GREAT LAKES ENGINEERING GROUP, LLC

Underwater Bridge Inspection Report
Grosse Ile Parkway over
Trenton Channel
STR 12006

Submitted To:

Wayne County

Submitted By:

Great Lakes Engineering Group

November 9, 2021

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EXECUTIVE SUMMARY

Grosse Ile Parkway over Trenton Channel is a twelve-span moveable swing bridge with a steel superstructure. The bridge is located in Wayne County, Michigan. The original structure was built around 1873 as a railroad crossing and was converted to carry vehicular traffic in 1932. The structure carries two lanes of two-way traffic and is 1,346 feet in length. All eleven pier units (piers 1w-11w) are submerged in the channel. The bridge has undergone numerous repair projects throughout its lifespan, and most recently was closed to traffic while extensive pier repairs were performed at piers 2w, 4w, 6w, 8w, 9w, and 10w. Pier repair verification dives were performed during the project, and these reports are available as separate documents.

STR 12006
Grosse Ile Parkway over
Trenton Channel
Wayne County

Piers 1w through 11w were subject to underwater inspection on November 9-10, 2021 while the structure remained closed to vehicular traffic due to the pier repair project and ongoing superstructure repairs. The pier repair and superstructure repair projects were overseen by HNTB, Michigan on behalf of Wayne County. Coordination was required to ensure contractor equipment and operations did not impact the safety of the dive team or contractor personnel. Power to the swing span pier was turned off due the ongoing construction projects. The dive team performed the underwater inspection under the contractor's United States Coast Guard permits.

The pier units are comprised of a mixture of three different design types. Piers 2w, 4w, 6w, 8w, and 10w are the original structure pier units. The upper portions of the even numbered piers are constructed of reinforced concrete and were originally built upon timber cribbing with a loose rock infill. Piers 2w, 4w, 6w, 8w, and 10w underwent major repairs during the second half of 2021 due to an extensive loss of the rock infill within the timber cribbing and deterioration of the timber cribbing. The repairs consisted of installing FP-475 vinyl or 6" rib-16 ga. sheet piling on the exterior of the timber cribbing which was secured with steel C5x9 walers. Grout filled bags were installed along the channel bottom at the bottom of the vinyl sheeting / channel bottom interface to anchor the stay-in-place formwork vertically and horizontally. The interior of the timber cribbing was then backfilled with grout using underwater injection methods. Steel ice breakers were installed at the upstream (north) ends of the even numbered piers during the repair project. Surface repairs were also performed at the even numbered piers.

Piers 1w, 3w, 5w, 7w and 11w are constructed of reinforced concrete and are founded on reinforced concrete footings of varying thickness. These piers were added between the original piers at the time the structure was converted to a vehicular crossing in 1932. The footings at these piers rest on limestone bedrock according to original plans.

Pier 9w is original to the 1873 design and is the swing / pivot span for the navigable channel. The pier consists of a large reinforced concrete cap supported by timber cribbing with loose rock infill. Pier 9w was also subject to the same pier repairs as the even numbered piers. Pier 9w has a timber cribbing pier protection system that extends upstream and downstream of the pier.

Based on the underwater inspection the piers are overall in **fair to poor condition**. The odd numbered piers (1w, 3w, 5w, 7w, and 11w) are in **poor condition**. Vertical footing exposure ranging from 1'-2" minimum to 10'-6" maximum was observed at these piers. Although these piers are founded on bedrock, the footing exposure is an area of concern and should be continued to be monitored at increased frequency. Piers 1w, 3w, 5w, 7w, and 11w also exhibit extensive deterioration both above and below the waterline. Areas of spalling, delamination, 1/2" to 4" deep scaling, vertical and horizontal cracking, and map cracking is present above and below the waterline at these piers.

The even numbered piers (2w, 4w, 6w, 8w, and 10w) are in **fair condition**. Extensive underwater repairs were performed at these piers during the second half of 2021. The previous loss of rock infill and deteriorated timber cribbing has been repaired with a combination of grout bags, vinyl and steel stay-in-place sheeting forms, steel walers, and pressure injected grout fill. Although these piers have been repaired, they should continue to be monitored for movement / settlement or degradation of the pier repairs and/or streambed. Piers 2w, 4w, 6w, 8w, and 10w also exhibit deterioration above the waterline consisting of spalling, delamination, map cracking, and vertical and horizontal cracking.

Pier 9w is in **fair to poor condition**. The structural portion of pier 9w received the same repairs as the even numbered piers, however steel sheeting was used as the formwork. The swing / pivot portion of pier 9w is in **fair condition**. The previous deterioration of the timber cribbing and loss of rock infill has been repaired with the same procedures detailed in the paragraph above. The previous deterioration above the waterline at pier 9w has been repaired.

The timber cribbing pier protection system at pier 9w is in **poor condition**. The purpose of the system is to protect the bridge from impacts by vessels and also to identify the navigable channel. The protection system has the visual appearance of sinking, especially at the north end (upstream end). During the 2021, 2020, 2019, and 2017 underwater inspections, water levels have been higher than in older inspections. The high water levels contribute to the sinking appearance, however the extensive deterioration of the pier protection cribbing below water, and failed previous repairs are contributing to the settlement of the pier protection system.

The following are recommendations for STR 12006 as a result of the underwater inspection:

- Adjust underwater inspection frequency to bring 2022 inspection into the months of June, July, August, or September of 2022; then set frequency to 24 months thereafter.
- Continue to survey pier elevations at 4 locations of each pier and monitor by a licensed surveyor or engineer to check for settlement.
- Perform substructure repairs (concrete patching, epoxy injection of cracks) at piers 1w, 2w, 3w, 4w, 5w, 6w, 7w, 8w, 10w, and 11w.
- Replace or retrofit the pier protection system at pier 9w, both the north and south ends.
- Fill the voids between the timber sheeting and channel bottom at Pier 9W, northwest corner.

Proposed NBI ratings based on underwater inspection only		
Item	**Current NBI Rating**	**Proposed NBI Rating (based on UW insp.)**
BSIR #17 (Scour Inspection)	4	4
SIA #60 (Substructure)	5	5
SIA #61 (Channel)	7	7
SIA #71 (Waterway Adequacy)	8	8
SIA #111 (Navigation Protection)	2	3
SIA #113 (Scour Criticality)	4	4

According to National Bridge Inspection Standards (NBIS), it is recommended that the substructure units of STR 12006 be inspected underwater at an increased frequency not to exceed 24 months.

Steel stay-in-place forms and walers

Grout bags and vinyl stay-place forms

GENERAL SITE PROCEDURES

QUALIFIED TEAM

The team performing the underwater inspection is qualified in accordance with the National Bridge Inspection Standards 23 CFR Part 650.309. The underwater inspection was conducted by a four-person team consisting of a Professional Engineer Dive Team Leader/Qualified Dive Inspector/Qualified Team Leader (Casey Collings, P.E.), a Qualified Dive Inspector/Qualified Team Leader (Matt Davis), a Diving Safety Supervisor (Paul Davis), and a Dive Tender (Brian Hebden, P.E.).

EQUIPMENT

The inspection was conducted using Self-Contained Underwater Breathing Apparatus (SCUBA). The inspection team accessed the bridge and worked from an 18-foot Dive Safety Boat. Two-way wired communications were used to convey inspection notes from the diver to the top-side team leader and recorded on note sheets. Additional equipment consisted of an under-water digital camera, underwater video camera, LED high intensity submersible dive light, dive knife, scraper, 4' probing rod, 25' and 50' survey rods, and a side imaging sonar unit.

LEVEL OF INSPECTION

The Level I underwater inspection consisted of a close visual and tactile examination using large sweeping motions of the hands where visibility was limited. A Level II inspection was performed on 10% of the submerged substructure units. The inspection was conducted over the total exterior surface of each underwater substructure unit. Probing along the mud line was also done along each substructure unit and the adjacent streambed. Upstream and downstream cross sections were taken and recorded using an established benchmark.

APPROVALS

This bridge falls under the jurisdiction of the United States Coast Guard (USCG). Approval was required to perform the underwater inspection. The dive team performed the underwater inspection under the contractor's United States Coast Guard permits.

FIELD INSPECTION FINDINGS

Grosse Ile Parkway over Trenton Channel is a twelve-span moveable swing bridge with a steel superstructure. The bridge is located in Wayne County, Michigan. The original structure was built around 1873 as a railroad crossing and was converted to carry vehicular traffic in 1932. The structure carries two lanes of two-way traffic and is 1,346 feet in length. All eleven pier units (piers 1w-11w) are submerged in the channel. The bridge has undergone numerous repair projects throughout its lifespan, and most recently was closed to traffic while extensive pier repairs were performed at piers 2w, 4w, 6w, 8w, 9w, and 10w. Pier repair verification dives were performed during the project, and these reports are available as separate documents. Piers 1w through 11w were subject to underwater inspection on November 9-10, 2021.

The overall condition of the submerged substructure is **fair to poor**. Below is a summary of the field site observations for the various components of the underwater inspection.

Substructure Unit	Observations Below the Waterline	Observations Above the Waterline
Pier 1w (Refer to Substructure Elevation Drawings and Soundings Section)	• Vertical footing exposure on all sides of pier. Maximum vertical exposure was 7'-9" inches along the east side of pier. • No undermining of footing observed. • 5' tall band of 1/2" deep scaling of the concrete starting at the waterline. Scaling surrounds perimeter of pier. • 2 sft spall in the east face of pier, located approximately 4' below waterline. • Horizonal crack in the exposed footing at the southeast end. • Deep scaling of concrete on the exposed footing at the south (downstream) end, scaling 1" to 2" deep. • Full height vertical cracks in west and east elevations of pier, extending from the bolster area down to the top of footing. • Uniform algae growth on concrete surfaces up to 1" thick. • Channel bottom consists of sand and scattered rocks up to 1' diameter.	• West elevation: 12 sft and 6 sft delamination in bolster area. Vertical and horizontal cracking in pier face. • East elevation: 24 sft and 4 sft spalls in bolster area. 16 sft and 6 sft spalls in pier face. Vertical and horizontal cracks in pier face and bolster area.

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Substructure Unit	Observations Below the Waterline	Observations Above the Waterline
Pier 2w (Refer to Substructure Elevation Drawings and Soundings Section)	• Repairs made to previous timber cribbing deterioration and loss of rock infill. • FP-475 vinyl sheeting surrounds pier (used as stay-in-place formwork). • C5x9 steel walers spaced at 2'-0" vertical spacing securing formwork. • Grout backfill inside vinyl formwork. • Steel ice breaker plate at upstream end, extending 5' below waterline. • Smaller ice steel ice breaker plate extends to channel bottom. • Grout bags along channel bottom. • 2 sft spall in west pier face just below waterline. • Uniform algae growth on concrete surfaces up to 1/16" thick. • Channel bottom consists of grout bags, sand and rocks up to 1' diameter.	• South end: 5 sft spall and 25 sft area of map cracking. • West elevation: 2 sft spall w/ exp steel and 3 sft spall. 8 sft delamination and 1 sft delamination. Vertical cracking in pier face. • East elevation: 60 sft spall w/ exp steel. 2 sft delamination. Vertical crack in pier face.
Pier 3w (Refer to Substructure Elevation Drawings and Soundings Section)	• Vertical footing exposure on all sides of pier. Maximum vertical exposure was 6'-10" inches along the north end of pier. • No undermining of footing observed. • 3 sft spall at south end, extends below and above waterline. • 2' tall band of 2" to 4" deep scaling in the pier wall starting at the top of footing and extending up 2'. Scaling surrounds perimeter of pier. • 1" to 2" deep scaling at north end of pier, extending approximately 4' below waterline. • Horizonal cracks in the exposed footing along the west elevation, east elevation, and north end. • Full height vertical cracks in west and east elevations of pier, extending from the bolster area down to the top of footing. • Uniform algae growth on concrete surfaces up to 1" thick. • Channel bottom consists of sand and scattered rocks up to 1' diameter.	• South end: 3 sft spall extends above and below waterline. • West elevation: 3 sft delamination in bolster area. Vertical and horizontal cracking in pier face. • East elevation: 4 sft spall in bolster area. Vertical and horizontal cracks in pier face.

Substructure Unit	Observations Below the Waterline	Observations Above the Waterline
Pier 4w (Refer to Substructure Elevation Drawings and Soundings Section)	• Repairs made to previous timber cribbing deterioration and loss of rock infill. • FP-475 vinyl sheeting surrounds pier (used as stay-in-place formwork). • C5x9 steel walers spaced at 2'-0" vertical spacing securing formwork. • Grout backfill inside vinyl formwork. • Steel ice breaker plate at upstream end, extending 5' below waterline. • Smaller ice steel ice breaker plate extends to channel bottom. • Grout bags along channel bottom. • 10 sft spall at south end starting at waterline and extending 2' below waterline. • Uniform algae growth on concrete surfaces up to 1/16" thick. • Channel bottom consists of grout bags, sand and rocks up to 1' diameter.	• South end: 25 sft area of map cracking. • West elevation: 6 sft spall at south end. Vertical cracking in pier face. • East elevation: Vertical cracks in pier face.
Pier 5w (Refer to Substructure Elevation Drawings and Soundings Section)	• Vertical footing exposure on all sides of pier. Maximum vertical exposure was 9'-1" inches along the west elevation and at north end of pier. • No undermining of footing observed. • 4 sft spall in footing at southwest corner. • 1/8" wide horizontal and vertical cracks in footing along west and east elevations. • 4' tall band of 2" to 3" deep scaling of the concrete below and above waterline. Scaling surrounds perimeter of pier. • Vertical and horizontal cracks in west and east elevations of pier. • 50 sft area of map cracking in west elevation of pier wall extends partially below waterline. • Uniform algae growth on concrete surfaces up to 1" thick. • Channel bottom consists of sand and scattered rocks up to 1' diameter.	• West elevation: 18 sft and 12 sft spalls in pier wall. 50 sft area of map cracking extends partially below waterline. 4 sft spall in bolster area. Concrete patch in bolster area. Vertical and horizontal cracking in pier wall. • East elevation: 2 sft spall in bolster area. 30 sft and 6 sft areas of map cracking in pier wall. Vertical and horizontal cracks in pier face. Concrete patches in bolster area. • 4' tall band of 2" to 3" deep scaling of concrete above and below waterline. Scaling surrounds perimeter of pier.

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Substructure Unit	Observations Below the Waterline	Observations Above the Waterline
Pier 6w (Refer to Substructure Elevation Drawings and Soundings Section)	• Repairs made to previous timber cribbing deterioration and loss of rock infill. • FP-475 vinyl sheeting surrounds pier (used as stay-in-place formwork). • C5x9 steel walers spaced at 2'-0" vertical spacing securing formwork. • Grout backfill inside vinyl formwork. • Steel ice breaker plate at upstream end, extending 5' below waterline. • Smaller ice steel ice breaker plate extends to channel bottom. • Grout bags along channel bottom. • Areas of spalling on all sides just below waterline. Majority of spalled areas are above waterline. • Uniform algae growth on concrete surfaces up to 1/16" thick. • Channel bottom consists of grout bags, sand and scattered rocks up to 1' diameter.	• South end: 4 sft spall, 50% extends below waterline. • North end: 8 sft spall, 25% extends below waterline. • West elevation: 3 sft spall, 50% extends below waterline. Vertical and horizontal cracking in pier face. • East elevation: 8 sft spall, 30% extends below waterline. Vertical crack in pier face.
Pier 7w (Refer to Substructure Elevation Drawings and Soundings Section)	• Vertical footing exposure on all sides of pier. Maximum vertical exposure was 8'-10" inches at the north end of pier. • No undermining of footing observed. • 1/8" wide horizontal cracks in footing along west and east elevations. • 4 sft spall in pier wall in east elevation at south end. • 32 sft spall in east elevation extends 50% above waterline. • 1' tall band of 2" to 4" deep scaling on exposed footing. Scaling starts at top of footing and extends down 1'. Scaling surrounds perimeter of pier. • 3' tall band of 2" deep scaling of the concrete in pier wall. Scaling starts at top of footing and extends up 3'. Scaling surrounds perimeter of pier. • Vertical cracks in west and east elevations of pier. • Uniform algae growth on concrete surfaces up to 1" thick. • Channel bottom consists of sand and scattered rocks up to 1' diameter.	• West elevation: 12 sft and 2 sft spalls in bolster area. Vertical and horizontal cracking in pier wall. • East elevation: 8 sft spall in bolster area. 18 sft and 32 sft spalls in pier wall. 32 sft spall extends 50% below waterline. Vertical and horizontal cracks in pier face.

Substructure Unit	Observations Below the Waterline	Observations Above the Waterline
Pier 8w (Refer to Substructure Elevation Drawings and Soundings Section)	• Repairs made to previous timber cribbing deterioration and loss of rock infill. • 6" rib-16 ga. steel sheeting surrounds pier (used as stay-in-place formwork). • C5x9 steel walers spaced at 2'-0" vertical spacing securing formwork. • Grout backfill inside vinyl formwork. • Steel ice breaker plate at upstream end, extending 5' below waterline. • Smaller ice steel ice breaker plate extends to channel bottom. • Grout bags along channel bottom. • Uniform algae growth on concrete surfaces up to 1/16" thick. • Channel bottom consists of grout bags, sand and scattered rocks up to 1' diameter.	• West elevation: 2 sft delamination in bolster area. 14 sft and 1 sft delaminated area in pier wall. Vertical crack in pier wall. • East elevation: Vertical cracks in pier wall and bolster area.
Pier 9w (Refer to Substructure Elevation Drawings and Soundings Section)	• Repairs made to previous timber cribbing, plywood sheeting, grout repair deterioration and loss of rock infill. • 6" rib-16 ga. steel sheeting on west and east elevations of pier (used as stay-in-place formwork). • C5x9 steel walers spaced at 2'-0" vertical spacing securing formwork. • Grout backfill inside steel formwork. • Uniform algae growth on concrete surfaces up to 1/16" thick. • Channel bottom consists of sand and scattered rocks 1' to 4' in diameter.	• Repairs (concrete patches) made to previous spalled and delaminated areas on the pivot portion of the pier.
Pier 9w - Pier Protection System (Refer to Substructure Elevation Drawings and Soundings Section)	• Vertical timbers at upstream (north) end of pier have shifted, some have fallen onto channel bottom. • Horizontal timbers in southwest corner of cribbing have come loose and are unstable. • Fluctuations in the channel bottom have created gaps below the exterior plywood along both sides of the pier. The older interior cribbing is visible, but diver was not able to reach. • Deteriorated timbers members with loss of section 30%-70%. • Scattered riprap 1' to 4' in diameter on channel bottom around perimeter	• Settlement of timber cribbing at north side of pier.

Substructure Unit	Observations Below the Waterline	Observations Above the Waterline
Pier 10w (Refer to Substructure Elevation Drawings and Soundings Section)	• Repairs made to previous timber cribbing deterioration and loss of rock infill. • FP-475 vinyl sheeting surrounds pier (used as stay-in-place formwork). • C5x9 steel walers spaced at 2'-0" vertical spacing securing formwork. • Grout backfill inside steel formwork. • Steel ice breaker plate at upstream end, extending 5' below waterline. • Smaller ice steel ice breaker plate extends to channel bottom. • Grout bags along channel bottom. • 12 sft spall at south end, 75% is above waterline. • 1 sft spall at north end, 50% is above waterline. 10 sft area of 4" deep scaling at north end, 50% is above waterline. • Vertical cracks in west and east elevations extend below waterline to top of footing elevation. • Uniform algae growth on concrete surfaces up to 1/16" thick. • Channel bottom consists of grout bags, sand and scattered rocks up to 1' diameter.	• South end: 12 sft spall, 25% extends below waterline. • North end: 1 sft spall, 50% extends below waterline. 10 sft area of 4" deep scaling, 50% extends below waterline. • West elevation: 26 sft area of delamination in south end of pier wall and bolster area. Vertical and horizontal cracking in pier wall and bolster area. • East elevation: 4 sft spall in pier wall. Vertical cracks in pier wall.
Pier 11w (Refer to Substructure Elevation Drawings and Soundings Section)	• Vertical footing exposure on all sides of pier. Maximum vertical exposure was 10'-6" inches at the north end of the pier. • No undermining of footing observed. • 2 sft spall in footing at southeast corner. • 4 sft spall in nose of pier wall along east elevation, just above top of footing. • 3 sft spall along east elevation extends 50% above waterline. • Uniform algae growth on concrete surfaces up to 1/16" thick. • Channel bottom consists of sand and scattered rocks up to 1' diameter.	• West elevation: 10 sft and 4 sft spalls in pier wall. • East elevation: 10 sft spall in bolster area. 1 sft and 3 sft spalls in pier wall. 3 sft spall extends 50% below waterline.

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SUBSTRUCTURE

Based on the underwater inspection the piers are overall in **fair to poor condition**. Vertical footing exposure ranging from 1'-2" minimum to 10'-6" maximum was observed at piers 1w, 3w, 5w, 7w, and 11w. Although these piers are founded on bedrock, the footing exposure is an area of concern and should be continued to be monitored at increased frequency. Piers 1w, 3w, 5w, 7w, and 11w also exhibit extensive deterioration both above and below the waterline. Areas of spalling, delamination, 1/2" to 4" deep scaling, vertical and horizontal cracking, and map cracking is present in these piers. Piers 1w, 3w, 5w, 7w, and 11w are in overall **poor condition**.

The even numbered piers (2w, 4w, 6w, 8w, and 10w) are in **fair condition**. Extensive underwater repairs were performed at these piers during the second half of 2021. The previous loss of rock infill and deteriorated timber cribbing has been repaired with a combination of grout bags, vinyl and steel stay-in-place sheeting forms, steel walers, and pressure injected grout fill. Above the waterline, piers 2w, 4w, 6w, 8w, and 10w have deterioration consisting of spalling, delamination, map cracking, and vertical and horizontal cracking.

Pier 9w is in **fair condition**. The structural portion of pier 9w received the same repairs as the even numbered piers, however steel sheeting was used as the formwork. The swing / pivot portion of pier 9w is in **fair condition**. The previous deterioration of the timber cribbing and loss of rock infill has been repaired with the same procedures detailed in the paragraph above. The previous deterioration above the waterline at pier 9w has been repaired.

Based upon the underwater inspection only, the submerged portions of the piers are in overall **fair to poor condition**. The current Bridge Safety Inspection Report rating for Substructure (SIA Item #60) is a 5. Based upon the underwater inspection only, it is recommended that this rating remain a 5. Please refer to the preceding table for detailed information on pier footing exposure and overall deterioration.

SCOUR COUNTERMEASURES

There is scattered riprap in place along the channel bottom at the submerged potions of the piers. Vertical footing exposure is present at piers 1w, 3w, 5w, 7w, and 11w. Scour repairs have been made to piers 2w, 4w, 6w, 8w, 9w, and 10w during the second half of 2021. Scour repairs at these piers consisted of installing stay-in-place forms on the exterior of the timber cribbing and injecting grout into the interior of the cribbing to repair the loss of stone infill. Grout filled bags were also installed along the channel bottom at these piers to secure the stay -in-place forms to the channel bottom.

The current Bridge Safety Inspection Report rating for Scour Criticality (SIA Item #113) is a 4. Based on the design of the pier units and the observations of the underwater inspection it is

recommended that this rating remain a 4.

SCOUR INSPECTION

Vertical footing exposure was observed at piers 1w, 3w, 5w, 7w, and 11w during the underwater inspection. No undermining of the footings was observed at any pier. Footing exposure observations were as follows;

Pier 1w footing exposure on all sides ranged from 1'-2" minimum to 7'-9" maximum. Maximum exposure was along the east elevation of the pier. Pier 3w footing exposure along all sides ranged from 1'-4" minimum to 6'-10" maximum, with maximum exposure at the north end (upstream end). Footing exposure on all sides of pier 5w ranged from 3'-10" minimum to 9'-1" maximum. Maximum exposure was along the east elevation. Pier 7w footing exposure on all sides ranged from 5'-10" minimum to 8'-10" maximum. Maximum exposure was at the north end (upstream end) of the pier. Pier 11w footing exposure along all sides ranged from 5'-9" minimum to 10'-6" maximum, with maximum exposure at the north end (upstream end).

The current Bridge Safety Inspection Report rating for Scour Inspection (BSIR Item #17) is a 4. Based on the observed scour conditions and vertical footing exposure at piers 1w, 3w, 5w, 7w, and 11w it is recommended that this rating remain a 4 in accordance with MDOT NBI rating guidelines.

NAVIGATION PROTECTION SYSTEMS

The watercourse is deemed navigable according to the U.S. Coast Guard; therefore, protection systems and navigation lights at or near the bridge are required. A timber cribbing pier protection system is in place at pier 9w. The protection system at pier 9w is in **poor condition**. The purpose of the system is to protect the bridge from impacts by vessels and also to identify the navigable channel. The protection system has the visual appearance of sinking, especially at the north end (upstream end). During the 2021, 2020, 2019, and 2017 underwater inspections, water levels have been higher than in older inspections. The high water levels contribute to the sinking appearance, however the extensive deterioration of the pier protection cribbing below water, and failed previous repairs are contributing to the settlement of the pier protection system. There are multiple areas within the timber cribbing system that exhibit section loss of 20%-75%. No pier protection systems are in place at piers 1w, 2w, 3w, 4w, 5w, 6w, 7w, 8w, 10w, and 11w.

Navigation lighting is installed at the structure from piers 8w to 10w as well as on southern and northern ends of the pier protection system at pier 9w. The navigation lighting was not operating at the time of underwater inspection due to power at the bridge being turned off for ongoing repair work.

The current Bridge Safety Inspection Report rating for Pier or Abutment Protection (For Navigation) (SIA Item #111) is a 2. It is recommended that this coding be changed to a 3 to indi-

CHANNEL AND CHANNEL PROTECTION

The physical conditions associated with the flow of water through the bridge, such as waterway stability and the condition of the channel and slope, were evaluated. The west channel banks are natural with no slope protection in place. Stacked stone slabs are in place in front of the west abutment. The east channel banks have stacked stone blocks in place to retain the approach slopes. Farther from the bridge, there is a boat launch in the northwest quadrant and a marina in the southeast quadrant. No major erosion or significant debris was observed in the channel banks at the bridge.

The current Bridge Safety Inspection Report rating for Channel and Channel Protection (BSIR # 16, SIA Item #61) is a 7. Based upon the underwater inspection and observed channel conditions it is recommended that this rating remain a 7.

WATERWAY ADEQUACY

The waterway opening, with respect to the passage of flow through the bridge, was evaluated. The bridge deck is above the roadway approaches. The bridge deck elevation is above the roadway approaches. The bridge deck and roadway approaches are above flood water elevations (high water) with a slight chance of overtopping the roadway approaches.

The current Bridge Safety Inspection Report rating for Waterway Adequacy (SIA Item #71) is an 8. Based upon the underwater inspection and MDOT SIA coding guidelines it is recommended that this item remain rated an 8 to coincide with the functional classification of the route carried by the structure (Urban - Minor Arterial).

STREAMBED PROFILES

The water surface elevation at the time of inspection was 575.49 feet. Piers 1w through 11w are submerged in the waterway and the channel extended from the west abutment to the east abutment. The channel was approximately 1,338 feet wide and the waterway was flowing from north to south. Both upstream and downstream cross sections were taken across the length of the bridge along the fascias, and compared to previous cross sections. Please refer to “Stream Cross Sections” tab of this report for the stream profiles.

EVALUATION AND RECOMMENDATIONS

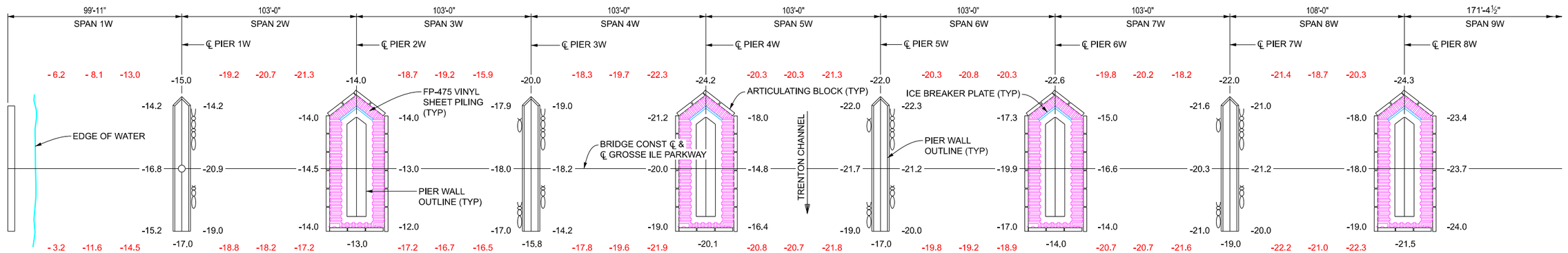
Based on the underwater inspection the piers are overall in **fair to poor condition**. The odd numbered piers (1w, 3w, 5w, 7w, and 11w) are in **poor condition**. Vertical footing exposure ranging from 1'-2" minimum to 10'-6" maximum was observed at these piers. Although these piers are founded on bedrock, the footing exposure is an area of concern and should be continued to be monitored at increased frequency. Piers 1w, 3w, 5w, 7w, and 11w also exhibit extensive deterioration both above and below the waterline. Areas of spalling, delamination, 1/2" to 4" deep scaling, vertical and horizontal cracking, and map cracking is present above and below the waterline at these piers.

The even numbered piers (2w, 4w, 6w, 8w, and 10w) are in **fair condition**. Extensive underwater repairs were performed at these piers during the second half of 2021. The previous loss of rock infill and deteriorated timber cribbing has been repaired with a combination of grout bags, vinyl and steel stay-in-place sheeting forms, steel walers, and pressure injected grout fill. Although these piers have been repaired, they should continue to be monitored for movement / settlement or degradation of the pier repairs and/or streambed. Piers 2w, 4w, 6w, 8w, and 10w also exhibit deterioration above the waterline consisting of spalling, delamination, map cracking, and vertical and horizontal cracking.

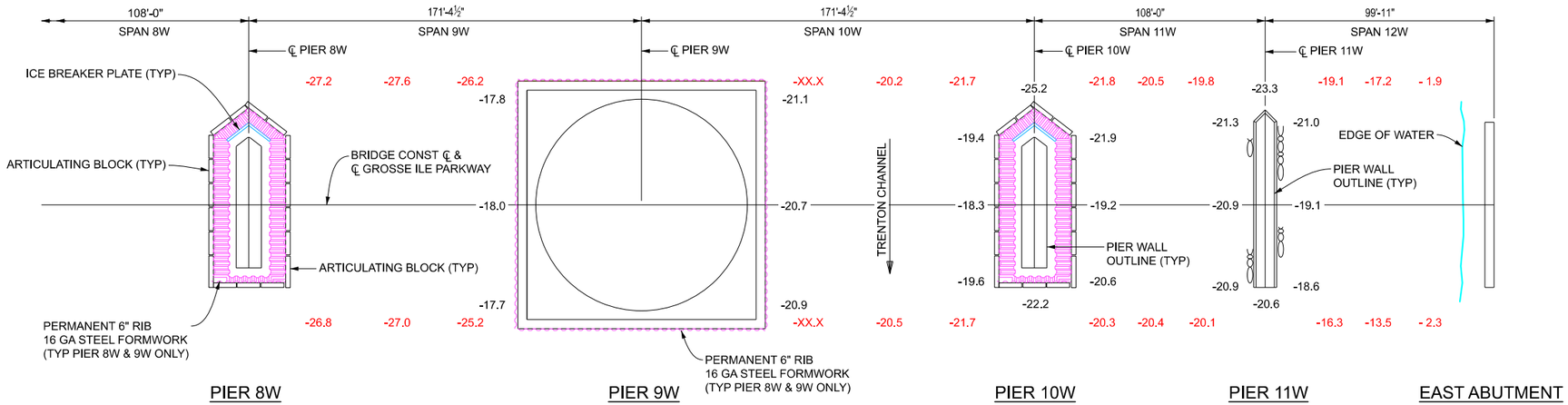
Pier 9w is in **fair to poor condition**. The structural portion of pier 9w received the same repairs as the even numbered piers, however steel sheeting was used as the formwork. The swing / pivot portion of pier 9w is in **fair condition**. The previous deterioration of the timber cribbing and loss of rock infill has been repaired with the same procedures detailed in the paragraph above. The previous deterioration above the waterline at pier 9w has been repaired.

The timber cribbing pier protection system at pier 9w is in **poor condition**. The purpose of the system is to protect the bridge from impacts by vessels and also to identify the navigable channel. The protection system has the visual appearance of sinking, especially at the north end (upstream end). During the 2021, 2020, 2019, and 2017 underwater inspections, water levels have been higher than in older inspections. The high water levels contribute to the sinking appearance, however the extensive deterioration of the pier protection cribbing below water, and failed previous repairs are contributing to the settlement of the pier protection system.

According to the National Bridge Inspection Standards (NBIS), it is recommended that the substructure units of STR 12006 be inspected underwater at an increased frequency not to exceed 24 months. Furthermore, it is recommended that channel cross sections be taken at the structure during biennial inspections or soon after flood occurrences.



WEST ABUTMENT PIER 1W PIER 2W PIER 3W PIER 4W PIER 5W PIER 6W PIER 7W PIER 8W



PIER 8W PIER 9W PIER 10W PIER 11W EAST ABUTMENT

PLAN VIEW

AT THE TIME OF DIVE

AMBIENT AIR TEMP	55°
WATER TEMP	49°
VELOCITY OF WATER	2.5 fps
TURBIDITY	10'
STREAMBED MATERIAL	ROCK

NOTE:

WATER SURFACE ELEVATION AT THE TIME OF DIVE INSPECTION WAS 575.49 ON 11/09/21. BENCHMARK ELEVATION WAS 583.94 TAKEN AT LOW STEEL SPAN 1W.

LEGEND

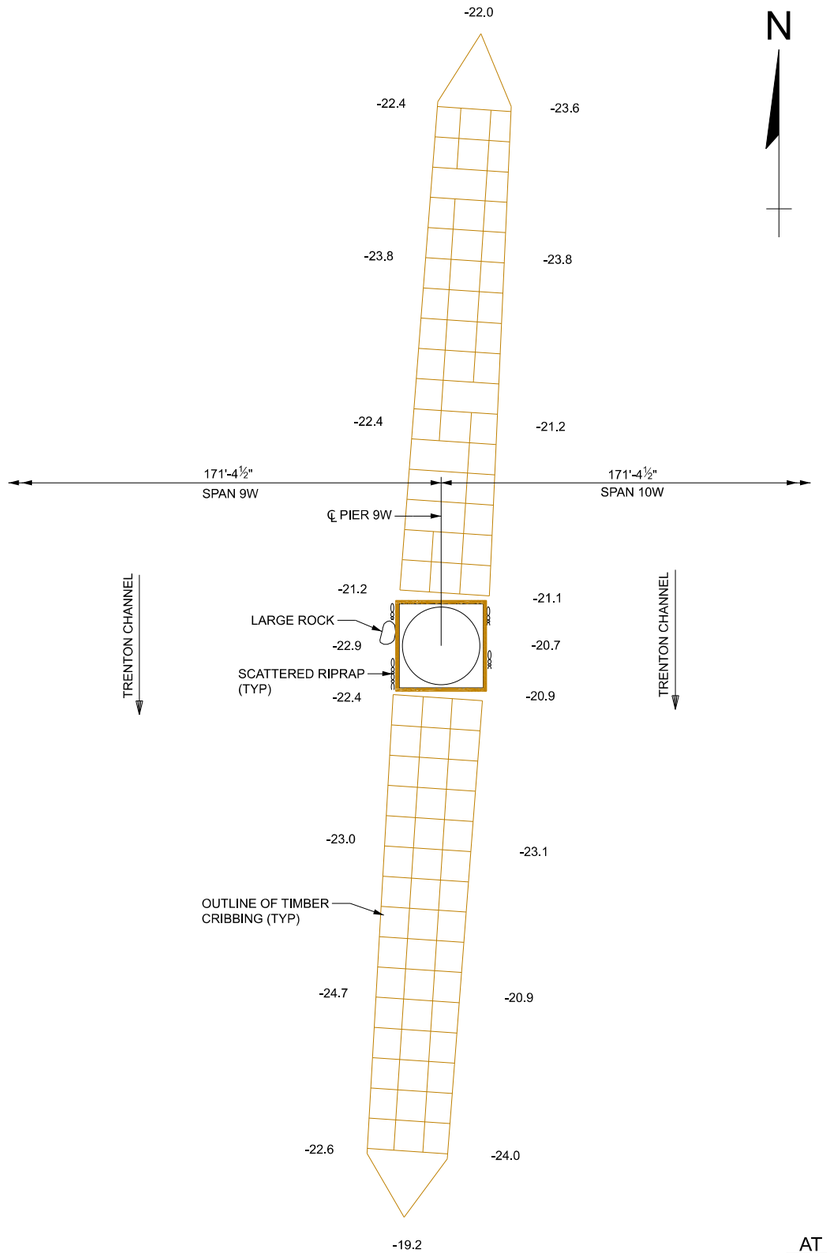
-00.0	SOUNDING DEPTH FROM WATER SURFACE TO RIVER BOTTOM.
-00.0	SOUNDING DEPTH FROM WATER SURFACE TO RIVER BOTTOM ALONG BRIDGE FASCIA
	RIPRAP
	SHEET PILING
	TIMBER/DEBRIS PILE

WAYNE COUNTY ROADS DIVISION

GROSSE ILE PARKWAY OVER TRENTON CHANNEL
STRUCTURE NUMBER 12006
UNDERWATER BRIDGE INSPECTION
GROSSE ILE, MI

DRAWING: PIER SOUNDING PLAN	
STRUCTURE NO: 12006	GLEG JOB NO: 1020-2-704
DRAWN BY: JLS	DATE: 11/09/21
CHECKED BY: CJC	FILE: 704 uwpl.dgn

GREAT LAKES ENGINEERING GROUP, LLC



PIER 9W

PLAN VIEW

AT THE TIME OF DIVE

AMBIENT AIR TEMP	55°
WATER TEMP	49°
VELOCITY OF WATER	2.5 fps
TURBIDITY	10'
STREAMBED MATERIAL	ROCK

NOTE:

WATER SURFACE ELEVATION AT THE TIME OF DIVE INSPECTION WAS 575.49 ON 11/09/21. BENCHMARK ELEVATION WAS 583.94 TAKEN AT LOW STEEL SPAN 1W.

LEGEND

-00.0	SOUNDING DEPTH FROM WATER SURFACE TO RIVER BOTTOM.
-00.0	SOUNDING DEPTH FROM WATER SURFACE TO RIVER BOTTOM ALONG BRIDGE FASCIA
	RIPRAP
	SHEET PILING
	TIMBER/DEBRIS PILE

WAYNE COUNTY ROADS DIVISION

GROSSE ILE PARKWAY OVER TRENTON CHANNEL
STRUCTURE NUMBER 12006
UNDERWATER BRIDGE INSPECTION
GROSSE ILE, MI

DRAWING: PIER SOUNDING PLAN	
STRUCTURE NO: 12006	GLEG JOB NO: 1020-2-704
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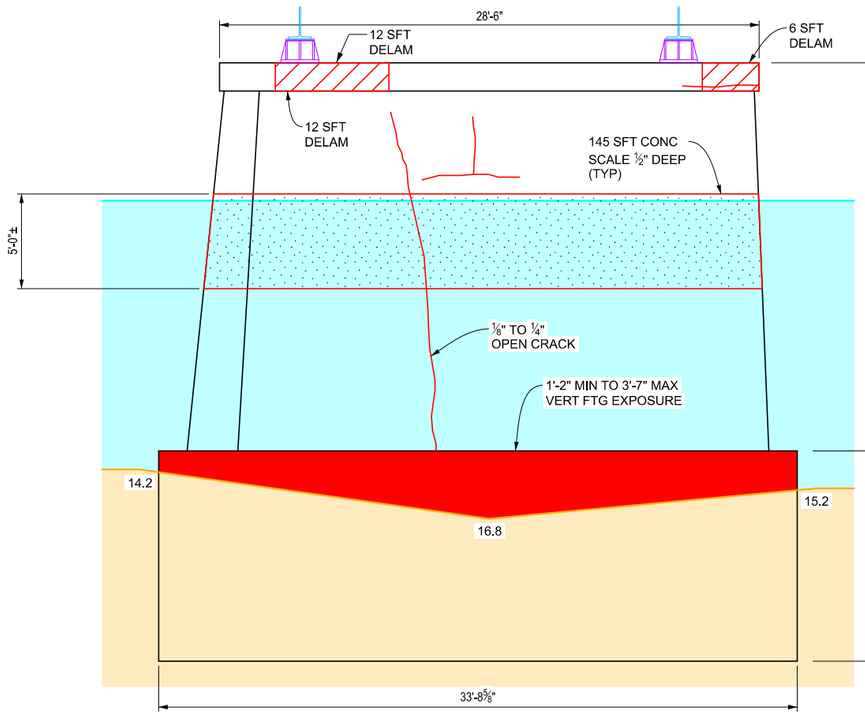
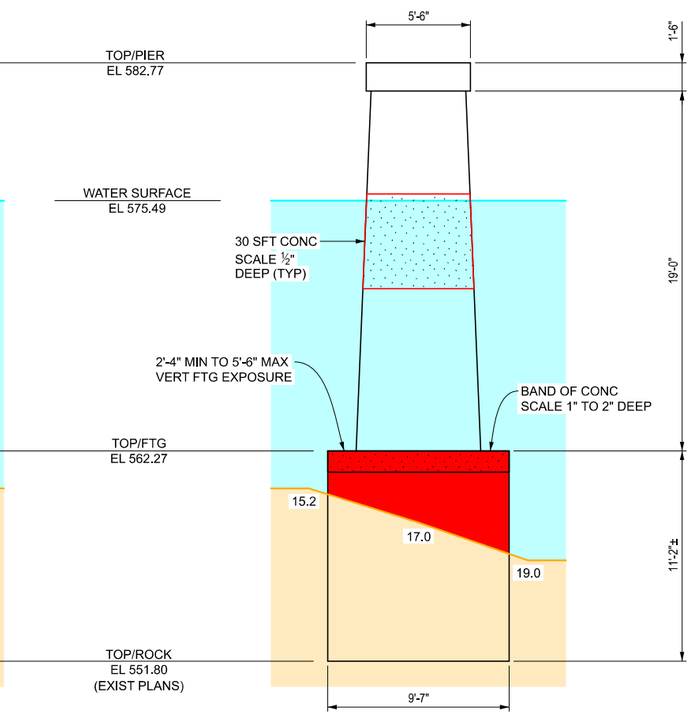
GREAT LAKES ENGINEERING GROUP, LLC

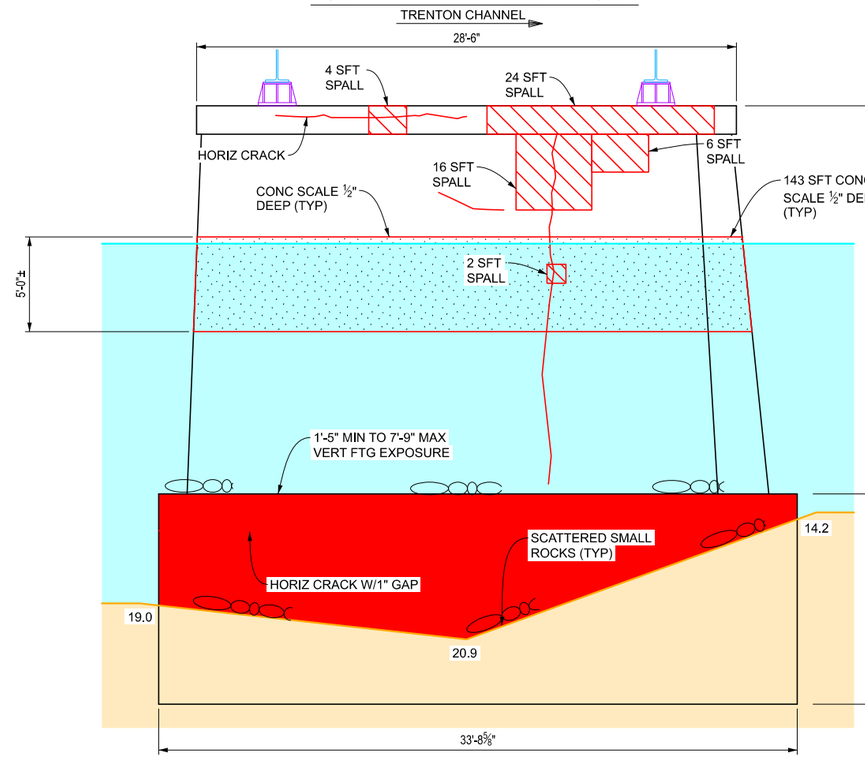


PIER 1W WEST ELEVATION

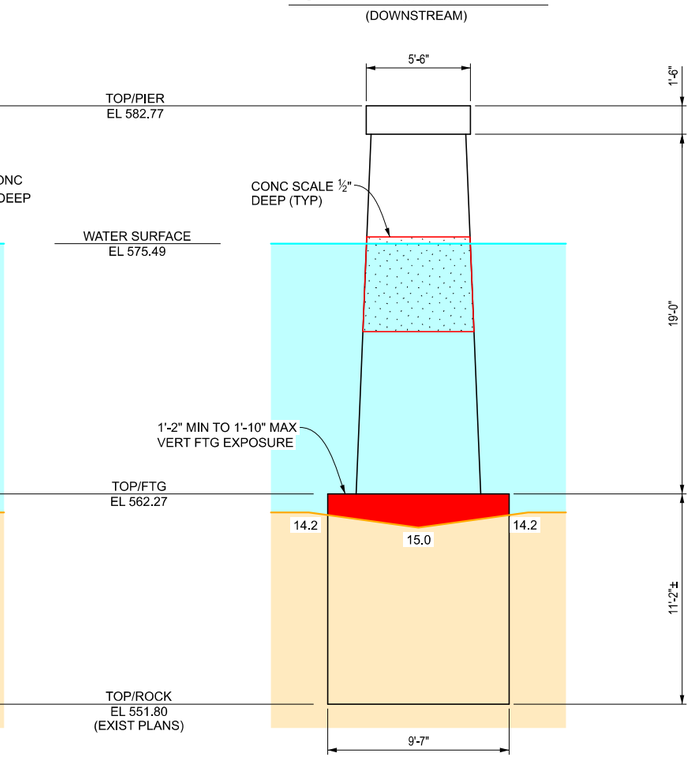


PIER 1W SOUTH END

(DOWNSTREAM)



PIER 1W EAST ELEVATION



PIER 1W NORTH END

(UPSTREAM)

NOTE:

WATER SURFACE ELEVATION AT THE TIME OF DIVE INSPECTION WAS 575.49 ON 11/09/21. BENCH MARK ELEVATION WAS 583.94 TAKEN AT LOW STEEL SPAN 1W.

LEGEND

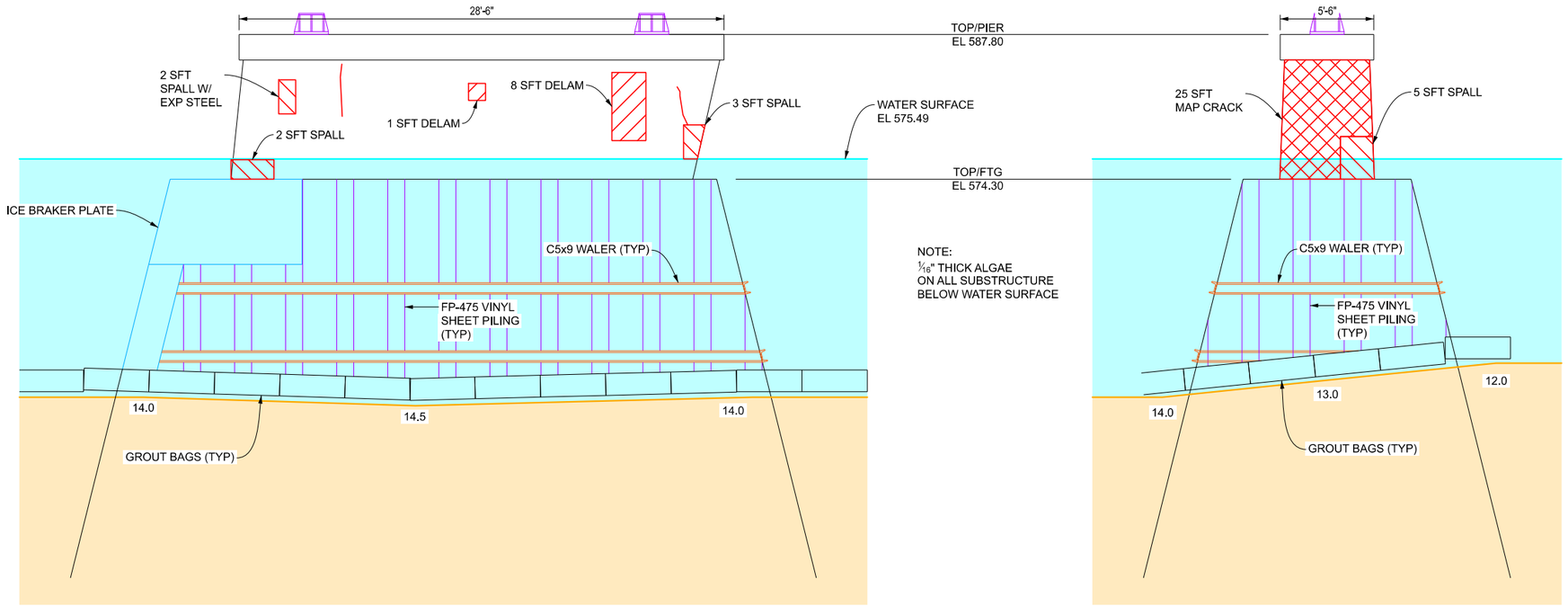
-00.0	SOUNDING DEPTH FROM WATER SURFACE TO RIVER BOTTOM.
	RIPRAP
	SHEET PILING
	VERTICAL EXPOSURE OF FOOTING
	VERTICAL EXPOSURE OF TREMIE
	VERTICAL UNDERMINING BELOW FOUNDATION
	TIMBER/DEBRIS PILE

WAYNE COUNTY ROADS DIVISION

GROSSE ILE PARKWAY OVER TRENTON CHANNEL
STRUCTURE NUMBER 12006
UNDERWATER BRIDGE INSPECTION
GROSSE ILE, MI

DRAWING: PIER SOUNDING ELEVATION	
STRUCTURE NO: 12006	GLEG JOB NO: 1020-2-704
DRAWN BY: JLS	DATE: 11/09/21
CHECKED BY: CJC	FILE: 704 uwpi.dgn

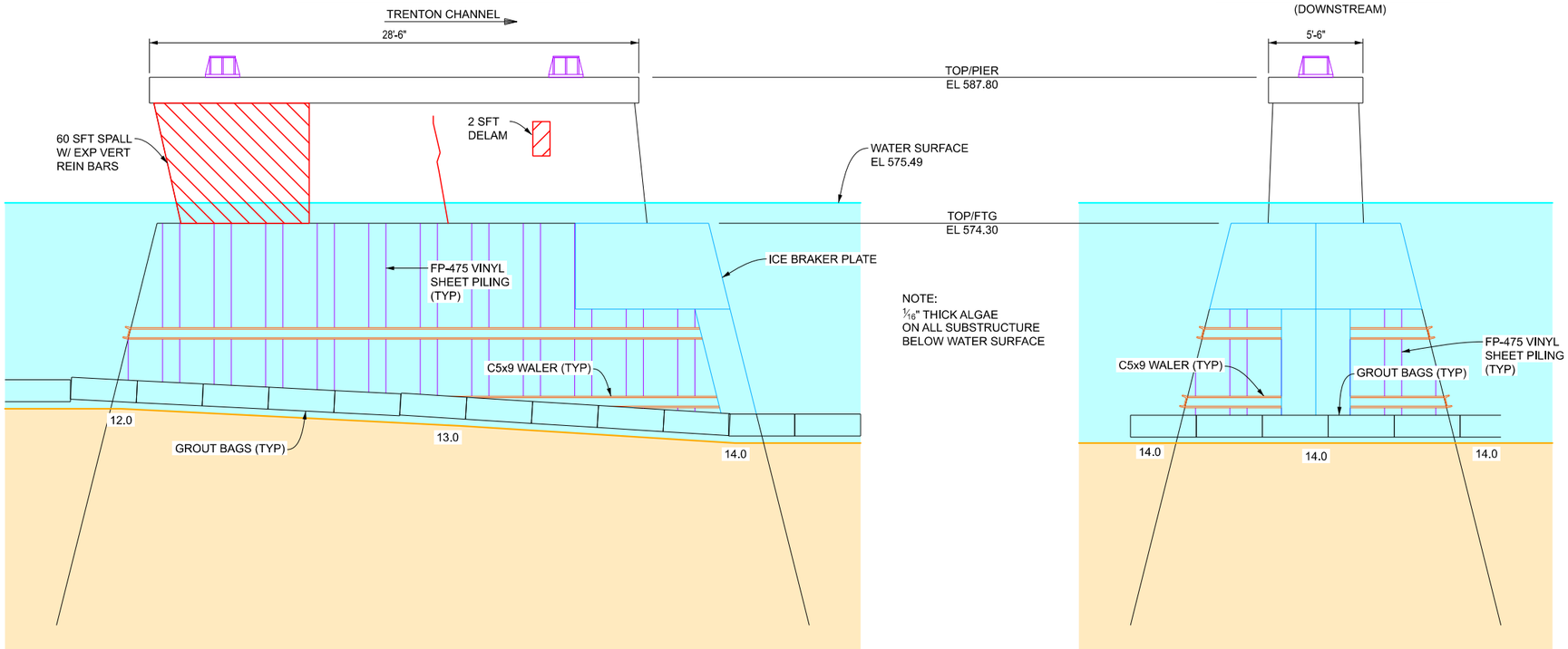
GREAT LAKES ENGINEERING GROUP, LLC



PIER 2W WEST ELEVATION

PIER 2W SOUTH END

(DOWNSTREAM)



PIER 2W EAST ELEVATION

TRENTON CHANNEL

PIER 2W NORTH END

(UPSTREAM)

NOTE:

WATER SURFACE ELEVATION AT THE TIME OF DIVE INSPECTION WAS 575.49 ON 11/09/21.
BENCH MARK ELEVATION WAS 583.94 TAKEN AT LOW STEEL SPAN 1W.

