





# Francis Scott Key Bridge Rebuild Project

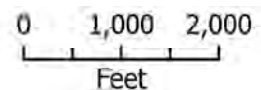
## Vicinity Map

Baltimore City and Baltimore County, Maryland  
 June 2024 **24-WL-0607 and 24-WL-0653**

**24-WQC-0022**  
**202460906**  
**7/8/2024**  
**1 of 45**



-  Study Area
-  County Boundaries



## **REMAINDER OF FSK BRIDGE DEMOLITION**

### **NOTES:**

- Erosion controls shall be in place on both approaches prior to removing any deck or dropping any steel.
- Shielding barges will be positioned beneath span being removed to prevent any slurry or debris from entering the waterway.

### **Deck, Parapet, and Median Removal (Water)**

1. The existing median barrier will be removed by hammering it every ten (10) feet to create sections. The barrier will then be hammered where it meets the deck. Cut any rebar and move each section down the bridge.
2. Parapet will be removed by sawcutting techniques.
3. Core holes in the parapet to allow rigging to be inserted.
4. Make plunge cuts every ten (10) feet to create sections.
5. Finally, make a longitudinal cut adjacent to the bottom of the barrier.
6. Lift the sections and place them on the deck.
7. Drag the sections out of the way to the laydown area.
8. Next, the concrete deck will be removed. The concrete deck is non-composite so sawcutting techniques will also be utilized for this removal operation.
9. The size of the deck panels shall be six (6) feet long and nine (9) feet wide (this is the spacing of the girders.)
10. Make the sawcuts in the span to be removed. Sawcut down the center of the existing girders.
11. Once the deck is sawcut, begin to remove the deck sections.
12. Deck sections shall be moved off the span and down to the laydown yard.
13. The concrete deck and parapet sections will be downsized and then shall be loaded into trucks for recycling at an approved recycling facility.

### **Deck, Parapet, and Median Removal (Land)**

1. The existing median barrier will be removed by hammering it every ten (10) feet to create sections. The barrier will then be hammered where it meets the deck. Cut

- any rebar and move each section down the bridge.
2. Parapet will be removed by sawcutting techniques.
3. Core holes in the parapet to allow rigging to be inserted.
4. Make plunge cuts every ten (10) feet to create sections.
5. Finally, make a longitudinal cut adjacent to the bottom of the barrier.
6. Lift the sections and place them on the deck.
7. Drag the sections out of the way to the laydown area.  
Next, the concrete deck will be removed. The concrete deck is non-composite so sawcutting techniques will also be utilized for this removal operation.
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10. Once the deck is sawcut, begin to remove the deck sections.
11. Deck sections shall be moved off the span and down to the laydown yard.
12. The concrete deck and parapet sections will be downsized and then shall be loaded into trucks for recycling at an approved recycling facility.

### **Girder Removal (Water)**

1. The existing continuous span girders shall be removed either in pairs or as a single unit (there are seven (7) beams in each span.)
2. Position the Ringer Crane into position and spud down. A material barge shall be placed alongside the crane barge.
3. Remove the first section of steel by cutting holes in the web to insert the chain through. A spreader bar will be utilized as these spans are 300 feet long.
4. Lift the section of steel with the crane and place it on the material barge.
5. Multiple material barges may be required due to the span length.
6. Continue in each span until all the beams are removed.
7. Move to the adjacent span and repeat the process.
8. The operation will then be moved to the opposite approach to remove those spans.
9. The material barges will be pushed to the laydown yard where they will be offloaded.
10. Once the steel is offloaded, it will be subsequently downsized with a combination of hydraulic shears and oxygen/propane torches.
11. Load steel into trucks to be recycled at facility listed above.

### **Girder & Pier Removal (Land) – Piers 1 through 13 & 25 through 36**

1. The existing land spans and piers shall be removed by felling the piers and allowing the steel girders to drop.
2. The existing column legs, caps, and struts shall be drilled to allow charges to be placed.
3. Once all charges are placed, explosive demolition shall fell the piers which will bring

- the steel girders down to the ground.
4. Once the steel girders and piers are on the ground, process the materials. Any remaining portions of the piers shall be hammered with a hydraulic excavator equipped with a hydraulic hammer.
  5. Multiple spans will be felled at once since the spans are continuous.
  6. Repeat the process for the remaining land spans.
  7. Load concrete and steel into trucks to be recycled at facility listed above.

**Pier Above Water Removal – Piers 14 through 16 & 22 through 24**

1. The portion of the piers above the water for the remaining piers (14, 15, 16, and 22, 23, 24) shall be removed using explosives.
2. The existing pier caps, columns, and struts shall be drilled to allow charges to be placed.
3. Once the charges are placed, the explosives will fail the piers and allow them to fall into the water.
4. They will be cleaned up with the portions of the piers that are below water.

**Pier Below Water Removal – Piers 14 through 16 & 19 through 24**

1. The portions of the existing piers that are below water (14, 15, 16, 19, 20, 21, 22, 23, and 24) shall be removed utilizing explosives.
2. The piers shall either be drilled from on top of the pier or from a barge.
3. Divers will be sent down to inspect the footing to check for any cofferdams that may have been left in place. If they are found, the sheets will be cut vertically every eight (8) feet.
4. Once the drilling is completed, the explosives will be placed and the piers will be imploded.
5. Once they are imploded, the river bottom will be cleaned up with a combination of hydraulic excavators and duty cycle cranes equipped with clamshell buckets.
6. Place material on barges and push to trestle or offloading yard.
7. Offload all the debris from the barges then move the barge back to each pier until the cleanup is complete.
8. Piers shall be removed to two (2) feet below existing mudline or as directed by the United States Coast Guard (USCG) or the United States Army Corps of Engineers (USACE). Approximate elevations of mudline:
  - a. Pier 14 – EL -16
  - b. Pier 15 – EL -16
  - c. Pier 16 – EL -20
  - d. Pier 19 – EL -25
  - e. Pier 20 – EL -24
  - f. Pier 21 – EL -24
  - g. Pier 22 – EL -19
  - h. Pier 23 – EL -13

- i. Pier 24 – EL -15
9. Load concrete into trucks to be recycled at facility listed above.

### **Abutment Removal**

1. The existing abutments and wingwalls shall be completely removed.
2. Hammer the abutments and wingwalls with a hydraulic excavator equipped with a hydraulic hammer.
3. Load concrete into trucks to be recycled at an approved facility.

### **Pier 18 Strut & Column Removal (Above Water)**

1. The portion of Pier 18 above the water shall be removed using explosives.
2. The existing pier caps, columns, and struts shall be drilled to allow charges to be placed.
3. Once the charges are placed, the explosives will fail the piers and allow them to fall into the water.
4. They will be cleaned up with the portions of the piers that are below water.

### **Pier 17 & 18 Lower Strut, Column, and Footing Removal (Below Water)**

1. The portions of the existing Piers 17 and 18 that are below water shall be removed utilizing explosives.
2. The piers shall either be drilled from on top of the pier or from a barge.
3. Divers will be sent down to inspect the footings/tremies to check for any cofferdams that may have been left in place. If they are found, the sheets will be cut vertically every eight (8) feet.
4. Once the drilling is completed, the explosives will be placed and the piers will be imploded.
5. Once they are imploded, the river bottom will be cleaned up with a combination of hydraulic excavators and duty cycle cranes equipped with clamshell buckets.
6. Place material on barges and push to trestle or offloading yard.
7. Offload all the debris from the barges then move the barge back to each pier until the cleanup is complete.
8. Pier 17 and 18 shall be removed to the top of the (footing) foundation concrete unless otherwise directed by MDTA.
9. Load concrete into trucks to be recycled at facility listed above.

### **Dolphins A, B, C, & D Removal**

1. The top portion of each of the dolphins from EL 4 to EL 0 shall be hammered in place utilizing hydraulic excavators equipped with hydraulic hammers operating on barges.
2. Concrete shall fall into water and will be cleaned up after the remainder of the dolphins are removed.
3. The dolphins shall be drilled from a barge.
4. Divers will be sent down to inspect the sheets. The sheets will be cut vertically

- every eight (8) feet.
5. Once the drilling is completed, the explosives will be placed and the dolphins will be imploded.
  6. Once they are imploded, the river bottom will be cleaned up with a combination of hydraulic excavators and duty cycle cranes equipped with clamshell buckets.
  7. Place material on barges and push to trestle or offloading yard.
  8. Offload all the debris from the barges then move the barge back to each dolphin until the cleanup is complete.
  9. Dolphins shall be removed to two (2) feet below existing mudline. Approximate elevations of the mudline – A & C EL -40 – B & D EL -26
  10. Load concrete into trucks to be recycled at facility listed above.

### **Salt Shed Removal**

1. The existing wood framed salt shed shall be demolished systematically starting at the top and working towards the bottom.
2. Once the upper portion is removed, any existing slabs, foundations, or sonotubes shall be removed to two (2) feet below ground level.
3. Load concrete and construction/demolition debris into trucks to be recycled at an approved facility.

## Piers 19-21 Blast Parameters

	<u>P19</u>	<u>P20</u>	<u>P21</u>
Number of holes	180	126	163
Hole depth (ft)	36	34	34
Hole diameter(in)	2.75	2.75	2.75
Spacing(ft)	5	4.5	4.5
Burden(ft)	4.5	4.5	4.5
Number of holes	180	126	163
Max. decks per hole	2	2	2
Max. explosives /delay(lb)	30	24	26
Approx. Total explosive(lb)	5500	3000	4300
Average powder factor	1.75	1.75	1.75
Minimum delay (ms)	9	9	9

### Estimated Peak Particle Velocity (in/sec) at Utility Trench

<b>Structure</b>	<b>Distance(ft)</b>	<b>lb/delay</b>	<b>K = 24.2</b>	<b>160</b>	<b>240</b>	<b>300</b>
Pier 19	~230	30	0.061	0.405	0.607	0.795
Pier 20	~230	24	0.051	0.338	0.508	0.635
Pier 21	~230	26	0.058	0.383	0.574	0.718

\*\* K value indicates level of confinement of the blast with 24.2 being unconfined and 300 being extremely confined (as a sinking cut in solid bedrock).

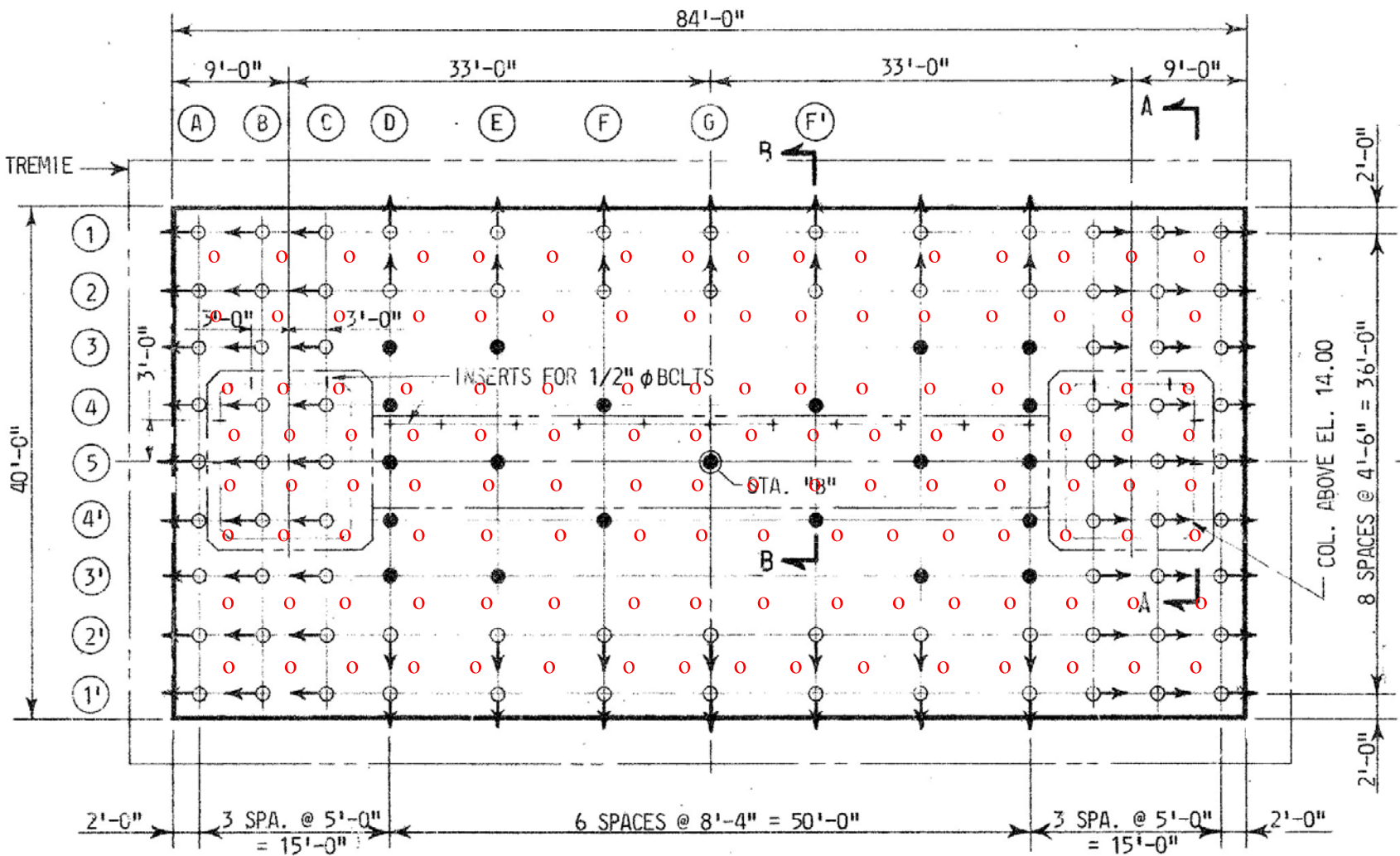
SLOPE 1/4"/FT.

EL. 148.7

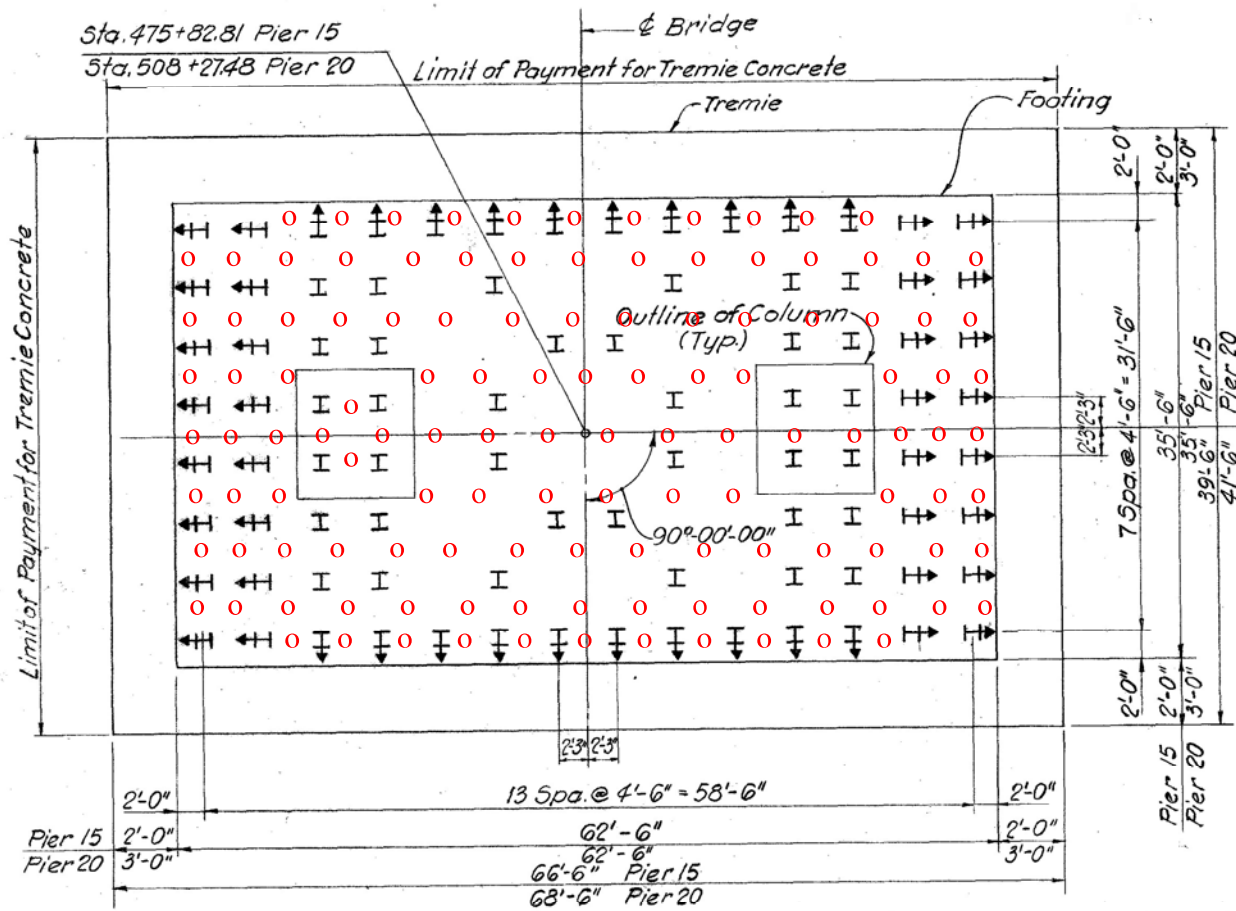
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BC

E PIER

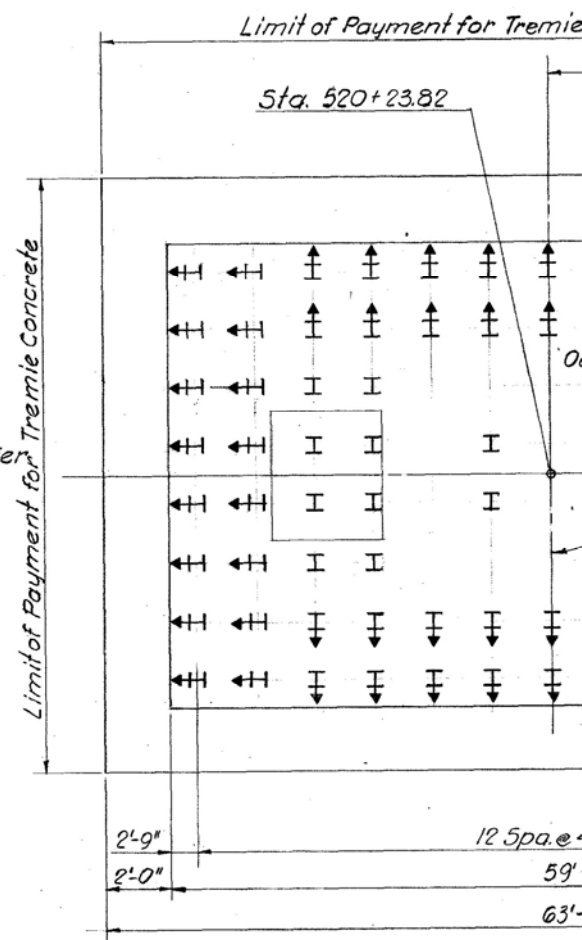
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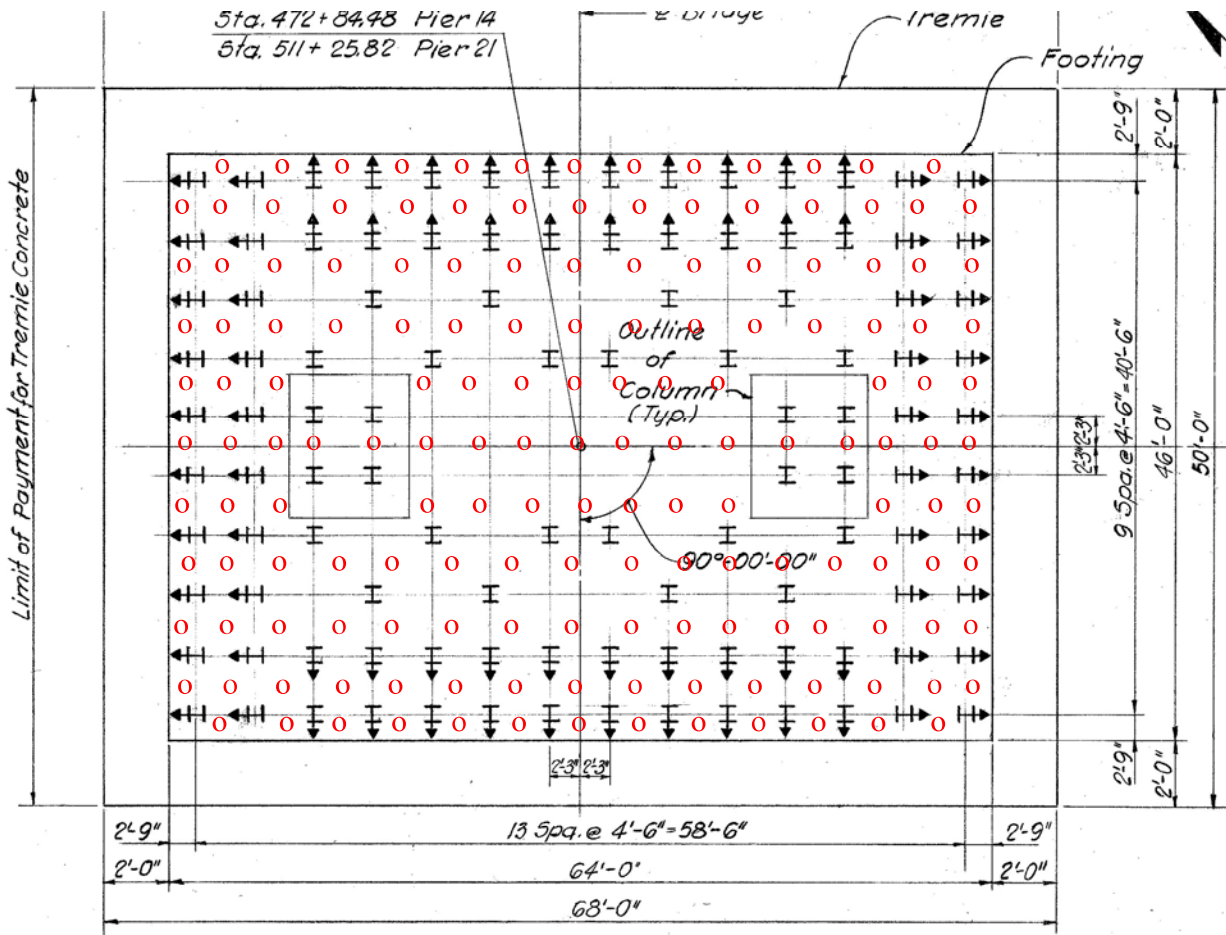




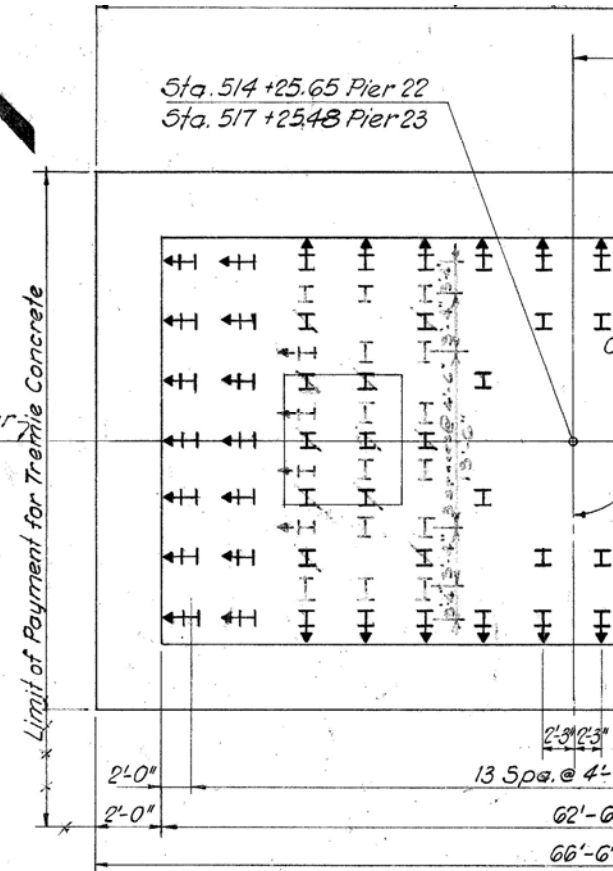
**PILE PLAN PIERS 15 & 20**



**PILE PLAN**

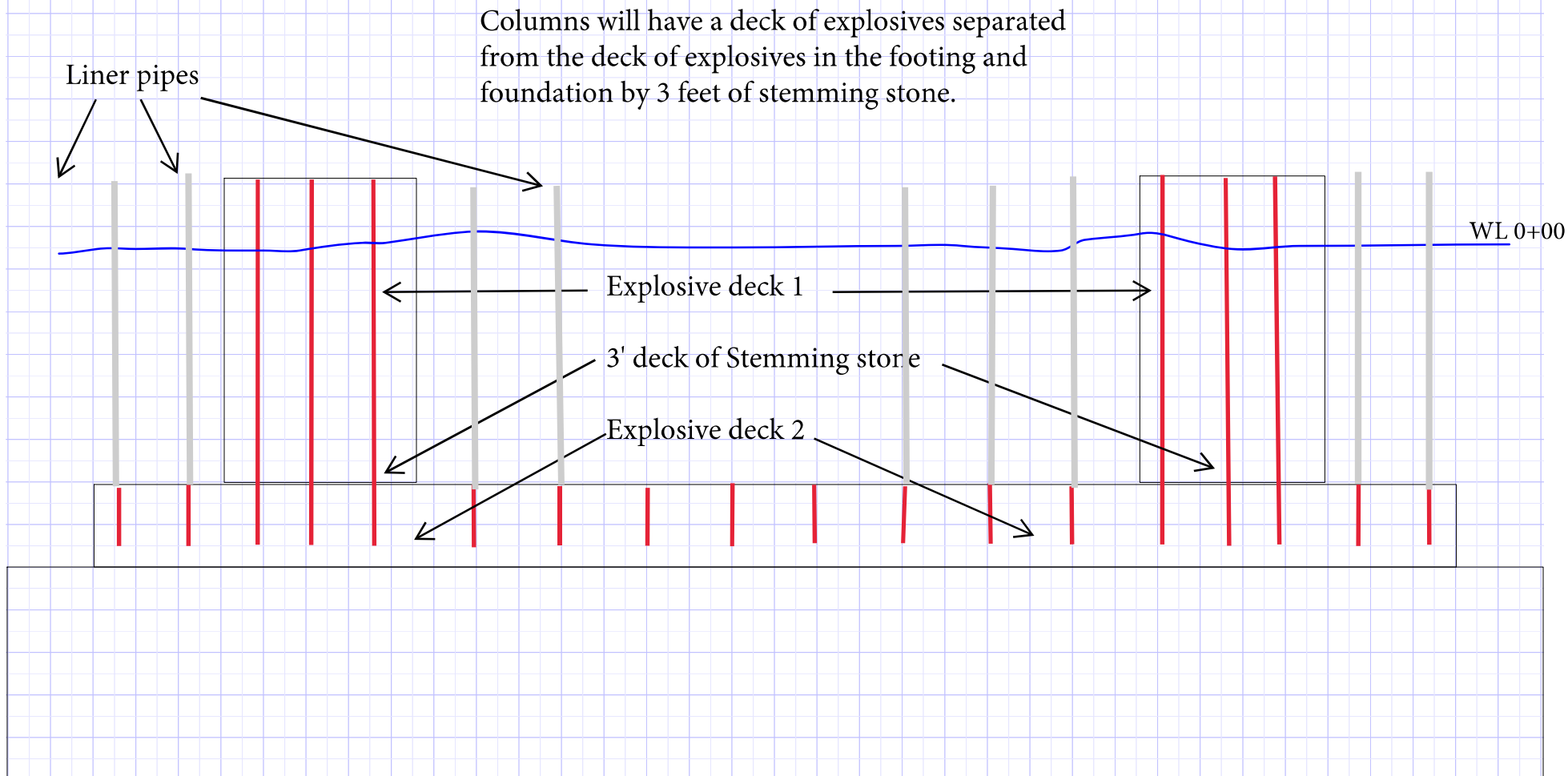


**PILE PLAN PIERS 14 & 21**



**PILE PLAN PIERS 22 & 23**

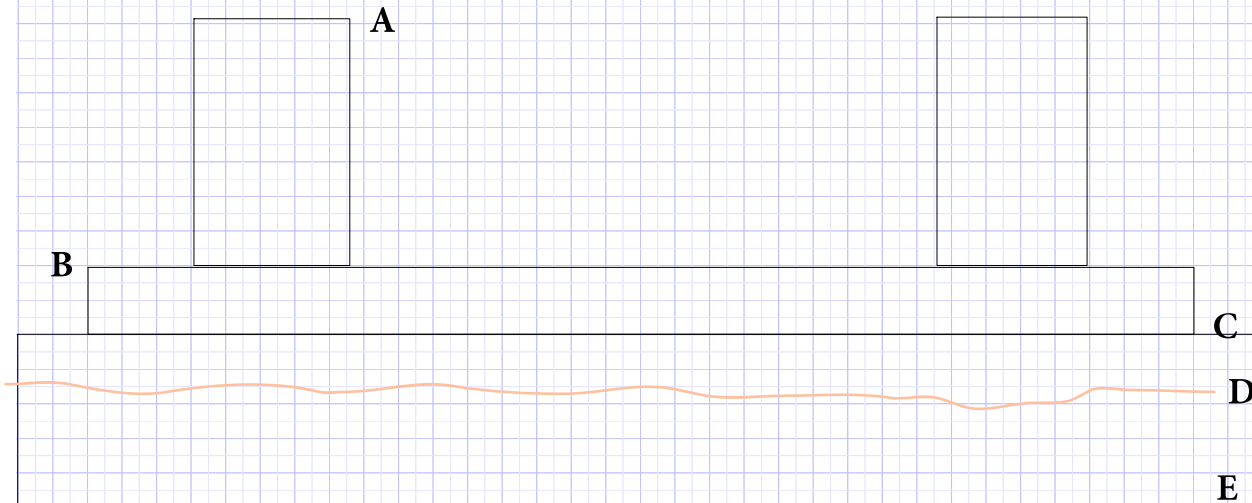
# Typical cross sectional view of drilled piers



Holes in footing and foundation will be drilled using a template and casing pipes. Once the holes are drilled liner pipes will be placed in each hole to facilitate loading of explosives from above the water.

