SP-Y

APPENDIX

RMTA

System Map

RICHMOND EXPRESSWAY SYSTEM

Scale: 0 1000 2000 3000ft.

48 - Bridge Number
RMTA Facilities Shown in Red

CITY OWNED GRAVEL LOT

APPROXIMATELY 10,500 S.F. RMTA OWNED STAGING AREA

RMTA OWNED ABANDONED RAMP

RMTA OWNED STAGING AREA

Section One

Section Two Connection To I-195

Section Three

Section Four Downtown Expressway

Connection to Downtown Expressway

Powhite Parkway Extension (VDOT Toll Road)

RICHMOND

JAMES RIVER

UNIVERSITY OF RICHMOND

JOSEPH BRYAN PARK

Toll Booths

BRYAN PARK INTERCHANGE

LABURNUM AVE.

NORTH AVE.

WESTWOOD AVE.

BROOKLAND PARK BLVD.

CHAMBERLAYNE AVE.

BROOK RD.

OVERBOOK RD.

MEADOW BRIDGE

Visitor Information Center

The Diamond

Science Museum Of Virginia

VIRGINIA UNION UNIVERSITY

Virginia Museum of Fine Arts

Virginia Commonwealth University

BOULEVARD INTERCHANGE

STADIUM INTERCHANGE

POWHITE BRIDGE OVER THE JAMES RIVER

FOREST HILL AVE. INTERCHANGE

CHIPPENHAM PARKWAY INTERCHANGE

Toll Plaza (SB)

Toll Plaza (NB)

Toll Plaza

Toll Booths

BOULEVARD BRIDGE 7500# Limit

ROBERT E. LEE BRIDGE

MAYOS BRIDGE

MANCHESTER BRIDGE

DOWNTOWN I-95 INTERCHANGE

MAIN ST. STATION

Downtown Expressway State Rte. 195

Powhite Parkway State Rte 76

WILLIAM BYRD PARK

MAYMONT PARK

FOREST HILL PARK

HOLLYWOOD CEMETERY

MT. CALVARY CEMETERY

RIVERVIEW CEMETERY

COLORADO AVE.

WILLOW OAKS COUNTRY CLUB

Water Works

Public Library

COLISEUM

Med. Col. Of Va. (VCU)

STATE CAPITOL

Shockoe Slip Historic District

Chamber of Commerce

City Hall

Monroe Park

The Mosque

Chimborazo Park

Williams Island

HUGUENOT BRIDGE

HUGUENOT ROAD

RIVERSIDE DR.

LIBBIE AVE.

MONUMENT AVE.

PATTERSON AVE.

GROVE AVE.

CARY STREET ROAD

COMMONWEALTH AVE.

MALVERN AVE.

HAMILTON ST.

THOMPSON ST.

KENT RD.

BROAD ST.

THREE CHOPT RD.

DOVER RD.

PORTLAND PL.

IDLEWOOD AVE.

MAPLEWOOD AVE.

CITY STADIUM

GRANT RD.

DOUGLASDALE RD.

FOREST HILL AVE.

WESTOVER BLVD.

BLILEY RD.

JAHNKE RD.

CHIPPENHAM

SEABOARD COAST LINE

CSX RAILWAY

NORFOLK SOUTHERN

(SOUTHERN RAILWAY)

(C & O RY.)

A.C.L. & P. R.R.

I-195

FLOYD AVE

MAIN ST

CARY ST

PARKWOOD AVE.

GRAYLAND AVE.

IDLEWOOD AVE.

LAKEVIEW AVE.

ALLEN AVE.

MEADOW ST.

RANDOLPH ST.

HARRISON ST.

CHERRY ST.

LAUREL ST.

BELVIDERE

FRANKLIN ST.

CANAL ST.

BYRD ST.

MARSHALL ST.

BROAD ST.

LEIGH ST.

ADAMS ST.

1st ST.

2nd ST.

3rd ST.

4th ST.

5th ST.

6th ST.

7th ST.

9th ST.

10th ST.

12th ST.

17th ST.

18th ST.

25th ST.

MOSBY ST.

CARRINGTON ST.

NINE MILE RD.

FAIRFIELD AVE.

CLAY ST.

MECHANICSVILLE

SEABOARD COAST LINE

Toll Booths

Toll Booths

Toll Booths

Toll Booths

Toll Plaza

Toll Plaza

Toll Plaza (SB)

Toll Plaza (NB)

Powhite Parkway State Rte 76

Section One

Section Two Connection To I-195

Section Three

Section Four Downtown Expressway

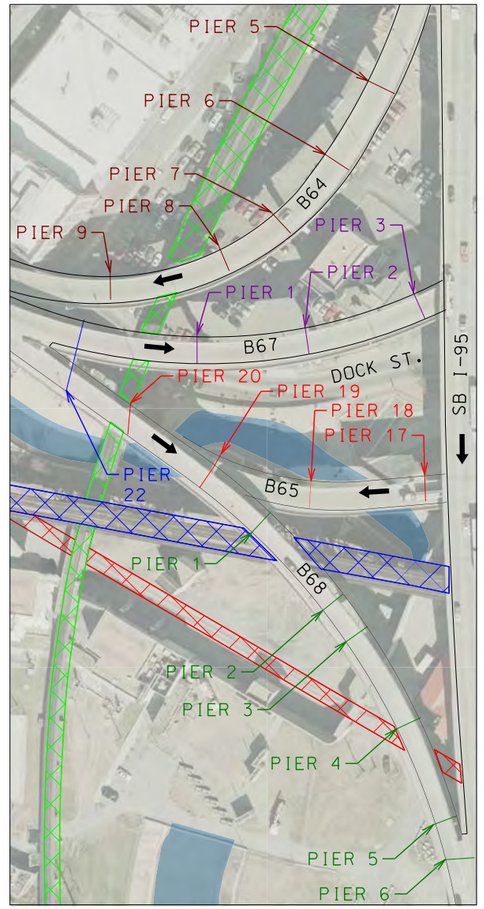
Connection to Downtown Expressway

Powhite Parkway Extension (VDOT Toll Road)

RMTA

RICHMOND METROPOLITAN TRANSPORTATION AUTHORITY

INSERT 1



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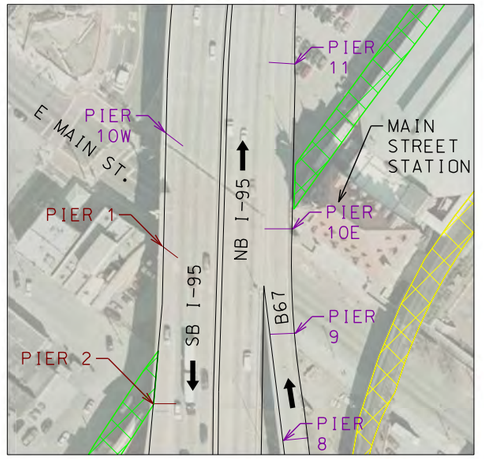

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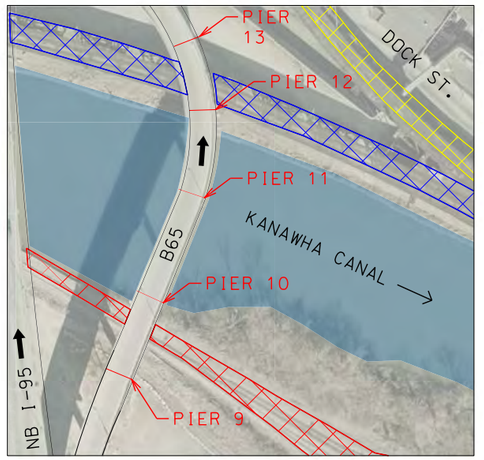


LEGEND:
- BRIDGE 63
- BRIDGE 64
- BRIDGE 65
- BRIDGE 66
- BRIDGE 67
- BRIDGE 68
- N&S RAILROAD
- CSX RAILROAD
- CSX RAILROAD
- CSX RAILROAD

NOTES:
1) PIER NUMBERS BASED ON AS-BUILT DRAWINGS FROM CONTRACTS C-10 AND C-11.
2) RAILROAD LIMITS AND PIER LOCATIONS BASED ON AERIAL PHOTOGRAPHY.
3) THIS EXHIBIT IS FOR REFERENCE ONLY. REFER TO AS-BUILT DRAWINGS FOR EXACT PIER LOCATIONS.
4) BRIDGE 63 IS ON BOTTOM, BRIDGE 66 IS ON TOP.

RICHMOND METROPOLITAN TRANSPORTATION AUTHORITY

HNTB
2900 S. QUINCY STREET, SUITE 200
ARLINGTON, VIRGINIA
(703) 824-5100

I-95 RAMPS PIER LOCATION EXHIBIT

Scale:	Date:	Contract No.:	Sheet:
N.T.S.	MAY 2015	MR-2015	1 OF 1

Pier Map-DR2016.dgn
3/4/2016

INDEX OF SHEETS

SHEET NO.	TITLE
1	COVER SHEET
2-3	GENERAL PLAN AND ELEVATION
4	BRIDGE LAYOUT, GENERAL NOTES AND ESTIMATE OF QUANTITIES
5	PROFILES AND PAVEMENT ELEVATIONS
6	SOUTH ABUTMENT
7	NORTH ABUTMENT
8	ABUTMENT DETAILS
9	PIER 1
10	PIER 2
11	PIER 3 ⚠
12	(DELETED) ⚠
13	PIER 4 ⚠
14	(DELETED) ⚠
15	PIER 5
16	PIER 6
17	PIER 7
18	PIER 8
19	PIER 9
20	PIER 10
21	PIER 11
22	PIER 12
23	PIER 13
24	PIER 14
25	PIER 15
26	PIER 16
27	PIER 17
28	FRAMING PLAN - UNITS 1, 2, 3 AND 4
29	FRAMING PLAN - UNITS 5 THRU 12 ⚠
30	FRAMING PLAN - UNITS 13, 14 AND 15
31	FRAMING PLAN - UNITS 16, 17 AND 18
32-33	STRUCTURAL STEEL DETAILS
34	SHOES
35	JOINT DETAILS
36	DRAINAGE SCUPPERS
37	DECK PLAN - UNITS 1, 2, 3 AND 4
38	DECK PLAN - UNITS 5 THRU 12 ⚠
39	DECK PLAN - UNITS 13, 14 AND 15
40	DECK PLAN - UNITS 16, 17 AND 18
41	DECK DETAILS
42	ALUMINUM RAILING DETAILS
43	(DELETED) ⚠
44	ELECTRICAL DETAILS
45	APPROACH SLABS
46	SLOPE PROTECTION
47-53	BORING LOGS

LIMITED ACCESS HIGHWAY

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	1	53

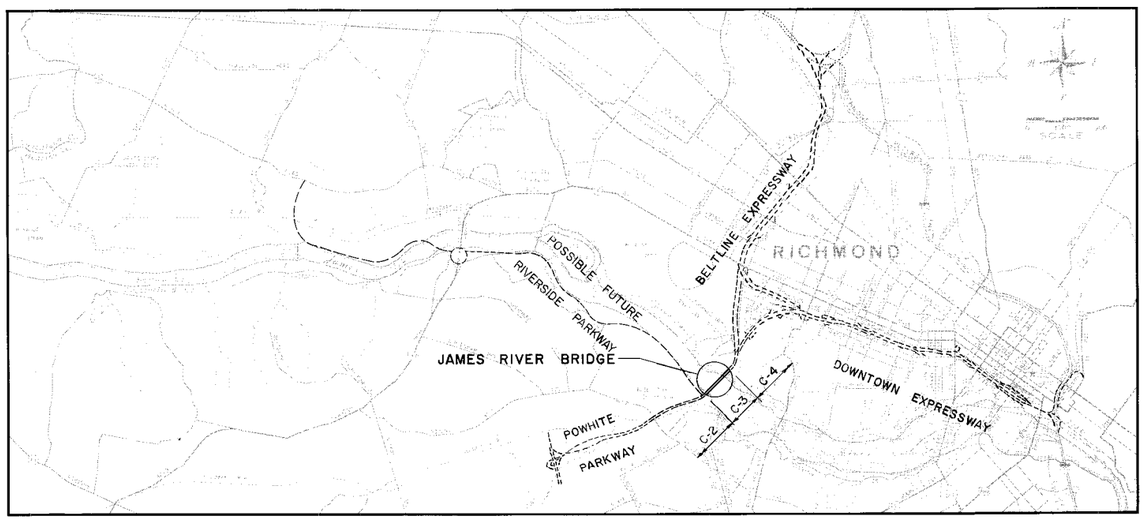
RICHMOND METROPOLITAN AUTHORITY

PLAN AND PROFILE OF PROPOSED

RICHMOND EXPRESSWAY SYSTEM

CHESTERFIELD COUNTY
CITY OF RICHMOND

JAMES RIVER BRIDGE



CONTRACT C-3

BRIDGE B-8

CONVENTIONAL SIGNS

STATE LINE
COUNTY LINE
CITY, TOWN OR VILLAGE
RIGHT OF WAY LINE
FENCE LINE
UNFENCED PROPERTY LINE
FENCED PROPERTY LINE
TRAVELED WAY
GUARD RAIL
RETAINING WALL
RAILROADS
BASE OR SURVEY LINE

LEVEE OR EMBANKMENT
BRIDGES
CULVERTS
DROP INLET
TROLLEY POLES
POWER POLES
TELEPHONE OR TELEGRAPH POLES
MARSH
HEDGE
WOODS
GROUND ELEVATION
GRADE ELEVATION
POLES WITHIN CONSTRUCTION LIMITS

⚠ Index Revised J.G.V. 2-20-71

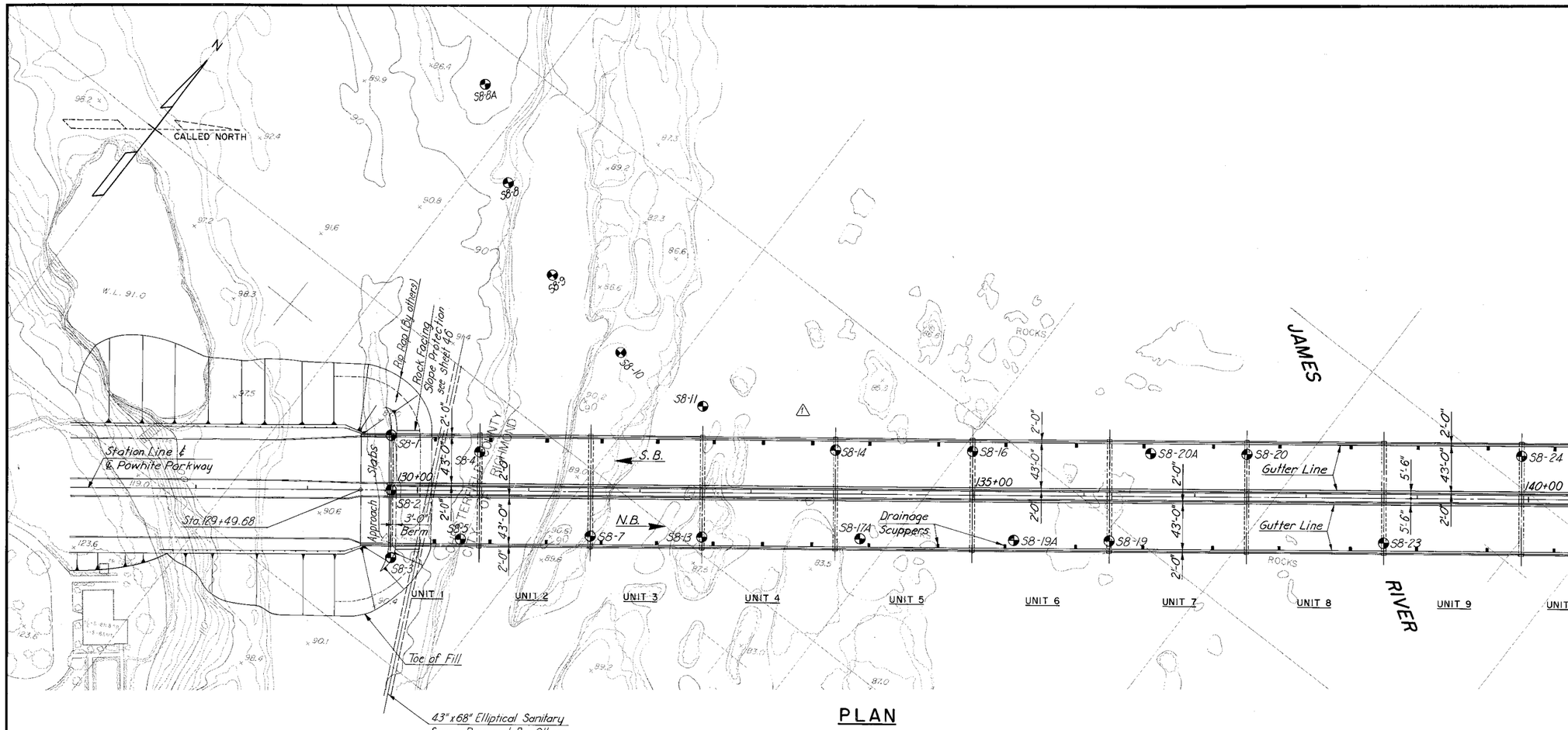
SUBMITTED BY	
Date	
1-22-71 Date	John P. Fowler JP — HOWARD, NEEDLES, TAMMEN & BERGENDOFF general consultant

RECOMMENDED BY	
Date	
1-23-71 Date	GENERAL MANAGER, RICHMOND METROPOLITAN AUTHORITY

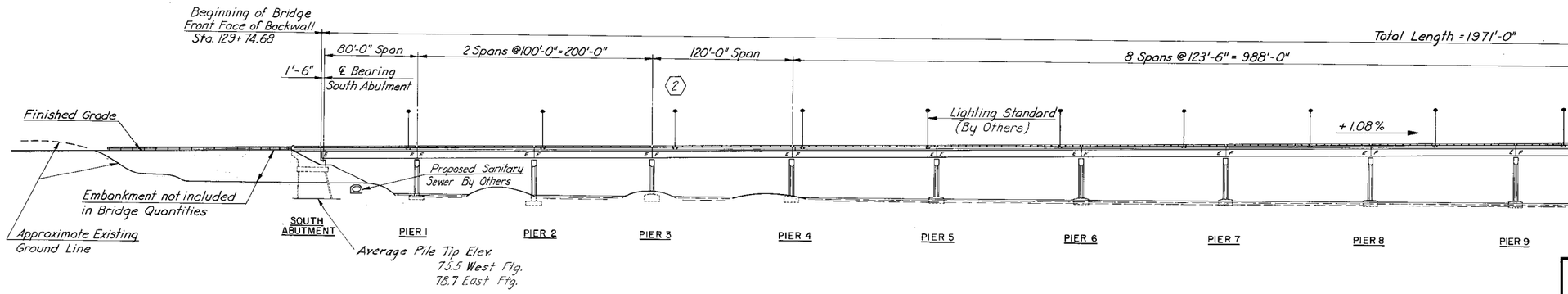
APPROVED BY	
1-23-71 Date	CHAIRMAN, RICHMOND METROPOLITAN AUTHORITY

Plans Revised			
Sheet No.	Date	Sheet No.	Date
1-6,9-16,28,29	2-20-71		
32-38,41,43,46	2-20-71		
1,2,3,17,37,	3-9-71		
38,39,40	3-9-71		
1,4,35,36,44	4-5-71		
21	9-3-71		
23	4-12-72		
45	9-12-72		

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	2	53



PLAN



ELEVATION

△1

CURVE DATA														SUMMARY				
CURVE NO.	△	D	R	T	L	~~BACK TANGENT BEARING~~	FORWARD TANGENT BEARING	BEGIN CURVE	COORDINATES NORTH	COORDINATES EAST	P.I.	COORDINATES NORTH	COORDINATES EAST	END CURVE	COORDINATES NORTH	COORDINATES EAST
1	8°00'00"	10°00'00.0"	572.96'	40.06'	80.00'	~~S 52°46'10.5" W~~	S60°46'10.5"W	P.C. 10+00.00	~~52,836.89~~	50,936.00	10+40.06	52,666.65	50,904.10	P.C.C. 10+80.00	52,647.09	50,869.14
2	61°13'55.5"	33°22'40.4"	310.00'	~~183.45'~~	331.30'	S60°46'10.5"W	N57°59'54.0"W	P.C.C. 10+80.00	52,647.09	50,869.14	12+63.45	~~52,551.50~~	~~50,709.05~~	P.C.C. 14+11.30	52,654.72	50,553.48
3	~~30°20'06"~~	~~10°00'00.0"~~	572.96'	153.52'	300.00'	N57°59'54.0"W	N 27°59'54.0"W	P.C.C. 14+11.30	52,654.72	50,553.48	15+64.82	52,736.08	50,423.28	P.T. 17+11.30	~~52,811.64~~	~~50,351.21~~

	BY	DATE
MADE	HBW	8-67
CHECKED	FXH	2-68
IN CHARGE	FXH	

NO.	REVISION	BY	DATE
3	AS BUILT	JRC	12-72
②	Light Std. Location	J.G.V.	3/9/71
△1	Remove Ramp Taper	H.B.W.	2/20/71

NOTES:

For Bridge Layout and General Notes see sheet no. 4.

For Profiles see sheet no. 5.

⊕ Indicates 2½" ϕ Cased Hole Boring.

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

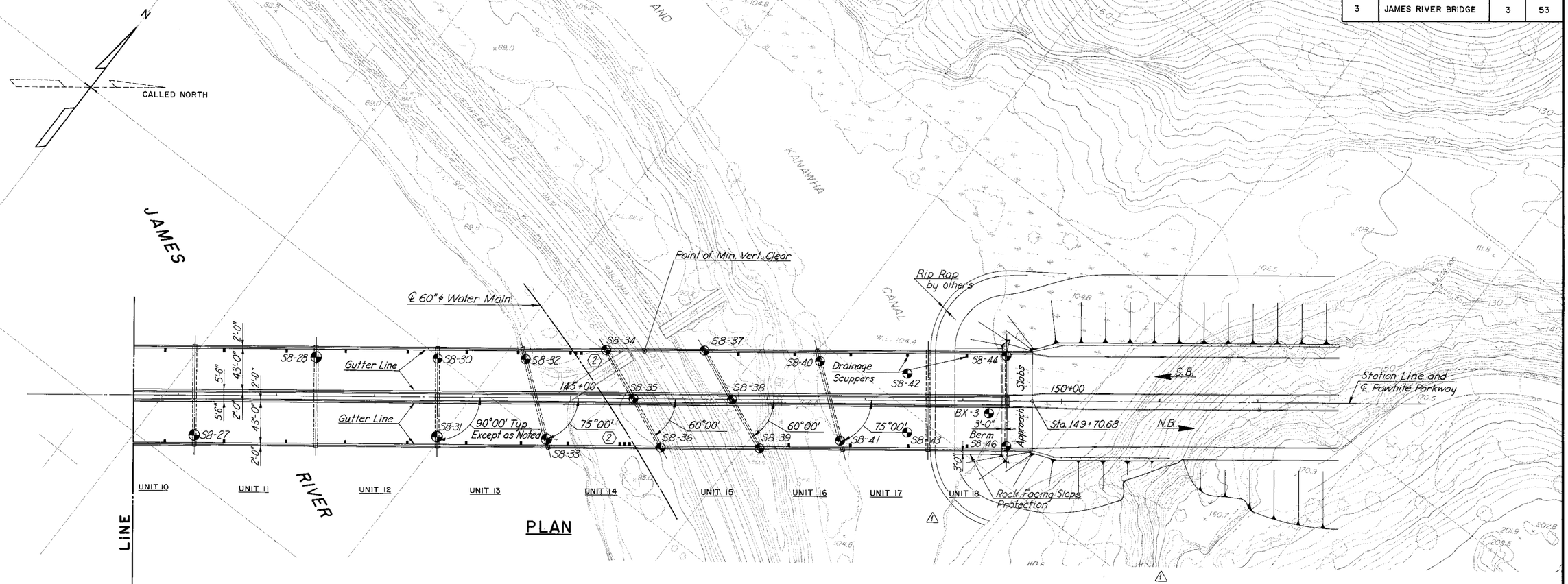
JAMES RIVER BRIDGE

GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1" = 50'
CONTRACT NO.: C-3
SHEET NO. 2 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	3	53



NOTES:

For Bridge Layout and General Notes see sheet no. 4.
For Profiles see sheet no. 5.
Indicates 2½" ϕ Cased Hole Boring.

AS BUILT

	BY	DATE
MADE	HBW	8-67
CHECKED	FXH	2-68
IN CHARGE	FXH	

NO.	REVISION	BY	DATE
3	AS BUILT	JRC	12-72
②	Scupper Location	J.G.V.	3/9/71
⚠	Elim. Disposal Area Add Foot Path	E.V.R.	2/20/71

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

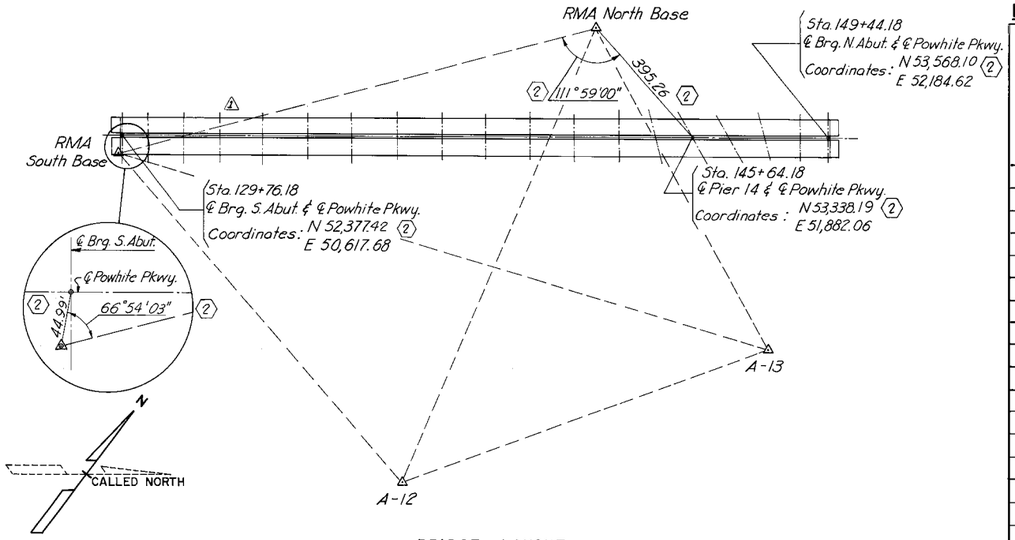
JAMES RIVER BRIDGE

GENERAL PLAN AND ELEVATION

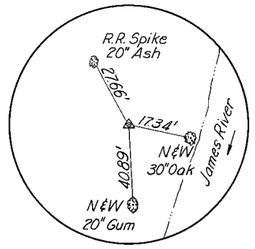
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1" = 50'
CONTRACT NO.: C-3
SHEET NO. 3 OF 53

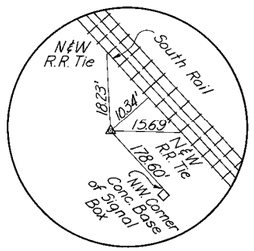
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	4	53



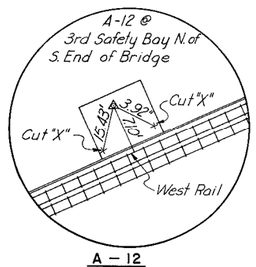
BRIDGE LAYOUT



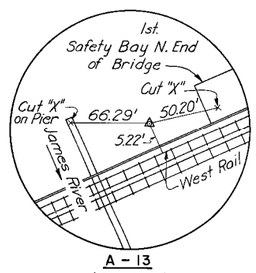
RMA SOUTH BASE
(Conc. Post w/ copper weld rod)
Elevation : 89.91
Coordinates : N 52,338.08
E 50,639.50



RMA NORTH BASE
(Conc. Post w/ copper weld rod)
Elevation : 103.89
Coordinates : N 53,446.49
E 51,501.93



A – 12
(5/8" Plug)
Elevation : 174.45
Coordinates : N 51,816.04
E 52,055.56



A – 13
(5/8" Plug)
Elevation : 174.20
Coordinates : N 52,797.35
E 52,600.49

ESTIMATE OF QUANTITIES (4)

	Struct. Excav. of Piers 10 To 13 Incl.	Struct. Excav. Except Piers 10 To 13 Incl.	Porous Backfill	Steel Sheet Piling (Left In Place)	Steel Piles 10BP42	Steel Piles 12BP53	Concrete Class A3 Substructure	Concrete Class A3 Appr. Slabs	Concrete Class A4	Concrete Class T3	Reinforcing Steel	Structural Steel	Aluminum Bridge Railing	Dampproofing	6" Pipe Underdrain	(4)	Rock Facing Slope Protect. 6" Thick	Water Borings & Cased Holes Incl. Sampling	NX Core Borings In Rock	(4)
	C.Y.	C.Y.	C.Y.	S.F.	L.F.	L.F.	C.Y.	C.Y.	C.Y.	C.Y.	Lbs.	Lbs.	L.F.	S.Y.	L.F.		S.Y.	L.F.	L.F.	
Superstructure									60598 (4)		1,345,522 (4)	6,310,579 (4)	7965 (4)							
South Abutment		624	48		1520.8		295.0				13465			142	133		170			
North Abutment		608	48		3226.0		286.7				13465			144	136		844			
Pier 1		323 (4)					270.9 (4)				44586 (4)									(4)
Pier 2		358 (4)					262.6 (4)				44586 (4)									(4)
Pier 3		123 (4)					274.5 (4)				44434 (4)									(4)
Pier 4		97 (4)					311.8 (4)				44435 (4)									(4)
Pier 5		156 (4)					324.2 (4)				44434 (4)									(4)
Pier 6		132 (4)					293.1 (4)				44435 (4)									(4)
Pier 7		133					341.8				44434									
Pier 8		105					328.4				44435									
Pier 9		154					318.3				44434									
Pier 10	245						382.7			51.0	56790							1.2	38.5	
Pier 11	705						547.5				74957							12.5	114.6	
Pier 12	842						575.5				75469							47.6	41.4	
Pier 13	886						596.8			28.5	89317							18.7	40.0	
Pier 14		845		1469			448.2			61.2	78522									
Pier 15		946		1494			483.3			25.0	78522									
Pier 16		656		2260		1465.7	370.8			156.7	46374									
Pier 17		478		2197		2048.8	353.0			151.3	43678									
Approach Slabs								238.6			51461									
		(4)					(4)		(4)		(4)	(4)	(4)							
TOTAL	2678	5,808	96	7920	5049.8	3514.5	7075.1	238.6	60598	473.7	2,361,755	6,310,579	7,965	286	269		1014	80	234.5	(4)

GENERAL NOTES:

ROADWAY — Twin Roadways 43'-0" clear.

CAPACITY — Dead Load-Includes 15 lbs. per sq. ft. for future wearing surface.
Live Loads-HS20-44 loading and B.P.R. Modified Loading for Military Vehicles.

SPECIFICATIONS — GENERAL - Virginia Department of Highway Road and Bridge Specifications, 1970.
DESIGN - A.A.S.H.O. Standard Specifications for Highway Bridges, 1961, modified by Special Design Provisions.
WELDING - 1969 Standard Specifications for Welded Highway and Railway Bridges of the American Welding Society.
ELECTRICAL - National Electrical Code, National Electrical Safety Code.

CONTRACT SPECIAL PROVISIONS

Specifications and Contract Special Provisions referred to above are necessary to make these plans complete.

DATUM — CITY OF RICHMOND

TEMPERATURE — The normal temperature referred to on the plans is 68°F. The temperature range for movement is 0°F to 120°F.

DIMENSIONS — All dimensions are measured horizontally and vertically unless otherwise noted.

FOUNDATIONS — All footing concrete shall be placed in the dry except where Class T3 Concrete is indicated on the plans or approved by the Engineer. Special attention is called to Sections 401.04 and 401.05 of the General Specifications, and to the Contract Special Provisions, concerning preparation of foundations for footings.

Because of the erratic nature of ground conditions at the site, elevations of the bottoms of the footings shown on the plans shall be considered approximate only. Should excavations at the time of construction reveal the foundations to be inadequate, redesign may be required.

CONCRETE NOTES — Concrete in superstructure shall be Class A4. All other concrete (except tremie seal concrete) shall be Class A3. All exposed edges and corners shall have a ¾" chamfer or fillet unless otherwise noted. Care in the method of vibration, the use of low-slump concrete, and/or other means shall be employed to prevent downgrade movement of newly placed slab concrete when the gradient is over 2%.

All reinforcing steel shall conform to A.S.T.M. A-615, Grade 40. reinforcing bar dimensions on the detailed drawings are to centers of bars unless otherwise noted. Clear distance between reinforcing steel and face of concrete shall be as noted on the plans. All bar laps shall be as shown on the plans.

STEEL NOTES — Structural steel shall conform to A.S.T.M. Specification A36 except as noted.

All field connections shall be made with ⅞" diameter high strength bolts unless otherwise noted. Bolts shall conform to A.S.T.M. Specification A-325.

	BY	DATE				
			(3)	As Built	JRC	12-72
MADE	HBW	11-67	(2)	Bridge Layout	H.B.W	4/5/71
CHECKED	FXH	2-68	(1)	Quantities & Ramp Widening	H.B.W. RB	2/20/71
IN CHARGE	FXH		NO.	REVISION	BY	DATE

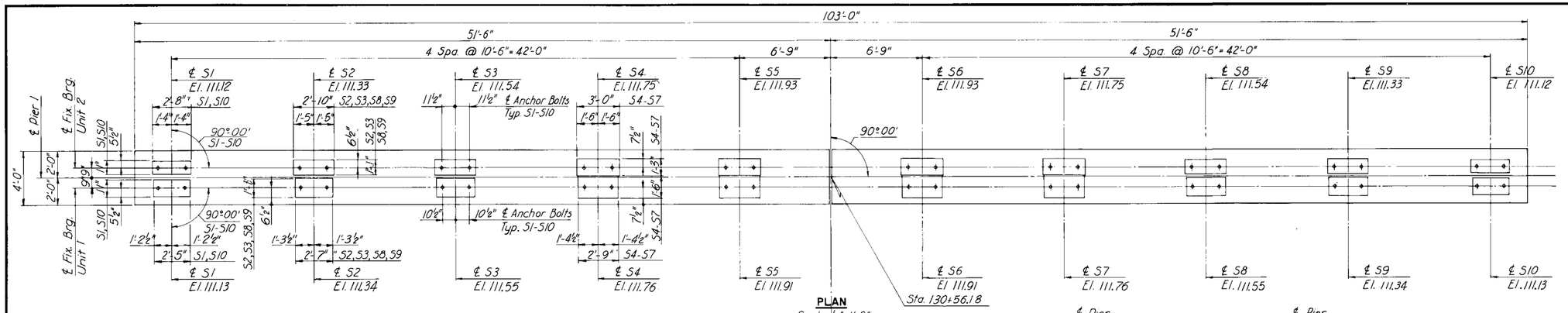
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

JAMES RIVER BRIDGE
BRIDGE LAYOUT
GENERAL NOTES
ESTIMATE OF QUANTITIES

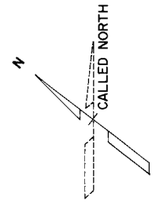
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

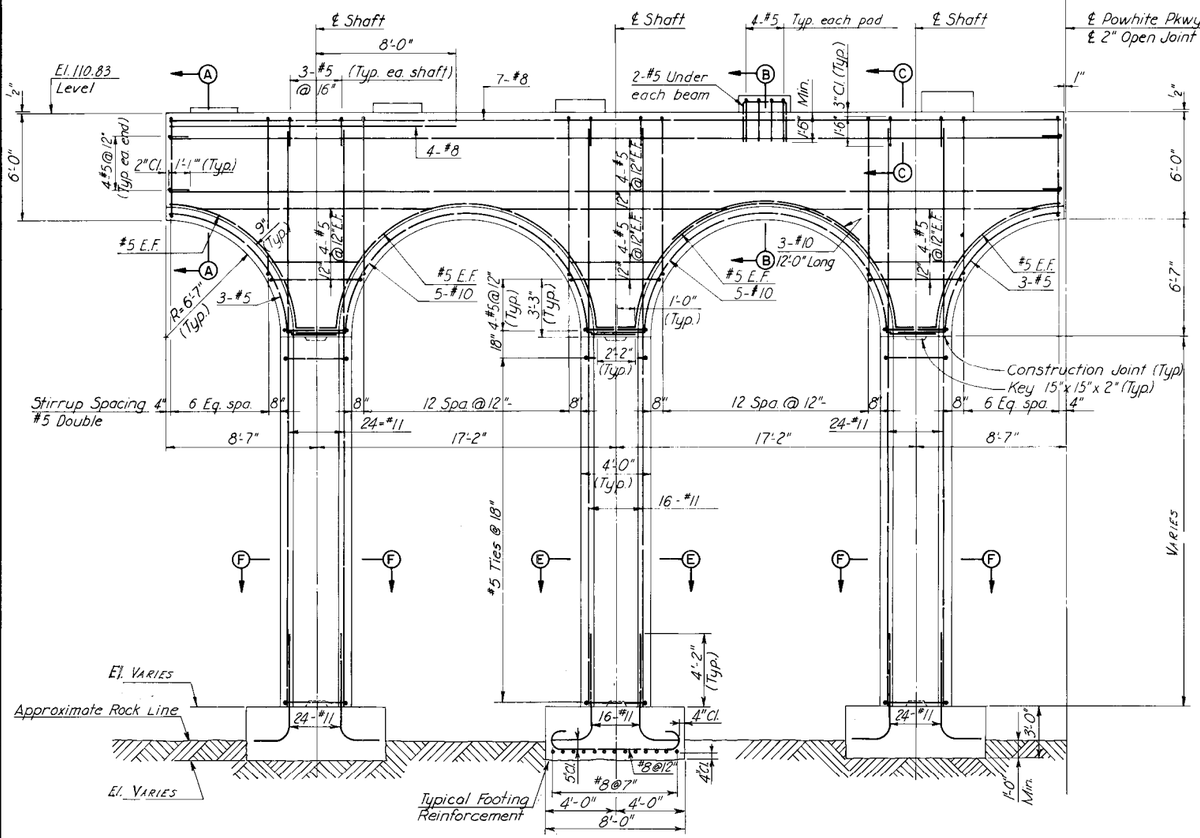
SCALE: NO SCALE
CONTRACT NO: C-3
SHEET NO. 4 OF 53

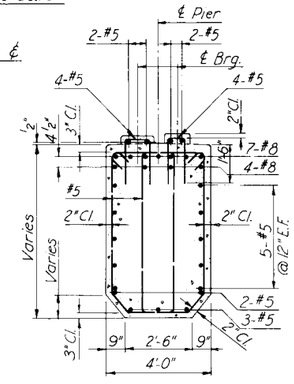
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	9	53



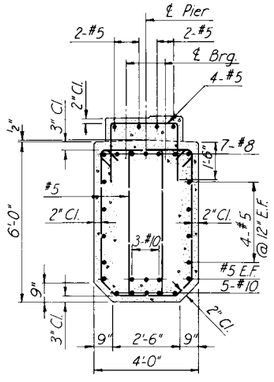
PLAN
Scale: 1/4"=1'-0"



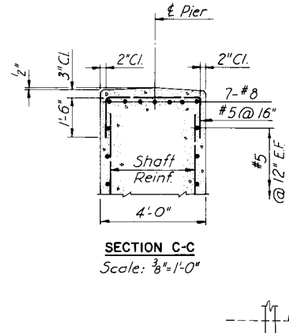




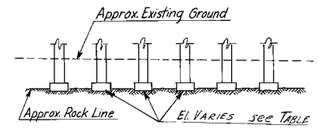
SECTION A-A
Scale: 3/8"=1'-0"



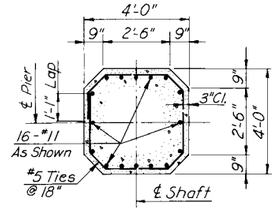
SECTION B-B
Scale: 3/8"=1'-0"



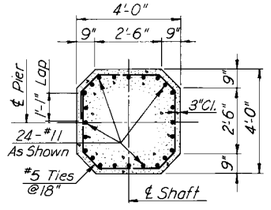
SECTION C-C
Scale: 3/8"=1'-0"



ELEVATION
Scale: 1"=30'-0"



SECTION E-E
Scale: 3/8"=1'-0"



SECTION F-F
Scale: 3/8"=1'-0"

NOTES

AS BUILT

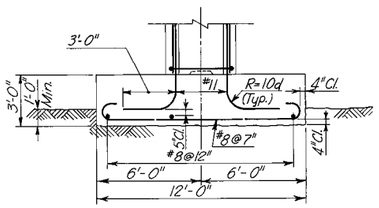
Pier foundations are designed for an allowable bearing pressure of 7 Tons/S.F.

FOOTING NO.	TOP ELEV.	AVE. BOTTOM ELEV.	STEM LENGTH
1 L W	80.36	76.46	17.89
1 C W	79.32	75.58	18.93
1 R W	78.55	75.12	19.70
1 L E	79.43	74.95	18.82
1 C E	80.28	76.59	17.97
1 R E	80.88	77.04	17.37

1 = Pier No.
L-C-R = Left - Center - Right
W-E = West - East

HALF ELEVATION
Scale: 1/4"=1'-0"

Note:
Pier symmetrical about ℄ Powhite Pkwy.



FOOTING END VIEW
Scale: 1/4"=1'-0"

	BY	DATE				
MADE	L.B.P.	7-67	2	AS BUILT	JRC	12-72
CHECKED	FXH	2-68	1	Complete	J.G.V.	2-2071
IN CHARGE	FXH		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

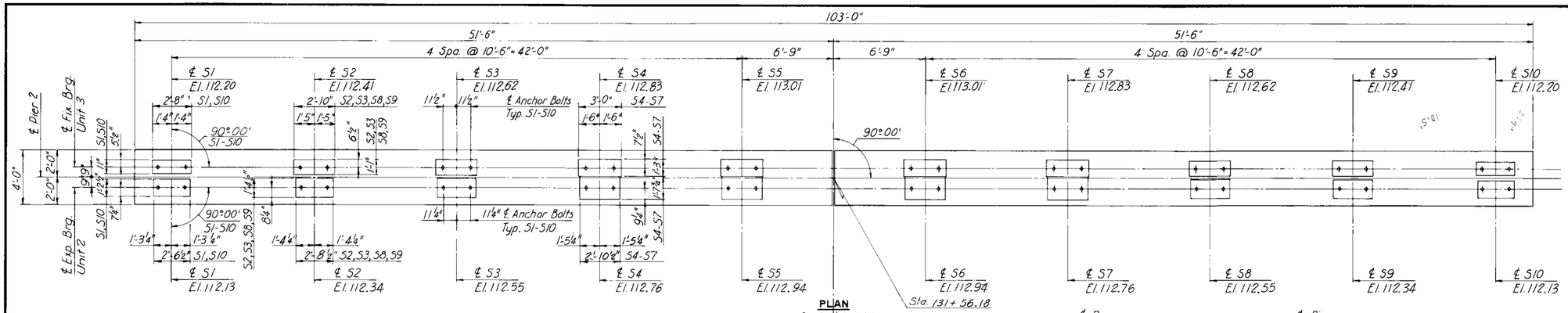
JAMES RIVER BRIDGE

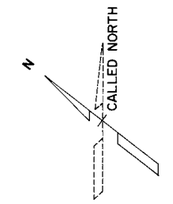
PIER 1

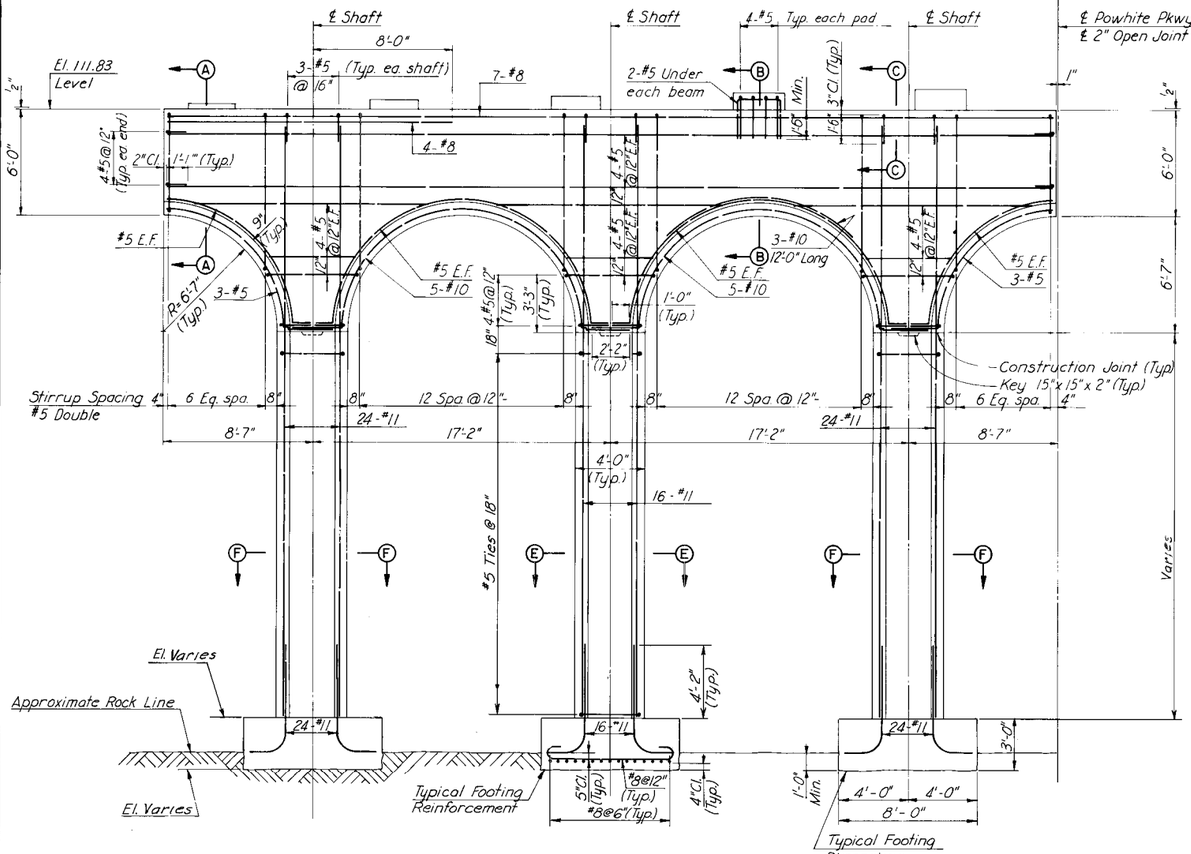
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: C-3
SHEET NO. 9 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	10	53



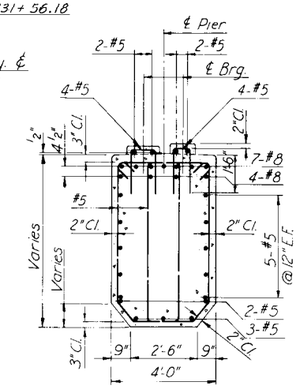




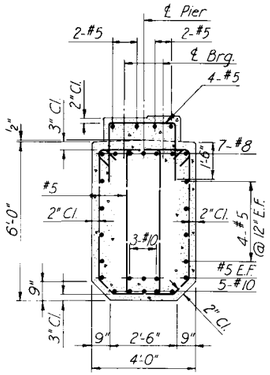
HALF ELEVATION
Scale: ¼"=1'-0"

Note:
Pier symmetrical about ℄ Powhite Pkwy.

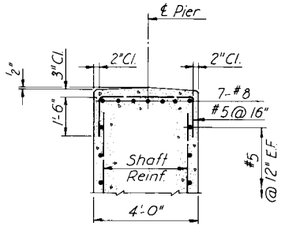
FOOTING NO.	TOP ELEV.	AVE. BOTTOM ELEV.	STEM LENGTH
2 LW	82.81	78.95	16.44
2 CW	84.21	80.62	15.04
2 RW	81.24	77.77	18.01
2 LE	81.81	78.30	17.44
2 CE	81.17	77.33	18.08
2 RE	80.36	76.84	18.89



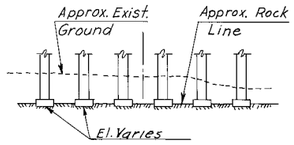
SECTION A-A
Scale: ⅜"=1'-0"



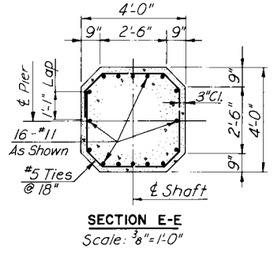
SECTION B-B
Scale: ⅜"=1'-0"



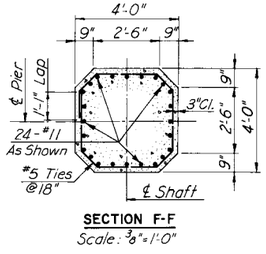
SECTION C-C
Scale: ⅜"=1'-0"



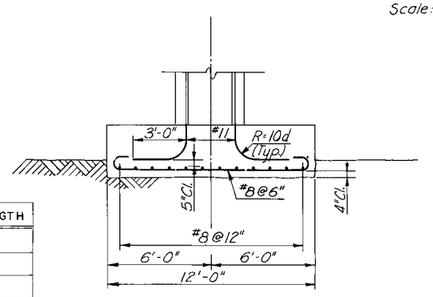
ELEVATION
Scale: 1"=30'-0"



SECTION E-E
Scale: ⅜"=1'-0"



SECTION F-F
Scale: ⅜"=1'-0"



FOOTING END VIEW
Scale: ¼"=1'-0"

NOTES:

Pier foundations are designed for an allowable bearing pressure of 10 Tons/S.F.

	BY	DATE				
MADE	L.B.P.	7-67	2	AS BUILT	JRC	12-72
CHECKED	FXH	2-68	1	Complete	H.B.W.	2/20/71
IN CHARGE	FXH		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

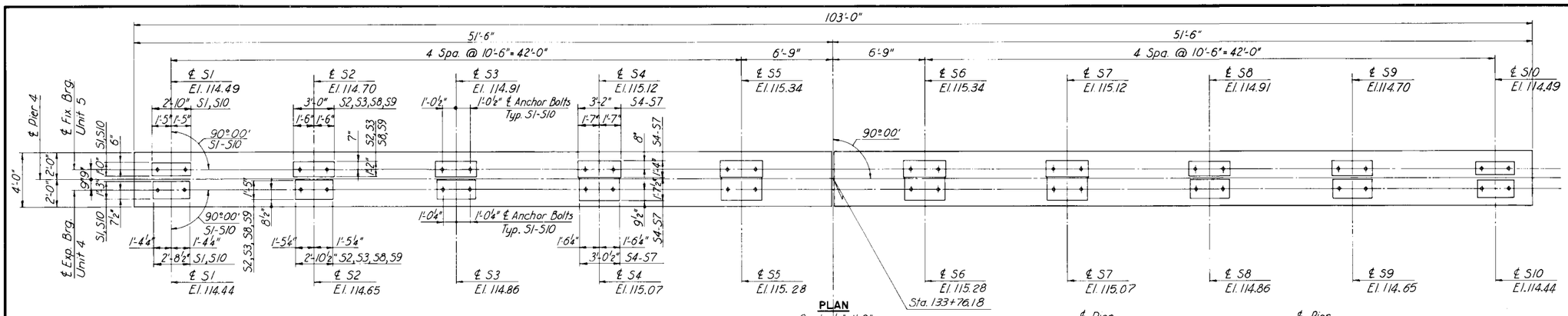
JAMES RIVER BRIDGE

PIER 2

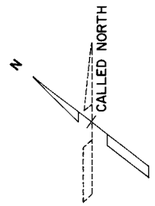
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

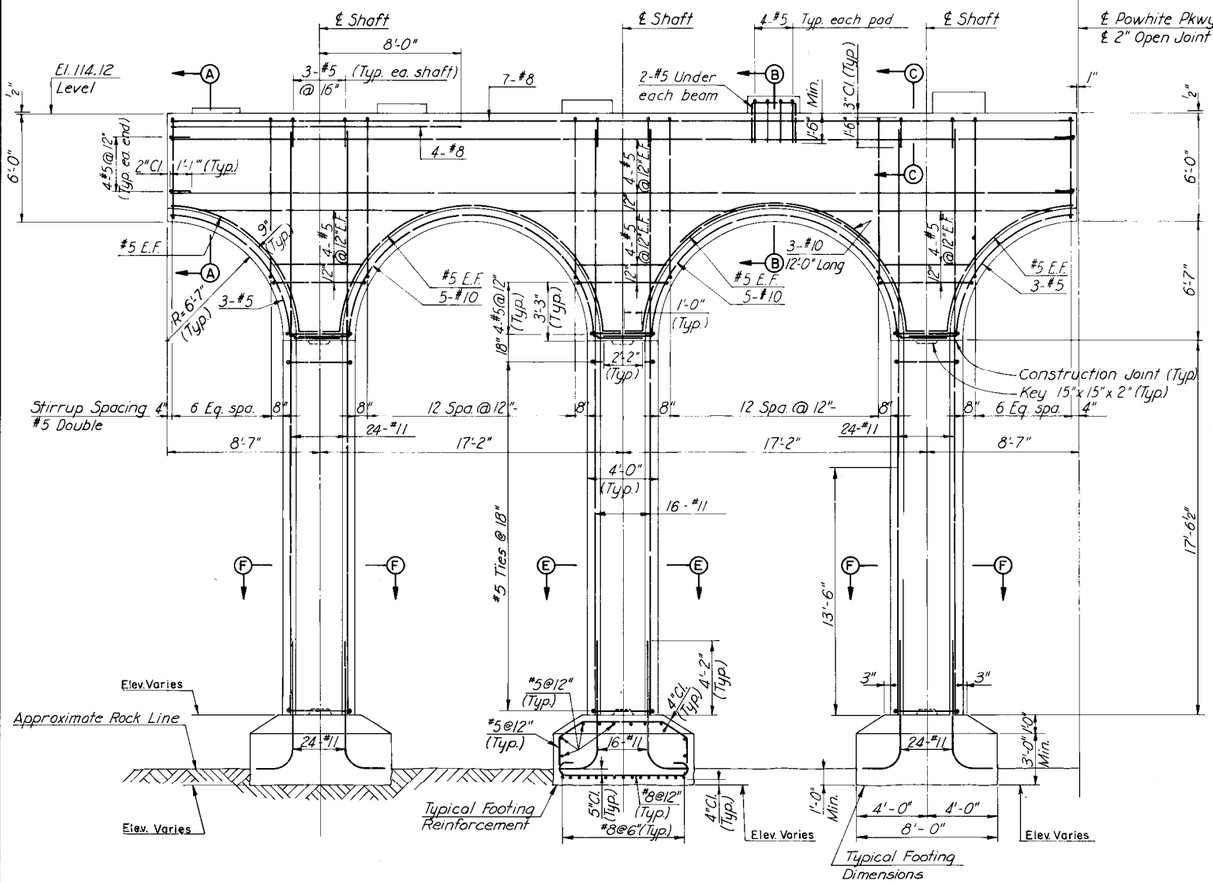
SCALE: AS SHOWN
CONTRACT NO.: C-3
SHEET NO. 10 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	13	53



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

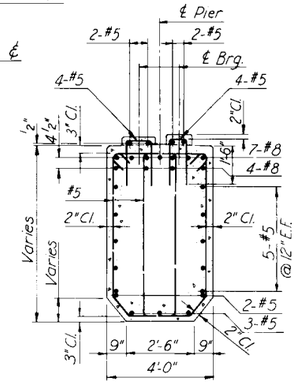




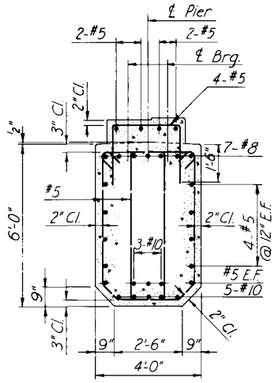
HALF ELEVATION
Scale: 1/4"=1'-0"

Note:
Pier symmetrical about ℄ Powhite Pkwy. except for bottom of Footing Elevations.

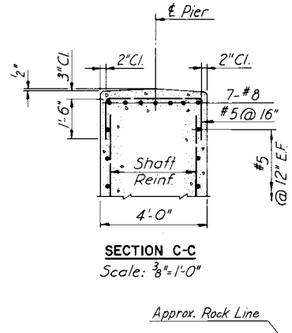
FOOTING NO.	AVE. BOTTOM ELEV.
4 L W	77.83
4 C W	77.24
4 R W	77.57
4 L E	77.86
4 C E	77.79
4 R E	77.93



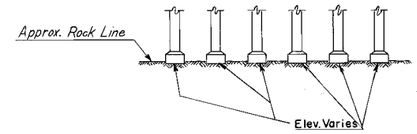
SECTION A-A
Scale: 3/8"=1'-0"



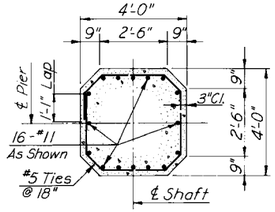
SECTION B-B
Scale: 3/8"=1'-0"



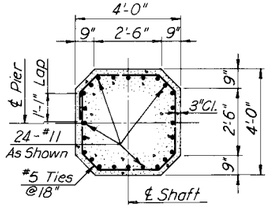
SECTION C-C
Scale: 3/8"=1'-0"



ELEVATION
Scale: 1"=30'-0"



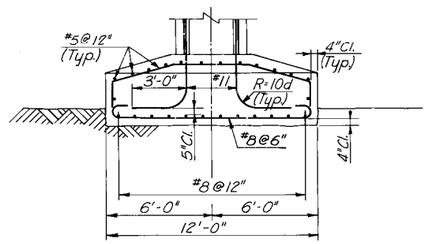
SECTION E-E
Scale: 3/8"=1'-0"



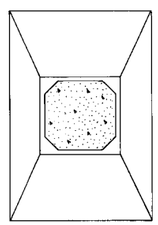
SECTION F-F
Scale: 3/8"=1'-0"

AS BUILT

NOTES:



FOOTING END VIEW
Scale: 1/4"=1'-0"



FOOTING PLAN
Scale: 1/4"=1'-0"

Pier foundations are designed for an allowable bearing pressure of 10 Tons/S.F.

	BY	DATE				
MADE	L.B.P.	7-67	2	AS BUILT	JRC	12-72
CHECKED	FXH	2-68	1	Complete	J.G.V.	2-20-71
IN CHARGE	FXH		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

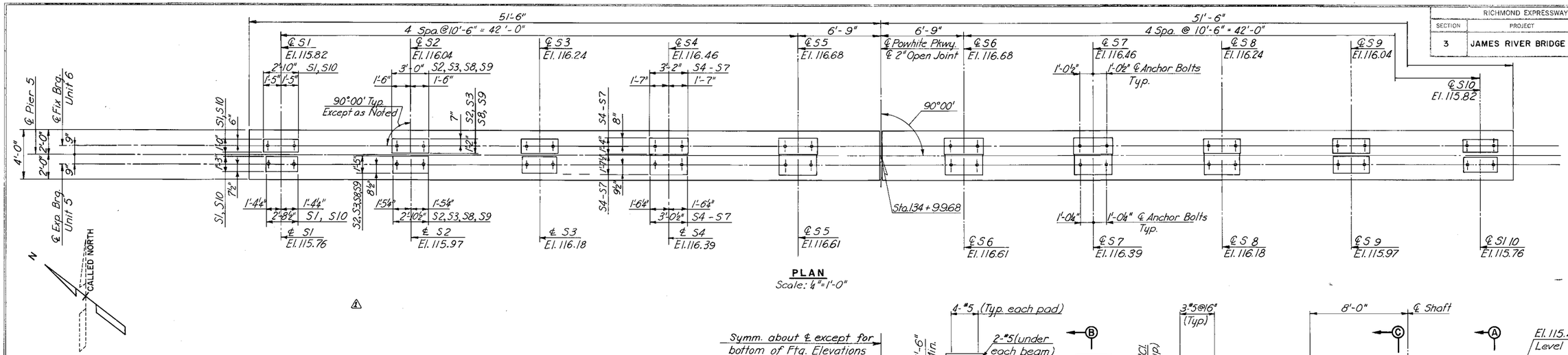
JAMES RIVER BRIDGE

PIER 4

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

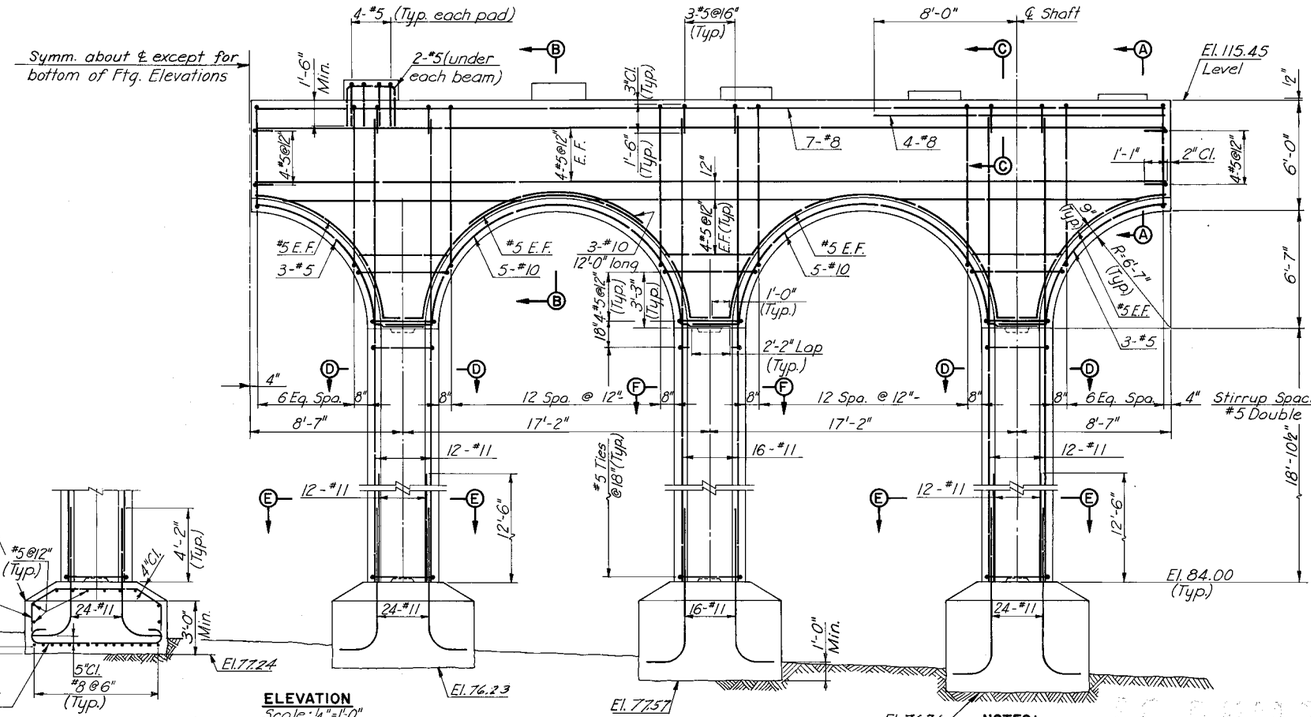
SCALE: AS SHOWN
CONTRACT NO.: C-3
SHEET NO. 13 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	15	53



PLAN
Scale: ¼"=1'-0"

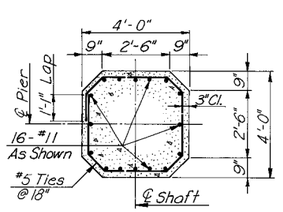
FOOTING NO.	AVE. BOTTOM ELEV.
5 L W	78.56
5 C W	77.78
5 R W	77.24
5 L E	76.23
5 C E	77.57
5 R E	76.71



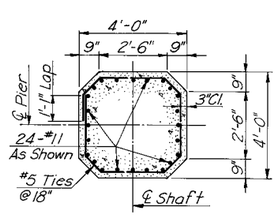
ELEVATION
Scale: ¼"=1'-0"

NOTES:

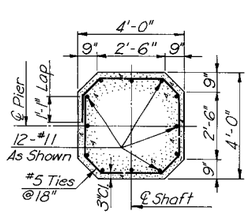
Pier foundations are designed for an allowable bearing pressure of 10 Tons/S.F.



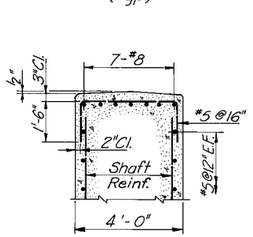
SECTION F-F
Scale: ⅜"=1'-0"



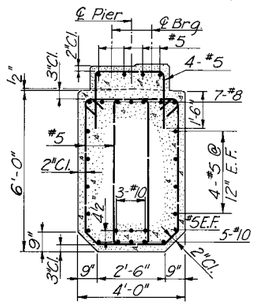
SECTION E-E
Scale: ⅜"=1'-0"



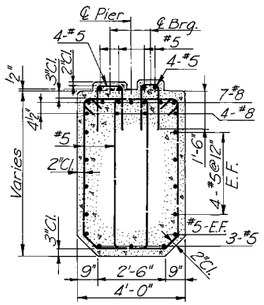
SECTION D-D
Scale: ⅜"=1'-0"



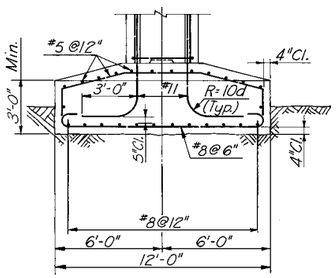
SECTION C-C
Scale: ⅜"=1'-0"



SECTION B-B
Scale: ⅜"=1'-0"



SECTION A-A
Scale: ⅜"=1'-0"



FOOTING END VIEW
Scale: 4"=1'-0"

	BY	DATE				
MADE	HBW	11-67	2	AS BUILT	JRC	12-72
CHECKED	FXH	2-68	⚠	Pier made Symm. about ℄	E.R.	2/20/71
IN CHARGE	FXH		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

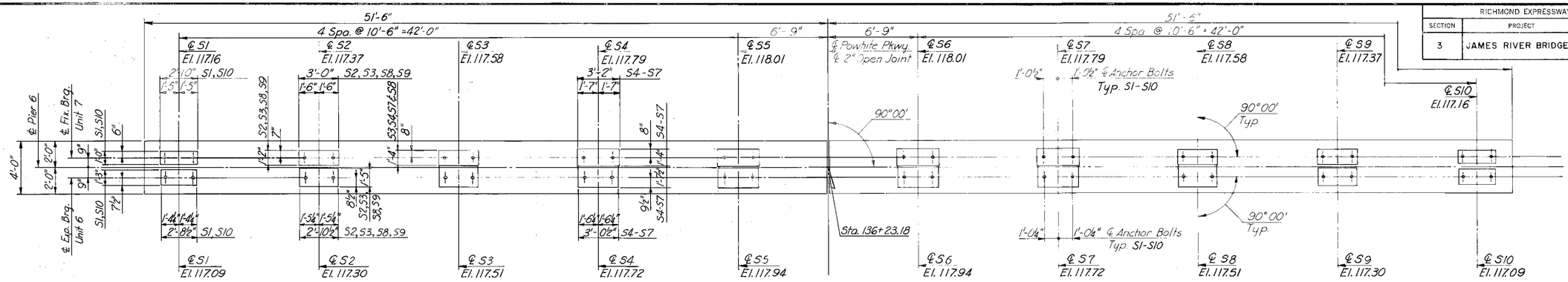
JAMES RIVER BRIDGE

PIER 5

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO. C-3
SHEET NO. 15 OF 53

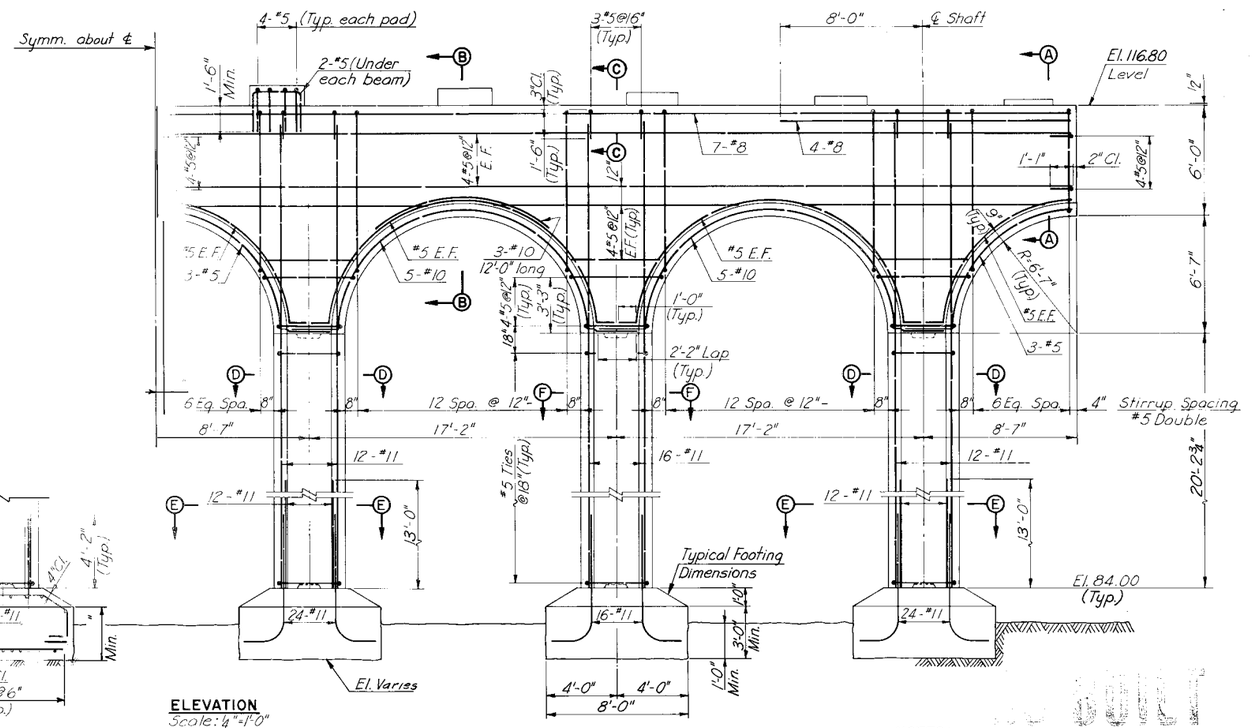
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	16	53



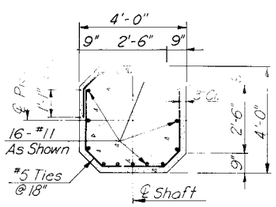
PLAN
Scale: 1" = 1'-0"

FOOTING NO.	AVE. BOTTOM ELEV.
6 L W	79.30
6 C W	79.05
6 R W	79.90
6 L E	79.02
6 C E	78.36
6 R E	78.36

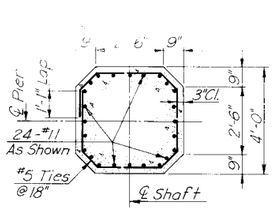
⚠



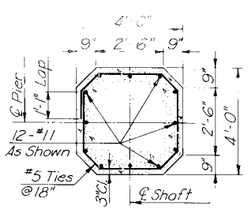
ELEVATION
Scale: 1" = 1'-0"



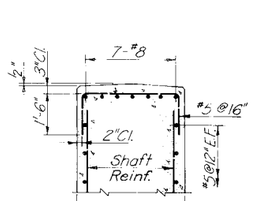
SECTION F-F
Scale: 3/8" = 1'-0"



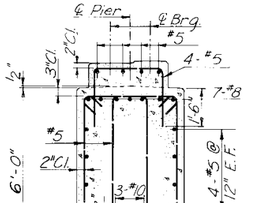
SECTION E-E
Scale: 3/8" = 1'-0"



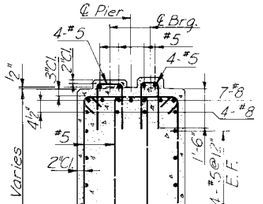
SECTION D-D
Scale: 3/8" = 1'-0"



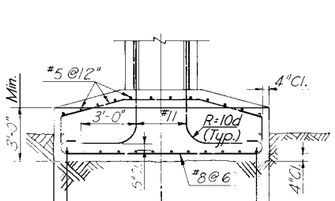
SECTION C-C
Scale: 3/8" = 1'-0"



SECTION B-B
Scale: 3/8" = 1'-0"



SECTION A-A
Scale: 3/8" = 1'-0"



FOOTING END VIEW
Scale: 1" = 1'-0"

	BY	DATE				
MADE	HBW	11-67	2	AS BUILT	JRC	12-72
CHECKED	FXH	2-68	⚠	Pier Symm. about ℄	J.G.V.	2-20-71
IN CHARGE	FXH		NO.	REVISION	BY	DATE

NOTES:

Pier foundations are designed for an allowable bearing pressure of 10 Tons/S.F.

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

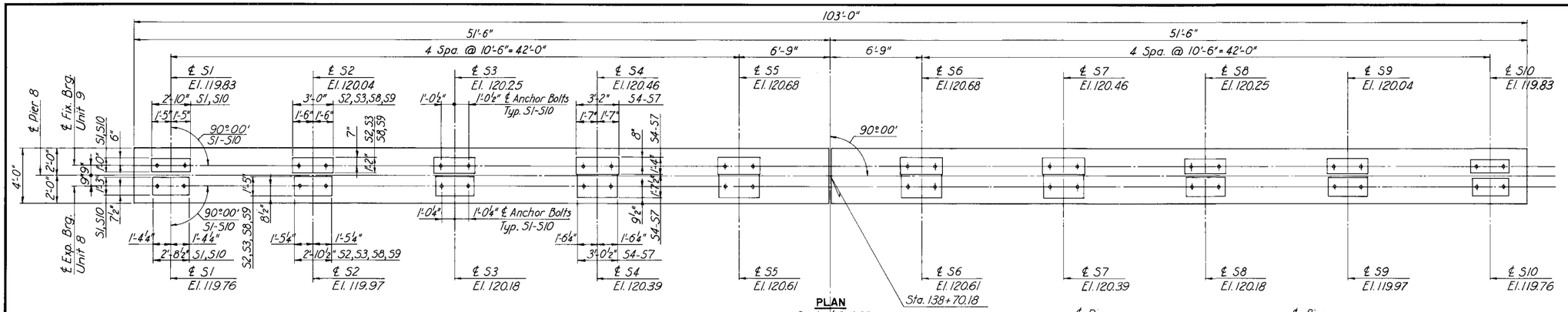
JAMES RIVER BRIDGE

PIER 6

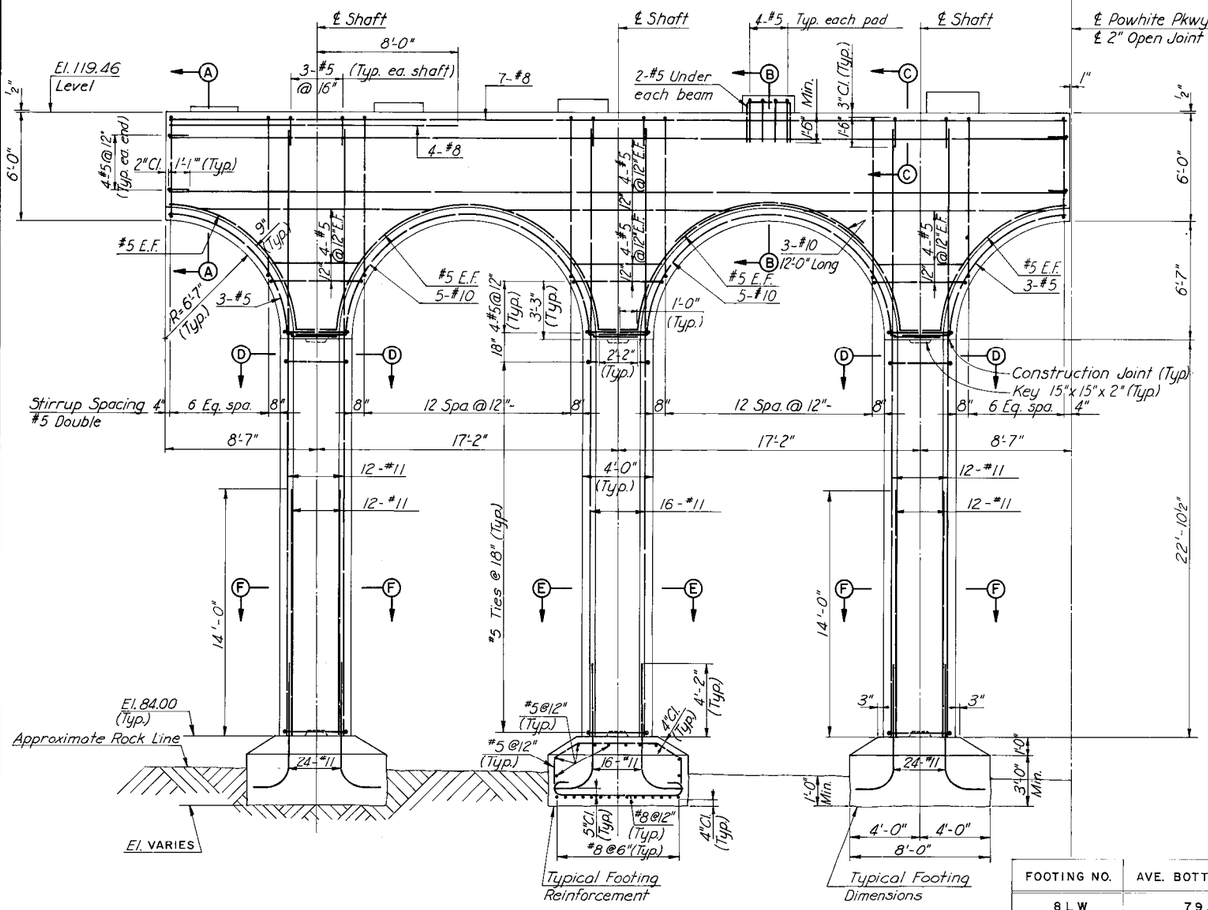
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO. C-3
SHEET NO. 16 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	18	53



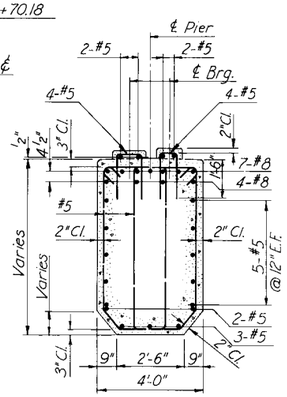
PLAN
Scale: 1/4"=1'-0"



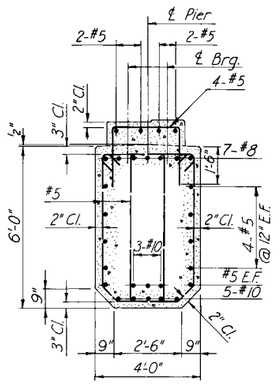
HALF ELEVATION
Scale: 1/4"=1'-0"

Note:
Pier symmetrical about ℄ Powhite Pkwy.

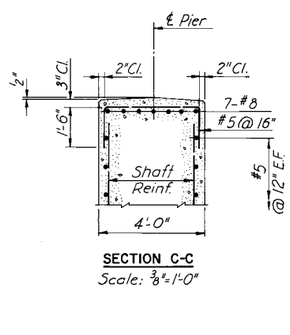
FOOTING NO.	AVE. BOTTOM ELEV.
8LW	79.3
8CW	78.4
8RW	78.3
8LE	76.8
8CE	76.7
8RE	74.4



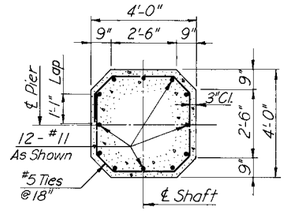
SECTION A-A
Scale: 3/8"=1'-0"



SECTION B-B
Scale: 3/8"=1'-0"



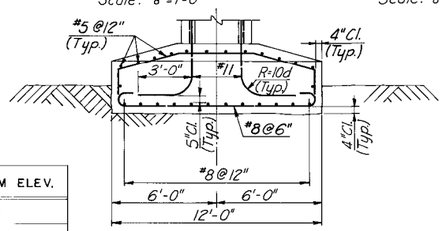
SECTION C-C
Scale: 3/8"=1'-0"



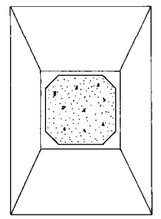
SECTION D-D
Scale: 3/8"=1'-0"

SECTION E-E
Scale: 3/8"=1'-0"

SECTION F-F
Scale: 3/8"=1'-0"



FOOTING END VIEW
Scale: 1/4"=1'-0"



FOOTING PLAN
Scale: 1/4"=1'-0"

NOTES:

Pier foundations are designed for an allowable bearing pressure of 10 Tons/S.F.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	HBW	7-67				
CHECKED	FXH	2-68	1	AS BUILT	JRC	12-72
IN CHARGE	FXH					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

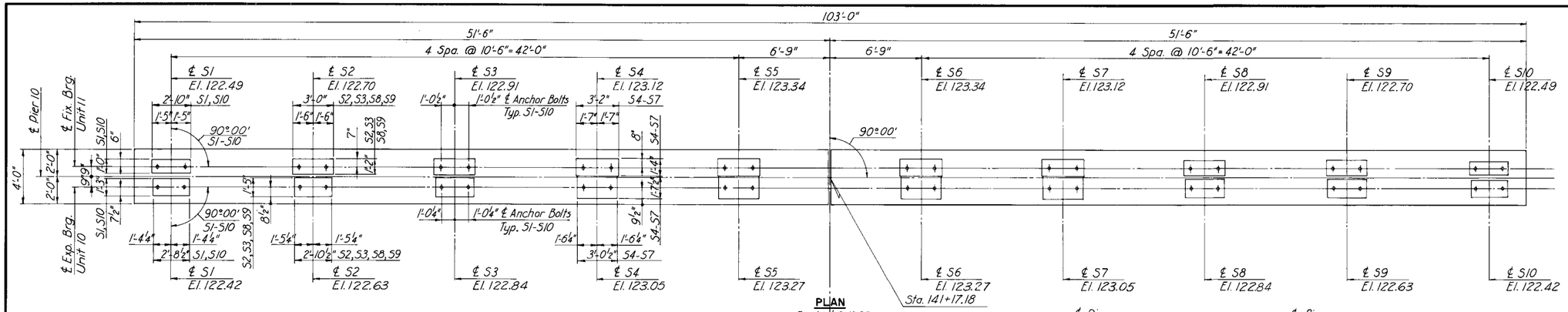
JAMES RIVER BRIDGE

PIER 8

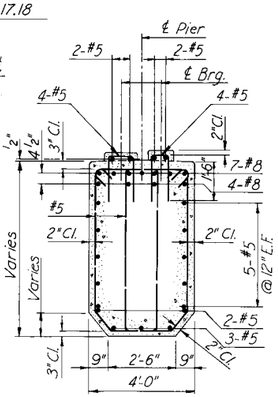
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: C-3
SHEET NO. 18 OF 53

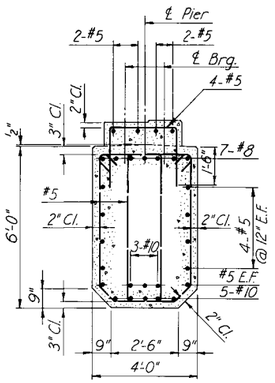
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	20	53



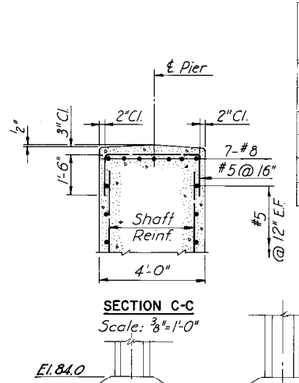
PLAN
Scale: 1/4"=1'-0"



SECTION A-A
Scale: 3/8"=1'-0"

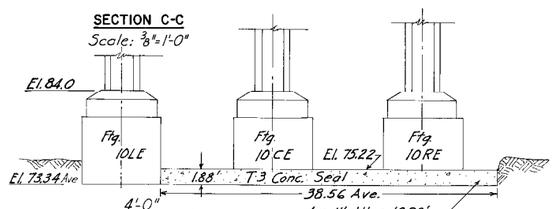


SECTION B-B
Scale: 3/8"=1'-0"

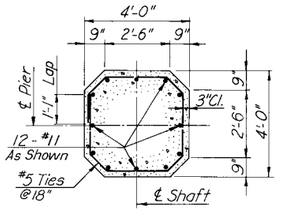


SECTION C-C
Scale: 3/8"=1'-0"

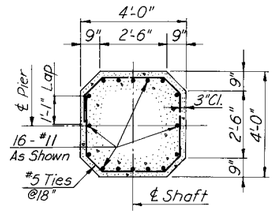
FOOTING NO.	AVE. BOTTOM ELEV.
10 L W	77.78
10 C W	76.95
10 R W	76.24
10 L E	73.34
10 C E	See Below
10 R E	" "



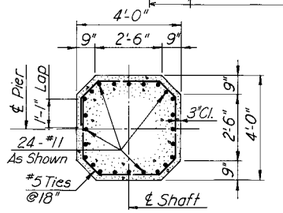
FOOTING EAST SIDE ONLY
Scale 1/8" = 1'



SECTION D-D
Scale: 3/8"=1'-0"

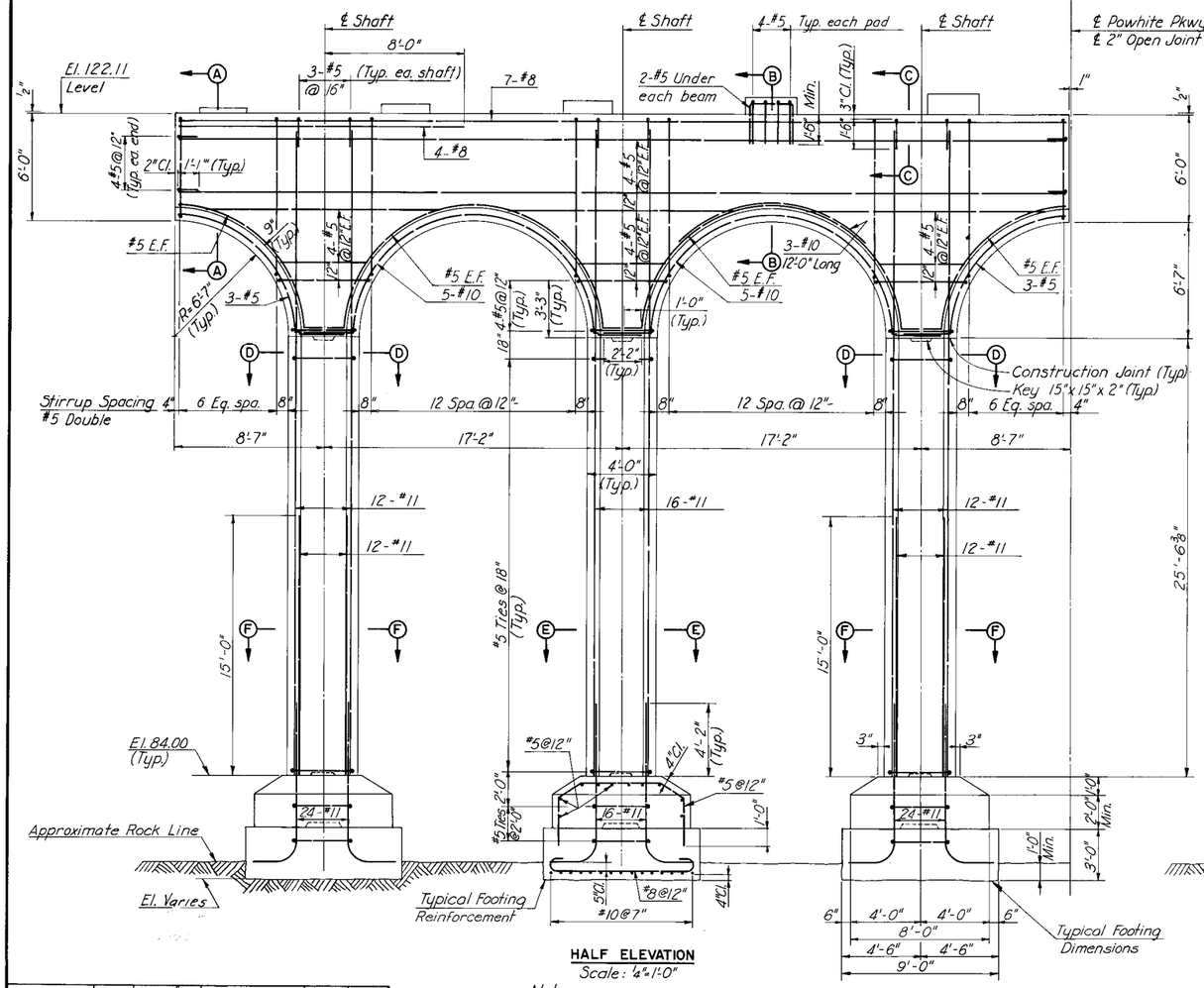


SECTION E-E
Scale: 3/8"=1'-0"



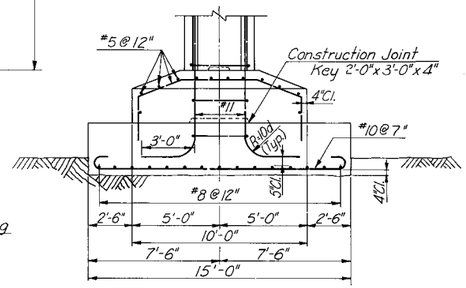
SECTION F-F
Scale: 3/8"=1'-0"

AS BUILT

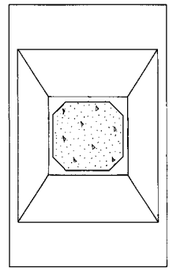


HALF ELEVATION
Scale: 1/4"=1'-0"

Note:
Pier symmetrical about ℄ Powhite Pkwy.



FOOTING END VIEW
Scale: 1/4"=1'-0"



FOOTING PLAN
Scale: 1/4"=1'-0"

NOTES:

Pier foundations are designed for an allowable bearing pressure of 5 Tons/S.F.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	HBW	7-67				
CHECKED	FXH	2-68	1	AS BUILT	JRC	12-72
IN CHARGE	FXH					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

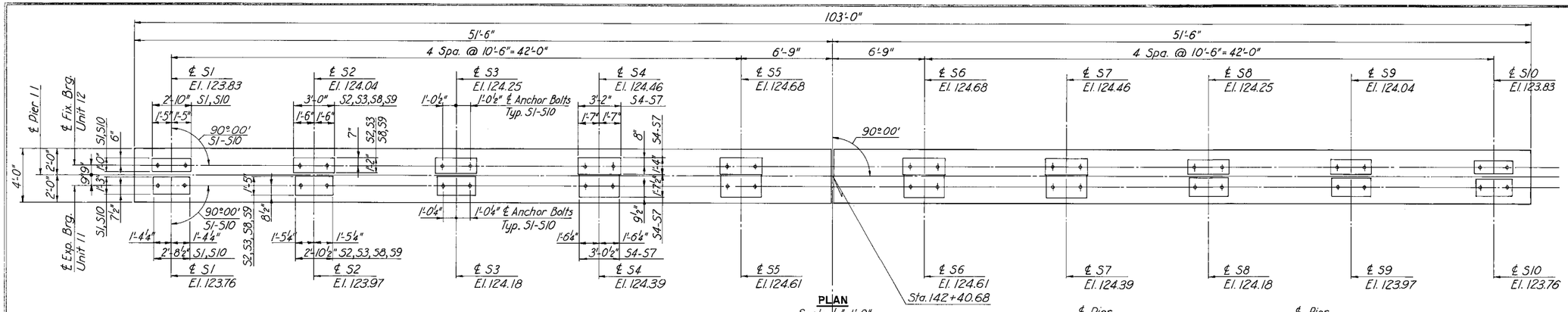
JAMES RIVER BRIDGE

PIER 10

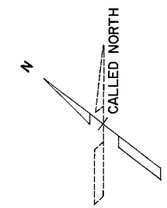
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

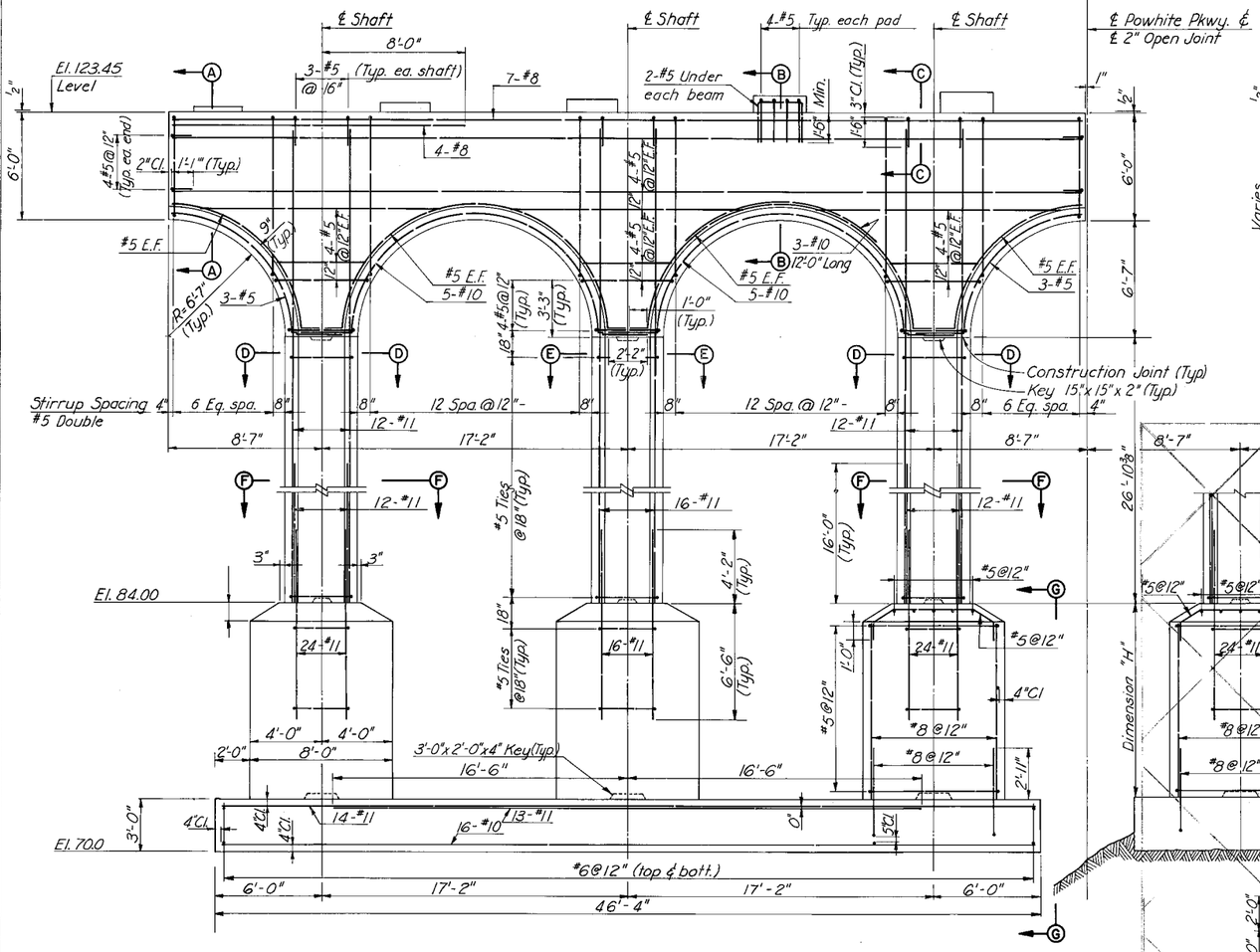
SCALE: AS SHOWN
CONTRACT NO.: C-3
SHEET NO. 20 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	21	53

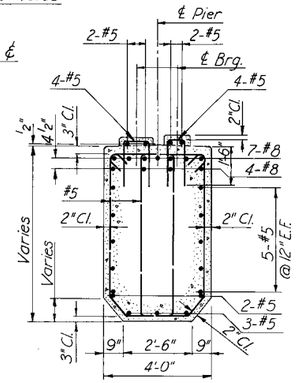


PLAN
Scale: 1/4"=1'-0"

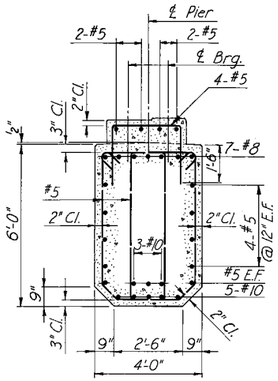




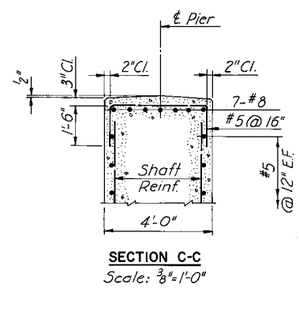
ELEVATION
Scale: 1/4"=1'-0"



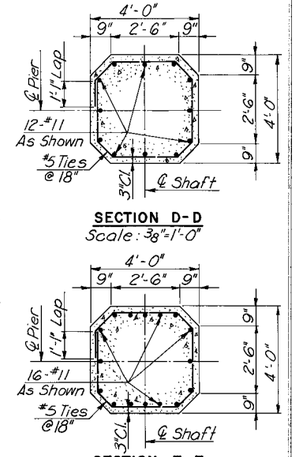
SECTION A-A
Scale: 3/8"=1'-0"



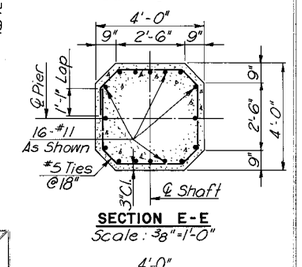
SECTION B-B
Scale: 3/8"=1'-0"



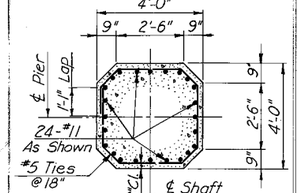
SECTION C-C
Scale: 3/8"=1'-0"



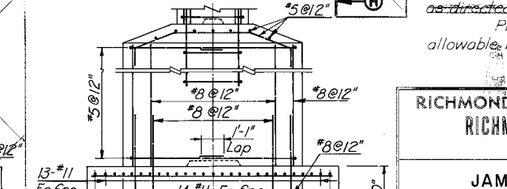
SECTION D-D
Scale: 3/8"=1'-0"



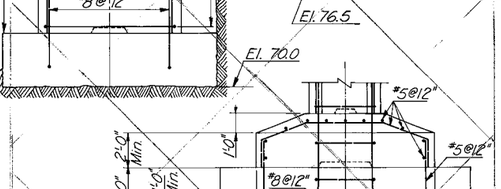
SECTION E-E
Scale: 3/8"=1'-0"



SECTION F-F
Scale: 3/8"=1'-0"



VIEW G-G
Scale: 1/4"=1'-0"



VIEW H-H
Scale: 1/4"=1'-0"

NOTES:
~~Foundation elevations are approximate only and may be varied to suit field conditions as directed by the Engineer.~~
Pier foundations are designed for an allowable bearing pressure of 3.5 Tons/S.F.

Note:
Pier symmetrical about ℄ Powhite Pkwy. except as shown.

	BY	DATE				
MADE	L.B.P.	7-67	2	AS BUILT	JRC	12-72
CHECKED	F.X.H.	2-68	1	Elim. Sheet Pilg. & Ftg	JRC	9-3-71
IN CHARGE	F.X.H.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

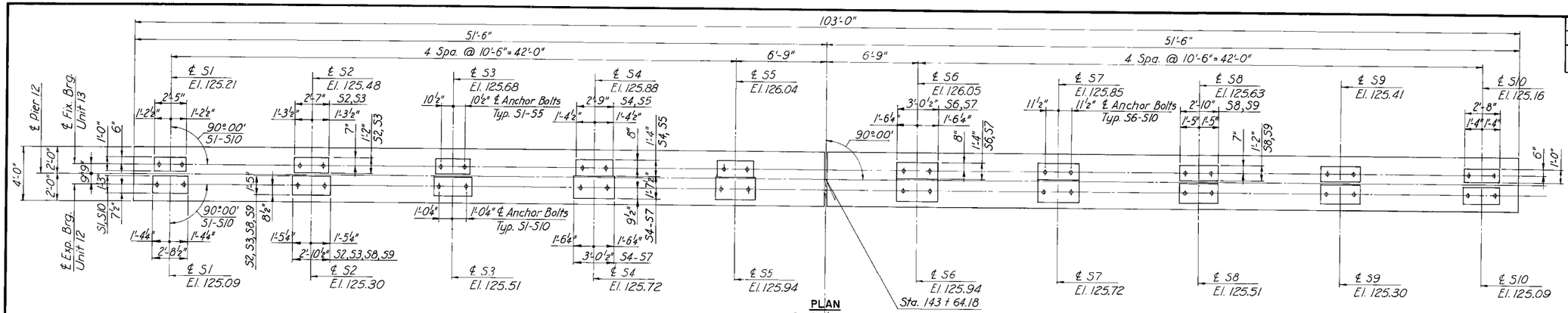
JAMES RIVER BRIDGE

PIER 11

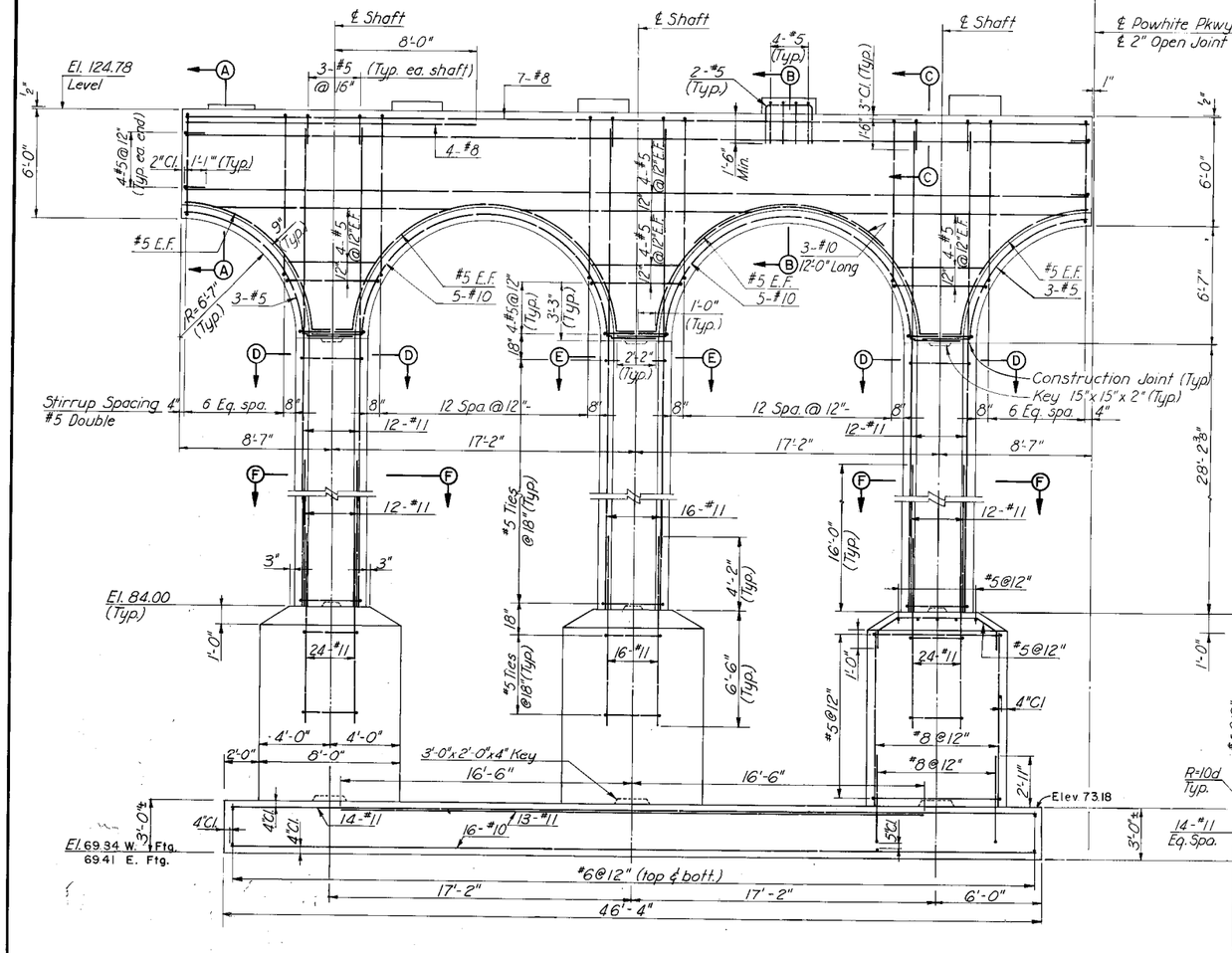
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

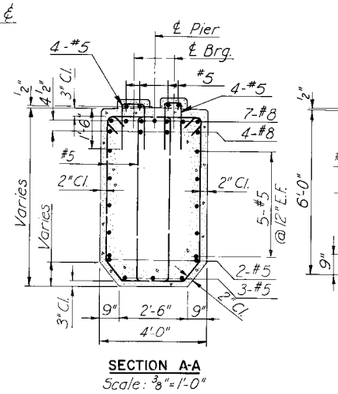
SCALE: AS SHOWN
CONTRACT NO. C-3
SHEET NO. 21 OF 53

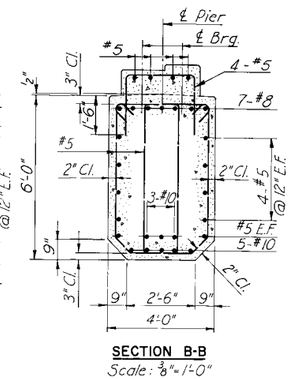
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	22	53

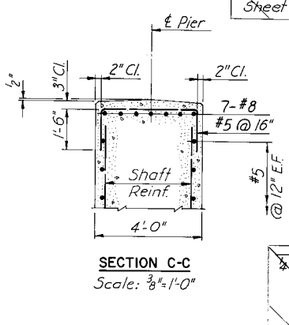


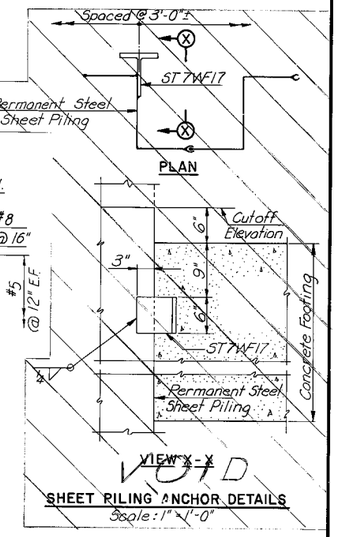
PLAN
Scale: 1/4"=1'-0"

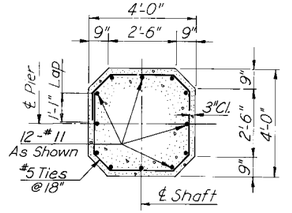


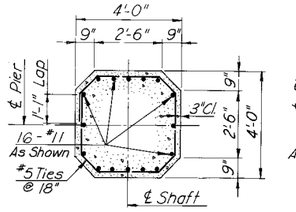


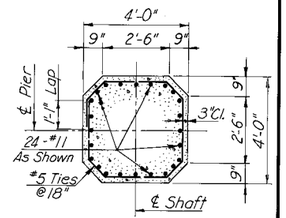


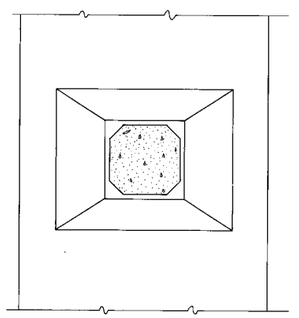


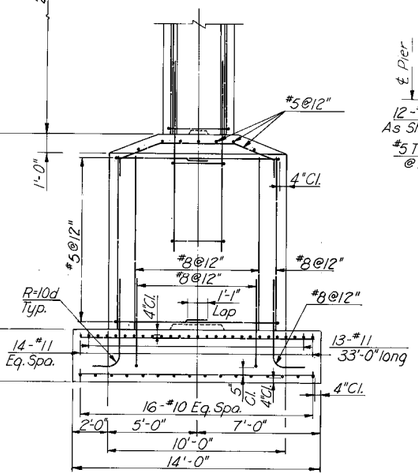









PART FOOTING PLAN
Scale: 1/4"=1'-0"



NOTES:

AS BUILT

Pier foundations are designed for an allowable bearing pressure of 3½ Tons/S.F.

	BY	DATE				
MADE	HBW	7-67				
CHECKED	FXH	3-68	1	AS BUILT	JRC	12-72
IN CHARGE	F.X.H.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

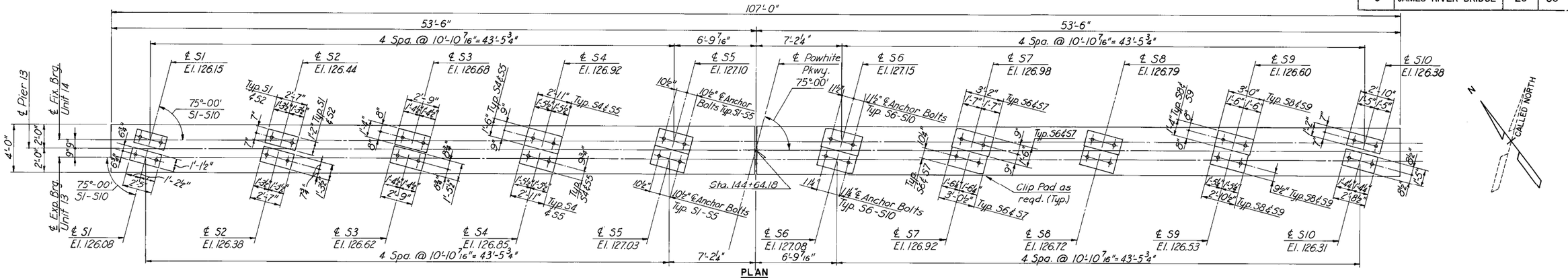
JAMES RIVER BRIDGE

PIER 12

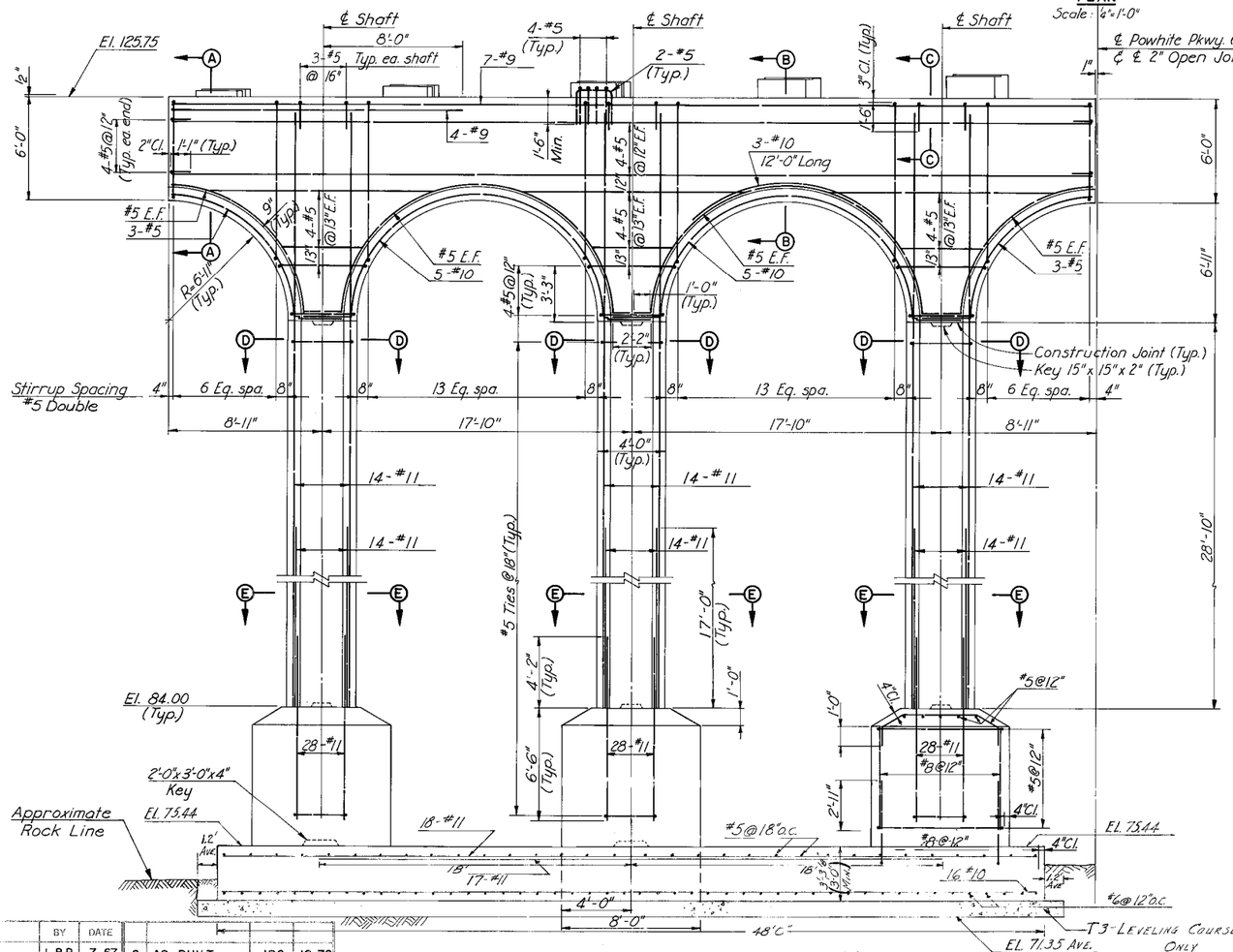
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: C-3
SHEET NO. 22 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	23	53

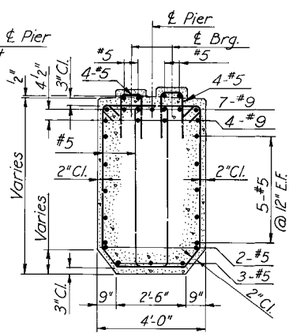


PLAN
Scale: 1/4"=1'-0"

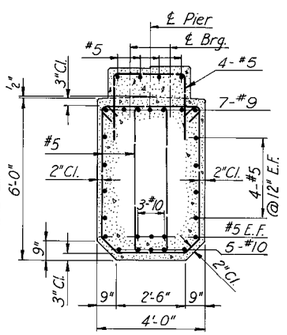


HALF ELEVATION
Scale: 1/4"=1'-0"

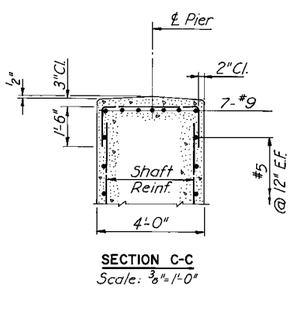
Note:
Pier symmetrical about ℄ 2" Open Joint except as shown.



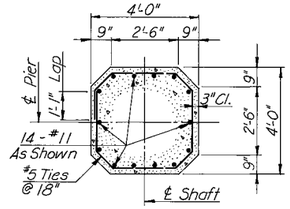
SECTION A-A
Scale: 3/8"=1'-0"



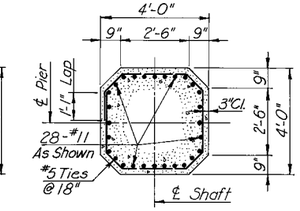
SECTION B-B
Scale: 3/8"=1'-0"



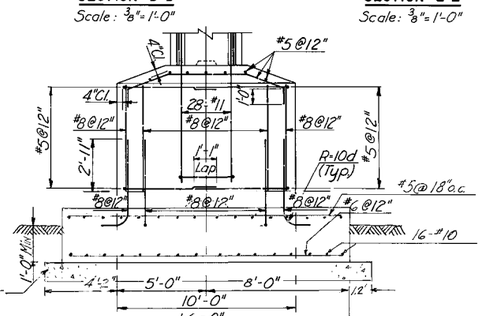
SECTION C-C
Scale: 3/8"=1'-0"



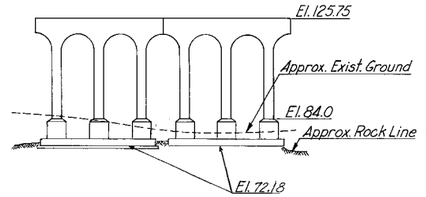
SECTION D-D
Scale: 3/8"=1'-0"



SECTION E-E
Scale: 3/8"=1'-0"



FOOTING END VIEW
Scale: 1/4"=1'-0"



ELEVATION
Scale: 1"=30'

NOTES:
~~Foundation elevations are approximate only and may be varied to suit field conditions as directed by the Engineer.~~
Pier foundations are designed for an allowable bearing pressure of 5 Tons/S.F.

AS BUILT
RICHMOND METROPOLITAN AUTHORITY
EXPRESSWAY SYSTEM

JAMES RIVER BRIDGE

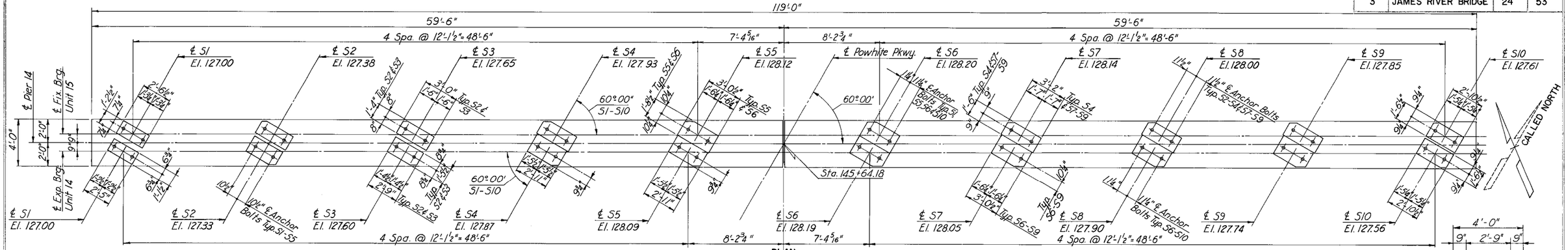
PIER 13

	BY	DATE				
MADE	L.B.P.	7-67	2	AS BUILT	JRC	12-72
CHECKED	F.X.H.	3-68	1	Rev. Footings	JRC	4-12-72
IN CHARGE	F.X.H		NO.	REVISION	BY	DATE

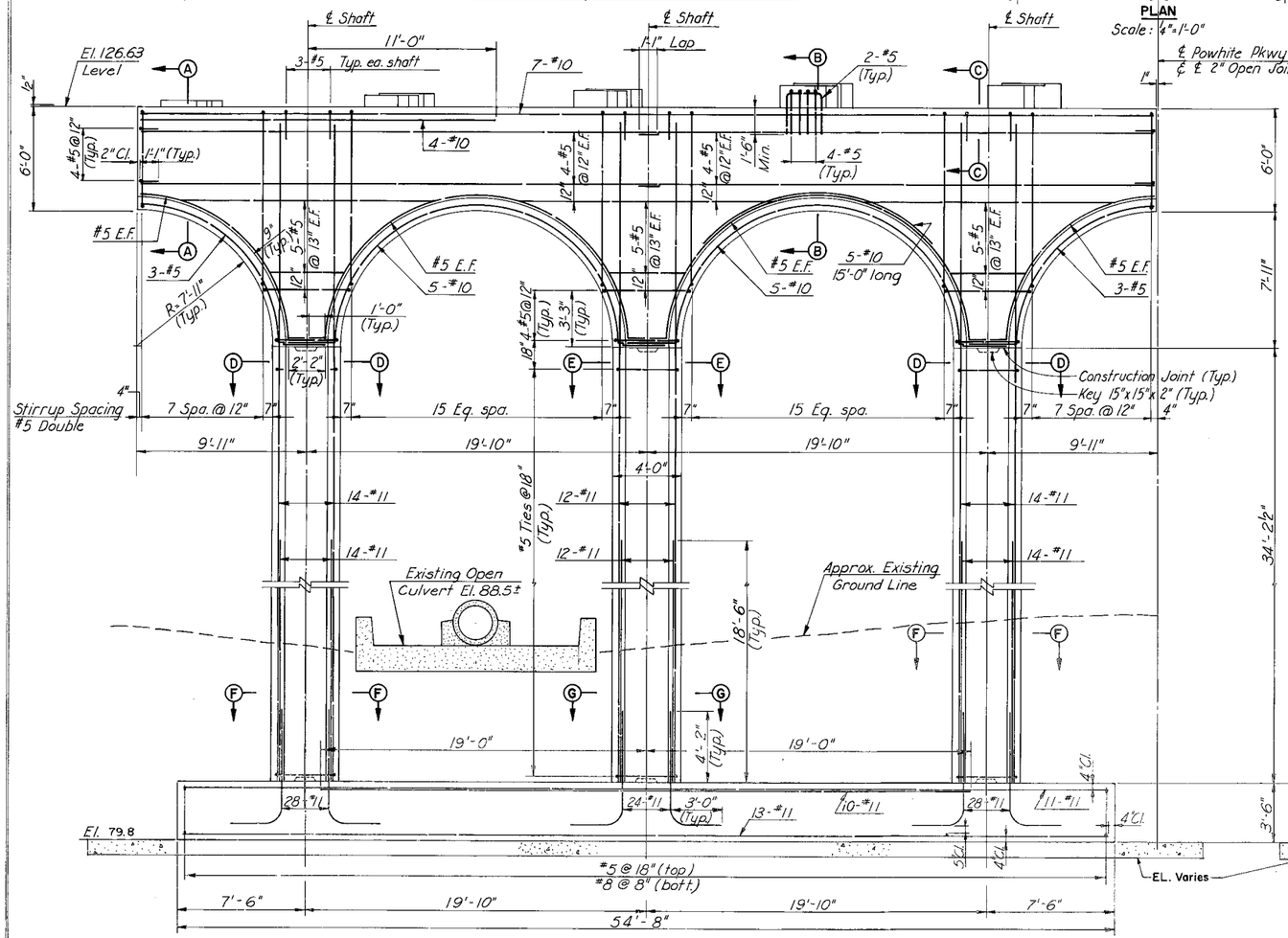
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO. C-3
SHEET NO. 23 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	24	53

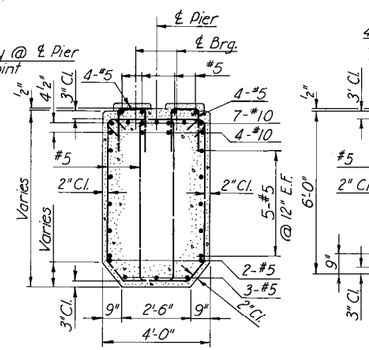


PLAN
Scale: 1/4"=1'-0"

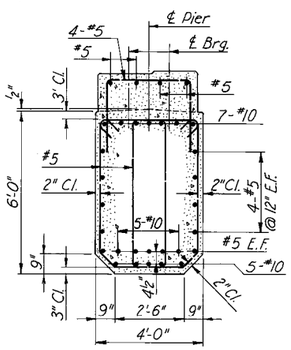


HALF ELEVATION
Scale: 1/4"=1'-0"

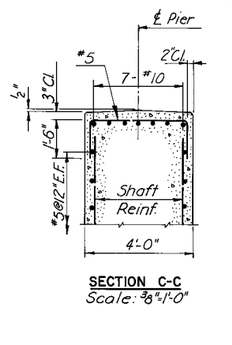
Note: Pier symmetrical about ℄ 2" open joint.



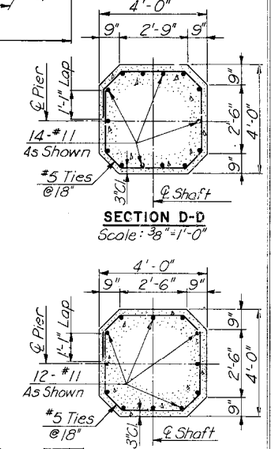
SECTION A-A
Scale: 3/8"=1'-0"



SECTION B-B
Scale: 3/8"=1'-0"

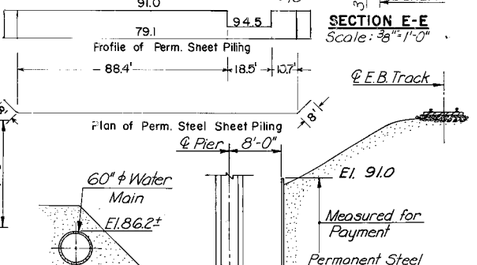


SECTION C-C
Scale: 3/8"=1'-0"

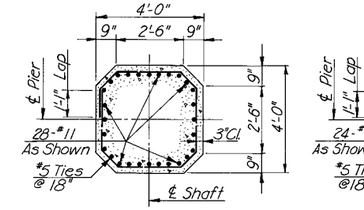


SECTION D-D
Scale: 3/8"=1'-0"

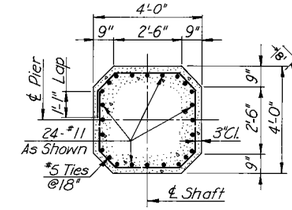
SECTION E-E
Scale: 3/8"=1'-0"



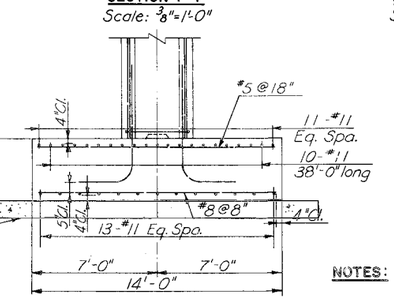
END ELEVATION
NOT TO SCALE



SECTION F-F
Scale: 3/8"=1'-0"



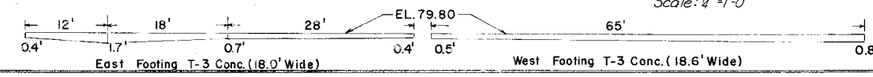
SECTION G-G
Scale: 3/8"=1'-0"



FOOTING END VIEW
Scale: 1/4"=1'-0"

NOTES:

Pier foundations are designed for an allowable bearing pressure of 3½ Tons/S.F.



	BY	DATE				
MADE	L.B.P.	7-67				
CHECKED	F.X.H.	3-68	1	AS BUILT	JRC	12-72
IN CHARGE	F.X.H.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

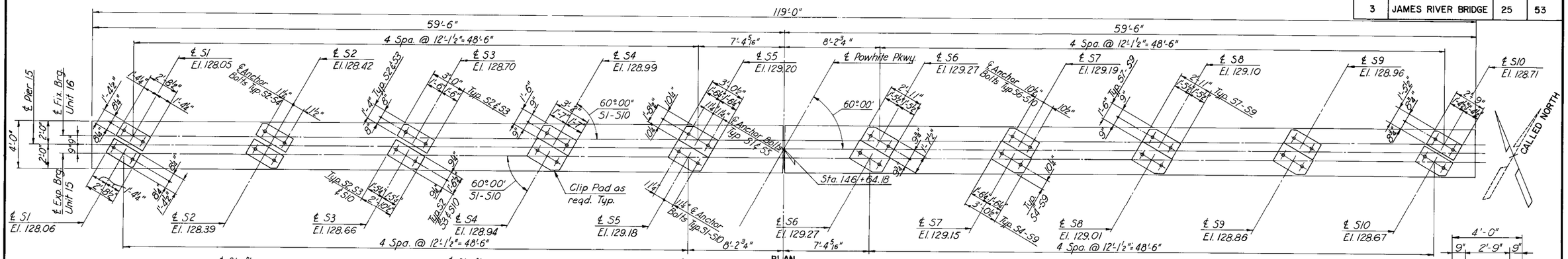
JAMES RIVER BRIDGE

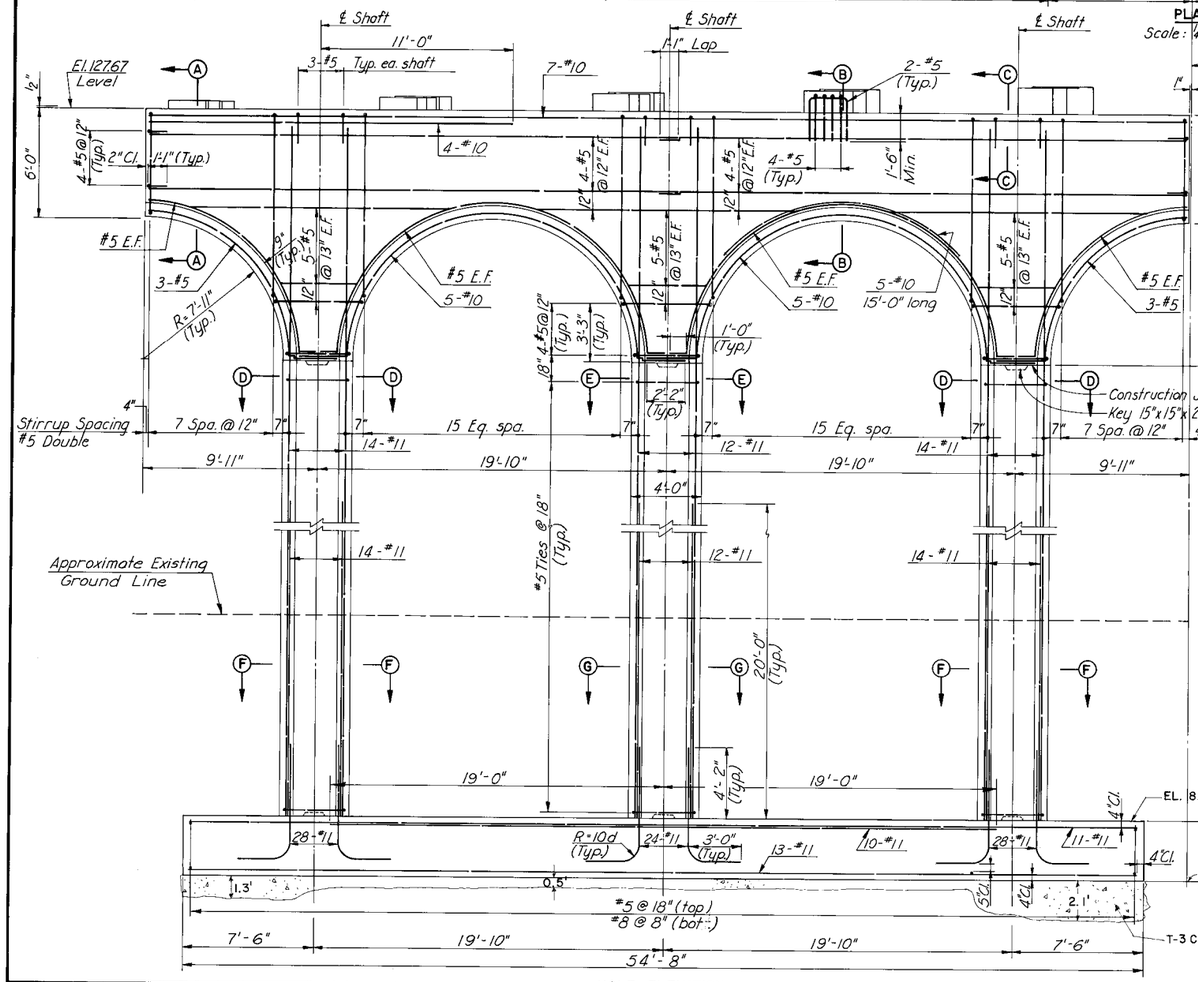
PIER 14

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: C-3
SHEET NO. 24 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	25	53

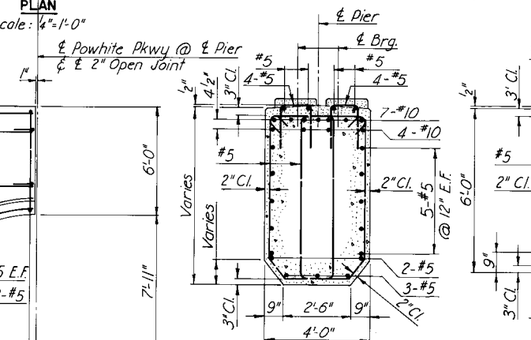




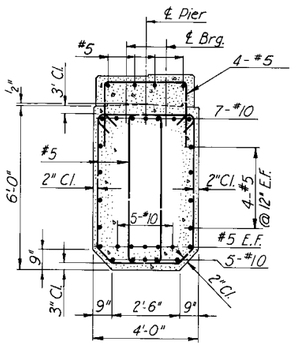
HALF ELEVATION
Scale: ¼"=1'-0"

Note:
Pier symmetrical about ℄ 2" open joint.

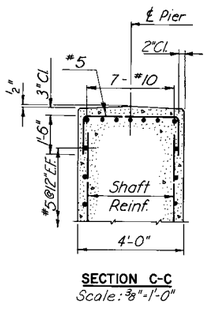
PLAN
Scale: ¼"=1'-0"



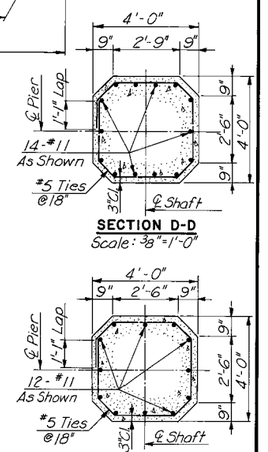
SECTION A-A
Scale: ⅜"=1'-0"



SECTION B-B
Scale: ⅜"=1'-0"

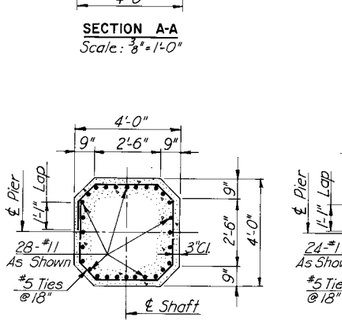


SECTION C-C
Scale: ⅜"=1'-0"

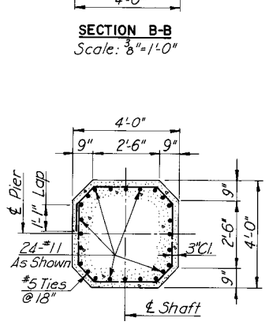


SECTION D-D
Scale: ⅜"=1'-0"

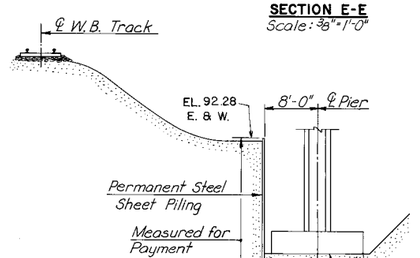
SECTION E-E
Scale: ⅜"=1'-0"



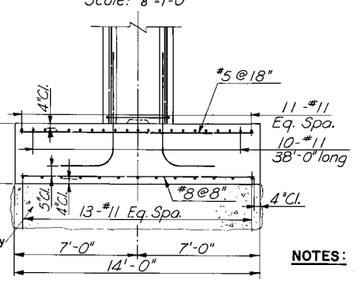
SECTION F-F
Scale: ⅜"=1'-0"



SECTION G-G
Scale: ⅜"=1'-0"



END ELEVATION
Scale: 3/32"=1'-0"



FOOTING END VIEW
Scale: 4"=1'-0"

NOTES:

Pier foundations are designed for an allowable bearing pressure of 3½ Tons/S.F.

	BY	DATE				
MADE	HBW	7-67				
CHECKED	FXH	3-68	1	AS BUILT	JRC	12-72
IN CHARGE	FXH		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

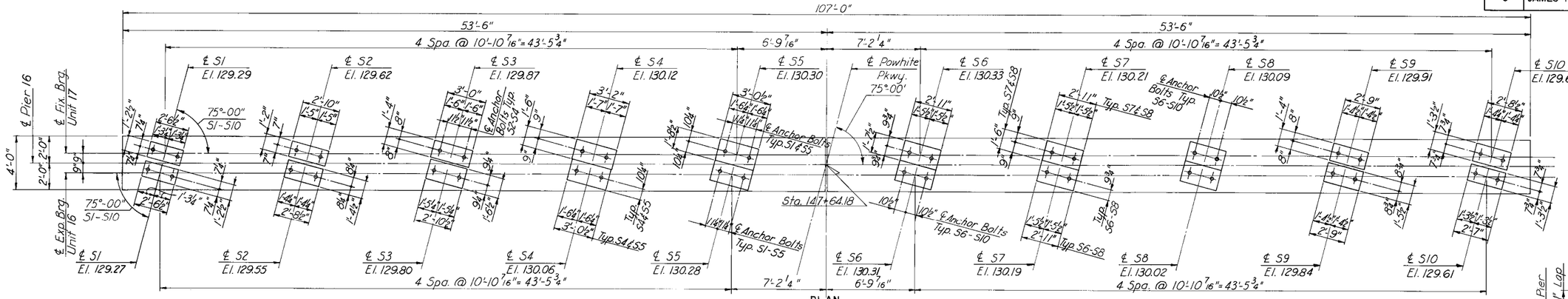
JAMES RIVER BRIDGE

PIER 15

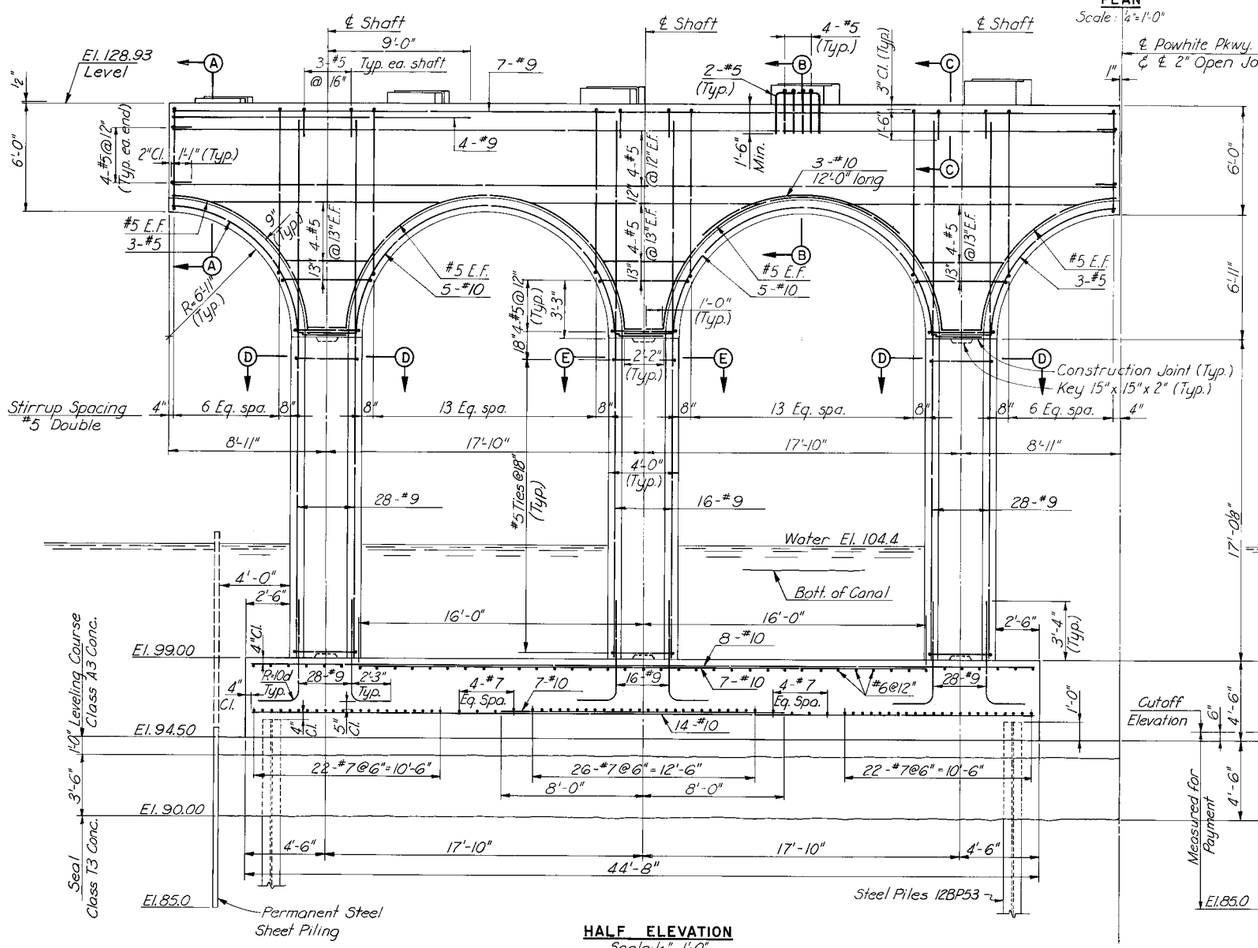
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: C-3
SHEET NO. 25 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	26	53

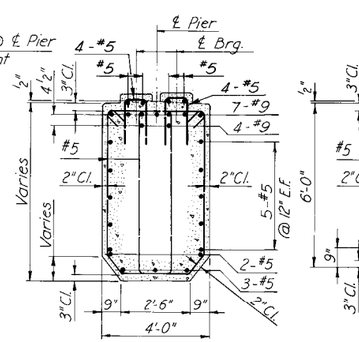


PLAN
Scale: 1/4"=1'-0"

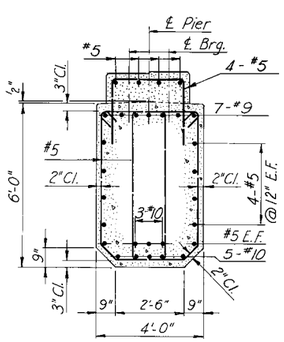


HALF ELEVATION
Scale: 1/4"=1'-0"

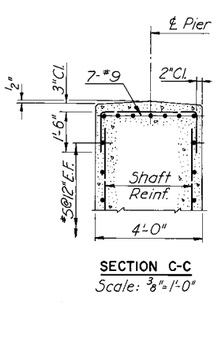
Note:
Pier symmetrical about ℄ 2" Open Joint.



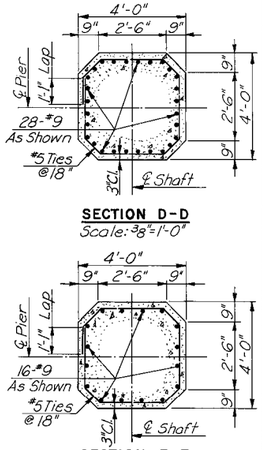
SECTION A-A
Scale: 3/8"=1'-0"



SECTION B-B
Scale: 3/8"=1'-0"

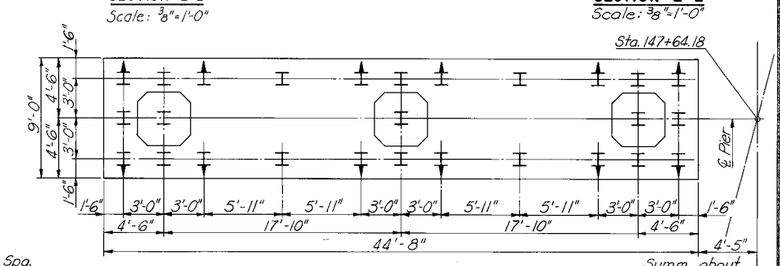


SECTION C-C
Scale: 3/8"=1'-0"



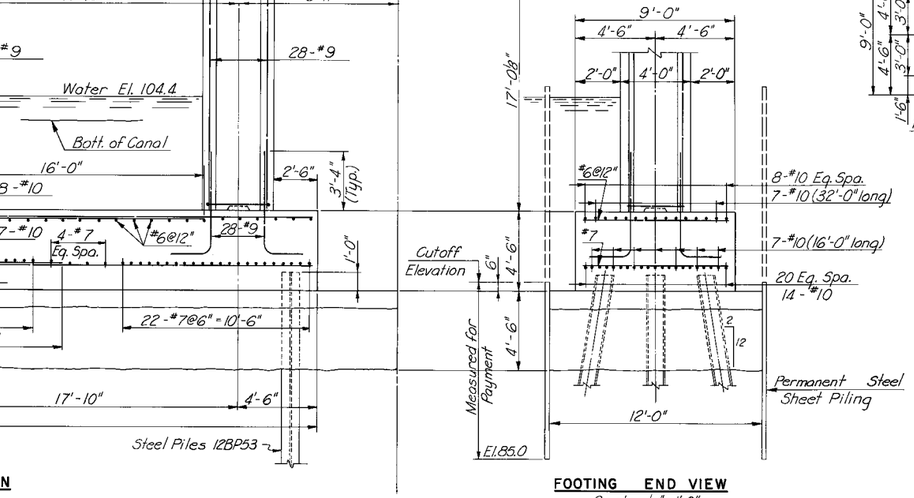
SECTION D-D
Scale: 3/8"=1'-0"

SECTION E-E
Scale: 3/8"=1'-0"



HALF PILE PLAN
Scale: 3/16"=1'-0"

Pile Notes:
I denotes vertical piles.
T denotes battered pile. Battered 2:12 in direction of arrow.
All piles steel H (12BP53). 55T capacity.
Average pile tip West Fig. = 75.7
East Fig. = 61.4



FOOTING END VIEW
Scale: 1/4"=1'-0"

	BY	DATE				
MADE	HBW	7-67				
CHECKED	FXH	3-68	1	AS BUILT		12-72
IN CHARGE	FXH		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

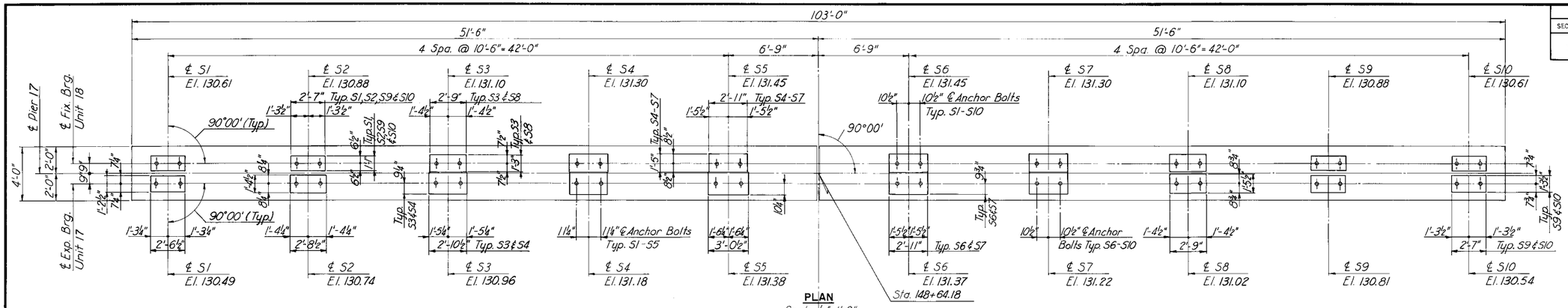
JAMES RIVER BRIDGE

PIER 16

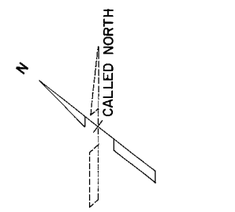
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

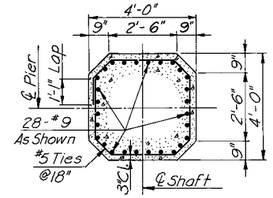
SCALE: AS SHOWN
CONTRACT NO.: C-3
SHEET NO. 26 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	27	53

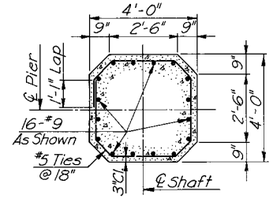


PLAN
Scale: ¼"=1'-0"

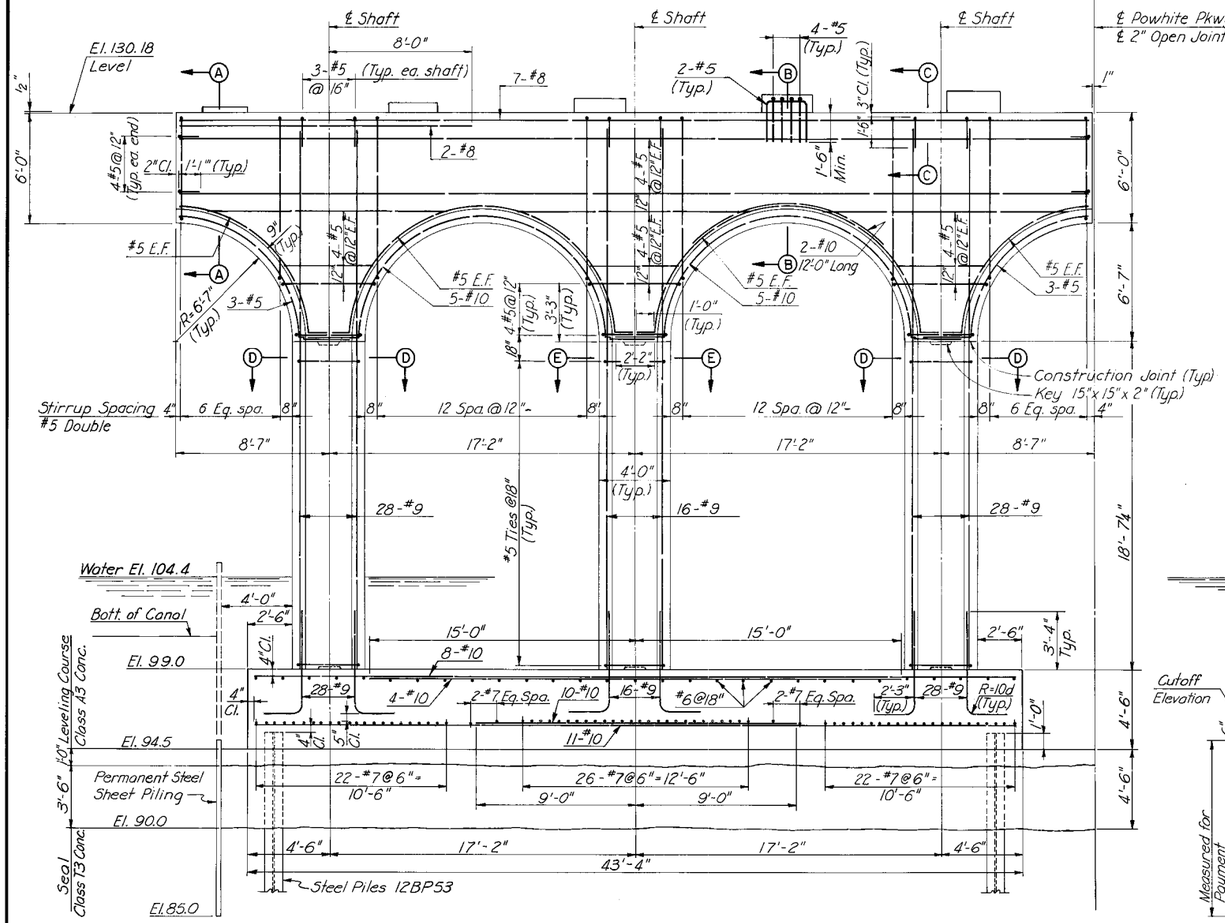




SECTION D-D
Scale: ⅜"=1'-0"

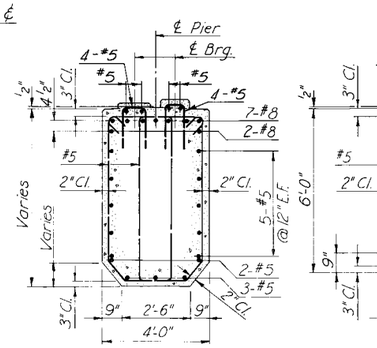


SECTION E-E
Scale: ⅜"=1'-0"

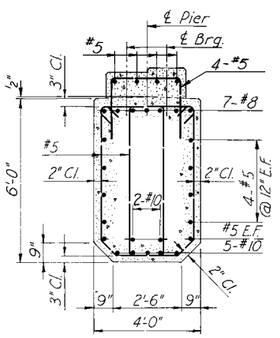


HALF ELEVATION
Scale: ¼"=1'-0"

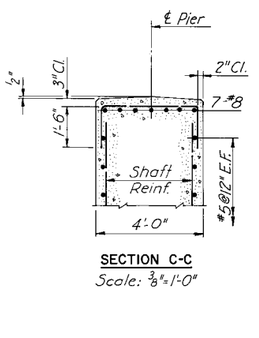
Note:
Pier symmetrical about ℄ Powhite Pkwy.



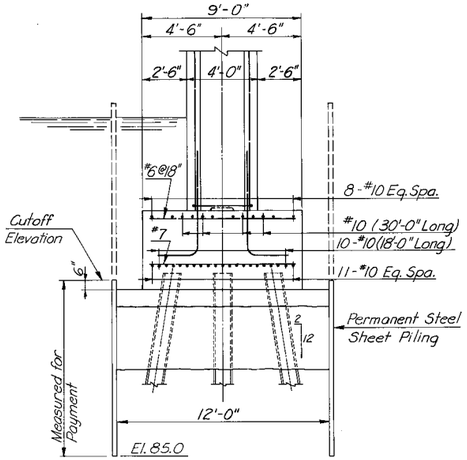
SECTION A-A
Scale: ⅜"=1'-0"



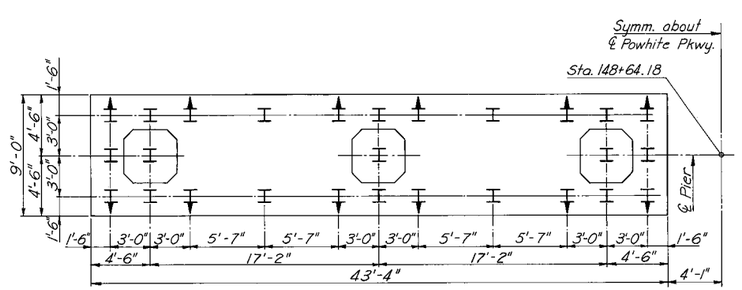
SECTION B-B
Scale: ⅜"=1'-0"



SECTION C-C
Scale: ⅜"=1'-0"



FOOTING END VIEW
Scale: ¼" = 1'-0"



HALF PILE PLAN
Scale: 3/16"=1'-0"

Pile Notes:
I denotes vertical pile.
Ŧ denotes battered pile. Batter 2:12 in direction of arrow.
All piles are steel H (12BP53). 55T capacity.
Average pile tip: El. **47.5** (N.B. Roadway Pier)
El. **68.0** (S.B. Roadway Pier)

AS BUILT

	BY	DATE				
MADE	HBW	7-67				
CHECKED	FXH	3-68	1	AS BUILT	JRC	12-72
IN CHARGE	FXH		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

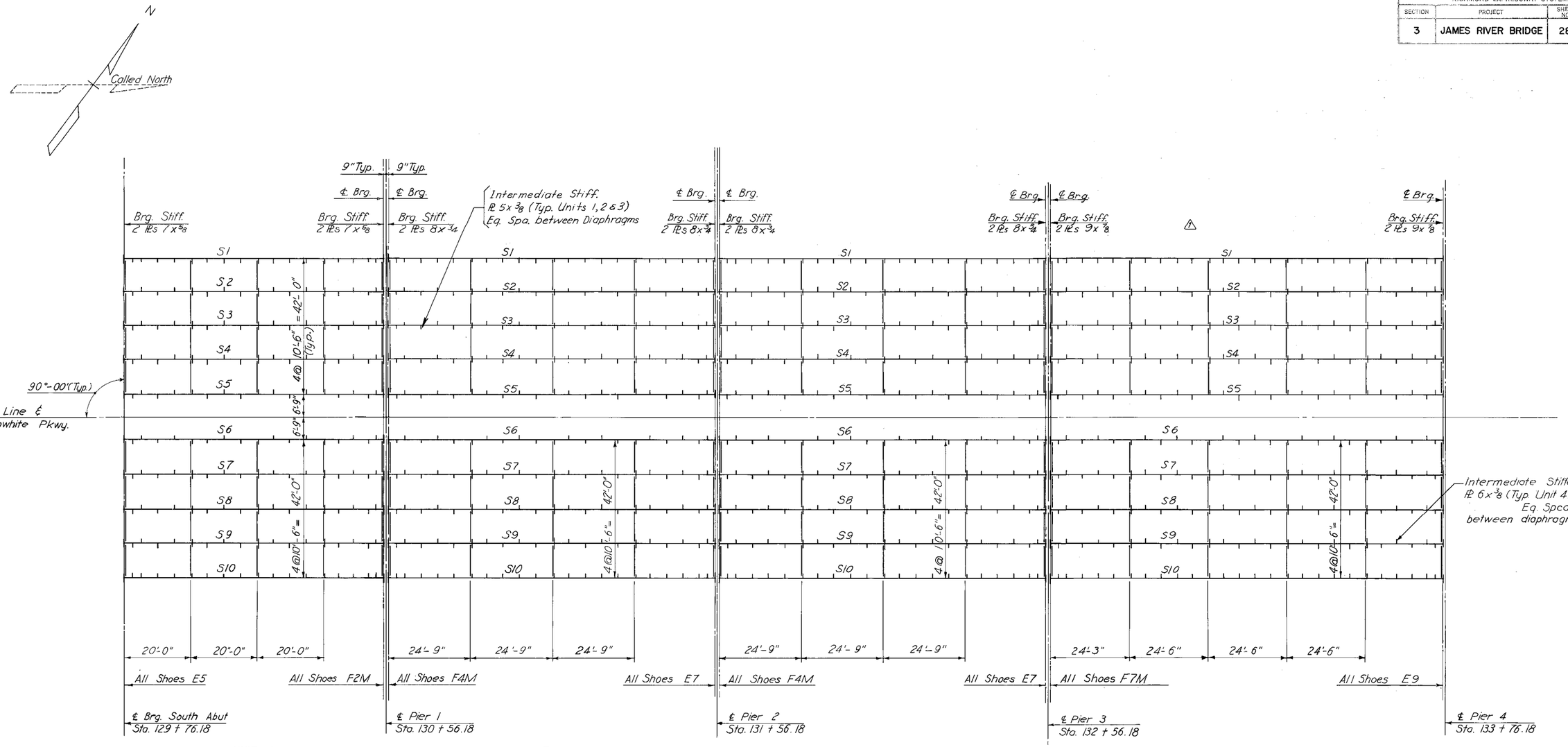
JAMES RIVER BRIDGE

PIER 17

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

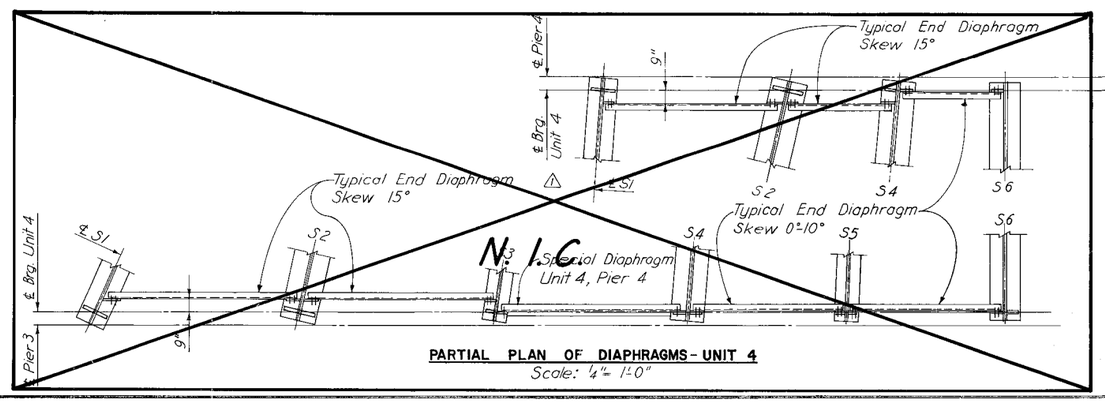
SCALE: AS SHOWN
CONTRACT NO.: C-3
SHEET NO. 27 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	28	53



STRINGER LENGTHS (c to c Bearing)					
Unit	Stringer	Length	Unit	Stringer	Length
1	S1-S10	79'-3"	3	S1-S10	98'-6"
2	S1-S10	98'-6"	4	S1-S10	118'-6"

⚠



PARTIAL PLAN OF DIAPHRAGMS - UNIT 4
Scale: 1/4" = 1'-0"

N.I.C.

	BY	DATE				
MADE	EVR	7-67	2	AS BUILT	JRC	12-72
CHECKED	FXH	8-67	⚠1	Remove Ramp Taper	H.B.W.	2/20/71
IN CHARGE	FXH		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

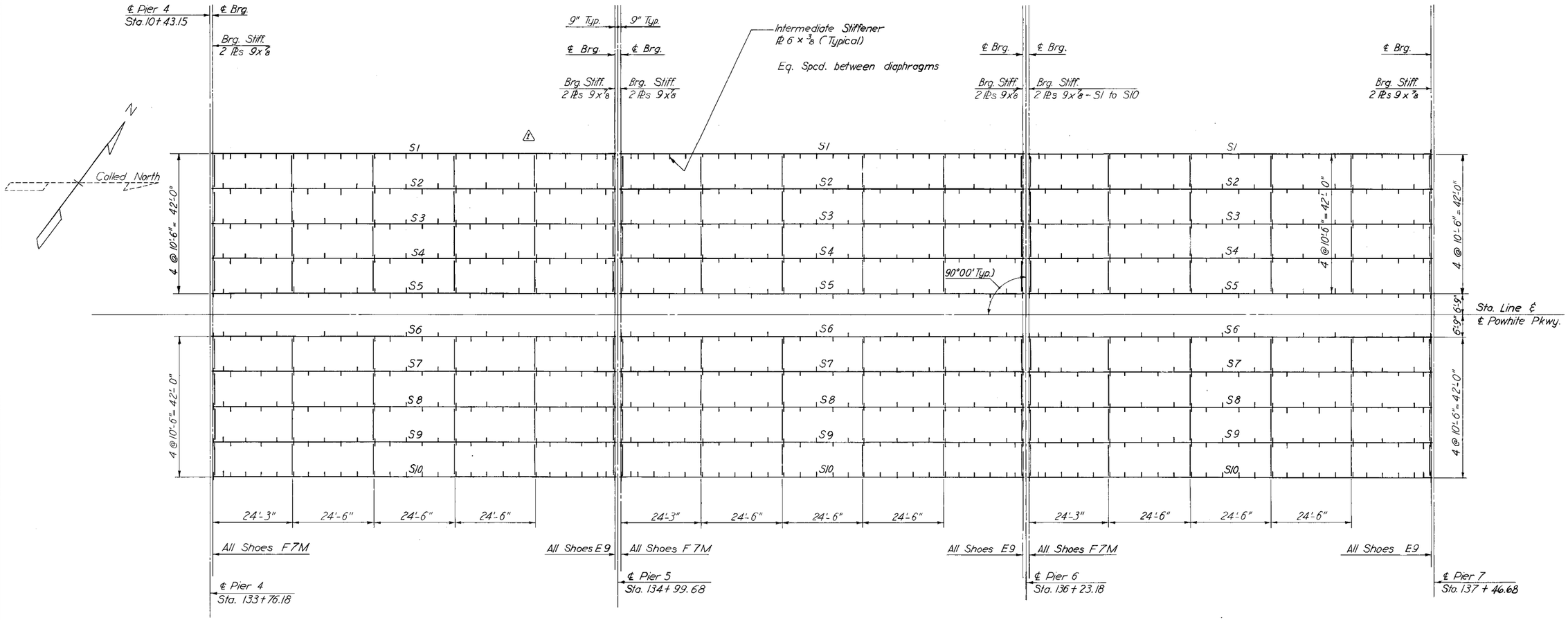
JAMES RIVER BRIDGE

FRAMING PLAN UNITS 1, 2, 3 & 4

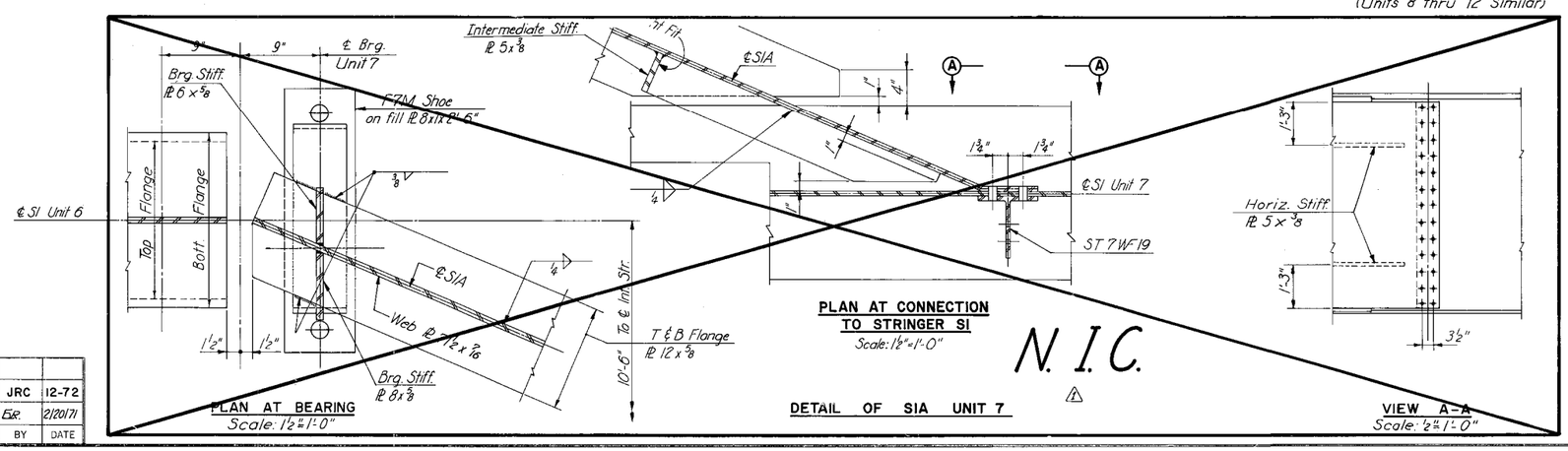
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=15' (Unless Noted)
CONTRACT NO.: C-3
SHEET NO. 28 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	29	53



STRINGER LENGTHS (C.C. Bearing)		
Unit	Stringer	Length
5-12	S1-S10	122-0"



	BY	DATE				
MADE	EVR	7-67	2	AS BUILT	JRC	12-72
CHECKED	FXH	8-67	1	Removed Ramp Widening	EJR	2/20/71
IN CHARGE	FXH		NO.	REVISION	BY	DATE

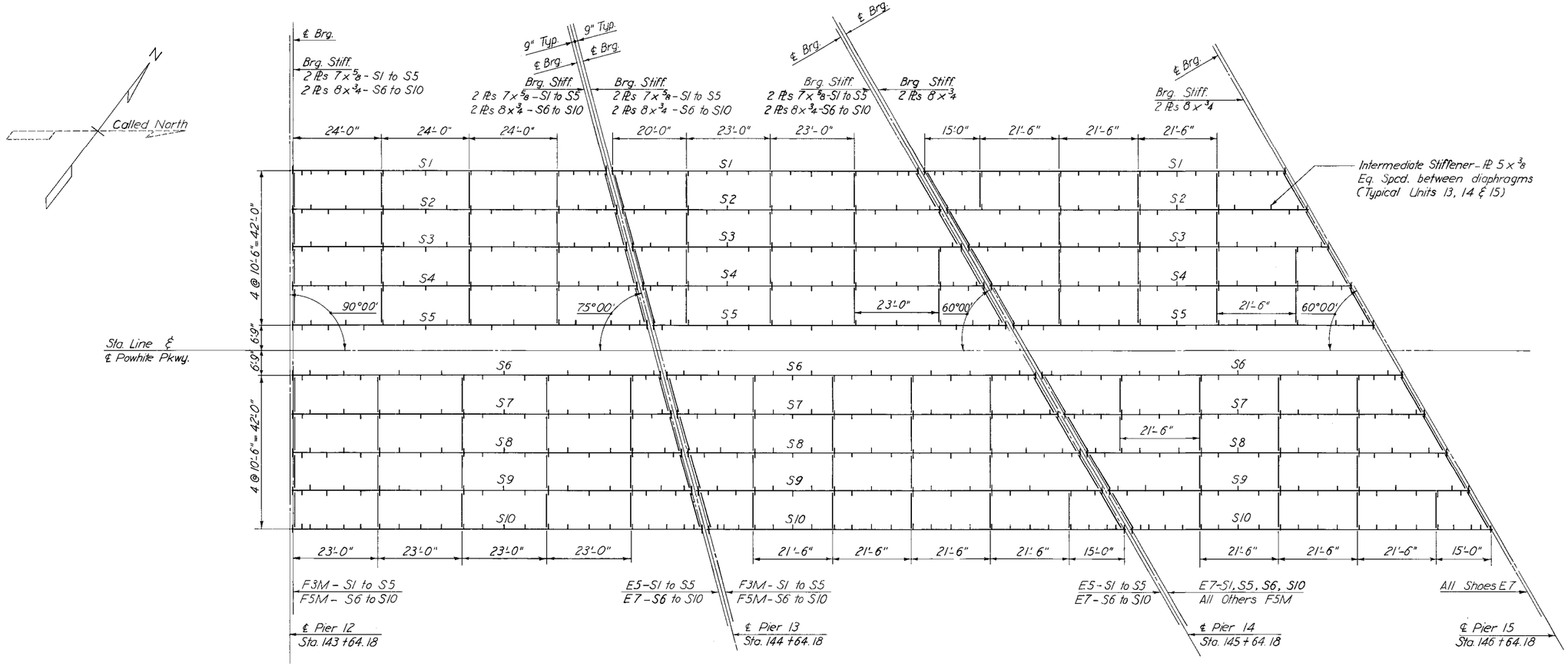
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

JAMES RIVER BRIDGE
FRAMING PLAN UNITS 5 THRU 12

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=15' (Unless Noted)
CONTRACT NO: C-3
SHEET NO. 29 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	30	53



UNIT 13 UNIT 14 UNIT 15

STRINGER LENGTHS
(c to c Bearing)

Unit	Stringer	Length	Unit	Stringer	Length	Unit	Stringer	Length
13	S1	85'-4 15/16"	13 (cont'd)	S8	105'-10 7/8"	14 (cont'd)	S5	96'-3 1/4"
	S2	88'-2 11/16"		S9	108'-8 11/16"		S6	100'-5 3/8"
	S3	91'-0 7/16"		S10	111'-6 7/16"		S7	103'-8 5/16"
	S4	93'-10 3/16"	14	S1	83'-3 5/16"		S8	106'-11 5/16"
	S5	96'-8"		S2	85'-6 1/4"		S9	110'-2 5/16"
	S6	100'-3 3/8"		S3	89'-9 1/4"		S10	113'-5 5/16"
	S7	103'-1 1/8"		S4	93'-0 1/4"	15	S1 - S10	98'-3 3/16"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EVR	7-67				
CHECKED	FXH	8-67	1	AS BUILT	JRC	12-72
IN CHARGE	FXH					

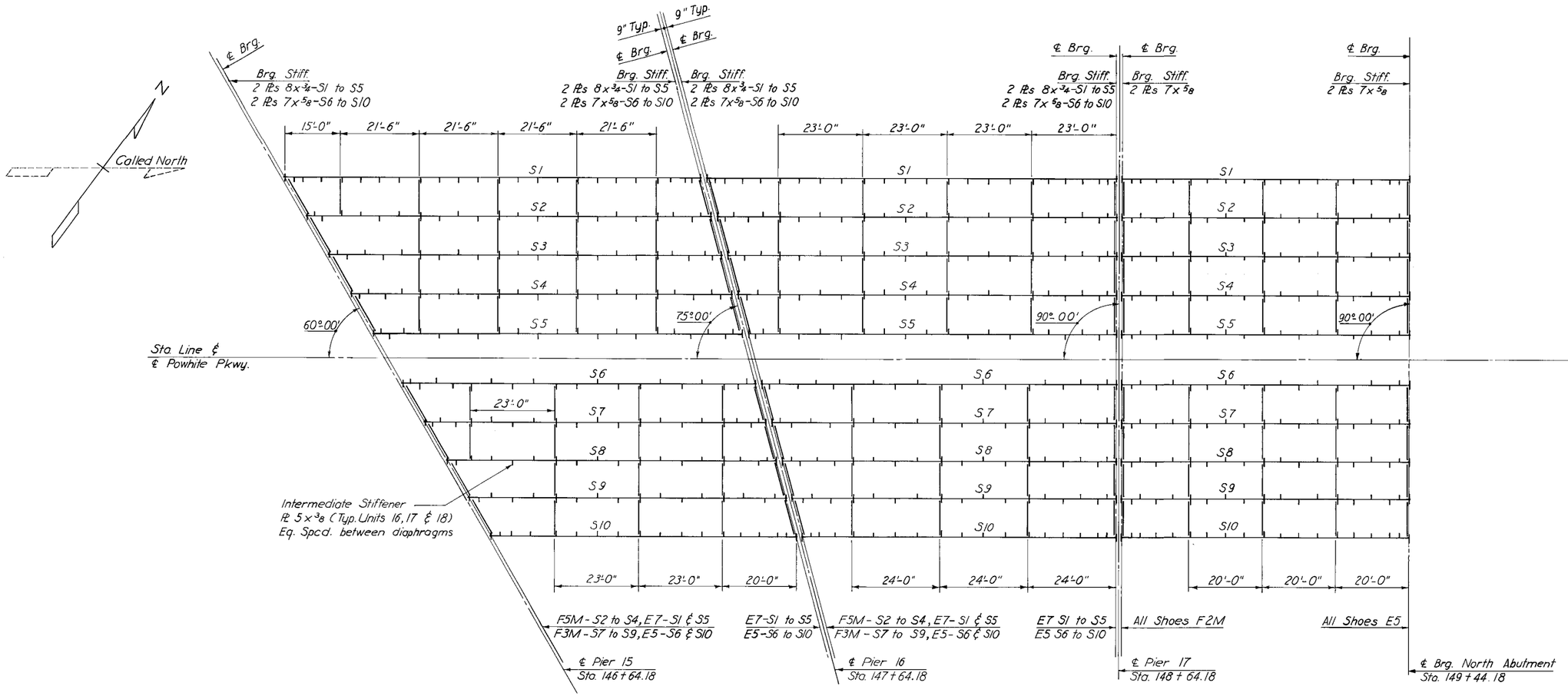
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

JAMES RIVER BRIDGE
FRAMING PLAN UNITS 13,14 & 15

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1" = 15'-0"
CONTRACT NO.: C-3
SHEET NO. 30 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	31	53



UNIT 16 UNIT 17 UNIT 18

STRINGER LENGTHS
(c to c Bearing)

Unit	Stringer	Length	Unit	Stringer	Length	Unit	Stringer	Length
16	S1	113'-5 5/16"	16 (cont'd)	S8	89'-9¼"	17 (cont'd)	S5	100'-3 3/8"
	S2	110'-2 5/16"		S9	85'-6¼"		S6	96'-8"
	S3	106'-11 5/16"		S10	83'-3 5/16"		S7	93'-10 3/16"
	S4	103'-8 5/16"	17	S1	111'-6 7/16"		S8	91'-0 7/16"
	S5	100'-5 3/8"		S2	108'-8 11/16"		S9	88'-2 11/16"
	S6	96'-3¼"		S3	105'-10 7/8"		S10	85'-4 15/16"
	S7	93'-0¼"		S4	103'-1⅞"	18	S1-S10	79'-3"

	BY	DATE				
MADE	EVR	7-67				
CHECKED	FXH	8-67	1	AS BUILT	JRC	12-72
IN CHARGE	FXH		NO.	REVISION	BY	DATE

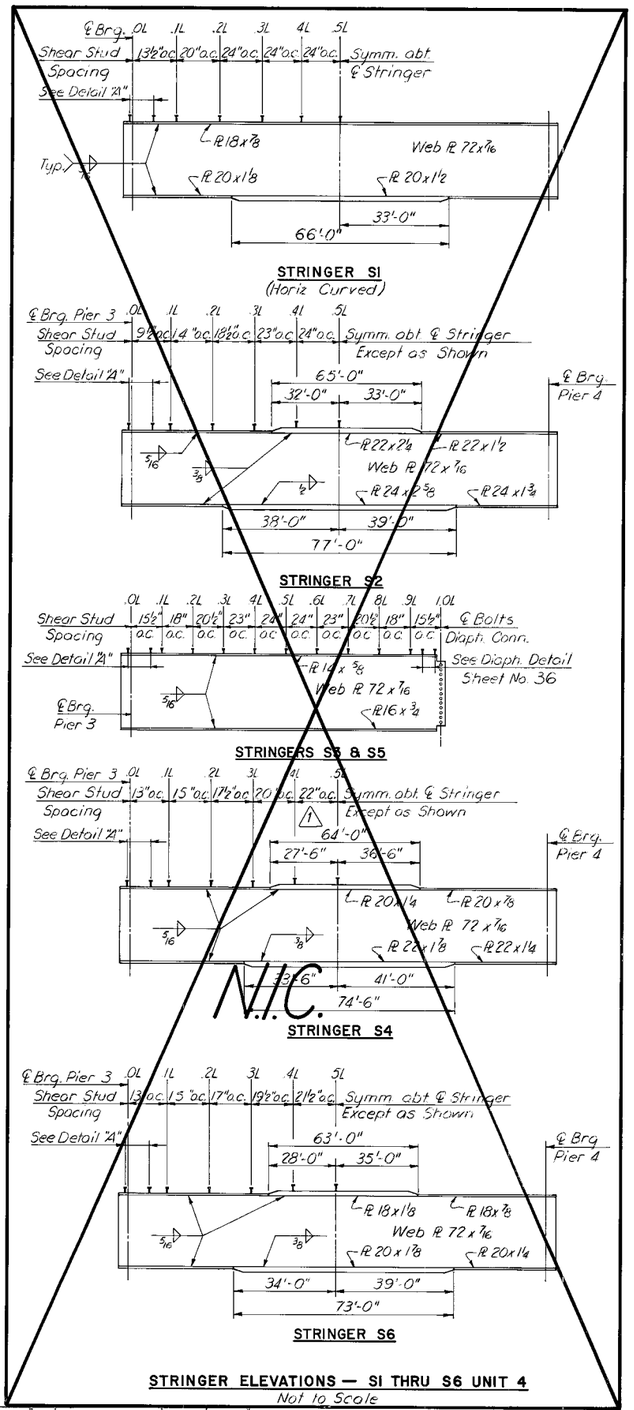
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

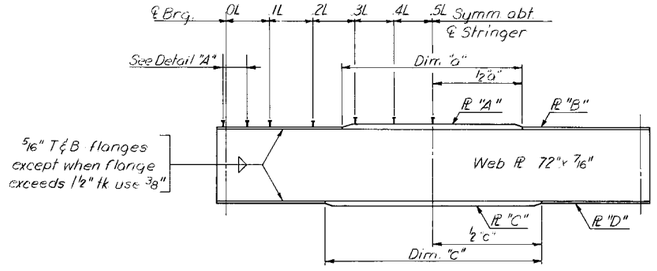
JAMES RIVER BRIDGE
FRAMING PLAN UNITS 16, 17 & 18

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

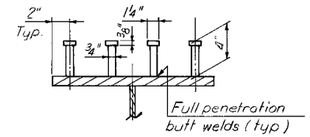
SCALE: 1" = 15'-0"
CONTRACT NO.: C-3
SHEET NO. 31 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	32	53

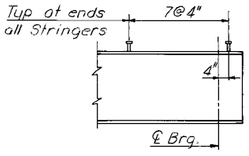




TYPICAL STRINGER ELEVATION
Not to Scale



SHEAR STUD DETAIL
Not to Scale



DETAIL "A"
Not to Scale

SHEAR STUD NOTE:

Capacity = 3400lbs. per stud.

