NYSDEC Demolition Plan
for the
Tappan Zee Hudson River Crossing

Rev 6
May 25, 2018

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Document History			
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4/4/2018	Revised for Area 2 Demolition Methods & DEC Comments	EB	5
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1.0 INTRODUCTION

Tappan Zee Constructions, LLC (TZC) has prepared this Demolition Plan (Plan) Rev 6 to provide the general approach and means and methods that will be utilized to demolish the existing Tappan Zee Bridge. This Plan has been prepared specifically to meet the Tappan Zee Hudson River Crossing Project (Project) demolition requirements and environmental performance commitments (EPCs) provided in the Project DB Contract Documents (Contract No. D214134) Part 3 Project Requirements, Section 3 Environmental Compliance and Section 25 Demolition as Conformed November 2012.

1.1 Limits of Demolition

Demolition requirements are included in the Project's Final Environmental Impact Statement (FEIS), July 2012 and Record of Decision (ROD), September 2012 and Project permits, including:

- NYSDEC Permit ID 3-9903-00043/00012-14 modified July 2014;
- NFMS Endangered Species Act Section 7 Consultation Biological Opinion (BO) NER-2017-14375 dated November 1, 2017;
- United States Coast Guard (USCG) Permit dated April 2013;
- United States Army Corps of Engineers (USACE) Permit Number NAN-2012-00090-M10; and
- NMFS Essential Fish Habitat (EFH) Assessment Conservation Recommendations (CR) dated June 2012, Appendix F of the FEIS.

As required by the FEIS and Project permits, all parts of the existing Tappan Zee Bridge across the Hudson River not utilized in the new bridge shall be removed to a minimum of two feet (2') below the river bottom, including:

- Removal of timber piles 2' below river bottom;
- Removal of caisson-supported piers 2' below river bottom; and
- Removal of fenders 2' below river bottom.

1.2 Limit of Demolition for Bents 190 and 191

Bents 190 and 191 of the existing Bridge were constructed to the immediate west and east of the Metro North Railroad (MNR) Right of Way (ROW), respectively. These bents are in close proximity to the MNR track foundations and nearby slopes. Removal of the structures to 2' below the river bottom may result in destabilization of the tracks or slopes in the ROW.

TZC is proposing to keep the existing Tappan Zee Bridge Bents 191 and 190 to remain at or above grade and top of caisson, respectively. Please see Attachment A for drawings of the proposed removal and remaining elevations of these existing bridge bents. As described below, allowing these bridge structures to remain will reduce in-water and landward excavation and demolition activities adjacent to the MNR commuter railroad, thereby reducing potential impacts to railroad operations and near-shore areas without adversely impacting other resources.

1.2.1 Existing Pier Locations and Conditions

Existing Bent 191 is located immediately east of the MNR ROW in Westchester County. This landside bent consists of two (one north and one south) concrete spread footings founded on rock approximately below existing grade. Each footing is approximately (L x W x H) and each supports a single concrete pier column (one north and one south). The southernmost corner of the south footing is approximately 23 feet east of the MNR Track 3 and is visible above the existing grade (Attachment B: Figures #1 and #2). The northernmost corner of the south footing is not visible and is approximately 10 feet below the existing steeply sloping grade. Removing the concrete columns and footings of existing bridge Bent 191 below the existing ground line would require excavation and demolition, most likely via hydraulic hammer (e.g., hoe ram) or similar impact equipment, below grade and within very close proximity to the MNR tracks.

Existing Bent 190 is located immediately west of the MNR ROW in Westchester County. This waterside bent consists of two (one north and one south) circular, steel sheet pile encased concrete caissons founded on rock approximately below the riverbed. Each caisson is approximately feet in diameter and each supports a single concrete pier column (one north and one south). The north caisson is surrounded by a square-shaped sheet pile cofferdam. The top of the sheet pile is just visible above the existing shoreline (Attachment B: Figures 2, 3, and 4). The eastern edge of the circular caisson and sheet pile cofferdam is approximately 20 feet from MNR Track 4. The circular caisson is not visible and is buried approximately 1-8 feet below the existing sloping shoreline. Demolition and removal of the north pier caisson would require excavation of the existing shoreline to within approximately feet of MNR Track 4 or require significant support of excavation (e.g., temporary sheeting) be installed between the MNR tracks and the existing caisson.

The south caisson is located approximately 18 feet from the existing shoreline and 9 feet from Pier 42 Eastbound in water depths of 2-4 feet below mean low water (MLW). The top of the south caisson is approximately 1-foot below mean high water (MHW) and remains partially submerged at MHW (Attachment B: Figures 5 and 6). Removing the caisson two feet below the bottom of the existing waterway would require demolition of the concrete caisson, most likely via hydraulic hammer (e.g., hoe ram) or similar impact equipment, and temporary disturbance of the river bottom immediately surrounding the caisson to remove the outer steel sheet pile via cutting or hydraulic shears. The Project FEIS determined sediments within the vicinity of Bent 190 demonstrated elevated levels of metals. The proposed limits of demolition for Bent 190 would minimize disturbance of these sediments within the Hudson River.

1.2.2 Proposed Pier Demolition

Bent 191 – TZC proposes to remove the existing north and south bent columns to grade via concrete wire saw, hammer or shears and leave the footings in place, thereby avoiding additional excavation and demolition below grade and in close proximity to the MNR tracks. See Attachment A for proposed conditions following pier column demolition.

Bent 190 – TZC proposes to remove the existing north bent column to approximately elevation 4.00 to allow for signage and marking for navigation, thereby avoiding additional excavation and demolition below grade and in close proximity to the MNR tracks. See Attachment A for proposed conditions following

column removal. Concrete wire saw or shears would be used to remove the concrete column. Similarly, TZC proposes to remove the south bent column to elevation 4.00. The existing caisson and footing would remain in place, thereby avoiding in-water demolition in this near-shore area. Concrete wire saw or shears would be used to remove the concrete column.

As described above, Bent 190 is in close proximity to the MNR track structure and nearby slopes. Given the proximity of the north caisson of Bent 190 from the edge of Track 4 of MNR, removal of the structures to 2' below river bottom will impose an unstable slope (1:1) extended from the limits of removal to the edge of the existing railroad track. According to existing boring logs, the top strata consist of very soft organic material with identified weight of rod properties. This material carries minimal to no shear strength and the required excavation can cause major disturbance in the natural state of the existing slope.

1.2.3 Assessment of Benefits and Potential Adverse Effects

Existing Bents 191 and 190 are located within NYSTA property and lands underwater, and their respective footings are located under the new bridge structure, near new bridge Piers 42 and 43. Due to their nature (i.e., existing footings mostly buried below existing grades), location and access restrictions, transportation and ecological resources were evaluated to identify the benefits and potential adverse effects of the proposed modification.

Transportation resources near Bents 191 and 190 are the Hudson River and MNR. MNR passes immediately adjacent to both bents, within the existing MNR ROW. Bent 191 is located landward and outside of the MNR ROW; therefore, leaving the pier footings in place at this location would have no effect on future navigation of the Hudson River or MNR operations. Similarly, Bent 190 is located outside of the MNR ROW; therefore, leaving the pier footing in place at this location would have no effect on MNR operations.

The north and south foundation at Bent 190 is located along the existing Hudson River shoreline well outside of the navigation channel or waterway used for navigation. The south caisson footing is located approximately 18 feet from the existing shoreline in shallow water that is well outside of the navigation channel and is not used for navigation purposes. TZC proposes to clearly mark the remaining footing using signage or similar to minimize any hazard to navigation. Given the close proximity of the existing foundations to the new bridge pier foundations, navigation through the area would be subject to security and other restrictions; therefore leaving the Bent 190 foundation in place would not adversely impact navigation or transportation resources of the Hudson River.

There are no ecological resources identified near existing Bent 191, which is located immediately east of the MNR in a maintained and unvegetated ROW. Ecological resources near Bent 190 are the aquatic resources, including threatened and endangered species, and habitat of the Hudson River. Near Bent 190 the aquatic habitat is predominately intertidal and subtidal habitats of varying depths, ranging from shallow intertidal shorelines to shallow subtidal shoals. The benthic habitat is unvegetated consisting of coarse sandy to fine silty sediments.

NMFS identified this region of the Hudson as EFH for 16 federally managed species; and identified two federally endangered fish species that occur in this region of the Hudson River, the shortnose sturgeon (*Acipenser brevirostrum*) and the Atlantic sturgeon (*Acipenser oxyrinchus*). NMFS identified several EFH

Conservation Recommendations to avoid, minimize and mitigate for Project impacts pursuant to Section 305(b)(4)(A) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and provided several Conservation Recommendations pursuant to Section 7(a)(1) of the Endangered Species Act (ESA), as well as reasonable and prudent measures (RPMs) to minimize and monitor impacts of incidental take of listed shortnose and Atlantic sturgeon.

Prior environmental assessments, including the FEIS and ROD, recognized the benefit of removing the existing waterside bridge piers to offset the footprint of the new bridge pier foundations. At existing Bent 190, the south bent foundation occupies approximately [redacted] of open water benthic habitat; the north bent foundation and rectangular cofferdam occupies approximately [redacted] of intertidal and open water benthic habitat. The total in-water footprint of the new bridge is approximately [redacted] acres (NYSTA December 17, 2012 Supplement to the March 26, 2012 Joint Permit Application), well below the alternative replacement bridge footprints assessed in the FEIS and ROD (6.5 and 8 acres for the Long Span and Short Span Options, respectively), resulting in a net gain of open water benthic habitat of 2.4 acres following demolition of the existing bridge. Leaving the Bent 190 foundations in place would diminish this net gain by less than 2% while decreasing the disturbance of impacted sediments in the area.

Given the relatively small size of the Bent 190 foundation footprint as compared to the available soft-sediment benthic habitat in the Tappan Zee region (RMs 24-33), leaving the foundations in place would result in an extremely small loss of soft-bottom benthic or foraging habitat for sturgeon. Sturgeon are only likely to be present in the shallow waters along the shoreline if suitable forage is present. Therefore effects to sturgeon are likely to be limited, insignificant and discountable.

FEIS EPCs, NMFS conservation recommendations, and environmental permits, including the NYSDEC Permit 3-9903-0043 and USACE Permit NAN-2012-00090, recognized the benefit of minimizing the disturbance of bottom sediment to minimize potential impacts to aquatic resources. Leaving the Bent 190 column foundations in place would avoid disturbing the Hudson River bottom in the near shoreline intertidal and subtidal habitat.

2.0 EXISTING STRUCTURE

2.1 Area Map General

Beginning in Rockland and working east, the existing structure has been divided into six (6) distinct Demolition Areas (see Attachment C) based on structure type, location and interaction with the completion of the permanent structure. Areas 1 and 6 are unique due to the coordination necessary to complete the new structure and because they each have a land and marine portion. The Demolition Areas are as follows:

- Area 1 A/B: Rockland Tie-in
- Area 2: Rockland Approach
- Area 3: Rockland Truss
- Area 4: Main Span
- Area 5: Westchester Truss
- Area 6 A/B: Westchester Tie-in

Attachment D provides bridge structure definitions for each of the Demolition Areas.

2.2 Area 1: Rockland Tie-in

The Rockland Tie-in Area is comprised of the on land existing structure terminating at the Rockland Abutment. This is designated at Area 1A, and includes Span 1 over River Road. The marine portion, Area 1B, transitions at Bent 3 and continues thru Pier 30. It shares a partial footprint with the permanent approach spans (Unit 1EB and 2EB). Furthermore, this section of existing structure is bordered to the north by the new bridge and shallow water to the south.

2.3 Area 2: Rockland Approach

The Rockland Approach (Piers 31 through 165) consists of the long causeway between the Rockland Tie-in and Rockland Truss sections. This is the largest section by linear footage, and consists of existing structure similar to that described in Area 1. Areas 1 and 2 have been divided due to the construction coordination necessary to perform permanent new bridge work in Area 1. Due to this delineation, work in Area 2 can commence at the beginning of the demolition work window. Area 2 is confined to the north by the new structure with decreasing access from Bents 50 to 30.

2.4 Area 3: Rockland Truss

Working east from Rockland County, the first underdeck spans begin in the Rockland Truss section. Transitioning from the [redacted] causeway spans, Area 3 begins at Bent 166 and ends at Bent 172. The spans in this section are typical [redacted] and consist of a steel truss supporting the precast concrete panel road surface. The concrete substructure found in Area 3 can also be considered typical at each bent. An upper, solid concrete strut connecting two (2) hollow concrete columns can be found at each location. The top elevation of each bent will vary slightly, and will contribute to the total volume of column concrete. Both circular and rectangular caissons are found in this area.

2.5 Area 4: Main Span

The Main Span (Piers 173, 175, 176, and 178) is a unique structure over the navigable channel. This area is dominated by the steel superstructure cantilever through truss, which is divided into Anchor, Cantilever and Suspended spans. The superstructure supports the precast concrete panel wearing surface, which is a similar design found in Areas 1 – 3. The substructure in this section is unique to this area. Each bent in this area is steel lattice members making up the columns and top strut. The top elevation of each bent varies slightly, and the structure can be considered symmetrical about the centerline of span. The foundations in Area 4 are similar to the rectangular caissons found in Area 3. Specifically, the foundations at Bents 175 and 176 are significantly larger than the anchor bents.

2.6 Area 5: East Deck Truss

Area 5 (Piers 179 through 184) shares many structural details with Area 3. Both sections consist of steel underdeck trusses, supported on concrete struts and columns. Similarly, the bents in the Area consist of circular caissons. Due to the horizontal curve of this Area, the span lengths vary. This determines the

specific length of the underdeck section. The Exodermic Deck specifics in this Area are similar to those found in Area 6, and substantially different to the deck details in Areas 1 – 4.

2.7 Area 6: Westchester Tie-in

Area 6 (Piers 185 through 191) represents the tie-in portion to the Westchester Landing. Similar to Area 1, this section is both divided into water (6A) and land portions (6B), as well as coordinated with the final work (Unit 9EB) of the permanent new bridge. Area 6A is structurally identical to Area 5, sharing features for deck, superstructure truss, concrete substructure and foundations.

3.0 SCHEDULE AND SEQUENCING OF WORK

3.1 Sequence General and Milestones

Provided in Attachment E is an overview of the major work areas and anticipated schedule for demolition activities. The schedule information provided is based upon the most up to date Project schedule. Demolition operations began in August 2017. Deck removal operations in Areas 2, 4, and 6 began in October 2017 after all traffic was shifted to the new structure. As each section is completed, the associated substructure work will commence. The foundation work will be the last work performed in each Area.

4.0 REGULATORY REQUIREMENTS

As further described below, demolition of the existing bridge will be conducted in accordance with the Project's requirements in the FEIS, ROD and Project permits (Refer to Section 1.1 for a list of applicable permits). Specifically, means and methods proposed demonstrate conformity with the NYSDEC Permit ID 3-9903-00043/00012-14 Conditions 45-51, 54-55, 57, and 59 as further described below.

Condition 46: Bridge demolition must be conducted in a manner that minimizes the resuspension of sediment.

TZC has planned for demolition to be performed in a manner consistent with the means and methods described in the FEIS. During substructure and superstructure removal, the proposed demolition takes advantage of the large equipment available to TZC, allowing large pieces of the structure to be cut and removed to the extent possible, rather than demolishing the structures in-place. During foundation removal, full depth turbidity curtains will be employed in Areas 1 and 6 to minimize sediment resuspension. In addition, the rectangular caisson removal will start from the inside out, allowing concrete material to stay within to the interior of the structure during the onset of removal. Every effort will be made to ensure that demolition debris is confined to the location of foundation removal during demolition and removal. Where applicable, side scan sonar will be used to identify all material to be removed from the River during demolition. Once identified, this material will be recovered.

For more information about Best Management Practices (BMPs) to be employed during Mechanical Foundation Demolition, please refer to Attachment J of this plan.

Condition 47: All debris and materials from the demolition of the existing Tappan Zee Bridge must be removed from the bed and banks of the Hudson River.

TZC will perform a pre-demolition bathymetric survey from the Westchester shore to the Rockland shore and between 700 feet north and south of existing bridge centerline to establish pre-demolition baseline conditions. Periodic side scan sonar surveys will be conducted to identify debris that may have entered the River with the potential to affect navigation.

A post-demolition bathymetric survey will be conducted and compared to the pre-demolition bathymetric survey to verify no debris is present. As depicted in Attachment F, a barge mounted excavator or crane with clam bucket attachment, material grapple or bucket will be used to remove the demolition debris. Demolition debris will be bucketed to adjacent debris barges for off-site disposal.

An additional bathymetric survey will be conducted in areas that have received debris recovery after the post-demolition bathymetric survey to verify all debris capable of being identified by the bathymetric survey has been removed from the river bed.

The proposed demolition means and methods have the potential to produce debris from hoe ramming, shearing, wire sawing and drilling. Debris size will vary and is described below:

- Hoe ramming operations may generate debris ranging from dust/granular aggregates to pieces equal or larger than the smallest dimension of the structure being demolished. For example, a two foot by two foot column may generate debris two foot in diameter. Solid circular caisson may generate large debris pieces that could be over 6 feet in diameter.
- Shearing operations may generate debris ranging from dust/granular aggregates to pieces equal or less than the smallest dimension of the structure being demolished. For example, a two foot by two foot column may generate debris up two foot in diameter.
- Wire sawing operations will generate fines and may generate spalls around the size of a fist.
- Drilling operations will generate dust/granular aggregates.

Demolition debris will be removed from the river bottom prior to the completion of demolition activities.

Condition 48: Piles, caissons, abutments, fenders and other in-water components of the existing Tappan Zee Bridge must be removed to two feet below the mud line. Silt curtains must be deployed during this operation.

In-water components will be removed to the NYSDEC required demolition limits, provided in Attachment K. Full depth turbidity curtains will be used in Areas 1 and 6 during foundation removal (refer to Attachment G). Turbidity curtains, 5-feet deep and anchored to the river bottom, will be employed in Areas 2, 3, 4, and 5 to contain debris and reduce turbidity.

In order to access the foundations to the NYSDEC required demolition limit, sediment would be displaced around the foundations. The proposed displacement would result in a trench of approximately two-feet deep and three-feet wide surrounding the pier. Sediment would be displaced from the area surrounding the pier to the edge of the disturbed area in a small mound. This sediment is anticipated to cover approximately three-feet of previously uncovered benthic habitat surrounding the pier. The total surface area of the benthic area disturbed and the volume of sediment displaced are summarized in Table 1 for the Demolition Areas.

Table 1 – Surface Area and Volume of Disturbed Sediments

Demolition Area	Surface Area	Volume
	Acre	(CY)
3 – Rockland Truss: Bents 166 – 172	1.2	880
4 – Main Span: Bents 173 – 178	1.0	800
5 – Westchester Truss: Bents 179 – 186	1.0	700
6 – Westchester Tie-in: Bents 187 – 190	0.4	400
Total	**3.6**	**2,780**

Displacement of benthic sediments, as described above, is necessary to achieve removal of the TZB in accordance with the contract and Project permits. The foundation types, including the circular caissons and the floating caissons require external access in order to perform the necessary work. For example, the metal sheet piles wrapping the circular caissons would be cut using a shear or diver which would be accessed from outside of the footprint of the pier. Sediment displacement would allow access to these components of the existing bridge to the NYSDEC required demolition limit with minimal sediment disturbance.

In order to minimize sediment resuspension, an open excavator bucket would be utilized to pull back sediment around the foundations rather than lifting sediment up into the water column. This method could result in isolated resuspension of benthic sediments. Hand jetting may be used to expose steel sheet and pipe pile to facilitate cutting by divers. The hand jetting method will use either pressurized air or water in order to displace the sediment to reach the necessary elevations.

Extensive water quality monitoring during the Project has demonstrated that resuspension of bottom sediments associated with activities such as dredging and pile driving infrequently resulted in exceedances of the Project's NYSDEC Permit conditions. Furthermore, any observed exceedances were also typically temporary in nature.

Condition 49: A floating containment booms and/or silt curtains must be deployed around all active substructure demolition areas to control and contain debris and discharges to meet water quality standards.

TZC will utilize means and methods that will minimize the likelihood of debris entering the River. Specifically, TZC intends to remove substructure in large modular components minimizing potential for generation of small pieces of debris at risk of falling into the River. Visual observations of activities will be conducted by a barge-based or vessel-based observer during demolition activities as required

per the Water Quality Monitoring Plan. If turbidity is observed that extends beyond the 500-ft mixing zone, corrective actions will be implemented to comply with water quality standards.

Condition 50: A debris containment net must be deployed and maintained at all times during demolition of the bridge deck and superstructure.

TZC will remove the existing Tappan Zee Bridge deck and superstructure in modular components, minimizing risk of debris generation during superstructure removal operations. TZC will utilize access systems during the superstructure removal stage to provide access for workers to separate deck panels, stringer beams and diaphragms from the supporting bridge structure. These access systems serve dual purpose by providing debris containment for anchor bolt, stringer beam and diaphragm separation for deck removal operations. Deck preparation in Areas 2, 3, 5 and 6 will occur while over debris containment. Deck rigging and removal in Areas 2, 3, 5, and 6 may occur without debris containment. Area 4 deck preparation and deck removal will occur over debris containment. These areas are further described below. Containment measures are detailed in Attachment H.

Rockland Causeway (Areas 1 and 2):

Superstructure consists of a composite deck/superstructure element made up of deck panels precast integrally over bridge beams. Panels/beams sit directly on top of the bridge column/caps and will be removed in modular pieces by crane in the following steps:

- Separate panels with top side deck saws. Vacuums will be used to control water generated during the operation.
- Deck Preparation - Drill out lifting holes/attach lifting lugs at corner points of panel. Cut bolt connecting panel to pier cap.
- Rig and lift panel off pier, set onto barge.

Truss Spans (Areas 3, 5, and 6):

Superstructure consists of simple span truss elements with precast deck panels secured on top framing of truss. Deck removal will be similar to the Rockland Causeway described above, removing enough deck to rig and lift the entire truss span [redacted] in the following steps:

- Separate panels with top side deck saws. Vacuums will be used to control water generated during the operation.
- Deck Preparation - Drill out lifting holes/attach lifting lugs at corner points of panel. Cut bolt connecting panel to truss.
- Rig and lift panel off truss, set onto barge.
- Install lifting lug on truss at four points.
- Rig truss with Barge Mounted Derrick Crane.
- Lift truss off piers, set onto barge.

Main Span (Area 4)

Superstructure consists of a suspended, cantilever and anchor truss elements with precast deck panels secured on floor beam framing of truss. Deck removal will be similar to the Rockland Causeway described above, removing deck prior to truss removal.

- Separate panels with top side deck saws. Vacuums will be used to control water generated during the operation.
- Deck Preparation - Drill out lifting holes/attach lifting lugs at corner points of panel. Cut bolt connecting panel to truss.
- Rig and lift panel off truss, set onto barge.
- Install falsework, access, and strand jacking equipment
- Lower with strand jacks to barges. Truss removal and lowering is not anticipated to produce debris as it is a large modular component. In the event debris were to be produced, the truss sections are lowered onto barges, which would provide debris containment.

Rigging and lifting of deck panels from the above described structures to barges is not anticipated to produce debris. In the event debris is generated during the lifting operation, the method will be reevaluated and updated to address the conditions of the operation.

Condition 51: Blasting for bridge demolition is prohibited.

Blasting is not being proposed for demolition of the existing Tappan Zee Bridge.

Condition 54: Within 60 days of completion of bridge demolition, a hydrographic survey of the river bottom beneath the footprint of the demolished bridge must be submitted to the Department. For comparison purposes a pre-demolition survey must be provided with the post-construction survey.

TZC will conduct a pre- and post-bathymetric survey of the riverbed from Westchester shore to Rockland shore and between 700 feet north and south of the existing bridge centerline within 60 days of completion of Bridge demolition. The bathymetric survey will be conducted on a 10ft grid and referenced to the North American Vertical Datum (NAVD88).

Condition 55: The Permittee must minimize disturbance to Peregrine Falcons during all phases of the bridge replacement project. All activities must maintain the maximum distance from the peregrine falcon nest on the existing bridge as practical. No less than 30 days before starting the Authorize Activity the Permittee must submit a plan for protection of the falcon nest to the department

A Peregrine Falcon Protection Plan has been prepared for the Project which describes demolition activities. TZC will schedule coordination meetings with the NYSDEC two (2) months prior to demolition on the existing Main Span to discuss issues related to the falcon nest. TZC will provide necessary cooperation and access to the NYSDEC to facilitate the evaluation of the peregrine falcons nesting activity during each year of demolition to determine if a pair is active on the territory, are nesting and the success of that nest.

Condition 57: The Permittee must evaluate Peregrine Falcon nesting activity during each year of construction and demolition to determine if a pair is active on the territory, are nesting, and the success of that nest. Any reports of impacts to the nest should be reported to the wildlife manager at the NYSDEC Region 3 Headquarters in New Paltz, NY.

A Peregrine Falcon Protection Plan has been prepared for the Project which describes demolition activities. TZC will provide necessary cooperation and access to the NYSDEC to facilitate the evaluation of the peregrine falcons nesting activity during each year of demolition to determine if a pair is active on the territory, are nesting and the success of that nest. Any reports of impact to the nest will be reported according to the approved Plan.

Condition 59: At least 45 days before starting dredging activities; decanting activities; removal of large debris fields; pile driving in zone C; channel armoring; cofferdam construction; removal of the existing bridge; or any other activity that may cause resuspension of the bottom sediments, Permittee must submit a water quality monitoring plan to the department. If activities occur concurrently in multiple locations, each activity that may cause resuspension of bottom sediments must be monitored separately. The Plan must be in effect at all times during these activities. The above activities may start when the Department has given written approval of the plan.

Water Quality Monitoring Plan (WQMP) Rev10 was submitted to and approved by the NYSDEC in May 2018. As required, the WQMP will be updated to reflect conditions that may change as demolition progresses.

5.0 REMOVAL OF DECK SUPERSTRUCTURE

5.1 Superstructure Deck General

The existing deck consists of three (3) structural types; Precast, Exodermic and Cast in Place. The Precast deck variety accounts for the majority of the existing span and can be found in Areas 1 – 4. Areas 5 and 6A, to include Span 191, represent the locations of the Exodermic Deck. Finally, the Area 6B Tie-in on land is constructed with a Cast in Place deck system. Each type will be removed similarly, saw cut from the supporting structure and lofted free. The unique details, and necessary steps to free the deck, will be described in this section. As these activities will require the cutting and removal of steel members, adherence to the OSHA Lead Exposure requirements for personnel protection and monitoring, OSHA 1926.62(d)(2)(iv), will be necessary. In addition to the wearing surface itself, this section outlines the necessary components to be removed prior to the deck activities. Contractual requirements for NYSTA Salvageable components will dictate individual bridge components to be removed and stored at NYSTA locations. Once panel sections are free from the structure, they will be landed on trailers or barges for processing.

5.2 Deck Miscellaneous Sections

In addition to the deck itself, there exists miscellaneous items that will be disconnected and removed from the structure. As mentioned above, contractual requirements for NYSTA Salvageable components will

dictate individual bridge components to be removed and stored at NYSTA locations. Utilities will be decommissioned prior to the start of all demolition activities. Outside of the bridge demolition footprint the utility source will be de-energized, locked and tagged per approved Project plans. This will allow the safe demolition and removal of all light poles, sign structures, conduit and bridge lighting. Bridge barriers will also be removed at this time. Side and mobile barriers can be removed prior to saw cutting panel joints. Barrier sections will be rigged and disconnected from the concrete deck. These sections will be loaded on trailers and later, transferred to barges.

