0176

Contents

Attachment A – Effects Determination Stages 1-22
Attachment B – Staging Schedule
Attachment C – USGS Locus Map
Attachment D – Project Plans
Attachment E – Contractors Workplan Matrix
Attachment F – Tidal Wetland Creation and Planting Specifications

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Attachment A – Effects Determination

Stages 1-22

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Effects Determination

Stage 1

Sound

Barge placement and construction activities are expected to allow adequate zones of passage to be maintained throughout the action area. The Norwalk River measures approximately 383 feet wide at the bridge during MHW. All barge placement, clamshell bucket, and pile driving and extraction activities will be coordinated to allow ample room for passage at all times. Furthermore, during construction operations, the construction barges will be anchored by spuds and negligibly disturb (28 sf per spudded barge) a portion of the bottom. Dredging activities will include dredging to final depth following removal of pivot pier fender system north and south of the bridge, dredging of the new docking area for the ferry vessel relocation, and dredging to install the sheet pile bulkhead and to accommodate construction vessel drafts at the marine staging yard. Clamshell buckets' peak contact pressure levels of 124.0 dB re 1 µPa-m (measured at 150 meters, Dickerson et al., 2001) will not exceed the behavioral and/or physiological injury thresholds for ESA listed sturgeon or sea turtle species. An excavator with a jackhammer/rock breaker attachment will be used for IMAX demolition activities. The use of an of this equipment would yield approximately 173.0 dB re 1 µPa (OGP, 2008, Melbourne Metro Rail Project, 2016) which is above the behavioral threshold for sturgeon and sea turtle species. It is extremely unlikely for these species to be affected as this work is being conducted out of the water and above the riverbank. If these sounds do reach the water column, these species will be expected to adjust course away from the ensonified area and use the multitude of available foraging opportunities throughout the Norwalk River, Norwalk Harbor, and nearby Long Island Sound.

This stage of the project will also consist of pile driving and/or extraction activities. Activity 1: Extraction of 12" timber piles at the pivot pier. Activity 2: Extraction and driving of 12" timber piles for ferry vessel relocation. Activity 3: Driving of 30" steel pipe piles for ramp access to the wetland mitigation sites. Activity 4: Driving of 14" steel H-piles and steel sheet piles for bank stabilization for the IMAX demolition. Activity 5: Driving of steel sheet piles for the bulkhead at the marine staging yard, and driving of 14" steel H-piles and 24" steel trestle piles for the marine staging yard work trestle. The four tables listed below (Tables 1-4) identify the acoustical results from proxy projects of similar conditions using GARFO's in-house data spreadsheet tool. Sound pressure levels resulting from select pile work may rise above the behavioral and physiological injury thresholds for the above identified ESA listed species. Sturgeon and sea turtle behavioral thresholds of 150 and 166 dB re 1 µPa RMS respectively and physiological thresholds of 206 and 180 dB re 1 µPa RMS respectively will at times not be met. For these species to be affected, they will have to be within relative distances (listed in Tables 3 and 4) of the activity and remain there for a prolonged period of time. This is extremely unlikely to occur as sturgeon and sea turtle species will be expected to adjust course away from the ensonified area and use the multitude of available foraging opportunities throughout the Norwalk River, Norwalk Harbor, and nearby Long Island Sound. Bubble curtains will be deployed for pile driving and extraction activities as a mitigative measure to attenuated sound, and soft starts will be used at the beginning of each shift.

Sounds from the dredging portion of this stage should not adversely affect any of the above identified ESA listed species, as the sound pressure levels will not exceed the behavioral or

physiological injury thresholds, and their presence is not expected during the months that these activities are proposed to take place, and therefore no adverse effect is anticipated. Sounds from the pile extraction and driving portions of this stage will be coordinated to ensure activities are only taking place on one half (or occupy only 50% when working in the middle of the river) of the river at a time, only during predetermined daily time windows (ex. 12-hour work periods followed by 12-hour work free periods), and otherwise conducted in a manner that makes a portion of the river accessible to fish passage. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Table 1 – Proxy Projects for Estimating Underwater Noise

Project Location	Water Depth (m)	Pile Size (inches)	Pile Type	Hammer Type	Attenuation rate (dB/10m)
Alameda, CA - San Francisco Bay	2-4	12-14"	Timber	Cushioned Impact	5
Norfolk, VA	12.2	12-16"	Timber	Vibratory	5
Not Available	6	14"	Steel H-Type	Impact	5
Fort Bragg, CA	2	12"	Steel H-Type	Vibratory	5
Florence, OR - Siuslaw River	3	30"	Steel Pipe	Impact	5
Florence, OR - Siuslaw River	3	30"	Steel Pipe	Vibratory	5
Martinez, CA - Carquinez Straits	15	24"	Steel Pipe	Impact	5
Rodeo, CA - San Francisco Bay, CA	5	24"	Steel Pipe	Vibratory	3
Not Available	15	24"	AZ Steel Sheet	Impact	5
Not Available	15	24"	AZ Steel Sheet	Vibratory	5

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 2 – Proxy-Based Estimates for Underwater Noise

Type of Pile	Hammer Type	Estimated Peak Noise Level (dB_{Peak})	Estimated Pressure Level (dB_{RMS})	Estimated Single Strike Sound Exposure Level (dB_{sSEL})
12-14" Timber	Cushioned Impact	180	170	160
12-16" Timber	Vibratory	176	165	165

14" Steel H-Type	Impact	208	193	177
12" Steel H-Type	Vibratory	169	155	144
30" Steel Pipe	Impact	210	190	177
30" Steel Pipe	Vibratory	200	180	167
24" Steel Pipe	Impact	207	194	178
24" Steel Pipe	Vibratory	193	179	168
24" AZ Steel Sheet	Impact	205	190	180
24" AZ Steel Sheet	Vibratory	182	165	165

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 3 – Estimated Distances to Sturgeon Injury and Behavioral Thresholds

Type of Pile	**Hammer Type**	**Distance (m) to 206dB$_{Peak}$ (injury)**	**Distance (m) to sSEL of 150 dB (surrogate for 187 dBcSEL injury)**	**Distance (m) to Behavioral Disturbance Threshold (150 dB$_{RMS}$)**
12-14" Timber	Cushioned Impact	NA	30.0	50.0
12-16" Timber	Vibratory	NA	39.0	39.0
14" Steel H-Type	Impact	14.0	64.0	96.0
12" Steel H-Type	Vibratory	NA	NA	40.0
30" Steel Pipe	Impact	18.0	64.0	90.0
30" Steel Pipe	Vibratory	NA	44.0	70.0
24" Steel Pipe	Impact	12.0	66.0	98.0
24" Steel Pipe	Vibratory	NA	70.0	106.7
24" AZ Steel Sheet	Impact	NA	70.0	90.0
24" AZ Steel Sheet	Vibratory	NA	40.0	40.0

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 4 – Estimated Distances to Sea Turtle Injury and Behavioral Thresholds

Type Pile	**Hammer Type**	**Distance (m) to 180 dB RMS (injury)**	**Distance (m) to 166 dBRMS (behavior)**

12-14" Timber	Cushioned Impact	NA	18.0
12-16" Timber	Vibratory	NA	NA
14" Steel H-Type	Impact	36.0	64.0
12" Steel H-Type	Vibratory	NA	NA
30" Steel Pipe	Impact	30.0	58.0
30" Steel Pipe	Vibratory	10.0	38.0
24" Steel Pipe	Impact	38.0	66.0
24" Steel Pipe	Vibratory	NA	53.3
24" AZ Steel Sheet	Impact	30.0	58.0
24" AZ Steel Sheet	Vibratory	NA	NA

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Habitat Structure and Disturbance

Habitat disturbing activities during this stage include dredging of the area within the existing pivot pier fender system and removal of the fender system itself, dredging and pile driving for the new ferry vessel mooring location, tidal wetland mitigation site and access ramp construction, and dredging and pile driving for the marine staging yard bulkhead and work trestle. Pile driving activities during this stage will temporarily eliminate spot locations of benthic habitat, but as a fraction of the available habitat in the action area, is not expected to have an effect on sturgeon or sea turtle use. The changes in water depths during this stage will not be expected to alter use of the areas by any of the sturgeon or sea turtle species and the underlying substrates will allow for recolonization by algae and benthic organisms from adjacent communities, given the proximity to colonizing biota nearby in the river and harbor (Rhoads and Germano, 1982). Recruitment rates by algae and benthic fauna are tied to light penetration into the water column, water chemistry and temperature, substrate characteristics, and other factors such as wave or tidal energy, and bathymetry. Habitat disturbance from this stage of the project when added to existing conditions will result in a change in depth for select portions of the river and temporary alteration of the shadow pattern, but not a change in the use of the areas by the above Section 7 listed species or diminish its quality such that there would be any effects on an individual that can be meaningfully measured, detected, or evaluated and are therefore insignificant.

Dredging (Capture)

Dredging activities during Stage 1 include dredging to final depth following removal of pivot pier fender system north and south of the bridge, dredging of the new docking area for the ferry vessel relocation, and dredging to install the sheet pile bulkhead and to accommodate construction vessel drafts at the marine staging yard. These activities will only occupy small fractions of the width of the river in their respective locations allowing ample room for avoidance. This portion of the project will employ the use of a mechanical dredge (clamshell bucket) and interactions with the above listed species are extremely unlikely to occur. For an individual to be impacted by a clamshell bucket they would likely need to be directly below the bucket as it reaches the riverbed and remain motionless as the bucket closes. Capture incidents from this stage, when added to existing conditions, are discountable due to the river extents available for avoidance and passage,

and the time of year dredging will take place (December and January) where listed species are expected to be absent.

Water Quality

Temporary localized increases in turbidity/suspended sediment will result from the clamshell excavation work, pile driving, and marsh restoration regrading. Additionally, this stage will include herbicide treatment for invasive species control. All type(s) of herbicide and methods of spraying will be completed in accordance with contract specifications for control and removal of invasive vegetation, which includes the stipulation that all chemical/adjuvant formulation applied must be approved for aquatic environments. Additionally, spraying of herbicides will occur on days when wind velocities are below 10 MPH to avoid over spray. Total suspended solids (TSS) for clamshell bucket excavation range from 105 mg/L up to 445 mg/L (ACOE, 2001) with turbidity levels between 15 mg/L and 191 mg/L up to 2,000 feet from the excavation site (Burton, 1993) when unconfined. TSS concentrations for pile driving and extraction, of approximately 5.0 to 10.0 mg/L above background levels, can be expected within approximately 300 feet of the pile being driven or extracted when unconfined (FHWA 2012) and are well below those shown to have adverse effects on fish (Burton 1993) and benthic communities (EPA 1986). The turbidity producing work will ultimately take place within turbidity curtains (pile driving and extraction, bulkhead installation, marsh restoration excavation and grading), above MLW during low tide (marsh restoration), and/or during the winter months (dredging will be during December and January) such that no impairment of movement of the above listed species will be expected or any other effect that can be meaningfully measured, detected, or evaluated. Additionally, for fender demolition activities, tarps and/or debris shields will be deployed below the cuts to help prevent wood chips and saw dust from entering the water. Any effects resulting from a change in water quality during this stage will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Prey Quantity/Quality

Benthic prey habitat disturbing activities during Stage 1 include excavation of the area within the existing pivot pier fender system and removal of the fender system itself, excavation and pile driving for the new ferry vessel mooring location, tidal wetland mitigation site construction, and excavation and pile driving for the marine staging yard bulkhead and trestle. Benthic disruption will be temporary and the available substrate area for benthic prey species colonization will not be diminished as a result of this stage. Of the listed species identified, only the loggerhead turtle, Kemp's ridley turtle, Atlantic sturgeon, and shortnose sturgeon maintain a diet that consists, at least in some part, of benthic invertebrates (Bigelow and Schroeder, 1953, Seney and Musick, 2007, Witzell and Schmid, 2005, Dadswell et al.). The opportunity for benthic invertebrates to recolonize the excavated areas and regraded tidal marsh sediments will immediately (within days to weeks) follow this work, reestablishing and increasing foraging habitat, and therefore any effects on prey quantity and quality resulting from this project will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual,

or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time will typically include a crane barge, a material barge, and when necessary, a work barge. These vessels will either employ the use of spuds, be tied to a barge using spuds, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers at their respective locations onsite. They will be complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement and turbidity curtain placement adjustments. The increase in traffic associated with this stage is extremely small. During the project activities, a minimal number (3-6 per activity) of project vessels will be added to the baseline. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall action area on any given day. As such, any increased risk of a vessel strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

This stage will consist of both in water structure addition and removal. In water structure removal activities will include the pivot pier fender system and timber piles and the existing ferry vessel dock and timber piles. Temporary, construction phase in water structures to be added for this stage of the project will consist of H-piles and sheeting at the river's edge for the IMAX demolition, new ferry vessel dock and timber piles, ramp and pipe piles in the intertidal zone for wetland mitigation site access, and the construction of a sheet pile bulkhead and pipe pile work trestle at the marine staging yard. These in water structural additions will be located within the river during construction, but will ultimately be removed following project completion. The final (temporary) condition following this stage will result in a slight increase in horizontal clearance at the bridge, and an insignificant change in the area available for fish or sea turtle passage downstream at the relocated ferry vessel dock and at the marine staging yard. Any effects resulting from a temporary addition of in water structures will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Stage 2

Sound

Barge placement and construction activities are expected to allow adequate zones of passage to be maintained throughout the action area. The Norwalk River measures approximately 383 feet wide at the bridge during MHW. All barge placement and pile driving will be coordinated to allow ample room for passage at all times. Furthermore, during construction operations, the construction barges will be anchored by spuds and negligibly disturb (28 sf per spudded barge) a portion of the bottom. This stage of the project will consist of pile driving activities including driving of 30" steel pipe piles, 24" steel piles, and 14" steel H-piles for installation of the temporary work trestles at all 4 quadrants of the bridge. There will be driving of 14" steel H-piles and steel sheeting for installation of the temporary marine enclosures around the locations for the two new lift piers.

Lastly there will be 30" steel pipe piles and 24" steel piles driven within these marine enclosures for use as support for the installation of the drilled shafts to be constructed in a later stage.

The four tables listed below (Tables 5-8) identify the acoustical results from proxy projects of similar conditions using GARFO's in-house data spreadsheet tool. Additionally, if a situation arises where multiple piles need to be driven simultaneously, the sound pressure levels presented in the following tables could rise as much as 3 dB re 1 µPa RMS above the numbers listed (WSDOT, 2018). Sound pressure levels resulting from select pile work may rise above the behavioral and physiological injury thresholds for the above identified ESA listed species. Sturgeon and sea turtle behavioral thresholds of 150 and 166 dB re 1 µPa RMS respectively and physiological thresholds of 206 and 180 dB re 1 µPa RMS respectively will at times not be met. For these species to be affected, they will have to be within relative distances (listed in Tables 7 and 8) of the activity and remain there for a prolonged period of time. This is extremely unlikely to occur as sturgeon and sea turtle species will be expected to adjust course away from the ensonified area and use the multitude of available foraging opportunities throughout the Norwalk River, Norwalk Harbor, and nearby Long Island Sound. Bubble curtains will be deployed during pile driving activities as a mitigative measure to attenuated sound, and soft starts will be used at the beginning of each shift. Furthermore, sounds from the pile extraction and driving activities during this stage will be coordinated to ensure activities are only taking place on one half (or occupy only 50% when working in the middle of the river) of the river at a time, only during predetermined daily time windows (ex. 12-hour work periods followed by 12-hour work free periods), and otherwise conducted in a manner that makes a portion of the river accessible to fish passage. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Table 5 – Proxy Projects for Estimating Underwater Noise

Project Location	Water Depth (m)	Pile Size (inches)	Pile Type	Hammer Type	Attenuation rate (dB/10m)
Not Available	6	14"	Steel H-Type	Impact	5
Fort Bragg, CA	2	12"	Steel H-Type	Vibratory	5
Florence, OR - Siuslaw River	3	30"	Steel Pipe	Impact	5
Florence, OR - Siuslaw River	3	30"	Steel Pipe	Vibratory	5
Martinez, CA - Carquinez Straits	15	24"	Steel Pipe	Impact	5
Rodeo, CA - San Francisco Bay, CA	5	24"	Steel Pipe	Vibratory	3
Not Available	15	24"	AZ Steel Sheet	Impact	5
Not Available	15	24"	AZ Steel Sheet	Vibratory	5

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 6 – Proxy-Based Estimates for Underwater Noise

Type of Pile	Hammer Type	Estimated Peak Noise Level (dB_{Peak})	Estimated Pressure Level (dB_{RMS})	Estimated Single Strike Sound Exposure Level (dB_{sSEL})
14" Steel H-Type	Impact	208	193	177
12" Steel H-Type	Vibratory	169	155	144
30" Steel Pipe	Impact	210	190	177
30" Steel Pipe	Vibratory	200	180	167
24" Steel Pipe	Impact	207	194	178
24" Steel Pipe	Vibratory	193	179	168
24" AZ Steel Sheet	Impact	205	190	180
24" AZ Steel Sheet	Vibratory	182	165	165

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 7 – Estimated Distances to Sturgeon Injury and Behavioral Thresholds

Type of Pile	Hammer Type	Distance (m) to 206dB_{Peak} (injury)	Distance (m) to sSEL of 150 dB (surrogate for 187 dBcSEL injury)	Distance (m) to Behavioral Disturbance Threshold (150 dB_{RMS})
14" Steel H-Type	Impact	14.0	64.0	96.0
12" Steel H-Type	Vibratory	NA	NA	40.0
30" Steel Pipe	Impact	18.0	64.0	90.0
30" Steel Pipe	Vibratory	NA	44.0	70.0
24" Steel Pipe	Impact	12.0	66.0	98.0
24" Steel Pipe	Vibratory	NA	70.0	106.7
24" AZ Steel Sheet	Impact	NA	70.0	90.0
24" AZ Steel Sheet	Vibratory	NA	40.0	40.0

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 8 – Estimated Distances to Sea Turtle Injury and Behavioral Thresholds

Type Pile	Hammer Type		

		Distance (m) to 180 dB RMS (injury)	Distance (m) to 166 dBRMS (behavior)
14" Steel H-Type	Impact	36.0	64.0
12" Steel H-Type	Vibratory	NA	NA
30" Steel Pipe	Impact	30.0	58.0
30" Steel Pipe	Vibratory	10.0	38.0
24" Steel Pipe	Impact	38.0	66.0
24" Steel Pipe	Vibratory	NA	53.3
24" AZ Steel Sheet	Impact	30.0	58.0
24" AZ Steel Sheet	Vibratory	NA	NA

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Habitat Structure and Disturbance

Habitat disturbing activities during this stage include pile driving and work trestle erection on all four quadrants of the bridge, marine enclosure installation extending waterward from the river bank on each side of the river, and pile driving and steel support erection within these marine enclosures. Pile driving activities during this stage will temporarily eliminate spot locations of benthic habitat, but as a fraction of the available habitat in the action area, is not expected to have an affect on sturgeon or sea turtle use. Marine enclosure installation will temporarily eliminate two locations of accessible benthic habitat, but as a fraction of the available habitat in the action area, is not expected to have an affect on sturgeon or sea turtle use either. There are no anticipated changes in water depths during this stage. Habitat disturbance from this stage of the project when added to existing conditions will result in temporary alterations of benthic habitat availability and temporary alteration of the shadow patterns, but not a change in the use of the areas by the above Section 7 listed species or diminish its quality such that there would be any effects on an individual that can be meaningfully measured, detected, or evaluated and are therefore insignificant.

Dredging (Capture)

There will be no dredging or excavation activities in the waterway during this stage and as a result, capture incidents from this stage, when added to existing conditions, will have no effect.

Water Quality

Temporary localized increases in turbidity/suspended sediment will result from the pile driving for erection of work platforms, marine enclosure installation, and drilled shaft support pile installation (driven within marine enclosures). TSS concentrations for pile/sheet driving, of approximately 5.0 to 10.0 mg/L above background levels, can be expected within approximately 300 feet of the pile/sheeting being driven (FHWA 2012) and are well below those shown to have adverse effects on fish (Burton 1993) and benthic communities (EPA 1986). Ultimately, the turbidity producing work will not be expected to impair movement of the above listed species or produce any other effect that can be meaningfully measured, detected, or evaluated. Additionally, debris shields will be used to catch any debris and slag from control house removal activities during this stage. Any

effects resulting from a change in water quality during this stage will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Prey Quantity/Quality

Benthic prey habitat disturbing activities during Stage 2 include pile driving for construction phase work platforms, installation of marine enclosures for lift pier construction, and drilled shaft pile installation (within these enclosures). Benthic prey habitat will be temporarily displaced by these activities for numerous stages while bridge construction is underway. These areas account for only a small portion of the available prey habitat within the action area that will result in minimal, temporary impact on prey resources given the scale of the action area. The opportunity for benthic invertebrates to recolonize these areas disturbed by work the trestles and marine enclosures will immediately (within days to weeks) follow removal, reestablishing and increasing foraging habitat, and therefore any effects on prey quantity and quality resulting from this project will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time will typically include a crane barge, a material barge (two when necessary), and when necessary, a work barge. These vessels will either employ the use of spuds, be tied to a barge using spuds, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers at their respective locations onsite. They will be complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement, bubble curtain placement, and turbidity curtain placement adjustments. The increase in traffic associated with this stage is extremely small. During the project activities, a minimal number (2-6 per activity) of project vessels will be added to the baseline. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall action area on any given day. As such, any increased risk of a vessel strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

Temporary, construction phase in water structures to be added for this stage of the project will consist of work trestles and associated piles at all 4 quadrants of the bridge, marine enclosures to isolate the location for lift pier construction, and support piles and steel for construction of the lift piers (located within the marine enclosures). These will be located within the river during construction, but will ultimately be removed following various stages of project completion. The final (temporary) condition following this stage will result in work trestle piles expected to function only as obstacles, not acting as a continuous barrier to fish or sea turtle passage at any location in the river, and a temporary change in horizontal clearance at the bridge resulting from the addition of the marine enclosures. The marine enclosures will only account for a portion of

the total width of the river at this location, much of which is intertidal, and accounts for a small fraction (<1%) of the entire action area. As a result, any effects from the temporary addition of these in water structures on the scale of the action area will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Stage 3

Sound

Barge placement and construction activities are expected to allow adequate zones of passage to be maintained throughout the action area. The Norwalk River measures approximately 383 feet wide at the bridge during MHW. All barge placement and construction activities during this stage will be coordinated to allow ample room for passage at all times. Furthermore, during construction operations, the construction barges will be anchored by spuds and negligibly disturb (28 sf per spudded barge) a portion of the bottom, and construction activities will be confined to areas within marine enclosures. This stage of the project will consist of installation of 12-foot diameter drilled shafts, 10-foot diameter center supports with 12" micropiles, and 12" steel bearing pile driving for temporary low headroom work platforms. Shaft drilling may yield approximately 174.0 dB re 1 µPa (Tappan Zee Constructors, LLC, 2017) which is above the behavioral threshold for sturgeon and sea turtle species. Micropile drilling is may generate sounds similar to those of geotechnical drilling with peak sound pressure levels of 151.0 dB re 1 µPa (WSDOT 2007) which will be just above the behavioral thresholds for sturgeon species.

The four tables listed below (Tables 9-12) identify the acoustical results from proxy projects of similar conditions using GARFO's in-house data spreadsheet tool. Sound pressure levels resulting from select pile work may rise above the behavioral injury thresholds for the above identified ESA listed species and the physiological threshold for the above listed sea turtles. Sturgeon and sea turtle behavioral thresholds of 150 and 166 dB re 1 µPa RMS respectively and the sea turtle physiological threshold of 180 dB re 1 µPa RMS will at times not be met. For these species to be affected, they will have to be within relative distances (listed in Tables 11 and 12) of the activity and remain there for a prolonged period of time. This is extremely unlikely to occur as sturgeon and sea turtle species will be expected to adjust course away from the ensonified area and use the multitude of available foraging opportunities throughout the Norwalk River, Norwalk Harbor, and nearby Long Island Sound. Bubble curtains will be deployed during pile driving and extraction activities as a mitigative measure to attenuated sound, and soft starts will be used at the beginning of each shift. Furthermore, sounds from the pile driving and shaft drilling activities during this stage will be coordinated to ensure activities are only taking place on one half (or occupy only 50% when working in the middle of the river) of the river at a time, only during predetermined daily time windows (ex. 12-hour work periods followed by 12-hour work free periods), and otherwise conducted in a manner that makes a portion of the river accessible to fish passage. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Table 9 – Proxy Projects for Estimating Underwater Noise

Project Location	Water Depth (m)	Pile Size (inches)	Pile Type	Hammer Type	Attenuation rate (dB/10m)
Sausalito, CA - Richardson Bay	2	12"	Steel Pipe	Impact	5
Sausalito, CA - Richardson Bay	2	12"	Steel Pipe	Vibratory	5

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 10 – Proxy-Based Estimates for Underwater Noise

Type of Pile	Hammer Type	Estimated Peak Noise Level (dB_{Peak})	Estimated Pressure Level (dB_{RMS})	Estimated Single Strike Sound Exposure Level (dB_{sSEL})
12" Steel Pipe	Impact	203	191	178
12" Steel Pipe	Vibratory	193	181	168

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 11 – Estimated Distances to Sturgeon Injury and Behavioral Thresholds

Type of Pile	Hammer Type	Distance (m) to 206dB_{Peak} (injury)	Distance (m) to sSEL of 150 dB (surrogate for 187 dBcSEL injury)	Distance (m) to Behavioral Disturbance Threshold (150 dB_{RMS})
12" Steel Pipe	Impact	NA	66.0	92.0
12" Steel Pipe	Vibratory	NA	46.0	72.0

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 12 – Estimated Distances to Sea Turtle Injury and Behavioral Thresholds

Type Pile	Hammer Type	Distance (m) to 180 dB RMS (injury)	Distance (m) to 166 dBRMS (behavior)
12" Steel Pipe	Impact	32.0	60.0
12" Steel Pipe	Vibratory	12.0	40.0

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Habitat Structure and Disturbance

This stage will involve the installation of the 8 drilled shafts (4 per lift pier) and 4 center supports (2 per lift pier) which will be permanent fixtures within the river following completion of the project, and thirty-two 12" steel bearing piles for temporary low headroom platforms. Since these in water structures will be constructed within the marine enclosures erected in Stage 2, this stage will not alter the habitat available for fish and sea turtle use following completion of this stage, and as a result, any effects from this work when added to the baseline conditions, will be extremely unlikely to occur and are therefore discountable.

Dredging (Capture)

There will be no dredging or excavation activities in the waterway during this stage and as a result, capture incidents from this stage, when added to existing conditions, will have no effect.

Water Quality

Temporary localized increases in turbidity/suspended sediment will result from shaft, center support micro pile drilling, and pile driving however these activities will be conducted within marine enclosures where turbidity will be contained by both a turbidity curtain and the enclosures themselves. Ultimately, the turbidity producing work will not be expected to impair movement of the above listed species or produce any other effect beyond the marine enclosures. Any change in water quality during this stage will be extremely unlikely when added to the baseline conditions, and therefore will be discountable.

Prey Quantity/Quality

Benthic prey habitat disturbing activities during Stage 3 include drilled shaft installation, center support installation, and pile driving within already constructed marine enclosures. No additional benthic prey habitat will be displaced by these activities from that experienced by Stage 2 and as a result activities during this stage will have no effect.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time will typically include a work barge and a material barge. These vessels will either employ the use of spuds, be tied to a barge using spuds or to a work platform, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers at their respective locations onsite. They will be complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement adjustments. The increase in traffic associated with this stage is extremely small. During the project activities, a minimal number (2-5 per activity) of project vessels will be added to the baseline. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall action area on any given day. As such, any increased risk of a vessel

strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

Stage 3 will involve the installation of the 8 drilled shafts (4 per lift pier) and 4 center supports (2 per lift pier) which will be permanent fixtures within the river following completion of the project, and thirty-two 12" steel bearing piles for temporary low headroom platforms. Since these in water structures will be constructed within the marine enclosures erected in Stage 2, this stage will not alter the width of the river available for fish or sea turtle passage following completion of this stage, and as a result, any effects from this work when added to the baseline conditions, will have no effect.

Stage 4

Sound

Barge placement and construction activities are expected to allow adequate zones of passage to be maintained throughout the action area. The Norwalk River measures approximately 383 feet wide at the bridge during MHW. All barge placement, excavation, and pile extraction activities will be coordinated to allow ample room for passage at all times. Furthermore, during construction operations, the construction barges will be anchored by spuds and negligibly disturb (28 sf per spudded barge) a portion of the bottom. Dredging will take place within the marine enclosures for placement of precast concrete tubs. Backhoe dredge peak contact pressure levels of 143.2 dB re 1 µPa-m (measured at 60 meters, Reine et al., 2012) will not exceed the behavioral and/or physiological injury thresholds for ESA listed sturgeon or sea turtle species.

This stage of the project will also consist of pile extraction of 14" steel H-piles used as supports for the drilled shaft installation from within the marine enclosures. The four tables listed below (Tables 13-16) identify the acoustical results from a proxy project of similar conditions using GARFO's in-house data spreadsheet tool. All sound pressure levels resulting from this pile work are expected to remain below the physiological injury thresholds for the above identified ESA listed species. Sturgeon and sea turtle behavioral thresholds of 150 and 166 dB re 1 µPa RMS respectively will at times not be met. For these species to be affected, they will have to be within relative distances (listed in Tables 15 and 16) of the activity and remain there for a prolonged period of time. This is extremely unlikely to occur as sturgeon and sea turtle species will be expected to adjust course away from the ensonified area and use the multitude of available foraging opportunities throughout the Norwalk River, Norwalk Harbor, and nearby Long Island Sound. Bubble curtains will be deployed during pile extraction activities as a mitigative measure to attenuated sound, and soft starts will be used at the beginning of each shift.

Sounds from the dredging portion of this stage should not adversely affect any of the above identified ESA listed species, as it not expected to exceed the behavioral and/or physiological injury thresholds for ESA listed sturgeon or sea turtle species, and will be constructed within the marine enclosures and therefore no adverse effect is anticipated. Sounds from the pile extraction portions of this stage will be coordinated to ensure activities are only taking place on one half (or occupy only 50% when working in the middle of the river) of the river at a time, only during

predetermined daily time windows (ex. 12-hour work periods followed by 12-hour work free periods), and otherwise conducted in a manner that makes a portion of the river accessible to fish passage. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Table 13 – Proxy Projects for Estimating Underwater Noise

Project Location	Water Depth (m)	Pile Size (inches)	Pile Type	Hammer Type	Attenuation rate (dB/10m)
Fort Bragg, CA	2	12"	Steel H-Type	Vibratory	5

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 14 – Proxy-Based Estimates for Underwater Noise

Type of Pile	Hammer Type	Estimated Peak Noise Level (dB_{Peak})	Estimated Pressure Level (dB_{RMS})	Estimated Single Strike Sound Exposure Level (dB_{sSEL})
12" Steel H-Type	Vibratory	169	155	144

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 15 – Estimated Distances to Sturgeon Injury and Behavioral Thresholds

Type of Pile	Hammer Type	Distance (m) to 206dB_{Peak} (injury)	Distance (m) to sSEL of 150 dB (surrogate for 187 dBcSEL injury)	Distance (m) to Behavioral Disturbance Threshold (150 dB_{RMS})
12" Steel H-Type	Vibratory	NA	NA	40.0

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 16 – Estimated Distances to Sea Turtle Injury and Behavioral Thresholds

Type Pile	Hammer Type	Distance (m) to 180 dB RMS (injury)	Distance (m) to 166 dBRMS (behavior)
12" Steel H-Type	Vibratory	NA	NA

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Habitat Structure and Disturbance

This stage will involve removal of pile and steel support, and excavation for precast concrete tub installation all located within the marine enclosures. Since these in water structures will be constructed within the marine enclosures erected in Stage 2, this stage will not alter the habitat available for fish and sea turtle use following completion of this stage, and as a result, any effects from this work will be extremely unlikely to occur when added to the baseline conditions, and therefore will be discountable.

Dredging (Capture)

Dredging during this stage will take place within the marine enclosures for placement of precast concrete tubs. This activity will only occupy small fractions of the width of the river and within the marine enclosures making the capture avoidance a certainty. Capture incidents from this stage, when added to existing conditions, will have no effect due to the excavation area exclusion by marine enclosures.

Water Quality

Temporary localized increases in turbidity/suspended sediment will result from shaft support steel removal and 2 cy bucket excavation for concrete tub installation, however these activities will be conducted within marine enclosures where turbidity will be contained by both a turbidity curtain and the enclosures themselves. Ultimately, the turbidity producing work will not be expected to impair movement of the above listed species or produce any other effect beyond the marine enclosures. Additionally, during concrete pouring activities, a debris shield will be placed on platform work areas to eliminate spillage of concrete into the water and facilitate clean up following the concrete pours. Any effects resulting from a change in water quality beyond the marine enclosures when added to the baseline conditions, will be discountable.

Prey Quantity/Quality

Benthic prey habitat disturbing activities during Stage 4 include shaft support piling removal and excavation for precast concrete tubs, both of which occur in the marine enclosures. No additional benthic prey habitat will be displaced by these activities from that experienced by Stage 2 and as a result activities during this stage will have no effect.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time will typically include a material barge. This vessel will either employ the use of spuds, be tied to a barge using spuds or to a work platform, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers at their respective locations onsite. It will be complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement adjustments. The increase

in traffic associated with this stage is extremely small. During the project activities, a minimal number (2-5 per activity) of project vessels will be added to the baseline. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall action area on any given day. As such, any increased risk of a vessel strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

Stage 4 will involve the removal of piling and steel supports used to assist in the drilled shaft and center support erection, and installation of precast concrete tubs. Since these in water structures will be constructed within the marine enclosures erected in Stage 2, this stage will not alter the width of the river available for fish passage or sea turtle following completion of this stage, and as a result, any effects from this work when added to the baseline conditions, will have no effect.

Stage 5

Sound

Barge placement and construction activities are expected to allow adequate zones of passage to be maintained throughout the action area. The Norwalk River measures approximately 383 feet wide at the bridge during MHW. All barge placement and pile extraction will be coordinated to allow ample room for passage at all times. Furthermore, during construction operations, the construction barges will be anchored by spuds and negligibly (28 sf per spudded barge) disturb a portion of the bottom. This stage of the project will consist of extracting of 12" steel bearing piles from work platform removal and steel sheeting used as the northern and southern limits of the marine enclosures. Impact guns will be used for unbolting platform components. The use of an impact gun would yield approximately 162.0 dB re 1 μPa (OGP, 2008, Hytorc) which is above the behavioral threshold for sturgeon species. It is extremely unlikely for sturgeon species to be affected as they will be expected to adjust course away from the ensonified area and use the multitude of available foraging opportunities throughout the Norwalk River, Norwalk Harbor, and nearby Long Island Sound. Bubble curtains will be deployed during pile extraction activities as a mitigative measure to attenuated sound, and soft starts will be used at the beginning of each shift.

The four tables listed below (Tables 17-20) identify the acoustical results from proxy projects of similar conditions using GARFO's in-house data spreadsheet tool. Sound pressure levels resulting from select pile work may rise above the behavioral injury thresholds for the above identified ESA listed species and the physiological threshold for the above listed sea turtles. Sturgeon and sea turtle behavioral thresholds of 150 and 166 dB re 1 μPa RMS respectively and the sea turtle physiological threshold of 180 dB re 1 μPa RMS will at times not be met. For these species to be affected, they will have to be within relative distances (listed in Tables 19 and 20) of the activity and remain there for a prolonged period of time. This is extremely unlikely to occur as sturgeon and sea turtle species will be expected to adjust course away from the ensonified area and use the multitude of available foraging opportunities throughout the Norwalk River, Norwalk Harbor, and nearby Long Island Sound. Furthermore, sounds from the pile extraction and driving activities during this stage will be coordinated to ensure activities are only taking place on one half (or occupy only 50% when working in the middle of the river) of the river at a time, only during

predetermined daily time windows (ex. 12-hour work periods followed by 12-hour work free periods), and otherwise conducted in a manner that makes a portion of the river accessible to fish passage. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Table 17 – Proxy Projects for Estimating Underwater Noise

Project Location	Water Depth (m)	Pile Size (inches)	Pile Type	Hammer Type	Attenuation rate (dB/10m)
Sausalito, CA - Richardson Bay	2	12"	Steel Pipe	Vibratory	5
Not Available	15	24"	AZ Steel Sheet	Vibratory	5

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 18 – Proxy-Based Estimates for Underwater Noise

Type of Pile	Hammer Type	Estimated Peak Noise Level (dB_{Peak})	Estimated Pressure Level (dB_{RMS})	Estimated Single Strike Sound Exposure Level (dB_{sSEL})
12" Steel Pipe	Vibratory	193	181	168
24" AZ Steel Sheet	Vibratory	182	165	165

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 19 – Estimated Distances to Sturgeon Injury and Behavioral Thresholds

Type of Pile	Hammer Type	Distance (m) to 206dB_{Peak} (injury)	Distance (m) to sSEL of 150 dB (surrogate for 187 dBcSEL injury)	Distance (m) to Behavioral Disturbance Threshold (150 dB_{RMS})
12" Steel Pipe	Vibratory	NA	46.0	72.0
24" AZ Steel Sheet	Vibratory	NA	40.0	40.0

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 20 – Estimated Distances to Sea Turtle Injury and Behavioral Thresholds

Type Pile	Hammer Type		

		Distance (m) to 180 dB RMS (injury)	Distance (m) to 166 dBRMS (behavior)
12" Steel Pipe	Vibratory	12.0	40.0
24" AZ Steel Sheet	Vibratory	NA	NA

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Habitat Structure and Disturbance

This stage will involve partial removal of the under-bridge portion of the work platforms at the east and west approach spans, and partial removal of the marine enclosures including all of the sheeting extending east to west across portions of the river. These removals will open more exposed benthic habitat available for fish and sea turtle use, reduces shading, and ultimately will positively alter the habitat, and as a result, any effects following completion of this stage will be wholly beneficial.

Dredging (Capture)

There will be no dredging or excavation activities in the waterway during this stage and as a result, capture incidents from this stage, when added to existing conditions, will have no effect.

Water Quality

Temporary localized increases in turbidity/suspended sediment will result from the partial marine enclosure removal. TSS concentrations for pile/sheet extraction, of approximately 5.0 to 10.0 mg/L above background levels, can be expected within approximately 300 feet of the pile/sheeting being extracted (FHWA 2012) and are well below those shown to have adverse effects on fish (Burton 1993) and benthic communities (EPA 1986). Ultimately, the turbidity producing work will not be expected to impair movement of the above listed species or produce any other effect that can be meaningfully measured, detected, or evaluated. Any effects resulting from a change in water quality during this stage will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Prey Quantity/Quality

Benthic prey habitat disturbing activities during Stage 5 include partial removal of the marine enclosures. The opportunity for benthic invertebrates to recolonize these areas disturbed by work on the marine enclosures will immediately (within days to weeks) follow removal, reestablishing and increasing foraging habitat, and therefore any effects on prey quantity and quality resulting from this project will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels

anticipated on site at any given time will typically include a work barge and a material barge. These vessels will either employ the use of spuds, be tied to a barge using spuds or to a work platform, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers at their respective locations onsite. They will be complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement adjustments. The increase in traffic associated with this stage is extremely small. During the project activities, a minimal number (2-5 per activity) of project vessels will be added to the baseline. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall action area on any given day. As such, any increased risk of a vessel strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

Stage 5 will involve partial removal of the under-bridge portion of the work platforms at the east and west approach spans, and partial removal of the marine enclosures including all of the sheeting extending east to west across portions of the river. These removals will open more exposed river and ultimately positively alter the width of the river available for fish and sea turtle passage, and as a result, any effects following completion of this stage will be wholly beneficial.

Stage 6

Sound

Barge placement and construction activities are expected to allow adequate zones of passage to be maintained throughout the action area. The Norwalk River measures approximately 383 feet wide at the bridge during MHW. All barge placement, clamshell bucket, and pile driving and extraction activities will be coordinated to allow ample room for passage at all times. Furthermore, during construction operations, the construction barges will be anchored by spuds and negligibly disturb (28 sf per spudded barge) a portion of the bottom. Dredging will take be conducted for the installation of the submarine cable from lift pier to lift pier. Clamshell buckets' peak contact pressure levels of 124.0 dB re 1 μPa-m (measured at 150 meters, Dickerson et al., 2001) will not exceed the behavioral and/or physiological injury thresholds for ESA listed sturgeon or sea turtle species. The use of a generator and on a barge for hydro-fluidization technique (ex. 125 kW diesel generator) would yield approximately 148.0 dB re 1 μPa (OGP, 2008, eNoise Control) which remains below the behavioral and/or physiological injury thresholds for these species. For fender rail installation a compressor and hand tools will be used. The use of a compressor would yield approximately 147.0 dB re 1 μPa (OGP, 2008, WorkSafe) which also remains below the behavioral and/or physiological injury thresholds for these species.

This stage of the project will also consist of pile driving and/or extraction activities. Activity 1: Selective removal of existing 12" timber fender piles for submarine cable installation. Activity 2: Driving of 14" composite pipe piles following submarine cable installation. Activity 3: Removal of 12" timber piles as part of the partial removal of the northeast work platform. Activity 4: Removal of 30" steel pipe piles and 14" steel H-piles for partial northeast work platform removal.

The four tables listed below (Tables 21-24) identify the acoustical results from proxy projects of similar conditions using GARFO's in-house data spreadsheet tool. Sound pressure levels resulting from select pile work may rise above the behavioral injury thresholds for the above identified ESA listed species and the physiological threshold for the above listed sea turtles. Sturgeon and sea turtle behavioral thresholds of 150 and 166 dB re 1 µPa RMS respectively and physiological thresholds of 206 and 180 dB re 1 µPa RMS respectively will at times not be met. For these species to be affected, they will have to be within relative distances (listed in Tables 23 and 24) of the activity and remain there for a prolonged period of time. This is extremely unlikely to occur as sturgeon and sea turtle species will be expected to adjust course away from the ensonified area and use the multitude of available foraging opportunities throughout the Norwalk River, Norwalk Harbor, and nearby Long Island Sound. Bubble curtains will be deployed during pile driving and extraction activities as a mitigative measure to attenuated sound, and soft starts will be used at the beginning of each shift.

Sounds from the dredging portion of this stage should not adversely affect any of the above identified ESA listed species, as their presence is not expected during the months that this activity is proposed to take place, and therefore no adverse effect is anticipated. Sounds from the pile extraction and driving portions of this stage will be coordinated to ensure activities are only taking place on one half (or occupy only 50% when working in the middle of the river) of the river at a time, only during predetermined daily time windows (ex. 12-hour work periods followed by 12-hour work free periods), and otherwise conducted in a manner that makes a portion of the river accessible to fish passage. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Table 21 – Proxy Projects for Estimating Underwater Noise

Project Location	Water Depth (m)	Pile Size (inches)	Pile Type	Hammer Type	Attenuation rate (dB/10m)
Alameda, CA - San Francisco Bay	2-4	12-14"	Timber	Cushioned Impact	5
Norfolk, VA	12.2	12-16"	Timber	Vibratory	5
Not Available	6	14"	Steel H-Type	Impact	5
Fort Bragg, CA	2	12"	Steel H-Type	Vibratory	5
Florence, OR - Siuslaw River	3	30"	Steel Pipe	Impact	5
Florence, OR - Siuslaw River	3	30"	Steel Pipe	Vibratory	5
Not Available	10	13"	Plastic	Impact	5
Not Available	15	14"	Steel Pipe	Impact	5
San Rafael, CA - San Francisco Bay	>15	14"	Steel Pipe	Vibratory	2

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected.
Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 22 – Proxy-Based Estimates for Underwater Noise

Type of Pile	Hammer Type	Estimated Peak Noise Level (dB_{Peak})	Estimated Pressure Level (dB_{RMS})	Estimated Single Strike Sound Exposure Level (dB_{sSEL})
12-14" Timber	Cushioned Impact	180	170	160
12-16" Timber	Vibratory	176	165	165
14" Steel H-Type	Impact	208	193	177
12" Steel H-Type	Vibratory	169	155	144
30" Steel Pipe	Impact	210	190	177
30" Steel Pipe	Vibratory	200	180	167
13" Plastic	Impact	177	153	152
14" Steel Pipe	Impact	200	184	174
14" Steel Pipe	Vibratory	186	170	160

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 23 – Estimated Distances to Sturgeon Injury and Behavioral Thresholds

Type of Pile	Hammer Type	Distance (m) to 206dB_{Peak} (injury)	Distance (m) to sSEL of 150 dB (surrogate for 187 dBcSEL injury)	Distance (m) to Behavioral Disturbance Threshold (150 dB_{RMS})
12-14" Timber	Cushioned Impact	NA	30.0	50.0
12-16" Timber	Vibratory	NA	39.0	39.0
14" Steel H-Type	Impact	14.0	64.0	96.0
12" Steel H-Type	Vibratory	NA	NA	40.0
30" Steel Pipe	Impact	18.0	64.0	90.0
30" Steel Pipe	Vibratory	NA	44.0	70.0
13" Plastic	Impact	NA	14.0	16.0
14" Steel Pipe	Impact	NA	58.0	78.0
14" Steel Pipe	Vibratory	NA	70.0	120.0

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 24 – Estimated Distances to Sea Turtle Injury and Behavioral Thresholds

Type Pile	Hammer Type	Distance (m) to 180 dB RMS (injury)	Distance (m) to 166 dBRMS (behavior)
12-14" Timber	Cushioned Impact	NA	18.0
12-16" Timber	Vibratory	NA	NA
14" Steel H-Type	Impact	36.0	64.0
12" Steel H-Type	Vibratory	NA	NA
30" Steel Pipe	Impact	30.0	58.0
30" Steel Pipe	Vibratory	10.0	38.0
13" Plastic	Impact	NA	NA
14" Steel Pipe	Impact	18.0	46.0
14" Steel Pipe	Vibratory	NA	40.0

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Habitat Structure and Disturbance

Habitat disturbing activities during this stage include dredging for the installation submarine cables between the new lift piers. Upon completion, the trench will be backfilled to match the pre-construction elevations of the river bottom using suitable backfill material to match the grain size composition of the original sediments. There will not be any change in water depths. This stage will also consist of removal of a portion of the northeast work platform and associated piles and partial installation of the permanent fender system and piles. Habitat disturbance from this stage of the project when added to existing conditions will result in temporary alterations of benthic habitat substrate and temporary alteration of the shadow patterns, but not a change in the use of the areas by the above Section 7 listed species or diminish its quality such that there would be any effects on an individual that can be meaningfully measured, detected, or evaluated and are therefore insignificant.

Dredging (Capture)

Dredging activities during Stage 6 include excavation for installation of submarine cables from lift pier to lift pier. This activity will only occupy small fractions of the width of the river at a time allowing ample room for avoidance. This portion of the project will employ the use of a mechanical dredge (clamshell bucket) and interactions with the above listed species are extremely unlikely to occur. For an individual to be impacted by a clamshell bucket they would likely need to be directly below the bucket as it reaches the riverbed and remain motionless as the bucket closes. Capture incidents from this stage, when added to existing conditions, are discountable due to the river extents available for avoidance and passage, and the time of year dredging will take place (December and January) where listed species are expected to be absent.

Water Quality

Temporary localized increases in turbidity/suspended sediment will result from the clamshell excavation work, pile driving, and pile extraction. Total suspended solids (TSS) for clamshell bucket excavation range from 105 mg/L up to 445 mg/L (ACOE, 2001) with turbidity levels between 15 mg/L and 191 mg/L up to 2,000 feet from the excavation site (Burton, 1993). TSS concentrations for pile driving and extraction, of approximately 5.0 to 10.0 mg/L above background levels, can be expected within approximately 300 feet of the pile being driven or extracted (FHWA 2012) and are well below those shown to have adverse effects on fish (Burton 1993) and benthic communities (EPA 1986). The turbidity producing work from excavation will ultimately take place within turbidity curtains and during the winter months (December and January), in addition all turbidity producing work in this stage being conducted such that no impairment of movement of the above listed species will be expected or any other effect that can be meaningfully measured, detected, or evaluated. Any effects resulting from a change in water quality during this stage will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Prey Quantity/Quality

Benthic prey habitat disturbing activities during Stage 6 include excavation for submarine cable installation, partial installation of fender piles, and partial removal of the northeast work platform. The opportunity for benthic invertebrates to recolonize the excavated areas will immediately (within days to weeks) follow this work, reestablishing and increasing foraging habitat, and therefore any effects on prey quantity and quality resulting from this project will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time will typically include a crane barge, deck barge, and a material barge. These vessels will either employ the use of spuds, be tied to a barge using spuds or to a work platform, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers at their respective locations onsite. They will be complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement and turbidity curtain placement adjustments. The increase in traffic associated with this stage is extremely small. During the project activities, a minimal number (2-5 per activity) of project vessels will be added to the baseline. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall action area on any given day. As such, any increased risk of a vessel strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

This stage will consist of both in water structure addition and removal. In water structure removal will include select fender removal for submarine cable installation and a portion of the northeast work platform and associated piles. In water structure additions will be limited to partial installation of the permanent fender system and piles. Submarine cables will also be installed during this stage, but ultimately end up below the riverbed, and will not contribute any addition of in water structures in the water column. The final condition following this stage will result in an insignificant change in the area available for fish or sea turtle passage. Any effects resulting from these changes to in water structures will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Stage 7

Sound

This stage will consist of timber mat and shoring tower placement in the intertidal areas beneath the approach spans, as well as disassembly of approach span steel. These activities will require the use of small equipment and hand tools and are not expected to produce sounds that would injure or impair movement of ESA listed sturgeon or sea turtle species. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Habitat Structure and Disturbance

This stage will include the addition of temporary timber mats and temporary shoring towers to be used as supports for demolition of the approach spans. These elements will be placed in intertidal areas and as a result, will not be measurable, or detectable when added to the baseline conditions, and effects are therefore insignificant.

Dredging (Capture)

There will be no dredging or excavation activities in the waterway during this stage and as a result, capture incidents from this stage, when added to existing conditions, will have no effect.

Water Quality

During this stage, timber mats will be placed in intertidal areas for small equipment access, but are not expected to contribute to a change in water quality. There will be no dredging, excavation, or other sediment disturbing activities expected to increase turbidity or otherwise alter water quality in the waterway during this stage that can be meaningfully measured, detected, or evaluated and any effects are therefore insignificant.

Prey Quantity/Quality

Benthic prey habitat disturbing activities during Stage 7 include installation of temporary supports for approach span demolition and intertidal impacts from equipment movement during demolition. The opportunity for benthic invertebrates to recolonize these areas will immediately (within days to weeks) follow completion of this work, reestablishing and increasing foraging habitat, and

therefore any effects on prey quantity and quality resulting from this project will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time will typically include a deck barge. This vessel will either employ the use of spuds, be tied to a work platform, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers at their respective locations onsite. It will be complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement adjustments. The increase in traffic associated with this stage is extremely small. During the project activities, a minimal number (1-4 per activity) of project vessels will be added to the baseline. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall action area on any given day. As such, any increased risk of a vessel strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

This stage will include the addition of temporary timber mats and temporary shoring towers to be used as supports for demolition of the approach spans. These elements will be temporary and placed in intertidal areas and as a result, will not be measurable, or detectable when added to the baseline conditions, and effects are therefore insignificant.

Stage 8

Sound

This stage will consist of hoisting forms, steel, and other construction materials for pier cap and grinding for bearing pedestal construction. These activities will require the use of cranes, and excavator, small equipment, and hand tools and are not expected to produce sounds that would injure or impair movement of ESA listed sturgeon or sea turtle species. An excavator with a jackhammer/rock breaker attachment will be used for east abutment demolition activities. The use of an of this equipment would yield approximately 173.0 dB re 1 µPa (OGP, 2008, Melbourne Metro Rail Project, 2016) which is above the behavioral threshold for sturgeon and sea turtle species. It is extremely unlikely for these species to be affected as this work is being conducted out of the water and above the riverbank. The use of a grinder would yield approximately 159.0 dB re 1 µPa (OGP, 2008, WorkSafe) which is above the behavioral threshold for sturgeon species. It is extremely unlikely for sturgeon species to be affected as they will be expected to adjust course away from the ensonified area and use the multitude of available foraging opportunities throughout the Norwalk River, Norwalk Harbor, and nearby Long Island Sound. Based on this, we conclude

that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Habitat Structure and Disturbance

No aquatic habitat disturbing activities are expected during Stage 8 and as a result, when added to the baseline conditions, will have no effect.

Dredging (Capture)

There will be no dredging or excavation activities in the waterway during this stage and as a result, capture incidents from this stage, when added to existing conditions, will have no effect.

Water Quality

There will be no dredging, excavation, or other sediment disturbing activities expected to increase turbidity or otherwise alter water quality in the waterway during this stage and as a result will have no effect.

Prey Quantity/Quality

No benthic prey habitat disturbing activities are expected during Stage 8 and as a result, when added to the baseline conditions, will have no effect.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time will typically include a crane barge and material barge. These vessels will either employ the use of spuds, be tied to a barge using spuds or to a work platform, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers at their respective locations onsite. They will be complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement adjustments. The increase in traffic associated with this stage is extremely small. During the project activities, a minimal number (2-5 per activity) of project vessels will be added to the baseline. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall action area on any given day. As such, any increased risk of a vessel strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

This stage will not alter the amount and/or location of any in water structures, and as a result, when added to the baseline conditions, will have no effect.

Stage 9

Sound

Barge placement and construction activities are expected to allow adequate zones of passage to be maintained throughout the action area. The Norwalk River measures approximately 383 feet wide at the bridge during MHW. All barge placement and pile extraction activities will be coordinated to allow ample room for passage at all times. Furthermore, during construction operations, the construction barges will be anchored by spuds and negligibly disturb (28 sf per spudded barge) a portion of the bottom. This stage of the project will consist of pile extraction of 30" steel pipe piles as part of the partial removal of the southeast work platform.

The four tables listed below (Tables 25-28) identify the acoustical results from proxy projects of similar conditions using GARFO's in-house data spreadsheet tool. Sound pressure levels resulting from select pile work may rise above the behavioral injury thresholds for the above identified ESA listed species and the physiological threshold for the above listed sea turtles. Sturgeon and sea turtle behavioral thresholds of 150 and 166 dB re 1 µPa RMS respectively and the sea turtle physiological threshold of 180 dB re 1 µPa RMS will at times not be met. For these species to be affected, they will have to be within relative distances (listed in Tables 27 and 28) of the activity and remain there for a prolonged period of time. This is extremely unlikely to occur as sturgeon and sea turtle species will be expected to adjust course away from the ensonified area and use the multitude of available foraging opportunities throughout the Norwalk River, Norwalk Harbor, and nearby Long Island Sound. Bubble curtains will be deployed during pile extraction activities as a mitigative measure to attenuated sound, and soft starts will be used at the beginning of each shift. Sounds from the pile extraction portions of this stage will be coordinated to ensure activities are only taking place on one half (or occupy only 50% when working in the middle of the river) of the river at a time, only during predetermined daily time windows (ex. 12-hour work periods followed by 12-hour work free periods), and otherwise conducted in a manner that makes a portion of the river accessible to fish passage. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Table 25 – Proxy Projects for Estimating Underwater Noise

Project Location	Water Depth (m)	Pile Size (inches)	Pile Type	Hammer Type	Attenuation rate (dB/10m)
Florence, OR - Siuslaw River	3	30"	Steel Pipe	Vibratory	5

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected.
Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 26 – Proxy-Based Estimates for Underwater Noise

Type of Pile	Hammer Type	Estimated Peak Noise Level (dB_{Peak})	Estimated Pressure Level (dB_{RMS})	Estimated Single Strike Sound Exposure Level (dB_{sSEL})
30" Steel Pipe	Vibratory	200	180	167

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected.
Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 27 – Estimated Distances to Sturgeon Injury and Behavioral Thresholds

Type of Pile	Hammer Type	Distance (m) to 206dB_{Peak} (injury)	Distance (m) to sSEL of 150 dB (surrogate for 187 dBcSEL injury)	Distance (m) to Behavioral Disturbance Threshold (150 dB_{RMS})
30" Steel Pipe	Vibratory	NA	44.0	70.0

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected.
Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 28 – Estimated Distances to Sea Turtle Injury and Behavioral Thresholds

Type Pile	Hammer Type	Distance (m) to 180 dB RMS (injury)	Distance (m) to 166 dBRMS (behavior)
30" Steel Pipe	Vibratory	10.0	38.0

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected.
Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Habitat Structure and Disturbance

Benthic habitat disturbing activities during Stage 9 include partial removal of the southwest work platform. This removal will open more exposed benthic habitat available for fish and sea turtle use, will reduce shading, and ultimately will positively alter the habitat, and as a result, any effects following completion of this stage will be wholly beneficial.

Dredging (Capture)

There will be no dredging or excavation activities in the waterway during this stage and as a result, capture incidents from this stage, when added to existing conditions, will have no effect.

Water Quality

Temporary localized increases in turbidity/suspended sediment will result from pile extraction. TSS concentrations for pile extraction, of approximately 5.0 to 10.0 mg/L above background levels, can be expected within approximately 300 feet of the pile being driven or extracted (FHWA 2012) and are well below those shown to have adverse effects on fish (Burton 1993) and benthic communities (EPA 1986). The turbidity producing work during this stage will be conducted within a turbidity curtain, and ultimately not be expected to impair movement of the above listed species or produce any other effect that can be meaningfully measured, detected, or evaluated. Any effects resulting from a change in water quality will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Prey Quantity/Quality

Benthic prey habitat disturbing activities during Stage 9 include partial removal of the southwest work platform. The opportunity for benthic invertebrates to recolonize the impacted areas will immediately (within days to weeks) follow partial removal of the work platform, reestablishing and increasing foraging habitat, and therefore any effects on prey quantity and quality resulting from this project will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Vessels

No vessel movement activities are expected during Stage 9 and as a result, any risk of vessel impact when added to the baseline conditions, will have no effect.

In-Water Structures

This stage will involve partial removal of the southeast work trestle and piles. This removal will open more exposed river and ultimately positively alter the extent of the river available for fish or sea turtle passage, and as a result, any effects following completion of this stage will be wholly beneficial.

Stage 10

Sound

This stage will consist of tower span hoisting and placement, steel and precast concrete placement and erection, and timber mat placement in the intertidal areas for man-lift access. These activities will require the use of cranes, small equipment, and hand tools and are not expected to produce sounds that would injure or impair movement of ESA listed sturgeon or sea turtle species. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Habitat Structure and Disturbance

No aquatic habitat disturbing activities are expected during Stage 10 and as a result, when added to the baseline conditions, will have no effect.

Dredging (Capture)

There will be no dredging or excavation activities in the waterway during this stage and as a result, capture incidents from this stage, when added to existing conditions, will have no effect.

Water Quality

There will be no dredging, excavation, or other sediment disturbing activities expected to increase turbidity or otherwise alter water quality in the waterway during this stage and as a result will have no effect.