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## Typical Elevations



**A - Top of pier**  
P19 = ~+4  
P20 = ~+1  
P21 = ~+1

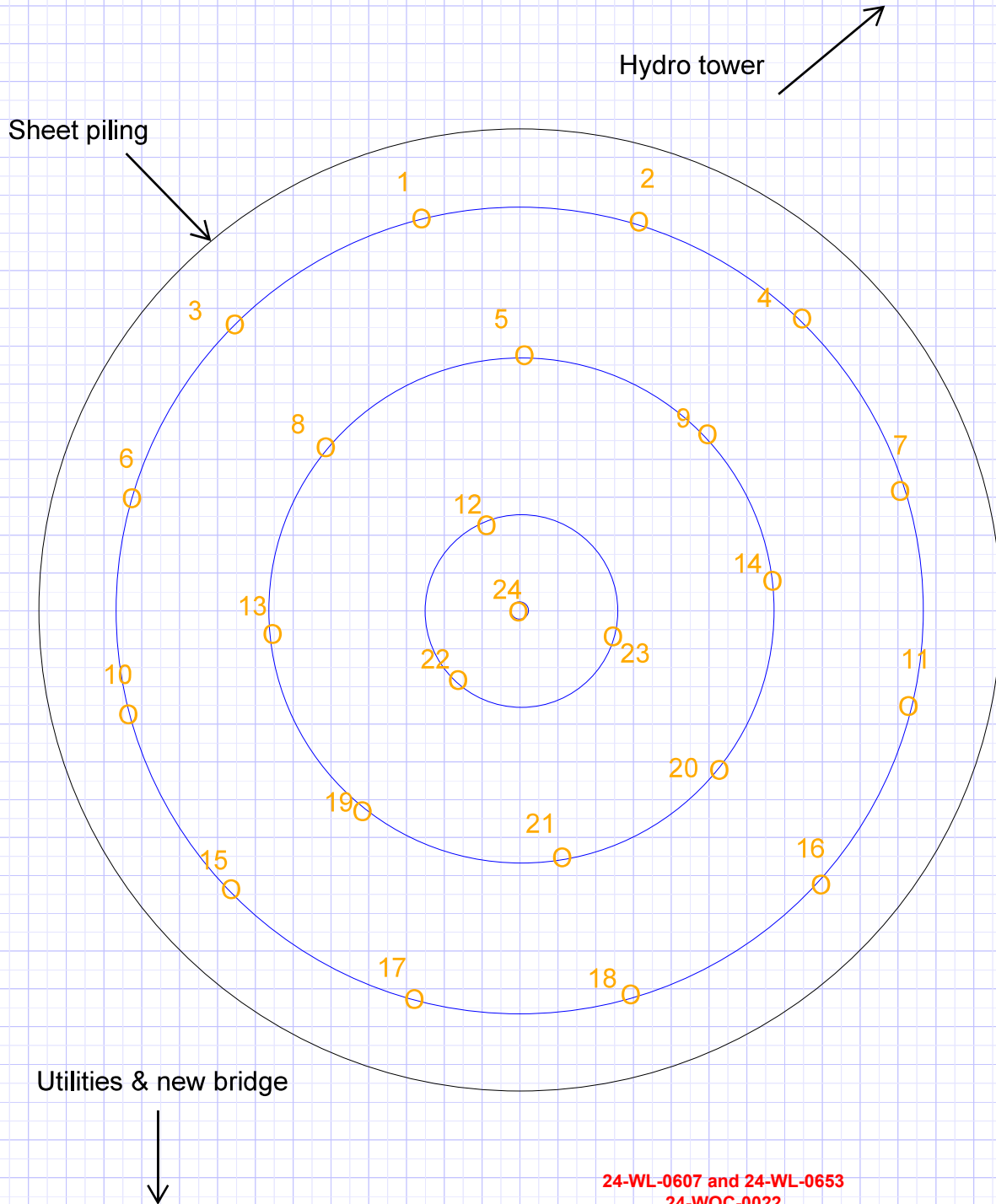
**B - Top of footing**  
P19 = -15  
P20 = -15  
P21 = -15

**C - Top of foundation**  
P19 = -21  
P20 = -23  
P21 = -23

**D - Mud line (per as built)**  
P19 = -25  
P20 = -24  
P21 = -24

**E - Bottom of foundation**  
P19 = -35  
P20 = -26  
P21 = -36

# DOLPHIN B



## Blast Parameters

Number of holes = 24  
Hole diameter = 2.75"  
Hole depth = 32'  
Spacing = 5.5'  
Burden = 4 - 4.5'  
Collar height = 4'  
Explosive column = 28'  
Approx. total explosives wt. = ~1123 lb  
Max. explosive / delay = 47 lb  
Overall powder factor = 1.8 (ranges 1 - 2 )  
Delay between detonations = 17ms Total shot duration = 391ms  
Initiation - Nonel dual delay detonators.  
Explosive - Dynamax Pro.  
Shot sequence as numbered on sketch.  
All explosive columns will be double primed, one detonator in bottom and one near the top for redundancy.  
Sheet pile to be Pre-cut.

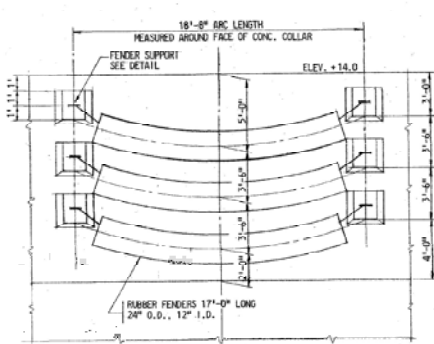
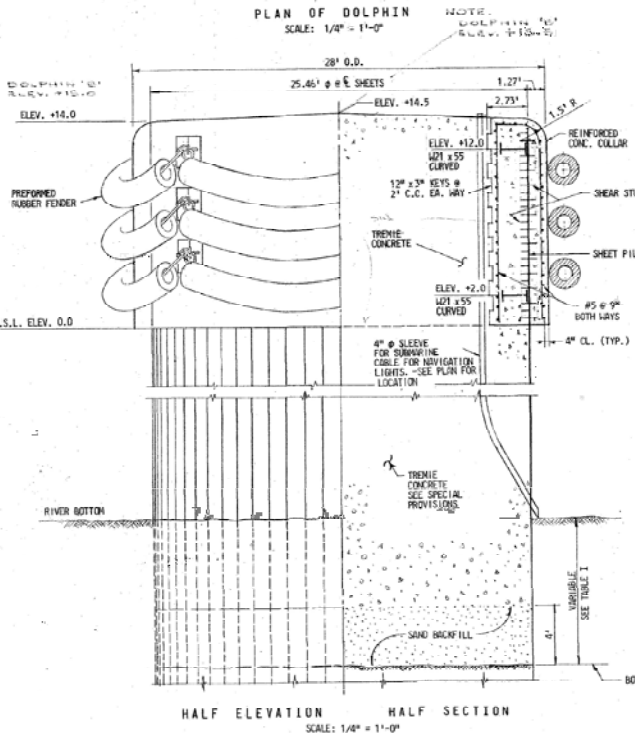
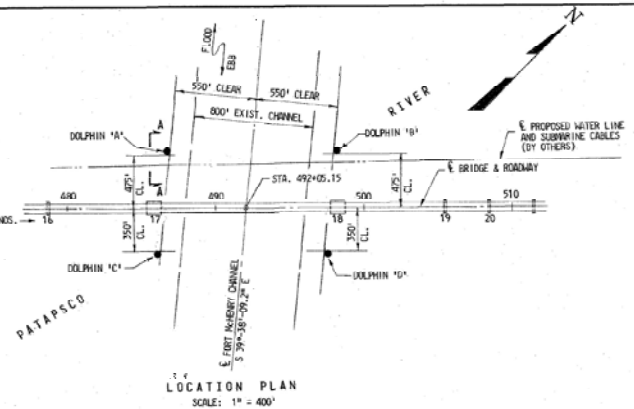
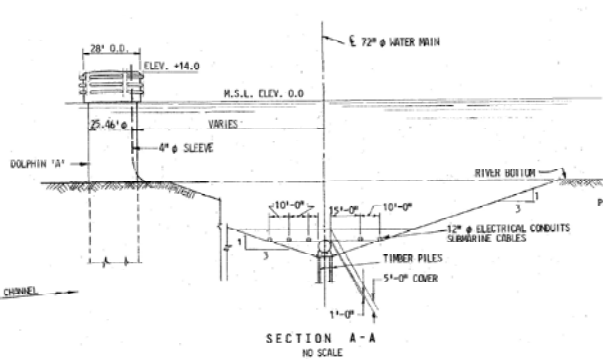
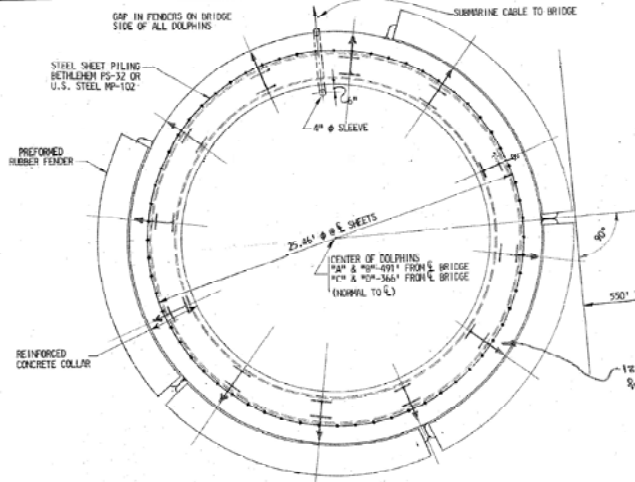
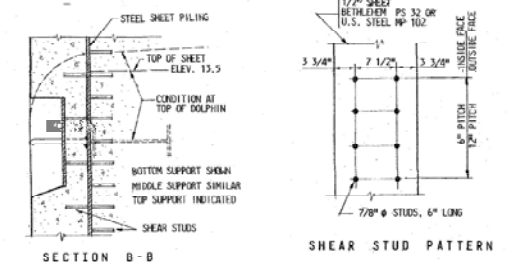
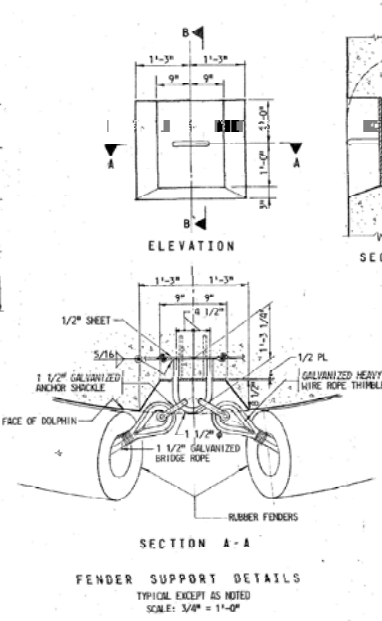


TABLE I

DOLPHIN	ELEVATION		
	BOTTOM OF FIC.	BOTTOM OF THEMIC	RIVER BOTTOM
A	-52	-48	-40
B	-52	-48	-26
C	-52	-48	-40
D	-52	-48	-26



NOTES:  
FOR GENERAL NOTES SEE Dwg. NO. D-102.  
THE SHEET PILING SHALL BE DRIVEN AS SPECIFIED.  
MATERIAL INSIDE THE SHEETING SHALL BE EXCAVATED TO ELEVATIONS INDICATED IN TABLE I.

AS BUILT

STATE OF MARYLAND  
DEPARTMENT OF TRANSPORTATION  
STATE HIGHWAY ADMINISTRATION  
BALTIMORE, MD.  
BALTIMORE HARBOR OUTER CROSSING  
PATAPSCO RIVER BRIDGE  
DOLPHINS

REVISIONS

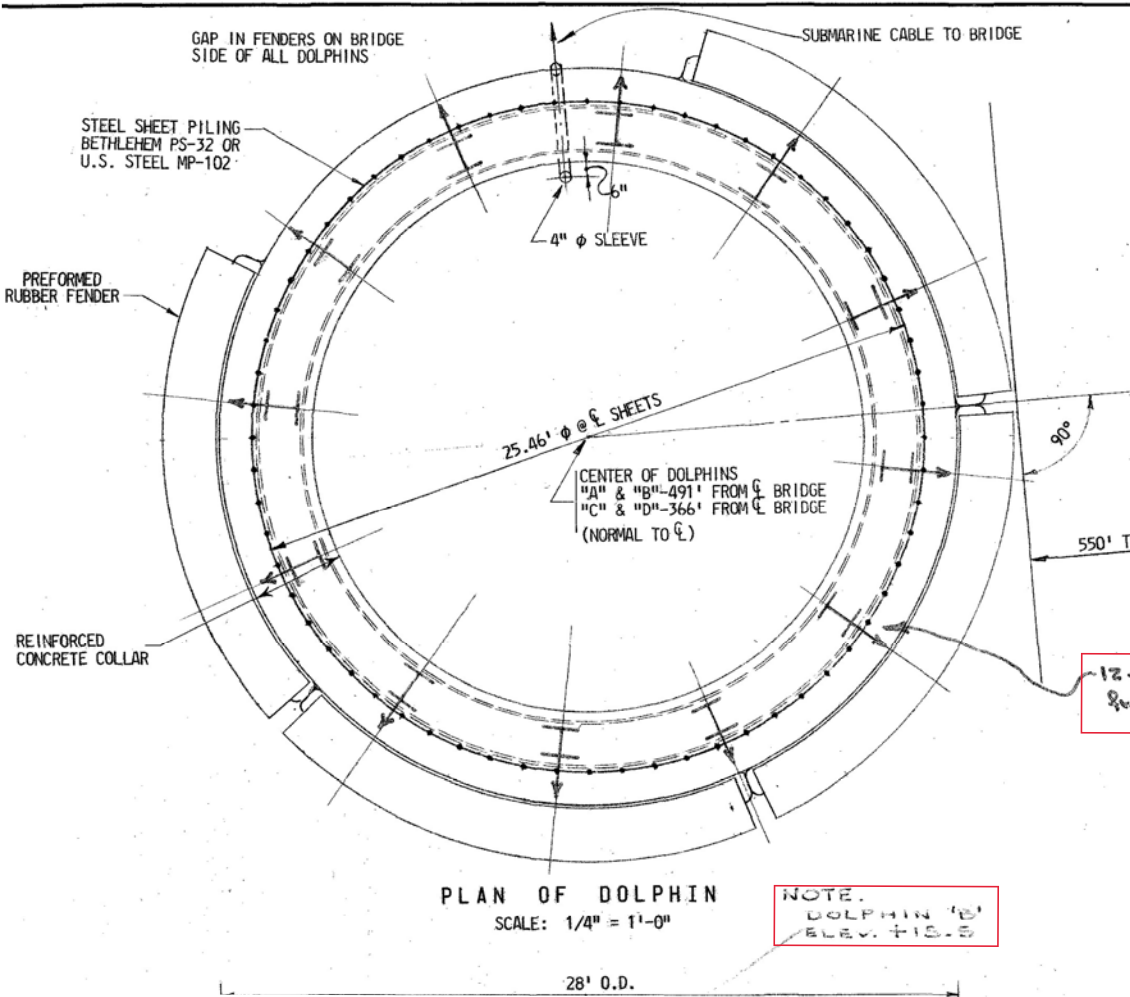
SCALE AS NOTED DATE JAN., 1972 CONTRACT 07-6

MADE BY E.B.M.  
TRACED BY E.B.M.  
CHECKED BY E.E.B.

J. F. CRONIN COMPANY INC.  
DESIGN ENGINEERS  
BALTIMORE, MARYLAND

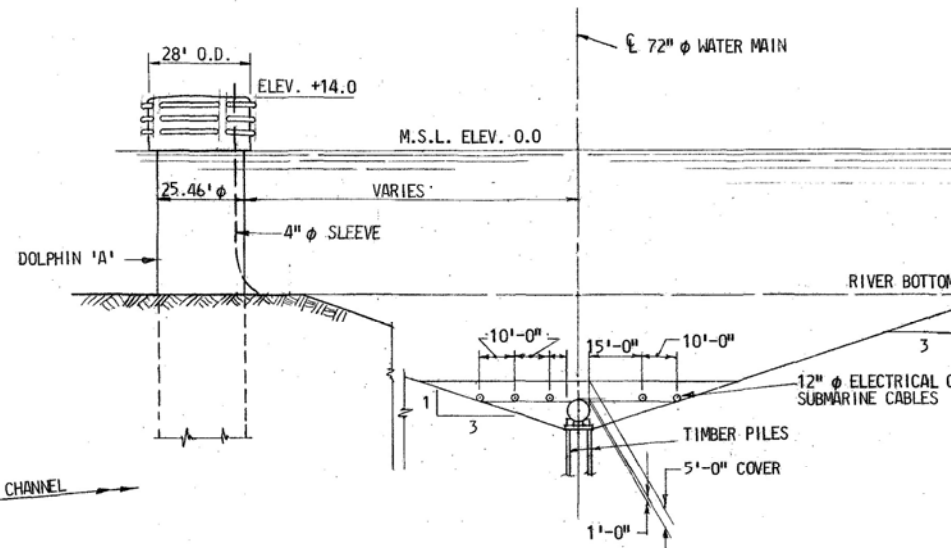
DRAWING NO. A-115  
SHEET NO. 15 OF 24  
INDEX: D

File No. Pocket No. Folder No.



PLAN OF DOLPHIN  
SCALE: 1/4" = 1'-0"

NOTE.  
DOLPHIN 'B'  
ELEV. +13.5



SECTION A-A  
NO SCALE

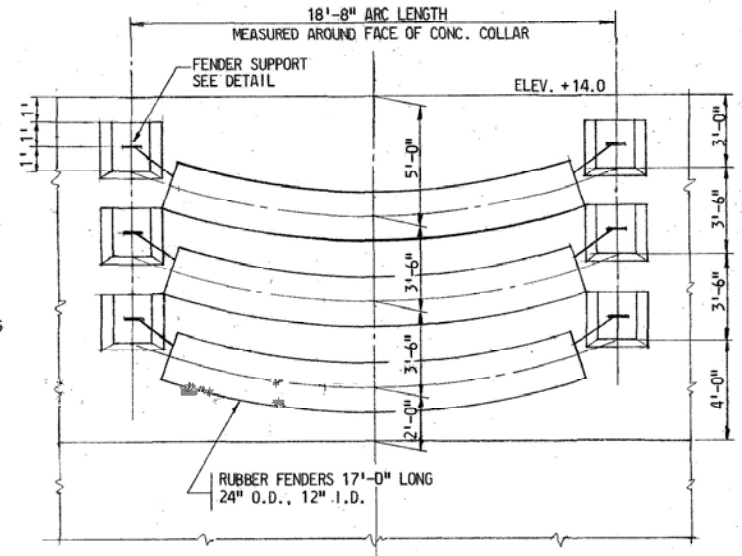
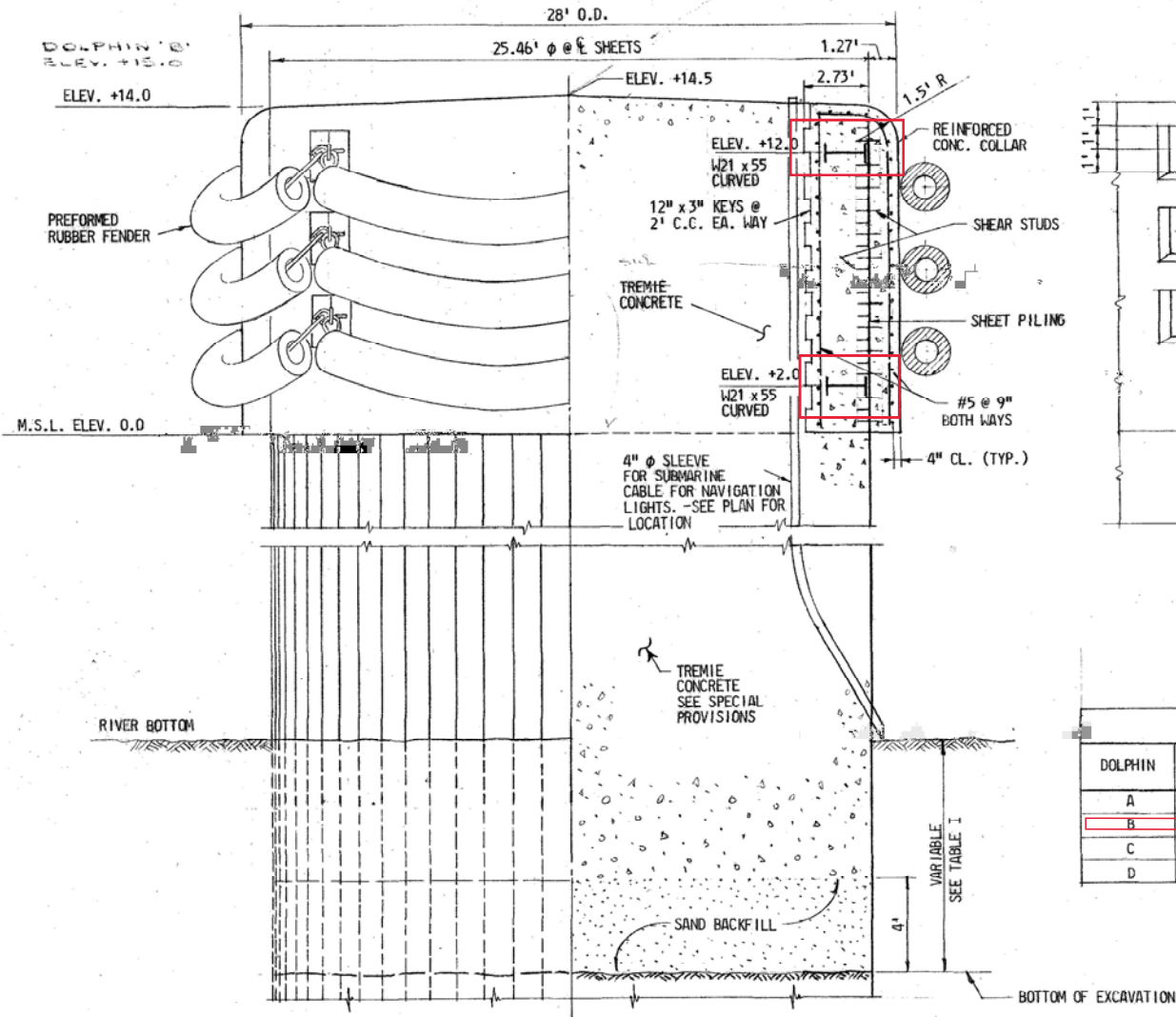
12-HP 14x102 piles on 1:5 batter from 114' to 162' long - Dolphin 'B' only

18'-8" ARC LENGTH

PLAN OF DOLPHIN

SCALE: 1/4" = 1'-0"

NOTE:  
DOLPHIN 'B'  
ELEV. +12.0



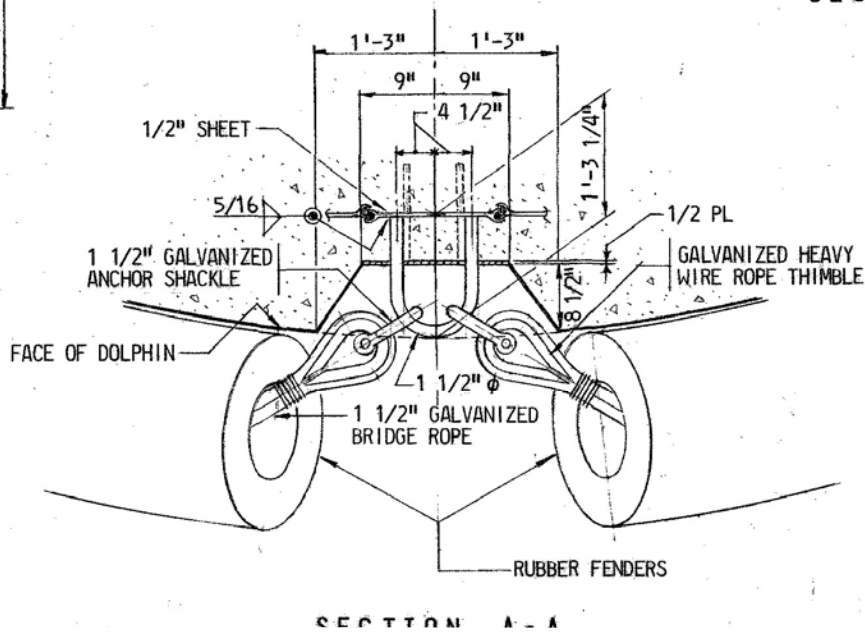
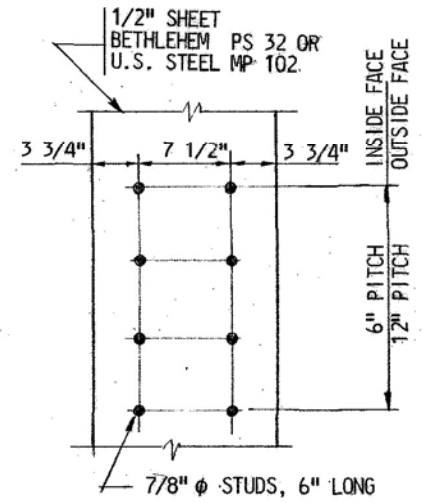
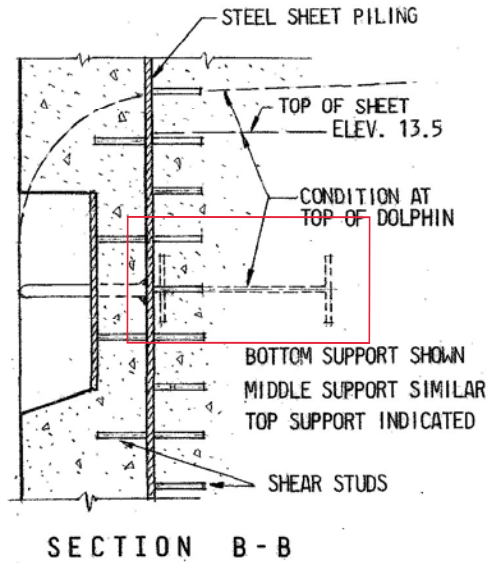
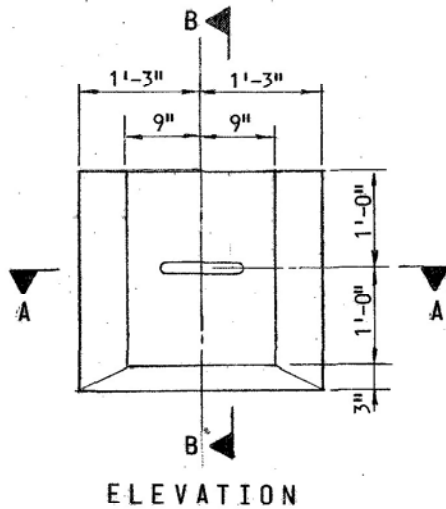
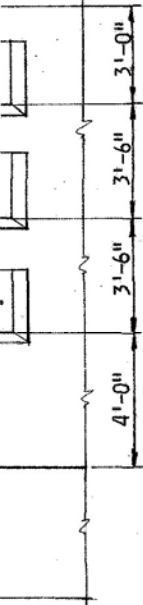
FENDER ARRANGEMENT

DEVELOPED VIEW  
SCALE: 1/4" = 1'-0"

TABLE I

DOLPHIN	ELEVATION		
	BOTTOM OF EXC.	BOTTOM OF TREMIE	RIVER BOTTOM
A	- 52	- 48	- 40
B	- 52	- 48	- 26
C	- 52	- 48	- 40
D	- 52	- 48	- 26





NOTES :

FOR GENERAL NOTES SEE DWG. NO. A-102.

THE SHEET PILING SHALL BE DRIVEN AS SPECIFIED.

MATERIAL INSIDE THE SHEETING SHALL BE EXCAVATED TO ELEVATIONS INDICATED IN TABLE I.  
~~All elevations this sheet subject to Note 12 DWG. A-102 Control 01-219.~~

AS BUILT

REVISIONS

STATE OF MARYLAND  
 DEPARTMENT OF TRANSPORTATION  
 STATE HIGHWAY ADMINISTRATION  
 BALTIMORE, MD.