5.3 Precast Panels

Precast panels are found in Areas 1 – 4. The panels in Areas 1 and 2 are [redacted] in length and [redacted] in weight. Panels in Area 3 are approximately [redacted] in length and [redacted] in weight. The precast panel stringers are connected to the main floor beam truss members, in addition to the panel to panel diaphragm channel connections. At approximately [redacted], the Area 4 Main Span panels are longer and heavier than the Area 3 panels. These panels average [redacted] and are supported at each end at the floor beam members. The bolted seat connection and the diaphragm connections require under deck access to facilitate full panel removal.

5.3.1 Demo sequence Areas 2 and 3

The typical sequence of work is outlined in the steps below:

1. Working underneath the deck, torch cut the diaphragms connecting the individual panels and the anchor bolts tying the panels to the substructure.
2. Separate the panels along the transverse and parallel joints with concrete deck saws. Open lifting holes with drills.
3. Rig and loft panels onto deck barges for off-site disposal.

5.3.2 Demo Sequence Area 4

The typical sequence of work is outlined in the steps below:

1. Assemble and install underdeck debris and access shielding.
2. Access the precast panels from the underdeck shielding and torch cut diaphragms and anchor bolts from main floor beams.
3. Separate the panels along the transverse and parallel joints with concrete deck saws. Open lifting holes with drills.
4. Rig and loft panels onto deck barges for off-site disposal.

5.4 Exodermic Panels

The Exodermic Deck sections in Areas 5 and 6 have a variable width depending on lane location. Between Bents 178 and 190, the typical Exodermic Deck Panels are [redacted] in length, with main bearing bars running

the width (transverse to traffic) and distribution bars fabricated perpendicular. The steel grid is topped (precast) with concrete and paved with a -inch asphalt wearing surface.

5.4.1 Demo Sequence Areas 5 and 6

The typical sequence of work is outlined in the steps below:

1. Saw cut exodermic deck into panels.
2. Install lifting lugs to the panels utilizing drop in anchors.
3. Rig and loft panels onto deck barges for off-site disposal.

6.0 REMOVAL OF STEEL SUPERSTRUCTURE

6.1 Superstructure Steel General

Existing steel superstructure includes the Main Span Truss and the Approach Underdeck Trusses in Areas 3 through 6. The removal of steel structural members will require adherence to the OSHA Lead Exposure requirements for personnel protection and monitoring, OSHA 1926.62(d)(2)(iv). The dismantling will be performed by removing large sections of existing truss, lowering to barges for off-site disposal. This will be utilized for all twenty (20) underdeck trusses, as well as the two (2) approach and one (1) suspended Main Spans. Only the cantilevered portions of the Main Span will be removed incrementally.

6.2 Underdeck Truss Removal Sequence

The typical sequence of work is outlined in the steps below:

1. Install lifting lugs at lifting points.
2. Position Left Coast Lifter (LCL) at confirmed radius of pick.
3. Lift truss and place on barge for off-site disposal.

6.3 Main Span – Suspended Span Removal Sequence

The typical sequence of work is outlined in the steps below:

1. Modify existing members and install falsework systems and access.
2. Install Strand Jacking system.
3. Close channel for a period estimated at 48 hours to allow lowering of the Suspended span, tie-down (lashing and securing) to the transport barges and towing away from the main channel. This channel closure will be coordinated with the USCG and other Regulatory agencies, as appropriate.
4. Lower span to barge and secure for dismantling and disposal.

6.4 Main Span – Cantilever Span Removal Sequence

The typical sequence of work is outlined in the steps below:

1. Modify existing members, install falsework systems and access, and finally cut and loft members.
2. Prepare rigging locations for each pick. Take the load with the crane prior to performing the final torch cuts.
3. Cut the section free, swing and land the section on the adjacent material barge.
4. Coordinate stages that will impact or alter the navigable channel with the USCG and other Regulatory agencies, as appropriate.

6.5 Main Span – Anchor Spans Removal Sequence

The typical sequence of work is outlined in the steps below:

1. Modify existing members and install falsework systems and access.
2. Install Strand Jacking system.
3. Lower span and secure to barges for dismantling and disposal.

7.0 REMOVAL OF SUBSTRUCTURE

7.1 Existing Substructure General

Existing substructure, bridge wide, is defined as a system of concrete columns tied together at the top by a concrete strut(s), also referred to as a pier cap. The Substructure is further defined as the portion of the bridge above the foundations and below the superstructure/deck. Areas 1, 2, 3, 5, and 6 are concrete while Area 4 is steel.

7.2 Areas 1 and 2

The typical sequence of work is outlined in the steps below:

1. Rig concrete struts and columns with crane.
2. Separate reinforced concrete connection by hammering, cutting or shearing.
3. Loft sections and land on debris barges for off-site disposal

7.3 Areas 3, 5, and 6

The typical sequence of work is outlined in the steps below:

1. Rig concrete struts and columns with crane.
2. Separate reinforced concrete connection with wire saw.

3. Loft sections and land on debris barges; downsize for off-site disposal.
4. The bottom 30-feet of the substructure will remain in place and be demolished with the foundation as described below.

7.4 Area 4 Steel Lattice Substructure

The typical sequence of work is outlined in the steps below:

1. Remove Icebreaker/Fender assemblies. Prepare rigging locations for each pick section.
2. Take the load with the crane and torch cut the pier sections.
3. Land the section with the crane on the adjacent material barge for off-site disposal.

8.0 REMOVAL OF BRIDGE FOUNDATION AND PILES

8.1 Foundation General

There are (3) major foundation types on the existing structure.

1. Timber pile supported pile cap foundations are found in Areas 1 and 2.
2. Paired solid concrete circular caissons founded on H Pile are found in Areas 3, 5, and 6, at Bents 166 – 168 and 179 – 190. These foundations are fully or partially enclosed by steel sheet pile.
3. Hollow rectangular caissons are found at in Areas 3, 4, and 5, at Bents 169 – 178. These foundations consist of cellular rooms separated by concrete walls and ceilings. Each of these foundations are founded on either H Pile or H Pile encapsulated inside circular piles.

8.2 Areas 1 and 2 – Timber Pile Caps

The typical sequence of work is as follows in Area 1B:

1. Demolish pile caps in place using hydraulic hammers and shears. Bucket rubblized material from the river bottom and place in adjacent debris barge for transport for off-site disposal.
2. Snap timber piles at the NYSDEC required demolition limit using barge mounted excavators equipped with a bucket and thumb or grapples.

The typical sequence of work is as follows in Area 2:

1. Demolish in place using hydraulic hammers and shears. Bucket rubblized material from the river bottom and place in adjacent debris barge for transport for off-site disposal.
2. Snap timber piles at the NYSDEC required demolition limit using barge mounted excavators equipped with a bucket and thumb or grapples.

8.3 Circular Caissons

The typical sequence of work is as follows:

1. Displace existing material from the river bottom with an excavator or jetting to expose sheet pile at demolition limit.
2. Mark and torch cut sheet pile at demolition limit with divers.
3. Hoe ram the remaining 30-feet of concrete column substructure, if applicable.
4. Hammer and bucket caisson to debris barges for off-site disposal.
5. Sheet pile removal shall occur at any time during this operation.
6. If applicable, cut and remove H pile at the base of caisson.

8.4 Rectangular Caissons

The typical sequence of work is as follows:

1. Install temporary [redacted] spuds as needed around pier perimeter with vibratory pile driver/ extractor. Piles are for mooring/fendering of work barges.
2. To the extent possible start demolition inside of the exterior walls, beginning with the roof of the caisson and continuing to the intermediate floors and interior walls.
3. Advance demolition and removal of the exterior walls.
4. Demolish via hoe ramming, cutting and shearing.
5. Remove debris throughout the operation via bucketing. All debris will be removed to the NYSDEC required demolition limit.

9.0 REMOVAL OF ICEBREAKER AND FENDER

9.1 Timber Pile Clusters – Bents 4 – 165

The typical sequence of events is as follows:

1. Install full depth turbidity curtains prior to work commencing at Bents 4 – 30.
2. Snap timber piles at the NYSDEC required demolition limit with excavators equipped with a bucket and thumb or grapples.
3. Any timbers that break above the required depth below the river bottom may be removed during the demolition of the pile caps.

9.2 Timber/Steel Fender Frame – Bents 169 – 173 and 178

The typical sequence of events is as follows:

1. Rig sections of the timber/steel fender with barge mounted crane or excavator.
2. Displace material to expose pile to the NYSDEC required demolition limit.
3. Cut pile supports to the NYSDEC required demolition limit with divers or excavator mounted shear.
4. Torch cut and loft section to debris barge for off-site disposal.
5. Alternatively to cutting pile, pile may be extracted with a vibratory hammer.

9.3 Triangular Concrete Icebreakers

The typical sequence of events is as follows:

1. Displace existing material from the river bottom with an excavator or jetting to expose sheet pile.
2. Mark and torch cut sheet piles at demolition limits by divers.
3. Hammer and bucket concrete to debris barges for off-site disposal.
4. Sheet pile removal shall occur at any time during this operation.
5. If applicable, cut and remove H pile and or timber pile at the base of ice breaker.

9.4 Main Span Fender

The typical sequence of events is as follows:

1. Wire saw or otherwise cut fender into sections, remaining supported by steel pile.
2. Drill and/or install rigging locations.
3. Rig sections with barge mounted crane.
4. Perform additional wire sawing, if applicable.
5. Separate rigged precast section from pile with wire saw, shear, torch or other cutting method, if applicable.
6. Loft and land section on debris barge for off-disposal.
7. Displace existing material from the river bottom with a bucket or jetting to the NYSDEC required demolition limit
8. Torch cut or shear remaining pile at the NYSDEC required demolition limit and place on debris barge for off-disposal.

10.0 BARGE TRANSFER OF MATERIALS

Materials not reused or recycled will be transported to an appropriate, permitted off-site disposal facility. TZC has awarded the following disposal contracts for the disposal of demolition material:

- **ACK Marine and General Contracting, LLC.**
  - Disposal Location: Port of Coeymans, New York
  - Distance from Tappan Zee Bridge Site: 100 Nautical Miles
  - Demolition Material: Concrete Rubble
  - Estimated Number of Shipments: 130
  - Disposal Shipping Method: Barge
- **CS Construction Logistics, LLC.**
  - Disposal Location: Port of Coeymans, New York
  - Distance from Tappan Zee Bridge Site: 100 Nautical Miles
  - Demolition Material: Timber Pile (Creosote/CCA treated and untreated,)
  - Estimated Number of Shipments: 74
  - Disposal Shipping Method: Barge
- **SIMS Metal Management**
  - Disposal Locations:
    - SIMS Albany, New York
      - Distance from Tappan Zee Bridge Site: 101 Nautical Miles
      - Estimated Number of Shipments: 24
    - SIMS New Jersey
      - Distance from Tappan Zee Bridge Site: 30 Nautical Miles
      - Estimated Number of Shipments: 20
  - Demolition Material: Steel Lattice, Underdeck Truss, Anchor Span Truss, Suspended Span Truss and Cantilever Span
  - Disposal Shipping Method: Barge
- **Weeks Marine Inc.**
  - Disposal Locations: Perth Amboy, NJ
  - Distance from Tappan Zee Bridge Site: 44 Nautical Miles
  - Estimated Number of Shipments: 175

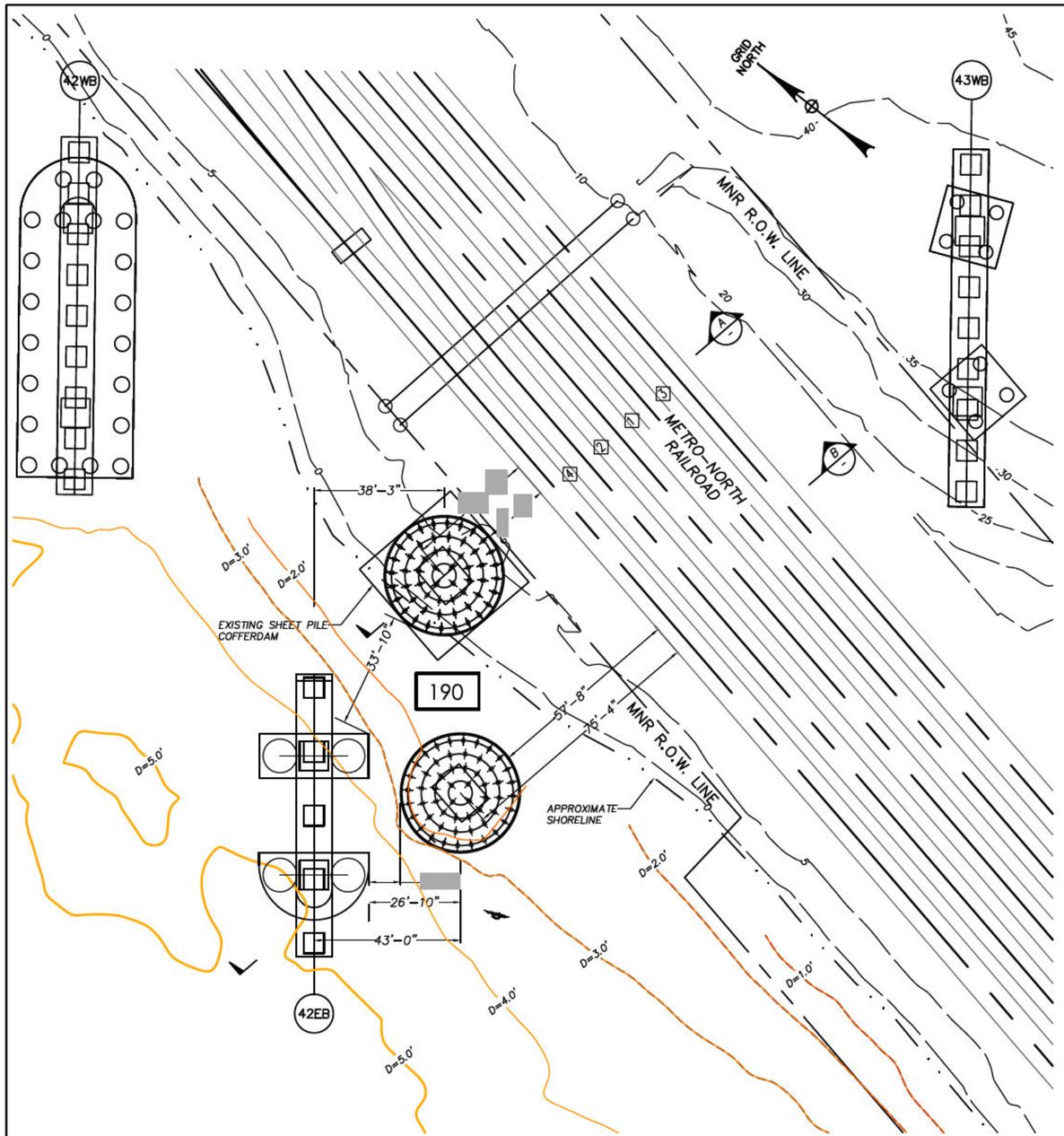
- Demolition Material: Precast Deck Panels, exodermic deck panels, concrete substructure, concrete pile caps and precast concrete fenders
- Disposal Shipping Method: Barge

Alternatively to upland disposal, processed concrete may be disposed of as follows:

- **Fire Island Reef**
  - Estimated Number of Shipments: 55
- **Moriches Reef**
  - Estimated Number of Shipments: 6
- **Shinnecock Reef**
  - Estimated Number of Shipments: 6
- **Rockaway Reef**
  - Estimated Number of Shipments: 6
- **Hempstead Reef**
  - Estimated Number of Shipments: 40

Attachment A

Bents 190/191 Plans and Sections



GENERAL PLAN VIEW BENT 190

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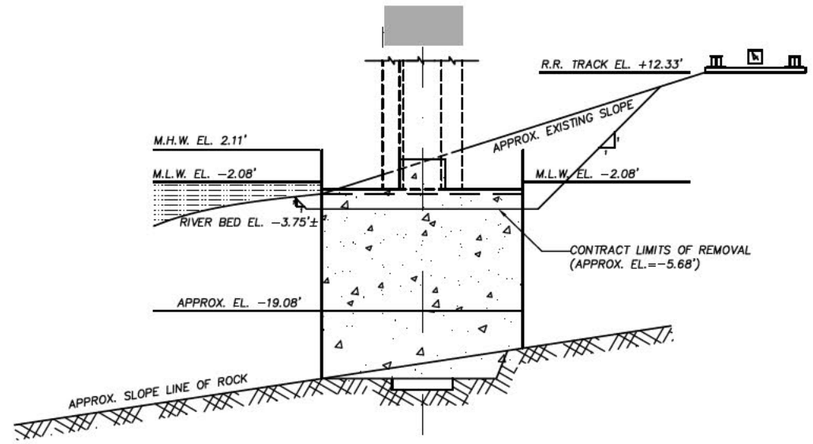

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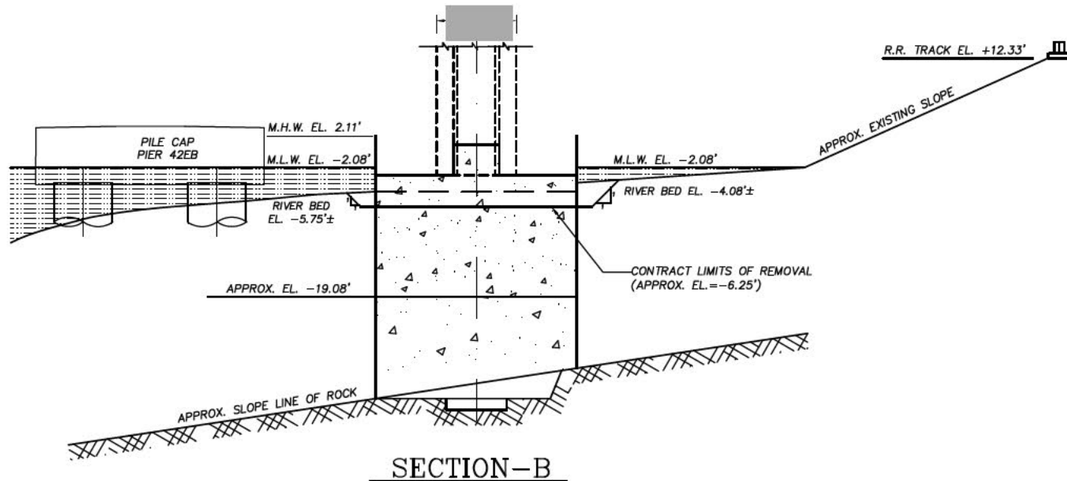

SECTION–B

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200 SOUTHERN BLVD., ALBANY, NY 12209

TITLE OF PROJECT: THE NEW NY BRIDGE
CONTRACT NUMBER: D214134
LOCATION OF PROJECT: MILEPOST 14,67 +/- IN ROCKLAND & WESTCHESTER COUNTIES

TAPPAN ZEE CONSTRUCTORS, LLC

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DRAWING CH'K BY:
SUPERVISOR:

TITLE OF DRAWING
BENT 190
PLAN AND SECTION

DATE: 08/04/2015
DRAWING NUMBER: TZC-00XX-TW
REVISION: 0

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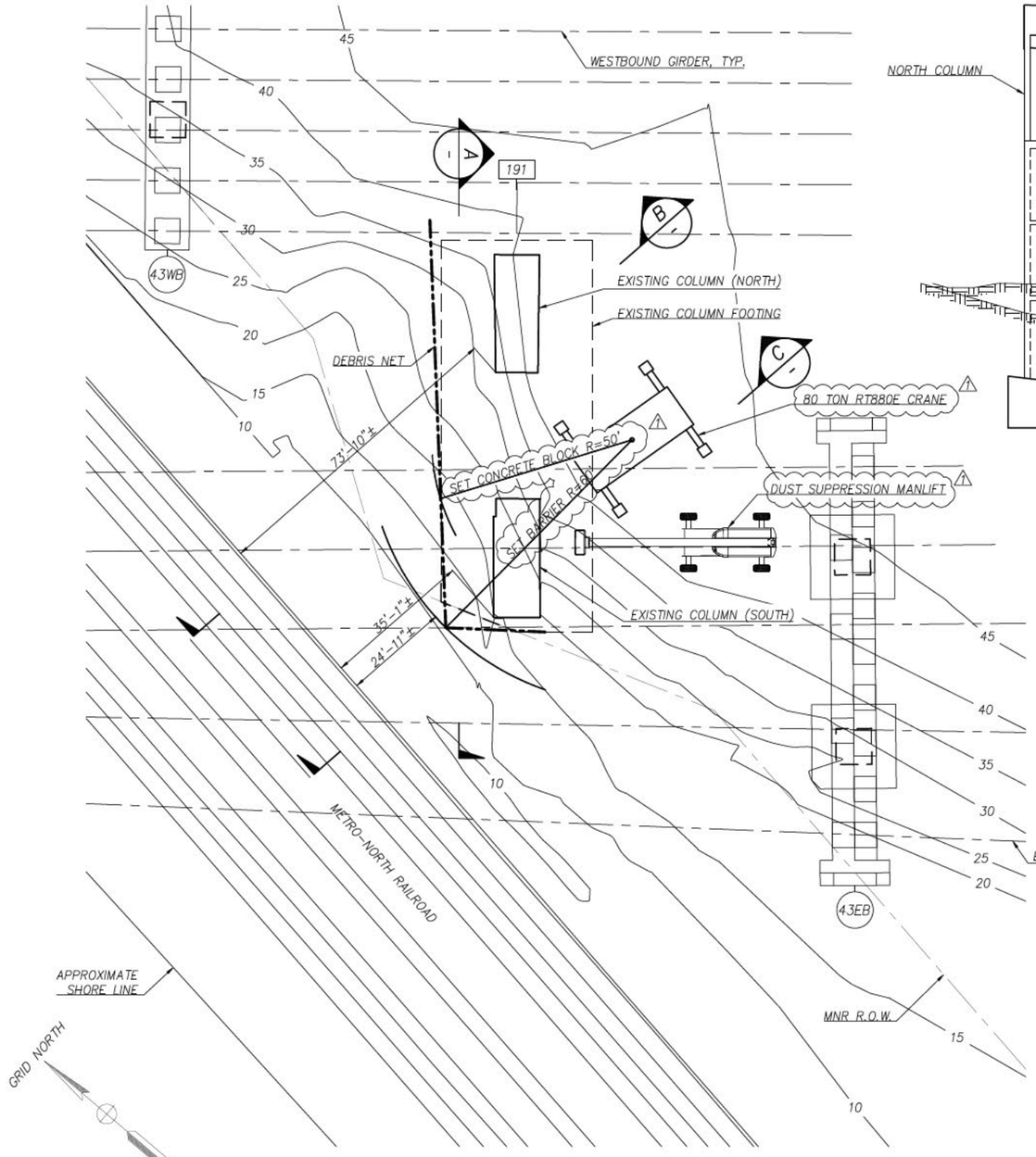
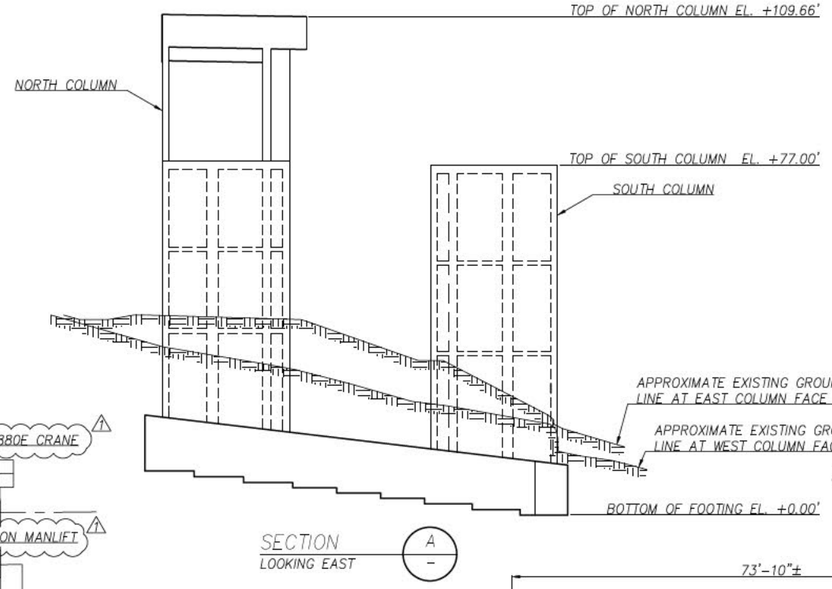
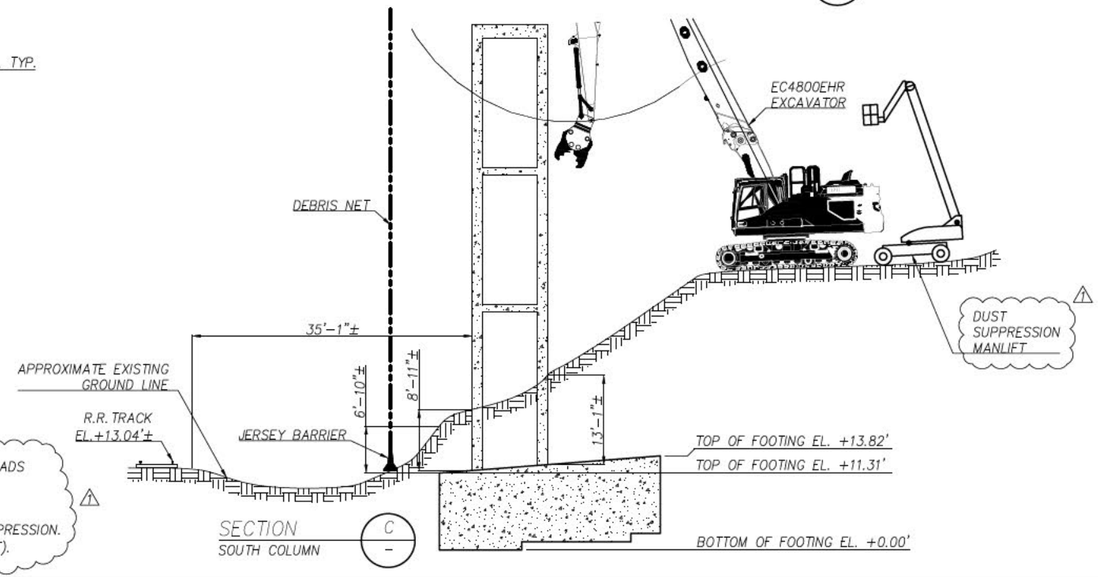


GENERAL PLAN VIEW – BENT 191



SECTION A – LOOKING EAST

SECTION B – NORTH COLUMN



SECTION C – SOUTH COLUMN

NOTES:

1. 80 TON RT880E CRANE SHALL BE USED TO PLACE BARRIER AND CONCRETE BLOCK. CRANE LOADS SHALL BE LESS THAN 65% OF CRANE CAPACITY WHILE BOOM FACES METRO-NORTH RAILROAD. REFERENCE CRITICAL LIFT SHEETS.
2. BENT 191 NORTH AND SOUTH COLUMNS SHALL BE DEMOLISHED WITH A HIGH-REACH EC480EHR EXCAVATOR AND ASSIST EXCAVATORS AS NEEDED. A MANLIFT SHALL BE USED FOR DUST SUPPRESSION.
3. AS DEMOLITION PROGRESSES, COLUMN PIECES SHALL BE PULLED EAST (AWAY FROM DEBRIS NET).
4. COLUMNS SHALL BE DEMOLISHED TO TOP OF EXISTING GRADE.