Prey Quantity/Quality

Benthic prey habitat disturbing activities during Stage 10 are limited to intertidal timber matting for equipment access to set approach span steel. The opportunity for benthic invertebrates to recolonize these areas will immediately (within days to weeks) follow the work when timber mats are removed, reestablishing and increasing foraging habitat, and therefore any effects on prey quantity and quality resulting from this project will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time will typically include a crane barge and material barge. These vessels will either employ the use of spuds, be tied to a barge using spuds or to a work platform, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers at their respective locations onsite. They will be complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement adjustments. The increase in traffic associated with this stage is extremely small. During the project activities, a minimal number (2-5 per activity) of project vessels will be added to the baseline. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall action area on any given day. As such, any increased risk of a vessel strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

This stage will not alter the amount and/or location of any in water structures, and as a result, when added to the baseline conditions, will have no effect.

Stage 11

Sound

This stage will consist of concrete closure pours, slide rail erection, and timber mat placement in the intertidal areas for man-lift access. These activities will require the use of cranes, small equipment, a compressor, and hand tools and are not expected to produce sounds that would injure or impair movement of ESA listed sturgeon or sea turtle species. The use of a compressor would yield approximately 147.0 dB re 1 µPa (OGP, 2008, WorkSafe) which remains below the behavioral and/or physiological injury thresholds for these species. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Habitat Structure and Disturbance

No aquatic habitat disturbing activities are expected during Stage 11 and as a result, when added to the baseline conditions, will have no effect.

Dredging (Capture)

There will be no dredging or excavation activities in the waterway during this stage and as a result, capture incidents from this stage, when added to existing conditions, will have no effect.

Water Quality

For concrete pouring activities, a debris shield will be provided at the work area to prevent concrete from getting into the water. There will be no dredging, excavation, or other sediment disturbing activities expected to increase turbidity or otherwise alter water quality in the waterway during this stage and as a result will have no effect.

Prey Quantity/Quality

Benthic prey habitat disturbing activities during Stage 11 are similar to stage 10 and include intertidal timber matting for equipment access to set approach span decks. The opportunity for benthic invertebrates to recolonize these areas will immediately (within days to weeks) follow the work when timber mats are removed, reestablishing and increasing foraging habitat, and therefore any effects on prey quantity and quality resulting from this project will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time will typically include a crane barge, a material barge, and a work barge. These vessels will either employ the use of spuds, be tied to a barge using spuds or to a work platform, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers at their respective locations onsite. They will be

complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement adjustments. The increase in traffic associated with this stage is extremely small. During the project activities, a minimal number (3-6 per activity) of project vessels will be added to the baseline. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall action area on any given day. As such, any increased risk of a vessel strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

This stage will not alter the amount and/or location of any in water structures, and as a result, when added to the baseline conditions, will have no effect.

Stage 12

Sound

Barge placement and construction activities are expected to allow adequate zones of passage to be maintained throughout the action area. The Norwalk River measures approximately 383 feet wide at the bridge during MHW. All barge placement and pile driving activities will be coordinated to allow ample room for passage at all times. Furthermore, during construction operations, the construction barges will be anchored by spuds and negligibly disturb (28 sf per spudded barge) a portion of the bottom. This stage of the project will consist of pile driving of 14" steel template piles and 14" steel H-piles for the installation of slide rails.

The four tables listed below (Tables 29-32) identify the acoustical results from proxy projects of similar conditions using GARFO's in-house data spreadsheet tool. Sound pressure levels resulting from select pile work may rise above the behavioral and physiological injury thresholds for the above identified ESA listed species. Sturgeon and sea turtle behavioral thresholds of 150 and 166 dB re 1 µPa RMS respectively and physiological thresholds of 206 and 180 dB re 1 µPa RMS respectively will at times not be met. For these species to be affected, they will have to be within relative distances (listed in Tables 31 and 32) of the activity and remain there for a prolonged period of time. This is extremely unlikely to occur as sturgeon and sea turtle species will be expected to adjust course away from the ensonified area and use the multitude of available foraging opportunities throughout the Norwalk River, Norwalk Harbor, and nearby Long Island Sound. Bubble curtains will also be deployed during pile driving as a mitigative measure to attenuated sound and soft starts will be used at the beginning of each shift. Furthermore, sounds from the pile driving activities during this stage will be coordinated to ensure activities are only taking place on one half (or occupy only 50% when working in the middle of the river) of the river at a time, only during predetermined daily time windows (ex. 12-hour work periods followed by 12-hour work free periods), and otherwise conducted in a manner that makes a portion of the river accessible to fish passage. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Table 29 – Proxy Projects for Estimating Underwater Noise

Project Location	Water Depth (m)	Pile Size (inches)	Pile Type	Hammer Type	Attenuation rate (dB/10m)
Not Available	6	14"	Steel H-Type	Impact	5
Fort Bragg, CA	2	12"	Steel H-Type	Vibratory	5
Not Available	15	14"	Steel Pipe	Impact	5
San Rafael, CA - San Francisco Bay	>15	14"	Steel Pipe	Vibratory	2

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected.
Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 30 – Proxy-Based Estimates for Underwater Noise

Type of Pile	Hammer Type	Estimated Peak Noise Level (dB_{Peak})	Estimated Pressure Level (dB_{RMS})	Estimated Single Strike Sound Exposure Level (dB_{sSEL})
14" Steel H-Type	Impact	208	193	177
12" Steel H-Type	Vibratory	169	155	144
14" Steel Pipe	Impact	200	184	174
14" Steel Pipe	Vibratory	186	170	160

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected.
Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 31 – Estimated Distances to Sturgeon Injury and Behavioral Thresholds

Type of Pile	Hammer Type	Distance (m) to 206dB_{Peak} (injury)	Distance (m) to sSEL of 150 dB (surrogate for 187 dBcSEL injury)	Distance (m) to Behavioral Disturbance Threshold (150 dB_{RMS})
14" Steel H-Type	Impact	14.0	64.0	96.0
12" Steel H-Type	Vibratory	NA	NA	40.0
14" Steel Pipe	Impact	NA	58.0	78.0
14" Steel Pipe	Vibratory	NA	70.0	120.0

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected.
Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 32 – Estimated Distances to Sea Turtle Injury and Behavioral Thresholds

Type Pile	Hammer Type		

		Distance (m) to 180 dB RMS (injury)	Distance (m) to 166 dBRMS (behavior)
14" Steel H-Type	Impact	36.0	64.0
12" Steel H-Type	Vibratory	NA	NA
14" Steel Pipe	Impact	18.0	46.0
14" Steel Pipe	Vibratory	NA	40.0

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Habitat Structure and Disturbance

Habitat disturbing activities during this stage will be limited to temporary slide rail construction and associated piles, caps, girders, and bracing. These elements will temporarily eliminate spot locations of benthic habitat, but as a fraction of the available habitat in the action area, is not expected to have an effect on sturgeon or sea turtle use. Habitat disturbance from this stage of the project when added to existing conditions will result in temporary alterations of benthic habitat availability and temporary alteration of the shadow patterns, but not a change in the use of the areas by the above Section 7 listed species or diminish its quality such that there would be any effects on an individual that can be meaningfully measured, detected, or evaluated and are therefore insignificant.

Dredging (Capture)

There will be no dredging or excavation activities in the waterway during this stage and as a result, capture incidents from this stage, when added to existing conditions, will have no effect.

Water Quality

Temporary localized increases in turbidity/suspended sediment will result from the pile driving for slide rail erection. TSS concentrations for pile driving, of approximately 5.0 to 10.0 mg/L above background levels, can be expected within approximately 300 feet of the pile being driven (FHWA 2012) and are well below those shown to have adverse effects on fish (Burton 1993) and benthic communities (EPA 1986). Ultimately, the turbidity producing work will not be expected to impair movement of the above listed species or produce any other effect that can be meaningfully measured, detected, or evaluated. Any effects resulting from a change in water quality during this stage will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Prey Quantity/Quality

Benthic prey habitat disturbing activities during Stage 12 include installation of temporary piles and template piles for the sliding rail system. The opportunity for benthic invertebrates to recolonize these areas will immediately (within days to weeks) follow removal of the rail system and piles during Stage 15, reestablishing and increasing foraging habitat, and therefore any effects on prey quantity and quality resulting from this project will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time will typically include a crane barge and a material barge. These vessels will either employ the use of spuds, be tied to a barge using spuds or to a work platform, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers at their respective locations onsite. They will be complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement adjustments. The increase in traffic associated with this stage is extremely small. During the project activities, a minimal number (2-5 per activity) of project vessels will be added to the baseline. For approximately one week during lift span float in activities, additional tug boats (up to 3), push boats (up to 2), and float-in barges (up to 2) will be added to the baseline. These additional vessels will be moving at low speeds, less than 4 knots, while in transit to the bridge, and remain motionless following arrival and during lift span transfer. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall action area on any given day. As such, any increased risk of a vessel strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

This stage will involve partial removal of the southeast work trestle and piles. This removal will open more exposed river and ultimately positively alter the extent of the river available for fish or sea turtle passage, and as a result, any effects following completion of this stage will be wholly beneficial.

Stage 13

Sound

This stage will consist of select removal of approach span steel and lift span sliding activities. These activities will require the use of cranes and hand tools and are not expected to produce sounds that would injure or impair movement of ESA listed sturgeon or sea turtle species. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Habitat Structure and Disturbance

No aquatic habitat disturbing activities are expected during Stage 13 and as a result, when added to the baseline conditions, will have no effect.

Dredging (Capture)

There will be no dredging or excavation activities in the waterway during this stage and as a result, capture incidents from this stage, when added to existing conditions, will have no effect.

Water Quality

As part of this stage, sections of the approach span steel will need to be cut. A crane barge will be positioned against the existing pier and the crane will hold each section while the section is cut for removal to eliminate any material falling into the waterway. There will be no dredging, excavation, or other sediment disturbing activities expected to increase turbidity or otherwise alter water quality in the waterway during this stage that can be meaningfully measured, detected, or evaluated and any effects are therefore insignificant.

Prey Quantity/Quality

No benthic prey habitat disturbing activities are expected during Stage 13 and as a result, when added to the baseline conditions, will have no effect.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time will typically include a work barge, a material barge, and at times a delivery barge. These vessels will either employ the use of spuds, be tied to a barge using spuds or to a work platform, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers at their respective locations onsite. They will be complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement adjustments. The increase in traffic associated with this stage is extremely small. During the project activities, a minimal number (2-5 per activity) of project vessels will be added to the baseline. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall action area on any given day. As such, any increased risk of a vessel strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

This stage will not alter the amount and/or location of any in water structures, and as a result, when added to the baseline conditions, will have no effect.

Stage 14

Sound

Barge placement and construction activities are expected to allow adequate zones of passage to be maintained throughout the action area. The Norwalk River measures approximately 383 feet wide

at the bridge during MHW. All barge placement, excavation, and pile extraction activities will be coordinated to allow ample room for passage at all times. Furthermore, during construction operations, the construction barges will be anchored by spuds and negligibly disturb (28 sf per spudded barge) a portion of the bottom. This stage will include placement of timber mat and shoring tower in the intertidal areas beneath the approach spans, demolition of the existing swing span, and disassembly of approach span steel. These activities will require the use of cranes, excavators, small equipment, hydraulic sheers, and hand tools and are not expected to produce sounds that would injure or impair movement of ESA listed sturgeon or sea turtle species.

Dredging with a clamshell bucket will be conducted to remove the retired signal and control cables. Clamshell buckets' peak contact pressure levels of 124.0 dB re 1 μPa-m (measured at 150 meters, Dickerson et al., 2001) will not exceed the behavioral and/or physiological injury thresholds for ESA listed sturgeon or sea turtle species.

Sounds from the dredging portion of this stage should not adversely affect any of the above identified ESA listed species, as it not expected to exceed the behavioral and/or physiological injury thresholds for ESA listed sturgeon or sea turtle species, and their presence is not expected during the months that this activity is proposed to take place, and therefore no adverse effect is anticipated. Sounds from the pile extraction portions of this stage will be coordinated to ensure activities are only taking place on one half (or occupy only 50% when working in the middle of the river) of the river at a time, only during predetermined daily time windows (ex. 12-hour work periods followed by 12-hour work free periods), and otherwise conducted in a manner that makes a portion of the river accessible to fish passage. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Habitat Structure and Disturbance

This stage will include removal of retired submarine power and control cables from beneath the riverbed. Upon completion, the trench will be backfilled to match the pre-construction elevations of the river bottom using suitable backfill material to match the grain size composition of the original sediments. There will not be any change in water depths. This stage will also include addition of temporary timber mats and temporary shoring towers placed in the intertidal zone to be used as supports for demolition of the approach spans. Habitat disturbance from this stage of the project when added to existing conditions will result in temporary alterations of benthic habitat substrate and temporary structures in the intertidal zone, but not a change in the use of the areas by the above Section 7 listed species or diminish its quality such that there would be any effects on an individual that can be meaningfully measured, detected, or evaluated and are therefore insignificant.

Dredging (Capture)

Dredging during this stage will be conducted to remove the retired signal and control cables. This activity will only occupy small fractions of the width of the river at a time allowing ample room for avoidance. This portion of the project will employ the use of a mechanical dredge (clamshell bucket) and interactions with the above listed species are extremely unlikely to occur. For an individual to be impacted by a clamshell bucket they would likely need to be directly below the

bucket as it reaches the riverbed and remain motionless as the bucket closes. Capture incidents from this stage, when added to existing conditions, are discountable due to the river extents available for avoidance and passage, and the time of year dredging will take place (December and January) where listed species are expected to be absent.

Water Quality

During this stage barges will be positioned beneath the existing swing span during demolition for catching demolition debris to avoid it from reaching the waterway. During this stage, timber mats will be placed in intertidal areas for small equipment access, but are not expected to contribute to a change in water quality. Temporary localized increases in turbidity/suspended sediment will result from the clamshell excavation work for submarine cable removal. Total suspended solids (TSS) for clamshell bucket excavation range from 105 mg/L up to 445 mg/L (ACOE, 2001) with turbidity levels between 15 mg/L and 191 mg/L up to 2,000 feet from the excavation site (Burton, 1993). The turbidity producing work from excavation will ultimately take place within turbidity curtains and during the winter months (December and January), in addition all turbidity producing work in this stage being conducted such that no impairment of movement of the above listed species will be expected or any other effect that can be meaningfully measured, detected, or evaluated. Any effects resulting from a change in water quality during this stage will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Prey Quantity/Quality

Benthic prey habitat disturbing activities during Stage 14 include installation of temporary supports for approach span demolition, submarine cable removal, and intertidal impacts from equipment movement during demolition. The opportunity for benthic invertebrates to recolonize these areas will immediately (within days to weeks) follow completion of this work, reestablishing and increasing foraging habitat, and therefore any effects on prey quantity and quality resulting from this project will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time will typically include a material barge. This vessel will either employ the use of spuds, be tied to a barge using spuds or to a work platform, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers at their respective locations onsite. It will be complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement and turbidity curtain placement adjustments. The increase in traffic associated with this stage is extremely small. During the project activities, a minimal number (2-5 per activity) of project vessels will be added to the baseline. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall action area on any given day. As such, any increased risk of a

vessel strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

This stage will include removal of retired submarine power and control cables from beneath the riverbed, and the addition of temporary timber mats and temporary shoring towers to be used as supports for demolition of the approach spans. These elements will be temporary and placed in intertidal areas and as a result, will not be measurable, or detectable when added to the baseline conditions, and effects are therefore insignificant.

Stage 15

Sound

Barge placement and construction activities are expected to allow adequate zones of passage to be maintained throughout the action area. The Norwalk River measures approximately 383 feet wide at the bridge during MHW. All barge placement, clamshell bucket, and pile driving and extraction activities will be coordinated to allow ample room for passage at all times. Furthermore, during construction operations, the construction barges will be anchored by spuds and negligibly disturb (28 sf per spudded barge) a portion of the bottom. Dredging activities will include dredging with a clamshell bucket to final depth around the pivot pier and dredging to remove the retired submarine cable from the existing rest pier to rest pier. Clamshell buckets' peak contact pressure levels of 124.0 dB re 1 µPa-m (measured at 150 meters, Dickerson et al., 2001) will not exceed the behavioral and/or physiological injury thresholds for ESA listed sturgeon or sea turtle species. An excavator with a jackhammer/rock breaker attachment will be used for pier and east abutment demolition activities. The use of an of this equipment would yield approximately 173.0 dB re 1 µPa (OGP, 2008, Melbourne Metro Rail Project, 2016) which is above the behavioral threshold for sturgeon and sea turtle species. It is extremely unlikely for these species to be affected as they will be expected to adjust course away from the ensonified area and use the multitude of available foraging opportunities throughout the Norwalk River, Norwalk Harbor, and nearby Long Island Sound. Bubble curtains will be deployed during pile driving and extraction activities as a mitigative measure to attenuated sound, and soft starts will be used at the beginning of each shift.

This stage of the project will also consist of pile driving and/or extraction activities at various locations. Activity 1: Extraction of 14" steel H-piles for removal of the slide rails located north of the bridge. Activity 2: Driving of 14" steel H-piles and steel sheet piles for construction of marine enclosures around the existing rest piers and pivot pier. Activity 3: Extraction of 14" steel H-piles and steel sheet piles for construction of marine enclosures around the existing rest piers and pivot pier. Activity 4: Driving of 14" steel H-piles and 14" composite pipe piles for southern portions of the new east and west fender systems. The four tables listed below (Tables 33-36) identify the acoustical results from proxy projects of similar conditions using GARFO's in-house data spreadsheet tool. Sound pressure levels resulting from select pile work may rise above the behavioral and physiological injury thresholds for the above identified ESA listed species. Sturgeon and sea turtle behavioral thresholds of 150 and 166 dB re 1 µPa RMS respectively and physiological thresholds of 206 and 180 dB re 1 µPa RMS respectively will at times not be met. For these species to be affected, they will have to be within relative distances (listed in Tables 35

and 36) of the activity and remain there for a prolonged period of time. This is extremely unlikely to occur as sturgeon and sea turtle species will be expected to adjust course away from the ensonified area and use the multitude of available foraging opportunities throughout the Norwalk River, Norwalk Harbor, and nearby Long Island Sound.

Sounds from the dredging portion of this stage should not adversely affect any of the above identified ESA listed species, as the sound pressure levels will not exceed the behavioral or physiological injury thresholds, and their presence is not expected during the months that these activities are proposed to take place, and therefore no adverse effect is anticipated. Sounds from the pile extraction and driving portions of this stage will be coordinated to ensure activities are only taking place on one half (or occupy only 50% when working in the middle of the river) of the river at a time, only during predetermined daily time windows (ex. 12-hour work periods followed by 12-hour work free periods), and otherwise conducted in a manner that makes a portion of the river accessible to fish passage. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Table 33 – Proxy Projects for Estimating Underwater Noise

Project Location	Water Depth (m)	Pile Size (inches)	Pile Type	Hammer Type	Attenuation rate (dB/10m)
Not Available	6	14"	Steel H-Type	Impact	5
Fort Bragg, CA	2	12"	Steel H-Type	Vibratory	5
Not Available	15	24"	AZ Steel Sheet	Impact	5
Not Available	15	24"	AZ Steel Sheet	Vibratory	5
Not Available	10	13"	Plastic	Impact	5
Not Available	15	14"	Steel Pipe	Impact	5
San Rafael, CA - San Francisco Bay	>15	14"	Steel Pipe	Vibratory	2

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected.
Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 34 – Proxy-Based Estimates for Underwater Noise

Type of Pile	Hammer Type	Estimated Peak Noise Level (dB_{Peak})	Estimated Pressure Level (dB_{RMS})	Estimated Single Strike Sound Exposure Level (dB_{sSEL})
14" Steel H-Type	Impact	208	193	177
12" Steel H-Type	Vibratory	169	155	144

24" AZ Steel Sheet	Impact	205	190	180
24" AZ Steel Sheet	Vibratory	182	165	165
13" Plastic	Impact	177	153	152
14" Steel Pipe	Impact	200	184	174
14" Steel Pipe	Vibratory	186	170	160

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected.
Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 35 – Estimated Distances to Sturgeon Injury and Behavioral Thresholds

Type of Pile	Hammer Type	Distance (m) to 206dB$_{Peak}$ (injury)	Distance (m) to sSEL of 150 dB (surrogate for 187 dBcSEL injury)	Distance (m) to Behavioral Disturbance Threshold (150 dB$_{RMS}$)
14" Steel H-Type	Impact	14.0	64.0	96.0
12" Steel H-Type	Vibratory	NA	NA	40.0
24" AZ Steel Sheet	Impact	NA	70.0	90.0
24" AZ Steel Sheet	Vibratory	NA	40.0	40.0
13" Plastic	Impact	NA	14.0	16.0
14" Steel Pipe	Impact	NA	58.0	78.0
14" Steel Pipe	Vibratory	NA	70.0	120.0

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected.
Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 36 – Estimated Distances to Sea Turtle Injury and Behavioral Thresholds

Type Pile	Hammer Type	Distance (m) to 180 dB RMS (injury)	Distance (m) to 166 dBRMS (behavior)
14" Steel H-Type	Impact	36.0	64.0
12" Steel H-Type	Vibratory	NA	NA
24" AZ Steel Sheet	Impact	30.0	58.0
24" AZ Steel Sheet	Vibratory	NA	NA
13" Plastic	Impact	NA	NA
14" Steel Pipe	Impact	18.0	46.0
14" Steel Pipe	Vibratory	NA	40.0

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected.

Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Habitat Structure and Disturbance

This stage will include removal of the temporary slide rail system and associated piles, caps, girders, and bracing. This stage will also involve the installation of marine enclosures for demolition of the existing pivot pier and rest piers, and ultimately end with the removal of these marine enclosures following that demolition. This stage will also include installation of the permanent southeast and southwest fender wings and piles, and removal of the retired submarine cables beneath the riverbed extending between the rest piers. Upon completion of cable removal, the trench will be backfilled to match the pre-construction elevations of the river bottom using suitable backfill material to match the grain size composition of the original sediments. There will not be any change in water depths. Habitat disturbance from this stage of the project when added to existing conditions will result in an overall cumulative addition of benthic habitat and temporary alterations of benthic habitat substrate, but not a change in the use of the areas by the above Section 7 listed species or diminish its quality such that there would be any effects on an individual that can be meaningfully measured, detected, or evaluated and are therefore insignificant.

Dredging (Capture)

Dredging activities during this stage will include dredging to final depth around the pivot pier and dredging to remove the retired submarine cable from the existing rest pier to rest pier. These activities will only occupy small fractions of the width of the river in their respective locations allowing ample room for avoidance. This portion of the project will employ the use of a mechanical dredge (clamshell bucket) and interactions with the above listed species are extremely unlikely to occur. For an individual to be impacted by a clamshell bucket they would likely need to be directly below the bucket as it reaches the riverbed and remain motionless as the bucket closes. Capture incidents from this stage, when added to existing conditions, are discountable due to the river extents available for avoidance and passage, and the time of year dredging will take place (December and January) where listed species are expected to be absent.

Water Quality

Temporary localized increases in turbidity/suspended sediment will result from the clamshell excavation work, pile/sheet driving and extraction, and pier demolition (within marine enclosures). Total suspended solids (TSS) for clamshell bucket excavation range from 105 mg/L up to 445 mg/L (ACOE, 2001) with turbidity levels between 15 mg/L and 191 mg/L up to 2,000 feet from the excavation site (Burton, 1993). TSS concentrations for pile/sheet driving and extraction, of approximately 5.0 to 10.0 mg/L above background levels, can be expected within approximately 300 feet of the pile/sheeting being driven or extracted (FHWA 2012) and are well below those shown to have adverse effects on fish (Burton 1993) and benthic communities (EPA 1986). The turbidity producing work from excavation will ultimately take place within turbidity curtains and during the winter months (December and January), in addition all turbidity producing work in this stag being conducted such that no impairment of movement of the above listed species will be expected or any other effect that can be meaningfully measured, detected, or evaluated. Any effects resulting from a change in water quality during this stage will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Prey Quantity/Quality

Benthic prey habitat disturbing activities during Stage 15 include removal of the sliding rail system, installation of marine enclosures around the existing piers, existing pier demolition, existing submarine cable removal, and southeast and southwest fender installation. New benthic habitat will be created as a result of the removal of the pivot pier and two rest piers. The opportunity for benthic invertebrates to recolonize these areas will immediately (within days to weeks) follow completion of this work, reestablishing and increasing foraging habitat, and therefore any effects on prey quantity and quality resulting from this project will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time will typically include a crane barge, work barge, and a material barge. These vessels will either employ the use of spuds, be tied to a barge using spuds or to a work platform, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers at their respective locations onsite. They will be complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement and turbidity curtain placement adjustments. The increase in traffic associated with this stage is extremely small. During the project activities, a minimal number (3-6 per activity) of project vessels will be added to the baseline. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall action area on any given day. As such, any increased risk of a vessel strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

This stage will include removal of the temporary slide rail system and associated piles, caps, girders, and bracing. This stage will also involve the installation of marine enclosures for demolition of the existing pivot pier and rest piers, and ultimately end with the removal of these marine enclosures following that demolition. This stage will also include installation of the permanent southeast and southwest fender wings and piles, and removal of the retired submarine cables beneath the riverbed extending between the rest piers. The final condition following this stage will result in an insignificant change in the area available for fish or sea turtle passage. Any effects resulting from these changes to in water structures will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Stage 16

Sound

This stage will consist of hoisting forms, steel, and other construction materials for pier cap concrete pours. These activities will require the use of cranes, small equipment, and hand tools and are not expected to produce sounds that would injure or impair movement of ESA listed sturgeon or sea turtle species. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Habitat Structure and Disturbance

No aquatic habitat disturbing activities are expected during Stage 16 and as a result, when added to the baseline conditions, will have no effect.

Dredging (Capture)

There will be no dredging or excavation activities in the waterway during this stage and as a result, capture incidents from this stage, when added to existing conditions, will have no effect.

Water Quality

During pier cap construction activities, a perimeter work platform will be installed for access and containment of construction debris. There will be no dredging, excavation, or other sediment disturbing activities expected to increase turbidity or otherwise alter water quality in the waterway during this stage that can be meaningfully measured, detected, or evaluated and any effects are therefore insignificant.

Prey Quantity/Quality

No benthic prey habitat disturbing activities are expected during Stage 16 and as a result, when added to the baseline conditions, will have no effect.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time will typically include a crane barge and a material barge. These vessels will either employ the use of spuds, be tied to a barge using spuds or to a work platform, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers at their respective locations onsite. They will be complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement adjustments. The increase in traffic associated with this stage is extremely small. During the project activities, a minimal number (2-5 per activity) of project vessels will be added to the baseline. The addition of project vessels will also be intermittent, temporary, and restricted to a

small portion of the overall action area on any given day. As such, any increased risk of a vessel strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

This stage will not alter the amount and/or location of any in water structures, and as a result, when added to the baseline conditions, will have no effect.

Stage 17

Sound

Construction activities during this stage will take place at the marine staging yard and require occasional barge deliveries. These activities are not expected to produce sounds that would injure or impair movement of ESA listed sturgeon or sea turtle species. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Habitat Structure and Disturbance

No aquatic habitat disturbing activities are expected during Stage 17 and as a result, when added to the baseline conditions, will have no effect.

Dredging (Capture)

There will be no dredging or excavation activities in the waterway during this stage and as a result, capture incidents from this stage, when added to existing conditions, will have no effect.

Water Quality

There will be no dredging, excavation, or other sediment disturbing activities expected to increase turbidity or otherwise alter water quality in the waterway during this and as a result will have no effect.

Prey Quantity/Quality

No benthic prey habitat disturbing activities are expected during Stage 17 and as a result, when added to the baseline conditions, will have no effect.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time will typically include a material barge, and at times a delivery barge. These vessels will either employ the use of spuds, be tied to a barge using spuds or to a work platform, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated

significantly slower while making maneuvers at their respective locations onsite. They will be complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement adjustments. The increase in traffic associated with this stage is extremely small. During the project activities, a minimal number (1-5 per activity) of project vessels will be added to the baseline. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall action area on any given day. As such, any increased risk of a vessel strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

This stage will not alter the amount and/or location of any in water structures, and as a result, when added to the baseline conditions, will have no effect.

Stage 18

Sound

This stage will consist of tower span hoisting and placement, approach span steel placement and erection, and timber mat placement in the intertidal areas for man-lift access. These activities will require the use of cranes, small equipment, and hand tools and are not expected to produce sounds that would injure or impair movement of ESA listed sturgeon or sea turtle species. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Habitat Structure and Disturbance

Habitat affecting activities during this stage will only involve addition of timber mats beneath the approach spans for man-lift access. These elements will be placed in intertidal areas and as a result, will not be measurable, or detectable when added to the baseline conditions, and effects are therefore insignificant.

Dredging (Capture)

There will be no dredging or excavation activities in the waterway during this stage and as a result, capture incidents from this stage, when added to existing conditions, will have no effect.

Water Quality

During this stage, timber mats will be placed in intertidal areas for man-lift access, but are not expected to contribute to a change in water quality. There will be no dredging, excavation, or other sediment disturbing activities expected to increase turbidity or otherwise alter water quality in the waterway during this stage that can be meaningfully measured, detected, or evaluated and any effects are therefore insignificant.

Prey Quantity/Quality

Benthic prey habitat disturbing activities during Stage 18 are limited to intertidal timber matting for equipment access to erection of approach span steel. The opportunity for benthic invertebrates

to recolonize these areas will immediately (within days to weeks) follow the work when timber mats are removed, reestablishing and increasing foraging habitat, and therefore any effects on prey quantity and quality resulting from this project will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time will typically include a crane barge and a material barge. These vessels will either employ the use of spuds, be tied to a barge using spuds or to a work platform, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers at their respective locations onsite. They will be complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement adjustments. The increase in traffic associated with this stage is extremely small. During the project activities, a minimal number (2-5 per activity) of project vessels will be added to the baseline. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall action area on any given day. As such, any increased risk of a vessel strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

This stage will not alter the amount and/or location of any permanent in water structures and only involve addition of timber mats into the intertidal zones beneath the approach spans for man-lift access, and as a result, will not be measurable, or detectable when added to the baseline conditions, and effects are therefore insignificant.

Stage 19

Sound

This stage will consist precast deck placement, concrete closure pours, and timber mat placement in the intertidal areas for man-lift access and rubber tired backhoe/loaders. These activities will require the use of cranes, small equipment, and hand tools and are not expected to produce sounds that would injure or impair movement of ESA listed sturgeon or sea turtle species. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Habitat Structure and Disturbance

No aquatic habitat disturbing activities are expected during Stage 19 and as a result, when added to the baseline conditions, will have no effect.

Dredging (Capture)

There will be no dredging or excavation activities in the waterway during this stage and as a result, capture incidents from this stage, when added to existing conditions, will have no effect.

Water Quality

During this stage, timber mats will be placed in intertidal areas for man-lift access, but are not expected to contribute to a change in water quality. During concrete pours, a debris shield will be provided at the work area to prevent concrete from getting into the water. There will be no dredging, excavation, or other sediment disturbing activities expected to increase turbidity or otherwise alter water quality in the waterway during this stage that can be meaningfully measured, detected, or evaluated and any effects are therefore insignificant.

Prey Quantity/Quality

Benthic prey habitat disturbing activities during Stage 19 are limited to intertidal timber matting for equipment access for setting the precast deck sections and completion of the concrete pours for the approach spans. The opportunity for benthic invertebrates to recolonize these areas will immediately (within days to weeks) follow the work when timber mats are removed, reestablishing and increasing foraging habitat, and therefore any effects on prey quantity and quality resulting from this project will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Vessels

No vessel movement activities are expected during Stage 19 and as a result, when added to the baseline conditions, will have no effect.

In-Water Structures

This stage will not alter the amount and/or location of any in water structures, and as a result, when added to the baseline conditions, will have no effect.

Stage 20

Sound

This stage will consist floating the north lift span from the marine staging yard to the bridge. These activities will require the use of cranes and a float in barge and are not expected to produce sounds that would injure or impair movement of ESA listed sturgeon or sea turtle species. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Habitat Structure and Disturbance

No aquatic habitat disturbing activities are expected during Stage 20 and as a result, when added to the baseline conditions, will have no effect.

Dredging (Capture)

There will be no dredging or excavation activities in the waterway during this stage and as a result, capture incidents from this stage, when added to existing conditions, will have no effect.

Water Quality

There will be no dredging, excavation, or other sediment disturbing activities expected to increase turbidity or otherwise alter water quality in the waterway during this stage and as a result will have no effect.

Prey Quantity/Quality

No benthic prey habitat disturbing activities are expected during Stage 20 and as a result, when added to the baseline conditions, will have no effect.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time will typically include a float-in barge. This vessel will either employ the use of spuds, be tied to a barge using spuds or to a work platform, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers at their respective locations onsite. It will be complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement adjustments. The increase in traffic associated with this stage is extremely small. During the project activities, a minimal number (2-5 per activity) of project vessels will be added to the baseline. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall action area on any given day. As such, any increased risk of a vessel strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

This stage will not alter the amount and/or location of any in water structures, and as a result, when added to the baseline conditions, will have no effect.

Stage 21

Sound

This stage will consist lifting the north lift span into place. These activities will require the use of cranes and hydraulic jacks and are not expected to produce sounds that would injure or impair movement of ESA listed sturgeon or sea turtle species. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities

when added to the existing conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Habitat Structure and Disturbance

No aquatic habitat disturbing activities are expected during Stage 21 and as a result, when added to the baseline conditions, will have no effect.

Dredging (Capture)

There will be no dredging or excavation activities in the waterway during this stage and as a result, capture incidents from this stage, when added to existing conditions, will have no effect.

Water Quality

There will be no dredging, excavation, or other sediment disturbing activities expected to increase turbidity or otherwise alter water quality in the waterway during this stage and as a result will have no effect.

Prey Quantity/Quality

No benthic prey habitat disturbing activities are expected during Stage 21 and as a result, when added to the baseline conditions, will have no effect.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time will typically include tug boats (up to 3), push boats (up to 2), and a float-in barge. These vessels will either employ the use of spuds, be tied to a work platform, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers at their respective locations onsite. They will be complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement and turbidity curtain placement adjustments. The increase in traffic associated with this stage is extremely small. During the project activities, a minimal number (4-9 per activity) of project vessels will be added to the baseline. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall action area on any given day. As such, any increased risk of a vessel strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

This stage will not alter the amount and/or location of any in water structures, and as a result, when added to the baseline conditions, will have no effect.

Stage 22

Sound

Barge placement and construction activities are expected to allow adequate zones of passage to be maintained throughout the action area. The Norwalk River measures approximately 383 feet wide at the bridge during MHW. All barge placement, clamshell bucket, and pile driving and extraction activities will be coordinated to allow ample room for passage at all times. Furthermore, during construction operations, the construction barges will be anchored by spuds and negligibly disturb (28 sf per spudded barge) a portion of the bottom. Clamshell buckets' peak contact pressure levels of 124.0 dB re 1 μPa-m (measured at 150 meters, Dickerson et al., 2001) do not exceed the behavioral and/or physiological injury thresholds for ESA listed sturgeon or sea turtle species. This stage of the project will also consist of pile driving and/or extraction activities at various locations. Activity 1: Driving of 14" steel H-piles and 14" composite pipe piles for northern portions of the new east and west fender systems. Activity 2: Extraction of 30" steel pipe piles, 24" steel pipe piles, 14" steel H-piles, and steel sheeting for demolition of the temporary work trestles at all 4 quadrants of the bridge including removal of the sheeting at the IMAX location. Activity 3: Extraction of 24" steel pipe piles, 14" steel H-piles, and steel sheeting for demolition of the temporary work trestle at the marine staging yard, and driving steel sheet piles for construction of the final bulkhead.

The four tables listed below (Tables 37-40) identify the acoustical results from proxy projects of similar conditions using GARFO's in-house data spreadsheet tool. Additionally, if a situation arises where multiple piles need to be driven simultaneously, the sound pressure levels presented in the following tables could rise as much as 3 dB re 1 μPa RMS above the numbers listed (WSDOT, 2018). Sound pressure levels resulting from select pile work may rise above the behavioral injury thresholds for the above identified ESA listed species and the physiological threshold for the above listed sea turtles. Sturgeon and sea turtle behavioral thresholds of 150 and 166 dB re 1 μPa RMS respectively and the sea turtle physiological threshold of 180 dB re 1 μPa RMS will at times not be met. For these species to be affected, they will have to be within relative distances (listed in Tables 39 and 40) of the activity and remain there for a prolonged period of time. This is extremely unlikely to occur as sturgeon and sea turtle species will be expected to adjust course away from the ensonified area and use the multitude of available foraging opportunities throughout the Norwalk River, Norwalk Harbor, and nearby Long Island Sound. Bubble curtains will also be deployed during pile driving and extraction as a mitigative measure to attenuated sound and soft starts will be used at the beginning of each shift.

Sounds from the dredging portion of this stage should not adversely affect any of the above identified ESA listed species, as their presence is not expected during the months that this activity is proposed to take place, and therefore no adverse effect is anticipated. Sounds from the pile extraction and driving portions of this stage will be coordinated to ensure activities are only taking place on one half (or occupy only 50% when working in the middle of the river) of the river at a time, only during predetermined daily time windows (ex. 12-hour work periods followed by 12-hour work free periods), and otherwise conducted in a manner that makes a portion of the river accessible to fish passage. Based on this, we conclude that the effects of elevated sound pressure on listed species resulting from the proposed construction activities when added to the existing

conditions are not capable of being meaningfully measured, detected, or evaluated, and are therefore insignificant.

Table 37 – Proxy Projects for Estimating Underwater Noise

Project Location	Water Depth (m)	Pile Size (inches)	Pile Type	Hammer Type	Attenuation rate (dB/10m)
Fort Bragg, CA	2	12"	Steel H-Type	Vibratory	5
Florence, OR - Siuslaw River	3	30"	Steel Pipe	Vibratory	5
San Rafael, CA - San Francisco Bay	>15	14"	Steel Pipe	Vibratory	2
Not Available	15	24"	AZ Steel Sheet	Vibratory	5
Rodeo, CA - San Francisco Bay, CA	5	24"	Steel Pipe	Vibratory	3

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 38 – Proxy-Based Estimates for Underwater Noise

Type of Pile	Hammer Type	Estimated Peak Noise Level (dB_{Peak})	Estimated Pressure Level (dB_{RMS})	Estimated Single Strike Sound Exposure Level (dB_{sSEL})
12" Steel H-Type	Vibratory	169	155	144
30" Steel Pipe	Vibratory	200	180	167
14" Steel Pipe	Vibratory	186	170	160
24" AZ Steel Sheet	Vibratory	182	165	165
24" Steel Pipe	Vibratory	193	179	168

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 39 – Estimated Distances to Sturgeon Injury and Behavioral Thresholds

Type of Pile	Hammer Type	Distance (m) to 206dB_{Peak} (injury)	Distance (m) to sSEL of 150 dB (surrogate for 187 dBcSEL injury)	Distance (m) to Behavioral Disturbance Threshold (150 dB_{RMS})
12" Steel H-Type	Vibratory	NA	NA	40.0
30" Steel Pipe	Vibratory	NA	44.0	70.0

14" Steel Pipe	Vibratory	NA	70.0	120.0
24" AZ Steel Sheet	Vibratory	NA	40.0	40.0
24" Steel Pipe	Vibratory	NA	70.0	106.7

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Table 40 – Estimated Distances to Sea Turtle Injury and Behavioral Thresholds

Type Pile	Hammer Type	Distance (m) to 180 dB RMS (injury)	Distance (m) to 166 dBRMS (behavior)
12" Steel H-Type	Vibratory	NA	NA
30" Steel Pipe	Vibratory	10.0	38.0
14" Steel Pipe	Vibratory	NA	40.0
24" AZ Steel Sheet	Vibratory	NA	NA
24" Steel Pipe	Vibratory	NA	53.3

Notes: For activities where exact size, type, material, hammer, or other criteria were unavailable, the closest available option was selected. Where multiple proxy projects were available, that which resulted in the highest peak sound pressure level was selected.

Habitat Structure and Disturbance

This final stage will involve removal of construction phase in water structures for all remaining work trestles and associated piles and sheeting including the work trestle at the marine staging yard, removal of retired signal and communications cables from beneath the riverbed, and installation of the final marine staging yard bulkhead. Upon completion of cable removal, the trench will be backfilled to match the pre-construction elevations of the river bottom using suitable backfill material to match the grain size composition of the original sediments. There will not be any change in water depths. This stage will also include the final additions of the permanent fender piles and system. The final condition following this stage will result in more available benthic habitat and ultimately positively alter the width of the river available for fish or sea turtle use, and as a result, any effects following completion of this stage will be wholly beneficial.

Dredging (Capture)

Dredging activities may occur during Stage 22 and will include excavation for removal of existing submarine cables north of the bridge. This portion of the project will employ the use of a mechanical dredge (clamshell bucket) and interactions with the above listed species are extremely unlikely to occur. For an individual to be impacted by a clamshell bucket they would likely need to be directly below the bucket as it reaches the riverbed and remain motionless as the bucket closes. Capture incidents from this stage, when added to existing conditions, are discountable due to the river extents available for avoidance and passage, and the time of year dredging will take place (December and January) where listed species are expected to be absent.

Water Quality

Temporary localized increases in turbidity/suspended sediment will result from the clamshell excavation and pile driving and extraction. Total suspended solids (TSS) for clamshell bucket excavation range from 105 mg/L up to 445 mg/L (ACOE, 2001) with turbidity levels between 15 mg/L and 191 mg/L up to 2,000 feet from the excavation site (Burton, 1993). TSS concentrations for pile driving and extraction, of approximately 5.0 to 10.0 mg/L above background levels, can be expected within approximately 300 feet of the pile being driven or extracted (FHWA 2012) and are well below those shown to have adverse effects on fish (Burton 1993) and benthic communities (EPA 1986). The turbidity producing work from excavation will ultimately take place within turbidity curtains and during the winter months (December and January), in addition all turbidity producing work in this stag being conducted such that no impairment of movement of the above listed species will be expected or any other effect that can be meaningfully measured, detected, or evaluated. Any effects resulting from a change in water quality during this stage will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Prey Quantity/Quality

Benthic prey habitat disturbing activities during Stage 22 include installation of the remaining fender piles, removal of the work platforms, removal of IMAX sheeting, removal of the marine staging yard trestle, installation of marine staging yard bulkhead sheeting, and excavation of existing submarine cables. The opportunity for benthic invertebrates to recolonize these areas will immediately (within days to weeks) follow this work, reestablishing and increasing foraging habitat, and therefore any effects on prey quantity and quality resulting from this project will not be measurable, or detectable when added to the baseline conditions, and are therefore insignificant.

Vessels

It has been determined that vessel traffic for this stage, when added to baseline conditions, is not likely to adversely affect ESA-listed species for the following reasons. Adding project vessels to the existing baseline will not increase the risk that any vessel in the area will strike an individual, or will increase it to such a small extent that the effect of the action (i.e., any increase in risk of a strike caused by the project) cannot be meaningfully measured or detected. Construction vessels anticipated on site at any given time will typically include a crane barge, a material barge, and a work barge. These vessels will either employ the use of spuds, be tied to a barge using spuds or to a work platform, or held in place by a workboat while work activities are underway and will remain mostly motionless. Movements to and from the site will be at a max 4 knots, and operated significantly slower while making maneuvers at their respective locations onsite. They will be complimented by a push boat (mini tug boat), a work boat, and a safety boat, all of which will remain moored for a majority of their presence on site, only being used when needed to make barge placement and turbidity curtain placement adjustments. The increase in traffic associated with this stage is extremely small. During the project activities, a minimal number (3-6 per activity) of project vessels will be added to the baseline. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall action area on any given day. As such, any increased risk of a vessel strike caused by this stage will be too small to be meaningfully measured or detected. As a result, the effect of the action on the risk of a vessel strike in the action area is insignificant.

In-Water Structures

This final stage will involve removal of construction phase in water structures for all remaining work trestles and associated piles and sheeting including the work trestle at the marine staging yard, removal of retired signal and communications cables from beneath the riverbed, and installation of final marine staging yard bulkhead. This stage will also include the final additions of the permanent fender piles and system. The final condition following this stage will result in more exposed river and ultimately positively alter the width of the river available for fish or sea turtle passage, and as a result, any effects following completion of this stage will be wholly beneficial.

Attachment B – Staging Schedule

(Schedule is estimated and subject to change based on final start date)

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Sea Turtle Presence Time-of-Year

Sturgeon Presence Time-of-Year

	January	February	March	April	May	June	July	August	September	October	November	December
2019												
Pivot Pier Fender Removal and Dredging (Stage 1)												
Vessel Mooring Relocation (Stage 1)												
Tidal Wetland Mitigation Site Construction (Stage 1)												
IMAX Theatre Demolition (Stage 1)												
Marine Staging Yard Bulkhead, Trestle, and Fender Piling (Stage 1)												
Installation of Work Platforms (Stage 2)												
Demolish Existing Control House (Stage 2)												
2020												
Pivot Pier Fender Removal and Dredging (Stage 1)												
Vessel Mooring Relocation (Stage 1)												
Tidal Wetland Mitigation Site Construction (Stage 1)												
IMAX Theatre Demolition (Stage 1)												
Marine Staging Yard Bulkhead, Trestle, and Fender Piling (Stage 1)												
Installation of Work Platforms (Stage 2)												
Lift Pier Marine Enclosures (Stage 2)												
Drilled Shaft Support Trestle Installation (Stage 2)												
Demolish Existing Control House (Stage 2)												
Installation of Drilled Shafts at Each Lift Pier (Stage 3)												
Installation of Center Supports at Each Lift Pier (Stage 3)												
Lift Pier Concrete Tub Set and Pour Over Drilled Shafts (Stage 4)												
Lift Pier Concrete Tub Set and Pour Over Center Supports (Stage 4)												
Approach Span Under Bridge Work Platform Removal (Stage 5)												
Partial Marine Enclosure Removal (Stage 5)												
Existing Approach Span Member and Section Removal (Stage 7)												
2021												
Installation of Drilled Shafts at Each Lift Pier (Stage 3)												
Installation of Center Supports at Each Lift Pier (Stage 3)												
Construct New South Lift Span at Marine Staging Yard (Stage 3)												
Drilled Shaft Steel and Support Piling Removal (Stage 4)												
Lift Pier Concrete Tub Excavation (Stage 4)												
Lift Pier Concrete Tub Set and Pour Over Drilled Shafts (Stage 4)												
Lift Pier Concrete Tub Set and Pour Over Center Supports (Stage 4)												
Approach Span Under Bridge Work Platform Removal (Stage 5)												
Partial Marine Enclosure Removal (Stage 5)												
Submarine Cable Installation (Stage 6)												
Partial Installation of Permanent Fender Piles (Stage 6)												
NE Work Platform Partial Removal for Control House Const. (Stage 6)												
Installation of Temp. Supports for Approach Span Demolition (Stage 7)												
Existing Approach Span Member and Section Removal (Stage 7)												
Pier Cap Construction at Lift Piers (Stage 8)												
Set Bearings at Lift Piers (Stage 8)												
Excavation and Demolition of East Abutment Wall (Stage 8)												
Partial Removal of Southeast Work Platform (Stage 9)												
Construction of New East Abutment (Stage 9)												
Set Tower Spans at Lift Piers (Stage 10)												
Set Approach Span Steel (Stage 10)												
Install Approach Span Concrete Decks and Walkways (Stage 11)												

Sea Turtle Presence Time-of-Year

Sturgeon Presence Time-of-Year

	January	February	March	April	May	June	July	August	September	October	November	December
2022												
Construct New South Lift Span at Marine Staging Yard (Stage 3)												
Submarine Cable Installation (Stage 6)												
Installation of Fender Rails (Stage 6)												
Set Approach Span Steel (Stage 10)												
Install Approach Span Concrete Decks and Walkways (Stage 11)												
Installation of Supports Stringers, Bracing, and Rail Systems (Stage 11)												
Installation of Temp. Piles, Pile Caps, Girders, Bracing, & Rails (Stage 12)												
Float Lift Span into Place and Transfer Span onto Sliding Rails (Stage 12)												
Cut Away Interfering Approach Steel (Stage 13)												
Slid Existing Swing Span to the North (Stage 13)												
Slide New Lift Span to the North (Stage 13)												
Begin Construction of the New North Lift Span (Stage 13)												
Demolition of the Existing Swing Span (Stage 14)												
Installation of Temp. Supports for Approach Span Demolition (Stage 14)												
Removal of Existing Approach Span Members and Sections (Stage 14)												
Existing Submarine Power and Control Cable Removal (Stage 14)												
Excavation and Demolition of East Abutment Wall (Stage 15)												
Removal of Sliding Rail System (Stage 15)												
Marine Enclosure Installation (Stage 15)												
Existing Pier Demolition (Stage 15)												
Install Permanent Fender at Southeast and Southwest Wings (Stage 15)												
Complete Top/Pedestal Concrete on North Half of Lift Piers (Stage 16)												
Continued Construction of North Lift Span (Stage 17)												
Setting of Tower Spans at Lift Piers (Stage 18)												
Removal of Work Platforms (Stage 22)												
Existing Submarine Cable Removal (Stage 22)												
2023												
Begin Construction of the New North Lift Span (stage 13)												
Existing Submarine Power and Control Cable Removal (Stage 14)												
Marine Enclosure Installation (Stage 15)												
Existing Pier Demolition (Stage 15)												
Continued Construction of North Lift Span (Stage 17)												
Partial Construction of New East Abutment (Stage 17)												
Setting of Tower Spans at Lift Piers (Stage 18)												
Erect Steel for Approach Spans (Stage 18)												
Set Precast Deck Sections and Completion of Concrete Pours (Stage 19)												
Move North Lift Span from Marine Staging Yard (Stage 20)												
Move North Lift Span into Final Position (Stage 21)												
Installation of Remaining Fender Piles and Fender System (Stage 22)												
Removal of Work Platforms (Stage 22)												
Existing Submarine Cable Removal (Stage 22)												
Staging Yard Trestle Removal and Bulkhead Installation (Stage 22)												
2024												
Existing Submarine Cable Removal (Stage 15)												
Removal of Work Platforms (Stage 22)												

Attachment C – USGS Locus Map

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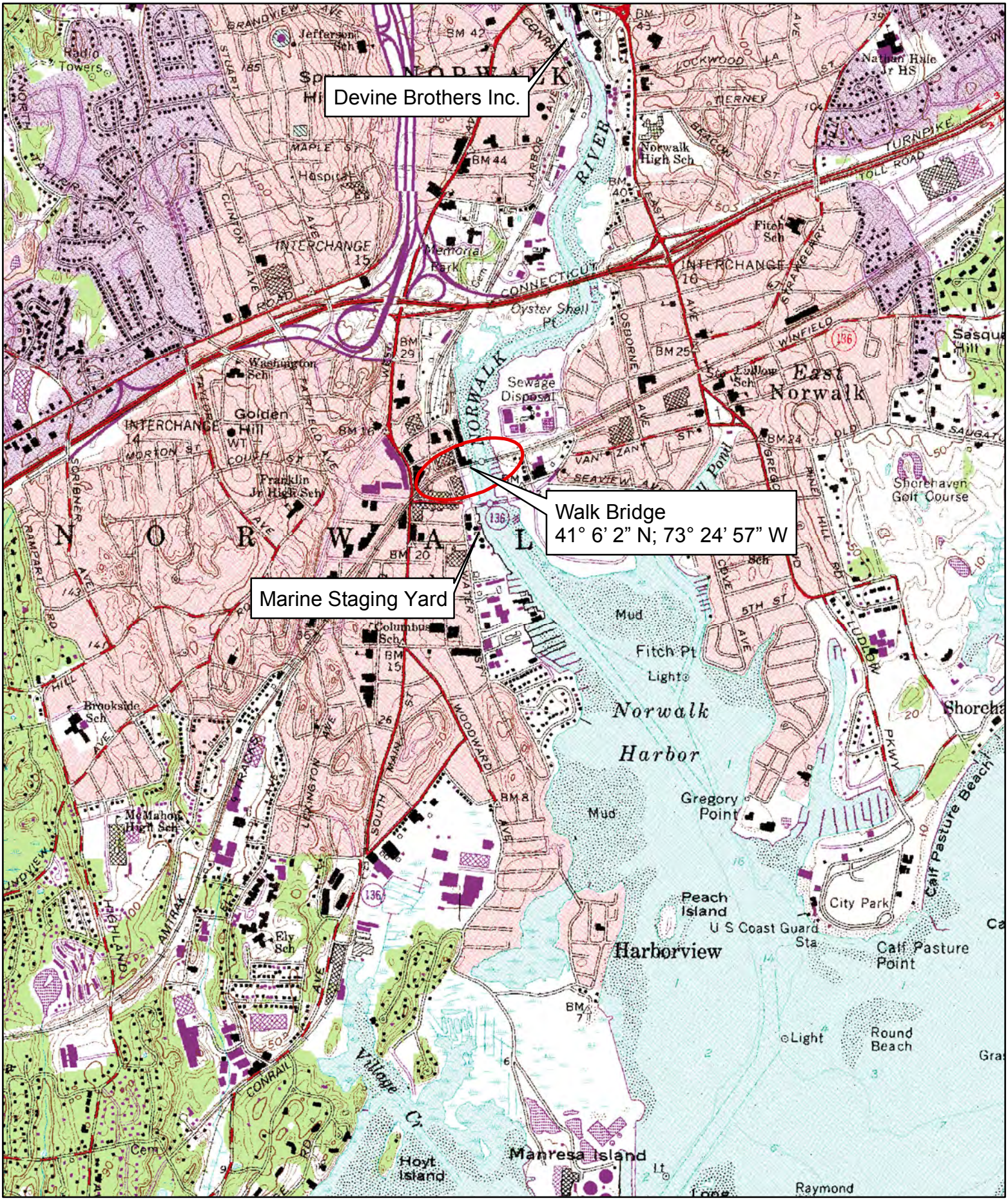

Norwalk South Quadrangle
Connecticut - Fairfield County
7.5 Minute Series
41073-A4-TF-024

Walk Bridge Replacement Project
Norwalk, Connecticut
Bridge No. 04288R
Connecticut Department of Transportation
Project No. 0301-0176

0 625 1,250 2,500 Feet

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Attachment D – Project Plans

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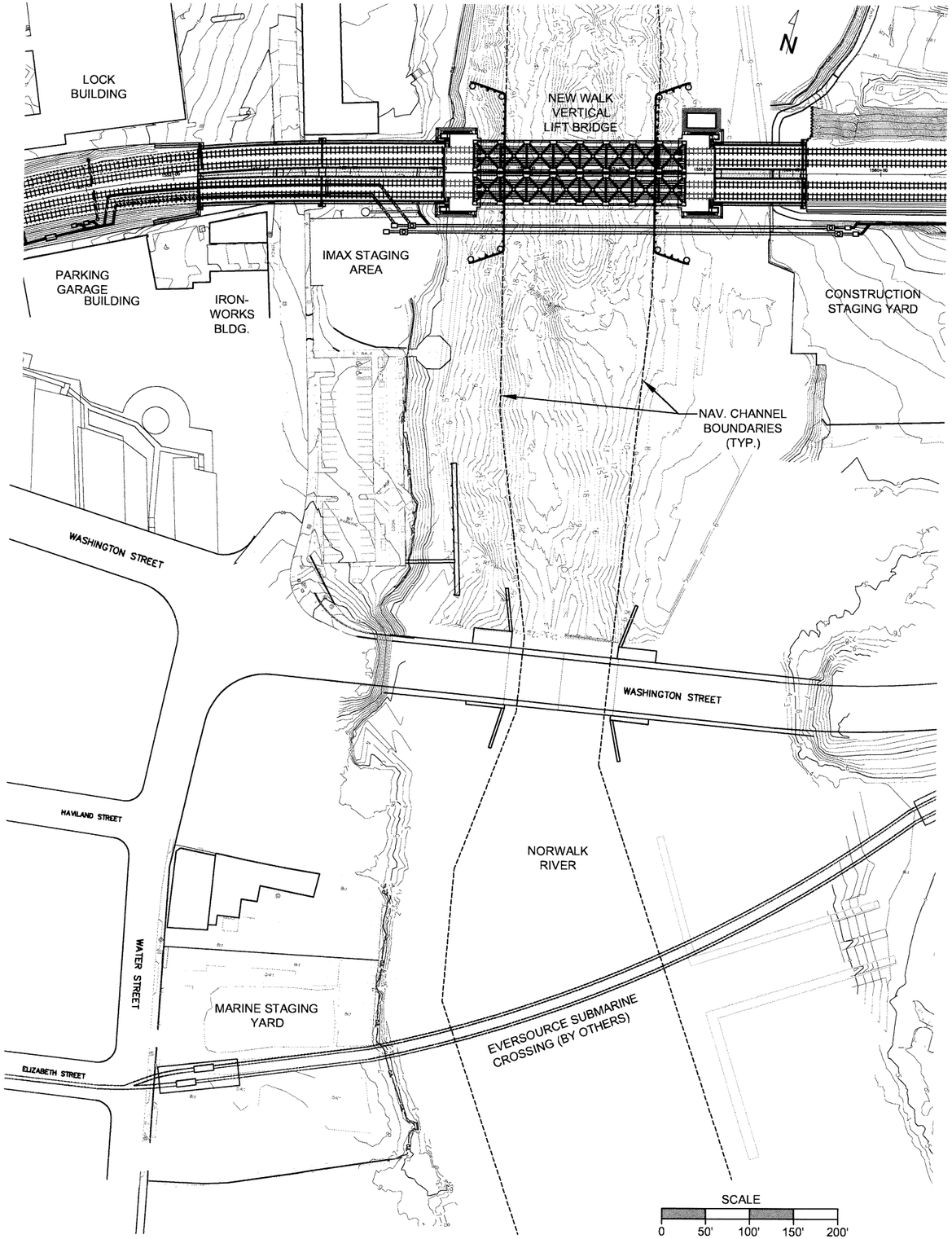


PROPOSED CONSTRUCTION SEQUENCE FOR WALK BRIDGE

** SELECTED ACTIVITIES (SEE NOTE 7) **

(PRELIMINARY) - 6-5-2018

NOTES AND ASSUMPTIONS FOR THIS CONSTRUCTION SEQUENCE:

1. A SOFT START WILL BE USED AT THE BEGINNING OF EACH SHIFT THAT REQUIRES PILE DRIVING AND EXTRACTION, SHAFT DRILLING, AND MICROPILE DRILLING ACTIVITIES.
2. ALL PILE DRIVING AND EXTRACTION ACTIVITY WILL BE ENCLOSED IN BUBBLE CURTAINS.
3. ALL PILE DRIVING AND EXTRACTION, SHAFT DRILLING, AND MICROPILE DRILLING ACTIVITIES WILL BE CONDUCTED DURING 12-HOUR WORK PERIODS FOLLOWED BY 12-HOUR WORK FREE PERIODS.
4. ALL PILE DRIVING AND EXTRACTION, SHAFT DRILLING, AND MICROPILE DRILLING ACTIVITIES CONDUCTED BETWEEN APRIL 1 AND JUNE 30 WILL ONLY OCCUR BETWEEN ONE HOUR AFTER SUNRISE TO ONE HOUR BEFORE SUNSET.
5. ALL PILE DRIVING AND EXTRACTION, SHAFT DRILLING, AND MICROPILE DRILLING ACTIVITIES WILL BE CONDUCTED TO ONLY OCCUPY ONE HALF OF THE RIVER AT A TIME (OR ONLY OCCUPY 50% OF THE RIVER WHEN WORKING IN THE MIDDLE).
6. ALL DREDGING WILL BE CONDUCTED BETWEEN DECEMBER 1ST AND JANUARY 31ST.
7. ACTITIVIES SHOWN ON THESE DRAWINGS ARE LIMITED TO THOSE WITH A POTENTIAL TO AFFECT ESA LISTED SPECIES.
8. CONTOUR DATUM SHOWN IS NAVD88.
9. ALL NEW CONSTRUCTION DETAILS ARE FROM HNTB PRELIMINARY DESIGN PLANS DATED 3-27-2017, EXCEPT FOR SELECTED UPDATES BASED ON MORE RECENT INFORMATION PROVIDED BY HNTB.
10. THE MEANS AND METHODS SHOWN IN THIS SEQUENCE ARE PRELIMINARY.
11. IN GENERAL, EQUIPMENT AND BARGES ARE NOT SHOWN ON THESE DRAWINGS. FOR PRELIMINARY BARGE PLACEMENT INFORMATION, SEE CMJV PRELMINARY BARGE MOORING & MOVEMENT PLAN DATED 6-5-2018.
12. THIS SEQUENCE SHOWS GENERAL STAGES ONLY. THE WORK ACTIVITIES WITHIN EACH STAGE MAY BEGIN AND END AT DIFFERENT POINTS DURING EACH STAGE, AND MAY EXTEND INTO OTHER STAGES.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

COVER SHEET

SCALE: 1" = 140'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE JV

SHEET 1 OF 24

JOB 3215103

STAGE 1

= HTL

= MHW

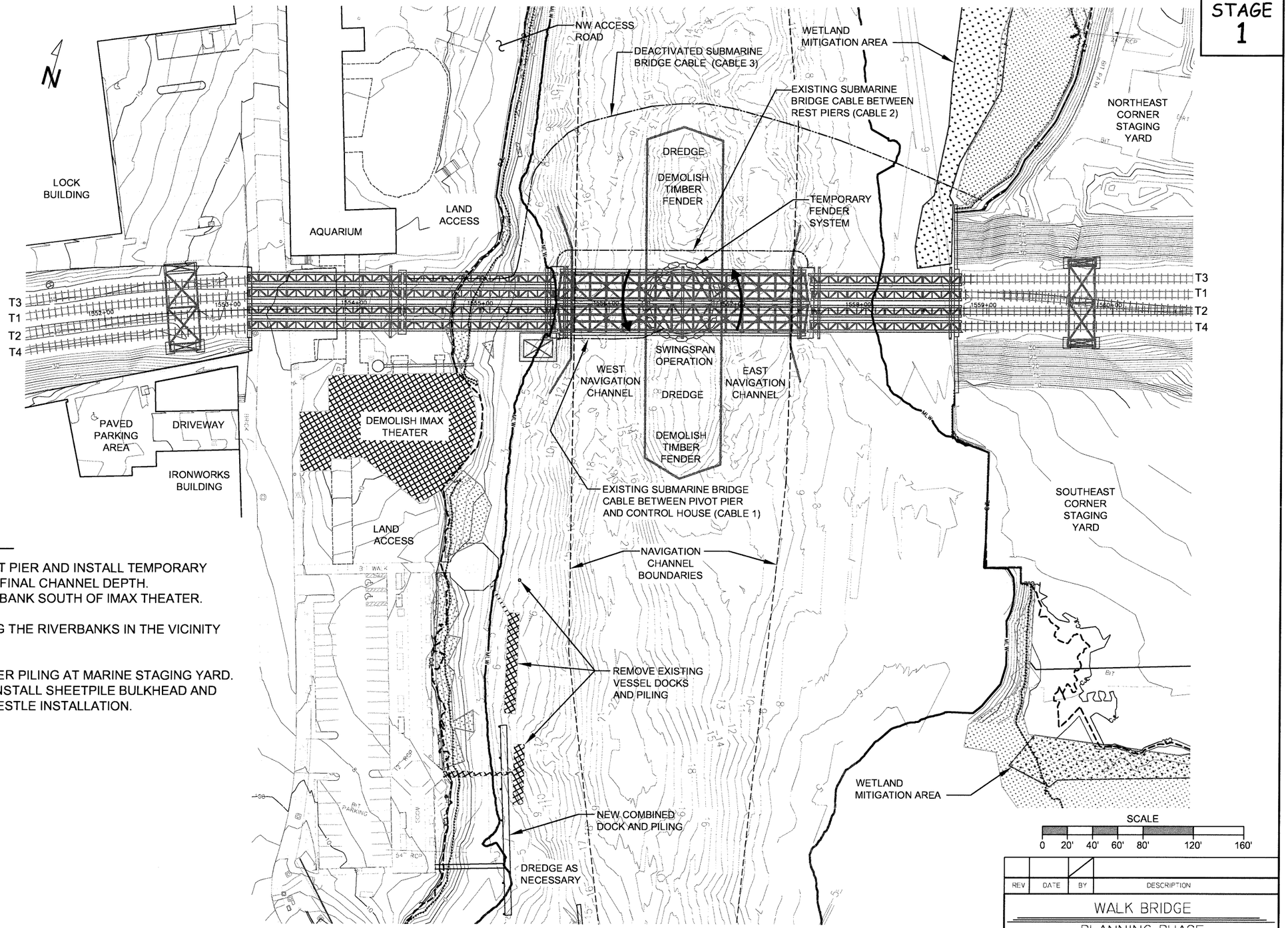
= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS

= WETLAND MITIGATION AREAS

NOTE: ADDITIONAL LOCATIONS OF WETLAND MITIGATION ARE SHOWN IN THE CMJV PRELIMINARY BARGE MOORING & MOVEMENT PLAN DATED 6-5-2018.