The contractor may, if he elects, use three ⅞" diameter studs of the same longitudinal spacing in lieu of four ¾" diameter studs shown.

Stud rows shall be placed parallel to the main deck reinforcing.

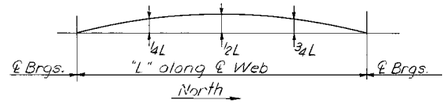
Shear stud spacing shown is maximum spacing.

STRINGER SCHEDULE

UNIT	STRINGER	PL "A"	Dim. "a"	PL "B"	PL "C"	Dim. "c"	PL "D"	SHEAR STUD SPACING 0L-1L	1L-2L	2L-3L	3L-4L	4L-5L
1	S5&S6	14 x ⅝	F. L.	—	16 x ⅞	F. L.	—	12"	13½"	16"	18½"	20½"
	S1-S4,S7-S10	14 x ⅝	F. L.	—	16 x 1	40'-6"	16 x ¾	11½"	13½"	15½"	18"	20"
2	~~—~~	~~16 x ⅜~~	~~F. L.~~	~~—~~	~~18 x 1⅛~~	~~54'-0"~~	~~18 x ⅞~~	~~13½"~~	~~15½"~~	~~19½"~~	~~24"~~	~~24"~~
	~~—~~	~~16 x ⅜~~	~~F. L.~~	~~—~~	~~18 x 1⅛~~	~~52'-6"~~	~~18 x ⅞~~	~~13½"~~	~~16"~~	~~19½"~~	~~24"~~	~~24"~~
	S5 & S6	16 x ¾	F. L.	—	18 x 1⅜	60'-6"	18 x ⅞	12"	14"	18"	22"	24"
	S1-S4,S7-S10	16 x ¾	F. L.	—	18 x 1½	58'-6"	18 x 1	12"	14"	16"	19"	21"
3	~~—~~	~~16 x ¾~~	~~F. L.~~	~~—~~	~~18 x 1½~~	~~56'-6"~~	~~18 x ⅞~~	~~13"~~	~~15"~~	~~17½"~~	~~20½"~~	~~22½"~~
	S5 & S6	16 x ¾	F. L.	—	18 x 1⅜	60'-6"	18 x ⅞	12"	14"	18"	22"	24"
	S1-S4,S7-S10	16 x ¾	F. L.	—	18 x 1½	58'-6"	18 x 1	12"	14"	16"	19"	21"
4	See Elevations this Sheet											
	S1-S4,S7-S10	18 x 1½	62'-0"	18 x ⅞	20 x 1⅞	74'-6"	20 x 1¼	12½"	14½"	17½"	21"	23"
	S5 & S6	18 x 1½	59'-0"	18 x ⅞	20 x 1⅞	71'-0"	20 x 1¼	12½"	14½"	18½"	23½"	24"
5	~~—~~	~~18 x 1⅜~~	~~60'-0"~~	~~18 x ⅞~~	~~20 x 1¾~~	~~72'-0"~~	~~20 x 1⅛~~	~~13½"~~	~~15½"~~	~~20"~~	~~24"~~	~~24"~~
	~~—~~	~~18 x 1~~	~~F. L.~~	~~—~~	~~20 x 1⅜~~	~~75'-0"~~	~~20 x 1⅜~~	~~14½"~~	~~16½"~~	~~20½"~~	~~23½"~~	~~24"~~
	S5&S6	18 x 1¼	66'-0"	18 x ⅞	20 x 2	73'-0"	20 x 1⅜	12½"	14½"	17½"	24"	24"
	S1-S4,S7-S10	18 x 1⅜	68'-6"	18 x ⅞	20 x 2	75'-6"	20 x 1⅜	12½"	14½"	17½"	21½"	23½"
6	S5&S6	18 x 1¼	66'-0"	18 x ⅞	20 x 2	73'-0"	20 x 1⅜	12½"	14½"	17½"	24"	24"
	S1-S4,S7-S10	18 x 1½	68'-6"	18 x ⅞	20 x 2	75'-6"	20 x 1⅜	12½"	14½"	17½"	21½"	23½"
7 Thru 12	S1-S4,S7-S10	18 x 1⅜	68'-6"	18 x ⅞	20 x 2	75'-6"	20 x 1⅜	12½"	14½"	17½"	21½"	23½"
	S5&S6	18 x 1¼	66'-0"	18 x ⅞	20 x 2	73'-0"	20 x 1⅜	12½"	14½"	17½"	24"	24"
13 & 14	S1	14 x ⅝	F. L.	—	16 x 1⅛	51'-0"	16 x ¾	11½"	13"	15½"	18"	20"
	S2	14 x ⅝	F. L.	—	16 x 1¼	51'-0"	16 x ⅞	11½"	13½"	15½"	18"	20"
	S3	14 x ⅝	F. L.	—	16 x 1⅜	55'-6"	16 x ⅞	11½"	13½"	16½"	18½"	20"
	S4	14 x ⅝	F. L.	—	16 x 1½	55'-6"	16 x 1	12"	13½"	15½"	18½"	20"
	S5	14 x ¾	F. L.	—	16 x 1½	57'-0"	16 x 1	12"	14"	16½"	21"	24"
	S6	16 x ¾	F. L.	—	18 x 1⅜	62'-6"	18 x ⅞	12"	14"	17½"	22"	24"
	S7	16 x ⅞	F. L.	—	18 x 1⅝	61'-0"	18 x 1½	12"	14"	16"	19½"	21"
	S8	16 x 1	51'-0"	16 x ¾	18 x 1¾	66'-6"	18 x 1½	12"	14"	17"	19½"	22"
	S9	16 x 1	57'-0"	16 x ¾	18 x 1⅞	67'-0"	18 x 1¼	12"	14"	17"	20"	22"
	S10	16 x 1⅛	63'-6"	16 x ¾	18 x 2	68'-6"	18 x 1⅜	12½"	14"	16½"	20½"	22½"
15	S1-S4,S7-S10	16 x ¾	F. L.	—	16 x 1½	58'-6"	18 x 1	12"	14"	16"	19"	21"
	S5&S6	16 x ¾	F. L.	—	18 x 1⅜	60'-6"	16 x ⅞	12"	14"	18"	22"	24"
16 & 17	S1	16 x 1⅛	63'-6"	16 x ¾	18 x 2	68'-6"	18 x 1⅜	12½"	14"	16½"	20½"	22½"
	S2	16 x 1	57'-0"	16 x ¾	18 x 1⅞	67'-0"	18 x 1¼	12"	14"	17"	20"	22"
	S3	16 x 1	51'-0"	16 x ¾	18 x 1¾	66'-6"	18 x 1½	12"	14"	17"	19½"	21½"
	S4	16 x ⅞	F. L.	—	18 x 1⅜	61'-0"	18 x 1½	12"	14"	16"	19½"	21"
	S5	16 x ¾	F. L.	—	18 x 1⅜	62'-6"	18 x ⅞	12"	14"	17½"	22"	24"
	S6	14 x ¾	F. L.	—	16 x 1½	57'-0"	16 x 1	12"	14"	16½"	21"	24"
	S7	14 x ⅝	F. L.	—	16 x 1½	55'-6"	16 x 1	12"	13½"	15½"	18½"	20"
	S8	14 x ⅝	F. L.	—	16 x 1⅜	55'-6"	16 x ⅞	11½"	13½"	16½"	18½"	20"
	S9	14 x ⅝	F. L.	—	16 x 1¼	51'-0"	16 x ⅞	11½"	13½"	15½"	18"	20"
	S10	14 x ⅝	F. L.	—	16 x 1⅛	51'-0"	16 x ¾	11½"	13"	15½"	18"	20"
18	S1-S4,S7-S10	14 x ⅝	F. L.	—	16 x 1	40'-6"	16 x ¾	11½"	13½"	15½"	18"	20"
	S5&S6	14 x ⅝	F. L.	—	16 x ⅞	F. L.	—	12"	13½"	16"	18½"	20½"

NOTES:

For General Notes see sheet no. 4.
For Joint Details see sheet no. 35.
For Shoe Details see sheet no. 34.
Scupper locations shown on Deck Plans. For Scupper Details see sheet no. 36.
For stringer lengths see Framing Plans.



CAMBER DIAGRAM

NOTE TO FABRICATOR:

Stringers fabricated with an upword camber amounting to (see table). This will provide approximate compensation for deflection under full dead load.

CAMBER SCHEDULE

UNIT	STRINGER	4 & 3¾	½	UNIT	STRINGER	4 & 3¾	½
1	S1 - S10	¾"	1"	13 & 14	S6	1¾"	1⅞"
2	~~—~~	~~1¼"~~	~~1⅜"~~		S7	1½"	2⅛"
	~~—~~	~~1¼"~~	~~1⅝"~~		S8	1⅝"	2¼"
	S1 - S10	1⅜"	1¾"		S9	1⅝"	2¼"
3	~~—~~	~~1¼"~~	~~1⅜"~~		S10	1⅞"	2½"
	S1-S10	1⅜"	1⅞"	15	S1-S10	1⅜"	1⅞"
4	S1 - S10	2"	2¾"	16 & 17	S1	1⅞"	2⅛"
5	S5&S6	2⅛"	3"		S2	1¾"	2⅜"
	S1-S4,S7-S10	2⅛"	2⅞"		S3	1⅝"	2¼"
6	S5&S6	2⅛"	3"		S4	1½"	2⅛"
	S1-S4,S7-S10	2⅛"	2⅞"		S5	1⅜"	1⅞"
7 Thru 12	S1-S4,S7-S10	2⅛"	2⅞"		S6&S7	1¼"	1¾"
	S5&S6	2⅛"	3"		S8	1⅛"	1½"
13 & 14	S1	⅞"	1⅛"		S9	1"	1⅜"
	S2	1"	1⅜"		S10	⅞"	1⅛"
	S3	1⅛"	1½"	18	S1-S10	¾"	1"
	S4&S5	¼"	1¾"				

	BY	DATE				
MADE	HBW	7-67	2	AS BUILT	JRC	12-72
CHECKED	FXH	8-67	1	Remove Ramp Taper Strs.	H.B.W.	2/20/71
IN CHARGE	FXH		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

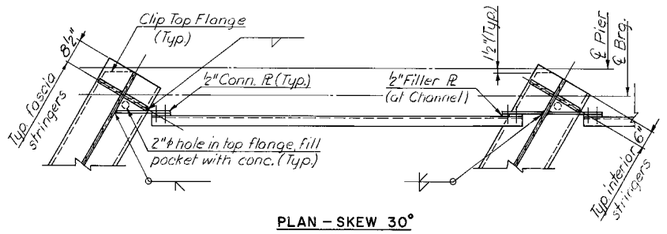
JAMES RIVER BRIDGE

STRUCTURAL STEEL DETAILS

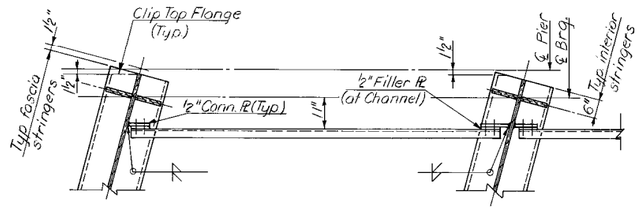
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO: C-3
SHEET NO. 32 OF 53

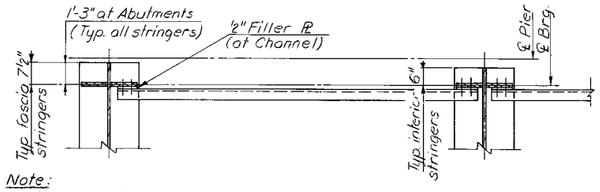
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	33	53



PLAN – SKEW 30°

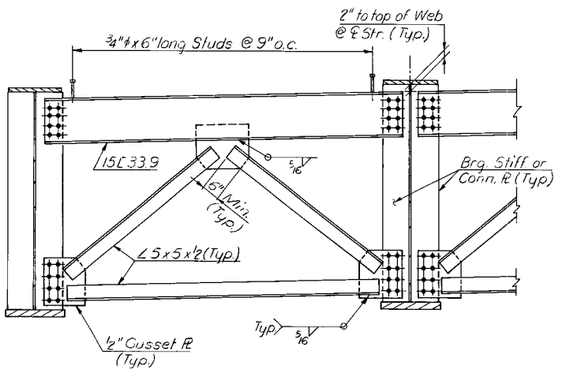


PLAN – SKEW 15°



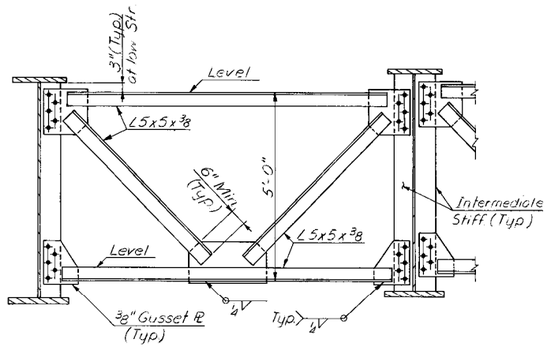
Note:
For Skew up to 10° Bearing Stiffeners to be parallel to ℄ Brg.

PLAN – SKEW 0° THRU 10°

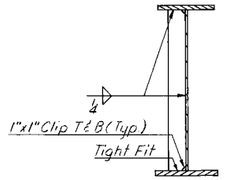


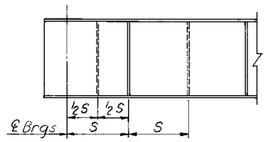
ELEVATION

TYPICAL END DIAPHRAGM DETAILS
Scale: ½" = 1'-0"



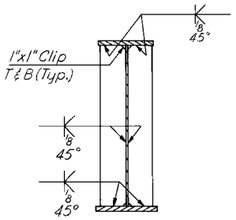
TYPICAL INTERMEDIATE DIAPHRAGM
Scale: ½" = 1'-0"



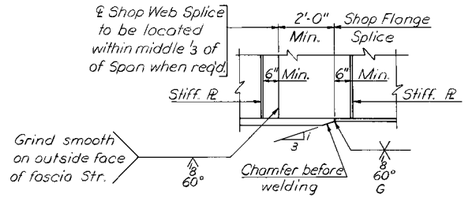


Note:
Equal Spaces "S" between diaphragms as shown in Framing Plan.

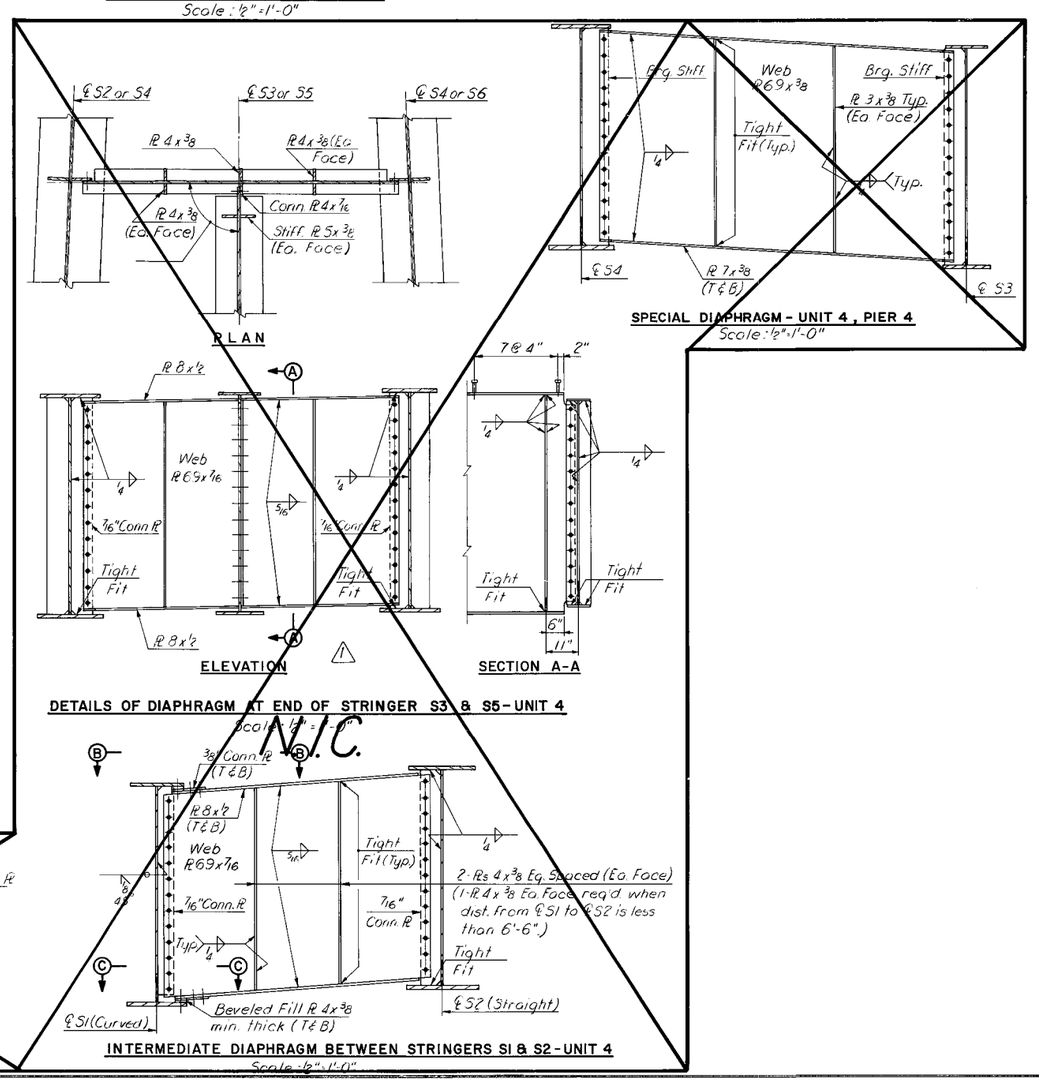
INTERMEDIATE STIFFENER DETAILS
Not to Scale



BEARING STIFFENER DETAIL
Not to Scale



SHOP SPLICE DETAIL
Not to Scale



N.C.

AS BUILT

	BY	DATE				
MADE	HBW	7-67	2	AS BUILT	JRC	12-72
CHECKED	FXH	8-67	1	Remove Ramp Framing	J.G.V.	2-20-71
IN CHARGE	FXH		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

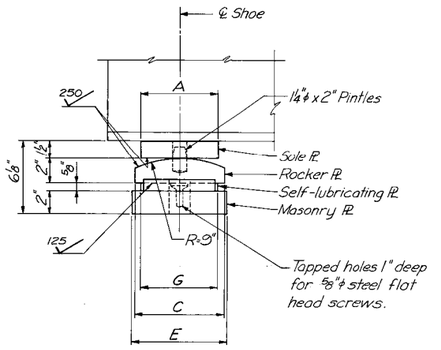
JAMES RIVER BRIDGE

STRUCTURAL STEEL DETAILS

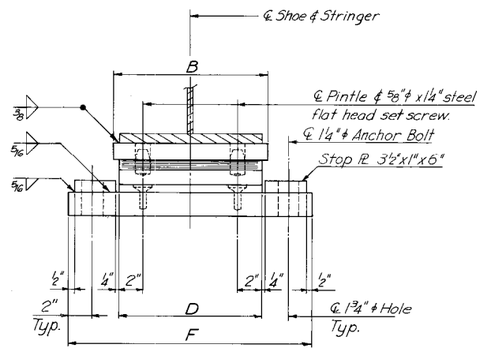
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: C-3
SHEET NO. 33 OF 53

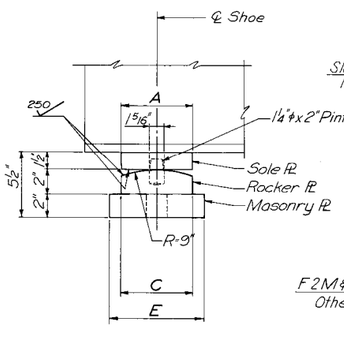
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	34	53



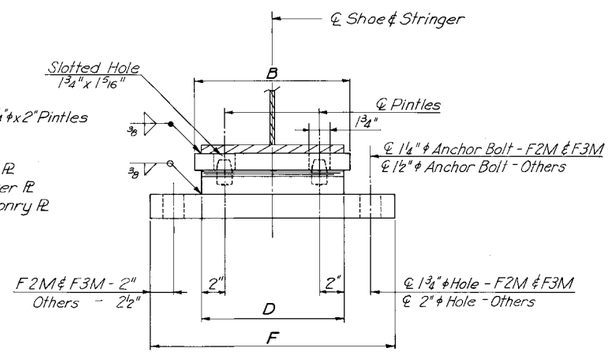
SIDE ELEVATION



END ELEVATION



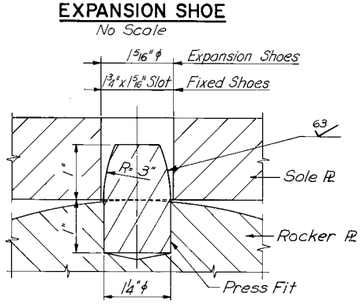
SIDE ELEVATION



END ELEVATION

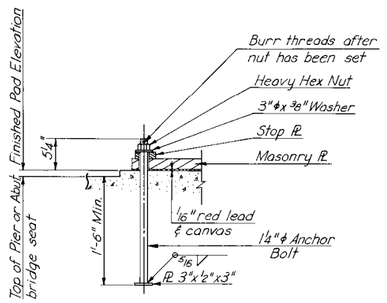
EXPANSION SHOE

No Scale



PINTLE DETAIL

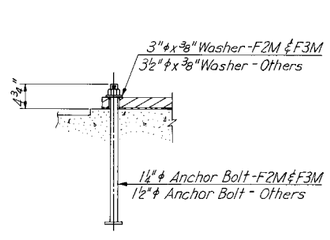
Scale: ¾"=1"



EXPANSION SHOE

ANCHOR BOLT DETAIL

No Scale



FIXED SHOE

Note:
Anchor Bolt for Fixed Shoes same as Anchor Bolt for Exp. Shoes except as shown.

FIXED SHOE

No Scale

Shoe Notes:

Top of masonry plates, bottom of rocker plates and top and bottom of sole plates planed, straightened or otherwise treated to secure true level surfaces.

Contact surfaces noted on the plans with finish symbols shall be finished in accordance with the American National Standards Institute surface roughness requirement, as defined in ASA B46.1 Surface Roughness, Waviness and Lay, Part I.

The plates comprising the expansion shoes shall be set so as to be truly centered under full dead load at a temperture of 68°F.

Concrete pads shall be formed integral with abutment or pier and not less than ⅛" or more than ¼" above finished elevotion. Dress down pads by rubbing, grinding or as otherwise approved by the Engineer, to true level surfaces at the finished elevation.

Anchor bolt assemblies shall conform to A.S.T.M. A-307 and shall be hot-dip galvanized conforming to A.S.T.M. A-153.

Templates shall be used to accurately set the anchor bolts.

Material for shoes (exclusive of self-lubricating plates) shall be high strength low alloy structural steel conforming to A.S.T.M. Specification A-588.

Material for self-lubricating plates shall be Leaded Tin Bronze conforming to A.S.T.M. Specification B22, alloy D modified to the extent that 1.5 to 2.5 percent lead is allowable.

Shoes shall be included with structural steel item for payment.

SHOE DIMENSIONS

EXPANSION SHOES	A	B	C	D	E	F	G
E4	6"	1'-5½"	9"	1'-4½"	9½"	2'-1"	6"
E5	6"	1'-5½"	9"	1'-4½"	9½"	2'-1"	7"
E6	6"	1'-7"	9"	1'-6"	10½"	2'-2½"	6"
E7	6"	1'-7"	9½"	1'-6"	10½"	2'-2½"	7½"
E8	6"	1'-9"	9"	1'-8"	11"	2'-4½"	6½"
E9	6"	1'-9"	10"	1'-8"	11"	2'-4½"	7½"
~~E11~~	~~6"~~	~~1'-11"~~	~~10"~~	~~1'-10"~~	~~11"~~	~~2'-6½"~~	~~7½"~~
E12	6"	2'-1"	9½"	2'-0"	9½"	2'-4½"	6½"
~~E14~~	~~6"~~	~~2'-1"~~	~~1'-0"~~	~~2'-0"~~	~~1'-1"~~	~~2'-8½"~~	~~9½"~~

FIXED SHOES	A	B	C	D	E	F
F2M	6"	1'-5½"	6"	1'-4½"	7"	2'-1"
F3M	6"	1'-5½"	6"	1'-4½"	8"	2'-1"
F4M	6"	1'-7"	6"	1'-6"	7"	2'-4"
F5M	6"	1'-7"	6"	1'-6"	8"	2'-4"
F6M	6"	1'-9"	6"	1'-8"	7"	2'-6"
F7M	6"	1'-9"	6"	1'-8"	8"	2'-6"
~~F9M~~	~~6"~~	~~1'-11"~~	~~6"~~	~~1'-10"~~	~~8"~~	~~2'-8½"~~
F10M	6"	2'-1"	6"	2'-0"	7"	2'-10½"

	BY	DATE
MADE	HBW	5-67
CHECKED	FXH	8-67
IN CHARGE	FXH	

NO.	REVISION	BY	DATE
2	AS BUILT	JRC	12-72
⚠	Delete Shoes.	H.B.W.	2/20/71

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

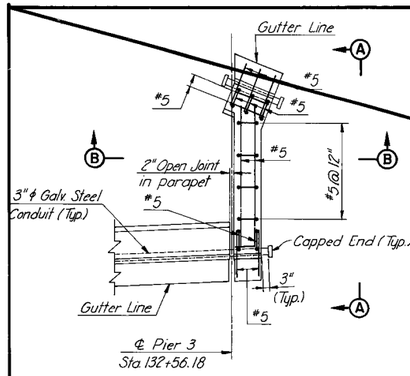
JAMES RIVER BRIDGE

SHOES

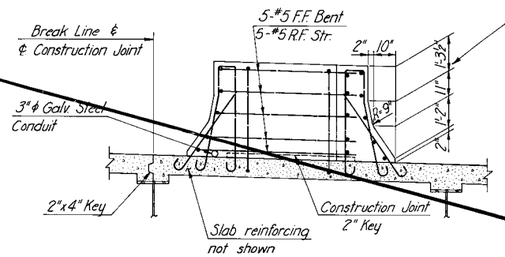
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO: C-3
SHEET NO. 34 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	37	53



NOSE DETAIL
Scale: $\frac{3}{8}$"=1'-0"



SECTION A-A
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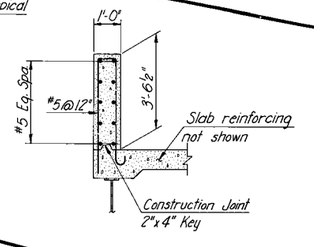
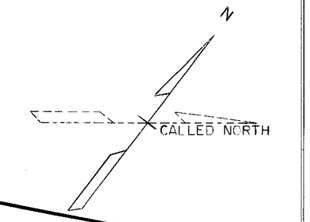
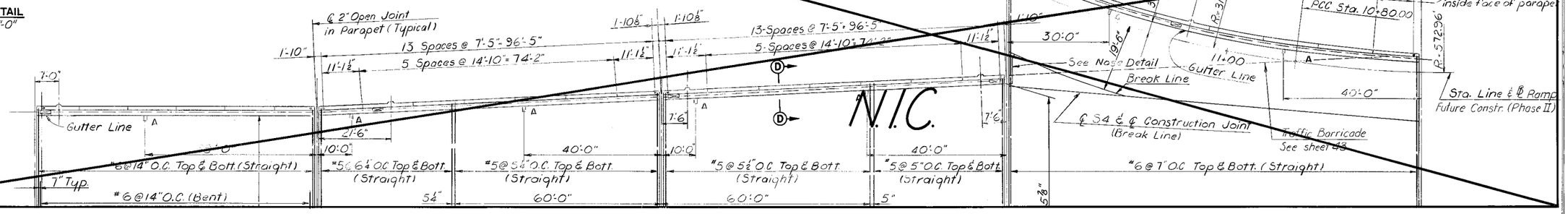
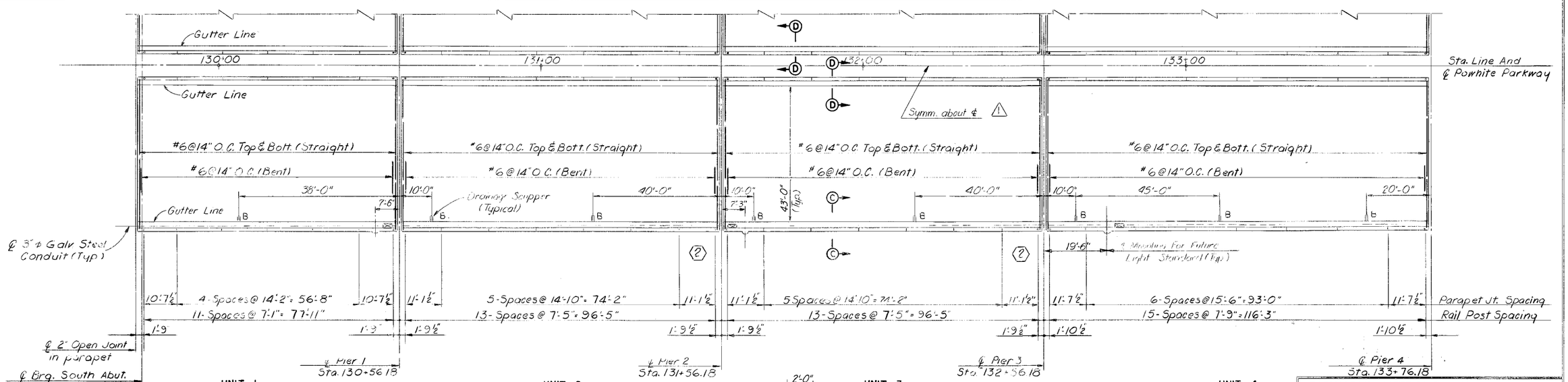


SECTION B-B
Scale: $\frac{3}{8}$"=1'-0"

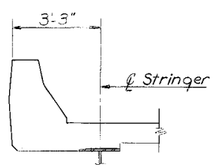




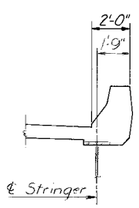
N.I.C.



UNIT 1 UNIT 2 UNIT 3 UNIT 4



SECTION D-D
NO SCALE



SECTION C-C
NO SCALE

Notes:
For General Notes see Sheet No. 4.
For Longitudinal Reinforcement, additional reinforcement at Deck Joints, additional Details and Cross Section see Sheet No. 41.
For Details of Mounting For Future Lighting Standard see Sheet No. 44.
For Joint Details see Sheet No. 35.
For Scupper Details see Sheet No. 36.

	BY	DATE
MADE	D.E.K.	7-67
CHECKED	H.B.W.	9-67
IN CHARGE	F.X.H.	

NO.	REVISION	BY	DATE
3	AS BUILT	JRC	12-72
②	Light Std. Location	J.G.V.	3/9/71
⚠	Remove Ramp Taper	J.G.V.	2-20-71

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

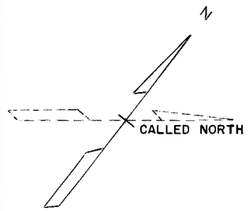
JAMES RIVER BRIDGE

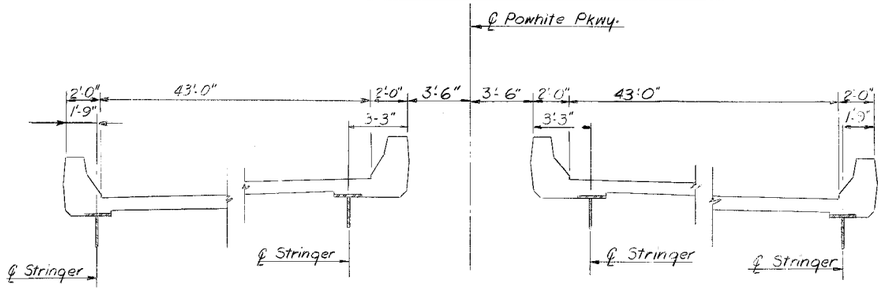
DECK PLAN - UNITS 1,2,3&4

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

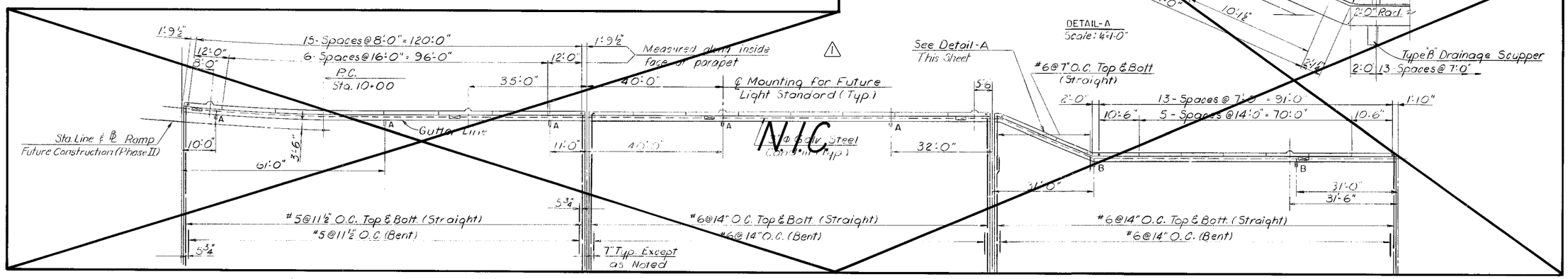
SCALE: 1"=15' UNLESS NOTED
CONTRACT NO.: C-3
SHEET NO. 37 OF 53

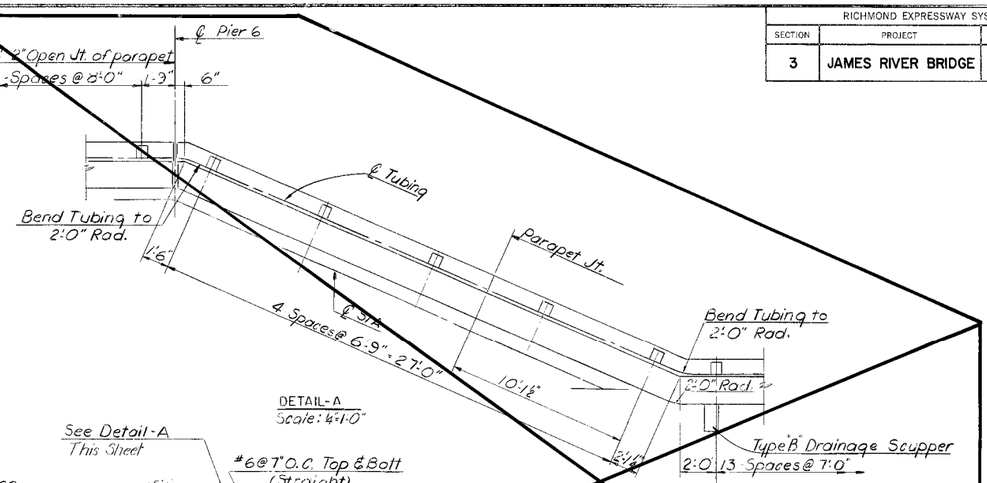
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	38	53



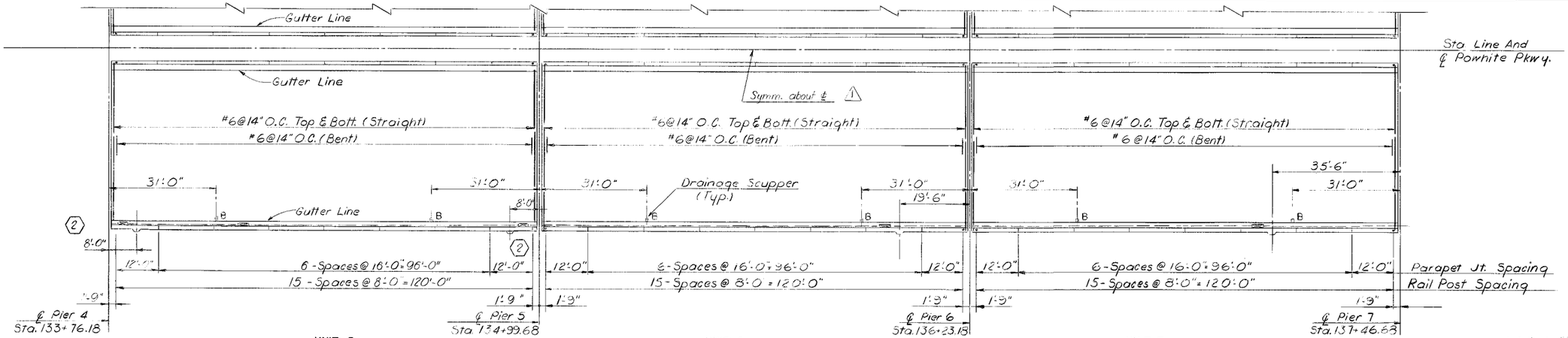


TYPICAL SECTION
LOOKING NORTH
NO SCALE



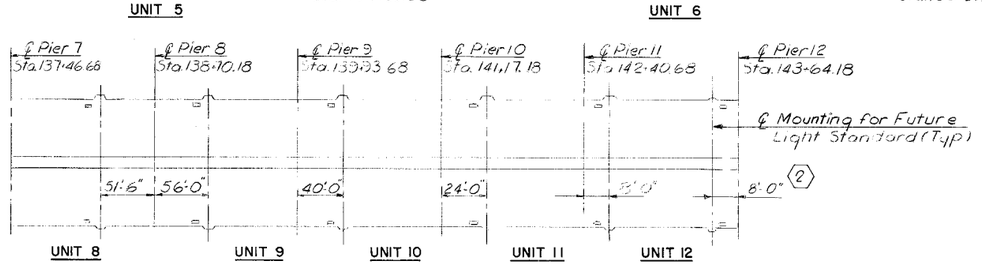


DETAIL-A
Scale: 4"=1'-0"



UNIT 5 — UNIT 6 — UNIT 7

UNIT 7
SCUPPER LOCATIONS AND REINFORCEMENT FOR UNITS 8 THRU 12 SIMILAR TO UNIT 7



LIGHTING STANDARD LOCATIONS FOR UNITS 8 THRU 12
NO SCALE

Notes:
For Notes see Sheet No. 37

	BY	DATE	NO.	REVISION	BY	DATE
MADE	D.E.K.	7-67	3	AS BUILT	JRC	12-72
CHECKED	H.B.W.	9-67	②	Light Std. Location	J.G.V.	3/9/71
IN CHARGE	F.X.H.		⚠	Remove Ramp Widening	J.G.V.	2-20-71

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

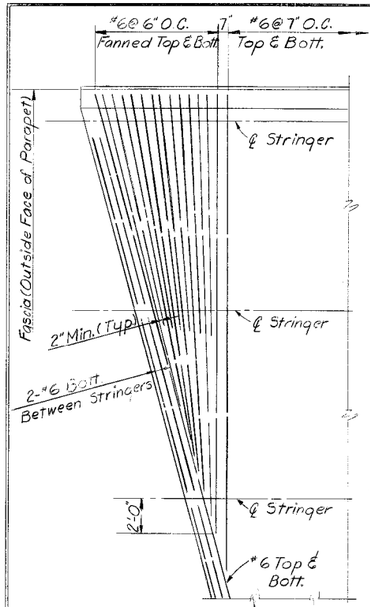
JAMES RIVER BRIDGE

DECK PLAN-UNITS 5 THRU 12

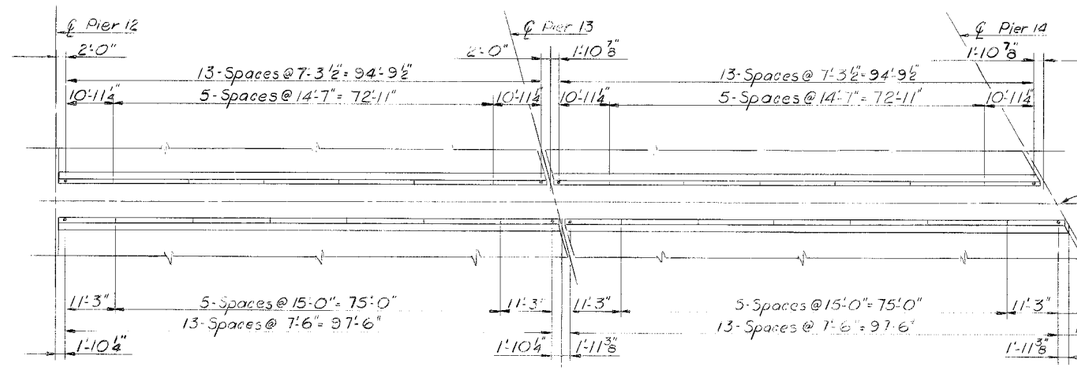
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=15' UNLESS NOTED
CONTRACT NO.: C-3
SHEET NO. 38 OF 53

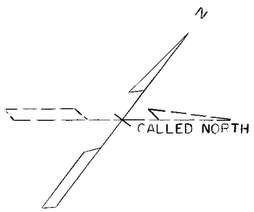
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	39	53

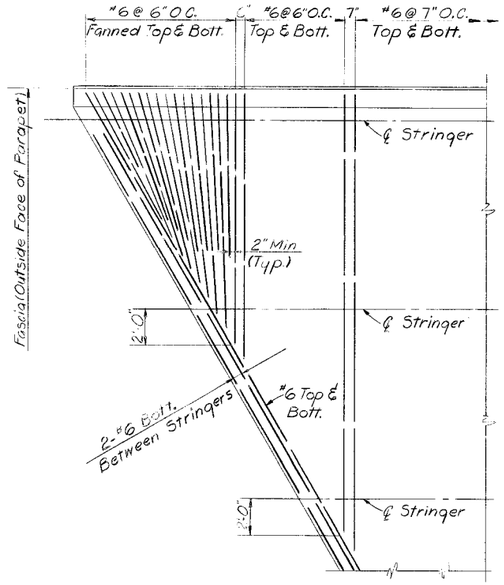


CORNER DETAIL
15° SKEW
Scale: 1/4"=1'-0"

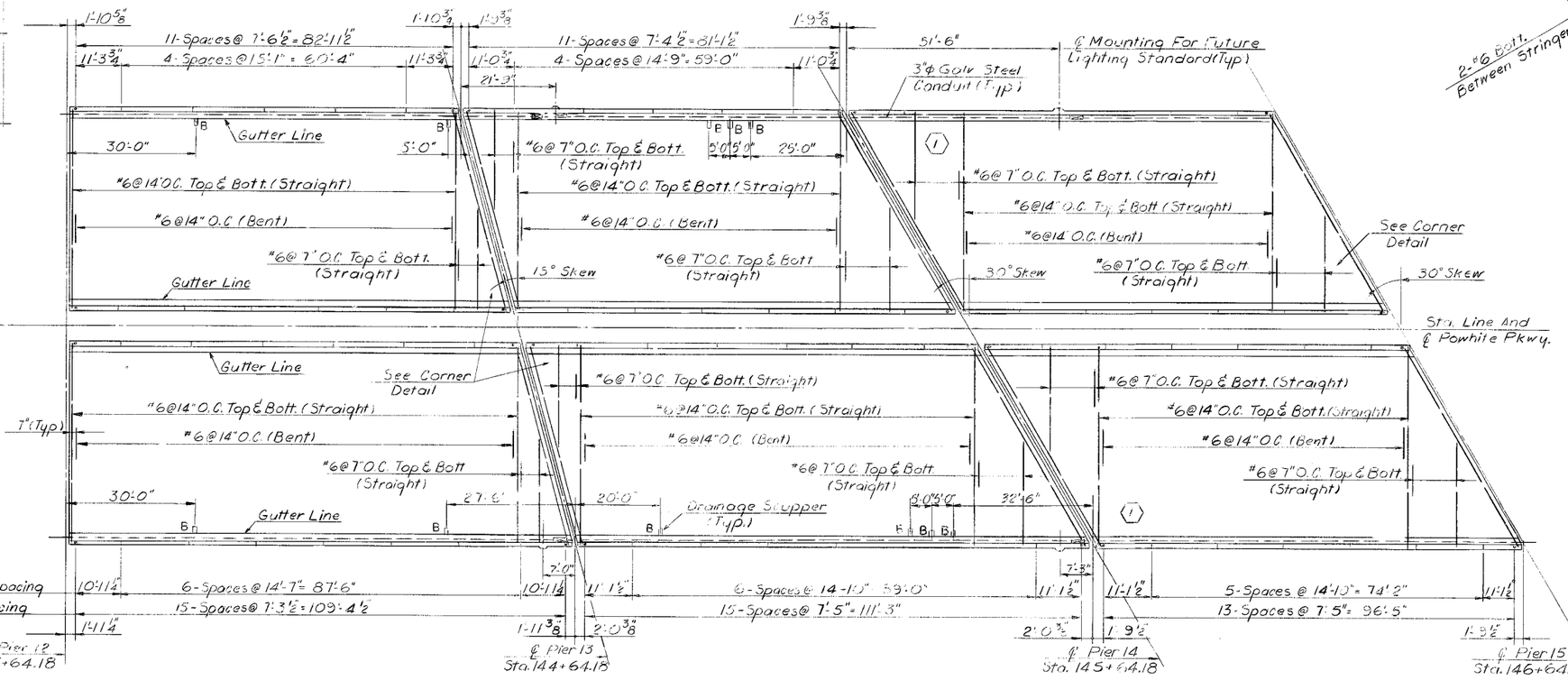


RAIL POST & JOINT SPACING AT MEDIAN

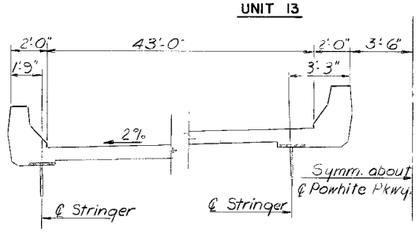




CORNER DETAIL
30° SKEW
Scale: 1/4"=1'-0"



UNIT 13 UNIT 14 UNIT 15



TYPICAL SECTION
LOOKING NORTH
NO SCALE

Notes:
For Notes See Sheet No. 37

	BY	DATE				
MADE	D.E.K.	7-67	2	AS BUILT	JRC	12-72
CHECKED	H.B.W.	9-67	1	Light Std. & Scupper Location	J.G.V.	3/9/71
IN CHARGE	F.X.H.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

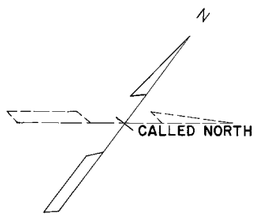
JAMES RIVER BRIDGE

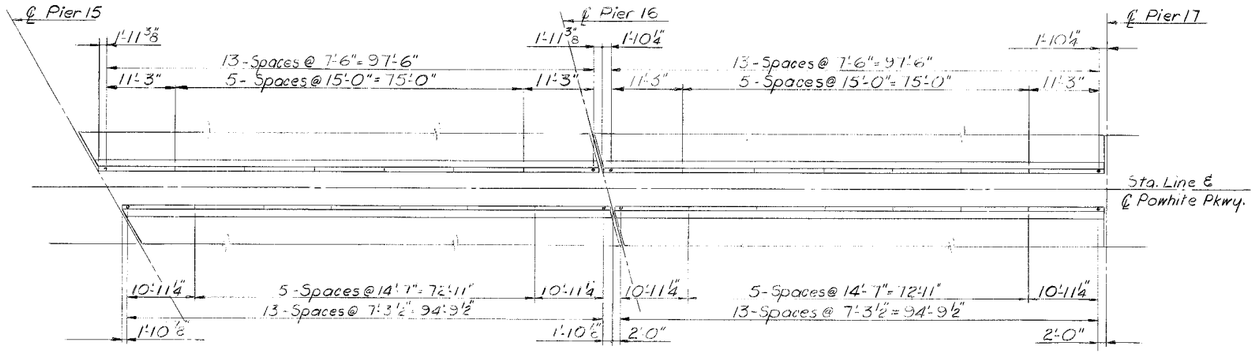
DECK PLAN – UNITS 13, 14 & 15

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

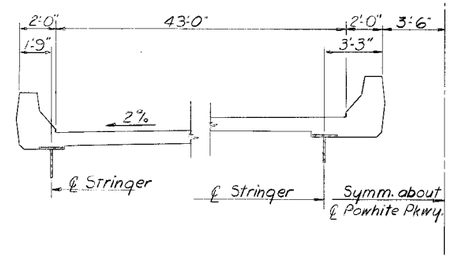
SCALE: 1"=5' UNLESS NOTED
CONTRACT NO.: C-3
SHEET NO. 39 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	40	53

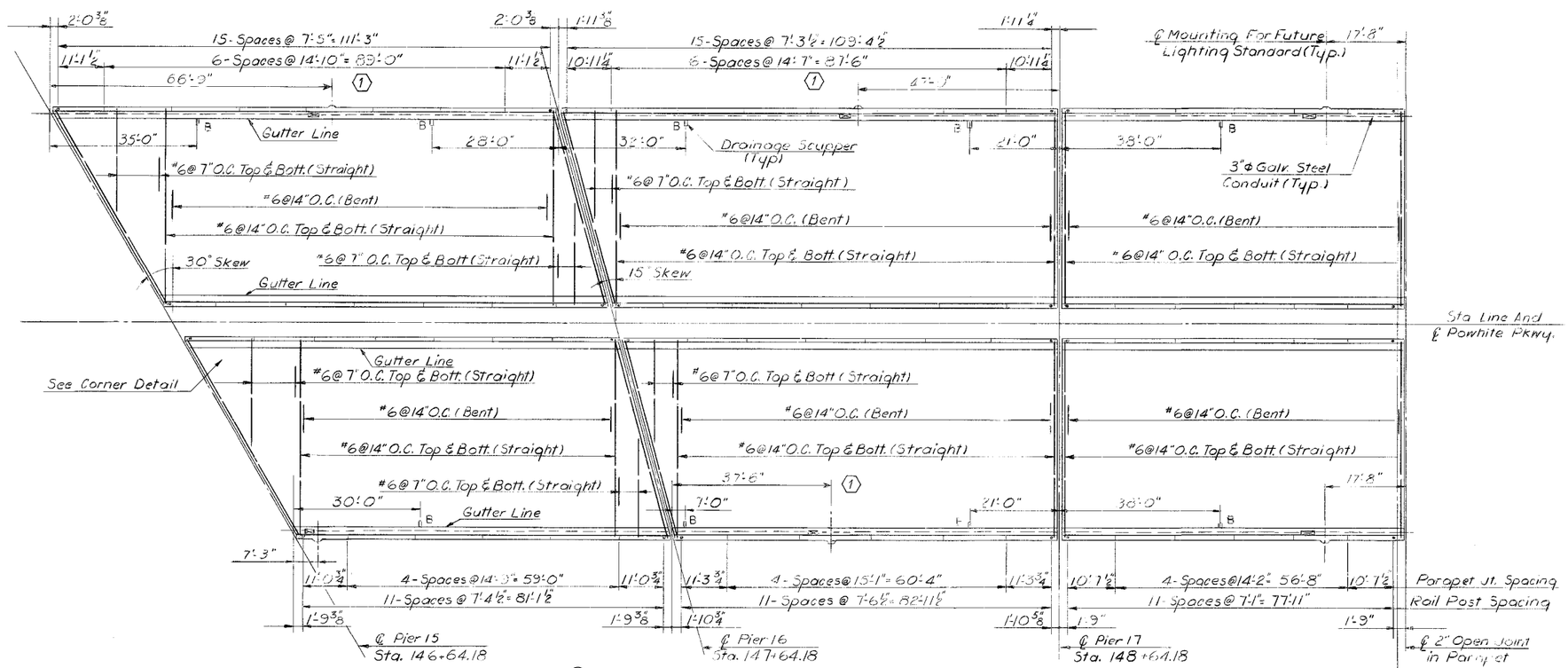


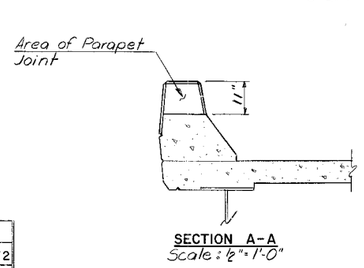


RAIL POST & JOINT SPACING AT MEDIAN

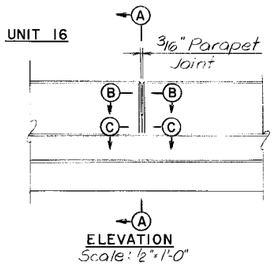


TYPICAL SECTION
SCALE: 1/4"=1'-0"

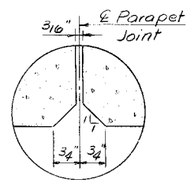




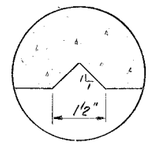
SECTION A-A
Scale: 1/2"=1'-0"



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



SECTION B-B
Half Size



SECTION C-C
Half Size

PARAPET JOINT DETAILS

Notes:
For Notes See Sheet No. 37
For Corner Details See Sheet No. 39

	BY	DATE				
MADE	DE.K.	7-67	2	AS BUILT	JRC	12-72
CHECKED	H.B.W.	9-67	1	Light Std. Location	H.B.W.	3/9/71
IN CHARGE	F.X.H.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

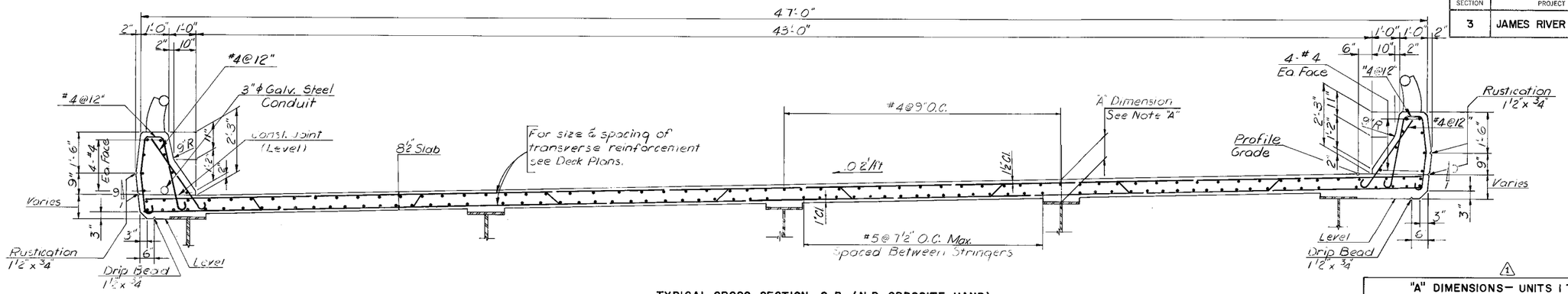
JAMES RIVER BRIDGE

DECK PLAN - UNITS 16, 17 & 18

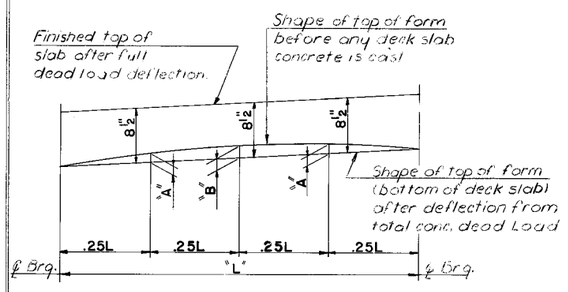
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=15' UNLESS NOTED
CONTRACT NO.: C-3
SHEET NO. 40 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	41	53



TYPICAL CROSS SECTION S.B. (N.B. OPPOSITE HAND)
SCALE: ½"= 1'-0"
⚠1



DEAD LOAD DEFLECTION DIAGRAM
NO SCALE

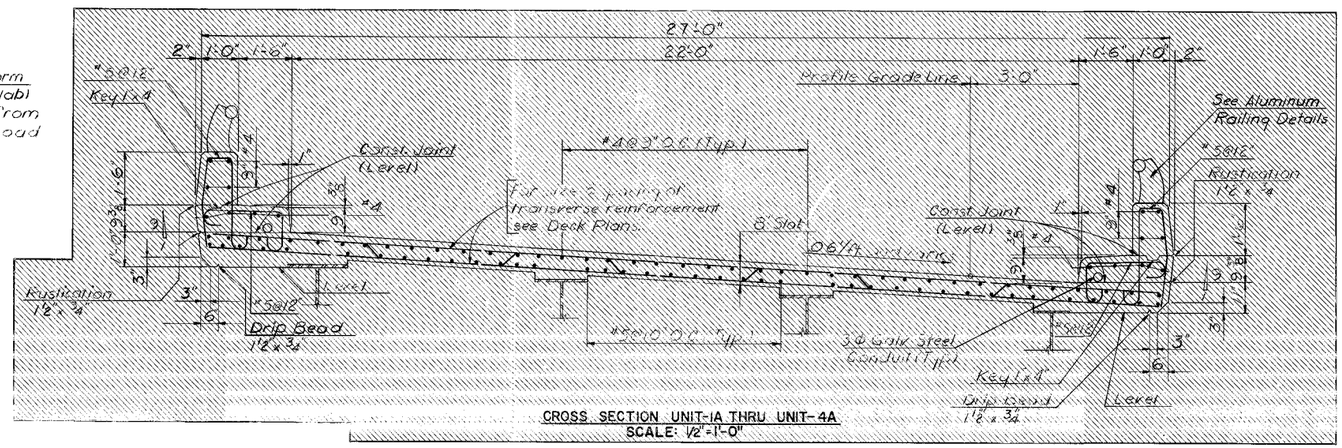
NOTE TO CONTRACTOR

The deflections noted are those anticipated to occur in the stringer upon placement of the total concrete dead load. In practice the stringers, in place, are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided for by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab & the top of stringer, without alteration of the slab thickness.

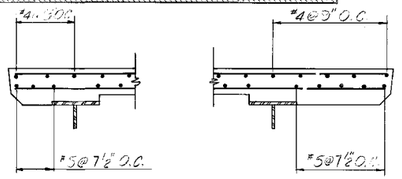
⚠1

DEFLECTION SCHEDULE

UNIT	STRINGER	A	B	UNIT	STRINGER	A	B	UNIT	STRINGER	A	B
1	S1-S10	5/8"	7/8"	7-12	S1-S10	1 5/8"	2¼"		S1	1 3/8"	2"
2	~~S1-S6~~	~~1"~~	~~1 3/8"~~		S1	¾"	1"		S2	1 3/8"	1 7/8"
	S1-S10	1⅛"	1½"		S2	7/8"	1⅛"		S3	1¼"	1 3/4"
3	~~S1-S6~~	~~1"~~	~~1 3/8"~~		S3	7/8"	1¼"		S4	1¼"	1 5/8"
	S1-S10	1⅛"	1½"		S4	1"	1 3/8"		S5	1⅛"	1 5/8"
4	~~S1~~	~~1 5/8"~~	~~2¼"~~	13 & 14	S5	1"	1½"	16 & 17	S6	1"	1½"
	~~S2&S4~~	~~1 3/8"~~	~~2⅛"~~		S6	1⅛"	1 5/8"		S7	1"	1 3/8"
	~~S3&S5~~	~~1½"~~	~~2 3/4"~~		S7	1¼"	1 5/8"		S8	⅞"	1¼"
	~~S6~~	~~1½"~~	~~2¼"~~		S8	1¼"	1 3/4"		S9	⅞"	1⅛"
	S1-S10	1½"	2⅛"		S9	1 3/8"	1 7/8"		S10	¾"	1"
5	S1-S10	1 5/8"	2¼"		S10	1 3/8"	2"	18	S1-S10	5/8"	⅞"
6	S1-S10	1 5/8"	2¼"	15	S1-S10	1⅛"	1½"				



CROSS SECTION UNIT-1A THRU UNIT-4A
SCALE: ½"=1'-0"



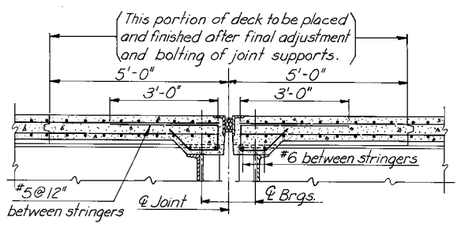
LONGITUDINAL REINFORCEMENT AT FASCIA

"A" DIMENSIONS — UNITS 1 THRU 18			
UNIT 1		UNIT 7	
S5 & S6	10 3/8"	~~S1A~~	~~10 3/8"~~
S1-S4 & S7-S10	9¾"	S2-S4 & S7-S9	10¼"
UNIT 2 & 3		S5 & S6	10⅛"
S5 & S6	10¼"	S1 & S10	10½"
S1-S4 & S7-S10	9¾"	UNIT 8 THRU 12	
UNIT 4		S2-S4 & S7-S9	10¼"
~~S1 (AT PIER 3)~~	~~10"~~	S5 & S6	10⅛"
~~S1 (AT PIER 4)~~	~~10⅛"~~	S1 & S10	10½"
~~S2~~	~~11"~~	UNIT 13 & 14	
~~S3~~	~~10"~~	S1	10¾"
~~S4~~	~~10¼"~~	S2, S3, S4 & S7	9¾"
~~S5~~	~~9¾"~~	S5 & S6	10¼"
~~S6~~	~~10"~~	S8 & S9	10"
S1-S10	10⅛"	S10	10½"
UNIT 5		UNIT 15	
~~S1~~	~~10⅛"~~	S2-S4 & S7-S9	9¾"
~~S2~~	~~9¾"~~	S5 & S6	10¼"
~~S3-S6~~	~~9¾"~~	S1 & S10	10½"
S5 & S6	10⅛"	UNIT 16 & 17	
S2-S4 & S7-S9	10¼"	S1	10½"
S1 & S10	10½"	S2 & S3	10"
		S4, S7, S8 & S9	9¾"
UNIT 6		S5 & S6	10¼"
S5 & S6	10⅛"	S10	10¾"
S2-S4 & S7-S9	10¼"	UNIT 18	
S1 & S10	10½"	S2-S4 & S7-S9	9¾"
		S5 & S6	10⅜"
		S1 & S10	10¾"

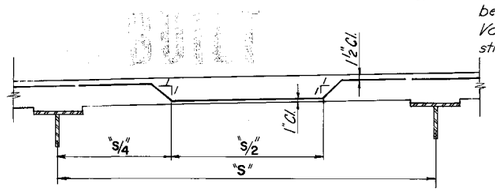
"A" DIMENSIONS — UNITS 1A THRU 4A			
UNIT 1A		UNIT 4A	
S1, S2 & S3	9½"	S1 (AT PIER 3A)	9½"
S4	10"	S1 (AT PIER 3)	10¼"
UNITS 2A & 3A		S2 & S3	9½"
S1, S2 & S3	9½"	S4	10"
S4	9¾"		

Note A

"A" Dimension is given at the intersection of the ℄ Stringer and ℄ Bearing. Dimension shown is measured from top of top flange to construction joint for Fascia Stringers with 1'-3" overhang (see deck plan) and from top of top flange to top of deck for all other stringers. This dimension may vary between bearings due to change in top flange thickness or Variation in Camber, except that no portion of the stringer flange may fall within the slab.



TYPICAL SECTION AT JOINT



TYPICAL BENT BAR DETAIL

Notes:
For Notes see Sheet No. 37.
All Bar clearances to conc. face are 2" unless noted.

	BY	DATE				
MADE	D.E.K.	7-67	2	AS BUILT	JRC	12-72
CHECKED	H.B.W.	9-67	⚠1	X-Sections & Deflections	EJR	2/20/71
IN CHARGE	F.X.H.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

JAMES RIVER BRIDGE

DECK DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1" = 1'-0" UNLESS NOTED
CONTRACT NO.: C-3
SHEET NO. 41 OF 53

LIMITED ACCESS HIGHWAY

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	1	106

REVISED BY

DESIGNED BY

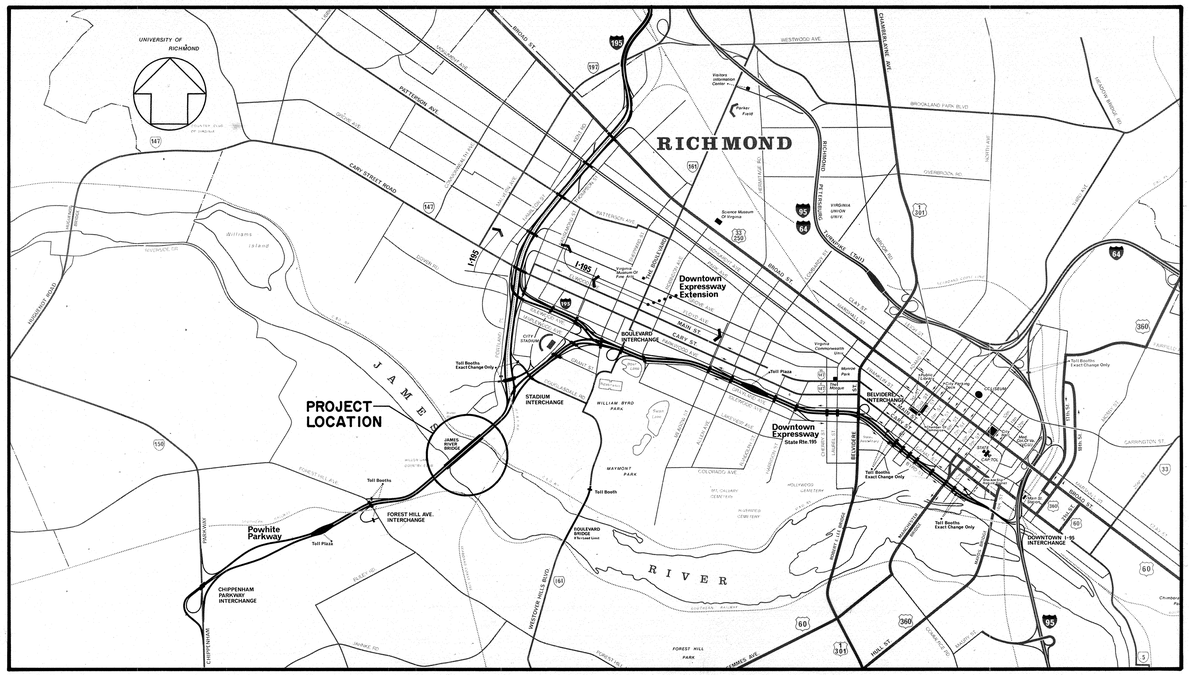
RICHMOND METROPOLITAN AUTHORITY

RICHMOND EXPRESSWAY SYSTEM

PROPOSED WIDENING

JAMES RIVER BRIDGE

INDEX OF SHEETS



CONVENTIONAL SIGNS

STATE LINE	LEVEE OR EMBANKMENT
COUNTY LINE	BRIDGES
CITY, TOWN OR VILLAGE	CULVERTS
RIGHT OF WAY LINE	DROP INLET
FENCE LINE	TROLLEY POLES
UNFENCED PROPERTY LINE	POWER POLES
FENCED PROPERTY LINE	TELEPHONE OR TELEGRAPH POLES
TRAVELED WAY	MARSH
GUARD RAIL	HEDGE
RETAINING WALL	WOODS
RAILROADS	GROUND ELEVATION
BASE OR SURVEY LINE	GRADE ELEVATION
	POLES WITHIN CONSTRUCTION LIMITS

CONTRACT C-13

AS BUILT

COMMONWEALTH OF VIRGINIA
DANIEL J. APPEL
CIVIL ENGINEER
No. 2437
CERTIFIED PROFESSIONAL ENGINEER

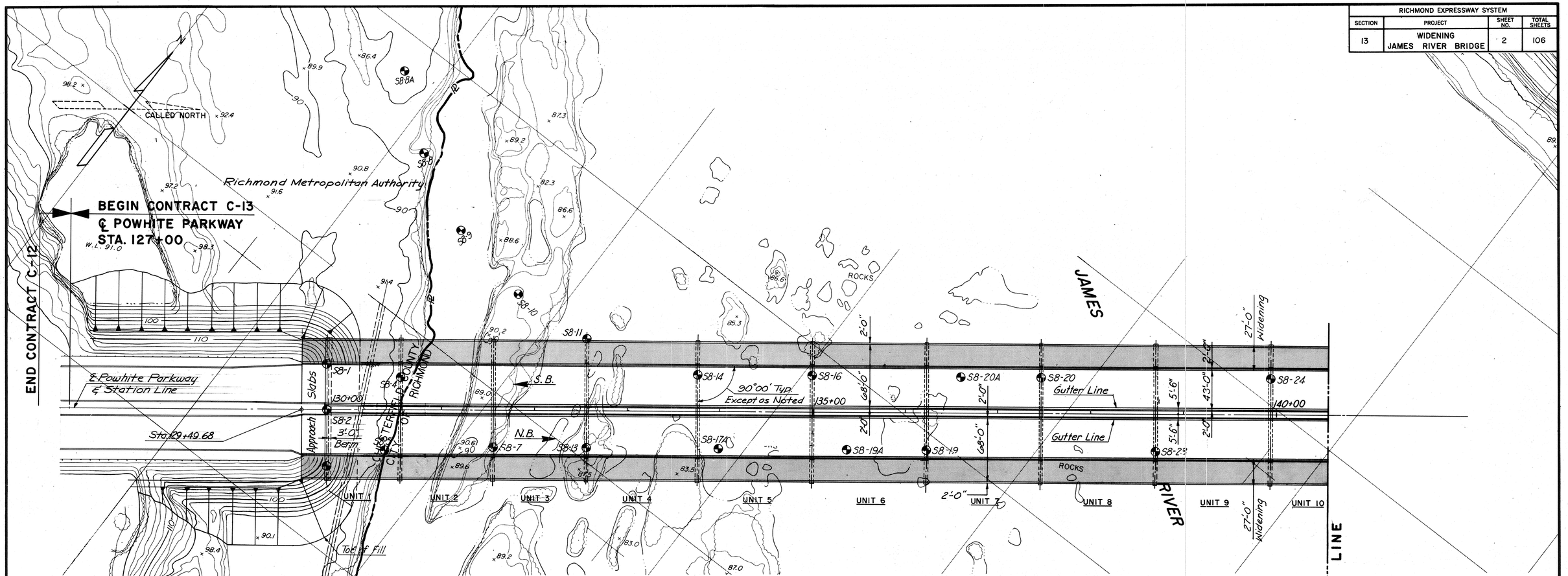
SUBMITTED BY	
Date	
3-16-87	
Date	HOWARD, NEEDLES, TAMMEN & BERGENDOFF general consultant

RECOMMENDED BY	
Date	
3-29-87	
Date	GENERAL MANAGER, RICHMOND METROPOLITAN AUTHORITY

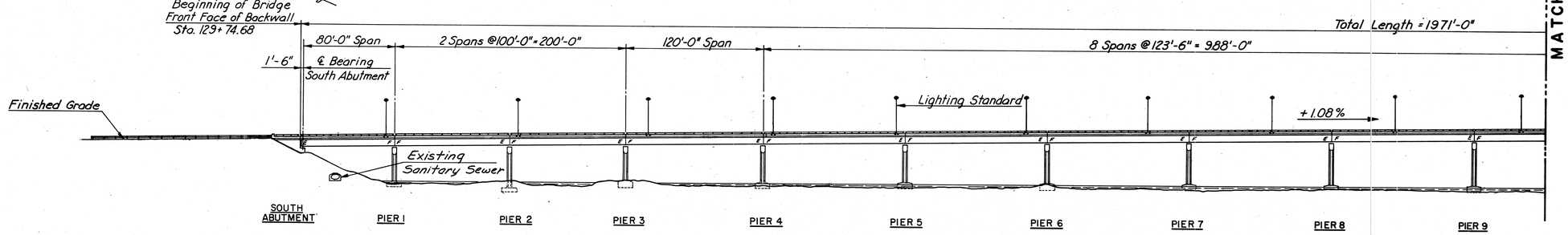
APPROVED BY	
3-29-87	
Date	CHAIRMAN, RICHMOND METROPOLITAN AUTHORITY

Plans Revised			
Sheet No.	Date	Sheet No.	Date

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	2	106



PLAN



ELEVATION

	BY	DATE	NO.	REVISION	BY	DATE
MADE	A.L.C.	3-87		As Built	TEM	3-89
CHECKED	T.F.P.	3-87	⚠	Property Line	ALC	4-87
IN CHARGE	S.R.					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: 1" - 50'
CONTRACT NO.: C-13
SHEET NO. 2 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	3	106

N

CALLED NORTH

JAMES RIVER

MATCH LINE

CSX Transportation

CHESAPEAKE AND OHIO RAILROAD

KANAWHA CANAL

Robert & Bessie B. Carter

Fitzgerald Bemiss

John C. & Elizabeth M. Hogan

Elizabeth S. Brock

Jack Cahsino

C. Merle Luck Jr.

END CONTRACT C-13
℄ POWHITE PARKWAY
STA. 151+50.0

BEGIN CONTRACT C-14

Temporary Construction Easement

Point of Min. Vert. Clear.

Richmond Metropolitan Authority

℄ Existing 60" Water Main

24.5'± Min. Horiz. Cl.

39.5' Min. Horiz. Cl.

150'-0"

27'-0" Widening

2'-0"

5'-6"

68'-0"

Gutter Line

S8-27 S8-28 S8-30 S8-31 S8-32 S8-33 S8-34 S8-35 S8-36 S8-37 S8-38 S8-39 S8-40 S8-41 S8-42 S8-43 S8-44

90°00' Typ. Except as Noted

75°00' 60°00' 60°00' 75°00'

W.L. 104.4

W.L. 90.3

145+00

150+00

Sta. 149+70.68

S.B.

N.B.

℄ Powhite Parkway ℄ Station Line

BX-3 3'-0" Berm S8-46

Approach Slabs

UNIT 10 UNIT 11 UNIT 12 UNIT 13 UNIT 14 UNIT 15 UNIT 16 UNIT 17 UNIT 18

28.5' Min. Horiz. Cl.

43.5' Min. Horiz. Cl.

CSX Transportation

Temporary Construction Easement

C. Merle Luck Jr.

PLAN

Total Length = 1971'-0"

8 Spans @ 123'-6" = 988'-0"

5 Spans @ 100'-0" = 500'-0"

End of Bridge
Front Face of Backwall
Sta. 149+45.68

80'-0" Span

℄ Bearing North Abutment

1'-6"

Finished Grade

+1.08 %

Lighting Standard (Typ.)

23'-2" Vert. Clear

℄ Tracks

1:1 2

PIER 10 PIER 11 PIER 12 PIER 13 PIER 14 PIER 15 PIER 16 PIER 17 NORTH ABUTMENT

ELEVATION

As Built TEM 3-89

	BY	DATE
MADE	ALC	3-87
CHECKED	T.F.P	3-87
IN CHARGE	S.R.	

NO.	REVISION	BY	DATE
2	Added Horiz. Cl.	EJM	7-87
2	Vert. Clear	ALC	5-87
1	Property Line	ALC	4-87

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: 1" - 50'
CONTRACT NO.: C-13
SHEET NO. 3 OF 106

△4 ESTIMATE OF QUANTITIES *

	CONSTRUCTION SURVEY △1	EMBANKMENT	TEMPORARY SILT FENCE	FILTER CLOTH	STRUCTURE EXCAVATION AT PIERS	STRUCTURE EXCAVATION	POROUS BACKFILL	STEEL SHEET PILING	STEEL PILES 10BP42	DRIVING TEST FOR STEEL PILE 10BP42	CONCRETE CLASS A3 SUBSTRUCTURE	CONCRETE CLASS A4 APPROACH SLABS	CONCRETE CLASS A4		CONCRETE BRIDGE PARAPET	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL	STRUCTURAL STEEL **	DRY RIPRAP CLASS I	RIPRAP FILTER CLOTH BEDDING		DAMPPROOFING	UNDERDRAIN 6" DIA.		MOBILIZATION	FIELD OFFICE				PARTIAL DEMOLITION OF EXISTING SUBSTRUCTURE	PARTIAL DEMOLITION OF EXISTING SUPERSTRUCTURE	TEMPORARY CAUSEWAYS AND ACCESS ROADS		ELASTOMETRIC EXPANSION DAM, 0-2"
	L.S.	C.Y.	L.F.	S.Y.	C.Y.	C.Y.	C.Y.	S.F.	L.F.	L.F.	C.Y.	C.Y.	C.Y.		L.F.	LBS.	LBS.	L.S.	S.Y.	S.Y.		S.Y.	L.F.		L.S.	MTH.				L.S.	L.S.	L.S.		L.F.
SUPERSTRUCTURE													3091.6		4038		604,840	1																2750
SOUTH ABUT.		2670	635	23		423	29		794	48	157.2					9100	590		1399	216		87	92											
NORTH ABUT.		2000	1100			305	28		1865		167.6					8410	590		942	120		93	98											
PIER 1					105						113.6					15750																		
PIER 2					75						113.1					14900																		
PIER 3					30						131.0					14890																		
PIER 4					37						124.7					13710																		
PIER 5					30						132.7					17250																		
PIER 6					47						124.3					14420																		
PIER 7					34						132.6					17610																		
PIER 8					45						151.4					19170																		
PIER 9					20						130.5					16170																		
PIER 10					51						165.7					20760																		
PIER 11					134						220.4					26080																		
PIER 12					95						226.0					26640																		
PIER 13					142						197.9					24480																		
PIER 14					403			640			158.0					21120																		
PIER 15					534			647			161.8					21700																		
PIER 16					443			1540	976		180.4					19220	△1																	
PIER 17					417			1627	1080		180.8					19580	△1																	
APPROACH SLAB												99.2				15100																		
TOTALS	1	4670	1735	23	2540	728	57	4454	4715	48	2946.6	99.2	3091.6		4038	356,060	606,020	1	2341	336		180	190		1	17				1	1	1		2750
				△2	△2	△3		△3	△2		△3			△3	△3	△1				△3								△1						

* For additional quantities see Sheet Nos. 67 & 101.

** The total weight of structural steel, 3,541,900 lbs, includes the shoes.

GENERAL NOTES

WIDTH: WIDENING OF 27'-0" TO THE EAST AND WEST OF THE EXISTING STRUCTURE.

SPAN LAYOUT: 18-SIMPLE SPAN, STEEL PLATE GIRDER WITH SPANS OF 2-80 FEET, 7-100 FEET, 1-100 FEET AND 8-123.5 FEET.

CAPACITY: HS20-44 LOADING AND ALTERNATE MILITARY LOADING. DESIGN LOADING INCLUDES 15 P.S.F. FOR FUTURE WEARING SURFACE AND 20 P.S.F. ALLOWANCE FOR CONSTRUCTION TOLERANCES AND CONSTRUCTION METHODS.

SPECIFICATIONS:

CONSTRUCTION: VIRGINIA DEPARTMENT OF HIGHWAYS AND TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS, 1982.

DESIGN: AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 1983, INCLUDING INTERIM SPECIFICATIONS, 1984, AND VDHT MODIFICATIONS.

STANDARDS: VIRGINIA DEPARTMENT OF HIGHWAYS AND TRANSPORTATION ROAD AND BRIDGE STANDARDS, 1982.

ALL DIMENSIONS ARE MEASURED HORIZONTALLY AND VERTICALLY UNLESS OTHERWISE SPECIFIED.

THESE PLANS ARE INCOMPLETE UNLESS ACCOMPANIED BY THE SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS INCLUDED IN THE CONTRACT DOCUMENTS.

ALL STRUCTURAL STEEL SHALL BE A36, EXCEPT AS NOTED.

FINISH PAINT SHALL BE LIGHT GREEN, FEDERAL STANDARD 595-24227.

CONCRETE IN SUPERSTRUCTURE SHALL BE CLASS A4. ALL OTHER CONCRETE, EXCEPT TREMIE SEAL CONCRETE, SHALL BE CLASS A3.

ALL DEFORMED REINFORCING BARS SHALL CONFORM TO ASTM A615, GRADE 60.

ALL REINFORCING BAR DIMENSIONS ON THE DETAILED DRAWINGS ARE TO CENTER OF BARS EXCEPT WHERE OTHERWISE NOTED AND ARE SUBJECT TO FABRICATION AND CONSTRUCTION TOLERANCES.

ALL FOOTING CONCRETE SHALL BE PLACED IN THE DRY EXCEPT WHERE CLASS T3 CONCRETE IS INDICATED ON THE PLANS OR APPROVED BY THE ENGINEER.

BECAUSE OF THE ERRATIC NATURE OF THE GROUND CONDITIONS AT THE SITE, ELEVATIONS OF THE BOTTOM OF THE FOOTINGS SHOWN ON THE PLANS SHALL BE CONSIDERED APPROXIMATE ONLY. DURING CONSTRUCTION SHOULD EXCAVATION OPERATIONS REVEAL THAT THE FOUNDATION IS INADEQUATE, REDESIGN MAY BE REQUIRED AT THE DISCRETION OF THE ENGINEER.

STEEL PILES 10BP42 ARE DESIGNED FOR A CAPACITY OF 55 TONS PER PILE. ALL PILES SHALL BE DRIVEN TO PRACTICAL REFUSAL.

PRIOR TO THE COMMENCEMENT OF ANY WORK THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS OF THE EXISTING STRUCTURE AND REPORT TO THE ENGINEER ANY DISCREPANCIES BETWEEN FIELD MEASUREMENTS AND MEASUREMENTS SHOWN ON THE CONTRACT PLANS.

△1 ELEVATIONS TAKEN FROM CITY OF RICHMOND DATUM.

△4 As Built TEM 3-89

	BY	DATE	NO.	REVISION	BY	DATE
			△3	Quantities	ALC	4-87
MADE	ALC	3-87	△2	Quantities	ALC	4-87
CHECKED	T.F.P.	3-87	△1	Quantities & Added Note	ALC	4-87
IN CHARGE S.R.			NO.	REVISION	BY	DATE

N87490

AS BUILT

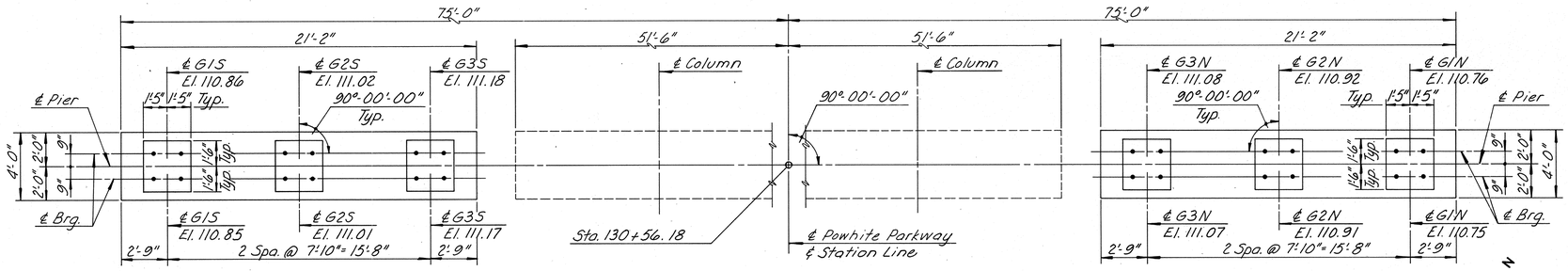
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

GENERAL NOTES
AND
ESTIMATED QUANTITES

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

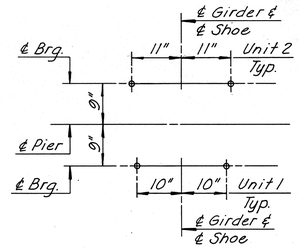
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 4 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	12	106

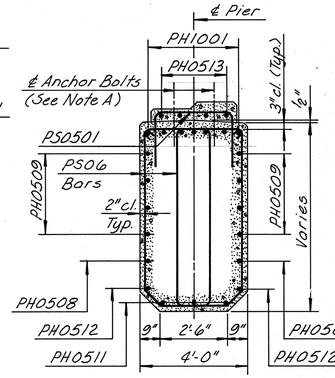


PLAN - SOUTHBOUND
Scale: 1/4" = 1'-0"

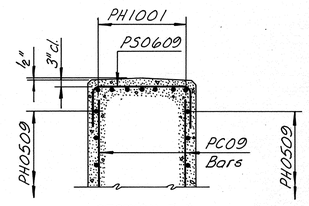
PLAN - NORTHBOUND
Scale: 1/4" = 1'-0"



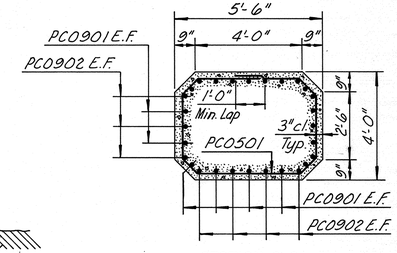
ANCHOR BOLT SETTING PLAN
No Scale



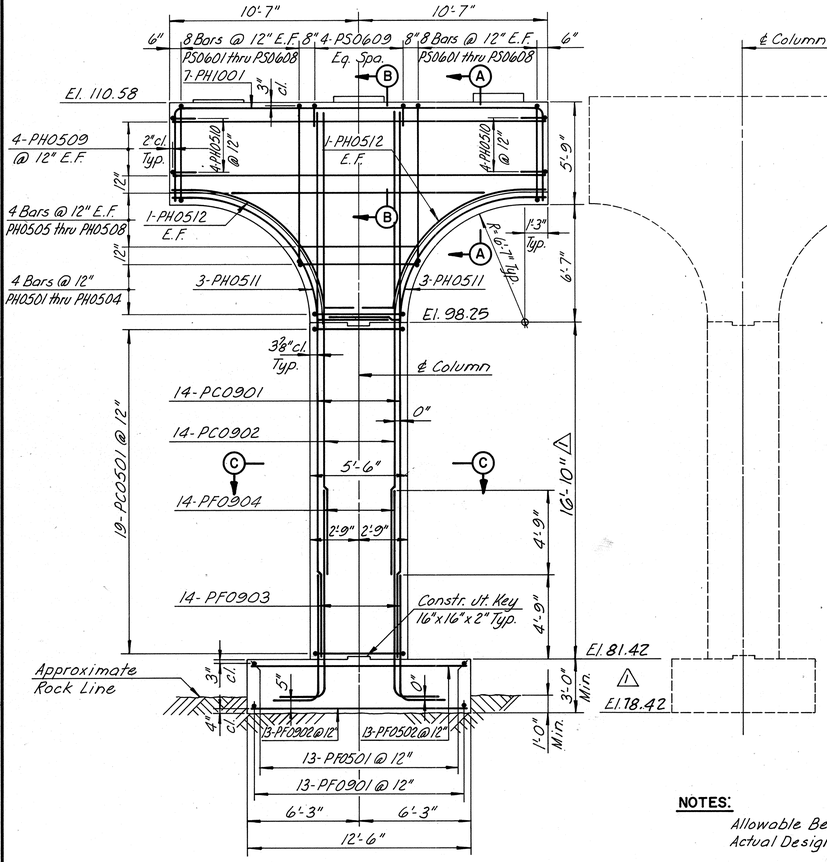
SECTION A-A
Scale: 3/8" = 1'-0"



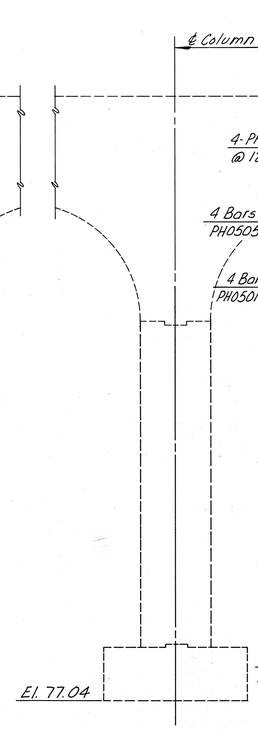
SECTION B-B
Scale: 3/8" = 1'-0"



SECTION C-C
Scale: 3/8" = 1'-0"

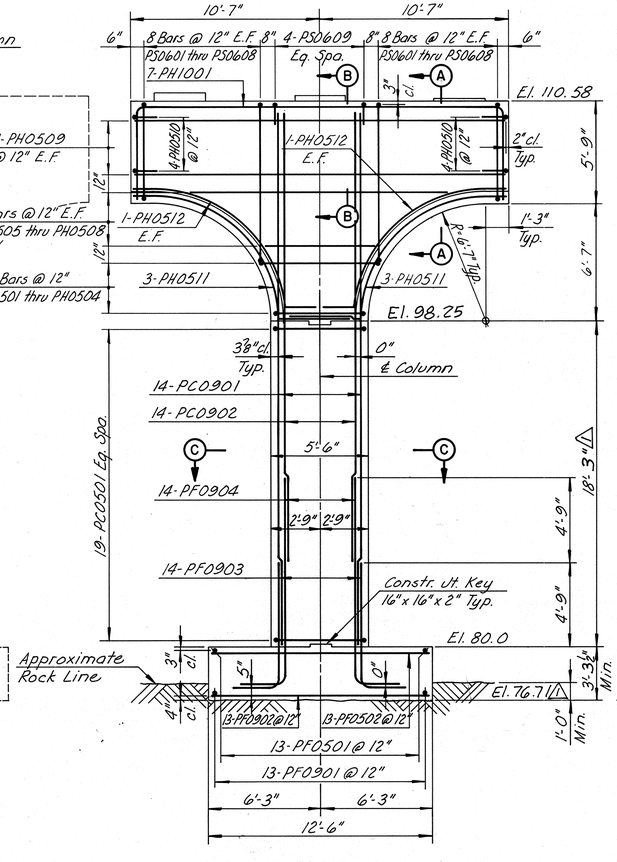


ELEVATION - SOUTHBOUND
Scale: 4" = 1'-0"

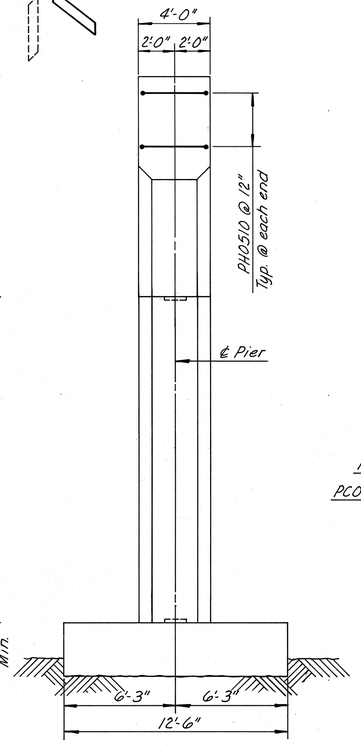


NOTES:

Allowable Bearing Pressure - 7 tons/s.f.
Actual Design Bearing Pressure - 4.7 tons/s.f.



ELEVATION - NORTHBOUND
Scale: 4" = 1'-0"



TYPICAL END VIEW
Scale: 4" = 1'-0"

NOTE A:

Pad reinforcing bars are to be spaced to clear Anchor Bolts.

	BY	DATE				
MADE	EUM	2-87				
CHECKED	TFP	3-87	1	As Built	TEM	3-89
IN CHARGE	S.R		NO.	REVISION	BY	DATE

AS BUILT

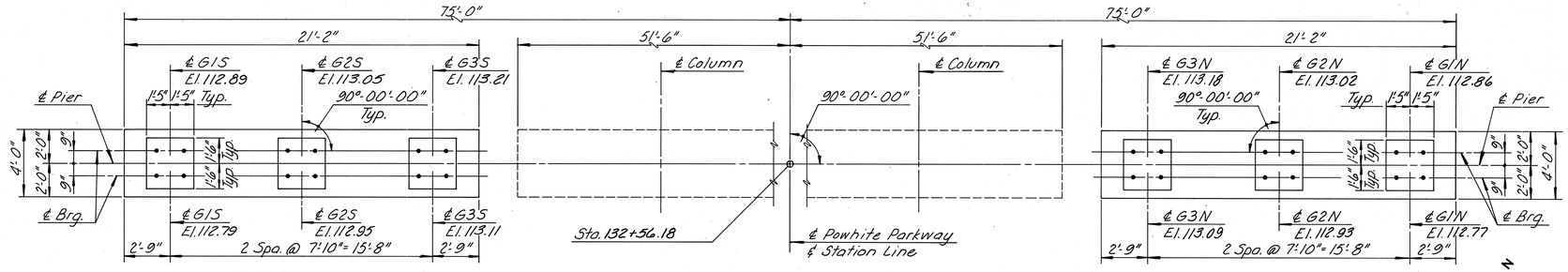
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

PIER I DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

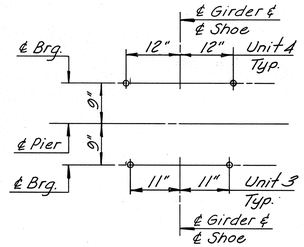
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 12 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	14	106

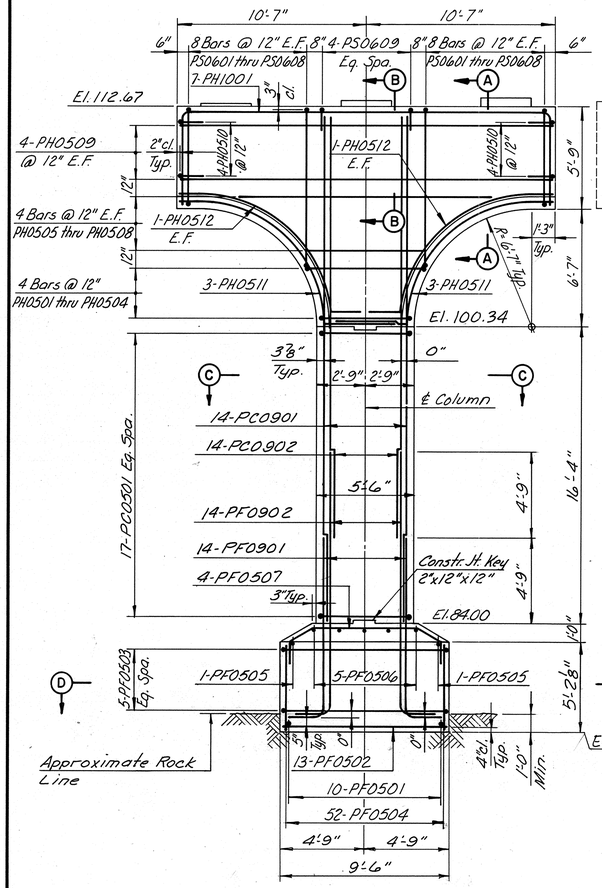


PLAN - SOUTHBOUND
Scale: 4" = 1'-0"

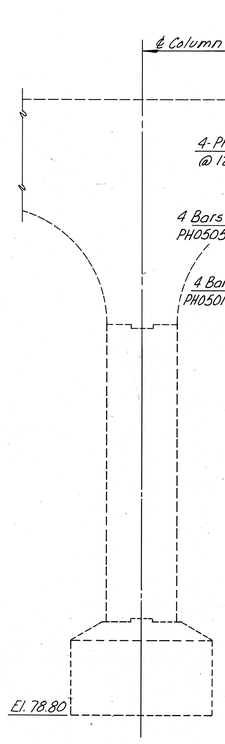
PLAN - NORTHBOUND
Scale: 4" = 1'-0"

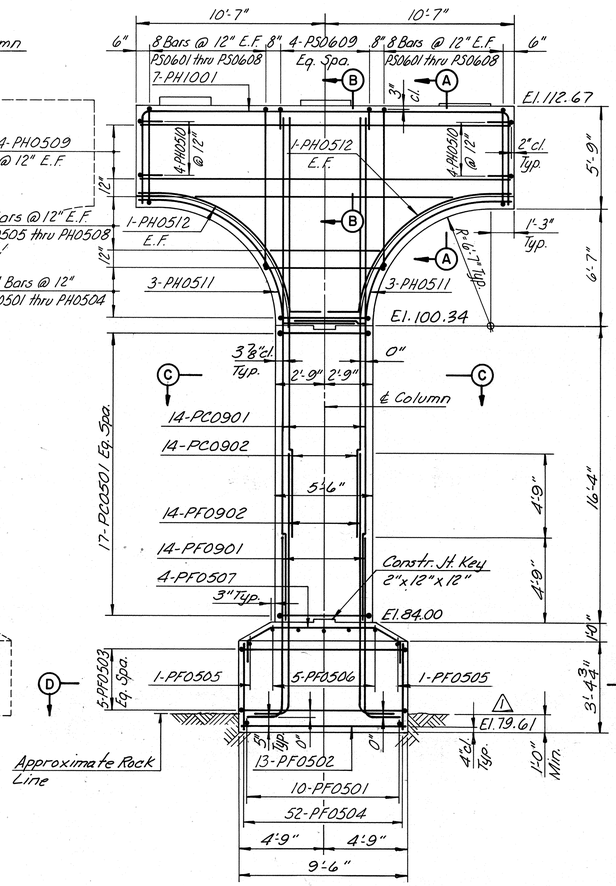


ANCHOR BOLT SETTING PLAN
No Scale



ELEVATION - SOUTHBOUND
Scale: 4" = 1'-0"





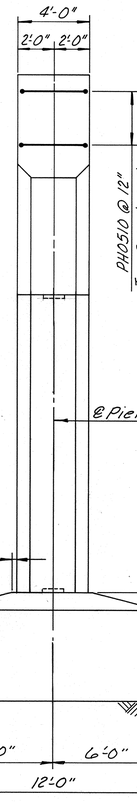
ELEVATION - NORTHBOUND
Scale: 4" = 1'-0"

NOTES:

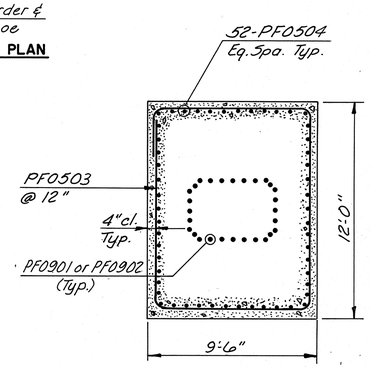
For Sections A-A, B-B and C-C, see Sheet No. 12

Maximum Allowable Bearing Pressure - 10 tons / s.f.

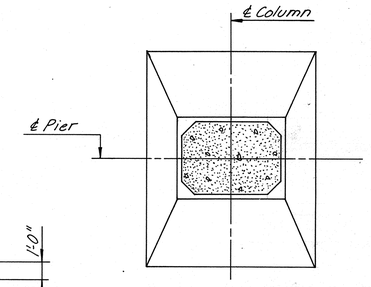
Actual Design Bearing Pressure - 7.9 tons / s.f.



TYPICAL END VIEW
Scale: 4" = 1'-0"



SECTION D-D
Scale: 4" = 1'-0"



FOOTING PLAN
Scale: 4" = 1'-0"

	BY	DATE
MADE	T.A.L	3-87
CHECKED	T.F.P.	3-87
IN CHARGE	S.R.	

NO.	REVISION	BY	DATE
⚠	As Built	T.E.M.	3-89

AS BUILT

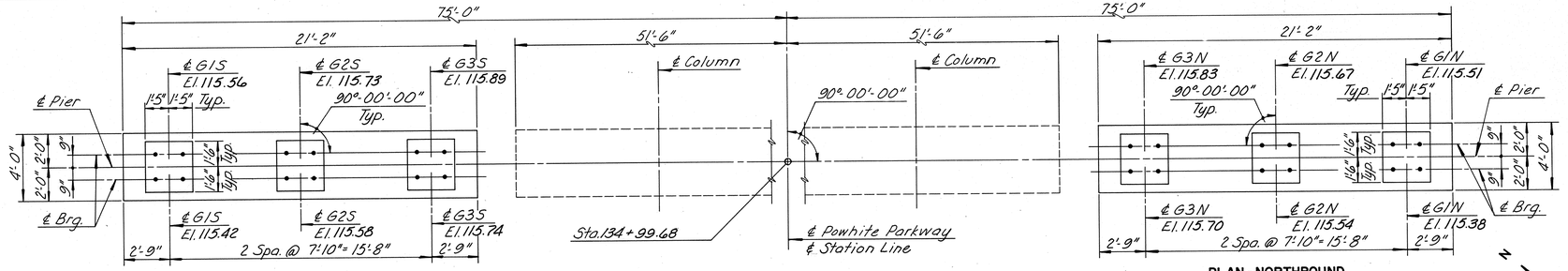
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

PIER 3 DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

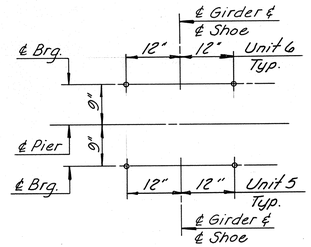
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 14 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	16	106

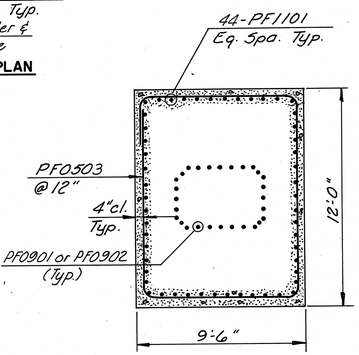


PLAN - SOUTHBOUND
Scale: 1/4" = 1'-0"

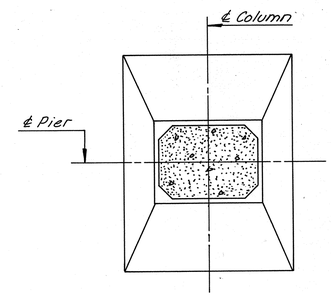
PLAN - NORTHBOUND
Scale: 1/4" = 1'-0"



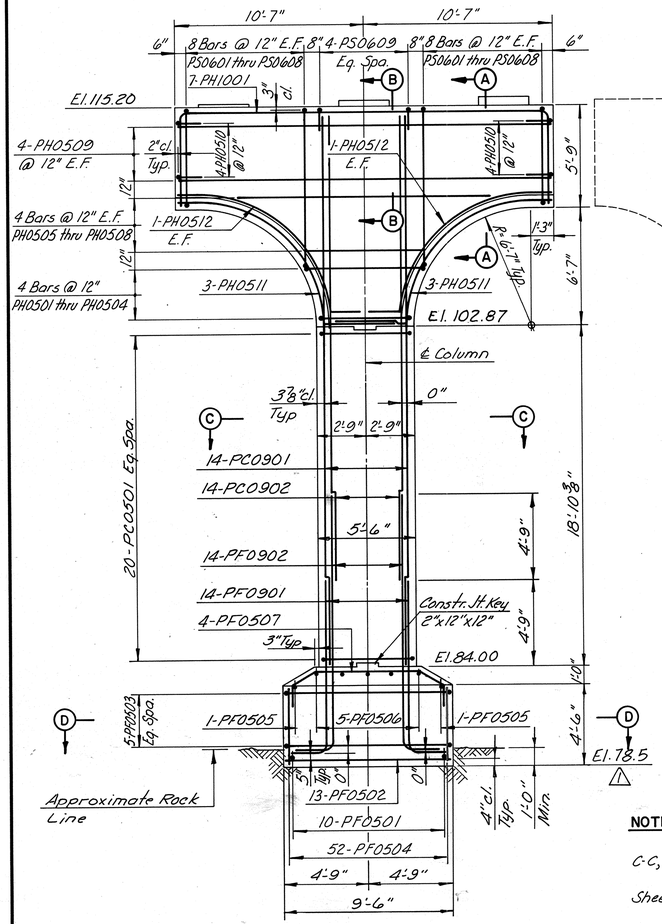
ANCHOR BOLT SETTING PLAN
No Scale



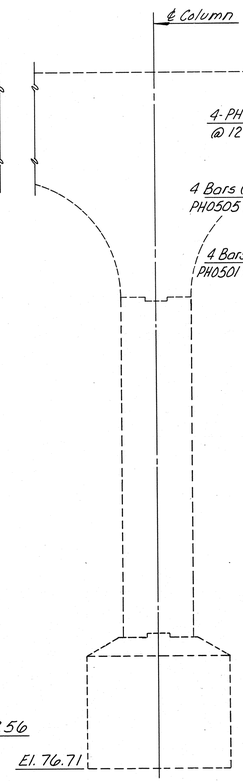
SECTION E-E
Scale: 1/4" = 1'-0"



FOOTING PLAN
Scale: 1/4" = 1'-0"



ELEVATION - SOUTHBOUND
Scale: 1/4" = 1'-0"



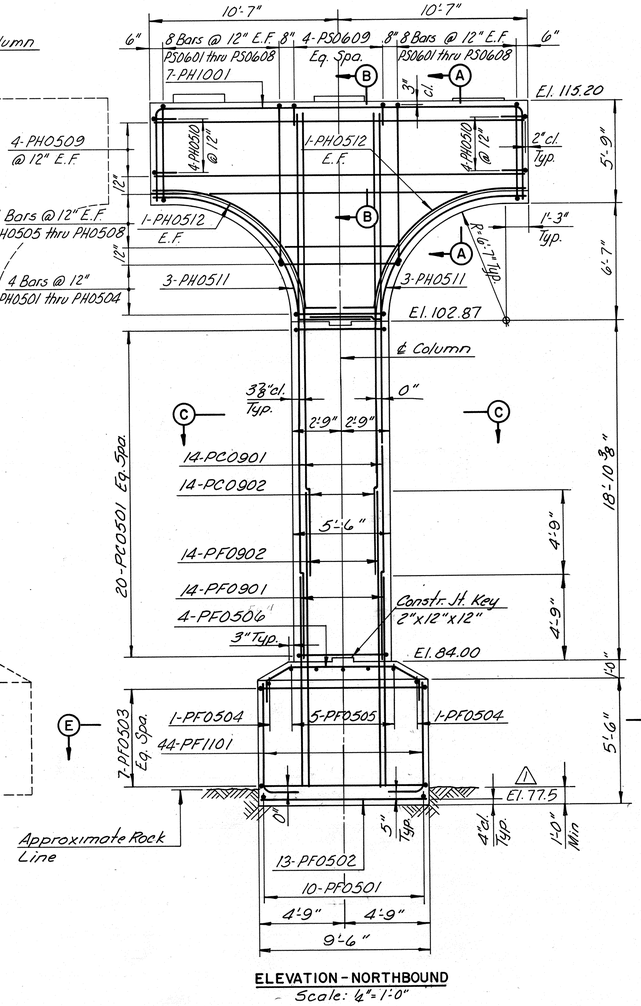
NOTES:

For Sections A-A, B-B and C-C, see Sheet No. 12

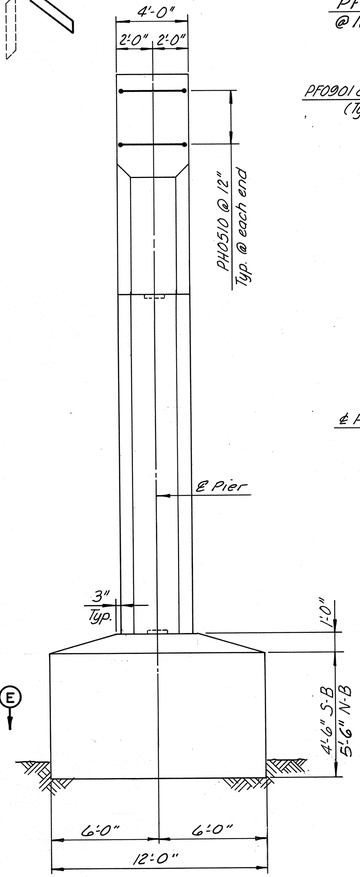
For Section D-D, see Sheet No. 14

Maximum Allowable Bearing Pressure - 10 tons/s.f.

Actual Design Bearing Pressure - 8.4 tons/s.f.



ELEVATION - NORTHBOUND
Scale: 1/4" = 1'-0"



TYPICAL END VIEW
Scale: 1/4" = 1'-0"

	BY	DATE				
MADE	T.A.L.	3-87				
CHECKED	T.F.P.	3-87	1	As Built	TEM	3-89
IN CHARGE	S.R.		NO.	REVISION	BY	DATE

N82490

AS BUILT

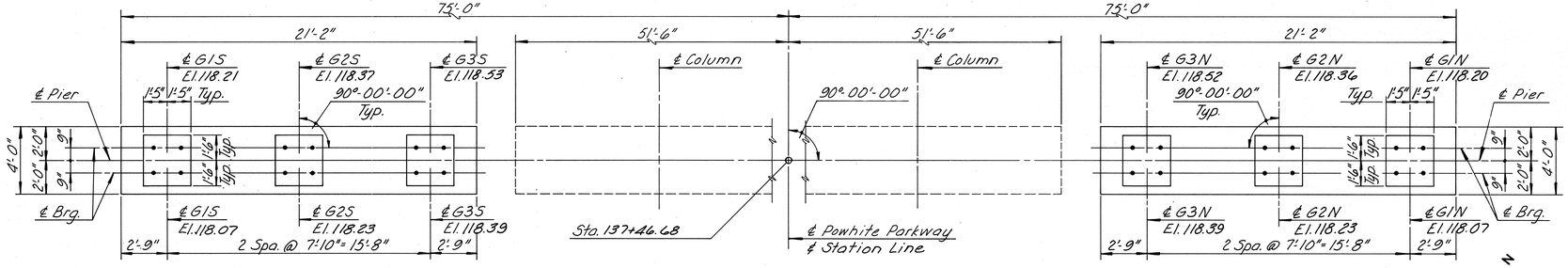
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

PIER 5 DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

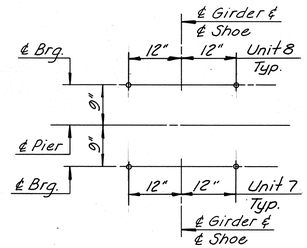
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 16 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	18	106

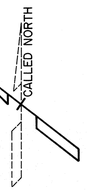


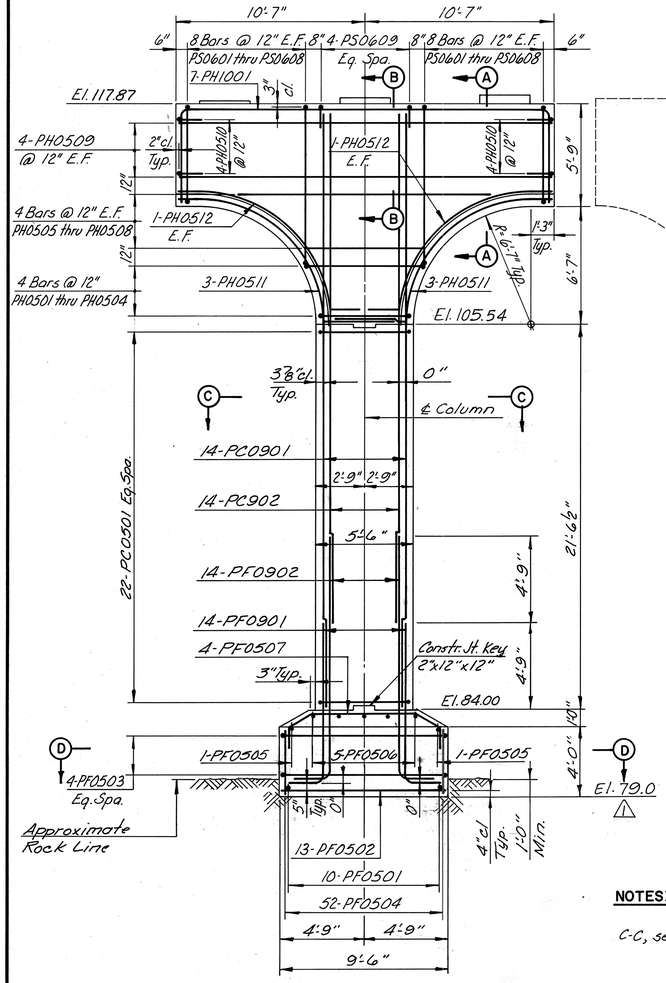
PLAN - SOUTHBOUND
Scale: 4" = 1'-0"

PLAN - NORTHBOUND
Scale: 4" = 1'-0"

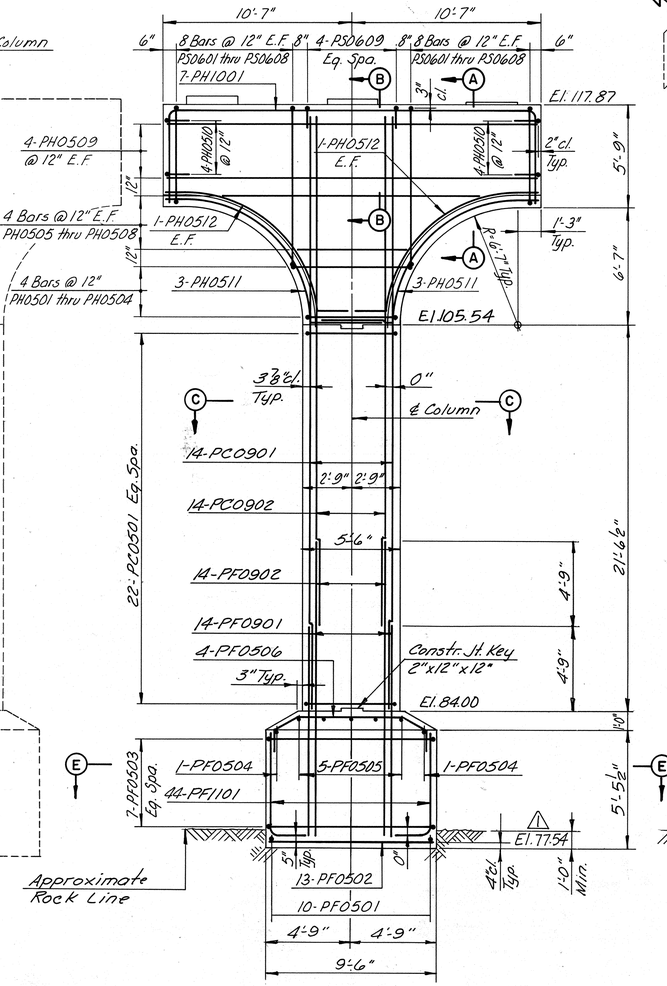


ANCHOR BOLT SETTING PLAN
No Scale

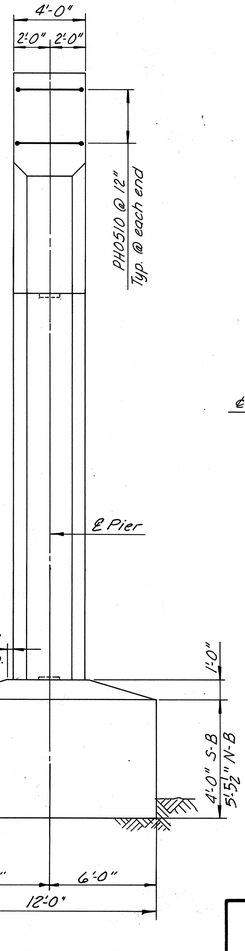




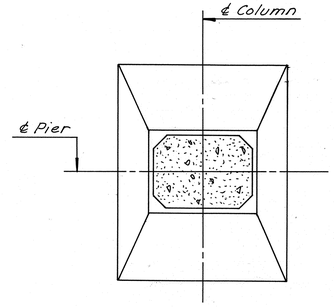
ELEVATION - SOUTHBOUND
Scale: 4" = 1'-0"



ELEVATION - NORTHBOUND
Scale: 4" = 1'-0"



TYPICAL END VIEW
Scale: 4" = 1'-0"



FOOTING PLAN
Scale: 4" = 1'-0"

NOTES:

For Sections A-A, B-B and C-C, see Sheet No.12
For Section D-D, see Sheet No.14
For Section E-E, see Sheet No.16
Maximum Allowable Bearing Pressure - 10 tons/s.f.
Actual Design Bearing Pressure - Southbound 7.9 tons/s.f.
Northbound 8.3 tons/s.f.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAL.	3-87				
CHECKED	T.F.P.	3-87	1	As Built	TEM	3-89
IN CHARGE	S.R.					

AS BUILT

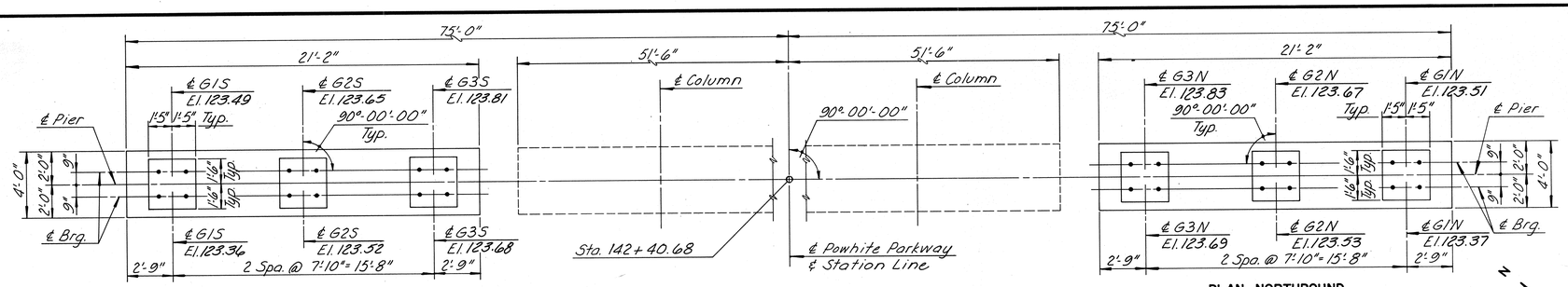
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

PIER 7 DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

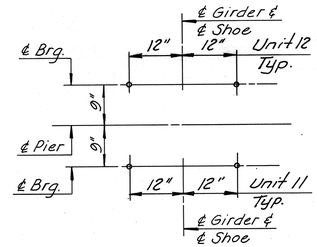
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 18 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	22	106

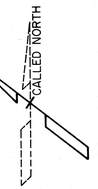


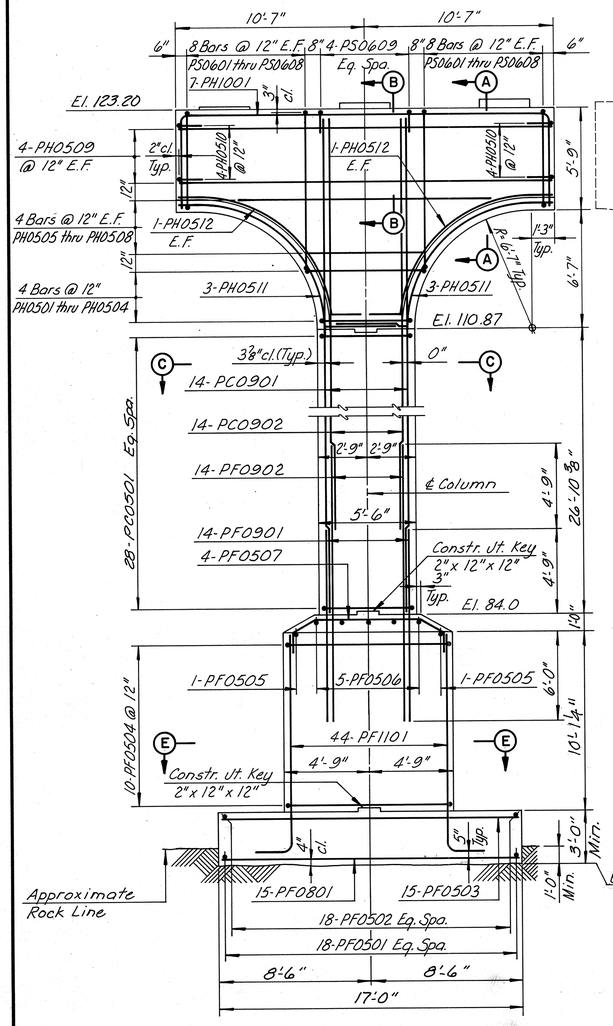
PLAN - SOUTHBOUND
Scale: 1/4" = 1'-0"

PLAN - NORTHBOUND
Scale: 1/4" = 1'-0"

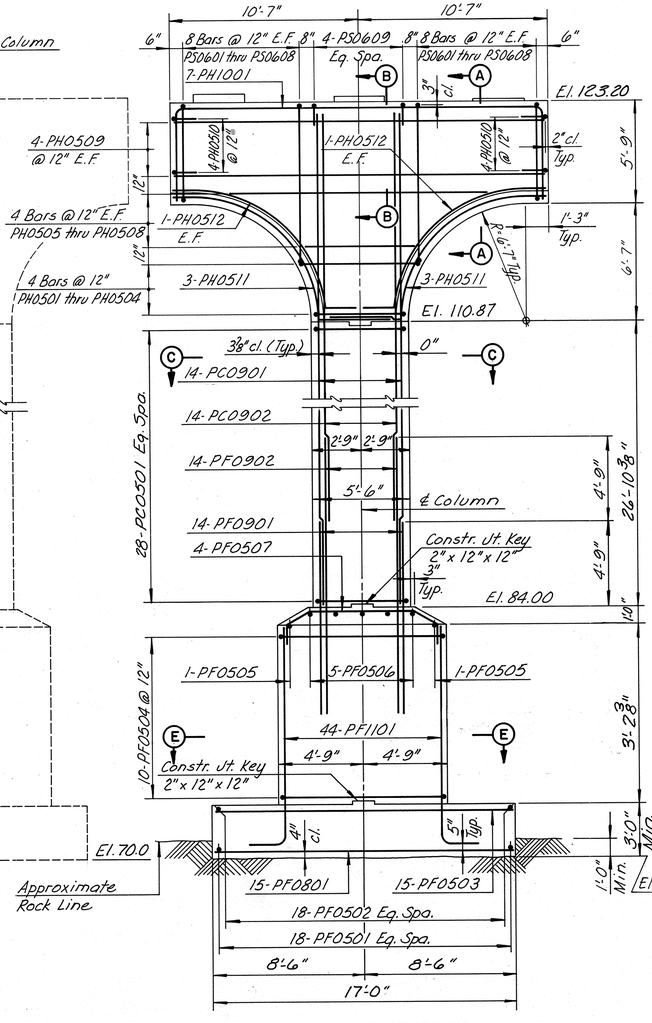


ANCHOR BOLT SETTING PLAN
No Scale

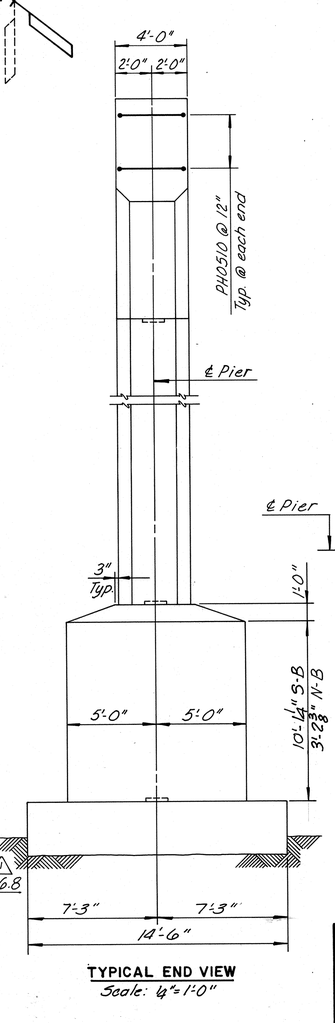




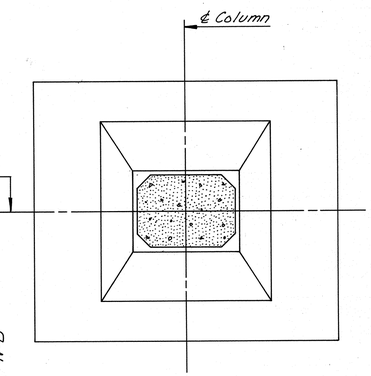
ELEVATION - SOUTHBOUND
Scale: 4" = 1'-0"



ELEVATION - NORTHBOUND
Scale: 4" = 1'-0"



TYPICAL END VIEW
Scale: 4" = 1'-0"



FOOTING PLAN
Scale: 4" = 1'-0"

NOTES:

For Sections A-A, B-B and C-C, see Sheet No.12

For Section E-E, see Sheet No.16

Maximum Allowable Bearing Pressure - 3.5 tons/s.f.

Actual Design Bearing Pressure - 3.3 tons/s.f.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EJM	3-87				
CHECKED	T.F.P	3-87	1	As Built	TEM	3-89
IN CHARGE	S.R.					

AS BUILT

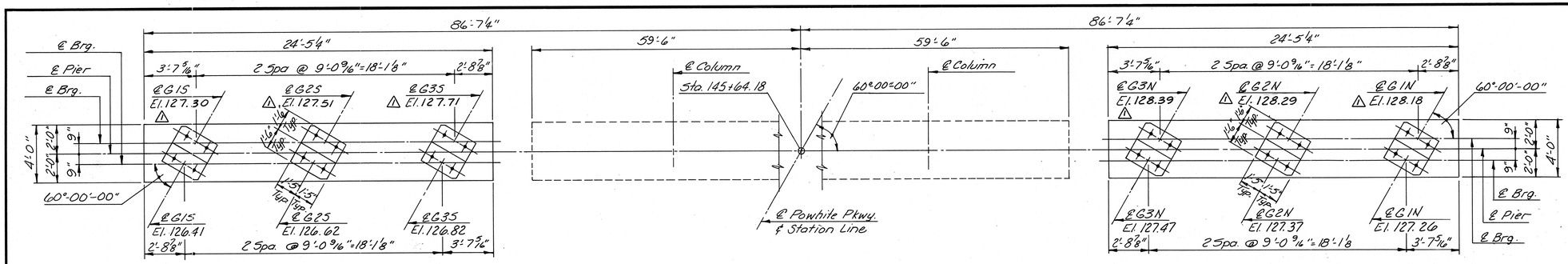
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

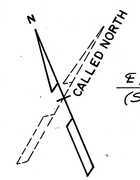
PIER 11 DETAILS

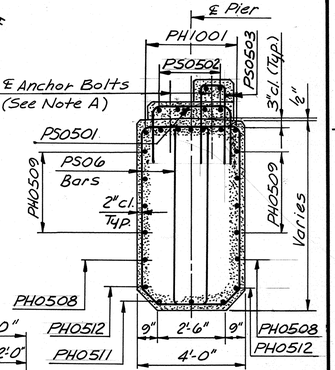
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 22 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	25	106

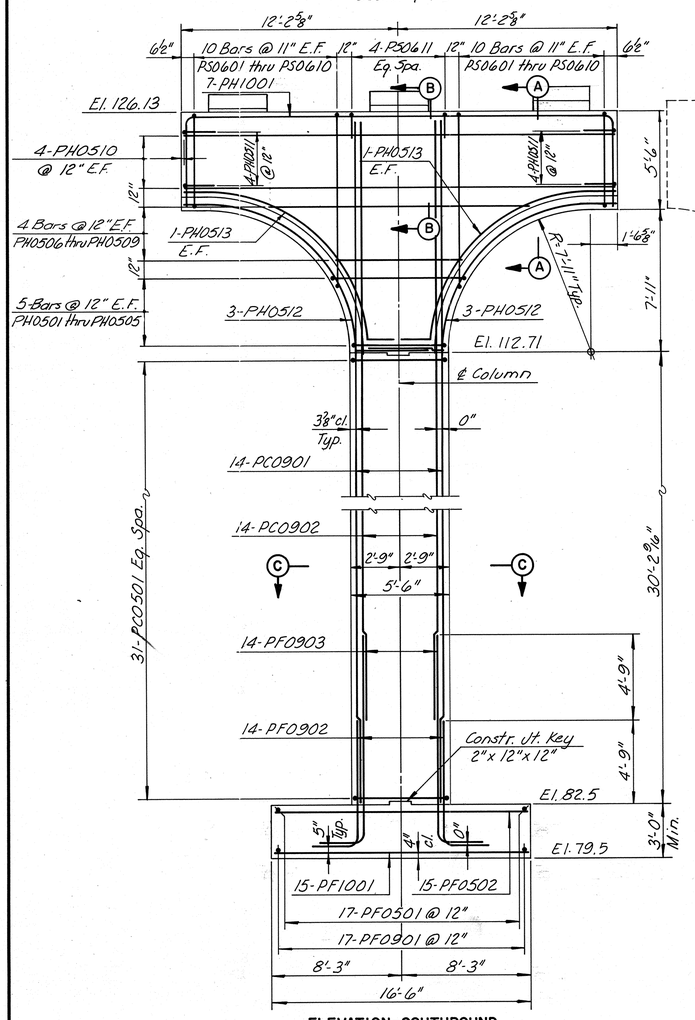




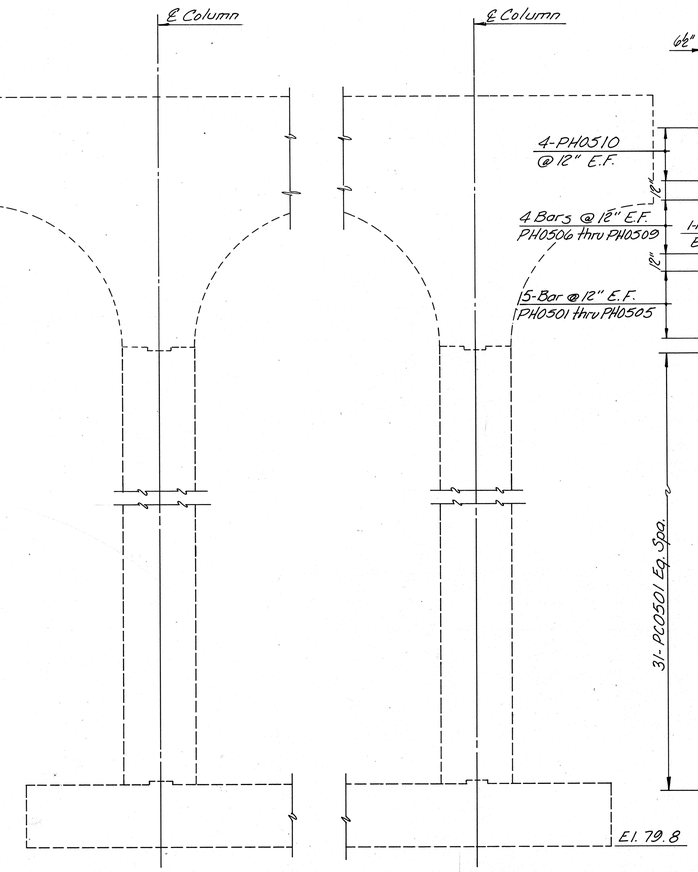


SECTION A-A
Scale: ⅜"=1'-0" ⚠

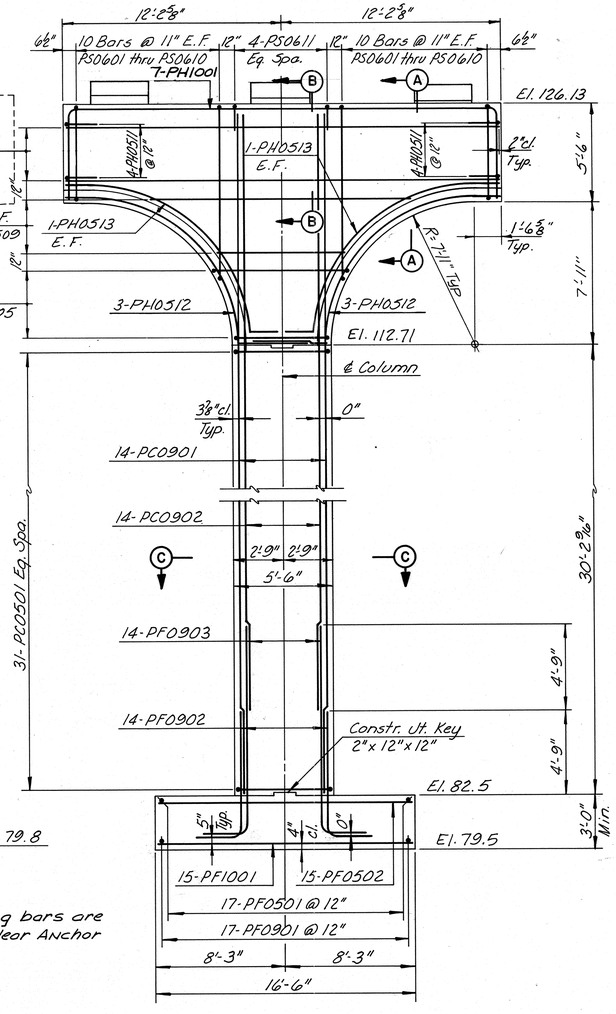
PLAN - SOUTHBOUND
Scale: ¼"=1'-0"



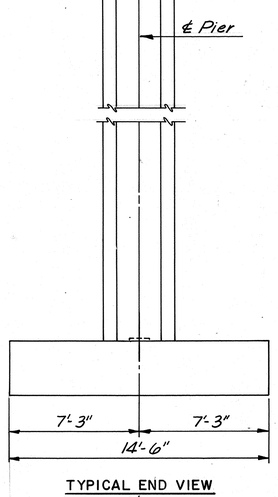
ELEVATION - SOUTHBOUND
Scale: ¼"=1'-0"



PLAN - NORTHBOUND
Scale: ¼"=1'-0"



ELEVATION - NORTHBOUND
Scale: ¼"=1'-0"



TYPICAL END VIEW
Scale: ¼"=1'-0"

NOTES:

⚠ For Sections B-B and C-C see Sheet No. 12

For Anchor Bolt Setting Plan, see Sheet No. 29

For Steel Sheet Piling requirements, see Sheet No. 29

Maximum Allowable Bearing Pressure - 3.5 tons/s.f.

Actual Design Bearing Pressure - Southbound - 3.3 tons/s.f. Northbound - 3.0 tons/s.f.

⚠ NOTE A:

Pad reinforcing bars are to be spaced to clear Anchor Bolts.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EUM	2-87	⚠2	As Built	TEM	3-89
CHECKED	T.F.R.	3-87	⚠1	EL.'s Plans, Added Sect. A-A	ALC	5-87
IN CHARGE	S.R.					

AS BUILT

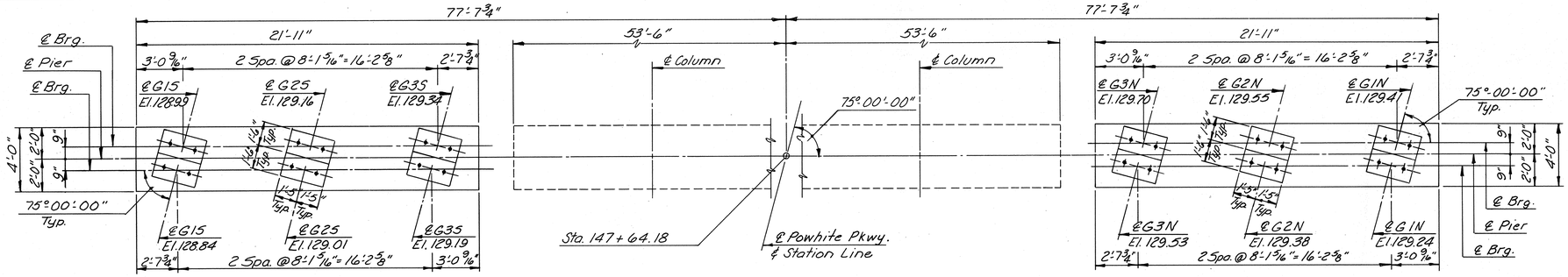
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

PIER 14 DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

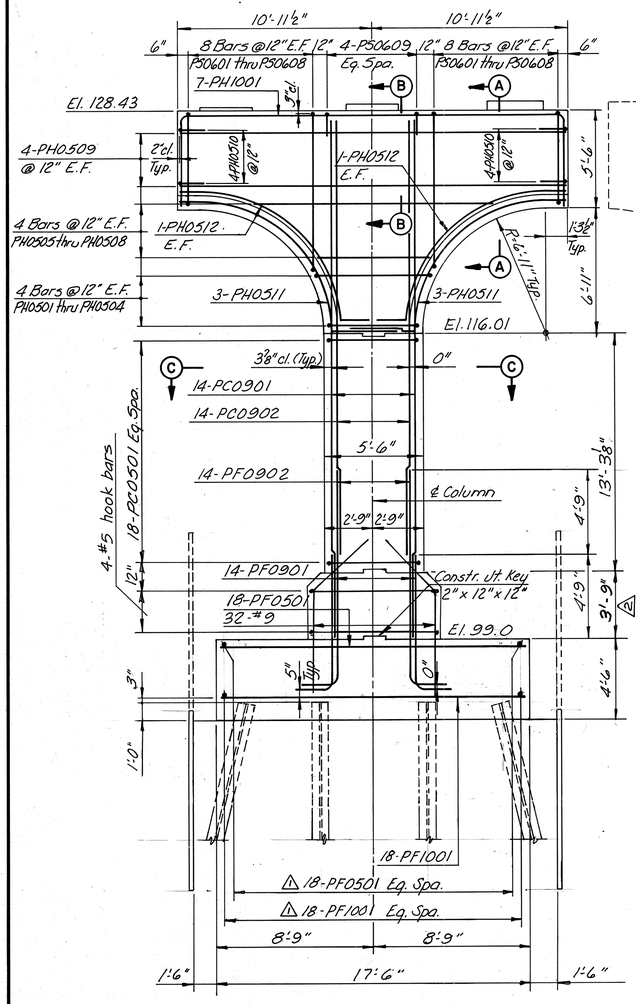
SCALE: AS SHOWN
CONTRACT NO: C-13
SHEET NO. 25 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGING	27	106

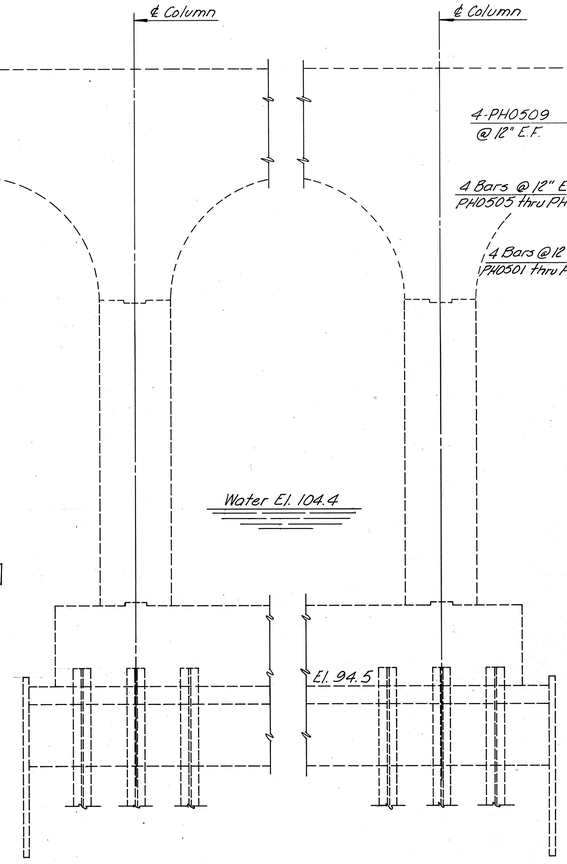


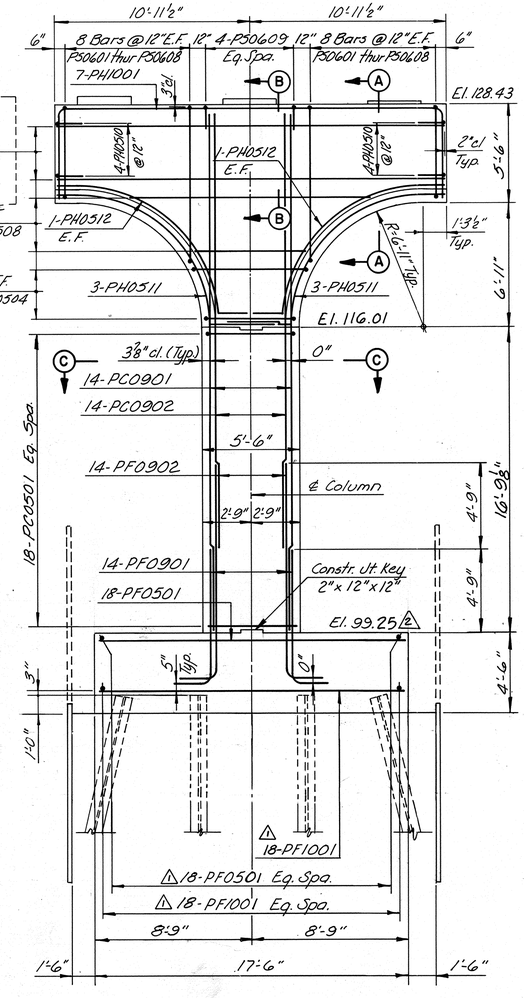
PLAN - SOUTHBOUND
Scale: 4"=1'-0"

PLAN - NORTHBOUND
Scale: 4"=1'-0"

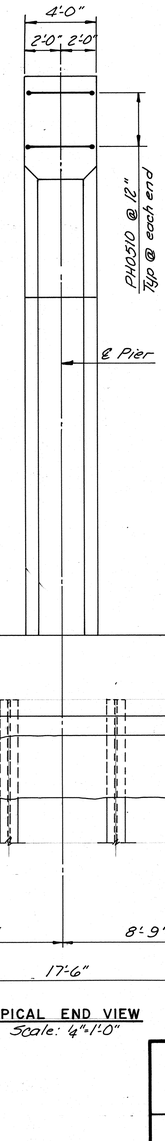


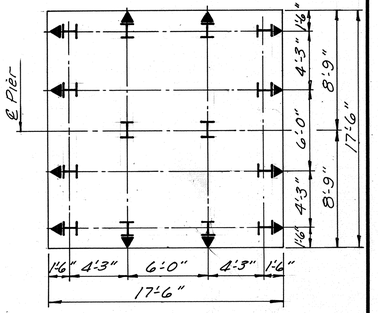
ELEVATION - SOUTHBOUND
Scale: 4"=1'-0"





ELEVATION - NORTHBOUND
Scale: 4"=1'-0"

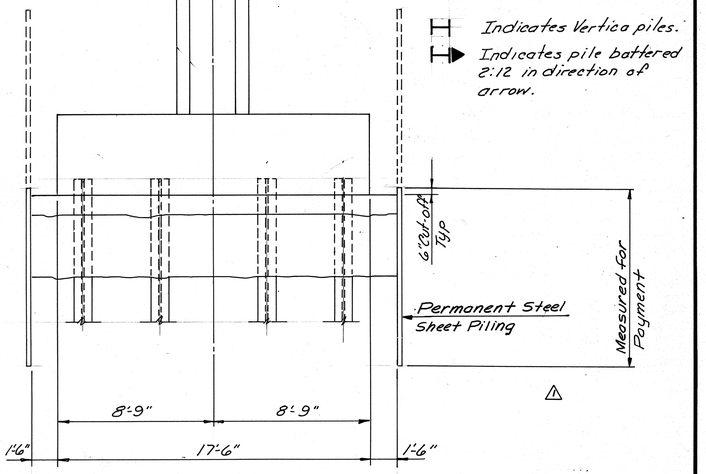




TYPICAL PILE PLAN
Scale: 3/16"=1'-0"

NOTE:
For Sections A-A, B-B and C-C, see Sheet No.12.
For Anchor Bolt Setting Plan, see Sheet No. 29.

PILE NOTES:
- Indicates Vertica piles.
- Indicates pile battered 2:12 in direction of arrow.



TYPICAL END VIEW
Scale: 4"=1'-0"

	BY	DATE				
MADE	EJM	3-87	⚠2	As Built	TEM	3-89
CHECKED	T.F.P.	3-87	⚠	Both Elevation & END View	ALC	4-87
IN CHARGE	S.R.		NO.	REVISION	BY	DATE

N31X6

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

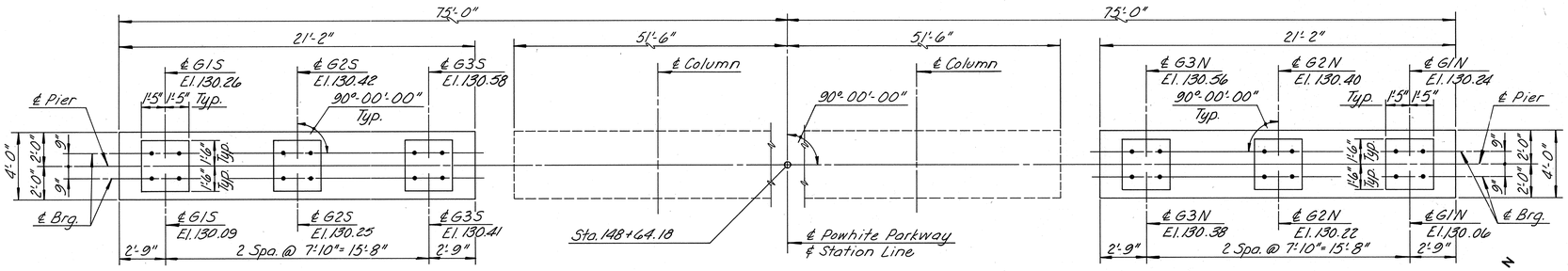
PIER 16 DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 27 OF 106

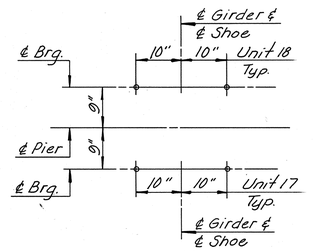
AS BUILT

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGING	28	106

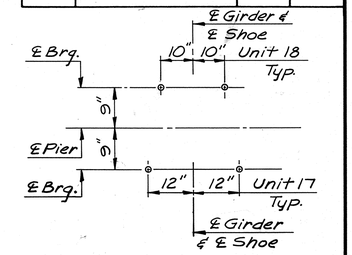


PLAN - SOUTHBOUND
Scale: 1/4" = 1'-0"

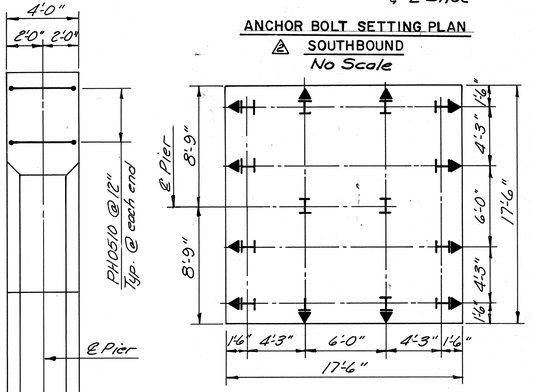
PLAN - NORTHBOUND
Scale: 1/4" = 1'-0"



ANCHOR BOLT SETTING PLAN
⚠ NORTHBOUND (No Scale)

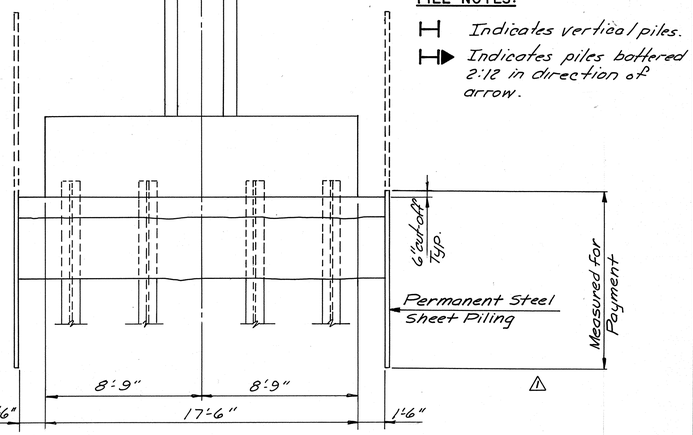


ANCHOR BOLT SETTING PLAN
⚠ SOUTHBOUND
No Scale

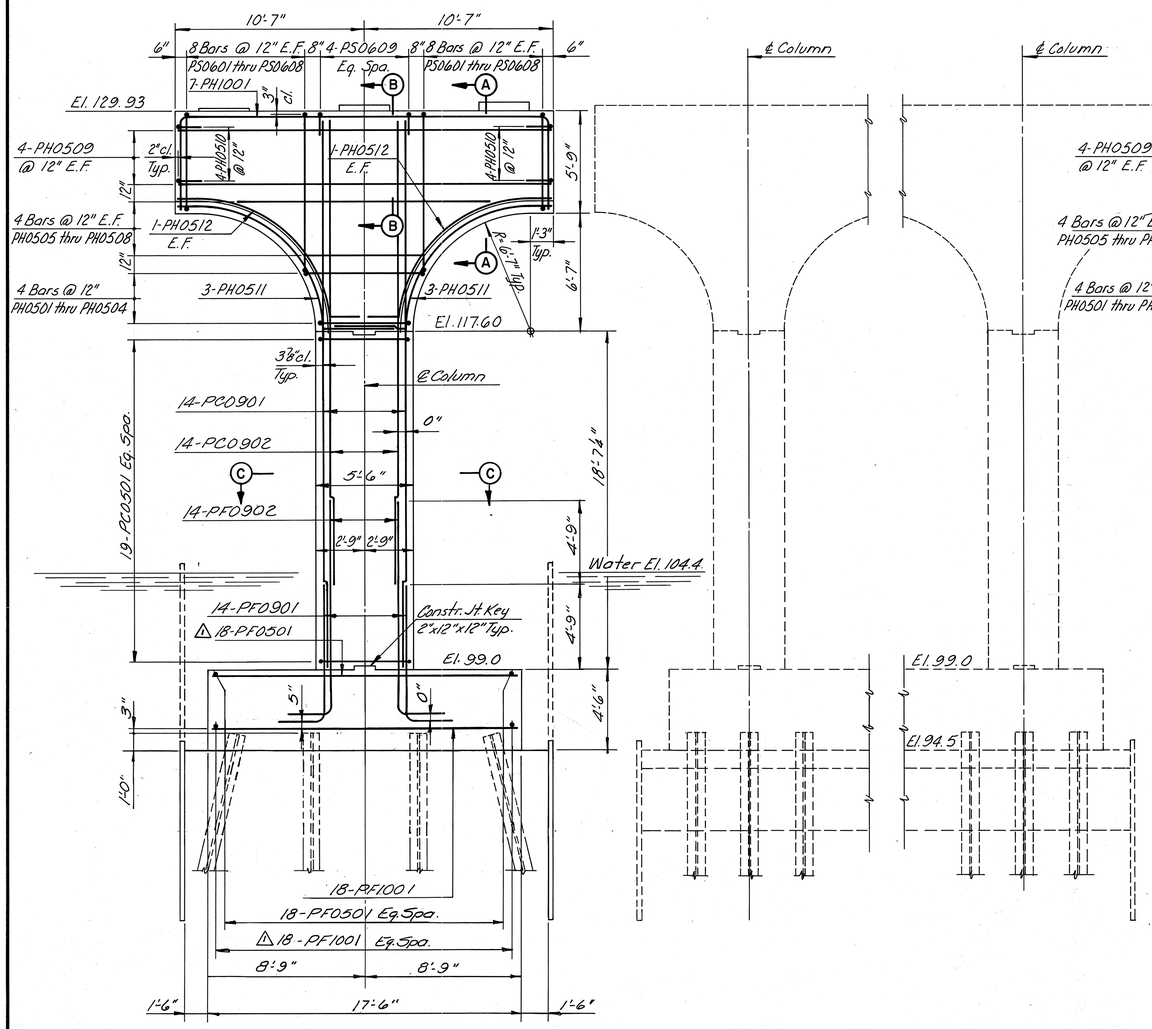


TYPICAL PILE PLAN
Scale: 3/16" = 1'-0"

PILE NOTES:
- ⊢ Indicates vertical piles.
- ⊢▶ Indicates piles battered 2:12 in direction of arrow.



TYPICAL END VIEW
Scale: 4" = 1'-0"



ELEVATION - SOUTHBOUND
Scale: 1/4" = 1'-0"

ELEVATION - NORTHBOUND
Scale: 1/4" = 1'-0"

NOTE:
For Section A-A, B-B, and C-C see Sheet No. 12.

	BY	DATE
MADE	T.A.L.	3-87
CHECKED	T.F.P.	3-87
IN CHARGE	S.R.	

NO.	REVISION	BY	DATE
	As Built	TEM	3-89
⚠	Rev. Anchor Bolt	ALC	6-87
⚠	Both Elevation & End View	ALC	4-87

AS BUILT

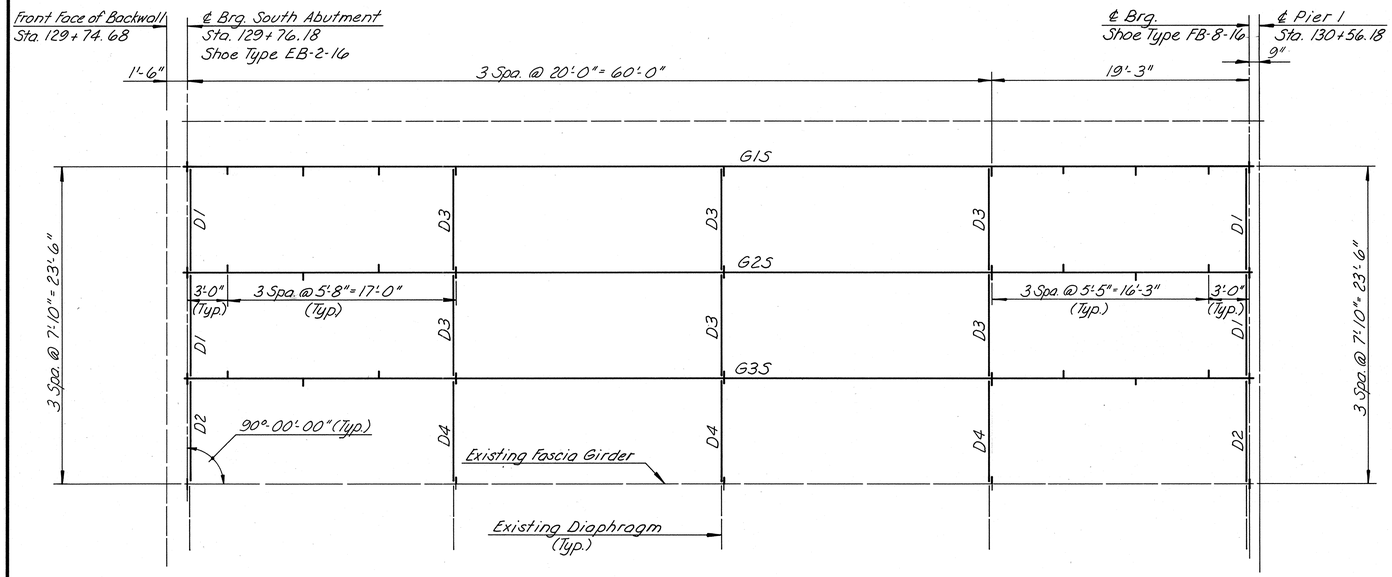
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

PIER 17 DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

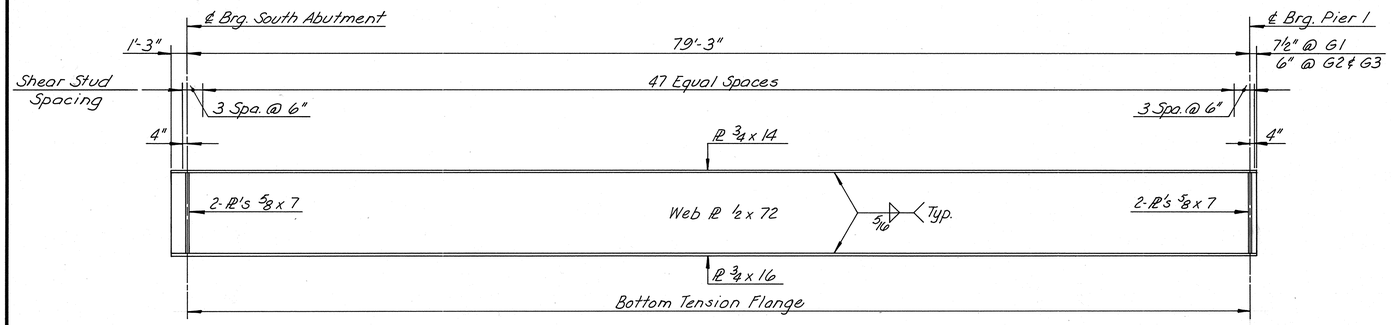
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 28 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	30	106



FRAMING PLAN - UNIT I SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16" = 1'-0"

NOTE:
For Steel Details, see Sheet No. 45.