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SUPERVISOR:	B YAFFEE

TITLE OF DRAWING: TZC DEMOLITION WORKS AREA 6B SUBSTRUCTURE REMOVAL BENT 191 DEMO

DATE: 3-5-18
DRAWING NUMBER: TZC-00869E-001
REVISION: 01

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Attachment B
Bents 190/191 Site Photos

Pier Bent 191 and 190 Site Photos

Figure 1 –Pier Bent 190 and 191 at Low water, August 15, 2013, looking northeast. Pier Bent 191 is on the right hand side where the underdeck truss terminates.

Figure 2 – Northern Pier Bent 190 at low water and Pier Bent 191, June 9, 2016, looking East.

Pier Bent 191 and 190 Site Photos

Figure 3 – Northern Pier Bent 190 at Low water, July 27, 2015, looking northeast. The remains of a sheetpile cofferdam which surrounds the pier bent.

Figure 4 – Pier Bent 190 at low water, February 2, 2016, looking West.

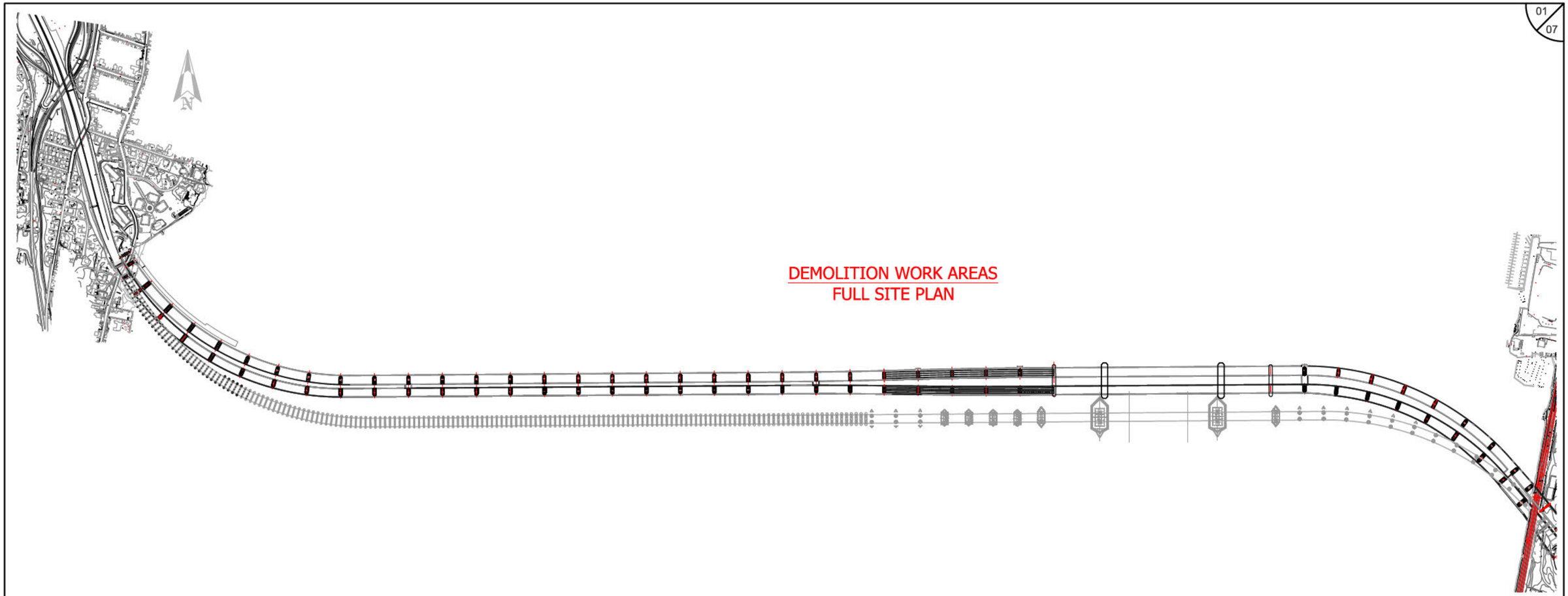
Pier Bent 191 and 190 Site Photos

Figure 5 – Pier Bent 190 at high water, June 7, 2016, looking northeast. The cofferdam on the left-hand side is the northern portion of Pier 42EB of the New NY Bridge.

Figure 6 – Pier Bent 190 at low water, June 9, 2016, looking northeast. The cofferdam on the left-hand side is the northern portion of Pier 42EB of the New NY Bridge.

Attachment C
Area Map and Designations

DEMOLITION WORK AREAS
FULL SITE PLAN



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TITLE OF DRAWING
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GENERAL PLAN

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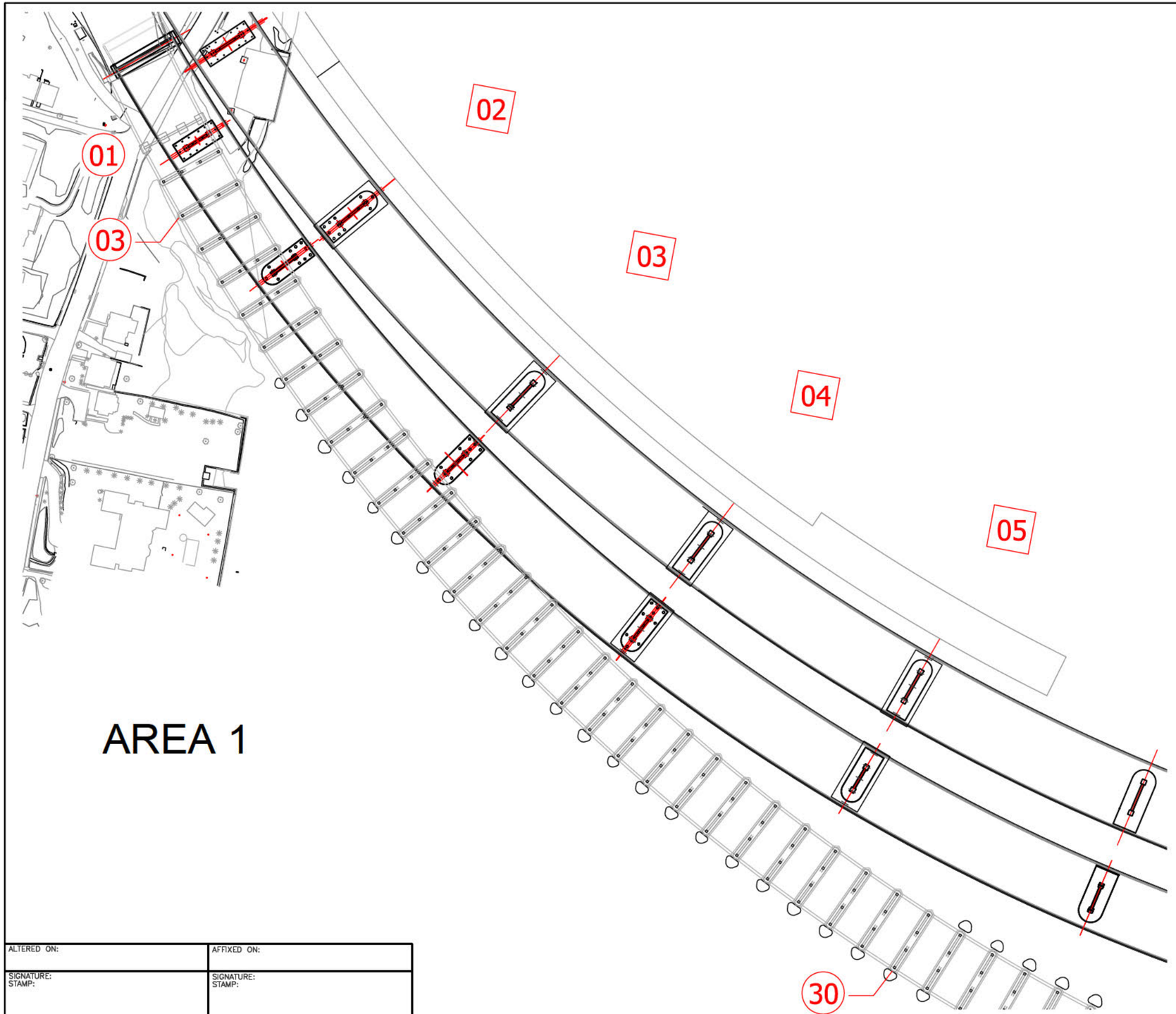

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AREA 01
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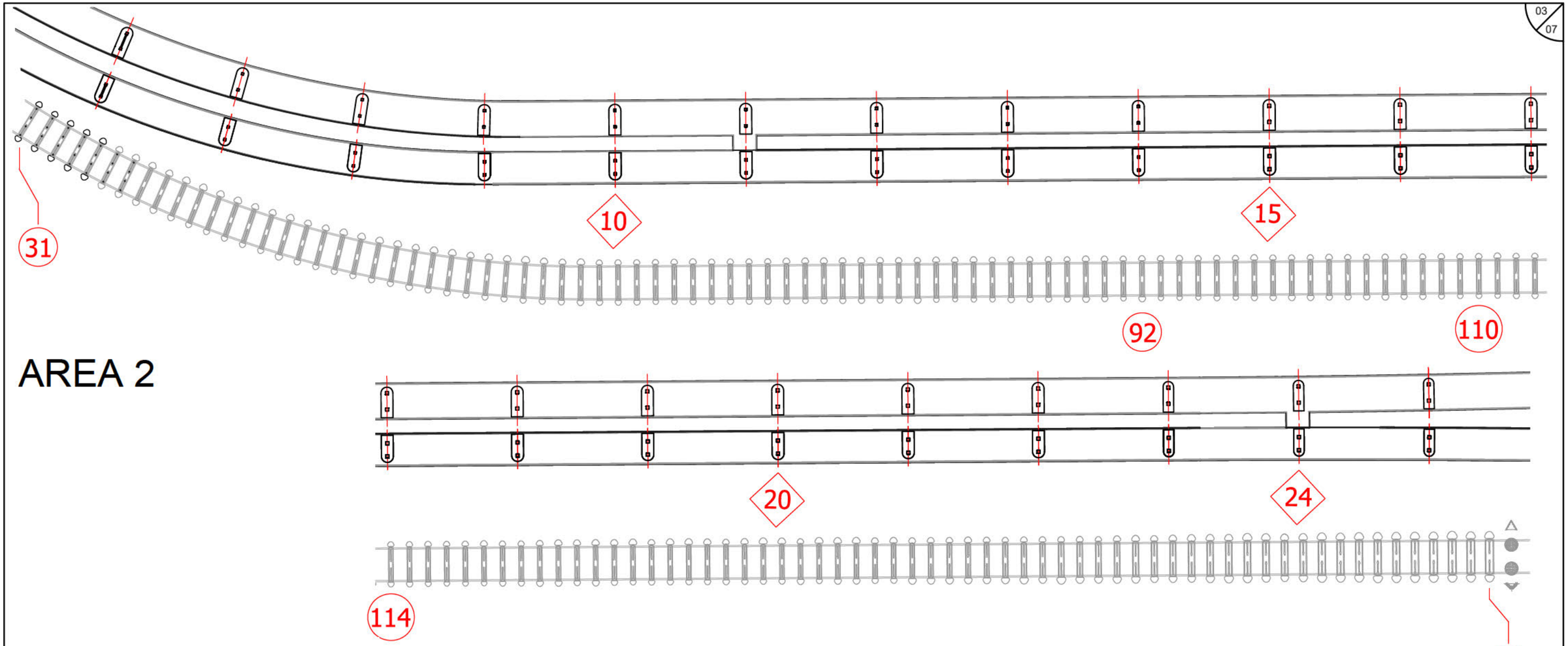

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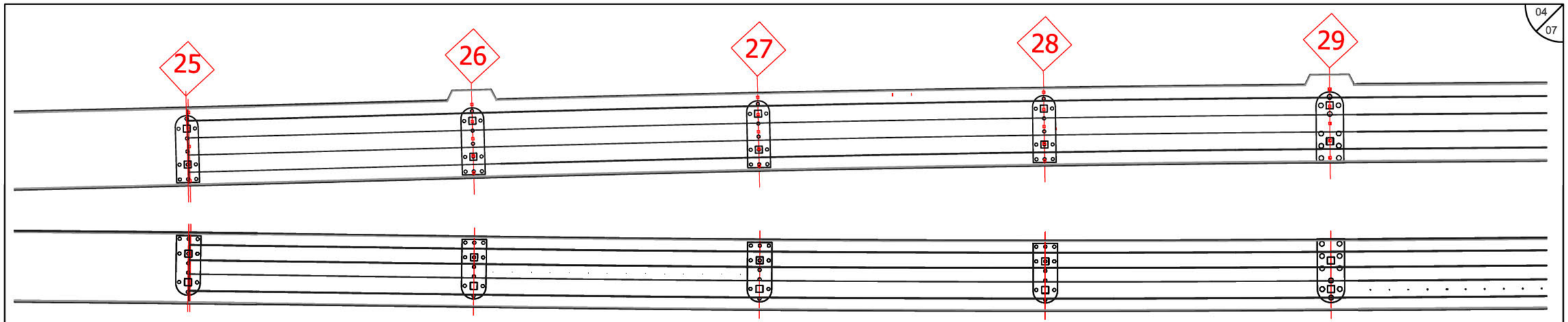

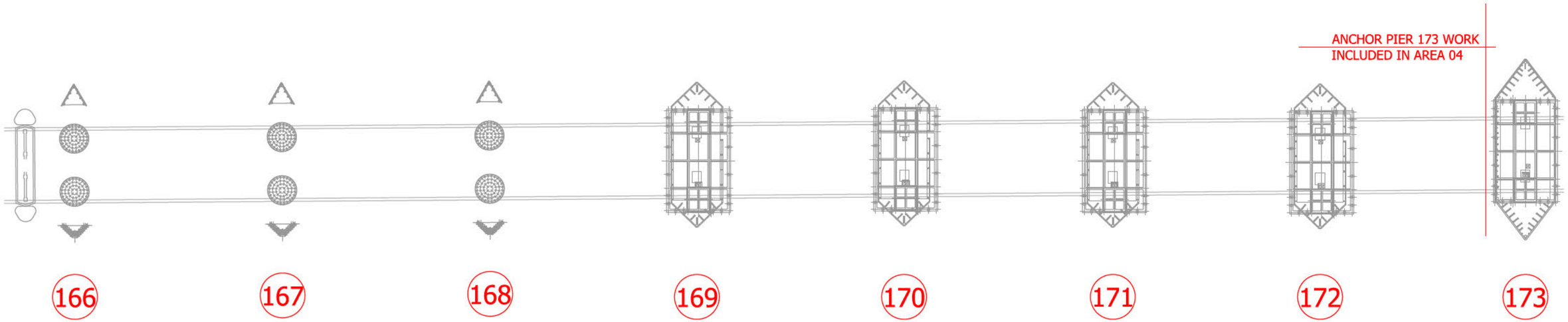

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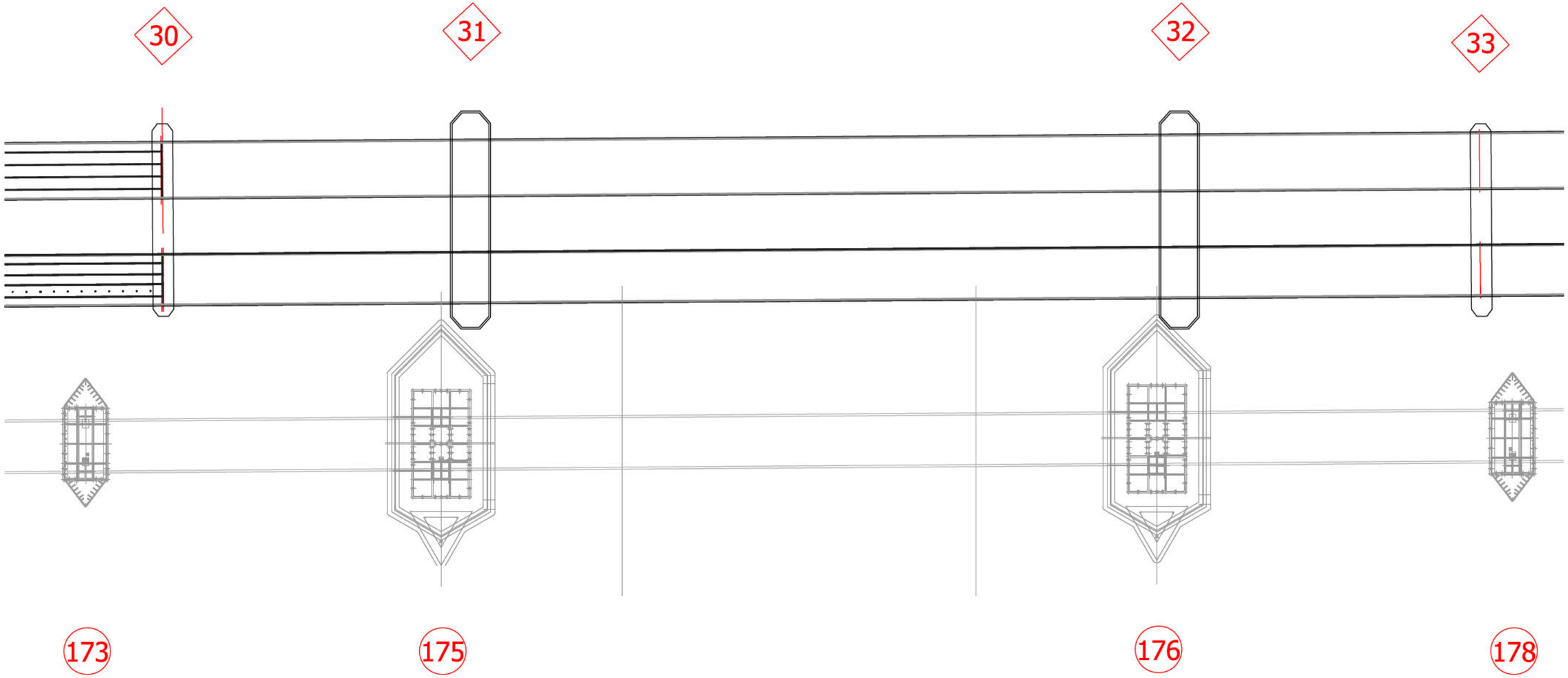

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GENERAL PLAN

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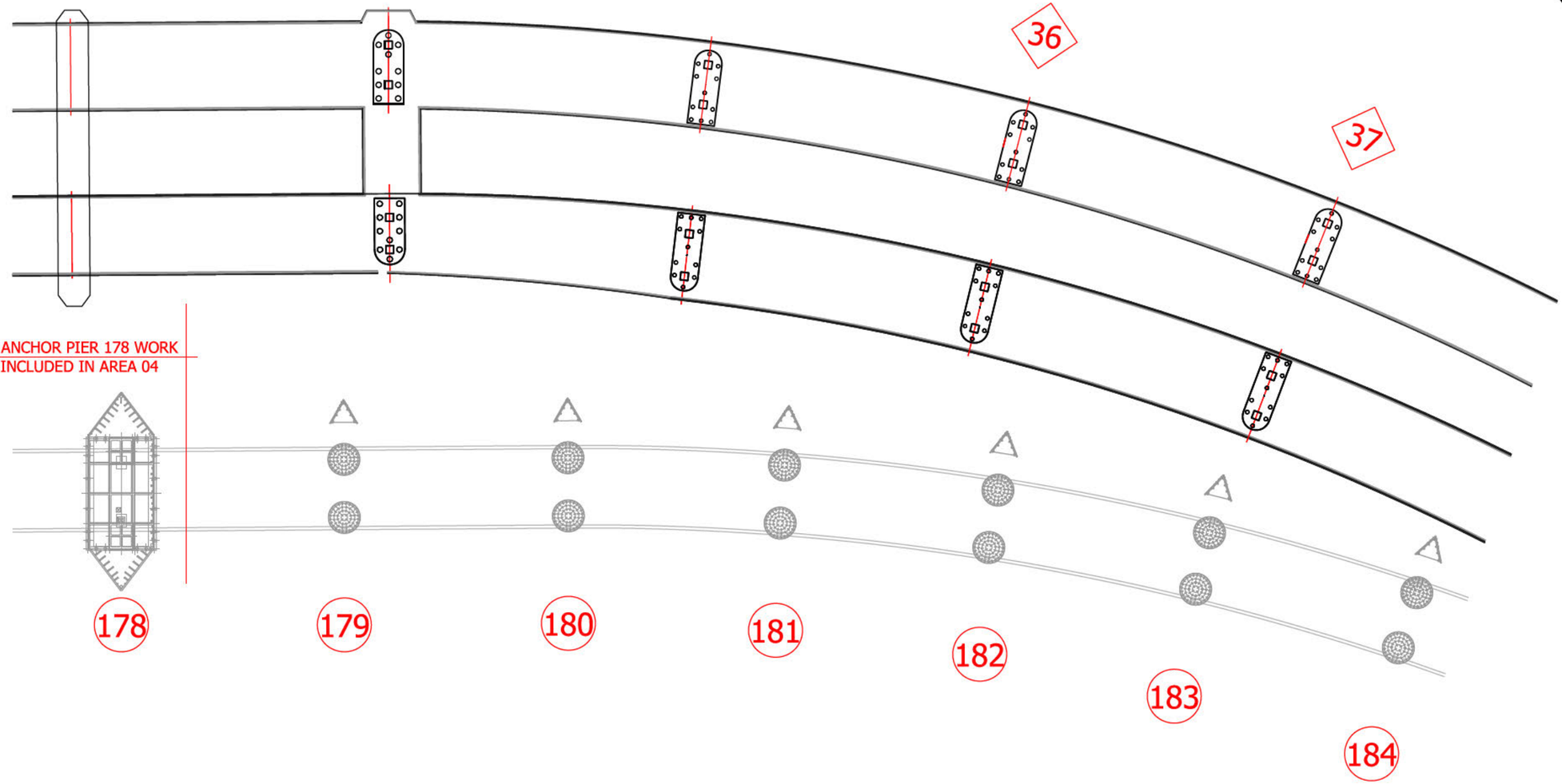

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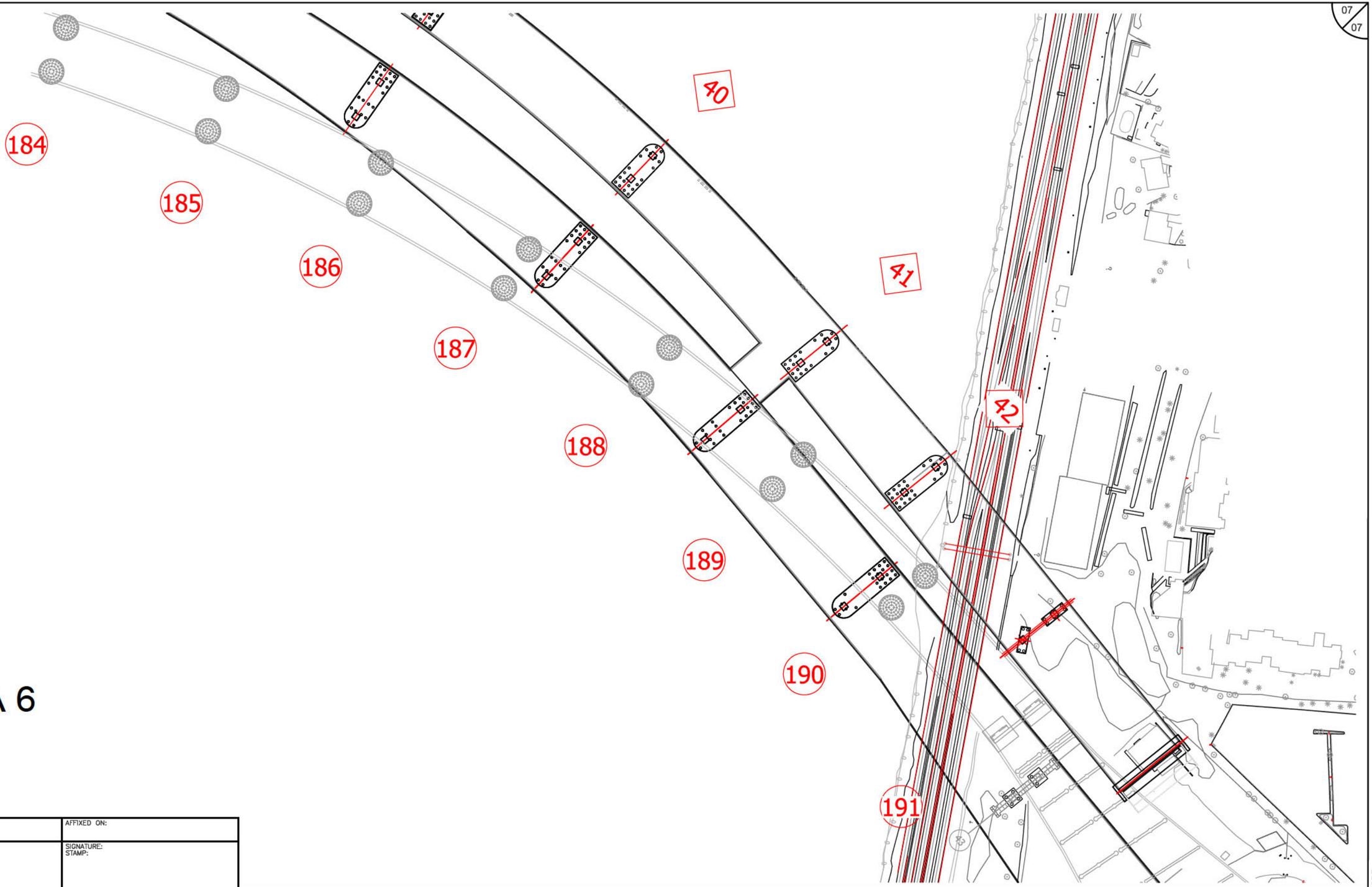

AREA 6

ALTERED ON:	AFFIXED ON:
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NEW YORK STATE THRUWAY AUTHORITY

NEW YORK STATE THRUWAY AUTHORITY
DEPARTMENT OF ENGINEERING
200 SOUTHERN BLVD., ALBANY, NY 12209

TITLE OF PROJECT	CONTRACT NUMBER
THE NEW NY BRIDGE	D214134

LOCATION OF PROJECT
MILEPOST 14.67 +/- IN
ROCKLAND & WESTCHESTER COUNTIES

TAPPAN ZEE CONSTRUCTORS, LLC

REVISIONS				
REV	DATE	BY	CHK BY	DESCRIPTION
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2				
1				

DESIGNED BY:
DESIGN CH'K BY:
DRAWN BY:
DRAWING CH'K BY:
SUPERVISOR:

TITLE OF DRAWING
DEMOLITION - AREA MAP
GENERAL PLAN

DATE:

DRAWING NUMBER:
DP - GENERAL

REVISION:
0

DOCUMENT TRACKING CODE:

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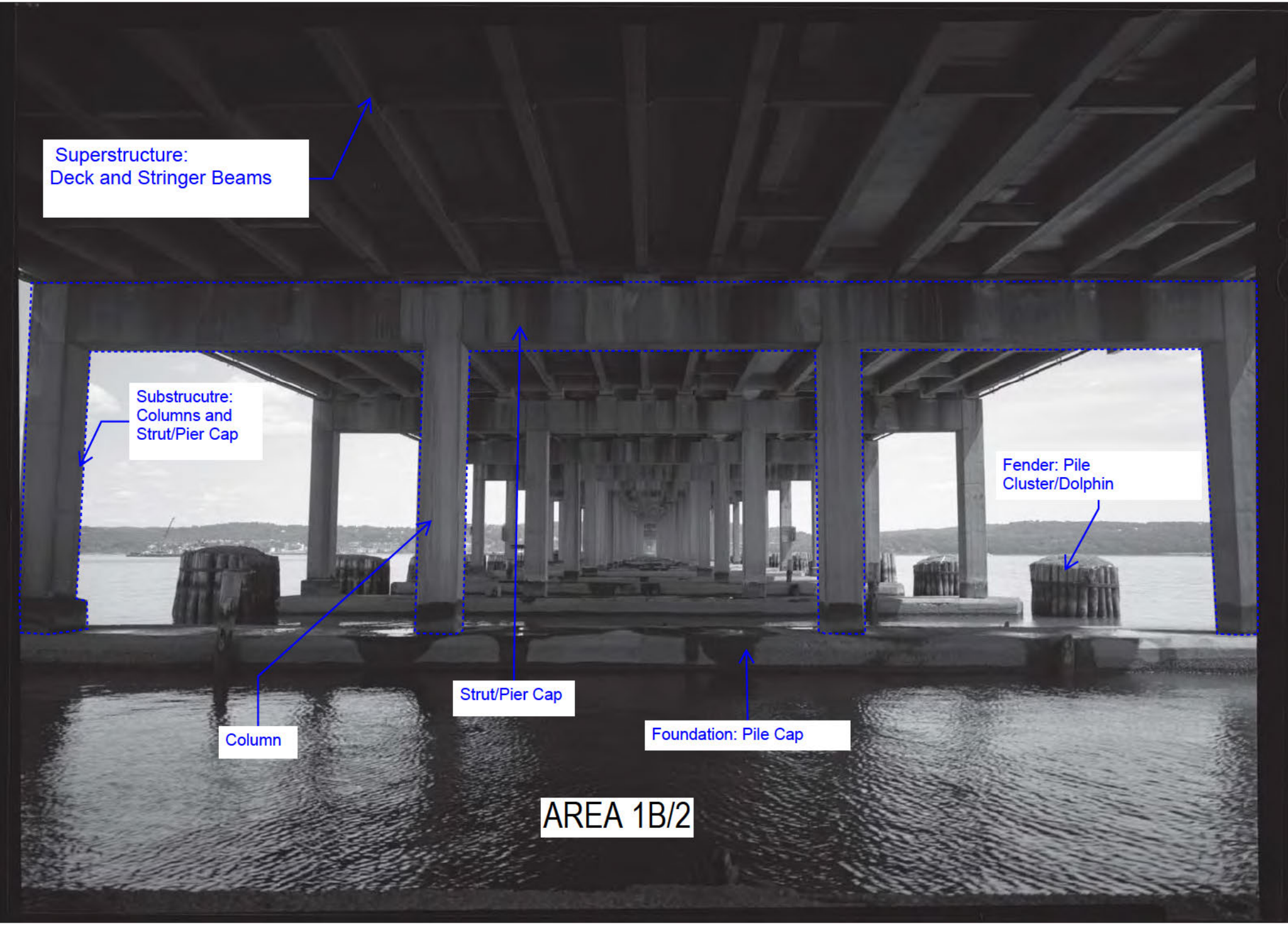
Attachment D
Bridge Structure Definitions

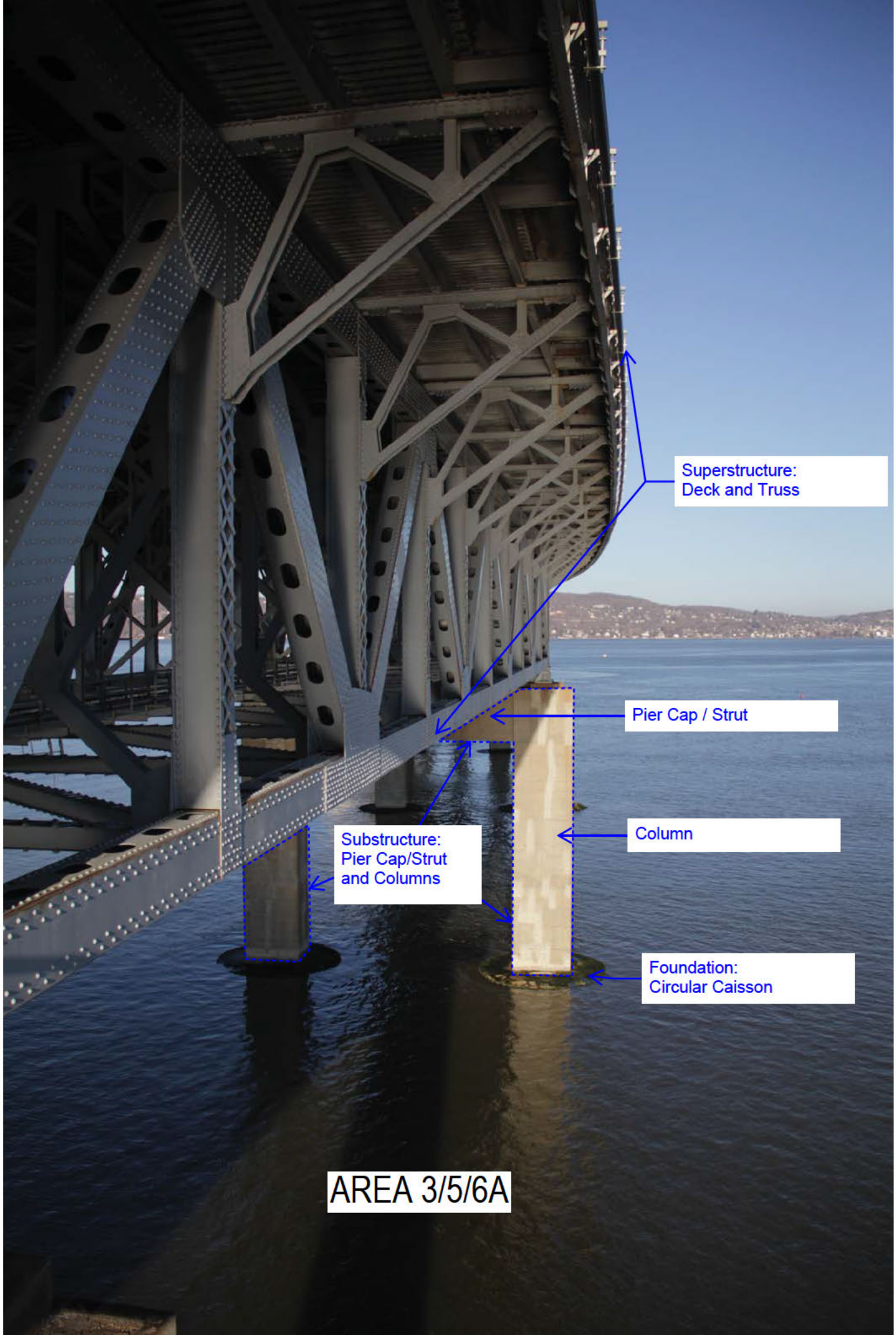

Superstructure:
Deck and Stringer Beams
Deck
Composite
Stringer
Beams
AREA 1B/2/3/4

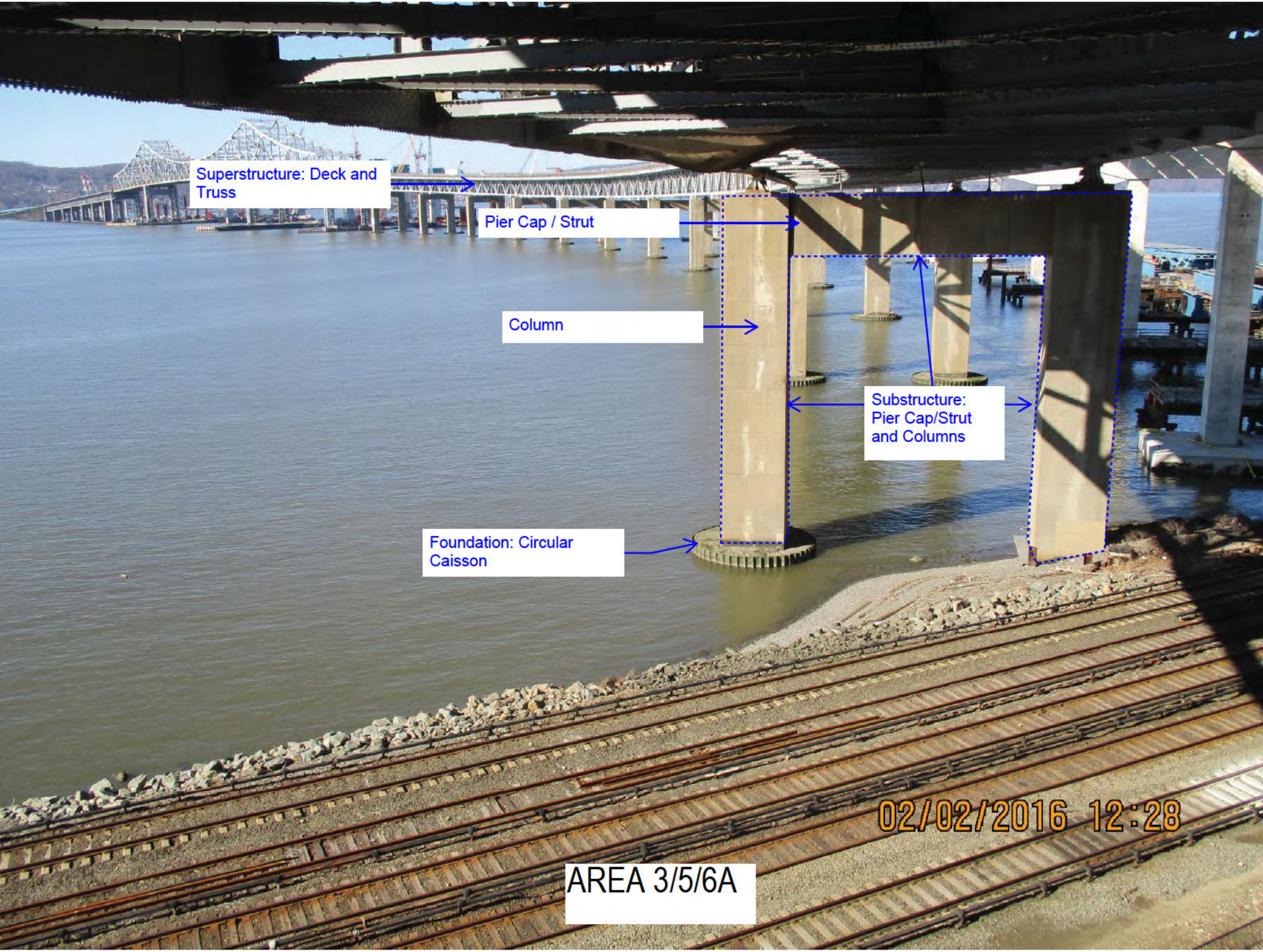

Superstructure:
Deck and Stringer Beams
Substrucutre:
Columns and Strut/Pier Cap
Column
Foundation: Pile Cap
Strut/Pier Cap
AREA 1B/2


Superstructure:
Deck and Stringer Beams
Substrucutre:
Columns and
Strut/Pier Cap
Fender: Pile
Cluster/Dolphin
Strut/Pier Cap
Column
Foundation: Pile Cap
AREA 1B/2


Substrucutre: Columns and Strut/Pier Cap
Fender: Pile Cluster/Dolphin
Foundation: Pile Cap

AREA 1B/2


Superstructure:
Deck and Truss
Pier Cap / Strut
Column
Substructure:
Pier Cap/Strut
and Columns
Foundation:
Circular Caisson
AREA 3/5/6A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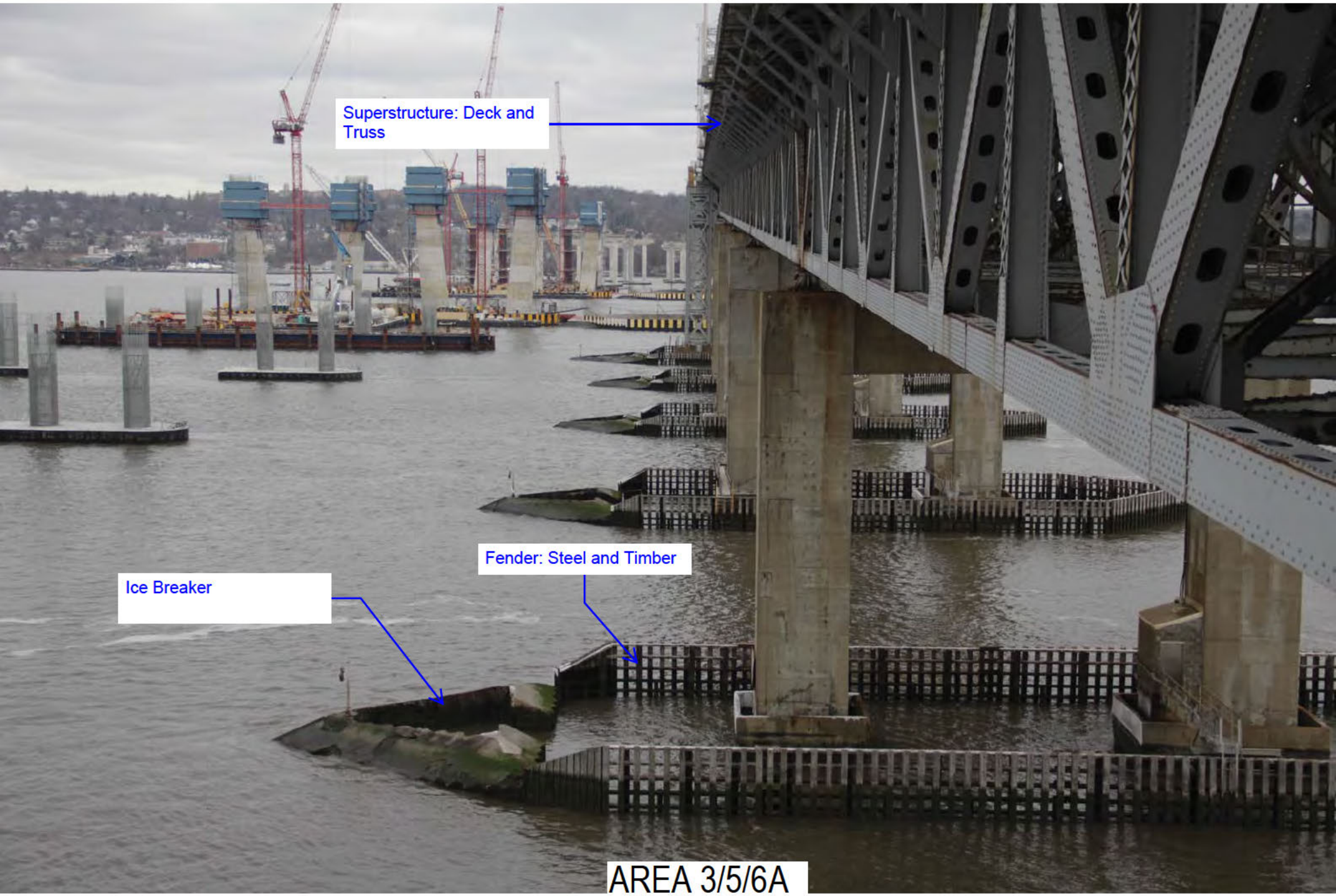
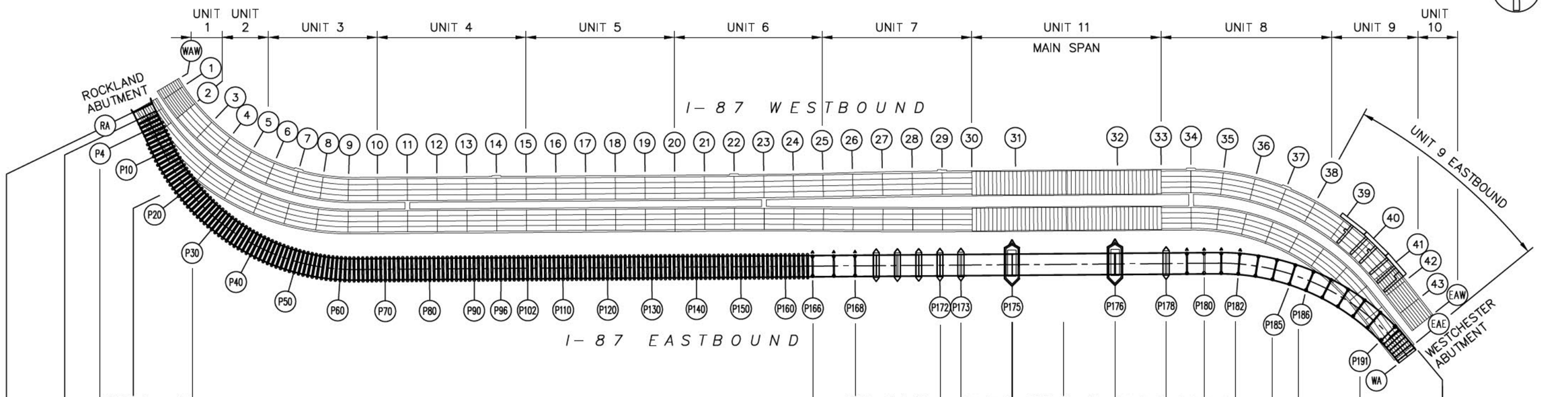
Pier Cap / Strut
Column
Substructure: Pier Cap/Strut and Columns
Foundation: Circular Caisson
02/02/2016 12:28
AREA 3/5/6A


Superstructure: Deck and Truss
Fender: Steel and Timber
Ice Breaker
AREA 3/5/6A


Superstructure
Substructure
Fender
AREA 4

Attachment E
Demolition Schedule



TIMBER DOLPHINS ICE BREAKERS**	S: 28–Aug–17 F: 20–Sep–17	S: 26–Sep–17 F: 26–Mar–18	S: 09–Oct–17 F: 14–May–18	S:09–Oct–17 F:15–May–18	S: 12–Mar–18 F: 14–Sep–18	S:09–Oct–17 F:15–May–18	S:13–Oct–17 F:15–May–18				
FENDERS**			S: 11–Oct–17 F: 22–Dec–17	S:11–Nov–17 F:22–Dec–17	S: 06–Nov–17 F: 15–May–18	S:11–Nov–17 F:22–Dec–17					
DECK	S:09–Oct–17 F:20–Oct–17	S: 09–Oct–17 F: 01–Nov–17	S: 12–Mar–18 F: 26–Apr–18	S: 09–Oct–17 F: 22–Dec–17	S: 09–Oct–17 F: 25–Apr–18	S: 09–Oct–17 F: 25–Apr–18	S: 07–Oct–17 F: 22–Dec–17	S: 28–Aug–17 F: 17–Nov–17			
STEEL SUPERSTRUCTURE			S: 12–Mar–18 F: 13–Apr–18	S: 09–Oct–17 F: 16–Oct–18		S: 14–Jun–18 F: 18–Jul–18	S: 06–Nov–17 F: 04–Dec–17				
SUBSTRUCTURE	S:17–Oct–17 F:02–Nov–17	S: 26–Oct–17 F: 22–Nov–17	S: 30–Apr–18 F: 28–Jun–18	S: 16–Apr–18 F: 16–May–18	S: 16–May–18 F: 27–Nov–18		S: 19–Jul–18 F: 19–Aug–18	S: 27–Nov–17 F: 19–Jul–18	S: 23–Oct–17 F: 02–Jun–18		
FOUNDATIONS**		S:03–Jul–18 F:08–Aug–18	S: 30–Nov–17 F: 22–Dec–17	S: 14–May–18 F: 28–Dec–18	S: 17–May–18 F: 05–Dec–18	S: 20–Aug–18 F: 05–Sep–19	S: 17–Oct–18 F: 04–Jun–19	S: 2–Apr–18 F: 06–Aug–18			
	AREA 1A	AREA 1B	AREA 2		AREA 3	AREA 4	AREA 5	AREA 6A	AREA 6B		

NOTES: DATES ARE BASED ON M003 MILESTONE DATE OF 10/6/2017

**DENOTES IN–WATER WORK

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F: FOR FINISHED

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NEW YORK STATE THRUWAY AUTHORITY
DEPARTMENT OF ENGINEERING
200 SOUTHERN BLVD., ALBANY, NY 12209

TITLE OF PROJECT: THE NEW NY BRIDGE
CONTRACT NUMBER: D214134
LOCATION OF PROJECT: MILEPOST 14.67 +/- IN ROCKLAND & WESTCHESTER COUNTIES

TAPPAN ZEE CONSTRUCTORS, LLC

REVISIONS					
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DESIGN CH'K BY:
DRAWN BY:
DRAWING CH'K BY:
SUPERVISOR:

TITLE OF DRAWING:
NEW NY BRIDGE
EXISTING BRIDGE
DEMOLITION
SCHEDULE MATRIX

DATE: 04/04/2018
DRAWING NUMBER:
REVISION: 3

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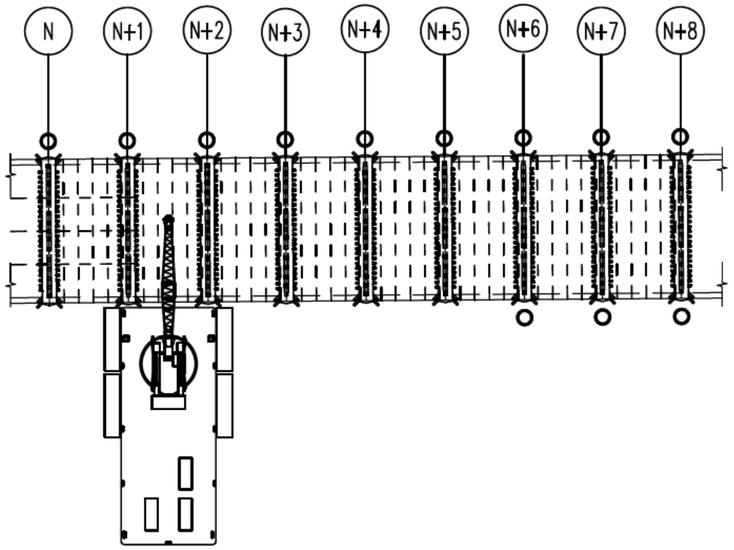

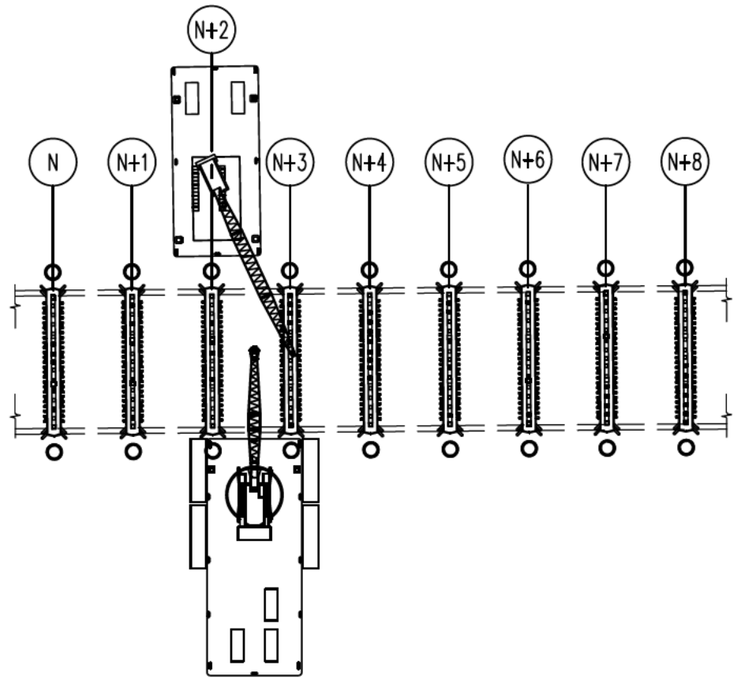

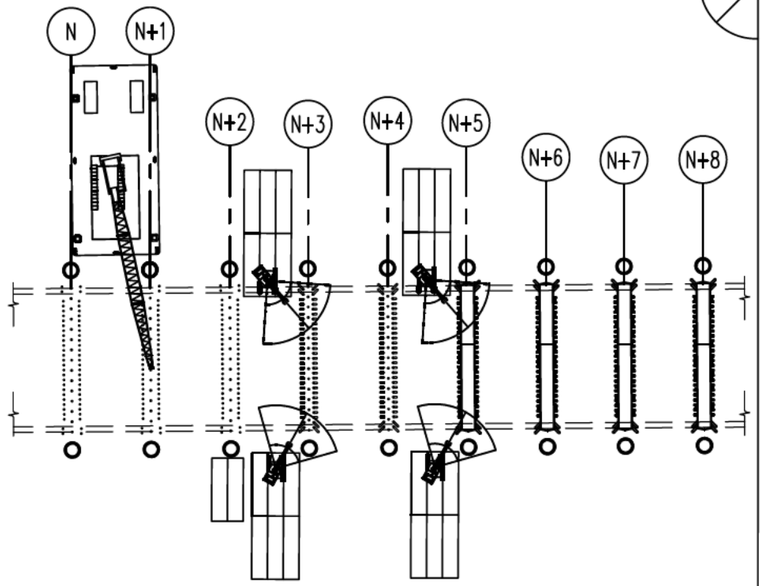

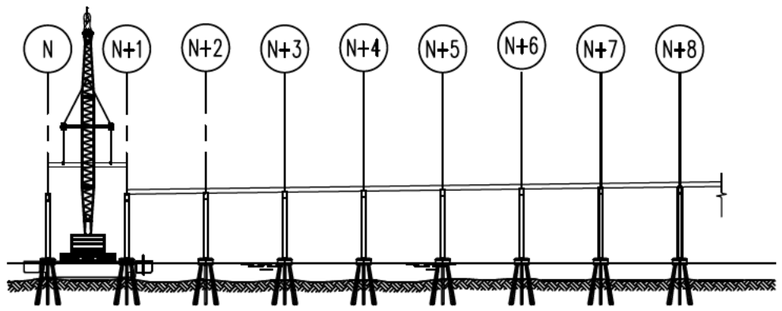

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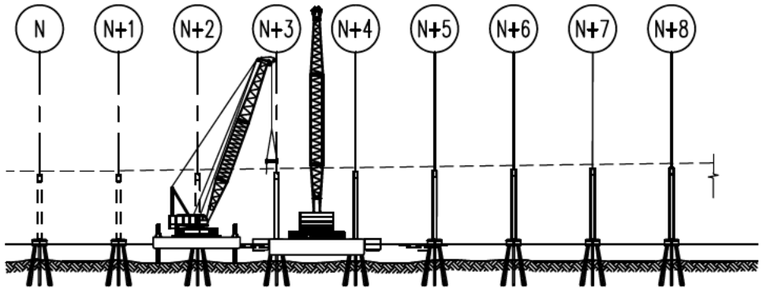