LEGEND

-00.0	SOUNDING DEPTH FROM WATER SURFACE TO RIVER BOTTOM.
	RIPRAP
	SHEET PILING
	VERTICAL EXPOSURE OF FOOTING
	VERTICAL EXPOSURE OF TREMIE
	VERTICAL UNDERMINING BELOW FOUNDATION
	TIMBER/DEBRIS PILE

WAYNE COUNTY ROADS DIVISION

GROSSE ILE PARKWAY OVER TRENTON CHANNEL
STRUCTURE NUMBER 12006
UNDERWATER BRIDGE INSPECTION
GROSSE ILE, MI

DRAWING: PIER SOUNDING ELEVATION	
STRUCTURE NO: 12006	GLEG JOB NO: 1020-2-704
DRAWN BY: JLS	DATE: 11/09/21
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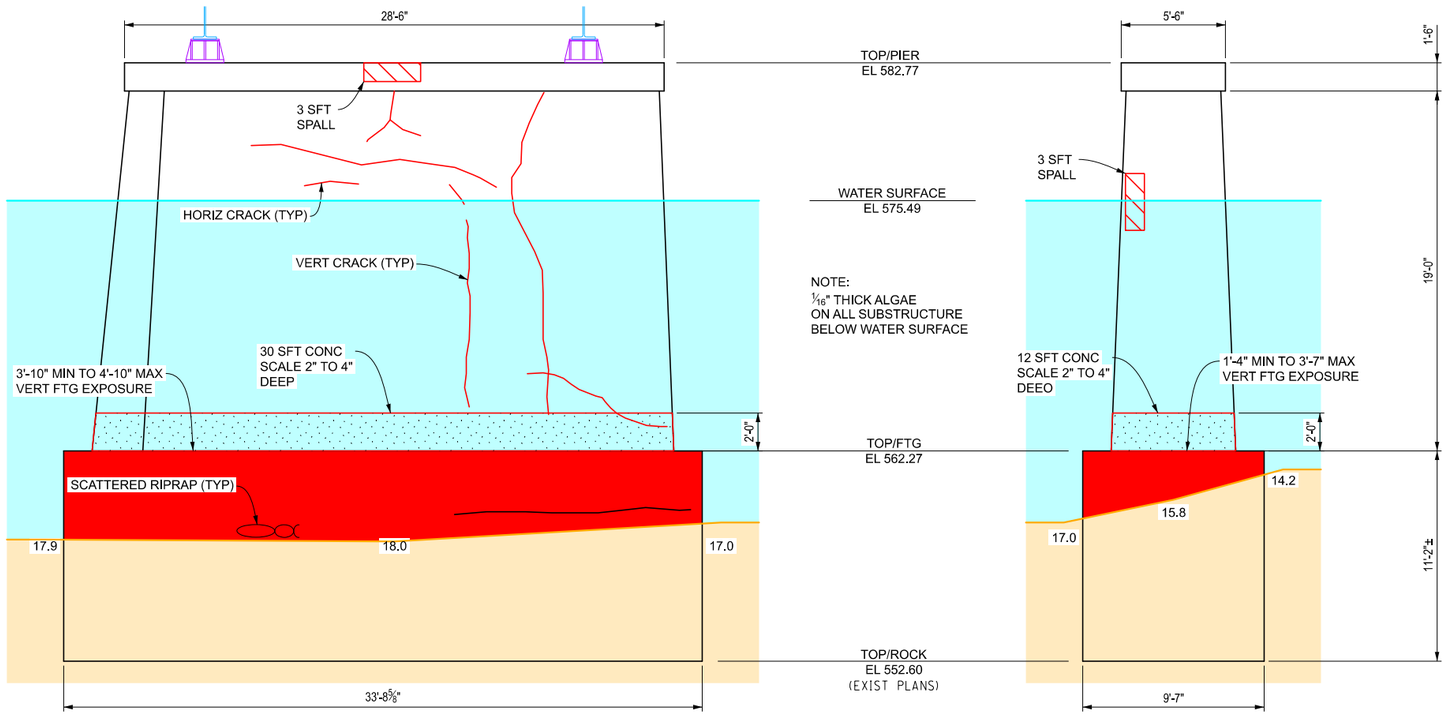
GREAT LAKES ENGINEERING GROUP, LLC

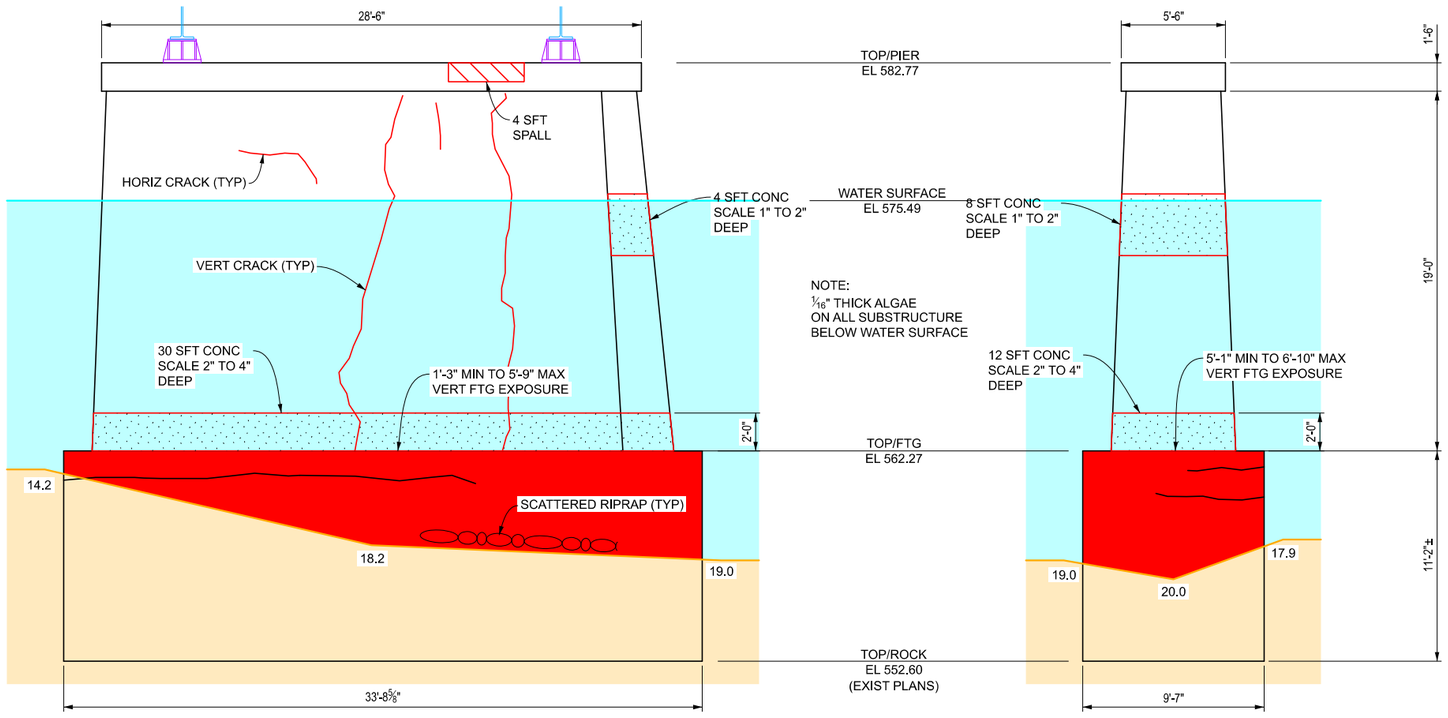


PIER 3W WEST ELEVATION

TRENTON CHANNEL

PIER 3W SOUTH END

(DOWNSTREAM)



PIER 3W EAST ELEVATION

TRENTON CHANNEL

PIER 3W NORTH END

(UPSTREAM)

NOTE:

WATER SURFACE ELEVATION AT THE TIME OF DIVE INSPECTION WAS 575.49 ON 11/09/21. BENCH MARK ELEVATION WAS 583.94 TAKEN AT LOW STEEL SPAN 1W.

LEGEND

-00.0	SOUNDING DEPTH FROM WATER SURFACE TO RIVER BOTTOM.
	RIPRAP
	SHEET PILING
	VERTICAL EXPOSURE OF FOOTING
	VERTICAL EXPOSURE OF TREMIE
	VERTICAL UNDERMINING BELOW FOUNDATION
	TIMBER/DEBRIS PILE

WAYNE COUNTY ROADS DIVISION

GROSSE ILE PARKWAY OVER TRENTON CHANNEL
STRUCTURE NUMBER 12006
UNDERWATER BRIDGE INSPECTION
GROSSE ILE, MI

DRAWING: PIER SOUNDING ELEVATION	
STRUCTURE NO: 12006	GLEG JOB NO: 1020-2-704
DRAWN BY: JLS	DATE: 11/09/21
CHECKED BY: CJC	FILE: 704 uwpi.dgn

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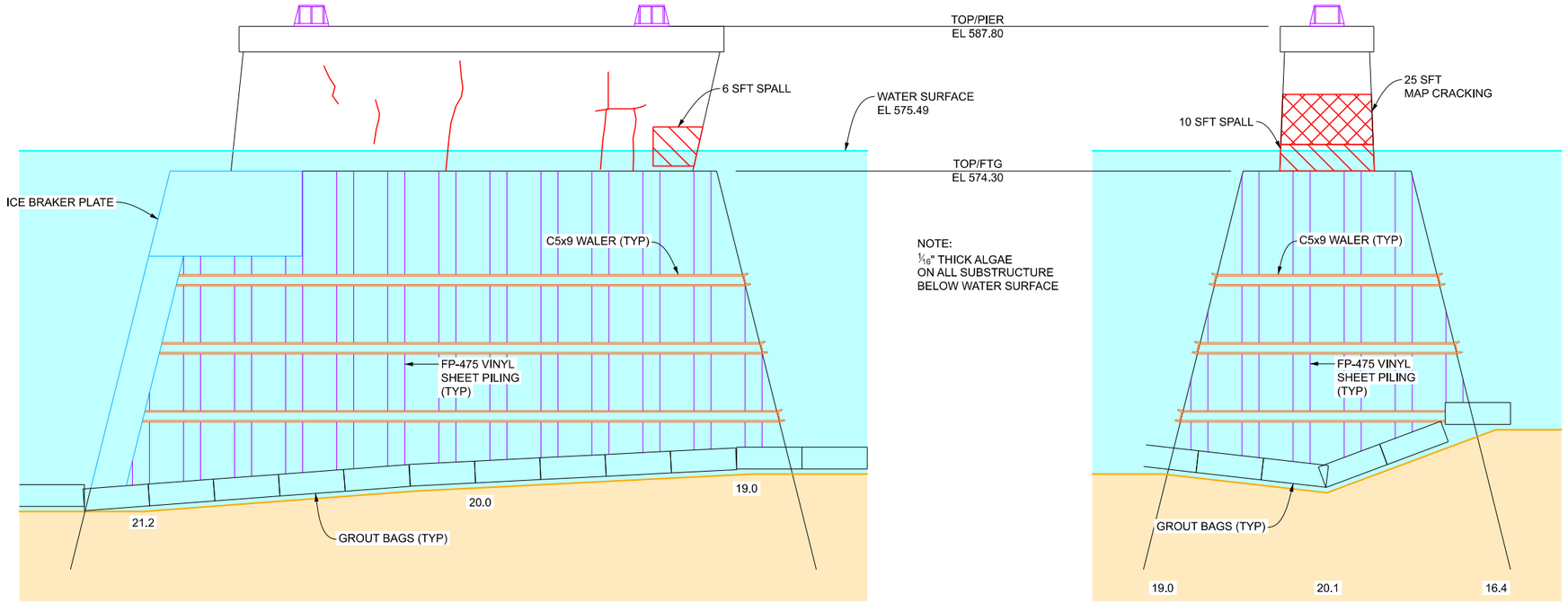
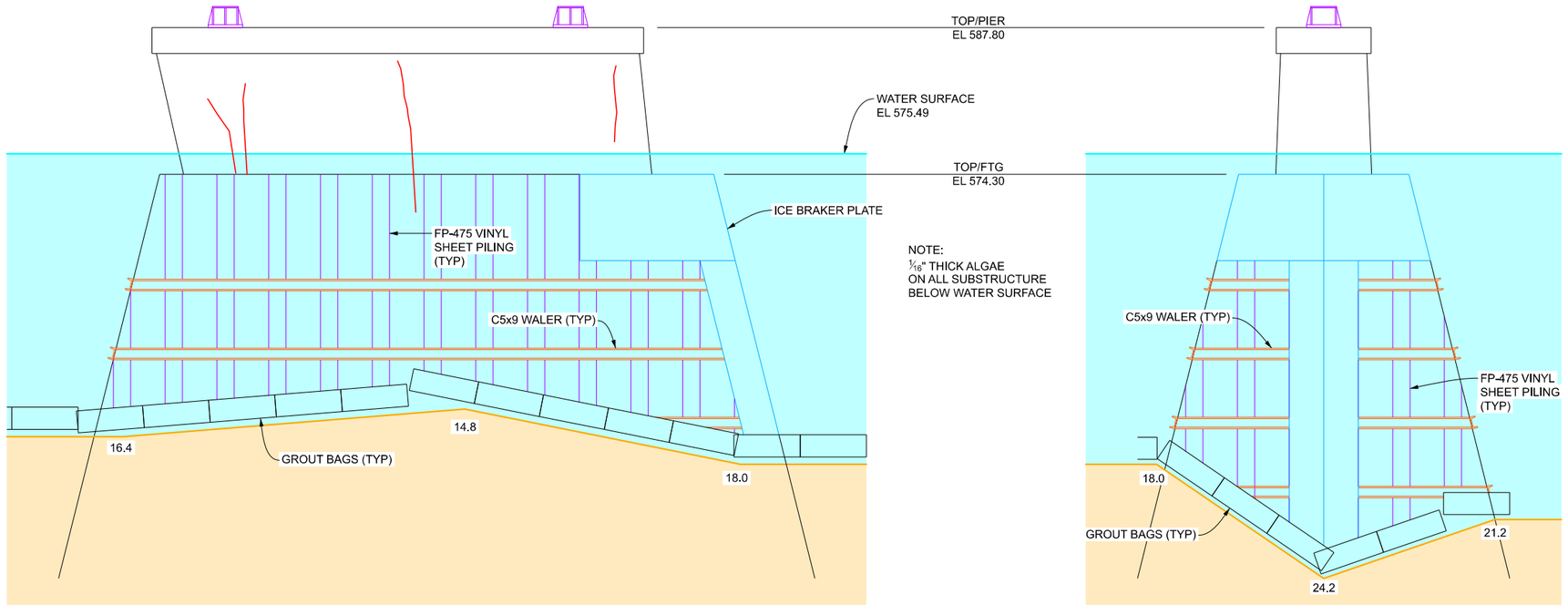


PIER 4W WEST ELEVATION

TRENTON CHANNEL

PIER 4W SOUTH END

(DOWNSTREAM)



PIER 4W EAST ELEVATION

TRENTON CHANNEL

PIER 4W NORTH END

(UPSTREAM)

NOTE:

WATER SURFACE ELEVATION AT THE TIME OF DIVE INSPECTION WAS 575.49 ON 11/09/21. BENCH MARK ELEVATION WAS 583.94 TAKEN AT LOW STEEL SPAN 1W.

LEGEND

-00.0	SOUNDING DEPTH FROM WATER SURFACE TO RIVER BOTTOM.
	RIPRAP
	SHEET PILING
	VERTICAL EXPOSURE OF FOOTING
	VERTICAL EXPOSURE OF TREMIE
	VERTICAL UNDERMINING BELOW FOUNDATION
	TIMBER/DEBRIS PILE

WAYNE COUNTY ROADS DIVISION

GROSSE ILE PARKWAY OVER TRENTON CHANNEL
STRUCTURE NUMBER 12006
UNDERWATER BRIDGE INSPECTION
GROSSE ILE, MI

DRAWING: PIER SOUNDING ELEVATION	
STRUCTURE NO: 12006	GLEG JOB NO: 1020-2-704
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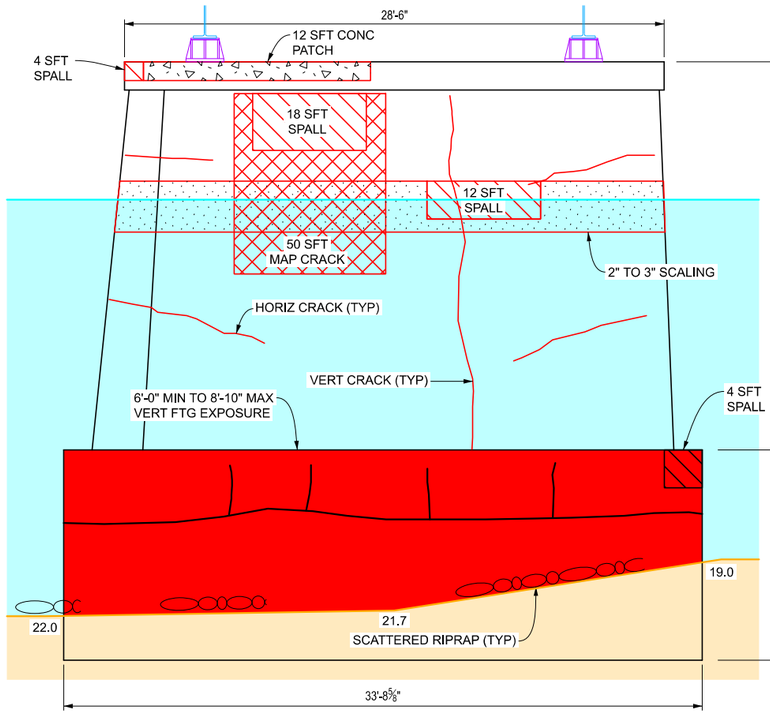
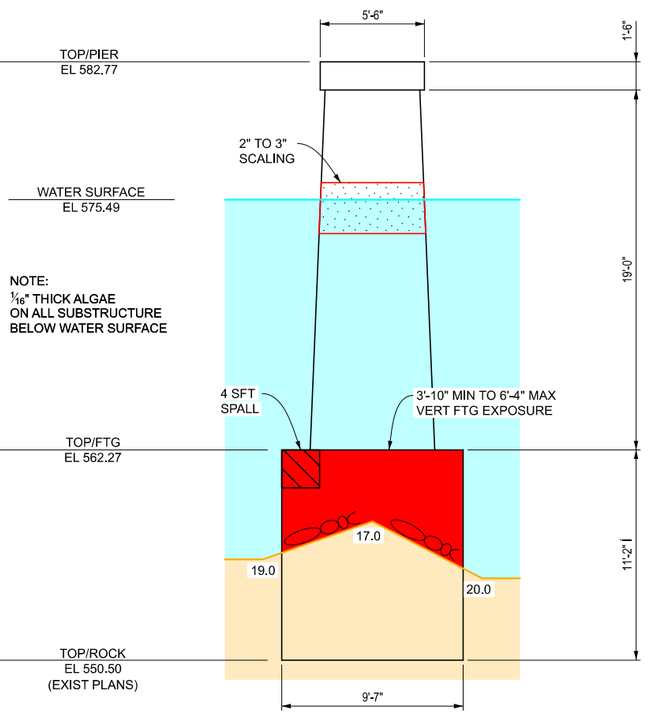
GREAT LAKES ENGINEERING GROUP, LLC



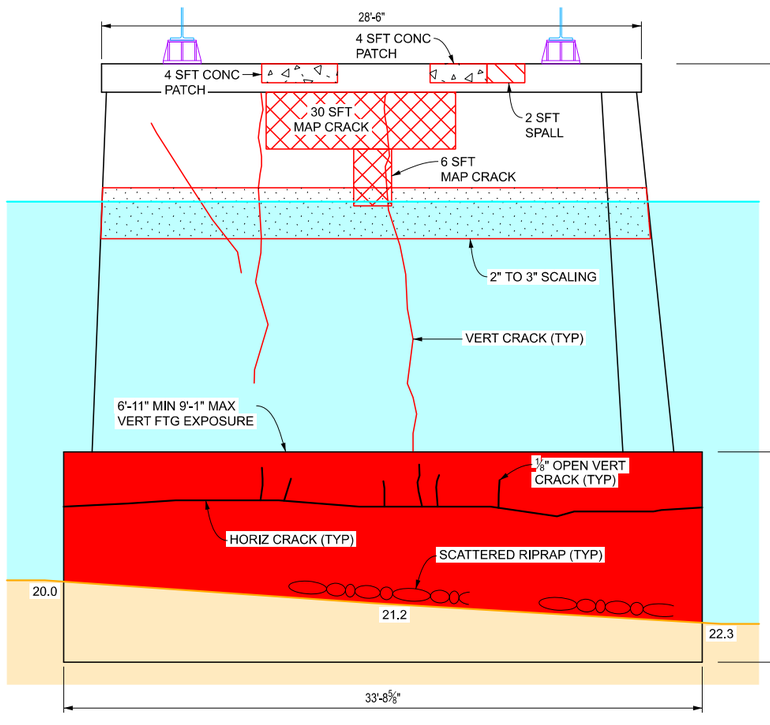
PIER 5W WEST ELEVATION

TRENTON CHANNEL



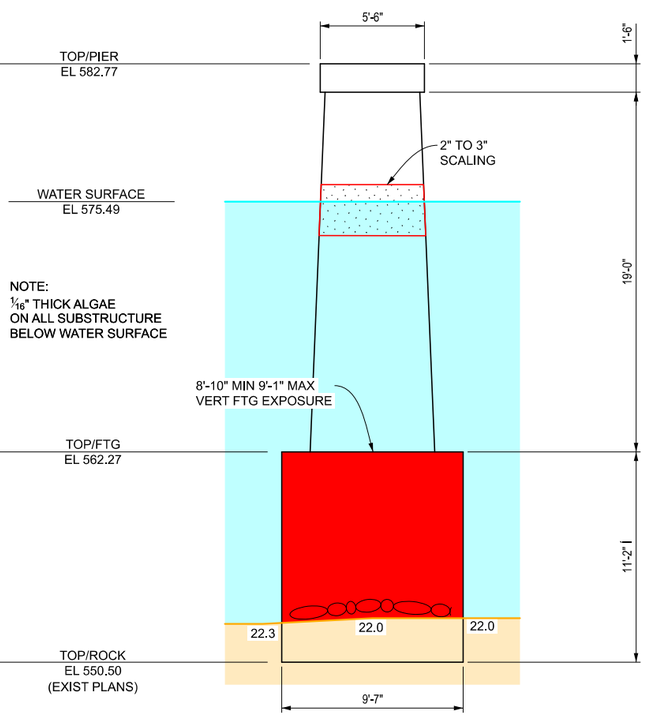
PIER 5W SOUTH END

(DOWNSTREAM)



PIER 5W EAST ELEVATION

TRENTON CHANNEL



PIER 5W NORTH END

(UPSTREAM)

NOTE:

WATER SURFACE ELEVATION AT THE TIME OF DIVE INSPECTION WAS 575.49 ON 11/09/21. BENCH MARK ELEVATION WAS 583.94 TAKEN AT LOW STEEL SPAN 1W.

LEGEND

-00.0	SOUNDING DEPTH FROM WATER SURFACE TO RIVER BOTTOM.
	RIPRAP
	SHEET PILING
	VERTICAL EXPOSURE OF FOOTING
	VERTICAL EXPOSURE OF TREMIE
	VERTICAL UNDERMINING BELOW FOUNDATION
	TIMBER/DEBRIS PILE

WAYNE COUNTY ROADS DIVISION

GROSSE ILE PARKWAY OVER TRENTON CHANNEL
STRUCTURE NUMBER 12006
UNDERWATER BRIDGE INSPECTION
GROSSE ILE, MI

DRAWING: PIER SOUNDING ELEVATION	
STRUCTURE NO: 12006	GLEG JOB NO: 1020-2-704
DRAWN BY: JLS	DATE: 11/09/21
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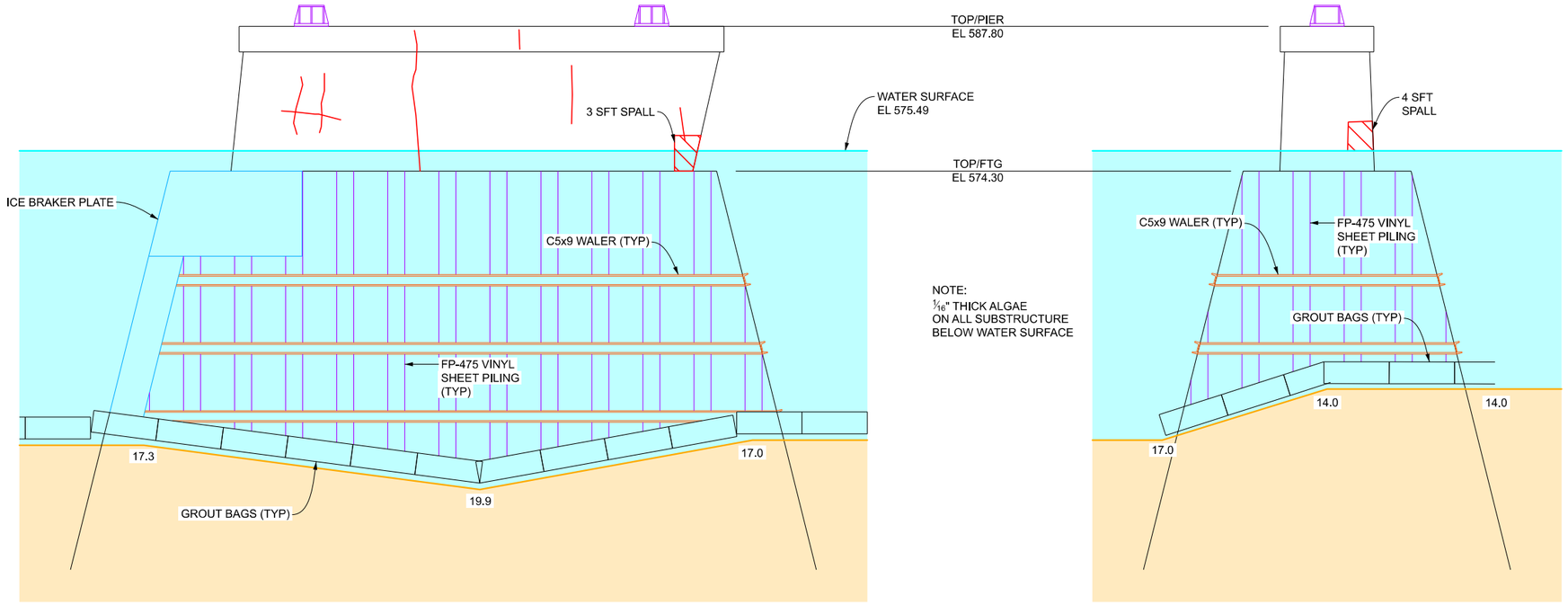
GREAT LAKES ENGINEERING GROUP, LLC

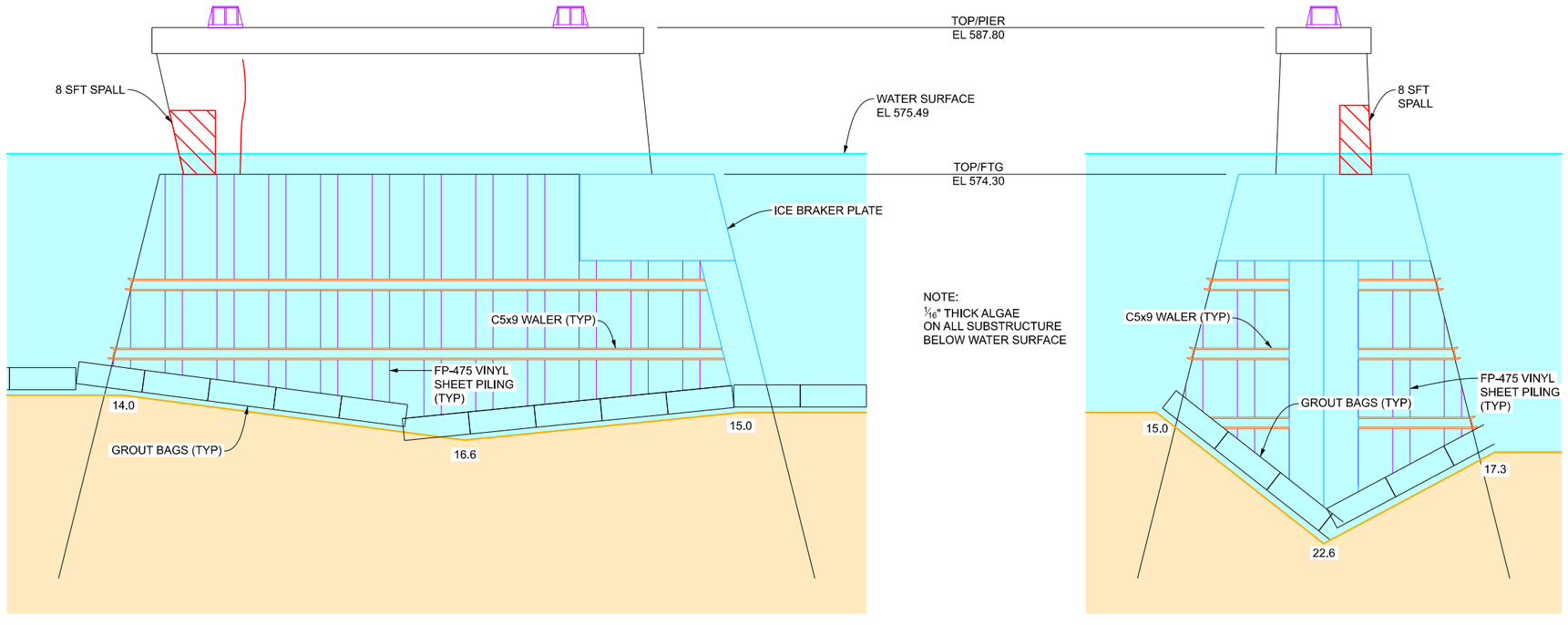


PIER 6W WEST ELEVATION

TRENTON CHANNEL

PIER 6W SOUTH END

(DOWNSTREAM)



PIER 6W EAST ELEVATION

TRENTON CHANNEL

PIER 6W NORTH END

(UPSTREAM)

NOTE:

WATER SURFACE ELEVATION AT THE TIME OF DIVE INSPECTION WAS 575.49 ON 11/09/21. BENCH MARK ELEVATION WAS 583.94 TAKEN AT LOW STEEL SPAN 1W.

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	RIPRAP
	SHEET PILING
	VERTICAL EXPOSURE OF FOOTING
	VERTICAL EXPOSURE OF TREMIE
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	TIMBER/DEBRIS PILE

WAYNE COUNTY ROADS DIVISION

GROSSE ILE PARKWAY OVER TRENTON CHANNEL
STRUCTURE NUMBER 12006
UNDERWATER BRIDGE INSPECTION
GROSSE ILE, MI

DRAWING: PIER SOUNDING ELEVATION	
STRUCTURE NO: 12006	GLEG JOB NO: 1020-2-704
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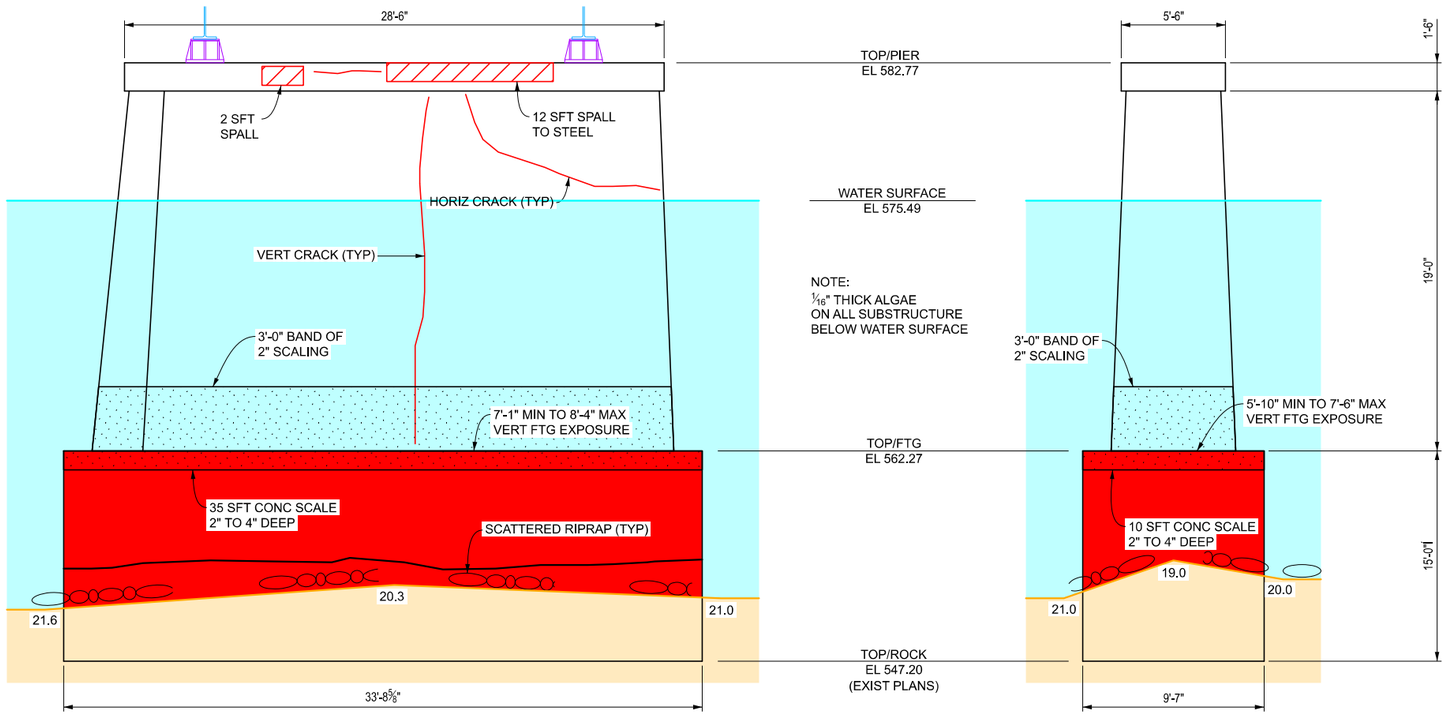
GREAT LAKES ENGINEERING GROUP, LLC

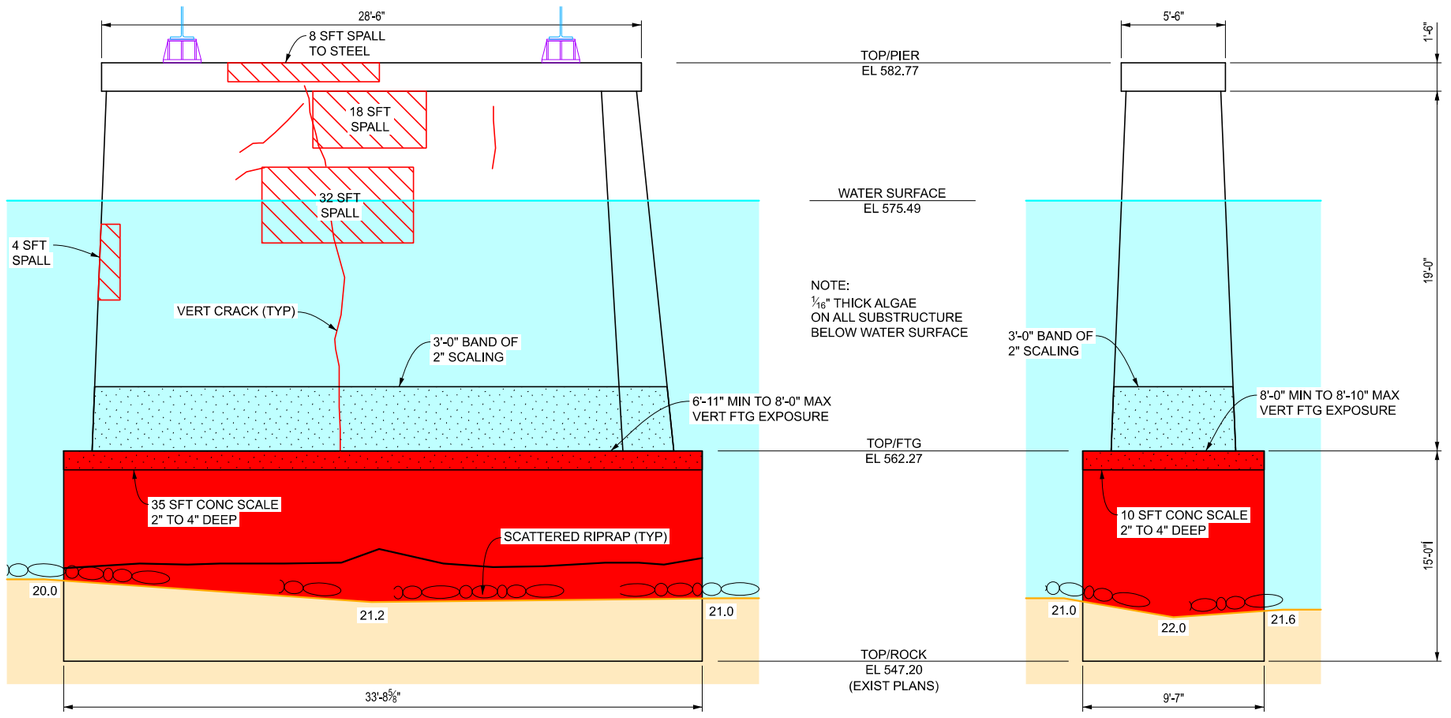


PIER 7W WEST ELEVATION

TRENTON CHANNEL

PIER 7W SOUTH END

(DOWNSTREAM)



PIER 7W EAST ELEVATION

TRENTON CHANNEL

PIER 7W NORTH END

(UPSTREAM)

NOTE:

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	RIPRAP
	SHEET PILING
	VERTICAL EXPOSURE OF FOOTING
	VERTICAL EXPOSURE OF TREMIE
	VERTICAL UNDERMINING BELOW FOUNDATION
	TIMBER/DEBRIS PILE

WAYNE COUNTY ROADS DIVISION

GROSSE ILE PARKWAY OVER TRENTON CHANNEL
STRUCTURE NUMBER 12006
UNDERWATER BRIDGE INSPECTION
GROSSE ILE, MI

DRAWING: PIER SOUNDING ELEVATION	
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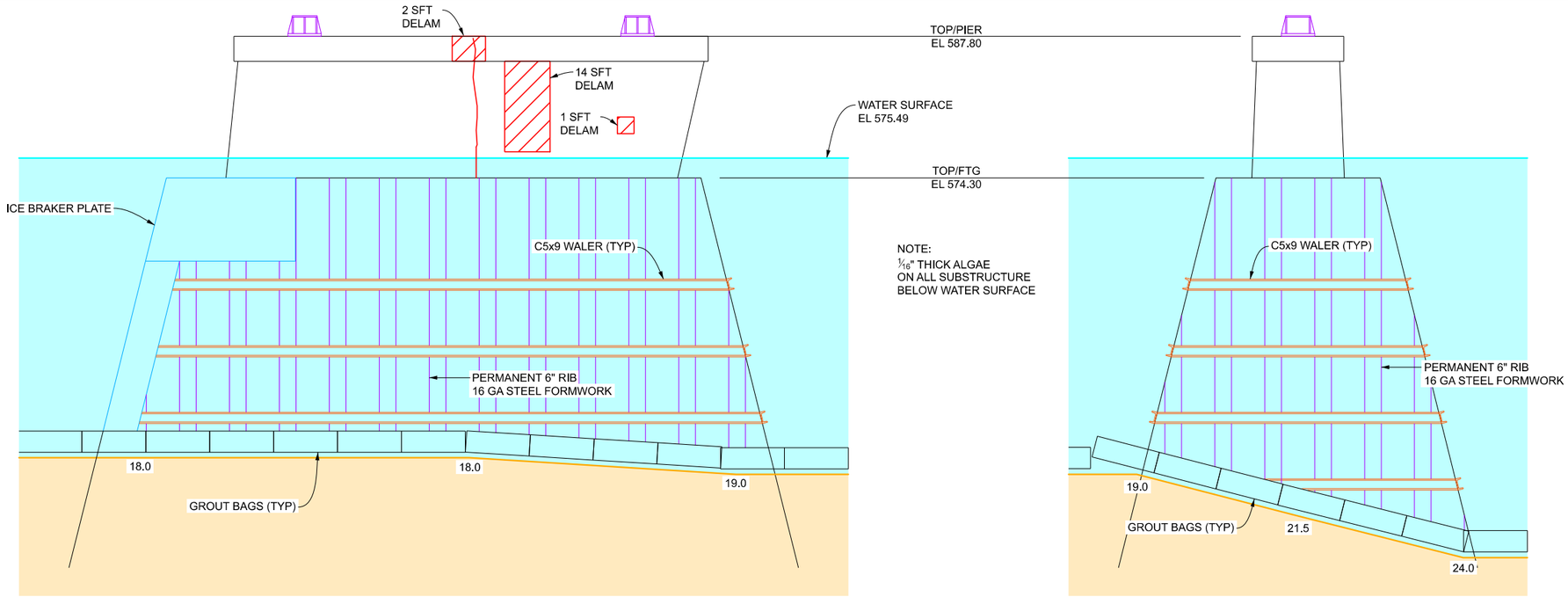


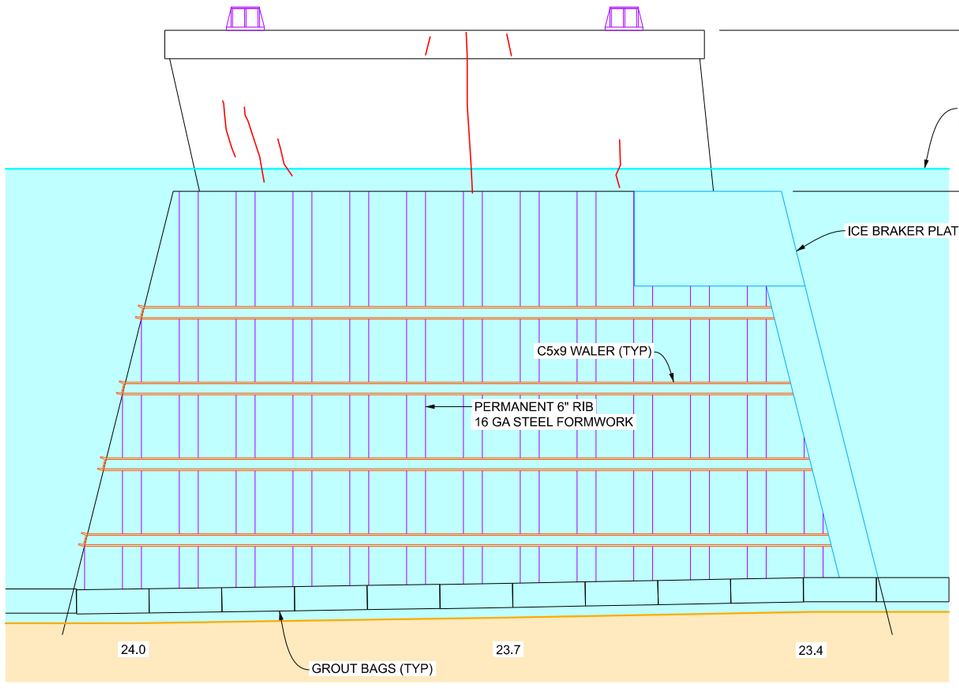
PIER 8W WEST ELEVATION

TRENTON CHANNEL

NOTE:
1/16" THICK ALGAE ON ALL SUBSTRUCTURE BELOW WATER SURFACE

PIER 8W SOUTH END

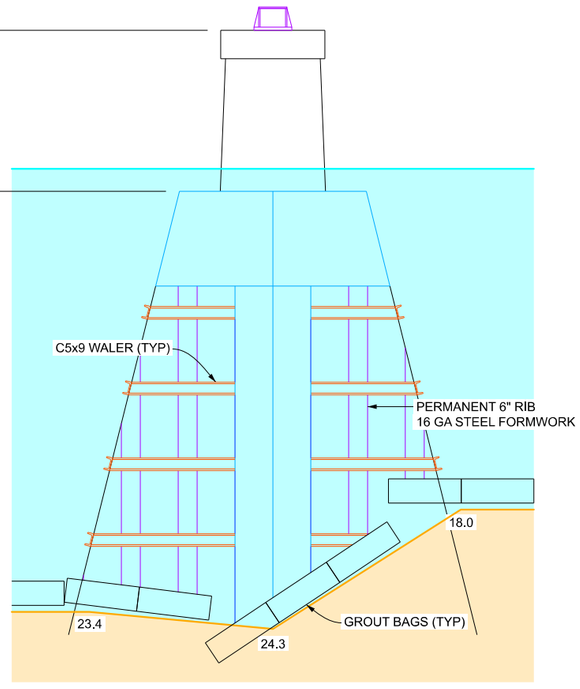
(DOWNSTREAM)



PIER 8W EAST ELEVATION

TRENTON CHANNEL

NOTE:
1/16" THICK ALGAE ON ALL SUBSTRUCTURE BELOW WATER SURFACE



PIER 8W NORTH END

(UPSTREAM)

NOTE:

WATER SURFACE ELEVATION AT THE TIME OF DIVE INSPECTION WAS 575.49 ON 11/09/21. BENCH MARK ELEVATION WAS 583.94 TAKEN AT LOW STEEL SPAN 1W.

LEGEND

-00.0	SOUNDING DEPTH FROM WATER SURFACE TO RIVER BOTTOM.
	RIPRAP
	SHEET PILING
	VERTICAL EXPOSURE OF FOOTING
	VERTICAL EXPOSURE OF TREMIE
	VERTICAL UNDERMINING BELOW FOUNDATION
	TIMBER/DEBRIS PILE

WAYNE COUNTY ROADS DIVISION

GROSSE ILE PARKWAY OVER TRENTON CHANNEL
STRUCTURE NUMBER 12006
UNDERWATER BRIDGE INSPECTION
GROSSE ILE, MI

DRAWING: PIER SOUNDING ELEVATION	
STRUCTURE NO: 12006	GLEG JOB NO: 1020-2-704
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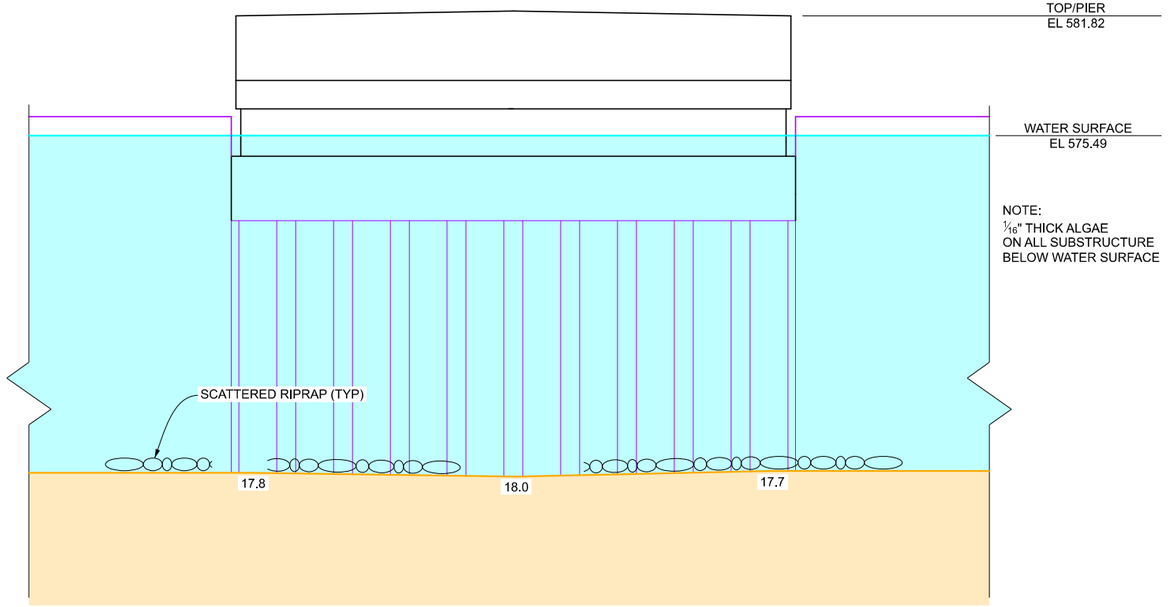
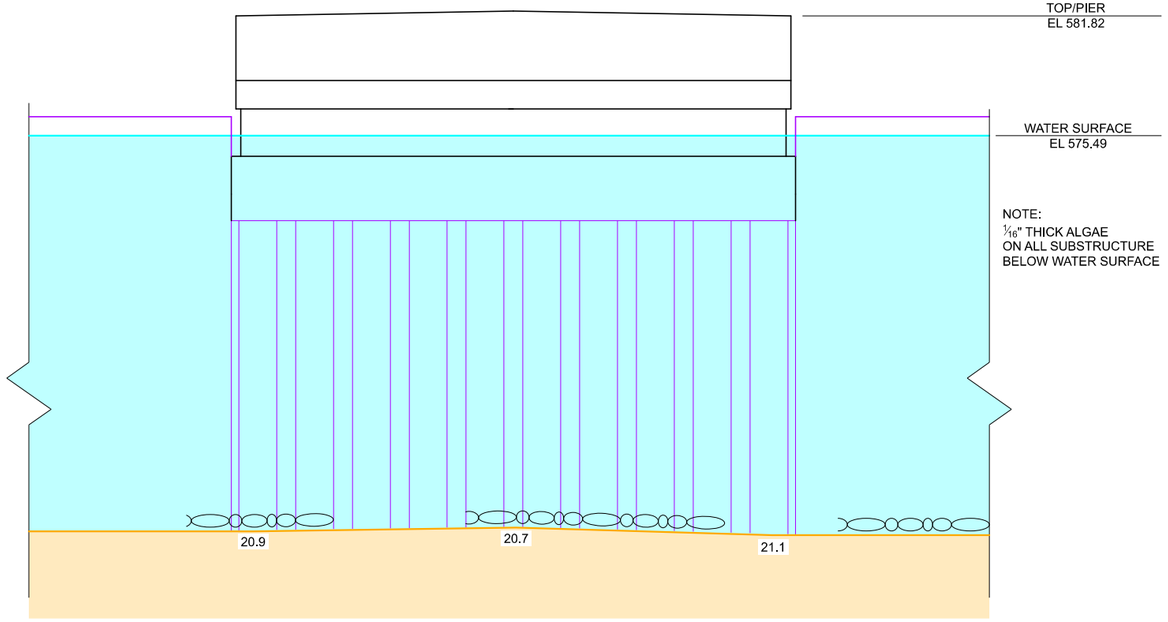
GREAT LAKES ENGINEERING GROUP, LLC



PIER 9W WEST ELEVATION

TRENTON CHANNEL



PIER 9W EAST ELEVATION

TRENTON CHANNEL

NOTE:

WATER SURFACE ELEVATION AT THE TIME OF DIVE INSPECTION WAS 575.49 ON 11/09/21. BENCH MARK ELEVATION WAS 583.94 TAKEN AT LOW STEEL SPAN 1W.

LEGEND

-00.0	SOUNDING DEPTH FROM WATER SURFACE TO RIVER BOTTOM.
	RIPRAP
	SHEET PILING
	VERTICAL EXPOSURE OF FOOTING
	VERTICAL EXPOSURE OF TREMIE
	VERTICAL UNDERMINING BELOW FOUNDATION
	TIMBER/DEBRIS PILE

WAYNE COUNTY ROADS DIVISION

GROSSE ILE PARKWAY OVER TRENTON CHANNEL
STRUCTURE NUMBER 12006
UNDERWATER BRIDGE INSPECTION
GROSSE ILE, MI

DRAWING: PIER SOUNDING ELEVATION	
STRUCTURE NO: 12006	GLEG JOB NO: 1020-2-704
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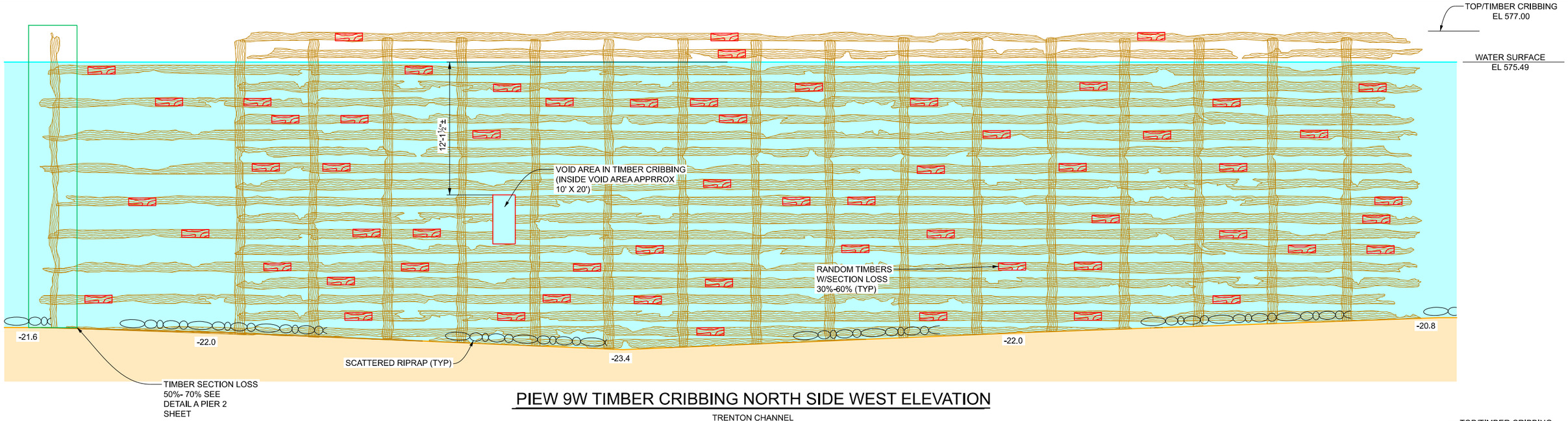
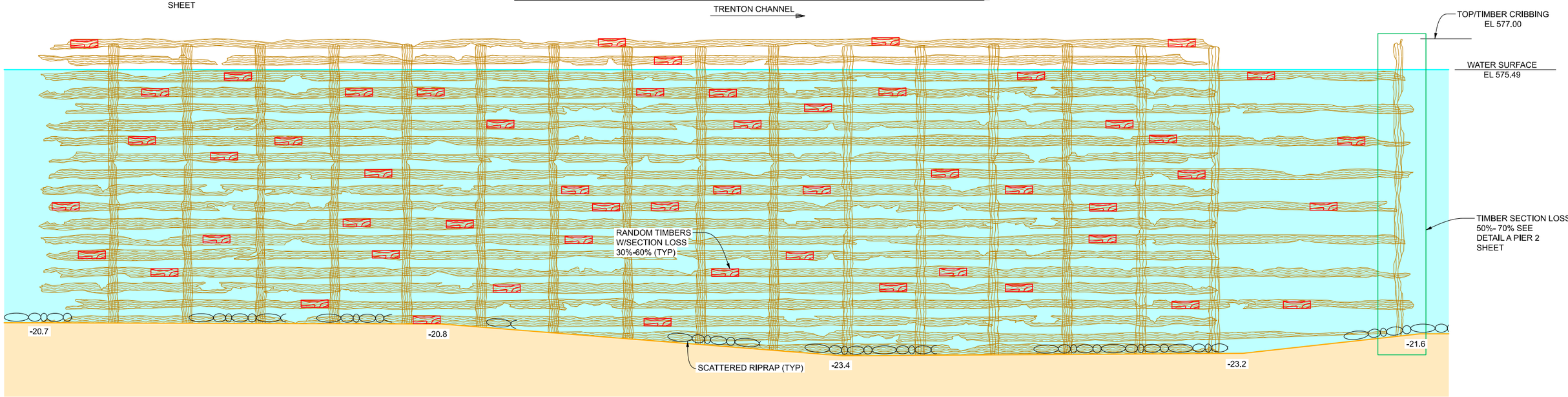
GREAT LAKES ENGINEERING GROUP, LLC



PIEW 9W TIMBER CRIBBING NORTH SIDE WEST ELEVATION



PIEW 9W TIMBER CRIBBING NORTH SIDE EAST ELEVATION

TRENTON CHANNEL

NOTE:

WATER SURFACE ELEVATION AT THE TIME OF DIVE INSPECTION WAS 575.49 ON 11/09/21. BENCH MARK ELEVATION WAS 583.94 TAKEN AT LOW STEEL SPAN 1W.