GIRDER ELEVATION - UNIT I SOUTHBOUND & NORTHBOUND
Scale: 3/16" = 1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EUM	1-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	SR					

AS BUILT

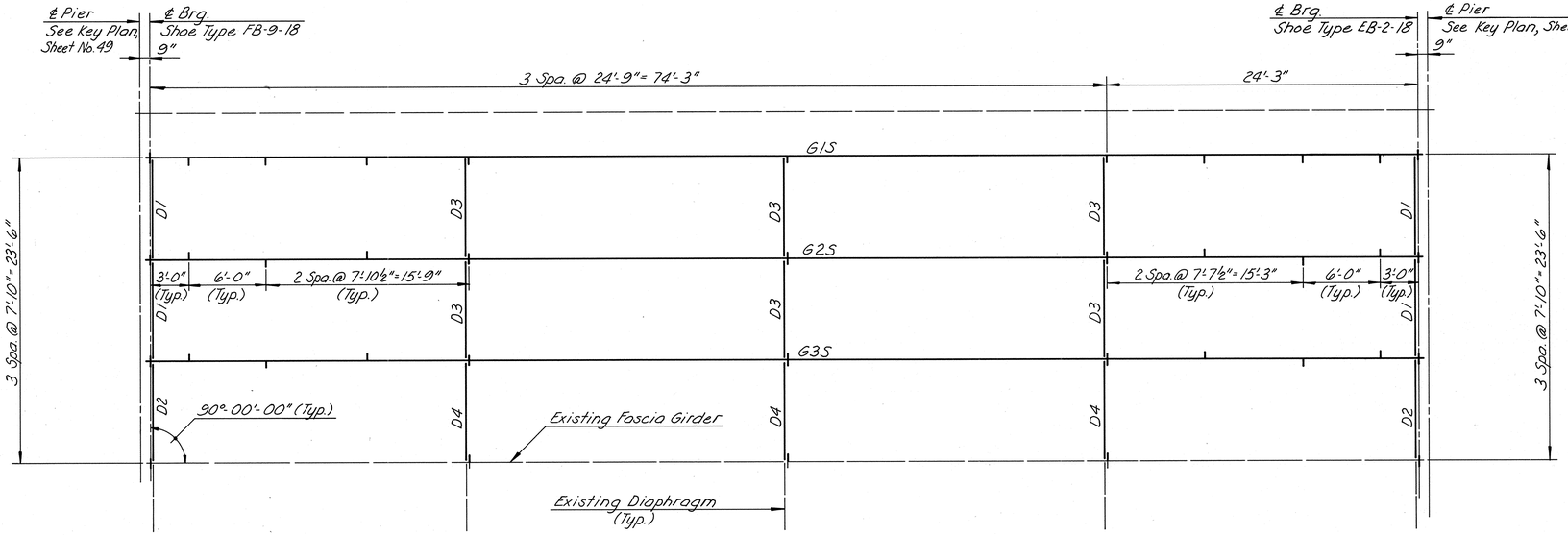
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNIT I SOUTHBOUND & NORTHBOUND

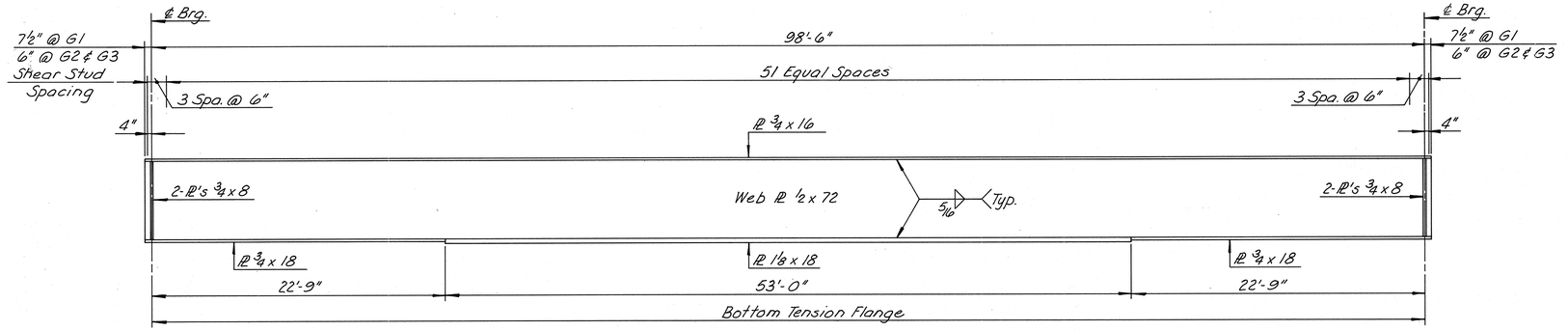
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 30 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	31	106



FRAMING PLAN - UNITS 2 & 3 SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16" = 1'-0"



GIRDER ELEVATION - UNITS 2 & 3 SOUTHBOUND & NORTHBOUND
Scale: 3/16" = 1'-0"

NOTE:
For Steel Details, see Sheet No. 45.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EJM	1-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	SR					

N2539

AS BUILT

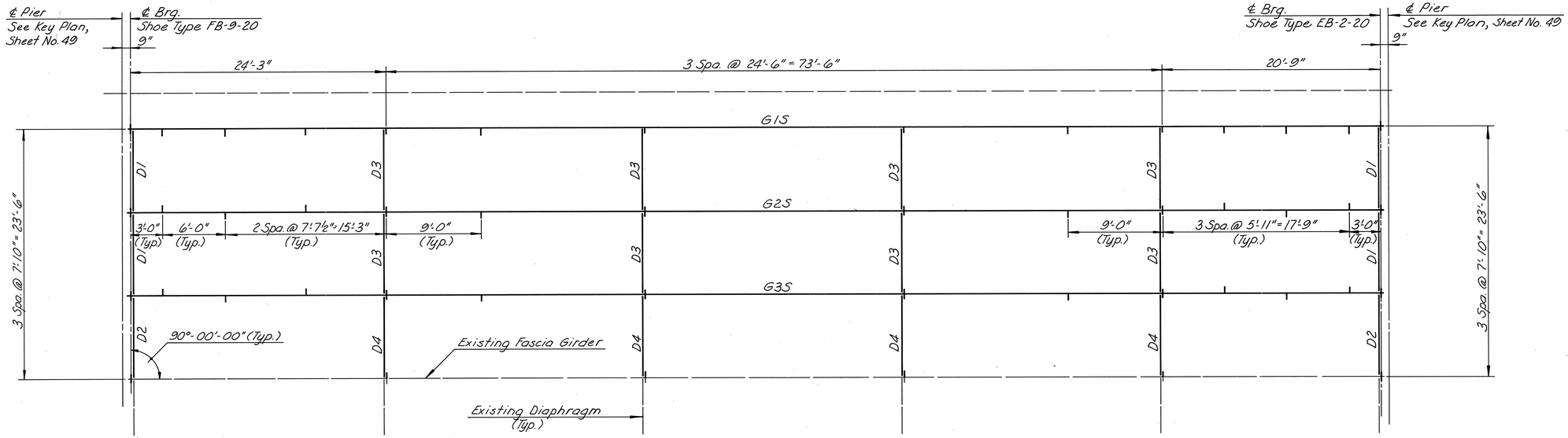
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNITS 2 & 3 SOUTHBOUND & NORTHBOUND

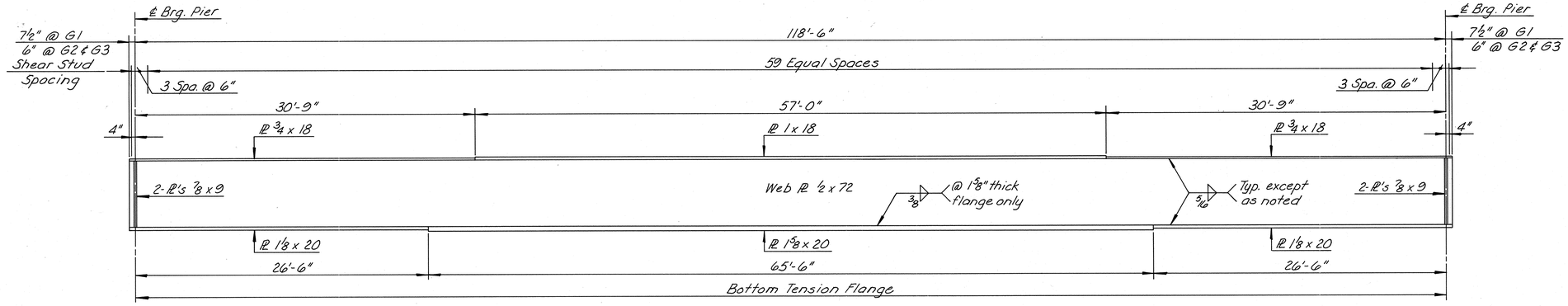
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 31 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	32	106



FRAMING PLAN - UNIT 4 SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16" = 1'-0"



GIRDER ELEVATION - UNIT 4 SOUTHBOUND & NORTHBOUND
Scale: 3/16" = 1'-0"

NOTE:
For Steel Details, see Sheet No. 45.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EJM	1-87				
CHECKED	TFP	3-87		As-Built	TEM	3-89
IN CHARGE	SR					

AS BUILT

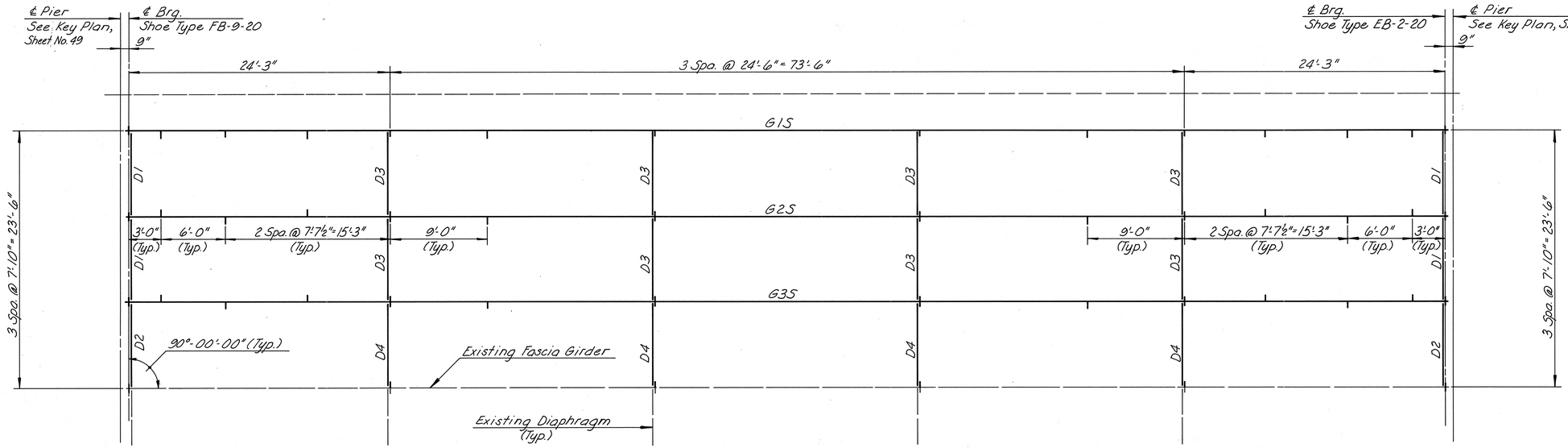
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNIT 4 SOUTHBOUND & NORTHBOUND

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

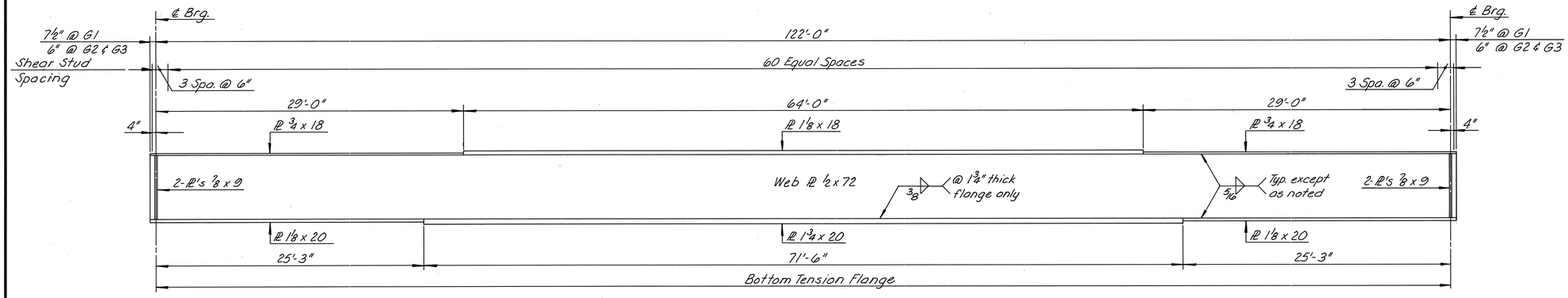
SCALE: AS SHOWS
CONTRACT NO.: C-13
SHEET NO. 32 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	33	106



FRAMING PLAN - UNITS 5 THRU 12 SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16" = 1'-0"

NOTE:
For Steel Details, see Sheet No. 45.



GIRDER ELEVATION - UNITS 5 THRU 12 SOUTHBOUND & NORTHBOUND
Scale: 3/16" = 1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EJM	1-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	SR					

N2509

AS BUILT

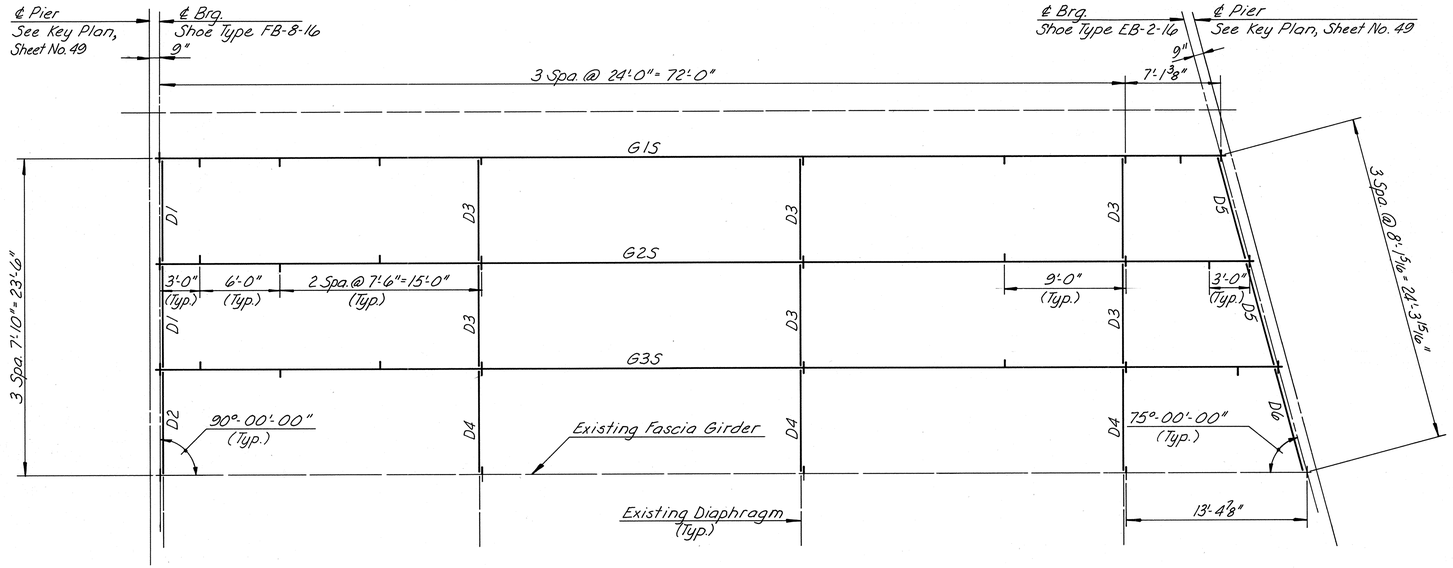
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNITS 5 THRU 12 SOUTHBOUND & NORTHBOUND

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

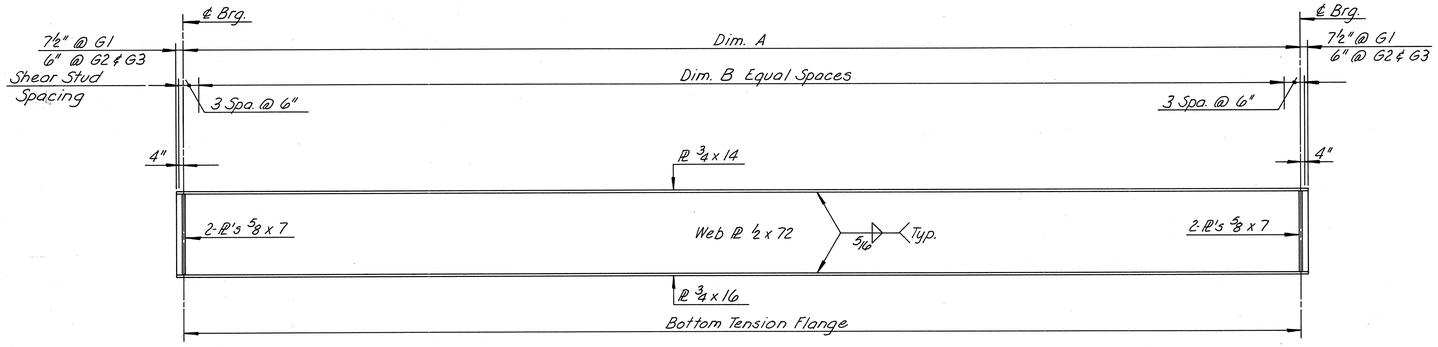
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 33 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	34	106



FRAMING PLAN-UNIT 13 SOUTHBOUND
Scale: 3/16" = 1'-0"

NOTE:
For Steel Details, see Sheet No. 45.



GIRDER ELEVATION-UNIT 13 SOUTHBOUND
Scale: 3/16" = 1'-0"

GIRDER	DIM. A	DIM. B
G1	79'-1⅜"	43
G2	81'-2½"	44
G3	83'-3¾"	45

	BY	DATE
MADE	EJM	1-87
CHECKED	TFP	3-87
IN CHARGE	SR	

NO.	REVISION	BY	DATE
	As Built	TEM	3-89

AS BUILT

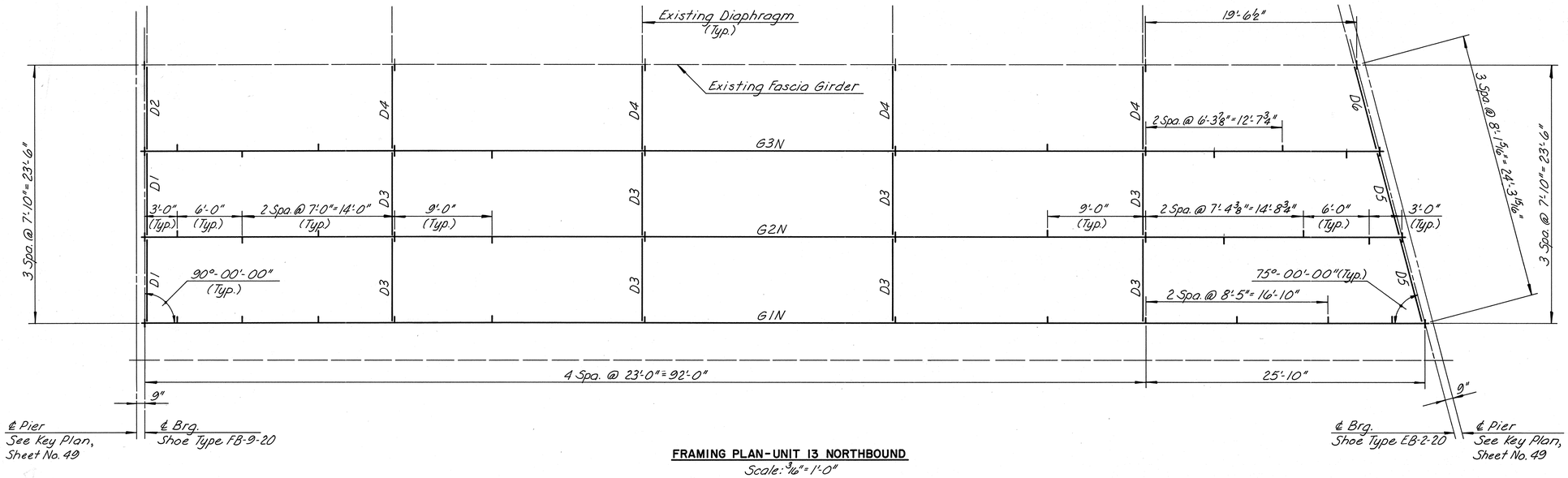
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNIT 13 SOUTHBOUND

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

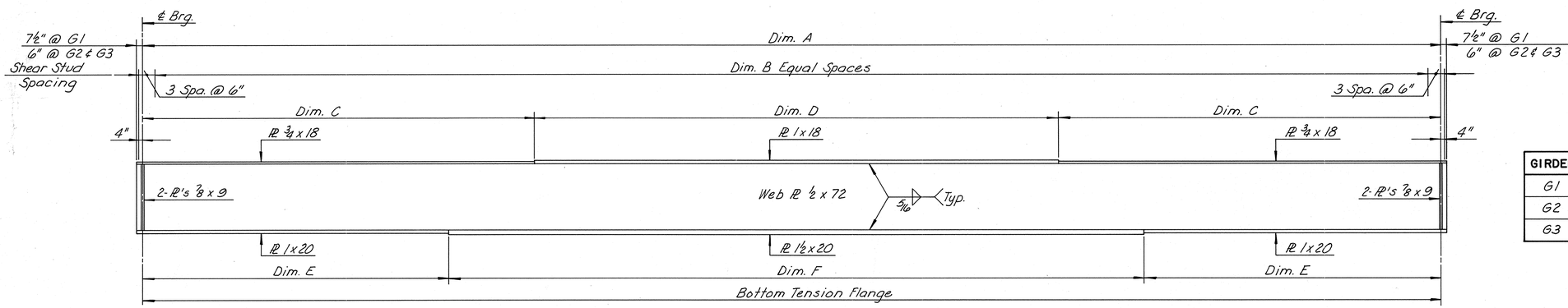
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 34 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	35	106



FRAMING PLAN - UNIT 13 NORTHBOUND
Scale: 3/16"= 1'-0"

NOTE:
For Steel Details, see Sheet No. 45



GIRDER ELEVATION - UNIT 13 NORTHBOUND
Scale: 3/16"= 1'-0"

GIRDER	DIM. A	DIM. B	DIM. C	DIM. D	DIM. E	DIM. F
G1	117'-10"	58	32'-11"	52'-0"	25'-8"	66'-6"
G2	115'-8¾"	57	32'-1⅜"	51'-6"	24'-7⅜"	66'-6"
G3	113'-7⅝"	56	33'-9 13/16"	46'-0"	25'-6 3/16"	62'-6"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EJM	1-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	SR					

AS BUILT

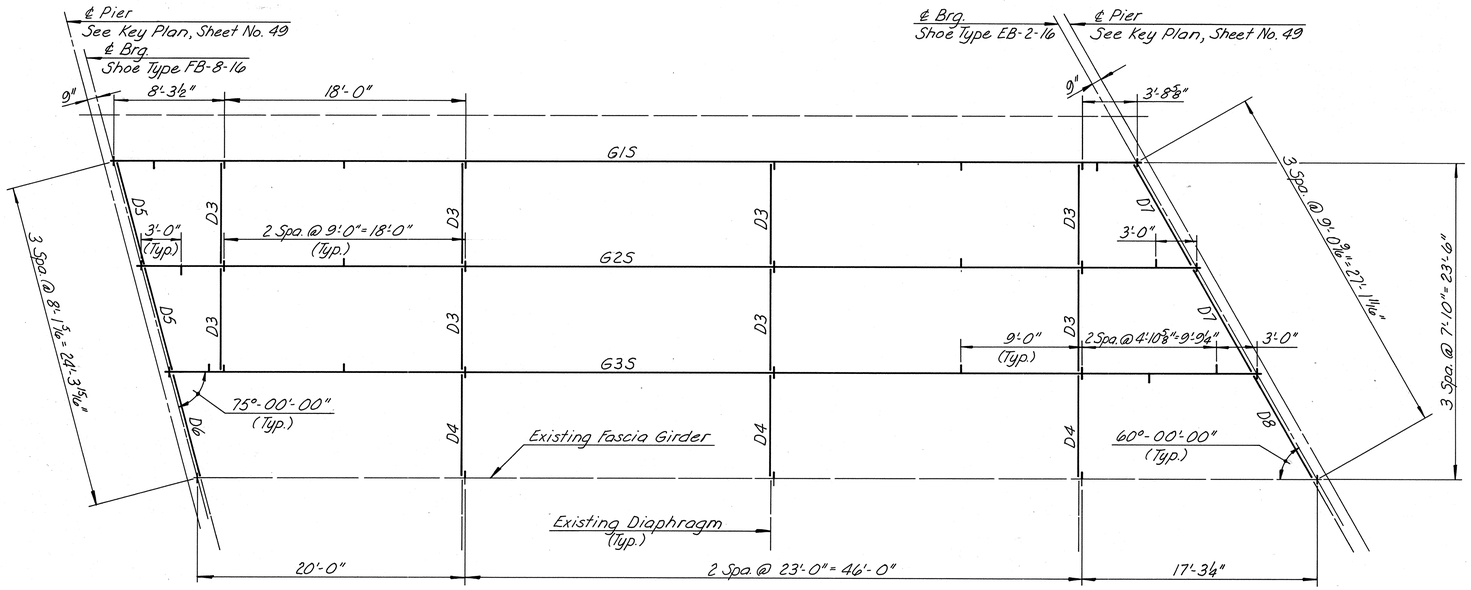
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNIT 13 NORTHBOUND

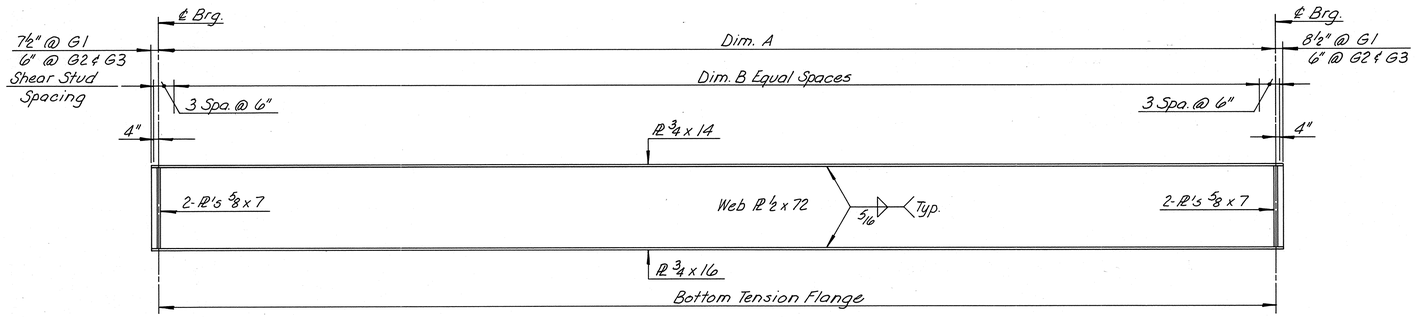
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 35 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	36	106



FRAMING PLAN - UNIT 14 SOUTHBOUND
Scale: 3/16" = 1'-0"



GIRDER ELEVATION - UNIT 14 SOUTHBOUND
Scale: 3/16" = 1'-0"

GIRDER	DIM. A	DIM. B
G1	76'-0"	43
G2	78'-5⅛"	44
G3	80'-10¼"	46

NOTE:
For Steel Details, see Sheet No. 45.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EJM	1-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	SR					

N25099

AS BUILT

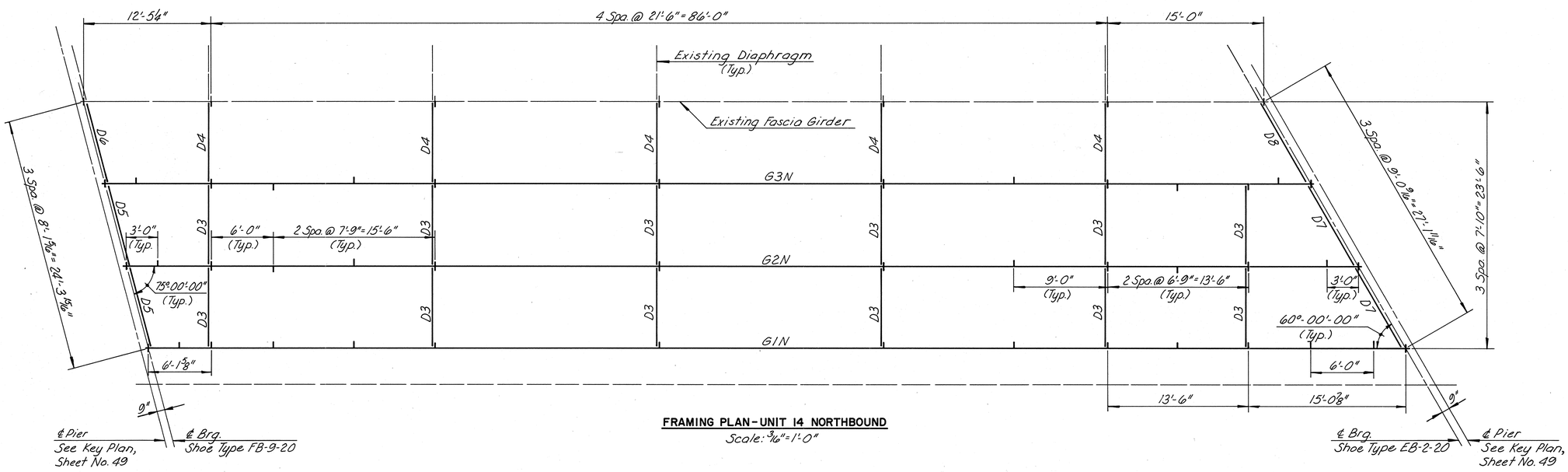
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNIT 14 SOUTHBOUND

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

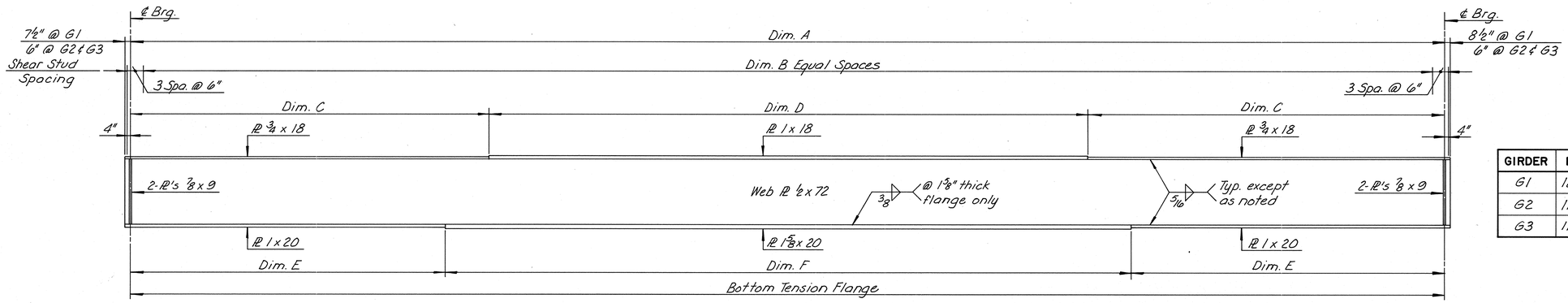
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 36 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	37	106



FRAMING PLAN - UNIT 14 NORTHBOUND
Scale: 3/16" = 1'-0"

NOTE:
For Steel Details, see Sheet No. 45.



GIRDER ELEVATION - UNIT 14 NORTHBOUND
Scale: 3/16" = 1'-0"

GIRDER	DIM. A	DIM. B	DIM. C	DIM. D	DIM. E	DIM. F
G1	120'-8½"	60	32'-10¼"	55'-0"	26'-1¼"	68'-6"
G2	118'-3½"	59	30'-10¾"	56'-6"	26'-7¾"	65'-0"
G3	115'-10⅜"	58	31'-11⅜"	52'-0"	24'-8⅜"	66'-6"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EJM	1-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	SR					

AS BUILT

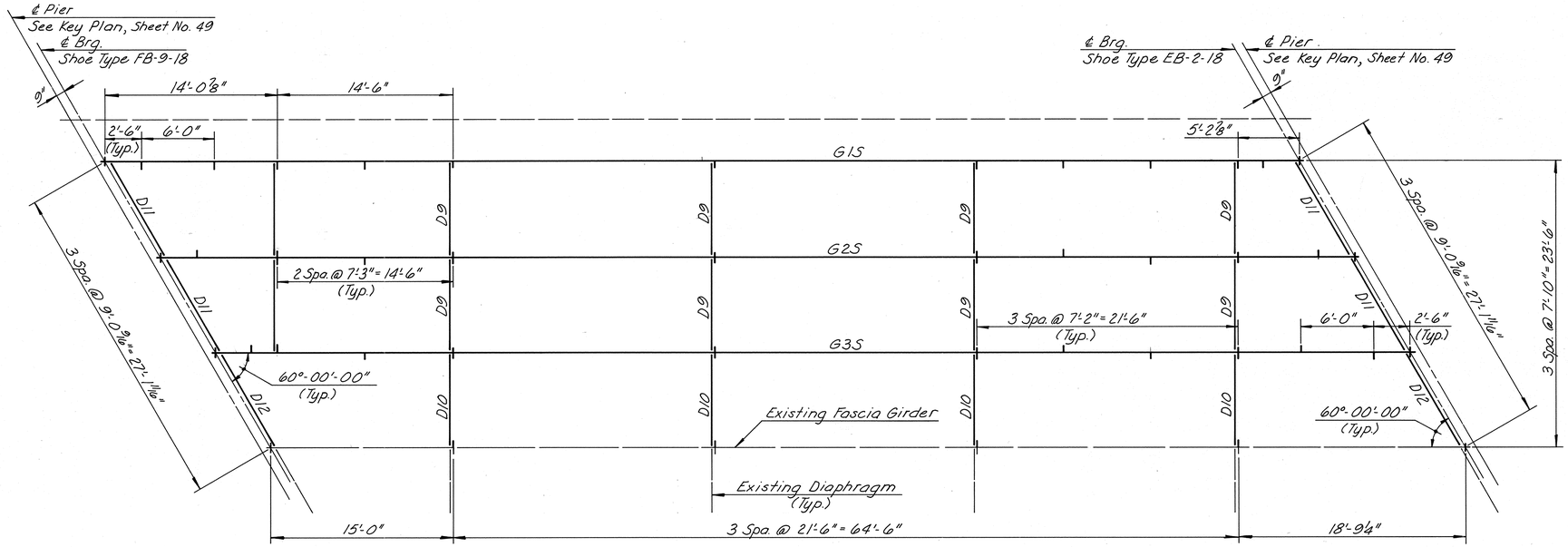
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNIT 14 NORTHBOUND

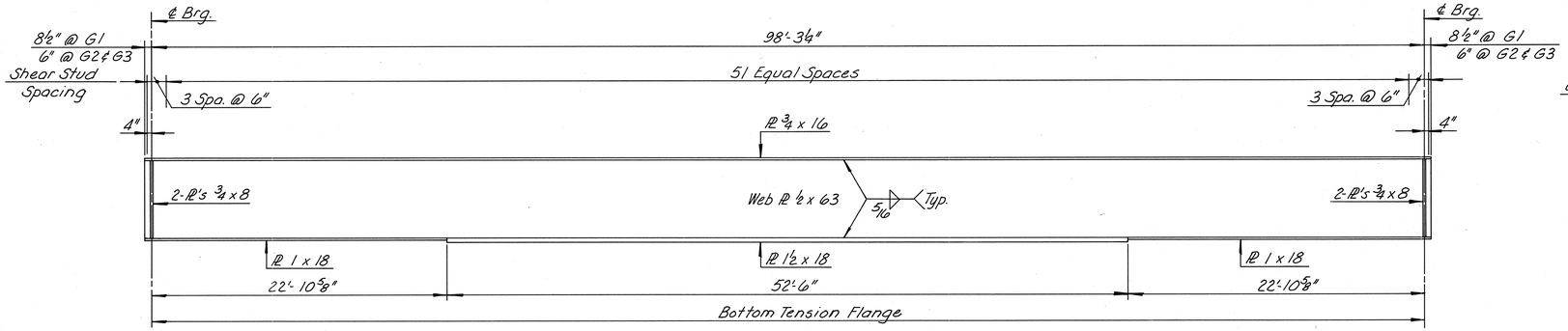
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 37 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	38	106

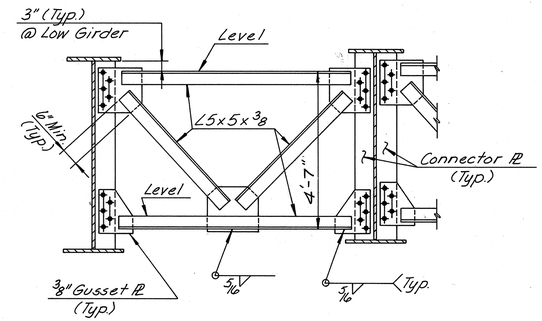


⚠ **FRAMING PLAN - UNIT 15 SOUTHBOUND**
Scale: 3/16" = 1'-0"

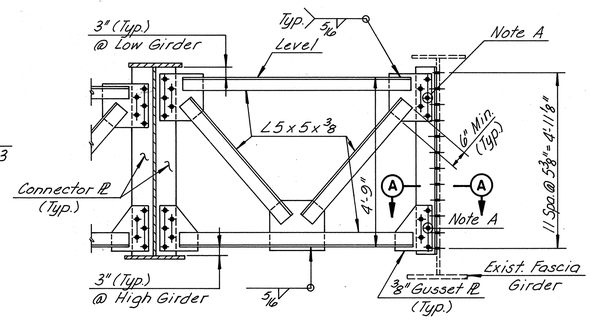


⚠ **GIRDER ELEVATION - UNIT 15 SOUTHBOUND**
Scale: 3/16" = 1'-0"

NOTE:
For Section A-A, see Sheet No. 45.
For Diaphragms 11 & 12, see Sheet No. 39.
For Additional Steel Details, see Sheet No. 45.



⚠ **INTERMEDIATE DIAPHRAGM D9**
Scale: ½" = 1'-0"



⚠ **INTERMEDIATE DIAPHRAGM D10**
Scale: ½" = 1'-0"

	BY	DATE				
MADE	EJM	1-87		As Built	TEM	3-89
CHECKED	TFP	3-87	⚠	Diaphragm & Girder Rev.	EJM	5-87
IN CHARGE	SR		NO.	REVISION	BY	DATE

N2599

AS BUILT

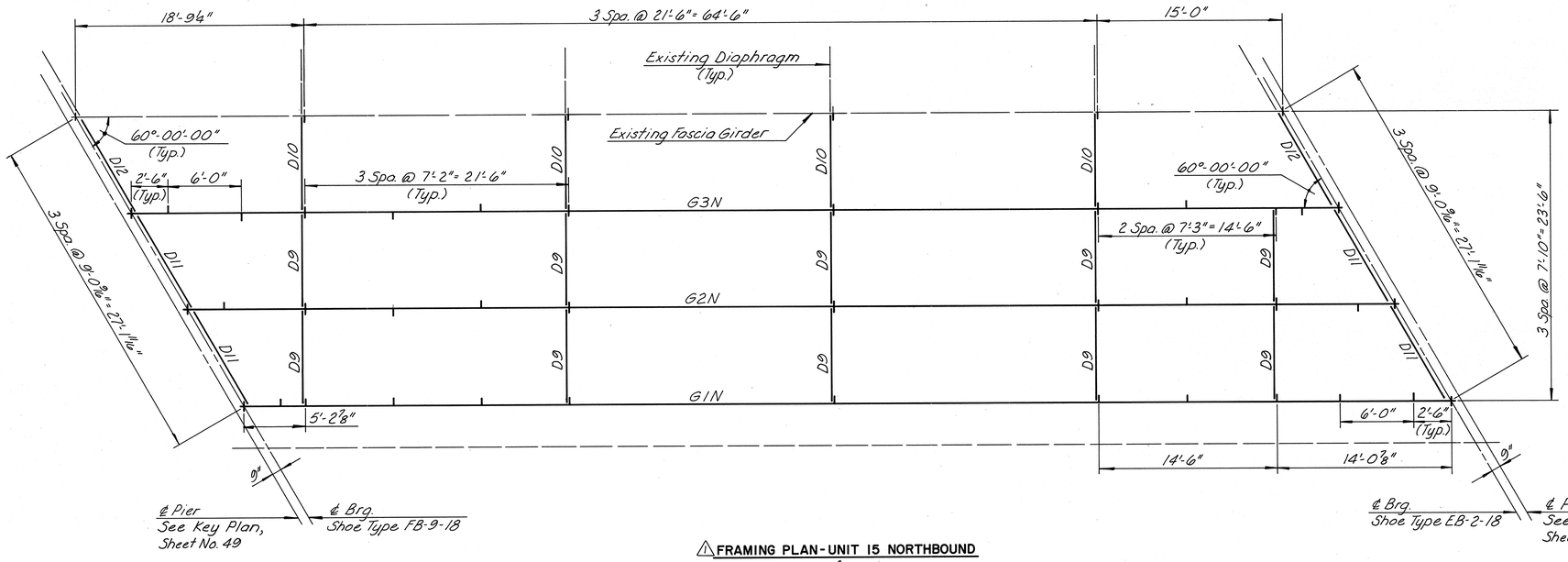
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNIT 15 SOUTHBOUND

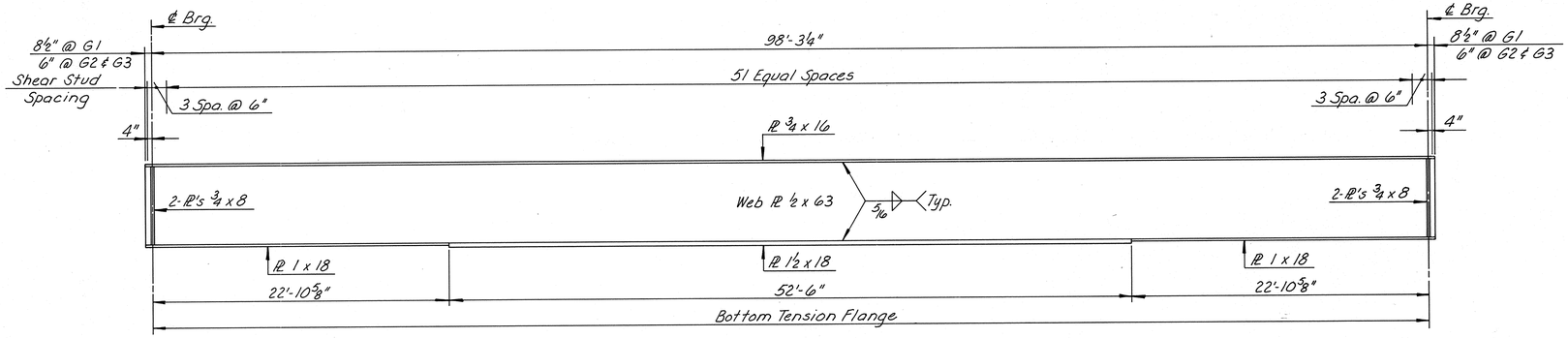
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 38 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	39	106

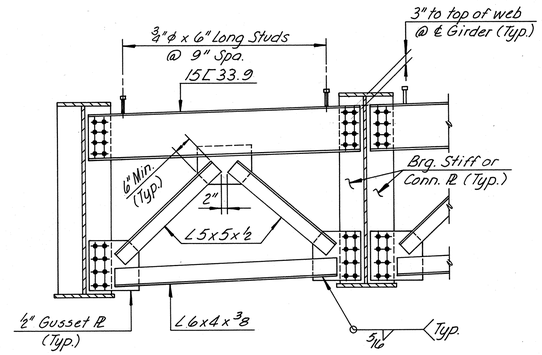


⚠ FRAMING PLAN - UNIT 15 NORTHBOUND
Scale: 3/16" = 1'-0"

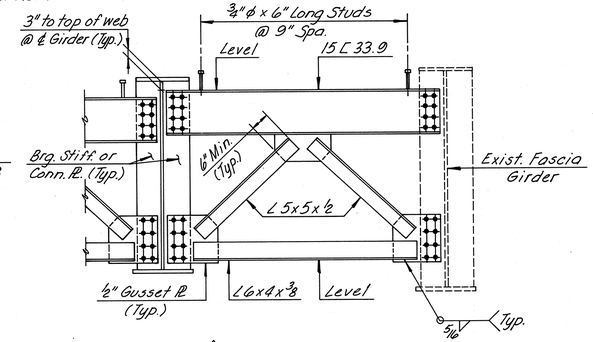


⚠ GIRDER ELEVATION - UNIT 15 NORTHBOUND
Scale: 3/16" = 1'-0"

NOTE:
For Steel Details, see Sheet No. 45.



⚠ END DIAPHRAGM D11
Scale: ½" = 1'-0"



⚠ END DIAPHRAGM D12
Scale: ½" = 1'-0"

	BY	DATE
MADE	EJM	1-87
CHECKED	TFP	3-87
IN CHARGE	SR	

NO.	REVISION	BY	DATE
⚠	Rev. Diaph. & Girder	EJM	5-87

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

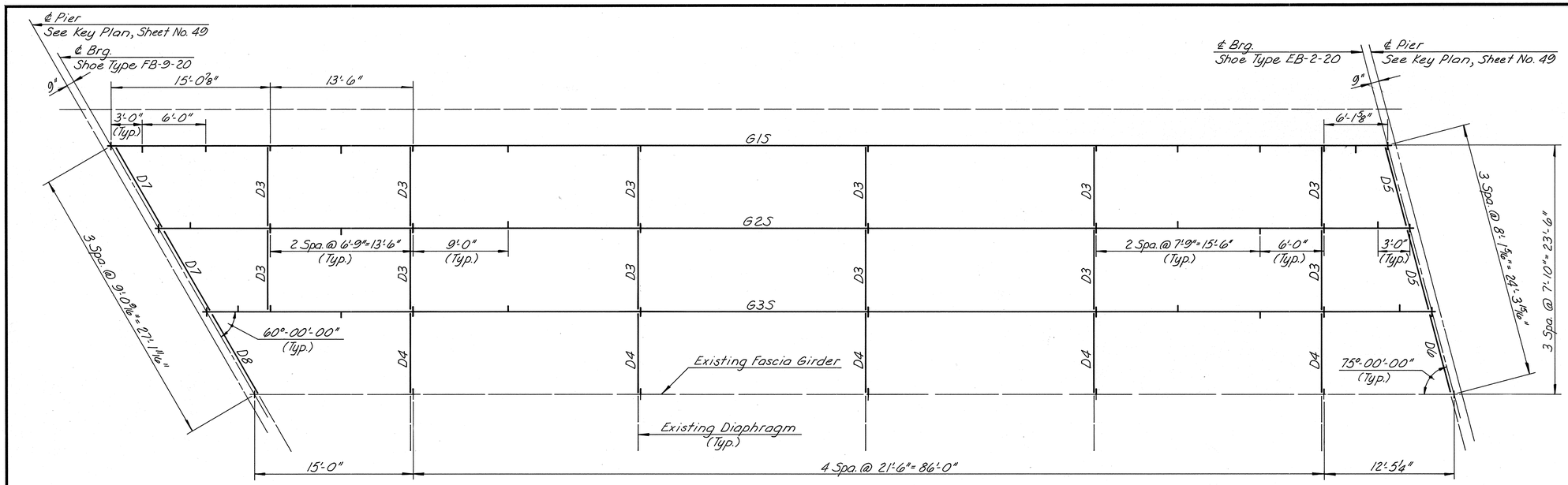
FRAMING PLAN & GIRDER ELEVATION
UNIT 15 NORTHBOUND

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 39 OF 106

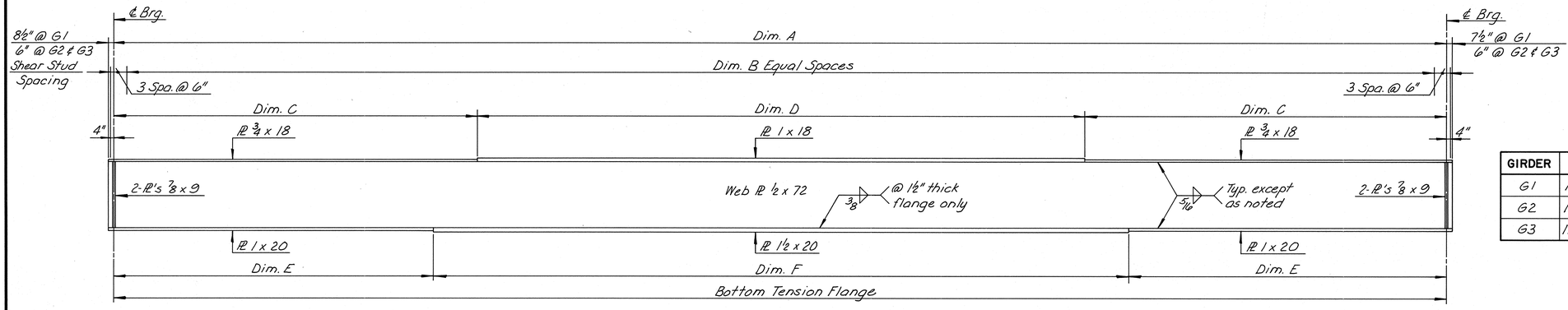
N75399

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	40	106



FRAMING PLAN - UNIT 16 SOUTHBOUND
Scale: 3/16" = 1'-0"

NOTE:
For Steel Details, see Sheet No. 45.



GIRDER ELEVATION - UNIT 16 SOUTHBOUND
Scale: 3/16" = 1'-0"

GIRDER	DIM. A	DIM. B	DIM. C	DIM. D	DIM. E	DIM. F
G1	120'-8½"	60	32'-10¼"	55'-0"	26'-1¼"	68'-6"
G2	118'-3½"	59	30'-10¾"	56'-6"	26'-7¾"	65'-0"
G3	115'-10⅜"	58	31'-11⅜"	52'-0"	24'-8⅜"	66'-6"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EJM	1-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	SR					

AS BUILT

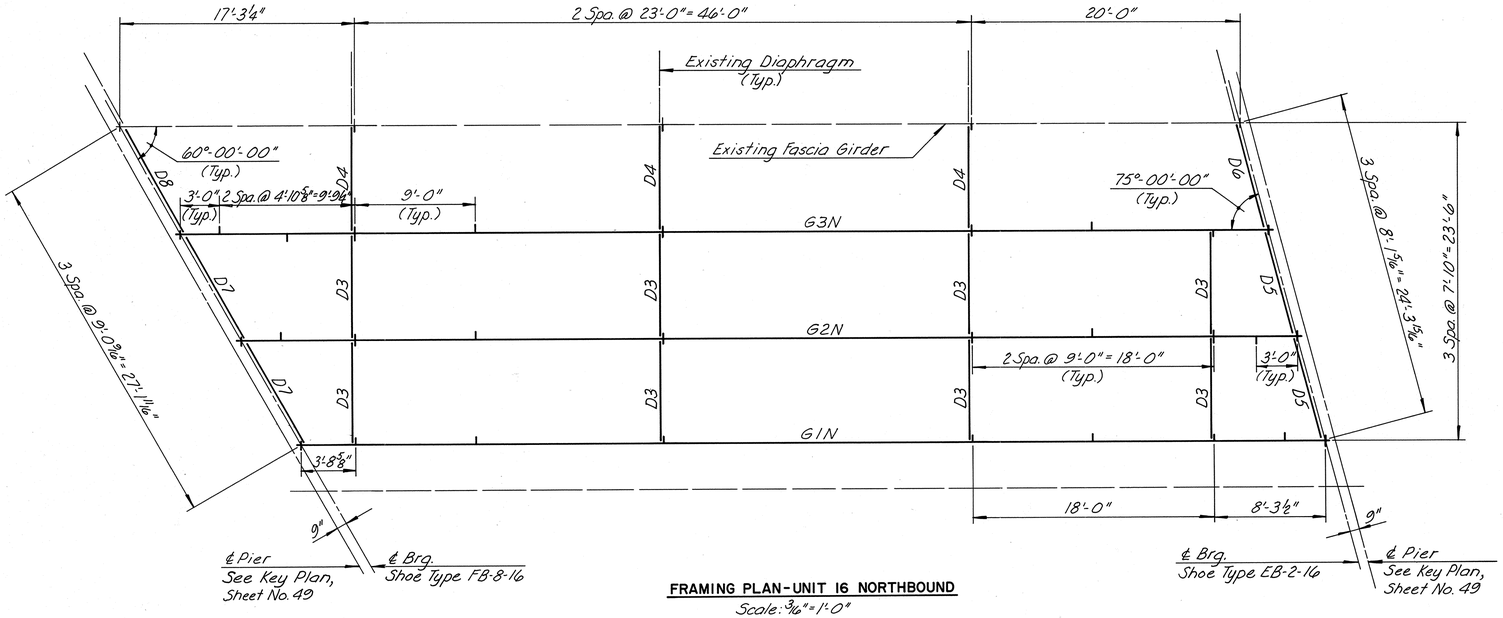
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNIT 16 SOUTHBOUND

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

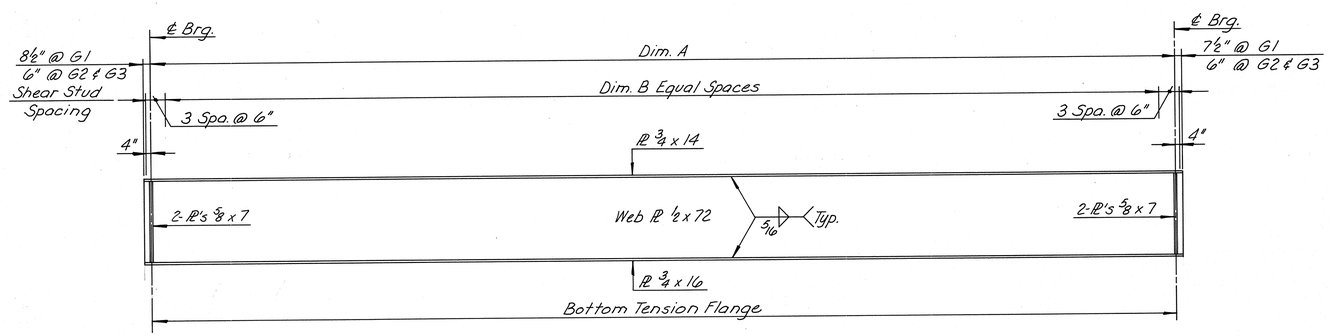
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 40 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	41	106



FRAMING PLAN - UNIT 16 NORTHBOUND
Scale: 3/16" = 1'-0"

NOTE:
For Steel Details, see Sheet No. 45.



GIRDER ELEVATION - UNIT 16 NORTHBOUND
Scale: 3/16" = 1'-0"

GIRDER	DIM. A	DIM. B
G1	76'-0"	43
G2	78'-5⅛"	44
G3	80'-10¼"	46

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EJM	1-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	SR					

N7539

AS BUILT

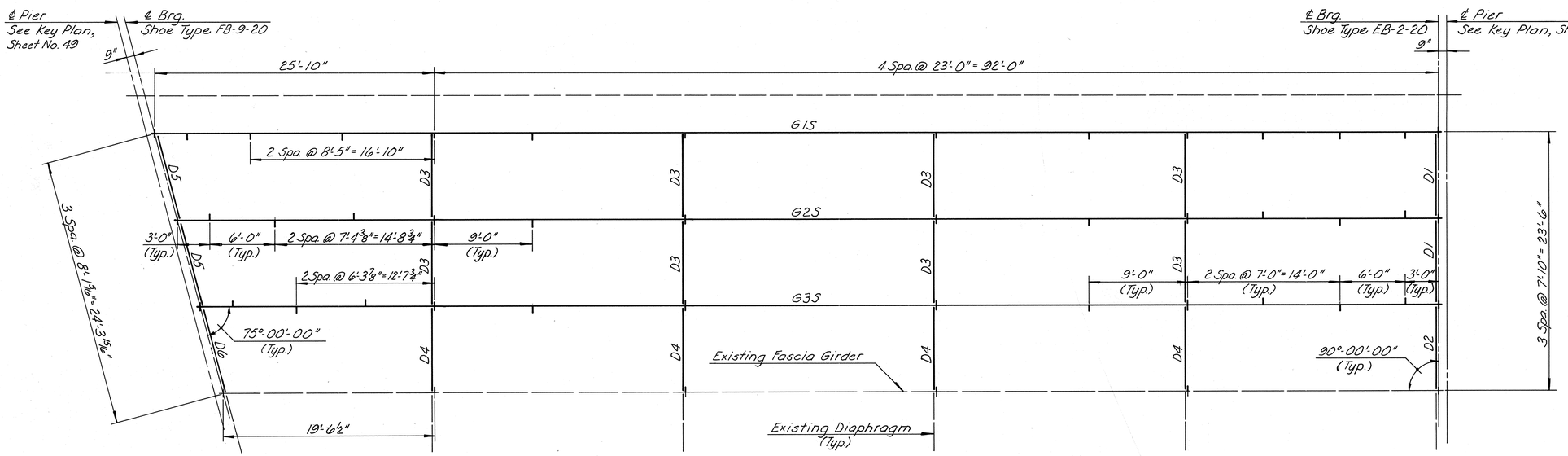
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNIT 16 NORTHBOUND

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

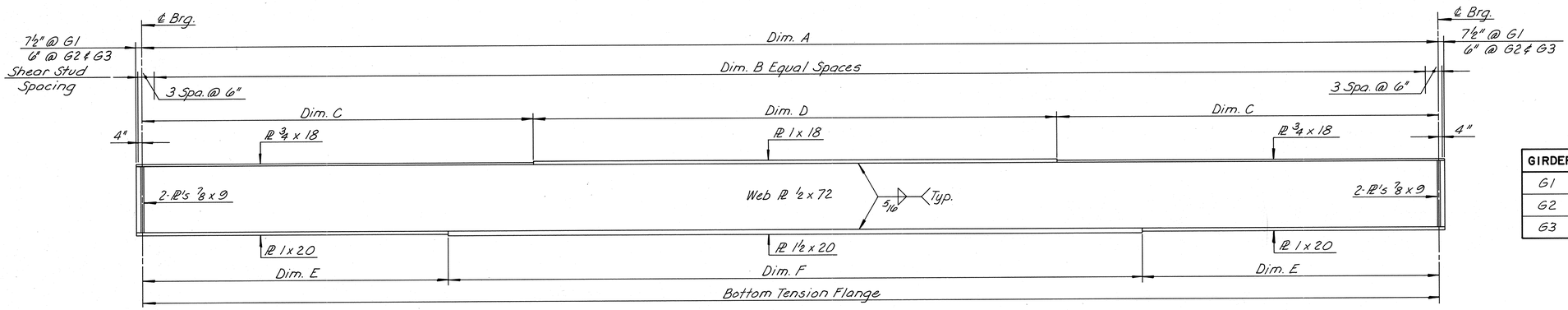
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 41 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	42	106



NOTE:
For Steel Details, see Sheet No. 45.

FRAMING PLAN - UNIT 17 SOUTHBOUND
Scale: 3/16" = 1'-0"



GIRDER	DIM. A	DIM. B	DIM. C	DIM. D	DIM. E	DIM. F
G1	117'-10"	58	32'-11"	52'-0"	25'-8"	66'-6"
G2	115'-8 3/4"	57	32'-1 3/8"	51'-6"	24'-7 3/8"	66'-6"
G3	113'-7 5/8"	56	33'-9 13/16"	46'-0"	25'-6 13/16"	62'-6"

GIRDER ELEVATION - UNIT 17 SOUTHBOUND
Scale: 3/16" = 1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EUM	1-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	SR					

N2939

AS BUILT

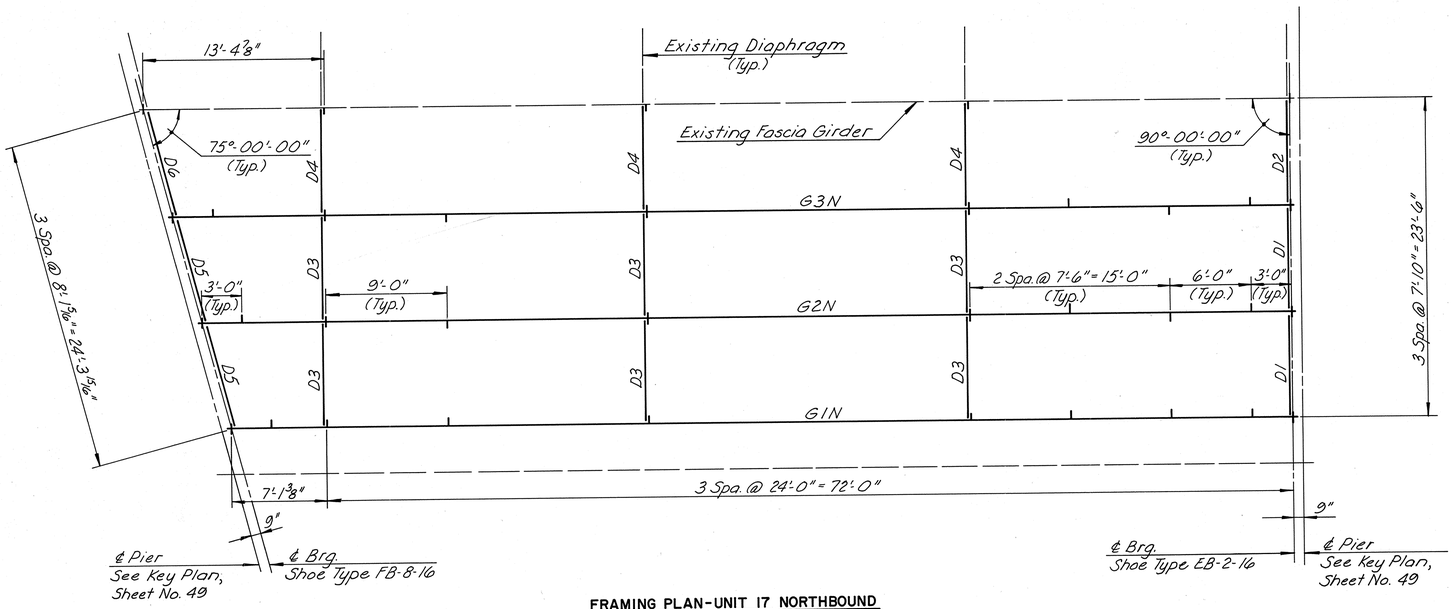
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNIT 17 SOUTHBOUND

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

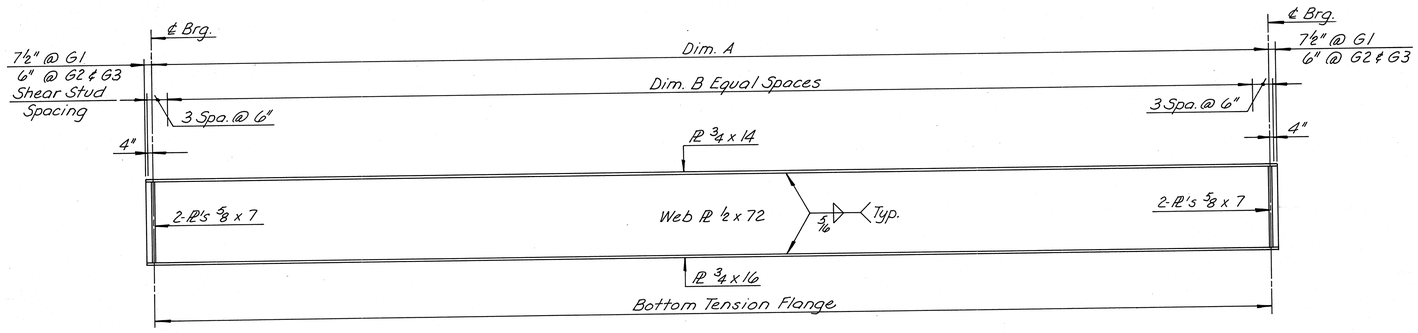
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 42 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	43	106



FRAMING PLAN-UNIT 17 NORTHBOUND
Scale: 3/16" = 1'-0"

NOTE:
For Steel Details, see Sheet No. 45.



GIRDER ELEVATION-UNIT 17 NORTHBOUND
Scale: 3/16" = 1'-0"

GIRDER	DIM. A	DIM. B
G1	79'-1 3/8"	43
G2	81'-2½"	44
G3	83'-3¾"	45

	BY	DATE
MADE	EJM	1-87
CHECKED	TFP	3-87
IN CHARGE	SR	

NO.	REVISION	BY	DATE
	As Built	TEM	3-89

AS BUILT

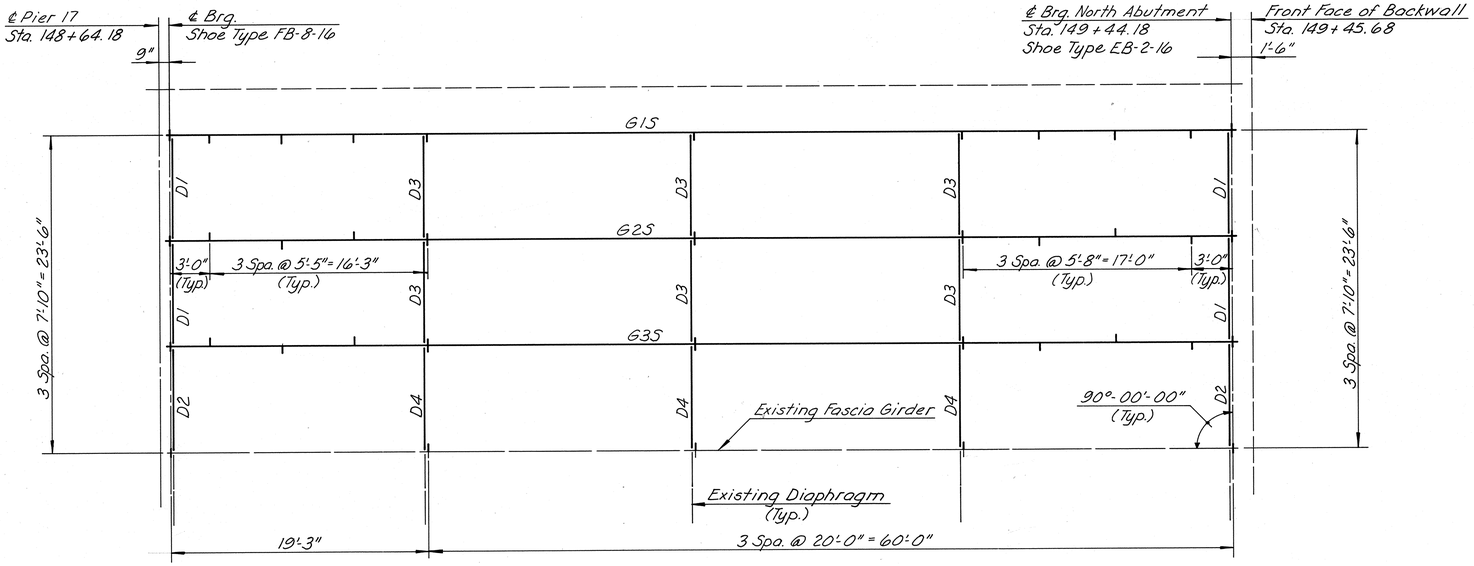
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNIT 17 NORTHBOUND

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

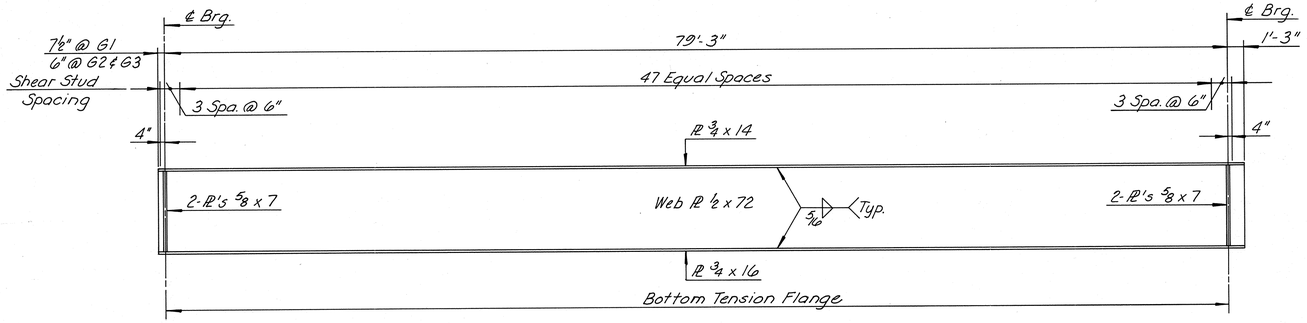
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 43 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	44	106



FRAMING PLAN - UNIT 18 SOUTHBOUND & NORTHBOUND (SOUTHBOUND SHOWN)
Scale: 3/16" = 1'-0"

NOTE:
For Steel Details, see Sheet No. 45.



GIRDER ELEVATION - UNIT 18 SOUTHBOUND & NORTHBOUND
Scale: 3/16" = 1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EJM	1-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	SR					

AS BUILT

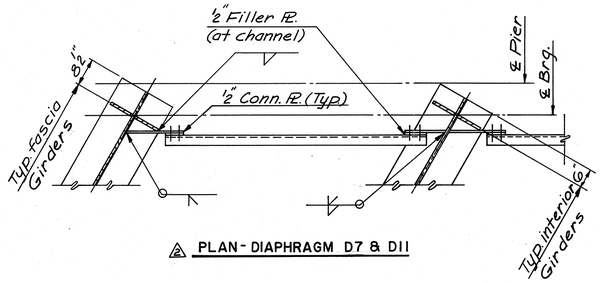
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNIT 18 SOUTHBOUND & NORTHBOUND

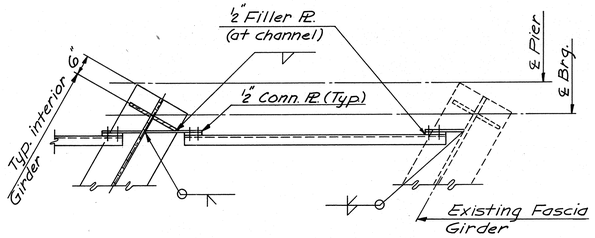
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 44 OF 106

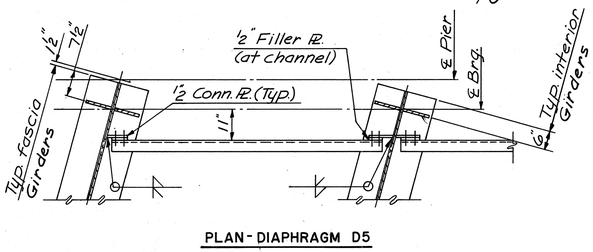
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	45	106



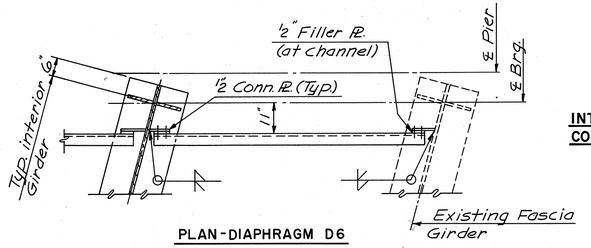
△2 PLAN - DIAPHRAGM D7 & D11



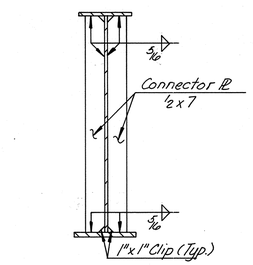
△2 PLAN - DIAPHRAGM D8 & D12



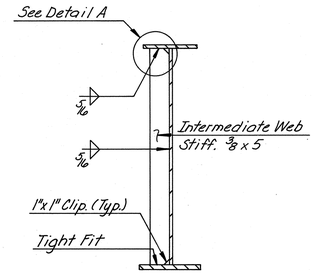
PLAN - DIAPHRAGM D5



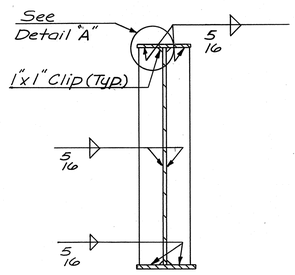
PLAN - DIAPHRAGM D6



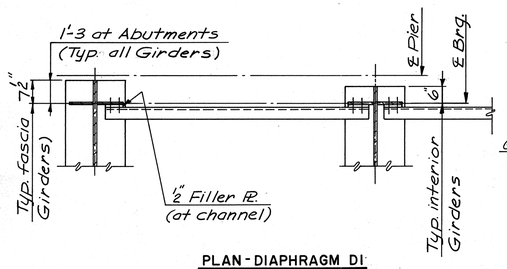
INTERMEDIATE DIAPHRAGM CONNECTOR PLATE DETAIL
No Scale



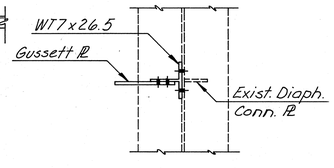
INTERMEDIATE WEB STIFFENER DETAIL
No Scale



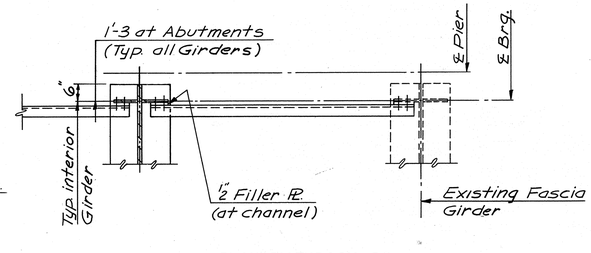
BEARING STIFFENER DETAIL
No Scale



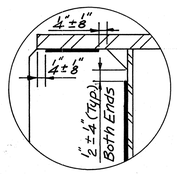
PLAN - DIAPHRAGM D1



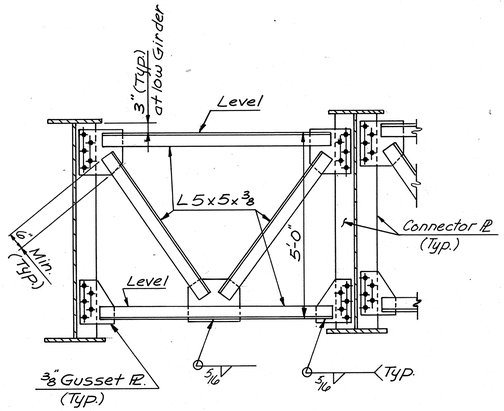
△SECTION A-A
Scale: ¾"=1'-0"



PLAN - DIAPHRAGM D2

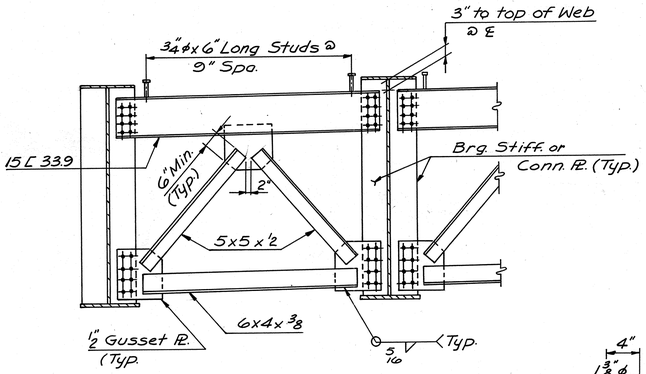


DETAIL "A"
No Scale

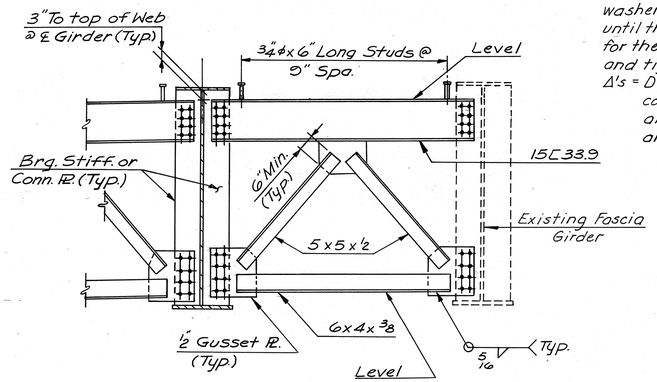


INTERMEDIATE DIAPHRAGM D3,
Scale: ½"=1'-0"

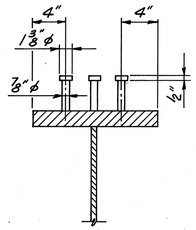
NOTE A:
Provide slotted hole in Conn. Pl. for Δ's deflection and 1"ϕ erection bolt with 3"ϕ washers. The bolt shall remain snug tight until the deck slab is placed, then the holes for the remaining bolts shall be field drilled and tightened.
Δ's = Deflection of girder from dead load of concrete deck slab, bolster and 20 p.s.f. allowance for construction tolerance and construction methods. See Sheets No. 68



ELEVATION
END DIAPHRAGM DETAILS - D1, D5, D7
Scale: ½"=1'-0"

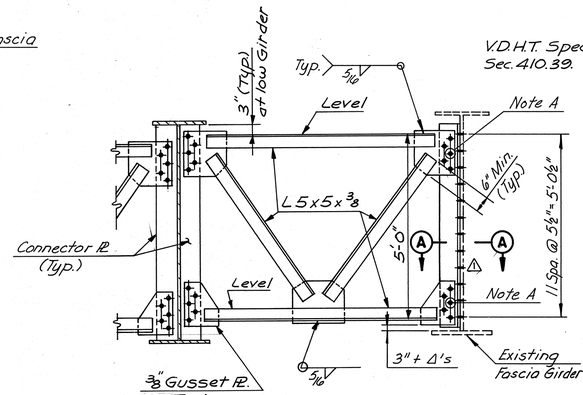


ELEVATION
END DIAPHRAGM DETAILS - D2, D6, D8
Scale: ½"=1'-0"

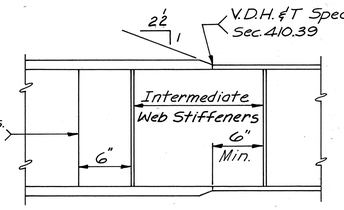


SHEAR STUD DETAIL
No Scale

NOTES:
Capacity = 6010 lbs. per stud shear spacing shown is maximum spacing.
All connections shall be made with ⅞"ϕ H.S. Bolts and shall conform to ASTM A-325.



INTERMEDIATE DIAPHRAGM D4
Scale: ½"=1'-0"



WELDED SPLICE DETAIL
No Scale

	BY	DATE		As Built	TEM	3-89
MADE	ALC	3-87	△2	Added Diaph's.	ALC	5-87
CHECKED	T.F.P	3-87	△1	Revised Conn. Pl.	T.F.P.	4-87
IN CHARGE	S.R.		NO.	REVISION	BY	DATE

N8590

AS BUILT

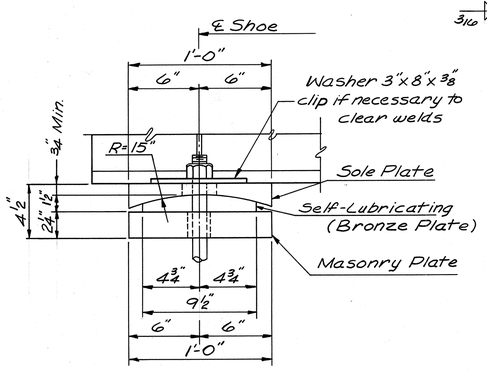
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

STEEL DETAILS

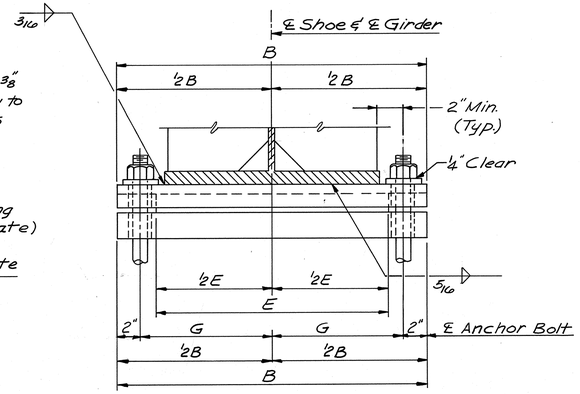
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 45 OF 106

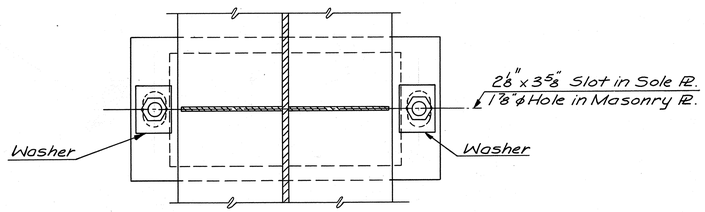
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	46	106



SIDE ELEVATION



END ELEVATION

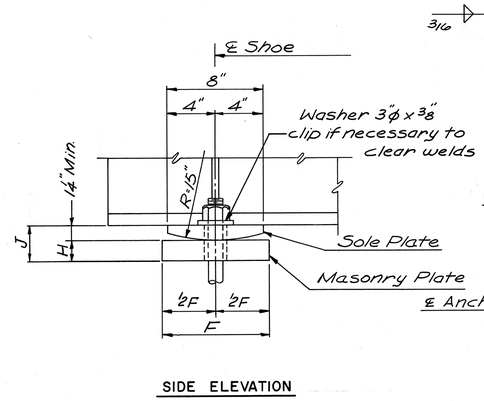


PLAN

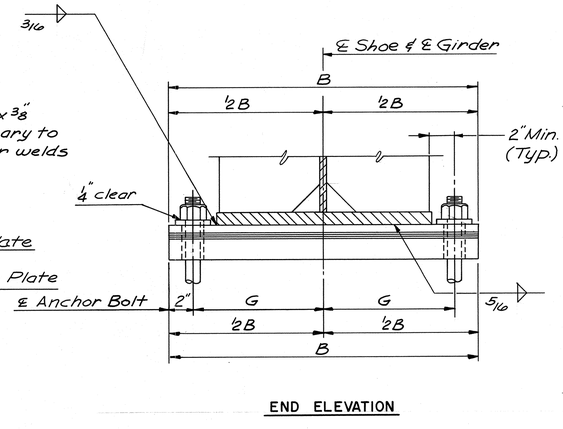
EXPANSION SHOE EB-2
No Scale

EXPANSION SHOES													
SHOE TYPE	NO. REQ'D	A	B	C	D	E	F	G	H	J	L		
EB-2-16	24		2'-0"			1'-5 1/2"		10"			1'-7"		
EB-2-18	18		2'-2"			1'-7 1/2"		11"			1'-7"		
EB-2-20	66		2'-4"			1'-9 1/2"		1'-0"			1'-7"		

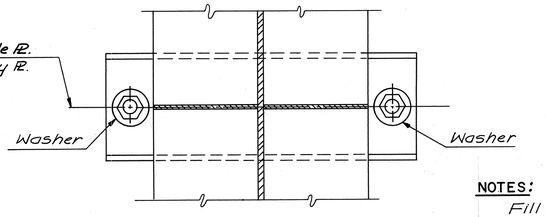
FIXED SHOES													
SHOE TYPE	NO. REQ'D	A	B	C	D	E	F	G	H	J	L		
FB-8-16	24		2'-0"				8"	10"	1 1/2"	2 3/4"	1'-2"		
FB-9-18	18		2'-2"				9"	11"	1 3/4"	4 1/2"	1'-2 1/4"		
FB-9-20	66		2'-4"				9"	1'-0"	1 3/4"	4 1/2"	1'-2 1/4"		



SIDE ELEVATION

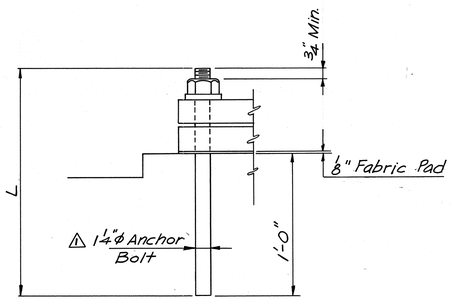


END ELEVATION



PLAN

FIXED SHOE
No Scale



ANCHOR BOLT DETAIL
No Scale

NOTES:

Fill slots and holes in masonry plate around anchor bolts with a nonhardening caulking compound or elastic joint sealer.

For expansion bearing, bevel sole plate to match grade.

Steel in bearing may be ASTM A36, A572, Grade 50, or A588 and shall be painted. Surface of sole plate and masonry plate in contact with bronze plates shall not be painted, but coated with multipurpose grease before shipment. Prior to assembly in place these surfaces shall be thoroughly coated with additional antioxidant lubricant furnished by the manufacturer.

Radius may be machined to compensate for grade.

Bearing shall be set so that at 68°F, it is at the midpoint of its movement.

For Expansion bearing, 15" Radius tolerances:
Sole Plate -0", +.01"
Bronze Plate -.01" +0"

	BY	DATE				
MADE	A.L.C.	2-87		As Built	TEM	3-89
CHECKED	T.F.P	3-87	⚠	1 1/4 ϕ Anchor Bolt	ALC	4-87
IN CHARGE	S.R.		NO.	REVISION	BY	DATE

N8295

AS BUILT

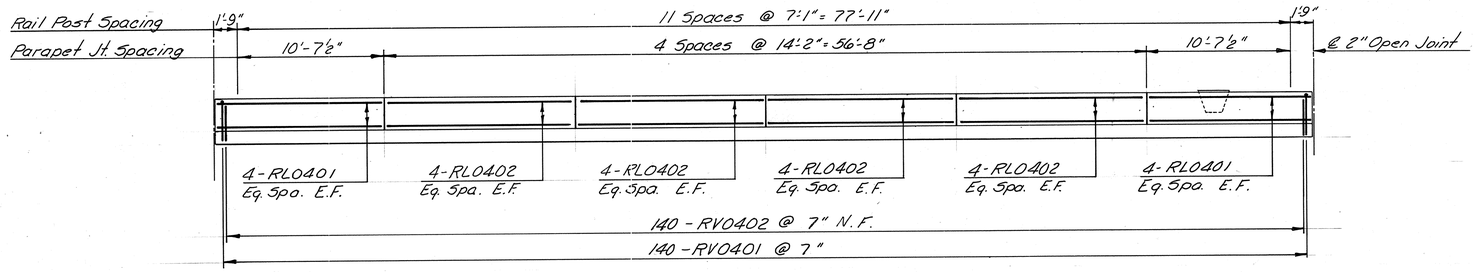
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

SHOE DETAILS

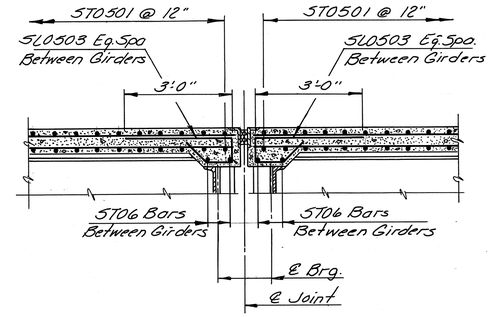
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 46 OF 106

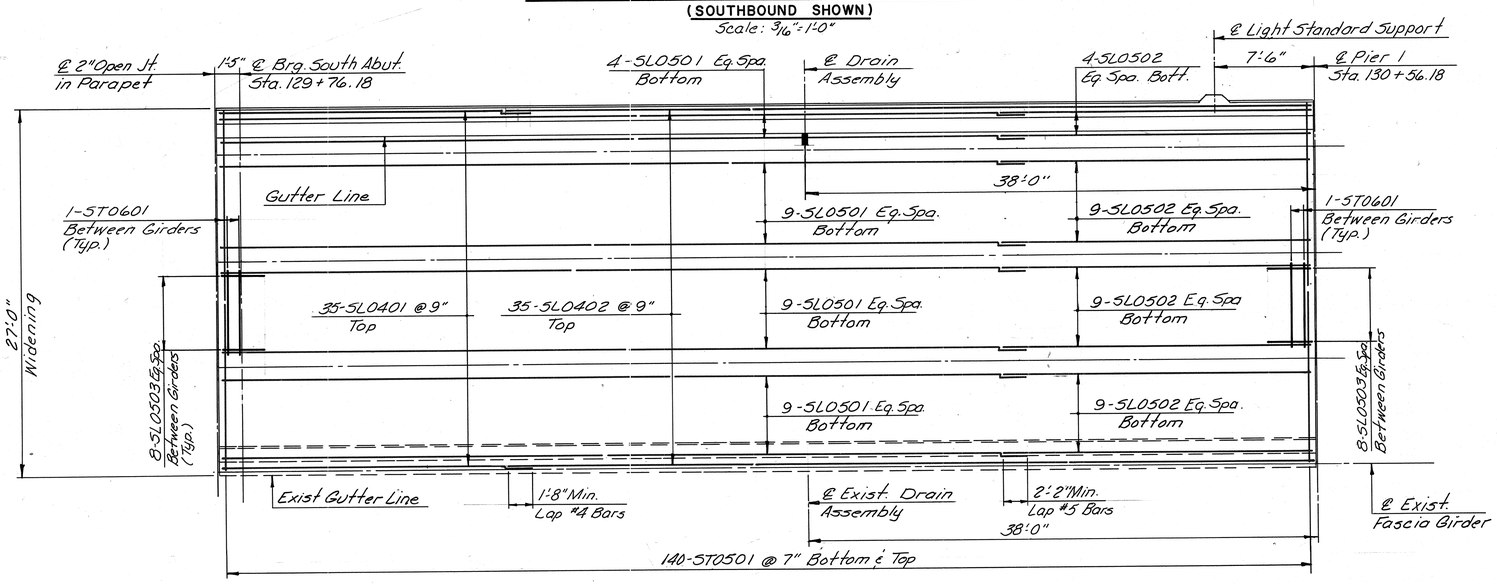
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	51	106



PARAPET ELEVATION - UNIT I SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16"=1'-0"



TYPICAL SECTION AT JOINT
Scale: ½"=1'-0"



DECK PLAN - UNIT I SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16"=1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAL	3-87				
CHECKED	T.F.R.	3-87		As Built	TEM	3-89
IN CHARGE	S.R.					

AS BUILT

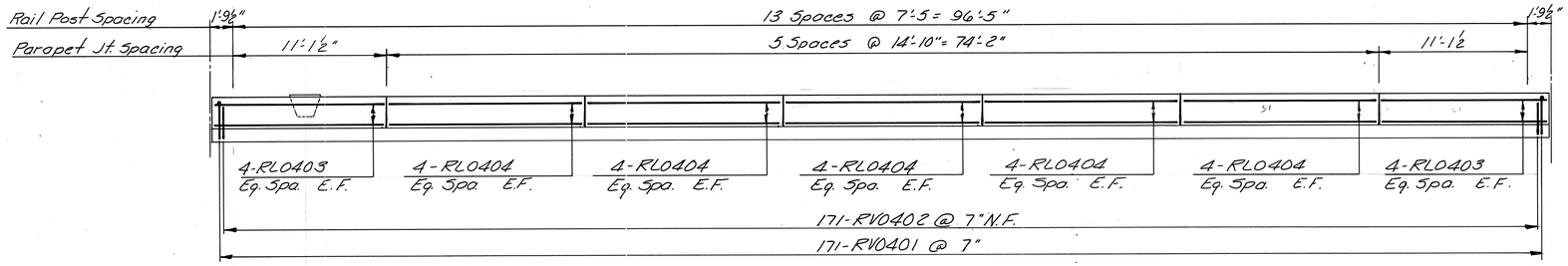
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN
UNIT I SOUTHBOUND & NORTHBOUND

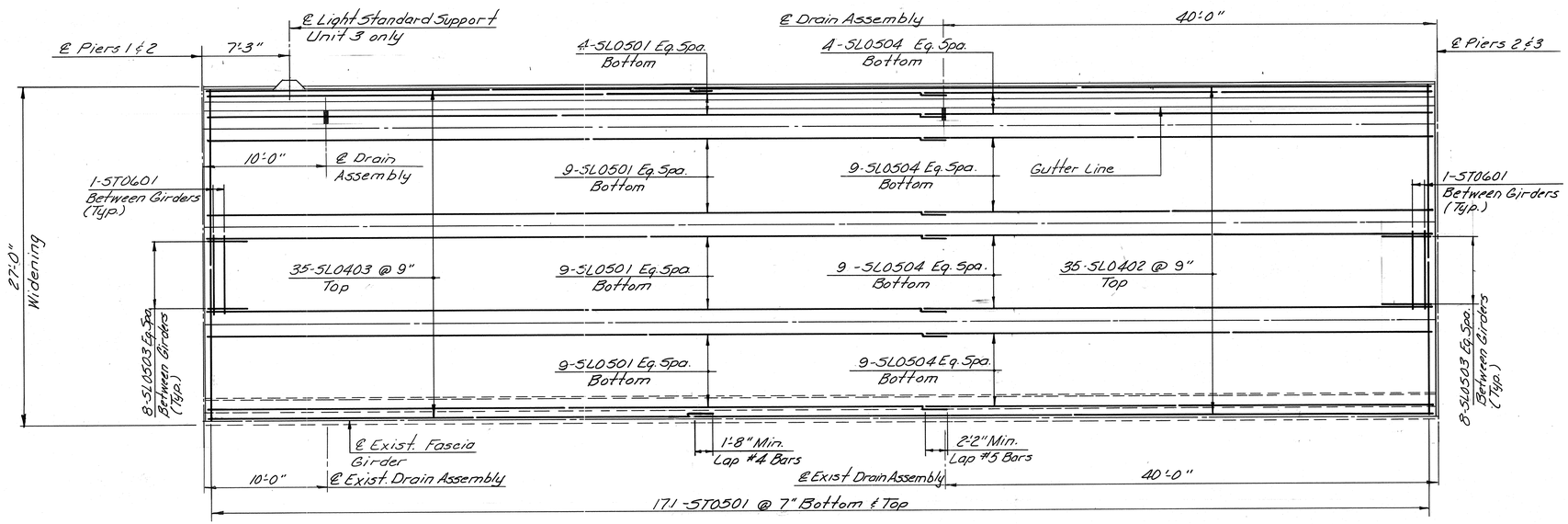
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 51 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	52	106



PARAPET ELEVATION – UNITS 2 & 3 SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16"=1'-0"



DECK PLAN – UNITS 2 & 3 SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16"=1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAL	3-87				
CHECKED	TRP	3-87		As Built	TEM	3-89
IN CHARGE	S.R.					

N7599

AS BUILT

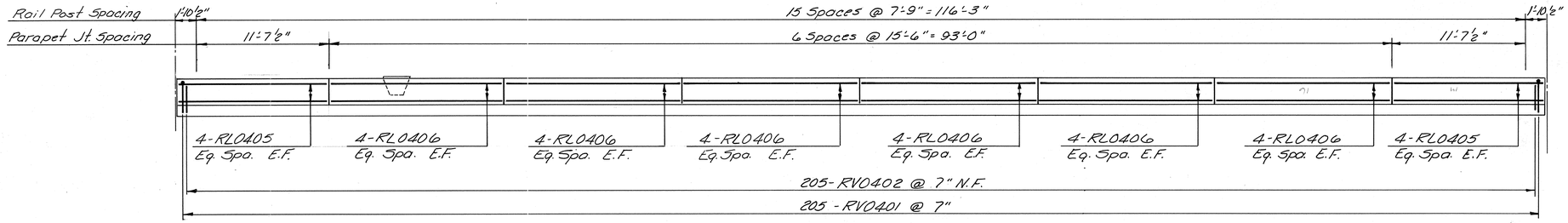
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN
UNITS 2 & 3 SOUTHBOUND & NORTHBOUND

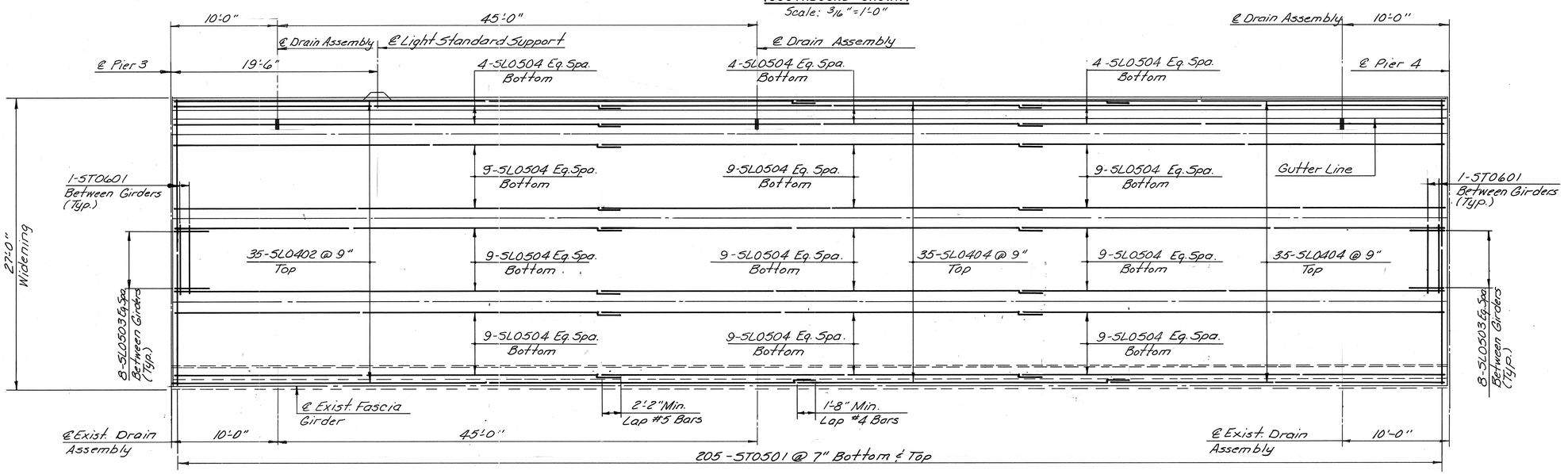
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 52 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	53	106



PARAPET ELEVATION – UNIT 4 SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16" = 1'-0"



DECK PLAN – UNIT 4 SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16" = 1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAL	3-87				
CHECKED	T.F.P.	3-87		As Built	TEM	3-89
IN CHARGE	S.R.					

AS BUILT

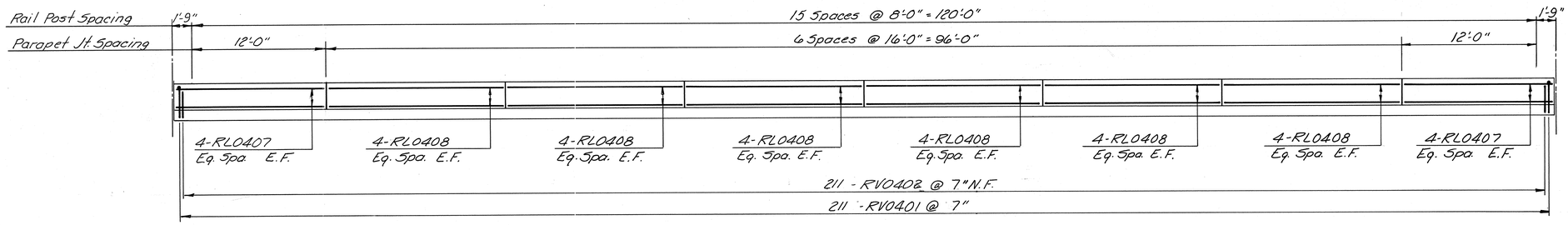
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN
UNIT 4 SOUTHBOUND & NORTHBOUND

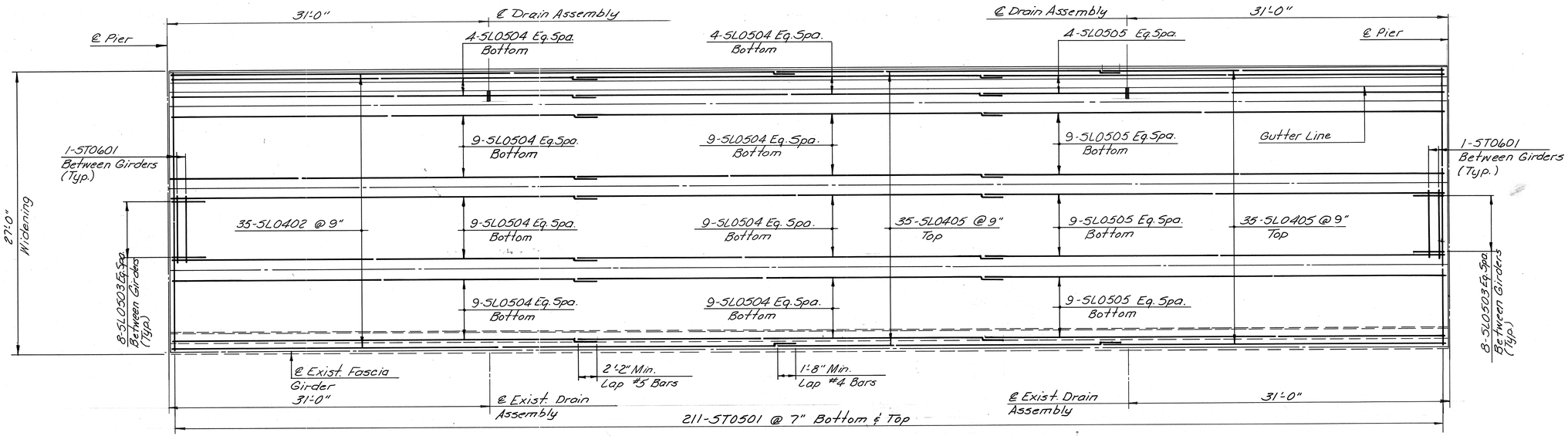
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 53 OF 106

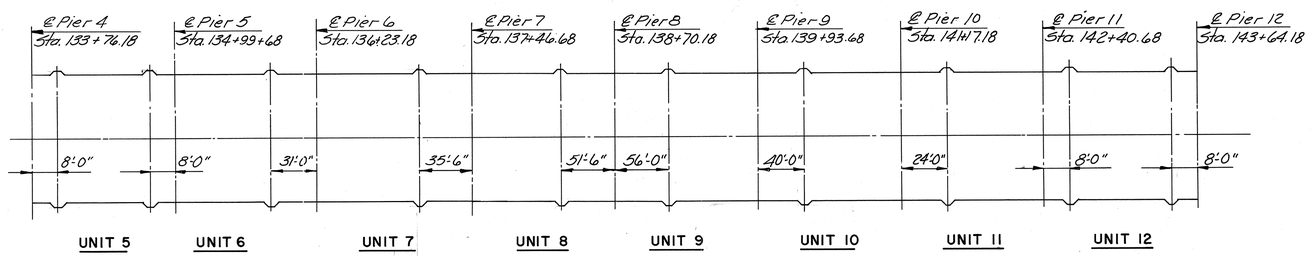
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	54	106



PARAPET ELEVATION - UNITS 5 THRU 12 SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16"=1'-0"



DECK PLAN - UNITS 5 THRU 12 SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16"=1'-0"



LIGHTING STANDARD LOCATIONS FOR UNITS 5 THRU 12
No Scale

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAL	3-87				
CHECKED	TRP	3-87		As Built	TEM	3-89
IN CHARGE	S.R.					

N2599

AS BUILT

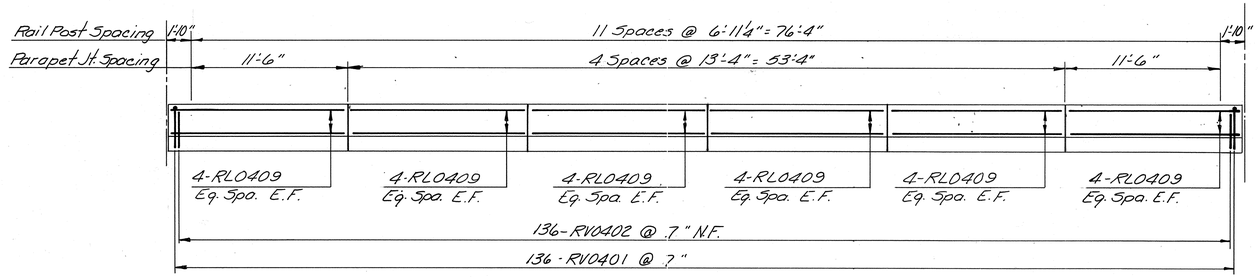
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN
UNITS 5 THRU 12 SOUTHBOUND & NORTHBOUND

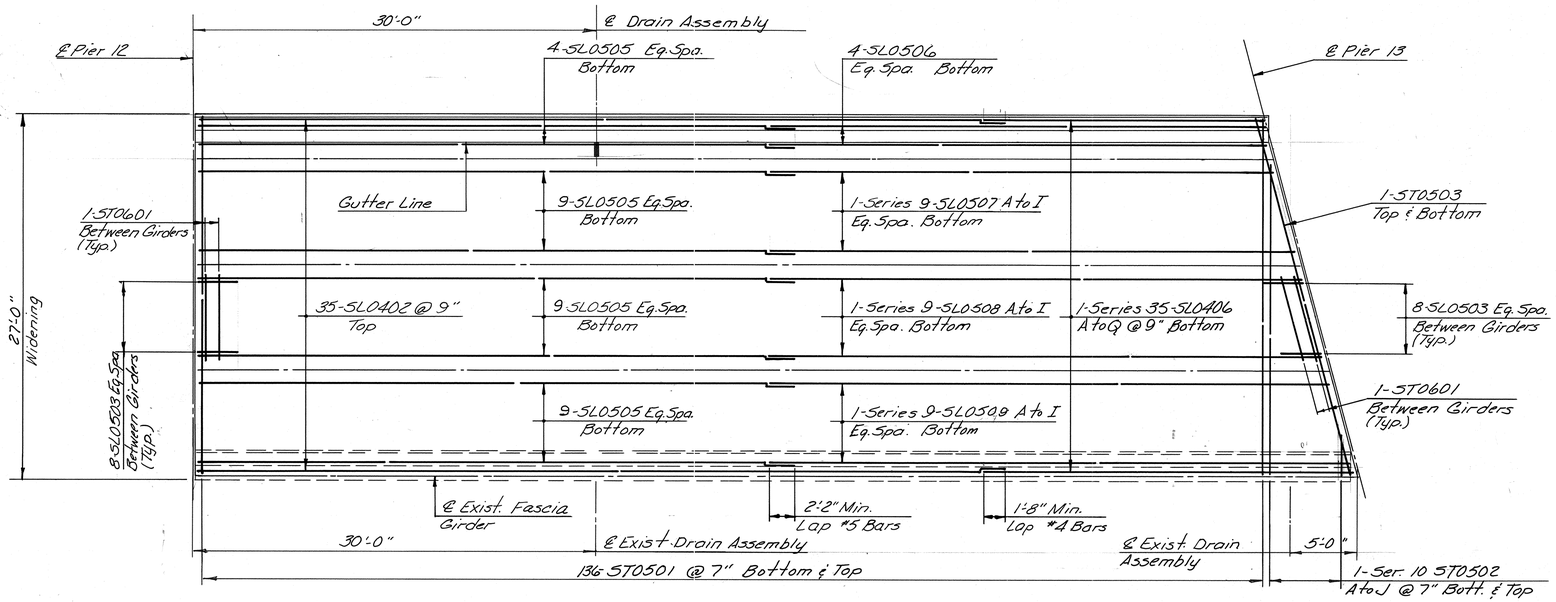
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 54 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	55	106



PARAPET ELEVATION – UNIT 13 SOUTHBOUND
Scale: 3/16" = 1'-0"



DECK PLAN – UNIT 13 SOUTHBOUND
Scale: 3/16" = 1'-0"

	BY	DATE				
MADE	TAL	3-87				
CHECKED	TRP	3-87		As Built	TEM	3-89
IN CHARGE	S.R.		NO.	REVISION	BY	DATE

AS BUILT

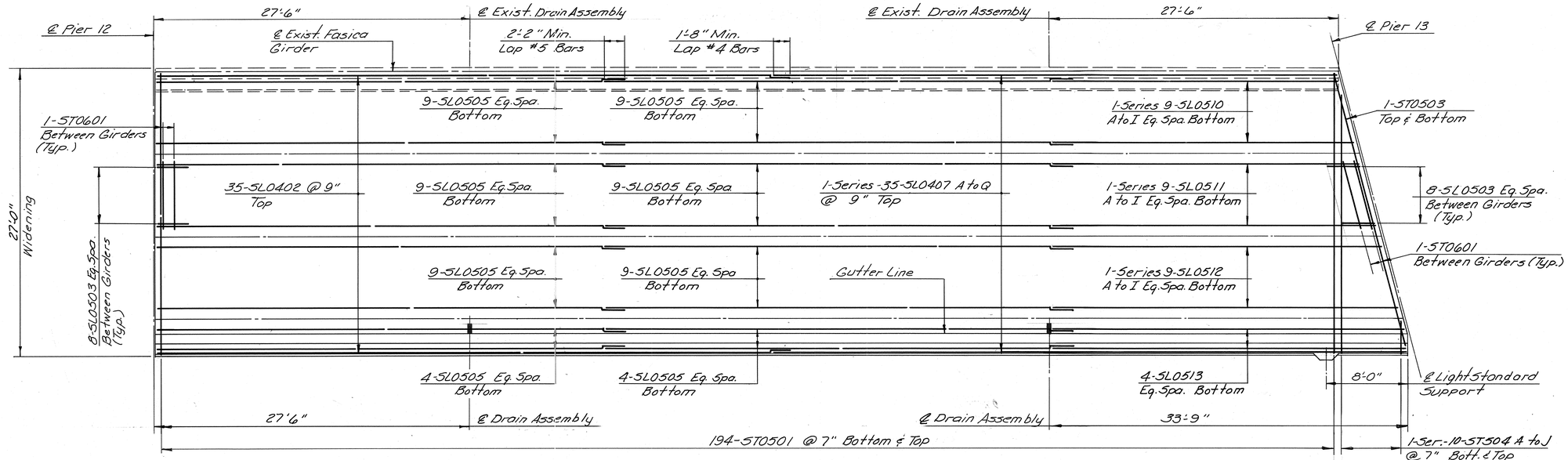
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN - UNIT 13 SOUTHBOUND

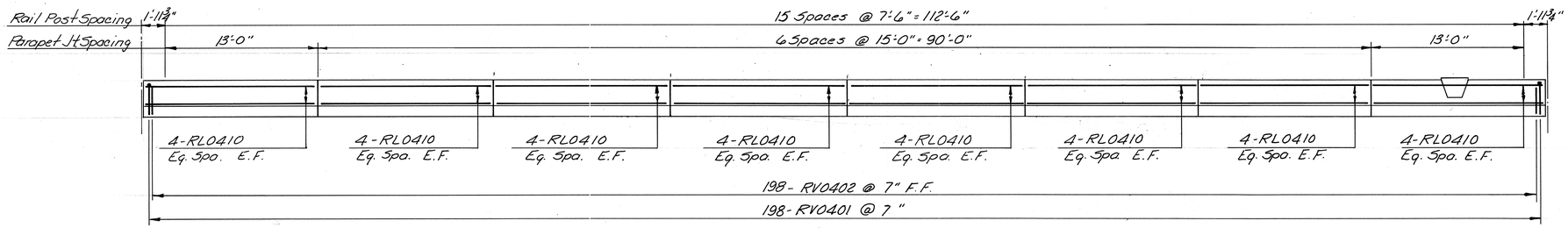
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 55 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	56	106



DECK PLAN - UNIT 13 NORTHBOUND
Scale: 3/16" = 1'-0"



PARAPET ELEVATION - UNIT 13 NORTHBOUND
Scale: 3/16" = 1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAL	3-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	S.R.					

AS BUILT

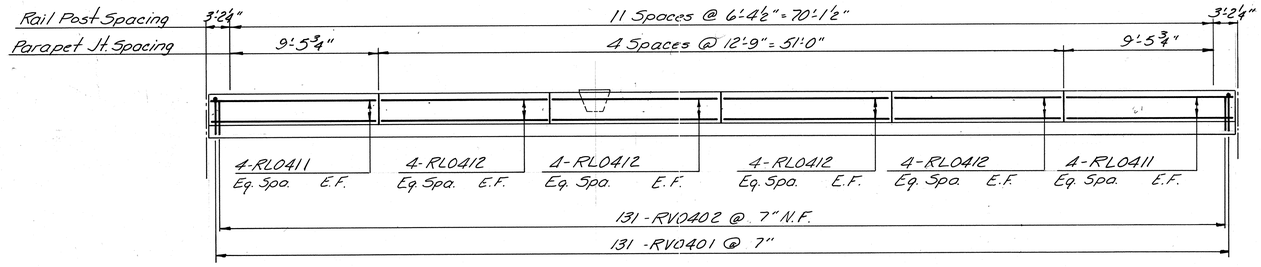
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN - UNIT 13 NORTHBOUND

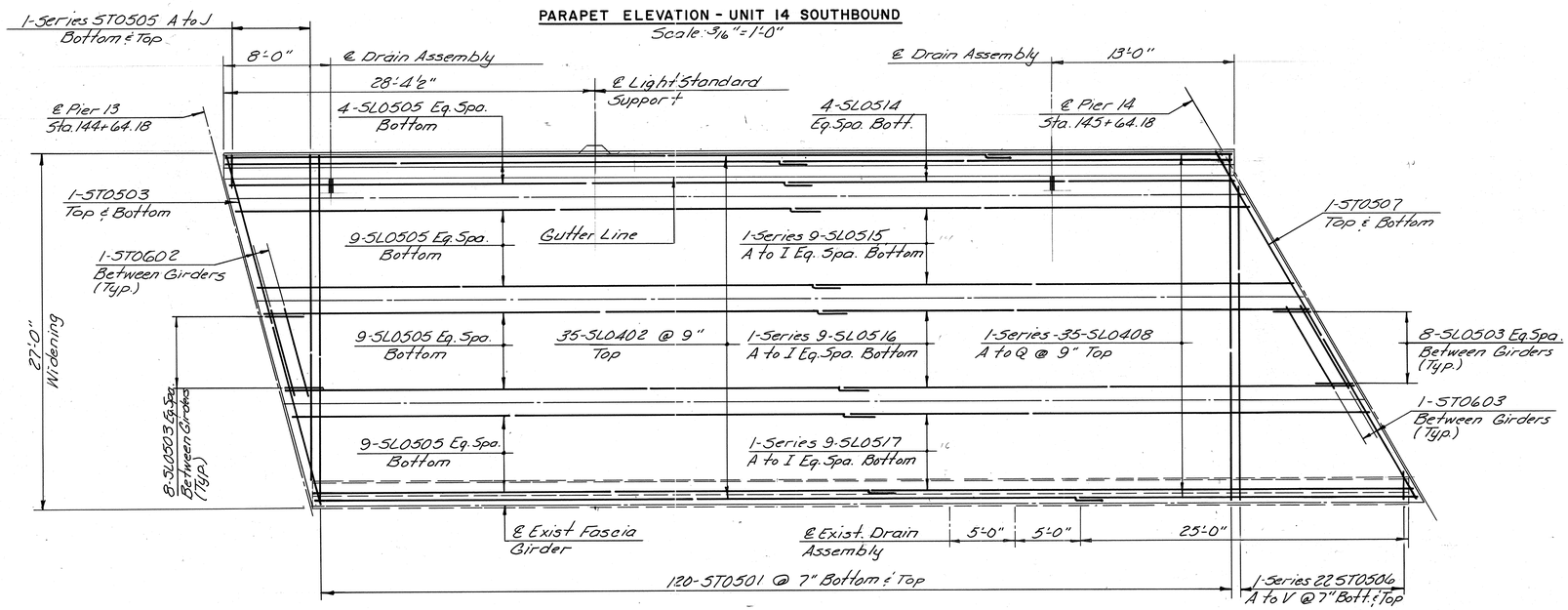
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 56 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	57	106



PARAPET ELEVATION - UNIT 14 SOUTHBOUND
Scale: 3/16" = 1'-0"



DECK PLAN - UNIT 14 SOUTHBOUND
Scale: 3/16" = 1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAL	3-87				
CHECKED	TRP	3-87		As Built	TEM	3-89
IN CHARGE	S.R.					

AS BUILT

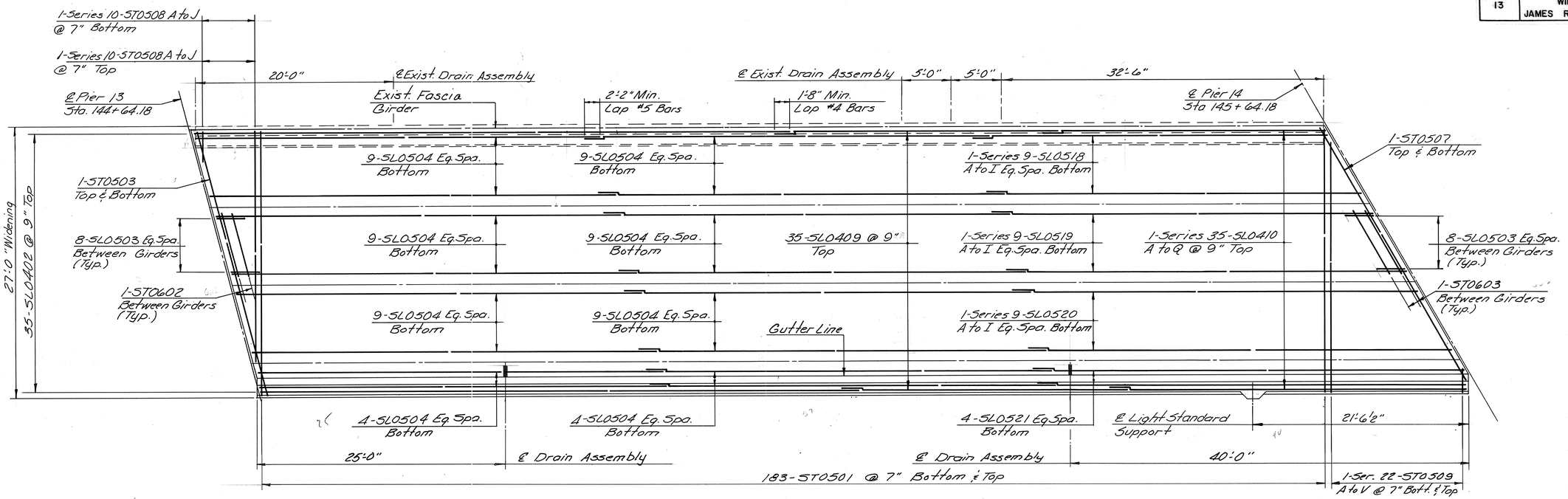
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN - UNIT 14 SOUTHBOUND

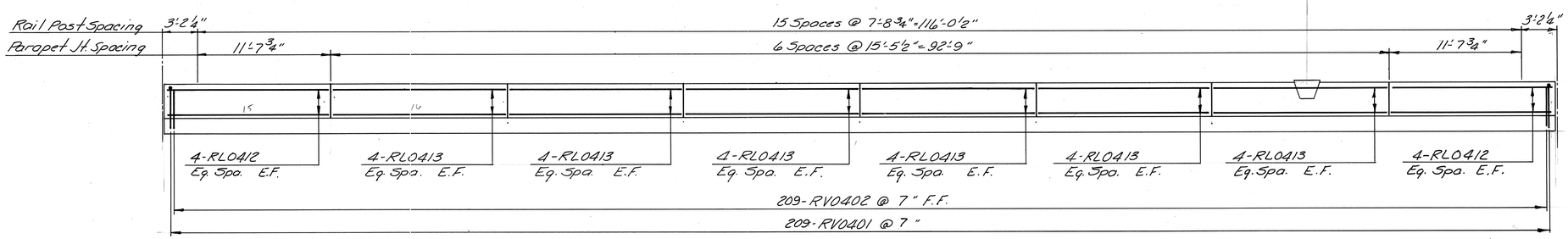
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 57 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	58	106



DECK PLAN - UNIT 14 NORTHBOUND
Scale: 3/16" = 1'-0"



PARAPET ELEVATION - UNIT 14 NORTHBOUND
Scale: 3/16" = 1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAL	3-87				
CHECKED	T.F.P.	3-87		As Built	TEM	3-89
IN CHARGE	S.R.					

N2599

AS BUILT

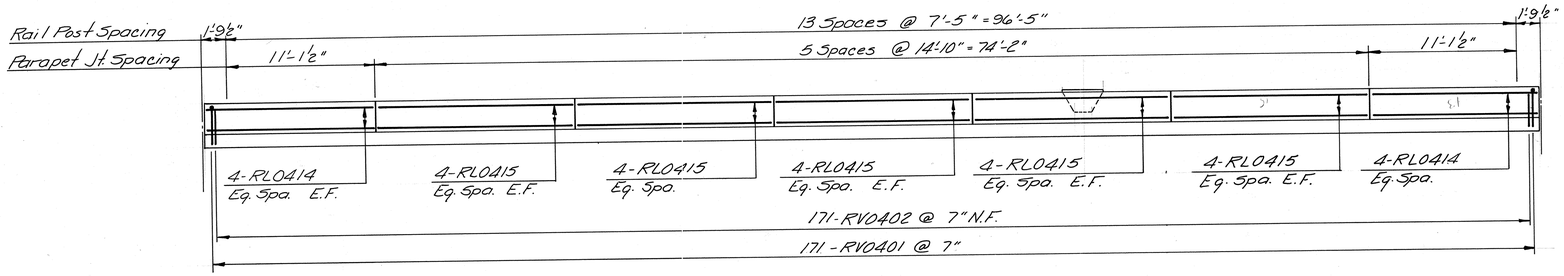
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN - UNIT 14 NORTHBOUND

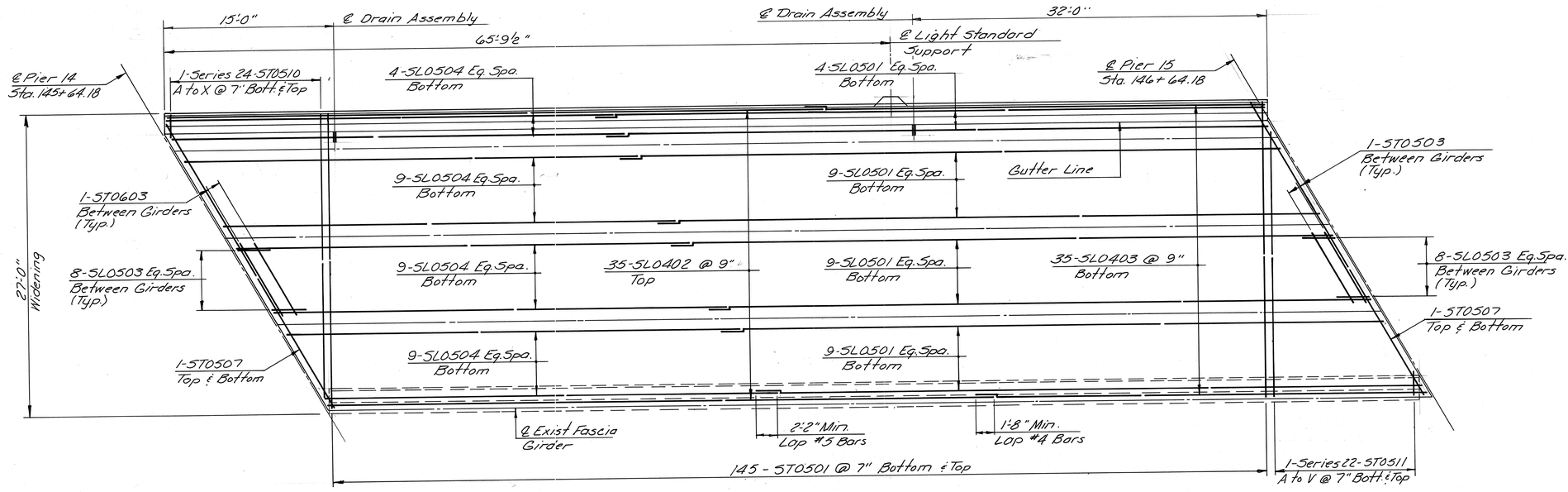
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 58 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	59	106



PARAPET ELEVATION – UNIT 15 SOUTHBOUND
Scale: 3/16" = 1'-0"



DECK PLAN – UNIT 15 SOUTHBOUND
Scale: 3/16" = 1'-0"

	BY	DATE				
MADE	TAL	3-87				
CHECKED	T.F.P.	3-87		As Built	TEM	3-89
IN CHARGE	S.R.		NO.	REVISION	BY	DATE

AS BUILT

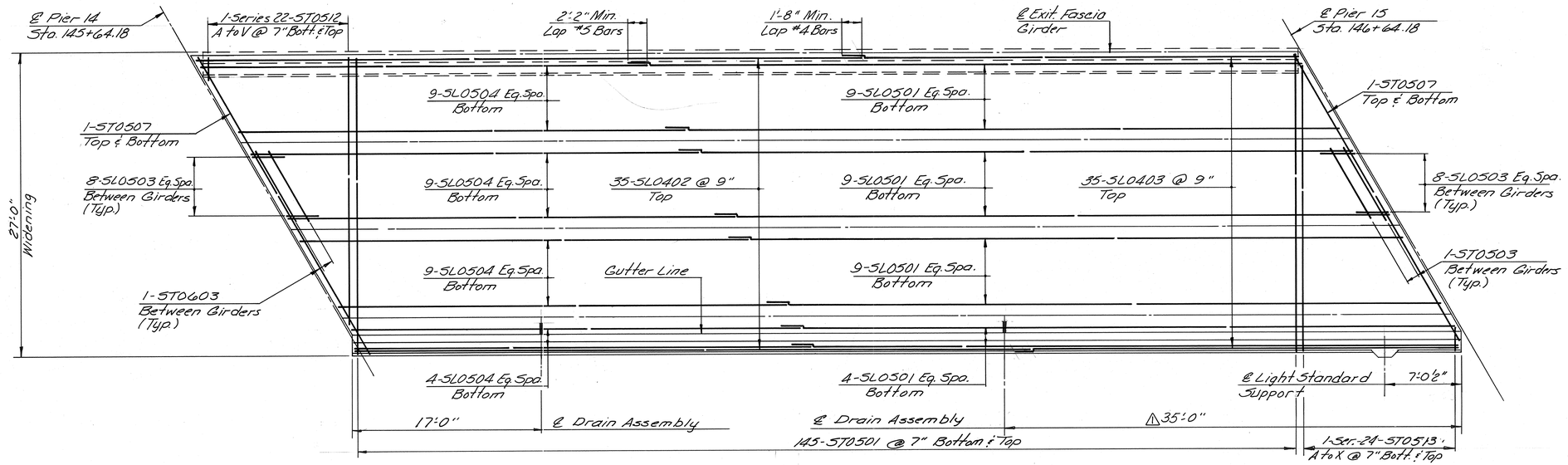
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN - UNIT 15 SOUTHBOUND

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

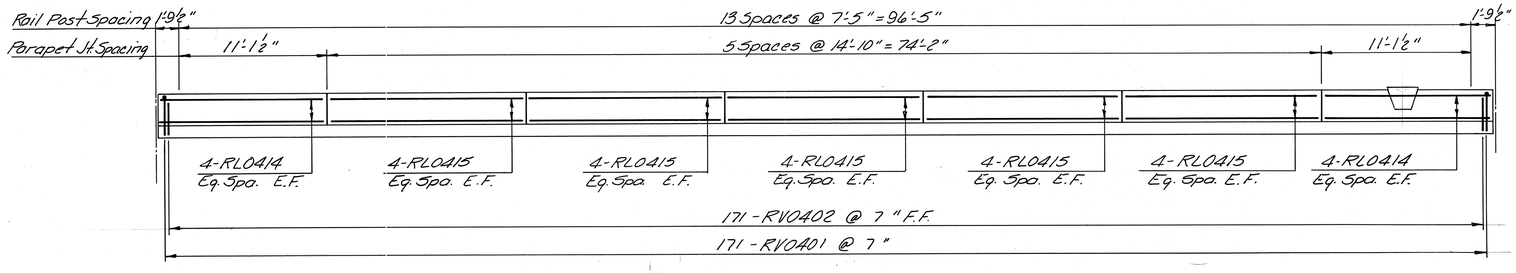
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 59 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	60	106



DECK PLAN - UNIT 15 NORTHBOUND

Scale: 3/16"=1'-0"



PARAPET ELEVATION - UNIT 15 NORTHBOUND

Scale: 3/16"=1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAL	3-87		As Built	TEM	3-89
CHECKED	TFP	3-87	△	Rel. Drain Assbly.	EJM	7-87
IN CHARGE	S.R.					

AS BUILT

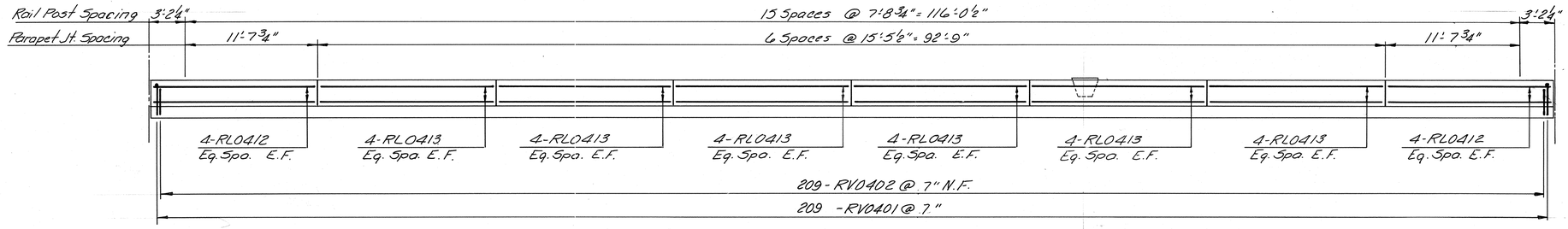
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN - UNIT 15 NORTHBOUND

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

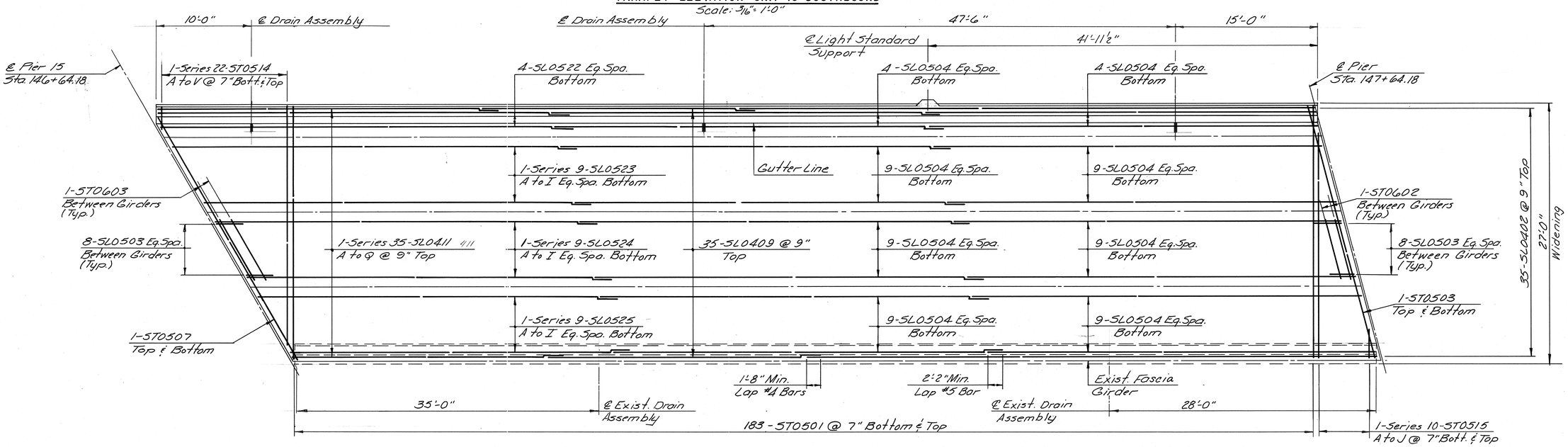
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 60 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	61	106



PARAPET ELEVATION - UNIT 16 SOUTHBOUND

Scale: 3/16" = 1'-0"



DECK PLAN - UNIT 16 SOUTHBOUND

Scale: 3/16" = 1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAL	3-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	S.R.					

AS BUILT

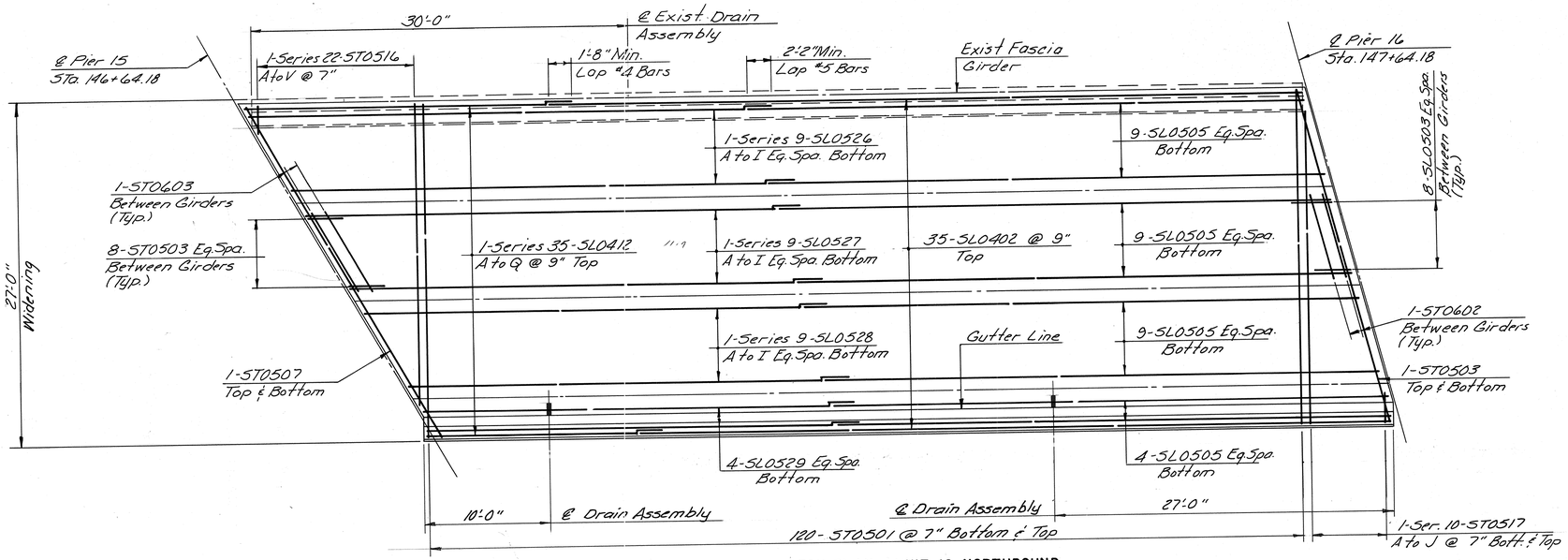
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN - UNIT 16 SOUTHBOUND

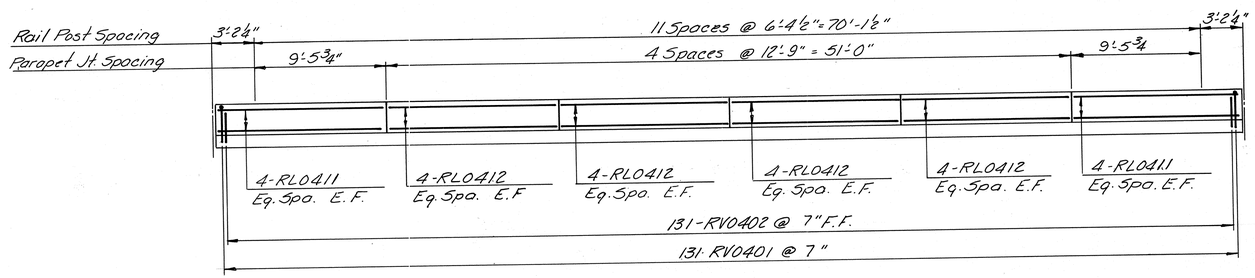
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 61 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	62	106



DECK PLAN – UNIT 16 NORTHBOUND
Scale: 3/16"=1'-0"



PARAPET ELEVATION – UNIT 16 NORTHBOUND
Scale: 3/16"=1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAL	3-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	S.R.					

AS BUILT

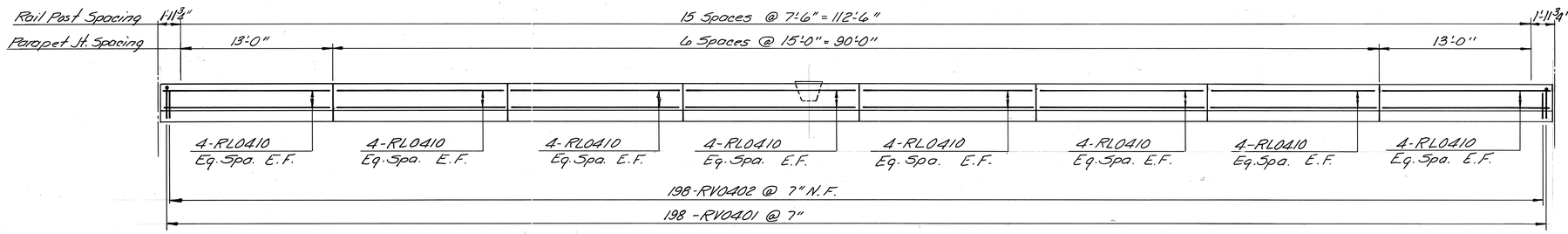
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN - UNIT 16 NORTHBOUND

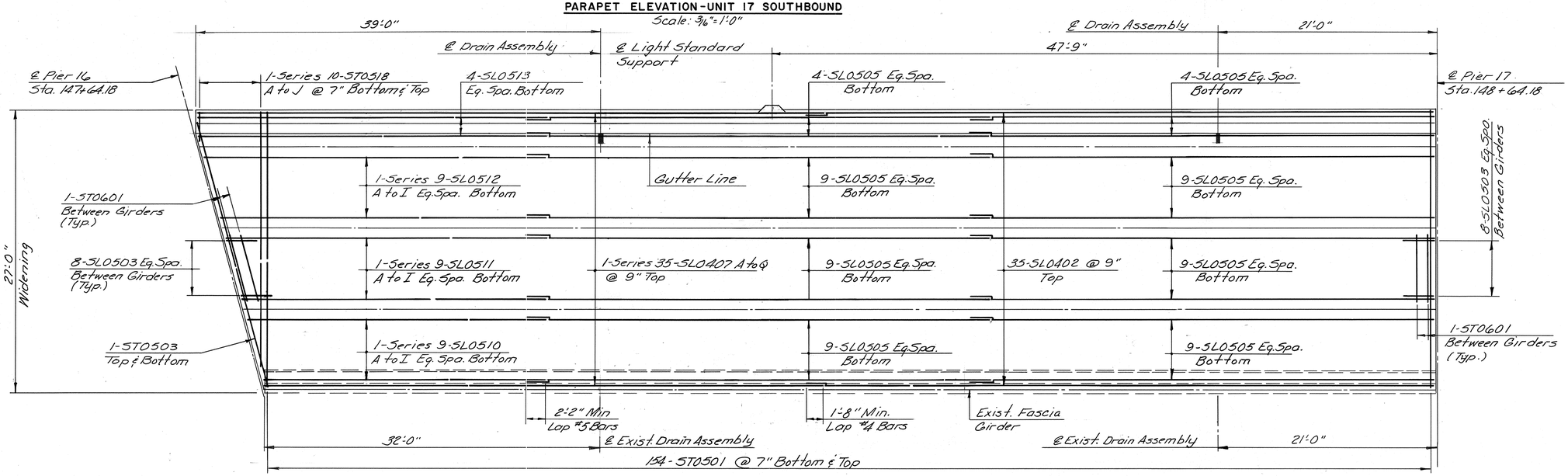
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 62 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	63	106



PARAPET ELEVATION - UNIT 17 SOUTHBOUND
Scale: 3/16" = 1'-0"



DECK PLAN - UNIT 17 SOUTHBOUND
Scale: 3/16" = 1'-0"

	BY	DATE
MADE	TAL	3-87
CHECKED	T.F.P	3-87
IN CHARGE	S.R.	

NO.	REVISION	BY	DATE
	As Built	TEM	3-89

AS BUILT

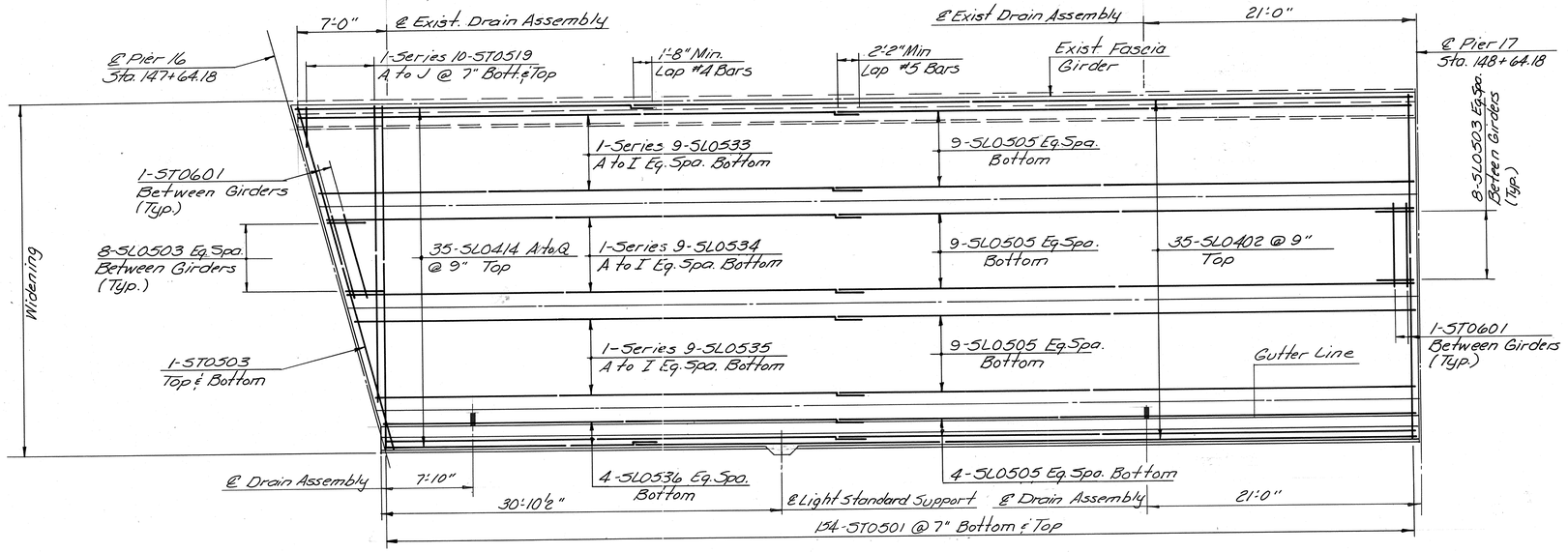
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN - UNIT 17 SOUTHBOUND

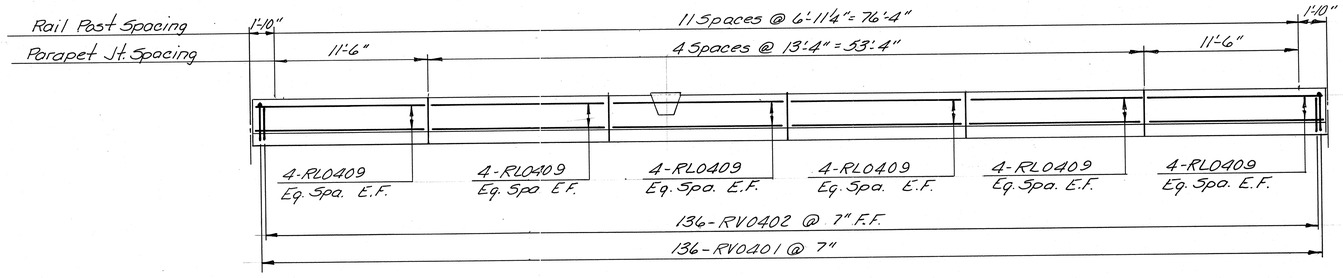
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 63 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	64	106



DECK PLAN - UNIT 17 NORTHBOUND
Scale: 3/16" = 1'-0"



PARAPET ELEVATION - UNIT 17 NORTHBOUND
Scale: 3/16" = 1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAL	3-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	S.R.					

AS BUILT

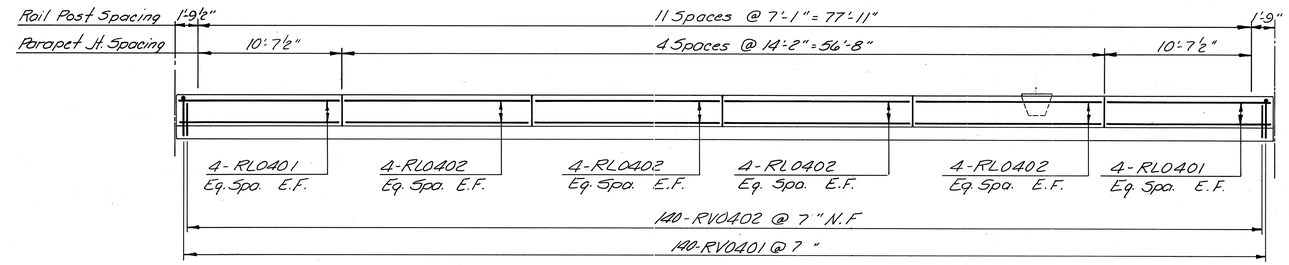
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN - UNIT 17 NORTHBOUND

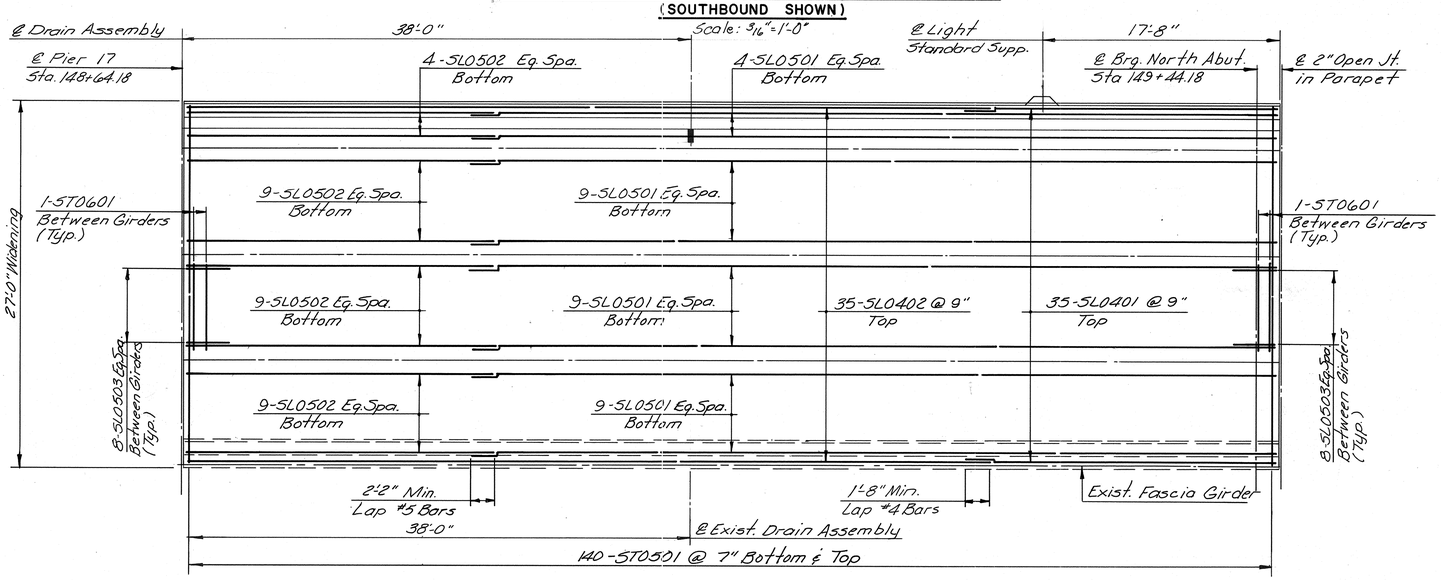
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 64 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	65	106



PARAPET ELEVATION - UNIT 18 SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16"=1'-0"



DECK PLAN - UNIT 18 SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16"=1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAL	3-87				
CHECKED	TRP	3-87		As Built	TEM	3-89
IN CHARGE S.R.						

AS BUILT

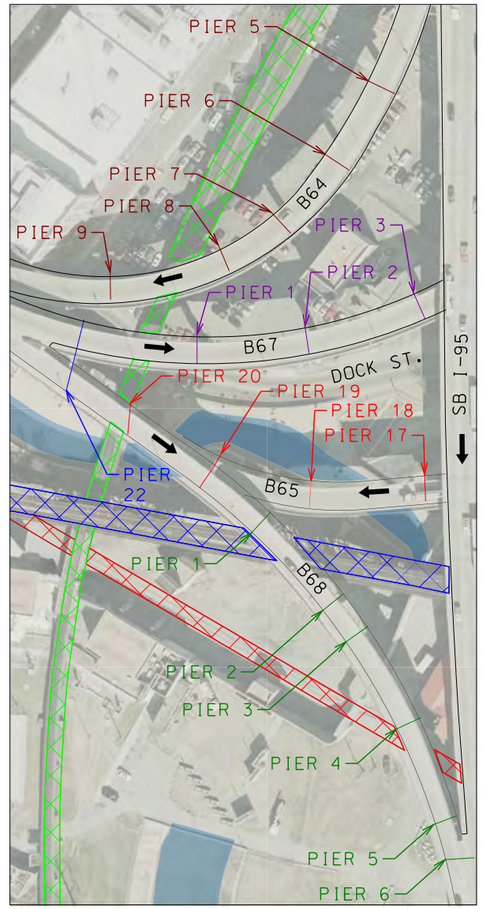
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN
UNIT 18 SOUTHBOUND & NORTHBOUND

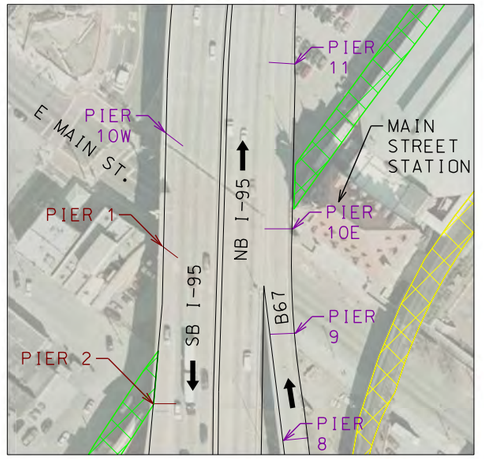
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 65 OF 106

INSERT 1



INSERT 2



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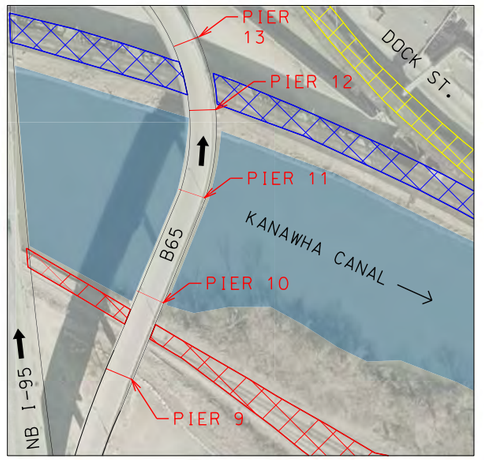


LEGEND:
- BRIDGE 63
- BRIDGE 64
- BRIDGE 65
- BRIDGE 66
- BRIDGE 67
- BRIDGE 68
- N&S RAILROAD
- CSX RAILROAD
- CSX RAILROAD
- CSX RAILROAD

NOTES:
1) PIER NUMBERS BASED ON AS-BUILT DRAWINGS FROM CONTRACTS C-10 AND C-11.
2) RAILROAD LIMITS AND PIER LOCATIONS BASED ON AERIAL PHOTOGRAPHY.
3) THIS EXHIBIT IS FOR REFERENCE ONLY. REFER TO AS-BUILT DRAWINGS FOR EXACT PIER LOCATIONS.
4) BRIDGE 63 IS ON BOTTOM, BRIDGE 66 IS ON TOP.

RICHMOND METROPOLITAN TRANSPORTATION AUTHORITY

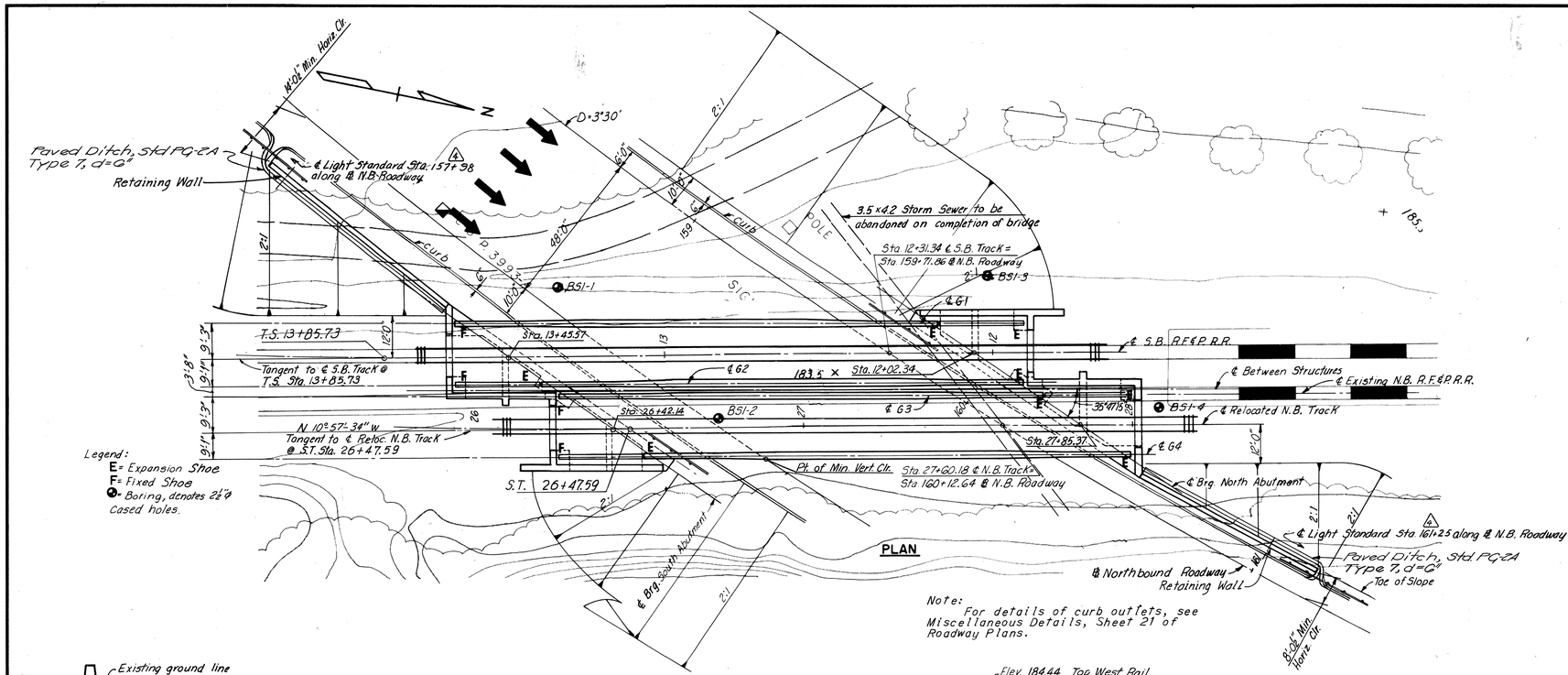
HNTB
2900 S. QUINCY STREET, SUITE 200
ARLINGTON, VIRGINIA
(703) 824-5100

I-95 RAMPS PIER LOCATION EXHIBIT

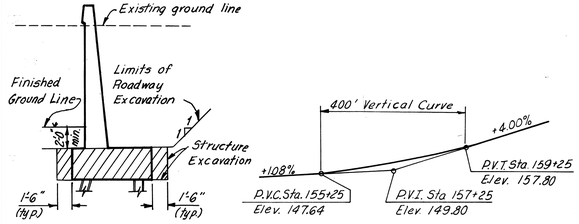
Scale:	Date:	Contract No.:	Sheet:
N.T.S.	MAY 2015	MR-2015	1 OF 1

Pier Map-DR2016.dgn
3/4/2016

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	94	155

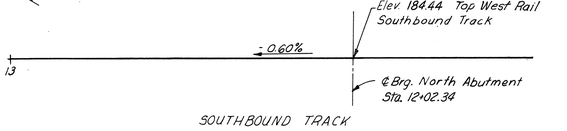


Note:
For details of curb outlets, see Miscellaneous Details, Sheet 21 of Roadway Plans.

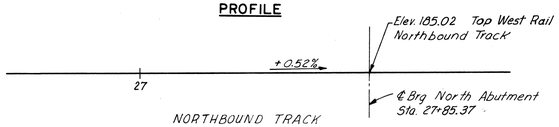


LIMITS OF EXCAVATION
No Scale

NORTHBOUND ROADWAY
PROFILE



SOUTHBOUND TRACK
PROFILE



NORTHBOUND TRACK
PROFILE

ESTIMATED QUANTITIES

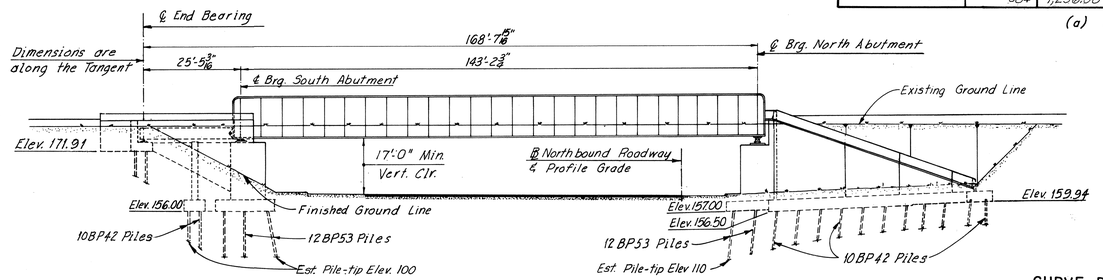
	Struct. Excav. Cu. Yds.	Concrete (a) Cu. Yds.	Reinf. Steel Lbs.	Struc. Steel (Lbs.) Mild Carbon	Struc. Steel (Lbs.) High Strength	Porous Backfill Cu. Yds.	Under-drain 6" Dia. Pipe Lin. Ft.	Steel piles 10BP42 Lin. Ft.	Steel piles 12BP53 Lin. Ft.	Asphalt damp-proofing Sq. Yds.	4" Asphalt Plank Sq. Ft.	1" Butyl Rubber Water-proofing Square	Bridge Drainage Metalwork Lbs.
Superstructure				855,568.2	280,976.7						7498	75	
North Abutment	286	598.82	65,027			64	129	1,858.4	2,999.0	183			
South Abutment	298	657.26	76,926			75	136	982.8	2,030.4	207			2,691
TOTAL	584	1,256.08	141,953	855,568.2	280,976.7	139	265	2,841.2	5,029.4	390	7498	75	2,691

(a) Class A3

INDEX

	BY	DATE
MADE	RLM	12-2-67
CHECKED	JEH	4-11-68
IN CHARGE	FKD	

NO.	REVISION	BY	DATE
5	As Built	JRC	3-73
4	Revise Ltg. Std.	JRC	9-71
3	Profile Grade	P.S.	4-12-71
2	General	J.G.V.	10-70
1	General Checking	AMH	5-13-68



ELEVATION

CURVE DATA

℄ Southbound Track	℄ Northbound Roadway	℄ Reloc. Northbound Track
T.S. = Sta. 13+85.73	P.I. = Sta. 156+91.30	C.S. = Sta. 23+97.59
S.C. = Sta. 16+41.73	Δ = 37°59'54"	S.T. = Sta. 26+47.59
Ls = 256.00'	D = 3°30'00"	Ls = 250.00'
θs = 5°40'49"	T = 563.64'	θs = 4°22'30"
Xc = 255.75'	L = 1085.66'	Xc = 249.85'
Yc = 8.45'	R = 1637.02'	Yc = 6.36'
L.T. = 170.75'		L.T. = 166.72'
S.T. = 85.41'		S.T. = 83.38'
L.C. = 255.89'		L.C. = 249.94'

GENERAL NOTES

STRUCTURE: Dual structures with one welded steel girder span and one rolled beam at each approach. Distance ℄-℄ Girders of 18'-4" with 1'-6" min. clear between structures.

CAPACITY: Live Loads - Cooper E-80 with 50% impact

SPECIFICATIONS: GENERAL: Virginia Department of Highway Road and Bridge Specifications 1970 and Contract Special Specifications. DESIGN: A.R.E.A. 1966 for Steel Railway Bridges, for Fixed Spans not exceeding 400 feet in length. WELDING: 1969 Standard Specifications for Welded Highway and Railway Bridges of the American Welding Society.

CONTRACT SPECIAL PROVISIONS:
Specifications and Contract Special Provisions referred to above are necessary to make these plans complete.

DATUM: City of Richmond

TEMPERATURE: The normal temperature referred to on the plan is 68°F. The temperature range for movement is 0°F to 120°F.

DIMENSIONS: All dimensions are measured horizontally and vertically unless otherwise noted.

EXCAVATION: Excavation below subgrade and cut slope template shall be classified as Structure Excavation. All excavation above these limits shall be classified as Regular Excavation and is not included in the Structural Quantities.

FOUNDATION: **Piles shall be driven to a minimum length corresponding to the approximate tip elevations shown on the Plans but in no case to less than a penetration affording the required safe bearing capacity noted on the Plans.**

CONCRETE NOTES: All concrete shall be Class A3. All exposed edges and corners shall have a ¾" chamfer or fillet unless otherwise noted.
Finishing Concrete Surfaces: See The Standard Architectural Detail sheets and The Contract Special Provisions for types and details.

All Reinforcing steel shall conform to A.S.T.M. A615, Grade 40. All reinforcing bar dimensions on the detailed drawings are to centers of bars unless otherwise noted. Clear distance between reinforcing steel and face of concrete shall be as noted on the plans. All bar laps shall be 30 diameters of the smaller bar unless otherwise noted.

STEEL NOTES: Structural steel shall conform to A.S.T.M. Specification A-36 and A-588.
All Field Connections shall be made with high strength bolts or rivets. High strength bolts and rivets shall be ⅞" diameter unless otherwise noted and shall conform to A.S.T.M. Specification A-325.

BENCH MARK: A-15 Copperweld rod on bridge on Blue Shingles Road Elev. 204.73.

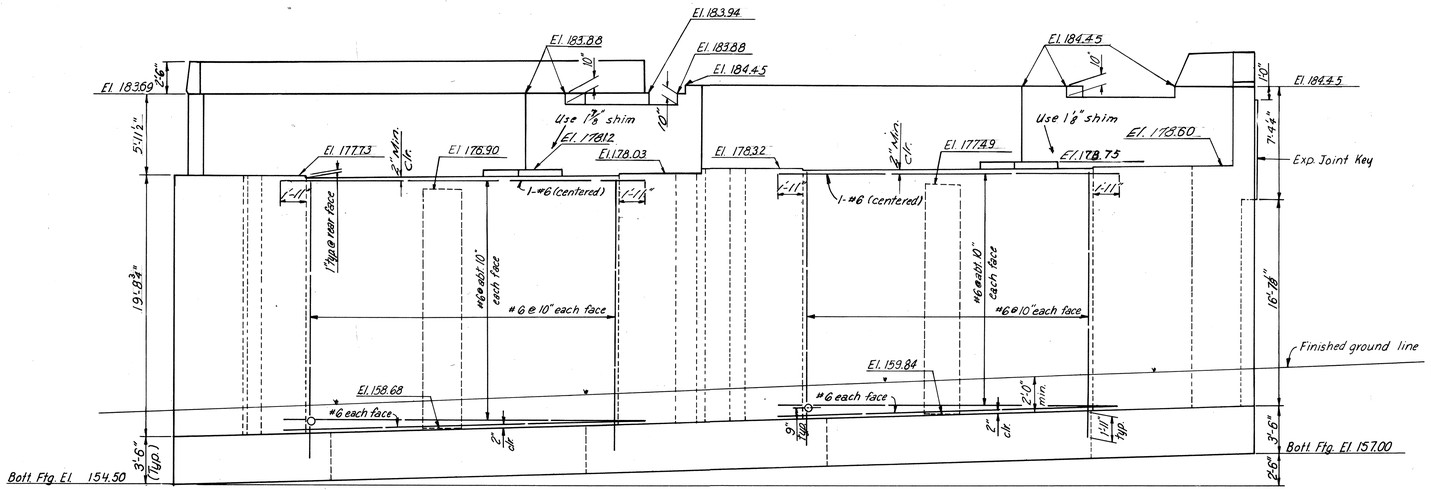
AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 9
R.F.&P.R.R. OVER NORTHBOUND ROADWAY
GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

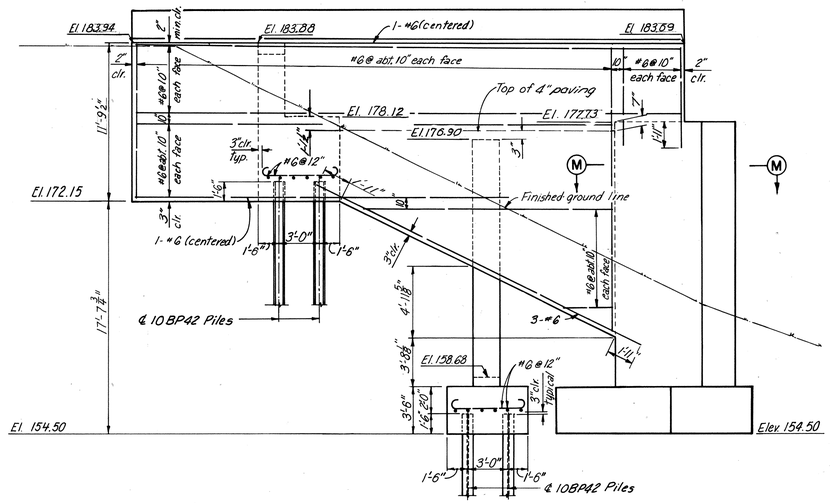
SCALE: 1"=20' unless noted
CONTRACT NO.: 4
SHEET NO. 1 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	95	155



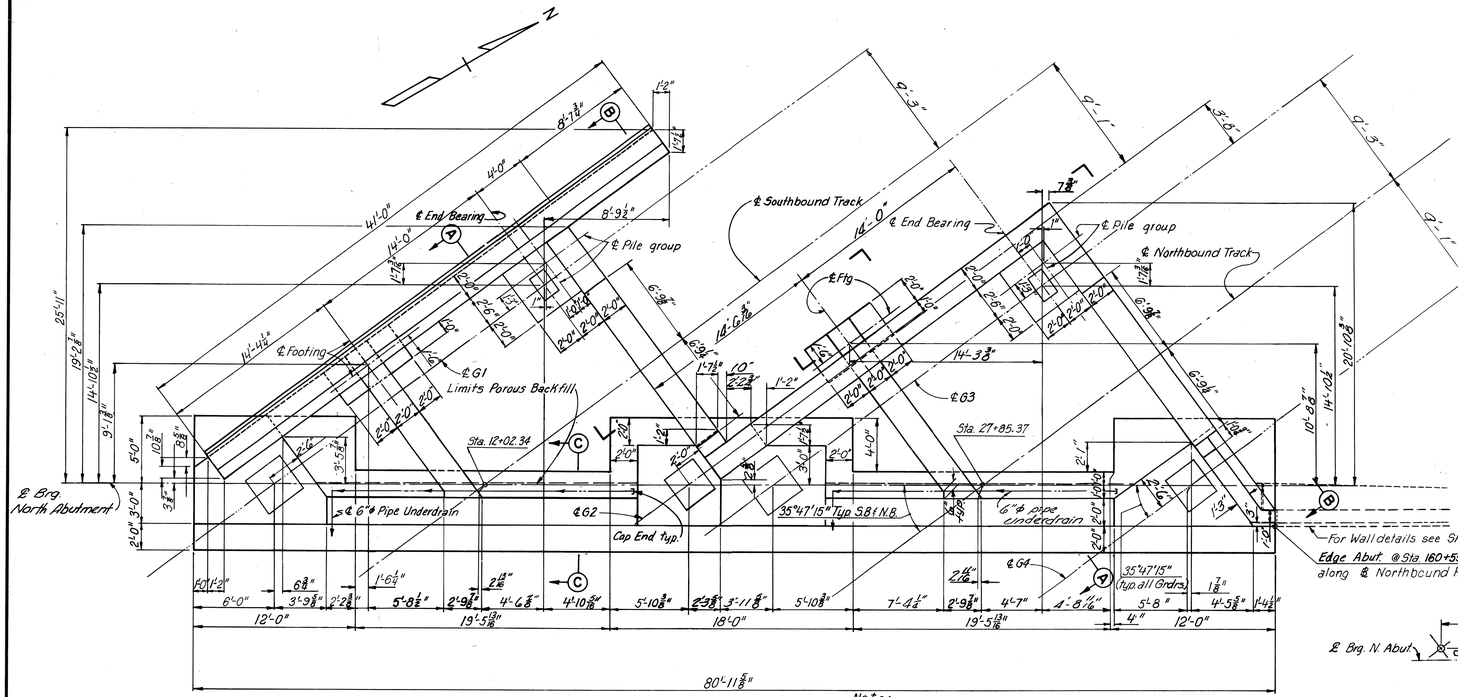
ELEVATION
Scale $\frac{3}{16}$"=1'-0"

Note:
Piles not shown in Elevation. For location, see Footing Plan.
Concrete pavement over backfill is level.



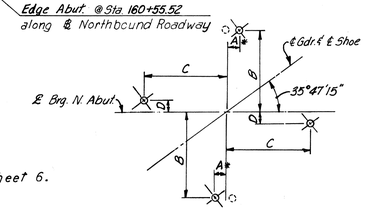
WEST WINGWALL ELEVATION
Scale $\frac{3}{8}$"=1'-0"

Note: Piles not shown in front footing. For location of piles, see Footing Plan.



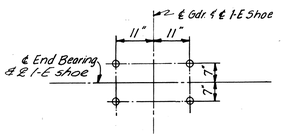
PLAN
Scale $\frac{3}{16}$"=1'-0"

Note:
For Sections A-A, B-B, C-C, and M-M, see Sheet 6.
For Reinforcing not shown, see Abutment Details, Sheet 6.
For Drainage Details, see Sheet 10.
Reinforcing to be shifted to miss underdrain.
6" Dia. Underdrain to be sloped at 4"/ft. towards outlet in front wall.



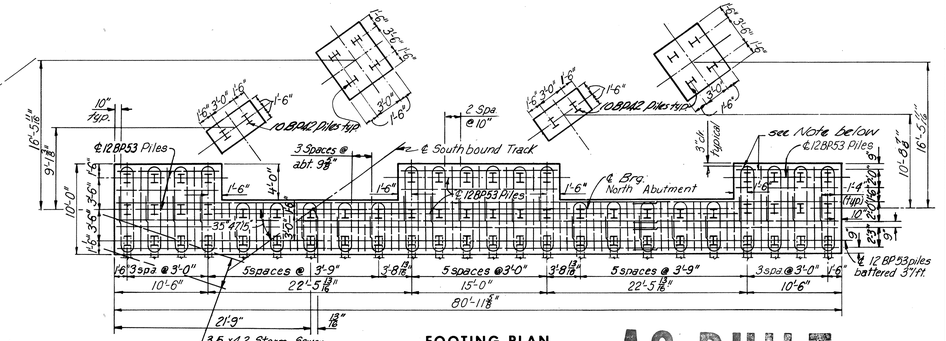
ANCHOR BOLT SETTING PLAN
No Scale

	A	B	C	D
1-EL SHOE	3¾"	1'-1 1/16"	1'-1 1/16"	3¾"
2-E SHOE	11"	1'-7 1/16"	1'-6 1/16"	16⅝"



ANCHOR BOLT SETTING PLAN
No Scale

*Anchor Bolt for 2-E Shoe lies on other side of dimension line as shown by dotted circle. This will also put dimension A on other side of dimension line.



FOOTING PLAN
Scale $\frac{1}{8}$"=1'-0"

AS BUILT

Note:
Stirrups around piles have a radius of 8" for the bends and a lap of 2'-6".
Reinforcing shown is typical for both top and bottom. All footing bars are # 8 bars.

Note:
6" Dia. Pipe Underdrain going thru front wall of Abutment, is to connect with tee to Std. UD-1 under N.B. Roadway. See Roadway Plans.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	RLM	2-7-68	3	As Built	JRC	3-73
CHECKED	AMH	5-10-68	2	Profile Grade	R.S.	4-12-71
IN CHARGE	FKD		1	General Checking	AMH	5-13-68

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 9
R.F.&P.R.R. OVER NORTHBOUND ROADWAY
NORTH ABUTMENT

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

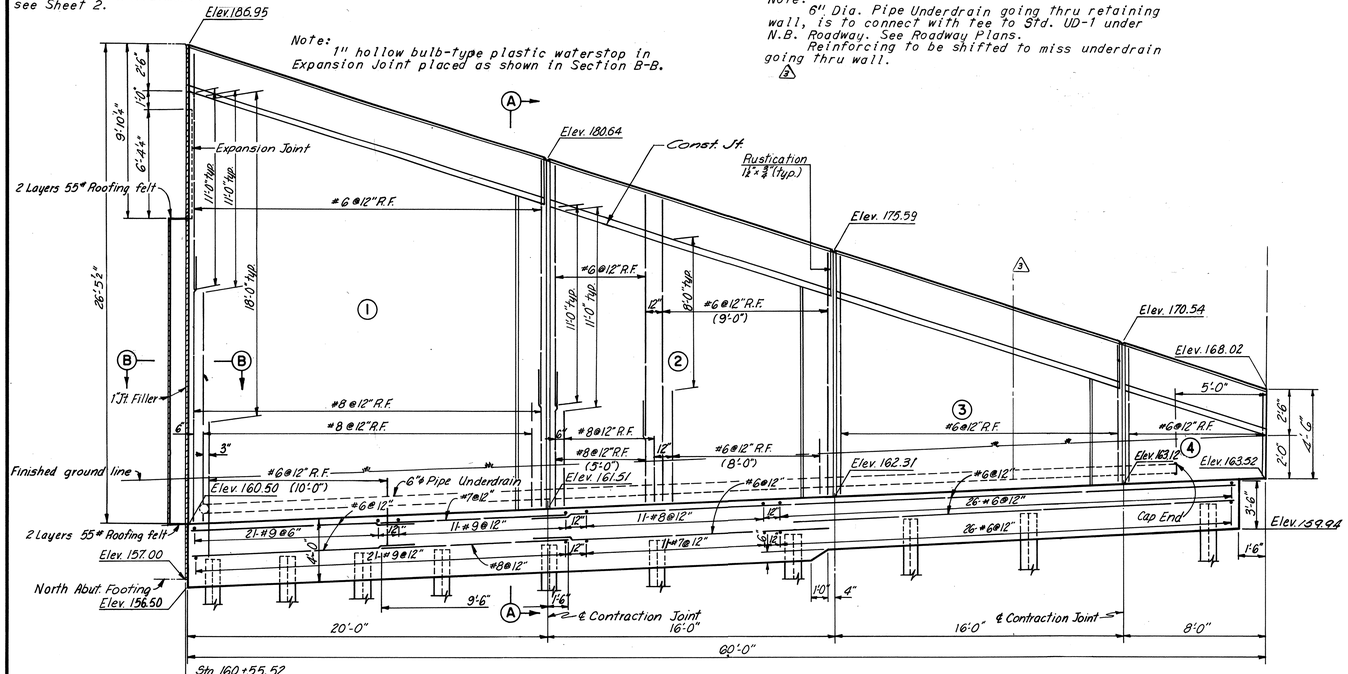
SCALE: As noted
CONTRACT NO.: 4
SHEET NO. 2 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	96	155

Note: For North Abutment, see Sheet 2.