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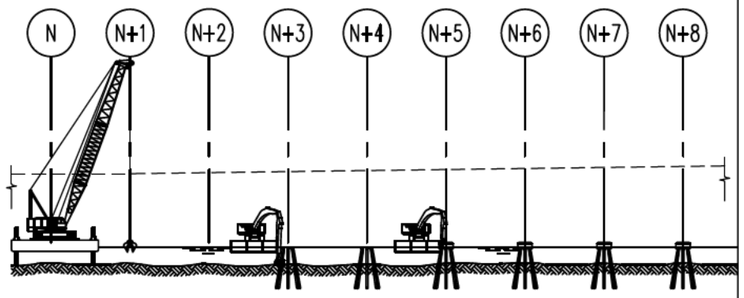

HAMMER PILE CAP, PILE REMOVAL, RUBBLE REMOVAL

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NEW YORK STATE THRUWAY AUTHORITY
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200 SOUTHERN BLVD., ALBANY, NY 12209

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THE NEW NY BRIDGE	D214134

LOCATION OF PROJECT
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ROCKLAND & WESTCHESTER COUNTIES

TAPPAN ZEE CONSTRUCTORS, LLC

REVISIONS				
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DESIGNED BY: AZ
DESIGN CH'K BY: BY
DRAWN BY: AZ
DRAWING CH'K BY:
SUPERVISOR: BY

TITLE OF DRAWING
NEW NY BRIDGE
EXISTING BRIDGE
DEMOLITION
AREA 2

DATE: 12/08/2017
DRAWING NUMBER:
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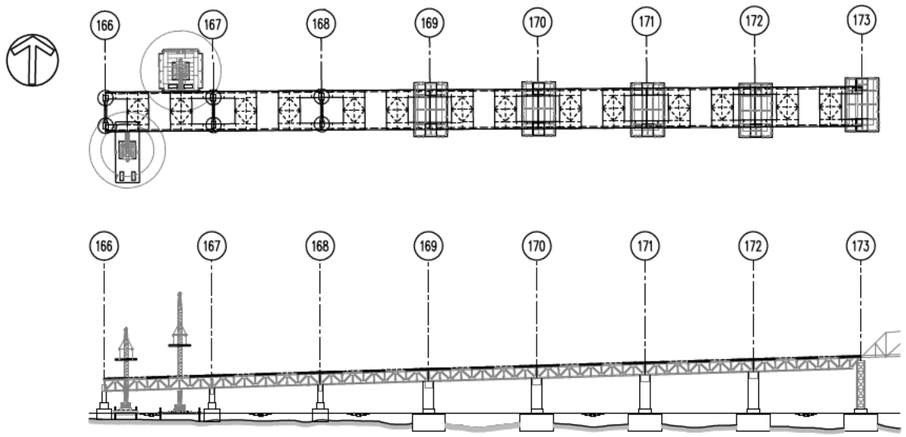

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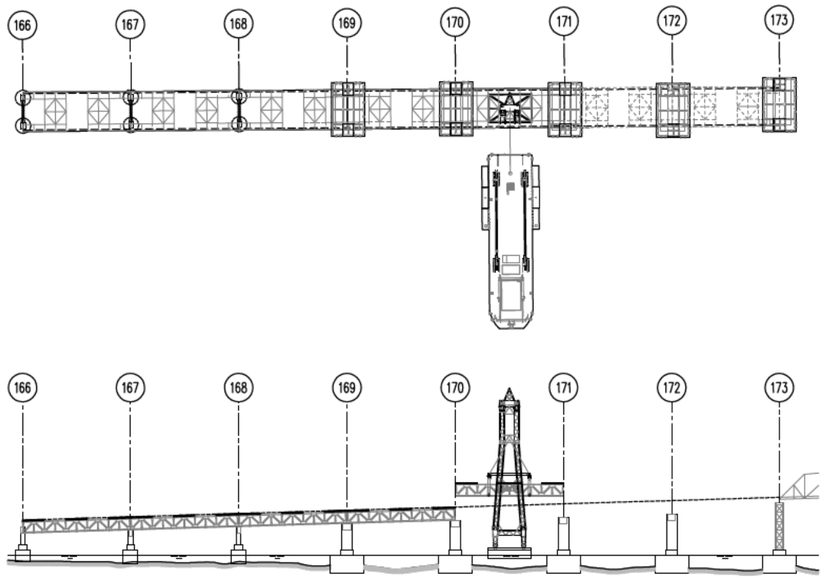

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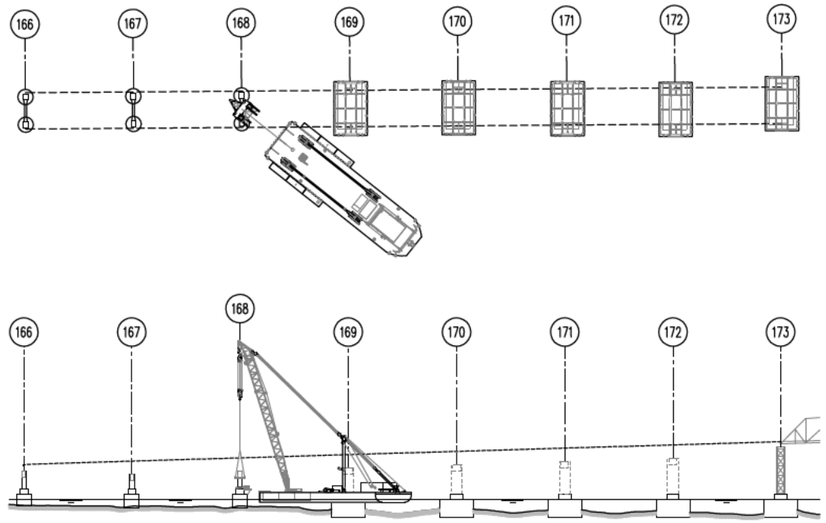

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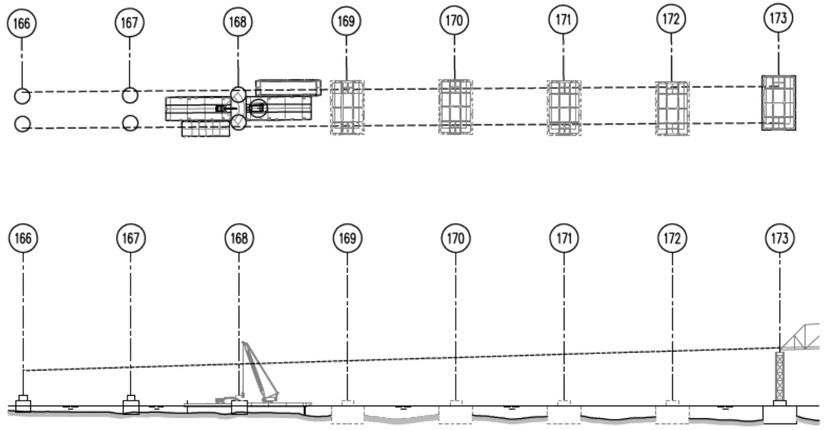

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NEW YORK STATE THRUWAY AUTHORITY
DEPARTMENT OF ENGINEERING
200 SOUTHERN BLVD., ALBANY, NY 12209

TITLE OF PROJECT	CONTRACT NUMBER
THE NEW NY BRIDGE	D214134

LOCATION OF PROJECT
MILEPOST 14.67 +/- IN
ROCKLAND & WESTCHESTER COUNTIES

TAPPAN ZEE CONSTRUCTORS, LLC

REVISIONS

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DESIGNED BY:
DESIGN CH'K BY:
DRAWN BY: JP
DRAWING CH'K BY:
SUPERVISOR:

TITLE OF DRAWING
NEW NY BRIDGE
EXISTING BRIDGE
DEMOLITION
AREA 3

DATE: 09/13/2016
DRAWING NUMBER:
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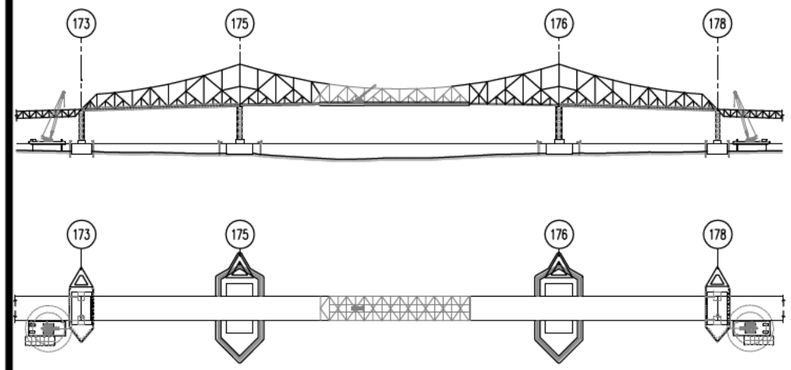
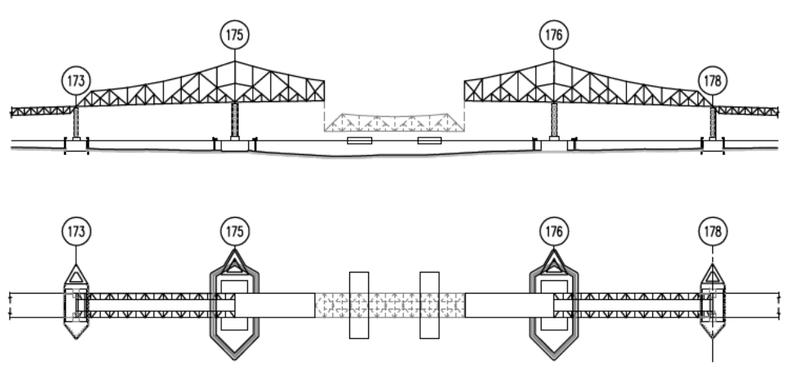
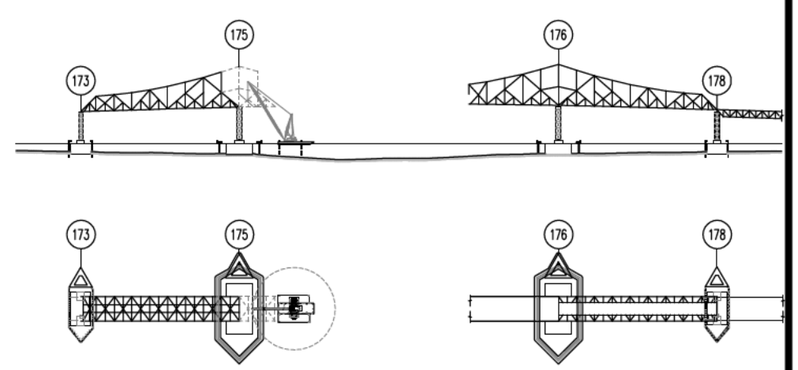


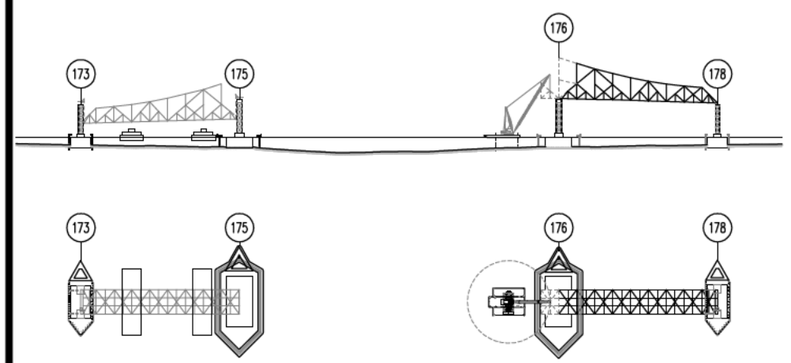
DECK REMOVAL TO LOWER SUSPENDED SPAN
(2X) LTM 1200
300T LR1300
275T TEREX HC275
(4X) DEBRIS BARGES



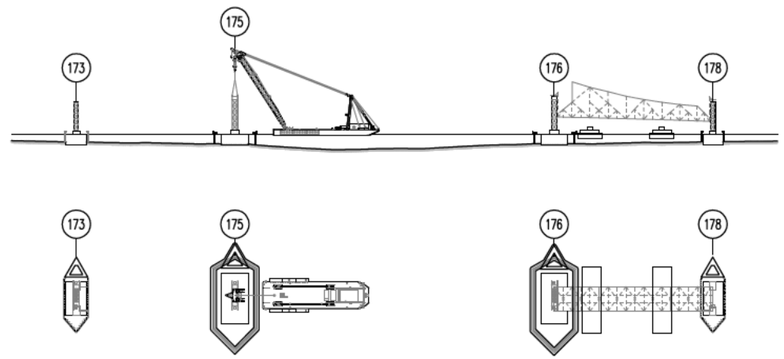
LOWERING SUSPENDED SPAN
65T HYDRO
(2X) DEBRIS BARGES



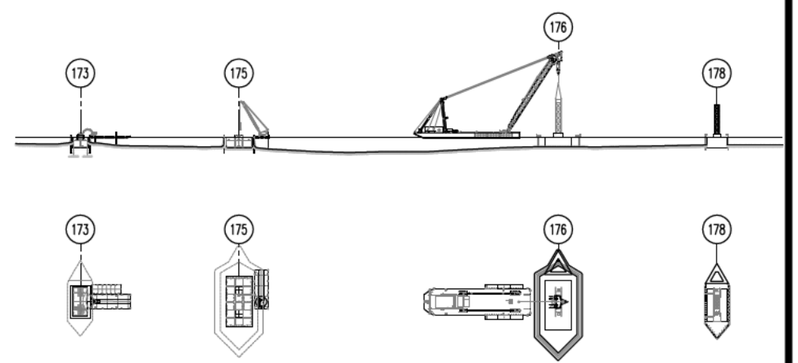
DISMANTLING CANTILEVER SPAN
4600 RINGER ON BARGE
65T HYDRO
(2X) DEBRIS BARGES



LOWERING ANCHOR SPAN
65T HYDRO
300T LR1300
(2X) DEBRIS BARGES



BENT AND COLUMN REMOVAL
SHEAR LEG LCL
14000 CRANE BARGE
DEBRIS BARGE



FOUNDATION REMOVAL
200T LB HS 895
CAT 374DL BARGE MOUNT
EXCAVATOR PC800
(3X) ASSIST CRANE BARGES
(2X) DEBRIS BARGES

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NEW YORK STATE THRUWAY AUTHORITY
DEPARTMENT OF ENGINEERING
200 SOUTHERN BLVD., ALBANY, NY 12209

TITLE OF PROJECT	CONTRACT NUMBER
THE NEW NY BRIDGE	D214134

LOCATION OF PROJECT
MILEPOST 14.67 +/- IN
ROCKLAND & WESTCHESTER COUNTIES

TAPPAN ZEE CONSTRUCTORS, LLC

REVISIONS

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DESIGN CH'K BY:
DRAWN BY: JP
DRAWING CH'K BY:
SUPERVISOR:

TITLE OF DRAWING
NEW NY BRIDGE
EXISTING BRIDGE
DEMOLITION
AREA 4

DATE: 09/16/2016
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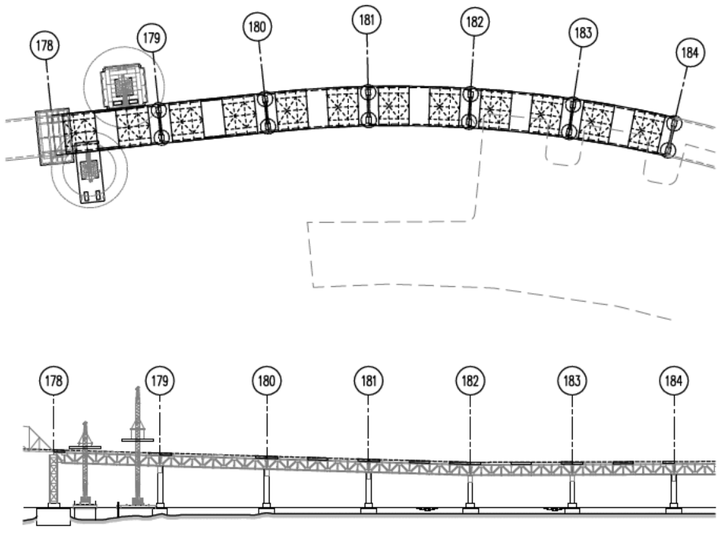

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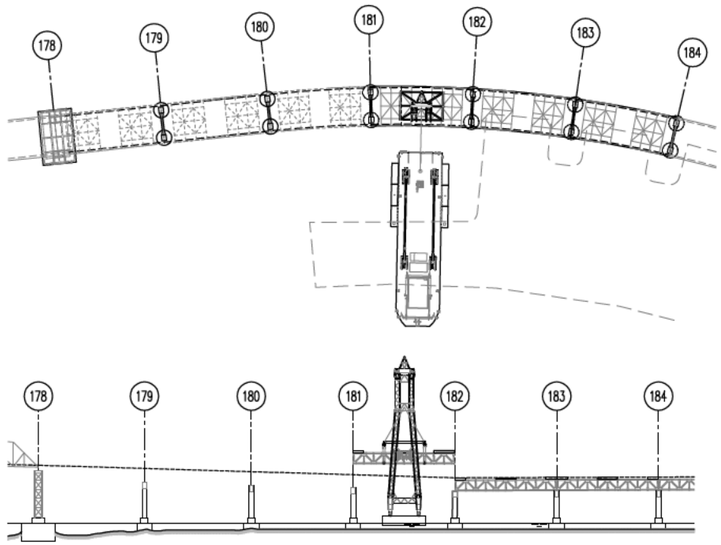

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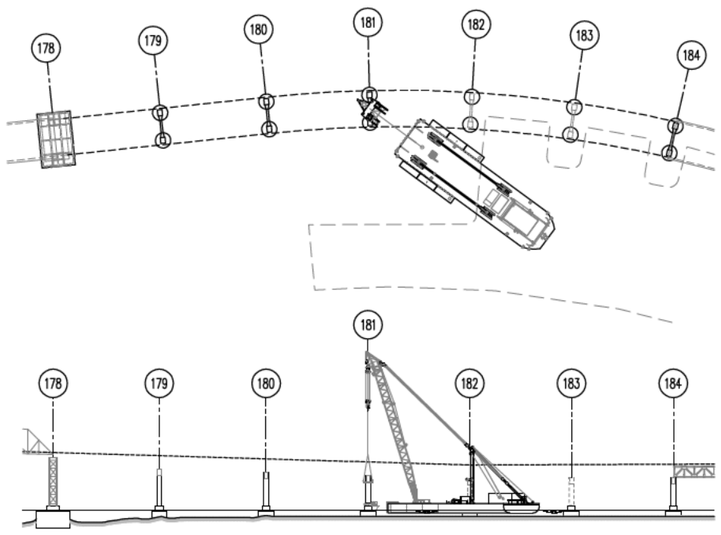

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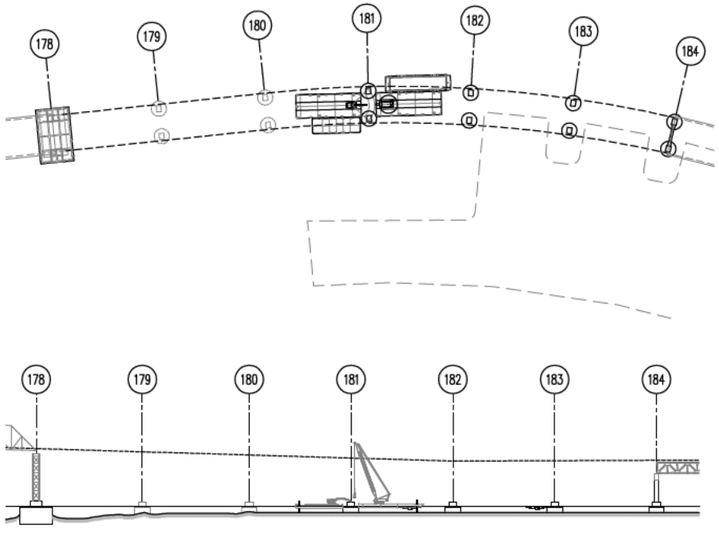

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IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

NEW YORK STATE THRUWAY AUTHORITY
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200 SOUTHERN BLVD., ALBANY, NY 12209

TITLE OF PROJECT: THE NEW NY BRIDGE
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LOCATION OF PROJECT: MILEPOST 14.67 +/- IN ROCKLAND & WESTCHESTER COUNTIES

TAPPAN ZEE CONSTRUCTORS, LLC

REVISIONS				
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DESIGN CH'K BY:
DRAWN BY: JP
DRAWING CH'K BY:
SUPERVISOR:

TITLE OF DRAWING
NEW NY BRIDGE
EXISTING BRIDGE
DEMOLITION
AREA 5

DATE: 09/14/2016
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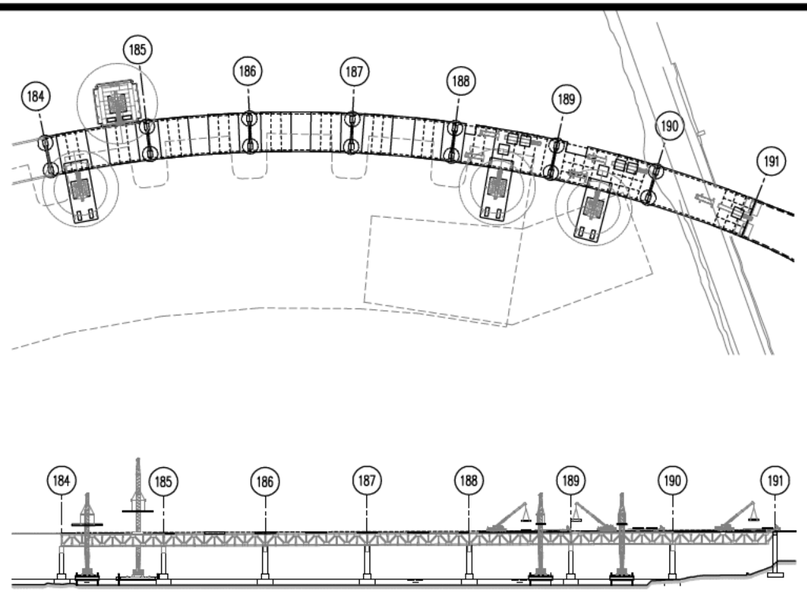

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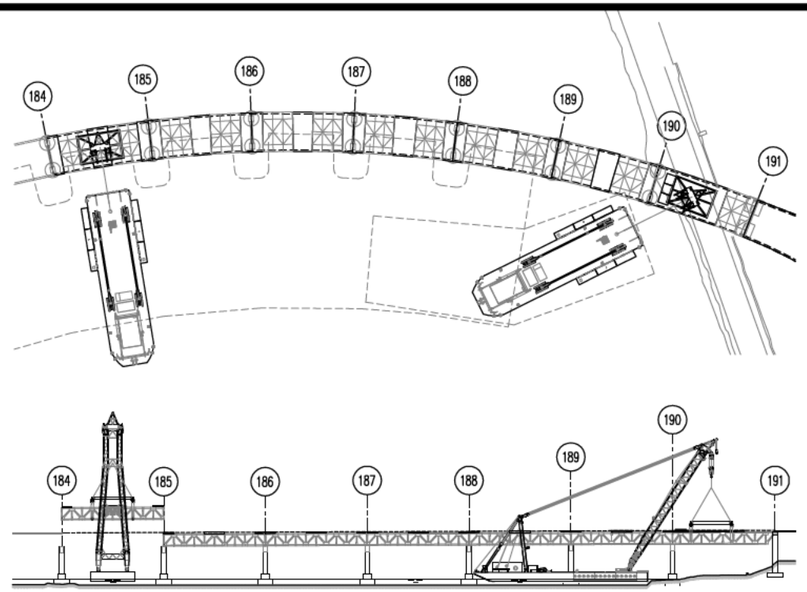

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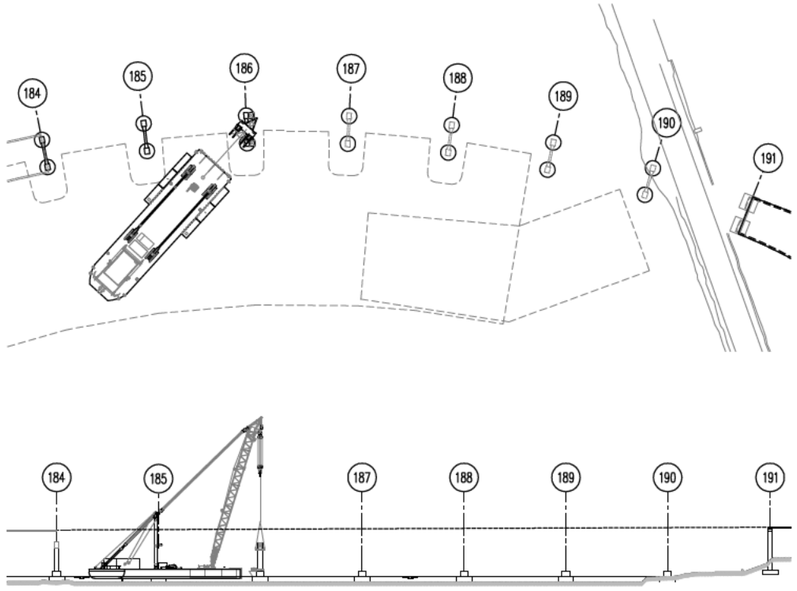

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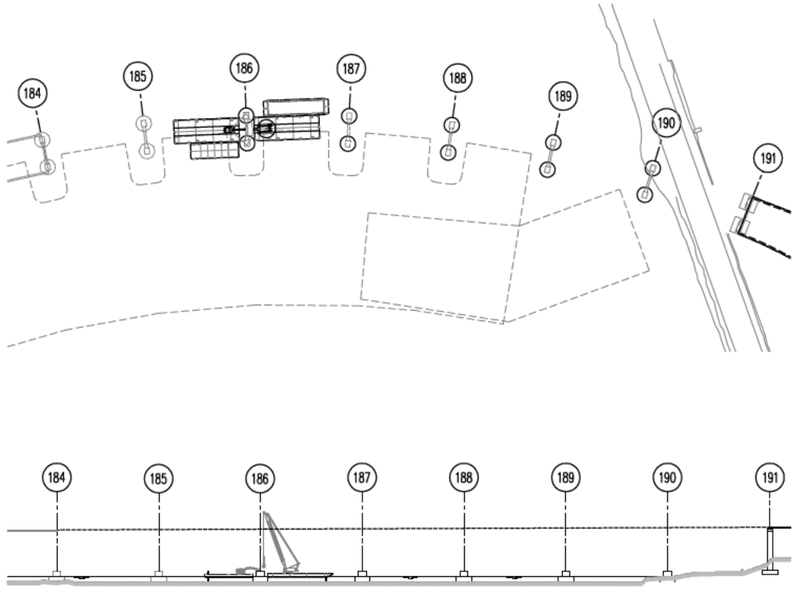

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NEW YORK STATE THRUWAY AUTHORITY
DEPARTMENT OF ENGINEERING
200 SOUTHERN BLVD., ALBANY, NY 12209

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TAPPAN ZEE CONSTRUCTORS, LLC

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DESIGNED BY:
DESIGN CH'K BY:
DRAWN BY: JP
DRAWING CH'K BY:
SUPERVISOR:

TITLE OF DRAWING
NEW NY BRIDGE
EXISTING BRIDGE
DEMOLITION
AREA 6A

DATE: 09/01/2016
DRAWING NUMBER:
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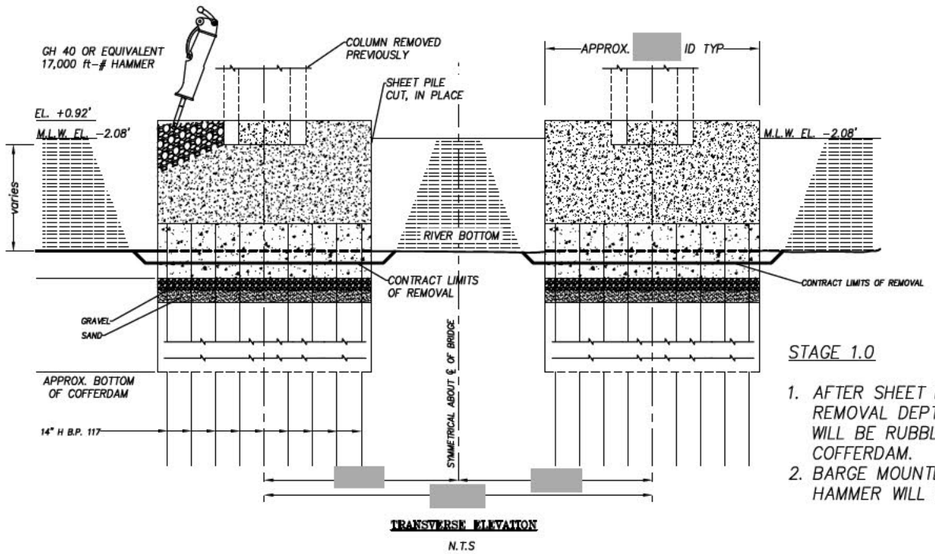
Attachment F
Debris Removal Depiction

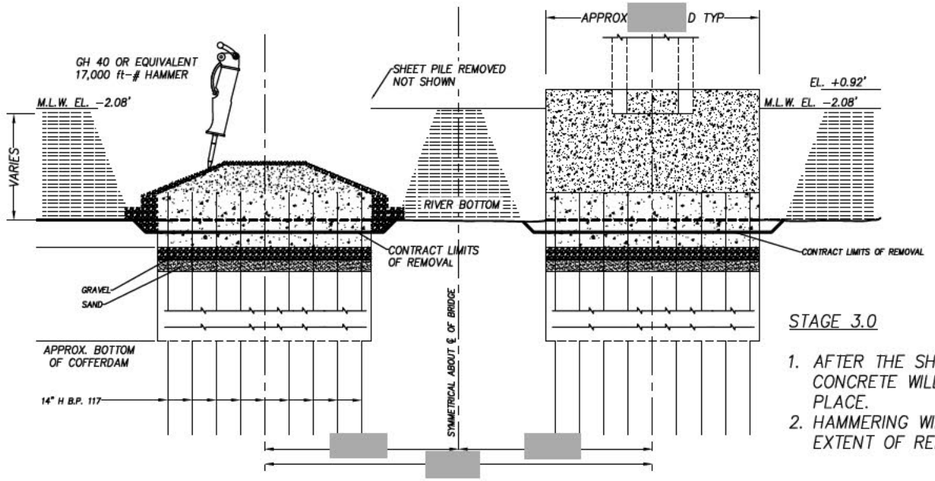


TRANSVERSE ELEVATION

N.T.S

STAGE 1.0

1. AFTER SHEET PILE HAVE BEEN CUT AT REMOVAL DEPTH. EXISTING MATERIAL WILL BE RUBBLIZED INSIDE EXISTING COFFERDAM.
2. BARGE MOUNTED EXCAVATOR WITH 17K HAMMER WILL PROCESS MATERIAL.

