APPENDIX
MR-2018

RECORD DRAWINGS

RMTA SYSTEM MAP AND PIER LOCATION EXHIBIT

RMTA BRIDGES Boulevard, 5, 8N, 9N, 13, 17, 65, 66, 67 & 68

(NOTE: Additional As-built Plans are Available upon Request to the Engineer)

RMTA

System Map

RICHMOND EXPRESSWAY SYSTEM

Scale: 0 1000 2000 3000ft.

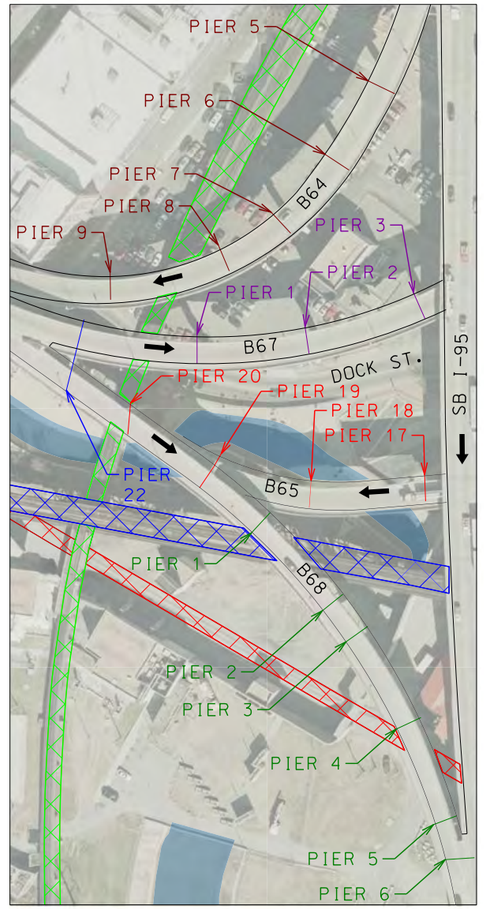
48 - Bridge Number
RMTA Facilities Shown in Red

RMTA
RICHMOND METROPOLITAN TRANSPORTATION AUTHORITY

RICHMOND

JOSEPH BRYAN PARK
Toll Booths
BRYAN PARK INTERCHANGE
LABURNUM AVE.
NORTH AVE.
WESTWOOD AVE.
BROOKLAND PARK BLVD.
OVERBROOK RD.
CHAMBERLAYNE AVE.
BROOK RD.
MEADOW
MECHANICSVILLE
UNIVERSITY OF RICHMOND
THREE CHOPT RD.
LIBBIE AVE.
MONUMENT AVE.
PATTERSON AVE.
GROVE AVE.
CARY STREET ROAD
COMMONWEALTH AVE.
MALVERN AVE.
HAMILTON ST.
KENT RD.
THOMPSON ST.
BROAD ST.
Visitor Information Center
The Diamond
Science Museum Of Virginia
HERMITAGE RD.
RICHMOND PETERSBURG TURNPIKE
VIRGINIA UNION UNIVERSITY
LOMBARDY ST.
HUGUENOT BRIDGE
HUGUENOT ROAD
RIVERSIDE DR.
Williams Island
DOVER RD.
NAMMOND ST.
I-195
Virginia Museum Of Fine Arts
SHEPPARD ST.
BOULEVARD
ROBINSON AVE.
Downtown Expressway Extension
PARK AVE
MONUMENT AVE
BROAD ST.
GROVE AVE
FLOYD AVE
MAIN ST
CARY ST
PARKWOOD AVE.
ELWOOD RD
CLAY ST
MARSHALL ST
LEIGH ST.
SEABOARD COAST LINE
Virginia Commonwealth University
FRANKLIN ST
ADAMS ST
Public Library
COLISEUM
Toll Booths
FAIRFIELD AVE.
MOSBY ST.
17th ST.
18th ST.
NINE MILE RD.
CARRINGTON ST.
25TH ST.
MARSHALL ST.
BROAD ST.
CLAY ST.
Chimborazo Park
SOUTHERN RAILWAY
Section Two Connection To I-195
PORTLAND PL.
IDLEWOOD AVE.
MAPLEWOOD AVE.
CITY STADIUM
GRANT RD
STADIUM INTERCHANGE
BOULEVARD INTERCHANGE
Toll Booths
Toll Plaza
Water Works
WILLIAM BYRD PARK
Swan Lake
DOUGLASDALE RD.
R.F.&P.R.R.
Connection to Downtown Expressway
Section Three
MAYMONT PARK
Toll Plaza
Downtown Expressway
State Rte. 195
BRAYLAND AVE.
IDLEWOOD AVE.
LAKEVIEW AVE.
MEADOW ST.
ALLEN AVE.
RANDOLPH ST.
HARRISON ST.
CHERRY ST.
LAUREL ST.
BELVIDERE
Monroe Park
The Mosque
State Penitentiary
CANAL ST
MAIN ST.
CARY ST.
Chamber of Commerce
City Hall
Med. Col. Of Va. (VCU)
STATE CAPITOL
Shockoe Slip Historic District
MAIN ST. STATION
DOWNTOWN I-95 INTERCHANGE
JAMES RIVER BRIDGE
MAYOS BRIDGE
MANCHESTER BRIDGE
ROBERT E. LEE BRIDGE
JAMES RIVER
CSX RAILWAY
NORFOLK SOUTHERN
(SOUTHERN RAILWAY)
(C. & O. RY.)
COLORADO AVE.
MT. CALVARY CEMETERY
HOLLYWOOD CEMETERY
RIVERVIEW CEMETERY
Section Four Downtown Expressway
WILLOW OAKS COUNTRY CLUB
FOREST HILL AVE.
Section One
POWHITE BRIDGE OVER THE JAMES RIVER
Toll Booths
FOREST HILL AVE. INTERCHANGE
Powhite Parkway State Rte 76
Toll Plaza (SB)
Toll Plaza (NB)
PARKWAY
(SOUTHERN RAILWAY)
BOULEVARD BRIDGE 7500# Limit
WESTOVER HILLS BLVD
BLILELY RD.
SEABOARD COAST LINE CSX RAILWAY
JAHNKE RD.
FOREST HILL PARK
SEMMES AVE.
HULL ST.
COMMERCE RD.
MAURY ST.
Powhite Parkway Extension (VDOT Toll Road)
CHIPPENHAM PARKWAY INTERCHANGE
CHIPPENHAM

INSERT 1



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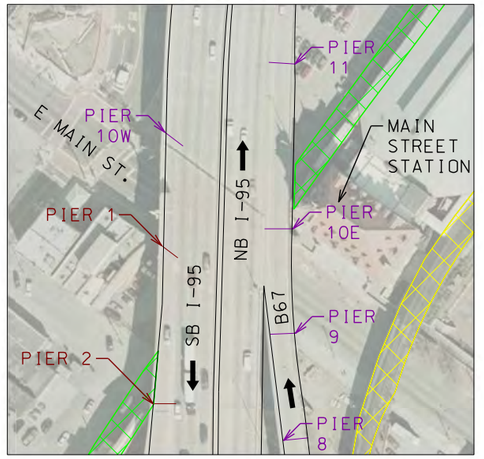

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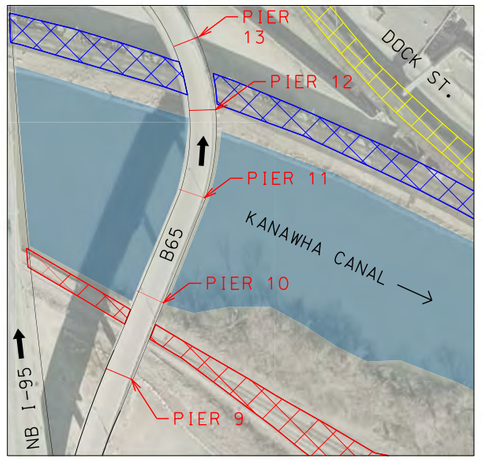


LEGEND:
- BRIDGE 63
- BRIDGE 64
- BRIDGE 65
- BRIDGE 66
- BRIDGE 67
- BRIDGE 68
- N&S RAILROAD
- CSX RAILROAD
- CSX RAILROAD
- CSX RAILROAD

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

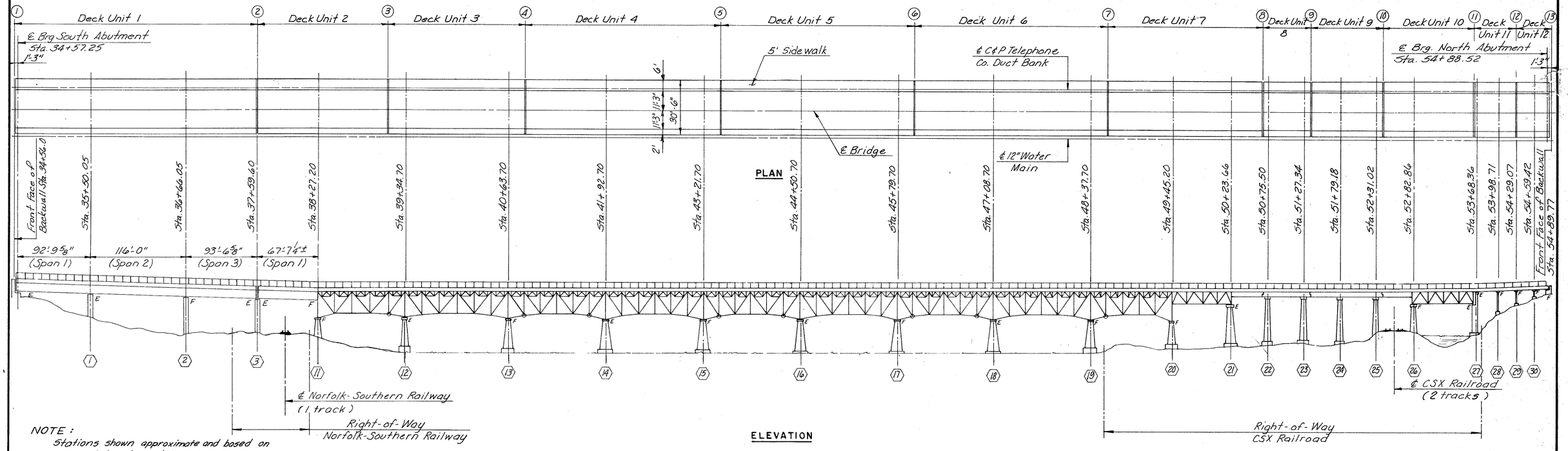
Pier Map-DR2016.dgn
3/4/2016

Boulevard Bridge

(VA State Rte. 161 – Westover Hills Blvd.)

Record Set Plans

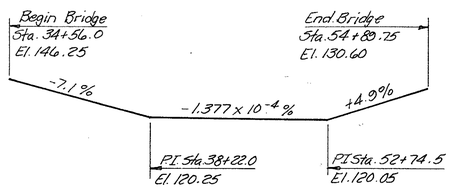
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C-17B	Boulevard Bridge Rehab	35(1)	



PLAN

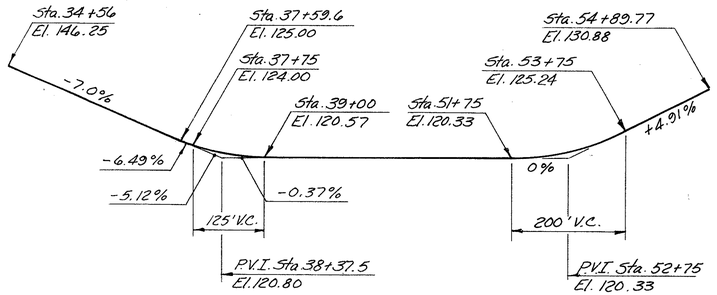
ELEVATION

NOTE :
Stations shown approximate and based on surveyed deck joint station. The Contractor is to verify all pertinent dimensions and elevations prior to the fabrication of any structural steel.



APPROXIMATE EXISTING PROFILE GRADE

Profile grade shown is based on surveyed elevation along the ℄ of the existing bridge.
The contractor is to verify all elevations prior to construction.



PROPOSED PROFILE GRADE

INDEX

LEGEND:
(1) Joint Number
⟨1⟩ Pier Number

NOTE:

LOAD RESTRICTIONS ARE CURRENTLY IN EFFECT ON THE EXISTING BRIDGE. CONSTRUCTION EQUIPMENT WEIGHING IN EXCESS OF 8 TONS SHOULD NOT BE PERMITTED ON THE BRIDGE.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	H.H.	2-92				
CHECKED	T.E.M	3-92				
IN CHARGE						

RECORD DRAWING

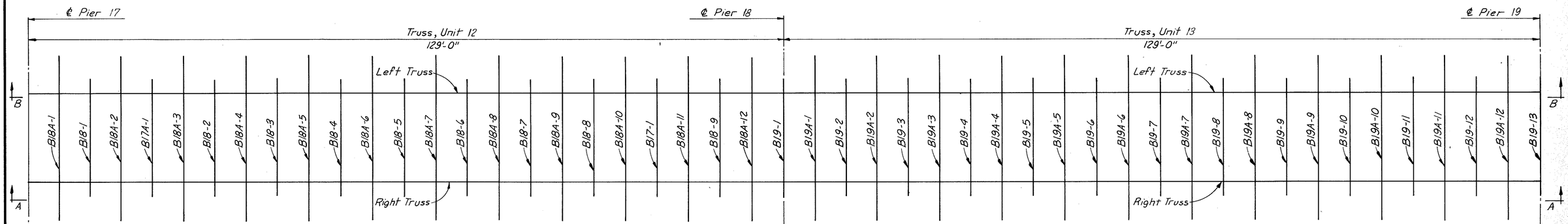
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BOULEVARD BRIDGE REHABILITATION
DECK REPLACEMENT
GENERAL PLAN, ELEVATIONS AND INDEX

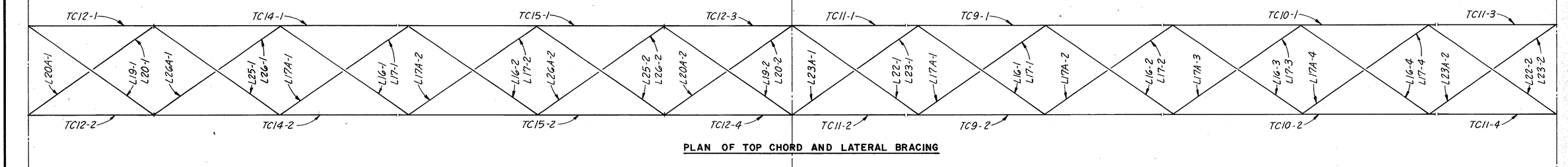
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: No. Scale
CONTRACT NO.: C-17B
SHEET NO. 1 OF 38

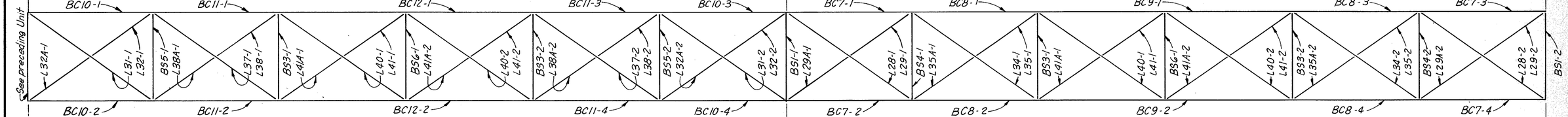
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS



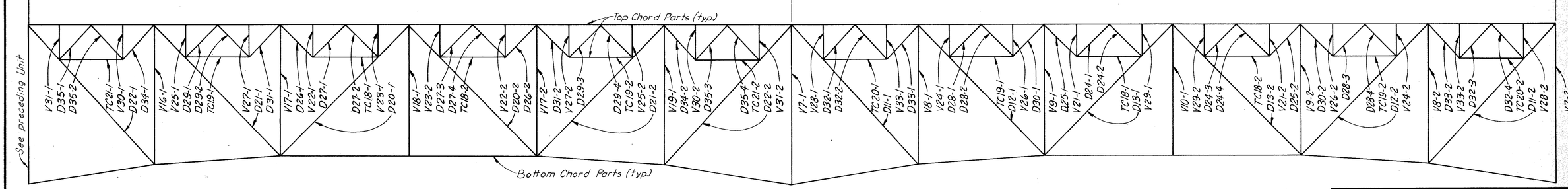
PLAN OF FLOOR BEAMS AND TRUSS



PLAN OF TOP CHORD AND LATERAL BRACING



PLAN OF BOTTOM CHORD, DIAPHRAGMS AND LATERAL BRACING



VIEW A-A

Note:
View B-B is similar to View A-A. Parts appearing in the left Truss (except those shown on the Plans of the Top and Bottom Chords) are indicated, in the table, with an L following the part identification.

Notes:
For Typical Floor Beam Detail, see Layout Units 1 thru 5.
For Typical Diaphragm Details and Elevations, see Layout Unit 14.
For Truss Details see, Typical Truss Detail Sheet.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	T.E.M.	2-72				
CHECKED	H.B.W.	3-72				
IN CHARGE	P.R.V.					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

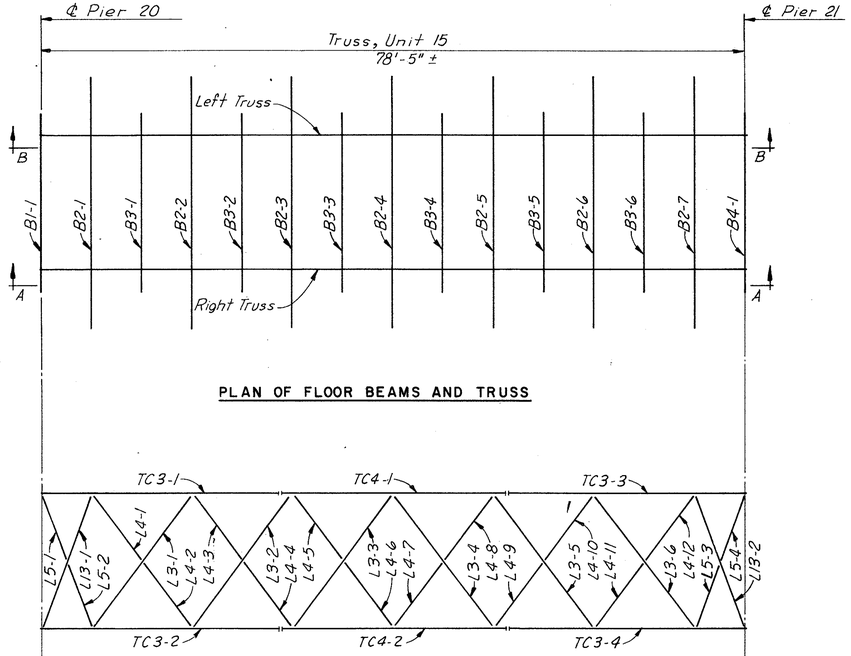
BOULEVARD BRIDGE OVER JAMES RIVER

LAYOUT UNITS 12 & 13

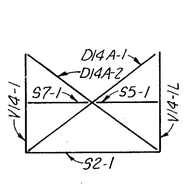
SCALE: No Scale
CONTRACT NO.:
SHEET NO. 20 OF ____

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS

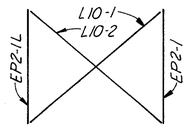


PLAN OF FLOOR BEAMS AND TRUSS

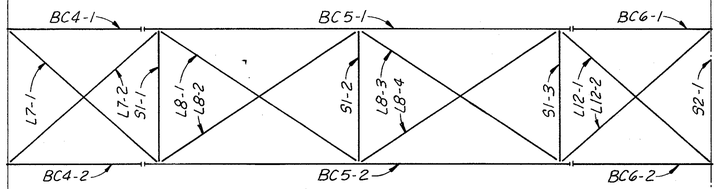


VIEW C-C

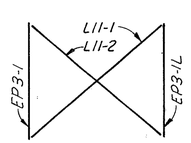
PLAN OF TOP CHORD AND LATERAL BRACING



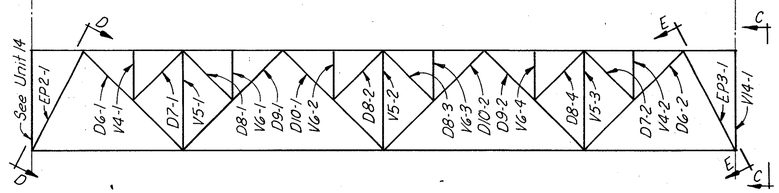
VIEW D-D



PLAN OF BOTTOM CHORD, DIAPHRAGMS AND LATERAL BRACING

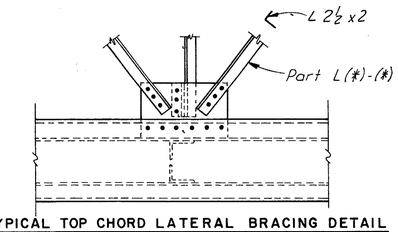


VIEW E-E



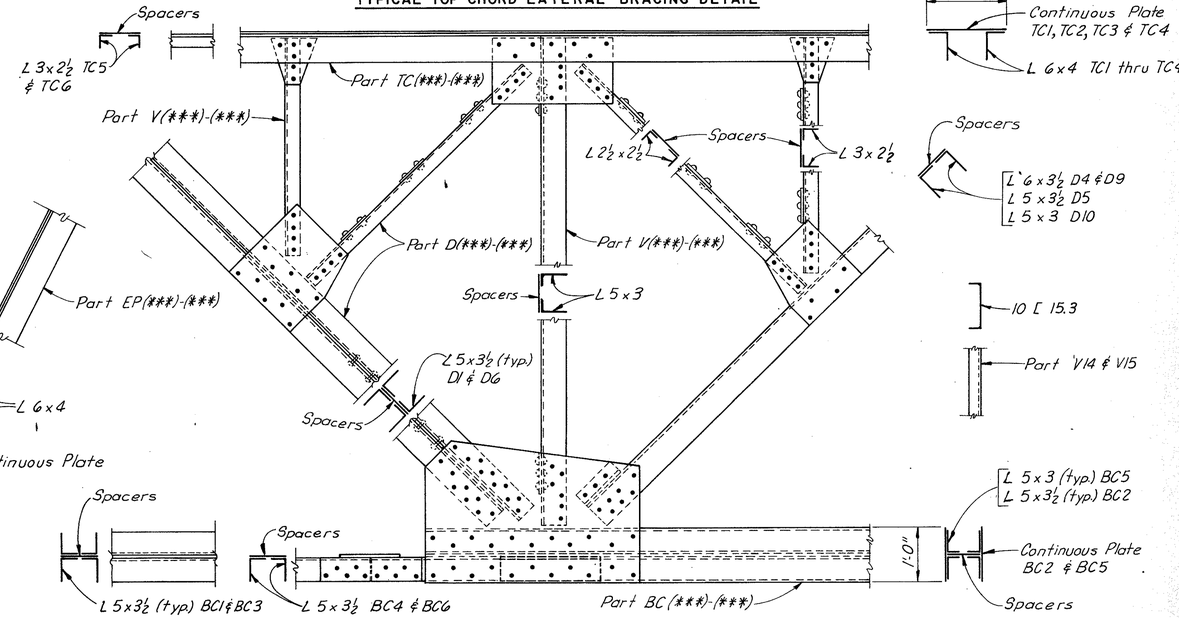
VIEW A-A

Notes:
For Typical Floor Beam Detail, see Layout Units 1 thru 5.
For Typical Diaphragm Details see Layout Units 21 thru 23.



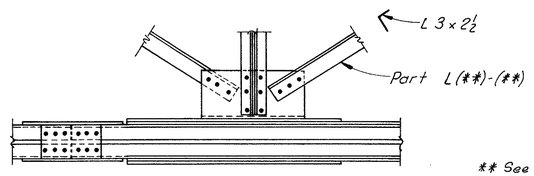
TYPICAL TOP CHORD LATERAL BRACING DETAIL

* See Plan of Top Chord and Lateral Bracing for identification.



*** See View A-A for identification.

TYPICAL TRUSS DETAIL UNIT 15 AND 21



** See Plan of Bottom Chord, Diaphragms and Lateral Bracing for identification

TYPICAL BOTTOM CHORD LATERAL BRACING DETAIL

Note:
View B-B is similar to View A-A. Parts appearing in the Left Truss (except those shown on the Plans of the Top and Bottom Chords) are indicated, in the table, with an L following the part identification.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	T.E.M	2-72				
CHECKED	H.B.W.	3-72				
IN CHARGE	P.R.Y.					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BOULEVARD BRIDGE OVER JAMES RIVER

LAYOUT UNIT 15

SCALE: No Scale
CONTRACT NO.:
SHEET NO. 21 OF

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

Shop Note: Work This Dwg. with Dwg. #20

SHIPMENT E

REQUIRED LIST		
No	Description	Mark
8	Verticals as shown	V7R
8	" opp hand	V7L
16	"	V8
8	"	V10
16	Diagonals	D11
16	"	D12
16	"	D13
8	Bottom Chords as shown	BC7R
8	" " opp hand	BC7L
8	" " as shown	BC8R
8	" " opp hand	BC8L
8	" "	BC9
8	Verticals as shown	V9R
8	" opp hand	V9L

GENERAL NOTES:

Material
Specifications
Rivets $\frac{3}{4}\phi$
Holes $\frac{13}{16}\phi$ unless noted
Reaming
Shop Paint 1 Ct Red Lead & Oil
Field Paint
Erection
Field Conn's
Inspection

For General Notes See Sheet #1

Material on Shop Bills 43 & 44

Atlantic Bridge Co Cont. #406

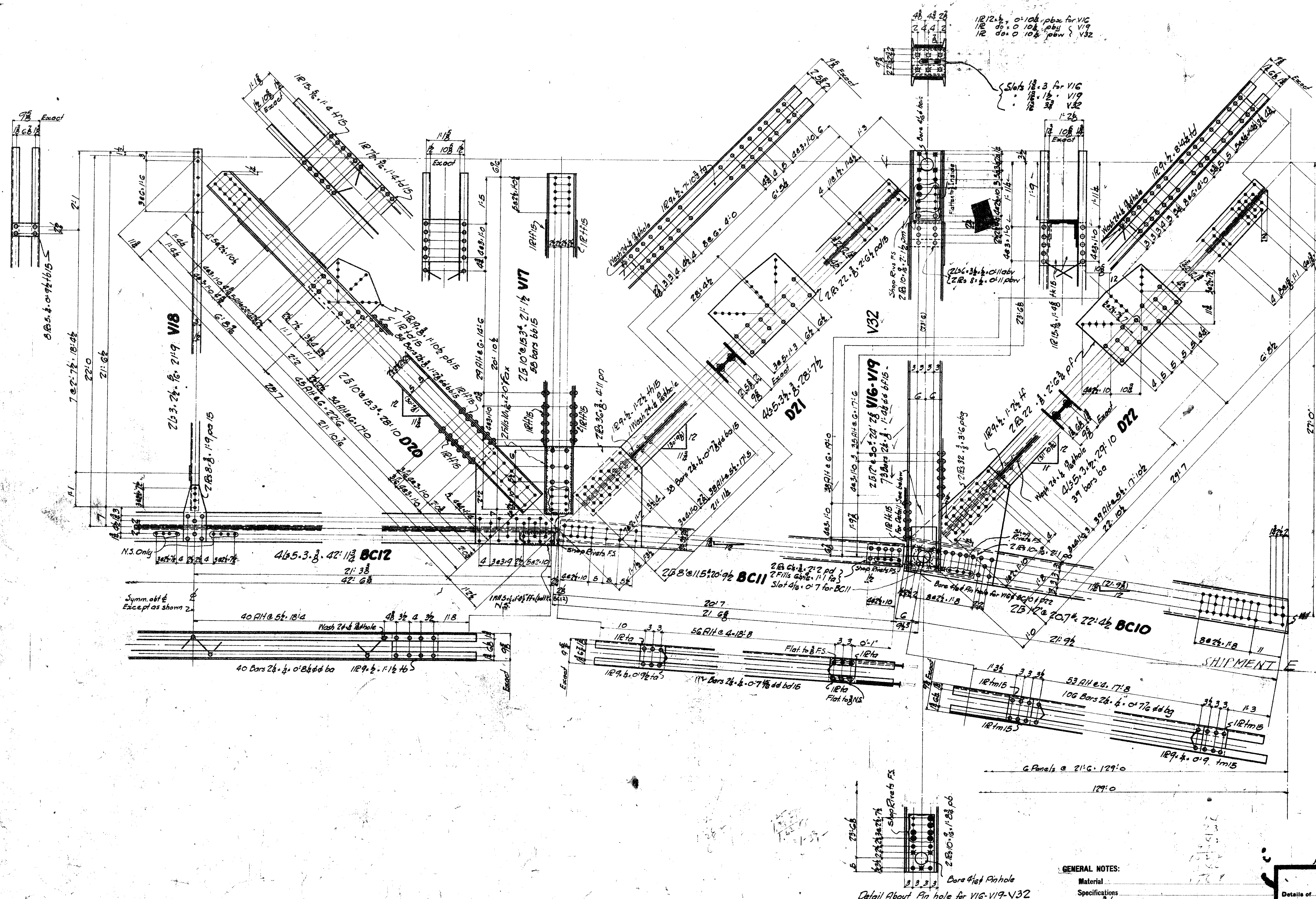
CONTRACT V 5585

Details of Cantilever Trusses

For Bridge over James River
Location Richmond, Va.
Owner Atlantic Bridge Co.

Virginia Bridge and Iron Co.
ROANOKE, VA.

To be fabricated at the Roanoke plant
Made by J.M.H. Traced by 1/22/24
In charge of Moore Checked by C.G.J. 4-1-24
Revised Field by
Scale in. = 1 ft. Sheet No. 15



REQUIRED LIST		
No	Description	Mark
10	Vertical Posts	V18
10	" " as shown	V17R
4	" " as shown	V16R
4	" " opp hand	V16L
3	" " as shown	V19R
3	" " opp hand	V19L
20	Diagonals	D20
16	"	D21
16	"	D22
10	Bottom Chords	BC12
8	" as shown	BC11R
8	" opp hand	BC11L
8	" as shown	BC10R
8	" opp hand	BC10L
1	Vertical Post as shown	V32R
1	opp hand	V32L
10	Verticals Post opp hand	V17L

GENERAL NOTES:

- Material
- Specifications
- Rivets ¾⌀
- Holes 13/16⌀ unless noted
- Reaming
- Shop Paint 1 Ct. Red Lead & Oil.
- Field Paint
- Erection
- Field Conn's
- Inspection

For General Notes See Sheet 1

Material on Shop Bills 45, 46, 47

Atlantic Bridge Co. Cont. #A400

CONTRACT V 5585

Details of Bottom Chord & Web Members for Suspended Trusses

For Bridge over James River

Location Richmond, Va.

Owner Atlantic Bridge Co.

VIRGINIA BRIDGE AND IRON CO.
ROANOKE, VA.

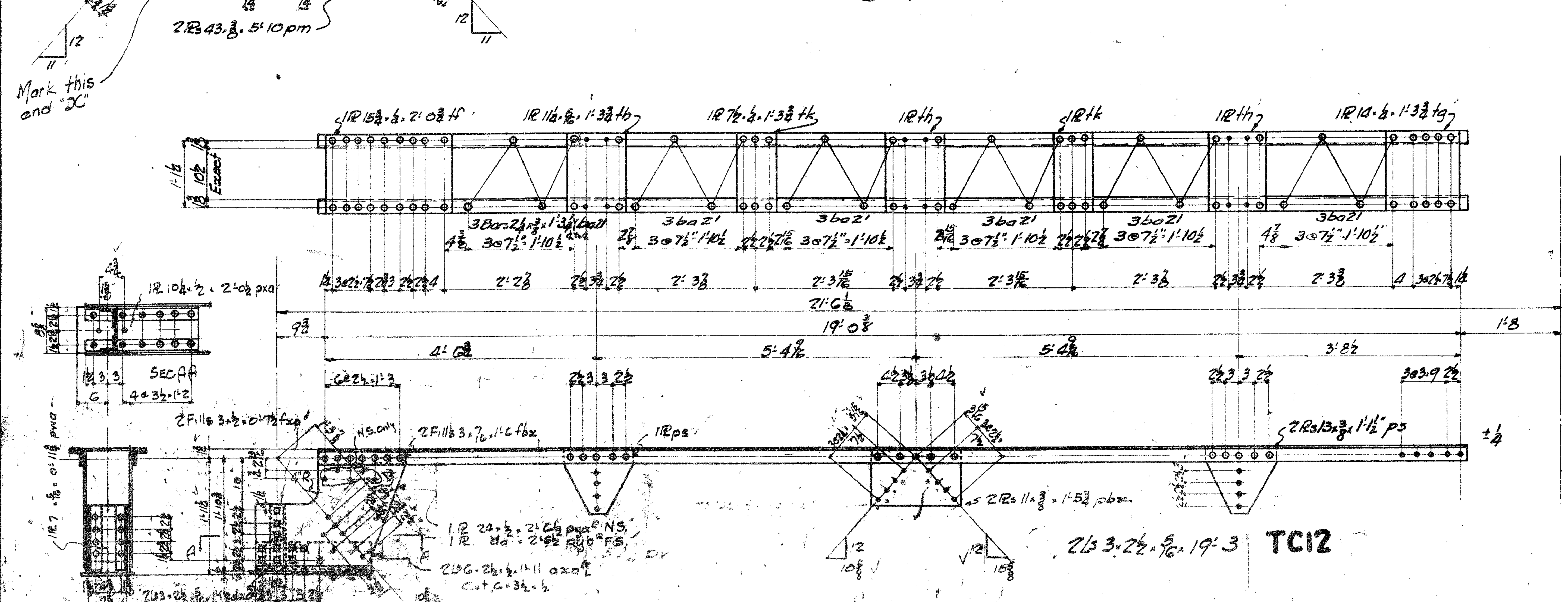
To be fabricated at Roanoke Plant

Made by J.M.H. Traced by

In charge of Moore Checked by G.I.