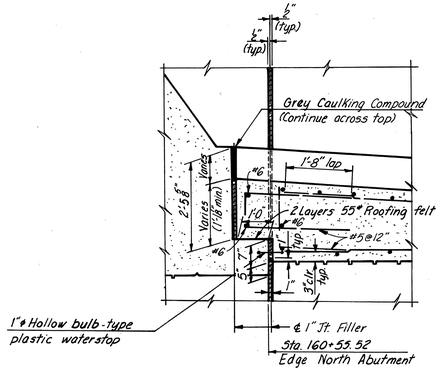
Note: 1" hollow bulb-type plastic waterstop in Expansion Joint placed as shown in Section B-B.

Note: 6" Dia. Pipe Underdrain going thru retaining wall, is to connect with Tee to Std. UD-1 under N.B. Roadway. See Roadway Plans. Reinforcing to be shifted to miss underdrain going thru wall. (3)

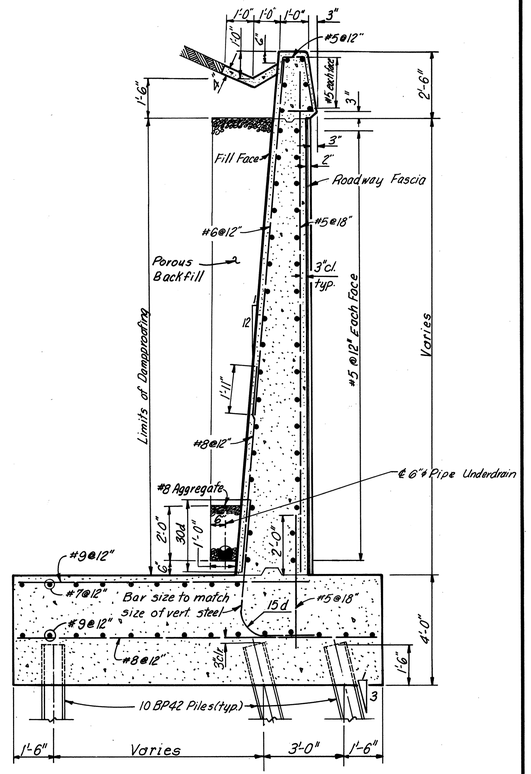


Legend:
R.F. denotes Rear Face.

ELEVATION
Scale: ¼"=1'-0"

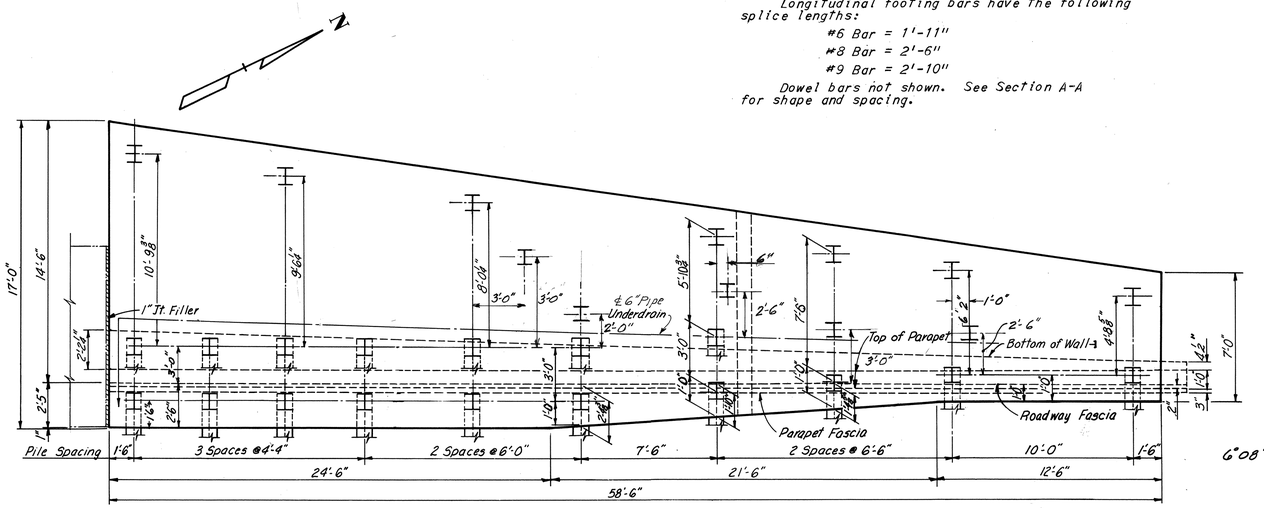


SECTION B-B
Scale: ½"=1'-0"

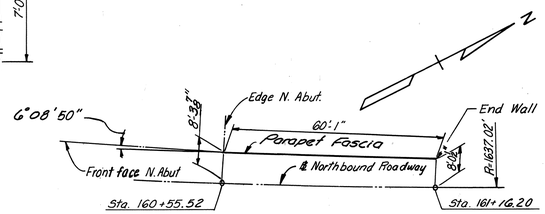


SECTION A-A
Scale: ¾"=1'-0"

Note:
Longitudinal footing bars have the following splice lengths:
#6 Bar = 1'-11"
#8 Bar = 2'-6"
#9 Bar = 2'-10"
Dowel bars not shown. See Section A-A for shape and spacing.



FOOTING PLAN
Scale: ¼"=1'-0"



WALL LAYOUT PLAN
No Scale

	BY	DATE
MADE	RLM	2-16-68
CHECKED	WC	4-2-68
IN CHARGE	FKD	

NO.	REVISION	BY	DATE
4	As Built	JRC	3-73
3	Revise Ltg. Std.	JRC	9-71
2	Profile Grade	P.S.	4-12-71
1	General Checking	AMH	5-13-68

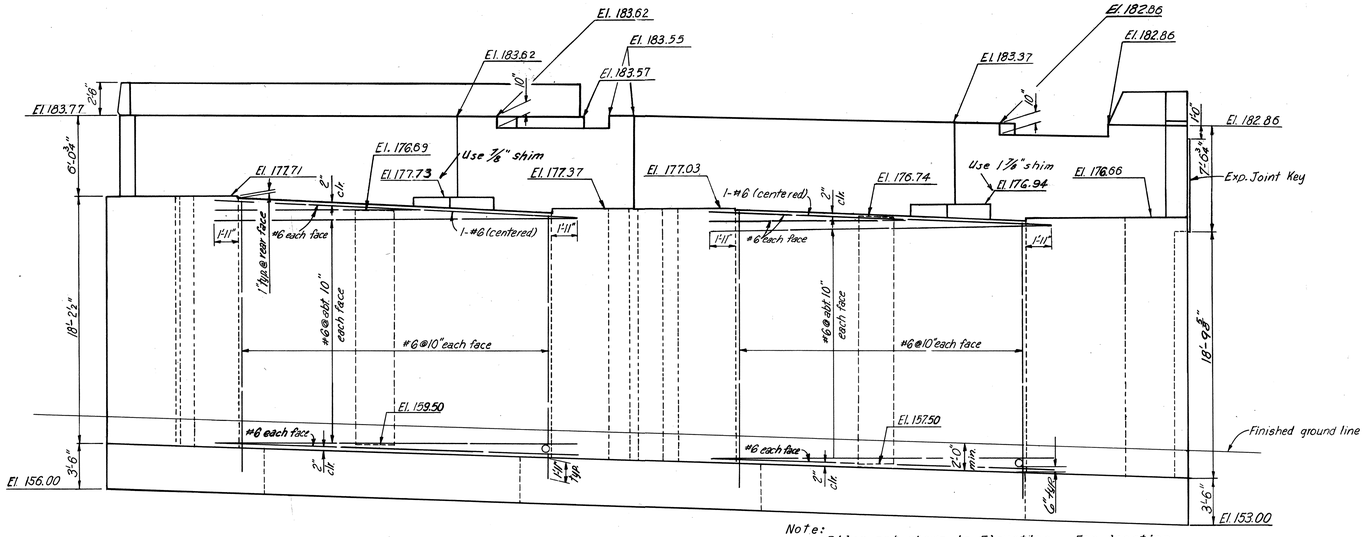
AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 9
R.F.&P.R.R. OVER
NORTHBOUND ROADWAY
NORTH ABUTMENT RETAINING WALL

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

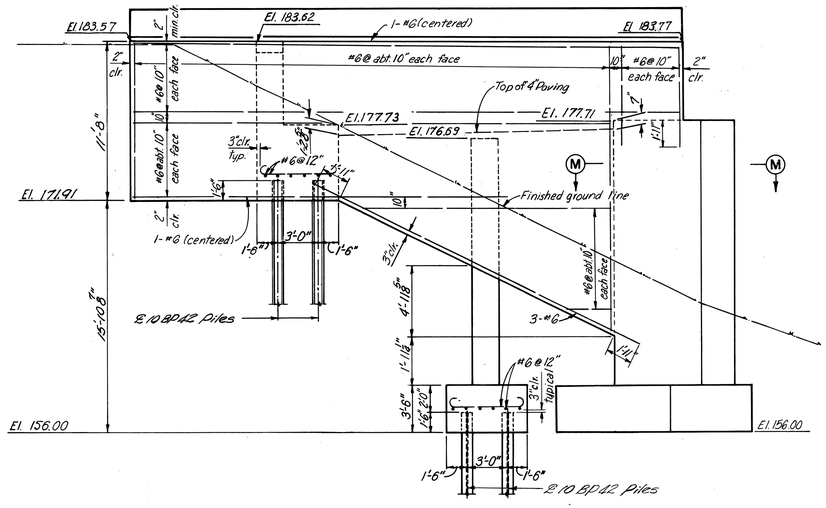
SCALE: As Noted
CONTRACT NO.: 4
SHEET NO. 3 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	97	155



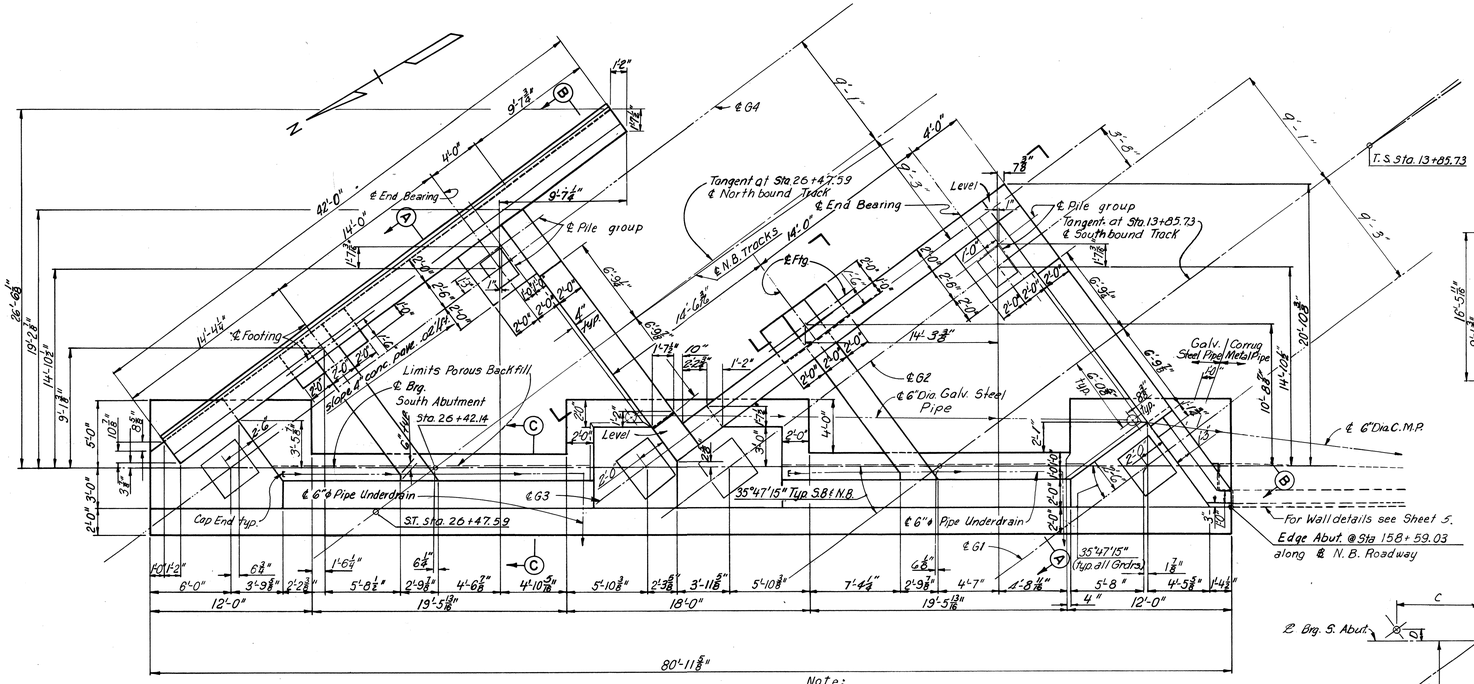
Note: Piles not shown in Elevation. For location, see Footing Plan.

ELEVATION
No Scale



EAST WINGWALL ELEVATION
Scale 3/16" = 1'-0"

Note: Piles not shown in front footing. For location of piles, see Footing Plan.

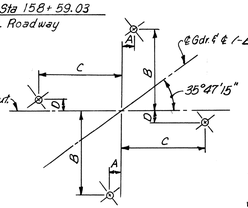


PLAN
Scale 3/16" = 1'-0"

Note: Payment for 6" Dia. C.M.P. and attachment of 6" Dia. C.M.P. to Paved Ditch is incidental to unit price bid for Paved Ditch, Std PD-2A
For details of connection of 6" Dia. C.M.P. to Paved Ditch, see Sheet 7.

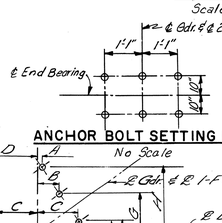
Note: For Sections A-A, B-B, C-C, and M-M, see Sheet 6.
For Reinforcing not shown, see Abutment Details, Sheet 6.
For Drainage Details, see Sheet 9.
Reinforcing to be shifted to miss underdrain and drainpipe going thru walls.
6" Dia. Underdrain to be sloped at 1/4"/ft. towards outlet in front wall.

Note: 6" Dia. Pipe Underdrai. going thru front wall of Abutment, is to connect with tee to Std. UD-1 under N.B. Roadway. See Roadway Plans.

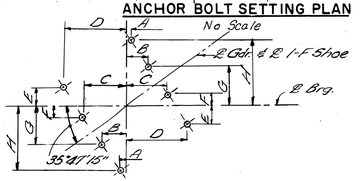


ANCHOR BOLT SETTING PLAN
No Scale

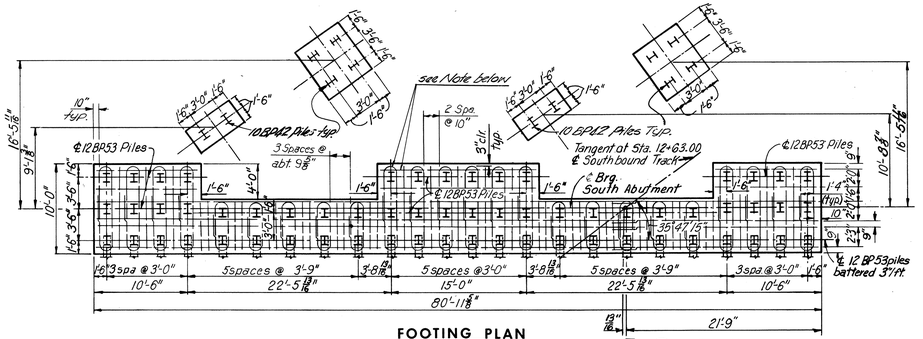
	A	B	C	D	E	F	G	H
1-EL Shoe	3 3/4"	1'-1 1/16"	1'-1 1/16"	3 3/4"	—	—	—	—
1-F Shoe	1 3/16"	7 1/16"	1'-2 1/16"	1'-7 7/16"	5 5/8"	2 3/4"	1'-0 7/16"	1'-0 3/16"



ANCHOR BOLT SETTING PLAN
No Scale



ANCHOR BOLT SETTING PLAN
No Scale



FOOTING PLAN
Scale 1/8" = 1'-0"

AS BUILT

Note: Stirrups around piles have a radius of 8" for the bends and a lap of 2'-6".
Reinforcing shown is typical for both top and bottom. All footing bars are #8 bars.

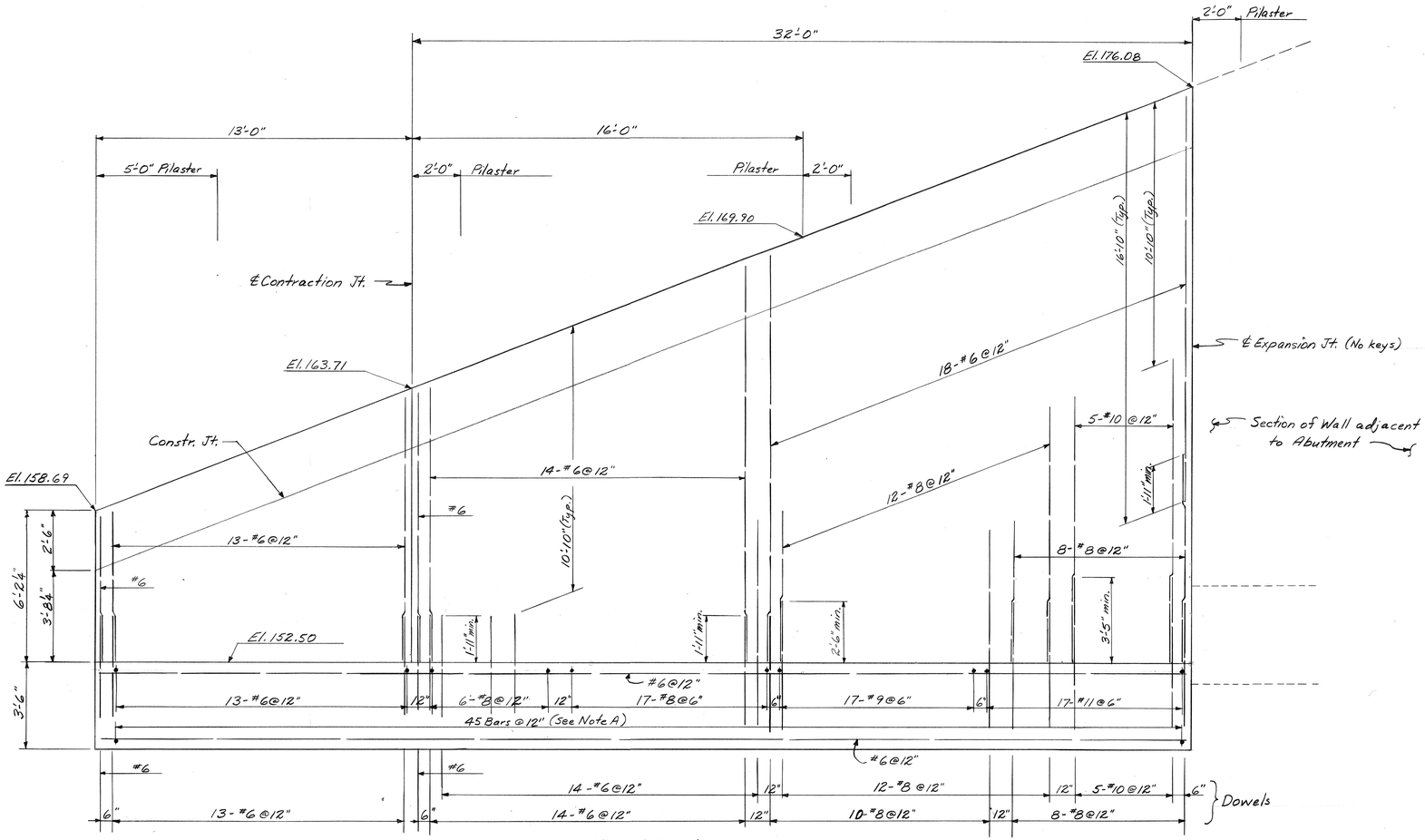
	BY	DATE	NO.	REVISION	BY	DATE
MADE	RLM	2-21-68	3	As Built	JRC	3-73
CHECKED	AMH	5-9-68	2	Profile Grade	P.S.	4-1271
IN CHARGE	FKD		1	General Checking	AMH	5-13-68

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 9
R.F.&P.R.R. OVER
NORTHBOUND ROADWAY
SOUTH ABUTMENT

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

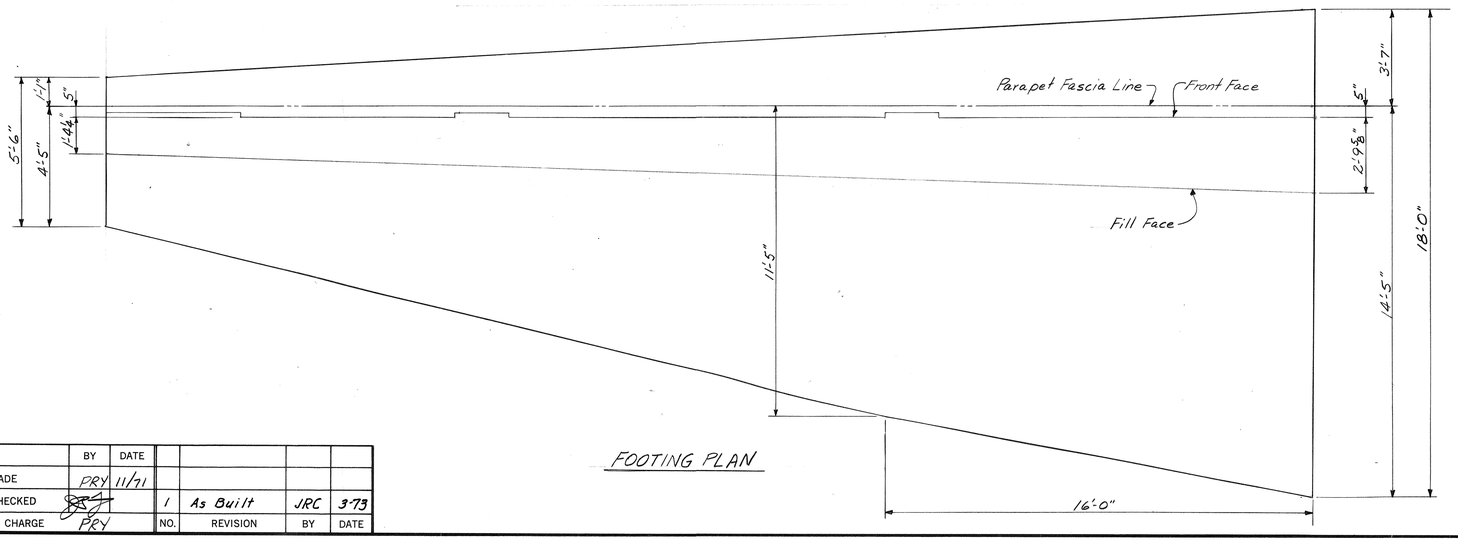
SCALE: As noted
CONTRACT NO.: 4
SHEET NO. 4 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXP.	98A	155

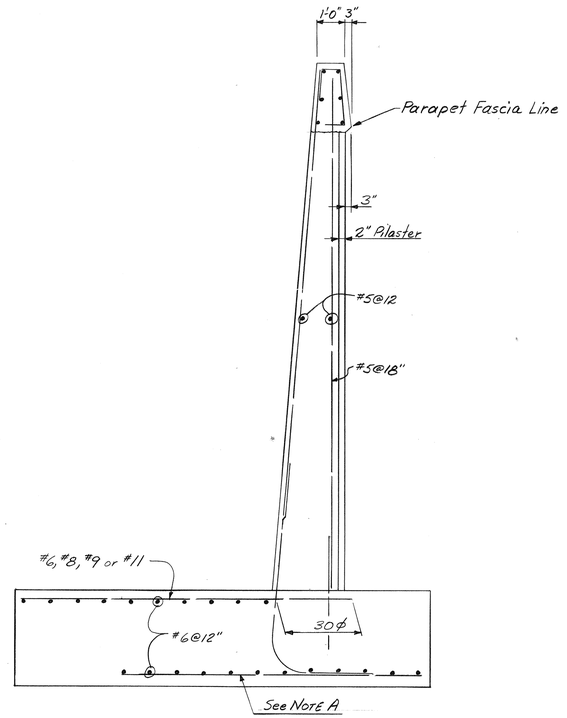


ELEVATION

All stem reinforcing and dowels shown for fill face.



FOOTING PLAN



TYPICAL SECTION

Note:
Horizontal stem steel, parapet bars and front face vertical bars & dowels are same as original except for increased quantity and/or length due to increased stem height.

Note A:
Use original transverse footing steel to the maximum extent possible. Place steel forward into the toe leaving the lower rear of the footing unreinforced if necessary. At the low end of the wall, salvage the longer original #6 top bars for use in the bottom as required.

AS BUILT

	BY	DATE
MADE	PRY	11/71
CHECKED		
IN CHARGE	PRY	

NO.	REVISION	BY	DATE
1	As Built	JRC	3-73

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

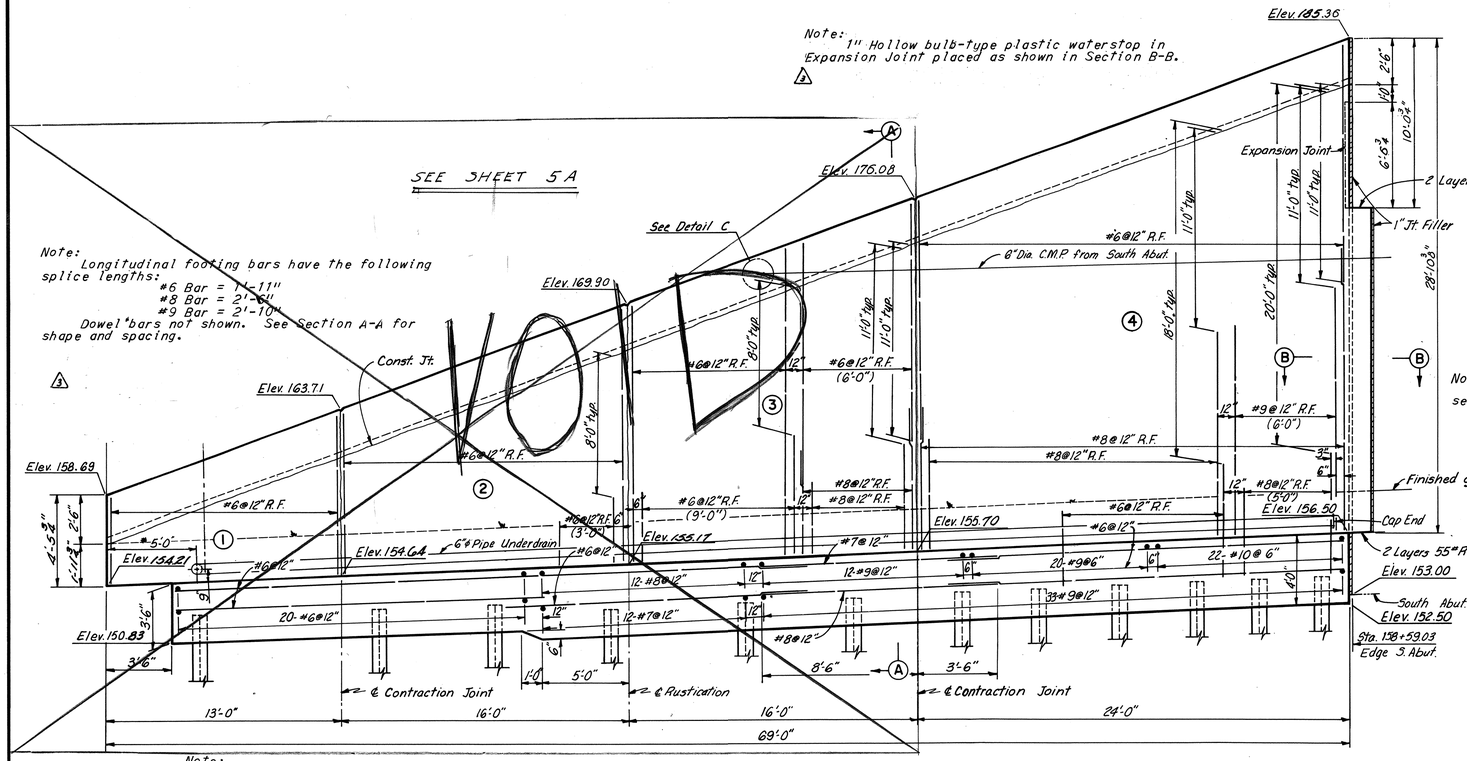
BRIDGE No. 9
R.F.&P.R.R. OVER NORTHBOUND ROADWAY
REVISED PORTION
SOUTH ABUTMENT RETAINING WALL

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 3/8"=1'-0"
CONTRACT NO.: 4
SHEET NO. 5A OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	98	155

Note:
For detail of connection of 6" Dia. C.M.P. to Concrete V-Gutter, see Detail C.

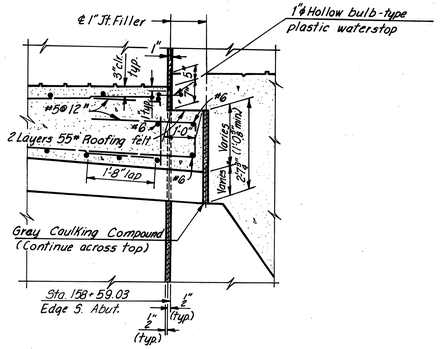


Note: 6" Dia. Pipe Underdrain going thru retaining wall, is to connect with tee to Std. UD-1 under N.B. Roadway. See Roadway Plans. Reinforcing to be shifted to miss underdrain going thru wall.

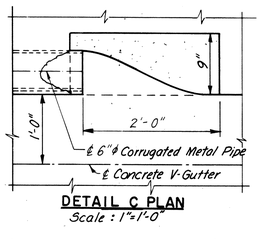
ELEVATION
Scale: ¼"=1'-0"

Legend:
R.F. denotes Fill Face.

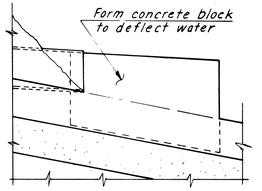
Note: For South Abutment, see Sheet 4.



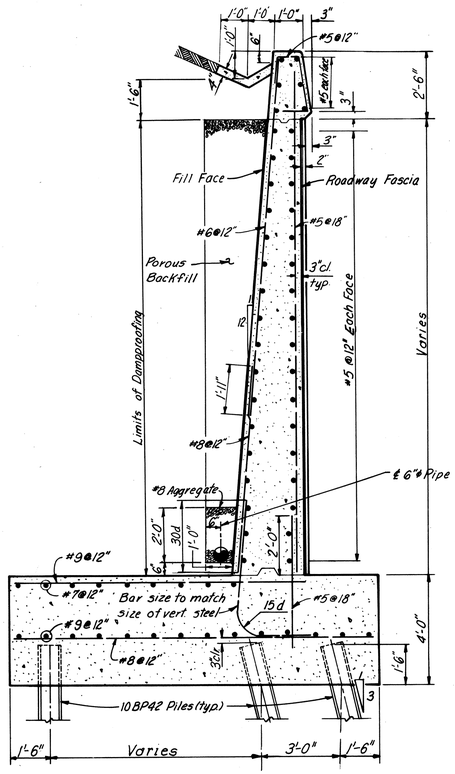
SECTION B-B
Scale: ½"=1'-0"



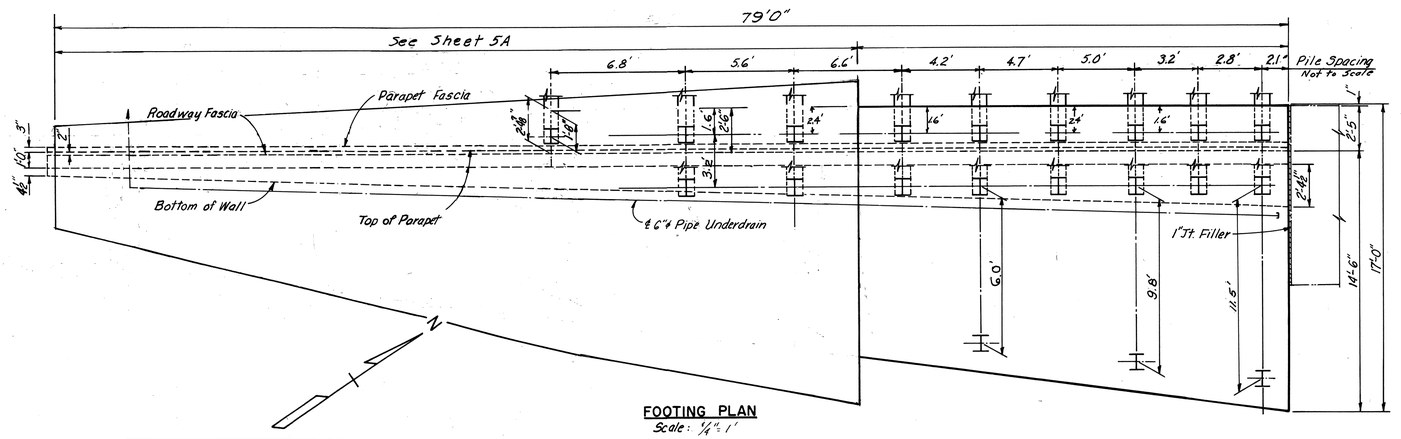
DETAIL C PLAN
Scale: 1"=1'-0"



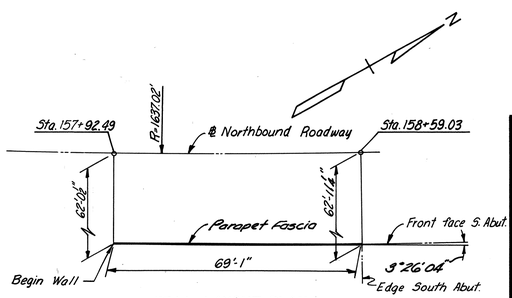
DETAIL C ELEVATION
South Abutment Drainage
Scale: 1" = 1'-0"



SECTION A-A
Scale: ⅜"=1'-0"



FOOTING PLAN
Scale: ¼"=1'



WALL LAYOUT PLAN
No Scale

	BY	DATE
MADE	RLM	2-19-68
CHECKED	AJC	4-2-68
IN CHARGE	FKD	

NO.	REVISION	BY	DATE
4	As Built	JRC	3-73
3	Revised Lt. Std.	JRC	9-71
2	Profile Grade	P.S.	4-12-71
1	General Revision	AMH	5-13-68

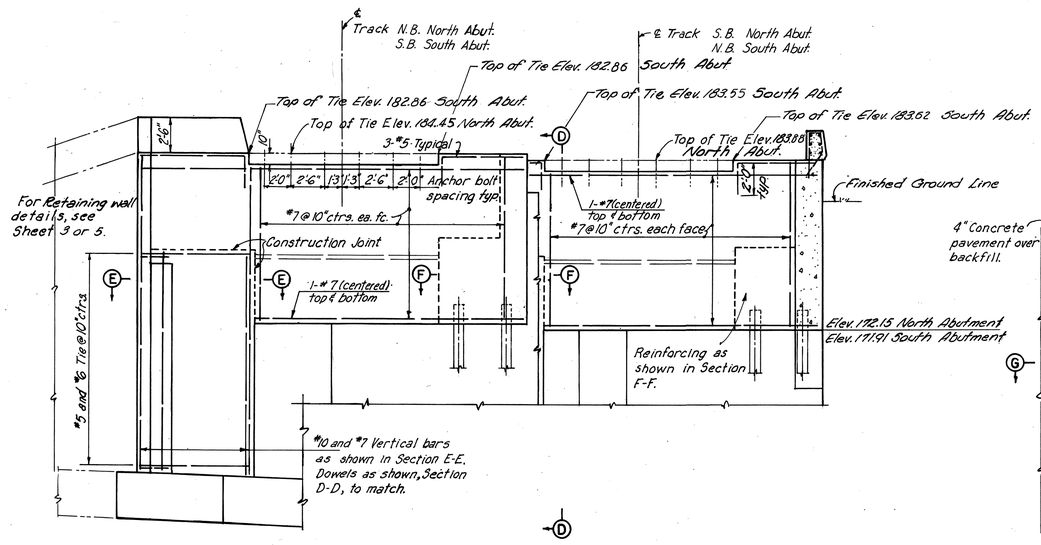
AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 9
R.F.&P.R.R. OVER
NORTHBOUND ROADWAY
SOUTH ABUTMENT RETAINING WALL

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

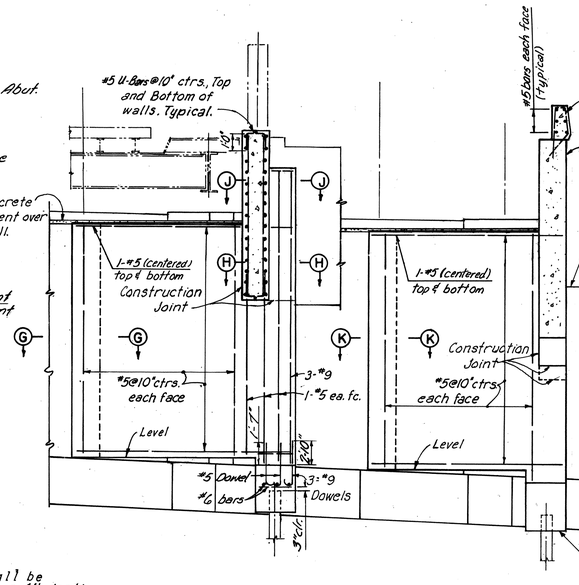
SCALE: As Noted
CONTRACT NO.: 4
SHEET NO. 5 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	99	155



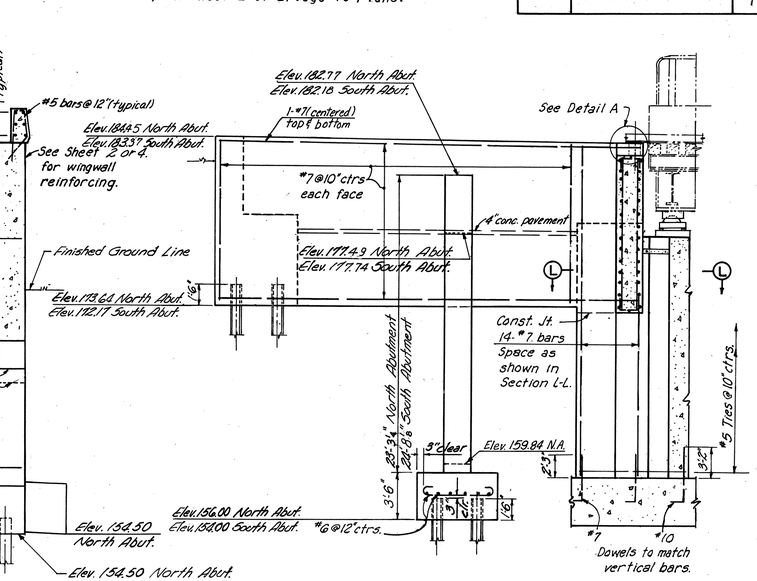
SECTION B–B
Scale: 3/16"=1'-0"
For location, see Sheet 2 or 4.

Note:
Paving shown within limits of abutment shall be 4" thick, of preformed joint filler, sealed with a 1" depth of hot applied joint Sealer, shall be installed between paving and abutment walls. Preformed joint sealer shall be bituminous type conforming to AASHO M213.
Paving will be paid for as "Concrete, Class A3, Substructures and Walls."

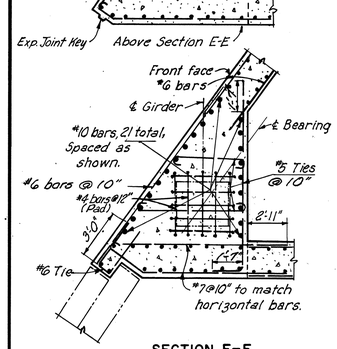


SECTION A–A
Scale: 3/16"=1'-0"
For location, see Sheet 2 or 4.

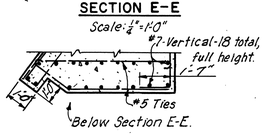
Note:
For Parapet Details, see Section H-H, Section S-S, and Section Y-Y, on Sheet 2 of Bridge 10 Plans.

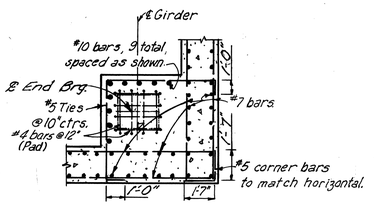


SECTION D–D
Scale: 3/16"=1'-0"

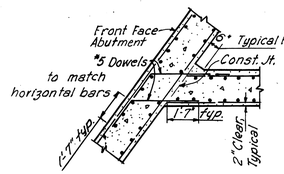


SECTION E–E
Scale: 1/2"=1'-0"

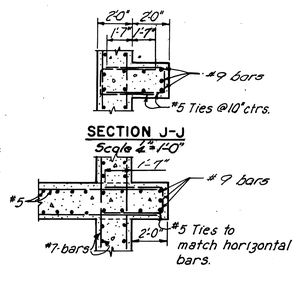




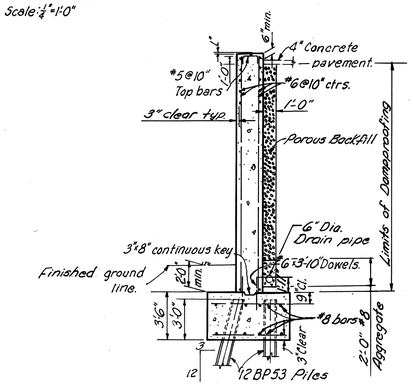
SECTION F–F
Scale: 1/2"=1'-0"



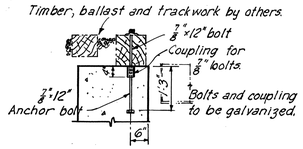
SECTION G–G
SECTION K–K
Scale: 1/4"=1'-0"



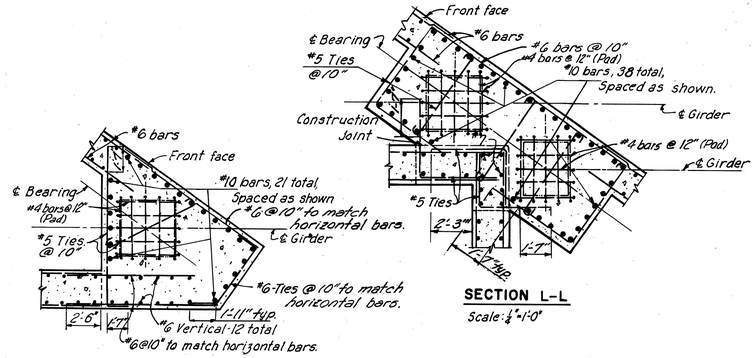
SECTION H–H
Scale: 1/2"=1'-0"



SECTION C–C
Scale: 3/16"=1'-0"
For location, see Sheet 2 or 4.



DETAIL A
Scale: 1/2"=1'-0"



SECTION L–L
Scale: 1/4"=1'-0"

SECTION M–M
Scale: 1/4"=1'-0"
For location, see Sheet 2 or 4.

Note:
Sections shown are for North Abutment, South Abutment similiar.
#4 Bars @ 12" shown in Sections E-E, F-F, L-L, and M-M, are to be U-shaped bars with 1'-6" legs.

AS BUILT

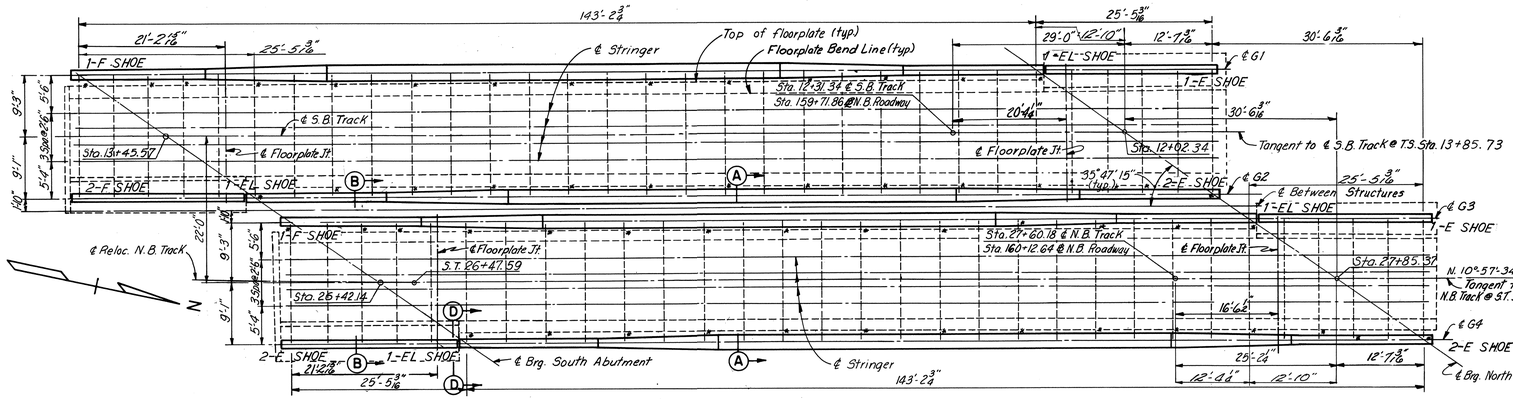
	BY	DATE	NO.	REVISION	BY	DATE
MADE	RGF	2-15-68	3	As Built	JRC	3-73
CHECKED	RLM	4-19-68	2	Profile Grade	P.S.	4-15-71
IN CHARGE	F K D		1	General Checking	AMH	5-13-68

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 9
R.F.&P.R.R. OVER NORTHBOUND ROADWAY
ABUTMENT DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Shown
CONTRACT NO.: 4
SHEET NO. 6 OF 12

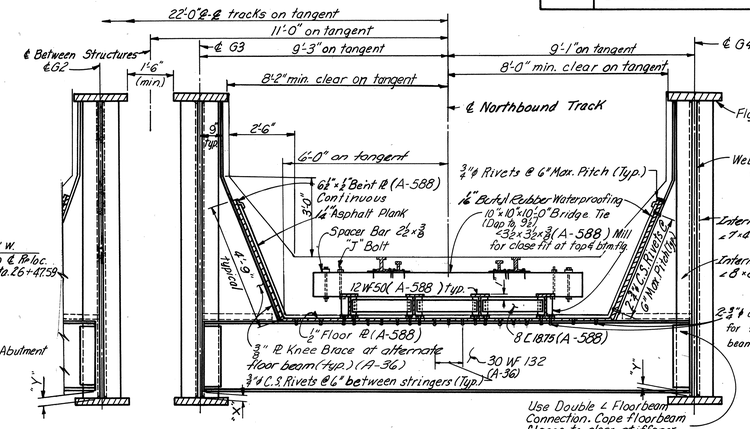
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	100	155



*---Denotes Knee Brace Location.

FRAMING PLAN

Scale: 3/32" = 1'-0"



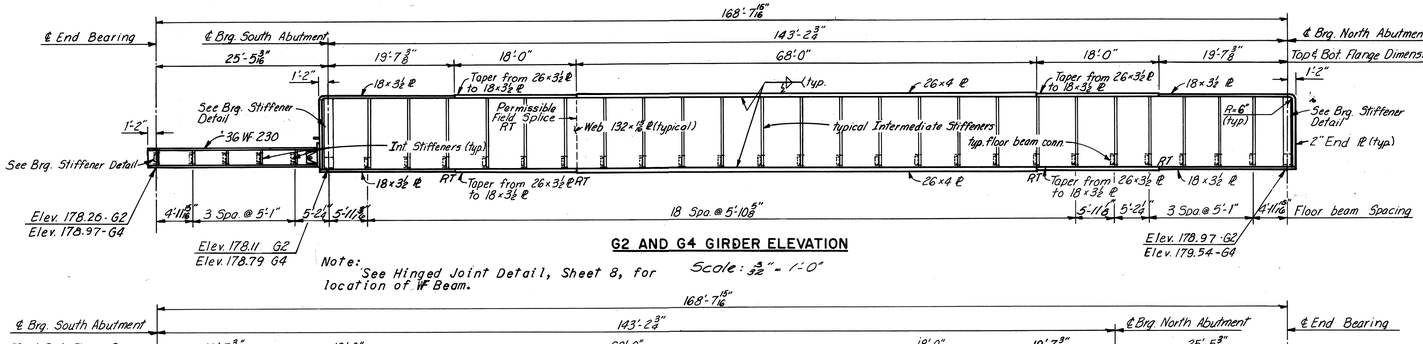
Note:
Floorplate connected to stringers by 2 rows of 3/4" Dia. countersunk rivets at 6" maximum pitch.
⚠ All riveted conections shown hereon may, at the contractors option, be replaced by high strength bolt connections.

SECTION A-A

Scale: 3/8" = 1'-0"

Note:
Ties, track, and fasteners are to be furnished and installed by others.

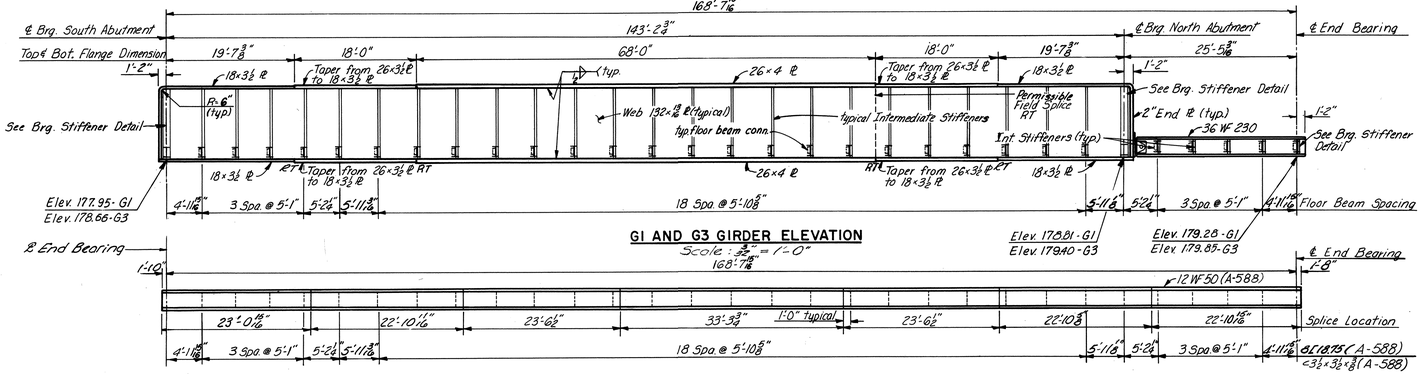
Note:
Asphalt plank shall be recessed to receive flange of 12 WF 50 stringers.



G2 AND G4 GIRDER ELEVATION

Scale: 3/32" = 1'-0"

Note:
See Hinged Joint Detail, Sheet 8, for location of WF Beam.



G1 AND G3 GIRDER ELEVATION

Scale: 3/32" = 1'-0"

TYPICAL STRINGER DETAIL

Scale: 3/32" = 1'-0"

FLOOR BEAM LOCATION TABLE		
SOUTHBOUND TRACK		
	G1	G2
DISTANCE	DIMENSION "X"	DIMENSION "Y"
0	2 3/4"	3"
4'-11 15/16"	2 3/4"	3"
10'-0 15/16"	2 3/4"	3"
15'-1 11/16"	2 3/4"	3"
20'-2 15/16"	2 3/4"	3"
25'-5 3/16"	3"	3"
31'-4 3/16"	3"	3"
37'-2 15/16"	3"	3"
43'-1 9/16"	3"	3"
49'-0 3/16"	3"	3"
54'-10 15/16"	3"	3"
60'-9 1/16"	3"	3"
66'-8 1/16"	3"	3"
72'-6 11/16"	3"	3"
78'-5 5/16"	3"	3"
84'-3 15/16"	3"	3"
90'-2 9/16"	3"	3"
96'-1 3/16"	3"	3"
101'-11 13/16"	3"	3"
107'-10 7/16"	3"	3"
113'-9 1/16"	3"	3"
119'-7 11/16"	3"	3"
125'-6 5/16"	3"	3"
131'-4 15/16"	3"	3"
137'-3 9/16"	3"	3"
143'-2 3/16"	3"	3"
148'- 5"	3"	2 3/4"
153'- 6"	3"	2 3/4"
158'- 7"	3"	2 3/4"
163'- 8"	3"	2 3/4"
168'- 7 15/16"	3"	2 3/4"

FLOOR BEAM LOCATION TABLE		
NORTHBOUND TRACK		
	G3	G4
DISTANCE	DIMENSION "X"	DIMENSION "Y"
0	2 9/16"	3 7/16"
4'-11 15/16"	2 11/16"	3 1/4"
10'- 0 15/16"	2 13/16"	3 1/16"
15'- 1 11/16"	2 15/16"	2 7/8"
20'- 2 15/16"	3"	3"
25'- 5 3/16"	3"	3"
31'- 4 3/16"	3"	3"
37'- 3"	3"	3"
43'- 1 3/16"	3"	3"
49'- 0 1/16"	3"	3"
54'-10 7/16"	3"	3"
60'- 9 1/16"	3"	3"
66'- 8 1/16"	3"	3"
72'- 6 3/16"	3"	3"
78'- 5 3/16"	3"	3"
84'- 4"	3"	3"
90'- 2 15/16"	3"	3"
96'- 1 13/16"	3"	3"
101'-11 7/16"	3"	3"
107'-10 1/16"	3"	3"
113'- 9 1/16"	3"	3"
119'- 7 3/16"	3"	3"
125'- 6 3/16"	3"	3"
131'- 5"	3"	3"
137'- 3 13/16"	3"	3"
143'- 2 13/16"	3"	3"
148'- 5"	3"	2 3/4"
153'- 6"	2 3/4"	3"
158'- 7"	2 3/4"	3"
163'- 8"	2 3/4"	3"
168'- 7 15/16"	2 3/4"	3"

RADIOGRAPHIC INSPECTION NOTE:
An "RT" shown on elevation views indicates radiographic inspection of adjacent flange and web, flange, or web welds in accordance with the Special Provisions.

Note:
Welded Girders are to be cambered to compensate for full anticipated dead load, see Sheet 9.

Notes:
For Shoe Details, see Sheet 10.
For Dead Load Deflections, see Sheet 9.
For Superstructure Details, see Sheets 8 and 9.
For Sections B-B, and D-D, see Sheet 9.

Note:
One butt welded shop splice will be permitted in each 26"x4" flange plate; details of splice shall be similar to that shown for Field Flange Splice, sheet 8. A maximum of 3 web splices including web splice at "Permissible Field Splice", will be permitted; detail of shop web splice shall be similar to that shown for Field Flange Splice, Sheet 8, except that web opening is not required and web splice shall not be located within 2'-0" of a shop flange splice.

Notes - Southbound Track:
Distances shown in Floor Beam Table are measured from north to south, starting at the extreme north floor beam.
Dimensions "X" and "Y" shown in Floor Beam Table for G1 and G2 are measured from top of bottom flange for Plate Girder section and from bottom of WF Beam section.

Elevations shown on Girder Elevations are at bottom of bottom flange for Plate Girder section and for WF Beam section.

Notes - Northbound Track:
Distances shown in Floor Beam Table are measured from south to north, starting at the extreme south floor beam.
Dimenstons "X" and "Y" shown in Floor Beam Table for G3 and G4 are measured from top of bottom flange for Plate Girder section and from bottom of WF Beam section.

Elevations shown on Girder Elevations are at bottom of bottom flange for Plate Girder section and for WF section.

	BY	DATE	NO.	REVISION	BY	DATE
			4	As Built	JRC	3-73
MADE	RLM	12-1967	⚠3	Addendum 3 Amendment 3	Ede.	4-12-71
CHECKED	JEH	4-9-68	2	Profile Grade	Ede.	4-12-71
IN CHARGE	FKD		1	General Checking	AMH	5-13-68

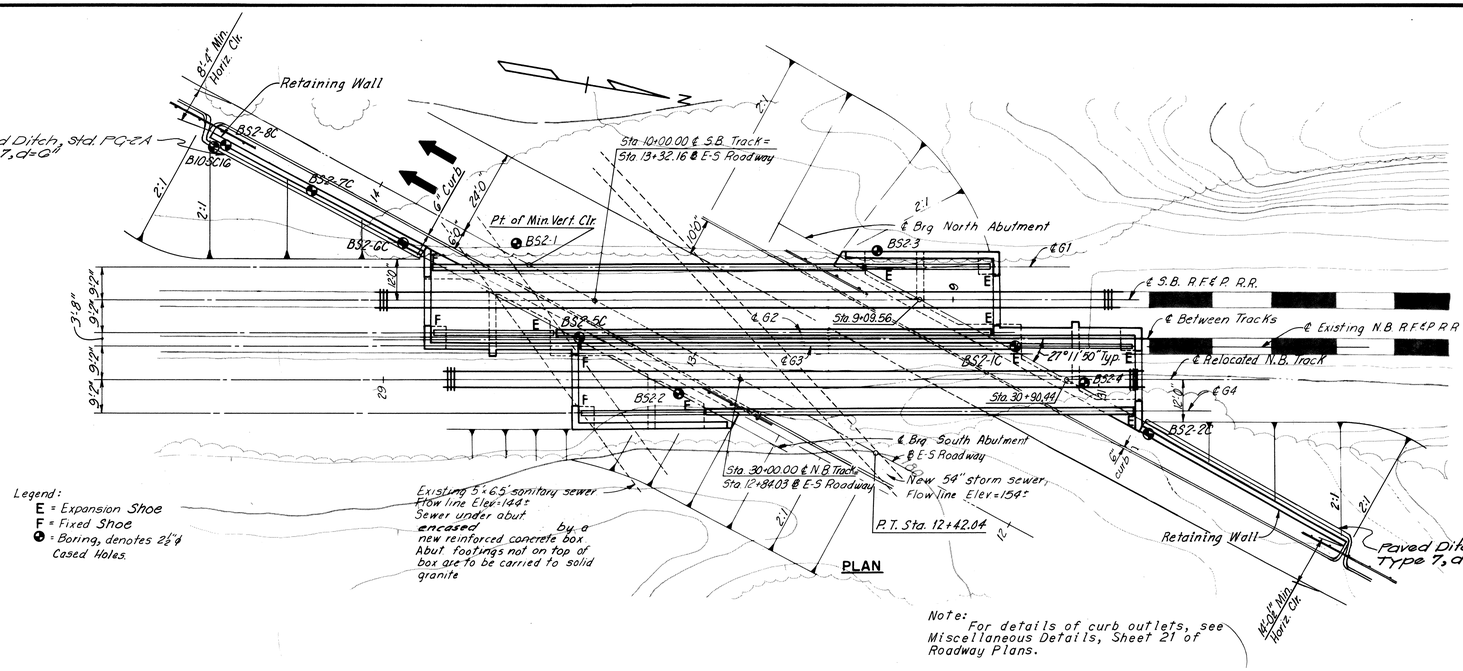
AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 9
R.F.&P.R.R. OVER
NORTHBOUND ROADWAY
FRAMING PLAN

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

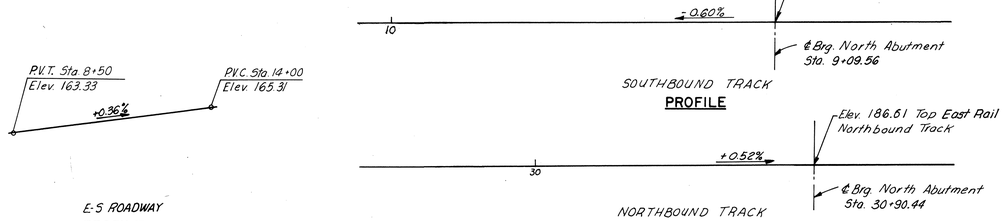
SCALE: As Noted
CONTRACT NO.: 4
SHEET NO. 7 OF 12

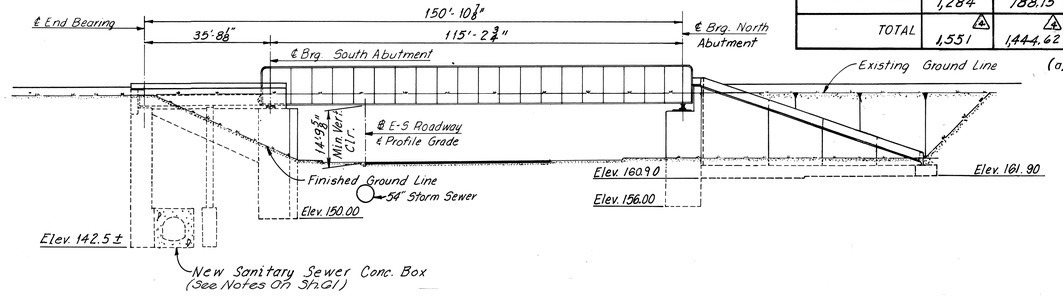
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	106	155



Legend:
E = Expansion Shoe
F = Fixed Shoe
● = Boring, denotes 2½" ϕ Cased Holes.

Note: For details of curb outlets, see Miscellaneous Details, Sheet 21 of Roadway Plans.





ELEVATION

INDEX

NO.	REVISION	BY	DATE
5	As Built	JRC	3-73
4	Wingwall Changes	F.L.G.	2-24-72
3	Profile Grade	P.S.	4-12-71
2	General	J.G.V.	10-70
1	General Checking	A.M.H.	5-13-68

	BY	DATE
MADE	RLM	12-5-67
CHECKED	JEH	4-9-68
IN CHARGE	FKD	

GENERAL NOTES

STRUCTURE: Dual structures with one welded steel girder span and one rolled beam at each approach. Distance ℄-℄ Girders of 18'-4" with 1'-6" min. clear between structures.

CAPACITY: Live Loads - Cooper E-80 with 50% impact.

SPECIFICATIONS: GENERAL: Virginia Department of Highway Road and Bridge Specifications 1970 and Contract Special Specifications. DESIGN: A.R.E.A. 1966 for Steel Railway Bridges, for Fixed Spans not exceeding 400 feet in length. WELDING: 1969 Standard Specifications for Welded Highway and Railway Bridges of the American Welding Society.

CONTRACT SPECIAL PROVISIONS:

Specifications and Contract Special Provisions referred to above are necessary to make these plans complete.

DATUM: City of Richmond

TEMPERATURE: The normal temperature referred to on the plan is 68°F. The temperature range for movement is 0°F to 120°F.

DIMENSIONS: All dimensions are measured horizontally and vertically unless otherwise noted.

EXCAVATION: Excavation below subgrade and cut slope template shall be classified as Structure Excavation. All excavation above these limits shall be classified as Regular Excavation and is not included in the Structural Quantities.

FOUNDATION: Footings shall rest on firm material. Foundation material shall be kept dry and special attention is called to Section 401.05 of the General Specifications, and to the Contract Special provisions, concerning preparation of foundations for footings.

CONCRETE NOTES: All concrete shall be Class A3. All exposed edges and corners shall have a ¾" chamfer or fillet unless otherwise noted.
Finishing Concrete Surfaces: See the Standard Architectural Detail Sheets and the Contract Special Provisions for types and details.

All reinforcing steel shall conform to A.S.T.M. A615, Grade 40. All reinforcing bar dimensions on the detailed drawings are to centers of bars unless otherwise noted. Clear distance between reinforcing steel and face of concrete shall be as noted on the plans. All bar laps shall be 30 diameters of the smaller bar unless otherwise noted.

STEEL NOTES: Structural steel shall conform to A.S.T.M. Specification A-36 and A-588. All Field Connections shall be made with high strength bolts or rivets. High strength bolts and rivets shall be ⅞" diameter unless otherwise noted and shall conform to A.S.T.M. Specification A-325.

BENCH MARK: A-15 Copperweld rod on bridge on Blue Shingles Road Elev. 204.73.

4 **FOUNDATION:** Piles shall be driven to a minimum length corresponding to the approximate tip elevations shown on the Plans but in no case to less than a penetration affording the required safe bearing capacity noted on the Plans.

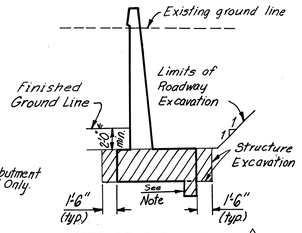
ESTIMATED QUANTITIES 5

	Struct. Excav. Cu. Yds.	Concrete (a) Cu. Yds.	Reinf. Steel Lbs.	Steel Piles 10HP42 Lin. Ft.		Porous Backfill Cu. Yds.	Under-drain 6" Pipe Lin. Ft.	Struct. Steel (Lbs.) Mild Carbon	Struct. Steel (Lbs.) High Strength	Asphalt damp-proofing Sq. Yds.	1½" Asphalt Plank Sq. Ft.	½" Butyl Rubber Waterproofing Square	Bridge Drainage Metalwork Lbs.
Superstructure								674,692.2	251,107.1		6,756	68	
North Abutment	267	656.47	75,346			66	167			242			
South Abutment	1,284	788.15	91,072	794.9		62	163			231			3,080
TOTAL	1,551	1,444.62	166,418	794.9		128	330	674,692.2	251,107.1	473	6,756	68	3,080

(a) Class A3

CURVE DATA

℄ E-5 Roadway
P.I. = Sta. 6+43.88
Δ = 37°15'41"
D = 3°00'00"
T = 643.88'
L = 1242.04'
R = 1909.86'



Note: North Abutment Wingwall Only.

LIMITS OF EXCAVATION 4
No Scale

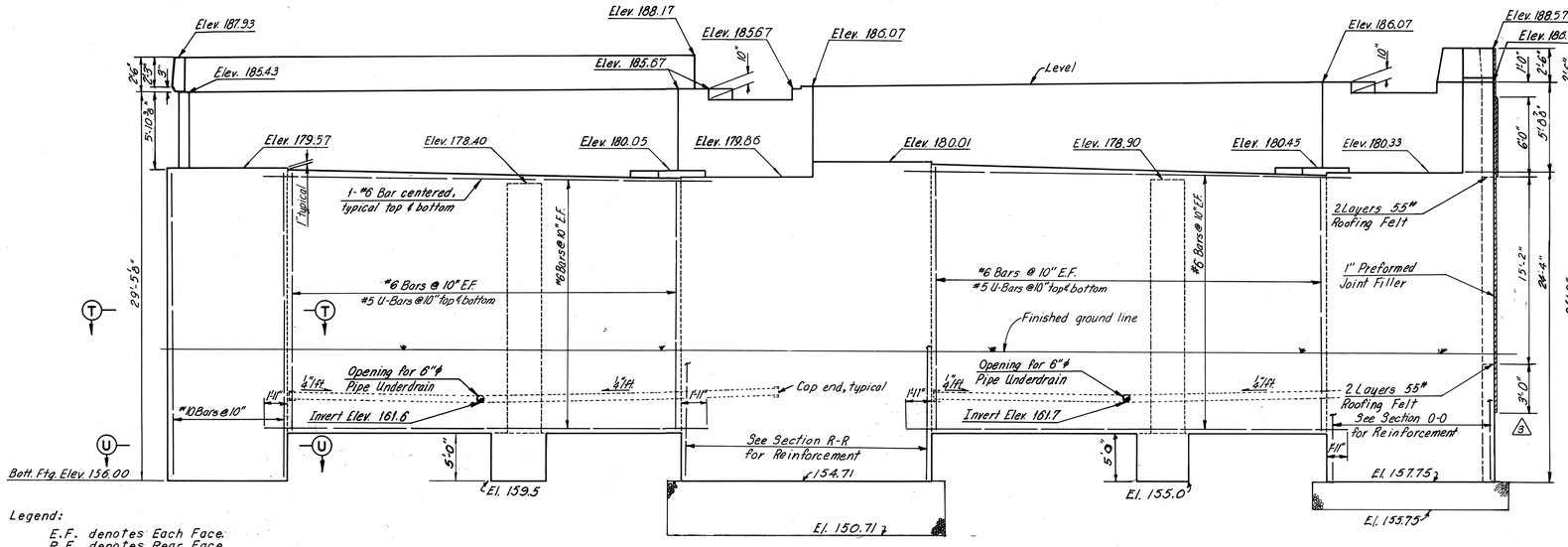
AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 10
R.F.&P.R.R. OVER
EAST-SOUTH ROADWAY
GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

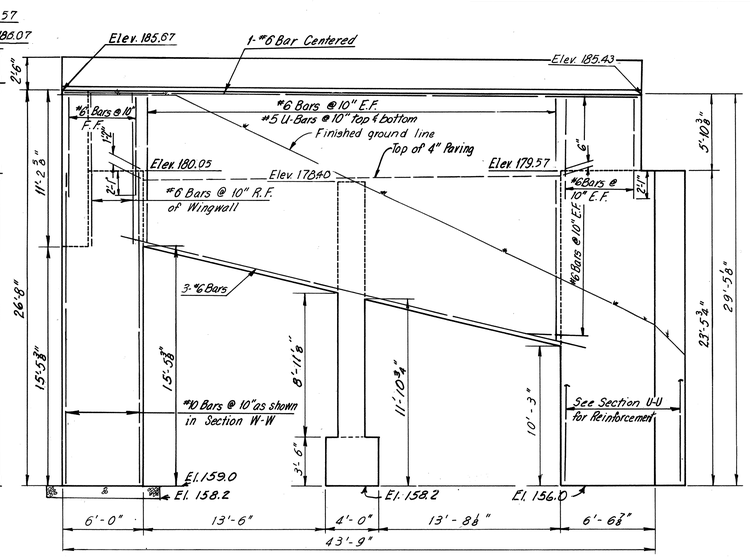
SCALE: 1"=20' unless noted
CONTRACT NO.: 4
SHEET NO. 1 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	107	155

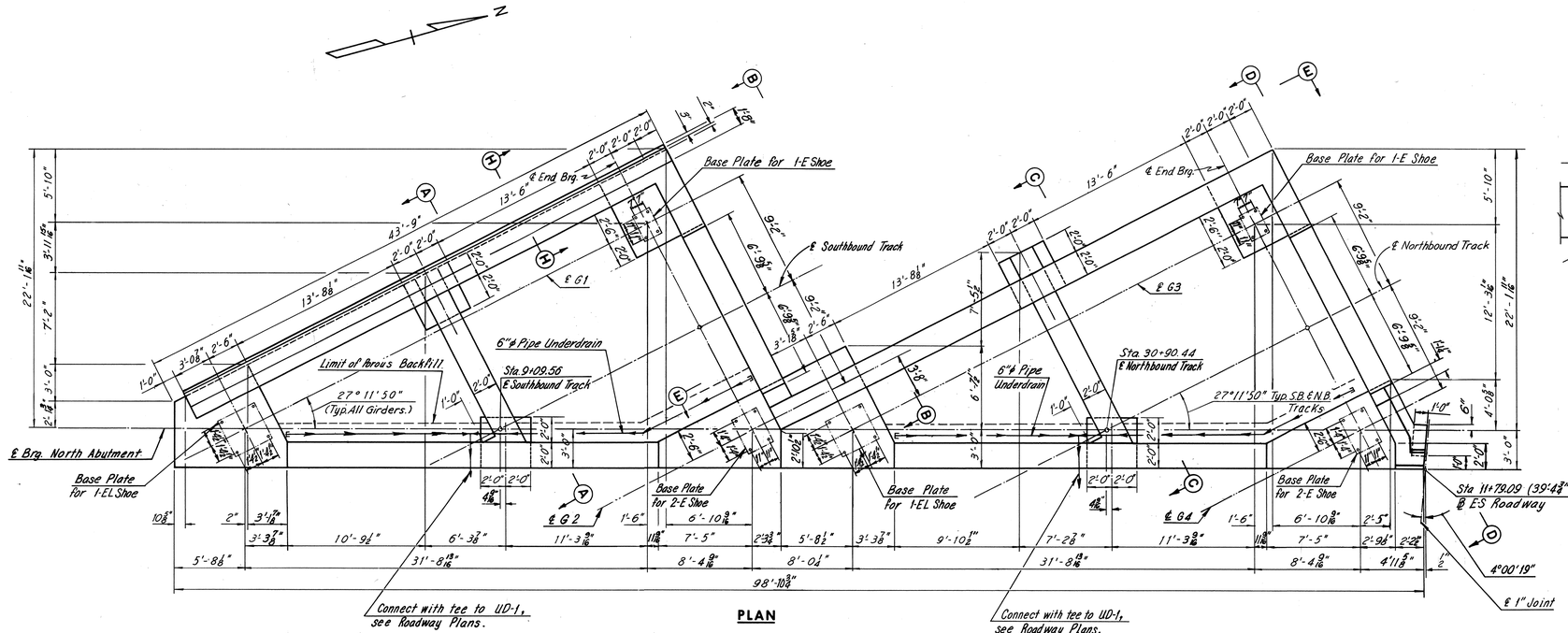


Legend:
E.F. denotes Each Face.
R.F. denotes Rear Face.
F.F. denotes Front Face.

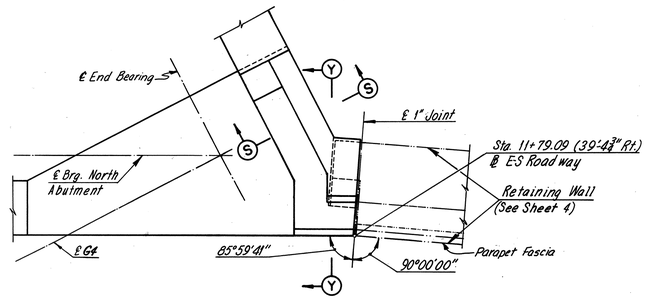
ELEVATION



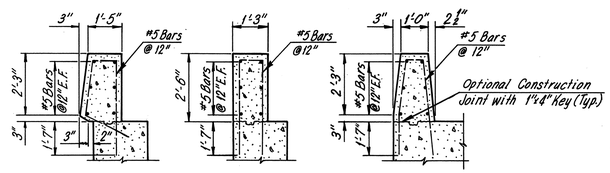
WEST WINGWALL ELEVATION



PLAN



DETAIL AT 1" JOINT



SECTION H-H **SECTION S-S** **SECTION Y-Y**

Note:
For Sections, see Sheet 3.
Reinforcing to be shifted to miss underdrain going thru walls.

AS BUILT

	BY	DATE
MADE	D.E.S.	3-7-68
CHECKED	R.L.M	4-30-68
IN CHARGE	F.K.D	

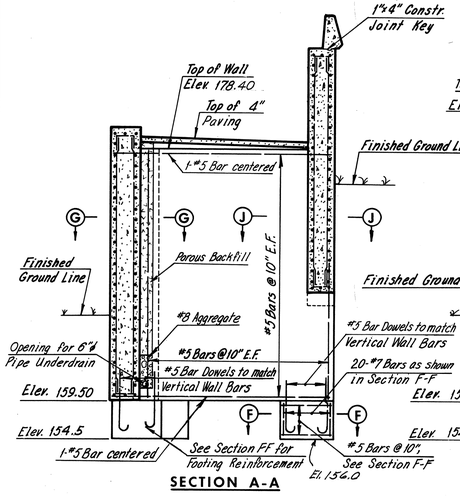
NO.	REVISION	BY	DATE
4	As Built	J.R.C.	3-73
3	Wall Flg. Elev.	J.G.V.	2.23.72
2	Profile Grade	R.S.	4-15-71
1	General Checking	A.M.H.	5-13-68

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 10
R.F.&P.R.R. OVER EAST-SOUTH ROADWAY
NORTH ABUTMENT

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

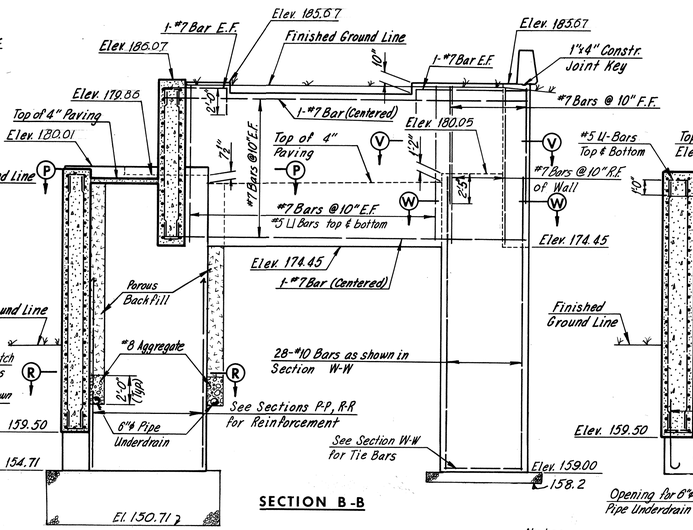
SCALE: No Scale
CONTRACT NO.: 4
SHEET NO. 2 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	108	155

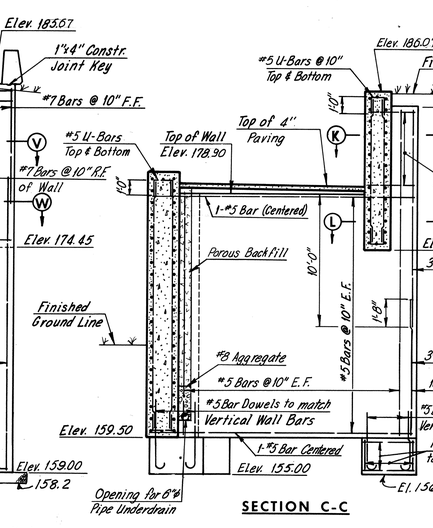


SECTION A-A

Note:
#5 U-Bars to be placed @ 10" ctrs. between footings in Section A-A and Section C-C.

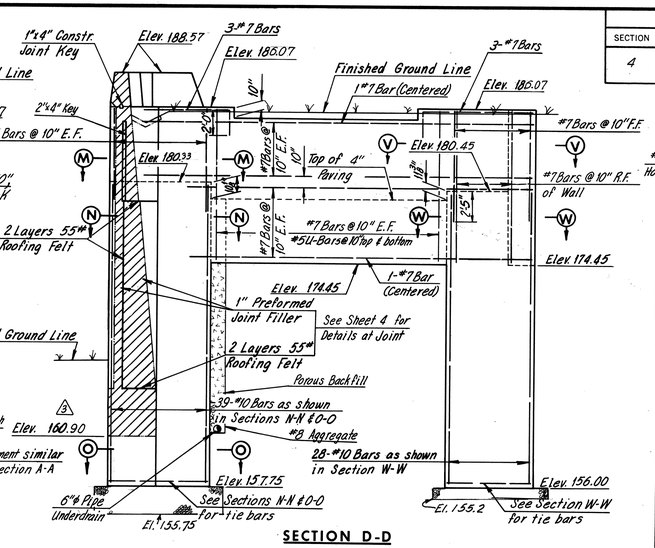


SECTION B-B



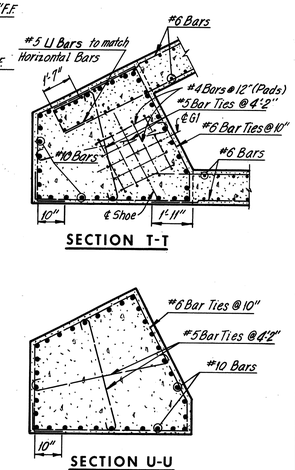
SECTION C-C

Note:
Dampproofing to be applied between wall and porous backfill, from bottom of 4" concrete paving to bottom of wall.



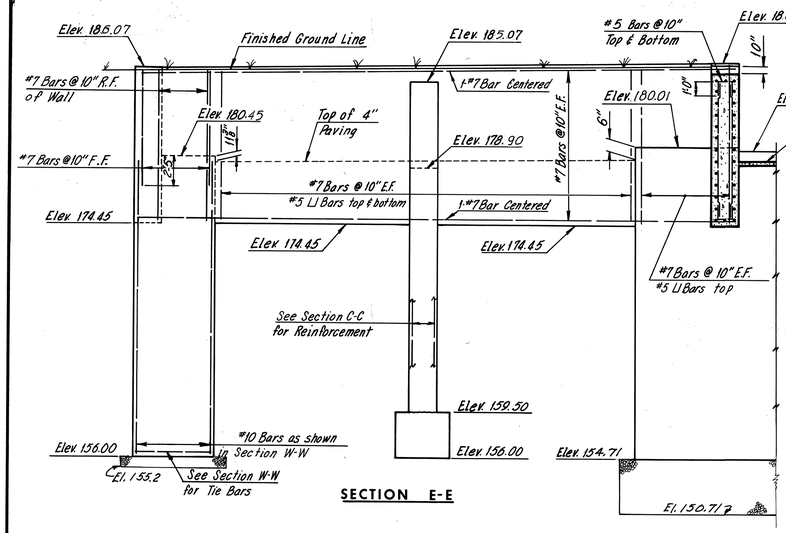
SECTION D-D

Note:
#4 Bars @ 12" shown in Sections M-M, P-P, T-T, and W-W, are to be U-Shaped Bars with 1'-6" legs.

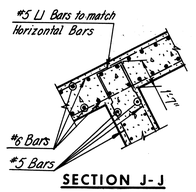


SECTION T-T

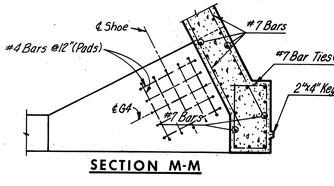
SECTION U-U



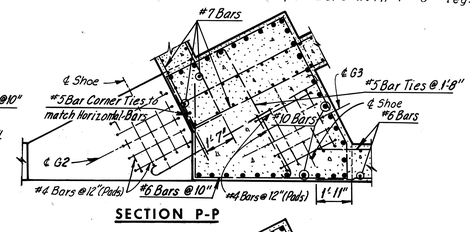
SECTION E-E



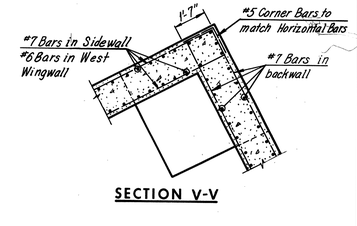
SECTION J-J



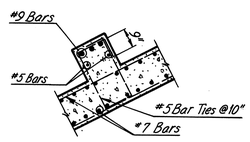
SECTION M-M



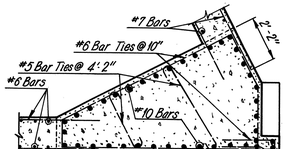
SECTION P-P



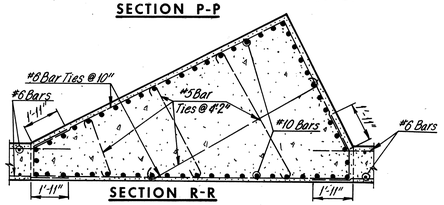
SECTION V-V



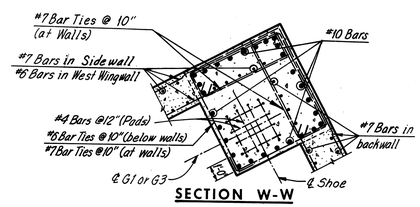
SECTION K-K



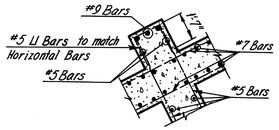
SECTION N-N



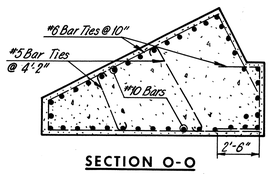
SECTION R-R



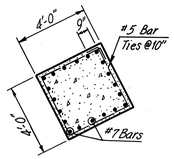
SECTION W-W



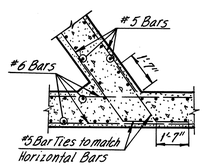
SECTION L-L



SECTION O-O



SECTION F-F



SECTION G-G

AS BUILT

Legend:
E.F. denotes Each Face
F.F. denotes Front Face
R.F. denotes Rear Face

Notes:
Paving shown within limits of abutment shall be 4" thick.
1/2" preformed joint filler, sealed with a 1" depth of hot applied joint sealer, shall be installed between paving and abutment walls. Preformed joint filler shall be bituminous type conforming to AASHO M213.
Paving will be paid for as "Concrete, Class A3, Substructures and Walls."
For Location of sections A-A, B-B, C-C, D-D, E-E, T-T and U-U, see Sheet 2.

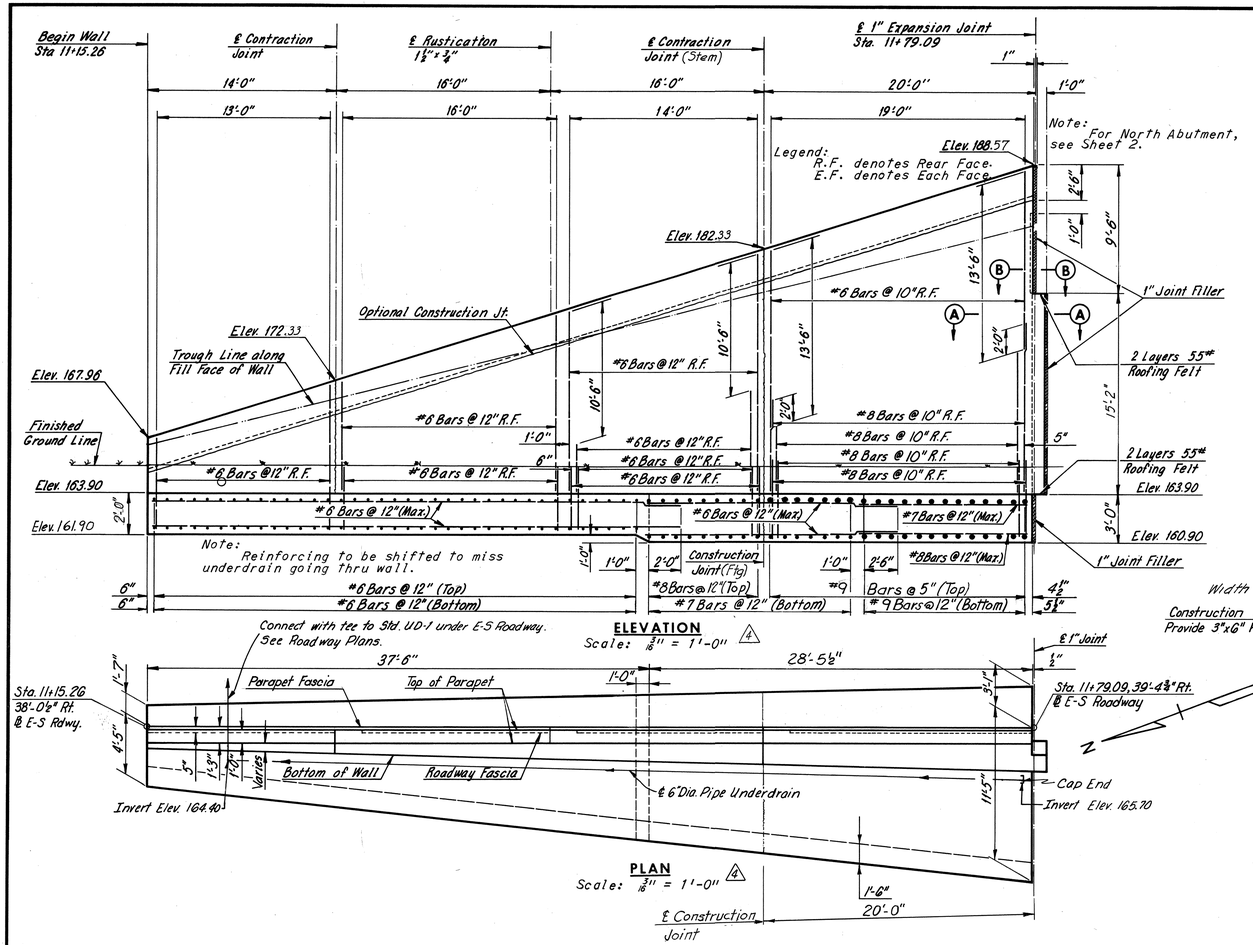
	BY	DATE	NO.	REVISION	BY	DATE
			4	As Built	JRC	3-73
MADE	D.E.S.	3-8-68	3	Wall Ftg. Elev.	J.G.V.	2-23-72
CHECKED	R.L.M.	4-30-68	2	Profile Grade	P.S.	4-15-71
IN CHARGE	F.K.D.		1	General Checking	A.M.H.	5-13-68

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 10
R.F.&P.R.R. OVER
EAST-SOUTH ROADWAY
NORTH ABUTMENT DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

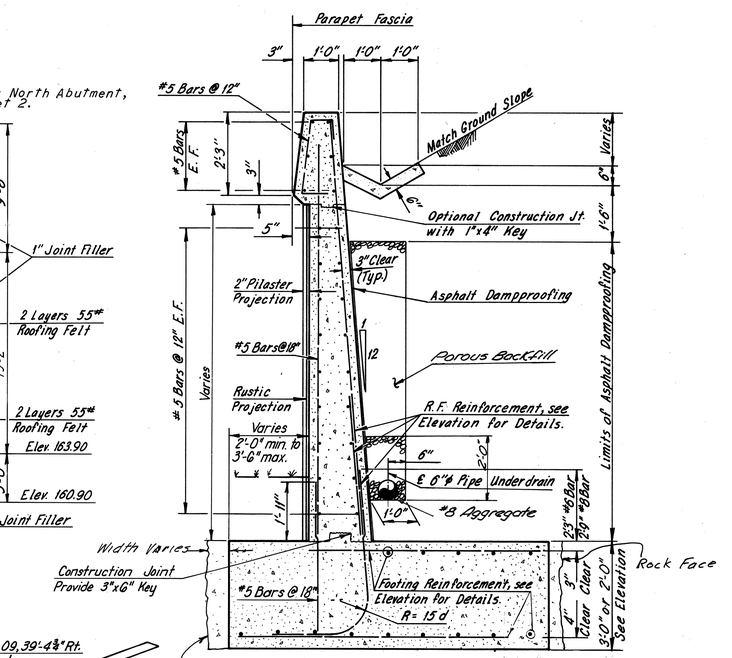
SCALE: No Scale
CONTRACT NO.: 4
SHEET NO. 3 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	109	155

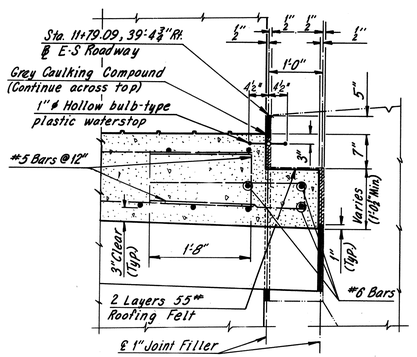


ELEVATION
Scale: $\frac{3}{16}$" = 1'-0" (4)

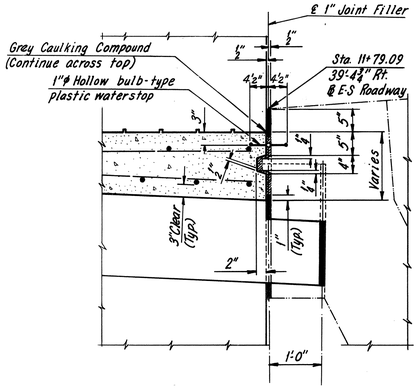
PLAN
Scale: $\frac{3}{16}$" = 1'-0" (4)



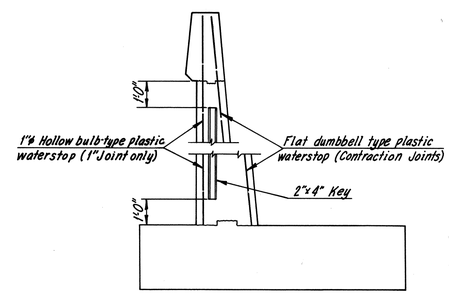
TYPICAL SECTION (4)
No Scale



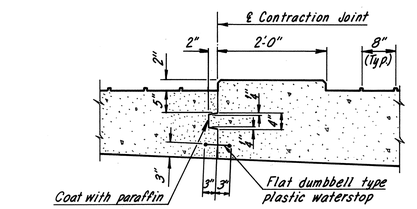
SECTION A-A
Scale: ¾" = 1'-0"



SECTION B-B
Scale: ¾" = 1'-0"

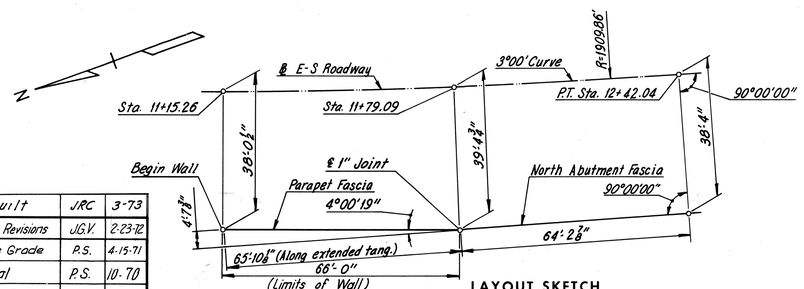


PLASTIC WATERSTOP DETAIL
No Scale



CONTRACTION JOINT DETAIL
Scale: ¾" = 1'-0"

AS BUILT



LAYOUT SKETCH
No Scale

	BY	DATE
MADE	D.E.S.	2-14-68
CHECKED	H.J.C.	4-1-68
IN CHARGE	FKD	

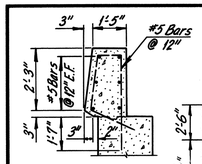
NO.	REVISION	BY	DATE
5	As Built	JRC	3-73
4	Footing Revisions	J.G.V.	2-23-72
3	Profile Grade	P.S.	4-15-71
2	General	P.S.	10-70
1	General Revisions	A.M.H.	5-13-68

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 10
R.F.&P.R.R. OVER
EAST-SOUTH ROADWAY
NORTH ABUTMENT RETAINING WALL

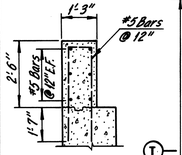
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 4
SHEET NO. 4 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	110	155



SECTION 1-1



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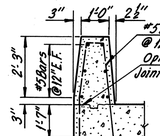
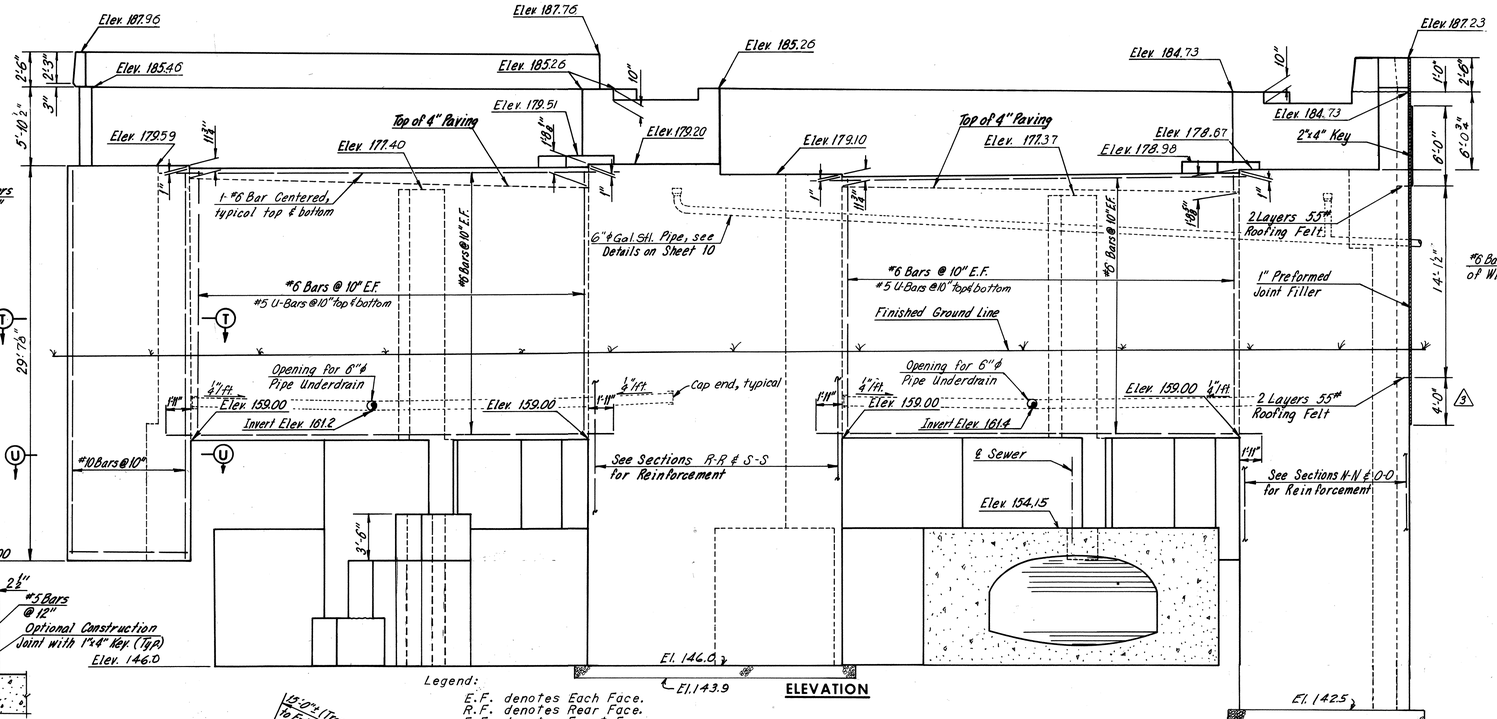
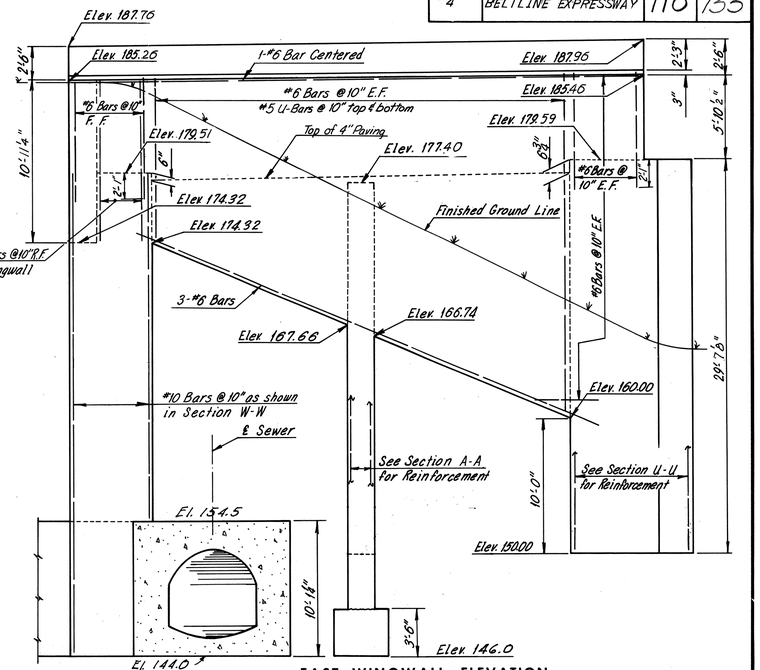


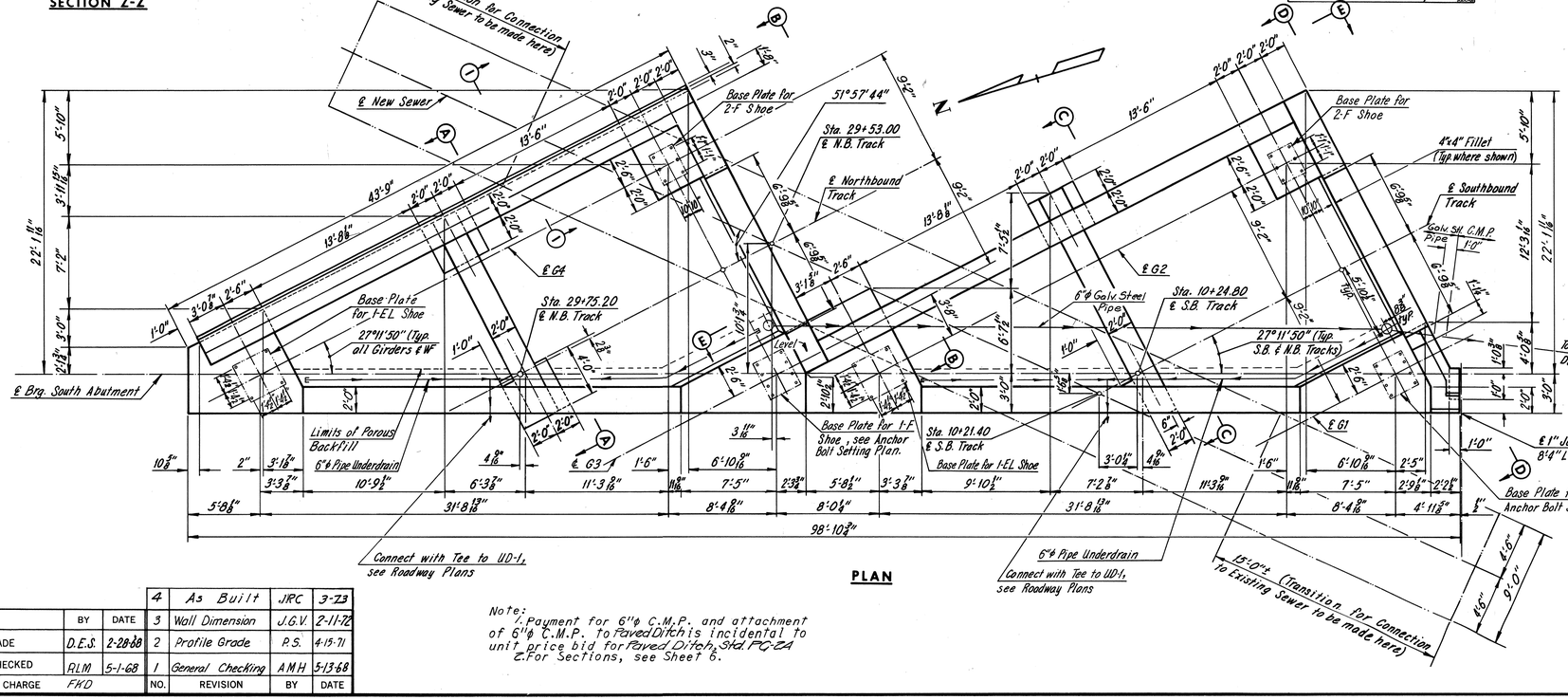
SECTION Z-Z



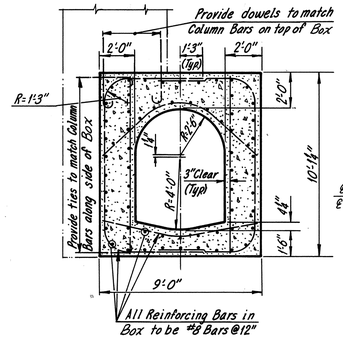
ELEVATION



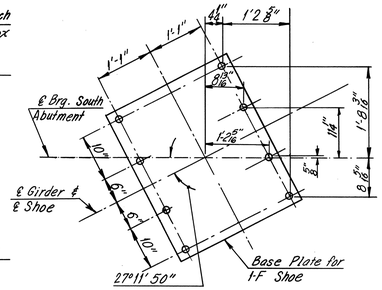
EAST WINGWALL ELEVATION



PLAN



TYPICAL SECTION OF REPLACEMENT SEWER



ANCHOR BOLT SETTING PLAN
(1-F Shoe)

Notes:
For Sections, see Sheet 6.

Note;
1. Payment for 6"ϕ C.M.P. and attachment of 6"ϕ C.M.P. to Paved Ditch is incidental to unit price bid for Paved Ditch, Std. PC-24
2. For Sections, see Sheet 6.

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
			4	As Built	JRC	3-73
			3	Wall Dimension	J.G.V.	2-11-72
MADE	D.E.S.	2-28-68	2	Profile Grade	P.S.	4-15-71
CHECKED	R.L.M.	5-1-68	1	General Checking	A.M.H.	5-13-68
IN CHARGE	F.H.O.					

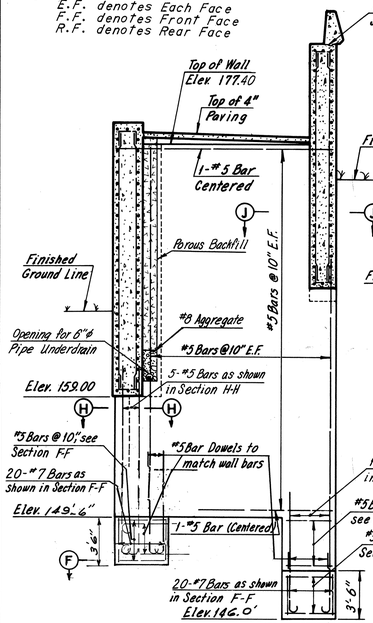
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 10
R.F.&P.R.R. OVER
EAST-SOUTH ROADWAY
SOUTH ABUTMENT

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

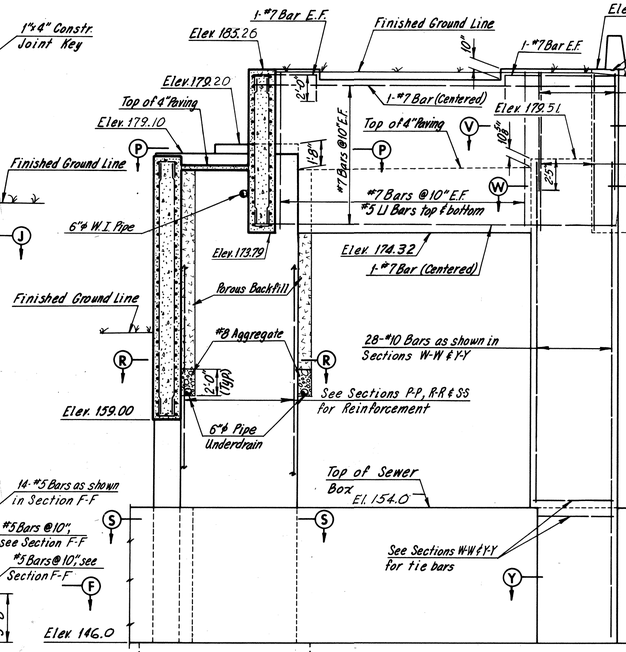
SCALE: No Scale
CONTRACT NO.: 4
SHEET NO. 5 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	111	155

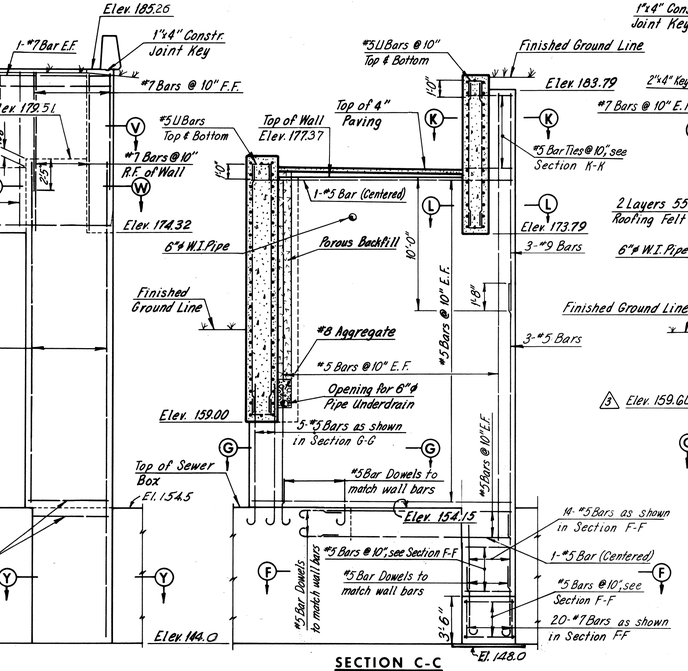
Legend:
E.F. denotes Each Face
F.F. denotes Front Face
R.F. denotes Rear Face



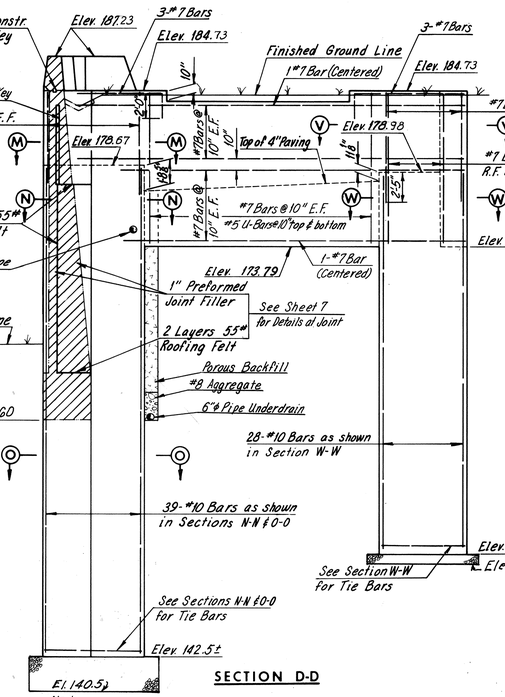
SECTION A-A



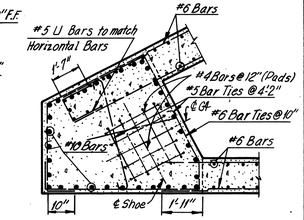
SECTION B-B



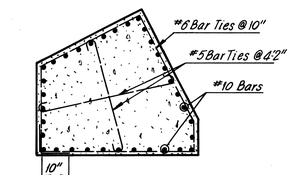
SECTION C-C



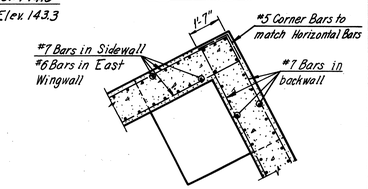
SECTION D-D



SECTION T-T



SECTION U-U

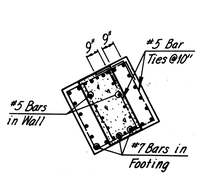


SECTION V-V

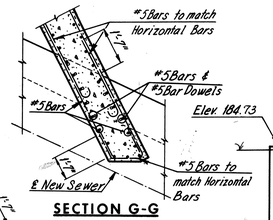
Note:
#5 U-Bars to be placed @ 10" ctrs. between footings in Section A-A and Section C-C.

Note:
Dampproofing to be applied between wall and porous backfill, from bottom of 4" concrete paving to bottom of wall.

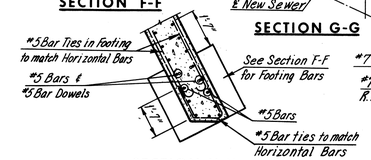
Note:
#4 Bars @ 12" shown in Sections M-M, P-P, T-T, and W-W, are to be U-Shaped Bars with 1'-6" legs.



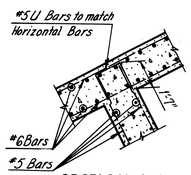
SECTION F-F



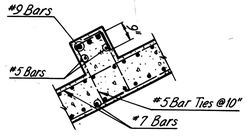
SECTION G-G



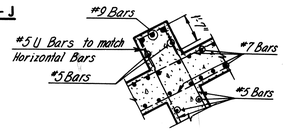
SECTION H-H



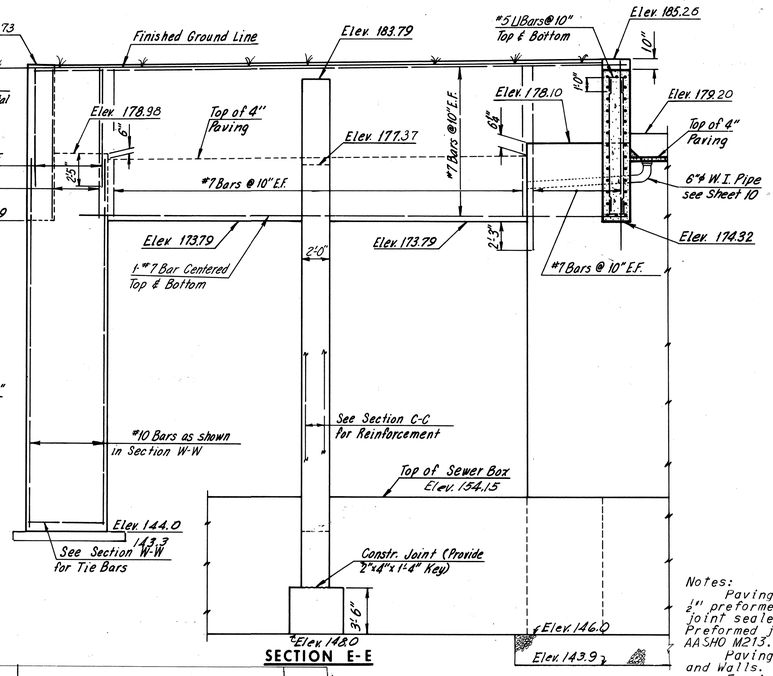
SECTION J-J



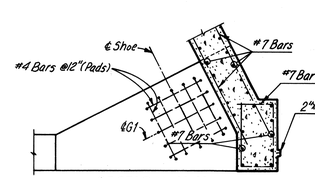
SECTION K-K



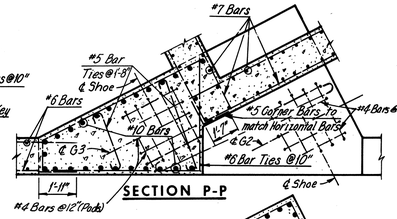
SECTION L-L



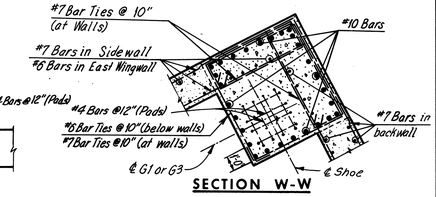
SECTION E-E



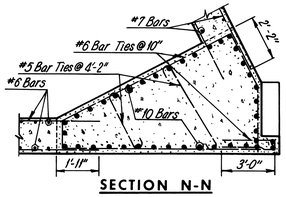
SECTION M-M



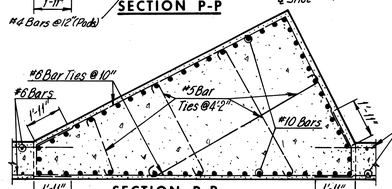
SECTION P-P



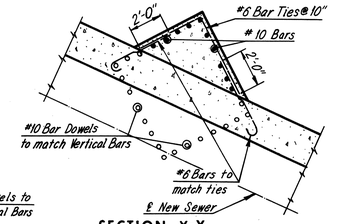
SECTION W-W



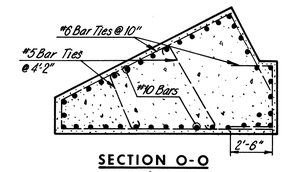
SECTION N-N



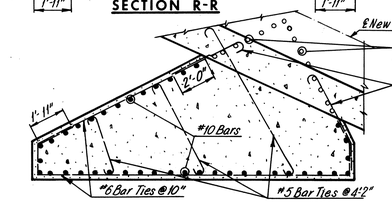
SECTION R-R



SECTION Y-Y



SECTION O-O



SECTION S-S

Notes:
Paving shown within limits of abutment shall be 4" thick. ½" preformed joint filler, sealed with a 1" depth of hot applied joint sealer, shall be installed between paving and abutment walls. Preformed joint filler shall be bituminous type conforming to AASHO M213.
Paving will be paid for as "Concrete, Class A3, Substructures and Walls."
For Location of sections A-A, B-B, C-C, D-D, E-E, T-T and U-U, see Sheet 5.

AS BUILT

	BY	DATE
MADE	D.E.S.	3-7-68
CHECKED	R.L.M	5-1-68
IN CHARGE	F.K.D	

NO.	REVISION	BY	DATE
3	Wall Elevation	J.G.V.	2-11-72
2	Profile Grade	P.S.	4-15-71
1	General Checking	A.M.H	5-13-68

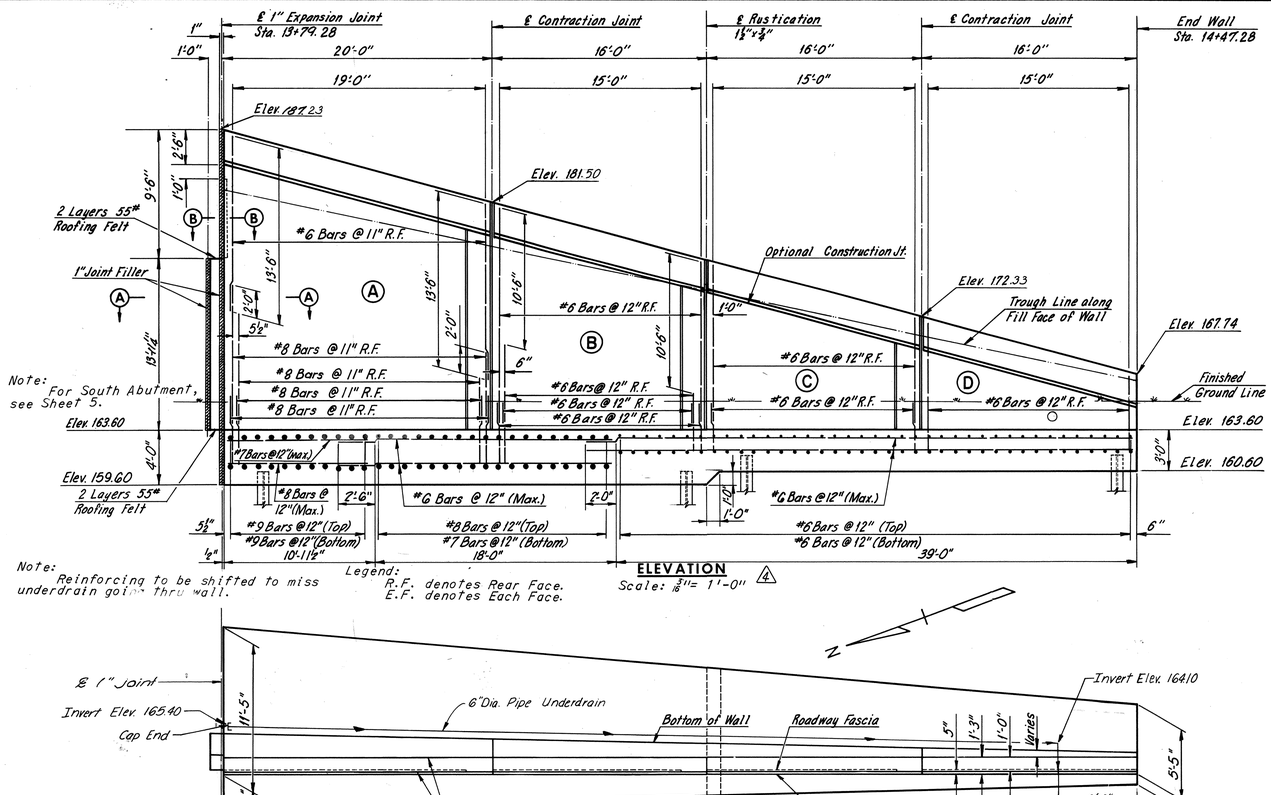
NO	DATE	REVISION	BY
4	3-7-73	As Built	J.R.C

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 10
R.F.&P.R.R. OVER
EAST-SOUTH ROADWAY
SOUTH ABUTMENT DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

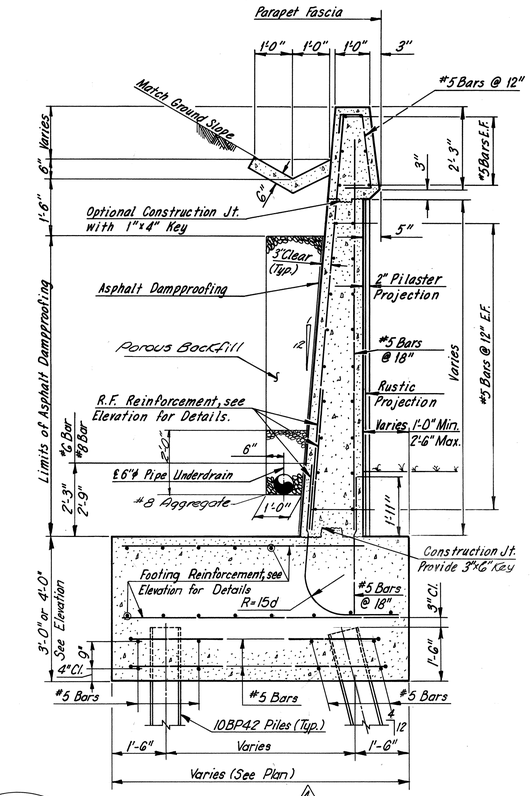
SCALE: No Scale
CONTRACT NO.: 4
SHEET NO. 6 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	112	155

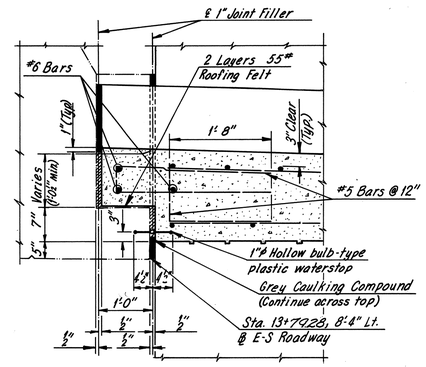


ELEVATION 4
Scale: 3/16" = 1'-0"

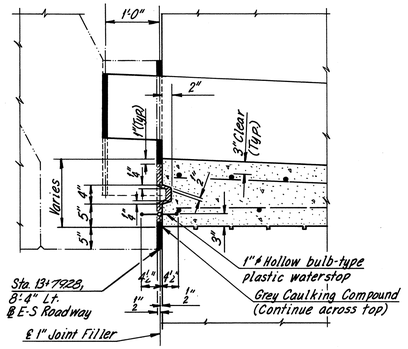
Note: For detail of connection of 6" Dia. C.M.P. to Concrete V-Gutter, see Detail C.



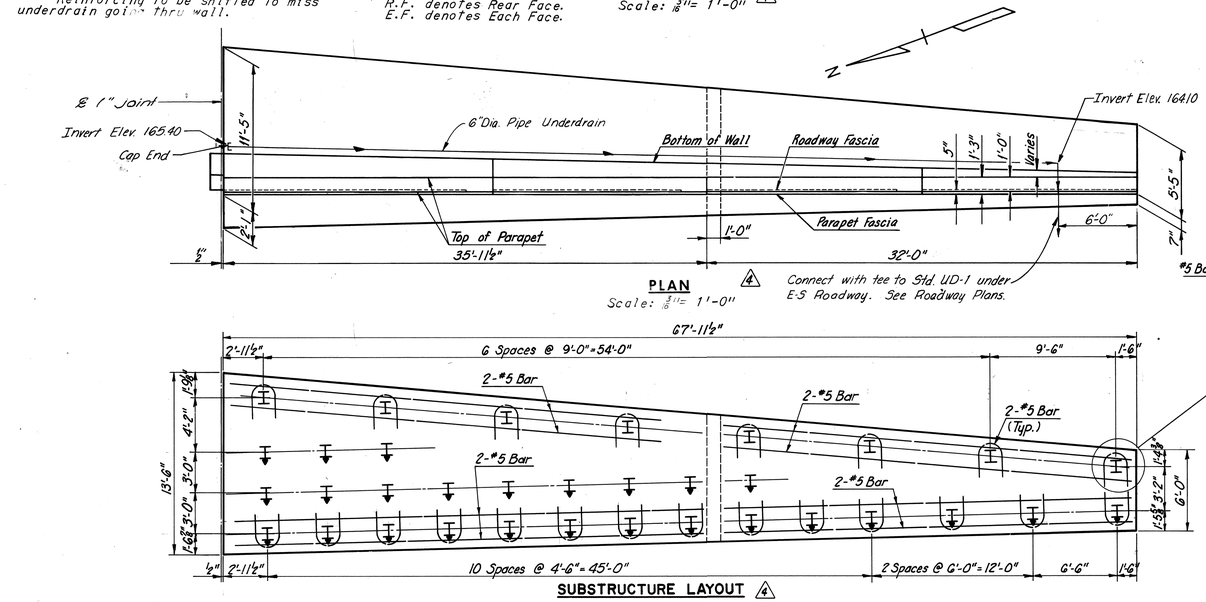
TYPICAL SECTION 4
No Scale



SECTION A-A
Scale: ¾" = 1'-0"



SECTION B-B
Scale: ¾" = 1'-0"

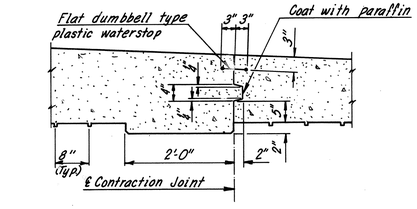


PLAN 4
Scale: 3/16" = 1'-0"

Connect with tee to Std. UD-1 under E-S Roadway. See Roadway Plans.

SUBSTRUCTURE LAYOUT 4
Scale: 3/16" = 1'-0"

PLASTIC WATERSTOP DETAIL
No Scale

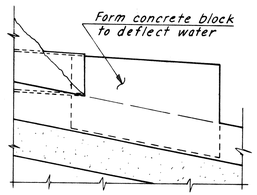


CONTRACTION JOINT DETAIL
Scal 3/4" = 1'-0"

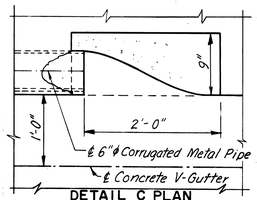
LAYOUT SKETCH
Scale: 1" = 20'-0"

NOTES: 4
All Piles 10BP42 steel piles (design capacity = 45 tons)
Jetting not permitted.
Number of Piles = 34.

Denotes 4:12 batter in direction of arrow.
Denotes vertical pile.



DETAIL C ELEVATION
South Abutment Drainage
Scale: .1" = 1'-0"



DETAIL C PLAN
Scale: 1"=1'-0"

AS BUILT

	BY	DATE
MADE	D.E.S.	2-20-68
CHECKED	A.J.C	4-1-68
IN CHARGE	FKD	

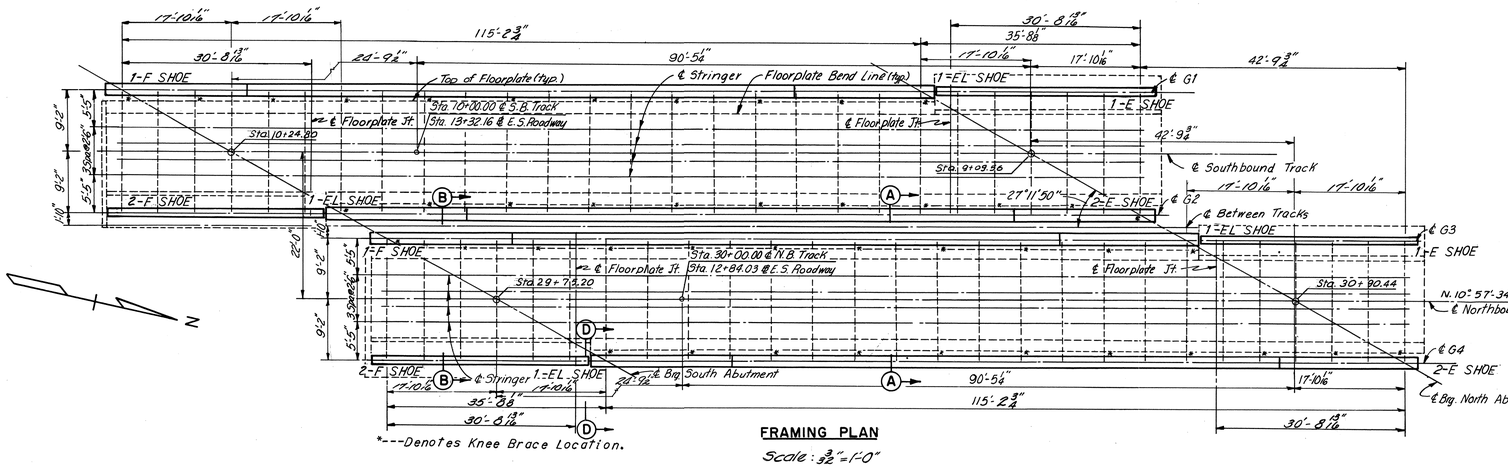
NO.	REVISION	BY	DATE
5	As Built	JRC	3-73
4	Footing Revision	J.G.V.	2-11-72
3	Profile Grade	P.S.	4-15-71
2	General	P.S.	7-70
1	General Revisions	A.M.H	5-13-68

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 10
R.F.&P.R.R. OVER EAST-SOUTH ROADWAY
SOUTH ABUTMENT RETAINING WALL

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 4
SHEET NO. 7 OF 12

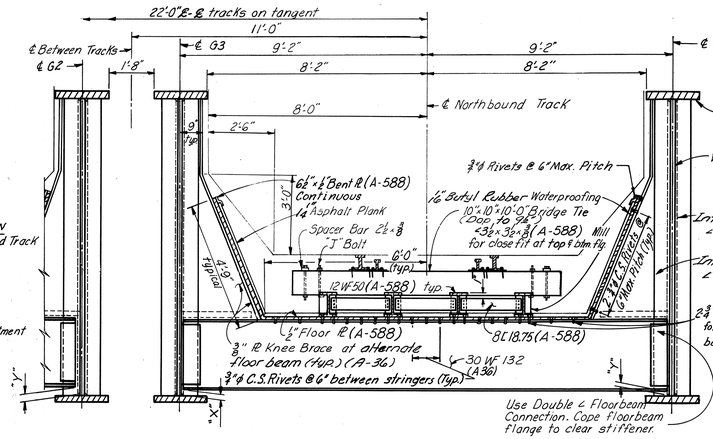
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	113	155



FRAMING PLAN

Scale: 3/32"=1'-0"

Note: Asphalt plank shall be recessed to receive flange of 12 WF 50 stringers.

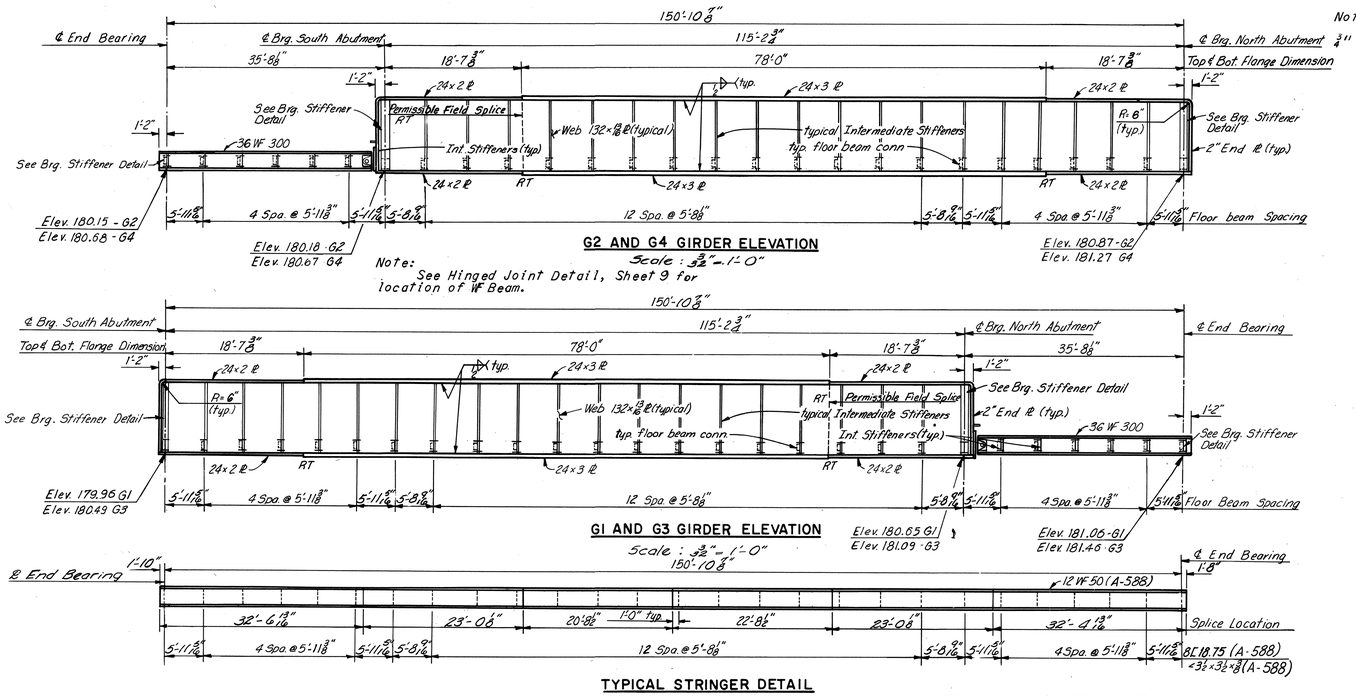


SECTION A-A

Scale: 3/8"=1'-0"

Note: Floorplate connected to stringers by two rows of 3/4" Dia. countersunk rivets at 6" maximum pitch.

Note: Ties, track, and fasteners are to be furnished and installed by others.



G2 AND G4 GIRDER ELEVATION

Scale: 3/32"=1'-0"

Note: See Hinged Joint Detail, Sheet 9 for location of WF Beam.

G1 AND G3 GIRDER ELEVATION

Scale: 3/32"=1'-0"

150'-10 7/8"

TYPICAL STRINGER DETAIL

Scale: 3/32"=1'-0"

Note: Welded Girders are to be cambered to compensate for full anticipated dead load, see Sheet 10.

RADIOGRAPHIC INSPECTION NOTE
An "RT" shown on elevation views indicates radiographic inspection of adjacent flange and web, flange, or web welds in accordance with the Special Provisions.

FLOOR BEAM LOCATION TABLE

SOUTHBOUND TRACK

DISTANCE	G1 DIMENSION "X"	G2 DIMENSION "Y"
0	2 3/4"	3"
5'-11 5/16"	2 3/4"	3"
11'-10 11/16"	2 3/4"	3"
17'-10 1/16"	2 3/4"	3"
23'-9 7/16"	2 3/4"	3"
29'-8 13/16"	2 3/4"	3"
35'-8 1/16"	3"	3"
41'-4 11/16"	3"	3"
47'-0 3/16"	3"	3"
52'-8 5/16"	3"	3"
58'-5 1/16"	3"	3"
64'-1 3/16"	3"	3"
69'-9 5/16"	3"	3"
75'-5 1/16"	3"	3"
81'-1 3/16"	3"	3"
86'-9 1/16"	3"	3"
92'-5 5/16"	3"	3"
98'-1 9/16"	3"	3
103'-10 1/16"	3"	3"
109'-6 3/16"	3"	3"
115'-2 3/4"	3"	3"
121'-2 1/16"	3"	2 3/4"
127'-1 7/16"	3	2 3/4"
133'-0 5/16"	3"	2 3/4"
139'-0 3/16"	3"	2 3/4"
144'-11 3/16"	3	2 3/4"
150'-10 7/8"	3"	2 3/4"

FLOOR BEAM LOCATION TABLE

NORTHBOUND TRACK

DISTANCE	G3 DIMENSION "X"	G4 DIMENSION "Y"
0	3"	2 3/4"
5'-11 5/16"	3"	2 3/4"
11'-10 11/16"	3"	2 3/4"
17'-10 1/16"	3"	2 3/4"
23'-9 7/16"	3"	2 3/4"
29'-8 13/16"	3"	2 3/4"
35'-8 1/16"	3"	3"
41'-4 11/16"	3"	3"
47'-0 3/16"	3"	3"
52'-8 5/16"	3"	3"
58'-5 1/16"	3"	3"
64'-1 3/16"	3"	3"
69'-9 5/16"	3"	3"
75'-5 1/16"	3"	3"
81' -1 3/16"	3"	3"
86'-9 11/16"	3"	3"
92'-5 5/16"	3"	3"
98'-1 13/16"	3"	3"
103'-10 1/16"	3"	3"
109'-6 3/16"	3"	3"
115'-2 3/4"	3"	3"
121'-2 1/16"	2 3/4"	3"
127'-1 7/16"	2 3/4"	3"
133 -0 5/16"	2 3/4"	3"
139'-0 3/16"	2 3/4"	3"
144'-11 3/16"	2 3/4"	3"
150'-10 7/8"	2 3/4"	3"

Note:
△ All riveted conections shown hereon may, at the contractors option, be replaced by high strength bolt connections

AS BUILT

Notes:
For Shoe Details, see Sheet 11.
For Dead Load Deflections, see Sheet 10.
For Superstructure Details, see Sheets 9 and 10.
For Sections B-B, and D-D, see Sheet 10.

Note: One butt welded shop splice will be permitted in each 24" x 3" flange plate; details of splice shall be similar to that shown for Field Flange Splice, sheet 9. A maximum of 2 web splices including web splice at "Permissible Field Splice", will be permitted; detail of shop web splice shall be similar to that shown for Field Flange Splice, sheet 9, except that web opening is not required and web splice shall not be located within 2'-0" of a shop flange splice.

Notes - Southbound Track:
Distances shown in Floor Beam Table are measured from north to south, starting at the extreme north floor beam.
Dimensions "X" and "Y" shown in Floor Beam Table for G1 and G2 are measured from top of bottom flange for Plate Girder section and from bottom of WF Beam section.
Elevations shown on Girder Elevations are at bottom of bottom flange for Plate Girder Section and for WF Beam section.

Notes - Northbound Track:
Distances shown in Floor Beam Table are measured from south to north, starting at the extreme south floor beam.
Dimensions "X" and "Y" shown in Floor Beam Table for G3 and G4 are measured from top of bottom flange for Plate Girder section and from bottom of WF Beam section.
Elevations shown on Girder Elevations are at bottom of bottom flange for Plate Girder section and for WF Beam section.

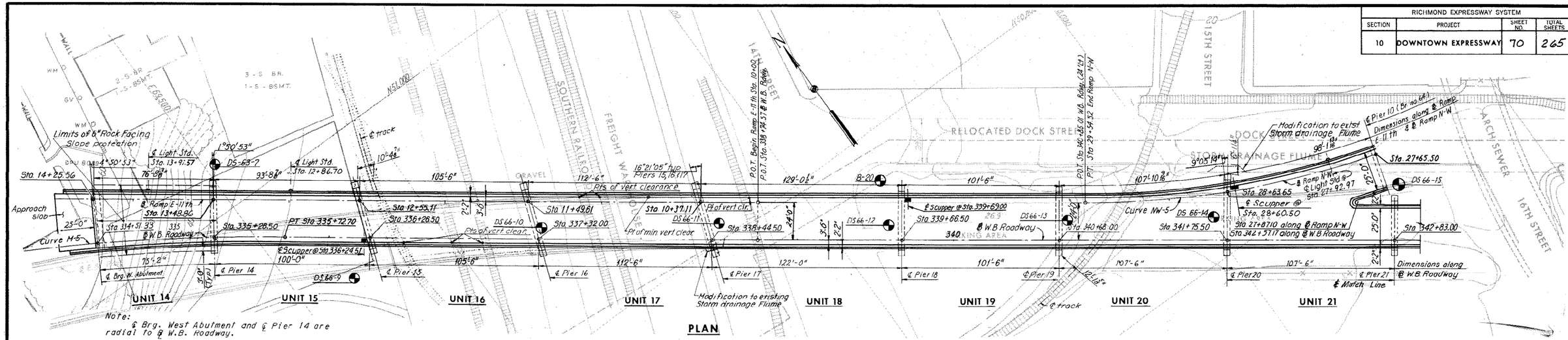
	BY	DATE	NO.	REVISION	BY	DATE
			4	As Built	IRC	3-73
			△3	Addendum 3 Amendment 3	Ee.	4-12-71
MADE	RLM	12-1467	2	Profile Grade	Ee.	4-12-71
CHECKED	JEH	4-10-68	1	General Checking	AMH	5-13-68
IN CHARGE	FKD					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 10
R.F.&P.R.R. OVER
EAST-SOUTH ROADWAY
FRAMING PLAN

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

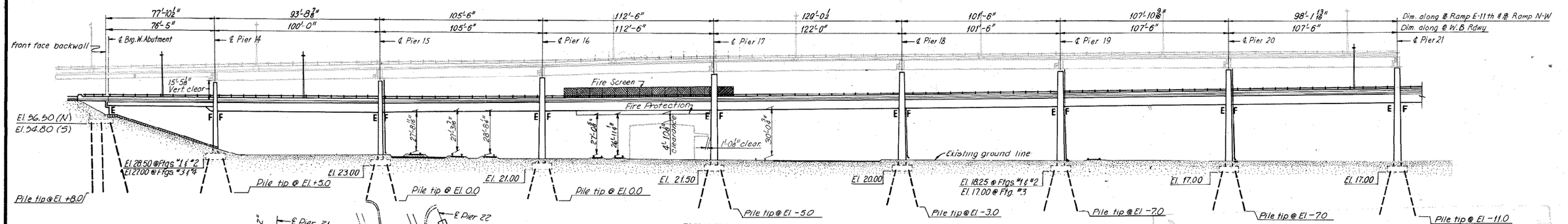
SCALE: As Noted
CONTRACT NO.: 4
SHEET NO. 8 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	70	265

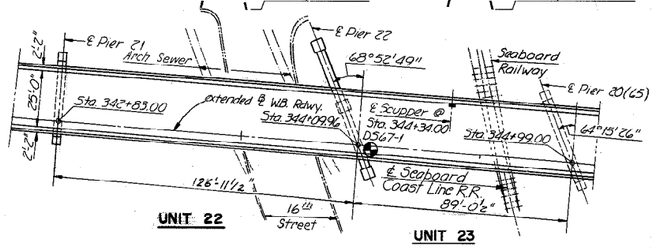


Note:
℄ Brg. West Abutment and ℄ Pier 14 are radial to ℄ W.B. Roadway.

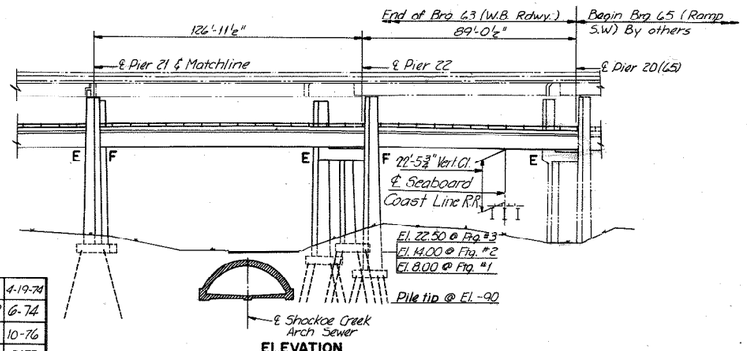
PLAN



ELEVATION



PLAN



ELEVATION

	BY	DATE
MADE	Y.C.P	1-9-69
CHECKED	J.D.	3-13-69
IN CHARGE	F.K.D.	

NO.	REVISION	BY	DATE
1	Joint Type & Rail-Road Name Added	PRMC	4-19-74
2	Seaboard & Coast Line Added To Elev.	K.D.P.	6-74
3	As Built	T.E.M.	10-76

℄ W.B. Roadway

Curve: M-5

P.I. = Sta. 334+26.15
Δ = 11°45'56"
D = 4°00'
T = 147.59'
L = 294.14'
R = 1432.40'

℄ Ramp N-W

Curve NW-5

P.I. = Sta. 28+25.38
Δ = 26°18'00"
D = 10°00'
T = 133.86'
L = 263.00'
R = 572.96'

HORIZONTAL CURVE DATA

Notes:
For Estimated quantities and General Notes see Sheet 2.
For Boring Logs see Sheets 26 thru 29.
For Layout of Pier 10(64) see Bridge No. 64 (Ramp N-W) Sheet 3.
◓ Indicates boring location.
Footing numbers (1,2, etc.) on each pier go from North to South.
For Profile Grade Data see Sheet 2.

INDEX

AS BUILT

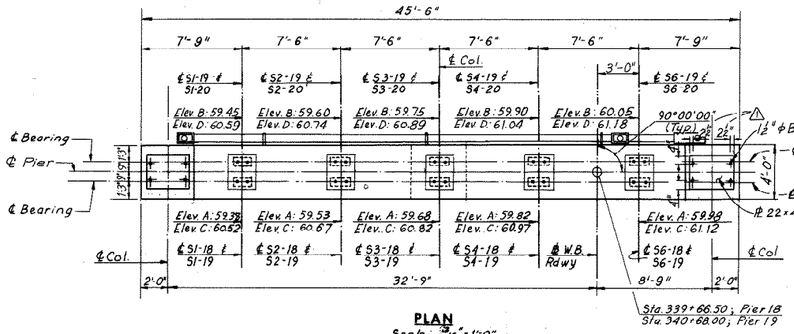
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 63
WESTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.
GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1" = 30'
CONTRACT NO. 10
SHEET NO. 1 OF 29

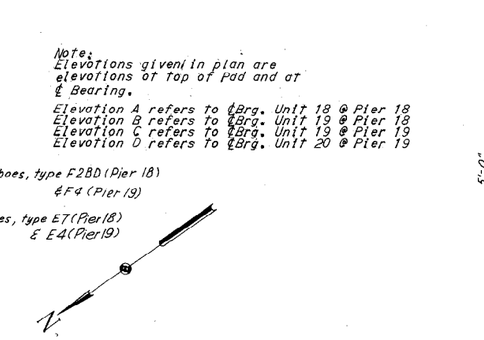
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	78	265



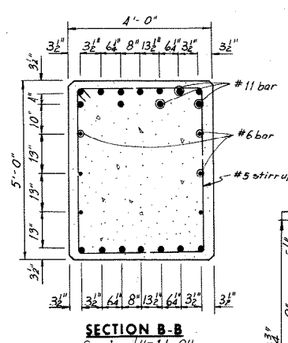
PLAN
Scale: 3/16" = 1'-0"

Note:
Elevations given in plan are elevations of top of pad and at ℄ Bearing.

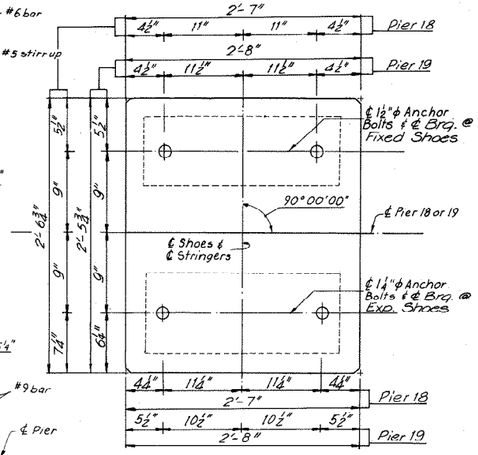
Elevation A refers to ℄ Brg. Unit 18 @ Pier 18
Elevation B refers to ℄ Brg. Unit 19 @ Pier 18
Elevation C refers to ℄ Brg. Unit 19 @ Pier 19
Elevation D refers to ℄ Brg. Unit 20 @ Pier 19



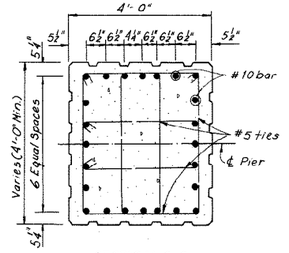
SECTION A-A
Scale 1/2" = 1'-0"



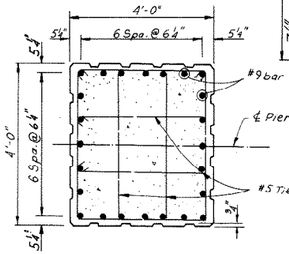
SECTION B-B
Scale 1/2" = 1'-0"



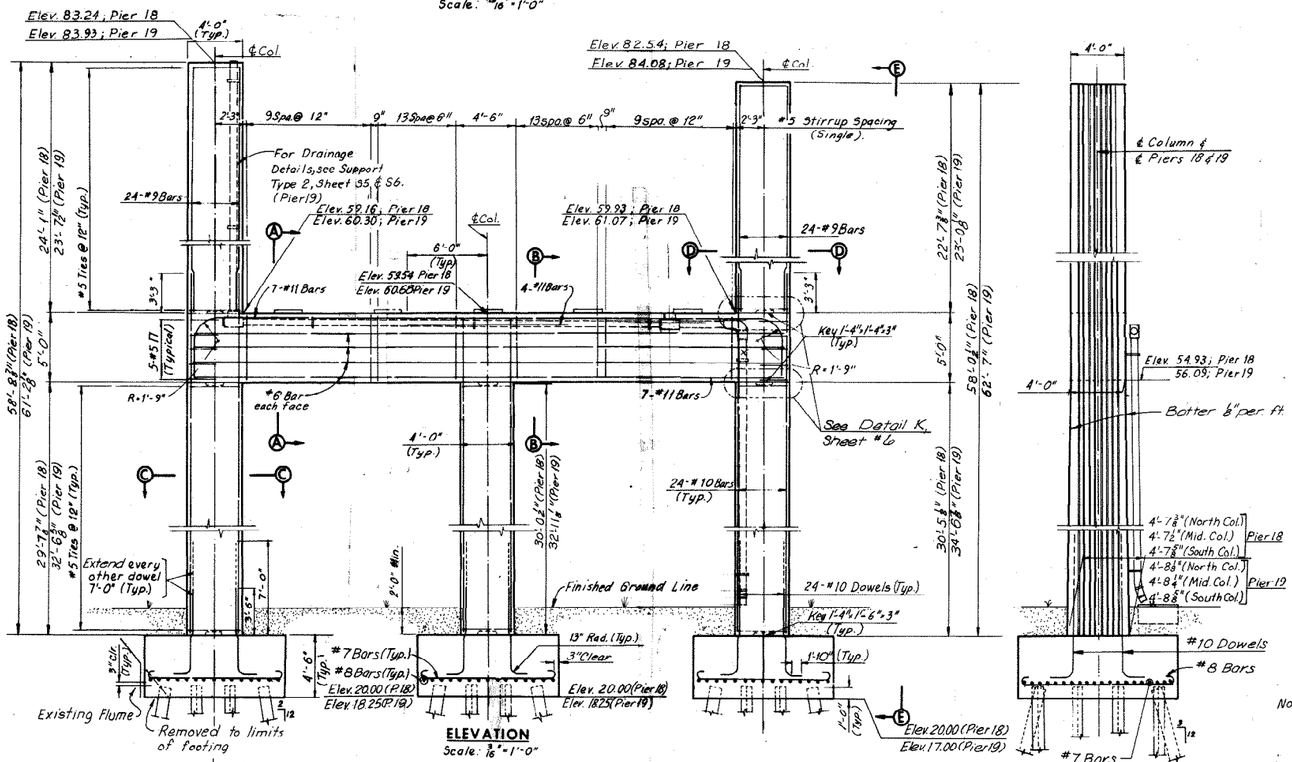
PAD AND ANCHOR BOLT SETTING PLAN
No Scale



SECTION C-C
Scale: 1/2" = 1'-0"



SECTION D-D
Scale: 1/2" = 1'-0"

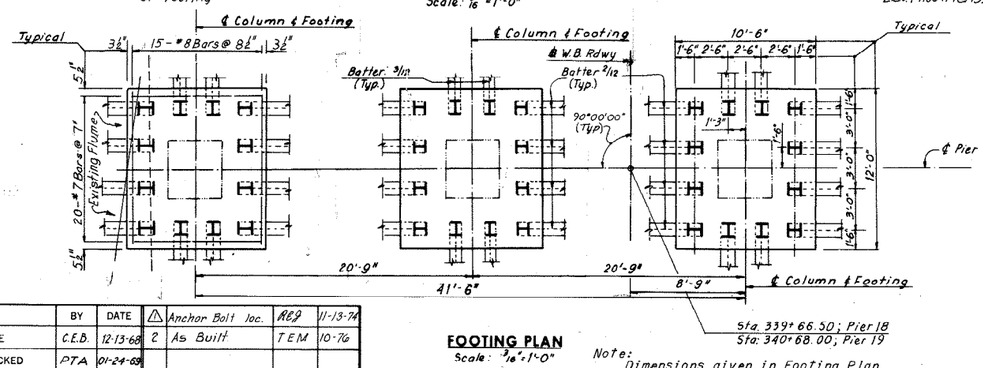


ELEVATION
Scale: 3/16" = 1'-0"

VIEW E-E
Scale: 3/16" = 1'-0"

Note:
All piles shall be 10BP42 Steel Piles (Design capacity = 45 tons).
Batter piles 3" or 2" per foot where shown.
For Shoe Details, see Sheets S1 and S2.
For Steel Pile Details, see Sheet 11.
Estimated Pile Tip elevations: -3.0 @ Pier 18, -7.0 @ Pier 19.
For architectural treatment of columns, see Sheet S7

Note:
1) Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft. redesign will be required.
2) Flume modification at Pier 18 only.



FOOTING PLAN
Scale: 3/16" = 1'-0"

Note:
Dimensions given in Footing Plan are measured at bottom of Footing.

	BY	DATE
MADE	C.E.B.	12-13-68
CHECKED	P.T.A	01-24-69
IN CHARGE		

NO.	REVISION	BY	DATE
⚠	Anchor Bolt loc.	R.E.J	11-13-74
2	As Built	T.E.M	10-76

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 63
WESTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.
PIERS 18 AND 19

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

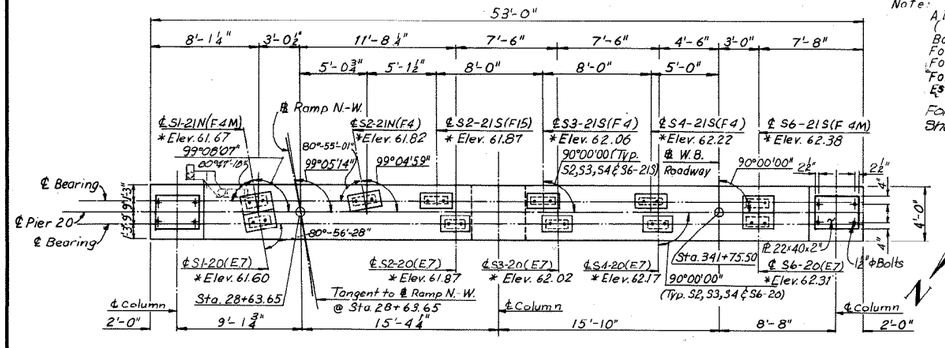
SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 9 OF 29

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	79	265

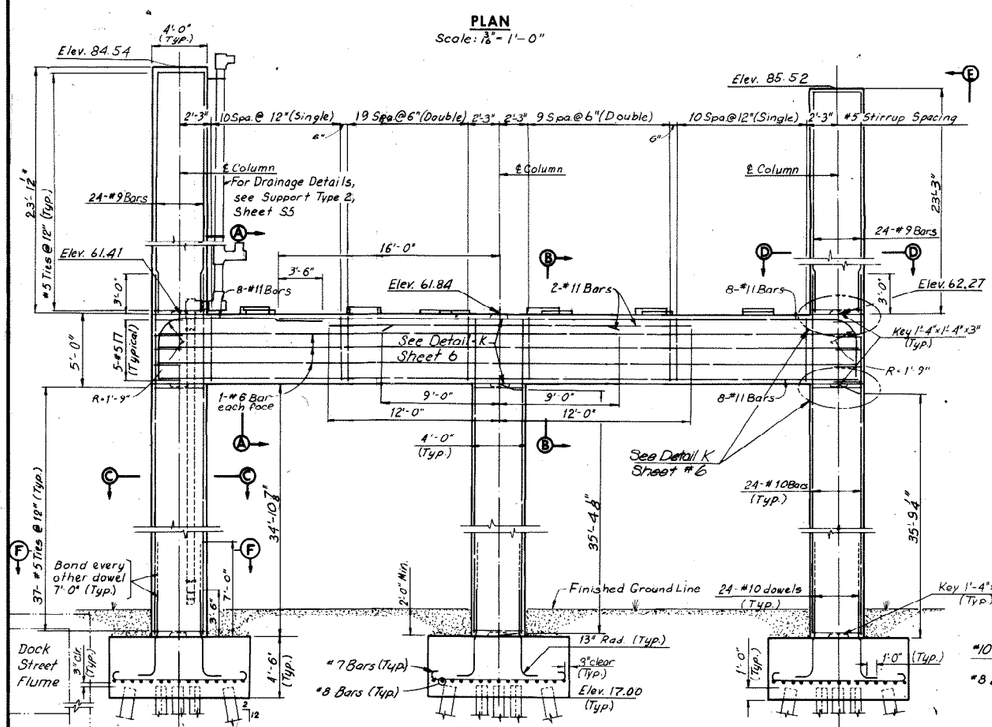
Note:
All piles shall be 10BP42 Steel Piles (Design capacity = 45 tons).
Batter piles 3" or 2" per foot where shown.
For Standard Shoe details, see Sheets S1 & S2.
For Framing Plan see Sheet 14.
For Pile Tip Details, see Sheet 11.
Estimated Pile Tip Elevation -70

For architectural treatment of columns, see Sheet 57

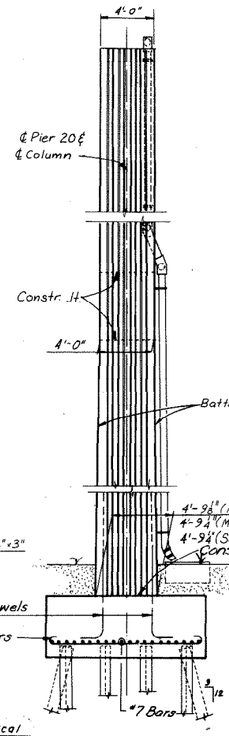
Note:
Elevations denoted with an asterisk (*) are elevations at top of pad and at ℄ Bearing.



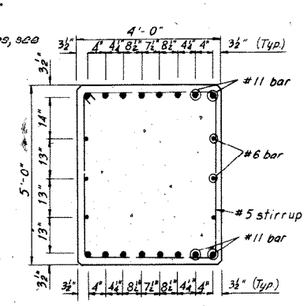
PLAN
Scale: ⅛"-1'-0"



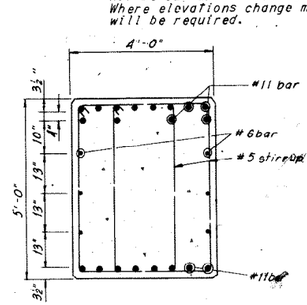
ELEVATION
Scale: ⅜"-1'-0"



VIEW E-E
Scale: 3/16"-1'-0"

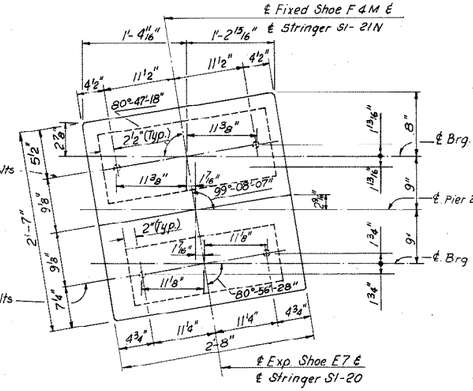


SECTION A-A
Scale: ½"-1'-0"

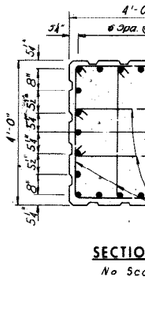


SECTION B-B
Scale: ½"-1'-0"

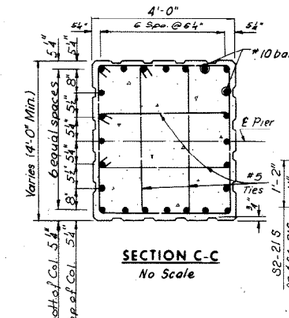
Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft. redesign will be required.



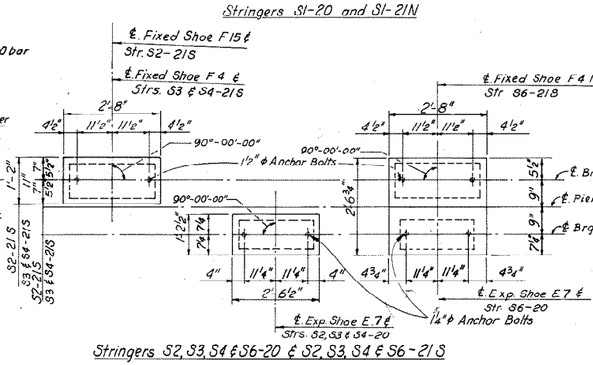
Stringers S1-20 and S1-21N



SECTION D-D
No Scale

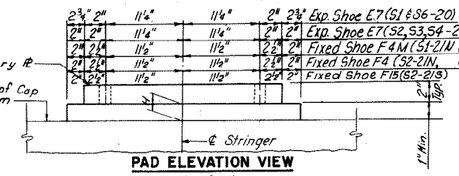


SECTION C-C
No Scale



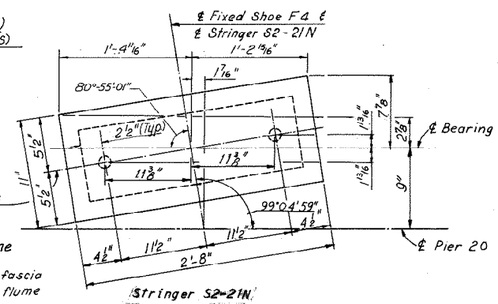
Stringers S2, S3, S4 & S6-20 & S2, S3, S4 & S6-21S

2⅜"	2"	11¼"	11¼"	2"	2⅜"	Exp. Shoe E7 (S1 & S6-20)
2"	2"	11¼"	11¼"	2"	2"	Exp. Shoe E7 (S2, S3, S4-20)
2"	2½"	11½"	11½"	2½"	2"	Fixed Shoe F4M (S1-21N & S6-21S)
2"	2½"	11½"	11½"	2½"	2"	Fixed Shoe F4 (S2-21N, S3, S4-21S)
2"	2½"	11½"	11½"	2½"	2"	Fixed Shoe F15 (S2-21S)



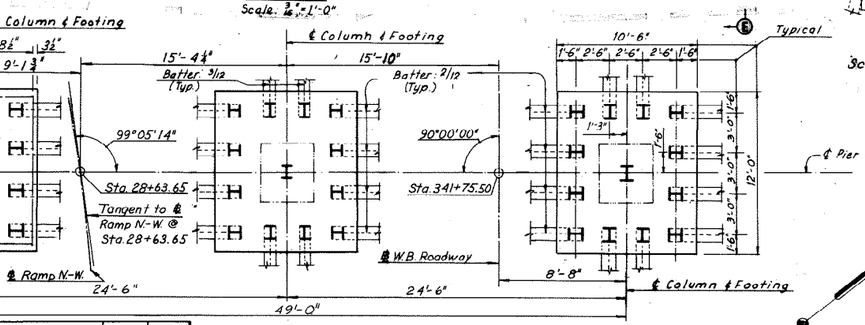
PAD ELEVATION VIEW
No Scale

Note:
Pads with height "H" of 4" or less shall not be reinforced.



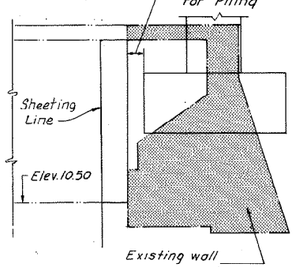
PAD AND ANCHOR BOLT SETTING PLAN
No Scale

Note:
Piles located within 10 ft. (horizontal distance) of Storm Drainage Flume shall be pre-bored to an Elevation 5 ft. below bottom of Flume.

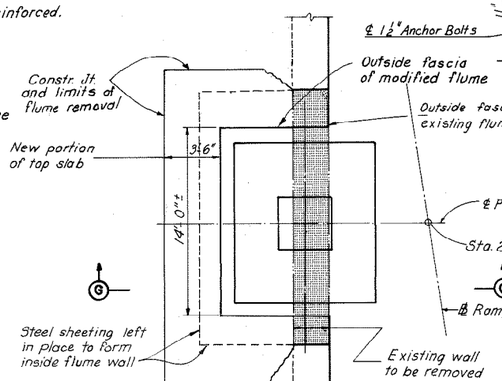


FOOTING PLAN
Scale: 3/16"-1'-0"

Note:
Dimensions given in Footing Plan are measured at bottom of footing.



SECTION G-G
No Scale



SECTION F-F
No Scale

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J. D.	12-3-68	2	Anchor Bolt loc. As Built	REG TEM	11-13-74 10-16
CHECKED	PTA	04-25-69				
IN CHARGE						

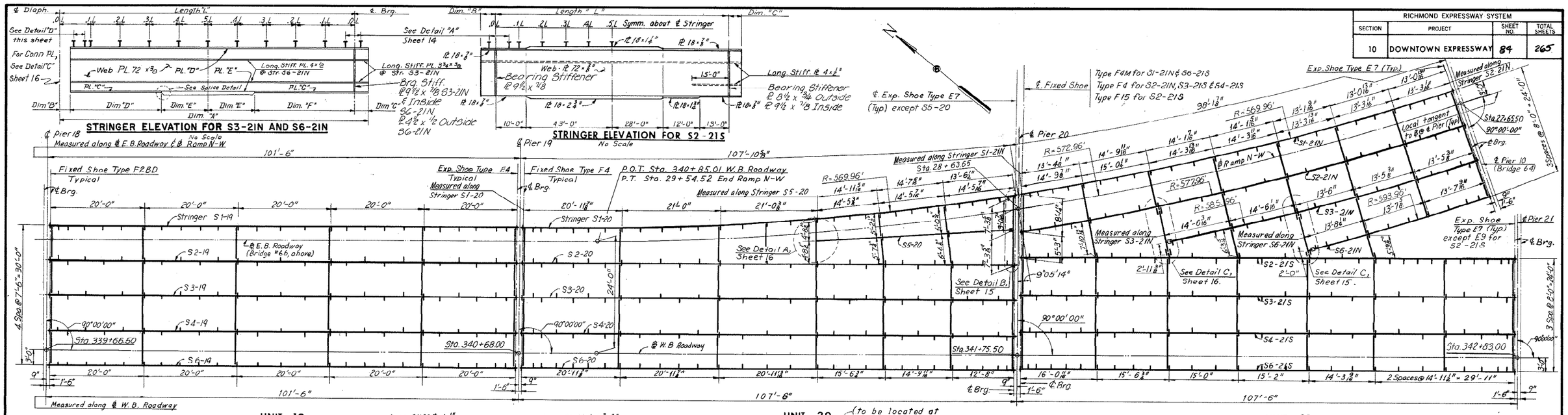
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

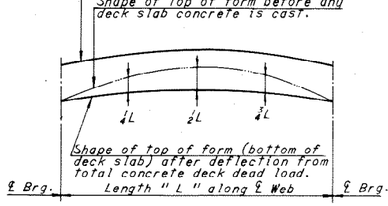
BRIDGE NO. 63
WESTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
PIER 20

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 10 OF 29

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	84	265



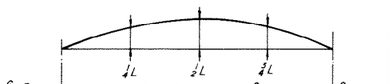


DEAD LOAD DEFLECTION DIAGRAM

NOTE TO CONTRACTOR

Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.

In practice, the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab and the top of stringer without altering the slab thickness.



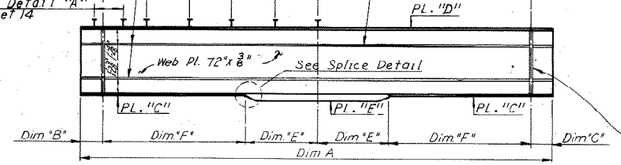
CAMBER DIAGRAM

NOTE TO FABRICATOR

The stringers shall be fabricated with an upward camber amounting to the tabulated value. This will provide approximate compensation conformity with finished grade.

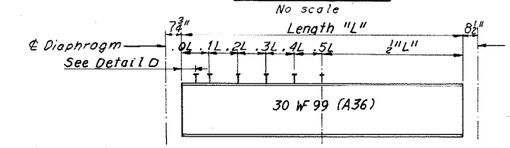
Dimensions are in inches.

(-) Sign in camber denotes downward camber.



STRINGER ELEVATION

No scale

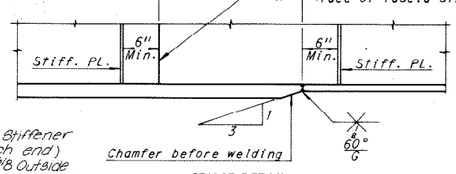


STRINGER ELEVATION FOR S5-20

No Scale

Bearing Stiffener (Typ. each end) PL 7 1/2 x 5/8 Outside S1-19, S6-19, S6-20 & S6-21S
PL 8 1/2 x 3/4 Outside S1-20, S1-21N & Inside S1-20
PL 9 1/2 x 7/8 allothers

Note: For web to flange weld sizes and longitudinal stiffener plate details see Sheet 14



SPLICE DETAIL

No scale

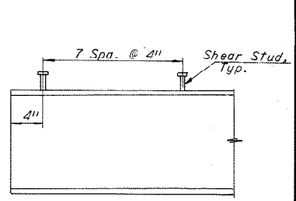
Note: All Steel shall be A36 unless otherwise shown.

Exterior Stringer Longitudinal Stiffeners shall be located on the exterior face of the stringer.

Intermediate stiffener pls. 4"x 3/8" shall be equally spaced between diaphragms as shown. The first two stiffener spaces at the ends of stringers shall be one-half the normal spacing within the panel.

SHOE SCHEDULE

EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E4	5	F2BD	5
		F4	8
E7	12	F4M	2
E9	1	F15	1



DETAIL D

No Scale

Note: It may be necessary to increase Bearing Stiffener size to accommodate erection of end diaphragms.