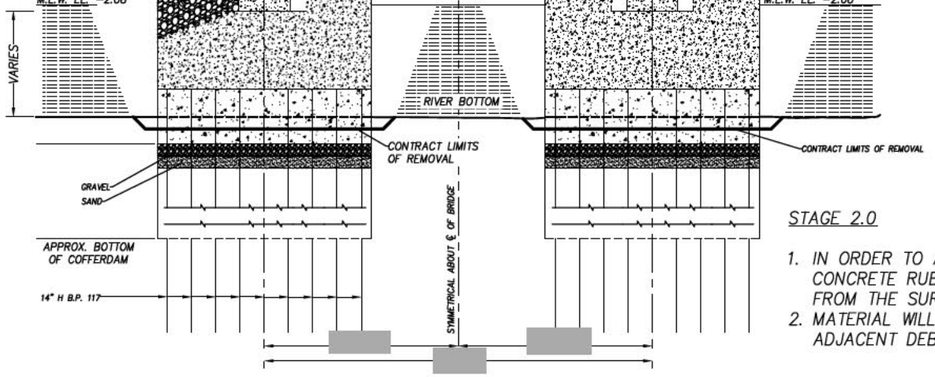


TRANSVERSE ELEVATION

N.T.S

STAGE 3.0

1. AFTER THE SHEET PILE ARE REMOVED, CONCRETE WILL BE HAMMERED IN PLACE.
2. HAMMERING WILL PROGRESS TO THE EXTENT OF REMOVAL.

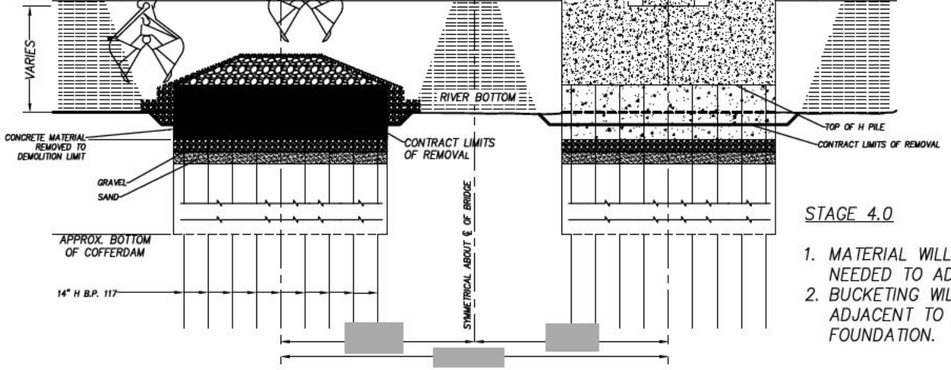


TRANSVERSE ELEVATION

N.T.S

STAGE 2.0

1. IN ORDER TO ADVANCE THE WORK CONCRETE RUBBLE WILL BE BUCKETED FROM THE SURFACE.
2. MATERIAL WILL BE PLACED IN ADJACENT DEBRIS BARGES.



TRANSVERSE ELEVATION

N.T.S

STAGE 4.0

1. MATERIAL WILL BE REMOVED AS NEEDED TO ADVANCE WORK.
2. BUCKETING WILL TAKE PLACE ON AND ADJACENT TO FOOTPRINT OF FOUNDATION.

GENERAL NOTES

1. WORK TO BE CONDUCTED ACCORDING TO THE CONSTRUCTION WORK PLAN. SEQUENCING IS CONCEPTUAL FOR THE PURPOSE OF ILLUSTRATING BUCKETING OPERATION
2. NOT MORE THAN 90 DAYS PRIOR TO DEMOLITION OF THE EXISTING BRIDGE SUBSTRUCTURE IN THE RIVER, TZC WILL PERFORM A BATHYMETRIC SURVEY OF THE RIVERBED. TZC WILL SUBMIT THE RIVERBED ELEVATIONS AND REMOVAL LIMITS OF DEMOLITION.
3. MATERIAL TO BE RUBBLIZED USING HYDRAULIC HAMMERS UNDERWATER. BROKEN MATERIAL WILL BE BUCKETED FROM THE WORKING SURFACE AND SURROUNDING AREA AS NEEDED TO ADVANCE WORK.
4. REMOVAL OF H PILE WILL BE DETERMINED BASED ON RELATIVE REMOVAL LIMIT TO TOP OF PILE ELEVATION.

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SIGNATURE: STAMP:	SIGNATURE: STAMP:

NEW YORK STATE THRUWAY AUTHORITY
DEPARTMENT OF ENGINEERING
200 SOUTHERN BLVD., ALBANY, NY 12209

TITLE OF PROJECT: THE NEW NY BRIDGE
CONTRACT NUMBER: D214134
LOCATION OF PROJECT: MILEPOST 14.67 +/- IN ROCKLAND & WESTCHESTER COUNTIES

TAPPAN ZEE CONSTRUCTORS, LLC

REVISIONS					
REV	DATE	BY	CHK BY	DESCRIPTION	
6					
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4					
3					
2					
1					

DESIGNED BY: F. LAST NAME
DESIGN CH'K BY: F. LAST NAME
DRAWN BY: BD
DRAWING CH'K BY: BP
SUPERVISOR:

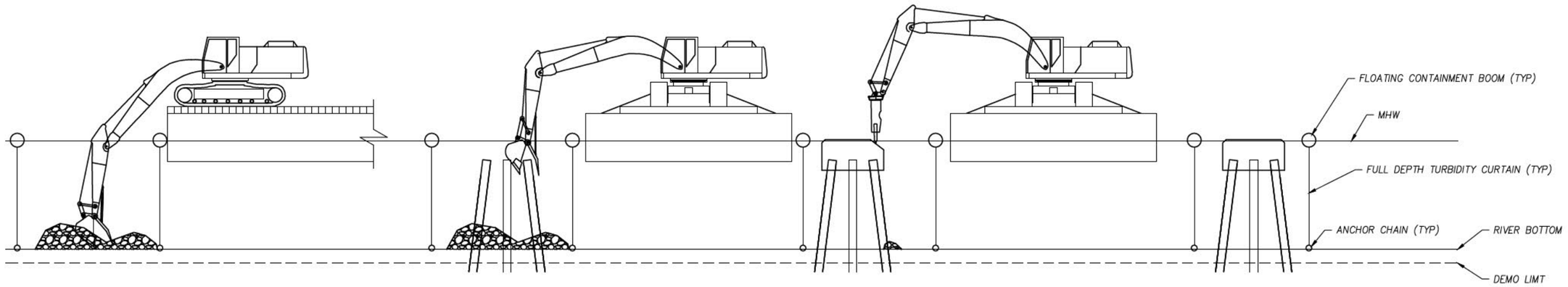
TITLE OF DRAWING
SEQUENCE ELEVATIONS
CAISSON DEMOLITION
AREA 3, 5, & 6
BUCKETING

DATE: 09/06/2016
DRAWING NUMBER: 00000-000
REVISION: ALPHA/NUMERIC

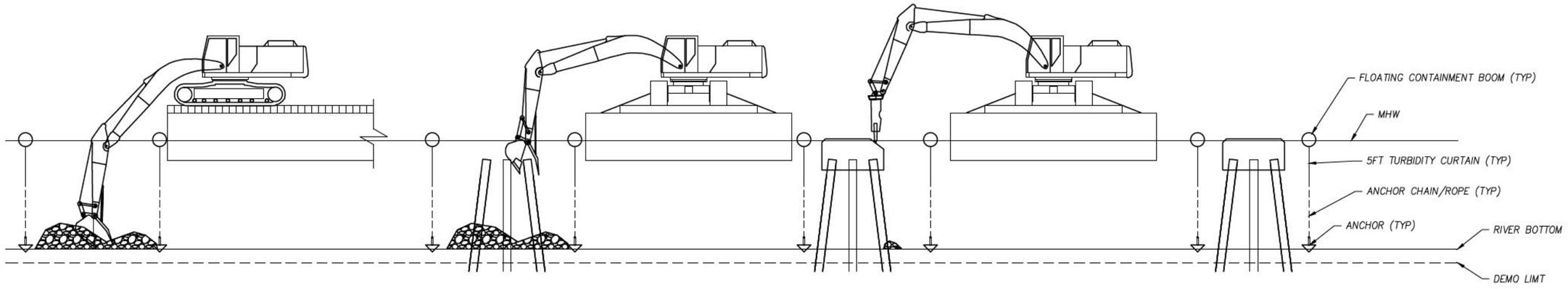
DOCUMENT TRACKING CODE:

September 13, 2016 C:\Users\ph29552\Desktop\Misc Drawing Folder\caisson_fender.dwg

Attachment G
Turbidity Curtain Detail



AREA 1B FULL DEPTH TURBIDITY CURTAIN DETAIL



AREA 02 5FT TURBIDITY CURTAIN DETAIL

NOTES:
1. TURBIDITY CURTAIN MAY SURROUND ONE OR MORE PIERS.

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NEW YORK STATE THRUWAY AUTHORITY

NEW YORK STATE THRUWAY AUTHORITY
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200 SOUTHERN BLVD., ALBANY, NY 12209

TITLE OF PROJECT	CONTRACT NUMBER
THE NEW NY BRIDGE	D214134

LOCATION OF PROJECT
MILEPOST 14.67 +/- IN
ROCKLAND & WESTCHESTER COUNTIES

TAPPAN ZEE CONSTRUCTORS, LLC

REVISIONS				
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6				
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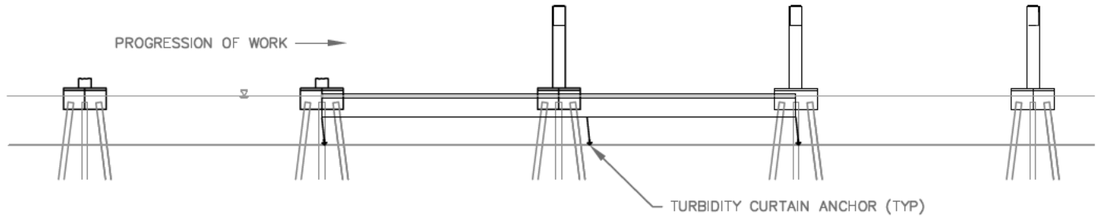
DESIGNED BY:	B. JOUFLAS
DESIGN CH'K BY:	A. REEVE
DRAWN BY:	B. JOUFLAS
DRAWING CH'K BY:	A. REEVE
SUPERVISOR:	B. YAFFEE

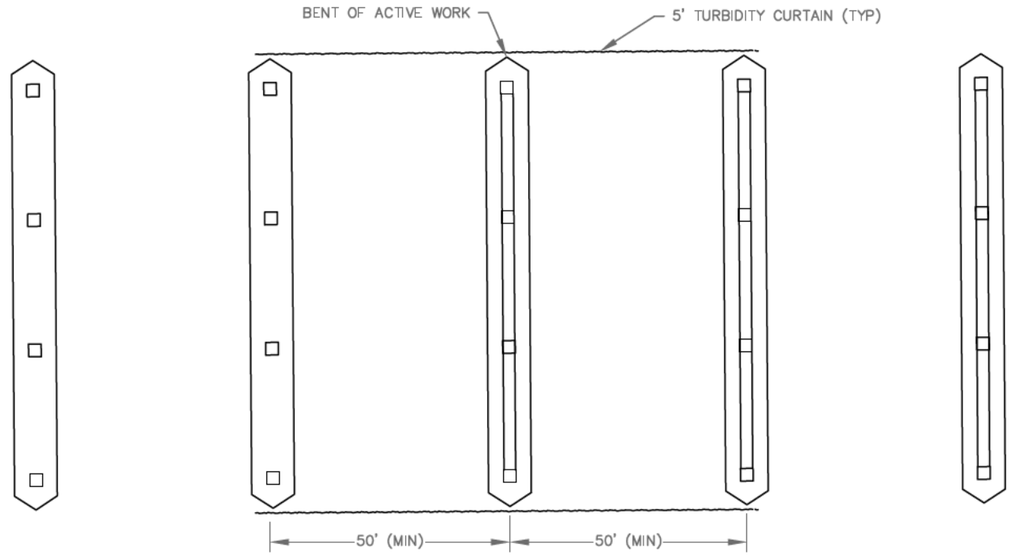
TITLE OF DRAWING
BRIDGE DEMOLITION
AREA 01 - 02
TURBIDITY CURTAIN DETAIL

DATE: 2/6/2018
DRAWING NUMBER: TZC-TBOOM-01
REVISION: 0

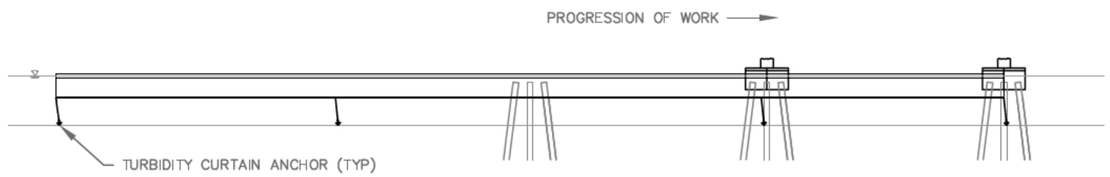
DOCUMENT TRACKING CODE:

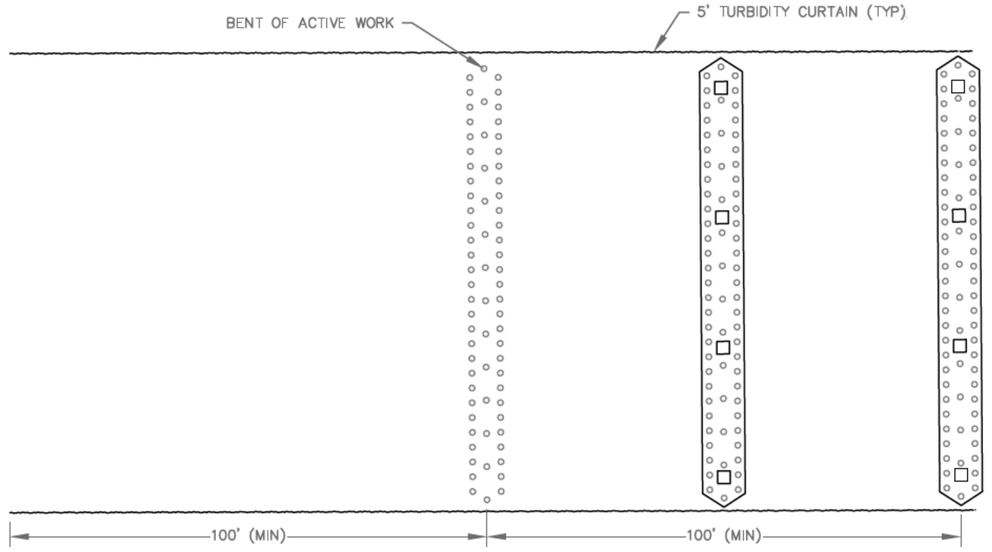
February 6, 2018 - 4:23 PM U:\500_Construction\Demolition\18 Personal Folders\BNJ\Turbidity Curtain\Area 1-6 Turbidity Curtain Details.dwg



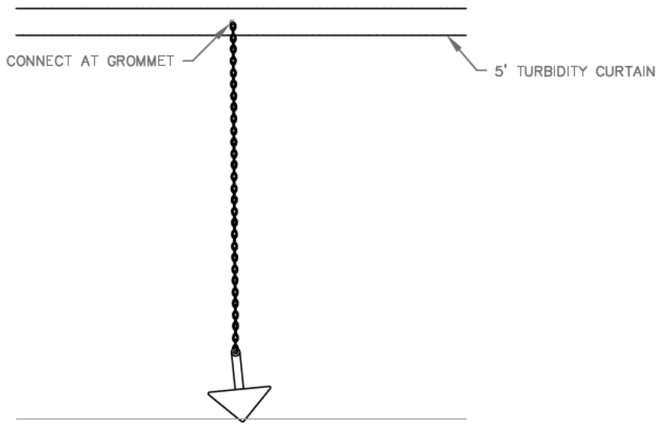


SUBSTRUCTURE REMOVAL TURBIDITY CURTAIN





FOUNDATION REMOVAL TURBIDITY CURTAIN



TYPICAL ANCHOR DETAIL

NOTES:
1. FOR SUBSTRUCTURE REMOVAL, TURBIDITY CURTAIN WILL EXTEND A MINIMUM OF 50' FROM ACTIVE WORK AREA OR WILL BE CLOSED.
2. FOR FOUNDATION REMOVAL, TURBIDITY CURTAIN WILL EXTEND A MINIMUM OF 100' FROM ACTIVE WORK AREA OR WILL BE CLOSED.
3. ANCHOR TURBIDITY CURTAIN AS NEEDED USING CONVENTIONAL ANCHORS.

ALTERED ON:	AFFIXED ON:
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NEW YORK STATE THRUWAY AUTHORITY
DEPARTMENT OF ENGINEERING
200 SOUTHERN BLVD., ALBANY, NY 12209

TITLE OF PROJECT	CONTRACT NUMBER
THE NEW NY BRIDGE	D214134

LOCATION OF PROJECT
MILEPOST 14.67 +/- IN
ROCKLAND & WESTCHESTER COUNTIES

TAPPAN ZEE CONSTRUCTORS, LLC

REVISIONS

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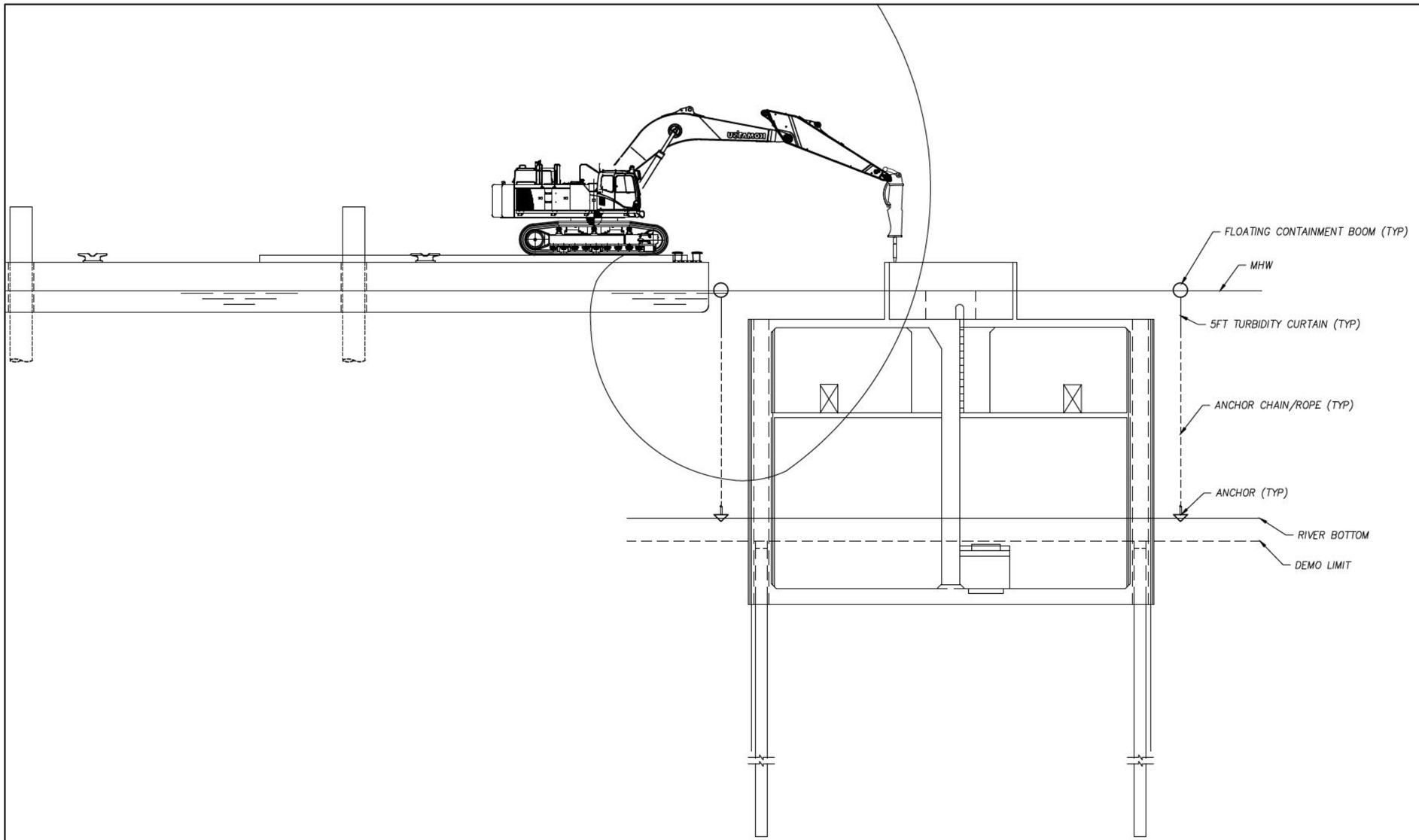
DESIGNED BY:	G. WORDEN
DESIGN CH'K BY:	A. REEVE
DRAWN BY:	G. WORDEN
DRAWING CH'K BY:	A. REEVE
SUPERVISOR:	B.YAFFEE

TITLE OF DRAWING
AREA 2
SUBSTRUCTURE &
FOUNDATION REMOVAL
TURBIDITY CURTAIN

DATE: 02-28-2018
DRAWING NUMBER: 648/652B APPENDIX
REVISION: 0

DOCUMENT TRACKING CODE:

March 30, 2018 - 1:36 PM U:\500_Construction\Demolition\18 Personal Folders\GSW\Area 2 - Foundations\Area 2 Turbidity Curtain Detail.dwg



AREA 03–05 5FT TURBIDITY CURTAIN DETAIL

NOTES:
1. TURBIDITY CURTAIN MAY SURROUND ONE OR MORE CAISSONS.

