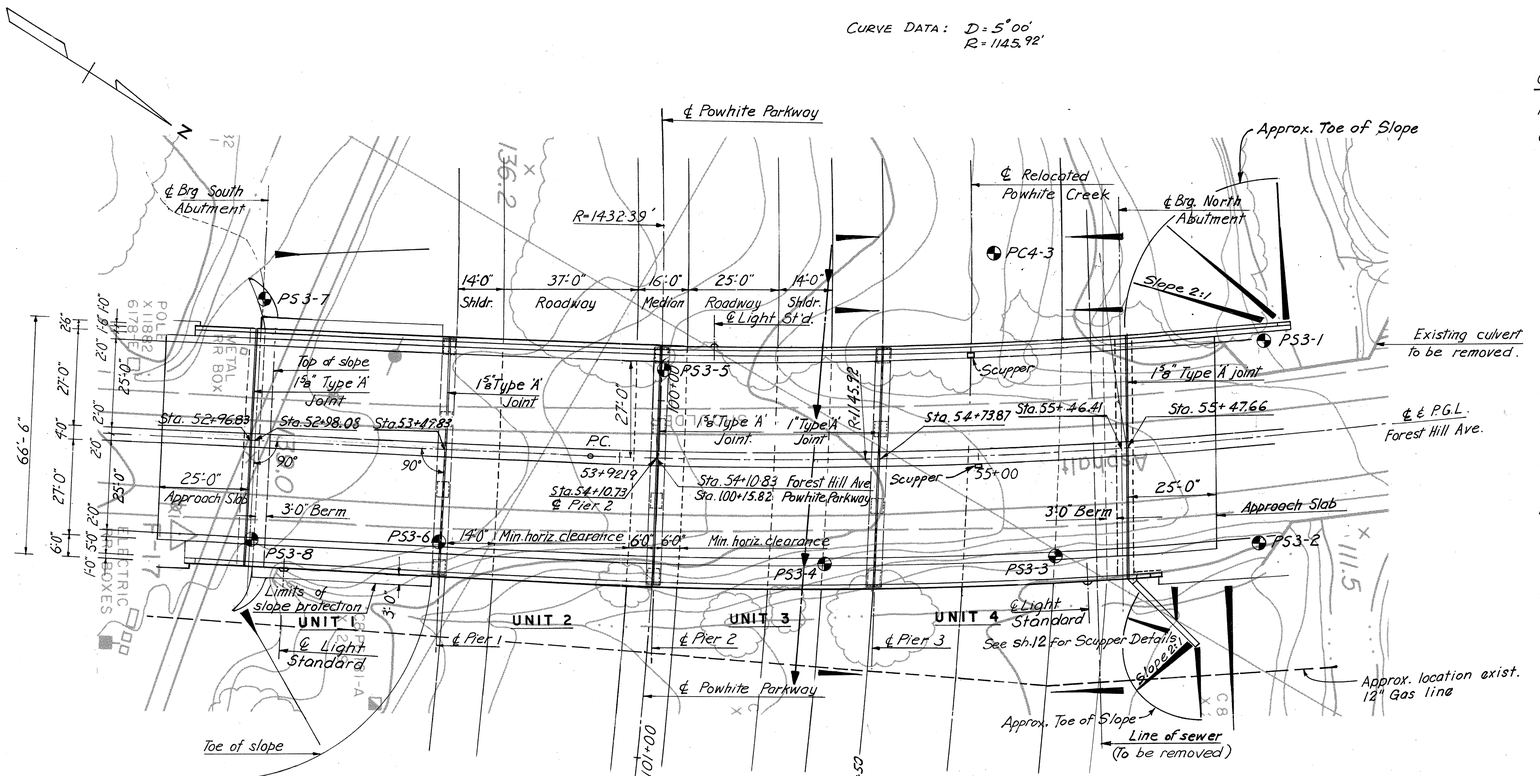
SP-Z

APPENDIX

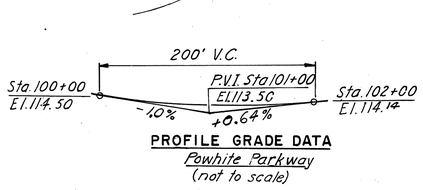
RMTA As-Built Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	151	188

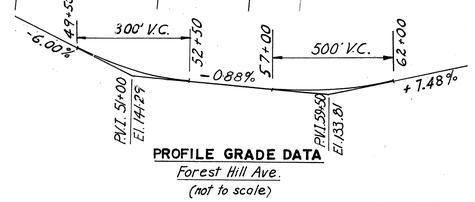
CURVE DATA: D = 5°00'
R = 1145.92'



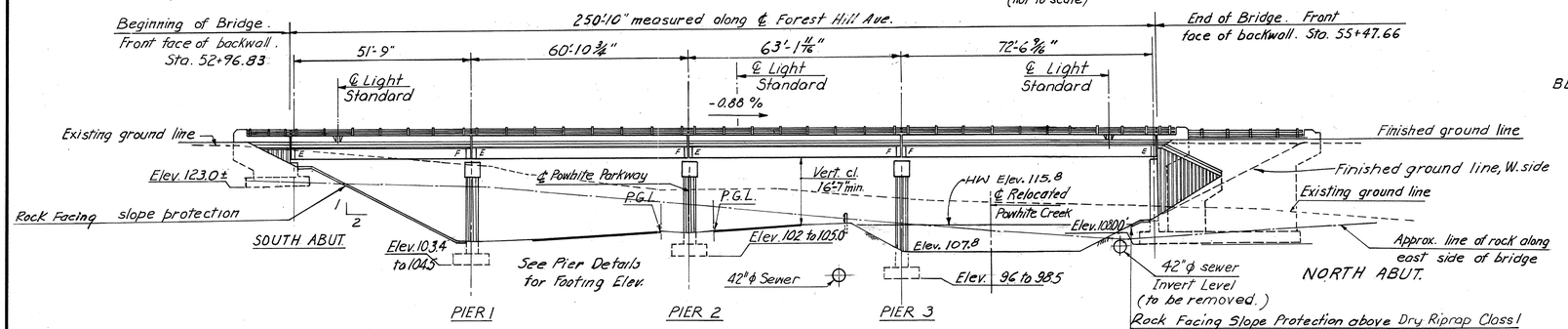
PLAN
Scale 1"=20'-0"



PROFILE GRADE DATA
Powhite Parkway
(not to scale)



PROFILE GRADE DATA
Forest Hill Ave.
(not to scale)



ELEVATION
Scale 1"=20'-0"

GENERAL NOTES:

ROADWAY: Two 27'-0" Clear roadways. One 5'-0" sidewalk. One 1'-6" curb.

CAPACITY: Dead Load- Includes 15 lbs. per sq. ft. for future wearing surface.
Live Loads- HS20-44 loading and B.P.R. modified for military vehicles.

SPECIFICATIONS: GENERAL - Virginia Department of Highways 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 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. 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. (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 reinf. bar dimensions on the detailed drawings are to be to the 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 7/8" diameter unless otherwise noted and shall conform to A.S.T.M. Specification A325.

BENCH MARK: See Reference Ties and Field Control Data sheet in highway plans.
F-17 (Copper Weld Rod) Elevation 139.03
F-18 (Copper Weld Rod) Elevation 141.18

BORINGS: ◓ Indicates location of 2½"ϕ cased hole boring.

AS BUILT

INDEX					
NO.	DESCRIPTION				
1	General Plan and Elevation	7	Pier 1 Details	16	Utility Support Det. At Bridge Abut.
2	Quantities and Misc. Details	8	Pier 2 & 3 Details	17	Approach Slab and Slope Pro. Det.
3	South Abutment Details	9	Framing Plan	18	Boring Logs
4	North Abutment Details	10	Typ. Transverse Section	51	Standard Shoe Details
5	North Abutment Details (1)	11	Deck Plans	53	Standard Alum. Rail Det. (2 Rail)
6	North Abutment Details (2)	12	Scupper Details	57	Standard Architectural Details
		13	Electrical Detail	58	Standard Architectural Details
		14	Joint Details		
		15	Conduit Installation Details		

	BY	DATE	NO.	REVISION	BY	DATE
MADE	JLN	2-68				
CHECKED	THN	2-68	1	As Built	JRC	3-73
IN CHARGE	RHW					

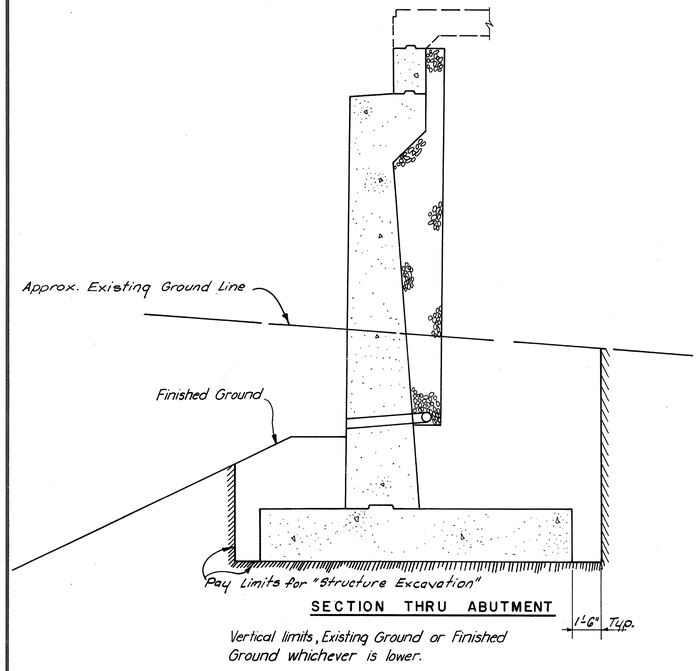
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

FOREST HILL AVENUE OVER POWHITE PARKWAY
BRIDGE B-06
GENERAL PLAN & ELEVATION

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

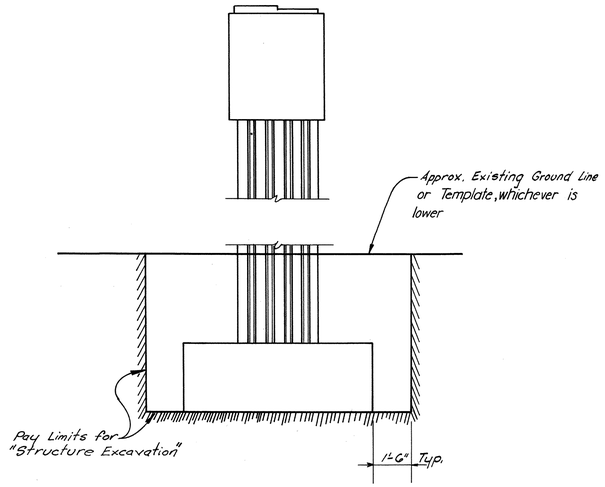
SCALE: AS SHOWN
CONTRACT NO.: C-2
SHEET NO. 1 OF 18

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	152	188

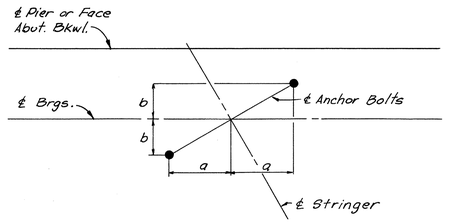


SECTION THRU ABUTMENT

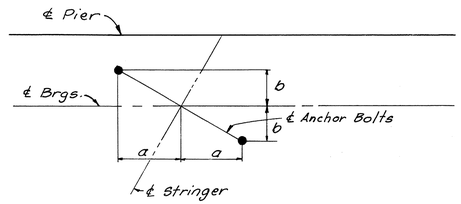
Vertical limits, Existing Ground or Finished Ground whichever is lower.



PIER END ELEVATION



TYPE 1



TYPE 2

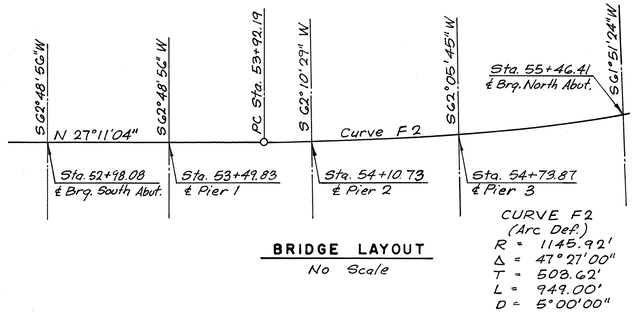
Substructure	Stringer	Type	"a"	"b"
S. ABUT.	S1 - S10	1	8 1/4"	0
PIER 1	S1 - S10	1	8	0
	S11 - S20	1	8 1/4	0
PIER 2	S11 - S20	2	8	1/16"
	S21 - S30	1	8 1/4	1/4
PIER 3	S21 - S24	1	8 1/16	1/4
	S25 - S30	1	8	1/4
	S31 - S36	1	7 15/16	3/4
	S37 - S40	1	8	1/16
N. ABUT.	S31 - S34	1	8 3/16	15/16
	S35	1	8 1/4	7/8
	S36 - S40	1	8 1/4	1/16

ANCHOR BOLT SETTING DIAGRAMS

ESTIMATED QUANTITIES

	Structure Excavation C.Y.	Concrete (a) C.Y.	Reinforcing Steel Lbs.	Structural Steel Lbs.	Aluminum Br. Railing (2 Rail) L.F.	Gas Main 12"ø L.F.	Conduit 6"ø VEPCO L.F.	Conduit 4"ø Telephone L.F.	Porous Backfill C.Y.	Rock Face Slope Protection S.Y.	Asphalt Damp-proofing S.Y.	Underdrain 6"ø Pipe L.F.	Conc. A-3 Br. Appr. Slab C.Y.
Superstructure	—	535.2 (b)	120,415	498,775	501.0	305.0	606.0	1,830.0	—	—	—	—	—
South Abutment	389	194.4	7,066	—	27.0	—	—	—	32	438	97	122	—
Pier 1	102	90.5	27,970	—	—	—	—	—	—	—	—	—	—
Pier 2	165.6	94.6	26,700	—	—	—	—	—	—	—	—	—	—
Pier 3	158.4	100.5	29,849	—	—	—	—	—	—	—	—	—	—
North Abutment	577	518.2	37,909	—	46.0	—	—	—	103	146	309	132	—
Approach Slabs	—		35,687	—	—	—	—	—	—	—	—	—	166
Total	1,392	998.2(a) 535.2(b)	285,596	498,775	574.0 (c)	305.0	606.0	1,830.0	135	584	406	254	166

(a) Class A3, unless noted.
(b) Class A4
(c) Includes that portion on abutments and wingwalls.



BRIDGE LAYOUT
No Scale

CURVE F2
(Arc Def.)
R = 1145.92'
Δ = 47°27'00"
T = 503.62'
L = 949.00'
D = 5°00'00"

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	R.S.S. A.J.P.	2-68	2	As Built	JRC	3-73
CHECKED	T.H.N.	2-68	1	General	J.G.V.	10-70
IN CHARGE R.H.W.						

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

FOREST HILL AVENUE OVER
POWHITE PARKWAY
BRIDGE B-06

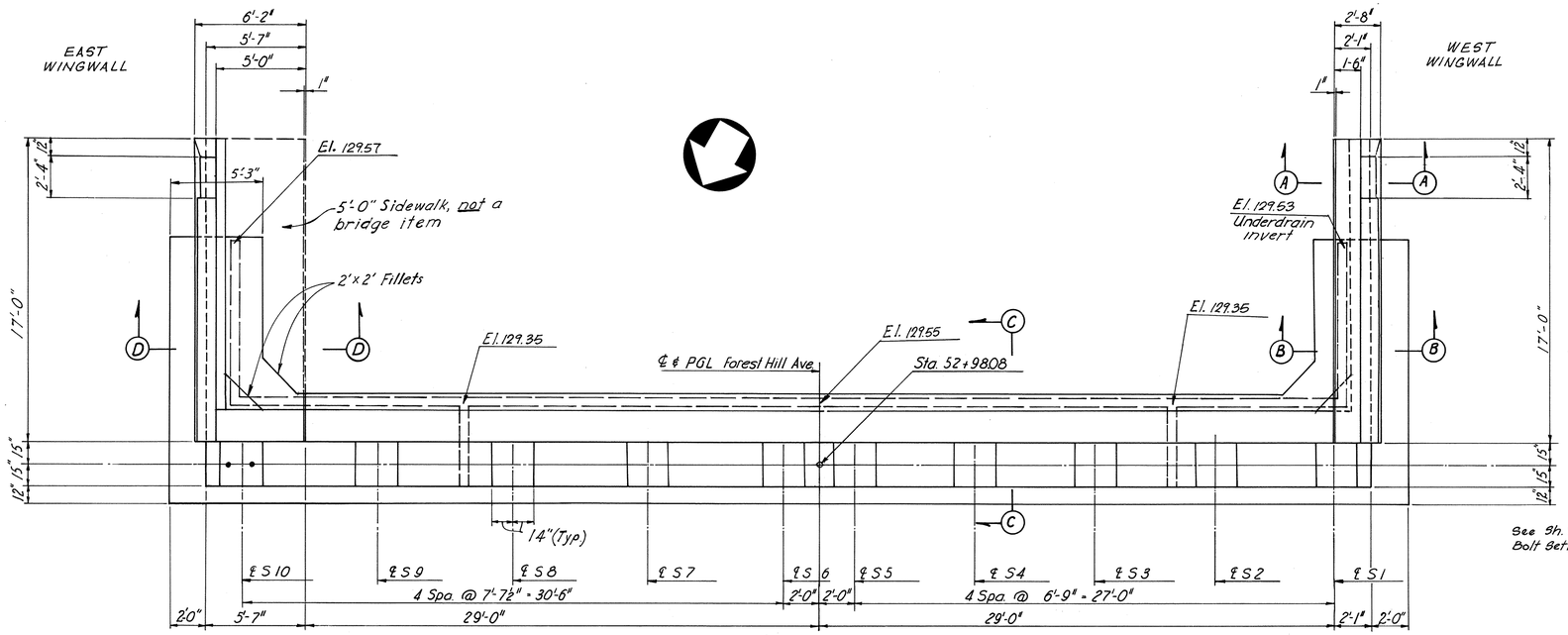
QUANTITIES AND MISC. DETAILS

HAYES, SEAY, MATTERN & MATTERN
Associate Engineers

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

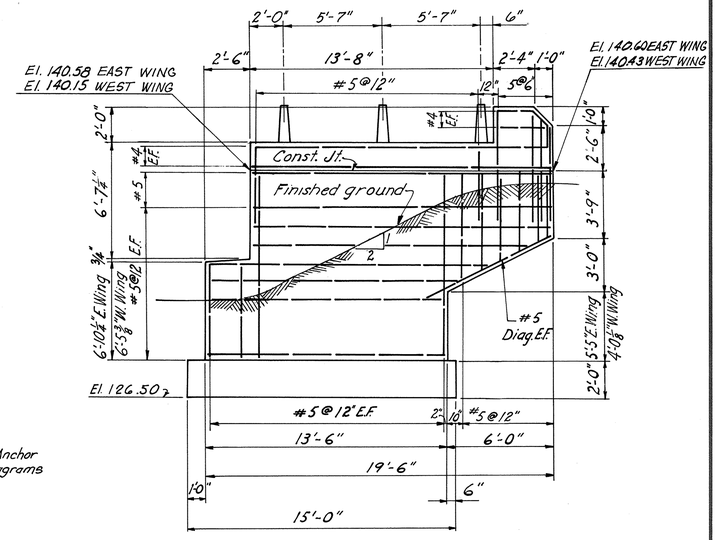
SCALE: NO SCALE
CONTRACT NO.: 2
SHEET NO. 2 OF 18

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	153	188

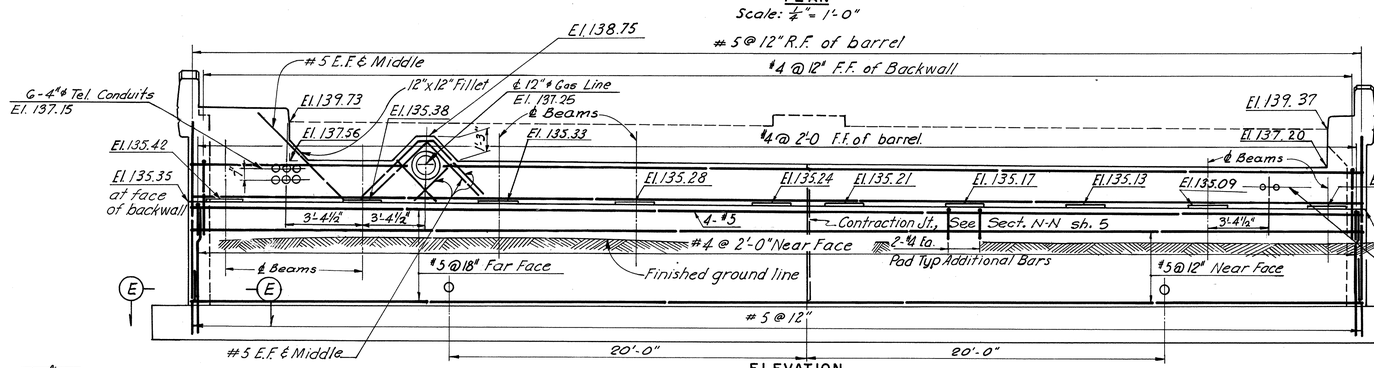


PLAN
Scale: ¼" = 1'-0"

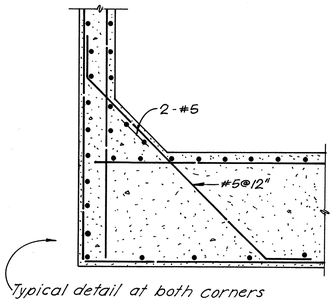
See Sh. 2 for Anchor Bolt Setting Diagrams



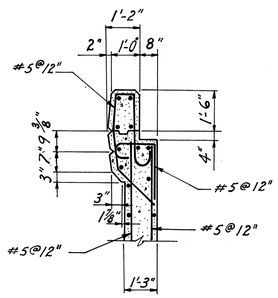
ELEVATION - WING WALL
Scale: ¼" = 1'-0"



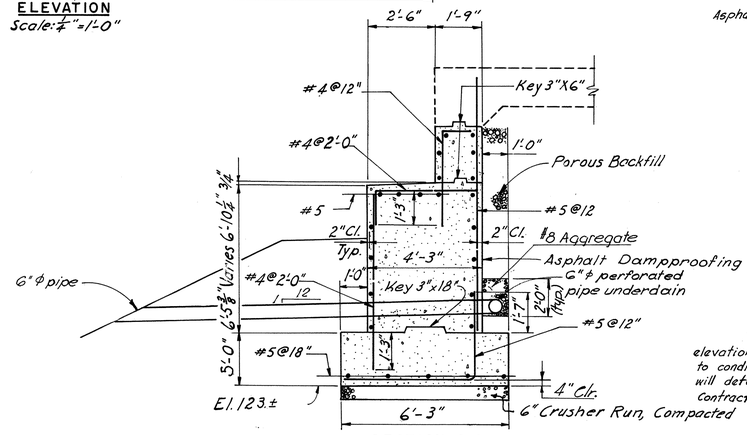
ELEVATION
Scale: ¼" = 1'-0"



SECTION E-E
Scale: ⅜" = 1'-0"

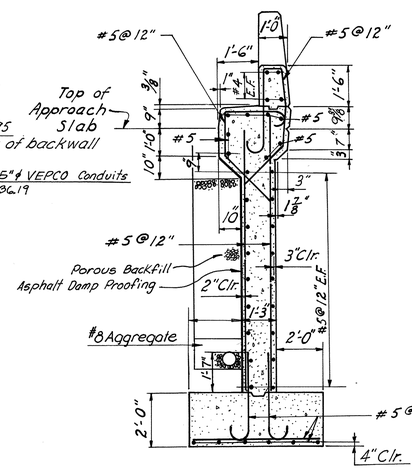


SECTION D-D
Scale: ⅜" = 1'-0"

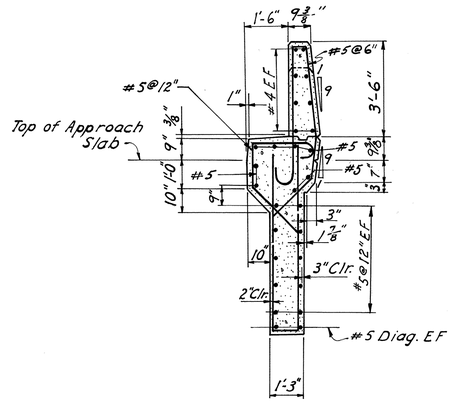


SECTION C-C
Scale: ⅜" = 1'-0"

Footings should be founded at the elevation shown on Plans unless otherwise directed by the Engineer due to conditions at the site during construction. In such cases, the Engineer will determine the extent of redesign necessary and will advise the Contractor before construction begins.



SECTION B-B
Scale: ⅜" = 1'-0"



SECTION A-A
Scale: ⅜" = 1'-0"

AS BUILT

	BY	DATE				
MADE	JLN	2-68	2	As Built	JRC	3-73
CHECKED	THN	2-68	1	Backwall	J.L.N.	5-1368
IN CHARGE	RHW		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

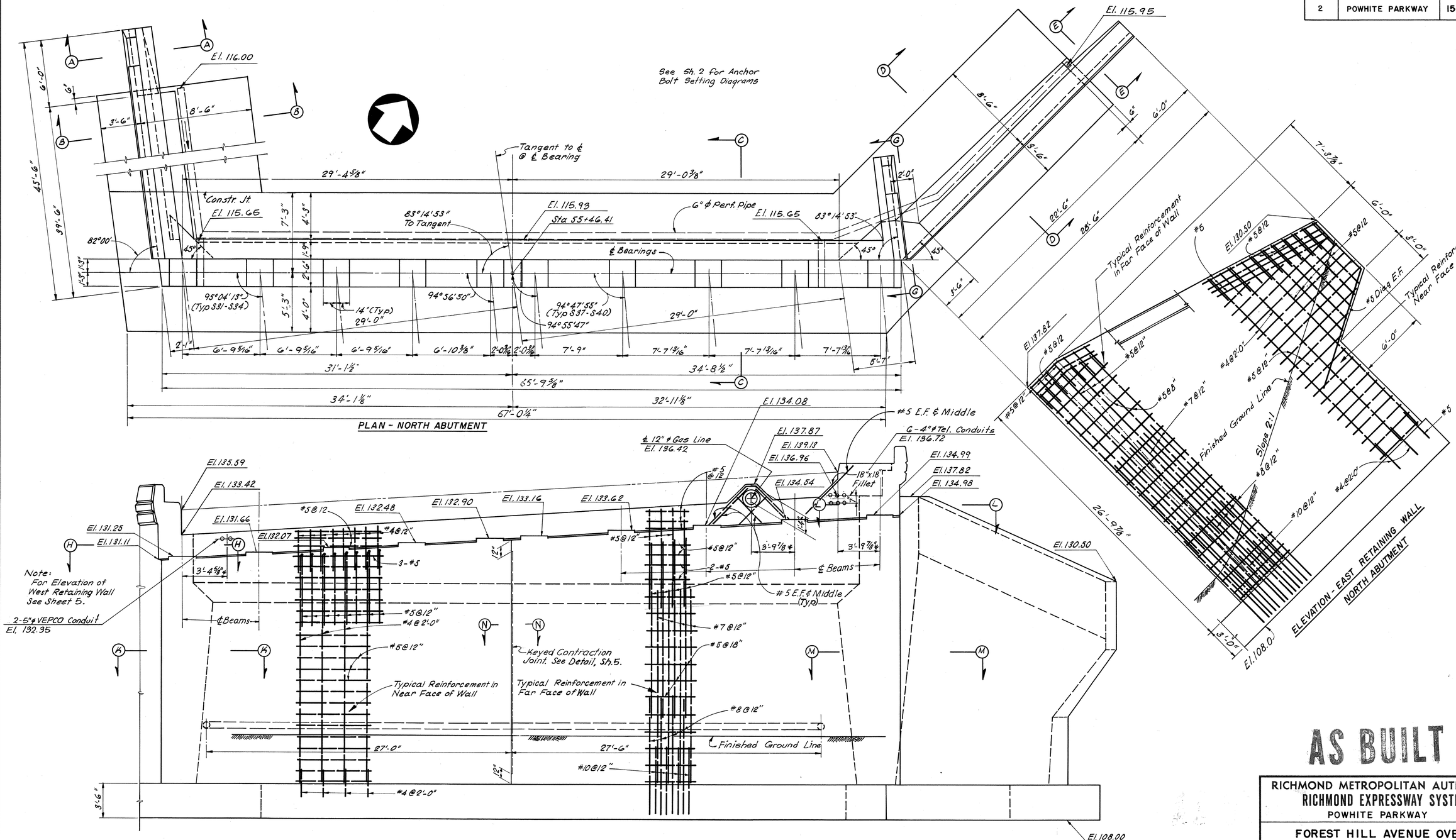
FOREST HILL AVENUE OVER POWHITE PARKWAY
BRIDGE B-06
SOUTH ABUTMENT DETAILS

HAYES, SEAY, MATTERN & MATTERN
Associate Engineers

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS SHOWN
CONTRACT NO.: 2
SHEET NO. 3 OF 18

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	154	188



	BY	DATE	NO.	REVISION	BY	DATE
MADE	JLN	2-68	2	As Built	JRC	3-73
CHECKED	THN	2-68	1	Backwall	J.L.N.	5-13-68
IN CHARGE	RHW					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

FOREST HILL AVENUE OVER POWHITE PARKWAY
BRIDGE B-06

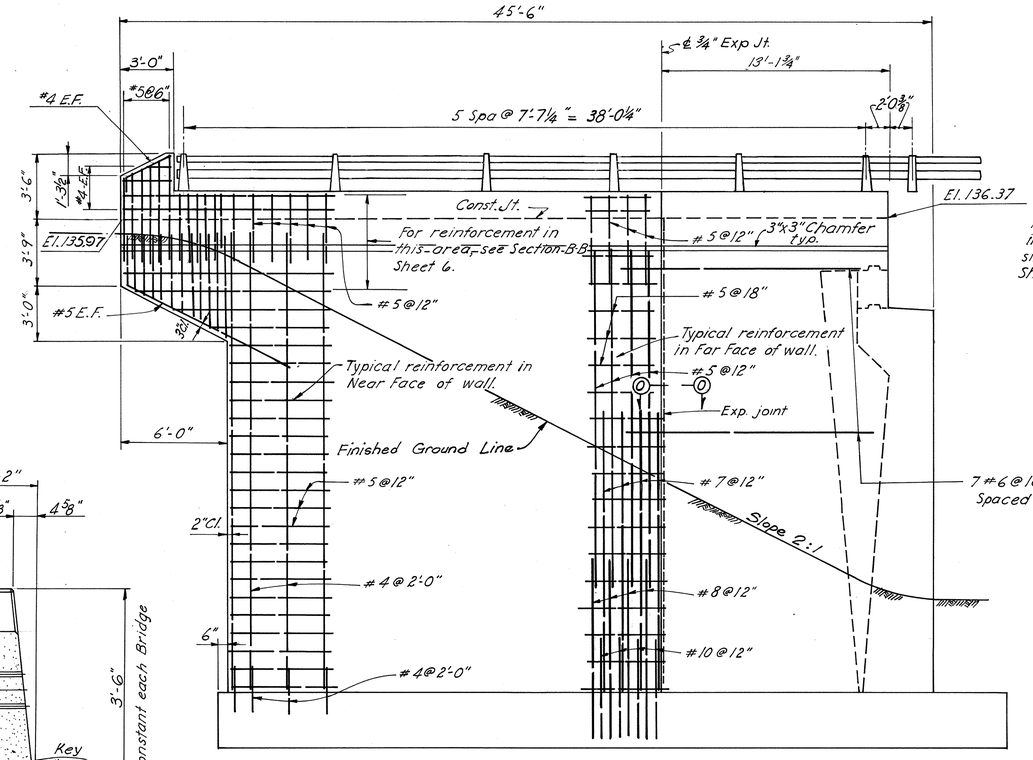
NORTH ABUTMENT DETAILS

HAYES, SEAY, MATTERN & MATTERN
Associate Engineers

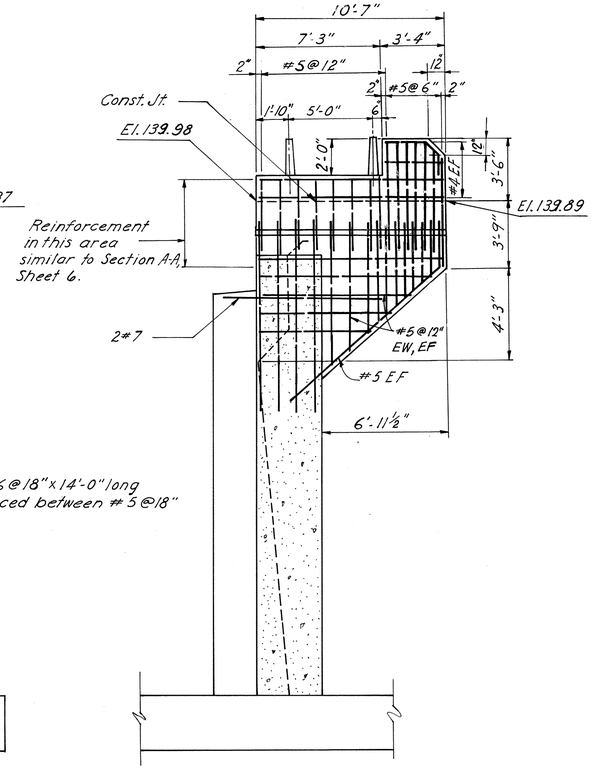
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: 1/4" = 1'-0"
CONTRACT NO.: 2
SHEET NO. 4 OF 18

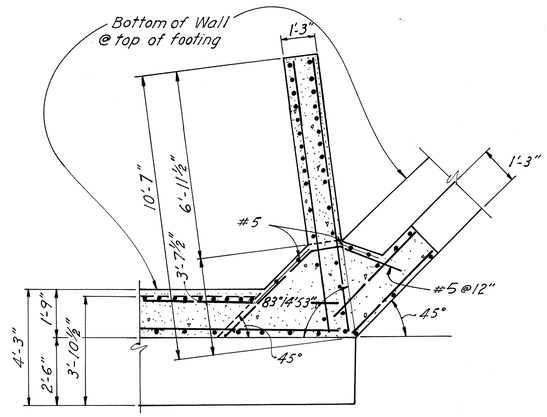
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	155	188



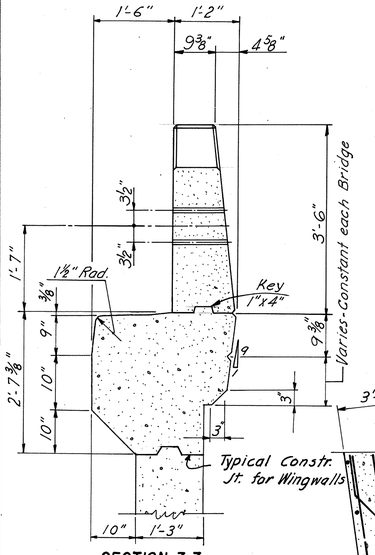
ELEVATION — WEST RETAINING WALL
NORTH ABUTMENT
Scale: ¼" = 1'-0"



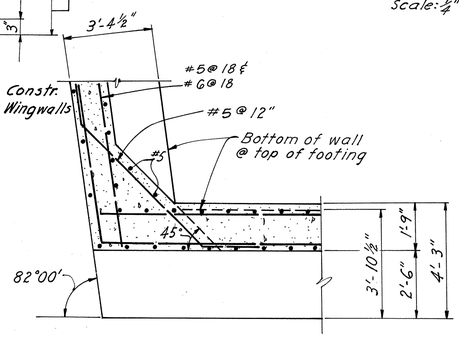
SECTION G-G
Scale: ¼" = 1'-0"



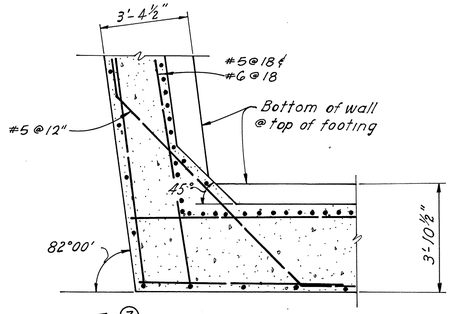
SECTION L-L
Scale: ⅜" = 1'-0"



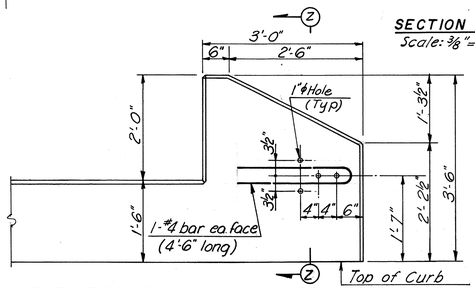
SECTION Z-Z
Scale: ¾" = 1'-0"



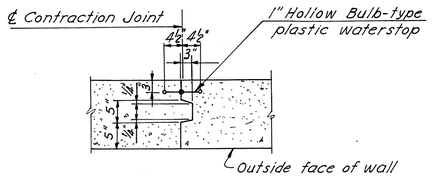
SECTION H-H
Scale: ⅜" = 1'-0"



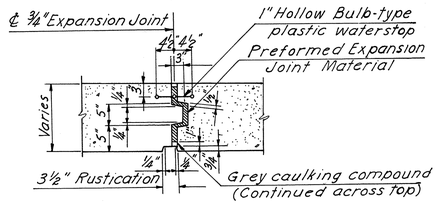
SECTION K-K
Scale: ⅜" = 1'-0"



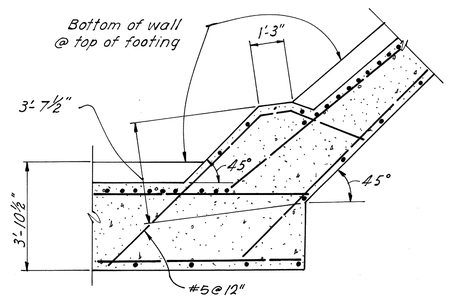
ELEVATION OF INSIDE FACE WEST WALL
Scale: ¾" = 1'-0"



SECTION N-N
Scale: ¾" = 1'-0"



SECTION O-O
Scale: ¾" = 1'-0"



SECTION M-M
Scale: ⅜" = 1'-0"

AS BUILT

	BY	DATE				
MADE	JLN	2-68				
CHECKED	THN	2-68	1	As Built	JRC	3-73
IN CHARGE	RHW		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

FOREST HILL AVENUE OVER
POWHITE PARKWAY
BRIDGE B-06

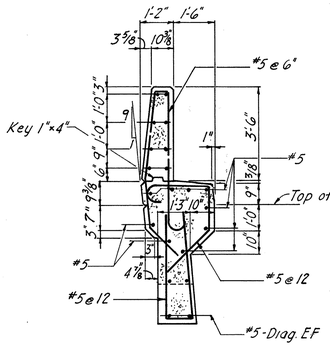
NORTH ABUTMENT DETAILS (1)

HAYES, SEAY, MATTERN & MATTERN
Associate Engineers

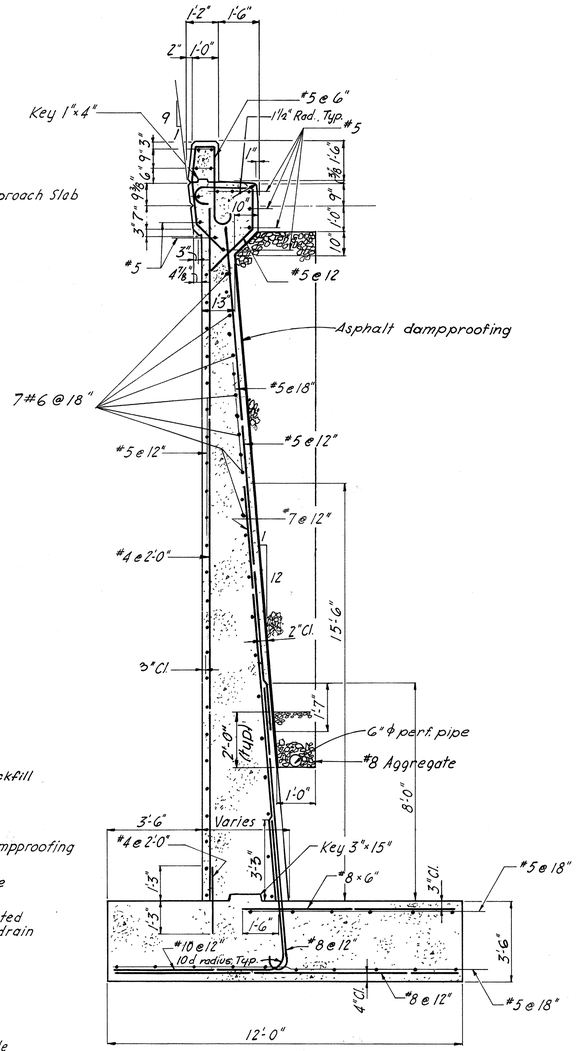
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS SHOWN
CONTRACT NO.: 2
SHEET NO. 5 OF 18

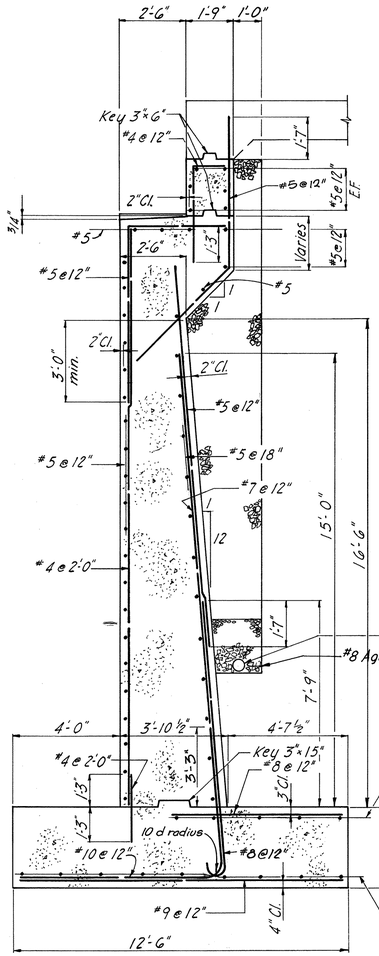
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	156	188



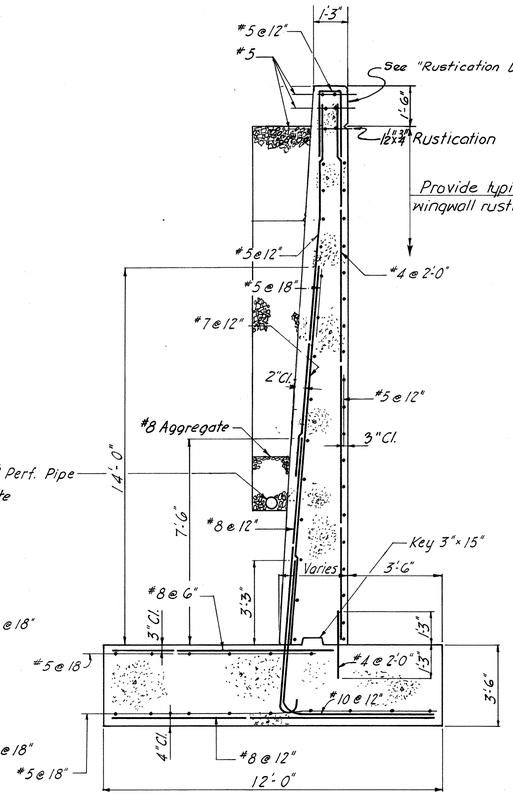
SECTION A-A



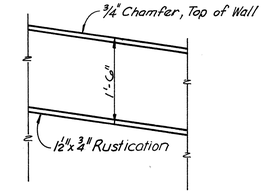
SECTION B-B



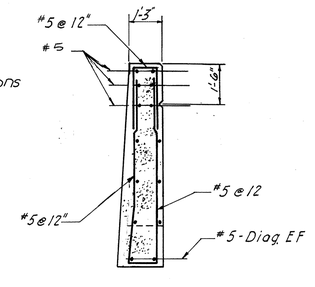
SECTION C-C



SECTION D-D



RUSTICATION DETAIL



SECTION E-E

DRAINAGE DETAILS

	BY	DATE	NO.	REVISION	BY	DATE
MADE	JLN	2-68	2	As Built	JRC	3-73
CHECKED	THN	2-68	1	Del backwall dim.	E.F.	5-68
IN CHARGE	RHW					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

FOREST HILL AVENUE OVER
POWHITE PARKWAY
BRIDGE B-06

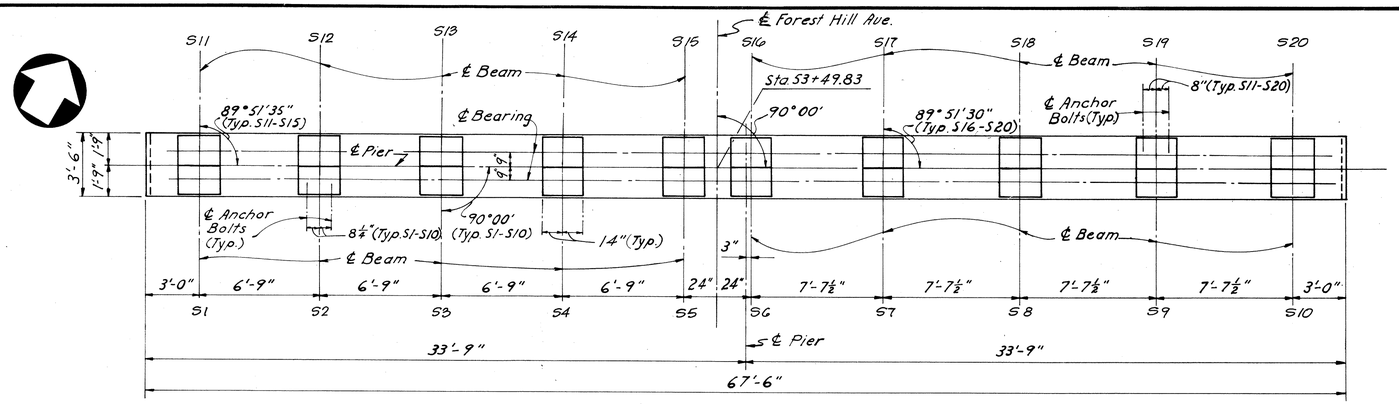
NORTH ABUTMENT DETAILS (2)

HAYES, SEAY, MATTERN & MATTERN
Associate Engineers

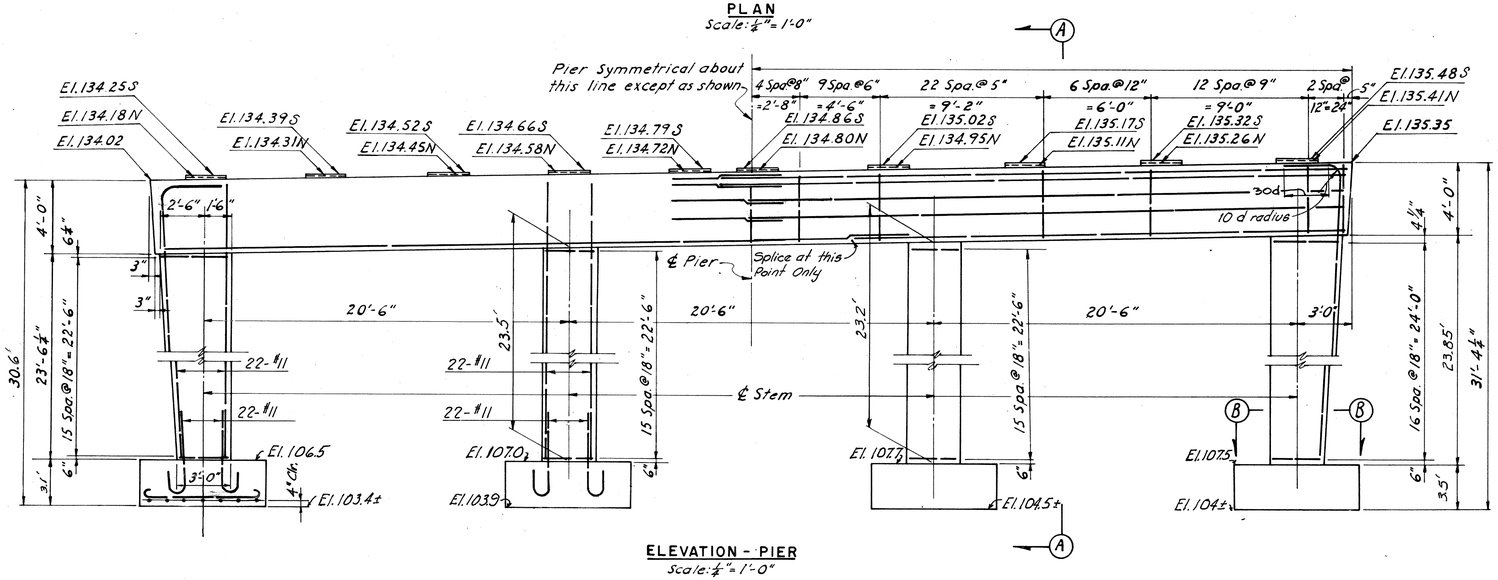
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: 3/8" = 1'-0"
CONTRACT NO.: 2
SHEET NO. 6 OF 18

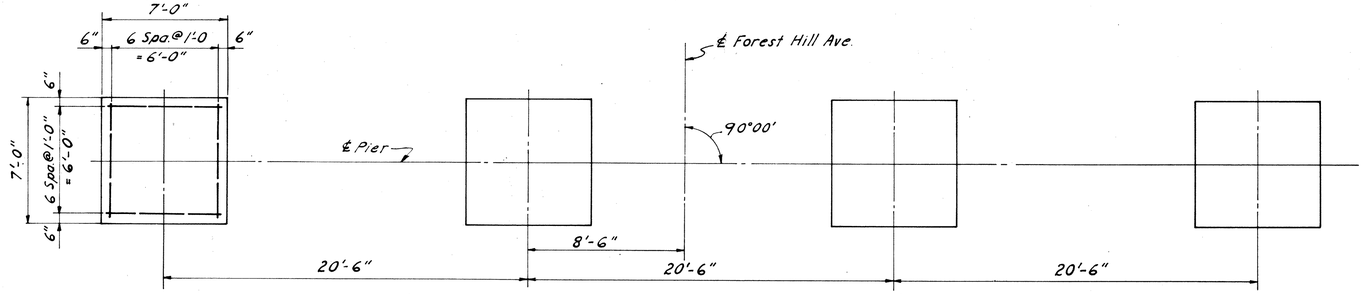
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	157	188



PLAN
Scale: ¼"= 1'-0"



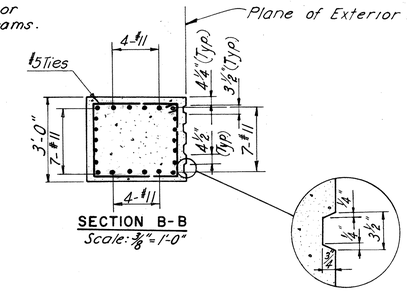
ELEVATION - PIER
Scale: ¼"= 1'-0"



FOOTING PLAN
Scale: ¼"= 1'-0"

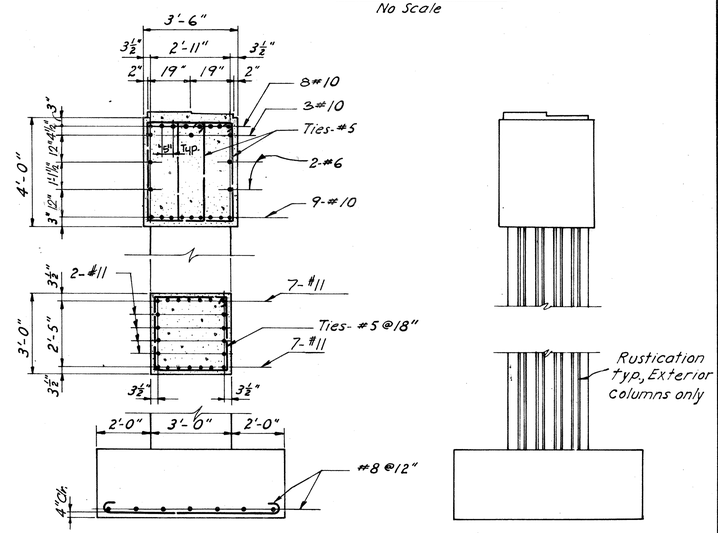
NOTE: All pier footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 Ft., redesign will be required.

NOTE:
See sh. 2 for Anchor Bolt Setting Diagrams.



SECTION B-B
Scale: ⅜"= 1'-0"

RUSTICATION DETAILS
No Scale



SECTION A-A
Scale: ⅜"= 1'-0"

END ELEVATION
Scale: ⅜"= 1'-0"

AS BUILT

	BY	DATE
MADE	JLN	2-68
CHECKED	THN	2-68
IN CHARGE	RHW	

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

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

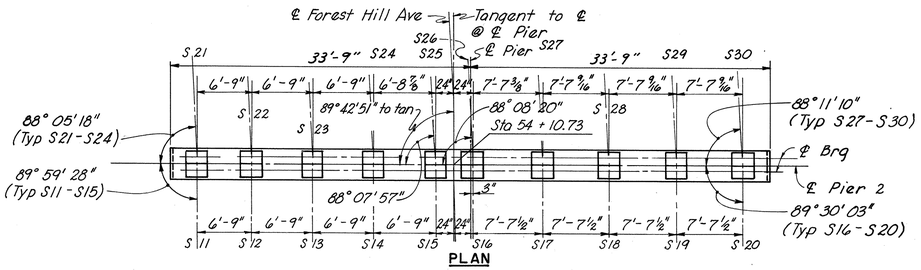
FOREST HILL AVENUE OVER POWHITE PARKWAY
BRIDGE B-06
PIER I DETAILS

HAYES, SEAY, MATTERN & MATTERN
Associate Engineers

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

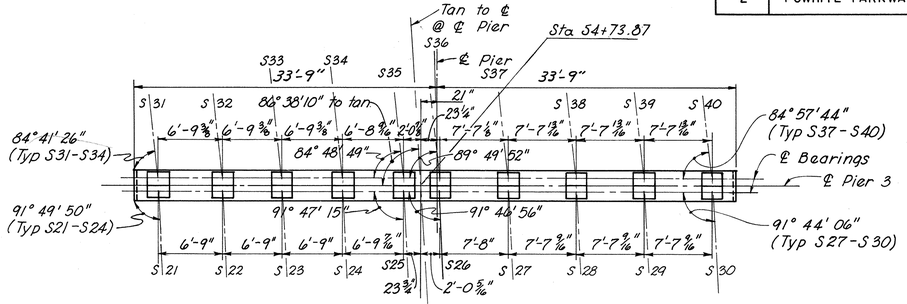
SCALE: AS SHOWN
CONTRACT NO.: 2
SHEET NO. 7 OF 18

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	158	188

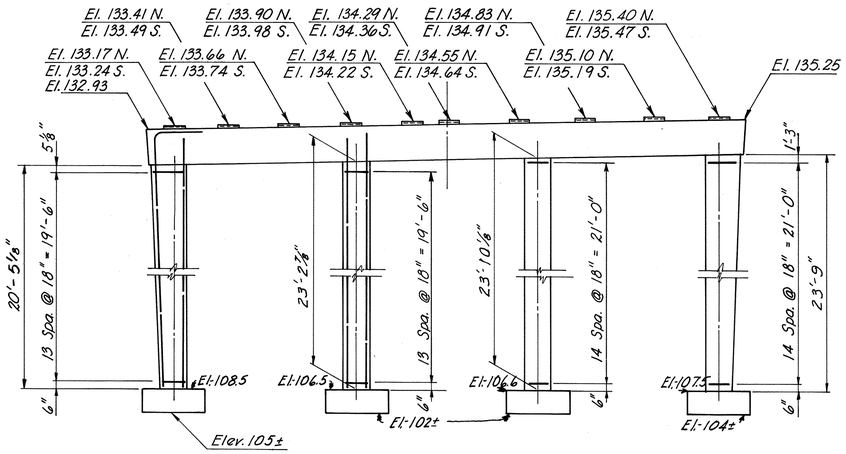


PLAN

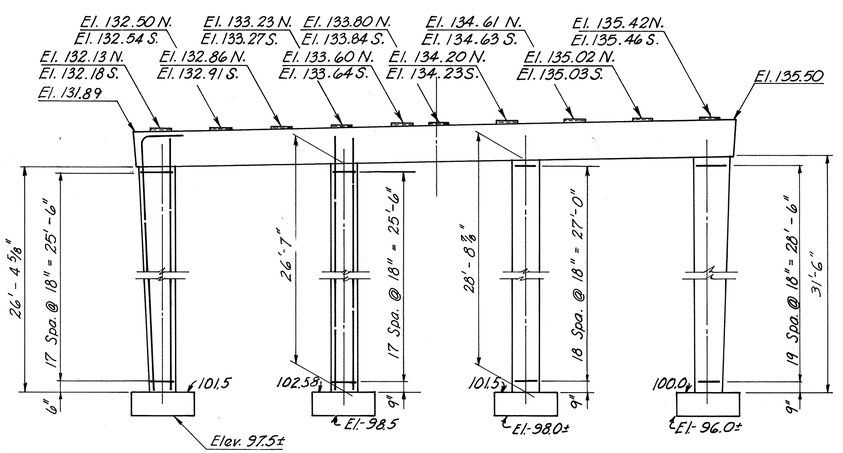
NOTE :
See sh. 2 for Anchor Bolt Setting Diagrams.



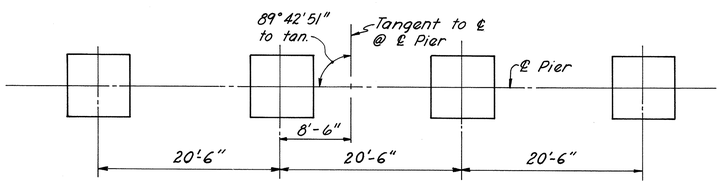
PLAN



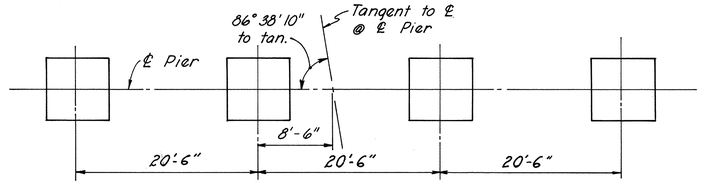
ELEVATION - PIER 2



ELEVATION - PIER 3



FOOTING PLAN



FOOTING PLAN

	BY	DATE	NO.	REVISION	BY	DATE
MADE	JLN	2-68				
CHECKED	THN	2-68	1	As Built	JRC	3-73
IN CHARGE	RHW					

Note: For dimensions, reinforcement and details not shown, see Pier 1, Sheet 7

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

FOREST HILL AVENUE OVER
POWHITE PARKWAY
BRIDGE B-06

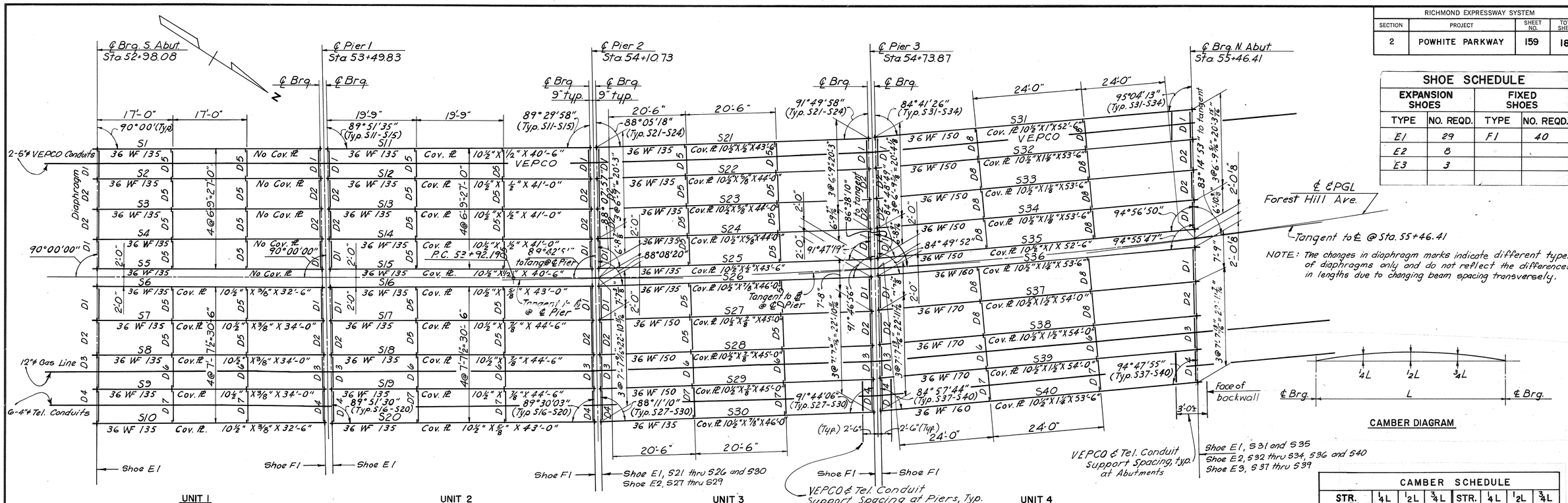
PIERS 2 & 3 DETAILS

HAYES, SEAY, MATTERN & MATTERN
Associate Engineers

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: 1/8" = 1'-0"
CONTRACT NO.: 2
SHEET NO. 8 OF 18

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	159	188



NOTE: The changes in diaphragm marks indicate different types of diaphragms only and do not reflect the differences in lengths due to changing beam spacing transversely.

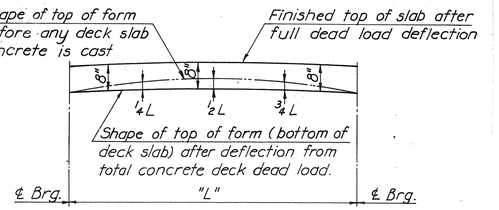
CAMBER DIAGRAM

SHOE SCHEDULE

EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E1	29	F1	40
E2	8		
E3	3		

CAMBER SCHEDULE

STR.	¼L	½L	¾L	STR.	¼L	½L	¾L
S1 & S5	3/8	9/16	3/8				
S2 – S4	7/16	11/16	7/16				
S6 – S10	1/2	3/4	1/2				
S11 – S15	3/4	1 1/16	3/4				
S16 & S20	13/16	1 1/8	13/16				
S17 – S19	7/8	1 1/4	7/8				
S21 – S25	5/8	15/16	5/8				
S26 – S30	11/16	1	11/16				
S31 – S35	15/16	1 3/8	15/16				
S36 & S40	1	1 3/8	1				
S37 – S39	1 1/16	1 1/2	1 1/16				



DEAD LOAD DEFLECTION DIAGRAM

DEFLECTION SCHEDULE

STR.	¼L & ¾L	½L	STR.	¼L & ¾L	½L
S1 - S5	3/8	9/16	S36 & S40	1 1/16	1 1/2
S6 - S10	7/16	5/8	S37 - S39	1 1/8	1 9/16
S11 - S15	5/8	7/8			
S16 & S20	11/16	13/16			
S17 - S19	3/4	1 1/16			
S21 - S25	11/16	1			
S26 - S30	3/4	1 1/16			
S31 - S35	1	1 7/16			

Dimensions are in inches.

NOTE TO CONTRACTOR:

The above deflections 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 for by adjusting forms to vary the thickness of the concrete bolster between the bottom of the slab and the top of stringers without alteration of the slab thickness.