LEGEND

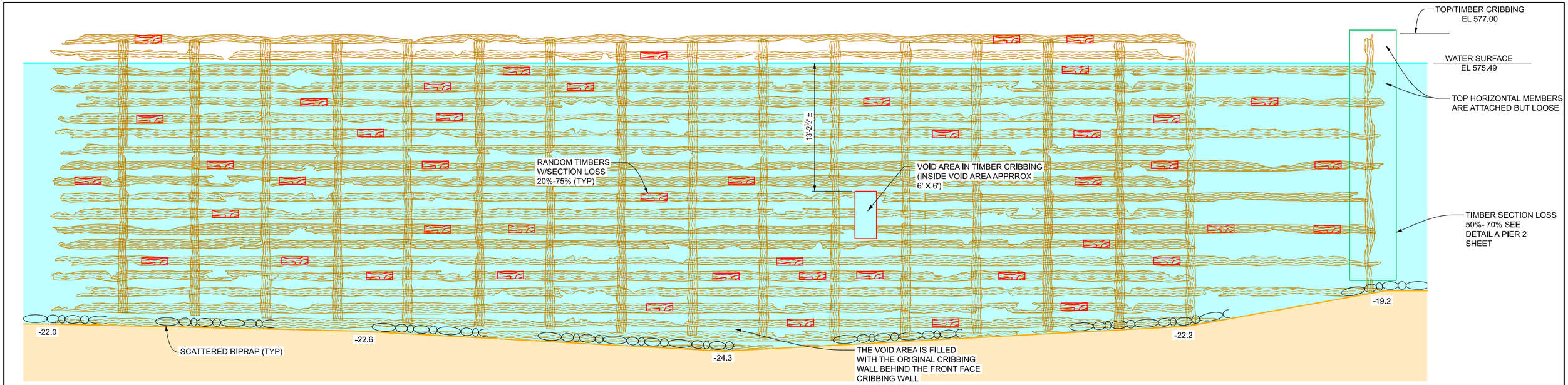
-00.0	SOUNDING DEPTH FROM WATER SURFACE TO RIVER BOTTOM.
	RIPRAP
	SHEET PILING
	VERTICAL EXPOSURE OF FOOTING
	VERTICAL EXPOSURE OF TREMIE
	VERTICAL UNDERMINING BELOW FOUNDATION
	TIMBER/DEBRIS PILE

WAYNE COUNTY ROADS DIVISION

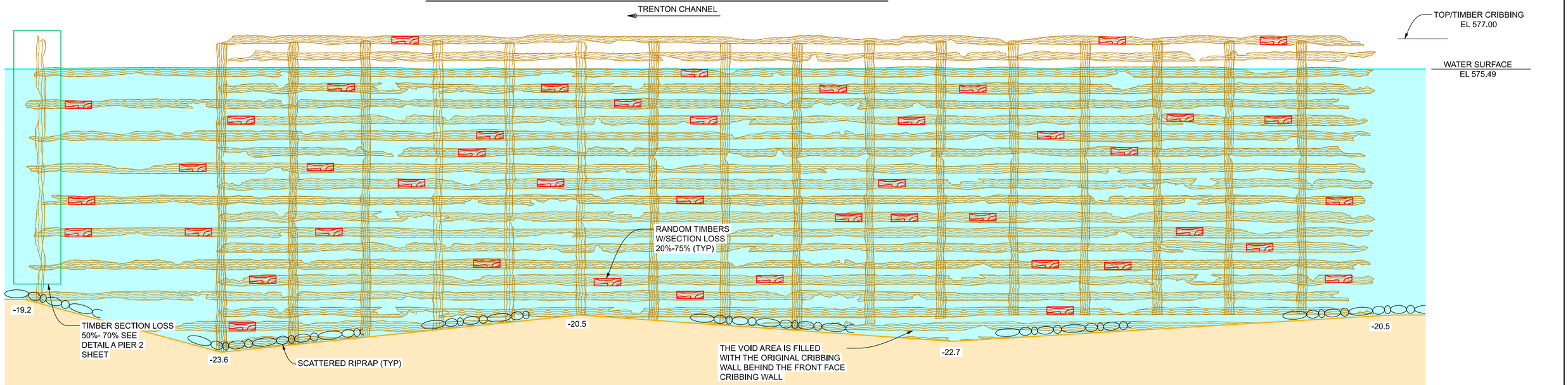
GROSSE ILE PARKWAY OVER TRENTON CHANNEL
STRUCTURE NUMBER 12006
UNDERWATER BRIDGE INSPECTION
GROSSE ILE, MI

DRAWING: PIER SOUNDING ELEVATION	
STRUCTURE NO: 12006	GLEG JOB NO: 1020-2-704
DRAWN BY: JLS	DATE: 11/09/21
CHECKED BY: CJC	FILE: 704 uwpi.dgn

GREAT LAKES ENGINEERING GROUP, LLC



PIEW 9W TIMBER CRIBBING SOUTH SIDE WEST ELEVATION



PIEW 9W TIMBER CRIBBING SOUTH SIDE EAST ELEVATION

TRENTON CHANNEL

NOTE:

WATER SURFACE ELEVATION AT THE TIME OF DIVE INSPECTION WAS 575.49 ON 11/09/21. BENCH MARK ELEVATION WAS 583.94 TAKEN AT LOW STEEL SPAN 1W.

LEGEND

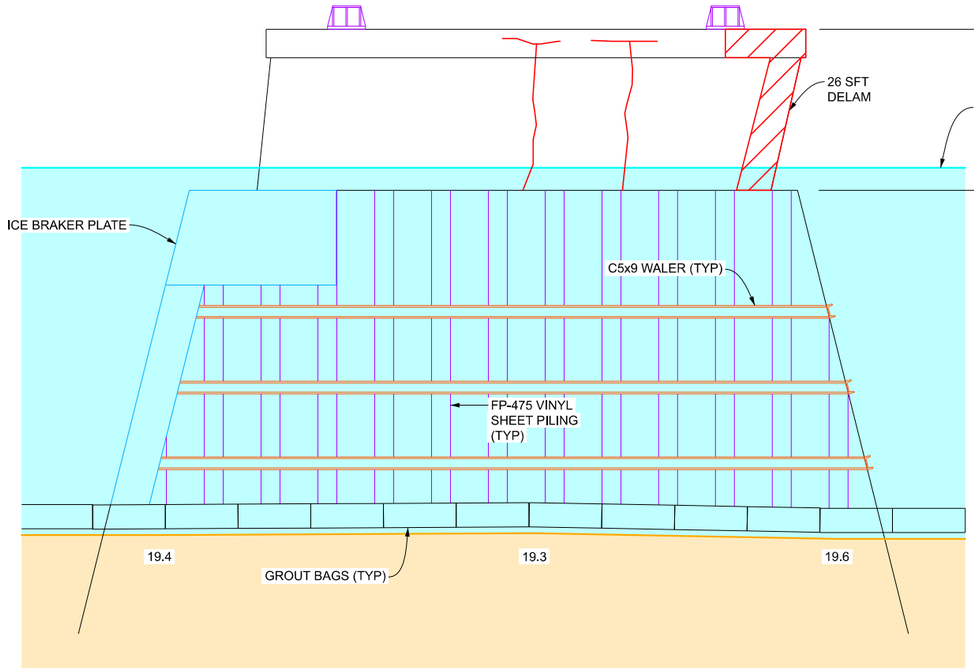
-00.0	SOUNDING DEPTH FROM WATER SURFACE TO RIVER BOTTOM.
	RIPRAP
	SHEET PILING
	VERTICAL EXPOSURE OF FOOTING
	VERTICAL EXPOSURE OF TREMIE
	VERTICAL UNDERMINING BELOW FOUNDATION
	TIMBER/DEBRIS PILE

WAYNE COUNTY ROADS DIVISION

GROSSE ILE PARKWAY OVER TRENTON CHANNEL
STRUCTURE NUMBER 12006
UNDERWATER BRIDGE INSPECTION
GROSSE ILE, MI

DRAWING: PIER SOUNDING ELEVATION	
STRUCTURE NO: 12006	GLEG JOB NO: 1020-2-704
DRAWN BY: JLS	DATE: 11/09/21
CHECKED BY: CJC	FILE: 704 uwpi.dgn

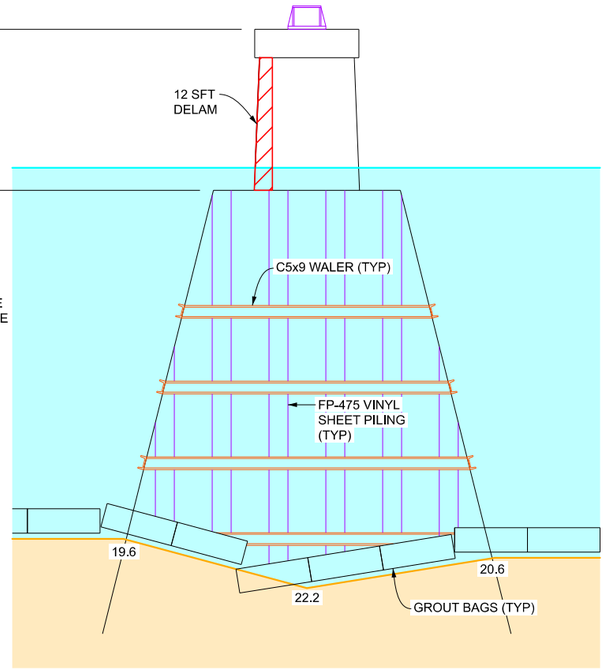
GREAT LAKES ENGINEERING GROUP, LLC



PIER 10W WEST ELEVATION

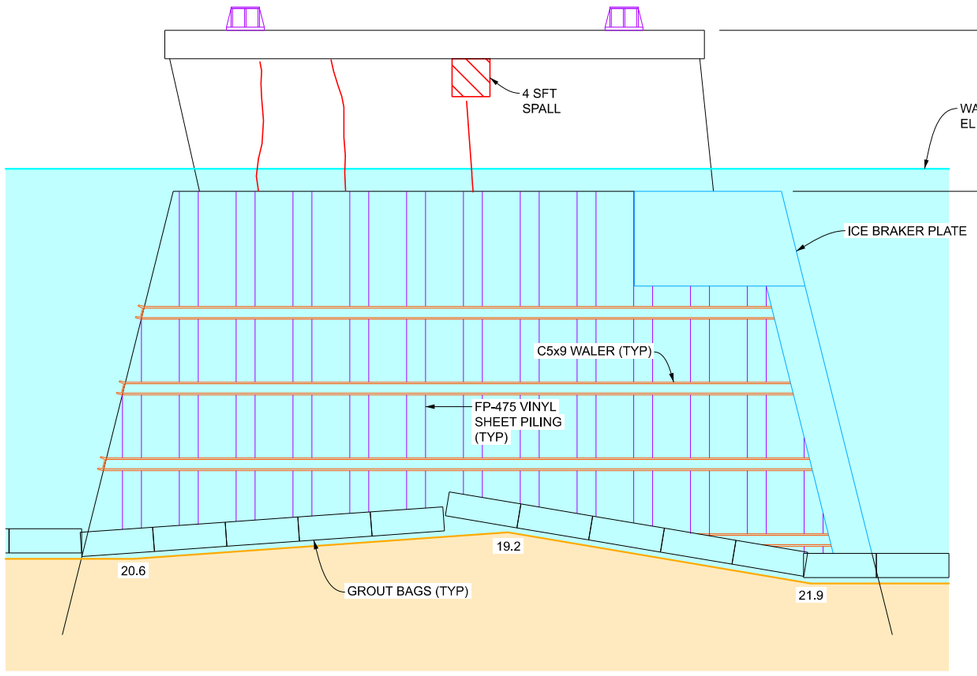
TRENTON CHANNEL

NOTE:
1/16" THICK ALGAE
ON ALL SUBSTRUCTURE
BELOW WATER SURFACE



PIER 10W SOUTH END

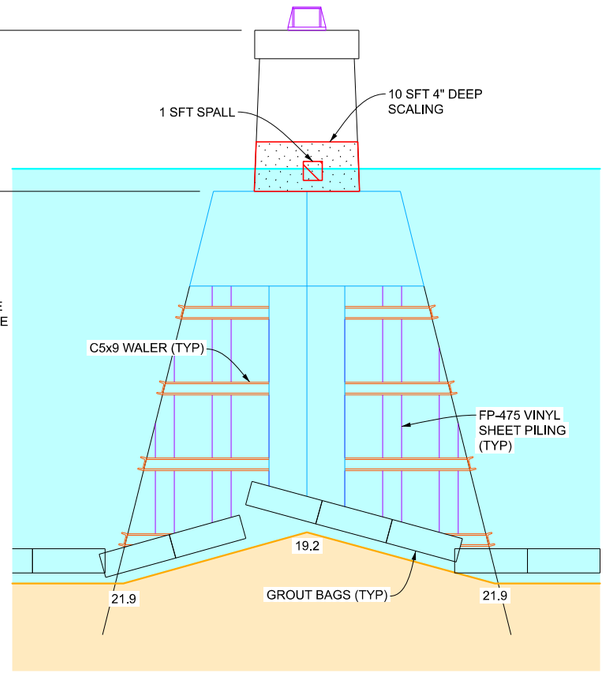
(DOWNSTREAM)



PIER 10W EAST ELEVATION

TRENTON CHANNEL

NOTE:
1/16" THICK ALGAE
ON ALL SUBSTRUCTURE
BELOW WATER SURFACE



PIER 10W NORTH END

(UPSTREAM)

NOTE:

WATER SURFACE ELEVATION AT THE TIME OF DIVE INSPECTION WAS 575.49 ON 11/09/21. BENCH MARK ELEVATION WAS 583.94 TAKEN AT LOW STEEL SPAN 1W.

LEGEND

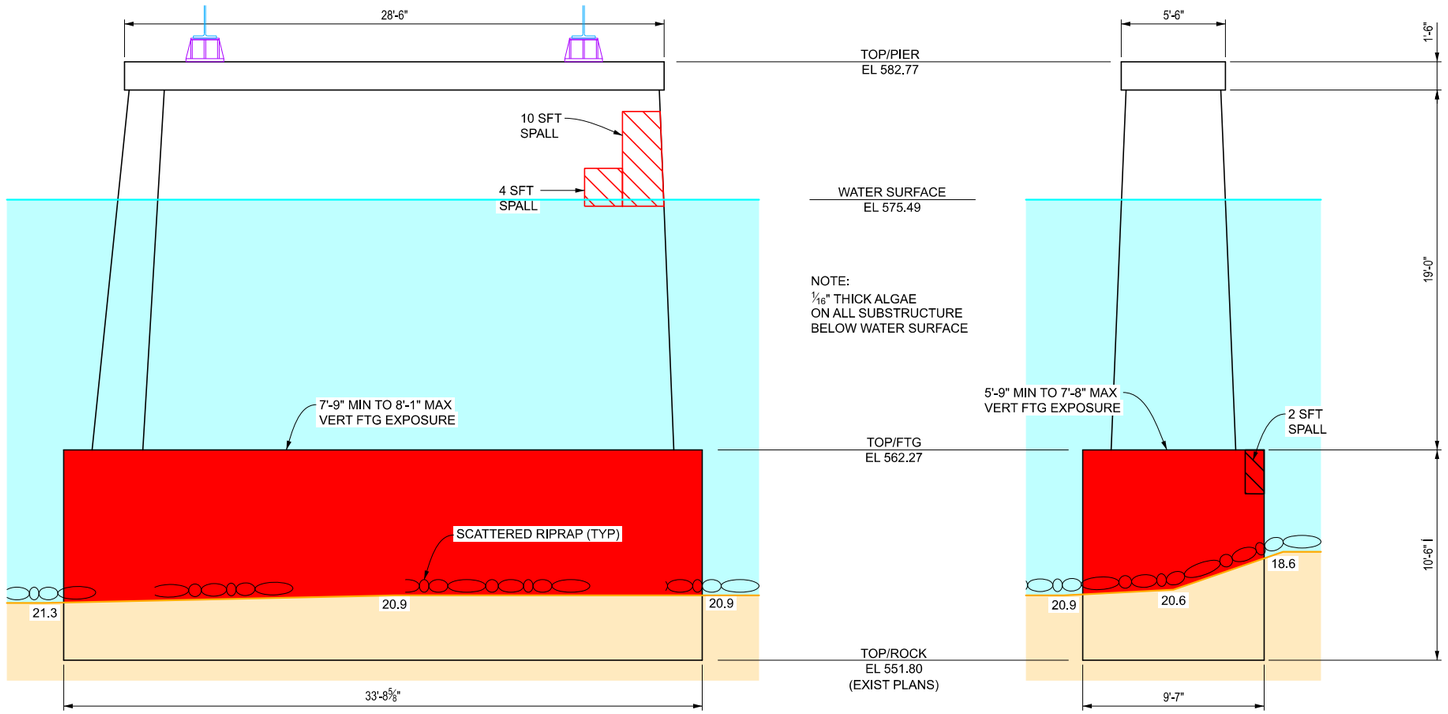
-00.0	SOUNDING DEPTH FROM WATER SURFACE TO RIVER BOTTOM.
	RIPRAP
	SHEET PILING
	VERTICAL EXPOSURE OF FOOTING
	VERTICAL EXPOSURE OF TREMIE
	VERTICAL UNDERMINING BELOW FOUNDATION
	TIMBER/DEBRIS PILE

WAYNE COUNTY ROADS DIVISION

GROSSE ILE PARKWAY OVER TRENTON CHANNEL
STRUCTURE NUMBER 12006
UNDERWATER BRIDGE INSPECTION
GROSSE ILE, MI

DRAWING: PIER SOUNDING ELEVATION	
STRUCTURE NO: 12006	GLEG JOB NO: 1020-2-704
DRAWN BY: JLS	DATE: 11/09/21
CHECKED BY: CJC	FILE: 704 uwpi.dgn

GREAT LAKES ENGINEERING GROUP, LLC

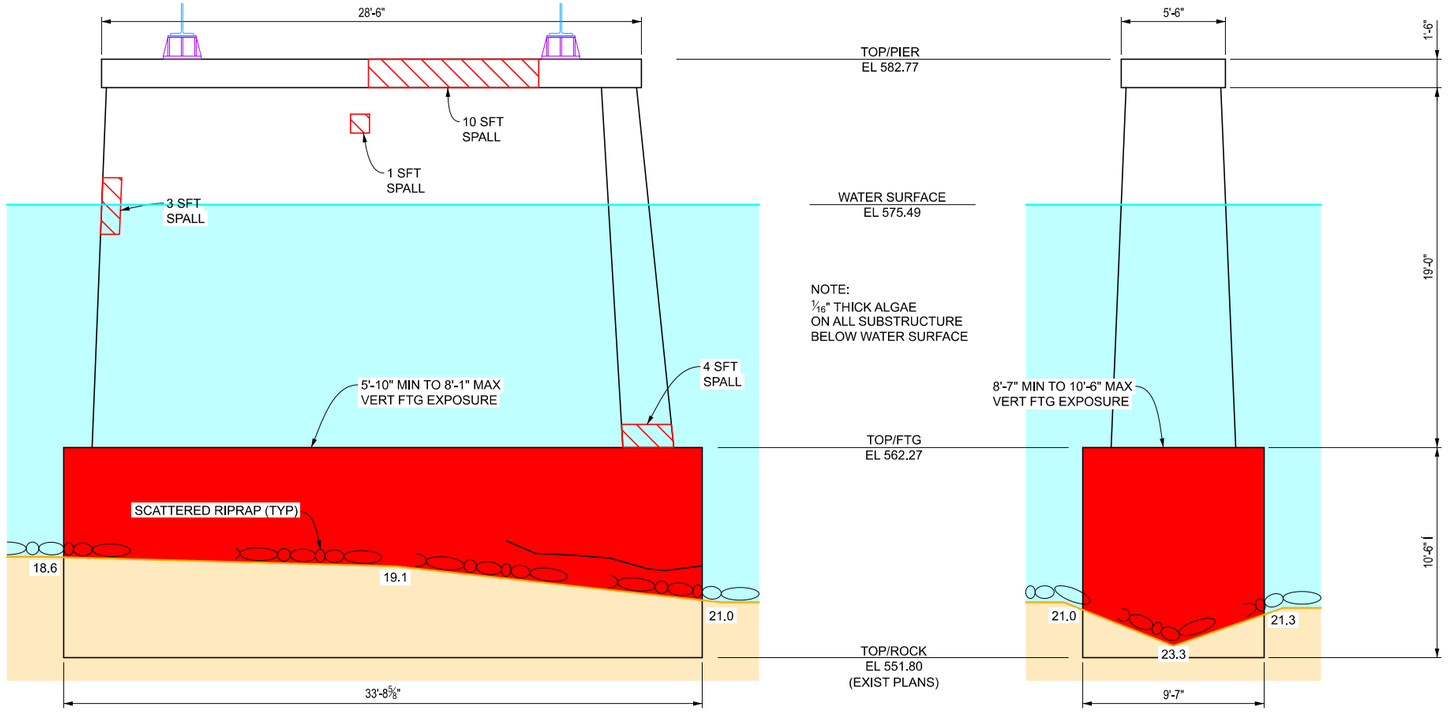


PIER 11W WEST ELEVATION

TRENTON CHANNEL

PIER 11W SOUTH END

(DOWNSTREAM)



PIER 11W EAST ELEVATION

TRENTON CHANNEL

PIER 11W NORTH END

(UPSTREAM)

NOTE:

WATER SURFACE ELEVATION AT THE TIME OF DIVE INSPECTION WAS 575.49 ON 11/09/21. BENCH MARK ELEVATION WAS 583.94 TAKEN AT LOW STEEL SPAN 1W.

LEGEND

-00.0	SOUNDING DEPTH FROM WATER SURFACE TO RIVER BOTTOM.
	RIPRAP
	SHEET PILING
	VERTICAL EXPOSURE OF FOOTING
	VERTICAL EXPOSURE OF TREMIE
	VERTICAL UNDERMINING BELOW FOUNDATION
	TIMBER/DEBRIS PILE

WAYNE COUNTY ROADS DIVISION

GROSSE ILE PARKWAY OVER TRENTON CHANNEL
STRUCTURE NUMBER 12006
UNDERWATER BRIDGE INSPECTION
GROSSE ILE, MI

DRAWING: PIER SOUNDING ELEVATION	
STRUCTURE NO: 12006	GLEG JOB NO: 1020-2-704
DRAWN BY: JLS	DATE: 11/09/21
CHECKED BY: CJC	FILE: 704 uwpi.dgn

GREAT LAKES ENGINEERING GROUP, LLC

BRIDGE CROSS-SECTIONS

DATE: 11/9/2021
STRUCTURE NO.: 12006
CONTROL SECTION: N/A
ROUTE: Grosse Ile Parkway
WATERCOURSE: Trenton Channel

CURRENT CROSS SECTION

UPSTREAM FACE

BENCHMARK ELEVATION: 583.94
DESCRIPTION OF BENCHMARK: Low steel, span 1w

UNDERCLEARANCE ELEVATION:
TOP OF ROAD ELEVATION:
WATER SURFACE ELEVATION: 575.49

DATE: 11/9/2021
REFERENCE ELEVATION: 575.49

STATION	READING	ELEVATION	DESCRIPTION
0.0	-2.0	577.5	East abutment
2.0	0.0	575.5	East edge of water
25.0	1.9	573.6	Span 12W, 1/4 pt
50.0	17.2	558.3	Span 12W, 1/2 pt
74.9	19.1	556.4	Span 12W, 3/4 pt
99.9	22.9	552.6	Pier 11W
125.1	19.8	555.7	Span 11W, 1/4 pt
150.3	20.5	555.0	Span 11W, 1/2 pt
175.4	21.8	553.7	Span 11W, 3/4 pt
200.6	24.8	550.7	Pier 10W
239.0	21.7	553.8	Span 10W, 1/4 pt
277.4	20.2	555.3	Span 10W, 1/2 pt
315.9	21.7	553.8	Span 10W, 3/4 pt
354.3	20.7	554.8	Pier 9W, east side
389.6	20.8	554.7	Pier 9W, west side
428.0	26.2	549.3	Span 9W, 1/4 pt
466.5	27.6	547.9	Span 9W, 1/2 pt
504.9	27.2	548.3	Span 9W, 3/4 pt
543.3	23.2	552.3	Pier 8W
568.5	20.3	555.2	Span 8W, 1/4 pt
593.6	18.7	556.8	Span 8W, 1/2 pt
618.8	21.4	554.1	Span 8W, 3/4 pt
644.0	24.0	551.5	Pier 7W
669.0	18.2	557.3	Span 7W, 1/4 pt
694.1	20.2	555.3	Span 7W, 1/2 pt
719.2	19.8	555.7	Span 7W, 3/4 pt
744.2	22.2	553.3	Pier 6W
769.3	20.3	555.2	Span 6W, 1/4 pt
794.3	20.8	554.7	Span 6W, 1/2 pt
819.4	20.3	555.2	Span 6W, 3/4 pt
844.5	23.5	552.0	Pier 5W
869.6	21.3	554.2	Span 5W, 1/4 pt
894.6	20.3	555.2	Span 5W, 1/2 pt
919.7	20.3	555.2	Span 5W, 3/4 pt
944.8	23.8	551.7	Pier 4W
969.8	22.3	553.2	Span 4W, 1/4 pt
994.9	19.7	555.8	Span 4W, 1/2 pt
1019.9	18.3	557.2	Span 4W, 3/4 pt
1045.0	19.6	555.9	Pier 3W
1070.1	15.9	559.6	Span 3W, 1/4 pt
1095.1	19.2	556.3	Span 3W, 1/2 pt
1120.2	18.7	556.8	Span 3W, 3/4 pt
1145.3	20.6	554.9	Pier 2W
1170.3	21.3	554.2	Span 2W, 1/4 pt
1195.4	20.7	554.8	Span 2W, 1/2 pt
1220.4	19.2	556.3	Span 2W, 3/4 pt
1245.5	16.8	558.7	Pier 1W
1270.5	13.0	562.5	Span 1W, 1/4 pt
1295.5	8.1	567.4	Span 1W, 1/2 pt
1320.6	6.2	569.3	Span 1W, 3/4 pt
1340.0	0.0	575.5	West edge of water
1345.8	-2.0	577.5	West abutment

PREVIOUS CROSS SECTION

UPSTREAM FACE

BENCHMARK ELEVATION: 583.94
DESCRIPTION OF BENCHMARK: Low steel, span 1w

UNDERCLEARANCE ELEVATION:
TOP OF ROAD ELEVATION:
WATER SURFACE ELEVATION: 575.1

DATE: 11/4/2020
REFERENCE ELEVATION: 575.1

STATION	READING	ELEVATION	DESCRIPTION
0.0	-2.0	577.1	East abutment
2.0	0.0	575.1	East edge of water
25.0	8.8	566.3	Span 12W, 1/4 pt
50.0	16.7	558.4	Span 12W, 1/2 pt
74.9	19.8	555.3	Span 12W, 3/4 pt
99.9	21.3	553.8	Pier 11W
125.1	21.8	553.3	Span 11W, 1/4 pt
150.3	22.0	553.1	Span 11W, 1/2 pt
175.4	22.5	552.6	Span 11W, 3/4 pt
200.6	22.0	553.1	Pier 10W
239.0	20.9	554.2	Span 10W, 1/4 pt
277.4	20.0	555.1	Span 10W, 1/2 pt
315.9	20.9	554.2	Span 10W, 3/4 pt
354.3	20.7	554.4	Pier 9W, east side
389.6	20.8	554.3	Pier 9W, west side
428.0	27.6	547.5	Span 9W, 1/4 pt
466.5	27.9	547.2	Span 9W, 1/2 pt
504.9	28.0	547.1	Span 9W, 3/4 pt
543.3	21.0	554.1	Pier 8W
568.5	20.2	554.9	Span 8W, 1/4 pt
593.6	20.7	554.4	Span 8W, 1/2 pt
618.8	21.6	553.5	Span 8W, 3/4 pt
644.0	22.0	553.1	Pier 7W
669.0	20.6	554.5	Span 7W, 1/4 pt
694.1	20.8	554.3	Span 7W, 1/2 pt
719.2	19.7	555.4	Span 7W, 3/4 pt
744.2	20.5	554.6	Pier 6W
769.3	21.0	554.1	Span 6W, 1/4 pt
794.3	21.4	553.7	Span 6W, 1/2 pt
819.4	21.0	554.1	Span 6W, 3/4 pt
844.5	21.7	553.4	Pier 5W
869.6	21.7	553.4	Span 5W, 1/4 pt
894.6	21.5	553.6	Span 5W, 1/2 pt
919.7	21.6	553.5	Span 5W, 3/4 pt
944.8	22.0	553.1	Pier 4W
969.8	23.2	551.9	Span 4W, 1/4 pt
994.9	19.8	555.3	Span 4W, 1/2 pt
1019.9	19.0	556.1	Span 4W, 3/4 pt
1045.0	18.3	556.8	Pier 3W
1070.1	18.8	556.3	Span 3W, 1/4 pt
1095.1	19.7	555.4	Span 3W, 1/2 pt
1120.2	18.5	556.6	Span 3W, 3/4 pt
1145.3	17.5	557.6	Pier 2W
1170.3	21.5	553.6	Span 2W, 1/4 pt
1195.4	21.2	553.9	Span 2W, 1/2 pt
1220.4	21.2	553.9	Span 2W, 3/4 pt
1245.5	13.5	561.6	Pier 1W
1270.5	8.2	566.9	Span 1W, 1/4 pt
1295.5	6.9	568.2	Span 1W, 1/2 pt
1320.6	5.6	569.5	Span 1W, 3/4 pt
1340.0	0.0	575.1	West edge of water
1345.8	-2.0	577.1	West abutment

PREVIOUS CROSS SECTION

UPSTREAM FACE

BENCHMARK ELEVATION: 583.94
DESCRIPTION OF BENCHMARK: Low steel, span 1w

UNDERCLEARANCE ELEVATION:
TOP OF ROAD ELEVATION:
WATER SURFACE ELEVATION: 576.4

DATE: 6/30/2020
REFERENCE ELEVATION: 576.4

STATION	READING	ELEVATION	DESCRIPTION
0.0	-2.0	578.4	East abutment
2.0	0.0	576.4	East edge of water
25.0	10.8	565.6	Span 12W, 1/4 pt
50.0	17.0	559.4	Span 12W, 1/2 pt
74.9	20.0	556.4	Span 12W, 3/4 pt
99.9	22.6	553.8	Pier 11W
125.1	21.6	554.8	Span 11W, 1/4 pt
150.3	22.7	553.7	Span 11W, 1/2 pt
175.4	23.2	553.2	Span 11W, 3/4 pt
200.6	23.0	553.4	Pier 10W
239.0	23.1	553.3	Span 10W, 1/4 pt
277.4	20.9	555.5	Span 10W, 1/2 pt
315.9	21.5	554.9	Span 10W, 3/4 pt
354.3	24.0	552.4	Pier 9W, east side
389.6	28.0	548.4	Pier 9W, west side
428.0	28.2	548.2	Span 9W, 1/4 pt
466.5	28.6	547.8	Span 9W, 1/2 pt
504.9	28.7	547.7	Span 9W, 3/4 pt
543.3	20.3	556.1	Pier 8W
568.5	22.3	554.1	Span 8W, 1/4 pt
593.6	20.6	555.8	Span 8W, 1/2 pt
618.8	22.4	554.0	Span 8W, 3/4 pt
644.0	23.2	553.2	Pier 7W
669.0	20.2	556.2	Span 7W, 1/4 pt
694.1	21.9	554.5	Span 7W, 1/2 pt
719.2	20.7	555.7	Span 7W, 3/4 pt
744.2	21.3	555.1	Pier 6W
769.3	22.0	554.4	Span 6W, 1/4 pt
794.3	22.5	553.9	Span 6W, 1/2 pt
819.4	22.1	554.3	Span 6W, 3/4 pt
844.5	22.6	553.8	Pier 5W
869.6	22.7	553.7	Span 5W, 1/4 pt
894.6	22.2	554.2	Span 5W, 1/2 pt
919.7	22.6	553.8	Span 5W, 3/4 pt
944.8	22.2	554.2	Pier 4W
969.8	23.8	552.6	Span 4W, 1/4 pt
994.9	24.3	552.1	Span 4W, 1/2 pt
1019.9	19.3	557.1	Span 4W, 3/4 pt
1045.0	20.5	555.9	Pier 3W
1070.1	18.7	557.7	Span 3W, 1/4 pt
1095.1	20.0	556.4	Span 3W, 1/2 pt
1120.2	21.5	554.9	Span 3W, 3/4 pt
1145.3	17.1	559.3	Pier 2W
1170.3	23.1	553.3	Span 2W, 1/4 pt
1195.4	22.3	554.1	Span 2W, 1/2 pt
1220.4	20.7	555.7	Span 2W, 3/4 pt
1245.5	16.0	560.4	Pier 1W
1270.5	9.5	566.9	Span 1W, 1/4 pt
1295.5	6.6	569.8	Span 1W, 1/2 pt
1320.6	3.9	572.5	Span 1W, 3/4 pt
1340.0	0.0	576.4	West edge of water
1345.8	-2.0	578.4	West abutment

PREVIOUS CROSS SECTION

UPSTREAM FACE

BENCHMARK ELEVATION: 582.77
DESCRIPTION OF BENCHMARK: Top of Pier 1w

UNDERCLEARANCE ELEVATION:
TOP OF ROAD ELEVATION:
WATER SURFACE ELEVATION: 574.8

DATE: 12/3/2019
REFERENCE ELEVATION: 574.8

STATION	READING	ELEVATION	DESCRIPTION
0.0	-2.5	577.3	East abutment
6.0	0.0	574.8	East edge of water
25.0	12.4	562.4	Span 12W, 1/4 pt
50.0	19.1	555.7	Span 12W, 1/2 pt
74.9	19.9	554.9	Span 12W, 3/4 pt
99.9	21.8	553.0	Pier 11W
125.1	22.0	552.8	Span 11W, 1/4 pt
150.3	22.7	552.1	Span 11W, 1/2 pt
175.4	23.1	551.7	Span 11W, 3/4 pt
200.6	23.7	551.1	Pier 10W
239.0	21.5	553.3	Span 10W, 1/4 pt
277.4	22.0	552.8	Span 10W, 1/2 pt
315.9	21.4	553.4	Span 10W, 3/4 pt
354.3	20.0	554.8	Pier 9W, east side
389.6	24.3	550.5	Pier 9W, west side
428.0	26.9	547.9	Span 9W, 1/4 pt
466.5	27.0	547.8	Span 9W, 1/2 pt
504.9	24.9	549.9	Span 9W, 3/4 pt
543.3	22.2	552.6	Pier 8W
568.5	20.6	554.2	Span 8W, 1/4 pt
593.6	21.9	552.9	Span 8W, 1/2 pt
618.8	21.9	552.9	Span 8W, 3/4 pt
644.0	22.3	552.5	Pier 7W
669.0	20.8	554.0	Span 7W, 1/4 pt
694.1	20.2	554.6	Span 7W, 1/2 pt
719.2	19.9	554.9	Span 7W, 3/4 pt
744.2	20.5	554.3	Pier 6W
769.3	20.9	553.9	Span 6W, 1/4 pt
794.3	21.0	553.8	Span 6W, 1/2 pt
819.4	20.9	553.9	Span 6W, 3/4 pt
844.5	21.8	553.0	Pier 5W
869.6	21.9	552.9	Span 5W, 1/4 pt
894.6	21.2	553.6	Span 5W, 1/2 pt
919.7	21.0	553.8	Span 5W, 3/4 pt
944.8	22.1	552.7	Pier 4W
969.8	23.8	551.0	Span 4W, 1/4 pt
994.9	21.3	553.5	Span 4W, 1/2 pt
1019.9	19.4	555.4	Span 4W, 3/4 pt
1045.0	17.9	556.9	Pier 3W
1070.1	18.9	555.9	Span 3W, 1/4 pt
1095.1	20.1	554.7	Span 3W, 1/2 pt
1120.2	20.0	554.8	Span 3W, 3/4 pt
1145.3	18.9	555.9	Pier 2W
1170.3	21.0	553.8	Span 2W, 1/4 pt
1195.4	20.7	554.1	Span 2W, 1/2 pt
1220.4	18.6	556.2	Span 2W, 3/4 pt
1245.5	15.1	559.7	Pier 1W
1270.5	9.7	565.1	Span 1W, 1/4 pt
1295.5	7.3	567.5	Span 1W, 1/2 pt
1320.6	4.1	570.7	Span 1W, 3/4 pt
1336.0	0.0	574.8	West edge of water
1345.8	-3.5	578.3	West abutment

BRIDGE CROSS-SECTIONS

DATE: 11/9/2021
STRUCTURE NO.: 12006
CONTROL SECTION: N/A
ROUTE: Grosse Ile Parkway
WATERCOURSE: Trenton Channel

CURRENT CROSS SECTION

DOWNSTREAM FACE

BENCHMARK ELEVATION: 583.94
DESCRIPTION OF BENCHMARK: Low steel, span 1w

UNDERCLEARANCE ELEVATION:
TOP OF ROAD ELEVATION:
WATER SURFACE ELEVATION: 575.49

DATE: 11/9/2021
REFERENCE ELEVATION: 575.49

STATION	READING	ELEVATION	DESCRIPTION
0.0	-2.0	577.5	East abutment
2.0	0.0	575.5	East edge of water
25.0	2.3	573.2	Span 12W, 1/4 pt
50.0	13.5	562.0	Span 12W, 1/2 pt
74.9	16.3	559.2	Span 12W, 3/4 pt
99.9	20.2	555.3	Pier 11W
125.1	20.1	555.4	Span 11W, 1/4 pt
150.3	20.4	555.1	Span 11W, 1/2 pt
175.4	20.3	555.2	Span 11W, 3/4 pt
200.6	21.8	553.7	Pier 10W
239.0	21.7	553.8	Span 10W, 1/4 pt
277.4	20.5	555.0	Span 10W, 1/2 pt
315.9	21.4	554.1	Span 10W, 3/4 pt
354.3	20.5	555.0	Pier 9W, east side
389.6	22.0	553.5	Pier 9W, west side
428.0	25.2	550.3	Span 9W, 1/4 pt
466.5	27.0	548.5	Span 9W, 1/2 pt
504.9	26.8	548.7	Span 9W, 3/4 pt
543.3	24.5	551.0	Pier 8W
568.5	22.3	553.2	Span 8W, 1/4 pt
593.6	21.0	554.5	Span 8W, 1/2 pt
618.8	22.3	553.2	Span 8W, 3/4 pt
644.0	22.5	553.0	Pier 7W
669.0	21.6	553.9	Span 7W, 1/4 pt
694.1	20.7	554.8	Span 7W, 1/2 pt
719.2	20.7	554.8	Span 7W, 3/4 pt
744.2	19.4	556.1	Pier 6W
769.3	18.9	556.6	Span 6W, 1/4 pt
794.3	19.2	556.3	Span 6W, 1/2 pt
819.4	19.8	555.7	Span 6W, 3/4 pt
844.5	20.8	554.7	Pier 5W
869.6	21.8	553.7	Span 5W, 1/4 pt
894.6	20.7	554.8	Span 5W, 1/2 pt
919.7	20.8	554.7	Span 5W, 3/4 pt
944.8	19.7	555.8	Pier 4W
969.8	21.9	553.6	Span 4W, 1/4 pt
994.9	19.6	555.9	Span 4W, 1/2 pt
1019.9	17.8	557.7	Span 4W, 3/4 pt
1045.0	18.1	557.4	Pier 3W
1070.1	16.5	559.0	Span 3W, 1/4 pt
1095.1	16.7	558.8	Span 3W, 1/2 pt
1120.2	17.2	558.3	Span 3W, 3/4 pt
1145.3	16.6	558.9	Pier 2W
1170.3	17.2	558.3	Span 2W, 1/4 pt
1195.4	18.2	557.3	Span 2W, 1/2 pt
1220.4	18.8	556.7	Span 2W, 3/4 pt
1245.5	18.3	557.2	Pier 1W
1270.5	14.5	561.0	Span 1W, 1/4 pt
1295.5	11.6	563.9	Span 1W, 1/2 pt
1320.6	3.2	572.3	Span 1W, 3/4 pt
1340.0	0.0	575.5	West edge of water
1345.8	-2.0	577.5	West abutment

PREVIOUS CROSS SECTION

DOWNSTREAM FACE

BENCHMARK ELEVATION: 583.94
DESCRIPTION OF BENCHMARK: Low steel, span 1w

UNDERCLEARANCE ELEVATION:
TOP OF ROAD ELEVATION:
WATER SURFACE ELEVATION: 575.14

DATE: 11/4/2020
REFERENCE ELEVATION: 575.14

STATION	READING	ELEVATION	DESCRIPTION
0.0	-2.0	577.1	East abutment
2.0	0.0	575.1	East edge of water
25.0	5.6	569.5	Span 12W, 1/4 pt
50.0	8.9	566.2	Span 12W, 1/2 pt
74.9	13.8	561.3	Span 12W, 3/4 pt
99.9	19.0	556.1	Pier 11W
125.1	19.7	555.4	Span 11W, 1/4 pt
150.3	20.5	554.6	Span 11W, 1/2 pt
175.4	21.0	554.1	Span 11W, 3/4 pt
200.6	19.7	555.4	Pier 10W
239.0	21.8	553.3	Span 10W, 1/4 pt
277.4	21.7	553.4	Span 10W, 1/2 pt
315.9	21.5	553.6	Span 10W, 3/4 pt
354.3	20.5	554.6	Pier 9W, east side
389.6	22.0	553.1	Pier 9W, west side
428.0	27.6	547.5	Span 9W, 1/4 pt
466.5	27.8	547.3	Span 9W, 1/2 pt
504.9	27.9	547.2	Span 9W, 3/4 pt
543.3	21.3	553.8	Pier 8W
568.5	23.2	551.9	Span 8W, 1/4 pt
593.6	21.5	553.6	Span 8W, 1/2 pt
618.8	23.6	551.5	Span 8W, 3/4 pt
644.0	20.7	554.4	Pier 7W
669.0	21.8	553.3	Span 7W, 1/4 pt
694.1	21.9	553.2	Span 7W, 1/2 pt
719.2	21.7	553.4	Span 7W, 3/4 pt
744.2	17.5	557.6	Pier 6W
769.3	20.2	554.9	Span 6W, 1/4 pt
794.3	20.7	554.4	Span 6W, 1/2 pt
819.4	21.6	553.5	Span 6W, 3/4 pt
844.5	18.5	556.6	Pier 5W
869.6	23.7	551.4	Span 5W, 1/4 pt
894.6	22.5	552.6	Span 5W, 1/2 pt
919.7	21.8	553.3	Span 5W, 3/4 pt
944.8	20.0	555.1	Pier 4W
969.8	21.7	553.4	Span 4W, 1/4 pt
994.9	19.7	555.4	Span 4W, 1/2 pt
1019.9	16.6	558.5	Span 4W, 3/4 pt
1045.0	15.5	559.6	Pier 3W
1070.1	17.4	557.7	Span 3W, 1/4 pt
1095.1	17.2	557.9	Span 3W, 1/2 pt
1120.2	18.6	556.5	Span 3W, 3/4 pt
1145.3	17.8	557.3	Pier 2W
1170.3	19.8	555.3	Span 2W, 1/4 pt
1195.4	18.7	556.4	Span 2W, 1/2 pt
1220.4	19.2	555.9	Span 2W, 3/4 pt
1245.5	16.9	558.2	Pier 1W
1270.5	15.3	559.8	Span 1W, 1/4 pt
1295.5	11.3	563.8	Span 1W, 1/2 pt
1320.6	6.6	568.5	Span 1W, 3/4 pt
1340.0	0.0	575.1	West edge of water
1345.8	-2.0	577.1	West abutment

PREVIOUS CROSS SECTION

DOWNSTREAM FACE

BENCHMARK ELEVATION: 583.94
DESCRIPTION OF BENCHMARK: Low steel, span 1w

UNDERCLEARANCE ELEVATION:
TOP OF ROAD ELEVATION:
WATER SURFACE ELEVATION: 576.44

DATE: 6/30/2020
REFERENCE ELEVATION: 576.44

STATION	READING	ELEVATION	DESCRIPTION
0.0	-2.0	578.4	East abutment
2.0	0.0	576.4	East edge of water
25.0	4.6	571.8	Span 12W, 1/4 pt
50.0	13.6	562.8	Span 12W, 1/2 pt
74.9	17.2	559.2	Span 12W, 3/4 pt
99.9	18.5	557.9	Pier 11W
125.1	21.2	555.2	Span 11W, 1/4 pt
150.3	22.7	553.7	Span 11W, 1/2 pt
175.4	21.5	554.9	Span 11W, 3/4 pt
200.6	21.2	555.2	Pier 10W
239.0	22.9	553.5	Span 10W, 1/4 pt
277.4	22.5	553.9	Span 10W, 1/2 pt
315.9	22.4	554.0	Span 10W, 3/4 pt
354.3	20.7	555.7	Pier 9W, east side
389.6	19.2	557.2	Pier 9W, west side
428.0	27.0	549.4	Span 9W, 1/4 pt
466.5	27.6	548.8	Span 9W, 1/2 pt
504.9	28.2	548.2	Span 9W, 3/4 pt
543.3	20.0	556.4	Pier 8W
568.5	24.1	552.3	Span 8W, 1/4 pt
593.6	21.7	554.7	Span 8W, 1/2 pt
618.8	22.5	553.9	Span 8W, 3/4 pt
644.0	21.8	554.6	Pier 7W
669.0	23.1	553.3	Span 7W, 1/4 pt
694.1	22.2	554.2	Span 7W, 1/2 pt
719.2	22.2	554.2	Span 7W, 3/4 pt
744.2	19.5	556.9	Pier 6W
769.3	20.0	556.4	Span 6W, 1/4 pt
794.3	20.6	555.8	Span 6W, 1/2 pt
819.4	21.4	555.0	Span 6W, 3/4 pt
844.5	21.0	555.4	Pier 5W
869.6	23.4	553.0	Span 5W, 1/4 pt
894.6	24.1	552.3	Span 5W, 1/2 pt
919.7	22.8	553.6	Span 5W, 3/4 pt
944.8	18.3	558.1	Pier 4W
969.8	23.0	553.4	Span 4W, 1/4 pt
994.9	21.7	554.7	Span 4W, 1/2 pt
1019.9	19.2	557.2	Span 4W, 3/4 pt
1045.0	18.1	558.3	Pier 3W
1070.1	17.6	558.8	Span 3W, 1/4 pt
1095.1	17.7	558.7	Span 3W, 1/2 pt
1120.2	18.2	558.2	Span 3W, 3/4 pt
1145.3	16.4	560.0	Pier 2W
1170.3	18.6	557.8	Span 2W, 1/4 pt
1195.4	19.7	556.7	Span 2W, 1/2 pt
1220.4	19.6	556.8	Span 2W, 3/4 pt
1245.5	18.5	557.9	Pier 1W
1270.5	17.0	559.4	Span 1W, 1/4 pt
1295.5	13.0	563.4	Span 1W, 1/2 pt
1320.6	5.0	571.4	Span 1W, 3/4 pt
1340.0	0.0	576.4	West edge of water
1345.8	-2.0	578.4	West abutment

PREVIOUS CROSS SECTION

DOWNSTREAM FACE

BENCHMARK ELEVATION: 582.77
DESCRIPTION OF BENCHMARK: Top of Pier 1w

UNDERCLEARANCE ELEVATION:
TOP OF ROAD ELEVATION:
WATER SURFACE ELEVATION: 574.77

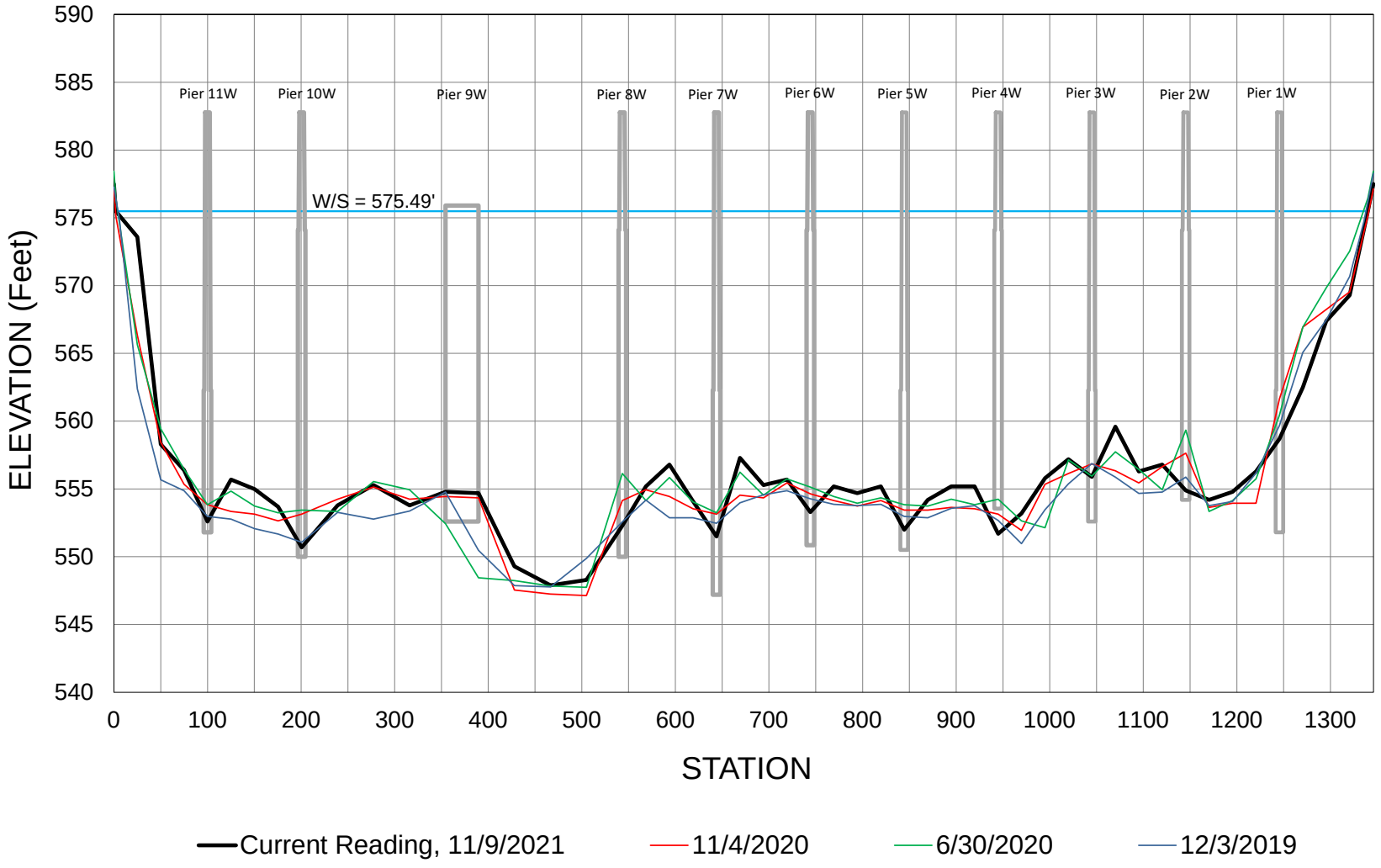
DATE: 12/3/2019
REFERENCE ELEVATION: 574.77

STATION	READING	ELEVATION	DESCRIPTION
0.0	-2.0	576.8	East abutment
6.0	0.0	574.8	East edge of water
25.0	5.7	569.1	Span 12W, 1/4 pt
50.0	9.5	565.3	Span 12W, 1/2 pt
74.9	15.5	559.3	Span 12W, 3/4 pt
99.9	19.1	555.7	Pier 11W
125.1	19.8	555.0	Span 11W, 1/4 pt
150.3	20.9	553.9	Span 11W, 1/2 pt
175.4	21.8	553.0	Span 11W, 3/4 pt
200.6	20.7	554.1	Pier 10W
239.0	22.7	552.1	Span 10W, 1/4 pt
277.4	22.1	552.7	Span 10W, 1/2 pt
315.9	20.9	553.9	Span 10W, 3/4 pt
354.3	20.0	554.8	Pier 9W, east side
389.6	17.9	556.9	Pier 9W, west side
428.0	26.7	548.1	Span 9W, 1/4 pt
466.5	26.9	547.9	Span 9W, 1/2 pt
504.9	26.7	548.1	Span 9W, 3/4 pt
543.3	22.8	552.0	Pier 8W
568.5	22.3	552.5	Span 8W, 1/4 pt
593.6	20.9	553.9	Span 8W, 1/2 pt
618.8	22.1	552.7	Span 8W, 3/4 pt
644.0	20.8	554.0	Pier 7W
669.0	20.9	553.9	Span 7W, 1/4 pt
694.1	21.9	552.9	Span 7W, 1/2 pt
719.2	21.1	553.7	Span 7W, 3/4 pt
744.2	17.7	557.1	Pier 6W
769.3	18.7	556.1	Span 6W, 1/4 pt
794.3	18.9	555.9	Span 6W, 1/2 pt
819.4	20.3	554.5	Span 6W, 3/4 pt
844.5	19.1	555.7	Pier 5W
869.6	22.7	552.1	Span 5W, 1/4 pt
894.6	22.4	552.4	Span 5W, 1/2 pt
919.7	22.0	552.8	Span 5W, 3/4 pt
944.8	18.0	556.8	Pier 4W
969.8	21.2	553.6	Span 4W, 1/4 pt
994.9	20.8	554.0	Span 4W, 1/2 pt
1019.9	18.8	556.0	Span 4W, 3/4 pt
1045.0	16.4	558.4	Pier 3W
1070.1	16.2	558.6	Span 3W, 1/4 pt
1095.1	16.7	558.1	Span 3W, 1/2 pt
1120.2	17.1	557.7	Span 3W, 3/4 pt
1145.3	14.9	559.9	Pier 2W
1170.3	18.0	556.8	Span 2W, 1/4 pt
1195.4	19.1	555.7	Span 2W, 1/2 pt
1220.4	18.1	556.7	Span 2W, 3/4 pt
1245.5	17.9	556.9	Pier 1W
1270.5	14.7	560.1	Span 1W, 1/4 pt
1295.5	9.9	564.9	Span 1W, 1/2 pt
1320.6	5.1	569.7	Span 1W, 3/4 pt
1333.0	0.0	574.8	West edge of water
1345.8	-3.5	578.3	West abutment

Grosse Ile Pkwy over Trenton Channel
STR: 12006
11/9/2021
Wayne County

UPSTREAM FACE

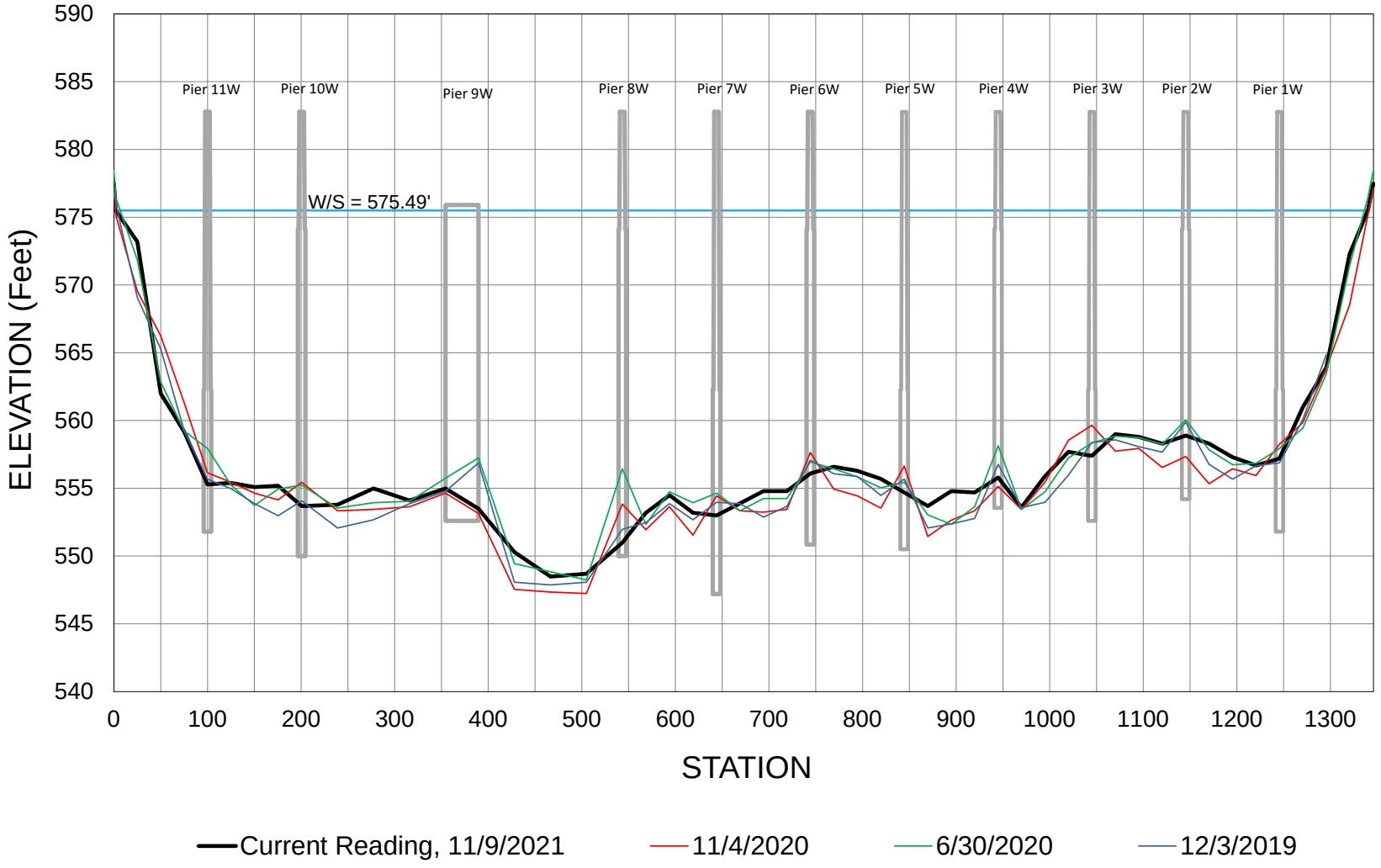
(looking downstream)



Grosse Ile Pkwy over Trenton Channel
STR: 12006
11/9/2021
Wayne County

DOWNSTREAM FACE

(looking downstream)