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NEW YORK STATE THRUWAY AUTHORITY
DEPARTMENT OF ENGINEERING
200 SOUTHERN BLVD., ALBANY, NY 12209

TITLE OF PROJECT	CONTRACT NUMBER
THE NEW NY BRIDGE	D214134

LOCATION OF PROJECT
MILEPOST 14.67 +/- IN
ROCKLAND & WESTCHESTER COUNTIES

TAPPAN ZEE CONSTRUCTORS, LLC

REVISIONS

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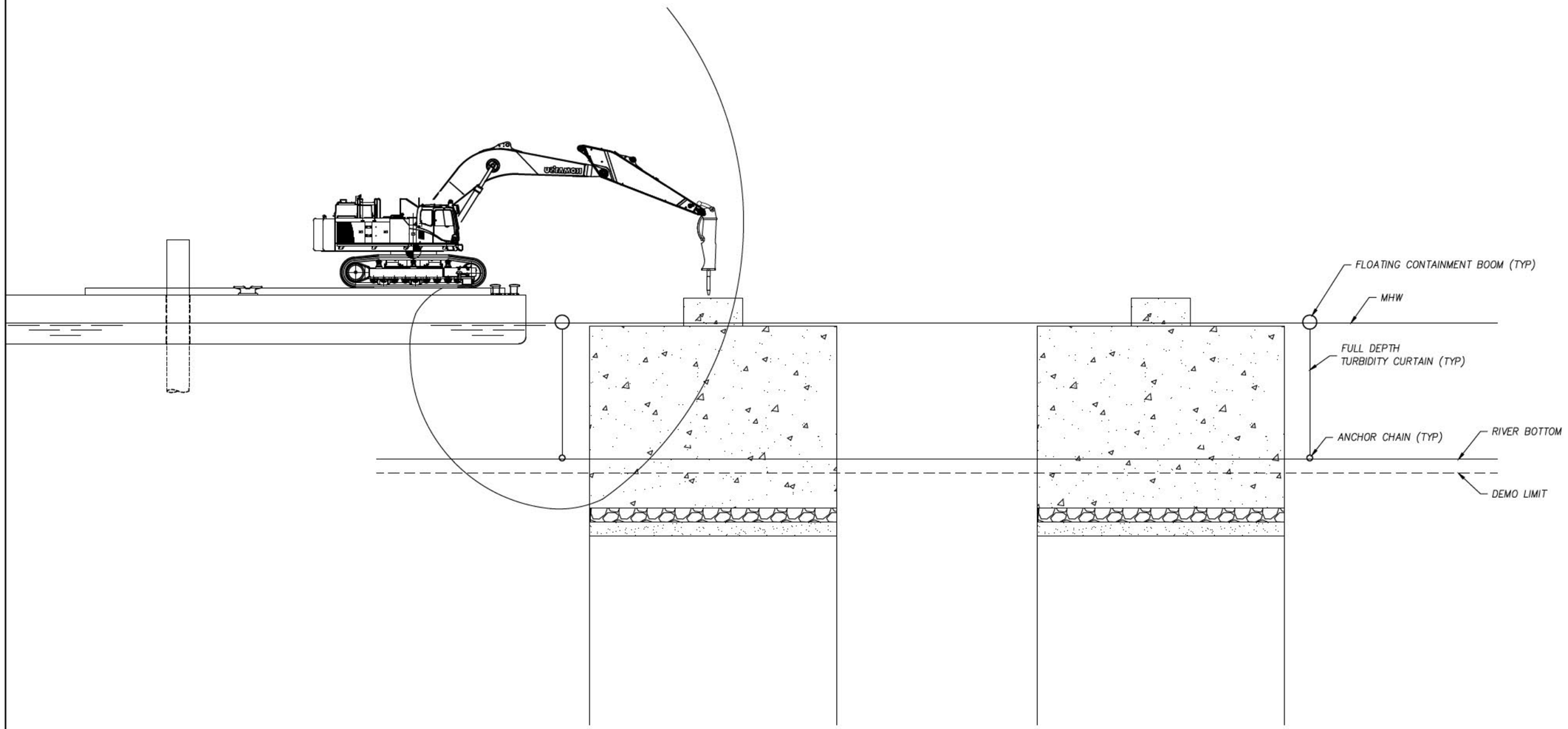
DESIGNED BY:	B. JOUFLAS
DESIGN CH'K BY:	A. REEVE
DRAWN BY:	B. JOUFLAS
DRAWING CH'K BY:	A. REEVE
SUPERVISOR:	B. YAFFEE

TITLE OF DRAWING
BRIDGE DEMOLITION
AREA 03 - 05
TURBIDITY CURTAIN DETAIL

DATE: 2/6/2018
DRAWING NUMBER: TZC-TBOOM-02
REVISION: 0

DOCUMENT TRACKING CODE:

February 6, 2018 – 4:23 PM U:\500_Construction\Demolition\18 Personal Folders\BNJ\Turbidity Curtain\Area 1-6 Turbidity Curtain Details.dwg



AREA 06 FULL DEPTH TURBIDITY CURTAIN DETAIL

NOTES:
1. TURBIDITY CURTAIN MAY SURROUND ONE OR MORE CAISSONS.

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200 SOUTHERN BLVD., ALBANY, NY 12209

TITLE OF PROJECT	CONTRACT NUMBER
THE NEW NY BRIDGE	D214134

LOCATION OF PROJECT
MILEPOST 14.67 +/- IN
ROCKLAND & WESTCHESTER COUNTIES

TAPPAN ZEE CONSTRUCTORS, LLC

REVISIONS

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6				
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DESIGNED BY:	B. JOUFLAS
DESIGN CH'K BY:	A. REEVE
DRAWN BY:	B. JOUFLAS
DRAWING CH'K BY:	A. REEVE
SUPERVISOR:	B. YAFFEE

TITLE OF DRAWING
BRIDGE DEMOLITION
AREA 06
TURBIDITY CURTAIN DETAIL

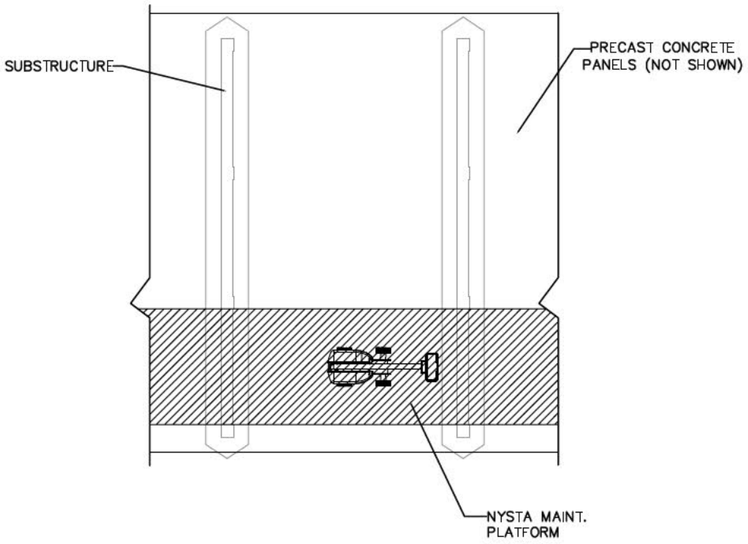
DATE: 2/6/2018
DRAWING NUMBER: TZC-TBOOM-03
REVISION: 0

DOCUMENT TRACKING CODE:

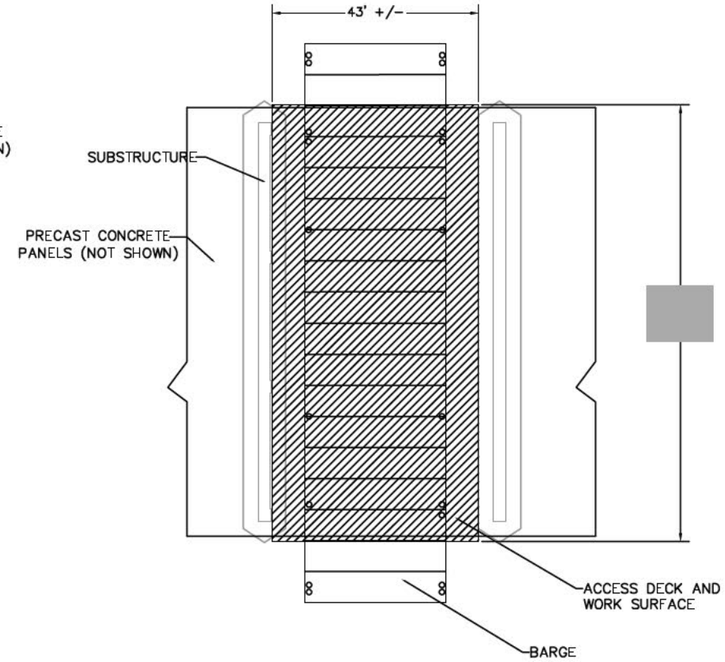
February 6, 2018 - 4:23 PM U: \500_Construction \Demolition \18 Personal Folders \BNJ \Turbidity Curtain \Area 1-6 Turbidity Curtain Details.dwg

Attachment H
Debris Containment

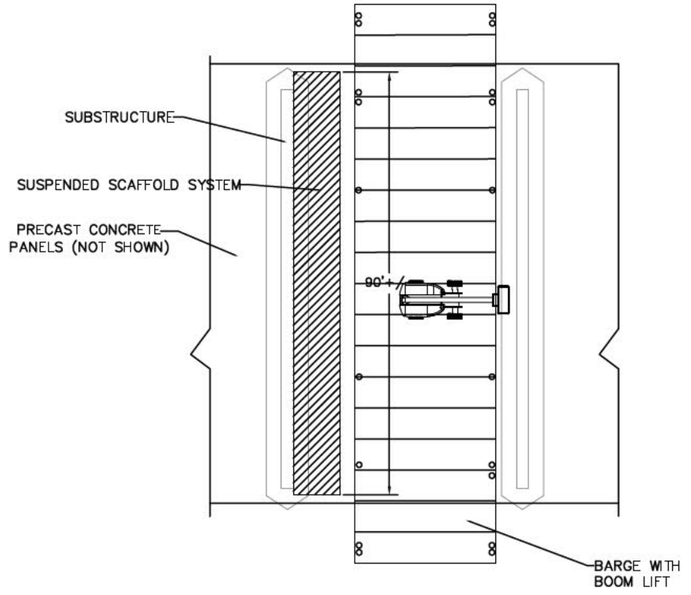
Tappan Zee Demolition - Area 1B & 2 Deck Removal Containment



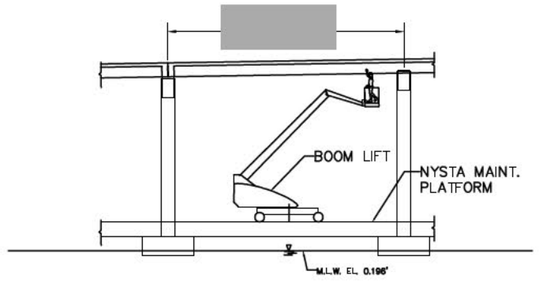
PLAN VIEW SPANS 3–30



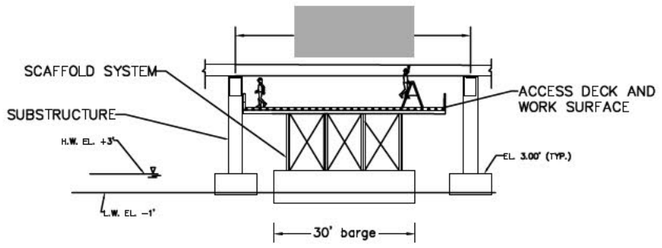
PLAN VIEW SPANS 30–128



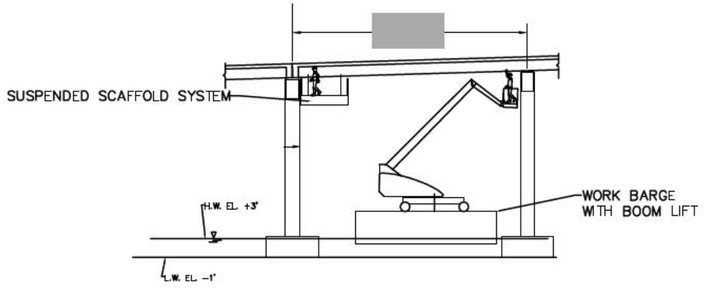
PLAN VIEW SPANS 129–166



END VIEW SPANS 3–30



END VIEW SPANS 30–128



END VIEW SPANS 129–166

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NEW YORK STATE THRUWAY AUTHORITY
DEPARTMENT OF ENGINEERING
200 SOUTHERN BLVD,, ALBANY, NY 12209

TITLE OF PROJECT	CONTRACT NUMBER
THE NEW NY BRIDGE	D214134

LOCATION OF PROJECT
MILEPOST 14.67 +/- IN
ROCKLAND & WESTCHESTER COUNTIES

TAPPAN ZEE CONSTRUCTORS, LLC

REVISIONS

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DESIGNED BY:
DESIGN CH'K BY:
DRAWN BY: K. LYNCH
DRAWING CH'K BY:
SUPERVISOR: B.YAFFEE

TITLE OF DRAWING
PROPOSED ACCESS FOR WATER SPANS 3-166

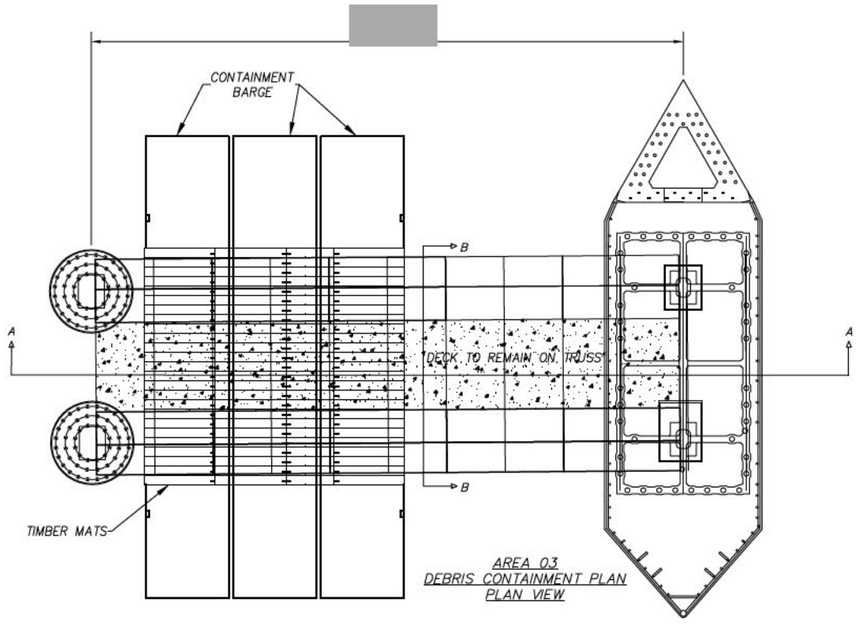
DATE: 04/04/2017
DRAWING NUMBER: TZC-00XX-TW
REVISION: 0

DOCUMENT TRACKING CODE:

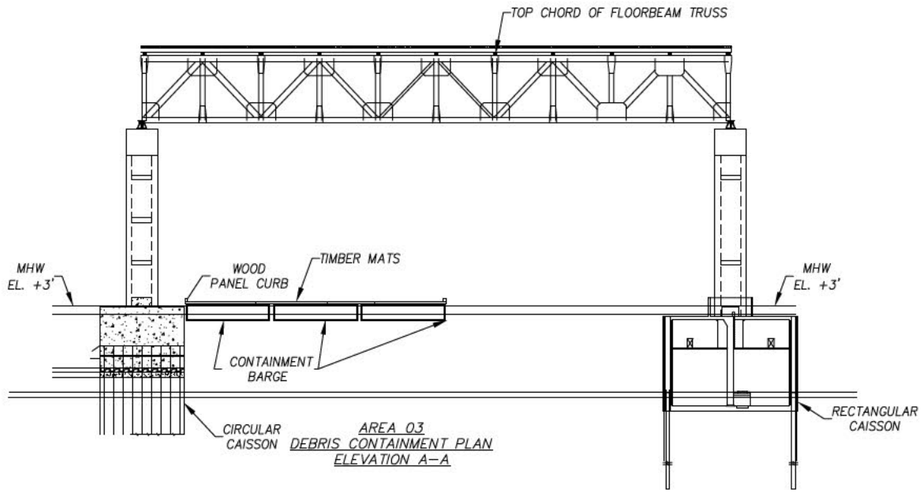
April 4, 2017 - 12:12 PM U:\500_Construction\Demolition\18 Personal Folders\KJL\area 2 3-27-2017.dwg

Tappan Zee Demolition – Area 03 Deck Removal Containment

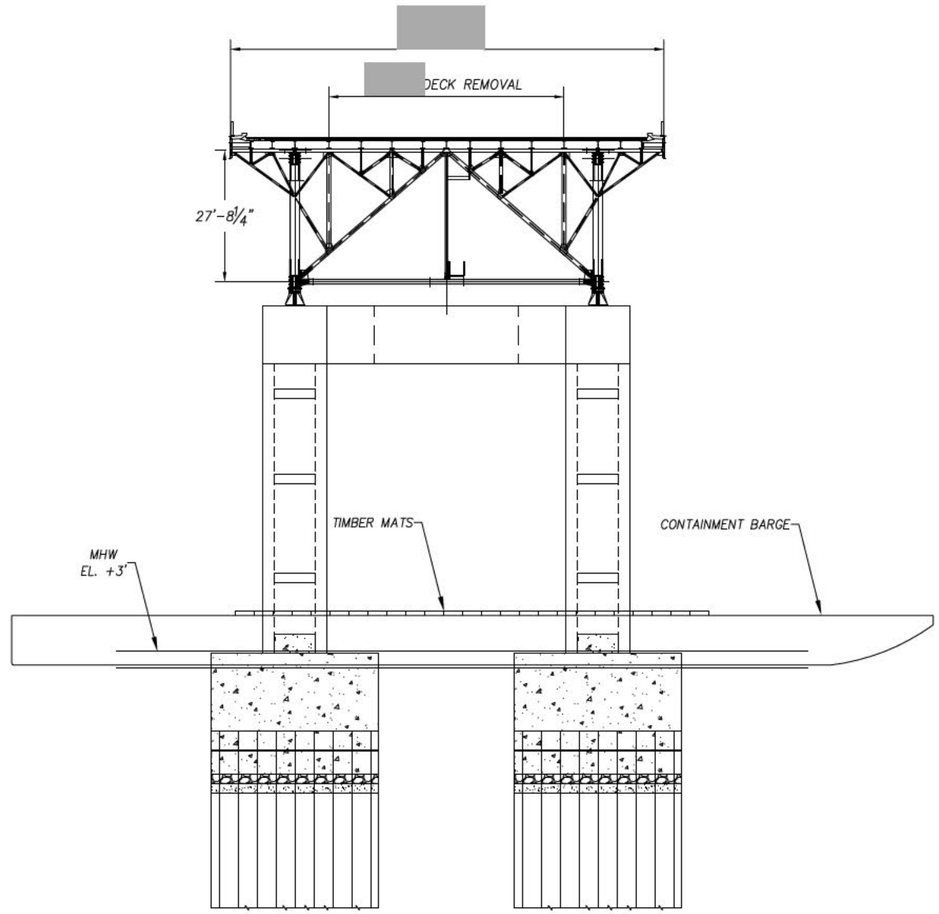
SUBMITTED BY: TZC – LLC



AREA 03
DEBRIS CONTAINMENT PLAN
PLAN VIEW



AREA 03
DEBRIS CONTAINMENT PLAN
ELEVATION A–A



AREA 03
DEBRIS CONTAINMENT PLAN
SECTION B–B

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NEW YORK STATE THRUWAY AUTHORITY
DEPARTMENT OF ENGINEERING
200 SOUTHERN BLVD., ALBANY, NY 12209

TITLE OF PROJECT: THE NEW NY BRIDGE
CONTRACT NUMBER: D214134
LOCATION OF PROJECT: MILEPOST 14,67 +/- IN ROCKLAND & WESTCHESTER COUNTIES

TAPPAN ZEE CONSTRUCTORS, LLC

REVISIONS				
REV	DATE	BY	CHK BY	DESCRIPTION
6				
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DESIGNED BY:
DESIGN CH'K BY:
DRAWN BY:
DRAWING CH'K BY:
SUPERVISOR:

TITLE OF DRAWING

DATE:
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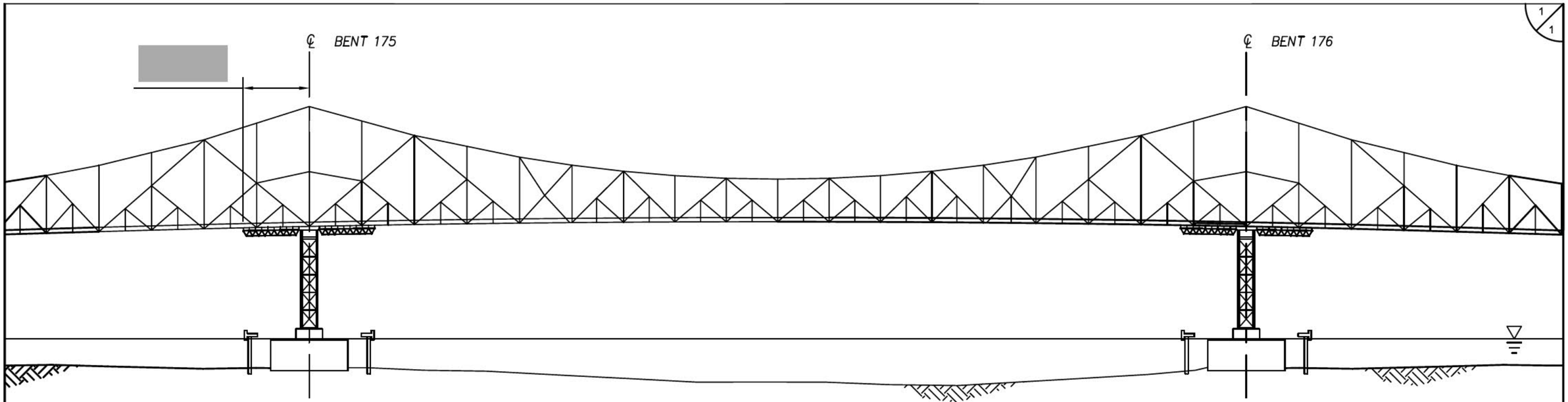
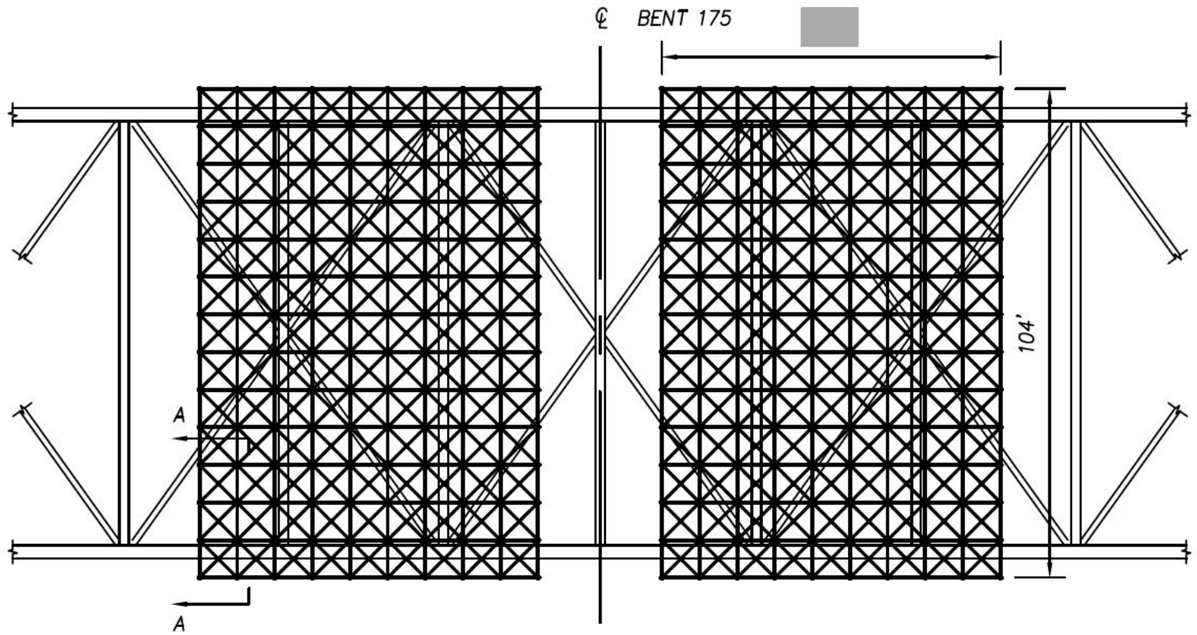
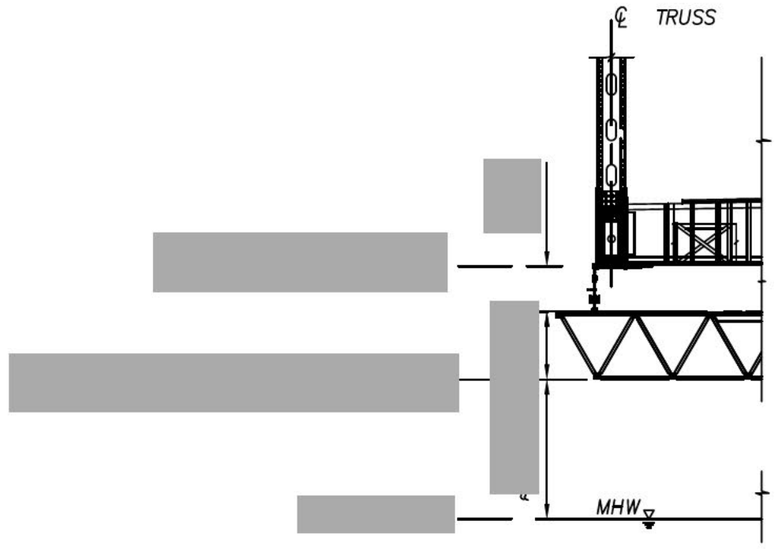
REVISION: 00

DOCUMENT TRACKING CODE:





PLAN VIEW @ BENT 175
SCALE: N.T.S.



SECTION A–A
SCALE: N.T.S.

Tappan Zee Demolition - Area 4 Deck Removal Containment

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NEW YORK STATE THRUWAY AUTHORITY
DEPARTMENT OF ENGINEERING
200 SOUTHERN BLVD., ALBANY, NY 12209

TITLE OF PROJECT: THE NEW NY BRIDGE
CONTRACT NUMBER: D214134
LOCATION OF PROJECT: MILEPOST 14.67 +/- IN ROCKLAND & WESTCHESTER COUNTIES

TAPPAN ZEE CONSTRUCTORS, LLC

REVISIONS				
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DESIGNED BY:
DESIGN CH'K BY:
DRAWN BY: J. RYNN
DRAWING CH'K BY:
SUPERVISOR: B. YAFFEE

TITLE OF DRAWING
EXISTING TZB MAINSPAN
BENTS 175 & 176
UNDERDECK ACCESS
HUDSON RIVER CLEARANCE

DATE: 04/03/2017
DRAWING NUMBER: EXS. BENT 175/176
REVISION: ALPHA/NUMERIC

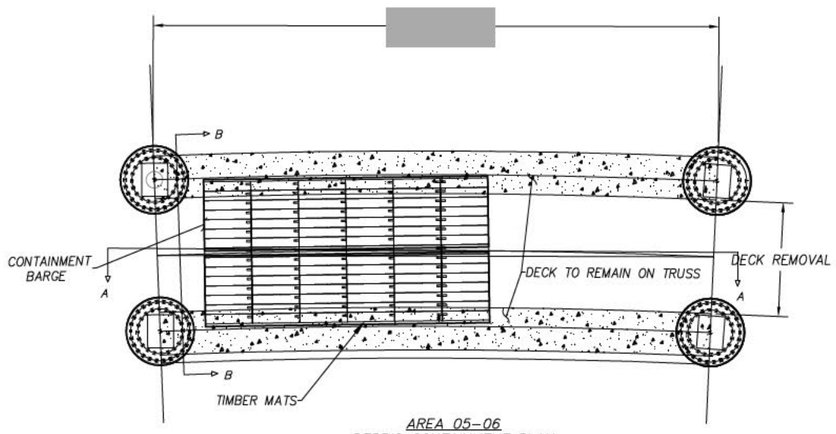
DOCUMENT TRACKING CODE:

April 3, 2017 U:\500_Construction\Demolition\18 Personal Folders\JBR\Deck Removal\Drawings\CAT System.dwg

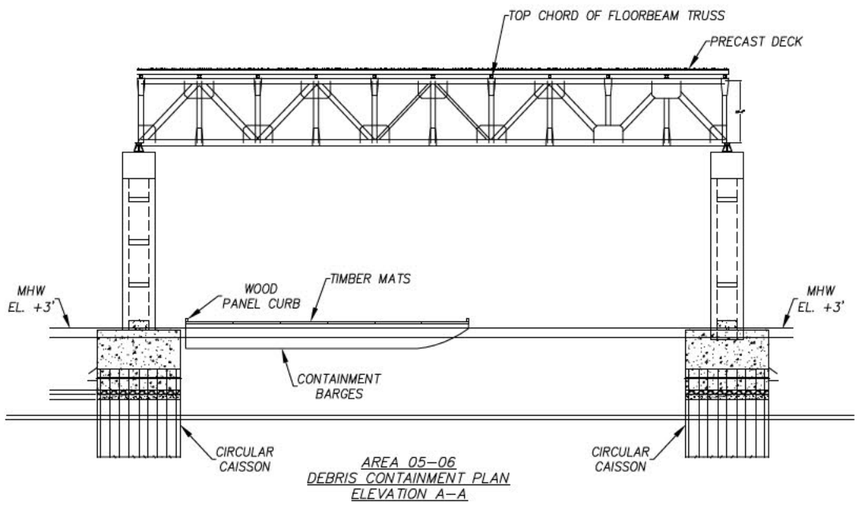
Note: Debris containment was provided by the metal pan on the underside of the deck panels in Areas 5 and 6. During core drilling any cores produced were removed vertically and placed onto the deck while the metal pan was still in place. The metal pan at the bottom of the core hole was removed vertically or bent back to allow access. These methods provided effective debris containment. The containment barges shown were not required.