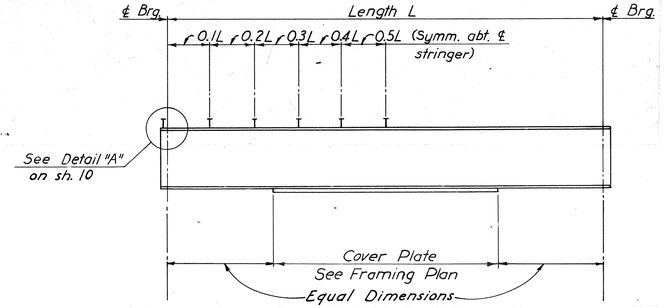
	BY	DATE				
MADE	DEK	10-67	2	As Built	JRC	3-73
CHECKED	THN	2-68	1	Conduit Support Spc.	JLN	5-13-68
IN CHARGE	RHW		NO.	REVISION	BY	DATE

FRAMING PLAN

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

STRINGER SCHEDULE

STR.	LENGTH ℄ BRG. TO ℄ BRG.	SHEAR STUD SPACING 0.1L	0.2L	0.3L	0.4L	0.5L
S1 – S10	51'-0"	6"	7"	8"	10"	12½"
S11	59'-0⅞"	7"	8"	9½"	11½"	14½"
S12	59'-1¾"	6½"	7½"	9"	11"	14"
S13	59'-2⅝"	6½"	7½"	9"	11"	14"
S14	59'-3⅝"	6½"	7½"	9"	11"	14"
S15	59'-4½"	7"	8"	9½"	11½"	14½"
S16	59'-5⅛"	6"	7"	8½"	10½"	13½"
S17	59'-6⅛"	5½"	6½"	8"	10"	12½"
S18	59'-7⅛"	5½"	6½"	8"	10"	12½"
S19	59'-8⅛"	5½"	6½"	8"	10"	12½"
S20	59'-9⅛"	6"	7"	8½"	10½"	13½"
S21	61'-7⅛"	7"	8"	9½"	11½"	14½"
S22	61'-7¼"	6½"	7½"	9"	11"	14"
S23	61'-7⅜"	6½"	7½"	9"	11"	14"
S24	61'-7⅜"	6½"	7½"	9"	11"	14"
S25	61'-7⅜"	7"	8"	9½"	11½"	14½"
S26	61'-7⅝"	6"	7"	8½"	10½"	13½"
S27	61'-7¾"	5½"	6½"	8"	10"	12½"



STRINGER ELEVATION

STRINGER SCHEDULE

STR.	LENGTH ℄ BRG. TO ℄ BRG.	SHEAR STUD SPACING 0.1L	0.2L	0.3L	0.4L	0.5L
S28	61'-7⅞"	5½"	6½"	8"	10"	12½"
S29	61'-8"	5½"	6½"	8"	10"	12½"
S30	61'-8⅛"	6"	7"	8½"	10½"	13½"
S31	71'-8⅛"	7"	8"	9½"	11½"	15"
S32	71'-8⅜"	6½"	7½"	9"	11"	14"
S33	71'-8¾"	6½"	7½"	9"	11"	14"
S34	71'-9⅛"	6½"	7½"	9"	11"	14"
S35	71'-9⅛"	7"	8"	9½"	11½"	15"
S36	71'-9¾"	6"	7"	9"	10½"	13½"
S37	71'-9⅞"	5½"	6½"	8"	10"	12½"
S38	71'-10¼"	5½"	6½"	8"	10"	12½"
S39	71'-10¾"	5½"	6½"	8"	10"	12½"
S40	71'-11 13/16"	6"	7"	9	10½"	13½"

Those stringers having a total camber of less then 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 above.

NOTE TO FABRICATOR:

The above stringers shall be fabricated with an upward camber amounting to the tabulated value.

This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.

Dimensions are in inches.

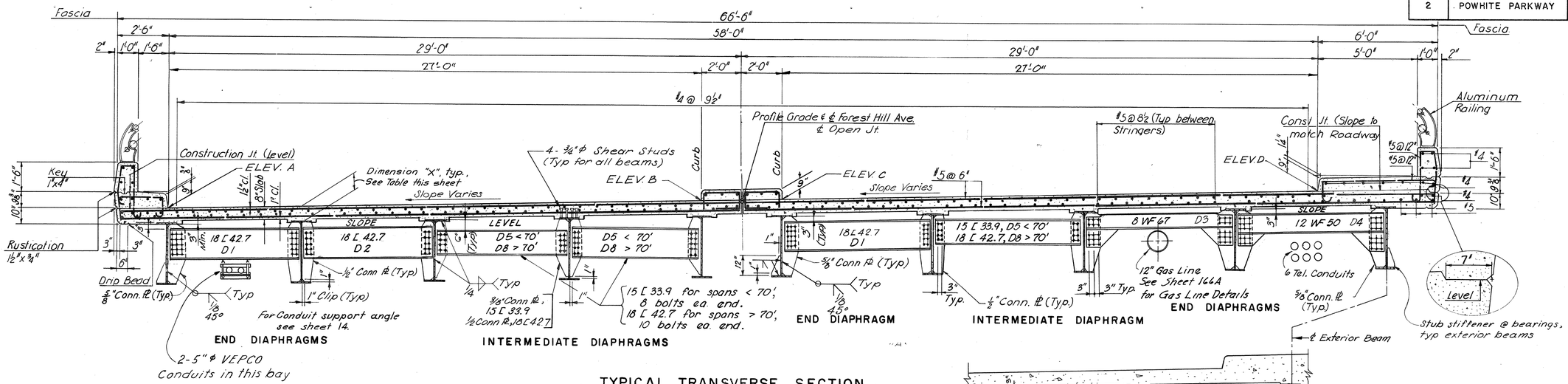
AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY
FOREST HILL AVENUE OVER POWHITE PARKWAY
BRIDGE B06
FRAMING PLAN

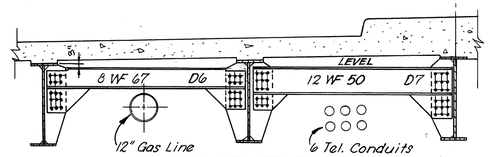
HAYES, SEAY, MATTERN & MATTERN
Associate Engineers
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS SHOWN
CONTRACT NO.: 2
SHEET NO. 9 OF 18

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	160	188

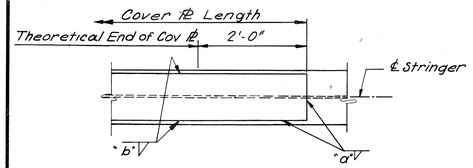


TYPICAL TRANSVERSE SECTION



INTERMEDIATE DIAPHRAGMS

See sh. 1 for Scupper Location and sh. 12 for Scupper Details.



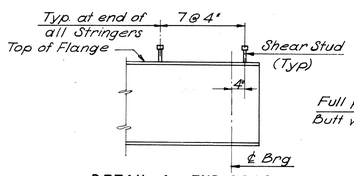
COVER PLATE DETAIL

No Cover ℔ Required for Str S1 Thru S5

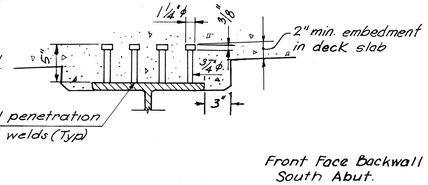
WELD SIZES

STR.	WELD SIZES	
	"a"	"b"
S6 Thru S10	5/16	5/16
S11 Thru S15	5/16	5/16
S16 Thru S20	3/8	5/16
S21 Thru S25	5/16	5/16
S26 Thru S30	3/8	5/16
S31 Thru S35	½	5/16
S36 Thru S40	5/8	3/8

See "FRAMING PLAN" sh. 9 For Stringer Designation



DETAIL A END SPACING



SHEAR STUD DETAIL

SHEAR CONNECTORS

Note: Three ⅞" ϕ Studs May be Substituted at the Same Longitudinal Spacing For Four ¾" ϕ Studs. Stud Rows Shall be placed parallel to the Main Deck Reinforcement.

DIMENSION "X"

STRINGER	DIMENSION "X"
S1-S26	10 3/16"
S27-S29	10 1/16"
S30	10 3/16"
S31-S35	10 1/16"
S36	10"
S37-S39	9 7/8"
S40	10"

Dimension "X" is from Top of Stringer Flange to Top of Slab.

Front Face Backwall South Abut.

℄ Pier 1

℄ Pier 2

GUTTER LINE ELEVATIONS

STATION	ELEV. A	ELEV. B	ELEV. C	ELEV. D	STATION	ELEV. A	ELEV. B	ELEV. C	ELEV. D
52 + 70.0	139.83	139.80	139.79	139.76	54 + 70.0	136.53	137.93	138.14	139.54
80	139.67	139.70	139.71	139.75	72.21				139.54
90	139.50	139.61	139.63	139.74	73.75			138.11	
96.83	139.39	139.55	139.57	139.73	73.94		137.90		
53 + 00.0	139.34	139.52	139.54	139.72	75.62	136.43			
10	139.17	139.42	139.46	139.71	80	136.36	137.84	138.05	139.53
20	139.01	139.33	139.38	139.70	90	136.20	137.74	137.97	139.52
30	138.84	139.24	139.30	139.69	55 + 00.0	136.03	137.65	137.89	139.51
40	138.68	139.14	139.21	139.68	10	135.94	137.56	137.80	139.42
49.83	138.51	139.05	139.13	139.67	20	135.85	137.47	137.71	139.33
50	138.51	139.05	139.13	139.67	30	135.77	137.39	137.63	139.25
60	138.35	138.96	139.05	139.66	40	135.68	137.30	137.54	139.16
70	138.18	138.86	138.96	139.65	43.07				139.13
80	138.02	138.77	138.88	139.64	46 18			137.51	
90	137.85	138.68	138.80	139.63	46.65		137.24		
54 + 00.0	137.68	138.58	138.72	139.62	49.94	135.59			
10	137.52	138.49	138.63	139.61	50	135.59	137.21	137.45	139.07
10.59				139.61	60	135.50	137.12	137.36	138.98
10.72			138.62		70	135.41	137.03	137.27	138.89
10.74		138.48							
10.88	137.50								
20.	137.35	138.40	138.55	139.59					
30	137.19	138.30	138.47	139.58					
40	137.02	138.21	138.39	139.57					
50	136.86	138.12	138.30	139.56					
60	136.69	138.02	138.22	139.55					

℄ Pier 3

℄ Brg. North Abut.

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	JDB RSS	2-68	2	As Built	JRC	3-73
CHECKED	THN	2-68	1	General	J.G.V.	10-70
IN CHARGE	RHW					

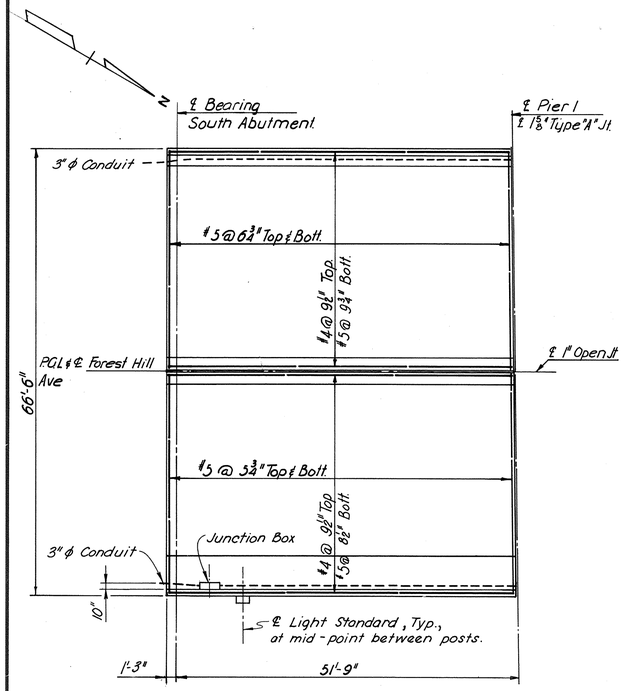
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

FOREST HILL AVENUE OVER
POWHITE PARKWAY
BRIDGE B-06
TYPICAL TRANSVERSE SECTION

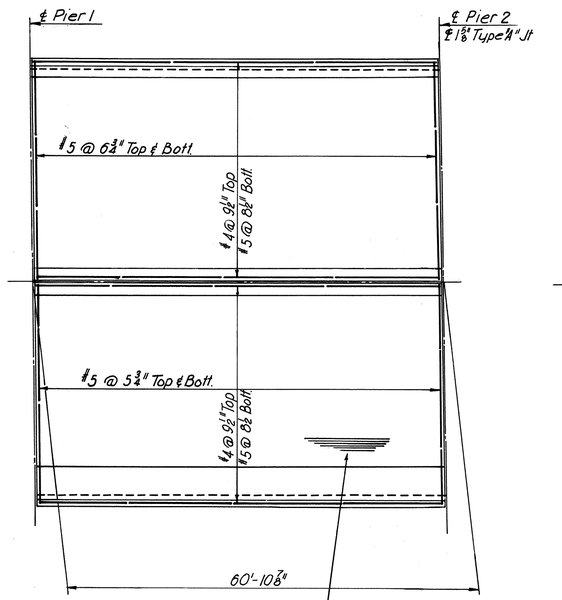
HAYES, SEAY, MATTERN & MATTERN
Associate Engineers
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS SHOWN
CONTRACT NO.: 2
SHEET NO. 10 OF 18

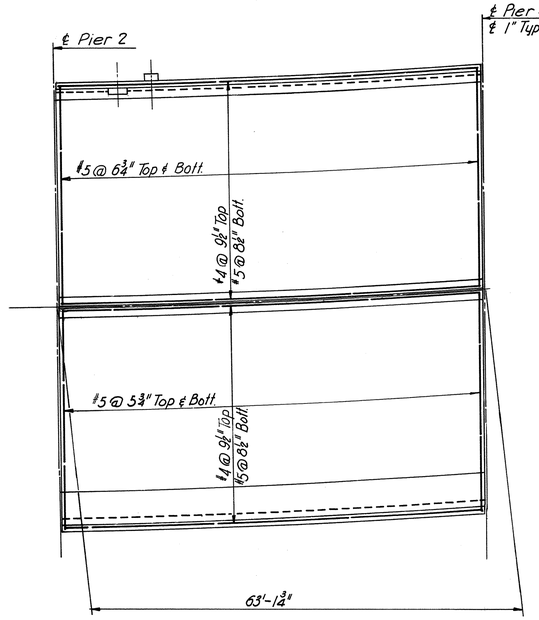
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	161	188



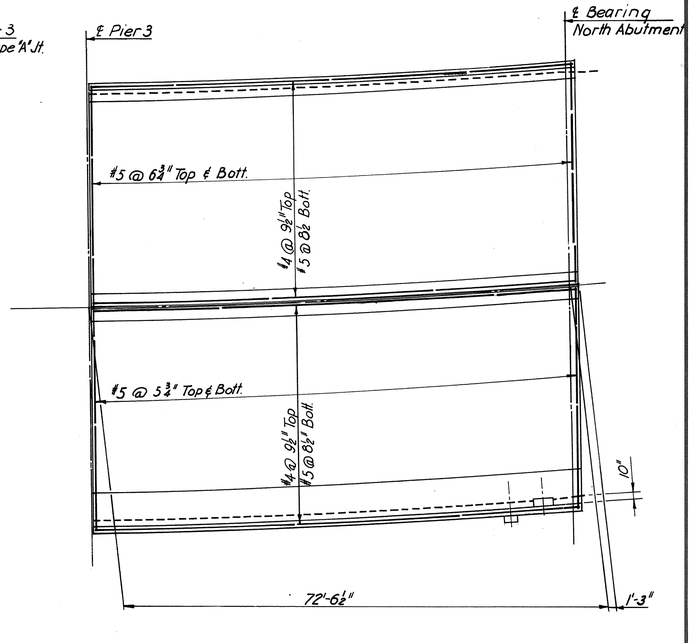
UNIT 1



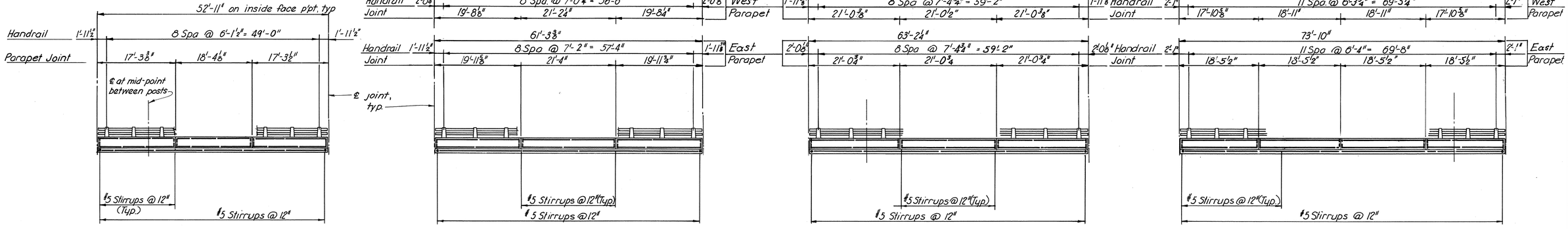
UNIT 2



UNIT 3



UNIT 4



CURB AND PARAPET ELEVATION

AS BUILT

	BY	DATE
MADE	E.F.	11-67
CHECKED	THN	2-68
IN CHARGE	RHW	

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

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

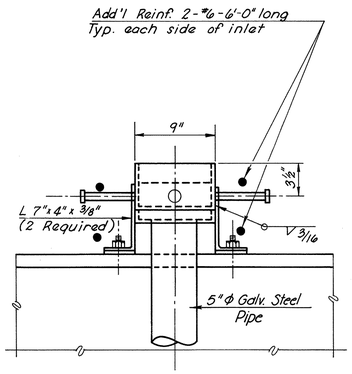
FOREST HILL AVENUE OVER POWHITE PARKWAY
BRIDGE B-06
DECK PLANS

HAYES, SEAY, MATTERN & MATTERN
Associate Engineers

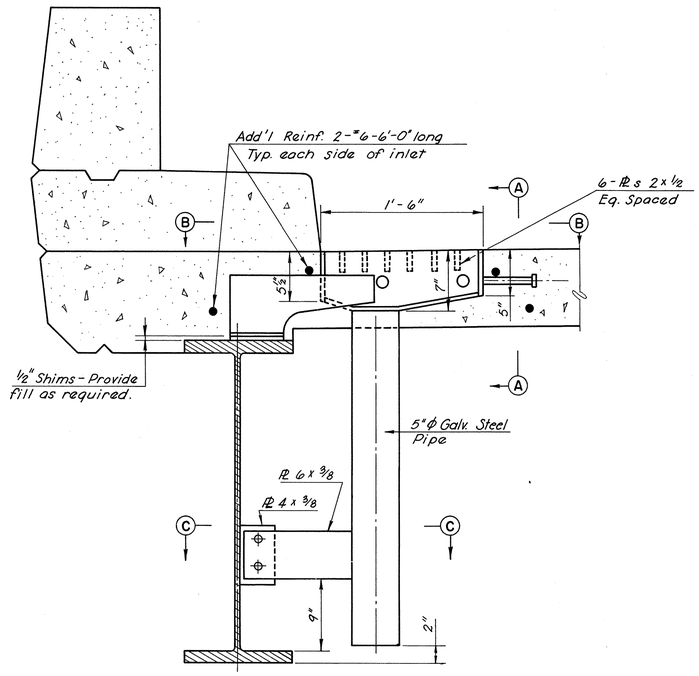
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: 3/32" = 1'-0"
CONTRACT NO.: 2
SHEET NO. 11 OF 18

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	162	188

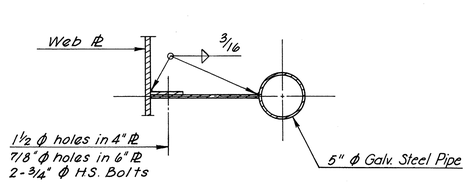


SECTION A - A

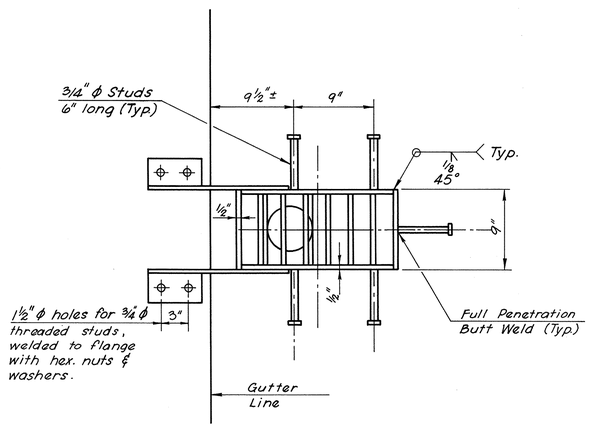


DRAINAGE SCUPPER

2 Required



SECTION C - C



SECTION B - B

NOTES

For General Notes . see sheet No. 1
For location of scuppers , see sheet No. 1
Scuppers are to be fabricated from ½" thick plates conforming to A.S.T.M. A36
Galvanized Steel Pipe to be in accordance with A.S.T.M. A333 - Grade 9.

All drainage metalwork shall be hot - dip galvanized after fabrication in accordance with the following specifications :
Scuppers - A.S.T.M. A123
Pipe - A.S.T.M. A53
Cost of all drainage metalwork to be included in the bid price for "Structural Steel"
Cut normal Deck Reinf. at scupper as required.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	SCH	2-68	2	As Built	JRC	3-73
CHECKED	RHW	2-68	1	General	J.G.V.	10-70
IN CHARGE	RHW					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

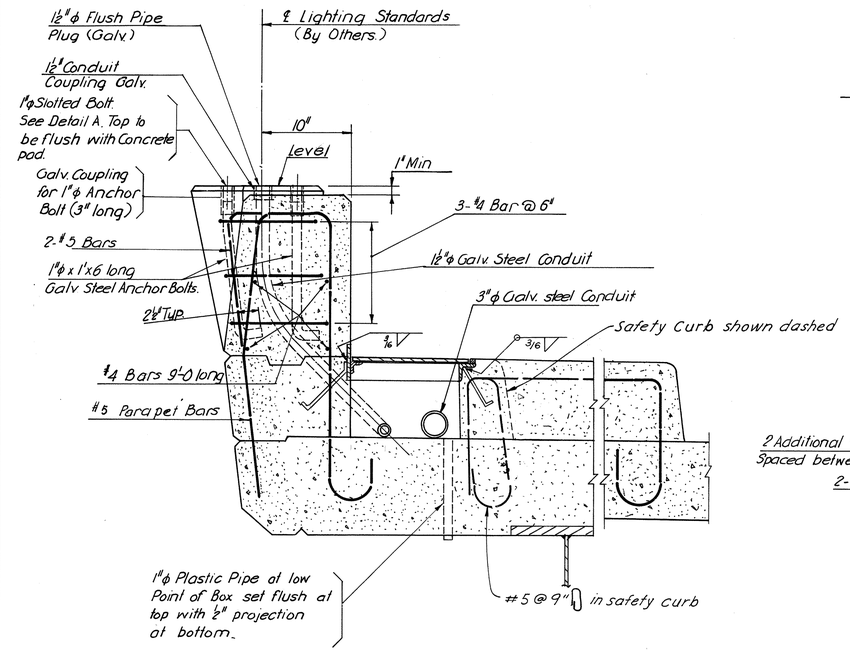
FOREST HILL AVENUE OVER
POWHITE PARKWAY
BRIDGE B-06
SCUPPER DETAILS

HAYES, SEAY, MATTERN & MATTERN
Associate Engineers

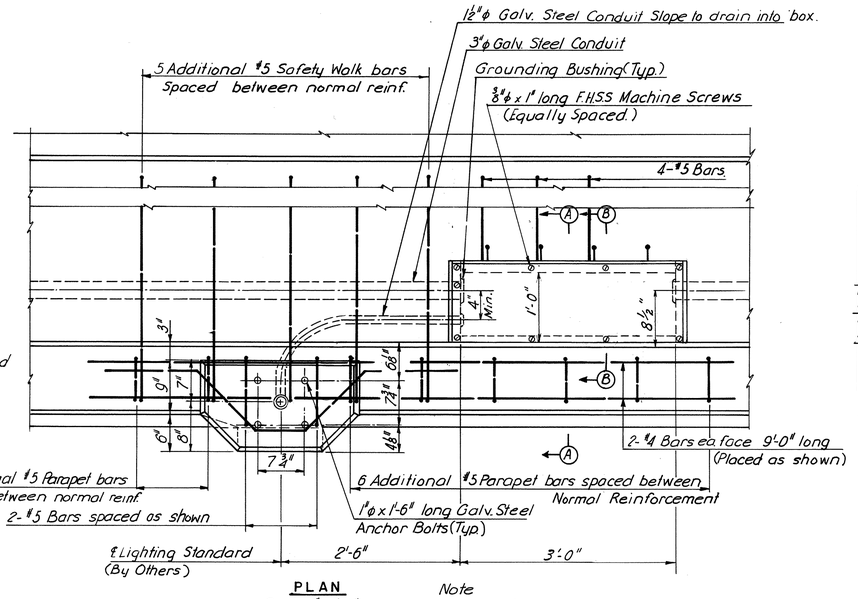
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: 1½"= 1'-0"
CONTRACT NO.: 2
SHEET NO. 12 OF 18

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	163	188

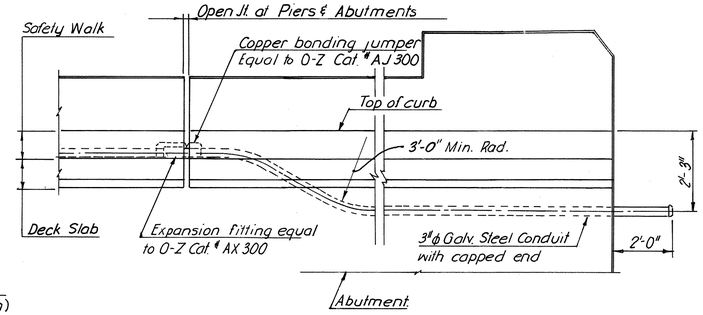


SECTION A-A
Scale 1½" = 1'-0"

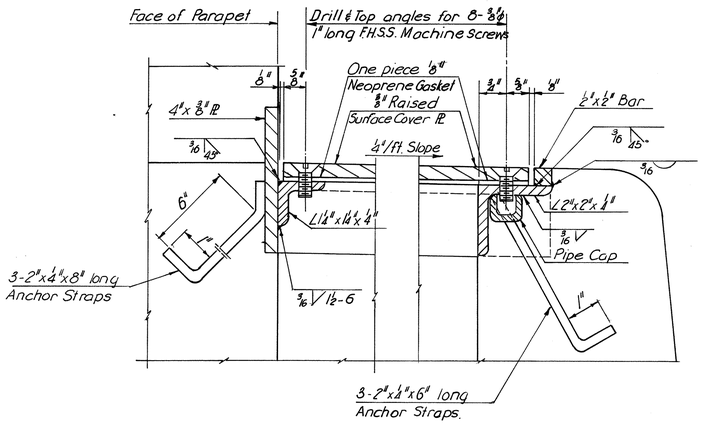


PLAN
Scale 1" = 1'-0"

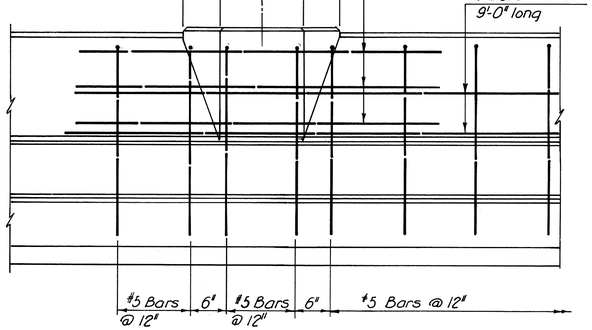
Note
Normal Parapet and Safety Walk Reinf not shown



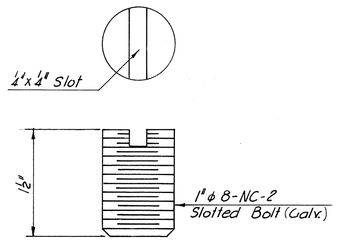
TYPICAL CONDUIT INSTALLATION AT EXPANSION JOINTS
No Scale



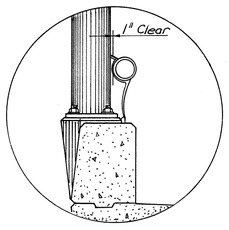
SECTION B-B
Half Size

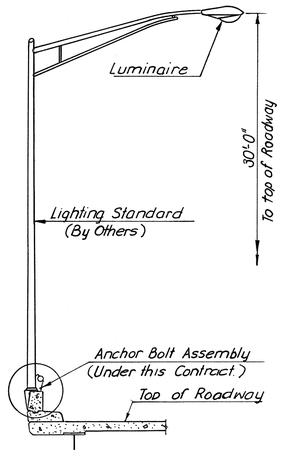


ELEVATION
Scale 1" = 1'-0"



DETAIL A
Full Size





TYPICAL FUTURE LIGHTING STANDARD INSTALLATION
No Scale

NOTES:

All conduits shall be terminated in Junction Box with grounding bushings equal to O-Z Type IGB

Anchor bolt assembly shall conform to ASTM A307 and shall be hot dipped galvanized after fabrication in accordance with ASTM A153

Junction Box, frame and cover shall be hot Galvanized after fabrication in accordance with ASTM A123

The cost of furnishing and installing frames and covers for Junction boxes and anchor bolt assemblies (for future lighting standards) shall be included in the lump sum price bid for the item "Structural Steel" for the bridge Structure

Slotted bolts and flush pipe plugs shall have threads painted with Graphite Grease at assembly

AS BUILT

	BY	DATE				
MADE	E.F.	11-67				
CHECKED	R.H.W.	2-68	1	As Built	J.R.C.	3-73
IN CHARGE	R.H.W.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

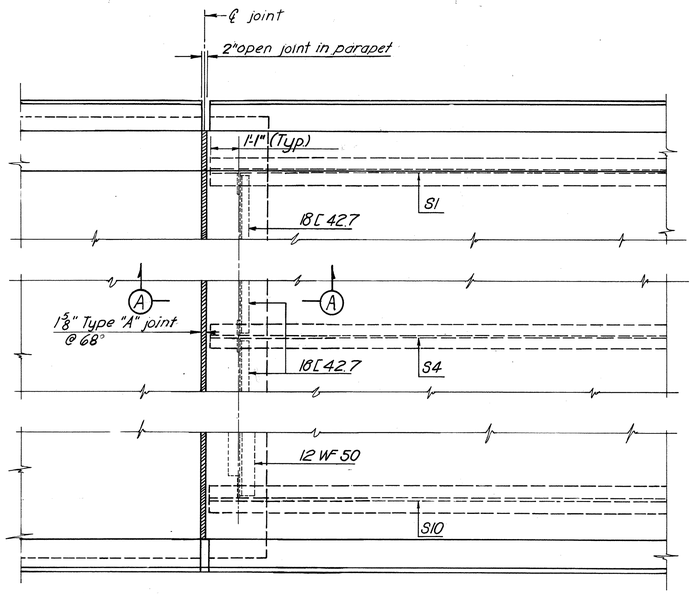
FOREST HILL AVENUE OVER POWHITE PARKWAY
BRIDGE B-06
ELECTRICAL DETAILS

HAYES, SEAY, MATTERN & MATTERN
Associate Engineers

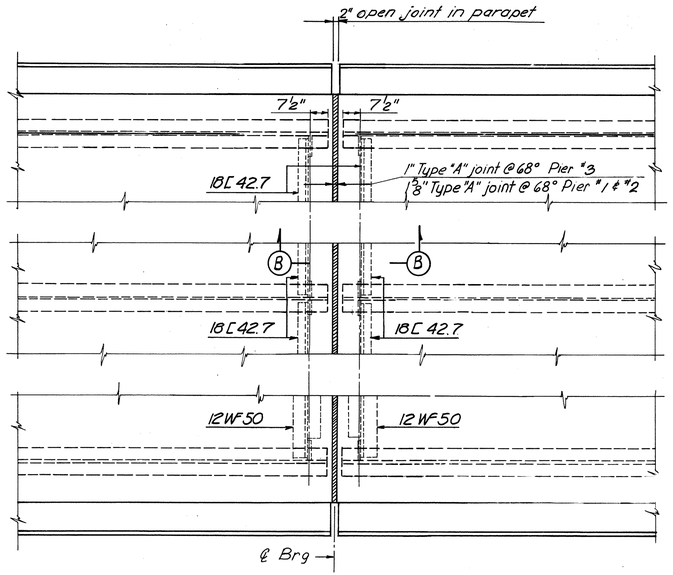
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS SHOWN
CONTRACT NO.: 2
SHEET NO. 13 OF 18

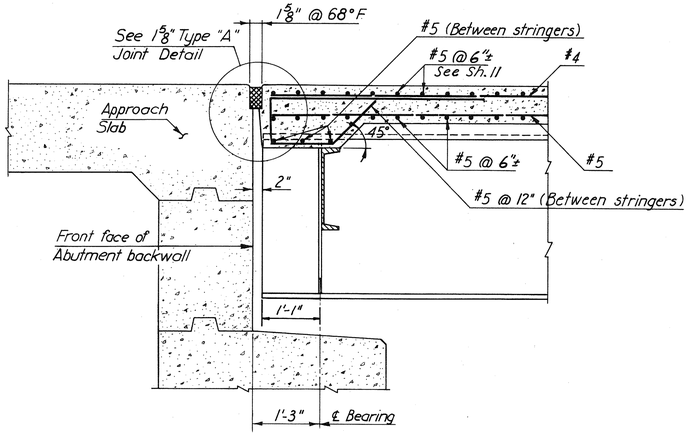
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	164	188



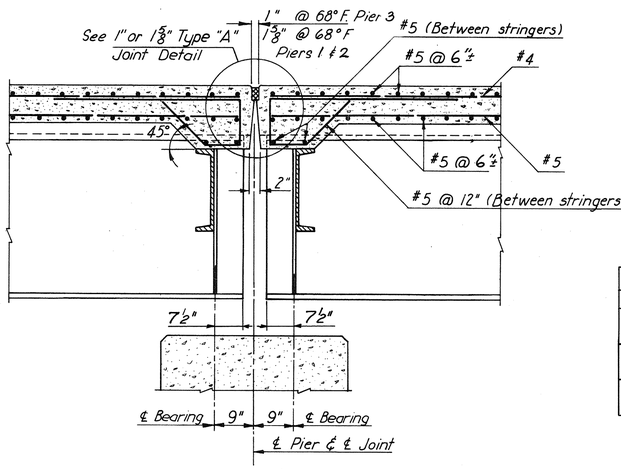
PLAN - JOINT AT SOUTH ABUTMENT
Scale ⅜" = 1'-0"
(North Abutment Similar)



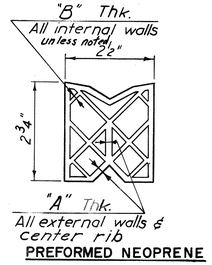
PLAN - JOINT AT PIER
Scale ⅜" = 1'-0"



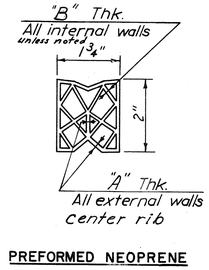
SECTION A-A
Scale: ¾" = 1'-0"



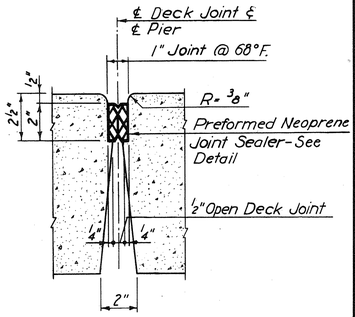
SECTION B-B
Scale: ¾" = 1'-0"



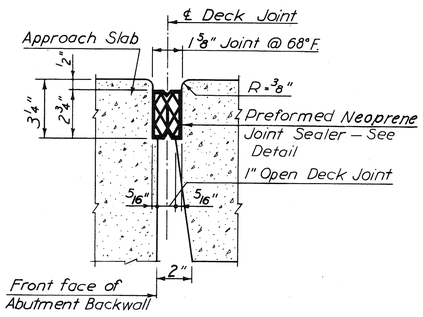
PREFORMED NEOPRENE JOINT SEALER FOR 1⅝" TYPE "A" JOINT
Scale: Half size



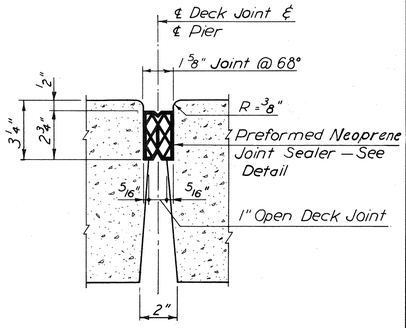
PREFORMED NEOPRENE JOINT SEALER FOR 1" TYPE "A" JOINT
Scale: Half size



1" TYPE "A" JOINT
Scale: 3" = 1'-0"
@ Pier 3

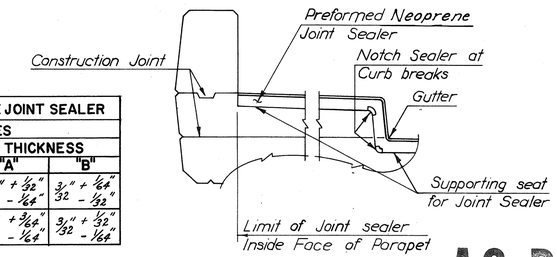


1⅝" TYPE "A" JOINT
Scale: 3" = 1'-0"
@ Abutments



1⅝" TYPE "A" JOINT
Scale: 3" = 1'-0"
@ Piers 1 & 2

PREFORMED NEOPRENE JOINT SEALER TOLERANCES			
WIDTH	HEIGHT	THICKNESS "A"	THICKNESS "B"
1¾" +3/16" - 0"	2" ± ⅛"	⅛" +1/32" -1/64"	3/32" +1/64" -1/32"
2½" +¼" - 0"	2¾" ± ⅛"	3/16" +3/64" -1/64"	3/32" +1/32" -1/64"



TREATMENT OF TYPE "A" JOINT AT CURB
No Scale

AS BUILT

NOTE TO CONTRACTOR:
It is absolutely essential that the openings for the preformed neoprene sealers be accurately formed and constructed to smooth, straight lines. The size of the opening shall be adjusted to allow for anticipated dead load rotation of the ends of the slab and for the temperature at the time of construction.

	BY	DATE				
MADE	T.E.M.	10-7-67				
CHECKED	RHW	2-68	1	As Built	JRC	3-73
IN CHARGE	RHW		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

FOREST HILL AVENUE OVER POWHITE PARKWAY
BRIDGE B-06

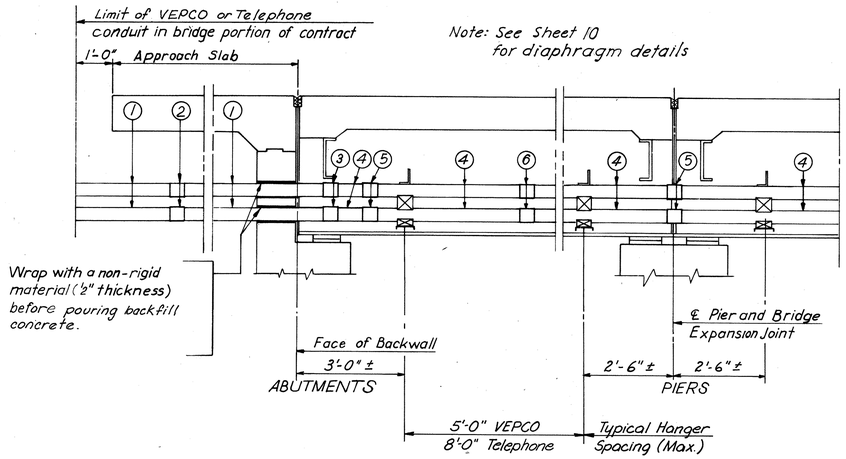
JOINT DETAILS

HAYES, SEAY, MATTERN & MATTERN
Associate Engineers

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS SHOWN
CONTRACT NO.: 2
SHEET NO. 14 OF 18

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	165	188



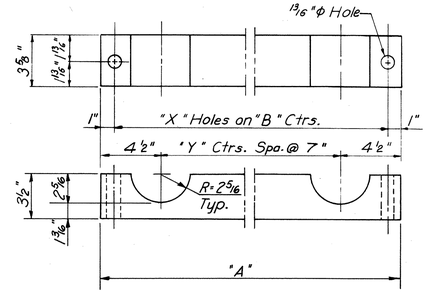
TYPICAL LONGITUDINAL SECTION

VEPCO

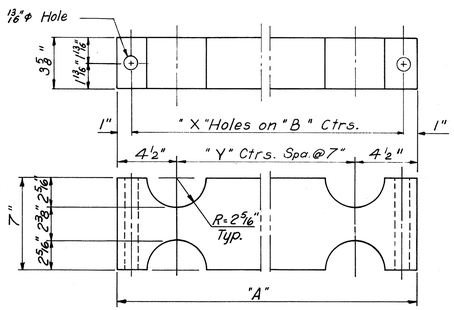
1. Galvanized steel pipe
2. Pipe coupling
3. Straight adaptor to connect galvanized steel pipe to cement asbestos conduit.
4. Heavy wall cement asbestos conduit.
5. Heavy wall cement asbestos conduit expansion coupling.
6. Heavy wall cement asbestos or plastic tapered coupling.

TELEPHONE

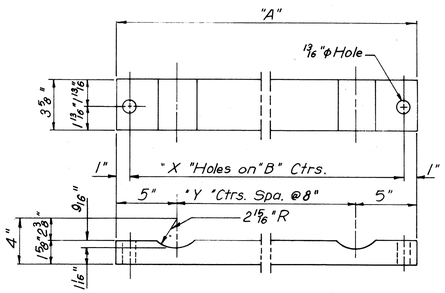
1. Galvanized steel pipe
2. Pipe coupling
3. Straight adaptor to connect galv. steel pipe to fiberglass reinforced epoxy duct
4. Fiberglass reinforced epoxy duct, 2 layer construction (4 pass) with nominal wall thickness of .066 inch
5. Expansion coupling for fiberglass reinforced epoxy duct
6. Coupling for fiberglass reinforced epoxy duct



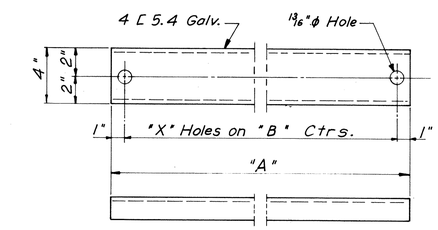
DETAIL 1
Wood separator for 4"ϕ fiberglass reinforced epoxy duct



DETAIL 2
Wood separator for 4"ϕ fiberglass reinforced epoxy duct



DETAIL 1-A
Wood separator for 5"ϕ cement asbestos conduit



NOTES :

Select conduit lengths so that coupling locations do not coincide with hanger locations. Inside edge of all conduit ends shall be chamfered.

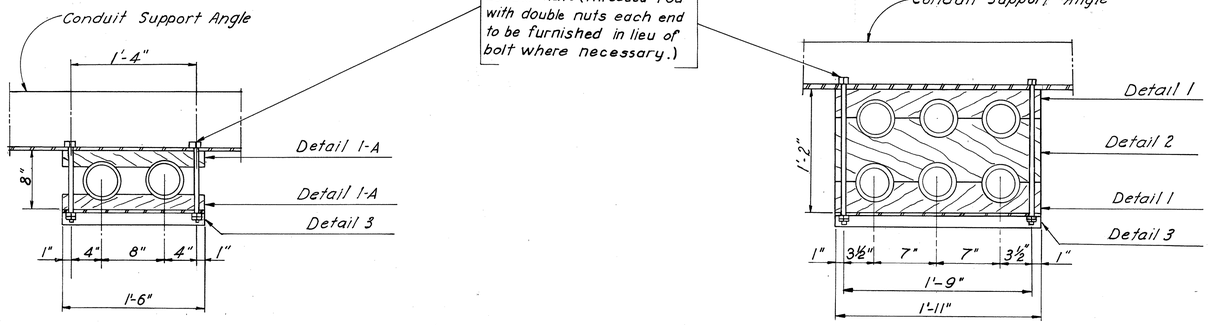
Fittings, in accordance with manufacturers' recommendations, shall be used when joining conduits at field-cut joints.

Splicing of steel pipe by welding will not be permitted. Threaded couplings must be used.

Pipe and hardware to be galvanized in accordance with provisions of AASHO M 111 (ASTM A123) Specifications.

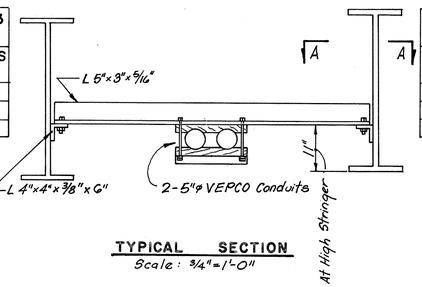
Nuts on all hanger bolts or rods are to be tightened to a snug assembly only and locked. Threads are to be crimped.

Wood separators shall be made from treated Southern Yellow Pine, Douglas Fir or Western Larch. Treatment to be in accordance with Virginia Department of Highways Road and Bridge Specifications, 1970.



BASIC ATTACHMENT DETAILS FOR 5"ϕ CEMENT ASBESTOS CONDUITS

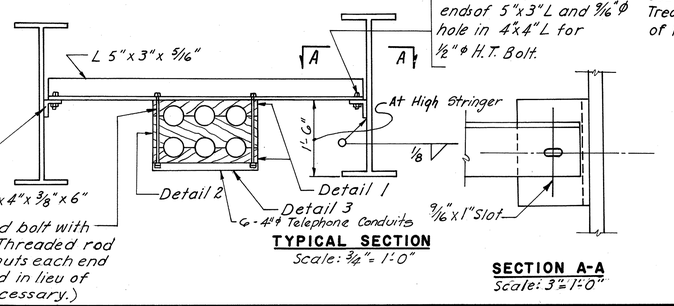
TABLE OF DIMENSIONS FOR DETAILS 1-A & 3 FOR 5"ϕ CONDUIT ATTACHMENT			
NO. OF COND. WIDE "Y"	"A"	"B"	NO. OF HOLES "X"
2	1'-6"	1'-4"	2
4	2'-10"	1'-4"	3
6	4'-2"	2'-0"	3



TYPICAL SECTION
Scale: ¾"=1'-0"

BASIC ATTACHMENT DETAILS FOR 4"ϕ FIBERGLASS REINFORCED EPOXY DUCTS

TABLE OF DIMENSIONS FOR DETAILS 1-3 FOR 4"ϕ CONDUIT ATTACHMENT			
NO. OF COND. WIDE "Y"	"A"	"B"	NO. OF HOLES "X"
3	1'-11"	1'-9"	2
4	2'-6"	1'-2"	3
6	3'-8"	1'-9"	3



TYPICAL SECTION
Scale: ¾"= 1'-0"

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

	BY	DATE	NO.	REVISION	BY	DATE
MADE	A.P.	11-67	3	As Built	JRC	3-73
CHECKED	A.B.P.	11-67	2	General	H.B.W.	11-70
IN CHARGE	R.H.W.		1	Support Spec.	J.L.N.	5-13-68

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

FOREST HILL AVENUE OVER POWHITE PARKWAY
BRIDGE B-06

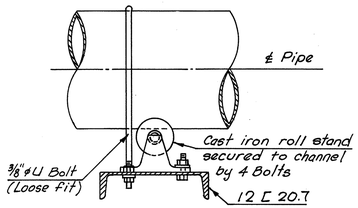
CONDUIT INSTALLATION DETAILS

HAYES, SEAY, MATTERN & MATTERN
Associate Engineers

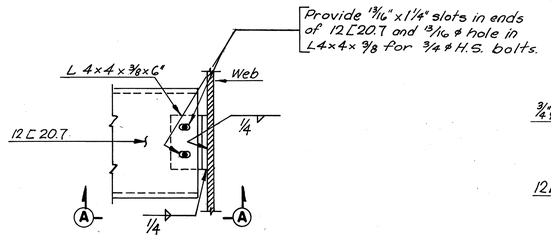
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS SHOWN
CONTRACT NO.: 2
SHEET NO. 15 OF 18

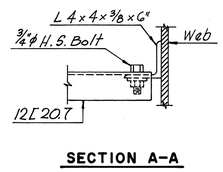
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	166	188



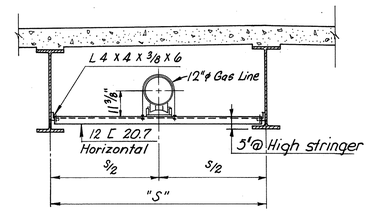
PIPE SUPPORT DETAIL



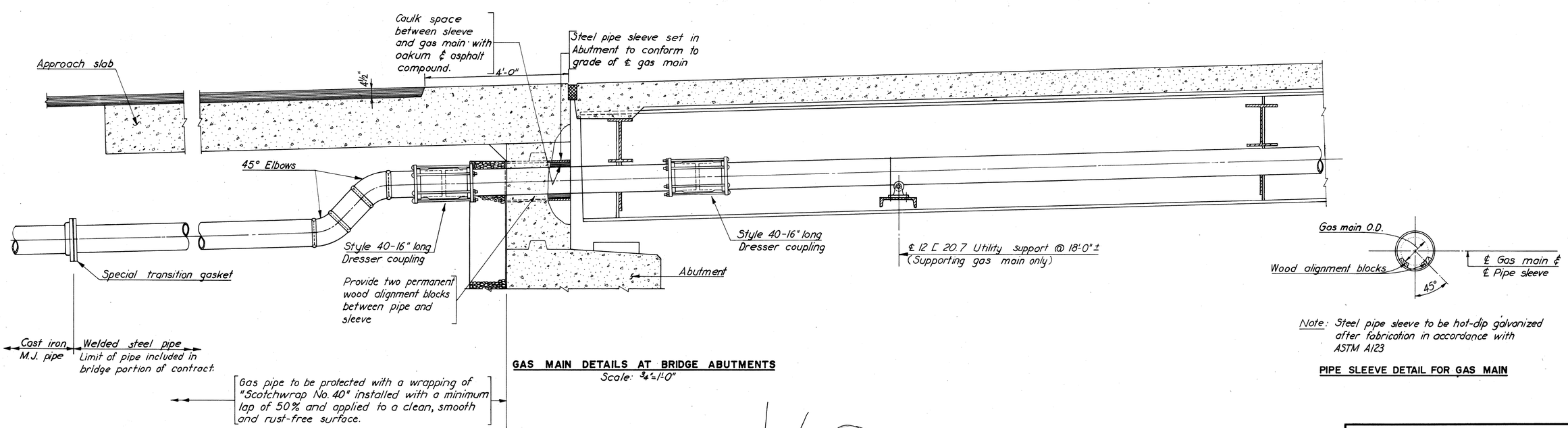
PIPE SUPPORT CONNECTION



SECTION A-A



TYPICAL SECTION
See Sh. 10



GAS MAIN DETAILS AT BRIDGE ABUTMENTS
Scale: 3/4"=1'0"

Note: Steel pipe sleeve to be hot-dip galvanized after fabrication in accordance with ASTM A123

PIPE SLEEVE DETAIL FOR GAS MAIN

VOID

SEE SHEET # 166A
16A of 18

	BY	DATE				
MADE	EVR	11-16-67				
CHECKED	RHW	2-68				
IN CHARGE	RHW		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

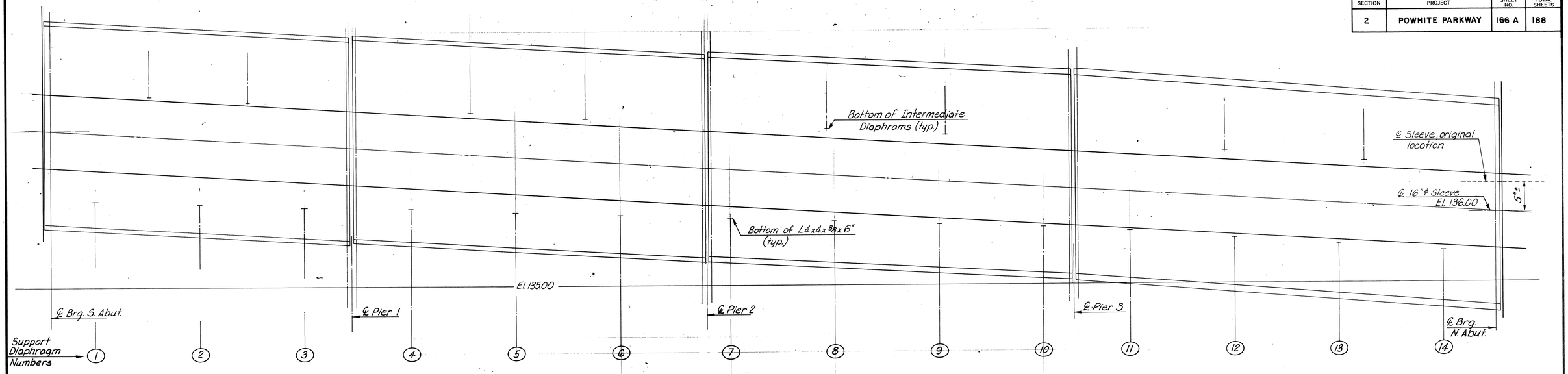
FOREST HILL AVENUE OVER POWHITE PARKWAY
BRIDGE B-06
UTILITY SUPPORT DETAILS AT BRIDGE ABUTMENTS

HAYES, SEAY, MATTERN & MATTERN
Associate Engineers

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

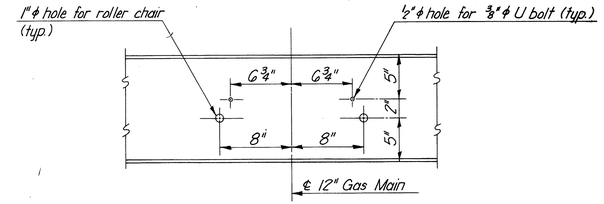
SCALE: AS SHOWN
CONTRACT NO.: 2
SHEET NO. 16 OF 18

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	166 A	188

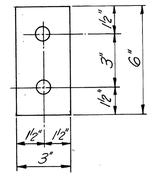


GAS MAIN PROFILE

Scale: 1/8" = 1'-0" Horiz.
1/2" = 1'-0" Vert.

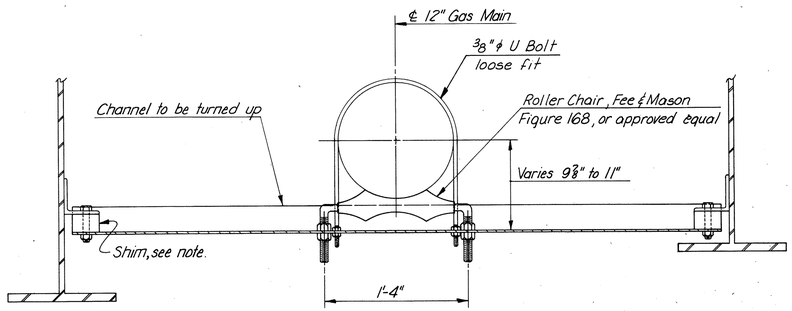


PLAN

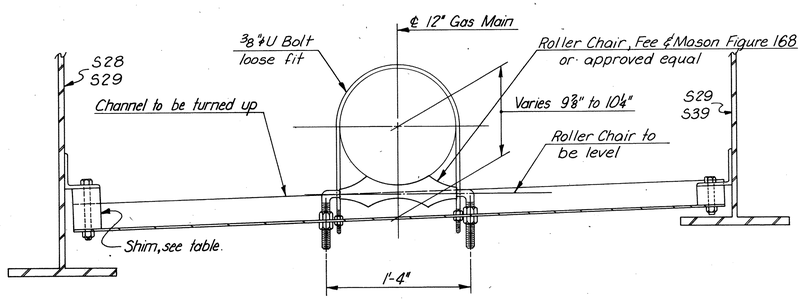


SHIM DETAIL
Scale: 3" = 1'-0"

NOTE:
No shims required on diaphragms 1 thru 4.
1" shims required on diaphragms 5 and 6.
2" shims required on diaphragm 7.



DIAPHRAGMS 1 THRU 7



DIAPHRAGMS 8 THRU 14

GAS MAIN SUPPORT DIAPHRAGMS

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

SHIM TABLE		
SUPPORT DIAPH. NO.	STRINGER	SHIM THICKNESS
8	S28	3"
	S29	2"
9	S28	3 1/2"
	S29	2"
10	S28	4 1/2"
	S29	2"
11, 12 & 13	S38	4 1/2"
	S39	2"
14	S38	3 1/2"
	S39	2"

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	HBW JGV	5-72				
CHECKED	TEM	5-72	1	As Built	JPC	3-73
IN CHARGE	P.R.Y.					

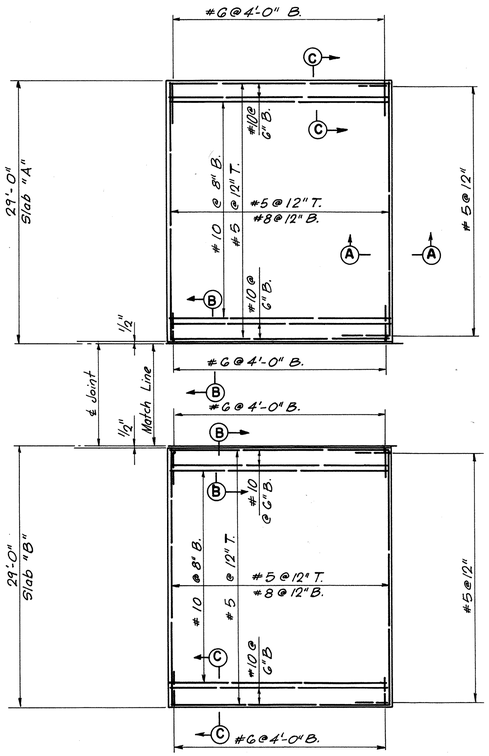
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FOREST HILL AVENUE OVER POWHITE PARKWAY
BRIDGE B-06
GAS MAIN SUPPORT DETAILS AND PROFILE

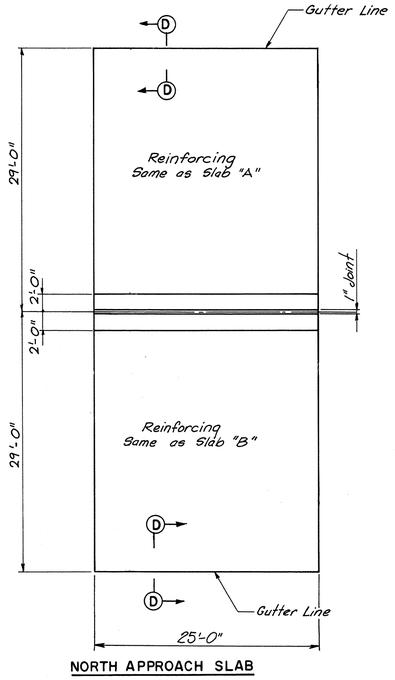
SCALE: AS SHOWN
CONTRACT NO.: 2
SHEET NO. 16 A OF 18

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

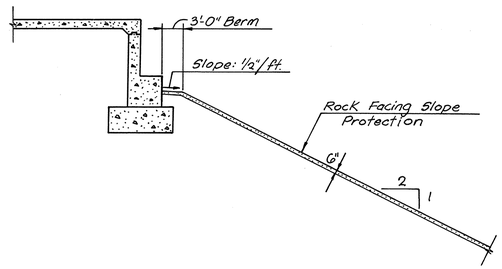
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	167	188



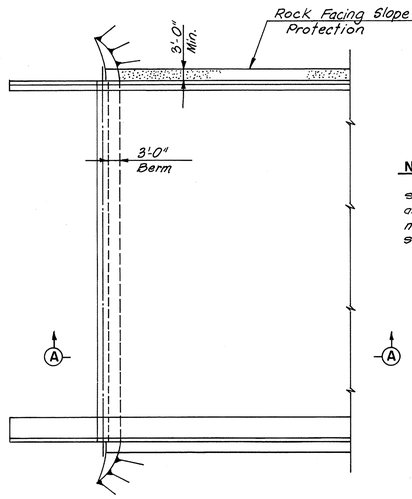
SOUTH APPROACH SLAB
No Scale



NORTH APPROACH SLAB
No Scale

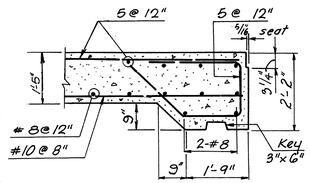


SECTION A-A
Scale: 1"=10'

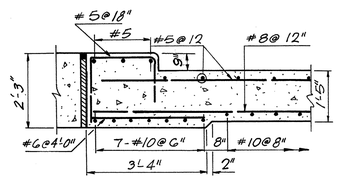


PLAN OF SLOPE PROTECTION
SOUTH ABUTMENT
(NORTH ABUTMENT SIMILAR)

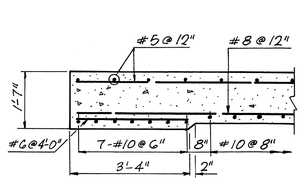
NOTES:
The item "Rock Facing Slope Protection" shall include the excavation of, or the placing and compaction of any embankment material necessary to bring the surface of protected slopes to the finished elevations shown.