RAITIMORE HARBOR OUTER CROSSING

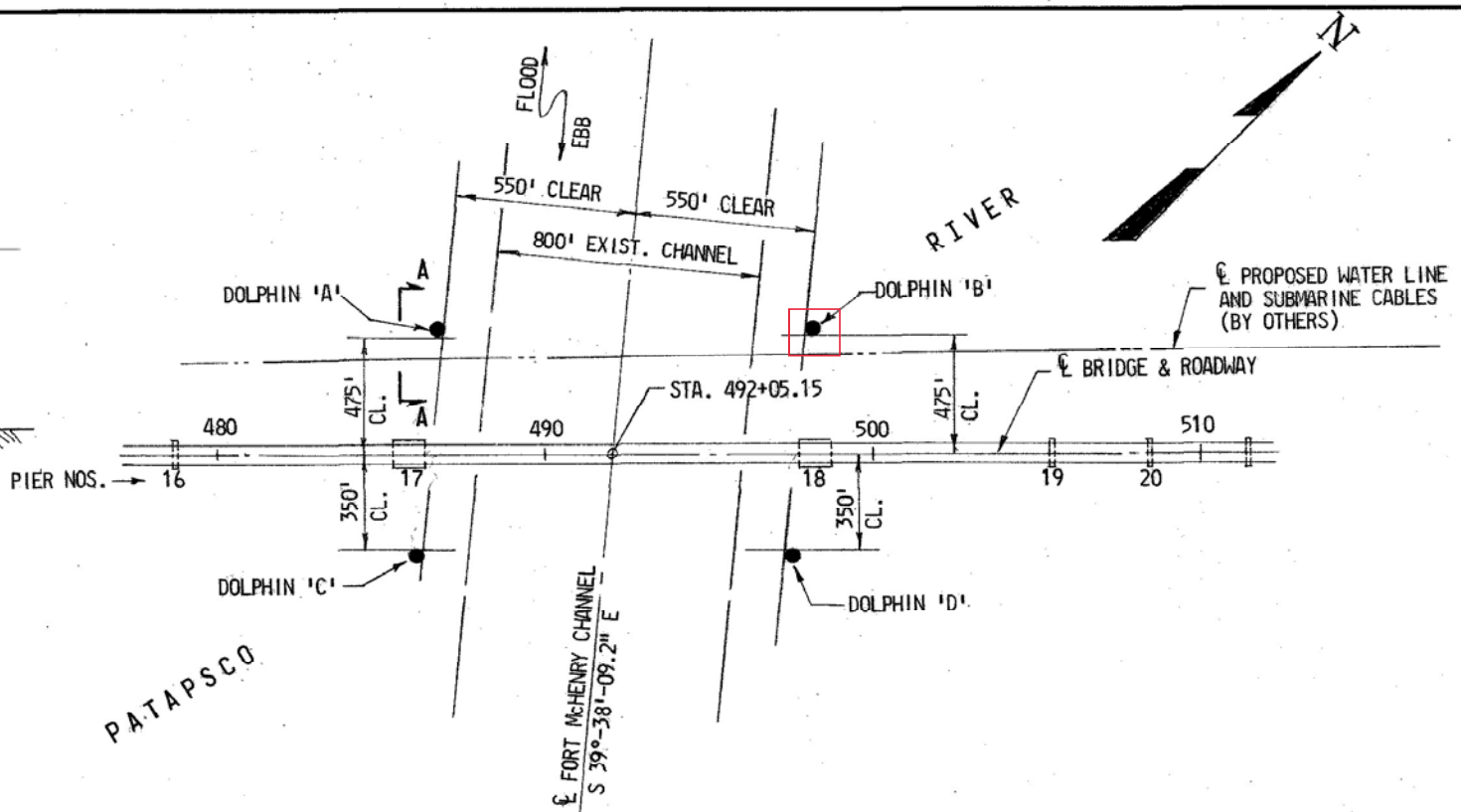
2"  $\phi$  WATER MAIN

10'-0"

12"  $\phi$  ELECTRICAL CONDUITS  
SUBMARINE CABLES

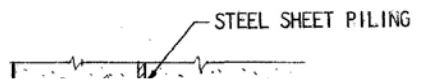
TIMBER PILES

5'-0" COVER



LOCATION PLAN  
SCALE: 1" = 400'

B

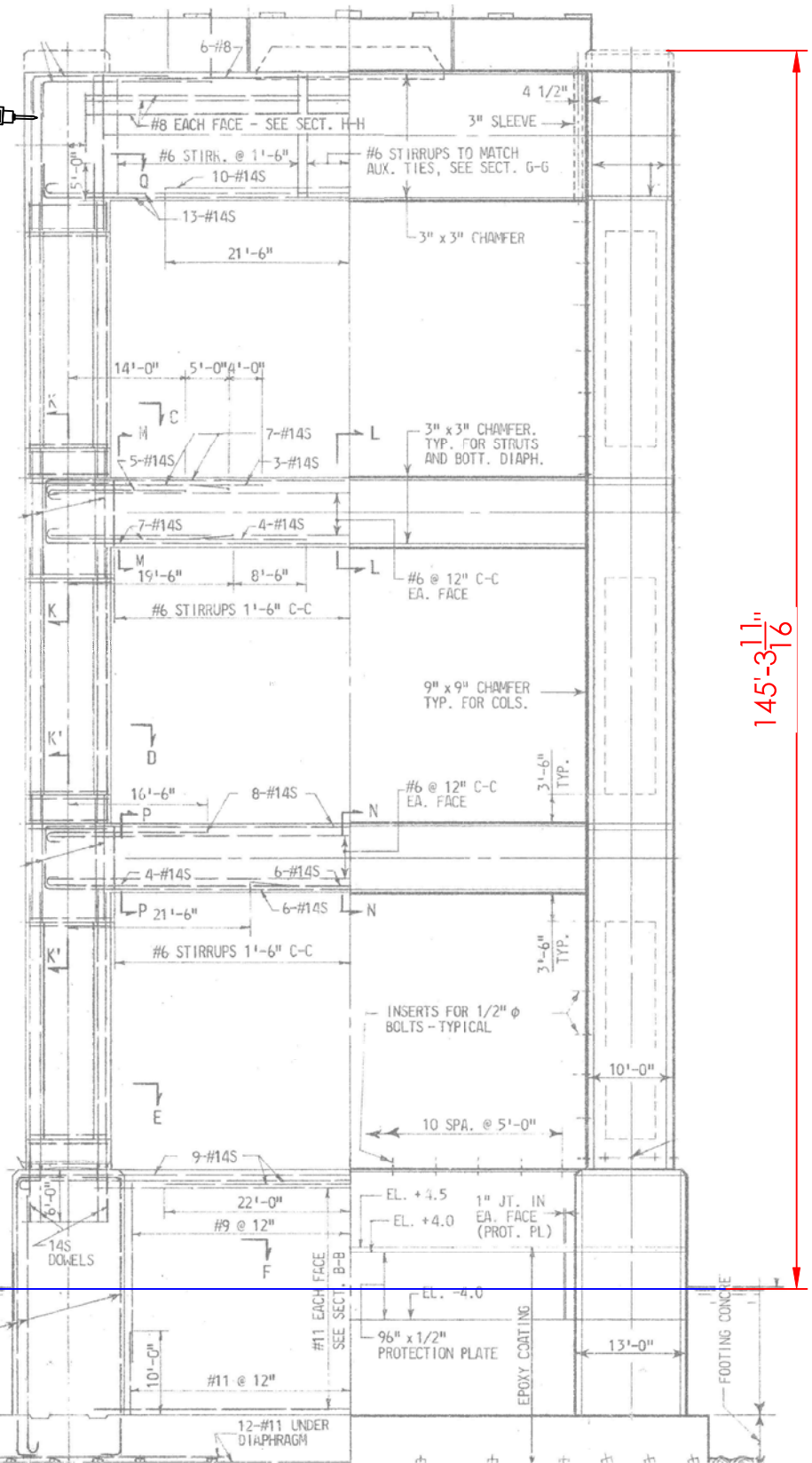


1/2" SHEET  
BETHLEHEM PS 32 OR  
U.S. STEEL MP 102.

FACE  
DE FACE

24-WL-0607 and 24-WL-0653  
24-WQC-0022  
202460906  
7/8/2024  
18 of 45

HIGH REACH  
EXCAVATOR WITH  
150' OF REACH



145'-3 1/16"

24-WL-0607 and 24-WL-0653  
24-WQC-0022  
202460906  
7/8/2024  
19 of 45

SCALE 1" = 20'

4	
3	
2	
1	
0	
NO.	DATE

FRANCIS SCOTT KEY BRIDGE  
REMAINING DEMOLITION  
PIER 16 SHOWN

PIER REMOVAL  
HAMMERING

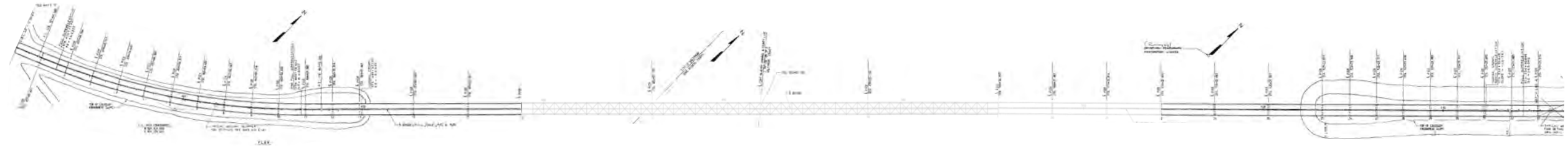
DWG. NO.  
D-1

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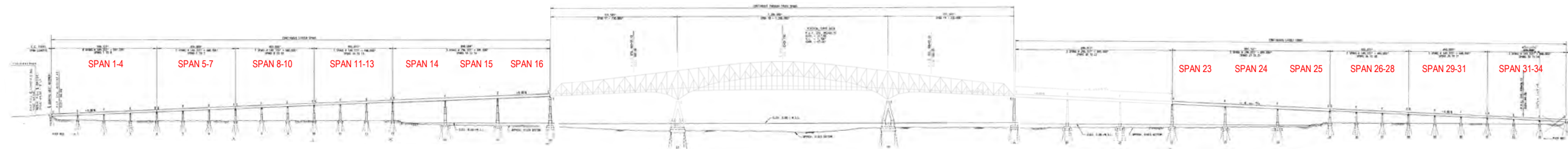
OWNER:  
MDTA  
2310 BROENING HIGHWAY  
BALTIMORE, MD 21224

DEMOLITION CONTRACTOR:

DRAFTER  
CHECKER  
SUPERVISOR



PLAN



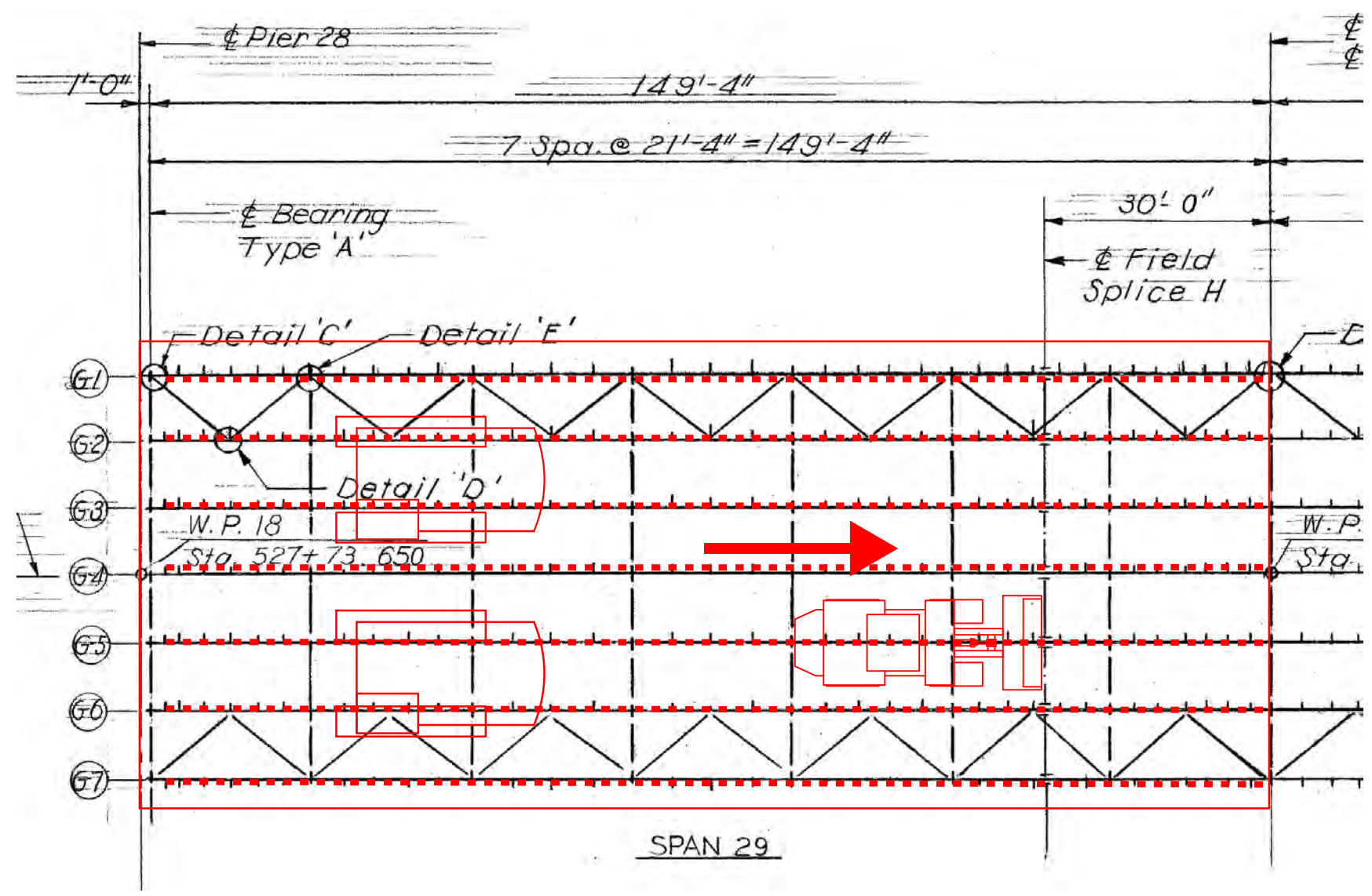
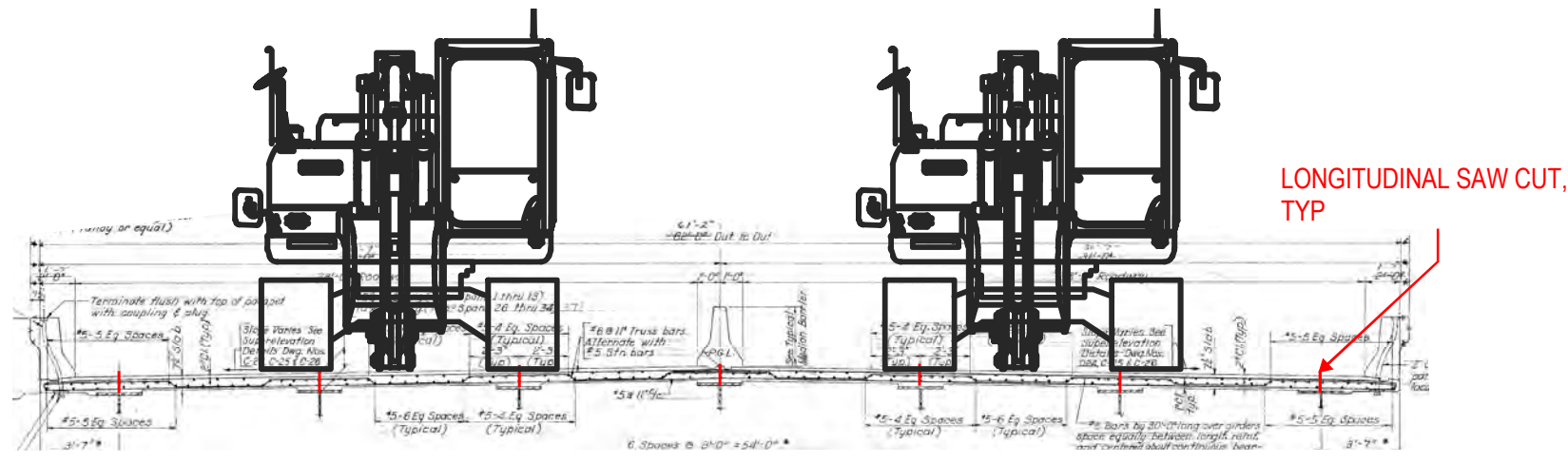
ELEVATION

PRELIMINARY  
NOT FOR CONSTRUCTION

24-WL-0607 and 24-WL-0653  
24-WQC-0022  
202460906

NO.	DATE	REMARKS	BY
△			
△			
△			

GENERAL LAYOUT KEY BRIDGE DEMOLITION	
DRAWN BY	CHK'D BY
DATE	
PROJECT	SHEET NO.



- DECK DEMOLITION SEQUENCE**
1. SAW AND REMOVE OVERHANG BARRIER AND DECK
  2. LONGITUDINAL SAW DECK
  3. WITH EXCAVATOR, PULL BACK SECTION OF DECK, CUT/BREAK REBAR, HAUL PANEL OFF DECK WITH LOADER
- REPEAT FOR ENTIRE DECK

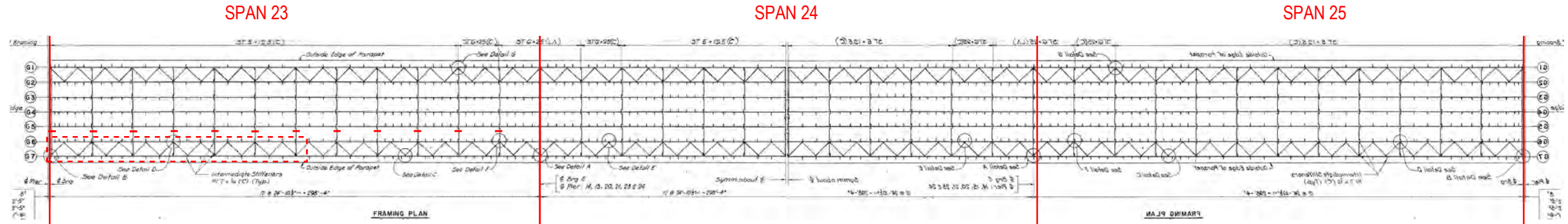
PRELIMINARY  
NOT FOR CONSTRUCTION

24-WL-0607 and 24-WL-0653  
24-WQC-0022  
202460906

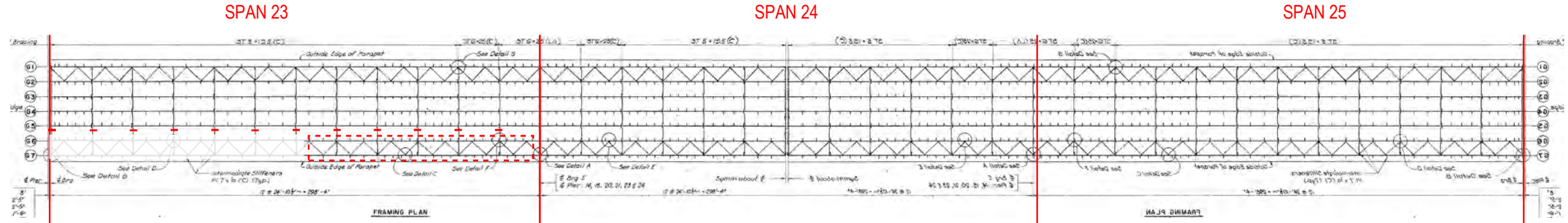
NO.	DATE	REMARKS	BY
△			
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GENERAL DECK DEMOLITION KEY BRIDGE DEMOLITION	
DRAWN BY	CHK'D BY
DATE	
PROJECT	SHEET NO.

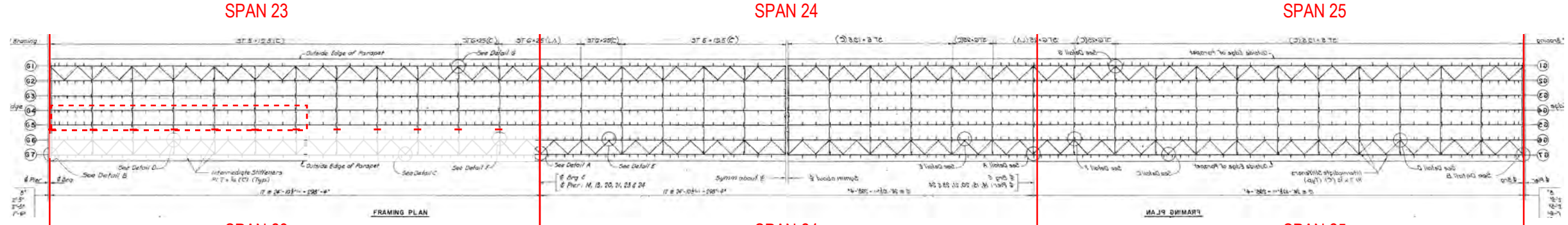
STEP 1 -  
CUT CROSSFRAMES BETWEEN G6 & G5  
HOIST G6&G7. APPROX WT = 100 TNS



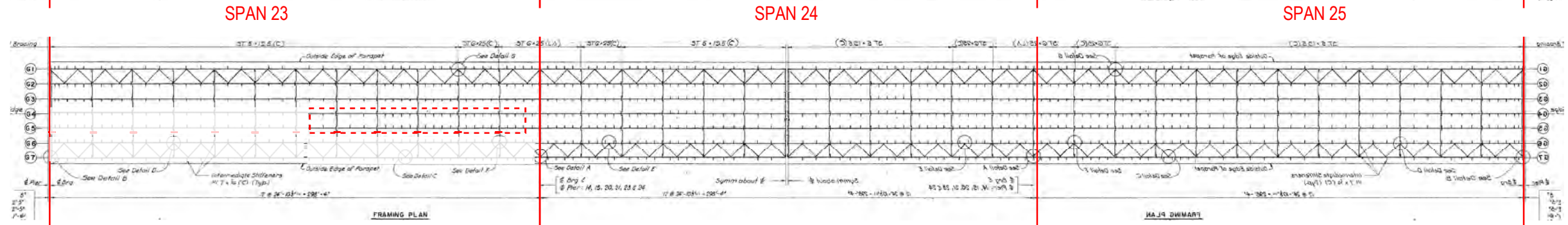
STEP 2 -  
CUT CROSSFRAMES BETWEEN G6 & G5  
HOIST G6&G7. APPROX WT = 75 TNS



STEP 3 -  
CUT CROSSFRAMES BETWEEN G3 & G4  
HOIST G4&G5. APPROX WT = 100 TNS



STEP 4 -  
CUT CROSSFRAMES BETWEEN G3 & G4  
HOIST G4&G5. APPROX WT = 75 TNS



PRELIMINARY  
NOT FOR CONSTRUCTION

24-WL-0607 and 24-WL-0653  
24-WQC-0022  
202460906

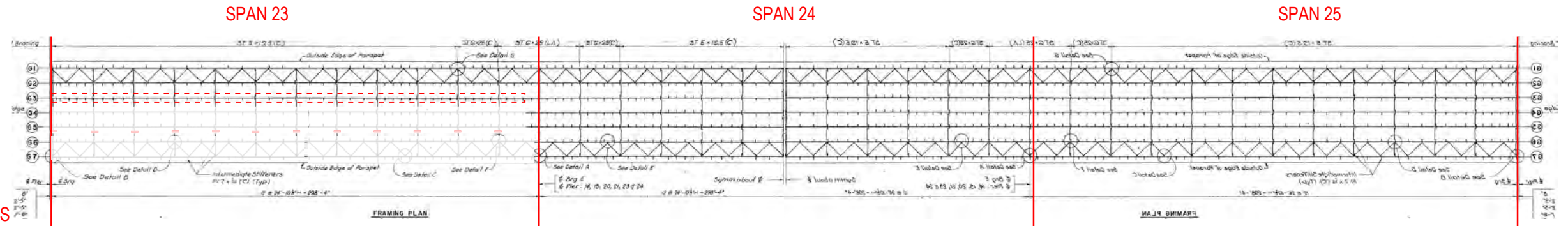
7/8/2024  
22 of 45

△			
△			
△			
NO.	DATE	REMARKS	BY

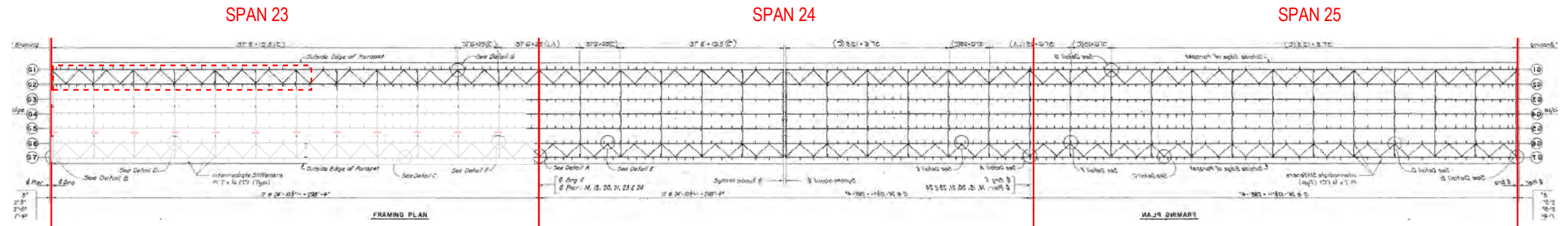
STEEL DEMOLITION SPANS 23-25 KEY BRIDGE DEMOLITION	
DRAWN BY	CHK'D BY
DATE	
PROJECT	SHEET NO.

STEP 5 -  
RIG TO G3 WITH SPREADER  
CUT CROSSFRAMES BETWEEN G3 & G2  
HOIST G3. APPROX WT = 90 TNS

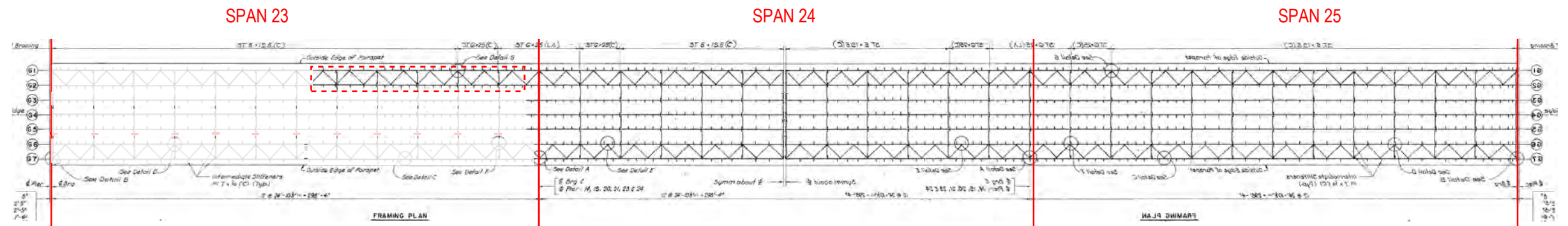
MAY ALSO TAKE PARTIAL LENGTH AND  
KEEP CONNECTED WITH CROSSFRAMES



STEP 6 -  
HOIST G1&G2. APPROX WT = 100 TNS



STEP 7 -  
HOIST G1&G2. APPROX WT = 75 TNS



REPEAT SAME STEPS FOR SPAN 24

PRELIMINARY  
NOT FOR CONSTRUCTION

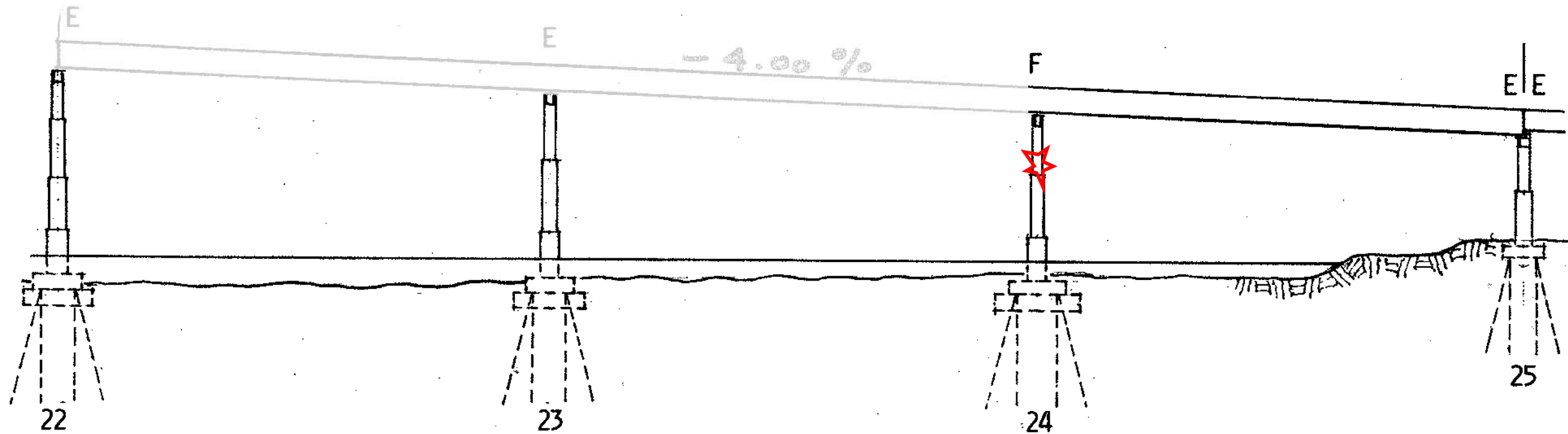
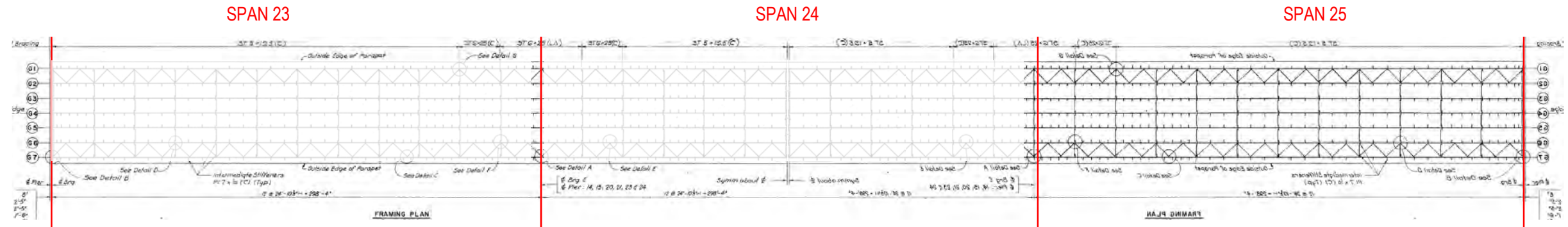
24-WL-0607 and 24-WL-0653  
24-WQC-0022  
202460906

7/8/2024  
23 of 45

NO.	DATE	REMARKS	BY

STEEL DEMOLITION SPANS 23-25 KEY BRIDGE DEMOLITION	
DRAWN BY	CHK'D BY
DATE	
PROJECT	SHEET NO.