STRINGER SCHEDULE

UNIT	STRINGER	Dim. "A"	LENGTH "L"	Dim. "B"	Dim. "C"	Dim. "D"	Dim. "E"	Dim. "F"	PL. "C"	PL. "D"	PL. "E"	MAX. SHEAR STUD SPACING 0.0L-0.1L*	0.1L-0.2L	0.2L-0.3L	0.3L-0.4L	0.4L-0.5L
19	S1-19	101'-4"	100'-0"	8"	8"	--	25'-0"	25'-0"	15x7/8"	15x3/4"	15x1 1/4"	14 1/2"	17"	20"	24"	24"
	S2-19	101'-2"	100'-0"	7"	7"	--	24'-0"	26'-0"	15x7/8"	15x3/4"	15x1 1/4"	16"	18"	21"	24"	24"
	S3-19	101'-2"	100'-0"	7"	7"	--	24'-0"	26'-0"	15x7/8"	15x3/4"	15x1 1/4"	16"	18"	21"	24"	24"
	S4-19	101'-2"	100'-0"	7"	7"	--	24'-0"	26'-0"	15x7/8"	15x3/4"	15x1 1/4"	16"	18"	21"	24"	24"
	S6-19	101'-4"	100'-0"	8"	8"	--	25'-0"	25'-0"	15x7/8"	15x3/4"	15x1 1/4"	14 1/2"	17"	20"	24"	24"
20	S1-20	107'-8 3/8"	106'-4 1/2"	8"	8 1/8"	--	34'-0"	19-2 1/4"	18x9/16"	18x3/4"	18x1 7/8"	12"	13 1/2"	17 1/8"	21 1/4"	24"
	S2-20	107'-2"	106'-0"	7"	7"	--	29'-6"	23'-6"	15x9/16"	15x3/4"	15x1 3/8"	15 1/2"	18"	21"	24"	24"
	S3-20	107'-2"	106'-0"	7"	7"	--	29'-6"	23'-6"	15x9/16"	15x3/4"	15x1 3/8"	15 1/2"	18"	21"	24"	24"
	S4-20	107'-2"	106'-0"	7"	7"	--	29'-6"	23'-6"	15x9/16"	15x3/4"	15x1 3/8"	15 1/2"	18"	21"	24"	24"
	S5-20	--	41'-9 1/4"	--	--	--	--	--	Stringer Size 30WF99			9"	10"	11"	13"	15"
	S6-20	107'-4"	106'-0"	8"	8"	--	28'-0"	25'-0"	15x1"	15x3/4"	15x1 1/2"	14 1/2"	17"	20"	24"	24"
21	S1-21N	96'-11 7/16"	95'-7 3/8"	8 1/8"	8"	--	33'-0"	14'-9 7/16"	18x7/8"	18x3/4"	18x1 1/4"	15"	17"	22"	24"	24"
	S2-21N	99'-5 11/16"	98'-3 5/8"	7 1/8"	7"	--	34'-0"	15'-1 13/16"	18x7/8"	18x3/4"	18x1 3/8"	12 1/2"	14"	17 1/2"	24"	24"
	S3-21N	69'-4 1/4"	69'-5"	7 3/4"	7"	10'-0 3/4"	24'-0"	10'-8 1/2"	12x5/8"	12x5/8"	12x1 3/8"	11"	12"	15"	17"	20 1/2"
	S6-21N	40'-11 15/16"	40'-11 7/16"	7 3/4"	8"	19'-10"	--	20'-5 11/16"	10x5/8"	10x5/8"	--	16"	18 1/2"	21"	24"	24"
	S2-21S	107'-4"	106'-0"	8"	8"	--	See Stringer Elevation for S2-21S				--	8"	8 1/2"	11"	16"	18"
	S3-21S	107'-2"	106'-0"	7"	7"	--	28'-6"	24'-6"	15x1"	15x3/4"	15x1 1/2"	15 1/2"	17"	20"	22 1/2"	24"
	S4-21S	107'-2"	106'-0"	7"	7"	--	28'-6"	24'-6"	15x1"	15x3/4"	15x1 1/2"	15 1/2"	17"	20"	22 1/2"	24"
	S6-21S	107'-4"	106'-0"	8"	8"	--	28'-6"	24'-6"	15x1"	15x3/4"	15x1 1/2"	14 1/2"	16 1/2"	19 1/2"	24"	24"

* Spacing begins at termination of 6 spaces @ 4".

DEAD LOAD DEFLECTION SCHEDULE

¼L	½L	¾L
1"	1 3/16"	1"
1"	1 3/16"	1"
1"	1 3/16"	1"
1"	1 3/16"	1"
1"	1 3/16"	1"
1 1/16"	1 7/16"	1 1/16"
1 3/16"	1 5/16"	1 3/16"
1 3/16"	1 5/16"	1 3/16"
1 3/16"	1 5/16"	1 3/16"
1 3/16"	1 5/16"	1 3/16"
1/4"	3/8"	1/4"
1 1/16"	1 5/16"	1 1/16"
1/16"	3/16"	1/16"
3/16"	1/16"	3/16"
3/16"	1/16"	3/16"
1/16"	1/16"	1/16"
1"	1 1/16"	1"

CAMBER SCHEDULE

¼L	½L	¾L
1 1/4"	1 3/16"	1 1/4"
1 1/4"	1 3/16"	1 1/4"
1 1/4"	1 3/16"	1 1/4"
1 1/4"	1 3/16"	1 1/4"
1 1/4"	1 3/16"	1 1/4"
1 1/16"	1 1/16"	1 1/16"
1 3/16"	1 5/16"	1 3/16"
1 3/16"	1 5/16"	1 3/16"
1 3/16"	1 5/16"	1 3/16"
1 3/16"	1 5/16"	1 3/16"
1 1/2"	2 5/16"	1 1/2"
1 5/16"	1 5/16"	1 5/16"
1 5/16"	1 5/16"	1 5/16"
1 5/16"	1 5/16"	1 5/16"
1 5/16"	1 5/16"	1 5/16"
1 5/16"	1 5/16"	1 5/16"
1 5/16"	1 5/16"	1 5/16"

Notes:
For Shoe details, see Sheets S1 & S2
For Diaphragm details, see Sheet 20.
For Superstructure steel quantities, see Sheet 2.
For additional framing details, see Sheet 16.
For Joint details, see Sheet 24.
For Shear Stud detail see Sheet 14.

AS BUILT

BY	DATE	NO.	REVISION	BY	DATE
MADE GSH	07-31-68	2	As Built	TEM	10-76
CHECKED PTA	10-23-68				
IN CHARGE					

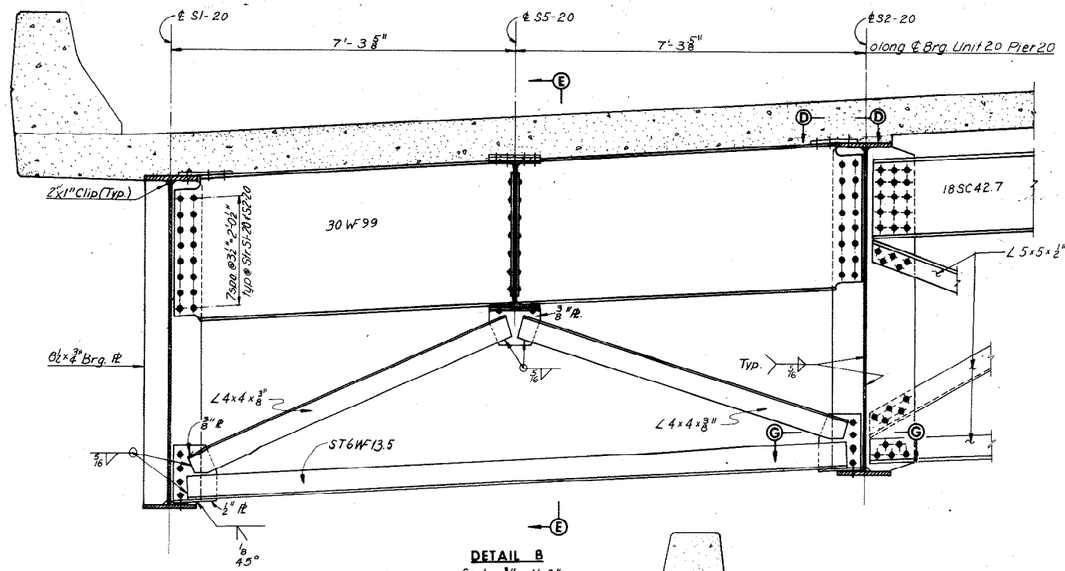
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 63
WESTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.
FRAMING PLAN—UNITS 19,20 AND 21

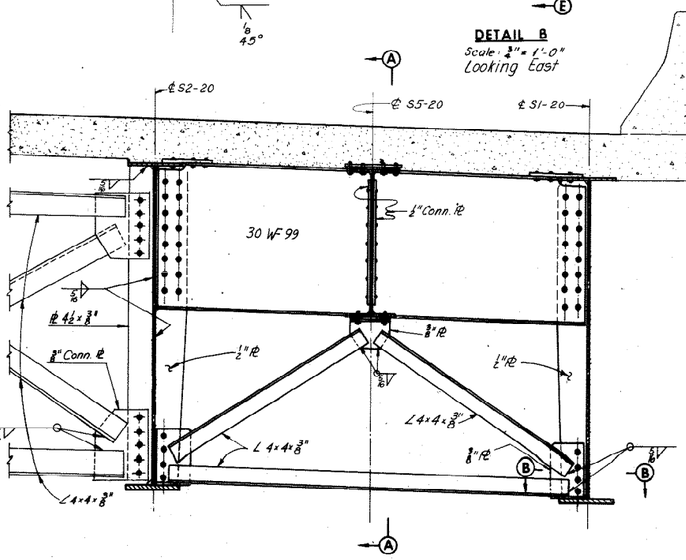
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 15 OF 29

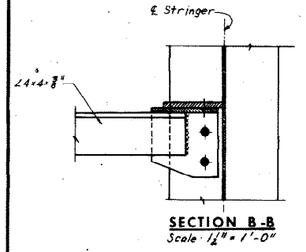
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	85	265



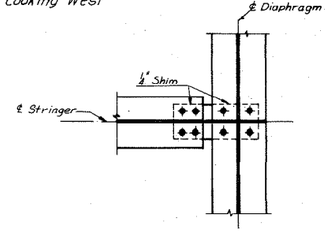
DETAIL B
Scale: 3/4" = 1'-0"
Looking East



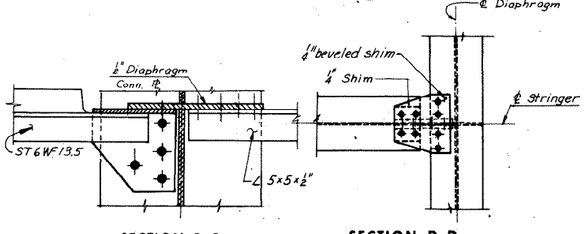
DETAIL A
Scale: 3/4" = 1'-0"
Looking West



SECTION B-B
Scale: 1 1/2" = 1'-0"



SECTION C-C
Scale: 3/4" = 1'-0"

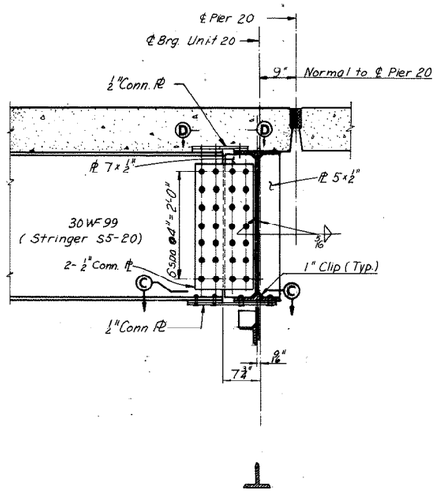


SECTION G-G
Scale: 1 1/2" = 1'-0"

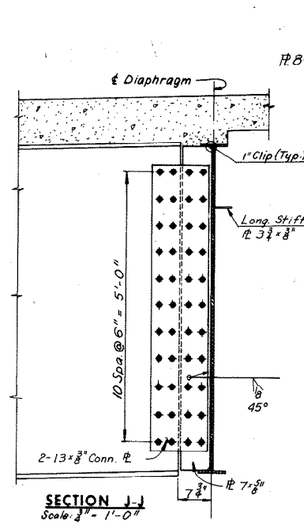
SECTION D-D
Scale: 3/4" = 1'-0"

Section H-H similar

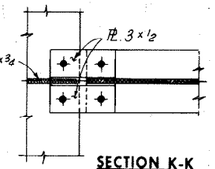
	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.D.	12-18-68				
CHECKED	PTA	1-29-69	1	As Built	TEM	10-76
IN CHARGE						



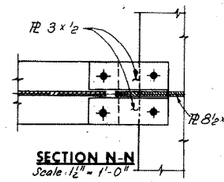
SECTION E-E
Scale: 3/4" = 1'-0"

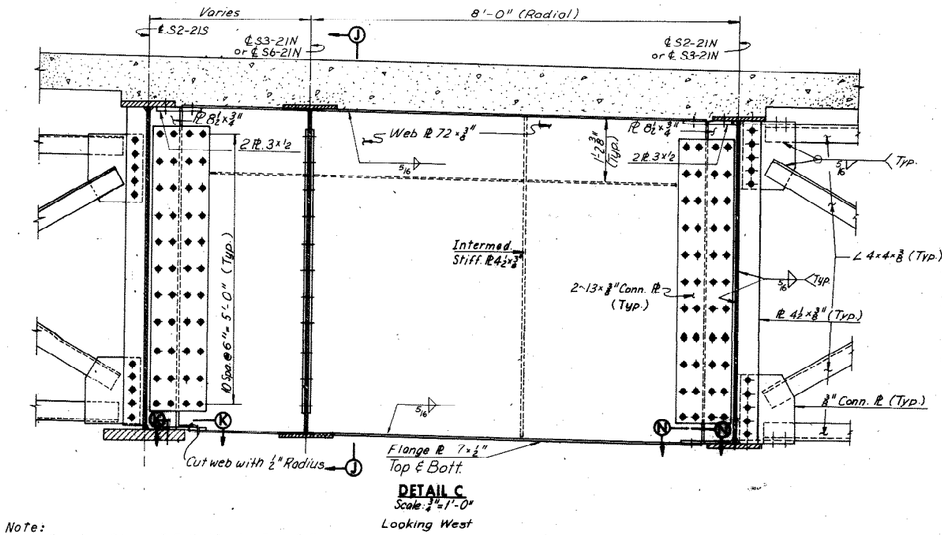


SECTION J-J
Scale: 3/8" = 1'-0"



Note: Section N-N Shown for S3-21N.
See Section K-K details for S2-21N.





DETAIL C
Scale: 3/4" = 1'-0"
Looking West

Note:
For location of Details A, B and C, see Framing Plan Units 20 and 21, Sheet 15.
All steel shall be A36 unless otherwise shown.

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 63
WESTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
FRAMING DETAILS
UNITS 20 AND 21

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 16 OF 29

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	89	265

Notes:
For End Diaphragms at Pier 18, Unit 19, see Section A-A, Sheet 19.
For End Diaphragms at Pier 19, Units 19 & 20, see Section A-A, Sheet 19.
For End Diaphragms at Pier 20, Units 20 & 21, see Section A-A, Sheet 19. and for Detail "D" see Sheet 16.
For End Diaphragms at Pier 10, Unit 21N and Pier 21, Unit 21S, see Section C-C this Sheet.

Note:
Transverse dotted lines in Units 20 and 21 represent interior diaphragm at left end of stringers S5-20, S3-21N and S6-21N.
For location of diaphragms see Sheet 14.

Handrail Post spacing
Parapet Joint spacing
Along inside face of Parapet

℄ Pier 18 & 2⅝" Type A Jt.
12" Open Jt.
101'-4½"
21'-8¼"
3 Spaces @ 22'-6" = 67'-6"
13 Spaces @ 7'-6" = 97'-6"
1'-11¼"
12'-2¼"
3"ϕ Steel Conduit
2'-6" ℄ Scupper @ Sta. 339+69.00
Stagger splices in alternate bars. (Typ.)
1'-3" Min. (Typ.)
28" Lt. (Typ.)
#4 Bars Top & Bott. Typ. For Spacing See Section A-A, Sheet 19.
#5 Bars @ 6" Top & Bottom
31'-0"
90°00'00" Sta 339+66.50 along ℄ W.B. Roadway
Sta 340+68.00 along ℄ W.B. Roadway
40'-0"
12"
1'-11¼"
21'-8¼"
13 Spaces @ 7'-6" = 97'-6"
3 Spaces @ 22'-6" = 67'-6"
12'-2¼"
101'-4½"
UNIT 19

℄ Pier 19 & 2⅝" Type A Jt.
12" Open Jt. (Typ.)
P.T. Sta 29+54.52 End ℄ Ramp N-W.
107'-9⅝"
3 Spaces @ 24'-0" = 72'-0"
13 Spaces @ 8'-0" = 104'-0"
3"ϕ Steel Conduit
21'-10½"
1'-10½"
1'-11¼"
9"ϕ #4 Bars @ 9½" (Top) 13"ϕ #4 Bars @ 6" (Bott)
15"ϕ #6 Bars @ 9½" (Top)
Sta 28+63.65 ℄ Ramp N-W.
13"ϕ #4 Bars @ 9½" (Top) 18"ϕ #4 Bars @ 6" (Bott)
10'-0" 10'-0"
#5 Bars @ 6" Top & Bottom
24'-0"
90°00'00"
Inside face parapet
2'-2¾"
P.O.T. Sta 340+85.01 ℄ W.B. Roadway
22'-0¼"
℄ W.B. Roadway
13 Spaces @ 7'-11" = 102'-11"
3 Spaces @ 23'-9" = 71'-3"
107'-4⅛"
14'-1¼"
UNIT 20

12" Open Jt.
℄ Pier 20 & 2⅝" Type A Jt.
13'-10⅜"
1'-10⅜"
13'-9¼"
2'-3¼"
96'-6½"
3 Spaces @ 23'-0" = 69'-0"
12 Spaces @ 7'-8" = 92'-0"
3"ϕ Steel Conduit
inside face of parapet
℄ Scupper @ Sta. 28+60.50
17-"4 Bars @ 9½" (Top) 23-"4 Bars, Spacing see Section C-C (Bott.)
16"ϕ #4 Bars @ 9½" (Top) 13"ϕ #4 Bars @ 5½" (Bott.)
28"
13-"4 Bars @ 9½" top & 16-"4 bars @ 5½" bott
10'-0" 10'-0"
2'-0" (Typ.)
#4 bars top and bottom as shown in Section C-C
For details of reinforcing in dotted area see Sheet 22.
147-"5 Bars @ 5" Top & Bott.
90°00'00" Sta 341+75.50 along ℄ W.B. Roadway.
2'-2¾"
22'-0¼"
13 Spaces @ 7'-11" = 102'-11"
3 Spaces @ 23'-9" = 71'-3"
107'-4⅛"
14'-1¼"
UNIT 21

Radius = 572.96'
℄ Junction Box
℄ Light Std. @ Sta 27+92.97
12" Open Jt.
℄ Pier 10 (Bridge 4.4) & 2⅝" Type A Jt.
2'-3¼"
21'-9¼"
5'-3"
℄ Ramp N-W
Sta 27+65.50 along ℄ Ramp N-W
℄ Junction Box 90°00'00"
61-"5 Bars @ 6" (Top & Bott.) (measured along South ℄ 3"ϕ Steel Conduit
3"ϕ Steel Conduit Gutter Line
2'-0"
24-"5 bars fanned top/bott @ 6" along South ℄
20-"6 bars @ 9½" top
10'-0" 10'-0"
℄ Pier 21 & 2⅝" Type A Jt.
12" Open Jt. (Typ.)
Gutter Line
3"ϕ steel Conduit
6" 37-"5 Bars @ 6" Top & Bott.
6" 55-"5 Bars @ 6" Top & Bott.
25'-0"
90°00'00"
Sta. 342+83.00 along ℄ W.B. Roadway

Sta. 27+87.10 ℄ Ramp N-W
Parapet Joint
Handrail Post
Concrete End Block
Handrail Post
Parapet Joint
measured along inside face of parapet
2'-0⅛" 3 Spa. @ 7'-3"=21'-9" 2'-0⅛"
12'-10⅝" 12'-10⅝"
25'-7¼"
12" open Jt.
Sta 342+57.17 ℄ W.B. Roadway

DECK PLAN
Scale 1"=10'-0"

Notes:
For Superstructure quantities, see Sheet 2.
For Framing plan, see Sheet 15
For Joint details, see Sheet 24
For Railing details, see Sheet 53.
For Standard Drainage Details, see Support Type 2 for Units 19 and 21, Sheet S5 & S6.

Note:
Intermediate Diaphragms shown in Section C-C can only be used where stringers are straight. For Intermediate Diaphragm Details for curved stringers, see Sheet 19.

CURB AND PARAPET DETAIL
No Scale

1'-2" 1'-0" 3'-6" Varies Varies
2"
℄ Ramp N-W
10¼" Typ. Varies
10⅝" Typ. to Top of Web
9" 9" 1'-6"
3"
L4x4x⅜"
L5x5x½"
Typ. ⅝"
3" Filler Pl.
3" Conn. ℄ (Typ.)
ST5WF10.5
For detail of long. stiffener, see Framing Plan, Sheet 15.
9" 9" 9" Max. 5½" Min. 2" Clr. 9" Typ. Bottom Long. Bar Spacing
2" 2'-6" Varies Varies 3 Spaces @ 1'-6" = 22'-6" See SECTION A-A, Sheet 19.
Intermediate Diaphragms

SECTION B-B
Scale: ⅜" = 1'-0"

1'-0" 1'-2" 1'-0" 25'-0" 1'-0"
3'-6" ℄ Ramp N-W ℄ Profile Grade Line
℄ W.B. Roadway Profile Grade Line 3'-6"
2" 10" 2"
Aluminum Railing, (Typ.) Details see Sheet 53
¾" Chamfer (Typ.)
2" Clr.
#4@12"
Rustication 1½"x¾" (Typ.)
#4
#5
Drip Bend 1½"x⅜" (Typ.)
Elev. F
Elev. F*
Elev. D
Elev. C*
Elev. A
Elev. B
Tup. Bottom Long. Bar Spacing 9½" 11" 10 Spa. @ 5½" 11" 9½"
10⅝" Typ. to Top of Web
#4@12" Spcs
#4 @ 9½"
1½" Clr.
1" Clr.
8" Uniform Slab
#4 Bars. Typ. Spacing as shown Varies
#5 @ 6" Top & Bottom
Construction Joint Horizontal (Typ.)
Shear Studs
R=9"
2'-1"
2'-2"
6" Typ.
6" 9" 1'-6"
3" 3" 3"
18"C42.7
3" (Typ.)
2"x1" Clip (Typ.)
Bearing Stiffener see Sheet 14
3"Filler ℄ (Typ.)
L4x4x⅜" (Typ.)
L5x5x½"
#4½ x⅜" (Typ.)
⅝" (Typ.)
1½"
4 Spa. @ 3" (Typ.)
6" Min. (Typ.)
3" Conn. ℄ (Typ.)
1" (Typ.)
5/16 Typ.
For detail of long. stiffener See Framing Plan, Sheet 15
Typ. Intermediate Diaphragms Typ. End Diaphragm
3 Spaces @ 8'-0" = 24'-0"
2'-6" 2"

SECTION C-C
Scale: ⅜" = 1'-0"

Note: Elev. C* are elevations along south gutterline of Ramp N-W from ℄ Pier 10 (64) to Sta 27+87.10 @ ctr. of Nose.
Elev. F* are elevations along north gutterline of W.B. Roadway between Sta. 342+57.17 @ ctr. of Nose and Sta. 342+83.00 @ ℄ Pier 21.

	BY	DATE				
MADE	GSH	7-29-68				
CHECKED	KCT	10-18-68	1	As Built	TEM	10-76
IN CHARGE			NO.	REVISION	BY	DATE

ELEVATION TABLE

STATION ℄ W. B.	ELEV. A	ELEV. B	ELEV. F*	ELEV. D	ELEV. E
339+66.50	67.46	67.39	—	66.91	66.84
+70.00	67.49	67.42	—	66.94	66.87
+80.00	67.61	67.54	—	67.06	66.99
+90.00	67.72	67.65	—	67.17	67.10
340+00.00	67.83	67.76	—	67.28	67.21
+10.00	67.94	67.87	—	67.39	67.32
+20.00	68.05	67.98	—	67.50	67.43
+30.00	68.17	68.10	—	67.62	67.55
+40.00	68.28	68.21	—	67.73	67.66
+50.00	68.39	68.32	—	67.84	67.77
+60.00	68.50	68.43	—	67.95	67.88
+68.00	68.59	68.52	—	68.04	67.97
+70.00	68.61	68.54	—	68.06	67.99
+80.00	68.73	68.66	—	68.18	68.11
+85.01	68.78	68.71	—	68.23	68.16
+90.00	68.84	68.77	—	—	—
341+00.00	68.95	68.88	—	—	—
+10.00	69.06	68.99	—	—	—
+20.00	69.18	69.11	—	—	—
+30.00	69.29	69.22	—	—	—
+40.00	69.40	69.33	—	—	—
+50.00	69.51	69.44	—	—	—
+60.00	69.62	69.55	—	—	—
+70.00	69.73	69.66	—	—	—
+75.50	69.80	69.73	—		
+80.00	69.85	69.78	—		
+90.00	69.96	69.89	—		
342+00.00	70.07	70.00	—		
+10.00	70.18	70.11	—		
+20.00	70.29	70.22	—		
+30.00	70.41	70.34	—		
+40.00	70.52	70.45	—		
+50.00	70.63	70.56	—		
+57.17	70.71	70.64	70.21		
+60.00	70.74	70.67	70.24		
+70.00	70.85	70.78	70.35		
+80.00	70.97	70.90	70.47		
342+83.00	71.00	70.93	70.50		

ELEVATION TABLE

STATION ℄ Ramp N-W.	ELEV. D	ELEV. E	ELEV. C
29+54.52	68.23	—	—
+50.00	68.28	68.21	—
+40.00	68.39	68.32	—
+30.00	68.50	68.43	—
+20.00	68.60	68.53	—
+10.00	68.70	68.63	—
29+00.00	68.80	68.73	—
28+90.00	68.89	68.82	—
+80.00	68.98	68.91	—
+70.00	69.07	69.00	—
+63.65	69.12	—	—
+63.17	—	69.05	—
+60.00	69.15	69.08	—
+50.00	69.23	69.16	—
+40.00	69.30	69.23	—
+30.00	69.37	69.30	—
+20.00	69.44	69.37	—
+10.00	69.51	69.44	—
28+00.00	69.57	69.50	—
27+90.00	69.64	69.56	—
27+87.10	69.67	69.58	70.21
+80.00	69.74	69.64	70.34
+70.00	69.87	69.76	70.56
27+65.50	69.94	69.82	70.66

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

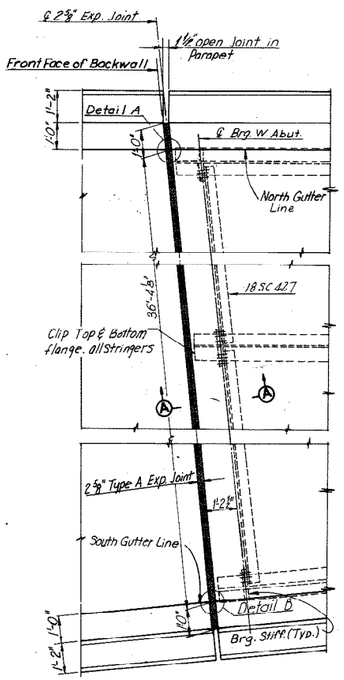
BRIDGE NO. 63
WESTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.

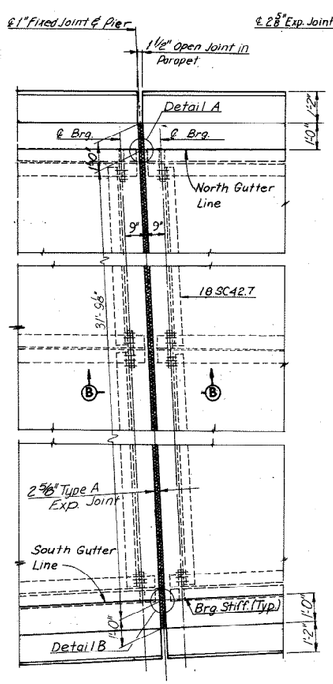
DECK PLAN — UNITS 19, 20 AND 21

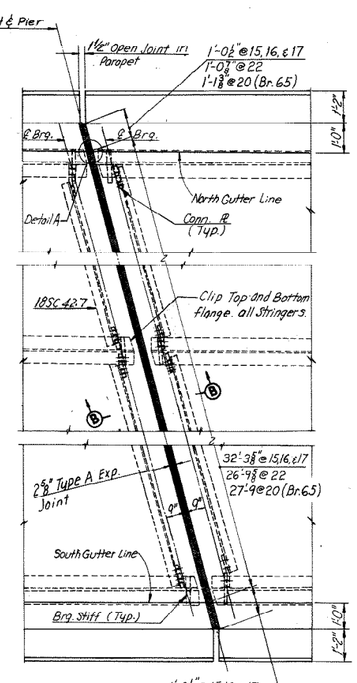
HOWARD, NEEOLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

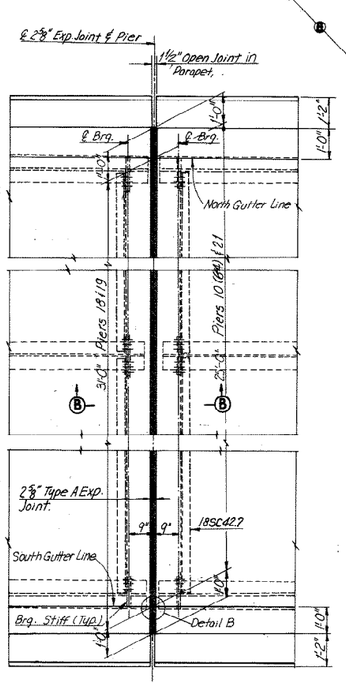
SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 20 OF 29

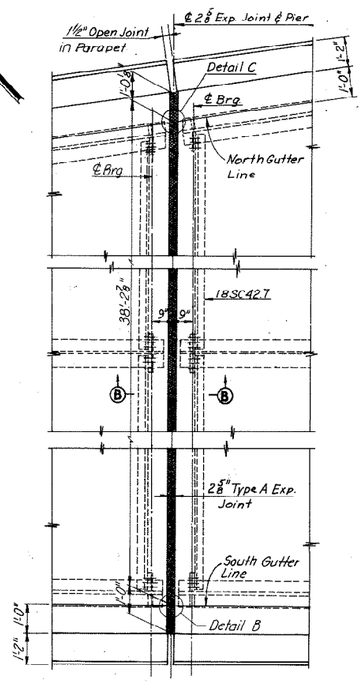
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	93	265

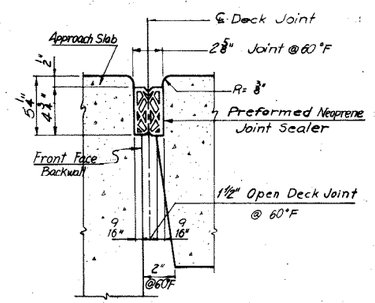












2⅝" TYPE "A" JOINT @ WEST ABUTMENT

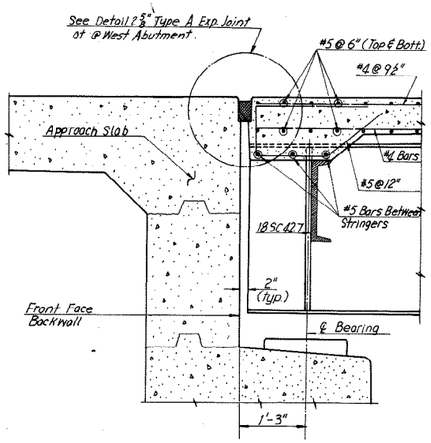
PLAN — JOINT AT WEST ABUTMENT
Scale : ⅜" = 1'-0"

PLAN — JOINT AT PIER 14
Scale : ⅜" = 1'-0"

PLAN — JOINT AT PIERS 15, 16, 17, 22 AND 20 (BR. 65)

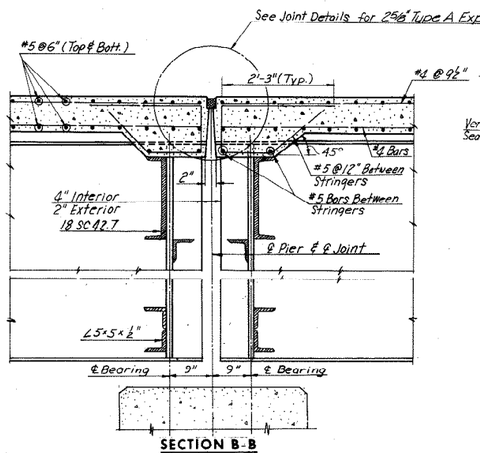
PLAN — JOINT AT PIERS 18, 19, 21 AND 10 (BR. 64)
Scale : ⅜" = 1'-0"

PLAN — JOINT AT PIER 20
Scale: ⅜" = 1'-0"



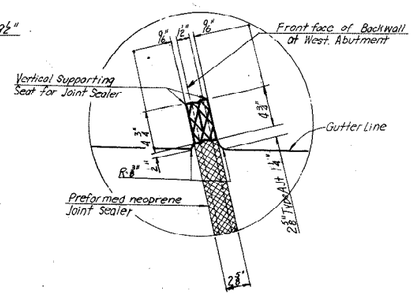
SECTION A-A
Scale : ¾" = 1'-0"

Note:
All horizontal dimensions of Sections shown above are normal to ℄ joint.

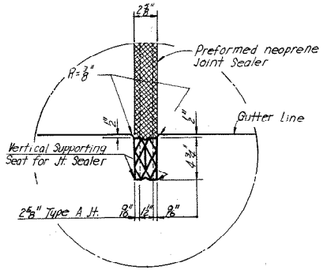


SECTION B-B
Scale: ¾" = 1'-0"

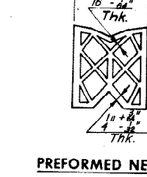
Note:
It is absolutely essential that the openings for the preformed neoprene joint sealers be accurately formed and constructed to smooth, straight lines. The size of opening shall be adjusted to allow for anticipated dead load rotation of the ends of the slab and for the temperature at the time of construction.



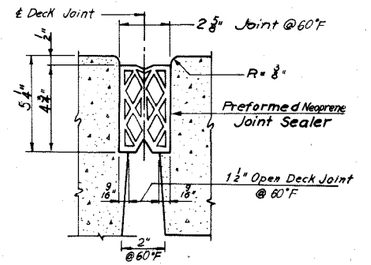
DETAIL A
No Scale
Typical for W. Abutment and Piers 14, 15, 16, 17 22, and 20 (Br. 65)



DETAIL B
No Scale
Typical for W. Abutment and Piers 14, 18, 19, 20, 21 and 10 (bridge 64).

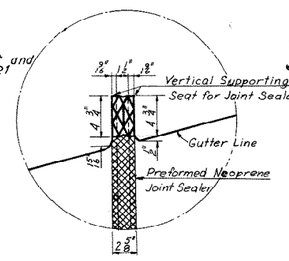


PREFORMED NEOPRENE JOINT SEALER FOR 2⅝" TYPE "A" JOINT

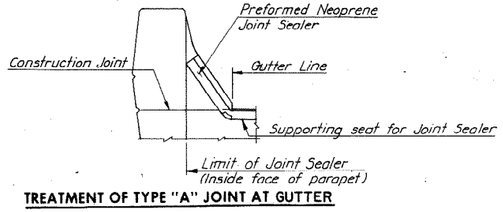


2⅝" TYPE "A" JOINT EXPANSION JOINTS
No Scale

Note:
All horizontal dimensions shown above are normal to ℄ Joint.



DETAIL C
No Scale
Typical for Pier 20.



TREATMENT OF TYPE "A" JOINT AT GUTTER
No Scale

	BY	DATE				
MADE	GSH	10-1-68				
CHECKED	J.D.	11-1968	1	As Built	TEM	10-76
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 63
WESTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.
JOINT DETAILS

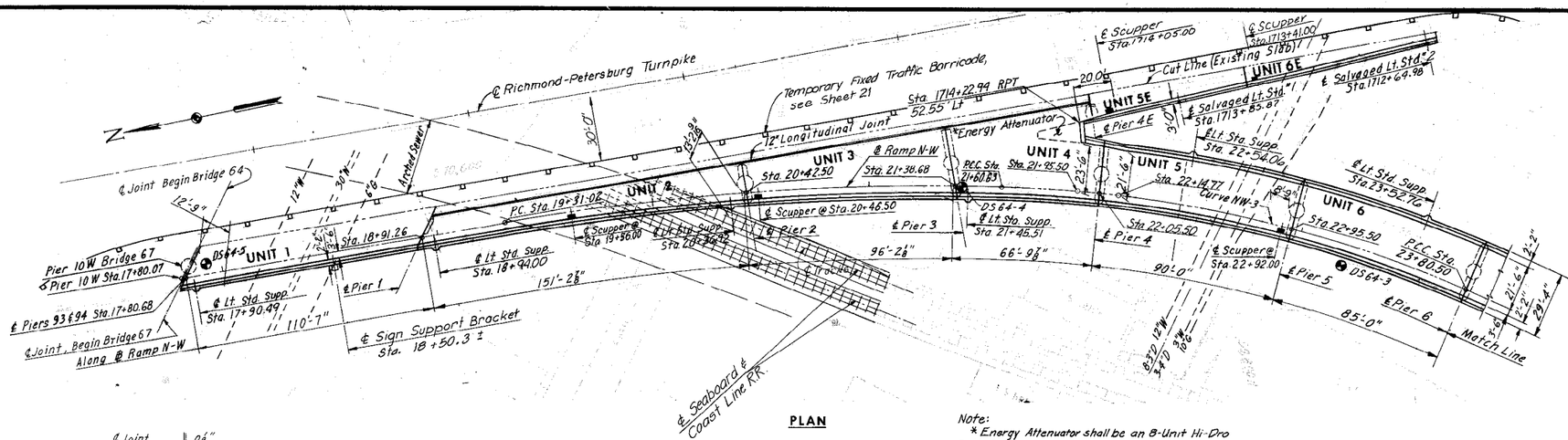
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 24 OF 29

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	99	265

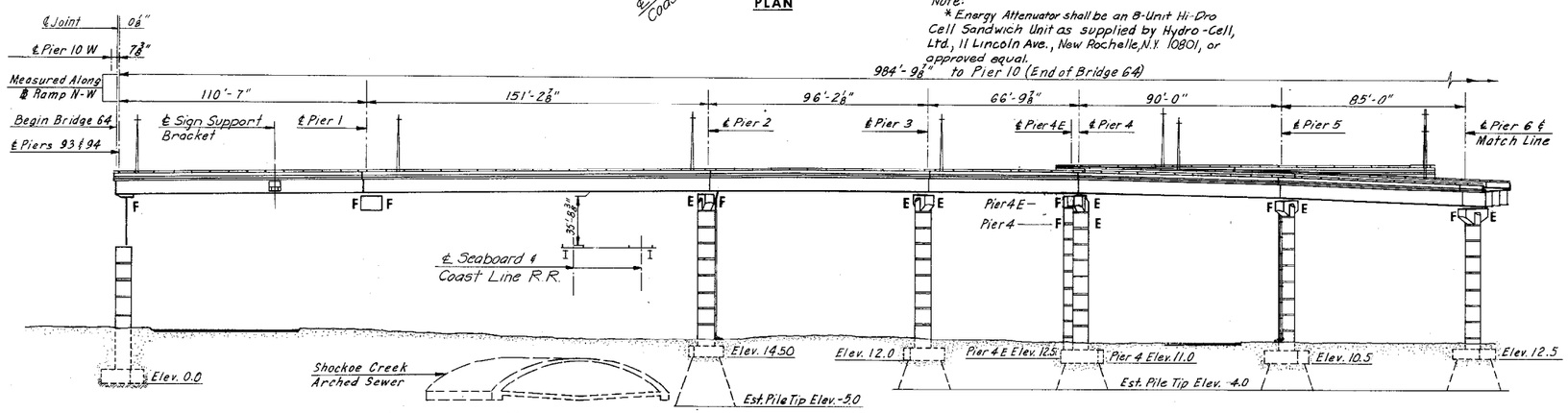
INDEX

Note:
For General Notes, see Sheet 2.
For Quantity Table, see Sheet 2.

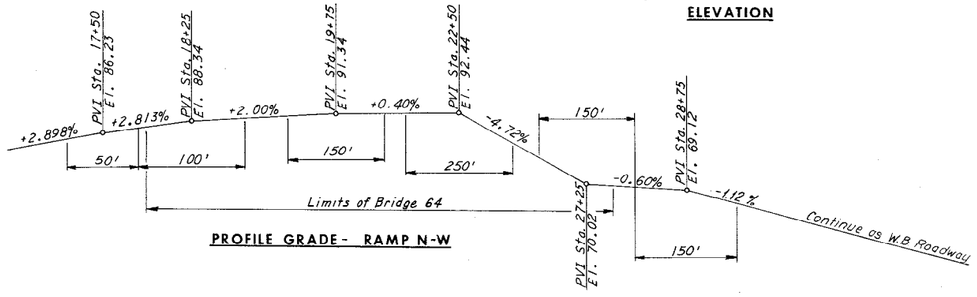


PLAN

Note:
* Energy Attenuator shall be an 8-Unit Hi-Dro Cell Sandwich Unit as supplied by Hydro-Cell, Ltd., 11 Lincoln Ave., New Rochelle, N.Y. 10801, or approved equal.



ELEVATION



PROFILE GRADE - RAMP N-W

HORIZONTAL CURVE DATA

℄ R. P. Turnpike

Curve: R.P.T.-1
P.I. = Sta. 1704+68.83
Δ = 15° 03' 56.2"
D = 1° 00' 00"
T = 757.65'
L = 1,506.56'
R = 5,729.58

Curve: R.P.T.-2
P.I. = Sta. 1723+07.01
Δ = 33° 27' 06.8"
D = 4° 00' 00"
T = 430.45'
L = 836.30'
R = 1,432.39'

℄ Ramp N-W

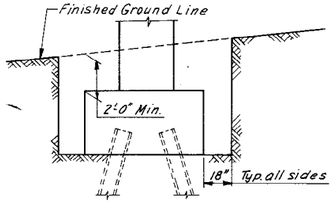
Curve: NW-1
P.I. = Sta. 13+42.50
Δ = 32° 01' 34"
D = 3° 57' 35.6"
T = 426.01'
L = 829.72'
R = 1,484.39

Curve: NW-2
P.I. = Sta. 20+46.21
Δ = 11° 28' 49.9"
D = 5° 00'
T = 115.19'
L = 229.61'
R = 1,145.92'

Curve: NW-3
P.I. = Sta. 22+71.93
Δ = 21° 59' 14.9"
D = 10° 00' 00"
T = 111.31'
L = 219.88'
R = 572.96'

Curve: NW-4
P.I. = 25+55.02
Δ = 64° 48' 04"
D = 20° 50' 05.4"
T = 174.52'
L = 311.02'
R = 275.00'

Curve: NW-5
P.I. = Sta. 28+25.38
Δ = 26° 18' 00"
D = 10° 00' 00"
T = 133.86'
L = 263.00'
R = 572.96'



LIMITS OF STRUCTURE EXCAVATION
No Scale

	BY	DATE
MADE	AMH	1-6-69
CHECKED	GCC	4-26-69
IN CHARGE		

4 As Built TEM 6-77

NO.	REVISION	BY	DATE
1	℄ Seaboard ℄ Coast Line Add To Plant El.	K.D.P.	6-74
2	Sign Support Bracket ℄ Sheet 12a added	L.B.P.	8-74
3	Added Sta.	KEG	1-13-76

AS BUILT

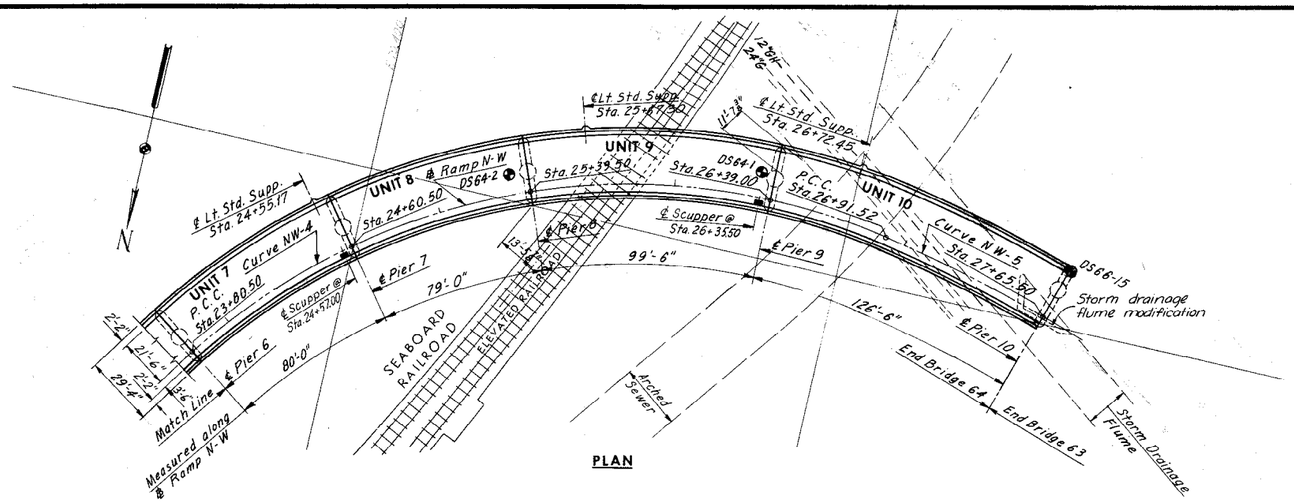
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

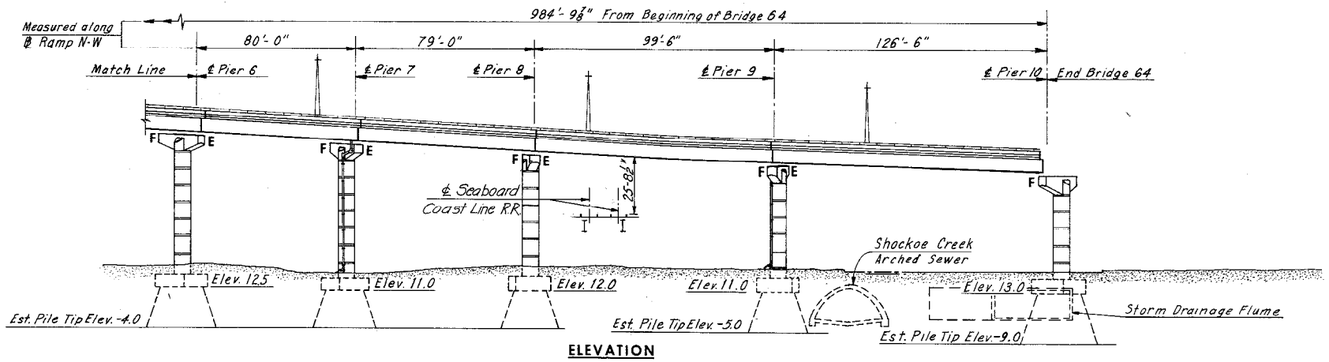
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1" = 30'-0"
CONTRACT NO.: 10
SHEET NO. 1 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	100	265



PLAN



ELEVATION

ESTIMATED QUANTITIES

	Structure Excavation Cu. Yds.	Concrete (‡) Cu. Yds.	Reinforcing Steel Lbs.	Str. Steel Mild Carbon Lbs.	Str. Steel High Strength Lbs.	Aluminum Railing (1-Rail) Lin. Ft.	Steel Piles 10BP42 Lin. Ft.
Superstructure	--	1,023.8	213,790	768,100	413,900	1,600	---
Substructure	1,125	1,484.1	236,580	2,000	---	---	145
Total	1,125	2,507.9	450,370	770,100	413,900	1,600	145

	Steel Piles 12BP53 Lin. Ft.	Sheet Piling Lump Sum	Metal Conduit Lin. Ft.	Energy Attenuator 8-Unit Each	Bridge Drainage Metal Work Lbs.	Modifications to R.P. Turnpike Bridge Lump Sum	Modifications to Storm Drainage Flume Cu. Yds.
Superstructure	---	--	1,075	1	13,030	1	--
Substructure	3,035	1	--	--	--	--	116
Total	3,035	1	1,075	1	13,030	1	116

‡ All Concrete for Superstructure shall be Class A4 and for Substructure Class A3.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	AMH	1-13-69	1	Seaboard & Coast Line Add. To Plan(s)	K.D.P.	6-74
CHECKED	GCC	4-28-69	2	Str. Steel Quantity	R.B.H.	9-74
IN CHARGE			3	As Built	TEM	6-77

GENERAL NOTES:

ROADWAY: One variable width roadway transitioning from a widening of Southbound roadway of Richmond-Petersburg turnpike to a ramp with 25'-0" clear roadway connecting with W.B. Roodway (Br. 63).

CAPACITY: Dead load includes 15 lbs. per sq. ft. for future wearing surface. Live load. HS 20-44 loading and alternate mtlitary loading.

SPECIFICATIONS:
GENERAL: Virginia Department of Highway Road and Bridge Specifications 1970.
DESIGN: A.A.S.H.O. Standard Specifications for Highway Bridges 1973, modified by Special Design provisions.
WELDING: 1972 Standard Specifications for Welded Highway and Railway Bridges of the American Welding Society.
CONTRACT SPECIAL PROVISIONS
Specifications and Contract Special Provisions referred to above are necessary to make these plans complete.

DATUM: City of Richmond

TEMPERATURE: The normal temperature referred to in the plans is 60°F. The temperature range for movement is 0° F. to 120° F.

DIMENSIONS: All dimensions are measured horizontally and vertically unless otherwise noted.

EXCAVATION: Excavation below subgrade and cut slope template shall be classified as Structure Excavation. All excavation above these limits shall be classified as Regular Excavation and is not included in the Structural Quantities.

FOUNDATIONS: Footings shall rest on firm material. Foundation material shall be dry and special attention is called to Section 401.05 of Standard Specifications and to the Contract Special Provisions, concerning preparation of foundations for footings.

CONCRETE NOTES: Concrete in superstructure shall be Class A 4. All other concrete shall be Class A 3. All exposed edges and corners shall have a ¾" chamfer or fillet unless otherwise noted. Care in the method of vibration, the use of low-slump concrete, and orother means shall be employed to prevent downgrade movement of newly placed slab concrete. Finishing Concrete Surfaces: See Standard Architectural Detail Sheets and the Contract Special Provisions for types and details. All reinforcing bar dimensions on the detailed drawings are to centers of bars unless otherwise noted. Clear distance between reinforing steel and face to concrete shall be as noted on the plans. All bar laps shall be 30 diameters of the smaller diameter bar unless otherwise noted. All reinforcing steel shall conform to ASTM A615 Grade 40.

STEEL NOTES: Structural steel shall conform to A.S.T.M. Designations A36, A572 - Grade 50 and A588 as noted. See Special Provisions.
All field connections shall be made with high strength bolts. High strength bolts shall be ⅞" diameter unless otherwise noted and shall conform to A.S.T.M. Specification A-325.

Note:
For Curve Data and Profile Grade, see Sheet 1.
For Layout Plan, see Sheet 3.

AS BUILT

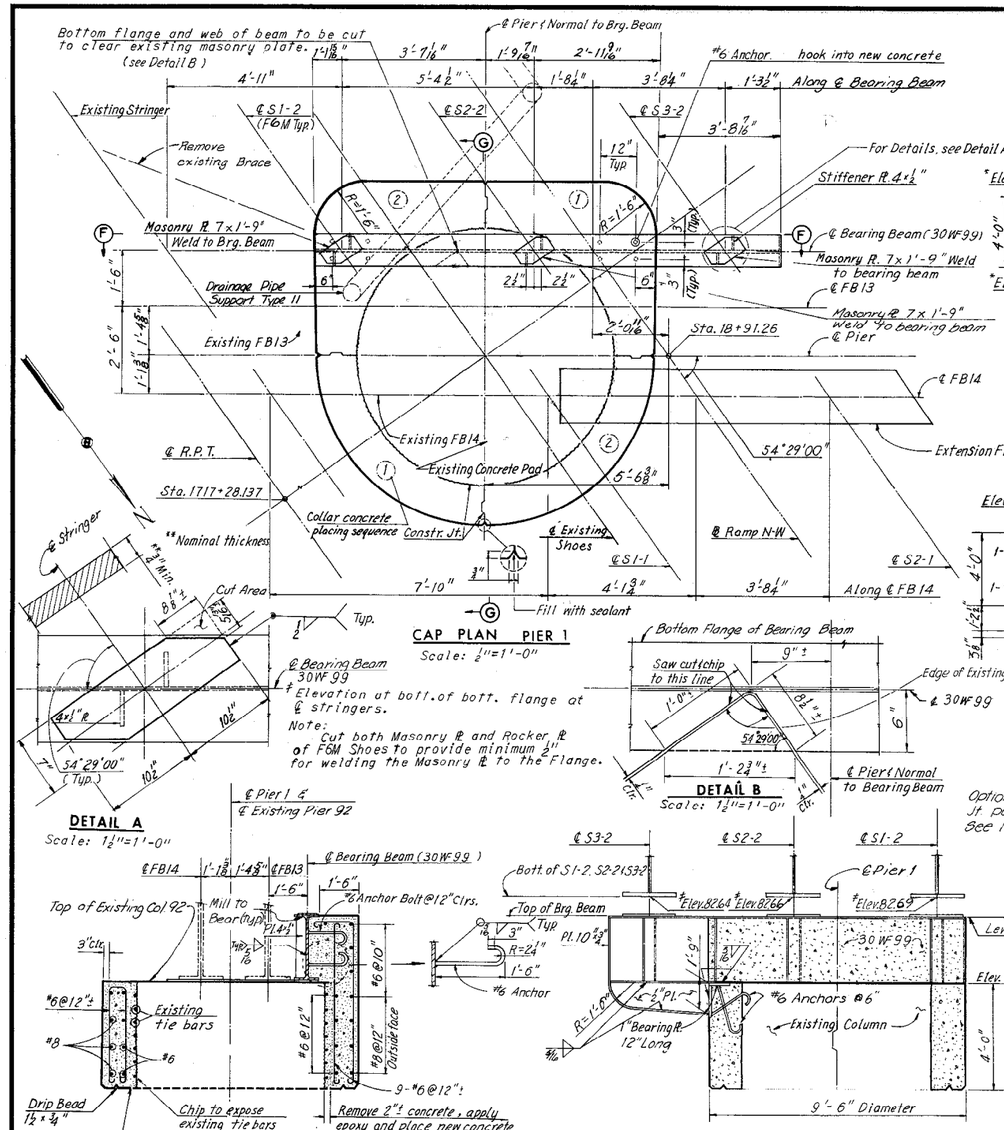
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 64
RAMP N-W CONNECTION FROM
RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

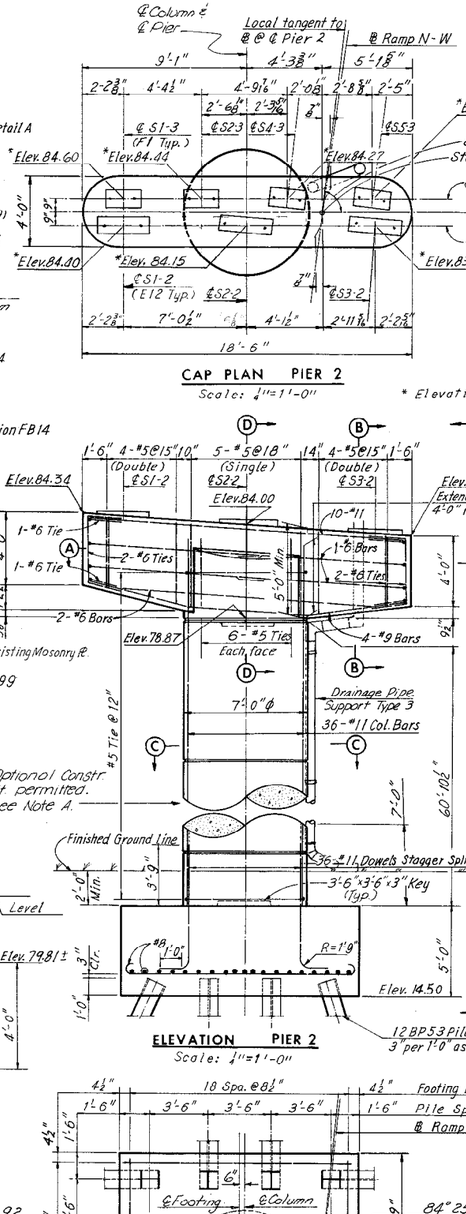
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1" = 30'-0"
CONTRACT NO. 10
SHEET NO. 2 OF 28

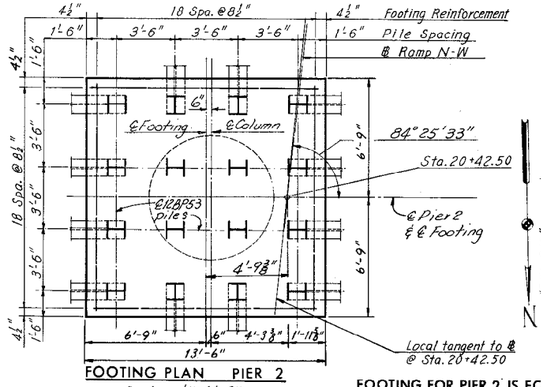
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	102	265



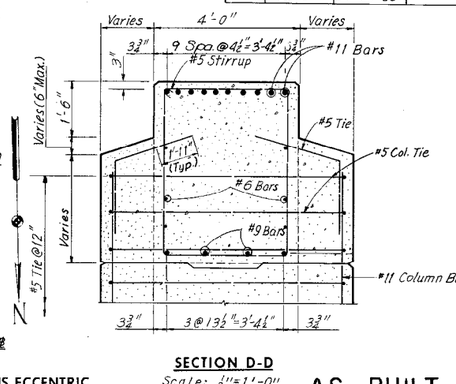
	BY	DATE			BY	DATE
			4	As Built	TEM	6-77
MADE	K.C.T.	3-16-69	3	Angle of Beam	REF	1-6-76
CHECKED	Y.C.P	4-24-69	2	Number of Girders	REF	12-30-74
IN CHARGE			1	Note Change	TEM	5-74
			NO.	REVISION	BY	DATE


℄ Column & ℄ Pier
Local tangent to ℄ @ ℄ Pier 2
℄ Ramp N-W
9'-1"
4'-3⅜"
5'-1⅝"
2'-2⅜"
4'-4½"
4'-9⅛"
2'-0⅛"
2'-8⅜"
2'-5"
2'-6⅝"
2'-3⅛"
℄ S1-3 (F1 Typ.)
℄ S2-3
℄ S4-3
℄ S5-3
*Elev. 84.09
84°25'33"
Sta. 20+42.50
℄ Bearing
℄ Pier 2
*Elev. 84.60
*Elev. 84.44
Elev. 84.27
*Elev. 84.10
*Elev. 84.15
*Elev. 83.90
4'-0"
9'-3"
℄ S1-2 (E12 Typ.)
℄ S2-2
℄ S3-2
3"
2'-2⅜"
7'-0½"
4'-1½"
2'-11⅞"
2'-2⅜"
18'-6"
CAP PLAN PIER 2
Scale: ¼"=1'-0"
* Elevation at top of concrete pad.
℄ Column & ℄ Pier
1'-11" Typ.
#11 Column Bars
#5 Stirrups
#6 Ties
#6 Bar
#5 Ties
#11 bar extend 4'-0" into cap beam
℄ Pier 2
N
SECTION A-A
Scale: ¼"=1'-0"
NOTE A
A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap at the splice shall be a minimum of 31'-6". Splices shall be Staggered at least 3'-3" between adjacent bars.
4'-0"
3¾"
19 Spa. @ 4½" = 3'-4½"
10-#11 Bars
#5 Stirrups
#6 Bars
4-#9 Bars
Varies
3@13½" = 3'-4½"
SECTION B-B
Scale: ½"=1'-0"
Elev. 84.34
Elev. 84.00
Elev. 83.66 Extend 6-#11 each side 4'-0" into cap beam
1'-6" 4-#5@15"10" (Double) ℄ S1-2
5-#5@18" (Single) ℄ S2-2
14" 4-#5@15" 1'-6" (Double) ℄ S3-2
1-#6 Tie
2-#6 Ties
2-#6 Bars
10-#11
1-#6 Bars
5'-0" Min.
4'-0"
Elev. 78.87
6-#5 Ties Each face
4-#9 Bars
7'-0" ϕ
Drainage Pipe Support Type 3
36-#11 Col. Bars
#5 Tie @ 12"
Optional Constr. Jt. permitted. See Note A.
Finished Ground Line
2'-0" Min.
3'-9"
36-#11 Dowels Stagger Spliced To Match Col. Bars
3'-6" x 3'-6" x 3" Key (Typ.)
#8 1'-0"
R=1'-9"
3" Clr.
1'-0"
Elev. 14.50
5'-0"
60'-10½"
12 BP 53 Piles, Batter 3" per 1'-0" as shown
ELEVATION PIER 2
Scale: ¼"=1'-0"
1'-6" 4-#5@15"10" (Double) ℄ S1-2
5-#5@18" (Single) ℄ S2-2
14" 4-#5@15" 1'-6" (Double) ℄ S3-2
Elev. 84.00
Elev. 83.66 Extend 6-#11 each side 4'-0" into cap beam
1-#6 Tie
1-#6 bar
1-#6 Tie
1-#6 Tie
Rustication, see Detail
8'-0"
Elev. 78.87
Elevation @ Footing
#8 Bar
VIEW E-E
Scale: ¼"=1'-0"
RUSTICATION DETAIL
Full Scale
℄ Pier 2 & ℄ Column
℄ Brg.
1'-7"
℄ Pier & ℄ Column
2" Clear
#5 Tie
#11 Bars equally spaced
℄ Column
SECTION C-C
Scale: ⅜"=1'-0"
E
D
B
A
J
I
℄ Stringer
℄ 1¼"ϕ Anchor bolts
℄ Bearing
H
G
F
C
9"
℄ Pier 2
d
Z" Typ.
Masonry Pl.
PAD AND ANCHOR BOLT SETTING PLAN
No Scale

DIMENSIONS FOR PAD AND ANCHOR BOLT SETTING PLAN											
Pier	Stringer	∅	B	A	B	C	D	E	F	G	H	I	J
2	S1-3	—	90°00'00"	4½"	8"	0	12½"	12½"	5⅜"	5⅜"	11½"	25"	8"
	S2-3	—	90°00'00"	4½"	8"	0	12½"	12½"	5⅜"	5⅜"	11½"	25"	8"
	S4-3	—	83°42'49"	4½"	7⅝"	⅜"	13⅛"	11¼"	7"	4⅜"	11½"	25"	8"
	S5-3	—	82°00'00"	4½"	7⅝"	1⅛"	13⅛"	11⅝"	7⅝"	4"	11½"	25"	8"
	S1-2	90°00'00"	—	4"	14½"	0	18½"	18½"	6⅜"	6⅜"	13½"	36½"	14½"
	S2-2	87°14'17"	—	4"	14⅜"	0	18½"	17⅞"	6⅞"	6"	13½"	36½"	14½"
	S3-2	84°26'56"	—	4"	14⅜"	1⅛"	18¾"	17⅞"	8¼"	5¼"	13½"	36½"	14½"



FOOTING FOR PIER 2 IS ECCENTRIC AS SHOWN ON FOOTING PLAN



AS BUILT

Note:
For Standard Shoe Details, see Sheets S1 & S2.
For Framing Plan, see Sheets 12 & 13.
For Steel and Concrete Quantities, see Sheet 2.
All piles shall be 12BP53 Steel Pile. (Design Capacity = 57 Tons.)
Estimated pile tip elevation, Pier 2 = -5.0
For Pile Details, see Sheet 7.
For Details of Extension FB 14, See Sheet 18.
For Standard Drainage Details, see Sheet 56.

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

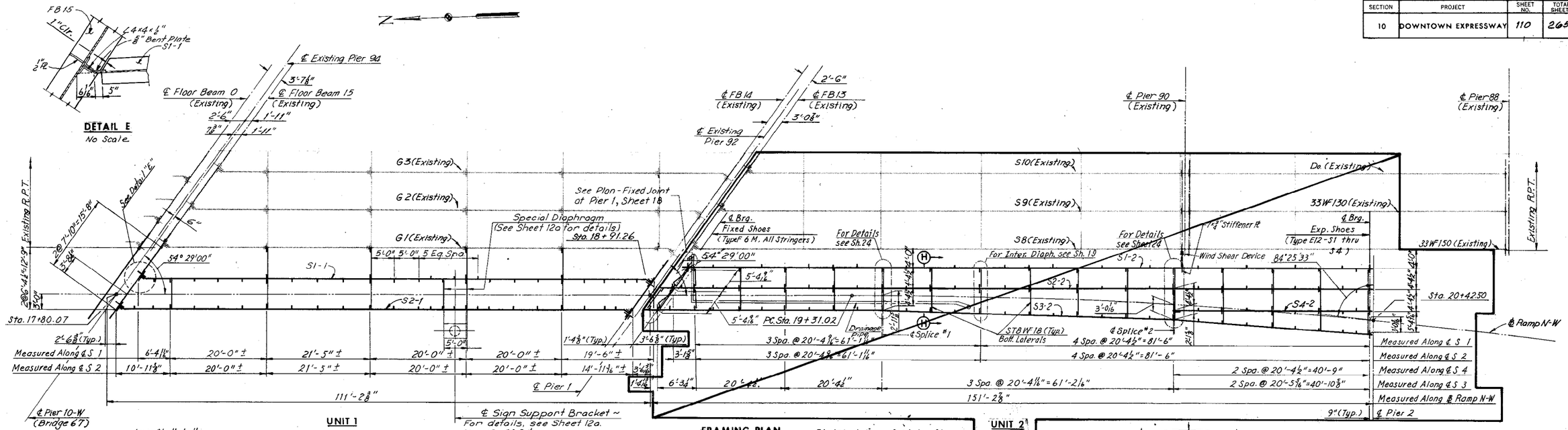
BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

PIERS 1 AND 2

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

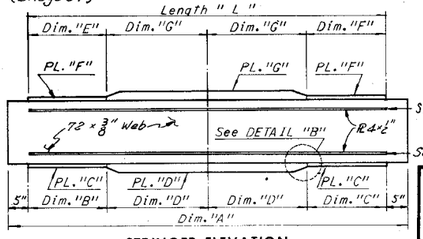
SCALE: As Noted
CONTRACT NO. 10
SHEET NO. 4 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	110	265

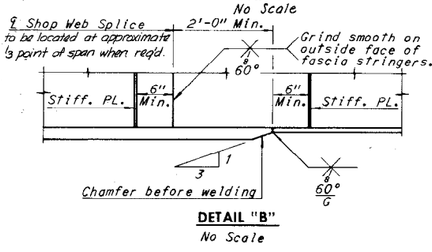


FRAMING PLAN
Scale: 1"=10'-0"

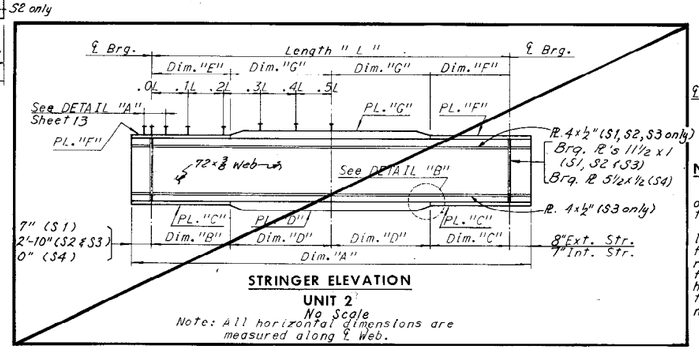
Note:
Dimensions shown on the plans for existing structural metalwork are in accordance with drawings prepared for the original construction. The Contractor shall verify all necessary dimensions of existing structural metalwork prior to fabrication of new metalwork.
New Diaphragms are to match Existing Diaphragms in Unit 1.



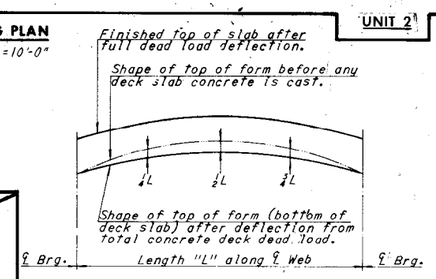
STRINGER ELEVATION
UNIT 1
No Scale



DETAIL "B"
No Scale



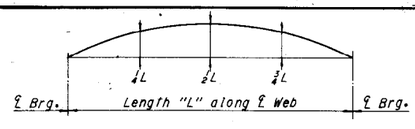
STRINGER ELEVATION
UNIT 2
No Scale
Note: All horizontal dimensions are measured along ℄ Web.



DEAD LOAD DEFLECTION DIAGRAM

NOTE TO CONTRACTOR

Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.
In practice, the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab and the top of stringer without altering the slab thickness.



CAMBER DIAGRAM

NOTE TO FABRICATOR

The stringers shall be fabricated with an upward camber amounting to the tabulated value.
This will provide approximate compensation for deflection under full dead load and for comformity with finished grade.

Note:
Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber Diagram.
If stringers are not cambered distance top of stringers to top of slab will vary along the stringer in accordance with the offset dimensions shown in the Camber Diagram, and with minimum distance as shown in Cross-Section on Sheet 17

⊕ Except as shown otherwise

Note:
Intermediate stiffener R's 4½x⅜" shall be equally spaced between diaphragms ~~@ as shown~~. The first two stiffener spaced at the ends of stringers shall be one-half normal spacing within the panel.
It may be necessary to increase Bearing Stiffener size to accommodate erection of end diaphragm.

Note:
For Deck Plan, see Sheet 19.
For Joint Details, see Sheets 18 & 25
For Joint Details of Pier 10W, see Sheet 42, Bridge 67.
For Standard Shoe Details, see Sheet 51.
For Details of FB 14 and FB 15, see Sheet 18.
See Sheet 4 for special modifications of masonry plate, FFM @ Pier 1.
For Section H-H, see Sheet 19.
For Horizontal Stiffener Detail and Flange to Web Welds, see Sheet 15.

SHOE SCHEDULE

EXPANSION SHOE		FIXED SHOE	
TYPE	NO. REQD.	TYPE	NO. REQD.
E 12	4	F 6 M	3

STRINGER SCHEDULE

UNIT	STRINGER	Dim. "A"	LENGTH "L"	Dim. "B"	Dim. "C"	Dim. "D"	Dim. "E"	Dim. "F"	Dim. "G"	PL."C"	PL. "D"	PL."F"	PL. "G"	MAX. SHEAR STUD SPACING 0.0L-0.1L*	0.1L-0.2L	0.2L-0.3L	0.3L-0.4L	0.4L-0.5L
1	S1-1	106'-3⅜"	105'-5⅜"	23'-0 1/16"	23'-0"	29'-8⅜"	23'-0 1/16"	23'-0"	29'-8⅜"	18x⅞"	18x1¼"	18x⅞"	18x1⅛"	—	—	—	—	—
	S2-1	106'-3⅜"	105'-5⅜"	23'-0 1/16"	23'-0"	29'-8⅜"	23'-0 1/16"	23'-0"	29'-8 1/16"	18x⅞"	18x1¼"	18x⅞"	18x1¼"	—	—	—	—	—
2	~~S1-2~~	~~143'-6 9/16"~~	~~142'-7 1/16"~~	~~19'-0"~~	~~19'-7½"~~	~~52'-0"~~	—	—	~~71'-3⅜"~~	~~24x1⅞"~~	~~24x2½"~~	—	18x1"	.24"	.24"	.24"	.24"	.24"
	S2-2	149'-2 3/16"	145'-9 3/16"	20'-0"	20'-9⅞"	52'-8"	—	—	73'-10 1/16"	24x1½"	24x2½"	—	18x1"	.24"	.24"	.24"	.24"	.24"
	S3-2	152'-6 1/16"	149'-0 5/16"	20'-0"	22'-0 1/16"	53'-6"	—	—	~~74'-0⅜"~~	24x1½"	24x2½"	—	18x1"	.24"	.24"	.24"	.24"	.24"
	~~S4-2~~	~~41'-4"~~	~~40'-0"~~	—	—	20'-4½"	—	—	20'-4½"	—	12x⅝"	—	12x⅝"	.24"	.24"	.24"	.24"	.24"

DEAD LOAD DEFLECTION SCHEDULE		
¼L	½L	¾L
7/8"	1 1/4"	7/8"
7/8"	1¼"	7/8"
~~1 3/8"~~	~~2"~~	~~1 3/8"~~
2 9/16"	3 5/16"	2 9/16"
1 13/16"	2 9/16"	1 13/16"
2¼"	3 1/8"	2¼"
0	1/16"	0

CAMBER SCHEDULE		
¼L	½L	¾L
2 3/16"	2 15/16"	2⅛"
2 3/16"	3"	2 3/16"
~~3 9/16"~~	~~5"~~	~~3 11/16"~~
4 3/16"	6 1/16"	4 1/4"
6 1/8"	8 7/16"	6 1/8"
14 1/16"	1/16"	1/16"

Note : * Spacing begins at termination of 6 spaces @ 4".
All steel shall be A36 unless otherwise shown.

Note: For revisions to Unit 2, see Sheet 12a.

	BY	DATE
MADE	Y.C.P	2-11-69
CHECKED	S.C.C.	4-24-69
IN CHARGE		

NO.	REVISION	BY	DATE
5	As Built	TEM	6-77
4	Pier Angle Chg.	RLJ	1-13-75
3	Note changed, added	PRM.S	4-19-74
2	Sign Support Bracket & Inter. Diaph. Spa. added	L.N.B.	9-9-74
1	Unit 2 Deleted	L.N.B.	10-1-74

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

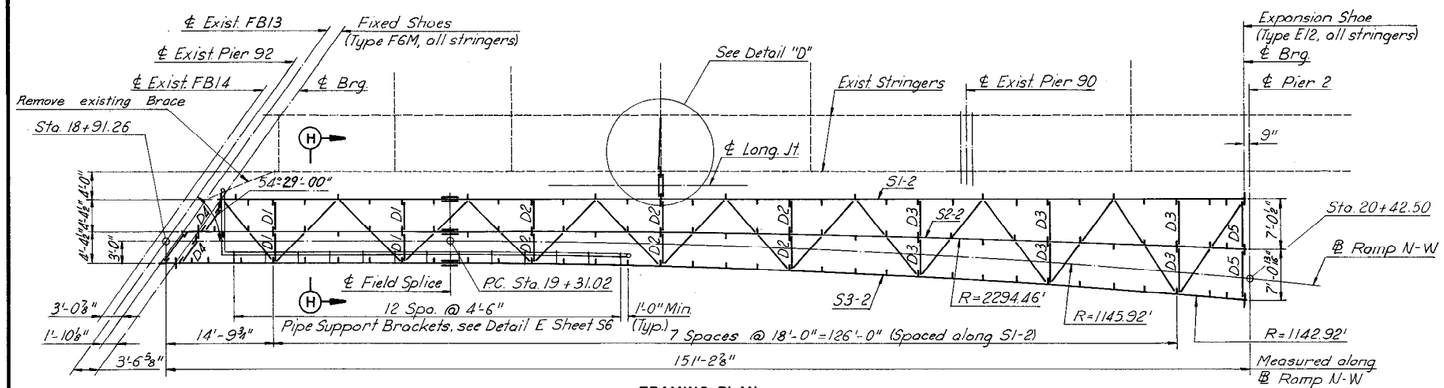
BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

FRAMING PLAN ~~UNITS 1~~

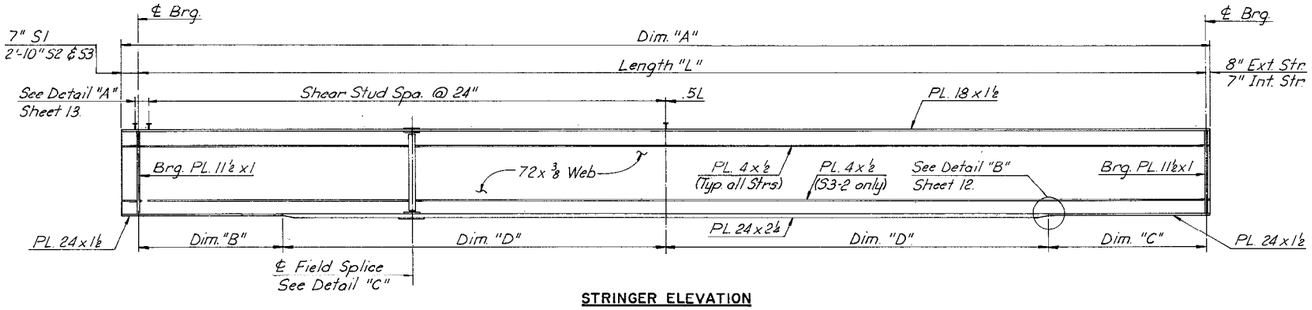
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 12 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	110b	265

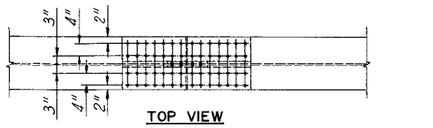


FRAMING PLAN
Scale: 1"=10'-0"

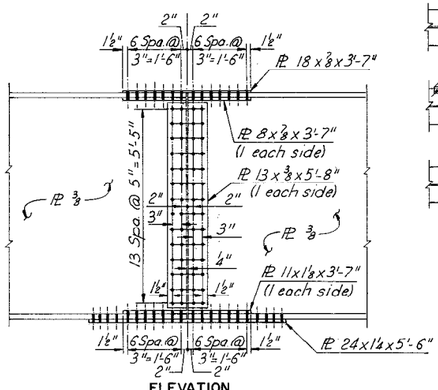


STRINGER ELEVATION
Scale: None

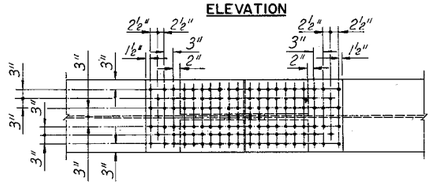
STRINGER SCHEDULE						DEAD LOAD DEFLECTION SCHEDULE						CAMBER SCHEDULE		
						DUE TO CONCRETE			DUE TO STEEL					
STRINGER	LENGTH "L"	DIM. "A"	DIM. "B"	DIM. "C"	DIM. "D"	¼L	½L	¾L	¼L	½L	¾L	¼L	½L	¾L
S1-2	142'-7 11/16"	143'-9 3/16"	19'-0"	19'-7 11/16"	52'-0"	1 5/16"	1 15/16"	1 3/8"	3/4"	1 1/16"	3/4"	3 3/8"	4 3/8"	3 3/16"
S2-2	145'-9 3/8"	149'-2 3/8"	20'-0"	20'-9 3/8"	52'-6"	1 9/16"	2 1/4"	1 5/8"	7/8"	1 1/16"	7/8"	4 1/2"	6 1/4"	4 5/8"
S3-2	149'-1"	152'-6 15/16"	20'-0"	22'-1"	53'-6"	1 3/4"	2 1/2"	1 3/4"	15/16"	1'4"	15/16"	5 7/16"	7 1/2"	5 1/2"



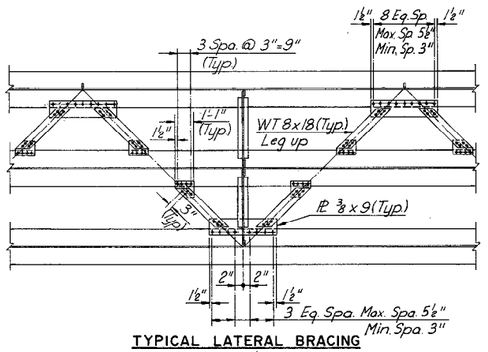
TOP VIEW



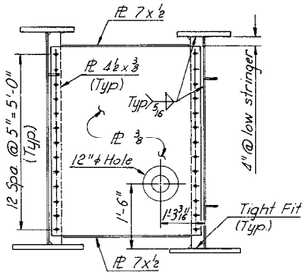
ELEVATION



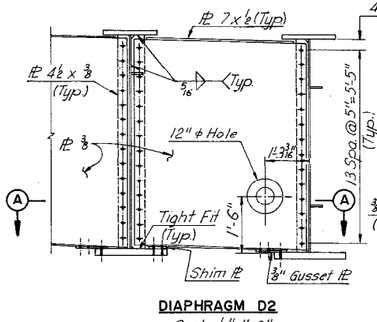
BOTTOM VIEW



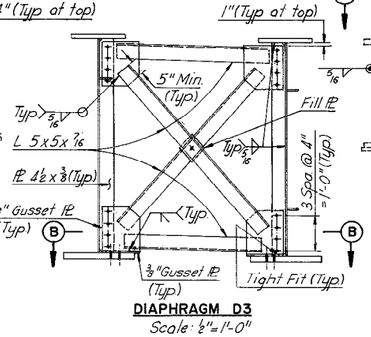
TYPICAL LATERAL BRACING
Scale: ¼"=1'-0"



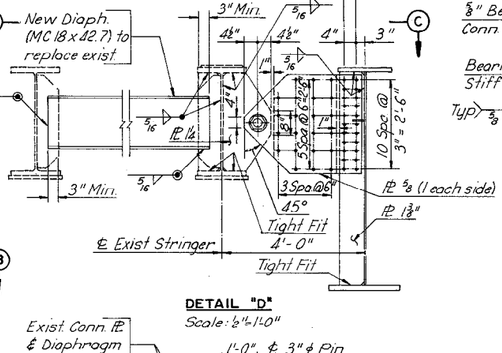
DIAPHRAGM D1
Scale: ½"=1'-0"



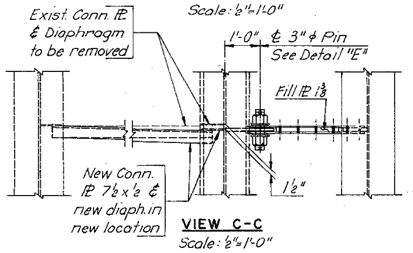
DIAPHRAGM D2
Scale: ½"=1'-0"



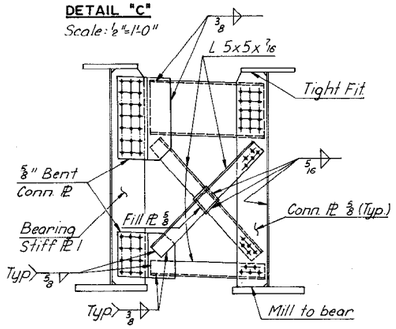
DIAPHRAGM D3
Scale: ½"=1'-0"



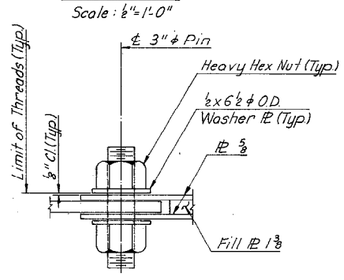
DETAIL "D"
Scale: ½"=1'-0"



VIEW C-C
Scale: ½"=1'-0"



DIAPHRAGM D4
Scale: ½"=1'-0"



DETAIL "E"
Scale: 1½"=1'-0"

NOTE: Spot weld nut to pin upon completion of assembly.

NOTE:
1. For Diaphragm D5 use type shown as end diaphragm section B-B, Sheet 20.
2. For notes not shown, see Sheet 12.
3. For Section H-H see Sheet 19.

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

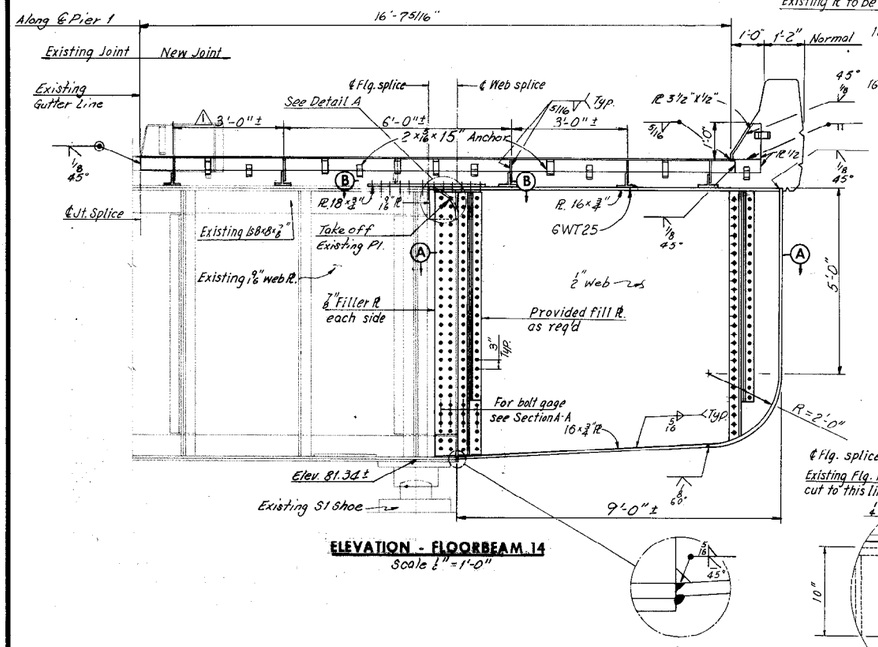
BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
FRAMING PLAN - UNIT 2

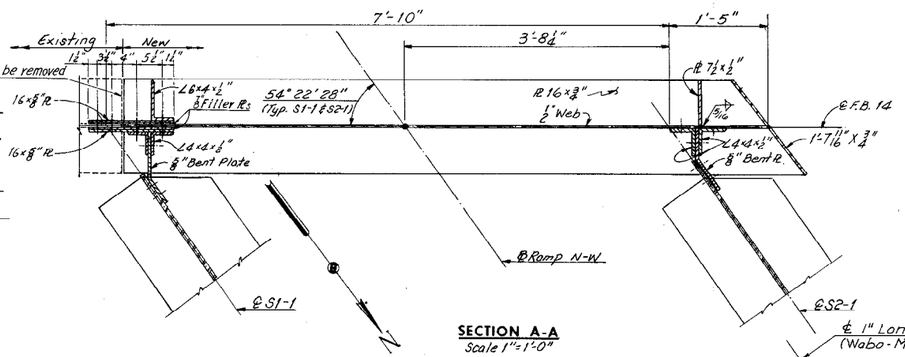
SCALE AS NOTED
DATE
SHEET 12b OF 28

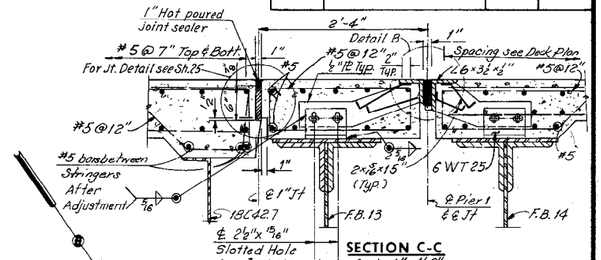
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
Alexandria, Virginia
HNTB

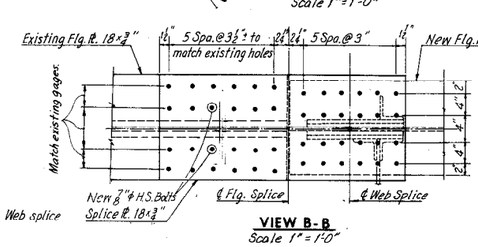
			NO.	REVISION	BY	DATE
DESIGNED			3	As Built	TEM	6-77
DRAWN	N.L.B.	10-7-74	2	Remove Brace & change angle	RLH	12-30-74
CHECKED	R.B.H.	11-4-74	1	New Sheet Added	N.L.B.	10-7-74
IN CHARGE	P.R.Y.					

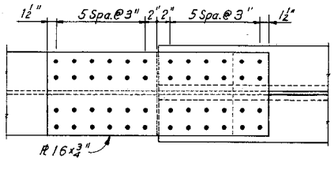
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10.	DOWNTOWN EXPRESSWAY	116	265

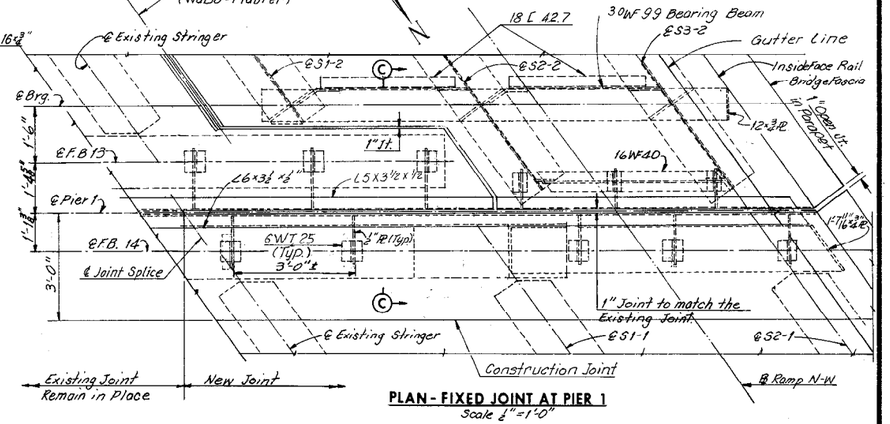






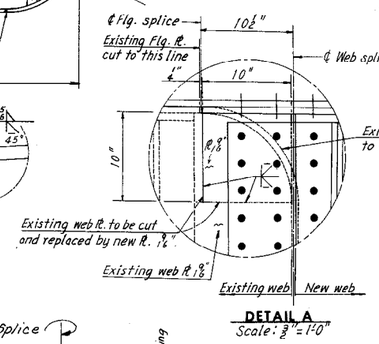


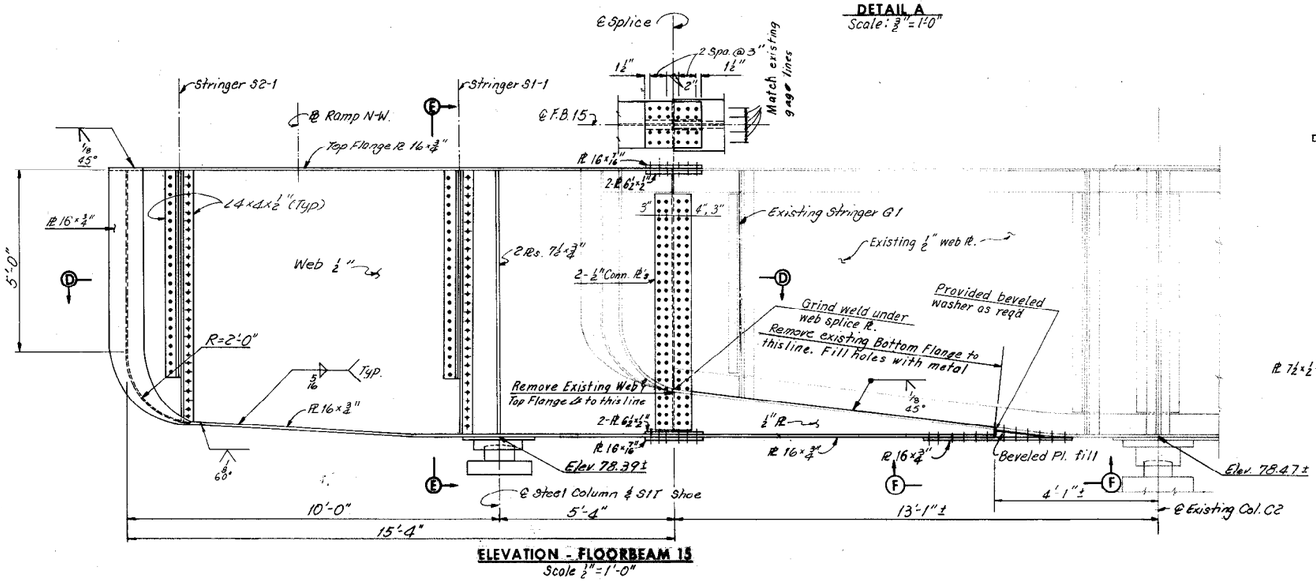


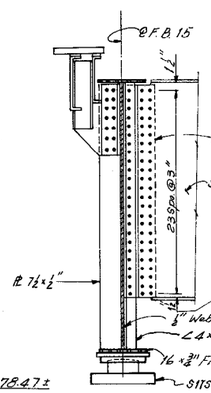


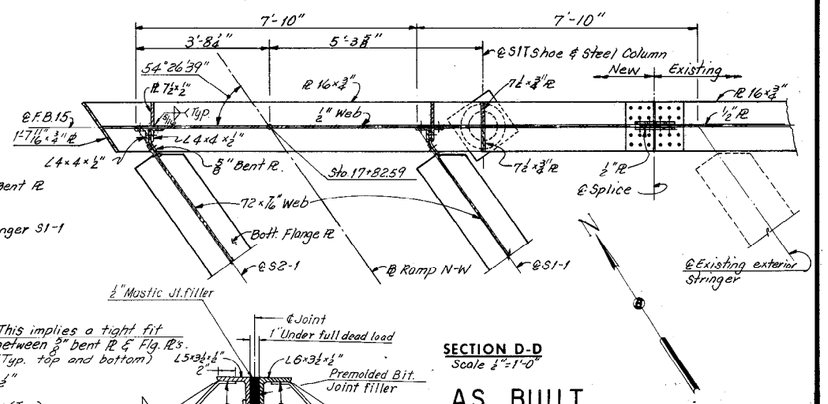
Note:
1" Joint at pier 1 is to match the existing Joint. The Contractor shall verify the location of Joint.

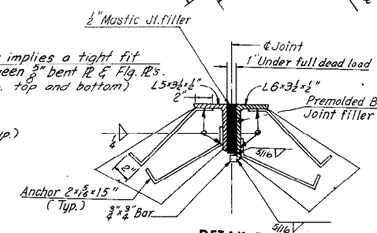
Bolts - 7/8" ϕ H. S. Bolts, ASTM Spec. A-325 unless otherwise noted.











AS BUILT

Note:
Dimensions shown on the plans for existing structural metalwork are in accordance with drawings prepared for the original construction. The Contractor shall verify all necessary dimensions of existing structural metalwork prior to fabrication of new metalwork.

Note:
For Joint Details at F.B. 15, see Sheet 42 Bridge 67.
For Framing plan, see Sheet 12.
For Steel Column Details, see Sheet 28 Bridge 67.
For SIT Shoe Details, see Sheet 47 Bridge 67.
All Elevations are to be verified by the Contractor.

	BY	DATE
MADE	G.C.C.	3-13-69
CHECKED	Y.C.P.	4-25-69
IN CHARGE		

NO.	REVISION	BY	DATE
2	As Built	TEM	6-77
1	Unit 2 End Diaph. @ Pier 1 revised L 3 x 3 x 5/16 Support 1" Changed to 6 1/16	LBP	10-31-74

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

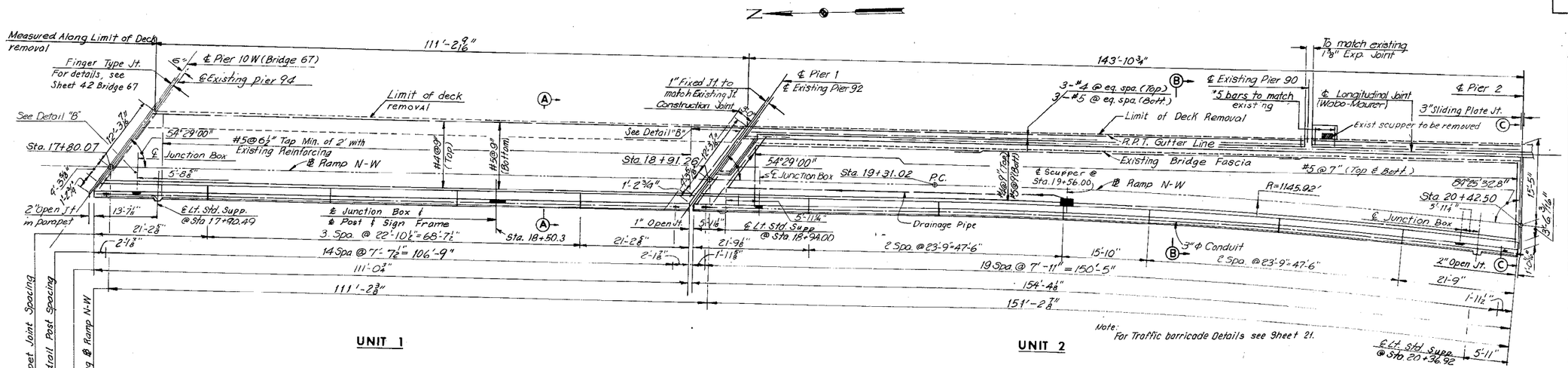
BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

FRAMING DETAILS

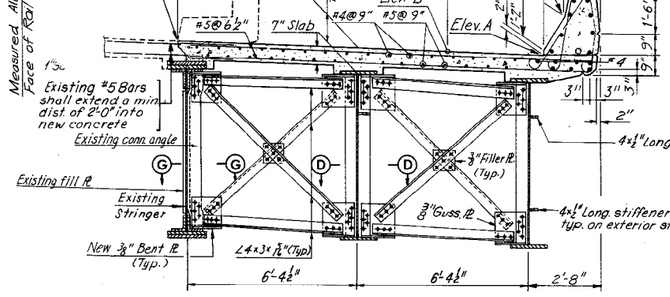
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 18 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	117	265

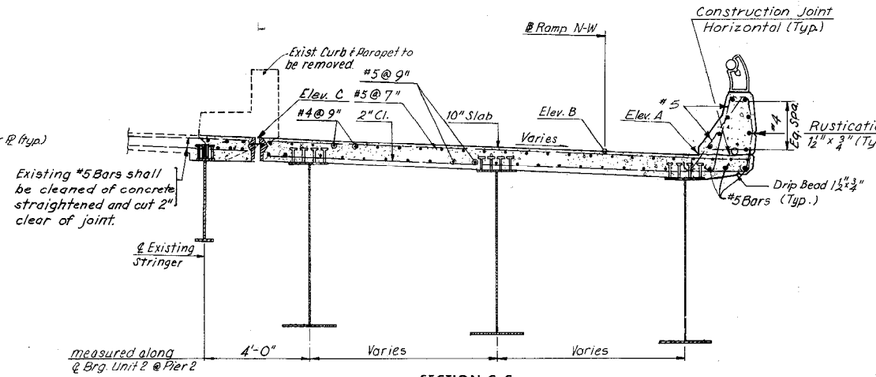


DECK PLAN
Scale: 1"=10'-0"

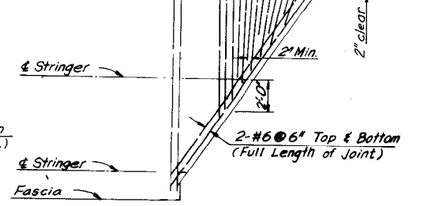


(Showing Intermediate Diaphragm)

SECTION A-A
Scale: ⅜" = 1'-0"



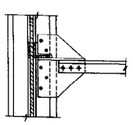
SECTION C-C
Scale ⅜" = 1'-0"



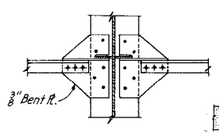
DETAIL B
Pier 1 shown Pier 10W similar.

ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
17+77.57	87.11	"	"
17+30	87.17	87.07	86.78
17+80.07	"	87.07	"
17+87.21	"	"	87.00
17+90	87.44	87.35	87.07
18+00	87.70	87.61	87.35
18+10	87.95	87.87	87.63
18+20	88.19	88.12	87.90
18+30	88.42	88.36	88.15
18+40	88.66	88.59	88.40
18+50	88.88	88.81	88.64
18+60	89.09	89.03	88.87
18+70	89.29	89.24	89.10
18+80	89.49	89.44	89.32
18+88.75	89.65	"	"
18+90	89.67	89.64	89.57
18+91.26	"	89.66	"
18+98.42	"	"	89.72
19+00	89.87	89.84	89.78
19+10	90.06	90.03	89.98
19+20	90.23	90.22	90.18
19+30	90.40	90.39	90.37
19+40	90.56	90.55	90.54
19+50	90.71	90.71	90.71
19+60	90.84	90.85	90.88
19+70	90.95	90.98	91.04
19+80	91.05	91.10	91.20
19+90	91.15	91.21	91.35
20+00	91.24	91.31	91.49
20+10	91.31	91.39	91.64
20+20	91.38	91.47	91.77
20+30	91.43	91.54	91.91
20+40	91.47	91.59	92.04
20+41.28	-	-	92.06
20+42.50	-	91.60	-
20+42.84	91.49	" -	-

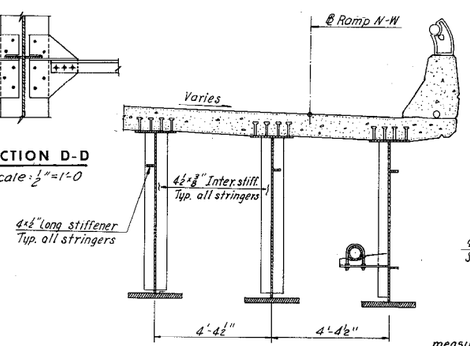
Elevations given in the Elevation Table may require adjustment in the field.



SECTION G-G
Scale: ½" = 1'-0"

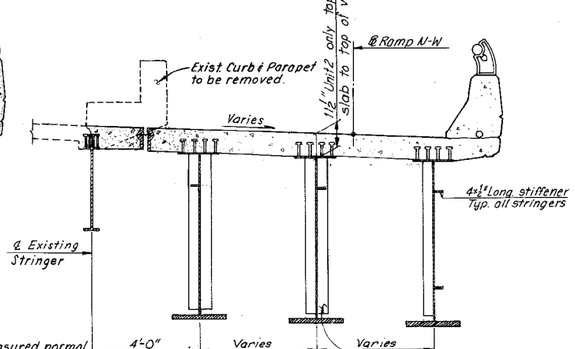


SECTION D-D
Scale: ½" = 1'-0



SECTION H-H
Scale: ⅛" = 1'-0"

For location of Section H-H, see Sheet 12b.



SECTION B-B
Scale: ⅜" = 1'-0"

Notes:
For Joint Details, see Sheet 18, 25 and Sheet 42 Bridge 67.
Elevation C is to be confirmed by by contractor.
For Framing Plan, see Sheet 12.
For Steel and Concrete Quantities, see Sheet 2.
For Handrail Details, see Sheet 53.
For Lighting Details, see Sheet 54.
For Standard Drainage Details, see Support Type 11 Sheet 56.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	Y.C.P	2-12-69	4	As Built	TEM	6-77
CHECKED	SCC	4-24-69	3	Note for Table of Elevations	DWB	1-28-75
IN CHARGE			2	Chg. of Pier Angle Added Jun. Bar	MEJ	1-13-75
			1	Deck Plan Sect A-A B-B C-C H-H, Det B	TEM	10-31-74

AS BUILT

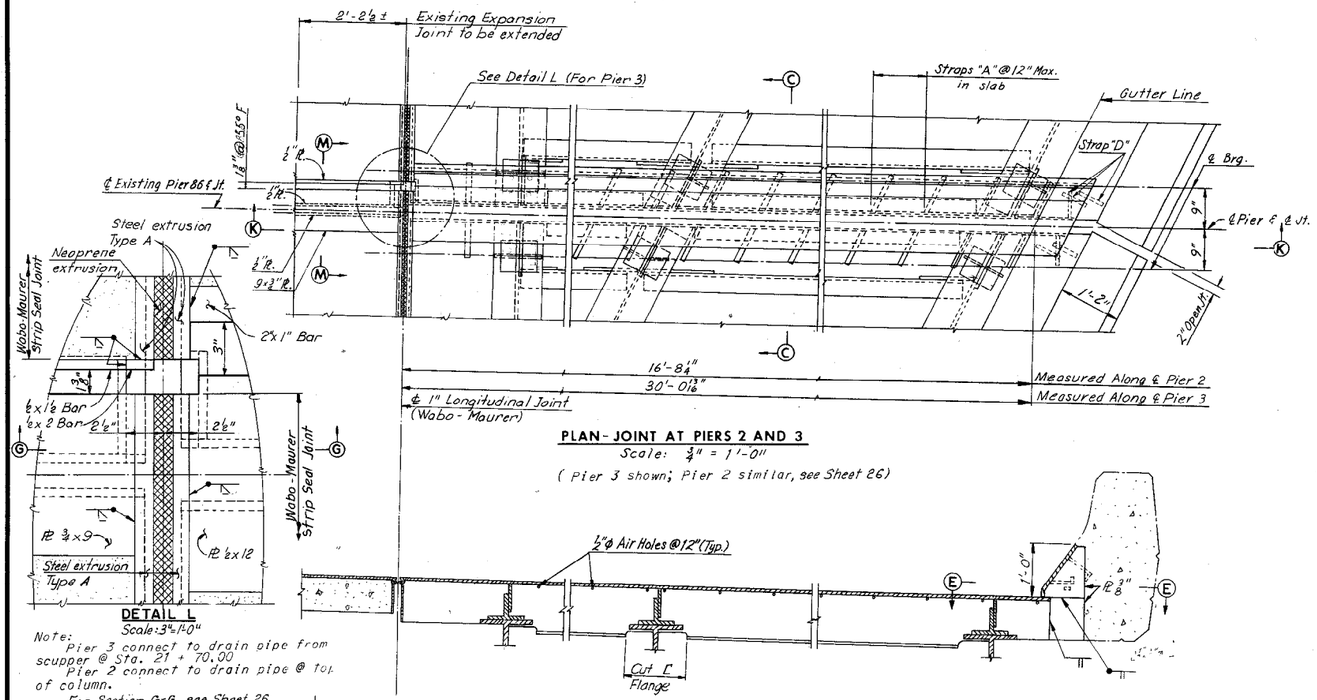
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
DECK PLAN UNITS 1 AND 2

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK · ALEXANDRIA · KANSAS CITY

SCALE: As Noted
CONTRACT NO: 10
SHEET NO. 19 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	123	265



DETAIL L
Scale: 3"=1'-0"

Note:
Pier 3 connect to drain pipe from scupper @ Sta. 21 + 70.00
Pier 2 connect to drain pipe @ top of column.
For Section G-G, see Sheet 26.

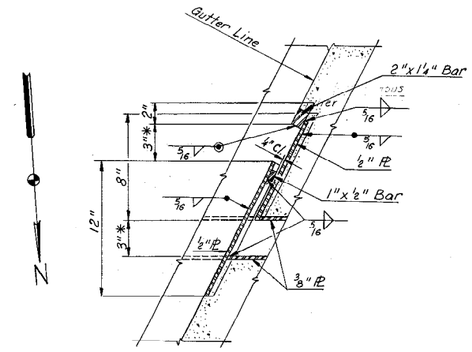
PLAN - JOINT AT PIERS 2 AND 3
Scale: ¾" = 1'-0"
(Pier 3 shown; Pier 2 similar, see Sheet 26)

SECTION K-K
Scale: ¾" = 1'-0"

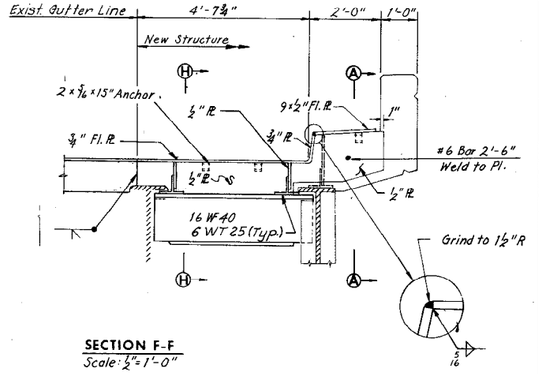
SECTION C-C
Scale: 1½"=1'-0"

Section above is shown for Pier 3. Section thru Joint @ Pier 2 is similar except for End Diaphragm in Unit-2, which consists of a ⅜"web Pl and a 4½"x⅝" Fl. Pl instead of 18SC42.7 as shown above

LEGEND
- ● Denotes transverse #5 Bar spaced as shown on Sheets 19 and 20.
- ○ Denotes transverse #6 Bar between stringers.
- ✱ Denotes dimension shown @ 60°F.

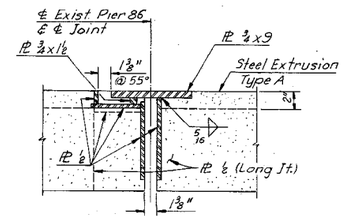


SECTION E-E
Scale: 1½"=1'-0"

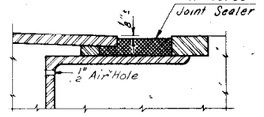


SECTION F-F
Scale: ½"=1'-0"

(For Location of Section F-F, See Sheet 26)

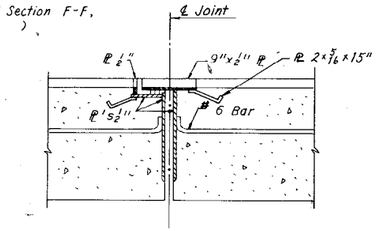


SECTION M-M
Scale: 1½"=1'-0"

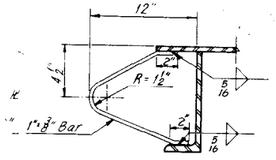


JOINT SEALER DETAIL
Scale: 3" = 1'-0"

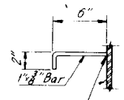
Note:
Throughly clean joint and fill with Hot Poured Joint Sealer. Trowel into curb joint.



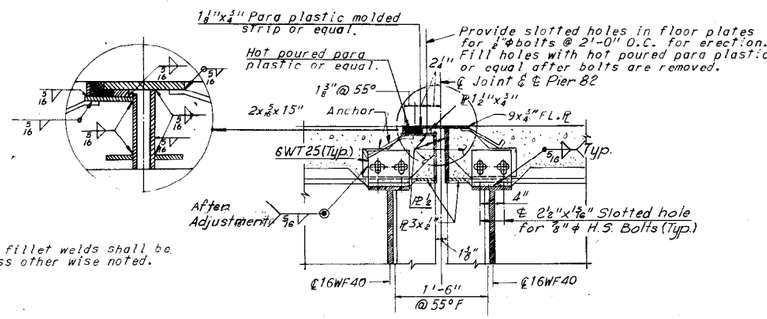
SECTION A-A
Scale: 1"=1'-0"



STRAP "A"
Scale: 1½" = 1'-0"

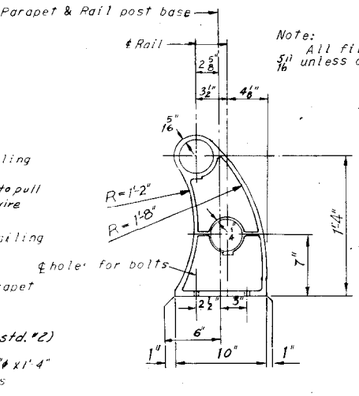


STRAP "D"
Scale: 1½" = 1'-0"



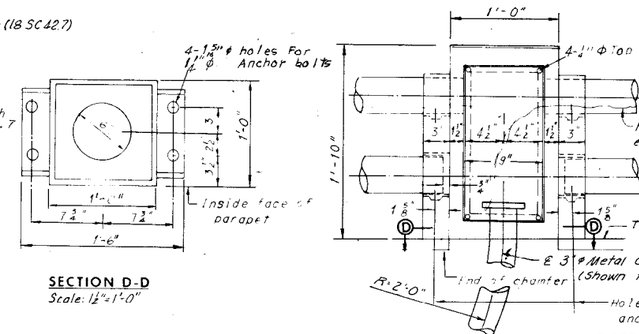
SECTION H-H
Scale: 1"=1'-0"

Note
All metal work in joints is to be included in Superstr. A36 Str. Steel.



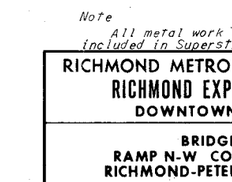
SALVAGED RAIL POST
Scale: 1½"=1'-0"

Note:
All fillet welds shall be 5/16" unless other wise noted.



DETAILS OF SALVAGED LIGHT STD. BASE
Scale: 1½"=1'-0"

SECTION D-D
Scale: 1½"=1'-0"



TYPICAL JOINT
No Scale

	BY	DATE	NO.	REVISION	BY	DATE
MADE	Y.C.P	3-20-69	2	Sect. G-G & Det. A moved to Sh. 26. Long. ℄ changed to Wabo-Maurer. Std'g ℄ & ℄ Supports changed to ℄ WT 25.	NLB	10-31-74
CHECKED	G.C.C	4-21-69	As Built TEM G-77			
IN CHARGE						

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

JOINT DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

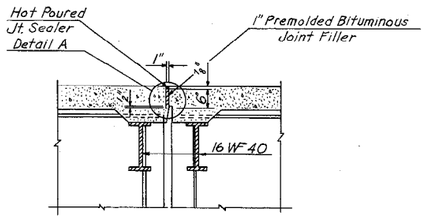
SCALE: As Noted
CONTRACT NO. 10
SHEET NO. 25 OF 28

AS BUILT

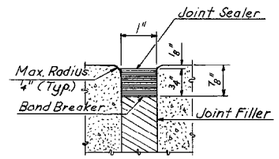
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	124	265

NOTES FOR FILLED JOINTS:

Joints shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free and water-free compressed air.

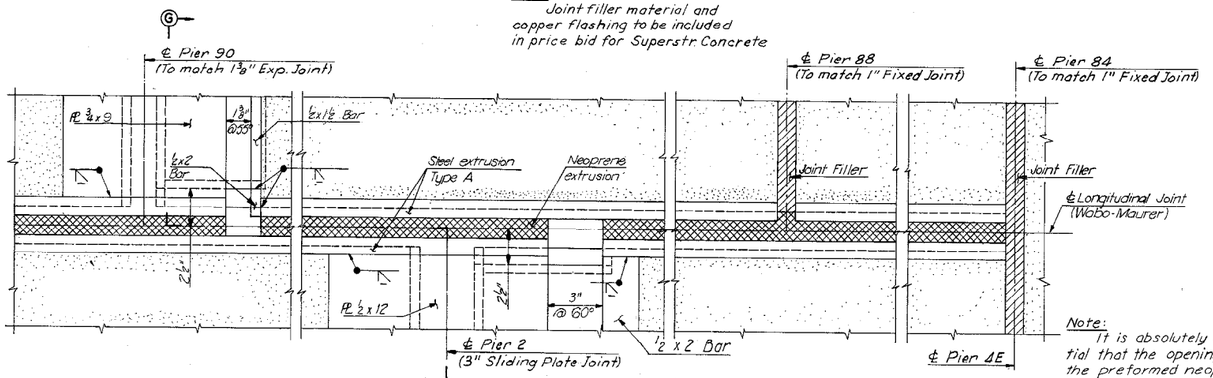


TYPICAL SECTION THRU 1" FIXED JOINT
Scale: 1/2"=1'-0"



DETAIL A
No Scale

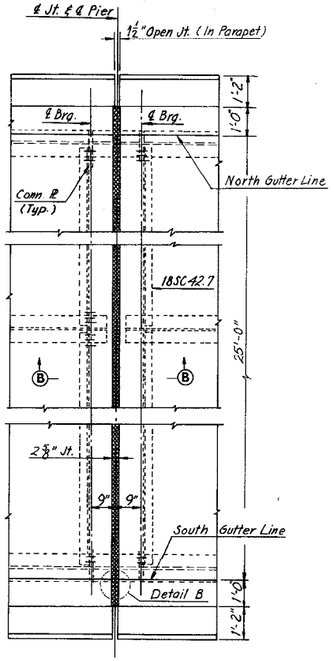
Note:
Joint filler material and copper flashing to be included in price bid for Superstr. Concrete



PLAN - LONGITUDINAL JOINT
Scale: 3"=1'-0"

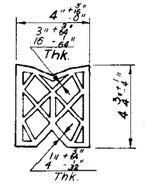
NOTE:
For Plan of Pier 3 & existing Pier 86, see Sheet 25.

Note:
It is absolutely essential that the openings for the preformed neoprene joint sealers be accurately formed and constructed to smooth, straight lines. The size of opening shall be adjusted to allow for anticipated dead load rotation of the ends of the slab and for the temperature at the time of construction.

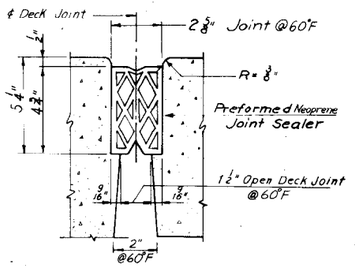


PLAN - JOINT AT PIERS 4,5,6,7,8 AND 9
Scale : 1/8" = 1'-0"

PLAN - JOINT AT PIER 4E
Scale: 1/8"=1'-0"

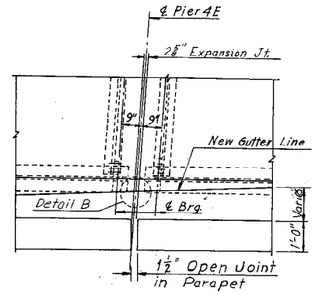


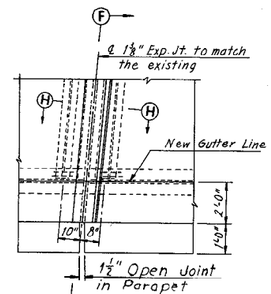
PREFORMED NEOPRENE JOINT SEALER FOR 2 5/8" TYPE "A" JOINT



2 5/8" TYPE "A" JOINT

EXPANSION JOINT DETAILS





PLAN - JOINT AT EXISTING PIER 82
Scale: 1/8" = 1'-0"
(For Section F-F & Section H-H, See Sheet 25)

NOTES FOR WABO-MAURER JOINT:

Do not use steel extrusions as screed support.

Steel extrusion shall conform to ASTM A36.

Structural steel shall conform to ASTM A588.

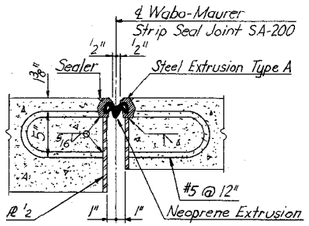
Steel assembly shall be shop welded to convenient lengths and butt welded in the field to desired length. Joint shall conform to grade of deck slab.

Steel assembly shall be sandblasted in the shop prior to painting.

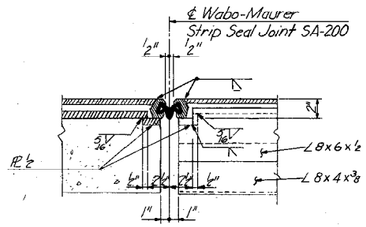
Steel assembly shall receive one shop coat of epoxy zinc paint.

Neoprene extrusion shall be roughened with a wire brush before bonding to steel extrusion with Bon Lastic Adhesive. Groove in steel extrusion to be blown out with oil-free and water-free compressed air prior to installation of Neoprene extrusion.

The Wabo-Maurer joint assembly shall be installed in accordance with manufacturer's recommended construction methods.

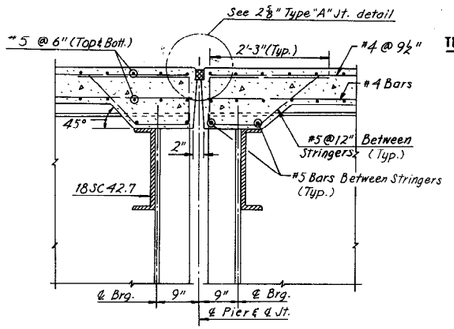


TYPICAL SECTION THRU WABO-MAURER JOINT
Scale: 1 1/2" = 1'-0"



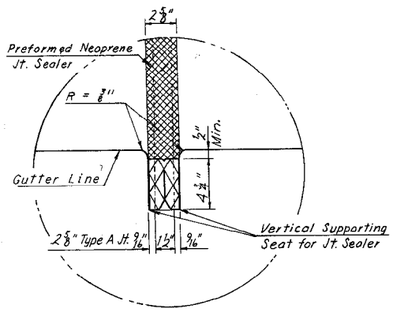
SECTION G-G
Scale: 1 1/2" = 1'-0"

NOTE: Steel extrusion of Wabo-Maurer Joint to rest & Slide on PL 1/2.
For location of Sect. G-G, see Plan-Long. Joint above & Detail L. Sheet 25.

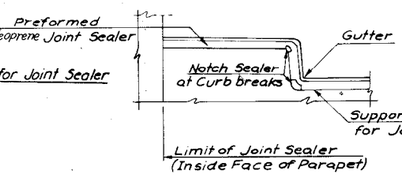


SECTION B-B
Scale: 3/4" = 1'-0"

TREATMENT OF TYPE "A" JOINT AT GUTTER
PIERS 4,5,6,7,8 AND 9
No Scale



DETAIL B
No Scale



TREATMENT OF TYPE "A" JOINT AT CURB
PIER 4E
No Scale

	BY	DATE
MADE	Y.C.P.	3-18-69
CHECKED	G.C.C.	4-21-69
IN CHARGE		

NO	REVISION	BY	DATE
2	As Built	TEM	6-77
1	Notes, Typ. Sect thru Joint, Det. A, Typ. Sect thru Wabo-Maurer joint, Sect G-G add.	E.J.M.	10-31-74

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

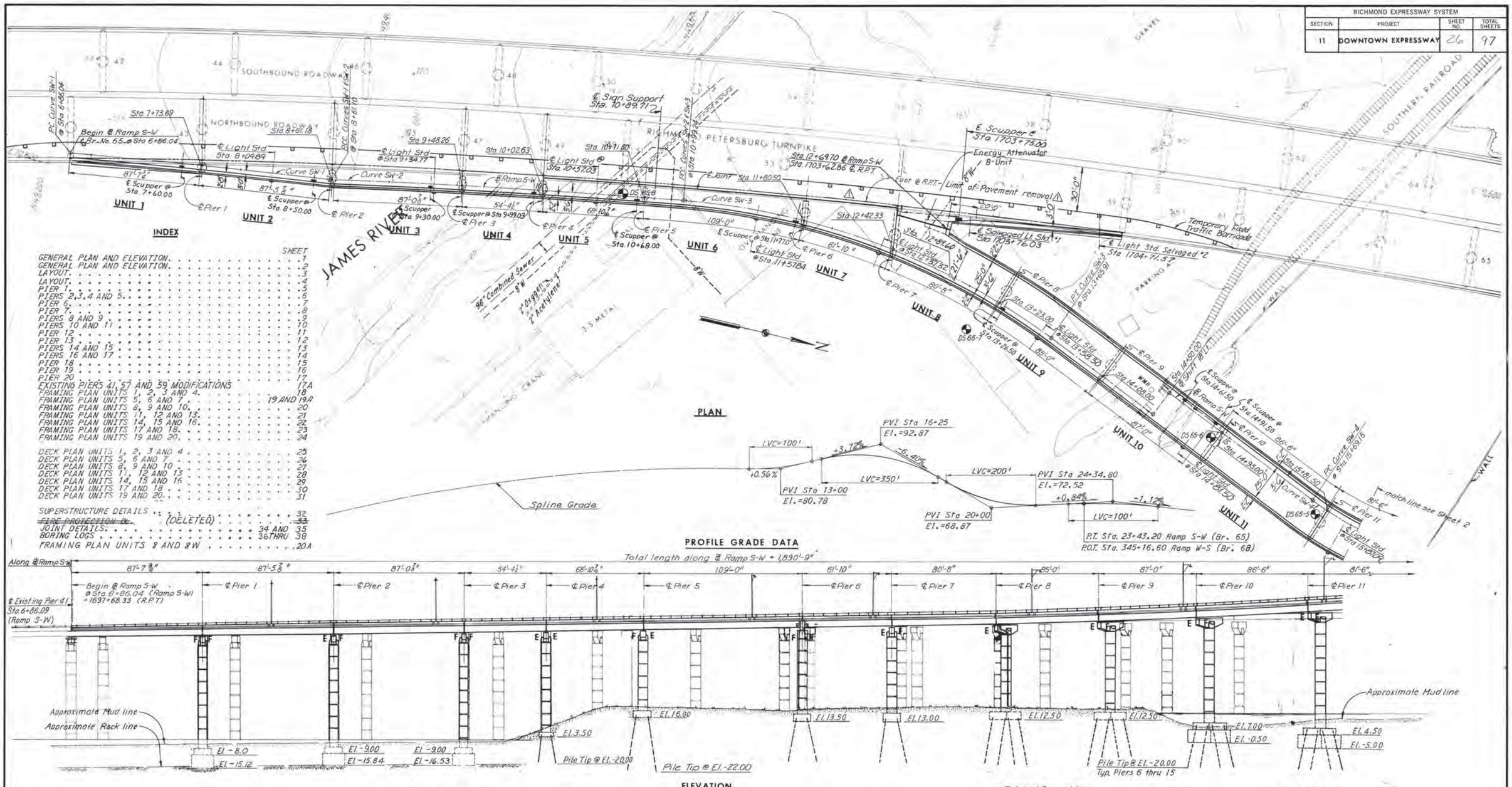
BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

JOINT DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 10
SHEET NO. 26 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	26	97



INDEX

PLAN

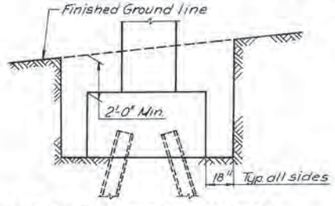
PROFILE GRADE DATA

Total length along ℄ Ramp S-W = 1,890'-9"

ELEVATION

Notes:
For General Plan and Elevation Units 12 thru 20 see Sheet 2.
For Layout of Ramp S-W, see Sheets 3 and 4.
For Estimated Quantities, see Sheet 4.
For Boring Logs, see Sheets 36 thru 38.
For General Notes, see Sheet 4.

Substructure Note: Footings for Piers 1, 2 and 3 shall be founded on concrete seals socketed 1'-0" into solid rock.



LIMITS OF STRUCTURE EXCAVATION

no scale

	BY	DATE
MADE	J.V. / J.L.K.	4-2-69 / 6-25-75
CHECKED	T.C.P. / D.W.B.	5-28-69 / 7-7-75
IN CHARGE		

NO.	REVISION	BY	DATE
3	Sheet 20a Added	T.E.M.	9-9-75
2	Profile Ramp W-S	T.E.M.	9-8-75
1	Limit of pavement removal & Sheet 17A added	G.B.P.	8-25-75

AS BUILT

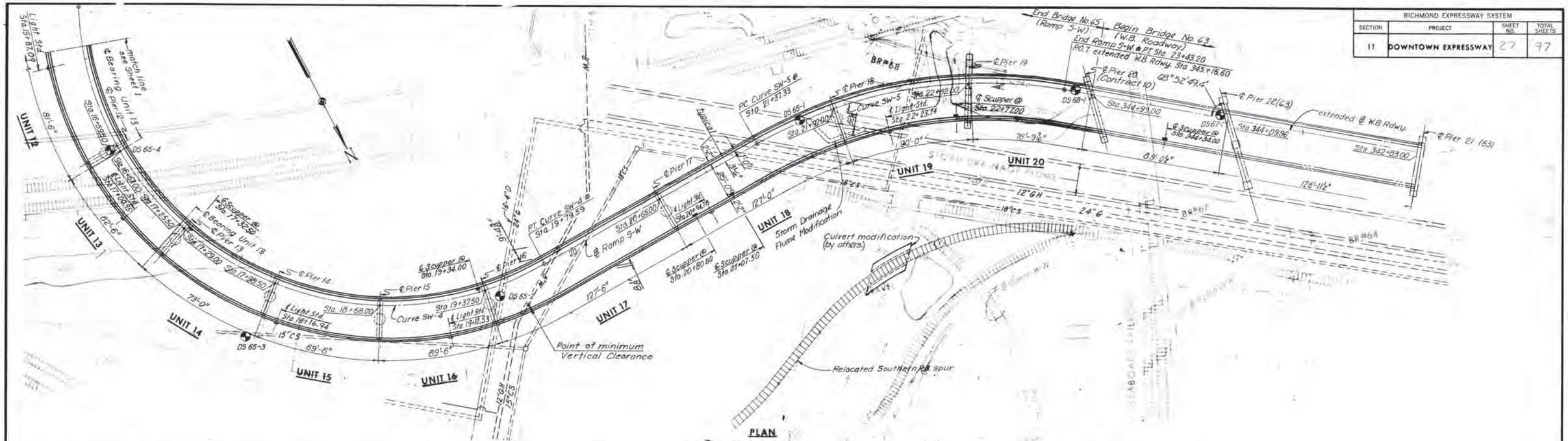
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=30'-0"
CONTRACT NO. 11
SHEET NO. 1 OF 38

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	27	97



PLAN

ELEVATION

Notes:
For General Plan and Elevation Units 1 thru 11, see Sheet 1.
For Layout of Ramp S-W, see Sheets 3 and 4.
For Estimated Quantities, see Sheet 4.
For Boring Logs, see Sheets 34 thru 38.
For General Notes, see Sheet 4.

HORIZONTAL CURVE DATA

℄ Ramp S-W

Curve: SW-1
P.I. = Sta. 7+73.58
Δ = 1°45'12"
D = 1°00'
T = 87.53'
L = 175.05'
R = 5,729.58'

Curve: SW-2
P.I. = Sta. 9+80.19
Δ = 2°24'12"
D = 1°00'33"
T = 119.09'
L = 238.14'
R = 5,677.58'

Curve: SW-3
P.I. = Sta. 12+36.15
Δ = 32°00'00"
D = 12°00'
T = 136'91'
L = 266.67'
R = 477.47'

Curve: SW-4
P.I. = Sta. 18+95.05
Δ = 116°25'03"
D = 28°21'51"
T = 325.90'
L = 410.44'
R = 202.00'

Curve: SW-5
P.I. = Sta. 22+44.51
Δ = 39°19'04"
D = 19°05'55"
T = 107.17'
L = 205.87'
R = 300.00'.

℄ Richmond-Petersburg Turnpike

Curve: R.P.T.-1
P.I. = Sta. 1704+68.83
Δ = 15°03'56"
D = 1°00'
T = 757.65'
L = 1,506.56'
R = 5,729.58

Curve: R.P.T.-2
P.I. = Sta. 1723+07.01
Δ = 33°27'07"
D = 4°00'
T = 430.45'
L = 836.30'
R = 1,432.39'

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.V.	4-2-69				
CHECKED	K.C.P.	5-28-69				
IN CHARGE						

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

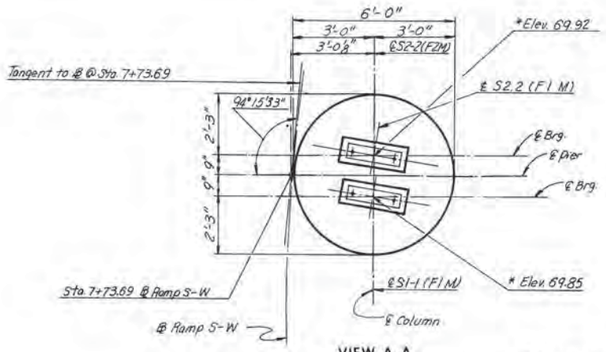
BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=30'-0"
CONTRACT NO. 11
SHEET NO. 2 OF 38

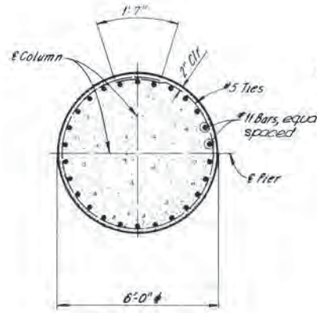
27

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	30	97

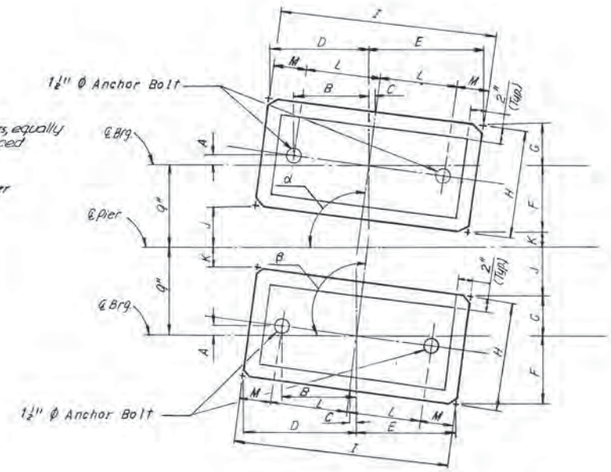


VIEW A-A
Scale : ⅜" = 1'-0"

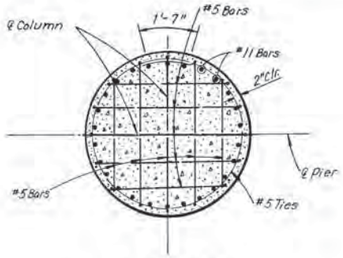
* Denotes top elevations of pad.



SECTION C-C
Scale: ⅜" = 1'-0"

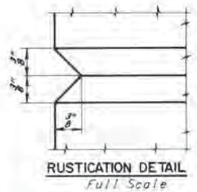


PAD AND ANCHOR BOLT SETTING PLAN
No Scale

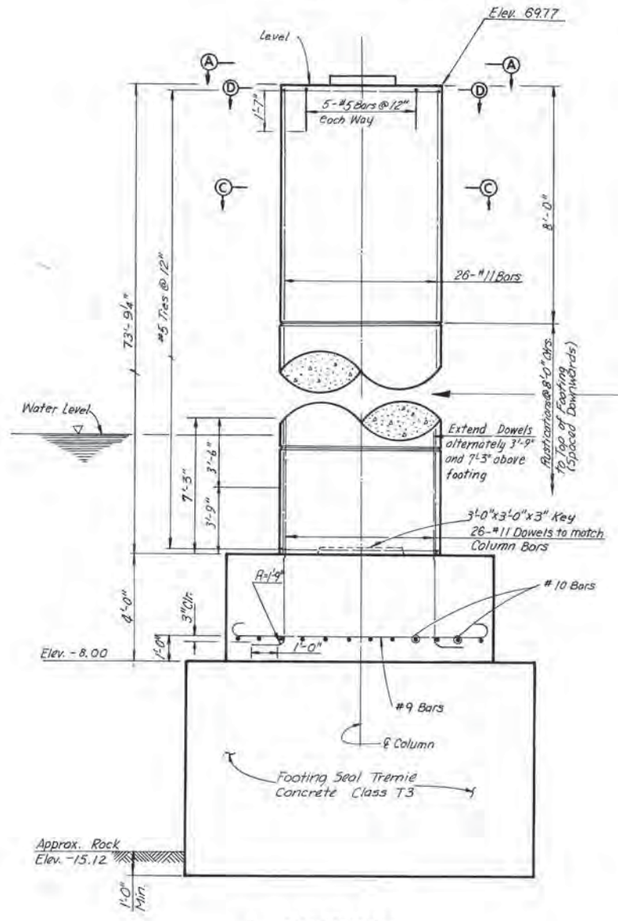


SECTION D-D
Scale : ⅜" = 1'-0"

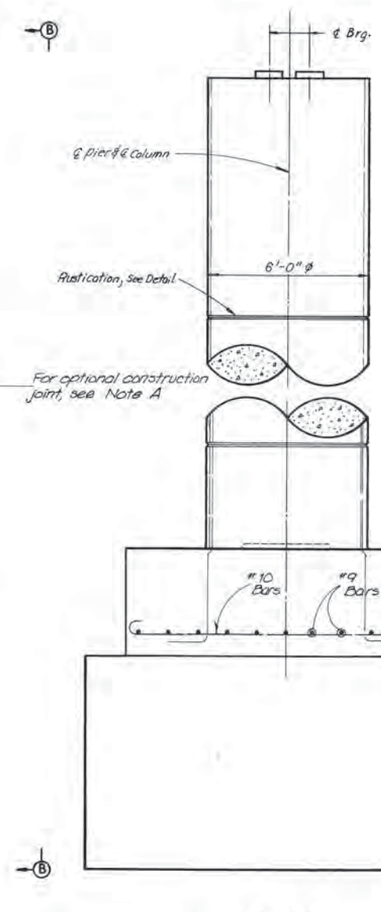
DIMENSIONS FOR PAD ANCHOR BOLT SETTING PLAN														
Stringer	α	β	A	B	C	D	E	F	G	H	I	J	K	L	M
S1-1	—	92°00'58"	5/16"	8"	3/16"	12 11/16"	12 5/16"	6 3/16"	5 5/16"	11½"	2'-1"	3 11/16"	2 13/16"	8"	4½"
S2-2	94°41'20"	—	3/8"	8"	½"	12"	12 9/16"	6¾"	4 11/16"	11½"	2'-1"	4 5/16"	2¼"	8"	4½"



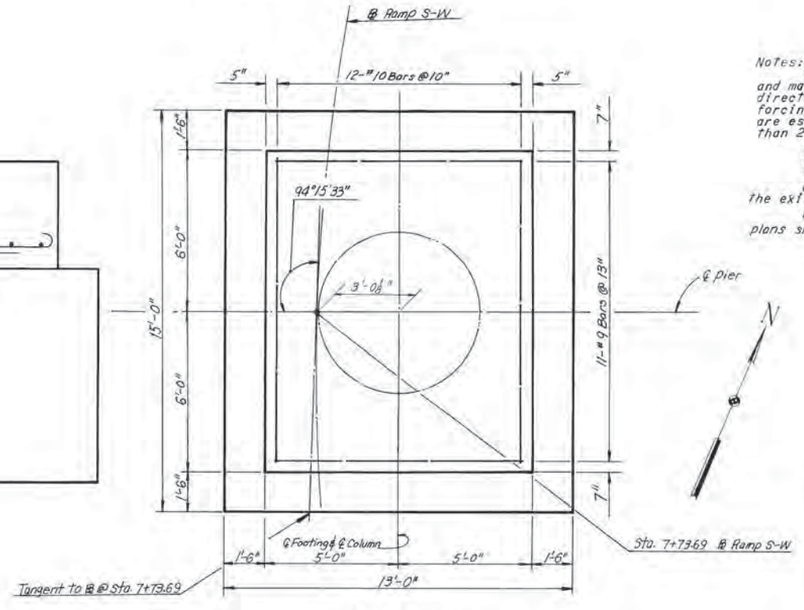
RUSTICATION DETAIL
Full Scale



ELEVATION PLAN
Scale : ⅜" = 1'-0"



VIEW B-B
Scale : ⅜" = 1'-0"



FOOTING PLAN
Scale : ⅜" = 1'-0"

Notes:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.
For Standard Shoe Details, see Sheet S1 & S2.
For Framing Plan, see Framing Plan Sheets 18.
For Quantities of Steel and Concrete, see Sheet 4.
Overexcavation will not be permitted between the existing pier and new pier.
Pier 1 is to match existing Pier 43. Station shown on plans shall be verified by the Contractor in the field.

NOTE A
A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap of the splice shall be a minimum of 3'-6". Splices shall be staggered at least 3'-3" between adjacent bars.

	BY	DATE
MADE	G.S.H.	2-10-69
	J.L.K.	6-25-75
CHECKED	K.C.T.	2-18-69
IN CHARGE		

NO.	REVISION	BY	DATE
2	Pad Elev. Shoe Type & Anchor Bolt set. Dim.	T.E.M.	9-76
1	Pad Elev., Str. no. & column height	T.E.M.	9-5-75

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

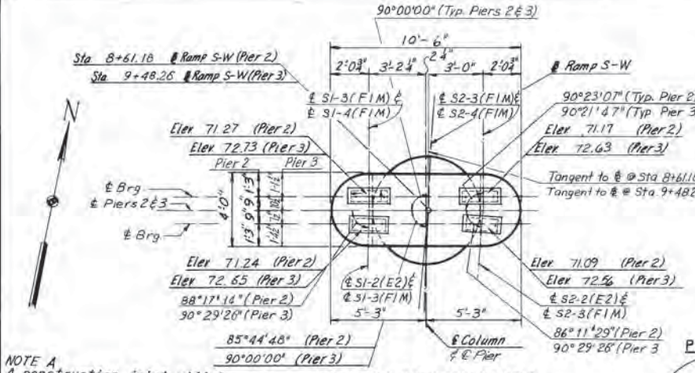
BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

PIER 1

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

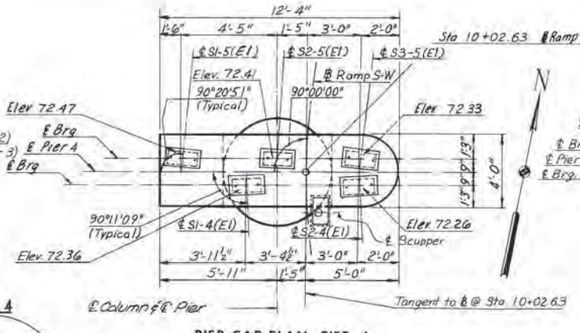
SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 5 OF 38

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	31	97

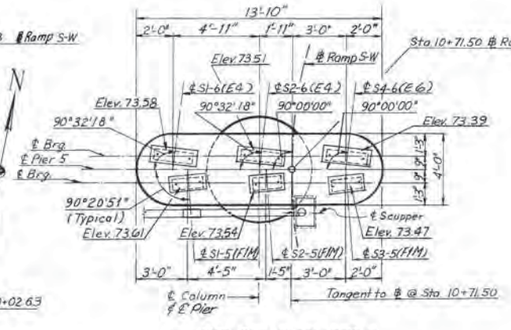


NOTE A
A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap at the splice shall be a minimum of 3'-6". Splices shall be Staggered at least 3'-3" between adjacent bars.

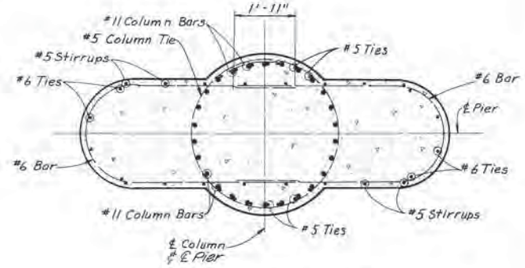
PIER CAP PLAN-PIERS 2 AND 3
Scale: 1/4"= 1'-0"



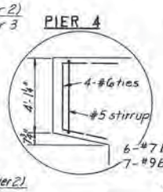
PIER CAP PLAN- PIER 4
Scale: 1/4"=1'-0"

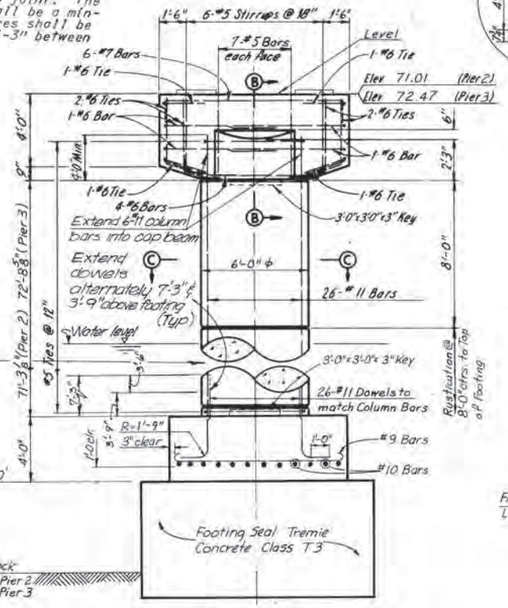


PIER CAP PLAN - PIER 5
Scale: 1/4"=1'-0"

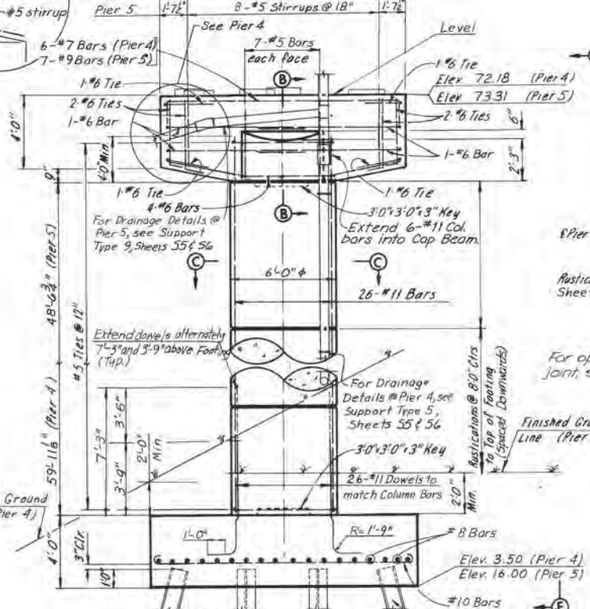


TYPICAL SECTION THRU CAP BEAM
Scale: 3/8"=1'-0"

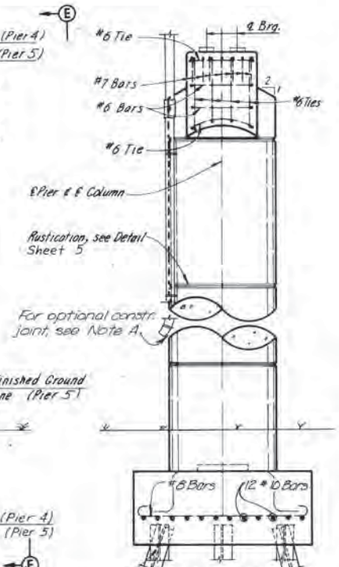




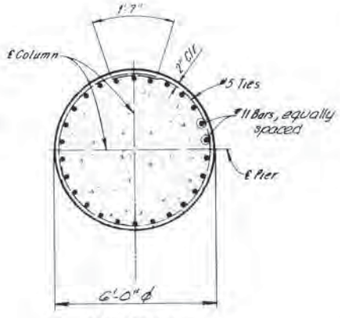
ELEVATION- PIERS 2 AND 3
Scale: 1/4"= 1'-0"



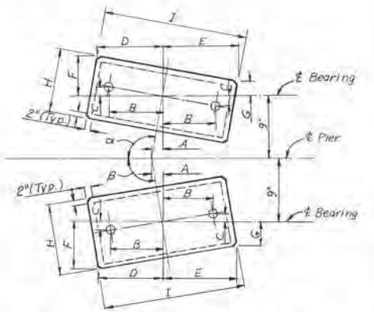
ELEVATION- PIERS 4 AND 5
Scale: 1/4"= 1'-0"



VIEW E-E
Scale: 1/4" = 1'-0"



SECTION C-C
Scale: 1/4" = 1'-0"

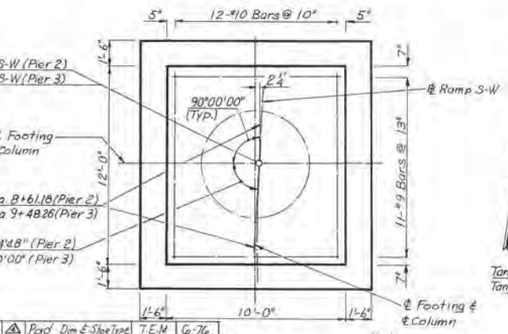


PAD AND ANCHOR BOLT SETTING PLAN
No Scale

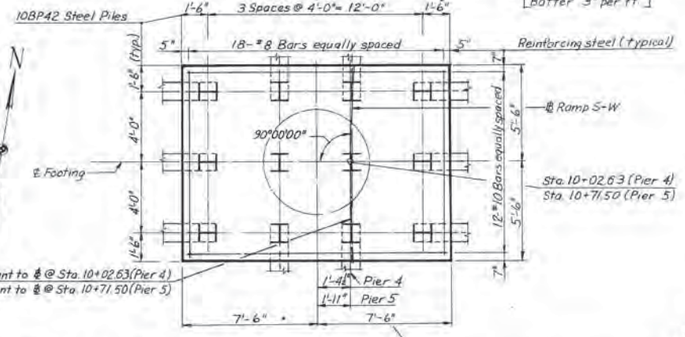
DIMENSIONS FOR PAD AND ANCHOR BOLT SETTING PLAN

Pier	Stringer	∝	B	A	B	C	D	E	F	G	H	I
2	S1 & S2-3	90°29'26"	-	1/4"	8"	1/4"	12 1/16"	12 9/16"	5 1/4"	5 3/16"	11 1/8"	2'-1"
2	S1-2	-	88°17'14"	1/4"	8 1/4"	1/4"	12 1/16"	6 9/16"	6 3/8"	6 3/8"	1'-1"	2'-0 1/2"
2	S2-2	-	86°11'29"	3/16"	8 1/4"	9/16"	12 3/8"	11 13/16"	5 11/16"	7 1/16"	1'-1"	2'-0 1/2"
3	S1 & S2-4	90°21'47"	-	1/16"	8"	1/16"	12 1/16"	12 9/16"	5 3/16"	5 3/16"	11 1/8"	2'-1"
3	S1 & S2-3	-	90°29'26"	1/16"	8"	1/16"	12 1/16"	12 9/16"	5 1/4"	5 3/16"	11 1/8"	2'-1"
4	S1, S2 & S3-5	90°20'51"	-	1/16"	8 1/16"	1/16"	12 1/16"	12 5/16"	6 1/16"	5 13/16"	1'-0"	2'-0 1/8"
4	S1 & S2-4	-	90°11'09"	1/16"	8 1/16"	1/16"	12 1/16"	12 1/16"	6 1/16"	5 13/16"	1'-0"	2'-0 1/16"
5	S1 & S2-6	90°32'18"	-	1/16"	10 1/2"	1/16"	14 1/16"	14 9/16"	6 1/16"	6 1/16"	1'-0 1/16"	2'-5"
5	S4-6	90°00'00"	-	0"	11 1/16"	0"	15 1/16"	15 1/16"	6 1/16"	6 1/16"	1'-0 1/16"	2'-6 1/16"
5	S1, S2 & S3-5	-	90°20'51"	1/16"	8"	1/16"	12 1/16"	12 9/16"	5 13/16"	5 13/16"	11 1/8"	2'-1"

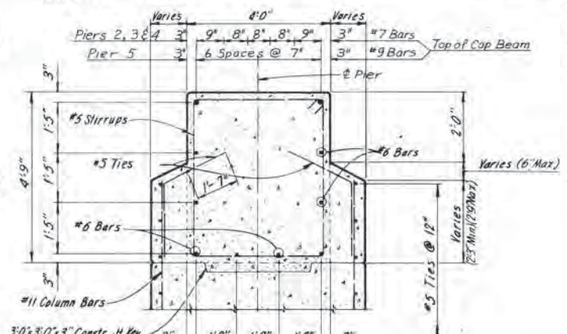
Notes:
Overexcavation will not be permitted between existing piers and new piers.
Piers 2, 3 and 4 are to match existing Piers 45, 47 and 49 respectively. Stations shown on the plans shall be verified by the Contractor in the field.
All piles shall be 10BP42 Steel Piles (Design Capacity = 45 tons).
For Framing Plans, see Sheets 18 & 19.
Estimated pile tip elevation = 20.0 Pier 4 and - 22.0 Pier 5.
Batter piles 3" per foot where shown
For Rustication Details, see Sheet 10.
For Pile Detail, see Sheet 9.
For Quantities of Steel and Concrete, see Sheet 9.



FOOTING PLAN- PIERS 2 AND 3
Scale: 1/4"= 1'-0"



FOOTING PLAN- PIERS 4 AND 5
Scale: 1/4"= 1'-0"



SECTION B-B
Scale: 1/4" = 1'-0"

Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.

Tangent to ℄ @ Sta. 10+02.63 (Pier 4)
Tangent to ℄ @ Sta. 10+71.50 (Pier 5)

NO.	REVISION	BY	DATE
3	Col. Reinf. Arrangement	TEM	9-30-76
2	Pad Dim. & Shoe Type	T.E.M.	6-76
1	Pad Elev.	T.E.M.	5-76
	Pad Elev. Shoe Type & Anchor Bolt Set. Plan	TEM	4-76
	Pad Elev. & Col. Dim.	T.E.M.	9-8-75

	BY	DATE
MADE	JJD JLH	2-8-89 6-25-75
CHECKED	G.S.H	2-20-89
IN CHARGE		

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

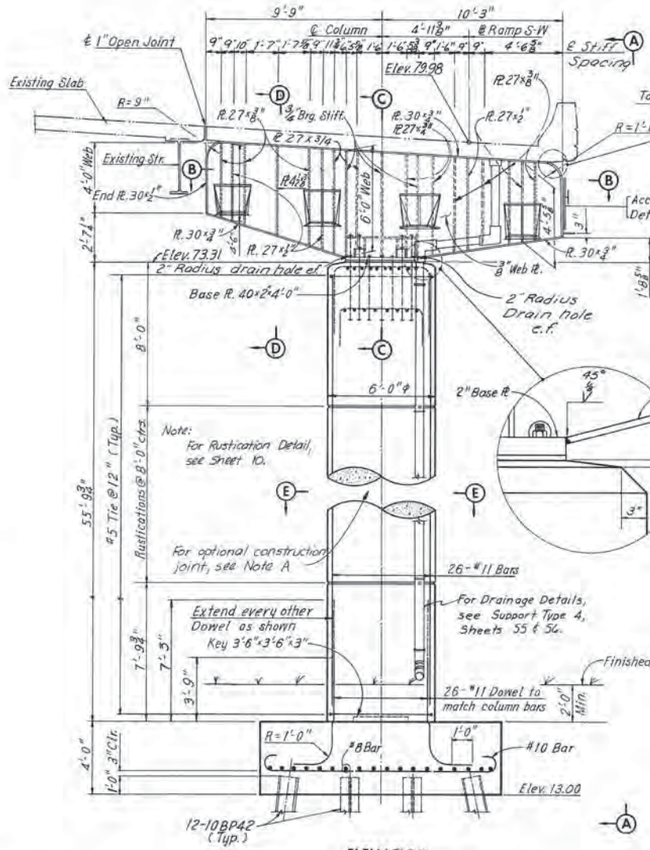
BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
PIERS 2, 3, 4 AND 5

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

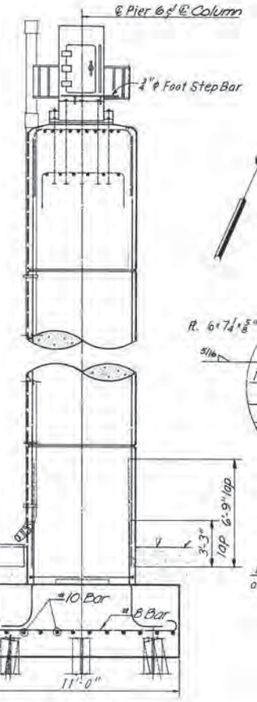
SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 6 OF 38

31

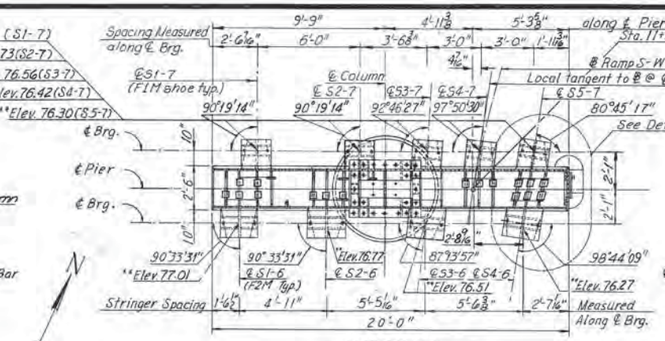
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	32	97



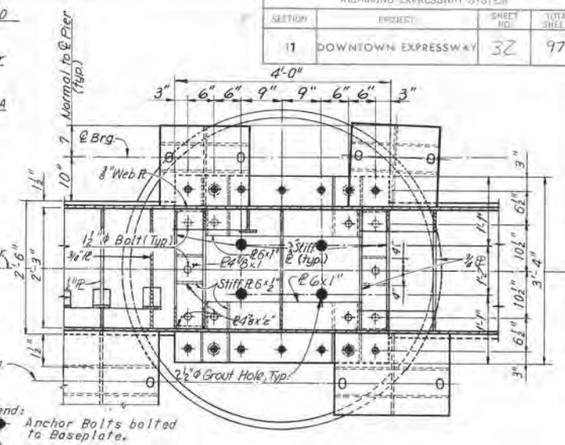
ELEVATION
Scale: ¼"=1'-0"



VIEW A-A
Scale: ¼"=1'-0"

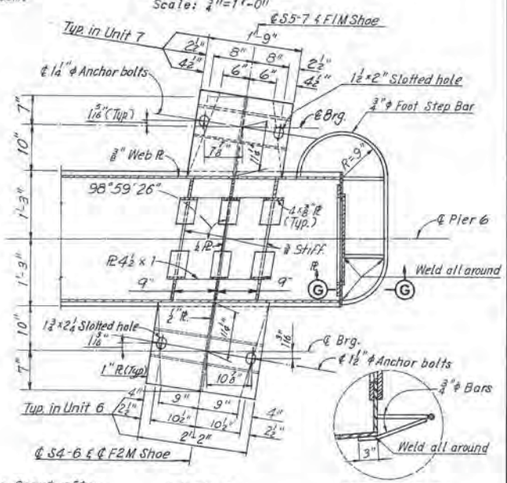


SECTION B-B
Scale: ¼"=1'-0"



BASE PLATE PLAN
Scale: ¾"=1'-0"

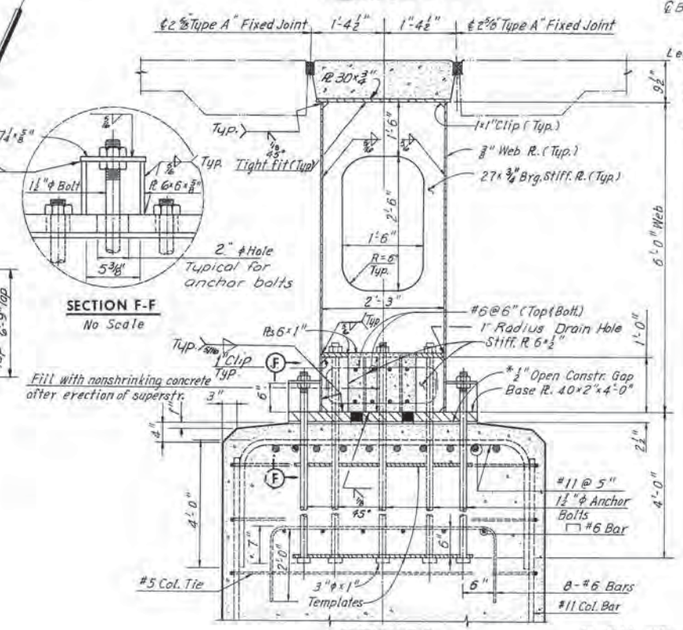
Legend:
- Anchor Bolts bolted to Baseplate.
- Adjustment Bolts bolted to ¾" bracket.
- Anchor Bolts bolted to 1" bracket inside Cap Beam.



DETAIL A
Scale: ¾"=1'-0"

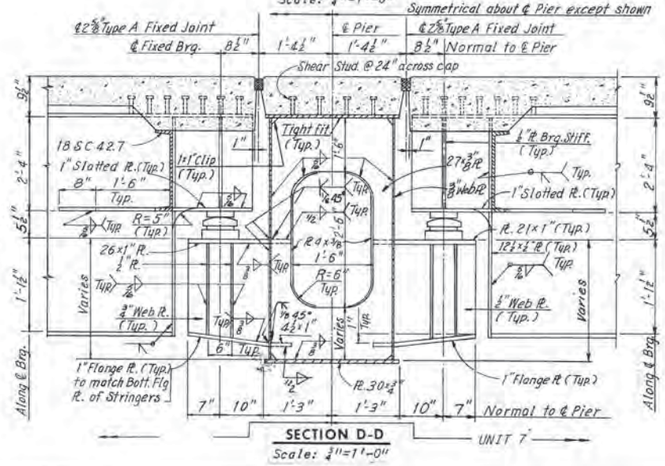
SECTION G-G
No Scale

SECTION F-F
No Scale

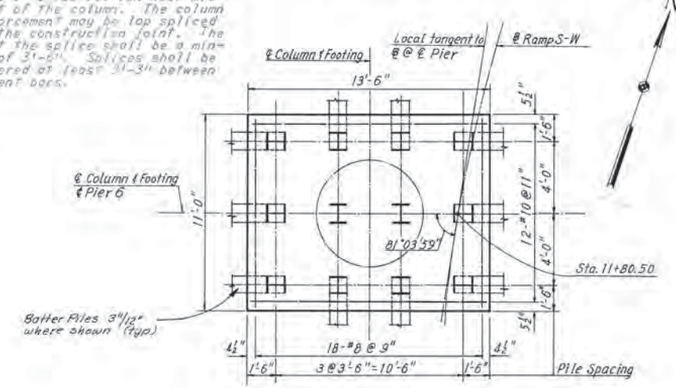


SECTION C-C
Scale: ¾"=1'-0"

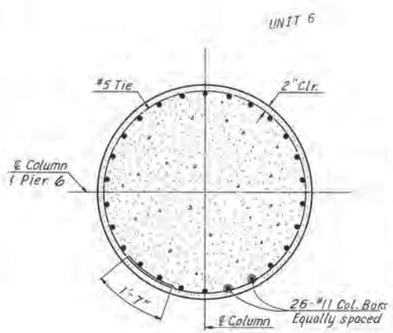
* Fill with nonshrinking Grout after Cap beam is in final position.



SECTION D-D
Scale: ¾"=1'-0"



FOOTING PLAN
Scale: ¼"=1'-0"



SECTION E-E
Scale: ¼"=1'-0"

NOTE A
A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap at the splice shall be a minimum of 31'-6". Splices shall be staggered at least 31-3" between adjacent bars.

Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcement shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.

Note:
All Structural Steel for Pier 6 shall be A36.
Top of cap beam, Pier 6, need not be cambered.

Notes:
For Joint Details see Sheet 34 and 35.
For Shear Stud Details see Sheet 20.
For Shoe Details see Sheet 51 and 52.
For Bearing Pile Details see Sheet 9.

Estimated Pile tip Elevation = -20.0
All piles shall be 10BP42 (Design capacity = 45 tons).

Note:
All anchor bolts connecting cap beam to column shall be 1½" in Dia. and each nut shall have washer (not shown on details)

	BY:	DATE:
MADE	R.C.T.	2-13-69
	J.L.R.	6-23-75
CHECKED	S.C.C.	5-27-69
IN CHARGE		

NO.	REVISION	BY	DATE
3	Shoe Plate Dim. in Detail A	T.E.M.	8-76
2	Pier Cap Dim.	T.E.M.	3-76
1	Pad Elev. & Col. Dim.	T.E.M.	9-8-75

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY
BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
PIER 6

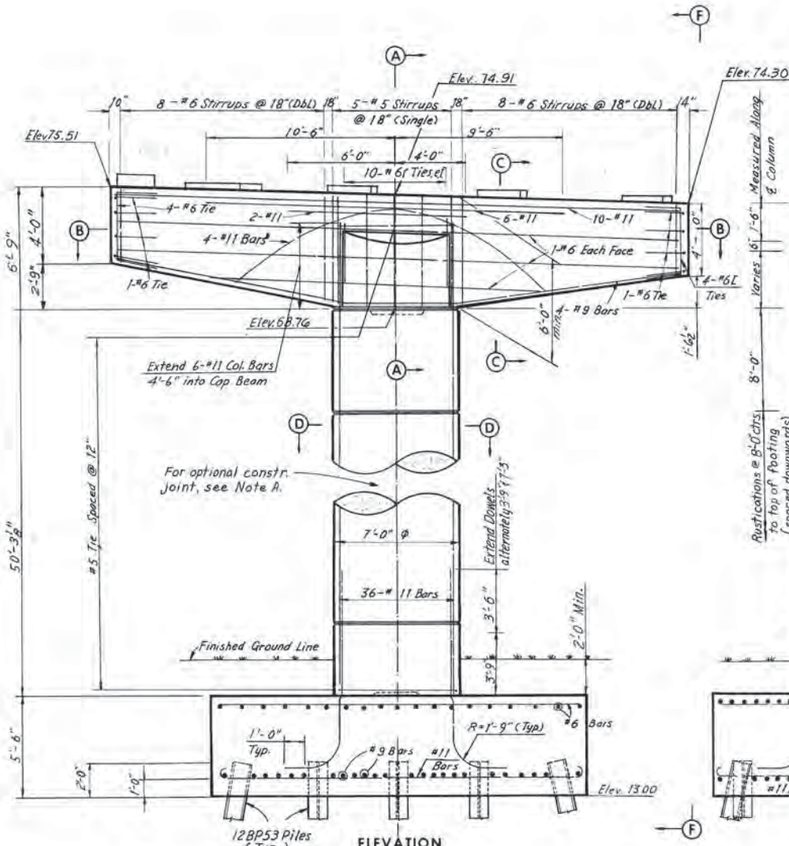
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 7 OF 38

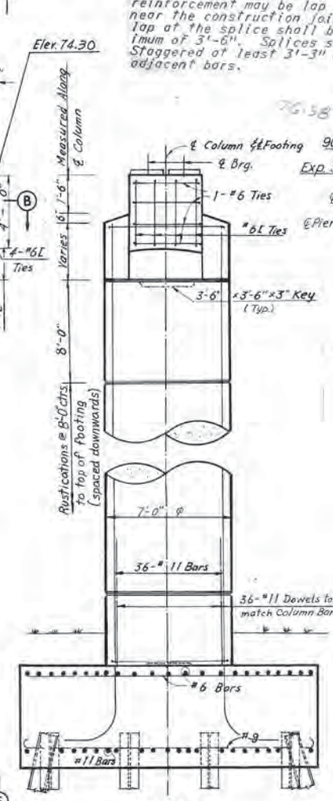
32

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	33	97

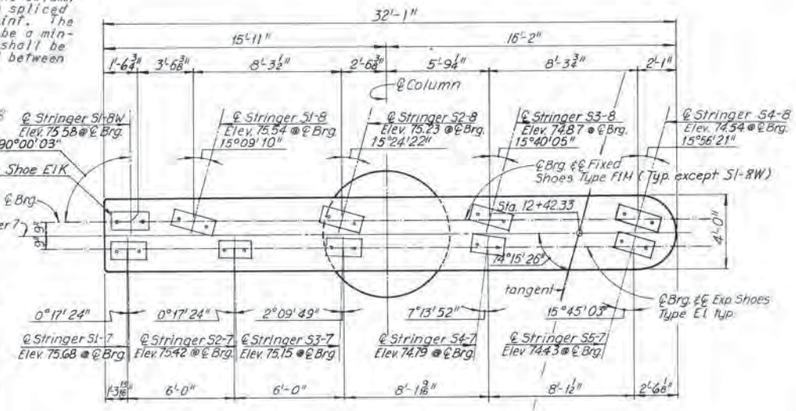
NOTE A
A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap at the splice shall be a minimum of 3'-6". Splices shall be Staggered at least 3'-3" between adjacent bars.



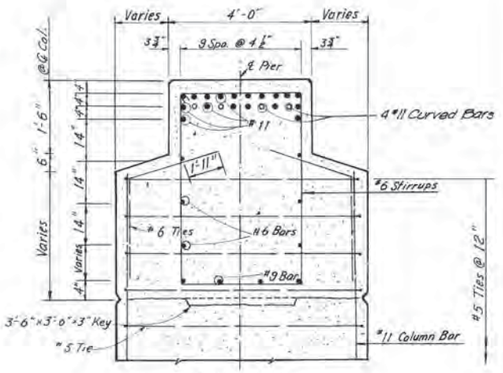
ELEVATION
Scale: 1/4"=1'-0"



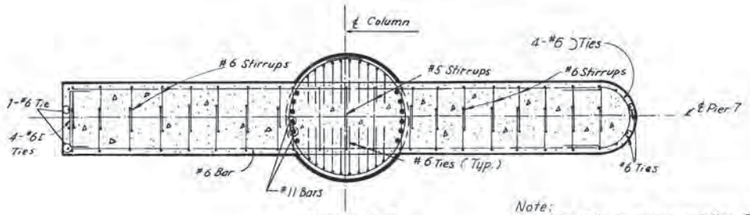
VIEW F-F
Scale: 1/4"=1'-0"



PIER CAP PLAN
Scale: 1/4" = 1'-0"

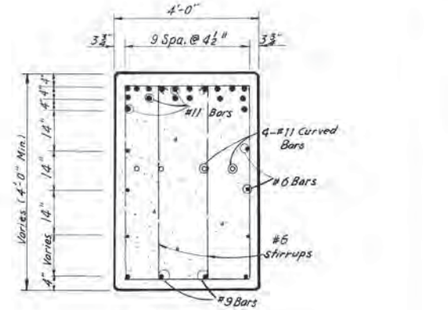


SECTION A-A
Scale: 1/2"=1'-0"

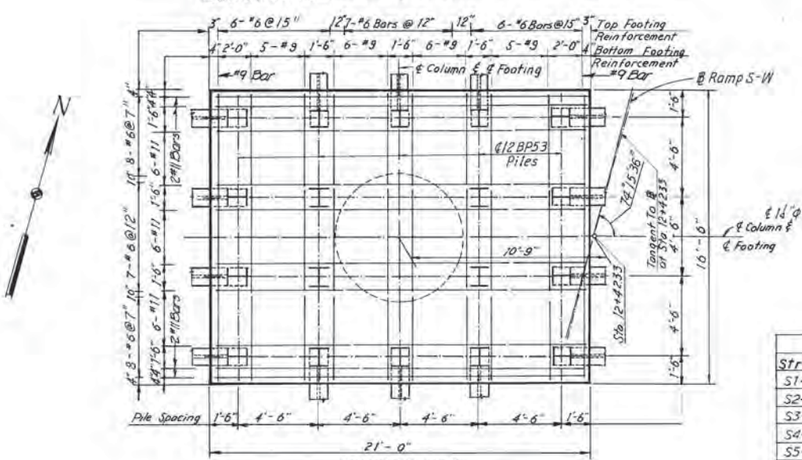


SECTION B-B
Scale: 1/4"=1'-0"

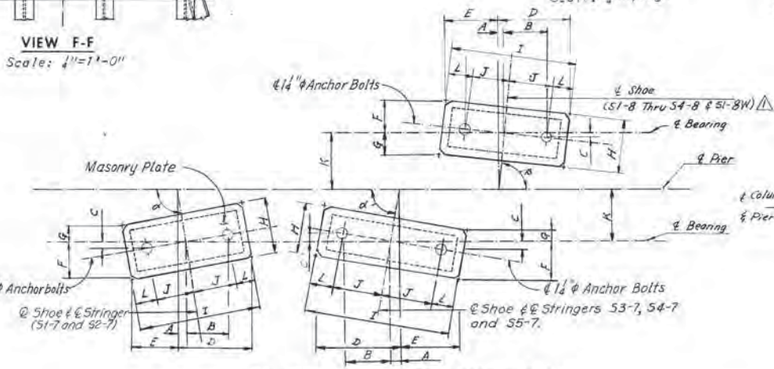
Note:
Pier 7 is to match existing Pier 55. Station shown shall be verified by the Contractor in the field.