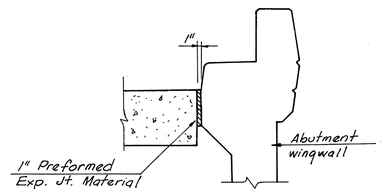
SECTION A-A
Scale: 1/2"=1'-0"



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



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



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

	BY	DATE	NO.	REVISION	BY	DATE
MADE	AJP	2-68	2	As Built	JRC	3-73
CHECKED	RHW	2-68	1	Approach Slab	J.L.N.	5-13-68
IN CHARGE	RHW					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

FOREST HILL AVENUE OVER
POWHITE PARKWAY
BRIDGE B-06

APPROACH SLAB AND SLOPE PROTECTION DETAILS

HAYES, SEAY, MATTERN & MATTERN
Associate Engineers

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS SHOWN
CONTRACT NO.: 2
SHEET NO. 17 OF 18

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	168	188

BORING PC4-3

Elev.	Casing Blows/Ft	Spoon Blows Per 6"		Sample No	Sample Depth	Strata Elev.	Materials & Remarks
126.6	4	4	6	S-1	0'-2'	126.6	
	10	11	14				Tan-Gray CLAYEY SILT, some m-f Sand, trace Roots
	24					123.0	
	75/.5'						
121.6	OPEN						
		50		S-2	5'-5.1'		Gray Decomposed GRANITE
						117.6	
	3 min			C-1	8'-13'		(C-1: 47% Rec)
116.6	2 min						
	5 min						
▼	2 min						
	3 min						
	3 min			C-2	13'-18'		(C-2: 100% Rec)
111.6	2 min						
	2 min						
	3 min						
	3 min						
	3 min			C-3	18'-23'		(C-3: 100% Rec)
106.6	3 min						
	2 min						Gray Weathered GRANITE
	4 min						
	4 min						
	2 min			C-4	23'-28'		(C-4: 75% Rec)
101.6	1 min						
	2 min						
	3 min						
	3 min						
	3 min			C-5	28'-33'		(C-5: 73% Rec)
96.6	4 min						
	4 min						
	2 min						
	2 min						
							Bottom of Hole, Elev. 93.6

BORING PS3-1

Elev.	Casing Blows/Ft	Spoon Blows Per 6"		Sample No	Sample Depth	Strata Elev.	Materials & Remarks
118.2	3	4	6	S-1	0'-2'	118.2	
	4	5	3				
	6						Brown-Gray CLAYEY SILT, and c-f Sand (Fill)
	6						
▼ 113.2	6	6	3	S-2	4'-6'	112.7	
	OPEN	3	100				
							Gray Decomposed GRANITE
	7 min			C-1	8.4'-13.4'	109.8	(C-1: 90% Rec)
108.2	12 min						
	15 min						
	15 min						Gray Medium Hard GRANITE
	15 min						
							Bottom of Hole, Elev. 104.8

BORING PS3-2

Elev.	Casing Blows/Ft	Spoon Blows Per 6"		Sample No	Sample Depth	Strata Elev.	Materials & Remarks
119.6	3	4	5	S-1	0'-2'	119.6	
	6	5	5				Brown-Gray c-f SAND, and f Gravel
	6						
	2					115.0	
114.6	1/.5'	2	100	S-2	4'-4.6'	114.0	BOULDER
▼	4 min			C-1	4.6'-9.6'		(C-1: 20% Rec)
	4 min						
	3 min						
	4 min						
109.6	6 min			C-2	9.6'-14.6'		(C-2: 23% Rec)
	4 min						
	6 min						Brown-Gray Medium Hard GRANITE
	5 min						
	6 min						
104.6	5 min			C-3	14.6'-19.6'		(C-3: 90% Rec)
	4 min						
	8 min						
	12 min						
	19 min						
							Bottom of Hole, Elev. 100.0

BORING PS3-3

Elev.	Casing Blows/Ft	Spoon Blows Per 6"		Sample No	Sample Depth	Strata Elev.	Materials & Remarks
121.0	3	2	11	S-1	0'-2'	121.0	
	13	6	9				
	53						Gray-Brown CLAYEY SILT, some c-f Sand, little m-f Gravel
	35					116.5	
116.0	1	1	2	S-2	4'-6'		
	20	1	1				
	10						
	3						Gray-Tan c-f SAND, little Silt, trace m-f Gravel
▼	6						
111.0	1	6	7	S-3	9'-10.3'		
	OPEN	100				110.0	
	3 min			C-1	11'-16'		(C-1: 83% Rec)
	4 min						
	6 min						Gray Medium Hard GRANITE
106.0	6 min						
	4 min						
							Bottom of Hole, Elev. 105.0

BORING PS3-4

Elev.	Casing Blows/Ft	Spoon Blows Per 6"		Sample No	Sample Depth	Strata Elev.	Materials & Remarks
121.7	2	11	13	S-1	0'-2'	121.7	
	6	10	9			120.2	Gray SILT, and c-f Sand, some m-f Gravel, trace Decomposed GRANITE
	11						
	13						Brown-Gray Decomposed GRANITE
116.7	OPEN	11	21	S-2	4'-5.4'		
▼	5 min	142		C-1	5.5'-10.5'	116.3	(C-1: 88% Rec)
	5 min						
	6 min						Gray Medium Hard GRANITE
	9 min						
111.7	8 min						
							Bottom of Hole, Elev. 111.2

BORING PS3-5

Elev.	Casing Blows/Ft	Spoon Blows Per 6"		Sample No	Sample Depth	Strata Elev.	Materials & Remarks
131.9	7	8	12	S-1	0'-2'	131.9	
	12	9	9				Brown-Gray Decomposed GRANITE, some Sand
	15						
	35					127.8	
▼ 126.9	3 min	100		S-2	4'-4.1'		
	2 min			C-1	4.1'-9.1'		(C-1: 60% Rec)
	3 min						Brown-Gray Medium Hard GRANITE
	2 min						
	3 min						
121.9							
							Bottom of Hole, Elev. 122.8

BORING PS3-6

Elev.	Casing Blows/Ft	Spoon Blows Per 6"		Sample No	Sample Depth	Strata Elev.	Materials & Remarks
136.1	3	12	17	S-1	0'-2'	136.1	
	7	4	5				
	5						Gray-Brown c-f SAND, some Silt, some f Gravel (Fill)
	4						
131.1	2	2	2	S-2	4'-6'		
	3	4	5			129.6	
	7		85	S-3	6.5'-7.0'		Brown Decomposed GRANITE
	OPEN					127.1	
▼ 126.1	5 min			C-1	9'-14'		(C-1: 90% Rec)
	5 min						
	5 min						Gray Medium Hard GRANITE
	5 min						
	8 min						
							Bottom of Hole, Elev. 122.1

BORING PS3-7

Elev.	Casing Blows/Ft	Spoon Blows Per 6"		Sample No	Sample Depth	Strata Elev.	Materials & Remarks
138.1	2	6	8	S-1	0'-2'	138.1	
	5	7	4				Gray-Brown Decomposed GRANITE
	8						
▼	20/.5'		100	S-2	3.5'-3.7'	134.4	
133.1	3 min			C-1	3.7'-8.7'		(C-1: 88% Rec)
	4 min						
	5 min						Gray Soft GRANITE
	5 min						
	5 min						
							Bottom of Hole, Elev. 129.4

BORING PS3-8

Elev.	Casing Blows/Ft	Spoon Blows Per 6"		Sample No	Sample Depth	Strata Elev.	Materials & Remarks
137.9	4	7	17	S-1	0'-2'	137.9	
	9	13	13				Gray-Brown c-f SAND, some m-f Gravel, trace Silt, Cinders (Fill)
	17					134.9	
	39						
132.9	OPEN	10	7	S-2	4'-6'		
		11	16				Gray-Brown Decomposed GRANITE
						128.8	
▼ 127.9	1 min	100		S-3	9'-9.1'		
	4 min			C-1	9.1'-14.1'		(C-1: 87% Rec)
	7 min						
	4 min						Gray Medium Hard GRANITE
	6 min						
							Bottom of Hole, Elev. 123.8

AS BUILT

Notes

(1) The first elevation noted is the existing ground surface.
(2) ▼ denotes the ground water level as measured.
(3) (a) Casing Blows are the blows per foot for a 300 pound hammer falling 24 inches except where noted otherwise.
(b) Also noted in Casing Blows column (where applicable) are rock drilling times in minutes per foot.
(4) (a) Spoon Blows are the blows per 6 inches for a 2" OD, 1⅜" ID Split Spoon Sampler using a 140 pound hammer falling 30 inches.
(b) W denotes penetration under weight of hammer.
(c) P denotes penetration by hydraulic pressure.
(5) (a) Samples designated by an "S" number indicate Split Spoon Samples.
(b) Samples designated by a "U" number indicate Undisturbed Shelby Tube Samples (3⅛" Ø).
(c) Samples designated by a "C" number indicate 1⅛" Ø (AX) Rock Cores.
(6) Sample descriptions are based on field visual identification by the boring inspector.
(7) Abbreviation and quantitative terms:

c-coarse	trace	1-10 %
m-medium	little	10-20 %
f-fine	some	20-35 %
	and	35-50 %

Note

For location of boring holes see General Plan and Elevation sheet.

	BY	DATE				
MADE	H.F.					
CHECKED	A.B.		1	As Built	JRC	3-73
IN CHARGE	E.P.R.		NO.	REVISION	BY	DATE

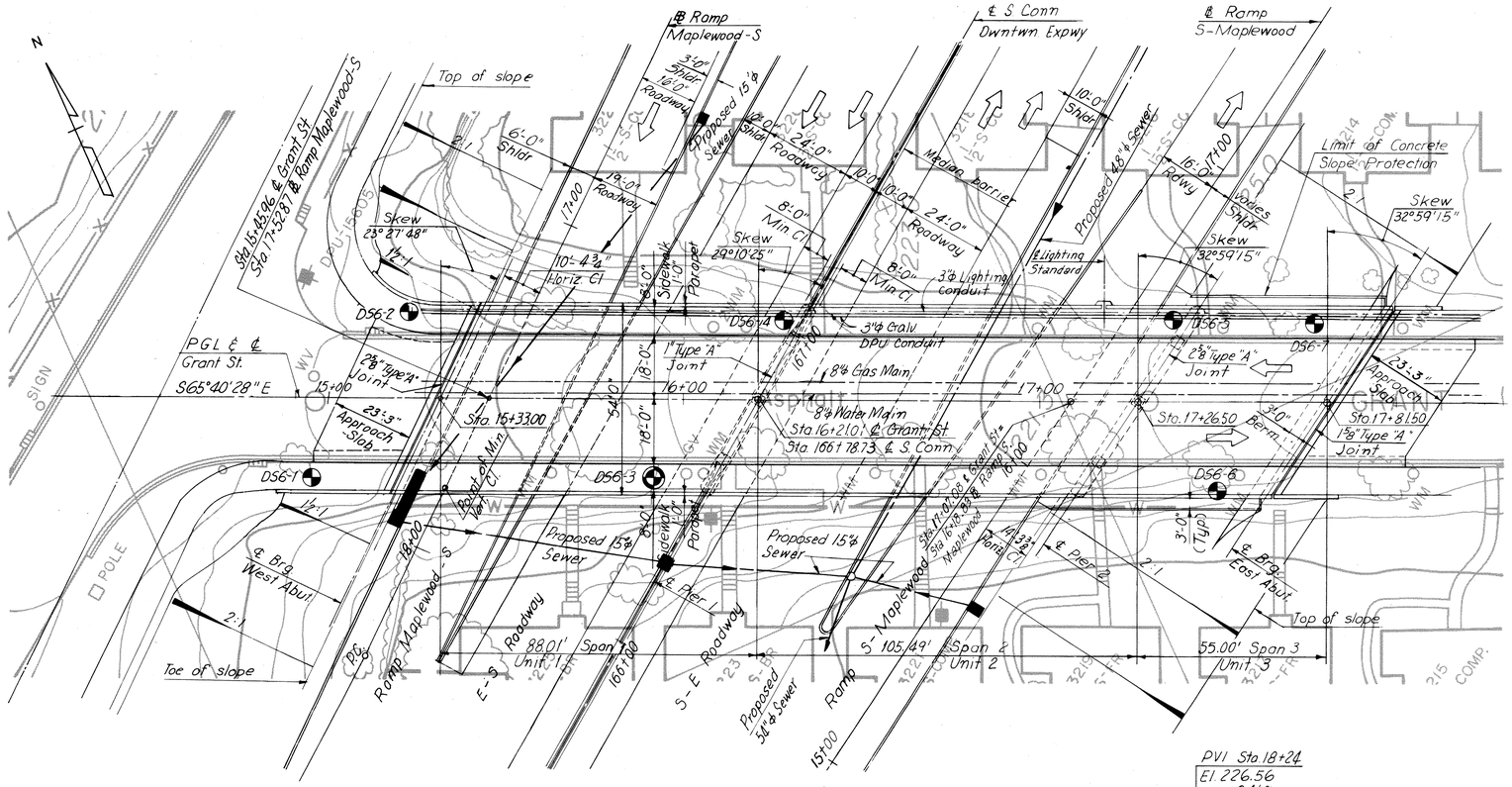
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

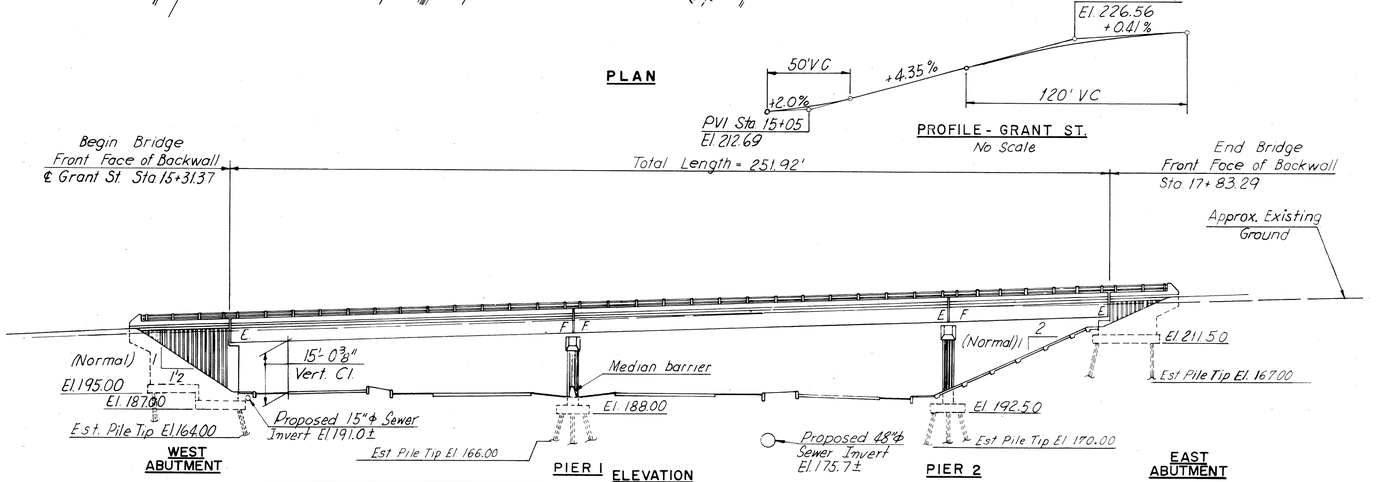
FOREST HILL AVENUE OVER POWHITE PARKWAY
BRIDGE B-06
BORING LOG

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

SCALE: NO SCALE
CONTRACT NO.: 2
SHEET NO. 18 OF 18

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
7	DOWNTOWN EXPRESSWAY	106	





GENERAL NOTES

ROADWAY: One 36'-0" Clear roadway. Two 8'-0" sidewalks.

CAPACITY: Dead Load-Includes 15 lbs. per sq. ft. for future wearing surface. Live Loads-HS20-44 loading and B.P.R. modified for military vehicles.

SPECIFICATIONS: GENERAL-Virginia Department of Highway Road and Bridge Specifications, 1970.
DESIGN-A.A.S.H.O. Standard Specifications for Highway Bridges. 1969 and 1970-72 Interim Specifications, modified by Special Provision.
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 on the plan 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. Found. mat'l. shall be kept dry & special attn. is called to Sec. 401.05 of the Gen. Specs. & to the Contract Special Prov. concerning preparation of found. for ftgs.

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. (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 be intermediate grade. 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. All shop welded web splices, flange splices and web to flange welds shall be made by the submerged arc process.

BENCH MARK: B-13. Copper Weld Rod, N.E. corner of McCloy and Grant St. Elev. 204.98'

◔ Indicates 2½" ϕ cased hole boring.

◓ Indicates 4" ϕ cased hole boring.

INDEX	
NO	DESCRIPTION
1	GENERAL PLAN AND ELEVATION
2 & 3	WEST ABUTMENT
4	EAST ABUTMENT
5	ABUTMENT DETAILS
6	PIER 1
7	PIER 2
8	FRAMING PLAN
9	DECK PLAN AND CROSS SECTION
10	JOINT DETAILS
11	APPROACH SLAB & SLOPE PROTECTION DETAILS
12 & 13	BORING LOGS
S1	STANDARD SHOE DETAILS
S3	STANDARD ALUMINUM RAILING DETAILS (2 RAIL)
S4	STANDARD ELECTRICAL DETAILS
S7-S9	STANDARD ARCHITECTURAL DETAILS
S11	STANDARD GAS & WATER MAIN SUPPORT DETAILS
S13	LIMITS OF EXCAVATION & BACKFILL

ESTIMATE OF QUANTITIES

	STRUCTURE EXCAVATION C.Y.	CONCRETE CLASS A4 C.Y.	CONCRETE CLASS A3 C.Y.	CONCRETE CLASS A3 APPR. SLAB C.Y.	STRUCTURAL STEEL LBS.	ALUMINUM BR. RAILING (2 RAIL) L.F.	POROUS BACKFILL C.Y.	REINFORCING STEEL LBS.	STEEL PILES 10 BP 42 L.F.	CONC. SLAB SLOPE PROT. S.Y.	ASPHALT DAMP PROOFING S.Y.	UNDER DRAIN 6"ϕ PIPE L.F.	GAS MAIN 8"ϕ L.F.	WATER MAIN 8"ϕ L.F.	METAL CONDUIT L.F.
SUPERSTRUCTURE		538.6			490,258	504		102,177					312	316	837
WEST ABUTMENT	777.4		395.0			60	130	82,554	1390.7	10.2	226	127			
EAST ABUTMENT	319.7		152.0			25	19	8,107	894.8	439.3	75	90			
PIER 1	131.7		123.2					24,147	561.6						
PIER 2	51.4		92.5					20,668	633.4						
APPROACH SLABS				97				28,426							
TOTAL	1280.2	538.6	762.7	97	490,258	589	149	216,079	3480.5	449.5	301	217	312	316	837

Notes:
The cost of furnishing and installing 2"ϕ and 3"ϕ galvanized steel conduit shall be included in the bid price for the item, "Metal Conduit".

	BY	DATE				
MADE	TCY	2-16-68				
CHECKED	ICH	2-29-68	1	As Built	TEM	9-75
IN CHARGE	RGC		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

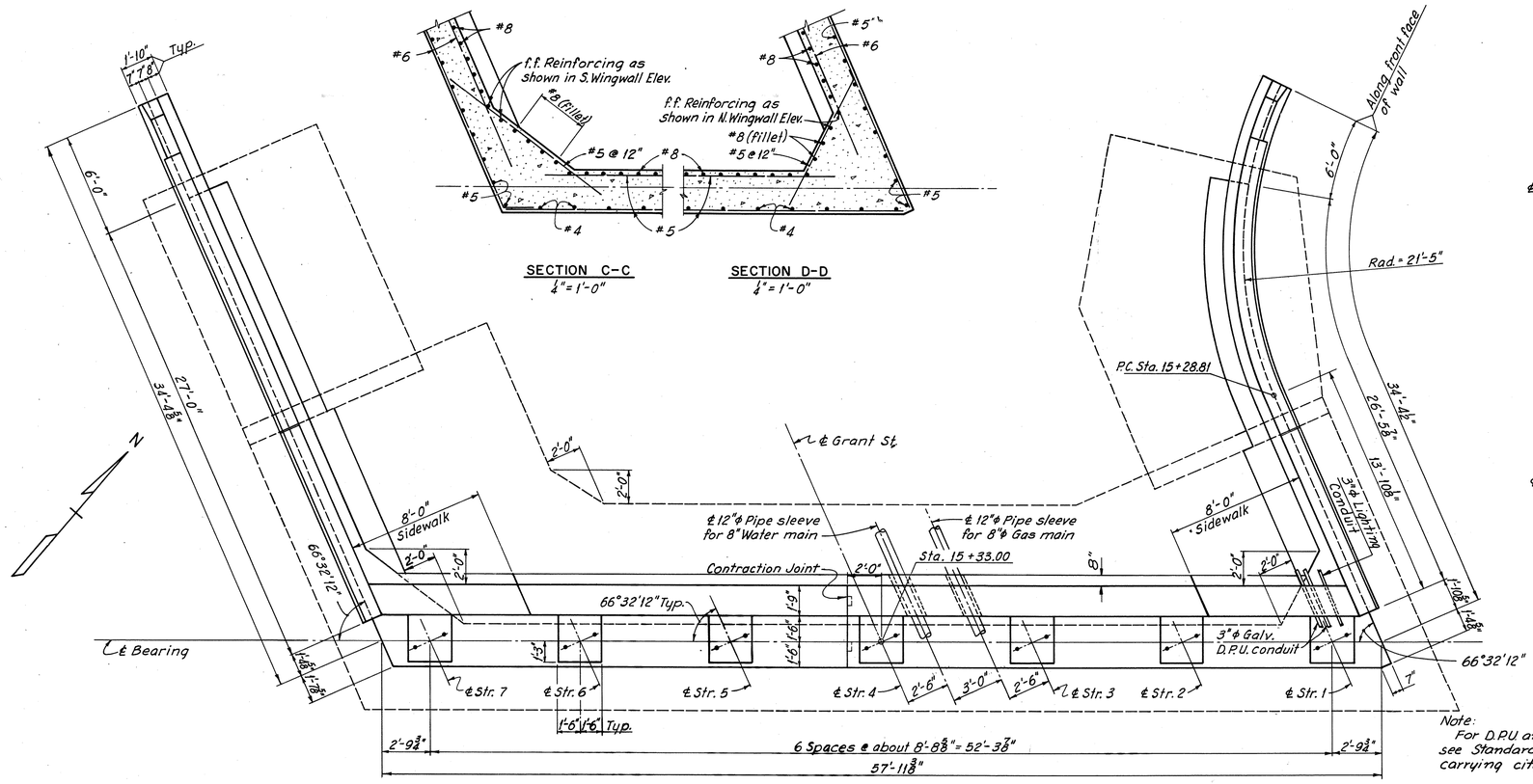
BRIDGE NO. 37
GRANT STREET OVER SOUTH CONNECTION DOWNTOWN EXPRESSWAY
GENERAL PLAN AND ELEVATION

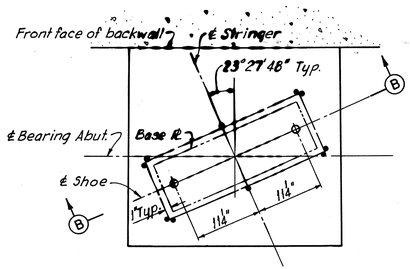
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

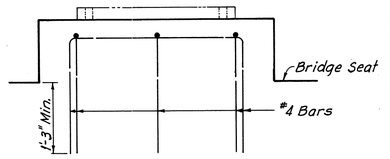
SCALE: 1"=20'
CONTRACT NO.: 7
SHEET NO. 1 OF 13

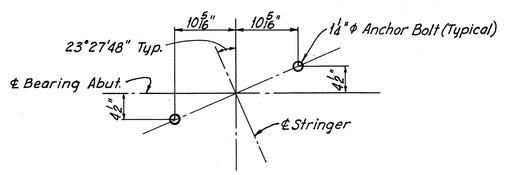
106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
7	DOWNTOWN EXPRESSWAY	107	

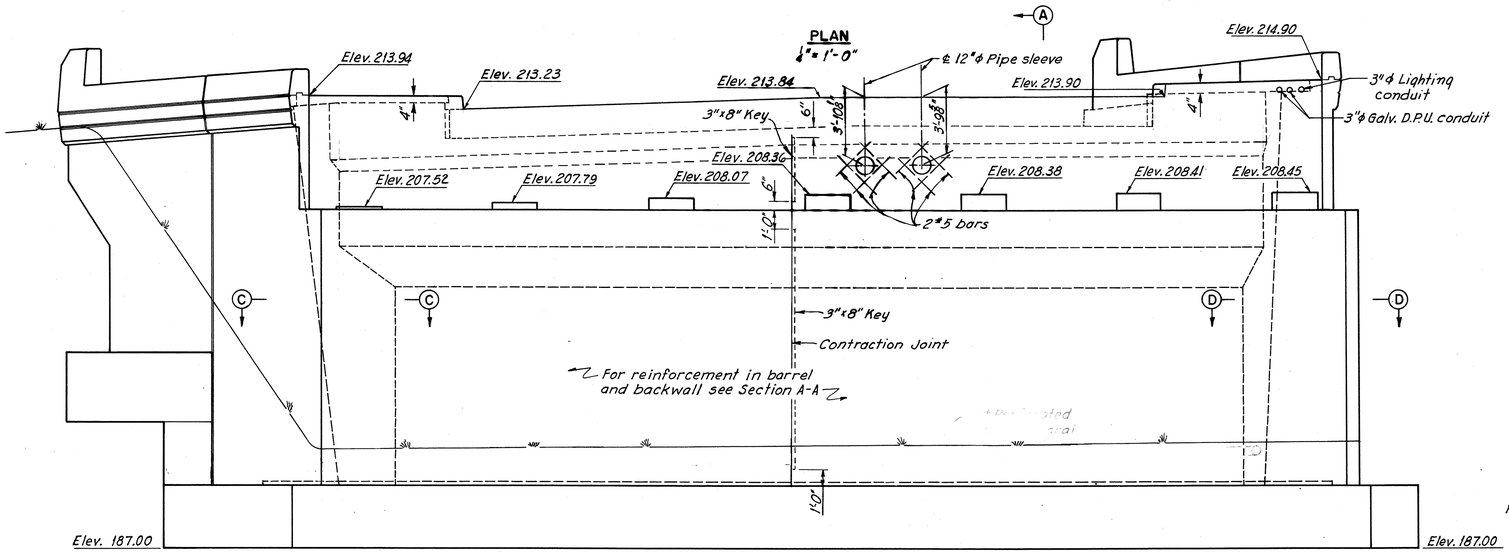






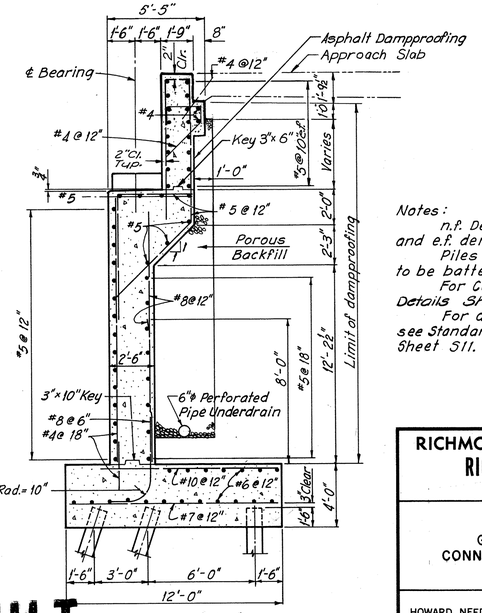


Note:
For D.P.U and Lighting conduit details see Standard Electrical Details (Bridge carrying city streets) Sheet 84.



Note:
Piles not shown in Elevation.
For pile details see Footing Plan, next sheet.

ELEVATION
¼"= 1'-0"



Notes:
n.f. Denotes near face; f.f. denotes far face and e.f. denotes each face.
Piles shall be 10 BP 42. All battered piles to be battered 4 in 12.
For Contraction joint details see Abutment Details Sheet 5.
For details of water main pipe sleeve, see Standard Gas and Water Main Support Details Sheet 511.

	BY	DATE				
MADE	GD	1-68				
CHECKED	TCY	2-29-68	1	As Built	TEM	9-75
IN CHARGE	RGC		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

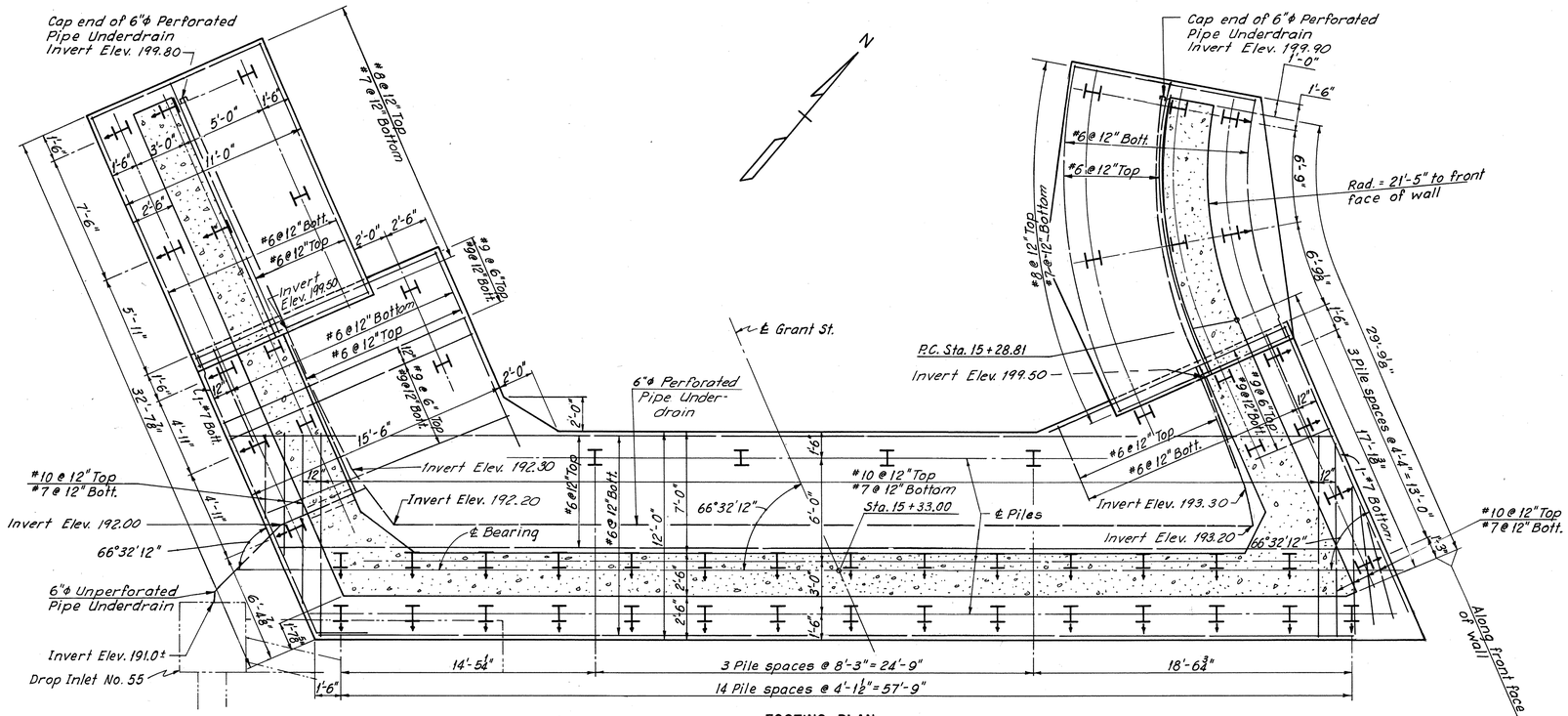
BRIDGE NO. 37
GRANT STREET OVER SOUTH CONNECTION DOWNTOWN EXPRESSWAY
WEST ABUTMENT

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

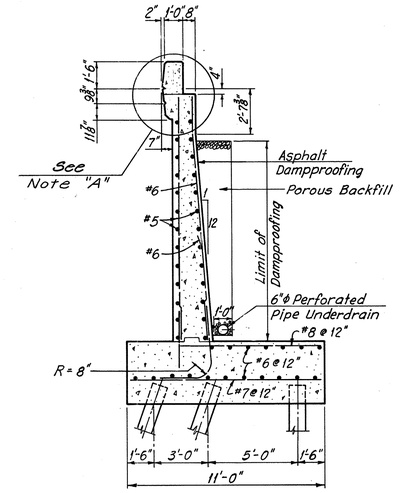
SCALE: As Shown
CONTRACT NO.: 7
SHEET NO. 2 OF 13

107

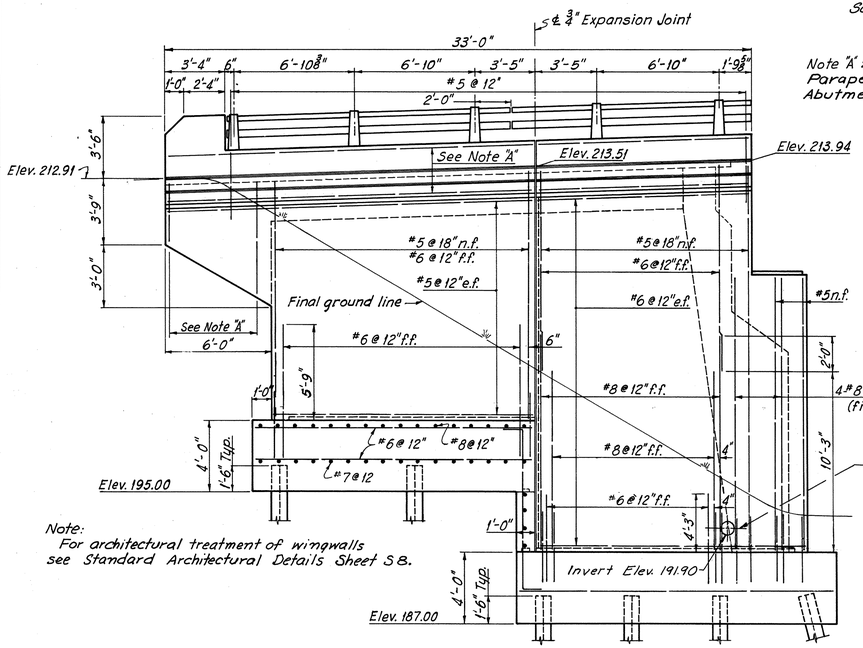
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
7	DOWNTOWN EXPRESSWAY	108	



FOOTING PLAN
Scale: ¼" = 1'-0"

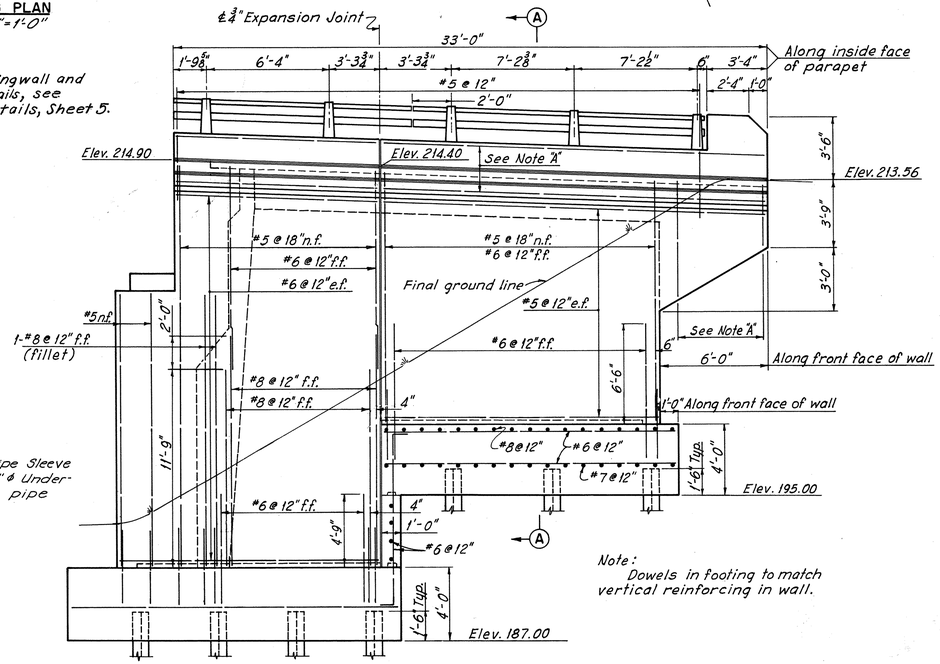


SECTION A-A
Scale: ¼" = 1'-0"



SOUTH WINGWALL ELEVATION
Scale: ¼" = 1'-0"

Note:
For architectural treatment of wingwalls see Standard Architectural Details Sheet S8.



DEVELOPED NORTH WINGWALL ELEVATION
Scale: ¼" = 1'-0"

Note:
Dowels in footing to match vertical reinforcing in wall.

Notes:
Footing should be founded at the elevation shown on Plans unless otherwise directed by the Engineer due to conditions at the site during construction. In such cases, the Engineer will determine the extent of re-design necessary and will advise the Contractor before construction begins.
All piles shall be 10 BP 42 Steel Piles (Design Capacity = 45 tons).
¼ Denotes pile battered 4 in 12 in direction of arrow.

	BY	DATE				
MADE	GD	1-68				
CHECKED	TCY	3-1-68	1	As Built	TEM	9-75
IN CHARGE	RGC		NO.	REVISION	BY	DATE

AS BUILT

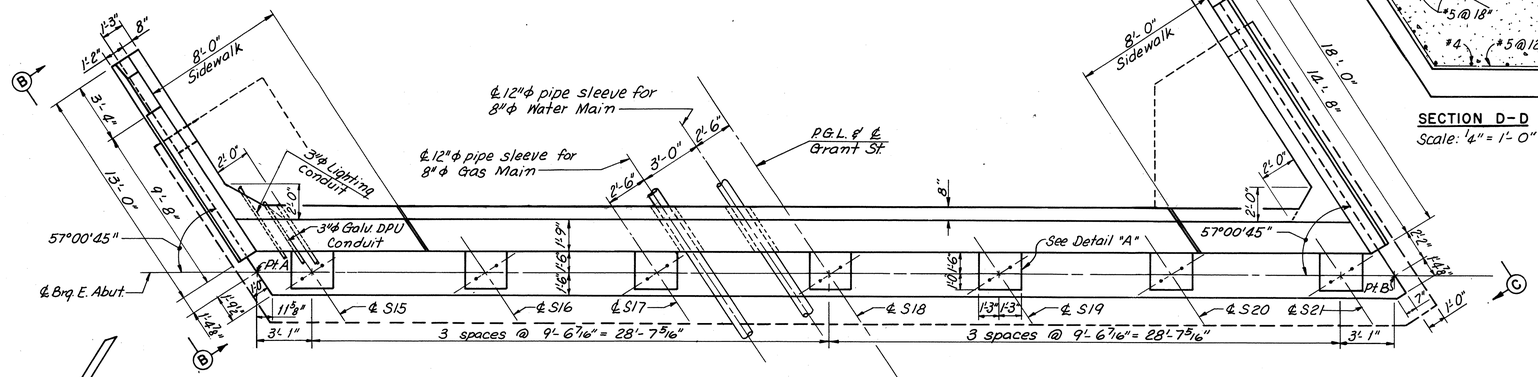
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 37
GRANT STREET OVER SOUTH CONNECTION DOWNTOWN EXPRESSWAY
WEST ABUTMENT

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

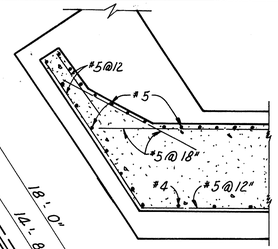
SCALE: as shown
CONTRACT NO.: 7
SHEET NO. 3 OF 13

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
7	DOWNTOWN EXPRESSWAY	109	

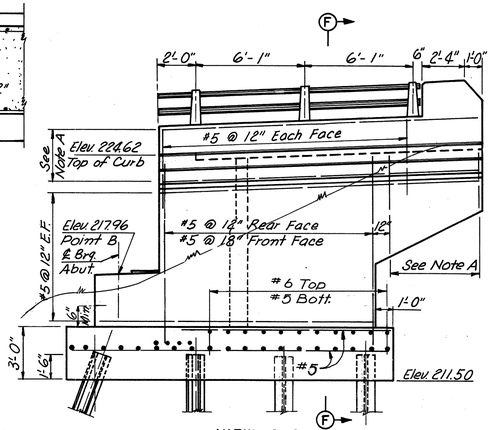


PLAN
Scale: 1/4" = 1'-0"

Note:
For D.P.U. and Lighting conduit details see Standard Electrical Details (Bridge carrying city streets), Sheet S-4

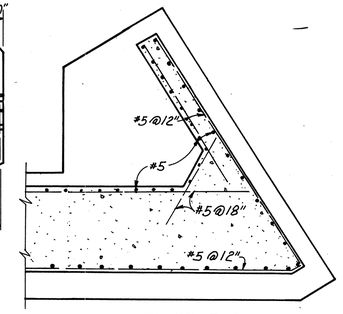


SECTION D-D
Scale: 1/4" = 1'-0"



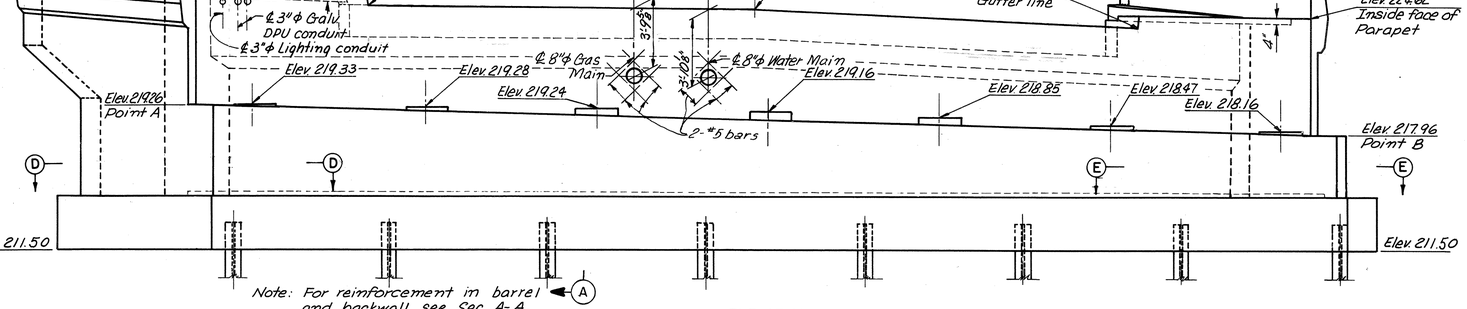
VIEW C-C
Scale: 1/4" = 1'-0"

Note:
For architectural treatment of wingwalls see Standard Architectural Details sheet S-7



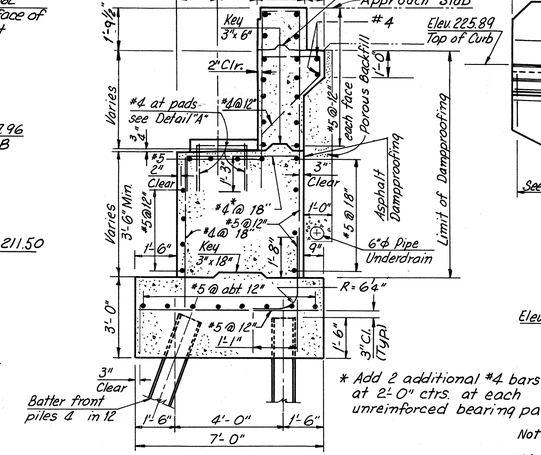
SECTION E-E
Scale: 1/4" = 1'-0"

Note A:
See Abutment Details, Sheet 5



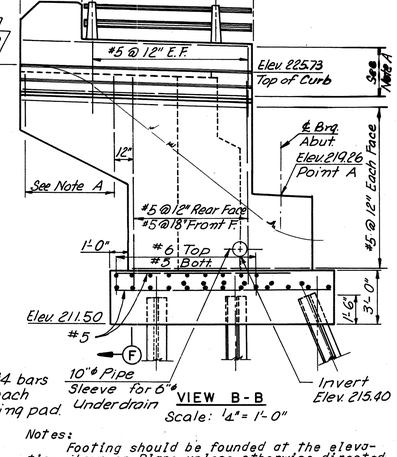
Note: For reinforcement in barrel and backwall see Sec. A-A.

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

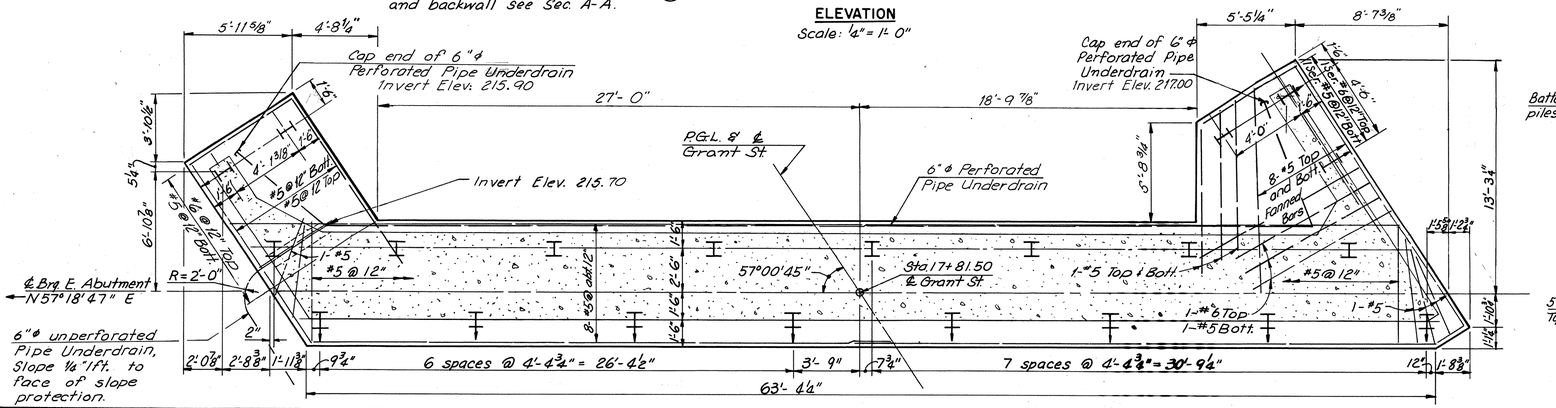


SECTION A-A
Scale: 3/8" = 1'-0"

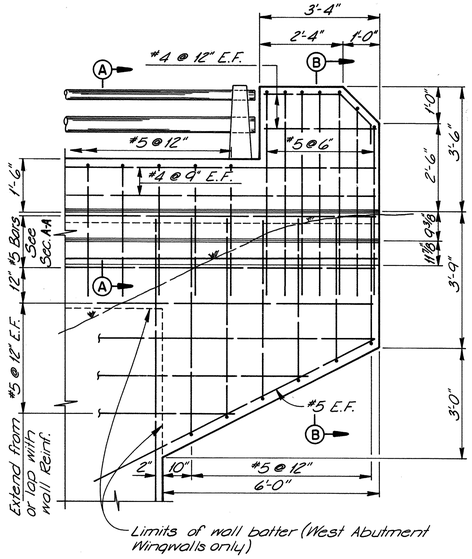
* Add 2 additional #4 bars at 2'-0" ctrs. at each unreinforced bearing pad.



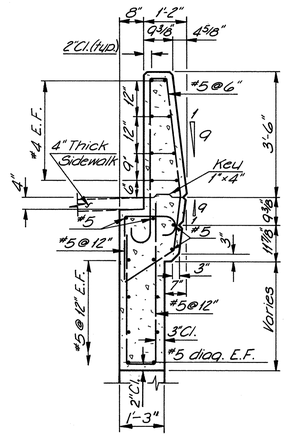
VIEW B-B
Scale: 1/4" = 1'-0"


Cap end of 6"ϕ Perforated Pipe Underdrain Invert Elev. 215.90
Cap end of 6"ϕ Perforated Pipe Underdrain Invert Elev. 217.00
27'-0"
18'-9 7/8"
P.G.L. ℄ Grant St.
Invert Elev. 215.70
6"ϕ Perforated Pipe Underdrain
#5@12" Bott.
#5@12" Top
#5@12"
#5@12"
#5@12"
#5@abt.12"
#5@12"
#5@12"
#5@

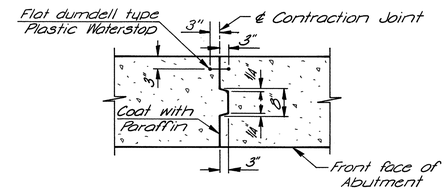
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
7	DOWNTOWN EXPRESSWAY	110	



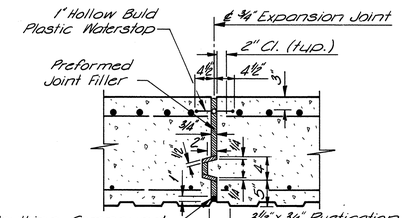
WINGWALL AND PARAPET DETAIL
Scale: 1/2"=1'-0"



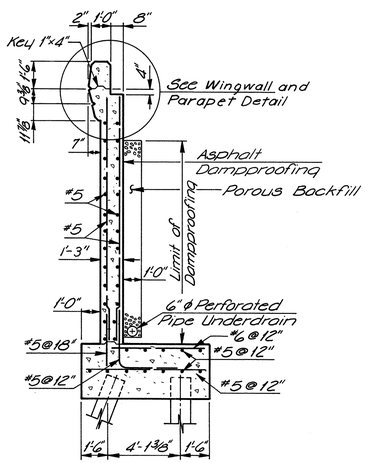
SECTION B-B
Scale: 1/2"=1'-0"



CONTRACTION JOINT AT ABUTMENTS
No Scale

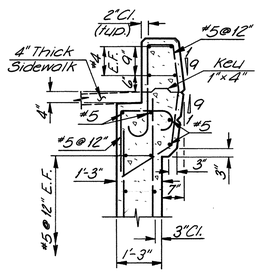


WINGWALL EXPANSION JOINTS
No Scale



SECTION F-F
(East Abutment)
Scale: 1/4"=1'-0"

Note:
For location of Section F-F, see East Abutment, sheet 4.



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

DESIGNED						
DRAWN						
CHECKED				As Built		
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

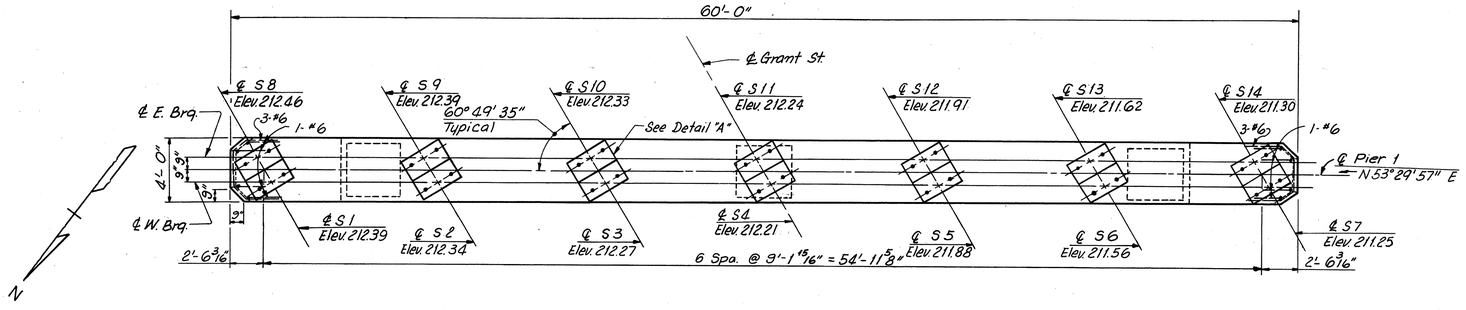
BRIDGE NO. 37
GRANT STREET OVER SOUTH CONNECTION DOWNTOWN EXPRESSWAY
ABUTMENT DETAILS

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

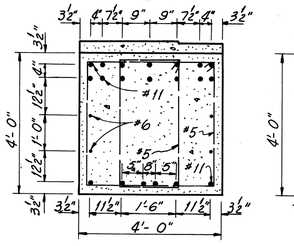
SCALE: AS SHOWN
CONTRACT NO.: 7
SHEET NO. 5 OF 13

110

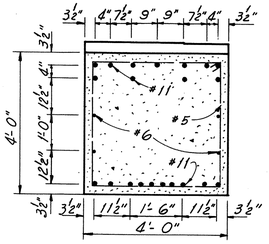
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
7	DOWNTOWN EXPRESSWAY	///	



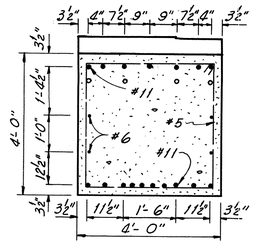
PLAN
Scale 1/4"=1'



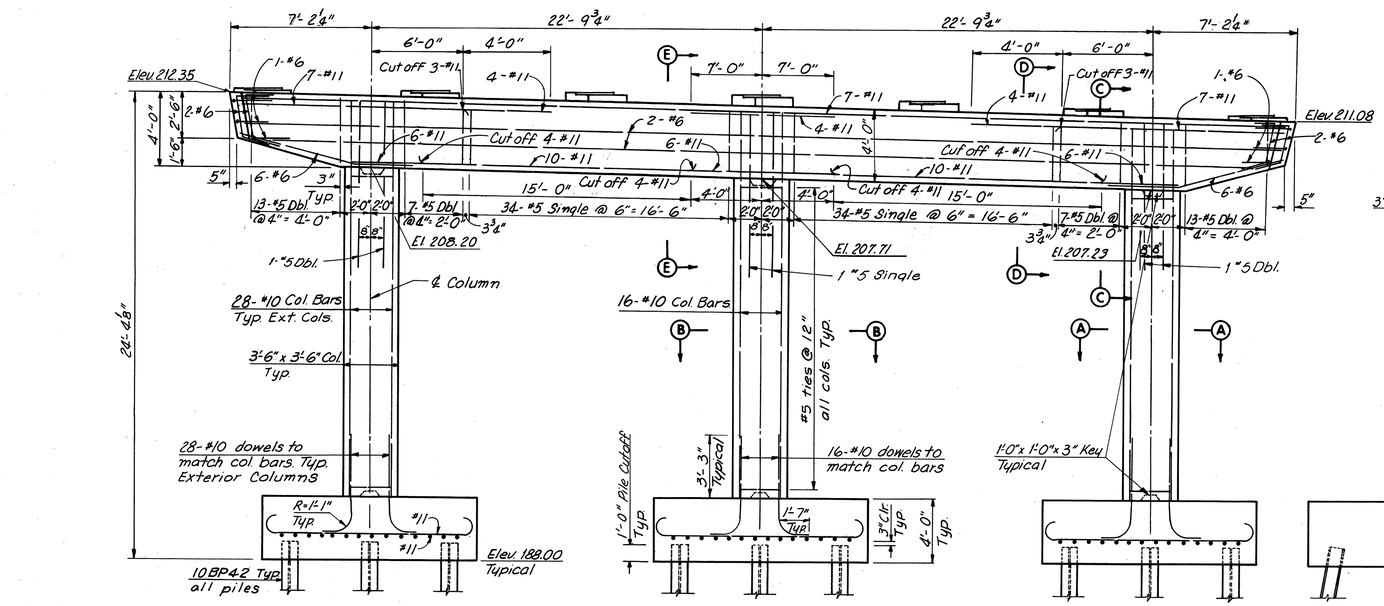
SECTION C-C
Scale 1/2"=1'



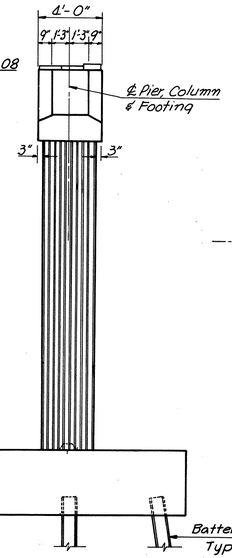
SECTION D-D
Scale 1/2"=1'



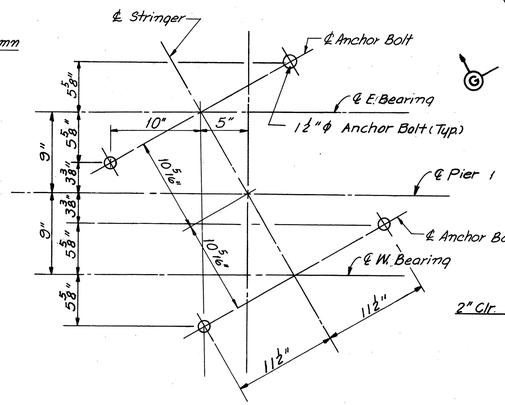
SECTION E-E
Scale 1/2"=1'



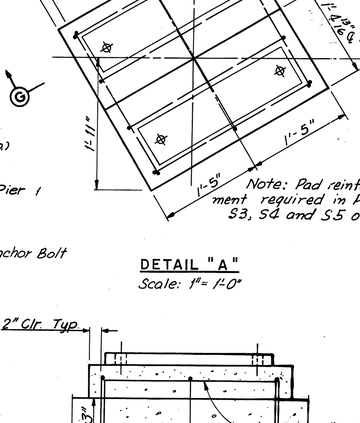
ELEVATION
Scale 1/4"=1'



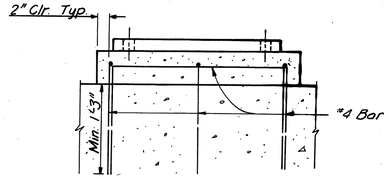
END VIEW
Scale: 1/4"=1'-0"



LOCATION OF ANCHOR BOLTS
Scale: 1½"=1'-0"



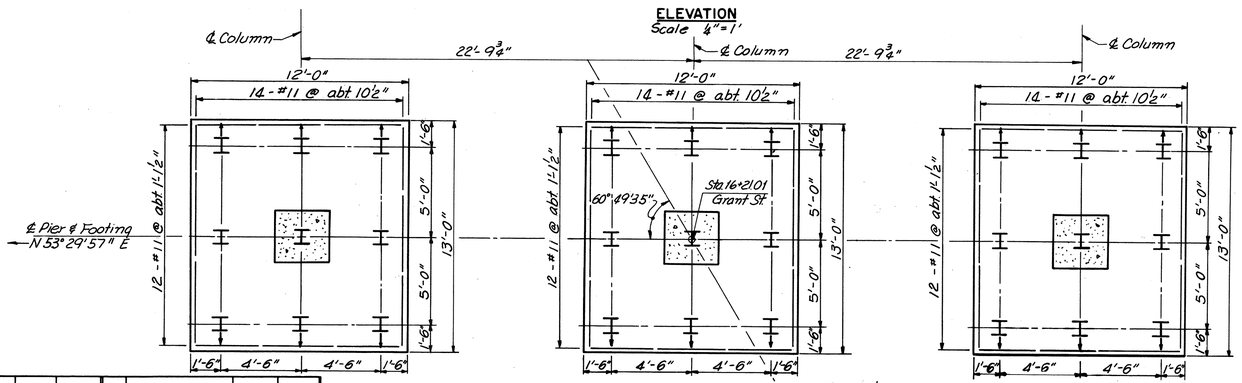
DETAIL "A"
Scale: 1"=1'-0"



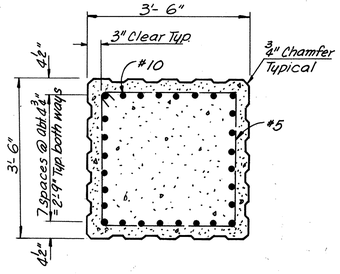
SECTION G-G
Scale: 1"=1'-0"

Notes:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change from more than 2 ft., redesign will be required.
All piles shall be 10 BP 42 Steel Piles (Design Capacity = 45 tons).
‡ Denotes pile battered 2 in 12 in direction shown

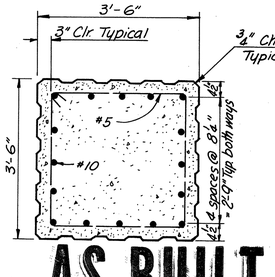
Note:
For architectural treatment of columns see Standard Architectural Details sheet 37



FOOTING PLAN
Scale 1/4"=1'



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



AS BUILT

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

	BY	DATE				
MADE	TCY	1-31-68				
CHECKED	ICH	2-20-68	1	As Built	TEM	9-75
IN CHARGE	R.G.C.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

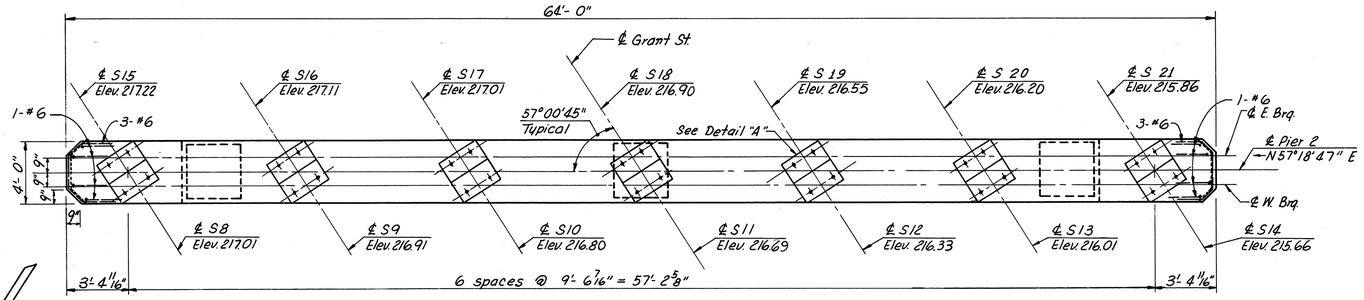
BRIDGE NO. 37
GRANT STREET OVER SOUTH CONNECTION DOWNTOWN EXPRESSWAY
PIER I

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

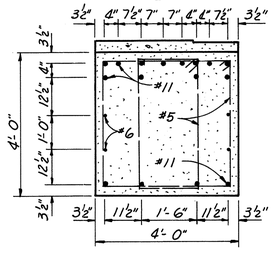
SCALE: As Shown
CONTRACT NO.: 7
SHEET NO. 6 OF 13

///

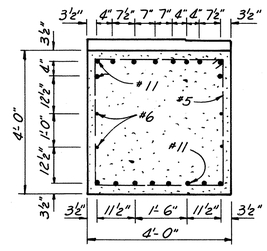
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
7	DOWNTOWN EXPRESSWAY	112	



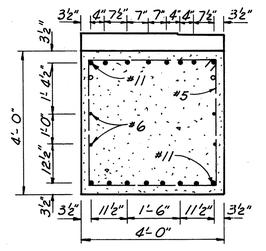
PLAN
Scale: 1/4"=1'0"



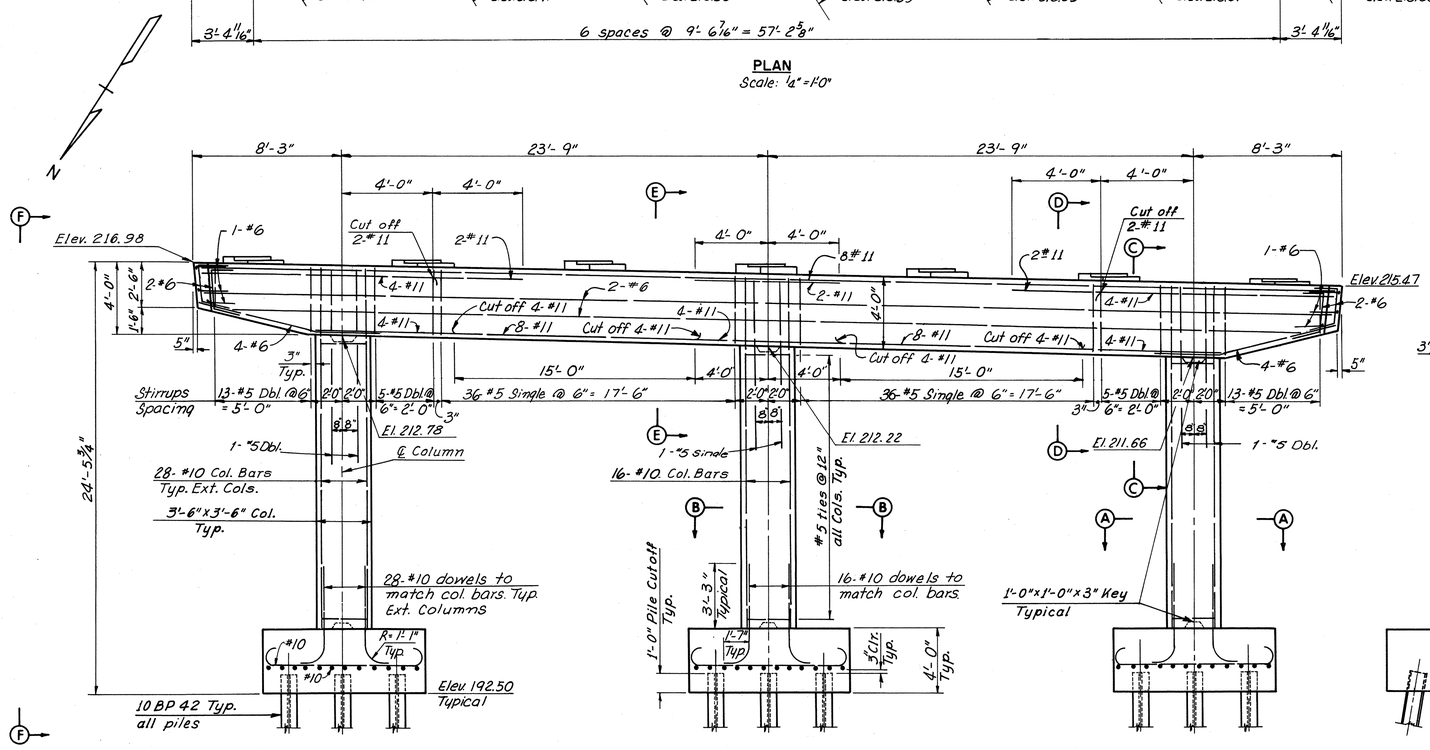
SECTION C-C
Scale: 1/2"= 1'-0"



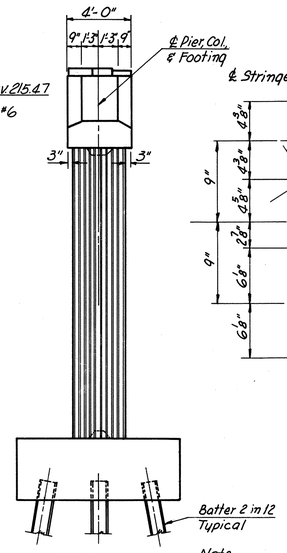
SECTION D-D
Scale: 1/2"= 1'-0"



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

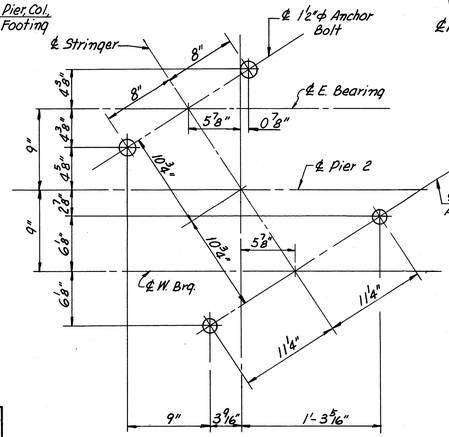


ELEVATION
Scale: 1/4"= 1'-0"

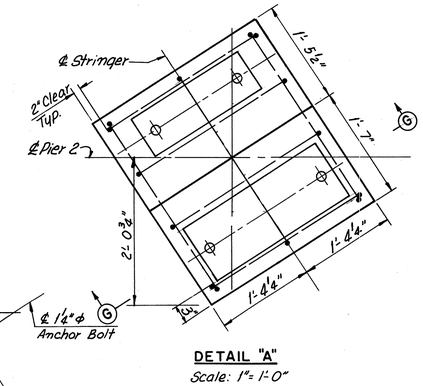


VIEW F-F
Scale: 1/4"= 1'-0"

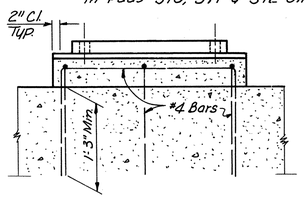
Note:
For architectural treatment of columns see Standard Architectural Details Sheet S7.