Revised Fld Ch'k'g by

Scale 1 In. = 1 Ft. Sheet No. 16 of



Shop Note: Work this Dwg. with Dwg. #15

REQUIRED LIST		
No	Description	Mark
4	Top Chords as shown	TC9R
4	" opp. hand	TC9L
4	" as shown	TC10R
4	" opp. hand.	TC10L
8	" as shown	TC11R
8	" opp hand	TC11L
8	" as shown	TC12R
8	" opp hand	TC12L

GENERAL NOTES:

Material

Specifications

Rivets ¾ ϕ

Holes 13/16 ϕ unless noted

Reaming

Shop Paint 1 Ct. Red Lead & oil

Field Paint

Erection

Field Conn's

Inspection

For General Notes See Sheet #1

Material on Shop Bills

Atlantic Bridge Co. Cont. #A400

CONTRACT V 5585

Details of Top Chord Sections

For Bridge over James River

Location Richmond, Va

Owner Atlantic Bridge Co.

VIRGINIA BRIDGE AND IRON CO.
ROANOKE, VA.

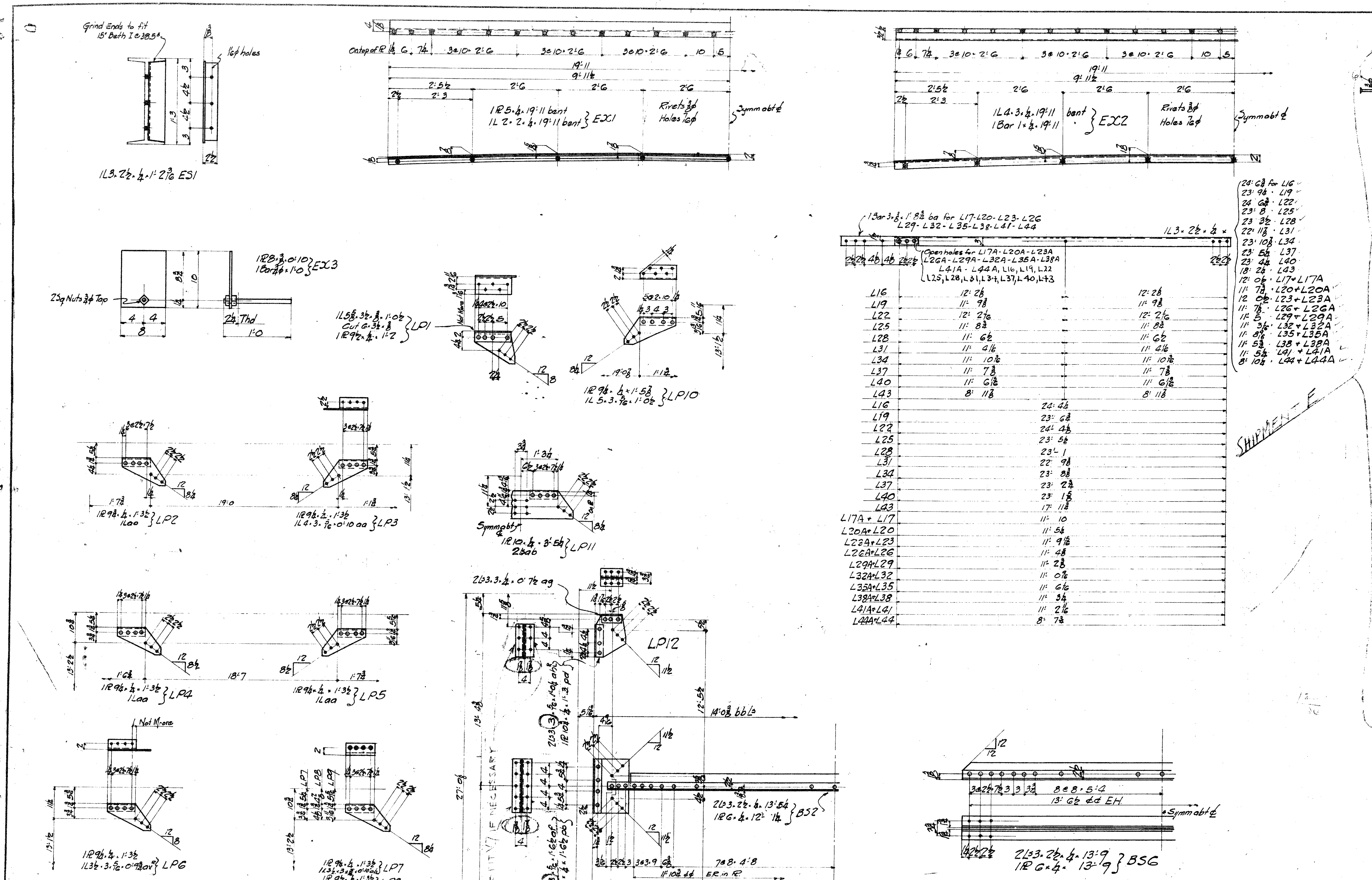
To be fabricated at Roanoke plant

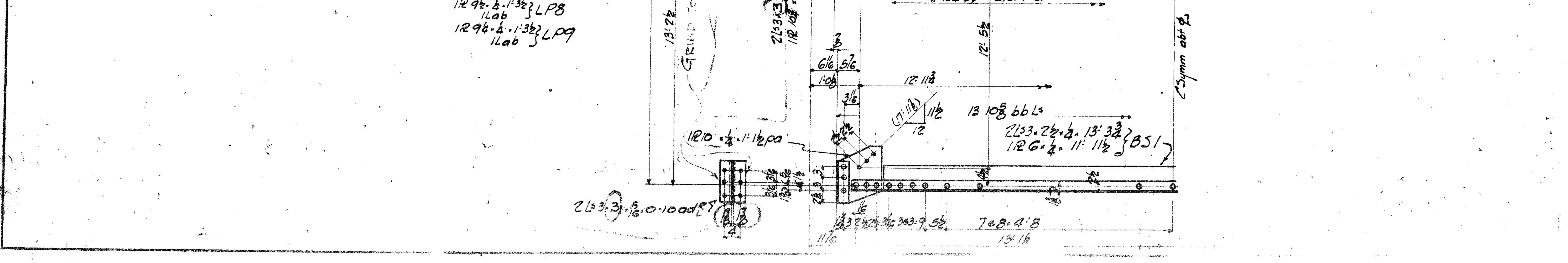
Made by J.M.H. Traced by

In charge of Moore Checked by C.G.F. 4-7-24

Revised F'ld Ch'k'd by

Scale in. = 1 Ft. Sheet No. 20 of





Required List		
No	Description	Mark
60	Stiffeners	ES1
6	Expansion Plates	EX1
6	" Slides	EX2
24	" Plates	EX3
204	Anchors ¾φ × 0'-5 ctsk hd.	AB4
8	Lateral Plates as shown	LP1R
8	" opp hand	LP1L
8	" as shown	LP2R
8	" opp hand	LP2L
8	" as shown	LP3R
8	" opp hand	LP3L
8	" as shown	LP4R
8	" opp hand	LP4L
8	" as shown	LP5R
8	" opp hand	LP5L
16	" as shown	LP6R
16	" opp hand	LP6L
10	" as shown	LP7R
10	" opp hand	LP7L
8	" as shown	LP8R
8	" opp hand	LP8L
2	" as shown	LP9R
2	" opp hand	LP9L
18	" as shown	LP10R
18	" opp hand	LP10L
18	" as shown	LP11
	"	
8	Bottom Struts	BS1
8	Struts	BS2
16	Lateral Plates	LP12
26	Laterals	L16
26	"	L17
8	"	L19
8	"	L20
8	"	L22
8	"	L23
10	"	L25
10	"	L26
8	"	L28
8	"	L29
8	"	L31
8	"	L32
8	"	L34
8	"	L35
10	"	L37
10	"	L38
18	"	L40
18	"	L41
16	"	L43
16	"	L44
9	Struts	BS6
26	Laterals	L17A
8	"	L20A
8	"	L23A
10	"	L26A
8	"	L29A
8	"	L32A
8	"	L35A
10	"	L38A
18	"	L41A
16	"	L44A

GENERAL NOTES:

- Material
- Specifications
- Rivets ¾φ unless noted
- Holes 13/16φ "
- Reaming
- Shop Paint 1 Ct. Red Lead & oil
- Field Paint
- Erection
- Field Conn's
- Inspection

For General Notes See Sheet #1

Material on Shop Bills

Atlantic Bridge Co Cont A400

CONTRACT V 5585

Details of Expansion Plates etc, Laterals and Lateral Plates
For Bridge over James River
Location Richmond, Va.
Owner Atlantic Bridge Co

VIRGINIA BRIDGE AND IRON CO.
ROANOKE, VA.

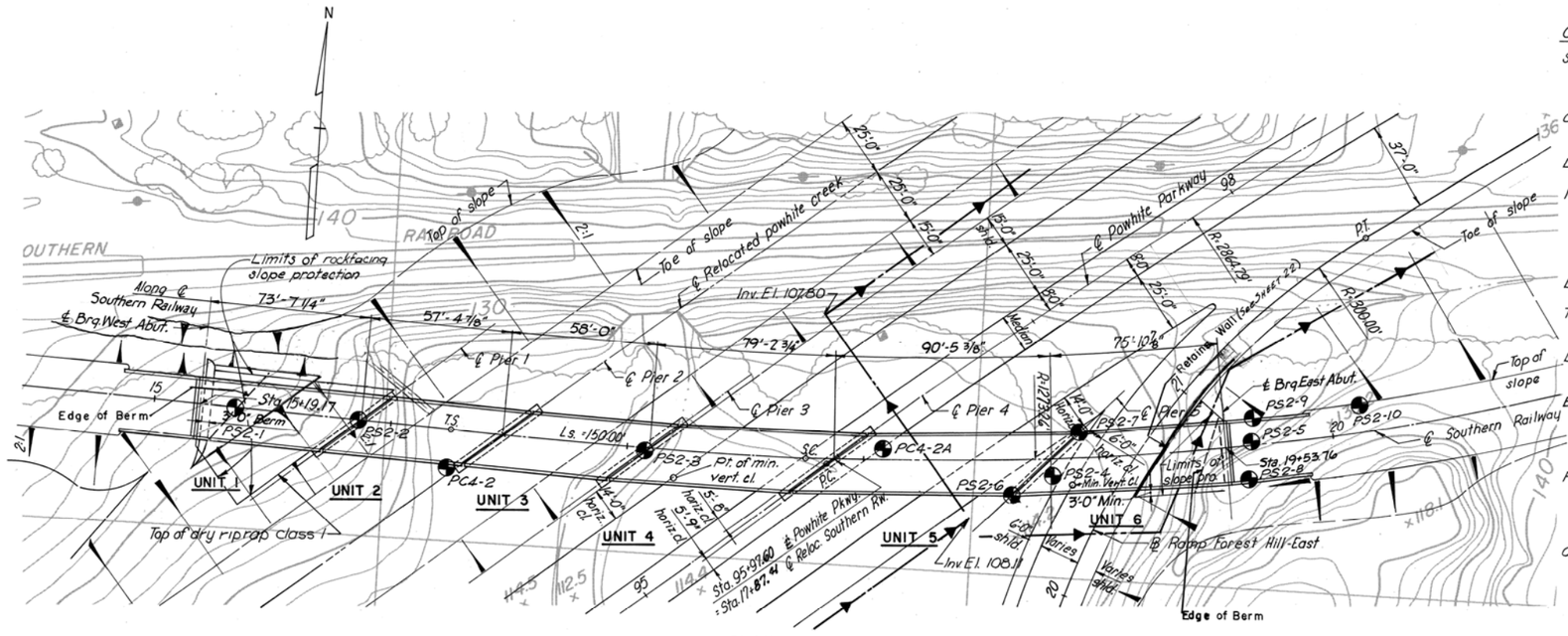
To be fabricated at Roanoke plant
Made by JMH — Traced by
In charge of Moore — Checked by
Revised — Fld Ch'k'd by
Scale in. = 1 Ft. — Sheet No. 22

Bridge 5

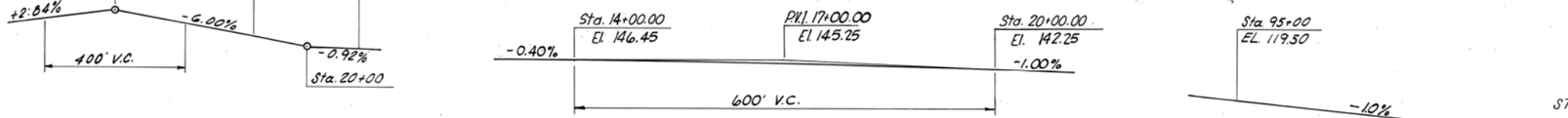
(Southern Railway Over Powhite Parkway)

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	132	188



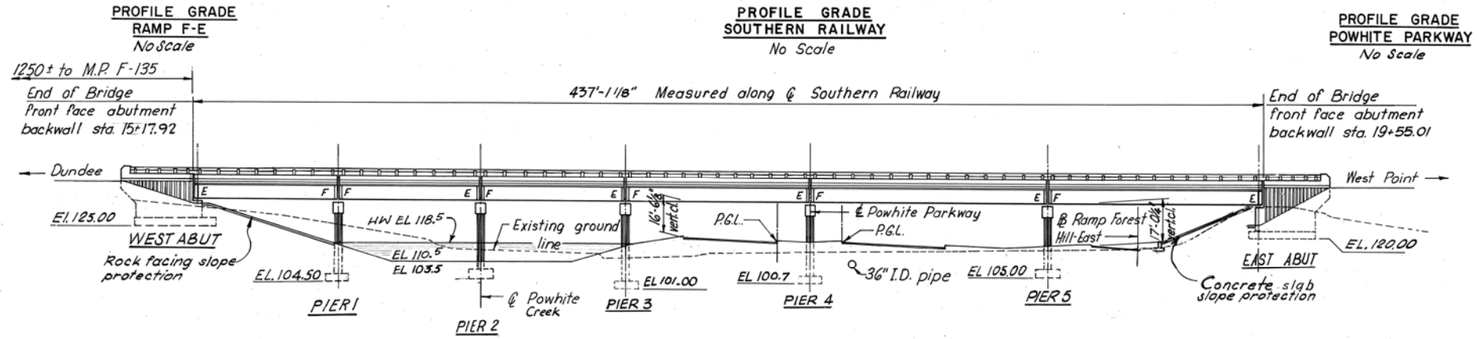
PLAN
Scale 1"=30'-0"



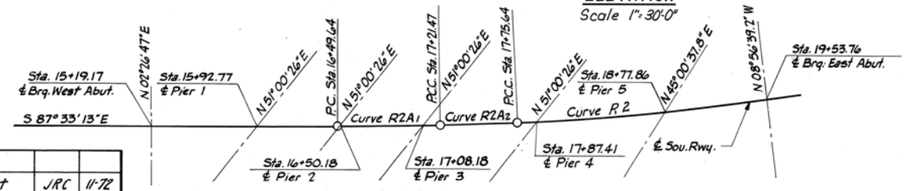
PROFILE GRADE
RAMP F-E
No Scale

PROFILE GRADE
SOUTHERN RAILWAY
No Scale

PROFILE GRADE
POWHITE PARKWAY
No Scale



ELEVATION
Scale 1"=30'-0"



BRIDGE LAYOUT
No Scale

Curve R2A1 (Arc Defin.)	Curve R2A2 (Arc Defin.)	Curve R2 (Chord Defin.)
R = 3353.53	R = 1445.00'	R = 1273.26'
Δ = 1°13'38.4"	Δ = 2°08'51.5"	L = 384.45'
T = 35.92'	T = 27.08'	D = 4°30'
L = 71.84'	L = 54.17'	
D = 1°42'30.7"	D = 3°57'54.4"	

	BY	DATE				
MADE	JDB	1-68	2	As Built	JRC	11-72
CHECKED	JGD	2-68	1	Dim. Unit 6 Brg. E. Abut.	TEM.	6-68
IN CHARGE	JGD		NO.	REVISION	BY	DATE

GENERAL NOTES :

SPECIFICATIONS :
A.R.E.A., current.
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.

LIVE LOAD :
Cooper's E-80

IMPACT :
Diesel impact plus rolling effect. Concrete Slab Derailment Impact :

$$LL \times \frac{LL}{DL + LL}$$

Structural Steel Derailment Impact :
0.9 x LL

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.

FOUNDATIONS :
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 :
Concrete in superstructure shall be Class A4 with a maximum slump of 2½ inches. All other 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 gradient is over 2%).

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 steal 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. Specification A36 except as Noted.

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.

BENCH MARK :
See Reference Ties and Field Control Data sheet in highway plans.
F-17 (Copper Weld Rod) Elevation 139.03
F-20 (Copper Weld Rod) Elevation 145.80

INDEX

Note :
See sh. 2 for Slab Elevations and Estimated Quantities.

⊕ – 2½" ϕ Cased Holes

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

SOUTHERN RAILWAY OVER POWHITE PARKWAY
BRIDGE B-05

GENERAL PLAN & ELEVATION

HAYES, SEAY, MATTERN & MATTERN
Associate Engineers
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

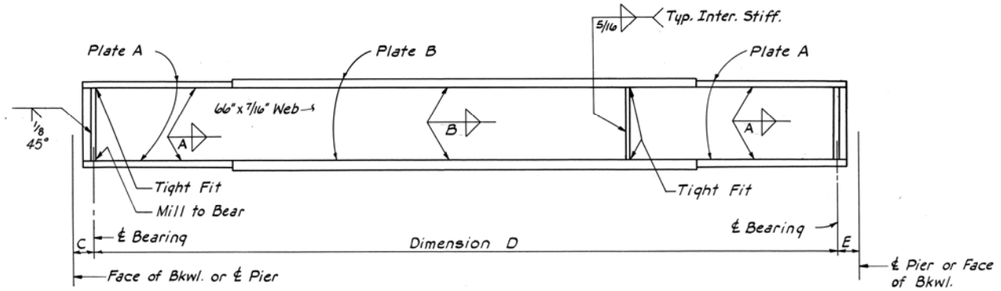
SCALE: AS SHOWN
CONTRACT NO.: C-2
SHEET NO. 1 OF 19

SOUTHERN RY. M.P F-135

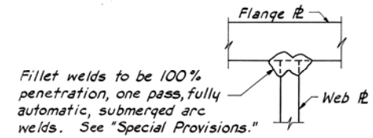
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	142	188

GIRDER SUMMARY

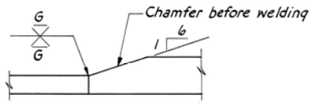
Girder Mark	PLATE A			PLATE B			Dimension			Brg. Stiff.
	Size	Length	Weld A	Size	Length	Weld B	C	D	E	Size
S1	18" x 1 7/16"	16'-9 3/4"	3/8	18" x 2 3/4"	51'-0"	1/2	1'-3"	82'-7 7/8"	1'-1 5/8"	8" x 1"
S2	18" x 1 3/4"	16'-10 3/8"	3/8	18" x 2 1/2"	47'-6"	1/2		79'-3 1/16"		
S3	18" x 1 1/2"	15'-1 15/16"	5/16	18" x 2 1/4"	47'-6"	3/8		75'-10 5/16"		
S4	18" x 1 1/2"	16'-5 3/16"	5/16	18" x 2 1/8"	41'-6"	3/8		72'-5 1/2"		
S5	18" x 1 1/4"	14'-9 1/8"	5/16	18" x 1 7/8"	41'-6	3/8		69'-0 3/4"		
S6	18" x 1 1/8"	14'-3 3/4"	5/16	18" x 1 5/8"	39'-0"	3/8		65'-7 1/16"		
S7	18" x 1"	13'-7 3/8"	5/16	18" x 1 1/2"	37'-0"	5/16		62'-3 3/4"		
S8	18" x 7/8"	13'-2"	5/16	18" x 1 1/4"	34'-6"	5/16	1'-3"	58'-10 3/8"	1'-1 5/8"	8" x 1"
S9	18" x 7/8"	14'-0 5/8"	5/16	18" x 1 1/8"	29'-0"	5/16	1'-1 5/8"	55'-2 5/16"	1'-1 5/8"	8" x 3/4"
S10-S16	18" x 7/8"	14'-0 1/2"	5/16			5/16	1'-1 5/8"	55'-1 3/16"	1'-1 5/8"	
S17	18" x 7/8"	14'-7"	5/16			5/16	1'-1 7/8"	56'-2 1/4"	1'-1 7/8"	
S18	18" x 7/8"	14'-4 3/16"	5/16			5/16	1'-1 3/4"	55'-8 3/16"	1'-1 3/4"	
S19	18" x 7/8"	14'-4 3/16"	5/16			5/16	1'-1 3/4"	55'-8 3/16"	1'-1 3/4"	
S20	18" x 7/8"	14'-4 3/16"	5/16			5/16	1'-1 3/4"	55'-8 7/8"	1'-1 3/4"	
S21	18" x 7/8"	14'-4 3/16"	5/16			5/16	1'-1 3/4"	55'-8 7/8"	1'-1 3/4"	
S22	18" x 7/8"	14'-4 3/16"	5/16			5/16	1'-1 3/4"	55'-8 7/8"	1'-1 3/4"	
S23	18" x 7/8"	14'-2"	5/16			5/16	1'-1 7/8"	55'-4 3/4"	1'-1 7/8"	
S24	18" x 7/8"	13'-11 7/8"	5/16	18" x 1 5/8"	29'-0"	5/16	1'-1 3/4"	55'-0 5/8"	1'-1 7/8"	8" x 3/4"
S25	18" x 1 5/8"	16'-3 15/16"	3/8	18" x 2 3/8"	47'-0"	1/2	1'-2 3/8"	77'-7 1/8"	1'-2 5/8"	8" x 7/8"
S26	18" x 1 5/8"	16'-1 1/2"	3/8	18" x 2 3/8"	47'-0"	1/2	1'-2 5/16"	77'-2 5/8"	1'-2 5/16"	8" x 7/8"
S27		15'-11 1/16"	3/8			1/2	1'-2 1/4"	76'-9 5/8"	1'-2 1/4"	
S28		15'-11 1/16"	3/8			1/2	1'-2 1/4"	76'-9 5/8"	1'-2 1/4"	
S29		15'-11 1/16"	3/8			1/2	1'-2 1/4"	76'-9 5/8"	1'-2 1/4"	
S30		15'-11 1/16"	3/8			1/2	1'-2 1/4"	76'-9 5/8"	1'-2 1/4"	
S31		15'-11 1/16"	3/8			1/2	1'-2 1/4"	76'-9 5/8"	1'-2 1/4"	
S32	18" x 1 5/8"	15'-5 7/16"	3/8	18" x 2 3/8"	47'-0"	1/2	1'-2 1/8"	75'-11 1/2"	1'-2 1/8"	8" x 7/8"
S33	20" x 2"	17'-4"	3/8	20" x 2 7/8"	54'-0"	1/2	1'-3 3/4"	86'-6 1/2"	1'-1 3/4"	9" x 1"
S34		17'-5 3/16"	3/8			1/2	1'-3 9/16"	86'-10 3/8"	1'-1 5/8"	
S35		17'-7 1/16"	3/8			1/2	1'-3 1/2"	87'-2 1/4"	1'-1 5/8"	
S36		18'-0 9/16"	3/8	20" x 2 7/8"	54'-0"	1/2	1'-3 1/2"	88'-0"	1'-1 5/8"	9" x 1"
S37		16'-11 3/16"	3/8	20" x 3"	57'-0	1/2	1'-3 1/2"	88'-7 3/8"	1'-1 5/8"	
S38		17'-4 5/16"	3/8			1/2"	1'-3 1/2"	89'-7 1/2"	1'-1 5/8"	
S39		17'-4 13/16"	3/8			1/2	1'-3 9/16"	89'-9"	1'-1 1/2"	
S40	20" x 2"	17'-5 5/16"	3/8	20" x 3"	57'-0"	1/2	1'-3 1/4"	89'-10 5/8"	1'-1 5/8"	9" x 1"
S41	18" x 1 1/8"	14'-2 1/2"	5/16	18" x 1 5/8"	36'-6"	1/2	1'-2 5/8"	62'-9 5/8"	1'-3"	8" x 1"
S42	18" x 1 1/4"	14'-5 1/4"	5/16	18" x 1 3/4"	40'-0"	3/8	1'-2 5/8"	66'-8 7/8"	1'-3"	
S43	18" x 1 3/8"	14'-8 1/16"	5/16	18" x 2"	43'-6"	3/8	1'-2 5/8"	70'-8 1/2"	1'-3"	
S44	18" x 1 1/2"	15'-1 7/8"	5/16	18" x 2 1/4"	46'-6"	3/8	1'-2 5/8"	74'-8 1/8"	1-3"	
S45	18" x 1 3/4"	16'-7 5/8"	3/8	18" x 2 1/2"	47'-6"	1/2	1'-2 3/4"	78'-7 5/8"	1'-3"	
S46	18" x 1 7/8"	16'-6 15/16"	3/8	18" x 2 3/4"	51'-6"	1/2	1'-2 3/4"	82'-6 1/4"	1'-3"	8" x 1"
S47	20" x 1 7/8"	17'-7 9/16"	3/8	20" x 2 3/4"	53'-6"	1/2	1'-2 3/4"	86'-6 3/8"	1'-3"	9" x 1"
S48	20" x 2"	17'-10"	3/8	20" x 3"	57'-0	1/2	1'-2 5/8"	90'-6 3/8"	1'-3"	9" x 1"



GIRDER DETAIL
No Scale



FLANGE PLATE WELDS
No Scale



FLANGE THICKNESS TRANSITION
No Scale

DEAD LOAD DEFLECTION SUMMARY

Girder Mark	Total Dead Load Defl. @ ℄ Girder
S1, S2	1/2"
S3	7/16"
S4	3/8"
S5, S6	5/16"
S7, S8	1/4"
S9, S24	3/16"
S25, S32	7/16"
S33, S38	9/16"
S39, S40	5/8"
S41	1/4"
S42	5/16"
S43, S44	3/8"
S45	7/16"
S46	1/2"
S47	9/16"
S48	5/8"

The above deflections are those anticipated to occur in the girder upon placement of the total dead load. The girders shall not be cambered to compensate for this deflection.

SHOP SPLICE DETAILS
Scale: 3/4"=1'-0"

AS BUILT

	BY	DATE				
MADE	HB	1-68	2	As Built	JRC	11-72
CHECKED	THN	2-68	1	Girder Summary	T.E.N.	6-68
IN CHARGE	JGD		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

SOUTHERN RAILWAY OVER
POWHITE PARKWAY
BRIDGE B-05

GIRDER DETAILS

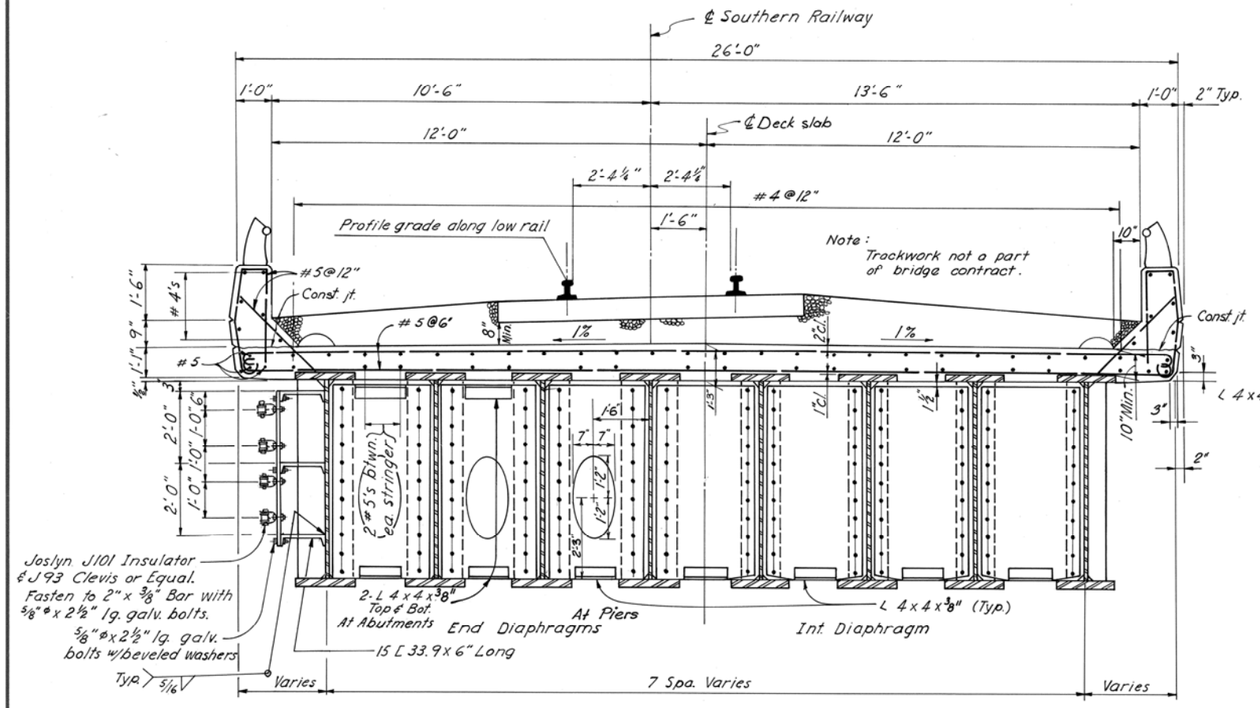
HAYES, SEAY, MATTERN & MATTERN
Associate Engineers

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: NO SCALE
CONTRACT NO.: 2
SHEET NO. 11 OF 19

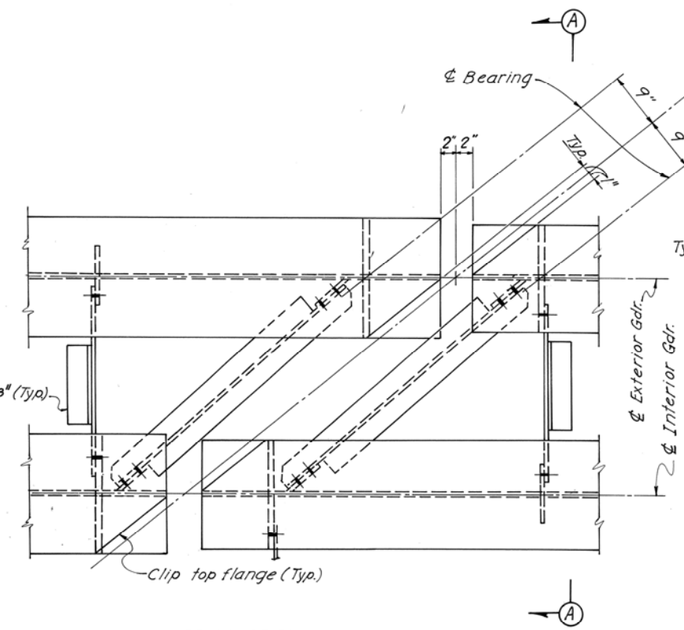
SOUTHERN RY. M.P. F-135.2

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	143	188

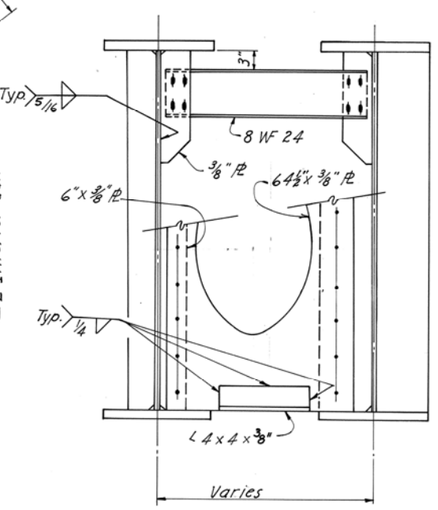


NOTE:
Space rocks 20'-0" apart along girders. Fasten high frequency wires to inside of insulators (Max. tension 250 #).