STEP 8-  
BLAST PIER 24 AND DROP SPAN 25  
RETRIEVE WITH DREDGE



PRELIMINARY  
NOT FOR CONSTRUCTION

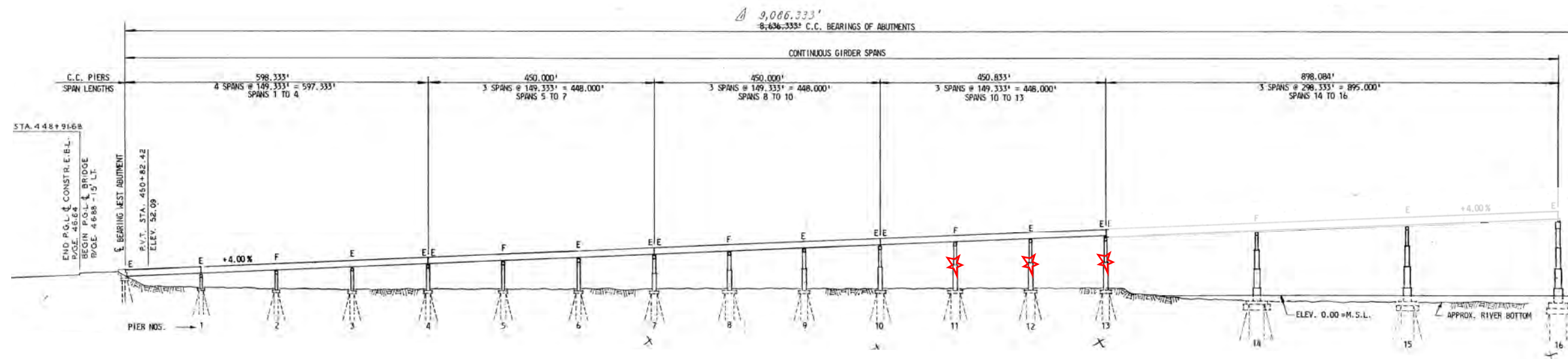
24-WL-0607 and 24-WL-0653  
24-WQC-0022  
202460906

7/8/2024  
24 of 45

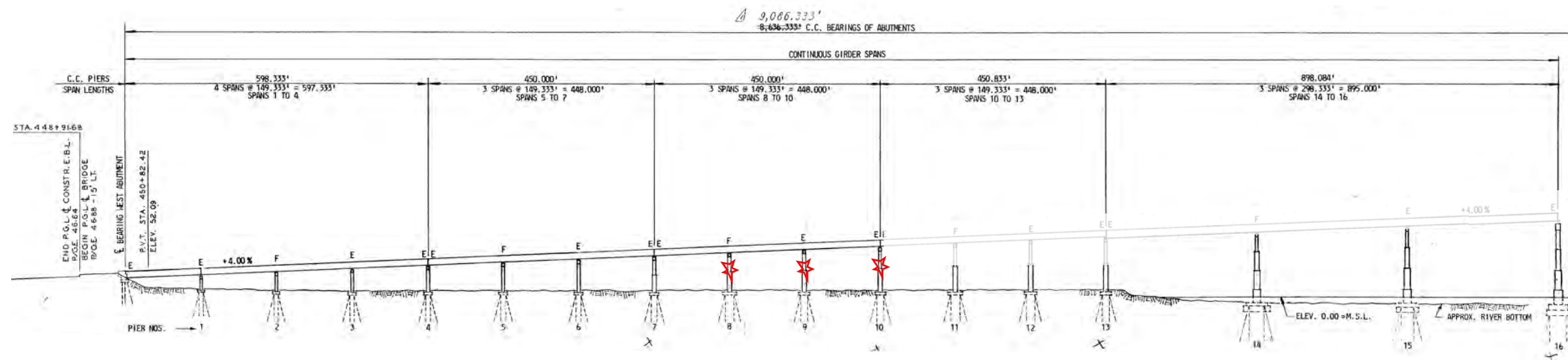
NO.	DATE	REMARKS	BY
△			
△			
△			

STEEL DEMOLITION SPANS 23-25 KEY BRIDGE DEMOLITION	
DRAWN BY	CHK'D BY
DATE	
PROJECT	SHEET NO.





STEP 1  
 BLAST PIERS 11, 12, 13 TO  
 DROP SPANS 11, 12, & 13  
 RETRIEVE WITH DREDGE



STEP 2  
 BLAST PIERS 8, 9, 10 TO  
 DROP SPANS 8, 9, & 10  
 RETRIEVE WITH DREDGE

REPEAT FOR ALL REMAINING  
 APPROACH SPANS

SIMILAR FOR SPANS 26 - 34

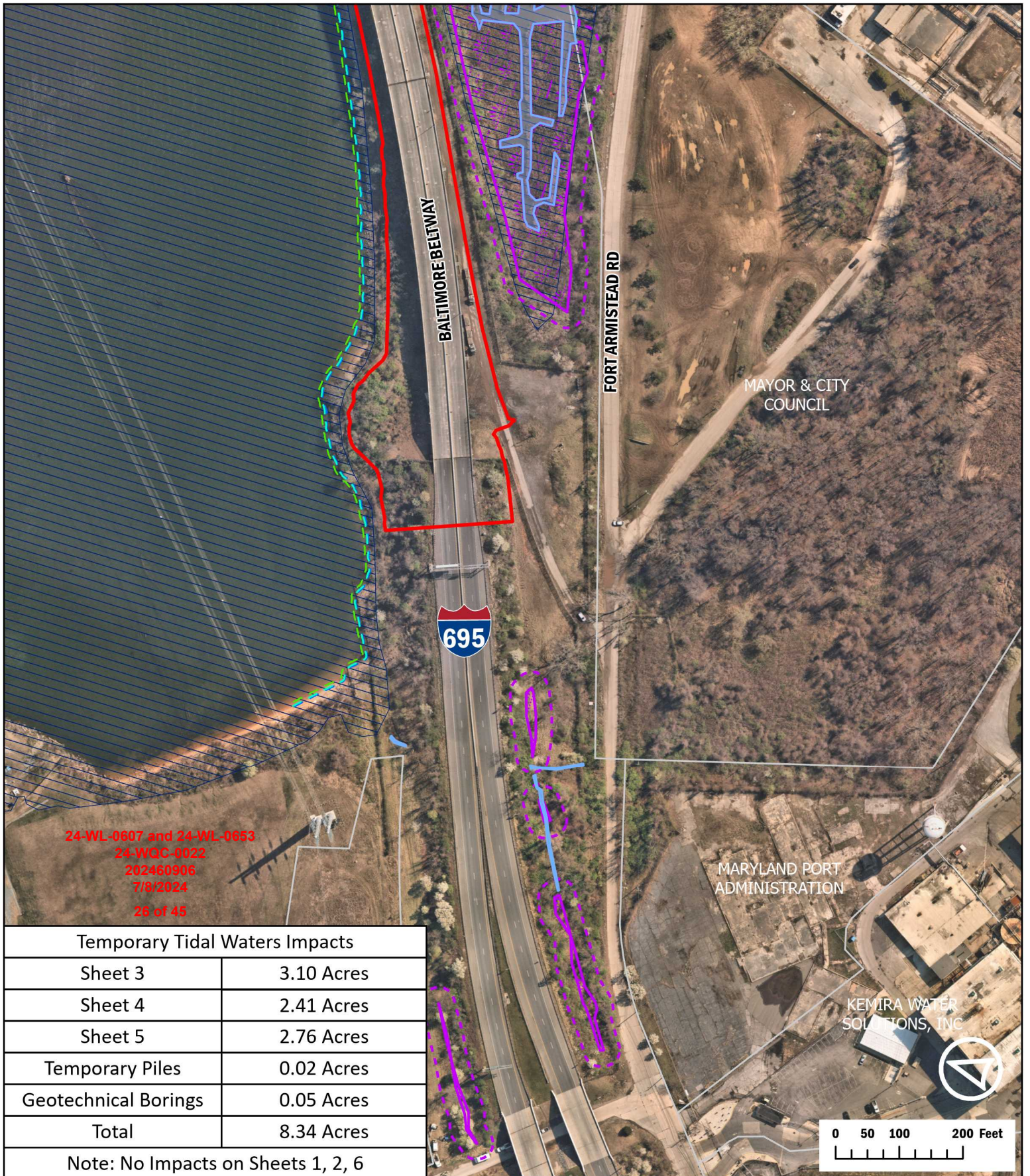
24-WL-0607 and 24-WL-0653  
 24-WQC-0022  
 202460906

7/8/2024  
 25 of 45

PRELIMINARY  
 NOT FOR CONSTRUCTION

NO.	DATE	REMARKS	BY

STEEL DEMOLITION SPANS 1-13 KEY BRIDGE DEMOLITION	
DRAWN BY	CHK'D BY
DATE	
PROJECT	SHEET NO.



24-WL-0607 and 24-WL-0653  
 24-WQC-0022  
 202460906  
 7/8/2024  
 26 of 45

**Temporary Tidal Waters Impacts**

Sheet 3	3.10 Acres
Sheet 4	2.41 Acres
Sheet 5	2.76 Acres
Temporary Piles	0.02 Acres
Geotechnical Borings	0.05 Acres
<b>Total</b>	<b>8.34 Acres</b>

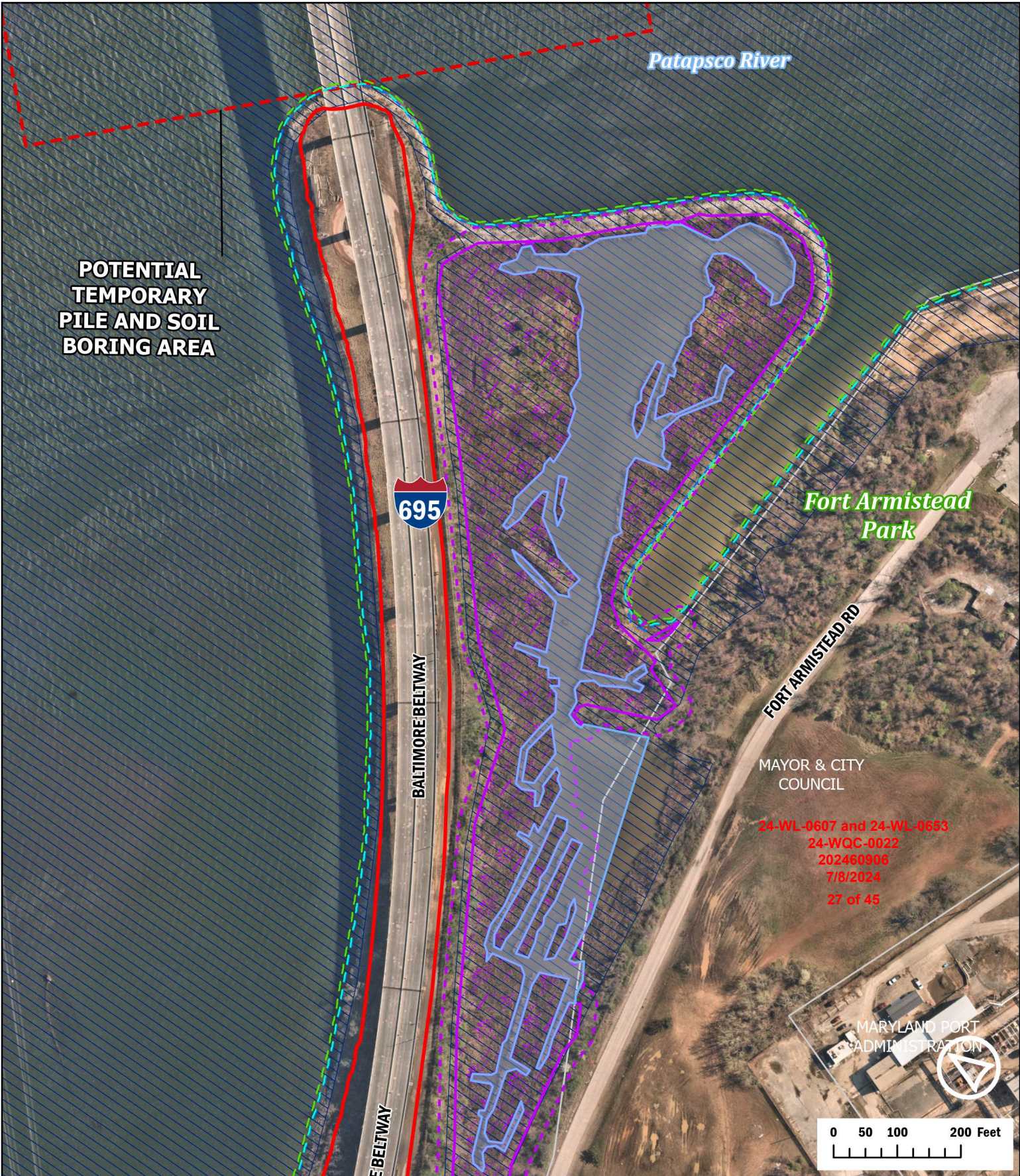
Note: No Impacts on Sheets 1, 2, 6

- Limits of Disturbance
- Potential Temporary Pile Area
- Streams
- Wetlands
- 25ft Wetland Buffer
- 100-Year Floodplain
- Approximate MLW Line
- MHHW Line
- MHW Line
- Property Parcels
- Municipal Boundaries



**Francis Scott Key  
 Bridge  
 Demolition  
 Impact Plates**

Page 1 of 6      July 2024



**POTENTIAL  
TEMPORARY  
PILE AND SOIL  
BORING AREA**

Patapsco River

695

BALTIMORE BELTWAY

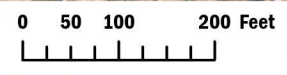
Fort Armistead  
Park

FORT ARMISTEAD RD

MAYOR & CITY  
COUNCIL

24-WL-0607 and 24-WL-0683  
24-WQC-0022  
202460906  
7/8/2024  
27 of 45

MARYLAND PORT  
ADMINISTRATION

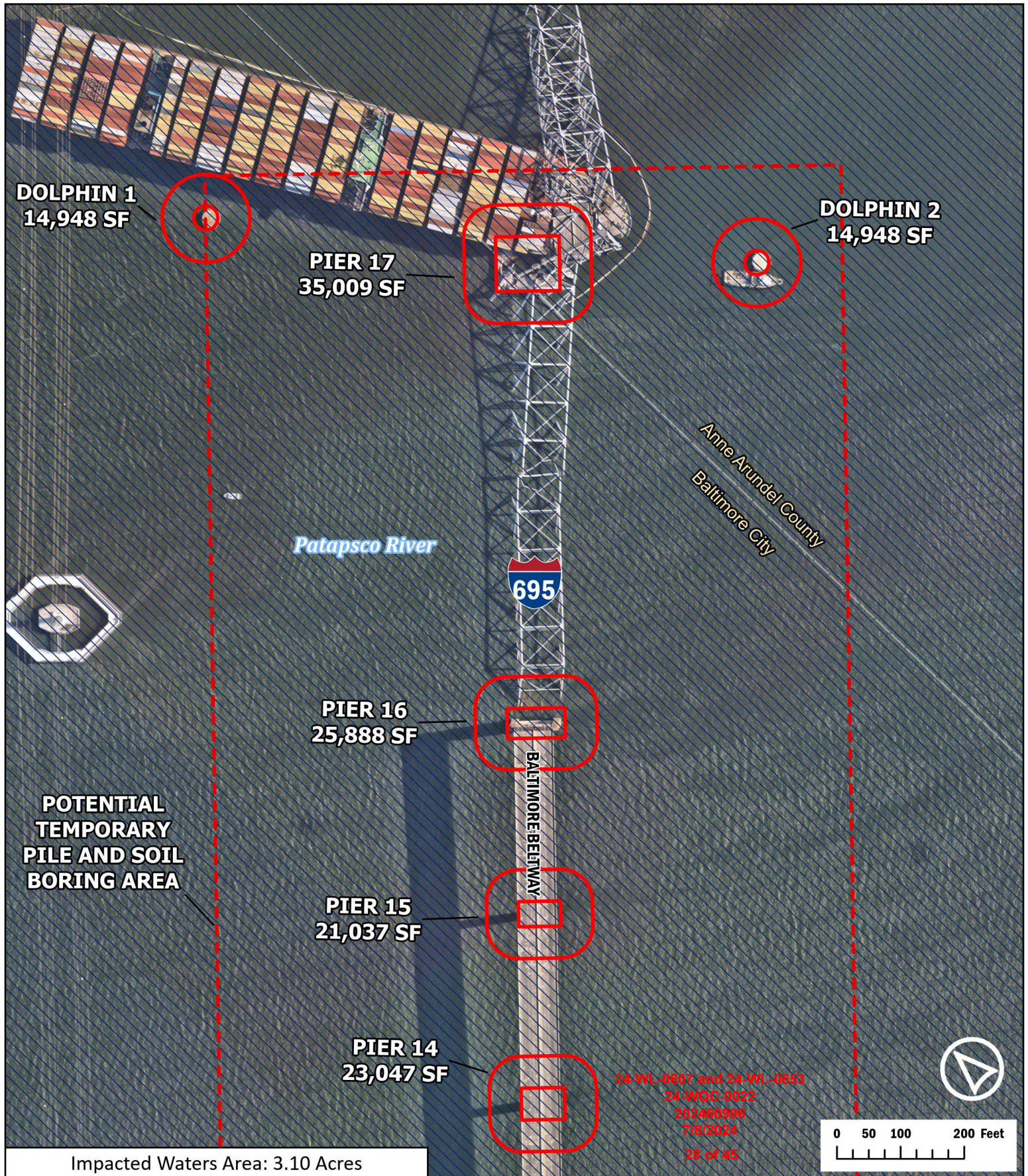


- Limits of Disturbance
- Potential Temporary Pile Area
- Streams
- Wetlands
- 25ft Wetland Buffer
- 100-Year Floodplain
- Approximate MLW Line
- MHHW Line
- MHW Line
- Property Parcels
- Municipal Boundaries



**Francis Scott Key  
Bridge  
Demolition  
Impact Plates**

Page 2 of 6      July 2024



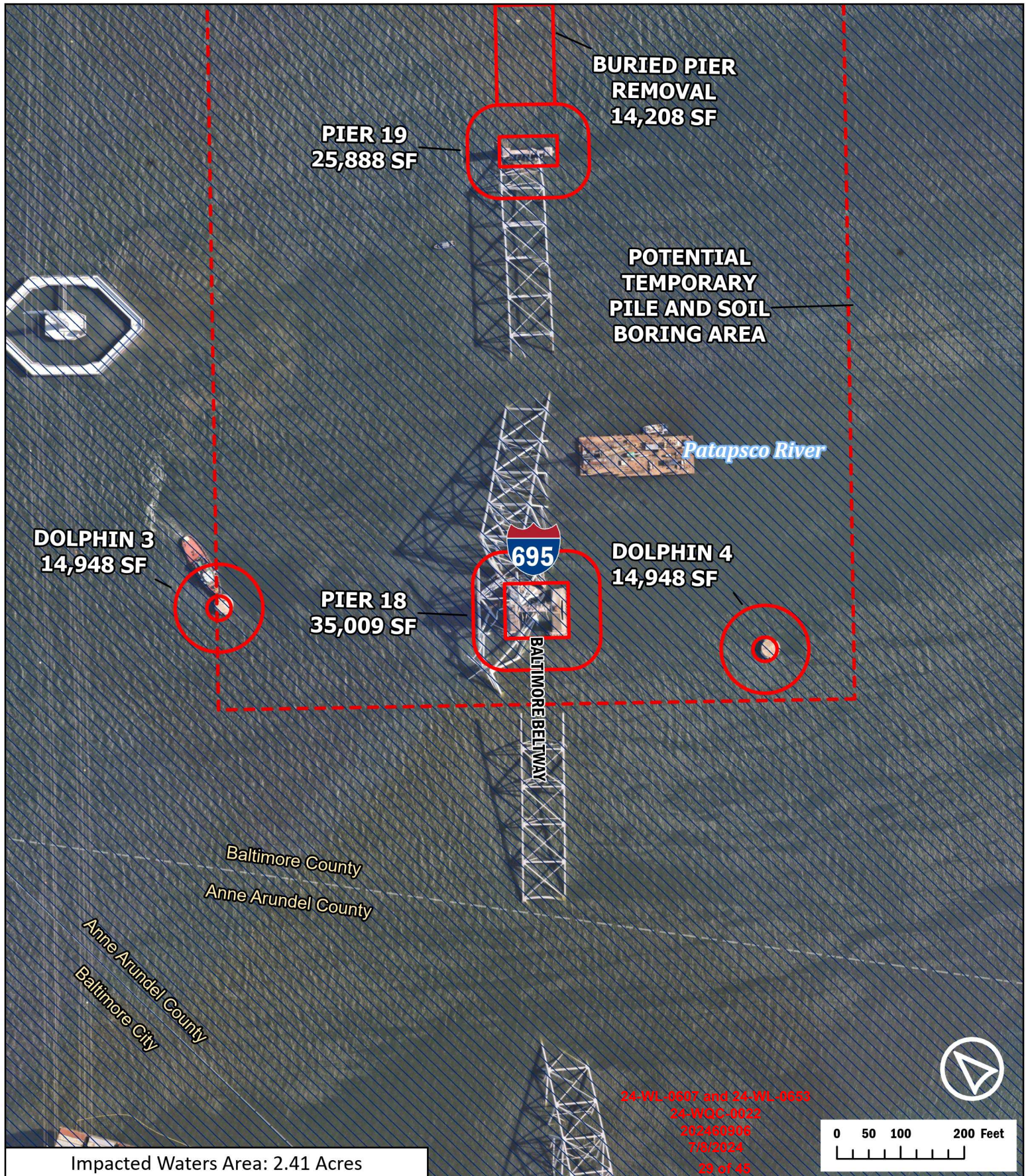
Impacted Waters Area: 3.10 Acres

- Limits of Disturbance
- Potential Temporary Pile Area
- Streams
- Wetlands
- 25ft Wetland Buffer
- 100-Year Floodplain
- Approximate MLW Line
- MHHW Line
- MHW Line
- Property Parcels
- Municipal Boundaries



**Francis Scott Key  
Bridge  
Demolition  
Impact Plates**

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24-WL-0607 and 24-WL-0653  
 24-WQC-0022  
 252469306  
 7/15/2024  
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Impacted Waters Area: 2.41 Acres

- Limits of Disturbance
- Potential Temporary Pile Area
- Streams
- Wetlands
- 25ft Wetland Buffer
- 100-Year Floodplain
- Approximate MLW Line
- MHHW Line
- MHW Line
- Property Parcels
- Municipal Boundaries



  
 Maryland  
 Transportation  
 Authority

  
 MDT  
 MARYLAND DEPARTMENT  
 OF TRANSPORTATION  
 STATE HIGHWAY  
 ADMINISTRATION

### Francis Scott Key Bridge Demolition Impact Plates

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**POTENTIAL  
TEMPORARY  
PILE AND SOIL  
BORING AREA**

**PIER 24  
& GIRDERS  
29,911 SF**

**PIER 23  
20,288 SF**

**PIER 22  
20,288 SF**

**PIER 21  
23,012 SF**

**PIER 20  
21,653 SF**

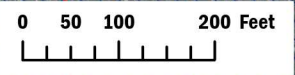
**BURIED PIER  
REMOVAL  
5,168 SF**

**BALTIMORE BELTWAY**

*Patapsco River*



24-WL-0607 and 24-WL-0613  
24-WO-0322  
202468906  
7182824  
38 of 45



**Impacted Waters Area: 2.76 Acres**

- Limits of Disturbance
- Potential Temporary Pile Area
- Streams
- Wetlands
- 25ft Wetland Buffer
- 100-Year Floodplain
- Approximate MLW Line
- MHHW Line
- MHW Line
- Property Parcels
- Municipal Boundaries



Maryland  
Transportation  
Authority



MARYLAND DEPARTMENT  
OF TRANSPORTATION  
STATE HIGHWAY  
ADMINISTRATION

**Francis Scott Key  
Bridge  
Demolition  
Impact Plates**

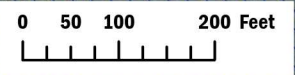
Patapsco River

AUTHORITY DR



BALTIMORE BELTWAY

24-WI-0807 and 24-WI-0853  
24-WSC-0022  
202460856  
7/8/2024  
31 of 45



- Limits of Disturbance
- Potential Temporary Pile Area
- Streams
- Wetlands
- 25ft Wetland Buffer
- 100-Year Floodplain
- Approximate MLW Line
- MHHW Line
- MHW Line
- Property Parcels
- Municipal Boundaries



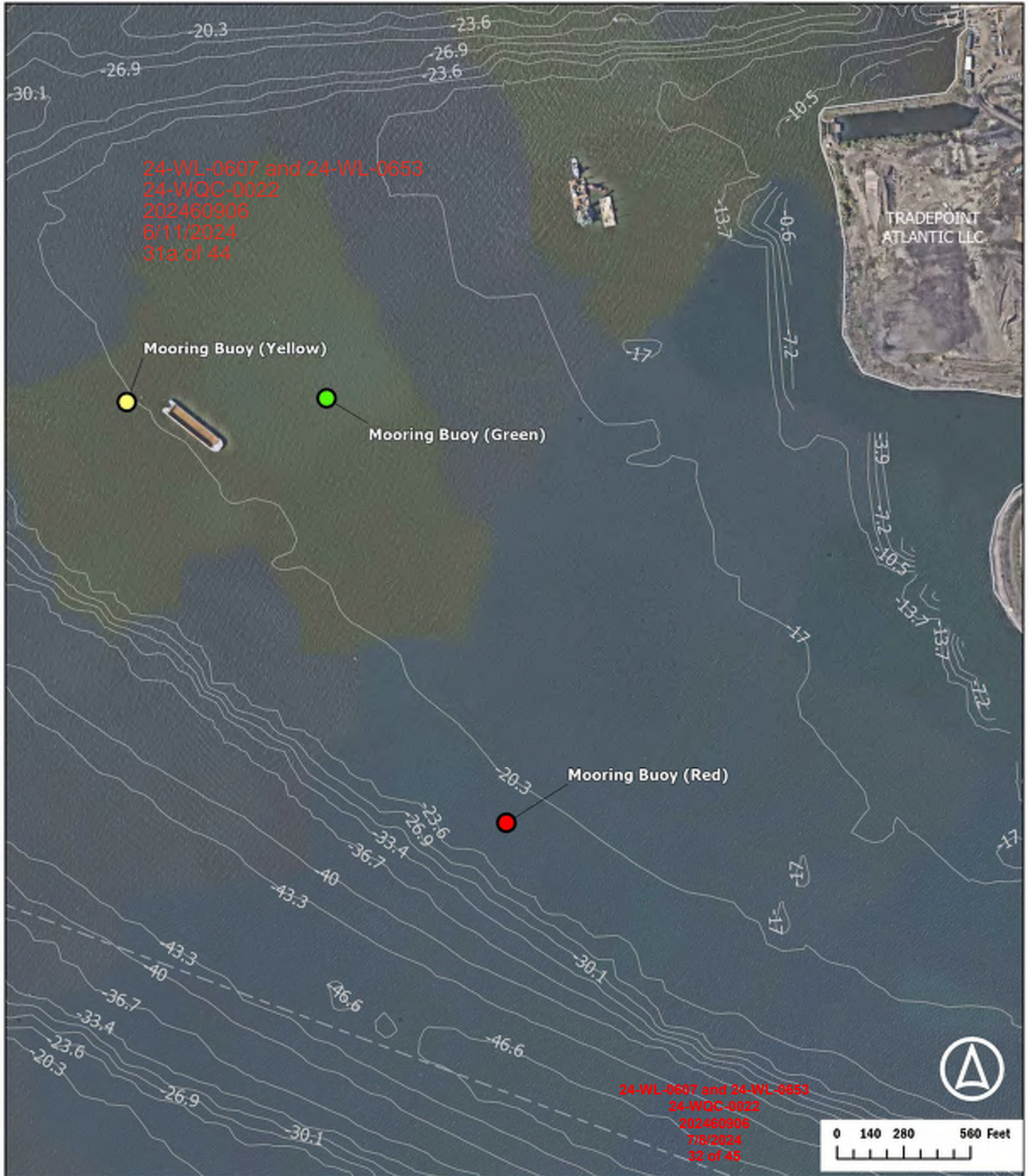

Maryland  
Transportation  
Authority



DEPARTMENT OF TRANSPORTATION  
MARYLAND DEPARTMENT  
OF TRANSPORTATION  
STATE HIGHWAY  
ADMINISTRATION

**Francis Scott Key  
Bridge  
Demolition  
Impact Plates**

Page 6 of 6      July 2024



- Limits of Disturbance
- Temporary Pile Area
- Streams
- Wetlands
- 25ft Wetland Buffer
- Approximate MLW Line
- MHHW Line
- MHW Line
- Bathymetry Contours
- Property Parcels
- Municipal Boundaries
- Mooring Buoy Yellow
- Mooring Buoy Green
- Mooring Buoy Red