LOCATION OF ANCHOR BOLTS
Scale: 1½"= 1'-0"

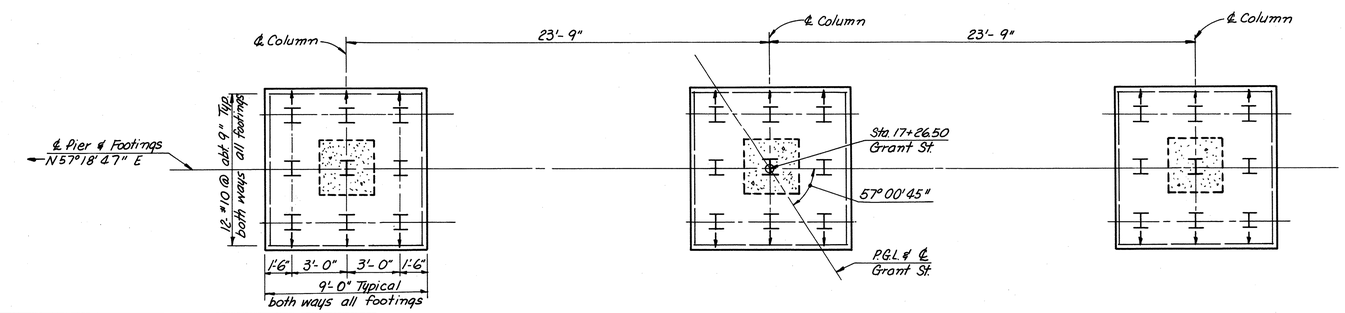


DETAIL "A"
Scale: 1"= 1'-0"
Note: Pad reinforcement required in Pads S10, S11 & S12 only.

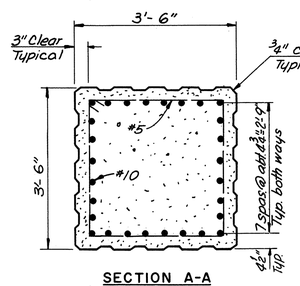


SECTION G-G
Scale: 1"= 1'-0"

Notes:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.
All piles shall be 10 BP 42 Steel Piles (Design Capacity = 45 tons).
‡ Denotes pile battered 2 in 12 in direction of arrow



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



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

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

	BY	DATE				
MADE	TCY	1-31-68				
CHECKED	ICH	2-20-68	1	As Built	TEM	9-75
IN CHARGE	R. G. C.		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

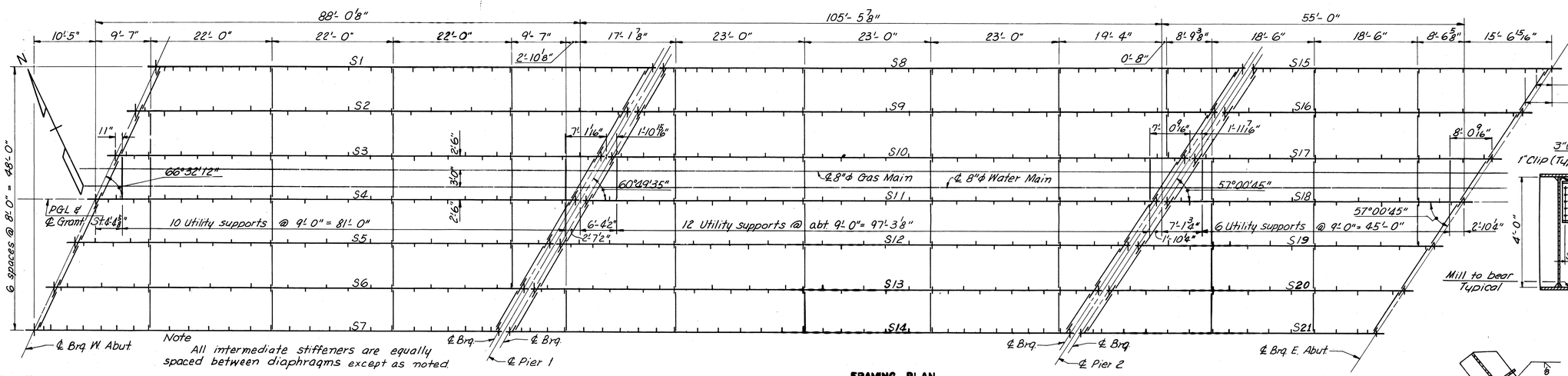
BRIDGE NO. 37
GRANT STREET OVER SOUTH CONNECTION DOWNTOWN EXPRESSWAY
PIER 2

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

SCALE: As Shown
CONTRACT NO.: 7
SHEET NO. 7 OF 13

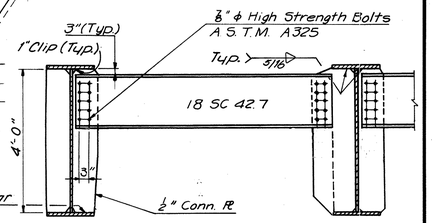
112

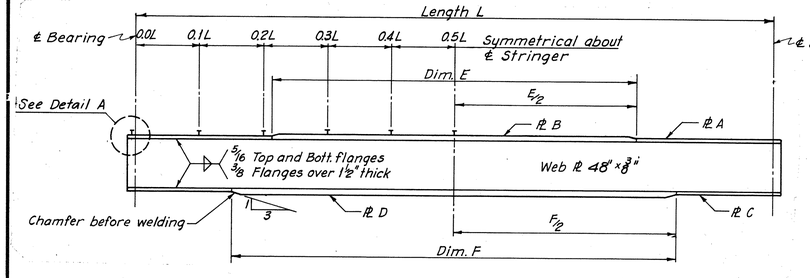
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
7	DOWNTOWN EXPRESSWAY	113	



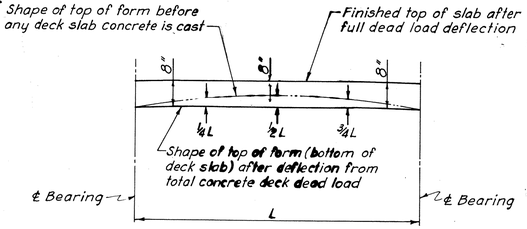
Note
All intermediate stiffeners are equally spaced between diaphragms except as noted.

½ Intermediate Stiffener Space
Intermediate Stiffener Space
Typical all stringer ends

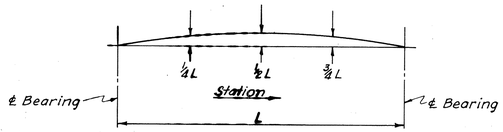




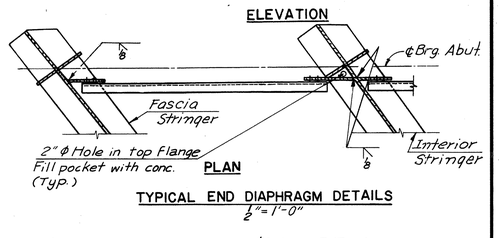
STRINGER ELEVATION



DEAD LOAD DEFLECTION DIAGRAM



CAMBER DIAGRAM



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

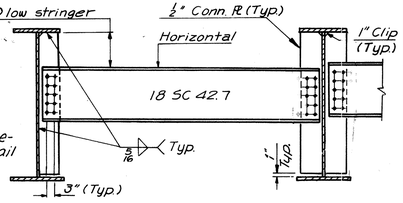
STRINGER SCHEDULE														
STRINGER	LENGTH ℄ BRG. TO ℄ BRG.	PL A	PL B	PL C	PL D	DIM. E	DIM. F	SHEAR STUD SPACING .0L-.1L*	.1L-.2L	.2L-.3L	.3L-.4L	.4L-.5L	BEARING STIFFENER	SHOE TYPE LT. END	SHOE TYPE RT. END
S1	90'-1⅝"	16×1¼	16×1¼	18×1¼	18×1¾	——	56'-6"	12"	15"	20"	24"	24"	2-7×½	E6	F4M
S2	89'-1 11/16"	16×1¼	16×1¼	18×1¼	18×1¾	——	55'-3"	11½"	13½"	16"	19½"	24"	2-7×½	E6	F4
S3	88'-1¾"	16×1¼	16×1¼	18×1¼	18×1¾	——	54'-8"	11½"	13½"	16"	19½"	24"	2-7×½	E6	F4
S4	87'-1 13/16"	16×1¼	16×1¼	18×1¼	18×1¾	——	54'-0"	11½"	13½"	16"	19½"	24"	2-7×½	E6	F4
S5	86'-1 15/16"	16×1¼	16×1¼	18×1¼	18×1¾	——	53'-5"	11½"	13½"	16"	19½"	24"	2-7×½	E6	F4
S6	85'-2"	16×1¼	16×1¼	18×1¼	18×1¾	——	52'-9"	11½"	13½"	16"	19½"	24"	2-7×½	E6	F4
S7	84'-2 1/16"	16×1¼	16×1¼	18×1¼	18×1¾	——	52'-9"	12"	15"	20"	24"	24"	2-7×½	E6	F4M
S8	105'-10 15/16"	16×1¼	16×2	18×1⅜	18×2½	53'-0"	64'-9"	14½"	18"	23½"	24"	24"	2-7×½	F4M	E7
S9	105'-2 1/16"	16×1¼	16×1⅜	18×1⅜	18×2½	52'-8"	65'-4"	12"	14"	16½"	20½"	24"	2-7×½	F4	E7
S10	104'-5 9/16"	16×1¼	16×1⅜	18×1⅜	18×2½	52'-3"	64'-10"	12"	14"	16½"	20½"	24"	2-7×½	F4	E7
S11	103'-8 13/16"	16×1¼	16×1⅜	18×1⅜	18×2½	51'-11"	64'-5"	12"	14"	16½"	20½"	24"	2-7×½	F4	E7
S12	103'-0⅛"	16×1¼	16×1⅜	18×1⅜	18×2½	51'-7"	63'-11"	12"	14"	16½"	20½"	24"	2-7×½	F4	E7
S13	102'-3⅜"	16×1¼	16×1¾	18×1¾	18×2½	51'-2"	63'-6"	12"	14"	16½"	20½"	24"	2-7×½	F4	E7
S14	101'-6 11/16"	16×1¼	16×2	18×1⅜	18×2½	50'-10"	62'-1"	14½"	18"	23½"	24"	24"	2-7×½	F4M	E7
S15,S21	54'-1¼"	12×⅞	12×⅞	12×⅞	12×⅞	——	——	16½"	20½"	24"	24"	24"	2-5×½	F1M	E1
S16 to S20	54'-1¼"	12×⅞	12×⅞	12×⅞	12×⅞	——	——	11½"	13"	15½"	19"	24"	2-5×½	F1	E1

* Denotes spacing which begins at termination of 5 spaces at 6"

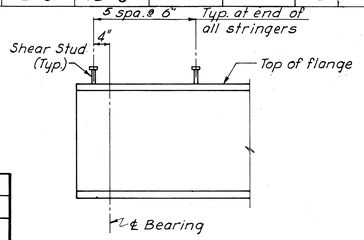
DEFLECTION SCHEDULE		
STR.	¼L & ¾L	½L
S1	1¾"	2 7/16"
S2	1 1/16"	2 3/16"
S3	1 7/16"	2"
S4	1¼"	1¾"
S5	1 5/16"	1 13/16"
S6	1 5/16"	1 13/16"
S7	1 3/16"	1⅞"
S8	2 5/16"	3¼"
S9	2 3/16"	3 1/16"
S10	2 1/16"	2⅞"
S11	1⅞"	2 5/8"
S12	2"	2 3/4"
S13	2"	2 3/4"
S14	2"	2 3/4"
S15,S21	7/16"	5/8"
S16,S20	⅜"	9/16"
S17,S19	⅜"	9/16"
S18	⅜"	½"

CAMBER SCHEDULE			
STR.	¼ L	½ L	¾ L
S1	1¾"	2 7/16"	1¾"
S2	1 1/16"	2 3/16"	1 1/16"
S3	1 1/16"	2"	1 1/16"
S4	1¼"	1¾"	1¼"
S5	1⅜"	1⅞"	1⅜"
S6	1¼"	1 13/16"	1 5/16"
S7	1 3/16"	1 13/16"	1¼"
S8	2 5/16"	3¼"	2 5/16"
S9	2 3/16"	3 1/16"	2 3/16"
S10	2 1/16"	2⅞"	2 1/16"
S11	1⅞"	2 5/8"	1⅞"
S12	2"	2¾"	2"
S13	2"	2¾"	2"
S14	2"	2¾"	2"
S15	1"	1 5/8"	1 5/16"
S16	¾"	1 5/16"	1⅛"
S17	⅝"	1 1/16"	15/16"
S18	½"	13/16"	13/16"
S19	7/16"	11/16"	9/16"
S20	⅜"	9/16"	7/16"
S21	7/16"	⅝"	7/16"

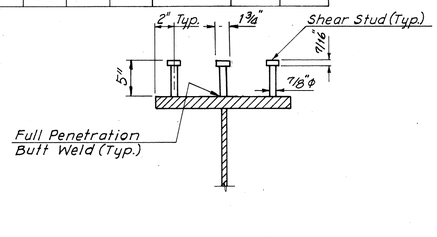
Note:
See Special Intermediate Diaphragm Detail on next sheet.



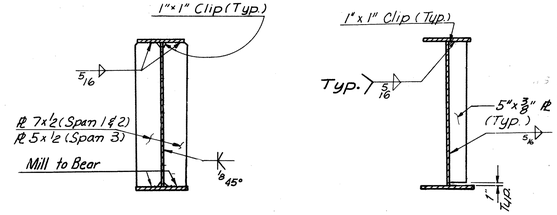
TYPICAL INTERMEDIATE DIAPHRAGM
½"=1'-0"



DETAIL "A"



SHEAR STUD DETAIL



BEARING STIFFENER
½"=1'-0"

INTERMEDIATE STIFFENER
½"=1'-0"

SHEAR STUD NOTE

Stud rows shall be placed parallel to the main deck reinforcing.
Shear stud spacing shown in maximum spacing.

NOTE TO CONTRACTOR

The above deflections 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 for by adjusting forms to vary the thickness of the concrete bolster between the bottom of the slab and the top of stringer, without alteration of the slab thickness.

NOTE TO FABRICATOR

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

Note:
For Gas and Water support details see Standard Sheet S11.

AS BUILT

	BY	DATE				
MADE	TCY	1-9-68				
CHECKED	ICH	2-21-68		As Built		
IN CHARGE	R. G. C.		NO.	REVISION	BY	DATE

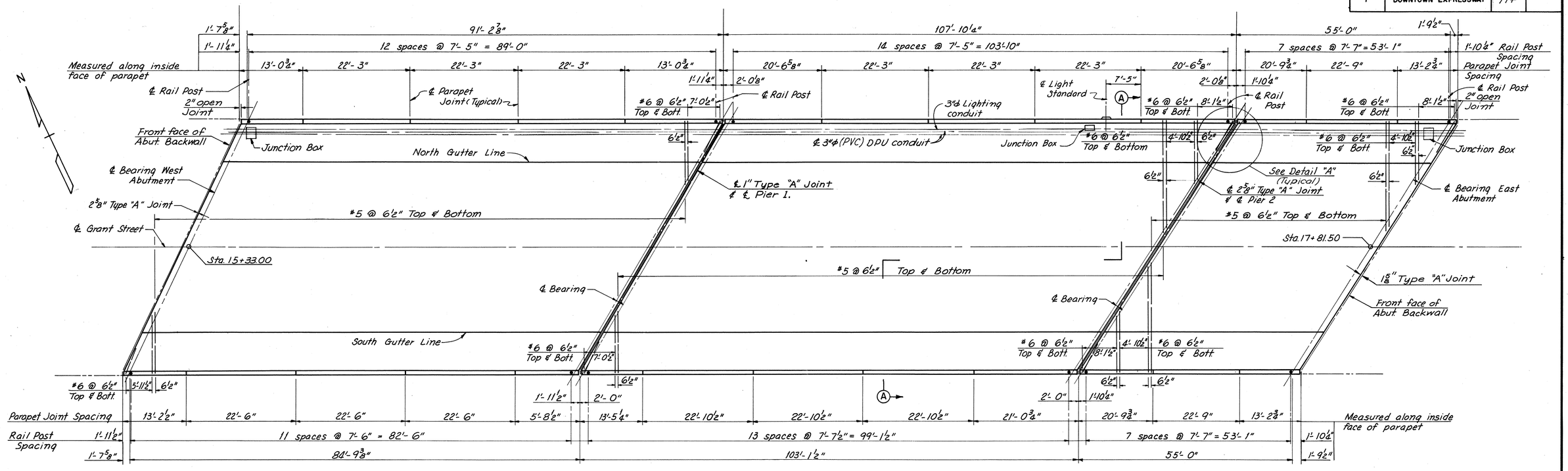
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 37
GRANT STREET OVER SOUTH CONNECTION DOWNTOWN EXPRESSWAY
FRAMING PLAN

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

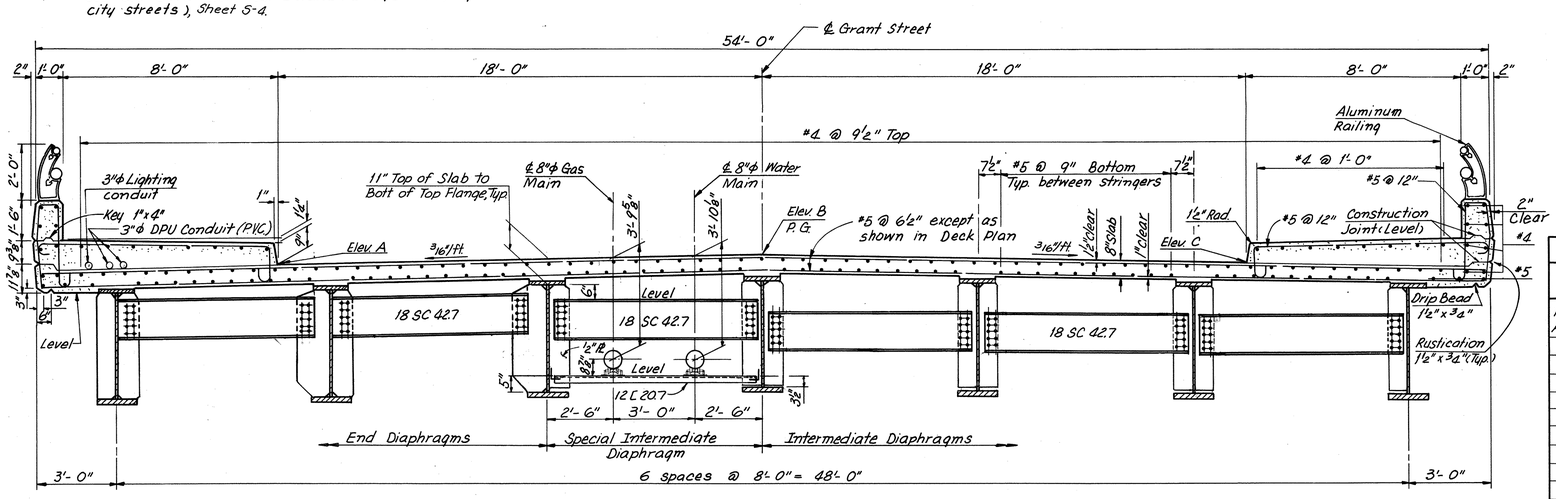
SCALE: As Shown
CONTRACT NO.: 7
SHEET NO. 8 OF 13

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
7	DOWNTOWN EXPRESSWAY	114	



DECK PLAN
No Scale

Note:
For Lighting details and D.P.U. conduit details see Standard Electrical Details (Bridge carrying city streets), Sheet S-4.

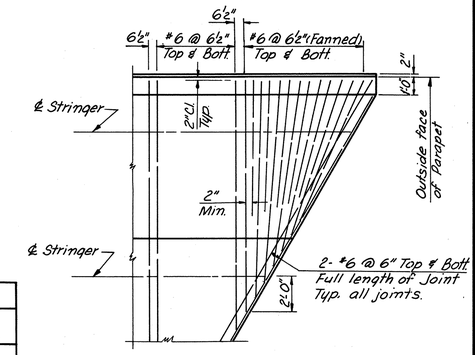


CROSS SECTION A-A
Scale: ⅜" = 1'-0"

3 Junction Boxes

2 each 2'-0" x 1'-11"
1 each 2'-0" x 1'-½"

ROADWAY ELEVATIONS			
LOCATION	ELEV. A	ELEV. B	ELEV. C
Front Face W. Abut Backwall	213.90	213.84	213.23
.25 Point	214.89	214.81	214.17
.50 Point	215.89	215.79	215.12
.75 Point	216.89	216.76	216.07
℄ Pier 1	217.89	217.73	217.02
.25 Point	219.06	218.88	218.15
.50 Point	220.22	220.03	219.27
.75 Point	221.38	221.17	220.40
℄ Pier 2	222.55	222.32	221.53
.25 Point	223.17	222.94	222.15
.50 Point	223.78	223.56	222.77
.75 Point	224.35	224.17	223.38
Front Face E. Abut Backwall	224.86	224.73	223.99



DETAIL "A"
Scale: ½" = 1'-0"

	BY	DATE				
MADE	TCY	11-21-67				
CHECKED	ICH	2-9-68	1	As Built	TEM	9-75
IN CHARGE	R.G.C.		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

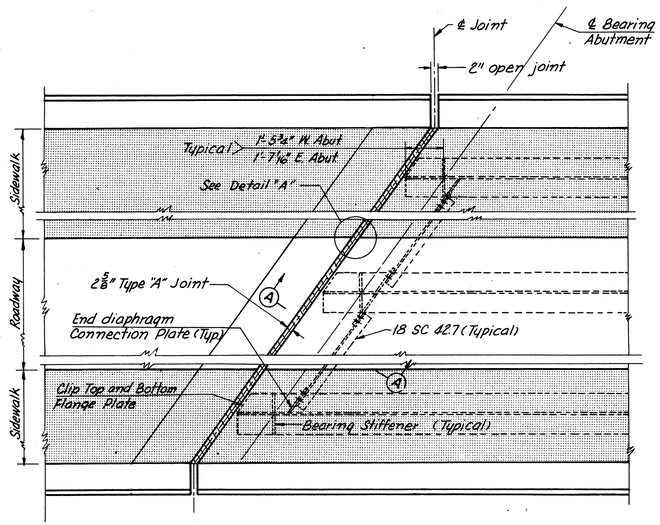
BRIDGE NO. 37
GRANT STREET OVER SOUTH CONNECTION DOWNTOWN EXPRESSWAY
DECK PLAN AND CROSS SECTION

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

SCALE: AS SHOWN
CONTRACT NO.: 7
SHEET NO. 9 OF 13

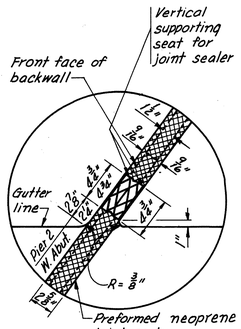
114

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
7	DOWNTOWN EXPRESSWAY	115	

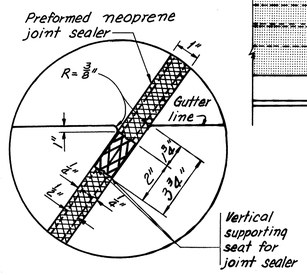


PLAN-JOINT AT WEST ABUTMENT
No Scale

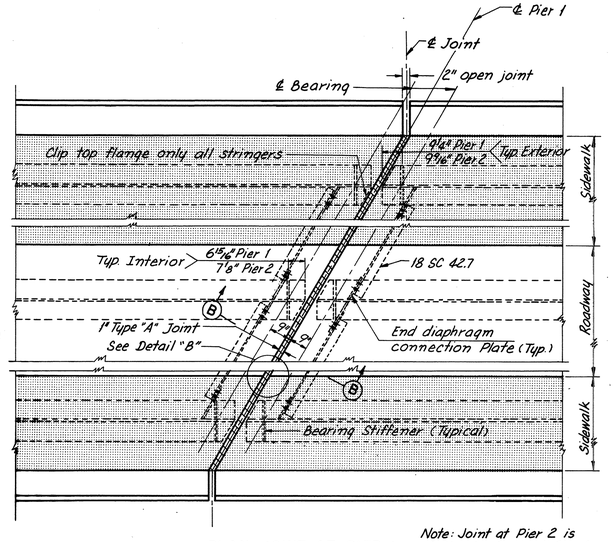
Note: Joint at East Abutment is similar to Joint at West Abutment except with 1⅝" Type "A" Joint. See Detail "C" and 1⅝" Type "A" Joint Detail.



DETAIL "A"
No Scale

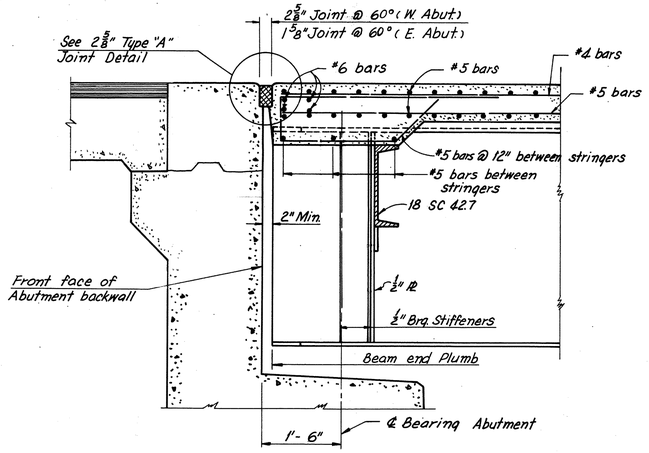


DETAIL "B"
No Scale

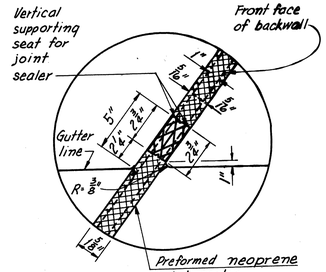


PLAN-JOINT AT PIER 1
No Scale

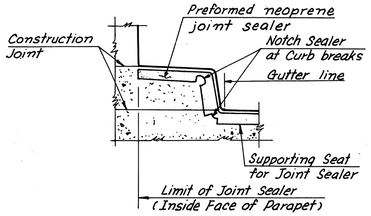
Note: Joint at Pier 2 is similar to Joint at Pier 1 except with 2⅝" Type "A" Joint.



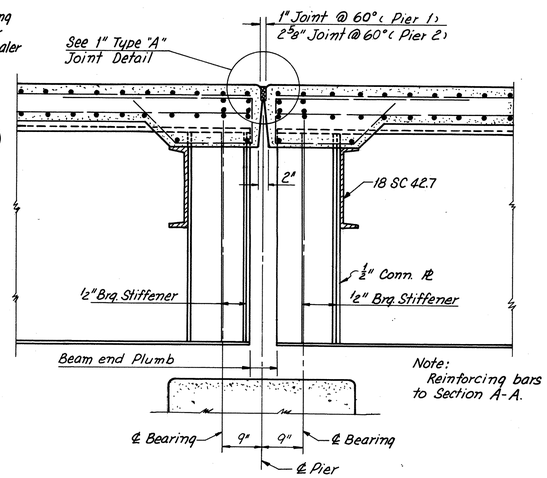
SECTION A-A
Scale: ¾" = 1'-0"



DETAIL "C"
EAST ABUTMENT
No Scale

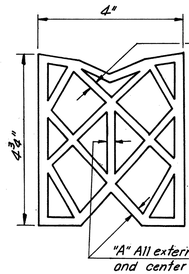


TREATMENT OF TYPE "A" JOINT AT CURB
No Scale

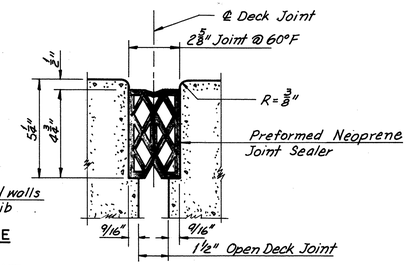


SECTION B-B
Scale: ¾" = 1'-0"

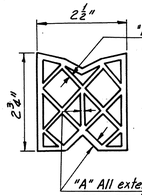
Note:
Reinforcing bars are similar to Section A-A.



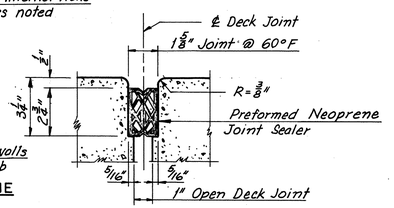
PREFORMED NEOPRENE JOINT SEALER FOR 2⅝" TYPE "A" JOINT
Scale: Half Size



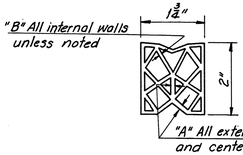
2⅝" TYPE "A" JOINT
Scale: 3" = 1'-0"



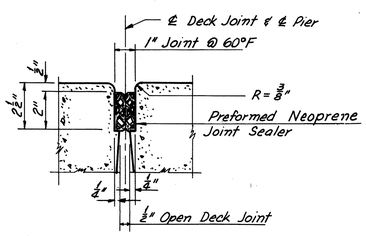
PREFORMED NEOPRENE JOINT SEALER FOR 1⅝" TYPE "A" JOINT
Scale: Half Size



1⅝" TYPE "A" JOINT
Scale: 3" = 1'-0"



PREFORMED NEOPRENE JOINT SEALER FOR 1" TYPE "A" JOINT
Scale: Half Size



1" TYPE "A" JOINT
Scale: 3" = 1'-0"

PREFORMED NEOPRENE JOINT SEALER TOLERANCES			
WIDTH	HEIGHT	THICKNESS A	THICKNESS B
1⅜" +7/16" -0"	2" ±⅛"	⅛" +1/32" -1/64"	3/32" +1/64" -1/32"
2½" +½" -0"	2¾" ±⅛"	3/16" +3/64" -1/64"	3/32" +1/32" -1/64"
4" +7/16" -0"	4¾" ±½"	½" +3/64" -1/32"	3/16" +2/64" -1/64"

NOTE TO CONTRACTOR:

It is absolutely essential that the openings for the preformed neoprene joint sealers be accurately formed and constructed to smooth, straight lines. The size of the opening shall be adjusted to allow for anticipated dead load rotation of the ends of the slab and for the temperature of the time of construction.

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TCY	2-20-68				
CHECKED	N.B.B.	2-21-68		As Built		
IN CHARGE	R.G.C.					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

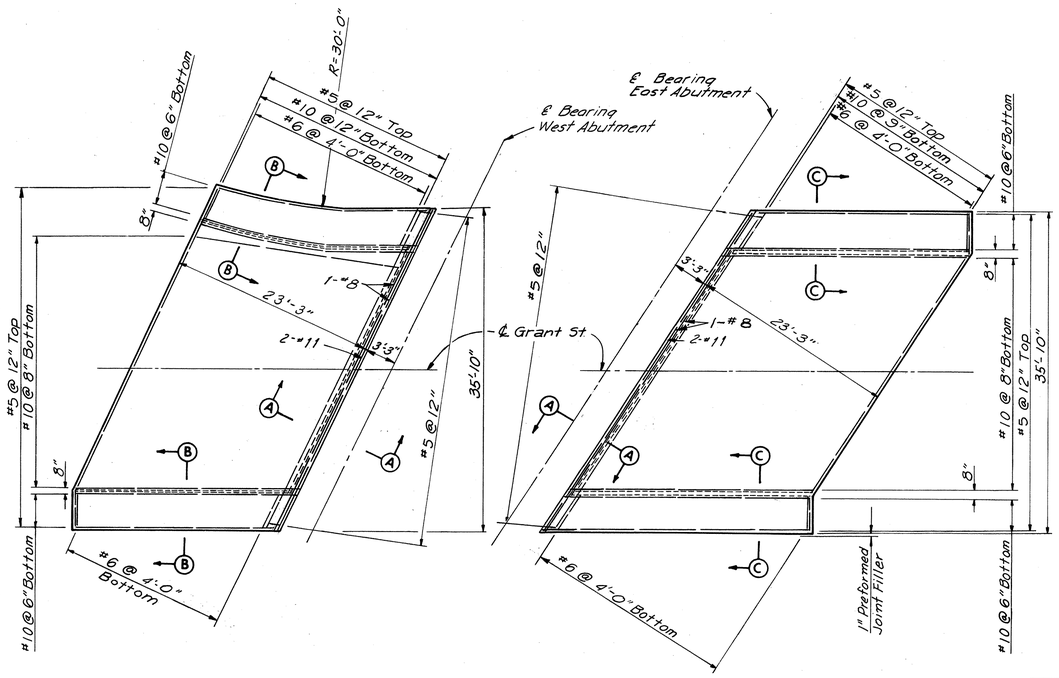
BRIDGE NO. 37
GRANT STREET OVER SOUTH CONNECTION DOWNTOWN EXPRESSWAY
JOINT DETAILS

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

SCALE: AS SHOWN
CONTRACT NO.: 7
SHEET NO. 10 OF 13

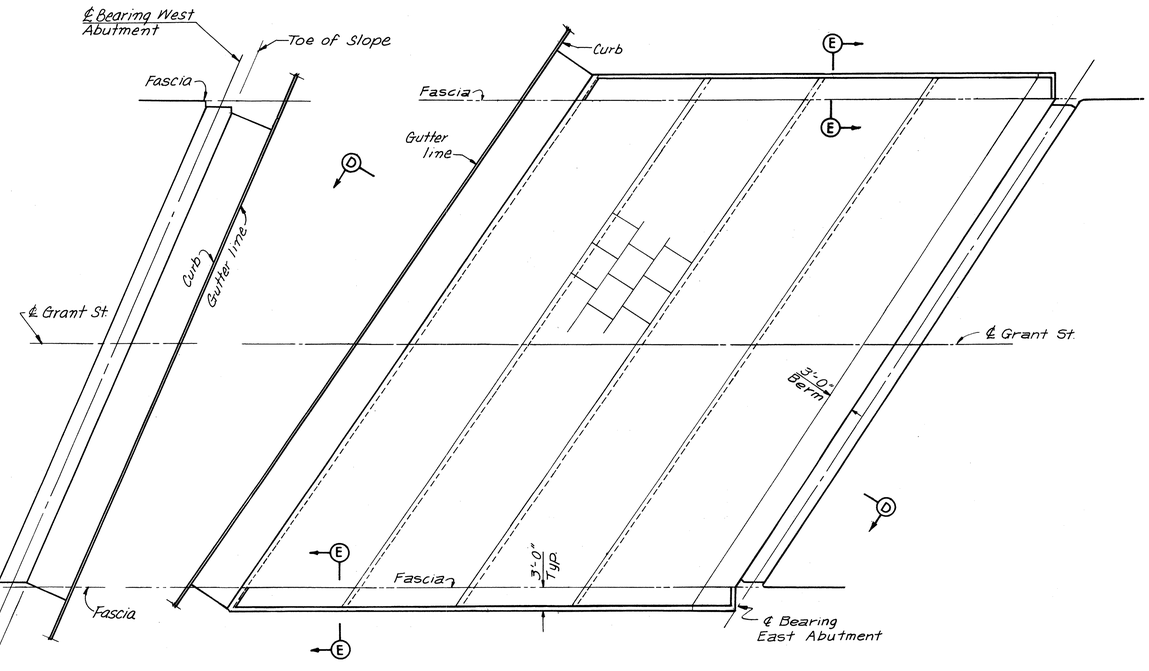
115

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
7	DOWNTOWN EXPRESSWAY	116	



WEST APPROACH SLAB
Scale: 1/8"=1'-0"

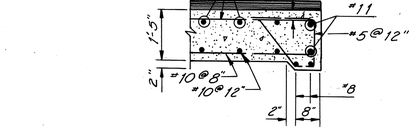
EAST APPROACH SLAB
Scale: 1/8"=1'-0"



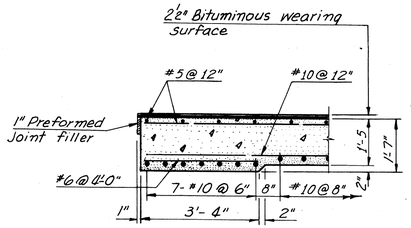
WEST END

EAST END

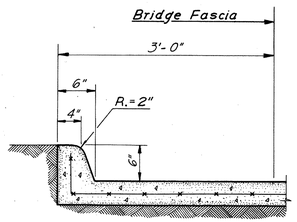
PLAN OF SLOPE PROTECTION
Scale: 1/8" = 1'-0"



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

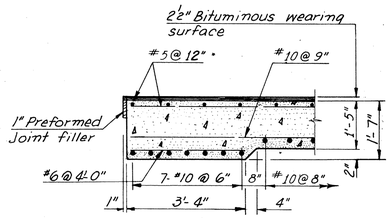


SECTION B-B
Scale: 1/2"=1'-0"

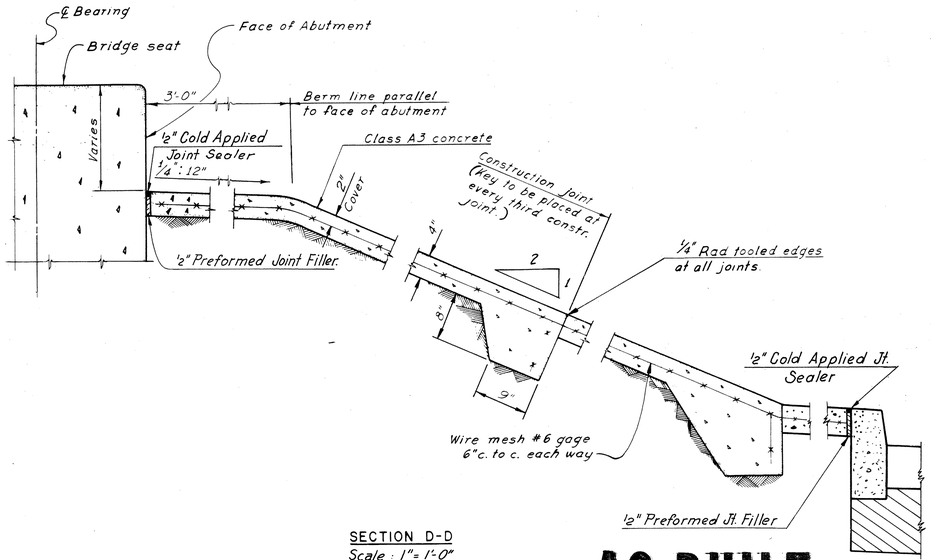


SECTION E-E
Scale: 1"=1'-0"

Note:
All reinforcing steel shall be 2" minimum clear from edge of bar to edge of concrete.



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



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

AS BUILT

SLOPE PROTECTION NOTE :

The item "Cast-in-place Concrete Slab Slope Protection" shall include the excavation of, or the placing and compaction of any embankment material necessary to bring the surface of the paved slopes to the finished elevations shown on the plans. "Cast-in-Place Concrete Slab Slope Protection" shall be paid for at the contract unit price per square yard, which price shall include the concrete slab including wire mesh and joint filler.

The slab shall be constructed in 4'-0" x 4'-0" panels, placed in horizontal courses, alternate panels being poured in a staggered pattern with adjacent panels poured later. The slab shall be Class A3 concrete of such consistency that it can be placed without the use of top forms. The surface shall be finished with a wood float.

Reinforcing shall consist of wire mesh No. 6 gage, 6" c.c. each way, placed at the center of the slab, and continuous through construction joints.

	BY	DATE				
MADE	JTC	11-18-67				
CHECKED	TCY	2-6-68	As Built			
IN CHARGE	R. G. C.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 37
GRANT STREET OVER SOUTH CONNECTION DOWNTOWN EXPRESSWAY
APPROACH SLAB AND SLOPE PROTECTION DETAILS

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

SCALE: As Shown
CONTRACT NO.: 7
SHEET NO. 11 OF 13

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
7	DOWNTOWN EXPRESSWAY	117	

BORING DS6-1

Elev.	Casing Blows/Ft	Spoon Blows Per 6"		Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
206.6						206.6	
	8	3	5	S-1	0'-2'		.3' TOPSOIL
	12	6	7				
	13						
	18						
201.6	11	9	12	S-2	4'-6'		
	13	16	18				
	19						
	14						
	16						
196.6	19	9	18	S-3	9'-11'		Brown m-f SAND, some Clayey Silt
▼	35	18	10				
	20						
	19						
	12						
191.6	10	2	3	S-4	14'-16'		
	9	3	5				
	9						
	8						
	7					187.6	
186.6	22	4	4	S-5	19'-21'		
	18	5	2				
	16						Brown CLAYEY SILT, some c-f Sand
	20						
	15					182.6	
181.6	10	8	6	S-6	24'-26'		
	18	9	10				
	37						
	27						
	20						
176.6	28	28	36	S-7	29'-31'		
	43	32	36				Brown c-f SAND, little m-f Gravel, little Clayey Silt
	25						
	14						
	24						
171.6	22	10	12	S-8	34'-36'		
	25	15	19				
	35						
	36						
	48					167.6	
166.6	OPEN	18	56	S-9	39'-		
		100			40.2'		Brown Decomposed GRANITE
	5 min			C-1	42.6'-	164.1	
	4 min				47.6'		(C-1: 30% Rec)
161.6	4 min						
	4 min						
	4 min						
	5 min			C-2	47.6'-		Gray Weathered GRANITE (C-2: 75% Rec)
	4 min				52.6'		
156.6	4 min						
	3 min						
	4 min					154.0	

Bottom of Hole, Elev. 154.0

BORING DS6-2

Elev.	Casing Blows/Ft	Spoon Blows Per 6"		Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
208.0						208.0	
	6	3	3	S-1	0'-1.5'		
	8	8					
	12						
	13						
203.0	18	8	10	S-2	4'-5.5'		Gray CLAYEY SILT, some f Sand
	15	13					
	14						
	14						
	13					199.0	
198.0	18	9	9	S-3	9'-10.5'		
	17	9					
	17						Brown-Gray CLAY & SILT, trace f Sand
	28						
	27					194.0	
193.0	15	7	5	S-4	14'-16'		
	8	3	2				
	12						
	11						
	10						Light Brown m-f SAND, some Silt
188.0	14	5	10	S-5	19'-21'		
	11	5	3				
	10						
	19					185.0	
	60						
183.0	12	35	9	S-6	24'-26'		
	15	9	17				
	31						
	39						Gray c-f SAND, and c-f Gravel, some Silt
	33						
178.0	30	54	50	S-7	29'-31'		
	21	29	7				
	23						
	24					175.0	
	24						
173.0	29	9	13	S-8	34'-36'		Brown CLAYEY SILT, little f Sand, trace Decomposed Granite
	63	21	60				
	426						
	195					170.0	
	600						
168.0	OPEN	100		S-9	39'-		Gray Decomposed GRANITE
					39.2'		
	3 min			C-1	42'-47'	166.0	(C-1: 90% Rec)
	4 min						Gray GRANITE
163.0	4 min						
	3 min						
	5 min						

Bottom of Hole, Elev. 161.0

BORING DS6-3

Elev.	Casing Blows/Ft	Spoon Blows Per 6"		Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
214.0						214.0	
	22	4	3	S-1	0'-2'		.5' TOPSOIL
	64	6	7				Red-Brown CLAYEY SILT, little m-f Sand
	56						
	59					210.5	
▼ 209.0	OPEN	P	P	2-U	4'-5.3'		Brown-Gray SILT & CLAY, trace f Sand
		P					
		11	15	S-3	7'- 9'	206.5	
		20	28				
204.0							Brown-Gray CLAYEY SILT, some m-f Sand
						201.0	
199.0		13	20	S-4	14'- 16'		Brown c-f SAND, and c-f Gravel, little Silt
		31	38				

Bottom of Hole, Elev. 198.0

BORING DS6-4

Elev.	Casing Blows/Ft	Spoon Blows Per 6"		Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
216.8						216.8	
	10	7	9	S-1	0'-2'		.3 TOPSOIL
	18	13	19				Gray-Brown CLAYEY SILT, little m-f Sand
	33					213.8	
	54						
211.8	15	9	12	S-2	4'-6'		
	12	15	21				
	16						
	20						Gray-Brown CLAY & SILT, trace f Sand
	30						
206.8	28	10	14	S-3	9'-11'		
	24	18	24				
	29						
	28					203.8	
	31						
201.8	37	6	7	S-4	14'-16'		
	29	7	10				
	57						
	54						
	34						
▼ 196.8	23	10	8	S-5	19'-21'		
	17	6	7				
	34						
	20						
	15						
191.8	20	7	3	S-6	24'-26'		Brown-Gray c-f SAND, little Clayey Silt, trace m-f Gravel
	14	3	3				
	13	6	3	S-7	26'-28'		
	20	3	2				
	21						
186.8	17	11	4	S-8	29'-31'		
	12	6	9				
	12						
	12						
	12						
181.8	11	2	4	S-9	34'-36'		
	7	14	8				
	17						
	120						
	108					177.8	
176.8	24	9	10	S-10	39'-41'		
	31	16	21				
	32						Brown c-f SAND, trace m-f Gravel, trace Decomposed Granite
	50						
	100						
171.8	75	47	56	S-11	44'-		
	600	105			45.5'	171.4	
	OPEN						Brown Decomposed GRANITE
166.8		100		S-12	49'-		
					49.2'	165.8	
	4 min			C-1	51'-56'		(C-1: 80% Rec)
	3 min						Brown Weathered GRANITE
	3 min						
161.8	4 min						

Bottom of Hole, Elev. 161.6

Notes:

(1) The first elevation noted is the existing ground surface.
(2) ▼ denotes the ground water level as measured.
(3) (a) Casing Blows are the blows per foot for a 300 pound hammer falling 24 inches except where noted otherwise.
(b) Also noted in Casing Blows column (where applicable) are rock drilling times in minutes per foot.
(4) (a) Spoon Blows are the blows per 6 inches for a 2" OD, 1⅜" ID Split Spoon Sampler using a 140 pound hammer falling 30 inches.
(b) W denotes penetration under weight of hammer.
(c) P denotes penetration by hydraulic pressure.
(5) (a) Samples designated by an "S" number indicate Split Spoon Samples.
(b) Samples designated by a "U" number indicate Undisturbed Shelby Tube Samples (3⅛" Ø).
(c) Samples designated by a "C" number indicate 1⅞" Ø (AX) Rock Cores.
(6) Sample descriptions are based on field visual identification by the boring inspector.
(7) Abbreviation and quantitative terms:

c-coarse	trace	1-10 %
m-medium	little	10-20 %
f-fine	some	20-35 %
	and	35-50 %

(8) For location of boring holes, see General Plan and Elevation.

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TCY	1-12-68				
CHECKED	NB²	2-28-68		As Built		
IN CHARGE	RGC					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 37
GRANT STREET OVER SOUTH
CONNECTION DOWNTOWN EXPRESSWAY
BORING LOGS

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

SCALE 1"=6' Vert.
CONTRACT NO. 7
SHEET NO. 12 OF 13

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
7	DOWNTOWN EXPRESSWAY	118	

BORING DS6-5

Elev.	Casing Blows/Ft	Spoon Blows Per 6"	Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
222.4	9	7 10	S-1	0'-2'	222.4	.3' TOPSOIL
	6	6 4				
	6					
	4					
217.4	2	2 1	S-2	4'-6'		
	3	1 4				Brown-Red CLAYEY SILT, some m-f Sand
	13					
	24					
	30					
212.4	31	10 18	S-3	9'-11'		
	42	19 19				
	33				210.0	
	33					
	38					
207.4	32	9 16	S-4	14'-16'		Gray-Brown CLAY & SILT, some m-f Sand
	29	19 22				
	29				204.8	
	36					
	50					
202.4	25	16 21	S-5	19'-21'		
	31	21 15				
	31					
	32					
	26					
197.4 ▼	19	10 7	S-6	24'-26'		Brown c-f SAND, little Clayey Silt, trace m-f Gravel
	24	13 8				
	27					
	36					
	65					
192.4	20	4 4	S-7	29'-31'		
	18	5 6				
	21					
	23				189.4	
	26					
187.4	29	13 22	S-8	34'-36'		
	46	16 14				
	36					
	34					
	21					
182.4	24	20 16	S-9	39'-41'		Light Brown c-f GRAVEL, and c-f Sand
	47	21 21				
	36					
	38					
	51					
177.4	23	18 18	S-10	44'-46'		
	35	17 27			176.4	
	71					
	51					
	29					Gray Decomposed GRANITE
172.4	39	15 44	S-11	49'-		
	OPEN	100		50.2'	171.4	
	5 min		C-1	51'-56'		(C-1: 50% Rec)
	3 min					
	4 min					
167.4	3 min					
	3 min					
	6 min		C-2	56'-61'		Gray Weathered GRANITE (C-2: 95% Rec)
	3 min					
	3 min					
162.4	3 min					
	5 min					
						Bottom of Hole, Elev. 161.2

BORING DS6-6

Elev.	Casing Blows/Ft	Spoon Blows Per 6"	Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
222.8	12	6 9	S-1	0'-1.5'	222.8	.3' TOPSOIL
	14	9				
	14					
	14					
217.8	9	7 7	S-2	4'-6'		
	9	10 11				
	15					
	19					
	23					
212.8	17	8 14	S-3	9'-11'		
	23	20 21				Gray-Brown CLAYEY SILT, little m-f Sand
	27					
	26					
	28					
207.8	24	7 15	S-4	14'-16'		
	26	19 22				
	31					
	38					
	36					
202.8	41	9 27	S-5	19'-21'		
	31	40 34				
	34					
▼	30					
	22				198.8	
197.8	18	4 4	S-6	24'-26'		
	16	8 9				Gray-Brown c-f SAND, and c-f Gravel, trace Clayey Silt
	19					
	29				194.8	
	22					
192.8	15	5 8	S-7	29'-31'		
	18	18 15				
	23					
	20					
	18					
187.8	19	2 3	S-8	34'-36'		
	17	3 5				
	21					Gray c-f SAND, little c-f Gravel, little Silt
	14					
	22					
182.8	13	3 2	S-9	39'-41'		
	11	1 3				
	10					
	10					
	9					
177.8	21	22 20	S-10	44'-46'		
	25	8 9				
	19					
	26					
	39					
172.8	27	23 17	S-11	49'-51'		
	39	19 28				
	51				170.8	
	163					
	253					Gray Decomposed GRANITE
167.8	290	68 79	S-12	54'-		
	100			55.25'	166.8	
	3 min		C-1	56'-61'		
	5 min					Gray GRANITE
	5 min					
162.8	4 min					
	4 min					
						Bottom of Hole, Elev. 161.8

BORING DS6-7

Elev.	Casing Blows/Ft	Spoon Blows Per 6"	Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
224.0	5	6 4	S-1	0'-2'	224.0	.3' TOPSOIL
	7	4 5				
	4					
	6					
219.0	4	4 2	S-2	4'-6'		
	5	2 3				
	8					
	12					Brown CLAYEY SILT, little m-f Sand
	15					
214.0	20	8 14	S-3	9'-11'		
	23	12 18				
	33					
	30					
	31				210.0	
209.0	28	10 16	S-4	14'-16'		
	27	25 29				
	32					Brown CLAY & SILT, little m-f Sand
	32					
	32				204.7	
204.0	29	13 17	S-5	19'-21'		
	33	24 29				
	30					
	34					
	30					
199.0 ▼	16	11 4	S-6	24'-26'		
	10	4 8				
	18					
	78					
	40					
194.0	32	10 19	S-7	29'-31'		Brown c-f SAND, some c-f Gravel, little Clayey Silt
	43	18 9				
	29					
	25					
	22					
189.0	19	3 7	S-8	34'-36'		
	20	8 8				
	21					
	18					
	15				185.0	
184.0	21	3 7	S-9	39'-41½'		
	29	11 14				
	32					
	175					Brown c-f SAND, some c-f Gravel, little Silt
	149					
179.0	201	5 5	S-10	44'-46'		
	25	10 20				
	39				177.0	
	44					
	46					
174.0	43	6 12	S-11	49'-51'		Brown Decomposed GRANITE
	49	20 44				
	105				172.0	
	3 min		C-1	52.5'-57.5'		(C-1: 80% Rec.)
169.0	3 min					
	4 min					Gray GRANITE
	4 min					
						Bottom of Hole, Elev. 166.5'

Notes:

(1) The first elevation noted is the existing ground surface.
(2) ▼ denotes the ground water level as measured.
(3) (a) Casing Blows are the blows per foot for a 300 pound hammer falling 24 inches except where noted otherwise.
(b) Also noted in Casing Blows column (where applicable) are rock drilling times in minutes per foot.
(4) (a) Spoon Blows are the blows per 6 inches for a 2" OD, 1⅜" ID Split Spoon Sampler using a 140 pound hammer falling 30 inches.
(b) W denotes penetration under weight of hammer.
(c) P denotes penetration by hydraulic pressure.
(5) (a) Samples designated by an "S" number indicate Split Spoon Samples.
(b) Samples designated by a "U" number indicate Undisturbed Shelby Tube Samples (3⅜" ϕ).
(c) Samples designated by a "C" number indicate 1⅛" ϕ (AX) Rock Cores.
(6) Sample descriptions are based on field visual identification by the boring inspector.
(7) Abbreviation and quantitative terms:

c-coarse	trace	1-10 %
m-medium	little	10-20 %
f-fine	some	20-35 %
	and	35-50 %

(8) For location of boring holes, see General Plan and Elevation.

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TCY	1-12-68				
CHECKED	NB²	2-7-68		As Built		
IN CHARGE	RGC					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

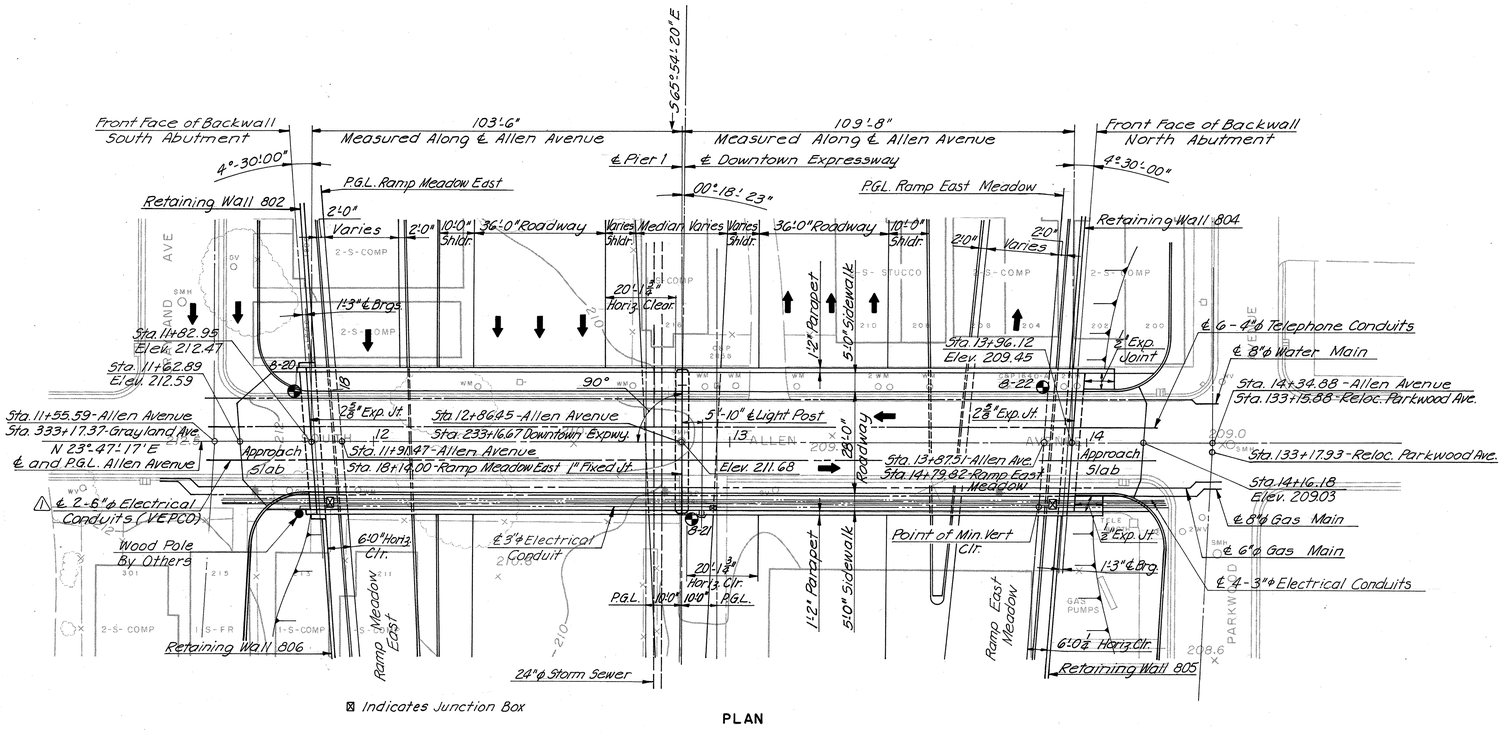
BRIDGE NO. 37
GRANT STREET OVER SOUTH
CONNECTION DOWNTOWN EXPRESSWAY
BORING LOGS

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

SCALE 1"=6' Vert
CONTRACT NO. 7
SHEET NO. 13 OF 13

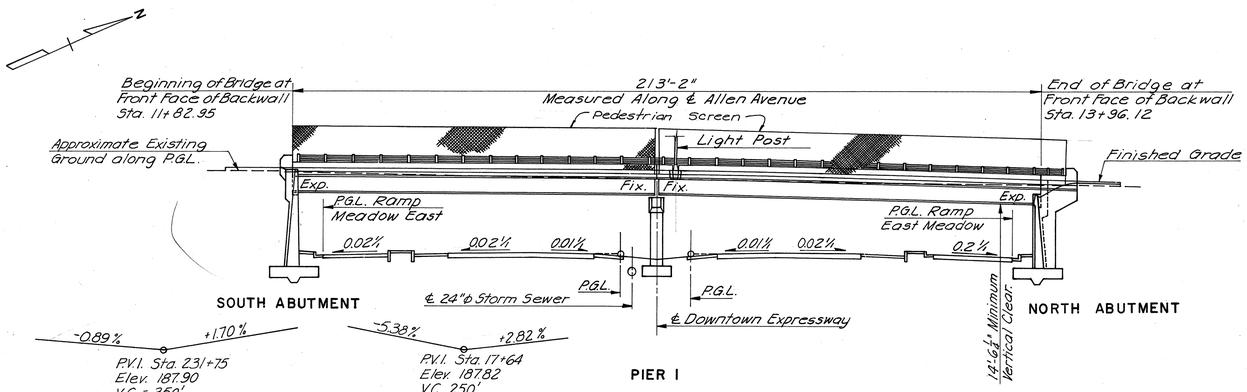
118

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



⊠ Indicates Junction Box

PLAN



	BY	DATE				
MADE	W.D.U.	8-67		AS BUILT	HMH	
CHECKED	W.E.O.	10-67	⚠	Rev. No. 8 Quantity Vepco Conduits	DGT	11-1274
IN CHARGE	W.E.O.		NO.	REVISION	BY	DATE

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 - HS 20-44 loading and B.P.R. modified for military vehicles.

SPECIFICATIONS:
GENERAL - Virginia Department of Highway Road and Bridge Specifications 1970
DESIGN - AASHO 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 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 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. 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 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. 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: C-28. Monument located in walk S.W. Corner Idlewood and South Allen. Elev. 217.02.

INDEX

No.	DESCRIPTION
1	General Plan and Elevation
2	South Abutment
3/4	North Abutment
5	Pier Details
6	Framing Plan
7	Cross Section & Utility Details
8	Deck Plan & Joint Details
9	Approach Slabs
10	Boring Logs
S1	Standard Shoe Details
S3	Standard Aluminum Railing Details
S4	Standard Electrical Details
S5/S8	Standard Architectural Details
S10	Standard Elect. and Tele. Cond. Details
S11	Standard Utility Support Details @ Abutment

NOTES:
Top of Pavement Elevations at ends of Deck along P.G.L. are given on Plan, remaining Pavement Elevations are given on Sheet 8.
◓ Indicates 2½"ϕ Cased Hole Boring.