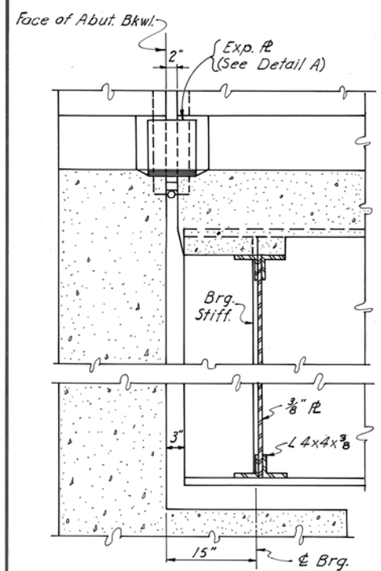
TYPICAL TRANSVERSE SECTION
Scale: ½" = 1'-0"



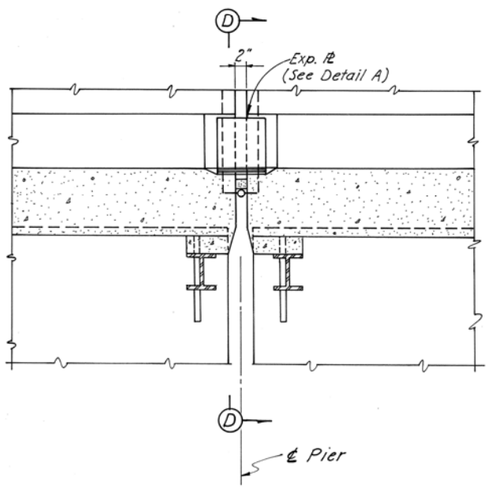
DETAIL OF END DIAPHRAGM
Scale: 1" = 1'-0"



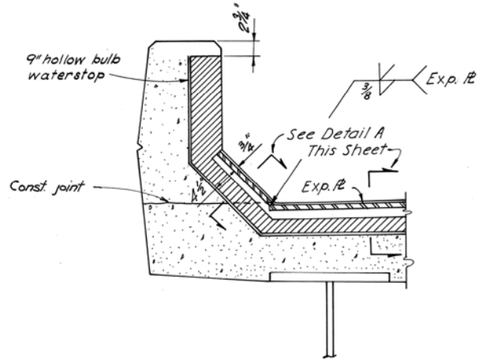
SECTION A-A
Scale: 1" = 1'-0"



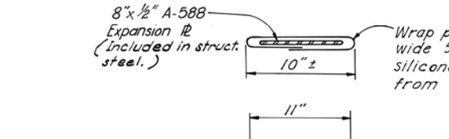
SECTION AT ABUTMENT
Scale: 1" = 1'-0"

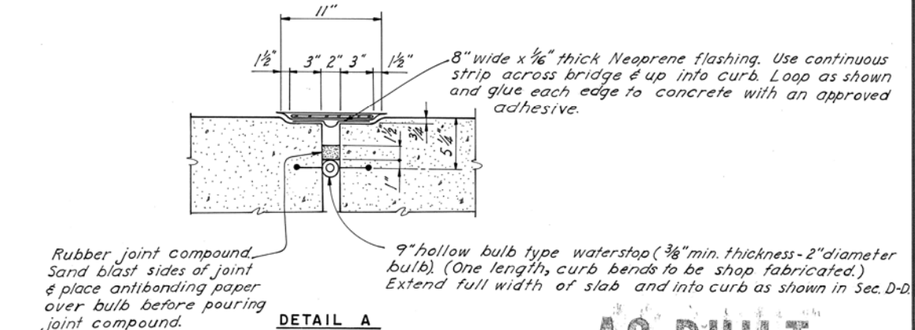


SECTION AT PIER
Scale: 1" = 1'-0"



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





DETAIL A
No Scale

	BY	DATE	NO.	REVISION	BY	DATE
			3	As Built	JRC	11-72
MADE	HB	1-68	2	General	J.G.V.	10-70
CHECKED	THN	2-68	1	End diaph & dim.	TEM	6-68
IN CHARGE	JGD					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

SOUTHERN RAILWAY OVER POWHITE PARKWAY
BRIDGE B-05

SUPERSTRUCTURE DETAILS

HAYES, SEAY, MATTERN & MATTERN
Associate Engineers

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS SHOWN
CONTRACT NO.: 2
SHEET NO. 12 OF 19

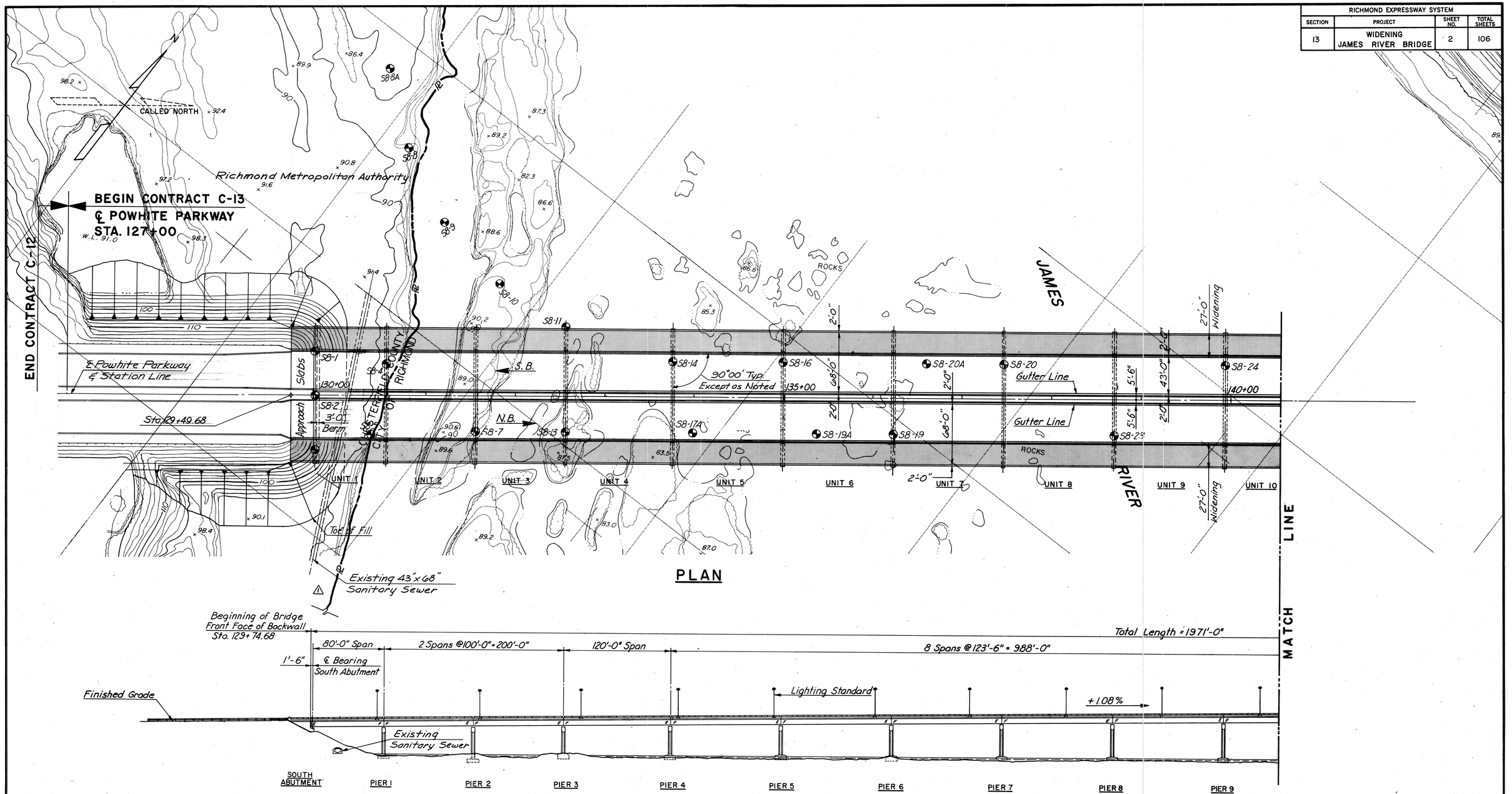
SOUTHERN RY. M.P. F-135.2

Bridge 8

(Powhite Parkway “Rte. 76” Over James River, Kanawha Canal and CSX RR)

Record Set Plans

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



	BY	DATE	NO.	REVISION	BY	DATE
MADE	A.L.C.	3-87		As Built	TEM	3-89
CHECKED	T.F.P.	3-87	1	Property Line	ALC	4-87
IN CHARGE	S.R.					

AS BUILT

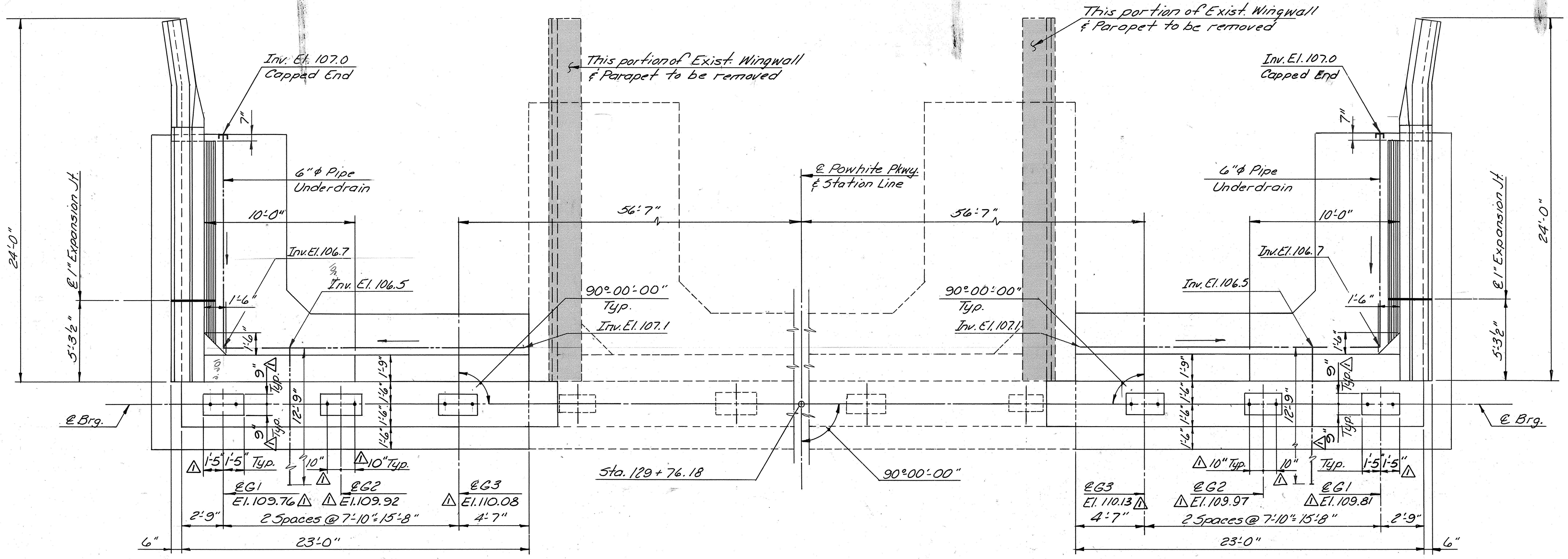
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

GENERAL PLAN AND ELEVATION

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

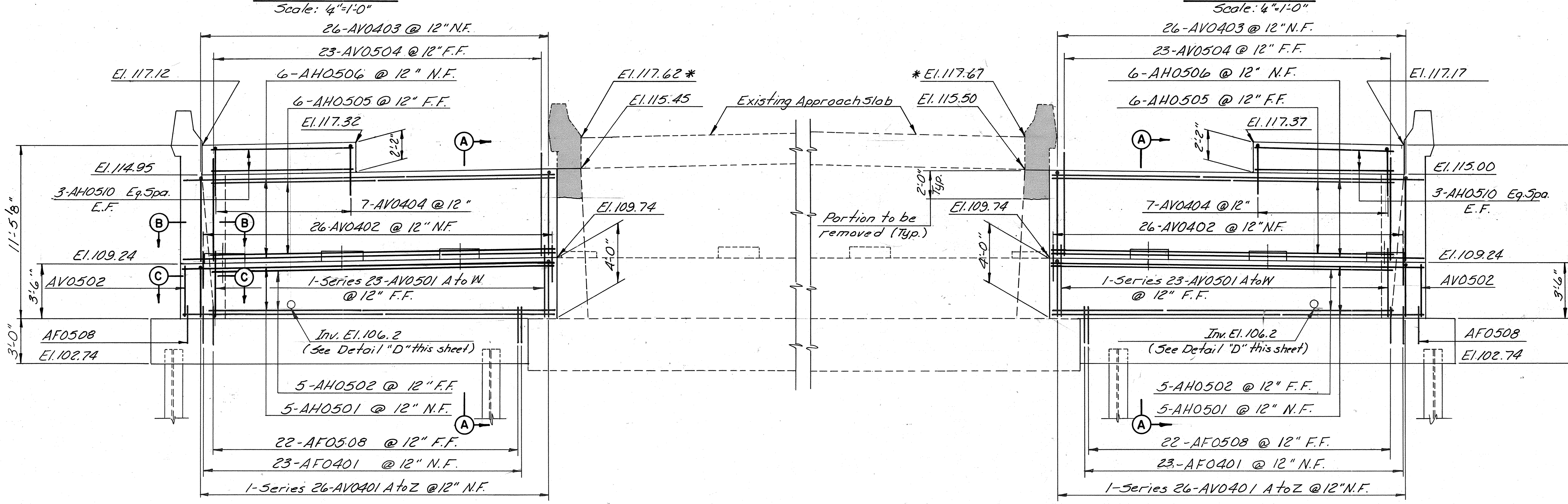
SCALE: 1" - 50'
CONTRACT NO.: C-13
SHEET NO. 2 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	5	106



PLAN – NORTHBOUND
Scale: ¼" = 1'-0"

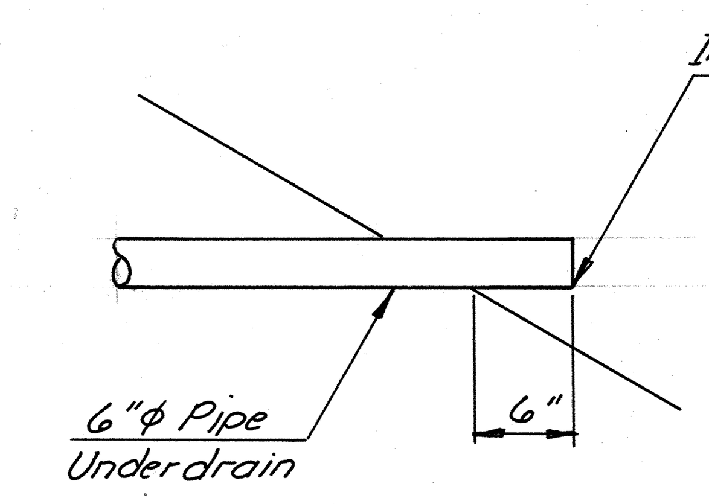
PLAN – SOUTHBOUND
Scale: ¼" = 1'-0"



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

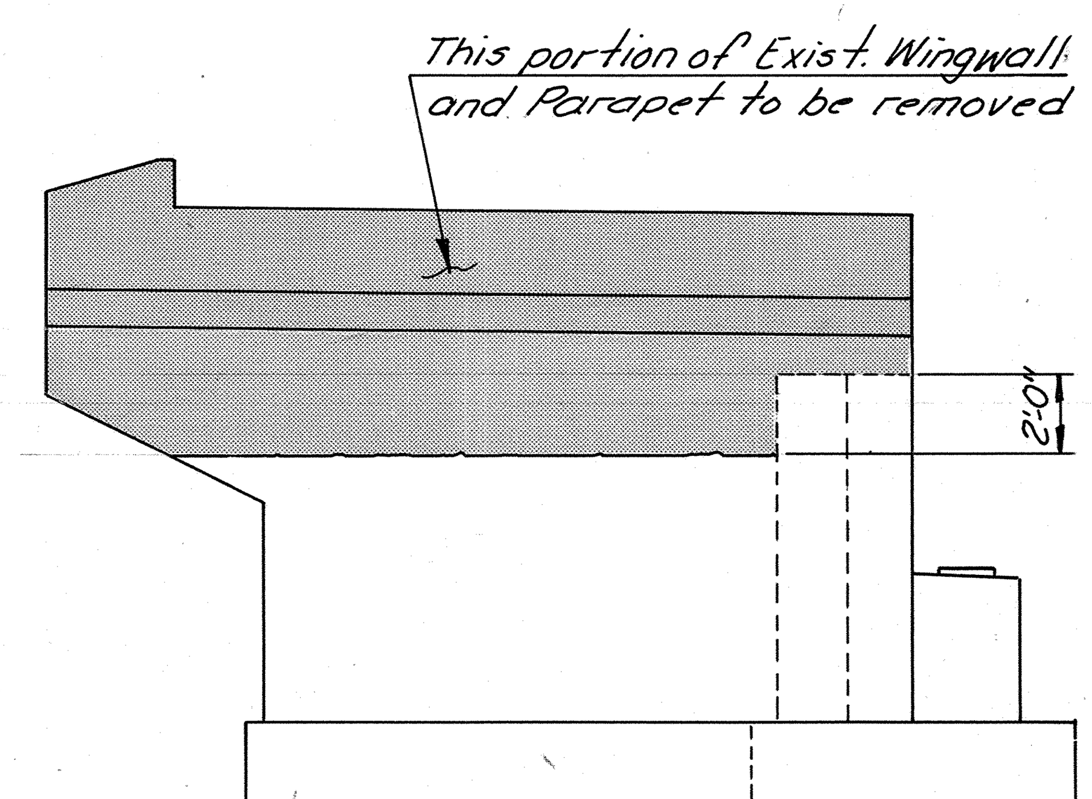
ELEVATION – SOUTHBOUND
Scale: ¼" = 1'-0"

* Field survey elevations.



DETAIL "D"
No Scale

LEGEND:
E.F. = Each Face
F.F. = Far Face
N.F. = Near Face



LIMITS OF REMOVAL
No Scale

NOTE:
For Sections A-A, B-B, and C-C see Sheet No. 6

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAL	1-87		As Built	TEM	3-89
CHECKED	T.F.P.	3-87	△	Rev. Anchor Bolt	ALC	6-87
IN CHARGE S.R.						

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

SOUTH ABUTMENT PLAN AND ELEVATION

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

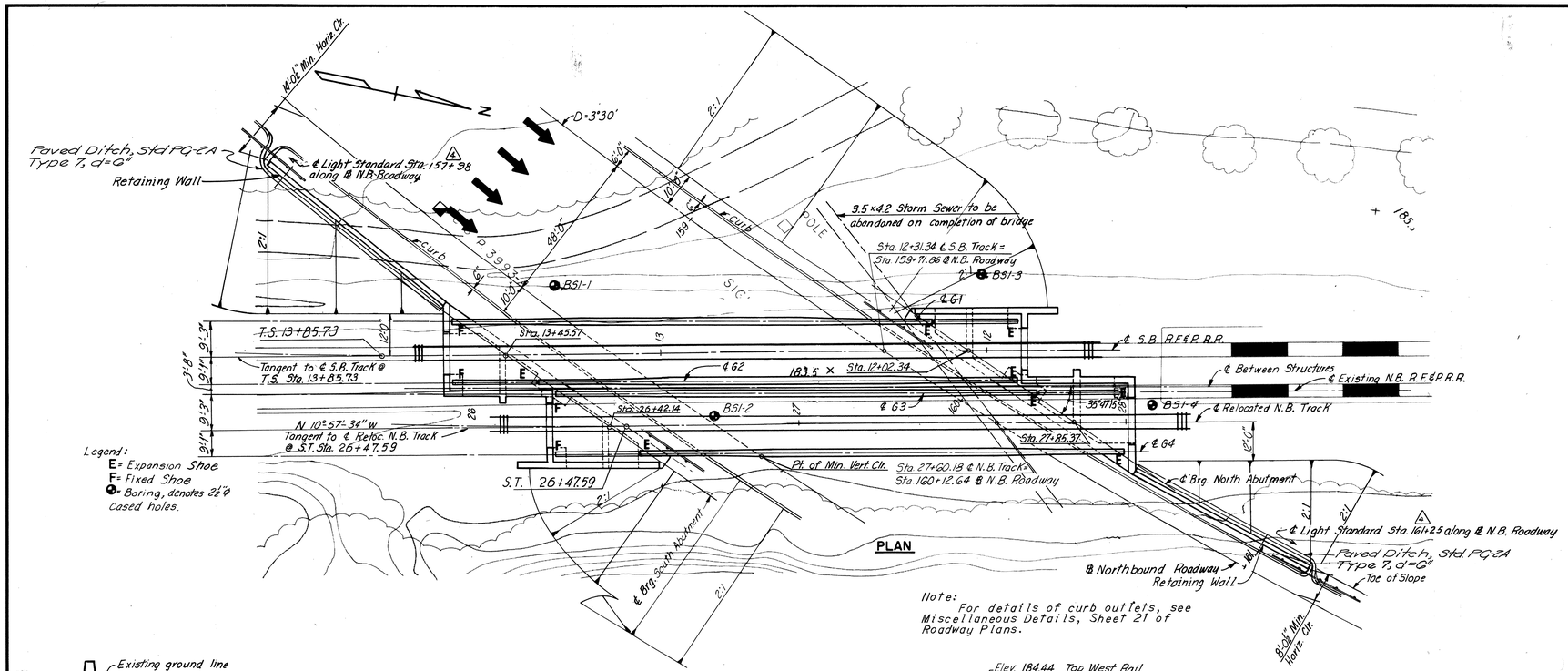
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 5 OF 106

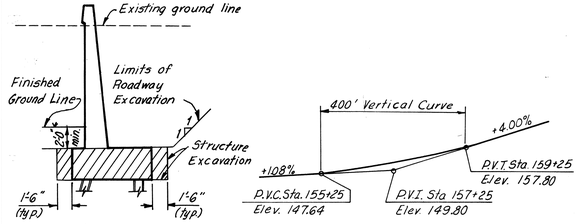
Bridge 9S & 9N

(Northbound & Southbound CSX RR over Northbound Powhite Parkway “Rte. 76”)

Record Set Plans

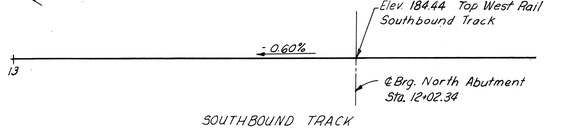
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	94	155



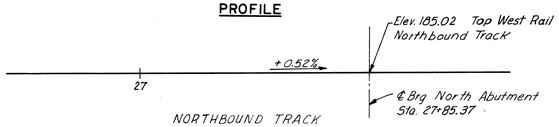


LIMITS OF EXCAVATION
No Scale

NORTHBOUND ROADWAY
PROFILE



SOUTHBOUND TRACK
PROFILE



NORTHBOUND TRACK
PROFILE

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.

ESTIMATED QUANTITIES

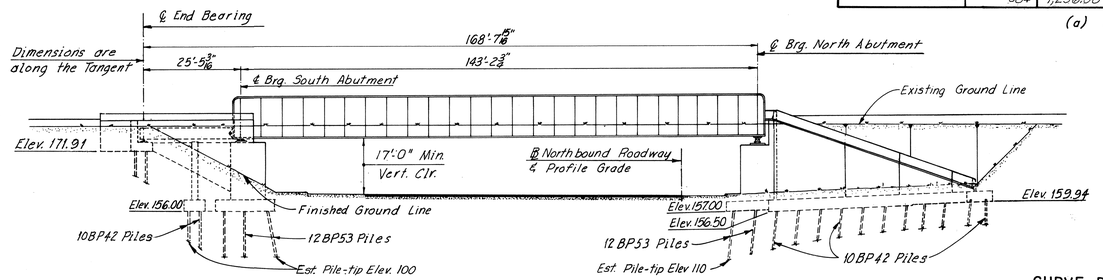
	Struct. Excav. Cu. Yds.	Concrete (a) Cu. Yds.	Reinf. Steel Lbs.	Struc. Steel (Lbs.) Mild Carbon	Struc. Steel (Lbs.) High Strength	Porous Backfill Cu. Yds.	Underdrain 6" Dia. Pipe Lin. Ft.	Steel piles 10BP42 Lin. Ft.	Steel piles 12BP53 Lin. Ft.	Asphalt damp-proofing Sq. Yds.	4" Asphalt Plank Sq. Ft.	1" Butyl Rubber Waterproofing 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	2,993.0	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	5,023.4	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'

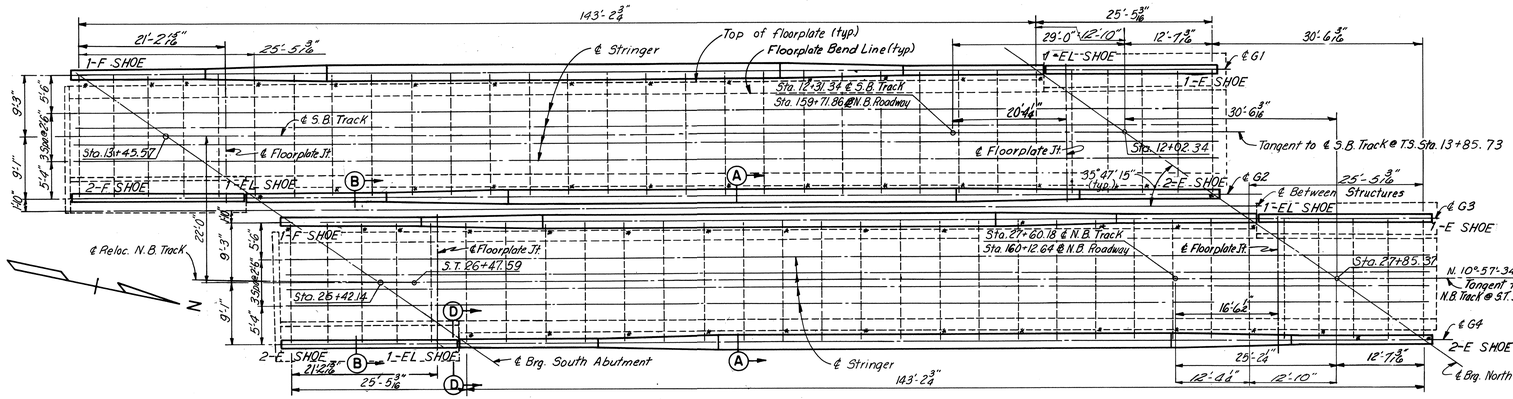
AS BUILT

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

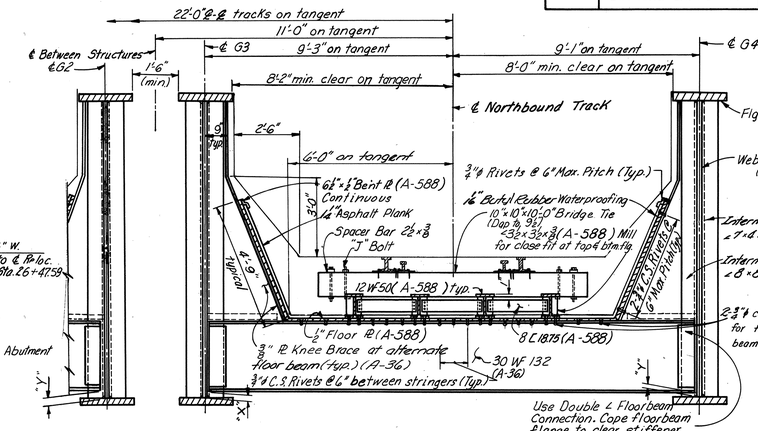
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	100	155



*---Denotes Knee Brace Location.

FRAMING PLAN

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



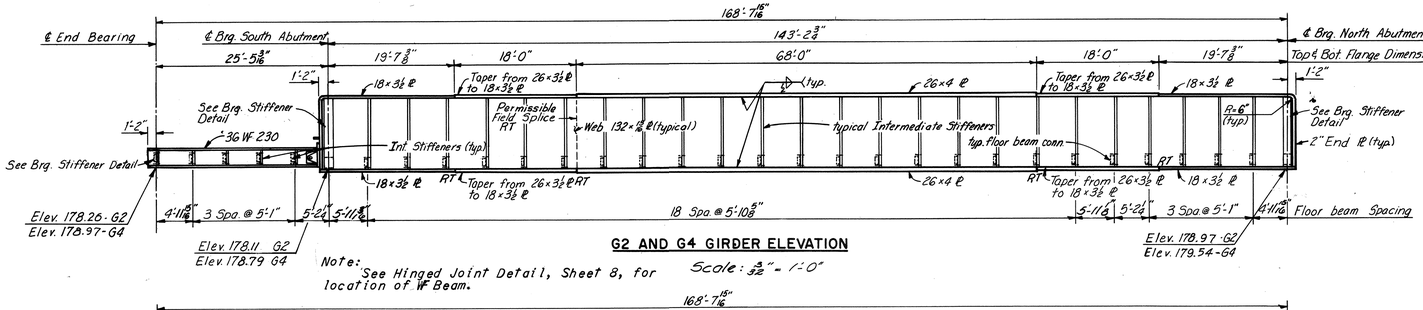
Note:
Floorplate connected to stringers by 2 rows of 3/4" Dia. countersunk rivets at 6" maximum pitch.
⚠ All riveted conections shown hereon may, at the contractors option, be replaced by high strength bolt connections

SECTION A-A

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

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

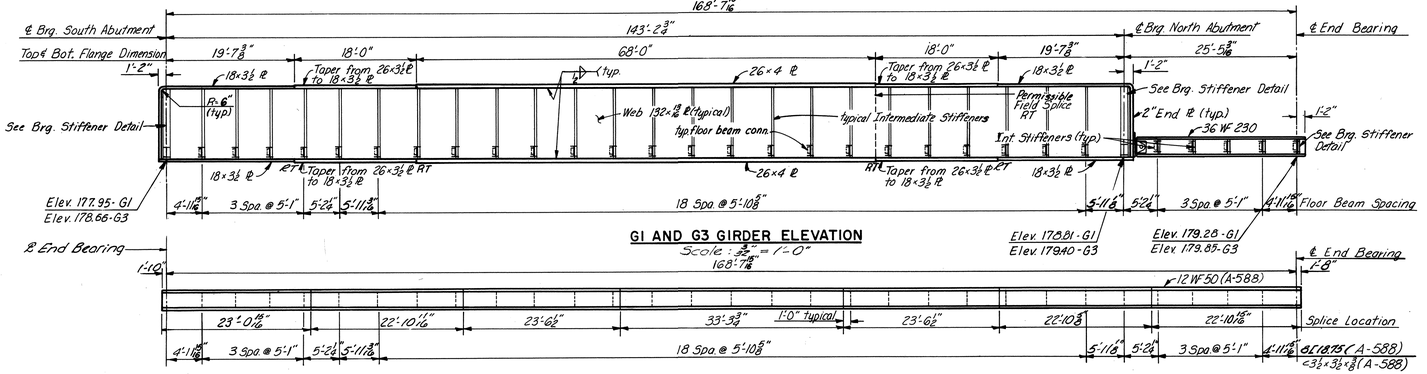
Note:
Asphalt plank shall be recessed to receive flange of 12 WF 50 stringers.



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 7/8"	2 3/4"	3"
20'-2 15/16"	2 3/4"	3"
25'-3 7/8"	3"	3"
31'-4 3/4"	3"	3"
37'-2 15/16"	3"	3"
43'-1 3/4"	3"	3"
49'-0 3/4"	3"	3"
54'-10 15/16"	3"	3"
60'-9 1/2"	3"	3"
66'-8 1/16"	3"	3"
72'-6 11/16"	3"	3"
78'-5 5/8"	3"	3"
84'-3 15/16"	3"	3"
90'-2 9/16"	3"	3"
96'-1 1/8"	3"	3"
101'-11 15/16"	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 3/4"	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 7/8"	2 15/16"	2 7/8"
20'-2 15/16"	3"	3"
25'-3 7/8"	3"	3"
31'-4 3/4"	3"	3"
37'-2 15/16"	3"	3"
43'-1 3/4"	3"	3"
49'-0 3/4"	3"	3"
54'-10 7/16"	3"	3"
60'-9 1/2"	3"	3"
66'-8 1/16"	3"	3"
72'-6 5/8"	3"	3"
78'-5 5/8"	3"	3"
84'-4"	3"	3"
90'-2 5/8"	3"	3"
96'-1 1/4"	3"	3"
101'-11 7/16"	3"	3"
107'-10 1/2"	3"	3"
113'-9 1/4"	3"	3"
119'-7 1/16"	3"	3"
125'-6 5/8"	3"	3"
131'-5"	3"	3"
137'-3 3/8"	3"	3"
143'-2 1/4"	3"	3"
148'-1"	2 3/4"	3"
153'-1" 6"	2 3/4"	3"
158'-1" 7"	2 5/8"	3"
163'-1" 8"	2 3/4"	3"
168'-1" 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

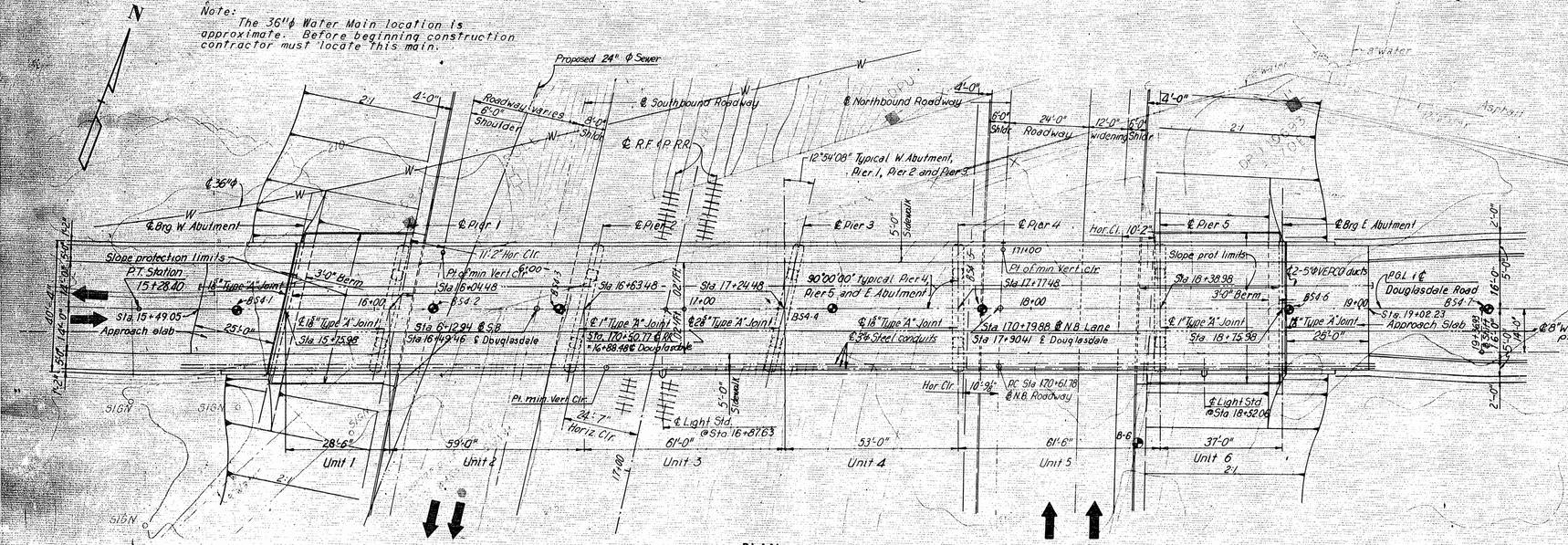
Bridge 13

(Douglasdale Road Over Beltline Expressway and R.F. & P.R.R.)