CONSTRUCTION ACTIVITIES

- DEMOLISH EXISTING TIMBER FENDER AT PIVOT PIER AND INSTALL TEMPORARY FENDER SYSTEM. DREDGE FENDER AREA TO FINAL CHANNEL DEPTH.
- RELOCATE VESSEL MOORING AREA ON WEST BANK SOUTH OF IMAX THEATER. DREDGE BERTHS AS NEEDED.
- PERFORM WETLAND MITIGATION WORK ALONG THE RIVERBANKS IN THE VICINITY OF THE BRIDGE.
- DEMOLISH IMAX THEATER.
- INSTALL MARINE ACCESS TRESTLE AND FENDER PILING AT MARINE STAGING YARD. DREDGE IN FRONT OF TRESTLE AS NEEDED. INSTALL SHEETPILE BULKHEAD AND EXCAVATE UPLAND AREA AS NEEDED FOR TRESTLE INSTALLATION.

NOTES:

1. VERTICAL DATUM IS NAVD88.
2. NEW CONSTRUCTION DETAILS ARE FROM HNTB PRELIMINARY DESIGN PLANS DATED 3-27-2017, WITH SELECTED UPDATES BASED ON MORE RECENT INFORMATION FROM HNTB.
3. EQUIPMENT AND BARGES NOT SHOWN. FOR BARGE PLACEMENT INFORMATION, SEE CMJV PRELIMINARY BARGE MOORING & MOVEMENT PLAN DATED 6-5-2018.
4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

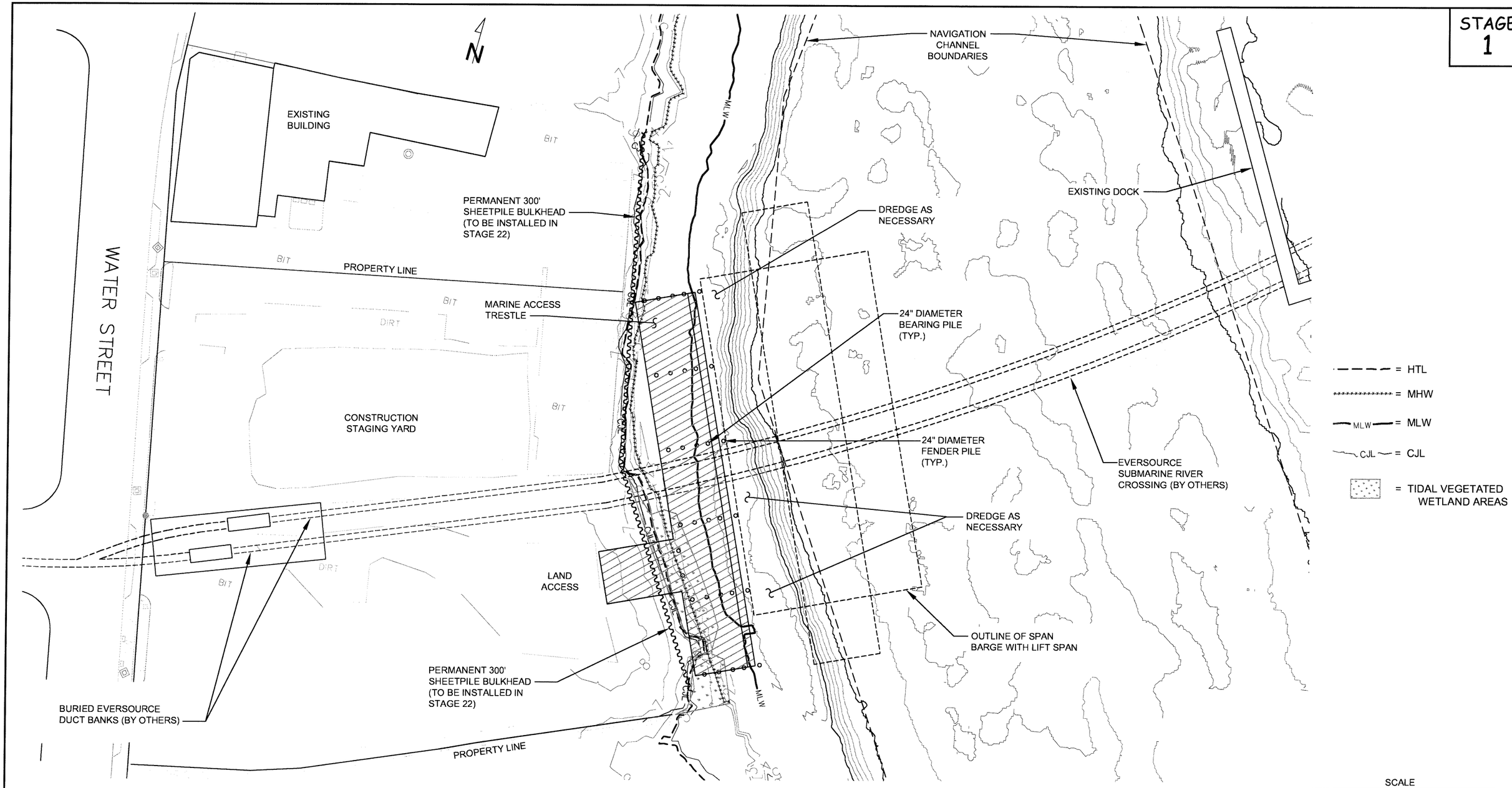
STAGE 1 - PLAN VIEW AT BRIDGE

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE LLC

SHEET 2 OF 24
JOB 3215103

STAGE 1



SEE DRAWING 24 OF 24 FOR PERMANENT BULKHEAD DETAILS

MARINE STAGING YARD

MARINE ACCESS TRESTLE:

- TRESTLE DECK AREA = 6,800 SF
- GRATED WALKWAY AREA = 800 SF
- TOTAL TRESTLE AREA = 7,600 SF
- 24" DIAMETER BEARING PILES = 26
- 24" DIAMETER FENDER PILES = 6
- DECK WORKING SURFACE ELEVATION = +10.5

NOTES:

1. VERTICAL DATUM IS NAVD88.
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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

SCALE
0 10' 20' 30' 40' 50' 75' 100'

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 1 - PLAN VIEW AT MARINE STAGING YARD

SCALE: 1" = 50'	SHEET 3 OF 24
DATE: 6-5-18	
DRAWN: B.NICHOLS	JOB 3215103
CHECK:	

WALK BRIDGE REPLACEMENT

CIANBRO MIDDLESEX A JOINT VENTURE

STAGE 2

NORTHWEST WORK PLATFORM:

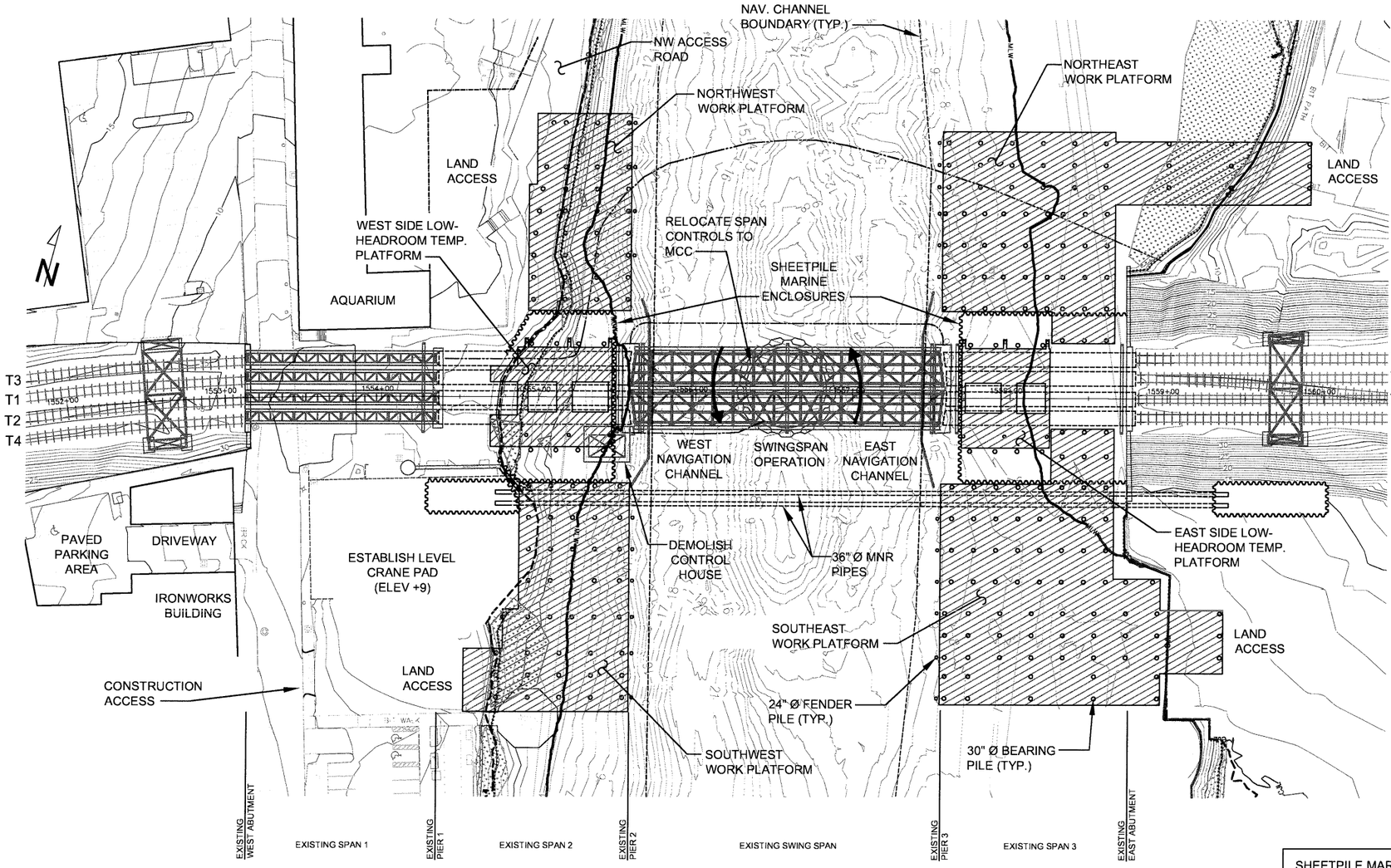
- DECK AREA = 7,900 SF
- 30" DIAMETER BEARING PILES = 32
- 24" DIAMETER FENDER PILES = 4 (NONE INSIDE MARINE ENCLOSURE)
- DECK WORKING SURFACE ELEVATION = +10.5

WEST SIDE LOW-HEADROOM TEMPORARY PLATFORM:

- DECK AREA = 3,600 SF
- 30" DIAMETER BEARING PILES FOR 12' DRILLED SHAFT WORK = 8
- 24" DIAMETER BEARING PILES FOR LIFT PIER CENTER SUPPORTS WORK = 6 (ALL INSIDE MARINE ENCLOSURE)
- DECK WORKING SURFACE ELEVATION = +5.0

SOUTHWEST WORK PLATFORM:

- DECK AREA = 11,800 SF
- 30" DIAMETER BEARING PILES = 41
- 24" DIAMETER FENDER PILES = 6 (NONE INSIDE MARINE ENCLOSURE)
- DECK WORKING SURFACE ELEVATION = +10.5



NORTHEAST WORK PLATFORM:

- DECK AREA = 18,400 SF
- 30" DIAMETER BEARING PILES = 66 (3 INSIDE MARINE ENCLOSURE)
- 24" DIAMETER FENDER PILES = 6
- DECK WORKING SURFACE ELEVATION = +10.5

EAST SIDE LOW-HEADROOM TEMPORARY PLATFORM:

- DECK AREA = 2,800 SF
- 30" DIAMETER BEARING PILES FOR 12' DRILLED SHAFT WORK = 8
- 24" DIAMETER BEARING PILES FOR LIFT PIER CENTER SUPPORTS WORK = 6 (ALL INSIDE MARINE ENCLOSURE)
- DECK WORKING SURFACE ELEVATION = +5.0

SOUTHEAST WORK PLATFORM:

- DECK AREA = 20,800 SF
- 30" DIAMETER BEARING PILES = 77 (6 INSIDE MARINE ENCLOSURE)
- 24" DIAMETER FENDER PILES = 6
- DECK WORKING SURFACE ELEVATION = +10.5

SHEETPILE MARINE ENCLOSURES:

WEST SIDE: 65' x 110'
EAST SIDE: 110' x 110'

CONSTRUCTION ACTIVITIES

- INSTALL FOUR WORK PLATFORMS WITH LAND ACCESS AND FENDER PILING AS SHOWN.
- INSTALL SHEETPILE MARINE ENCLOSURES FOR NEW LIFT PIER FOUNDATIONS ON EAST AND WEST SIDE AS SHOWN.
- INSTALL UNDER-BRIDGE LOW-HEADROOM WORK PLATFORMS FOR LIFT PIER CENTER SUPPORTS AS SHOWN.
- INSTALL PILING AND SUPPORT STEEL FOR DRILLED SHAFT OPERATION.
- MOVE SWING SPAN CONTROLS TO MCC (AT PIVOT PIER) AND DEMOLISH EXISTING BRIDGE CONTROL HOUSE.

= HTL
= MHW
= MLW
= CJL
= TIDAL VEGETATED WETLAND AREAS

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

1. VERTICAL DATUM IS NAVD88.
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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE
PLANNING PHASE
PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)
STAGE 2 - PLAN VIEW AT BRIDGE

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE LLC

SHEET 4 OF 24
JOB 3215103

STAGE 3

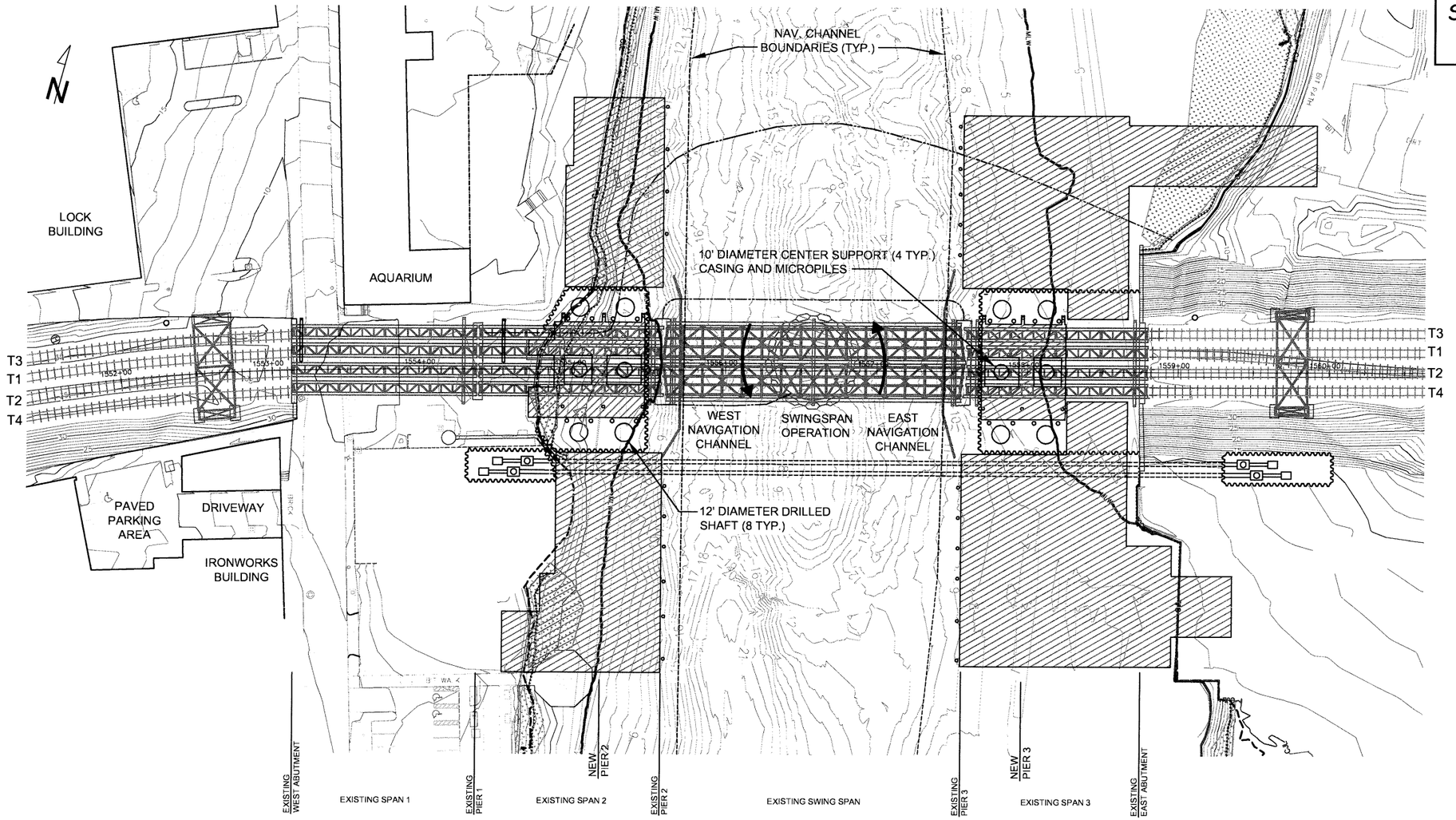
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- INSTALL (8) 12 FT. DIAMETER DRILLED SHAFTS FOR LIFT PIERS (WITHIN MARINE ENCLOSURES).
- CONSTRUCT (4) 10 FT. DIAMETER CENTER SUPPORTS FOR LIFT PIERS (WITHIN MARINE ENCLOSURES).
- BEGIN CONSTRUCTION OF NEW SOUTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 3 - PLAN VIEW

SCALE: 1" = 80'	WALK BRIDGE REPLACEMENT	SHEET 5 OF 24
DATE: 6-5-18	CIANBRO MIDDLESEX A JOINT VENTURE BY	JOB 3215103
DRAWN: B.NICHOLS		
CHECK:		

STAGE 4

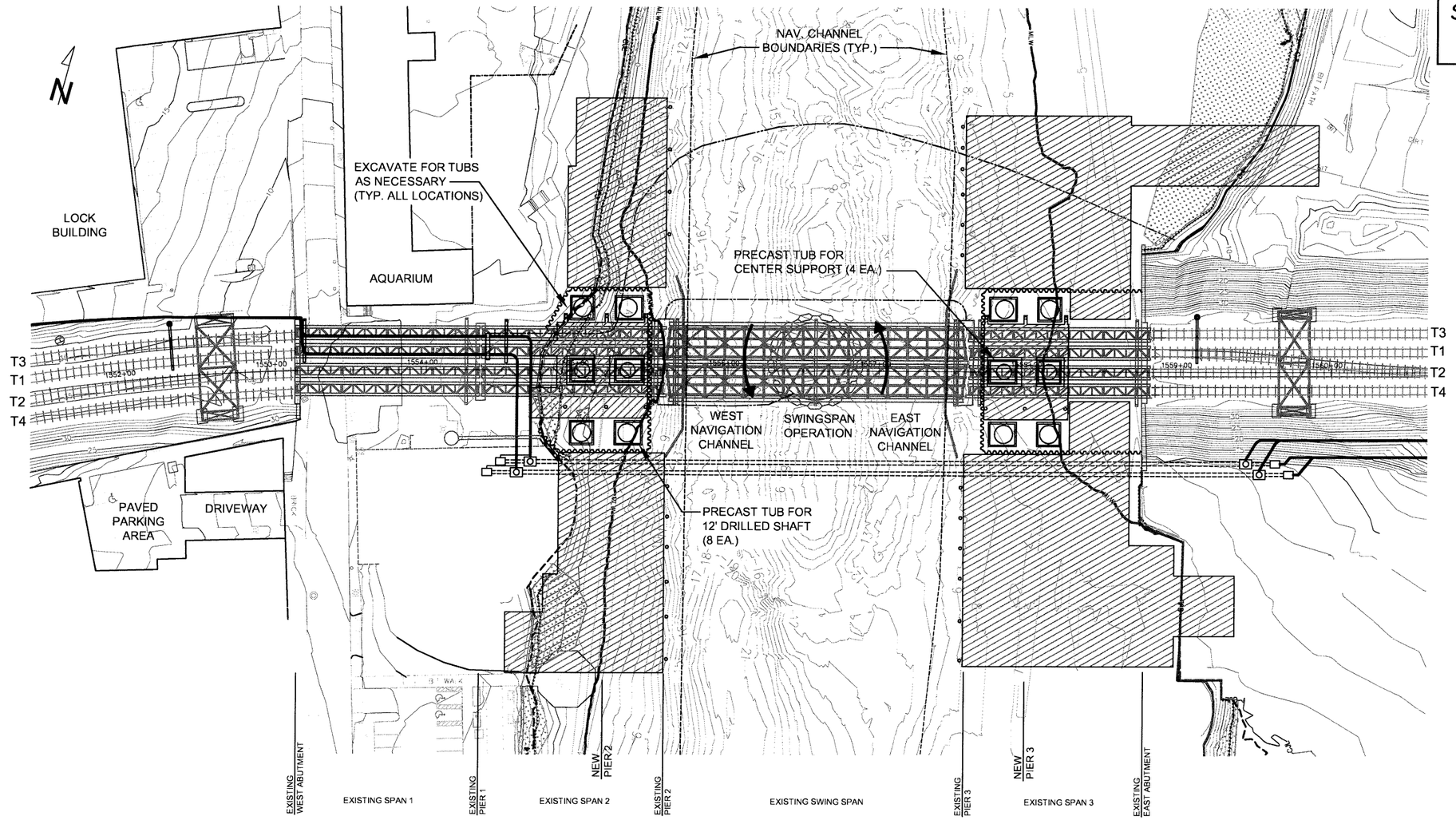
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- REMOVE SUPPORT PILING AND STEEL FOR 12 FT. DIAMETER DRILLED SHAFTS (WITHIN MARINE ENCLOSURES).
- EXCAVATE FOR LIFT PIER PRECAST TUBS AS NECESSARY (WITHIN MARINE ENCLOSURES).
- SET PRECAST TUBS ON 12 FT. DIAMETER DRILLED SHAFTS, SEAL, DEWATER, CUT OFF CASINGS, INSTALL REBAR, AND POUR THE BOXES.
- SET PRECAST TUBS ON 10 FT. DIAMETER CENTER SUPPORTS, SEAL, DEWATER, CUT OFF CASINGS, INSTALL REBAR, AND POUR THE BOXES.
- CONTINUE CONSTRUCTION OF NEW SOUTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 4 - PLAN VIEW

SCALE: 1" = 80'	WALK BRIDGE REPLACEMENT	SHEET 6 OF 24
DATE: 6-5-18		
DRAWN: B.NICHOLS		JOB 3215103
CHECK:	CIANBRO MIDDLESEX A JOINT VENTURE JV	

STAGE 5

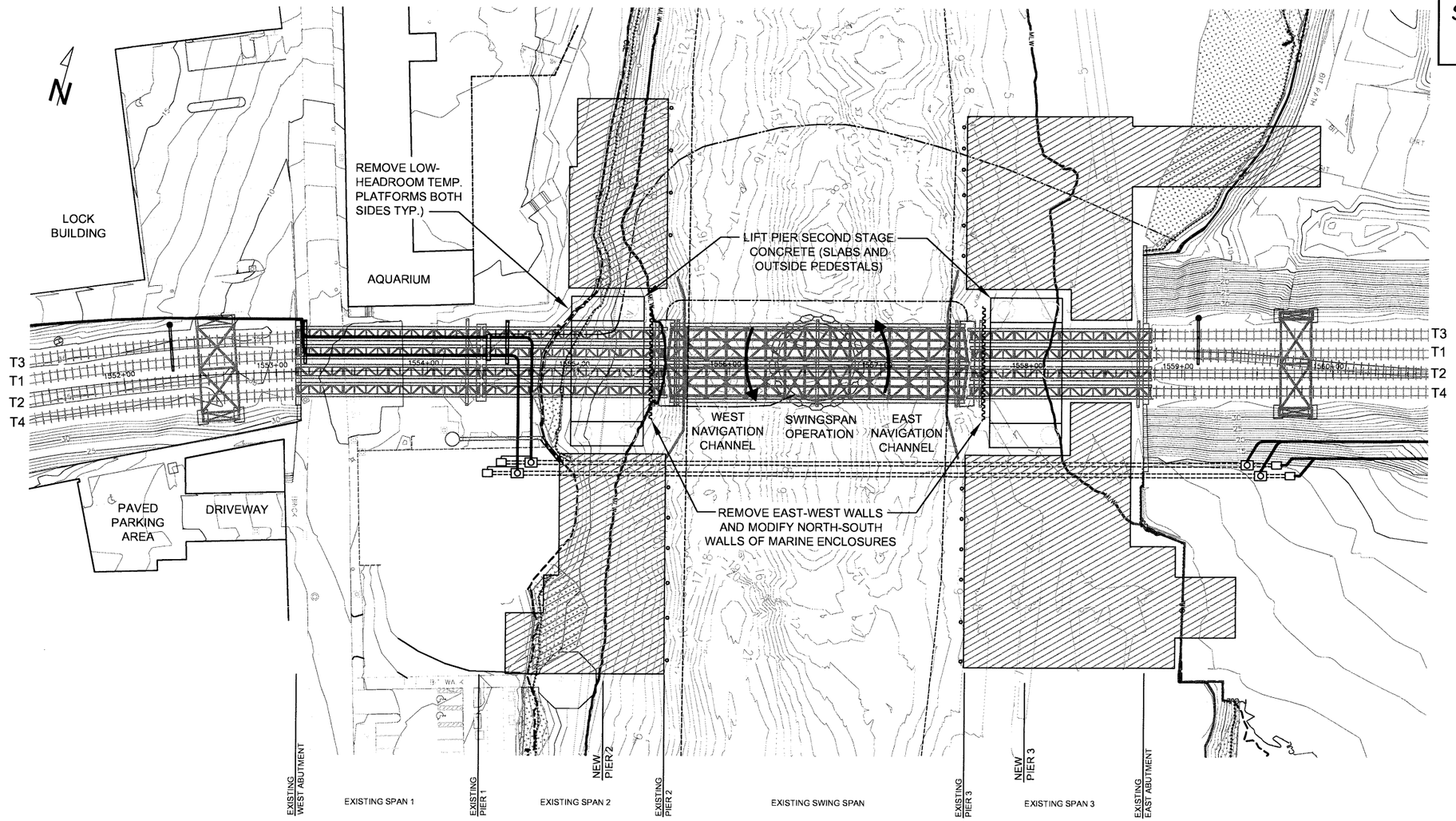
= HTL

= MHW

MLW = MLW

CJL = CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- CONSTRUCT PIER SLABS AND OUTSIDE PEDESTALS AT BOTH LIFT PIERS USING EITHER PRECAST OR CAST-IN-PLACE METHODS. WHEN COMPLETE, THE STRUCTURE UNDER THE BRIDGE WILL BE AT ELEVATION +15.0, AND THE STRUCTURE OUTSIDE OF THE BRIDGE WILL BE AT ELEVATION 24.0 AND READY FOR TOWER CONSTRUCTION.

- REMOVE UNDER-BRIDGE LOW-HEADROOM WORK PLATFORMS AND SUPPORT PILES BELOW THE EAST AND WEST APPROACH SPANS.
- REMOVE EAST-WEST WALLS OF MARINE ENCLOSURES AND SHORTEN NORTH-SOUTH WALLS AS SHOWN
- CONTINUE CONSTRUCTION OF NEW SOUTH LIFT SPAN AT MARINE STAGING YARD.

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PRELIMINARY

SCALE
0 20' 40' 60' 80' 120' 160'

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 5 - PLAN VIEW

SCALE: 1" = 80'	WALK BRIDGE REPLACEMENT	SHEET 7 OF 24
DATE: 6-5-18		
DRAWN: B.NICHOLS		JOB 3215103
CHECK:	CIANBRO | MIDDLESEX A JOINT VENTURE LV	

STAGE 6

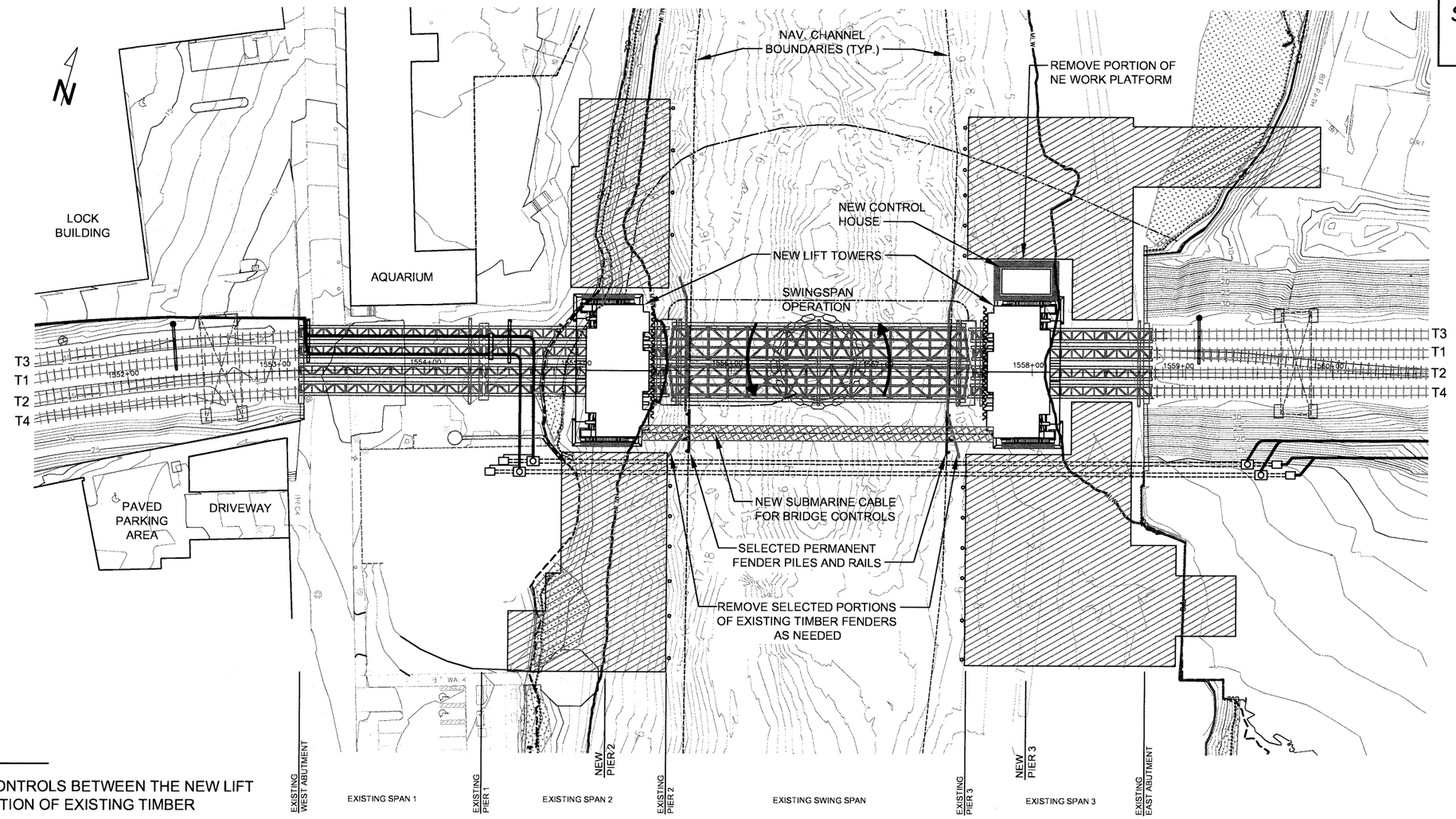
= HTL

= MHW

MLW = MLW

CJL = CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- INSTALL SUBMARINE CABLE FOR BRIDGE CONTROLS BETWEEN THE NEW LIFT PIERS ON THE SOUTH SIDE. DEMOLISH PORTION OF EXISTING TIMBER FENDERS AS NEEDED FOR INSTALLATION.
- INSTALL SELECTED PERMANENT FENDER PILES AND RAILS ON SOUTH SIDE OF BRIDGE AS SHOWN.
- ERECT (2) NEW LIFT TOWERS, INCLUDING COUNTERWEIGHT BOXES, SHEAVES, SHEAVE ROPES, MACHINERY, AND ROOF/HOOD STRUCTURES.

  TOWER ERECTION IS RESTRICTED TO ELEVATION +124 UNTIL HIGH TOWER WIRES ARE COMPLETELY REMOVED. AFTER HIGH TOWER WIRES ARE REMOVED, TOWER ERECTION CAN PROCEED TO FINAL ELEVATION.

- REMOVE PORTION OF NE WORK PLATFORM AS SHOWN.
- BEGIN CONSTRUCTION OF NEW BRIDGE CONTROL HOUSE ON NORTH SIDE.
- CONTINUE CONSTRUCTION OF NEW SOUTH LIFT SPAN AT MARINE STAGING YARD.

NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

SCALE
0 20' 40' 60' 80' 120' 160'

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 6 - PLAN VIEW

SCALE: 1" = 80'	SHEET 8 OF 24
DATE: 6-5-18	
DRAWN: B.NICHOLS	JOB 3215103
CHECK:	

WALK BRIDGE REPLACEMENT
CIANBRO | MIDDLESEX a JOINT VENTURE

STAGE 7

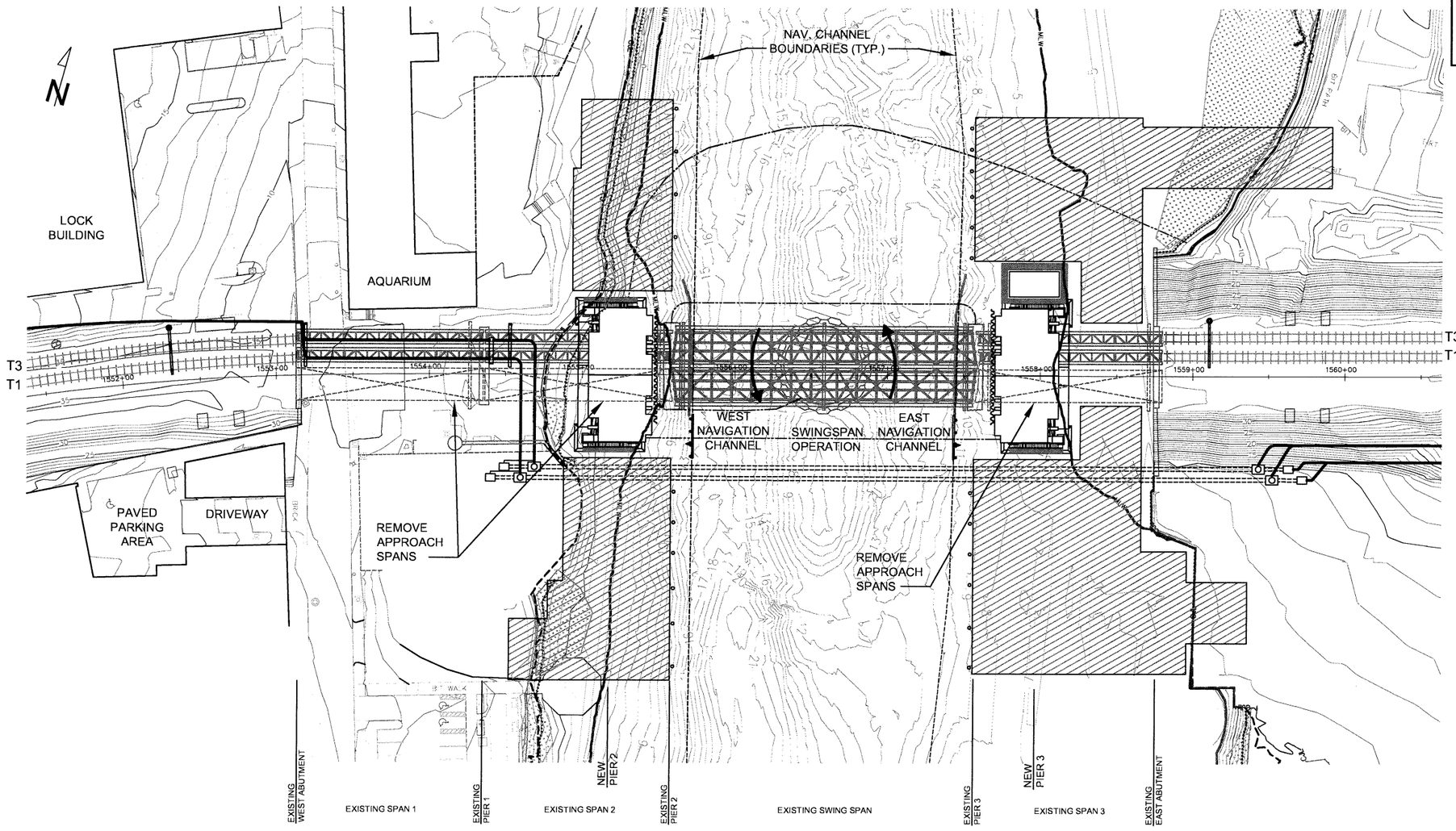
= HTL

= MHW

MLW = MLW

CJL = CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- CLOSE TRACKS 2 & 4 TO RAIL TRAFFIC.
- REMOVE EAST AND WEST APPROACH SPANS FOR TRACKS 2 & 4 (SIX 1-TRACK SPANS TOTAL).
- CONTINUE CONSTRUCTION OF NEW BRIDGE CONTROL HOUSE.
- CONTINUE CONSTRUCTION OF NEW SOUTH LIFT SPAN AT MARINE STAGING YARD.

SCALE

0 20' 40' 60' 80' 120' 160'

NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 7 - PLAN VIEW

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE LLC

SHEET 9 OF 24

JOB 3215103

STAGE 8

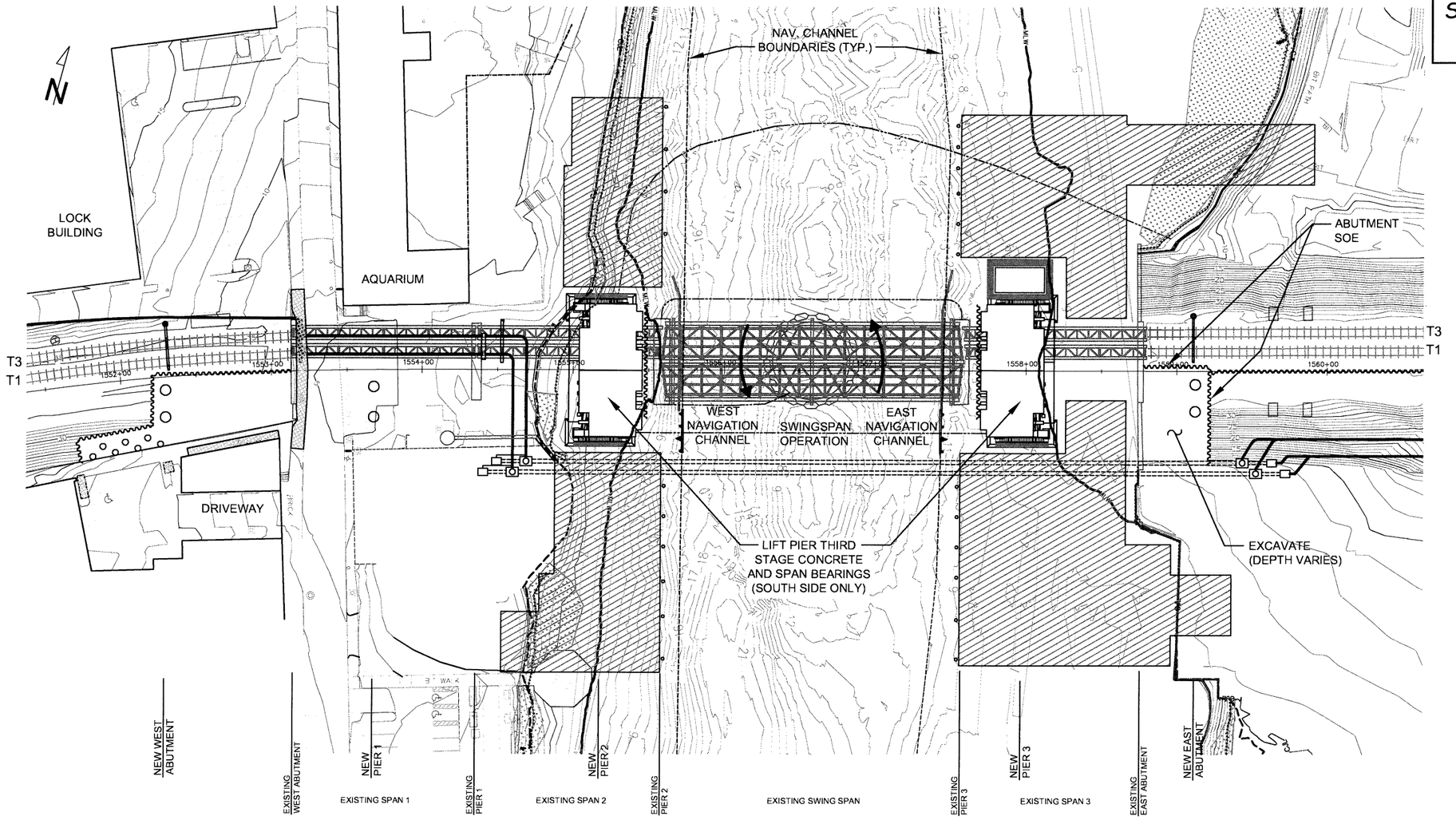
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- FORM, REBAR, AND POUR THE THIRD STAGE CONCRETE ON THE SOUTH SIDE OF BOTH LIFT PIERS AND INSTALL THE NEW SPAN BEARINGS.
- CONTINUE CONSTRUCTION OF NEW BRIDGE CONTROL HOUSE.
- CONTINUE CONSTRUCTION OF NEW SOUTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 8 - PLAN VIEW

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO | MIDDLESEX A JOINT VENTURE, LLC

SHEET 10 OF 24
JOB 3215103

STAGE 9

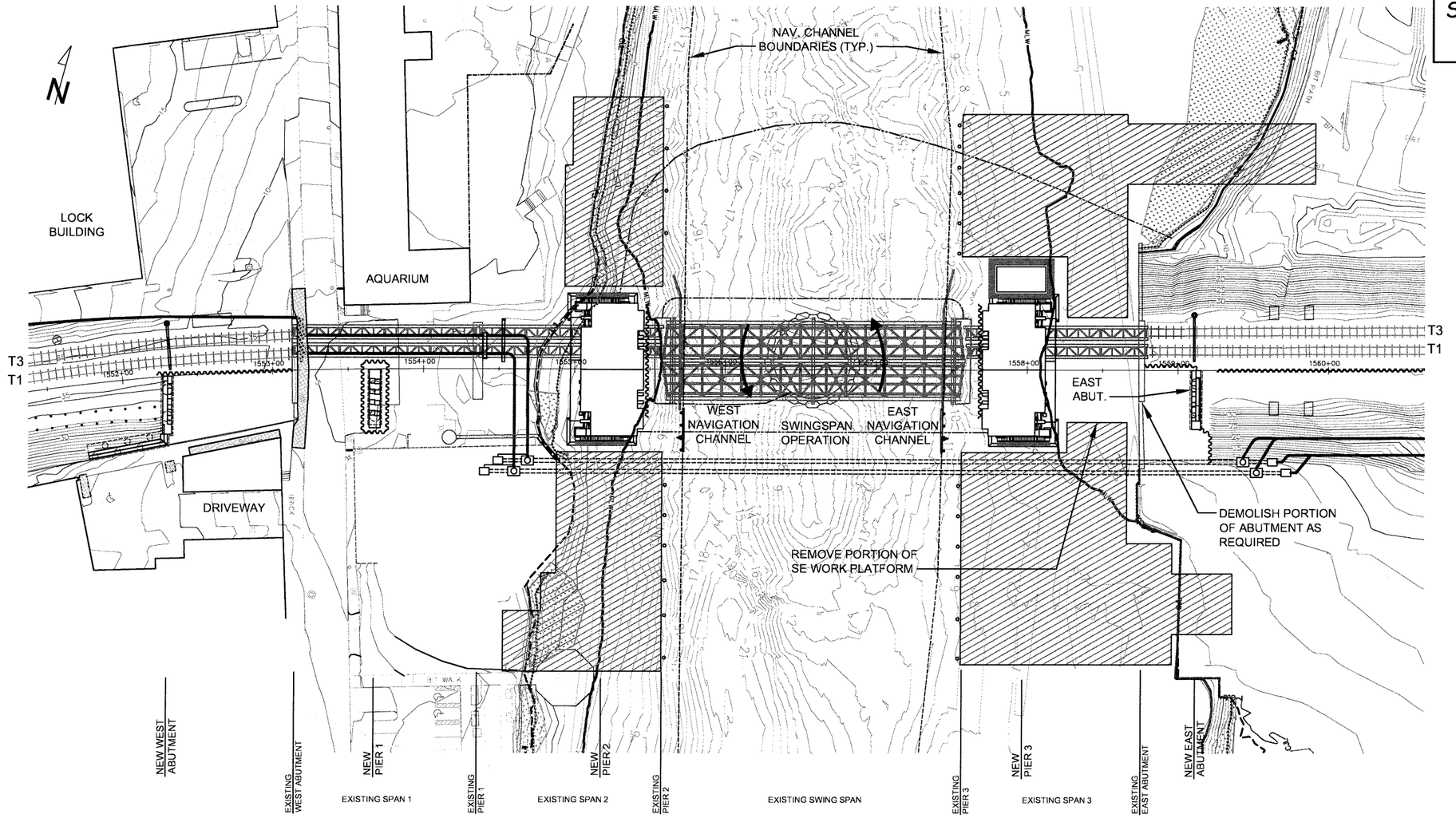
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- BUILD SOUTH HALF OF EAST ABUTMENT. BACKFILL BEHIND STRUCTURE WHEN COMPLETE.
- DEMOLISH PORTIONS OF EXISTING ABUTMENTS AS NEEDED TO MAKE ROOM FOR NEW TRACK 2 AND TRACK 4 SUPERSTRUCTURE.
- REMOVE PORTION OF SE WORK PLATFORM AS SHOWN.
- CONTINUE CONSTRUCTION OF NEW BRIDGE CONTROL HOUSE.
- CONTINUE CONSTRUCTION OF NEW SOUTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

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PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 9 - PLAN VIEW

SCALE: 1" = 80'	SHEET 11 OF 24
DATE: 6-5-18	
DRAWN: B.NICHOLS	JOB 3215103
CHECK:	

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE

STAGE 10

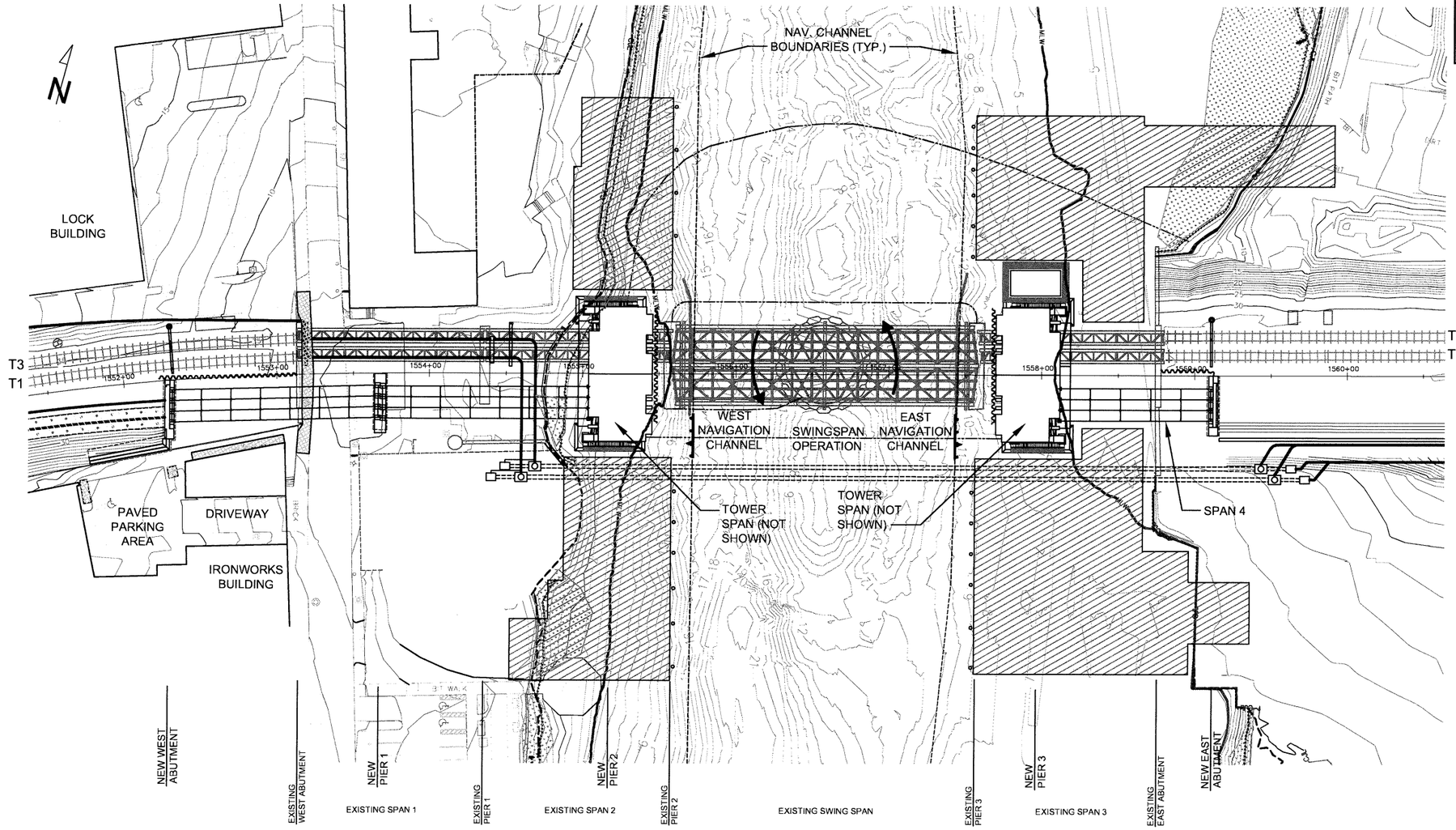
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- SET TOWER SPANS FOR TRACKS 2 & 4 AT LIFT PIERS.
- SET APPROACH SPAN 1, SPAN 2, AND SPAN 4 FOR TRACKS 2 & 4.
- CONTINUE CONSTRUCTION OF NEW BRIDGE CONTROL HOUSE.
- CONTINUE CONSTRUCTION OF NEW SOUTH LIFT SPAN AT MARINE STAGING YARD.