ESTIMATED QUANTITIES

	STRUCTURE EXCAVATION C.Y.	CONCRETE CLASS A4 C.Y.	CONCRETE CLASS A3 C.Y.	REINFORCING STEEL LBS.	STRUCTURAL STEEL - A36 LBS.	ALUMINUM BRIDGE RAILING L.F.	PEDESTRIAN SCREEN L.F.	ASPHALT DAMP-PROOFING S.Y.	6 INCH PIPE UNDERDRAIN L.S.	POROUS BACKFILL C.Y.	GAS MAIN 8" ϕ L.F.	GAS MAIN 6" ϕ L.F.	WATER MAIN 8" ϕ L.F.	CONDUIT 6" ϕ VEPCO L.F.	CONDUIT 4" ϕ TELEPHONE L.F.	3" ϕ PVC CONDUIT L.F.	2" ϕ METAL CONDUIT L.F.	STONE BEDDING TON
Superstructure		339.7		68,968	350,433	431	441				262	259	254	514	1278	1275	4	
South Abutment	165		195.4	13,503				117	48	68								
Pier 1	84		64.2	15,928														7.92
North Abutment	168		191.9	14,323				113	36	61								21.98
Approach Slabs			65.6	14,887														
Total	417	339.7	517.1	127,609	350,433	431	441	230	84	129	262	259	254	514	1278	1275	4	29.90

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 46
ALLEN AVENUE OVER
DOWNTOWN EXPRESSWAY

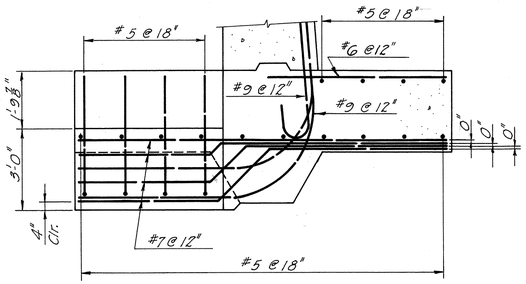
GENERAL PLAN AND ELEVATION

AMERICAN ENGINEERS
Richmond, Virginia

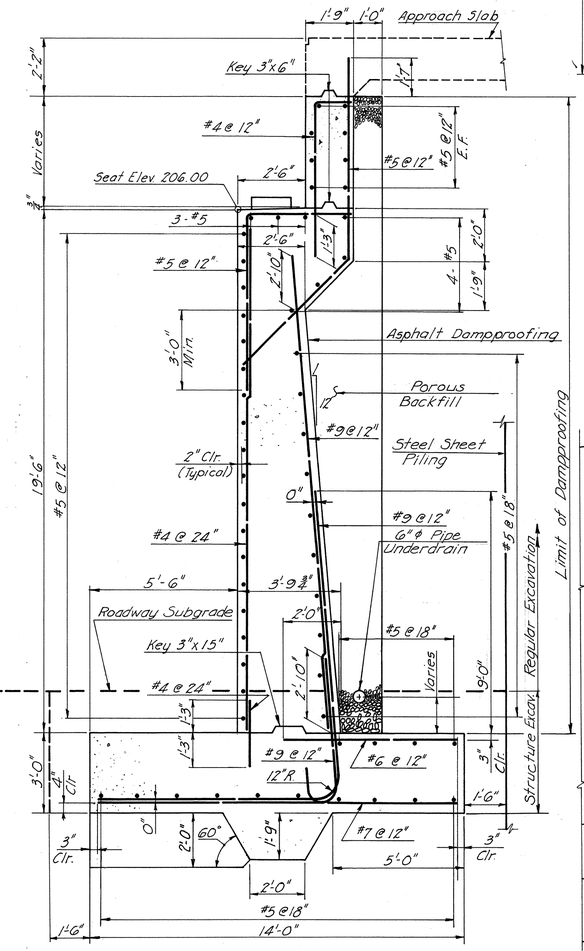
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: 1" = 20'
CONTRACT NO.: 8
SHEET NO. 1 OF 10

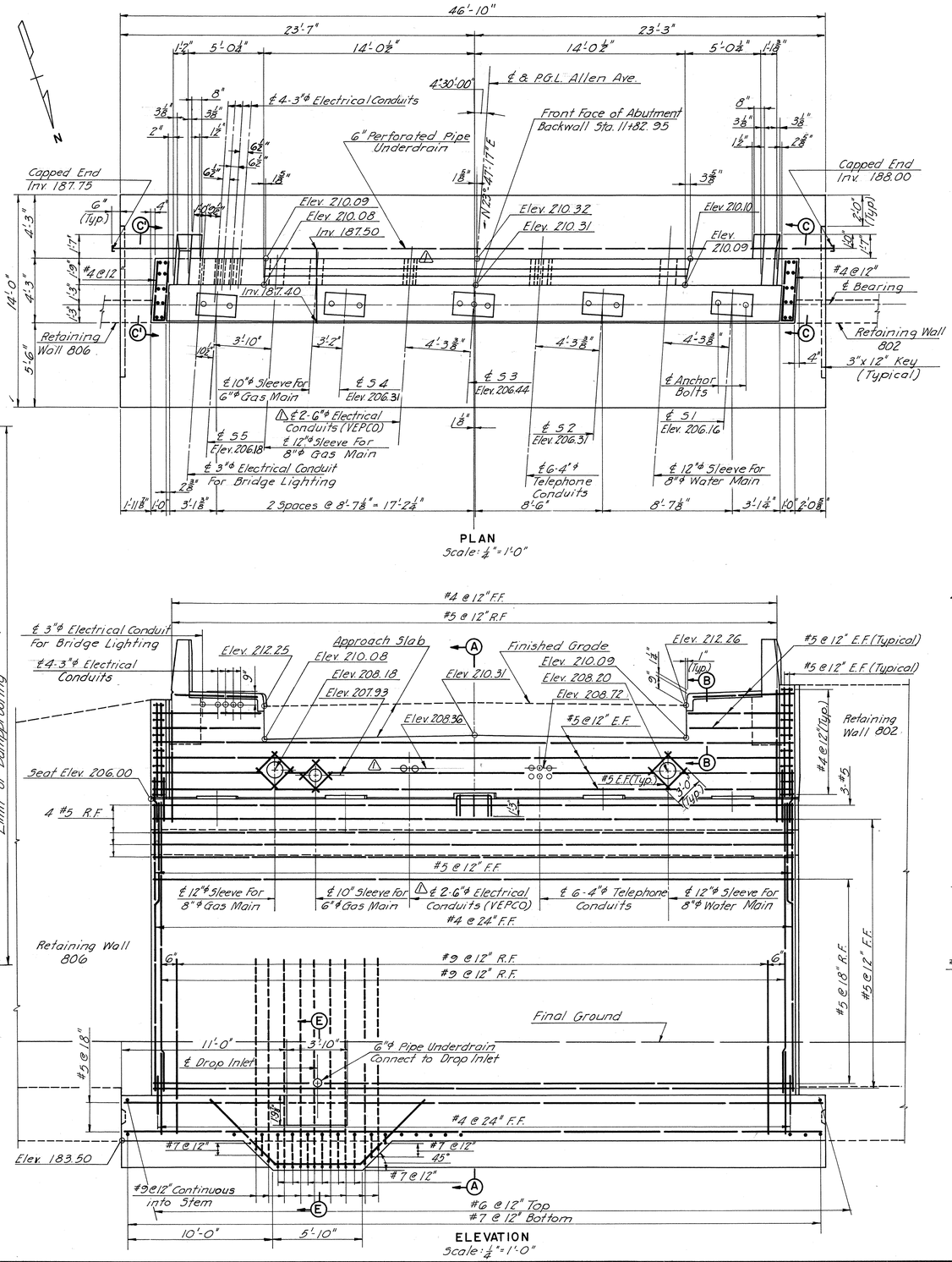
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	175	



SECTION E-E
Scale: ⅜"=1'-0"

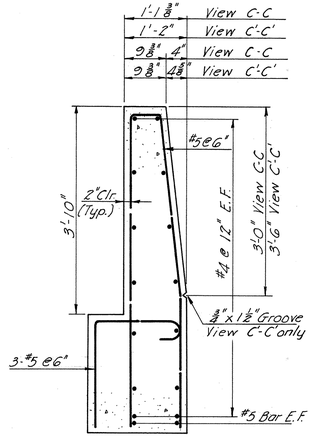


SECTION A-A
Scale: ⅜"=1'-0"

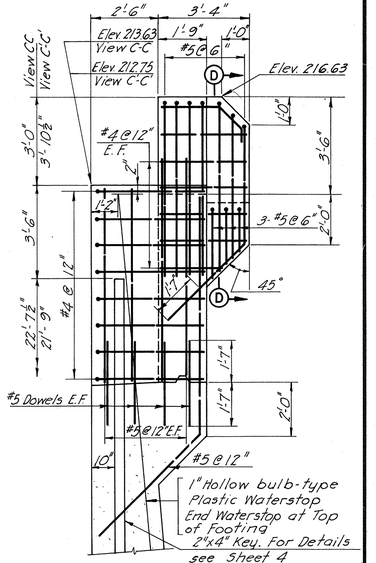


PLAN
Scale: ¼"=1'-0"

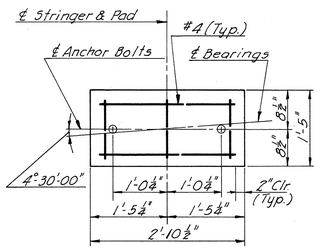
ELEVATION
Scale: ¼"=1'-0"



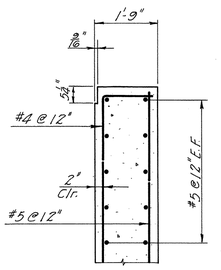
SECTION D-D
Scale: ¾"=1'-0"



VIEW C-C
View C'-C' Similar
Scale: ¾"=1'-0"



TYPICAL PAD DETAIL
Scale: ¾"=1'-0"
(Reinforcement Required at Pod 53 only)



SECTION B-B
Scale: ½"=1'-0"

NOTES:
For Framing Plan, see Sheet 6.
For Joint Details, see Sheet 8.
For Bearing Details, see Sheet 51.
For Approach Slab Details, see Sheet 9.
For General Notes, see Sheet 1.
For Architectural Treatment Details, see Sheet 97 & 99.
For Sections Showing Utility Details, see Sheet 7.
For Electrical Details, see Sheet S4.
F.F. Denotes Front Face.
R.F. Denotes Rear Face.
E.F. Denotes Each Face.
All Bar Spacings shown are Maximum.

FOUNDATION NOTES:
North and South Abutment Foundations are designed for an allowable bearing pressure of 3 tons per sq. ft.
Footings shall be founded at the elevation shown on the Plans unless otherwise directed by the Engineer due to conditions at the site during construction. In such cases the Engineer will determine the extent of redesign necessary and will advise the Contractor before construction begins.

AS BUILT

	BY	DATE				
MADE	C.F.S.	9-67				
CHECKED	W.E.O.	10-67	⚠	Rev. No. VEPCO Conduits	DGT	11-12-74
IN CHARGE	W. E. O.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 46
ALLEN AVENUE OVER
DOWNTOWN EXPRESSWAY

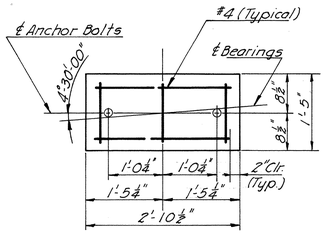
SOUTH ABUTMENT

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

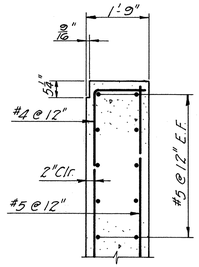
SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 2 OF 10

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	176	

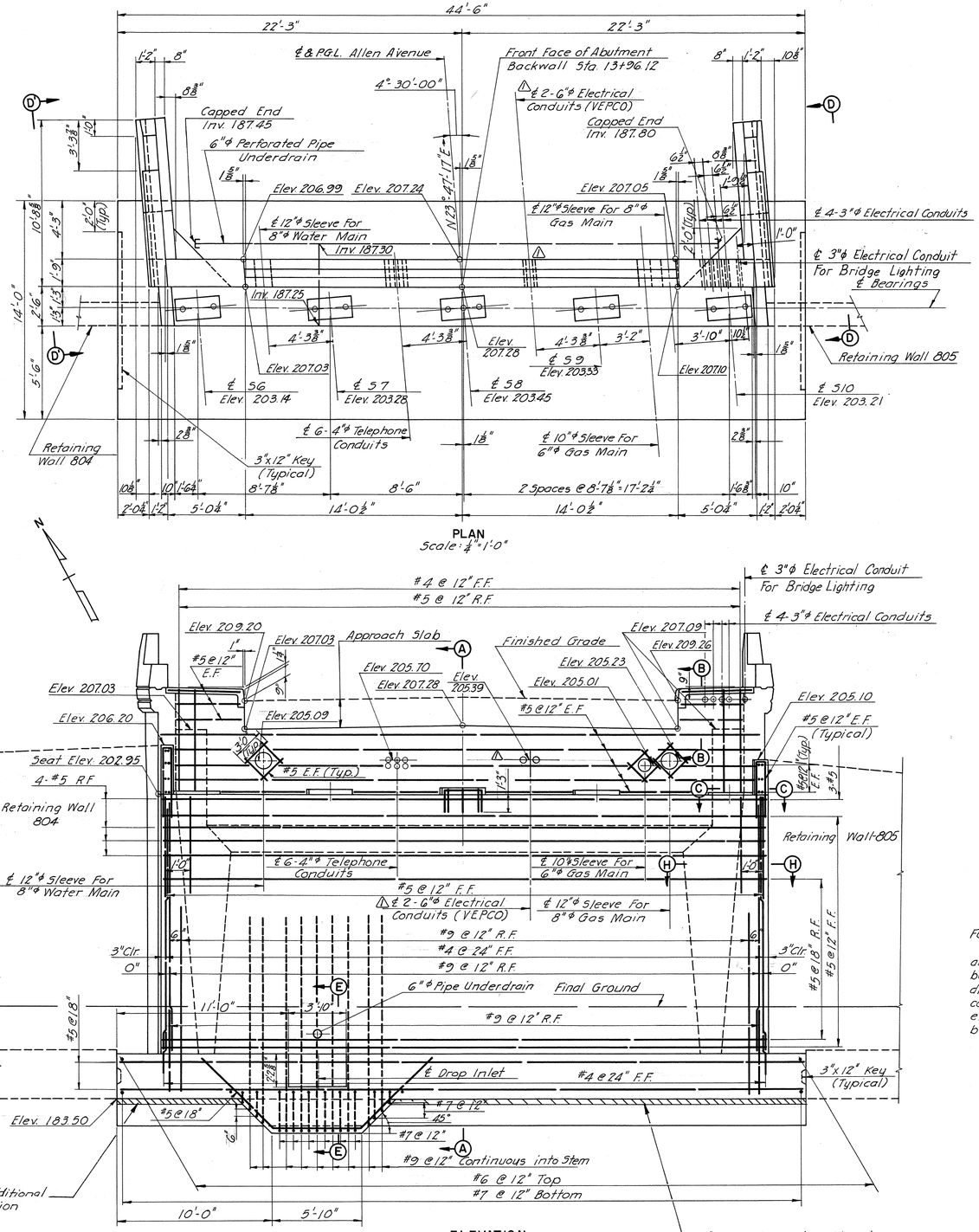


TYPICAL PAD DETAIL
Scale: ¾"=1'-0"

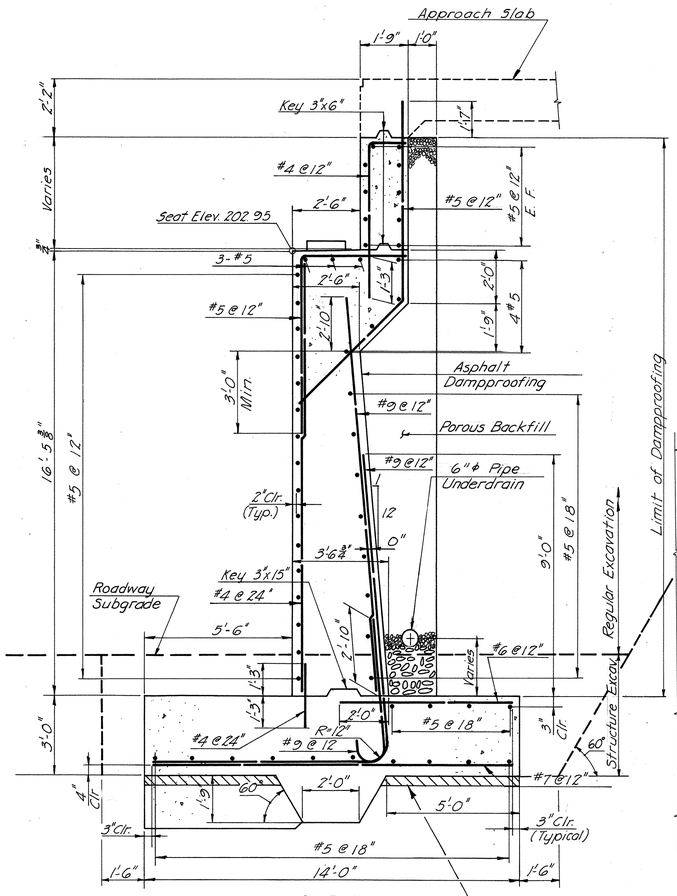
(Reinforcement Required at Pad 58 only)



SECTION B-B
Scale: ½"=1'-0"

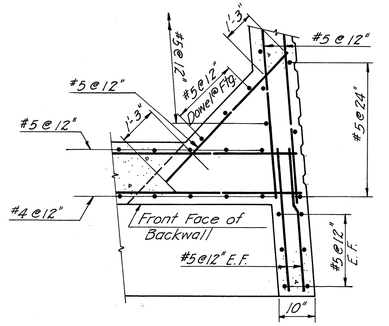


PLAN
Scale: ¼"=1'-0"

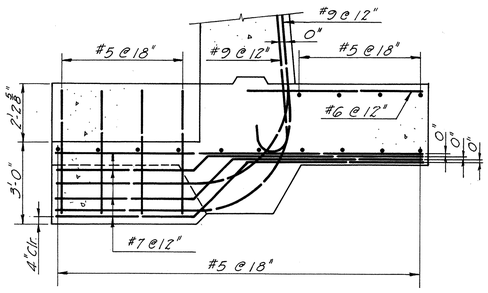


SECTION A-A
Scale: ¾"=1'-0"

ELEVATION
Scale: ¼"=1'-0"



SECTION C-C
Scale: ½"=1'-0"



SECTION E-E
Scale: ¾"=1'-0"

NOTES:
- For Section H-H, see Sheet 4.
- For Views D-D & D'-D', see Sheet 4.
- For Framing Plan, see Sheet 6.
- For Joint Details, see Sheet 8.
- For Bearing Details, see Sheet 31.
- For Approach Slab Details, see Sheet 9.
- For General Notes, see Sheet 1.
- For Architectural Treatment, see Sheet 57 to 59.
- For Sections Showing Utility Details, see Sheet 7.
- For Electrical Details, see Sheet 54.
- F.F. Denotes Front Face.
- R.F. Denotes Rear Face.
- E.F. Denotes Each Face.
- All Bar spacings shown are maximum.

FOUNDATION NOTES:

North and South Abutment Foundations are designed for an allowable bearing pressure of 3 tons per sq. ft. Footings shall be founded at the elevation shown on Plans unless otherwise directed by the Engineer due to conditions at the site during construction. In such cases the Engineer will determine the extent of redesign necessary and will advise the Contractor before construction begins.

AS BUILT

	BY	DATE				
MADE	CFS	9-67		AS BUILT	HMW	
CHECKED	WEO	10-67	1	Rev. No. VEPCO Conduits	DGT	11-12-74
IN CHARGE	WEO		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 46
ALLEN AVENUE OVER
DOWNTOWN EXPRESSWAY

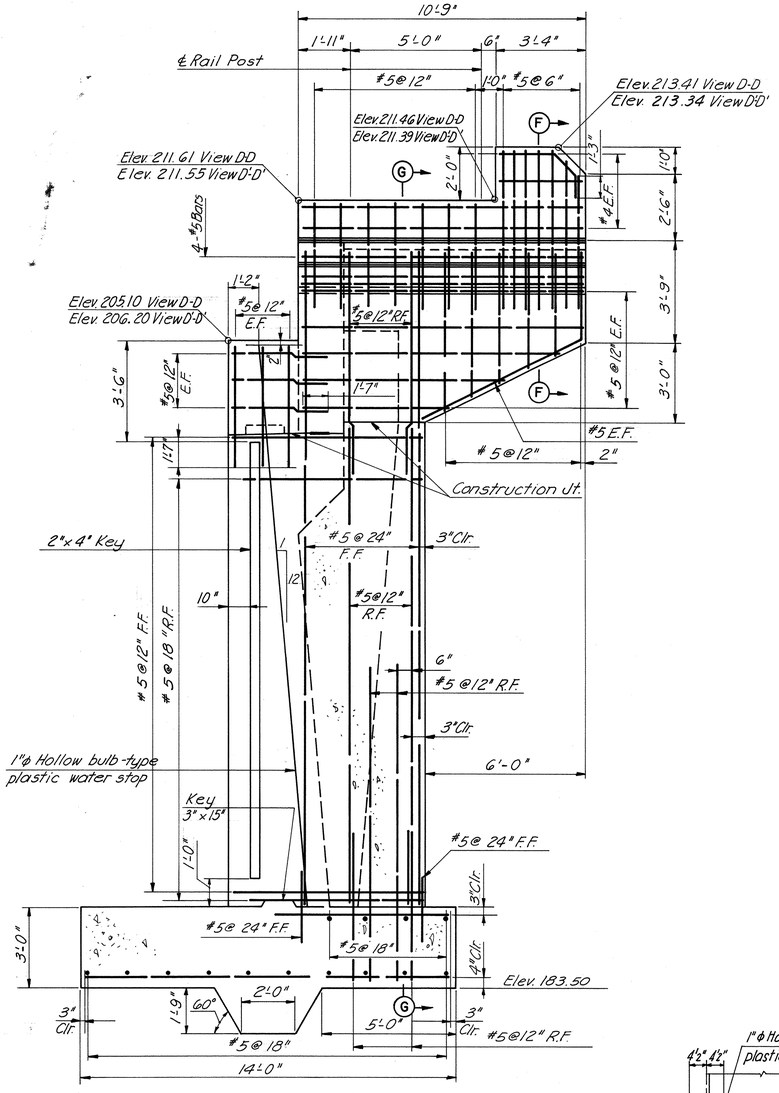
NORTH ABUTMENT

AMERICAN ENGINEERS
Richmond, Virginia

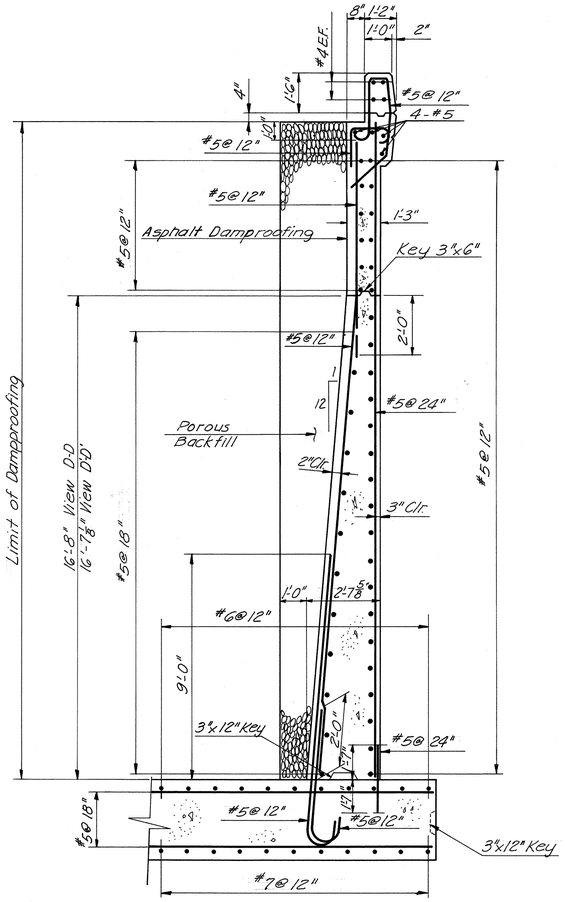
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 3 OF 10

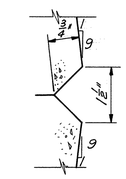
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	177	



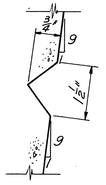
VIEW D-D SHOWN, VIEW D'-D' SIMLIAR
Scale: 3/8"=1'-0"



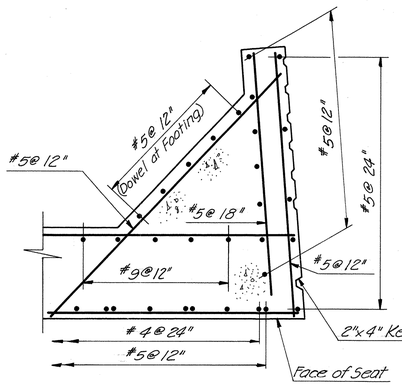
SECTION G-G
Scale: 3/8"=1'-0"



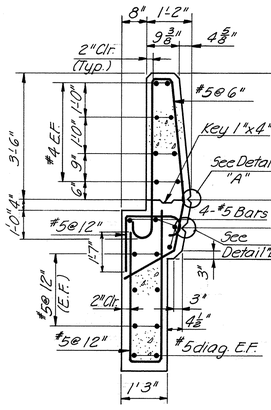
DETAIL "A"
Half Size



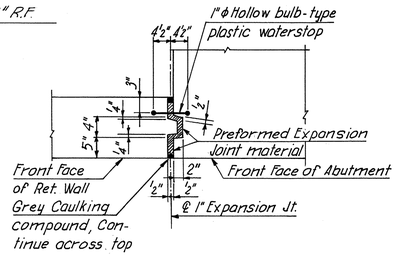
DETAIL "B"
Half Size



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



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



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

	BY	DATE	NO.	REVISION	BY	DATE
MADE	C.F.S.	9-67				
CHECKED	W.E.O.	10-67				
IN CHARGE	W.E.O.					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 46
ALLEN AVENUE OVER
DOWNTOWN EXPRESSWAY

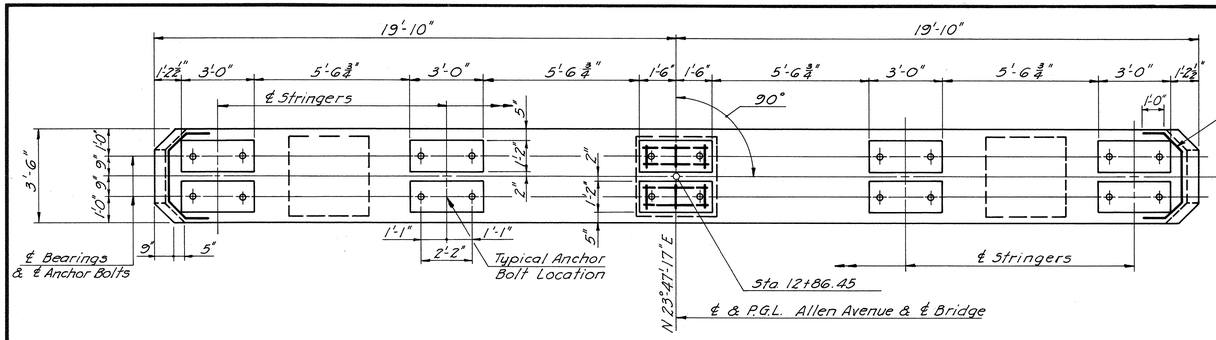
NORTH ABUTMENT

AMERICAN ENGINEERS
Richmond, Virginia

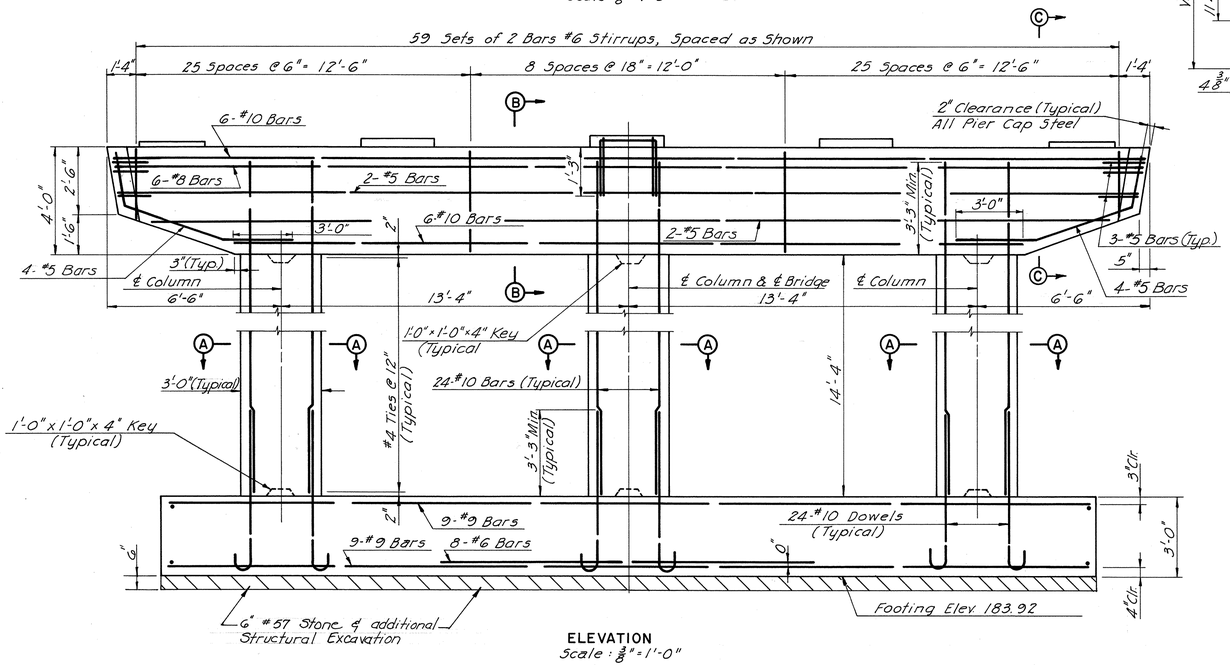
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 4 OF 10

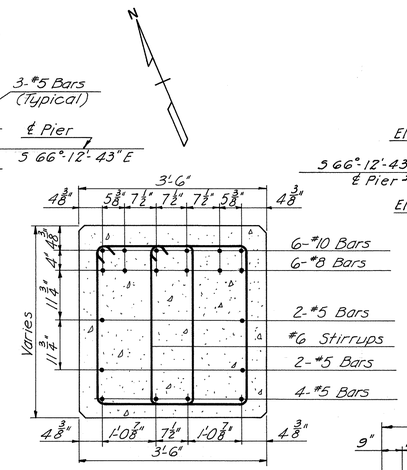
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	178	



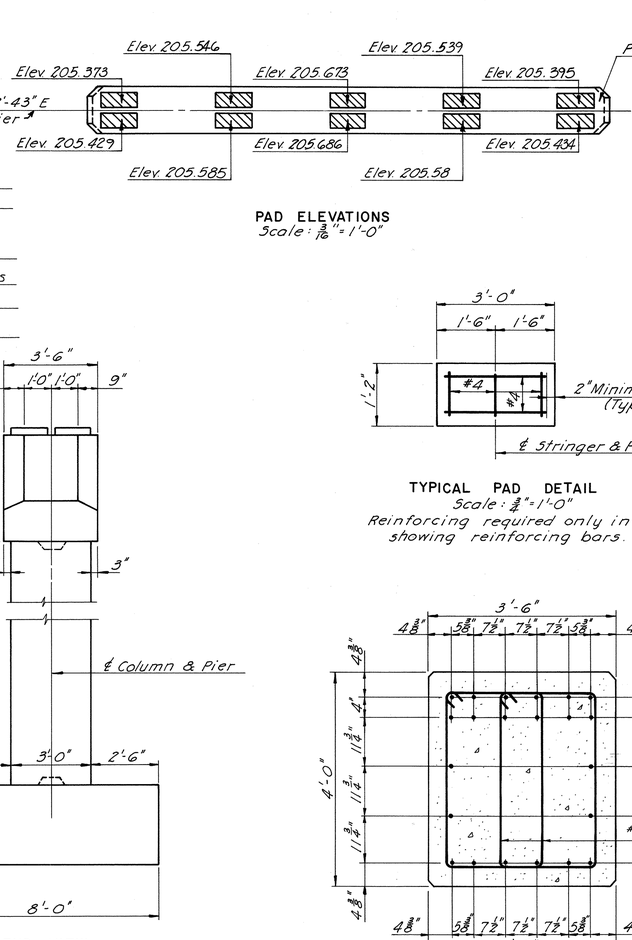
PLAN
Scale: $\frac{3}{8}$"=1'-0"



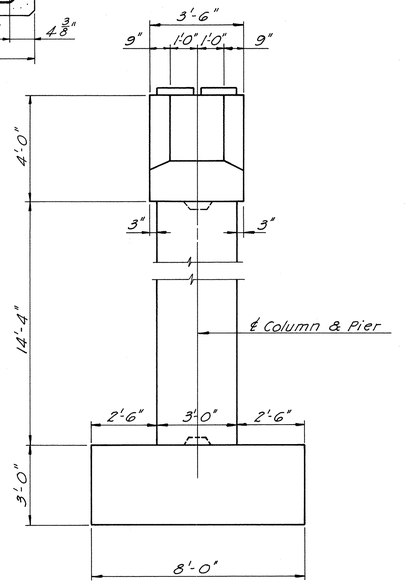
ELEVATION
Scale: $\frac{3}{8}$"=1'-0"



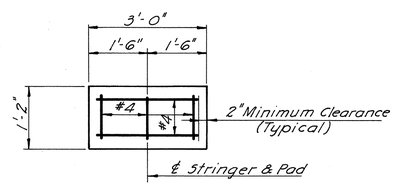
SECTION C-C
Scale: $\frac{3}{4}$"=1'-0"



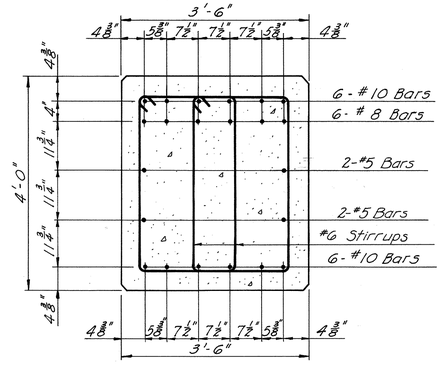
PAD ELEVATIONS
Scale: $\frac{3}{16}$"=1'-0"



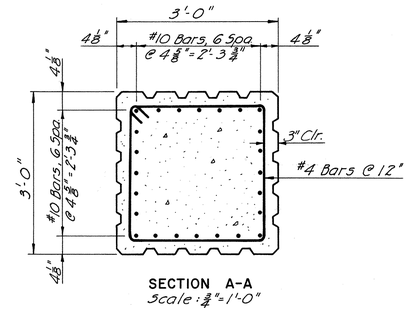
END VIEW
Scale: $\frac{3}{8}$"=1'-0"



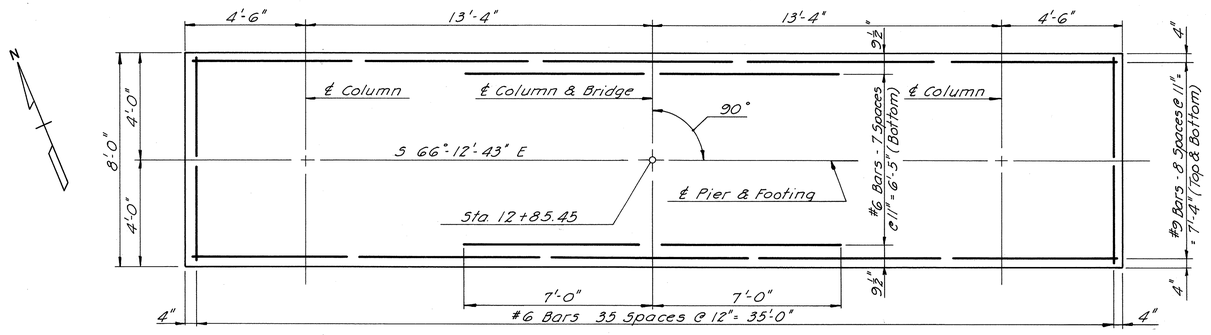
TYPICAL PAD DETAIL
Scale: $\frac{3}{4}$"=1'-0"
Reinforcing required only in pads showing reinforcing bars.



SECTION B-B
Scale: $\frac{3}{4}$"=1'-0"



SECTION A-A
Scale: $\frac{3}{4}$"=1'-0"



FOOTING PLAN
Scale: $\frac{3}{8}$"=1'-0"

NOTES:
For Framing Plan, see Sheet 6.
For Bearing Details, see Sheet 51
For General Notes, see Sheet 1
For Architectural Treatment, see Sheet 57 & 59

FOUNDATION NOTE:
Foundation Elevations are approximate and may be varied to suit field conditions as directed by the Engineer. Vertical Column reinforcing shall not be cut until these elevations are established.
Where elevations change by more than 2 feet, redesign will be required.
Pier Foundation is designed for an allowable Bearing Pressure of 3 tons per square foot.

AS BUILT

	BY	DATE				
MADE	JMS	8-67				
CHECKED	WEO	9-67		AS BUILT	HMW	
IN CHARGE	WEO		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

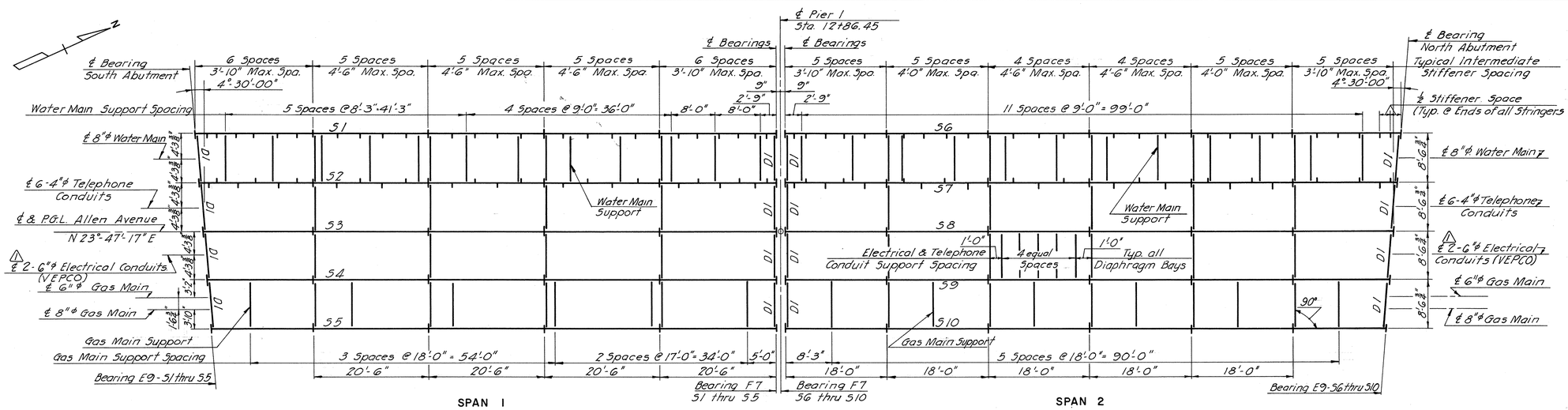
STRUCTURE B 46
ALLEN AVENUE OVER
DOWNTOWN EXPRESSWAY
PIER DETAILS

AMERICAN ENGINEERS
Richmond, Virginia

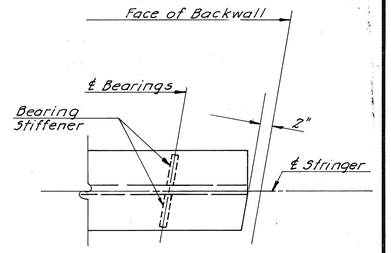
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 5 OF 10

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	179	



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

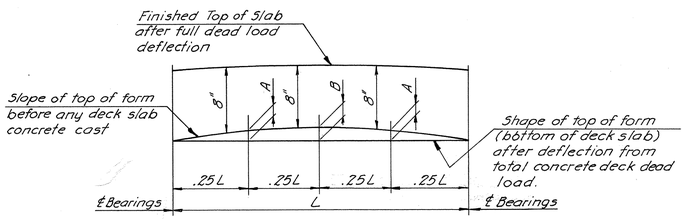


TYPICAL DETAIL
ENDS OF GIRDERS AT ABUTMENTS
No Scale

NOTE:
All intermediate Diaphragms are D2. Intermediate stiffeners shall be located on inside face of Stringers 51, 55, 56 and 510. They shall be placed on alternate sides along the remaining stringers.

BEARING TYPE	No. REQUIRED
E9	10
F7	10

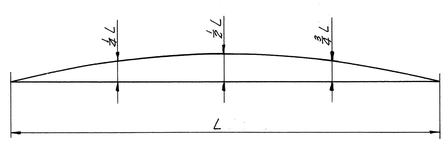
STRINGER	LENGTHS	℄ BRGS. TO ℄ BRGS.	
51	102'-10 1/8"	56	109'-0 1/8"
52	102'- 2"	57	108'-4 1/8"
53	101'- 6"	58	107'- 8"
54	100'- 9 3/8"	59	106'-11 3/8"
55	100'- 1 3/4"	510	106'- 3 3/4"



DEAD LOAD DEFLECTION DIAGRAM

STRINGERS	A	B
51	1 1/2"	2"
52, 55	1 5/16"	1 13/16"
53	1 1/16"	1 3/4"
54	1 1/4"	1 11/16"
56, 510	1 1/2"	2 3/8"
57	1 9/16"	2 7/8"
58, 59	1 7/16"	2"

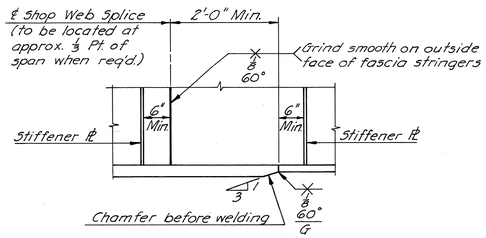
NOTE TO CONTRACTOR:
The above deflections are those anticipated to occur in the stringer upon placement of the total concrete deck dead load. In practice the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall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



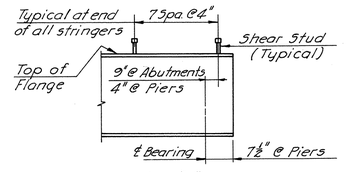
CAMBER DIAGRAM

STRINGERS	1/4 L	1/2 L	3/4 L
51	2 1/16"	4"	3 5/8"
52	2 1/2"	3 13/16"	3"
53, 55	2 1/16"	3 1/16"	2 15/16"
54	2 1/16"	3 3/8"	2 7/8"
56	3 1/16"	5 1/16"	3 1/16"
57	3 1/16"	5 1/4"	3 1/16"
58, 59	3 1/2"	4 15/16"	3 1/2"
510	3 7/16"	5 1/16"	3 7/16"

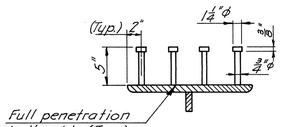
NOTE TO FABRICATOR:
The above stringers shall be fabricated with an upward camber amounting to (see table). This will provide approximate compensation for deflection under full load and for conformity with finishing grade. Stringers which are not required to be shop cambered shall be turned so that any mill tolerance deviation from straightness will be in the direction shown by the camber diagram above.



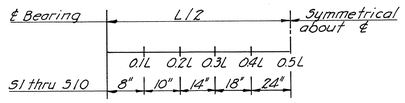
SHOP SPLICE DETAILS
No Scale



DETAIL "A"
No Scale

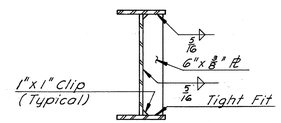


SHEAR STUD DETAIL
Scale: 1 1/2"=1'-0"

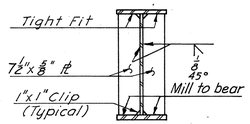


SHEAR STUD SPACING
No Scale

SHEAR STUD NOTES:
Capacity = 3400 lbs. per stud.
Three 7/8"ϕ studs may be substituted at the same longitudinal spacing as shown for 4-3/4"ϕ studs. Stud rows to be placed perpendicular to ℄ stringer.
For end condition see Detail "A".

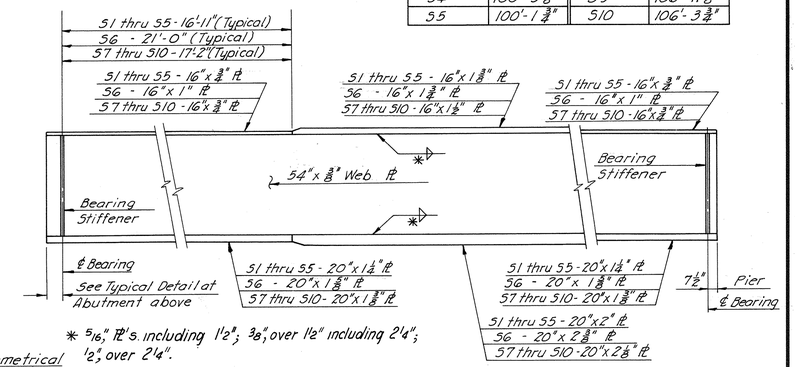


INTERMEDIATE STIFFENER



BEARING STIFFENER

STIFFENER DETAILS
No Scale



* 5/16" PL's including 1'-2"; 3/8" over 1'-2" including 2'-4"; 1/2" over 2'-4"

STRINGER DETAILS
No Scale

NOTES:
Structural Steel shall conform to ASTM Specification A36 (latest revision).
For General Notes, see Sheet 1.
For Superstructure Cross Section, see Sheet 7.
For Diaphragm Details, see Sheet 7.
For Utility Support Details, see Sheet 7.
For Bearing Shoe Dimensions, see Standard Sheet 51.

	BY	DATE				
MADE	D.L.A.	9-67				
CHECKED	W.E.O.	10-67	1	Rev. No. VEPCO Conduits	DGT	11-12-74
IN CHARGE	W. E. O.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B46
ALLEN AVENUE OVER
DOWNTOWN EXPRESSWAY

FRAMING PLAN

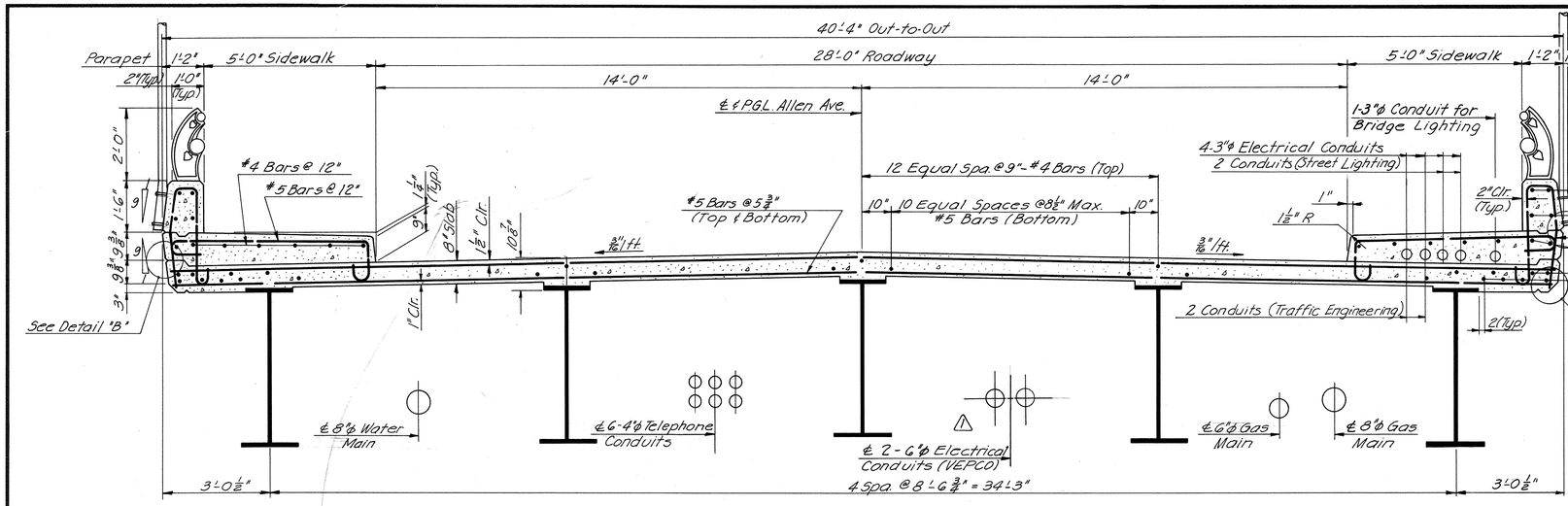
AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

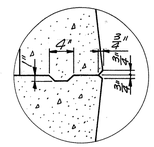
SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 6 OF 10

AS BUILT

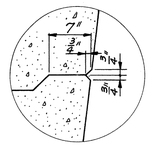
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	180	



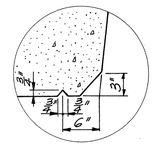
TYPICAL CROSS SECTION
Scale : ½" = 1'-0"



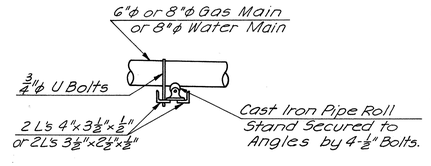
DETAIL "A"
Scale : 1" = 1'-0"



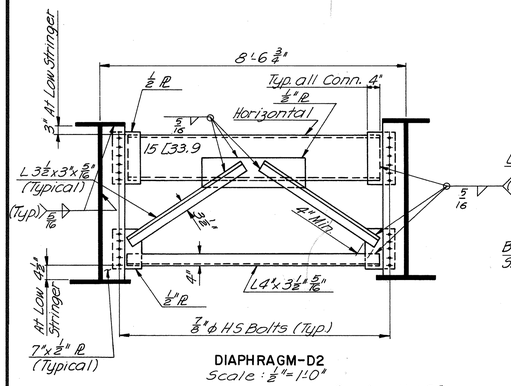
DETAIL "B"
Scale : 1" = 1'-0"



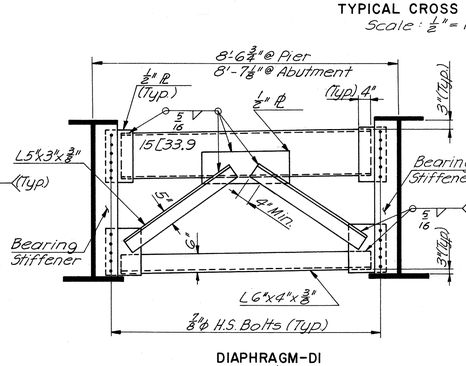
DETAIL "C"
Scale : 1" = 1'-0"



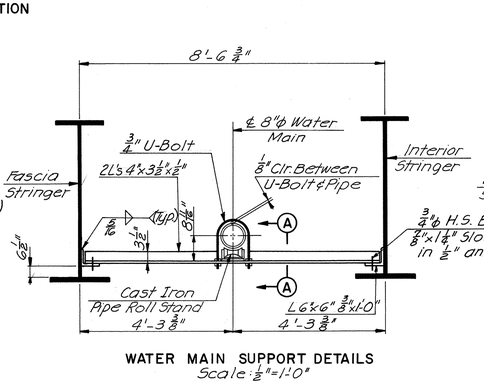
SECTION A-A
Scale : ½" = 1'-0"



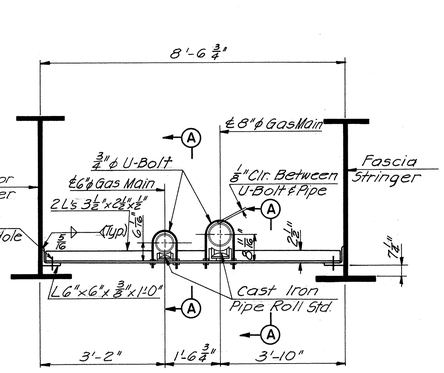
DIAPHRAGM-D2
Scale : ½" = 1'-0"



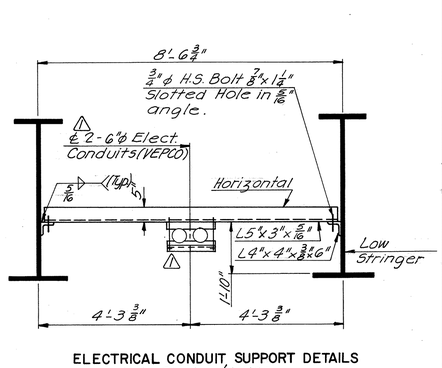
DIAPHRAGM-D1
Scale : ½" = 1'-0"



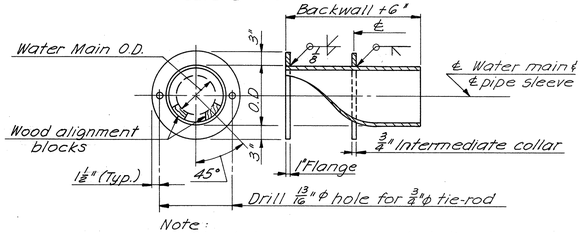
WATER MAIN SUPPORT DETAILS
Scale : ½" = 1'-0"



GAS MAIN SUPPORT DETAILS
Scale : ½" = 1'-0"

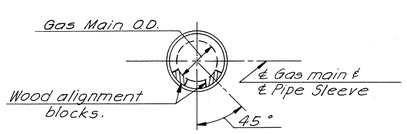


ELECTRICAL CONDUIT SUPPORT DETAILS
Scale : ½" 1'-0"



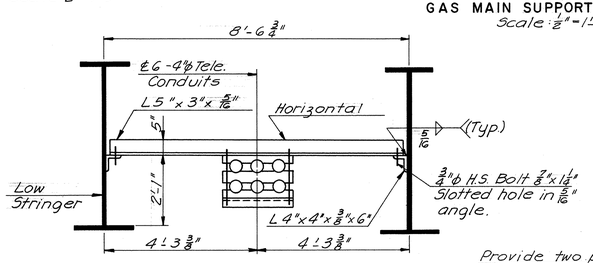
Note :
Steel pipe sleeve to be hot-diped galvanized after fabrication in accordance with ASTM A123

PIPE SLEEVE DETAIL FOR WATER MAIN



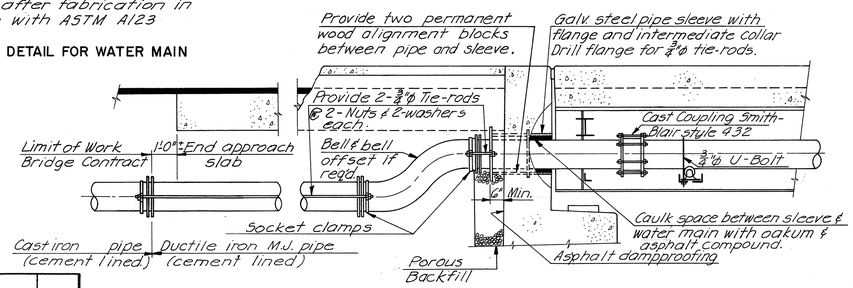
Note :
Steel pipe sleeve to be hot-dip galvanized after fabrication in accordance with ASTM A123

PIPE SLEEVE DETAIL FOR GAS MAIN

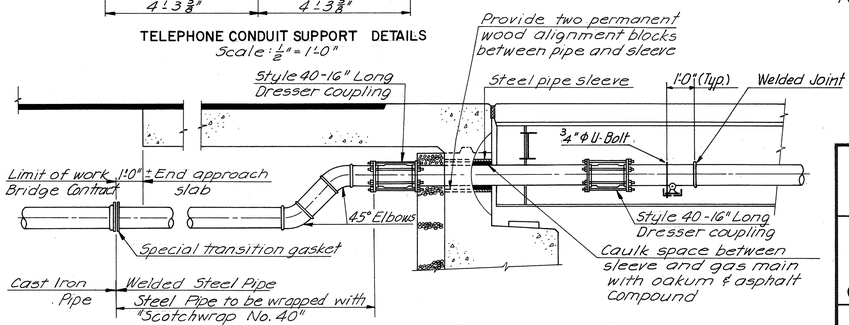


TELEPHONE CONDUIT SUPPORT DETAILS
Scale : ½" = 1'-0"

NOTES :
For General Notes, see Sheet 1.
For Framing Plan, see Sheet 6.
For Slab Plan, see Sheet 8.
For Electrical Conduit Hanger Details, see Sheet 910



WATER MAIN DETAILS AT ABUTMENTS
Scale : ⅜" = 1'-0"



GAS MAIN DETAILS AT ABUTMENTS
Scale : ⅜" 1'-0"

	BY	DATE				
MADE	C.F.S. R.P.R.	9-67		AS BUILT	HMW	
CHECKED	W.E.O.	10-67	1	Rev. No. VEPCO Conduits	DGT	11-12-74
IN CHARGE	W.E.O.		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B46
ALLEN AVENUE OVER
DOWNTOWN EXPRESSWAY

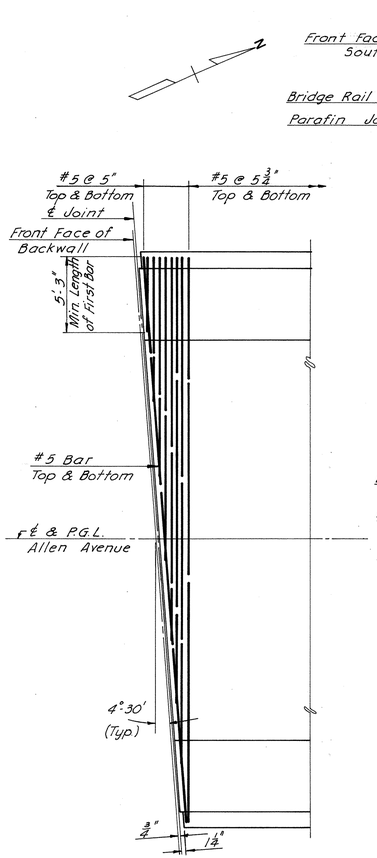
CROSS SECTION & UTILITY DETAILS

AMERICAN ENGINEERS
Richmond, Virginia

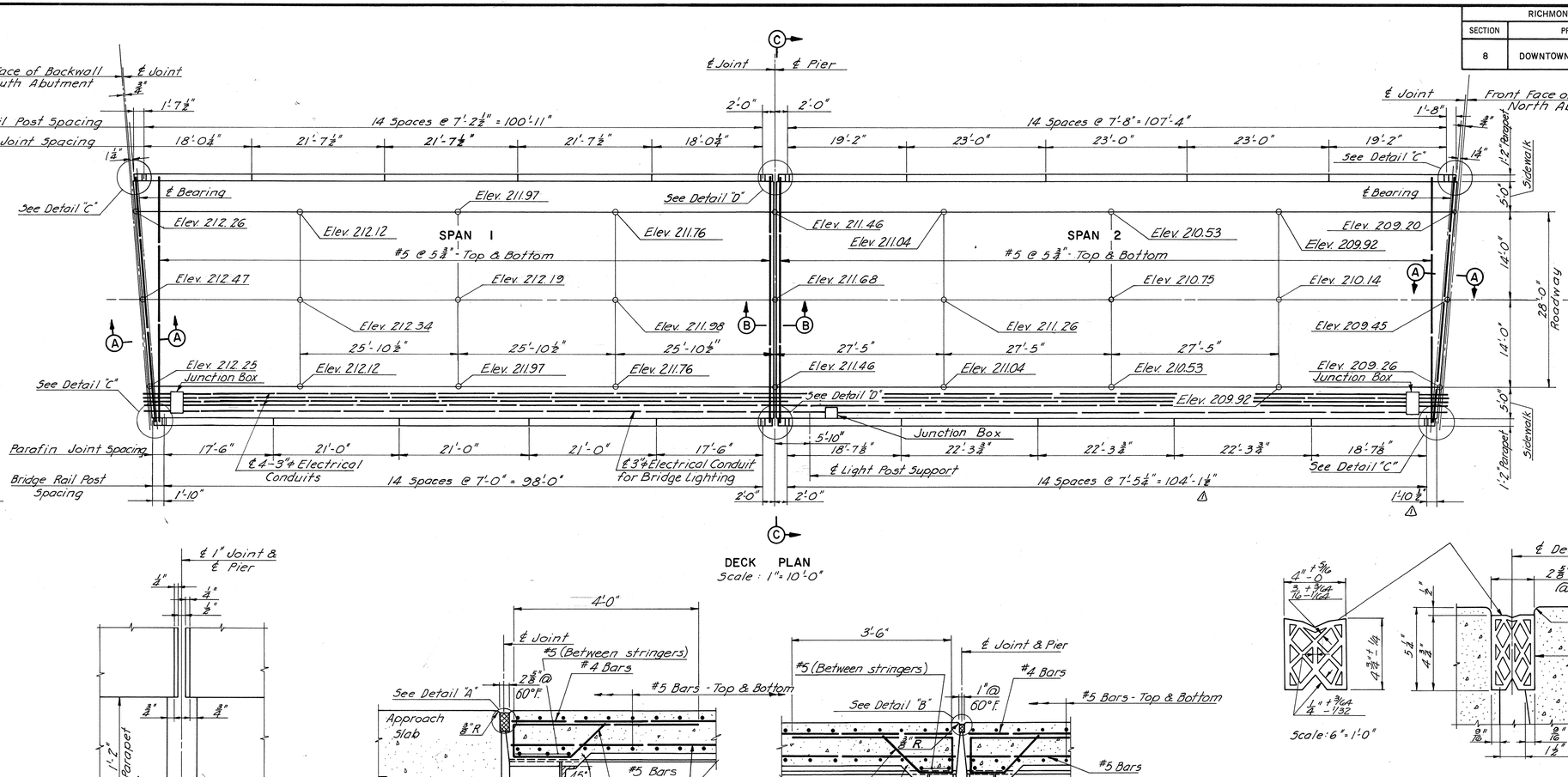
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 7 OF 10

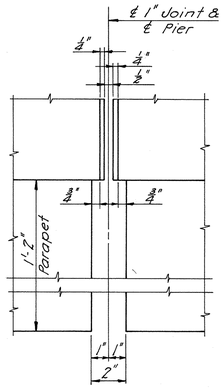
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	181	



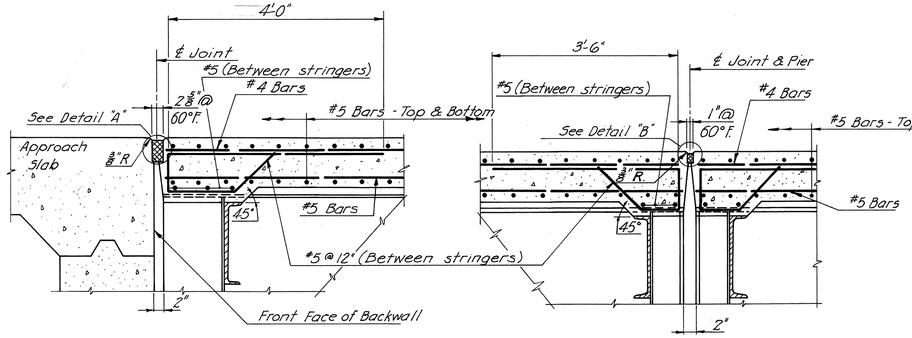
TYPICAL REINFORCING AT ABUTMENT ENDS OF SLAB
Scale : 1"= 5'-0"



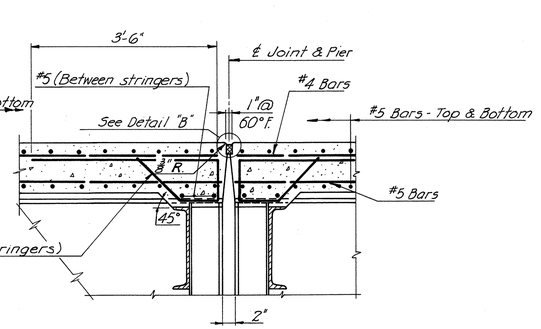
DECK PLAN
Scale : 1"= 10'-0"



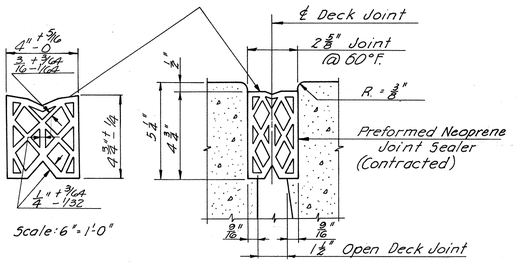
DETAIL "D"
Scale : 3"= 1'-0"



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

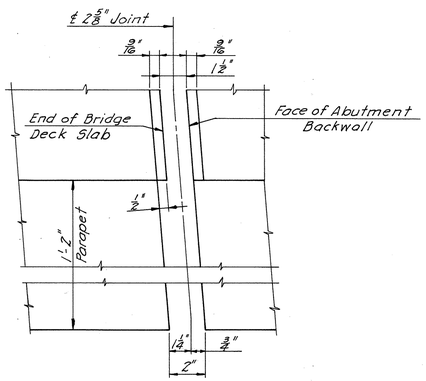


SECTION B-B
Scale : 3/4"= 1'-0"



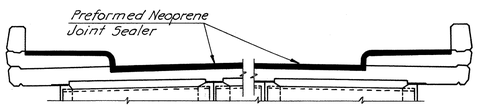
Scale: 6"= 1'-0"

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

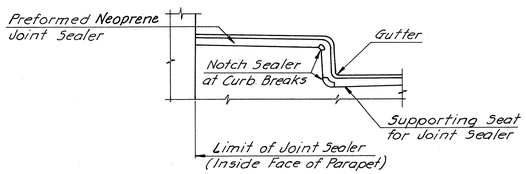


DETAIL "C"
Scale : 3"= 1'-0"

Note to Contractor :
It is absolutely essential that the openings for the preformed neoprene joint sealers be accurately formed and constructed to smooth, straight lines. The size of the opening shall be adjusted to allow for anticipated dead load rotation of the ends of the slab and for the temperature at the time of construction.

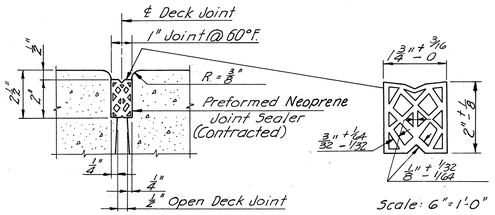


SECTION C-C
Scale : 1/4"= 1'-0"



TREATMENT OF JOINT AT CURB
No Scale

JOINT DETAILS



Scale: 6"= 1'-0"

DETAIL "B"
Scale : 3"= 1'-0"

NOTES :
For Typical Deck Cross Section, see Sheet 7.
For Railing Details, see Sheet 53.
For General Notes, see Sheet 1.
For Framing Plan, see Sheet 6.
For Light Post Support Details, see Sheet 54.