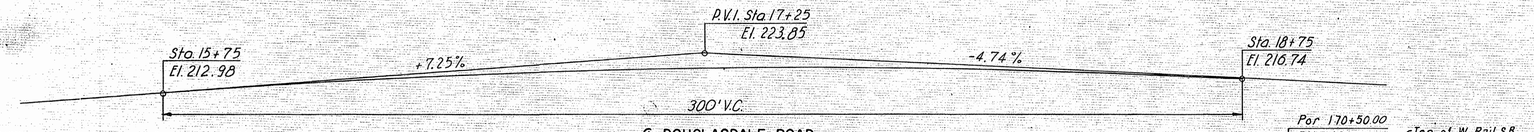
Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	118	153

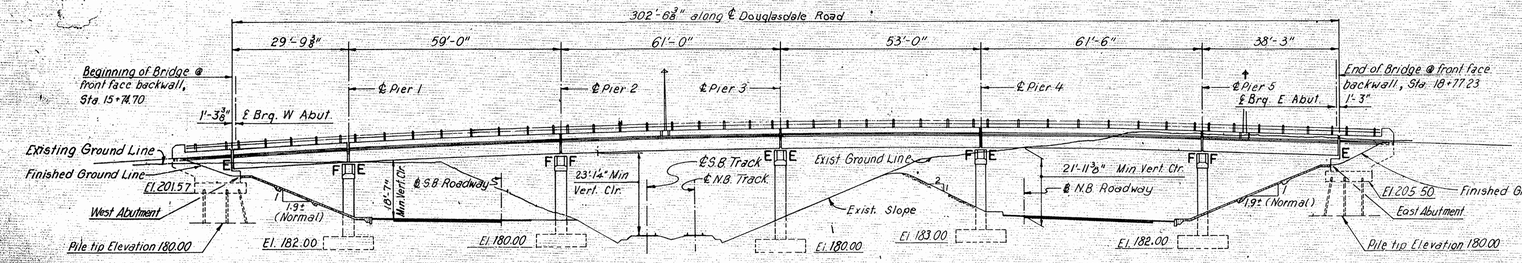
Note:
The 36"ϕ Water Main location is approximate. Before beginning construction contractor must locate this main.

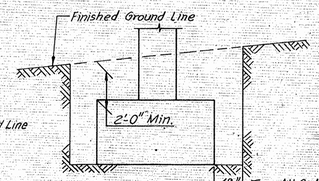


PLAN



PROFILE GRADES





CURVE DATA

℄ Northbound Roadway
P.I. = Sta. 173+60.82
Δ = 17°47'52"
D = 3°00'00"
T = R = 299.04'
L = 593.26'
R = 1,909.86'

Note: Pile Tip Elevations shown estimated.

(a) Class A3, unless noted
(b) Class A4
* Frame and Cover only.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	JV	3-4-68	3	Profile Grade	P.S.	4-8-71
CHECKED	MAA	3-6-68	2	General	J.G.V.	10-70
IN CHARGE	FKD		1	General Revisions	R.L.M.	5-1768

ELEVATION — ESTIMATED QUANTITIES — LIMITS OF EXCAVATION

	Struct. Excav. Cu. Yds.	Concrete (a) Cu. Yds.	Reinf. Steel lbs.	Str. Stl. Mild Carbon lbs.	Aluminum Railing (2-rails) Lin. Ft.	Porous Backfill Cu. Yds.	Under-drain 6" Dia. Pipe Lin. Ft.	Steel Piles 10BP42 Lin. Ft.	Con. Slab Sl. Prot. Sq. Yds.	Asphalt Damp-proofing Sq. Yds.	Approach Slab Conc. (a) Cu. Yds.	Metal Conduit Lin. Ft. 2" Dia.	Metal Conduit Lin. Ft. 3" Dia.	Conduit 5" Dia VEP-20 Lin. Ft.	Water Main 8" Dia. Lin. Ft.	*Junction Box Lbs.
Superstructure	—	464.8(b)	87,170	333,000	650	—	—	—	—	—	—	7	914	704	358	360
West Abutment	130	80.0	13,500	—	—	5.2	50	307	193.3	27	40.4	—	—	—	—	—
Pier 1	185	65.1	10,220	—	—	—	—	—	—	—	—	—	—	—	—	—
Pier 2	119	67.5	11,120	—	—	—	—	—	—	—	—	—	—	—	—	—
Pier 3	204	67.9	11,400	—	—	—	—	—	—	—	—	—	—	—	—	—
Pier 4	171	66.4	10,740	—	—	—	—	—	—	—	—	—	—	—	—	—
Pier 5	156	66.6	10,690	—	—	—	—	—	—	—	—	—	—	—	—	—
East Abutment	126	77.5	13,100	—	—	4.8	49	358	239.7	25	39.4	—	—	—	—	—
TOTAL	1091	464.8(b) 491.0	167,940	333,000	650	10	99	665	433	52	79.8	7	914	704	358	360

GENERAL NOTES

ROADWAY: One 28'-0" clear roadway. Two 5'-0" sidewalks.

CAPACITY: Dead Load includes 15 lbs. per sq. ft. for future wearing surface.
Live Loads - HS20-44 loading.

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.

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.

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 A4. All other 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.
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 diameter bar unless otherwise noted.

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

BENCH MARK: A-16 Copperweld rod N.W. of R.R. Bridge on Douglasdale. Elev. 213.60

Boring, denotes 2½"ϕ Cased hole

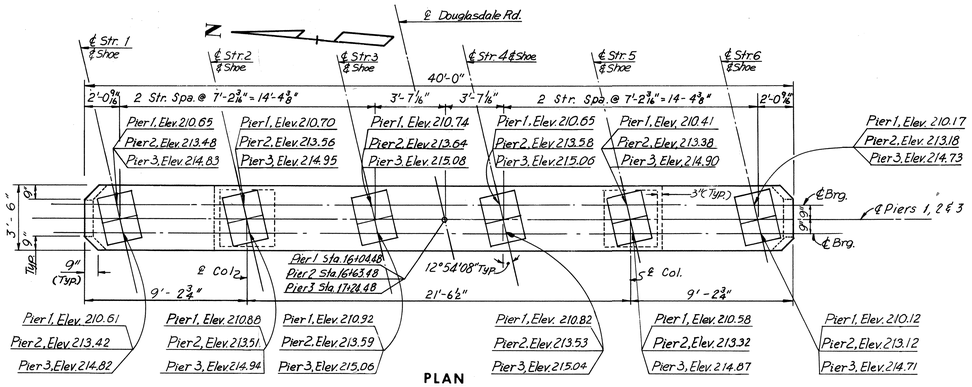
INDEX

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO 13
DOUGLASDALE ROAD OVER BELTLINE EXPRESSWAY AND R.F.&P.R.R.
GENERAL PLAN AND ELEVATION

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

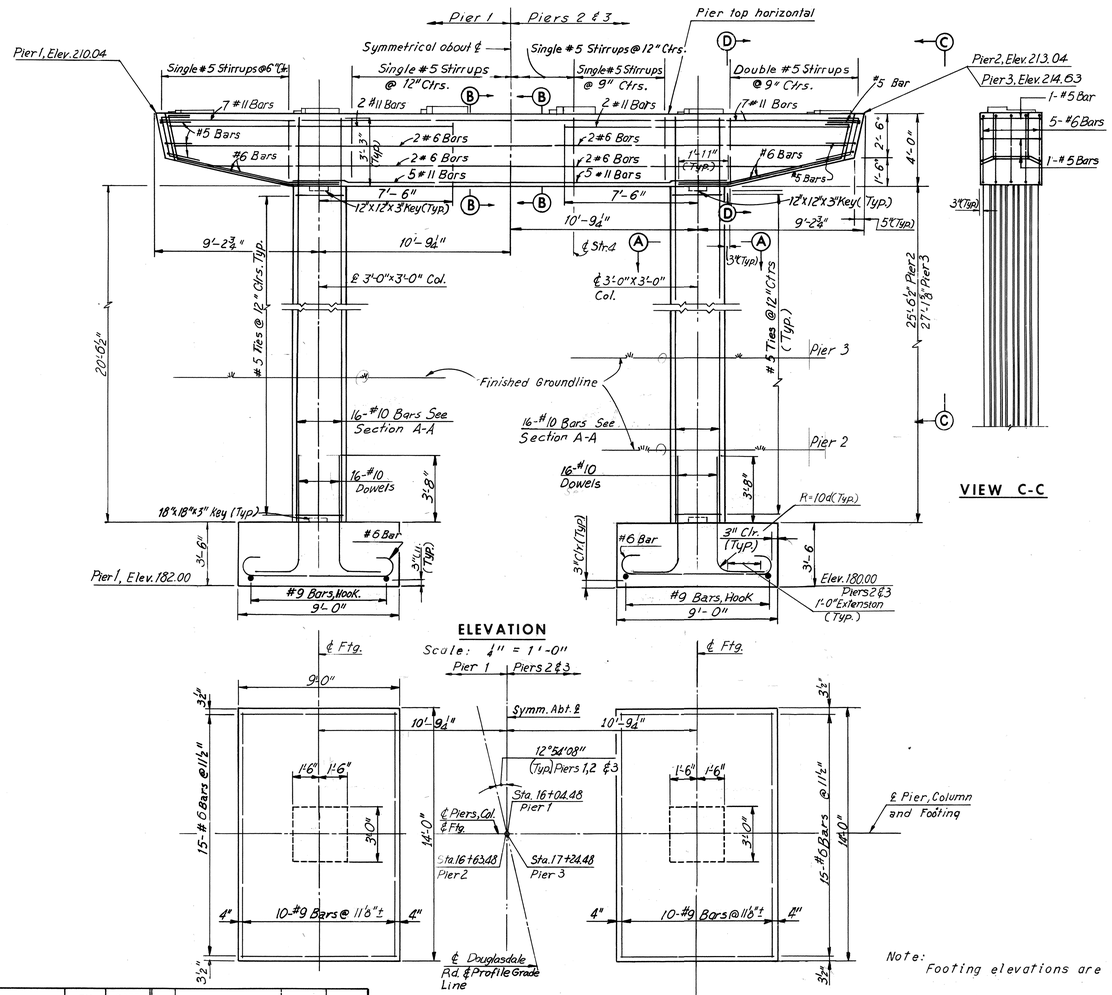
SCALE: 1"=20'
CONTRACT NO. 4
SHEET NO. 1 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	121	155



PLAN

Scale: 1" = 1'-0"



ELEVATION

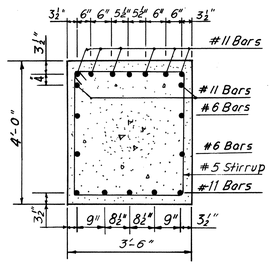
Scale: 1" = 1'-0"

VIEW C-C

FOOTING PLAN

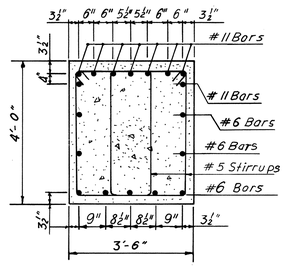
Scale: 1" = 1'-0"

Note: Footing elevations are exact.



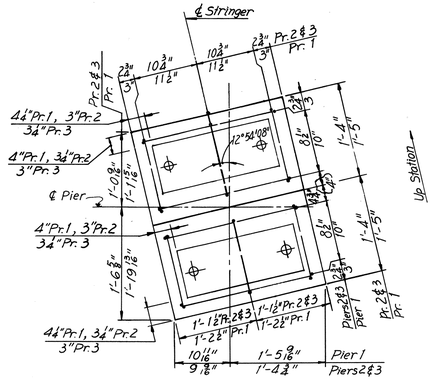
SECTION B-B

Scale: 1" = 1'-0"



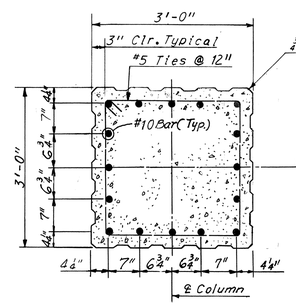
SECTION D-D

Scale: 1" = 1'-0"



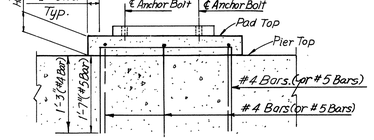
PLAN

No Scale



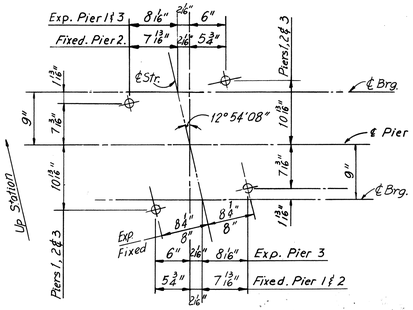
SECTION A-A

Scale: 3/4" = 1'-0"



REINFORCED PAD DETAIL

No Scale



ANCHOR BOLT SETTING PLAN

No Scale

Note:
Pads with heights of 4" or less shall not be reinforced.
Pads with heights between 4" and 6" use #4 bar.
Pads with heights between 8" and 12" use #5 bar.

Notes:
For shoe details see Sheet 51.
For Framing Plan see Sheet 6.

AS BUILT

	BY	DATE
MADE	M.A.A	9-29-67
CHECKED	J.J.W	3-6-68
IN CHARGE	F.K.D	

NO.	REVISION	BY	DATE
2	As Builts	R.H.	2-2-73
1	Profile Grade	P.S.	4-7-71

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO 13
DOUGLASDALE ROAD OVER BELTLINE EXPRESSWAY AND R.F.&P.R.R.
PIERS 1, 2 AND 3

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

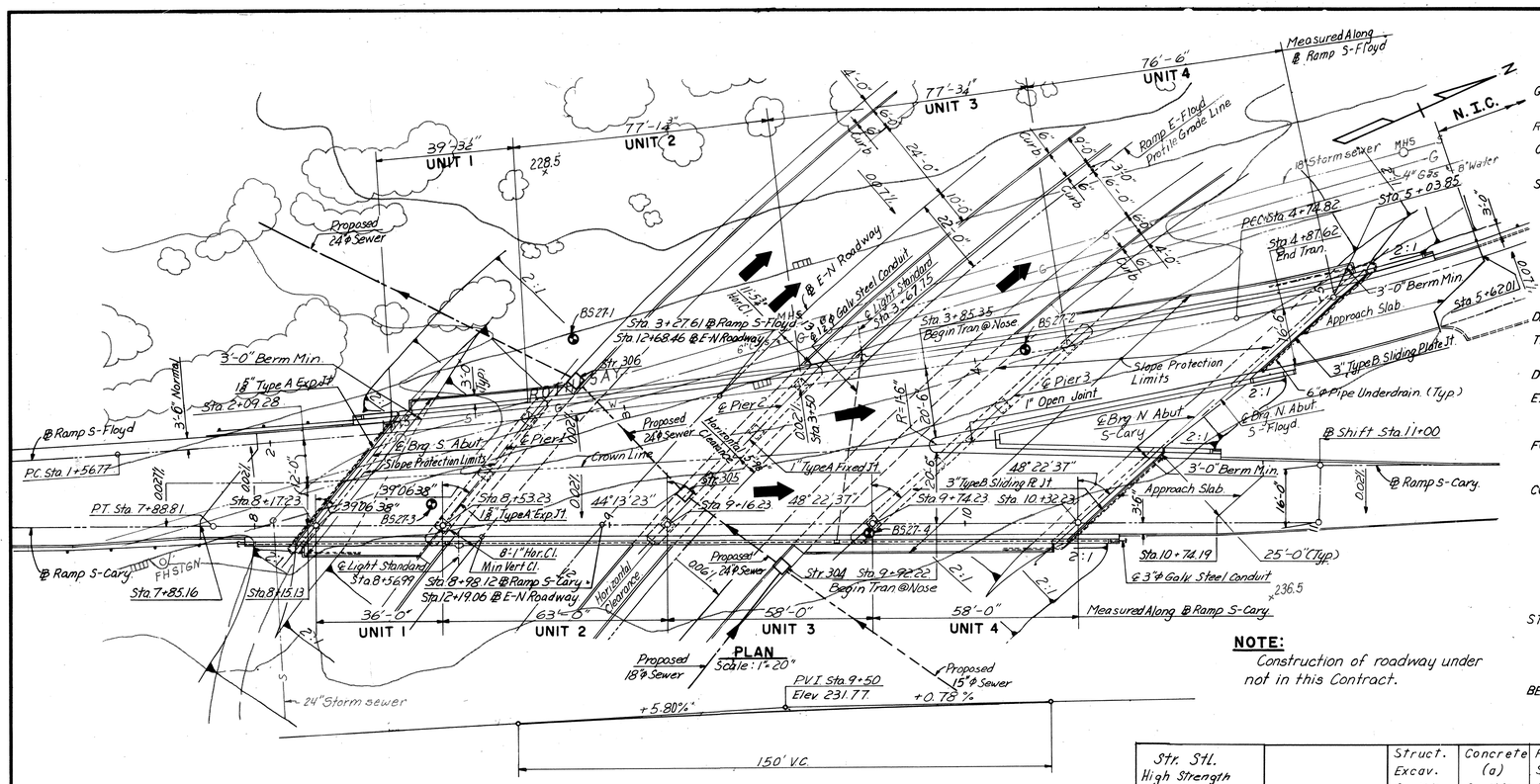
SCALE: As Noted
CONTRACT NO.: 4
SHEET NO. 4 OF 12

Bridge 17

(Ramp from NB Powhite Parkway “Rte. 76”/NB I-195 Connector over I-195 to Cary Street and Ramp from Northbound I-195 to Floyd Avenue)

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	130	155



GENERAL NOTES

ROADWAY — Variable width of roadway.

CAPACITY: — Dead Load includes 15 lbs. per sq. ft. for future wearing surface.

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.

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.

FOUNDATIONS: — 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: — Concrete in superstructure shall be Class A4. All other 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.

All reinforcing steel shall conform to A.S.T.M. A-615, 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.

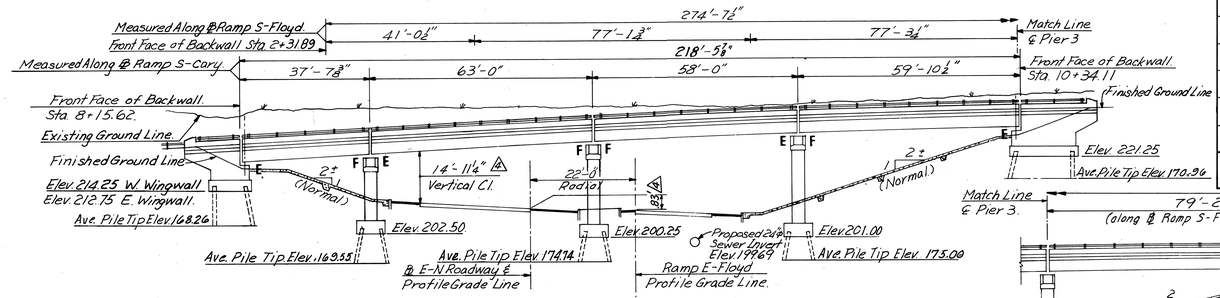
STEEL NOTES: — Structural steel shall conform to A.S.T.M. Specification A36 except as noted. All field connections shall be made with high strength bolts. High strength bolts shall be ⅞" diameter unless otherwise noted and shall conform to A.S.T.M Specification A-325.

BENCH MARK: — A-25 Copperweld rod S. side of Thompson St. and Cary Road. Elev. 256.59.

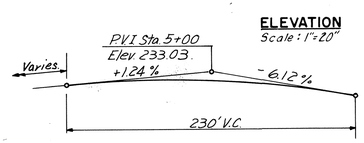
ESTIMATED QUANTITIES

Str. Stl. High Strength lbs. A588		Struct. Excav. Cu. Yds.	Concrete (a) Cu. Yds.	Reinf. Steel Lbs.	Str. Stl. Mild Carbon Lbs.	Aluminum railing (1-Rail) Lin. Ft.	Porous Backfill Cu. Yds.	Under-drain 6" Dia. Pipe Lin. Ft.	Con. Slab Sl. Prot. Sq. Yds.	Asphalt damp-proofing Sq. Yds.	Approach Slab Conc. (a) Cu. Yds.	Steel Piles 10BP42 Lin. Ft.	Parapet Junct. Box Complete Each	Metal Conduit 3" Dia. Lin. Ft.	Metal Conduit 1½" Dia. Lin. Ft.
11,561.2	Superstructure	–	395.98(b)	94,764	342,021.5	687	–	–	–	–	–	–	2	290	56
	South Abutment	179	87.81	26,326	–	–	7	68	–	31	62.91	654.3	–	–	–
	Pier 1	67	67.39	7,653	–	–	–	–	–	–	–	413.4	–	–	–
	Pier 2	90	99.35	12,167	–	–	–	–	–	–	–	432.1	–	–	–
	Pier 3	156	112.88	15,056	–	–	–	–	–	–	–	493.8	–	–	–
	N-Abut. S-Cary	143	79.26	21,016	–	–	5	56	–	25	52.85	621.7	–	–	–
	N-Abut. S-Floyd	180	88.22	23,400	–	–	6	80		28	73.48	802.1	–	–	–
	Total	815	395.98(b) 534.91	206,382	342,021.5	687	18	204	–	84	189.24	3,417.4	2	290	56

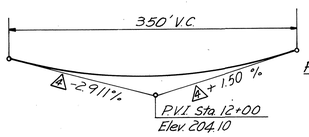
Estimated Quantities Notes:
(a) Class A3, unless noted
(b) Class A4



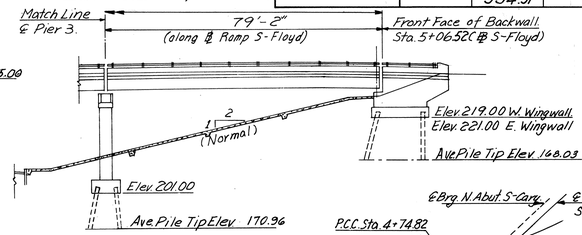
ELEVATION
Scale: 1"=20'

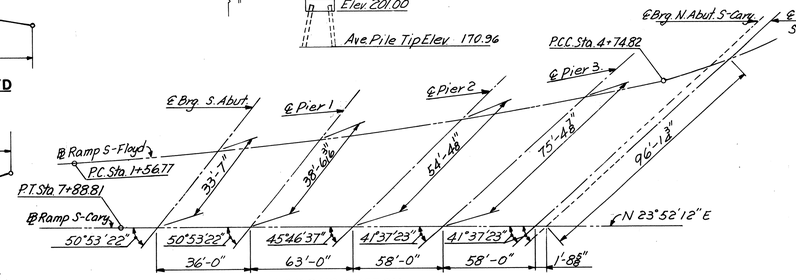


PROFILE GRADE ℄ RAMP S-FLOYD



PROFILE GRADE ℄ E-N ROADWAY





LAYOUT SKETCH
No Scale

CURVE DATA

℄ RAMP S-CARY

P.I. = Sta. 3+96.91
Δ = 15°46'34"
D = 2°00'00"
T = 396.91'
L = 788.81'
R = 2864.79'

℄ RAMP S-FLOYD

P.I. = Sta. 3+15.96
Δ = 6°21'39"
D = 2°00'00"
T = 159.19'
L = 318.05'
R = 2864.79'

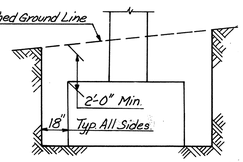
℄ RAMP S-FLOYD

P.I. = Sta. 5+60.34
Δ = 20°18'32"
D = 12°00'00"
T = 85.52'
L = 169.24'
R = 477.46'

℄ E-N ROADWAY

P.I. = Sta. 12+48.94
Δ = 59°15'01"
D = 7°30'00"
T = 434.42'
L = 790.00'
R = 763.94'

NO.	REVISION	BY	DATE
5	As Builts	R.H.	2-5-73
		BY	DATE
	MADE	G.C.C.	1-2-68
	CHECKED	L.J.R.	3-7-68
	IN CHARGE	F.K.D.	
4	Profile Grade - ℄ E-N Rdwy	L.B.P.	4-70
3	Parapet	E.V.R.	12-70
2	General	J.G.V.	10-70
1	General Revision	A.M.H	5-13-68



LIMITS OF STRUCTURE EXCAVATION

AS BUILT

INDEX

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 17
RAMP S-CARY OVER EAST-NORTH ROADWAY
GENERAL PLAN AND ELEVATION

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

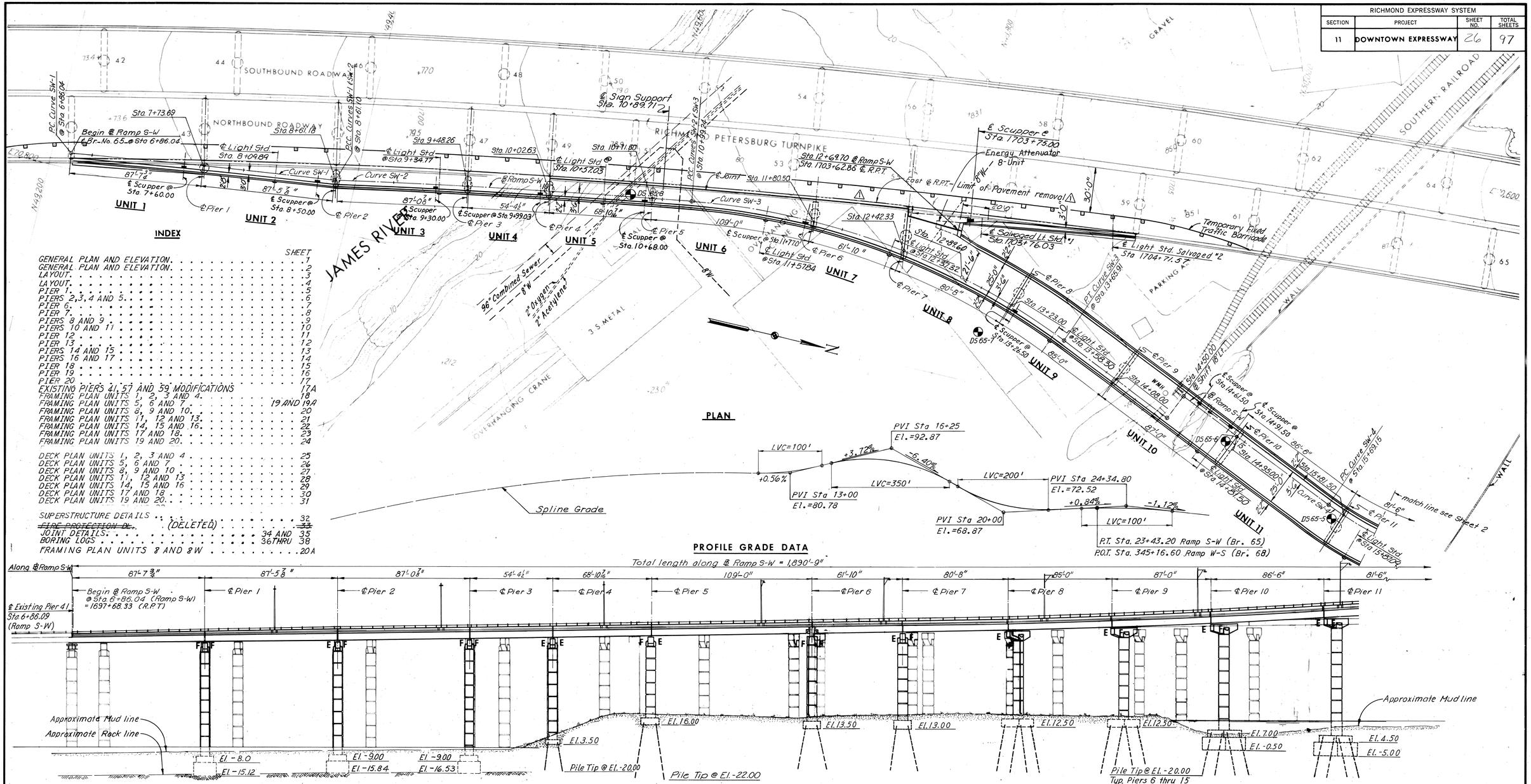
SCALE: As noted
CONTRACT NO.: 4
SHEET NO. 1 OF 14

Bridge 65

(Ramp from Northbound I-95 to Westbound Downtown Expressway “Rte. 195” over NS RR and CSX RR)

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	26	97



INDEX

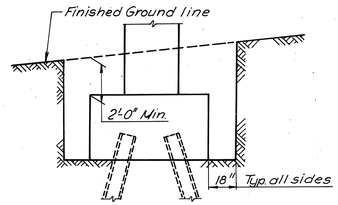
PROFILE GRADE DATA

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

NO.	REVISION	BY	DATE
2	Sheet 20a Added	TEM	9-9-75
1	Profile Ramp W-S	TEM	9-8-75
	Limit of pavement removal & Sheet 17A added	G.B.P.	8-25-75

	BY	DATE
MADE	J.V. JLK	4-28-69 6-25-75
CHECKED	V.C.P. D.W.B	5-28-69 7-7-75
IN CHARGE		

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

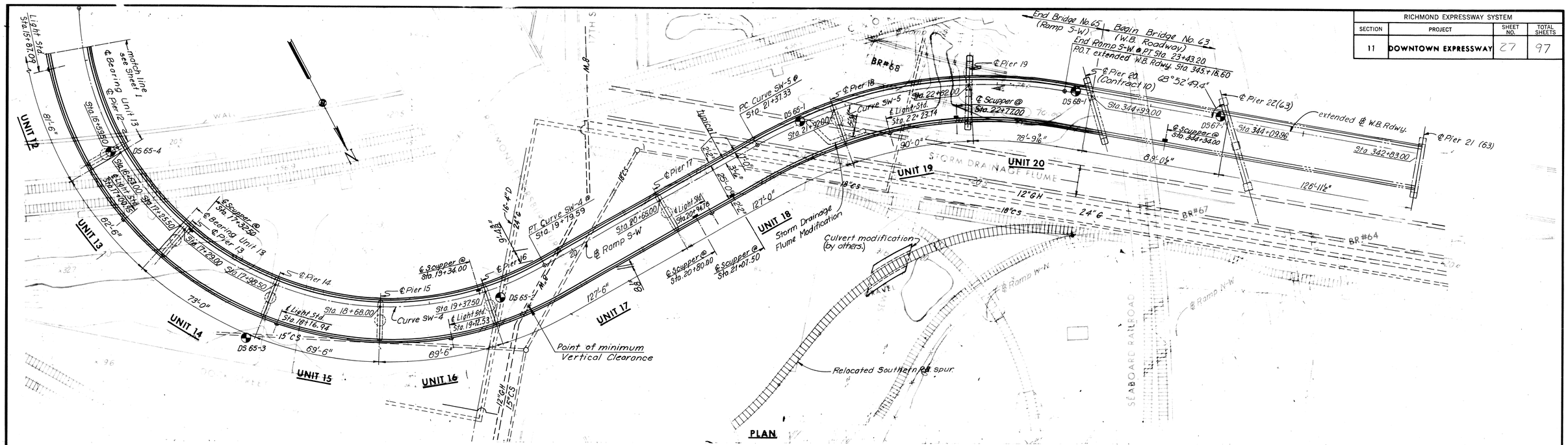
BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