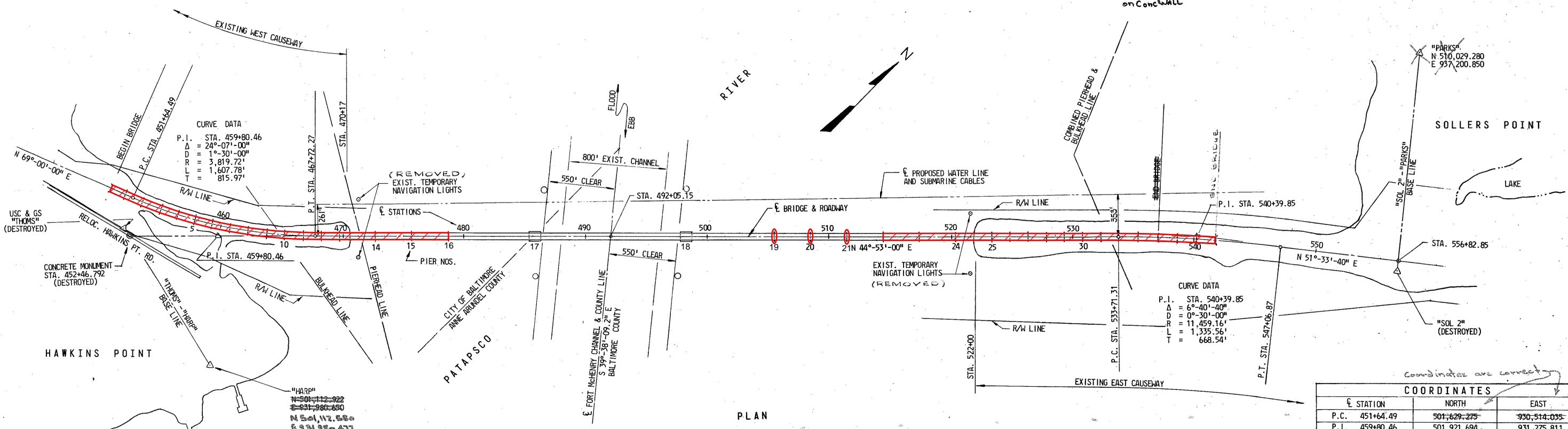
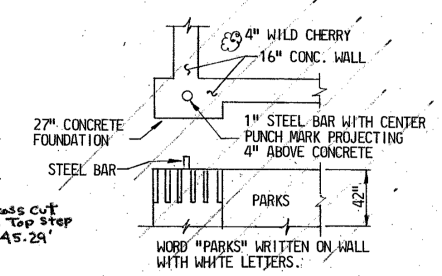
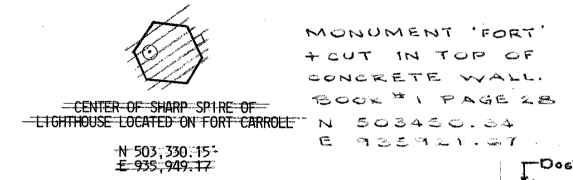
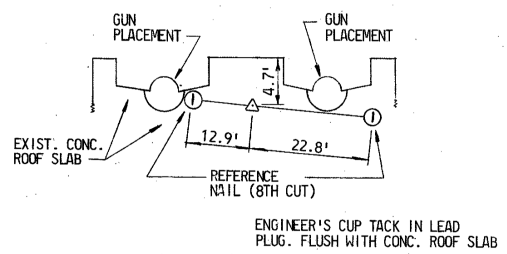


**Francis Scott Key  
Bridge  
Demolition  
Emergency Authorization  
Plates**

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DEMOLITION LIMITS SHOWN IN RED



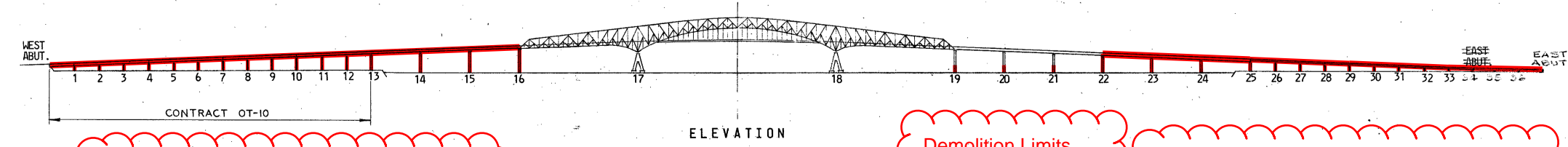
Truss Spans and Bridge Superstructure from Span 17 through Span 22 Salvage Operations/Demolition by Others

DATUM: -ALL ELEVATIONS ARE IN FEET AND ARE BASED ON U.S. COAST AND GEODETIC SURVEY MEAN SEA LEVEL DATUM, 1929 ADJUSTMENT.

HORIZONTAL CONTROL: THIS PROJECT IS ORIENTED TO CONFORM TO THE MARYLAND GRID SYSTEM.

COORDINATES

STATION	NORTH	EAST
P.C. 451+64.49	501,629.275	930,514.035
P.I. 459+80.46	501,921.694	931,275.811
P.T. 467+72.27	502,499.847	931,851.614
P.O.T. 492+05.15	504,223.654	933,568.415
P.C. 533+71.31	507,175.567	936,508.332
P.I. 540+39.85	507,649.254	936,980.094
P.T. 547+06.87	508,064.869	937,503.739



Demolition Limits include Bridge Deck and Piers from West Abutment through Pier 16

REMOVE TREMIE CONCRETE AND PILES TO 2 FEET BELOW MUDLINE AS REQUIRED BY USCG BRIDGE PERMIT.

Demolition Limits include Remaining Portions of Piers 19, 20 and 21

Demolition Limits include Bridge Deck and Piers from Pier 22 to East Abutment

24-WL-0607 and 24-WL-0653  
24-WQC-0022  
202460906  
7/8/2024

AS BUILT

REVISIONS

STATE OF MARYLAND  
DEPARTMENT OF TRANSPORTATION  
STATE HIGHWAY ADMINISTRATION  
BALTIMORE, MD.

BALTIMORE HARBOR OUTER CROSSING  
PATAPSCO RIVER BRIDGE

BRIDGE DEMOLITION PLAN

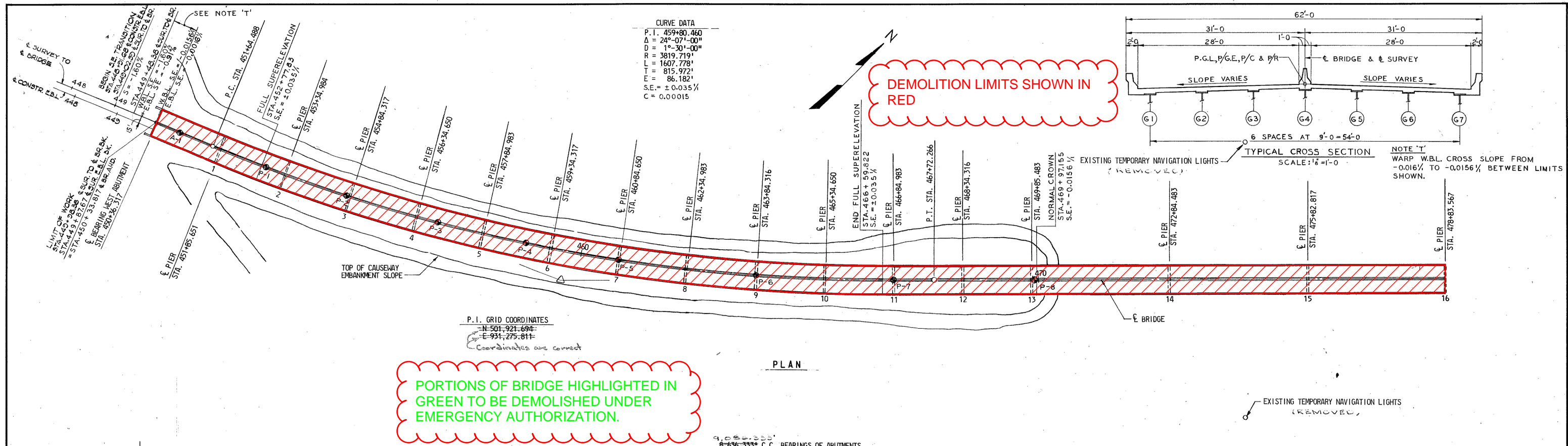
SCALE: 1" = 400' DATE: JAN. 1972 CONTRACT OT-10

MADE BY: E.R.A.  
TRACED BY: E.R.A.  
CHECKED BY: S.J.S.

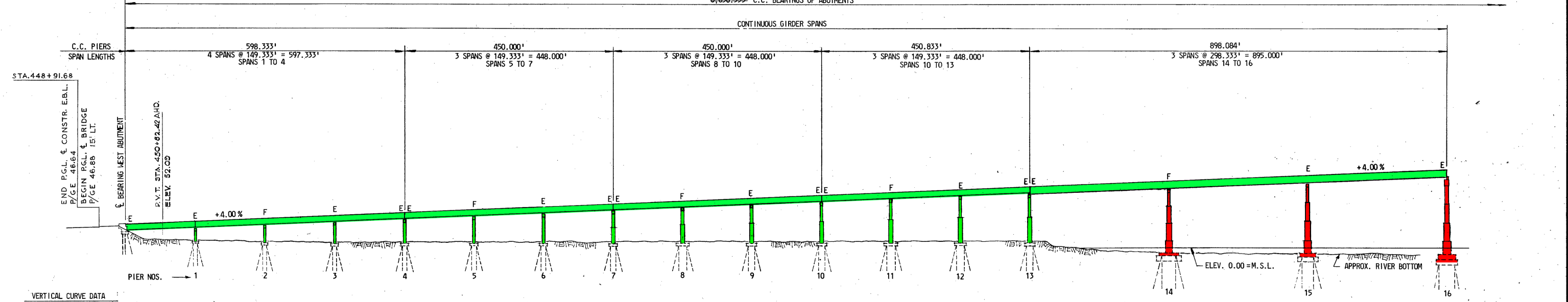
ZOLLMAN ASSOC. INC.  
AND  
SINGSTAD, KEHART  
NOVEMBER AND HURKA  
A JOINT VENTURE  
Baltimore, Md.

DRAWING NO. C-2  
SHEET NO. OF  
INDEXED

File No. \_\_\_\_\_ Pocket No. \_\_\_\_\_ Folder No. \_\_\_\_\_



**PORTIONS OF BRIDGE HIGHLIGHTED IN GREEN TO BE DEMOLISHED UNDER EMERGENCY AUTHORIZATION.**



**DEMOLITION LIMITS INCLUDE PIERS 14, 15 AND 16 (COLUMNS AND FOUNDATIONS)**

**REMOVE TREMIE CONCRETE AND PILES TO 2 FEET BELOW MUDLINE AS REQUIRED BY USCG BRIDGE PERMIT.**

24-WL-0607 and 24-WL-0653  
 24-WQC-0022  
 202460906  
 7/8/2024  
 34 of 45

**AS BUILT**

STATE OF MARYLAND  
 DEPARTMENT OF TRANSPORTATION  
 STATE HIGHWAY ADMINISTRATION  
 BALTIMORE, MD.  
**BALTIMORE HARBOR OUTER CROSSING  
 PATAPSCO RIVER BRIDGE  
 BRIDGE DEMOLITION PLAN  
 GENERAL PLAN & ELEVATION I**

SCALE: 1" = 100'    DATE JAN. 1972    CONTRACT OT-10

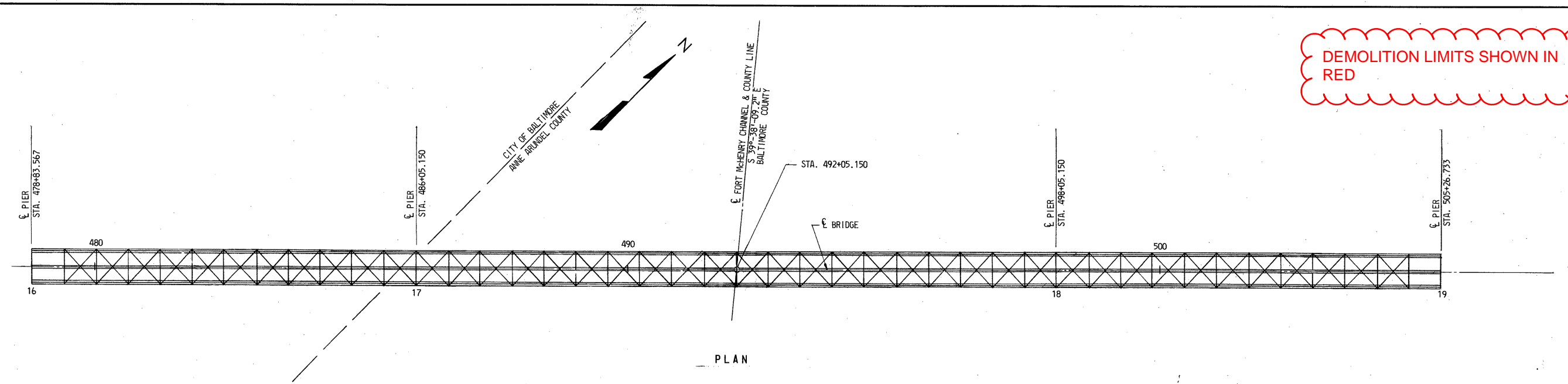
MADE BY: ERA  
 TRACED BY: ERA  
 CHECKED BY: SJS

ZOLLMAN ASSOC. INC.  
 AND  
 SINGSTAD, KEHART  
 NOVEMBER AND HURKA  
 A JOINT VENTURE  
 Baltimore, Md.

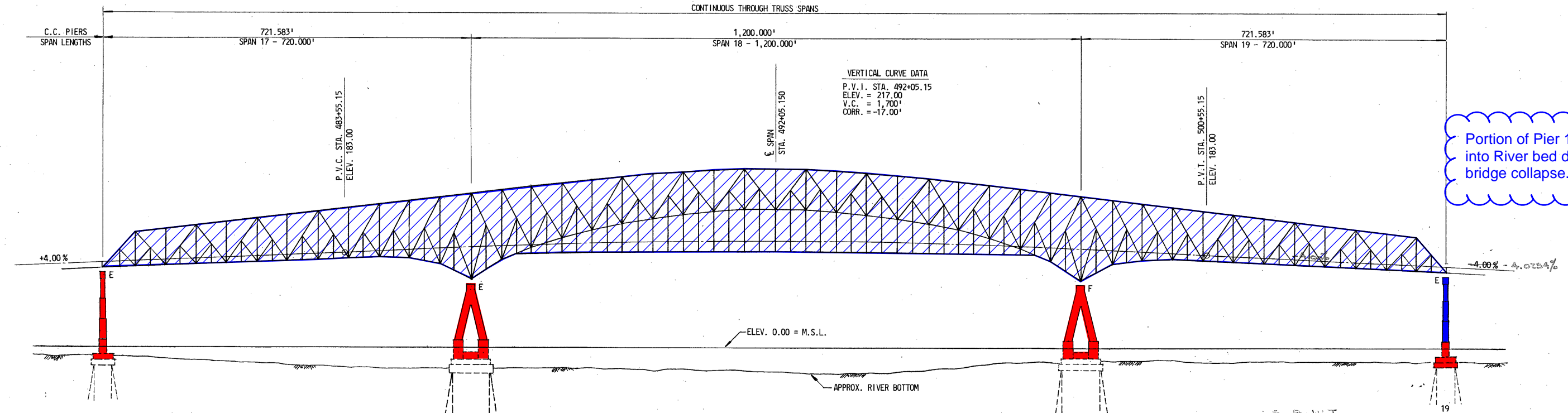
DRAWING NO. C-3  
 SHEET NO. OF  
 INDEXED

File No.    Pocket No.    Folder No.

DEMOLITION LIMITS SHOWN IN RED



9,086.333'  
8,636.333' C.C. BEARINGS OF ABUTMENTS



Portion of Pier 19 fell into River bed during bridge collapse.

REMOVE TREMIE CONCRETE AND PILES TO 2 FEET BELOW MUDLINE AS REQUIRED BY USCG, EXCEPT FOR PIERS 17 AND 18 THAT WILL BE INCORPORATED INTO PIER PROTECTION.

SALVAGE OPERATIONS FOR CONTINUOUS TRUSS SPANS BY OTHERS

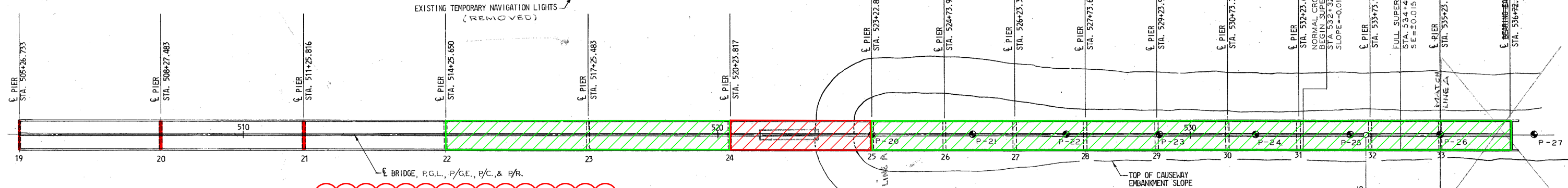
DEMOLITION LIMITS INCLUDE PIERS 16 AND 19 (COLUMNS AND FOUNDATIONS) AND REMAINING PORTIONS OF COLUMNS ABOVE FOUNDATION CONCRETE FOR PIERS 17 and 18

NOTE: ALL DIMENSIONS & SPAN LENGTHS SHOWN ARE HORIZONTAL. All elevations this sheet subject to Note 12 Supp. B-102 Contract 07-819.

24-WL-0607 and 24-WL-0653  
24-WQC-0022  
20240906  
7/8/2024  
35 of 45

REVISIONS	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION BALTIMORE, MD.	
	BALTIMORE HARBOR OUTER CROSSING PATAPSCO RIVER BRIDGE BRIDGE DEMOLITION PLAN GENERAL PLAN AND ELEVATION II	
	SCALE: 1" = 100'	DATE JAN. 1972 CONTRACT QT-10
	MADE BY E.R.A.	ZOLLMAN ASSOC. INC. AND SINGSTAD, KEHART NOVEMBER AND HURKA A JOINT VENTURE Baltimore, Md.
	TRACED BY E.R.A.	DRAWING NO. C-2
	CHECKED BY S.J.S.	SHEET NO. OF
	File No	INDEXED
	Packet No	
	Folder No	

DEMOLITION LIMITS SHOWN IN RED



Portions of Bridge Highlighted in Green to be demolished under Emergency Authorization.

SALVAGE OPERATIONS FOR SUPERSTRUCTURE OF SPANS 20, 21 and 22 BY OTHERS

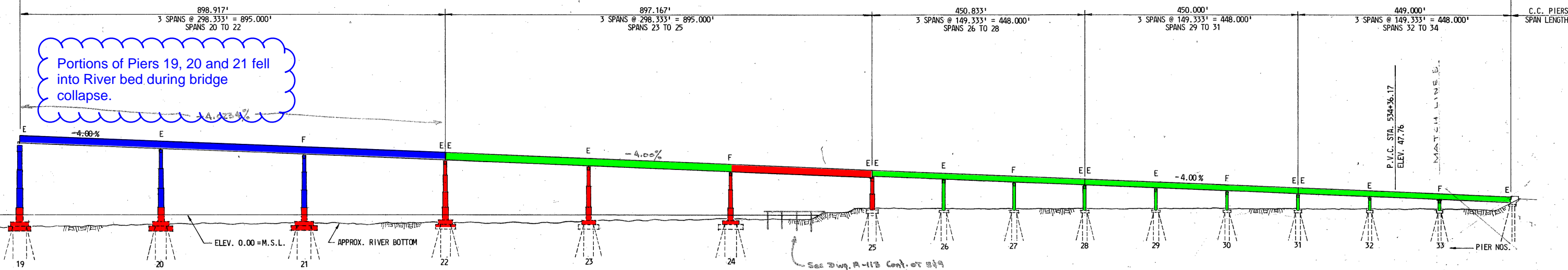
PLAN

P.I. GRID COORDINATES  
 N 507,649.254  
 E 936,980.094

CURVE DATA  
 P.I. STA. 540+39.850  
 $\Delta = 6^{\circ}-40'-40''$   
 $D = 0^{\circ}-30'-00''$   
 $R = 11,459.156'$   
 $L = 1,335.556'$   
 $E = 668.535'$   
 $T = 19.485'$   
 $S.E. = \pm 0.0156\%$   
 $C = 0.00015$

C.C. BEARINGS OF ABUTMENTS

CONTINUOUS GIRDER SPANS



Portions of Piers 19, 20 and 21 fell into River bed during bridge collapse.

Demolition Limits include Remaining Portions of Piers 19, 20 and 21

Demolition Limits include Piers 19 through 25 (Column and Foundation) and Span 25 (Superstructure)

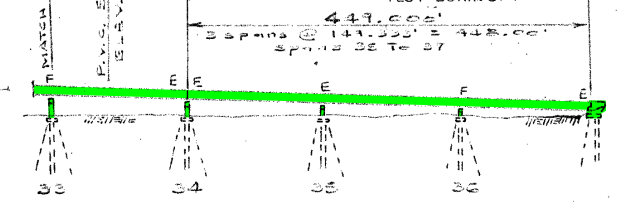
REMOVE TREMIE CONCRETE AND PILES TO 2 FEET BELOW MUDLINE AS REQUIRED BY USCG BRIDGE PERMIT.

24-WL-0607 and 24-WL-0653  
 24-WQC-0022  
 202460906  
 7/8/2024

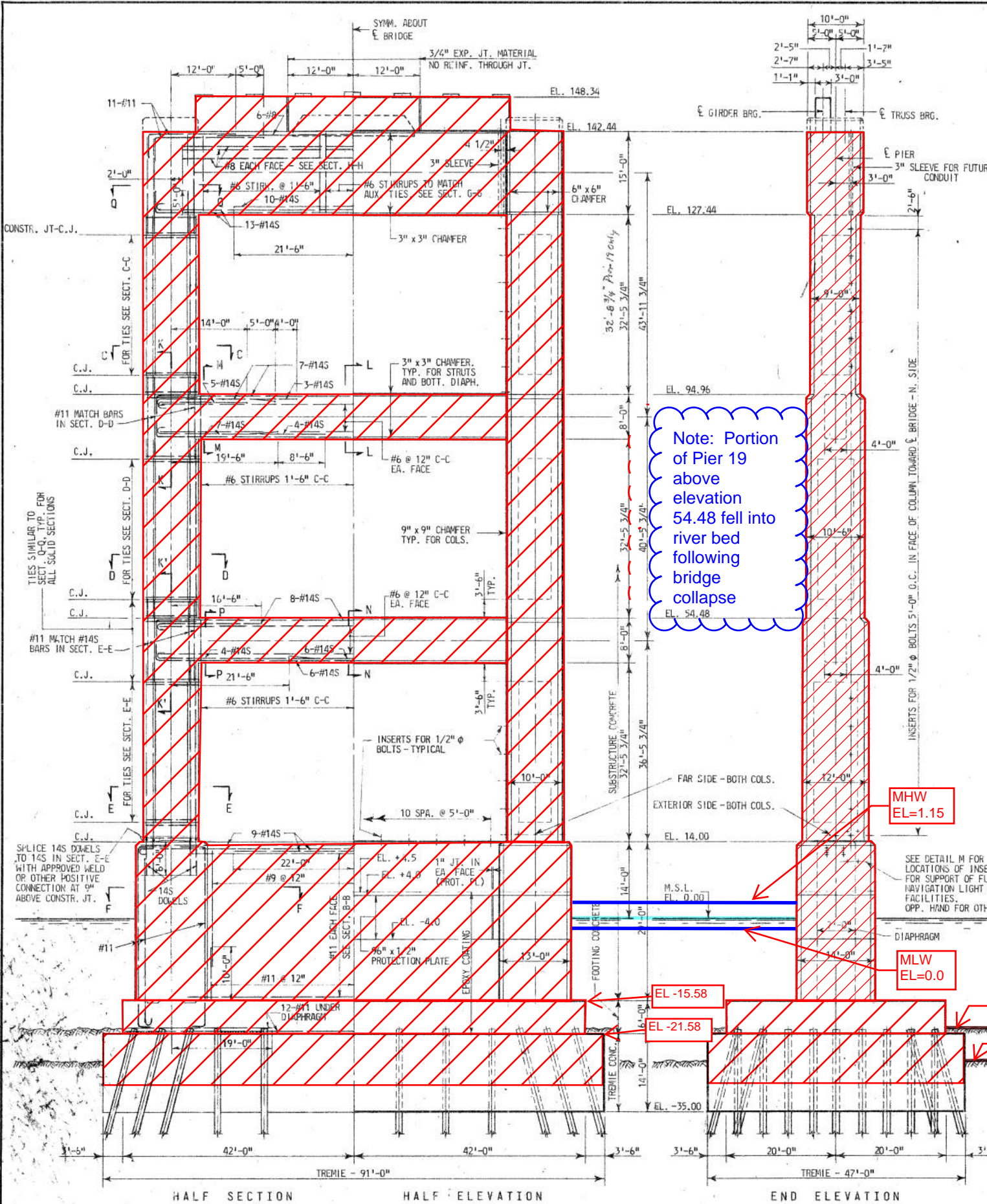
ELEVATION

VERTICAL CURVE DATA  
 P.V.I. STA. 539+36.17 540+35.99  
 ELEV. = 27.76 21.77  
 V.C. = 1000'  
 CORR. = +4.375'  
 GRADES = -4.00% +4.56%  
 -0.50% -0.32%