Tappan Zee Demolition – Area 05–06 Deck Removal Containment

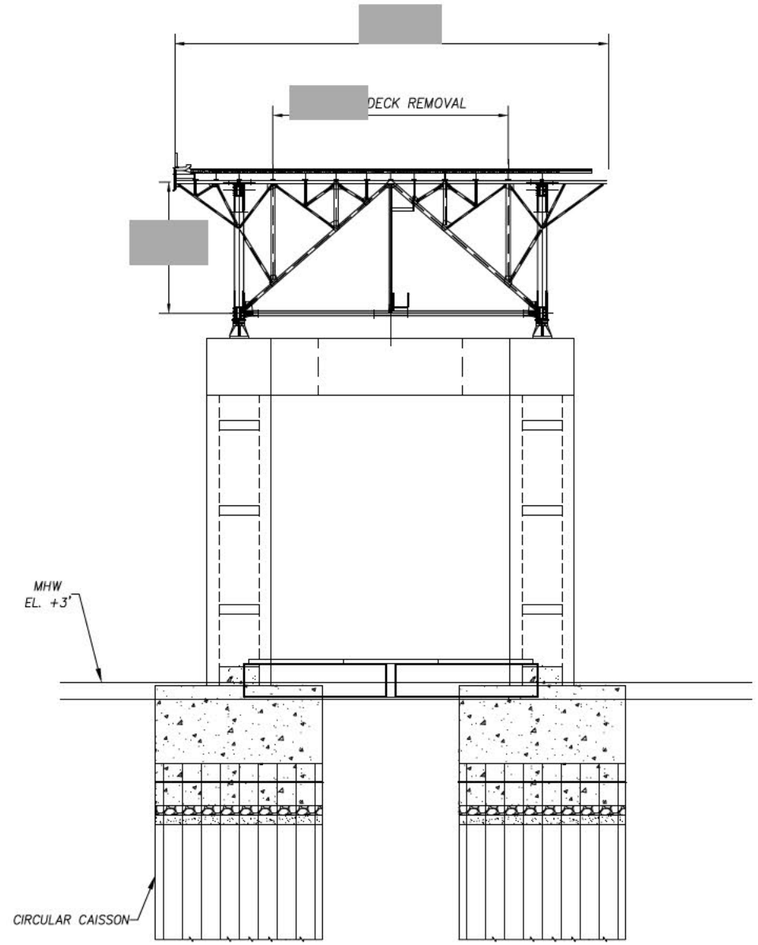
SUBMITTED BY: TZC – LLC



AREA 05–06
DEBRIS CONTAINMENT PLAN
PLAN VIEW



AREA 05–06
DEBRIS CONTAINMENT PLAN
ELEVATION A–A



AREA 05–06
DEBRIS CONTAINMENT PLAN
SECTION B–B

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NEW YORK STATE THRUWAY AUTHORITY
DEPARTMENT OF ENGINEERING
200 SOUTHERN BLVD., ALBANY, NY 12209

TITLE OF PROJECT	CONTRACT NUMBER
THE NEW NY BRIDGE	D214134

LOCATION OF PROJECT
MILEPOST 14.67 +/- IN
ROCKLAND & WESTCHESTER COUNTIES

TAPPAN ZEE CONSTRUCTORS, LLC

REVISIONS

REV	DATE	BY	CHK BY	DESCRIPTION
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DESIGNED BY:
DESIGN CH'K BY:
DRAWN BY:
DRAWING CH'K BY:
SUPERVISOR:

TITLE OF DRAWING

DATE:
DRAWING NUMBER:
REVISION: 00

DOCUMENT TRACKING CODE:

Attachment I
Timber Pile Removal

Typical Timber Dolphin Removal Sequence

The steel wires that lash the dolphins together are first removed. Then an excavator with a bucket and thumb is used to remove the concrete cap on top of the piles. This cap is able to be removed in a single piece. Once the wires and cap have been removed, a turbidity curtain, as described below, is deployed around the timber dolphin as appropriate, based upon the Area in which the work is being performed. A wire sling is secured around one or more piles, and the excavator is used to pull them from the river bottom. Once removed, to the maximum extent practicable the piles are allowed to drain above the water and within the turbidity curtain before being swung onto an adjacent barge. Once removal of piles is completed, a perforated excavator bucket is used to remove smaller pieces of debris that have collected within the turbidity curtain.

Environmental Controls

The following provides a description of the controls utilized for the removal of timber piles during demolition of the existing Tappan Zee Bridge:

- Prior to timber pile removal, a turbidity curtain will be deployed around the work area. Full depth curtain will be utilized in Area 1, and 5-foot curtain will be utilized in Areas 2, 3, 4 and 5. Area 6 does not contain timber pile.

- Absorbent boom will be placed within the turbidity curtain prior to timber pile removal. Once the absorbent boom is saturated, it will be removed and immediately replaced as needed.

- In the event a sheen is observed outside the curtain, absorbent boom and/or additional measures will be used to contain and absorb the sheen. Clean up will continue until the sheen is contained and cleared up in its entirety. In addition, the turbidity curtain will be examined for breaches. Any identified breaches in the curtain will be immediately repaired.

- Prior to opening the turbidity curtain, absorbent material will be removed and placed in containers for off-site disposal. Prior to disposal at an appropriately permitted facility, the containers will be stored on site. At this time, TZC has not yet contracted for the disposal of the drums containing the absorbent boom. The appropriate documentation will be provided to NYSTA when disposal is completed. In addition, an excavator with a perforated bucket will be used to capture timber pieces and smaller debris that may have broken off during removal operations. Those pieces will be loaded onto barges for off-site disposal. Timber pile is disposed of at the Port of Coeymans.

- Barges used for loading timber piles will have sealed curbing placed around them to contain water and/or creosote that may accumulate on the barge during transport and off-loading. Should water accumulate on the barge, absorbent boom will be placed within the contained area on the barge to capture sheen and/or constituents that may leach from the timber piles. Water that accumulates and does not evaporate prior to transport or prior to an impending precipitation event with the potential to over top the curbing will be placed into a container for off-site disposal. Prior to disposal at an appropriately permitted facility, the containers will be stored on site. At this

time, TZC has not yet contracted for the disposal of the water. The appropriate documentation will be provided to NYSTA when disposal, if necessary, is completed.

- The same operation continues as removal activities move to a new location.

Creosote Sheen Reporting Procedures

Prior to demolition activities commencing, the TZC demolition team received environmental compliance training, including review of TZC's Spill Prevention Control & Countermeasures (SPCC) Plan. Throughout timber pile removal activities and in response to sheens observed, TZC has and will continue to follow the requirements of its SPCC Plan. In addition, TZC has met with both the NYSDEC and USCG on reporting requirements in the event that a creosote-based sheen is observed during timber pile removal. The following summarizes the agreed to reporting protocols:

- NYSDEC
  - Should a sheen be observed within the turbidity curtain, it does not need to be called in.
  - Should a sheen be observed outside the turbidity curtain, it will be called in and a new spill number assigned.
  - The NYSDEC is to continue to be included on email blasts reporting the spills.
  - A 3-week look ahead schedule is provided to the NYSDEC via email.
- USCG:
  - Should a sheen be observed within the turbidity curtain, it does not need to be called in.
  - Should a sheen be observed outside the turbidity curtain, it will be called in and a new spill number assigned.
  - The USCG is to continue to be included on email blasts reporting the spills.
  - A 3-week look ahead schedule is provided to the USCG via email.

Attachment J

Sitewide and Area 2 Rockland Causeway Foundation Removal Best Management Practices

Tappan Zee Constructors, LLC (TZC) is preparing to remove the Area 2 Rockland Causeway portion of the existing Tappan Zee Bridge in 2018. Deck and substructure removal is scheduled to start in early spring and will be completed by mid-summer. Foundation removal is expected to begin by late-spring of 2018 and will be completed in spring of 2019. Area 2 Rockland Causeway Foundation Demolition consists of the removal of 138 concrete pile caps, constructed of 21,262 cubic yards (CY) of concrete supported on 11,265 timber pile. The Rockland Causeway foundation system will be removed through the following sequence using mechanical methods:

1. Install floating containment boom with turbidity curtain around the pile cap(s);
2. Position hoe ram barges;
3. Hammer concrete pile cap(s) into rubble;
4. Advance to the next pier(s) and repeat steps 1-3;
5. Install floating containment boom with turbidity curtain around the pile cluster(s) and rubble pile(s);
6. Position bucket-excavator barge adjacent to exposed timber pile;
7. Remove exposed pile utilizing the direct pull method by pinching or choking top of exposed pile with bucket or rigging, pull/extract/snap timber pile below river bottom, verify that demolition limit has been achieved by evaluating length of mud/pile length and load onto timber barge;
8. Bucket rubble off of river bottom and load onto rubble barge (Steps 7 & 8 may have concurrency); and
9. Scan area in groups of 4 to 10 piers, return and remove any remaining material with bucket. These scans will be provided to the NYSDEC as specified in TZC's Inspection Test Plan.

The following Best Management Practices (BMPs) will be utilized during demolition activities in Area 2 and where applicable and not otherwise specified in the Demolition Plan in the other Demolition Areas:

1. CONCRETE MECHANICAL BREAKING – General BMPs

1.1. Prior to beginning work, TZC will side-scan and log the conditions of the riverbed surrounding the pile cap.

1.2. A floating containment boom with a five-foot turbidity curtain anchored to the river bottom will be deployed around all active pile cap demolition areas.

1.3. Impact breakers, shears or other mechanical demolition equipment will be operated in a downward manner that allows concrete rubble to separate cleanly from the supporting timber piles and accumulate in a consolidated area in and around the foundation footprint.

1.4. Excavator operators will minimize the spread of debris during mechanical breaking. Concrete rubble entangled in rebar within the piling will be lifted directly to debris barges or detangled from piling allowing it to consolidate within the foundation footprint.

2. TIMBER PILE REMOVAL – General BMPs

2.1. A floating containment boom with a five-foot turbidity curtain anchored to the river bottom will be deployed around all active pile removal areas.

2.2. Pile will be extracted utilizing the direct pull method. The direct pull extraction refers to the removal of piling by grabbing or choking the piling and directly pulling the piling from the sediment using an excavator. The operator will pull in an upward direction, applying side loading only as necessary to snap the pile.

2.3. The excavator operator will remove piling slowly to minimize turbidity in the water column as well as sediment disturbance.

2.4. Once out of the water, the piling will be moved expeditiously to the containment barge.

2.5. The piling will not be shaken, hosed off, stripped or scraped off, left hanging to drip or any other action intended to clean or remove adhering material from the piling. Any sediment associated with removed piling will not be returned to the waterway. Material will be stacked and organized in a manner to prevent timber or retained sediment from reentering the water.

2.6. TZC will record pile quantity and pile lengths during removal to verify each pile has been removed to below the demolition limit. Any pile identified as breaking above the demolition limit will be recorded and have its location logged. When possible the broken pile will immediately be pursued while equipment is at that location. If not possible, TZC will return to the location during rubble removal to pursue the pile.

2.7. To ensure ongoing adherence to these BMPs, the superintendent and field engineer will conduct documented weekly reviews of the work practices with the pile removal crew.

3. CONCRETE RUBBLE REMOVAL – General BMPs

3.1. A floating containment boom with a five-foot turbidity curtain anchored to the river bottom (full depth curtain in Area 6) will be deployed around all active debris removal areas.

3.2. Excavators will be aligned and positioned to allow the operator to work within a tight perimeter of the extent of the debris pile. When possible timber pile removal may occur in conjunction with rubble removal so timber pile may be used to orient the operator directly over the pier footprint and associated debris pile.

3.3. TZC will have adequate barges available to allow rubble and timber to be directly removed from the river to a barge without redepositing material in the river. Deliberate redepositing of material will not be allowed.

3.4. The excavator operator will operate the bucket slowly when lifting material from the rubble pile to minimize resuspension of sediment. In an effort to minimize the resuspension of sediment, operators will pause the excavator bucket near the river bottom to allow material in the bucket to settle before slowly lifting material through the water column.

3.5. Buckets of material will not be shaken, washed through the water column, hosed off, left hanging to drip or any other action intended to clean or remove latent material from the rubble. Any sediment associated with removed rubble will not be returned to the waterway.

3.6. Upon completion of debris removal TZC will side-scan and log the conditions of the river bed. This information will be used to verify all demolition debris material has been removed and identify any remaining debris that must be removed.

3.7. To ensure ongoing adherence to these BMPs the superintendent and field engineer will conduct documented weekly reviews of the work practices with the rubble removal crew.

4. COMMUNICATION AND TRAINING – General BMPs

4.1. The ECT and TZC's Construction Manager will review and discuss these BMPs in a dedicated training session with TZC's demolition team. Heavy emphasis will be placed on equipment operation methods to minimize resuspension of sediments, minimizing the removal footprint and preventing the double handling of material.

4.2. TZC's superintendent and field engineer will monitor the implementation of these BMPs during field operations. Daily activities will be recorded on the Demolition Checklist and the ECT will be contacted should any issues arise in the field during operations.

4.3. TZC's Area Manager, superintendent and field engineer will review removal logs and side scan data collection information weekly.

4.4. TZC's Area Manager and/or Deputy Area Manager will conduct weekly, documented inspections of the operation to confirm compliance with these BMPs.

Attachment K
NYSDEC Required Demolition Limits

TZC Proposed Demolition Limits with DEC Required Limits
03/23/2017

Description								
Pier	Foundation Type	Riverbed Depth Upstream	Riverbed Depth Downstream	Interpolated Riverbed Depth at CL of Pier	Interpolated Upstream Pier Demo Limit	Interpolated Downstream Pier Demo Limit	Pier CL Demo Limit	DEC Required Limits
		FT	FT	FT	FT	FT	FT	FT
AREA 1B								
Pier 4	Timber Pile	5	5	5	7	7	7	**10**
Pier 5	Timber Pile	5	5	5	7	7	7	**10**
Pier 6	Timber Pile	5	5	5	7	7	7	**10**
Pier 7	Timber Pile	5	5	5	7	7	7	**10**
Pier 8	Timber Pile	5	5	5	7	7	7	**10**
Pier 9	Timber Pile	5	5	5	7	7	7	**10**
Pier 10	Timber Pile	5	5	5	7	7	7	**10**
Pier 11	Timber Pile	6	6	6	8	8	8	**12**
Pier 12	Timber Pile	6	6	6	8	8	8	**12**
Pier 13	Timber Pile	6	6	6	8	8	8	**12**
Pier 14	Timber Pile	6	6	6	8	8	8	**12**
Pier 15	Timber Pile	6	6	6	8	8	8	**12**
Pier 16	Timber Pile	6	6	6	8	8	8	**12**
Pier 17	Timber Pile	6	6	6	8	8	8	**12**
Pier 18	Timber Pile	6	6	6	8	8	8	**12**
Pier 19	Timber Pile	6	6	6	8	8	8	**12**
Pier 20	Timber Pile	6	6	6	8	8	8	**12**
Pier 21	Timber Pile	6	6	6	8	8	8	**12**
Pier 22	Timber Pile	6	6	6	8	8	8	**12**
Pier 23	Timber Pile	6	6	6	8	8	8	**12**
Pier 24	Timber Pile	6	6	6	8	8	8	**12**
Pier 25	Timber Pile	6	6	6	8	8	8	**12**
Pier 26	Timber Pile	6	6	6	8	8	8	**12**
Pier 27	Timber Pile	6	6	6	8	8	8	**12**
Pier 28	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 29	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 30	Timber Pile	10	7	8.5	12	9	10.5	**13**
AREA 2								
Pier 31	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 32	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 33	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 34	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 35	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 36	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 37	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 38	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 39	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 40	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 41	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 42	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 43	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 44	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 45	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 46	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 47	Timber Pile	10	7	8.5	12	9	10.5	**13**

TZC Proposed Demolition Limits with DEC Required Limits
03/23/2017

Description								
Pier	Foundation Type	Riverbed Depth Upstream	Riverbed Depth Downstream	Interpolated Riverbed Depth at CL of Pier	Interpolated Upstream Pier Demo Limit	Interpolated Downstream Pier Demo Limit	Pier CL Demo Limit	DEC Required Limits
		FT	FT	FT	FT	FT	FT	FT
Pier 48	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 49	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 50	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 51	Timber Pile	10	7	8.5	12	9	10.5	**13**
Pier 52	Timber Pile	10	8	9	12	10	11	**13**
Pier 53	Timber Pile	10	8	9	12	10	11	**13**
Pier 54	Timber Pile	10	8	9	12	10	11	**13**
Pier 55	Timber Pile	10	8	9	12	10	11	**13**
Pier 56	Timber Pile	10	8	9	12	10	11	**13**
Pier 57	Timber Pile	10	8	9	12	10	11	**13**
Pier 58	Timber Pile	10	8	9	12	10	11	**13**
Pier 59	Timber Pile	10	8	9	12	10	11	**13**
Pier 60	Timber Pile	11	9	10	13	11	12	**13**
Pier 61	Timber Pile	11	9	10	13	11	12	**13**
Pier 62	Timber Pile	11	9	10	13	11	12	**13**
Pier 63	Timber Pile	11	9	10	13	11	12	**13**
Pier 64	Timber Pile	11	9	10	13	11	12	**13**
Pier 65	Timber Pile	11	9	10	13	11	12	**13**
Pier 66	Timber Pile	11	9	10	13	11	12	**13**
Pier 67	Timber Pile	11	9	10	13	11	12	**13**
Pier 68	Timber Pile	11	9	10	13	11	12	**13**
Pier 69	Timber Pile	11	10	10.5	13	12	12.5	**15**
Pier 70	Timber Pile	11	10	10.5	13	12	12.5	**15**
Pier 71	Timber Pile	11	10	10.5	13	12	12.5	**15**
Pier 72	Timber Pile	11	10	10.5	13	12	12.5	**15**
Pier 73	Timber Pile	11	10	10.5	13	12	12.5	**15**
Pier 74	Timber Pile	11	10	10.5	13	12	12.5	**15**
Pier 75	Timber Pile	11	10	10.5	13	12	12.5	**15**
Pier 76	Timber Pile	11	10	10.5	13	12	12.5	**15**
Pier 77	Timber Pile	11	10	10.5	13	12	12.5	**15**
Pier 78	Timber Pile	11	10	10.5	13	12	12.5	**15**
Pier 79	Timber Pile	11	10	10.5	13	12	12.5	**15**
Pier 80	Timber Pile	11	10	10.5	13	12	12.5	**15**
Pier 81	Timber Pile	11	10	10.5	13	12	12.5	**15**
Pier 82	Timber Pile	11	10	10.5	13	12	12.5	**15**
Pier 83	Timber Pile	12	11	11.5	14	13	13.5	**15**
Pier 84	Timber Pile	12	11	11.5	14	13	13.5	**15**
Pier 85	Timber Pile	12	11	11.5	14	13	13.5	**15**
Pier 86	Timber Pile	12	11	11.5	14	13	13.5	**15**
Pier 87	Timber Pile	12	11	11.5	14	13	13.5	**15**
Pier 88	Timber Pile	12	11	11.5	14	13	13.5	**15**
Pier 89	Timber Pile	12	11	11.5	14	13	13.5	**15**
Pier 90	Timber Pile	12	11	11.5	14	13	13.5	**15**
Pier 91	Timber Pile	12	11	11.5	14	13	13.5	**15**
Pier 92	Timber Pile	12	11	11.5	14	13	13.5	**15**
Pier 93	Timber Pile	12	11	11.5	14	13	13.5	**15**

TZC Proposed Demolition Limits with DEC Required Limits
03/23/2017

Description								
Pier	Foundation Type	Riverbed Depth Upstream	Riverbed Depth Downstream	Interpolated Riverbed Depth at CL of Pier	Interpolated Upstream Pier Demo Limit	Interpolated Downstream Pier Demo Limit	Pier CL Demo Limit	DEC Required Limits
		FT	FT	FT	FT	FT	FT	FT
Pier 94	Timber Pile	12	11	11.5	14	13	13.5	**15**
Pier 95	Timber Pile	12	11	11.5	14	13	13.5	**15**
Pier 96	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 97	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 98	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 99	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 100	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 101	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 102	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 103	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 104	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 105	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 106	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 107	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 108	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 109	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 110	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 111	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 112	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 113	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 114	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 115	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 116	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 117	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 118	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 119	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 120	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 121	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 122	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 123	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 124	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 125	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 126	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 127	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 128	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 129	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 130	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 131	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 132	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 133	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 134	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 135	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 136	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 137	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 138	Timber Pile	13	12	12.5	15	14	14.5	**15**
Pier 139	Timber Pile	13	12	12.5	15	14	14.5	**15**

TZC Proposed Demolition Limits with DEC Required Limits
03/23/2017

Description								
Pier	Foundation Type	Riverbed Depth Upstream	Riverbed Depth Downstream	Interpolated Riverbed Depth at CL of Pier	Interpolated Upstream Pier Demo Limit	Interpolated Downstream Pier Demo Limit	Pier CL Demo Limit	DEC Required Limits
		FT	FT	FT	FT	FT	FT	FT
Pier 140	Timber Pile	13	12	12.5	15	14	14.5	15
Pier 141	Timber Pile	13	12	12.5	15	14	14.5	15
Pier 142	Timber Pile	13	12	12.5	15	14	14.5	15
Pier 143	Timber Pile	13	12	12.5	15	14	14.5	15
Pier 144	Timber Pile	13	12	12.5	15	14	14.5	15
Pier 145	Timber Pile	13	12	12.5	15	14	14.5	15
Pier 146	Timber Pile	13	12	12.5	15	14	14.5	15
Pier 147	Timber Pile	13	12	12.5	15	14	14.5	15
Pier 148	Timber Pile	13	12	12.5	15	14	14.5	15
Pier 149	Timber Pile	13	12	12.5	15	14	14.5	15
Pier 150	Timber Pile	14	12	13	16	14	15	17
Pier 151	Timber Pile	14	12	13	16	14	15	17
Pier 152	Timber Pile	14	12	13	16	14	15	17
Pier 153	Timber Pile	14	12	13	16	14	15	17
Pier 154	Timber Pile	14	12	13	16	14	15	17
Pier 155	Timber Pile	14	12	13	16	14	15	17
Pier 156	Timber Pile	14	12	13	16	14	15	17
Pier 157	Timber Pile	15	11	13	17	13	15	17
Pier 158	Timber Pile	15	11	13	17	13	15	17
Pier 159	Timber Pile	15	11	13	17	13	15	17
Pier 160	Timber Pile	15	11	13	17	13	15	17
Pier 161	Timber Pile	15	11	13	17	13	15	17
Pier 162	Timber Pile	15	11	13	17	13	15	17
Pier 163	Timber Pile	15	12	13.5	17	14	15.5	17
Pier 164	Timber Pile	15	12	13.5	17	14	15.5	17
Pier 165	Timber Pile	15	11	13	17	13	15	17
AREA 3								
Pier 166	Circ. Caisson	15.89	11	13.91	16.38	15.44	15.91	18
Pier 167	Circ. Caisson	17	18	17.55	19.45	19.64	19.55	20
Pier 168	Circ. Caisson	18	18	18	20	20	20	21
Pier 169	Rec. Caisson	19	20	18.94	21.49	21.57	20.94	23
		18	18.65		20.32	20.37		
Pier 170	Rec. Caisson	17	20	18.92	20.29	20.52	20.92	24
		18	21		21.32	21.56		
Pier 171	Rec. Caisson	22	22	23.62	24	24	25.62	26
		26	24		27.34	27.12		
Pier 172	Rec. Caisson	29	28	28.83	30.57	30.49	30.83	32
		31	27		31.27	30.98		
AREA 4								
Pier 173	Rec. Caisson	32	30	31.04	33.12	32.97	33.04	36
		32	30		33.11	32.97		
Pier 175	Rec. Caisson	39	36.67	38.03	40.11	39.8	40.03	42
		39	37		40.23	39.97		
Pier 176	Rec. Caisson	38	39	38.56	40.48	40.63	40.56	42
		38	39		40.48	40.63		
Pier 178	Rec. Caisson	25	28	25.03	27.8	28.31	27.03	30

TZC Proposed Demolition Limits with DEC Required Limits
03/23/2017

Description								
Pier	Foundation Type	Riverbed Depth Upstream	Riverbed Depth Downstream	Interpolated Riverbed Depth at CL of Pier	Interpolated Upstream Pier Demo Limit	Interpolated Downstream Pier Demo Limit	Pier CL Demo Limit	DEC Required Limits
		FT	FT	FT	FT	FT	FT	FT
~~Pier 178~~	~~Rec. Caisson~~	24	24	~~25.83~~	26	26	~~27.83~~	~~36~~
AREA 5								
Pier 179	Circ. Caisson	17.34	18	17.56	19.46	19.65	19.56	**20**
Pier 180	Circ. Caisson	15	16	15.44	17.38	17.49	17.44	**18**
Pier 181	Circ. Caisson	12	12	12	14	14	14	**16**
Pier 182	Circ. Caisson	11	10	10.43	12.44	12.41	12.43	**16**
Pier 183	Circ. Caisson	10	9	9.42	11.45	11.38	11.42	**15**
Pier 184	Circ. Caisson	10	8	8.83	10.89	10.76	10.83	**15**
AREA 6A								
Pier 185	Circ. Caisson	9	9	9	11	11	11	**14**
Pier 186	Circ. Caisson	8.79	8	8.46	10.34	10.58	10.46	**14**
Pier 187	Circ. Caisson	8	8	8	10	10	10	**14**
Pier 188	Circ. Caisson	8	8	8	10	10	10	**13**
Pier 189	Circ. Caisson	7	7	7	9	9	9	**12**