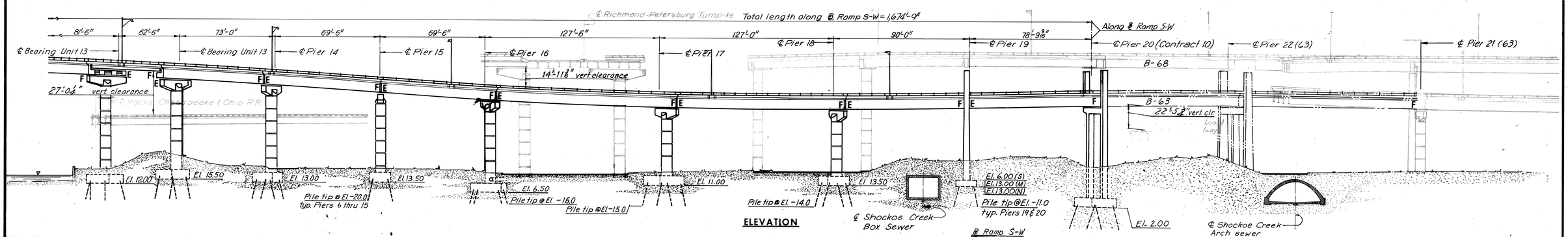
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=30'-0"
CONTRACT NO. 11
SHEET NO. 1 OF 38

26

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	27	97





ELEVATION

HORIZONTAL CURVE DATA

℄ Ramp S-W

Curve: SW-1
P.I. = Sta. 7+73.58
Δ = 1°45'02"
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°27'51"
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'

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.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.V.	4-2-69				
CHECKED	Y.C.P.	5-28-69				
IN CHARGE						

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

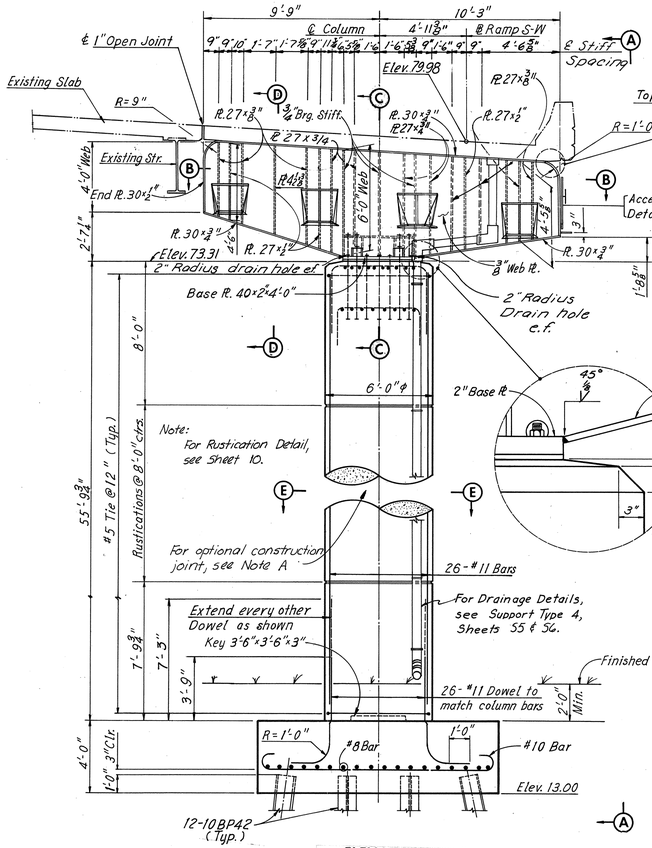
BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

GENERAL PLAN AND ELEVATION

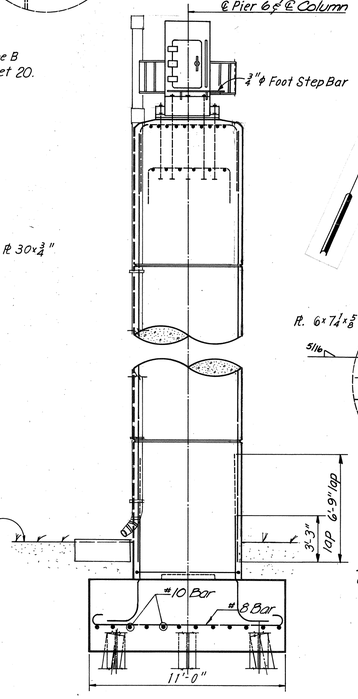
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=30'-0"
CONTRACT NO. 11
SHEET NO. 2 OF 38

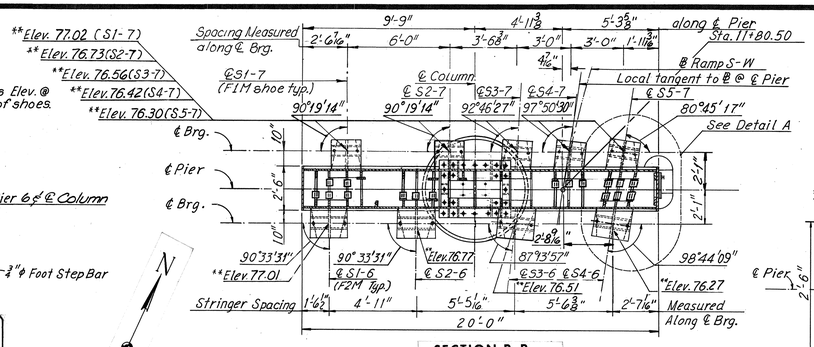
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	32	97



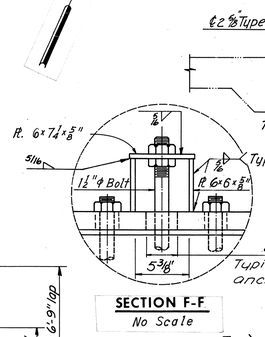
ELEVATION
Scale: 1/4"=1'-0"



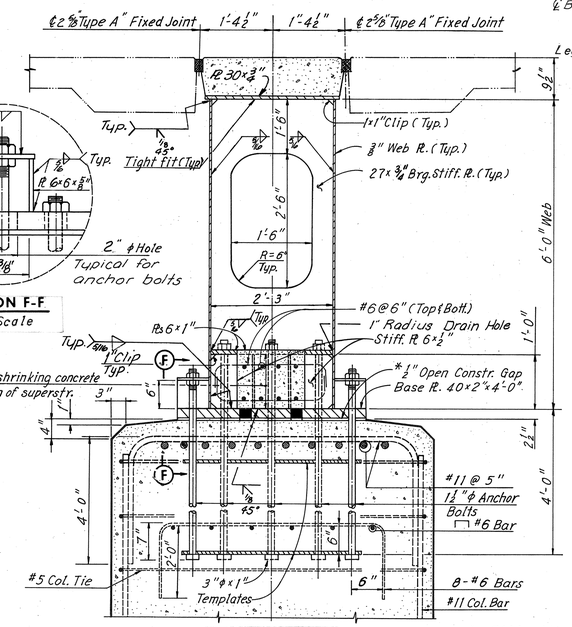
VIEW A-A
Scale: 1/4"=1'-0"



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

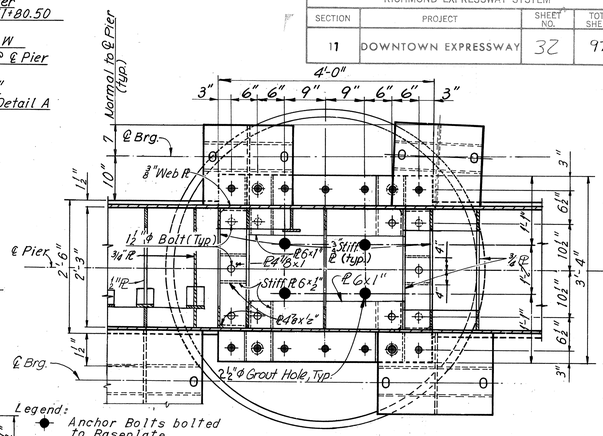


SECTION F-F
No Scale

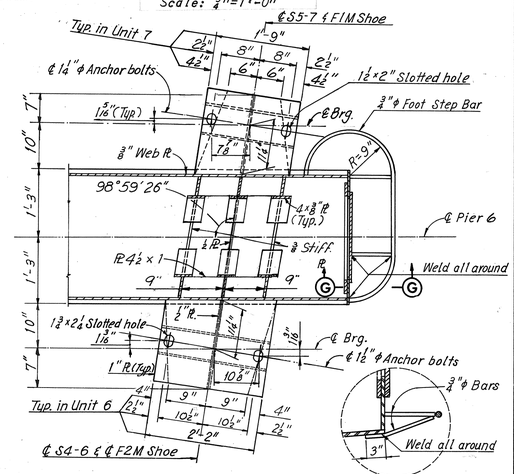


SECTION C-C
Scale: 3/4"=1'-0"

Legend:
- Anchor Bolts bolted to Baseplate.
- Adjustment Bolts bolted to 8" bracket.
- Anchor Bolts bolted to 1" bracket inside Cap Beam.

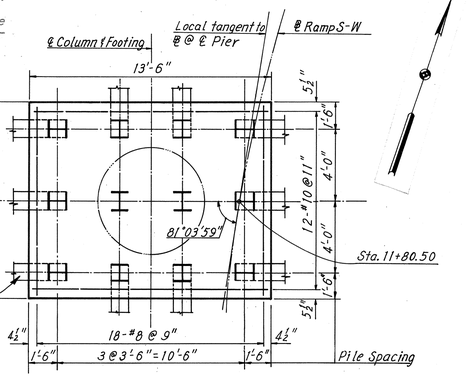


BASE PLATE PLAN
Scale: 3/4"=1'-0"

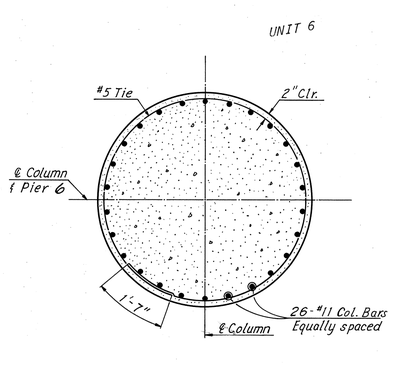


DETAIL A
Scale: 3/4"=1'-0"

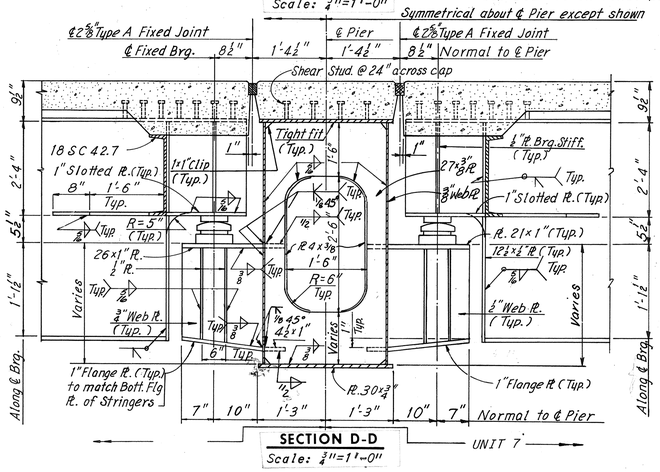
SECTION G-G
No Scale



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



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



SECTION D-D
Scale: 3/4"=1'-0"

*. Fill with nonshrinking Grout after Cap beam is in final position.

Notes:
For Joint Details see Sheet 34 and 35.
For Shear Stud Details see Sheet 20.
For Shoe Details see Sheet S1 and S2.
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 1 1/2" in Dia. and each nut shall have washer (not shown on details)

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.

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.

	BY	DATE
MADE	K.C.T. / J.L.K.	8-13-69 / 6-25-75
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

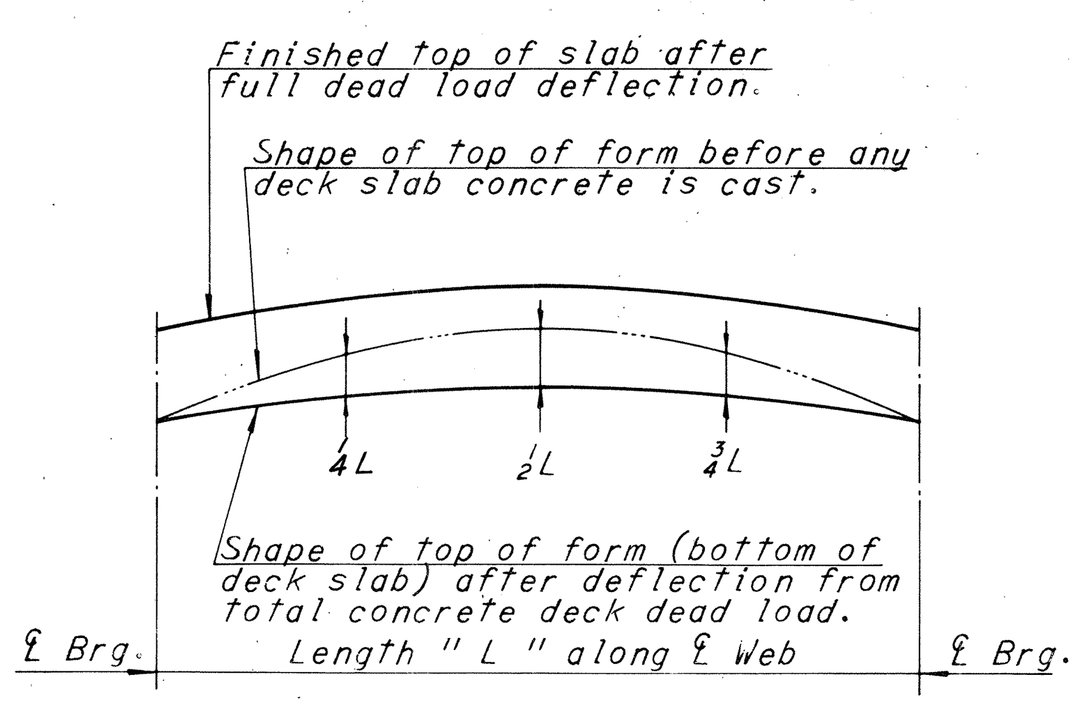
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 11
SHEET NO. 7 OF 38

32

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	45	97

FRAMING PLAN
Scale: 1" = 10'-0"

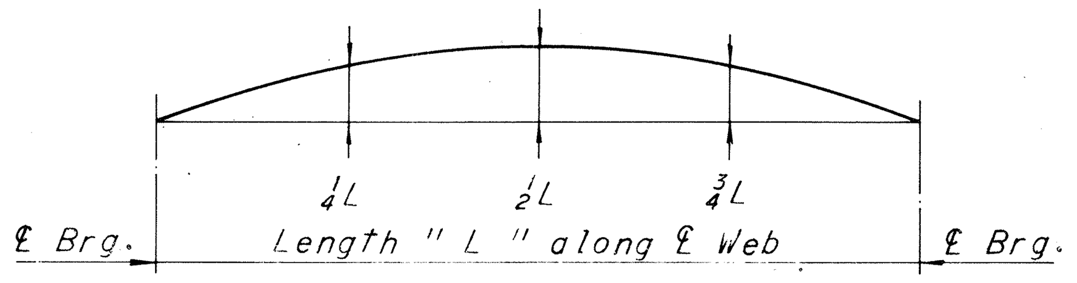


DEAD LOAD DEFLECTION DIAGRAM

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

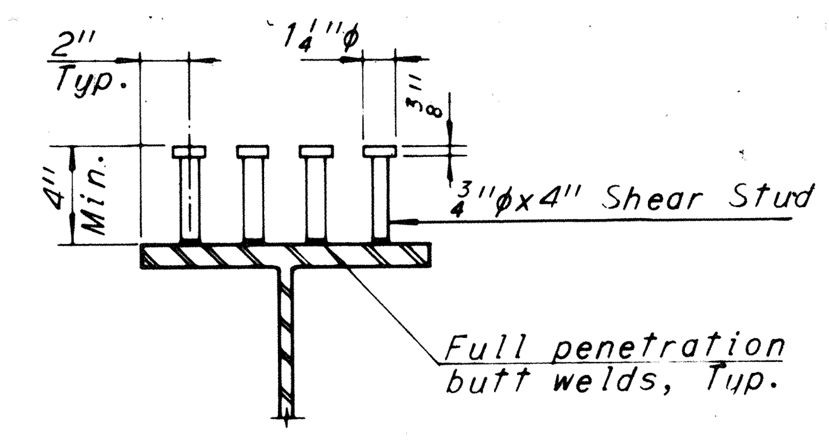
The stringers shall be fabricated with a total camber amounting to the tabulated value. A positive number indicates an upward camber and negative number indicates a downward camber. This will provide approximate compensation for deflection under full dead load and for comformity with finished grade.

Dimensions are in inches.

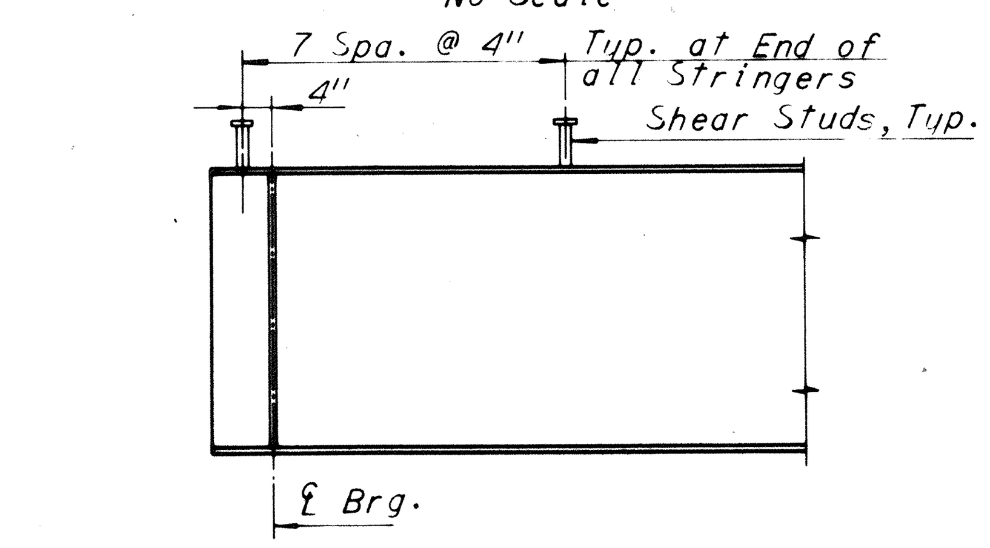
Notes:

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 from 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 27.



SHEAR STUD DETAIL
No Scale

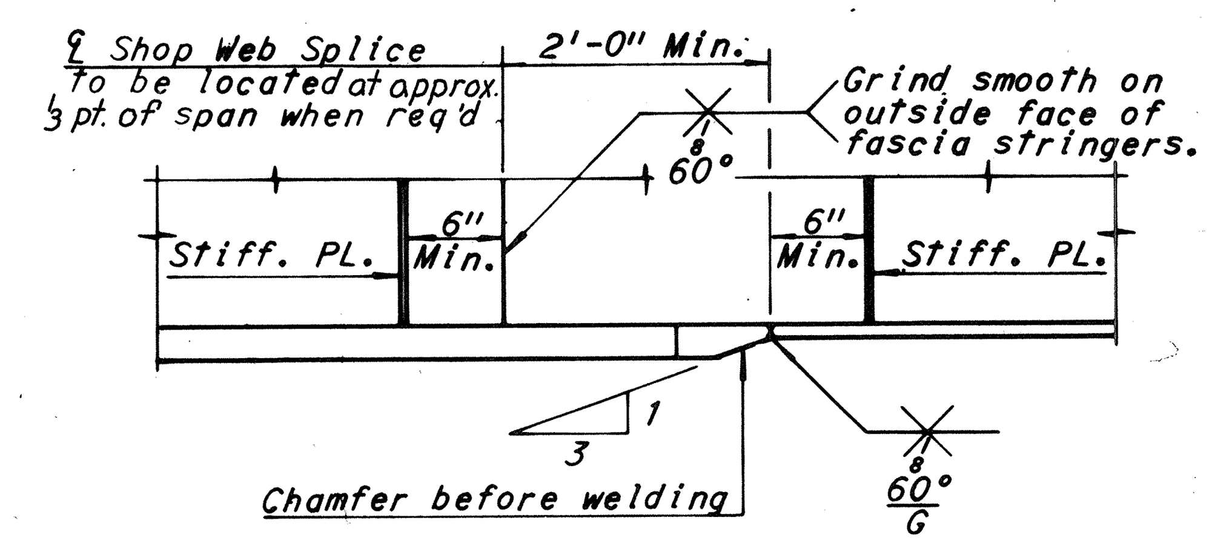


DETAIL "A"
No Scale

SHEAR STUD NOTE

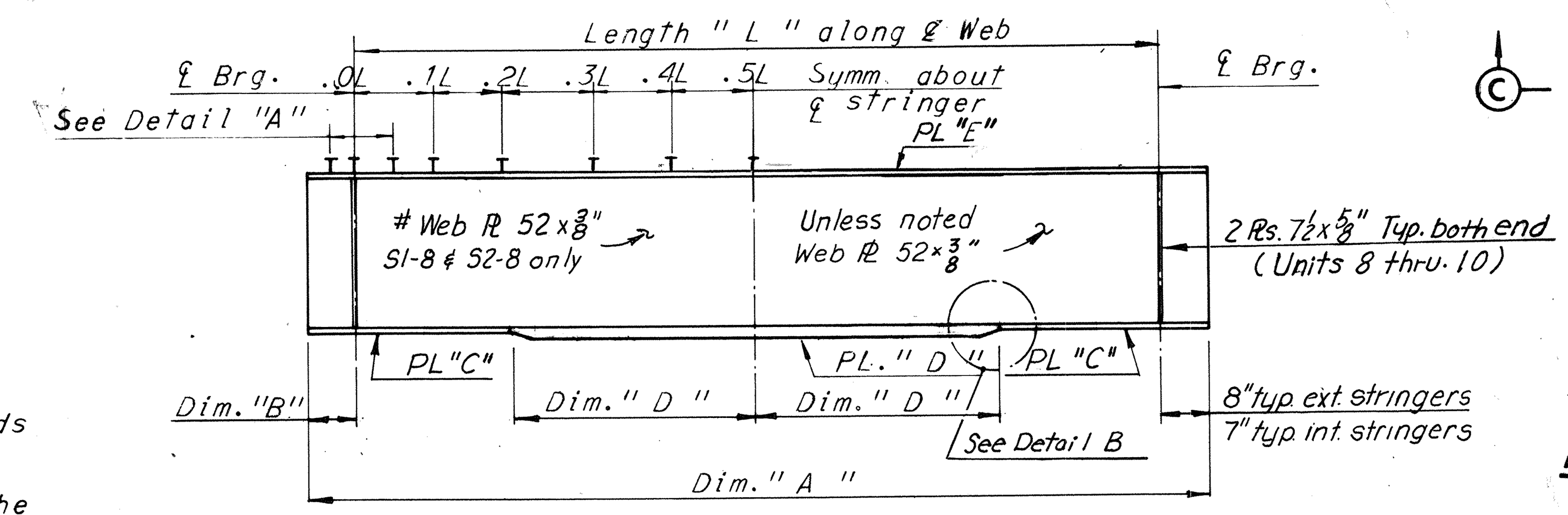
Contractor may, if he elects, use three ⅞" diameter studs at the same longitudinal spacing in lieu of the four ¾" diameter studs shown.

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

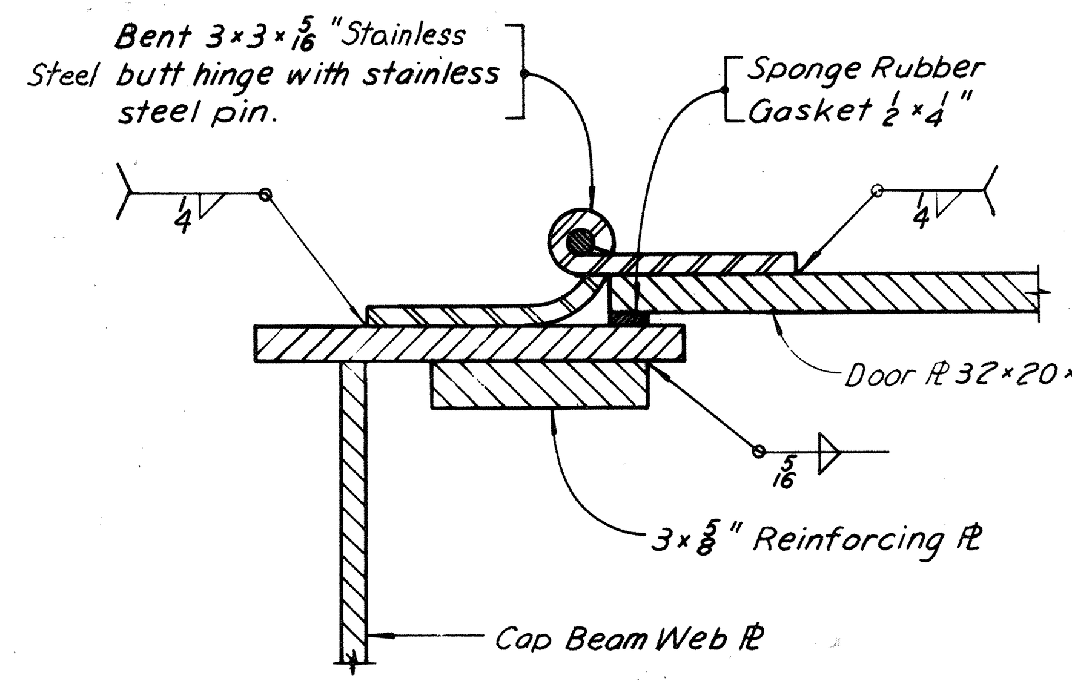


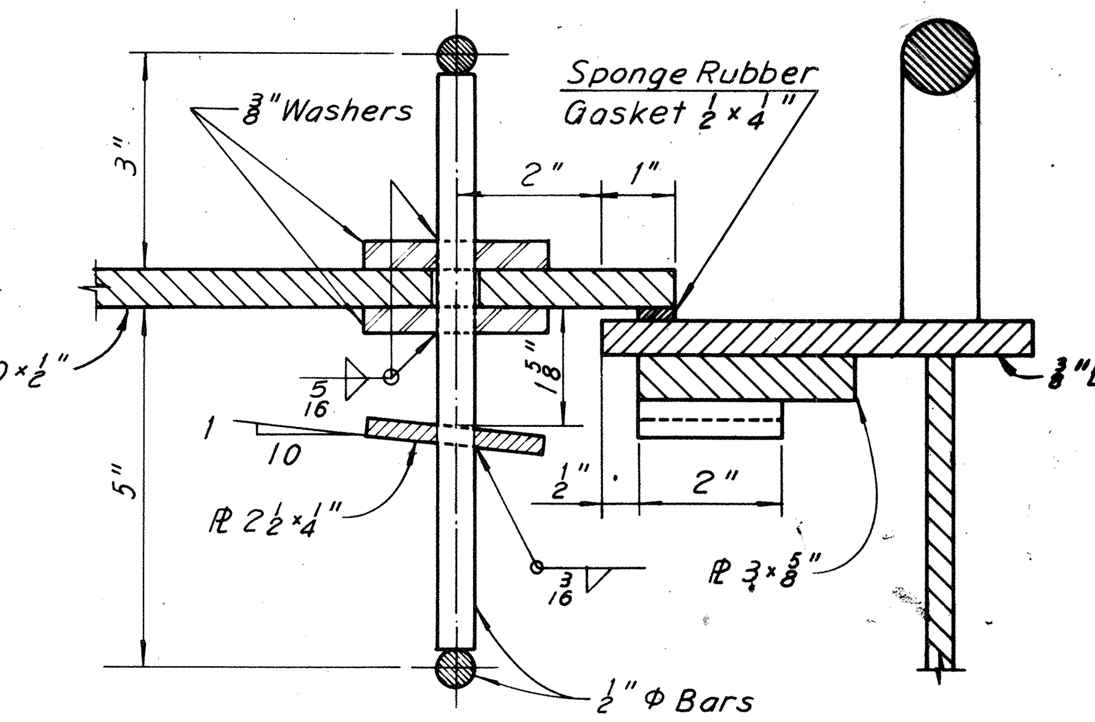
DETAIL "B"
No Scale

# Denotes A572-Grade 50 Steel for thickness of ¾" and under and A588 Steel for thickness over ¾".

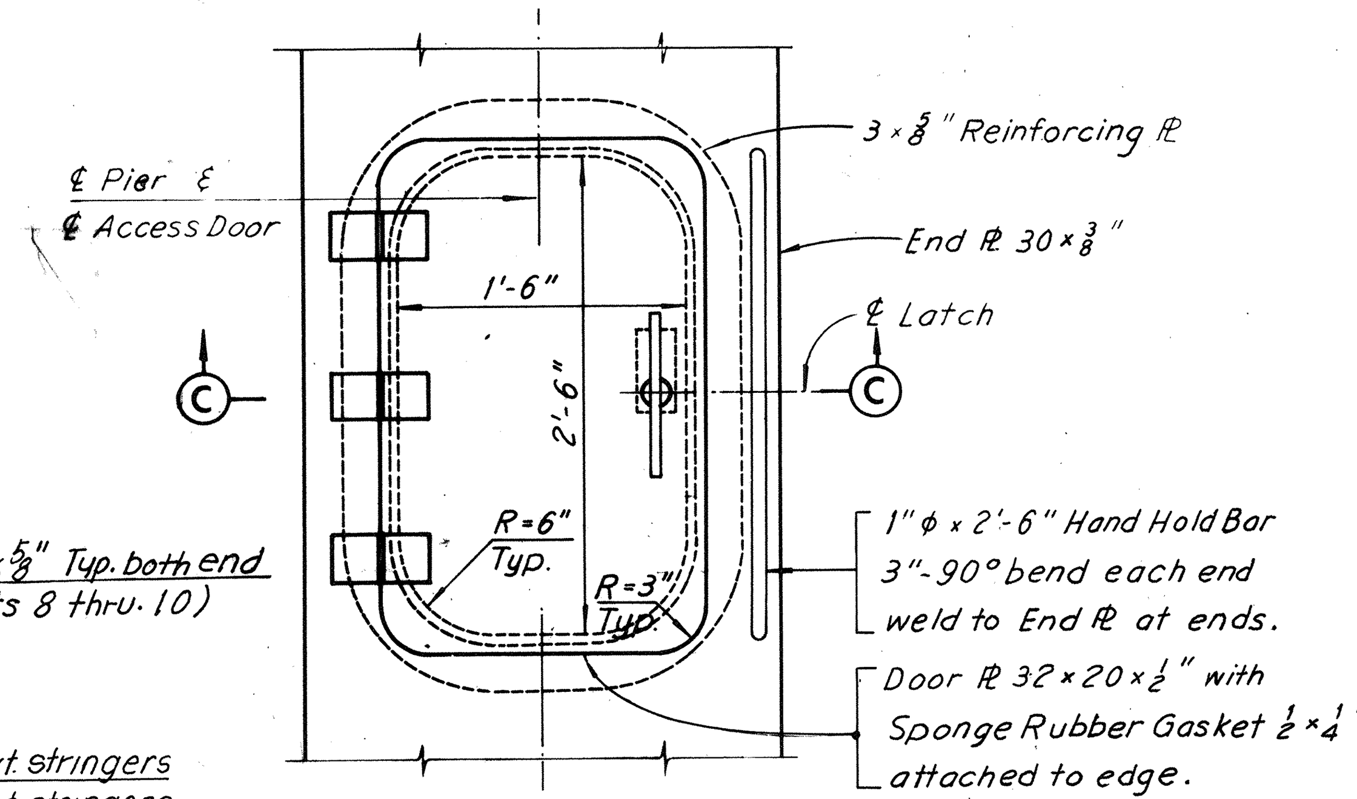


STRINGER ELEVATION
No Scale





SECTION C-C
No Scale



ACCESS DOOR - TYPE B
Scale: 1" = 1'-0"
For the location of Access Door Type-B, see sheet 7.

SHOE SCHEDULE			
EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E4	12	F2	12

Notes:

All steel shall be A36 steel unless denoted otherwise.

Intermediate stiffener plates shall be equally spaced between diaphragms as shown.

The first two plates at the ends of stringers shall be one half the normal spacing within the panel.

All intermediate stiffeners shall be Pl. 4½x⅜".

For framing and connecting detail, see sheet 27.

For shoe detail, see sheet S1 & S2.

All Horizontal Dimensions are measured along ℄ Web.

For Web to Flange Welds and Longitudinal Stiffener Details, see Sheet 24.

For Diaphragm Details, see Sheet 27.

For Structural Steel Quantities, see Sheet 4.

For Joint Details, see Sheets 34 and 35.

It may be necessary to increase Bearing Stiffener size to accommodate erection of end diaphragms

For Sections A-A and B-B see Sheet 20a.

* Spacing begins at termination of 7 spaces @ 4".