South elevation of bridge

South elevation of bridge

North elevation of bridge

North elevation of bridge

South channel

North channel

Pier 1w, west elevation

Pier 1w, east elevation

Pier 2w, west elevation

Pier 2w, east elevation

Pier 2w, steel ice breaker at channel bottom, typical

Pier 2w, vinyl sheeting and steel waler, typical

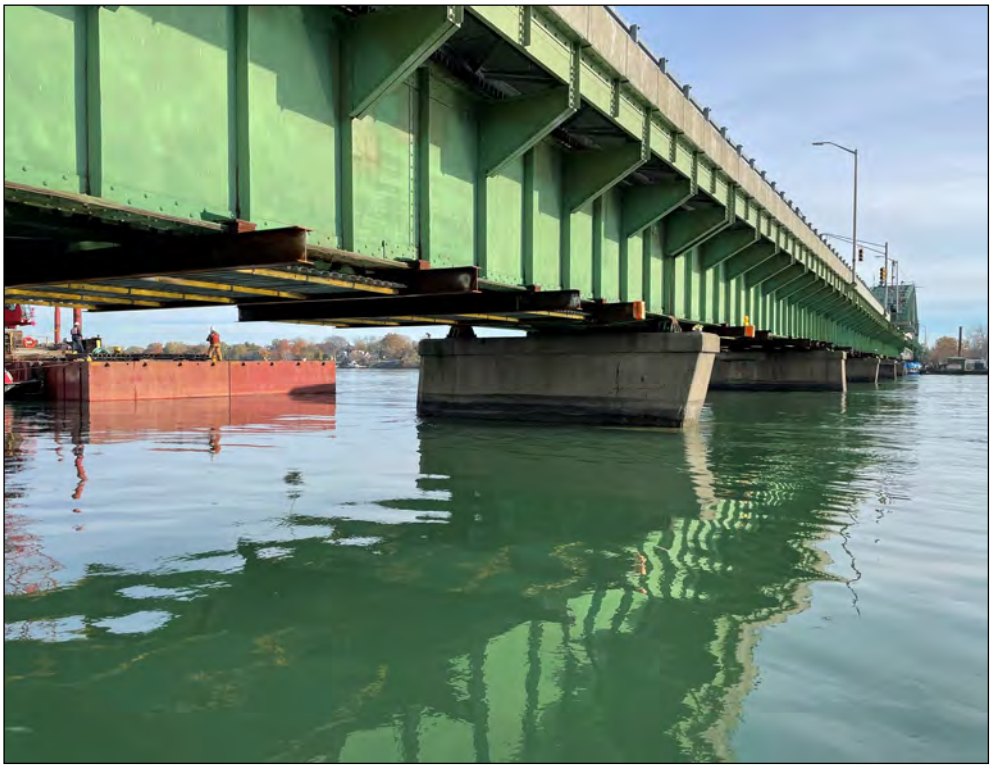
Pier 3w, west elevation

Pier 3w, east elevation

Pier 3w, horizontal crack in footing, typical west and east elevations

Pier 3w, typical condition of exposed footing

Pier 4w, west elevation



Pier 4w, east elevation

Pier 4w, vinyl sheeting at channel bottom, typical

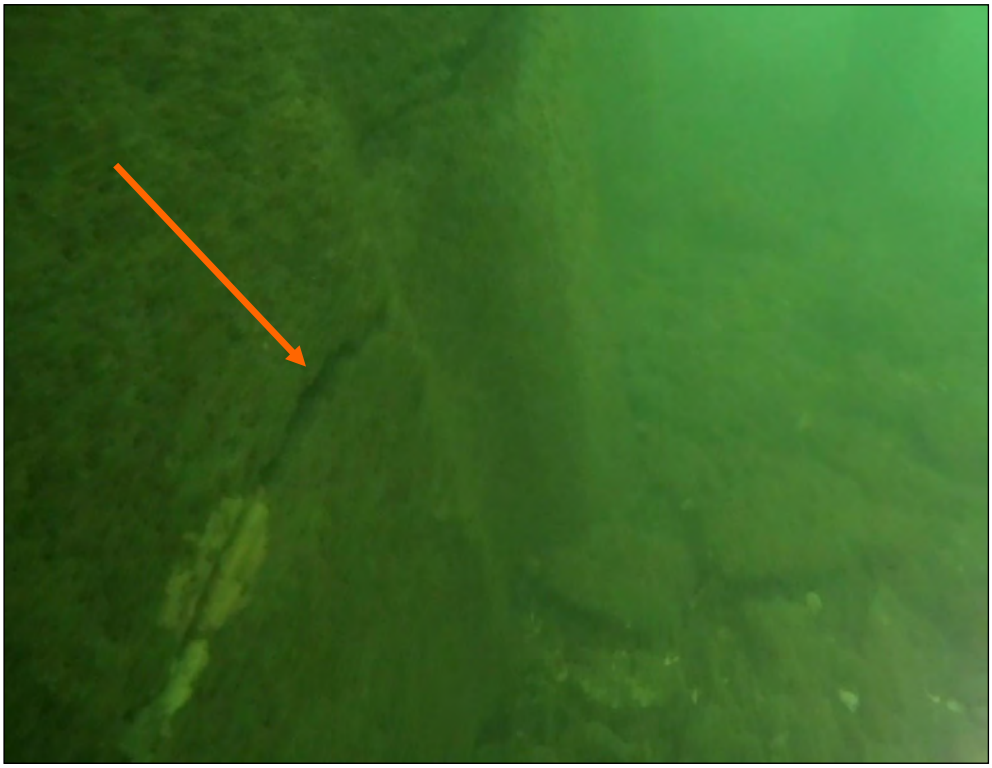
Pier 4w, vinyl sheeting and grout bags at channel bottom, typical

Pier 5w, west elevation

Pier 5w, east elevation

Pier 5w, open crack in footing, typical west and east elevations

Pier 5w, open crack in footing, typical west and east elevations



Pier 6w, west elevation

Pier 6w, east elevation

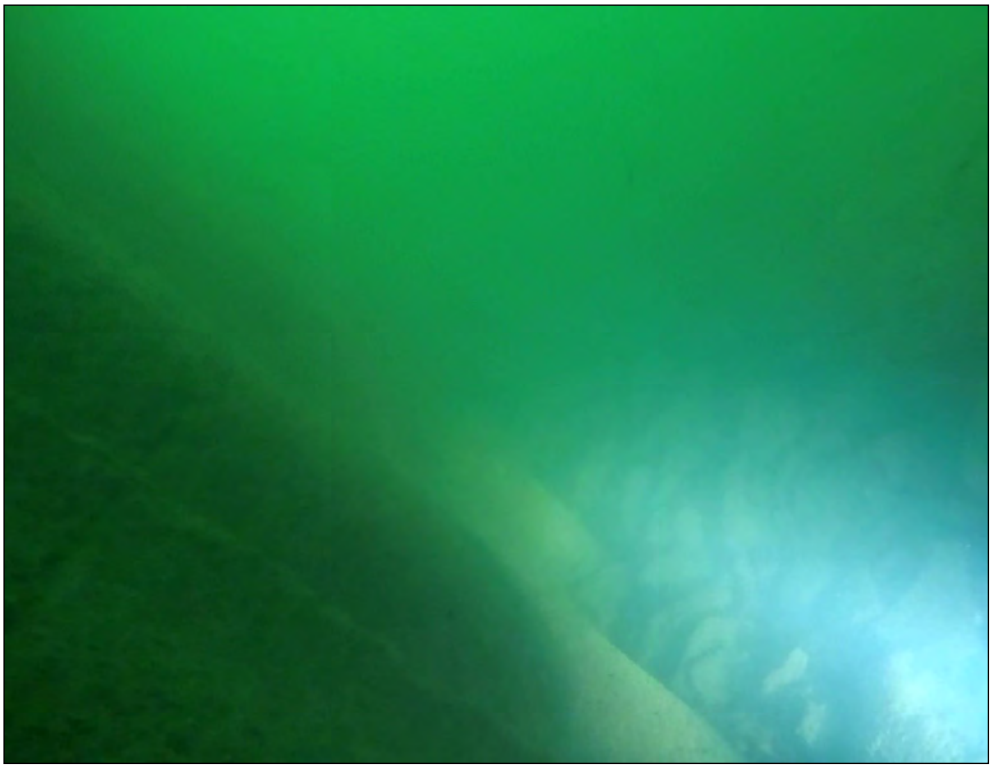
Pier 6w, grout bags and vinyl sheeting at channel bottom, typical

Pier 6w, corner of vinyl sheeting, steel walers and grout bags at channel bottom, typical

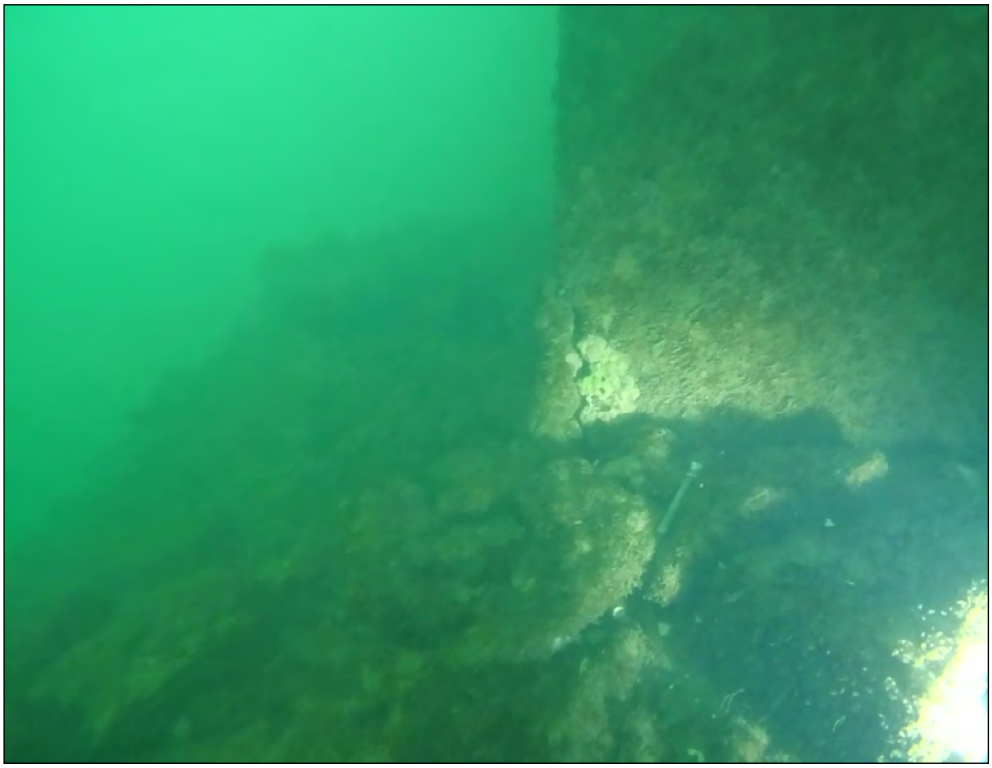
Pier 7w, west elevation

Pier 7w, east elevation

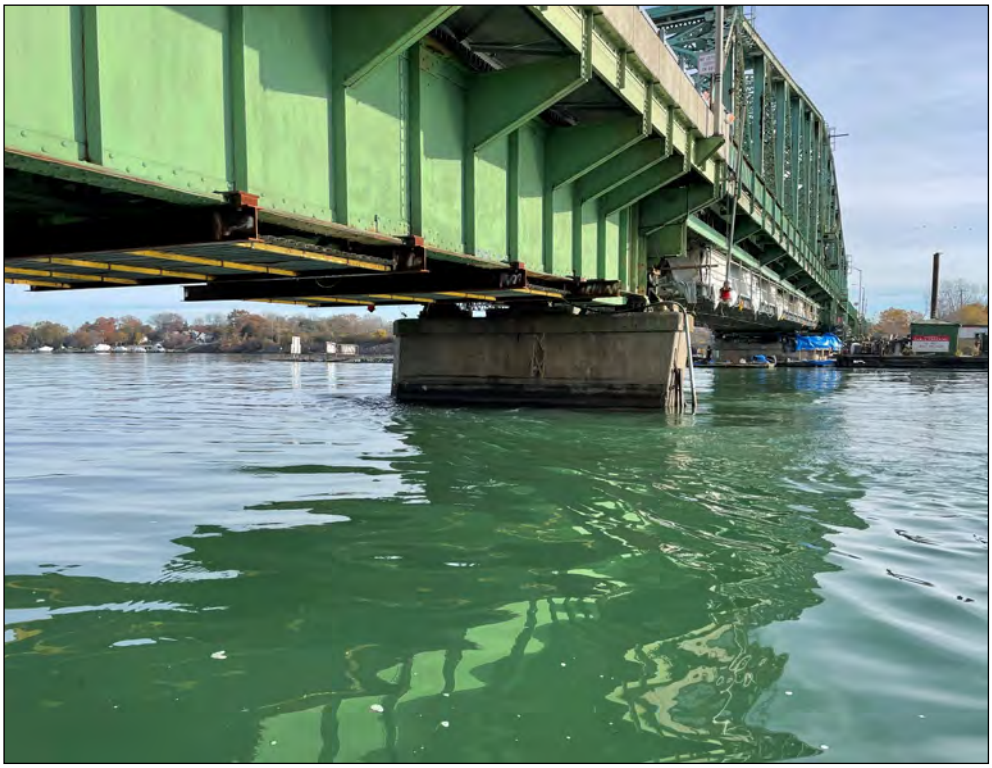
Pier 7w, footing exposure at upstream nose, typical



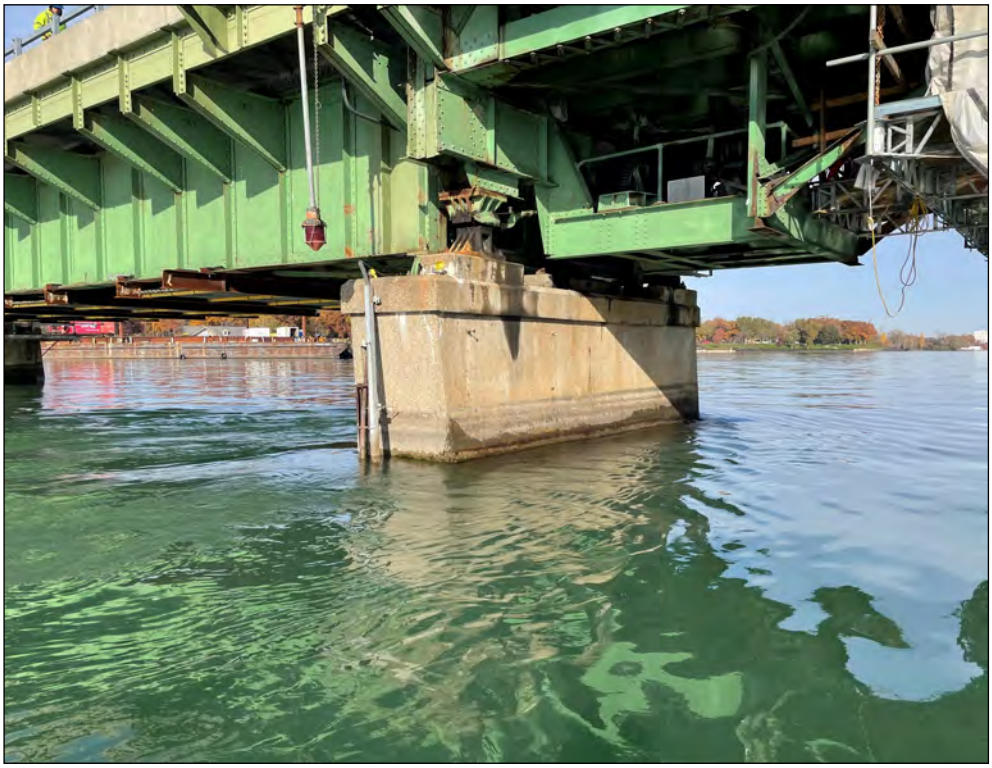
Pier 7w, pier stem wall and footing interface, typical



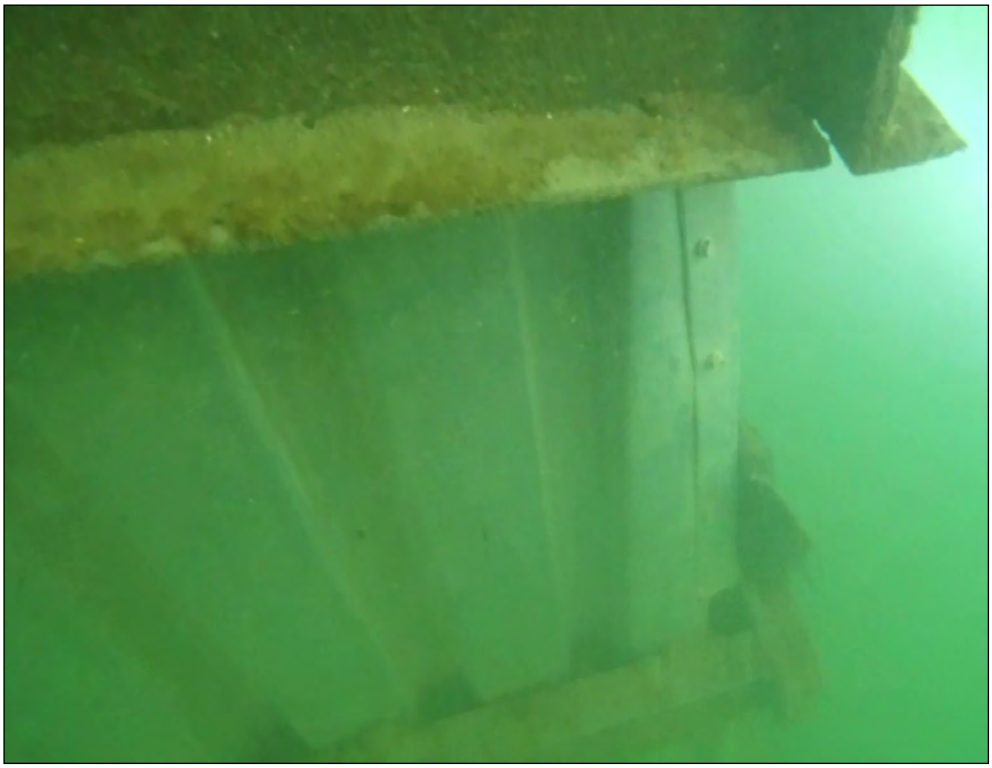
Pier 8w, west elevation



Pier 8w, east elevation

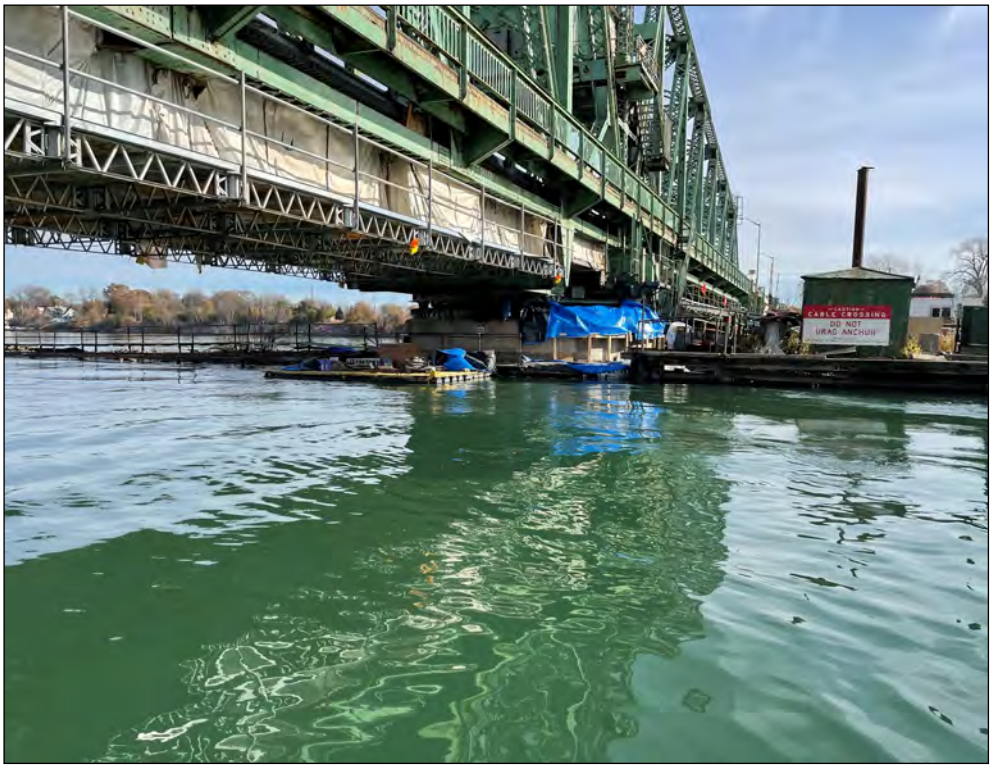


Pier 8w, steel sheeting and steel walers, typical

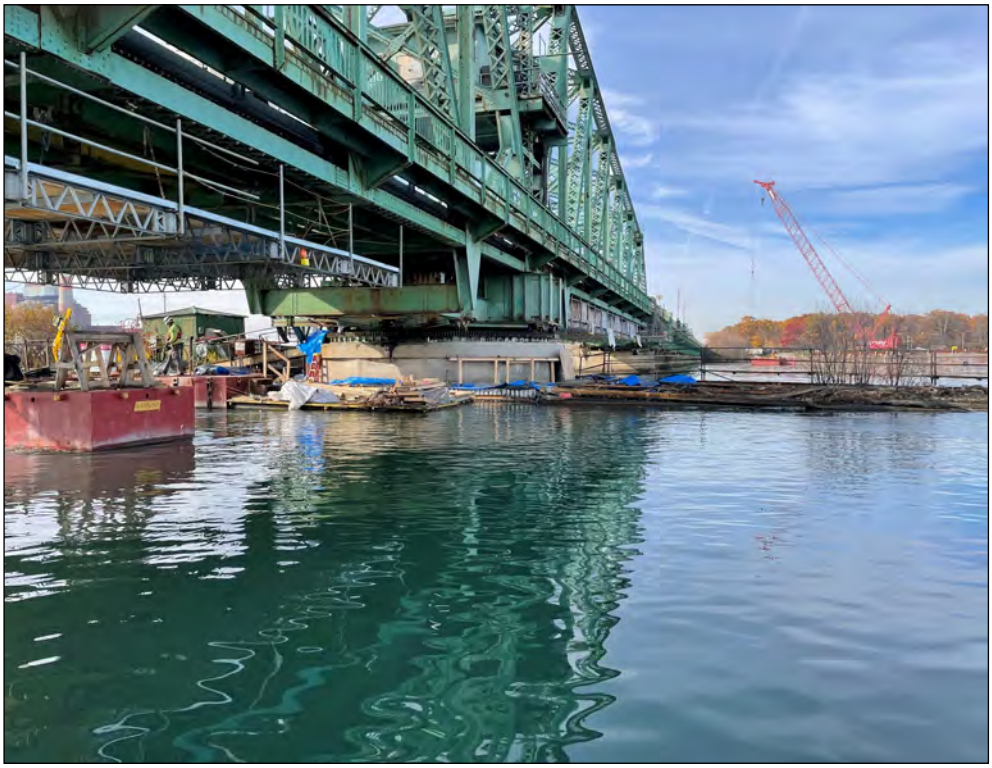


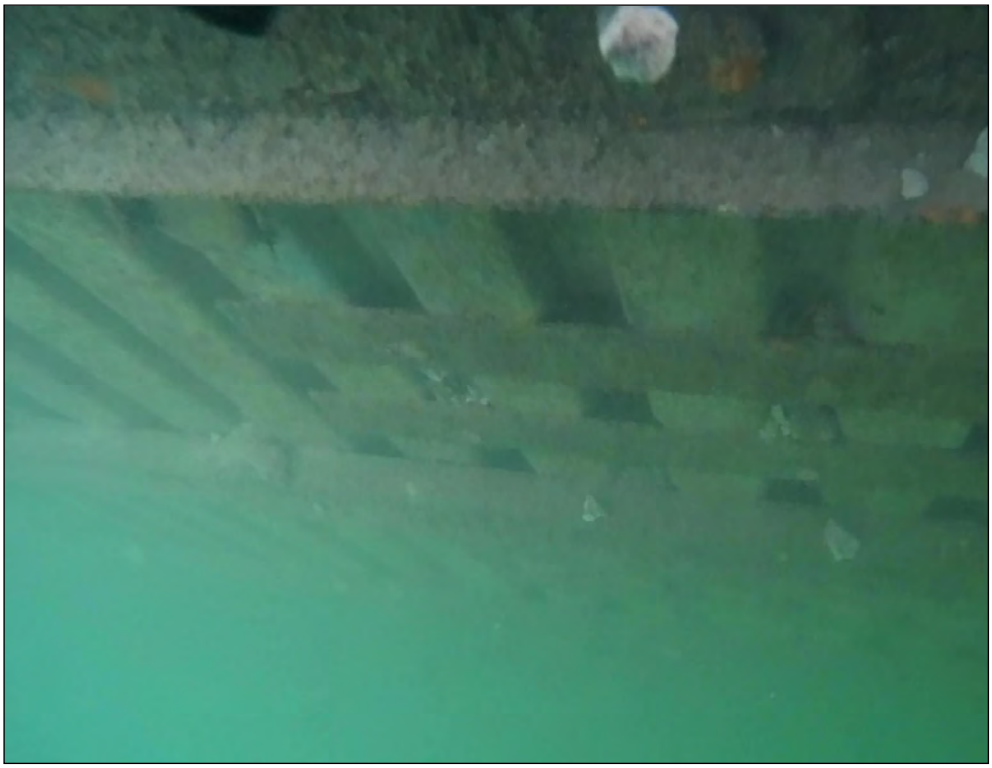
Pier 8w, steel sheeting and steel walers at channel bottom, typical

Pier 9w, west elevation

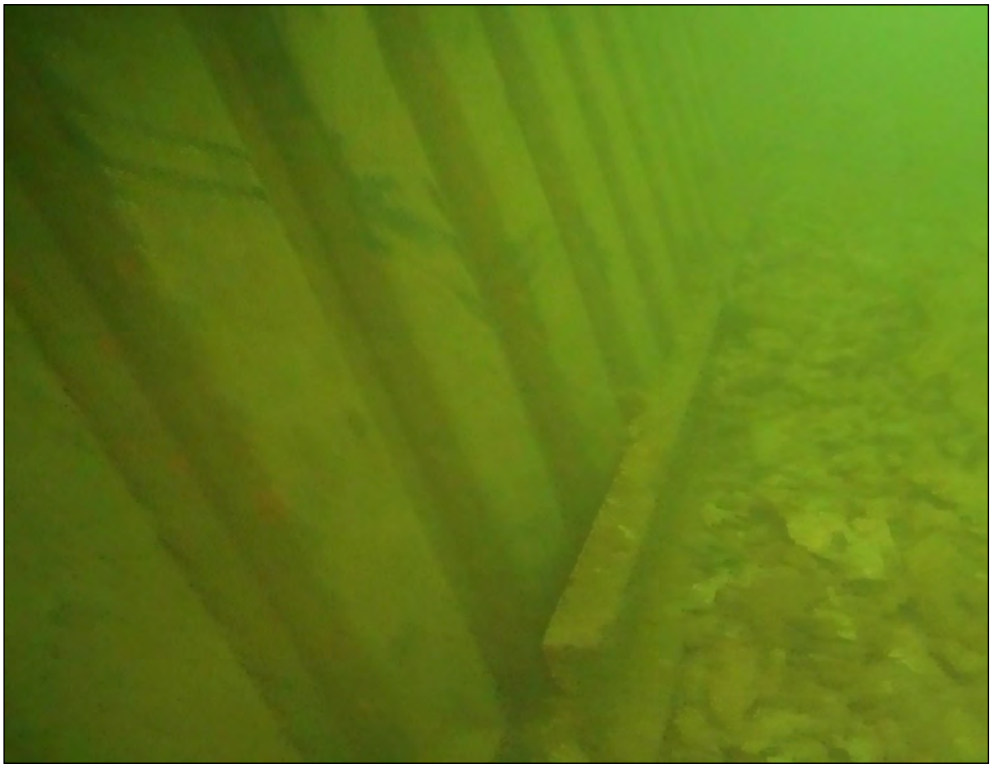


Pier 9w, east elevation



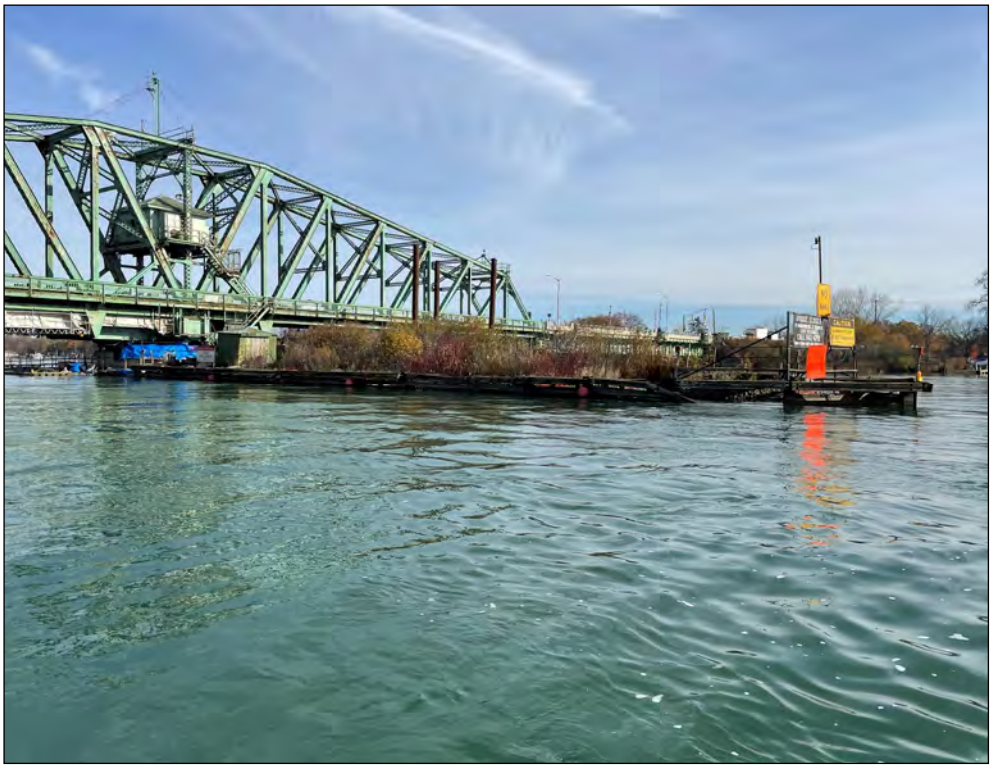


Pier 9w, steel sheeting and steel walers, typical



Pier 9w, steel sheeting and steel walers at channel bottom, typical

Pier 9w, southwest timber fender



Pier 9w, southeast timber fender

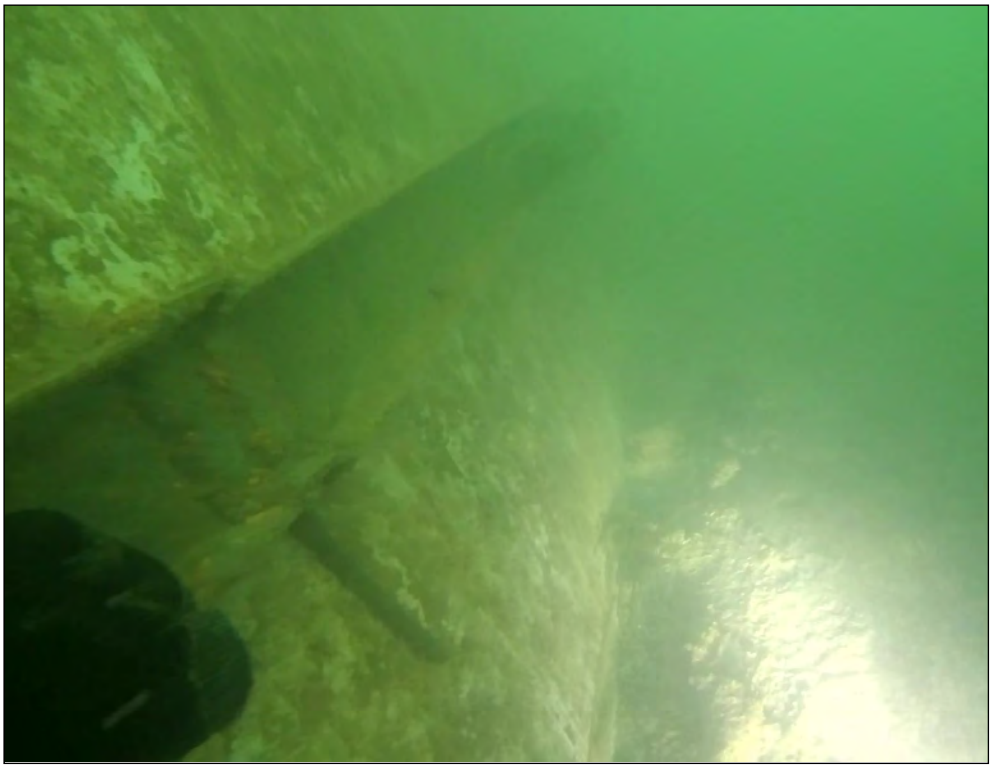
Pier 9w, northwest timber fender

Pier 9w, northeast timber fender

Pier 10w, west elevation

Pier 10w, east elevation

Pier 10w, vinyl sheeting and steel walers, typical

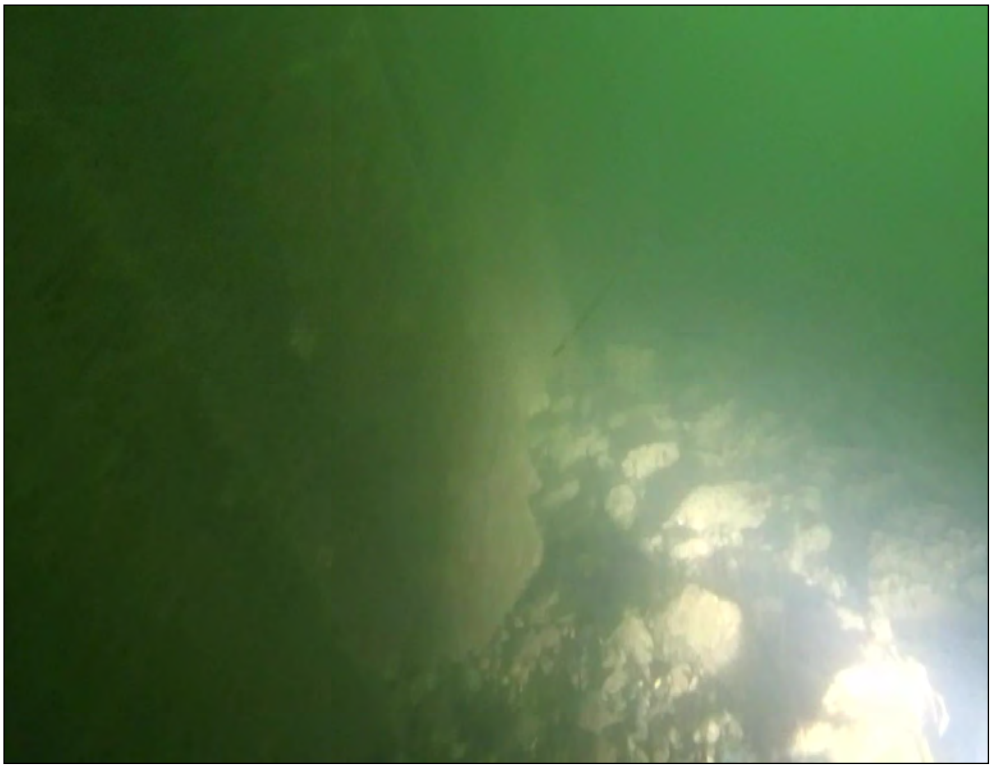


Pier 10w, vinyl sheeting and steel walers, typical

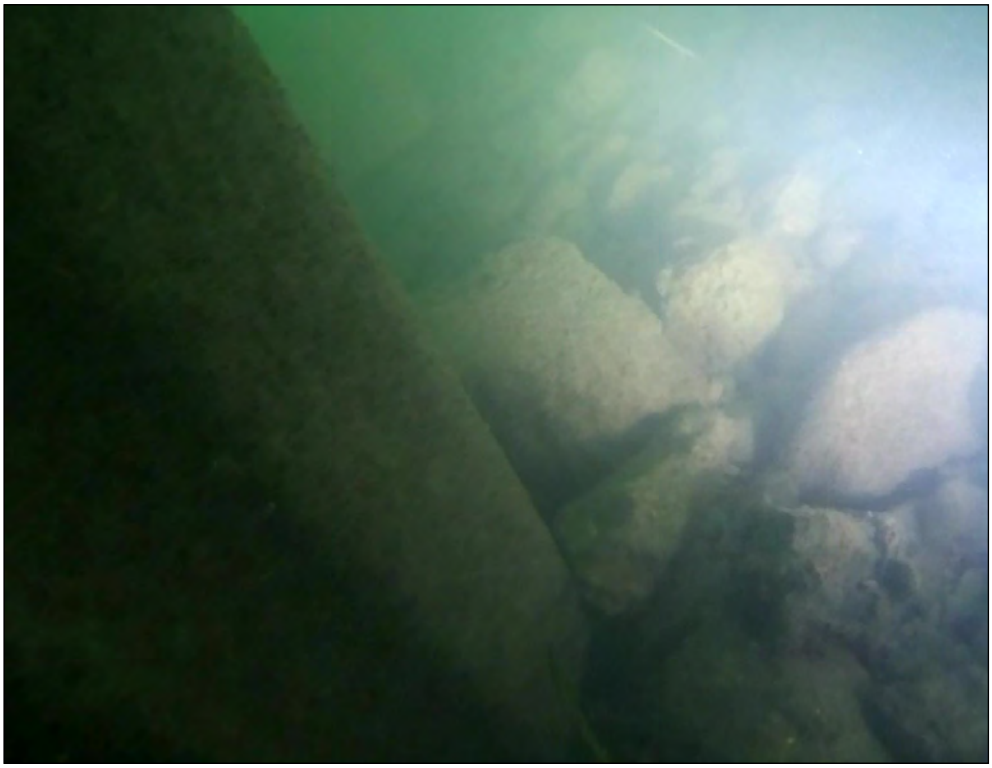
Pier 11w, west elevation

Pier 11w, east elevation

Pier 11w, footing exposure and channel bottom, typical



Pier 11w, footing exposure and channel bottom, typical



West abutment

East abutment

Southwest channel bank

Southeast channel bank

Northwest channel bank

Northeast channel bank

MICHIGAN DEPARTMENT OF TRANSPORTATION

STR 12006	**UNDERWATER INSPECTION REPORT [SIA #92-B]**		
Facility	**Latitude / Longitude**	**MDOT Structure ID**	**Structure Condition**
GROSSE ILE PARKWAY	42.1273 / -83.173	82200010000B020	Poor Condition(4)
Feature	**Length / Width / Spans**	**Owner**	
TRENTON CHANNEL	1,345.88 / 31.8 / 12	County: Wayne(82)	
Location	**Built / Recon. / Paint / Ovly.**	**TSC**	**Operational Status**
GROSSE ILE	1932 / 2007 / 1978 /	Taylor(25)	P Posted for load(26NNNN)
Region / County	**Material / Design**	**Last NBI Inspection**	**Scour Evaluation**
Metro(7) / Wayne(82)	4 Steel Continuous / 17 Movable- Swing	11/23/2021 / 6SAN	4 Stable, needs action

UNDERWATER SPECIAL INSPECTION E2UF

Inspector Name	**Agency / Company Name**	**Insp. Freq.**	**Insp. Date**
Casey Collings	Great Lakes Engineering Group	10	11/09/2021

GENERAL NOTES

Grosse Ile Parkway over Trenton Channel is a twelve-span moveable swing bridge with a steel superstructure. The bridge is located in Wayne County, Michigan. The original structure was built around 1873 as a railroad crossing and was converted to carry vehicular traffic in 1932. The structure carries two lanes of two-way traffic and is 1,346 feet in length. All eleven pier units (piers 1w-11w) are submerged in the channel. The bridge has undergone numerous repair projects throughout its lifespan, and most recently was closed to traffic while extensive pier repairs were performed at piers 2w, 4w, 6w, 8w, 9w, and 10w. Pier repair verification dives were performed during the project, and these reports are available as separate documents.

Piers 1w through 11w were subject to underwater inspection on November 9-10, 2021 while the structure remained closed to vehicular traffic due to the pier repair project and ongoing superstructure repairs. The pier repair and superstructure repair projects were overseen by HNTB, Michigan on behalf of Wayne County. Coordination was required to ensure contractor equipment and operations did not impact the safety of the dive team or contractor personnel. Power to the swing span pier was turned off due the ongoing construction projects. The dive team performed the underwater inspection under the contractor¿s United States Coast Guard permits.

INSPECTION PROCEDURES

QUALIFIED TEAM
The team performing the underwater inspection is qualified in accordance with the National Bridge Inspection Standards 23 CFR Part 650.309. The underwater inspection was conducted by a four-person team consisting of a Professional Engineer Dive Team Leader/Qualified Dive Inspector/Qualified Team Leader (Casey Collings, P.E.), a Qualified Dive Inspector/Qualified Team Leader (Matt Davis), a Diving Safety Supervisor (Paul Davis), and a Dive Tender (Brian Hedben, P.E.).
EQUIPMENT
The inspection was conducted using Self-Contained Underwater Breathing Apparatus (SCUBA). The inspection team accessed the bridge and worked from a 18-foot Dive Safety Boat. Two-way wired communications were used to convey inspection notes from the diver to the topside team leader and recorded on note sheets. Additional equipment consisted of an underwater digital camera, underwater video camera, LED high intensity submersible dive light, dive knife, scraper, 4' probing rod, 25' and 50' survey rods, and a side imaging sonar unit.
LEVEL OF INSPECTION
The Level I underwater inspection consisted of a close visual and tactile examination using large sweeping motions of the hands where visibility was limited. A Level II inspection was performed on 10% of the submerged substructure units. The inspection was conducted over the total exterior surface of each underwater substructure unit. Probing along the mud line was also done along each substructure unit and the adjacent streambed. Upstream and downstream cross sections were taken and recorded using a USGS benchmark.
APPROVALS
This bridge falls under the jurisdiction of the United States Coast Guard (USCG). Approval was required to perform the underwater inspection. The dive team performed the underwater inspection under the contractor¿s United States Coast Guard permits.

NAVIGATION PROTECTION SYSTEMS

Protection Systems Fender Timbers

Inspection Comments

The watercourse is deemed navigable according to the U.S. Coast Guard; therefore, protection systems and navigation lights at or near the bridge are required. A timber cribbing pier protection system is in place at pier 9w. The protection system at pier 9w is in poor condition. The purpose of the system is to protect the bridge from impacts by vessels and also to identify the navigable channel. The protection system has the visual appearance of sinking, especially at the north end (upstream end). During the 2021, 2020, 2019, and 2017 underwater inspections, water levels have been higher than in older inspections. The high water levels contribute to the sinking appearance, however the extensive deterioration of the pier protection cribbing below water, and failed previous repairs are contributing to the settlement of the pier protection system. There are multiple areas within the timber cribbing system that exhibit section loss of 20%-75%. No pier protection systems are in place at piers 1w, 2w, 3w, 4w, 5w, 6w, 7w, 8w, 10w, and 11w.

Navigation lighting is installed at the structure from piers 8w to 10w as well as on southern and northern ends of the pier protection system at pier 9w. The navigation lighting was not operating at the time of underwater inspection due to power at the bridge being turned off for ongoing repair work.

STR 12006 UNDERWATER INSPECTION REPORT [SIA #92-B]

Facility	Latitude / Longitude	MDOT Structure ID	Structure Condition
GROSSE ILE PARKWAY	42.1273 / -83.173	82200010000B020	Poor Condition(4)
Feature	**Length / Width / Spans**	**Owner**	
TRENTON CHANNEL	1,345.88 / 31.8 / 12	County: Wayne(82)	
Location	**Built / Recon. / Paint / Ovly.**	**TSC**	**Operational Status**
GROSSE ILE	1932 / 2007 / 1978 /	Taylor(25)	P Posted for load(26NNNN)
Region / County	**Material / Design**	**Last NBI Inspection**	**Scour Evaluation**
Metro(7) / Wayne(82)	4 Steel Continuous / 17 Movable- Swing	11/23/2021 / 6SAN	4 Stable, needs action

Weather Conditions on Day of Dive

Sunny.

INSPECTION STAFF & EQUIPMENT

Engineer	Casey Collings
Diver	Casey Collings
Tender	Matt Davis
Dive Equipment	Scuba

Nearest Boat Launch Site

Marina in the northwest quadrant.

Safety Concerns

Active construction site (above water), strong current, recreational boat traffic.

INSPECTION DETAILS

Waterway and Bank Observations

The physical conditions associated with the flow of water through the bridge, such as stream stability and the condition of the channel and slope, were evaluated.

The west channel banks are natural with no slope protection in place. The east channel banks have stacked stone blocks in place to retain the approach slopes. Farther from the bridge, there is a boat launch in the northwest quadrant and a marina in the southeast quadrant. No erosion or significant debris was found at the bridge.

Substructure Observations (Above the waterline)

Summary: Several open spalls to exposed steel, open vertical cracks and delaminations in concrete portions of the piers above water. Several areas previously marked out and include bearing bolster areas. Contractor scaffolding is present at several piers preventing visual inspection of the upper portions. Several areas of spalls and delaminations were recently repaired or in the process of being repaired.

Substructure Observations (Below the waterline)

Piers 1w, 3w, 5w, 7w, and 11w have a rocky channel bottom with some riprap along the bottom of the footings. The footing are exposed by design.

Piers 2w, 4w, 6w, 8w, 9w, 10w have newly placed grout bags placed at the bottom of stay in place forms utilized for the pier stabilization. Stay in place forms are already algae covered. Toe of stay in place forms was covered in grout and/or grout bags.

Debris in Waterway

None noted.

Recommendations

Underwater Video Available?	Y
Underwater Video Description	Mask mounted video.
Underwater Video Location	GLEG Server
Stream Bed Profile Completed?	Y
Site Plan Completed?	Y
Photographs?	Y

RECOMMENDATIONS AND ACTION ITEMS

Recommendation

Nav Protect Rpr

Priority	Comments
H	Replace or retrofit the pier protection system at the pivot Pier 9W, both north and south ends. Recommend destructive testing such as cores be taken for retrofit design.

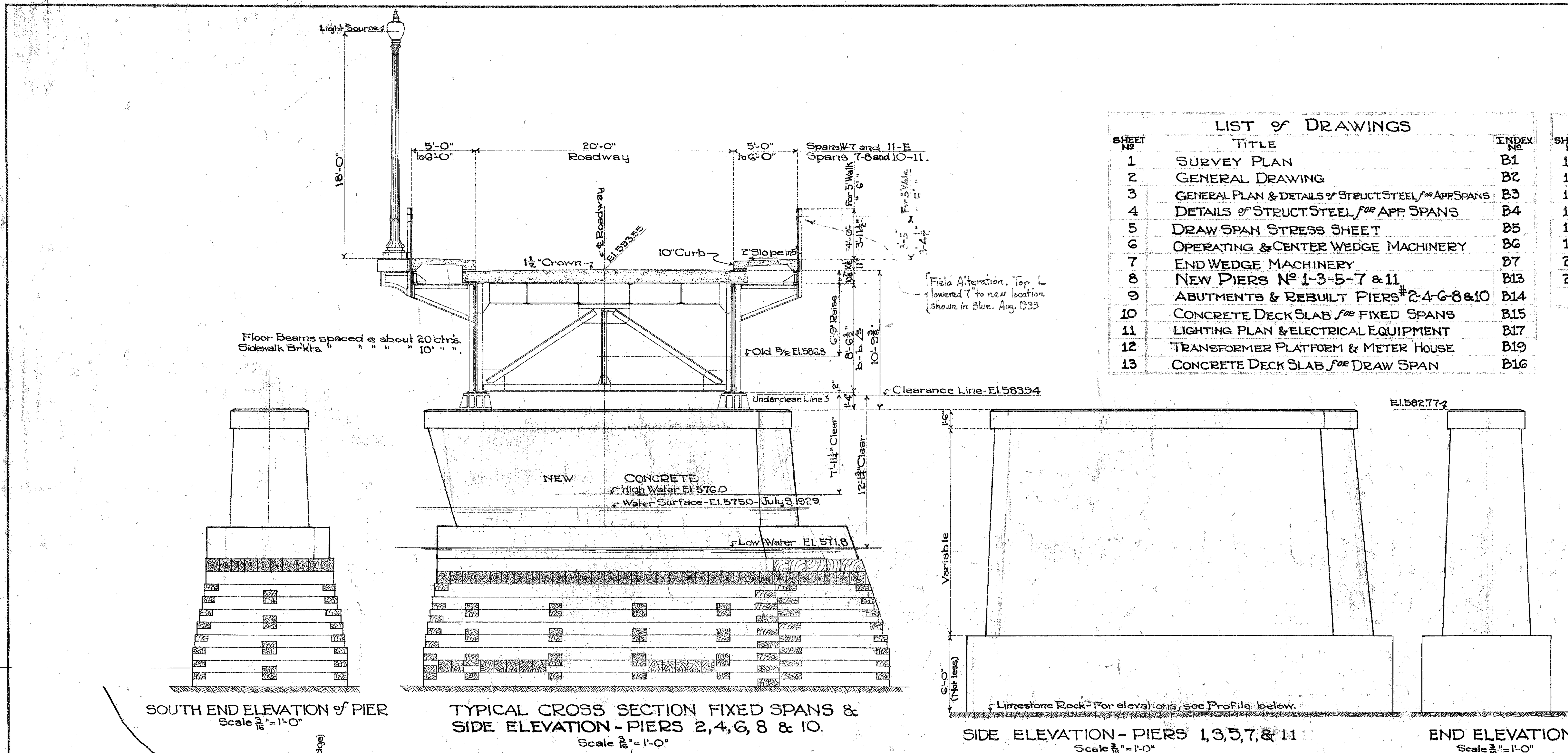
STR 12006 **UNDERWATER INSPECTION REPORT [SIA #92-B]**

Facility	Latitude / Longitude	MDOT Structure ID	Structure Condition
GROSSE ILE PARKWAY	42.1273 / -83.173	82200010000B020	Poor Condition(4)
Feature	**Length / Width / Spans**	**Owner**	
TRENTON CHANNEL	1,345.88 / 31.8 / 12	County: Wayne(82)	
Location	**Built / Recon. / Paint / Ovly.**	**TSC**	**Operational Status**
GROSSE ILE	1932 / 2007 / 1978 /	Taylor(25)	P Posted for load(26NNNN)
Region / County	**Material / Design**	**Last NBI Inspection**	**Scour Evaluation**
Metro(7) / Wayne(82)	4 Steel Continuous / 17 Movable- Swing	11/23/2021 / 6SAN	4 Stable, needs action

Recommendation

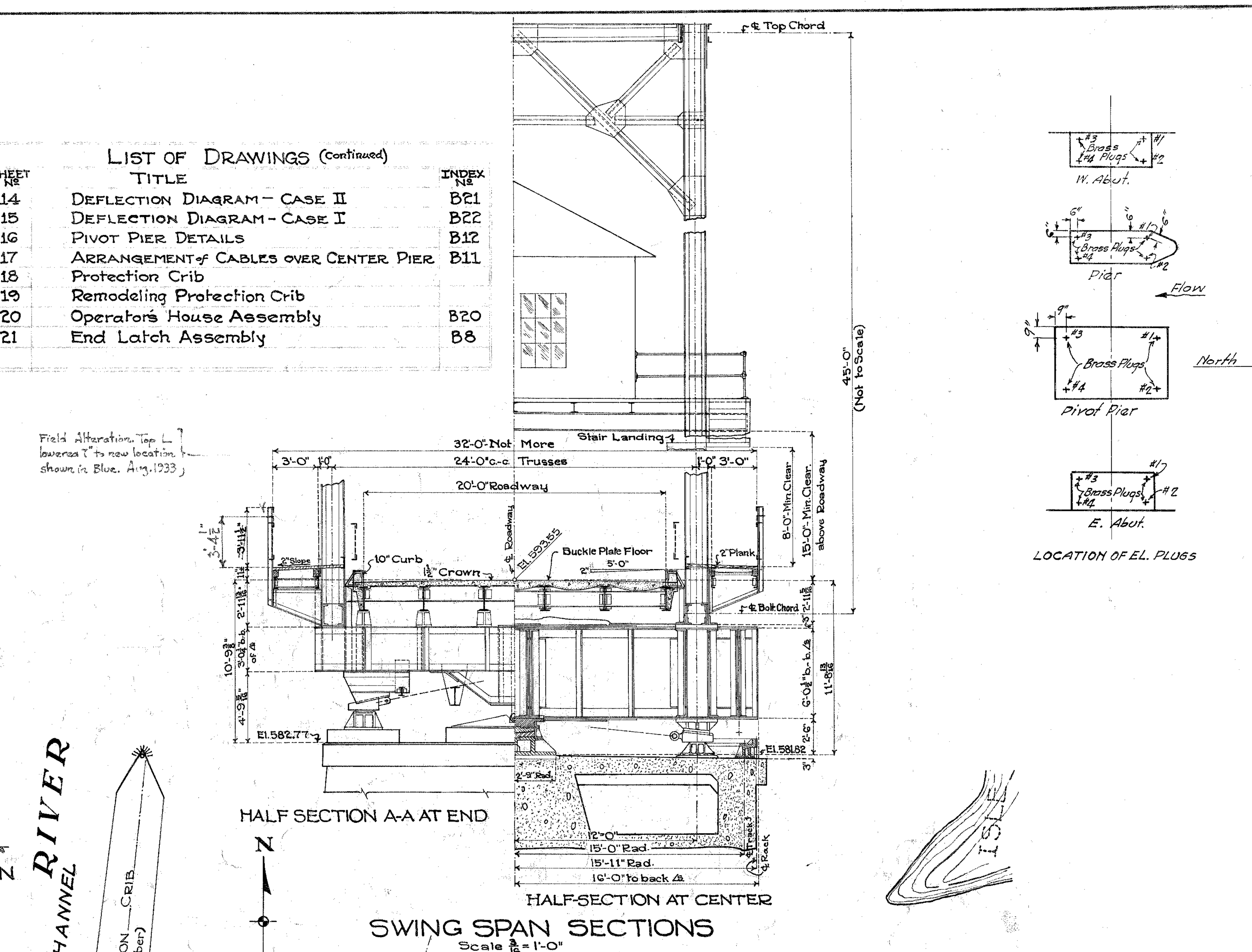
Other

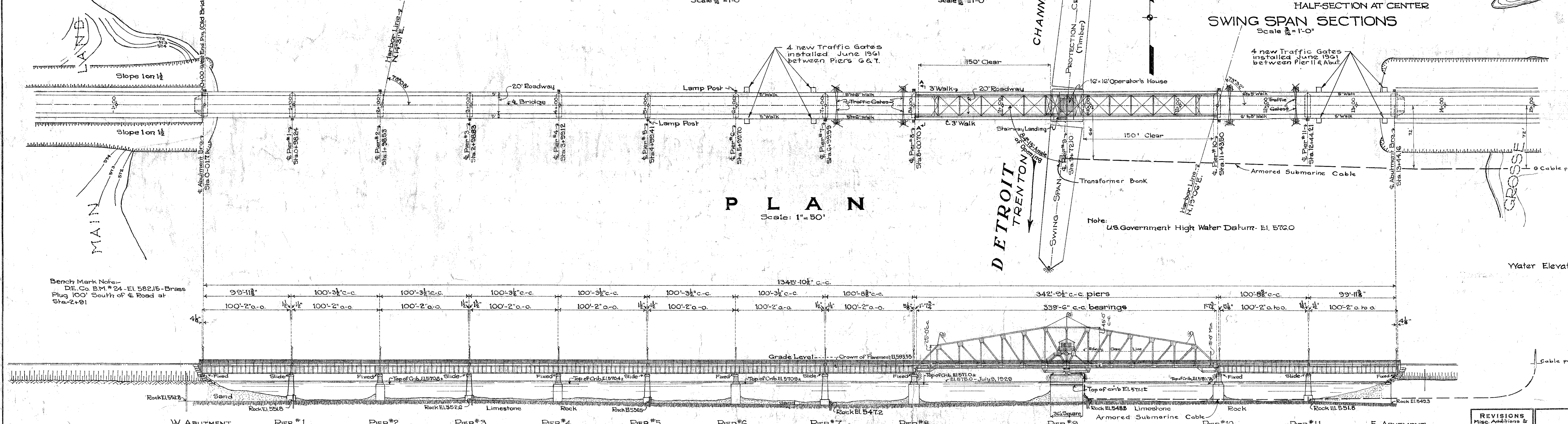
Priority	Comments
H	Continue to Survey Pier Elevations monthly at 4 locations at each pier and monitor monthly by an licensed surveyor or engineer to check for settlement.