SCALE

0 20' 40' 60' 80' 120' 160'

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 10 - PLAN VIEW

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE LLC

SHEET 12 OF 24

JOB 3215103

NOTES:

1. VERTICAL DATUM IS NAVD88.
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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

STAGE 11

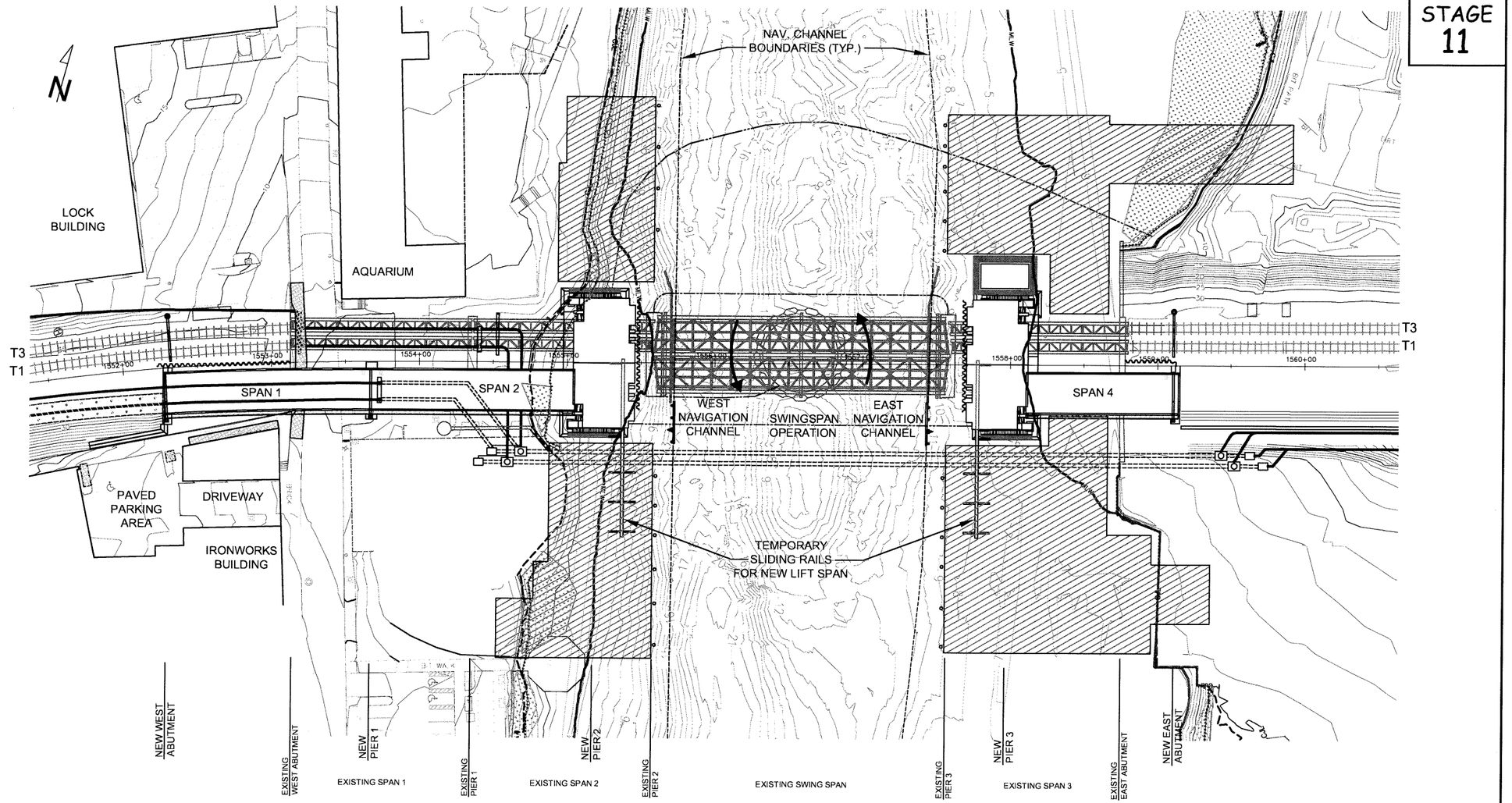
= HTL

= MHW

MLW = MLW

CJL = CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- INSTALL CONCRETE DECKS AND WALKWAYS FOR NEW APPROACH SPANS 1, 2, AND 4 AND NEW TOWER SPANS.
- BUILD SLIDING RAILS FOR NEW SOUTH LIFT SPAN INSTALLATION OPERATION.
- COMPLETE CONSTRUCTION OF NEW SOUTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE II - PLAN VIEW

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE LLC

SHEET 13 OF 24
JOB 3215103

STAGE 12

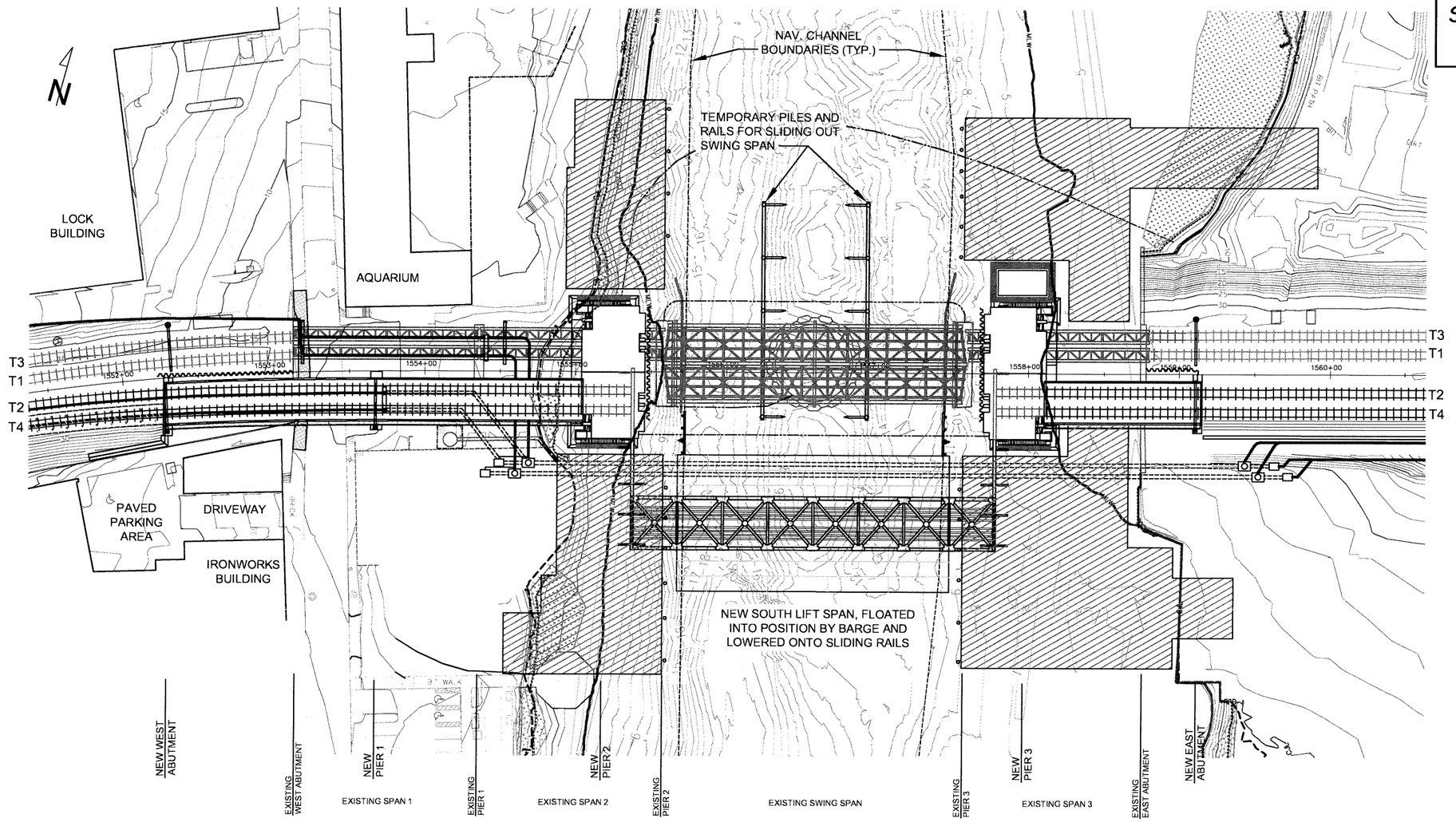
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- CLOSE BOTH NAVIGATION CHANNELS AND INSTALL PILING AND RAILS FOR SWING SPAN SLIDE-OUT OPERATION (OPEN SWING SPAN AS NEEDED TO INSTALL PILING BENEATH IT).
- FLOAT BARGE WITH NEW SOUTH LIFT SPAN INTO PLACE SOUTH OF BRIDGE, AND TRANSFER SPAN TO SLIDING RAILS. REMOVE BARGE.

TEMPORARY PILING FOR SWING SPAN SLIDE-OUT :

10 EACH 30" DIAMETER BEARING PILES
8 EACH HP14 BATTER PILES

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

1. VERTICAL DATUM IS NAVD88.
2. NEW CONSTRUCTION DETAILS ARE FROM HNTB PRELIMINARY DESIGN PLANS DATED 3-27-2017, WITH SELECTED UPDATES BASED ON MORE RECENT INFORMATION FROM HNTB.
3. EQUIPMENT AND BARGES NOT SHOWN. FOR BARGE PLACEMENT INFORMATION, SEE CMJV PRELIMINARY BARGE MOORING & MOVEMENT PLAN DATED 6-5-2018.
4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 12 - PLAN VIEW

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE LLC

SHEET 14 OF 24
JOB 3215103

STAGE 13

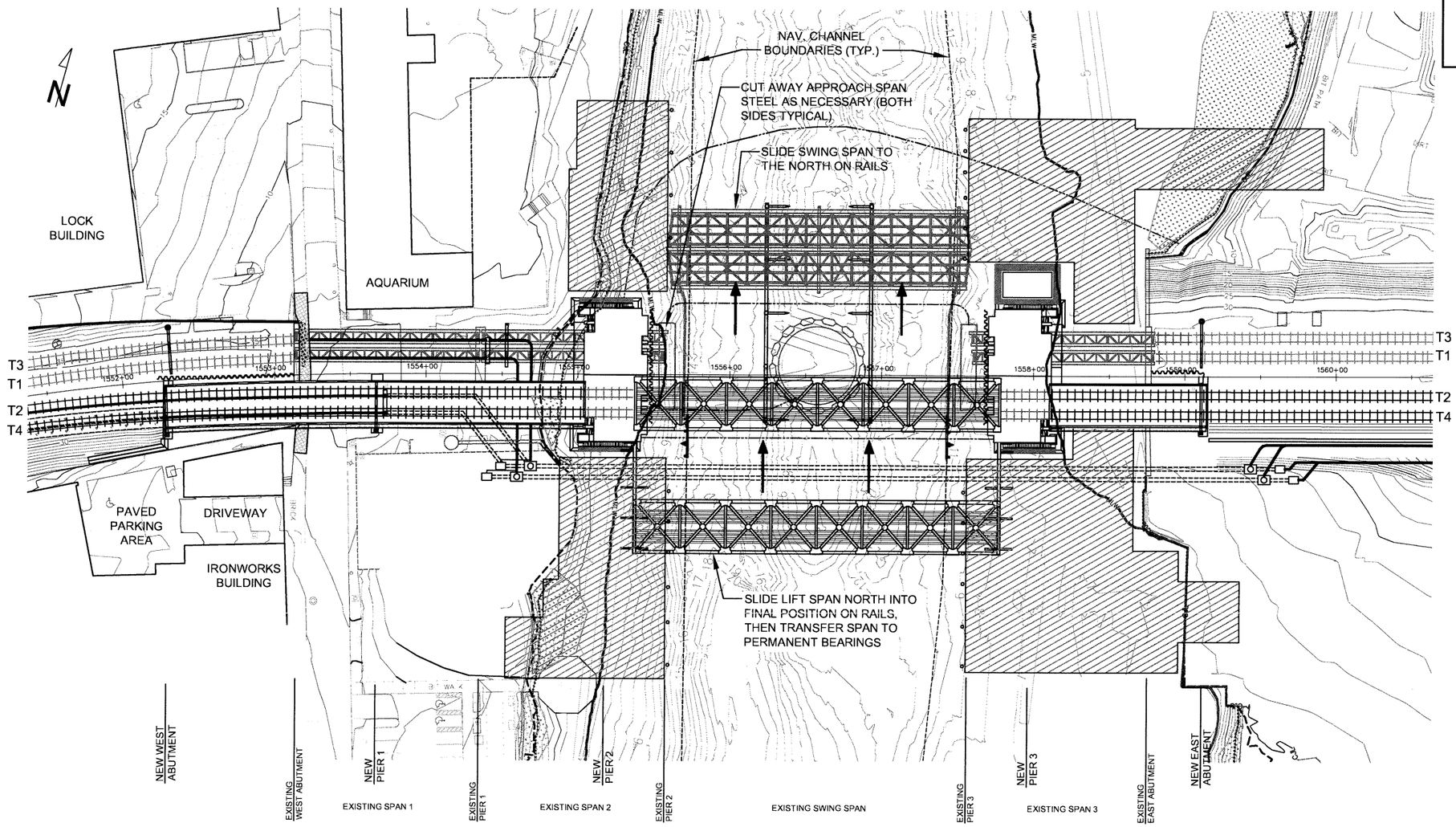
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- BEGIN 96-HOUR 4-TRACK SHUTDOWN BY CLOSING TRACKS 1 & 3 TO RAIL TRAFFIC.
- CUT AWAY APPROACH STEEL THAT INTERFERES WITH SWING SPAN SLIDEOUT.
- SLIDE SWING SPAN TO THE NORTH ON RAILS AS SHOWN.
- SLIDE NEW LIFT SPAN TO THE NORTH ON RAILS UNTIL IT IS DIRECTLY ABOVE FINAL POSITION, THEN JACK THE SPAN UP, REMOVE RAILS BELOW IT, AND SET SPAN DOWN ONTO THE PERMANENT BEARINGS.
- OPEN TRACKS 2 & 4 TO RAIL TRAFFIC.
- BEGIN CONSTRUCTION OF NEW NORTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 13 - PLAN VIEW

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO | MIDDLESEX A JOINT VENTURE

SHEET 15 OF 24
JOB 3215103

STAGE 14

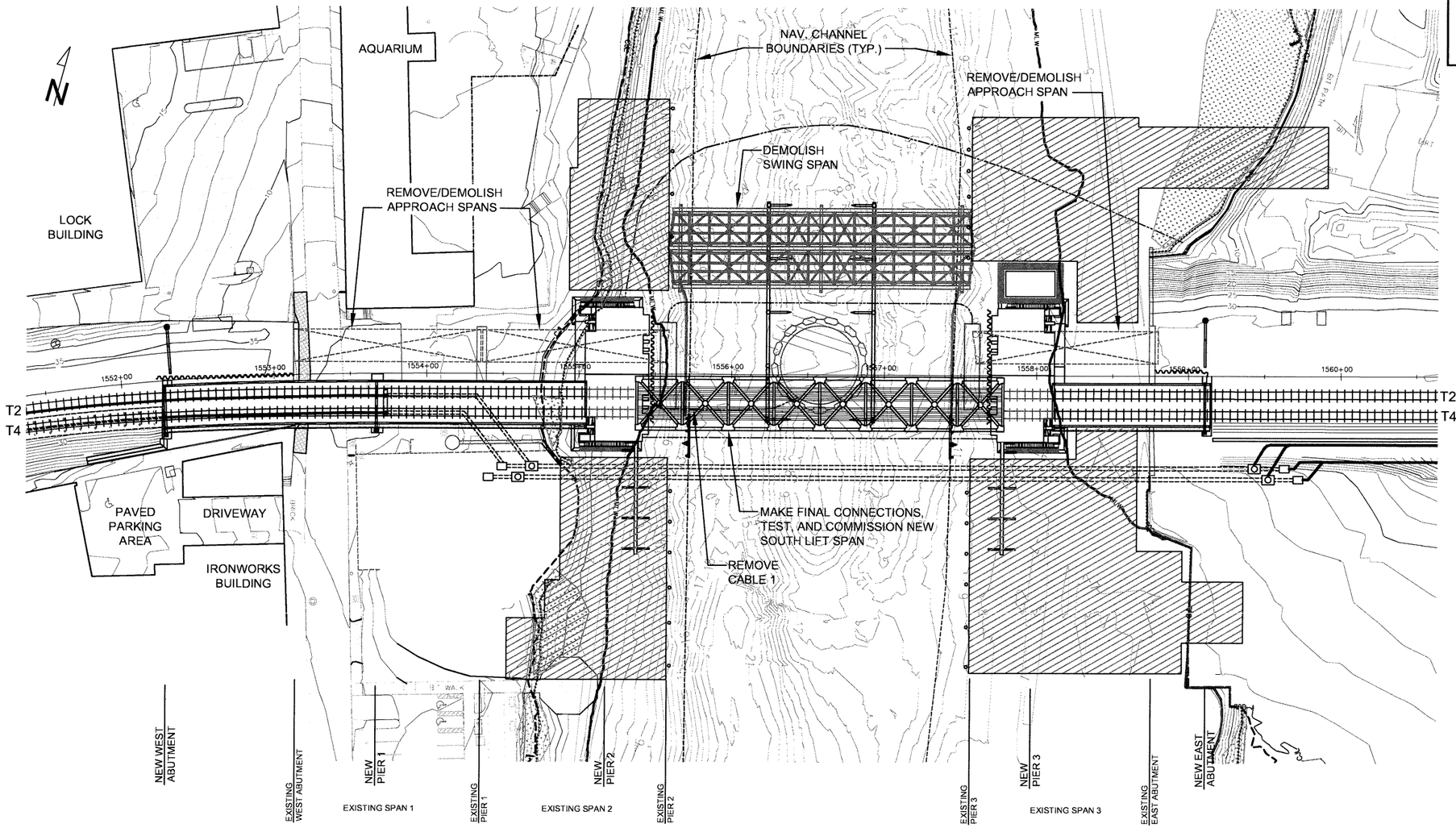
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- REMOVE DEACTIVATED SUBMARINE BRIDGE CABLE ON THE SOUTH SIDE (CABLE 1).
- CONNECT COUNTERWEIGHTS TO SOUTH LIFT SPAN.
- MAKE FINAL MECHANICAL AND ELECTRICAL CONNECTIONS TO LIFT SPAN. ALIGN, TEST, AND COMMISSION SPAN.
- DEMOLISH SWING SPAN IN PLACE ON RAILS, USING CRANES OR EXCAVATORS ON WORK PLATFORMS.
- REMOVE EAST AND WEST APPROACH SPANS FOR TRACKS 1 & 3 (SIX 1-TRACK SPANS TOTAL).
- CONTINUE CONSTRUCTION OF NEW NORTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 14 - PLAN VIEW

SCALE: 1" = 80'	WALK BRIDGE REPLACEMENT	SHEET 16 OF 24
DATE: 6-5-18	CIANBRO | MIDDLESEX A JOINT VENTURE NY	JOB 3215103
DRAWN: B.NICHOLS		
CHECK:		

STAGE 15

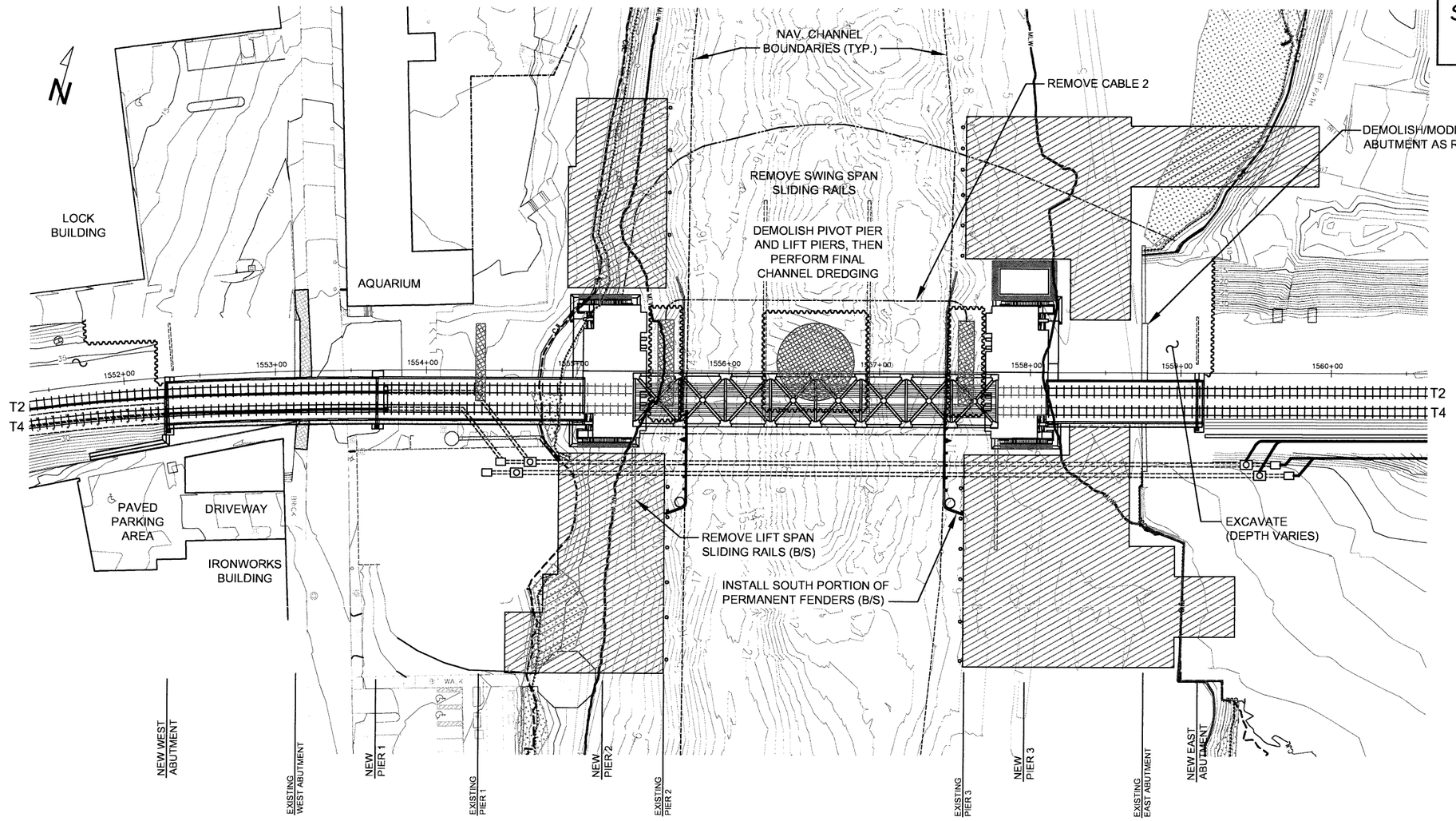
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- REMOVE SWING SPAN SLIDING RAILS AND LIFT SPAN SLIDING RAILS.
- INSTALL MARINE ENCLOSURES AROUND RIVER PIERS.
- DEMOLISH PIVOT PIER, BOTH REST PIERS, AND EXISTING PIER 1. REMOVE MARINE ENCLOSURES WHEN FINISHED, AND DREDGE CHANNEL TO FINAL DEPTH.
- REMOVE/DEMOLISH SUBMARINE CABLE 2.
- DEMOLISH EXISTING ABUTMENTS TO EXTENTS REQUIRED.
- INSTALL AS MUCH OF THE SOUTH PORTION OF THE PERMANENT FENDER SYSTEM AS POSSIBLE.
- CONTINUE CONSTRUCTION OF NEW NORTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 15 - PLAN VIEW

SCALE:	1" = 80'
DATE:	6-5-18
DRAWN:	B.NICHOLS
CHECK:	

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE LLC

SHEET 17 OF 24

JOB 3215103

STAGE 16

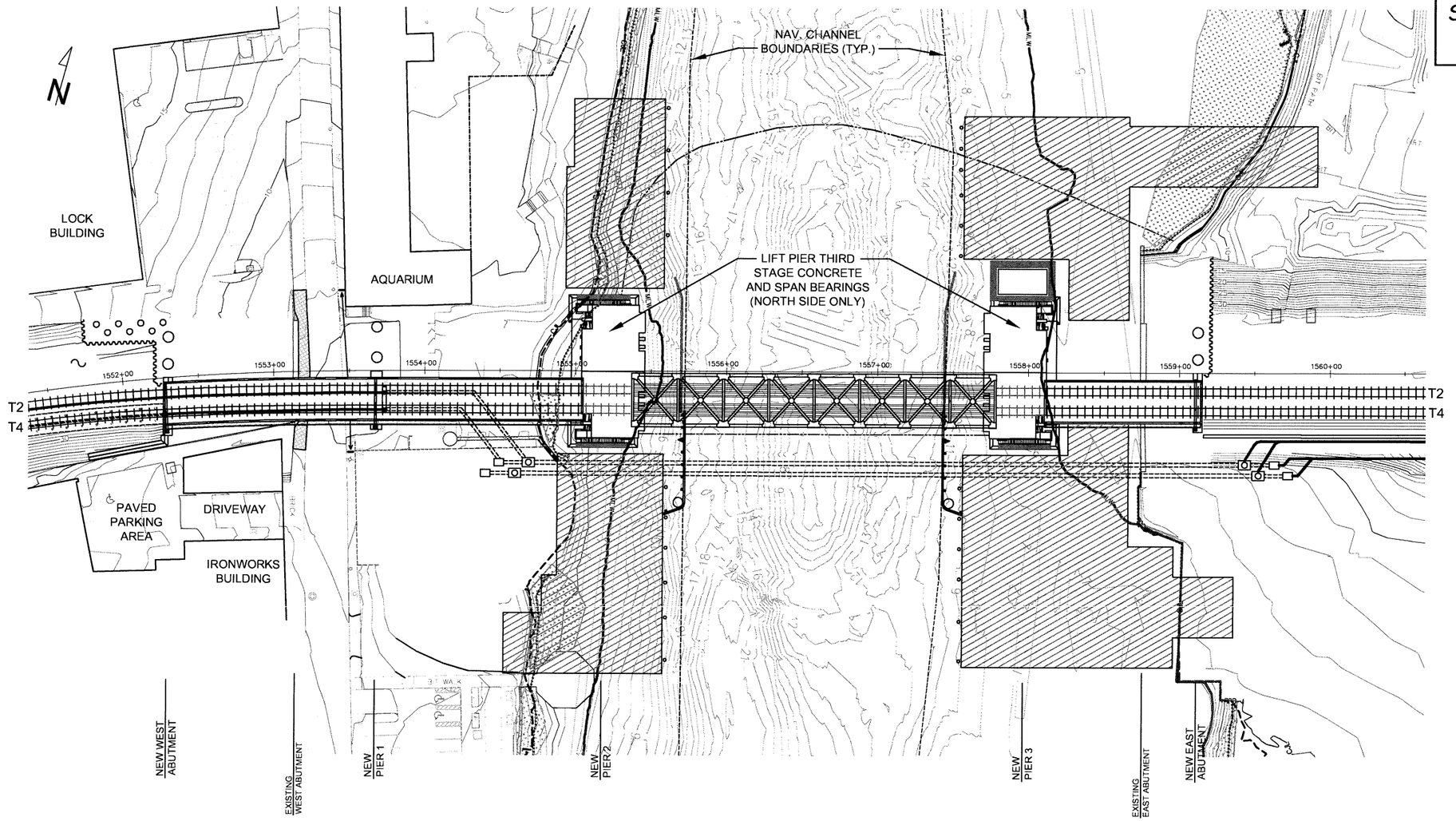
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- OPEN NEW FULL-WIDTH NAVIGATION CHANNEL.
- FORM, REBAR, AND POUR THE THIRD STAGE CONCRETE ON THE NORTH SIDE OF BOTH LIFT PIERS AND INSTALL THE NEW SPAN BEARINGS.
- CONTINUE CONSTRUCTION OF NEW NORTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE FOR IN-WATER WORK ONLY

STAGE 16 - PLAN VIEW

SCALE:	1" = 80'
DATE:	6-5-18
DRAWN:	B.NICHOLS
CHECK:	

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE LLC

SHEET 18 OF 24

JOB 3215103

STAGE 17

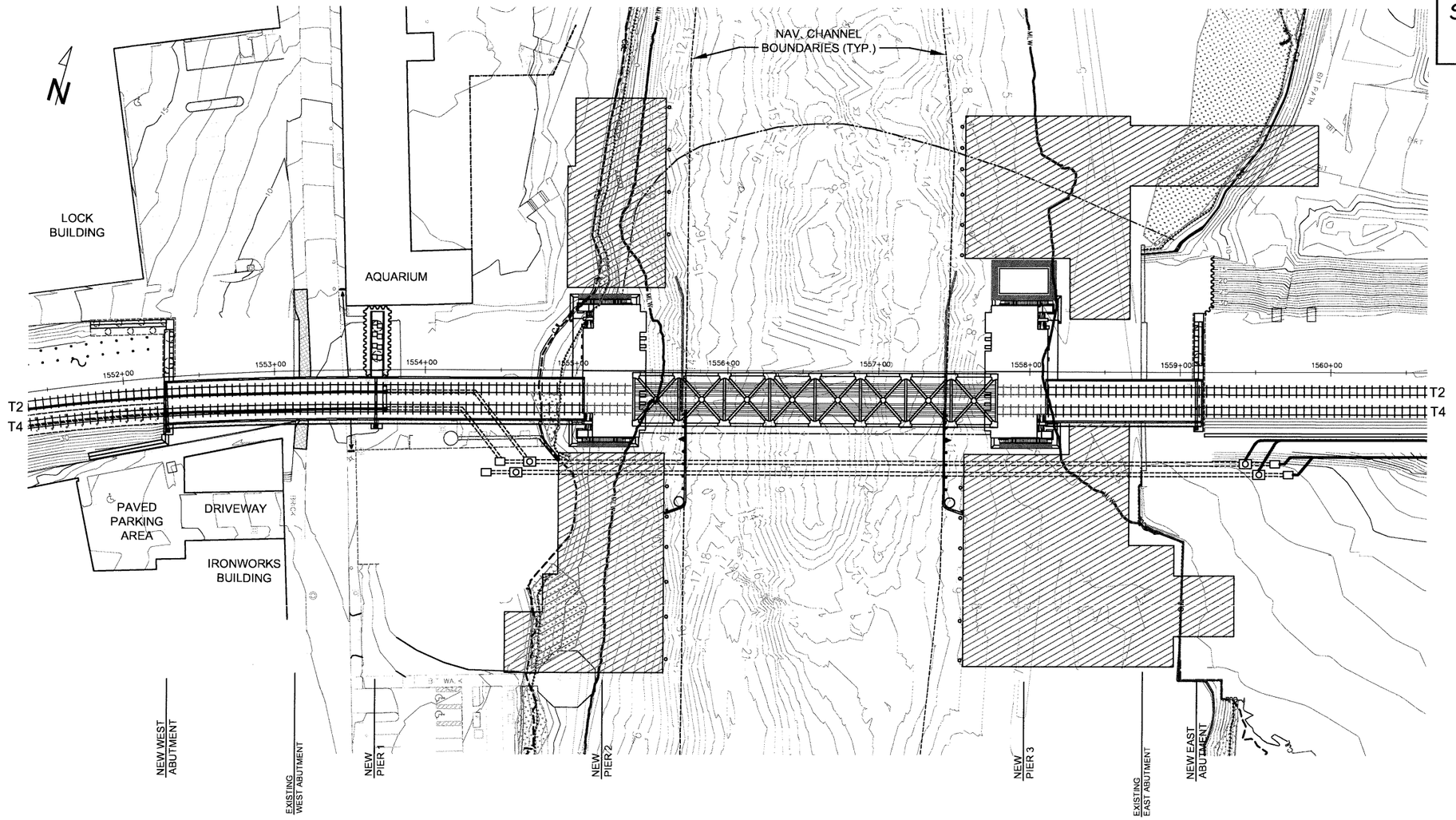
= HTL

= MHW

MLW = MLW

CJL = CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- BUILD NORTH HALF OF EAST ABUTMENT. BACKFILL BEHIND STRUCTURE WHEN COMPLETE.
- CONTINUE CONSTRUCTION OF NEW NORTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 17 - PLAN VIEW

SCALE: 1" = 80'	WALK BRIDGE REPLACEMENT	SHEET 19 OF 24
DATE: 6-5-18		
DRAWN: B.NICI-OLS	CIANBRO MIDDLESEX A JOINT VENTURE LLC	JOB 3215103
CHECK:		

STAGE 18

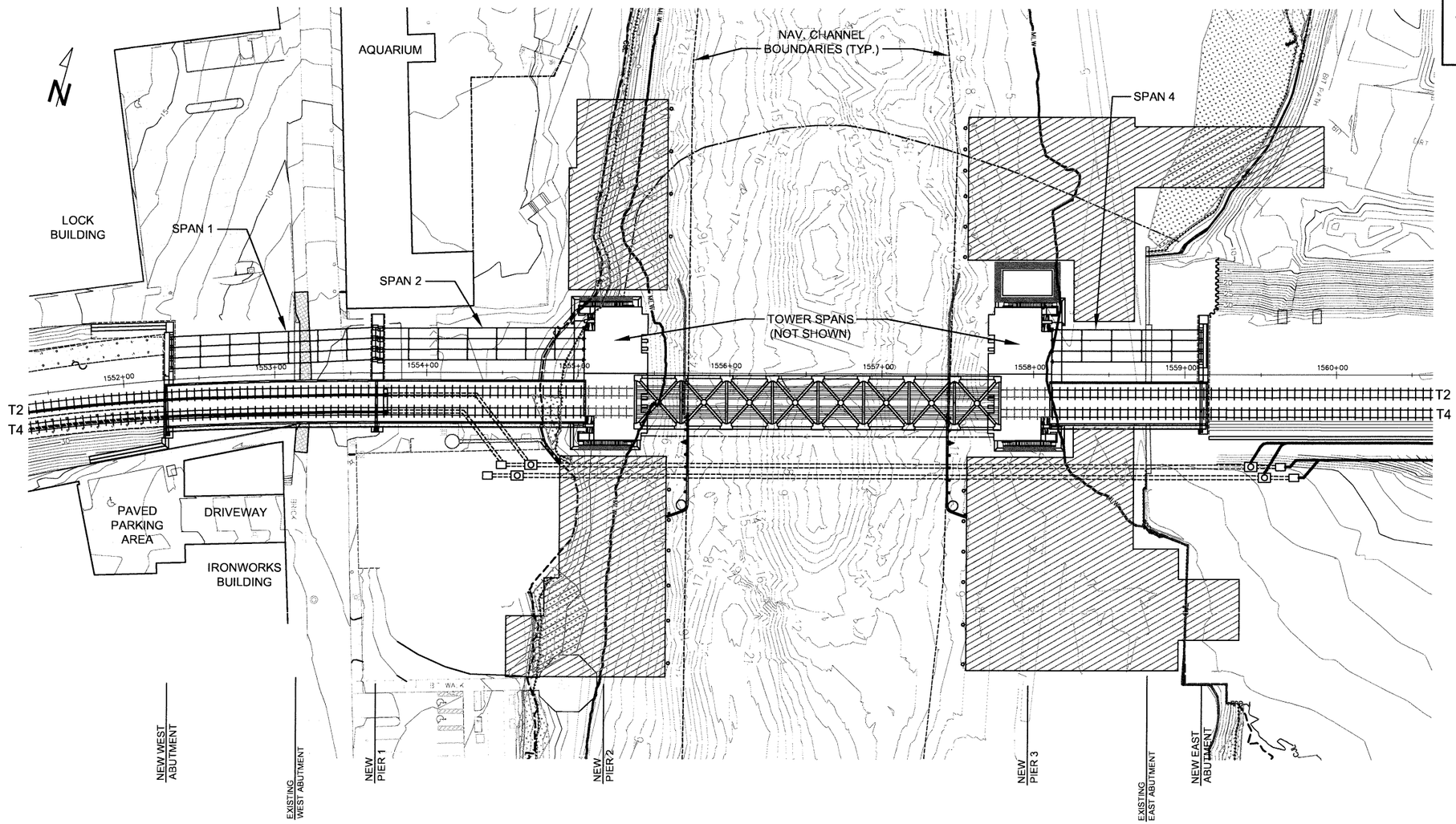
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- SET TOWER SPANS FOR TRACKS 1 & 3 AT LIFT PIERS.
- SET APPROACH SPAN 1, SPAN 2, AND SPAN 4 FOR TRACKS 1 & 3.
- CONTINUE CONSTRUCTION OF NEW NORTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 18 - PLAN VIEW

SCALE: 1" = 80'	SHEET 20 OF 24
DATE: 6-5-18	
DRAWN: B.NICHOLS	JOB 3215103
CHECK:	

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE, LLC

STAGE 19

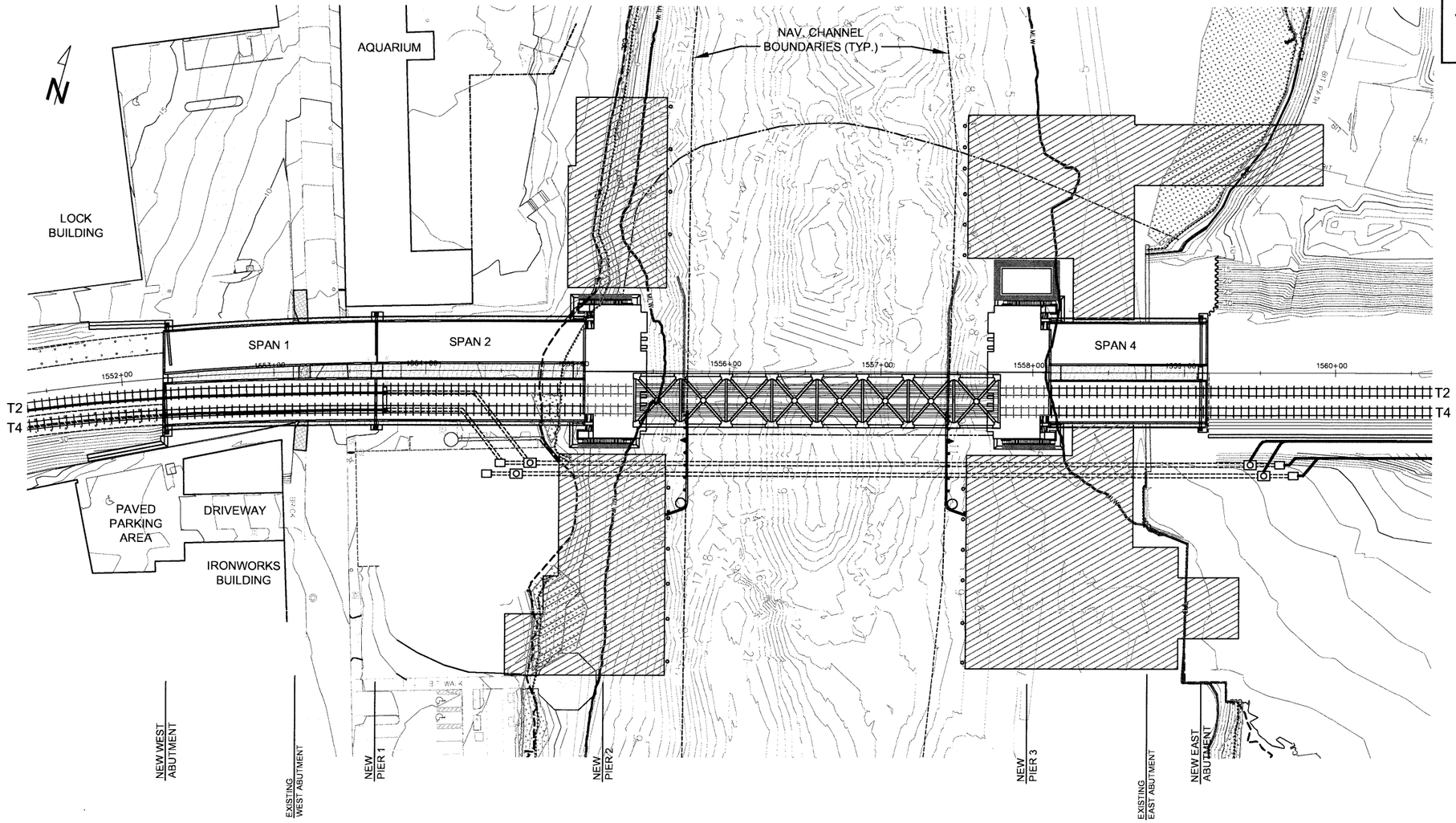
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- INSTALL CONCRETE DECKS AND WALKWAYS FOR NEW APPROACH SPANS 1, 2, AND 4 AND NEW TOWER SPANS.
- COMPLETE CONSTRUCTION OF NEW NORTH LIFT SPAN AT MARINE STAGING YARD.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 19 - PLAN VIEW

SCALE: 1" = 80'	SHEET 21 OF 24
DATE: 6-5-18	
DRAWN: B.NICHOLS	JOB 3215103
CHECK:	

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE JV

STAGE 20

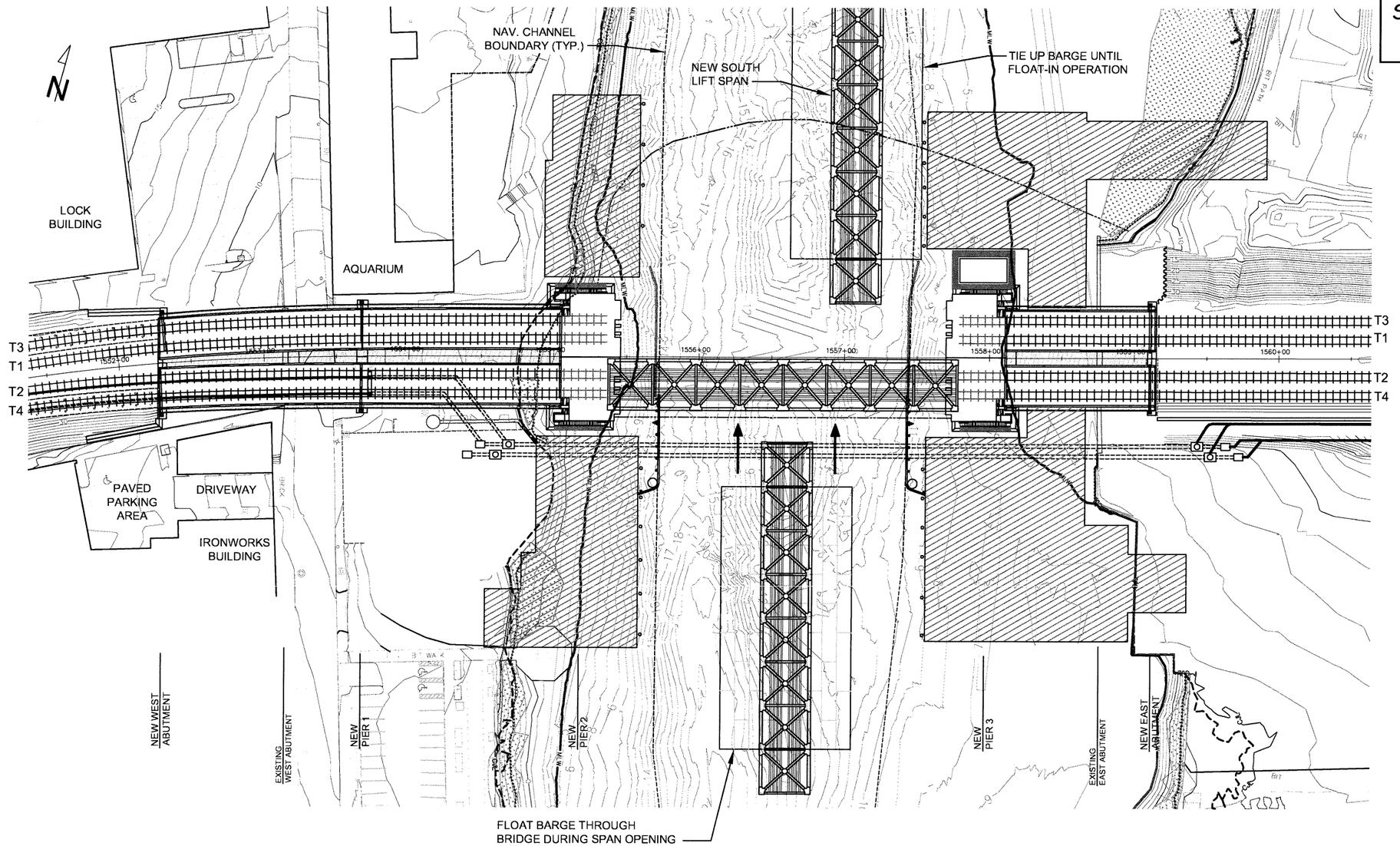
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- FLOAT BARGE WITH NEW LIFT SPAN THROUGH BRIDGE DURING SPAN OPENING AND TIE BARGE UP TEMPORARILY AT NE WORK PLATFORM.
- USE JACKING TOWERS TO RAISE LIFT SPAN (ON BARGE) TO HEIGHT NEEDED FOR FLOAT-IN OPERATION.

SCALE
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NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 20 - PLAN VIEW

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE, LLC

SHEET 22 OF 24
JOB 3215103

STAGE 21

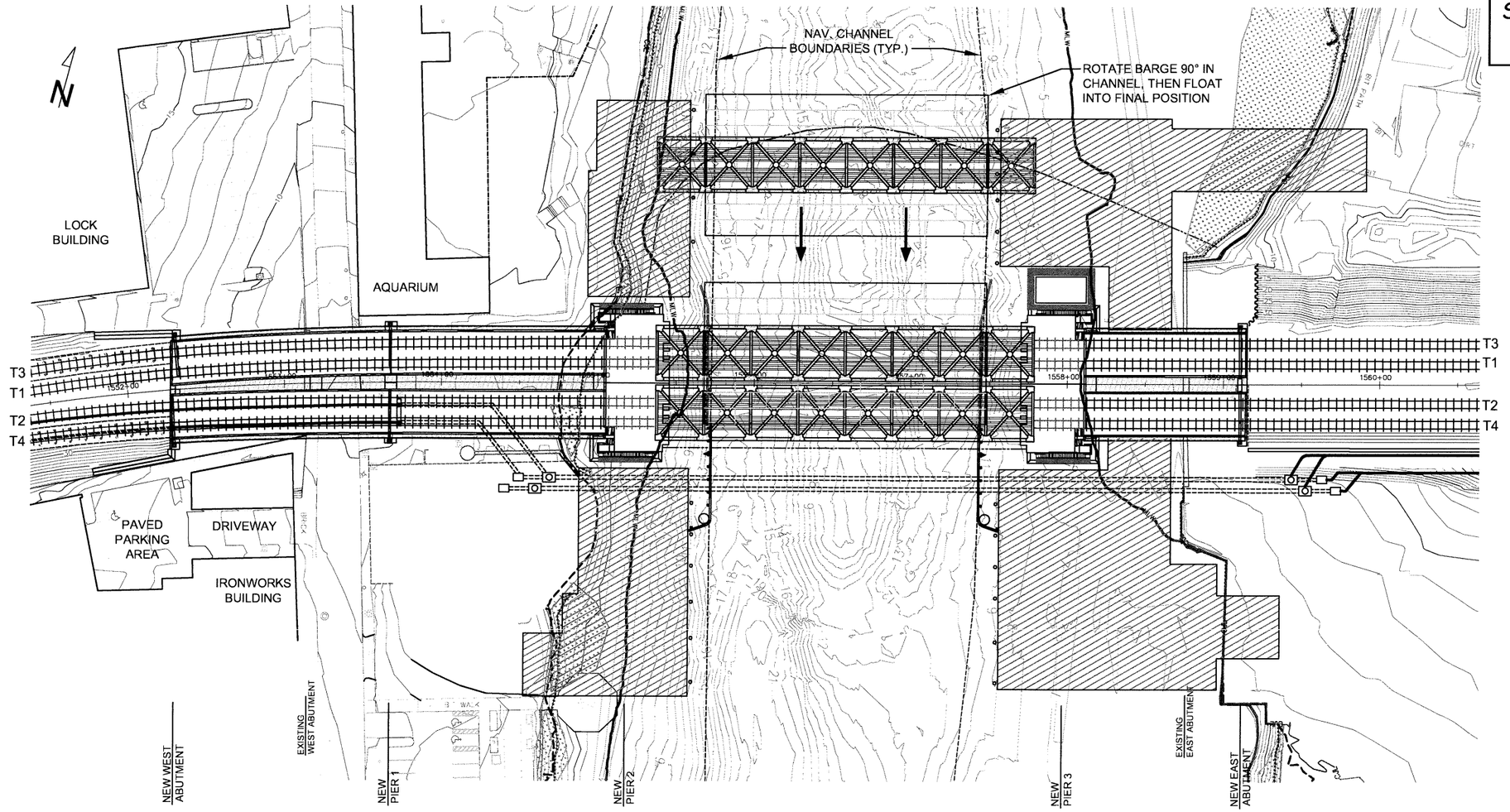
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- FLOAT LIFT SPAN BARGE INTO DEEP WATER CHANNEL NORTH OF THE BRIDGE, ROTATE IT 90°, THEN FLOAT IT BETWEEN NEW PIERS UNTIL LIFT SPAN IS IN FINAL POSITION.
- JACK LIFT SPAN DOWN ONTO PERMANENT BEARINGS AND REMOVE BARGE.
- CONNECT COUNTERWEIGHTS TO NORTH LIFT SPAN.
- MAKE FINAL MECHANICAL AND ELECTRICAL CONNECTIONS TO NORTH LIFT SPAN. ALIGN, TEST, AND COMMISSION SPAN.

SCALE
0 20' 40' 60' 80' 120' 160'

NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 21 - PLAN VIEW

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE

SHEET 23 OF 24
JOB 3215103

STAGE 22

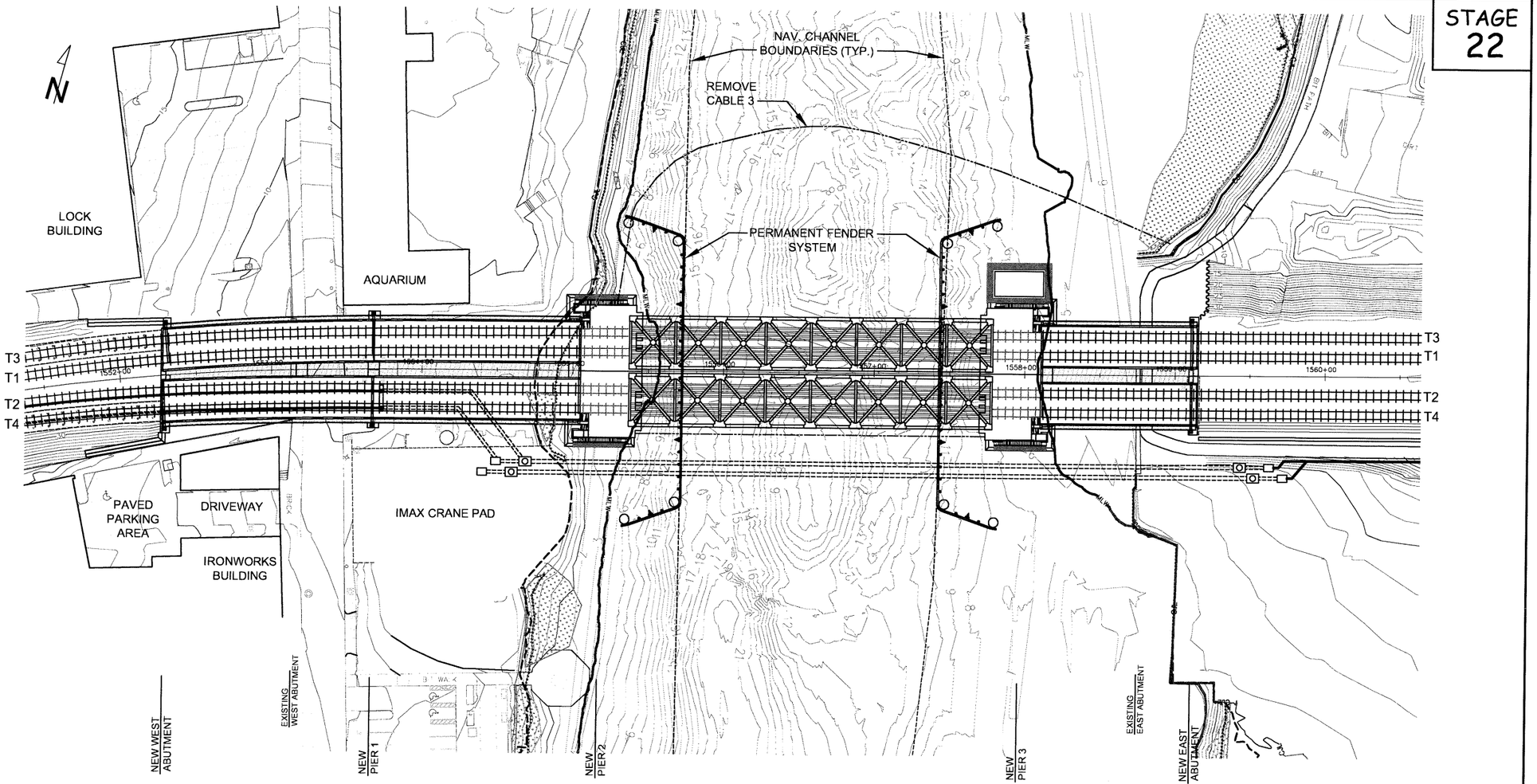
= HTL

= MHW

= MLW

= CJL

= TIDAL VEGETATED WETLAND AREAS



CONSTRUCTION ACTIVITIES

- COMPLETE INSTALLATION OF PERMANENT FENDER SYSTEM.
- REMOVE DEACTIVATED SUBMARINE BRIDGE CABLE ON THE NORTH SIDE (CABLE 3).
- DEMOBILIZE ALL EQUIPMENT FROM WORK PLATFORMS AND REMOVE PLATFORMS.
- DEMOBILIZE ALL EQUIPMENT FROM MARINE STAGING YARD, INSTALL PERMANENT BULKHEAD (80 PZ35 SHEETPILES), AND REMOVE TRESTLE. (SEE DRAWING 3 OF 24 FOR APPROXIMATE LOCATION OF PERMANENT BULKHEAD).
- RESTORE IMAX CRANE PAD TO CONDITION REQUIRED.

NOTES:

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4. SEE COVER SHEET FOR OTHER NOTES AND ASSUMPTIONS.

PRELIMINARY

SCALE
0 20' 40' 60' 80' 120' 160'

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIM. CONSTRUCTION SEQUENCE (SELECTED ACTIVITIES)

STAGE 22 - PLAN VIEW

SCALE: 1" = 80'
DATE: 6-5-18
DRAWN: B.NICHOLS
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO | MIDDLESEX A JOINT VENTURE LLC

SHEET 24 OF 24
JOB 3215103

AQUARIUM

POTENTIAL CARGO BARGE MOORING LOCATIONS

NW WORK PLATFORM

NE WORK PLATFORM

HTL

SW WORK PLATFORM

SE WORK PLATFORM

CARGO BARGES WILL NOT BE MOORED AT EAST AND WEST CHANNEL SIMULTANEOUSLY

POTENTIAL CARGO BARGE MOORING LOCATIONS

CJL

HTL

RELOCATED VESSEL DOCK

NAV. CHANNEL BOUNDARY

BARGE MOVEMENTS

BARGE MOVEMENTS

NAV. CHANNEL BOUNDARY

TIDAL VEGETATED WETLAND AREAS

MHW

DRAFT

WASHINGTON STREET

MHW

MLW

MLW

CJL

POTENTIAL CARGO BARGE MOORING LOCATION (IN PLACE OF FLOAT-IN BARGE)

MARINE STAGING YARD

POTENTIAL CARGO BARGE MOORING LOCATION (SHORT TERM ONLY)

NAV. CHANNEL BOUNDARY

ACCESS TRESTLE

LIFT SPAN ASSEMBLY & FLOAT-IN BARGE: 90' x 180'

NORWALK RIVER

TYPICAL POTENTIAL CARGO BARGES

NOTE: THIS PLAN SHOWS POSSIBLE BARGE MOVEMENTS FOR ALL CONSTRUCTION STAGING EXCEPT STAGES 12, 20 & 21.

WALK BRIDGE CONSTRUCTION PRELIMINARY BARGE MOORING & MOVEMENT PLAN 6 - 5 - 2018

TYPICAL CARGO BARGE SIZES

- 72' x 54'
- 90' x 30'
- 110' x 30'
- 110' x 40'
- 120' x 40'
- 120' x 50' (shown here)
- 140' x 40'
- 150' x 40'
- 160' x 54'
- 180' x 54'
- 200' x 40'
- 250' x 54'
- 280' x 54'

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIMINARY BARGE MOORING/MOVEMENT LAYOUT

TYPICAL POTENTIAL CARGO BARGES

SCALE:	1" = 100'
DATE:	6-5-18
DRAWN:	D. MALLEN
CHECK:	

WALK BRIDGE REPLACEMENT

CIANBRO MIDDLESEX A JOINT VENTURE XV

SHEET BARGE-1

JOB 3215103

AQUARIUM

POTENTIAL CARGO BARGE MOORING LOCATIONS

NW WORK PLATFORM

NE WORK PLATFORM

POTENTIAL RESPECT BARGE MOORING LOCATION

SW WORK PLATFORM

SE WORK PLATFORM

CARGO BARGE (USED FOR EITHER MOORING LOCATION)

CJL

HTL

POTENTIAL RESPECT BARGE MOORING LOCATION

HTL

NAV. CHANNEL BOUNDARY

BARGE MOVEMENTS

NAV. CHANNEL BOUNDARY

MHW

RELOCATED VESSEL DOCK

TIDAL VEGETATED WETLAND AREAS

WASHINGTON STREET

MHW

MLW

MLW

BARGE MOVEMENTS

CJL

POTENTIAL CARGO BARGE MOORING LOCATION

NAV. CHANNEL BOUNDARY

MARINE STAGING YARD

LIFT SPAN ASSEMBLY & FLOAT-IN BARGE: 90' x 180'

ACCESS TRESTLE

NORWALK RIVER

NOTE: THIS PLAN SHOWS POSSIBLE BARGE MOVEMENTS FOR CONSTRUCTION STAGES 3, 18 & 22.

POTENTIAL LOCATIONS FOR RESPECT BARGE

DRAFT

RESPECT BARGE:

200' x 74' BARGE WITH 4100 RINGER CRANE

CARGO BARGES:

SEE SHEET BARGE-1 FOR TYPICAL CARGO BARGE SIZES

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIMINARY BARGE MOORING/MOVEMENT LAYOUT

RESPECT BARGE WITH RINGER CRANE

SCALE: 1" = 100'
DATE: 6-5-18
DRAWN: D. MALLEN
CHECK:

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE XV

SHEET BARGE-2

JOB 3215103

TO DEVINE BROS. BULKHEAD

PA-2 AREA OF PHRAGMITES TREATMENT (NO BARGES)

NOTE: SEE DWG. 7 FOR LOCATION OF DEVINE BROS. BULKHEAD

PA-3 SPARTINA ALTERNIFLORA MARSH RESTORATION (NO BARGES)

PA-4 AREA OF PHRAGMITES TREATMENT (NO BARGES)

MLW

PA-6 AREA OF PHRAGMITES TREATMENT (NO BARGES)

MLW

CJL

PA-7 SPARTINA ALTERNIFLORA MARSH RESTORATION (NO BARGES)

CJL

INTERTIDAL HABITAT/ TIDAL MARSH REMEDIATION (RIPRAP) AREA

AQUARIUM

EQUIPMENT BARGE

MATERIAL BARGE

POTENTIAL BARGE MOVEMENTS

HTL

EXISTING WALK RR SWING BRIDGE

GOLDSTEIN PLACE

NORWALK RIVER

NAV. CHANNEL BOUNDARY

NAV. CHANNEL BOUNDARY

PA-9 AREA OF PHRAGMITES TREATMENT (NO BARGES)

LIBERTY SQUARE

HTL

MHW

WASHINGTON STREET

MHW

PA-8 AREA OF PHRAGMITES TREATMENT (NO BARGES)

TO MARINE STAGING YARD (IF AVAILABLE)

DRAFT

THIS PLAN ASSUMES THAT THE WETLAND MITIGATION WORK WILL BE AN INITIAL ACTIVITY ALONG WITH THE INSTALLATION OF THE WORK TRESTLES AT THE BRIDGE SITE.