STRINGER SCHEDULE

UNIT	STRINGER	Dim. "A"	LENGTH "L"	Dim. "B"		Dim. "D"	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	DEAD LOAD DEFLECTION SCHEDULE ¼L	½L	¾L	CAMBER SCHEDULE ¼L	½L	¾L
8	S1-8	89'-11 3/16"	88'- 7 3/16"	8"		26'-6"	#16x1½"	#16x2"	#12x1"		9"	10"	12"	16½"	20"	1¼"	1¾"	1¼"	-¾"	-1"	-11/16"
	S2-8	86'- 1 15/16"	84'- 11 15/16"	7"		30'-0"	#16x1"	#16x1½"	#12x¾"		11½"	12½"	15"	18"	21½"	1 3/16"	1 11/16"	1 3/16"	-13/16"	-1 1/16"	-13/16"
	S3-8	82'- 6 11/16"	81'- 4 11/16"	7"		24'-0"	16x 1"	16x1¾"	12x1"		12"	13"	16"	19"	23"	7/8	1¼"	7/8"	-1⅛"	-1½"	-1⅛"
	S4-8	79'- 1 7/16"	77'- 9 7/16"	8"		26'-0"	16x ¾"	16x1⅜"	12x¾"		12"	13½"	16"	19"	24"	¾"	1 1/16"	¾"	-1 1/14"	-1 5/8	-1¼"
9	S1-9	86'- 8⅝"	85'- 4⅝"	8"		27'-6"	16x1¼"	16x2⅛"	12x¾"		10"	11"	14"	16½"	21"	1¼"	1¾"	1¼"	1½"	2⅛"	1½"
	S2-9	85'- 10"	84'- 8"	7"		28'-0"	16x 1"	16x 2"	12x¾"		11"	12½"	15½"	18"	22"	1"	1⅜"	1"	1¼"	1 11/16"	1¼"
	S3-9	85'- 1⅜"	83'-11⅜"	7"		30'-0"	16x ¾"	16x1¾"	12x¾"		11½"	13"	16"	19"	23"	1"	1⅜"	1"	1 3/16"	1⅝"	1 3/16"
	S4-9	84'- 6¾"	83'- 2¾"	8"		28'-0"	16x ¾"	16x1¾"	12x¾"		11½"	13½"	17"	20½"	24"	15/16"	1 5/16"	15/16"	1⅛"	1 9/16"	1⅛"
10	S1-10	86'- 10"	85'- 6"	8"		29'-0"	16x ¾"	16x1½"	12x¾"		10½"	11½"	15"	18"	23"	1⅛"	1 9/16"	1⅛"	1 5/16"	3 9/16"	3"
	S2-10	86'- 8"	85'- 6"	7"		29'-0"	16x ¾"	16x1½"	12x¾"		11½"	12½"	15½"	18½"	22"	1 1/16"	1½"	1 1/16"	1 9/16"	3½"	2 15/16"
	S3-10	86'- 8"	85'- 6"	7"		29'-0"	16x ¾"	16x1½"	12x¾"		11½"	12½"	15½"	18½"	22"	1 1/16"	1½"	1 1/16"	1 15/16	3 7/16"	2 15/16"
	S4-10	86'-10"	85'- 6"	8"		29'-0"	16x ¾"	16x1½"	12x¾"		10½"	11½"	15"	18"	23"	1⅛"	1 9/16"	1⅛"	2 5/16"	3½"	2 15/16"

	BY	DATE	NO.	REVISION	BY	DATE
			3	Str. length S2-8	TEM	3-76
			2	Dimensions Added	TEM	9-9-75
MADE	R.C. JLK	1-16-69 6-26-75	1	Bracket Unit 8	TEM	8-25-75
CHECKED	AMH	1-24-69	1	Re-design S1-8 & S2-8	TEM	
IN CHARGE			NO.	REVISION	BY	DATE
			4	Pt. Sta.	TEM	5-76

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
FRAMING PLAN UNITS 8,9 AND 10

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

SCALE: As Noted
CONTRACT NO.: 11
SHEET NO. 20 OF 38

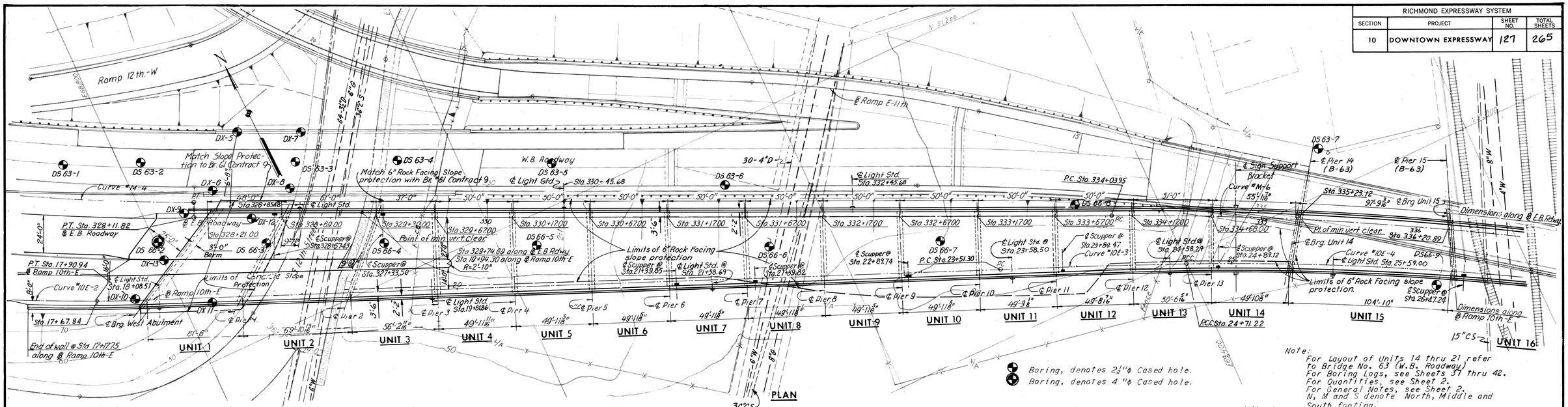
45

Bridge 66

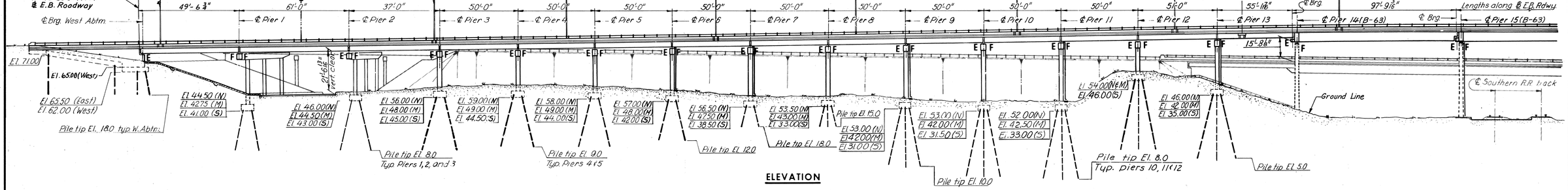
(Eastbound Downtown Expressway “Rte. 195” over Virginia Street and South 14th Street)

Record Set Plans

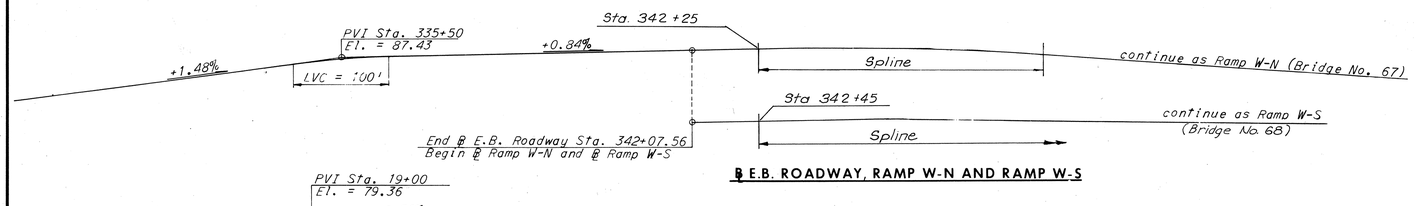
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	127	265



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-4		℄ 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'

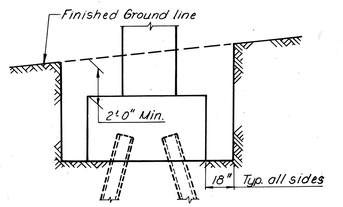
Curve: 10E-2		℄ Ramp 10th-E Curve: 10E-3		Curve: 10E-4	
P.I.	= 17+36.87	P.I.	= 24+11.27	P.I.	= 26+80.64
Δ	= 6°29'42"	Δ	= 1°11'57"	Δ	= 12°30'55"
D	= 6°00'	D	= 1°00'	D	= 3°00'
T	= 54.18'	T	= 59.97'	T	= 209.42'
L	= 108.25	L	= 119.93'	L	= 417.18'
R	= 954.93'	R	= 5,729.58'	R	= 1,909.86'

HORIZONTAL CURVE DATA

	BY	DATE
MADE	J.V.	9-12-68
CHECKED	G.C.C.	5-26-69
IN CHARGE		

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

INDEX



LIMITS OF STRUCTURE EXCAVATION
no scale

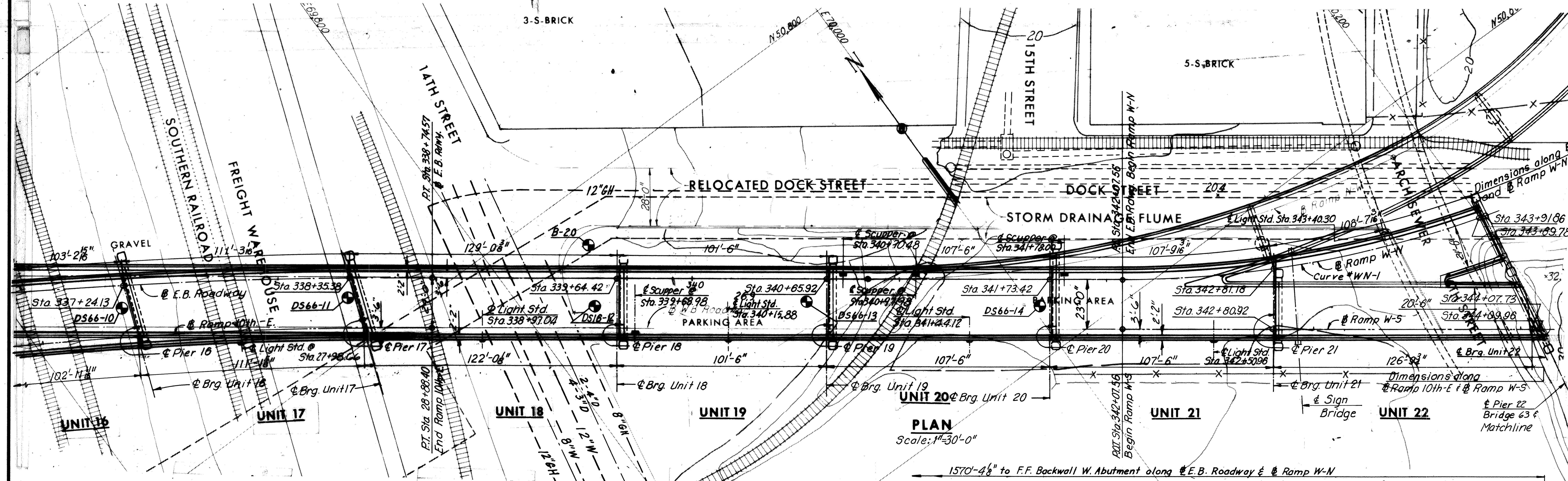
AS BUILT

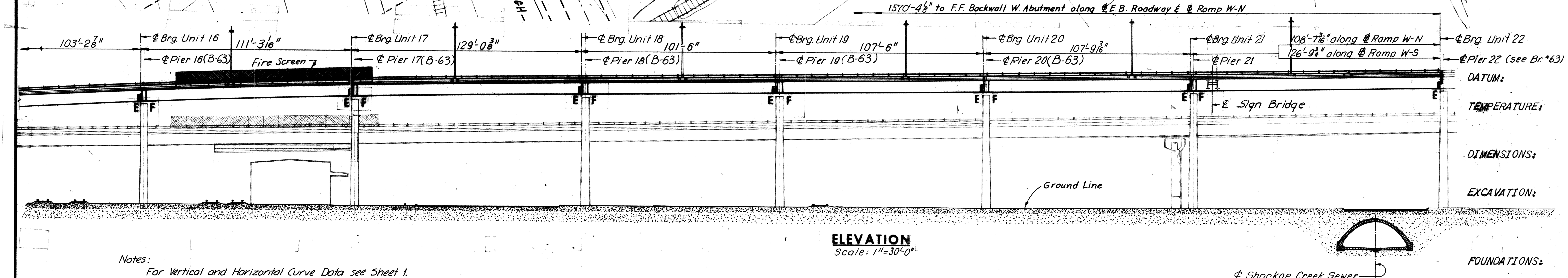
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

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

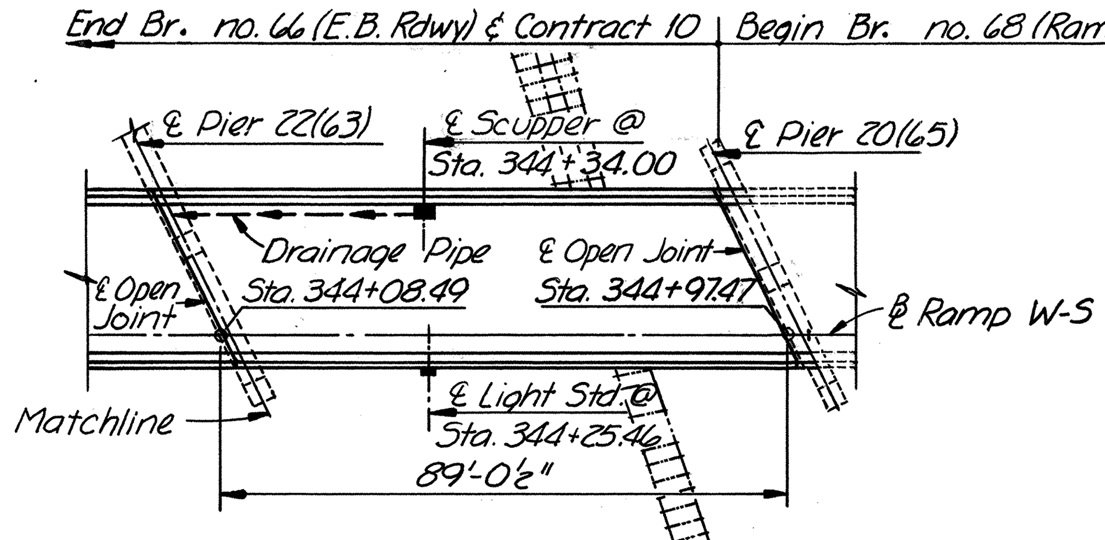




ELEVATION
Scale: 1"=30'-0"

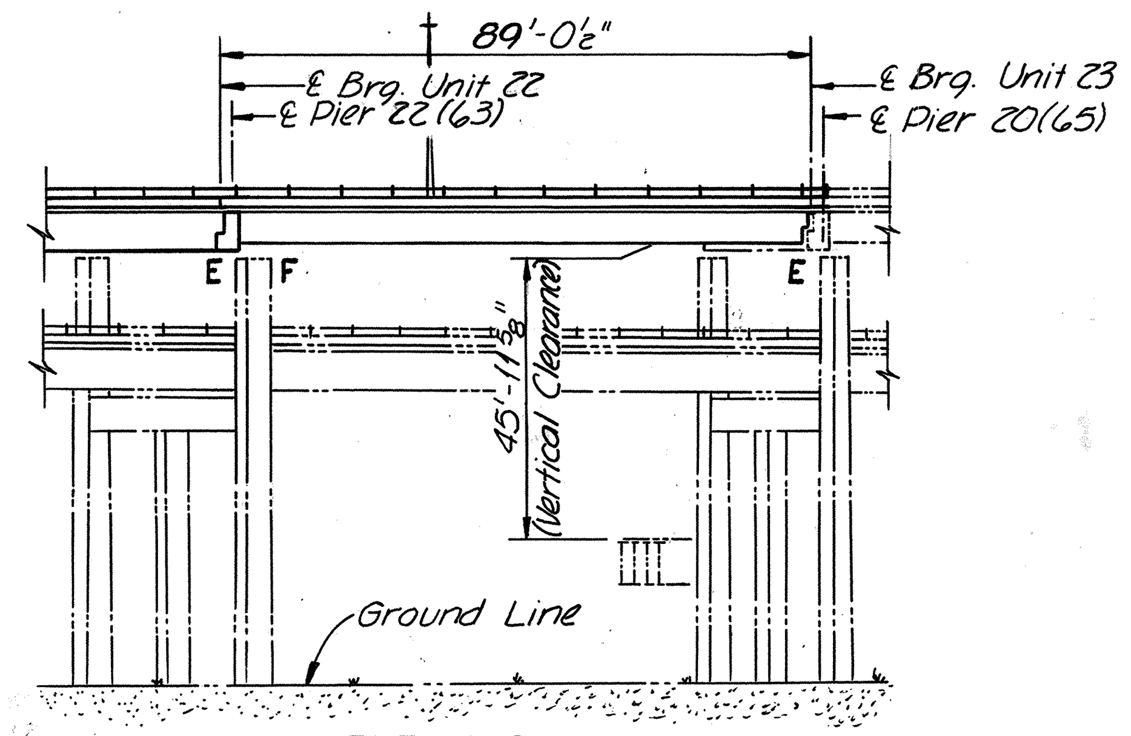
Notes:
For Vertical and Horizontal Curve Data see Sheet 1.
For Layout of Units 14 thru 22 refer to Bridge No. 63 (Westbound Roadway).

End Br. no. 66 (E.B. Rdwy) & Contract 10 | Begin Br. no. 68 (Ramp W-S) by others



UNIT 23

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.	Porous Backfill Cu. Yds.	Underdrain 6"Dia. Pipe Lin. Ft.	Steel Piles 10BP42 Lin. Ft.
Superstructure	--	2,237.6	530,860	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 8-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.

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.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.V.	1-9-69	1	Span Fixities & R.R. name added	PRMS	4-19-74
CHECKED	G.C.C.	5-26-69	2	Sign Bridge added & Struct. St'l Qty.	R.B.H.	9-74
IN CHARGE			3	As Built	TEM	8-76

AS BUILT

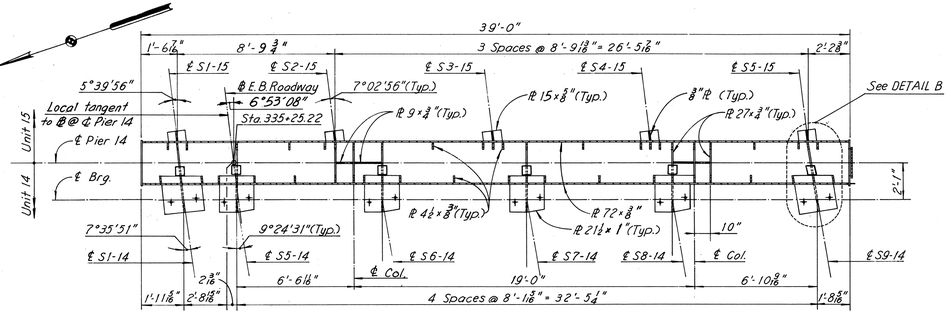
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
GENERAL PLAN AND ELEVATION

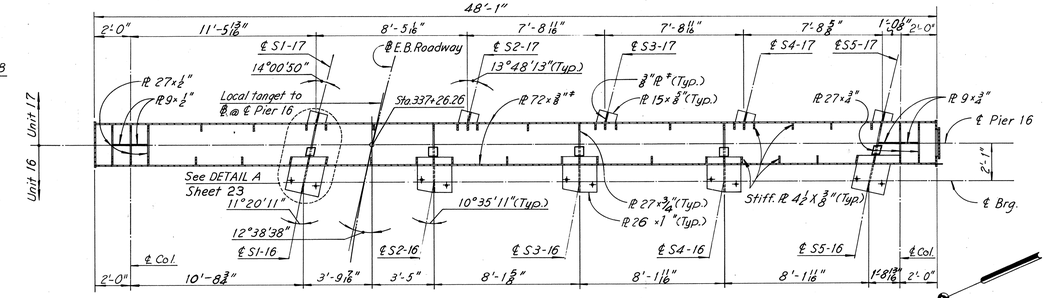
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 2 OF 46

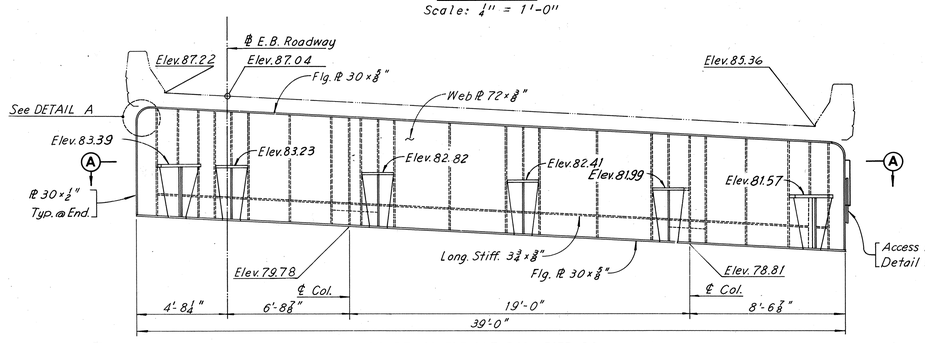
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	148	265



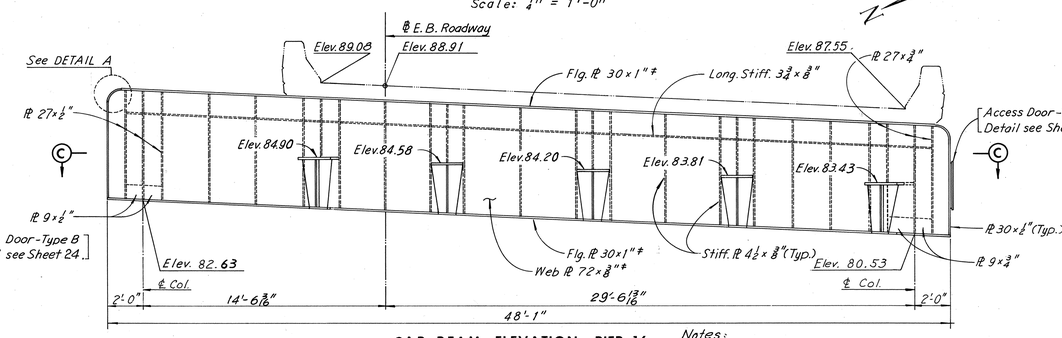
SECTION A-A
Scale: ¼" = 1'-0"



SECTION C-C
Scale: ¼" = 1'-0"



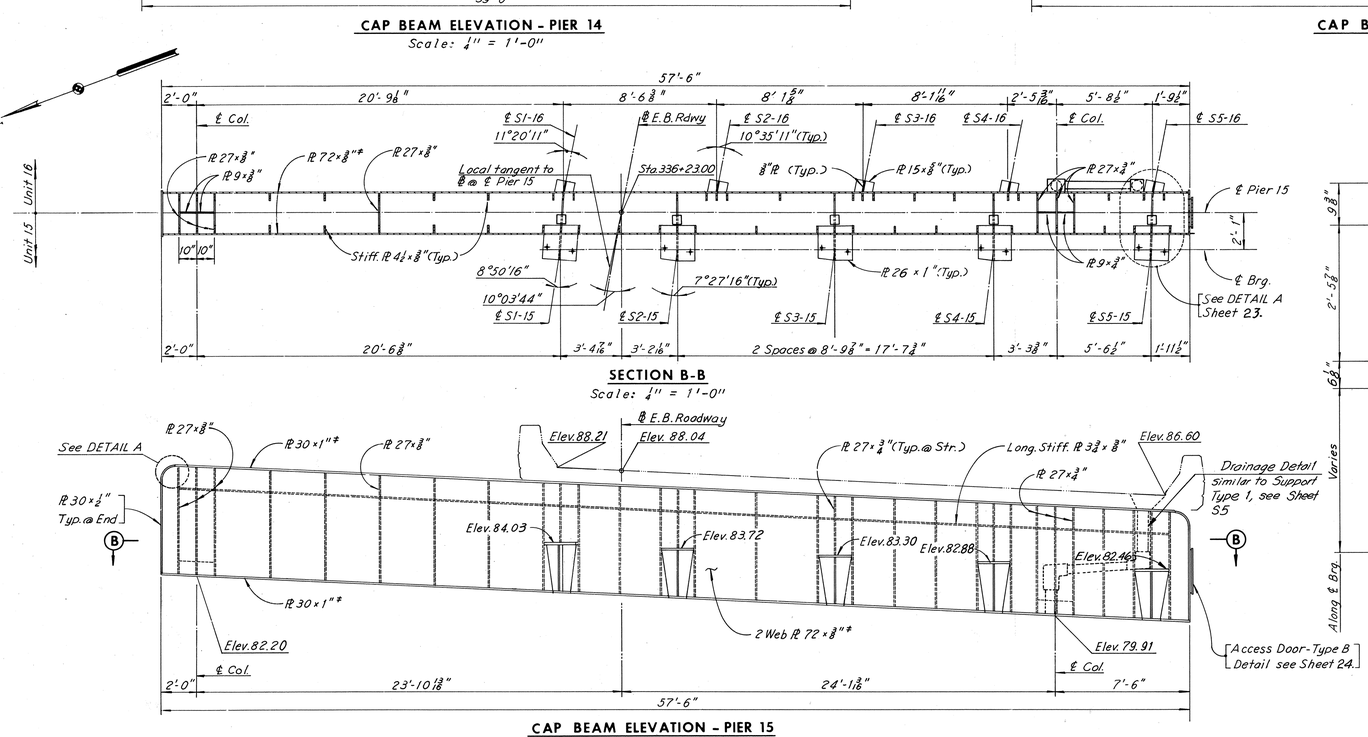
CAP BEAM ELEVATION - PIER 14
Scale: ¼" = 1'-0"



CAP BEAM ELEVATION - PIER 16
Scale: ¼" = 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.

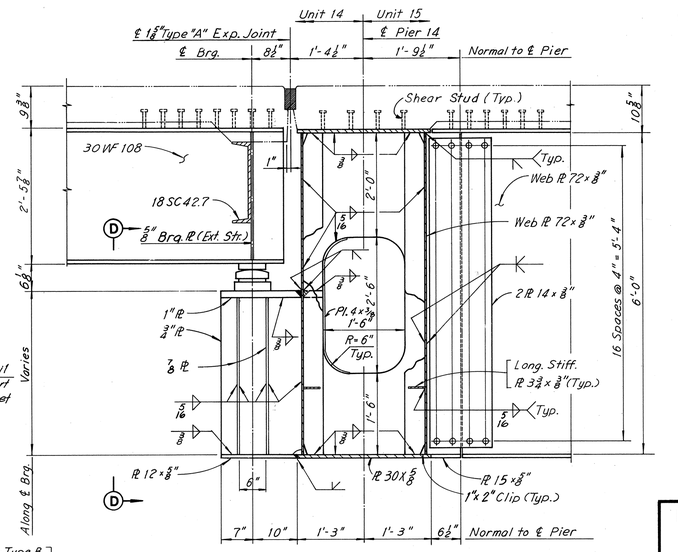


SECTION B-B
Scale: ¼" = 1'-0"

CAP BEAM ELEVATION - PIER 15
Scale: ¼" = 1'-0"

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".

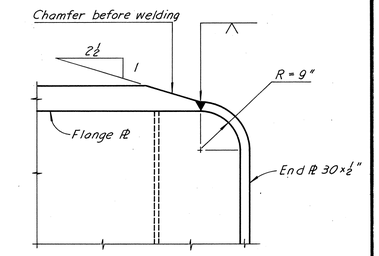
Provide Drain Holes at lower end of cap beam.
All elevations shown are final elevations.



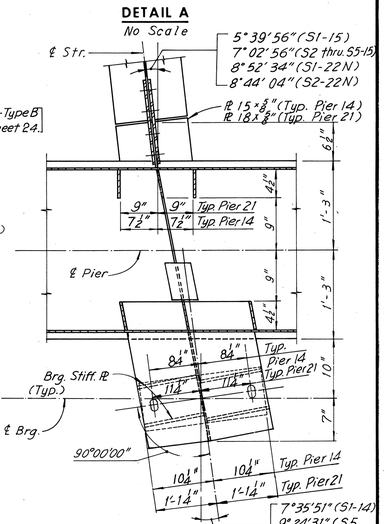
TYPICAL SECTION - PIER 14
Scale: ¾" = 1'-0"

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
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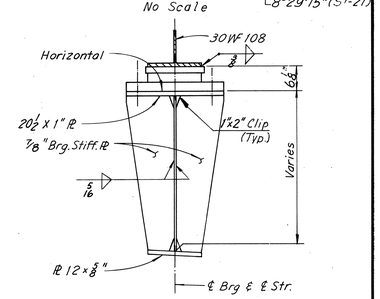


SECTION D-D
No Scale

	BY	DATE
MADE	M.H.H	12-7-68
CHECKED	J. D.	1-29-69
IN CHARGE		

NO.	REVISION	BY	DATE
2	As Built	TEM	8-76

Note changed PRMS 4-19-71

AS BUILT

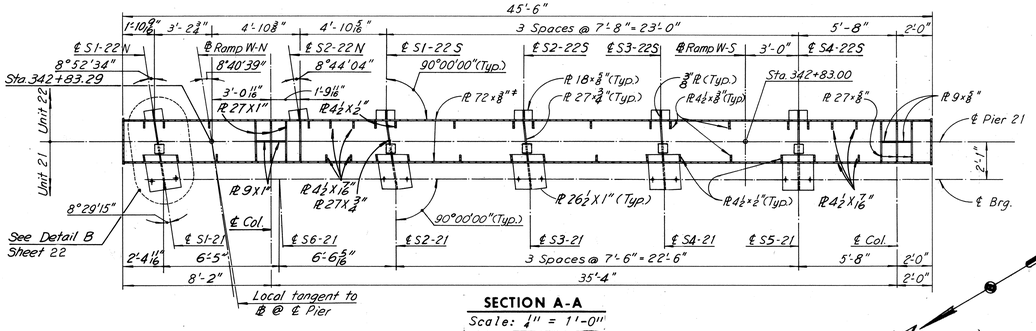
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
FRAMING DETAILS
PIERS 14, 15 AND 16

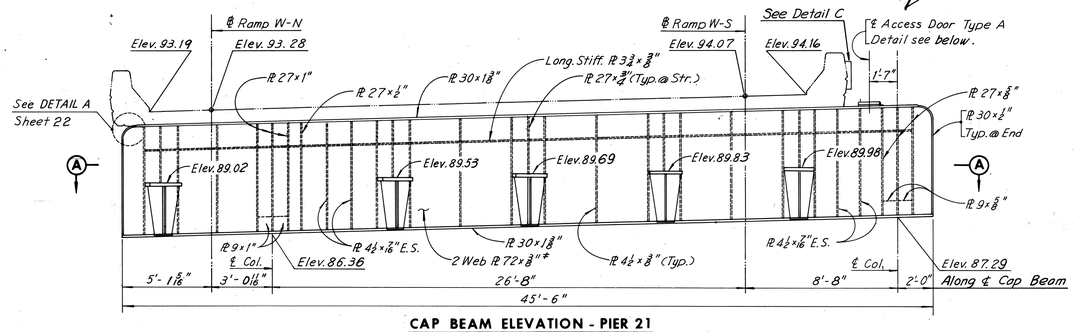
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 22 OF 46

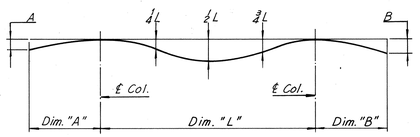
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	150	265



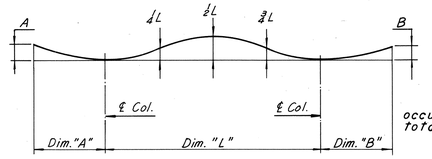
SECTION A-A
Scale: 1" = 1'-0"



CAP BEAM ELEVATION - PIER 21
Scale: 1" = 1'-0"



DEAD LOAD DEFLECTION DIAGRAM
No Scale



CAMBER DIAGRAM
No Scale

CAP BEAM SCHEDULE				DEAD LOAD DEFLECTION SCHEDULE					CAMBER SCHEDULE				
PIER	Dim "A"	Dim. "L"	Dim. "B"	A	¼L	½L	¾L		A	¼L	½L	¾L	B
14	11'-5⅛"	19'-0"	8'-6⅞"	0	0	0	0	0	0	0	0	0	0
15	2'-0"	48'-0"	7'-6"	0	1/16	1/16	1/16	-1/16	0	1/16	1/16	1/16	-1/16
16	2'-0"	44'-1"	2'-0"	0	1/16	1/16	1/16	0	0	1/16	1/16	1/16	0
17	2'-0"	43'-11"	2'-0"	0	1/16	1/16	1/16	0	0	1/16	1/16	1/16	0
18	2'-0"	41'-6"	2'-0"	0	1/16	1/16	1/16	0	0	1/16	1/16	1/16	0
19	2'-0"	41'-6"	2'-0"	0	1/16	1/16	1/16	0	0	1/16	1/16	1/16	0
20	2'-0"	49'-0"	2'-0"	0	1/16	1/16	1/16	0	0	1/8	1/8	1/8	0
21	8'-2"	35'-4"	2'-0"	-1/16	1/16	1/8	1/16	0	-1/16	1/8	3/16	1/8	0

Note: A negative deflection indicates an upward deflection, and a negative camber indicates a downward camber.