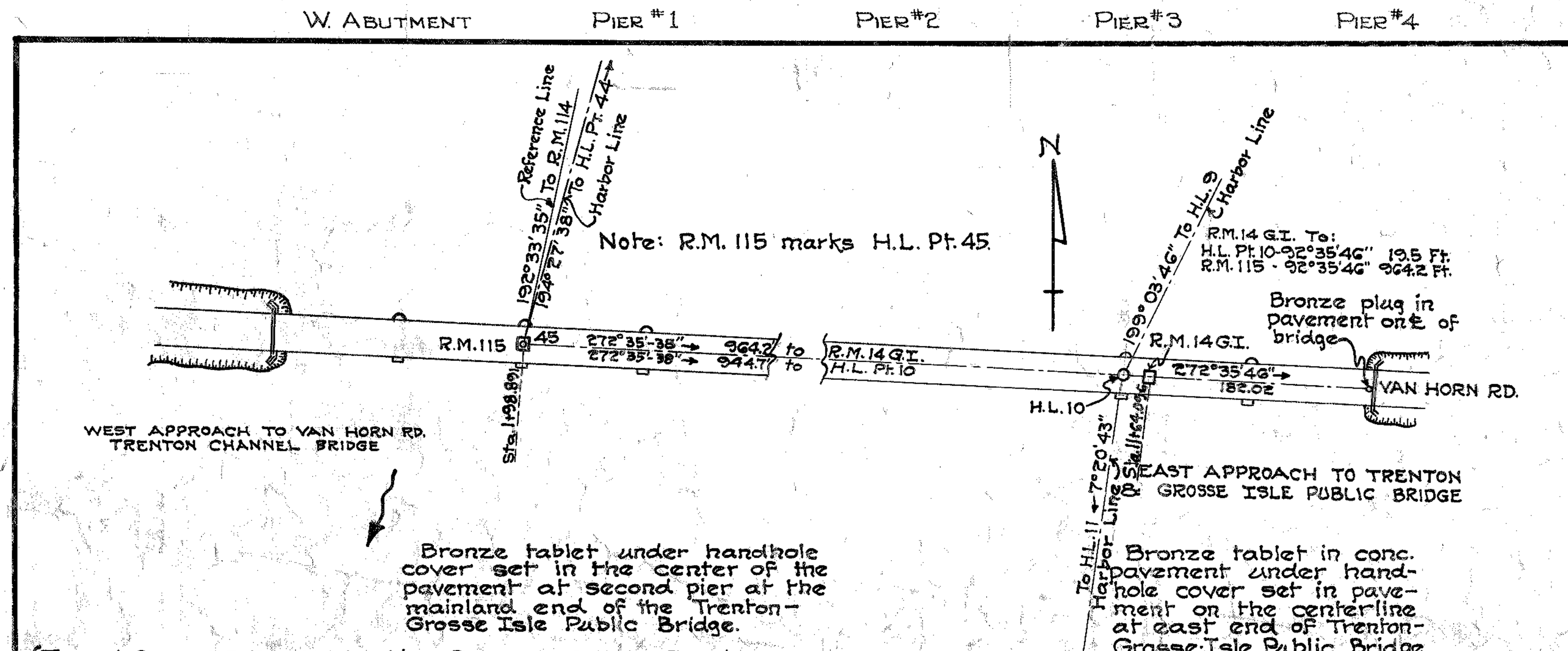


SHEET Nº	LIST of DRAWINGS TITLE	INDEX Nº
1	SURVEY PLAN	B1
2	GENERAL DRAWING	B2
3	GENERAL PLAN & DETAILS of STRUCT. STEEL for APP. SPANS	B3
4	DETAILS of STRUCT. STEEL for APP. SPANS	B4
5	DRAW SPAN STRESS SHEET	B5
6	OPERATING & CENTER WEDGE MACHINERY	B6
7	END WEDGE MACHINERY	B7
8	NEW PIERS Nº 1-3-5-7 & 11	B13
9	ABUTMENTS & REBUILT PIERS #2-4-6-8 & 10	B14
10	CONCRETE DECK SLAB for FIXED SPANS	B15
11	LIGHTING PLAN & ELECTRICAL EQUIPMENT	B17
12	TRANSFORMER PLATFORM & METER HOUSE	B19
13	CONCRETE DECK SLAB for DRAW SPAN	B16

SHEET Nº	LIST OF DRAWINGS (continued) TITLE	INDEX Nº
14	DEFLECTION DIAGRAM - CASE II	B21
15	DEFLECTION DIAGRAM - CASE I	B22
16	PIVOT PIER DETAILS	B12
17	ARRANGEMENT of CABLES OVER CENTER PIER	B11
18	Protection Crib	
19	Remodeling Protection Crib	
20	Operator's House Assembly	B20
21	End Latch Assembly	B8







NOTES

LOADING.

Floor: 24-Ton Trucks spaced @ 25' ctrs. per lane; 25% Impact.

Girders and Trusses:

Roadway: 150#/□'; 25% Impact.

Walk: 80#/□'; No Impact.

16T — 10'-0" — 8T; 5'-0"

SPECIFICATIONS.

Steel: A.R.E.A. { General Specifications for Steel Railway Bridges, - Aug., 1925. Specifications for Movable Railway Bridges - 1922.

Concrete: Joint Committee, 1924.

Also, Board of Wayne County Road Commissioner's General Specifications, and Supplementary Specifications for Job #382.

MATERIALS & WORKMANSHIP.

Structural Steel: Workmanship shall, in general, conform to requirements for that class of work specified as "Reamed Work." Holes in diaphragms over center pivot, center wedges, and end wedges shall be sub-punched $\frac{11}{16}$"φ and reamed to $\frac{15}{16}$"φ as in the case of all other main material. Rivets to be $\frac{7}{8}$"φ.

Concrete: To be proportioned by "water-cement" ratio for 3,000 pounds per square inch at twenty-eight days. For method of proportioning and controlling mix, see specifications.

Shop Paint: One coat Red Lead and Oil as specified.

Field Paint: Two coats as specified.

REVISIONS
Misc. Additions & Revisions. P.A.N. 7-3-30. F.H.C.
Drwg. List Revised M.K. 2-16-33
Sketch of Reference Monuments added M.K. 8-23-33
Piers brought up to date W.H.S. 7-5-34 F.H.C.
El. Plugs shown J.W.C. 5-31-39
Armored Submarine Cable shown. F.H.C. F.H.B. 4-4-44
Traffic Gates relocated M.J.P. 7-17-62

JOB 382

DATE: [illegible]-193[illegible]

ISSUE NO.

BOARD OF
WAYNE COUNTY ROAD COMMISSIONERS
DETROIT, MICHIGAN.

EDWARD N. HINES, CHAIRMAN — WILLIAM F. BUTLER, COMMISSIONER — JOHN S. HAGGERTY, COMMISSIONER

VAN HORN ROAD TRENTON CHANNEL BRIDGE TO GROSSE ~ ISLE

BRIDGE - B1 OF 82-7-32

GENERAL DRAWING

DESIGNED BY W.H.S. DRAWN BY P.A.N. CHECKED BY F.H.C.

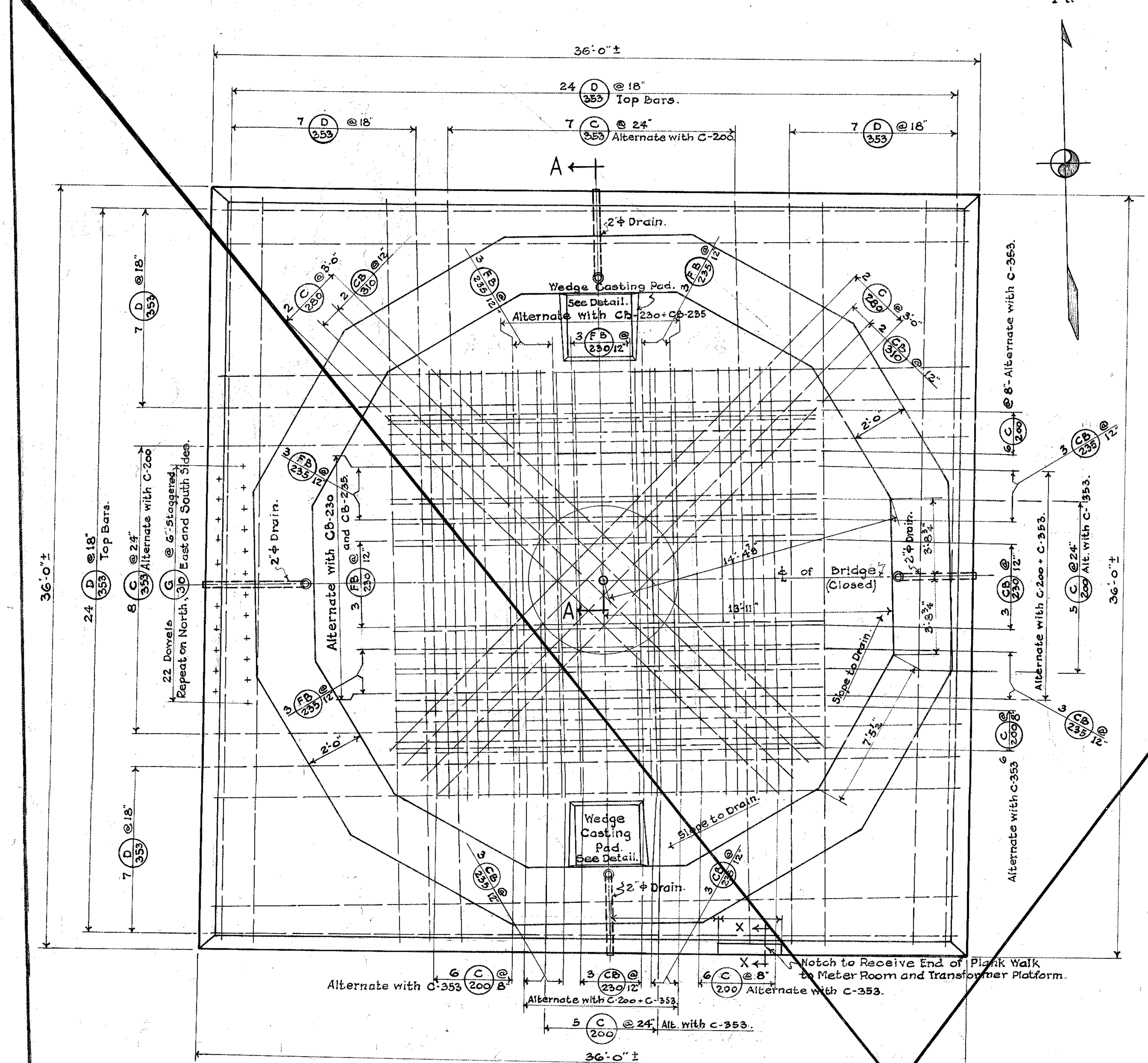
DATE 3-15-30. SCALES As Shown.

CORRECT [signature] Reg. Civ. Eng. Bridge Engineer

APPROVED ______ Reg. Civ. Eng. Engineer Manager

SHEET No. 2

JOB #382-B2



PLAN OF PIVOT PIER.

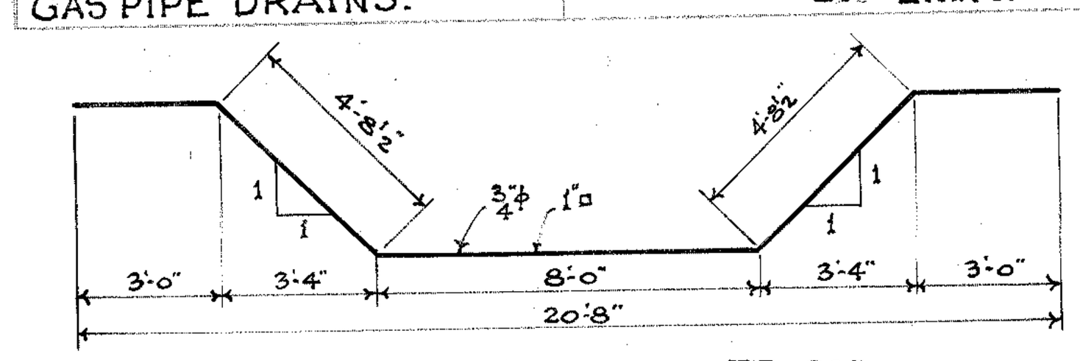
Scale: 1/4" = 1'-0".

BILL OF REINFORCING BARS.

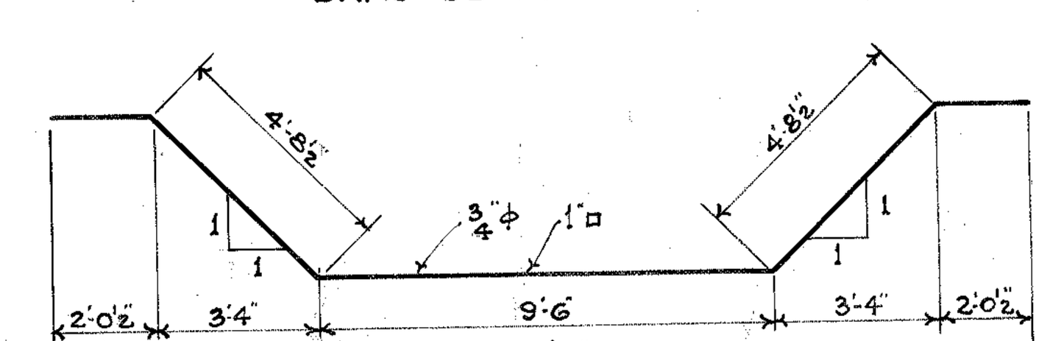
MARK	NUMBER	SIZE	LENGTH	REMARKS.
D-353	24	1" ϕ	35'-3"	East and West Top Rods.
D-353	24	1" ϕ	35'-3"	North - South " "
D-353	14	1" ϕ	35'-3"	" " Bottom "
D-353	14	1" ϕ	35'-3"	East - West " "
C-353	7	1" □	35'-3"	" " " " "
C-353	7	1" □	35'-3"	North - South " "
C-200	17	1" □	20'-0"	" " " " "
C-200	17	1" □	20'-0"	East - West " "
C-280	4	1" □	28'-0"	Diagonal Bottom "
CB-235	6	1" □	23'-5"	East and West Bottom Bent Rods.
CB-230	3	1" □	23'-0"	" " " " " "
CB-235	6	1" □	23'-5"	North - South " " "
CB-230	3	1" □	23'-0"	" " " " " "
FB-235	6	3/4 ϕ	23'-5"	East - West " " "
FB-230	3	3/4 ϕ	23'-0"	" " " " " "
FB-235	6	3/4 ϕ	23'-5"	North - South " " "
FB-230	3	3/4 ϕ	23'-0"	" " " " " "
G-30	88	5/8 ϕ	3'-0"	Vertical Dowels.
CB-310	4	1" □	31'-0"	Diagonal Bottom Bent Rods.

QUANTITIES.

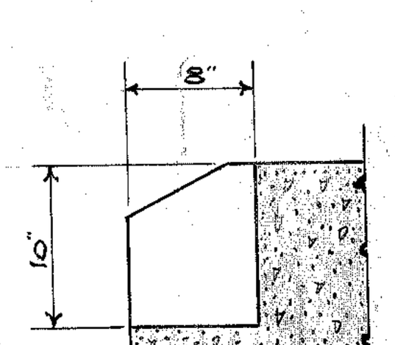
CONCRETE.	6 cu.yds. Grout - Contract Sect. B. / 166 " " Reg. Conc. " " A.
REINFORCING STEEL.	14300 Lbs.
POWER CONDUIT.	Lin. Ft.
LIGHTING CONDUIT.	Lin. Ft.
GAS PIPE DRAINS.	20 Lin. Ft. ±



BARS CB-235 and FB-235.

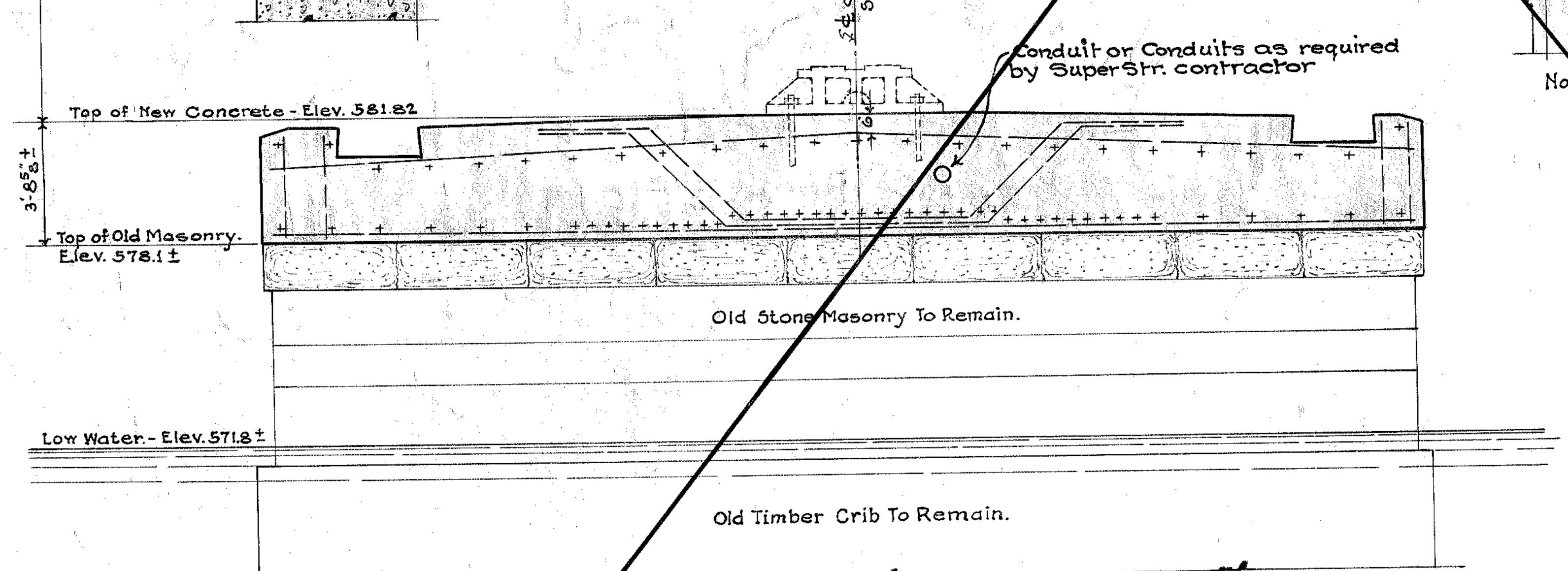


BARS CB-230 and FB 230.



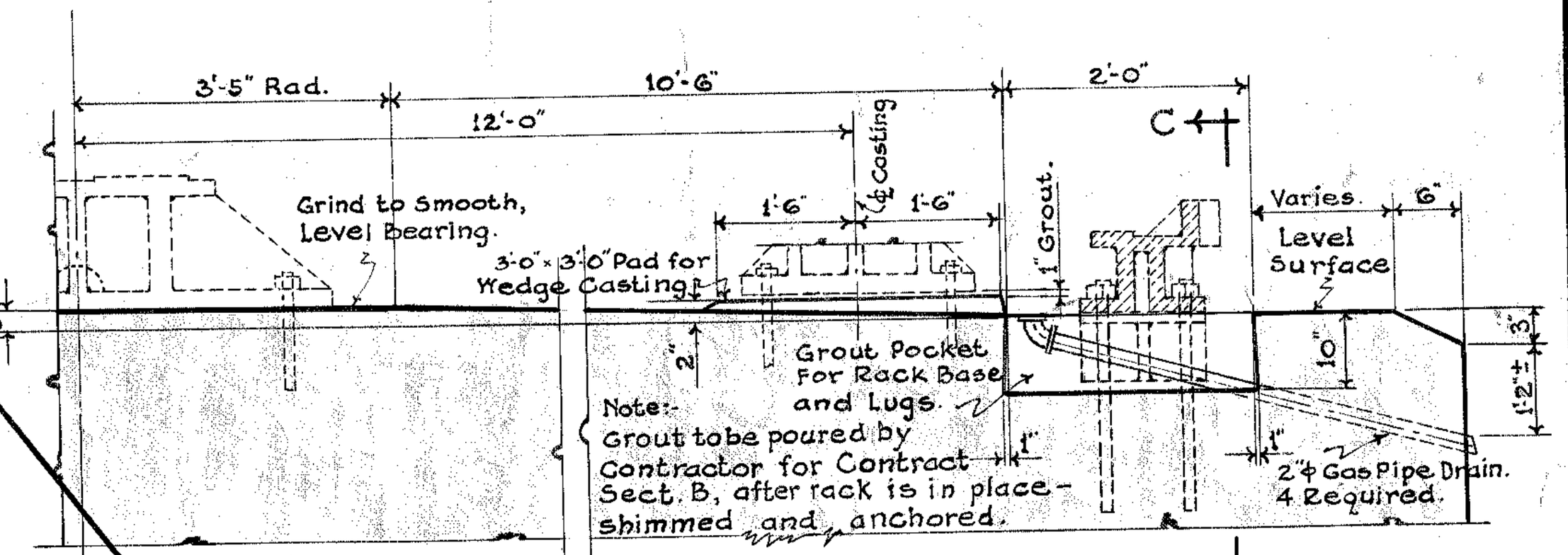
SECTION X-X.

Scale: 1" = 1'-0".



SECTION OF PIVOT PIER ON ℄ OF BRIDGE.

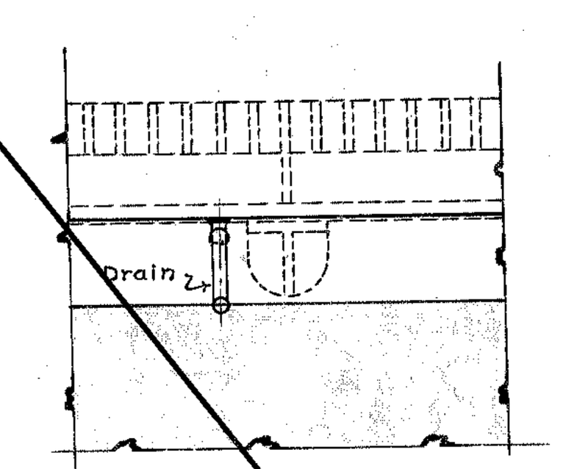
Scale: 1/4" = 1'-0".



Note:- For Location and Size of Anchor Bolts See Sheet No. 6.

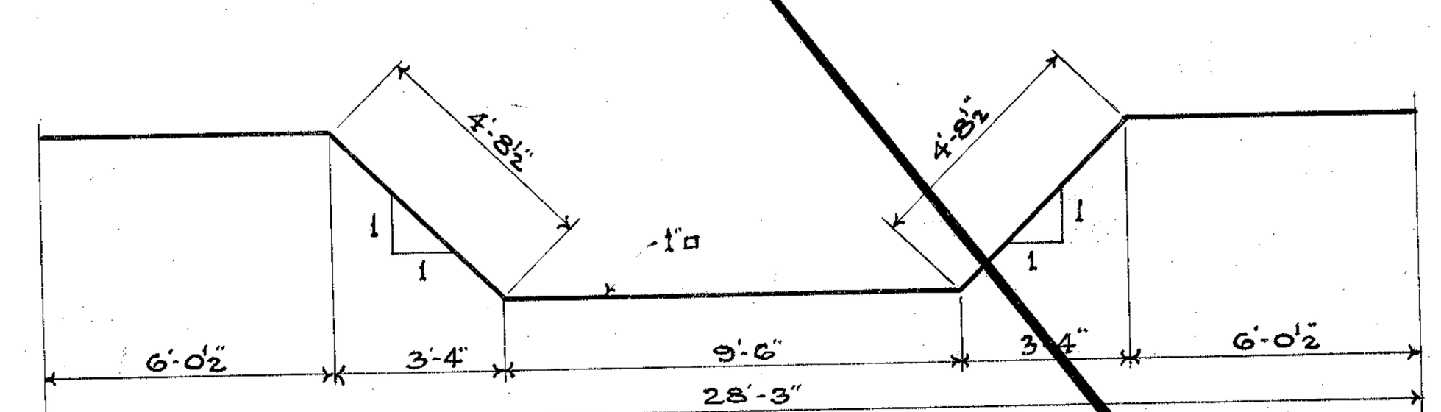
SECTION A-A ON ℄ OF PIVOT PIER.

Scale: 1/2" = 1'-0".



SECTION C C.

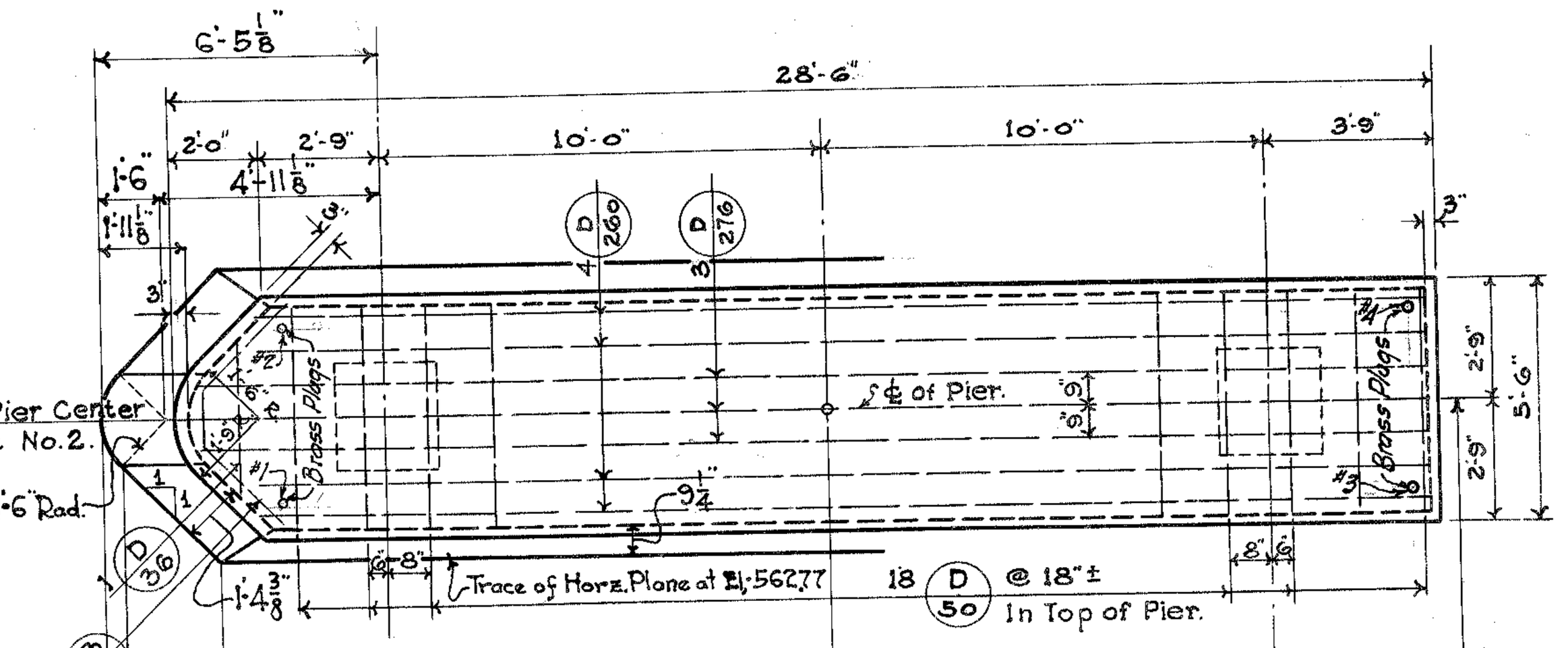
Scale: 1/2" = 1'-0".



BARS CB-310.

VOID

NOTE:- For Location of Pier Center Lines, See Sheet No. 2.



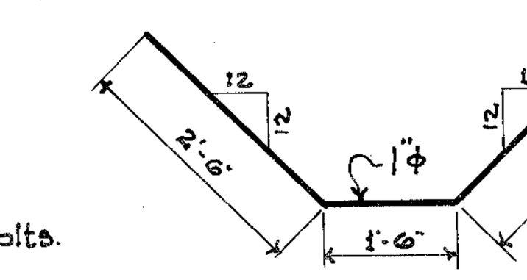
PLAN OF PIER TOP.

NOTE:- Bars under bearings must be spaced as shown to clear future location of anchor bolts.

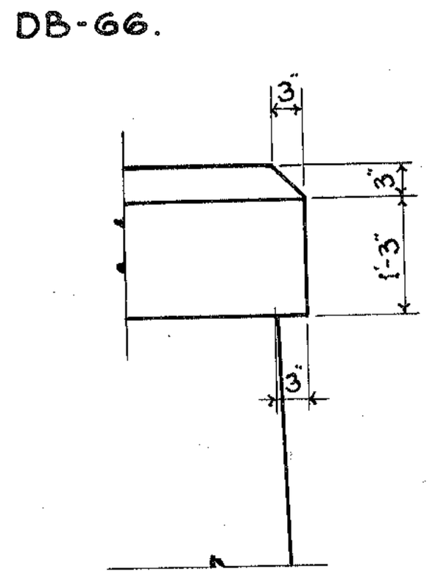
BILL OF REINFORCING BARS.

BARS FOR EACH PIER

MARK.	NUMBER	SIZE.	LENGTH.	REMARKS.
D-50	18	1" ϕ	5'-0"	Cross Bars.
D-260	4	1" ϕ	26'-0"	Outside Longitudinal Bars.
D-276	3	1" ϕ	27'-6"	Inside " "
D-36	1	1" ϕ	3'-6"	Cross Bar in Nose of Pier Top.
DB-66	1	1" ϕ	6'-6"	" " " " " "

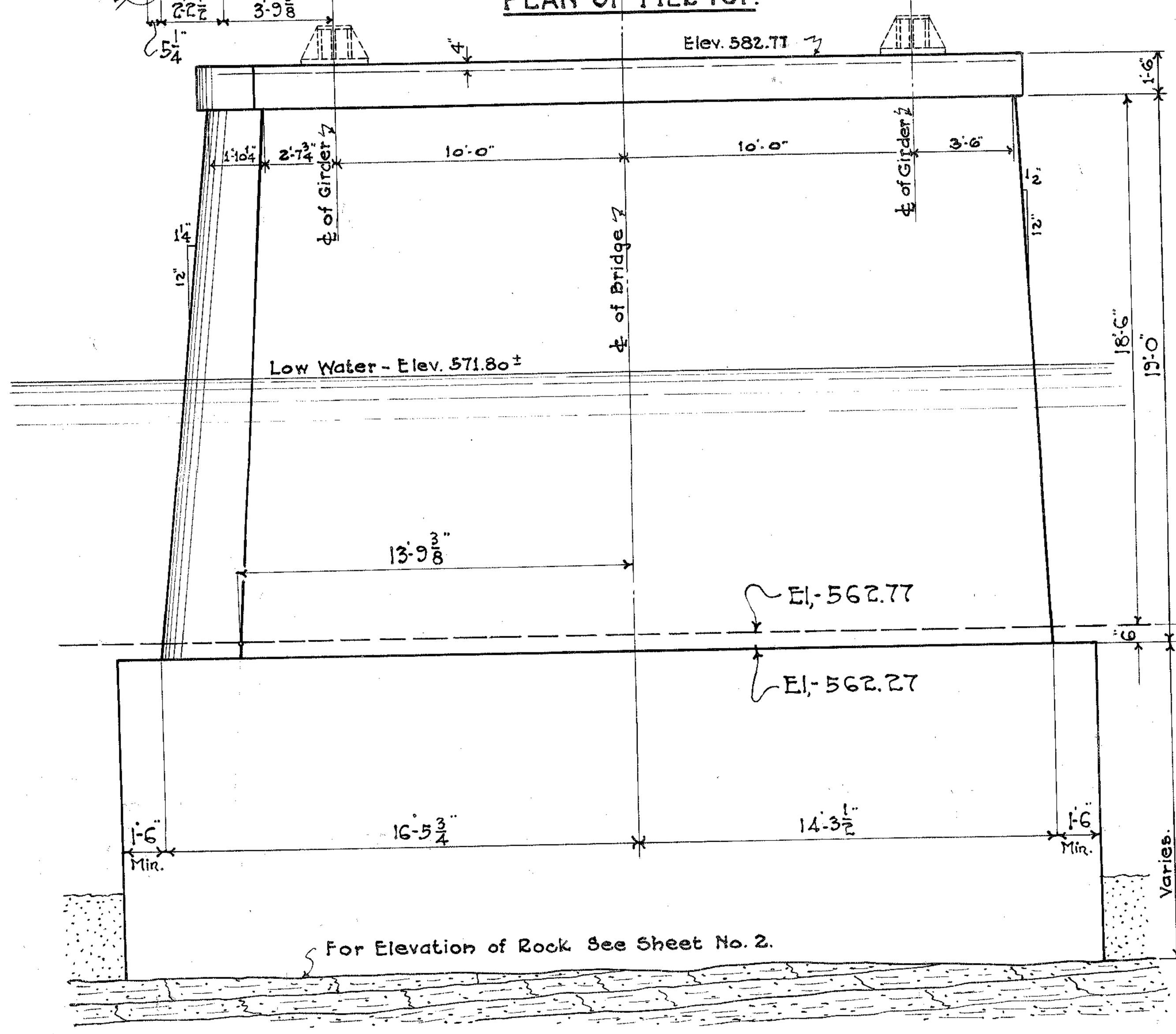


BAR DB-66.

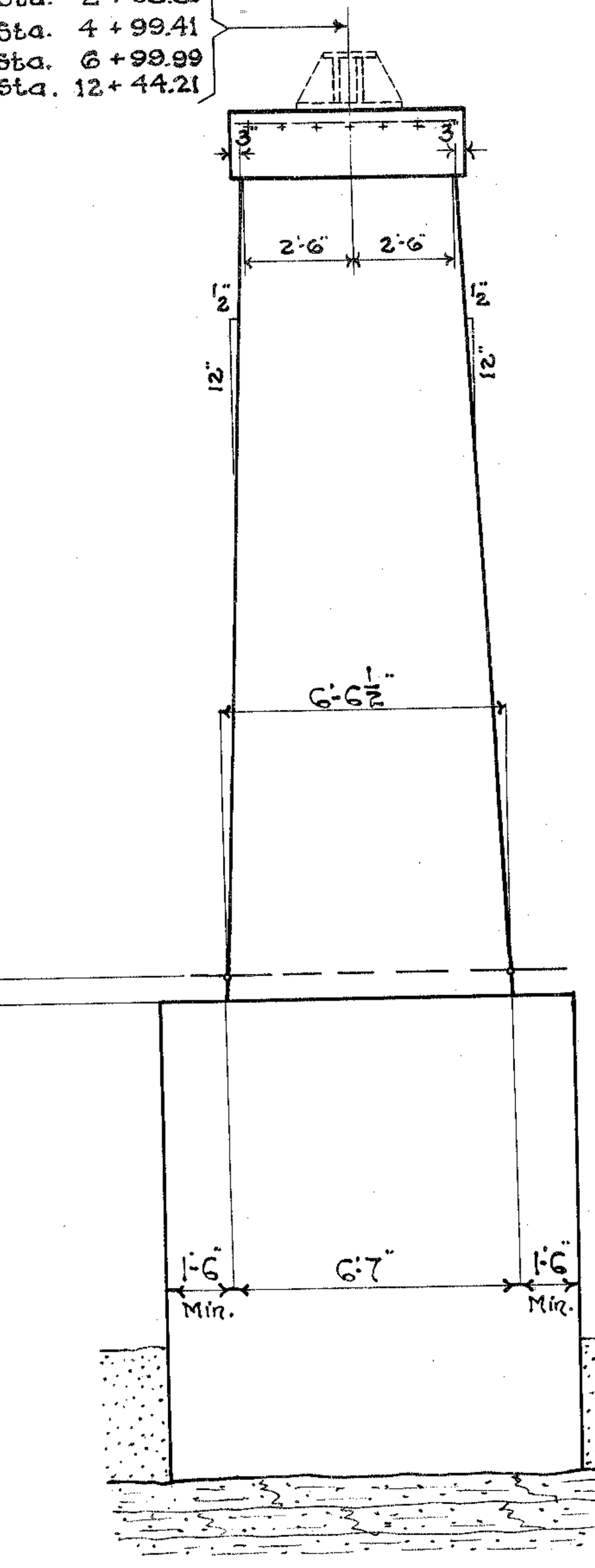


DETAIL OF PIER COPING.

Scale: 1/2" = 1'-0".



SIDE ELEVATION.



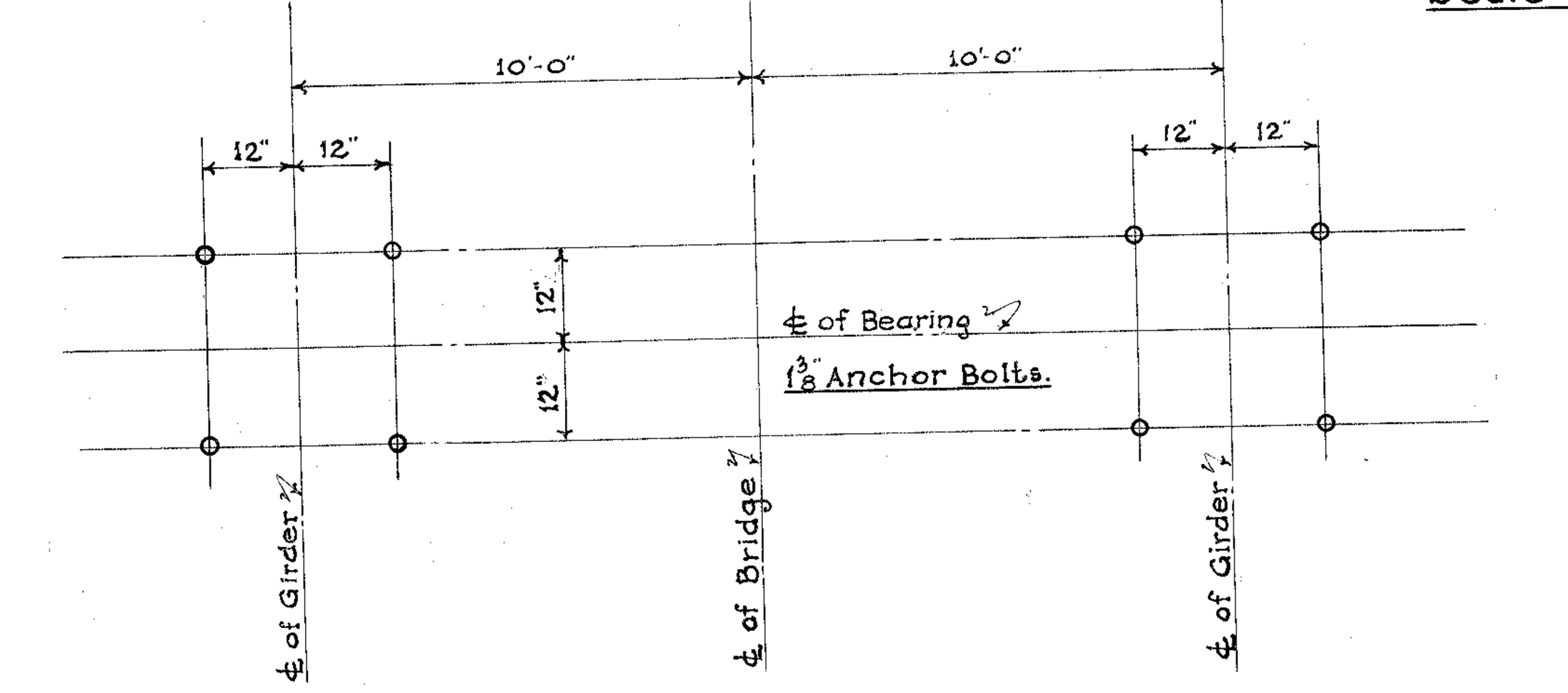
DOWN STREAM ELEVATION.

DETAIL OF PIERS Nos. 1, 3, 5, 7 AND 11.

Scale:- 1/4" = 1'-0".

QUANTITIES FOR EACH PIER.

CONCRETE - Tremie.	133 CU.YDS.	By Plan
" Dry.	125 " "	
REINFORCING STEEL.		765 LBS.



PLAN OF ANCHOR BOLTS FOR PIERS 1, 3, 5, 7 and 11.

NOTE:- For General Notes Applying to this Sheet, See Sheet No. 9.

REVISIONS
- Plank Walk Notch Added to Pivot Pier. 6-11-30 M.S. P.A.N.
- Note added re. grout for Rock Track 7-8-30 M.S.
- Elev. of Wedge Casting Pad changed 7-31-30 M.S. P.A.N.
- Pier altered. 9-11-30 M.S.
- El. plugs added 5-31-39 J.W.C.

JOB 382.
ISSUE No. 7
DATE: 9-15-1930

BOARD OF
WAYNE COUNTY ROAD COMMISSIONERS
DETROIT, MICHIGAN.

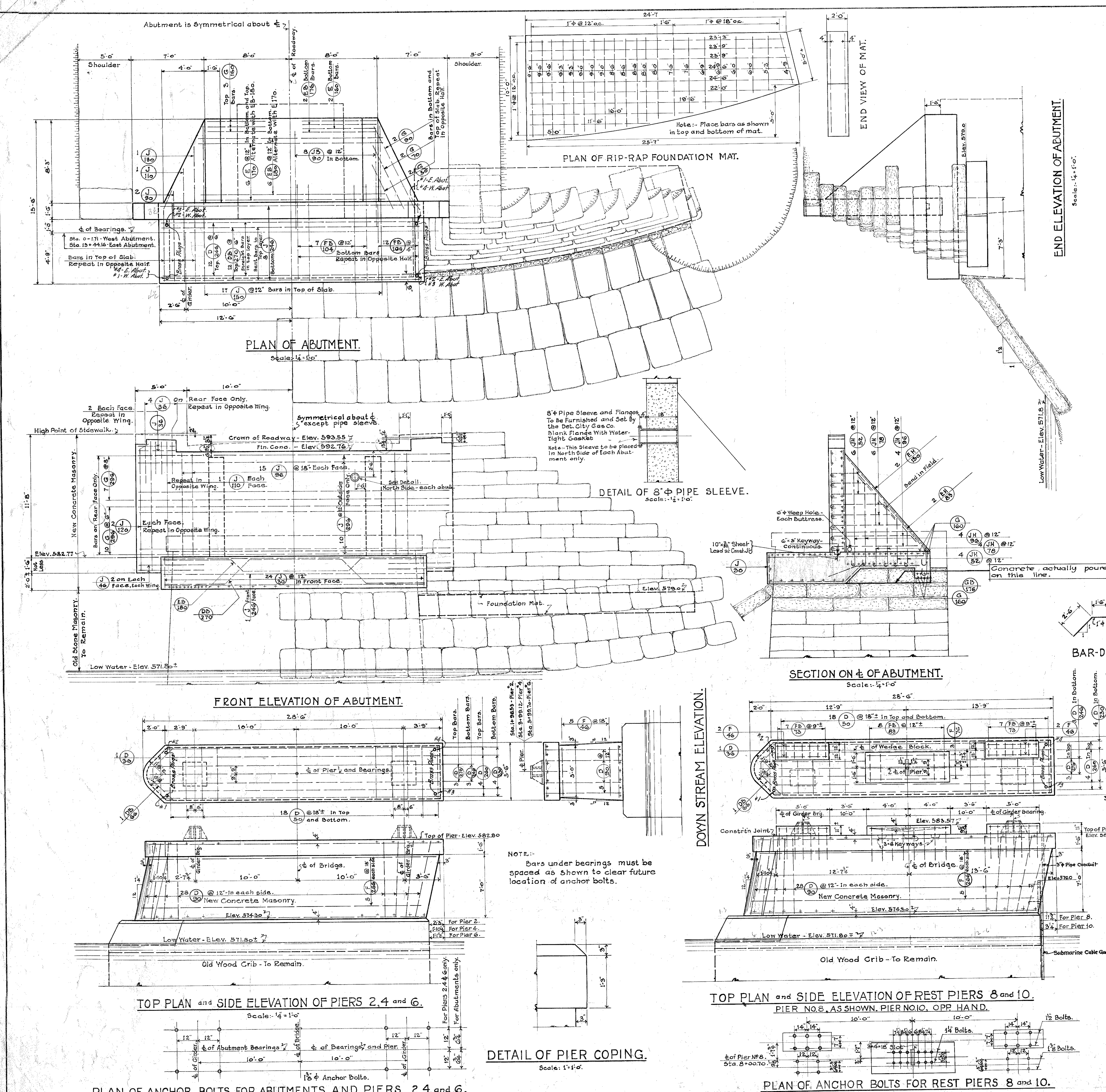
EDWARD N. HINES, CHAIRMAN — JOHN S. HAGGERTY, COMMISSIONER — WILLIAM F. BUTLER, COMMISSIONER

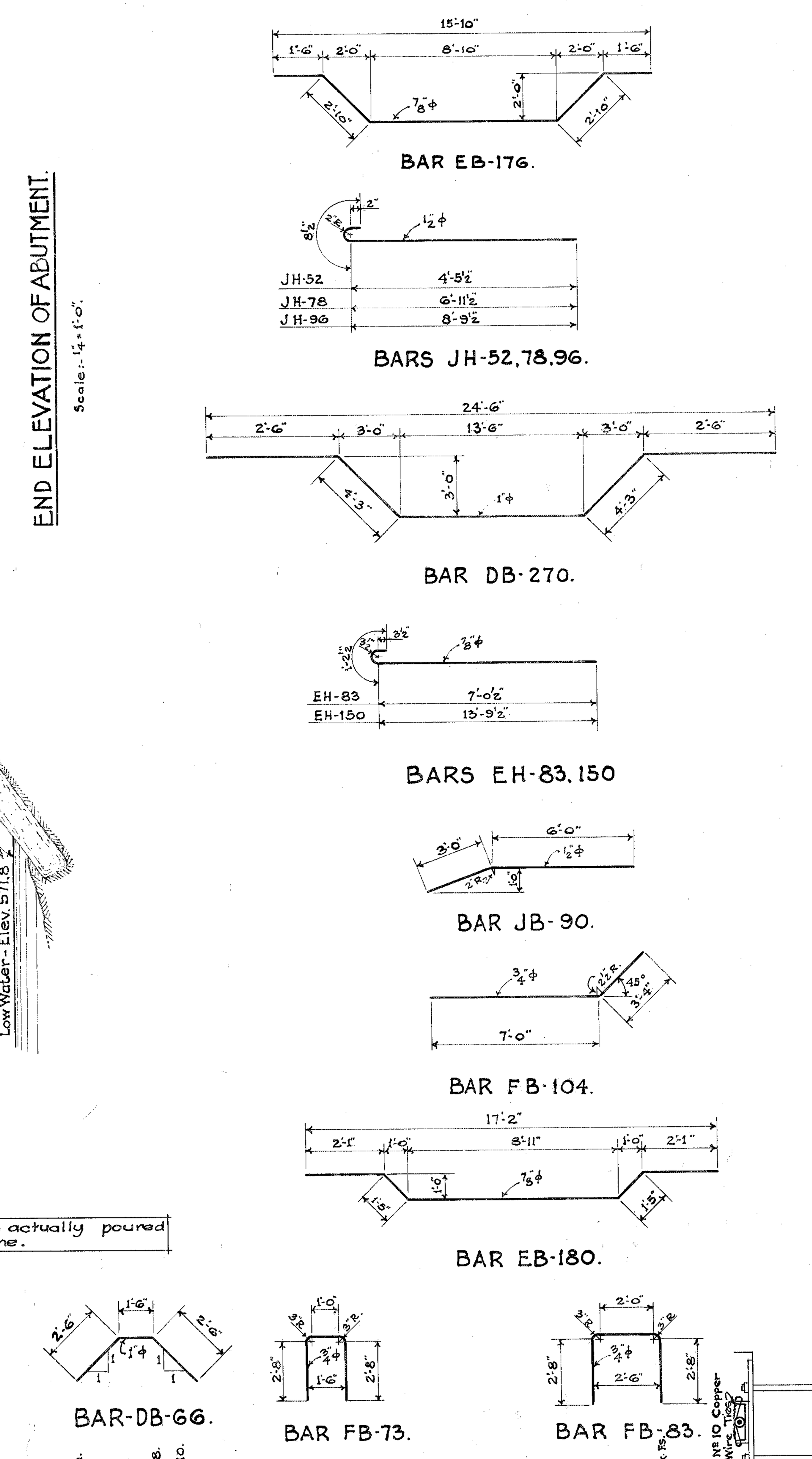
VAN HORN ROAD
TRENTON CHANNEL BRIDGE
TO
GROSSE ~ ISLE
BRIDGE - B1 OF 82-7-32.

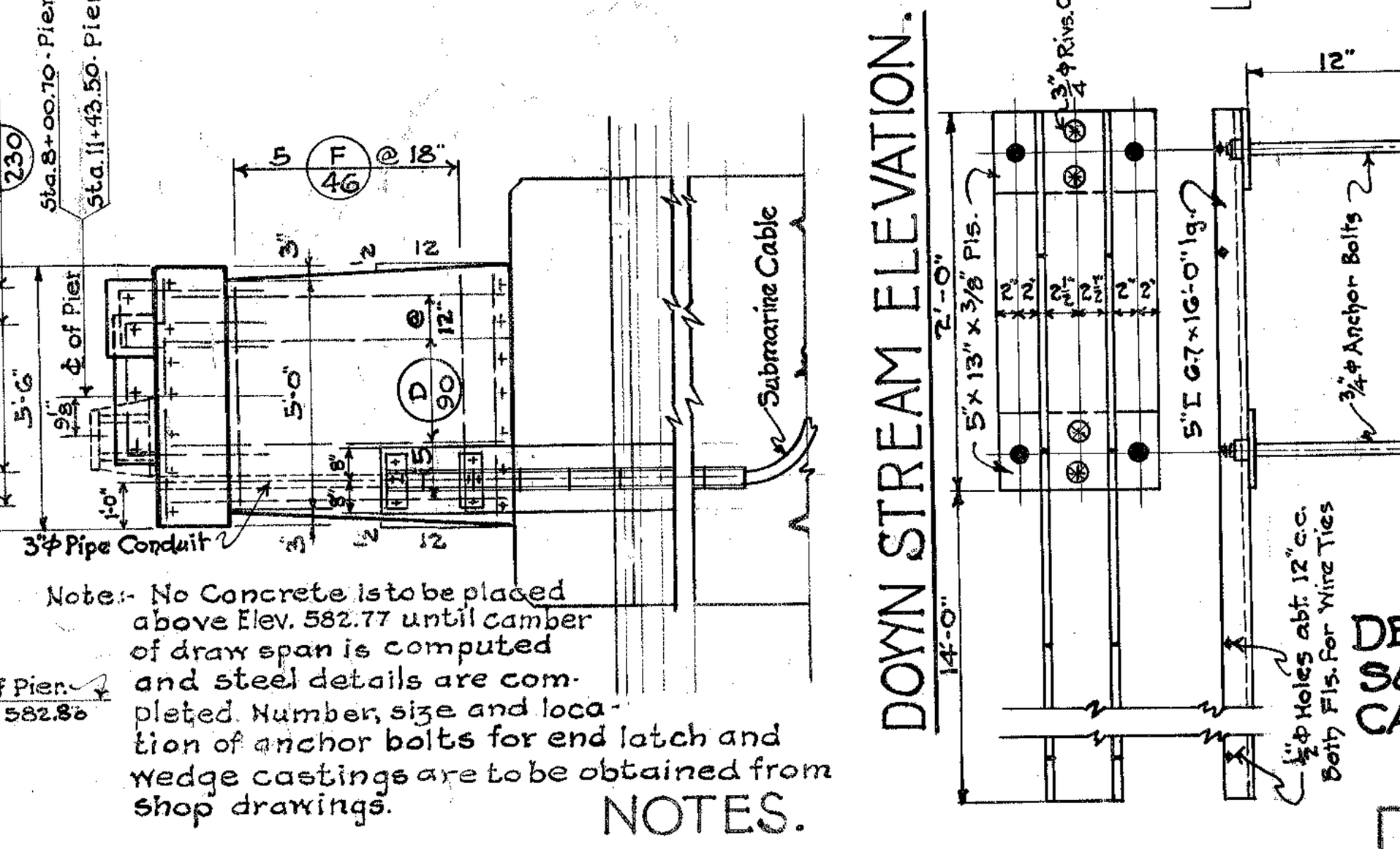
NEW PIERS No. 1-3-5-7-11

DESIGNED BY ______ DRAWN BY M.S. CHECKED BY P.A.N.
DATE March 3, 1930. SCALE As Noted.
CORRECT [signature] Bridge Engineer Reg. Civ. Eng.
APPROVED ______ Engineer Manager Reg. Civ. Eng.
SHEET No. 8.

JOB #382- B13







BILL OF REINFORCING BARS.

	MARK.	NUMBER.	SIZE.	LENGTH.	REMARKS.
RODS FOR EACH ABUTMENT - EXCLUSIVE OF RIP RAP FOUNDATION MAT. TOE.	J-30	24	½"φ	3'-0"	Vert. in Front Face of Toe.
	J-246	1	½"φ	24'-6"	Hor. Long. in Front Face of Toe.
	D-246	12	1"φ	24'-6"	Hor. " " Top of Toe.
	DB-270	12	1"φ	27'-0"	Hor. " " " " "
	FB-104	38	¾"φ	10'-4"	Hor. Cross in Bottom of Toe.
	J-46	8	½"φ	4'-6"	Hor. Dowels to Wing Wall.
	J-246	8	½"φ	24'-6"	Hor. Long. in Bottom of Toe.
	J-150	17	½"φ	15'-0"	Hor. Cross " Top " "
	J-90	4	½"φ	9'-0"	Hor. " " " " "
	J-110	2	½"φ	11'-0"	Hor. " " " " "
	J-130	2	½"φ	13'-0"	Hor. " " " " "
KEY BM.	G-160	3	⅝"φ	16'-0"	Hor. Long. in Top of Key Beam.
	E-160	2	⅞"φ	16'-0"	Hor. " " Bott. " " "
	EB-176	2	⅞"φ	17'-6"	Hor. " Bent up in " "
HEEL.	JB-90	16	½"φ	9'-0"	Hor. Cross in Bottom of Heel.
	G-90	2	⅝"φ	9'-0"	Hor. Diagonal, " " " "
	G-70	2	⅝"φ	7'-0"	Hor. " " " " "
	G-50	2	⅝"φ	5'-0"	Hor. " " " " "
	G-90	2	⅝"φ	9'-0"	Hor. " " Top " "
	G-70	2	⅝"φ	7'-0"	Hor. " " " " "
	G-50	2	⅝"φ	5'-0"	Hor. " " " " "
	E-170	12	⅞"φ	17'-0"	Hor. Long. " Bottom and Top.
	EB-180	6	⅞"φ	18'-0"	Hor. " Bent up from Bottom.
STEM.	J-120	4	½"φ	12'-0"	Vert. in Front Face of Stem.
	J-110	2	½"φ	11'-0"	Vert. " " " " "
	J-96	15	½"φ	9'-6"	Vert. " " " " "
	J-120	4	½"φ	12'-0"	Vert. " Rear " " "
	J-110	2	½"φ	11'-0"	Vert. " " " " "
	J-96	15	½"φ	9'-6"	Vert. " " " " "
	G-296	20	⅝"φ	29'-6"	Hor. " " " " "
	J-296	10	½"φ	29'-6"	Hor. " Front " " "
	J-36	8	½"φ	3'-6"	Vert. " " " " Wing.
	J-36	8	½"φ	3'-6"	Hor. " " " " "
BUTTRESSES.	EH-150	4	⅞"φ	15'-0"	Diagonal - 2 Bars in each Bt'rss.
	EH-83	4	⅞"φ	8'-3"	Diagonal - 2 " " " "
	JH-52	12	½"φ	5'-2"	Hor. - 6 " " " "
	JH-78	12	½"φ	7'-8"	Hor. - 6 " " " "
	JH-96	8	½"φ	9'-6"	Hor. - 4 " " " "
	JH-52	8	½"φ	5'-2"	Vert. - 4 " " " "
	JH-78	8	½"φ	7'-8"	Vert. - 4 " " " "
	JH-96	8	½"φ	9'-6"	Vert. - 4 " " " "
TOTAL RODS FOR ALL PIERS.	D-90	305	1"φ	9'-0"	Vert. in all faces of Piers.
	F-46	25	¾"φ	4'-6"	Hor. in Down Stream Face of Piers.
	D-36	10	1"φ	3'-6"	2 Each in Nose of All Piers.
	DB-66	10	1"φ	6'-6"	2 " " " " " "
	D-276	15	1"φ	27'-6"	3 " " Top " " "
	D-260	20	1"φ	26'-0"	4 " " " " " "
	D-50	180	1"φ	5'-0"	18 " " " and Bottom, All Piers.
	FB-73	28	¾"φ	7'-3"	In Tops of Rest Piers Only.
	FB-83	16	¾"φ	8'-3"	" " " " " "
	F-46	8	¾"φ	4'-6"	" " " " " "
	F-76	6	¾"φ	7'-6"	" " " " " "
	D-246	15	1"φ	24'-6"	3 Each in Bottom of All Piers.
	D-230	20	1"φ	23'-0"	4 " " " " " "
	F-266	50	¾"φ	26'-6"	Hor. in side Faces of Piers.