EQUIPMENT BARGE:

40' x 50' FLEXIFLOAT BARGE
OR
40' x 30' FLAT DECK BARGE

NOTE: EQUIPMENT BARGE WILL HAVE SPUD ANCHORS

MATERIAL BARGE:

SEE SHEET BARGE-1 FOR TYPICAL CARGO BARGE SIZES

POTENTIAL BARGES FOR WETLAND MITIGATION

NOTE: THIS PLAN SHOWS POSSIBLE BARGE MOVEMENTS FOR CONSTRUCTION STAGE 3

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIMINARY BARGE MOORING/MOVEMENT LAYOUT

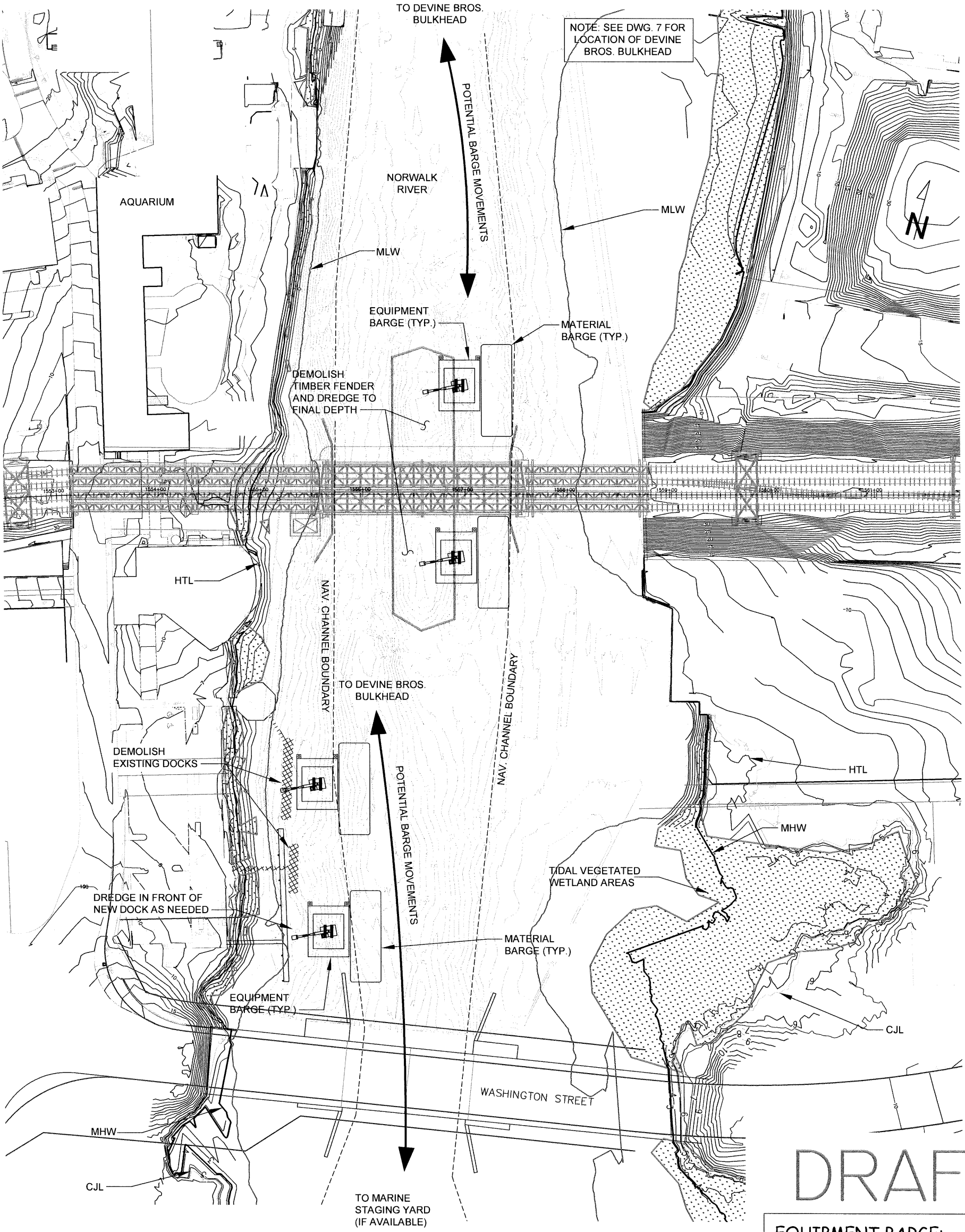
POTENTIAL BARGES FOR WETLAND MITIGATION WORK

SCALE:	N/A
DATE:	6-5-18
DRAWN:	D. MALLEN
CHECK:	

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX
A JOINT VENTURE XV

SHEET BARGE-3

JOB 3215103



DRAFT

THE EARLY DREDGING WORK OCCURS BEFORE THE WORK TRESTLES ARE INSTALLED AT THE BRIDGE SITE.

BARGES WILL BE USED TO STORE DEMOLITION MATERIAL AND DREDGED MATERIAL, AND TO DECANT WATER FROM DREDGED SOIL.

NOTE: THIS PLAN SHOWS POSSIBLE BARGE MOVEMENTS FOR CONSTRUCTION STAGE 1.

POTENTIAL BARGES FOR EARLY DEMO/DREDGING

EQUIPMENT BARGE:

40' x 50' FLEXIFLOAT BARGE
OR
40' x 30' FLAT DECK BARGE

NOTE: EQUIPMENT BARGE WILL HAVE SPUD ANCHORS

MATERIAL BARGE:

SEE SHEET BARGE-1 FOR TYPICAL CARGO BARGE SIZES

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIMINARY BARGE MOORING/MOVEMENT LAYOUT

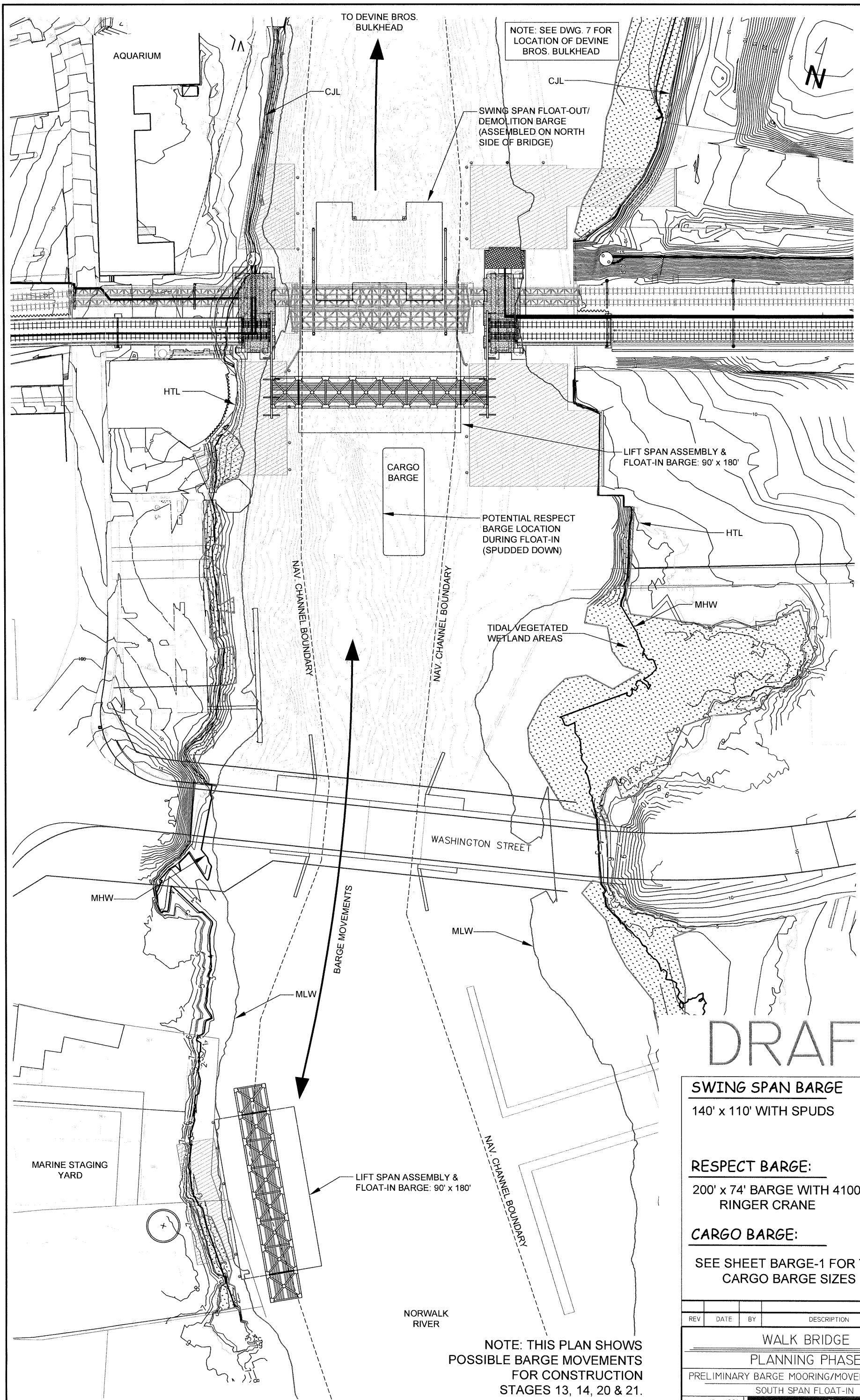
POTENTIAL BARGES FOR EARLY DEMO/DREDGING WORK

SCALE:	1" = 100'
DATE:	6-5-18
DRAWN:	D. MALLEN
CHECK:	

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX A JOINT VENTURE XV

SHEET BARGE-4

JOB 3215103



DRAFT

NOTE: THIS PLAN SHOWS POSSIBLE BARGE MOVEMENTS FOR CONSTRUCTION STAGES 13, 14, 20 & 21.

SWING SPAN BARGE

140' x 110' WITH SPUDS

RESPECT BARGE:

200' x 74' BARGE WITH 4100 RINGER CRANE

CARGO BARGE:

SEE SHEET BARGE-1 FOR TYPICAL CARGO BARGE SIZES

REV	DATE	BY	DESCRIPTION

SOUTH SPAN FLOAT-IN OPERATION

WALK BRIDGE

PLANNING PHASE

PRELIMINARY BARGE MOORING/MOVEMENT LAYOUT

SOUTH SPAN FLOAT-IN

SCALE:	1" = 100'
DATE:	6-5-18
DRAWN:	D. MALLEN
CHECK:	

WALK BRIDGE REPLACEMENT

CIANBRO MIDDLESEX A JOINT VENTURE XV

SHEET BARGE-5

JOB 3215103

AQUARIUM

TO DEVINE BROS. BULKHEAD

POTENTIAL BARGE MOVEMENTS

NOTE: SEE DWG. 7 FOR LOCATION OF DEVINE BROS. BULKHEAD

N

CJL

EQUIPMENT BARGE

CJL

MATERIAL BARGE

MATERIAL BARGE

HTL

SHEETPILE MARINE ENCLOSURES

MATERIAL BARGE

HTL

MHW

TIDAL VEGETATED WETLAND AREAS

NAV. CHANNEL BOUNDARY

POTENTIAL BARGE MOVEMENTS

NAV. CHANNEL BOUNDARY

WASHINGTON STREET

MHW

MLW

MLW

TO MARINE STAGING YARD (IF AVAILABLE)

NAV. CHANNEL BOUNDARY

MARINE STAGING YARD

POSSIBLE LIFT SPAN ASSEMBLY & FLOAT-IN BARGE: 90' x 180'
OR
TRESTLE AVAILABLE FOR DREDGING MATERIAL BARGES

NORWALK RIVER

NOTE: THIS PLAN SHOWS POSSIBLE BARGE MOVEMENTS FOR CONSTRUCTION STAGE 15.

RIVER PIER DEMOLITION OPERATION

DRAFT

EQUIPMENT BARGE:

50' x 100' FLEXIFLOAT BARGE

NOTE: EQUIPMENT BARGE WILL HAVE SPUD ANCHORS

MATERIAL BARGES:

SEE SHEET BARGE-1 FOR TYPICAL CARGO BARGE SIZES

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIMINARY BARGE MOORING/MOVEMENT LAYOUT

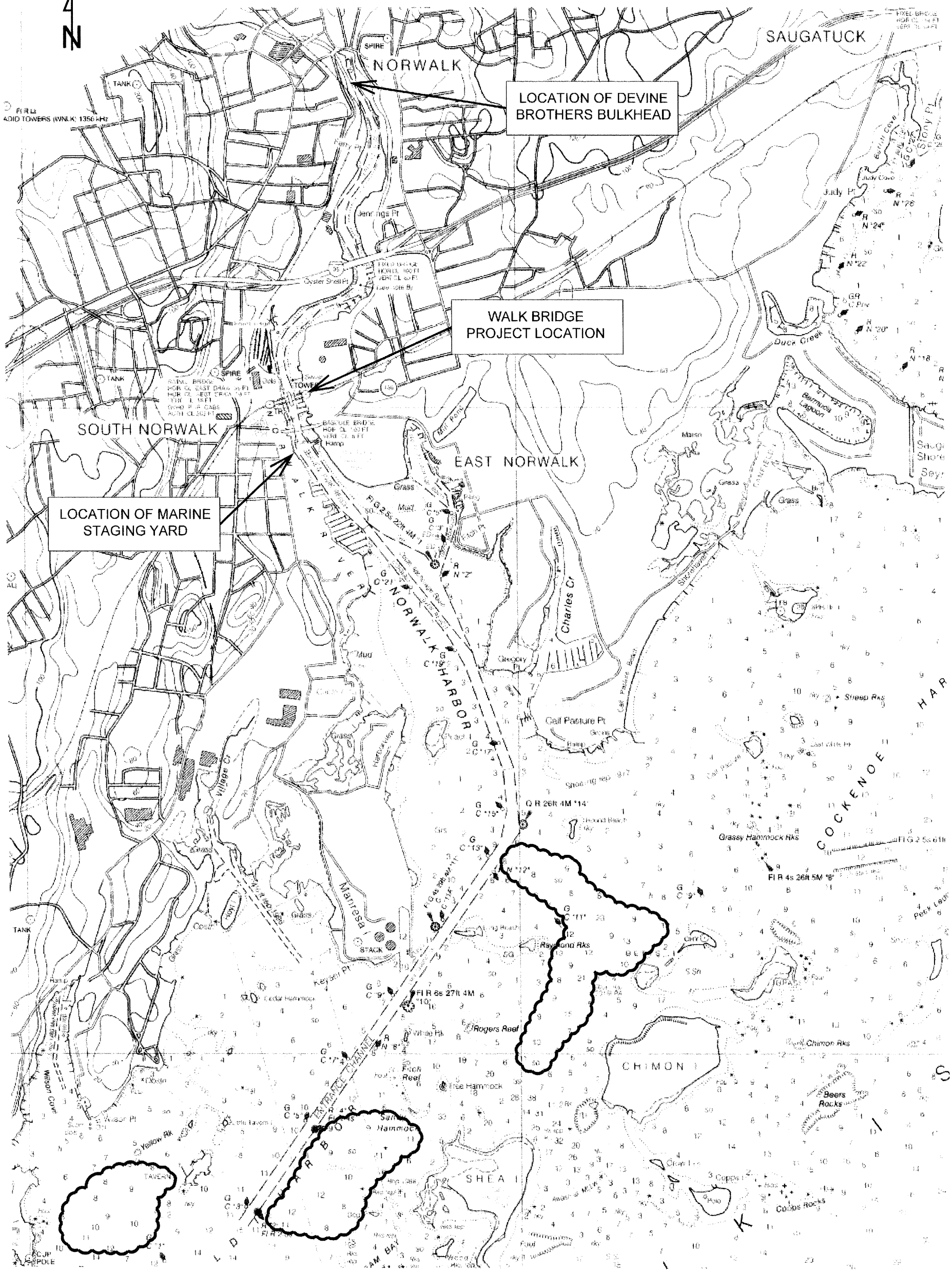
RIVER PIER DEMOLITION

SCALE:	1" = 100'
DATE:	6-5-18
DRAWN:	D. MALLEN
CHECK:	

WALK BRIDGE REPLACEMENT
CIANBRO MIDDLESEX
A JOINT VENTURE XV

SHEET BARGE-6

JOB 3215103



A MINIMUM OF (2) MOORING BUOYS WILL BE INSTALLED WITHIN EACH AREA FOR THE DURATION OF THE WALK BRIDGE CONSTRUCTION.

LOCATION OF THE BUOYS TO BE DETERMINED WITH COAST GUARD APPROVAL.

= POSSIBLE GENERAL AREA OF MOORING BUOY INSTALLATION.

POTENTIAL MOORING BUOY LOCATIONS

DRAFT

REV	DATE	BY	DESCRIPTION

WALK BRIDGE

PLANNING PHASE

PRELIMINARY BARGE MOORING/MOVEMENT LAYOUT

POTENTIAL MOORING BUOY LOCATIONS

SCALE: N.T.S.	WALK BRIDGE REPLACEMENT	SHEET BARGE-7
DATE: 6-5-18		
DRAWN: D. MALLEN	CIANBRO MIDDLESEX A JOINT VENTURE JV	JOB 3215103
CHECK:		

Attachment E – Contractor's Workplan Matrix

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Section 7 Consultation and EFH Assessment Processes for Walk Bridge

Stage 1- Site Preparation

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES					SCHEDULE	
Staging Task	Activity ID	Task	ITEM	QTY	UNIT	Equipment/Vessels Used (SEE CODES BELOW)	DAYS USED	Barge Moves On Site (times/ day)	Barge Moves Off Site	Shift D- Day, N- Night T- Tide	Daily Intensity (Hours)	Possible Mitigation	Early Start	Early Finish
A.		RMOVE FENDERS AT PIVOT PIER, INSTALL TEMPORARY FENDER SYSTEM AND DREDGE TO FINAL DEPTH												
A.1	A22530 & A28470	REMOVE FENDERS AT THE PIVOT PIER, INSTALL TEMPORARY FENDER SYSTEM	12" Wooden Piles Removed	200	EA	BGC, BGM, BGW, C2, BCS, E48, VW, VP, HP, HE	25	3	3x /WK 1.3 m To Devine	D		Bubble Curtain	16-Dec-19	21-Feb-20
A.2	A22570 & A22480	DREDGE TO FINAL DEPTH Average (500 Feet L X 125 Feet W X 5 Feet D)	Dredging	11,350	CY		51	4	4 times / wk- 1.3 m Devine	D		n/a	13-Dec-19	29-Jan-20
			Dredge Area	7,000	SY								2-Dec-19	13-Dec-19
B		RELOCATE EXISTING VESSEL MOORING, DREDGE NEW BERTHING AREAS REMOVE EXISTING DOCK AND PILING												
1	A28450	Remove dock section and piling	Remove 12" Wood Piles	30	EA	BGC, BGM, BCS, E48, VW, VP, HV	10	3	Unload onsite	D		n/a	13-Dec-19	26-Dec-19
2	A28490	DREDGE NEW DOCKING AREA Average (50 feet L X 20 Feet W X 3 Feet D)	Soils	100	CY	BGC, BGM, BGW, C2, BCS, E48, VW, VP,	10	2	1 Ld , 1.3m to Devine	D		n/a	2-Dec-19	13-Dec-19
3	A28460	Construct new dock - Drive PILES	Drive 12" Wooden Piles	24	EA	BGC, BGM, BCS, E48, VW, VP, HV, HP	7	4	n/a	D		Bubble Curtain	4-Jan-20	11-Jan-20
	A28460	Construct new dock- Set Floats	Floats & Ramp	12	EA	BGC, BGM, BCS, E48, VW, VP,	3	8	n/a	D		n/a	12-Jan-20	15-Jan-20
C		TIDAL WETLAND MITIGATION - ALONG THE RIVERBANKS NORTH OF THE WALK BRIDGE .												
1	A28520	Establish Access to Staging Area off Smith Rd North of Bridge via Ramp fromTrestle	30" Diameter Piles	9	EA	E30, E46, (2)TT, C2, HV, HI	10	n/a	n/a	D		n/a	16-Nov-19	27-Nov-19
		Install temporary sheet piles for access ramp	Avg 40' PZ35 Sheet Piles	70	EA	HV,E30,L4,TT,C175	24	n/a	n/a	D		n/a	16-Nov-19	16-Dec-19
		Construct access to mitigation area from Northeast platform	Temporary Fill	800	CY	HV,E30,L4,TT,C175	24	n/a	n/a	D		n/a	16-Nov-19	16-Dec-19
WM 1-4	A28530	Perform Environmental Mitigation on East River Bank North of Bridge	n/a	n/a	n/a	E30, E46, (2)TT,	60	n/a	n/a	D / T		n/a	2-Dec-19	13-Feb-20

D.		REMOVAL OF THE IMAX THEATER											
1.a.	A22560	Protect Existing Pump Station & RCP Outfall	n/a	n/a	n/a	ELR	15	n/a	n/a	D	10 hour shifts, 6 days per week	n/a	16-Nov-19	6-Dec-19
1.b.	A22530	Prep IMAX Theater for Demolition	n/a	n/a	n/a	ELR	5	n/a	n/a	D		n/a	16-Nov-19	12-Dec-19
1.c.		Erosion and Sedimentation controls	n/a	n/a	n/a	ELR	3	n/a	n/a	D		n/a		
1.d.		Remove Stone Rip Rap	n/a	n/a	n/a	EX48	4	n/a	n/a	D		work at low tide		
1.d.		Install Sheet Pile Template	14" Steel H Piles	6	EA	300 Ton Crane, Vibratory Hammer (Impact Hammer only if required)	2	n/a	n/a	D		work at low tide		
1.d.		Drive Sheet piles	PZ35 Sheetpiles	43	Dbls	300 Ton Crane, Vibratory Hammer (Impact Hammer only if required)	12	n/a	n/a	D		Bubble Curtain		
2	A22520	Demolish IMAX Theater	n/a	n/a	n/a	E48, M60	30	n/a	n/a	D			22-Jan-20	27-Feb-20
E		INSTALL SHEETPPILE BULKHEAD, DREDGE AND CONSTRUCT MARINE ACCESS TRESTLE AT MARINE STAGING YARD												
1		Pretrench / Dredge for Sheet Pile	Soils	306	CY	E48, TT, BCS	3	n/a	n/a	D		n/a		
		Average Dredge Area 250' Lx 4' Wx 8' D	Area	111	SY									
2	A24910	Install Sheetpile Bulkhead	PZ35 Sheetpiles	58	Dbls	C2, HV, HI vibratory hammer , (Impact hammer only if required) .	22	n/a	n/a	D		Bubble Curtain	27-Dec-19	21-Jan-20
3	A24920	Excavate water side of Bulkhead	Soils	3,150	CY	E48, TT, BGC, BGM, C2B, BCS	20	6	18 Ld , 1.3m to Devine	T		n/a	13-Dec-19	5-Jan-20
		Average Dredge Area 200 feet L x 105 Feet W x 4 feet D	Dredge Area	1,025	SY									
4	A24630	Drive 14 inch Steel H Piles/Template	14 inch H Piles	32	EA	BGC, BGM, C2B, M60, HV,Vibatory Hammer & Impact Hammer	25	8	n/a	D		Bubble Curtain	3-Dec-20	25-Feb-21
		Drive 24 inch Steel Trestle Piles	24 inch Piles	32	EA			8	n/a	D		Bubble Curtain		
5	A24630	Install pile bents, stringers, mats and timber curbs	n/a	n/a	n/a	BGC, BGM, C2B, M60,	30	5	1 x / wk	D		n/a	3-Dec-20	26-Feb-21
6	A258540	Dredge Water Side of Trestle	Soils removed	1600	CY	BGC, BGM, C2B, M60, BCS	10	6	18 Ld , 1.3m to Devine	D		n/a	2-Dec-19	13-Dec-19
		Average Dredge Area 250 feet long x 30 Feet W x 6 feetD	Dredge Area	350	SY									
7	A24630	Place earthen ramp for trestle access	Soils Placed	300	CY	E48, TT	10	n/a	n/a	D		n/a	3-Dec-20	26-Feb-21
8		Provide LED lights below trestle	Lights	1000	LF	C2	15	n/a	n/a	T		n/a	26-Feb-21	19-Mar-21

Stage 2 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES					SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/Vessels Used (SEE CODES BELOW)	DAYS USED	Barge Moves On Site (times/ day)	Barge Moves Off Site	Shift D-Day, N-Night T-Tide	Daily Intensity (Hours)	Possible Mitigation	Early Start	Early Finish
A		INSTALL WORK PLATFORMS WITH LAND ACCESS AND FENDER PILING									10 hour days, 6 days per week			
1 THRU 4	A2440, A680, A11490, A11470, A28620, A28660	Access & Trestle Construction (North East, North West, South East, South West & Marine Staging Yard)	30" Dia Piles	207	EA	Crane Barge with Spuds 200' x 74' Material Barge (2) 100' x 30' Work Barge 40' x 40' Crane 200 Ton Man-lift 60 Ft Track Excavator 40 – 80 Ton Aluminum Work Boat / push boat Vibratory and impact pile hammers	241	6	2 times /week to Devine 1.3 miles	D/N		Bubble Curtains	16-Dec-19	7-Oct-20
			24" Dia Steel Piles	22	EA					D				
			14" Steel H Piles	80	EA					D				
		Excavate and Fill onshore bulkheads Excavation all above HTL/CJL	Soils	1200	CY		15	n/a	n/a	D		Erosion & Sedimentation Control	13-Jan-20	29-Jan-20
		Install LED lights under platform	Lights	4000	LF	C2, M60,	60	n/a	n/a	T		n/a		
B		INSTALL MARINE ENCLOSURES AT LIFT PIER FOUNDATIONS												
1 thru 6	A28710	Template steel H Piles for marine enclosure	14" Steel H Piles	50	EA	Crane Barge with Spuds 200' x 74' Material Barges 100' x 30' Crane on barge 200 Ton Crane on Platform 300 Ton Man-lift 60 Ft Track Excavator 40-80 Ton Rubber tire backhoe/loader Aluminum Work Boat / Push Boat Vibratory pile hammer Impact Hammer (if required)	15	n/a	n/a	D		Bubble Curtain	20-Jun-20	9-Jul-20
	A28710	Construct Pier 2 Marine Enclosure Wall - North of Bridge - (work completed from platform)	Cold Rolled Sheets	20	Dbls		15			D/N		Bubble Curtain	20-Jun-20	9-Jul-20
	A28700	Construct Pier 2 Marine Enclosure Wall - South of Bridge - (work completed from platform)	Cold Rolled Sheets	20	Dbls		15			D		Bubble Curtain	5-Aug-20	21-Aug-20
	A28720	Construct Pier 2 Marine Enclosure Wall - Under Bridge	Cold Rolled Sheets	33	Dbls		30	6	1 time / wk to Devine 1.3	D		Bubble Curtain	23-Oct-20	30-Nov-20
	A28680	Construct Pier 3 Marine Enclosure Wall - North of Bridge - (work completed from platform)	Cold Rolled Sheets	32	Dbls		15	n/a	n/a	D		Bubble Curtain	20-May-20	8-Jun-20
	A28370	Construct Pier 3 Marine Enclosure Wall - South of Bridge - (work completed from platform)	Cold Rolled Sheets	32	Dbls		15			D		Bubble Curtain	22-May-20	10-Jun-20
	A28690	Construct Pier 3 Marine Enclosure Wall - Under Bridge	Cold Rolled Sheets	33	Dbls		30	6	1 time / wk to Devine 1.3	D		Bubble Curtain	20-Jul-20	22-Aug-20
		Deploy Silt Curtain inside the marine enclosures	Silt Curtains	2	EA	Work Barge-40x40, 200 ton Crane, Push Boat	4	n/a	n/a	D		n/a	7-May-20	26-May-20
C		INSTALL PILES AND SUPPORT STEEL FOR THE DRILLED SHAFT OPERATION - (Additional Trestle construction to build around installed cans)												
	A28740-A28750	Install Temporary 30" Support Piles	30" Steel Piles	16	EA	Crane - Shafts 300 Ton Crane – Support 175 Ton Hydraulic Crane 80 Ton Man-lift 60 Ft Work Barge 40' x 40' Low headroom drill Hydraulic & Impact Hammers Excavator 15 ton Concrete Pump	30	2	n/a	D		Bubble Curtain	9-Jun-20	27-Aug-20
		Install Temporary 24" Support Piles	24" Steel Piles	12	EA			2	n/a	D		Bubble Curtain	9-Jun-20	27-Aug-20
	A21540-A22600	Install Support Steel	24" Shapes	12	Pcs		15	1	n/a	N		n/a	24-Aug-20	11-Dec-20
		Install Mats	Timber Mats	70	EA		15	1	n/a	D		n/a	11-Aug-20	27-Aug-20
D		Demolish Existing Control House	Remove	1	EA	C2, M60, E48	10	1	n/a	D		Debris Shield	27-Dec-19	9-Jan-20

Section 7 Consultation and EFH Assessment Processes for Walk Bridge

Stage 3 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES					SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/Vessels Used (SEE CODES BELOW)	DAYS USED	Barge Moves On Site (times/ day)	Barge Moves Off Site	Shift D-Day, N-Night T-Tide	Daily Intensity (Hours)	Possible Mitigation	Early Start	Early Finish
A		INSTALL 4 EACH 12 FOOT DIAMETER DRILLED SHAFTS AT EACH LIFT PIER												
1 THRU 7	A26970 A27000	Install Drilled Shaft - Pier 2 - Northside - Platform	12'Dia Shafts	2	EA	200 ton Crane, 300 toncrane, 80 Ton Hydraulic Crane, 80 foot Manlift, Work Barge 40x40, Hydraulic Oscillator, Excavator 30 Tons, Concrete Pumps	76	n/a	n/a	D	10 hour days, 6 days per week	Bubble Curtain	16-Jan-21	2-Feb-21
	A27030 AA27060	Install Drilled Shaft - Pier 2 - Southside - Platform	12'Dia Shafts	2	EA		75	n/a	n/a	D		Bubble Curtain	16-Feb-21	5-Mar-21
	A26910 A26940	Install Drilled Shaft - Pier 3 - Northside - Platform	12'Dia Shafts	2	EA		76	n/a	n/a	D		Bubble Curtain	2-Nov-20	18-Nov-20
	A22700 A26880	Install Drilled Shaft- Pier 3 - Southside - Platform	12'Dia Shafts	2	EA		75	n/a	n/a	D		Bubble Curtain	5-Oct-20	21-Oct-20
B		INSTALL 2 EACH 10 FOOT DIAMETER CENTER SUPPPORTS AT EACH LIFT PIER												
		Install 50' x 50' low head room platform under bridge next to pier 2	12" Steel Bearing Pile	16	Ea	DLH, HV, HP, E30	10	n/a	n/a	D	10 hour days, 6 days per week	Bubble Curtain	2-Jan-21	12-Jan-21
		Install 50' x 50' low head room platform under bridge next to pier 3	12" Steel Bearing Pile	16	Ea	DLH, HV, HP, E30	10	n/a	n/a	D	10 hour days, 6 days per week	Bubble Curtain	14-Aug-20	24-Aug-20
1 THRU 12	A28810 A28840	Install Casings & Micro Piles at Center of Pier 2	12" Micro Piles	20	EA	C2, C3, BH80, M60, BGW, DLH, E30, PC	70	1	n/a	D/N	10 hour days, 6 days per week	Bubble Curtain	12-Jan-21	29-Jan-21
	A28900 A28870	Install Casings & Micro Piles at Center of Pier 3	12" Micro Piles	20	EA		53	1	n/a	D/N		Bubble Curtain	24-Aug-20	6-Oct-20
	A24890	Directional drill Pipes across River WBridge-6D/W MNRR (C&S)	n/a	n/a	n/a	No in-water activity	88	n/a	n/a	D		n/a	29-Apr-20	13-Aug-20
C	A23680 A27770	Begin construction of new south lift span at marine staging yard	n/a	n/a	n/a	C2, BGM, BH80	180	1	Material Delivery Barges = 2 lds / Month	D	10 hour days, 6 days per week	n/a	24-May-21	5-Mar-22

Section 7 Consultation and EFH Assessment Processes for Walk Bridge

Stage 4 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T-Tide	Daily Intensity (Hours)	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	Barge Moves On Site (times/ day)	Barge Moves Off Site				Early Start	Early Finish
A	A29410 A29420	REMOVE SUPPORT PILING & STEEL FOR 12 FOOT DIAMETER DRILLED SHAFTS (Work From Platform)	14" H piles	24	EA	300 Ton Crane , Material Barge 100x30, Vibratory Hammer	12	n/a	n/a	D	10 hour days, 6 days per week	Work From Platform & Bubble Curtain	8-Feb-21	12-Mar-21
B	A29870 A29880	EXCAVATE FOR LIFT PIER PRECAST CONCRETE TUBS (Work From Platform) 12 Locations: 25" x 25": Avg Depth 2.5'	Soils AREA	700 900	CY SY	Excavator 80 Ton, Triaxle Truck, Digging Bucket (Inside sheet pile enclosure)	12	n/a	n/a	D	16 hours/ Day	Work From Platform & Bubble Curtain	11-Feb-21	5-Feb-21
C	1012.5	SET PRECAST TUBS ON 12 FOOT DIAMETER SHAFTS AND POUR (PIERS 2 & 3)												
1 THRU 4	A29010 A29090	Pier 2 -- Precast TUB (AB,CD)	Tubs	4	EA	C3, BGM, HV,	48	1	n/a	D/N	10 hour days, 6 days per week	Work from platform at Low Tide	4-Jan-21	28-Apr-21
	A29450 A29640	Pier 3 --Precast TUB (AB,CD)	Tubs	4	CF		48	1	n/a	D/N		Work from platform at Low Tide	19-Aug-20	5-Feb-21
D		SET PRECAST TUBS ON 10 FOOT DIAMETER SHAFTS AND POUR (PIERS 2 & 3)												
1 THRU 4	A29220 A29400	Pier 2 -- Precast TUB (E,F)	Tubs	2	EA	C3, BGM, HV,	24	1	n/a	D/N	10 hour days, 6 days per week	Work Low Tide on Low Platform	17-Feb-21	14-May-21
	A29660 A29840	Pier 3 -- Precast TUB (E,F)	Tubs	2	EA		24	1	n/a	D/N		Work Low Tide on Low Platform	23-Nov-20	19-Jan-21

Stage 5 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES					SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	Barge Moves On Site (times/ day)	Barge Moves Off Site	Shift D- Day, N- Night T- Tide	Daily Intensity (Hours)	Possible Mitigation	Early Start	Early Finish
A		REMOVE LOW HEADROOM WORK PLATFORMS												
	A30010	REMOVE LOW HEADROOM WORK PLATFORM- PIER 2 (50'x50')	Supports 12" bearing piles	3 16	EA EA	BGW, CH80,BGM	40	n/a	n/a	D/N	6 dys /wk 8 hours/ day	Work from Platform, Silt curtain & Low Tide	24-Mar-21	21-May-21
	A30020	REMOVE LOW HEADROOM WORK PLATFORM- PIER 3 (50'x50')	Supports 12" bearing piles	3 16	EA EA	BGW, CH80,BGM	40	4	n/a	D/N	6 dys /wk 8 hours/ day	Work from Platform, Silt curtain & Low Tide	5-Dec-20	6-Feb-21
B		PARTIAL REMOVAL OF MARINE ENCLOSURES												
	A30030 A29980	Shorten/Remove Pier 2 Marine Enclosure Northside, Southside & under bridge.	Sheets Removed	23	Dbls	C3, BGW,HV, ML60, VW, VP	10	n/a	n/a	D	6 dys /wk 8 hours/ day	Work from Platform, Silt curtain & Low Tide	12-Nov-20	25-Jan-21
	A30040 A30000	Shorten/Remove Pier 3 Marine Enclosure Northside, Southside & under bridge.	Sheets Removed	23	Dbls		10	n/a	n/a	D	6 dys /wk 8 hours/ day	Work from Platform, Silt curtain & Low Tide	12-Nov-20	25-Jan-21

Stage 6 - CMJV Draft Estimate 30%

2.4	ACTIVITY		MATERIALS			EQUIPMENT		Barge Moves					SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/Vessels Used (SEE CODES BELOW)	DAYS USED	On Site (times/ day)	Off Site	Shift D-Day, N-Night T-Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	Early Start	Early Finish
A	**A300090**	**INSTALL SUBMARINE CABLES BETWEEN PIERS 2 AND 3 (270 FT x 22 FT) = Avg Depth 4 feet**	Dredge Soils Area(SY)	960 **600**	CY SY	BGC, BGM, E48, BCS	60	4	n/a	D	7 days 12 hours	Off Season Work, Silt Curtain	1-Dec-21	13-Jan-22
	A23320	Construct New Control House - Pier 3 (MATERIALS MAY BE DELIVERED BY BARGE)	n/a	n/a	n/a	Deck Barges 100x30 300 Ton Crane on Platform	190	2	Delivery 2 loads / wk	D	6 days/week 12 hours/day	Work from Platform	30-Jun-21	24-Feb-22
	A23010	Erect New Lift Tower - Pier 2 (MATERIALS MAY BE DELIVERED BY BARGE)	n/a	n/a	n/a		72	2	Delivery 2 loads / wk	D		Work from Platform	1-Sep-21	29-Nov-21
	A23020	Erect New Lift Tower - Pier 3 (MATERIALS MAY BE DELIVERED BY BARGE)	n/a	n/a	n/a		72	2	Delivery 2 loads / wk	D		Work from Platform	16-Jun-21	30-Nov-21
	A25880	Install Mechanical Room Sheaves and Machinery - Pier 2	n/a	n/a	n/a	Deck Barges 100x30 300 Ton Crane on Platform, **Vibratory Hammer**	54	2	Delivery 2 loads / wk	D	6 days / week and 10 hours / day	Work from Platform	8-Feb-22	13-Apr-22
	A25900	Install Tower & Mechanical Room Electrical - Pier 2	n/a	n/a	n/a		30	2	Delivery 2 loads / wk	D		Work from Platform	4-Jun-22	11-Jul-22
	A25840	Install Mechaincal Room Sheaves and Machinery - Pier 3	n/a	n/a	n/a		54	2	Delivery 2 loads / wk	D		Work from Platform	5-Nov-21	17-Jan-22
	A25890	Install Tower & Mechanical Room Electrical - Pier 3	n/a	n/a	n/a		30	2	Delivery 2 loads / wk	D		Work from Platform	8-Mar-22	11-Apr-22
	A30100	Selective Demo of Existing Pier Fenders for Submarine Cable Installation	Remove 12" Dia Timber Piles	6	EA		5	2	Delivery 2 loads / wk	D		n/a	25-Sep-21	30-Sep-21
B & C		INSTALL PERMANENT FENDER PILES & RAILS												
	A30110	Install Template Piles	14" H Piles	8	Ea	Vibratory Hammer, (Impact Hammer if necessary)	2	n/a	n/a	D	10 Hrs/Day 6 days/ Wk	Work from Platform	30-Sep-21	1-Oct-21
	A30110	Install New Fender Piles at Submarine Cable Location	14" Composite Pipe Piles	16	EA	Material Barges 100x30 300 Ton Crane on Platform, Vibratory Hammer, Impact Hammer	5	n/a	n/a	D	6 days/wk - 10 hrs/ day	Work from Platform	1-Oct-21	6-Oct-21
	A30120	Install New Fender Rails at Submarine Cable Location	n/a	n/a	n/a		10	n/a	n/a	D		Work from Platform	12-Jan-22	22-Jan-22
D	A26820	REMOVE SECTION OF NORTHEAST WORK PLATFORM - For Control House Construction (1800SF)	Remove 30" steel pipe piles and 14" H Piles	12	EA	200 Ton Crane, Excavator 80 Ton, Triaxle Truck,Vibratory Hammer	10	n/a	n/a	D	10 Hrs/Day 6 days/ Wk	Work from Platform	15-Jul-21	6-Aug-21

Section 7 Consultation and EFH Assessment Processes for Walk Bridge

Stage 7 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		Barge Moves		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
		REMOVE TRACKS 2 AND 4, EAST AND WEST APPROACH SPANS												
A		Install Temporary Supports for Approach Spans 2 and 4	Shoring Towers	6	EA	Excavator / Loader Rubber Tired	20	n/a	n/a	D	10 hrs /day 6 days/ wk	Work Low Tide	1-Mar-21	29-Mar-21
B	A24550 A27660	Remove Tracks 2 and 4, East & West Approach Spans	n/a	n/a	n/a	Deck Barge 100 x 30 Crane 300 ton Excavator 40-80 ton	52	3	n/a	D	8 hrs/day 6	n/a	19-Aug-20	30-Apr-21

Stage 8 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT			Barge Moves		Shift D-Day, N-Night T-Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/Vessels Used	(SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A25070 A25090	Lift Pier2 - Form & Pour Pedestals -	n/a	n/a	n/a	Crane Barge with Spuds Material Barge Crane on platform Crane Man-lift Aluminum Work Boat Push Boat	200’ x 74’ 100’ x 30’ 300 Ton 200 Ton 60 Ft	31	2	n/a	D	6 days /wk 8 hrs /day	Debris Shield	11-Sep-2021	16-Oct-2021
A	A25400 A25420	Lift Pier3 - Form & Pour Pedestals - South Side	n/a	n/a	n/a			31	2	n/a	D		Debris Shield	28-Jun-2021	5-Aug-2021
B	OA.OC.OA1360	Set Bearings at Pier Caps 2 and 3	n/a	n/a	n/a	Crane Barge with Spuds Crane Aluminum Work Boat Push Boat	200’ x 74’ 200 Ton	4	2	n/a	D		Debris Shield	2-Jun-2021	4-Jun-2021
C	A23160	Excavation and demo of the East Abutment	n/a	n/a	n/a	Track Excavator 40-80TN		20	n/a	n/a	D		Debris Shield	23-Jun-2021	19-Jul-2021

Stage 9 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A30130	Remove (50SY) Section of SE Work Platform for Approach Steel Erection	30" Dia Steel Piles	12	EA	Crane 300 Ton Man-lift 60 Ft Vibratory Hammer	15	n/a	n/a	D	6 dys/wk 8 hrs/dy	Platform work, silt Curtain	30-Jul-21	16-Aug-21
A	A30130	Remove Support Steel	W24 - W 36 Steel Sections	6	EA	Crane 300 Ton Man-lift 60 Ft Track Excavator 40-80 Ton	15	n/a	n/a	D	6 dys/wk 8 hrs/dy	Platform work, silt Curtain	30-Jul-21	16-Aug-21
B	A23380	Construction of New East Abutment	n/a	n/a	n/a	Track Excavator 40TN Crane 300TN	60	n/a	n/a	D	6 dys/wk 8 hrs/dy	Debris Shield	5-Aug-21	4-Oct-21

Stage 10 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A		SET TOWER SPANS AT PIERS 2 AND 3												
	A27710 A24540	Preassemble Tower Span - Pier 2/ Erect Tower Span - Pier 2	n/a	n/a	n/a	Crane Barge with Spuds 200'x74' Material Barge 100' x 30' Crane on platform 200 Ton	150	1	n/a	D	10 HRS/ DAY 6 DAYS/WK	Pre-Assembling Spans	24-Apr-21	23-Oct-21
	A27720 A25800	Preassemble Tower Span - Pier 3/ Erect Tower Span - Pier 3	n/a	n/a	n/a	Crane on platform 300 Ton Man-lift 60 Ft Track Excavator 40 – 80 Ton Aluminum Work Boat / Push Boat	105	1	n/a	D	10 HRS/ DAY 6 DAYS/WK	Pre-Assembling Spans	7-Apr-21	12-Aug-21
B		SET APPROACH SPANS AT PIERS 2 AND 4												
	A27730 A23390	Preassemble Span 1 - Southside / Erect Span 1 - Southside	n/a	n/a	n/a	Crane Barge with Spuds 200'x74' Material Barge 100' x 30' Crane on platform 200 Ton Crane on platform 300 Ton Man-lift 60 Ft Track Excavator 40 – 80 Ton Aluminum Work Boat / Push Boat	24 12	1	n/a	D	6 dys/wk 10 hrs/dy	Pre-Assembling Spans	18-Jan-22	7-Feb-22
	A27740 A23410	Preassemble Span 2 - Southside / Erect Span 2 - Southside	n/a	n/a	n/a		24 12	1	n/a	D		Pre-Assembling Spans	9-Jul-21	9-Oct-21
	A27750 A23470	Preassemble Span 4 - Southside/ Erect Span 4 - Southside	n/a	n/a	n/a		24 12	1	n/a	D		Pre-Assembling Spans	7-Apr-21	2-Aug-21

Section 7 Consultation and EFH Assessment Processes for Walk Bridge

Stage 11 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T-Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A		INSTALL CONCRETE DECKS & WALKWAYS AT APPROACH SPANS 2 AND 4												
	A23480	Set precast deck span 4 Southside	Deck Panels Closure Pours	7 8	EA EA	C3, BGC, BGM, BGW, C2, M60,E48,VW, VP	24	2	1	D	6 day (8 hours per day)	Erect From Platform	23-Oct-21	5-Nov-21
	A23420	Set precast deck span2 Southside	Deck Panels Closure Pours	6 7	EA EA		24	2	1	D		Erect From Platform	3-Mar-22	16-Mar-22
B		INSTALL SUPPORT, STRINGERS, BRACING & RAIL SYSTEM												
	A23630	A23630 Install New Slide Rails at Pier 2 and 3 - Southside - East	n/a	n/a	n/a	C3, BGC, BGM, BGW, C2, M60,E48,VW, VP, HP, HV	24	n/a	n/a	D	6 day (8 hours per day)	Erect From Platform		
	A23630	A23630 Install New Slide Rails at Pier 2 and 3 - Southside - West	n/a	n/a	n/a		24	n/a	n/a	D		Erect From Platform	14-Apr-22	13-Jun-22

Stage 12 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A25580	INSTALL TEMPORARY PILES, PILE CAPS, GIRDERS, BRACING AND RAILS FOR SLIDING - Existing Bridge	14" Steel Template Piles	16	EA	BGC, BGM, C2, M60, VW, VP, HP, HV	20	4	2	D	6 days /week 8 Hrs/day	Bubble Curtain	21-Jul-22	17-Aug-22
			14" Steel H Piles	56	EA									
	L11220	Close both navigation channels and install piling, support steel and rails for swing span slide out. (OPEN SWING SPAN AS NEEDED TO INSTALL PILING BENEATH IT).	n/a	n/a	n/a	n/a	36	2	2	D		n/a	21-Jul-21	17-Aug-22
B	A23690	FLOAT LIFT SPAN INTO PLACE AND TRANSFER SPAN ONTO SLIDING RAILS	n/a	n/a	n/a	3-VT, 2-VP, 2-BGF	6	1	1	D	6 days / week 10 hours / days	n/a	8-Jul-22	14-Jul-22

Stage 13 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A23770	96Hr Outage - Demo Existing Swing Span Approach Steel & Prep for Slide	n/a	n/a	n/a	Cranes 300 Ton Material Barge 100'x30' Work Barge 40'x40' Man-lifts 60 Ft Aluminum Work Boat / Push Boat	1	4	2	D	1 day (24 hours per day)	Catch Barges	18-Aug-22	18-Aug-22
B C	A26220	96Hr Outage - Slide Existing Swing Span out & New Southside Lift Span In	n/a	n/a	n/a		2	4	2	D	2days (24 hours per day)	n/a	20-Aug-22	21-Aug-22
	A26230	96Hr Outage - Make Final Track, OCS, & C&S Connections & Test Track	n/a	n/a	n/a		1	4	2	D	1 day (24 hours per day)	n/a	22-Aug-22	22-Aug-22
	A26440	MNRR to Perform Required Testing prior to Activation	n/a	n/a	n/a		1	n/a	n/a	D	1 day (24 hours per day)	n/a	23-Aug-22	23-Aug-22
D	A27800	Begin construction north lift span at marine staging yard and continue until float-in.	n/a	n/a	n/a	Cranes 200 Ton Material Barge 100x30 Delivery Barges Varies Man-lifts 60 Ft	180	1	Material Delivery Barges = 2 lds / Month	D	6 days (8 hours per day)	n/a	27-Sep-22	9-May-23

Section 7 Consultation and EFH Assessment Processes for Walk Bridge

Stage 14 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T-Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A26260	DEMOLISH EXISTING SWING SPAN FROM EXISTING PLATFORMS	n/a	n/a	n/a	300 Ton Crane Material	10	4	n/a	D	6 DAYS / WEEK --- 10 HRS/DAY	Catch Barges	15-Sep-22	26-Sep-22
B	A26260	INSTALL TEMPORARY SUPPORTS FOR APPROACH SPANS 2 AND 4 DEMOLITION	Shoring Towers	6	EA	Barge 100x30, Track	10	n/a	n/a	D		Work Low Tide	15-Sep-22	26-Sep-22
C	A23760	Remove Existing Approach Superstructure - Span 3 - Tracks 1 & 3	n/a	n/a	n/a	Excavator 60 ton, 36"	6	4	n/a	D		n/a	21-Sep-22	27-Sep-22
C	A23750	Remove Existing Approach Superstructure - Span 2 - Tracks 1 & 3	n/a	n/a	n/a	Hydraulic Shear, 25k ft-lb	30	4	n/a	D		n/a	21-Sep-22	25-Oct-22
C	A27910	Transport & Process Superstructure - Span 1 - Tracks 1 & 3	n/a	n/a	n/a	Hydraulic Hammer	6	n/a	n/a	D		n/a	26-Oct-22	1-Nov-22
C	A27920	Transport & Process Superstructure - Span 3 - Tracks 1 & 3	n/a	n/a	n/a		6	4	n/a	D		Catch Barges	2-Nov-22	8-Nov-22
C	A27930	Transport & Process Superstructure - Span 2 - Tracks 1 & 3	n/a	n/a	n/a	4 CY Loader,	6	n/a	n/a	D		n/a	9-Nov-22	15-Nov-22
C	A23780	Remove Remaining Swing Span Sections to Platform for Demo	n/a	n/a	n/a	Work Boat,	5	4	n/a	D	6 day (8 hours per day)	Catch Barges	9-Sep-22	14-Sep-22
D		Remove Old Power & Control Cables (150 Ft x 20 Ft) Avg Depth =4Ft	Dredge Soils AREA	475 560	CY SY	Push Boat BCS	15	1	n/a	D	6 day (8 hours per day)	Catch Barges	15-Dec-22	15-Jan-23

Section 7 Consultation and EFH Assessment Processes for Walk Bridge

Stage 15 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T-Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A26300 A26450	Remove Temporary Fender from around Pivot Pier/ - Remove Slide Rails North of Bridge/ - Remove Slide Rails South of Bridge/	Remove 14" Steel H Piles	72	EA	Cranes 300 Ton Crane Barge w/ Spuds 200 x 74 Material Barge 100x30 Work Barge 40' x 40' Impact and vibratory hammers Excavator Hydraulic Crane 80 Ton Man-lifts 60 Ft BCS	50	4	n/a	D	6 dy/wk 10 hrs/ dy		22-Aug-22	28-Dec-22
B / C		Install marine enclosures around river piers and demolish pivot pier and both rest piers.												
B / C	A23840 & A23860	EXISTING PIERS 2 & 3 Marine Enclosure Template piles	14" Steel H Piles	22	EA		40	4	n/a	D	6 day (10 hours per day)	Marine Enclosure	29-Dec-22	9-May-23
		Install Marine Enclos. Sheeting Existing Piers 2 & 3	Pz35 Sheetpiles	124	Dbls			4	n/a	D		n/a		
	A23850 & A23870	Demolish Existing Piers 2 and 3 (2000 SF Each)	Stone/Conc	1320	CY		24	6	2/wk to Devine 1.3 Miles	D		Marine Enclosure		
	A26330 & A26310	Remove Marine Enclosure at Piers 2 and 3	Pz35 Sheetpiles	124	Dbls		26	2	n/a	D		n/a		
		Remove Template Piles- Piers 2 and 3	14" Steel H Piles	22	EA			4	n/a	D		n/a		
B / C	A23880	EXISTING PIVOT PIER - Marine Enclosures-Template Piles	14" Steel H Piles	22	Piles		32	4	n/a	D		Silt Curtain	29-Sep-22	24-Jan-23
		Pivot Pier-Marine Enclosure - Install Sheets	Pz35 Sheetpiles	88	Dbls			4	n/a	D		Silt Curtain		
	A23890	Pivot Pier-Marine Enclosure - Demo (5000 SF)	Stone/Conc	3275	CY		60	6	2/wk to Devine 1.3 Miles	D		Silt Curtain		
	A26320	Pivot Pier-Marine Enclosure - Remove Sheets	Pz35 Sheetpiles	88	Dbls		18	2	n/a	D		n/a		
		Remove template Pile - Pivot Pier						4	n/a	D		n/a		
	A30160	Dredge channel to final depth round Pivot Pier (Area includes 200 feet around the pivot x Pier 14 feet wide) Depth = 14 Feet	Soils Area	1550 320	CY SY		30	4	n/a	D		Silt Curtain		
D	A30170	Remove submarine cables for CP243 Average (200 feet x 12 feet x 8 feet)	Soils	725	CY		15	8	n/a	D		Silt Curtain	9-Jan-24	15-Jan-24
E	A30180 & A30190	Modify Southeast and Southwest Work Platforms for Installation of Fenders	n/a	n/a	n/a	300 Ton Crane on Platform, Work Barge, Material Barge, Impact Hammer, Vibratory Hammer	50	n/a	n/a	n/a		n/a	13-Oct-22	13-Dec-22
	A30200 & A30210	Install South East Fender System Install South West Fender System	14" Steel H Template Piles	10	EA			5	n/a			n/a		
			14" Diameter Composite Fender Piles	60	EA			5				n/a		
F	A26410 & A26430	Excavation and demo of the East Abutment	n/a	n/a	n/a	Track Excavator 40-80TN	20	n/a	n/a	D	D	Debris Shield	12-Oct-22	14-Nov-22

Stage 16 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A26510	Form & Rebar Pedestals for Lift Pier 3 - Northside	n/a	n/a	n/a	Cranes 300 Ton Crane on Barge 200 Ton Crane Barge w/ Spuds 200x74 Material Barge 100x30	36	4	n/a	D	6 day /wk 10 hours /day	Debris shield aournd perimeter	28-Sep-22	8-Nov-22
	A26520	Place Pedestals for Lift Pier 3 - Northside	n/a	n/a	n/a									
	A26530	Cure Pedestals for Lift Pier 3 - Northside	n/a	n/a	n/a									

Stage 17 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T-Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A27800 A27820	CONTINUE CONSTRUCTION ON THE NORTH LIFT SPAN	n/a	n/a	n/a	Cranes 200 Ton Material Barge 100x30 Delivery Barges Varies Man-lifts 60 Ft	n/a	n/a	n/a	D	6 Days/ Week --- 10 Hours/Day	n/a	27-Sep-22	9-May-23
B	A24220 & A26630	Construction of New East Abutment	n/a	n/a	n/a	Track Excavator 40TN Crane 200TN	65	n/a	n/a	D	6 Days/ Week --- 10 Hours/Day	Debris Shield	21-Jan-23	11-Apr-23

Stage 18 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	Days Used	On Site Daily	Off Site				Early Start	Early Finish
A	A28070 A26730	SET PIER 2 TOWER SPANS NORTHSIDE	Tower Spans	2	EA	300 ton Crane -Platform 200 Ton Crane-Barge Material Barge 100x30 Crane Barge w/ Spuds Manlift 60 Ft	10	1	n/a	D	6 days / week 10 hours / day	n/a	7-Mar-23	27-Mar-23
	A30340 A30360	SET PIER 3 TOWER SPANS NORTHSIDE	Tower Spans	2	EA		10	1	n/a	D		n/a	11-Sep-22	2-Dec-22
B	A27840 A24250	Preassemble Span 2-Northside Erect Span 2 - Northside	n/a	n/a	n/a	300 ton Crane -Platform 200 Ton Crane-Barge Material Barge 100x30 Crane Barge w/ Spuds Manlift 60 Ft	24	1	n/a	D	6 days / week 10 hours / day	n/a	7-Mar-23	12-Apr-23
	A27870 A24310	Preassemble Span 4 - Northside Erect Span 4 - Northside	n/a	n/a	n/a		24	1	n/a	D		n/a	04-Apr-23	26-Apr-23

Stage 19 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A24260	Set & Secure Precast Deck Slab & Curb - Span 2 - Northside	Deck Panels Closure Pours	7 8	EA EA	Crane 300 Ton Cranes 200 Ton Crane 80 Ton Excavator 40 Ton Man-lifts 60 Ft	24	2	n/a	D	6 days / week ----------10 hours / day	n/a	13-Apr-23	26-Apr-23
A	A24230	Set & Secure Precast Deck & Curb - Span 4 - Northside.	Deck Panels Closure Pours	6 7	EA EA		24	2	n/a	D		n/a	9-May-23	22-May-23

Stage 20 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A	A24490	Float Northside Lift Span to Northside of Bridge	n/a	n/a	n/a	Float-in Barge 90'x180' Crane 175 Ton Man-lift 60 Ft Aluminum Work Boat	2	1	1	D/N	6 days/week, 10 hours / day	n/a	8-Jul-23	10-Jul-23
	A24500	Prep Northside Lift Span for Installation & Jack Up to Required Float In Elevation	n/a	n/a	n/a		5	n/a	n/a	D/N		n/a	11-Jul-23	15-Jul-23

Stage 21 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T- Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
A		Float new north lift span into place												
		CLOSE CHANNEL TO MARINE TRAFFIC AND MOVE THE NORTH LIFT SPAN FROM THE NORTHEAST PLATFORM TO IT'S FINAL POSITION.												
	A24480	Float-In & Secure Northside Lift Span	n/a	n/a	n/a	Tug Boats Aluminum Work Boat Push Boats Hydraulic Jacks	2	2	n/a	D/N	7 days/ week, 10 hours / day	n/a	17-Jul-23	18-Jul-23
	A26800	Activate New Northside Lift Span	n/a	n/a	n/a		5	2	n/a	D		n/a	19-Jul-23	24-Jul-23
	A30250	Make Final Mechanical & Electrical Connections for Lift Span - Northside	n/a	n/a	n/a		5	2	n/a	D		n/a	19-Jul-23	24-Jul-23
	A30260	Connect Counterweight Ropes to Lift Span - Northside	n/a	n/a	n/a		2	2	n/a	D		n/a	19-Jul-23	20-Jul-23
	30670	Release Counterweight & Tension Ropes Prior to Operation - Northside	n/a	n/a	n/a		3	2	n/a	D		n/a	21-Jul-23	24-Jul-23
	A30270	Perform Final Alignment & Balancing of Lift Span - Northside	n/a	n/a	n/a		20	n/a	n/a	D		n/a	25-Jul-23	16-Aug-23
	A30280	Commission Lift Span - Northside	n/a	n/a	n/a		10	n/a	n/a	D		n/a	17-Aug-23	28-Aug-23
	A26840	Make Final Track, OCS, & C&S Connections & Test Track s 1 & 3	n/a	n/a	n/a		1	n/a	n/a	D		n/a	8-Dec-23	8-Dec-23

Section 7 Consultation and EFH Assessment Processes for Walk Bridge

Stage 22 - CMJV Draft Estimate 30%

	ACTIVITY		MATERIALS			EQUIPMENT		BARGE MOVES		Shift D-Day, N-Night T-Tide	Daily Intensity [days/wk] [hour/day]	Possible Mitigation	SCHEDULE	
Staging Task	Activity ID	Task	Item	Qty	Units	Equipment/ Vessels Used (SEE CODES BELOW)	DAYS USED	On Site Daily	Off Site				Early Start	Early Finish
	A30300	Modify NE Work Platform for Installation of the Northeast Fender (No in-water Work)	n/a	n/a	n/a	Crane Barge with Spuds 200x74 Material Barge 100' x 30' Work Barge 40' x 40' Excavator 40 ton Crane 200 Ton Man-lift 60 Ft Hydraulic crane 80 Ton Aluminum Work Boat Vibratory pile hammer	10	n/a	n/a	D	6 day (8 hours per day)	n/a	19-Jul-23	29-Jul-23
	A30320	Install North East Fender System	14" Composite Pipe Piles 14" H Piles	30 7	EA EA		20	4	n/a	D		Bubble Curtain	31-Jul-23	22-Aug-23
	A24510	Remove Trestle & Piles - NE	30'' Pipe Piles	66	EA		56	2	n/a	D		Bubble Curtain	23-Aug-23	28-Oct-23
			24" Pipe Piles	6	Ea		56	2	n/a	D		Bubble Curtain	23-Aug-23	28-Oct-23
			14" Steel H Piles	20	Ea		56	2	n/a	D		Bubble Curtain	23-Aug-23	28-Oct-23
	A30740	Perform Restoration - NE	n/a	n/a	n/a		36	n/a	n/a	D		n/a	22-Nov-23	11-Jan-24
	A30310	Modify NW Work Platform for Installation of the North West Fender (No in-water Work)	n/a	n/a	n/a		10	n/a	n/a	D		n/a	31-Jul-23	10-Aug-23
	A30330	Install North West Fender System	14" Composite Pipe Piles 14" H Piles	30 7	EA EA		20	4	n/a	D		Bubble Curtain	23-Aug-23	16-Sep-23
	A24530	Remove Trestle & Piles - NW	30'' Pipe Piles	32	EA		56	2	n/a	D		Bubble Curtain	22-Nov-23	11-Jan-24
			24" Pipe Piles	4	Ea		56	2	n/a	D		Bubble Curtain	22-Nov-23	11-Jan-24
			14" Steel H Piles	20	Ea		56	2	n/a	D		Bubble Curtain	22-Nov-23	11-Jan-24
	A30730	Perform Restoration - NW	n/a	n/a	n/a		36	n/a	n/a	D		n/a	12-Jan-24	24-Feb-24
	A30760	Perform Wetland Mitigation - NW	n/a	n/a	n/a		15	n/a	n/a	D		n/a	12-Jan-24	29-Jan-24
	A24520	Remove Trestle & Piles - SE	30'' Pipe Piles	77	EA		56	2	n/a	D		Bubble Curtain	1-Dec-22	10-Feb-23
			24" Pipe Piles	6	Ea		56	2	n/a	D		Bubble Curtain	23-Aug-23	28-Oct-23
			14" Steel H Piles	20	Ea		56	2	n/a	D		Bubble Curtain	23-Aug-23	28-Oct-23
	A30720	Perform Restoration - SE	n/a	n/a	n/a		36	n/a	n/a	D		n/a	11-Feb-23	27-Mar-23
	A24580	Remove Trestle & Piles Span - SW	30" Pipe Piles	128	EA		48	2	n/a	D		Bubble Curtain	21-Apr-23	17-Jun-23
	A24580	Remove Trestle & Piles Span - SW	30'' Pipe Piles	41	EA		48	2	n/a	D		Bubble Curtain	21-Apr-23	17-Jun-23
			24" Pipe Piles	6	Ea		48	2	n/a	D		Bubble Curtain	21-Apr-23	17-Jun-23
			14" Steel H Piles	20	Ea		48	2	n/a	D		Bubble Curtain	21-Apr-23	17-Jun-23
			PZ35 Sheetpiles	43	Dbls		48	2	n/a	D		Bubble Curtain	21-Apr-23	17-Jun-23
	A30710	Perform Restoration - SW	n/a	n/a	n/a		36	n/a	n/a	D		n/a	19-Jun-23	31-Jul-23
	A30750	Reverse Vessel Relocation - SW	n/a	n/a	n/a		15	4	n/a	D		n/a	19-Jun-23	6-Jul-23
	A30680	Remove Trestle & Piles Span - Storage Yard	24" Pipe Piles Sheets 14" H Piles	32 58 32	EA Dbls EA		48	2	n/a	D		Bubble Curtain	28-Jul-23	23-Sep-23
		Install permanent bulkhead along marine staging yard	PZ35 Sheetpiles	80	Dbls		30	n/a	n/a	D		Bubble Curtain	28-Jul-23	1-Oct-23
	A30700	Perform Restoration - Storage Yard	n/a	n/a	n/a		36	n/a	n/a	D		n/a	25-Sep-23	4-Nov-23
		Remove Old Signal & Control Cables (250 Ft x 20 Ft) Avg Depth =4Ft	Dredge Soils AREA	800	560 CY SY		15	1	n/a	D	6 day (8 hours per day)	Catch Barges	15-Dec-22	15-Jan-23

EQUIPMENT		
Code	**Type**	**Description**
BCS	Buckets	Clam Shell Bucket
BE	Buckets	Digging Bucket
BGC	Barge	Crane Barge w/ Spuds 200 x 74
BGD	Barge	Delivery Barges
BGF	Barge	Float-in Barges 90 x 180
BGK	Barge	Deck Barge 100 x 30
BGM	Barge	Material Barge 100 x 30
BGW	Barge	Work Barge 40x40
C175	Crane	175 Ton Crane
C2	Crane	Crane 200 Ton
C2B	Crane	200 Ton Crane on a Barge
C3	Crane	Crane 300 Ton on Platform
CH80	Crane	80 Hydraulic Crane
DEH	Demo Equipment	Hydraulic Hammer
DES	Demo Equipment	Hydraulic Shear
DLH	Drill	Drill Low Headroom
E30	Excavator	Excavator 30 Tons
E46	Excavator	Track Excavator 40-60 Ton
E48	Excavator	Track Excavator 40-80 Ton
ELR	Excavator	Excavator Loader Rubber Tired
HE	Hammer	Hammer / Extractor
HP	Hammer	Pile Impact Hammer
HV	Hammer	Vibratory Hammer
JH	Jacks/Lifts	Hydraulic Jacks
L4	Loaders	Loader 4 CY
M60	Lifts	Manlift 60 Ft
OSC	Oscillator	Hydraulic Oscillator
PC	Concrete Pump	Concrete Pump
TT	Truck	Triaxle Truck
VP	Vessel	Push Boat
VT	Vessel	Tug Boat
VW	Vessel	Work Boat

Attachment F – Tidal Wetland Creation and Planting Specifications

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ITEM #0948013A – TIDAL WETLAND CREATION

Description:

The work shall consist of the construction of a Tidal Creation, Tidal Restoration or Tidal Enhancement area ("mitigation area") at the site(s) identified on the Tidal Wetland Mitigation Plans. The work generally consists of excavating, backfilling, and preparing appropriate site grades under the direction of an Environmental Inspector from the Connecticut Department of Transportation's Office of Environmental Planning (OEP).