NOTE TO CONTRACTOR

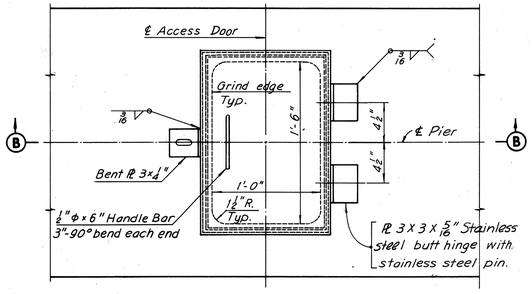
Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.

NOTE TO FABRICATOR

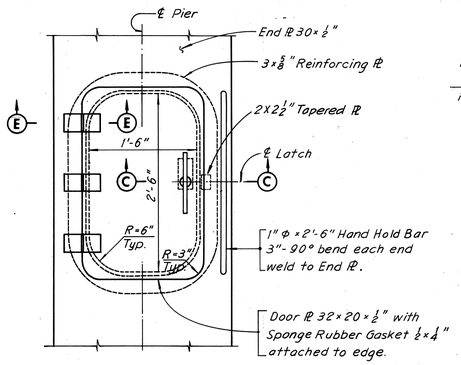
The cap beams shall be fabricated with an upward camber amounting to the tabulated value. This will provide approximate compensation for deflection under full dead load and for comformity with finished grade.
Dimensions are in inches.

Note:
Cap beams 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 cap beams are not cambered, distance top of cap beams to top of slab will vary along the cap beams in accordance with the offset dimensions shown in the Camber Diagram and Contractor shall adjust the bearing pads.

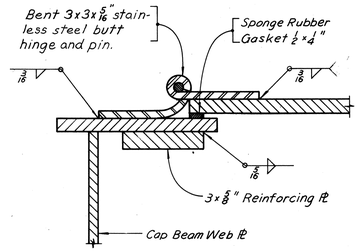
Notes :
For Framing Plan Units 21 and 22, see Sheet 20.
For Typical Section through Cap Beam see Sheet 23.
For Deck Plan Units 21 & 22, see Sheet 34.



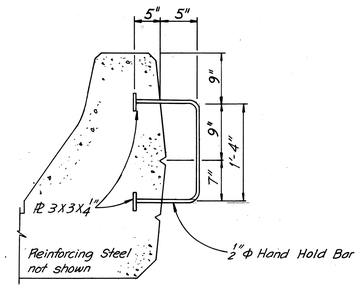
ACCESS DOOR - TYPE A
Scale: 1½" = 1'-0"



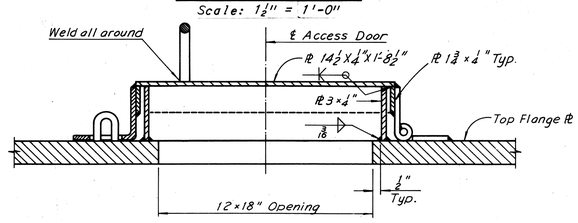
ACCESS DOOR - TYPE B
Scale: 1" = 1'-0"



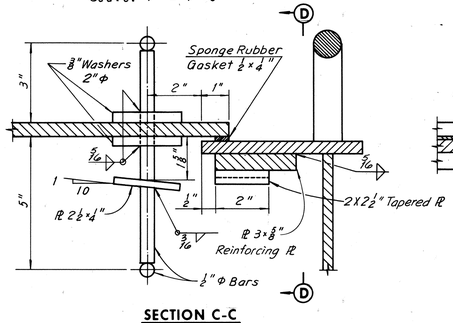
SECTION E-E
No Scale



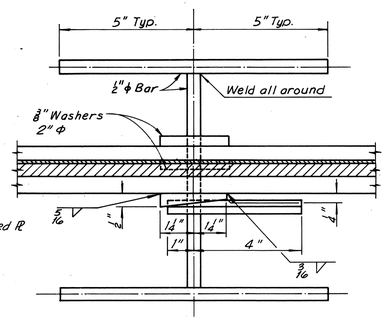
DETAIL C
Scale: 1"=1'-0"



SECTION B-B
No Scale



SECTION C-C
No Scale



SECTION D-D
No Scale

Notes :
All Steel is A36 unless otherwise shown.
‡Use A572 Grade 50 for thickness of ¾" and less, and A588 for thickness over ¾".

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	M.H.H.	12-2768	2	As Built	TEM	8-76
CHECKED	JD	5-7-69				
IN CHARGE			1	Note & Welds Chngd	PRMS	4-19-74

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
FRAMING DETAILS PIER 21

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

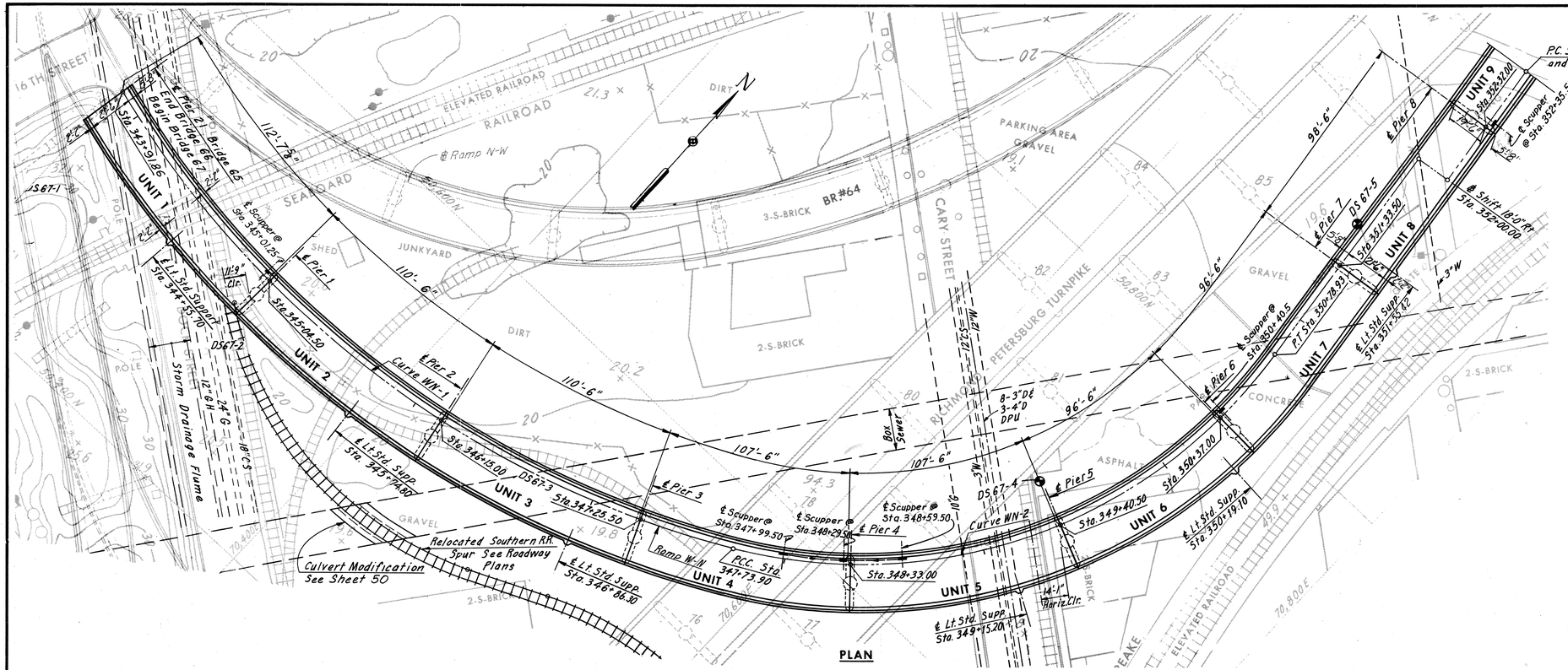
SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 24 OF 46

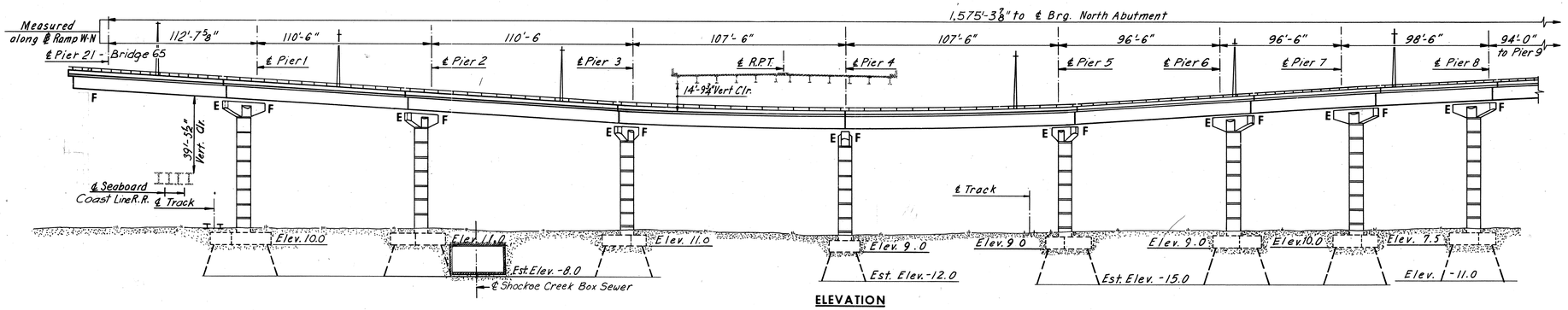
Bridge 67

(Ramp from Eastbound Downtown Expressway “Rte. 195” to Northbound I-95 over Dock Street, East Cary Street, East Main Street “Rte. 60” and CSX RR)

Record Set Plans

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'

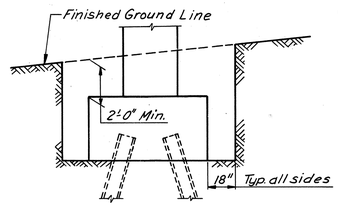
Curve: WN-4
P.I. = Sta 355+39.85
Δ = 5°01'11"
D = 1°30'
T = 167.43'
L = 334.65'
R = 3,819.72'

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

INDEX

Note:
For General Notes, see Sheet 4.
For Quantity Table, see Sheet 3

	BY	DATE	NO.	REVISION	BY	DATE
MADE	AMH	3-5-69	3	As Built	TEM	6-77
CHECKED	KCT	5-12-69	2	Light Sta. Location Unit 8	JLK	6-6-75
IN CHARGE			1	Sheets 42 & 45 added	LBP	3-5-75

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO
RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

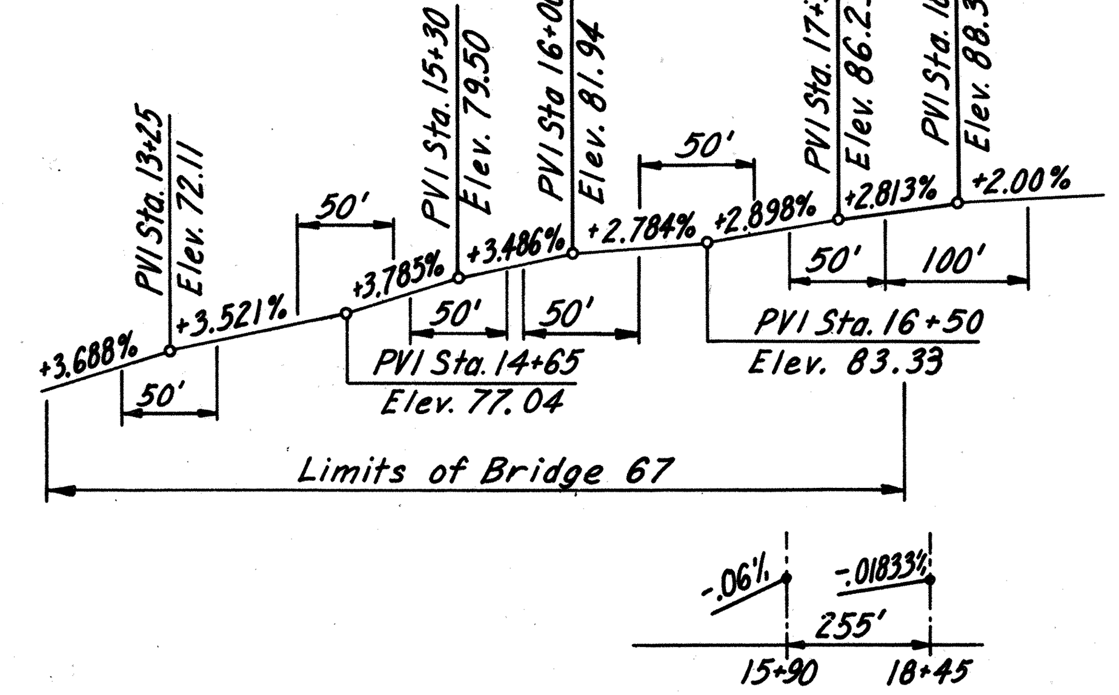
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1" = 30'-0"
CONTRACT NO.: 10
SHEET NO. 1 OF 54

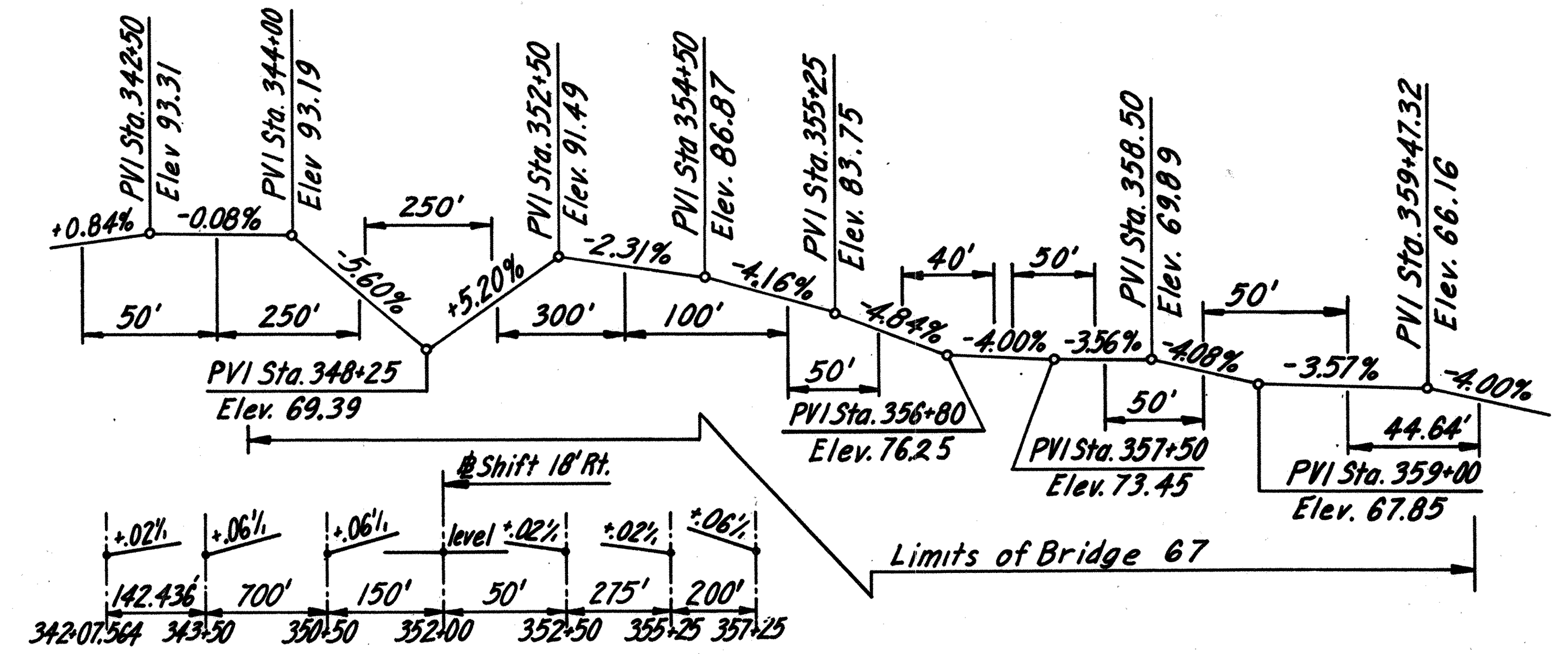
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	174	265

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	NO.	REVISION	BY	DATE
MADE	AMH	12-30-68	2	As Built	TEM	6-77
CHECKED	KCT	5-12-69	△	Revised Piers & Abut Sta. & Span Length	DWB	1-24-75
IN CHARGE						

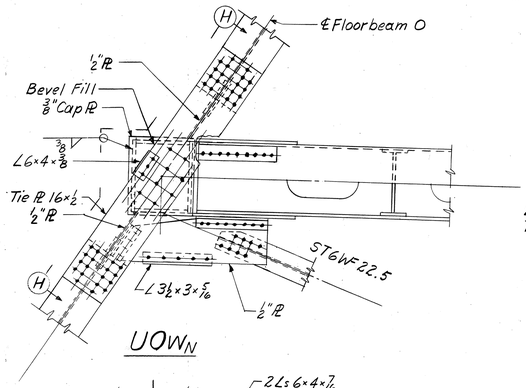
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO
RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

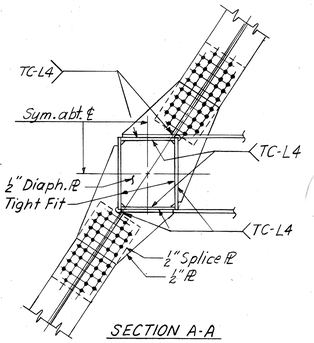
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 2 OF 54

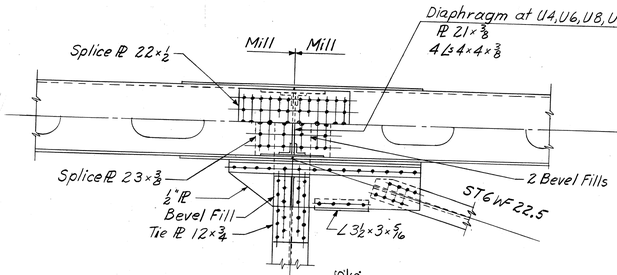
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	211	265

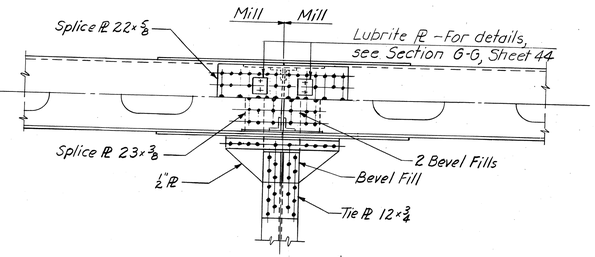


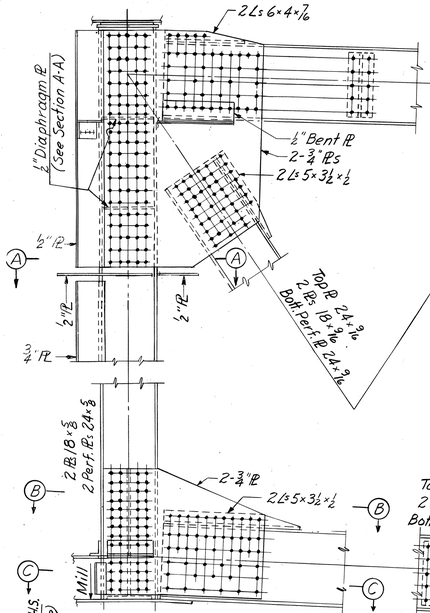
U0W$_N$

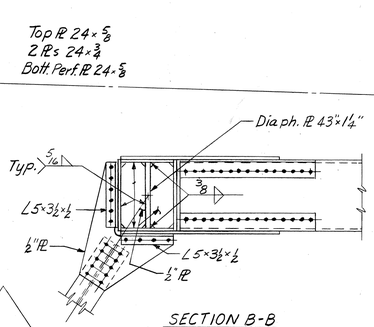


SECTION A-A

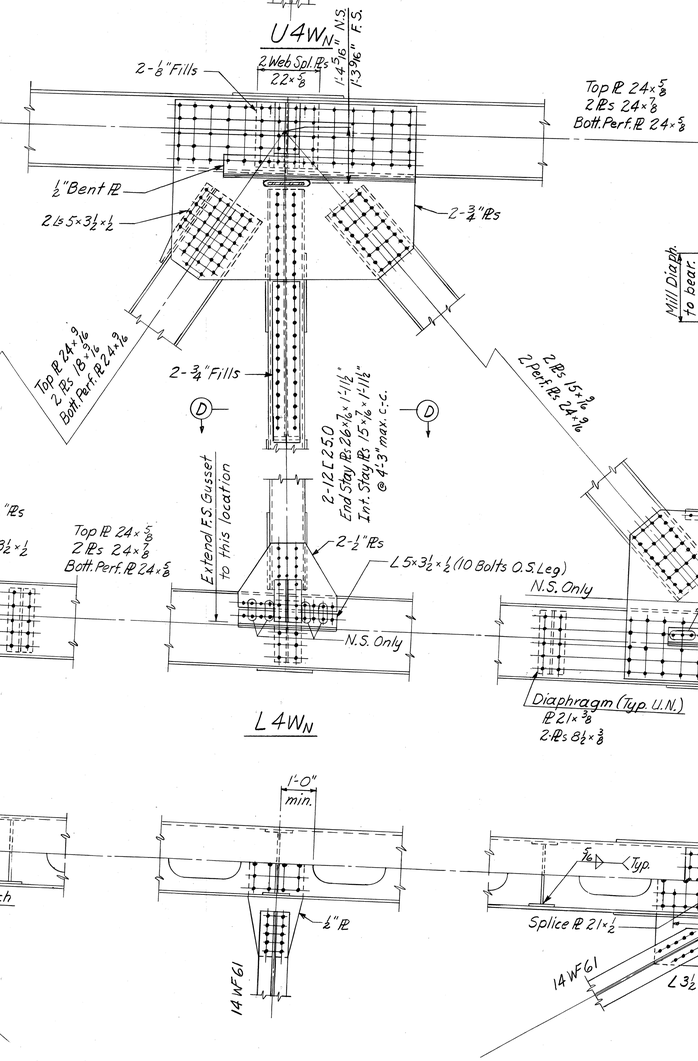


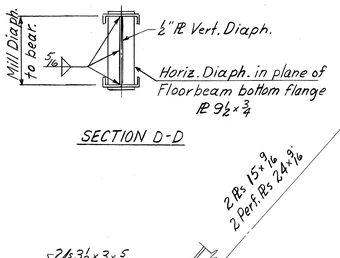




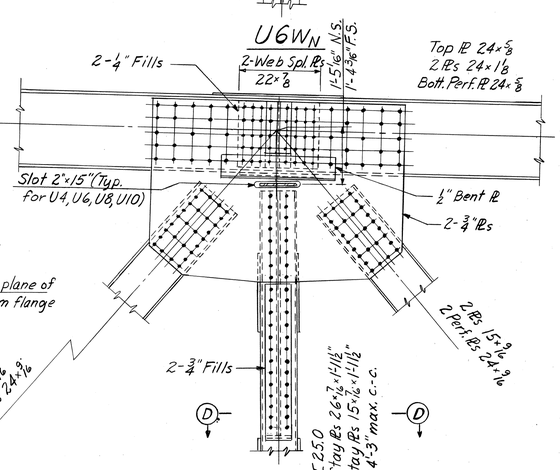


SECTION B-B



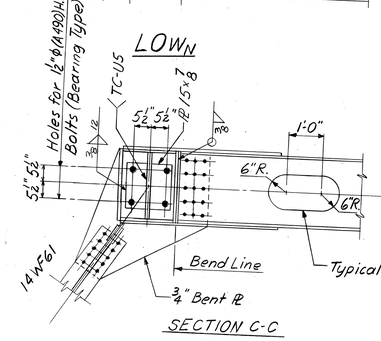


SECTION D-D



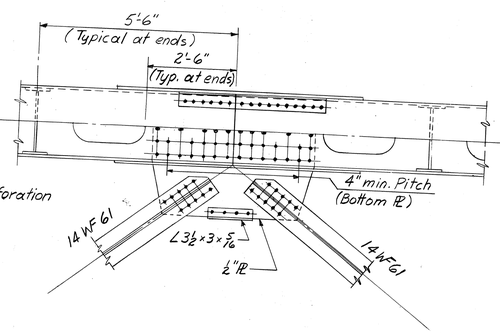
Details for L6W$_N$ Same as for L4W$_N$.

NOTE:
For Sect. H-H, see Sh. 41.



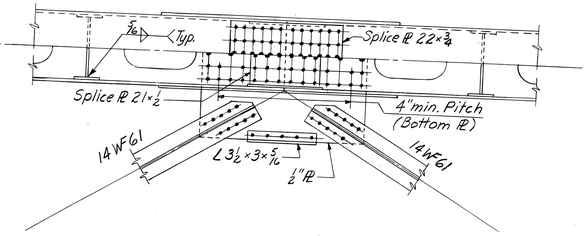
SECTION C-C

L0W$_N$

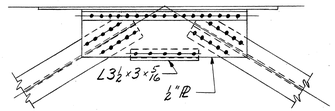


L3$_A$W$_N$

L4W$_N$



L5W$_N$



TYPICAL TOP FLANGE CONNECTION BOTTOM LATERALS

DESIGNED							
DRAWN	PRY	1-74	2	As Built	TEM	6-77
CHECKED			⚠	Slot location & misc. changes	d.B.P.	2-7.75
IN CHARGE	PRY		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

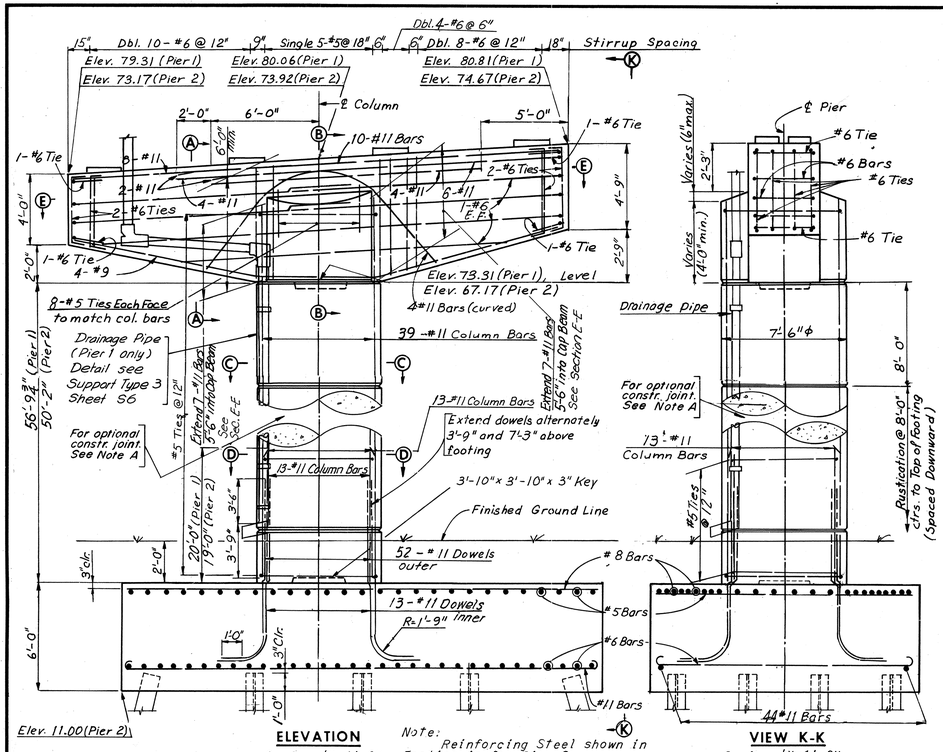
TRUSS DETAILS - P.P.O TO P.P.6

SCALE ½"=1'-0"
DATE

SHEET 39 OF 54

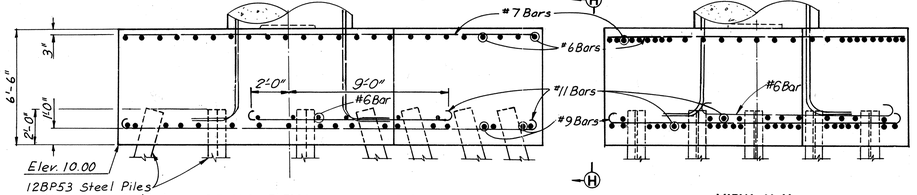
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
Alexandria, Virginia
HNTB

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	177	265



ELEVATION
Scale: 1"=1'-0"

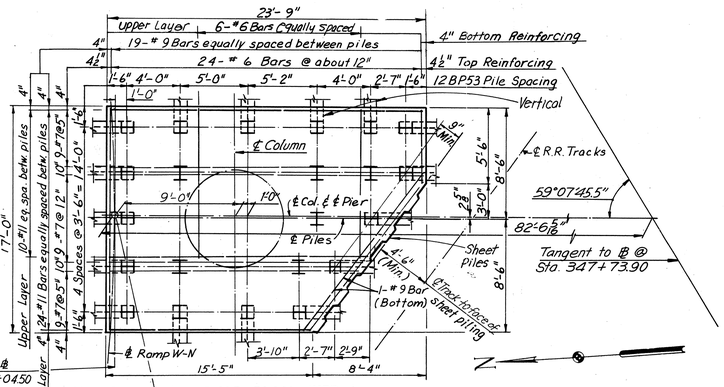
Note: Reinforcing Steel shown in Footing is for Pier 2.



FOOTING ELEVATION - PIER 1
Scale: 1"=1'-0"

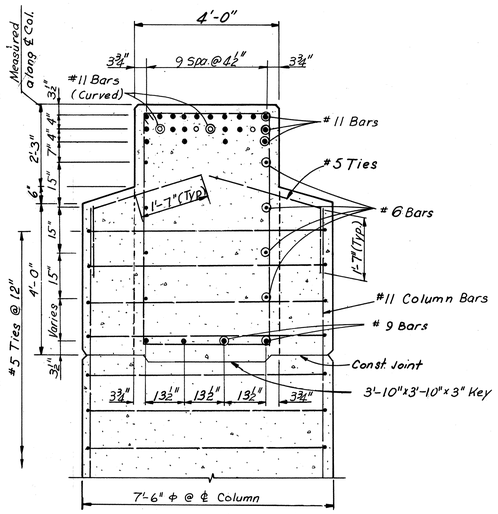
VIEW K-K
Scale: 1"=1'-0"

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

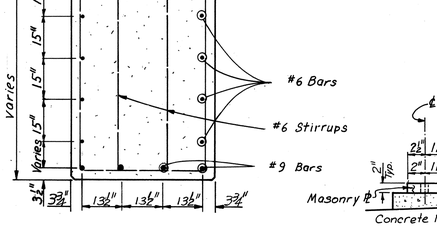


FOOTING PLAN - PIER 1
Scale: 3/16"=1'-0"

Note: For 12BP53 Steel Pile Details, see Sheet 6. 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 S16,S2. For Framing Plan, See Sheet 19 & 20. Estimated Pile tip Elevation 18.00.

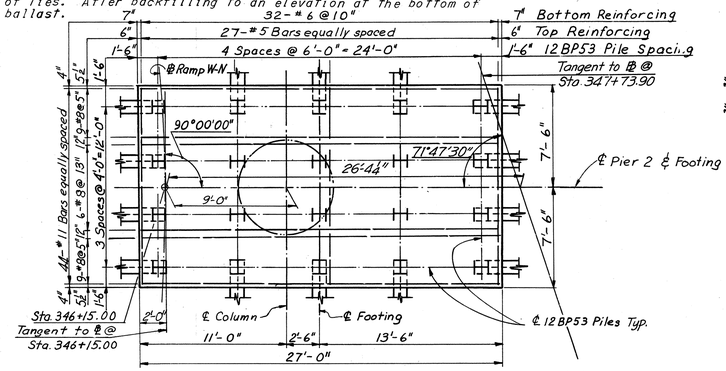


SECTION B-B
Scale: 1/2"=1'-0"



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

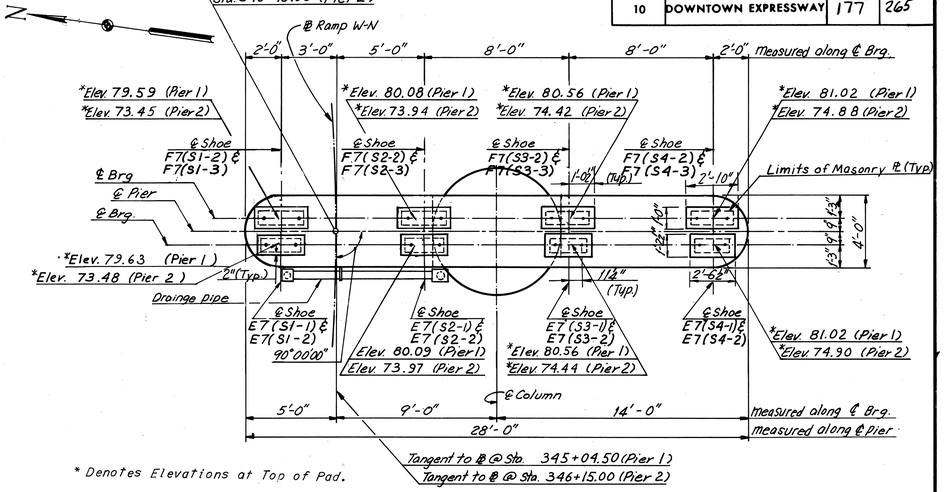
Note: (Pier 1 only)
The face of the Sheet piling to ℄ Track not encroach within 4'-6" and nor over the top of rail during the Construction of the piers.
The Sheet piling shall be cut off at the Elev. of Bottom of ties. After backfilling to an elevation at the bottom of ballast.