RIP RAP FOUNDATION MAT.

All bars to be 1"φ. Lengths of these bars is shown on plan of mat. Weight of these bars is included in Abutment Quantities.

QUANTITIES.

	CU. YDS.	POUNDS.
WEST ABUTMENT		
CONCRETE.	58 in Abutment. 31 in Found. Mat.	
REINFORCING STEEL.		5275 in Abutment. 3840 in Found. Mat.
DRY WALLS AND RIP RAP.	125.	
EAST ABUTMENT.		
CONCRETE.	58 in Abutment. 31 in Found. Mat.	
REINFORCING STEEL.		5275 in Abutment. 3840 in Found. Mat.
DRY WALLS AND RIP RAP.	125.	
PIERS Nos. 2, 4 and 6.		
CONCRETE. (3 Piers)	132.7 Tremie. 137.5 Dry.	
REINFORCING STEEL.		10165.
REST PIERS Nos. 8 and 10.		
CONCRETE. (2 Piers)	153.2 Tremie. 95.9 Dry.	
REINFORCING STEEL.		7380

Total Concrete:- 411.4 Cu.Yds. Dry.- 285.9 Cu.Yds. Tremie.

Total Dry Walls & Rip Rap:- 250 Cu.Yds.

Total Reinforcing Steel:- 36165 Lbs.

NOTES.

SPECIFICATIONS:- Board of Wayne County Road Commissioners' Specifications as revised Jan., 1930 and Supplementary Specifications for Highway Bridge Job No. 382. Design:- Joint Committee, 1924.

CONCRETE:- To be proportioned by "Water-Cement" ratio and Strength of 3000 lbs. per sq. in. at 28 days. For method of proportioning and controlling mix, see Specifications. Bevel all exposed edges ¾ unless otherwise specified. Lower edges of Copings are to be left square. Exposed surfaces are to be rubbed as soon as forms are removed. No cement grout is to be used on rubbed surfaces.

REINFORCING STEEL:- All bars to be deformed bars of Current Intermediate Grade as specified in the A.S.T.M. Standard Specifications for Billet-Steel Reinforcement Bars. (Serial Designation A-15-14). All bars to be securely tagged before being shipped to the job. Bars shall be securely wired together at each intersection. No concrete is to be placed until all bars to be encased are securely fastened in place.

CONSTRUCTION JOINTS:- Construction joints shall be located as shown, and no others will be allowed except on the approval of the Engineer. No horizontal construction joints will be allowed except at the top of the footing and as noted.

WATERPROOFING:- Buttresses and back of abutment to be painted one coat of Approved Asphalt Waterproofing.

REVISIONS
Abutment Stem Relocated. M.S. 4-22-30
Sheet Lead Added. PAN. 5-5-30
Quantities Revised Due to checking. M.S. 5-12-30.
Gas Co. Pipe Sleeve Detail Added. M.S. 6-9-30
Bars added in faces of piers. M.S. 7-10-30 PAN.
Elev. of Abutment Stem raised 1/2" M.S. 7-23-30. PAN.
Abutment anchor bolt spacing revised. 10-11-30 M.S. PAN.
Rip Rap Foundation Mat added. Quantities Revised 10-29-30 M.S. PAN
Final Concrete Quantities added 4-15-31 M.S.
Revised as constructed. W.D.S. 10-20-31 EJE 10-21-31
Submarine Cable Guard Details Added. 2-18-33 M.K.
El. plugs added 5-31-39 J.W.C.

JOB 382.
ISSUE No. 13
DATE:- 193

BOARD OF
WAYNE COUNTY ROAD COMMISSIONERS
DETROIT, MICHIGAN.

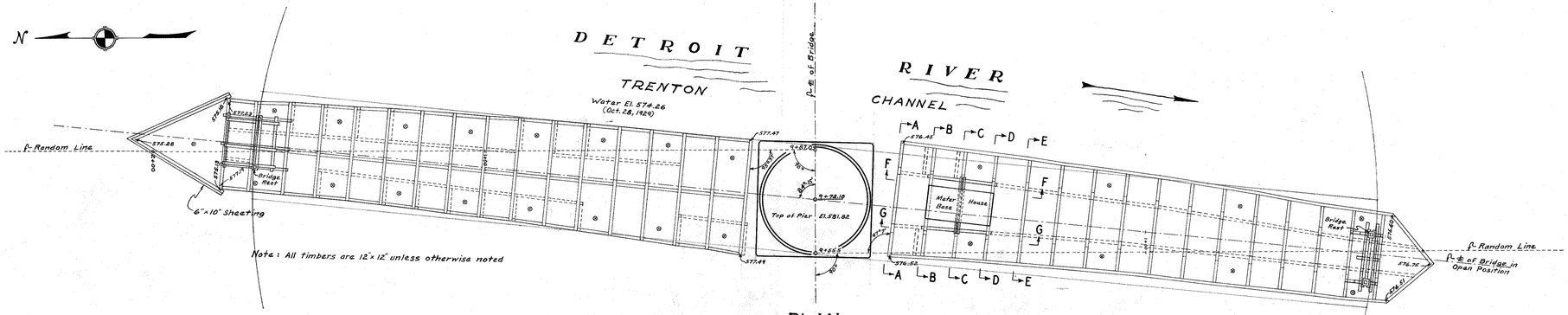
EDWARD N. HINES, CHAIRMAN — JOHN S. HAGGERTY, COMMISSIONER — WILLIAM F. BUTLER, COMMISSIONER

VAN HORN ROAD
TRENTON CHANNEL BRIDGE TO GROSSE ~ ISLE
BRIDGE - B1 OF 82-7-32.

ABUTMENTS & REBUILT PIERS. # 2-4-6-8 & 10

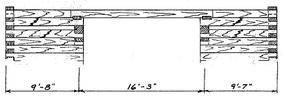
DESIGNED BY ____ DRAWN BY M.S. CHECKED BY PAN.
DATE March 3, 1930. SCALE As Noted
CORRECT [signature] Bridge Engineer Reg. Civ. Eng.
APPROVED ____ Engineer Manager Reg. Civ. Eng.
SHEET No. 9.

JOB # 382-B14

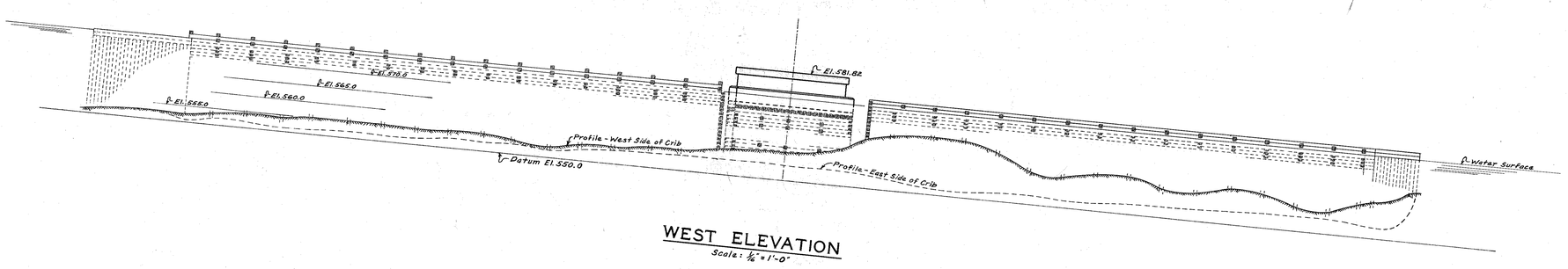


Note: All timbers are 12"×12" unless otherwise noted

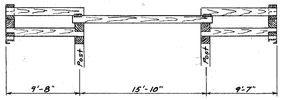
PLAN
Scale: 1/16"=1'-0"



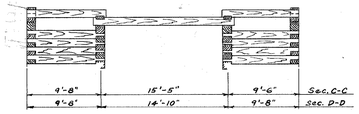
SEC. A-A



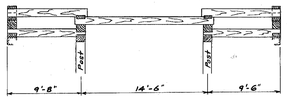
WEST ELEVATION
Scale: 1/16"=1'-0"



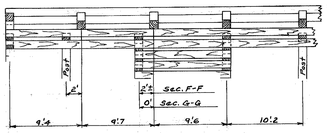
SEC. B-B



SEC. C-C & D-D



SEC. E-E



SEC. F-F & G-G

SEE SHEET 19 FOR NEW TRENTON BRIDGE IN 1935

NOTE: ⊗ = Rock Filled Crib
See Field Book #136 & Field Data in General Folder

REVISIONS
Checker's Changes G.J.P. 11-21-31 P.A.N.

BOARD OF
WAYNE COUNTY ROAD COMMISSIONERS
DETROIT, MICHIGAN.

EDWARD N. HINES, CHAIRMAN
JOHN S. HAGGERTY, COMMISSIONER
WILLIAM F. BUTLER, COMMISSIONER

VAN HORN ROAD
TRENTON CHANNEL BRIDGE
TO
GROSSE ISLE
BRIDGE - B1 OF 82-7-32

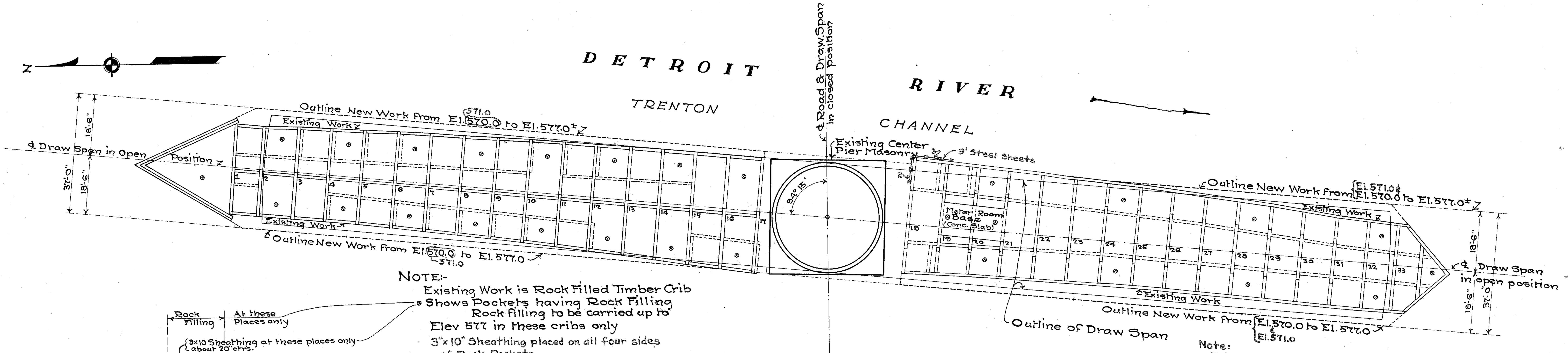
PROTECTION CRIB

DESIGNED BY _____ DRAWN BY G.J.P. CHECKED BY P.A.N. 11-25-31
DATE 3-6-31 SCALE 1/16"=1'-0" except as shown.
CORRECT _____ Bridge Engineer _____ Reg. Civ. Eng.
APPROVED _____ Engineer Manager _____ Reg. Civ. Eng.

JOB 382
ISSUE No.
DATE:

SHEET No. 18

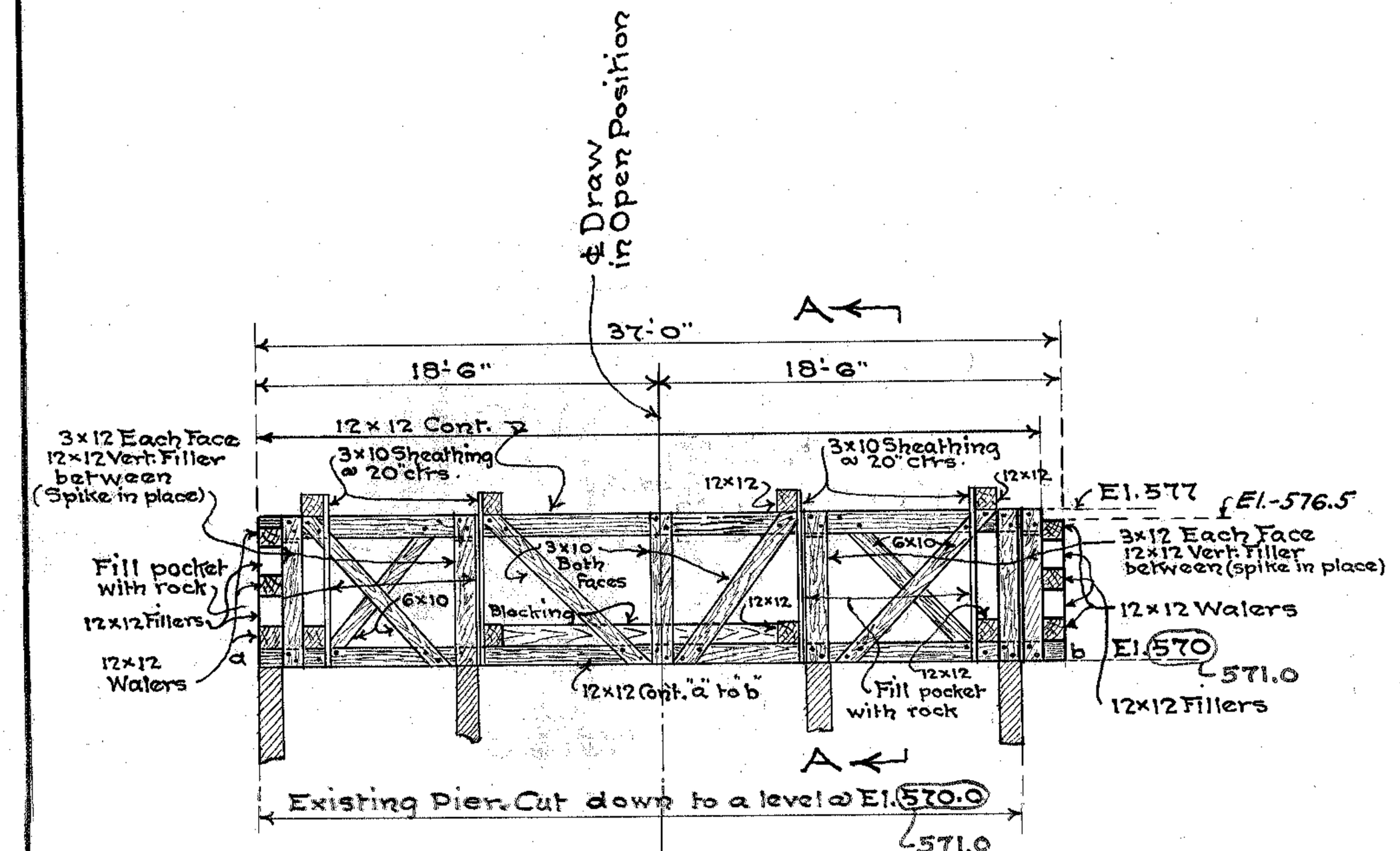
JOB #382-B25



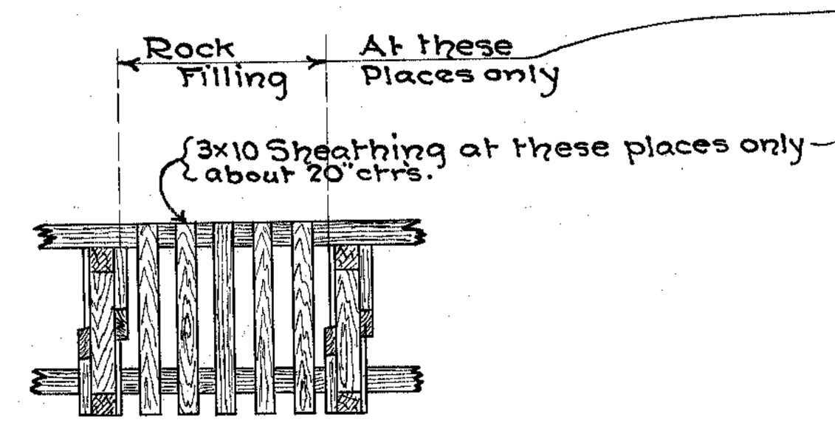
NOTE:- Existing Work is Rock Filled Timber Crib. Shows Pockets having Rock Filling. Rock filling to be carried up to Elev 577 in these cribs only. 3"x10" Sheathing placed on all four sides of Rock Pockets.

PLAN
Scale:- 1/16" to 1'

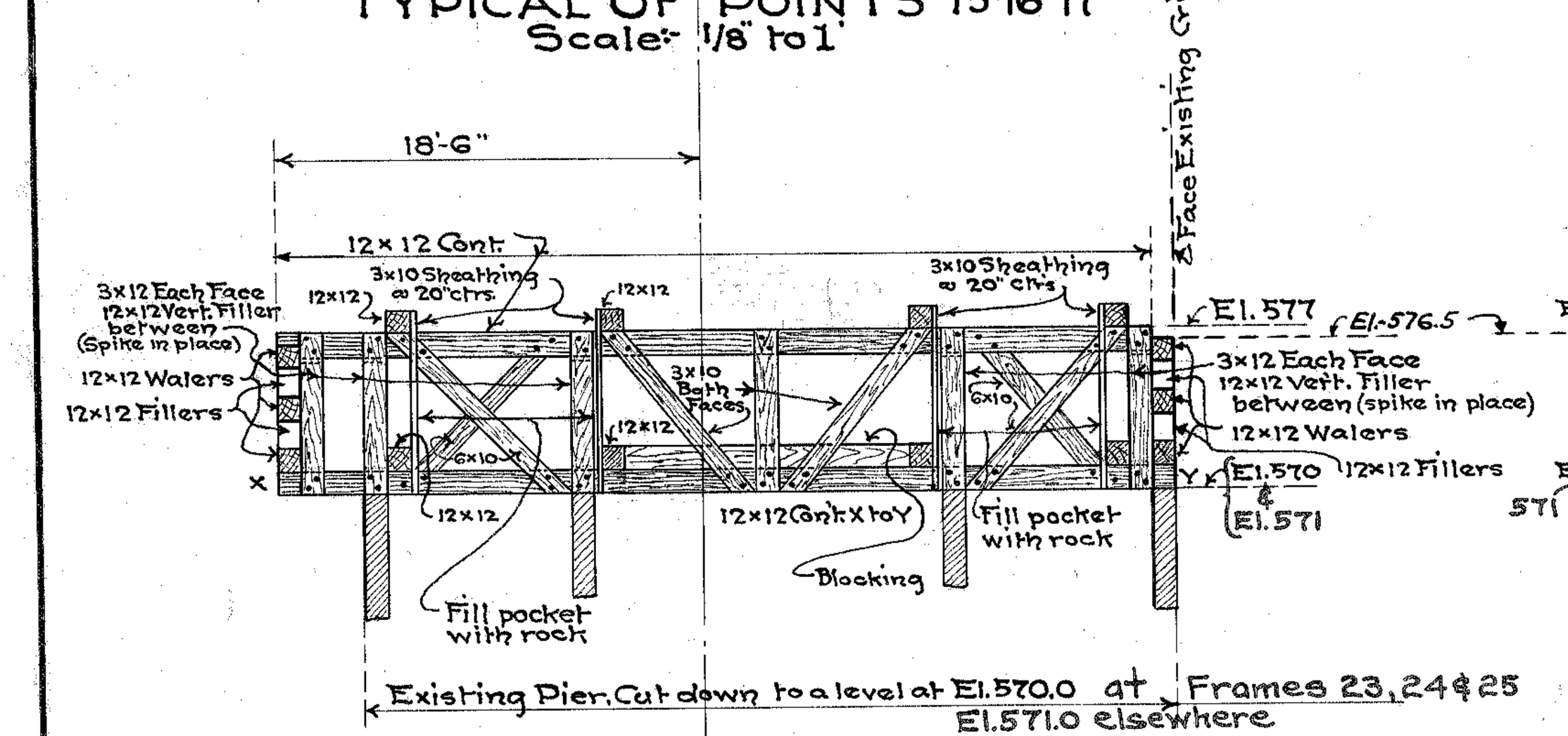
Note: Existing Frames 23, 24, 25 and 26 cut down to El. 570.0 and new frames built upon 4 new 12"x12" longitudinal timbers.



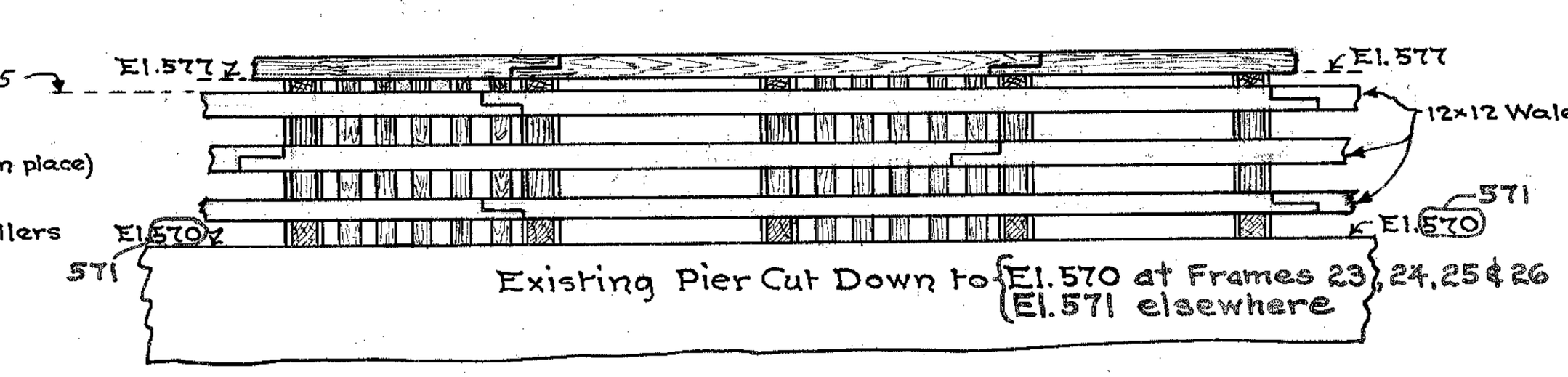
CROSS SECTION
TYPICAL OF POINTS 15-16-17
Scale:- 1/8" to 1'



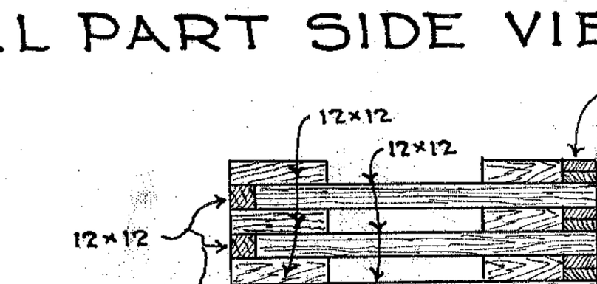
SECT. "AA"



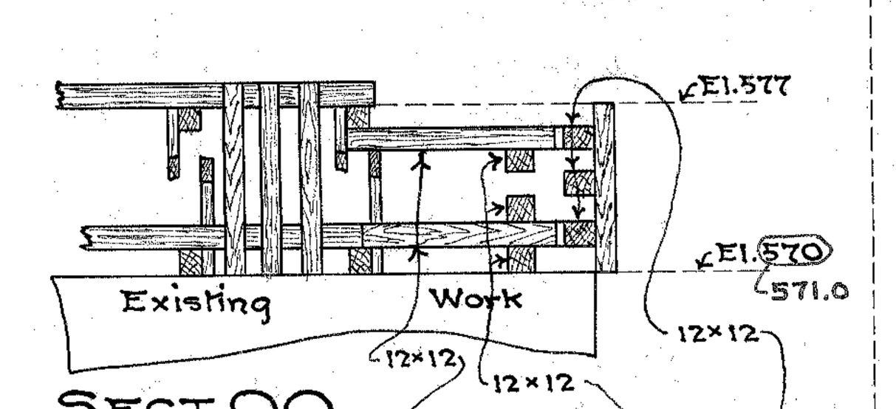
CROSS SECTION
TYPICAL OF POINTS-18-22 to 25 Incl.
Scale:- 1/8" to 1'



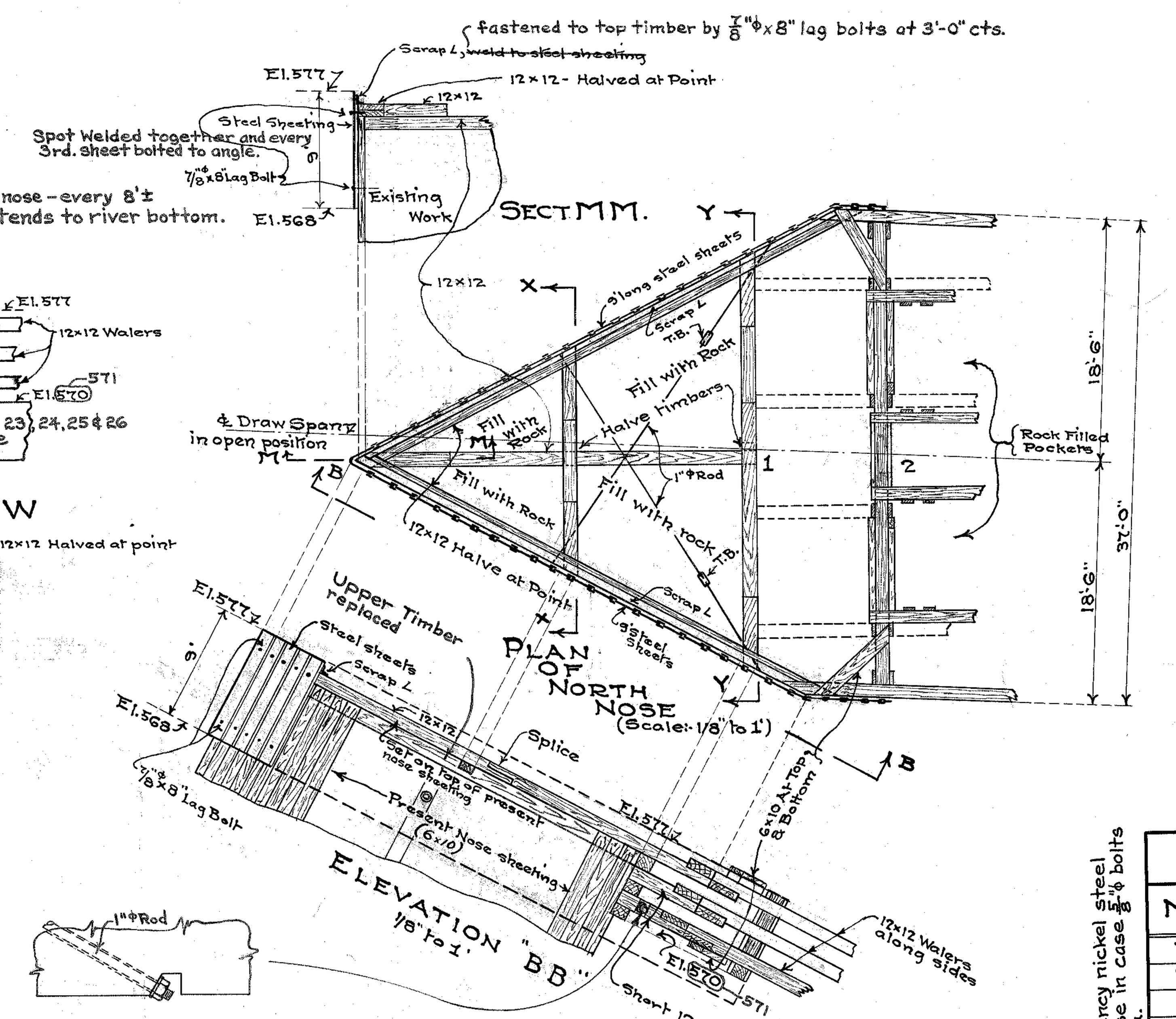
TYPICAL PART SIDE VIEW



SECT. "RR"



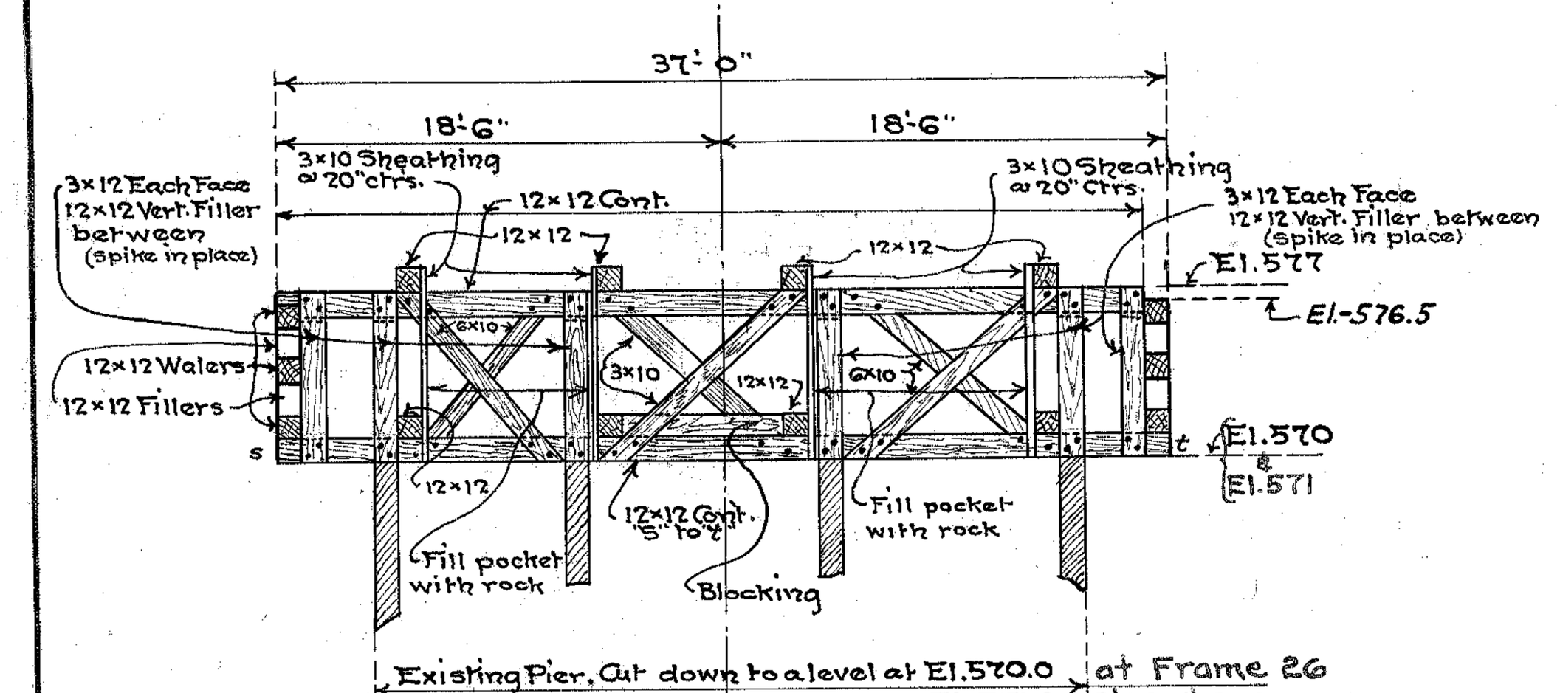
SECT. QQ



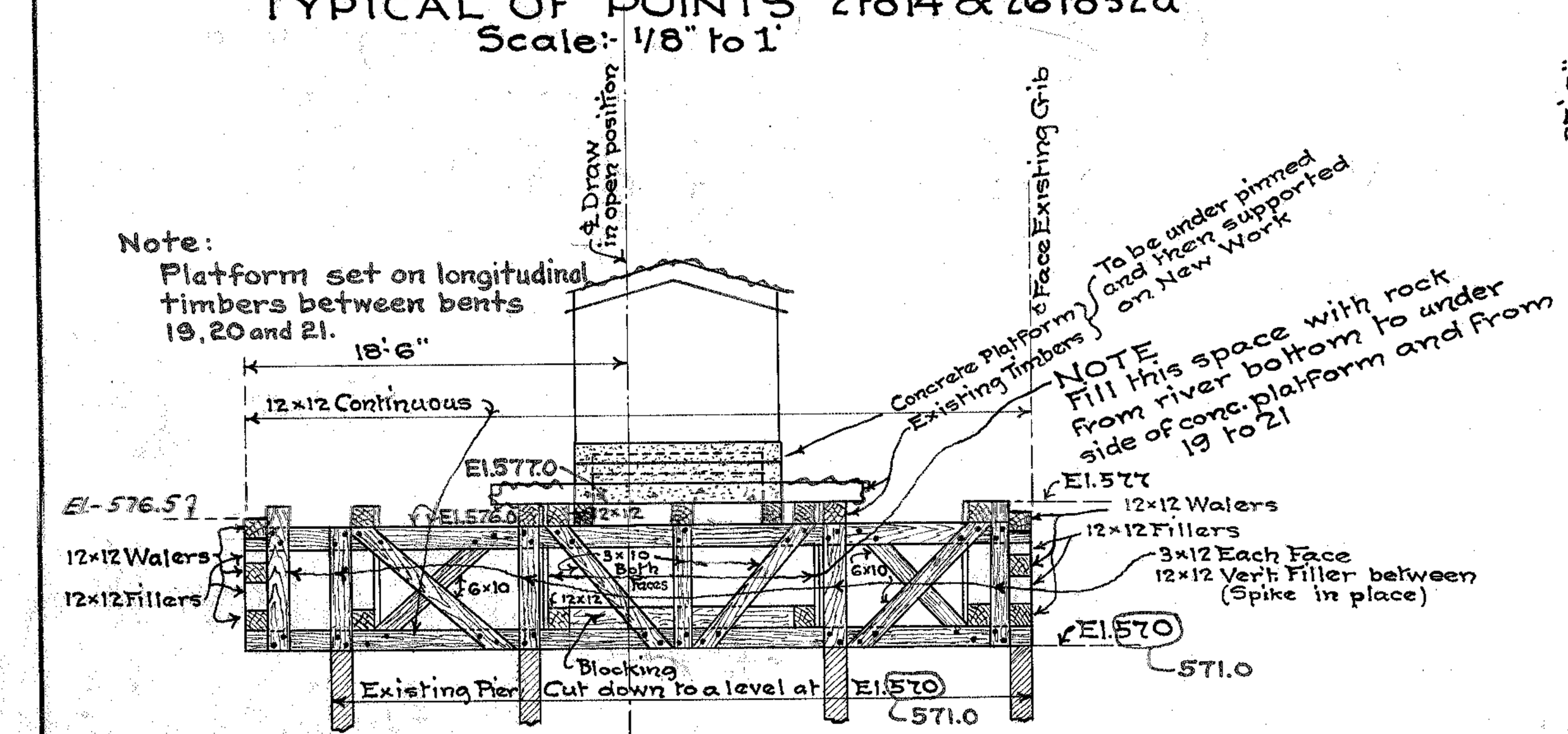
PLAN OF NORTH NOSE (Scale:- 1/8" to 1')

ELEVATION "BB" 1/8" to 1'

DETAIL OF TIE ROD FASTENING

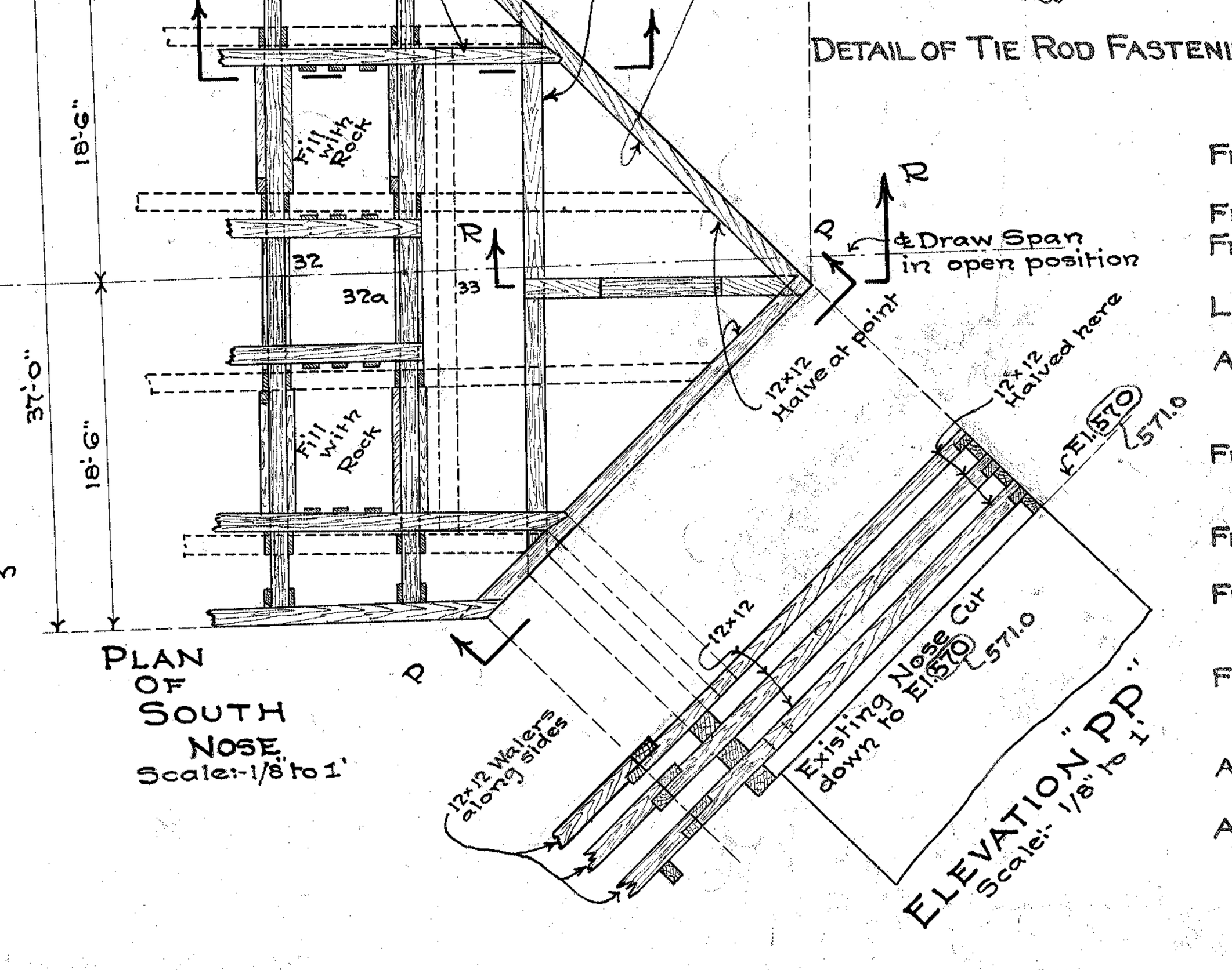


CROSS SECTION
TYPICAL OF POINTS 2 to 14 & 26 to 32a
Scale:- 1/8" to 1'



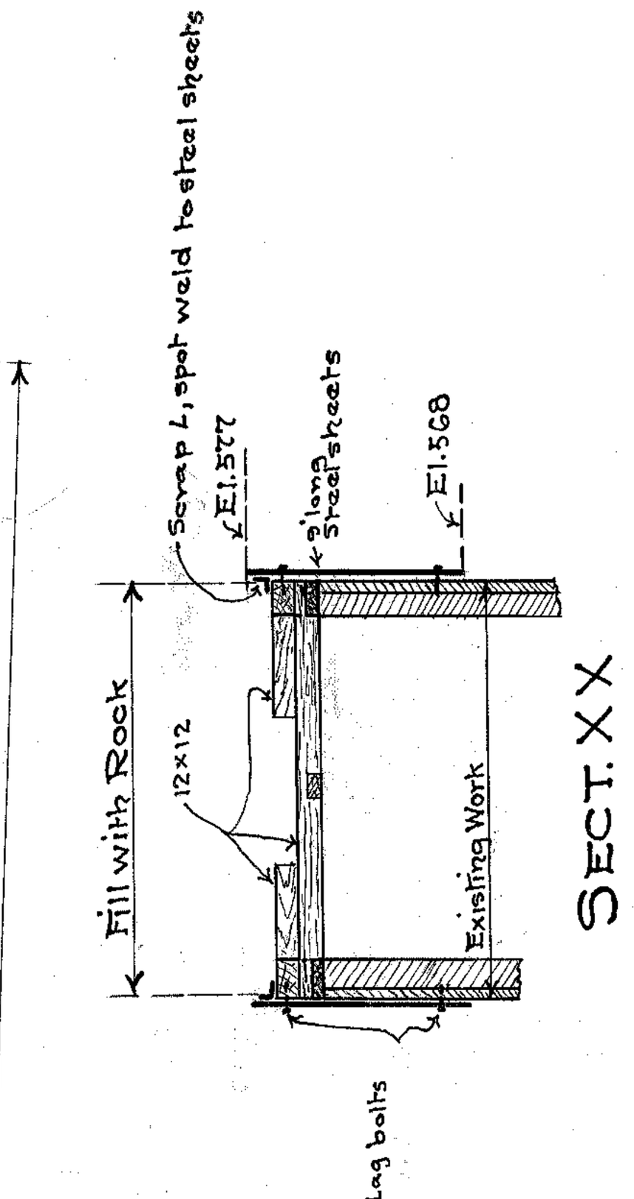
Note: Platform set on longitudinal timbers between bents 19, 20 and 21.

CROSS SECTION
TYPICAL OF POINTS 19-20 & 21
Scale:- 1/8" to 1'

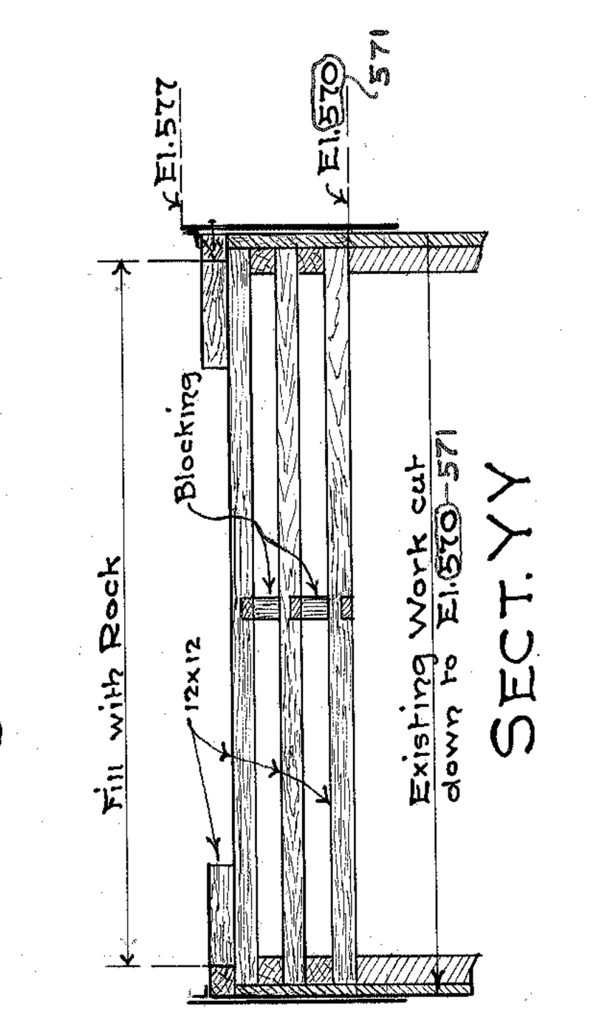


PLAN OF SOUTH NOSE Scale:- 1/8" to 1'

ELEVATION "PP" Scale:- 1/8" to 1'



SECT. XX



SECT. YY

NOTES:
- Material to be Fir to conform with Sections 214, 218 of Grading Rules of the West Coast Lumberman's Association.
- Ends of Timbers, daps, cuts, bolt holes and all contact surfaces to receive a brush coat of hot Carbolineum or other approved preservative.

BILL OF TIMBER AS ORDERED

ITEM	QUANTITY	SIZE	DESCRIPTION
1	30888 Bd. Ft.	12"×12"×22'	Fir Timber
2	4320 " "	12"×12"×24'	" "
3	2160 " "	12"×12"×30'	" "
4	31416 " "	12"×12"×34'	" "
5	25056 " "	12"×12"×36'	" "
6	17328 " "	12"×12"×38'	" "
7	3840 " "	12"×12"×40'	" "
8	8544 " "	3"×12"×16'	" "
9	1500 " "	3"×10"×12'	" "
10	7200 " "	3"×10"×16'	" "
11	800 " "	3"×10"×20'	" "
12	6600 " "	6"×10"×10'	" "

ESTIMATED QUANTITIES
Additional Rock Filling 487 cu. yds (Measured in place)
Timber 137,492 F.B.M.

BILL OF IRON

Nº	ITEM	DIA.	LENGTH OF BOLT	LENGTH OF THREAD	REMARKS
255	Bolt – Sq. Hd. & Nut	3/4"φ	1'-2"	3"	
765	" " " " "	"	1'-5"	3"	
960	" " " " "	"	1'-8"	3"	
1070	" " " " "	"	2'-2"	3"	
100	Drift Bolts	3/4"φ	1'-1"		One end pointed
215	Lag Bolts - Sq. Hd.	7/8"φ	0'-8"		Gimlet point
10,000	60 d Wire Spikes				(11-100# Kegs)
5,000	3"×3"×3/8" Plate Washers (For 3/4" Bolts)				(7/8" Hole)
1,100	Ogee Cast Iron Washers (For 3/4" Bolts)				
3,460	#3 TECO Toothed Rings (Hot Dip Galvanized)	For 3/4" Bolts			Timber Eng. Co.
10	Nickel Steel Bolts & Nuts	5/8"φ	1'-6"	6" Each End	Timber Eng. Co.
6	" " " " "	"	2'-0"	8" Each End	" " "
6	" " " " "	"	2'-6"	10" Each End	" " "
2	Tie Rods	1"φ			29'± each
	Sheet Piling (Scrap Steel Sheeting)				680 Lin. Ft. ±
	6"×6"×3/8" Scrap Ls				80 Lin. Ft. ±

16,000# (bracketed: Bolts through Ogee Cast Iron Washers)

Additional 3/4"φ emergency nickel steel bolts ordered for use in case 5/8"φ bolts are not strong enough.

Steel Sheeting used – Lackawanna SP12 and SP15.

PAINTING NOTES

North Pier

Frame #1 - Complete frame joints painted with Detroit Graphite Co. Aluminum paste & #258 liquid.

Frames #2, 3, 4 & 5 – All joints painted with White Lead and Oil.

Frames #6-17 incl. – Joints painted with Detroit Graphite Co. Aluminum paste & #258 Bronzing liquid.

Longitudinal timbers painted with Detroit Graphite Co. Aluminum paste & #258 Bronzing liquid.

All Match-marking and Numbering painted with Rogers "Black Asphaltum" paint on entire north pier.

South Pier

Frame #18 - Joints on horizontal timbers and diagonal bracing painted with Water. lox. Vertical posts painted with Boydell Bros. #5601 Bronzing liquid & Aluminum paste.

Frames #19, 20, 22, 23 and #25-33 incl. – All joints painted with Aluminum paste and Boydell Bros. #5601 Bronzing liquid.

Frame #21 – Joints on horizontal timbers painted with Boydell Bros. Structural Steel Gray #3. Vertical posts and diagonals painted as Frames #19, 20, 22, 23 and 25-33 incl.

Frame #24 – Joints on longitudinal timbers painted with Rinshed-Mason Gray paint. Vertical posts and diagonals painted as Frames #19, 20, 22, 23 and 25-33 incl.

All longitudinal timbers painted with Aluminum paste and Boydell Bros. #5601 Bronzing liquid.

All Match-marking and Numbering painted with Eagle #1348 Black Engine Enamel.

SCHEME "D"

REVISIONS
- Steel Sheeting added 7-3-34 W.W.S. ✓J.C.M.
- Bill of Timber and Notes added 8-3-34 M.K.
- Revised and List of Iron added. S.L., 3-30-35, ✓J.W.C. "
- Bill of Iron revised 5-6-35 M.K. ✓S.L.
- Quantity of Rock Revised - 9-10-35 M.K. F.H.C.
- Field Changes G.J.P. 1-15-37 ✓J.W.C.