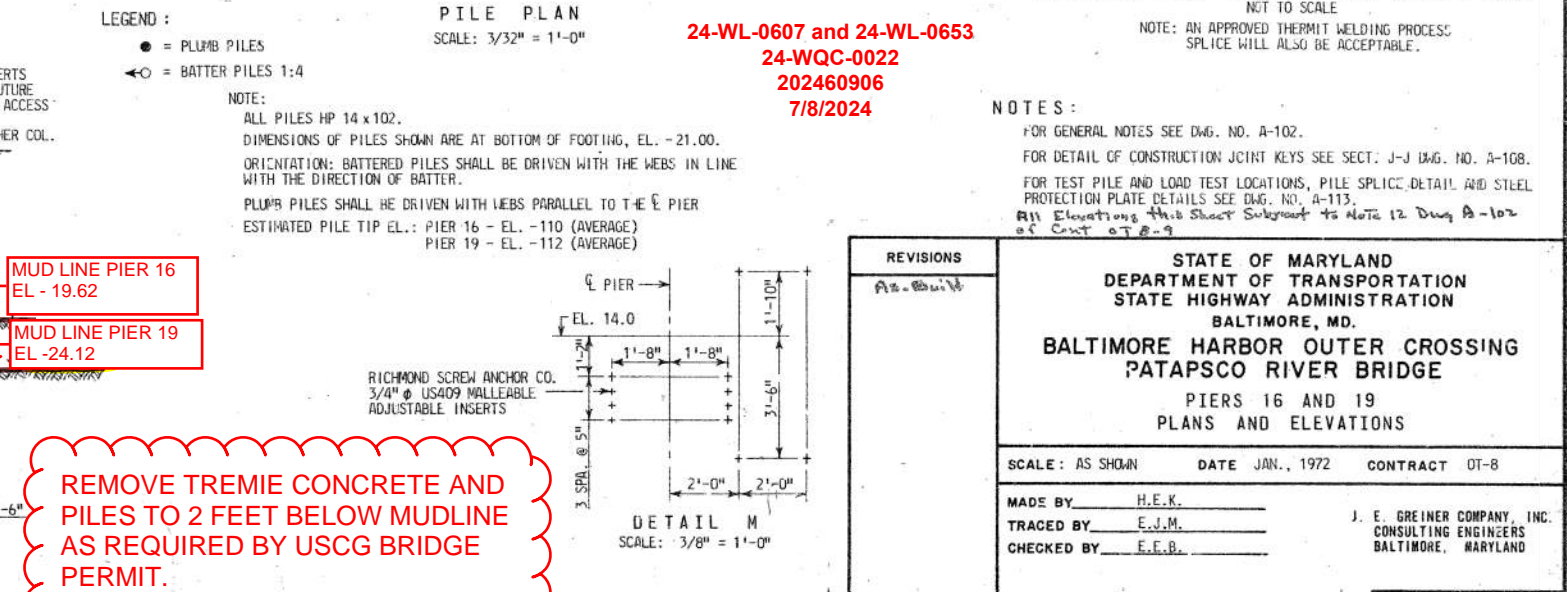
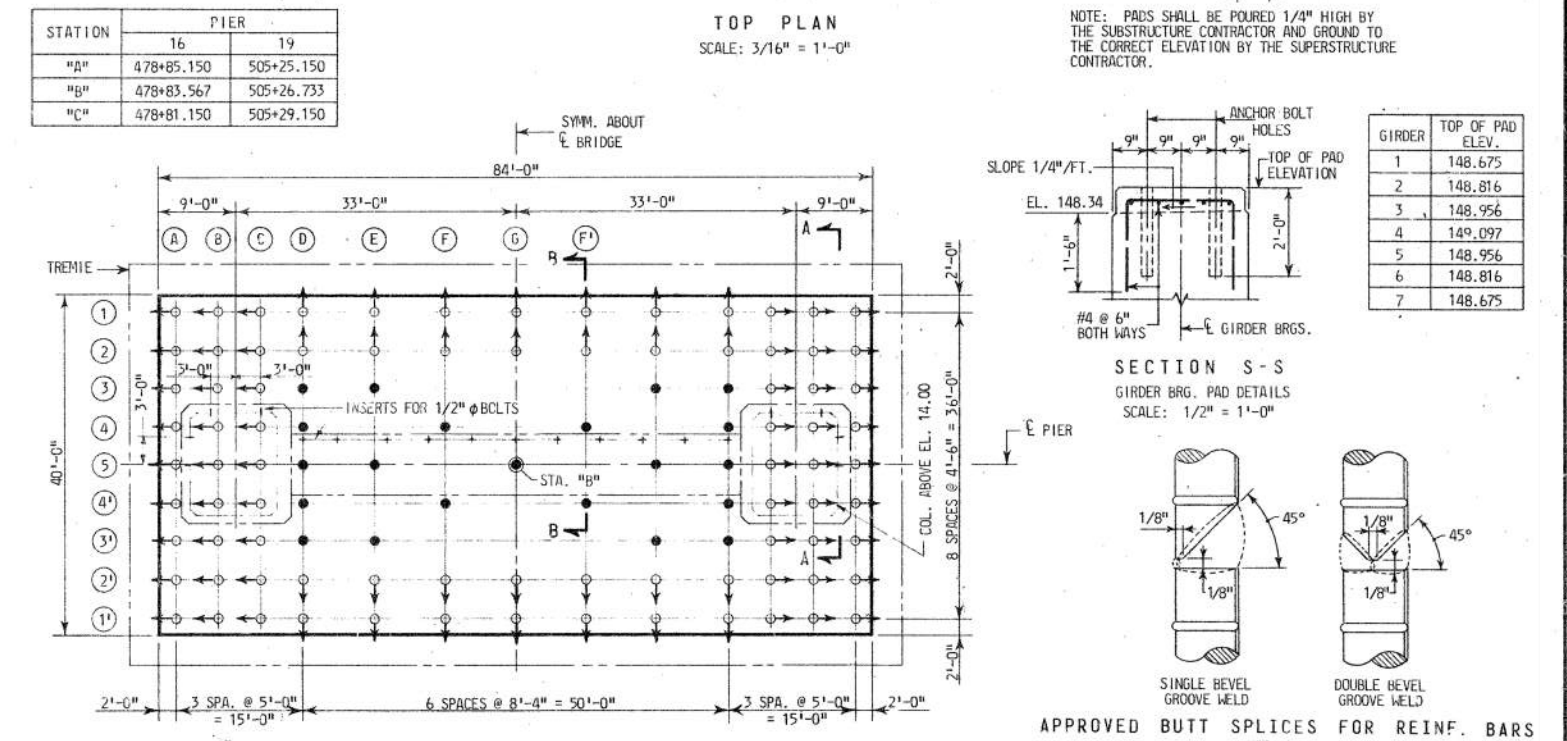
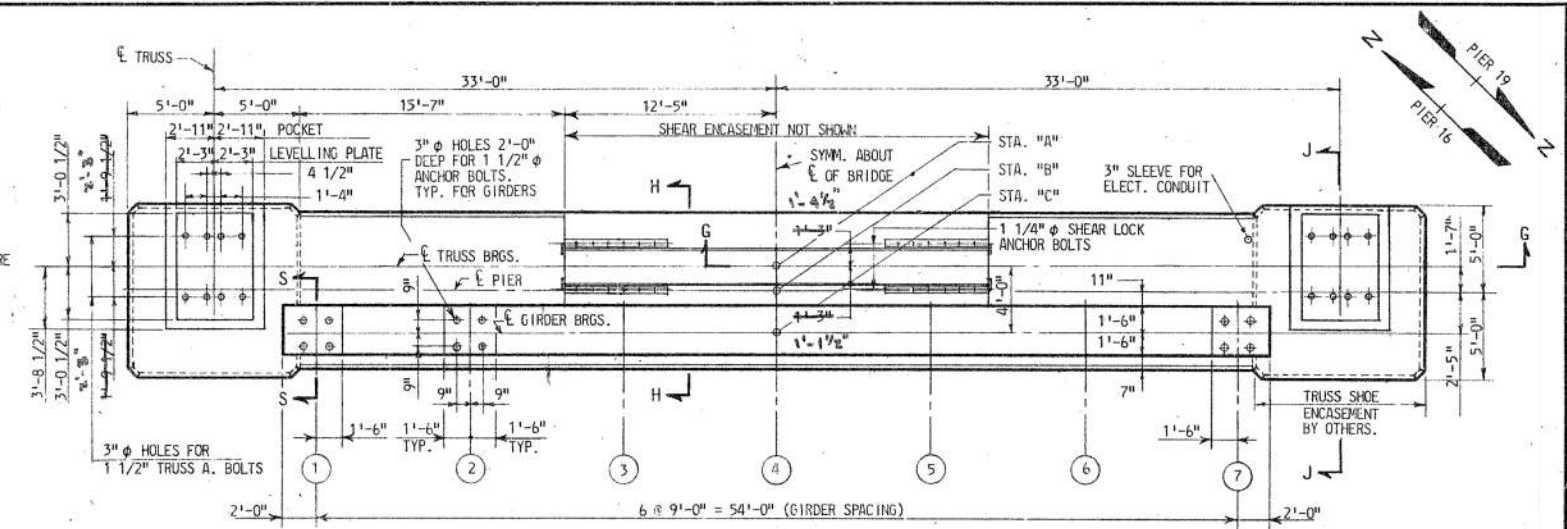
NOTES:  
 ALL DIMENSIONS & SPAN LENGTHS SHOWN ARE HORIZONTAL.  
 ● DENOTES LOCATION OF TEST BORING.



REVISIONS	STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION BALTIMORE, MD.	
	BALTIMORE HARBOR OUTER CROSSING PATAPSCO RIVER BRIDGE BRIDGE DEMOLITION PLAN GENERAL PLAN AND ELEVATION III	
SCALE: 1" = 100'		DATE: JAN. 1972 CONTRACT: OT-10
MADE BY: E.R.A.	ZOLLMAN ASSOC. INC. AND SINGSTAD, KEHART NOVEMBER AND HURKA A JOINT VENTURE Baltimore, Md.	
TRACED BY: E.R.A.	DRAWING NO. C-5	
CHECKED BY: S.J.S.	SHEET NO. OF	
INDEXED		



ALL MARKUP ELEVATIONS RELATIVE TO MLW = 0.0



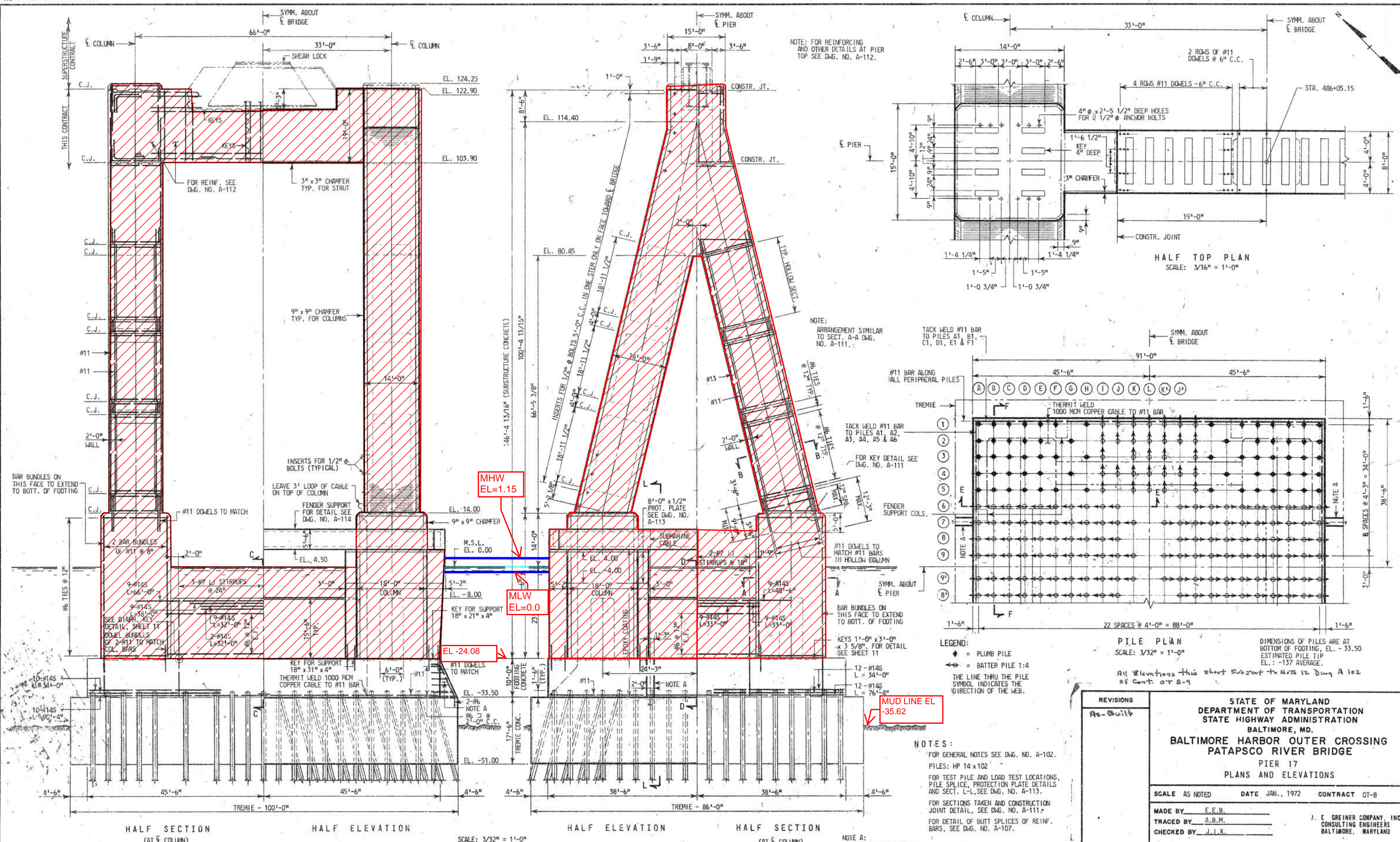
STATE OF MARYLAND  
DEPARTMENT OF TRANSPORTATION  
STATE HIGHWAY ADMINISTRATION  
BALTIMORE, MD.  
**BALTIMORE HARBOR OUTER CROSSING  
PATAPSCO RIVER BRIDGE**  
PIERS 16 AND 19  
PLANS AND ELEVATIONS

SCALE: AS SHOWN DATE JAN., 1972 CONTRACT OT-8

MADE BY: H.E.K.  
TRACED BY: E.J.M.  
CHECKED BY: E.F.B.

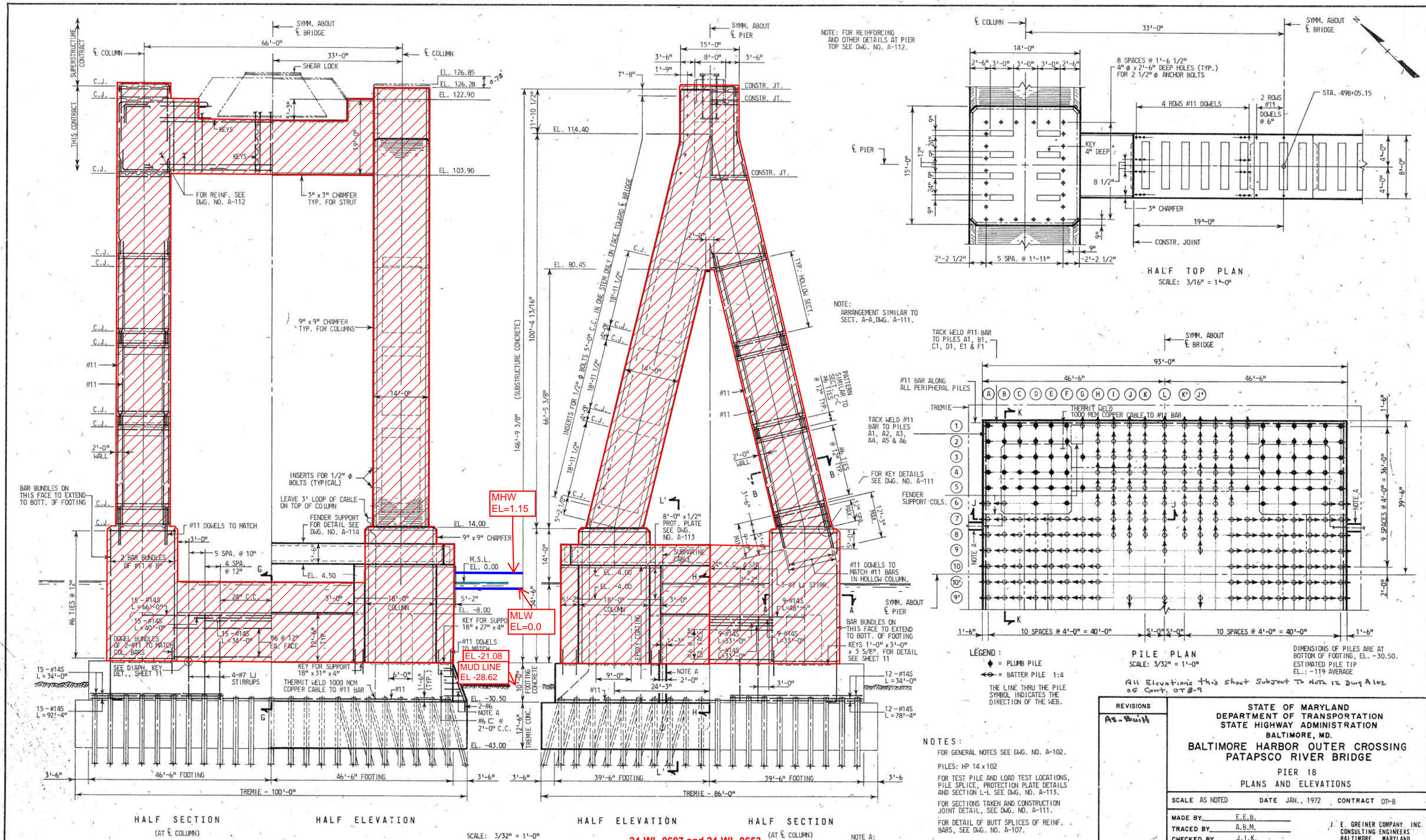
J. E. GREINER COMPANY, INC.  
CONSULTING ENGINEERS  
BALTIMORE, MARYLAND

DRAWING NO. A-107  
SHEET NO. 7 OF 24  
INDEXED



ALL MARKUP ELEVATIONS  
RELATIVE TO MLW = 0.0

24-WL-0607 and 24-WL-0653  
24-WQC-0022  
202460906  
7/8/2024  
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NOTE: FOR REINFORCING AND OTHER DETAILS AT PIER TOP SEE DWG. NO. A-112.

NOTE: ARRANGEMENT SIMILAR TO SECT. A-A, DWG. A-111.

TACK WELD #11 BAR TO PILES AT B1, C1, D1, E1 & F1

SYMM. ABOUT PIER

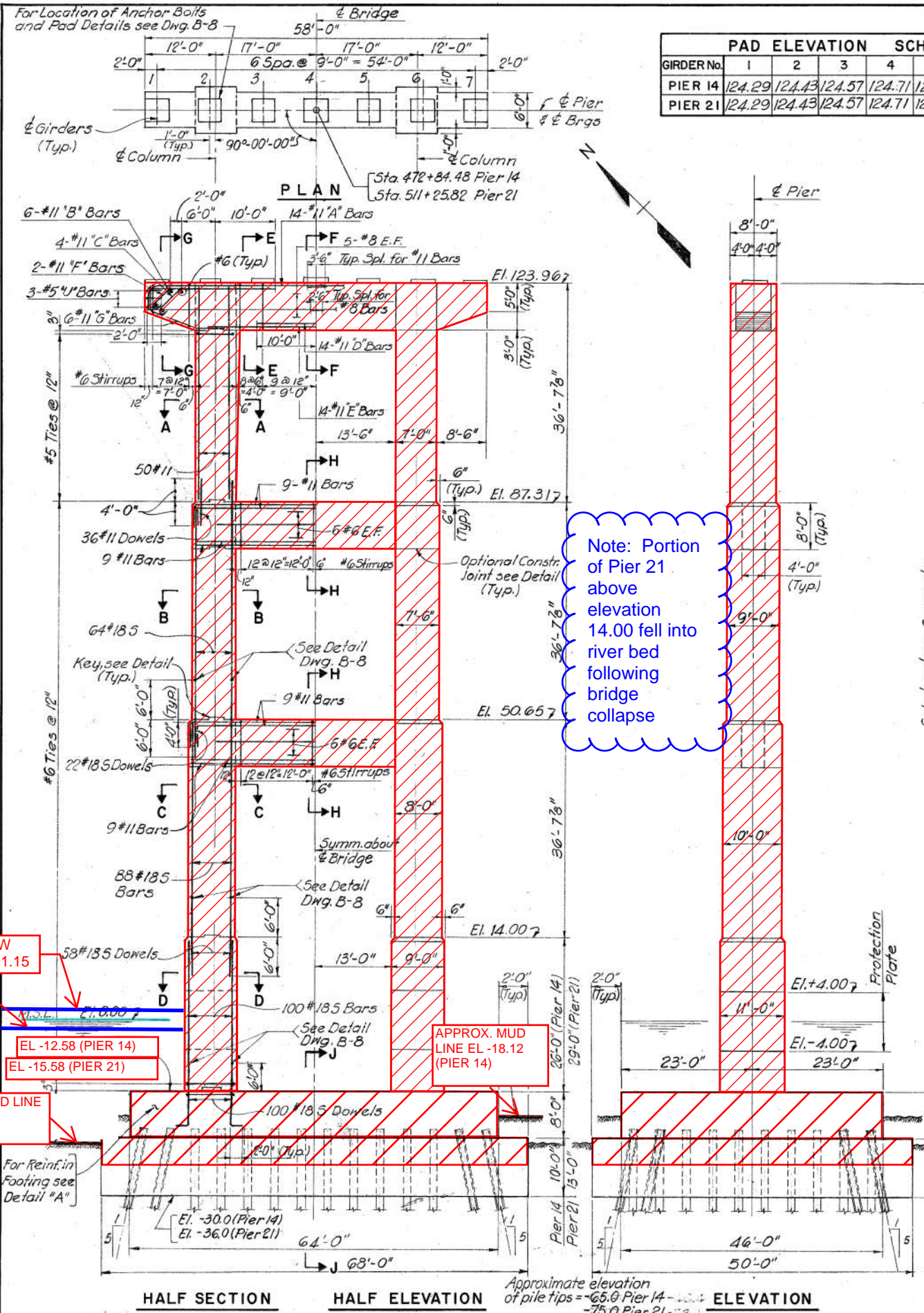
LEGEND:  
 ○ = PLUMB PILE  
 ⊕ = BATTER PILE 1:4  
 THE LINE THRU THE PILE SYMBOL INDICATES THE DIRECTION OF THE WEB.

NOTES:  
 FOR GENERAL NOTES SEE DWG. NO. A-102.  
 PILES: HP 14 x 102  
 FOR TEST PILE AND LOAD TEST LOCATIONS, PILE SPLICE, PROTECTION PLATE DETAILS AND SECTION L-L SEE DWG. NO. A-113.  
 FOR SECTIONS TAKEN AND CONSTRUCTION JOINT DETAIL, SEE DWG. NO. A-111.  
 FOR DETAIL OF BUTT SPLICES OF REINF. BARS, SEE DWG. NO. A-107.

REVISIONS As-Built		STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION BALTIMORE, MD. <b>BALTIMORE HARBOR OUTER CROSSING          PATAPSCO RIVER BRIDGE</b> PIER 18 PLANS AND ELEVATIONS	
SCALE AS NOTED		DATE JAN., 1972 CONTRACT OT-8	
MADE BY E.E.B. TRACED BY A.B.M. CHECKED BY J.I.K.		J. E. GREINER COMPANY, INC. CONSULTING ENGINEERS BALTIMORE, MARYLAND	
DRAWING NO. A-110		SHEET NO. 10 OF 24	
INDEXED		INDEXED	

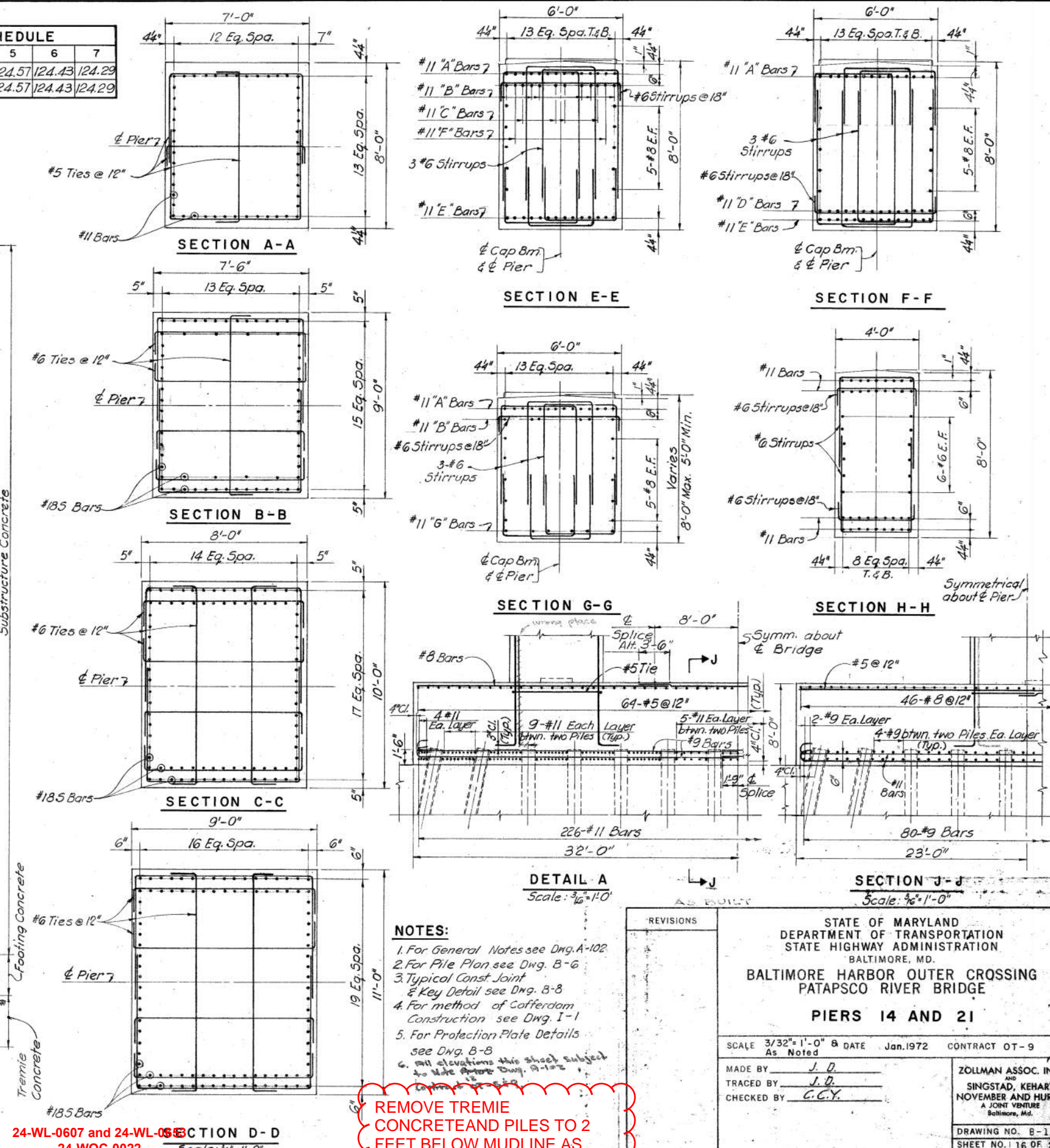
ALL MARKUP ELEVATIONS  
 RELATIVE TO MLW = 0.0

24-WL-0607 and 24-WL-0653  
 24-WQC-002  
 202460906  
 7/8/2024



PAD ELEVATION SCHEDULE							
GIRDER No.	1	2	3	4	5	6	7
PIER 14	124.29	124.43	124.57	124.71	124.57	124.43	124.29
PIER 21	124.29	124.43	124.57	124.71	124.57	124.43	124.29

Note: Portion of Pier 21 above elevation 14.00 fell into river bed following bridge collapse



- NOTES:**
1. For General Notes see Dwg. A-102
  2. For Pile Plan see Dwg. B-6
  3. Typical Const. Joint & Key Detail see Dwg. B-8
  4. For method of Cofferdam Construction see Dwg. I-1
  5. For Protection Plate Details see Dwg. B-8
  6. All elevations this sheet subject to late Auto. Dwg. A-102

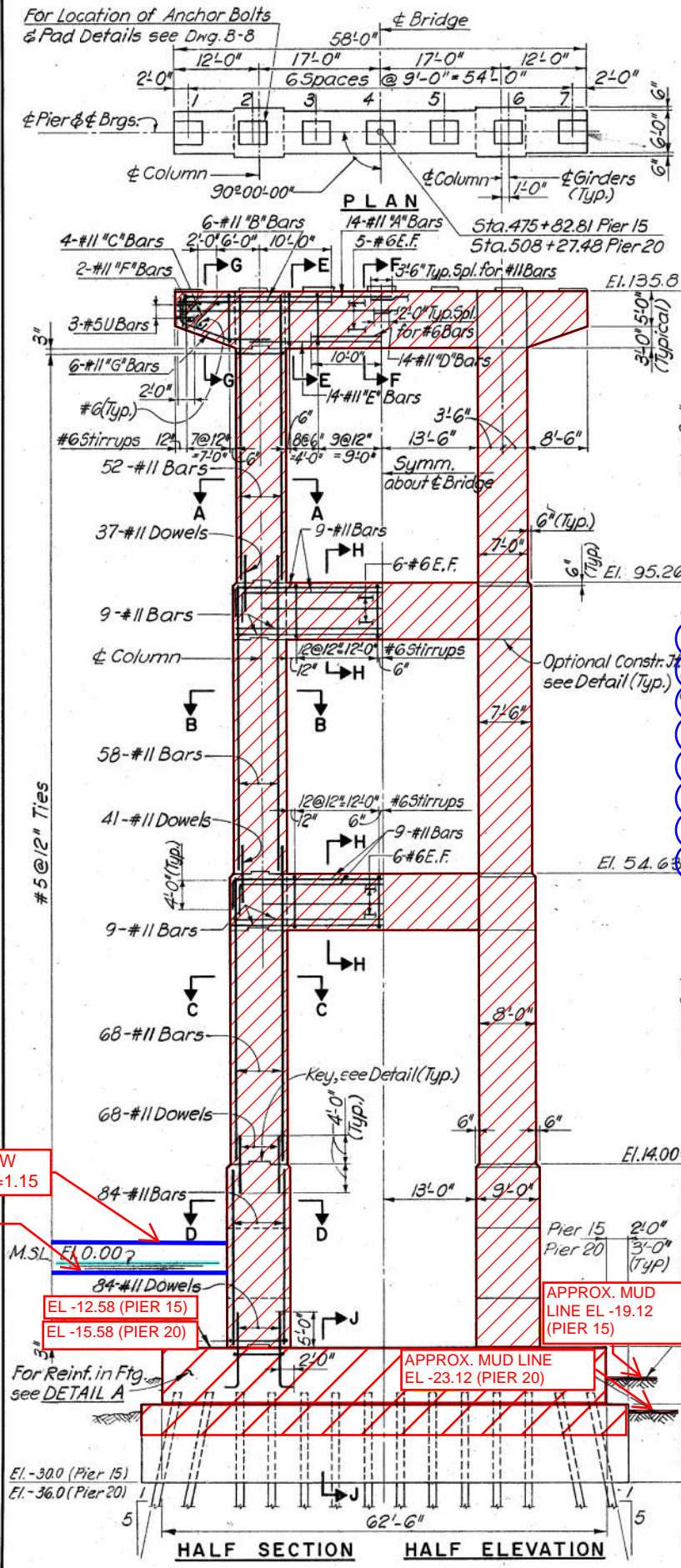
REMOVE TREMIE CONCRETE AND PILES TO 2 FEET BELOW MUDLINE AS REQUIRED BY USCG BRIDGE DEDMIT

ALL MARKUP ELEVATIONS RELATIVE TO MLW = 0.0

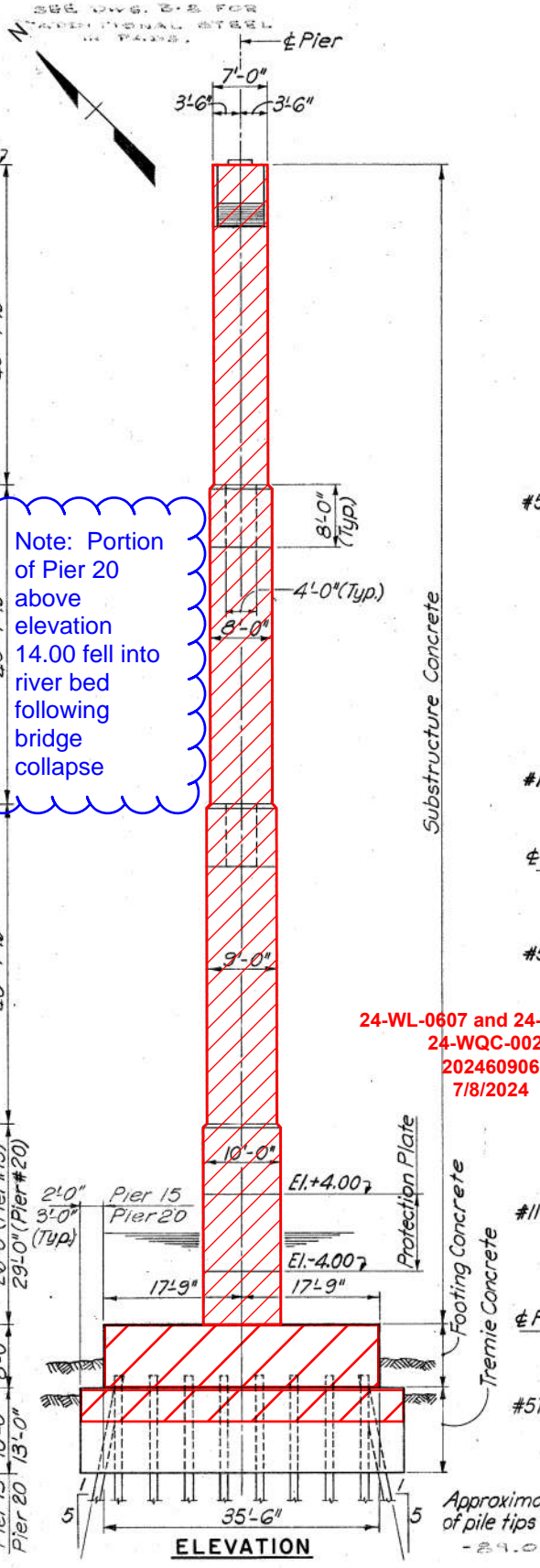
24-WL-0607 and 24-WL-0583  
24-WQC-0022  
20246906  
7/8/2024  
40 of 45

STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION BALTIMORE, MD. <b>BALTIMORE HARBOR OUTER CROSSING                  PATAPSCO RIVER BRIDGE</b> <b>PIERS 14 AND 21</b>	
SCALE 3/32"=1'-0" & DATE Jan. 1972 As Noted	CONTRACT OT-9
MADE BY J. D. TRACED BY J. D. CHECKED BY C.C.Y.	ZOLLMAN ASSOC. INC. SINGSTAD, KEHART NOVEMBER AND HURKA A JOINT VENTURE Baltimore, Md. DRAWING NO. B-1 SHEET NO. 16 OF 24 INDEXED
File No. _____ Pocket No. _____ Folder No. _____	

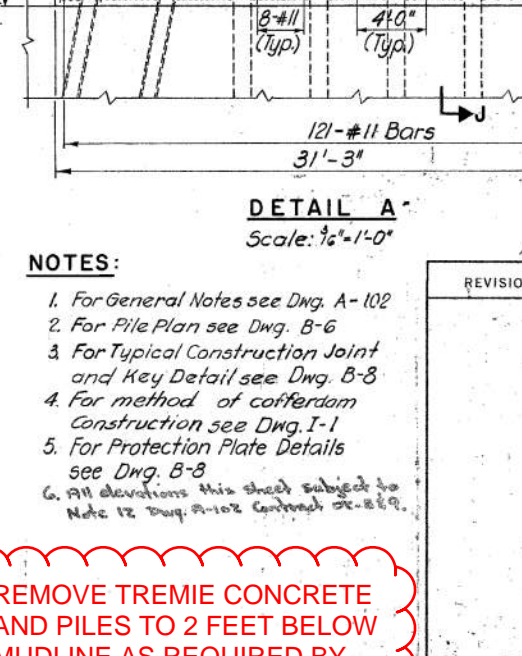
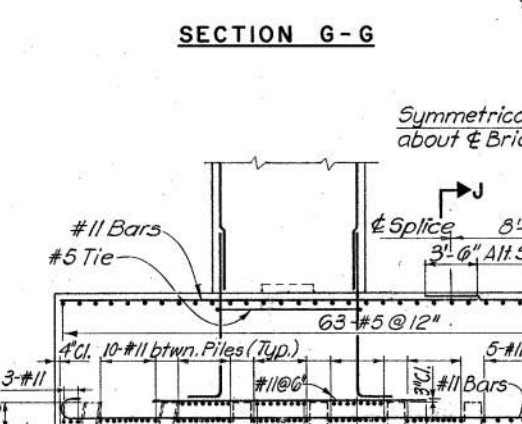
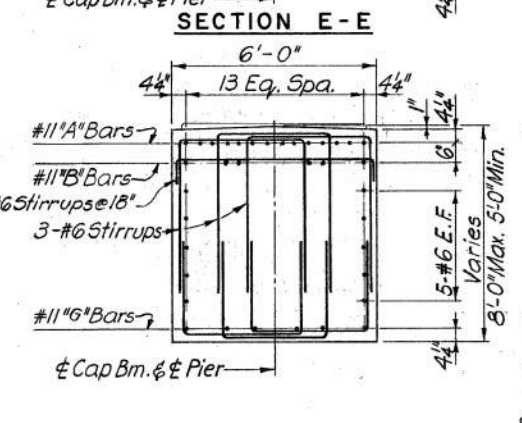
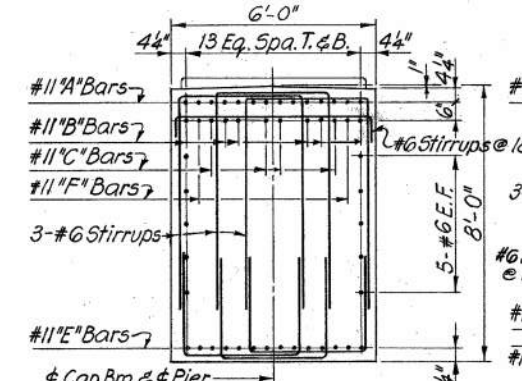
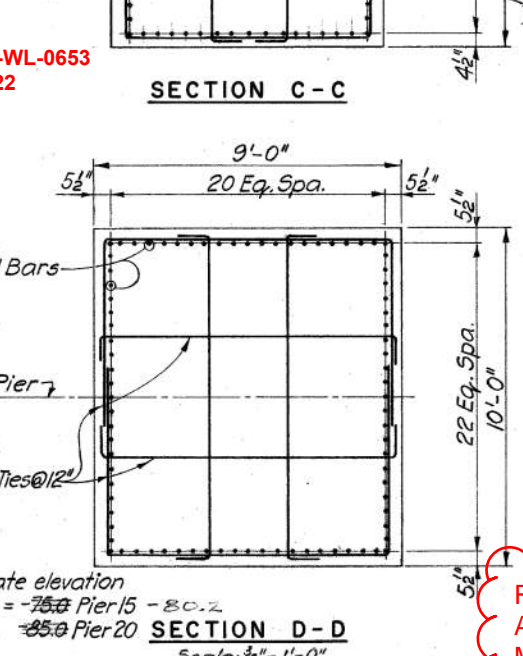
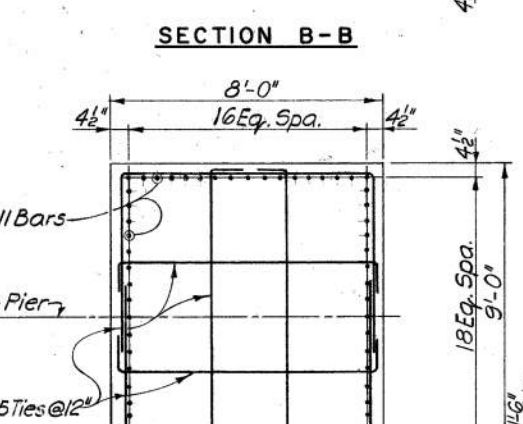
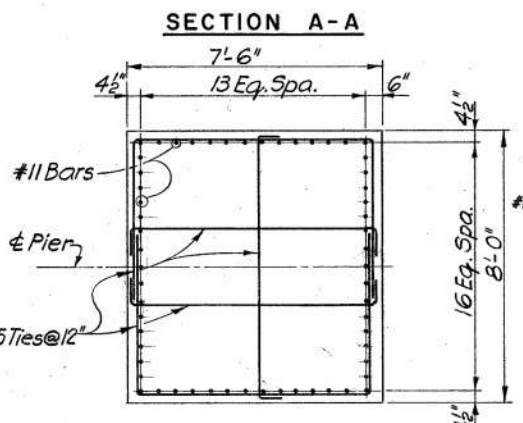
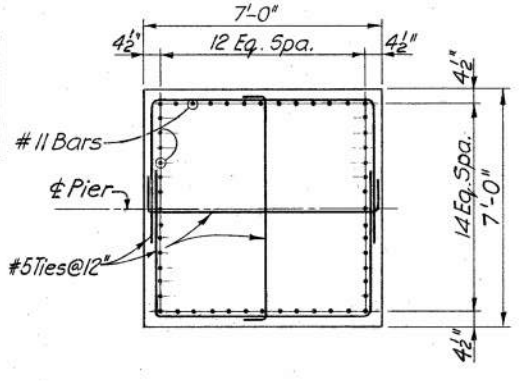




PAD ELEVATION SCHEDULE							
GIRDER No	1	2	3	4	5	6	7
PIER 15	136.22	136.37	136.51	136.65	136.51	136.37	136.22
PIER 20	136.22	136.37	136.51	136.65	136.51	136.37	136.22

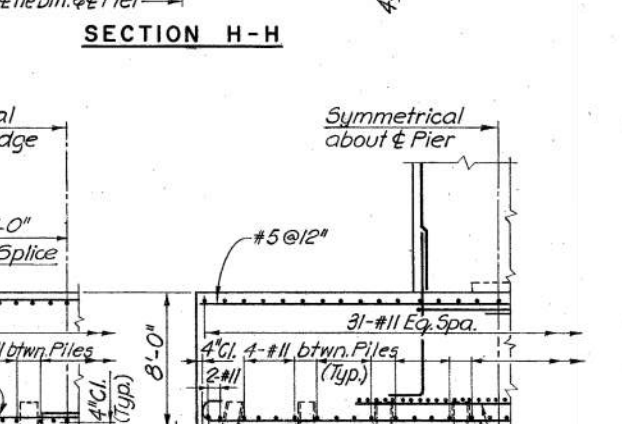
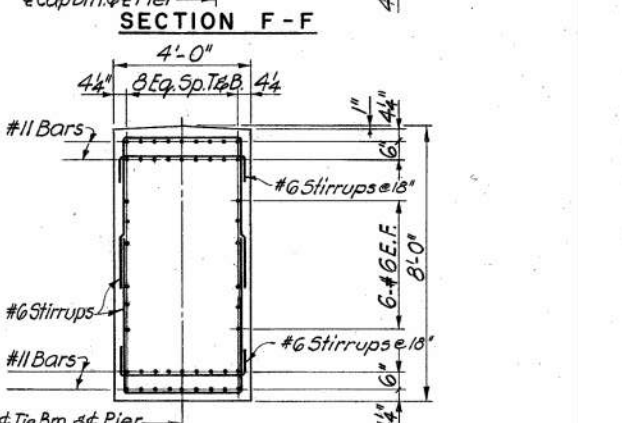
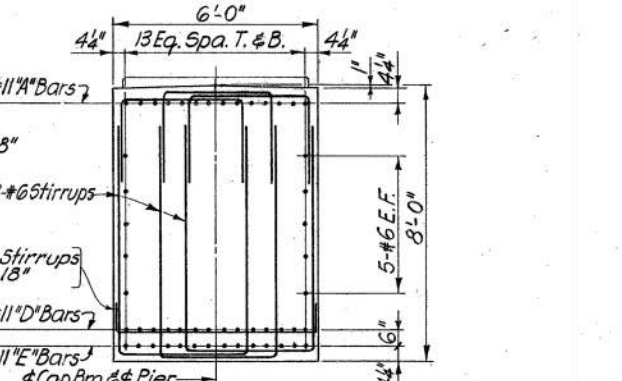


ALL MARKUP ELEVATIONS RELATIVE TO MLW = 0.0



- NOTES:**
1. For General Notes see Dwg. A-102
  2. For Pile Plan see Dwg. B-6
  3. For Typical Construction Joint and Key Detail see Dwg. B-3
  4. For method of cofferdam construction see Dwg. I-1
  5. For Protection Plate Details see Dwg. B-8
  6. All elevations in this sheet subject to Note 12 Dwg. A-102 Contract DC-819.

REMOVE TREMIE CONCRETE AND PILES TO 2 FEET BELOW MUDLINE AS REQUIRED BY USCG BRIDGE PERMIT.



**REVISIONS**

AS BUILT

STATE OF MARYLAND  
DEPARTMENT OF TRANSPORTATION  
STATE HIGHWAY ADMINISTRATION  
BALTIMORE, MD.  
**BALTIMORE HARBOR OUTER CROSSING  
PATAPSCO RIVER BRIDGE  
PIERS 15 AND 20**

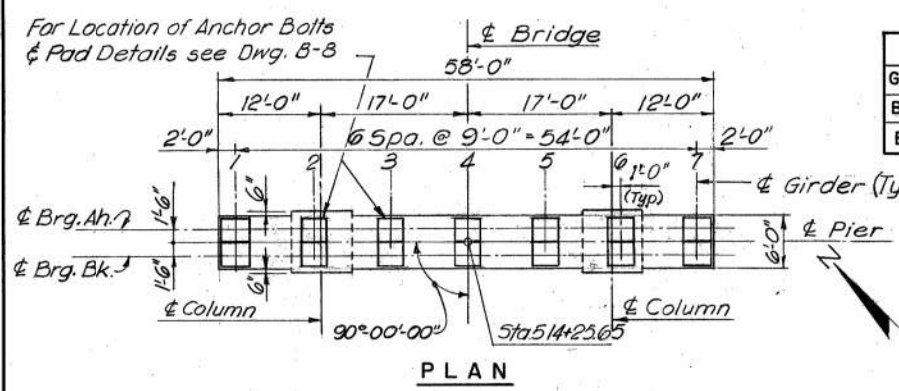
SCALE 3/32"=1'-0" & As Noted DATE Jan. 1972 CONTRACT OT-9

MADE BY O.S.  
TRACED BY O.S.  
CHECKED BY C.C.Y.

ZOLLMAN ASSOC. INC.  
AND  
SINGSTAD, KEHART  
NOVEMBER AND HURKA  
A JOINT VENTURE  
Baltimore, Md.

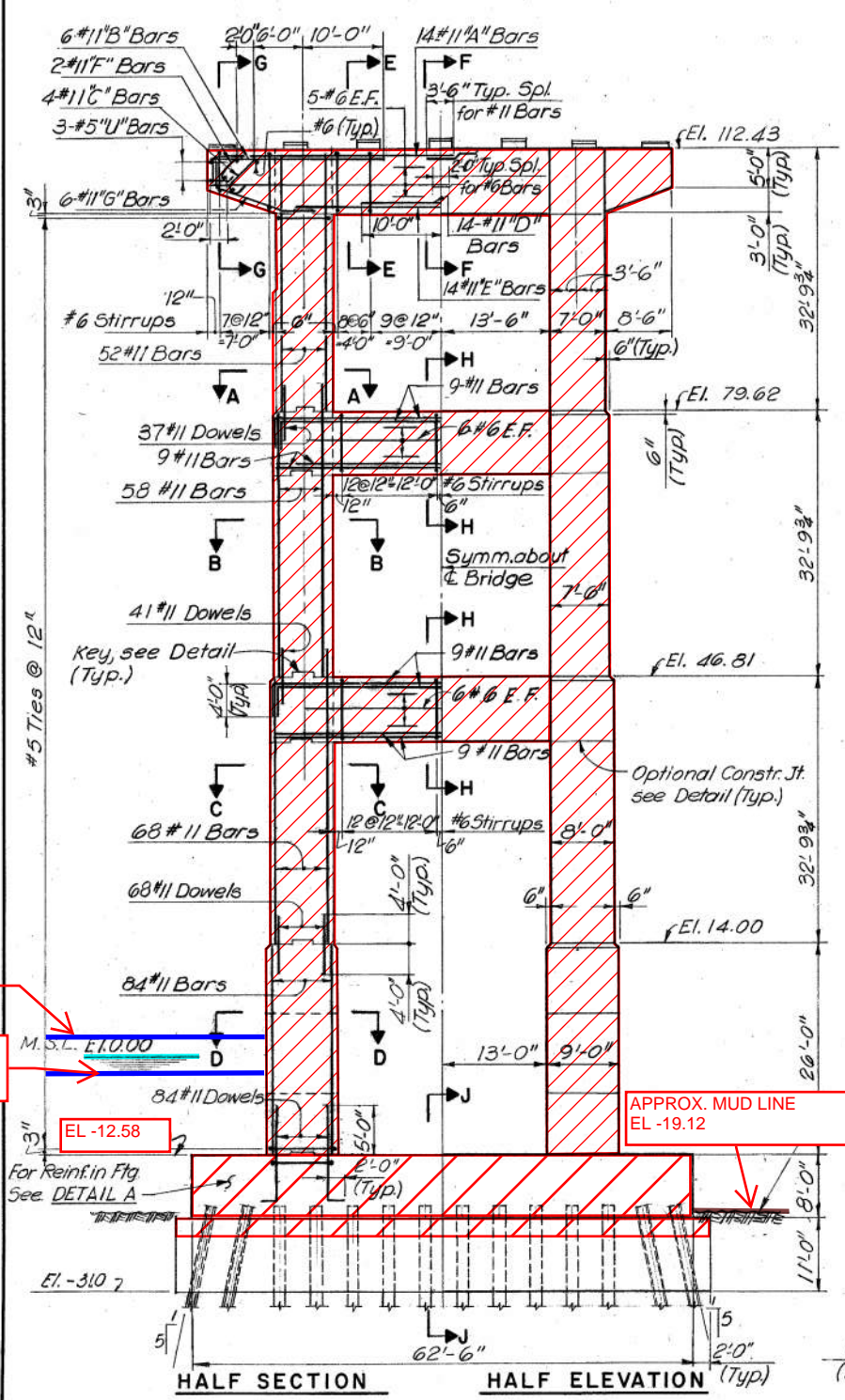
DRAWING NO. B-2  
SHEET NO. 17 OF 24  
INDEXED

File No. \_\_\_\_\_ Pocket No. \_\_\_\_\_ Folder No. \_\_\_\_\_



PAD ELEVATION SCHEDULE							
GIRDER No.	1	2	3	4	5	6	7
BRG. Ah.	112.76	112.91	113.05	113.19	113.05	112.91	112.76
BRG. Bk.	112.88	113.03	113.17	113.31	113.17	113.03	112.88

24-WL-0607 and 24-WL-0653  
24-WQC-0022  
202460906  
7/8/2024

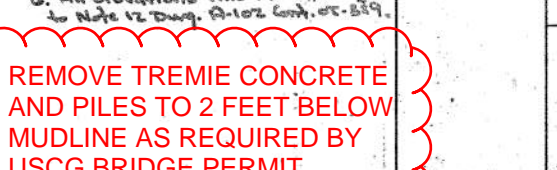
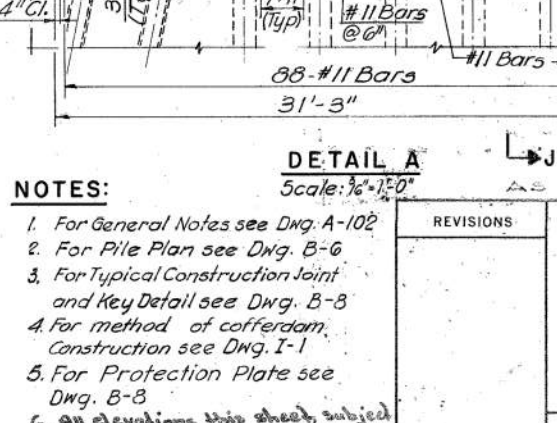
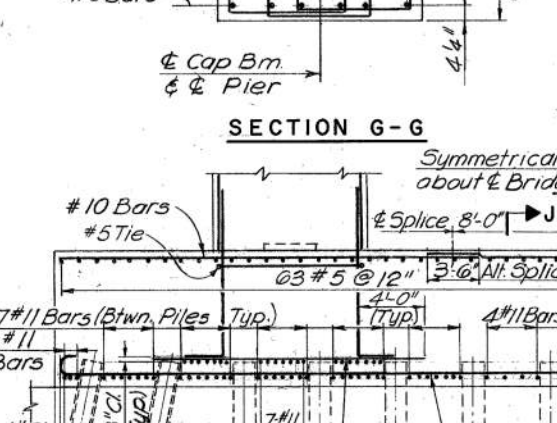
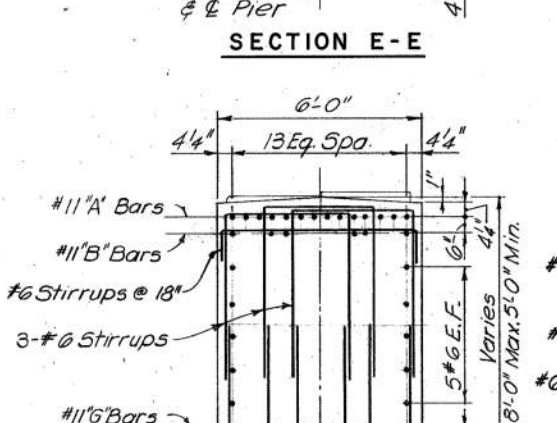
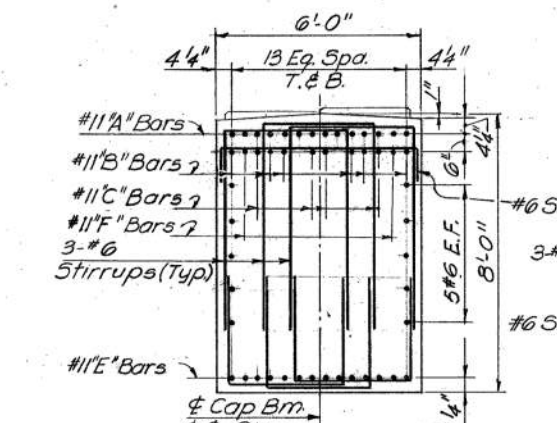
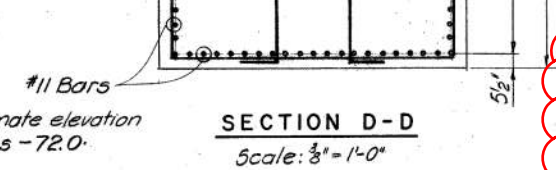
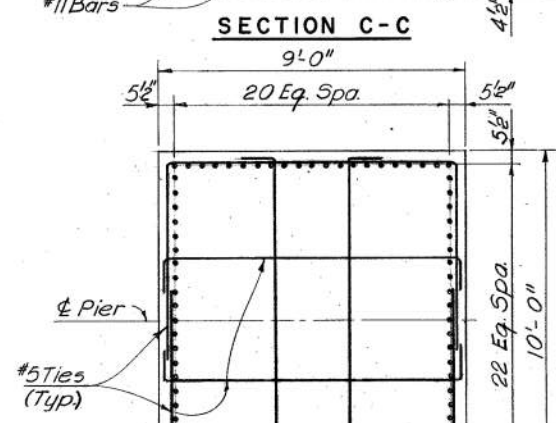
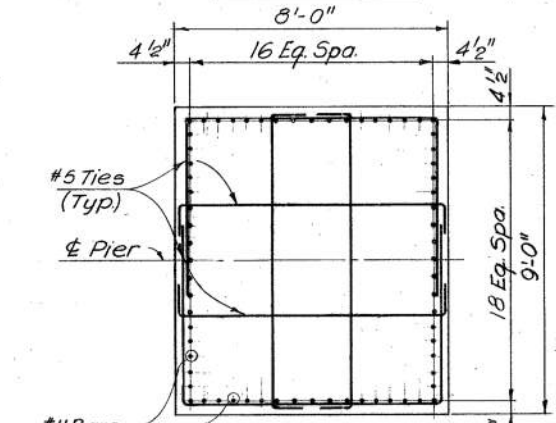
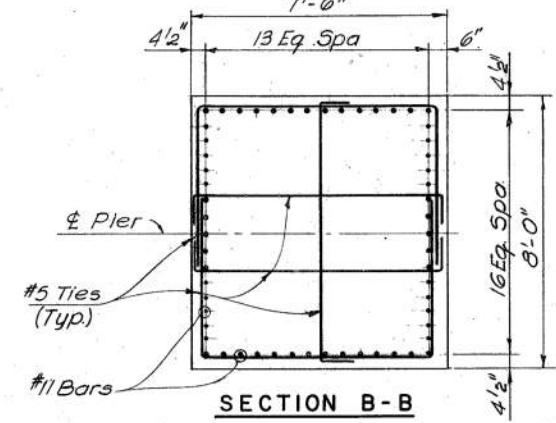
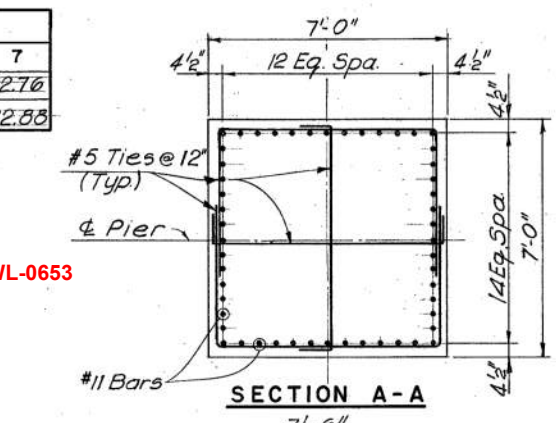