FOOTING PLAN - PIER 2
Scale: 3/16"=1'-0"

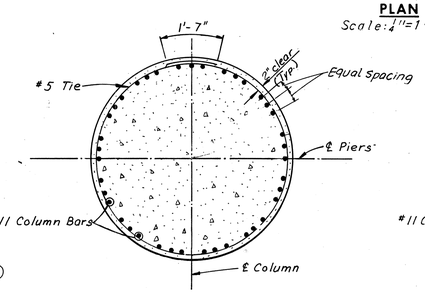
Note: Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.

FOOTINGS FOR PIERS 1 AND 2 ARE ECCENTRIC AS SHOWN ON FOOTING PLANS ABOVE

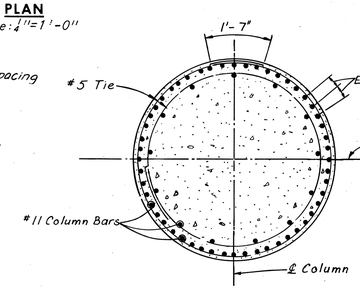


* Denotes Elevations at Top of Pad.

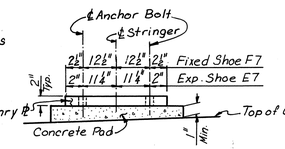
PLAN
Scale: 1/4"=1'-0"



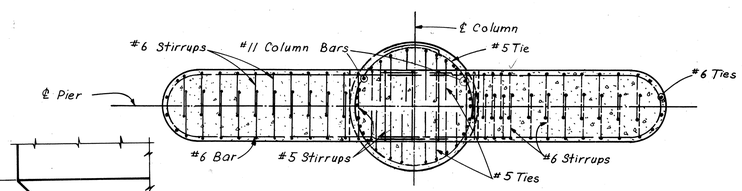
SECTION C-C
Scale: 3/8"=1'-0"



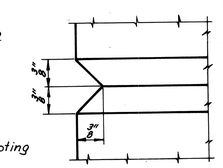
SECTION D-D
Scale: 3/8"=1'-0"



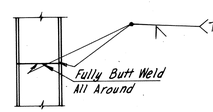
PAD ELEVATION VIEW
No Scale



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



RUSTICATION DETAIL
Full Scale



PILE SPLICE DETAIL
No Scale

Note A:
A construction joint will be permitted at a rustication near midheight of the column. The column reinforcement may be lap spliced near the construction joint. The lap at the splice shall be a minmum of 3'-6". Splices shall be staggered atleast 3'-3" between adjacent bars.

	BY	DATE				
MADE	J.D.	9-16-68				
CHECKED	G.S.H.	4-21-69	1	As Built	TEM	6-77
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

PIERS 1 AND 2

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

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 5 OF 54

Bridge 68

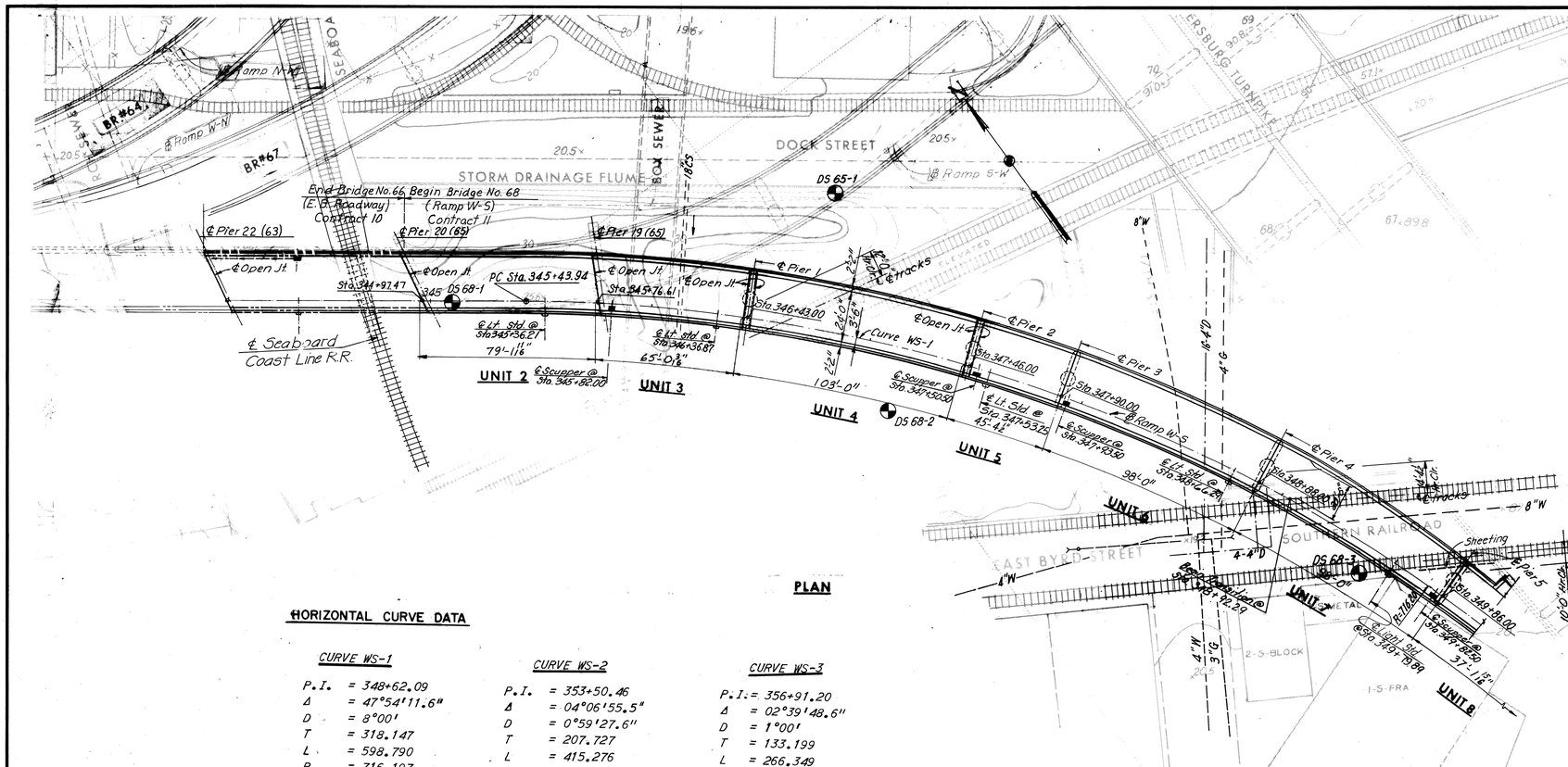
(Ramp from Eastbound Downtown Expressway “Rte. 195” to Southbound I-95 over East Byrd Street, NS RR and CSX RR)

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	64	97

INDEX

PLAN



HORIZONTAL CURVE DATA

CURVE WS-1

P.I.	= 348+62.09
Δ	= 47°54'11.6"
D	= 8°00'
T	= 318.147
L	= 598.790
R	= 716.197

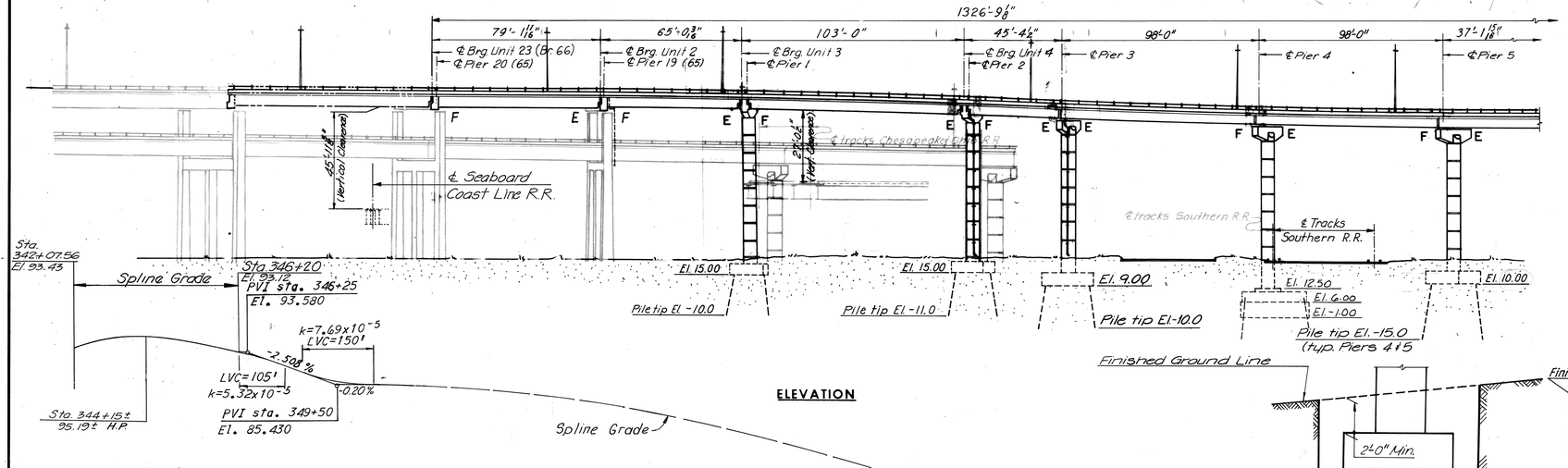
CURVE WS-2

P.I.	= 353+50.46
Δ	= 04°06'55.5"
D	= 0°59'27.6"
T	= 207.727
L	= 415.276
R	= 5,781.578

CURVE WS-3

P.I.	= 356+91.20
Δ	= 02°39'48.6"
D	= 1°00'
T	= 133.199
L	= 266.349
R	= 5,729.578

ELEVATION



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 classified as Regular Excavation and is not included in the Structural Quantities.

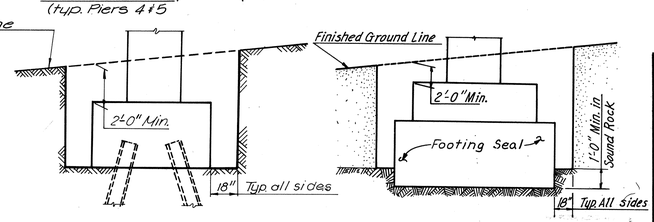
FOUNDATIONS: Footings shall rest on firm material. Foundation material shall be dry and special attention is called to Section 401.05 of General Specifications and to the Contract Special Provisions, concerning preparation of foundations for footings.

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 ¾" diameter unless otherwise noted and shall conform to A.S.T.M. Specification A-325.

LIMITS OF STRUCTURE EXCAVATION

No Scale



	BY	DATE
MADE	J.V.	4-2-69
CHECKED	G.S.H.	7-16-69
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

△2 PROFILE GRADE ℄ RAMP W-S

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

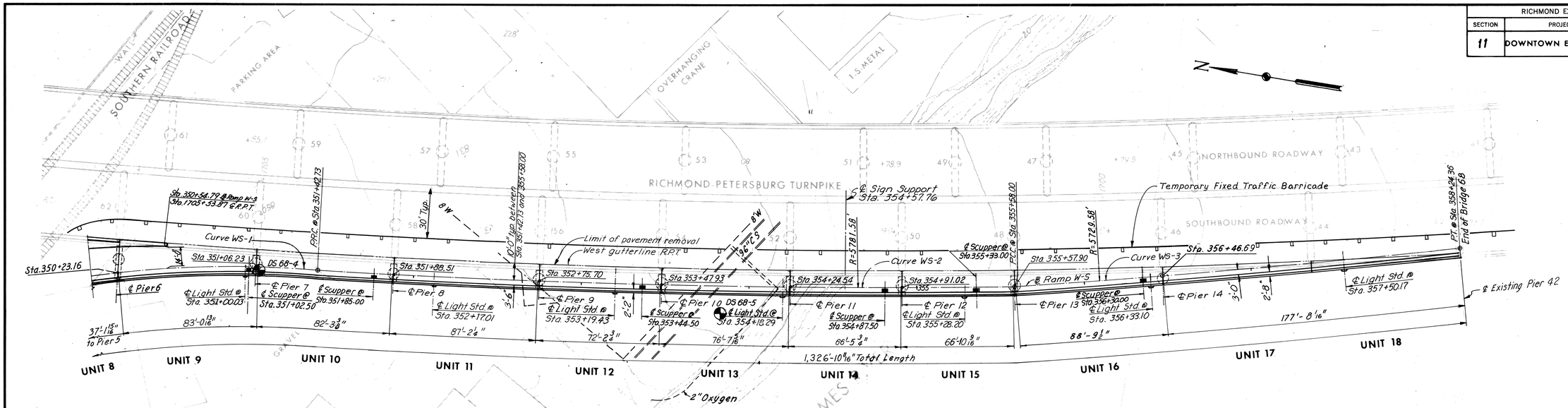
BRIDGE NO. 68
RAMP W-S CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

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

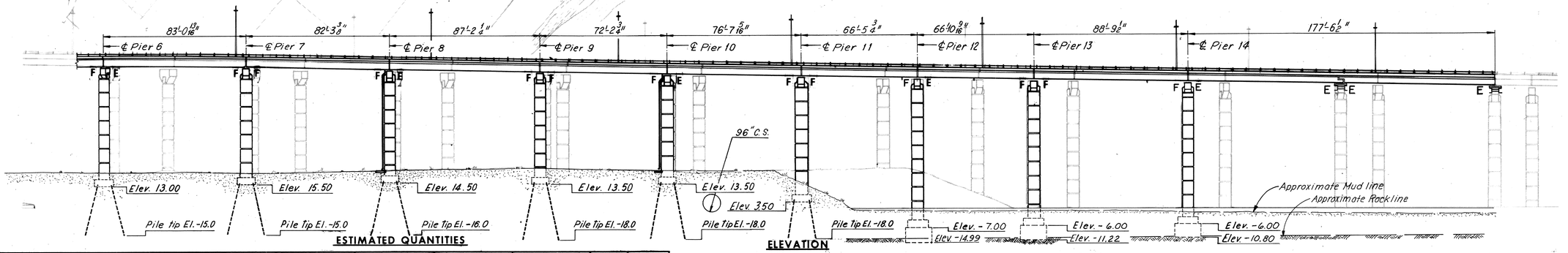
SCALE: 1"=30'
CONTRACT NO.: 11
SHEET NO. 1 OF 28

64

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	65	97



PLAN



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	----	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
MADE	J.V	4-3-69
CHECKED	G.S.H.	7-16-69
IN CHARGE		

NO.	REVISION	BY	DATE
1	At Pier 44 & 42 Struc. Steel Quan	T.E.M.	8-26-75

* 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

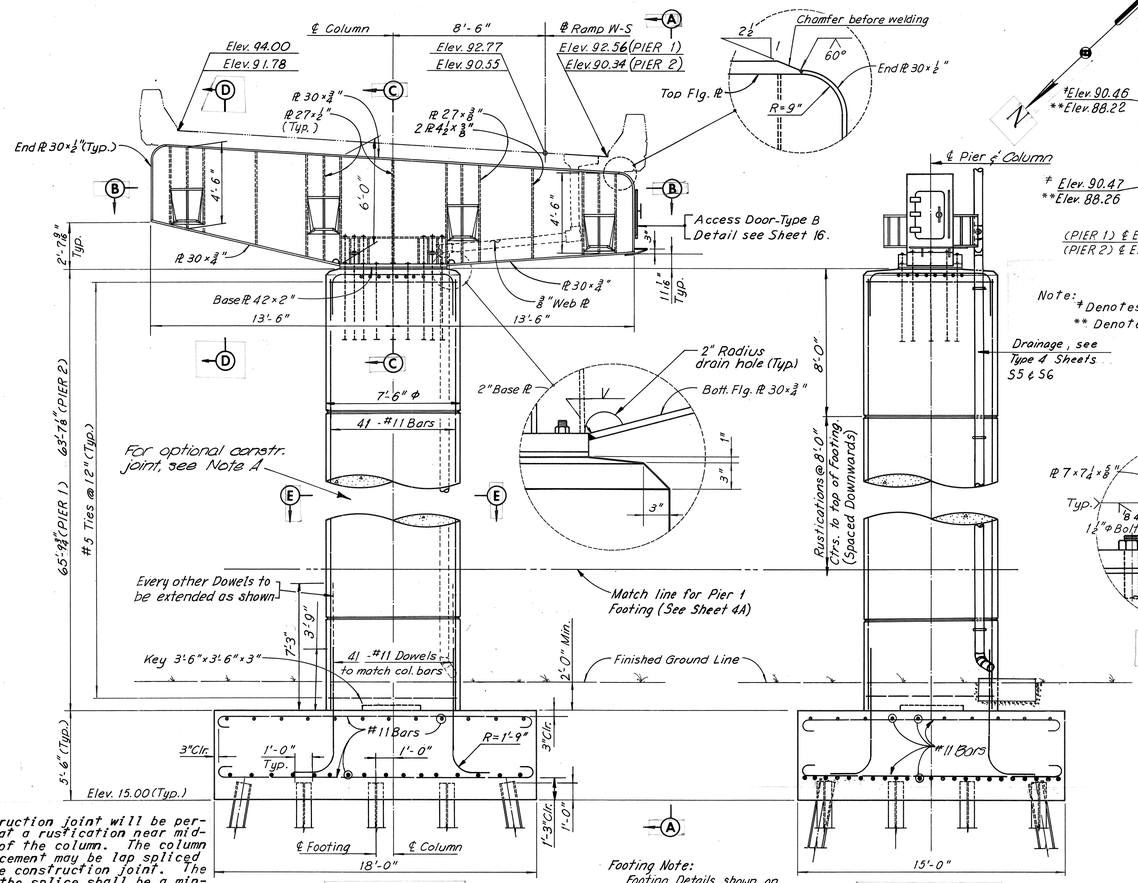
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

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

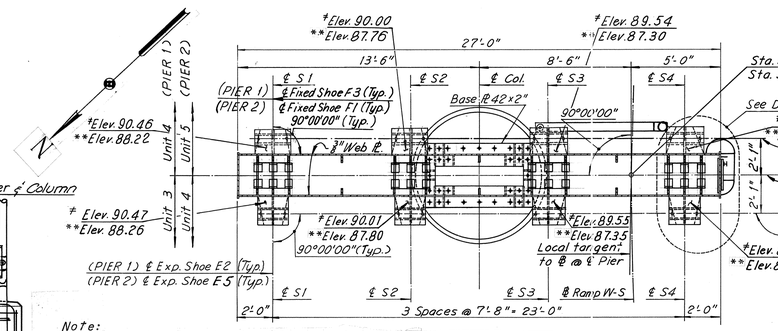


ELEVATION
Scale: ¼" = 1'-0"

VIEW A-A
Scale: ¼" = 1'-0"

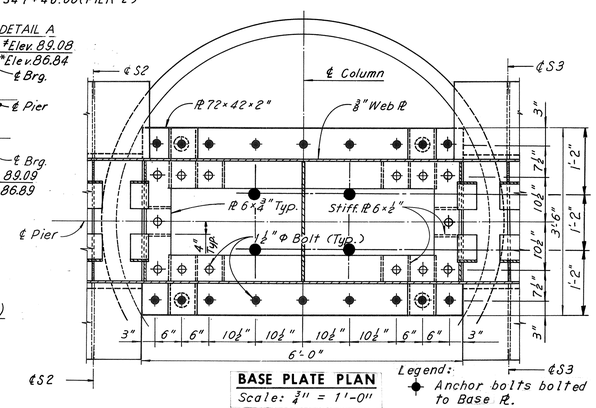
NOTE A
A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap at the splice shall be a minimum of 3'-6". Splices shall be staggered at least 3'-3" between adjacent bars.

Footing Note:
Footing Details shown on this sheet are for Pier 2 Only. For Pier 1 see Sheet 4A.



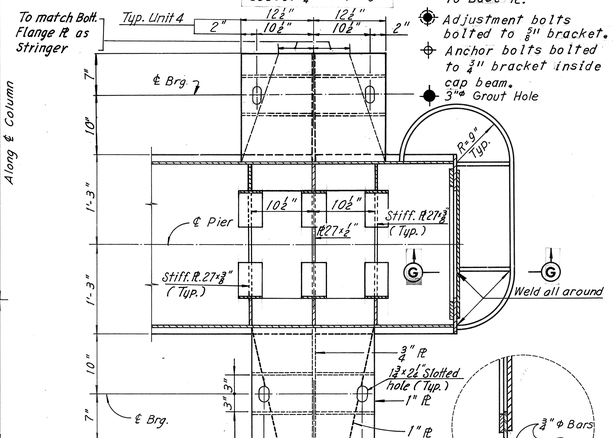
Note:
* Denotes Base PL Elevation on Pier 1.
** Denotes Base ℄ Elevation on Pier 2.

SECTION B-B
Scale: ¼" = 1'-0"



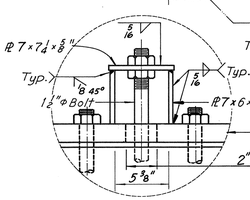
BASE PLATE PLAN
Scale: ¾" = 1'-0"

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

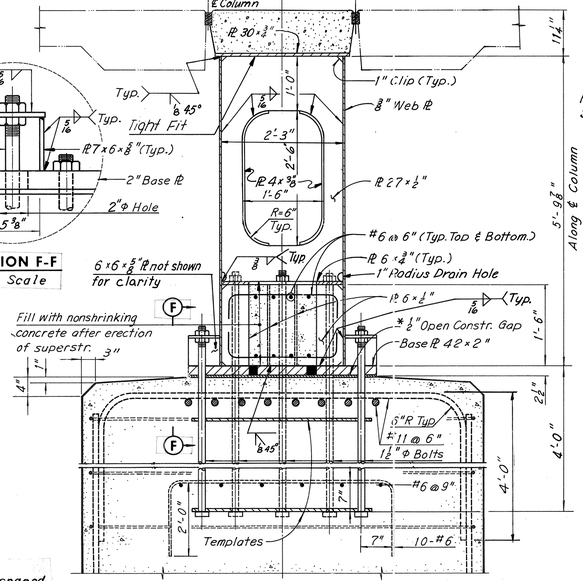


DETAIL A
Scale: 1" = 1'-0"

SECTION G-G



SECTION F-F
No Scale



SECTION C-C
Scale: ¾" = 1'-0"

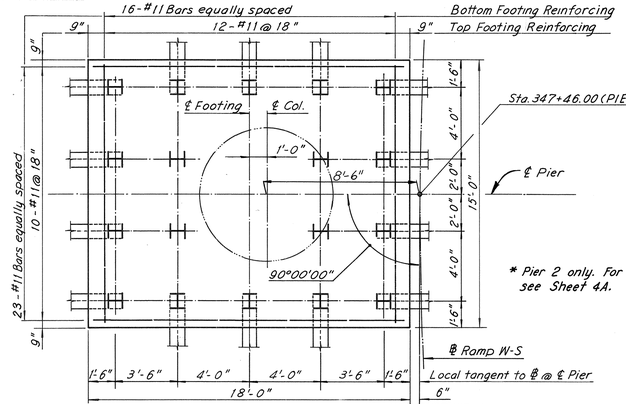
Note: * Fill with nonshrinking Grout after Capbeam is in final position.

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.

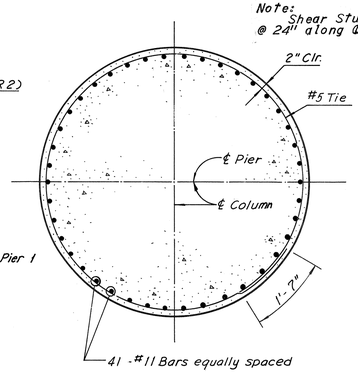


FOOTING PLAN *
Scale: ¼" = 1'-0"

FOOTINGS FOR PIERS 1 AND 2 ARE ECCENTRIC AS SHOWN ON FOOTING PLAN

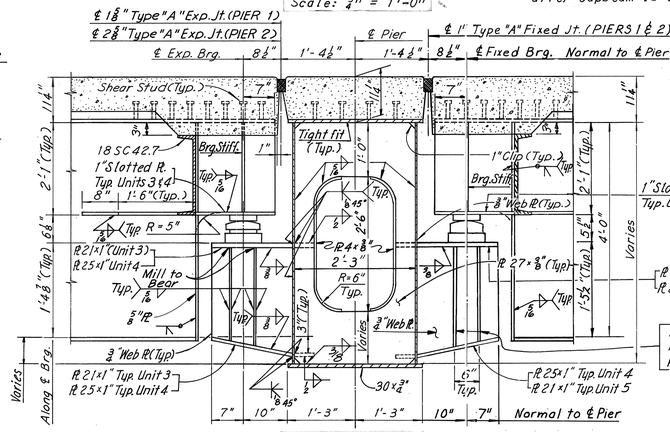
Note: Batter piles 3" per ft. as shown. All piles are 12 BP53 steel piles (Design Capacity=57 Tons

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.



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 Structural Steel for Piers 1 and 2 shall be A36. Steel Cap Beams need not be cambered.

AS BUILT

	BY	DATE				
MADE	MHH	1-17-69	2	PL Deleted and Dim. added Sect D-D	TEM	8-76
CHECKED	JD	2-13-69	1	Footing Details Pier 1 Deleted	MSD	3-13-75
IN CHARGE			NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

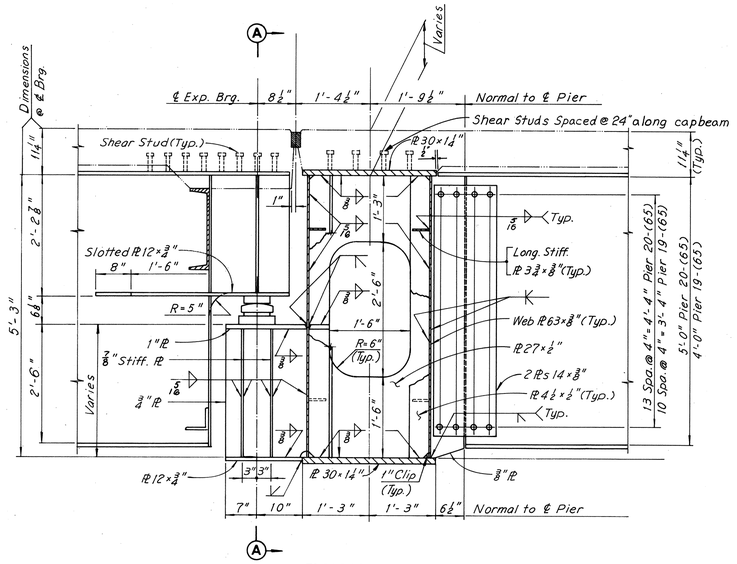
BRIDGE NO. 68
RAMP W-S CONNECTION TO
RICHMOND-PETERSBURG TURNPIKE

PIERS 1 AND 2

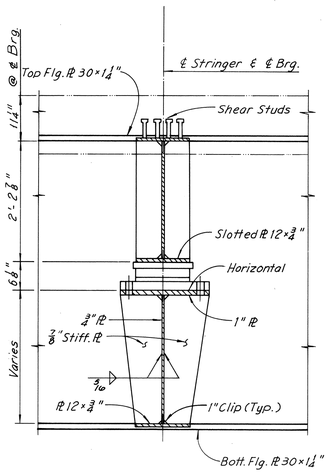
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 11
SHEET NO. 4 OF 28

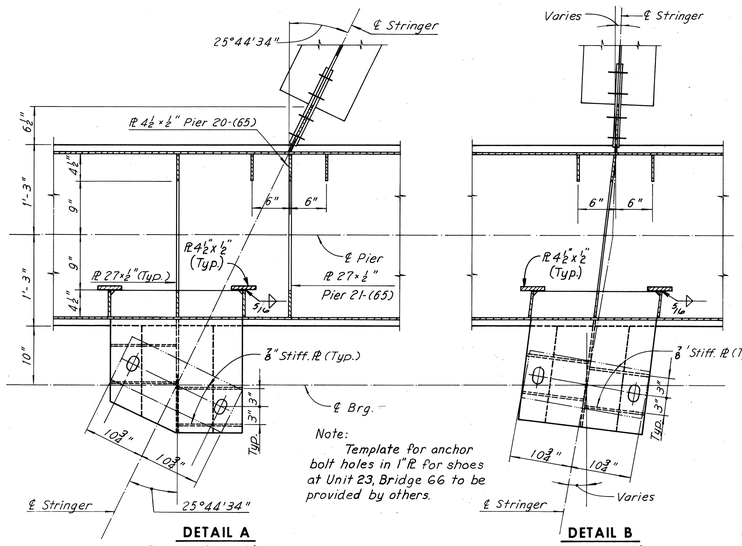
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	81	97



TYPICAL SECTION
Scale: ¾" = 1'-0"



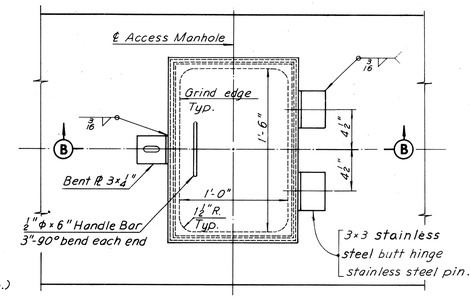
SECTION A-A
Scale: ¾" = 1'-0"



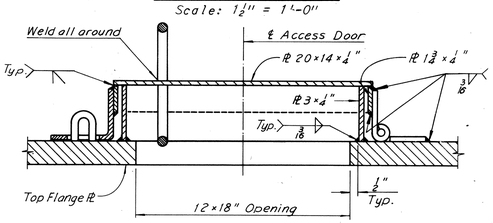
Note:
Template for anchor bolt holes in 1" PL for shoes at Unit 23, Bridge 66 to be provided by others.

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

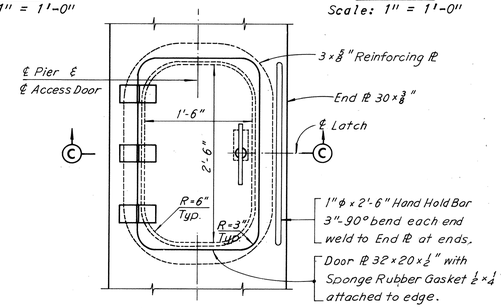
DETAIL B
Scale: 1" = 1'-0"



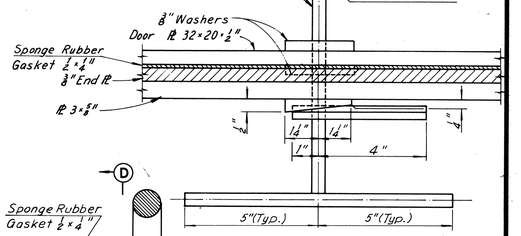
ACCESS DOOR - TYPE A
Scale: 1½" = 1'-0"

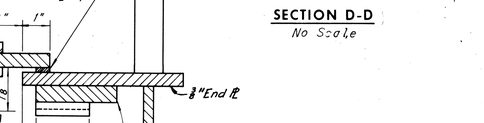


SECTION B-B
No Scale



ACCESS DOOR - TYPE B
Scale: 1" = 1'-0"





SECTION D-D
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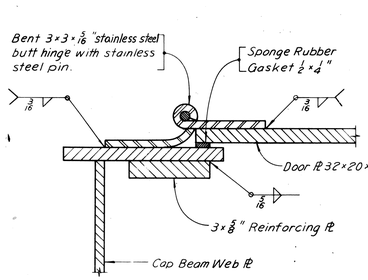

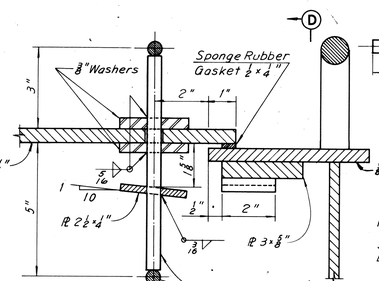

SECTION C-C
No Scale

Notes:
For location of Typical Section, Details A and B, and Access Doors, see Framing Details for Piers 19 and 20, Sheet 17.
For location of Details C and D, see Framing Plan Units 17 and 18, Sheet 16.

AS BUILT

	BY	DATE				
MADE	MHH	1-31-69				
CHECKED	JD	5-2-69	1	Dim and weld size	TEM	9-30-76
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
FRAMING DETAILS

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

SCALE: As Noted
CONTRACT NO: 11
SHEET NO. 18 OF 28