JOB 382
ISSUE No:-
DATE:- 9-19-35

BOARD OF
WAYNE COUNTY ROAD COMMISSIONERS
DETROIT, MICHIGAN.
EDWARD N. HINES, CHAIRMAN — JOHN S. HAGGERTY, COMMISSIONER — WILLIAM F. BUTLER, COMMISSIONER

VAN HORN ROAD TRENTON CHANNEL BRIDGE TO GROSSE ~ ISLE
BRIDGE-B1 OF 82-7-32

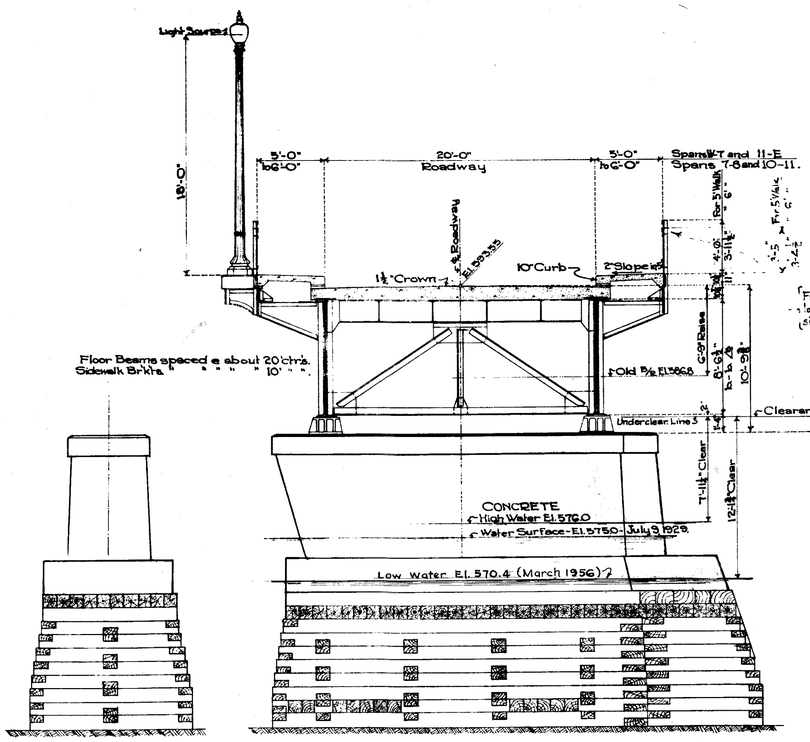
REMODELING PROTECTION PIER

DESIGNED BY W.W.S. DRAWN BY W.W.S. CHECKED BY J.W.C.
DATE 6-1-1933 SCALE As Noted

CORRECT ____ Reg. Civ. Eng. Bridge Engineer
APPROVED ____ Reg. Civ. Eng. Engineer Manager

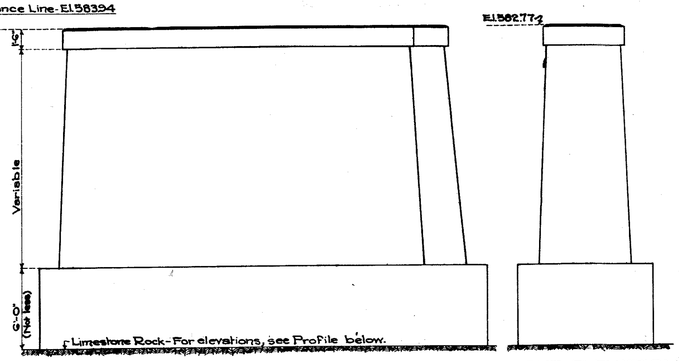
SHEET No. 19

JOB #382-B26



SOUTH END ELEVATION of PIER
Scale ⅜"=1'-0"

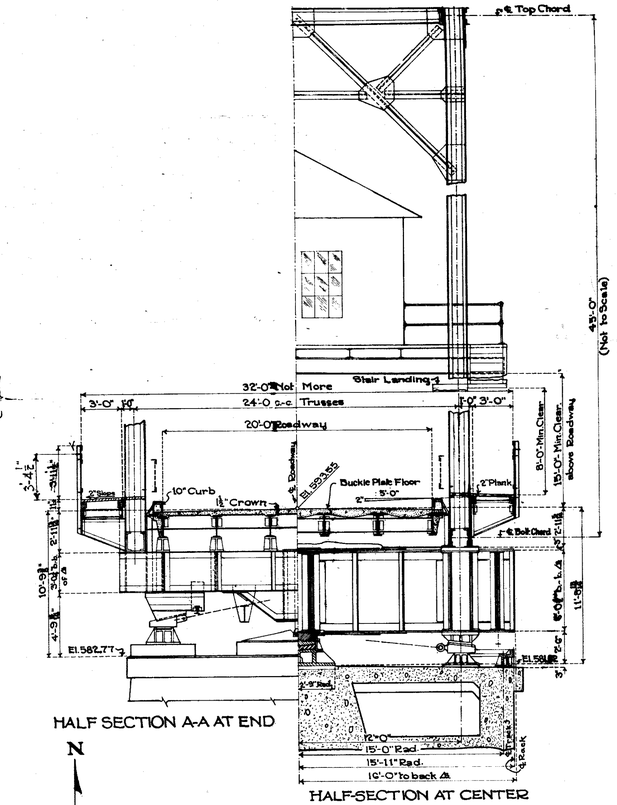
TYPICAL CROSS SECTION FIXED SPANS & SIDE ELEVATION - PIERS 2,4,6,8 & 10.
Scale ⅜"=1'-0"



SIDE ELEVATION - PIERS 1,3,5,7,& 11
Scale ⅜"=1'-0"

END ELEVATION
Scale ⅜"=1'-0"

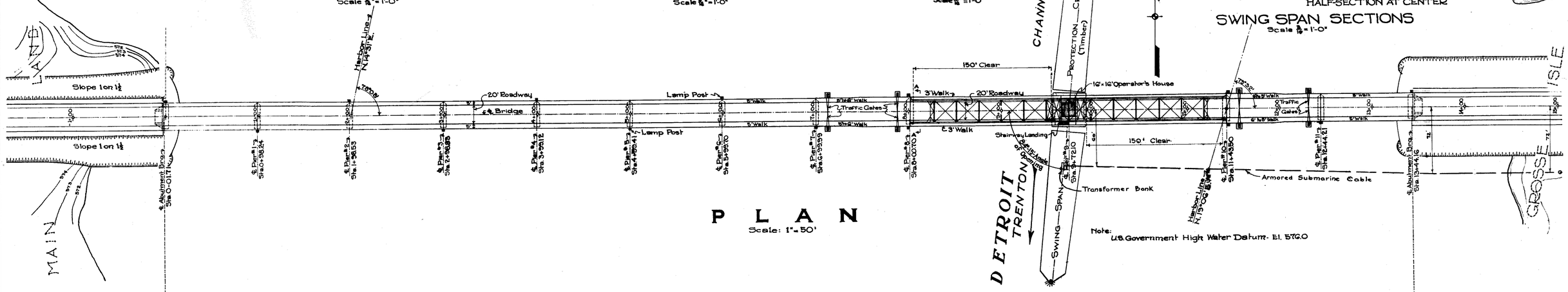
Field Alteration-Top L lowered T to new location shown in Blue. Aug. 1933



HALF SECTION A-A AT END

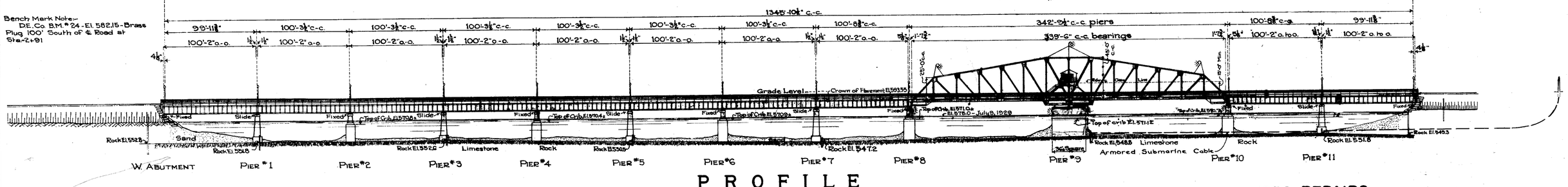
HALF-SECTION AT CENTER

SWING SPAN SECTIONS
Scale ⅜"=1'-0"



P L A N
Scale: 1"=50'

Note:
U.S. Government High Water Datum - El. 576.0



P R O F I L E
Scale 1"=50'

1958 REPAIRS

SQUAD LEADER A.W. Johnson

REVISIONS		

DRAWN BY D.K. Compton — CHECKED BY R.M. Martin — DATE 11-1-57
TRACED BY — CHECKED BY — DATE

CORRECT S. Lifsit
ENGINEER OF DESIGN - STRUCTURES AND EXPRESSWAYS

APPROVED E.H. Chapin
ENGINEER OF BRIDGES AND STRUCTURES

APPROVED
COUNTY HIGHWAY ENGINEER

BOARD OF
WAYNE COUNTY ROAD COMMISSIONERS
DETROIT, MICHIGAN
MICHAEL J. O'BRIEN — WILLIAM E. KREGER — CHARLES L. WILSON

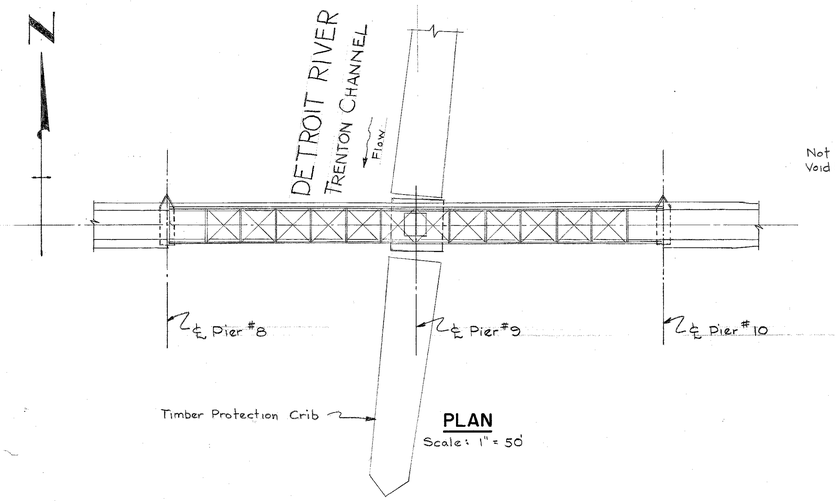
GROSSE ISLE PARKWAY BRIDGE over TRENTON CHANNEL (DETROIT RIVER)
EXISTING BRIDGE GENERAL DRAWING

COUNTY JOB 382
ISSUE NO. 1
DATE 10-31-57
SHEET NO. B-52

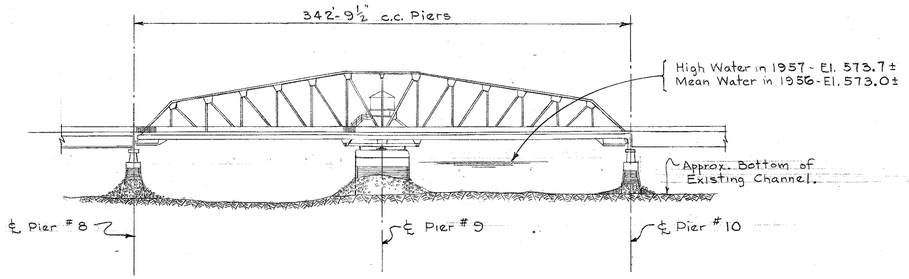
Job 382-B52

Job 382-* B52

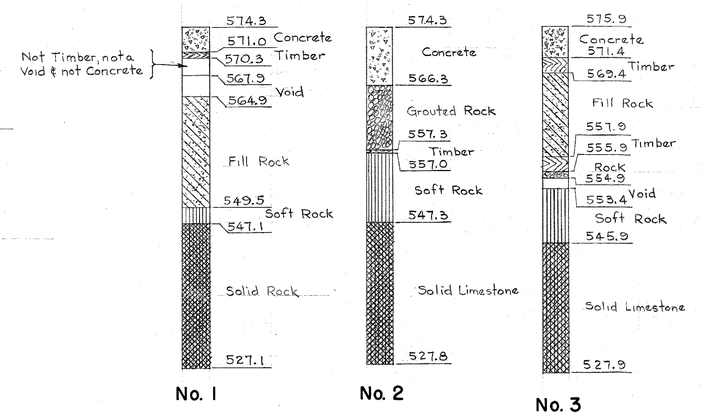
5-1-57



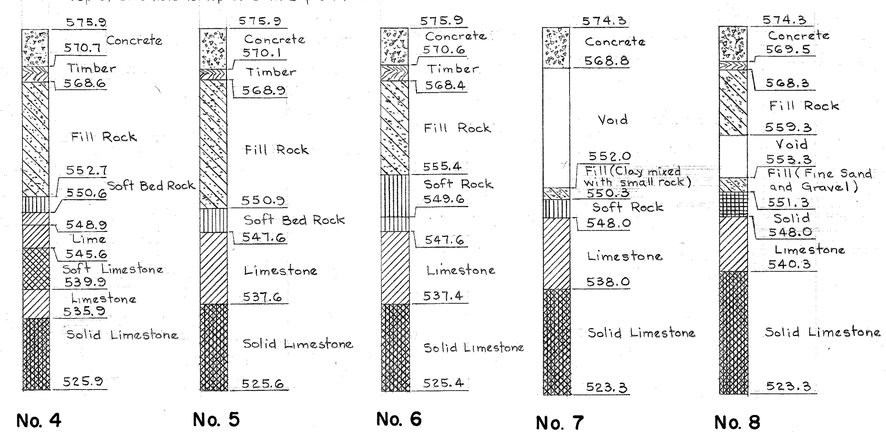
PLAN
Scale: 1" = 50'



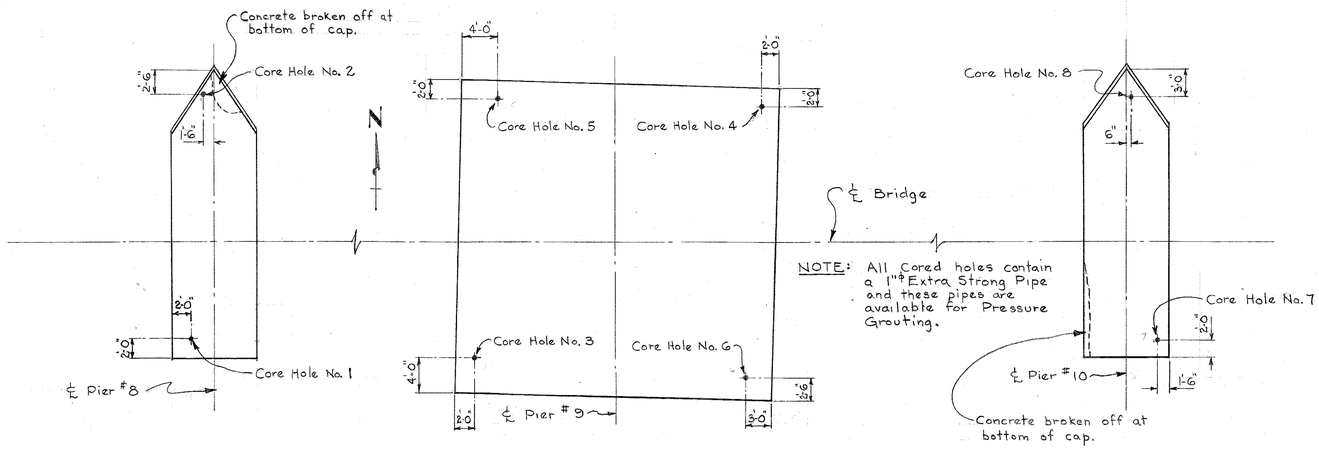
ELEVATION
Scale: 1" = 50'



NOTES: Elevations given to right of Core
Top of Core Hole is top of conc. cap on Timber cribs.



CORE HOLES



NOTE: All Cored holes contain a 1" ϕ Extra Strong Pipe and these pipes are available for Pressure Grouting.

PLAN OF CONCRETE CAPS AT PIERS #8, #9 & #10
SHOWING LOCATION OF CORE HOLES
Scale: ⅛" = 1'-0"

SQUAD LEADER A. W. Johnson

REVISIONS			DRAWN BY	CHECKED BY	DATE
			D. K. Compton	R. W. Dilworth	10-19-57
			TRACED BY	CHECKED BY	DATE

CORRECT
S Sifait
ENGINEER OF DESIGN STRUCTURES AND EXPRESSWAYS

APPROVED F. E. Hogan
ENGINEER OF BRIDGES AND STRUCTURES

APPROVED J. W. Bross
COUNTY HIGHWAY ENGINEER

BOARD OF
WAYNE COUNTY ROAD COMMISSIONERS
DETROIT, MICHIGAN
MICHAEL J. O'BRIEN — WILLIAM E. KREGER — CHARLES L. WILSON

1958 REPAIRS

GROSSE ISLE PARKWAY BRIDGE over TRENTON CHANNEL (DETROIT RIVER) STABILIZATION & REPAIRS TO ROCK-FILLED PIERS #8, #9 AND #10

ISSUE NO. 1
DATE 10-31-57

COUNTY JOB 382
SHEET NO. B-53

Job 382-B53

Job 382-B53

1958 REPAIRS

REVISIONS		

SQUAD LEADER: Alfred W. Johnson
DRAWN BY: R.M. Martin — CHECKED BY: D.K. Compton — DATE: 10-24-57
TRACED BY — CHECKED BY — DATE
CORRECT: S. Lifsitz — ENGINEER OF DESIGN, STRUCTURES AND EXPRESSWAYS
APPROVED: F. H. Chaguin — ENGINEER OF BRIDGES AND STRUCTURES
APPROVED: J. W. Gross — COUNTY HIGHWAY ENGINEER

BOARD OF
WAYNE COUNTY ROAD COMMISSIONERS
DETROIT, MICHIGAN
MICHAEL J. O'BRIEN — WILLIAM E. KREGER — CHARLES L. WILSON

GROSSE ISLE PARKWAY BRIDGE over TRENTON CHANNEL (DETROIT RIVER)
STABILIZATION & REPAIRS TO ROCK-FILLED PIERS #8, #9 AND #10 (CONT'D.)

ISSUE NO. 1 — DATE 10-31-57
COUNTY JOB 382
SHEET NO. B-54

Job 382-B52

Job 382-#B54

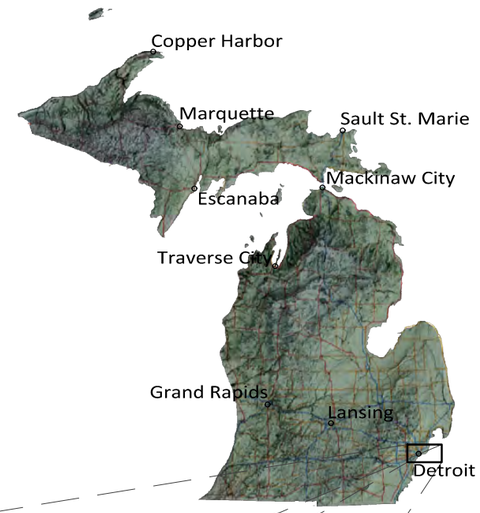
WAYNE COUNTY DEPT. OF PUBLIC SERVICES

CONSTRUCTION PLANS FOR PROPOSED PIER REPAIRS OF

GROSSE ILE PARKWAY BRIDGE

BRIDGE NO. 382, SN 12006

TRENTON AND GROSSE ISLE TWP., MI



VICINITY MAP

SCALE: 1" = 300'

INDEX OF DRAWINGS

STATE OF MICHIGAN
STEVEN J. MILLER
ENGINEER
No. 6201062131
LICENSED PROFESSIONAL ENGINEER
4/16/2021

OWNER:
WAYNE COUNTY DEPT. OF PUBLIC SERVICES
400 MONROE ST.
3RD FLOOR
DETROIT, MICHIGAN 48226

CLIENT:
J.F. BRENNAN CO. INC.
818 BAINBRIDGE ST.
LA CROSSE, WI 54603
608-784-7173
WWW.JFBRENNAN.COM

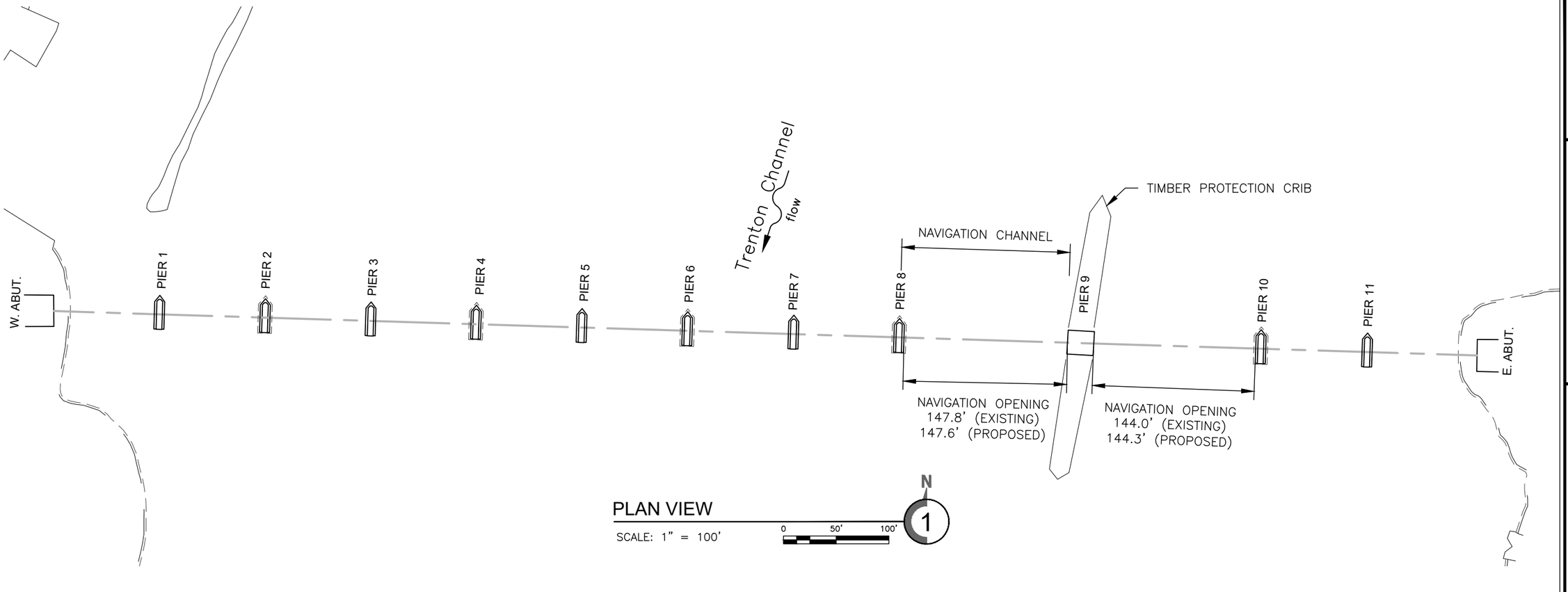
CIVIL ENGINEER:
524 E. LUDINGTON ST
SUITE 202
ESCANABA, MI 49829
906-285-6500
WWW.COLLINSENGR.COM

COLLINS ENGINEERS, P.C.
524 E. Ludington St., Ste. 202
Escanaba, MI 49829
906-285-6500
www.collinsengr.com

BRENNAN

Title Sheet
Grosse Ile Parkway Bridge
Pier Repairs
Grosse Ile, MI

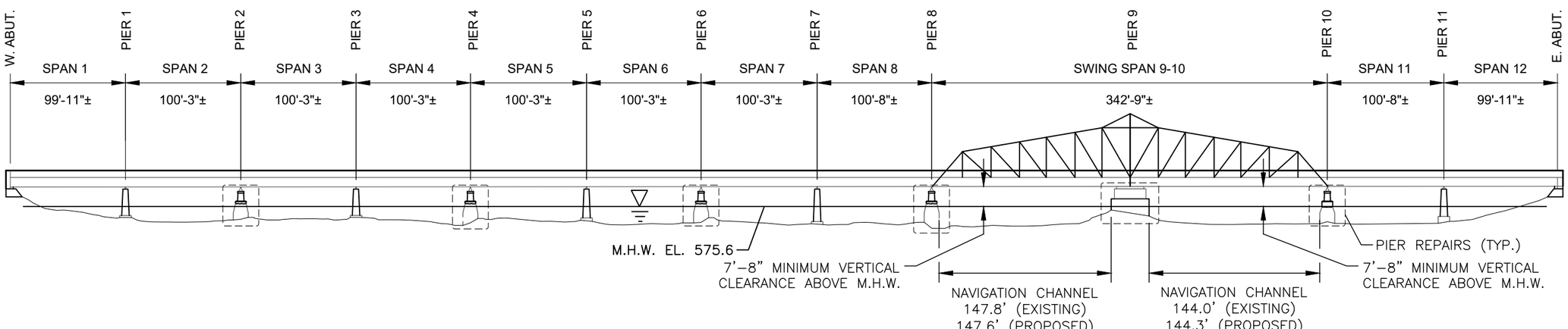
CEI PROJECT	60-12797
DESIGNED BY:	SJM
DRAWN BY:	JCG
CHECKED BY:	SJM
DATE:	4-16-21
SHEET NO:	T-01



PLAN VIEW

SCALE: 1" = 100'

1



ELEVATION VIEW

SCALE: 1" = 100'

2

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BRENNAN

General Plan & Elevation
Grosse Ile Parkway Bridge
Pier Repairs

Grosse Ile, MI

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GENERAL NOTES:

1. THE WORK COVERED BY THESE PLANS INCLUDES GROUTING THE VOIDS IN THE TIMBER CRIBS FOR PIERS #2, #4, #6, #8, #9 AND #10. THIS WORK WILL BE PERFORMED UNDER LIMITED HEADROOM.
2. CONSTRUCTION LIVE LOADING ON THE BRIDGE SUPERSTRUCTURE IS NOT PERMITTED. ALL WORK SHALL BE COMPLETED FROM THE WATER UNLESS OTHERWISE APPROVED BY WAYNE COUNTY.
3. THE CONTRACTOR SHALL BE RESPONSIBLE TO MAINTAIN THE STRUCTURAL INTEGRITY AND OVERALL STABILITY OF THE BRIDGE AT ALL TIMES DURING CONSTRUCTION.
4. VINYL FORMWORK SHALL BE INSTALLED ON PIERS #2, #4, #6 AND #10. STEEL FORMWORK SHALL BE INSTALLED ON PIERS #8 AND #9.
5. FABRIC FORMED CONCRETE (HYDROTEX ARTICULATING BLOCK - AB600) SHALL BE PLACED ON RIVERBED TO THE LIMITS SHOWN ON THE PLANS AT PIERS #2, #4, #6 AND #10.
6. FLOATING/SUSPENDED TURBIDITY CURTAINS OR OTHER APPROVED METHODS, SHALL BE INSTALLED AROUND THE FULL PERIMETER OF ALL PIERS DURING ALL REPAIR WORK.
7. THE CONTRACTOR SHALL LOCATE ALL ACTIVE UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED. COORDINATE ANY UTILITIES REQUIRING RELOCATION WITH WAYNE COUNTY PRIOR TO BEGINNING WORK.
8. EXCEPT AS AMENDED BY THE SPECIAL PROVISIONS OR OTHERWISE INDICATED ON THE PLANS ALL WORK SHALL BE IN ACCORDANCE WITH MICHIGAN DEPARTMENT OF TRANSPORTATION, 2012 STANDARD SPECIFICATIONS FOR CONSTRUCTION.
9. PLAN ELEVATIONS REFER TO U.S.C.G. DATUM PER EXISTING PLANS FROM 1930 BRIDGE RECONSTRUCTION.
10. WATER LEVEL IS SUBJECT TO CHANGE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING A DETERMINATION OF WATER LEVELS DURING CONSTRUCTION.
11. GROUTING OF TIMBER CRIBS AT PIERS #8, #9, AND #10 WILL REQUIRE COORDINATION WITH U.S. COAST GUARD VESSEL TRAFFIC SERVICES SARNIA, TO ENSURE WORK DOES NOT AFFECT PROPER OPERATION OF THE SWING SPAN AS REQUIRED BY THE FEDERAL CODE OF REGULATIONS. IT IS NOTED THAT THE SWING SPANS ARE CURRENTLY INOPERABLE.
12. THE COAST GUARD SHALL BE NOTIFIED OF WORK WITHIN THE NAVIGATION CHANNEL AT LEAST 30 DAYS PRIOR TO BEGINNING WORK. CONTACT:

    MR. WILLIAM B. STANIFER
    CHIEF, BRIDGE BRANCH, NINTH COAST GUARD DISTRICT
    216-902-6086
    WILLIAM.B.STANIFER@USCG.MIL

    MR. LEE D. SOULE
    216-902-608
    LEE.D.SOULE@USCG.MIL

13. SPAN 9 OF THE BRIDGE IS THE FEDERAL NAVIGATION CHANNEL. MEASUREMENTS OF THE NAVIGATION CLEARANCES IN SPANS 9 AND 10 WERE TAKEN BY SURVEYORS FROM JF BRENNAN COMPANY INC. ON MARH 24TH, 2021. THE WATER SURFACE ELEVATION ON THIS DATE WAS EL. 573.97 FT. NAVD88. THE EXISTING AND PROPOSED NAVIGATION CLEARANCES IN SPANS 9 AND 10 ARE PROVIDED IN THE TABLE BELOW.

NAVIGATION CLEARANCES							
SPAN	ELEV.	EXISTING NAVIGATION CLEAR			PROPOSED NAVIGATION CLEAR		
		U.S.	MID	D.S.	U.S.	MID	D.S.
9	571	148.7	148.4	147.8	148.5	148.2	147.6
	560	146.7	146.7	146.6	146.5	146.5	146.4
10	571	144.0	--	--	143.3	--	--
	560	--	--	--	--	--	--

U.S. = UPSTREAM ON PIER
MID = MIDDLE ON PIER
D.S. = DOWNSTREAM ON PIER

14. THE FOLLOWING DESIGN CRITERIA/MATERIALS HAVE BEEN ESTABLISHED FOR THIS PROJECT:
    A. GROUT / CONCRETE MIX
        - F'C= 3000 PSI AT 28 DAYS FOR GROUT
        - W= 150 PCF MAXIMUM UNIT WEIGHT OF CONCRETE
        - MAXIMUM CONCRETE/GROUT POUR HEIGHT IS 4 FEET
    B. SHORE GUARD SYNTHETIC SHEET PILING FP-475 OR APPROVED EQUAL OR BETTER (PIERS 2, 4, 6 & 10)
        - SECTION MODULUS (Z) = 20.5 IN^3/FT.
        - MOMENT OF INERTIA (I)= 45 IN^4/ FT
        - ALLOWABLE MOMENT (M)= 5,467 LB-FT / FT
    C. STEEL FORMWORK (PIERS 8 & 9)
        - (RED BIRD ENGINEERING SALES) OR EQUAL
        - 6" RIB- 16GA ALLOWABLE STRESS 20,000 PSI
        - SECTION MODULUS (Z)= 0.390 IN^3/FT.
        - MOMENT OF INERTIA (I)= 0.350 IN^4/ FT
        - ALLOWABLE MOMENT (M)= 650 LB-FT / FT
    D. FORMWORK FABRIC
        - FABRIFORM PJ400 OR FABRIFORM BALLISTIC OR APPROVED EQUAL
    E. HEX LAG SCREWS- ASME B18.2.1-1996
    F. HYDROTEX ARTICULATING BLOCK (AB600 OR EQUIVALENT)
    G. PATCH REPAIR MATERIAL- FIVE STAR STRUCTURAL CONCRETE V/O PERMANENT REPAIR MATERIAL OR APPROVED EQUAL
    H. EPOXY BONDING COMPOUND PER MDOT SPECIFICATIONS FOR CONCRETE REPAIRS

15. ONCE ON SITE THE CONTRACTOR SHALL COMPLETE A SURVEY OF THE PROJECT SITE TO VERIFY THE EXISTING CONDITIONS. ANY CONDITIONS FOUND BY THE CONTRACTOR THAT WERE NOT ANTICIPATED ON THE CONTRACT PLANS AND THAT WILL AFFECT THE COST OR IMPLEMENTATION OF THE CONSTRUCTION SPECIFIED SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF WAYNE COUNTY AND THE ENGINEER.
16. THE CONTRACTOR SHALL EXERCISE CAUTION DURING ALL CONSTRUCTION OPERATIONS TO PREVENT ANY DAMAGE TO ADJACENT STRUCTURES, AND UTILITIES, WITHIN THE SCOPE OF THIS PROJECT'S WORK ITEMS. STRUCTURES, UTILITIES, STRUCTURAL COMPONENTS, AND IMPROVEMENTS NOT WITHIN THE SCOPE OF THIS PROJECT THAT ARE DAMAGED DURING THE CONSTRUCTION OPERATIONS SHALL BE REPAIRED OR REPLACED AT THE EXPENSE OF THE CONTRACTOR.
17. THE CONTRACTOR SHALL IMPLEMENT PROTECTIVE MEASURES TO CAPTURE ALL EXCESS CONSTRUCTION MATERIALS, REMOVAL ITEMS, WASTE, DEBRIS AND HAZARDOUS SUBSTANCES, AND NOT ALLOW THEIR DISCHARGE INTO THE SURROUNDING LAND, WATER OR AIR. THE CONTRACTOR SHALL PROPERLY DISPOSE OF THESE ITEMS ACCORDING TO THE REGULATIONS OF ALL GOVERNING AGENCIES.

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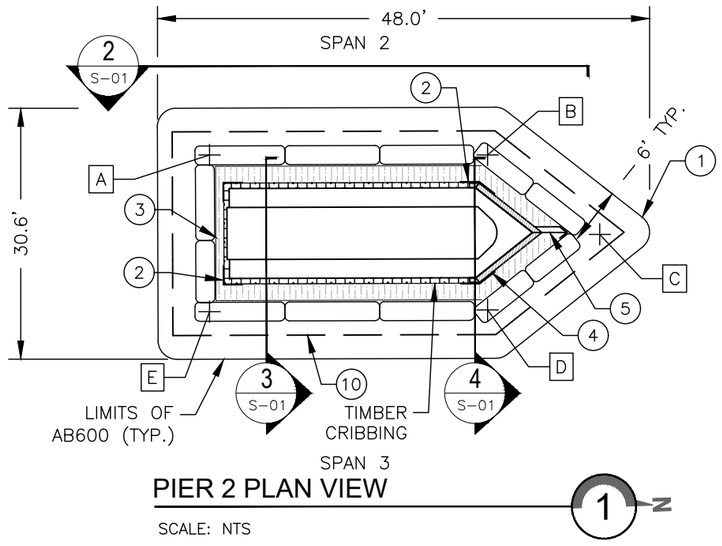


PIER 2 PLAN VIEW

1

SCALE: NTS

LEGEND:

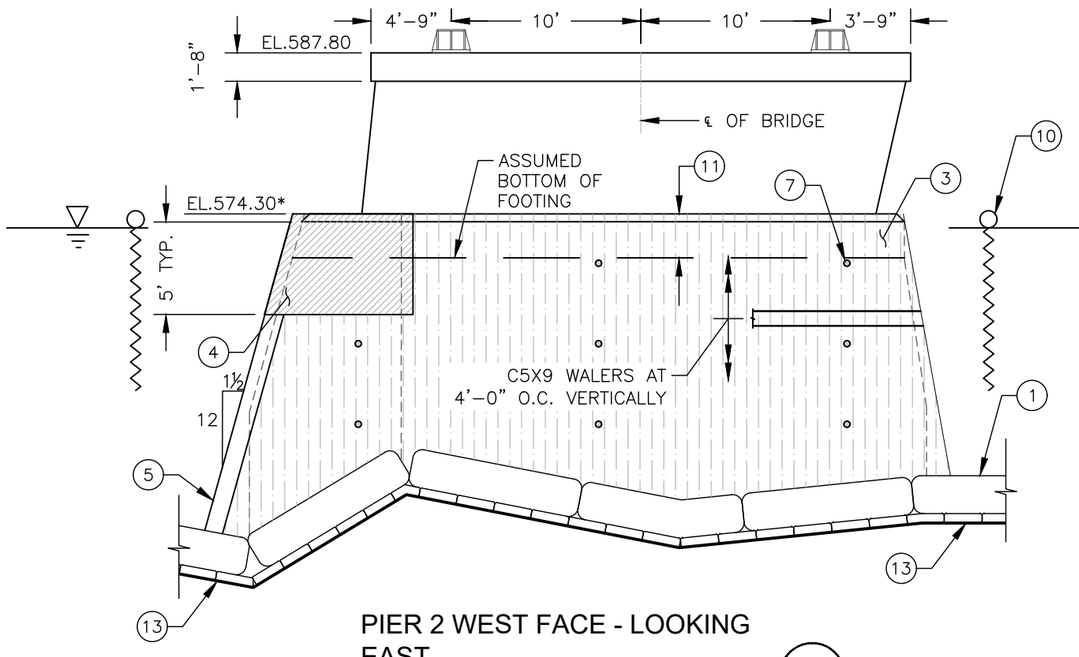
- CHANNEL BOTTOM
- 00 - REPAIR NOTE
- A - STREAMBED ELEVATION
- FP-475 VINYL SHEETPILING
- STEEL PLATE
- 2" Ø CORE HOLE
- GROUT INFILL
- CRIBBING STONE WITH GROUT INFILL

PIER 2 STREAMBED ELEVATIONS		
LOCATION	CORNER	ELEVATION
A	SW	557.8
B	NW	559.3
C	N	554.7
D	NE	553.1
E	SE	558.2

NOTE: TABLE ELEVATIONS ARE ESTIMATED AND FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR SHALL VERIFY ELEVATIONS PRIOR TO STARTING WORK.

REPAIR NOTES:

1. HYDROTEX ARTICULATING BLOCK (AB600) FABRIC FORMED CONCRETE PLACED ON RIVER BED AND USED TO SEAL AGAINST GROUT ESCAPE. EXTEND FABRIC FORMED CONCRETE 6'-0" OFF PIER IN ALL DIRECTIONS. PLACE HYDROTEX GROUT BAGS AT BASE OF PIER TO HOLD FORMWORK IN PLACE.
2. INSTALL STEEL REINFORCING PLATES AT ALL 4 CORNERS OF PIER. SEE PIER DETAILS ON SHEET S-08.
3. FP-475 WEATHERABLE RIGID VINYL SYNTHETIC SHEETPILING USED AS STAY-IN-PLACE FORMWORK.
4. PLACE LARGE STEEL ½" ICE BREAKER PLATE AND/OR OTHER ACCESSORIES EXTENDING FROM TOP OF FOOTING TO 5'-0" BELOW TOP OF FOOTING. SEE PIER DETAILS ON SHEET S-08.
5. PLACE SMALL STEEL ½" ICE BREAKER PLATE AT NOSE OF PIER. SEE PIER DETAILS ON SHEET S-08.
6. FILL ANNULAR SPACE BETWEEN FORMWORK AND CRIBBING WITH GROUT BACKFILL. FILL THE VOIDS IN THE INTERIOR OF THE CRIBBING FROM THE STREAM BED TO THE BOTTOM OF THE FOOTING WITH GROUT BACKFILL.
7. DRILL 2" Ø HORIZONTAL CORE HOLES ON EACH SIDE OF THE PIER TO VERIFY GROUT INSTALLATION WAS PERFORMED IN ACCORDANCE WITH THE SPECIFICATIONS.
8. REPAIR CONCRETE SPALLING/DELAMINATIONS/ETC. ON PIER FOOTING/WALL SEE PIER DETAILS.
9. FOR TYPICAL FORMWORK LIMITS, SEE PIER DETAILS ON SHEET S-07.
10. INSTALL TURBIDITY CURTAIN AROUND PERIMETER OF PIER WORK AREA
11. THE THICKNESS OF THE EXISTING PIER FOOTING IS ESTIMATED TO BE 4'-10". THE CONTRACTOR, HOWEVER, SHALL VERIFY THE ACTUAL DIMENSIONS IN THE FIELD.
12. THE WIDTH OF THE EXISTING PIER FOOTING IS ESTIMATED TO BE 9'-0". THE CONTRACTOR, HOWEVER, SHALL VERIFY THE ACTUAL DIMENSIONS IN THE FIELD.
13. THE TABLE BELOW PROVIDES THE ESTIMATED STREAM BED ELEVATIONS AT THE PIER CORNERS BASED ON A HYDROGRAPHIC SURVEY PERFORMED ON DECEMBER 2, 2020. THE WATERLINE ELEVATION WAS MEASURED AT 574.30 AT THE TIME OF THE SURVEY.
14. THE ESTIMATED GROUT VOLUME TO BE INSTALLED AT PIER 2 IS 92 CY. THE ACTUAL VOLUME WILL DEPEND ON THE CONDITIONS ENCOUNTERED IN THE FIELD.

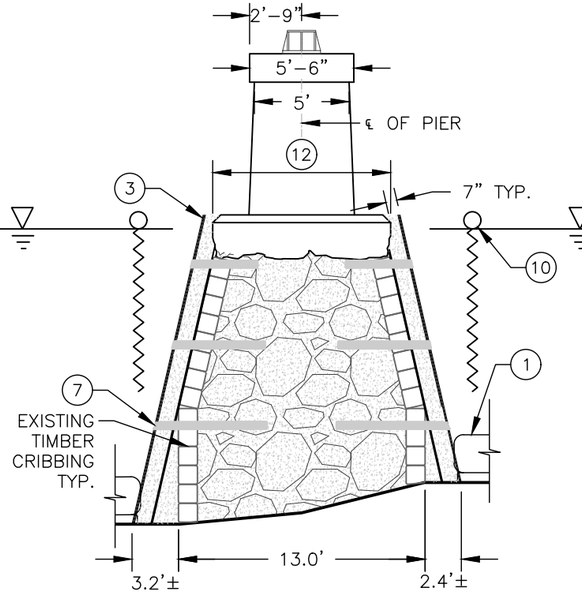


PIER 2 WEST FACE - LOOKING EAST

2

SCALE: NTS

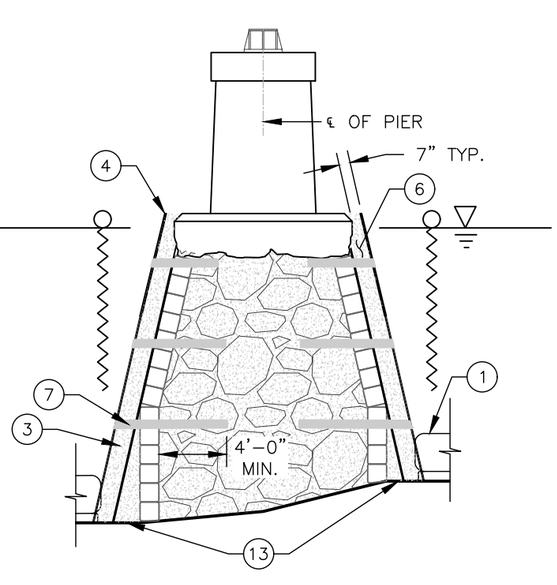
* FORMWORK TO BE INSTALLED TO TOP OF FOOTING ELEVATION



PIER 2 CROSS SECTION - LOOKING NORTH

3

SCALE: NTS



PIER 2 CROSS SECTION - LOOKING NORTH

4

SCALE: NTS

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BRENNAN

Pier Repair Plans
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Pier 2 Repairs
Grosse Ile, MI

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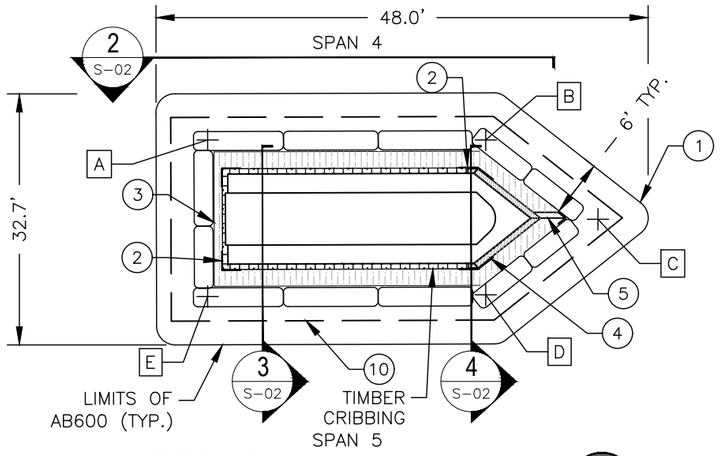

PIER 4 PLAN VIEW

1

SCALE: NTS

LEGEND:

- CHANNEL BOTTOM
- 00 - REPAIR NOTE
- A - STREAMBED ELEVATION
- FP-475 VINYL SHEETPILING
- STEEL PLATE
- 2" Ø CORE HOLE
- GROUT INFILL
- CRIBBING STONE WITH GROUT INFILL

PIER 4 STREAMBED ELEVATIONS		
LOCATION	CORNER	ELEVATION
A	SW	553.2
B	NW	554.3
C	N	551.8
D	NE	554.7
E	SE	558.6

NOTE: TABLE ELEVATIONS ARE ESTIMATED AND FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR SHALL VERIFY ELEVATIONS PRIOR TO STARTING WORK.

REPAIR NOTES:

1. HYDROTEX ARTICULATING BLOCK (AB600) FABRIC FORMED CONCRETE PLACED ON RIVER BED AND USED TO SEAL AGAINST GROUT ESCAPE. EXTEND FABRIC FORMED CONCRETE 6'-0" OFF PIER IN ALL DIRECTIONS. PLACE HYDROTEX GROUT BAGS AT BASE OF PIER TO HOLD FORMWORK IN PLACE.
2. INSTALL STEEL REINFORCING PLATES AT ALL 4 CORNERS OF PIER. SEE PIER DETAILS ON SHEET S-08.
3. FP-475 WEATHERABLE RIGID VINYL SYNTHETIC SHEETPILING USED AS STAY-IN-PLACE FORMWORK.
4. PLACE LARGE STEEL ½" ICE BREAKER PLATE AND/OR OTHER ACCESSORIES EXTENDING FROM TOP OF FOOTING TO 5'-0" BELOW TOP OF FOOTING. SEE PIER DETAILS ON SHEET S-08.
5. PLACE SMALL STEEL ½" ICE BREAKER PLATE AT NOSE OF PIER. SEE PIER DETAILS ON SHEET S-08.
6. FILL ANNULAR SPACE BETWEEN FORMWORK AND CRIBBING WITH GROUT BACKFILL. FILL THE VOIDS IN THE INTERIOR OF THE CRIBBING FROM THE STREAM BED TO THE BOTTOM OF THE FOOTING WITH GROUT BACKFILL.
7. DRILL 2" Ø HORIZONTAL CORE HOLES ON EACH SIDE OF THE PIER TO VERIFY GROUT INSTALLATION WAS PERFORMED IN ACCORDANCE WITH THE SPECIFICATIONS.
8. REPAIR CONCRETE SPALLING/DELAMINATIONS/ETC. ON PIER FOOTING/WALL SEE PIER DETAILS.
9. FOR TYPICAL FORMWORK LIMITS, SEE PIER DETAILS ON SHEET S-07.
10. INSTALL TURBIDITY CURTAIN AROUND PERIMETER OF PIER WORK AREA
11. THE THICKNESS OF THE EXISTING PIER FOOTING IS ESTIMATED TO BE 4'-10". THE CONTRACTOR, HOWEVER, SHALL VERIFY THE ACTUAL DIMENSIONS IN THE FIELD.
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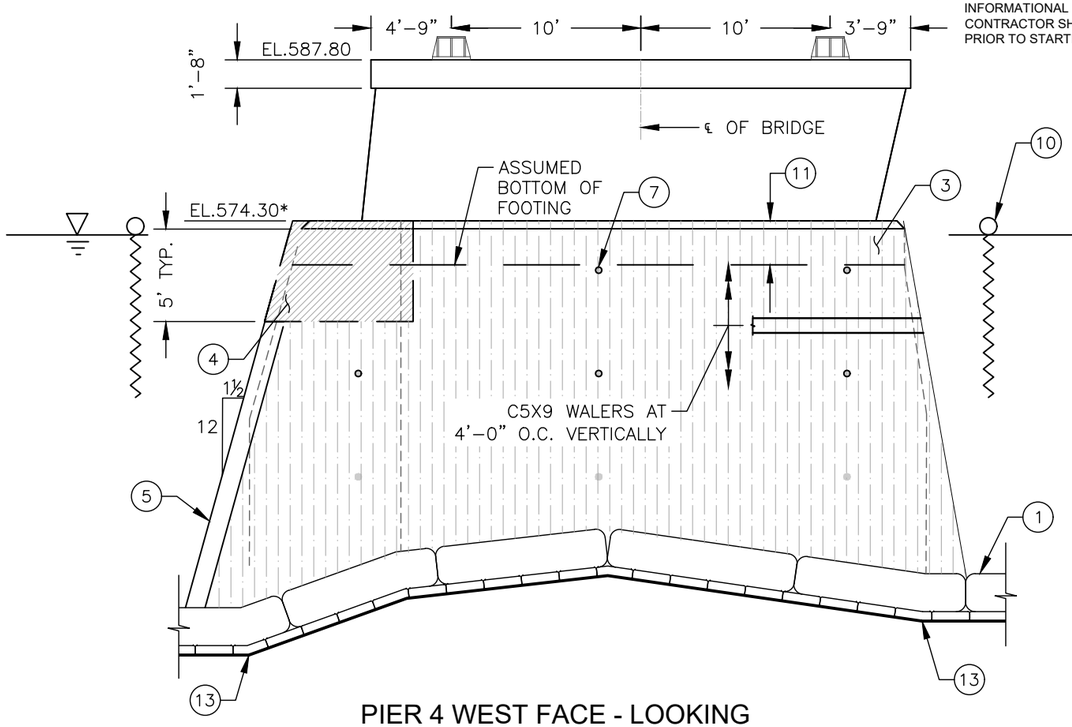
13. THE TABLE BELOW PROVIDES THE ESTIMATED STREAM BED ELEVATIONS AT THE PIER CORNERS BASED ON A HYDROGRAPHIC SURVEY PERFORMED ON DECEMBER 2, 2020. THE WATERLINE ELEVATION WAS MEASURED AT 574.30 AT THE TIME OF THE SURVEY.
14. THE ESTIMATED GROUT VOLUME TO BE INSTALLED AT PIER 4 IS 108 CY. THE ACTUAL VOLUME WILL DEPEND ON THE CONDITIONS ENCOUNTERED IN THE FIELD.

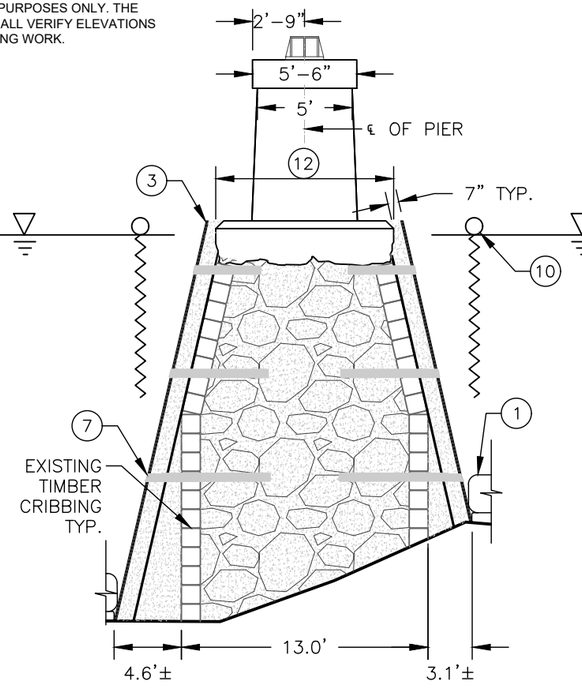


* FORMWORK TO BE INSTALLED TO TOP OF FOOTING ELEVATION

PIER 4 WEST FACE - LOOKING EAST

2

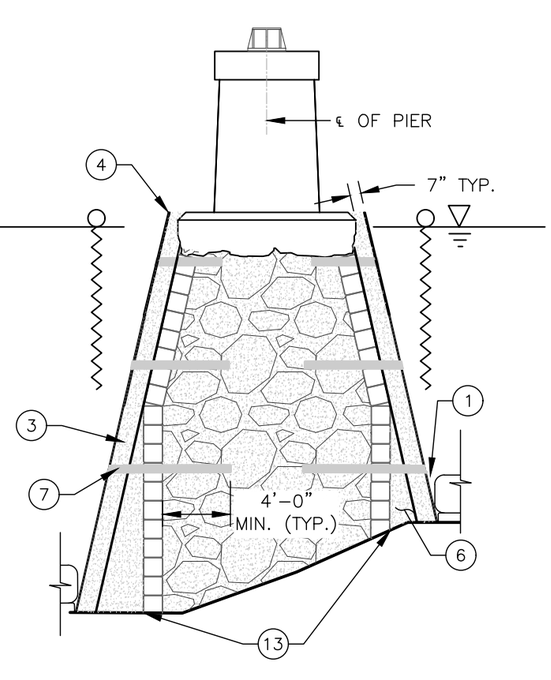
SCALE: NTS



PIER 4 CROSS SECTION - LOOKING NORTH

3

SCALE: NTS



PIER 4 CROSS SECTION - LOOKING NORTH

4

SCALE: NTS

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BRENNAN

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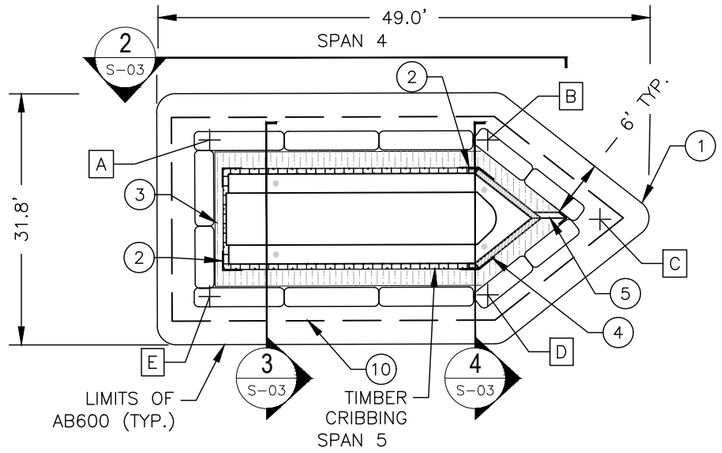

PIER 6 PLAN VIEW

SCALE: NTS

1

LEGEND:

- CHANNEL BOTTOM
- 00 - REPAIR NOTE
- A - STREAMBED ELEVATION
- FP-475 VINYL SHEETPILING
- STEEL PLATE
- 2" Ø CORE HOLE
- GROUT INFILL
- CRIBBING STONE WITH GROUT INFILL

PIER 6 STREAMBED ELEVATIONS		
LOCATION	CORNER	ELEVATION
A	SW	555.4
B	NW	558.0
C	N	553.1
D	NE	556.5
E	SE	559.6

NOTE: TABLE ELEVATIONS ARE ESTIMATED AND FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR SHALL VERIFY ELEVATIONS PRIOR TO STARTING WORK.

REPAIR NOTES:

1. HYDROTEX ARTICULATING BLOCK (AB600) FABRIC FORMED CONCRETE PLACED ON RIVER BED AND USED TO SEAL AGAINST GROUT ESCAPE. EXTEND FABRIC FORMED CONCRETE 6'-0" OFF PIER IN ALL DIRECTIONS. PLACE HYDROTEX GROUT BAGS AT BASE OF PIER TO HOLD FORMWORK IN PLACE.
2. INSTALL STEEL REINFORCING PLATES AT ALL 4 CORNERS OF PIER. SEE PIER DETAILS ON SHEET S-08.
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7. DRILL 2" Ø HORIZONTAL CORE HOLES ON EACH SIDE OF THE PIER TO VERIFY GROUT INSTALLATION WAS PERFORMED IN ACCORDANCE WITH THE SPECIFICATIONS.
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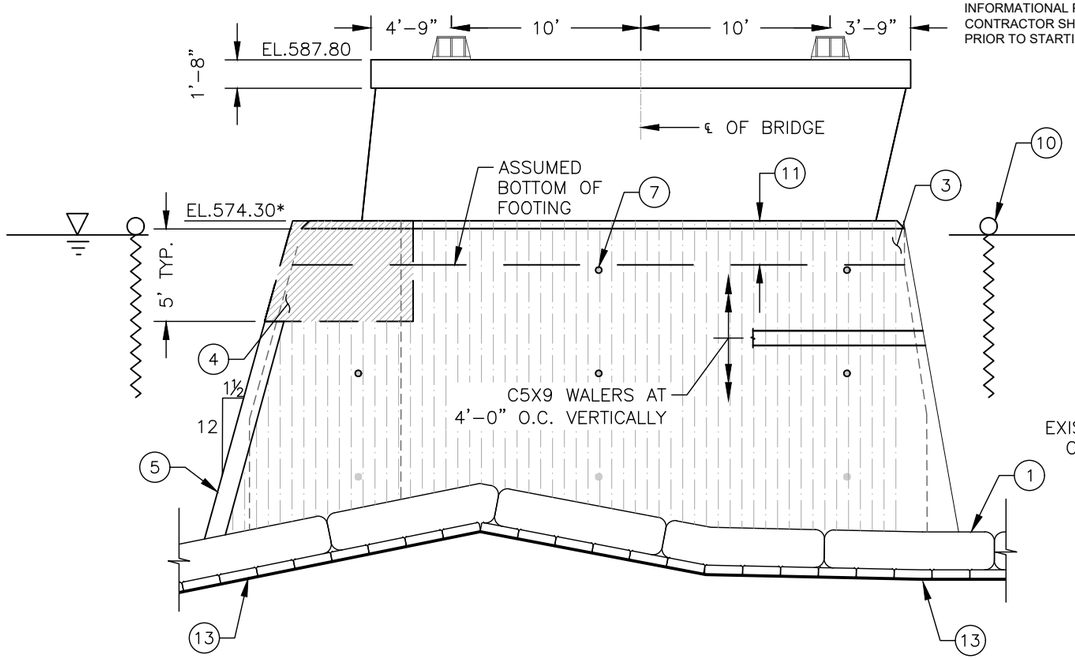
14. THE ESTIMATED GROUT VOLUME TO BE INSTALLED AT PIER 6 IS 96 CY. THE ACTUAL VOLUME WILL DEPEND ON THE CONDITIONS ENCOUNTERED IN THE FIELD.

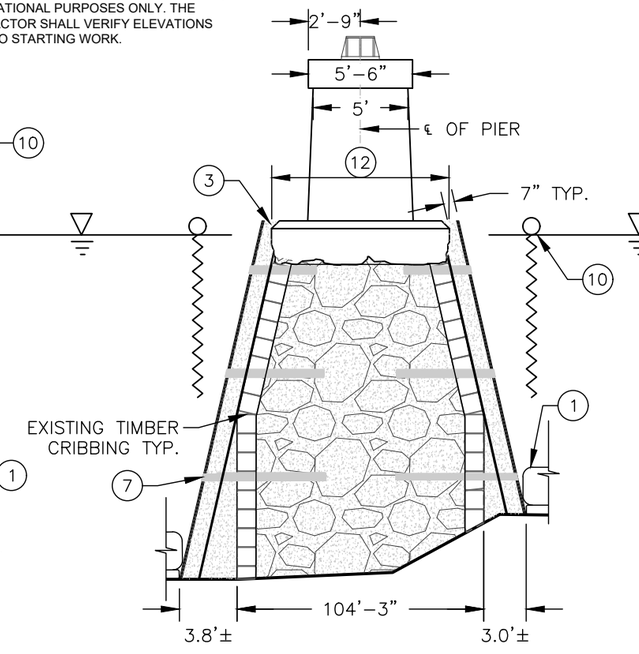


PIER 6 WEST FACE - LOOKING EAST

SCALE: NTS

2

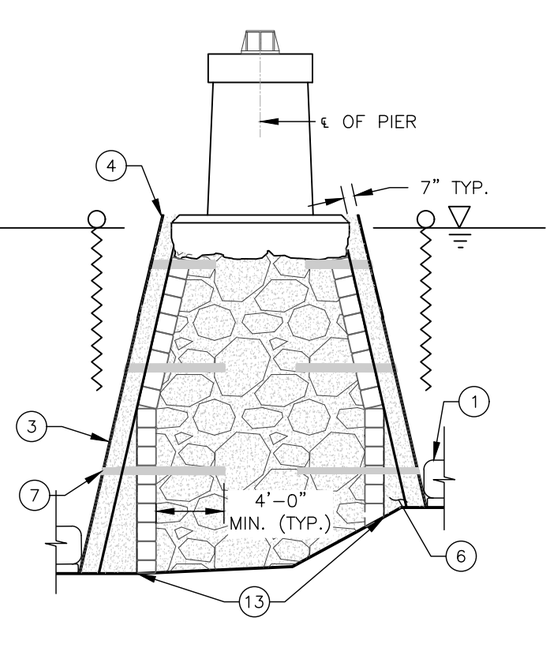
* FORMWORK TO BE INSTALLED TO TOP OF FOOTING ELEVATION



PIER 6 CROSS SECTION - LOOKING NORTH

SCALE: NTS

3



PIER 6 CROSS SECTION - LOOKING NORTH

SCALE: NTS

4

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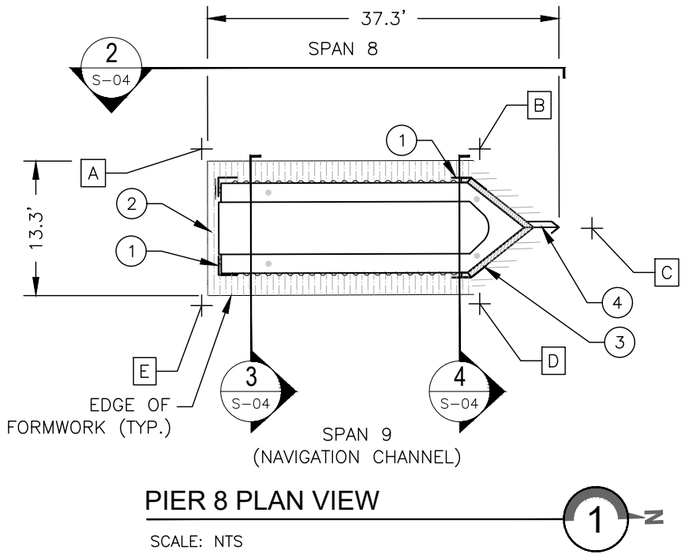


PIER 8 PLAN VIEW

SCALE: NTS

1

LEGEND:

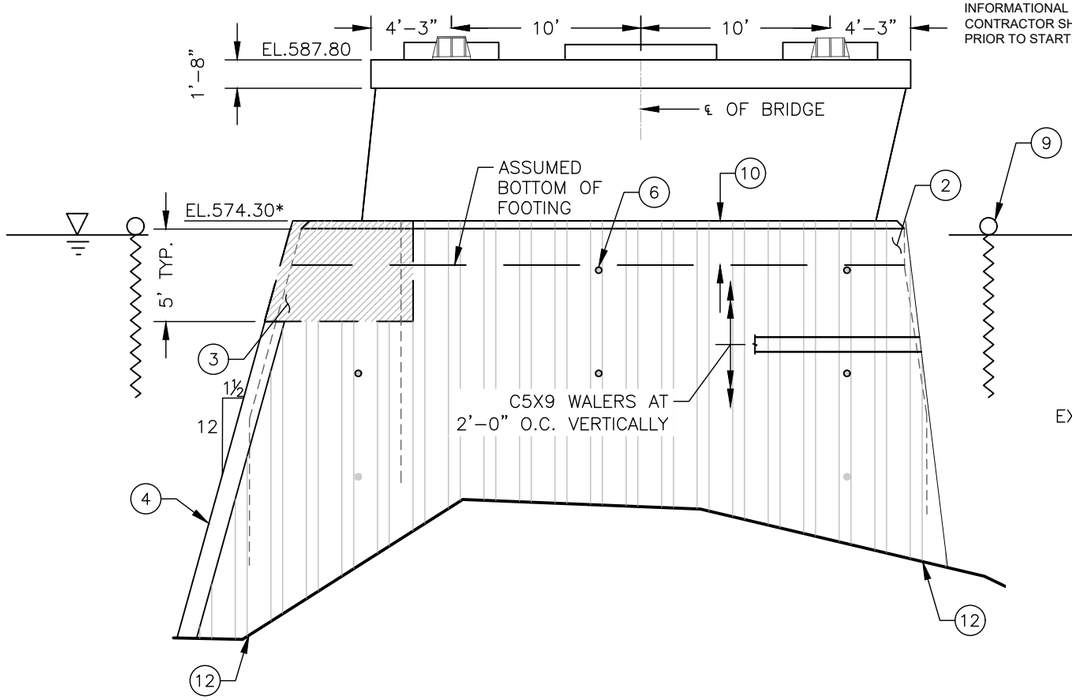
- CHANNEL BOTTOM
- 00 - REPAIR NOTE
- A - STREAMBED ELEVATION
- STEEL FORMWORK
- STEEL PLATE
- 2" Ø CORE HOLE
- GROUT INFILL
- CRIBBING STONE WITH GROUT INFILL

PIER 8 STREAMBED ELEVATIONS		
LOCATION	CORNER	ELEVATION
A	SW	555.7
B	NW	559.5
C	N	551.2
D	NE	552.0
E	SE	550.4

NOTE: TABLE ELEVATIONS ARE ESTIMATED AND FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR SHALL VERIFY ELEVATIONS PRIOR TO STARTING WORK.