SECTION C-C
Scale: 1/2"=1'-0"



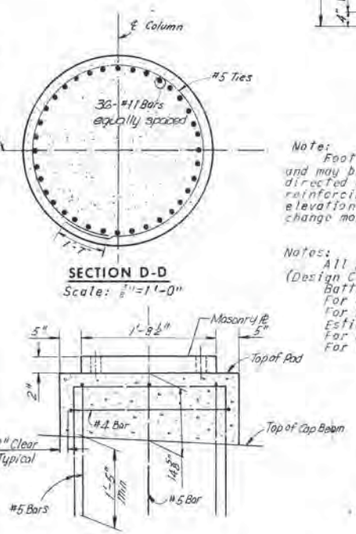
FOOTING PLAN
Scale: 1/4"=1'-0"



PAD AND ANCHOR BOLT SETTING PLAN
No Scale

DIMENSIONS OF ANCHOR BOLT SETTING PLAN

Stringer	α	β	A	B	C	D	E	F	G	H	I	J	K	L
S1-7	90°17'24"	---	4"	8 1/4"	4"	1'-0 5/16"	1'-0 3/4"	6 1/16"	5 5/16"	1'-0"	2'-0 1/2"	8 1/4"	9"	4"
S2-7	90°17'24"	---	4"	8 1/4"	4"	1'-0 5/16"	1'-0 3/4"	6 1/16"	5 5/16"	1'-0"	2'-0 1/2"	8 1/4"	9"	4"
S3-7	87°50'11"	---	4 5/16"	8 1/4"	4 5/16"	1'-0 15/16"	1'-1 1/16"	6 1/16"	5 5/16"	1'-0"	2'-0 1/2"	8 1/4"	9"	4"
S4-7	82°46'08"	---	1 1/4"	8 3/16"	1 1/4"	1'-2 1/4"	10 1/4"	7 1/4"	4 5/16"	1'-0"	2'-0 1/2"	8 1/4"	9"	4"
S5-7	74°14'57"	---	2 3/8"	7 15/16"	2 1/4"	1'-3 15/16"	7 5/16"	9 1/4"	2 5/16"	1'-0"	2'-0 1/2"	8 1/4"	9"	4"
S1-8	---	74°50'50"	2 1/2"	10 1/8"	2 3/8"	1'-6 3/16"	10 5/16"	9 1/16"	1 3/16"	1'1"	2'-6"	10 1/2"	9"	4 1/2"
S2-8	---	74°35'38"	2 1/2"	10 1/8"	2 3/8"	1'-6 3/16"	10 1/4"	9 5/16"	1 3/16"	1'1"	2'-6"	10 1/2"	9"	4 1/2"
S3-8	---	74°19'55"	2 1/2"	10 1/8"	2 3/8"	1'-6 1/16"	10 1/16"	9 3/16"	1 1/4"	1'1"	2'-6"	10 1/2"	9"	4 1/2"
S4-8	---	74°03'39"	2 3/8"	10 1/4"	2 7/16"	1'-6 1/16"	10 5/16"	9 3/16"	1 7/16"	1'1"	2'-6"	10 1/2"	9"	4 1/2"
S1-8W		89°59'57"	-"-	8 1/4"	-"-	1'-0 1/4"	1'-0 1/4"	6"	6"	1'-0"	2'-0 1/2"	8 1/4	9"	4"



SECTION D-D
Scale: 1/2"=1'-0"

Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.

Notes:
All piles shall be 12BP53 steel piles (Design Capacity = 57 tons.)
Batter all piles 3" per foot where shown.
For Standard Shoe Details, see Sheet S1 & S2.
For Framing Plan, see Sheet 19 & 20.
Estimated Pile Tip Elevation is -20.0
For Rustication Details, see Sheet 10.
For 12BP53 Steel Pile Details, see Sheet 9.

REINFORCING PAD DETAIL OF S1-8W
No Scale

	BY	DATE
DRAWN	A.E.	2-17-89
TRACED	J.L.K.	6-26-75
CHECKED	Y.C.P.	3-3-89
IN CHARGE		

NO.	REVISION	BY	DATE
3	Cap Dimensions	PRY	10-76
2	Pad Elev. Col. Dim.	T.E.M.	9-8-75
1	S1-8W Angle & Pad. Dim.	T.E.M.	9-2-75

AS BUILT

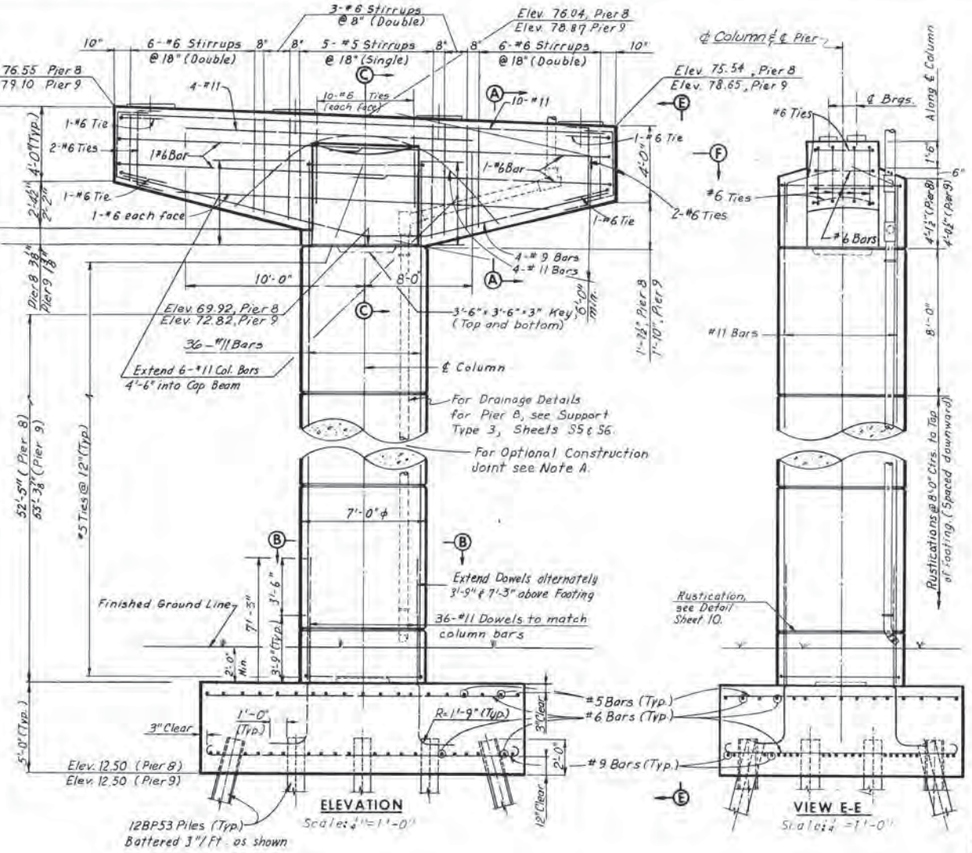
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

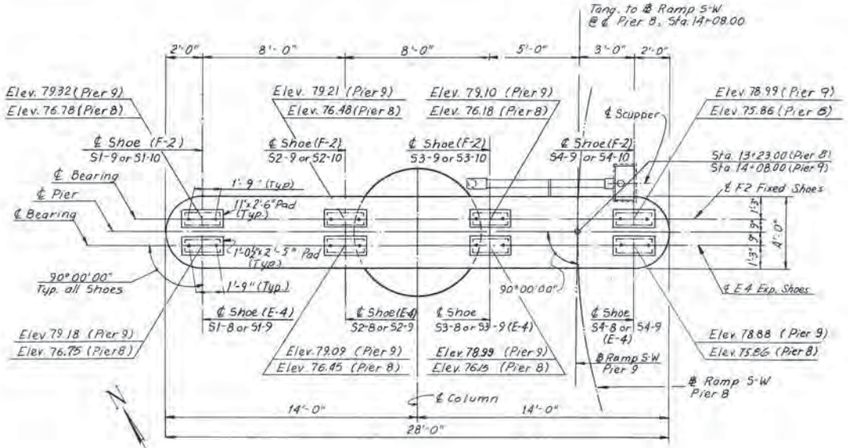
BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
PIER 7

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 8 OF 38

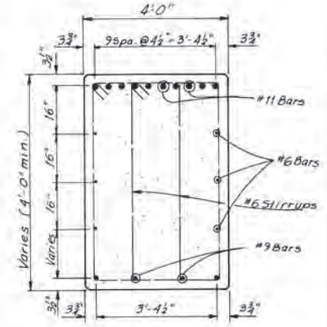
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	34	97





PLAN

Scale: 1"=1'-0"

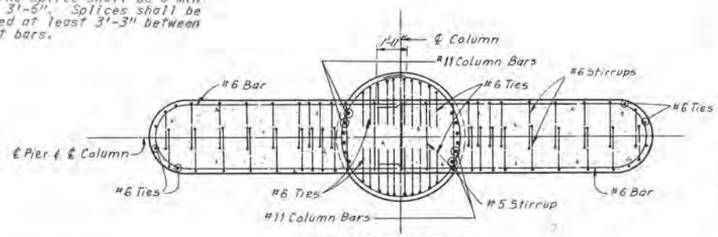


SECTION A-A

Scale: 1"=1'-0"

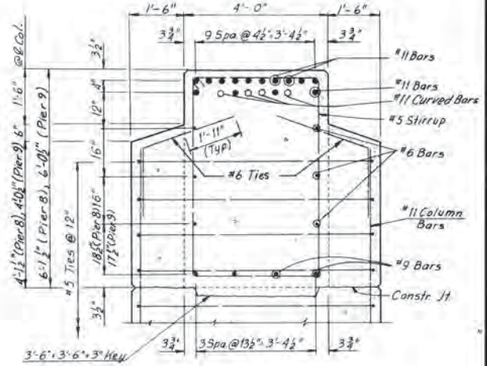
NOTE A

A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap of the splice shall be a minimum of 3'-6". Splices shall be staggered at least 3'-3" between adjacent bars.



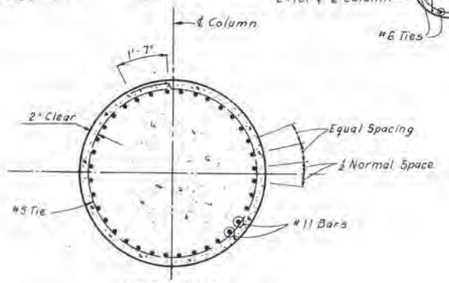
SECTION F-F

Scale: 1"=1'-0"



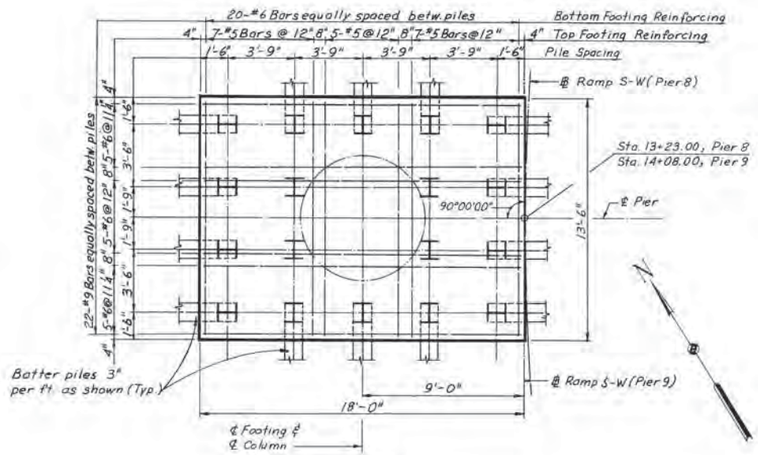
SECTION C-C

Scale: 1" = 1'-0"



SECTION B-B

Scale: 1"=1'-0"

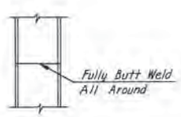


FOOTING PLAN

Scale: 1"=1'-0"

Note:

Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcement shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.



STEEL PILE SPLICE DETAIL

No Scale

Notes:

All piles shall be 12BP53 Steel Piles (Design capacity= 57 tons).
Batter piles 3" per ft. as shown.
For Standard Shoe Details see Sheet S1 & S2.
For Framing Plans see Sheet 20.
Estimated Pile Tip elevation -20.0

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	CEB/JD	12-17-68				
CHECKED	PTA	01-07-69				
IN CHARGE						

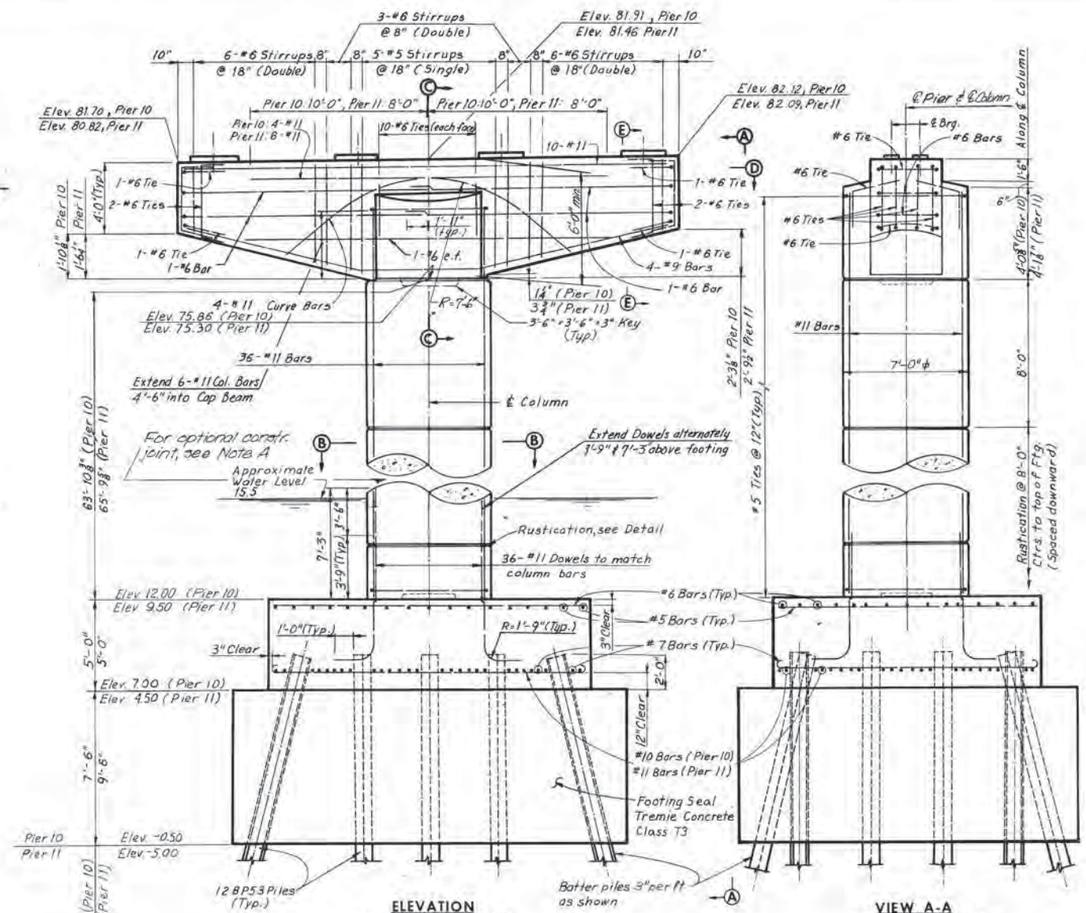
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
PIERS 8 AND 9

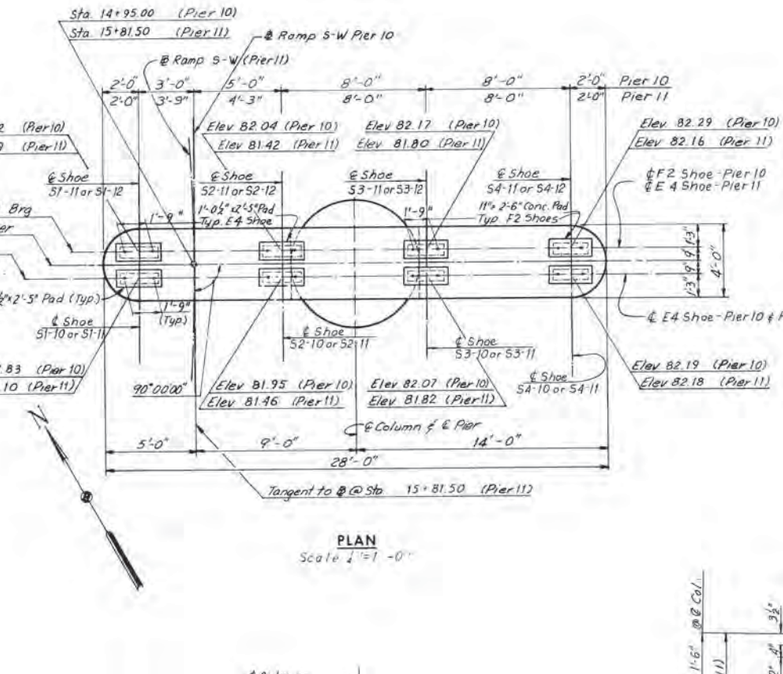
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 9 OF 38

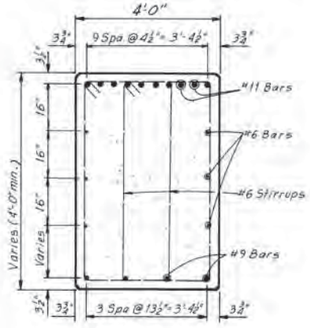
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	35	97



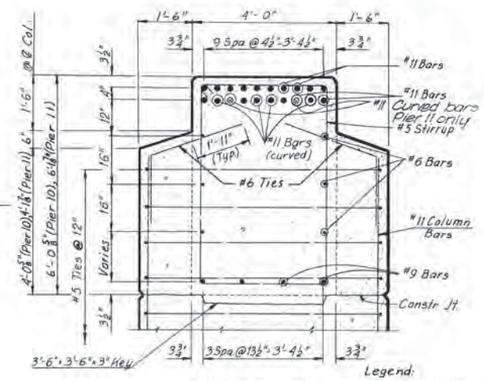
ELEVATION
Scale: ¼" = 1'-0"



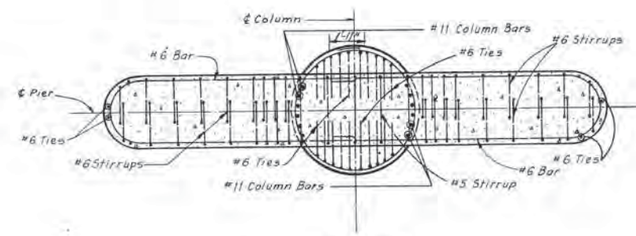
PLAN
Scale ¼" = 1'-0"



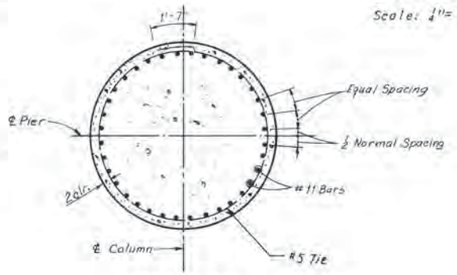
SECTION E-E
Scale ½" = 1'-0"



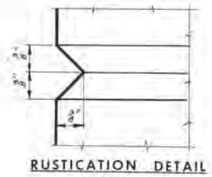
SECTION C-C
Scale: ½" = 1'-0"



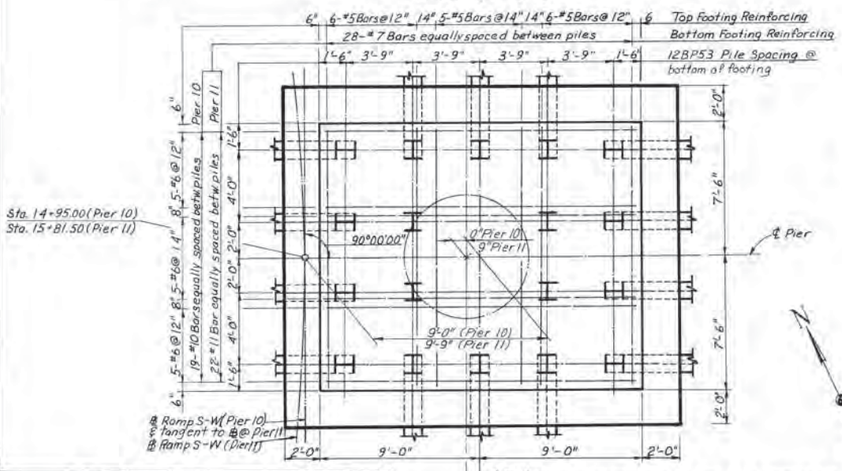
SECTION D-D
Scale: ½" = 1'-0"



SECTION B-B
Scale: ¾" = 1'-0"



RUSTICATION DETAIL
Full Scale



FOOTING PLAN
Scale: ¼" = 1'-0"

FOOTING FOR PIER 11 IS ECCENTRIC AS SHOWN ON FOOTING PLAN

Note:
Bottom reinforcement shown in View A-A is for pier 11 only. Bottom reinforcement for pier 10 is similar except in size & number.

Note:
For layout of piers 10 and 11 See Sheet 3.
Pile dimensions given on Footing plan are measured at bottom of Footing (Elev. 7.00 Pier 10 and Elev. 4.50 Pier 11).

NOTE A
A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap of the splice shall be a minimum of 3'-6". Splices shall be staggered at least 3'-3" between adjacent bars.

Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcement shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.

Notes:
All piles shall be 12BP53 Steel Piles (Design capacity = 57 Tons).
Batter piles 3" per ft. as shown.
For Standard Shoe Details see Sheet S1 & S2.
For Framing Plans see Sheet 20 & 21
Estimated Pile Tip elevation -20.0

AS BUILT

	BY	DATE
MADE	CRB/JD	12-18-68
CHECKED	GSH	1-21-69
IN CHARGE		

NO.	REVISION	BY	DATE

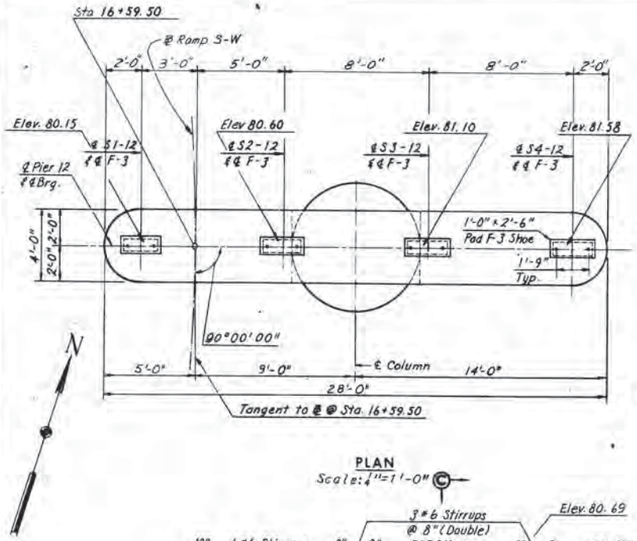
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
PIERS 10 AND 11

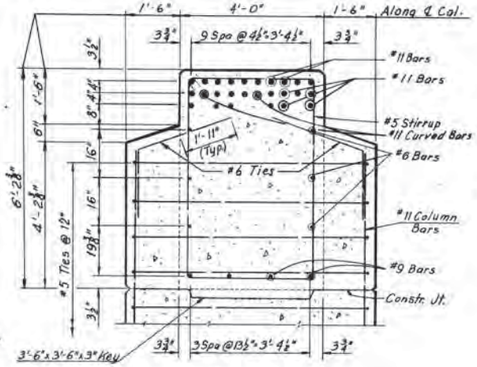
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 10 OF 38

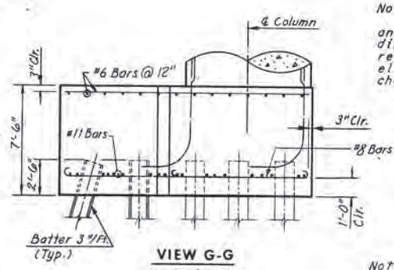
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	36	97



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



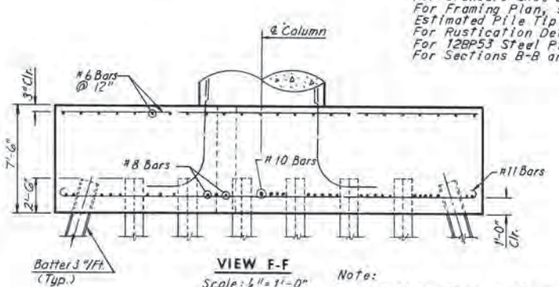
SECTION C-C
Scale: 1/2" = 1'-0"



VIEW G-G
Scale: 1/4"=1'-0"

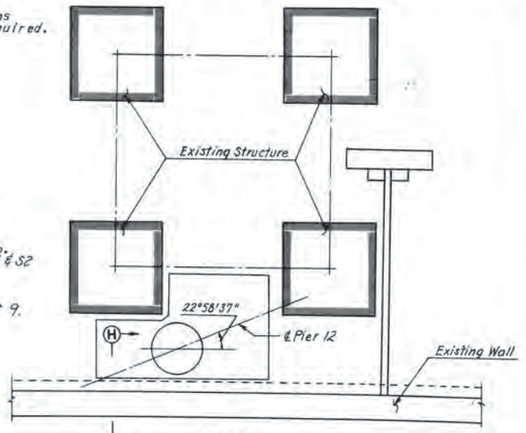
Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.

Notes:
All piles shall be 12BP53 steel piles (Design Capacity= 57 tons)
Batter all piles 3" per foot where shown.
For Standard Shoe Details, see Sheets S1 & S2
For Framing Plan, see Sheet 21.
Estimated Pile Tip Elevation is -20.0.
For Rustication Details, see Sheet 5.
For 12BP53 Steel Pile Details, see Sheet 9.
For Sections B-B and D-D, see Sheet 12.

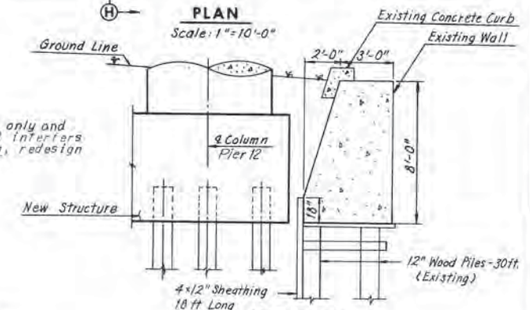


VIEW F-F
Scale: 1/4"=1'-0"

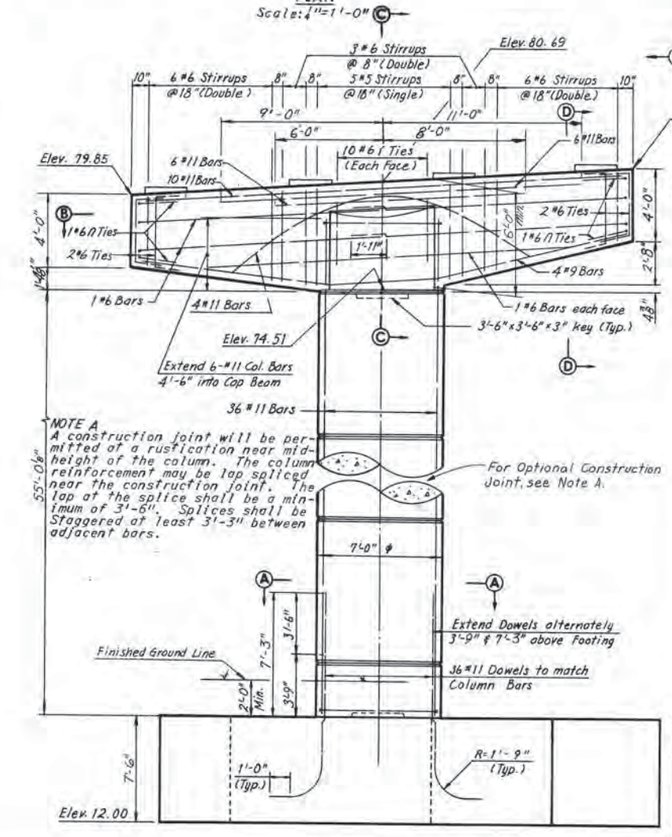
Note:
Wall location as shown on Plan is approximate only and shall be verified in field. If existing wall interfers with the piling or parts of the new footing, redesign of footing will be required



PLAN
Scale: 1"=10'-0"

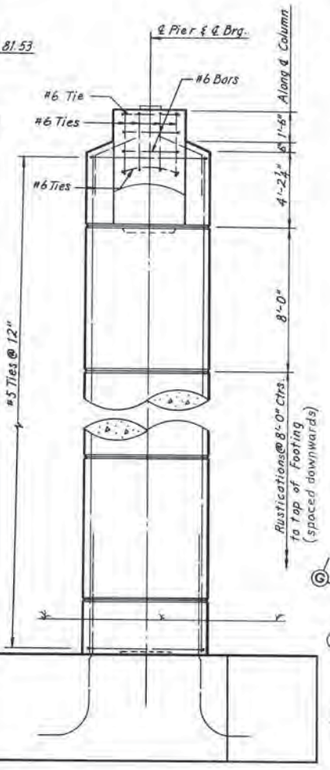


SECTION H-H
Scale: 1/4"=1'-0"



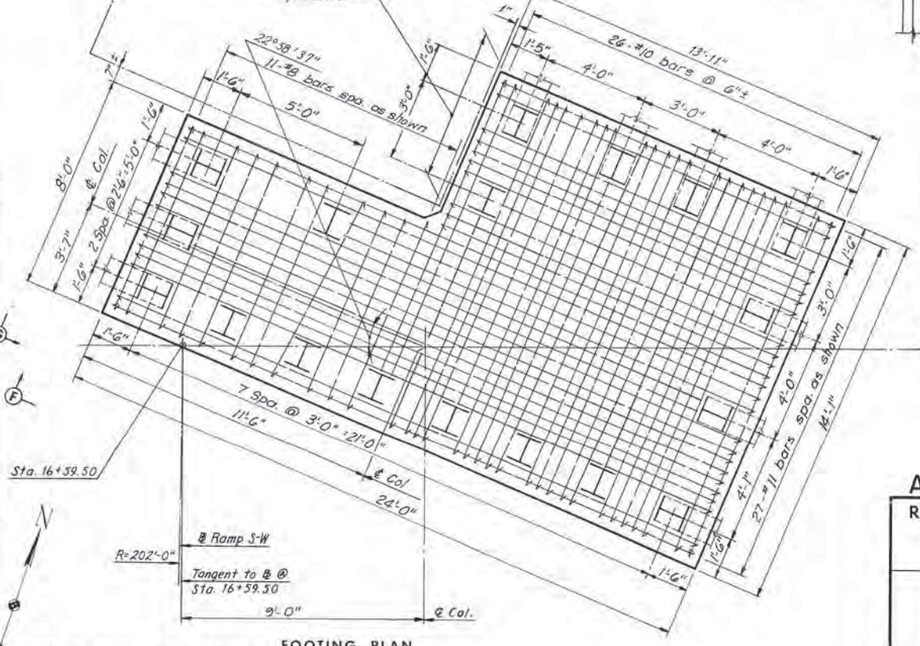
ELEVATION
Scale: 1/4"=1'-0"

NOTE A
A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap at the splice shall be a minimum of 3'-6". Splices shall be Staggered at least 3'-3" between adjacent bars.



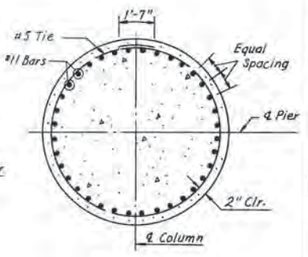
VIEW E-E
Scale: 1/4"=1'-0"

Note:
12 BP 53 Bearing Piles and Footing Reinforcing Steel in "ELEVATION" or "VIEW E-E" are not shown.



FOOTING PLAN
Scale: 1/8"=1'-0"

FOOTING FOR PIER 12 IS ECCENTRIC AS SHOWN ON FOOTING PLAN (Showing Bottom Reinforcing)



SECTION A-A
Scale: 3/8"=1'-0"

	BY	DATE
MADE	Y.C.P	3-29-69
CHECKED	K.C.T	5-6-69
IN CHARGE		

NO.	REVISION	BY	DATE

AS BUILT

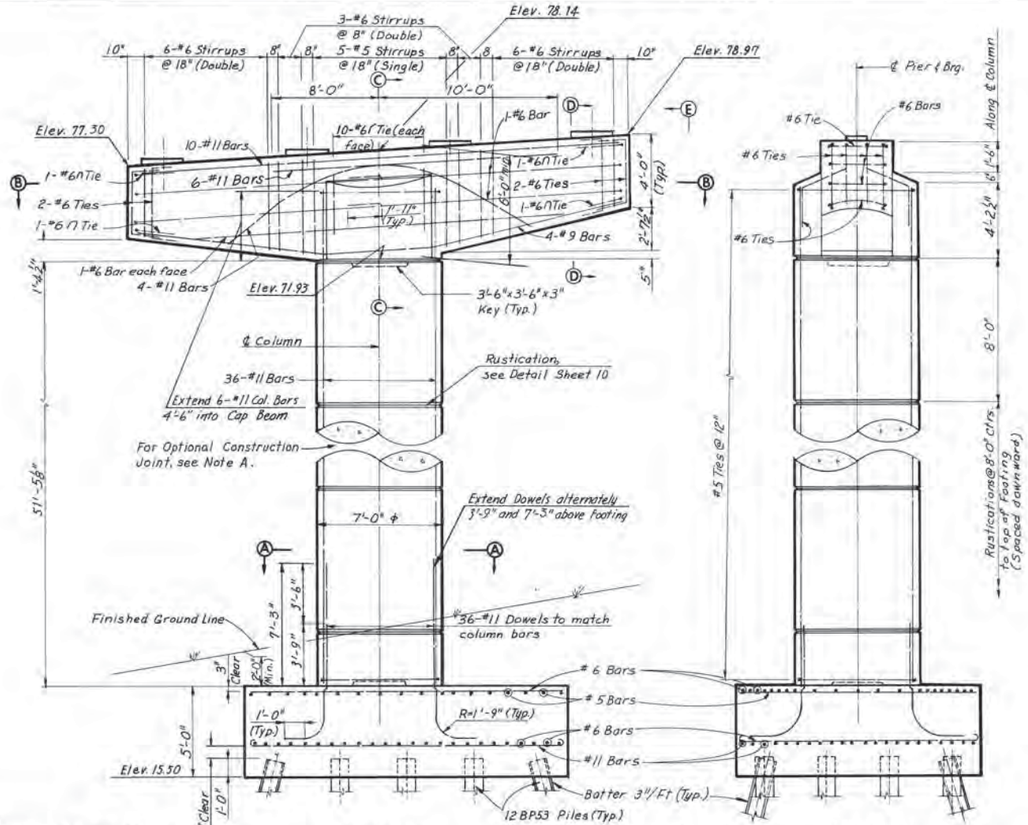
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
PIER 12

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 11 OF 38

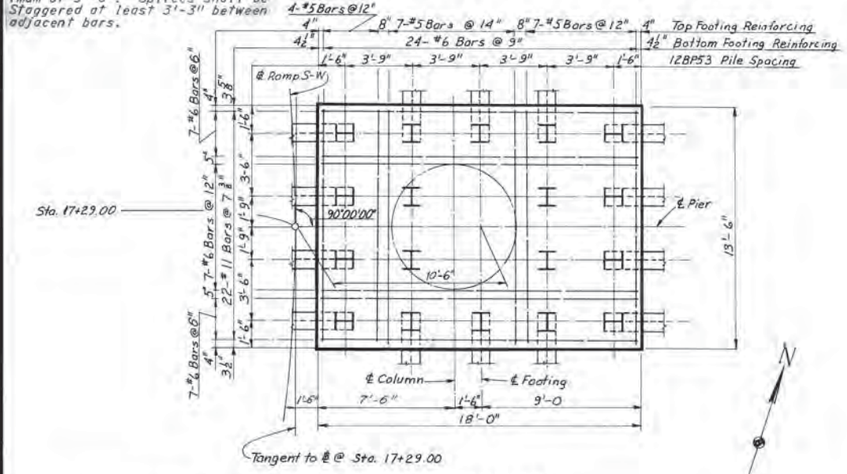
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	37	97



ELEVATION
Scale: $\frac{1}{4}$"=1'-0"

VIEW E-E
Scale: $\frac{1}{4}$"=1'-0"

NOTE A
A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap at the splice shall be a minimum of 3'-6". Splices shall be staggered at least 3'-3" between adjacent bars.



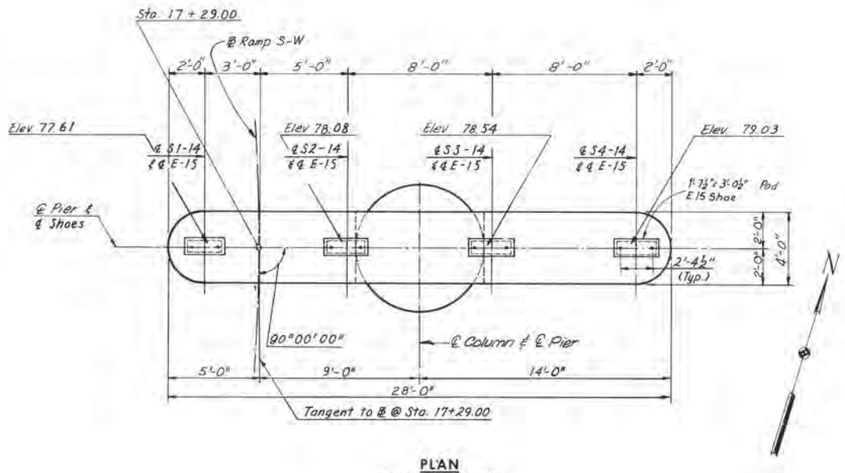
FOOTING PLAN
Scale: $\frac{1}{4}$"=1'-0"

Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.

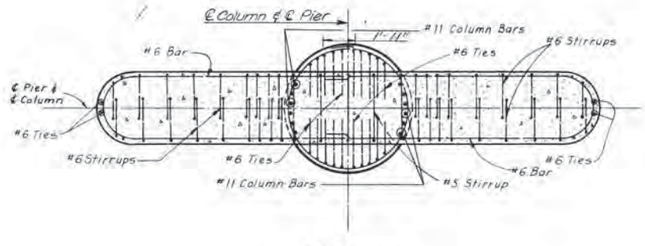
Notes:
All piles shall be 12BP53 steel piles (Design Capacity= 57 ton)
Batter all piles 3" per foot where shown.
For Standard Shoe Details, see Sheets 51 & 52.
For Framing Plan, see Sheet 22
Estimated Pile Tip Elevation is - 20.0.
For Rustication Details, see Sheet 10.
For 12BP53 Steel Pile Details, see Sheet 9.

Note:
Existing Flood-protection dike is to be restored to original contour upon completion of Pier construction.

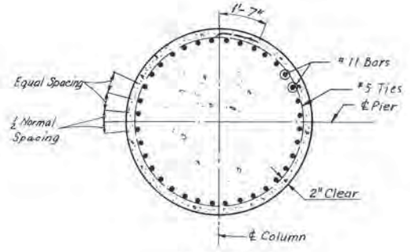
FOOTING FOR PIER 13 IS ECCENTRIC AS SHOWN ON FOOTING PLAN



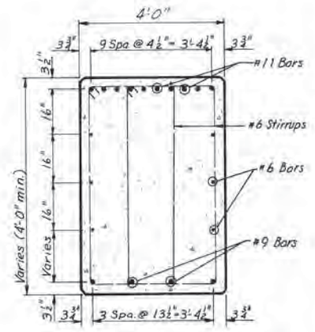
PLAN
Scale $\frac{1}{4}$"=1'-0"



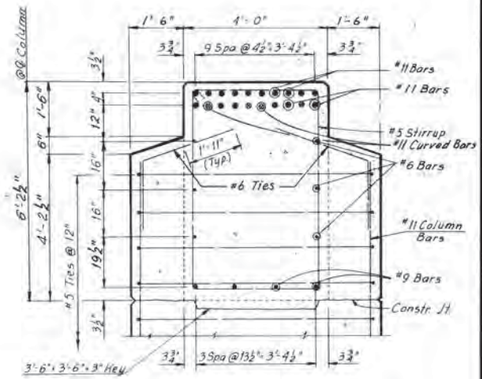
SECTION B-B
Scale: $\frac{1}{4}$"=1'-0"



SECTION A-A
Scale: $\frac{1}{4}$"=1'-0"



SECTION D-D
Scale $\frac{1}{2}$"=1'-0"



SECTION C-C
Scale: $\frac{1}{2}$" = 1'-0"

	BY	DATE
MADE	JD/PTA	1-6-69
CHECKED	GSH	1-20-69
IN CHARGE		

NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

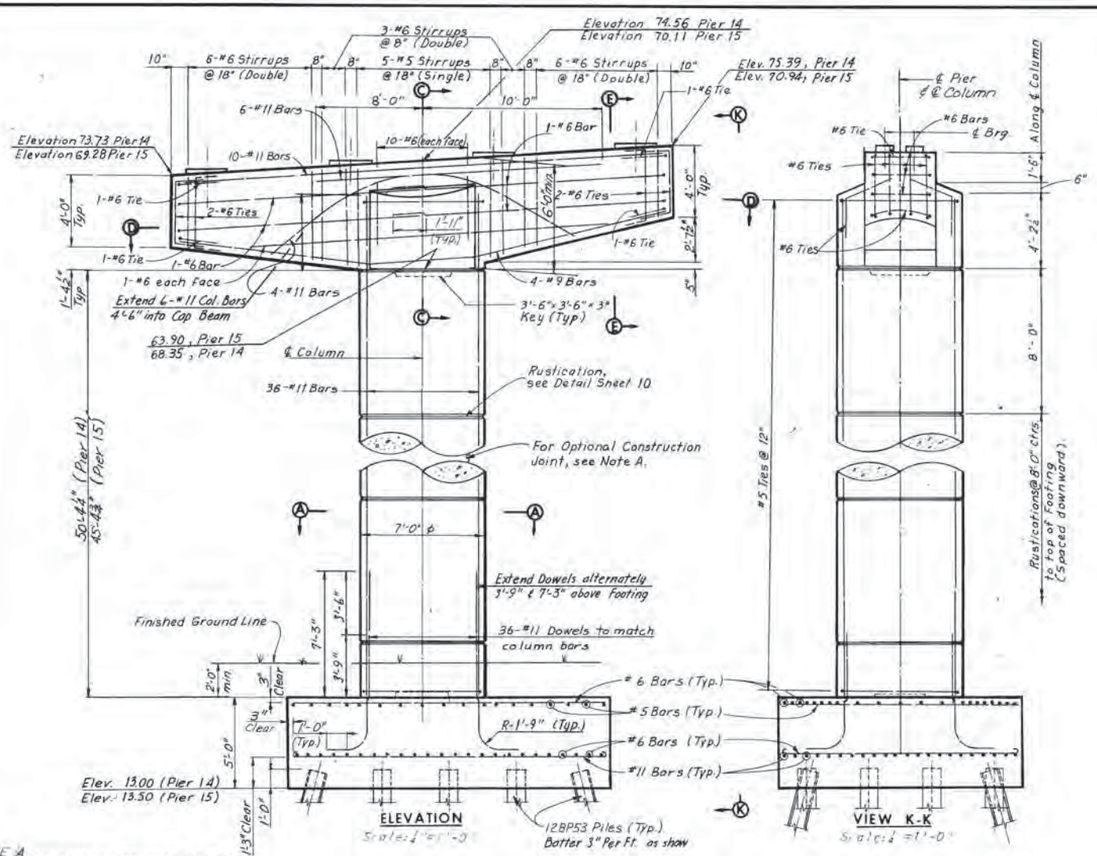
BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
PIER 13

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE As Noted
CONTRACT NO. 11
SHEET NO. 12 OF 38

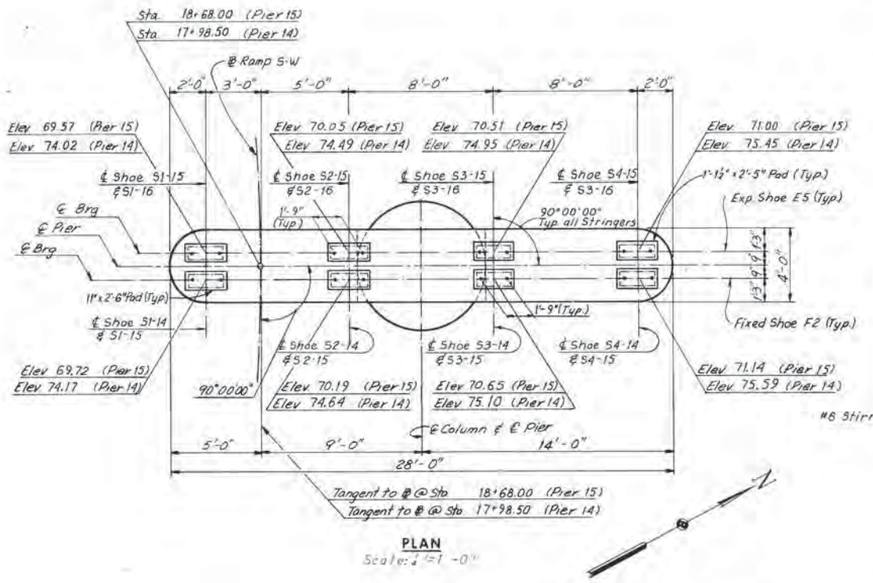
37

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	38	97

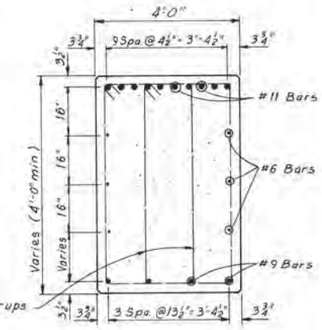


ELEVATION
Scale: ¼"=1'-0"

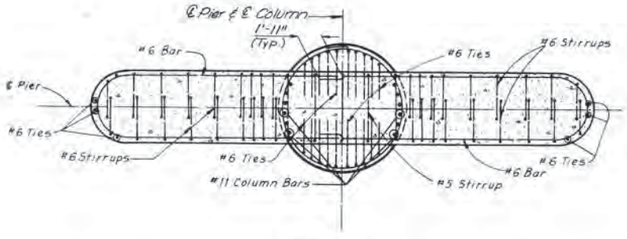
VIEW K-K
Scale: ¼"=1'-0"



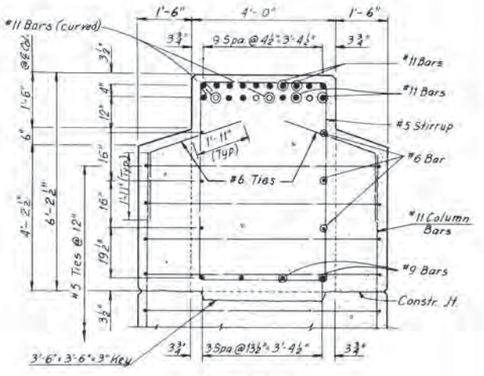
PLAN
Scale: ¼"=1'-0"



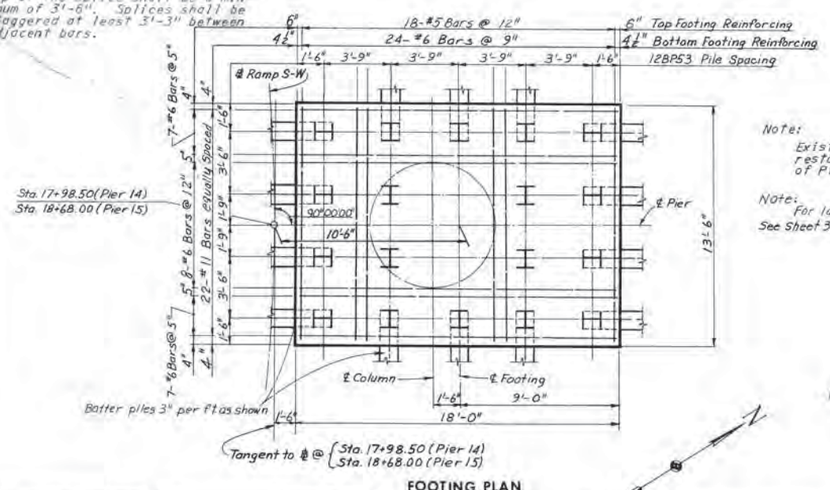
SECTION E-E
Scale: ¼"=1'-0"



SECTION D-D
Scale: ¼"= 1'-0"



SECTION C-C
Scale: ¼" = 1'-0"



FOOTING PLAN
Scale: ¼" = 1'-0"

Note:
Existing Flood-protection dike is to be restored to original contour upon completion of Pier construction.

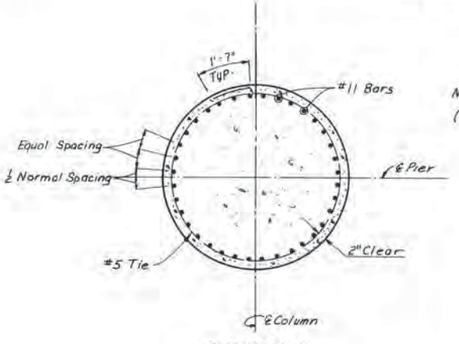
Note:
For layout of Piers 14 and 15 See Sheet 3.

FOOTINGS FOR PIERS 14 AND 15 ARE ECCENTRIC AS SHOWN ON FOOTING PLAN

Note:
Dimensions given in Footing Plan are measured at bottom of Footing.

Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcement shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.

NOTE A
A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap of the splice shall be a minimum of 3'-6". Splices shall be staggered at least 3'-3" between adjacent bars.



SECTION A-A
Scale: ½" =1'-0"

Notes:
All piles shall be 12BP53 Steel Piles (Design capacity = 57 tons).
Batter piles 3" per ft. as shown.
For Shoe Details see Sheet S1 & S2.

For Steel Pile Details see Sheet 9.
For Framing Plans see Sheet 22.
Estimated Pile Tip elevations -20.0.

	BY	DATE
MADE	CEB/JD	12-19-68
CHECKED	RC	1.20.69
IN CHARGE		

NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

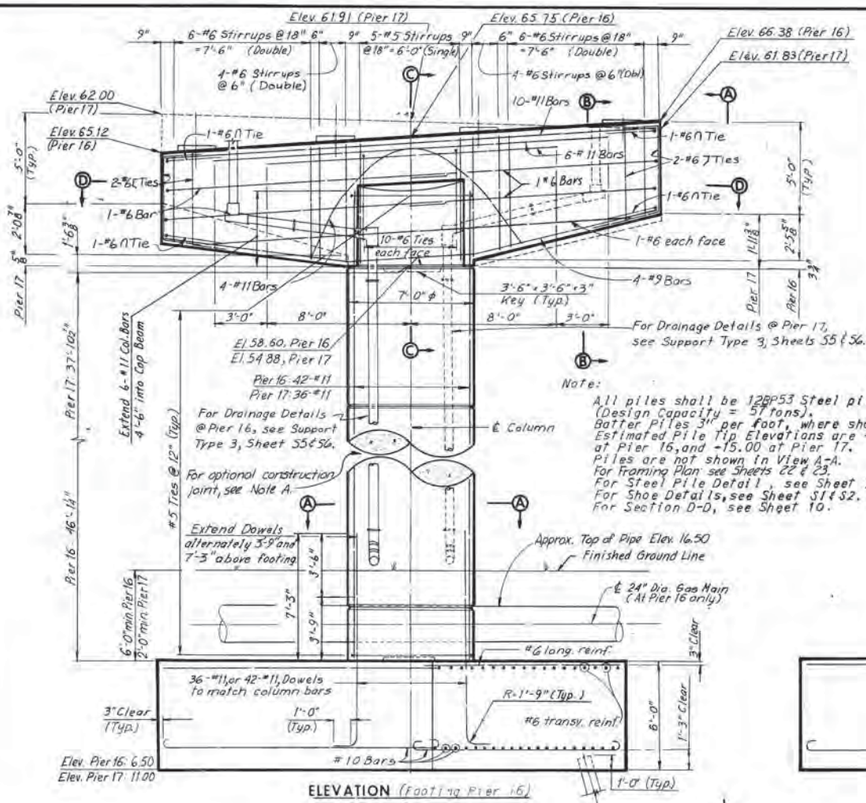
BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
PIERS 14 AND 15

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 11
SHEET NO. 13 OF 38

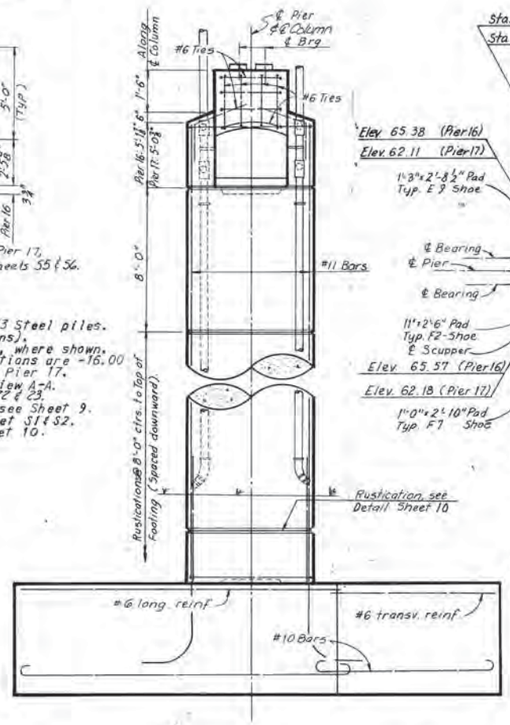
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	39	97

NOTE A
A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap at the splice shall be a minimum of 3'-6". Splices shall be staggered at least 3'-3" between adjacent bars.



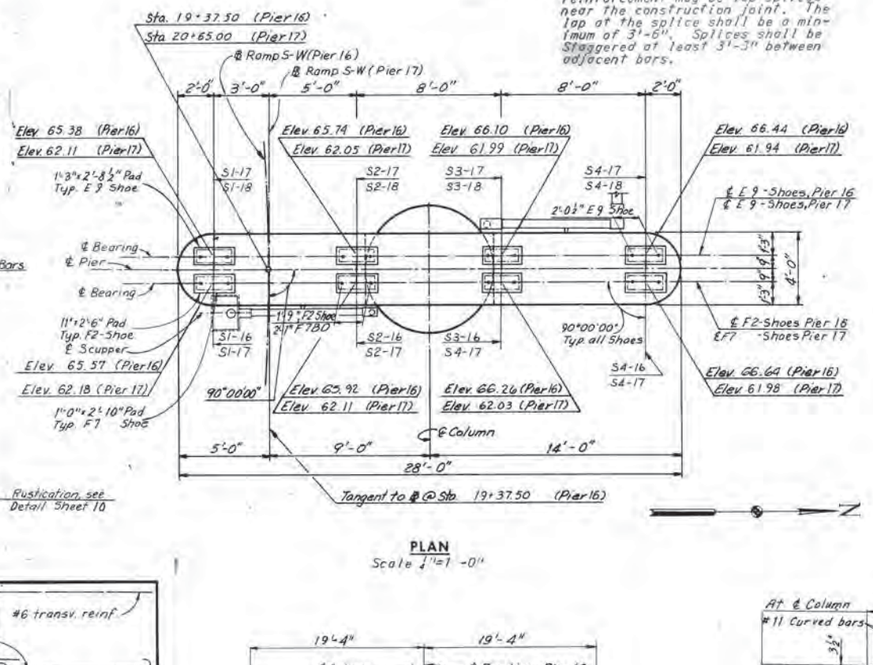
ELEVATION (Footing Pier 16)

Note:
All piles shall be 12BP53 Steel piles. (Design Capacity = 51 tons). Batter Piles 3" per foot, where shown. Estimated Pile Tip Elevations are -16.00 at Pier 16, and -15.00 at Pier 17. Piles are not shown in View A-A. For Framing Plan see Sheets 22 & 23. For Steel Pile Detail, see Sheet 9. For Shoe Details, see Sheet 51 & 52. For Section D-D, see Sheet 10.

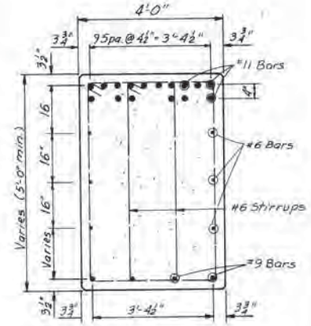


VIEW A-A
Scale: ¼" = 1'-0"

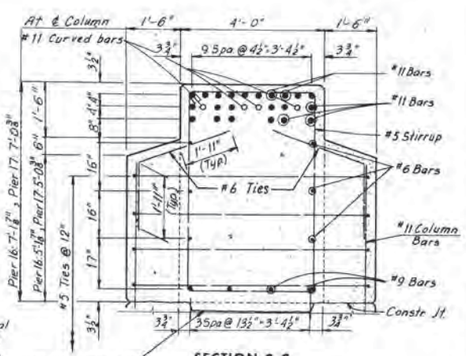
Note:
Piles to be battered 3:12 Pier 17 Footing.



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



SECTION B-B
Scale ½"=1'-0"

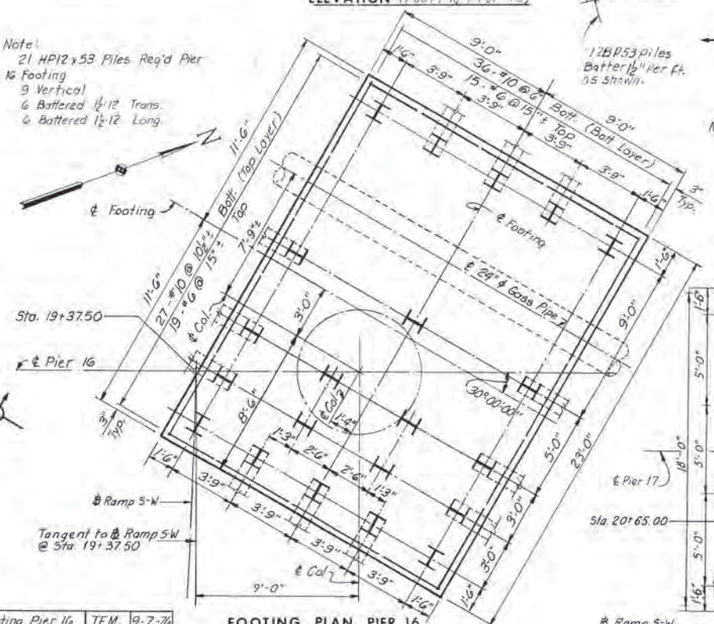


SECTION C-C
Scale: ½" = 1'-0"

Sequence of placing the supports of the 24" ϕ Gas Line:

1) Make a local excavation at each end of the support to below the pipe invert elevation. Drive timber piles and install timber beams.
2) Complete excavation for pipe support. Adequate temporary support of the pipe shall be maintained by earth, blocking or other means as approved by the Engineer until installation of the pipe support is completed.
3) Install W beams, timber blocks and beam ties.
4) The pipe support shall remain in place.
5) Payment will be made at the Lump Sum Bid price for "Pipe Support at Pier 16".

Note:
21 HP12 x 53 Piles Req'd Pier & Footing
9 Vertical
6 Battered ½:12 Trans.
6 Battered ½:12 Long.

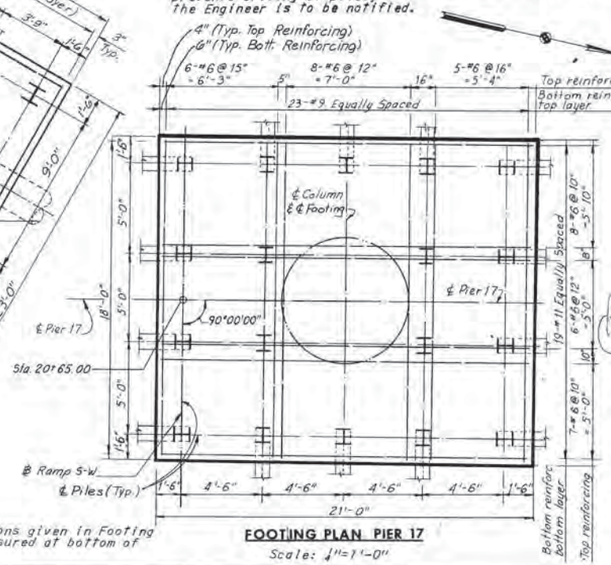


Note:
Dimensions given in Footing Plan are measured at bottom of footing.

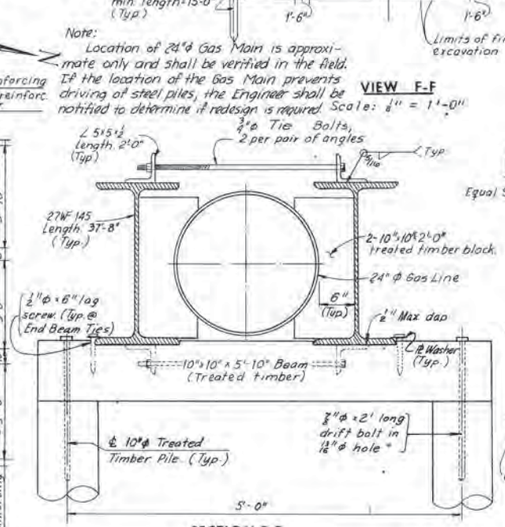
FOOTING PLAN PIER 16

FOOTING FOR PIER 16 IS ECCENTRIC AS SHOWN ON FOOTING PLAN

Note:
If location of Gas Line prevents driving of piles, the Engineer is to be notified.



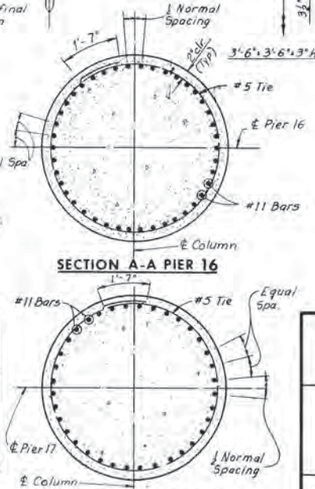
FOOTING PLAN PIER 17
Scale: ¼"=1'-0"



Note:
Location of 24" ϕ Gas Main is approximate only and shall be verified in the field. If the location of the Gas Main prevents driving of steel piles, the Engineer shall be notified to determine if redesign is required.

VIEW F-F
Scale: ½" = 1'-0"

SECTION E-E
Scale: 1" = 1'-0"



SECTION A-A PIER 16

SECTION A-A PIER 17
Scale: ½" = 1'-0"

AS BUILT

Footing Pier 16	T.E.M.	9-7-76

	BY	DATE
MADE	C.E.B.	1-16-69
CHECKED	J.D.	1-23-69
IN CHARGE		

NO.	REVISION	BY	DATE
3	Pier Dim Pier 17	T.E.M.	8-26-76
2	Pad Elev. Pier 16	T.E.M.	5-76
1	Shoe Type revised	J.B.P.	9-25-75

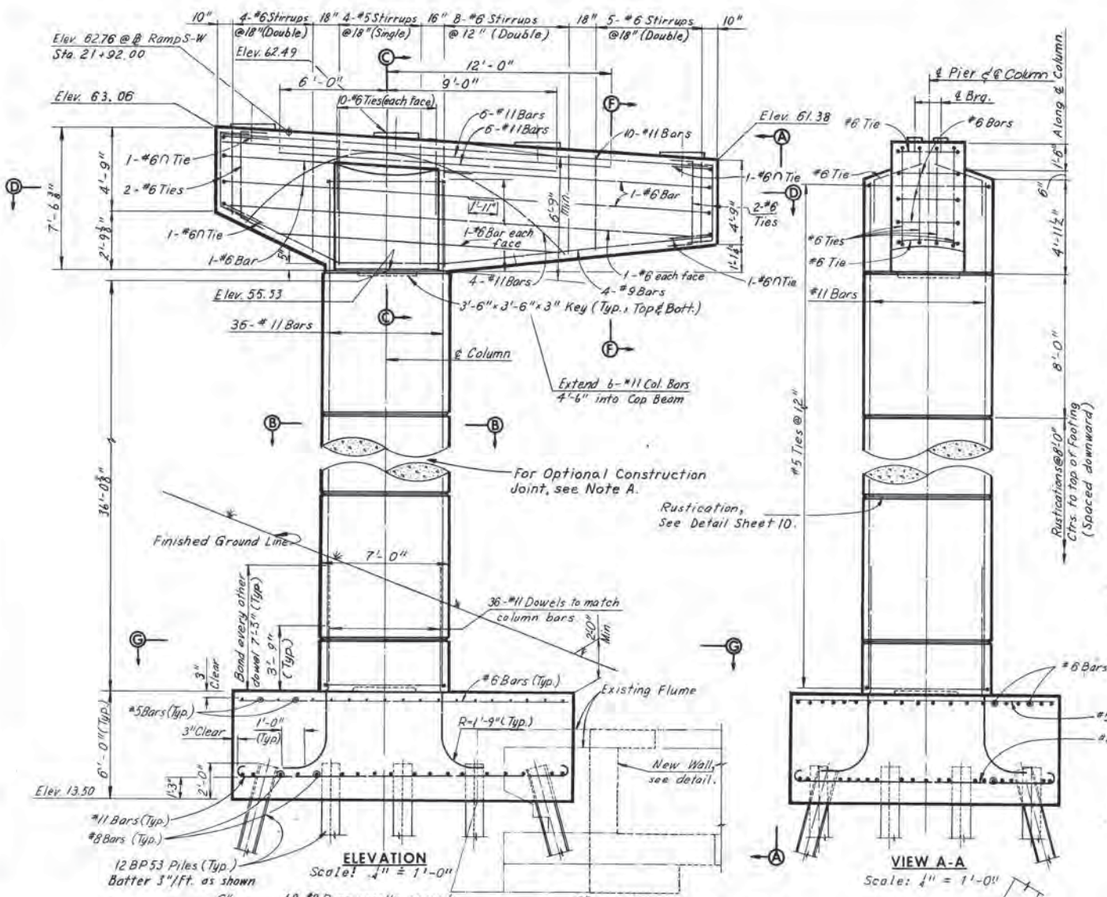
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
PIERS 16 AND 17

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

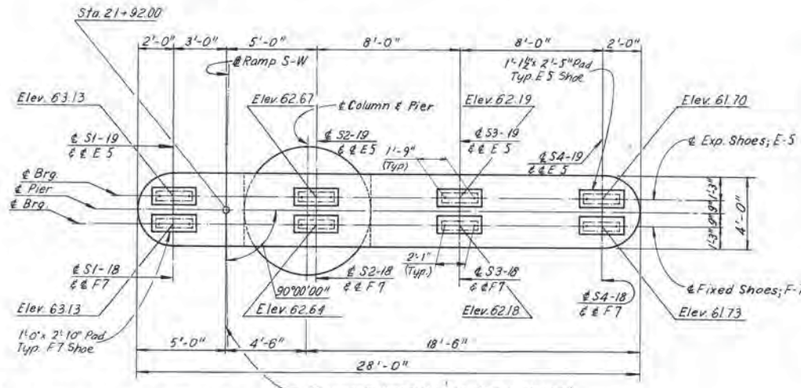
SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 14 OF 38

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	40	97



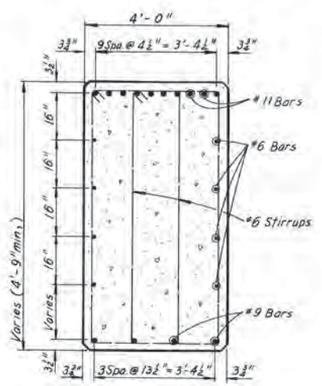
ELEVATION
Scale: 1" = 1'-0"

VIEW A-A
Scale: 1" = 1'-0"



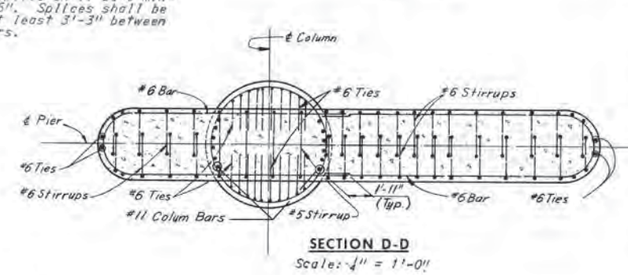
PLAN
Scale: 1" = 1'-0"

Note:
Pads with heights of 4" or less shall not be reinforced.

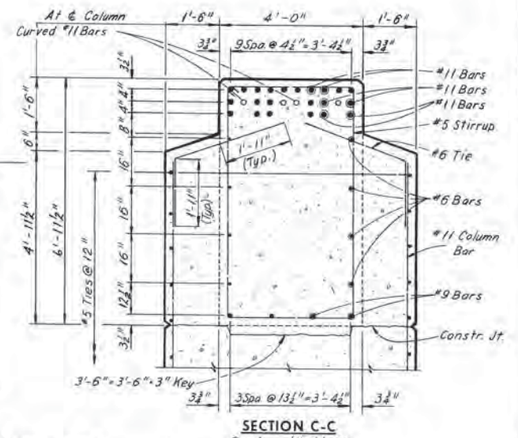


SECTION F-F
Scale: 1" = 1'-0"

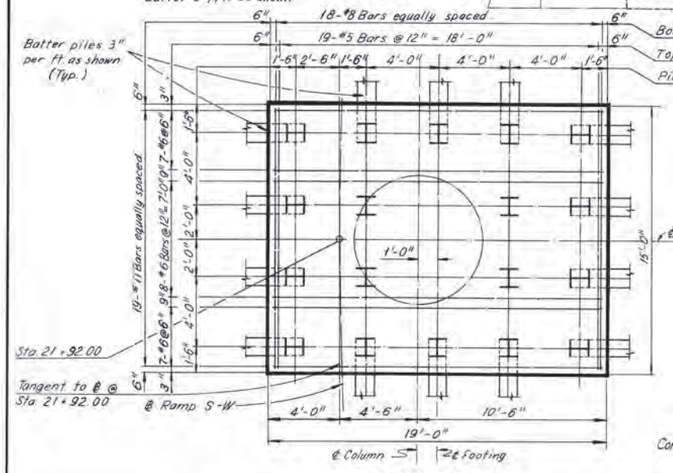
NOTE A
A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap at the splice shall be a minimum of 3'-6". Splices shall be Staggered at least 3'-3" between adjacent bars.



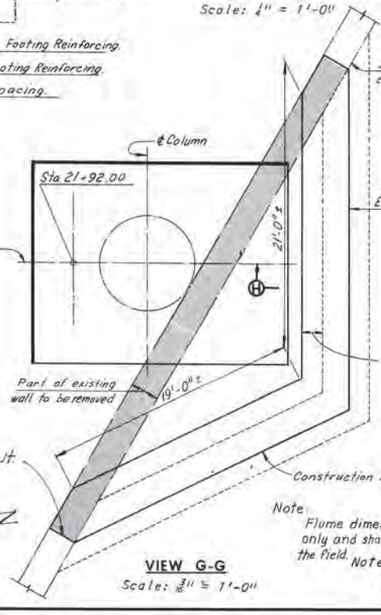
SECTION D-D
Scale: 1" = 1'-0"



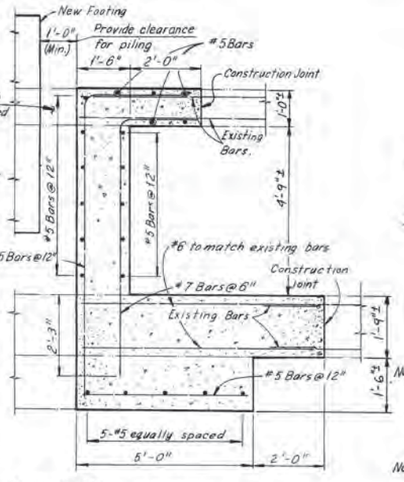
SECTION C-C
Scale: 1" = 1'-0"



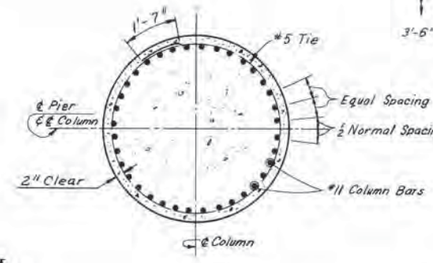
FOOTING PLAN
Scale: 1" = 1'-0"



VIEW G-G
Scale: 3/16" = 1'-0"



SECTION H-H
Scale: 1" = 1'-0"



SECTION B-B
Scale: 1" = 1'-0"

Note:
Flume dimensions shown are approximate only and shall be verified by the Contractor in the field.

Note:
Piles located within 10 ft. (horizontal distance) of Storm Drainage Flume shall be pre-bored to an Elevation 5 ft. below bottom of Flume.

Note:
All piles shall be 12BP53 Steel Piles (Design Capacity = 57 tons) Batter piles 3" per foot where shown.

Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical Shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required. Bottom elevation of Flume must be established by field inspection.

Note:
Existing Flood-protection dike is to be restored to original contour upon completion of Pier construction.

Notes:
For Steel Pile Details, see Sheet 9.
For Shoe Details, see Sheet S1 & S2.
Estimated Pile Tip elevation -14.0

	BY	DATE	NO.	REVISION	BY	DATE
MADE	PTA	12-20-68				
CHECKED	J.D.	1-15-69	1	Rev. Footing Reinf.	TEM	9-8-75
IN CHARGE						

FOOTING FOR PIER 18 IS ECCENTRIC AS SHOWN ON FOOTING PLAN

AS BUILT

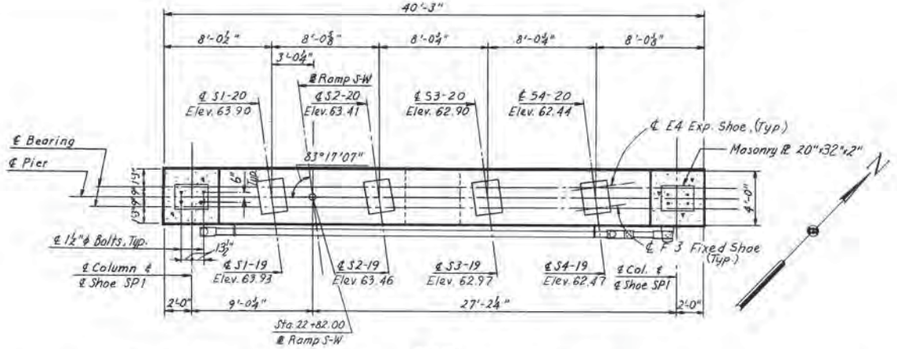
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
PIER 18

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

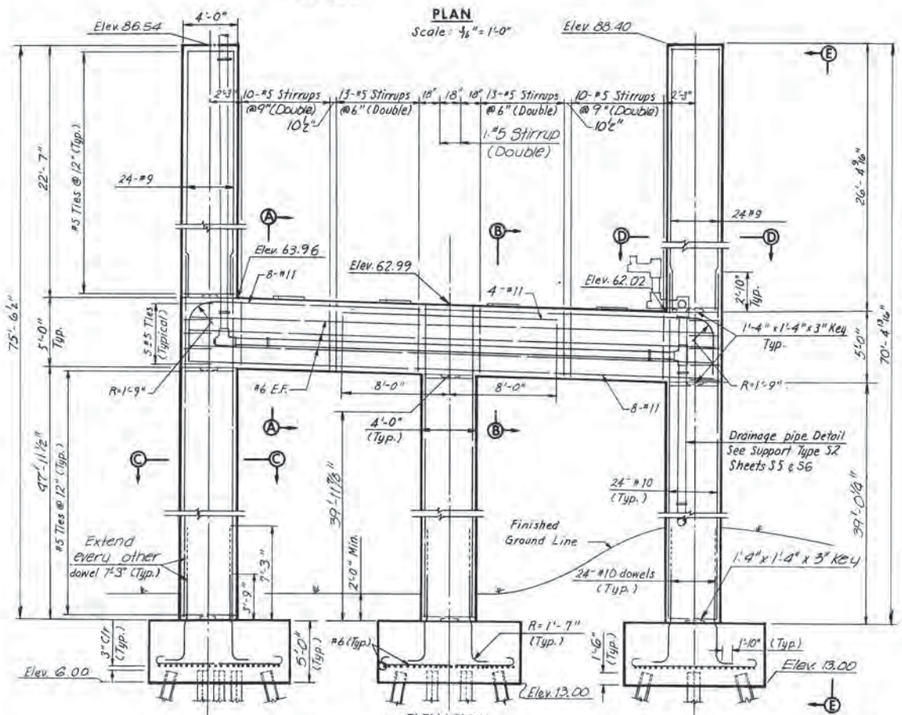
SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 15 OF 38

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	41	97



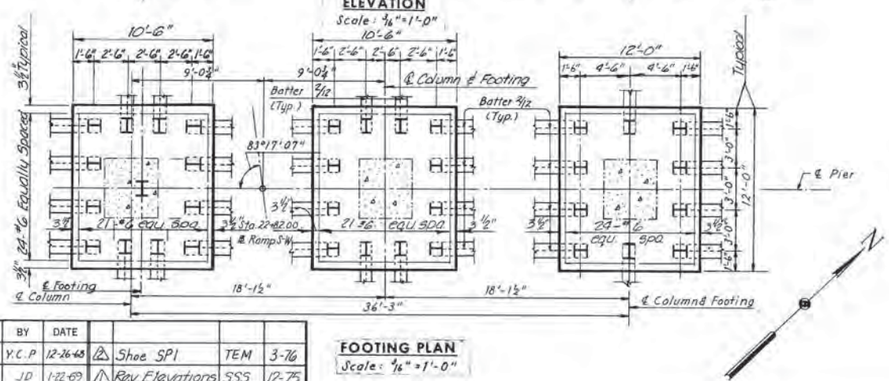
PLAN

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



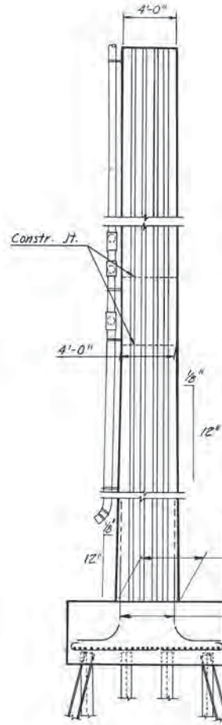
ELEVATION

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



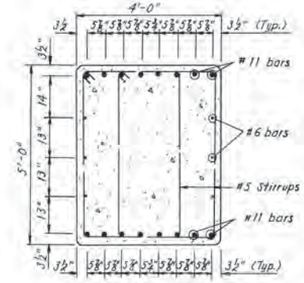
FOOTING PLAN

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



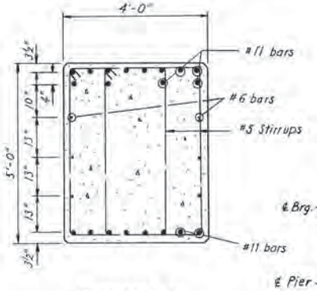
VIEW E-E

Scale: 3/16" = 1'-0"



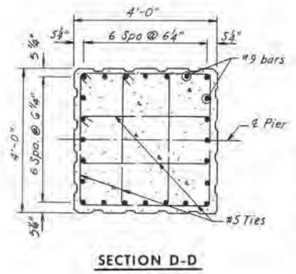
SECTION A-A

Scale: ½" = 1'-0"



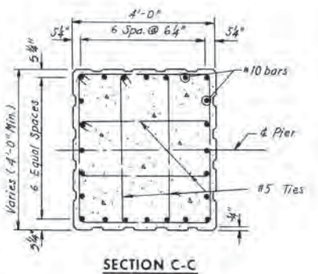
SECTION B-B

Scale: ½" = 1'-0"



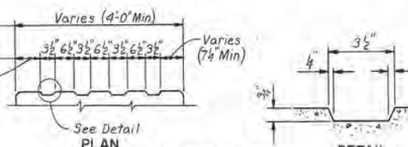
SECTION D-D

Scale: ½" = 1'-0"

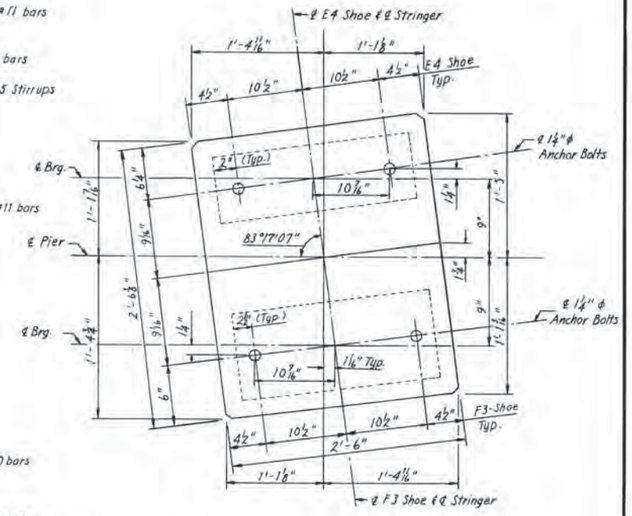


SECTION C-C

No Scale

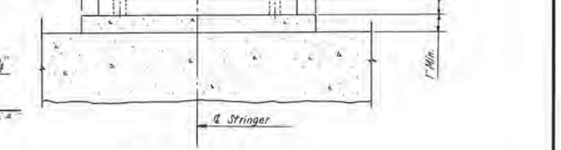


Note:
Rustications on pier shaft shall extend a minimum of 2'-0" below the finished ground line except that when the top of footing is within 5'-0" of the finished ground line the rustications shall extend to the top of footing.



PAD AND ANCHOR BOLT SETTING PLAN

No Scale



PAD ELEVATION VIEW

No Scale

Notes:
For Shoe Details, see Sheet S1 and S2.
Batter Piles 2"/ft where shown.
For Steel Pile Details, see Sheet 4.
For Framing Plan see Sheet 24.
Estimated Pile Tip Elevation = -11.0
All piles shall be 12BP53 steel piles (Design capacity = 57 tons)

Note:
Existing Flood-protection dike is to be restored to original contour upon completion of Pier construction.

Note
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcement shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	Y.C.P	12-26-68	2	Shoe SP1	TEM	3-76
CHECKED	JD	1-22-69	1	Rev. Elevations	SSS	12-75
IN CHARGE						

AS BUILT

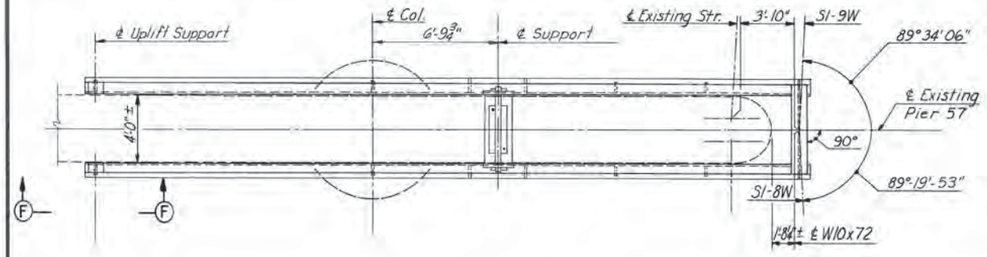
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
PIER 19

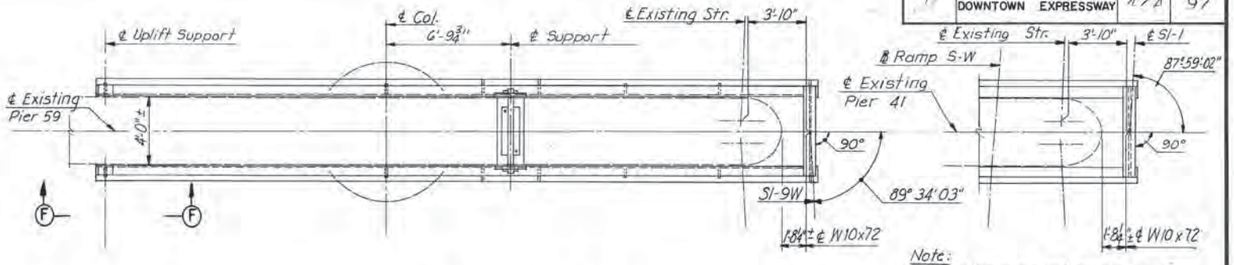
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 16 OF 38

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO	TOTAL SHEETS
"	DOWNTOWN EXPRESSWAY	12A	97



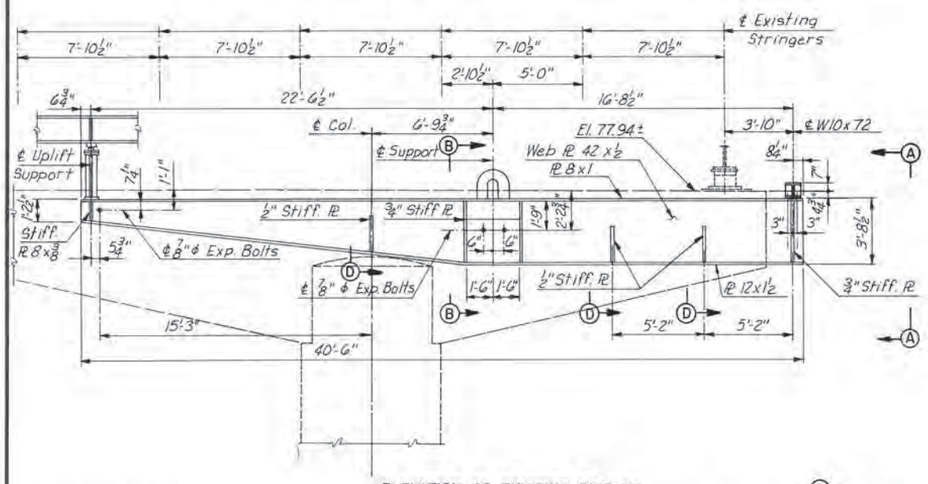
PLAN OF EXISTING PIER 57
Scale: ¼"=1'-0"



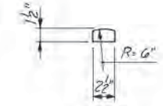
Note:
For dimensions not shown, see Plan of Pier 59.

PLAN OF EXISTING PIER 59
Scale: ¼"=1'-0"

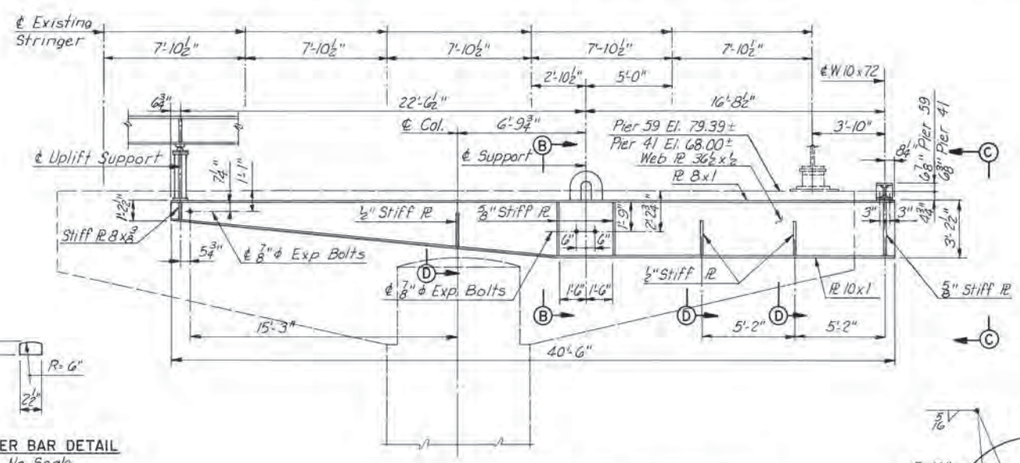
PARTIAL PLAN OF EXISTING PIER 41
Scale: ¼"=1'-0"



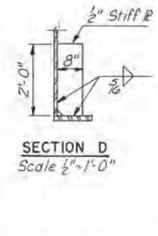
ELEVATION OF EXISTING PIER 57
Scale: ¼"=1'-0"



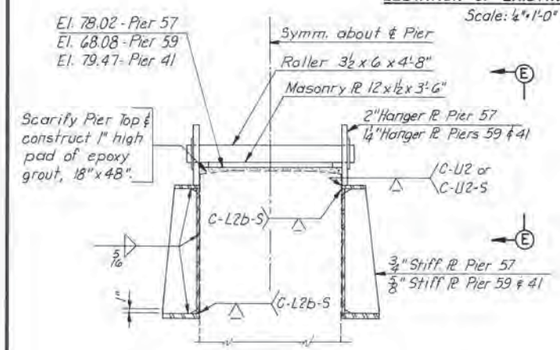
ROCKER BAR DETAIL
No Scale



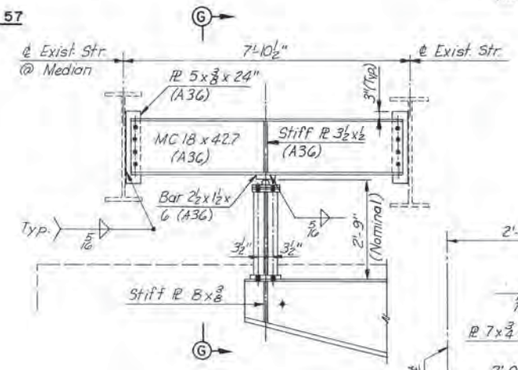
ELEVATION OF EXISTING PIERS 59 & 41
Scale: ¼"=1'-0"



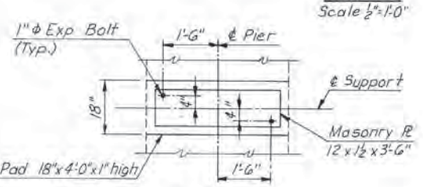
SECTION D
Scale ½"=1'-0"



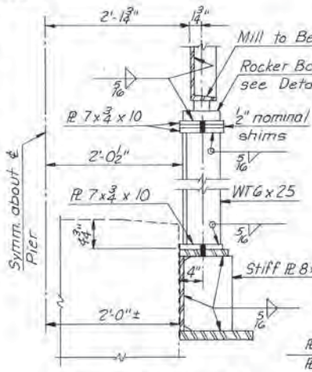
SECTION B-B
Scale ½"=1'-0"



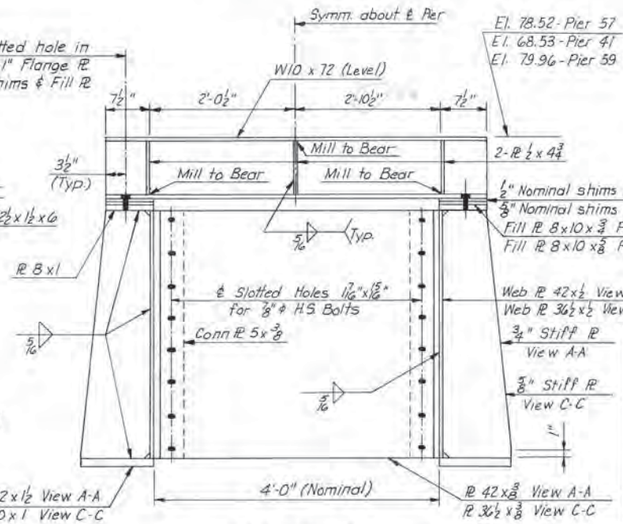
VIEW F-F
Scale ½"=1'-0"



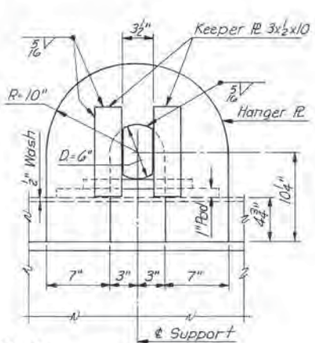
PAD PLAN
Scale ½"=1'-0"



SECTION G-G
Scale 1"=1'-0"



VIEW A-A & C-C
Scale 1"=1'-0"



VIEW E-E
Scale ½"=1'-0"

NOTE:
Structural steel shall be A588 except as noted.

AS BUILT

DESIGNED			3	Entire Sheet	TEM	10-76
DRAWN	EJM/GBP	8-11-75	2	Elev. and Dim.	TEM	9-8-75
CHECKED	PRY	10-14-76	1	New Sheet added	G.B.P.	8-25-75
IN CHARGE P.R.Y.			NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

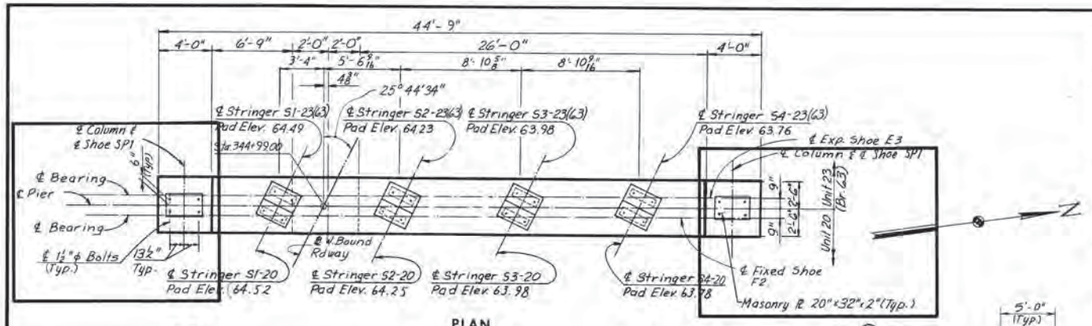
BRIDGE NO. 65
RAMP S-W CONNECTION TO
RICHMOND - PETERSBURG TURNPIKE

EXISTING PIERS 41, 57 & 59 MODIFICATIONS

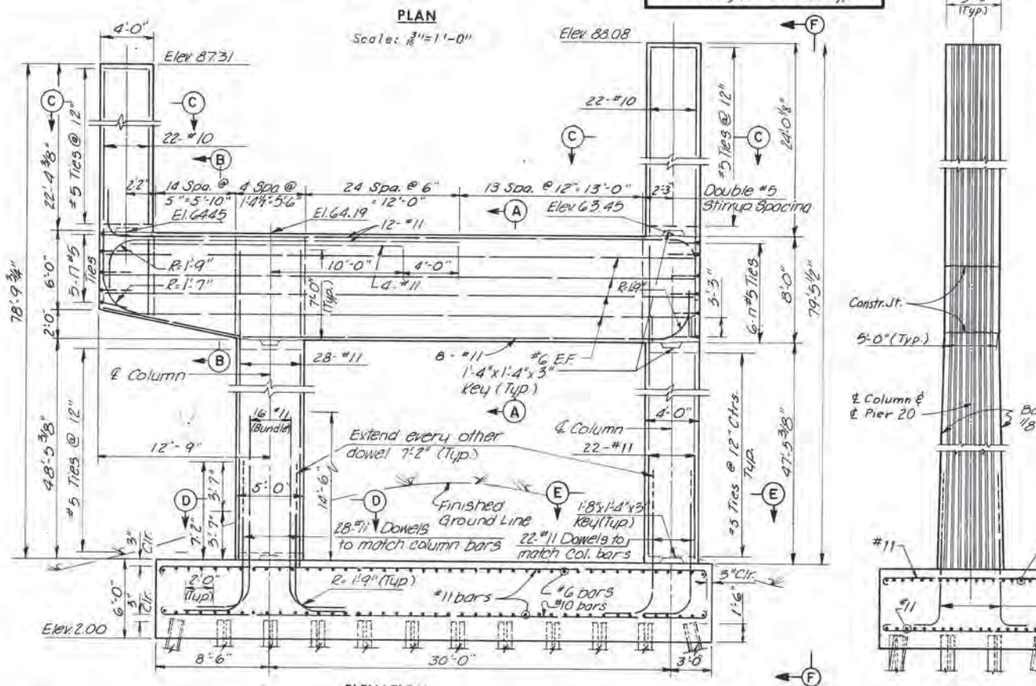
SCALE As Noted
DATE
SHEET 17A OF 38

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
Alexandria, Virginia
HNTB

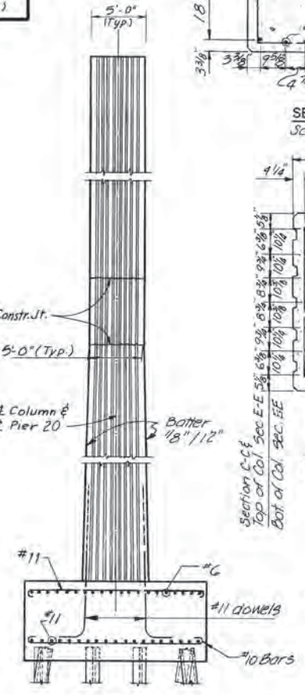
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	42	97



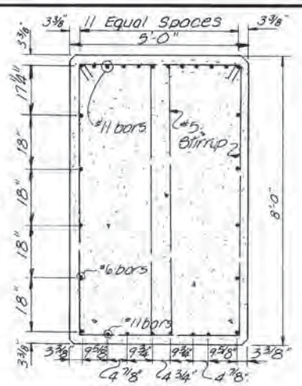
PLAN
Scale: ⅜"=1'-0"



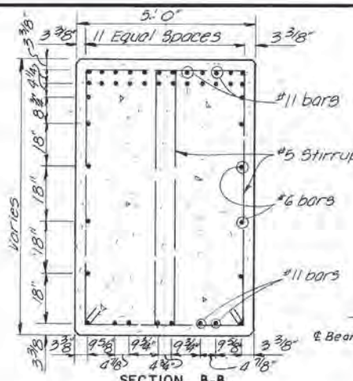
ELEVATION
Scale: ⅛"=1'-0"



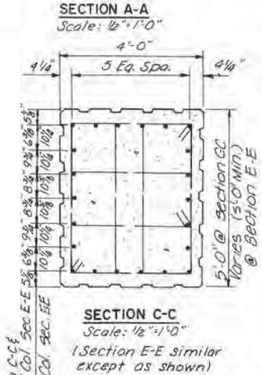
VIEW F-F
No Scale



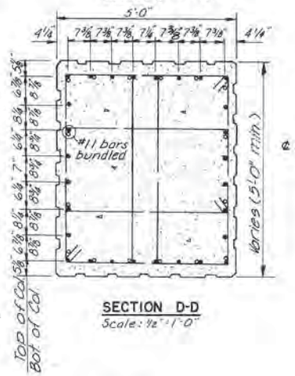
SECTION A-A
Scale: ½"=1'-0"



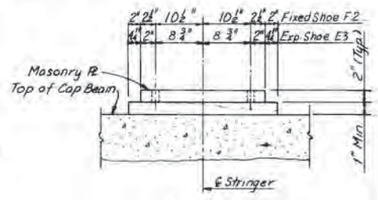
SECTION B-B
Scale: ½"=1'-0"



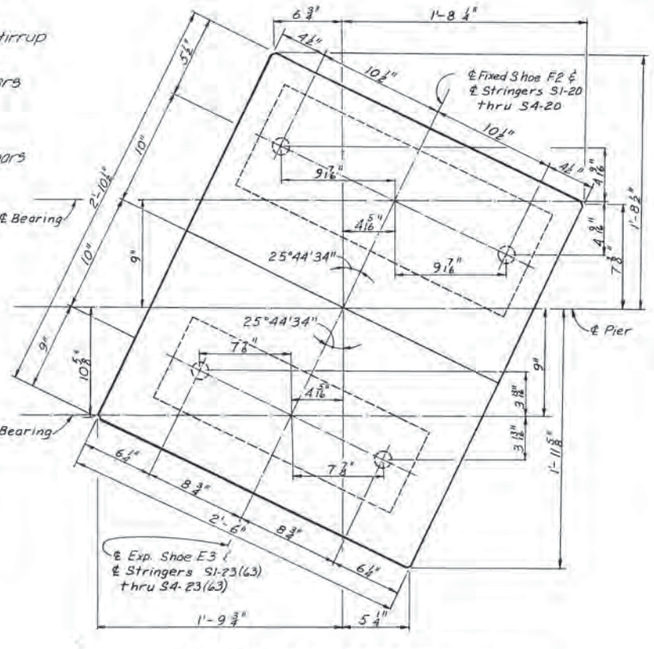
SECTION C-C
Scale: ½"=1'-0"
(Section E-E similar except as shown)



SECTION D-D
Scale: ½"=1'-0"



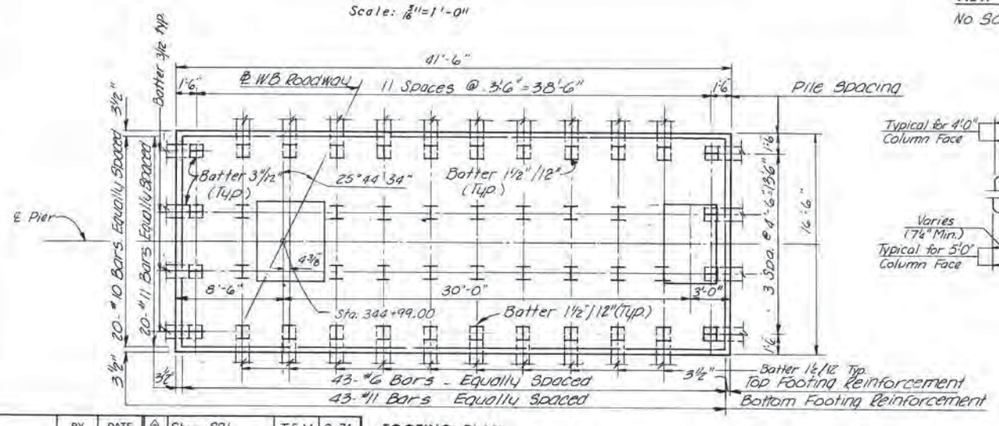
PAD ELEVATION VIEW
No Scale



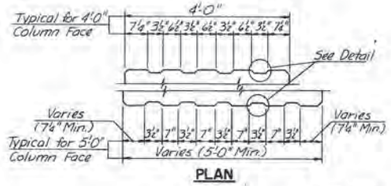
PAD AND ANCHOR BOLT SETTING PLAN
No Scale

Note:
Anchor Bolts and Setting Template for the shoes at Unit 23(63) shall be furnished by others for setting in the pier cap by the Contractor.

NOTE:
Pier 20 was constructed as part of Contract 10 with the Exception of the anchor bolts for the upper steel capbeam (SP1 Shoes). These shall be supplied and drilled in place as part of Contract 11.



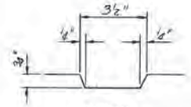
FOOTING PLAN
Scale: ¾"=1'-0"



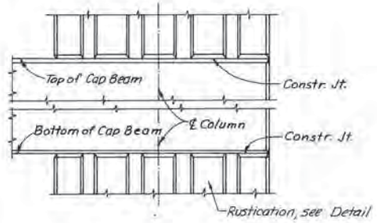
PLAN

RUSTICATION DETAIL
No Scale

Note:
Rustications on pier shafts shall extend a minimum of 2'-0" below the finished ground line except that when the top of footing is within 5'-0" of the finished ground line the rustications shall extend to the top of footing.



DETAIL



DETAIL K
No Scale

Note:
All piles shall be 12BP53 Steel Piles (Design Capacity = 57 tons).
Batter all transverse piles 3" per foot where shown.
Batter all longitudinal piles 1½" per foot where shown.
For Standard Shoe details, see Sheet S1 & S2.
For Framing Plan, see Sheet 24.
Estimated Pile Tip Elevation −11.0.

Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2ft. redesign will be required.

	BY	DATE
MADE	J.D.	12-13-68
CHECKED	C.E.B	1-17-69
IN CHARGE		

NO.	REVISION	BY	DATE
3	Shoe SP1	T.E.M.	3-76
2	Right Col. Elev.	T.E.M.	3-76
1	Rev. Elevations	SSS	12-75

AS BUILT

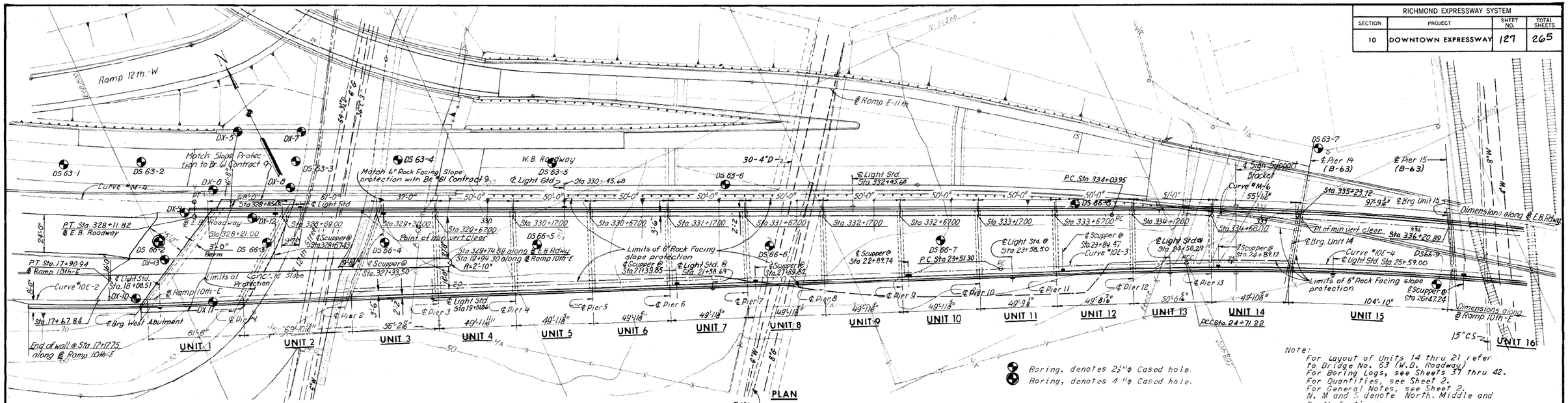
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
PIER 20

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

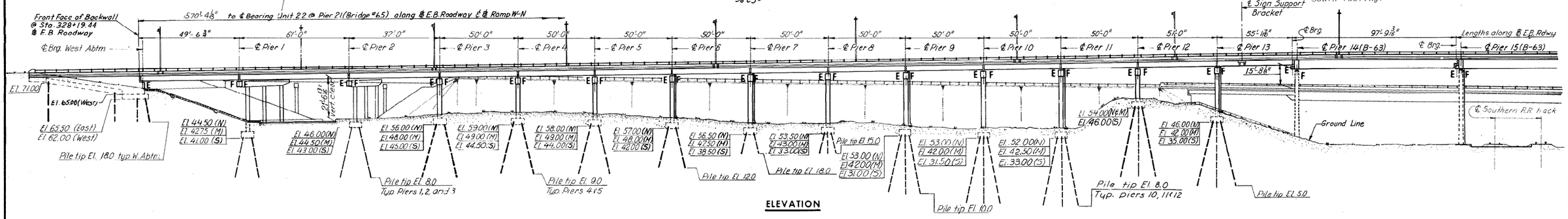
SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 17 OF 38

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	127	265

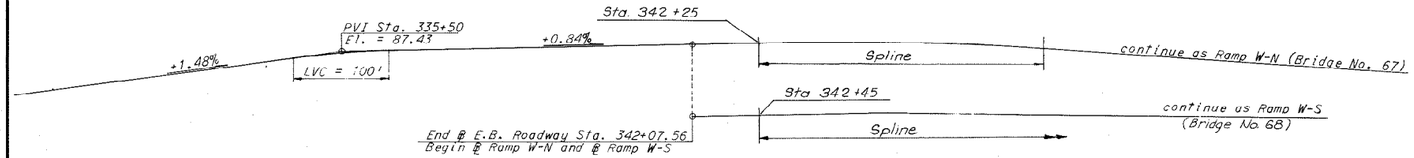


Boring, denotes 2½"ϕ Cased hole.
Boring, denotes 4 "ϕ Cased hole.

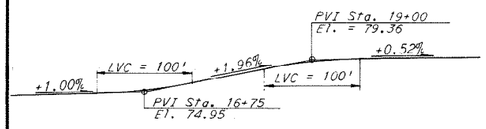
Note:
For Layout of Units 14 thru 21 refer to Bridge No. 63 (W.B. Roadway)
For Boring Logs, see Sheets 37 thru 42.
For Quantities, see Sheet 2.
For General Notes, see Sheet 2.
N, M and S denote North, Middle and South footing.



ELEVATION



℄ E.B. ROADWAY, RAMP W-N AND RAMP W-S



℄ RAMP 10TH-E.

PROFILE GRADE DATA

℄ Downtown Expressway Curve M-9		℄ E.B. Roadway Curve M-6		℄ Ramp W-N Curve WN-1	
P.I.	= 326+57.21	P.I.	= 336+40.09	P.I.	= 345+25.47
Δ	= 12°25'03"	Δ	= 11°45'56"	Δ	= 64°53'49"
D	= 4°00'	D	= 2°30'	D	= 11°27'33"
T	= 155.83'	T	= 236.14'	T	= 317.90'
L	= 310.44'	L	= 470.62'	L	= 566.33'
R	= 1,432.40'	R	= 2,291.83'	R	= 500.00'

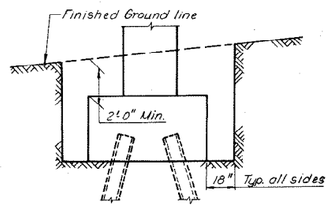
Curve: 10E-2		℄ Ramp 10th-E Curve: 10E-3		Curve: 10E-4	
P.I.	= 17+35.87	P.I.	= 24+11.27	P.I.	= 26+80.64
Δ	= 6°29'42"	Δ	= 1°11'57"	Δ	= 12°30'55"
D	= 6°00'	D	= 1°00'	D	= 3°00'
T	= 54.18'	T	= 59.97'	T	= 209.42'
L	= 108.25'	L	= 119.93'	L	= 417.18'
R	= 954.93'	R	= 5,729.58'	R	= 1,909.86'

HORIZONTAL CURVE DATA

NO.	REVISION	BY	DATE
3	As Built	TEM	8-76
2	Sign Support Bracket & Sh. 16A & 20A added.	R.B.H.	9-74
1	Footing elev. & piles, Piers 8, 9, 10, 11, 12 & 13	R.B.H.	8-74

	BY	DATE
MADE	JV	9-12-68
CHECKED	C.C.C.	5-26-69
IN CHARGE		

INDEX



LIMITS OF STRUCTURE EXCAVATION
no scale

AS BUILT

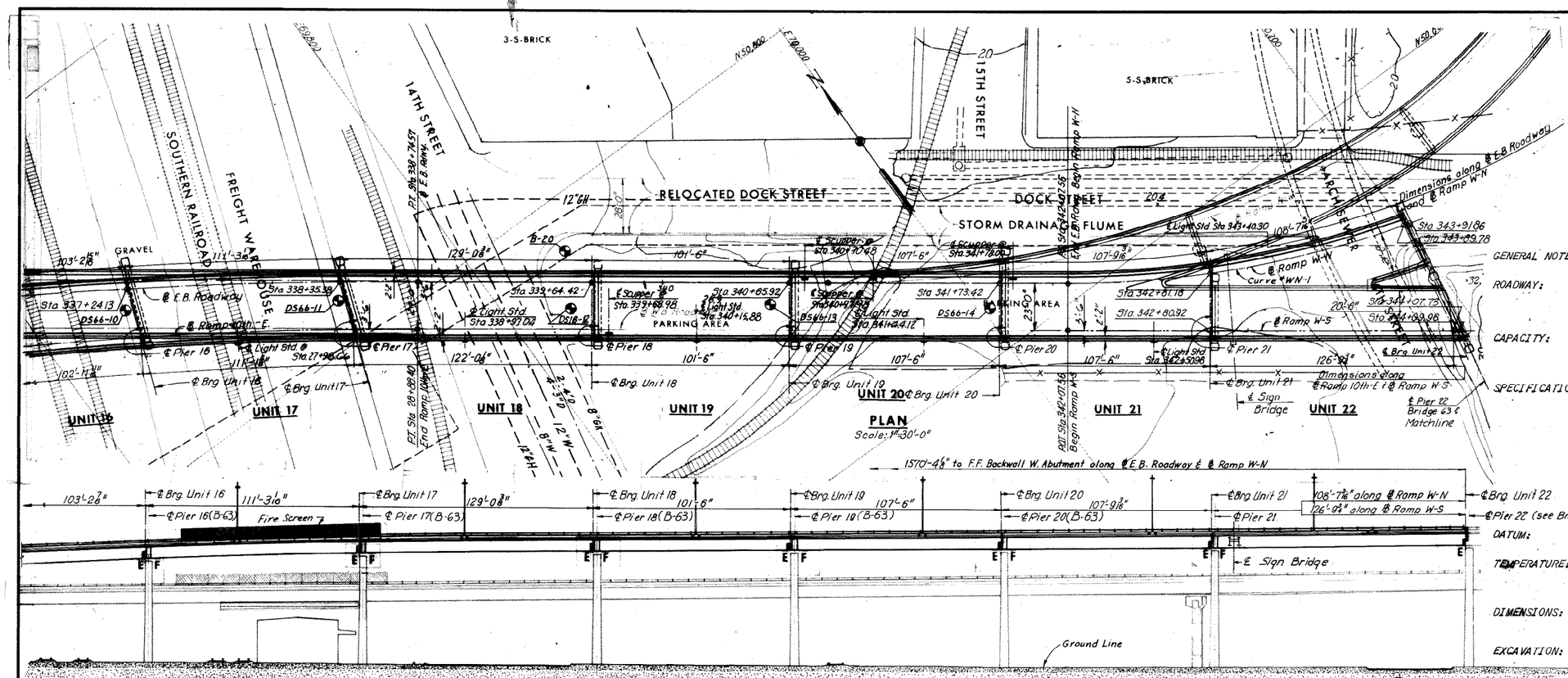
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=30'
CONTRACT NO.: 10
SHEET NO. 1 OF 46

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	128	265



Notes:
For Vertical and Horizontal Curve Data see Sheet 1.
For Layout of Units 16 thru 22 refer to Bridge No. 63 (Westbound Roadway).

ESTIMATED QUANTITIES

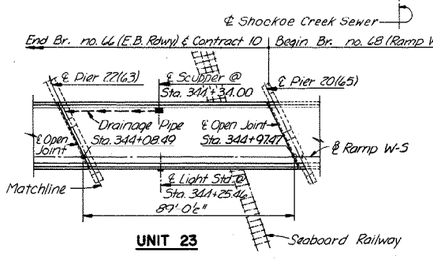
	Structure Excavation Cu. Yds.	Concrete (‡) Cu. Yds.	Reinforcing Steel Lbs.	Str. Steel Mild Carbon Lbs.	Str. Steel High Strength Lbs.	Aluminum Railing (1-Rail) Lin. Ft.	Porous Backfill Cu. Yds.	Underdrain 6"Dia. Pipe Lin. Ft.	Steel Piles 10BP42 Lin. Ft.
Superstructure	--	2,237.6	530,840	1,564,700	567,800	3,241	--	--	---
Substructure	1,835	1,256.6	155,030	---	----	84	34	150	9,410
Total	1,835	3,494.2 ‡	685,890	1,564,700	567,800	3,325	34	150	9,410

	Asphalt Damp-proofing Sq. Yds.	Approach Slab Concrete (‡) Cu. Yds.	Fire Screen Lin. Ft.	Approach Slab Reinforcing Steel (Lbs.)	Metal Conduit Lin. Ft.	Concrete Slope Protection Sq. Yds.	Bridge Drainage Metal Work Lbs.	Rock Facing Slope Prot. Sq. Yds.	Energy Attenuator B-Unit Each
Superstructure	--	--	210	---	2,214	--	11,870	--	1
Substructure	105	91.5	---	23,870	92	559	--	3,320	---
Total	105	91.5 ‡	210	23,870	2,306	559	11,870	3,320	1

‡ All Concrete for Superstructure shall be Class A4 and for Substructure Class A3.

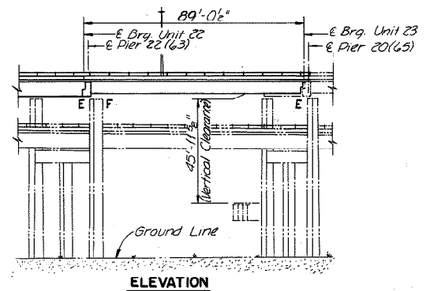
	BY	DATE
MADE	J.V.	1-9-69
CHECKED	G.C.C.	5-26-69
IN CHARGE		

NO.	REVISION	BY	DATE
1	Span Fixities & R.R. name added	PRMS.	4-19-76
2	Sign Bridge added & Struct. Str. Qty.	R.B.H.	9-74
3	As Built	TEM	8-76



UNIT 23

PLAN



ELEVATION

GENERAL NOTES:

ROADWAY: One variable width roadway transitioning from E.B. Roadway Downtown Expressway and Ramp 10th-E into Ramps W-N and W-S (Bridges No. 67 and 68)

CAPACITY: Dead load includes 15 lbs. per sq. ft. for future wearing surface. Live load: HS 20-44 loading and alternate military loading.

SPECIFICATIONS:
GENERAL: Virginia Department of Highway Road and Bridge Specifications 1970
DESIGN: A.A.S.H.O. Standard Specifications for Highway Bridges 1973 modified by Special Design provisions.
WELDING: 1972 Structural Welding Code of the American Welding Society

CONTRACT SPECIAL PROVISIONS
Specifications and Contract Special Provisions referred to above are necessary to make these plans complete

DATUM: City of Richmond

TEMPERATURE: The normal temperature referred to in the plans is 60°F. The temperature range for movement is 0°F to 120°F.

DIMENSIONS: All dimensions are measured horizontally and vertically unless otherwise noted.

EXCAVATION: Excavation below subgrade and cut slope template shall be classified as Structure Excavation. All excavation above these limits shall be classified as Regular Excavation and is not included in the Structural Quantities.

FOUNDATIONS: Footings shall rest on firm material. Foundation material shall be dry and special attention is called to Section 401.05 of General Specifications and to the Contract Special Provisions, concerning preparation of foundations for footings.

CONCRETE NOTES: Concrete in superstructure shall be Class A-4. All other concrete shall be Class A-3. All exposed edges and corners shall have a ¾" chamfer or fillet unless otherwise noted. Care in the method of vibration, the use of low-slump concrete, and or other means shall be employed to prevent downgrade movement of newly placed slab concrete. Finishing Concrete Surfaces: See Standard Architectural Detail Sheets and the Contract Special Provisions for types and details. All reinforcing steel shall be deformed bars conforming to ASTM A615 Grade 40. All reinforcing bar dimensions on the detailed drawings are to centers of bars unless otherwise noted. Clear distance between reinforcing steel and face of concrete shall be as noted on the plans. All bar laps shall be 30 diameters of the smaller diameter bar unless otherwise noted.

STEEL NOTES: Structural steel shall conform to A.S.T.M. Designations A36, A572 - Grade 50 and A588 as noted. See Special Provisions.
All field connections shall be made with high strength bolts. High strength bolts shall be ⅞" diameter unless otherwise noted and shall conform to A.S.T.M. Specification A-325.

AS BUILT

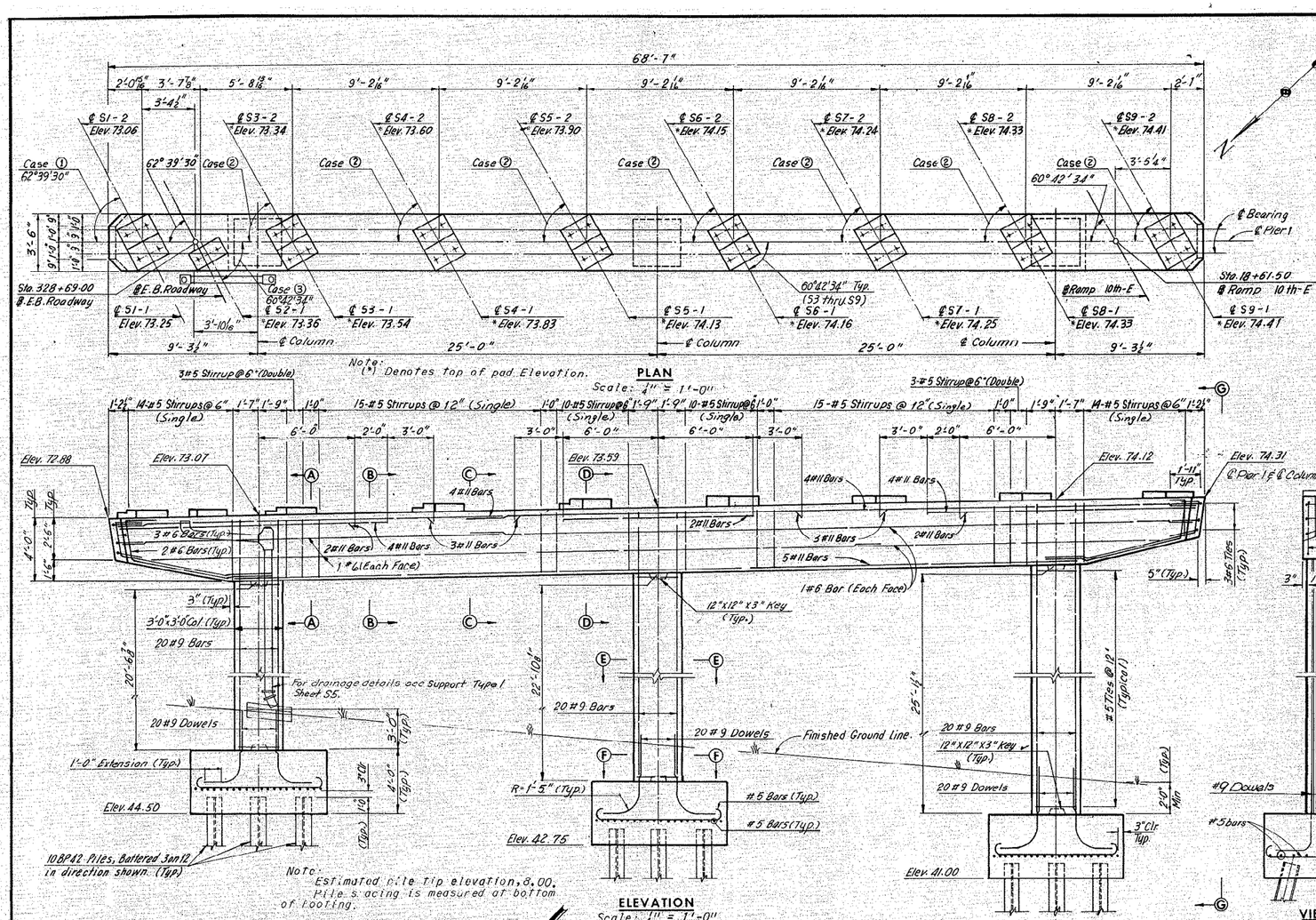
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

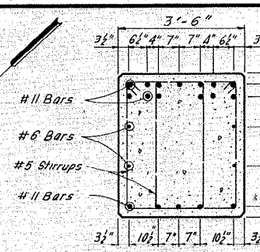
BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
GENERAL PLAN AND ELEVATION

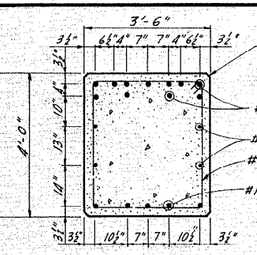
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

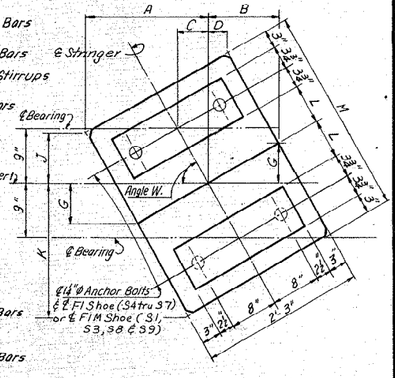
SCALE: As Noted
CONTRACT NO: 10
SHEET NO. 2 OF 46

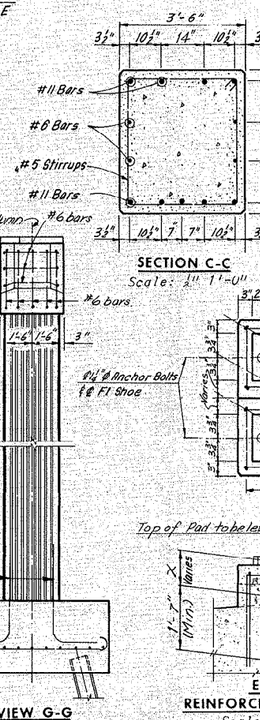
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	132	265

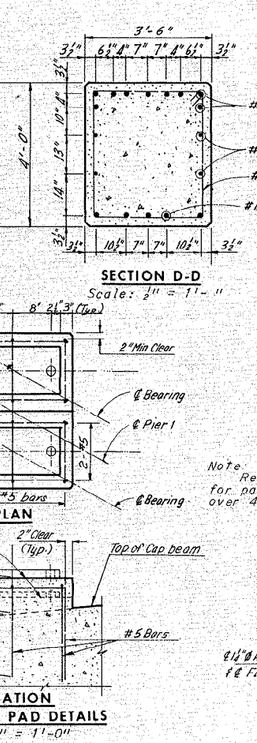


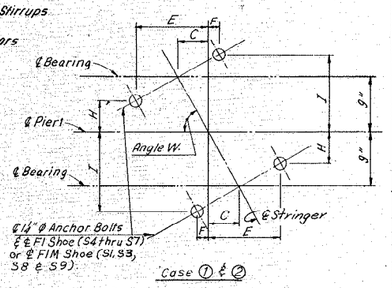


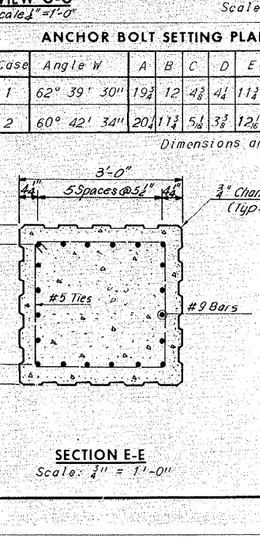


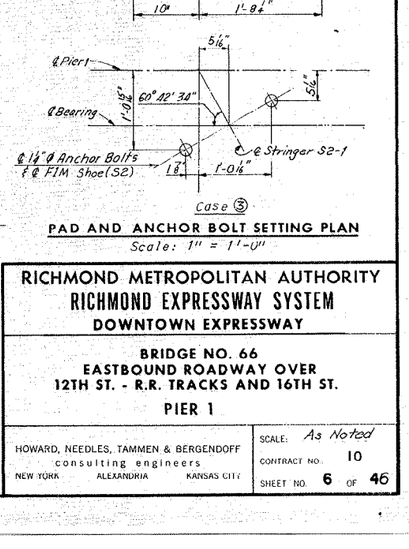










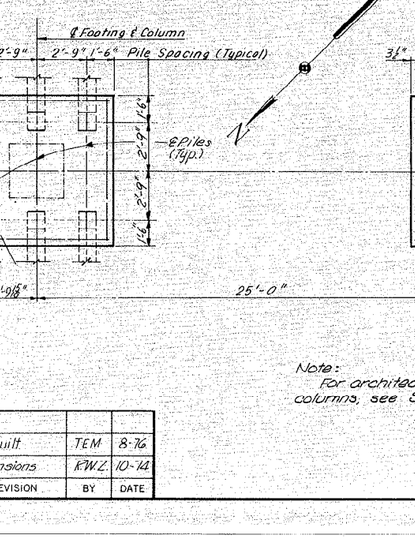


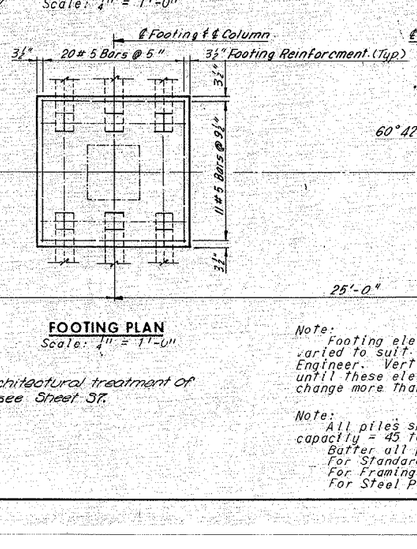
Note: Reinforcement required only for pads with "X" dimension over 4".

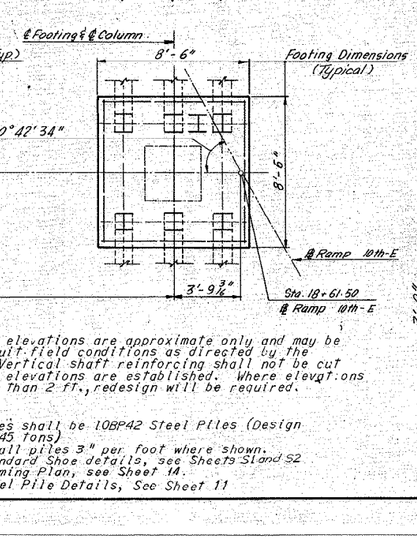
PAD AND ANCHOR BOLT SETTING PLAN
Scale: 1" = 1'-0"

ANCHOR BOLT SETTING PLAN DIMENSIONS													
Case	Angle W	A	B	C	D	E	F	G	H	I	J	K	L	M
1	62° 39' 30"	19⅜	12	4⅞	4¼	11⅜	2⅛	6¼	5⅛	12⅛	8⅜	21¼	6⅜	33⅜
2	60° 42' 34"	20⅛	11⅞	5⅛	3⅜	12⅛	1⅞	6⅜	5⅛	12⅛	8⅜	21¼	6⅜	34¼

Dimensions are in inches.

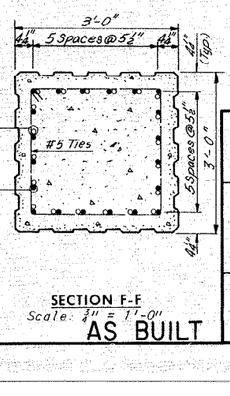






Note: Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.

Note: All piles shall be 10BP42 Steel Piles (Design capacity = 45 tons). Batter all piles 3" per foot where shown. For Standard Shoe details, see Sheets S1 and S2. For Framing Plan, see Sheet 14. For Steel Pile Details, See Sheet 11



	BY	DATE				
MADE	MAA	7-31-68	2	As Built	TEM	8-76
CHECKED	RLM	8-1568	1	Dimensions	K.W.L.	10-14
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

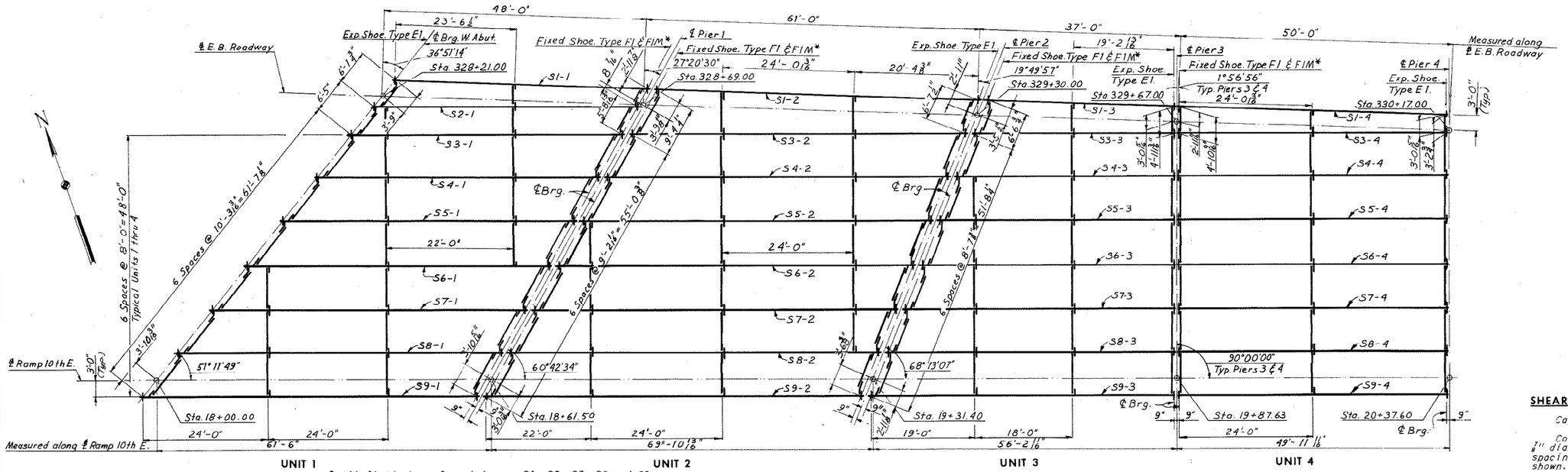
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
PIER 1

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 10
SHEET NO. 6 OF 46

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	140	265



* All fixed shoes for stringers S1, S2, S3, S8 and S9 @ Piers 1, 2 and 3 shall be of type F1M, all other fixed shoes to be of type F1.

FRAMING PLAN
Scale: 1" = 10'-0"

STRINGER SCHEDULE

UNIT	STRINGER	STRINGER SIZE	Dim. "A"	LENGTH "L"	Dim. "B"	Dim. "C"	Dim. "D"	PL."D"	MAX. SHEAR STUD SPACING 0.0L-0.1L*	0.1L-0.2L	0.2L-0.3L	0.3L-0.4L	0.4L-0.5L
1	S1-1	33 WF 118	48'-6 3/8"	46'-5 1/2"	1'-4 1/2"	9"	0	0	13"	14 1/2"	17"	20 1/2"	24"
	S2-1	33 WF 118	50'-6 1/4"	48'-5 11/16"	1'-4 11/16"	8"	0	0	12 1/2"	13 1/2"	16"	19"	23 1/2"
	S3-1	33 WF 118	51'-9 1/8"	49'-8 3/16"	1'-4 11/16"	8"	0	0	9"	10"	11 1/2"	13 1/2"	16 1/2"
	S4-1	33 WF 118	53'-8 3/4"	51'-7 15/16"	1'-4 11/16"	8"	19'-0"	10x 1/2"	7 1/2"	8"	10"	11 1/2"	14"
	S5-1	33 WF 118	55'-7 3/4"	53'-7 1/16"	1'-4 11/16"	8"	21'-0"	10x 3/8"	7 1/2"	8"	10"	11 1/2"	14"
	S6-1	36 WF 135	57'-7 1/8"	55'-6 7/16"	1'-4 11/16"	8"	21'-0"	10 1/2 x 5/8"	8"	8 1/2"	10 1/2"	12 1/2"	15"
	S7-1	36 WF 135	59'-6 7/16"	57'-5 3/4"	1'-4 11/16"	8"	21'-6"	10 1/2 x 5/8"	8"	8 1/2"	10 1/2"	12 1/2"	15"
	S8-1	36 WF 135	61'-5 3/4"	59'-5 1/16"	1'-4 11/16"	8"	22'-6"	10 1/2 x 3/4"	8"	8 1/2"	10 1/2"	12 1/2"	15"
	S9-1	36 WF 135	63'-6 3/8"	61'-4 7/16"	1'-4 11/16"	9 3/8"	24'-0"	10 1/2 x 3/4"	7"	8 1/2"	9 1/2"	11 1/2"	14 1/2"
2	S1-2	36 WF 135	60'-4 3/4"	58'-10 11/16"	9"	8 1/2"	22'-0"	10 1/2 x 1/2"	8"	9 1/2"	11 1/2"	13 1/2"	17"
	S3-2	36 WF 135	62'-1 3/16"	60'-11 5/16"	8"	7 13/16"	22'-6"	10 1/2 x 5/8"	8 1/2"	9 1/2"	11 1/2"	13 1/2"	16 1/2"
	S4-2	36 WF 150	63'-0 11/16"	62'-3 7/8"	8"	7 13/16"	23'-3"	10 1/2 x 5/8"	8"	8 1/2"	11"	12 1/2"	15 1/2"
	S5-2	36 WF 150	64'-10 7/8"	63'-6 5/16"	8"	7 13/16"	24'-0"	10 1/2 x 3/4"	8"	8 1/2"	11"	12 1/2"	15 1/2"
	S6-2	36 WF 150	66'-1 11/16"	64'-10 1/16"	8"	7 13/16"	25'-0"	10 1/2 x 1"	8"	8 1/2"	10 1/2"	12 1/2"	15 1/2"
	S7-2	36 WF 150	67'-5 3/16"	66'-1 3/8"	8"	7 13/16"	25'-9"	10 1/2 x 1"	8"	8 1/2"	11"	12 1/2"	15 1/2"
	S8-2	36 WF 150	68'-8 11/16"	67'-5 1/16"	8"	7 13/16"	26'-6"	10 1/2 x 1 1/8"	8"	8 1/2"	11"	12 1/2"	15 1/2"
	S9-2	36 WF 150	70'-2 3/8"	68'-8 3/8"	9 3/8"	8 13/16"	27'-0"	10 1/2 x 1 1/4"	7 1/2"	8 1/2"	11"	13 1/2"	16 1/2"
3	S1-3	30 WF 99	35'-7 11/16"	34'-3 5/16"	8 1/2"	8"	0	0	11"	12"	14"	16 1/2"	20 1/2"
	S3-3	30 WF 99	37'-10 9/16"	36'-6 1/4"	7 7/8"	7"	0	0	9"	10"	11 1/2"	13 1/2"	16"
	S4-3	30 WF 108	41'-1 1/8"	39'-10 9/16"	7 7/8"	7"	0	0	7 1/2"	8"	9"	10 1/2"	13"
	S5-3	30 WF 108	44'-3 1/16"	43'-0 5/16"	7 7/8"	7"	15'-0"	9x 1/4"	7"	7 1/2"	9 1/2"	11"	13"
	S6-3	30 WF 108	47'-5 3/8"	46'-3 5/16"	7 7/8"	7"	17'-0"	9x 1/4"	7"	7 1/2"	9"	11"	13"
	S7-3	30 WF 108	50'-8 1/4"	49'-5 1/16"	7 7/8"	7"	19'-3"	9x 3/8"	7"	7 1/2"	9"	11"	13"
	S8-3	30 WF 108	53'-10 3/8"	52'-8"	7 7/8"	7"	21'-6"	9x 1"	7"	7 1/2"	9 1/2"	11"	13"
	S9-3	30 WF 108	57'-3"	55'-10 7/8"	8 5/8"	8"	23'-3"	9x 1 1/8"	7"	7 1/2"	9 1/2"	11 1/2"	14"
4	S1-4	30 WF 108	49'-10"	48'-6"	8"	8"	0	0	10 1/2"	11 1/2"	13 1/2"	16 1/2"	20 1/2"
	S3-4	30 WF 99	49'-7 5/8"	48'-5 5/16"	7"	7"	18'-0"	9x 1/4"	8 1/2"	9 1/2"	11 1/2"	13 1/2"	16"
	S4-4	30 WF 108	49'-7 5/8"	48'-5 5/16"	7"	7"	18'-6"	9x 3/8"	7"	7 1/2"	9 1/2"	11"	13"
	S5-4	30 WF 108	49'-7 5/8"	48'-5 5/16"	7"	7"	18'-6"	9x 3/4"	7"	7 1/2"	9 1/2"	11"	13"
	S6-4	30 WF 108	49'-7 5/8"	48'-5 5/16"	7"	7"	18'-6"	9x 3/4"	7"	7 1/2"	9 1/2"	11"	13"
	S7-4	30 WF108	49'-7 5/8"	48'-5 5/16"	7"	7"	18'-6"	9x 3/4"	7"	7 1/2"	9 1/2"	11"	13"
	S8-4	30 WF 108	49'-7 5/8"	48'-5 5/16"	7"	7"	18'-6"	9x 3/4"	7"	7 1/2"	9 1/2"	11"	13"
	S9-4	30 WF 108	49'-9 5/8"	48'-5 5/8"	8"	8"	19'-0"	9x 5/8"	7"	8"	9 1/2"	11 1/2"	14"

* Spacing begins at termination of 6 spaces @ 4".

Note: All steel shall be A36 unless otherwise denoted.

Notes:
For Diaphragm and Connection Details, see Sheet 26.
For Joint Details, see Sheet 37.
For Shoe Details, see Sheets 31 and 32
For angles between ℄ Piers and Stringers, see Sheets 3, 6, 7 & 8.
For Superstructure steel quantities, see Sheet 2.

DEAD LOAD DEFLECTION SCHEDULE

¼L	½L	¾L
4"	8"	4"
9/16"	7/16"	9/16"
3/8"	9/16"	3/8"
1/2"	11/16"	1/2"
9/16"	13/16"	9/16"
1/16"	1/16"	1/16"
5/8"	13/16"	5/8"
5/8"	13/16"	5/8"
11/16"	15/16"	11/16"
11/16"	15/16"	11/16"
3/8"	9/16"	3/8"
3/4"	1"	3/4"
3/4"	1"	3/4"
7/8"	1 1/16"	7/8"
7/8"	1 1/16"	7/8"
1"	1 3/16"	1"
1"	1 3/16"	1"
1 1/16"	1 5/16"	1 1/16"
1 1/16"	1 5/16"	1 1/16"
1"	1 3/16"	1"
1"	1 3/16"	1"
1 1/16"	1 5/16"	1 1/16"
1 1/16"	1 5/16"	1 1/16"
1/4"	3/8"	1/4"
1/4"	3/8"	1/4"
1/4"	3/8"	1/4"
5/16"	7/16"	5/16"
5/16"	7/16"	5/16"
5/16"	7/16"	5/16"
5/16"	7/16"	5/16"
5/16"	7/16"	5/16"
5/16"	7/16"	5/16"
5/16"	7/16"	5/16"
5/16"	7/16"	5/16"

CAMBER SCHEDULE

¼L	½L	¾L
5/16"	1/2"	5/16"
3/8"	1/2"	3/8"
7/16"	11/16"	7/16"
7/16"	11/16"	7/16"
1/2"	3/4"	1/2"
9/16"	13/16"	9/16"
9/16"	13/16"	9/16"
5/8"	15/16"	5/8"
5/8"	15/16"	5/8"
11/16"	1 1/16"	11/16"
11/16"	1 1/16"	11/16"
3/4"	1 1/8"	3/4"
3/4"	1 1/8"	3/4"
13/16"	1 3/16"	13/16"
13/16"	1 3/16"	13/16"
7/8"	1 5/16"	7/8"
7/8"	1 5/16"	7/8"
15/16"	1 7/16"	15/16"
15/16"	1 7/16"	15/16"
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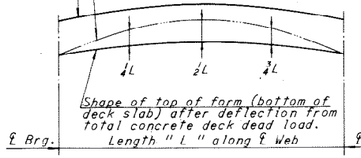
5/16"	7/16"	5/16"

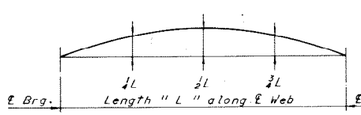


DEAD LOAD DEFLECTION DIAGRAM

NOTE TO CONTRACTOR

Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.

In practice, the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab and the top of stringer without altering the slab thickness.



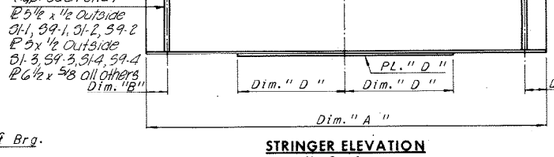
CAMBER DIAGRAM

NOTE TO FABRICATOR

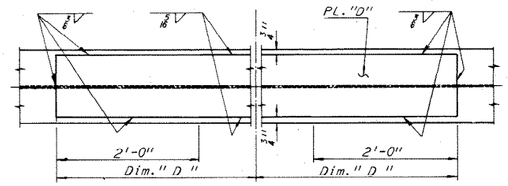
The stringers shall be fabricated with an upward camber amounting to the tabulated value.

This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.

Dimensions are in inches.

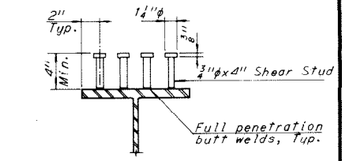


STRINGER ELEVATION
No Scale

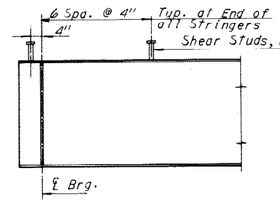


COVER PLATE DETAIL
No Scale

Note:
Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber Diagram.
If stringers are not cambered, distance top of stringers to top of slab will vary along the stringer in accordance with the offset dimensions shown in the Camber Diagram, and with minimum distance as shown in cross-section on Sheet 28.



SHEAR STUD DETAIL
No Scale



DETAIL "A"
No Scale

SHEAR STUD NOTE

Capacity = 3,400 lbs. per stud.

Contractor may, if he elects, use three ¾" diameter studs at the same longitudinal spacing in lieu of the four ¾" diameter studs shown.

Stud rows shall be placed parallel to the main deck reinforcement.

SHOE SCHEDULE

EXPANSION SHOES		FIXED SHOES	
TYPE	NO.REQD.	TYPE	NO.REQD.
E1	33	F1	16
		F1M	17

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.D.	8-6-68	2	As Built	TEM	8-76
CHECKED	J.V.	10-22-68	1	Pier 1 & 2 Dim. Change	LBP	10-16-74
IN CHARGE						

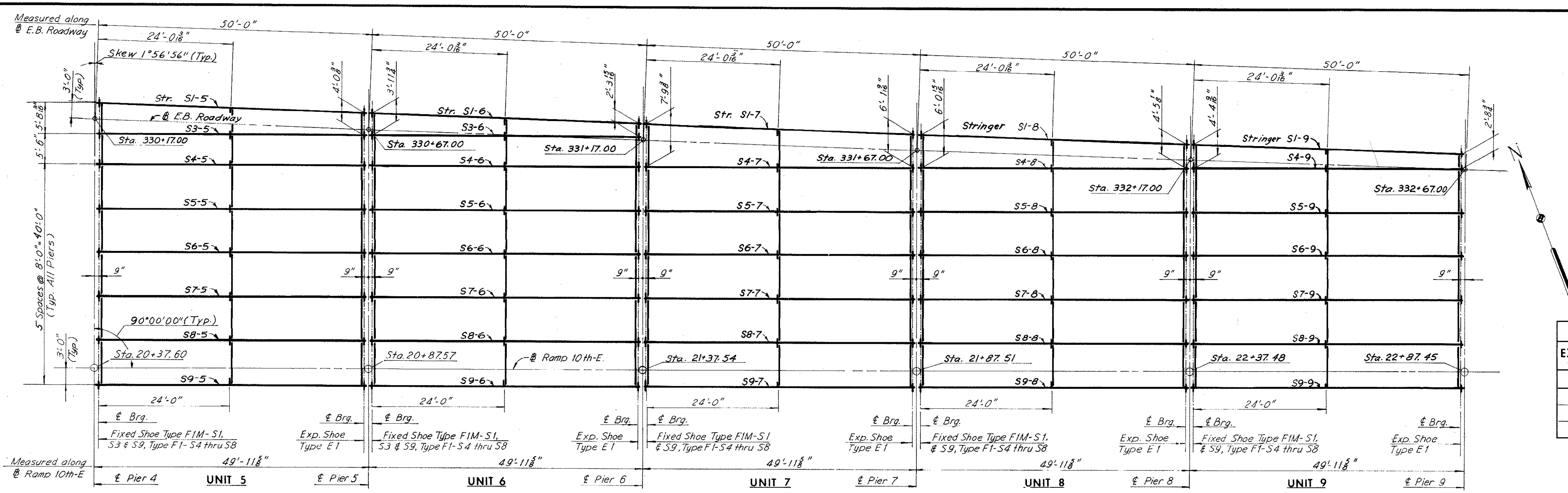
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.

FRAMING PLAN - UNITS 1,2,3 AND 4

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=10' Unless as shown
CONTRACT NO.: 10
SHEET NO. 14 OF 46



FRAMING PLAN
Scale: 1" = 10'-0"

SHOE SCHEDULE

EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E1	37	F1	25
		F1M	12

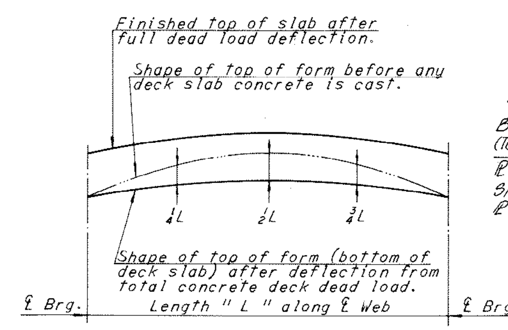
STRINGER SCHEDULE

UNIT	STRINGER	STRINGER SIZE	Dim. "A"	LENGTH "L"	Dim. "B"	Dim. "C"	Dim. "D"	PL. "D"	MAX. SHEAR STUD SPACING 0.0L-0.1L*	0.1L-0.2L	0.2L-0.3L	0.3L-0.4L	0.4L-0.5L	DEAD LOAD DEFLECTION SCHEDULE ¼L	½L	¾L	CAMBER SCHEDULE ¼L	½L	¾L
5	S1-5	30 WF 108	49'-10"	48'-6"	8"	8"	0	0	11"	11½"	13½"	16½"	20½"	½"	11/16"	½"	9/16"	¾"	9/16"
	S3-5	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	0	0	10"	11½"	13"	15½"	19"	7/16"	⅝"	7/16"	½"	¾"	½"
	S4-5	30 WF 99	49'-7⅝"	48'-5⅝"	7"	7"	18'-0"	9x⅝"	8"	9"	11"	12½"	15"	7/16"	9/16"	7/16"	½"	11/16"	½"
	S5-5	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S6-5	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S7-5	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S8-5	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	11/16"	½"	9/16"	13/16"	9/16"
	S9-5	30 WF 108	49'-9⅝"	48'-5⅝"	8"	8"	19'-0"	9x⅝"	7½"	8"	9½"	11½"	14"	½"	11/16"	½"	9/16"	¾"	9/16"
6	S1-6	30 WF 99	49'-10"	48'-6"	8"	8"	0	0	13½"	15"	18"	22"	24"	½"	⅝"	½"	9/16"	¾"	9/16"
	S3-6	30 WF 99	49'-7⅝"	48'-5⅝"	7"	7"	0	0	11½"	12½"	14½"	17½"	21½"	7/16"	9/16"	7/16"	½"	11/16"	½"
	S4-6	30 WF 99	49'-7⅝"	48'-5⅝"	7"	7"	18'-0"	9x⅝"	8"	9"	11"	12½"	15"	7/16"	9/16"	7/16"	½"	11/16"	½"
	S5-6	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S6-6	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S7-6	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S8-6	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	11/16"	½"	9/16"	13/16"	9/16"
	S9-6	30 WF 108	49'-9⅝"	48'-5⅝"	8"	8"	19'-0"	9x⅝"	7½"	8"	9½"	11½"	14"	½"	11/16"	½"	9/16"	¾"	9/16"
7	S1-7	30 WF 108	49'-10"	48'-6"	8"	8"	17'-6"	9x½"	8"	8½"	10½"	12½"	15½"	½"	⅝"	½"	9/16"	¾"	9/16"
	S4-7	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S5-7	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S6-7	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S7-7	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S8-7	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	11/16"	½"	9/16"	13/16"	9/16"
	S9-7	30 WF 108	49'-9⅝"	48'-5⅝"	8"	8"	19'-0"	9x⅝"	7½"	8"	9½"	11½"	14"	½"	11/16"	½"	9/16"	¾"	9/16"
8	S1-8	30 WF 108	49'-10"	48'-6"	8"	8"	17'-6"	9x½"	9½"	10½"	13"	15½"	19½"	7/16"	⅝"	7/16"	9/16"	¾"	9/16"
	S4-8	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	8"	8½"	11"	13"	15½"	7/16"	⅝"	7/16"	½"	¾"	½"
	S5-8	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13½"	½"	⅝"	½"	9/16"	¾"	9/16"
	S6-8	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13½"	½"	⅝"	½"	9/16"	¾"	9/16"
	S7-8	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13½"	½"	⅝"	½"	9/16"	¾"	9/16"
	S8-8	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13½"	½"	11/16"	½"	9/16"	13/16"	9/16"
	S9-8	30 WF 108	49'-9⅝"	48'-5⅝"	8"	8"	19'-6"	9x⅝"	7"	7½"	10"	12"	14½"	½"	11/16"	½"	9/16"	¾"	9/16"
9	S1-9	30 WF 99	49'-10"	48'-6"	8"	8"	0	0	14"	15"	18"	22"	24"	½"	11/16"	½"	9/16"	13/16"	9/16"
	S4-9	30 WF 99	49'-7⅝"	48'-5⅝"	7"	7"	17'-0"	9x½"	9"	10"	12"	14"	17"	7/16"	⅝"	7/16"	9/16"	¾"	¾"
	S5-9	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S6-9	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18"-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S7-9	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S8-9	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	11/16"	½"	9/16"	13/16"	9/16"
	S9-9	30 WF 108	49'-9⅝"	48'-5⅝"	8"	8"	19'-0"	9x⅝"	7½"	8"	9½"	11½"	14"	½"	11/16"	½"	9/16"	¾"	9/16"

* Spacing begins at termination of 6 spaces @ 4".

Note:
All steel shall be A36 unless denoted otherwise.

Notes:
For Diaphragm and Connection Details, see Sheet 29.
For Joint Details, see Sheet 37.
For Shoe Details, see Sheets 51 and 52
For Shear Stud Details, see Sheet 14.
For angles between ℄ Piers and Stringers, see Sheets 8, 9, 10 & 11.
For Superstructure steel quantities, see Sheet 2.

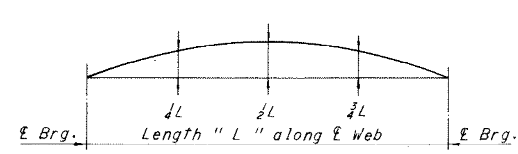


DEAD LOAD DEFLECTION DIAGRAM

NOTE TO CONTRACTOR

Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.

In practice, the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab and the top of stringer without altering the slab thickness.



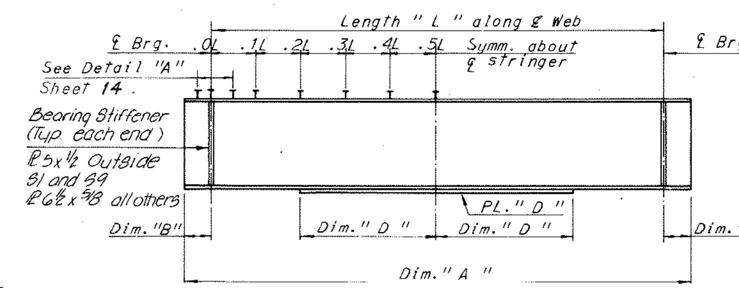
CAMBER DIAGRAM

NOTE TO FABRICATOR

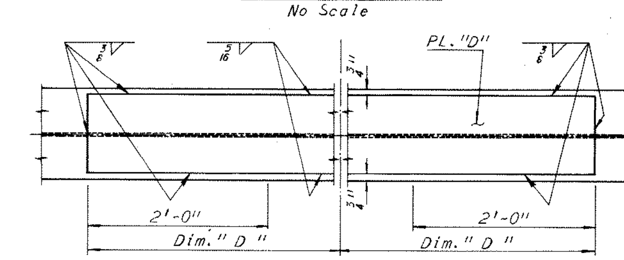
The stringers shall be fabricated with an upward camber amounting to the tabulated value.

This will provide approximate compensation for deflection under full dead load and for comformity with finished grade.

Dimensions are in inches.



STRINGER ELEVATION
No Scale



COVER PLATE DETAIL
No Scale

Note:
Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber Diagram.

If stringers are not cambered, distance top of stringers to top of slab will vary along the stringer in accordance with the offset dimensions shown in the Camber Diagram, and with minimum distance as shown in cross-section on Sheet 29.

	BY	DATE				
MADE	SHS	8-2-68				
CHECKED	JD	10-21-68	1	As Built	TEM	8-76
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

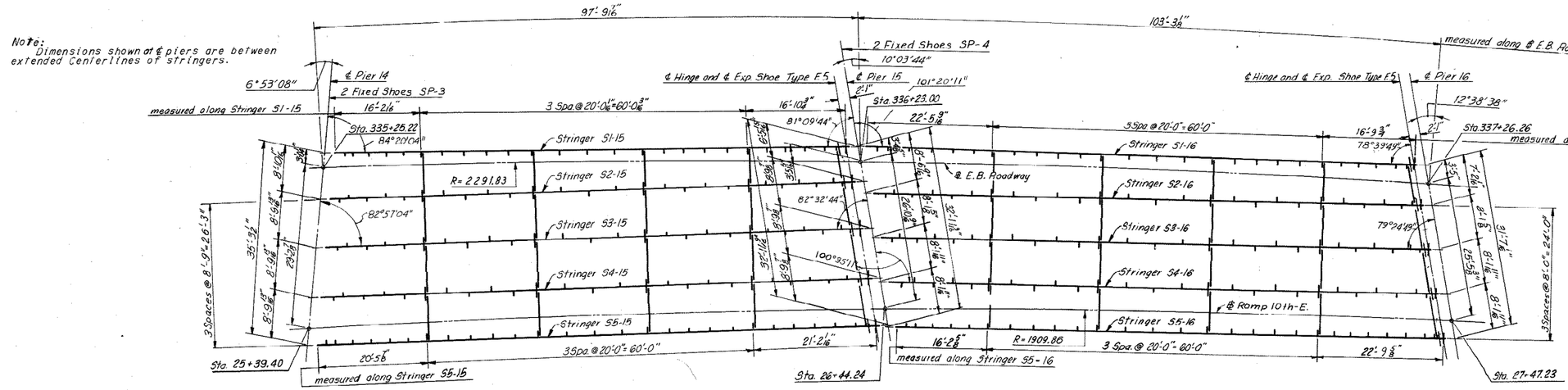
BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
FRAMING PLAN - UNITS 5,6,7,8, AND 9

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=10' Unless as shown
CONTRACT NO.: 10
SHEET NO. 15 OF 46

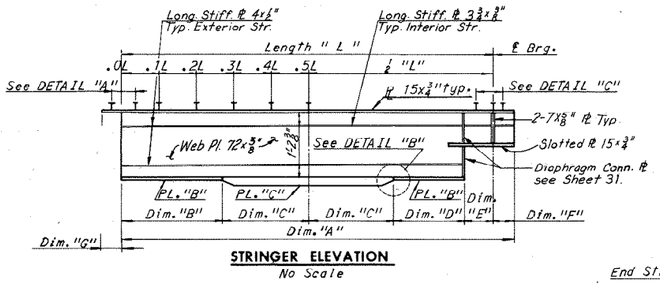
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	143	265

Note:
Dimensions shown at ℄ piers are between extended centerlines of stringers.

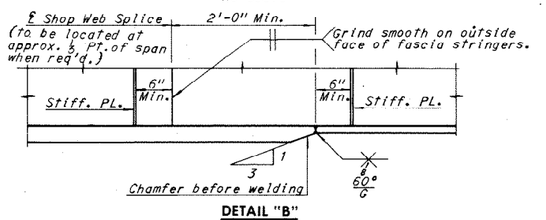


Note:
Stringers S2-15 thru S5-15 and Stringers S2-16 thru S5-16 are parallel.
Diaphragm spacing is shown along stringer length "L".

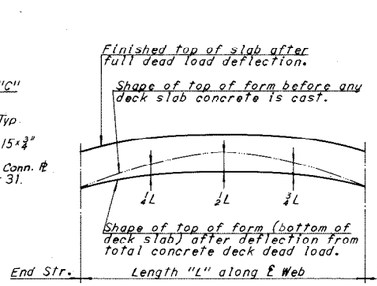
UNIT 15



STRINGER ELEVATION
No Scale



DETAIL "B"
No Scale



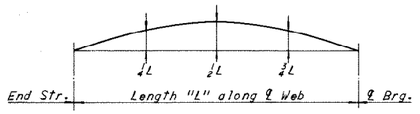
DEAD LOAD DEFLECTION DIAGRAM

NOTE TO CONTRACTOR

Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.
In practice, the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab and the top of stringer without altering the slab thickness.

UNIT 16

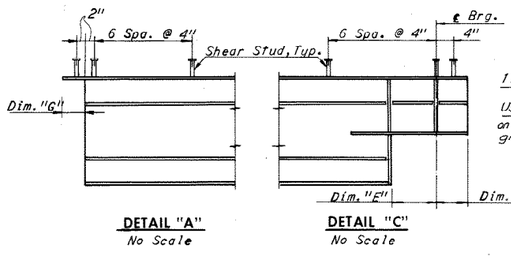
FRAMING PLAN
Scale: 1/32"=1'-0"



CAMBER DIAGRAM

NOTE TO FABRICATOR

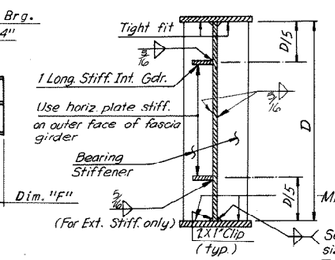
The stringers shall be fabricated with an upward camber amounting to the tabulated value.
This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.
Dimensions are in inches.
Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber Diagram.
If stringers are not cambered, distance top of stringers to top of slab will vary along the stringer in accordance with the offset dimensions shown in the Camber Diagram, and with minimum distance as shown in cross-section on Sheet 31.



DETAIL "A"
No Scale

DETAIL "C"
No Scale

SHOE SCHEDULE			
FIXED SHOES		EXPANSION SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
SP-3	2	E5	10
SP-4	2		



WEB TO FLANGE WELDS AND LONGITUDINAL STIFFENER WELD DETAILS
No Scale

Note:
Web to flange weld size shall be determined by flange thickness as follows:

To 1 1/2" ..... 5/16" weld
over 1 1/2" to 2 1/4" ..... 3/8" weld

Notes:
For Superstructure steel quantities, see Sheet 2.
For Joint Details, see Sheet 38.
For Shoe Details, see Sheets 51 and 52
For Diaphragm Details, see Sheet 31.
For Framing Details, see Sheet 22.
For Shear Stud Details, see Sheet 14.
For Angles between ℄ Piers and Stringers see Sheet 22.

STRINGER SCHEDULE

UNIT	STRINGER	Dim. "A"	LENGTH "L"	Dim. "B"	Dim. "C"	Dim. "D"	Dim. "E"	Dim. "F"	Dim. "G"	PL. "B"	PL. "C"	MAX. SHEAR STUD SPACING 0.0L-0.1L*	0.1L-0.2L	0.2L-0.3L	0.3L-0.4L	0.4L-0.5L
15	S1-15	93'- 8 1/16"	93'- 1"	23'-3 1/16"	23'-3"	22'-5 5/16"	10 1/16"	7 1/16"	6 9/16"	15x3/4"	15x1 1/16"	13 1/16"	15 1/2"	19"	24"	24"
	S2-15	95'- 6 3/16"	94'-11 15/16"	24'-5 7/16"	23'-0"	23'-7 7/16"	10 1/16"	7 1/16"	6 9/16"	15x3/4"	15x1 1/4"	14"	16"	18 1/2"	21 1/2"	23 1/2"
	S3-15	97'- 9 5/16"	97'- 2 1/2"	22'-1 1/4"	26'-6"	21'-3 3/16"	10 1/16"	7 1/16"	6 9/16"	15x3/4"	15x1 3/16"	14"	16"	18"	21"	22 1/2"
	S4-15	100'- 0 5/8"	99'- 5 1/4"	24'-2 3/8"	25'-6"	23'-4 3/8"	10 1/16"	7 1/16"	6 9/16"	15x1"	15x1 1/2"	14"	16"	18 1/2"	21"	23"
	S5-15	102'- 3"	101'- 7 15/16"	24'-4"	26'-6"	23'-5 3/16"	10 1/16"	7 1/16"	6 9/16"	15x1"	15x1 1/2"	13 1/2"	15 1/2"	18 1/2"	23"	24"
16	S1-16	99'-10 7/16"	99'- 3 5/16"	23'-7 5/16"	26'-0"	22'-9 1/16"	10 3/16"	7 1/16"	6 5/16"	15x7/8"	15x1 3/16"	14"	16"	19"	24"	24"
	S2-16	99'- 7 3/16"	99'- 0 1/4"	24'-6 1/16"	25'-0"	23'-7 15/16"	10 3/16"	7 1/16"	6 5/16"	15x7/8"	15x1 1/4"	15"	17"	19 1/2"	22 1/2"	24"
	S3-16	99'- 7 3/16"	99'- 0 1/4"	24'-0 1/16"	25'-6"	23'-1 15/16"	10 3/16"	7 1/16"	6 5/16"	15x7/8"	15x1 1/4"	15"	17"	19 1/2"	22 1/2"	24"
	S4-16	99'- 7 3/16"	99'- 0 1/4"	24'-0 1/16"	25'-6"	23'-1 15/16"	10 3/16"	7 1/16"	6 5/16"	15x7/8"	15x1 1/4"	15"	17"	19 1/2"	22 1/2"	24"
	S5-16	99'- 7 3/16"	99'- 0 1/4"	24'-0 1/16"	25'-6"	23'-1 15/16"	10 3/16"	7 1/16"	6 5/16"	15x7/8"	15x1 1/8"	14"	16 1/2"	19 1/2"	24"	24"

UNIT	STRINGER	DEAD LOAD DEFLECTION SCHEDULE 1/4L	1/2L	3/4L	CAMBER SCHEDULE 1/4L	1/2L	3/4L
15	S1-15	15/16"	1 1/16"	15/16"	1 3/16"	1 15/16"	1 5/16"
	S2-15	7/8"	1 1/8"	7/8"	1 1/2"	2"	1 7/16"
	S3-15	15/16"	1 1/8"	15/16"	1 5/16"	2 1/16"	1 1/2"
	S4-15	1"	1 1/8"	1"	1 11/16"	2 3/16"	1 5/16"
	S5-15	1 1/16"	1 1/8"	1 1/16"	1 3/16"	2 1/8"	1 5/16"
16	S1-16	15/16"	1 1/8"	15/16"	1 3/16"	1 9/16"	1 5/16"
	S2-16	15/16"	1 1/8"	15/16"	1"	1 1/16"	1"
	S3-16	1"	1 1/8"	1"	1"	1 1/16"	1"
	S4-16	1"	1 1/8"	1"	1"	1 1/16"	1"
	S5-16	15/16"	1 1/8"	15/16"	1 1/16"	1 1/8"	15/16"

Note All structural steel in Units 15 and 16 is A36.

* Spacing begins at termination of 6 spaces @ 4"

Longitudinal stiffeners shall be located on the exterior face of the exterior Stringers.

Intermediate stiffener Pls. 4 1/2 x 3/8" shall be equally spaced between diaphragms as shown. The first two stiffener spaces at the ends of stringers shall be one-half the normal spacing within the panel.

	BY	DATE				
MADE	RLM	7-31-68				
CHECKED	PTA	11-4-68	1	As Built	TEM	8-7-6
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.

FRAMING PLAN - UNITS 15 AND 16

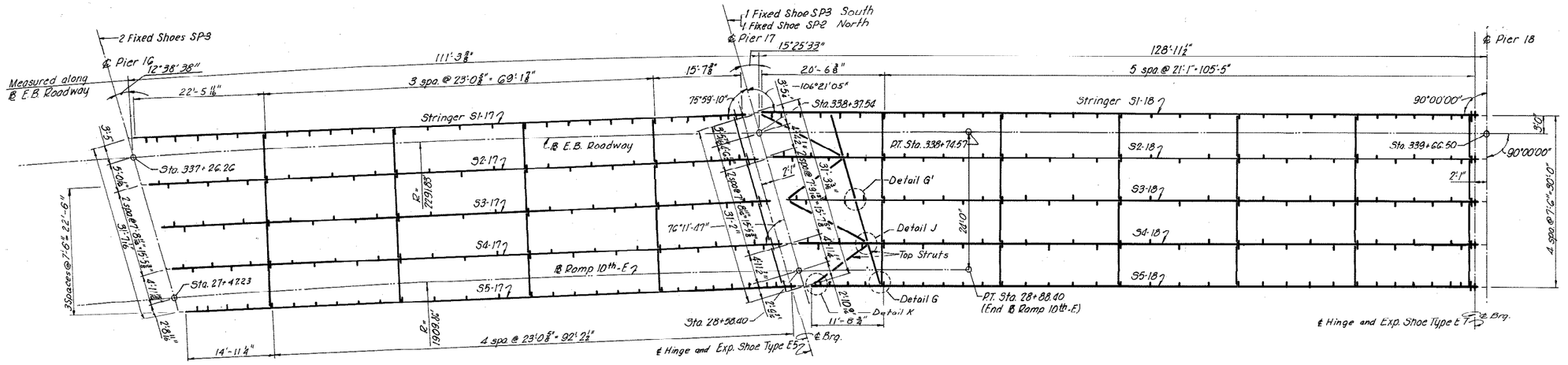
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK · ALEXANDRIA · KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 17 OF 46

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	144	265

Note:
Stringers S2-17 thru S5-17 and Stringers S1-18 thru S5-18 are parallel.
Diaphragm spacing is shown along stringer length "L".

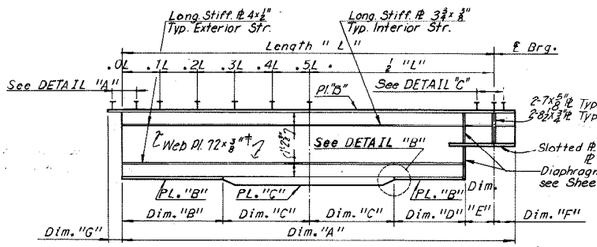
Dimensions shown at ℄ Piers are between extended center lines of stringers.



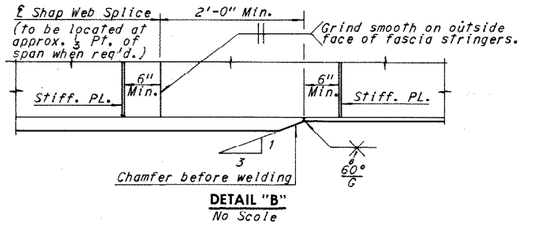
UNIT 17 **UNIT 18**

FRAMING PLAN
Scale: 1"=10'-0"

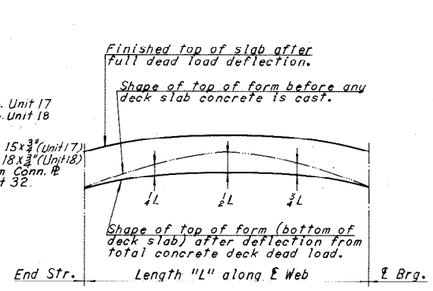
Note:
For web to flange weld sizes and longitudinal stiffener plate details see Sheet 17.