AS BUILT

	BY	DATE				
MADE	FBC	7-67				
CHECKED	WEO	9-67	1	Rev. Railpost Spa	R.W.Z.	7-74
IN CHARGE	W. E. O.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 46
ALLEN AVENUE OVER
DOWNTOWN EXPRESSWAY

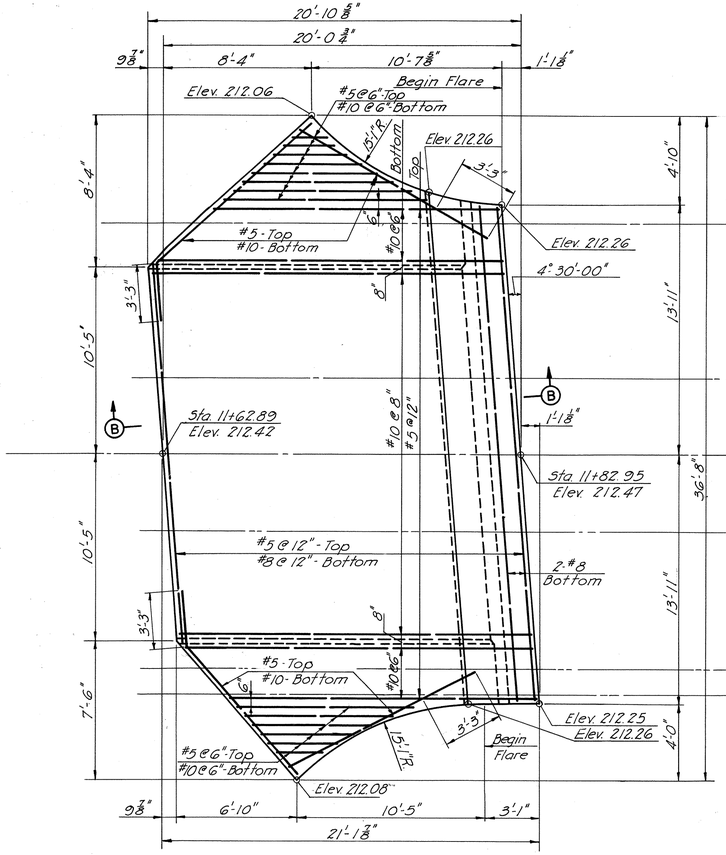
DECK PLAN AND JOINT DETAILS

AMERICAN ENGINEERS
Richmond, Virginia

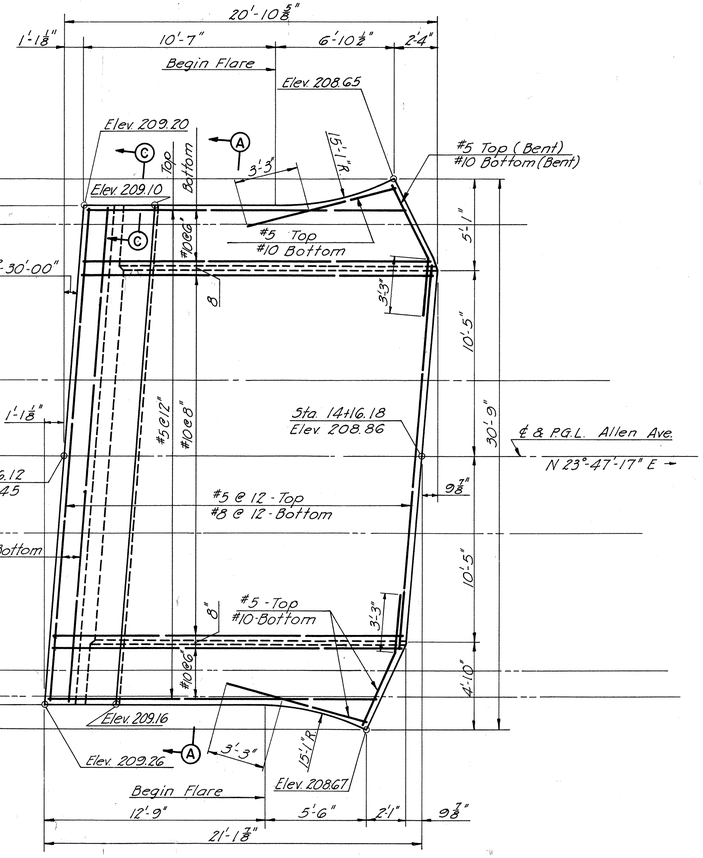
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 8 OF 10

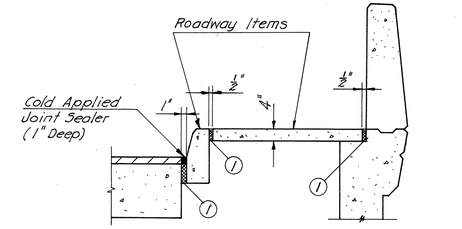
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	182	



PLAN - SOUTH ABUTMENT
Scale: ¼"=1'-0"

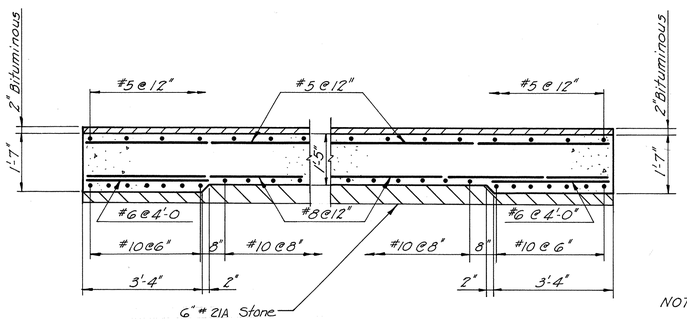


PLAN - NORTH ABUTMENT
Scale: ¼"=1'-0"



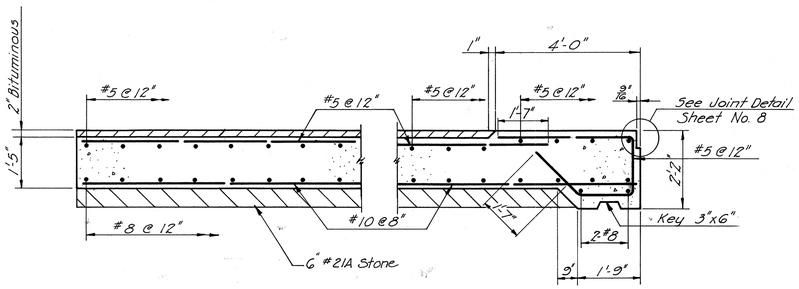
① = Preformed Expansion Joint Material

SECTION C-C
Scale: ½"=1'-0"



SECTION A-A
Scale: ½"=1'-0"

NOTE:
All Reintorcing Steel shall be 2" Clear.
Elevations shown are to top of concrete.



SECTION B-B
Scale: ½"=1'-0"

	BY	DATE				
MADE	R.P.R.	8-67		AS BUILT	HMW	
CHECKED	W.E.O.	9-67	⚠	Rev. No. Vepco Conduits	DGT	11-12-74
IN CHARGE	W.E.O.		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 46
ALLEN AVENUE OVER
DOWNTOWN EXPRESSWAY

APPROACH SLABS

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 9 OF 10

182

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	183	

BORING 8-20

Elev.	Casing Blows/Ft.	Spoon Blows Per 6"	Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
211.6	2	5 2	S-1	0'-2'	211.6	Fill: Tan SAND, and Gravel, some Clay
	9	4 7				
	22				207.6	
	15					
206.6	14					
	22	7 7	S-2	5'-7'		
	42	10 11				
	71					
	67					
201.6	70					
	87	13 17	S-3	10'-12'		
	97	18 21				
	94					
	107					
196.6	68					Mottled CLAY, some m-f Sand
	119	6 16	S-4	15'-17'		
	98	22 24				
	117					
	111					
▼ 191.6	142					
	91	13 20	S-5	20'-22'		
	83	22 25				
	99					
	146				187.6	
186.6	105					
	254	34 116	S-6	25'-27'		Weathered SAND and Gravel, some Yellow Clay (Wet)
	157	41 20				
	160					
	300/6"					
181.6	OPEN				181.6	
		26 19	S-7	30'-32'		
		19 23				White c-m GRAVEL, some c-f Sand, (Saturated)
176.6					176.6	
		10 44	S-8	35'-37'		Tan-White c-m SAND, some Yellow Clay, little c-f Gravel (Wet)
		91 54				
171.6						
		55 60	S-9	40'-42'		
		64 47				
					167.6	
166.6						
		44 39	S-10	45'-47'		Tan-White c-f GRAVEL, some c-f White Sand, trace Clay
		36 32				
161.6						
		31 26	S-11	50'-52'		
		39 58				
						Bottom of Hole Elev. 159.6

BORING 8-21

Elev.	Casing Blows/Ft.	Spoon Blows Per 6"	Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
209.8	5	10 7	S-1	0'-2'	209.8	Fill: Gray and Brown m-f SAND, trace Clayey Silt, trace Cinders, Brick , f Gravel
	5	5 6				
	5	4 4	S-2	2'-4'	206.4	
	4	3 1				
204.8	11	2 4	S-3	4'-6'		
	13	8 9				Gray c-f SAND, little Clayey Silt, (Fluid)
	19					
	26				201.3	
	29					
199.8	30					
	35	11 11	S-4	10'-12'		
	37	11 14				
	42					
	54					Gray-Brown f SAND, little Clay and Silt (Damp)
194.8	OPEN					
		7 11	S-5	15'-17'		
		15 22				
					190.3	
189.8						
		7 12	S-6	20'-22'		
		8 10				Tan c-f SAND, some Clay and Silt (Wet)
184.8					183.5	
▼ 183.8		10 8	S-7	25'-27'		
		42 33				
179.8						
		32 30	S-8	30'-32'		Tan c-f SAND, some m-f Gravel, little Clay and Silt
		30 20				
					175.5	
174.8						
		130 100	S-9	35'-37'		Gray c-f SAND, some c-f Gravel, (Wet)
		61 40				
	▼					
		27 27	S-10	38'-40'		
169.8		27 36				Bottom of Hole Elev. 169.8

BORING 8-22

Elev.	Casing Blows/Ft.	Spoon Blows Per 6"	Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
208.5	5	6 7	S-1	0'-2'	208.5	Fill: Black & Brown m-f SAND, little Clayey Silt, trace Cinders
	12	11 6			206.0	
	14	3 3	S-2	2'-4'	204.3	Fill: Brown-Gray, m-f SAND, little Silty Clay, trace f Brown Sand
	11	5 4				
203.5	4	2 3	S-3	4'-6'		
	5	3 8				Gray m-f SAND, and Silty Clay
	10					
	21				201.3	
	28					
198.5	29					
	32	9 12	S-4	10'-12'		Tan - Grey m-f SAND, and Silty Clay
	32	17 18				
	33					
	29					
193.5	36					
	OPEN	11 18	S-5	15'-17'		
		21 27				
					191.0	
▼ 188.5						
		9 7	S-6	20'-22'		Yellow-Tan c-f SAND, some Silty Clay, trace f Gravel (Saturated)
		9 6				
					185.0	
183.5						
		14 20	S-7	25'-27'		
		23 26				
178.5						
		- -	S-8	30'-32'		Yellow, Tan-Gray c-f SAND, little m-f Gravel, little Silty Clay
		50 38				
173.5						
		26 26	S-9	35'-37'		
		32 26				
168.5					168.5	
		18 27	S-10	40'-42'		
		21 50				Tan-Brown c-f SAND, some m-f Gravel, trace Silty Clay
		73 92	S-11	42'-44'		
		110 110				
						Bottom of Hole Elev. 164.5

GENERAL NOTES

(1) The first elevation noted is the existing ground surface.
(2) ▼ denotes the ground water level as measured.
(3) (a) Casing Blows are the blows per foot for a 300 pound hammer falling 24 inches except where noted otherwise.
(b) Also noted in Casing Blows column (where applicable) are rock drilling times in minutes per foot.
(4) (a) Spoon Blows are the blows per 6 inches for a 2" O.D., 1⅜ I.D. Split Spoon Sampler using a 140 pound hammer falling 30 inches.
(b) W denotes penetration under weight of hammer.
(c) P denotes penetration by hydraulic pressure.
(5) (a) Samples designated by an "S" number indicate Split Spoon Samples.
(b) Samples designated by a "U" number indicate Undisturbed Shelby Tube Samples (3 3/8 " ø).
(c) Samples designated by a "C" number indicate 1 3/16" ø (AX) Rock Cores.
(6) Samples descriptions are based on field visual identification by the boring inspector.
(7) Abbreviation and quantitative terms:

c-coarse	trace	1-10%
m-medium	little	10-20%
f-fine	some	20-35%
	and	35-50%

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.M.S.	8-10-67				
CHECKED	W.E.O.	8-11-67				
IN CHARGE	W.E.O.					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 46
ALLEN AVENUE OVER
DOWNTOWN EXPRESSWAY

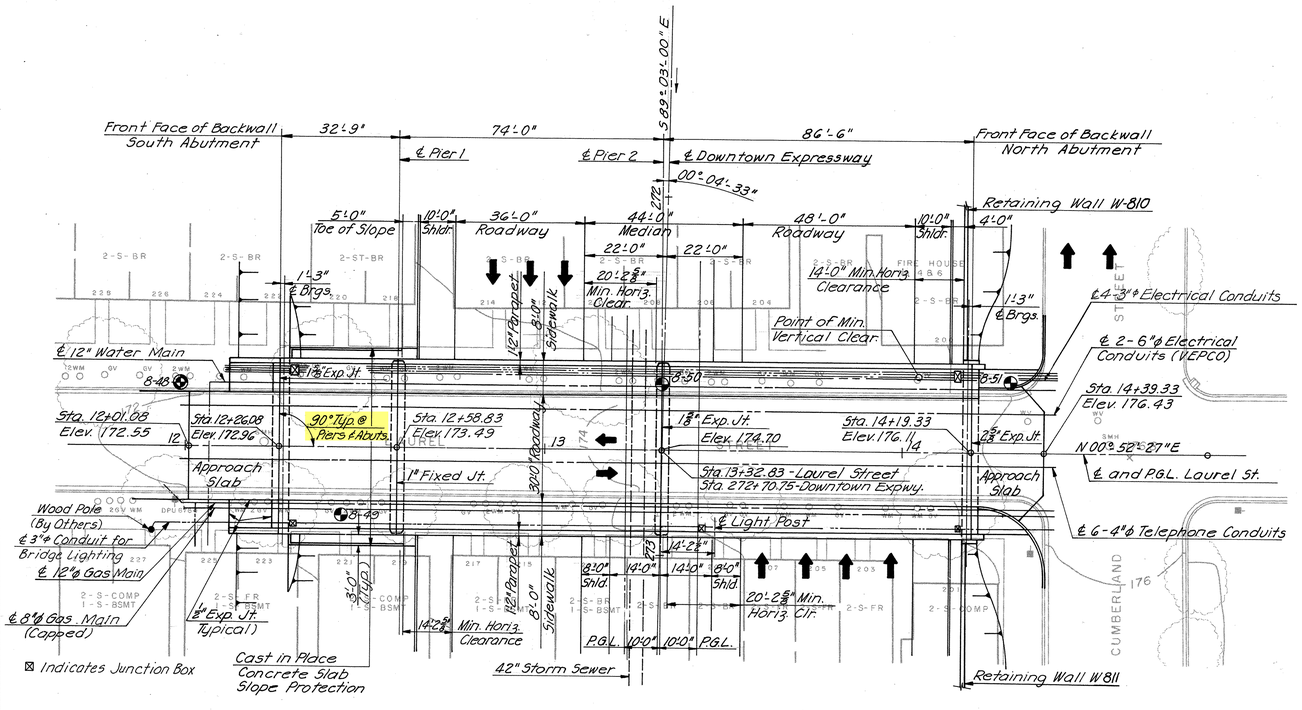
BORING LOGS

AMERICAN ENGINEERS
Richmond, Virginia

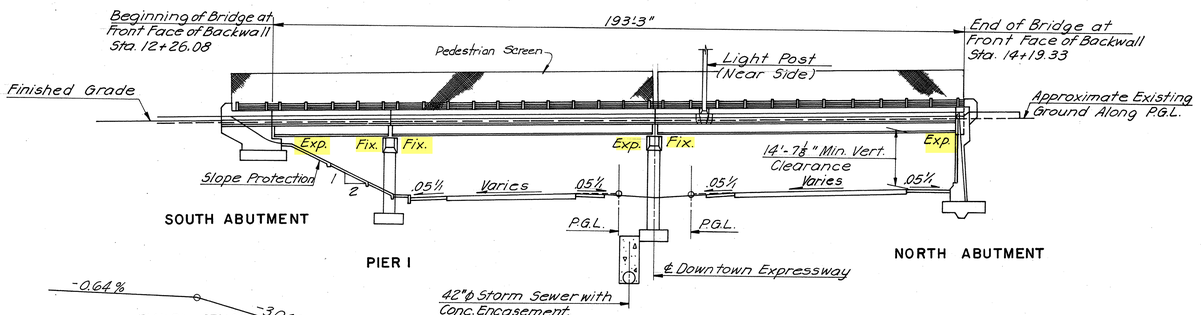
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: 1"=6' VERT.
CONTRACT NO.: 8
SHEET NO. 10 OF 10

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	222	



PLAN



SOUTH ABUTMENT

PIER 1

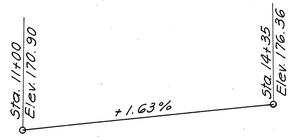
PIER 2

NORTH ABUTMENT

ELEVATION



DOWNTOWN EXPRESSWAY



LAUREL STREET

PROFILE DATA

	BY	DATE				
MADE	W.D.U.	8-67				
CHECKED	W.E.O.	10-67		AS BUILT	H.M.W.	4-76
IN CHARGE	W.E.O.		NO.	REVISION	BY	DATE

INDEX

No.	DESCRIPTION
1	General Plan and Elevation
2	South Abutment
3	North Abutment
4	Pier Details
5	Framing Plan
6	Cross Section & Utility Details
7	Deck Plan & Joint Details
8	Approach Slabs
9	Boring Logs
S1	Standard Shoe Details
S3	Standard Aluminum Railing Details
S4	Standard Electrical Details
S7/S8	Standard Architectural Details
S10	Standard Elect. and Tele. Cond. Details
S11	Standard Utility Support details @ Abut.

NOTES:
Top of Pavement Elevations at ends of Deck along P.G.L. are given on Plan, Remaining Pavement Elevations are given on Sheet 7.
Indicates 2½"ϕ Cased Hole Boring.
Indicates 4"ϕ Cased Hole Boring.

GENERAL NOTES:

ROADWAY: One 30'-0" Clear roadway. Two 8'-0" sidewalks.

CAPACITY: Dead Load - Includes 15 lbs. per sq. ft. for future wearing surface.
Live Loads - HS 20-44 loading and B.P.R. modified for military vehicles.

SPECIFICATIONS:
GENERAL - Virginia Department of Highway Road and Bridge Specifications 1970
DESIGN - AASHO 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 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 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. 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 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. Specification A36 except as noted.
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.

BENCH MARK: C-38. Monument located in walk N.E. Corner Cumberland and South Laurel. Elev. 176.83.

ESTIMATED QUANTITIES

	STRUCTURE EXCAVATION C.Y.	CONCRETE CLASS A4 C.Y.	CONCRETE CLASS A3 C.Y.	REINFORCING STEEL LBS.	STRUCTURAL STEEL-A36 LBS.	ALUMINUM BRIDGE RAILING L.F.	ASPHALT DAMP-PROOFING S.Y.	6 INCH PIPE UNDERDRAIN L.F.	POROUS BACKFILL C.Y.	CONC. SLAB SLOPE PROTECTION S.Y.	GAS MAIN 12"ϕ L.F.	GAS MAIN 8"ϕ L.F.	WATER MAIN 12"ϕ L.F.	CONDUITS 6"ϕ VEPCO L.F.	CONDUITS 4"ϕ TEL. L.F.	3"ϕ PVC CONDUIT L.F.	2"ϕ METAL CONDUIT L.F.	Pedestrian Screen L.F.	
Superstructure		364.21		68,195	382,078.4	408													
South Abutment	134		88.74	4,873			43	57	14	232.6	22.6	217.3	208	481	1442	960.5	4	420	
Pier 1	241		92.65	16,300															
Pier 2	272		97.54	19,411															
North Abutment	268.12		242.29	12,341			119	55	72										
Approach Slabs			76.60	17,263															
Total	915.12	364.21	597.32	138,383	382,078.4	408	162	112	86	232.6	22.6	217.3	208	481	1442	960.5	4	420	

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 50
LAUREL STREET OVER
DOWNTOWN EXPRESSWAY

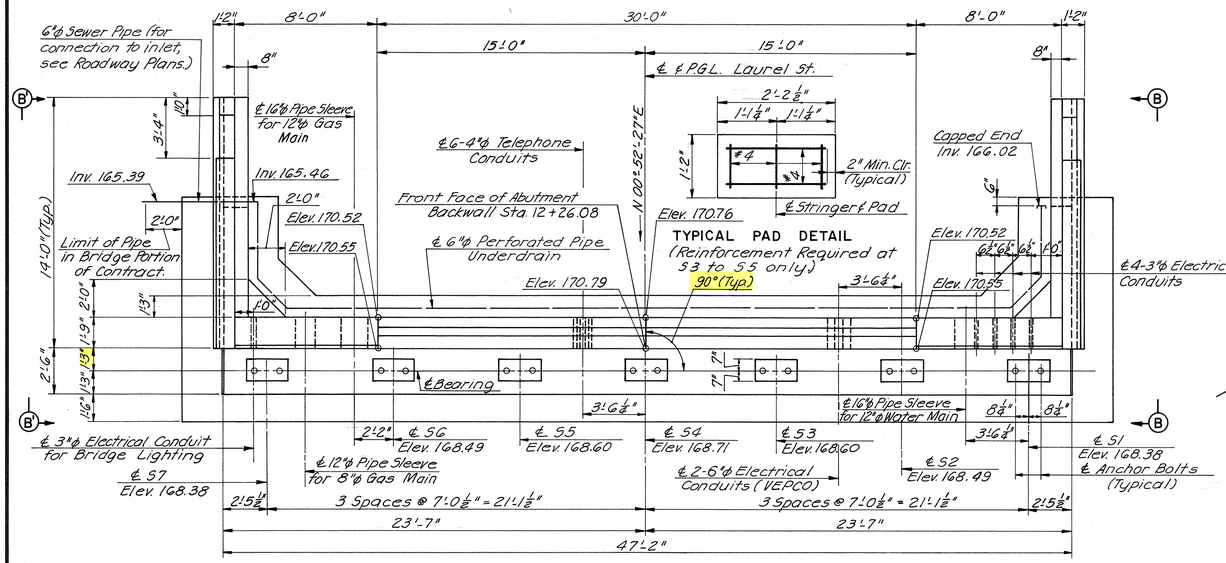
GENERAL PLAN AND ELEVATION

AMERICAN ENGINEERS
Richmond, Virginia

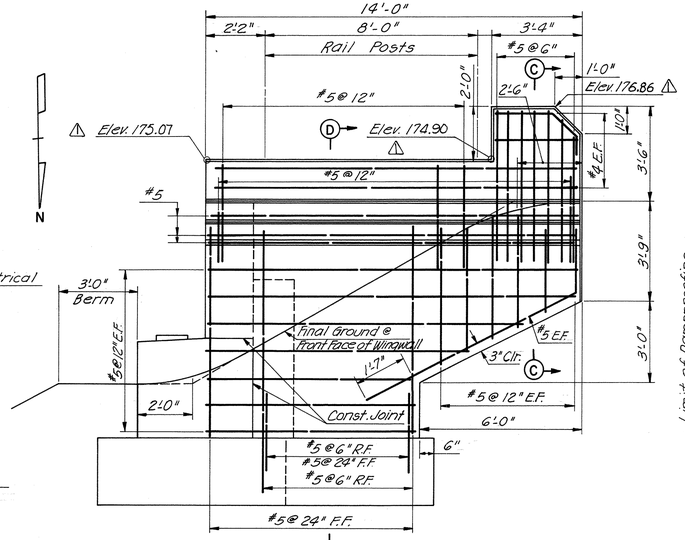
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: 1" = 20'
CONTRACT NO.: 8
SHEET NO. 1 OF 9

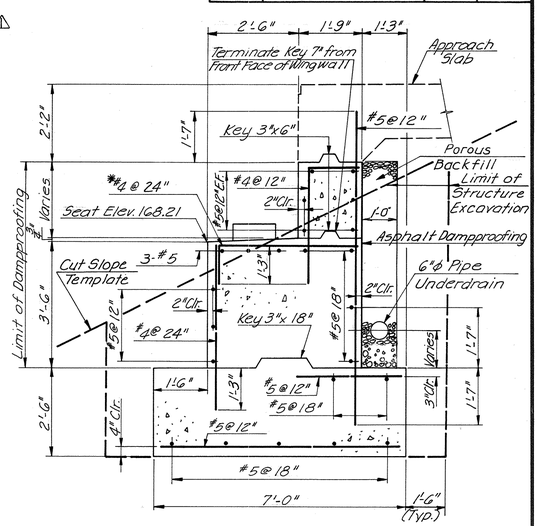
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	223	



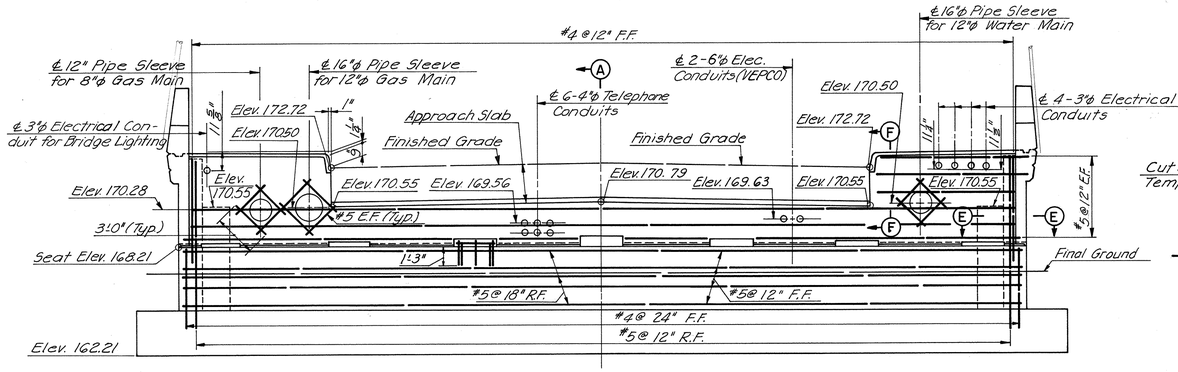
PLAN
Scale: ¼"=1'-0"



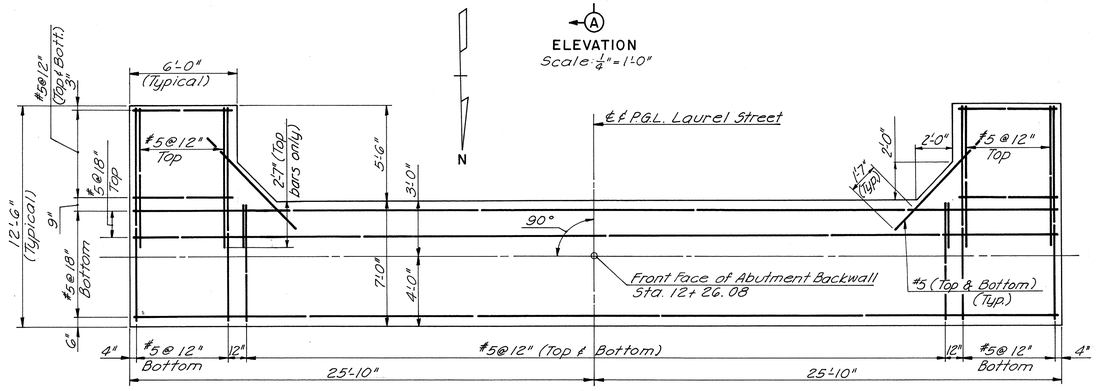
VIEW B-B
View B'-B' Similar
Scale: ⅜"=1'-0"



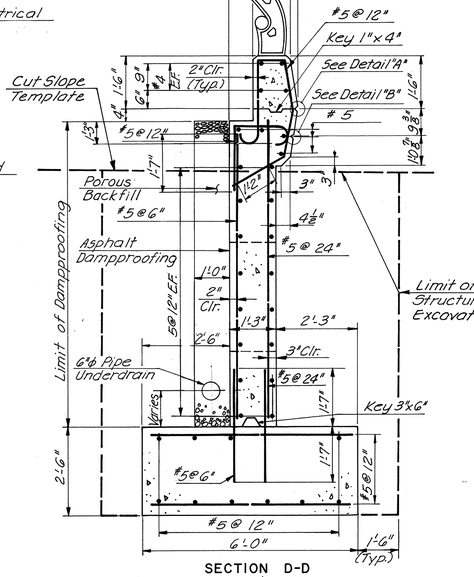
SECTION A-A
Scale ½"=1'-0"



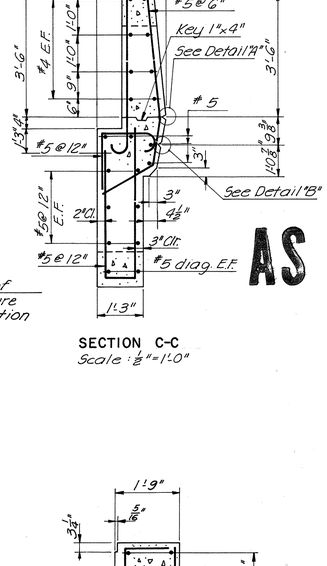
ELEVATION
Scale: ¼"=1'-0"



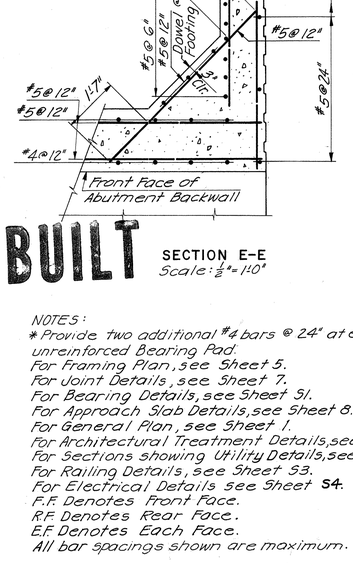
FOOTING PLAN
Scale: ¼"=1'-0"



SECTION D-D
Scale: ½"=1'-0"

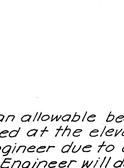


SECTION C-C
Scale: ½"=1'-0"

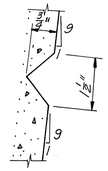


SECTION E-E
Scale: ½"=1'-0"

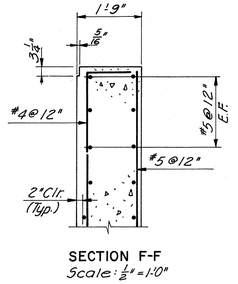
AS BUILT



DETAIL "A"
Half Size



DETAIL "B"
Half Size



SECTION F-F
Scale: ½"=1'-0"

NOTES:
* Provide two additional #4 bars @ 24" at each unreinforced Bearing Pad.
For Framing Plan, see Sheet 5.
For Joint Details, see Sheet 7.
For Bearing Details, see Sheet 51.
For Approach Slab Details, see Sheet 8.
For General Plan, see Sheet 1.
For Architectural Treatment Details, see Sheet 52 & 53.
For Sections showing Utility Details, see Sheet 6.
For Railing Details, see Sheet 53.
For Electrical Details see Sheet S4.
F.F. Denotes Front Face.
R.F. Denotes Rear Face.
E.F. Denotes Each Face.
All bar spacings shown are maximum.

	BY	DATE				
MADE	W.D.U.	9-67				
CHECKED	W.E.O.	10-67	⚠	Wingwall El.	T.E.M.	8-74
IN CHARGE	W.E.O.		NO.	REVISION	BY	DATE

Foundation Note:
South Abutment Foundation is designed for an allowable bearing pressure of 2 tons per sq. ft. Footings shall be founded at the elevation shown on Plans unless otherwise directed by the Engineer due to conditions at the site during construction. In such cases the Engineer will determine the extent of redesign necessary and will advise the Contractor before construction begins.

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B50
LAUREL STREET OVER
DOWNTOWN EXPRESSWAY

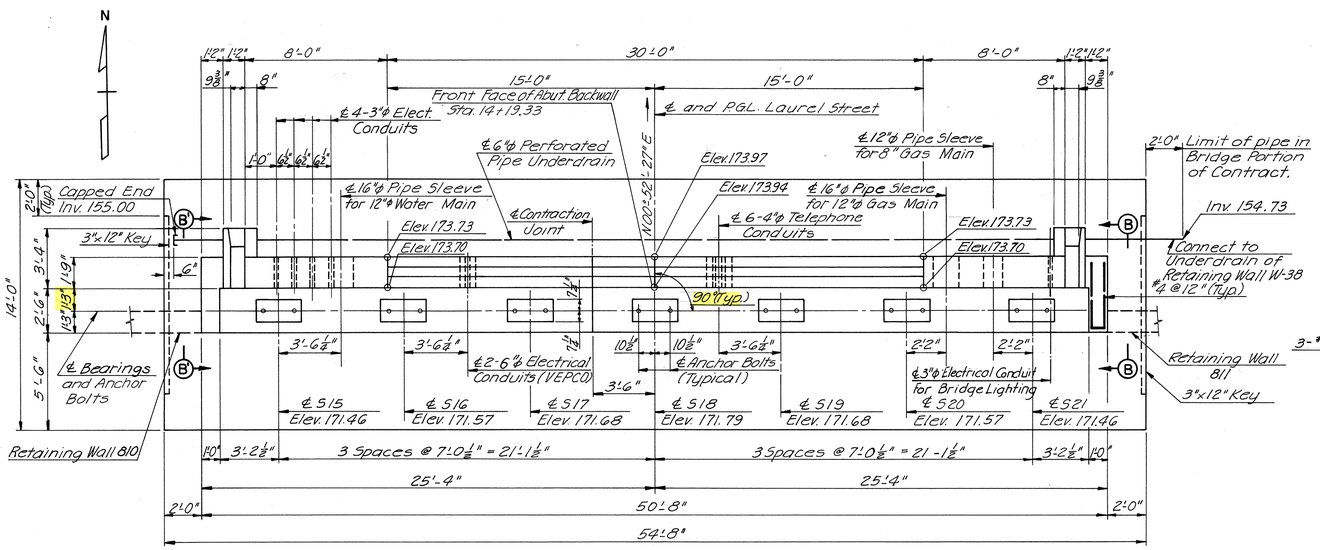
SOUTH ABUTMENT

AMERICAN ENGINEERS
Richmond, Virginia

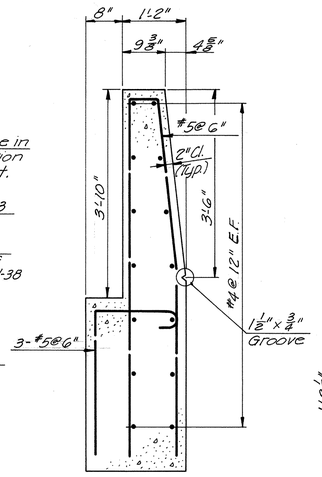
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 2 OF 9

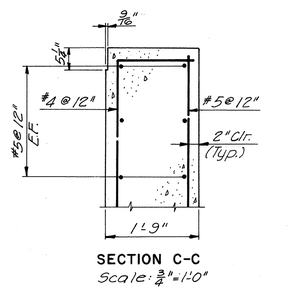
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	224	



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

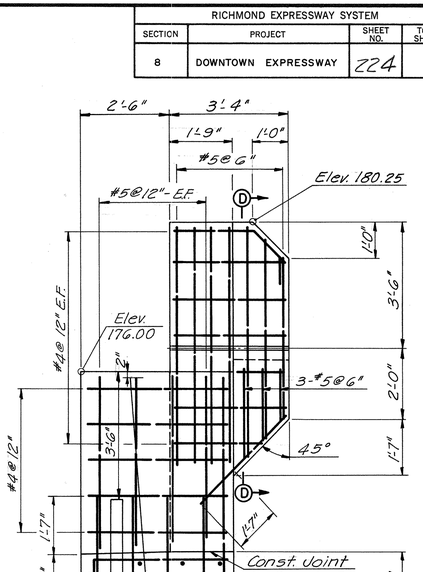


SECTION D-D
Scale: 3/4" = 1'-0"

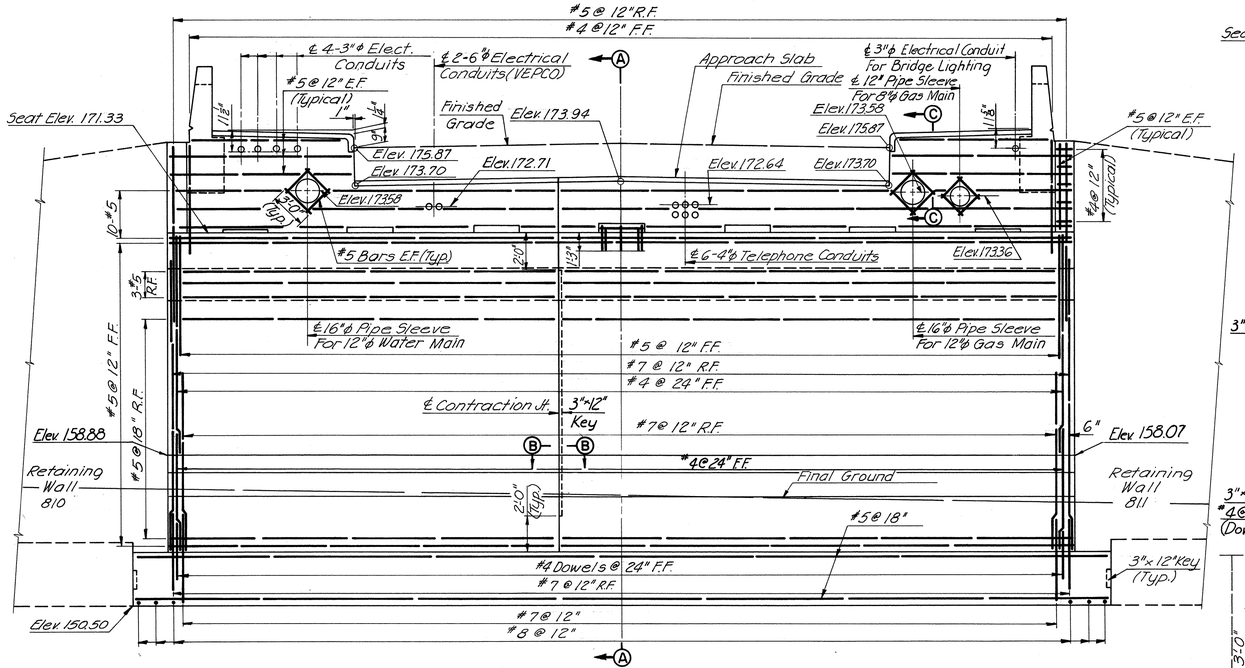


SECTION C-C
Scale: 3/4" = 1'-0"

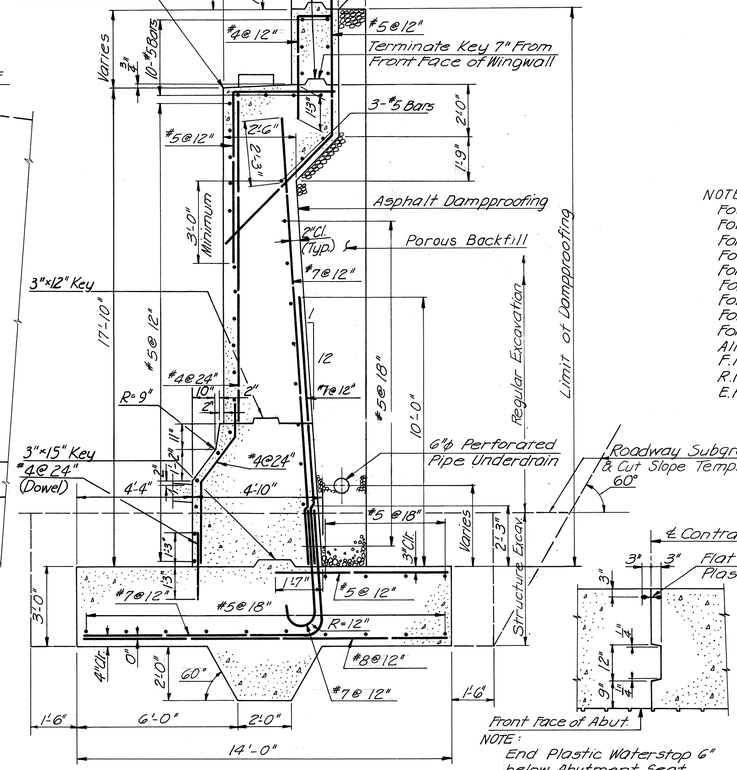
TYPICAL PAD DETAIL
(Reinforcement Required at 517 to 519 only)



VIEW B-B
(View B'-B' Similar)
Scale: 1/2" = 1'-0"



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



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

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

NOTE:
End Plastic Waterstop 6" below Abutment Seat.

Foundation Note:
North Abutment Foundation is designed for an allowable bearing pressure of 2 1/2 tons per sq. ft. Footings shall be founded at the elevation shown on plans unless otherwise directed by the Engineer due to conditions at the site during construction. In such cases the Engineer will determine the extent of redesign necessary and will advise the Contractor before construction begins.

NOTES:
For Framing Plan, see Sheet 5.
For Joint Details, see Sheet 7.
For Bearing Details, see Sheet 51.
For Approach Slab Details, see Sheet 8.
For General Notes, see Sheet 1.
For Architectural Treatment Details, see Sheet 51&52.
For Sections Showing Utility Details, see Sheet 6.
For Railing Details, see Sheet 53.
For Electrical Details, see Sheet S4.
All bar spacings shown are maximum.
F.F. Denotes Front Face.
R.F. Denotes Rear Face.
E.F. Denotes Each Face.

AS BUILT

	BY	DATE				
MADE	W.D.U.	9-67				
CHECKED	W.E.O.	10-67				
IN CHARGE	W.E.O.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B50
LAUREL STREET OVER
DOWNTOWN EXPRESSWAY

NORTH ABUTMENT

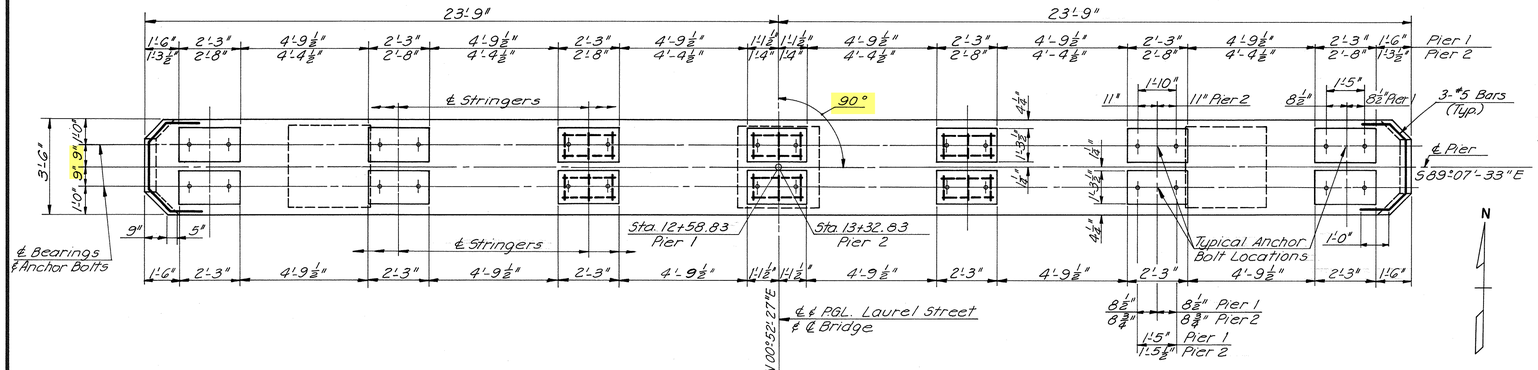
AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

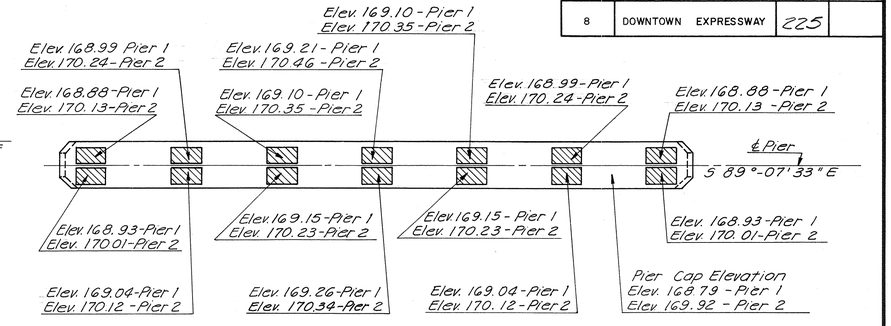
SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 3 OF 9

224

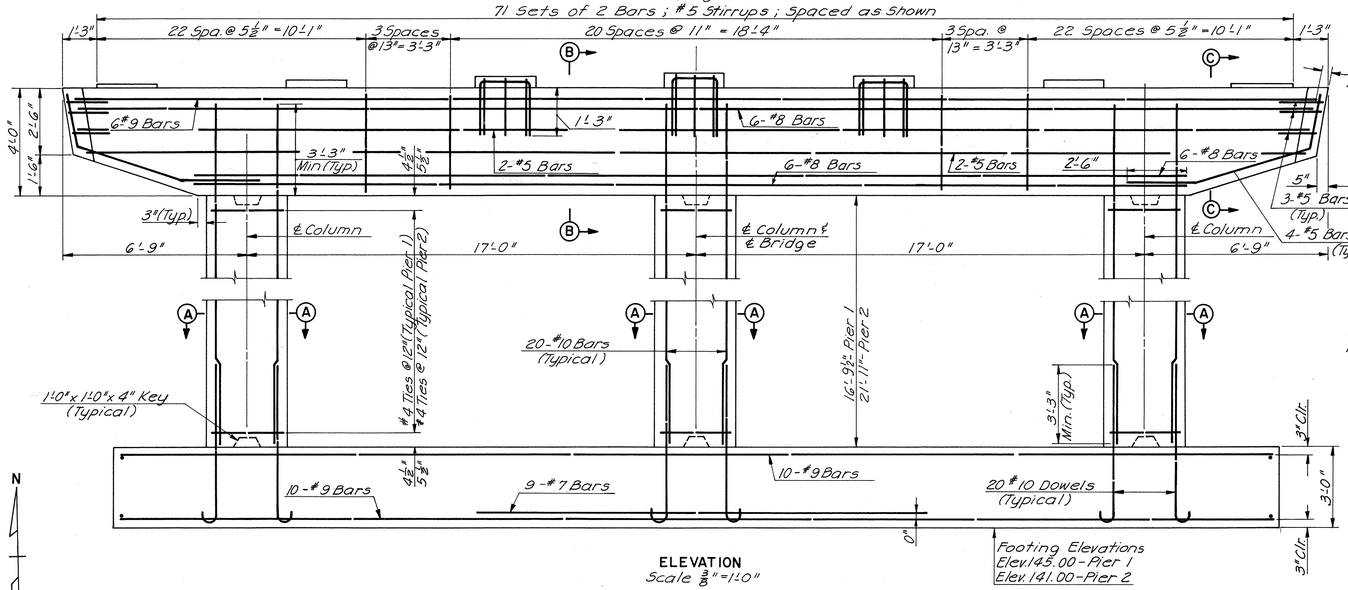
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	225	



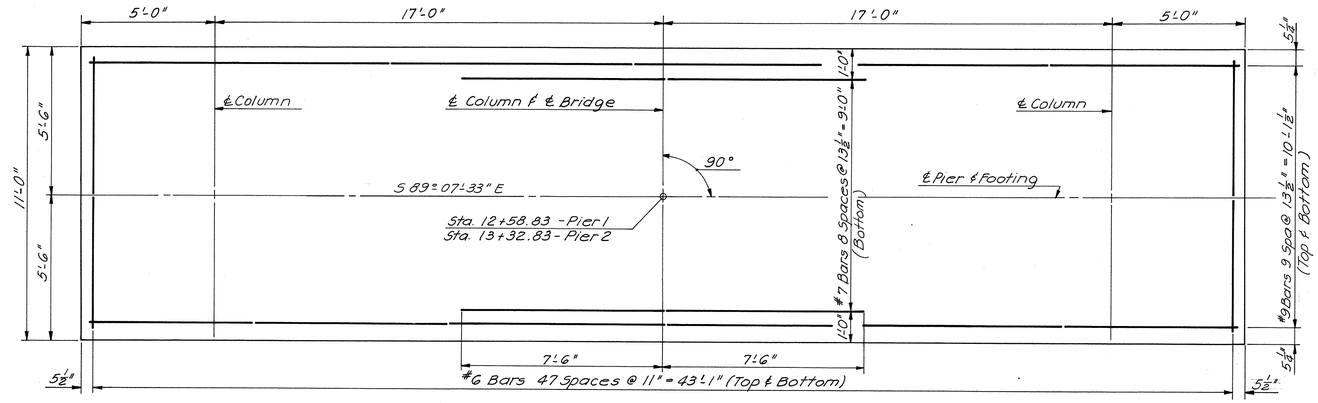
PLAN
Scale: $\frac{3}{32}$"=1'-0"



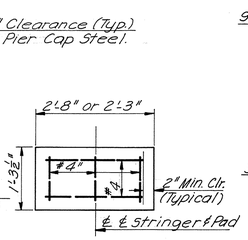
PAD ELEVATIONS
Scale: $\frac{3}{16}$"=1'-0"



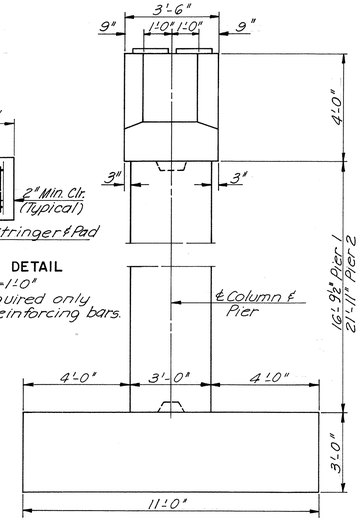
ELEVATION
Scale $\frac{3}{32}$"=1'-0"



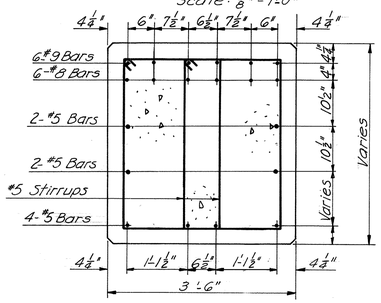
FOOTING PLAN
Scale $\frac{3}{32}$"=1'-0"



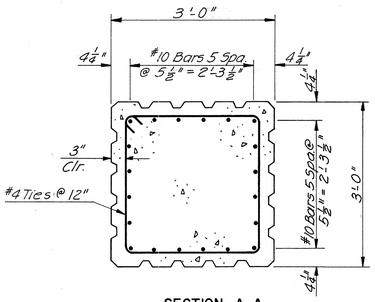
TYPICAL PAD DETAIL
Scale: $\frac{3}{4}$"=1'-0"
Reinforcement required only in pads showing reinforcing bars.



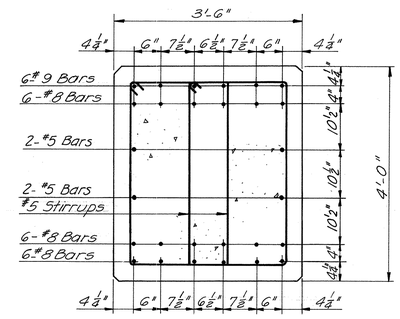
END VIEW
Scale: $\frac{3}{32}$"=1'-0"



SECTION C-C
Scale: $\frac{3}{4}$"=1'-0"



SECTION A-A
Scale: $\frac{3}{4}$"=1'-0"



SECTION B-B
Scale: $\frac{3}{4}$"=1'-0"

AS BUILT

NOTES:
For Framing Plan see Sheet 5.
For Bearing Details see Sheet 51.
For General Notes see Sheet 1.
For Architectural Treatment see Sheet 51 to 50

Foundation Note:
Foundation Elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical Column reinforcing shall not be cut until these elevations are established.
Where elevations change by more than 2 feet, redesign will be required.
Pier Foundation is designed for an allowable Bearing Pressure of 2 tons per sq. foot.

	BY	DATE
MADE	T.D.J.	9-67
CHECKED	W.E.O.	9-67
IN CHARGE	W.E.O.	

NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

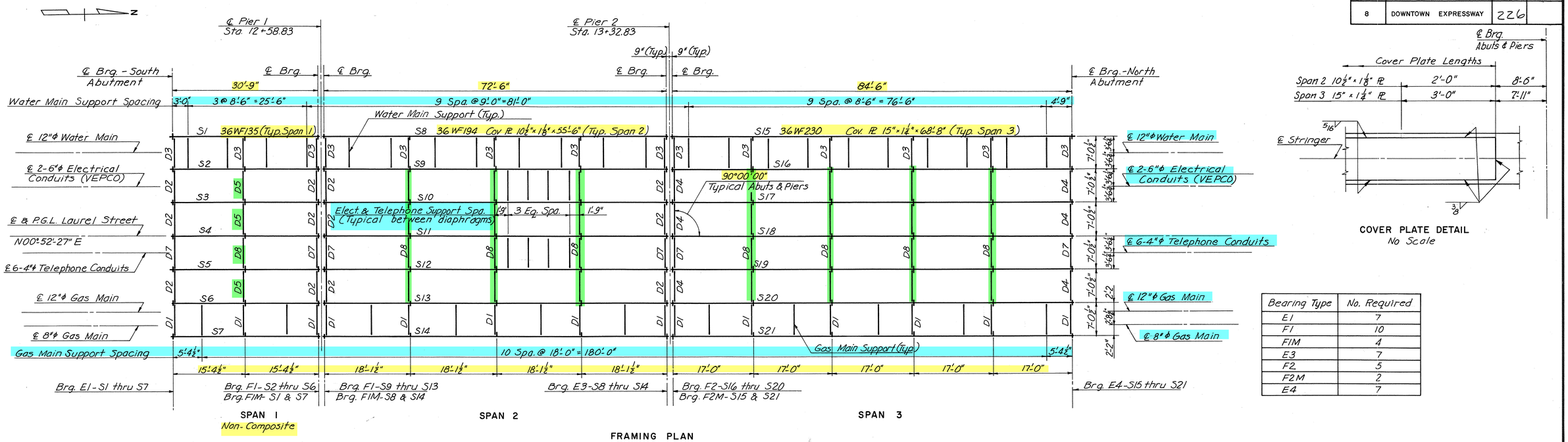
STRUCTURE B 50
LAUREL STREET OVER
DOWNTOWN EXPRESSWAY
PIER DETAILS

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 4 OF 9

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	226	

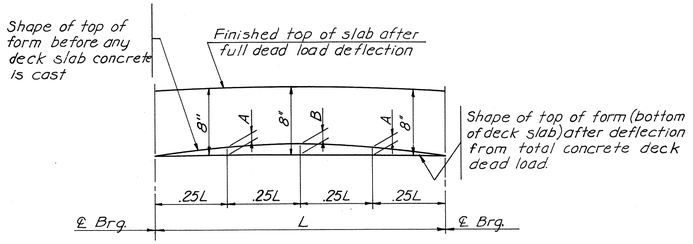


FRAMING PLAN
Scale: 1" = 10'-0"

Note: All intermediate diaphragms are D6 unless otherwise noted.

COVER PLATE DETAIL
No Scale

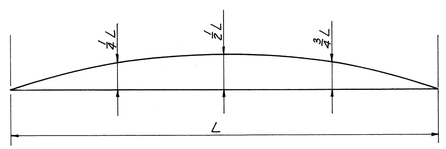
Bearing Type	No. Required
E1	7
F1	10
F1M	4
E3	7
F2	5
F2M	2
E4	7



DEAD LOAD DEFLECTION DIAGRAM

Stringers	A	B
S1 thru S7	1/16"	3/8"
S8, S14	1"	1 1/16"
S9 thru S13	7/8"	1 1/16"
S15, S21	1 1/4"	2 1/16"
S16 thru S20	1 1/4"	1 7/8"

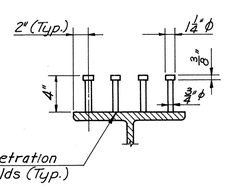
NOTE TO CONTRACTOR:
The above deflections are those anticipated to occur in the stringer upon placement of the total concrete deck dead load. In practice the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall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



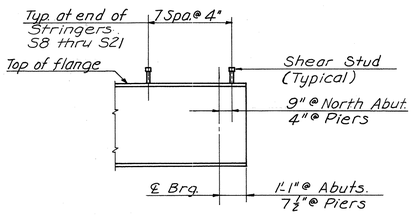
CAMBER DIAGRAM

Stringers	¼L, ¾L	½L
S8, S14	1 3/16"	1 3/8"
S9 thru S13	1 1/16"	1 1/16"
S15, S21	2"	2 1/16"
S16 thru S20	1 13/16"	2 3/16"

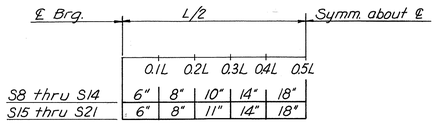
NOTE TO FABRICATOR:
The above stringers shall be fabricated with an upward camber amounting to (see table). This will provide approximate compensation for deflection under full dead load and for conformity with finished grade. Stringers which are not required to be shop cambered shall be turned so that any mill tolerance deviation from straightness will be in the direction shown by the camber diagram above.



SHEAR STUD DETAIL
Scale: 1½" = 1'-0"



DETAIL "A"
No Scale



SHEAR STUD SPACING
No Scale
Shear Stud spacing shown is maximum

Shear Stud Notes:
Capacity = 3400 lbs. per stud.
Three ⅞" diameter studs may be substituted at the same longitudinal spacing as shown for four ¾" diameter studs.
Stud rows to be placed perpendicular to ℄ stringer.
For end condition see Detail "A".

Notes:
Structural steel shall conform to ASTM Specifications A36 (latest revision).
For General Notes see Sheet 1.
For Superstructure Cross Section see Sheet 6.
For Diaphragm Details see Sheet 6.
For Utility Support Details see Sheet 6.
For Bearing Shoe Dimensions see Standard Sheet S1.

AS BUILT

	BY	DATE
MADE	F.B.C.	7-67
CHECKED	W.E.O.	9-67
IN CHARGE W.E.O.		

NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 50
LAUREL STREET OVER DOWNTOWN EXPRESSWAY

FRAMING PLAN

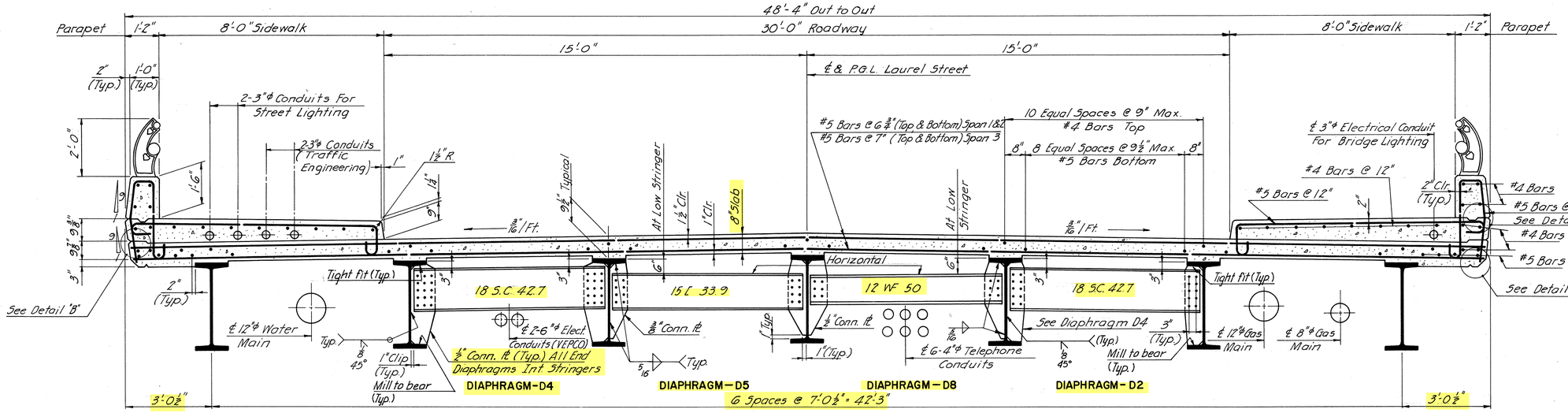
AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 5 OF 9

226

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	227	

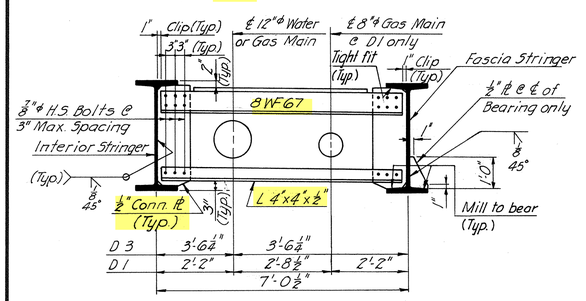


TYPICAL CROSS SECTION
Scale: ½" = 1'-0"

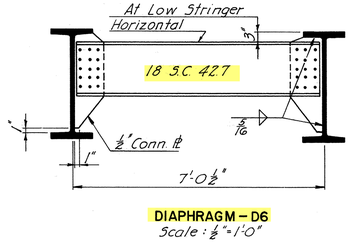
DETAIL "A"
Scale: 1" = 1'-0"

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

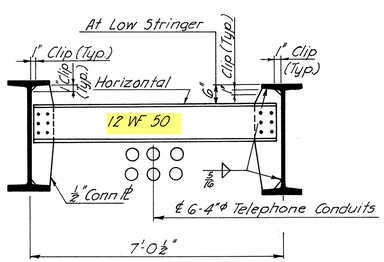
DETAIL "C"
Scale: 1" = 1'-0"



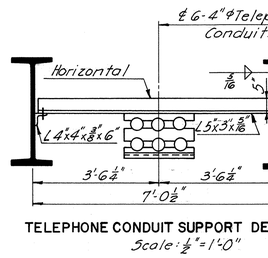
DIAPHRAGM-D1
DIAPHRAGM-D3
Scale: ½" = 1'-0"



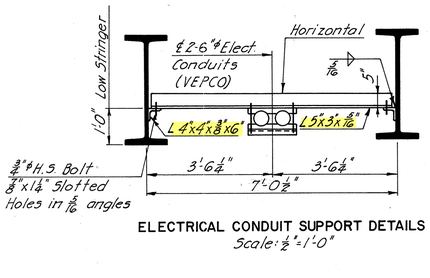
DIAPHRAGM-D6
Scale: ½" = 1'-0"



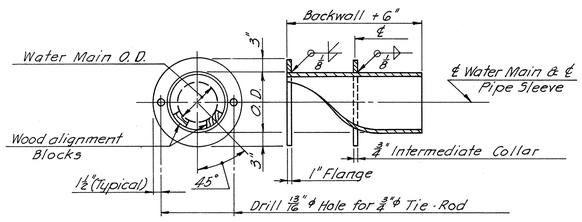
DIAPHRAGM-D7
Scale: ½" = 1'-0"



TELEPHONE CONDUIT SUPPORT DETAILS
Scale: ½" = 1'-0"

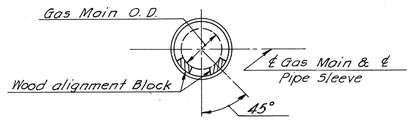


ELECTRICAL CONDUIT SUPPORT DETAILS
Scale: ½" = 1'-0"



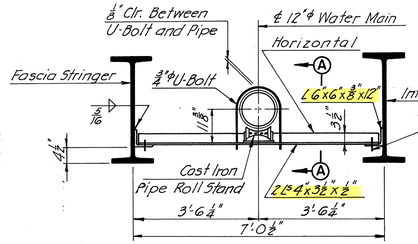
NOTE:
Steel pipe sleeve to be hot-dip galvanized after fabrication in accordance with A.S.T.M. A123

PIPE SLEEVE DETAIL FOR WATER MAIN

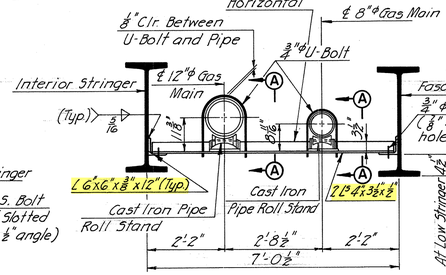


NOTE:
Steel pipe sleeve to be hot-dip galvanized after fabrication in accordance with A.S.T.M. A123

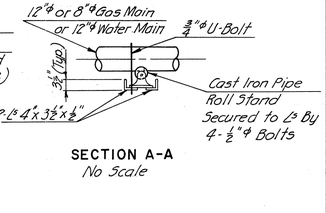
PIPE SLEEVE DETAIL FOR GAS MAIN



WATER MAIN SUPPORT DETAILS
Scale: ½" = 1'-0"

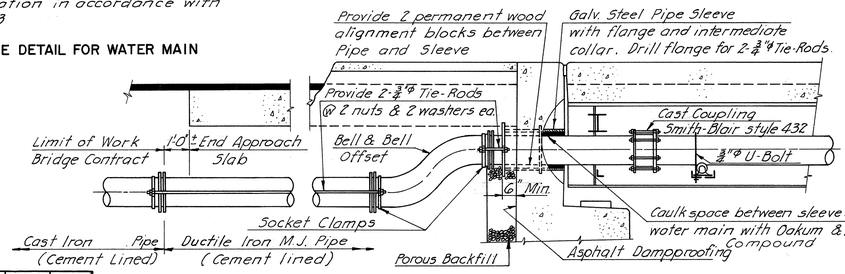


GAS MAIN SUPPORT DETAILS
Scale: ½" = 1'-0"

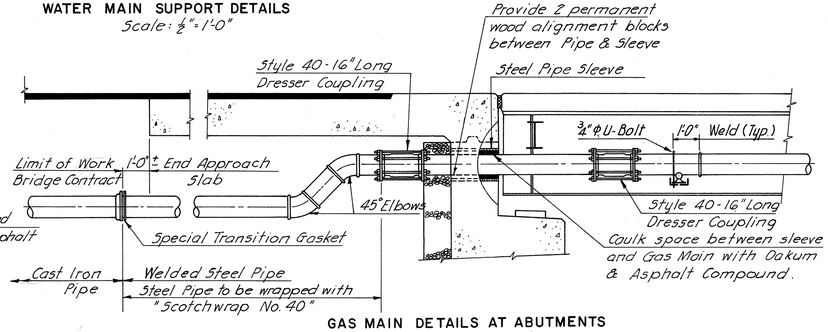


SECTION A-A
No Scale

NOTES:
For General Notes, see Sheet 1.
For Framing Plan, see Sheet 5.
For Slab Plan, see Sheet 7.
For Electrical Conduit Hanger Details, see Sheet S10



WATER MAIN DETAILS AT ABUTMENTS
Scale: ⅜" = 1'-0"



GAS MAIN DETAILS AT ABUTMENTS
Scale: ⅜" = 1'-0"

	BY	DATE				
MADE	C.F.S.	8-67				
CHECKED	W.E.O.	10-67				
IN CHARGE	W.E.O.		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B50
LAUREL STREET OVER
DOWNTOWN EXPRESSWAY

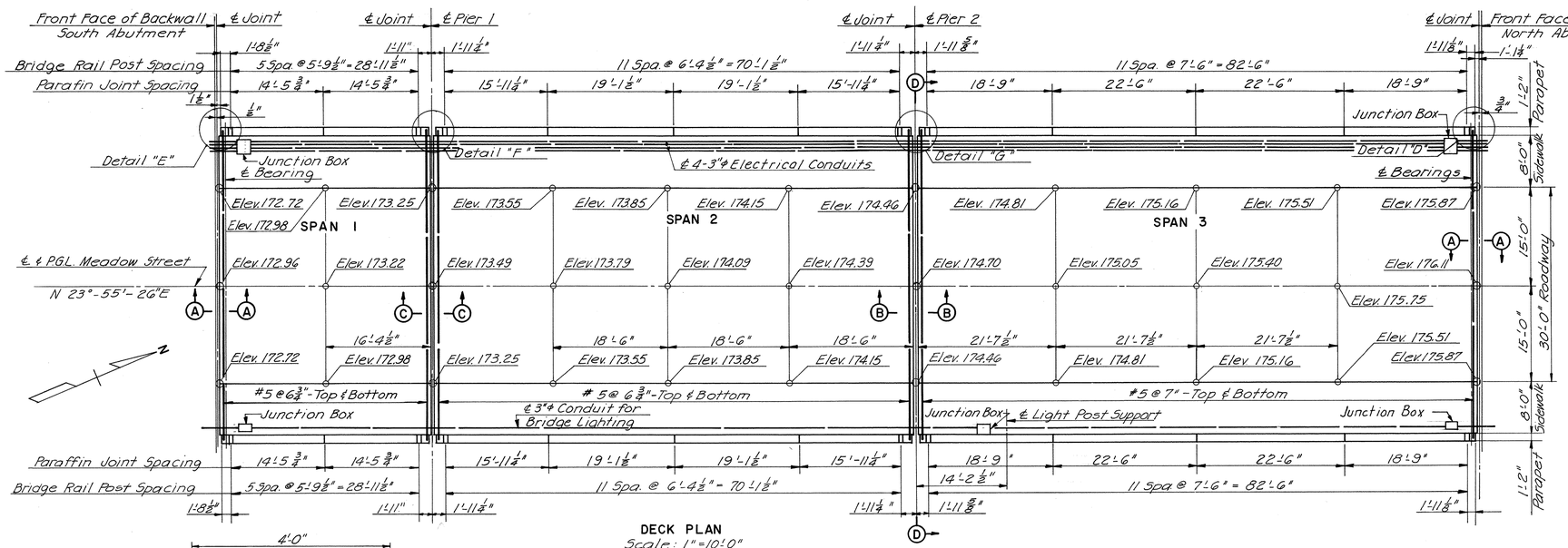
CROSS SECTION & UTILITY DETAILS

AMERICAN ENGINEERS
Richmond, Virginia

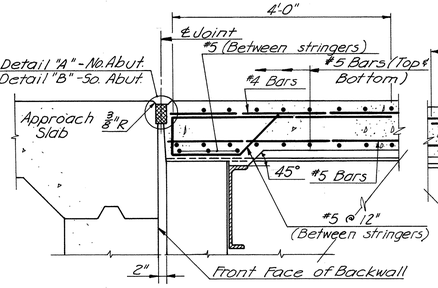
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 6 OF 9

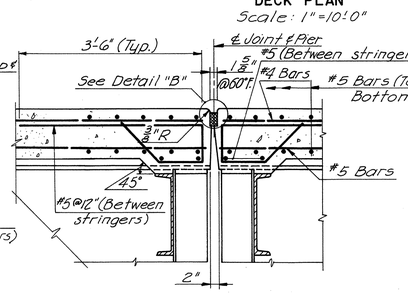
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	228	



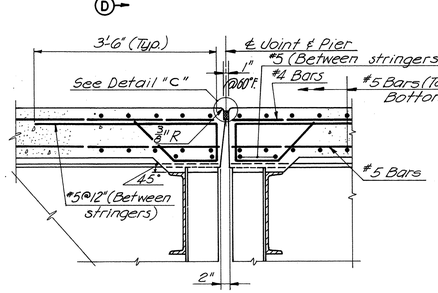
DECK PLAN
Scale: 1"=10'-0"



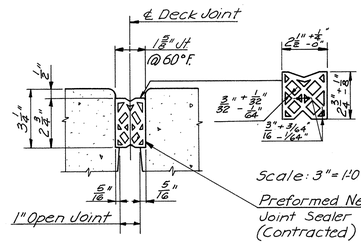
SECTION A-A
Scale: ¾"=1'-0"



SECTION B-B
Scale: ¾"=1'-0"

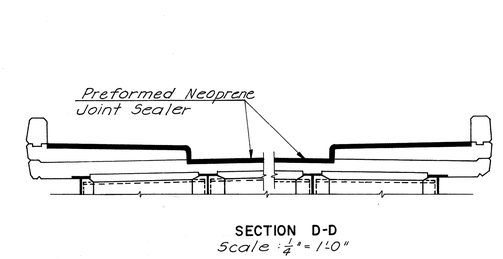


SECTION C-C
Scale: ¾"=1'-0"

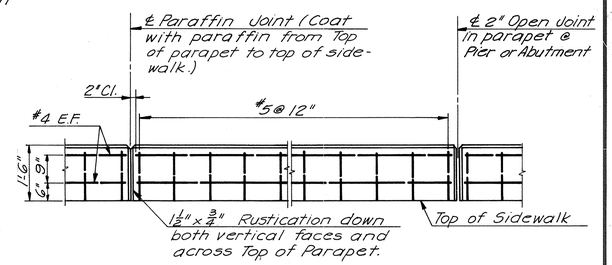


Scale: 3"=1'-0"

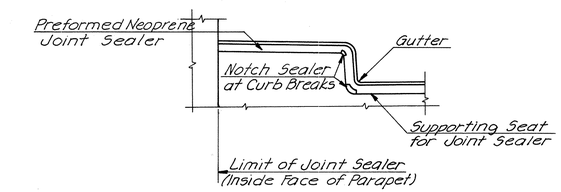
DETAIL "B"
Scale: 3"=1'-0"



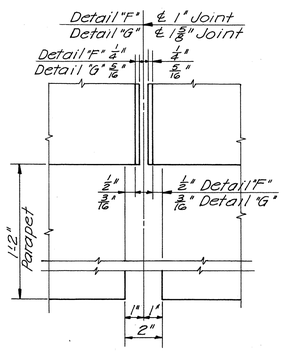
SECTION D-D
Scale: ¼"=1'-0"



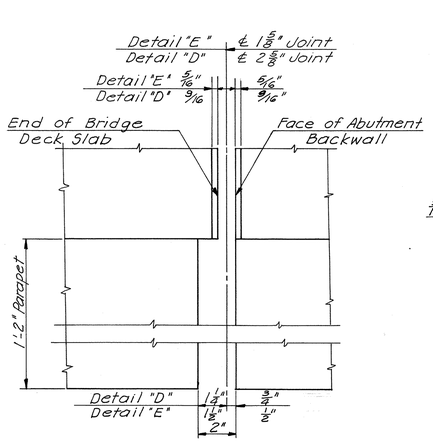
TYPICAL PARAPET ELEVATION
Scale: ½"=1'-0"



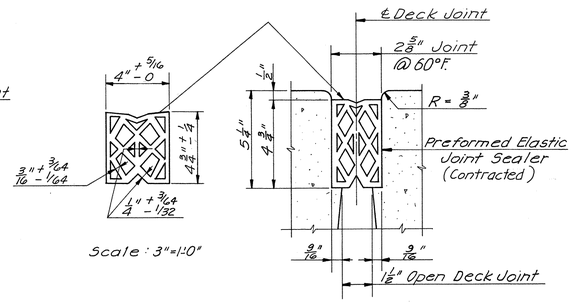
TREATMENT OF JOINT AT CURB
No Scale



DETAIL "F" & "G"
Scale: 3"=1'-0"

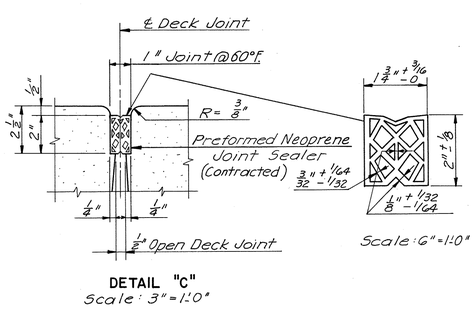


DETAIL "D" & "E"
Scale: 3"=1'-0"



Scale: 3"=1'-0"

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



Scale: 6"=1'-0"

DETAIL "C"
Scale: 3"=1'-0"

NOTES:
For Typical Deck Cross Section, see Sheet 6.
For General Notes, see Sheet 1.
For Framing Plan, see Sheet 5.
For Railing Details see Sheet 53.
For Light Post Support Details see Sheet 54.

Note to Contractor:
It is absolutely essential that the openings for the preformed neoprene joint sealers be accurately formed and constructed to smooth, straight lines. The size of the opening shall be adjusted to allow for anticipated dead load rotation of the ends of the slab and for the temperature at the time of construction.

AS BUILT

	BY	DATE
MADE	R.P.R.	8-67
CHECKED	W.E.O.	9-67
IN CHARGE	W.E.O.	

NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B50
LAUREL STREET OVER
DOWNTOWN EXPRESSWAY

DECK PLAN AND JOINT DETAILS

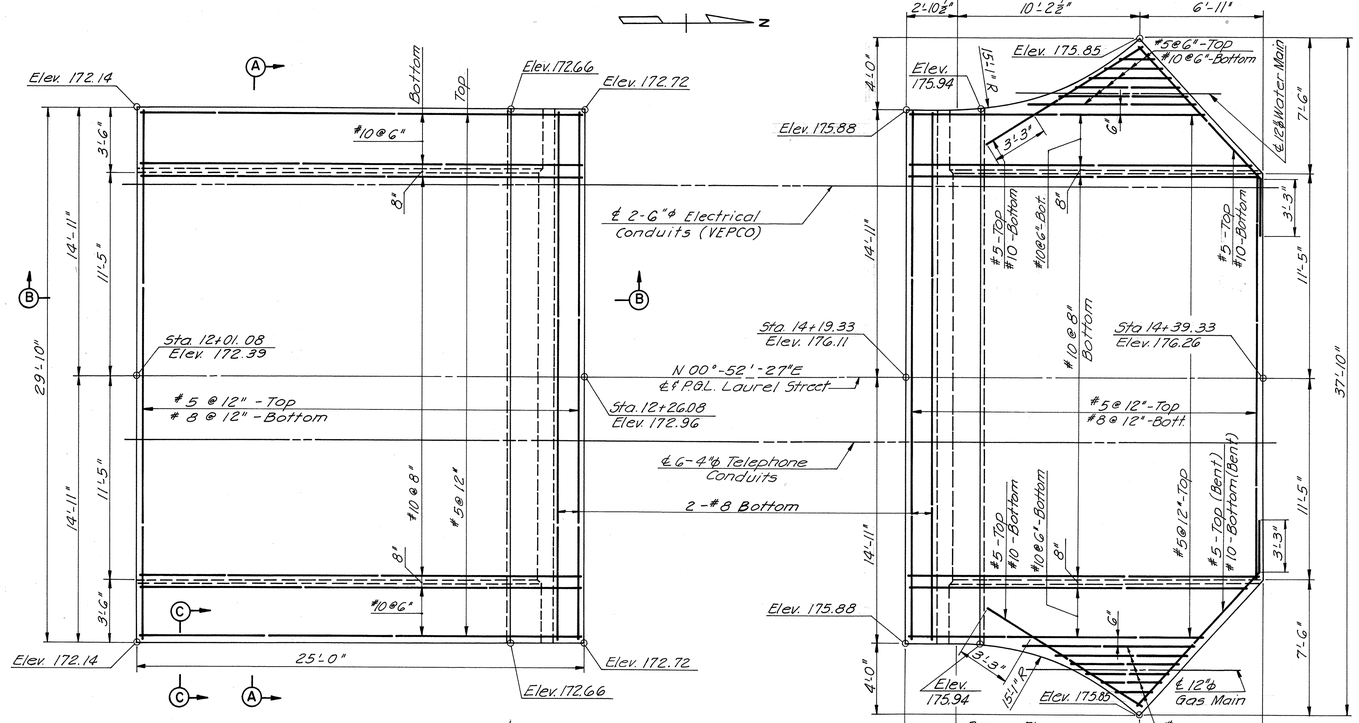
AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

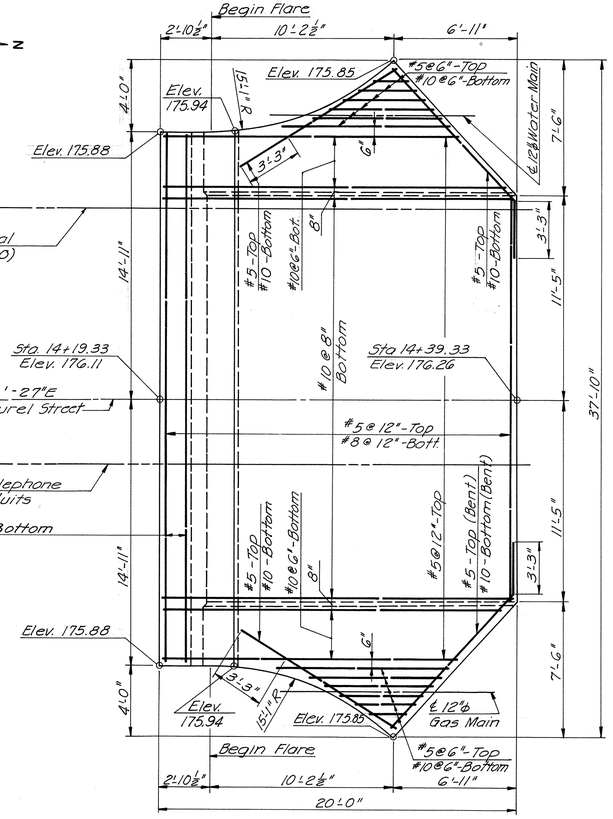
SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 7 OF 9

228

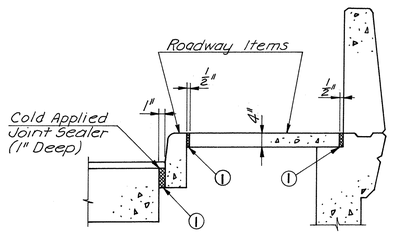
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	229	



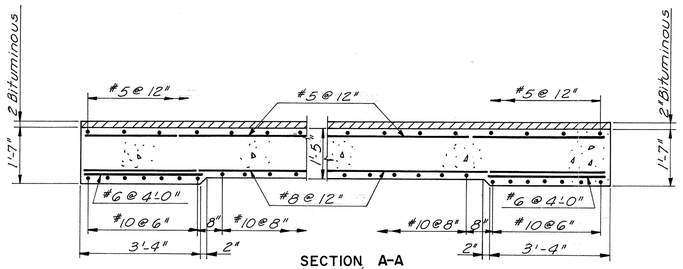
PLAN — SOUTH ABUTMENT
Scale : 1/4"=1'-0"



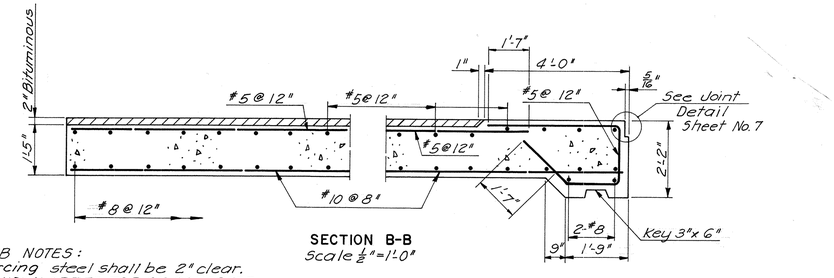
PLAN — NORTH ABUTMENT
Scale : 1/4"=1'-0"



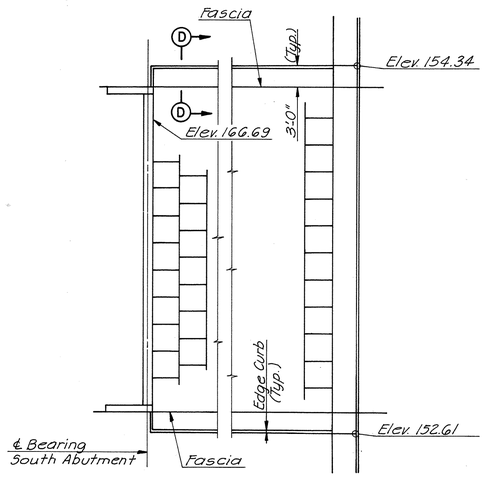
① Preformed Expansion Joint Material
SECTION C-C
Scale: 1/4"=1'-0"



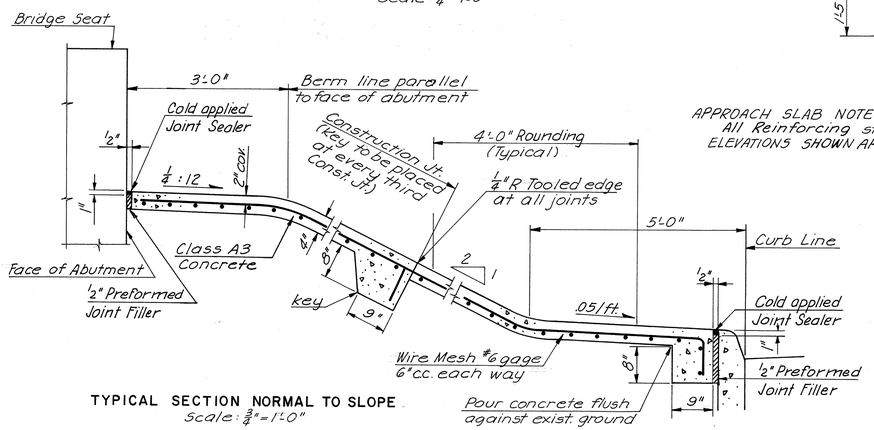
SECTION A-A
Scale : 1/2"=1'-0"



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

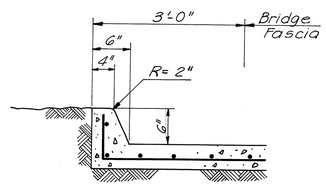


PLAN — SLOPE PROTECTION
Scale: 3/32"= 1'-0"



TYPICAL SECTION NORMAL TO SLOPE
Scale: 3/4"=1'-0"

APPROACH SLAB NOTES:
All Reinforcing steel shall be 2" clear.
ELEVATIONS SHOWN ARE TO TOP OF CONCRETE.



SECTION D-D
No Scale

SLOPE PROTECTION NOTES:

The Item "Concrete Slope Protection" shall include the excavation of or the placing and compaction of any embankment material necessary to bring the surface of the paved slopes of the finished elevations shown on the plans.

"Concrete Slope Protection" shall be paid for at the contract unit price per square yard, which price shall include the concrete slab including wire mesh and joint filler.

The slab shall be constructed in 4'-0"x4'-0" panels, placed in horizontal courses, alternate panels poured in a staggered pattern with adjacent panels poured later. The slab shall be Class A3 concrete of such consistency that it can be placed without the use of top forms, the surface shall be finished with a wood float.

Reinforcement shall consist of wire mesh #6 gage, 6" c.c. each way, placed at the center of the slab, and continuous through construction joints.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	R.P.R.	8-67				
CHECKED	W.E.O.	9-67				
IN CHARGE	W.E.O.					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 50
LAUREL STREET OVER
DOWNTOWN EXPRESSWAY
APPROACH SLAB & SLOPE PROTECTION DETAILS

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 8 OF 9

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	230	

BORING 8-48

Elev.	Casing Blows/Ft.	Spoon Blows Per 6"	Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
172.8	14	3 3	S-1	0'-2'	172.8	
	18	4 3			170.8	Fill: Red CLAY & SILT, some m-f Sand, trace Coal Ash
	26'					
	25					
167.8	12					
	25	3 5	S-2	5'-7'		
	44	6 7				
	79					
	118					
162.8	46					
	87	6 12	S-3	10'-12'		Reddish Tan SILT & CLAY, some m-f Sand, trace Gravel
	142	13 13				
	270					
	171					
157.8	84					
	123	41 40	S-4	15'-17'		
	225	41 24				
▼ 154.8	253					
	165				152.8	
152.8	25					
	80	7 16	S-5	20'-22'		Reddish SILT & CLAY, and Sand, some Gravel, little Limonite
	60	18 9				
	OPEN					
147.8		4 4	S-6	24'-26'	147.8	
		3 5				
		P P	7U	26'-27'		
		P				
142.8		3 4	S-8	29'-31'		
		5 8				
						Green SILT & CLAY, some f Sand, trace weathered Gravel (MARL)
137.8		3 3	S-9	34'-36'		
		5 5				
132.8						
		5 8	S-10	39'-41'		
		11 15				
127.8		4 16	S-11	44'-46'		
		6 11				
						Bottom of Hole Elev. 126.8

BORING 8-49

Elev.	Casing Blows/Ft.	Spoon Blows Per 6"	Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
173.1	3	5 9	S-1	0'-2'	173.1	
	9	6 8				Brown-Tan m-f SAND, some Silty Clay, trace Cinders
	15	5 7	S-2	2'-4'		
	16	6 7				
168.1	13	7 8	S-3	4'-6'		
	19	12 16			166.1	
	35					
	44					
	53					
163.1	72					
	45	14 15	S-4	10'-12'		Reddish Tan-Gray c-f SAND, and Silty Clay, trace Organic, trace f Gravel
	30	18 23				
	37					
▼ 159.1	59				159.6	
158.1	55					
	32	12 5	S-5	15'-17'		
	28	4 4				
	17					
	10					
153.1	9					Tan f SAND, and Silty Clay, trace f Gravel
	14	6 24	S-6	20'-22'		
	24	18 12				
	25					
	26					
148.1	28				148.1	
	OPEN	6 4	S-7	25'-27'		
		5 6				
143.1						
		4 5	S-8	30'-32'		
		6 7				
138.1						Gray-Green SILTY CLAY, and f Sand, trace Organic (MARL)
		3 5	S-9	35'-37'		
		4 2				
133.1						
		7 8	S-10	40'-42'		
		11 14				
128.1						
		8 9	S-11	45'-47'		
		13 16				
						Bottom of Hole Elev. 126.1

BORING 8-50

Elev.	Casing Blows/Ft.	Spoon Blows Per 6"	Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
174.3	1	2 1	S-1	0'-2'	174.3	
	3	2 1			171.8	Fill: Red CLAY, and Sand, little Gravel
	4					
	W					
169.3	9					
	14	8 10	S-2	5'-7'		Tan CLAY, and Sand, trace Gravel
	24	16 22				
	15				166.3	
	20					
164.3	21	15 20	S-3	9.5'-11'		
	16	22				
	14					
	15					Red CLAY, and Sand, little weathered Gravel, trace White Clayey Silt
	5					
159.3	11	30 37	S-4	14'-16'		
	37	21 19				
	28					
▼ 156.3	23					
	OPEN					
154.3						
		4 3	S-5	20'-22'		
		5 3				
149.3		26 18	S-6	24'-26'		
		6 8				
144.3					144.0	
		9 9	S-7	30'-32'		
		12 11				
139.3						
		4 5	S-8	35'-37'		
		6 9				
134.3						
		8 9	S-9	40'-42'		
		9 14				
129.3						Green Silt & Clay, trace f Sand, trace Shell trace Organic (MARL)
		6 9	S-10	45'-47'		
		10 7				
124.3						
		5 9	S-11	50'-52'		
		11 15				
119.3						
		7 8	S-12	55'-57'		
		10 18				
114.3						
		15 20	S-13	60'-67'	113.3	
						Tan c-f SAND, and Green Silt & Clay
109.3						
		12 25	S-14	65'-67'		
		31 35				
104.3						
		10 12	S-15	70'-72'	103.3	Green CLAY & SILT (MARL)
		15 32				Gray-Green m-f SAND, some Gravel, little Silt & Clay, little disintegrated Limestone
		11 34	S-16	73'-75'	99.8	White powdered LIMESTONE
99.3		48 165			98.8	
		207 /12"/2	S-17	75'-75.8		Bad Core - 6" LIMESTONE, m-c Sand
	3min.		C-1	75.8'-80		(C-1 20%Rec.)
	2min.					
	1min.					
94.3	1min.					
89.3						
84.3						
					81.8	
			C-2	92.5'-95		Bad Core 4" LIMESTONE Ash at top, 13 GRANITE Fragments at bottom, f-m SAND, some Green Clayey Silt between
	2min.					(C-2 10%Rec.)
79.3	2min.					
79.3	1min.		C-3	95'-99'		Gray Black GRANITE, Dense
	1min.					(C-3 50%Rec.)
	1min.					
	2min.					
						Bottom of Hole Elev. 75.8

BORING 8-51

Elev.	Casing Blows/Ft.	Spoon Blows Per 6"	Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
176.0	1	2 2	S-1	0'-2'	176.0	
	3	3 5				Red-Tan SILTY CLAY, and m-f Sand, trace m-f Gravel, trace Organic
	10	4 5	S-2	2'-4'		
	13	7 11				
171.0	30	10 21	S-3	4'-6'		
	30	19 21				
	30					
	35					
	34					
166.0	31				166.0	
	34	9 11	S-4	10'-12'		
	31	16 20				
	44					
	40					
161.0	28					
▼ 160.0	25	20 13	S-5	15'-17'		
	24	10 6				
	21					
	14					
156.0	16					Tan c-f SAND, some m-f Gravel, little Clayey Silt (Very Wet)
	27	1 1	S-6	20'-22'		
	21	1 1				
	17					
	26					
151.0	25					
	32	14 14	S-7	25'-27'		
	OPEN	8 13				
					147.0	
146.0						
		3 4	S-8	30'-32'		
		5 6				
141.0						
		3 3	S-9	35"-37"		Gray-Green SILTY CLAY, and m-f Sand, trace Organic (MARL)
		4 5				
136.0						
		4 5	S-10	40'-42'		
		6 9				
131.0						
		19 11	S-11	45'-47'		
		13 15				
126.0						
		5 8	S-12	50'-52'		
		12 8				
121.0						
		9 13	S-13	55'-57"		
		20 27				
						Bottom of Hole Elev. 119.0

GENERAL NOTES

(1) The first elevation noted is the existing ground surface.
(2) ▼ denotes the ground water level as measured.
(3) (a) Casing Blows are the blows per foot for a 300 pound hammer falling 24 inches except where noted otherwise.
(b) Also noted in Casing Blows column (where applicable) are rock drilling times in minutes per foot.
(4) (a) Spoon Blows are the blows per 6 inches for a 2" O.D., 1½ I.D. Split Spoon Sampler using a 140 pound hammer falling 30 inches.
(b) W denotes penetration under weight of hammer.
(c) P denotes penetration by hydraulic pressure.
(5) (a) Samples designated by an "S" number indicate Split Spoon Samples.
(b) Samples designated by a "U" number indicate Undisturbed Shelby Tube Samples (3 3/8 " ∅).
(c) Samples designated by a "C" number indicate 1 3/16" ∅ (AX) Rock Cores.
(6) Samples descriptions are based on field visual identification by the boring inspector.
(7) Abbreviation and quantitative terms:

c-coarse	trace 1-10%
m-medium	little 10-20%
f-fine	some 20-35%
	and 35-50%

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.M.S.	8-10-67				
CHECKED	W.E.O.	8-11-67				
IN CHARGE	W.E.O.					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 50
LAUREL STREET OVER
DOWNTOWN EXPRESSWAY

BORING LOGS

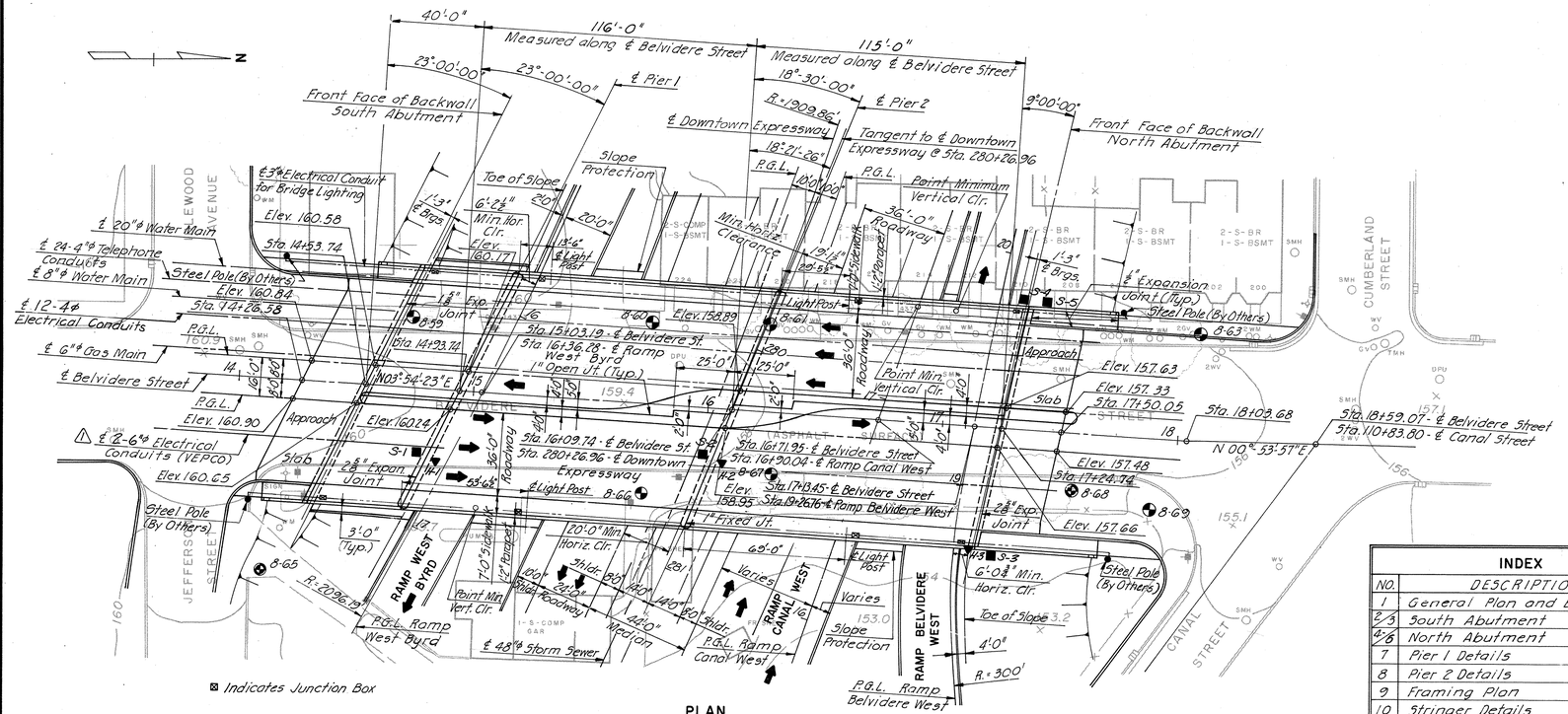
AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: 1" = 6' VERT.
CONTRACT NO.: 8
SHEET NO. 9 OF 9

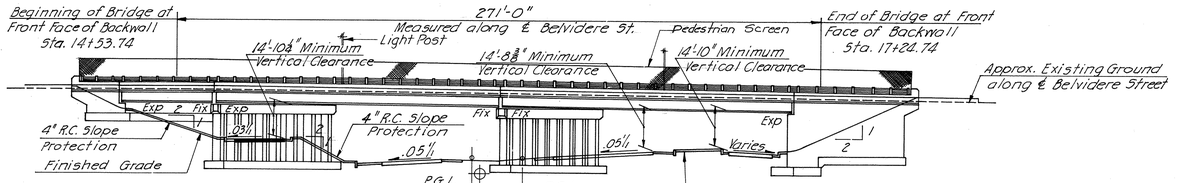
230

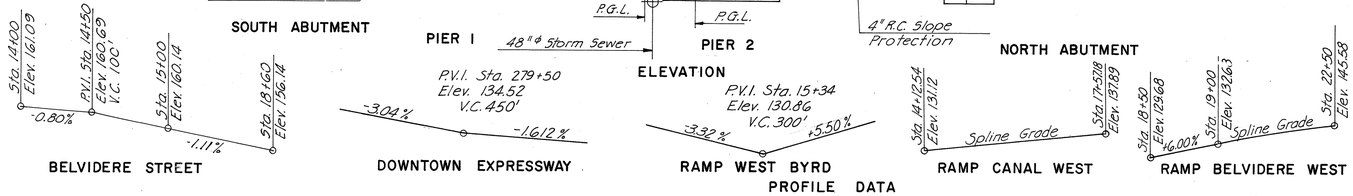
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	231	



⊠ Indicates Junction Box

PLAN





PROFILE DATA

INDEX

NO.	DESCRIPTION
1	General Plan and Elevation
2-3	South Abutment
4-6	North Abutment
7	Pier 1 Details
8	Pier 2 Details
9	Framing Plan
10	Stringer Details
11	Cross Section
12	Diaphragm Details
13	Utility Details
14	Deck Plan
15	Joint Details
16	Approach Slab - South Abutment
17	Approach Slab - North Abutment
18	Slope Protection Details
19-21	Boring Logs
S1	Standard Shoe Details
S3	Standard Aluminum Railing Details
S4	Standard Electrical Details
S7-S8	Standard Architectural Details
S10	Standard Elect and Tele Cond Details
S11	Standard Utility Support details @ Abut.

GENERAL NOTES:

ROADWAY: Two 36'-0" clear roadways. Two 7'-0" sidewalks. One variable median.

CAPACITY: Dead Load - includes 15 lbs. per sq. ft. for future wearing surface.
Live Loads - HS20-44 loading and B.P.R. modified for military vehicles.

SPECIFICATIONS: GENERAL - Virginia Department of Highway Road and Bridge Specifications 1970
DESIGN - A.A.S.H.O. Standard Specifications for Highway Bridges, 1961 modified by Special Design Provisions.
WELDING - 1969 Standard Specifications for welded Highway and Railway Bridges of the American Welding Society.

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 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 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. 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 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. Specification A36 except as noted.
All field connections shall be made with high strength bolts. High Strength bolts shall be ⅞"ϕ unless otherwise noted and shall conform to A.S.T.M. Specification A-325.

BENCH MARK: C-40 Monument located at S.E. corner Idlewood Avenue and Belvidere Street. Elev. 160.76.

ESTIMATED QUANTITIES

	STRUCTURE EXCAVATION C.Y.	CONCRETE CLASS A4 C.Y.	CONCRETE CLASS A3 C.Y.	REINFORCING STEEL LBS.	STRUCTURAL STEEL A36 LBS	ALUMINUM BRIDGE RAILING L.F.	CONCRETE SLAB SLOPE PROTECTION S.Y.	ASPHALT DAMP-PROOFING S.Y.	6" INCH PIPE UNDERDRAIN L.F.	POROUS BACKFILL C.Y.	GAS MAIN 6"ϕ L.F.	WATER MAIN 20"ϕ L.F.	WATER MAIN 8"ϕ L.F.	CONDUIT 6"ϕ VEPCO L.F.	CONDUIT 4"ϕ TELE. L.F.	Pedestrian Screen L.F.	CONDUIT 4"ϕ CITY L.F.	3"ϕ PVC. CONDUIT L.F.	2"ϕ METAL CONDUIT L.F.		
Superstructure		962.16		224,141	1,324,511.8	658															
South Abutment	475		234.47	11,589			564.9	228	126	76											
Pier 1	598		258.89	50,865			295.1														
Pier 2	318		258.71	48,366																	
North Abutment	1,194		891.55	76,607			131.2	468	170	289											
Approach Slabs			258.08	58,162																	
Total	2,585	962.16	1,901.70	468,730	1,324,511.8	658	991.2	696	296	365	323	247	313	664 ⚠	6,504	665	3,252	570	16		

	BY	DATE				
MADE	WDU	10-67		AS BUILT	HMW	4-76
CHECKED	WEO	12-67	⚠	Rev. VEPCO Quantity	DGT	1/12/74
IN CHARGE	WEO		NO.	REVISION	BY	DATE

NOTES: Top of Pavement Elevations at ends of Deck along P.G.L.'s are given on Plan; Remaining Pavement Elevations are given on Sheet 14.
⊕ - Indicates 2½"ϕ Cased Hole Boring.
⊕ - Indicates 4"ϕ Cased Hole Boring
▼ - Indicates Geonor Heave Points
■ - Indicates Settlement Points

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 51
BELVIDERE STREET OVER
DOWNTOWN EXPRESSWAY

GENERAL PLAN AND ELEVATION

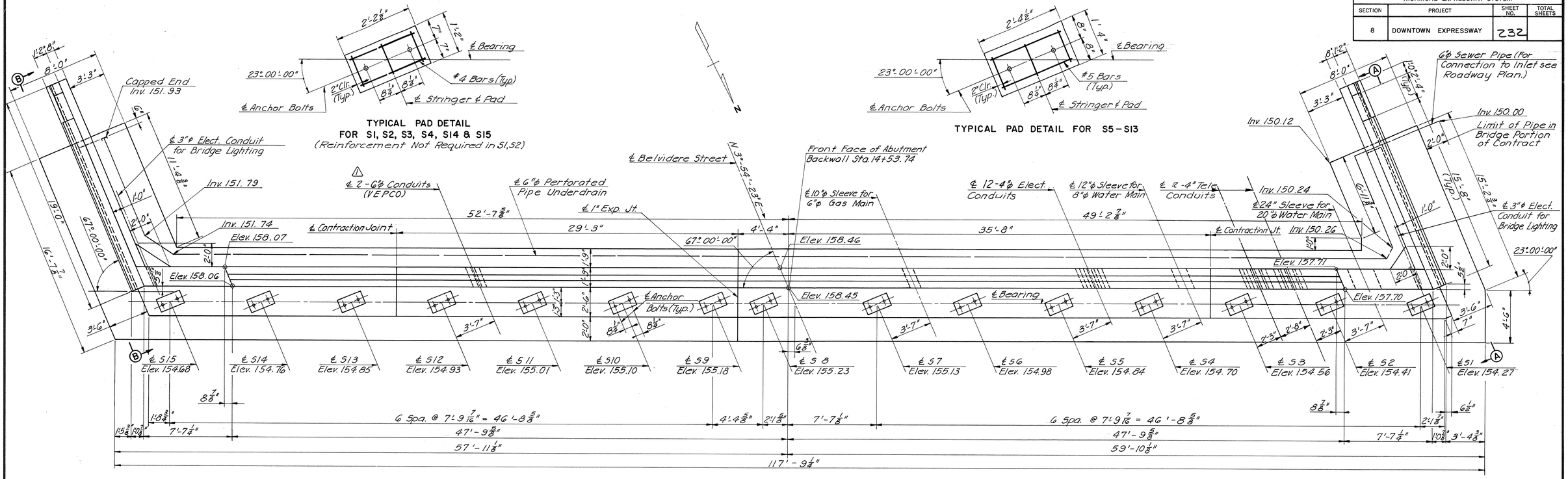
AMERICAN ENGINEERS
Richmond, Virginia

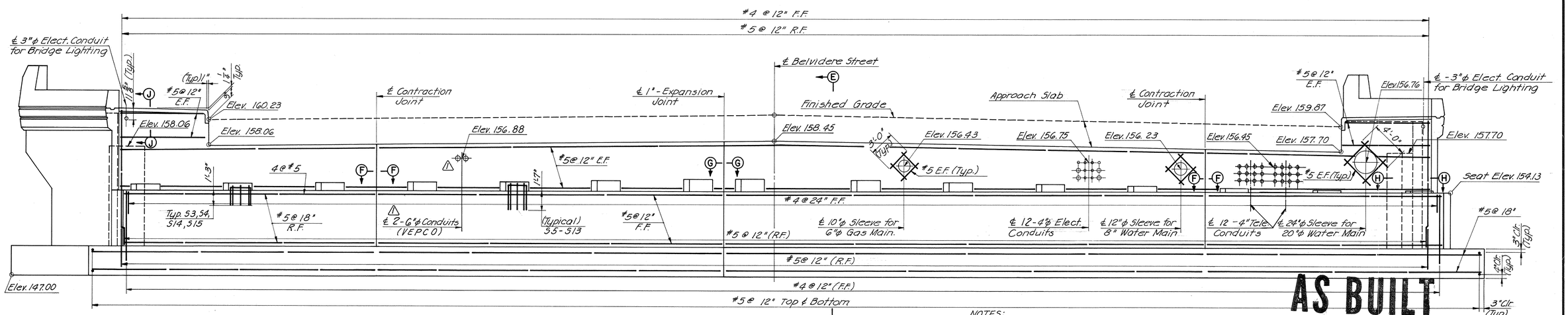
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: 1"=30'-0"
CONTRACT NO.: 8
SHEET NO. 1 OF 21

231

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	232	





AS BUILT

Foundation Note:
South Abutment Foundation is designed for an allowable bearing pressure of 12 tons per sq. ft. Footings shall be founded at the elevation shown on the plans unless directed by the Engineer due to conditions at the sight during construction. In such cases the Engineer will determine the extent of redesign necessary and will advise the Contractor before construction begins.

NOTES:
For Railing Details see Sheet S3.
For Architectural Treatment Details see Sheet S7 to S9
For Framing Plan, see Sheet 9.
For Joint Details, see Sheet 15.
For Bearing Details, see Sheet 51.
For Approach Slab Details, see Sheet 16.
For General Notes, see Sheet 1.
For Electrical Details, see Sheet S4.
For Railing Details, see Sheet S3.
For Sections, Views and additional Details, see Sheet 3.
F.F. Denotes Front Face
R.F. Denotes Rear Face
E.F. Denotes Each Face
All Bar spacings shown are maximum.
For Sections showing Utility Details see Sheet 13.

	BY	DATE
MADE	C.F.S	11-67
CHECKED	W.E.O.	12-67
IN CHARGE	W.E.O.	

NO.	REVISION	BY	DATE
1	Rev. No. VEPCO Conduits	DGT	1/12/74

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B51
BELVIDERE STREET OVER DOWNTOWN EXPRESSWAY

SOUTH ABUTMENT

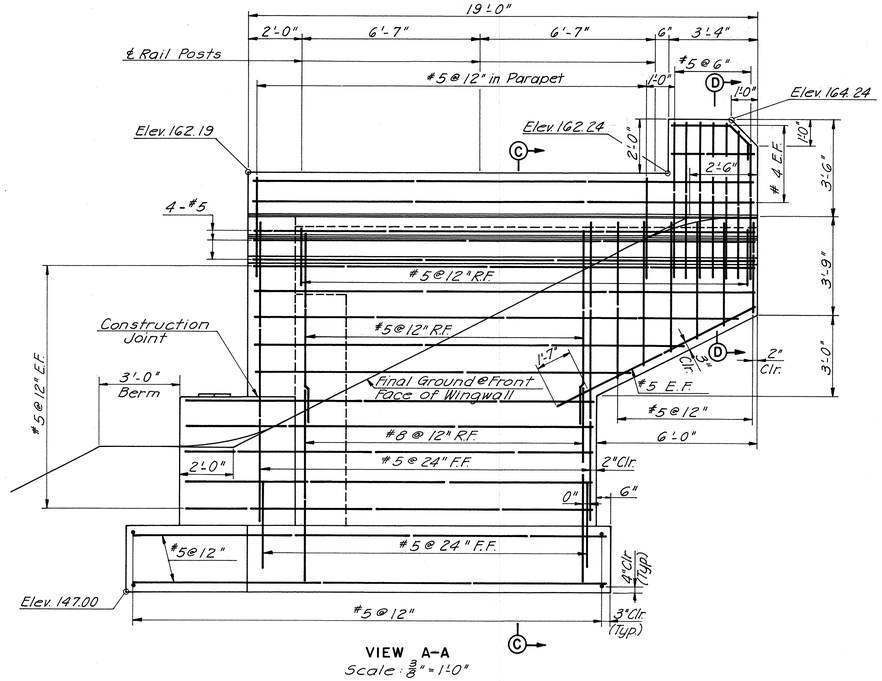
AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

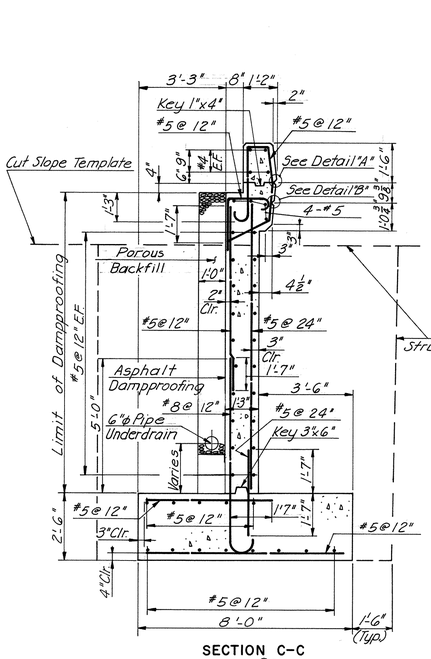
SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 2 OF 21

232

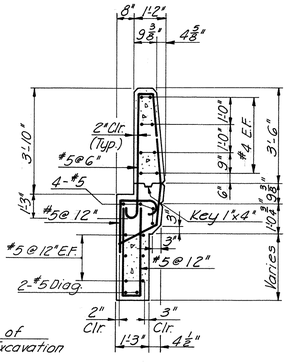
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	233	



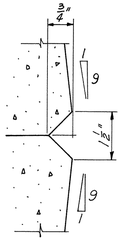
VIEW A-A
Scale: $\frac{3}{8}$"=1'-0"



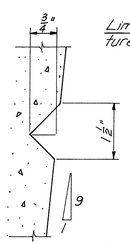
SECTION C-C
Scale: $\frac{3}{8}$"=1'-0"



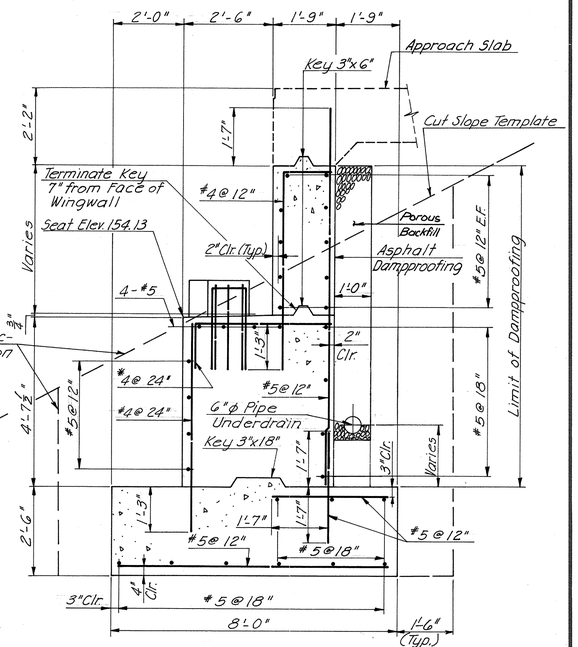
SECTION D-D
Scale: $\frac{3}{8}$"=1'-0"



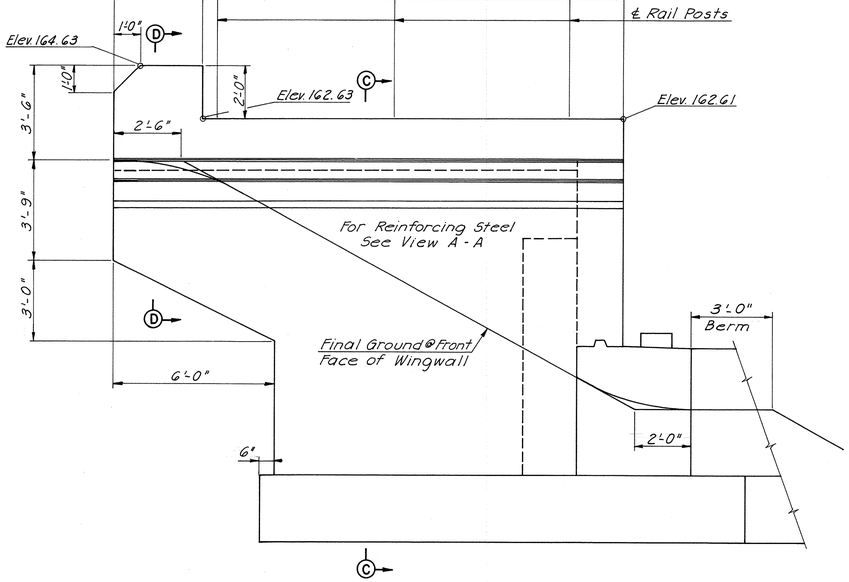
DETAIL "A"
Half Scale



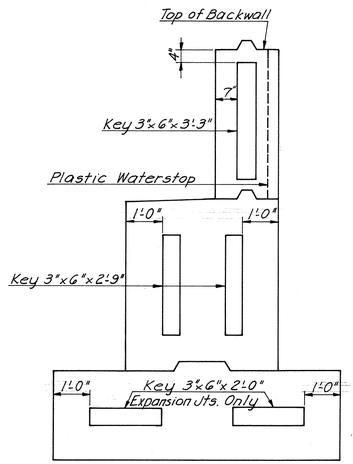
DETAIL "B"
Half Scale



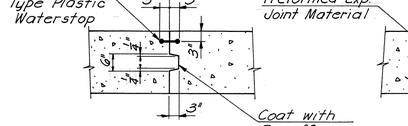
SECTION E-E
Scale: $\frac{1}{2}$" = 1'-0"



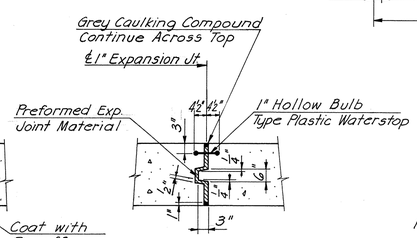
VIEW B-B
Scale: $\frac{3}{8}$"=1'-0"



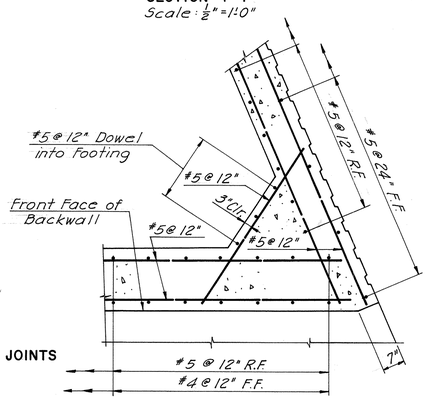
DETAIL AT CONTRACTION AND EXPANSION JOINTS
Scale: $\frac{1}{2}$"=1'-0"



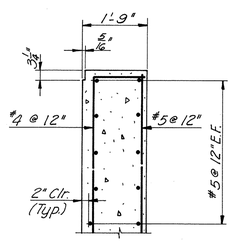
SECTION F-F
Scale: $\frac{1}{2}$"=1'-0"



SECTION G-G
Scale: $\frac{1}{2}$"=1'-0"



SECTION H-H
Scale: $\frac{1}{2}$"=1'-0"



SECTION J-J
Scale: $\frac{1}{2}$"=1'-0"

NOTES:
For Plan & Elevation, see Sheet 2.
R.F. Denotes Rear Face.
E.F. Denotes Each Face.
F.F. Denotes Front Face.
* Two additional #4 bars at 24" to be provided at each unreinforced bearing pad.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	C.F.S.	11-67				
CHECKED	W.E.O.	12-67				
IN CHARGE	W.E.O.					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

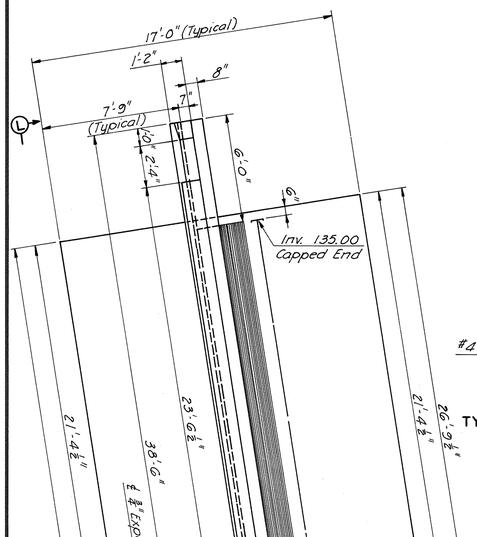
STRUCTURE B51
BELVIDERE STREET OVER
DOWNTOWN EXPRESSWAY
SOUTH ABUTMENT

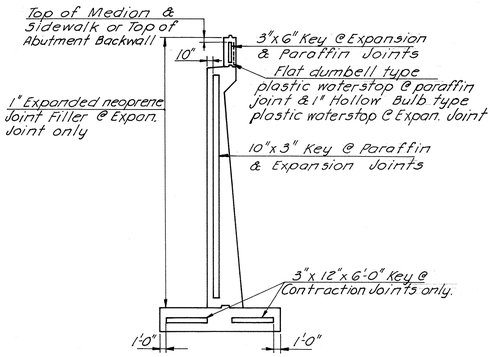
AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

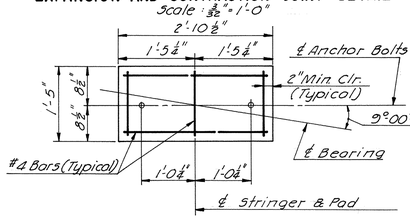
SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 3 OF 21

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	234	



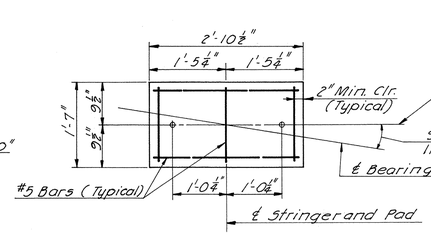


EXPANSION AND CONTRACTION JOINT DETAIL

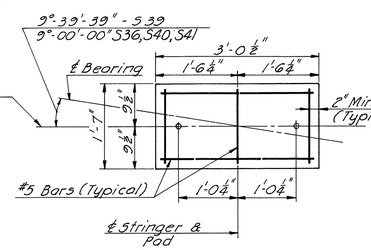


TYPICAL PAD DETAIL FOR S31–S35 & S42–S45
(Reinforcement Not Required in S31 & S32 & S45)

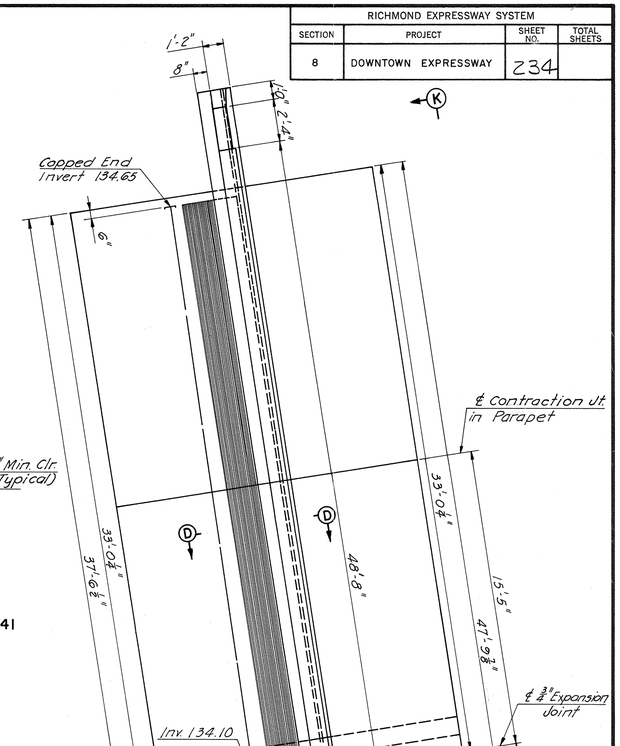
NOTES:
For Elevation View, See Sheet 5.
For Section D-D & Views K-K & L-L, see Sheet 6.
For Framing Plan, see Sheet 9.
For Joint Details, see Sheet 15.
For Bearing Details, see Sheet 51.
For Approach Slab Details, see Sheet 17.
For General Notes, see Sheet 1.
For Architectural Treatment Details, see Sheet S7 to S10
For Utility Details, see Sheet 13.
For Railing Details, see Sheet 53.
For Electrical Details, see Sheet S4.
F.F. Denotes Front Face.
R.F. Denotes Rear Face.
E.F. Denotes Each Face.
All bar spacings shown are maximum.

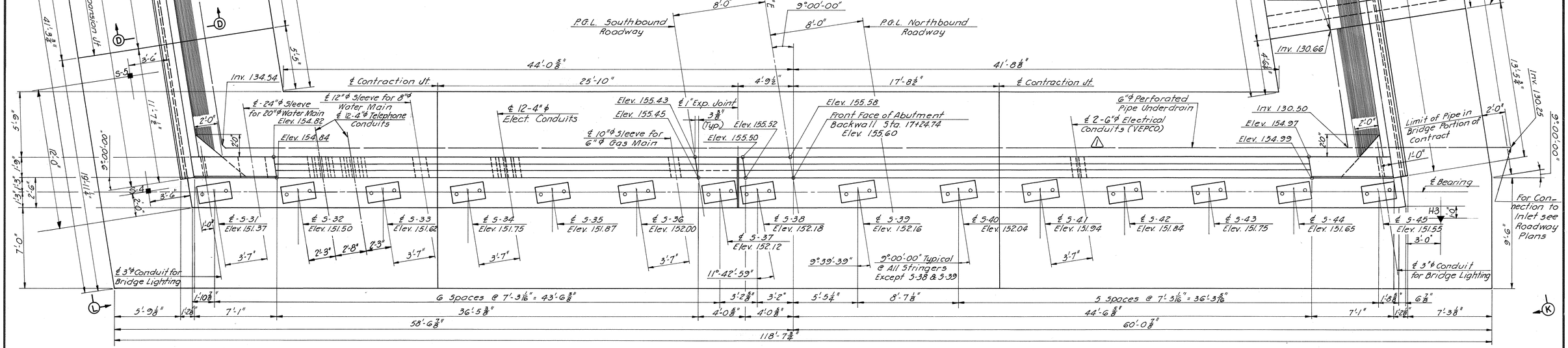


TYPICAL PAD DETAIL FOR S37 & S38



TYPICAL PAD DETAIL S36, S39–S41





PLAN
Scale: ¼"=1'-0"

FOUNDATION NOTE:
North Abutment Foundation is designed for an allowable bearing pressure of 2½ tons per sq. ft. Footings shall be founded at the elevation shown on the Plans unless otherwise directed by the Engineer due to conditions at the site during construction. In such cases the Engineer will determine the extent of redesign necessary and will advise the Contractor before construction begins.

	BY	DATE				
MADE	DLA	11-67		AS BUILT	H.M.W.	4-76
CHECKED	WEO	12-67	1	Rev. No. VEPCO Conduits	DGT	1/12/74
IN CHARGE	WEO		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B51
BELVIDERE STREET OVER
DOWNTOWN EXPRESSWAY

NORTH ABUTMENT

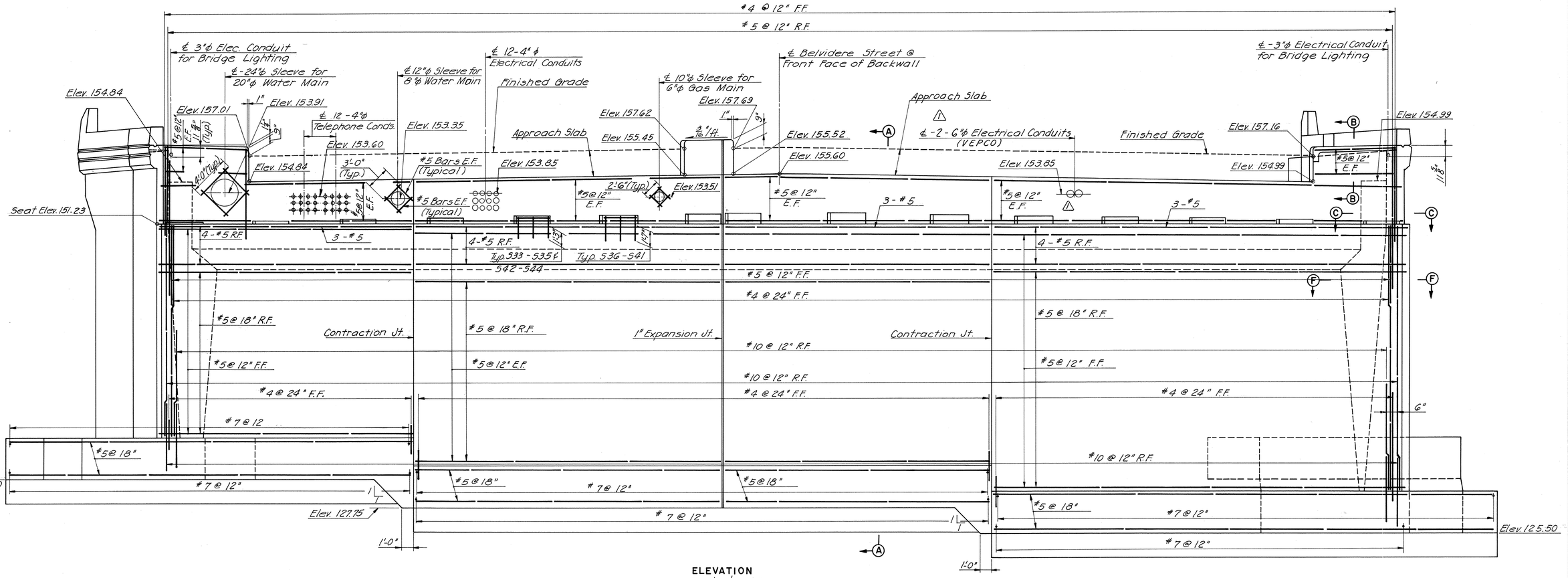
AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

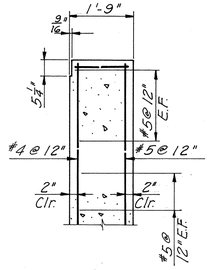
SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 4 OF 21

234

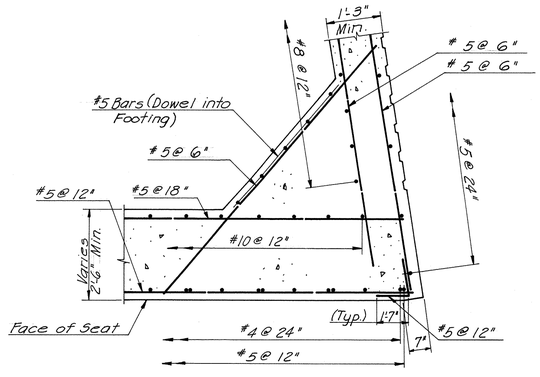
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	235	



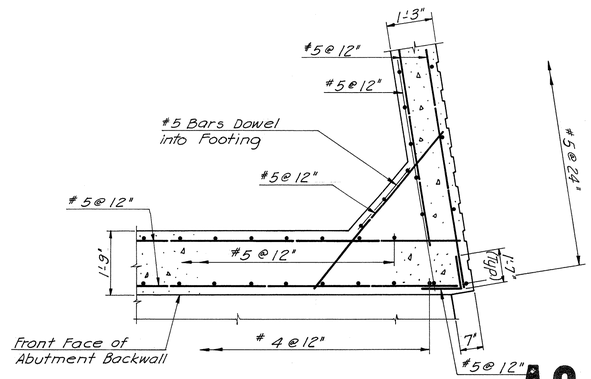
ELEVATION
Scale: 1/4"=1'-0"



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



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



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

NOTES:
For Plan, see Sheet 4.
For Sections & Details, see Sheet 6.
For Expansion & Contraction Joint Details, see Sheet 4.