REPAIR NOTES:

1. INSTALL STEEL REINFORCING PLATES AT ALL 4 CORNERS OF PIER. SEE PIER DETAILS.
2. RED BIRD ENGINEERING 6" RIB-16 6A STEEL FORMWORK OR EQUAL USES AS FORMWORK .
3. PLACE LARGE STEEL ½" ICE BREAKER PLATE AND/OR OTHER ACCESSORIES EXTENDING FROM TOP OF FOOTING TO 5'-0" BELOW TOP OF FOOTING. SEE PIER DETAILS ON SHEET S-08.
4. PLACE SMALL STEEL ½" ICE BREAKER PLATE AT NOSE OF PIER. SEE PIER DETAILS ON SHEET S-08.
5. FILL ANNULAR SPACE BETWEEN FORMWORK AND CRIBBING WITH GROUT BACKFILL. FILL THE VOIDS IN THE INTERIOR OF THE CRIBBING FROM THE STREAM BED TO THE BOTTOM OF THE FOOTING WITH GROUT BACKFILL.
6. DRILL 2" Ø HORIZONTAL CORE HOLES ON EACH SIDE OF THE PIER TO VERIFY GROUT INSTALLATION WAS PERFORMED IN ACCORDANCE WITH THE SPECIFICATIONS.
7. REPAIR CONCRETE SPALLING/DELAMINATIONS/ETC. ON PIER FOOTING/WALL SEE PIER DETAILS.
8. FOR TYPICAL FORMWORK LIMITS, SEE PIER DETAILS ON SHEET S-07.
9. INSTALL TURBIDITY CURTAIN AROUND PERIMETER OF PIER WORK AREA.
10. THE THICKNESS OF THE EXISTING PIER FOOTING IS ESTIMATED TO BE 4'-10". THE CONTRACTOR, HOWEVER, SHALL VERIFY THE ACTUAL DIMENSIONS IN THE FIELD.
11. THE WIDTH OF THE EXISTING PIER FOOTING IS ESTIMATED TO BE 9'-0". THE CONTRACTOR, HOWEVER, SHALL VERIFY THE ACTUAL DIMENSIONS IN THE FIELD.
12. THE TABLE BELOW PROVIDES THE ESTIMATED STREAM BED ELEVATIONS AT THE PIER CORNERS BASED ON A HYDROGRAPHIC SURVEY PERFORMED ON DECEMBER 2, 2020. THE WATERLINE ELEVATION WAS MEASURED AT 574.30 AT THE TIME OF THE SURVEY.
13. SEE PIER DETAILS FOR TYPICAL DETAIL AT FORM WORK BREAK.
14. THE ESTIMATED GROUT VOLUME TO BE INSTALLED AT PIER 8 IS 94 CY. THE ACTUAL VOLUME WILL DEPEND ON THE CONDITIONS ENCOUNTERED IN THE FIELD.

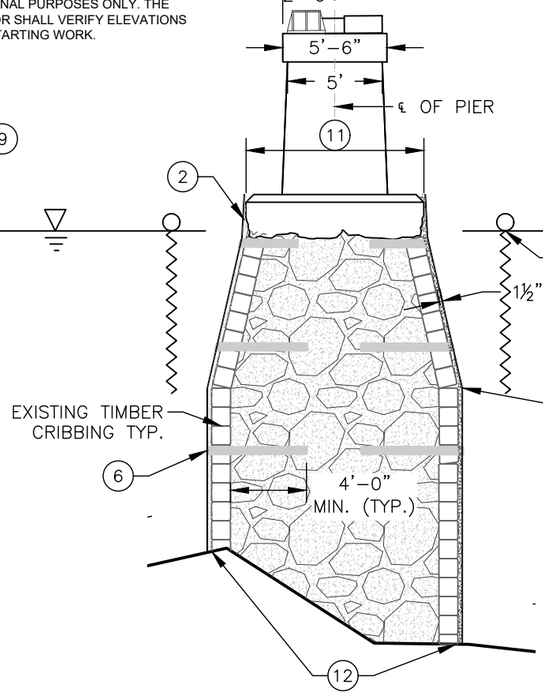


* FORMWORK TO BE INSTALLED TO TOP OF FOOTING ELEVATION

PIER 8 WEST FACE - LOOKING EAST

SCALE: NTS

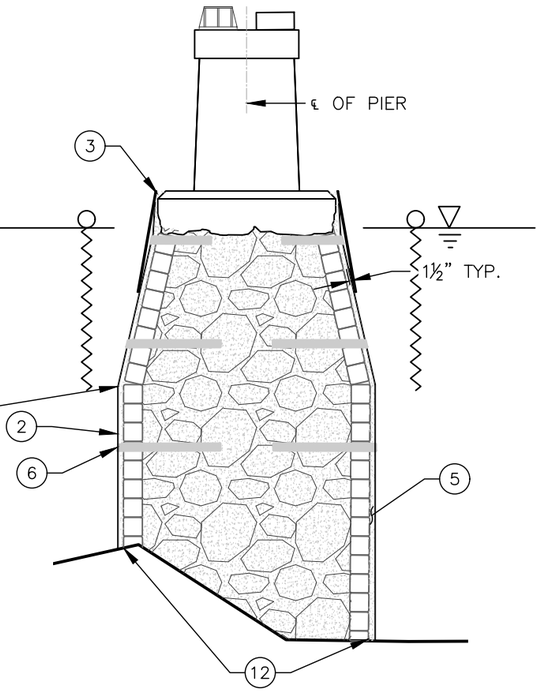
2



PIER 8 CROSS SECTION - LOOKING NORTH

SCALE: NTS

3



PIER 8 CROSS SECTION - LOOKING NORTH

SCALE: NTS

4

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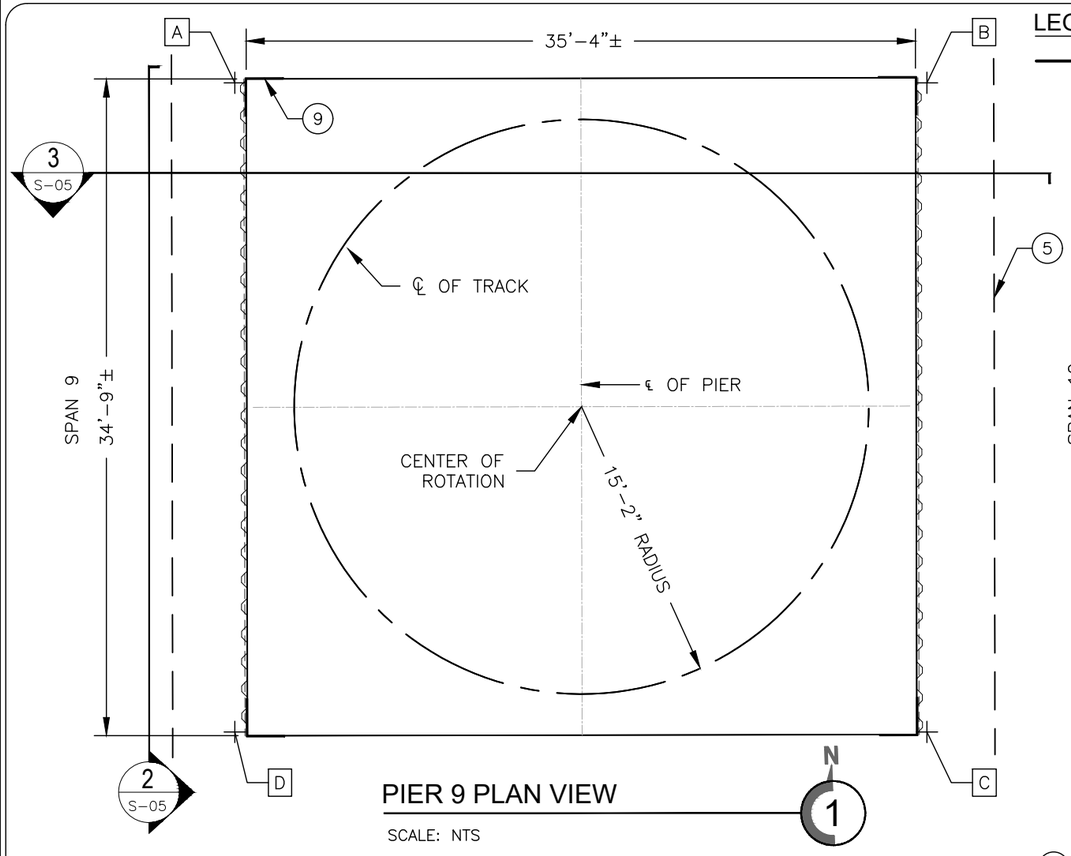
BRENNAN

Pier Repair Plans
Grosse Ile Parkway Bridge
Pier 8 Repairs
Grosse Ile, MI

CEI PROJECT	60-12797
DESIGNED BY:	SJM
DRAWN BY:	JCG
CHECKED BY:	SJM
DATE:	4-16-21
SHEET NO:	S-04



PIER 9 PLAN VIEW

SCALE: NTS

1

LEGEND:

- CHANNEL BOTTOM
- 00 - REPAIR NOTE
- A - STREAMBED ELEVATION
- STEEL FORMWORK
- 2" Ø CORE HOLE
- GROUT INFILL
- CRIBBING STONE WITH GROUT INFILL

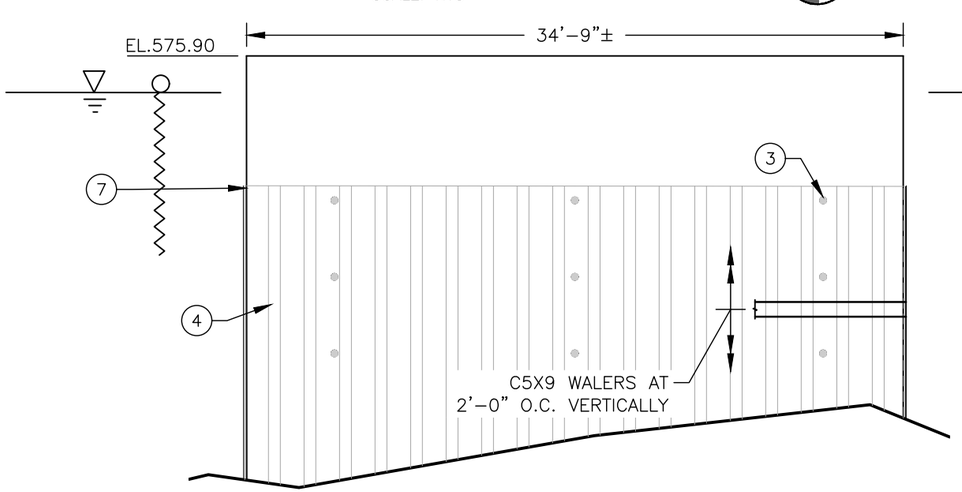
REPAIR NOTES:

1. RED BIRD ENGINEERING 6" RIB-16 GA STEEL FORMWORK OR EQUAL USED AS FORM WORK. FORMWORK ATTACHED TO CRIBBING USING LAG BOLTS SPACED A MAXIMUM OF 2'-0". ON CENTER VERTICALLY.
2. FILL ANNULAR SPACE BETWEEN FORMWORK AND CRIBBING WITH GROUT BACKFILL. FILL THE VOIDS IN THE INTERIOR OF THE CRIBBING FROM THE STREAM BED TO THE BOTTOM OF THE FOOTING WITH GROUT BACKFILL.
3. DRILL 2" Ø HORIZONTAL CORE HOLES ON EACH SIDE OF THE PIER TO VERIFY GROUT INSTALLATION WAS PERFORMED IN ACCORDANCE WITH THE SPECIFICATIONS.
4. REPAIR CONCRETE SPALLING/DELAMINATIONS/ETC. ON PIER FOOTING/WALL AS PER SPECIFICATIONS.
5. INSTALL TURBIDITY CURTAIN AROUND PERIMETER OF PIER WORK AREA.
6. THE TABLE BELOW PROVIDES THE ESTIMATED STREAM BED ELEVATIONS AT THE PIER CORNERS BASED ON A HYDROGRAPHIC SURVEY PERFORMED ON DECEMBER 2, 2020. THE WATERLINE ELEVATION WAS MEASURED AT 574.30 AT THE TIME OF THE SURVEY.
7. INSTALL FORMWORK TO ELEV 570.0.
8. THE ESTIMATED GROUT VOLUME TO BE INSTALLED AT PIER 2 IS 221 CY. THE ACTUAL VOLUME WILL DEPEND ON THE CONDITIONS ENCOUNTERED IN THE FIELD.
9. INSTALL STEEL REINFORCING PLATES AT ALL 4 CORNERS OF PIER. SEE PIER DETAILS ON SHEET S-08.

PIER 9 STREAMBED ELEVATIONS

LOCATION	CORNER	ELEVATION
A	NW	554.7
B	NE	558.8
C	SE	556.7
D	SW	557.4

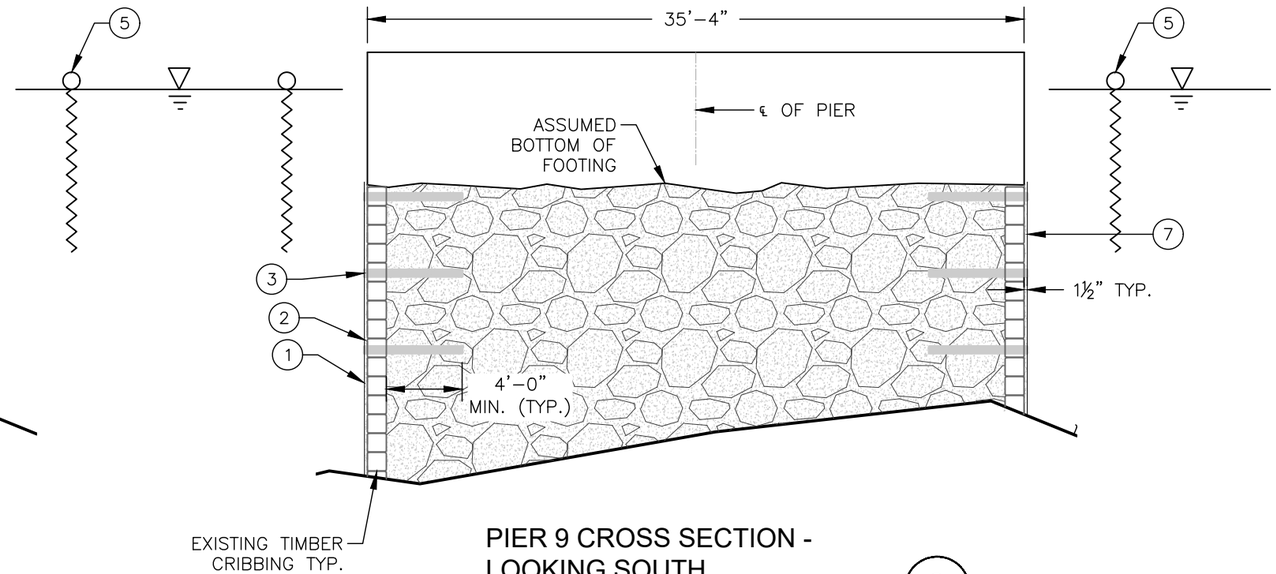
NOTE: TABLE ELEVATIONS ARE ESTIMATED AND FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR SHALL VERIFY ELEVATIONS PRIOR TO STARTING WORK.



PIER 9 EAST FACE - LOOKING WEST

SCALE: NTS

2



PIER 9 CROSS SECTION - LOOKING SOUTH

SCALE: NTS

3

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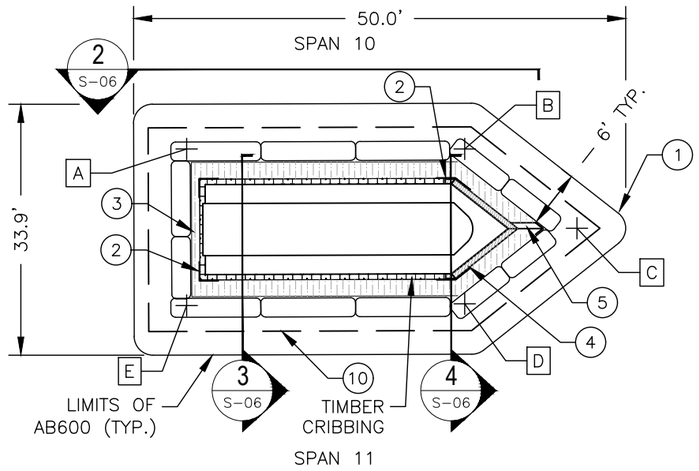


PIER 10 PLAN VIEW

1 N

SCALE: NTS

LEGEND:

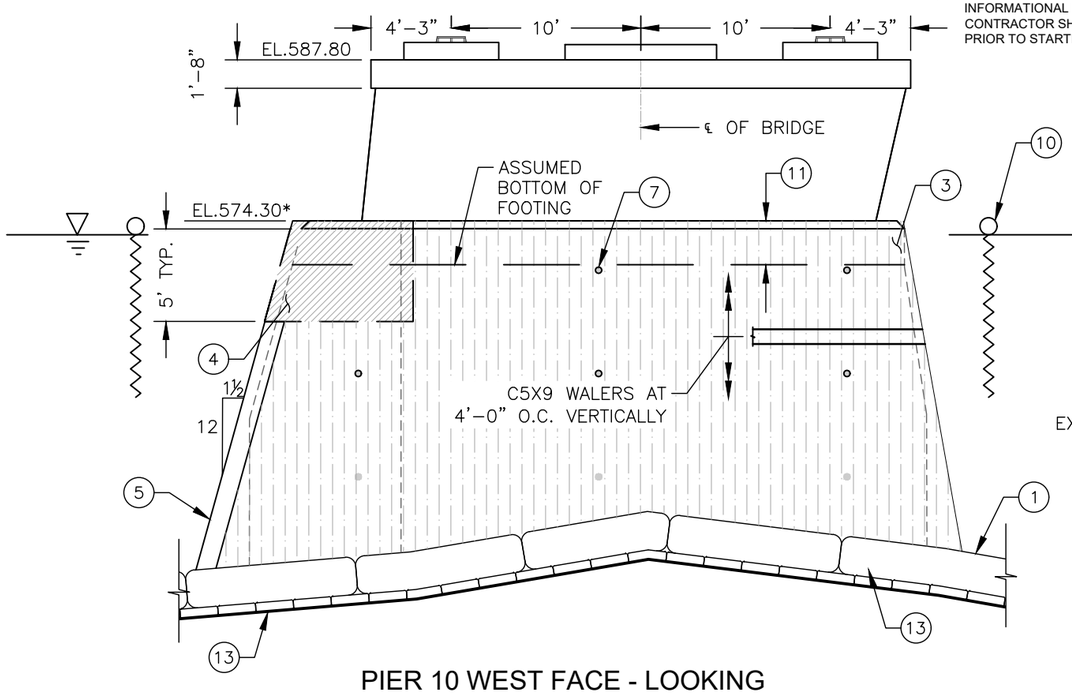
- CHANNEL BOTTOM
- 00 - REPAIR NOTE
- A - STREAMBED ELEVATION
- FP-475 VINYL SHEETPILING
- STEEL PLATE
- 2" Ø CORE HOLE
- GROUT INFILL
- CRIBBING STONE WITH GROUT INFILL

PIER 10 STREAMBED ELEVATIONS		
LOCATION	CORNER	ELEVATION
A	SW	554.4
B	NW	554.4
C	N	551.1
D	NE	552.7
E	SE	554.9

NOTE: TABLE ELEVATIONS ARE ESTIMATED AND FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR SHALL VERIFY ELEVATIONS PRIOR TO STARTING WORK.

REPAIR NOTES:

1. HYDROTEX ARTICULATING BLOCK (AB600) FABRIC FORMED CONCRETE PLACED ON RIVER BED AND USED TO SEAL AGAINST GROUT ESCAPE. EXTEND FABRIC FORMED CONCRETE 6'-0" OFF PIER IN ALL DIRECTIONS. PLACE HYDROTEX GROUT BAGS AT BASE OF PIER TO HOLD FORMWORK IN PLACE.
2. INSTALL STEEL REINFORCING PLATES AT ALL 4 CORNERS OF PIER. SEE PIER DETAILS ON SHEET S-08.
3. FP-475 WEATHERABLE RIGID VINYL SYNTHETIC SHEETPILING USED AS STAY-IN-PLACE FORMWORK.
4. PLACE LARGE STEEL ½" ICE BREAKER PLATE AND/OR OTHER ACCESSORIES EXTENDING FROM TOP OF FOOTING TO 5'-0" BELOW TOP OF FOOTING. SEE PIER DETAILS ON SHEET S-08.
5. PLACE SMALL STEEL ½" ICE BREAKER PLATE AT NOSE OF PIER. SEE PIER DETAILS ON SHEET S-08.
6. FILL ANNULAR SPACE BETWEEN FORMWORK AND CRIBBING WITH GROUT BACKFILL. FILL THE VOIDS IN THE INTERIOR OF THE CRIBBING FROM THE STREAM BED TO THE BOTTOM OF THE FOOTING WITH GROUT BACKFILL.
7. DRILL 2" Ø HORIZONTAL CORE HOLES ON EACH SIDE OF THE PIER TO VERIFY GROUT INSTALLATION WAS PERFORMED IN ACCORDANCE WITH THE SPECIFICATIONS.
8. REPAIR CONCRETE SPALLING/DELAMINATIONS/ETC. ON PIER FOOTING/WALL SEE PIER DETAILS.
9. FOR TYPICAL FORMWORK LIMITS, SEE PIER DETAILS ON SHEET S-07.
10. INSTALL TURBIDITY CURTAIN AROUND PERIMETER OF PIER WORK AREA
11. THE THICKNESS OF THE EXISTING PIER FOOTING IS ESTIMATED TO BE 5'-6". THE CONTRACTOR, HOWEVER, SHALL VERIFY THE ACTUAL DIMENSIONS IN THE FIELD.
12. THE WIDTH OF THE EXISTING PIER FOOTING IS ESTIMATED TO BE 9'-0". THE CONTRACTOR, HOWEVER, SHALL VERIFY THE ACTUAL DIMENSIONS IN THE FIELD.
13. THE TABLE BELOW PROVIDES THE ESTIMATED STREAM BED ELEVATIONS AT THE PIER CORNERS BASED ON A HYDROGRAPHIC SURVEY PERFORMED ON DECEMBER 2, 2020. THE WATERLINE ELEVATION WAS MEASURED AT 574.30 AT THE TIME OF THE SURVEY.
14. THE ESTIMATED GROUT VOLUME TO BE INSTALLED AT PIER 10 IS 152 CY. THE ACTUAL VOLUME WILL DEPEND ON THE CONDITIONS ENCOUNTERED IN THE FIELD.

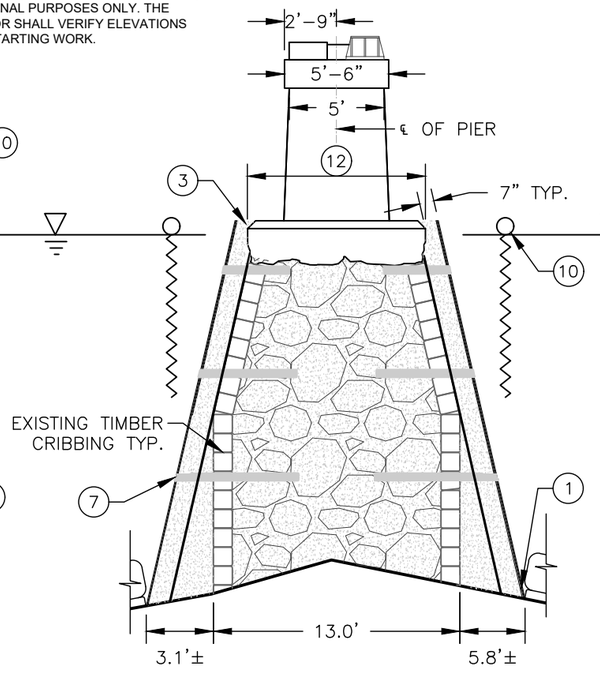


* FORMWORK TO BE INSTALLED TO TOP OF FOOTING ELEVATION

PIER 10 WEST FACE - LOOKING EAST

2

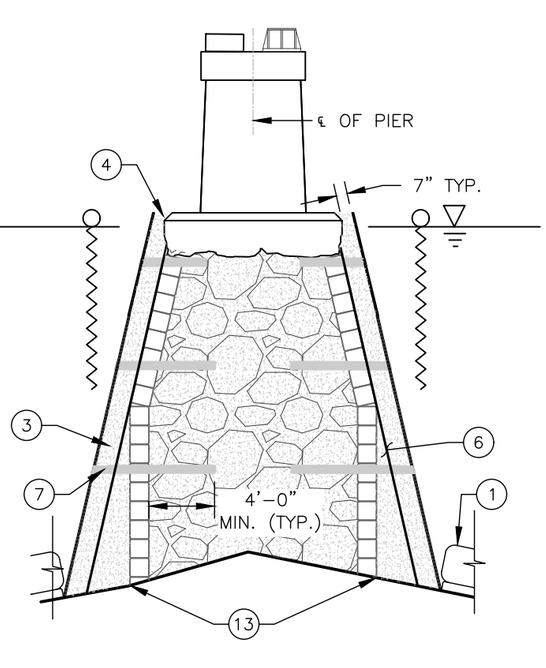
SCALE: NTS



PIER 10 CROSS SECTION - LOOKING NORTH

3

SCALE: NTS



PIER 10 CROSS SECTION - LOOKING NORTH

4

SCALE: NTS

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COUNTY OF WAYNE, MICHIGAN

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Grosse Ile Parkway Bridge
Pier 10 Repairs
Grosse Ile, MI

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CHECKED BY:	SJM
DATE:	4-16-21
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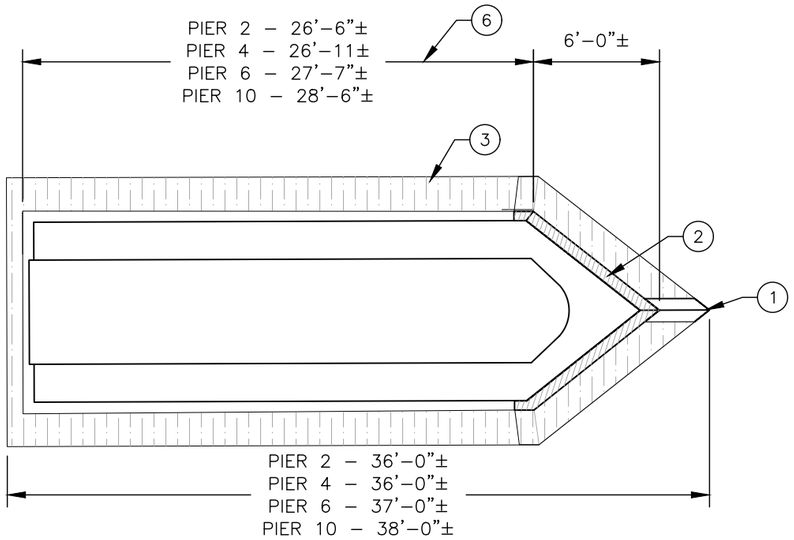
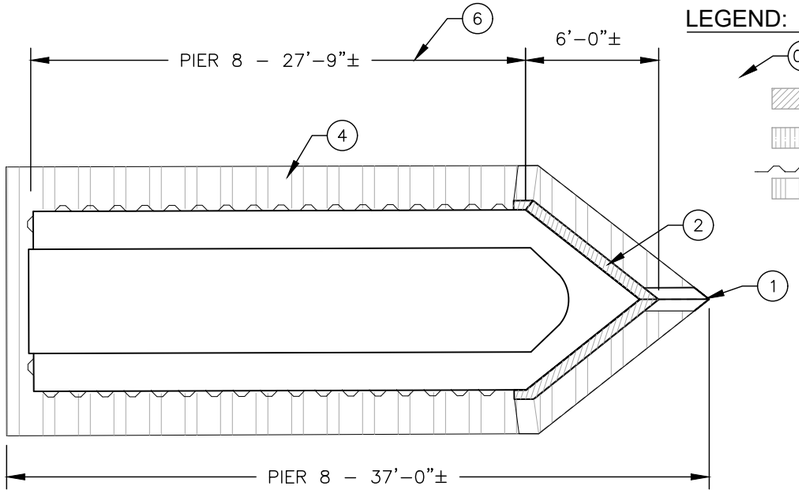


FORMWORK PIERS 2, 4, 6, & 10 — 1

SCALE: NTS

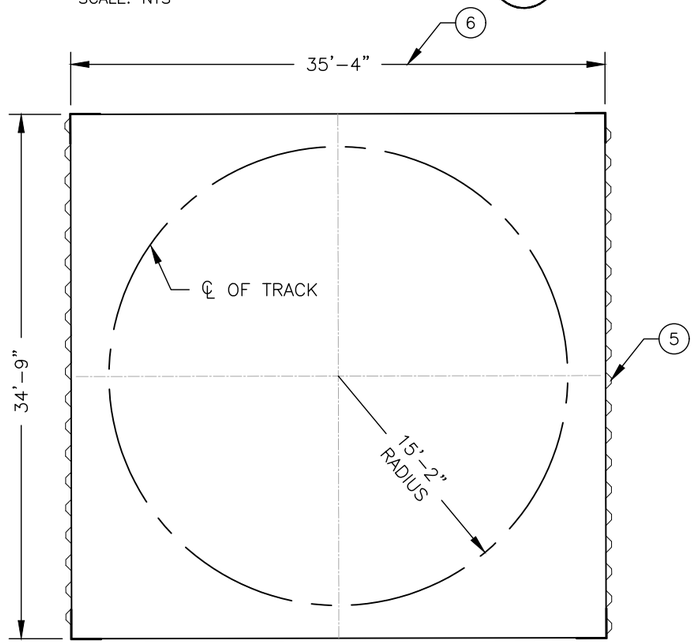


FORMWORK PIER 8 — 2

SCALE: NTS

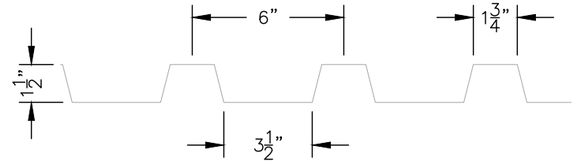
LEGEND:

- 00 - REPAIR NOTE
- STEEL PLATE
- FM-475 VINYL SHEETPILING
- STEEL FORMWORK



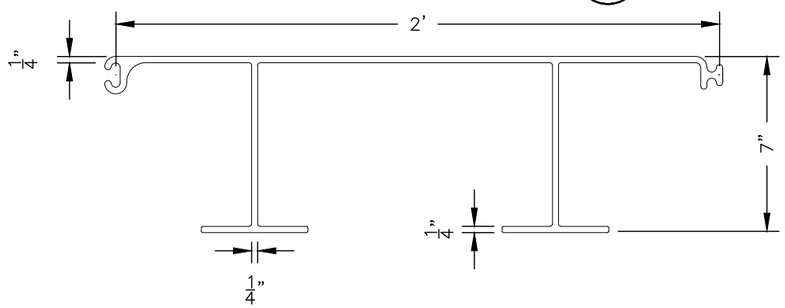
FORMWORK PIER 9 — 3

SCALE: NTS



STEEL SHEETING DETAIL — 4

SCALE: NTS



VINYL SHEETING DETAIL — 5

SCALE: NTS

DETAIL NOTES:

1. LARGE STEEL ICE BREAKER PLATE TO BE INSTALLED FROM TOP OF FOOTING TO FIVE FEET BELOW TOP OF FOOTING.
2. SMALL STEEL ICE BREAKER FROM FIVE FEET BELOW TOP OF FOOTING TO STREAM BED.
3. VINYL STAY-IN-PLACE FORMWORK TO BE INSTALLED TO TOP OF FOOTING ELEVATION ON PIERS 2, 4, 6, 10.
4. STEEL STAY-IN-PLACE FORMWORK ON PIERS 8 & 9.
5. STEEL STAY-IN-PLACE FORMWORK ON EAST AND WEST SIDES ONLY ON PIER 9.
6. PIER LENGTHS ARE ESTIMATED AND SHALL BE VERIFIED BY CONTRACTOR PRIOR TO BEGINNING FIELD WORK

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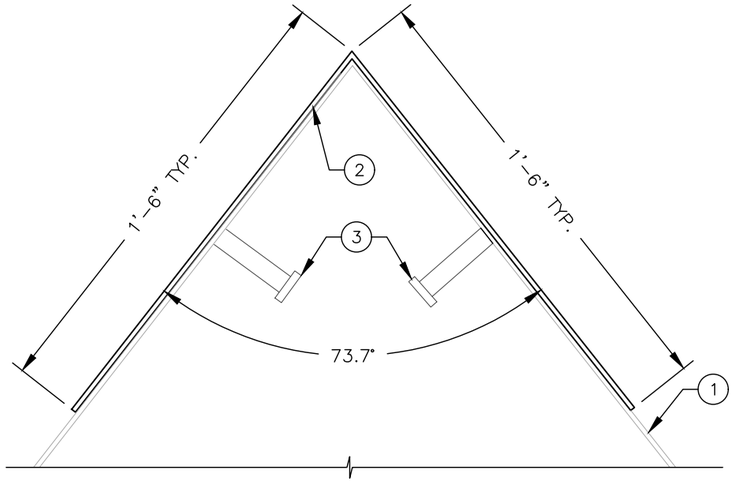
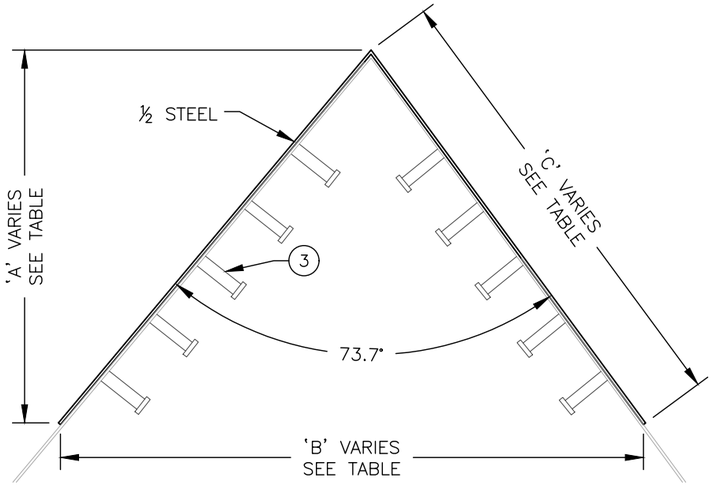


SMALL ICEBREAKER DETAIL

SCALE: NTS



LARGE ICEBREAKER DETAIL

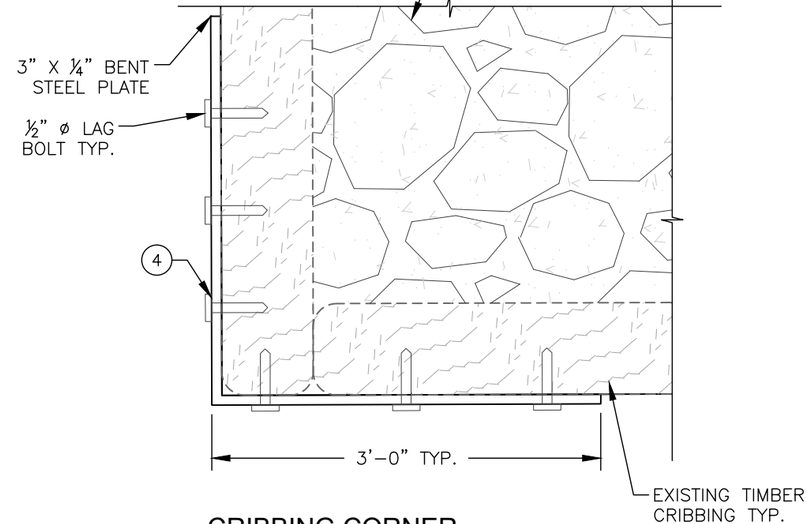
SCALE: NTS

LEGEND:

(00) - Repair Note

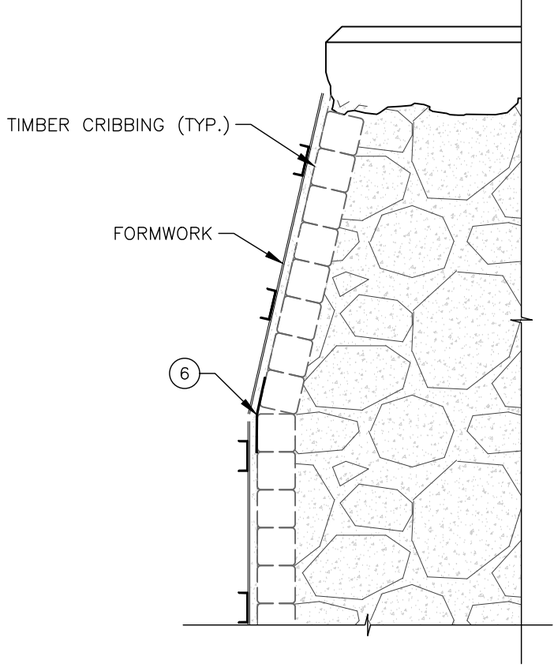
NOTES:

1. VINYL OR STEEL STAY-IN-PLACE FORMWORK.
2. SMALL ½" STEEL ICEBREAKER FROM CHANNEL BOTTOM TO 5' BELOW TOP OF FOOTING.
3. ¾" Ø STUD WELDED AT 1'-0" SPACING VERTICALLY ON STEEL ICEBREAKER AS CONNECTION INTO GROUT.
4. INSTALL STEEL REINFORCEMENT PLATE TO REINFORCE TIMBER CRIBBING AT PIER CORNERS. REINFORCEMENT SHALL BE PLACED AT EACH CORNER AND AT ALL LEVELS OF CRIBBING VERTICALLY. ATTACH WITH A MINIMUM OF 3 EACH ½" LAG SCREWS PER FACE. CUSTOM MODIFY FORMWORK AND CONNECTIONS AS NEEDED AT CORNERS TO MAINTAIN THE INTEGRITY OF FORMWORK AND THE GROUT SEAL.
5. ESTIMATED LARGE STEEL ICE BREAKER PLATE DIMENSIONS ARE SHOWN IN THE TABLE BELOW. PRIOR TO FABRICATION AND INSTALLATION, THE CONTRACTOR SHALL VERIFY AND MODIFY IF NECESSARY, ALL PLATE DIMENSIONS AND ANGLES IN THE FIELD.
6. ATTACH FORMWORK FABRIC TO CRIBBING TO SEAL ANY GAPS AT CORNERS AND OTHER LOCATIONS.



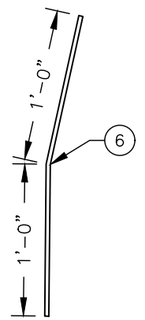
CRIBBING CORNER REINFORCEMENT DETAIL

SCALE: NTS



TIMBER CRIBBING DETAIL

SCALE: NTS



FORMWORK FABRIC DETAIL

SCALE: NTS

ICEBREAKER PLATE DIMENSIONS (PIERS 2, 4, 6 & 10)			
LOCATION	DIMENSION `A;	DIMENSION `B'	DIMENSION `C'
TOP OF PLATE	6'-11½"	10'-5½"	8'-8½"
BOTTOM OF PLATE	7'-11⅛"	11'-11"	9'-11"

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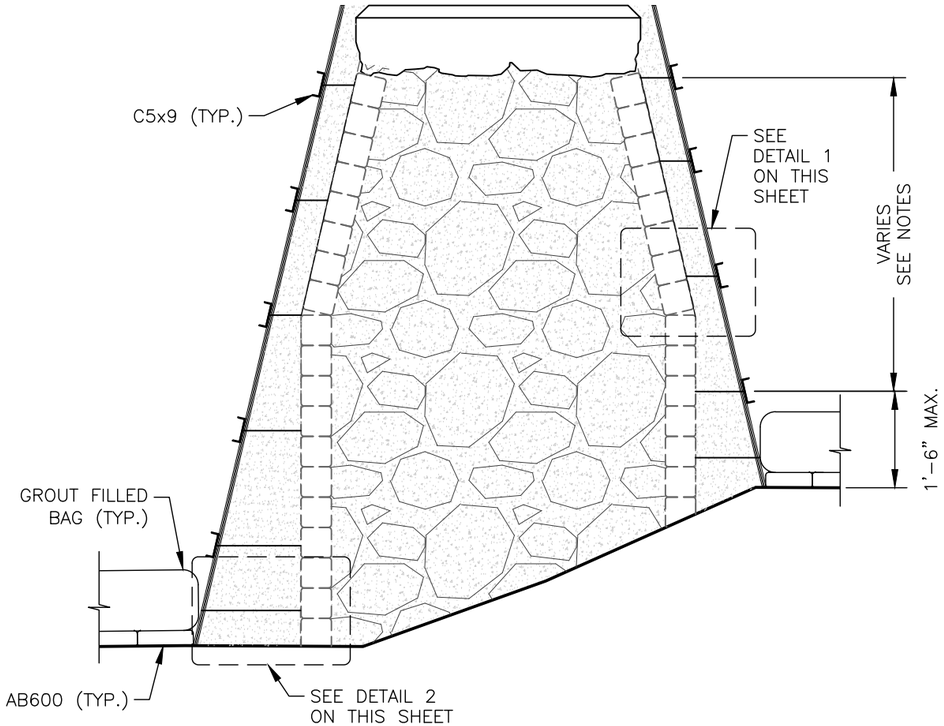
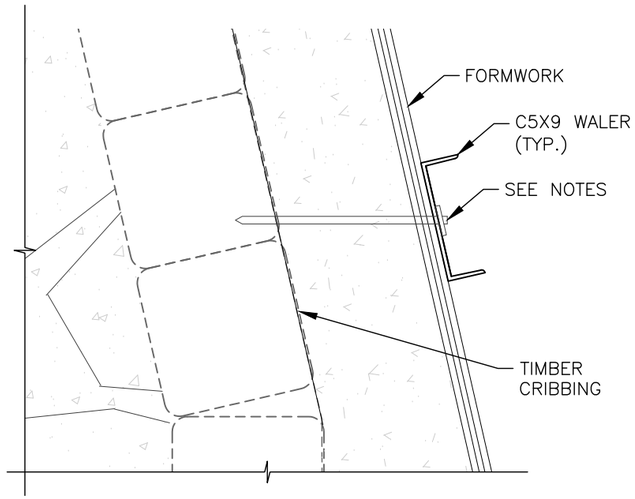
SHEET NO:	S-08



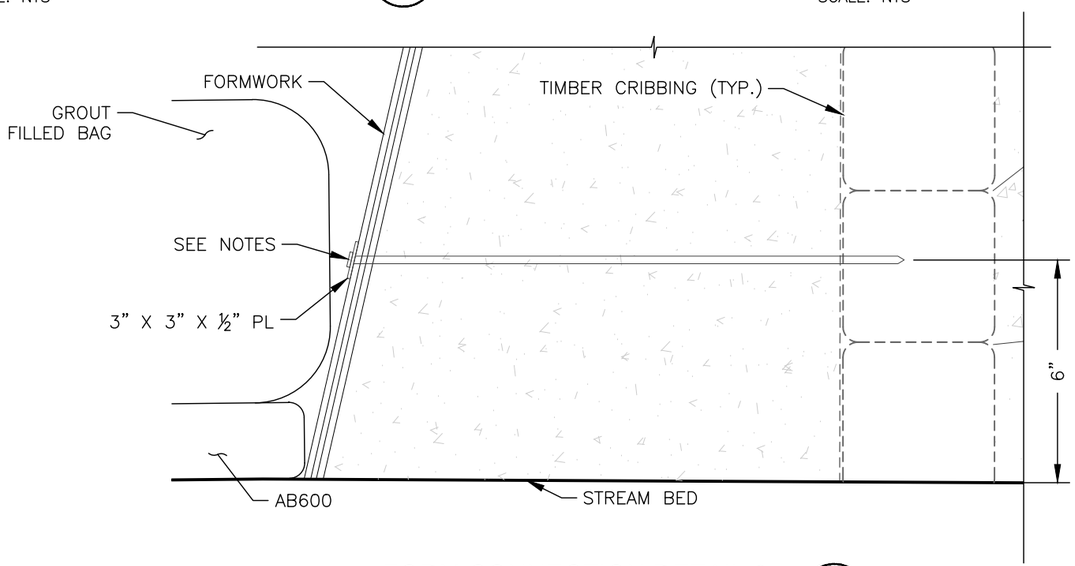
WALER INSTALLATION 1

SCALE: NTS



WALER CONNECTION DETAIL 1 2

SCALE: NTS



FORM CONNECTION DETAIL 2 3

SCALE: NTS

LEGEND:

(00) - Repair Note

NOTES:

1. FURNISH AASHTO M270 GRADE 36 STRUCTURAL STEEL FOR THE WALERS IN ACCORDANCE WITH SECTION 906 OF THE STANDARD SPECIFICATIONS.
2. FURNISH TAPPED LAG BOLTS, COIL-LAGS, COIL BOLTS, THREADED RODS AND/OR OTHER SUITABLE ACCESSORIES AND RELATED HARDWARE TO ATTACH THE BRACING AND THE FORMWORK TO THE CRIBBING AT THE LOCATIONS SHOWN ON THE PLANS. THE MAXIMUM SPACING OF WALER CONNECTIONS IS 4'0" ON CENTER HORIZONTALLY ALONG THE LENGTH OF THE PIER.
3. FOR PIERS 8 AND 9, THE MAXIMUM SPACING OF WALERS AND FORMWORK CONNECTIONS TO THE CRIBBING IS 2'0" ON CENTER VERTICALLY ALONG THE LENGTH OF THE PIER.
4. FOR PIERS 2, 4, 6 AND 10, THE MAXIMUM SPACING OF WALERS AND FORMWORK CONNECTIONS TO THE CRIBBING IS 4'-0" ON CENTER VERTICALLY ALONG THE LENGTH OF THE PIER.
5. CONFIRM THE SIZE AND SPECIES OF TIMBER CRIBBING TO WHICH CONNECTIONS ARE BEING MADE, TO ASSURE THE LAG WITHDRAWAL LOAD CAPACITY IS NOT BEING EXCEEDED. PROVIDE CONNECTIONS TO SUSTAIN A MAXIMUM SAFE WORKING LOAD OF 2100 LBS. AND A 2.0 FACTOR OF SAFETY
6. ALL FORMING ACCESSORIES AND RELATED HARDWARE MUST BE OF PROPER LENGTH, DIAMETER AND CAPACITY. DO NOT EXCEED THE SPACING SHOWN ON THE PLANS. IF A GREATER SAFETY FACTOR IS REQUIRED FOR ANY REASON, THE CONTRACTOR SHALL REDUCE THE SAFE WORKING LOAD CAPACITY ACCORDINGLY.

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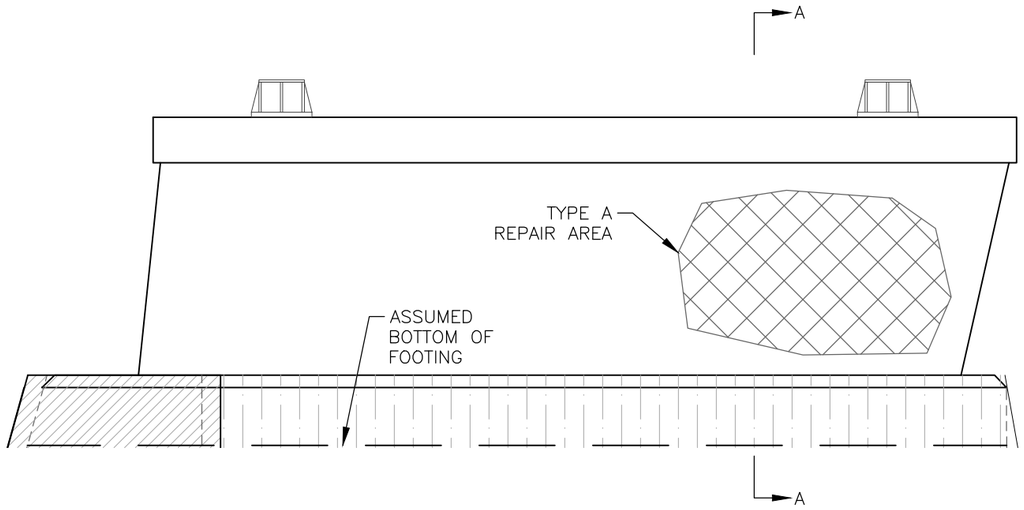
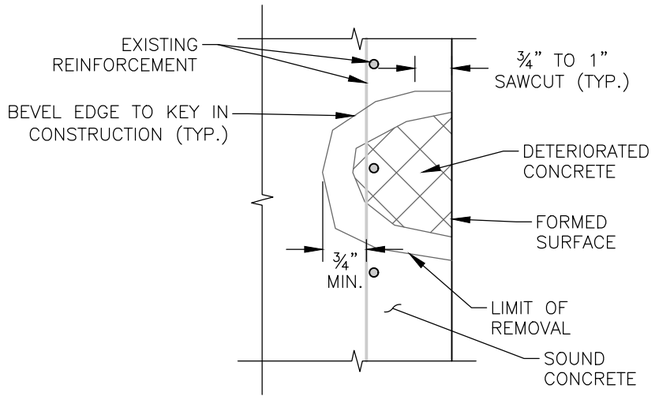


TYPICAL PIER WEST FACE - LOOKING EAST

1

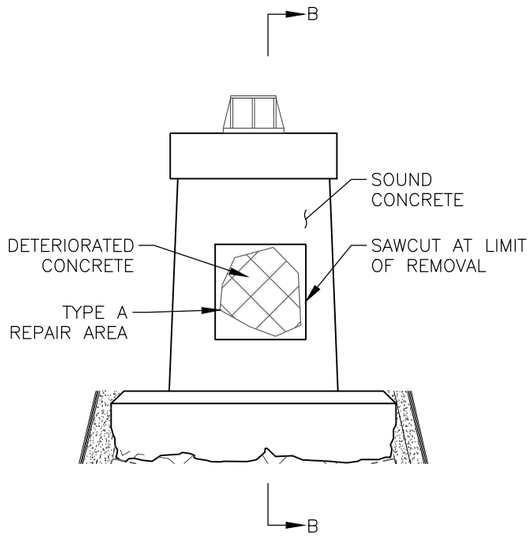
SCALE: NTS



SECTION A-A

2

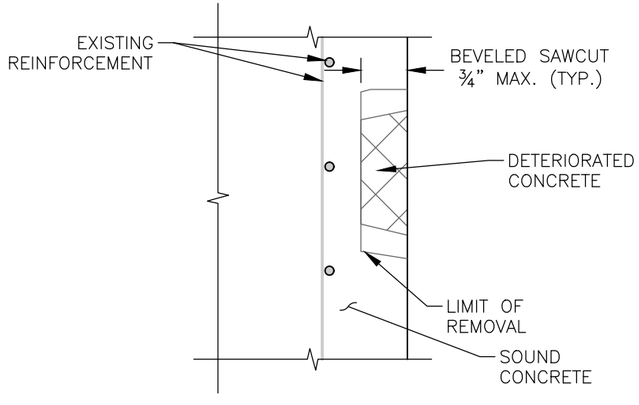
SCALE: NTS



TYPICAL PIER CROSS SECTION - LOOKING NORTH

3

SCALE: NTS



SECTION B-B

4

SCALE: NTS

CONCRETE REPAIRS	
PIER 2	
PIER FACE	TYPE A (SF)
WEST	15
NORTH	--
SOUTH	25
EAST	60
PIER 4	
PIER FACE	TYPE A (SF)
WEST	10
NORTH	--
SOUTH	30
EAST	10
PIER 6	
PIER FACE	TYPE A (SF)
WEST	5
NORTH	10
SOUTH	4
EAST	10
PIER 8	
PIER FACE	TYPE A (SF)
WEST	20
NORTH	--
SOUTH	--
EAST	--

TABLE NOTES:

TYPE A PIER REPAIRS: ABOVE WATER AREA (SF) (SPALLING, DELAMINATIONS, SCALING, OR MAP CRACKING)

LEGEND:

- CONCRETE REMOVAL

REPAIR NOTES:

CONCRETE REPAIRS ABOVE WATER SHALL NOT BE COMPLETED UNTIL AFTER BELOW WATER REPAIRS ARE COMPLETED.

REPAIR LOCATIONS SHOWN ARE ONLY EXAMPLE LOCATIONS. THE QUANTITIES SHOWN IN THE TABLE FOR TYPE A ARE ESTIMATED. THE CONTRACTOR SHALL IDENTIFY AND LOCATE THE ACTUAL LOCATIONS ON THE PIERS AND THE TYPE AND QUANTITIES OF REPAIRS TO BE CONSTRUCTED.

WHEN DEPTH OF DETERIORATED CONCRETE IS LESS THAN OR EQUAL TO ¾"

1. SQUARE OFF DETERIORATED CONCRETE TO SOUND CONCRETE WITH A SAWCUT OF ¾" MAXIMUM.
2. REMOVE ALL LOOSE AND DELAMINATED CONCRETE TO PROVIDE A SOUND BOND BETWEEN EXISTING CONCRETE AND PATCHING MATERIAL.
3. APPLY A RAPID HARDENING CONCRETE PATCHING MATERIAL. FIVE STAR STRUCTURAL CONCRETE WITHOUT VERTICAL LOVERHEAD PERMANENT REPAIR MATERIAL OR EQUAL.

WHEN DEPTH OF DETERIORATED CONCRETE IS GREATER THAN ¾"

1. SQUARE OFF DETERIORATED CONCRETE TO SOUND CONCRETE WITH A SAWCUT OF ¾" MINIMUM TO 1" MAXIMUM, BUT NOT TO THE DEPTH OF REINFORCEMENT STEEL. BACK BEVEL EDGE BEYOND SAWCUT.
2. USE HANDTOOLS TO REMOVE ALL LOOSE AND DELAMINATED CONCRETE TO PROVIDE A SOUND BOND BETWEEN EXISTING CONCRETE AND NEW CONCRETE.
3. IF DETERIORATED CONCRETE EXTENDS BEYOND THE PRIMARY REINFORCEMENT, REMOVE THE CONCRETE TO AT LEAST ¾" BEHIND THE REINFORCEMENT.
4. APPLY AN EPOXY BONDING COMPOUND BETWEEN THE EXISTING AND THE NEW CONCRETE.
5. CLEAN EXISTING REINFORCING BARS BY MECHANICAL MEANS.
6. APPLY A RAPID HARDENING CONCRETE PATCHING MATERIAL. FIVE STAR STRUCTURAL CONCRETE WITHOUT VERTICAL LOVERHEAD PERMANENT REPAIR MATERIAL OR EQUAL.

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BRENNAN

Pier Repair Plans
Grosse Ile Parkway Bridge
Repair Details
Grosse Ile, MI

CEI PROJECT	60-12797
DESIGNED BY:	SJM
DRAWN BY:	JCG
CHECKED BY:	SJM
DATE:	4-16-21
SHEET NO:	S-10