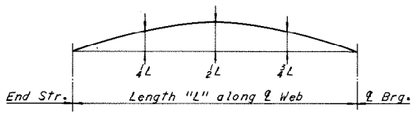
STRINGER ELEVATION
No Scale



DETAIL "B"
No Scale



DEAD LOAD DEFLECTION DIAGRAM



CAMBER DIAGRAM

NOTE TO FABRICATOR

The stringers shall be fabricated with an upward camber amounting to the tabulated value. This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.

Dimensions are in inches.

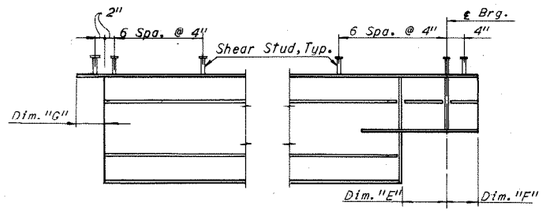
Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber Diagram.

If stringers are not cambered, distance top of stringers to top of slab will vary along the stringer in accordance with the offset dimensions shown in the Camber Diagram, and with minimum distance as shown in cross-section on Sheet 32.

NOTE TO CONTRACTOR

Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.

In practice, the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab and the top of stringer without altering the slab thickness.



DETAIL "A"
No Scale

DETAIL "C"
No Scale

SHOE SCHEDULE

EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E5	5	SP-2	1
E7	5	SP-3	3

Note:
Longitudinal stiffeners shall be located on the exterior face of the exterior Stringers. Intermediate stiffener Pls. 4x3/8" shall be equally spaced between diaphragms as shown. The first two stiffener spaces at the ends of stringers shall be one-half the normal spacing within the panel.
All steel shall be A36 unless otherwise noted.

Notes:
For Framing Details, see Sheet 22 and 23.
For Joint Details, see Sheet 38.
For Shoe Details, see Sheets S1 & S2.
For Diaphragm Details, see Sheet 32.
For Superstructure steel quantities, see Sheet 2.
For Details G, G', J and K, see Sheet 27.
For Shear Stud Details, see Sheet 14.
For Angles between ℄ Piers and Stringers, see Sheets 22 & 23.

STRINGER SCHEDULE

UNIT	STRINGER	Dim. "A"	LENGTH "L"	Dim. "B"	Dim. "C"	Dim. "D"	Dim. "E"	Dim. "F"	Dim. "G"	PL. "B"	PL. "C"	MAX. SHEAR STUD SPACING 0.0L-0.1L*	0.1L-0.2L	0.2L-0.3L	0.3L-0.4L	0.4L-0.5L
17	S1-17	107'-10⅜"	107'-2⅝"	26'-7½"	27'-0"	25'-9⅛"	10⅝"	7¼"	6⅛"	‡ 15x⅜"	‡ 15x1¼"	13½"	15¼"	18½"	23"	24"
	S2-17	107'-9"	107'-1⅜"	28'-6⅞"	25'-0"	27'-8⅜"	10⅜"	7¼"	6⅛"	‡ 15x⅜"	‡ 15x1"	14½"	17"	19½"	22"	24"
	S3-17	107'-9"	107'-1⅜"	28'-6⅞"	25'-0"	27'-8⅜"	10⅜"	7¼"	6⅛"	‡ 15x⅜"	‡ 15x1"	14½"	17"	19½"	22"	24"
	S4-17	107'-9"	107'-1⅜"	28'-6⅞"	25'-0"	27'-8⅜"	10⅜"	7¼"	6⅛"	‡ 15x⅜"	‡ 15x1"	14½"	17"	19½"	22"	24"
	S5-17	107'-9"	107'-1⅜"	28'-0⅞"	25'-6"	27'-2⅜"	10⅜"	7¼"	6⅛"	‡ 15x⅜"	‡ 15x1¼"	14"	16"	19"	24"	24"
18	S1-18	126'-6⅜"	125'-11⅜"	30'-11⅛"	32'-0"	30'-1⅛"	10"	7"	6¾"	‡ 18x⅞"	‡ 18x1¼"	14"	16½"	19½"	24"	24"
	S2-18	124'-4"	123'-9"	34'-10½"	27'-0"	34'-0½"	10"	7"	6¾"	‡ 18x⅞"	‡ 18x1¼"	16"	18½"	21½"	24"	24"
	S3-18	122'-1⅜"	121'-6⅜"	36'-3⅝"	24'-6"	35'-5¼"	10"	7"	6¾"	‡ 18x⅞"	‡ 18x1¼"	16"	18½"	21½"	23½"	24"
	S4-18	119'-11⅜"	119'-4⅜"	——	118'-6⅜"	——	10"	7"	6¾"	‡ 18x⅞"	‡ 18x1	16"	18½"	21½"	23½"	24"
	S5-18	117'-8⅜"	117'-1¾"	37'-0⅞"	21'-6"	36'-2⅝"	10"	7"	6¾"	‡ 18x⅞"	‡ 18x1¼"	14½"	17"	20"	24"	24"

DEAD LOAD DEFLECTION SCHEDULE			CAMBER SCHEDULE		
¼L	½L	¾L	¼L	½L	¾L
1⅜"	2¼"	1⅝"	2"	2¾"	2⅛"
1⅜"	2¼"	1⅝"	1 11/16"	2⅝"	1⅝"
1⅜"	2¼"	1⅝"	1½"	2"	1⅜"
1⅜"	2¼"	1⅝"	1⅝"	1⅝"	1 1/16"
1⅜"	2⅜"	1⅝"	1"	1 1/16"	⅝"
2¼"	3¼"	2¼"	2 5/16"	4 1/16"	2 5/16"
2⅜"	2⅝"	2⅜"	2 1/16"	3 1/16"	2¾"
2"	2¾"	2"	2 3/16"	3 1/16"	2 5/16"
1⅞"	2⅝"	1⅞"	2⅛"	3 1/16"	2⅝"
1¾"	2¾"	1¾"	2¼"	3 3/16"	2⅝"

*Spacing begins at termination of 6 spaces @ 4".

‡ Denotes A572-Grade 50 steel for thickness of 4" and under and A588 steel for thickness over 4".

	BY	DATE	NO.	REVISION	BY	DATE
MADE	FEO	8-20-68	2	As Built	TEM	8-76
CHECKED	PTA	4-25-69	1	Pier 17 Shoes	DWB	11/14/74
IN CHARGE						

AS BUILT

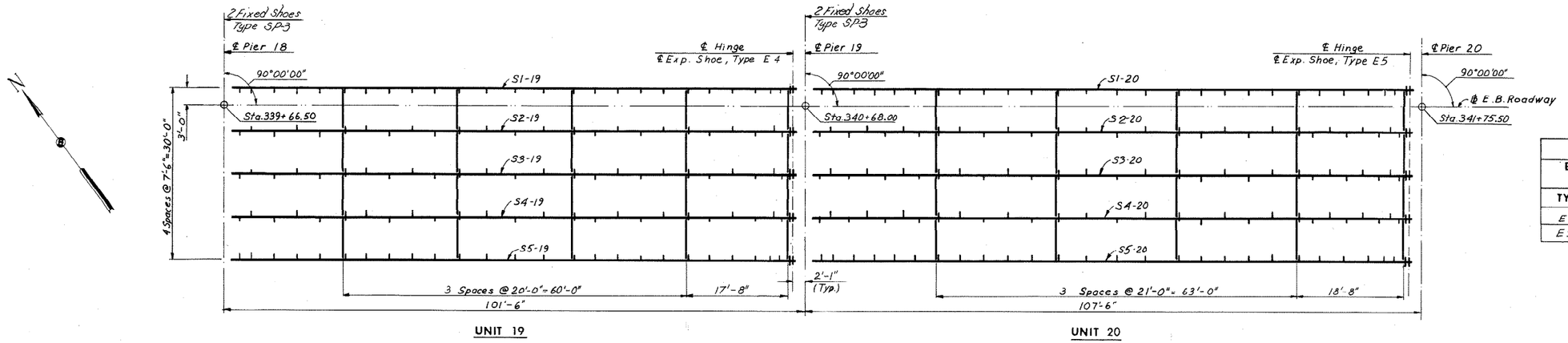
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
FRAMING PLAN - UNITS 17 AND 18

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 18 OF 46

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	145	265

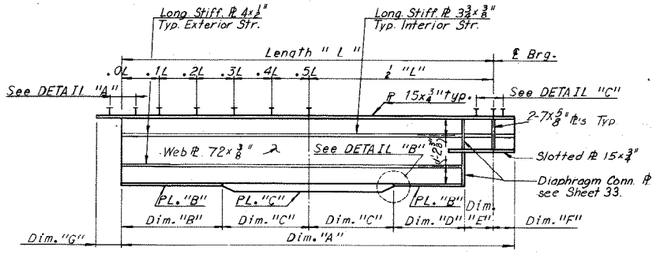


FRAMING PLAN
Scale: 1" = 10'-0"

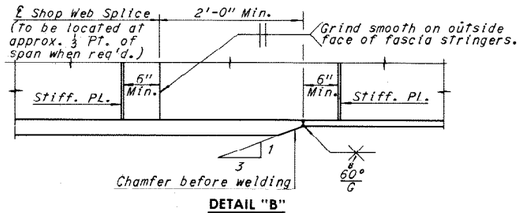
SHOE SCHEDULE

EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E4	5	SP-3	4
E5	5		

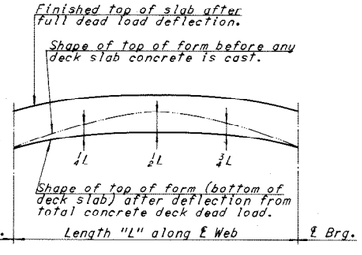
Note: For web to flange weld sizes and Longitudinal Stiffener Plate details see Sheet 17.



STRINGER ELEVATION
No Scale



DETAIL "B"
No Scale

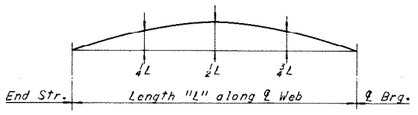


DEAD LOAD DEFLECTION DIAGRAM

NOTE TO CONTRACTOR

Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.

In practice, the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab and the top of stringer without altering the slab thickness.



CAMBER DIAGRAM

NOTE TO FABRICATOR

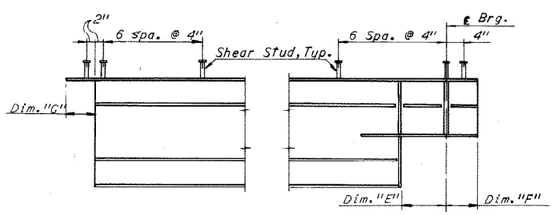
The stringers shall be fabricated with an upward camber amounting to the tabulated value.

This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.

Dimensions are in inches.

Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber Diagram.

If stringers are not cambered, distance top of stringers to top of slab will vary along the stringer in accordance with the offset dimensions shown in the Camber Diagram, and with minimum distance as shown in cross-section on Sheet 33.



DETAIL "A"
No Scale

DETAIL "C"
No Scale

Note: Longitudinal stiffeners shall be located on the exterior face of the exterior Stringers.

Intermediate stiffener Pls. 4½ x 8" shall be equally spaced between diaphragms as shown. The first two stiffener spaces at the end of stringers shall be one-half the normal spacing within the panel.

STRINGER SCHEDULE

UNIT	STRINGER	Dim. "A"	LENGTH "L"	Dim. "B"	Dim. "C"	Dim. "D"	Dim. "E"	Dim. "F"	Dim. "G"	PL. "B"	PL. "C"	MAX. SHEAR STUD SPACING 0.0L-0.1L*	0.1L-0.2L	0.2L-0.3L	0.3L-0.4L	0.4L-0.5L
19	S1-19	98'-2½"	97'-7¼"	23'-9⅝"	25'-0"	22'-11⅝"	10"	7"	6¼"	15x⅞"	15x1¼"	14½"	17"	20"	24"	24"
	S2-19	98'-2½"	97'-7¼"	24'-9⅝"	24'-0"	23'-11⅝"	10"	7"	6¼"	15x⅞"	15x1¼"	16"	18"	21"	24"	24"
	S3-19	98'-2½"	97'-7¼"	24'-9⅝"	24'-0"	23'-11⅝"	10"	7"	6¼"	15x⅞"	15x1¼"	16"	18"	21"	24"	24"
	S4-19	98'-2½"	97'-7¼"	24'-9⅝"	24'-0"	23'-11⅝"	10"	7"	6¼"	15x⅞"	15x1¼"	16"	18"	21"	24"	24"
	S5-19	98'-2½"	97'-7¼"	23'-9⅝"	25'-0"	22'-11⅝"	10"	7"	6¼"	15x⅞"	15x1¼"	14½"	17"	20"	24"	24"
20	S1-20	104'-2½"	103'-7¼"	24'-3⅝"	27'-6"	23'-5⅝"	10"	7"	6¼"	15x1"	15x1½"	14½"	17"	20"	24"	24"
	S2-20	104'-2½"	103'-7¼"	22'-3⅝"	29'-6"	21'-5⅝"	10"	7"	6¼"	15x⅞"	15x1⅜"	15½"	18"	21"	24"	24"
	S3-20	104'-2½"	103'-7¼"	22'-3⅝"	29'-6"	21'-5⅝"	10"	7"	6¼"	15x⅞"	15x1⅜"	15½"	18"	21"	24"	24"
	S4-20	104'-2½"	103'-7¼"	22'-3⅝"	29'-6"	21'-5⅝"	10"	7"	6¼"	15x⅞"	15x1⅜"	15½"	18"	21"	24"	24"
	S5-20	104'-2½"	103'-7¼"	24'-3⅝"	27'-6"	23'-5⅝"	10"	7"	6¼"	15x1"	15x1½"	14½"	17"	20"	24"	24"

DEAD LOAD DEFLECTION SCHEDULE		
¼L	½L	¾L
1"	1⅞"	1"
1"	1⅞"	1"
1"	1⅞"	1"
1"	1⅞"	1"
1"	1⅞"	1"
1"	1⅞"	1"
1⅛"	1⅝"	1⅛"
1⅜"	1⅝"	1⅜"
1⅜"	1⅝"	1⅜"
1⅜"	1⅝"	1⅜"
1¼"	1⅝"	1¼"

CAMBER SCHEDULE		
¼L	½L	¾L
1¼"	1⅜"	1¼"
1¼"	1⅜"	1¼"
1¼"	1⅜"	1¼"
1¼"	1⅜"	1¼"
1¼"	1⅜"	1¼"
1¼"	1⅜"	1¼"
1 1/16"	2"	1 5/16"
1 3/16"	2 1/16"	1 7/16"
1 3/16"	2 1/16"	1 7/16"
1 3/16"	2 1/16"	1 7/16"
1 1/16"	2 1/16"	1 7/16"
1 1/16"	2 1/16"	1 7/16"

* Spacing begins at termination of 6 spaces @ 4"

Note: All structural steel in Units 19 and 20 is A36.

Notes:
For Superstructure steel quantities, see Sheet 2.
For Diaphragm Details, see Sheet 33.
For Shoe Details, see Sheets St1S2
For Joint Details, see Sheet 38.
For Framing Details, see Sheet 23.
For Shear Stud Details, see Sheet 14.
For Angles between ℄ Piers and Stringers, see Sheet 23.

	BY	DATE				
MADE	J.D.	8-6-68				
CHECKED	PTA	11-4-68	1	As Built	TEM	8-7-69
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

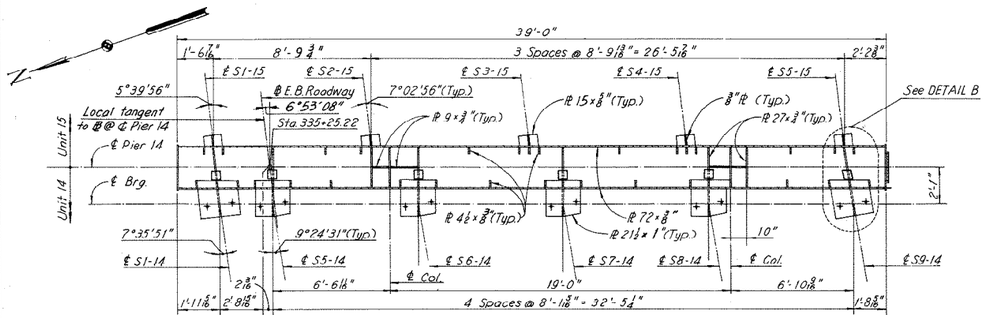
BRIDGE NO. 66
EASTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.

FRAMING PLAN - UNITS 19 AND 20

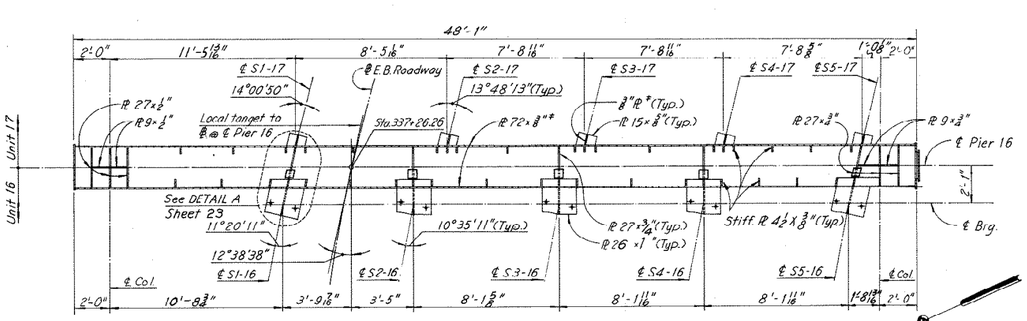
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO: 10
SHEET NO. 19 OF 46

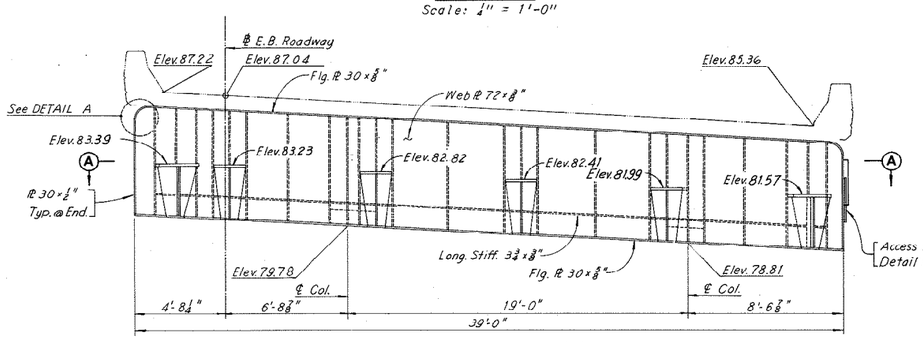
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	148	265



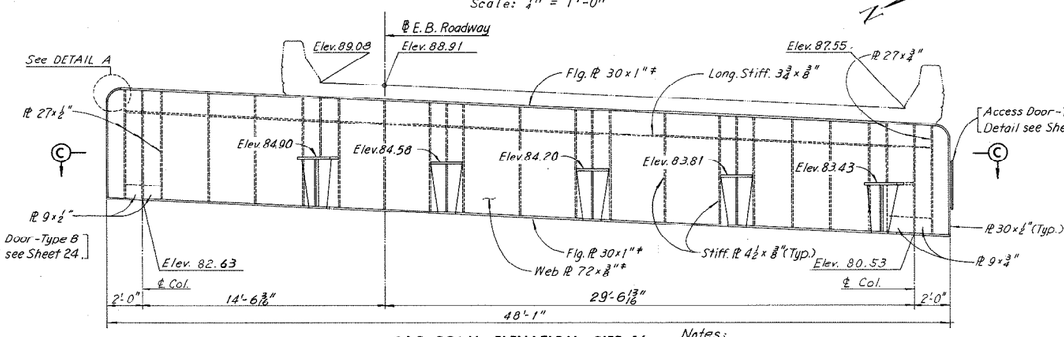
SECTION A-A
Scale: 1/4" = 1'-0"



SECTION C-C
Scale: 1/4" = 1'-0"



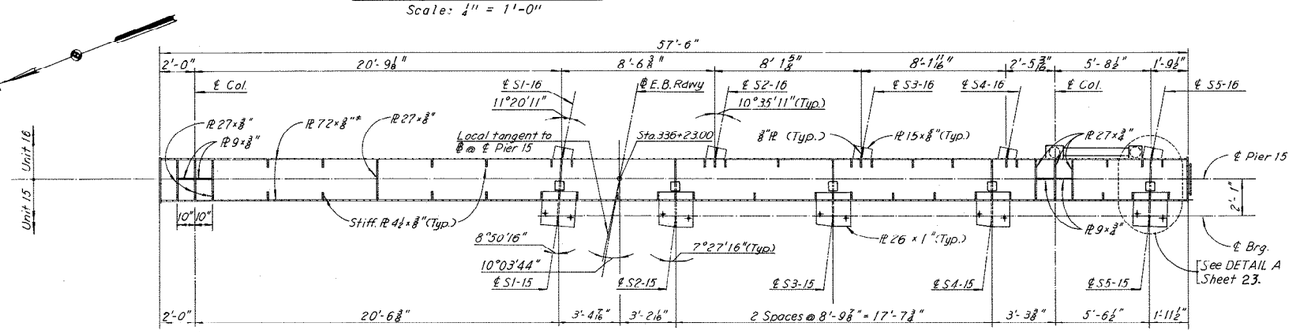
CAP BEAM ELEVATION - PIER 14
Scale: 1/4" = 1'-0"



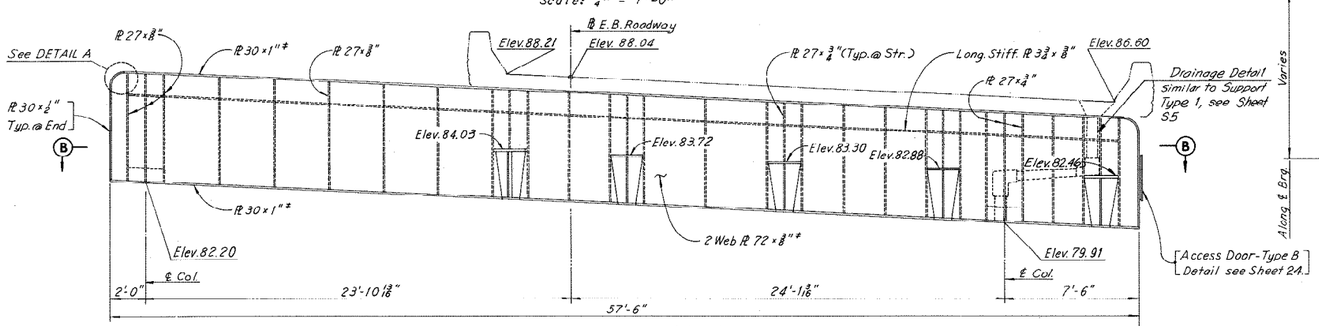
CAP BEAM ELEVATION - PIER 16
Scale: 1/4" = 1'-0"

Notes:
For Framing Plans see: Sheet 16 for Unit 14, Sheet 17 for Units 15 & 16, Sheet 18 for Unit 17.

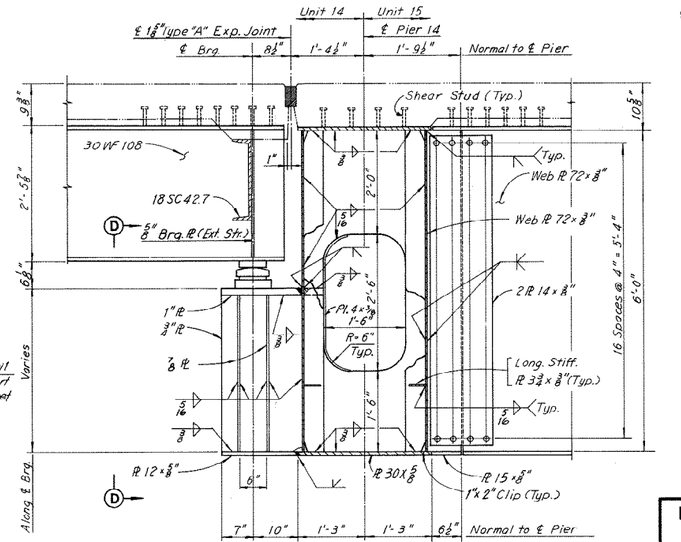
For Deck Plans see: Sheet 30 for Unit 14, Sheet 31 for Units 15 & 16, Sheet 32 for Unit 17.



SECTION B-B
Scale: 1/4" = 1'-0"



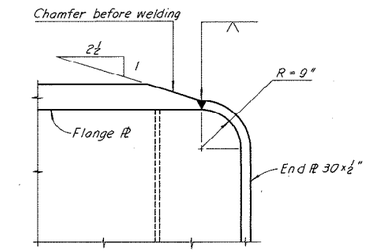
CAP BEAM ELEVATION - PIER 15
Scale: 1/4" = 1'-0"



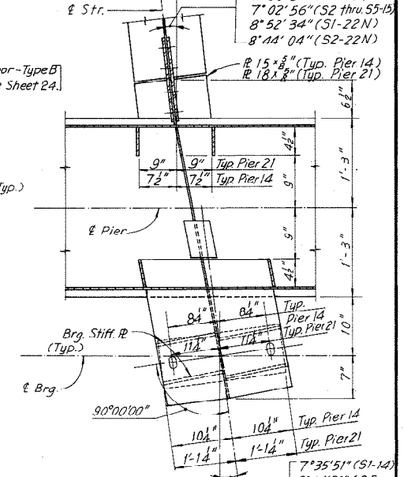
TYPICAL SECTION - PIER 14
Scale: 3/4" = 1'-0"

Note: TYPICAL SECTION for Piers 15 and 16, see TYPICAL SECTION, Sheet 23.

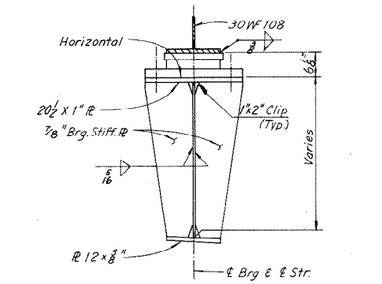
Note: Shear studs are placed in rows, with four shear studs in each row. Rows are spaced at 24" centers within limits of concrete deck.



DETAIL A
No Scale



DETAIL B
No Scale



SECTION D-D
No Scale

Note: All steel shall be A36 unless denoted otherwise.
* Denotes A572-Grade 50 steel for thickness of 3/4" and under and A588 steel for thickness over 3/4".

Provide Drain Holes at lower end of cap beam.
All elevations shown are final elevations.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	M.H.H	12-7-68	2	As Built	TEM	8-76
CHECKED	J.D.	1-29-69				
IN CHARGE						

AS BUILT

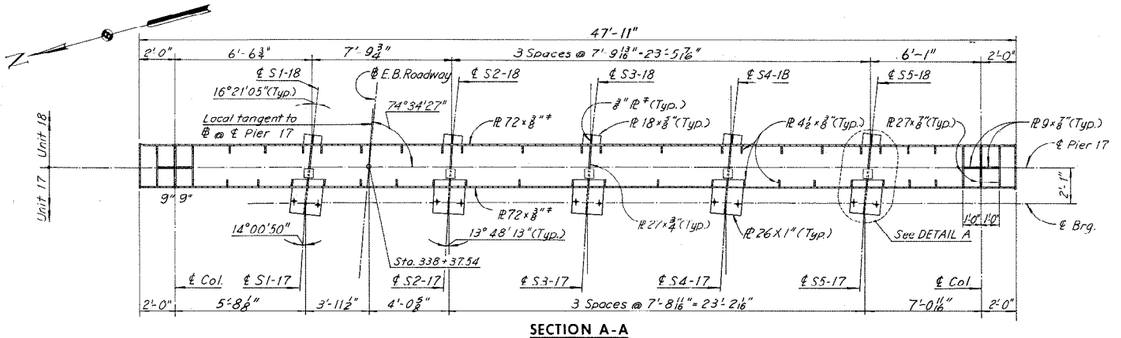
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.
FRAMING DETAILS
PIERS 14, 15 AND 16

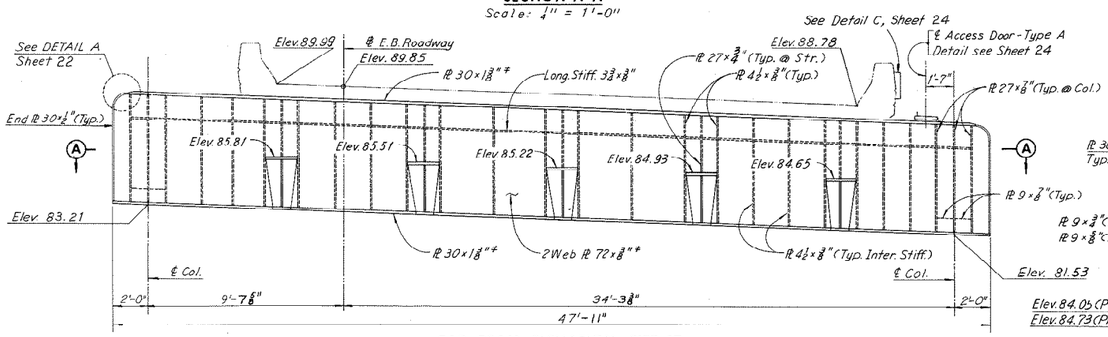
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 22 OF 46

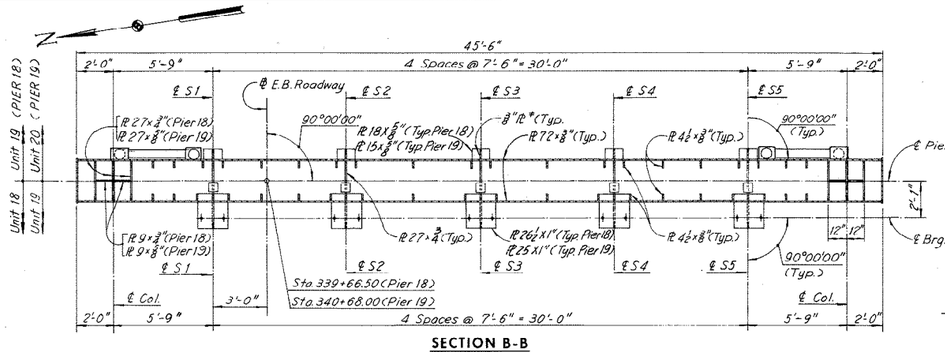
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	149	265



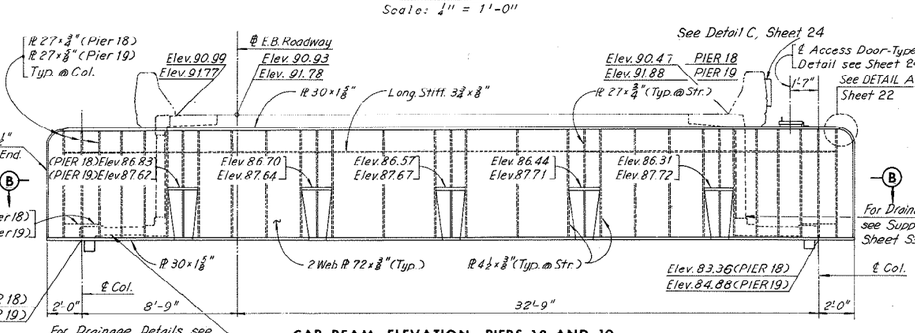
SECTION A-A
Scale: ¼" = 1'-0"



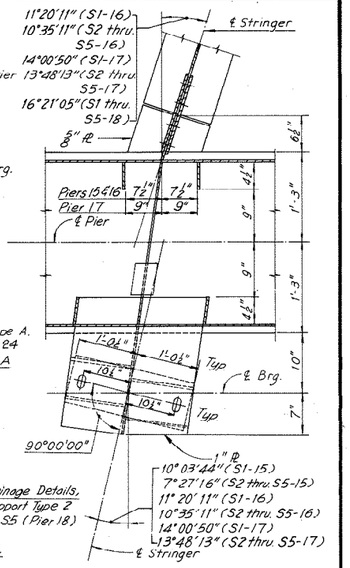
CAP BEAM ELEVATION - PIER 17
Scale: ¼" = 1'-0"



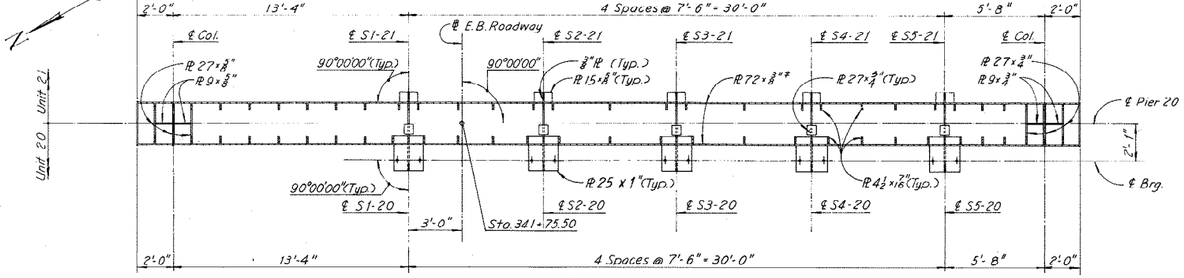
SECTION B-B
Scale: ¼" = 1'-0"



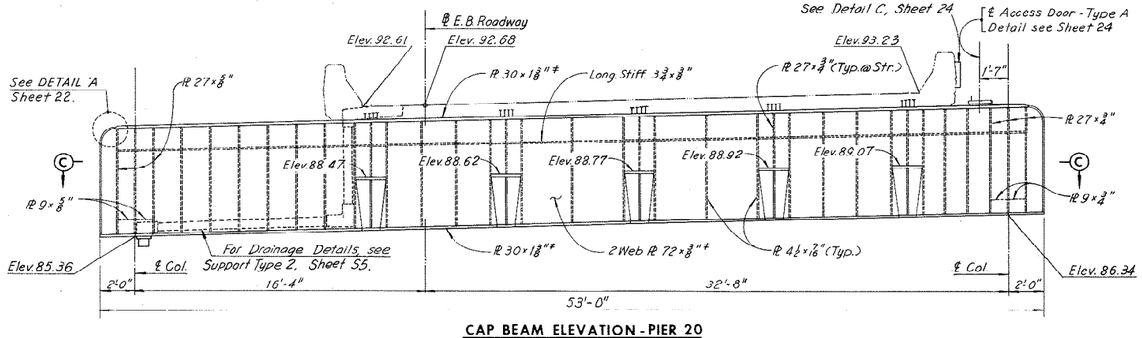
CAP BEAM ELEVATION - PIERS 18 AND 19
Scale: ¼" = 1'-0"



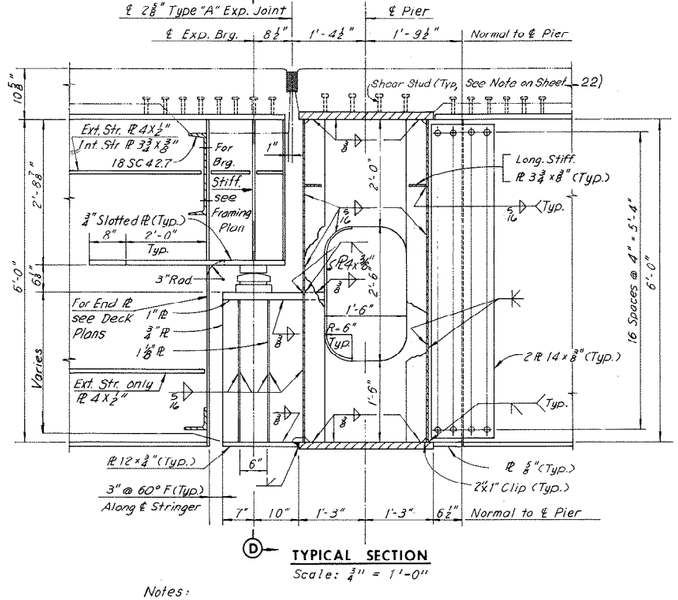
DETAIL A
No Scale



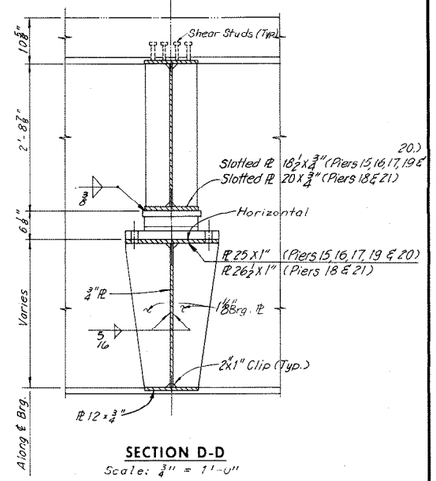
SECTION C-C
Scale: ¼" = 1'-0"



CAP BEAM ELEVATION - PIER 20
Scale: ¼" = 1'-0"



TYPICAL SECTION
Scale: ¾" = 1'-0"



SECTION D-D
Scale: ¾" = 1'-0"

Notes:
For Framing Plans see:
Sheet 18 for Units 17 & 18.
Sheet 19 for Units 19 & 20.
Sheet 20 for Units 21 & 22.
For Deck Plans see:
Sheet 32 for Units 17 & 18.
Sheet 33 for Units 19 & 20.
Sheet 34 for Units 21 & 22.

	BY	DATE				
MADE	M.H.H.	12-17-68				
CHECKED	J.D.	1-29-69	1	As Built	TEM	8-76
IN CHARGE			NO.	REVISION	BY	DATE

Note:
All steel shall be A36 unless denoted otherwise.
# Denotes A572-Grade 50 steel for thickness of ¾" and under and A588 steel for thickness over ¾".

Provide Drain Holes at lower end of cap beam.
All elevations shown are final elevations.

AS BUILT

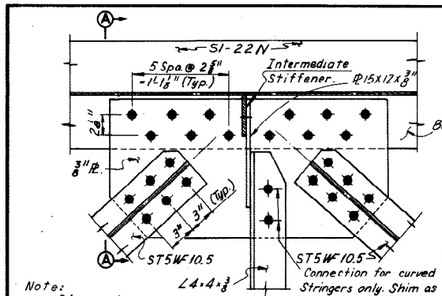
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.
FRAMING DETAILS
PIERS 17, 18, 19 AND 20

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

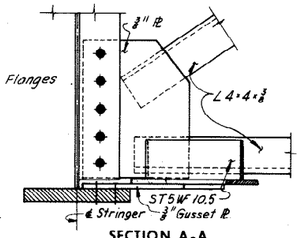
SCALE: As Noted
CONTRACT NO. 10
SHEET NO. 23 OF 46

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	153	265

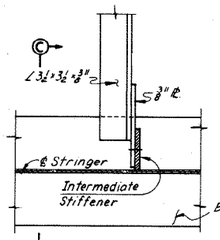


Note: Diagonal Angle in Intermediate Diaphragm is not shown.

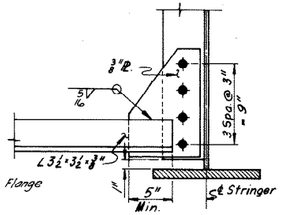
DETAIL A
Scale: ½" = 1'-0"
Detail A' Similar.



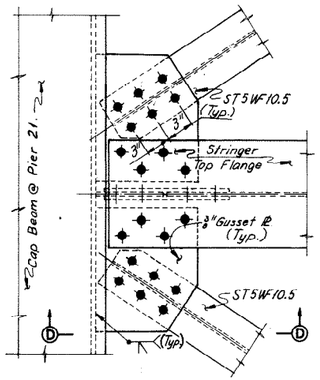
SECTION A-A
Scale: ½" = 1'-0"



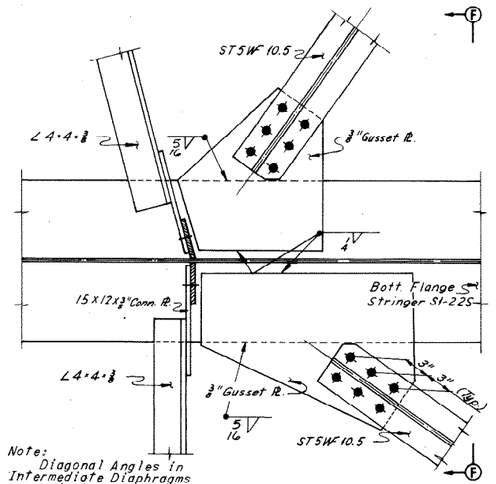
DETAIL B
Scale: ½" = 1'-0"



SECTION C-C
Scale: ½" = 1'-0"

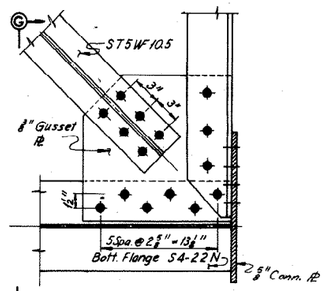


DETAIL C
Scale: ½" = 1'-0"

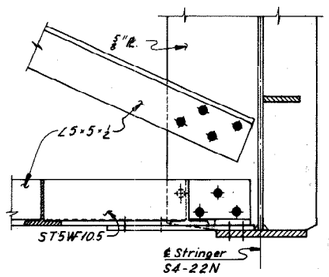


Note: Diagonal Angles in Intermediate Diaphragms are not shown.

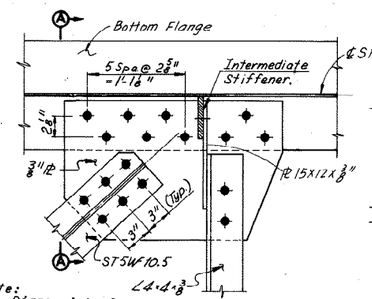
DETAIL E
Scale: ½" = 1'-0"



DETAIL F
Scale: ½" = 1'-0"

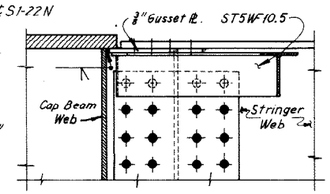


SECTION G-G
Scale: ½" = 1'-0"

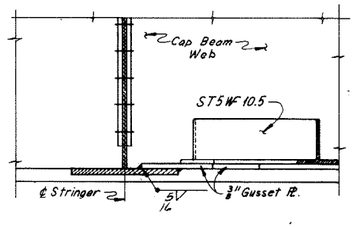


Note: Diagonal Angle in Intermediate Diaphragm is not shown.

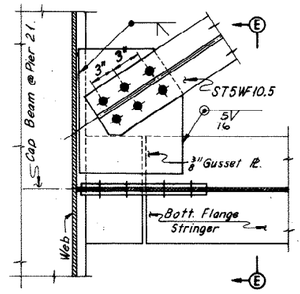
DETAIL M
Scale: ½" = 1'-0"



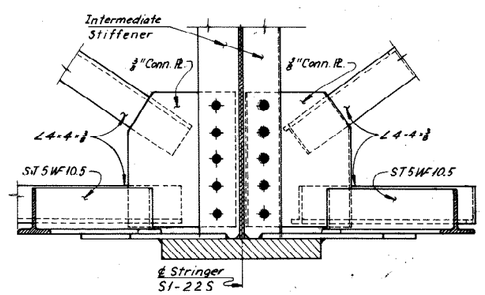
SECTION D-D
Scale: ½" = 1'-0"



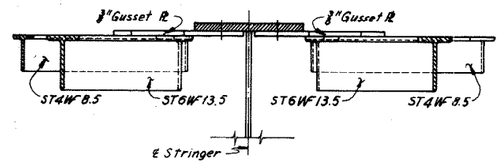
SECTION E-E
Scale: ½" = 1'-0"



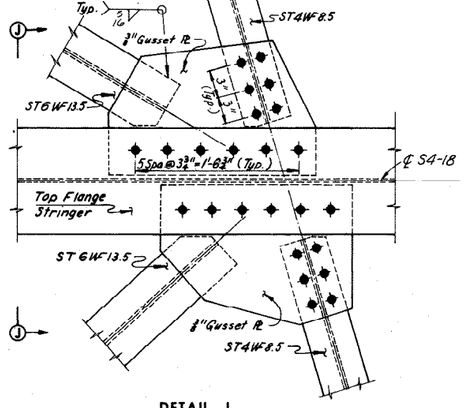
DETAIL D
Scale: ½" = 1'-0"



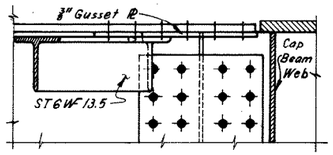
SECTION F-F
Scale: ½" = 1'-0"



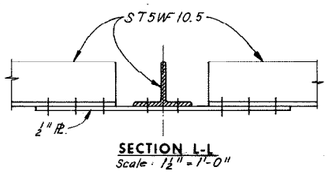
SECTION J-J
Scale: ½" = 1'-0"



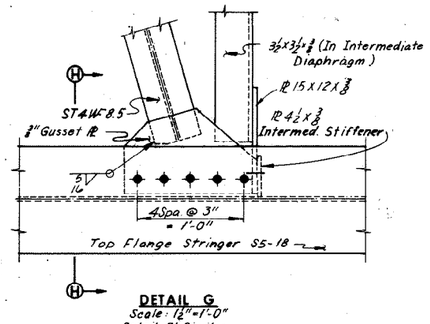
DETAIL J
Scale: ½" = 1'-0"
Detail J' Similar.



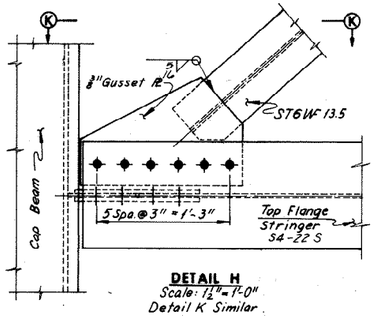
SECTION K-K
Scale: ½" = 1'-0"



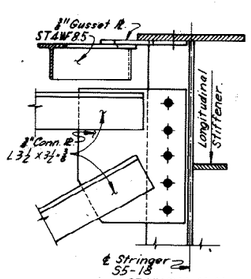
SECTION L-L
Scale: ½" = 1'-0"



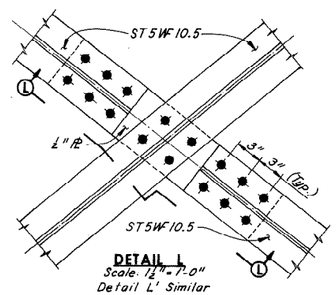
DETAIL G
Scale: 12"=1'-0"
Detail G' Similar.



DETAIL H
Scale: 1½" = 1'-0"
Detail K' Similar.



SECTION H-H
Scale: 1½" = 1'-0"



DETAIL L
Scale: 1½" = 1'-0"
Detail L' Similar

Note: For location of Details A, A', B, C, D, E, F, H, J', L, L' and M, see Sheet 20. For location of Details G, G', J and K, see Sheet 18.

	BY	DATE				
MADE	PTA	12-14-68				
CHECKED	AMH	2-10-69	1	As Built	TEM	8-26
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

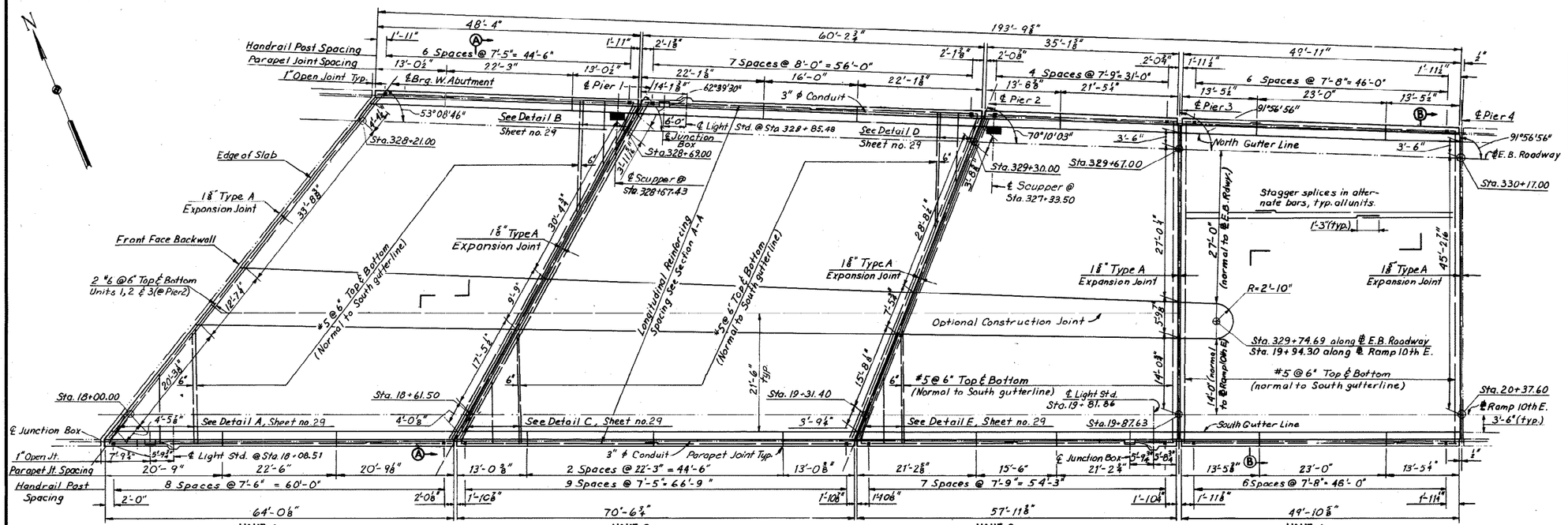
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.
FRAMING DETAILS
UNITS 18, 21 AND 22

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 10
SHEET NO. 27 OF 46

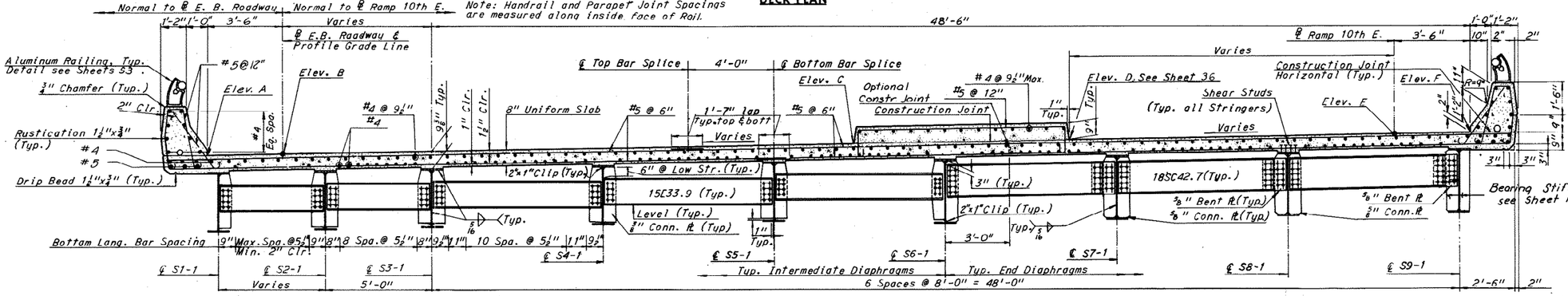
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	154	265



DECK PLAN

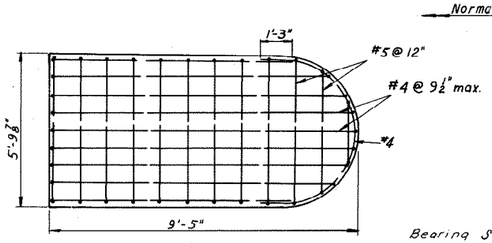
ELEVATION TABLE					
STATION	ELEV. A	ELEV. B	ELEV. C	ELEV. E	ELEV.
328+00.00	76.13	76.33	77.81	—	—
+00.00	—	—	77.81	—	—
+10.00	76.29	76.48	77.91	—	—
+20.00	76.44	76.63	78.00	—	—
+21.00	—	76.64	—	—	—
+23.62	76.50	—	—	—	—
+30.00	76.61	76.77	78.10	—	—
+40.00	76.76	76.92	78.19	—	—
+50.00	76.91	77.07	78.28	—	—
+55.04	—	—	78.33	—	—
+60.00	77.07	77.22	78.38	—	—
+69.00	—	77.35	—	—	—
+70.00	77.22	77.37	78.47	—	—
+70.81	77.25	—	—	—	—
+80.00	77.38	77.51	78.57	—	—
+90.00	77.53	77.66	78.66	—	—
329+00.00	77.68	77.81	78.75	—	—
+10.00	77.84	77.96	78.85	—	—
+20.00	77.99	78.11	78.94	—	—
+20.26	—	—	78.95	—	—
+30.00	78.16	78.25	79.04	—	—
+31.26	78.17	—	—	—	—
+40.00	78.31	78.40	79.13	—	—
+50.00	78.46	78.55	79.22	—	—
+60.00	78.62	78.70	79.32	—	—
+66.88	78.73	—	—	—	—
+67.00	—	78.80	—	—	—
+67.92	—	—	79.39	—	—
+70.00	78.77	78.85	79.41	—	—
+80.00	78.93	78.99	—	79.88	79.94
+90.00	79.08	79.14	—	79.93	79.99
330+00.00	79.23	79.29	—	79.98	80.03
+10.00	79.39	79.44	—	80.03	80.08
+16.88	79.51	—	—	—	—
+17.00	—	79.54	—	—	80.12
+18.54	—	—	—	80.08	—
+18.64	—	—	—	—	80.12
+20.00	79.54	79.59	—	80.08	80.13

Note: For Elevations along ℄ Ramp 10th East, see Sheet 33.



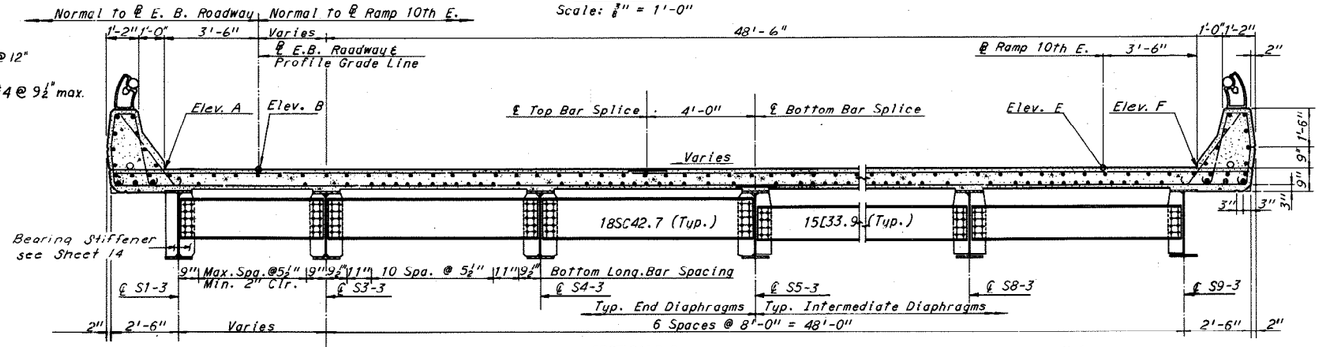
SECTION A-A

Scale: ⅜" = 1'-0"



REINFORCING DETAIL AT NOSE

Scale: ⅜"=1'-0"



SECTION B-B

Scale: ⅜" = 1'-0"

Notes:
- For Joint Details, see Sheet 37
- For Framing Plan, see Sheet 14.
- For Handrail Details, see Sheet 53
- For Superstructure quantities, see Sheet 2.
- For Details A, B, C, D and E, see Sheet 29
- For Standard Drainage Details, see Support Type 1, Sheet S5 & S6.

Note: Transverse dimensions given in Sections A-A and B-B are normal to ℄ Ramp 10th-E.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.D	8-6-68	2	As Built	T.E.M.	8-76
CHECKED	J.V.	10236				
IN CHARGE			1	Bar Space Added	PRMS	4-19-74

AS BUILT

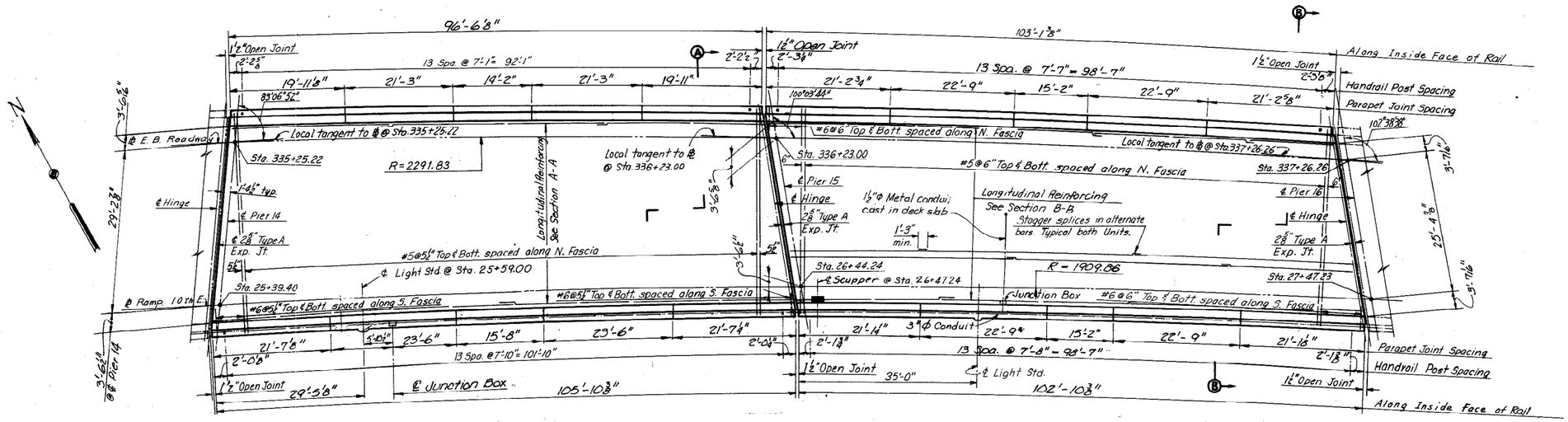
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.
DECK PLAN - UNITS 1,2,3 AND 4

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=10' Unless as shown
CONTRACT NO: 10
SHEET NO. 28 OF 46

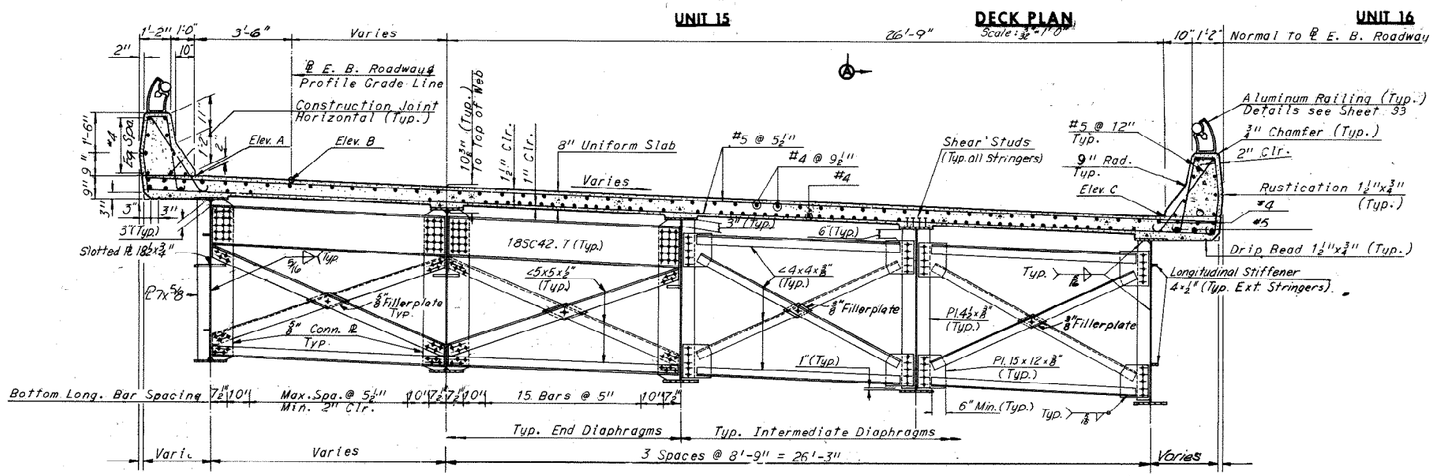
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	157	265



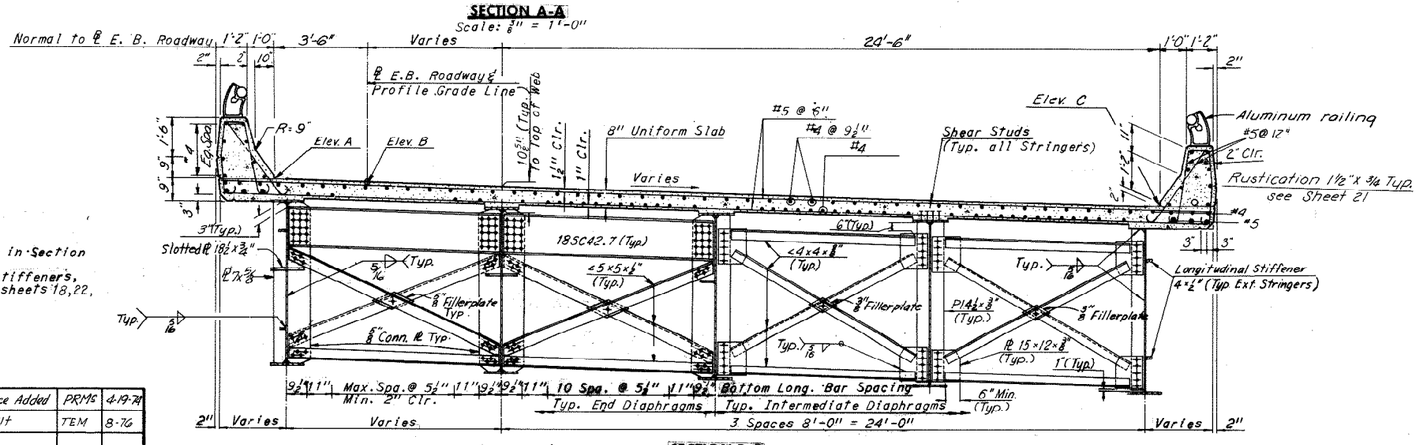
ELEVATION TABLE

STATION	ELEV. A	ELEV. B	ELEV. C
335+10.00	87.01	86.84	85.20
+20.00	87.15	86.97	85.35
+21.29	—	—	85.36
+25.22	87.22	—	—
+30.00	87.18	87.11	85.50
+40.00	87.40	87.23	85.64
+50.00	87.53	87.35	85.76
+60.00	87.63	87.46	85.89
+70.00	87.74	87.57	86.01
+80.00	87.85	87.67	86.11
+90.00	87.93	87.76	86.23
336+00.00	88.02	87.85	86.33
+10.00	88.10	87.93	86.42
+20.00	88.19	88.02	86.52
+22.38	88.21	—	—
+23.00	—	88.04	—
+28.25	—	—	86.60
+30.00	88.27	88.10	86.61
+40.00	88.36	88.19	86.70
+50.00	88.44	88.27	86.80
+60.00	88.52	88.35	86.89
+70.00	88.61	88.44	86.98
+80.00	88.69	88.52	87.08
+90.00	88.78	88.61	87.17
337+00.00	88.86	88.69	87.26
+10.00	88.94	88.77	87.35
+20.00	89.03	88.86	87.44
+25.48	89.08	—	—
+26.26	—	88.91	—
+30.00	89.11	88.94	87.53
+32.60	—	—	87.55
337+40.00	89.20	89.03	87.62

DECK PLAN
Scale: 3/32" = 1'-0"



SECTION A-A
Scale: 3/8" = 1'-0"



SECTION B-B
Scale: 3/8" = 1'-0"

Notes:
For details not shown in Section B-B, see Section A-A.
For details of brg. stiffeners, long. stiffeners, see sheets 18, 22, and 23.

Notes:
For Joint Details, see Sheet 38.
For Framing Plan, see Sheet 17.
For Handrail Details, see Sheet 53
For Superstructure quantities, see Sheet 2.
For Standard Drainage Details, see Support Type 2 Sheet 555&56.

	BY	DATE
MADE	RLM	8-6-68
CHECKED	SCC	10-21-68
IN CHARGE		

NO.	REVISION	BY	DATE
2	As Built	TEM	8-76

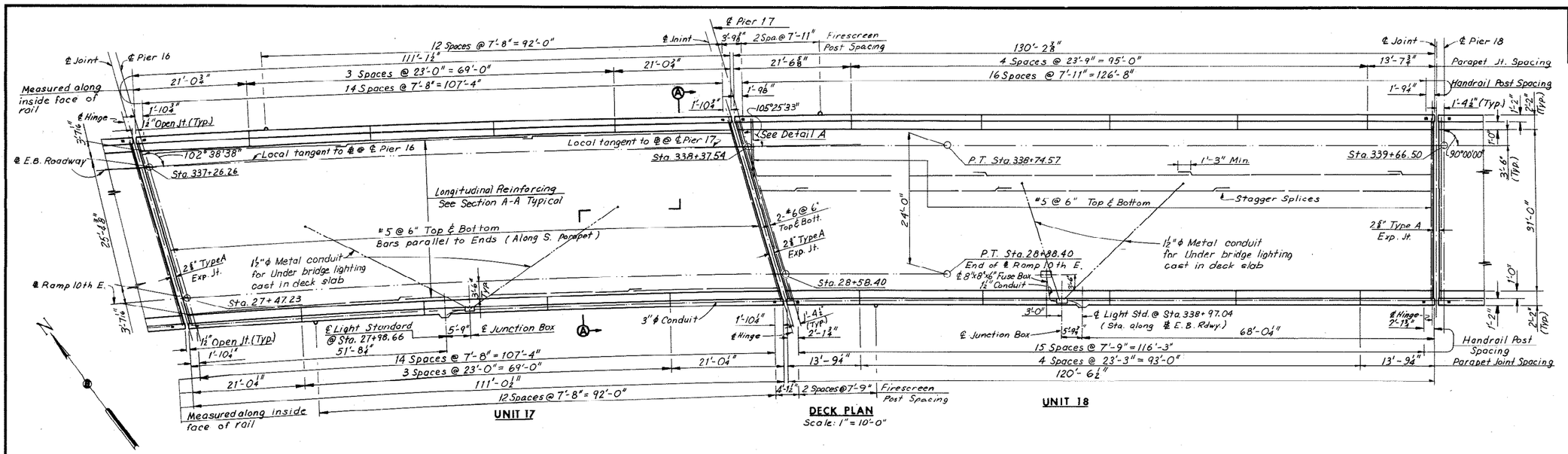
AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
DECK PLAN - UNITS 15 AND 16

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

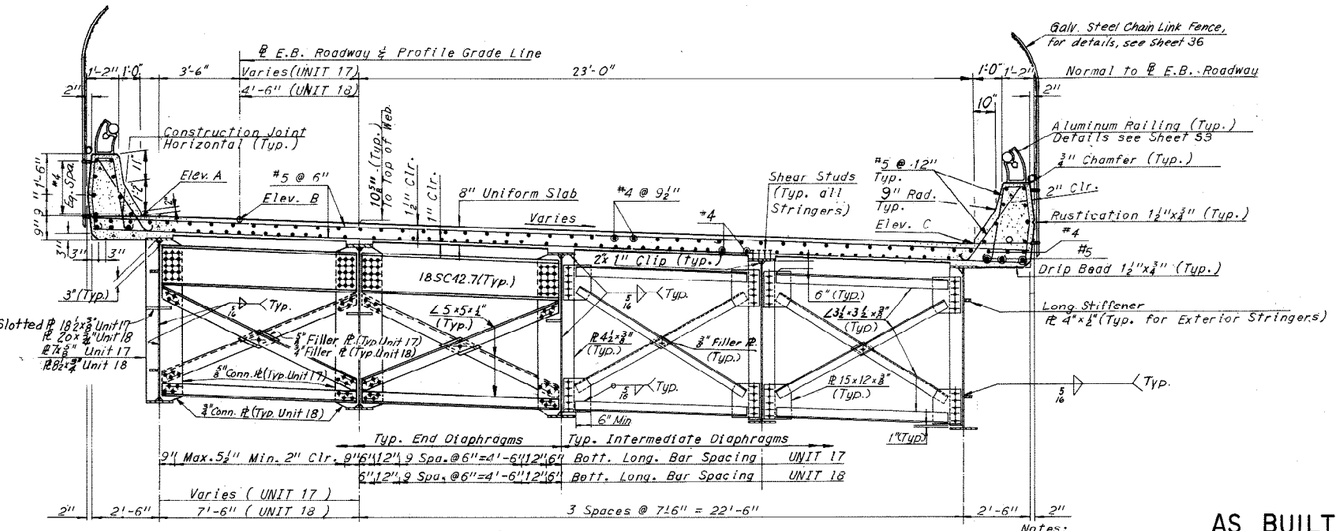
SCALE: As Noted
CONTRACT NO. 10
SHEET NO. 31 OF 46



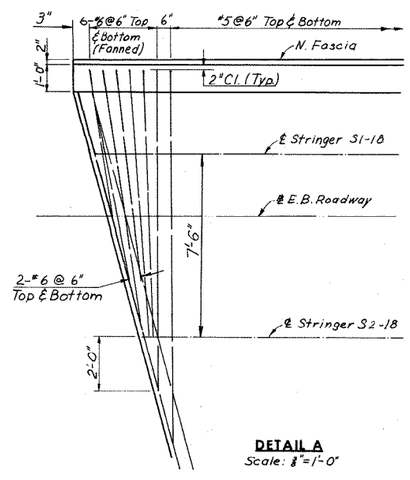
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	158	265

ELEVATION TABLE

STATION	ELEV. A	ELEV. B	ELEV. C
337+20.00	89.03	88.86	87.44
+25.48	89.08	--	--
+26.26	--	88.91	--
+30.00	89.11	88.94	87.53
+32.60	--	--	87.55
+40.00	89.20	89.03	87.62
+50.00	89.28	89.11	87.71
+60.00	89.36	89.19	87.80
+70.00	89.45	89.28	87.89
+80.00	89.53	89.36	87.98
+90.00	89.62	89.45	88.07
338+00.00	89.70	89.53	88.16
+10.00	89.78	89.61	88.30
+20.00	89.86	89.70	88.43
+30.00	89.93	89.78	88.51
+36.58	89.99	--	--
+37.54	--	89.85	--
+40.00	90.01	89.87	88.71
+45.13	--	--	88.78
+50.00	90.09	89.95	88.85
+60.00	90.17	90.03	88.99
+70.00	90.25	90.12	89.13
+80.00	90.32	90.20	89.26
+90.00	90.40	90.29	89.40
339+00.00	90.48	90.37	89.54
+10.00	90.55	90.45	89.69
+20.00	90.63	90.54	89.83
+30.00	90.70	90.62	89.96
+40.00	90.78	90.71	90.10
+50.00	90.86	90.79	90.24
+60.00	90.94	90.87	90.38
+66.50	90.99	90.93	90.47
+70.00	91.02	90.96	90.52



SECTION A-A
Scale: ⅜" = 1'-0"



DETAIL A
Scale: ⅜"=1'-0"

Notes:

AS BUILT

For Joint Details, see Sheet 38.
For Framing Plan, see Sheet 18.
For Handrail Details, see Sheet 33
For Superstructure Quantities, see Sheet 2.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.D.	8-9-68	1	As Built	TEM	8-76
CHECKED	R.C.	10-18-68				
IN CHARGE						

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.

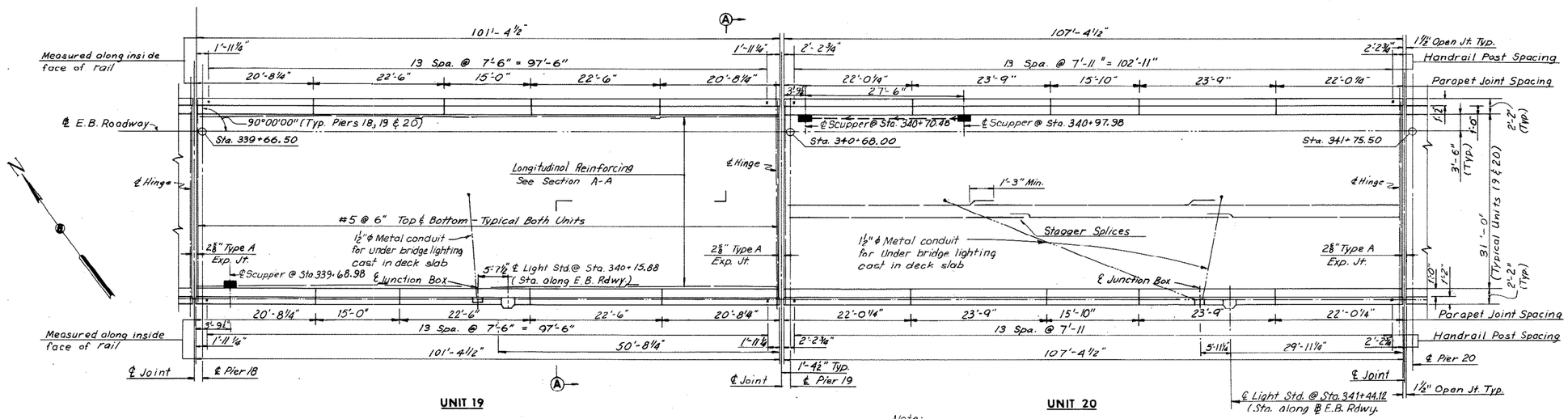
DECK PLAN – UNITS 17 AND 18

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

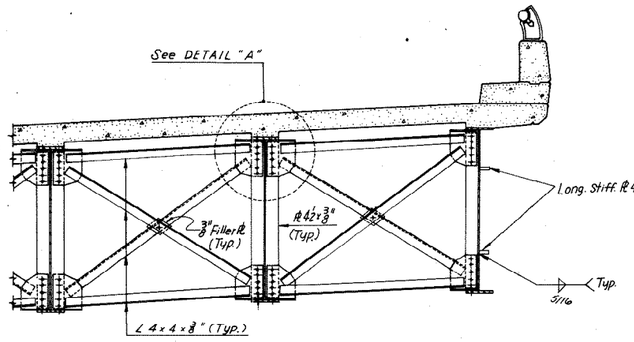
SCALE:
CONTRACT NO.: 10
SHEET NO. 32 OF 46

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	159	265

ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
339+60.00	90.94	90.87	90.38
+66.50	90.99	90.93	90.47
+70.00	91.02	90.96	90.52
+80.00	91.09	91.04	90.65
+90.00	91.17	91.13	90.79
340+00.00	91.24	91.21	90.94
+10.00	91.32	91.29	91.08
+20.00	91.40	91.38	91.22
+30.00	91.47	91.46	91.35
+40.00	91.55	91.55	91.49
+50.00	91.63	91.63	91.63
+60.00	91.71	91.71	91.77
+68.00	91.77	91.78	91.88
+70.00	91.79	91.80	91.91
+80.00	91.86	91.88	92.04
+90.00	91.94	91.97	92.18
341+00.00	92.02	92.05	92.32
+10.00	92.09	92.13	92.47
+20.00	92.17	92.22	92.61
+30.00	92.24	92.30	92.74
+40.00	92.32	92.39	92.87
+50.00	92.40	92.47	92.99
+60.00	92.49	92.55	93.09
+70.00	92.57	92.64	93.19
+75.50	92.61	92.68	93.23
+80.00	92.65	92.72	93.27

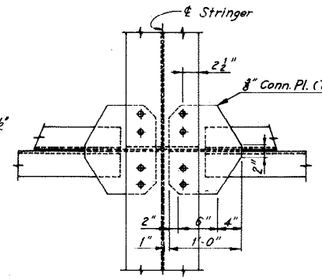


Note: for Standard Drainage details for Unit 19 see Support Type 2 Sheet 55 and for Unit 20 Support Type 7 Sheet 56.

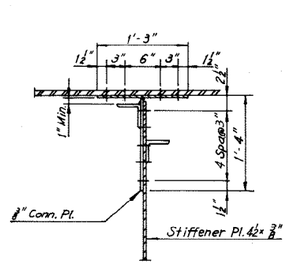


INTERMEDIATE DIAPHRAGM
Scale: ⅜"=1'-0"

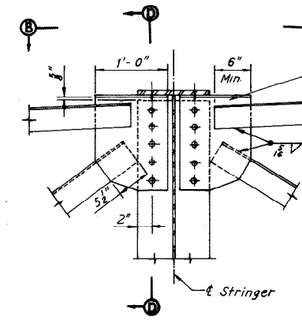
DECK PLAN
Scale: 1"=10'-0"



VIEW B-B
Scale: 1"=1'-0"



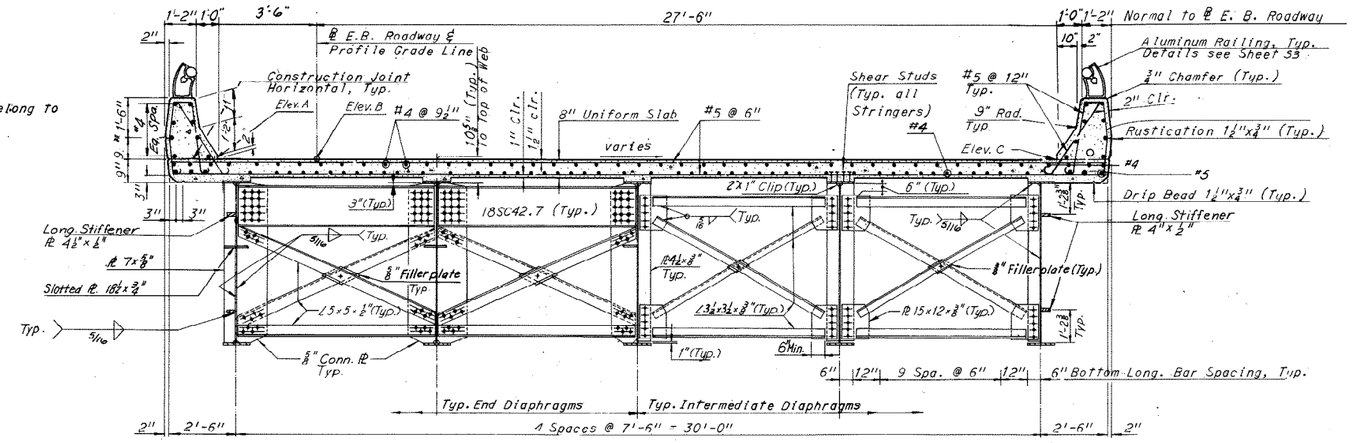
SECTION D-D
Scale: 1"=1'-0"



DETAIL A
Scale: 1" = 1'-0"

Note: Intermediate Diaphragm Details belong to Units 21 and 22, see Sheet 34

Note: For details of brg. stiffeners, see sheets 19 & 23



SECTION A-A
Scale: ⅜" = 1'-0"

Notes:
For Joint Details, see Sheet 38
For Framing Plan, see Sheet 19.
For Handrail Details, see Sheet 53
For Superstructure quantities, see Sheet 2.

	BY	DATE				
MADE	SHS	8-2-68				
CHECKED	R. C.	10-18-68	1	As Built	TEM	8-76
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

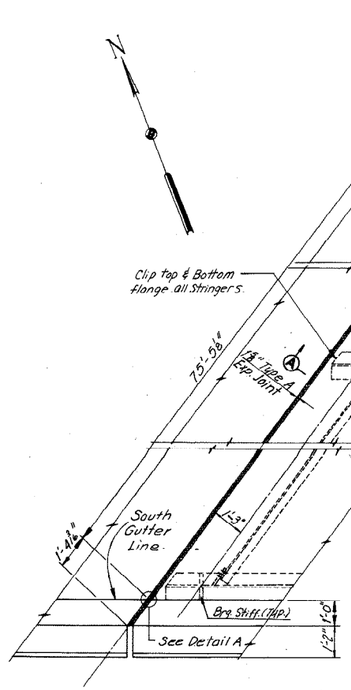
BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.

DECK PLAN-UNITS 19 AND 20

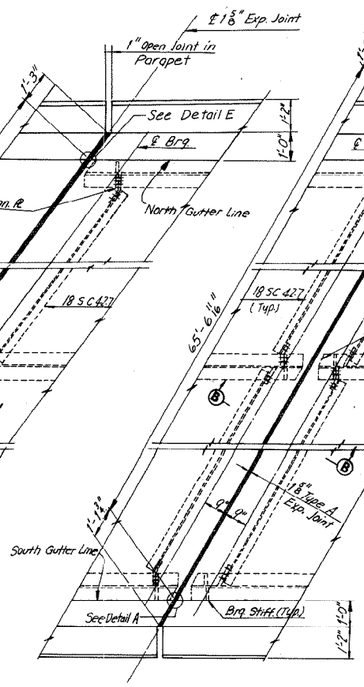
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 33 OF 46

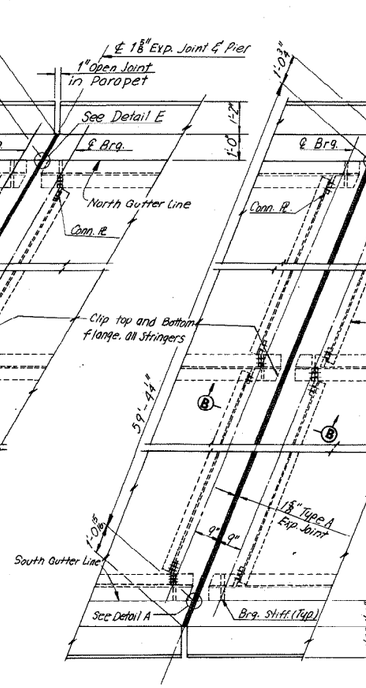
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	163	265



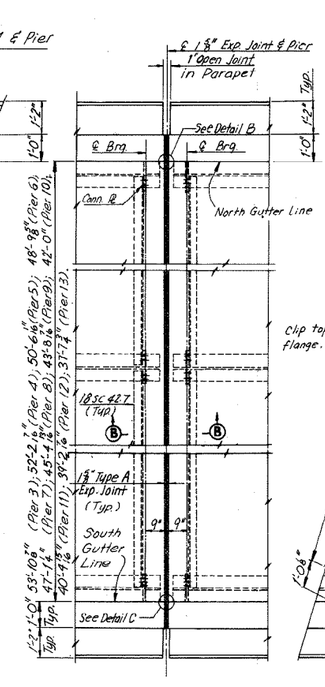
PLAN — JOINT AT WEST ABUTMENT
Scale: ⅜" = 1'-0"



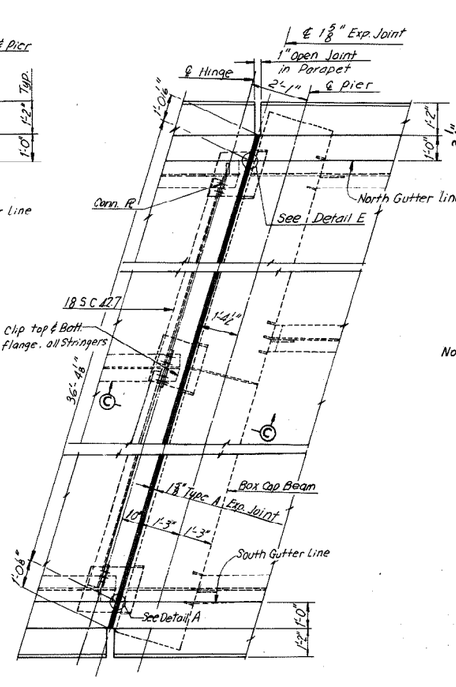
PLAN — JOINT AT PIER 1
Scale: ⅜" = 1'-0"



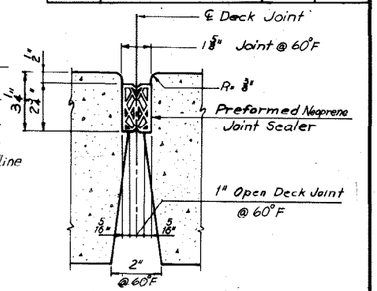
PLAN — JOINT AT PIER 2
Scale: ⅜" = 1'-0"



PLAN — JOINT AT PIERS 3 THRU. 13
Scale: ⅜" = 1'-0"

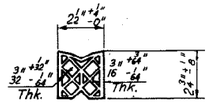


PLAN — JOINT AT PIER 14
Scale: ⅜" = 1'-0"



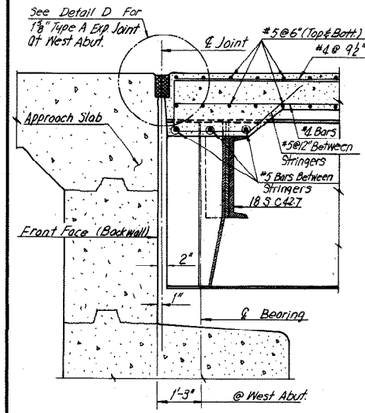
1⅝" TYPE "A" EXPANSION JOINT

Note: For Joint Detail @ Abutment see Detail D.

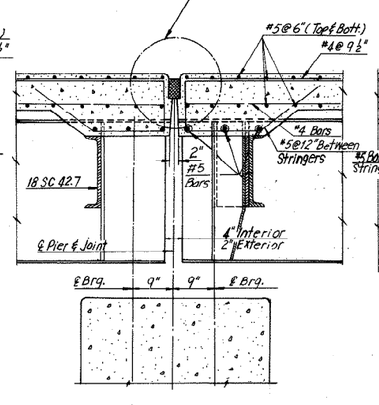


PREFORMED NEOPRENE JOINT SEALER FOR 1⅝" TYPE "A" EXPANSION JOINT

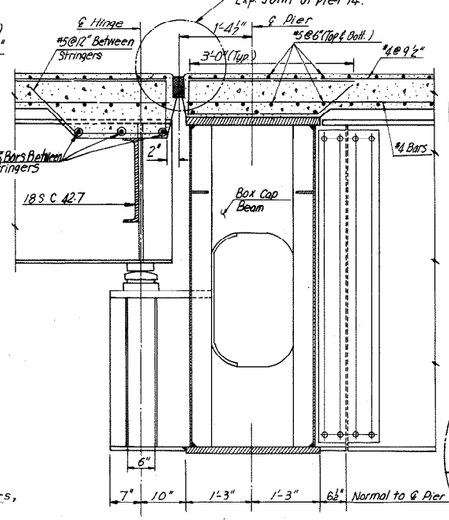
Note: End of stringers and connection ℞'s shall be plumb.



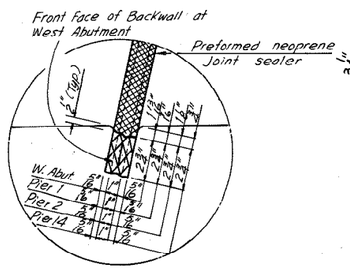
SECTION A-A
Scale: ¾" = 1'-0"



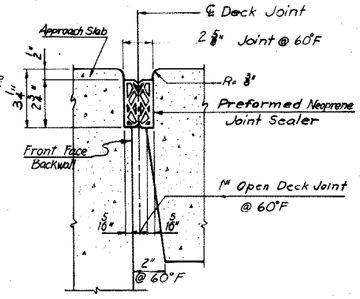
SECTION B-B
Scale: ¾" = 1'-0"



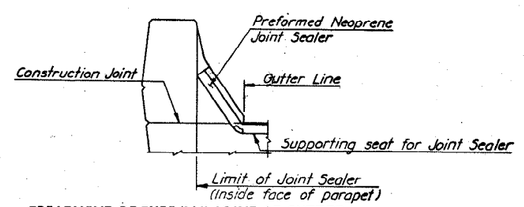
SECTION C-C
Scale: ¾" = 1'-0"



DETAIL A
No Scale

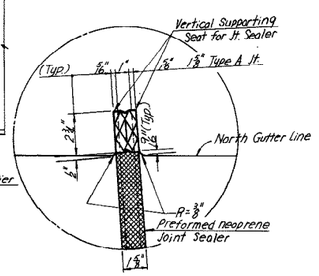


DETAIL D
No Scale

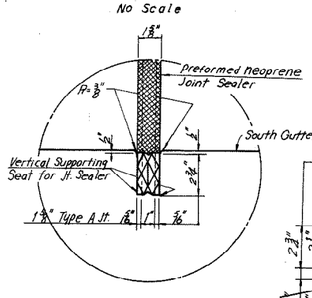


TREATMENT OF TYPE "A" JOINT AT GUTTER

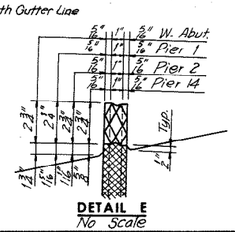
AS BUILT



DETAIL B
No Scale
Typical for Piers 3 thru. 13.



DETAIL C
No Scale
Typical for Piers 3 thru 13



DETAIL E
No Scale

Note: All horizontal dimensions of Sections shown above are normal to ℄ joint and pier.

Note: For details of bearing stiffeners, see Deck Plan Sheets 28,29, & 30.

Note: It is absolutely essential that the openings for the preformed neoprene joint sealers be accurately formed and constructed to smooth, straight lines. The size of opening shall be adjusted to allow for anticipated dead load rotation of the ends of the slab and for the temperature at the time of construction.

	BY	DATE				
MADE	G.S.H.	10-10-68				
CHECKED	C.E.B	2-5-69	1	As Built	TEM	8-76
IN CHARGE			NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

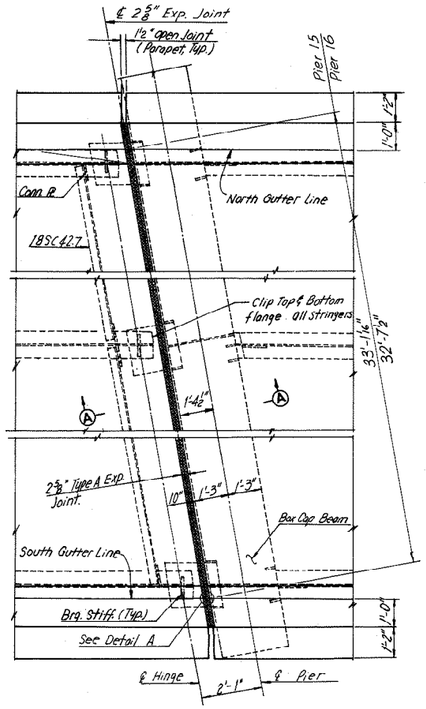
BRIDGE NO. 66
EASTBOUND ROADWAY O\
12TH ST. - R.R. TRACKS AND 161

JOINT DETAILS

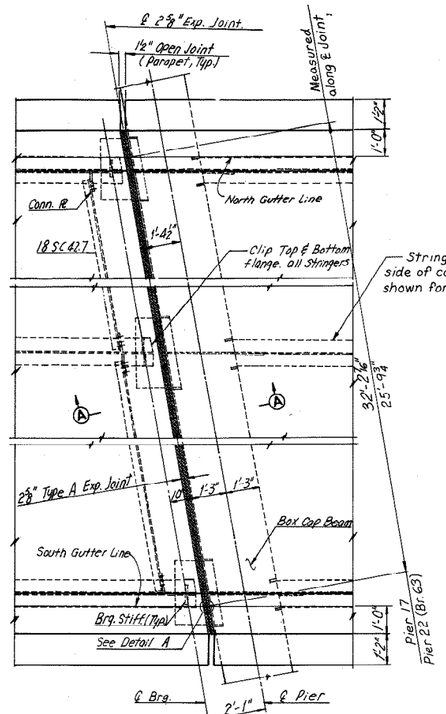
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 10
SHEET NO. 37 OF 46

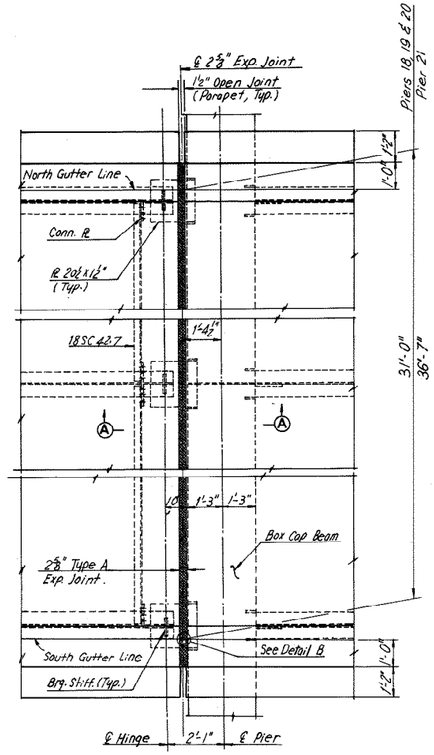
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	164	265



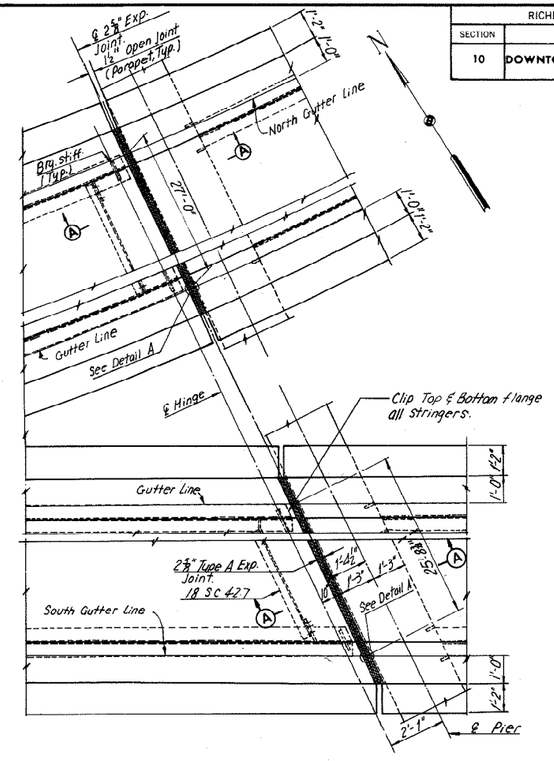
PLAN — JOINT AT PIERS 15 AND 16
Scale ⅜" = 1'-0"



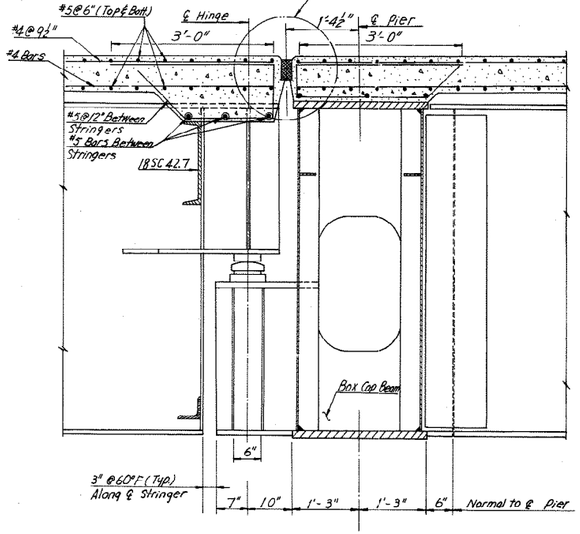
PLAN — JOINT AT PIER 17 AND PIER 22 (BR. 63)
Scale ⅜" = 1'-0"



PLAN — JOINT AT PIERS 18 19 ,20 AND 21 (BRIDGE 63)
Scale ⅜" = 1'-0"



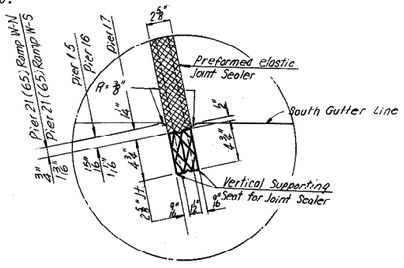
PLAN — JOINT AT PIER 22 (BRIDGE 63)
Scale ⅜" = 1'-0"



SECTION A-A
Scale ⅜" = 1'-0"

Note:
All horizontal dimensions of Section shown above are normal to ℄ joint and pier.

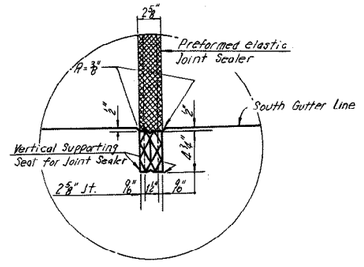
Note:
End of stringers and connection R's shall be plumb.



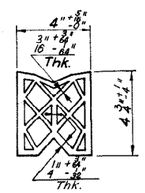
DETAIL A
No Scale
Typical for Piers 15 thru 17 & Pier 21 (Br. 65)

Note:
For details of bearing stiffeners, see Framing Plan Sheets 17 thru 21.

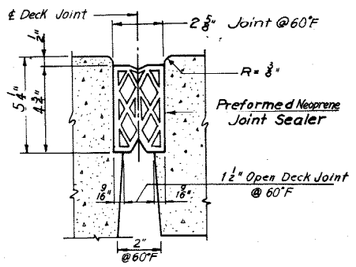
Note:
It is absolutely essential that the openings for the preformed neoprene joint sealers be accurately formed and constructed to smooth, straight lines. The size of opening shall be adjusted to allow for anticipated dead load rotation of ends of the slab and for the temperature at the time of construction.



DETAIL B
No Scale
Typical for Piers 18 thru 20 & Pier 21 (Br. 63.)

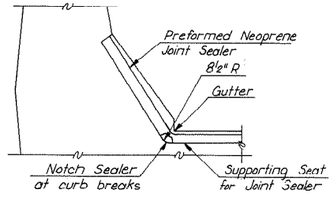


PREFORMED NEOPRENE JOINT SEALER FOR 2⅝" TYPE "A" EXPANSION JOINT
No Scale



2⅝" TYPE "A" EXPANSION JOINT
No Scale

Note:
All horizontal dimensions shown above are normal to ℄ Joint.



TREATMENT OF TYPE "A" JOINT AT CURB
No Scale

	BY	DATE	NO.	REVISION	BY	DATE
MADE	G.S.H.	10-15-68				
CHECKED	C.E.B.	2-5-69	1	As Built	TEM	8-76
IN CHARGE						

AS BUILT

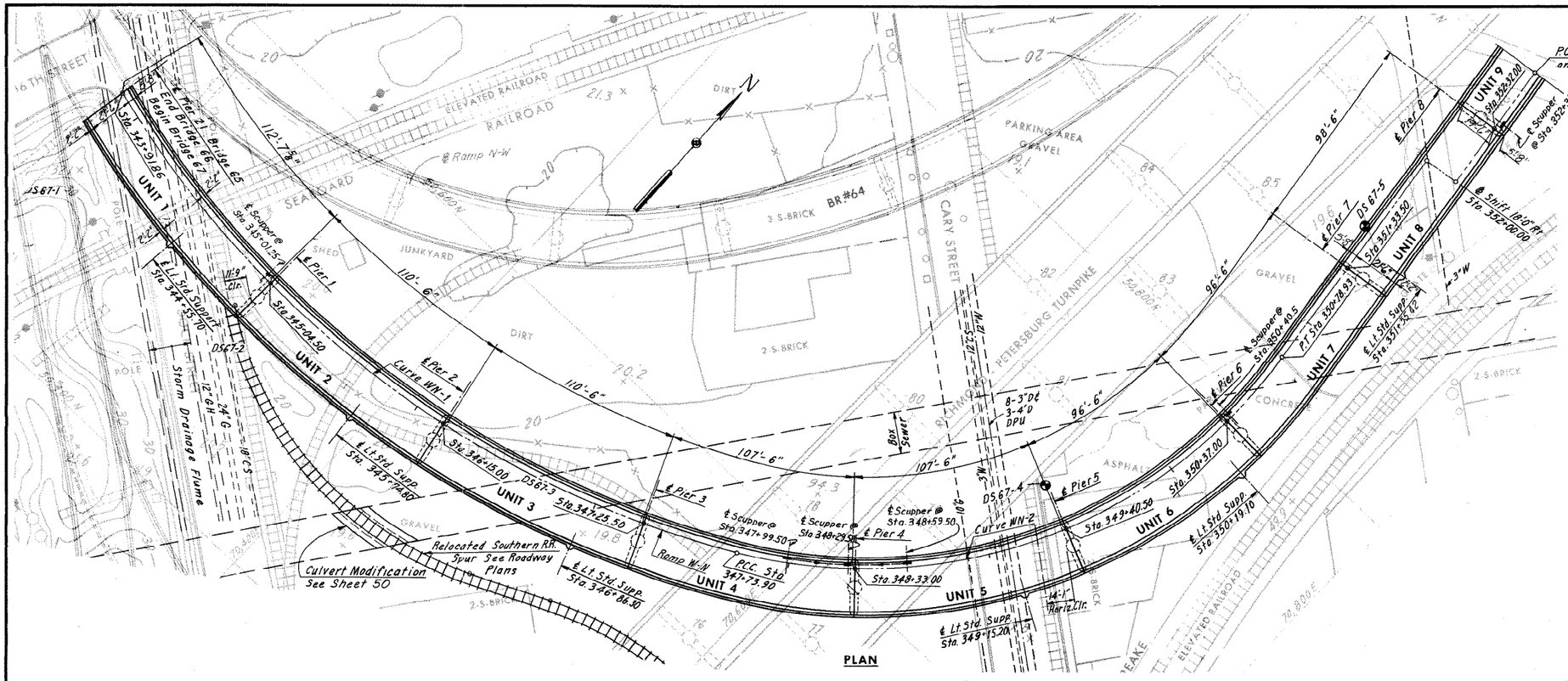
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

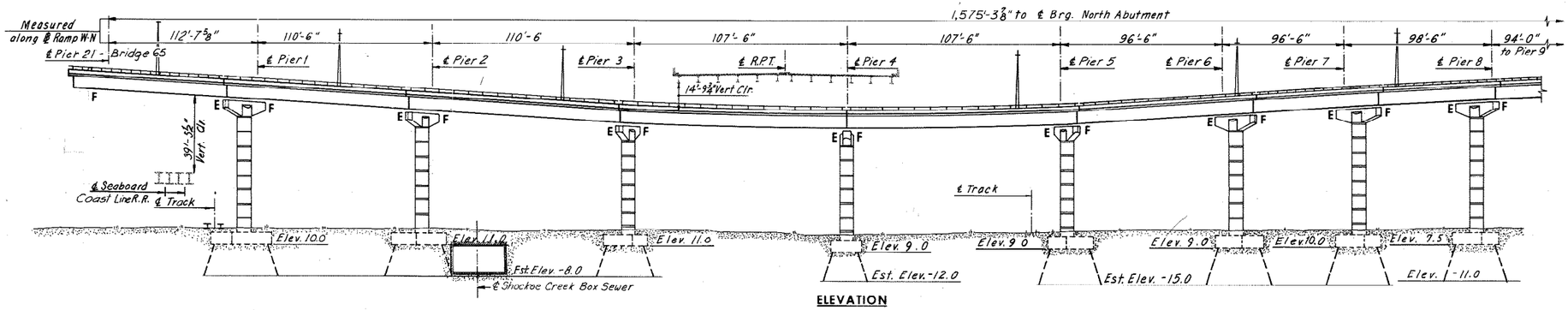
BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
JOINT DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 38 OF 46

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	173	265





ELEVATION

CURVE DATA

℄ R.P.T.

Curve: R.P.T.-1
P.I. = Sta. 1704+68.83
Δ = 15°03'56"
D = 1°00'
T = 757.65'
L = 1,506.56'
R = 5,729.58

Curve: R.P.T.-2
P.I. = Sta. 1723+07.01
Δ = 33°27'07"
D = 4°00'
T = 430.45'
L = 836.30'
R = 1,432.39'

℄ Ramp W-N

Curve: WN-1
P.I. = Sta. 345+25.47
Δ = 64°53'49"
D = 11°27'33"
T = 317.90'
L = 566.33'
R = 500.00

Curve: WN-2
P.I. = Sta. 349+47.64
Δ = 68°32'15"
D = 22°28'08"
T = 173.75'
L = 305.03'
R = 255.00'

Curve: WN-3
P.I. = Sta. 353+19.15
Δ = 6°23'54"
D = 6°00'
T = 53.38'
L = 106.64'
R = 954.93'

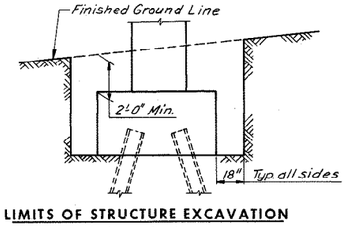
Curve: WN-4
P.I. = Sta. 355+39.85
Δ = 5°01'11"
D = 1°30'
T = 167.43'
L = 334.65'
R = 3,819.72'

Curve: WN-5
P.I. = Sta. 358+17.39
Δ = 13°10'51"
D = 6°00'
T = 110.33'
L = 219.68'
R = 954.93'

Curve: WN-6
P.I. = Sta. 361+67.68
Δ = 19° 35' 06"
D = 4° 09' 03"
T = 238.25'
L = 471.85'
R = 1,380.39'

℄ Ramp N-W

Curve: NW-1
P.I. = Sta. 13+42.50
Δ = 32° 01' 34"
D = 3° 51' 36"
T = 426.01'
L = 829.72'
R = 1,484.39



LIMITS OF STRUCTURE EXCAVATION
No Scale

AS BUILT

	BY	DATE
MADE	AMH	3-5-69
CHECKED	KCT	5-12-69
IN CHARGE		

NO.	REVISION	BY	DATE
3	As Built	TEM	6-77
2	Light Sta. Location Unit 8	JLK	6-6-75
1	Sheets 47 & 48 added	L.B.P.	3-5-75

INDEX

Note:
For General Notes, see Sheet 4.
For Quantity Table, see Sheet 3

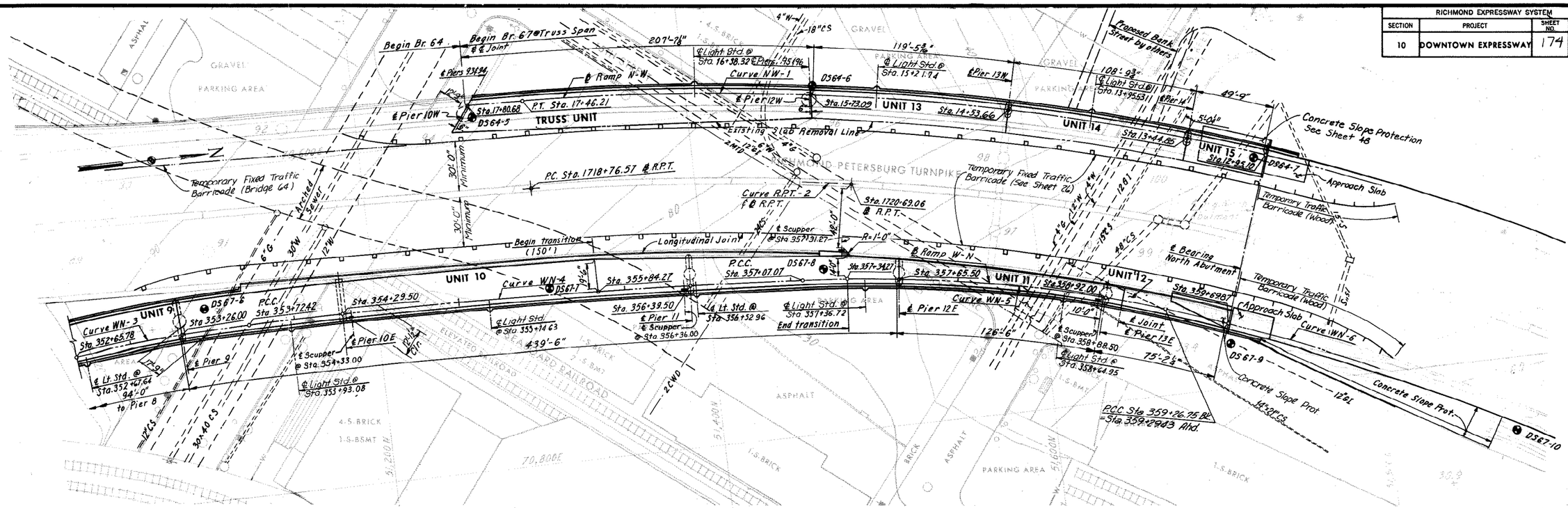
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

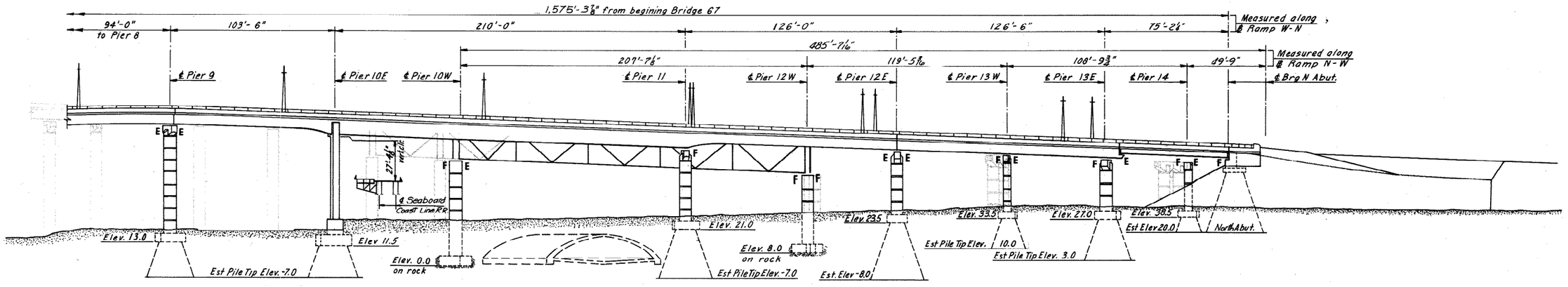
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1" = 30'-0"
CONTRACT NO.: 10
SHEET NO. 1 OF 54

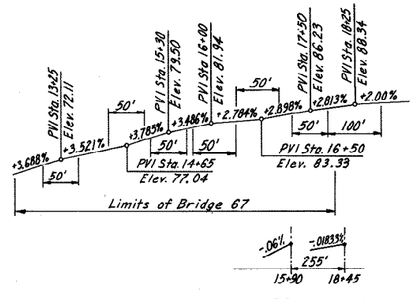
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	174	265



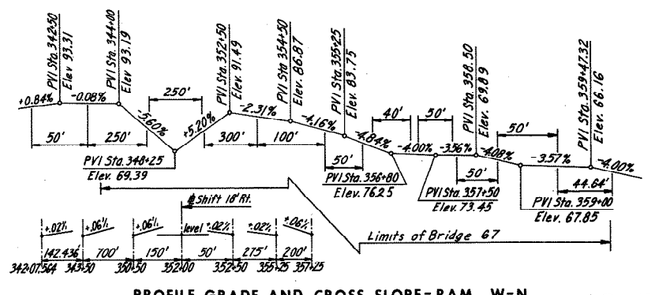
PLAN
Scale: 1"=30'-0"



ELEVATION
Scale: 1"=30'-0"



PROFILE GRADE CROSS SLOPE - RAMP N-W



PROFILE GRADE AND CROSS SLOPE - RAM W-N

AS BUILT

	BY	DATE
MADE	AMH	12-30-68
CHECKED	KCT	5-12-69
IN CHARGE		

NO.	REVISION	BY	DATE
2	'As Built	TEM	6-77
1	Revised Piers 9 & 10 E Sta. & Span Length	DWB	12-8-75

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

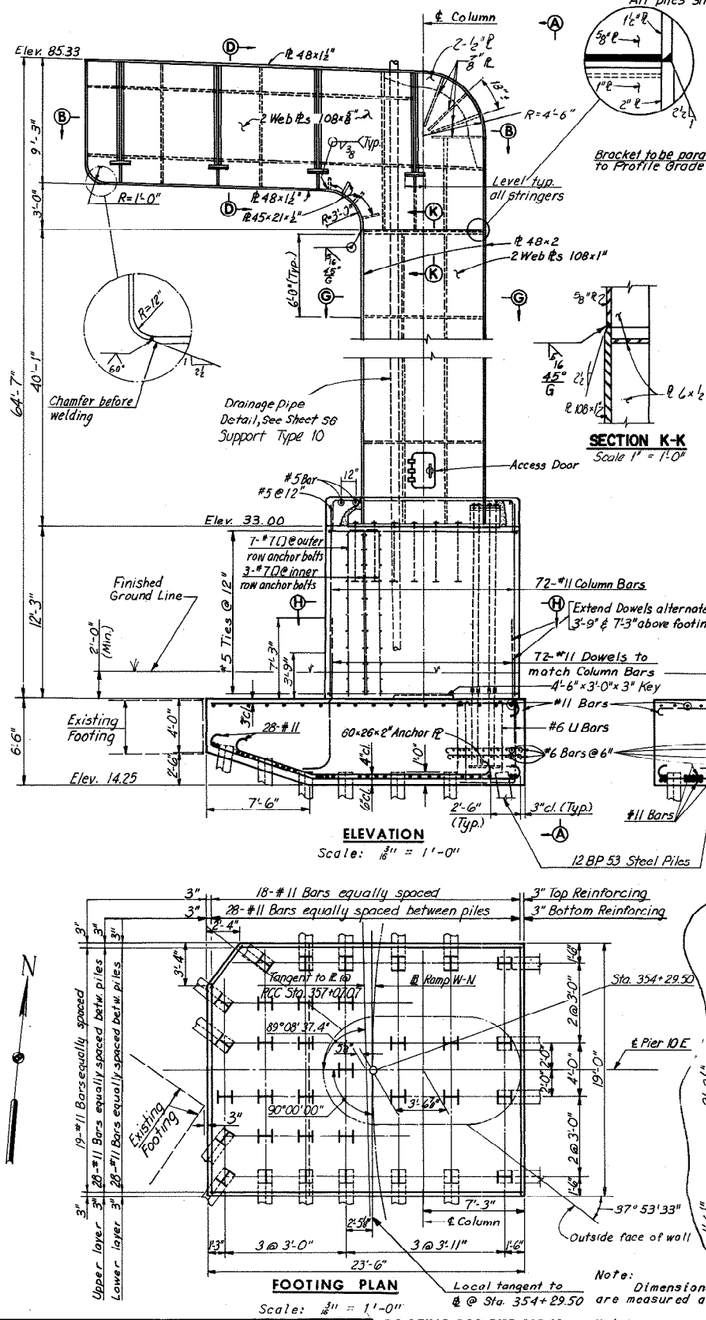
BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

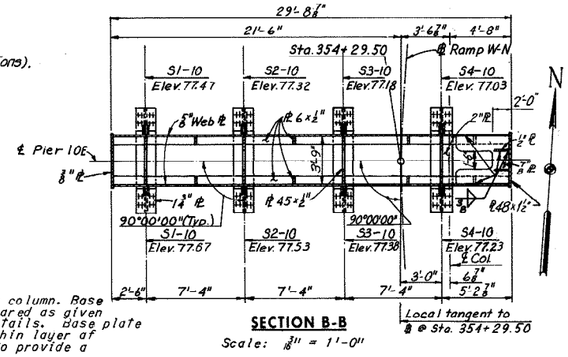
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 2 OF 54

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	183	265

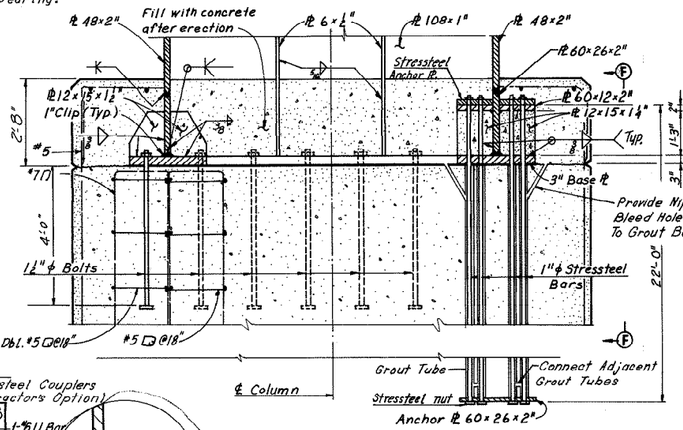
Note:
All steel shall be A36 except otherwise shown.
Pile Tip Elev. -7.00
Batter exterior piles 2" per foot in direction shown.
All piles shall be 12BP53 Steel Piles (Design Cap. = 57 Tons).

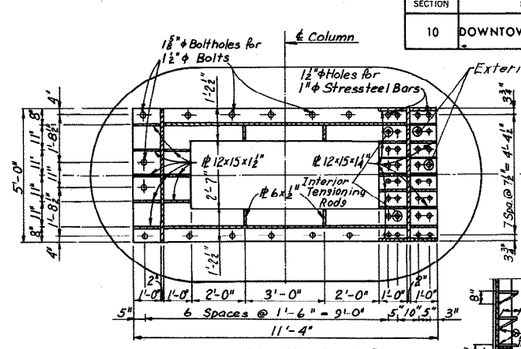




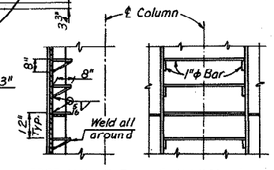
SECTION B-B
Scale: ⅜" = 1'-0"

Note:
Concrete under column. Base plate shall be prepared as given in standard shoe details. Base plate shall be set on a thin layer of dry cement powder to provide a uniform bearing.

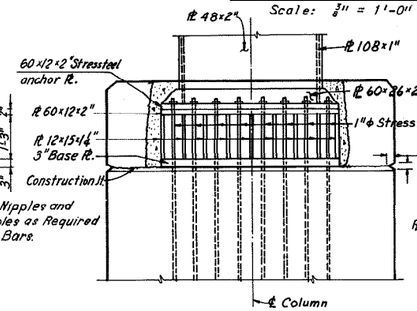




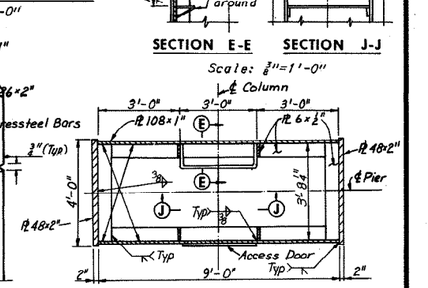
PLAN OF COLUMN BASE PLATE
Scale: ⅜" = 1'-0"



SECTION E-E SECTION J-J
Scale: ⅜"=1'-0"



VIEW F-F
Scale: ½" = 1'-0"



SECTION G-G
Scale: ⅜" = 1'-0"

Note:
Stressteel rods shall be 1" ℄ Special Grade, 160 ksi. min. ult Strength, 32 rods req'd. Rods to be grouted after tensioning. Initial Jacking Force Required. = 88^k ± 1" for seating wedge.

Rods shall be tensioned as outlined in the construction sequence. Rods need not be tensioned in pairs, However, tensioning shall proceed outward from the centerline of Pier 10.

Rods of the first group shall be checked in the same sequence as initial tensioning, checking shall continue until two successive 1" ℄ rods checked have a tension of at least 80^k.

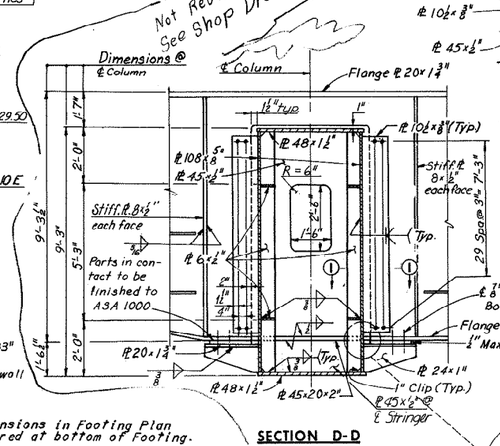
The contractor is cautioned against nicking the stress rods and he shall follow the manufacturers recommended handling procedures The contractor shall provide adequate safety measures. The contractor shall submit his proposed construction procedures to the engineer for approval.

FOOTING PLAN
Scale: ⅜" = 1'-0"

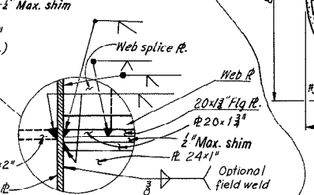
Note:
Dimensions in Footing Plan are measured at bottom of Footing.

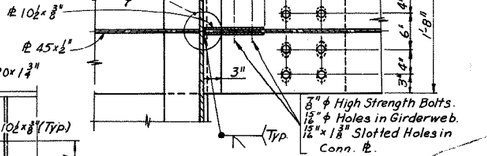
Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.

Not Revised See Shop Drawing



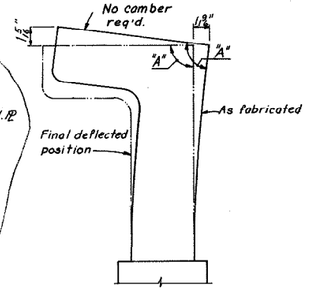
SECTION D-D
Scale: ⅜" = 1'-0"





SECTION C-C
Scale: ½" = 1'-0"

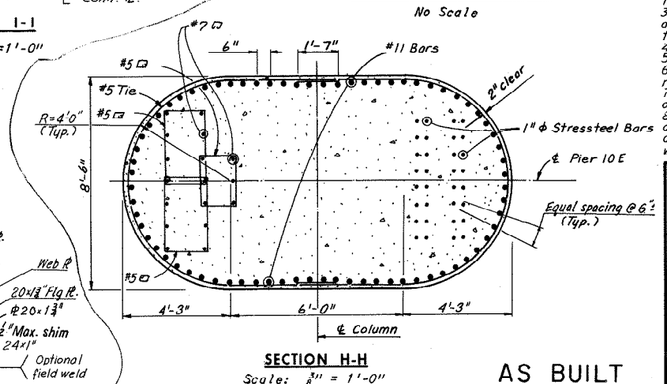
SECTION 1-1
Scale: 1"=1'-0"



CAMBERING OF COLUMN
No Scale

GENERAL CONSTRUCTION SEQUENCE:

1. Construct footing and pedestal including 32-1" ℄ stressteel bars.
2. Erect column and capbeam. Tighten down nuts on 1½" ℄ anchor bolts. Stress 12 interior tensioning rods.
3. Erect structural steel superstructure in such a manner that load eccentricity on the column is kept at a minimum.
4. Stress 12 exterior tensioning rods.
5. Place concrete deck.
6. Stress remaining 8 tensioning rods.
7. Check tension on initial group of rods.
8. Cutoff rod extension. Fill column base with concrete, grout and encase base and anchorage with concrete.



SECTION H-H
Scale: ⅜" = 1'-0"

	BY	DATE
MADE	J.D.	3-11-69
CHECKED	PTA	4-24-69
IN CHARGE		

NO.	REVISION	BY	DATE
3	As Built	TEM	6-77
2	Fdn. Plan & Elev. Changed	R.B.P.	7-23-75
1	Changed Dim. Sect. H-H Elev. Sect. B-B	RKJ	1-24-75

FOOTING FOR PIER 10E IS ECCENTRIC AS SHOWN ON FOOTING PLAN

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
PIER 10 E

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO: 10
SHEET NO. 11 OF 54

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	184	265

N

PIER CAP PLAN
Scale : 1/4" = 1'-0"

* Denoted top elevations of pad.

PIER CAP PLAN
Scale : 1/4" = 1'-0"

SECTION A-A
Scale : 3/8" = 1'-0"

SECTION D-D
Scale : 1/4" = 1'-0"

SECTION G-G
Scale : 1/2" = 1'-0"

SECTION E-E
Scale : 1/4" = 1'-0"

SECTION C-C
Scale : 1/2" = 1'-0"

ELEVATION—PIER 11
Scale : 1/4" = 1'-0"

ELEVATION—PIER 12E
Scale : 1/4" = 1'-0"

VIEW F-F
Scale : 1/4" = 1'-0"

SECTION B-B
Scale: 1/4" = 1'-0"

PAD AND ANCHOR BOLT SETTING PLAN
No Scale

FOOTING PLAN—PIER 11
Scale : 1/4" = 1'-0"

FOOTING PLAN—PIER 12E
Scale : 1/4" = 1'-0"

PAD AND ANCHOR BOLT SETTING PLAN
No Scale

Notes:
For Standard Shoe Details, see Sheets S1 and S2
For Framing Plan, see Sheets 26 and 27
For Quantities of Steel and Concrete, see Sheet 2
All piles shall be 12BP53 Steel piles
(Design Capacity = 57 Tons)
Estimated pile tip elevation: Pier 11 = -5.0 ft.
Pier 12E = -8.0 ft.

Note: Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.

	BY	DATE
MADE	G.S.H.	3-19-69
CHECKED	PTA	5-7-69
IN CHARGE		

NO.	REVISION	BY	DATE
1	Notes Added	LRH	4-19-74
2	Column size	T.E.M.	9-10-74
3	BP1 'R' size chg. Pier Cap Dim. Chg.	REF	11-13-74
4	As Built Pier 12E	DWG	2-10-75
5	As Built TEM 6-77		

DIMENSIONS FOR PAD AND ANCHOR BOLT SETTING PLAN													
Stringer	∝	A	B	C	D	E	F	G	H	I	J	K	L	M
S1-11	87°00'50"	3/8"	10 1/2"	3/8"	1'-2 3/8"	1'-2 3/8"	5 1/2"	7"	1'-0 1/2"	2'-5"	3 1/2"	2"	4"	10 1/2"
S2-11	88°28'25"	3/8"	10 1/2"	1/4"	1'-2 5/8"	1'-2 5/8"	5 7/8"	6 3/8"	1'-0 1/2"	2'-5"	3 1/2"	2 3/8"	4"	10 1/2"
S3-11	89°57'17"	0"	10 1/2"	0"	1'-2 1/2"	1'-2 1/2"	6 1/4"	6 1/4"	1'-0 1/2"	2'-5"	2 3/8"	2 3/8"	4"	10 1/2"

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

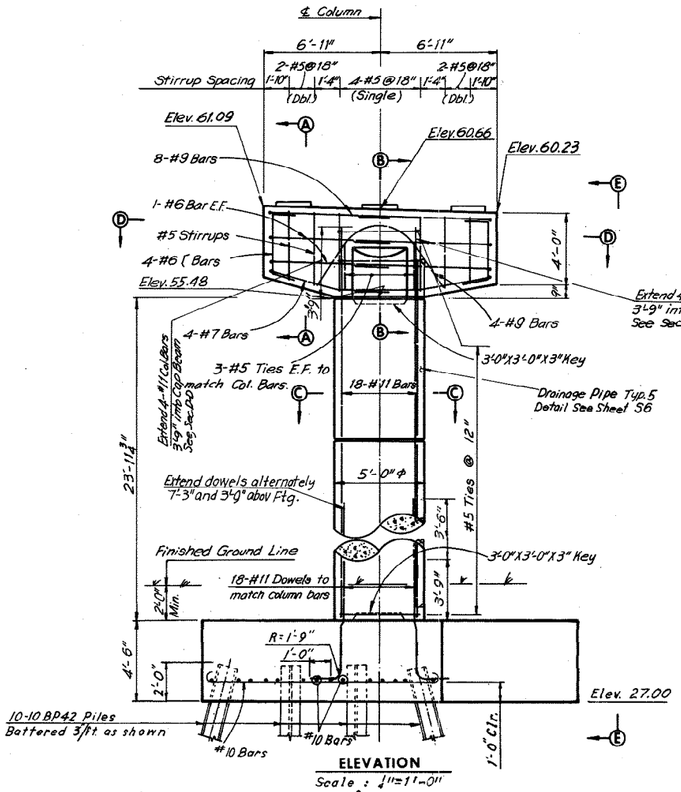
BRIDGE NO. 67
RAMP W-N CONNECTION TO
RICHMOND-PETERSBURG TURNPIKE
PIERS 11 AND 12E

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

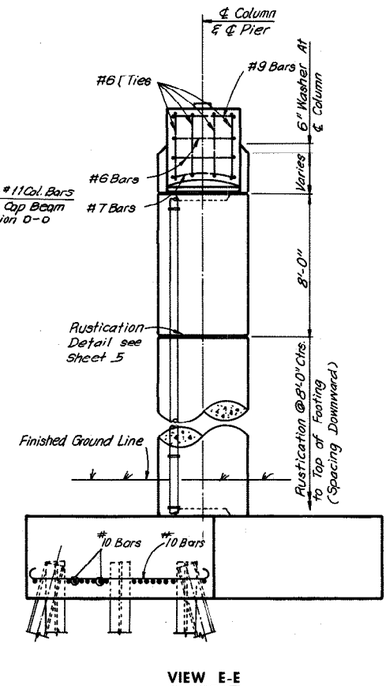
SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 12 OF 54

AS BUILT

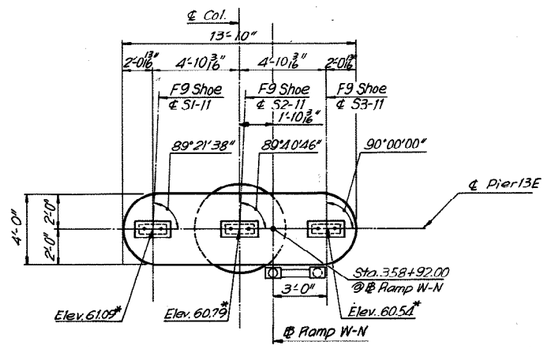
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	185	265



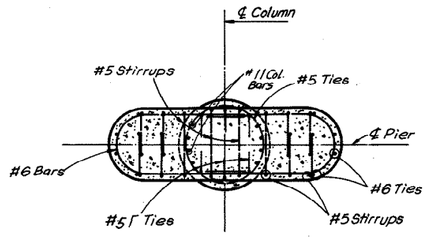
ELEVATION
Scale : 1/4"=1'-0"



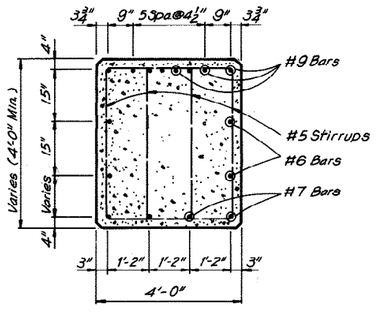
VIEW E-E
Scale : 1/4"=1'-0"



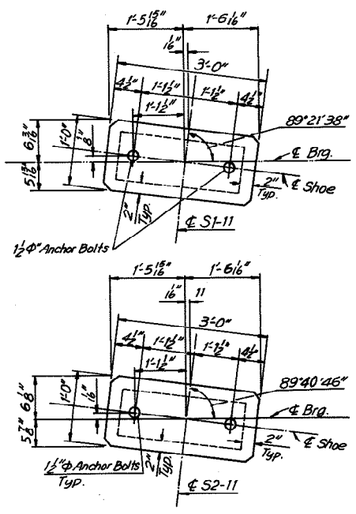
PLAN
Scale : 1/4"=1'-0"
*Denotes Elevations of Top Pad.



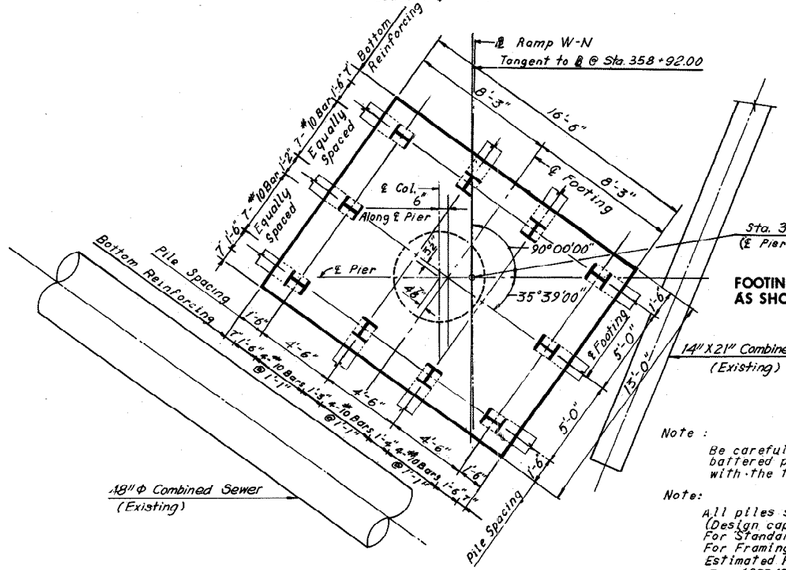
SECTION D-D
Scale : 1/4"=1'-0"



SECTION A-A
Scale : 1/2"=1'-0"



PAD AND ANCHOR BOLT SETTING PLAN
No Scale



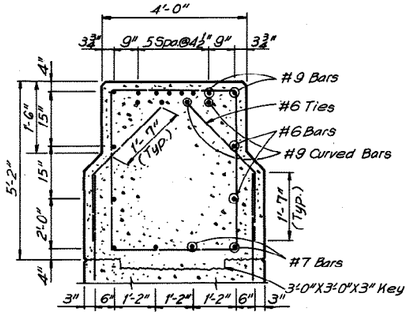
FOOTING PLAN
Scale : 1/4"=1'-0"

FOOTING FOR PIER 13E IS ECCENTRIC AS SHOWN ON FOOTING PLAN

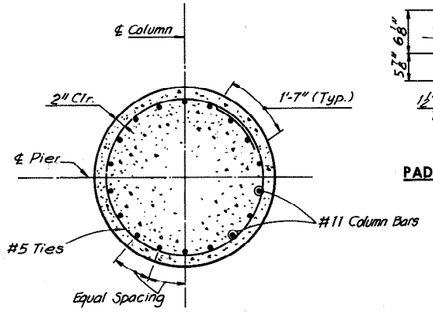
Note :
Be careful to avoid interference of battered piles and footing excavations with the two existing combined sewers.

Note:
All piles shall be 10BP42 Steel Piles (Design capacity = 45 tons.)
For Standard Shoe Details, see Sheet
For Framing Plans, see Sheets 26 & 27.
Estimated Pile tip elevation. 30
For 10BP42 Steel Piles details, see Sheet 5.

Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft. redesign will be required.



SECTION B-B
Scale : 1/2"=1'-0"



SECTION C-C
Scale : 1/2"=1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	SCC	2.19.69	2	As Built	TEM	6-77
CHECKED	GSH	2.19.69	1	Pad Elevations	DWS	2-10-75
IN CHARGE						

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

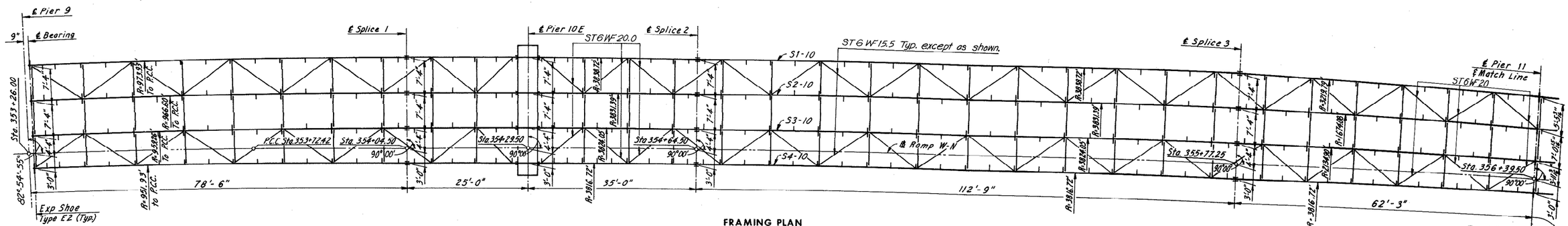
BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
PIER 13E

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

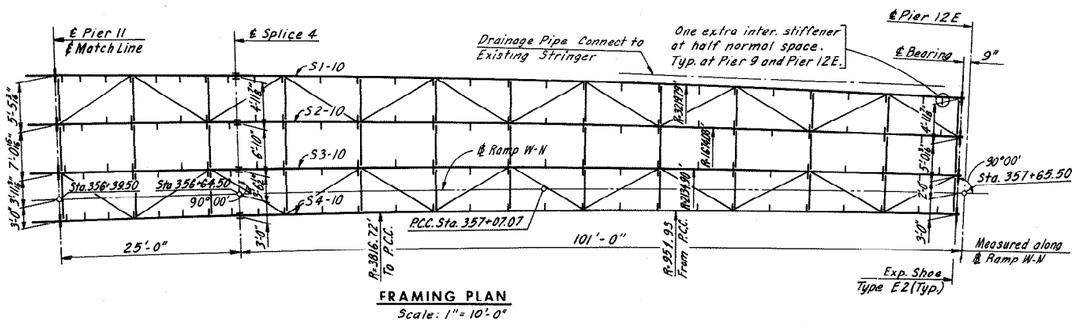
SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 13 OF 54

SHOE SCHEDULE			
EXP. SHOE		FIXED SHOE	
TYPE	NO.	TYPE	NO.
E2	8	SP-1	4

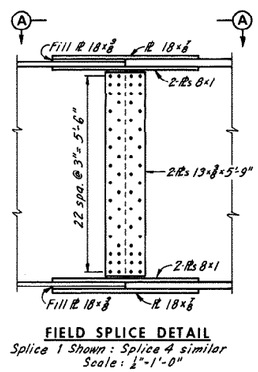
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	196	265



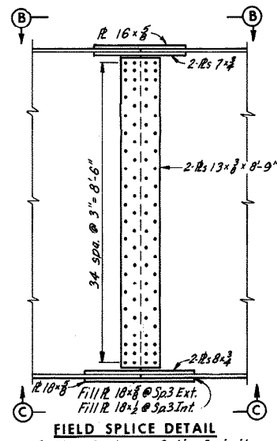
FRAMING PLAN
Scale: 1"=10'-0"



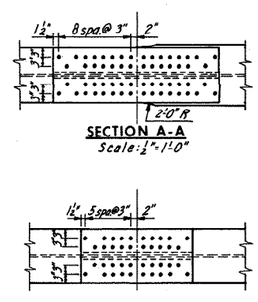
FRAMING PLAN
Scale: 1"=10'-0"



FIELD SPLICE DETAIL
Splice 1 Shown : Splice 4 similar
Scale: ½"=1'-0"



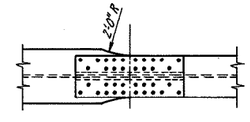
FIELD SPLICE DETAIL
Splice 2 shown; Splice 3 similar
Scale: ½"=1'-0"



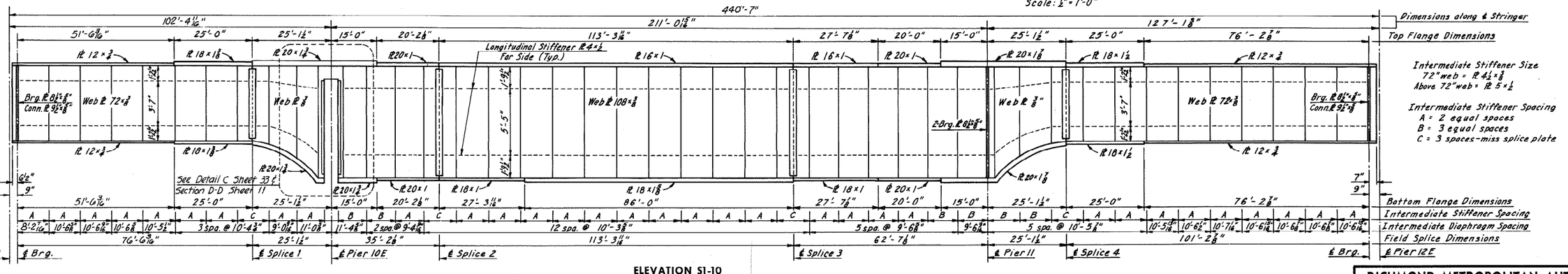
SECTION A-A
Scale: ½"=1'-0"

SECTION B-B
Splice 3
Scale: ½"=1'-0"

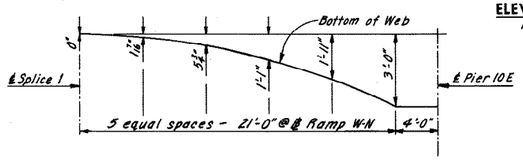
SECTION C-C
Scale: ½"=1'-0"



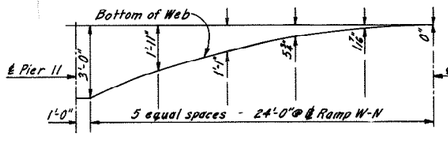
SECTION B-B
Splice 2
Scale: ½"=1'-0"



ELEVATION S1-10
No Scale



HAUNCH DETAIL
No Scale



HAUNCH DETAIL
No Scale

Notes:
For Deck Plan, see Sheet 34.
For Shoe Details, see Sheet 52.
For Details of Intermediate Diaphragms, see Sheet 23.
For Details of End Diaphragms, see Section D-D Sheet 33.
For Details of Lateral Bracing, see Sheet 23.
All steel is A36 unless otherwise noted.
For Joint Details, see Sheet 49.
For Web to Flange Weld, see Note, Sheet 20.

	BY	DATE
MADE	AMH	2-2869
CHECKED	JD	4-26-69
IN CHARGE		

NO.	REVISION	BY	DATE
1	Note Added	LRH	4-19-74
2	As Built	TEM	6-77

AS BUILT

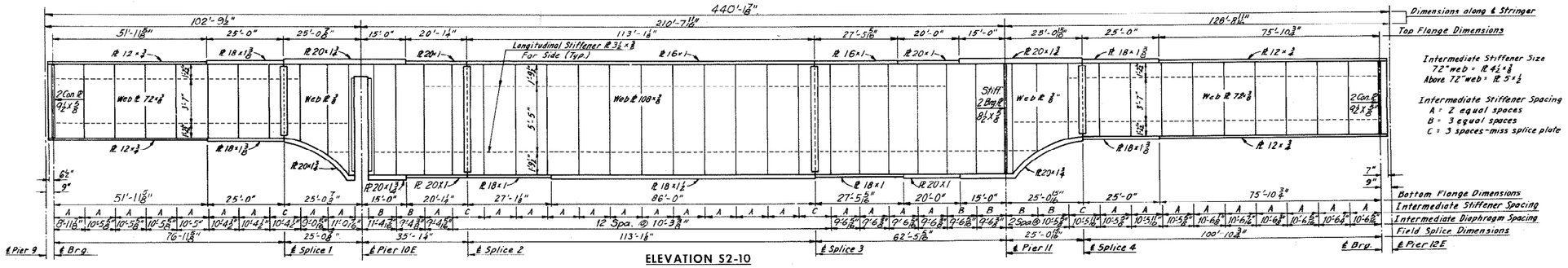
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

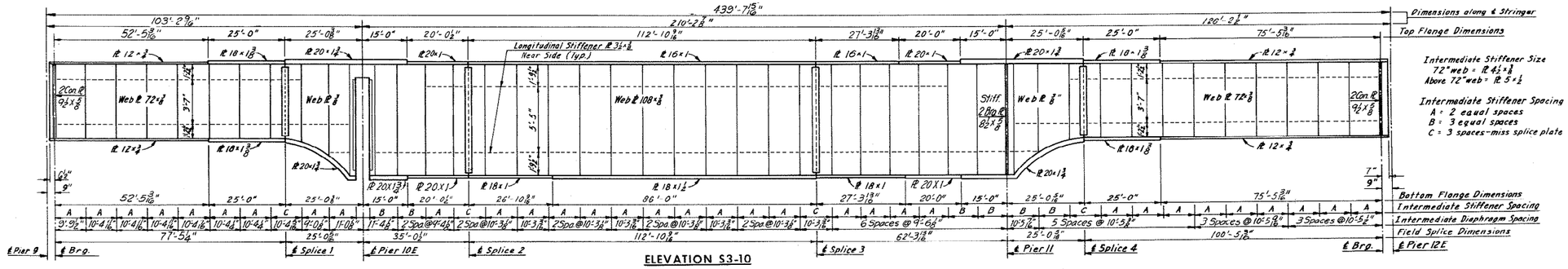
BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
FRAMING PLAN - UNIT 10

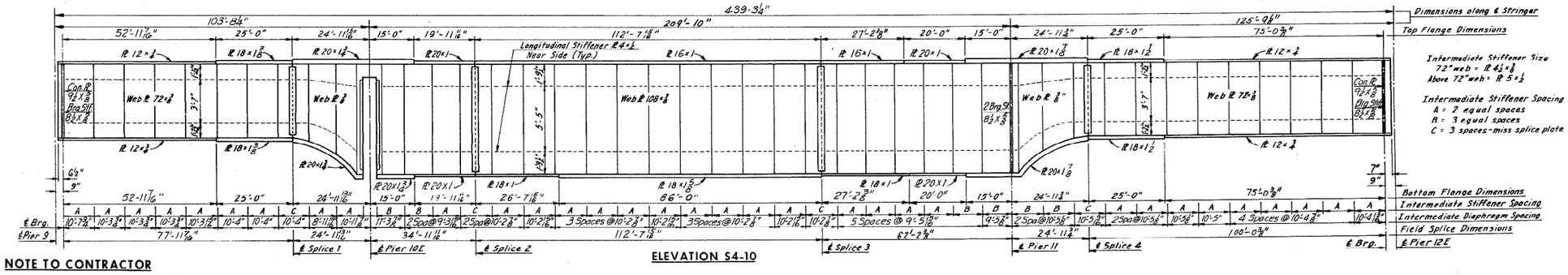
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 24 OF 54

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	197	265







Intermediate Stiffener Size
72" web = PL 4½ x ⅜
Above 72" web = PL 5 x ½

Intermediate Stiffener Spacing
A = 2 equal spaces
B = 3 equal spaces
C = 3 spaces-miss splice plate

STRINGER	ELEV. A	ELEV. B	ELEV. C	ELEV. D	ELEV. E	ELEV. F
S1-10	88.50	87.37	85.60	80.87	76.81	72.72
S2-10	88.35	87.23	85.46	80.65	76.57	72.42
S3-10	88.21	87.08	85.31	80.43	76.24	72.12
S4-10	88.06	86.93	85.16	80.20	75.93	71.82

NOTE TO CONTRACTOR

Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.

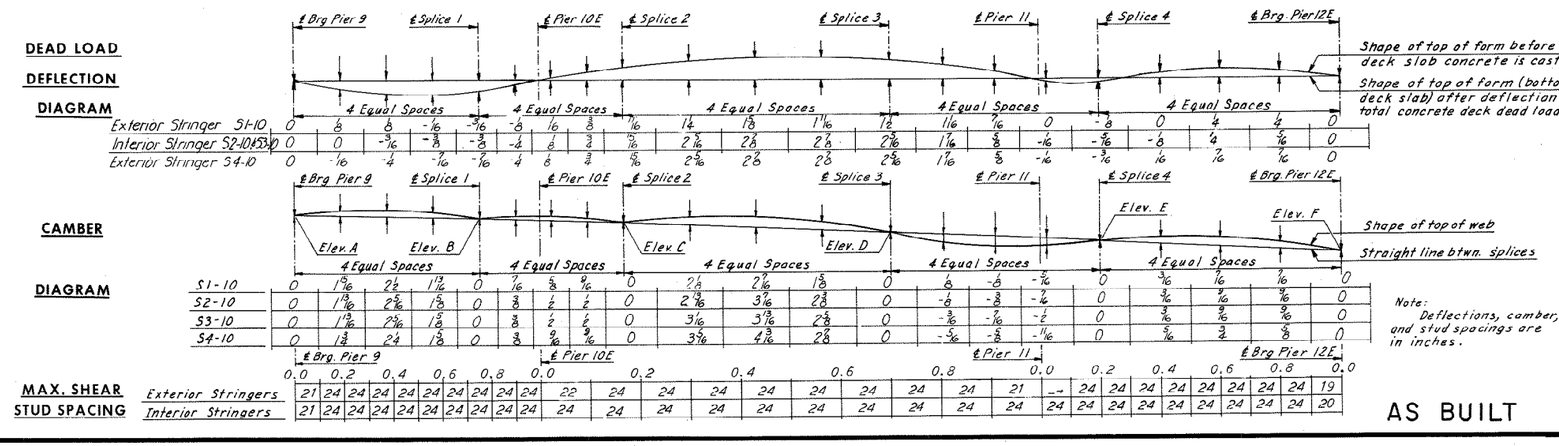
In practice, the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab and the top of stringer without altering the slab thickness.

NOTE TO FABRICATOR

The stringers shall be fabricated with an upward camber amounting to the tabulated value. This will provide approximate compensation for deflection under full dead load and for comformity with finished grade.

Note:
Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber Diagram.

If stringers are not cambered distance top of stringers to top of slab will vary along the stringer in accordance with the offset dimensions shown in the Camber Diagram, and with minimum distance as shown in Cross-Section on Sheet



Note:
For Deck Plan, see Sheet 34.
All Steel shall be A36 unless otherwise noted.
For Details not shown, see Section D-D, sheet 11 and Detail C, sheet 33.
For Web to Flange Weld size, see Note, Sheet 20.

Note:
Deflections, camber, and stud spacings are in inches.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	AMH	2-28-69	2	As Built	TEM	6-77
CHECKED	JD	4-29-69				
IN CHARGE						

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE

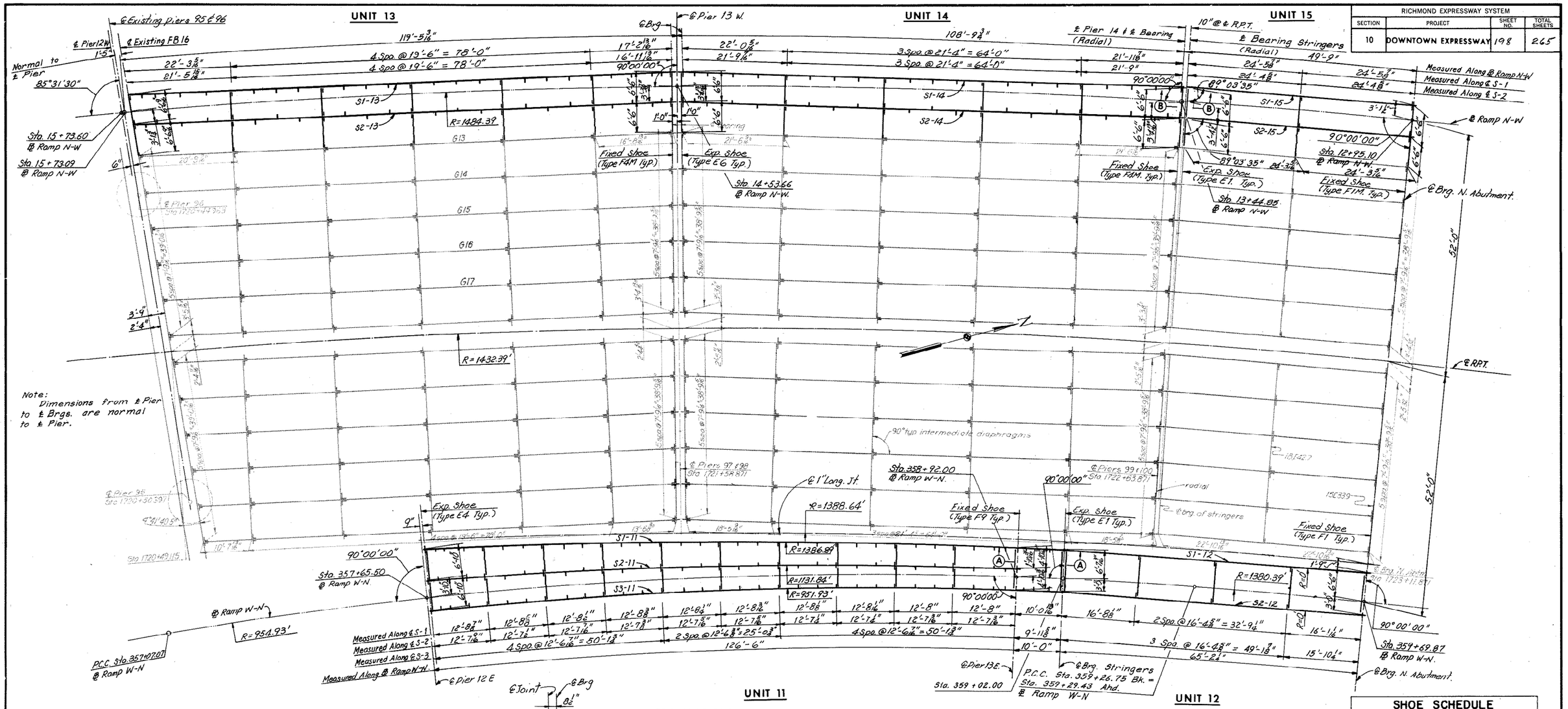
GIRDER ELEVATIONS - UNIT 10

AS BUILT

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: No Scale
CONTRACT NO.: 10
SHEET NO. 25 OF 54

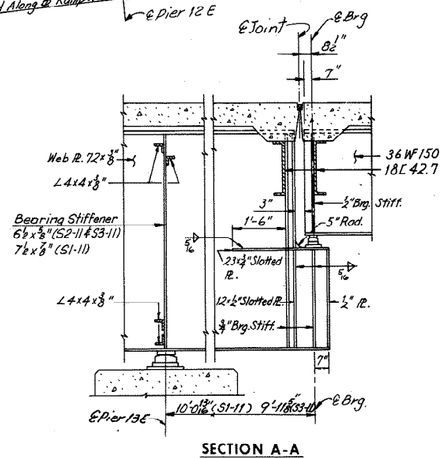
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	198	265



Note:
For Stringer Elevation, see Sheet 27.
For Stringer Schedule, see Sheet 27.
For Camber Schedule, see Sheet 27.
For FB 16 Details, see Sheet 28.
For Deck Plan, see Sheet 35.
For Shoe Details, see Sheets S1 & S2.

Note:
Dimensions shown on the plans for existing structural metalwork are in accordance with drawings prepared for the original construction. The Contractor shall verify all necessary dimensions of existing structural metalwork prior to fabrication of new metalwork.
New Diaphragms are to match Existing Diaphragms, in Units 13, 14 and 15.

	BY	DATE				
			1	Framing Revised Units 12, 13, 14, 15	RLH	12-5-74
MADE	Y.C.P. Q.C.C.	2-24-69	2	P.C.C. & WN	DWB	12-11-74
CHECKED	K.C.T.	4-2669	3	As Built	TEM	6-77
IN CHARGE			NO.	REVISION	BY	DATE



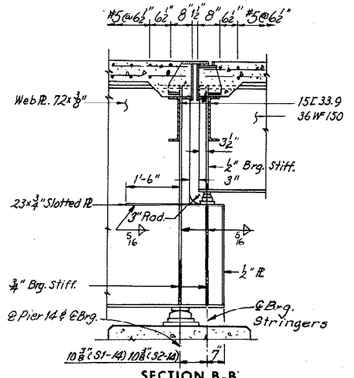
SECTION A-A
Scale: ½"= 1'-0"

UNIT 11

FRAMING PLAN
Scale: 1"=10'-0"

Note:
Intermediate stiffener Pls. 4x⅜" shall be equally spaces between diaphragms as shown. The first two stiffener spaces at the end of stringers shall be one-half the normal spacing within the panel.

UNIT 12



SECTION B-B
Scale: ½"= 1'-0"

AS BUILT

SHOE SCHEDULE

FIXED SHOES		EXPANSION SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
F1	2	E1	4
F1M	2	E4	3
F4M	4	E6	2
F9	3	-	-

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

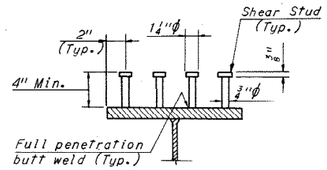
BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE

FRAMING PLAN – UNITS 11, 12, 13, 14 AND 15

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 26 OF 54

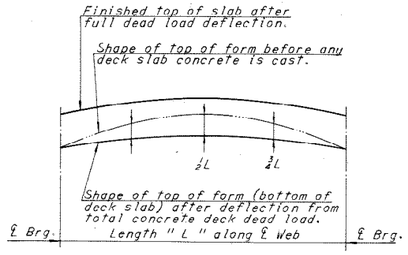
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	199	265



SHEAR STUD DETAIL
No Scale

SHEAR STUD NOTE

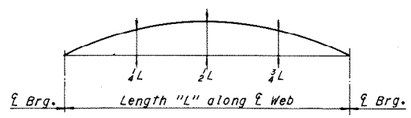
Capacity = 3,400 lbs. per stud.
The Contractor may, if he elects, use three ⅞" diameter studs at the same longitudinal spacing in lieu of the four ¾" diameter studs shown.
Stud rows shall be placed parallel to the main deck reinforcing.
Shear stud spacing shown is maximum spacing.



DEAD LOAD DEFLECTION DIAGRAM

NOTE TO CONTRACTOR

Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.
In practice, the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab and the top of stringer without altering the slab thickness.

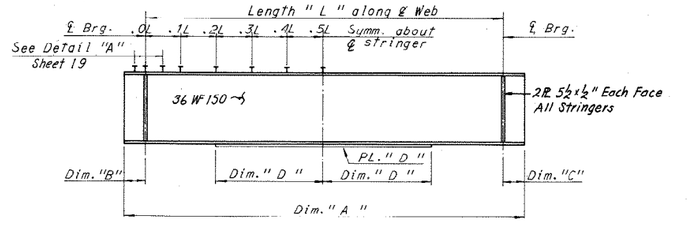


CAMBER DIAGRAM

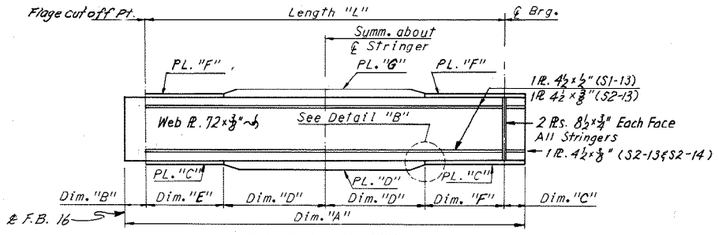
NOTE TO FABRICATOR

The stringers shall be fabricated with an upward camber amounting to the tabulated value. This will provide approximate compensation for deflection under full dead load and for comformity with finished grade.

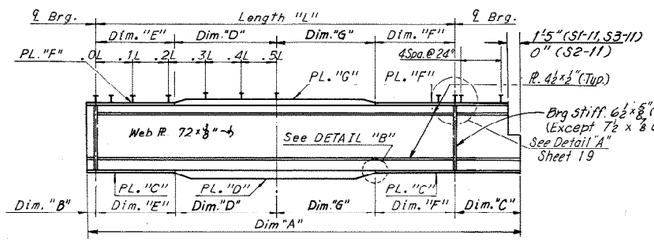
Note:
Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber Diagram.
If stringers are not cambered, distance top of stringers to top of slab will vary along the stringer in accordonce with the offset dimensions shown in the Camber Diagram, and with minimum distonce as shown in Cross-Section on Sheet



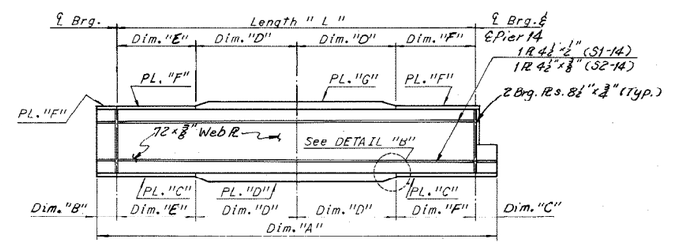
STRINGER ELEVATION
No Scale
(Unit 12 ℄ 15)



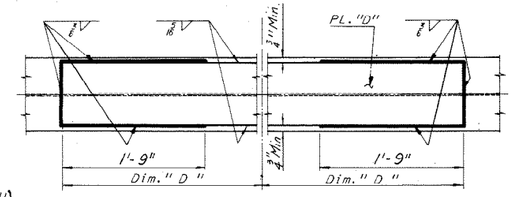
STRINGER ELEVATION
No Scale
(Unit 13)



STRINGER ELEVATION
No Scale
(Unit 11)

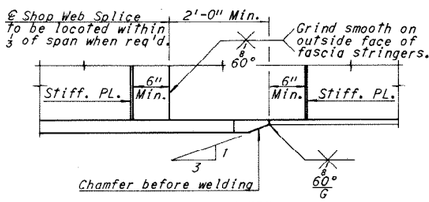


STRINGER ELEVATION
No Scale
(Unit 14)



COVER PLATE DETAIL
No Scale

Note:
Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber Diagram.
If stringers are not cambered distance, top of stringers to top of slab will vary along the stringer in accordance with the offset dimensions shown in the Camber Diagram, and with minimum distance as shown in cross-section on Sheet 35 .



DETAIL "B"
No Scale
NOTE: Web to flange weld size see sheet 20.

STRINGER SCHEDULE

UNIT	STRINGER	Dim. "A"	LENGTH "L"	Dim. "B"	Dim. "C"	Dim. "D"	Dim. "E"	Dim. "F"	Dim. "G"	PL."C"	PL. "D"	PL."F"	PL. "G"	MAX. SHEAR STUD SPACING 0.0L-0.1L*	0.1L-0.2L	0.2L-0.3L	0.3L-0.4L	0.4L-0.5L
11	S1-11	133'-1 15/16"	126'-11"	7"	10'-7 11/16"	38'-0"	25'-5 5/16"	25'-5 1/4"	38'-0"	16'-1 9/16"	18 x 2"	12 x1"	16 x 1"	17"	19"	24"	24"	24"
	S2-11	127'-3 3/8"	126'-1 8/16"	7"	7"	31'-6"	31'-6 1/16"	31'-6 1/16"	31'-6"	14 x1½"	16 x 2"	12x1"	12 x1"	18"	20½"	24"	24"	24"
	S3-11	136'-5 7/16"	125'-4 1/16"	7"	10'-6 3/16"	37'-8"	25'-0 1/16"	18'-6 1/16"	44'-2"	14 x1"	14x2 "	12x1 1/16"	12x1"	.22"	24"	24"	24"	24"
12	S1-12	66'-9 7/16"	65'-6 1/16"	7"	8"	24'-0"	--	--	--	36WF150	10½x¾ "	-	-	8"	9"	11"	12½"	15"
	S3-12	66'-5 5/8"	65'-0 1/2"	7"	10"	23'-9"	--	--	--	36WF150	10½x¾ "	-	-	10"	11"	14½"	17½"	24"
13	S1-13	118'-4 5/16"	116'-7 1/16"	11"	10½"	37'-0"	21'-3 1/16"	21'-3 1/16"	-	18x1"	18x1 1/16"	18x1"	18x1 5/16"	-	-	-	-	-
	S2-13	117'-4 1/4"	115'-6 3/16"	11"	10½"	36'-0"	21'-9 3/16"	21'-9 3/16"	-	18x1"	18x1½"	18x1"	18x1½"	-	-	-	-	-
14	S1-14	110'-4 1/4"	108'-0 3/16"	10½"	1'-5 3/16"	35'-0"	19'-0 1/16"	19'-0 1/16"	-	18x1"	18x1 1/16"	18x1"	18x1 1/16"	-	-	-	-	-
	S2-14	109'-10 3/16"	107'-8 1/2"	10½"	1'-5 3/16"	35'-0"	18'-9 1/4"	18'-9 1/4"	-	18x⅞"	18x1 3/16"	18x⅞"	18x1 3/16"	-	-	-	-	-
15	S1-15	50'-1 1/4"	48'-11 3/16"	3½"	10"	--	--	--	--	36WF150	-	-	-	--	--	--	--	--
	S2-15	49'-8 11/16"	48'-9 3/16"	3½"	8"	--	--	--	--	36WF150	--	--	--	--	--	--	--	--

DEAD LOAD DEFLECTION SCHEDULE			CAMBER SCHEDULE		
¼L	½L	¾L	¼L	½L	¾L
1 5/16	1 13/16	1 1/4	2 3/4	3 3/8	2 9/16
1 1/16	2 1/16	1 1/16	2 1/16	4 3/8	3 3/8
1 9/16	2 3/8	1 7/16	2 5/8	4	2 15/16
9/16	3/4	9/16	3/4	1	13/16
1 3/16	1 5/8	13/16	1	1 7/16	1 5/8
1 3/16	1 5/8	1 3/16	1 9/16	2 3/16	1 9/16
1 1/8	1 1/2	1 1/8	1 1/2	2 1/16	1 1/2
1	1 3/8	1	1 1/16	1 3/4	1 5/16
7/8	1 1/4	7/8	1 1/4	1 3/8	1 1/4
5/16	7/16	5/16	3/8	1/2	3/8
5/16	3/8	5/16	5/16	1/2	5/16

* *Spacing begins at termination of 6 spaces @ 4".*

	BY	DATE
MADE	V.C.P. Q.C.C.	2-26-69
CHECKED	K.C.T.	4-28-69
IN CHARGE		

NO.	REVISION	BY	DATE
⚠	Framing Revised Units 12,13,14,15	RLH	12-5-74
2	As Built	TEM	6-77

NOTE.
All steel shall be A36 unless otherwise shown.
Longitudinal stiffeners of exterior stringer shall be located on the exterior face of the stringer.

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

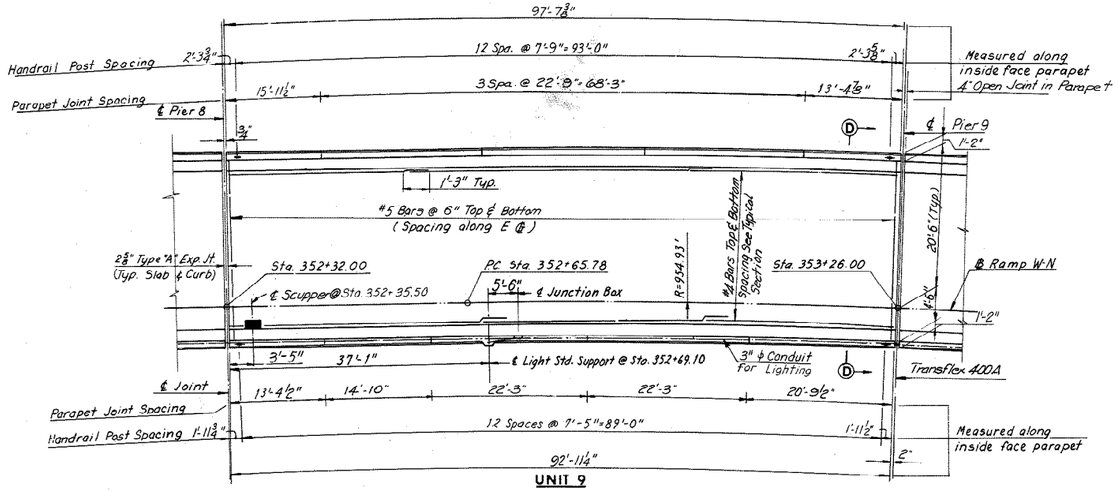
BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE

FRAMING PLAN - UNITS 11,12,13,14 AND 15

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: No Scale
CONTRACT NO.: 10
SHEET NO. 27 OF 54

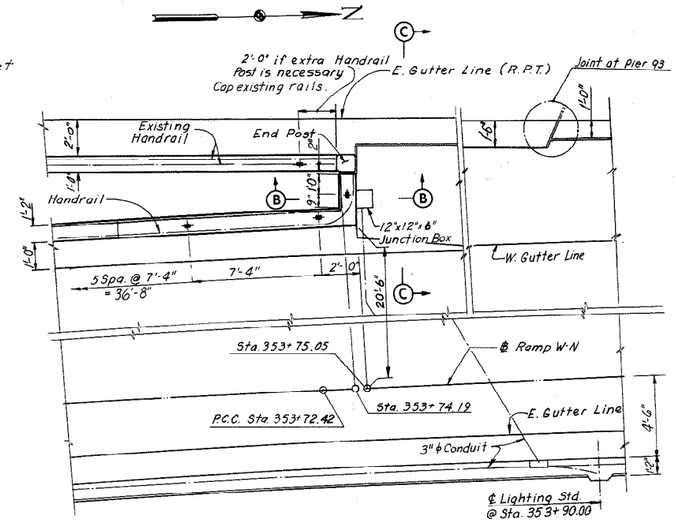
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	205	265



UNIT 9

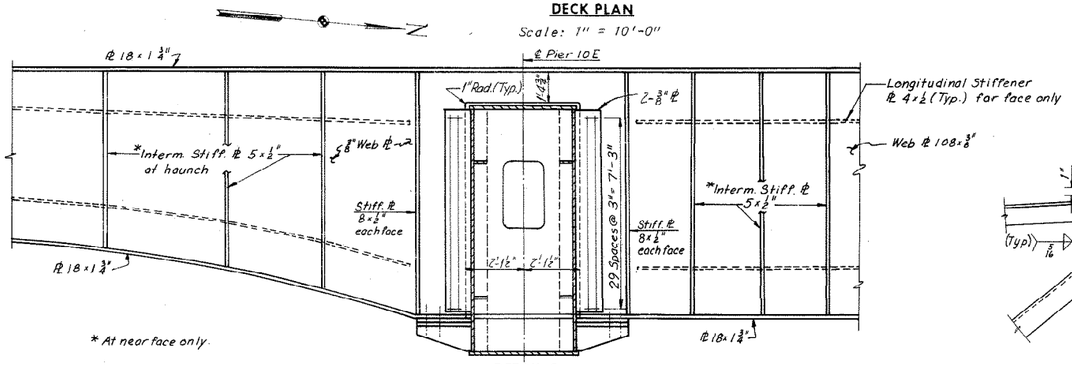
DECK PLAN

Scale: 1" = 10'-0"



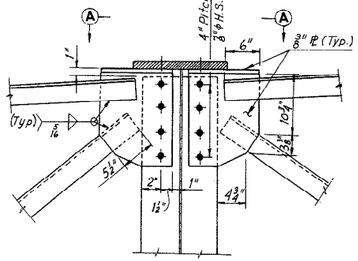
ELEVATION TABLE			
STATION	ELEV A	ELEV B	ELEV C
352+30.00	88.57	88.33	88.29
32.00	88.63	88.37	88.33
40.00	88.83	88.52	88.46
50.00	89.06	88.67	88.60
60.00	89.20	88.81	88.74
70.00	89.30	88.91	88.84
80.00	89.39	89.00	88.93
90.00	89.44	89.05	88.98
353+00.00	89.47	89.08	89.01
10.00	89.48	89.09	89.02
20.00	89.46	89.07	89.00
26.00	89.44	89.05	88.98
30.00	89.42	89.03	88.96

Note: Connect Lighting Conduit in existing structure with Junction Box at nose of new part of structure.