Materials:

Planting Soil : Natural or manmade planting substrate or topsoil may be used, which shall consist of soils containing ***no less than*** 75% sand by weight and an organic content no less than 10% and no more than 15%. The soil must be analyzed by USDA-approved methodology for organic matter by loss-on-ignition of oven-dried samples dried at 105 degrees centigrade. The mineral fraction must be analyzed to determine weight percentage of sand, as determined after passing a 2-millimeter (mm) sieve. Sand particles are defined to be between 0.05 and 2.0 mm in diameter. The topsoil must be free of seeds and roots of invasive species and inspected and approved by the Connecticut Department of Transportation Office of Environmental Planning (CT DOT OEP) prior to its application.

Planting soil not furnished by the Contractor shall be native soil material from areas free of invasive species stripped from permitted earth excavation areas within the project limits if it meets the criteria described above and the Certified Material test results are approved by OEP. If these soils do not meet the criteria, additional make-up material from off-site areas may be substituted or mixed with the on-site project material provided the resultant soil composition meets the applicable criteria. Clean leaf compost is the preferred soil amendment to achieve the organic content criteria. If other soil amendments are more readily available than clean leaf compost they can be used to meet the requirement for organic content.

The soils must be analyzed by USDA-approved methodology for organic matter by loss-on-ignition of oven-dried samples dried at 105 degrees centigrade. The mineral fraction must be analyzed to determine weight percentage of sand, as determined after passing a 2-millimeter (mm) sieve. Sand particles are defined to be between 0.05 and 2.0 mm in diameter. Certified Materials Test results are to be submitted to OEP for approval. The soils must be free of seeds and roots of invasive species and inspected and approved by OEP prior to their application.

If soil must be supplemented with organic material, the following sources are acceptable but must meet the specification of planting soil described above:

a) **Native Wetland Soil:** The top layer of native wetland soil excavated from within the project limits or from another permitted wetland source. The bottom of this layer shall be defined as the depth at which the soil color and texture changes, indicating the beginning

of the subsoil. Each source must be inspected in place at least 6 months prior to excavation and determined by OEP to be free from seeds and roots of invasive species.

b) Compost: Compost shall meet the requirements of **Subarticle M.13.06 – Compost.**

c) Peat: Peat shall meet the requirements of **Subarticle M.13.07 – 13 – Peat.** Peat material excavated from the project site may be substituted for commercially packaged peat, at the discretion of the Engineer, if the on-site peat meets all the requirements of the specification.

Backfill: Backfill used in the Tidal Wetland Mitigation Area shall be native or manmade material. Backfill shall consist of soils meeting the textural classification of silt loam and consist of greater than 50% silt; the percentage of clay is typically less than 25%. The soils must be analyzed by USDA-approved methodology. The mineral fraction must be analyzed to determine the particle gradation to meet the above textural requirement. Certified Materials Test results are to be submitted to OEP for approval. The soils must be free of seeds and roots of invasive species and inspected and approved by OEP prior to their use and application.

Construction Methods:

An Environmental Inspector from OEP will be on-site to monitor construction of the Tidal Wetland Mitigation Area(s) to ensure compliance with the Tidal Wetland Mitigation Plans.

The Contractor shall submit a construction schedule and an outline of construction methodologies for the required earthwork of the tidal wetland creation site according to the general construction sequence and requirements outlined below to OEP for approval. No work associated with the Wetland Mitigation Area(s) shall commence until OEP approval is granted. OEP shall have 30 days from the date the submission is received from District Construction to review and approve the submission. The Contractor must schedule wetland creation activities to begin as soon as access allows. There shall be no inactive period of longer than 10 days between the beginning of the excavation of the mitigation site and the time which final grades are reached. When applicable, and when conditions warrant, excavation and final grading shall be completed during and near times of low tide only unless the work area is contained and isolated from tidal action. The excavation, final grading, seeding and planting shall be scheduled so that planting will occur within an approved planting season. Upon completion of final grades, the site shall be exposed to tidal flushing for a minimum of 7 days and a maximum of 14 days to allow for settlement of the planting soil and to evaluate final grades. At the end of the first 7 days, the site conditions will be evaluated by an Environmental Inspector from OEP. Adjustments to final grades or additional placement of planting soil may be made at this time. Planting of rootstock is to immediately follow the maximum 14 day period.

During the performance of this work, a CT DOT Environmental Inspector from OEP will be available to visit the site to direct the construction activities involved in constructing the wetland creation sites. The Contractor shall arrange through the engineer at least 10 days prior to the commencement of these activities to ensure that the Environmental Inspector is available. OEP reserves the option to adjust the mitigation site Final Grading and Planting Plans to ensure mitigation site success. During Planting, a qualified wetland professional (or OEP Environmental Inspector) may relocate up to 50% of the plants in each community type if as-

built conditions would pose and unreasonable threat to the survival of plantings installed according to the planting plan. The plantings shall be relocated to locations with suitable hydrology and soils and where appropriate structural context with other plantings can be maintained.

(a) Upon the review and approval of the Contractors Mitigation Plan submittal, meet with OEP Environmental Inspector in the field prior to on-site mobilization for the wetland mitigation work.

(b) Identify temporary stockpile and staging locations.

(c) Verify and delineate established Limit of Disturbance in the field. Prior to excavation or placing of planting soil or backfill, set reference stakes for site-specific tidal data at the mitigation site in order to establish appropriate elevations for final grading as directed by OEP staff. (CJL, HTL, MHW, MLW and other jurisdictional limits as may be required by permit)

1. Obtain (survey) elevation of existing tidal vegetation and stake in field as directed by OEP.

(d) Install temporary sedimentation and erosion control measures.

(e) Remove nuisance vegetation and all invasive plant species in accordance with Item #0952051A – CONTROL AND REMOVAL OF INVASIVE VEGETATION.

(f) Identify, clear, grade, and construct any required haul road(s) if necessary. Construct haul roads in a manner that minimizes disturbance to existing vegetation. No additional impacts may occur to the existing tidal wetland vegetation other than already depicted on the plans as a result of access Haul roads are to be maintained throughout the duration of the project and haul road locations restored back to their original condition.

(g) Excavate mitigation site to a depth of at least 3 feet below proposed finished grade, following sequence and methods noted on the Grading Plan and as directed by an Environmental Inspector from OEP. Where Phragmites is present, excavation shall be to a sufficient depth to remove all roots of Phragmites and will be directed by OEP.

(h) If, during over excavation, wood debris, rubbish, or other bulky debris are encountered, the materials shall be removed and backfill placed in the resulting excavation to meet subgrade. Materials shall be removed from the wetland mitigation areas and transported to an approved upland facility. Disposal of such materials will be paid for under Item #0101135A – DISPOSAL OF DEBRIS.

(i) Backfill, as defined in the Materials section above, shall be placed in over excavated areas to meet the proposed sub-grade as required.

(j) Place tested and approved Planting soil over approved subgrade to a minimum depth of 24 inches in the locations and to the final grades shown on the Mitigation plan and in a manner consistent with specification of the Mitigation Plan and as directed by an Environmental Inspector from OEP. Planting soil shall be placed in a manner to avoid compaction of soil.

(k) Following placement of planting soil, re-establish site-specific tidal data (CJL, HTL, MWW, MLW) at the mitigation site and stake in the field in order to establish appropriate elevations for tidal wetland plantings.

(l) Areas beyond the limits of tidal influence are to be seeded in accordance with the seeding schedule of the 816. Prior to seeding, the seed tag shall be supplied to OEP for review and approval. Substitutions must be approved by OEP. Initiate and complete seeding consistent with specification of the Mitigation Plan.

(m) Upon placement of planting soil and approval of the site by OEP, the site shall be exposed to tidal flux for a minimum of 7 days and a maximum of 14 days. At 7 days, OEP will inspect the site and adjustments to final grade or planting soil depths may be made. An additional 7 days of exposure to tidal fluctuation may be recommended by OEP at this time and further adjustments to grade may be made.

(n) OEP shall inspect and approve the mitigation site at the conclusion of the 14 day tidal exposure prior to planting.

(o) Following 14 days of exposure to tidal cycles, planting of rootstock is to commence in accordance with the mitigation site planting plan. During the performance of this work, a CT DOT Environmental Inspector from OEP will be available to visit the site to direct the planting within the wetland mitigation site(s). The Contractor shall arrange through the engineer at least 10 days prior to the commencement of these activities to ensure that the Environmental Inspector is available. Any proposed plant substitutions must be approved in advance by OEP.

(p) Upon stabilization of the site remove temporary sedimentation and erosion control measures. Temporary devices and structures to control erosion and sedimentation in and around the Tidal Wetland Mitigation Area shall be disassembled and properly disposed of. Sediment collected by these devices shall be removed and placed upland in a manner that prevents its erosion and transport to a waterway or wetland, in accordance with Section 1.10, including Best Management Practices.

(q) Restore stockpiling and staging site(s) and access/haul roads to the mitigation site back to their original condition.

(r) Upon site completion clear the mitigation site of any exposed debris, rubbish, garbage, and other manmade litter.

(s) Provide certified post construction as-built plans of the mitigation sites to OEP as defined by the Army Corps of Engineers and/or Office of Long Island Sound Programs (OLISP) permit requirements.

(t) Install Wetland Creation signs as directed by OEP.

Method of Measurement:

Tidal Wetland Creation will be measured for payment by the number of square feet of Tidal Wetland Mitigation Area re-graded, covered with planting soil and backfill and accepted.

Basis of Payment:

The work will be paid for at the contract unit price per square foot for "Tidal Wetland Creation" within the Tidal Wetland Mitigation Area(s), complete in place, including all materials, equipment, maintenance, tools, labor, and work incidental thereto.

The price shall also include: survey and staking of reference elevations and work associated with maintaining the field stakes for the duration of construction to the point of acceptance of the site by OEP; forming subgrade within the Tidal Wetland Mitigation Areas; testing, mixing, and providing backfill and planting soil; placing backfill and planting soil; restoring stockpiling and staging site(s) ; removing and disposing of debris, garbage and litter that may have been generated during construction; and forming subgrade and planting soil within the Wetland Mitigation Areas.

The cost of installing and removing sedimentation and erosion controls, including Sedimentation Control Systems, Anti-tracking Pad, and installation, maintenance, and removal/restoration of haul roads shall be paid for under their respective contract items.

The cost of all excavation will be paid under the contract item, "Earth Excavation".

The cost of all plantings and seeding will be paid for under their respective contract items.

The cost of disposal of wood debris, rubbish, or other bulky debris encountered during excavation of the site shall be paid for under Item #0101135A – DISPOSAL OF DEBRIS.

The cost of installing wetland creation signs (51-1920) will be paid for under Item #1208928A - SIGN FACE - EXTRUDED ALUMINUM (TYPE III REFLECTIVE SHEETING).

The cost of removing invasive species shall be paid for under the contract Item #0952051A CONTROL AND REMOVAL OF INVASIVE SPECIES.

Pay Item	**Pay Unit**
Tidal Wetland Creation	S.F.

PROJECT SPECIFICATION:
TIDAL WETLAND CREATION

rev. 4/29/2015

ITEM #0949875A – WETLAND PLANTINGS

Amend Section 9.49 as follows ***for Wetland Mitigation Area(s) only****:*

Article 9.49.01—Description: *Add the following:*

Work under this item shall also include furnishing, installing, trees, shrubs and herbaceous stock of the type and size indicated in the Mitigation Planting Schedule and Mitigation Planting Plan for the Wetland Mitigation Area(s). Work in the Wetland Mitigation Area(s) will be performed under the direction of an Environmental Scientist from the Connecticut Department of Transportation's Office of Environmental Planning (OEP).

Article 9.49.02—Materials: *Add the following:*

The trees, shrubs and herbaceous stock to be planted within the Wetland Mitigation Area(s) shall be native varieties of those species listed in the Mitigation Planting Schedule of the Mitigation Planting Plan. The Environmental Scientist must approve any species substitutions from the Mitigation Planting Plan a minimum of 30 days in advance and receive regulatory approval of any substitutions prior to health inspection by DOT Landscape Design Unit and delivery to the Site. If substitutions are proposed, the Contractor must provide OEP with documentation from 5 wholesale plant material sources of supply indicating that the species type or size listed in the Mitigation Planting Schedule is not available. No cultivars or hybrids of any species will be allowed as a substitution.

Whenever possible, desirable plants that can be used within the Wetland Mitigation Area(s) as a result from clearing and grubbing operations shall be salvaged for installation in accordance with the requirements detailed in the Clearing and Grubbing special provision.

If backfill material is required within the Wetland Mitigation Area(s) due to over excavation of the Site, as determined by the Environmental Scientist, it shall meet the soil requirements of the Wetland Mitigation or Tidal Wetland Creation special provision.

Article 9.49.03—Construction Methods:

1. **Planting Season:** *Add the following:*

All Plant Material to be Installed in Wetland Mitigation Area(s)
(Including Deciduous and Evergreen)

May 1st to July 1st (inclusive for ***INLAND WETLAND MITIGATION***):
For **inland Wetland Mitigation Area(s),** installation of all trees, shrubs, and herbaceous plantings must be initiated during the spring season following fall final grading and seeding. Upon OEP review and approval of spring Site conditions, planting must be performed and completed within the specified period, or as otherwise directed by the Environmental Scientist.

May 1st to October 15th (inclusive for ***TIDAL WETLAND MITIGATION*****):**

For T**idal Wetland Mitigation Area(s)**, installation of all trees, shrubs, and herbaceous plantings must be initiated after final grade of the Site has settled and has been evaluated for tidal flows during a specified time period provided by the Environmental Scientist. Upon OEP review and evaluation of tidal conditions, planting must be performed and completed within the specified period, or as otherwise directed by the Environmental Scientist.

For inland Wetland Mitigation Area(s) or tidal Wetland Mitigation Area(s), a schedule for planting must be submitted by the Contractor and approved by the Environmental Scientist at least 30 days prior to planting. Plant locations shall be as generally depicted in the planting plan for the Wetland Mitigation Area(s) or as directed by the Environmental Scientist.

3. Field Coordination: *Add the following:*

For Wetland Mitigation Area(s), the Contractor shall submit a Source of Supply per M.13.07-4 to initiate the inspection and approval of all material. The Contractor shall review Site conditions and inform the Environmental Scientist of any conflicts. The Contractor shall coordinate planting layout with the Environmental Scientist for approval.

5. Preparation of Planting Areas: *Add the following:*

For Wetland Mitigation Area(s), planting areas shall be prepared by use of approved tools or machinery. All undesirable invasive species shall be removed in accordance with the requirements detailed in the Control and Removal of Invasive Vegetation special provision. Roots, debris or other obstructions shall be removed from the planting areas. All undesirable material shall be removed from the Site and disposed of by the Contractor in a manner satisfactory to the Engineer.

6. Pit Excavation: *Add the following:*

Plant pits within the Wetland Mitigation Area(s) must be hand dug. Machinery may be allowed for use in limited areas, with prior approval of the Environmental Scientist.

7. Setting Plants: *Add the following:*

All planting within the Wetland Mitigation Area(s) shall meet the following additional requirements:

d. Setting of Herbaceous Stock in Wetland Areas: Herbaceous stock shall be planted within planting cells or clusters, such that individual plants of the same species are grouped together within each cell. The term planting cells refers to the discrete clusters of plants shown on the approved Mitigation Planting Plan. If plant species are not shown planted in discrete clusters, the planting cell is the entire Wetland Mitigation Area(s). Planting cells shall be installed as shown on the plans according to their wetland indicator status or as directed by the Environmental Scientist.

During planting, the Environmental Scientist may relocate up to 50% of the planting cells from the locations shown on the plans to ensure plant survivability in accordance with Army Corps of Engineers Mitigation Guidance. All plants shall be set manually, and any relocated planting cells shall be placed in locations with suitable hydrology and soils, and where appropriate structural context with other planting cells can be maintained, as determined by the Environmental Scientist.

e. Setting of Trees and Shrubs in Wetland Areas: Trees and shrubs shall be installed as shown on the Mitigation Planting Plan or as directed by the Environmental Scientist. The placement of trees and shrubs must be identified in the field and approved by the Environmental Scientist prior to installation and placed according to their wetland indicator status. All trees and shrubs in the Wetland Mitigation Area(s) shall be set so that they are level with the microtopography within the immediate area. For each species of tree or shrub, the number of plants shall be evenly distributed within each planting zone, or as directed by the Environmental Scientist.

During planting, the Environmental Scientist may relocate up to 50% of the planting cells from the locations shown on the plans to ensure the survivability in accordance with Army Corps of Engineers Mitigation Guidance. All plants shall be set manually, and any relocated planting cells shall be placed in locations with suitable hydrology and soils, and where appropriate structural context with other planting cells can be maintained, as determined by the Environmental Scientist.

8. Fertilizing: *Add the following:*

Fertilizing within the Wetland Mitigation Area(s) is strictly prohibited.

10. Guying and Staking: *Add the following:*

For inland Wetland Mitigation Area(s), the guying and staking of deciduous or evergreen trees or shrubs is strictly prohibited with the exception of upland upper buffer or upland riparian shelf areas identified in the Wetland Mitigation Plan. Guying and staking of the identified plants shall meet the requirements as shown on the plans, or as directed by the Environmental Scientist.

For Tidal Wetland Mitigation Area(s), the guying and staking within coastal areas may be required as directed by the Environmental Scientist to stabilize plantings due to tidal flows.

13. Mulching: *Add the following:*

Mulching is strictly prohibited within Inland Wetland Mitigation Site(s) with the exception of upland upper buffer or upland riparian shelf areas identified in the Wetland Mitigation Plan, or as directed by the Environmental Scientist.

Mulching within Tidal Mitigation Site(s) may occur above the Coastal Jurisdictional Limit (CJL) as approved or as directed by the Environmental Scientist.

15. One-Year Establishment Period: *Add the following:*

For Wetland Mitigation Areas:

At the one-year review, the Environmental Scientist will identify, list and quantify dead or rejected plants. The Contractor shall furnish and install new plants as directed by the Environmental Scientist. Dead or rejected plants need not be removed from Wetland Mitigation Area(s).

Add the following at the end of Article 9.49.03:

16. Control and Removal of Invasive Vegetation: The Contractor shall control and eradicate the presence of invasive species within the Wetland Mitigation Area(s) and a minimum of 50 feet around the perimeter of the Wetland Mitigation Area(s) limits. Invasive vegetation removal, if required, shall be as specified in the Control and Removal of Invasive Vegetation special provision.

Article 9.49.04—Method of Measurement:

Add the following ***for Wetland Mitigation Area(s)*** *only:*

Wetland Plantings will be measured for payment as a Contract lump sum item.

Article 9.49.05—Basis of Payment: *Add the following:*

Wetland Plantings will be paid for at the Contract lump sum price for "Wetland Plantings," which price shall include all materials, tools, equipment, labor and work incidental thereto. The Contractor shall submit to the Department a Schedule of payment values for review and comment prior to payment.

Replacement of dead or rejected plants required within 1 year of the initial planting installation will not be measured for payment. The Environmental Scientist will inspect the wetland plants 1 year after initial installation, and determine the number and types of replacement plants to be provided. Forty percent (40%) of the Contract value for this item will be withheld until final acceptance of the mitigation plantings.

Any plants that have been salvaged during clearing and grubbing operations shall be paid for at the Contract unit price as specified in the Clearing and Grubbing special provision.

Pay Item	Pay Unit
Wetland Plantings	l.s.

Attachment M3 – CTDEEP Coordination

Attachment M3-1 – Coordination with Marine Fisheries Program

From: Samorajczyk, Christopher W
To: Sarah Walker
Cc: Joe Grilli; Davis, Andrew H
Subject: Fw: Drilling question
Date: Tuesday, June 16, 2020 10:25:35 AM

CTDEEP Marine Fisheries comments about drilling operations within caisson's behind marine enclosures being discountable below----

Christopher W. Samorajczyk
Wildlife Biologist
Connecticut Department of Transportation
Office of Environmental Planning
Bureau of Policy & Planning
P: 860-594-2938

From: Williams, Bruce
Sent: Wednesday, June 3, 2020 9:29 PM
To: Samorajczyk, Christopher W
Cc: Gephard, Steve; Davis, Andrew H
Subject: RE: Drilling question

Hi Chris,
Many of these same questions are coming up with the proposed replacement of the CT River Amtrak bridge between Old Saybrook and Old Lyme. That project is currently in the permitting phase with construction slated to start in 2022.

Drilling is not a concern during the diadromous TOY, as long as the drilling operations are within caissons behind a marine enclosure.

Bruce

From: Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov>
Sent: Wednesday, June 3, 2020 10:42 AM
To: Williams, Bruce <Bruce.Williams@ct.gov>
Cc: Gephard, Steve <Steve.Gephard@ct.gov>; Davis, Andrew H <Andrew.H.Davis@ct.gov>
Subject: Drilling question

Hi Bruce-
Hope all is well. Quick question on drilling operations----are you concerned with shaft drillings and micro pilling drilling during the diadromous TOY? The question came up during one the reviews on the WALK Bridge replacement project with the Contractor. We have the impact and vibratory restrictions in place for 1/2 hour before sunset to 1/2 hour after sunrise and we

also have the softstart restrictions in place. All drilling operations will be within the caisson behind a marine enclosure. We just wanted to double check with you and see if these construction activities were allowable during the 4/1-6/30 TOY----let me know if you have any questions--talk soon
Thanks, Chris

Christopher W. Samorajczyk
Wildlife Biologist
Connecticut Department of Transportation
Office of Environmental Planning
Bureau of Policy & Planning
P: 860-594-2938

WALK BRIDGE REPLACEMENT
INDEX OF PERMIT PLATES

DRAWING NUMBER	DRAWING TITLE	DRAWING NUMBER	DRAWING TITLE	DRAWING NUMBER	DRAWING TITLE	DRAWING NUMBER	DRAWING TITLE
GEN-1	INDEX OF PERMIT PLATES (SHEET 1 OF 2)	SUM-1	SUMMARY OF IMPACTS (SHEET 1 OF 15)	CA2-1	DUCTBANK INSTALLATION (SHEET 1 OF 4)	CA8-1	SOUTHEAST TRESTLE (SHEET 1 OF 5)
GEN-1A	INDEX OF PERMIT PLATES (SHEET 2 OF 2)	SUM-1A	SUMMARY OF IMPACTS (SHEET 2 OF 15)	CA2-2	DUCTBANK INSTALLATION (SHEET 2 OF 4)	CA8-2	SOUTHEAST TRESTLE (SHEET 2 OF 5)
GEN-2	GENERAL NOTES AND LEGEND	SUM-2	SUMMARY OF IMPACTS (SHEET 3 OF 15)	CA2-3	DUCTBANK INSTALLATION (SHEET 3 OF 4)	CA8-3	SOUTHEAST TRESTLE (SHEET 3 OF 5)
GEN-3	LOCATION PLAN	SUM-3	SITES 1, 2 & 3 STATE (SHEET 4 OF 15)	CA2-4	DUCTBANK INSTALLATION (SHEET 4 OF 4)	CA8-4	SOUTHEAST TRESTLE (SHEET 4 OF 5)
GEN-4	RESOURCE MAP (SHEET 1 OF 2)	SUM-4	SITE 4 STATE (SHEET 5 OF 15)			CA8-5	SOUTHEAST TRESTLE (SHEET 5 OF 5)
GEN-5	RESOURCE MAP (SHEET 2 OF 2)	SUM-5	SITE 5 STATE (SHEET 6 OF 15)	CA3-1	VESSEL RELOCATION (SHEET 1 OF 6)		
GEN-6	FLOOD ZONE MAP	SUM-5A	SITE 7 STATE (SHEET 7 OF 15)	CA3-2	VESSEL RELOCATION (SHEET 2 OF 6)	CA9-1	PIER 2 CONSTRUCTION (SHEET 1 OF 7)
GEN-7	SITE PLAN/KEY MAP	SUM-5B	SITE 8 STATE (SHEET 8 OF 15)	CA3-3	VESSEL RELOCATION (SHEET 3 OF 6)	CA9-2	PIER 2 CONSTRUCTION (SHEET 2 OF 7)
GEN-8	VESSEL BERTHING PLAN OVERALL (SHEET 1 OF 3)	SUM-5C	SITE 9 STATE (SHEET 9 OF 15)	CA3-4	VESSEL RELOCATION (SHEET 4 OF 6)	CA9-3	PIER 2 CONSTRUCTION (SHEET 3 OF 7)
GEN-9	VESSEL BERTHING PLAN WALK BRIDGE (SHEET 2 OF 3)	SUM-6	SITES 1, 2 & 3 FEDERAL (SHEET 10 OF 15)	CA3-5	VESSEL RELOCATION (SHEET 5 OF 6)	CA9-4	PIER 2 CONSTRUCTION (SHEET 4 OF 7)
GEN-10	VESSEL BERTHING PLAN MARINE STAGING YARD (SHEET 3 OF 3)	SUM-7	SITE 4 FEDERAL (SHEET 11 OF 15)	CA3-6	VESSEL RELOCATION (SHEET 6 OF 6)	CA9-5	PIER 2 CONSTRUCTION (SHEET 5 OF 7)
GEN-11	PARCEL MAP (SHEET 1 OF 2)	SUM-8	SITE 5 FEDERAL (SHEET 12 OF 15)			CA9-6	PIER 2 CONSTRUCTION (SHEET 6 OF 7)
GEN-12	PARCEL MAP (SHEET 2 OF 2)	SUM-9	SITE 7 FEDERAL (SHEET 13 OF 15)	CA4-1	MARINE STAGING YARD (SHEET 1 OF 4)	CA9-7	PIER 2 CONSTRUCTION (SHEET 7 OF 7)
		SUM-10	SITE 8 FEDERAL (SHEET 14 OF 15)	CA4-2	MARINE STAGING YARD (SHEET 2 OF 4)		
EP-1	EXISTING CONDITIONS (SHEET 1 OF 9)	SUM-11	SITE 9 FEDERAL (SHEET 15 OF 15)	CA4-3	MARINE STAGING YARD (SHEET 3 OF 4)	CA10-1	PIER 3 CONSTRUCTION (SHEET 1 OF 7)
EP-2	EXISTING CONDITIONS (SHEET 2 OF 9)			CA4-4	MARINE STAGING YARD (SHEET 4 OF 4)	CA10-2	PIER 3 CONSTRUCTION (SHEET 2 OF 7)
EP-3	EXISTING CONDITIONS (SHEET 3 OF 9)	FP-1	FLOODPLAIN IMPACTS (SHEET 1 OF 11)			CA10-3	PIER 3 CONSTRUCTION (SHEET 3 OF 7)
EP-4	EXISTING CONDITIONS (SHEET 4 OF 9)	FP-1A	FLOODPLAIN IMPACTS (SHEET 2 OF 11)	CA5-1	NORTHWEST TRESTLE (SHEET 1 OF 5)	CA10-4	PIER 3 CONSTRUCTION (SHEET 4 OF 7)
EP-5	EXISTING CONDITIONS (SHEET 5 OF 9)	FP-2	FLOODPLAIN IMPACTS (SHEET 3 OF 11)	CA5-2	NORTHWEST TRESTLE (SHEET 2 OF 5)	CA10-5	PIER 3 CONSTRUCTION (SHEET 5 OF 7)
EP-6	EXISTING CONDITIONS (SHEET 6 OF 9)	FP-3	FLOODPLAIN IMPACTS (SHEET 4 OF 11)	CA5-3	NORTHWEST TRESTLE (SHEET 3 OF 5)	CA10-6	PIER 3 CONSTRUCTION (SHEET 6 OF 7)
EP-7	EXISTING CONDITIONS (SHEET 7 OF 9)	FP-4	FLOODPLAIN IMPACTS (SHEET 5 OF 11)	CA5-4	NORTHWEST TRESTLE (SHEET 4 OF 5)	CA10-7	PIER 3 CONSTRUCTION (SHEET 7 OF 7)
EP-8	EXISTING CONDITIONS (SHEET 8 OF 9)	FP-5	FLOODPLAIN IMPACTS (SHEET 6 OF 11)	CA5-5	NORTHWEST TRESTLE (SHEET 5 OF 5)		
EP-9	EXISTING CONDITIONS (SHEET 9 OF 9)	FP-6	FLOODPLAIN IMPACTS (SHEET 7 OF 11)			CA11-1	BARGE MOORING (SHEET 1 OF 5)
		FP-7	FLOODPLAIN IMPACTS (SHEET 8 OF 11)	CA6-1	SOUTHWEST TRESTLE (SHEET 1 OF 5)	CA11-2	BARGE MOORING (SHEET 2 OF 5)
PP-1	PROPOSED CONDITIONS (SHEET 1 OF 9)	FP-8	FLOODPLAIN IMPACTS (SHEET 9 OF 11)	CA6-2	SOUTHWEST TRESTLE (SHEET 2 OF 5)	CA11-3	BARGE MOORING (SHEET 3 OF 5)
PP-2	PROPOSED CONDITIONS (SHEET 2 OF 9)	FP-9	FLOODPLAIN IMPACTS (SHEET 10 OF 11)	CA6-3	SOUTHWEST TRESTLE (SHEET 3 OF 5)	CA11-4	BARGE MOORING (SHEET 4 OF 5)
PP-3	PROPOSED CONDITIONS (SHEET 3 OF 9)	FP-10	FLOODPLAIN IMPACTS (SHEET 11 OF 11)	CA6-4	SOUTHWEST TRESTLE (SHEET 4 OF 5)	CA11-5	BARGE MOORING (SHEET 5 OF 5)
PP-4	PROPOSED CONDITIONS (SHEET 4 OF 9)			CA6-5	SOUTHWEST TRESTLE (SHEET 5 OF 5)		
PP-5	PROPOSED CONDITIONS (SHEET 5 OF 9)	CA1-1	IMAX REMOVAL (SHEET 1 OF 7)			CA12-1	SUBMARINE CABLE REMOVAL (SHEET 1 OF 4)
PP-6	PROPOSED CONDITIONS (SHEET 6 OF 9)	CA1-2	IMAX REMOVAL (SHEET 2 OF 7)	CA7-1	NORTHEAST TRESTLE (SHEET 1 OF 6)	CA12-2	SUBMARINE CABLE REMOVAL (SHEET 2 OF 4)
PP-7	PROPOSED CONDITIONS (SHEET 7 OF 9)	CA1-3	IMAX REMOVAL (SHEET 3 OF 7)	CA7-2	NORTHEAST TRESTLE (SHEET 2 OF 6)	CA12-3	SUBMARINE CABLE REMOVAL (SHEET 3 OF 4)
PP-8	PROPOSED CONDITIONS (SHEET 8 OF 9)	CA1-4	IMAX REMOVAL (SHEET 4 OF 7)	CA7-3	NORTHEAST TRESTLE (SHEET 3 OF 6)	CA12-4	SUBMARINE CABLE REMOVAL (SHEET 4 OF 4)
PP-9	PROPOSED CONDITIONS (SHEET 9 OF 9)	CA1-5	IMAX REMOVAL (SHEET 5 OF 7)	CA7-4	NORTHEAST TRESTLE (SHEET 4 OF 6)		
		CA1-6	IMAX REMOVAL (SHEET 6 OF 7)	CA7-5	NORTHEAST TRESTLE (SHEET 5 OF 6)		
		CA1-7	IMAX REMOVAL (SHEET 7 OF 7)	CA7-6	NORTHEAST TRESTLE (SHEET 6 OF 6)		

SCALE:

DRAWN: T. ADINOLFI

CHECKED: V. ROBBINS

APPROVED: C. BROWN

SIGNATURE BLOCK:

HNTB

HNTB CORPORATION
55 CAPITAL BLVD., 4TH FLOOR
ROCKY HILL, CT 06067
TEL. (860) 257-7327

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

PROJECT TITLE:
WALK BRIDGE REPLACEMENT OVER THE NORWALK RIVER BRIDGE NO. 04288R/MP 41.5

TOWN: **NORWALK**

DRAWING TITLE: **INDEX OF PERMIT PLATES (SHEET 1 OF 2)**

PROJECT NO.: **0301-0176**

DATE: **8-16-19**

DRAWING NO.: **GEN-1**

WALK BRIDGE REPLACEMENT
INDEX OF PERMIT PLATES

DRAWING NUMBER	DRAWING TITLE	DRAWING NUMBER	DRAWING TITLE	DRAWING NUMBER	DRAWING TITLE	DRAWING NUMBER	DRAWING TITLE
CA13-1	SWING SPAN REMOVAL (SHEET 1 OF 7)	CA16-1	WETLAND MITIGATION (MIT-001)				
CA13-2	SWING SPAN REMOVAL (SHEET 2 OF 7)	CA16-2	WETLAND MITIGATION (MIT-002)				
CA13-3	SWING SPAN REMOVAL (SHEET 3 OF 7)	CA16-3	WETLAND MITIGATION (MIT-003)				
CA13-4	SWING SPAN REMOVAL (SHEET 4 OF 7)	CA16-4	WETLAND MITIGATION (MIT-004)				
CA13-5	SWING SPAN REMOVAL (SHEET 5 OF 7)	CA16-5	WETLAND MITIGATION (MIT-005)				
CA13-6	SWING SPAN REMOVAL (SHEET 6 OF 7)	CA16-6	WETLAND MITIGATION (MIT-006)				
CA13-7	SWING SPAN REMOVAL (SHEET 7 OF 7)	CA16-7	WETLAND MITIGATION (MIT-007)				
		CA16-8	WETLAND MITIGATION (MIT-008)				
CA14-1	PIER REMOVAL (SHEET 1 OF 8)	CA16-9	WETLAND MITIGATION (MIT-009)				
CA14-2	PIER REMOVAL (SHEET 2 OF 8)	CA16-10	WETLAND MITIGATION (MIT-010)				
CA14-3	PIER REMOVAL (SHEET 3 OF 8)	CA16-11	WETLAND MITIGATION (MIT-011)				
CA14-4	PIER REMOVAL (SHEET 4 OF 8)	CA16-12	WETLAND MITIGATION (MIT-012)				
CA14-5	PIER REMOVAL (SHEET 5 OF 8)	CA16-13	WETLAND MITIGATION (MIT-013)				
CA14-6	PIER REMOVAL (SHEET 6 OF 8)	CA16-14	WETLAND MITIGATION (MIT-014)				
CA14-7	PIER REMOVAL (SHEET 7 OF 8)	CA16-15	WETLAND MITIGATION (MIT-015)				
CA14-8	PIER REMOVAL (SHEET 8 OF 8)	CA16-16	WETLAND MITIGATION (MIT-016)				
		CA16-17	WETLAND MITIGATION (MIT-017)				
CA15-1	FENDER INSTALLATION (SHEET 1 OF 6)	CA16-18	WETLAND MITIGATION (MIT-018)				
CA15-2	FENDER INSTALLATION (SHEET 2 OF 6)	CA16-19	WETLAND MITIGATION (MIT-019)				
CA15-3	FENDER INSTALLATION (SHEET 3 OF 6)	CA16-20	WETLAND MITIGATION (MIT-020)				
CA15-4	FENDER INSTALLATION (SHEET 4 OF 6)						
CA15-5	FENDER INSTALLATION (SHEET 5 OF 6)	CA17-1	DREDGING OPERATIONS (SHEET 1 OF 7)				
CA15-6	FENDER INSTALLATION (SHEET 6 OF 6)	CA17-2	DREDGING OPERATIONS (SHEET 2 OF 7)				
		CA17-3	DREDGING OPERATIONS (SHEET 3 OF 7)				
		CA17-4	DREDGING OPERATIONS (SHEET 4 OF 7)				
		CA17-5	DREDGING OPERATIONS (SHEET 5 OF 7)				
		CA17-6	DREDGING OPERATIONS (SHEET 6 OF 7)				
		CA17-7	DREDGING OPERATIONS (SHEET 7 OF 7)				
		CA18-1	LIFT SPAN INSTALLATION (SHEET 1 OF 6)				
		CA18-2	LIFT SPAN INSTALLATION (SHEET 2 OF 6)				
		CA18-3	LIFT SPAN INSTALLATION (SHEET 3 OF 6)				
		CA18-4	LIFT SPAN INSTALLATION (SHEET 4 OF 6)				
		CA18-5	LIFT SPAN INSTALLATION (SHEET 5 OF 6)				
		CA18-6	LIFT SPAN INSTALLATION (SHEET 6 OF 6)				

SCALE:

DRAWN: T. ADINOLFI

CHECKED: V. ROBBINS

APPROVED: C. BROWN

SIGNATURE BLOCK:

HNTB

HNTB CORPORATION
50 CAPITOL BLVD., 4TH FLOOR
ROCKY HILL, CT 06067
TEL: (860) 257-7377

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

PROJECT TITLE:
WALK BRIDGE REPLACEMENT
OVER THE NORWALK RIVER
BRIDGE NO. 04288R/MP 41.5

TOWN: NORWALK

PROJECT NO.: 0301-0176

DRAWING TITLE:
INDEX OF
PERMIT PLATES
(SHEET 2 OF 2)

DATE: 8-16-19

DRAWING NO.: GEN-1A

GENERAL NOTES:

1. A SOFT START WILL BE USED AT THE BEGINNING OF EACH SHIFT THAT REQUIRES PILE DRIVING AND EXTRACTION (INCLUDING SHEETPILES), SHAFT DRILLING, AND MICROPILE DRILLING ACTIVITIES WHEN CONDUCTED BETWEEN MARCH 16TH AND OCTOBER 31ST.
2. ALL PILE DRIVING AND EXTRACTION (INCLUDING SHEETPILES) ACTIVITY WILL BE ENCLOSED WITHIN TURBIDITY CURTAINS.
3. ALL PILE DRIVING AND EXTRACTION (INCLUDING SHEETPILES), SHAFT DRILLING, AND MICROPILE DRILLING ACTIVITIES CONDUCTED BETWEEN APRIL 1 AND JUNE 30 WILL ONLY OCCUR BETWEEN ONE HOUR AFTER SUNRISE TO ONE HOUR BEFORE SUNSET.
4. ALL PILE DRIVING AND EXTRACTION (INCLUDING SHEETPILES), SHAFT DRILLING, AND MICROPILE DRILLING ACTIVITIES WILL BE CONDUCTED TO ONLY OCCUPY ONE HALF OF THE RIVER AT A TIME (OR ONLY OCCUPY 50 PERCENT OF THE RIVER WHEN WORKING IN THE MIDDLE).
5. UNCONFINED DREDGING WILL BE CONDUCTED WITHIN TURBIDITY CURTAINS BETWEEN DECEMBER 1 AND JANUARY 31. IF NECESSARY TO DREDGE BETWEEN FEBRUARY 1 AND NOVEMBER 30, DREDGING WILL OCCUR WITHIN A MARINE ENCLOSURE SURROUNDED BY A TURBIDITY CURTAIN.
6. ALL BARGE MOVEMENTS WILL TAKE PLACE DURING SLACK WATER CONDITIONS COINCIDENT WITH HIGH TIDE TO MINIMIZE RIVER BOTTOM DISTURBANCES.
7. HORIZONTAL DATUM IS CT STATE PLANE COORDINATE SYSTEM BASED ON NAD83.
8. VERTICAL DATUM IS NAVD88.
9. AUTHORIZED DREDGE ELEVATION FOR THE FEDERAL NAVIGATION CHANNEL IS EL. -13.98 (NAVD88), 10 FEET BELOW MEAN LOWER LOW WATER.
10. EXISTING BRIDGE FOUNDATION ELEMENTS WITHIN THE NAVIGATION CHANNEL ARE TO BE REMOVED TO A DEPTH AT LEAST 1 FOOT BELOW THE AUTHORIZED DREDGE ELEVATION TO ALLOW FOR ACCIDENTAL OVER-DREDGING.
11. THE FLOOD ZONE MAP ON DRAWING NO. GEN-6 IS BASED ON FLOOD INSURANCE RATE MAP PANEL 0531 (REVISED JULY 8, 2013).
12. THE 100-YEAR FLOOD ELEVATION VARIES THROUGHOUT THE SITE. SEE FLOOD ZONE MAP (DWG. GEN-6) FOR ADDITIONAL INFORMATION.
13. TURBIDITY CURTAINS SHALL BE TYPE III AND COMPLY WITH ITEM #0210306A - TURBIDITY CONTROL CURTAINS.

LEGEND:

VEGETATED TIDAL WETLAND

EROSION AND SEDIMENTATION CONTROL

LIMITS OF RIPRAP

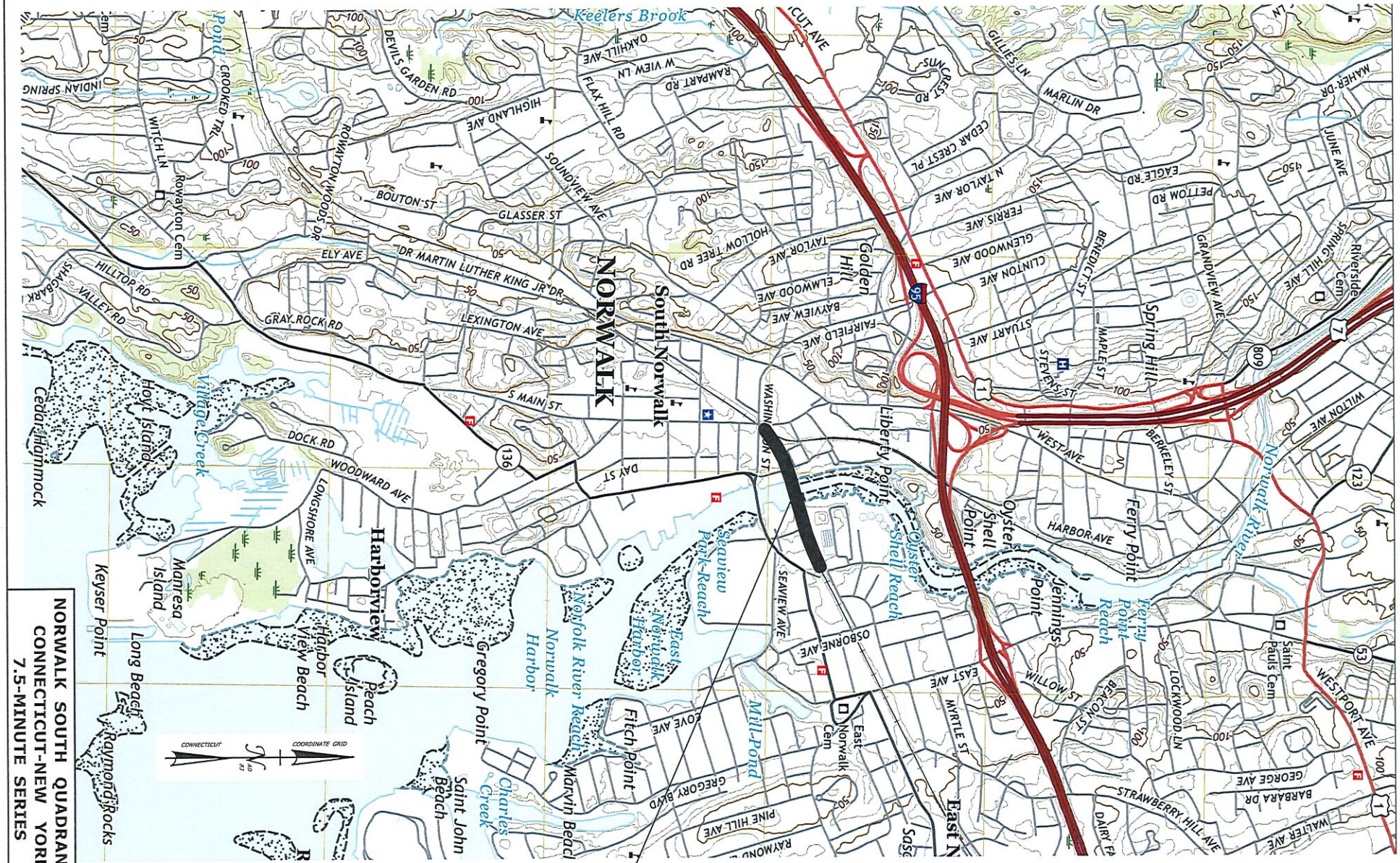
Steve Coppland
CTDEEP Fisheries Division
8-23-19

DETAILED CONSTRUCTION ACTIVITIES:

THESE DRAWINGS INCLUDE SUBSETS THAT DESCRIBE THE SEQUENCE REQUIRED TO PERFORM VARIOUS ACTIVITIES THAT IMPACT REGULATED AREAS WITHIN THE PROJECT LIMITS. THE ORDER IN WHICH THEY ARE PRESENTED IS INTENDED TO CONVEY LOGICAL DEPENDENCIES BETWEEN ACTIVITIES. HOWEVER, IT DOES NOT NECESSSARILY INDICATE THE SEQUENCE OF CONSTRUCTION, AS MANY OF THESE ACTIVITIES WILL OVERLAP THROUGHOUT THE COURSE OF THE PROJECT. SITE CONDITIONS AND BRIDGE PROGRESS ON EACH DRAWING ARE DEPICTED AS THEY WILL LIKELY EXIST AT THE TIME, BUT THEY ARE SUBJECT TO DIFFER BASED ON ACTUAL TIMING OF NOTICE TO PROCEED AND THE OVERALL CONSTRUCTION SCHEDULE, PARTCULARLY FOR ACTIVITIES DIRECTLY TIED TO THE DREDING WINDOW (SEE GENERAL NOTE 5).

NO.	NAME	DESCRIPTION
1	IMAX REMOVAL	REMOVAL OF THE EXISTING IMAX THEATER, SITE IMPROVEMENTS FOR CONSTRUCTION, AND RESTORATION UPON PROJECT COMPLETION
2	DUCTBANK INSTALLATION	CUT AND COVER TRENCHING OPERATION TO BURY CONDUITS FOR FUTURE PULLING OF CONDUCTORS FOR RAIL AND BRIDGE SYSTEMS
3	VESSEL RELOCATION	RECONFIGURATION OF THE VESSEL DOCKS ON THE WEST BANK OF THE RIVER BETWEEN WALK BRIDGE AND STROFFOLINO BRIDGE DURING CONSTRUCTION AND POST-CONSTRUCTION
4	MARINE STAGING YARD	PERMANENT IMPROVEMENTS TO PROPERTIES ON THE WEST BANK OF THE RIVER SOUTH OF STROFFOLINO BRIDGE INTENDED FOR LIFT SPAN ERECTION AND OTHER STAGING ACTIVITIES THROUGHOUT CONSTRUCTION OF WALK BRIDGE
5	NORTHWEST TRESTLE	INSTALLATION AND REMOVAL OF WORK PLATFORMS IN EACH QUADRANT TO BE USED FOR PRIMARY ACCESS TO THE BRIDGE THROUGHOUT CONSTRUCTION
6	SOUTHWEST TRESTLE	
7	NORTHEAST TRESTLE	
8	SOUTHEAST TRESTLE	
9	PIER 2 CONSTRUCTION	MEANS AND METHODS FOR CONSTRUCTION OF THE LIFT SPAN TOWER FOUNDATIONS
10	PIER 3 CONSTRUCTION	
11	BARGE MOORING	MOORING LOCATION IN NORWALK RIVER AND LONG ISLAND SOUND USED FOR CONSTRUCTION BARGES
12	SUBMARINE CABLE REMOVAL	REMOVAL OF THREE EXISTING SUBMARINE CABLES THAT WILL NO LONGER BE USED UPON COMPLETION OF WALK BRIDGE
13	SWING SPAN REMOVAL	SLIDE RAIL SYSTEM INSTALLATION, REMOVAL AND DISASSEMBLY OF THE EXISTING SWING SPAN
14	PIER REMOVAL	REMOVAL OF EXISTING PIERS IN THE RIVER AFTER REMOVAL OF THE SWING SPAN
15	FENDER INSTALLATION	INSTALLATION OF THE PROPOSED FENDER SYSTEM AFTER REMOVAL OF THE EXISTING FENDERS AND REST PIERS
16	WETLAND MITIGATION	TREATMENT AND REMOVAL OF INVASIVE SPECIES, SHORELINE AND SALT MARSH RESTORATION, AND ACCESS REQUIREMENTS
17	DREDGING OPERATIONS	DREDGING PLANS AT THE BRIDGE, VESSEL DOCKS, AND MARINE STAGING YARD.
18	LIFT SPAN INSTALLATION	SLIDE-IN AND FLOAT-IN OPERATIONS FOR INSTALLATION OF THE PROPOSED LIFT SPANS.