APPROX. MUD LINE  
EL. -19.12

MHW  
EL=1.15

MLW  
EL=0.0

ALL MARKUP ELEVATIONS  
RELATIVE TO MLW = 0.0



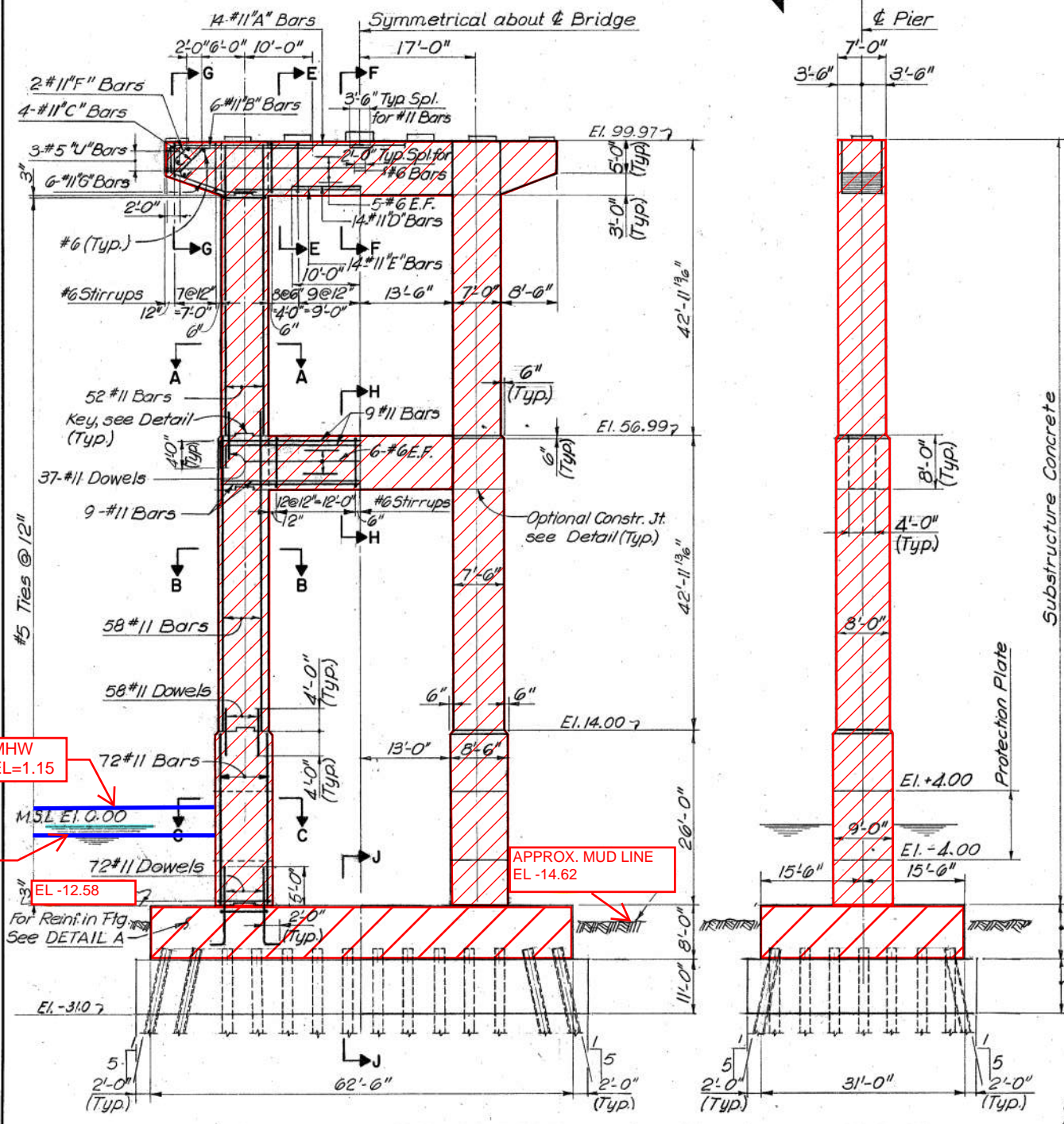
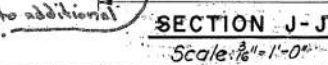
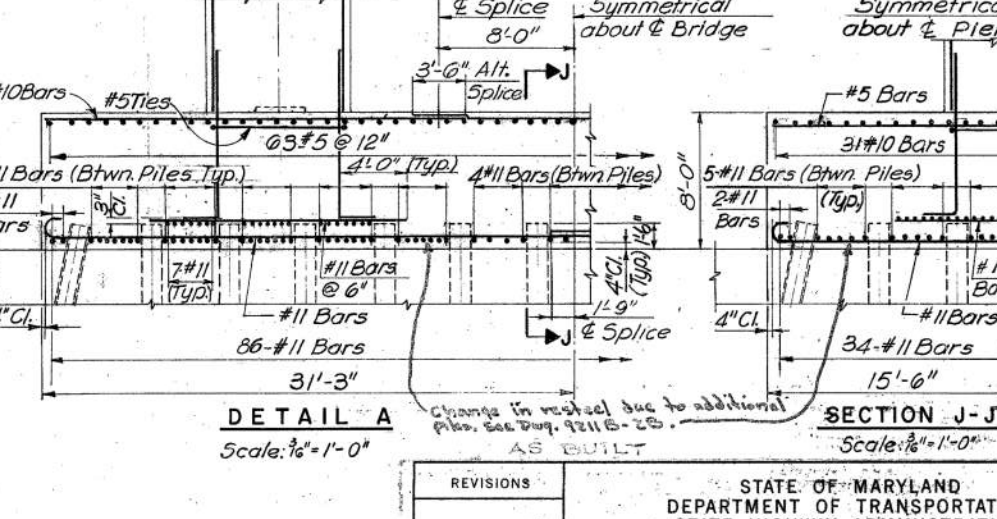
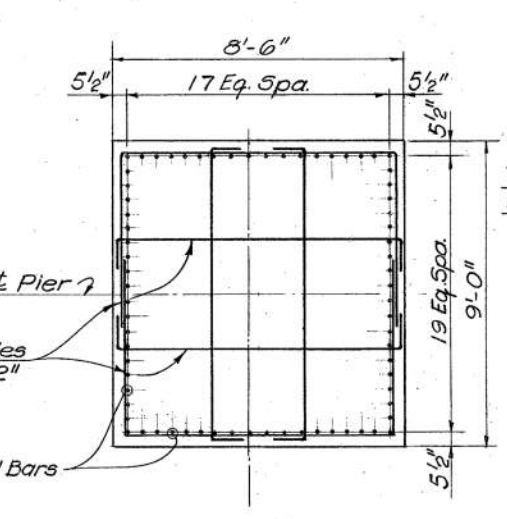
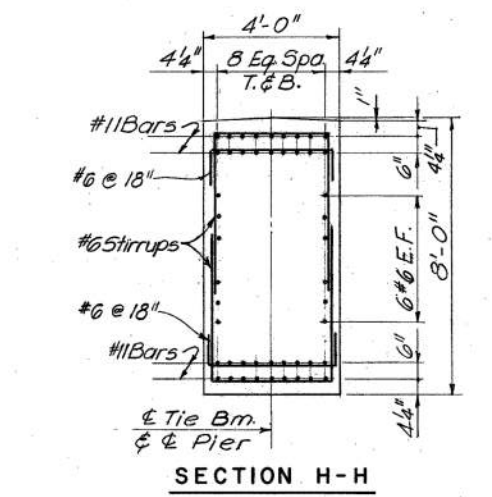
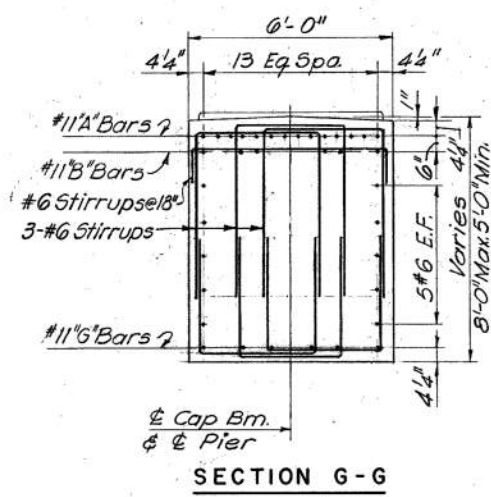
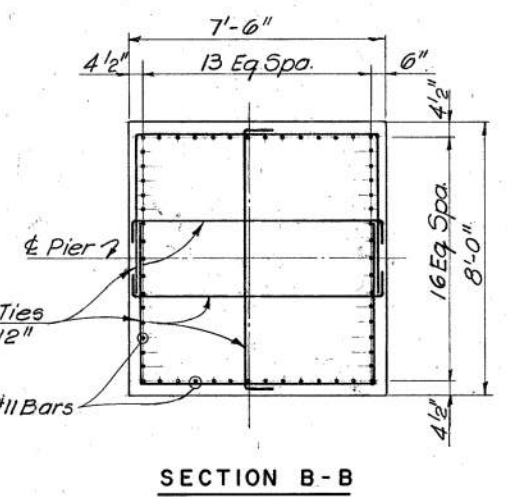
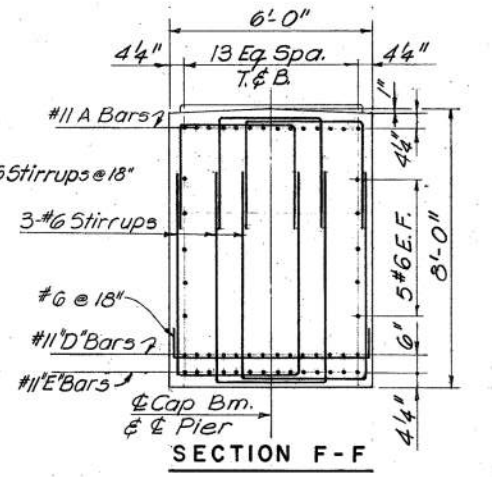
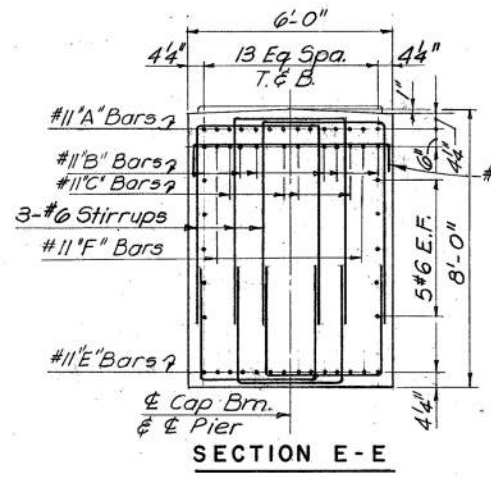
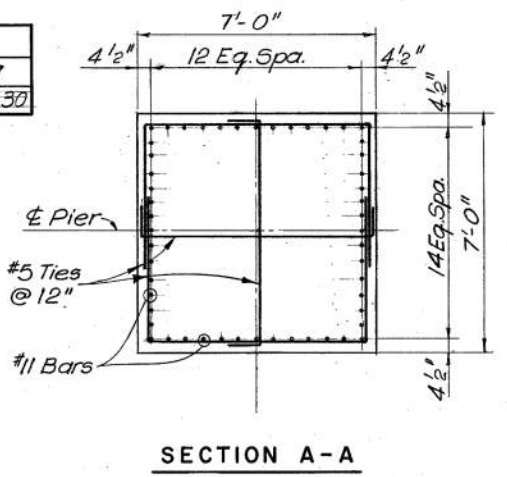
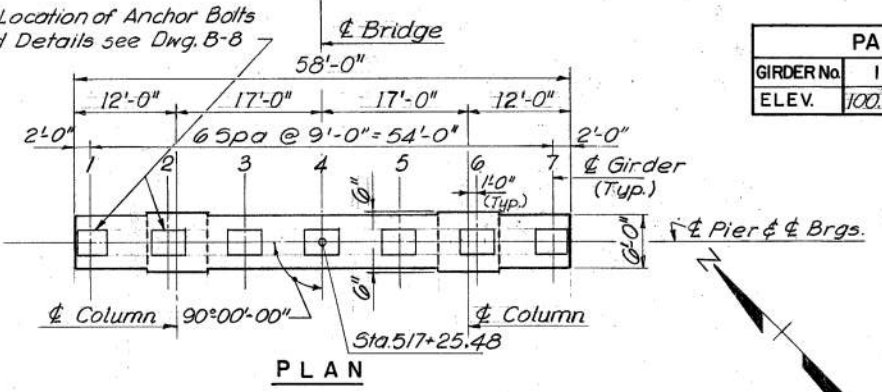
- NOTES:**
- For General Notes see Dwg. A-102
  - For Pile Plan see Dwg. B-6
  - For Typical Construction Joint and Key Detail see Dwg. B-3
  - For method of cofferdam construction see Dwg. I-1
  - For Protection Plate see Dwg. B-3
  - All elevations this sheet subject to Note 12 Dwg. A-102 Com. 05-219.

REMOVE TREMIE CONCRETE  
AND PILES TO 2 FEET BELOW  
MUDLINE AS REQUIRED BY  
USCG BRIDGE PERMIT.

REVISIONS		STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION BALTIMORE, MD.	
		BALTIMORE HARBOR OUTER CROSSING PATAPSCO RIVER BRIDGE	
		PIER 22	
SCALE 3/32" = 1'-0" & DATE Jan. 1972 CONTRACT OT-9		ZOLLMAN ASSOC. INC. AND SINGSTAD, KEHART NOVEMBER AND HURKA A JOINT VENTURE Baltimore, Md.	
MADE BY R.R.		DRAWING NO. B-3	
TRACED BY R.R.		SHEET NO. 18 OF 24	
CHECKED BY C.C.Y.		INDEXED	
File No. _____ Pocket No. _____ Folder No. _____			

For Location of Anchor Bolts & Pad Details see Dwg. B-8

PAD ELEVATION SCHEDULE							
GIRDER No.	1	2	3	4	5	6	7
ELEV.	100.30	100.45	100.59	100.73	100.59	100.45	100.30



Substructure Concrete

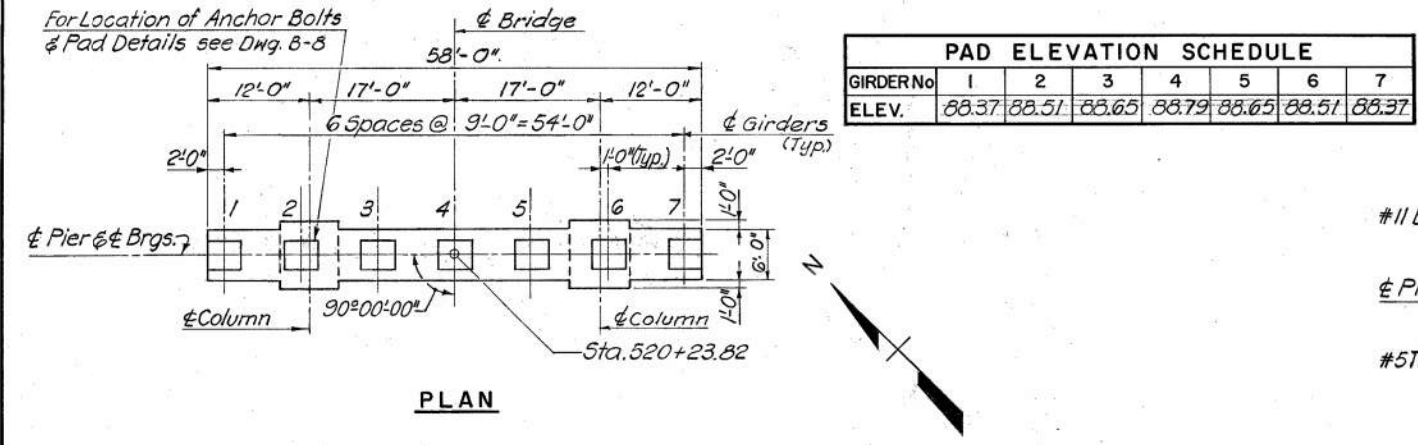
Tremie Concrete

Approximate elevation of pile tips -10.0 to -12.0  
24-WL-0607 and 24-WL-0653  
24-WQC-0022

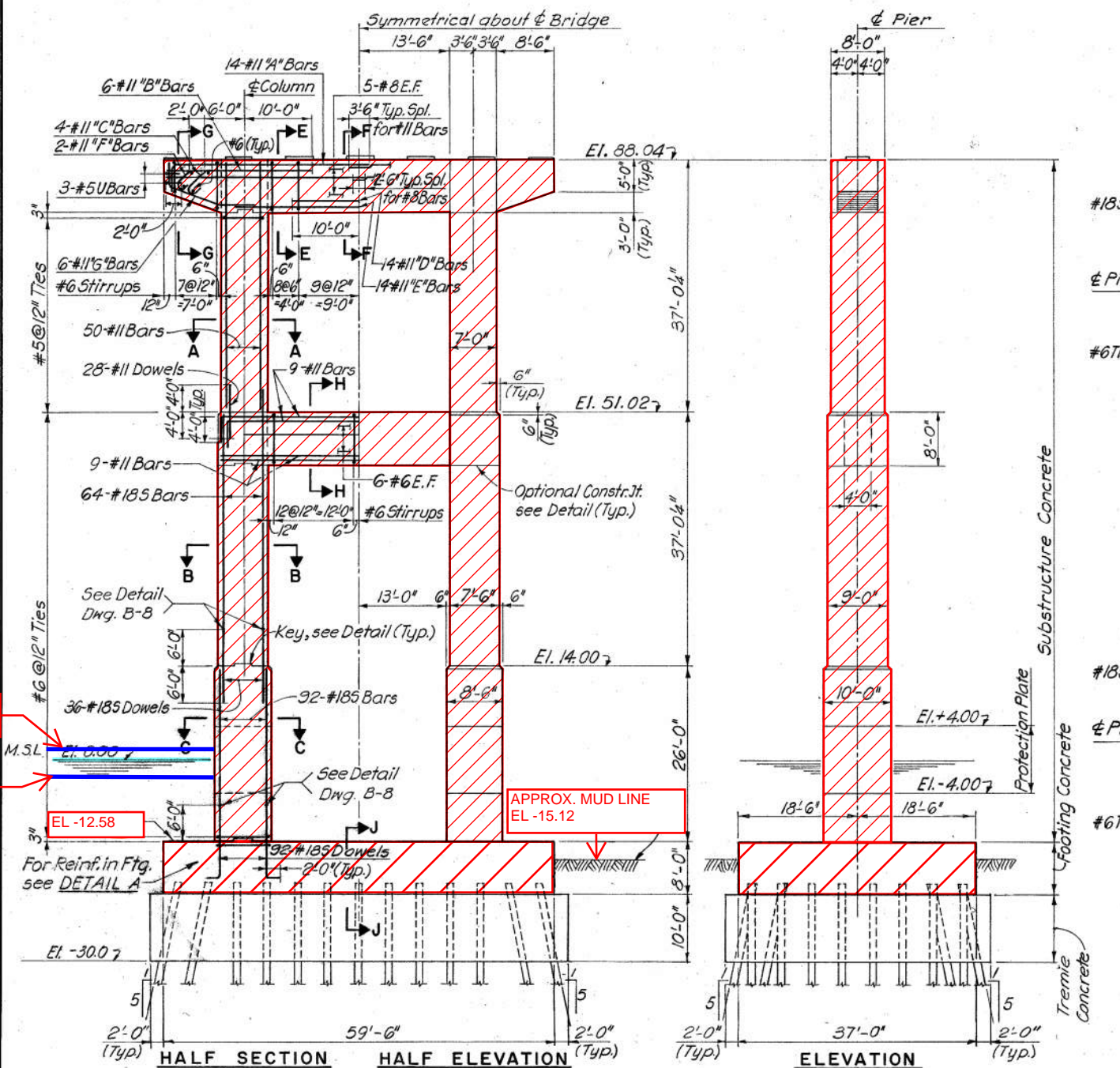
- NOTES:
1. For General Notes see Dwg. A-102
  2. For Pile Plan see Dwg. B-6
  3. For Typical Construction Joint and Key Detail see Dwg. B-8
  4. For method of cofferdam construction see Dwg. I-1
  5. For Protection Plate see Dwg. B-7
  6. All elevations this sheet subject to Note 12 Dwg. A-102 Cont. of B-9.

ALL MARKUP ELEVATIONS RELATIVE TO MLW = 0.0

REVISIONS		STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION BALTIMORE, MD. BALTIMORE HARBOR OUTER CROSSING PATAPSCO RIVER BRIDGE PIER 23	
SCALE 3/32"=1'-0" & DATE Jan. 1972 CONTRACT OT-9 As Noted		ZOLLMAN ASSOC. INC. AND SINGSTAD, KEHART NOVEMBER AND HURKA A JOINT VENTURE Baltimore, Md.	
MADE BY R.R. TRACED BY R.R. CHECKED BY C.C.V.		DRAWING NO. B-4 SHEET NO. 19 OF 24 INDEXED	



PAD ELEVATION SCHEDULE							
GIRDER NO.	1	2	3	4	5	6	7
ELEV.	88.37	88.51	88.65	88.79	88.65	88.51	88.37

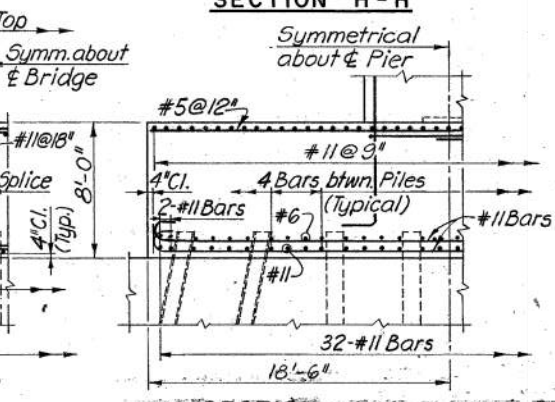
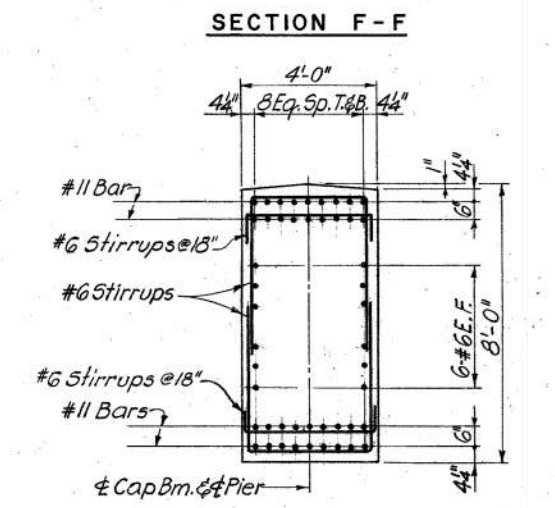
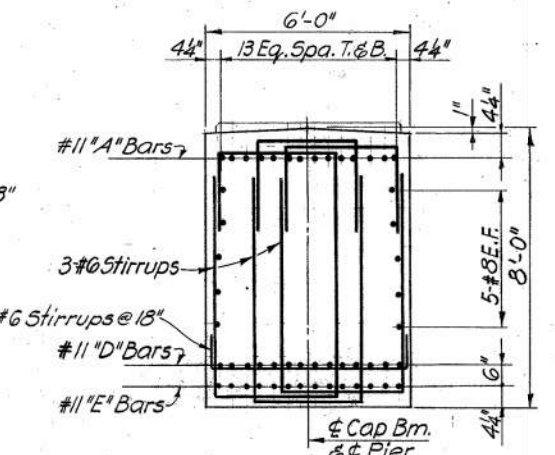
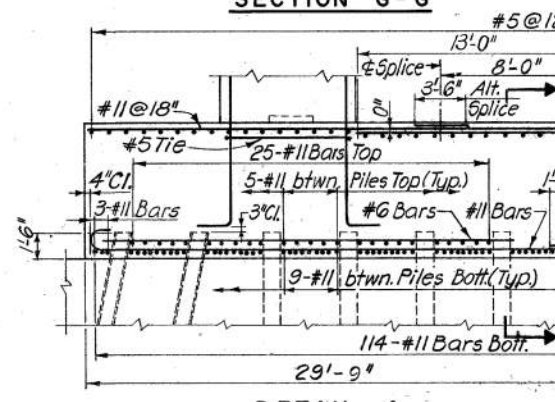
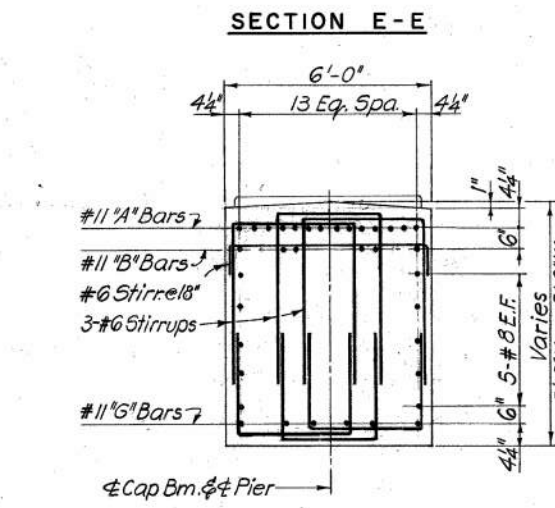
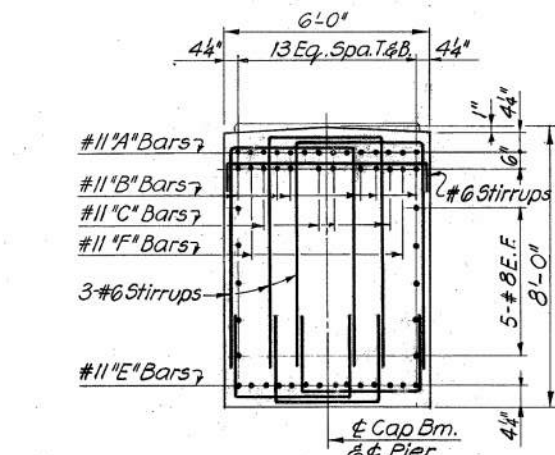
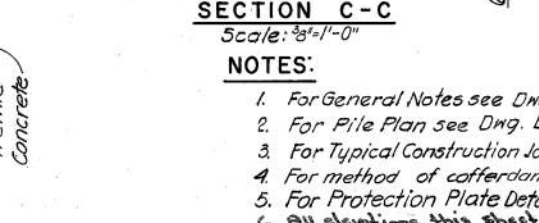
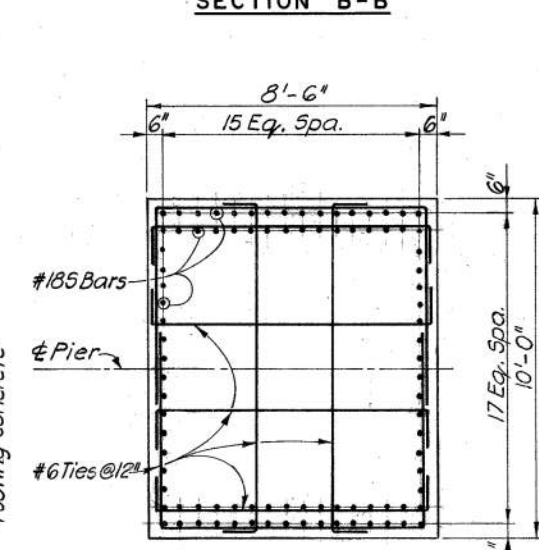
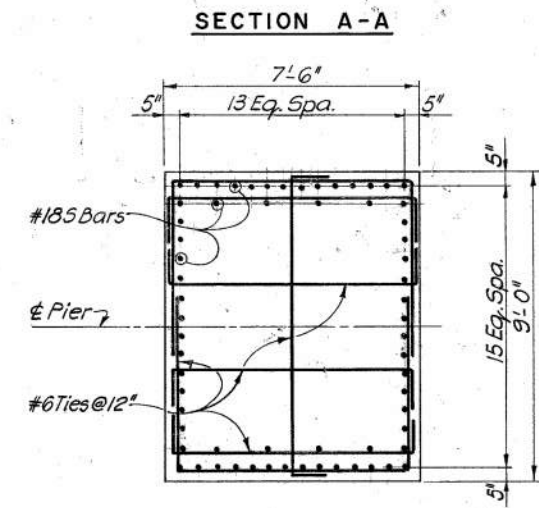
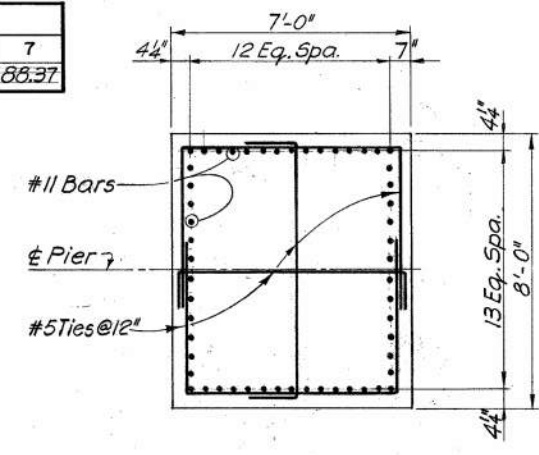


MHW EL=1.15  
MLW EL=0.0  
EL -12.58

APPROX. MUD LINE EL -15.12

Approximate elevation of pile tips = -105.6 - 110.7

24-WL-0607 and 24-WL-0653  
24-WQC-0022  
20246906  
7/8/2024  
44 of 45



- NOTES:**
1. For General Notes see Dwg. A-102
  2. For Pile Plan see Dwg. B-6
  3. For Typical Construction Joint & Key Detail see Dwg. B-8
  4. For method of cofferdam construction see Dwg. I-1
  5. For Protection Plate Details see Dwg. B-8
  6. All elevations this sheet subject to Note 12 Dwg. A-102 Contract 07-829.

ALL MARKUP ELEVATIONS RELATIVE TO MLW = 0.0

REVISIONS		

AS BUILT

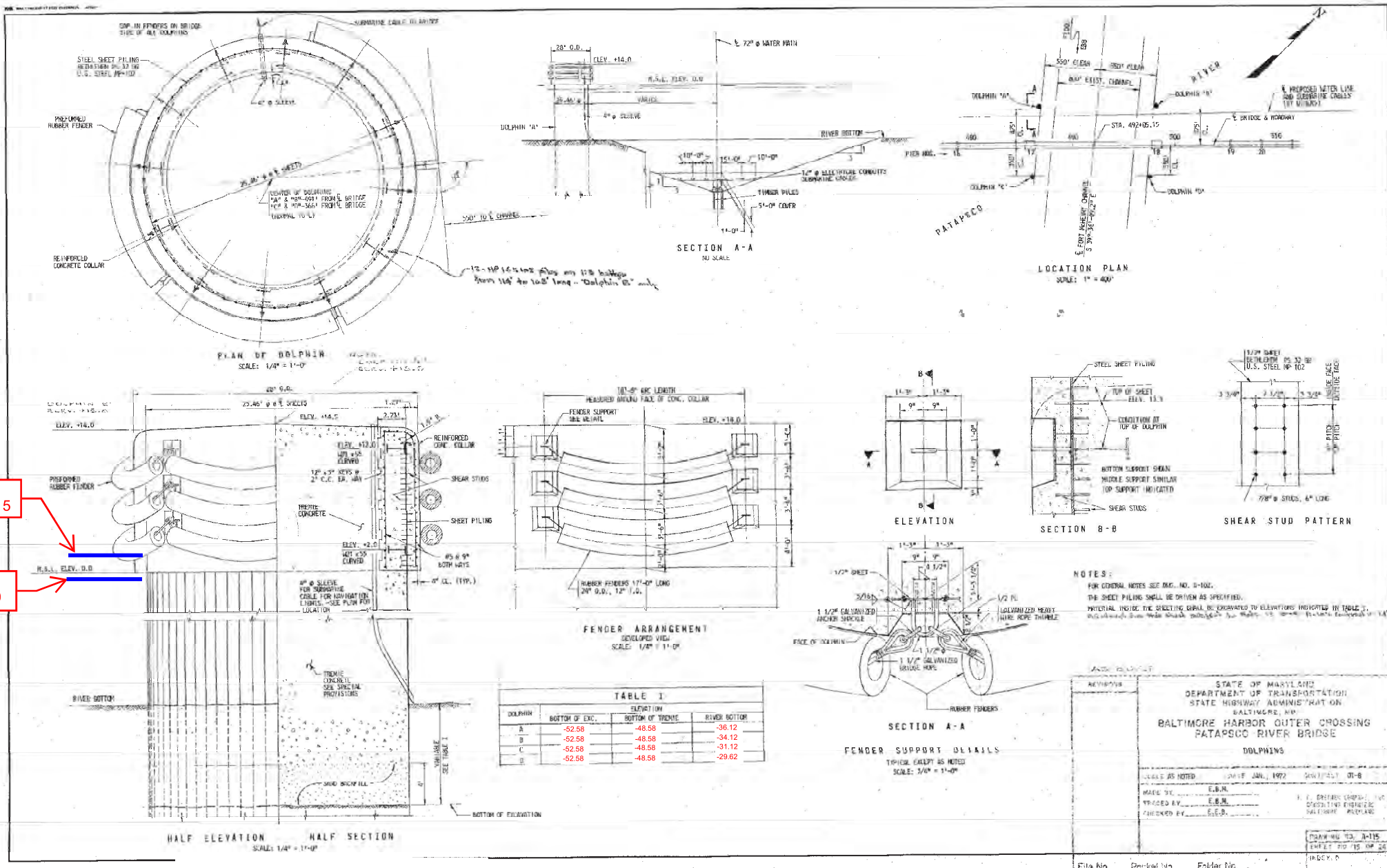
STATE OF MARYLAND  
DEPARTMENT OF TRANSPORTATION  
STATE HIGHWAY ADMINISTRATION  
BALTIMORE, MD.

**BALTIMORE HARBOR OUTER CROSSING  
PATAPSCO RIVER BRIDGE**

**PIER 24**

SCALE 3/32" = 1'-0" & DATE Jan. 1972	CONTRACT 07-829
MADE BY O.S.	ZOLLMAN ASSOC. INC.
TRACED BY O.S.	SINGSTAD, KEHART
CHECKED BY C.C.Y.	NOVEMBER AND HURKA
	A JOINT VENTURE
	Baltimore, Md.
	DRAWING NO. B-5
	SHEET NO. 20 OF 24
	INDEXED

File No. \_\_\_\_\_ Pocket No. \_\_\_\_\_ Folder No. \_\_\_\_\_



MHW  
EL=1.15

MLW  
EL=0.0

24-WL-0607 and 24-WL-0653  
24-WQC-0022  
202460906  
7/8/2024

ALL MARKUP ELEVATIONS  
RELATIVE TO MLW = 0.0