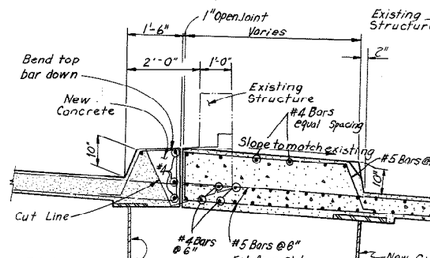
DETAIL C

Scale: ⅜"=1'-0"



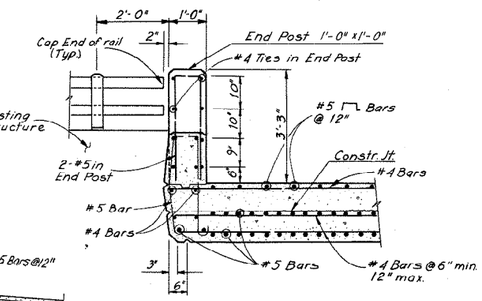
DETAIL A

Scale: 1" = 1'-0"



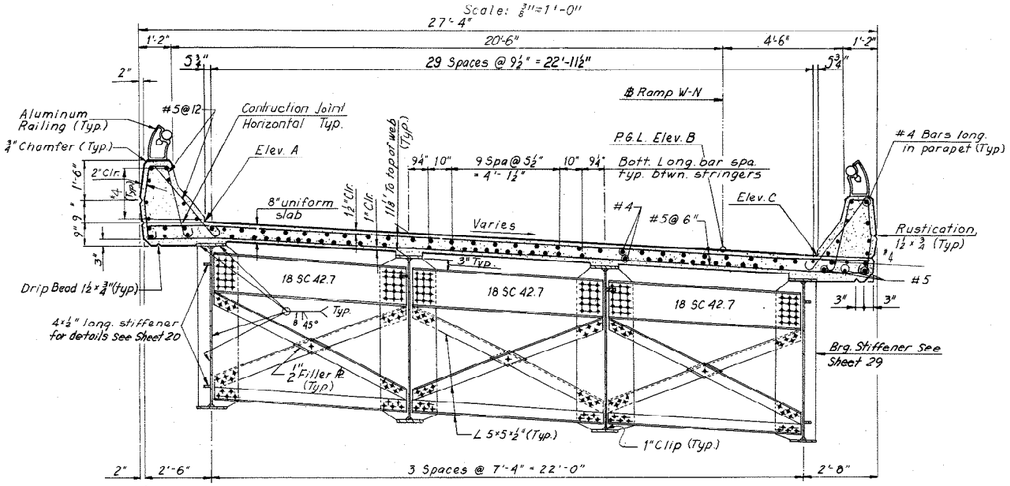
SECTION C-C

Scale: ½" = 1'-0"



SECTION B-B

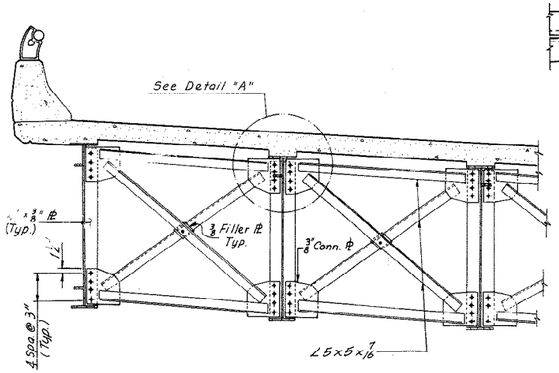
Scale: ½"=1'-0"



SECTION D-D — END DIAPHRAGM

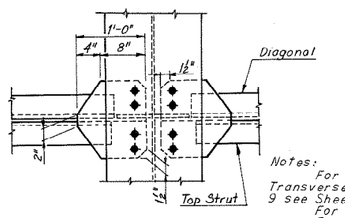
Scale: ⅜" = 1'-0"

Unit 9 shown, Unit 10 Diaphragm similar



INTERMEDIATE DIAPHRAGM-UNIT 9

Scale: ⅜"=1'-0"



VIEW A-A

Scale: 1"=1'-0"

Notes:
For Intermediate Diaphragm and Transverse Stiffener Spacing for Unit 9 see Sheet 23.
For Handrail Details see Sheet S3.
For Lighting Details see Sheet S4.
For Location of Detail B see Sheet 34.
For Standard Drainage Details see Support Type 3 Sheet S6.
For Location of Detail C see Stringer S1-10 Sheet 24.
For Typical Parapet Detail, see Sheet 29.

	BY	DATE				
MADE	C.E.B.	3-7-69	2	As Built	TEM	6-77
CHECKED	A.M.H.	4-21-69	1	Revised ∠ size, Intermediate Diap. Unit 9	KKF	1-24-75
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
DECK PLAN AND SUPERSTRUCTURE DETAILS UNIT 9

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO: 10
SHEET NO. 33 OF 54

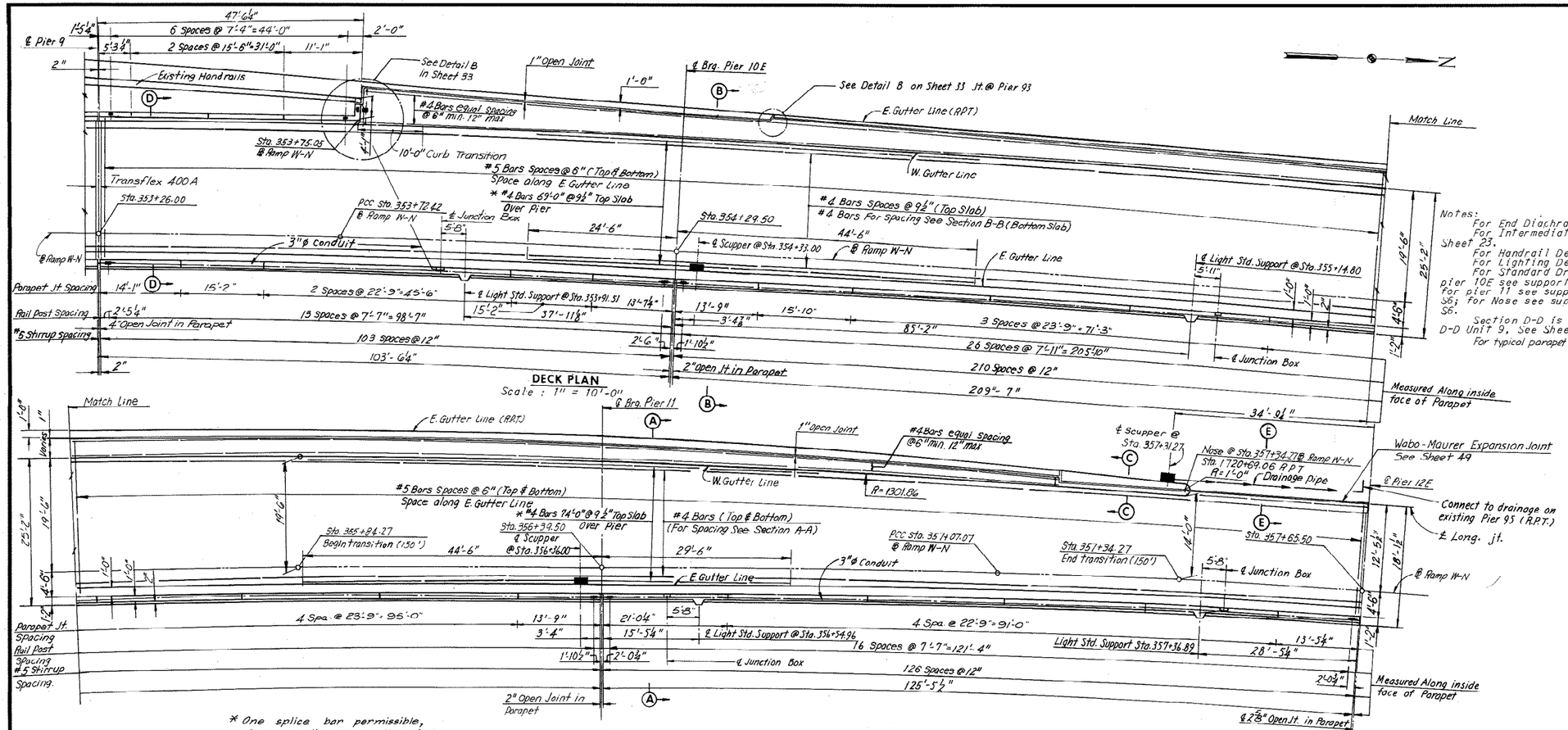
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	206	265

ELEVATION TABLE

STATION	ELEV. A	ELEV. B	ELEV. C
353+26.00	88.98	89.05	89.43
+30.00	88.96	89.03	89.41
+40.00	88.89	88.96	89.34
+50.00	88.80	88.87	89.25
+60.00	88.68	88.75	89.13
+70.00	88.54	88.61	88.99
+80.00	88.37	88.44	88.82
+90.00	88.17	88.24	88.62
354+00.00	87.96	88.03	88.41
+10.00	87.72	87.79	88.17
+20.00	87.46	87.53	87.91
+29.50	87.19	87.26	87.64
+30.00	87.17	87.24	87.62
+40.00	86.88	86.95	87.33
+50.00	86.57	86.64	87.02
+60.00	86.24	86.31	86.69
+70.00	85.89	85.96	86.34
+80.00	85.52	85.59	85.97
+90.00	85.13	85.20	85.58
355+00.00	84.72	84.79	85.17
+10.00	84.30	84.37	84.75
+20.00	83.86	83.93	84.33
+30.00	83.41	83.48	83.90
+40.00	82.94	83.02	83.46
+50.00	82.45	82.54	83.02
+60.00	81.97	82.06	82.57
+70.00	81.48	81.57	82.12
+80.00	80.99	81.09	81.68
+90.00	80.49	80.61	81.23
356+00.00	80.00	80.12	80.77
+10.00	79.51	79.64	80.31
+20.00	79.02	79.15	79.85
+30.00	78.53	78.67	79.39
+39.50	78.06	78.21	78.95
+40.00	78.04	78.19	78.92
+50.00	77.55	77.70	78.46
+60.00	77.06	77.22	77.99
+70.00	76.58	76.74	77.53
+80.00	76.11	76.29	77.10
+90.00	75.67	75.86	76.68
357+00.00	75.25	75.45	76.28
+10.00	74.85	75.05	75.88
+20.00	74.44	74.65	75.48
+30.00	74.04	74.25	75.09
+40.00	73.65	73.86	—
+50.00	73.27	73.48	—
+60.00	72.89	73.10	—
+65.50	72.69	72.90	—

Elevations given in the Elevation Table may require adjustment in the field.

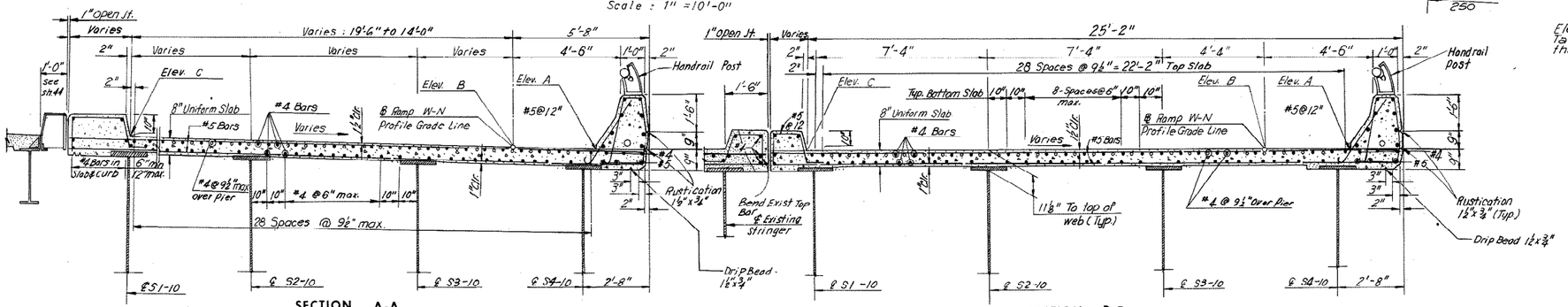
Notes:
For End Diaphragms see, Sheet 33.
For Intermediate Diaphragms see, Sheet 23.
For Handrail Details see, Sheet 53.
For Lighting Details see, Sheet 54.
For Standard Drainage Details for pier 10E see support Type 10, sheet S6; for pier 11 see support Type 5, Sheet S6; for Nose see support Type 9, Sheet S6.
Section D-D is similar to Section D-D Unit 9, See Sheet 33
For typical parapet Details, see Sheet 20.



DECK PLAN
Scale : 1" = 10'-0"

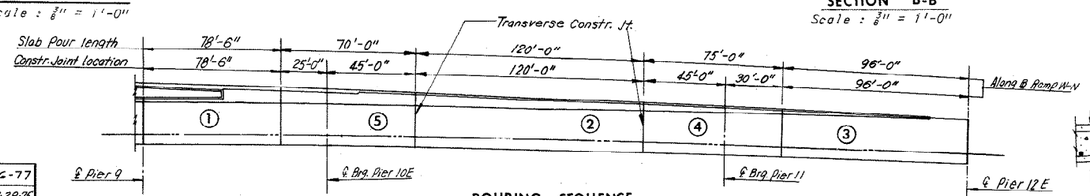
* One splice bar permissible, stagger splices on adjacent bars

DECK PLAN
Scale : 1" = 10'-0"

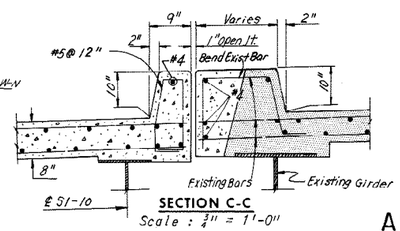


SECTION A-A
Scale : ⅜" = 1'-0"

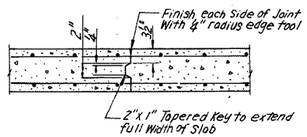
SECTION B-B
Scale : ⅜" = 1'-0"



POURING SEQUENCE
Scale : 1" = 40'-0"



SECTION C-C
Scale : ¾" = 1'-0"



TRANSVERSE CONSTRUCTION

JOINT DETAIL
No Scale

	BY	DATE				
			3	As Built	TEM	C-77
VADE	G.S.H	2-26-69	2	Note for Table of Elevations	DWB	1-28-75
CHECKED	AMH	4-23-69	1	Rev. length of bars. Rev. Road width	RSJ	1-24-75
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

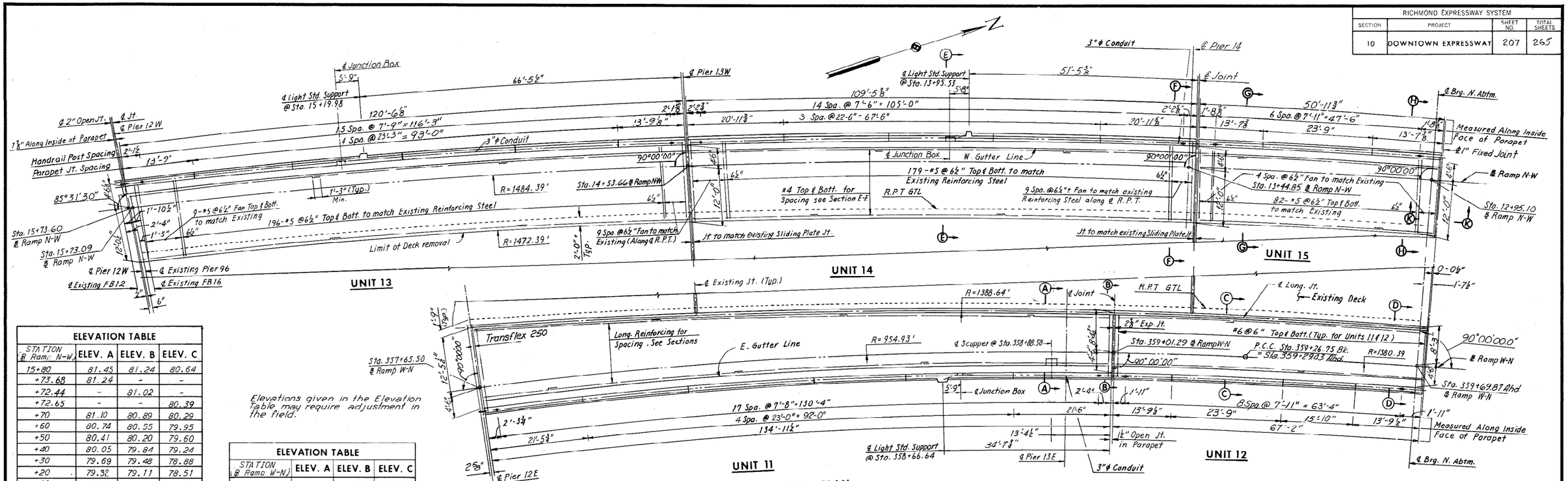
BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE

DECK PLAN — UNIT 10

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 34 OF 54

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	207	265



DECK PLAN

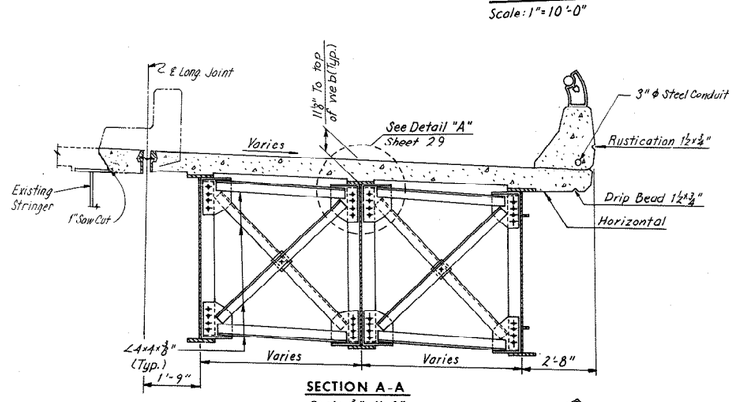
Scale: 1" = 10'-0"

Elevations given in the Elevation Table, may require adjustment in the field.

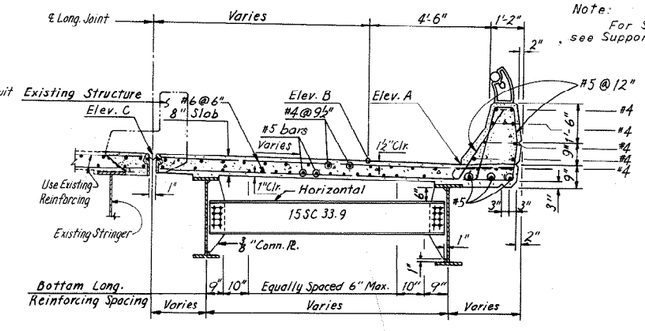
ELEVATION TABLE			
STATION ℄ Ramp N-W	ELEV. A	ELEV. B	ELEV. C
15+80	81.45	81.24	80.64
+73.68	81.24	-	-
+72.44	-	81.02	-
+72.65	-	-	80.39
+70	81.10	80.89	80.29
+60	80.74	80.55	79.95
+50	80.41	80.20	79.60
+40	80.05	79.84	79.24
+30	79.69	79.48	78.88
+20	79.32	79.11	78.51
+10	78.95	78.74	78.14
15+00	78.57	78.36	77.76
14+90	78.20	77.99	77.39
+80	77.82	77.61	77.01
+70	77.45	77.24	76.64
+60	77.08	76.87	76.27
+53.40	76.85	76.64	76.04
+50	76.72	76.51	75.91
+40	76.37	76.16	75.56
+30	76.02	75.81	75.21
+20	75.67	75.46	74.86
+10	75.31	75.10	74.50
14+00	74.96	74.75	74.15
13+90	74.61	74.40	73.80
+80	74.26	74.05	73.45
+70	73.91	73.70	73.10
+60	73.55	73.34	72.74
+50	73.20	72.99	72.39
+44.61	73.01	72.80	72.20
+40	72.85	72.64	72.04
+30	72.49	72.28	71.68
+20	72.13	71.92	71.32
+10	71.77	71.56	70.96
13+00	71.40	71.19	70.59
12+92.81	71.12	70.91	70.31

ELEVATION TABLE			
STATION ℄ Ramp W-N	ELEV. A	ELEV. B	ELEV. C
357+60	72.89	73.10	74.28
+65.50	72.69	72.90	73.65
+70	72.53	72.74	73.48
+80	72.17	72.38	73.09
+90	71.82	72.03	72.70
358+00	71.46	71.67	72.32
+10	71.10	71.31	71.94
+20	70.75	70.96	71.56
+30	70.39	70.60	71.19
+40	70.02	70.23	70.80
+50	69.65	69.86	70.41
+60	69.26	69.47	70.01
+70	68.86	69.07	69.60
+80	68.46	68.67	69.18
+90	68.05	68.27	68.78
+92	67.98	68.19	68.70
359+00	67.67	67.88	68.38
+02.00	67.60	67.81	68.31
+10	67.24	67.50	68.00
+20	66.93	67.14	67.63
+30	66.57	66.78	67.27
+40	66.20	66.41	66.91
+50	65.82	66.03	66.53
+60	65.44	65.65	66.14
+69.39	65.06	65.27	65.78
+70	65.04	65.25	65.75

Note:
For Sections E-E, F-F, G-G and H-H, see Sheet 47.
For Framing Plan, see Sheet 26.
For Joint Details, see Sheet 48 and 49.
Elevation C is to be confirmed by Contractor.
For Handrail Details, see Sheet 53.
For Typical Parapet Details, see Sheet 29.

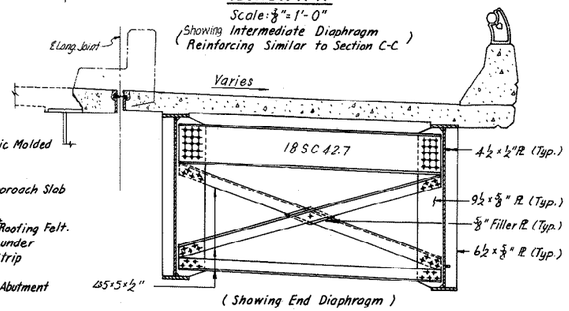


SECTION A-A
Scale: ⅜" = 1'-0"



(Showing Intermediate Diaphragm)

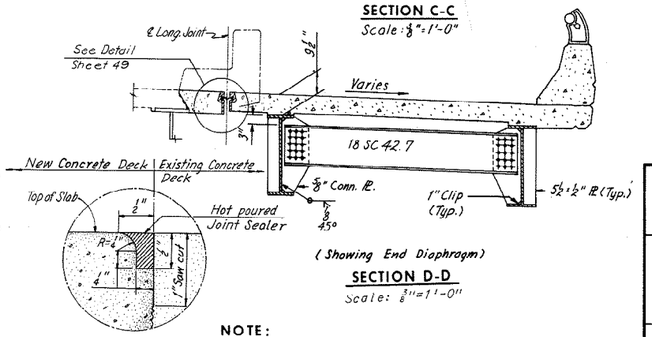
Note:
For Standard Drainage Details for Unit 11, see Support Type 3 Sheet 36,



(Showing End Diaphragm)

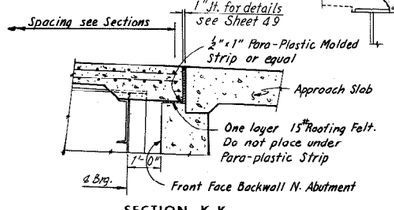
SECTION B-B
Scale: ⅜" = 1'-0"
(Showing Intermediate Diaphragm Reinforcing Similar to Section C-C)

SECTION C-C
Scale: ⅜" = 1'-0"



(Showing End Diaphragm)

SECTION D-D
Scale: ⅜" = 1'-0"



SECTION K-K
Scale 1" = 1'-0"

DETAIL C
Full Scale

NOTE:
For the proposed joint details between the existing and the new slab, see Detail C.

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	V.C.P. G.C.C.	2-27-69	3	As Built	TEM	6-77
CHECKED	K.C.T.	5-1-69	2	Note for Table of Elevations	DWB	1-28-75
IN CHARGE			1	Piers & Abutment Sta. Change	DWB	1-17-75

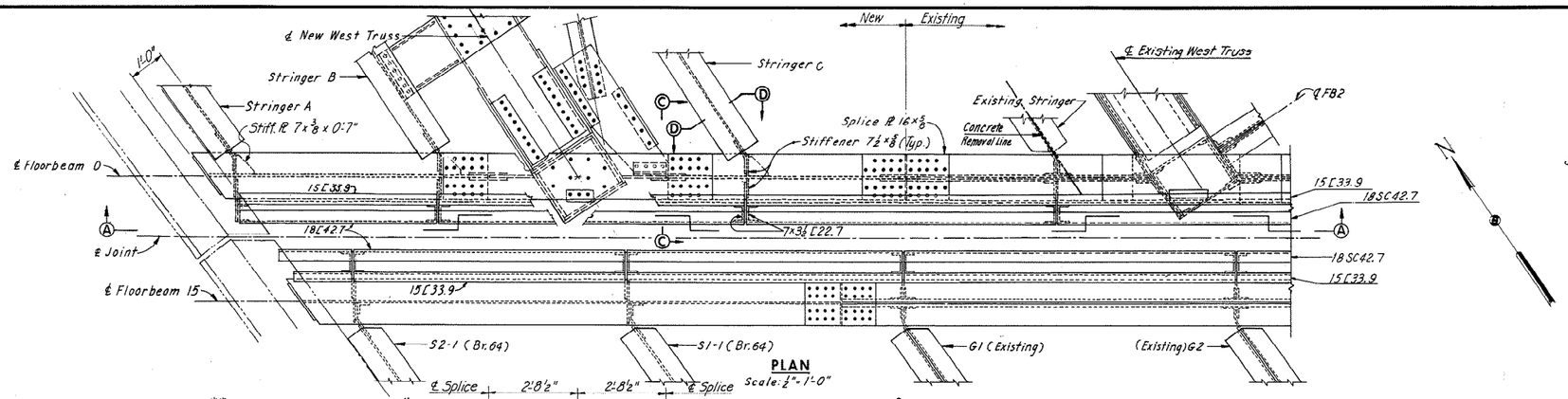
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
DECK PLAN-UNITS 11, 12, 13, 14 AND 15

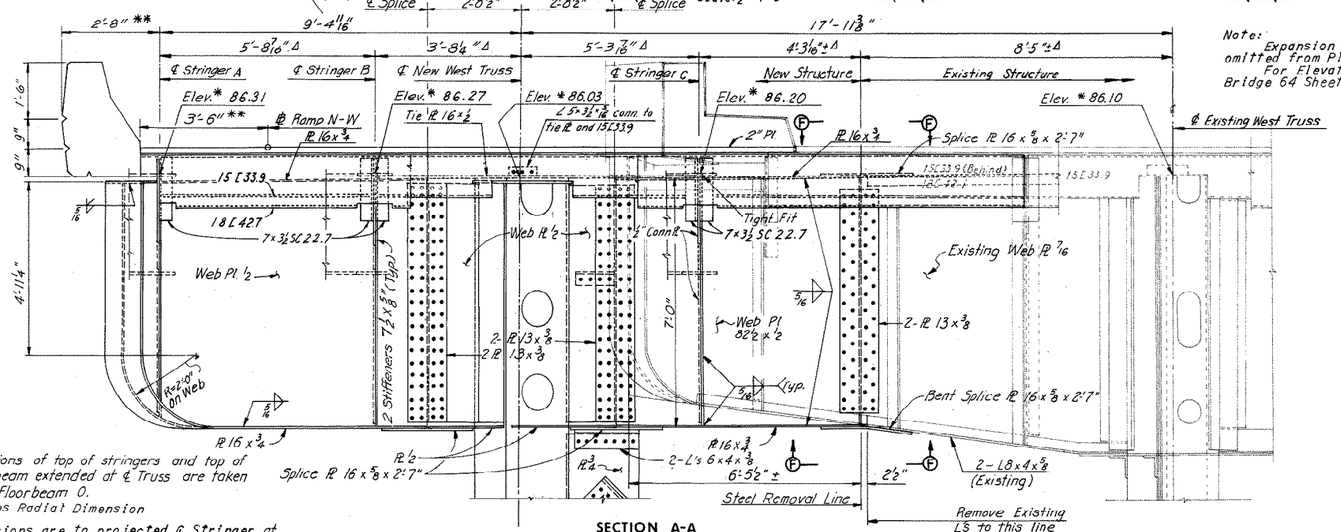
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 35 OF 54

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	214	265



PLAN
Scale: 1/2"-1'-0"



LEGEND:

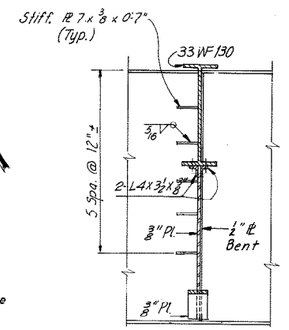
* Elevations of top of stringers and top of Floorbeam extended at ℄ Truss are taken at ℄ Floorbeam 0.

** Denotes Radial Dimension

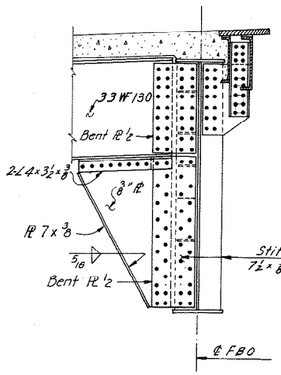
Δ Dimensions are to projected ℄ Stringer at ℄ Floorbeam. Connection - Stiffener Plate shall be located by the Fabricator.

SECTION A-A
ELEVATION-FLOORBEAM 0
Scale : 1/2" = 1'-0"

Note: Expansion plates and curb plates are omitted from Plan. For Elevation of Floorbeam 15, see Bridge 64 Sheet 18.



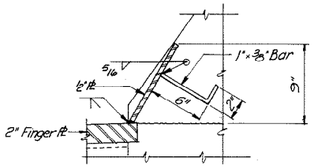
SECTION D-D
Scale: 1/2"=1'-0"



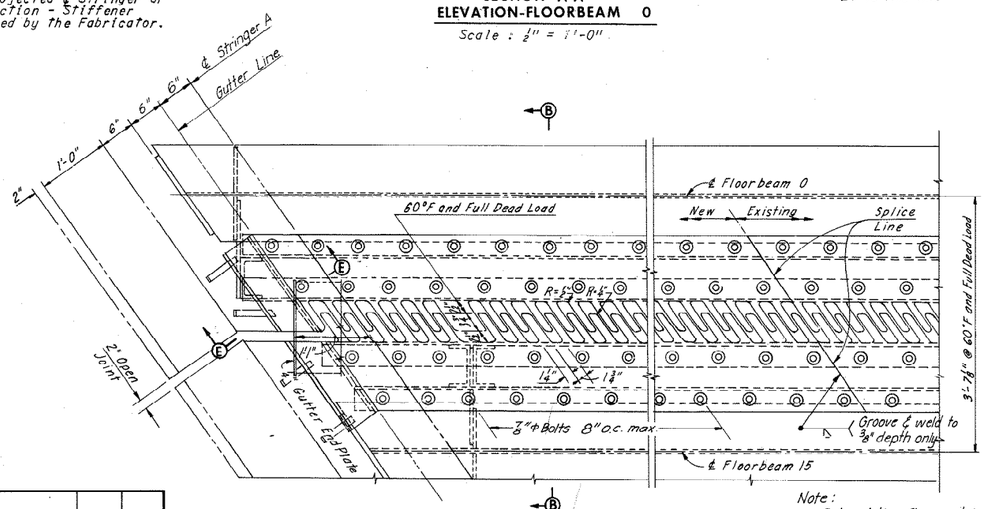
SECTION C-C
Scale: 1/2"=1'-0"

Note: Cut existing gutter on the west side of the existing stringer and set the new gutter into the existing gutter. Bolt the two together with existing bolts. Provide an 8" lap.

SECTION B-B
Scale: 1"=1'-0"

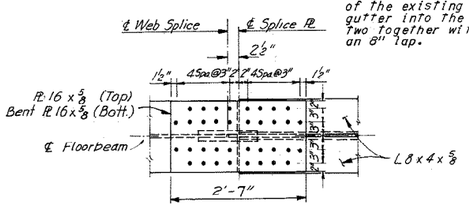


SECTION E-E
Scale : 1 1/2"=1'-0"



PART PLAN OF EXPANSION DEVICE
Scale: 1" = 1'-0"

Note: Cut existing finger plate as close to the existing gutter line as possible. New plate shall be provided long ℄ cut to exact length after existing plate is cut.



VIEW F-F
Scale : 3/4"=1'-0"
bottom Splice Similar

	BY	DATE
MADE	J.B.P. J.B.C.	1-75
CHECKED		
IN CHARGE		

NO.	REVISION	BY	DATE
2	As Built	TEM	6-77
1	New sheet added	J.B.P.	2-7-75

AS BUILT

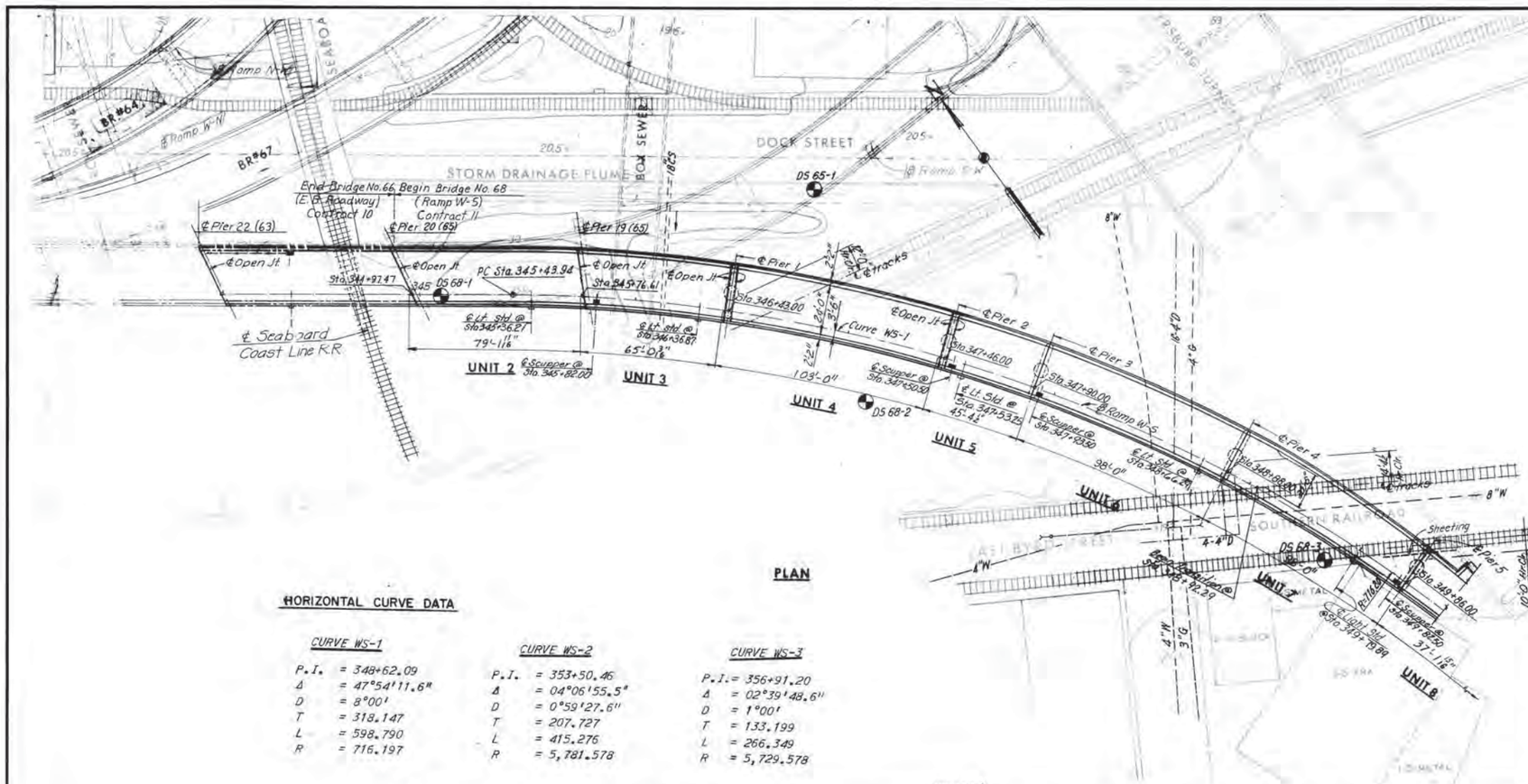
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
FLOORBEAM 0 AND JOINT DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 42 OF 54

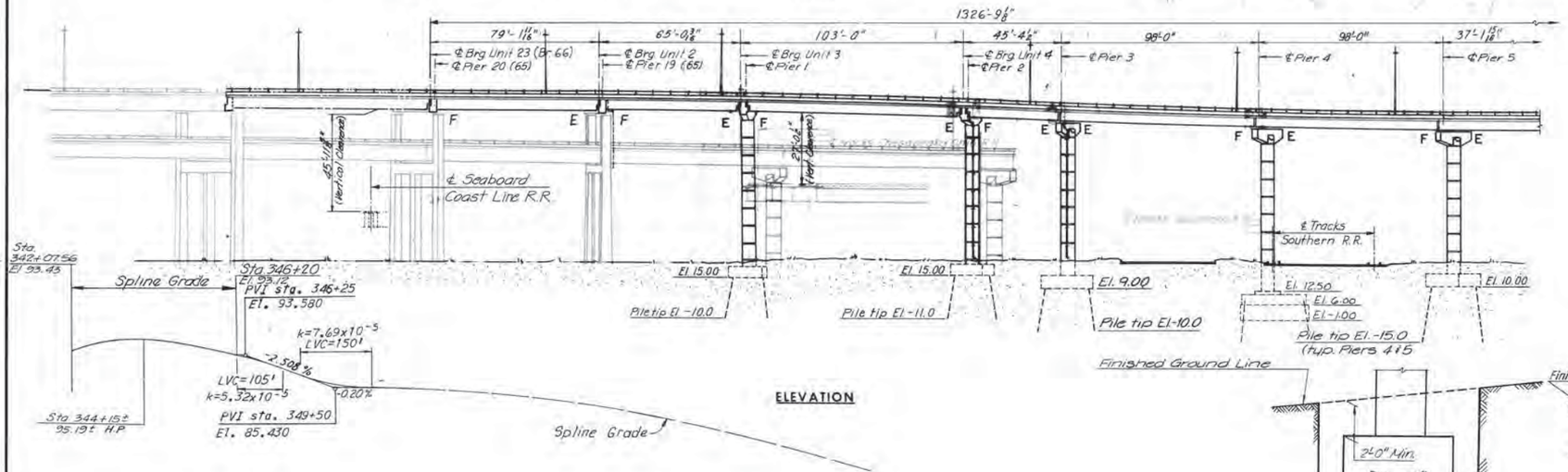
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	64	97



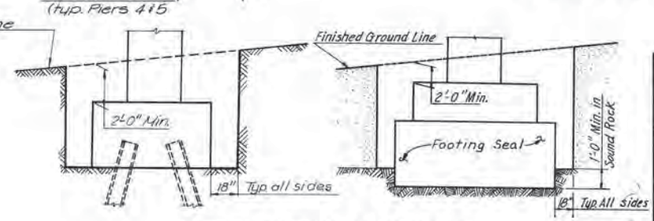
PLAN

HORIZONTAL CURVE DATA

CURVE WS-1		CURVE WS-2		CURVE WS-3	
P.I.	= 348+62.09	P.I.	= 353+50.45	P.I.	= 356+91.20
Δ	= 47°54'11.6"	Δ	= 04°06'55.5"	Δ	= 02°39'48.6"
D	= 8°00'	D	= 0°59'27.6"	D	= 1°00'
T	= 318.147	T	= 207.727	T	= 133.199
L	= 598.790	L	= 415.276	L	= 266.349
R	= 716.197	R	= 5,781.578	R	= 5,729.578



ELEVATION



LIMITS OF STRUCTURE EXCAVATION

No Scale

INDEX

GENERAL NOTES

ROADWAY: One 24'-0" clear roadway transitioning into a 13'-6" widening of existing Richmond-Petersburg Turnpike.

CAPACITY: Dead load includes 15lbs. per sq.ft. for future wearing surface. Live load HS 20-44 loading and alternate military loading.

SPECIFICATIONS:

- GENERAL: Virginia Department of Highway Road and Bridge Specifications 1970.
- DESIGN: A.A.S.H.O. Standard Specifications for Highway Bridges 1973, modified by Special Design provisions.
- WELDING: 1972 Structural Welding Code of the American Welding Society.

CONTRACT SPECIAL PROVISIONS
Specifications and Contract Special Provisions referred to above are necessary to make these plans complete.

DATUM: City of Richmond

TEMPERATURE: The normal temperature referred to in the plans is 60°F. The temperature range for movement is 0°F to 120°F.

DIMENSIONS: All dimensions are measured horizontally and vertically unless otherwise noted.

EXCAVATION: Excavation below subgrade and cut slope template shall be classified as Regular Excavation. All excavation above these limits shall be classifted as Regular Excavation and is not included in the Structural Quantities.

FOUNDATIONS: Footings shall rest on firm material. Foundation material shall be dry and special attention is called to Section 401.05 of General Specifications and to the Contract Special Provisions, concerning preparation of foundations for footings.

CONCRETE NOTES: Concrete in superstructure shall be Class A-4. All other concrete shall be Class A-3. All exposed edges and corners shall have a ¾" chamfer or fillet unless otherwise noted. Care in the method of vibration, the use of low-slump concrete, and or other means shall be employed to prevent downgrade movement of newly placed slab concrete. Finishing Concrete Surfaces: See Standard Architectural Detail Sheets and the Contract Special Provisions for types and details. All reinforcing steel shall be deformed bars conforming to ASTM A615 Grade 40. All reinforcing bar dimensions on the detailed drawings are to centers of bars unless otherwise noted. Clear distance between reinforcing steel and face of concrete shall be as noted on the plans. All bar laps shall be 30 diameters of the smaller diameter bar unless otherwise noted.

STEEL NOTES: Structural steel shall conform to A.S.T.M. Designations A36, A572-Grade 50 and A588 as noted. See Special Provisions. All field connections shall be made with high strength bolts. High strength bolts shall be ⅞" diameter unless otherwise noted and shall conform to A.S.T.M. Specification A-325.

	BY	DATE
MADE	J.V	4-2-69
CHECKED	G.S.H	7-18-69
IN CHARGE		

NO.	REVISION	BY	DATE
3	Rev. Profile Grade & Ramp W-S	SSS	12-75
2	Profile Grade W-S, Index	TEM	8-26-75
1	Seaboard Coast Line Added	TEM	6-74

△ PROFILE GRADE ℄ RAMP W-S

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

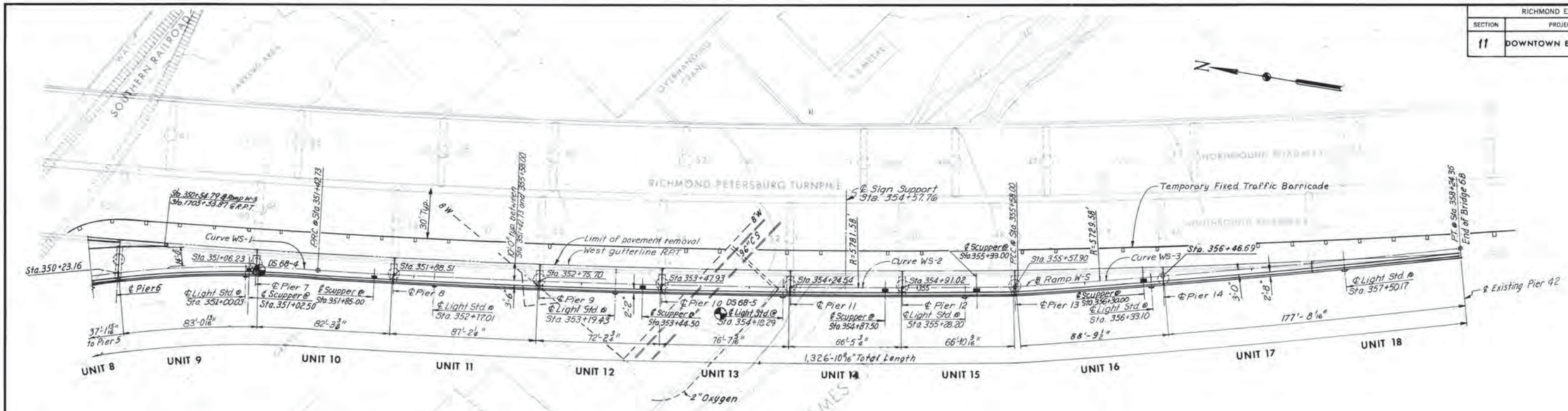
BRIDGE NO. 68
RAMP W-S CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

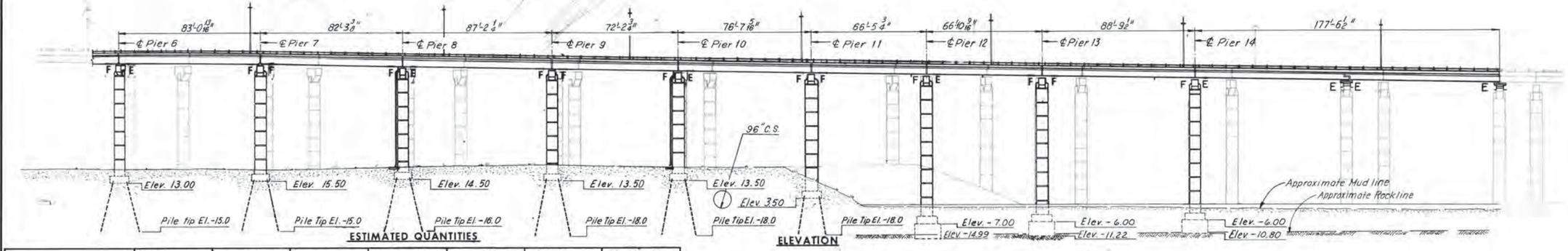
SCALE: 1"=30'
CONTRACT NO.: 11
SHEET NO. 1 OF 28

64

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	65	97



PLAN



ESTIMATED QUANTITIES

ELEVATION

	Structure Excavation Cu. Yds.	Concrete (†) Cu. Yds.	Reinforcing Steel Lbs.	Str. Steel Mild carbon Lbs.	Str. Steel High Strength Lbs.	Aluminum Railing (1-rail) Lin. Ft.	Steel Piles 10BP42 Lin. Ft.
Superstructure	----	888.7	215,200	600,400	255,600	1,849	-----
Substructure	1,415*	1,751.0	245,300	31,600	8,400	---	2,630
Total	1,415*	2,639.7	460,500	632,000	264,000	1,849	2,630

	Steel Piles 12BP53 Lin. Ft.	Tremie Concrete Class T3 Cu. Yds	Sheeting Pier 5 Lump Sum	Metal Conduit Lin. Ft	Bridge Drainage Metal work Lbs.	Modifications to R.P. Turnpike Bridge Lump Sum	Modifications to Existing Retaining Wall Cu. Yds.	Temporary Barricade Lin. Ft
Superstructure	---	---		1310	11,450	1	50	
Substructure	1,412	173.3	1	---	---	-	-	
Total	1,412	173.3	1	1,310	11,450	1	50	990

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.V.	6-3-69				
CHECKED	G.S.H.	7-16-69	1	At Pier 44 & 42 Struc. Steel Quan.	T.E.M.	8-26-75
IN CHARGE						

* Including 365 Cu. Yds. of " Underwater " Excavation for Piers 12, 13 and 14.

† All concrete for Superstructure shall be Class A4 and for Substructure Class A3. Concrete for Footing Seals shall be Tremie Concrete, Class T3 and is listed separately.

AS BUILT

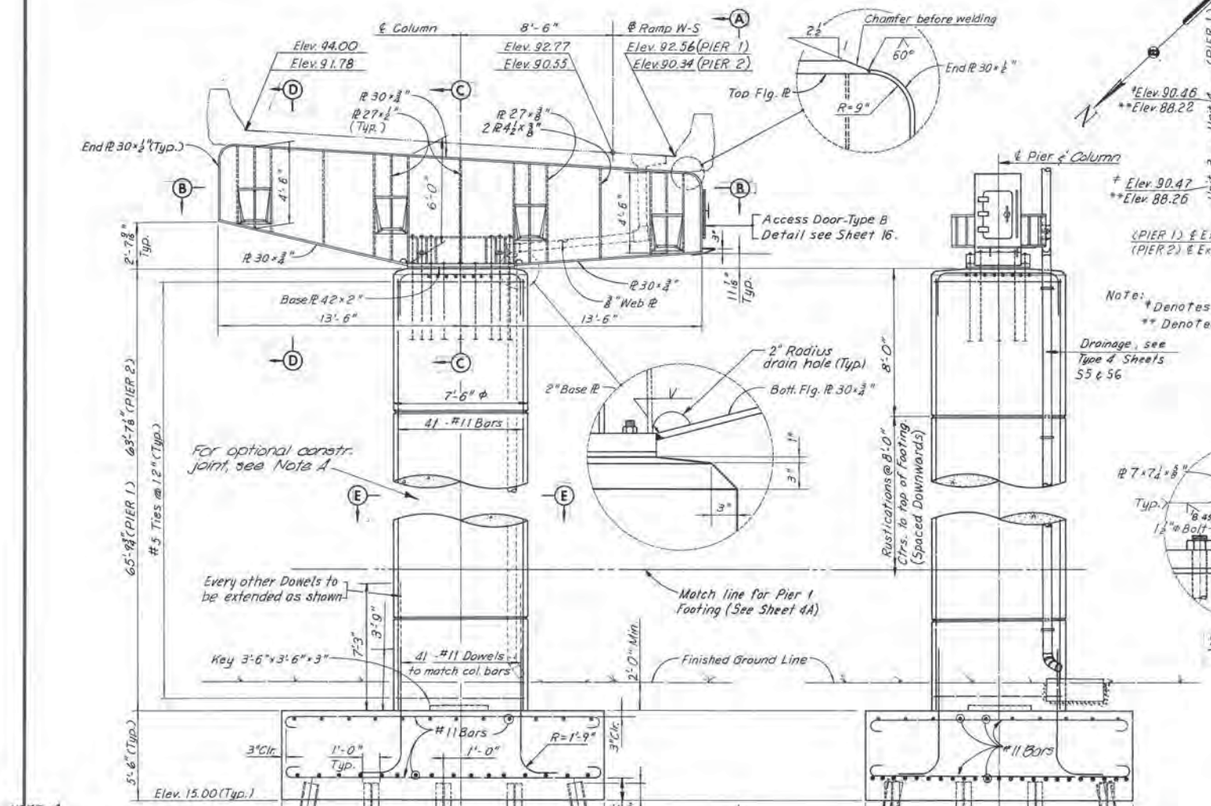
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 68
RAMP W-S CONNECTION TO
RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=30'
CONTRACT NO. 11
SHEET NO. 2 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	67	97

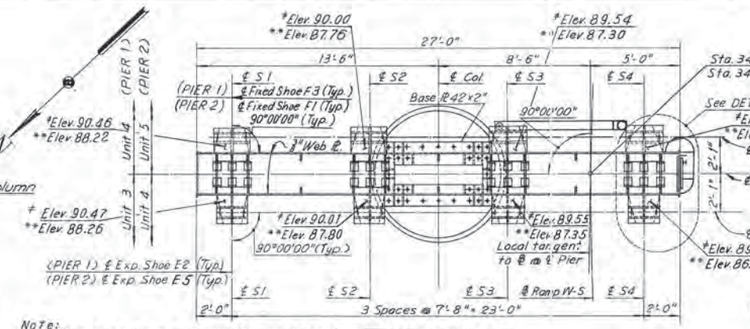


ELEVATION
Scale: ¼" = 1'-0"

VIEW A-A
Scale: ¼" = 1'-0"

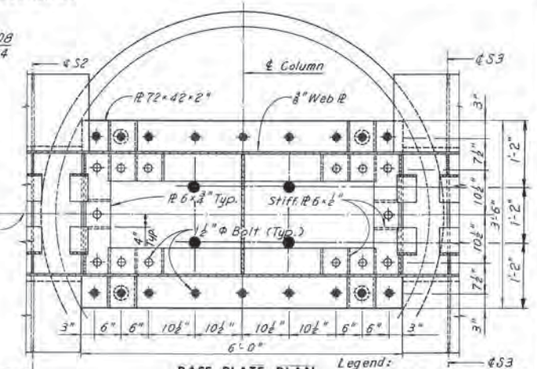
NOTE A
A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap of the splice shall be a minimum of 3'-6". Splices shall be staggered at least 3'-3" between adjacent bars.

Footing Note:
Footing Details shown on this sheet are for Pier 2 Only. For Pier 1 see Sheet 4A.



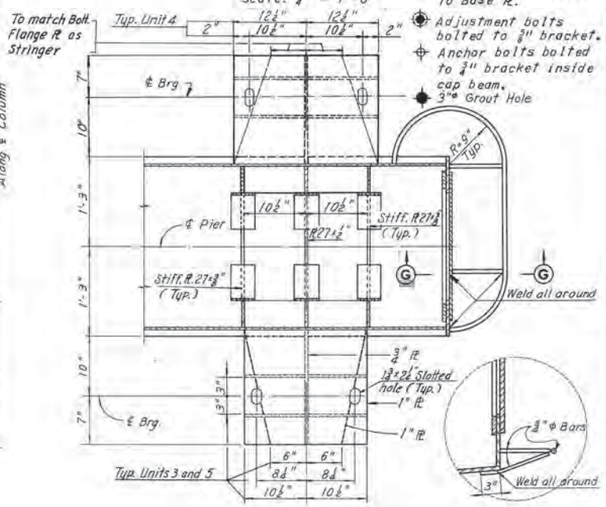
Note:
*Denotes Base ℄ Elevation on Pier 1.
**Denotes Base ℄ Elevation on Pier 2.

SECTION B-B
Scale: ¼" = 1'-0"



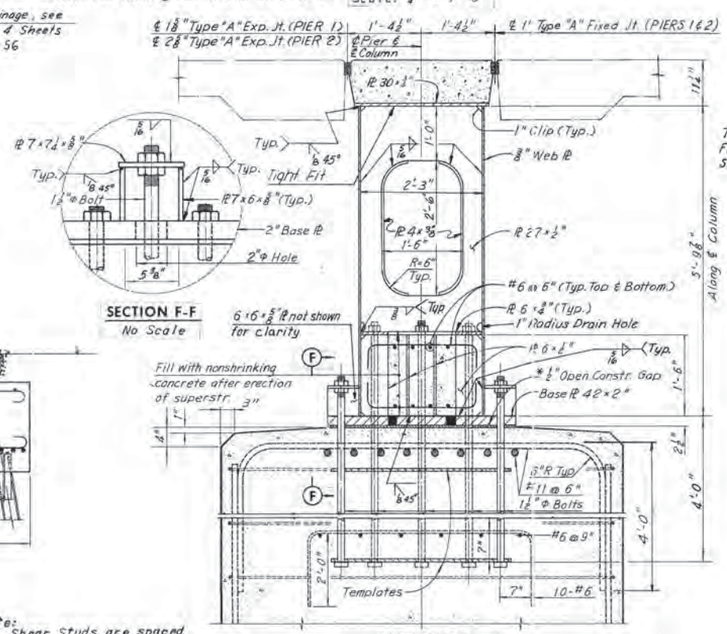
BASE PLATE PLAN
Scale: ¾" = 1'-0"

Legend:
- Anchor bolts bolted to Base PL.
- Adjustment bolts bolted to ⅜" bracket.
- Anchor bolts bolted to ¾" bracket inside cap beam.
- 3"Φ Grout Hole



DETAIL A
Scale: 1" = 1'-0"

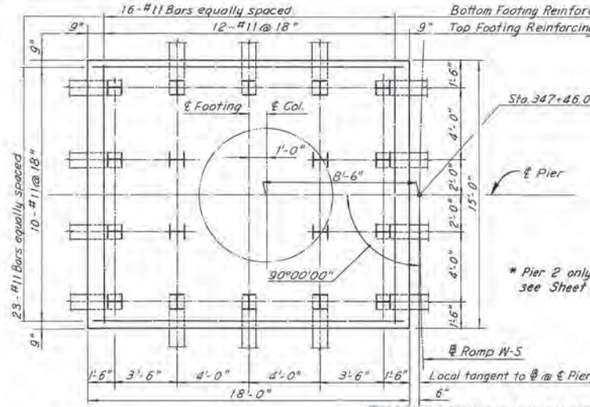
SECTION G-G



SECTION F-F
No Scale

SECTION C-C
Scale: ¾" = 1'-0"

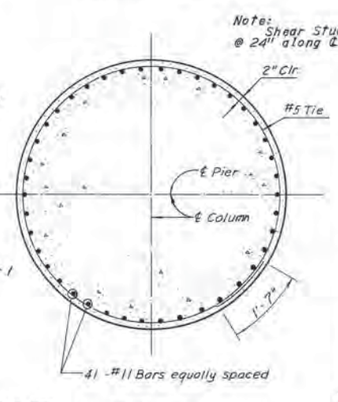
Note: * Fill with nonshrinking Grout after Capbeam is in final position.



FOOTING PLAN *
Scale: ¼" = 1'-0"

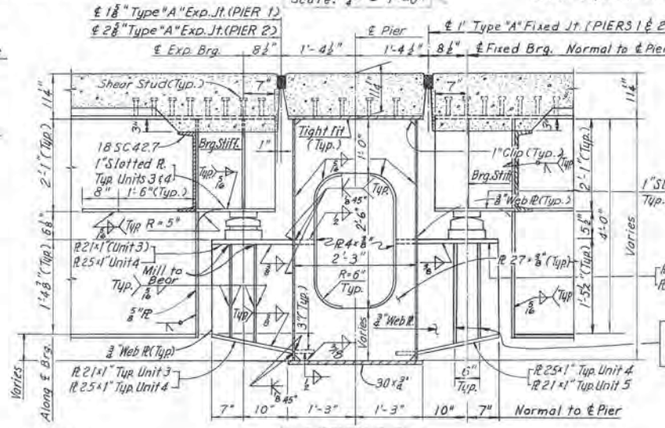
FOOTINGS FOR PIERS 1 AND 2 ARE ECCENTRIC AS SHOWN ON FOOTING PLAN

* Pier 2 only. For Pier 1 see Sheet 4A.



SECTION E-E
Scale: ¼" = 1'-0"

Note:
Shear Studs are spaced @ 24" along ℄ Cap beam.



SECTION D-D
Scale: ¾" = 1'-0"

Note:
All holes in base PL and bracket PL's for 1½" dia. anchor bolts shall be 2" in dia.

Notes:
For Framing Plan, see Sheet 13.
For Joint Details, see Sheet 25.
For Shear Stud Details, see Sheet 12.
For Shoe Details, see Sheets S1 and S2.
For Bearing pile Details, see Sheet 9.
Estimated pile tip elevation -10.00 for Pier 1 and -11.00 for Pier 2.

Note:
All anchor bolts connecting cap beam to column shall be 1½" dia., and each nut shall have washer (not shown on details).

For Rustication Detail, see Sheet 5.

Note: Batter piles 3" per ft. as shown. All piles are 12 BP53 steel piles (Design Capacity = 57 Tons)

Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcement shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.

Note:
All Structural Steel for Piers 1 and 2 shall be A36. Steel Cap Beams need not be cambered.

	BY	DATE
MADE	MHH	1-17-69
CHECKED	JD	2-13-69
IN CHARGE		

NO.	REVISION	BY	DATE
2	℄ Deleted and Dim added Sect D-D	TEM	8-76
1	Footing Details Pier 1 Deleted	MSD	3-13-75

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 68
RAMP W-S CONNECTION TO RICHMOND-PETERSBURG TURNPIKE

PIERS 1 AND 2

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 11
SHEET NO. 4 OF 28

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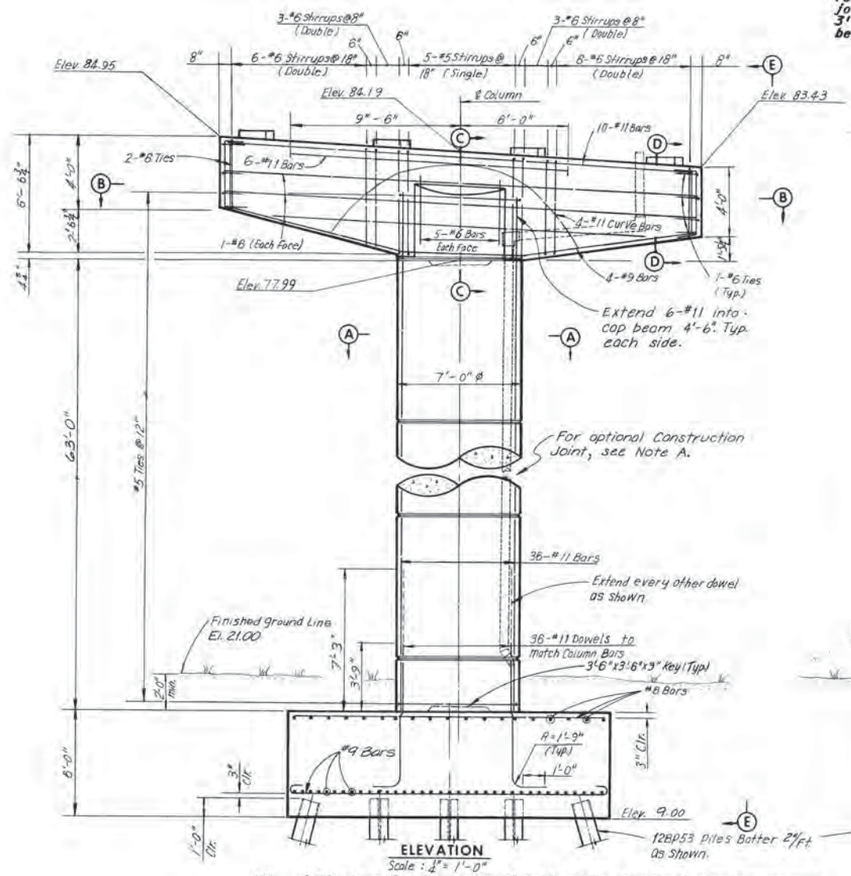
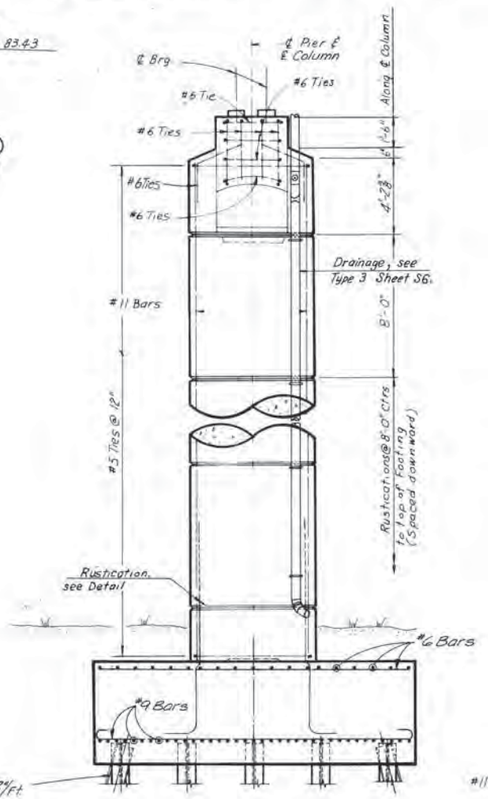
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	68	97

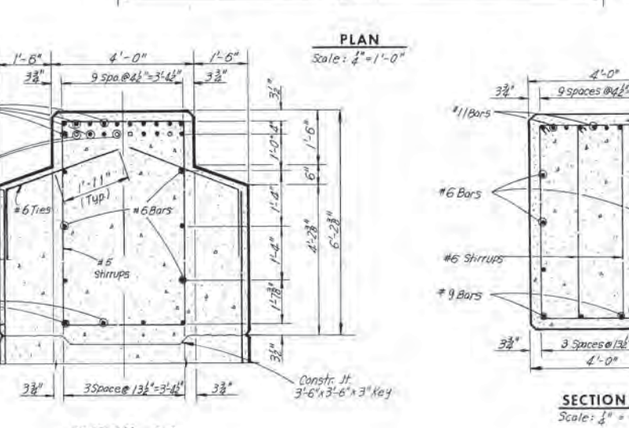
NOTE: A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap of the splice shall be a minimum of 3'-6". Splices shall be staggered at least 3'-3" between adjacent bars.



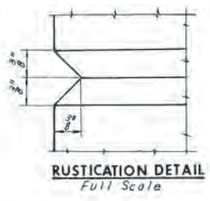
ELEVATION
Scale: 1/4" = 1'-0"



VIEW E-E
Scale: 1/4" = 1'-0"

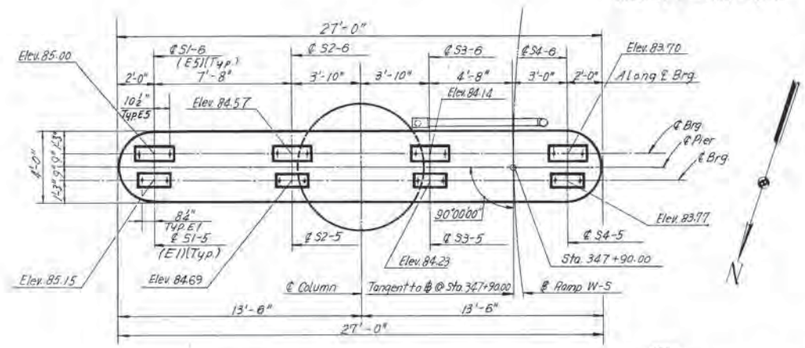


SECTION B-B
Scale: 1/4" = 1'-0"



RUSTICATION DETAIL
Full Scale

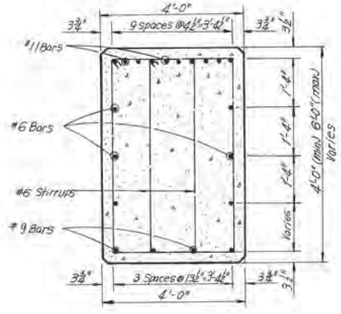
Note:
Typical dimensions of concrete pad for E1 shoe is 2'-0½"x1'-0" and for E5 shoe is 2'-5½"x1'-1½".



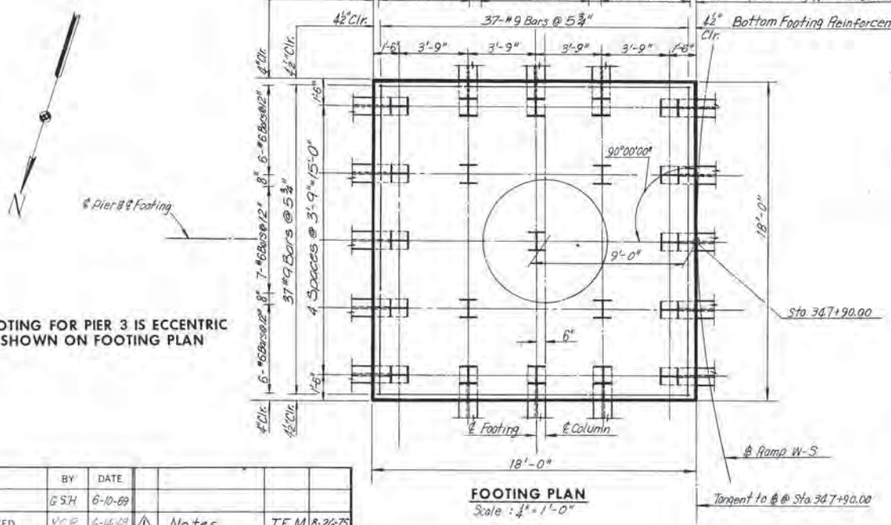
PLAN
Scale: 1/4" = 1'-0"

Note:
All elevations are @ top of Concrete Pad.

SECTION C-C
Scale: 1/4" = 1'-0"

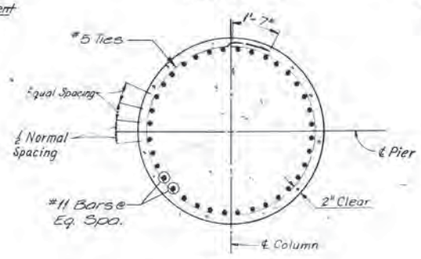


SECTION D-D
Scale: 1/4" = 1'-0"

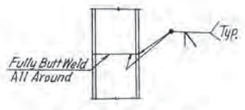


FOOTING PLAN
Scale: 1/4" = 1'-0"

FOOTING FOR PIER 3 IS ECCENTRIC AS SHOWN ON FOOTING PLAN



SECTION A-A
Scale: 1/4" = 1'-0"



PILE SPLICE DETAIL
No Scale

Note:
Footing Elevations are approximate only and maybe varied to suit field conditons as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2ft., redesign will be required.

Notes:
All piles shall be 12BP53 Steel Piles (design capacity =57tons)

For Standard Shoe Detail, see sheets S1 and S2.
For Framing Plan, see Sheet 13.
For Quantities of concrete and Steel see Sheet 2.
Estimated pile tip elevation is -10.0.

	BY	DATE				
MADE	GSH	6-10-69				
CHECKED	VCP	6-14-69	1	Notes	T.E.M	8-26-75
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

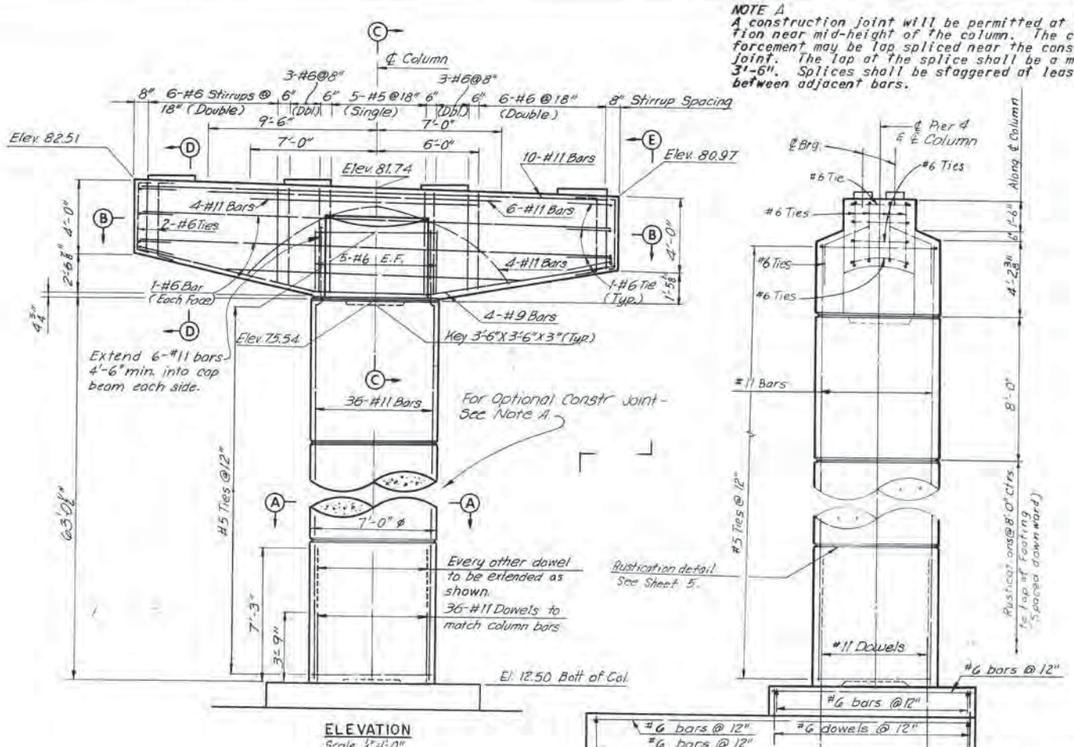
BRIDGE NO. 68
RAMP W-S CONNECTION TO
RICHMOND-PETERSBURG TURNPIKE
PIER 3

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

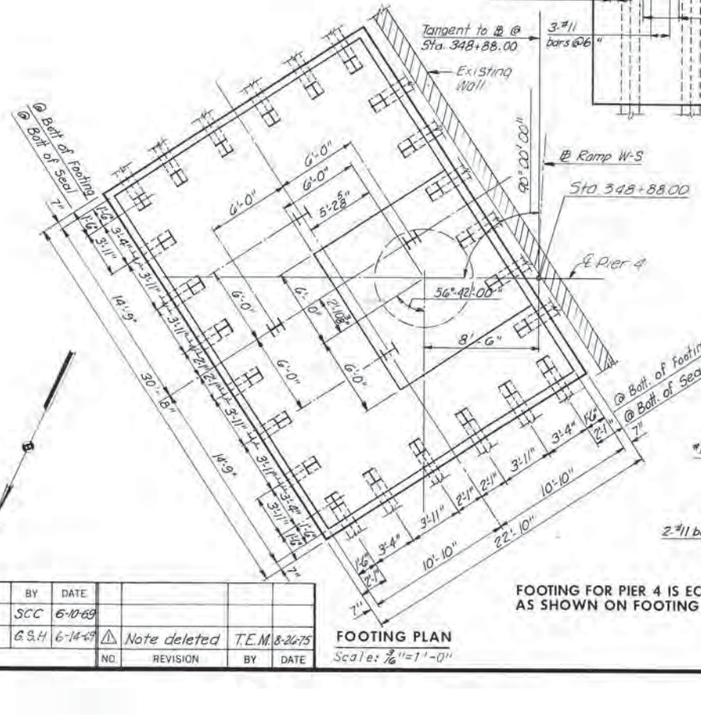
SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 5 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	69	97

NOTE A
A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap at the splice shall be a minimum of 3'-6". Splices shall be staggered at least 3'-3" between adjacent bars.

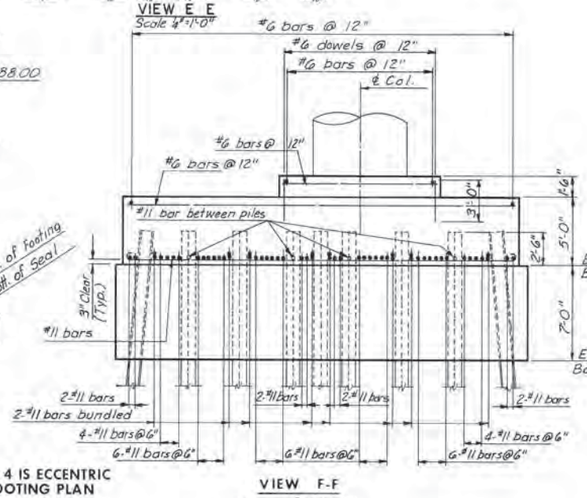


ELEVATION
Scale ¼"=1'-0"

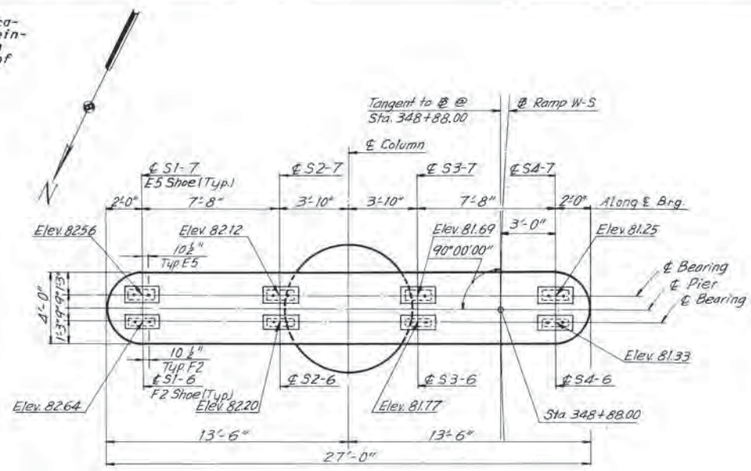


FOOTING PLAN
Scale: ⅜"=1'-0"

FOOTING FOR PIER 4 IS ECCENTRIC AS SHOWN ON FOOTING PLAN



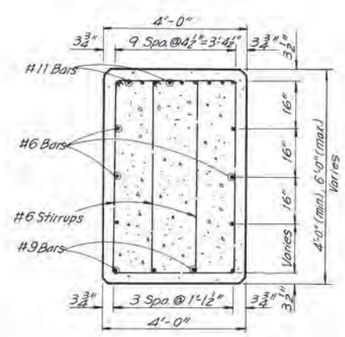
VIEW F-F
Scale: ⅜"=1'-0"



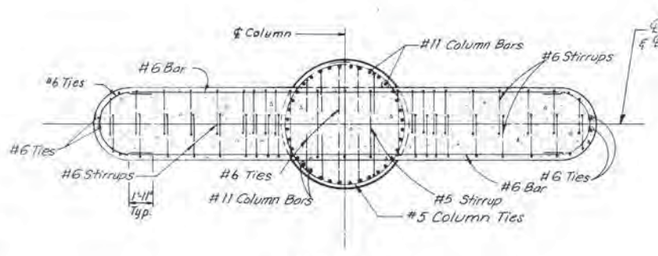
PLAN
Scale: ¼"=1'-0"

Note:
Typical dimensions of concrete pad for E5 shoe is 7'-5"x11'-1½" and for F2 shoe is 7'-6"x11".

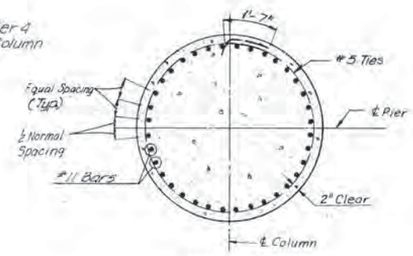
Note:
All elevations are @ top of Concrete Pad at ℄ Bearing.



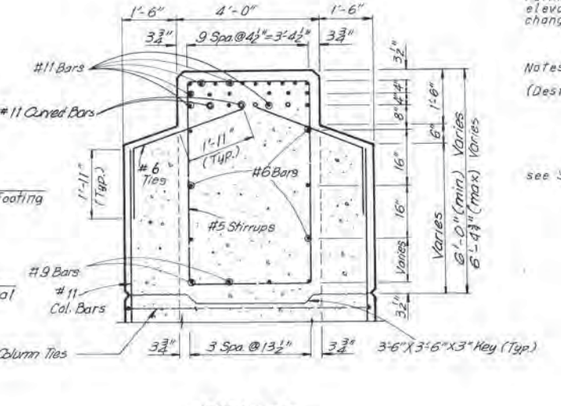
SECTION D-D
Scale: ½"=1'-0"



SECTION B-B
Scale: ¼"= 1'-0"



SECTION A-A
Scale: ¼"=1'-0"



SECTION C-C
Scale: ¼"=1'-0"

Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.

Notes:
All piles shall be 12BP53 steel piles (Design Capacity = 57 Tons)
Batter piles 1 per foot where shown.
For Standard Shoe Detail, see Sheets S1 and S2.
For Framing Plan, see Sheets 13 and 14.
For Rustication Detail, see, Sheet 5.
For 12BP53 Steel Pile Details, see Sheet 5.
For Quantities of concrete and steel, see Sheet 2.
Estimated pile tip Elevation is - 15.0.

AS BUILT

	BY	DATE				
MADE	SCC	6-10-69				
CHECKED	G.S.H	6-14-69	1	Note deleted	T.E.M.	8-26-75
IN CHARGE			NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

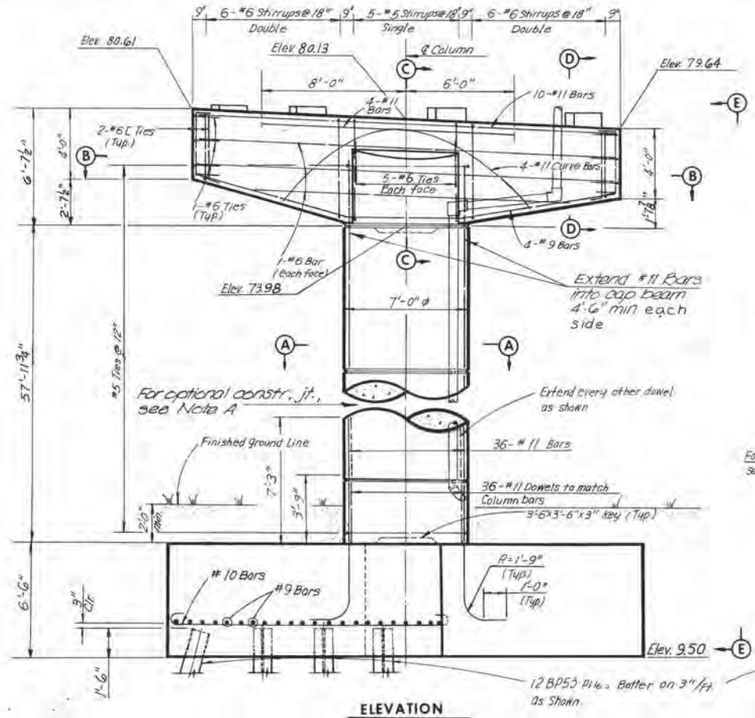
BRIDGE NO. 68
RAMP W-S CONNECTION TO
RICHMOND-PETERSBURG TURNPIKE
PIER 4

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

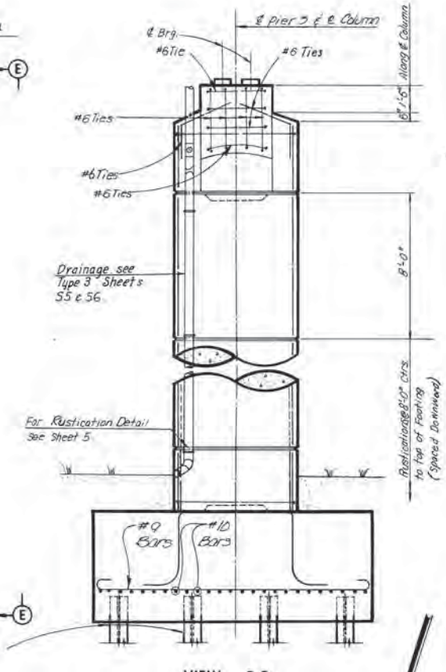
SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 6 OF 28

69

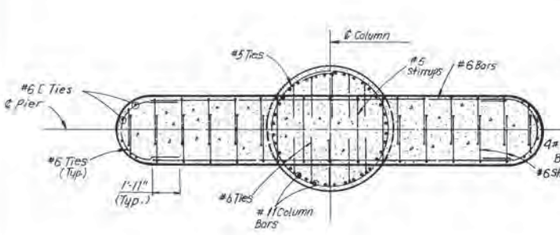
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	70	97



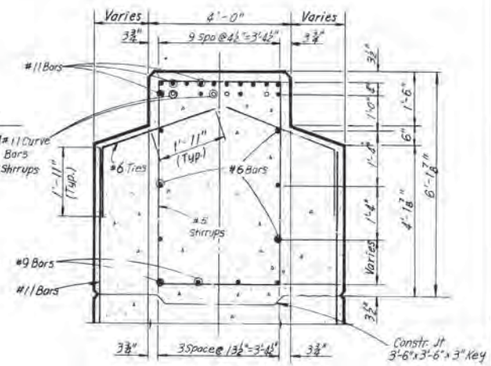
ELEVATION
Scale : 1" = 1'-0"



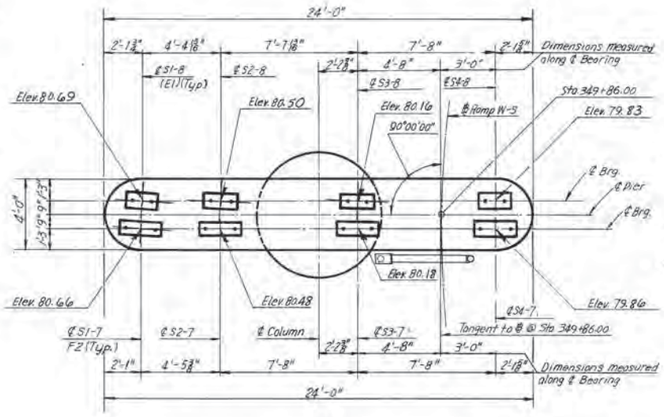
VIEW E-E
Scale : 1" = 1'-0"



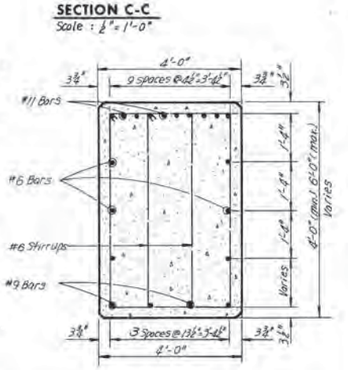
SECTION B-B
Scale : 1" = 1'-0"



SECTION C-C
Scale : 1" = 1'-0"

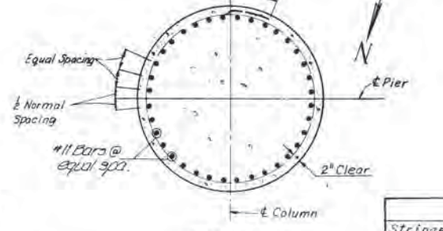


PLAN
Scale : 1" = 1'-0"

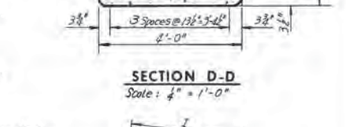


SECTION D-D
Scale : 1" = 1'-0"

Note: All elevations are @ top of Concrete Pad.

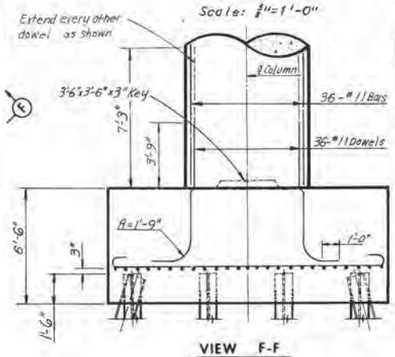


SECTION A-A
Scale : 1" = 1'-0"



PAD AND ANCHOR BOLT SETTING PLAN
No Scale

FOOTING PLAN
Scale : 1" = 1'-0"



VIEW F-F
Scale : 1" = 1'-0"

NOTE A
A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap at the splice shall be a minimum of 3'-6". Splices shall be staggered at least 3'-3" between adjacent bars.

DIMENSIONS FOR PAD AND ANCHOR BOLT SETTING PLAN

Stringers	α	β	A	B	C	D	E	F	G	H	I	J	K
S1-7	—	87°45'23"	5/8"	10½"	8/8"	15⅝"	14⅝"	6⅛"	4⅜"	11"	2'-6"	10½"	2½"
S2-7	—	90°00'00"	0"	10½"	0"	15 "	15 "	5½"	5½"	11"	2'-6"	10½"	2½"
S3-7	—	90°00'00"	0"	10½"	0"	15"	15"	5½"	5½"	11"	2'-6"	10½"	2½"
S4-7	—	90°00'00"	0"	10½"	0"	15"	15"	5½"	5½"	11"	2'-6"	10½"	2½"
S1-8	93°50'24"	—	5/8"	8¼"	5/8"	12⅝"	11⅞"	6⅛"	5⅜"	1'-0"	2'-0½"	8¼"	2"
S2-8	92°38'34"	—	5/8"	8¼"	5/8"	12¼"	12"	6½"	5½"	1'-0"	2'-0½"	8¼"	2"
S3-8	91°27'44"	—	¼"	8¼"	3/8"	12⅜"	12⅛"	6⅜"	5⅛"	1'-0"	2'-0½"	8¼"	2"
S4-8	91°27'44"	—	¼"	8¼"	3/8"	12⅜"	12⅛"	6⅜"	5⅛"	1'-0"	2'-0½"	8¼"	2"

Note:
Footing Elevations are approximate only and maybe varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.

Notes:
All piles shall be 12BP53 steel piles(Design Capacity = 57 tons).
Batter all piles 3" per foot where shown.
For Standard Shoe Detail, see Sheets S1 and S2.
For Framing Plan, see Sheet 14.
For Rustication Detail, see Sheet 5.
For 12BP53 Steel Pile Detail, see Sheet 5.
For Quantities of concrete and steel, see Sheet 2.
Estimated Pile tip elevations are -15.0

	BY	DATE				
MADE	GSH	6-10-69				
CHECKED	SCC	6-17-69	1	Pad Elevations	TEM	8-26-75
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 68
RAMP W-S CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
PIER 5

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 11
SHEET NO. 7 OF 28

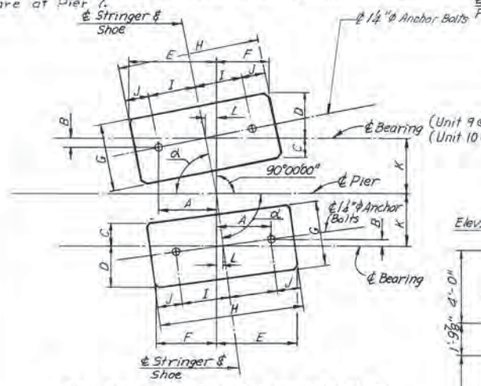
70

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	71	97

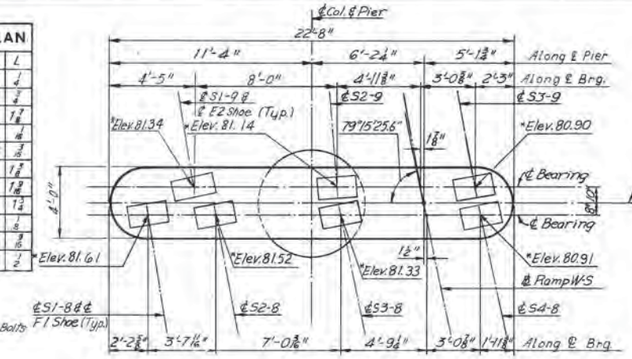
DIMENSIONS FOR PAD AND ANCHOR BOLT SETTING PLAN

Stringer	α	A	B	C	D	E	F	G	H	I	J	K	L
*S1-9	88°31'17"	8 1/2	7 7/8	6 7/8		13 3/4	12 15/16	15	2'-2 1/2"	8 1/4	5	10	1/4
*S2-9	85°33'46"	9 1/8	6 1/2	8 1/2		13 1/4	13 1/8	15	2'-2 1/2"	8 1/4	5	10	3/8
*S3-9	79°16'37"	10 1/8	4 7/8	9 1/8		16 1/4	9 3/4	15	2'-2 1/2"	8 1/4	5	10	1 7/8
S1-10	89°35'33"	8 1/4	5 5/8	5 5/8		12 5/8	12 3/8	11 1/4	2'-1"	8	4 1/2	9	1/16
S2-10	88°51'44"	8 3/8	5 1/2	6		12 7/8	12 3/8	11 1/4	2'-1"	8	4 1/2	9	3/16
S1-8	80°07'28"	9 1/4	3 3/4	8 3/8		15 3/4	10 3/8	13 1/4	2'-3"	8	5 1/2	8	1 3/8
S2-8	78°55'37"	9 1/4	4	9 1/8		16 1/4	10 3/8	13 1/2	2'-3"	8	5 1/2	8	1 5/8
S3, 4-8	77°44'47"	9 1/4	4 3/8	9 3/8		16 1/4	10 3/8	13 1/2	2'-3"	8	5 1/2	8	1 3/4
** S1-9	89°20'16"	8 1/4	5	5 3/8		12 5/8	12 3/8	11 1/2	2'-1"	8	4 1/2	9	1/8
** S2-9	86°22'45"	8 3/8	4 5/8	6 1/2		13 3/8	11 1/2	11 1/2	2'-1"	8	4 1/2	9	3/16
** S3-9	86°38'50"	8 3/8	5	6 1/2		13 3/8	11 3/8	11 3/8	2'-1"	8	4 1/2	9	1/2

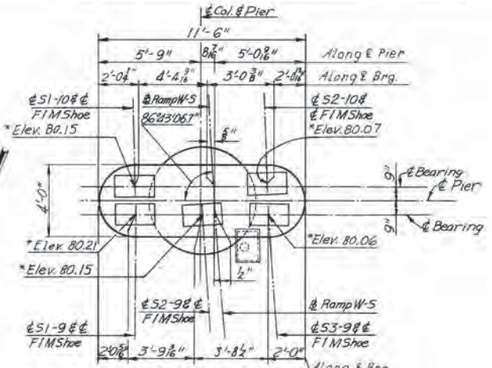
NOTE: Dimensions are in inches unless shown otherwise. Stringers denoted with * are at Pier 6 and with ** are at Pier 7.



PAD AND ANCHOR BOLT SETTING PLAN
No Scale

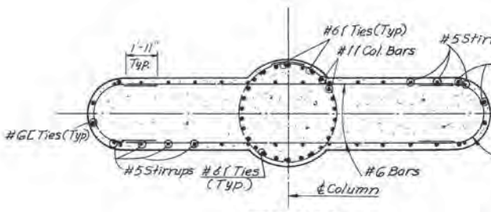


PLAN–PIER 6
Scale: 1/4" = 1'-0"

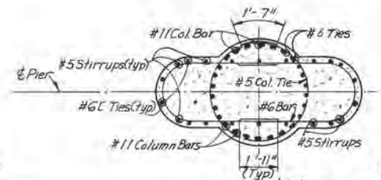


PLAN–PIER 7
Scale: 1/4" = 1'-0"

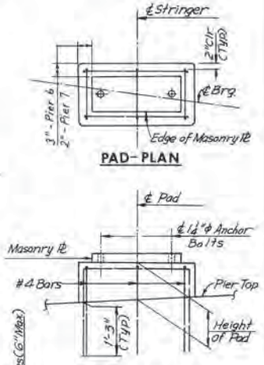
NOTE A
A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap at the splice shall be a minimum of 3'-6". Splices shall be staggered at least 3'-3" between adjacent bars.



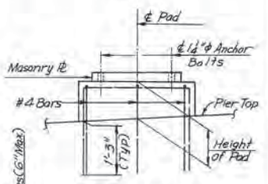
SECTION F-F
Scale: 1" = 1'-0"



SECTION E-E
Scale: 1" = 1'-0"

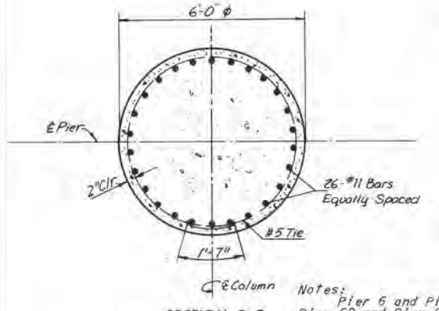


PAD–PLAN

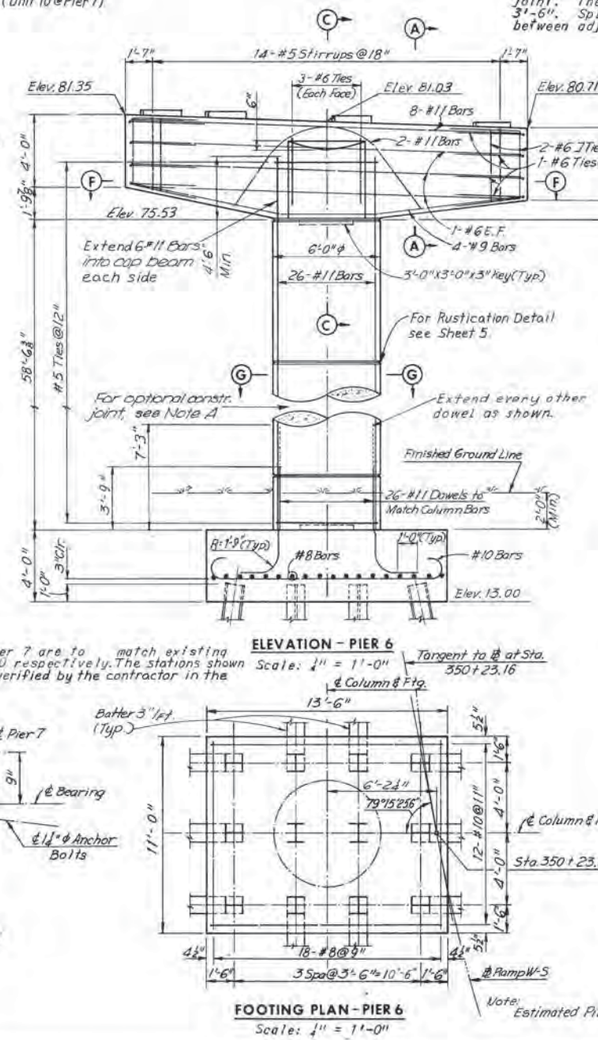


PAD–ELEVATION
No Scale

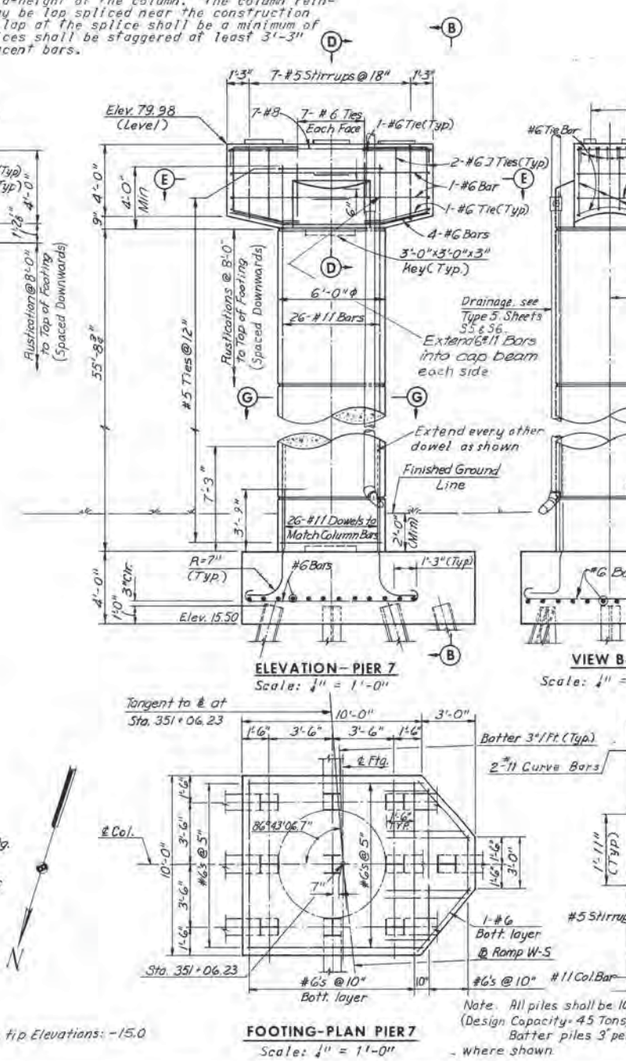
Notes:
Pads with heights of 4" or less shall not be reinforced. Pads with heights between 4" and 8" use #4 bars.
For Standard Shoe Details see Sheets S1 & S2.
For Framing Plans, see Sheets 14 & 15.
For Quantities of Concrete & Steel, see Sheet 2.



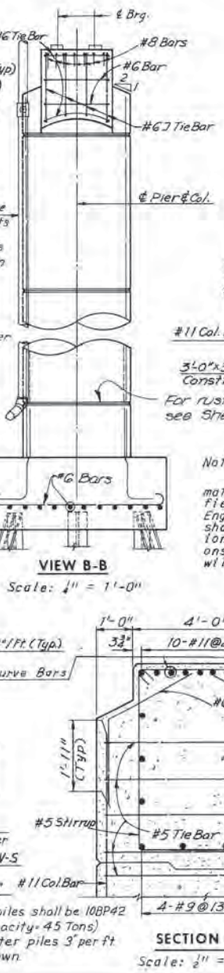
SECTION G-G
No Scale



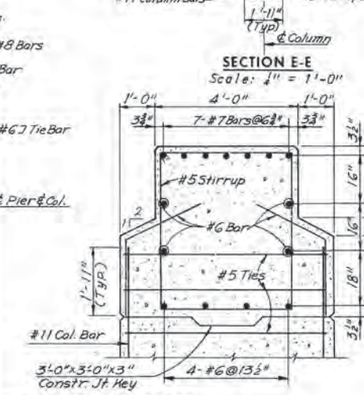
ELEVATION – PIER 6
Scale: 1/4" = 1'-0"



ELEVATION – PIER 7
Scale: 1/4" = 1'-0"

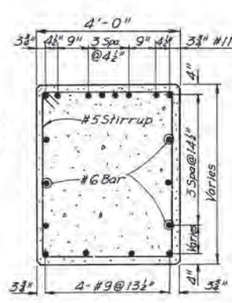


VIEW B-B
Scale: 1/4" = 1'-0"

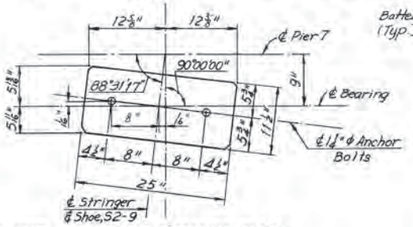


SECTION D-D
Scale: 1/4" = 1'-0"

Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft. redesign will be required.

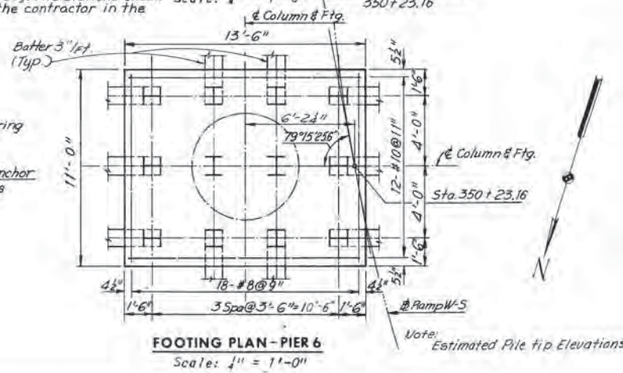


SECTION A-A
Scale: 1/4" = 1'-0"

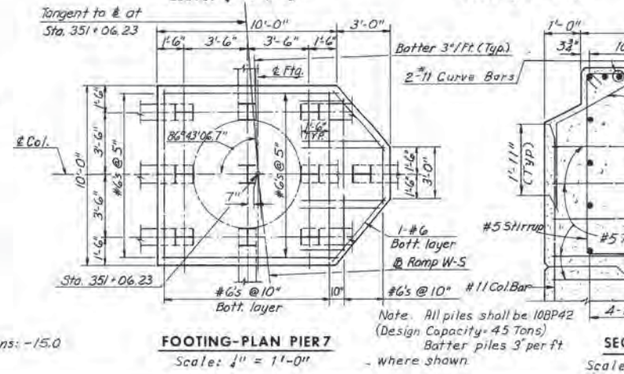


PAD AND ANCHOR BOLT SETTING PLAN
No Scale (S2-9 Only)

Notes:
Pier 6 and Pier 7 are to match existing Pier 62 and Pier 60 respectively. The stations shown on the plans shall be verified by the contractor in the field.



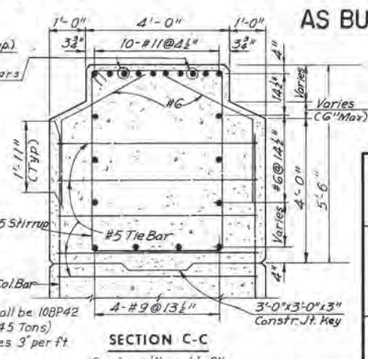
FOOTING PLAN – PIER 6
Scale: 1/4" = 1'-0"



FOOTING-PLAN PIER 7
Scale: 1/4" = 1'-0"

Note: All piles shall be 10BP42 (Design Capacity = 45 Tons) Batter piles 3" per ft where shown.

AS BUILT



SECTION C-C
Scale: 1/2" = 1'-0"

	BY	DATE
MADE	AHH	01-27-69
CHECKED	YCP	2-5-69
IN CHARGE		

NO.	REVISION	BY	DATE
2	Footing Dowel Pier 7 Pad Elevations	TEM	8-26-75
1		TEM	8-26-75

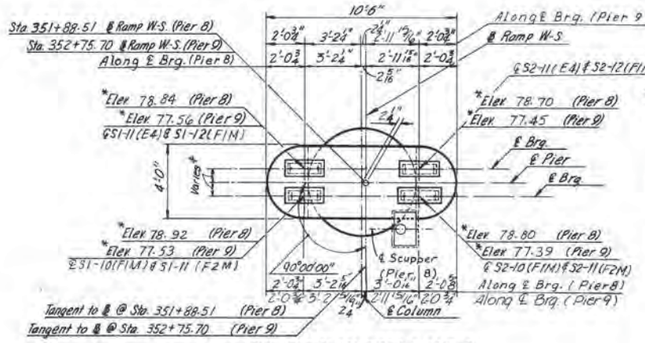
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 68
RAMP W-S CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
PIERS 6 AND 7

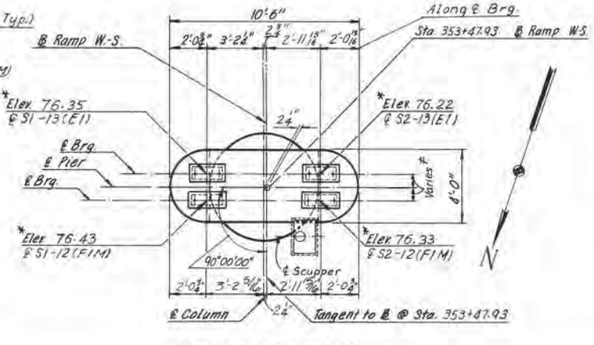
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 8 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	72	97



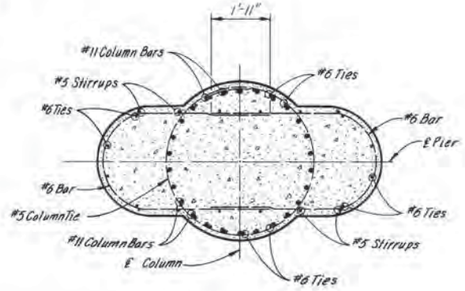
PIER CAP PLAN-PIERS 8 AND 9
Scale: $\frac{1}{4}$"= 1'-0"



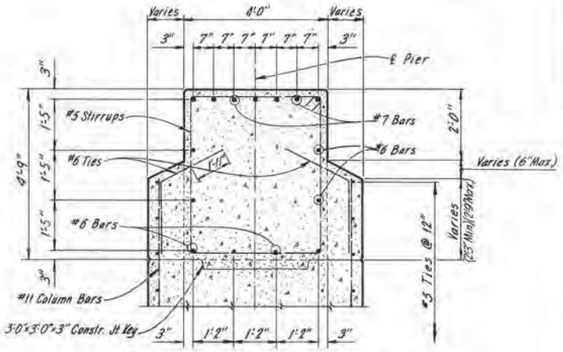
PIER CAP PLAN-PIER 10
Scale: $\frac{1}{4}$"= 1'-0"

* Denotes top elevations of pad.

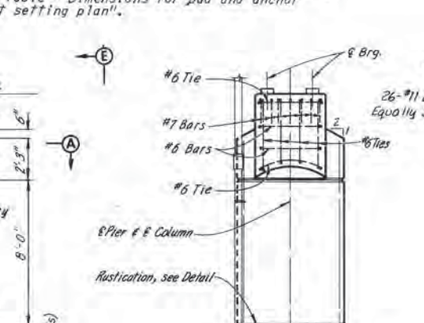
℄ The distances from ℄ Brg. to ℄ Pier are shown on the Table " Dimensions for pad and anchor bolt setting plan".



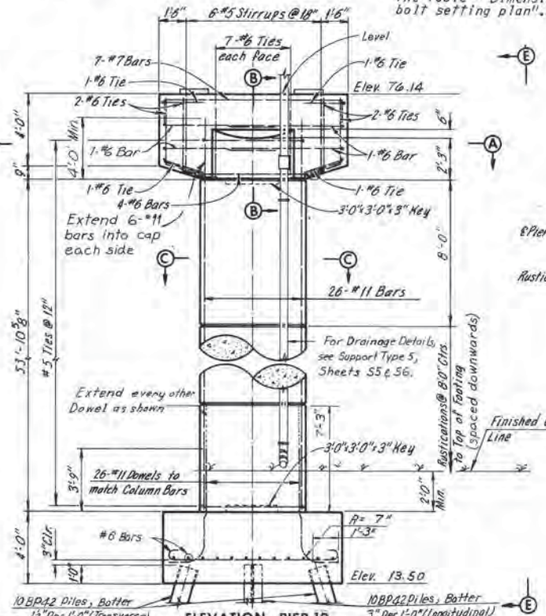
SECTION A-A
Scale: $\frac{3}{4}$" = 1'-0"



SECTION B-B
Scale: $\frac{1}{2}$" = 1'-0"

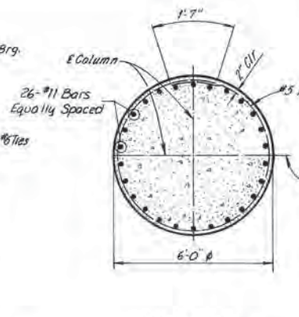


ELEVATION- PIERS 8 AND 9
Scale: $\frac{1}{4}$"= 1'-0"

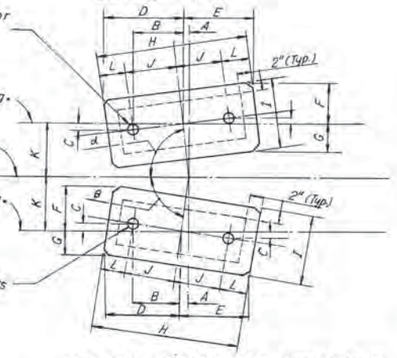


ELEVATION- PIER 10
Scale: $\frac{1}{4}$"= 1'-0"

VIEW E-E
Scale: $\frac{1}{4}$" = 1'-0"



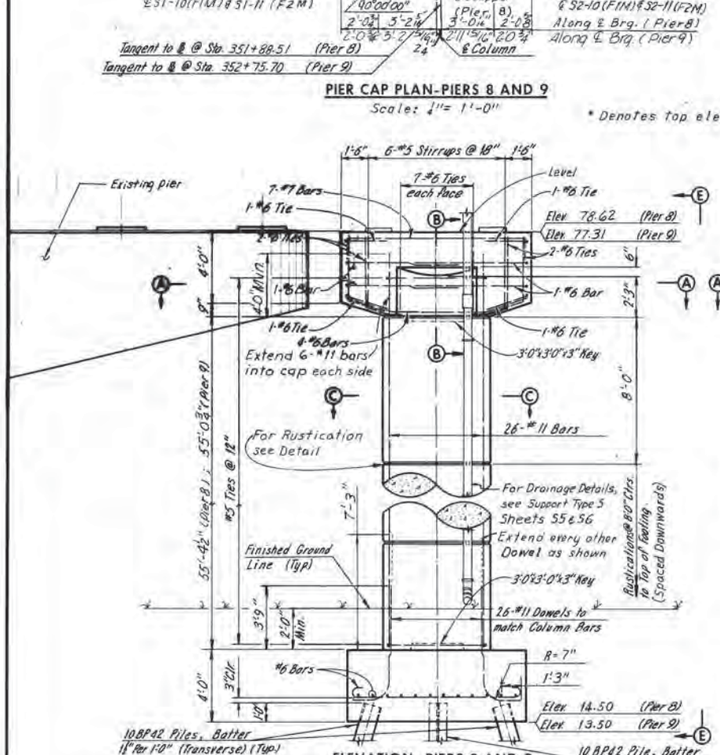
SECTION C-C
Scale: $\frac{3}{4}$" = 1'-0" 1¼" ℄ Anchor Bolts



PAD AND ANCHOR BOLT SETTING PLAN
NO Scale

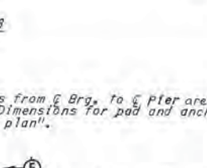
DIMENSIONS FOR PAD AND ANCHOR BOLT SETTING PLAN

Pier	Stringer	α	β	A	B	C	D	E	F	G	H	I	J	K	L
8	S1-10	–	89°36'33"	1/16"	8"	1/16"	1'-0½"	1'-0½"	5⅞"	5⅞"	2'-1"	11½"	8"	9"	4½"
	S2-10	–	90°19'22"	1/16"	8"	1/16"	1'-0½"	1'-0½"	5⅞"	5⅞"	2'-1"	11½"	8"	9"	4½"
	S1-11	90°25'55"	–	1/16"	10⅛"	1/16"	1'-2½"	1'-2½"	6⅝"	6⅛"	2'-5"	1'-0½"	10⅛"	9"	4"
	S2-11	90°25'55"	–	1/16"	10⅛"	1/16"	1'-2½"	1'-2½"	6⅝"	6⅛"	2'-5"	1'-0½"	10⅛"	9"	4"
9	S1-11	–	89°34'05"	1/16"	10⅛"	1/16"	1'-3"	1'-3"	5⅞"	5⅞"	2'-6"	11"	10½"	8"	4½"
	S2-11		89°34'05"	1/16"	10⅛"	1/16"	1'-3"	1'-3"	5⅞"	5⅞"	2'-6"	11"	10½"	8"	4½"
	S1-12	90°21'29"	–	1/16"	8"	1/16"	1'-0½"	1'-0½"	5⅞"	5⅞"	2'-1"	11½"	8"	10"	4½"
	S2-12	90°21'29"	–	1/16"	8"	1/16"	1'-0½"	1'-0½"	5⅞"	5⅞"	2'-1"	11½"	8"	10"	4½"
10	S1-12	–	90°21'29"	1/16"	8"	1/16"	1'-0½"	1'-0½"	5⅞"	5⅞"	2'-1"	11½"	8"	9"	4½"
	S2-12	–	90°21'29"	1/16"	8"	1/16"	1'-0½"	1'-0½"	5⅞"	5⅞"	2'-1"	11½"	8"	9"	4½"
	S1-13	89°38'31"	–	1/16"	8¼"	1/16"	1'-0¼"	1'-0¼"	6⅛"	5⅞"	2'-0½"	1'-0"	8¼"	9"	4"
	S2-13	89°38'31"	–	1/16"	8¼"	1/16"	1'-0¼"	1'-0¼"	6⅛"	5⅞"	2'-0½"	1'-0"	8¼"	9"	4"



FOOTING PLAN-PIERS 8 AND 9
Scale: $\frac{1}{4}$"= 1'-0"

FOOTING PLAN-PIER 10
Scale: $\frac{1}{4}$"= 1'-0"

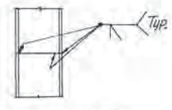


RUSTICATION DETAIL
Full Scale

Note:
Overexcavation will not be permitted between existing pier and newpier. Piers 8, 9 and 10 are to match existing piers 58, 56 and 54 respectively. The contractor shall verify the stations in the field.

Notes:
Footing elevations are approximate only and may be varied to suit field conditions as directed by Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft. redesign will be required.
All piles shall be 10BP42 Steel Piles.
(Design capacity = 45 Tons.)
For Standard Shoe Details, see Sheets S1 & S2.
For Framing Plans, see Sheets 15 and 16.
For quantities of concrete and steel, see Sheet 2.

Estimated pile tip elevation -16.00 Pier 8 , -18.00 Pier 9 and -18.00 Pier 10 .



PILE SPLICE DETAIL
No Scale

	BY	DATE				
MADE	DES G.S.H	1-28-69	2	Footing Dowels	TEM	8-26-76
CHECKED	K.C.T.	2-4-69	1	Pad Elevations	TEM	8-26-75
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

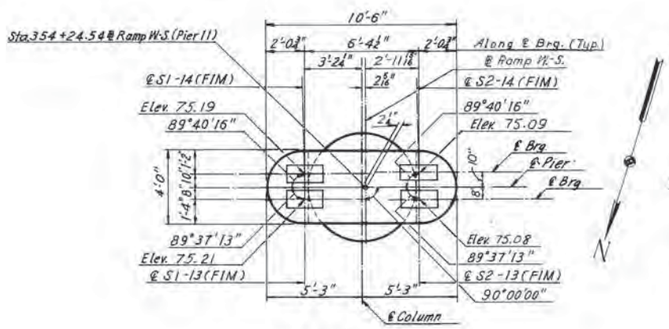
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 68
RAMP W-S CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
PIERS 8, 9 AND 10

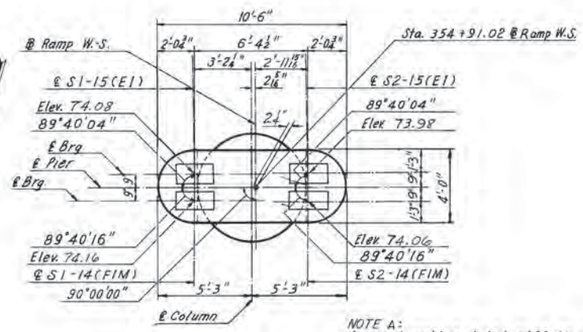
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 9 of 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	73	97

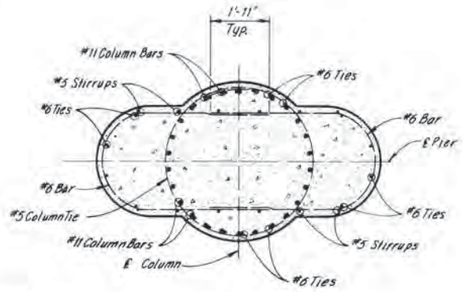


PIER CAP PLAN-PIER 11
Scale: ¼"= 1'-0"

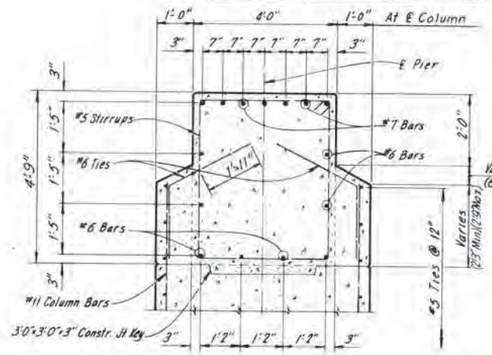


PIER CAP PLAN- PIER 12
Scale: ¼"= 1'-0"

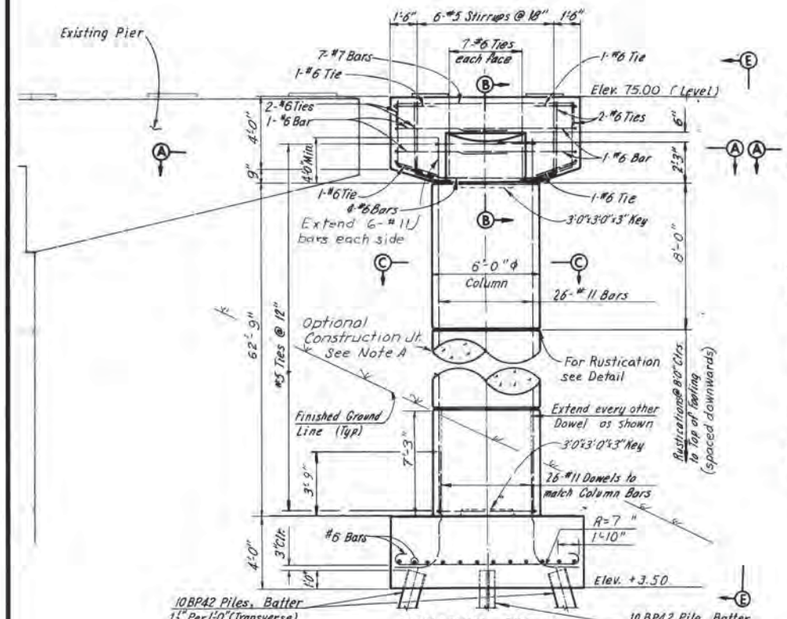
NOTE A:
A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap of the splice shall be a minimum of 31-6". Splices shall be staggered at least 3'-3" between adjacent bars.



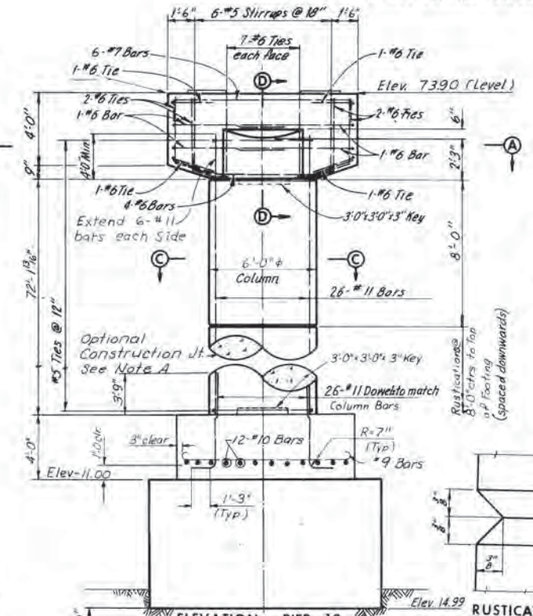
SECTION A-A
Scale: ⅜" = 1'-0"



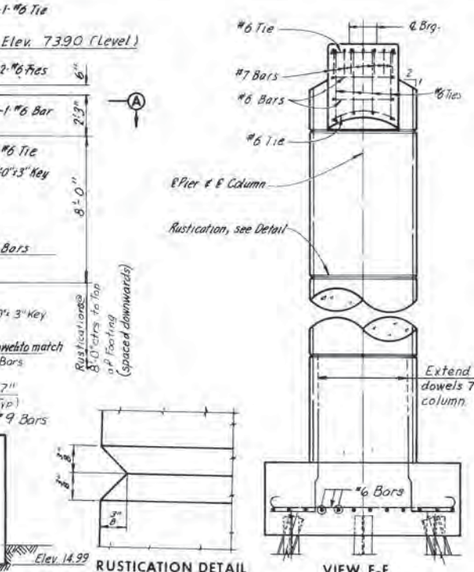
SECTION B-B
Scale: ½" = 1'-0"



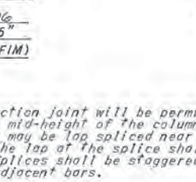
ELEVATION – PIER 11
Scale: ¼"=1'-0"



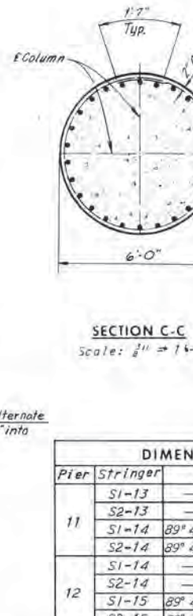
ELEVATION PIER 12
Scale: ¼"=1'-0"



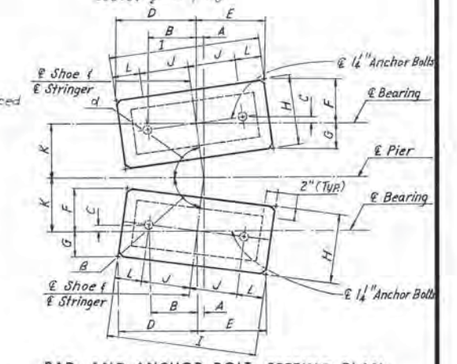
VIEW E-E
Scale: ¼" = 1'-0"
(Pier 11 shown, Per 12 similar except for Footing.)



RUSTICATION DETAIL
Full Scale



SECTION C-C
Scale: ⅜" = 1'-0"



PAD AND ANCHOR BOLT SETTING PLAN
No Scale

DIMENSIONS FOR PAD AND ANCHOR BOLT SETTING PLAN

Pier	Stringer	α	β	A	B	C	D	E	F	G	H	I	J	K	L
11	S1-13	—	89° 37' 13"	6"	8"	4"	12½"	12½"	5⅝"	5⅝"	11½"	2'-1"	8"	8"	4½"
	S2-13	—	89° 37' 13"	6"	8"	4"	12½"	12½"	5⅝"	5⅝"	11½"	2'-1"	8"	8"	4½"
	S1-14	89° 40' 16"	—	6"	8"	4"	12½"	12½"	5⅝"	5⅝"	11½"	2'-1"	8"	10"	4½"
	S2-14	89° 40' 16"	—	6"	8"	4"	12½"	12½"	5⅝"	5⅝"	11½"	2'-1"	8"	10"	4½"
12	S1-14	—	89° 40' 16"	6"	8"	4"	12½"	12½"	5⅝"	5⅝"	11½"	2'-1"	8"	9"	4½"
	S2-14	—	89° 40' 16"	6"	8"	4"	12½"	12½"	5⅝"	5⅝"	11½"	2'-1"	8"	9"	4½"
	S1-15	89° 40' 04"	—	6"	8¼"	4"	12½"	12½"	6⅛"	5⅝"	12"	2'-0½"	8¼"	9"	4"
	S2-15	89° 40' 04"	—	6"	8¼"	4"	12½"	12½"	6⅛"	5⅝"	12"	2'-0½"	8¼"	9"	4"

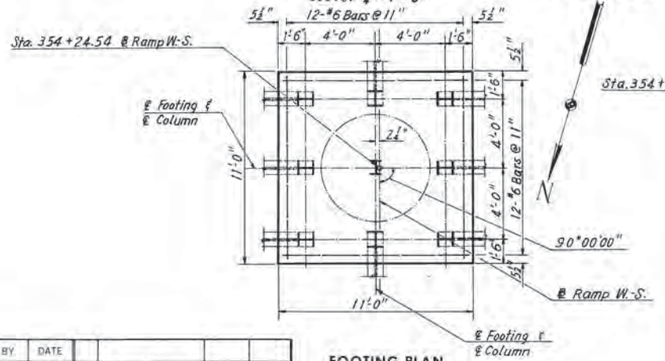
Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft. redesign will be required.

Overexcavation will not be permitted between existing pier and new pier.

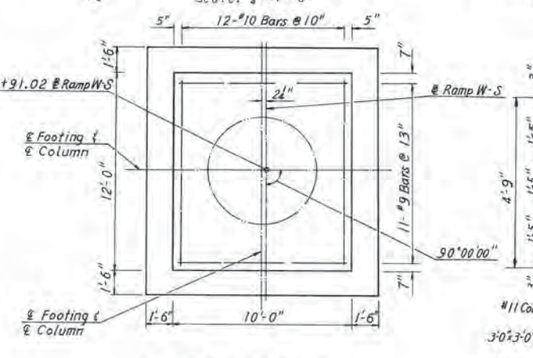
Pier 11 and pier 12 are to match existing pier 52 and pier 50 respectively, the Contractor shall verify the stations in the field.

All piles shall be 10BP42 Steel Piles.
(Design capacity = 45 Tons.)

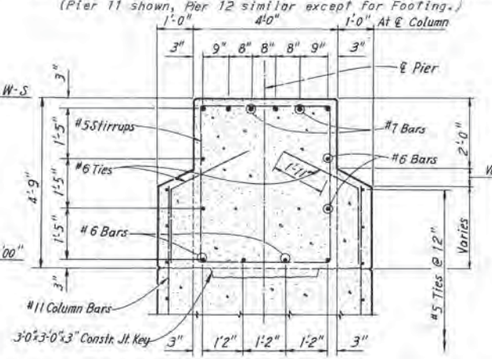
For Steel and Concrete quantities, see Sheet 2.



FOOTING PLAN
PIER 11
Scale: ¼"=1'-0"



FOOTING PLAN – PIER 12
Scale: ¼"=1'-0"



SECTION D-D
Scale: ½"=1'-0"

Note
For Standard Shoe Details see Sheets S1 and S2
For Framing Plans see Sheet 16.
Estimated Pile Tip Elevation -18.00 for Pier 11.

	BY	DATE				
MADE	KCT	1-22-69	2	Footing Dowels	TEM	8-26-76
CHECKED	R C	2-1-69	1	Pad Elevations	TEM	8-26-75
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 68
RAMP W-S CONNECTION TO
RICHMOND-PETERSBURG TURNPIKE

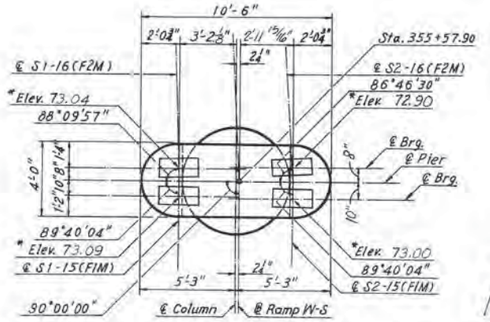
PIERS 11 AND 12

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

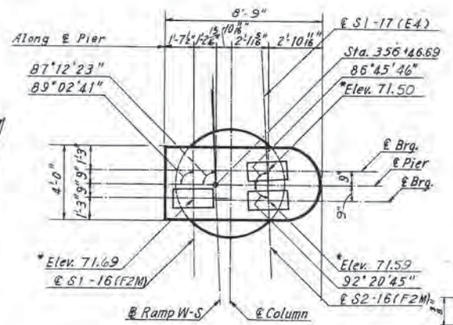
SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 10 OF 28

73

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	74	97

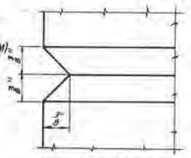


PIER CAP PLAN – PIER 13
Scale: ¼"=1'-0"

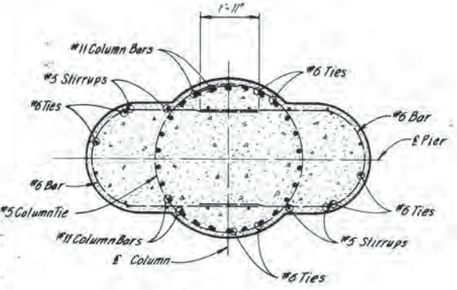


PIER CAP PLAN-PIER 14
Scale: ¼"= 1'-0"

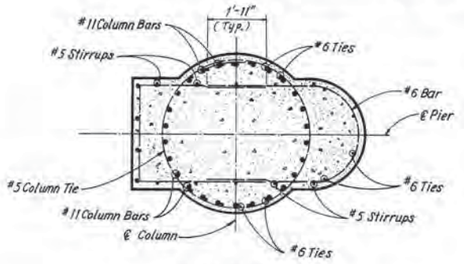
* Denotes top elevation of pad.



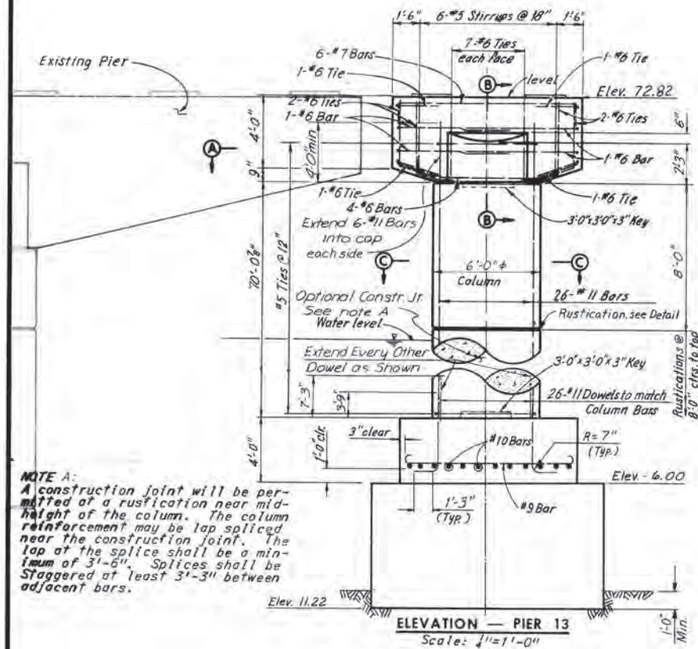
RUSTICATION DETAIL
Full Scale



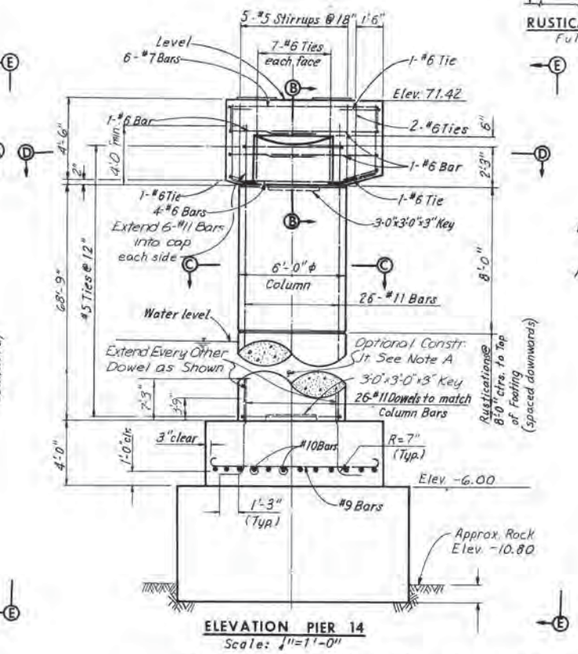
SECTION A-A
Scale: ⅜" = 1'-0"



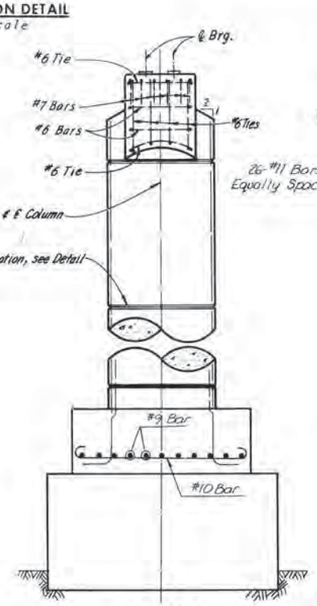
SECTION D-D
Scale: ⅜"=1'-0"



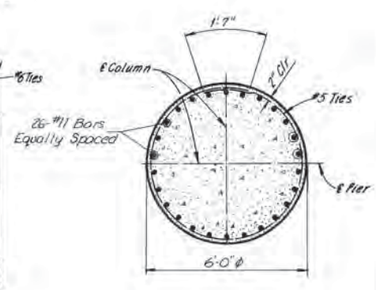
ELEVATION — PIER 13
Scale: ¼"=1'-0"



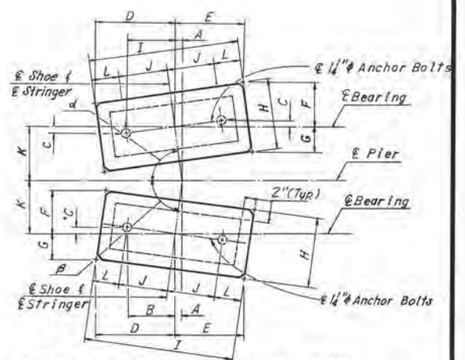
ELEVATION PIER 14
Scale: ¼"=1'-0"



VIEW E-E
Scale: ¼"=1'-0"



SECTION C-C
Scale: ⅜" = 1'-0"



PAD AND ANCHOR BOLT SETTING PLAN
NO Scale

DIMENSIONS FOR PAD AND ANCHOR BOLT SETTING PLAN

Pier	Stringer	d	B	A	B	C	D	E	F	G	H	I	J	K	L
13	S1-15	—	89°40'04"	1/16"	8"	1/4"	12 3/4"	12 1/4"	5 7/8"	5 7/8"	11 1/2"	2'-1"	8"	10"	4 1/2"
	S2-15	—	89°40'04"	1/16"	8"	1/4"	12 3/4"	12 1/4"	5 7/8"	5 7/8"	11 1/2"	2'-1"	8"	10"	4 1/2"
	S1-16	88°09'57"	—	1/4"	10 1/2"	3/16"	15 1/16"	14 7/8"	6"	5"	11"	2'-6"	10 1/2"	8"	4 1/2"
	S2-16	86°46'30"	—	1/4"	10 1/2"	3/16"	15 1/16"	14 7/8"	6 3/4"	4 3/4"	11"	2'-6"	10 1/2"	8"	4 1/2"
14	S1-16	—	90°57'19"	1/4"	10 1/2"	3/16"	15 1/16"	14 7/8"	5 3/4"	5 1/4"	11"	2'-6"	10 1/2"	9"	4 1/2"
	S2-16	—	92°20'45"	3/8"	10 1/2"	3/16"	15 1/16"	14 7/8"	6 1/4"	4 7/8"	11"	2'-6"	10 1/2"	9"	4 1/2"
	S1-17	86°45'29"	—	1/4"	10 1/2"	3/16"	15 1/16"	13 7/8"	7"	5 1/2"	12 1/2"	2'-5"	10 1/2"	9"	4"

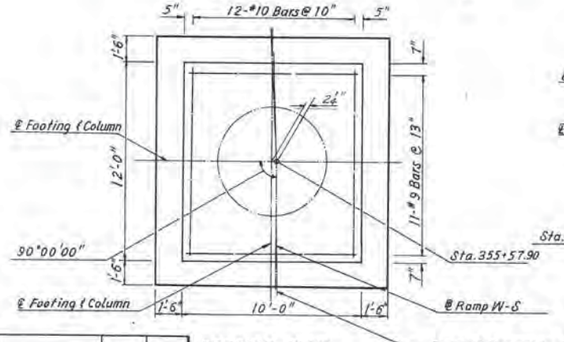
Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft. redesign will be required.

Overexcavation will not be permitted between existing pier and new pier.

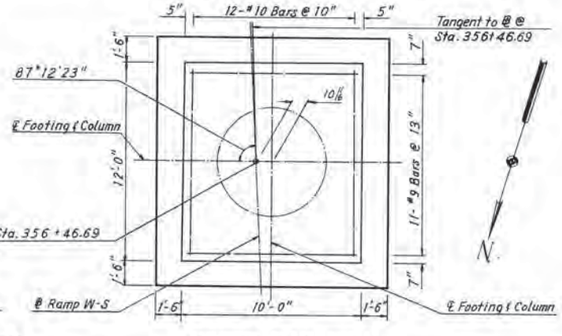
Pier 13 and pier 14 are to match existing pier 48 and pier 46 respectively, the Contractor shall verify the stations in the Field.

For Standard Shoe Details, see Sheets S1 and S2.
For Framing Plans, see Sheet 16.
For Steel and Concrete quantities, see Sheet 2.

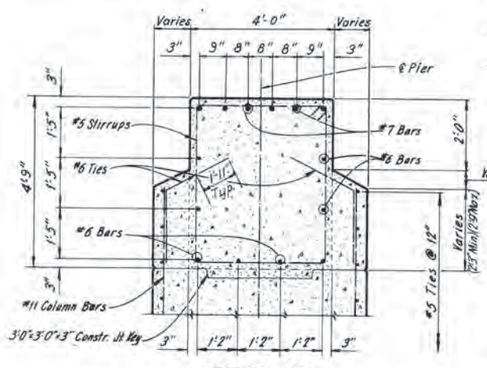
NOTE A:
A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The top of the splice shall be a minimum of 3'-6". Splices shall be Staggered at least 3'-3" between adjacent bars.



FOOTING PLAN
PIER 13
Scale: ¼"=1'-0"



FOOTING PLAN PIER 14
Scale: ¼"=1'-0"



SECTION B-B
Scale: ¼" = 1'-0"

AS BUILT

	BY	DATE				
MADE	KCT	1-28-69				
CHECKED	GSH	2-3-69	⚠	Pad Elevations Angle @ S1-17	T.E.M.	8-26-75
IN CHARGE			NO.	REVISION	BY	DATE

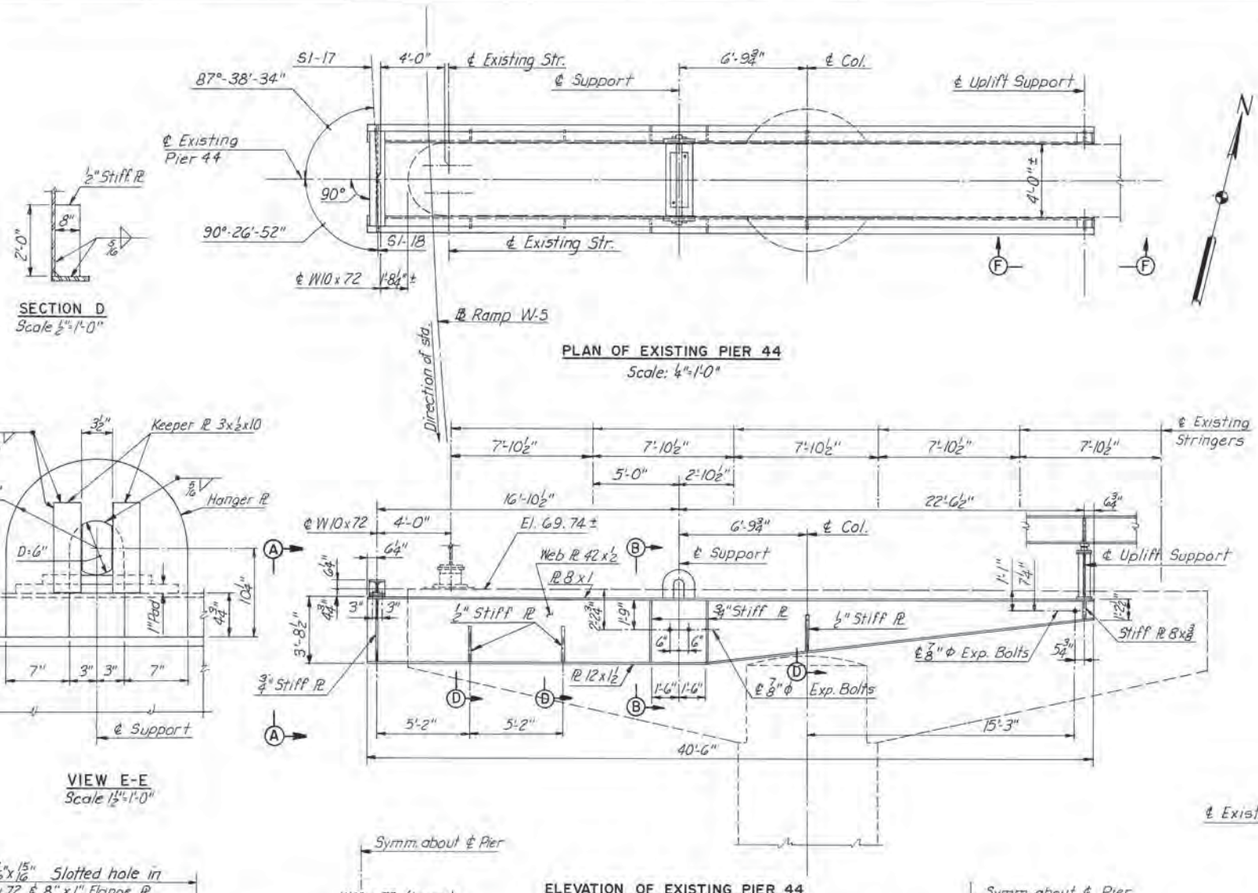
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 68
RAMP W-S CONNECTION TO
RICHMOND-PETERSBURG TURNPIKE
PIERS — 13 AND 14

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 11
SHEET NO. 11 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	74A	97

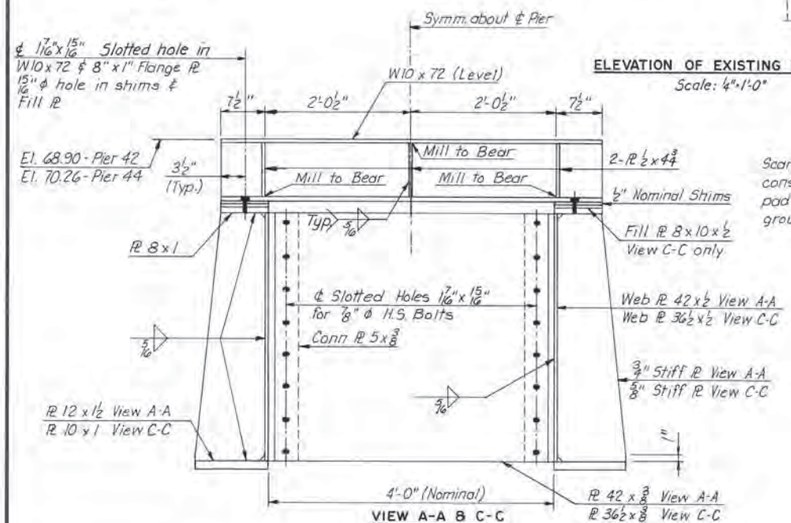


SECTION D
Scale ½"=1'-0"

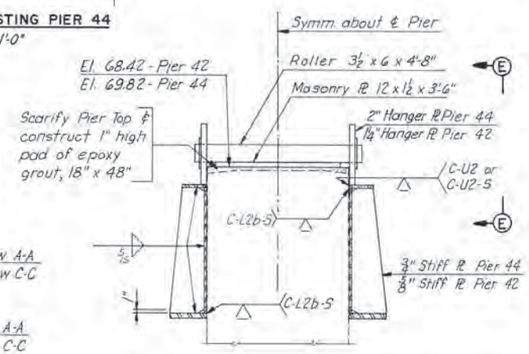
PLAN OF EXISTING PIER 44
Scale: ¼"=1'-0"

VIEW E-E
Scale 1½"=1'-0"

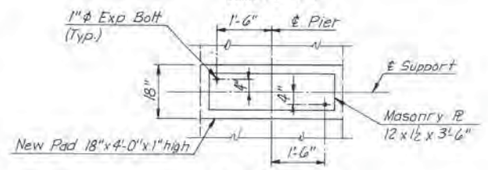
ELEVATION OF EXISTING PIER 44
Scale: ¼"=1'-0"



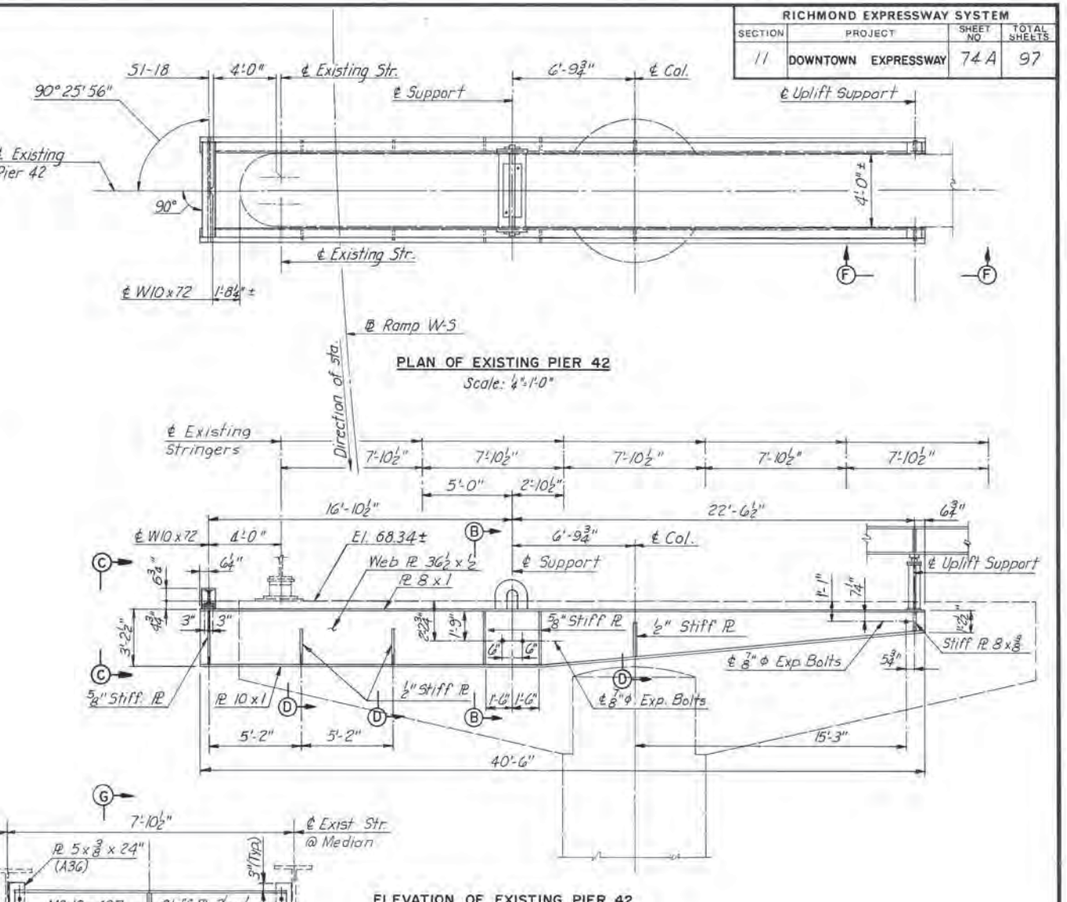
VIEW A-A & C-C
Scale: 1"=1'-0"



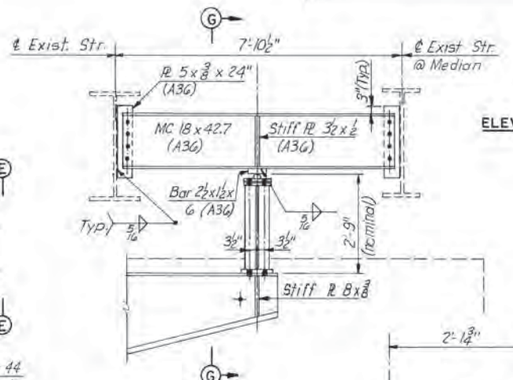
SECTION B-B
Scale: ½"=1'-0"



PAD PLAN
Scale ½"=1'-0"



PLAN OF EXISTING PIER 42
Scale: ¼"=1'-0"

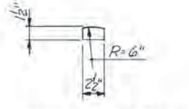


VIEW F-F
Scale ½"=1'-0"

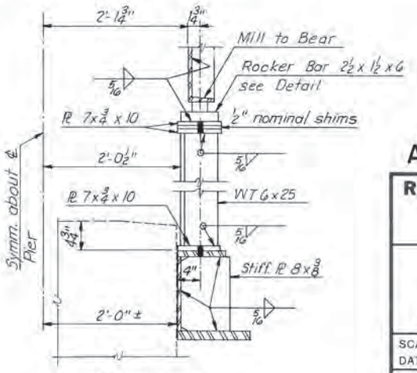
ELEVATION OF EXISTING PIER 42
Scale: ¼"=1'-0"

NOTES:

Structural steel shall be A588 except as noted.



ROCKER BAR DETAIL
No Scale



SECTION G-G
Scale 1"=1'-0"

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

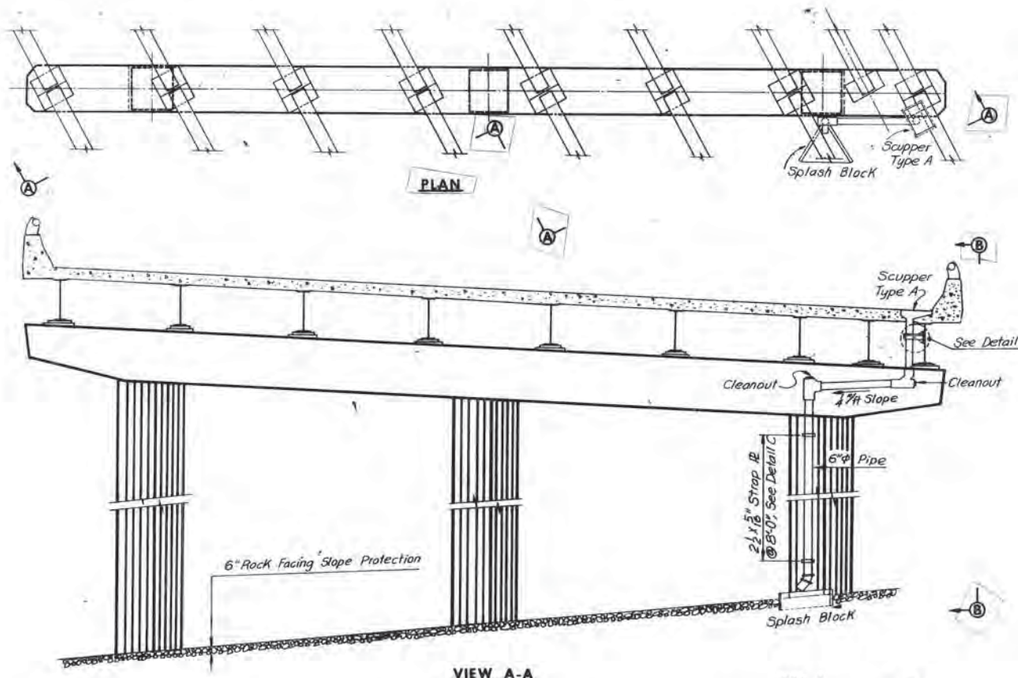
BRIDGE NO. 68
RAMP W-S CONNECTION TO
RICHMOND-PETERSBURG TURNPIKE
EXISTING PIERS 42 & 44 MODIFICATIONS

SCALE As Noted
DATE
SHEET 11A OF 28

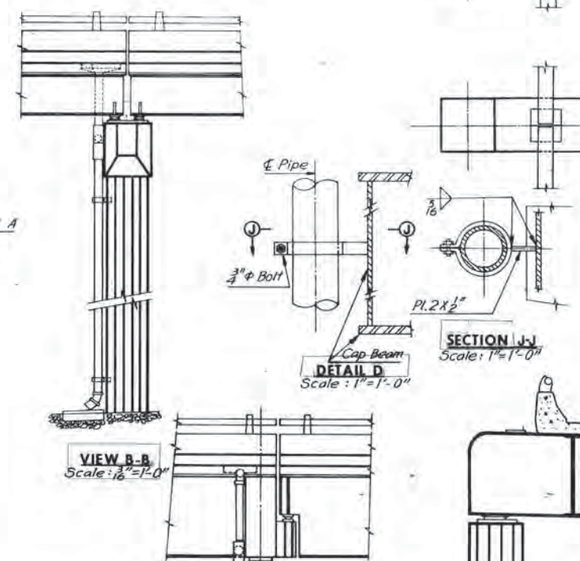
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
Alexandria, Virginia
HNTB

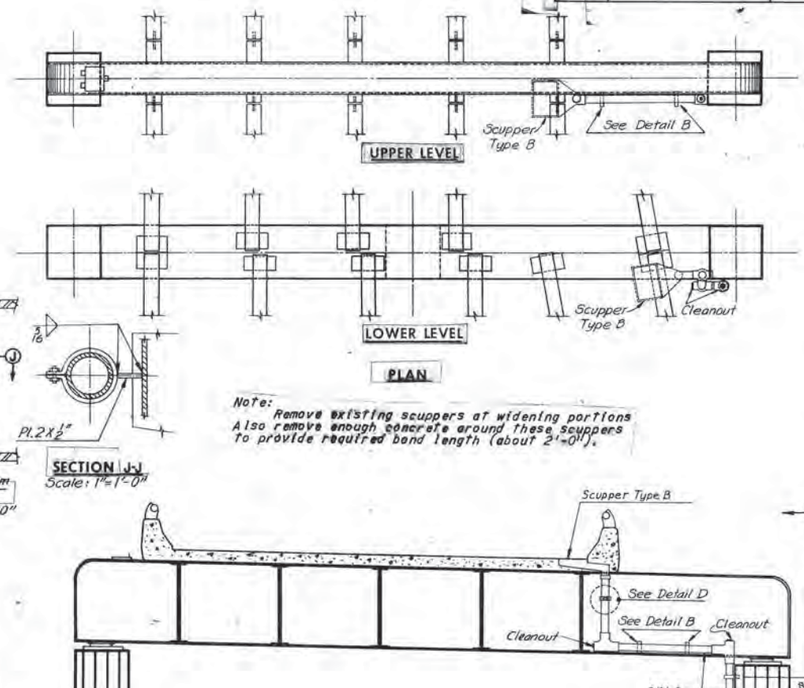
DESIGNED						
DRAWN	TEM/CBP	8-11-75	2	Entire Sheet	TEM	10-76
CHECKED	PRY	10-15-76	1	New Sheet added	C.B.P.	
IN CHARGE	P.R.Y.		NO.	REVISION	BY	DATE

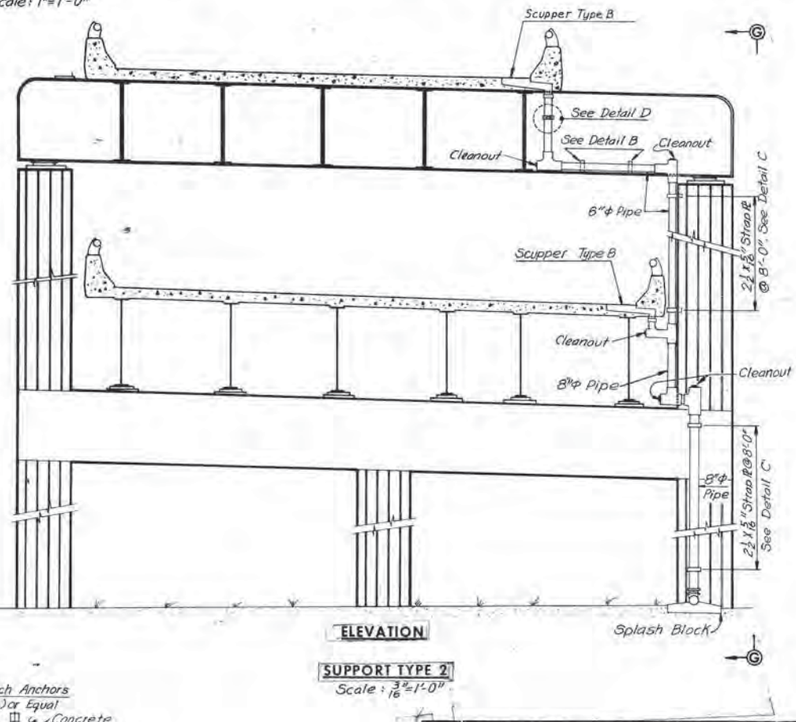
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
II	DOWNTOWN EXPRESSWAY	96	97

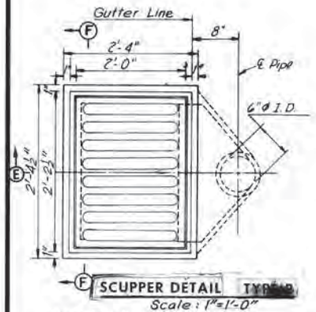


VIEW A-A
ELEVATION
SUPPORT TYPE 1
Scale : 1/16" = 1'-0"

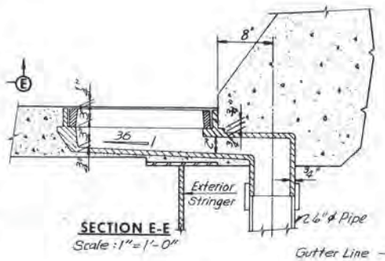


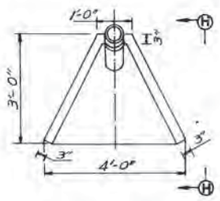


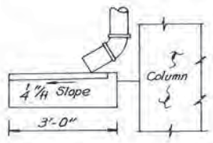


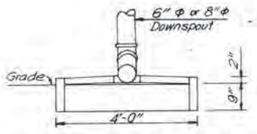


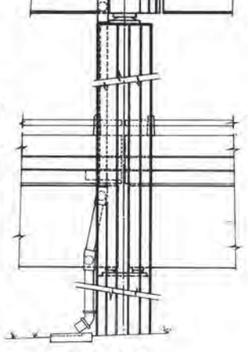
Note: For dimensions not given, see Scupper Detail, Type A.

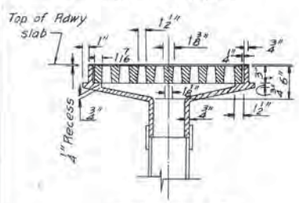


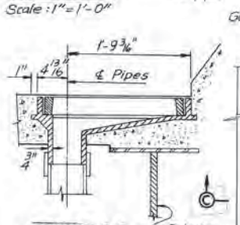


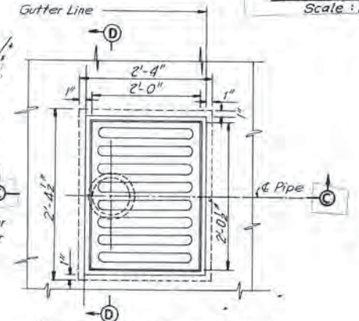


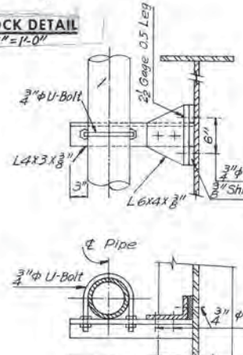


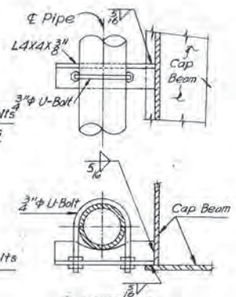


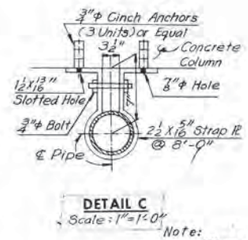












Note: Where existing scuppers are to be removed, concrete shall be removed 2'-0" minimum from the edges of scuppers.

	BY	DATE				
MADE	G.S.H.	10-10-69	A	Parapet Changed	PRM's	4-19-72
CHECKED						
IN CHARGE			NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

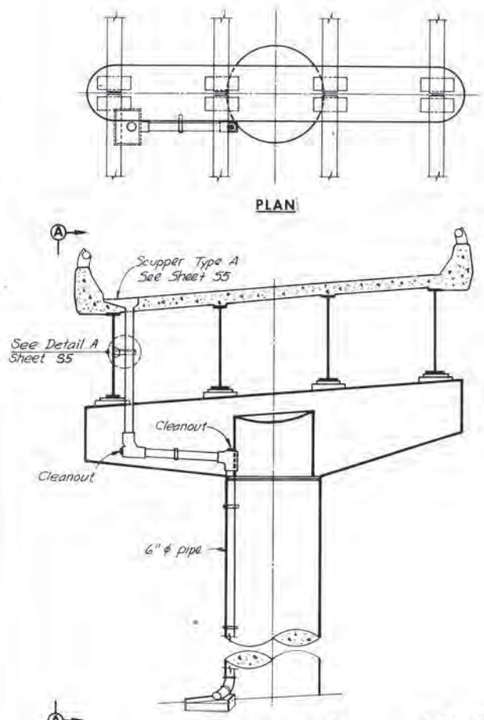
STANDARD DRAINAGE DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

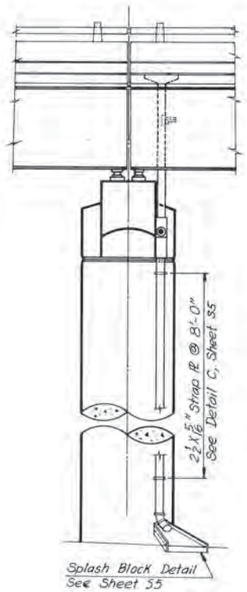
SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 55 OF 6

96

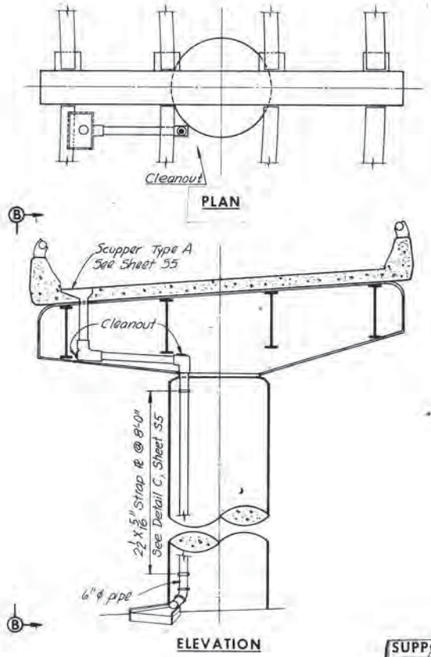
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	97	97



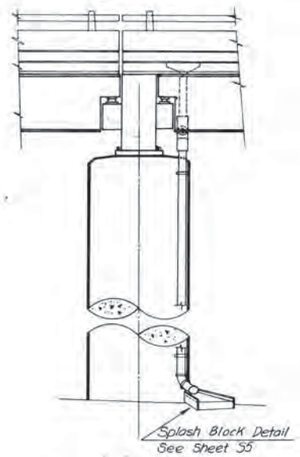
ELEVATION



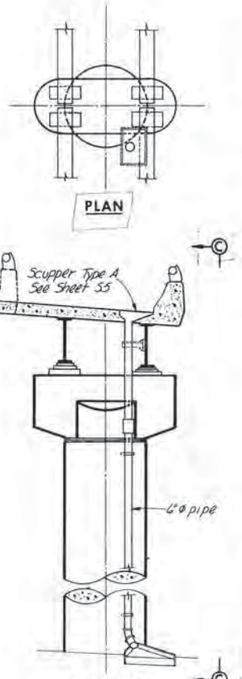
VIEW A-A



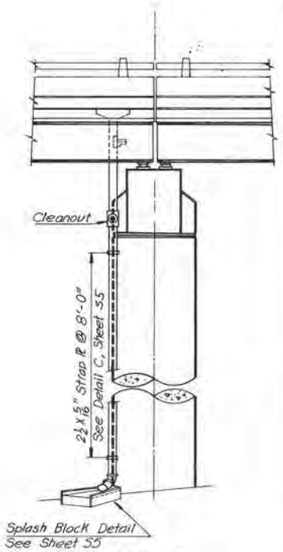
ELEVATION



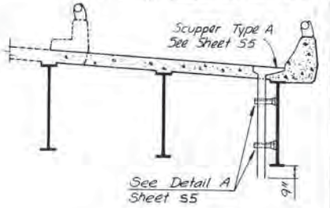
VIEW B-B



ELEVATION

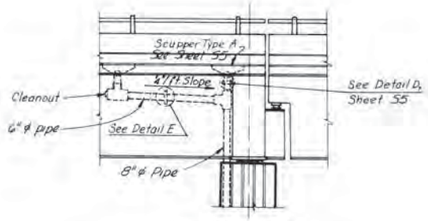


VIEW C-C

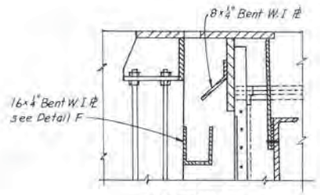


SUPPORT TYPE 6
Scale: ⅜"=1'-0"

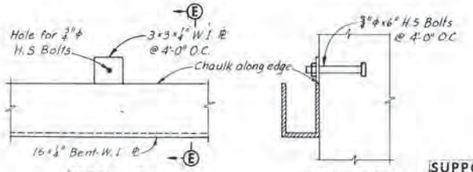
SUPPORT TYPE 3
Scale: ⅜"=1'-0"



SUPPORT TYPE 7
Scale: ⅜"=1'-0"

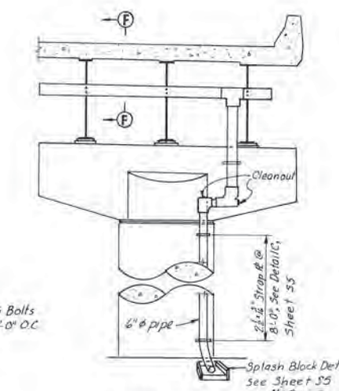


SECTION F-F
Scale: 1"=1'-0"



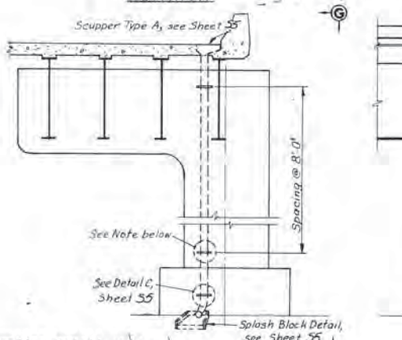
DETAIL E
Scale: 1½"=1'-0"

SECTION E-E
Scale: 1½"=1'-0"

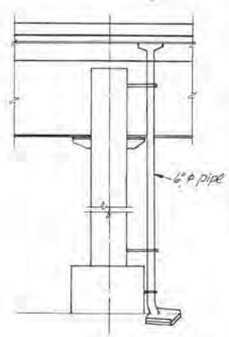


ELEVATION
Scale: ⅜"=1'-0"

Note:
Same Connection Detail used as shown in Detail E, except that ST4WF15.5 is turned 90°.

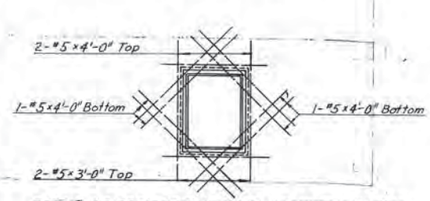


ELEVATION



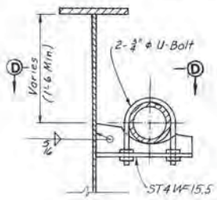
VIEW G-G

SUPPORT TYPE 5
Scale: ⅜"=1'-0"

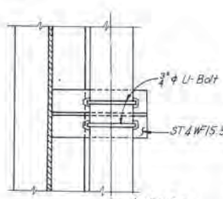


DETAIL OF REINFORCING STEEL AT CAST SCUPPER
No Scale

Note:
Bend bottom and top slab bars at Cast Scuppers where interference occurs.
Weight of Reinforcing Bars at Scupper: 48 lbs.

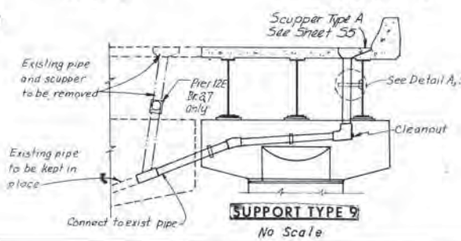


DETAIL E
Scale: 1"=1'-0"



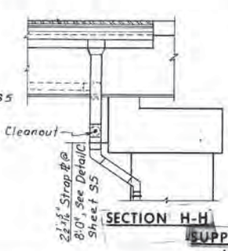
SECTION D-D
Scale: 1"=1'-0"

Note:
For Details below top of upper column, see Support Type 2, Sheet 55.

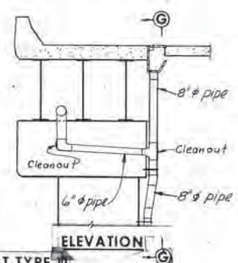


SUPPORT TYPE 9
No Scale

SUPPORT TYPE 8



SECTION H-H



ELEVATION

SUPPORT TYPE 11
No Scale

SUPPORT TYPE 10
Scale: 1" =1'-0"

	BY	DATE
MADE	SCC	1.29.69
CHECKED	G.S.H.	2.13.69
IN CHARGE		

NO.	REVISION	BY	DATE
1	Parapet Changed	P.R.Mc.	4-19-74

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STANDARD DRAINAGE DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 56 OF 66