SCALE:	DRAWN: H. UPSHAW CHECKED: T. ADINOLFI APPROVED: C. BROWN	SIGNATURE BLOCK: HNTB HNTB CORPORATION 55 CAPITAL BLVD., 4TH FLOOR ROCKY HILL, CT 06067 TEL: (860) 257-7277	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	PROJECT TITLE: WALK BRIDGE REPLACEMENT OVER THE NORWALK RIVER BRIDGE NO. 04288R/MP 41.5	TOWN: NORWALK DRAWING TITLE: GENERAL NOTES AND LEGEND	PROJECT NO.: 0301-0176 DATE: 8-16-19 DRAWING NO.: GEN-2



PROJECT LOCATION

NORWALK SOUTH QUADRANGLE
CONNECTICUT-NEW YORK
7.5-MINUTE SERIES

SCALE:
SCALE 1" = 2000'
0 1000 2000

DRAWN: H. UPSHAW
CHECKED: T. ADINOLFI
APPROVED: C. BROWN

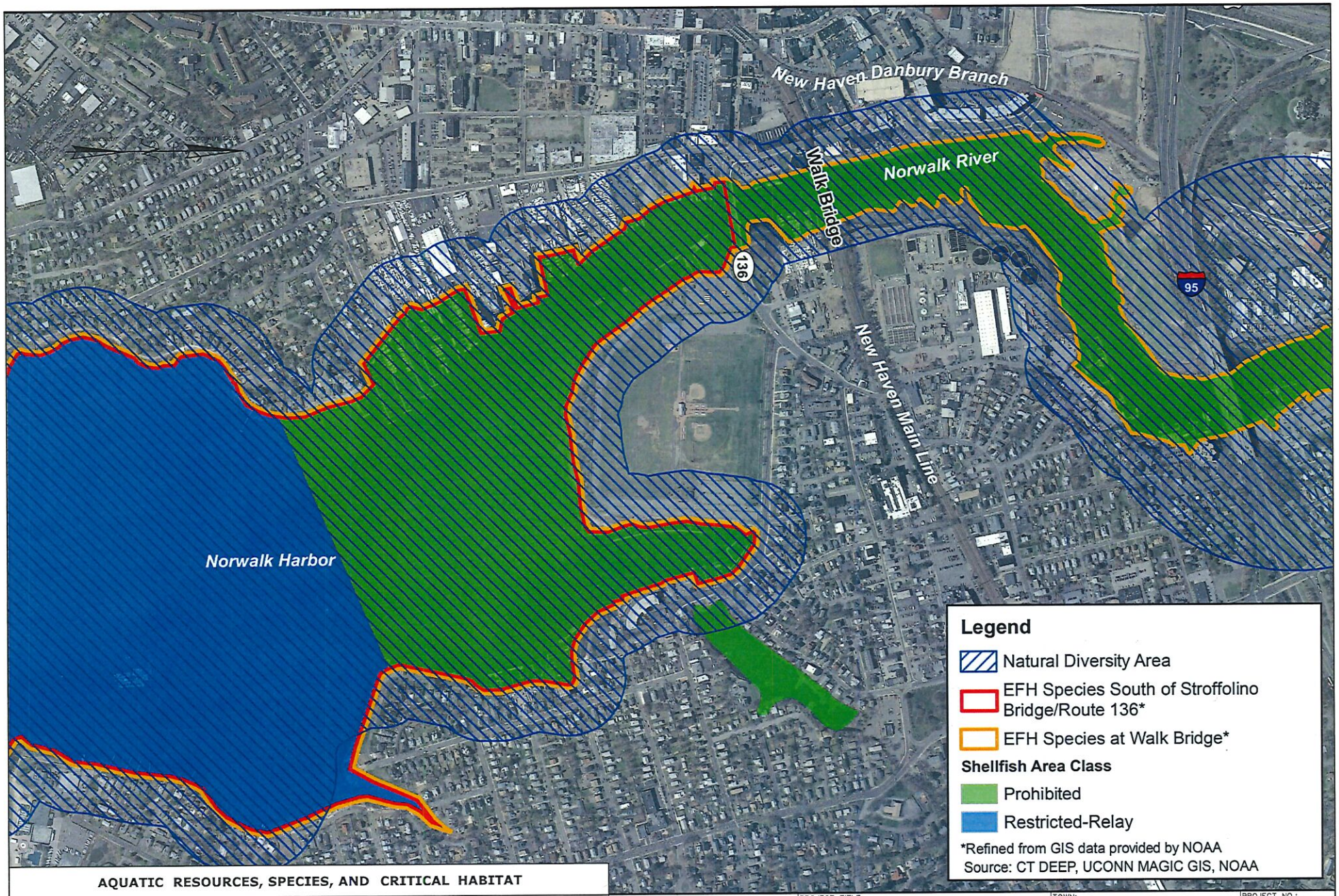
SIGNATURE BLOCK:
HNTB
HNTB CORPORATION
55 CAPITAL BLVD., 4TH FLOOR
ROCKY HILL, CT 06067
TEL. (860) 257-7377

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

PROJECT TITLE:
WALK BRIDGE REPLACEMENT
OVER THE NORWALK RIVER
BRIDGE NO. 04288R/MP 41.5

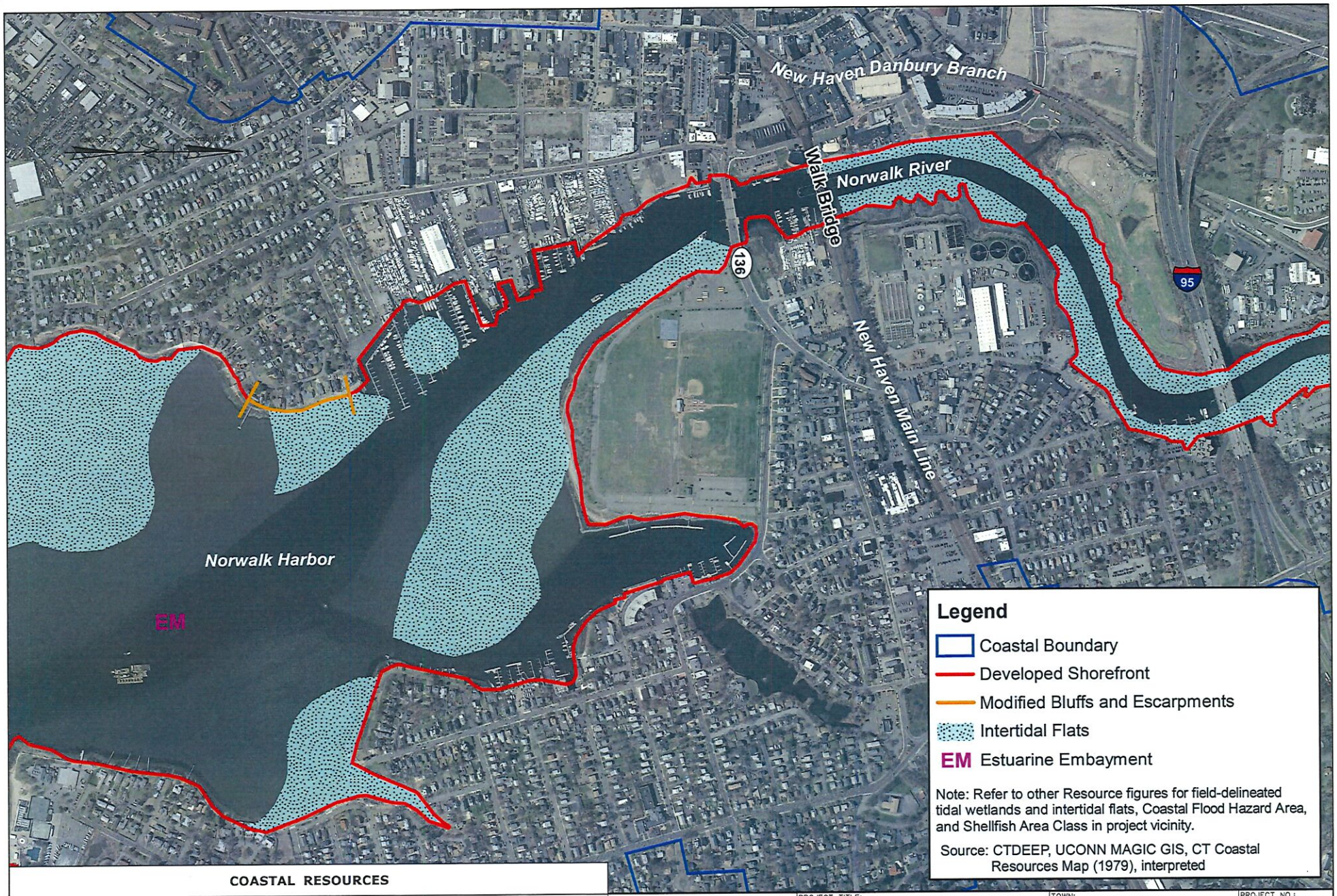
TOWN: NORWALK
DRAWING TITLE: LOCATION PLAN

PROJECT NO.: 0301-0176
DATE: 8-16-19
DRAWING NO.: GEN-3



AQUATIC RESOURCES, SPECIES, AND CRITICAL HABITAT

SCALE: SCALE 1" = 800' (0 400 800)	DRAWN: H. UPSHAW CHECKED: T. ADINOLFI APPROVED: C. BROWN	SIGNATURE BLOCK: HNTB HNTB CORPORATION 55 CAPITAL BLVD., 4TH FLOOR ROCKY HILL, CT 06067 TEL. (860) 257-7377	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	PROJECT TITLE: WALK BRIDGE REPLACEMENT OVER THE NORWALK RIVER BRIDGE NO. 04288R/MP 41.5	TOWN: NORWALK DRAWING TITLE: RESOURCE MAP (SHEET 1 OF 2) PROJECT NO.: 0301-0176 DATE: 8-16-19 DRAWING NO.: GEN-4



COASTAL RESOURCES

SCALE: SCALE 1" = 800'
0 400 800

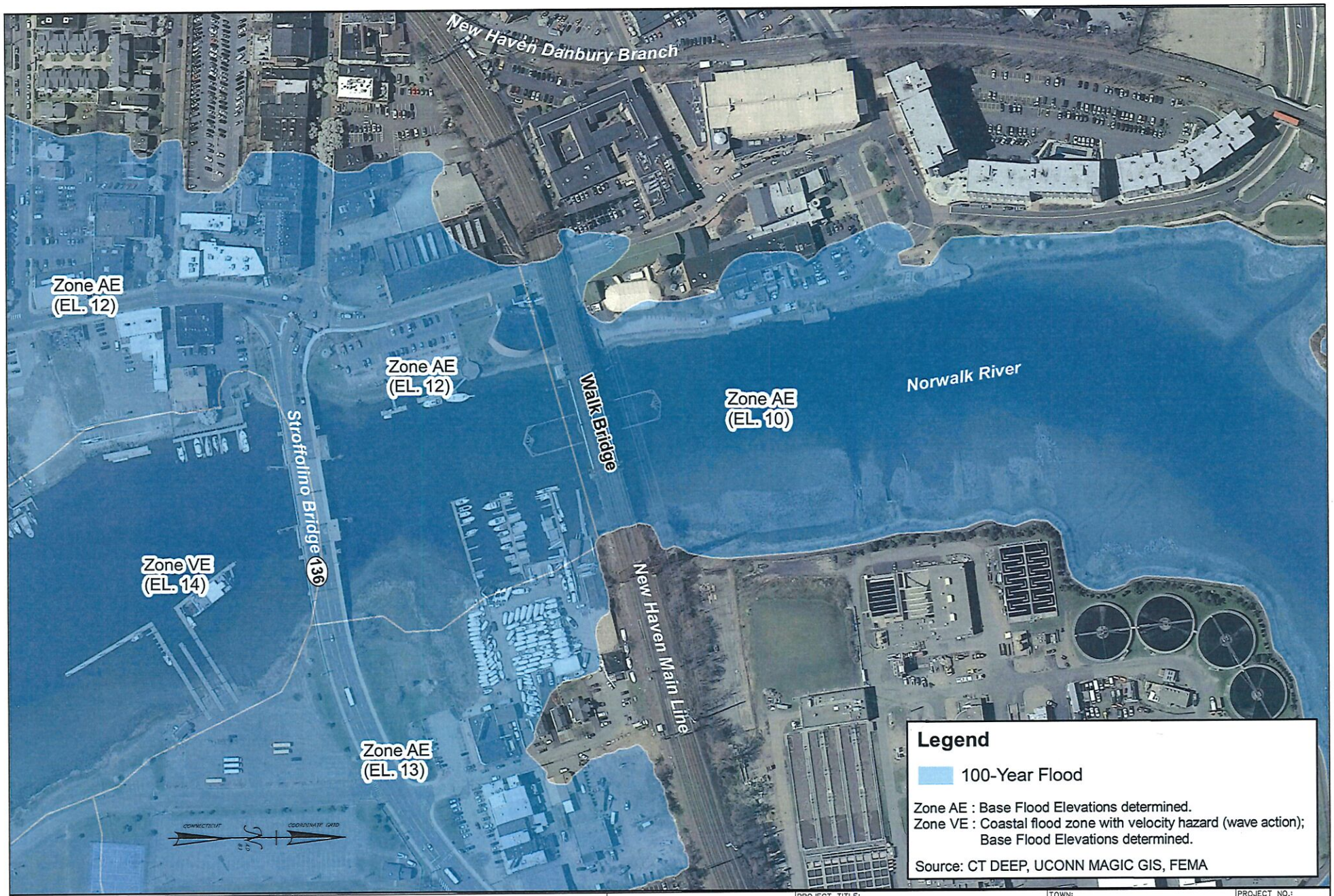
DRAWN: H. UPSHAW
CHECKED: T. ADINOLFI
APPROVED: C. BROWN

SIGNATURE BLOCK:
HNTB
HNTB CORPORATION
55 CAPITAL BLVD., 4TH FLOOR
ROCKY HILL, CT 06067
TEL. (860) 257-7377

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

PROJECT TITLE:
WALK BRIDGE REPLACEMENT OVER THE NORWALK RIVER BRIDGE NO. 04288R/MP 41.5

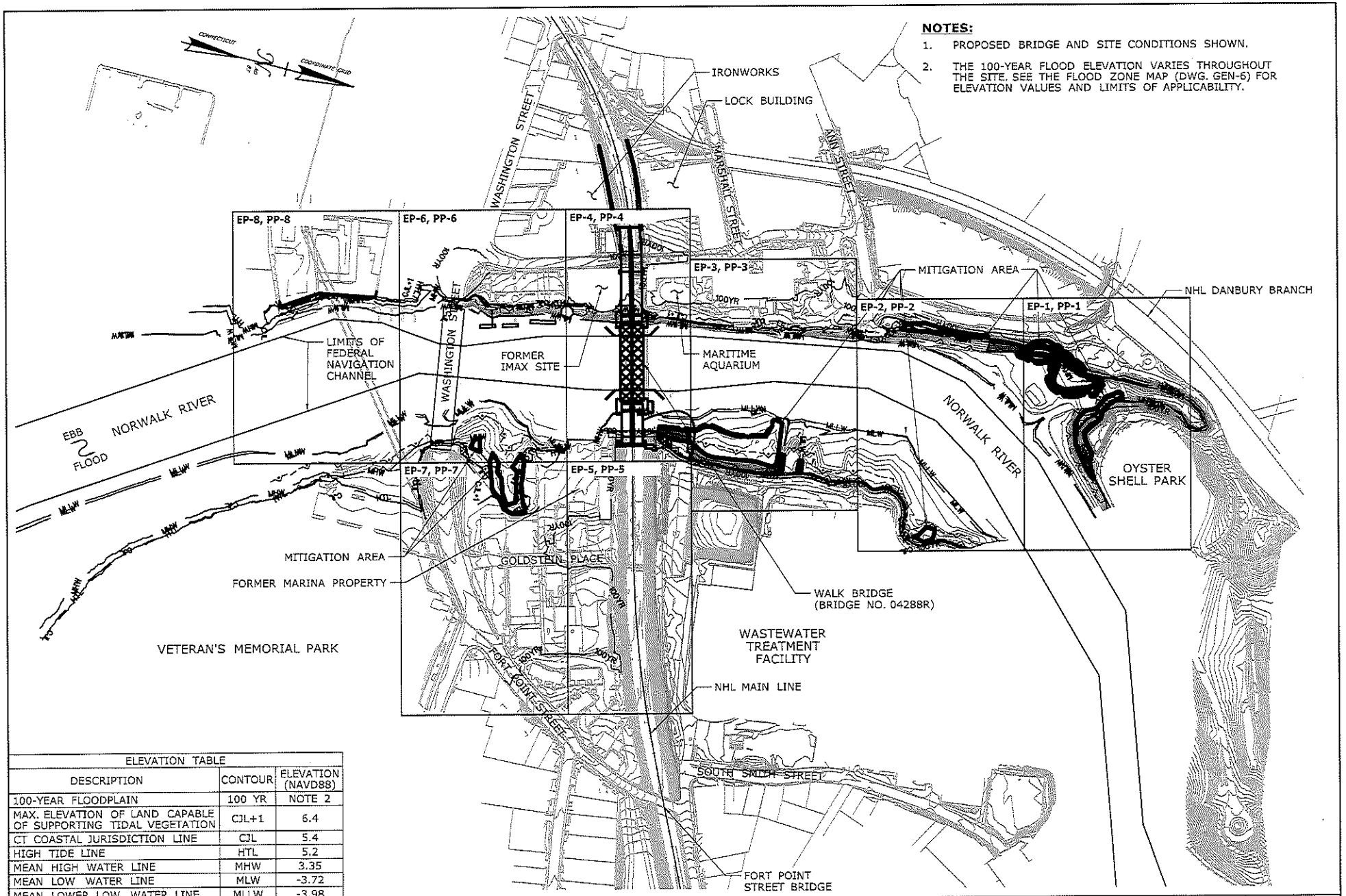
TOWN: NORWALK
PROJECT NO.: 0301-0176
DRAWING TITLE: RESOURCE MAP (SHEET 2 OF 2)
DATE: 8-16-19
DRAWING NO.: GEN-5



SCALE: SCALE 1" = 250' (0 125 250)	DRAWN: H. UPSHAW CHECKED: T. ADINOLFI APPROVED: C. BROWN	SIGNATURE BLOCK: HNTB HNTB CORPORATION 55 CAPITAL BLVD., 4TH FLOOR ROCKY HILL, CT 06067 TEL. (860) 257-7377	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	PROJECT TITLE: WALK BRIDGE REPLACEMENT OVER THE NORWALK RIVER BRIDGE NO. 04288R/MP 41.5	TOWN: NORWALK DRAWING TITLE: FLOOD ZONE MAP	PROJECT NO.: 0301-0176 DATE: 8-16-19 DRAWING NO.: GEN-6

NOTES:

1. PROPOSED BRIDGE AND SITE CONDITIONS SHOWN.
2. THE 100-YEAR FLOOD ELEVATION VARIES THROUGHOUT THE SITE. SEE THE FLOOD ZONE MAP (DWG. GEN-6) FOR ELEVATION VALUES AND LIMITS OF APPLICABILITY.



ELEVATION TABLE		
DESCRIPTION	CONTOUR	ELEVATION (NAVD88)
100-YEAR FLOODPLAIN	100 YR	NOTE 2
MAX. ELEVATION OF LAND CAPABLE OF SUPPORTING TIDAL VEGETATION	CJL+1	6.4
CT COASTAL JURISDICTION LINE	CJL	5.4
HIGH TIDE LINE	HTL	5.2
MEAN HIGH WATER LINE	MHW	3.35
MEAN LOW WATER LINE	MLW	-3.72
MEAN LOWER LOW WATER LINE	MLLW	-3.98

SCALE: SCALE 1" = 400' (0, 200, 400)

DRAWN: H. UPSHAW
CHECKED: T. ADINOLFI
APPROVED: C. BROWN

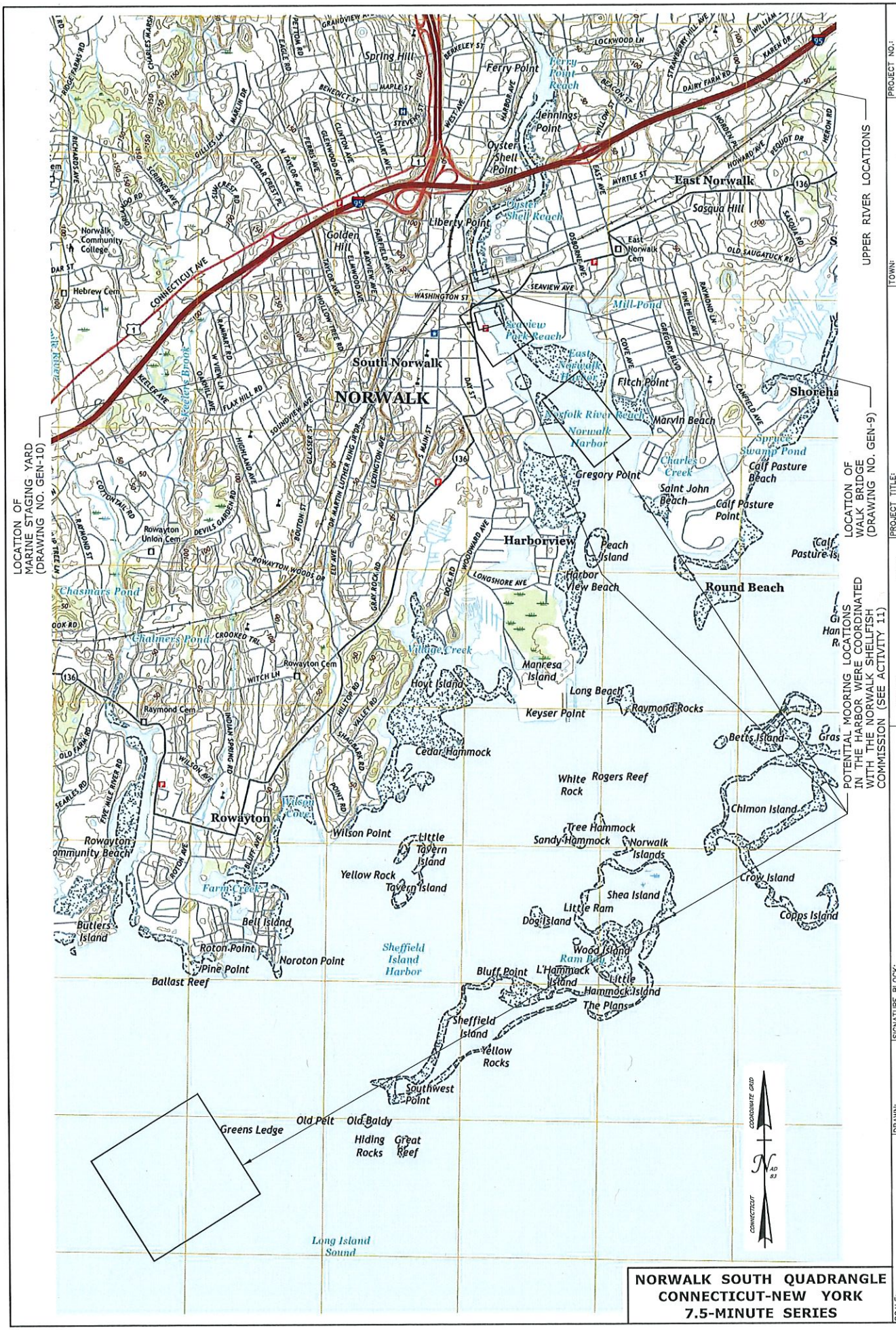
SIGNATURE BLOCK:

HNTB
HNTB CORPORATION
55 CAPITAL BLVD., 4TH FLOOR
ROCKY HILL, CT 06067
TEL. (860) 257-7277

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

PROJECT TITLE:
WALK BRIDGE REPLACEMENT OVER THE NORWALK RIVER BRIDGE NO. 04288R/MP 41.5

TOWN: **NORWALK**
PROJECT NO.: **0301-0176**
DRAWING TITLE: **SITE PLAN/KEY MAP**
DATE: **8-16-19**
DRAWING NO.: **GEN-7**



NORWALK SOUTH QUADRANGLE
CONNECTICUT-NEW YORK
7.5-MINUTE SERIES

SCALE: SCALE 1" = 3000' 0 1500 3000

DRAWN: H. UPSHAW
CHECKED: T. ADINOLFI
APPROVED: C. BROWN

SIGNATURE BLOCK: HNTB
HNTB CORPORATION
55 CAPITAL BLVD., 4TH FLOOR
ROCKY HILL, CT 06067
TEL: (860) 257-7377

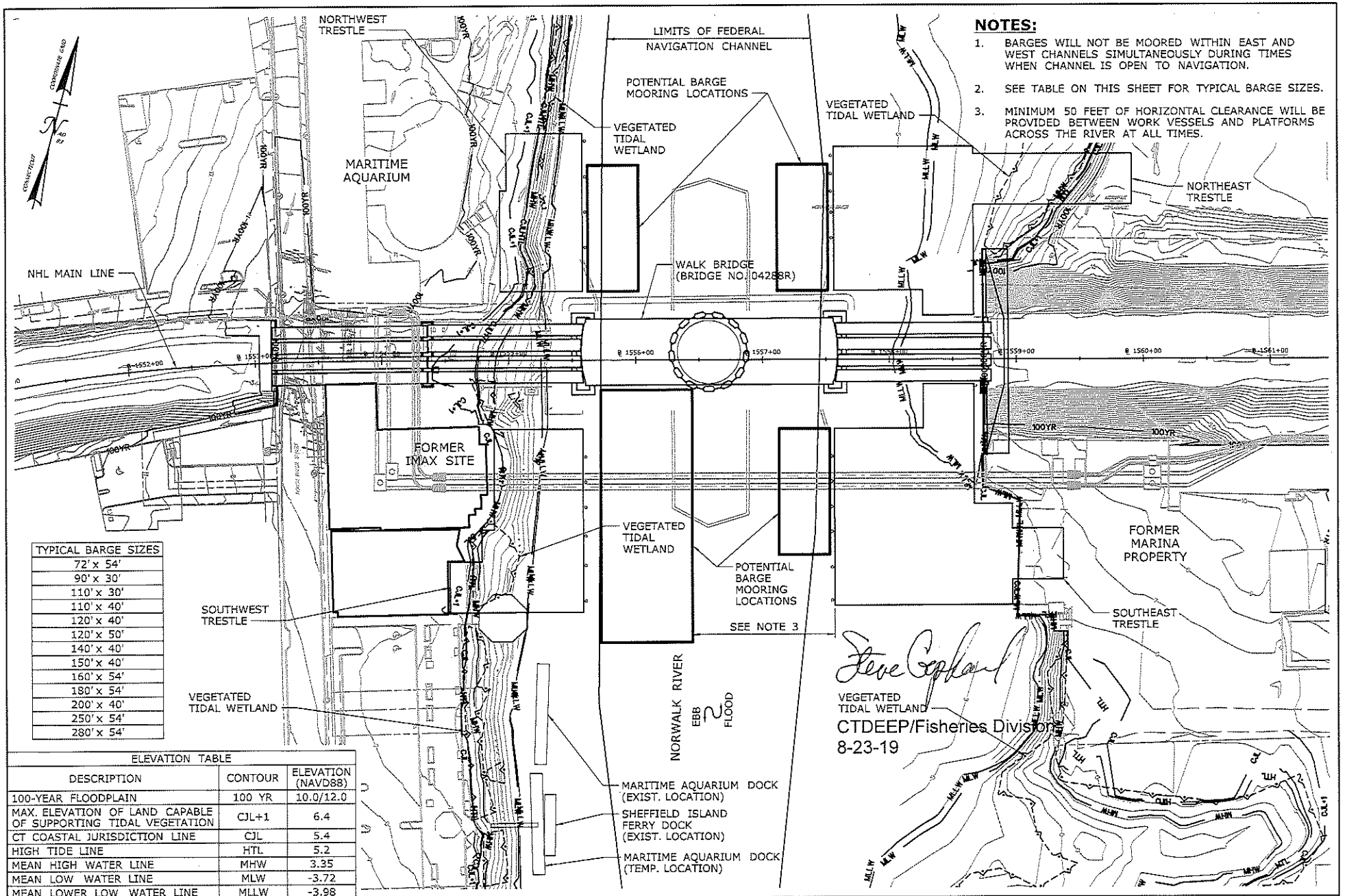
STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

PROJECT TITLE: WALK BRIDGE REPLACEMENT OVER THE NORWALK RIVER BRIDGE NO. 04288R/MP 41.5

TOWN: NORWALK

DRAWING TITLE: VESSEL BERTHING PLAN OVERALL (SHEET 1 OF 3)

PROJECT NO.: 0301-0176
DATE: 8-16-19
DRAWING NO.: GEN-8



NOTES:

1. BARGES WILL NOT BE MOORED WITHIN EAST AND WEST CHANNELS SIMULTANEOUSLY DURING TIMES WHEN CHANNEL IS OPEN TO NAVIGATION.
2. SEE TABLE ON THIS SHEET FOR TYPICAL BARGE SIZES.
3. MINIMUM 50 FEET OF HORIZONTAL CLEARANCE WILL BE PROVIDED BETWEEN WORK VESSELS AND PLATFORMS ACROSS THE RIVER AT ALL TIMES.

TYPICAL BARGE SIZES
72' x 54'
90' x 30'
110' x 30'
110' x 40'
120' x 40'
120' x 50'
140' x 40'
150' x 40'
160' x 54'
180' x 54'
200' x 40'
250' x 54'
280' x 54'

ELEVATION TABLE

DESCRIPTION	CONTOUR	ELEVATION (NAVD88)
100-YEAR FLOODPLAIN	100 YR	10.0/12.0
MAX. ELEVATION OF LAND CAPABLE OF SUPPORTING TIDAL VEGETATION	CJL+1	6.4
CT COASTAL JURISDICTION LINE	CJL	5.4
HIGH TIDE LINE	HTL	5.2
MEAN HIGH WATER LINE	MHW	3.35
MEAN LOW WATER LINE	MLW	-3.72
MEAN LOWER LOW WATER LINE	MLLW	-3.98

SCALE: SCALE 1" = 100' (0, 50, 100)

DRAWN: H. UPSHAW

CHECKED: T. ADINOLFI

APPROVED: C. BROWN

SIGNATURE BLOCK: HNTB

HNTB CORPORATION
55 CAPITAL BLVD., 4TH FLOOR
ROCKY HILL, CT 06067
TEL (860) 257-7177

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

PROJECT TITLE:
WALK BRIDGE REPLACEMENT OVER THE NORWALK RIVER BRIDGE NO. 04288R/MP 41.5

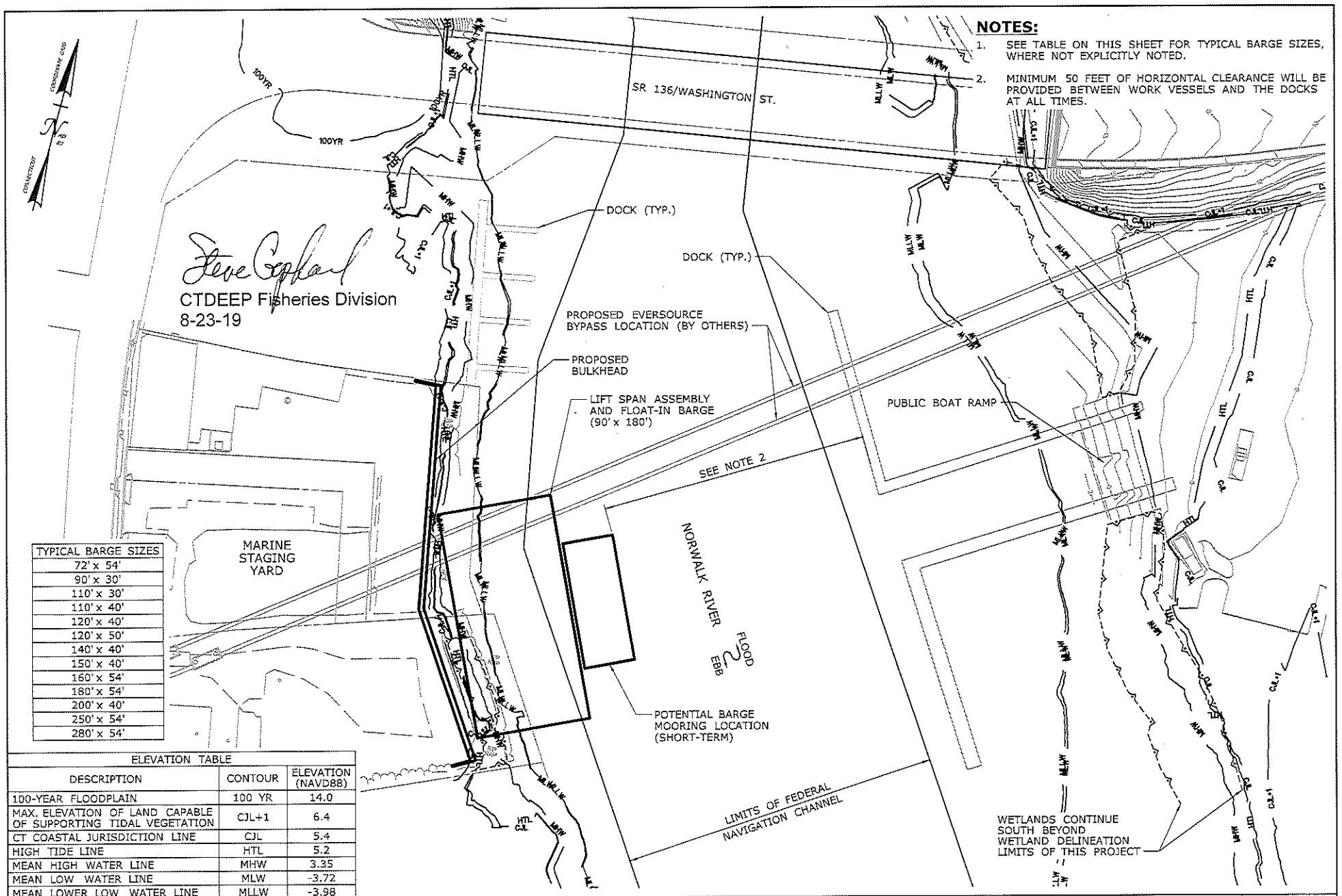
TOWN: **NORWALK**

PROJECT NO.: **0301-0176**

DRAWING TITLE:
VESSEL BERTHING PLAN WALK BRIDGE (SHEET 2 OF 3)

DATE: **8-16-19**

DRAWING NO.: **GEN-9**



TYPICAL BARGE SIZES
72' x 54'
90' x 30'
110' x 30'
110' x 40'
120' x 40'
120' x 50'
140' x 40'
150' x 40'
160' x 54'
180' x 54'
200' x 40'
250' x 54'
280' x 54'

ELEVATION TABLE		
DESCRIPTION	CONTOUR	ELEVATION (NAVD88)
100-YEAR FLOODPLAIN	100 YR	14.0
MAX. ELEVATION OF LAND CAPABLE OF SUPPORTING TIDAL VEGETATION	CJL+1	6.4
CT COASTAL JURISDICTION LINE	CJL	5.4
HIGH TIDE LINE	HTL	5.2
MEAN HIGH WATER LINE	MHW	3.35
MEAN LOW WATER LINE	MLW	-3.72
MEAN LOWER LOW WATER LINE	MLLW	-3.98

SCALE:
SCALE 1" = 100'
0 50 100

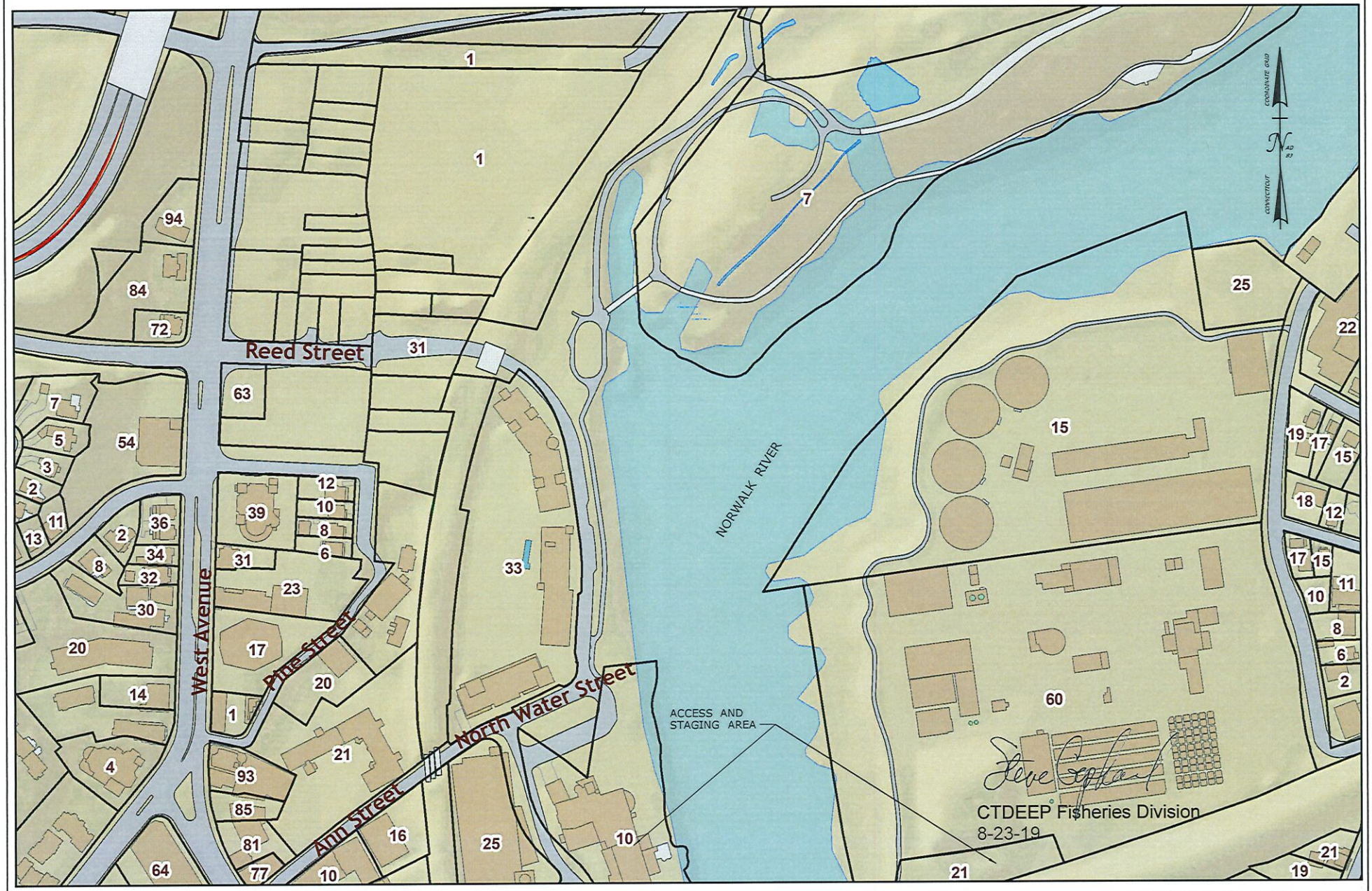
DRAWN: H. UPSHAW
CHECKED: T. ADINOLFI
APPROVED: C. BROWN

SIGNATURE BLOCK:
HNTB
HNTB CORPORATION
55 CAPITAL BLVD., 4TH FLOOR
ROCKY HILL, CT 06067
TEL. (860) 257-7377

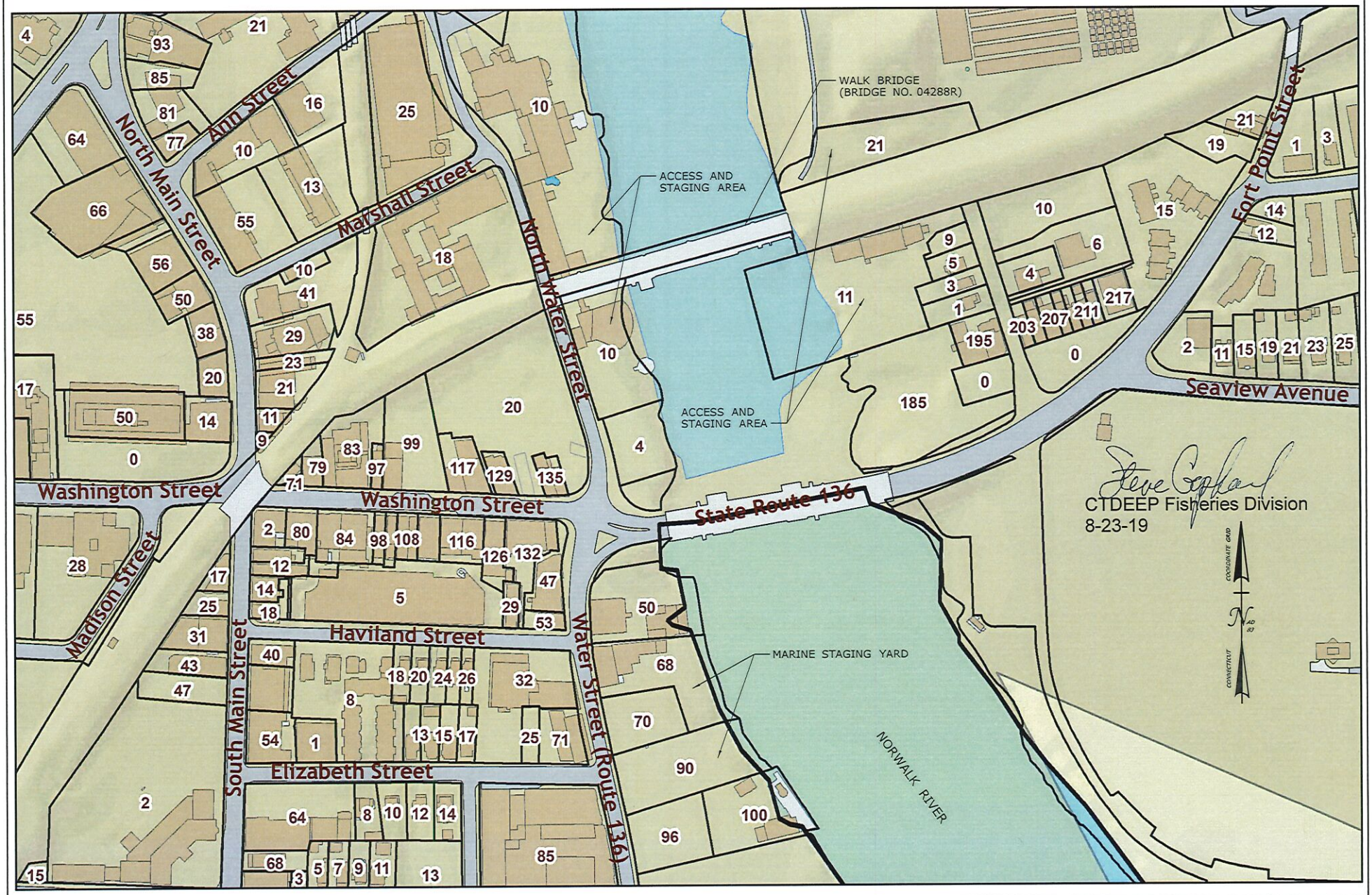
STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

PROJECT TITLE:
WALK BRIDGE REPLACEMENT OVER THE NORWALK RIVER BRIDGE NO. 04288R/MP 41.5

TOWN: **NORWALK**
PROJECT NO.: **0301-0176**
DRAWING TITLE: **VESSEL BERTHING PLAN MARINE STAGING YARD (SHEET 3 OF 3)**
DATE: **8-16-19**
DRAWING NO.: **GEN-10**



SCALE: NOT TO SCALE	DRAWN: H. UPSHAW CHECKED: T. ADINOLFI APPROVED: C. BROWN	SIGNATURE BLOCK: HNTB HNTB CORPORATION 55 CAPITAL BLVD., 4TH FLOOR ROCKY HILL, CT 06067 TEL. (860) 257-7377	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	PROJECT TITLE: WALK BRIDGE REPLACEMENT OVER THE NORWALK RIVER BRIDGE NO. 04288R/MP 41.5	TOWN: NORWALK DRAWING TITLE: PARCEL MAP (SHEET 1 OF 2)	PROJECT NO.: 0301-0176 DATE: 8-16-19 DRAWING NO.: GEN-11



SCALE: NOT TO SCALE	DRAWN: H. UPSHAW CHECKED: T. ADINOLFI APPROVED: C. BROWN	SIGNATURE BLOCK: HNTB HNTB CORPORATION 55 CAPITAL BLVD., 4TH FLOOR ROCKY HILL, CT 06067 TEL. (860) 257-7377	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	PROJECT TITLE: WALK BRIDGE REPLACEMENT OVER THE NORWALK RIVER BRIDGE NO. 04288R/MP 41.5	TOWN: NORWALK DRAWING TITLE: PARCEL MAP (SHEET 2 OF 2)	PROJECT NO.: 0301-0176 DATE: 8-16-19 DRAWING NO.: GEN-12

Samorajczyk, Christopher W

From: Williams, Bruce
Sent: Thursday, August 22, 2019 4:56 PM
To: Gephard, Steve
Cc: Samorajczyk, Christopher W
Subject: FW: CTDOT 301-176 WALK Bridge
Attachments: CTDOT 301-176_PermitPlates_GEN_Only_CTDEEP Marine Fisheries.pdf

Steve,
Please sign-off on the attached plans and forward them to Chris Samorajczyk. All of our concerns have been addressed with restrictions that equal or exceed our recommendations.

Bruce Williams
Fisheries Biologist
Diadromous Fish and Habitat Conservation and Enhancement Programs
Connecticut Department of Energy and Environmental Protection
Bureau of Natural Resources – Fisheries Division
Marine Headquarters - P.O. Box 719 / 333 Ferry Rd.
Old Lyme, CT 06371
P: 860.447.4317 / F: 860.434.6150 / E: bruce.williams@ct.gov

Connecticut Department of
ENERGY & ENVIRONMENTAL PROTECTION

www.ct.gov/deep

Conserving, improving and protecting our natural resources and environment;
Ensuring a clean, affordable, reliable, and sustainable energy supply

From: Samorajczyk, Christopher W
Sent: Thursday, August 22, 2019 1:26 PM
To: Williams, Bruce <Bruce.Williams@ct.gov>; Gephard, Steve <Steve.Gephard@ct.gov>
Subject: CTDOT 301-176 WALK Bridge

Hi Bruce/ Steve-
Attached are the final General Plates for CTDOT 301-176 WALK Bridge replacement over the Norwalk River. There are actually 160 Permit Plates for this job but thought just sending you the GEN set would be best. Pay close attention to GEN-2—The General Notes have the in water commitments that you would be interested in. We do not have a note to address the unconfined window form NMFS 2/1-9/30 or CTDEEP 4/1-6/30 only because we put a more stringent restriction on the Contractor where any in water wok most be behind containment throughout the whole year. This Project has been aggressively reviewed by NMFS GARFO HCD and PRD. If you get a chance and do not have any

questions please sign and return—we are looking to submit the Structures and Dredging Permit to CTDEEP LWRD next week---finally. If there are any issues with the review and or the attachment let me know ---talk soon
Chris

Christopher W. Samorajczyk
Wildlife Biologist
Connecticut Department of Transportation
Office of Environmental Planning
Bureau of Policy & Planning
P: 860-594-2938 / F: 860-594-3028 / E: christopher.samorajczyk@ct.gov

---

From: Williams, Bruce <Bruce.Williams@ct.gov>
Sent: Friday, December 21, 2018 1:24 PM
To: Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov>
Cc: Gephard, Steve <Steve.Gephard@ct.gov>
Subject: RE: CTDOT 301-176WALK Bridge

Chris,
I looked through the original consultation package and everything seems to be fine. All our big issues like TOYs are covered. My guess is that Mark Johnson addressed anything that would be of any concern to us. You did mention that there will be some minor changes to the proposal, like where and when bubble curtains are used. I know that NMFS will probably want bubble curtains in place whenever any pile driving is being done when we suspect that sturgeon are in the area, but I will defer to them on those decisions.

If any major changes in the plans do occur, please keep us updated.

Bruce

Bruce Williams
Fisheries Biologist
Diadromous Fish and Habitat Conservation and Enhancement Programs
Connecticut Department of Energy and Environmental Protection
Bureau of Natural Resources – Fisheries Division
Marine Headquarters - P.O. Box 719 / 333 Ferry Rd.
Old Lyme, CT 06371
P: 860.447.4317 / F: 860.434.6150 / E: bruce.williams@ct.gov

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

NOTE: Due to staff reductions, the Inland Fisheries Division and the Marine Fisheries Division have been merged into one division. Effective immediately, all DEEP fisheries staff are part of one division called the Fisheries Division.

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Conserving, improving and protecting our natural resources and environment;
Ensuring a clean, affordable, reliable, and sustainable energy supply

---

From: Samorajczyk, Christopher W
Sent: Thursday, December 20, 2018 7:25 AM
To: Williams, Bruce <Bruce.Williams@ct.gov>; Gephard, Steve <Steve.Gephard@ct.gov>
Cc: Davis, Andrew H <Andrew.H.Davis@ct.gov>
Subject: FW: CTDOT 301-176WALK Bridge

Hi Bruce/Steve-
Just wanted to see if you guys have any additional concerns or want to sit down and discuss the WALK Bridge replacement. We are going to reinitiate consultation with NMFS PRD and HCD due to some turbidity and acoustic testing that was unknown when we started consultation this past summer. The big TOYs are in place for no in water work April1 through June 30th, no silt producing activities Feb.1 through September 30th, soft starts on any new driving shift, and 12 on 12 off for any pile driving during April 1 through June 30th. All work will be done behind marine enclosures and turbidity controls. We will only be dredging in December and January. Attached is the original consultation package that was concurred with by NMFS. Some of the commitments like bubble curtains we are changing. Let me know what you guys think and we can discuss --talk soon
Thanks, Chris

From: Samorajczyk, Christopher W
Sent: Wednesday, October 31, 2018 11:43 AM
To: Williams, Bruce <Bruce.Williams@ct.gov>
Cc: Gephard, Steve <Steve.Gephard@ct.gov>; Davis, Andrew H <Andrew.H.Davis@ct.gov>
Subject: CTDOT 301-176WALK Bridge

Hi Bruce-
Just wanted to bring you up to speed on CTDOT 301-176 WALK Bridge replacement. Before Mark J left he had worked on this project and commented on some break out projects including CTDOT 301-181 which is the placement of submarine cables being trenched in before the WALK Bridge replacement starts. This as well as any open water dredging will only occur during the months of December and January. The Department has made numerous commitments to NMFS GARFO based on consultations with them for this project. Some of the commitments also came from Mark before he retired. The main concern Mark had was the anadromous fish (river herring) migration up the Norwalk River in spring to spawn in freshwater reaches. The period of migration is typically from April 1 to June 30. Through State and NMFS consultations we will only be pile driving during the periods of April 1 through June 30 and September 1 through November 30 between one hour after sunrise to one hour before sunset. There is no open water work except the dredging activities that will take place only in December and January. The Departments has also been in extensive talks with the Shellfish Commission to protect their interests and the industry throughout the River/Harbor. I have attached the Departments submittal to NMFS GARFO for both the EFH and ESA consultations both which have been approved. This gives a good overview of the WALK Bridge project as well as all the commitments (sheet 1 of 24) we have placed on the Contactor. We are currently developing the Permit Plates for the Structures & Dredging Permit. Let me know if you have any additional concerns and we can discuss—talk soon
Chris

Christopher W. Samorajczyk
Wildlife Biologist

Attachment M3-2 – Coordination with Division of Wildlife

From: Samorajczyk, Christopher W
To: Sarah Walker
Cc: Davis, Andrew H
Subject: Fw: Manresa Island Norwalk_Osprey
Date: Wednesday, June 24, 2020 8:32:06 AM

From: Hess, Brian
Sent: Thursday, March 19, 2020 8:10 AM
To: Samorajczyk, Christopher W
Cc: Davis, Andrew H; Lesay, Kimberly C
Subject: RE: Manresa Island Norwalk

Sounds good, thanks, Chris,

I think that timing may still be a consideration. If there is going to be activity during the nesting season, it would be best if that activity could begin before the birds arrive.

If they are buying a house on a busy street, they should see what it looks like at rush hour, not just on a Sunday morning.

Thanks,
Brian

From: Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov>
Sent: Wednesday, March 18, 2020 7:45 PM
To: Hess, Brian <Brian.Hess@ct.gov>
Cc: Davis, Andrew H <Andrew.H.Davis@ct.gov>; Lesay, Kimberly C <Kimberly.Lesay@ct.gov>
Subject: Re: Manresa Island Norwalk

Hi Brian-
Yes the central nest is on pole---the nests from west to east are on top of an out building approximately 40 feet in the air then the osprey pole located south of the security fence and then the east nest is atop one of the two dolphin pier clusters. The NRG folks seem to be aware of the ospreys, falcons, and the terrapins that frequent their land. There are a few other nesting poles that they erected around the island. I am planning on working with CTDOT Surveys to plot all the nests. I also plan on another visit in a few weeks to determine which osprey nests are active. Talk soon
Chris

From: Hess, Brian
Sent: Wednesday, March 18, 2020 5:08 PM
To: Samorajczyk, Christopher W; Dickson, Jenny
Cc: Davis, Andrew H; McKay, Dawn; Lesay, Kimberly C

Subject: RE: Manresa Island Norwalk

Hi Chris,

At just a cursory glance, I would agree about the falcons. That central nest is on a 30' telephone pole, right?

Thanks,
Brian

From: Samorajczyk, Christopher W <Christopher.Samorajczyk@ct.gov>
Sent: Wednesday, March 18, 2020 4:23 PM
To: Dickson, Jenny <Jenny.Dickson@ct.gov>
Cc: Hess, Brian <Brian.Hess@ct.gov>; Davis, Andrew H <Andrew.H.Davis@ct.gov>; McKay, Dawn <Dawn.McKay@ct.gov>; Lesay, Kimberly C <Kimberly.Lesay@ct.gov>
Subject: Manresa Island Norwalk

Hi Jenny-
Hope all is well—just wanted to run something by you quick---The Department was recently granted access to survey Manresa Island in Norwalk for possible future use as a staging yard for the WALK Bridge replacement Project. Some of the early coordination is evaluating this area for inclusion into the Departments NEPA re-evaluation. Attached is the area potentially needed that the Contractor is proposing---there will not be any wetland impacts however we have multiple osprey nests on the island and the Norwalk falcons have relocated to the smoke stack. There are 3 potentially active osprey nests in close proximity to the proposed areas for the bridge construction (second attachment ospreys marked as O—Falcon marked as F) just looking for any big issues with us moving forward with this area right now—I believe the falcons are too high for us to impact and the ospreys are usually tolerable to some commotion---talk soon
Thanks, Chris

Christopher W. Samorajczyk
Wildlife Biologist
Office of Environmental Planning
Connecticut Department of Transportation
☎Direct 860-594-2938 / F: 860-594-3028
Christopher.Samorajczyk@ct.gov

Attachment M4 – USFWS SEC 7 ESA Determinations

Attachment M4-1 – SEC 7 ESA No-Effect Determination, May 8, 2021

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

2800 BERLIN TURNPIKE, P.O. BOX 317546
NEWINGTON, CONNECTICUT 06131-7546
Phone: (860) 594-2938

May 8, 2021

NOTE TO FILE: CTDOT 301-176 USFWS SEC 7 ESA No-Effect Determination

USFWS IPaC ESA MAPPER identifies the threatened Northern long-eared bat (*Myotis septentrionalis*) and threatened red knot (*Calidris cantus rufa*) as occurring within the Project area. IPaC also identifies the endangered roseate tern (*Sterna dougalli dougalli)* as occurring adjacent to the project site. State of Connecticut Natural Diversity Data Base (NDDB) records identify the threatened piping plover (*Charadrius melodus*) as occurring near the Project area.

CTDOT 301-176 involves the full replacement of Bridge No. 04288R Metro North Railroad Bridge over the Norwalk River. This project has a large offsite staging yard referred to as Manresa Island located along the southwest tip of Norwalk Harbor which is considered in this determination. This Project was submitted to the United States Fish & Wildlife Service (USFWS) under the final 4 (d) streamlined consultation process for the Northern long-eared bat (*Myotis septentrionalis*) and has a not likely to adversely affect (NLLA) determination. This Project is located in a highly urbanized area with all bridge work being conducted form crane pads and barges. Habitat for the federally listed red knot, roseate tern, and piping plover does not exist within the Project area but does exist further out in the Norwalk Harbor and outer barrier islands. The bridge Project area is located up past the inner harbor and contains no preferred habitat for nesting, resting, and/or foraging for listed species. These species depend on true coastal shores with very little public impact. The bridge Project area is located in and away from any coastal shore within a downtown urban setting 2 miles north of any preferred habitat and close to a mile of even suitable habitat. The staging yard located at the southwest corner of the Harbor is closer to some potential habitat but lacks any habitat itself on the upland infield of an old decommissioned NRG Energy plant were the work will take place. Transportation to and from the infield staging area will be done on existing paved roads and there will be no habitat alteration within the Manresa Island site. Also, in consultation with state NDDB data there are no state records of either the roseate tern or red knot located in or anywhere near the Project area. There will be no impact to any ESA listed species associated with this Project.

It is for the above reasons that this Office concludes, on behalf of FTA, a finding of no-effect for this Project on any USFWS ESA species (other than *Myotis septentrionalis*) identified in or in proximity to this Project. This memo will be retained with the file documents.

Christopher Samorajczyk

Natural Resource Planning CTDOT

Attachment M4-2 – SEC 7 ESA Verification Letter, May 17, 2021

United States Department of the Interior

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

In Reply Refer To: May 17, 2021
Consultation code: 05E1NE00-2021-TA-3046
Event Code: 05E1NE00-2021-E-09319
Project Name: CTDOT 0301-0176_WALK Bridge Replacement

Subject: Verification letter for the 'CTDOT 0301-0176_WALK Bridge Replacement' project under the January 5, 2016, Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-eared Bat and Activities Excepted from Take Prohibitions.

Dear Christopher Samorajczyk:

The U.S. Fish and Wildlife Service (Service) received on May 10, 2021 your effects determination for the 'CTDOT 0301-0176_WALK Bridge Replacement' (the Action) using the northern long-eared bat (*Myotis septentrionalis*) key within the Information for Planning and Consultation (IPaC) system. This IPaC key assists users in determining whether a Federal action is consistent with the activities analyzed in the Service's January 5, 2016, Programmatic Biological Opinion (PBO). The PBO addresses activities excepted from "take"[1] prohibitions applicable to the northern long-eared bat under the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.).

Based upon your IPaC submission, the Action is consistent with activities analyzed in the PBO. The Action may affect the northern long-eared bat; however, any take that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o). Unless the Service advises you within 30 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that the PBO satisfies and concludes your responsibilities for this Action under ESA Section 7(a)(2) with respect to the northern long-eared bat.

Please report to our office any changes to the information about the Action that you submitted in IPaC, the results of any bat surveys conducted in the Action area, and any dead, injured, or sick northern long-eared bats that are found during Action implementation. If the Action is not completed within one year of the date of this letter, you must update and resubmit the information required in the IPaC key.

This IPaC-assisted determination allows you to rely on the PBO for compliance with ESA Section 7(a)(2) only for the northern long-eared bat. It **does not** apply to the following ESA-protected species that also may occur in the Action area:

- Red Knot *Calidris canutus rufa* Threatened
- Roseate Tern *Sterna dougallii dougallii* Endangered

If the Action may affect other federally listed species besides the northern long-eared bat, a proposed species, and/or designated critical habitat, additional consultation between you and this Service office is required. If the Action may disturb bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act is recommended.

---

[1]Take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct [ESA Section 3(19)].

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

CTDOT 0301-0176_WALK Bridge Replacement

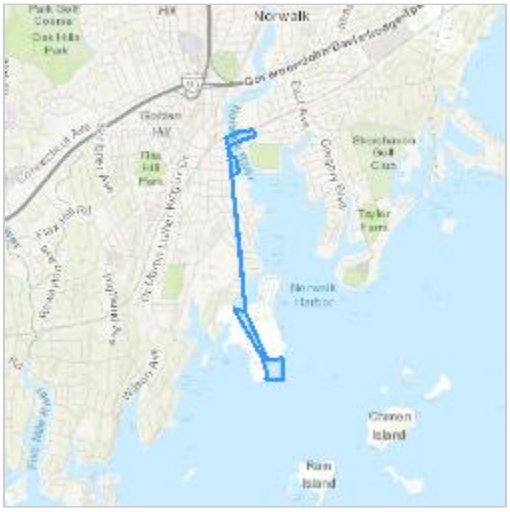
2. Description

The following description was provided for the project 'CTDOT 0301-0176_WALK Bridge Replacement':

> In cooperation with the Federal Transit Administration (FTA), the Connecticut Department of Transportation (CTDOT) proposes to replace the New Haven Line Railroad Bridge (Walk Bridge, Bridge No. 04288R) crossing the Norwalk River in Norwalk, Connecticut.
> CTDOT proposes to construct a movable vertical lift structure and fixed approach spans to replace the existing movable bridge. The project consists of the removal of the existing bridge, including the superstructure, substructure elements (abutments and piers), timber pier protection system, and deactivated electrical and railroad submarine cables; and construction of the replacement bridge. The four-span replacement bridge includes two side-by-side, 240-foot vertical lift spans across the Norwalk River, each with independently operated mechanical and electrical equipment. The pair of 240-foot vertical lift spans provides a horizontal clearance of approximately 220 feet between the pier-mounted fenders; however, the project does not alter the 170-foot federal navigation channel. The lift spans provide 60.73 feet vertical clearance above mean high water (MHW) when the span is fully raised, and 25.73 feet vertical clearance above MHW when the span is closed.
> CTDOT has coordinated with the National Oceanic and Atmospheric Administration/ National Marine Fisheries Service/Greater Atlantic Regional Fisheries Office (NOAA/NMFS/GARFO), CTDEEP Divisions of Wildife and Fisheries - Marine Fisheries Program, Norwalk Shellfish Commisison (NSC), and the U.S. Army Corps of Engineers (USACE) in developing environmental protection measures for the project. Through coordination with NOAA/NMFS/ GARFO, CTDEEP, USFWS, NSC, and USACE, CTDOT has agreed to implement the following environmental protection measures, including time of year restrictions and resource protection measures:
> Time of Year Restrictions:
> • All pile driving and extraction (including sheet piles) activities conducted between April 1st and June 30th will only occur between one hour after sunrise to one hour before sunset.
> • No unconfined turbidity producing activities will be allowed between February 1st and September 30th.
> • A soft start will be required between March 16th and October 31st . A soft start will be used at the beginning of each shift that requires pile driving and extraction (including sheet piles)activities, as well as following cessation of activity for a

period of 30 minutes or longer. A soft start is defined as follows:
There is an offsite staging are that will be utilized along the south shore of Norwalk Harbor at the old decommissioned NRG energy plant which will be an important staging yard for the bridge replacement. This area referred to as Manresa Island has also been included in all consultations both state and federal. As part of this project review two other species listed in IPaC were reviewed. Red knot and roseate tern were discounted due to the highly urbanized project area. The birds, if transient individuals, could happen to pass through would utilize the barrier offshore islands of Norwalk and not the heavily urbanized south Norwalk section were the project is taking place. There are also no known records of either species according to the best available data from CTDEEP NDDB. Therefore a no effect finding by OEP has been made.

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@41.08638915,-73.4141623810691,14z



Determination Key Result

This Federal Action may affect the northern long-eared bat in a manner consistent with the description of activities addressed by the Service's PBO dated January 5, 2016. Any taking that may occur incidental to this Action is not prohibited under the final 4(d) rule at 50 CFR §17.40(o). Therefore, the PBO satisfies your responsibilities for this Action under ESA Section 7(a)(2) relative to the northern long-eared bat.

Determination Key Description: Northern Long-eared Bat 4(d) Rule

This key was last updated in IPaC on May 15, 2017. Keys are subject to periodic revision.

This key is intended for actions that may affect the threatened northern long-eared bat.

The purpose of the key for Federal actions is to assist determinations as to whether proposed actions are consistent with those analyzed in the Service's PBO dated January 5, 2016.

Federal actions that may cause prohibited take of northern long-eared bats, affect ESA-listed species other than the northern long-eared bat, or affect any designated critical habitat, require

ESA Section 7(a)(2) consultation in addition to the use of this key. Federal actions that may affect species proposed for listing or critical habitat proposed for designation may require a conference under ESA Section 7(a)(4).

Determination Key Result

This project may affect the threatened Northern long-eared bat; therefore, consultation with the Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.) is required. However, based on the information you provided, this project may rely on the Service's January 5, 2016, *Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions* to fulfill its Section 7(a)(2) consultation obligation.

Qualification Interview

1. Is the action authorized, funded, or being carried out by a Federal agency?

   Yes

2. Have you determined that the proposed action will have "no effect" on the northern long-eared bat? (If you are unsure select "No")

   No

3. Will your activity purposefully **Take** northern long-eared bats?

   No

4. [Semantic] Is the project action area located wholly outside the White-nose Syndrome Zone?

   Automatically answered
   No

5. Have you contacted the appropriate agency to determine if your project is near a known hibernaculum or maternity roost tree?

   Location information for northern long-eared bat hibernacula is generally kept in state Natural Heritage Inventory databases – the availability of this data varies state-by-state. Many states provide online access to their data, either directly by providing maps or by providing the opportunity to make a data request. In some cases, to protect those resources, access to the information may be limited. A web page with links to state Natural Heritage Inventory databases and other sources of information on the locations of northern long-eared bat roost trees and hibernacula is available at www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html.

   Yes

6. Will the action affect a cave or mine where northern long-eared bats are known to hibernate (i.e., hibernaculum) or could it alter the entrance or the environment (physical or other alteration) of a hibernaculum?

   No

7. Will the action involve Tree Removal?

   Yes

8. Will the action only remove hazardous trees for the protection of human life or property?

   No

9. Will the action remove trees within 0.25 miles of a known northern long-eared bat hibernaculum at any time of year?

   No

10. Will the action remove a known occupied northern long-eared bat maternity roost tree or any trees within 150 feet of a known occupied maternity roost tree from June 1 through July 31?

    No

Project Questionnaire

If the project includes forest conversion, report the appropriate acreages below. Otherwise, type '0' in questions 1-3.

1. Estimated total acres of forest conversion:

.01

2. If known, estimated acres of forest conversion from April 1 to October 31

0

3. If known, estimated acres of forest conversion from June 1 to July 31

0

If the project includes timber harvest, report the appropriate acreages below. Otherwise, type '0' in questions 4-6.

4. Estimated total acres of timber harvest

0

5. If known, estimated acres of timber harvest from April 1 to October 31

0

6. If known, estimated acres of timber harvest from June 1 to July 31

0

If the project includes prescribed fire, report the appropriate acreages below. Otherwise, type '0' in questions 7-9.

7. Estimated total acres of prescribed fire

0

8. If known, estimated acres of prescribed fire from April 1 to October 31

0

9. If known, estimated acres of prescribed fire from June 1 to July 31

0

If the project includes new wind turbines, report the megawatts of wind capacity below. Otherwise, type '0' in question 10.

10. What is the estimated wind capacity (in megawatts) of the new turbine(s)?

0

Attachment M5 – CTDEEP NDDB Determination, May 16, 2021

Connecticut Department of

ENERGY &
ENVIRONMENTAL
PROTECTION

May 16, 2021

Christopher Samorajczyk
CT Department of Transportation
2800 Belin Turnpike
P.O. Box 317546
Newington, CT 06131
christopher.samorajczyk@ct.gov

Project: CTDOT Project # 301-176, Replacement of Walk Bridge (Bridge No.04288RR/Metro North) Over Norwalk River with Use of 68 & 70 Water Street and Small Portion of Manresa Island as Staging Areas in Norwalk, Connecticut
NDDB Determination No.: 202106690

Dear Christopher Samorajczyk,

I have re-reviewed Natural Diversity Data Base maps and files regarding the area delineated on the map you provided for the proposed CTDOT Project # 301-176, River Replacement of Walk Bridge (Bridge No.04288RR/Metro North) Over Norwalk River with Use of 68 & 70 Water Street and Small Portion of Manresa Island as Staging Areas in Norwalk, Connecticut. According to our information we have records for State Threatened *Falco peregrinus* (Peregrine falcon) and State Special Concern *Malaclemys t. terrapin* (Northern diamondback terrapin) from the vicinity of this project. Thank you for including the protocols you will follow to ensure the protection of the nesting peregrine falcon and northern diamondback terrapin with respect to this project. I concur that by utilizing these protection protocols it will lessen the adverse impact on these two species. I attached the protection plans you have proposed. This determination is good for two years. Please re-submit an NDDB Request for Review if the scope of work changes or if work has not begun on this project by May 16, 2023.

Natural Diversity Data Base information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Natural History Survey and cooperating units of DEEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the Data Base should not be substitutes for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available.

Please contact me if you have further questions at (860) 424-3592, or dawn.mckay@ct.gov . Thank you for consulting the Natural Diversity Data Base. .

Dawn M. McKay

Dawn M. McKay
Environmental Analyst 3







PEREGRINE FALCON
Connecticut Threatened Species

Protective Legislation: *Federal* - Migratory Bird Treaty Act of 1918. *State* - Connecticut General Statutes Sec. 26-311.

Scientific Name: *Falco peregrinus*

Size: 15-20 inches (38.1-50.8 cm) in length

Wingspan: 43-46 inches (109.2-116.8 cm)

Habitat Type:
Open country, from coastal lowlands to mountainous high country. High perches in urban areas, bridges and billboards.

Coloration:

- Adult peregrine falcons have long, pointed wings and a long, rounded tail with narrow, black bands, ending with a broad, dark band tipped with white.
- The barred upperparts are blue-gray, while the underparts are white to light buff and cross-barred with brown.
- The black crown and nape extend to the cheeks, forming a distinct black helmet.
- The feet are yellow.
- Immature peregrines are similar, but the back and underparts are brown and the throat is heavily streaked with brown.
- Both adult and immature peregrines have a bold, dark, vertical whisker-like mark (mustache mark) on the sides of the head.

Characteristics:

- Long-winged, medium-sized bird of prey.
- **Call:** A rasping kack-kack-kack. Also a long ascending wail, WEEchew-WEE-chew.
- **Typical Nesting Period**: April through July.
- Nest sites are located above open areas consisting of a hollow, unlined scrape on a cliff, ledge or rocky outcrop. There are falcon nest boxes (top, right photo) located on bridges across Connecticut. Abandoned hawk or raven nests may also be used.
- Pairs may use the same nest site for years

The peregrine falcon is a highly vocal and aggressive bird. Falcons pose a threat to anyone working around the nest area. Falcons will actively defend their nests by swooping and diving at predators. Falcons are capable of plunging from tremendous heights at speeds estimated at over 180 miles per hour. This is their preferred method of hunting. Falcons have sharp talons for grasping and holding prey and should not at anytime be approached or handled. It is required that there be no harassment, intentional or unintentional, to any falcons under state and federal law.

If any peregrine falcons are observed in or around the project area the Office of Environmental Planning (OEP) must be notified at 860-594-2937 or 860-594-2938. If OEP staff cannot be reached at either of the above referenced phone numbers, the District environmental coordinator will need to be contacted to facilitate further coordination with OEP's Water and Noise Compliance Unit.

SECTION 1.10 ENVIRONMENTAL COMPLIANCE

In Article 1.10.03-Water Pollution Control:
REQUIRED BEST MANAGEMENT PRACTICES

Add the following after Required Best Management Practices Number 13:

14. The peregrine falcon (*Falco peregrinus*) is a State threatened species and Connecticut's largest falcon, measuring up to 20 inches. Adults are slate gray above and pale underneath with fine bars and spots of black; they have long pointed wings with a narrow tail. Young falcons have the same composition but are darker underneath and browner all over. Peregrine falcons have adapted to life in urban settings. In Connecticut, they sometimes utilize bridges for nesting and brood rearing purposes. Peregrines will actively and aggressively defend the nest. The peregrine will attack anyone or anything that comes within the area of its nest. The peregrine falcon nesting season occurs between the months of April and July. For this reason, special conditions regarding the timing of work on the structures, and immediate area that have nesting falcons must be adhered to.

    In order to protect this species and project personnel, any construction and/or inspection activities which are within 400 feet of an identified nest shall not be permitted during nesting season (between April 1st and July 31st.) Any change in construction sequencing or timing affecting work within 400 feet of a known nest shall not be permitted.

    The Contractor shall, through the Engineer, at least 10 days prior to the commencement of any construction activities, arrange for a CT DOT Environmental Inspector from the Office of Environmental Planning (OEP) or their authorized delegate to be available to meet and identify the nest location as well as discuss proper protocol for maintaining environmental commitments made to the protection of this species and habitat.

    This species is protected by State laws which prohibit killing, harming, taking, or keeping them in your possession. Workers shall be notified of the existence of peregrine falcons in the area and be apprised of the laws protecting them. Photographs of, and the laws protecting, peregrine falcons shall be posted in the Contractor's and DOT field offices (species ID sheets will be provided by OEP). Any observations of this species are to be immediately reported to the Department.





Northern Diamondback Terrapin
Connecticut Species of Special Concern

Scientific Name*: Malaclemys t. terrapin*
Size: Males: 4-5.5 inches (10.2-14 cm) in length
Females: 6-9 inches (15.2-22.9 cm) in length

Habitat Type:

The Northern diamondback terrapin is the only species of turtle in North America, including Connecticut, that spends its life in brackish water (water that is less salty than sea water) which includes salt marshes, estuaries and tidal creeks. They hibernate in the winter submerged in the mud of tidal creeks. If a safety boat or barge is to be used, be cognizant of turtles possibly mating within the project area and proceed slowly when in tidal areas. Nests are constructed on the sandy borders of salt marshes and in dunes.

Colorations:

- The terrapin has both a dark and light variation. Both variations have carapaces (top of shell) patterned with concentric rings or ridges.
  - The dark variant has a completely black carapace (top of shell) with a yellow to off-white plastron (bottom chest plate). Their heads are gray to off-white with small black spots or streaks and their legs are dark gray to black.
  - The lighter variant has a gray to light brown carapace with yellow to greenish gray plastrons. Their heads are gray with small pepper-like gray spots and their legs are gray.
- The plastron may or may not be marked with bold, dark markings.
- The limbs and head may be spotted.
- Hatchlings are patterned similar to adults, but are brighter.

Characteristics:

- Small marine turtle. They spend their entire lives in a brackish environment.
- The carapace is wedge-shaped when viewed from above, with the widest part in the rear.
- They have large webbed feet.

If any Northern diamondback terrapins are observed in or around the project area, the Office of Environmental Planning (OEP) must be notified at 860-594-2937 or 860-594-2938. If OEP staff cannot be reached at either of the above referenced phone numbers, the District Environmental Coordinator will need to be contacted to facilitate further coordination with OEP's Water and Noise Compliance Unit.

SECTION 1.10 - ENVIRONMENTAL COMPLIANCE

In Article 1.10.03-Water Pollution Control:
REQUIRED BEST MANAGEMENT PRACTICES

Add the following after Required Best Management Practice Number 13:

14. The Contractor is hereby notified that the State listed species of Special Concern Northern diamondback terrapin (*Malaclemys t. terrapin*), is present within the Project limits. Northern diamondback terrapins are the only species of turtle in North America that spends its life in brackish water (water that is less salty than sea water). They are most abundant in tidal estuaries and will also be found in salt marshes and tidal creeks. Northern diamondback terrapins nest on the sandy borders of these habitats from June to July. Northern diamondback terrapins hibernate during the winter submerged in the mud of tidal creeks. They enter hibernation as early as November and emerge as early as April through the end of May depending on water temperature.

    All construction activities taking place within the Project limits will need to be coordinated with the Office of Environmental Planning (OEP) through the Engineer. At least 10 days prior to the commencement of any physical construction activities, the Contractor shall, through the Engineer, arrange for a CTDOT OEP Environmental Inspector, or their authorized delegate, to meet and discuss proper protocol for maintaining environmental commitments made for the protection of this species and habitat. OEP will provide oversight through the Engineer to ensure that the following protocols are followed and maintained during the course of the Project.

    During the terrapin's dormant period (November 1 to May 31):
    - Once the areas within the Project limits have been inspected and cleared of any nest sites, construction activities will be allowed in upland areas.
    - Work is not allowed in wetland/watercourse and sandy border areas unless these areas were in active construction prior to November 1, and additionally, do not contain any areas of terrapin habitat.

    For any work done during the terrapin's active period, which includes the nesting and hatching period, (April 1 to October 31), the CTDOT will require the following precautionary measures to protect the terrapin and terrapin habitat:

    a. All construction personnel working within Northern diamondback terrapin habitat must be apprised of the species description and the possible presence of this listed species.

    b. Exclusionary practices will be required in order to prevent any Northern diamondback terrapin access to construction areas. These measures will need to be installed at the limits of disturbance as shown on the plans.

c. Exclusionary fencing shall be at least 20 inches tall and must be secured to and remain in contact with the ground. The Contractor shall regularly inspect and maintain the fencing to prevent any gaps or openings at ground level. Standard silt fence is adequate; fencing with netting shall not be used.

d. The Contractor must search the work area each morning for the presence of this listed species prior to any work being done.

e. Any Northern diamondback terrapins encountered within the immediate work area shall be carefully moved to an adjacent area outside of the excluded area and the Engineer shall be immediately informed to contact OEP with the location.

f. All staging and storage areas in the vicinity of Northern diamondback terrapin habitat, outside of previously paved locations, regardless of the duration of time they will be used, must be reviewed by and receive written approval from OEP through the Engineer.

g. No heavy machinery or vehicles may be parked in any identified Northern diamondback terrapin habitat.

h. Exclusionary fencing shall be removed when it is no longer needed, and silt fence shall be removed as soon as the area is stable, to allow for reptile and amphibian passage to resume.

i. If a safety boat or barge is required for this Project, the Contractor must use special caution when navigating within tidal creeks. Terrapins tend to congregate close to the surface during their active period. Maintaining slow speeds will ensure the turtles' safety.

These practices will be applied to the entire Project unless a sketch is attached which identifies specific areas of concern.

This species is protected by State laws, which prohibit killing, harming, taking, or keeping them in your possession. Photographs and the laws protecting Northern diamondback terrapin shall be posted in the Contractor's and CTDOT field offices (species ID sheet will be provided by OEP).

Attachment M6 – Selected CTDOT Specifications

Item # 0101135A - Disposal of Debris

Item # 0210300A - 021030XA – Delivery and Installation of Turbidity Control Curtains

Item # 0948013A – Tidal Wetland Creation

Item # 0949315A - Fiber Roll

Item # 0949875A – Wetland Plantings

Item # 0950202A - Shoreline Grass Establishment

Item # 0952051A - Control and Removal of Invasive Vegetation

Notice to Contractor – Invasive Plant Species

ITEM #0101135A – DISPOSAL OF DEBRIS

Description: The work shall consist of the pickup and transport, as required, of non-project related debris from within the Project and mitigation limits. This item shall include all necessary equipment, material, accessories and labor to pickup and transport non-project related debris to a primary or secondary waste stockpile area or to an approved location as directed by the Engineer, where it will be disposed of by others. Debris located within the Project and mitigation limits shall be removed, including, but not limited to roadway pavement, rocks, wood, floating logs or other debris within the Norwalk River, concrete, metals and rubbish.

Construction Methods: The Contractor shall notify the Engineer of any debris encountered within mitigation limits and shall be responsible for the removal and proper disposal of debris.

Method of Measurement: The sum of money shown on the estimate and in the itemized proposal as "Estimate Cost" for disposal of debris will be considered the price bid even though payment will be made only for actual work performed. The estimate cost figure is not to be altered in any manner by the bidder. Should the bidder alter the amount shown, the altered figures will be disregarded and the original price will be used to determine the total amount of the bid for the Contract.

Basis of Payment: "Disposal of Debris" will be paid for in accordance with 1.09.04–Extra and Cost-Plus Work.

Pay Item	Pay Unit
Disposal of Debris	est.

ITEM #021030XA – DELIVERY AND INSTALLATION OF TURBIDITY CONTROL CURTAINS
ITEM #021031XA – MAINTENANCE AND RELOCATION OF TURBIDITY CONTROL CURTAINS
ITEM #021032XA – REMOVAL OF TURBIDITY CONTROL CURTAINS

Description: This work consists of furnishing, constructing, installing, relocating, maintaining, and removing a turbidity control curtain from the Norwalk River to minimize the drift of suspended sediment in the river. The layout of the turbidity control curtains shall be as indicated on the Contract plans, permits or as directed by the Environmental Scientist from the Office of Environmental Planning (OEP).

Materials: The Contractor shall use Type 3 Permeable Turbidity Barriers when working within tidally influenced waters.

Fabric: The turbidity control curtains fabric shall consist of 22 oz./yd^2 Nylon reinforced Vinyl Fabric (PVC), with UV inhibitors. The material shall have a tensile strength of not less than 200 lbs. when measured lengthwise or crosswise.

Length: The length of the turbidity control curtain shall be as specified in the plans, permit.

Skirt Depth: The depth of the skirt shall be measured to maintain a 1-foot offset above the bottom of the watercourse at all locations during high tide.

Color: The color of the turbidity control curtain shall be yellow.

Seams: All horizontal seams shall be 100% heat welded and all vertical seams shall be 100% RF welded.

Flotation Units: The flotation unit shall be a 12" polystyrene float with a buoyancy of 50 lbs./ft^2 capable to keep the turbidity control curtain at a minimal elevation of 3 inches above the water line.

Top Tension Cables: The top tension cable shall be 5/16" galvanized steel cable placed on each side of the curtain. The breaking strength of the tension cable shall be 10,000 lbs. per cable with a total breaking strength of 20,000 lbs.

Bottom Ballast Chain: The bottom ballast chain shall be 3/8" galvanized steel chain placed at the bottom on the skirt. The chain shall be finished off on both ends with a stress plates with a 1-ton hook on one end and ring on the other end. The breaking strength shall be 10,600 lbs. and weight shall be 1.50 lb./ft.

Fasteners: Top 18 inches shall consist of marine grade aluminum slide connectors and grommets for lacing from below the connector to bottom edge of skirt. The edges shall be reinforced with 5/8" poly rope with a minimum breaking strength of 800 lbs.

Anchors: The anchor shall consist of a leader chain, nylon rope, heavy duty marker buoy and 6 ft. of painted line. The anchor can be a grappling hook, plow or fluke-type and digs into the river bottom/harbor. The nylon rope shall act as an anchor line between the anchor and buoy. The anchor line shall have enough slack to allow the barrier to float freely with tidal changes without pulling the curtain below the water surface. The anchors shall be placed every 50 ft. to 100 ft. Alternate anchoring methods such as heavy concrete weights, driven pilings, or stakes may be used if approved, prior to use, by the Environmental Scientist.

Construction Methods: Prior to any river disturbance within the Project limits, the Contractor shall submit to the Environmental Scientist for review and approval, through the Engineer, the Type III Permeable Turbidity Barriers to be used. Within 30 days of receipt of the submittal, the Engineer will notify the Contractor whether the submittal is approved, rejected or requires modifications. If any part of the plan is not approved, the Contractor shall promptly make any necessary changes and re-submit the entire plan for approval. The entire plan must be approved in writing prior to beginning any in-water work within the Project Site.

General: When assembling and installing a turbidity control curtain, the Contractor shall follow the directions of the manufacturer.

Unless otherwise directed by the Environmental Scientist, the Contractor shall begin installation at high tide from a shoreline anchorage and work along with the current in a downstream direction.

The turbidity control curtain shall form a continuous vertical and horizontal barrier able to contain suspended sediment or turbidity within the river. The bottom skirt shall be suspended a minimum of 12 inches off the bottom of the river for the entire length of the turbidity curtain during high tide.

Installation of Turbidity Curtain: The turbidity control curtain shall be floated into position, attached to the anchor lines, and then unfurled.

The Contractor shall securely attach curtain panel ends together using rope lashings. The top lashing shall be securely tied to the anchor line.

The Contractor shall place the anchors such that the turbidity control curtain remains in the proper location and none of the flotation devices are pulled under the water surface. If directed by the Engineer, the Contractor shall supply and place additional anchorage.

Maintenance of Turbidity Curtain: Throughout the Project duration, the Contractor shall maintain the turbidity control curtain so that no sediment caused by the Project enters the Norwalk River beyond the limits of the turbidity control curtain.

Turbidity control curtains damaged prior to installation, during installation, or during the life of the Contract shall be repaired or replaced to the satisfaction of the Environmental Scientist.

Removal of Turbidity Curtain: The turbidity control curtain shall remain in place until all regulated in-water work for the Project is complete and the turbidity level has settled to preconstruction conditions.

When directed by the Environmental Scientist, the turbidity control curtain shall be furled in place, then released from its anchors and towed out of the water. The turbidity control curtain and all materials incidental to the construction of the turbidity control curtain shall be removed in such a manner as to minimize turbidity within the Norwalk River.

The turbidity curtain and related components shall become the property of the Contractor and shall be removed from the Project.

Method of Measurement:

1. **Delivery and Installation of Turbidity Control Curtains**: The length of turbidity control curtain measured for payment will be the number of linear feet of new turbidity control curtain accepted.
2. **Maintenance and Relocation of Turbidity Control Curtains**: The length of turbidity control curtain measured for payment will be the number of linear feet of turbidity control curtain maintained during construction and relocated between construction stages.
3. **Removal of Turbidity Control Curtains**: The length of Turbidity control curtains removed at the completion of construction.

Basis of Payment: Payment for this work will be made at the Contract unit price per linear foot of "Turbidity Control Curtains," completed in place, which shall include all materials, equipment, tools and labor incidental to the furnishing, assembling, installing, maintaining, relocating and removing of the turbidity control curtains.

Pay Item	Pay Unit
Delivery and Installation of Turbidity Control Curtains	l.f.
Maintenance and Relocation of Turbidity Control Curtains	l.f.
Removal of Turbidity Control Curtains	l.f.

ITEM #0948013A – TIDAL WETLAND CREATION

Description: The work under this item shall consist of the construction of a tidal creation area, tidal restoration area, tidal enhancement area ("mitigation area"), turtle nesting habitat area or living shoreline area at the Site(s) identified on the Tidal Wetland Mitigation Plans. The work generally consists of excavating, backfilling, furnishing material and preparing appropriate Site grades under the direction of an Environmental Scientist from the Connecticut Department of Transportation's Office of Environmental Planning (OEP).

This work shall include "Tidal Wetland Creation" within the tidal wetland mitigation area(s), living shoreline and turtle nesting habitat area(s), complete in place, including all materials, equipment, maintenance, tools, labor, and work incidental thereto as indicated in the plans.

The Tidal Wetland Creation shall also include: survey and staking of reference elevations and work associated with maintaining the field stakes for the duration of construction to the point of acceptance of the Site by OEP; forming subgrade within the tidal wetland mitigation areas, living shoreline or turtle nesting habitat areas; testing, mixing, and providing backfill, granular fill, riprap and planting soil; placing backfill and granular fill, placing turtle nesting beach sand, furnishing and placing oyster cultch and planting soil; restoring stockpile and staging Site(s); removing and disposing of debris, garbage and litter; and forming subgrade and planting soil within the wetland mitigation areas or turtle nesting habitat areas. The installation, maintenance, and removal/restoration of haul roads shall also be included in this item.

The Tidal Wetland Creation items required for the installation and removal of sedimentation and erosion controls, including sedimentation control systems, anti-tracking pad and coir/fiber rolls shall be paid for under their respective Contract items.

Excavation items shall be covered under Section 2.02, for Earth Excavation.

Excavated material shall be handled per Item #0101117A Controlled Material Handling.

Plantings shall be covered under Item #0949875A – Wetland Plantings.

Seeding shall be covered under their respective Contract items as shown in the plan.

The disposal of wood debris, rubbish, or other bulky debris encountered during excavation of the Site shall be covered under Contract Item #0101135A – Disposal of Debris.

Removal of and control of invasive vegetation shall be covered under Item #0952051A – Control and Removal of Invasive Vegetation.

Materials:

Planting Soil shall be native or manmade planting soil. Planting soil shall consist of soils containing *no more than* 25% sand by weight and an organic content between 25% and 40% by

weight. The Contractor shall test all planting soil and a certified test report shall be submitted to OEP for review and acceptance.

Planting soil not furnished by the Contractor shall be native soil material from areas free of invasive species stripped from permitted earth excavation areas within the Project limits. The stripped soil shall meet the criteria specified above and Certified Material Test results shall be approved by the OEP. If these soils do not meet the criteria, additional material from off-Site areas may be substituted or mixed with the on-Site material provided the resultant soil composition meets the applicable criteria.

The soils must be analyzed by USDA-approved methodology for organic matter by loss-on-ignition of oven-dried samples dried at 221°F. The mineral fraction must be analyzed to determine weight percentage of sand, as determined after passing a No. 10 sieve. Sand particles are defined to be between No. 35 and No. 10 sieve. Certified Materials Test results are to be submitted to OEP for approval. The soils must be free of seeds and roots of invasive species, inspected, and approved by OEP prior to their application.

If soil must be supplemented with organic material, the following sources are acceptable, but must meet the criteria for planting soil specified above:

a) **Native Wetland Soil**: The top layer of native wetland soil shall be excavated from within the Project limits or from another permitted wetland source approved by OEP. The bottom of this layer shall be defined as the depth at which the soil color and texture changes, indicating the beginning of the subsoil. Each source must be inspected in place at least 6 months prior to excavation for determination by OEP that it is free from seeds and roots of invasive species.

b) **Peat** shall meet the requirements of **Subarticle M.13.07–Plant Materials: 10. Peat.** Peat material excavated from the Project Site shall be substituted for commercially packaged peat, at the discretion of the Engineer if the on-Site peat does not meet all the requirements of M.13.07.

Backfill used in the tidal wetland mitigation area shall be native or manmade material. Backfill shall consist of soils meeting the textural classification of silt loam with at least 50% silt and the clay percentage less than 25%. The Contractor shall test the soil by USDA-approved methodology. A Certified Materials Test Report shall contain analysis of the mineral fraction to determine the particle gradation to meet the silt loam textural requirement. The Certified Materials Test Report shall be submitted to OEP for acceptance. The soils must be free of seeds and roots of invasive species and shall be inspected and approved by OEP prior to use and application.

Turtle Nesting Beach Sand shall be natural or manufactured sand consisting of clean, hard, durable, uncoated particles of quartz, other rock or marine shell fragments. It shall be free from lumps of clay, soft or flaky material, mica, loam, organic or other injurious material and shall be analyzed according to AASHTO T 21 to meet the following Site specific gradation:

Sieve Size	Percent Passing
1/2”	100
3/8”	97 – 100
No. 4	93 – 100
No. 8	86 – 97
No. 16	70 – 95
No. 30	25 – 88
No. 50	5 – 55
No. 100	0 – 10
No. 200	0 – 2

Turtle nesting beach sand shall meet the requirements of the colorimetric test and shall not produce a color darker than Gardner Color Standard No. 11. A certified materials test report shall be submitted by the Contractor to the Engineer for OEP acceptance.

a) **Soundness:** When tested with magnesium sulfate solution for soundness according to AASHTO T 104, no more than 10% of the fine aggregates shall be lost at the end of 5 cycles. Turtle nesting beach sand that fails to meet this requirement, but meets all other requirements, may be allowed for use on a restricted basis with the approval of the Engineer on a case-by-case basis.

b) **Storage:** Aggregate stockpiles shall be located on smooth, hard, sloped/well drained areas. Each source and gradation shall have an individual stockpile or bin. Aggregates shall be handled from stockpiles or other sources in such manner as to minimize segregation of the material. Aggregates that have become segregated or mixed with earth or foreign material shall not be used.

c) **Granular Fill:** Turtle nesting beach sand shall be placed on a 6-inch layer of granular fill. Granular fill shall meet the requirements of **Subarticle M.02.01–Granular Fill.**

Living Shoreline shall consist of riprap and granular fill.

a) **Riprap:** The riprap size shall be as noted on the plans and shall be resistant to action of air and water. Riprap shall meet the requirements of **Subarticle M.12.02–Riprap**.

Riprap material proposed by the Contractor must be inspected and approved by the OEP or their authorized delegate prior to the excavation of existing on-Site material within the Project limits or hauling of material from an off-Site source. The Contractor shall give the Engineer at least 10 working days’ notice for scheduling of the inspection and approval of the riprap.

b) Granular Fill: Granular fill shall be placed as shown on the plans. Granular fill shall meet the requirements of **Subarticle M.02.01–Granular Fill.**

Oyster Cultch: The Contractor shall submit to the Engineer the oyster cultch source supplier for approval through OEP and the Norwalk Shellfish Commission. Once source supplier is approved, a 5-gallon bucket sized sample shall be submitted for review by the Department of Agriculture, Bureau of Aquaculture prior to placement within the tidal mitigation areas. If the cultch source supplier is from Connecticut, no air-drying is required. If the cultch source supplier is from outside of Connecticut, the Contractor shall provide certified documentation that the cultch has been air dried for six months.

Construction Methods: An Environmental Scientist from the OEP will be on-Site to oversee and monitor construction of the tidal wetland mitigation area(s) to ensure compliance with the Tidal Wetland Mitigation Plans.

The Contractor shall submit a construction schedule and an outline of construction methodologies (called the Contractor's Mitigation Plan) for the required earthwork of the tidal wetland creation Site according to the general construction sequence and requirements outlined below to OEP for approval. No work associated with the tidal wetland mitigation area(s), living shoreline, invasive treatment areas, or turtle nesting habitat area(s) shall commence until the OEP has reviewed the submittal and approval is granted. OEP shall have 30 days from the date the submission is received from District Construction to review and approve the submission.

The Contractor must schedule tidal creation activities to begin as soon as access allows. There shall be no inactive period of longer than 10 days between the beginning of the excavation of the mitigation Site and the time when final grades are reached. When applicable, and when conditions warrant, excavation and final grading shall be completed during and near times of low tide unless the work area is contained and isolated from tidal action. The excavation, furnishing of material, final grading, seeding and planting shall be scheduled so that planting will occur within the planting season according to Item #0949875A – Wetland Plantings.

Upon completion of final grades, the Site shall be exposed to tidal flushing for a minimum of 7 days and a maximum of 14 days to allow for settlement of the planting soil and to evaluate final grades. During the 7-14 day settling period, the HTL will be flagged in the field by the Environmental Scientist from OEP or their designated representative. At the end of the first 7 days, the Site conditions will be evaluated by an Environmental Scientist from OEP. Adjustments to final grades or additional placement of planting soil may be made at this time. Planting of rootstock shall immediately follow.

The Contractor shall provide a construction schedule to the Engineer and OEP prior to beginning any construction activities. No work shall commence without OEP concurrence. The Contractor shall ensure that the Environmental Scientist from OEP is available at least 10 days prior to the commencement of these activities to ensure that the Environmental Scientist is available.

OEP reserves the option to adjust the mitigation Site final Grading and Planting Plans to ensure mitigation Site success. During planting, the OEP Environmental Scientist, or their designated

representative may relocate up to 50% of the plants in each community type if as-built conditions would pose an unreasonable threat to the survival of plantings installed according to the Planting Plan. The plantings shall be relocated within the tidal wetland creation area to locations with suitable hydrology and soils and where appropriate structural context with other plantings can be maintained.

Upon approval of the Contractor's Mitigation Plan submittal, the Contractor shall meet with the OEP Environmental Scientist in the field prior to on-Site mobilization for the following work at the various mitigation areas:

Mitigation Area 1, Mitigation Area 3 and Mitigation 6B

(a) Remove nuisance vegetation and all invasive plant species in accordance with Contract Item #0952051A – Control and Removal of Invasive Vegetation to the limits shown on the plans.

(b) Install tidal creation signs as directed by OEP.

Mitigation Area 2, Mitigation Area 6 and Mitigation 6A (except as noted)

(a) Identify proposed temporary stockpile and staging locations.

(b) Verify and delineate established Limit of Disturbance as shown on the plans. Prior to excavation or placing of planting soil, backfill, living shoreline or turtle nesting beach sand, the Contractor shall set reference stakes for Site-specific tidal data at the mitigation Site in order to establish appropriate elevations for final grading as directed by OEP staff.

1. Obtain (survey) elevation of existing tidal vegetation and stake in field as directed by OEP.
2. Stake CJL, HTL, MHW, MLW and other jurisdictional limits as may be required by the Project permit.

(c) Install temporary sedimentation and erosion control measures.

(d) Remove nuisance vegetation and all invasive plant species in accordance with Contract Item #0952051A – Control and Removal of Invasive Vegetation.

(e) Identify, clear, grade, and construct any required haul road(s) for access if necessary. Construct haul roads in a manner that minimizes disturbance to existing native vegetation. No additional impacts shall occur to the existing tidal wetland vegetation other than the impacts depicted on the plans. Access haul roads are to be maintained throughout the duration of the Project and haul road locations restored back to their original condition or as depicted on the plans.

(f) **Mitigation Area 2.** Where phragmites are present within the mitigation Site, over excavate to a minimum depth of 3 feet or to a sufficient depth below existing grade for the removal of all rhizomes or as directed by an Environmental Scientist from OEP.

(g) **Mitigation Area 6 and Mitigation Area 6A.** Remove the surface layer of existing riprap. Riprap removed shall be used to create the Living Shoreline. Existing riprap below the surface shall be over excavated to sufficient depth as directed by the Environmental Scientist from OEP. Existing on-Site riprap proposed to be used to create the Living Shoreline shall meet the percentage criteria as defined in the Contract plans. If there is an insufficient quantity of suitable material on-Site to create the Living Shoreline, the Contractor shall procure riprap of similar size to complete the Living Shoreline.

(h) Where over-excavation has occurred in the mitigation site areas, backfill material, as specified above, shall be placed to meet the proposed subgrade and compacted to the depth specified in the plans or as directed by an Environmental Scientist from OEP.

(i) A minimum of 14 inches of tested and approved planting soil shall be placed and compacted over the approved subgrade up to the final grade as shown on the Plan or as directed by an Environmental Scientist from OEP.

(j) **Mitigation Area 2.** Living shoreline, as specified under Materials, shall be placed within the mitigation Site to meet the proposed grade as required.

(k) **Mitigation Area 2.** Excavate turtle nesting habitat area to a minimum depth of at least 3 feet below proposed finished grade or as directed by the Environmental Scientist from OEP. Where phragmites rhizomes are present, over excavation shall be to a sufficient depth to remove all roots within the nesting turtle habitat area as directed by OEP. Granular fill, as specified above shall be placed in over excavated turtle nesting beach sand area on top of the proposed subgrade as required.

(l) **Mitigation Area 2.** Place tested and approved turtle nesting beach sand material on top of approved granular fill to the final grades shown on the Plan and in a manner consistent with specification of the Plan and as directed by an Environmental Scientist from OEP. Material shall be placed in a manner to avoid compaction.

(m) Oyster Cultch, as specified under Materials, shall be placed along the outer perimeter of the mitigation Site to meet the proposed grade as required.

(n) If wood debris, rubbish, or other bulky debris is encountered during over excavation of a mitigation Site or turtle nesting habitat area, the materials shall be removed and backfill placed in the resulting excavation to meet the proposed and approved subgrade. Materials shall be removed from the tidal mitigation areas and transported to an approved upland facility. Disposal of such materials will be paid for under Contract Item #0101135A – Disposal of Debris.

(o) Following placement of planting soil, re-establish Site-specific tidal data (CJL, HTL, MHW, MLW) at the mitigation Site and stake in the field in order to establish appropriate elevations for tidal wetland plantings.

(p) Prior to seeding, the seed tag shall be supplied to OEP for review and approval. Substitutions must be approved by OEP. Initiate and complete seeding consistent with specification of the Mitigation Plan.

(q) Upon placement of planting soil and approval of the Site by OEP, the Site shall be exposed to tidal flux for a minimum of 7 days and a maximum of 14 days. At 7 days, OEP will inspect the Site and adjustments to final grade or planting soil depths may be made. An additional 7 days of exposure to tidal fluctuation may be recommended by OEP at this time and further adjustments to grade may be made.

(r) OEP will inspect the mitigation Site at the conclusion of the 14 day tidal exposure. OEP will approve the Site prior to planting.

(s) **Mitigation Area 2.** Place coir rolls as shown on the plans or as directed by the Environmental Scientist from OEP.

(t) Following 14 days of exposure to tidal cycles, planting of rootstock shall commence in accordance with the Plans. During the performance of this work, an Environmental Scientist from OEP will be available to visit the Site to direct the planting within the wetland mitigation Site(s). The Contractor shall notify the Engineer at least 10 days prior to the commencement of these activities to ensure that the Environmental Scientist is available. Any proposed plant substitutions must be approved in advance by OEP.

(u) Upon stabilization of all Sites, remove temporary sedimentation and erosion control measures. Temporary devices and structures to control erosion and sedimentation in and around the tidal wetland mitigation area and turtle nesting habitat area shall be disassembled and properly disposed of. Sediment collected by these devices shall be removed and placed upland in a manner that prevents its erosion and transport to a waterway or wetland, in accordance with the Required Best Management Practices in Article 1.10.03.

(v) Restore stockpile and staging Site(s) and access/haul roads to the mitigation Site to their original condition or as depicted in the Tidal Mitigation Plan.

(w) Upon Site completion, clear the mitigation Site of any debris, rubbish, garbage, and other manmade litter.

(x) Provide certified post construction as-built plans of the mitigation Sites to OEP as defined by the Army Corps of Engineers and/or DEEP Land and Water Resources Division (LWRD) permit requirements.

(y) Install tidal creation signs as directed by OEP.

Mitigation Area 4 and Mitigation Area 5

(a) Remove nuisance vegetation and all invasive plant species in accordance with Contract Item #0952051A – Control and Removal of Invasive Vegetation and as shown in the plans.

(b) Planting, as directed by OEP, shall be done in the final year of bridge construction.

(c) Install tidal creation signs as directed by OEP.

Method of Measurement: This item will be paid for at the contract lump sum price for ITEM #0100154A – LUMP SUM.

Basis of Payment: This item will be paid for at the contract lump sum price for ITEM #0100154A – LUMP SUM which price shall include all administrative and procedural requirements, materials, equipment, labor and work incidental thereto.

ITEM #0949315A – FIBER ROLL

Description: This item shall consist of the furnishing and installing natural fiber rolls for uses as an erosion and sedimentation control measure as well as along slopes, streambanks, shorelines and as a wetland stabilization measure in accordance with the lines, grades, dimensions, sections and details shown on the plans.

Materials: Natural fiber roll shall be composed of 100% coconut fiber material and biodegradable. The minimum diameter of the fiber rolls shall be 20-inches.

Wooden stakes shall consist of a strong durable wood species without knots or flaws and installed per manufacturer's recommendation or at the discretion from the Environmental Scientist from the Office of Environmental Planning (OEP).

Construction Methods: The Contractor shall not place any fiber rolls until the Engineer is notified a minimum of 10 days prior to initiating placement. The Contractor shall coordinate all material selections, sizes and work with the Engineer to the produce the desired effects. Placement of fiber rolls may be subject to revision based on recommendations from the Environmental Scientists due to existing on-Site conditions.

Fiber rolls shall be placed and installed per the limits as shown on the plans. The fiber roll shall be embedded below existing or proposed grade to 1/3 of the diameter.

Adjacent fiber rolls shall be laced together, end to end, tightly and securely.

Method of Measurement: This item will be paid for at the contract lump sum price for ITEM #0100154A – LUMP SUM.

Basis of Payment: This item will be paid for at the contract lump sum price for ITEM #0100154A – LUMP SUM which price shall include all administrative and procedural requirements, materials, equipment, labor and work incidental thereto.

ITEM #0949875A – WETLAND PLANTINGS

Amend Section 9.49 as follows ***for Wetland Mitigation Area(s) only****:*

Article 9.49.01—Description: *Add the following:*

Work under this item shall also include furnishing, installing, trees, shrubs and herbaceous stock of the type and size indicated in the Mitigation Planting Schedule and Mitigation Planting Plan for the Wetland Mitigation Area(s). Work in the Wetland Mitigation Area(s) will be performed under the direction of an Environmental Scientist from the Connecticut Department of Transportation's Office of Environmental Planning (OEP).

Replacement of dead or rejected plants required within 1 year of the initial planting installation will not be measured for payment. The Environmental Scientist will inspect the wetland plants 1 year after initial installation, and determine the number and types of replacement plants to be provided. Forty percent (40%) of the Contract value for this item will be withheld until final acceptance of the mitigation plantings.

Article 9.49.02—Materials: *Add the following:*

The trees, shrubs and herbaceous stock to be planted within the Wetland Mitigation Area(s) shall be native varieties of those species listed in the Mitigation Planting Schedule of the Mitigation Planting Plan. The Environmental Scientist must approve any species substitutions from the Mitigation Planting Plan a minimum of 30 days in advance and receive regulatory approval of any substitutions prior to health inspection by DOT Landscape Design Unit and delivery to the Site. If substitutions are proposed, the Contractor must provide OEP with documentation from 5 wholesale plant material sources of supply indicating that the species type or size listed in the Mitigation Planting Schedule is not available. No cultivars or hybrids of any species will be allowed as a substitution.

If backfill material is required within the Wetland Mitigation Area(s) due to over excavation of the Site, as determined by the Environmental Scientist, it shall meet the soil requirements of the Tidal Wetland Creation special provision.

Article 9.49.03—Construction Methods:

1. **Planting Season:** *Add the following:*

All Plant Material to be Installed (Including Deciduous and Evergreen)

April 15 to October 15 (inclusive for ***TIDAL WETLAND MITIGATION*****):**
For **Tidal Wetland Mitigation Area(s)**, installation of all trees, shrubs, and herbaceous plantings must be initiated after final grade of the Site has settled and has been evaluated for tidal flows during a specified time period provided by the Environmental Scientist. Upon OEP review

and evaluation of tidal conditions, planting must be performed and completed within the specified period, or as otherwise directed by the Environmental Scientist.

For tidal Wetland Mitigation Area(s), a schedule for planting must be submitted by the Contractor and approved by the Environmental Scientist at least 30 days prior to planting. Plant locations shall be as generally depicted in the planting plan for the Wetland Mitigation Area(s) or as directed by the Environmental Scientist.

3. Layout: *Add the following:*

For Wetland Mitigation Area(s), the Contractor shall review Site conditions and inform the Environmental Scientist of any conflicts. The Contractor shall coordinate planting layout with the Environmental Scientist for approval.

4. Excavation: *Add the following:*

For Wetland Mitigation Area(s), planting areas shall be prepared by use of approved tools or machinery. All undesirable invasive species shall be removed in accordance with the requirements detailed in the Control and Removal of Invasive Vegetation special provision. Roots, debris or other obstructions shall be removed from the planting areas. All undesirable material shall be removed from the Site and disposed of by the Contractor in a manner satisfactory to the Engineer. Excavated material shall be handled under Item #0101117A – Controlled Material Handling.

5. Pits: *Add the following:*

Plant pits within the Wetland Mitigation Area(s) must be hand dug. Machinery may be allowed for use in limited areas, with prior approval of the Environmental Scientist.

6. Backfill: *Add the following:*

For Wetland Mitigation Area(s), backfill shall be as specified in the Tidal Wetland Creation special provision.

8. Setting Plants: *Add the following:*

d. Setting of Herbaceous Stock in Wetland Areas: Herbaceous stock shall be planted within planting cells or clusters, such that individual plants of the same species are grouped together within each cell. The term planting cells refers to the discrete clusters of plants shown on the approved Mitigation Planting Plan. If plant species are not shown planted in discrete clusters, the planting cell is the entire Wetland Mitigation Area(s). Planting cells shall be installed as shown on the plans according to their wetland indicator status or as directed by the Environmental Scientist.

e. Setting of Trees and Shrubs in Wetland Areas: Trees and shrubs shall be installed as shown on the Mitigation Planting Plan or as directed by the Environmental Scientist. The

placement of trees and shrubs must be identified in the field and approved by the Environmental Scientist prior to installation and placed according to their wetland indicator status. All trees and shrubs in the Wetland Mitigation Area(s) shall be set so that they are level with the microtopography within the immediate area. For each species of tree or shrub, the number of plants shall be evenly distributed within each planting zone, or as directed by the Environmental Scientist.

f. During planting, the Environmental Scientist may relocate up to 50% of the planting cells from the locations shown on the plans to ensure the survivability in accordance with Army Corps of Engineers Mitigation Guidance. All plants shall be set manually, and any relocated planting cells shall be placed in locations with suitable hydrology and soils, and where appropriate structural context with other planting cells can be maintained, as determined by the Environmental Scientist.

9. Fertilizing: *Add the following:*

Fertilizing within the Wetland Mitigation Area(s) is strictly prohibited.

10. Watering: *Add the following*

Watering within the Wetland Mitigation Area(s) is strictly prohibited.

11. Guying and Staking: *Add the following:*

For Tidal Wetland Mitigation Area(s), the guying and staking within coastal areas may occur above the higher elevation between the Coastal Jurisdictional Limit (CJL) or High Tide Limit (HTL) or as directed by the Environmental Scientist to stabilize plantings due to tidal flows.

12. Wrapping: *Delete Section.*

13. Pruning: *Delete Section.*

14. Spraying: *Delete Section.*

15. Mulching: *Add the following:*

For Tidal Wetland Mitigation Area(s), the mulching within coastal areas may occur above the higher elevation between the Coastal Jurisdictional Limit (CJL) or High Tide Limit (HTL) or as directed by the Environmental Scientist.

17. One-Year Establishment Period: *Add the following:*

A one-year review will be required from the date of initial plant installation within the Tidal Mitigation Areas. The Environmental Scientist will identify, list and quantify dead or rejected plants. The Contractor shall furnish and install new plants as directed by the Environmental Scientist. Dead or rejected plants need not be removed from Wetland Mitigation Area(s).

Add the following at the end of Article 9.49.03:

18. Control and Removal of Invasive Vegetation: The Contractor shall control and eradicate the presence of invasive species within the Wetland Mitigation Area(s) and a minimum of 50 feet around the perimeter of the Wetland Mitigation Area(s) limits. Invasive vegetation removal, if required, shall be as specified in the Control and Removal of Invasive Vegetation special provision.

Article 9.49.04—Method of Measurement:

Add the following ***for Wetland Mitigation Area(s)*** *only:*

This item will be paid for at the contract lump sum price for ITEM #0100154A – LUMP SUM.

Article 9.49.05—Basis of Payment: *Add the following:*

This item will be paid for at the contract lump sum price for ITEM #0100154A – LUMP SUM which price shall include all administrative and procedural requirements, materials, equipment, labor and work incidental thereto.

ITEM #0950202A - SHORELINE GRASS ESTABLISHMENT

Description: This item includes furnishing and placing a seed mixture to establish shoreline grasses within the Tidal Wetland Mitigation Site(s) or other locations shown on the Plans and directed by the Engineer.

This work will be paid for at the Contract unit price per square yard for "Shoreline Grass Establishment," which price shall include all materials, maintenance, equipment, tools, labor, transportation, operations and all work incidental thereto. Partial payment of up to 50% may be made for work completed, but not accepted. Full payment will be made when the work has been accepted by the Engineer.

Materials: All shoreline grass seed mixture sources shall be local to the northeast (New England, New York, Pennsylvania, New Jersey, Delaware, or Maryland).

Three qualified shoreline grass seed mixtures are detailed below. An equal seed mixture shall be submitted to the Office of Environmental Planning (OEP) for approval.

1. **New England Coastal Salt Tolerant Grass Mix**, New England Wetland Plants, Inc. 820 West Street Amherst, MA 01002. Rate shall be 1 pound PLS per 1,250 square foot.

2. **NJ Salt Tolerant Basin Mix,** Ernst Conservation Seeds, Inc. 8884 Mercer Pike, Meadville, PA 16335. Rate shall be 1 pound PLS per 2,180 square foot.

3. **Shore Mix®**, Sylva Native Nursery & Seed Company, 3815 Roser Road, Glen Rock, PA 17327. Rate shall be 1 pound PLS per 1,100 square foot.

The placement of fertilizer, mulch or erosion control matting will not be allowed within any Tidal Wetland Mitigation Site(s).

All shoreline seed mixture sources shall be approved by the OEP prior to application.

The Materials Certificate for all seed mixtures shall state that the seed mixture does not include any invasive species pursuant to CGS Sec. 22a-381d or any State-Threatened or State Endangered species pursuant to CGS Sec. 26-303. The seed tags from the bags are to be removed by the Engineer upon delivery and attached to the Materials Certificate. Seeding shall not occur if these requirements are not met.

All approved seed mixtures shall be obtained in sufficient quantities to meet the pure live seed (PLS) application rates as determined by the seed analysis of the mixture.

Construction Methods: Construction methods shall be those established as agronomically acceptable and feasible, and as approved by the Engineer.

Seeding for establishment of shoreline grasses in the Tidal Wetland Mitigation Site(s) shall occur after the completion of the Tidal Wetland Mitigation Site(s) and after 7 to 14 days of exposure to tidal cycles.

For establishment of shoreline grass in locations that are not in the Tidal Wetland Mitigation Site(s), seeding shall occur during the dates specified in Article 9.50.03-2.

If seed is purchased in bulk rather than PLS, the rate of application must be adjusted to meet the required PLS seeding rate. This seeding rate shall be increased by the appropriate percentage as determined by the following formula based on information on the seed tags at delivery:

(Germination Percentage X Purity Percentage) / 100 = PLS

The Engineer will verify that the seed is applied at a rate that will allow for 100 percent PLS. Mowing will not be allowed within Site(s) that are seeded with shoreline grass seed mix.

Method of Measurement: This item will be paid for at the contract lump sum price for ITEM #0100154A – LUMP SUM.

Basis of Payment: This item will be paid for at the contract lump sum price for ITEM #0100154A – LUMP SUM which price shall include all administrative and procedural requirements, materials, equipment, labor and work incidental thereto.

Pay Item	Pay Unit
LUMP SUM	LS

ITEM #0952051A – CONTROL AND REMOVAL OF INVASIVE VEGETATION

Description: This work shall include the development and implementation of an Invasive Vegetation Removal Plan (IVRP) to outline the materials, labor, and equipment the Contractor plans to use for the complete eradication and treatment of the invasive vegetation within the Tidal Mitigation Sites. The work shall also include the identification, removal, and off-Site disposal of unwanted vegetation as indicated on the plan sheets, permits or as directed by the Environmental Scientist from the Office of Environmental Planning (OEP).

All invasive vegetation listed on the following websites will be subject to eradication:

- Connecticut Invasive Plant Working Group (CIPWG) Invasive Plants Council (http://cipwg.uconn.edu/invasive_plant_list/)
- US Army Corps of Engineers (ACOE) New England District Compensatory Mitigation Guidance Appendix K (http://www.nae.usace.army.mil/portals/74/docs/regulatory/Mitigation/2016_New_England_Compensatory_Mitigation_Guidance.pdf)

All vegetation designated for removal shall be eradicated in its entirety in accordance with the IVRP submitted by the Contractor and approved by the Engineer. The use of herbicides will not be permitted between the dates of September 15 and May 15. These dates may be changed under the direction of Environmental Scientist or their approved delegate, based on the given yearly seasonal weather patterns.

Materials: All herbicides shall be registered for the species being treated and shall be formulated as applicable for target-species foliar treatment, cut surface, or injection applications. Where work in or immediately adjacent to wetlands is necessary, the product label(s) for any chemical/adjuvant formulation applied must indicate that the formulation is approved for aquatic environments.

Construction Methods:

1. Tidal Mitigation Sites (Site 1, Site 2, Site 3, Site 4, Site 5 and Site 6B): The invasive vegetation within these areas are to be treated by herbicide method only. Herbicide is to take root for 7-10 days. After the 7-10 day period and approval by the Environmental Scientist, the Contractor shall manually flush cut any invasive vegetation present as close to the existing grade as possible. All flush cut material is to be manually bagged for off-Site disposal.

For Site 2, the invasive vegetation shall be treated above the Coastal Jurisdictional Line (CJL) in accordance with the guidelines listed in the previous paragraph.

2. IVRP: Prior to any ground disturbance within the Project limits, the Contractor shall submit an IVRP to the Environmental Scientist for review and approval through the Engineer. Within 30 days of receipt of the submittal, the Engineer will notify the Contractor whether the IVRP is approved, rejected or requires modifications by the Contractor. If any part of the plan is not approved, the Contractor shall promptly make any necessary changes and re-submit the entire plan for approval. The entire plan must be approved in writing prior to beginning any work on-Site.

The IVRP shall include a schedule and outline with the following information:

1) The Contractor's methods of determining invasive vegetation surveyed limits, including:
    a. Stake out the limits prior to the initial treatment
    b. Maintain a record of the staked limits throughout the life of the Contract
2) Identification of the type(s) of invasive species present within the field surveyed limits
3) A marked up plan sheet outlining the invasive species limits and identifying the types of invasive species present within those limits and total square yards of proposed removal
4) For each species present on-Site, the following shall be described:
    a. Methods to eradicate specific invasive plant species for the life of the Contract and shall include the 1-Year Control and Removal of Invasive Vegetation Warranty Period eradication methods for each plant species
    b. Types and concentrations of any herbicides to be used, including any adjuvants, SDS sheets, types of tools or machinery to be used
    c. Schedules showing dates and eradication methods for life of the Contract including the 1-Year Control and Removal of Invasive Vegetation Warranty Period
5) All invasive species are considered controlled materials and are to be taken off-Site to an approved disposal facility. For disposal methods:
    a. Provide address of location, current permits / letters from the town authorizing such activity and a Site map (complete with regulated areas)
    b. Invasive plants shall not be buried on-Site
6) Proof of CT DEEP licensure for herbicide application
7) A description of safety equipment required
8) Procedures for handling chemical spills

No equipment or vehicles to complete the work will be permitted within the Tidal Mitigation Sites. Treatment within the Tidal Mitigation Sites shall be done manually. Any equipment used to process invasive vegetation must be cleaned prior to further use.

Any invasive species control and removal work performed throughout the duration of the Contract that causes damage or soil disturbance shall be repaired at the Contractor's expense within 7 days. It is the Contractor's responsibility to identify additional areas of concern for invasive vegetation within the limits of the Project, notify the Engineer, and to amend the IVRP. The Contractor shall be responsible to identify invasive vegetation at all times of the year and to prepare a plan for its eradication without assistance.

Herbicide applications will not be permitted during any rain event or during windy conditions. Broadcast or uncontrolled spray application will not be permitted and care must be taken to avoid contacting non-target native species. If any non-target native species to remain within the Project limits are inadvertently treated with herbicide and perish, the Contractor will be responsible to replace in-kind species at no cost to the State.

Remove all twining vines in treetops to the greatest extent possible without damaging the branches of the supporting desired vegetation. Cut and remove vines overtopping tree canopies to the extent practical. Climbing spikes will not be permitted for aerial work.

The Contractor shall also:

1) Maintain the labels for herbicides being used in his/her possession
2) Conduct all herbicide formulations and applications, including the addition of appropriate surfactants and other adjuvants, in strict conformance with the manufacturer's recommendation and per requirements of regulatory agencies
3) Maintain a written record of herbicide application, including the formulation, concentration, area treated, and date for each application. The records are to be provided by the commercial applicator and submitted to the Engineer following each treatment

Any invasive vegetation to be flush cut shall not be more than 2 inches above the ground line. Prune out any branches on non-treatment plants that are damaged during removal of vegetation. All corrective pruning shall conform to the National Arborists Association Pruning Standards.

Wherever removal operations result in exposed soils, disturbed areas shall be vegetatively stabilized with the appropriate seed mix, topsoil and placed above the CJL.

Once the IVRP is approved, a field review shall be scheduled for the Contractor and Environmental Scientist to review the limits of invasive species removal (surveyed and flagged by the Contactor prior to the meeting), the specific species required to be removed, and the Contractor's submitted invasive species removal plan. At this time, the Environmental Scientist may identify additional invasive species or designate additional areas for removal that are not included with the Contractor's submitted IVRP.

If changes are required to the approved IVRP during the life of the Contract, these changes shall be documented by the Contractor and resubmitted to the Environmental Scientist through the Engineer for review and approval a minimum of 10 days prior to beginning of the additional work associated with the change. The Contractor shall provide a 10 day work notice to the Engineer prior to proceeding with each treatment.

2. Invasive Treatment: The treatment schedule below may be modified based on the Contractor's construction schedule or existing field conditions at the discretion of the Environmental Scientist. The Contractor shall provide a 10 day work notice to the Engineer prior to proceeding with each treatment.

Treatment Measures: At minimum, the Contractor shall treat all areas within the optimal growing season between May 15 and September 15. Treatment shall occur twice a year in each year of the Contract until the final year of the Walk Bridge completion or as the Contractor's schedule allows. Specifically, one in the late spring and the second in the late summer. Additional treatment measures may be warranted within the same optimal growing season in any year at the discretion of the Environmental Scientist.

1-Year Control and Removal of Invasive Vegetation Warranty Period: A one-year warranty to treat invasive species at all Sites will be required. The dates for the one-warranty shall be scheduled to be specific for each Site that was treated the previous year. The treatment for one-

year warrant shall occur within the optimal growing season between May 15 and September 15. Only one treatment will be required for the one-year warranty.

Method of Measurement: This work will be measured for payment by the number of square yards of invasive vegetation identified, surveyed, treated and eradicated as required including any required re-treatment of any regrowth or new growth. No additional payment will be made for subsequent treatments. The area for removal will be surveyed and flagged prior to treatment and measured. After a review of the surveyed limits, the Engineer may designate additional areas for removal that are not shown on the plans. These additional areas will be measured for payment and included as part of the Contract work.

Basis of Payment: This work will be paid for at the Contract unit price per square yard for "Control and Removal of Invasive Vegetation." This payment shall include all labor, surveys, materials, tools, and equipment necessary for limits of the invasive area(s); maintenance of the limits throughout the Project; species identification; and cutting, treating, re-treating, removal, and off-Site disposal of designated invasive plant material. Off-Site disposal of residue shall include the loading, transport, dumping, and fees associated with legal off-Site disposal.

- Upon approval of the required IVRP, the Contractor will receive a payment equal to 20% of the estimated Contract value
- Upon successful completion of the treatment period in the final year of the Contract as determined during the Site review by the Engineer, the Contractor will receive a payment equal to 40%
- Upon successful completion of the 1-Year Control and Removal of Invasive Vegetation Warranty Period covering all treated Sites on the Project, the Contractor will receive a final payment equal to 40%

Vegetative stabilization of disturbed areas will be paid for under the respective Contract Items: "Turf Establishment," "Wetland Grass Establishment," "Conservation Seeding for Slopes," "Floodplain Establishment," "Wildflower Establishment," or "Shoreline Grass Establishment."

Pay Item	Pay Unit
Control and Removal of Invasive Vegetation	s.y.

NOTICE TO CONTRACTOR – INVASIVE PLANT SPECIES

Invasive Plant Species[1] Are Not Permitted In the Inland/Tidal Wetland Mitigation Site(s): Only plant materials native and indigenous to the Northeast shall be used within the Inland/Tidal Wetland Mitigation Site(s). Species not specified in the Mitigation Planting Plan shall not be used without written approval from the Connecticut Department of Transportation's Office of Environmental Planning (OEP). All woody debris stockpiled in accordance with the special provision for "Clearing and Grubbing" must be free from the invasive species.

All invasive vegetation listed on the following websites will be subject to eradication:

- Connecticut Invasive Plant Working Group (CIPWG) Invasive Plants Council (http://cipwg.uconn.edu/invasive_plant_list/)
- US Army Corps of Engineers (ACOE) New England District Compensatory Mitigation Guidance Appendix K (http://www.nae.usace.army.mil/portals/74/docs/regulatory/Mitigation/2016_New_England_Compensatory_Mitigation_Guidance.pdf)

Project specific invasive species additional to those listed on the website will be subject to removal at the Environmental Scientist's discretion.

[1]Scientific names are those used primarily in National Wetland Plant List (http://wetland_plants.usace.army.mil/) and secondarily in USDA PLANTS database (http://plants.usda.gov/).