	BY	DATE
MADE	D.L.A.	11-67
CHECKED	W.E.O.	12-67
IN CHARGE	W.E.O.	

NO.	REVISION	BY	DATE
1	Rev. No. VEPCO Conduits	DGT	11-1274

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B51
BELVIDERE STREET OVER
DOWNTOWN EXPRESSWAY

NORTH ABUTMENT

AMERICAN ENGINEERS
Richmond, Virginia

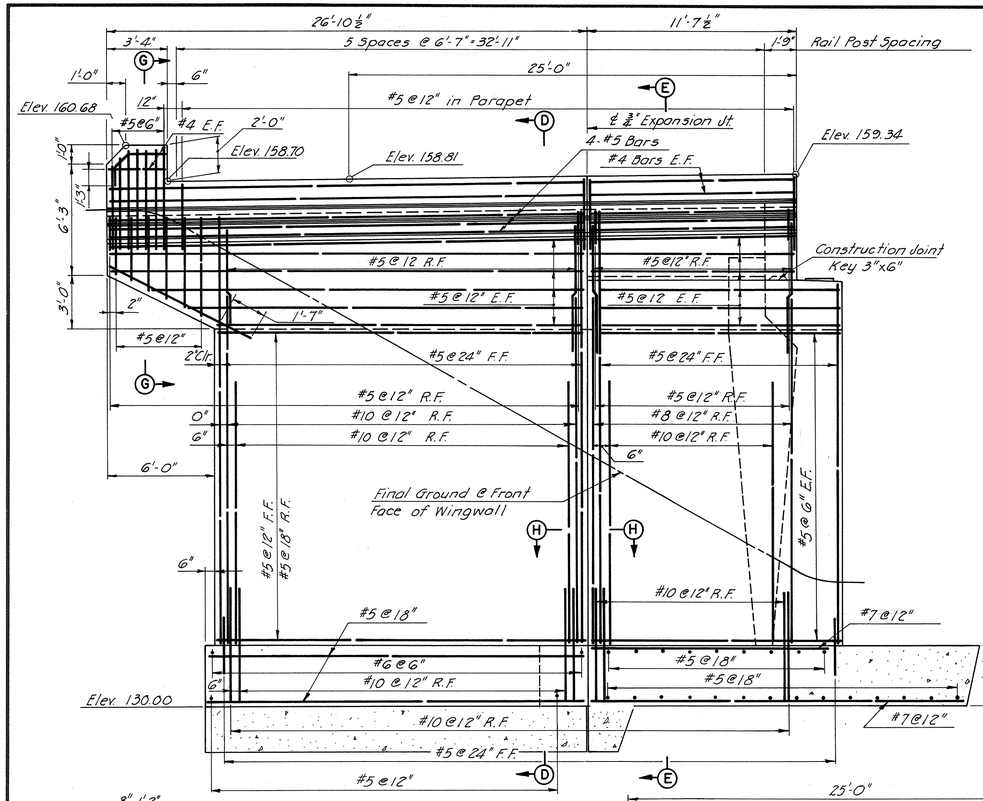
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 5 OF 21

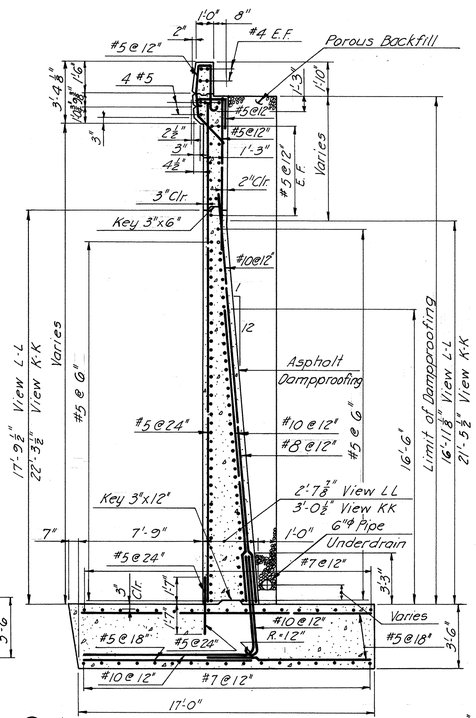
235

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	236	

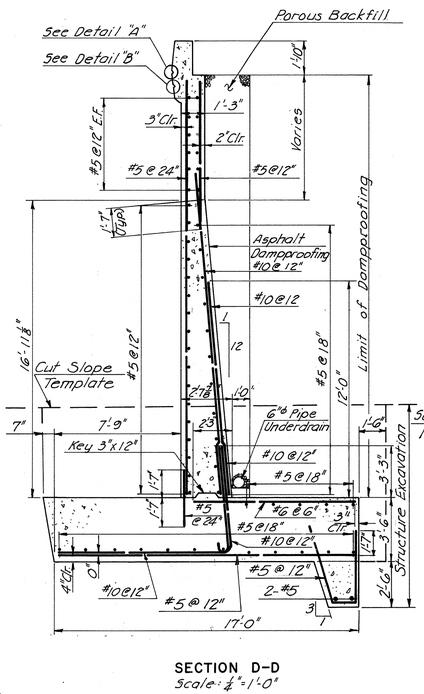
For dimensions & reinforcement not shown see Section E-E



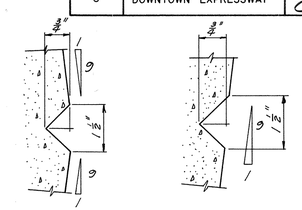
VIEW L-L
Scale: ¼"=1'-0"

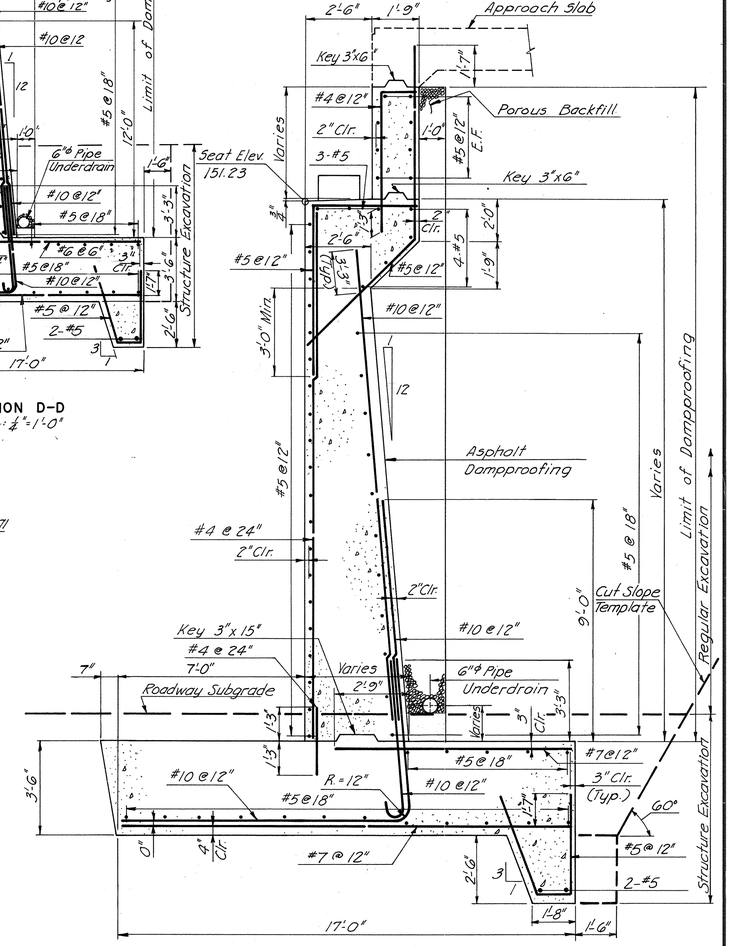


SECTION E-E
Scale: ¼"=1'-0"

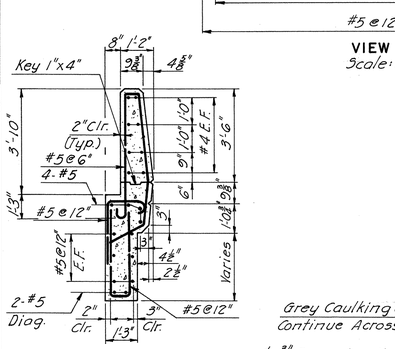


SECTION D-D
Scale: ¼"=1'-0"

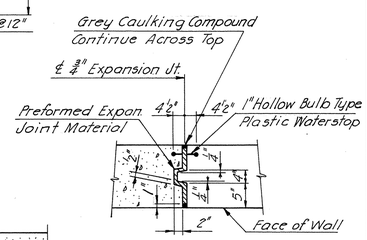




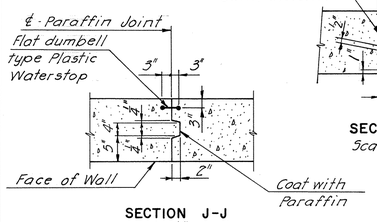
SECTION A-A
Scale: ⅜"=1'-0"



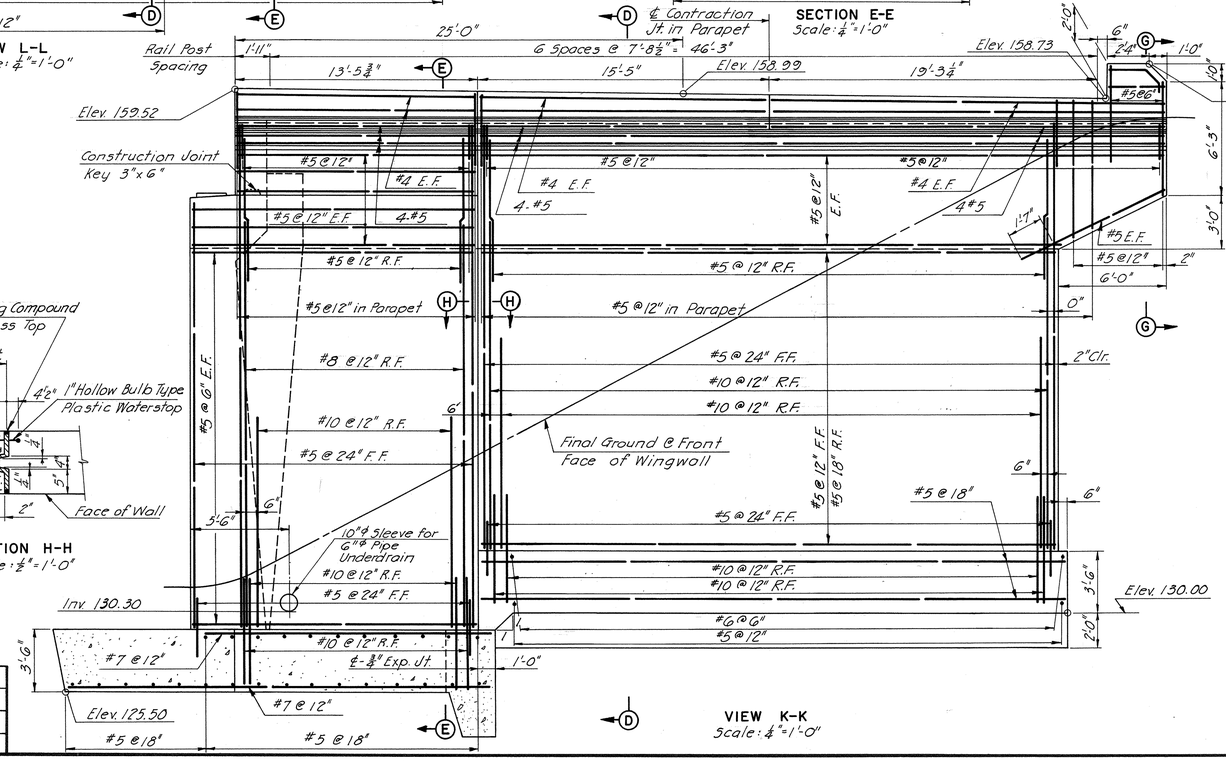
SECTION G-G
Scale: ⅜"=1'-0"



SECTION H-H
Scale: ½"=1'-0"



SECTION J-J
Scale: 1½"=1'-0"



VIEW K-K
Scale: ¼"=1'-0"

	BY	DATE				
MADE	DLA	11-67				
CHECKED	WEO	12-67				
IN CHARGE	WEO		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B51
BELVIDERE STREET OVER
DOWNTOWN EXPRESSWAY

NORTH ABUTMENT

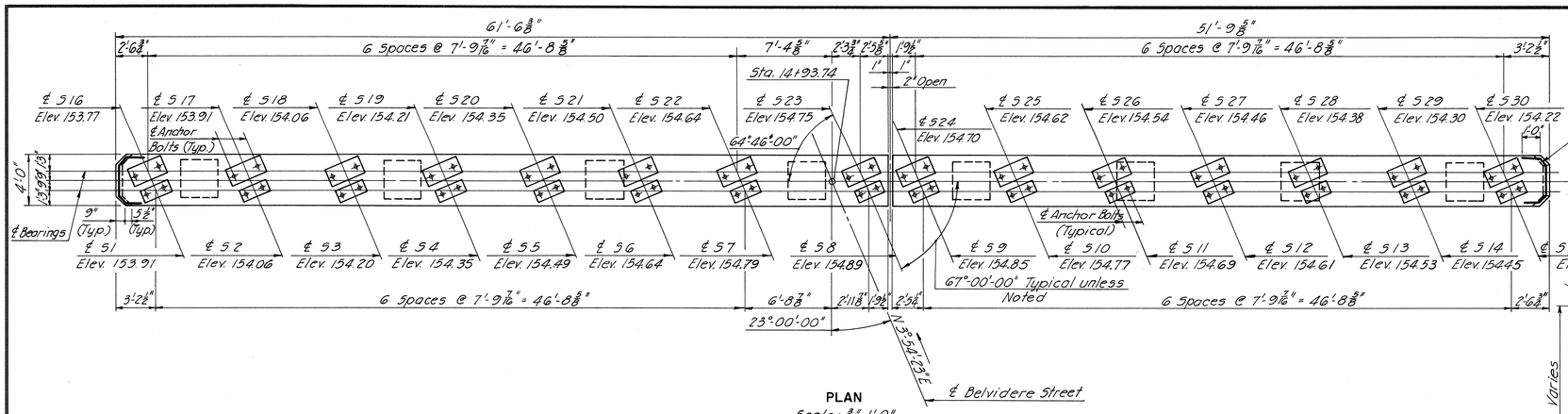
AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

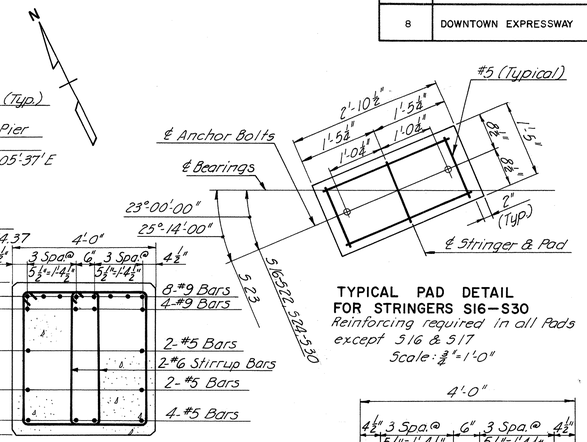
SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 6 OF 21

236

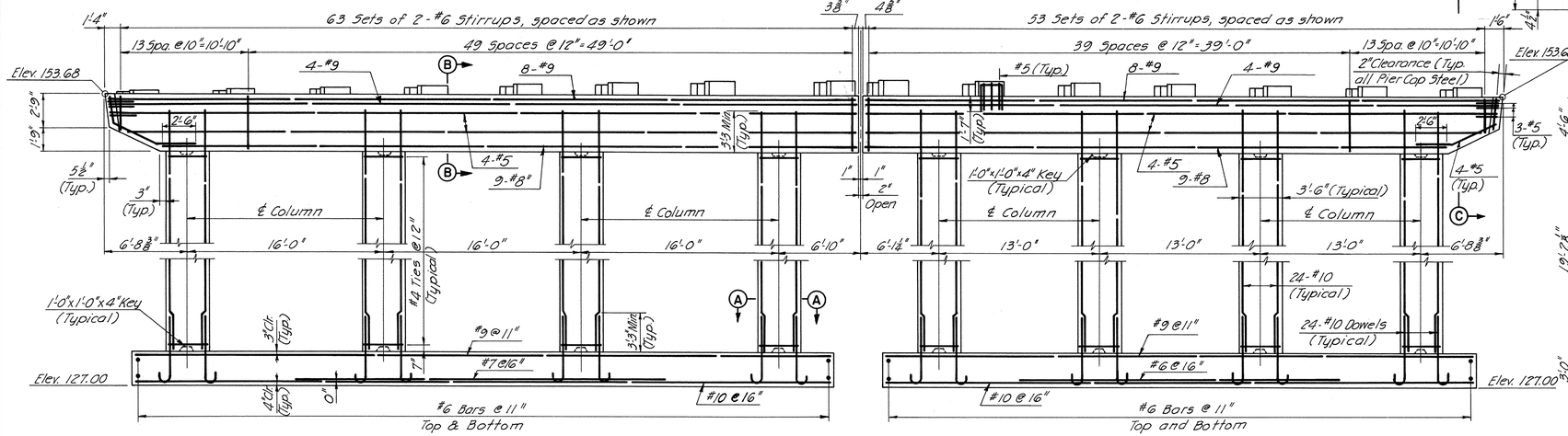
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	237	



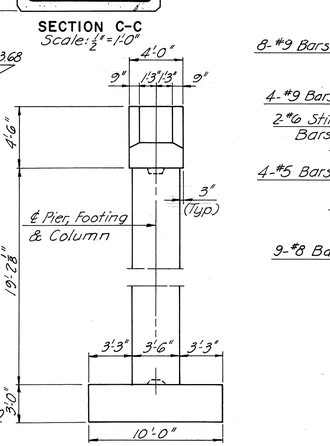
PLAN
Scale: ⅜"=1'-0"



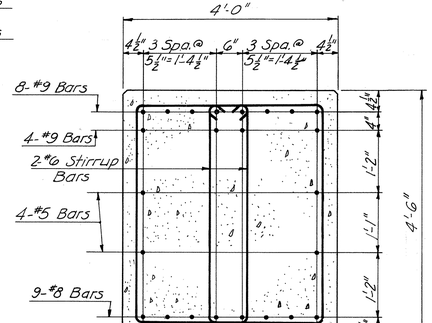
TYPICAL PAD DETAIL FOR STRINGERS S16–S30
Reinforcing required in all Pads except 516 & 517
Scale: ¾"=1'-0"



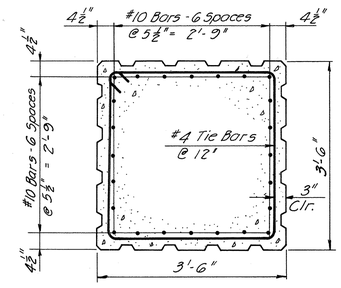
ELEVATION
Scale: ⅜"=1'-0"



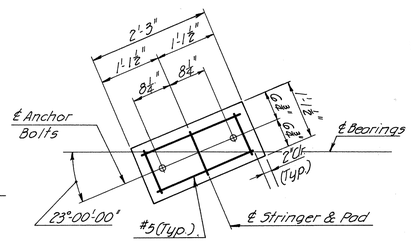
END VIEW
Scale: ⅜"=1'-0"



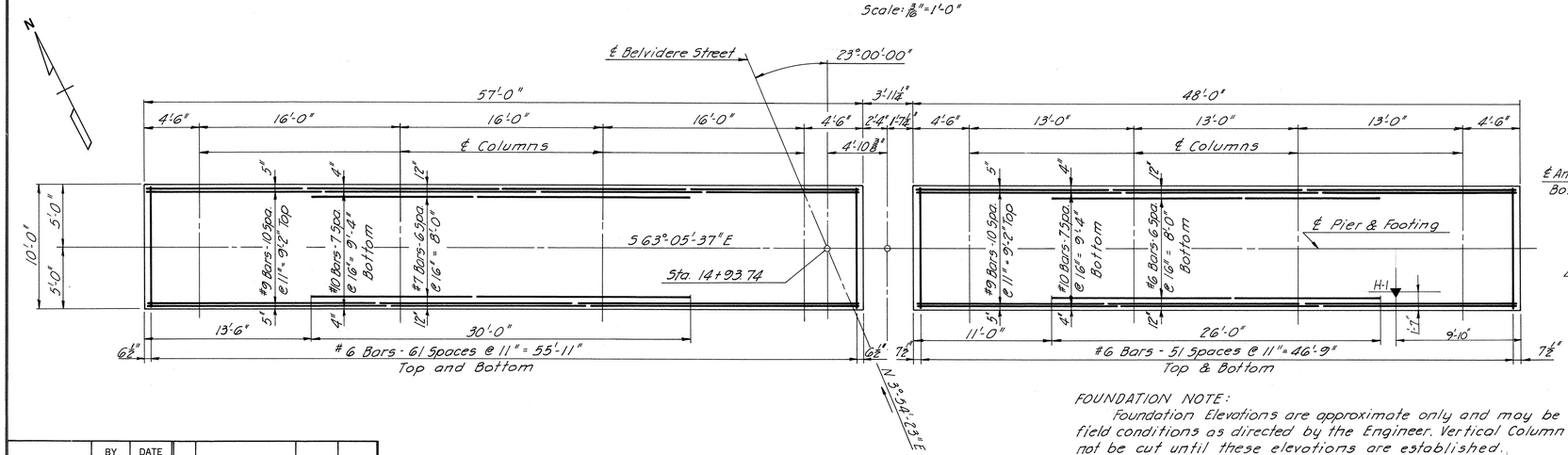
SECTION B–B
Scale: ¾"=1'-0"



SECTION A-A (TYP.)
Scale: ¾"=1'-0"



TYPICAL PAD DETAIL FOR STRINGERS S1–S15
Reinforcing Required in all Pads except 51
Scale: ¾"=1'-0"



FOOTING PLAN
Scale: ⅜"=1'-0"

NOTES:
For Framing Plan, see Sheet 9.
For Bearing Shoe Dimensions, see Standard Sheet 51.
For General Notes, see Sheet 1.
For Architectural Treatment Details, see Sheet 57 to 59.

FOUNDATION NOTE:
Foundation Elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical Column reinforcing shall not be cut until these elevations are established.
Where elevations change by more than 2 feet, redesign will be required.
Pier Foundation is designed for an allowable Bearing Pressure of 2½ tons per square foot.

	BY	DATE				
MADE	CFS	11-67				
CHECKED	WEO	12-67		AS BUILT	HMN	4-76
IN CHARGE	WEO		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

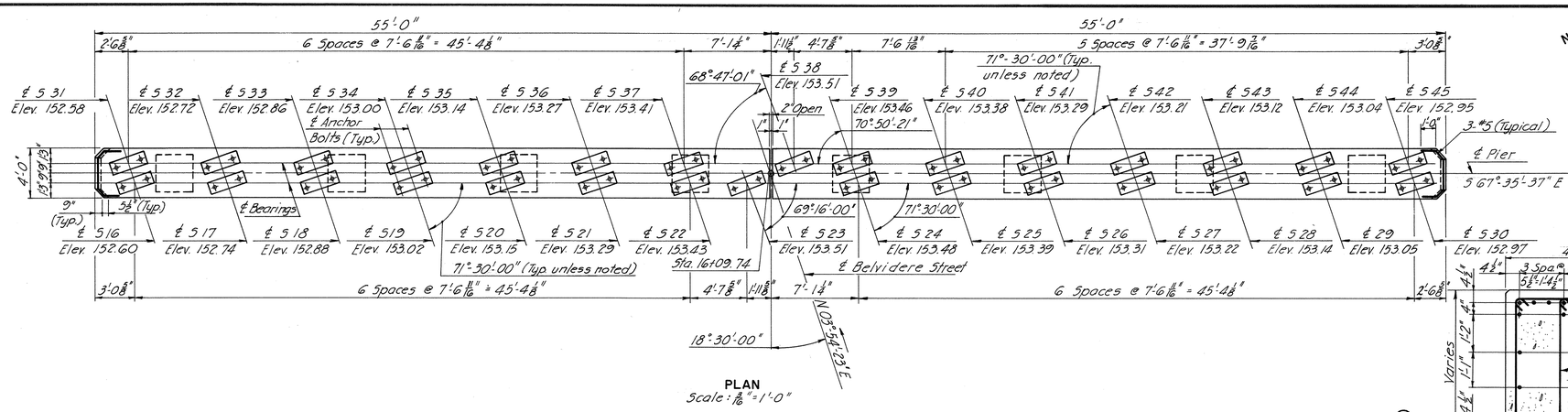
STRUCTURE B51
BELVIDERE STREET OVER DOWNTOWN EXPRESSWAY
PIER I DETAILS

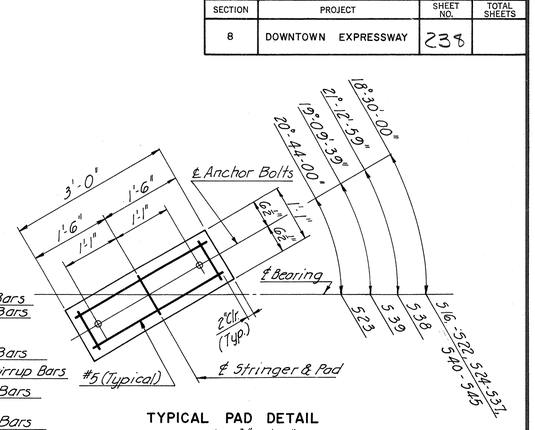
AMERICAN ENGINEERS
Richmond, Virginia

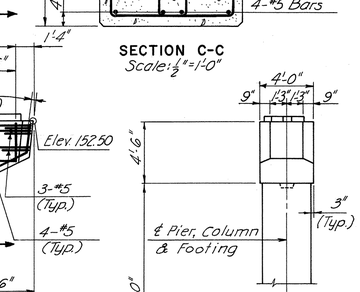
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

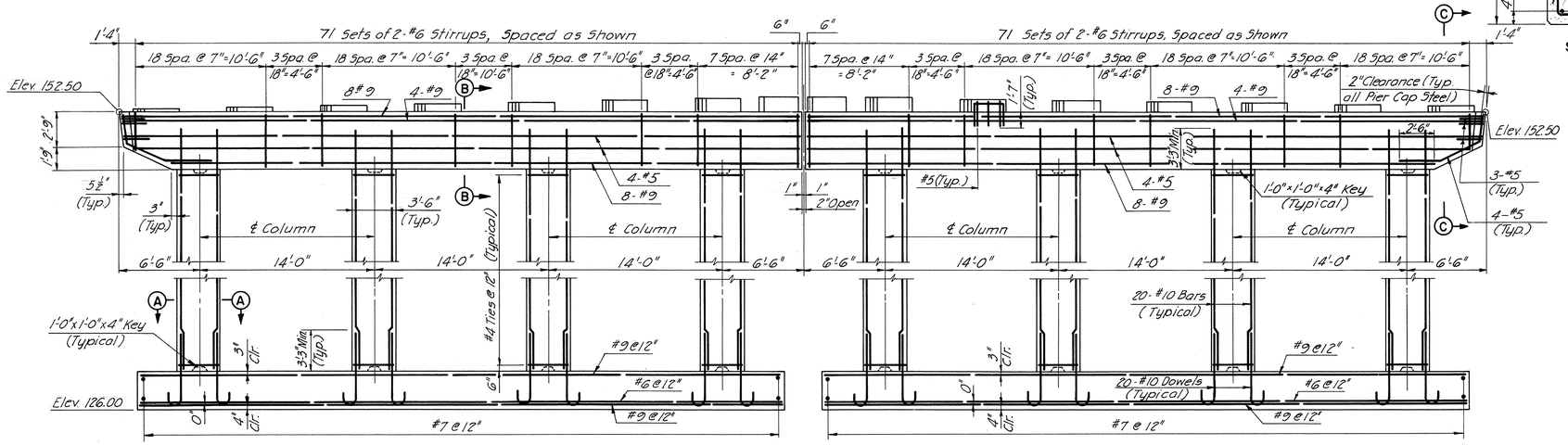
SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 7 OF 21

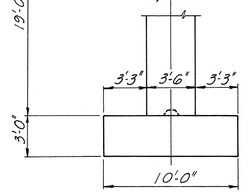
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	238	

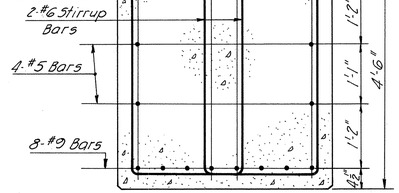


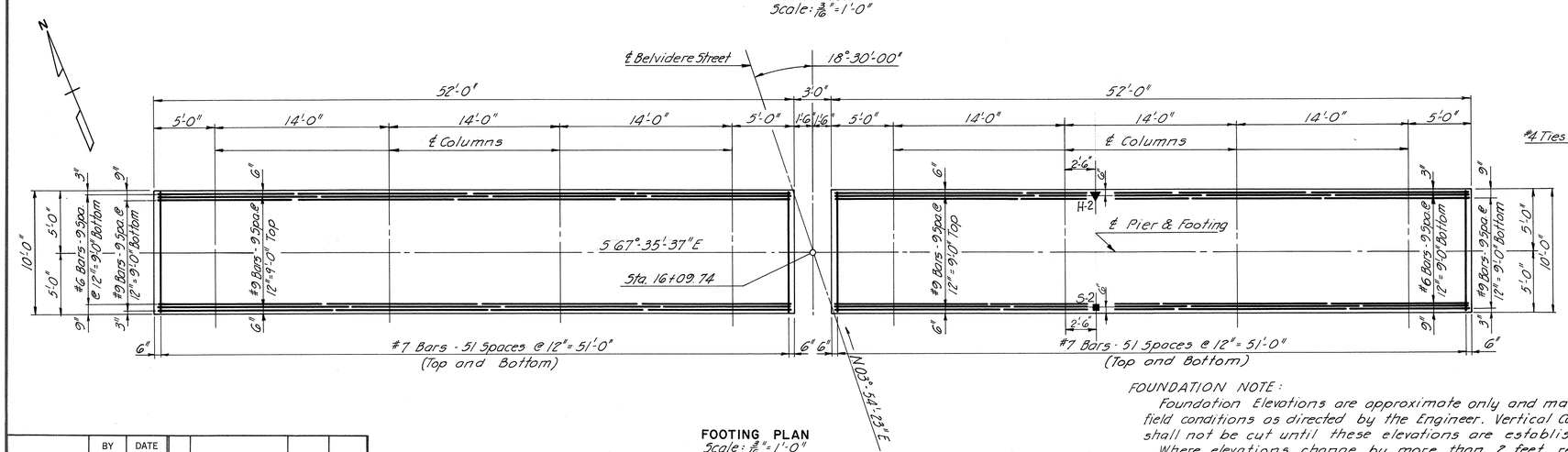


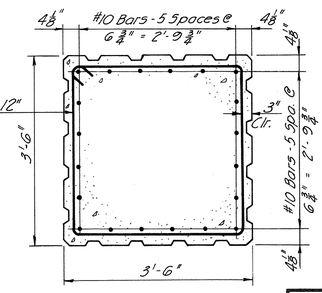












AS BUILT

NOTES:
For Framing Plan, see Sheet 9
For Bearing Shoe Dimensions, see Standard Sheet 51.
For General Notes, see Sheet 1.
For Architectural Treatment Details, see Sheet 57 to 59

FOUNDATION NOTE:
Foundation Elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical Column reinforcing shall not be cut until these elevations are established.
Where elevations change by more than 2 feet, redesign will be required.
Pier Foundation is designed for an allowable Bearing Pressure of 2½ tons per square foot.

	BY	DATE
MADE	CFS	11-67
CHECKED	WEO	12-67
IN CHARGE	WEO	

NO.	REVISION	BY	DATE
	AS BUILT	HMN	4-76

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

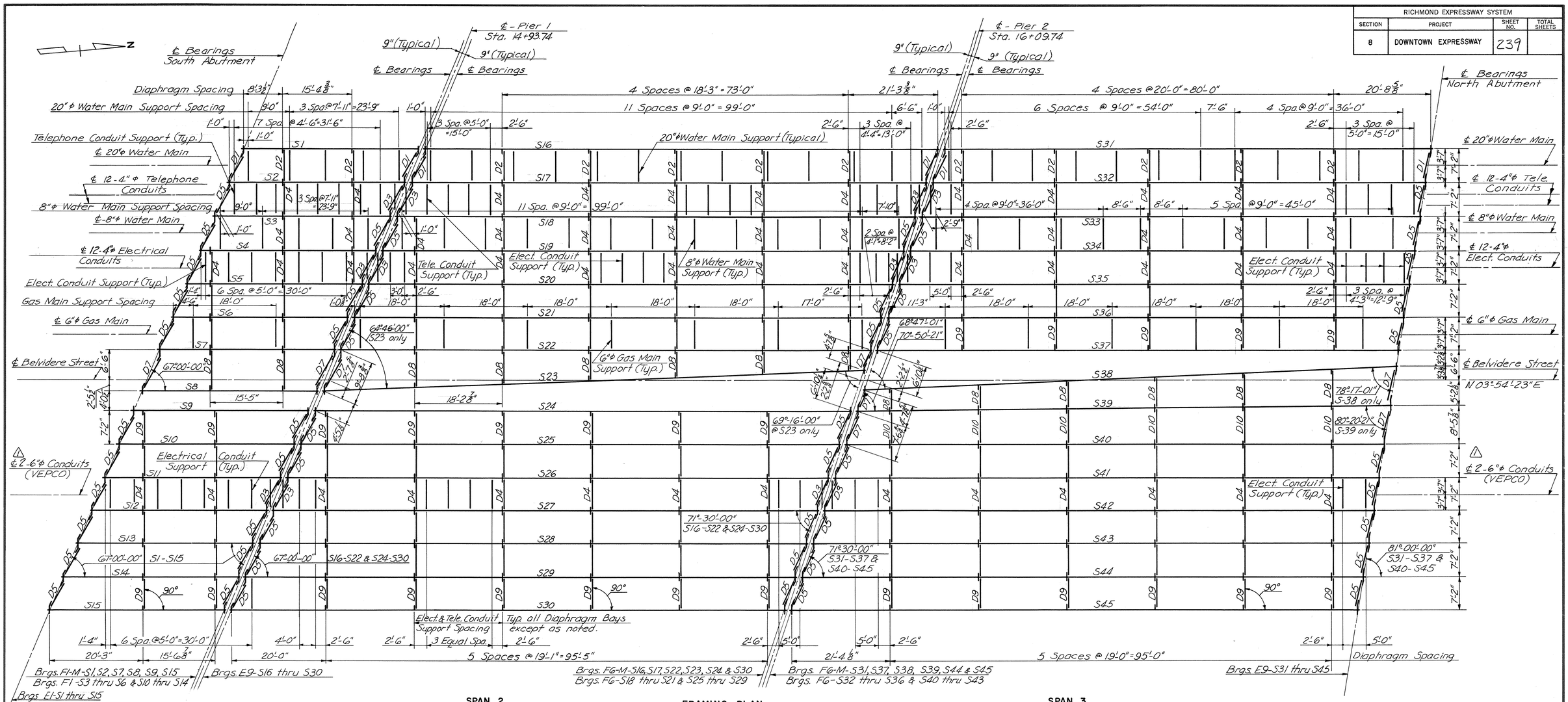
STRUCTURE B 51
BELVIDERE STREET OVER DOWNTOWN EXPRESSWAY
PIER 2 DETAILS

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 8 OF 21

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	239	



SPAN 1
Non-Composite

SPAN 2

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

SPAN 3

Bearing Type	No. Required
F1	9
F1-M	6
F6	18
F6-M	12
E1	15
E9	30

Stringer Lengths ℄ Brg. to ℄ Brg.

S1 thru S15	37'-9⅞"	S22	113'-9½"	S30	118'-10½"	S38	114'-3⅝"
		S23	116'-2⅜"	S31	104'-2⅝"	S39	114'-3⅜"
S16	109'-11¾"	S24	114'-11¾"	S32	105'-5½"	S40	115'-4½"
S17	110'-7⅛"	S25	115'-7½"	S33	106'-9"	S41	116'-7⅞"
S18	111'-2⅝"	S26	116'-3½"	S34	108'-0⅛"	S42	117'-10½"
S19	111'-10½"	S27	116'-10⅞"	S35	109'-3½"	S43	119'-1⅛"
S20	112'-6½"	S28	117'-6⅜"	S36	110'-6⅜"	S44	120'-4⅛"
S21	113'-2"	S29	118'-2⅛"	S37	111'-9⅛"	S45	121'-8"

NOTE:
All Intermediate Diaphragms are D6 unless otherwise noted.
Intermediate Stiffeners shall be located on inside face of stringers S1, S15, S16, S30, S31 & S45. They shall be located on alternate sides along the remaining stringers.

INTERMEDIATE STIFFENER SPACING (MAXIMUM)

Stringer	1st 2 Spaces	.1L	.2L	.3L	.4L	.5L
S1 thru S15	2'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"
S16 thru S45	1'-9"	3'-6"	3'-10"	4'-0"	4'-0"	4'-0"

NOTES:
Structural Steel Shall Conform to ASTM Specifications A-36 (Latest Revision).
For General Notes see Sheet 1.
For Superstructure Cross Section see Sheet 11.
For Diaphragm Details see Sheet 12.
For Utility Support Details see Sheet 13.
For Bearing Shoe Dimensions see Sheet 51.
For Stringer Details see Sheet 10.
For Stiffener Details see Sheet 10.

	BY	DATE
MADE	D.L.A.	9-67
CHECKED	W.E.O.	12-67
IN CHARGE	W.E.O.	

NO.	REVISION	BY	DATE
1	Rev. No. VEPCO Conduits	DGT	11-12-74

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

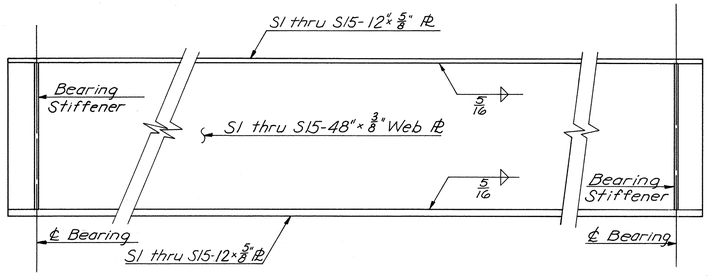
STRUCTURE B51
BELVIDERE STREET OVER DOWNTOWN EXPRESSWAY
FRAMING PLAN

AMERICAN ENGINEERS
Richmond, Virginia

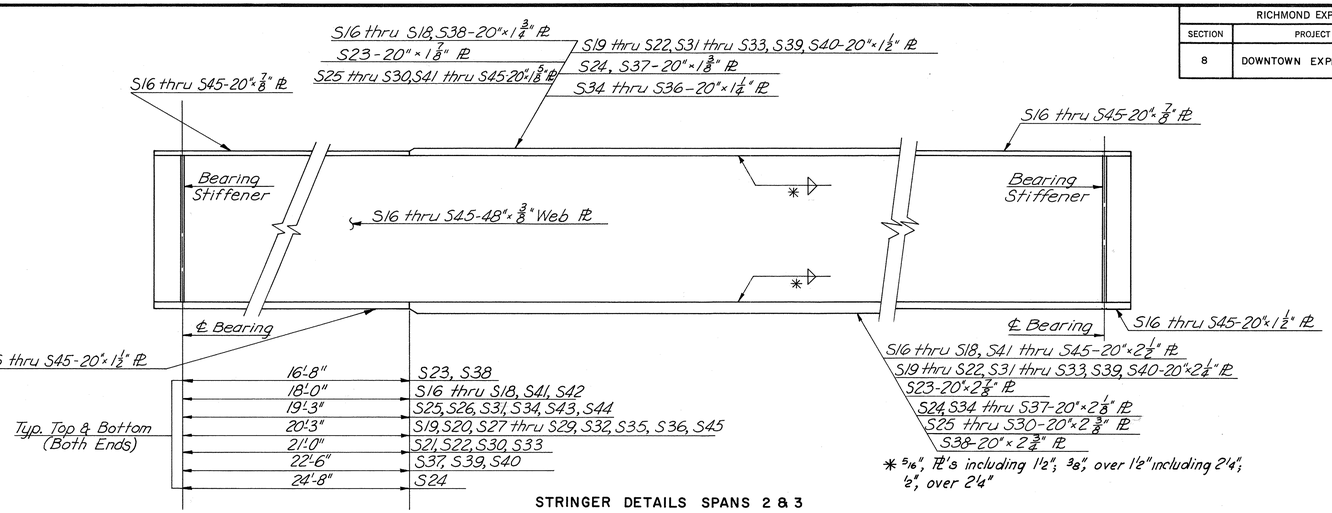
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 9 OF 21

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	240	

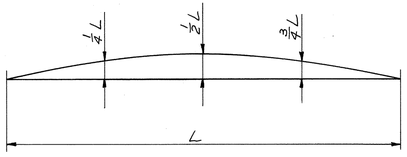


STRINGER DETAILS SPAN 1



* 5/16" Flt's including 1 1/2"; 3/8" over 1'-2" including 2'-4"; 1/2" over 2'-4"

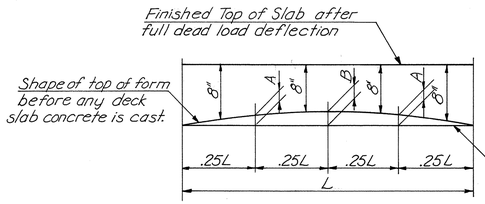
STRINGER DETAILS SPANS 2 & 3



CAMBER DIAGRAM
No Scale

Stringers	1/4 L	1/2 L	3/4 L
S1 thru S15	1/8"	3/16"	1/8"
S16, S18, S24, S34, S37, S38	2 5/16"	3 1/4"	2 5/16"
S17, S19 thru S23, S25, S35, S36	2 1/16"	3 3/8"	2 1/16"
S26 thru S29, S40 thru S43	2 3/8"	3 11/16"	2 3/8"
S30, S44	2 13/16"	4 1/8"	2 13/16"
S31 thru S33	2 1/8"	3"	2 1/8"
S39	2 1/2"	3 1/2"	2 1/4"
S45	3 3/16"	4 1/2"	3 1/16"

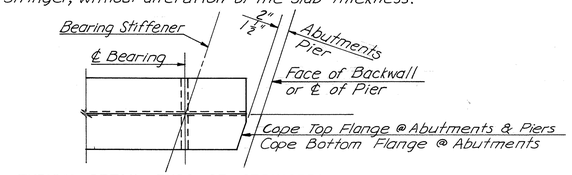
NOTE TO FABRICATOR:
The above stringers shall be fabricated with an upward camber amounting to (see table). This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.



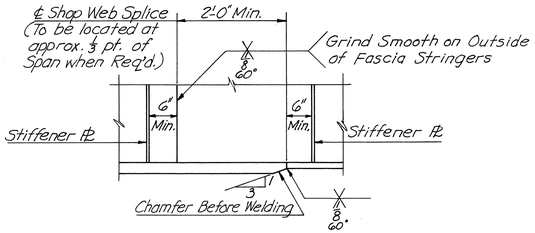
DEAD LOAD DEFLECTION DIAGRAM
No Scale

Stringers	A	B
S1 thru S15	1 9/16"	1/8"
S16 thru S18, S31	1 11/16"	2"
S19, S20, S24, S34, S37, S38	1 3/8"	2 5/16"
S21, S25 thru S29, S36, S39 thru S42	1 13/16"	2 1/16"
S30	2 1/4"	3 1/2"
S32, S33	1 7/16"	1 1/8"
S43, S44	2"	2 13/16"
S45	2 7/16"	3 3/8"
S22, S23, S35	1 1/4"	2 7/16"

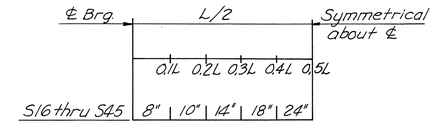
NOTE TO CONTRACTOR:
The above deflections are those anticipated to occur in the stringer upon placement of the total concrete deck load. In practice, the stringers in place, are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be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



TYPICAL DETAIL - ENDS OF STRINGERS
No Scale

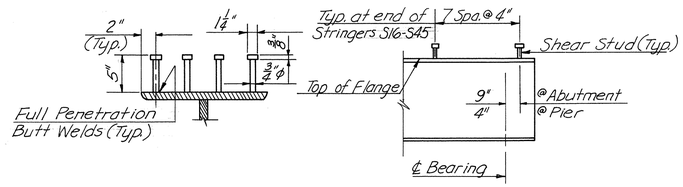


SHOP SPLICE DETAIL
No Scale



SHEAR STUD SPACING
No Scale

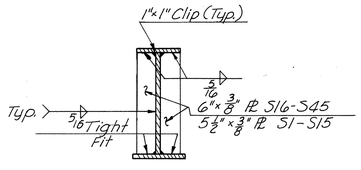
SHEAR STUD NOTES:
Capacity = 3,400 lbs. per stud.
Three 3/4" ϕ Studs may be substituted at the same Longitudinal Spacing as shown for 4-1/2" ϕ Studs.
Stud Rows to be placed Parallel to main deck reinf.
For End Condition see Detail "A"



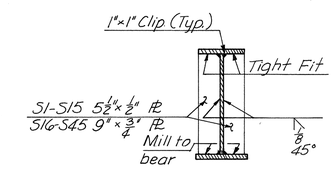
SHEAR STUD DETAIL
No Scale

DETAIL "A"
No Scale

NOTES:
Structural Steel Shall Conform to ASTM Specifications A-36 (Latest Revision).
For General Notes see Sheet 1.
For Superstructure Cross Section see Sheet 11
For Diaphragm Details see Sheet 12.
For Utility Support Details see Sheet 13.
For Framing Plan see Sheet 9.
For Stiffener Spacing see Sheet 9.



INTERMEDIATE STIFFENER



BEARING STIFFENER

STIFFENER DETAILS
No Scale

	BY	DATE
MADE	T.D.J.	11-67
CHECKED	W.E.O.	12-67
IN CHARGE	W.E.O.	

NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B51
BELVIDERE STREET OVER
DOWNTOWN EXPRESSWAY

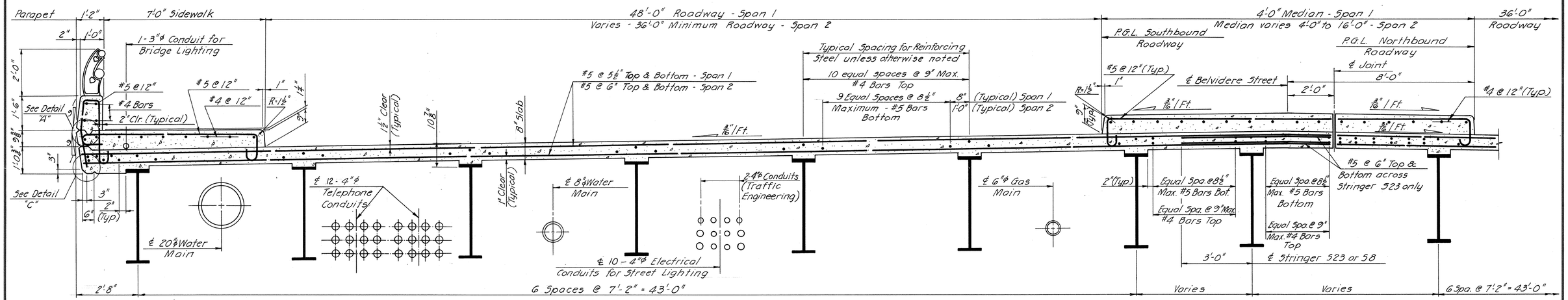
STRINGER DETAILS

AMERICAN ENGINEERS
Richmond, Virginia

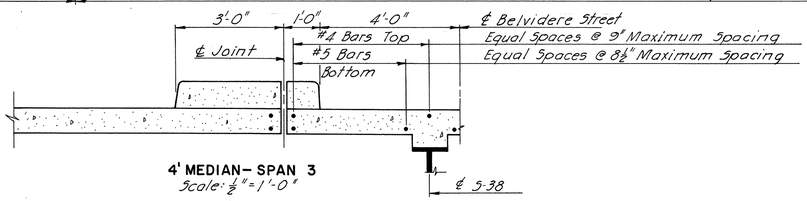
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 10 OF 21

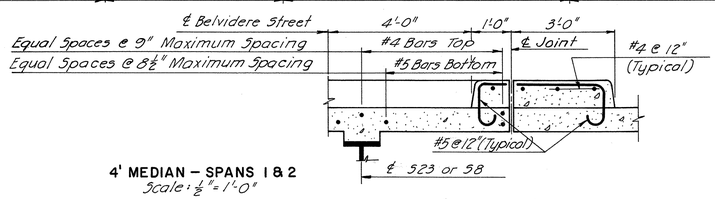
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	241	



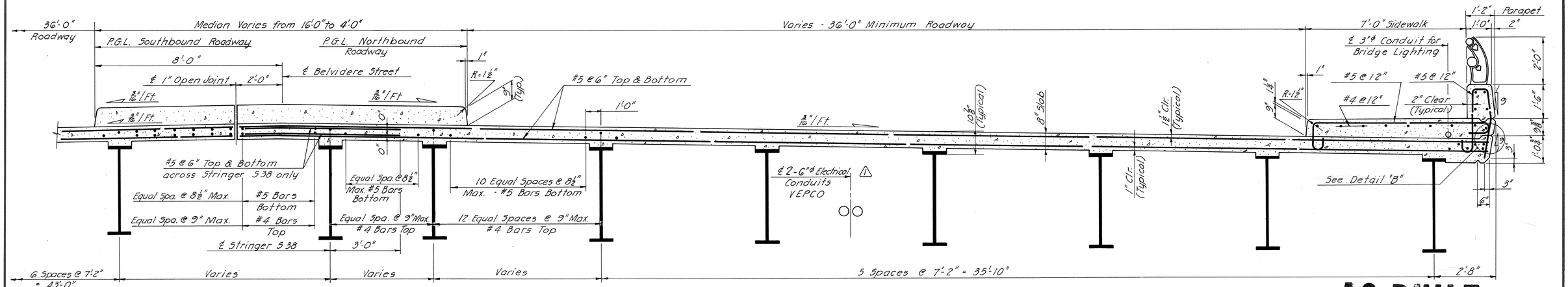
TYPICAL CROSS SECTION
Southbound Roadway (Spans 1 & 2 Shown)
Scale: ½" = 1'-0"



4' MEDIAN– SPAN 3
Scale: ½" = 1'-0"



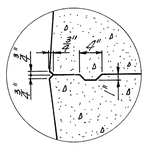
4' MEDIAN – SPANS 1 & 2
Scale: ½" = 1'-0"



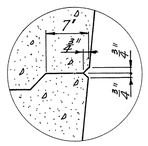
TYPICAL CROSS SECTION
Northbound Roadway (Span 3 Shown)
Scale: ½" = 1'-0"

AS BUILT

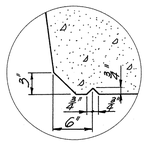
NOTES:
For General Notes, see Sheet 1.
For Framing Plan, see Sheet 9.
For Slab Plan, see Sheet 14.
For Diaphragm Details, see Sheet 12.
For Joint Details, see Sheet 15.
For Railing Details, see Sheet 53.



DETAIL "A"
Scale: 1½" = 1'-0"



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



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

	BY	DATE
MADE	DLA	9-67
CHECKED	WEO	12-67
IN CHARGE	WEO	

NO.	REVISION	BY	DATE
⚠	Rev. No VEPCO Conduits	DGT	11-1274

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B51
BELVIDERE STREET OVER
DOWNTOWN EXPRESSWAY
CROSS SECTION

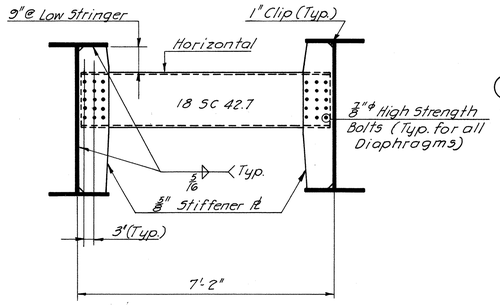
AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

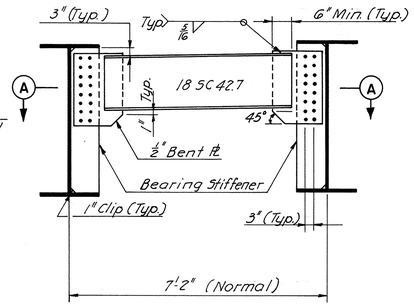
SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 11 OF 21

241

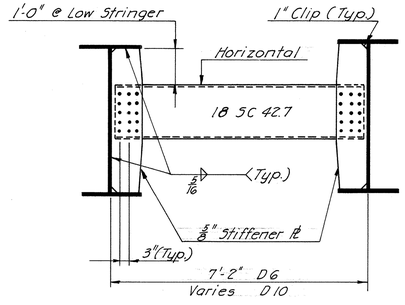
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	242	



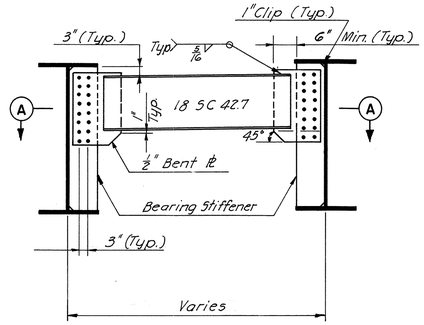
DIAPHRAGM D4



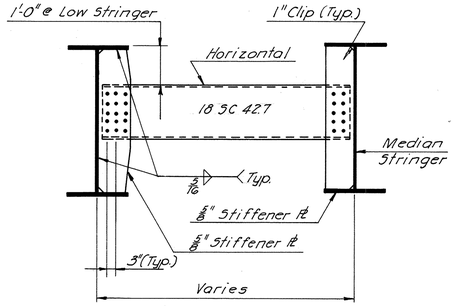
DIAPHRAGM D5



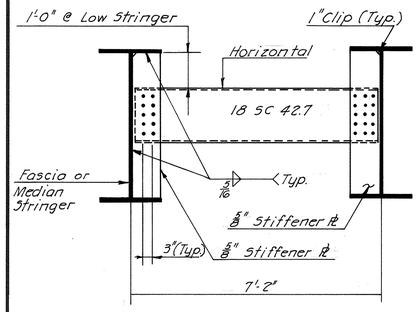
DIAPHRAGM D6 & D10



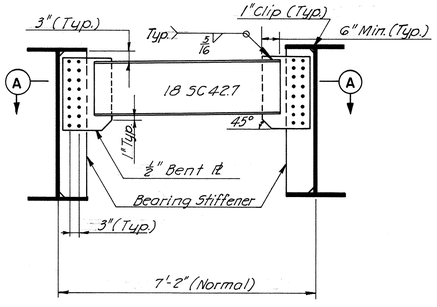
DIAPHRAGM D7



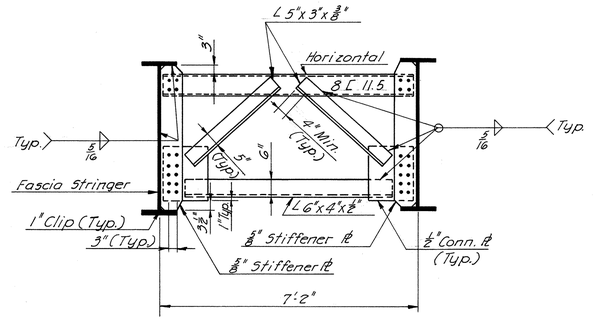
DIAPHRAGM D8



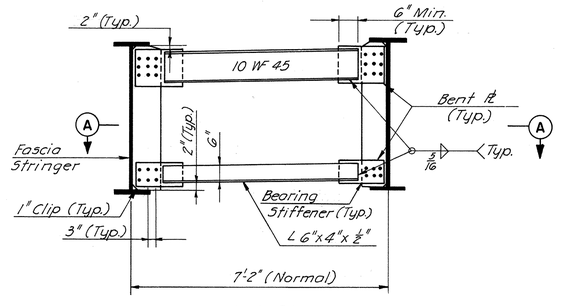
DIAPHRAGM D9



DIAPHRAGM D3



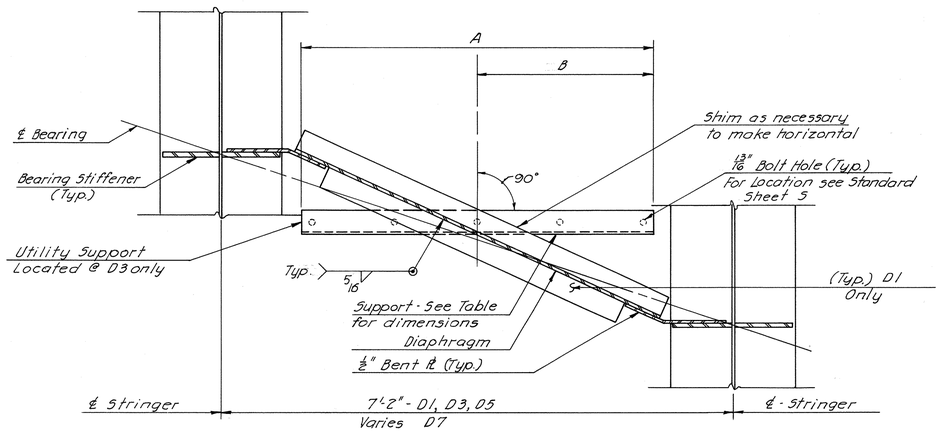
DIAPHRAGM D2



DIAPHRAGM D1

DIAPHRAGM DETAILS
Scale: 1/2"=1'-0"

UTILITY	SUPPORT	A	B
Telephone	G [8.2	4'-11"	2'-5 1/2"
Elect. - City	G [8.2	2'-7"	1'-3 1/2"
Elect. - VEPCO	G [8.2	1'-7"	0'-9 1/2"



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

NOTES:
For General Notes, see Sheet 1
For Framing Plan, see Sheet 9
For Stiffener Details, see Sheet 10

AS BUILT

	BY	DATE
MADE	QLA	10-67
CHECKED	WEO	12-67
IN CHARGE	WEO	

NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B51
BELVIDERE STREET OVER
DOWNTOWN EXPRESSWAY

DIAPHRAGM DETAILS

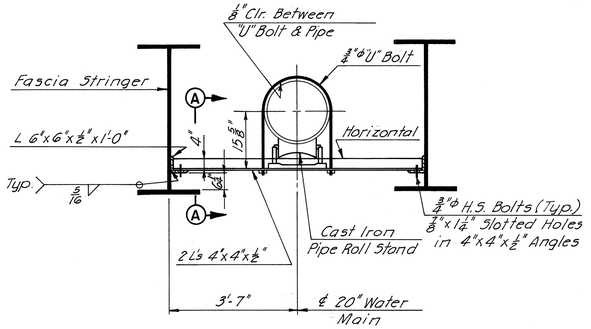
AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

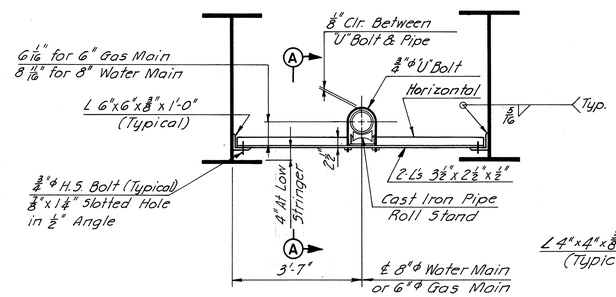
SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 12 OF 21

242

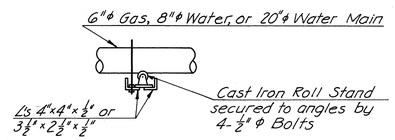
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	243	



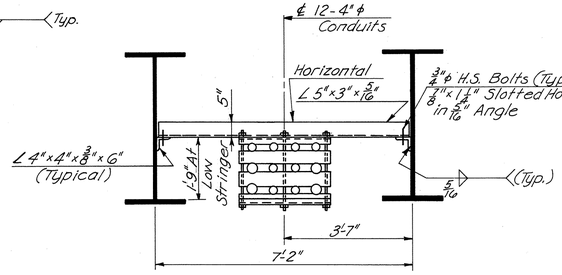
TYPICAL SUPPORT DETAILS
FOR 20" WATER MAIN
Scale: ½"=1'-0"



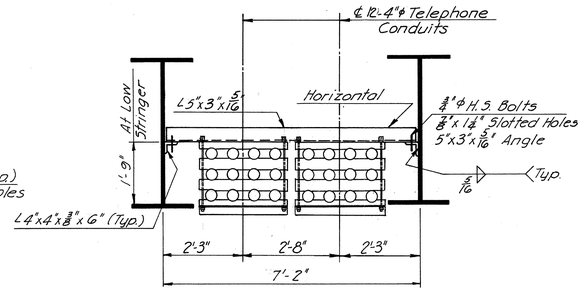
TYPICAL SUPPORT DETAILS
FOR 6" GAS MAIN OR 8" WATER MAIN
Scale: ½"=1'-0"



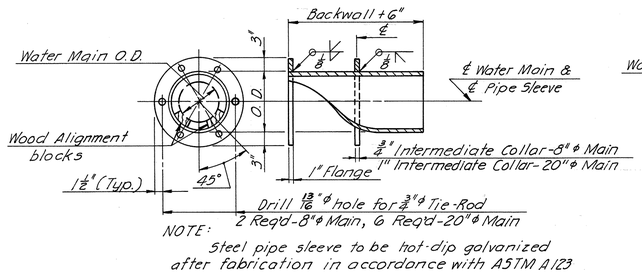
SECTION A-A
Scale: ½"=1'-0"



ELECTRICAL CONDUIT SUPPORT
Scale: ½"=1'-0"

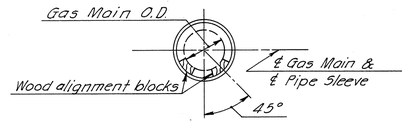


TELEPHONE CONDUIT SUPPORT
Scale: ½"=1'-0"



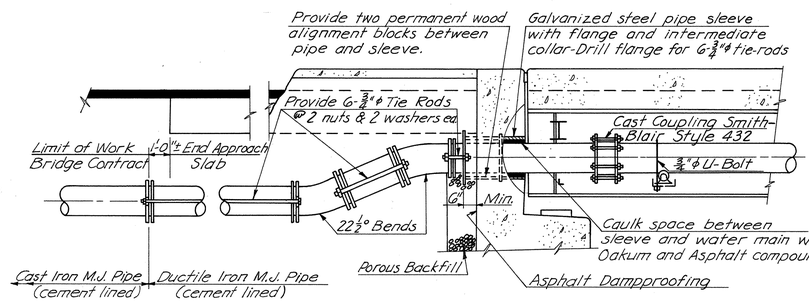
NOTE: Steel pipe sleeve to be hot-dip galvanized after fabrication in accordance with ASTM A123

PIPE SLEEVE DETAIL FOR WATER MAIN

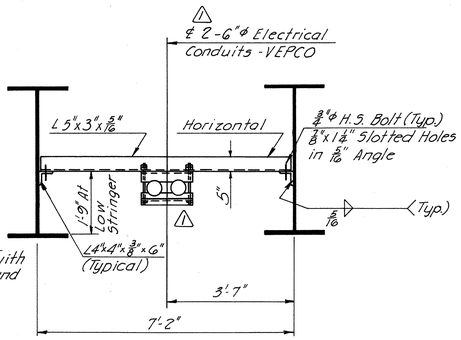


NOTE: Steel pipe sleeve to be hot-dip galvanized after fabrication in accordance with ASTM A123

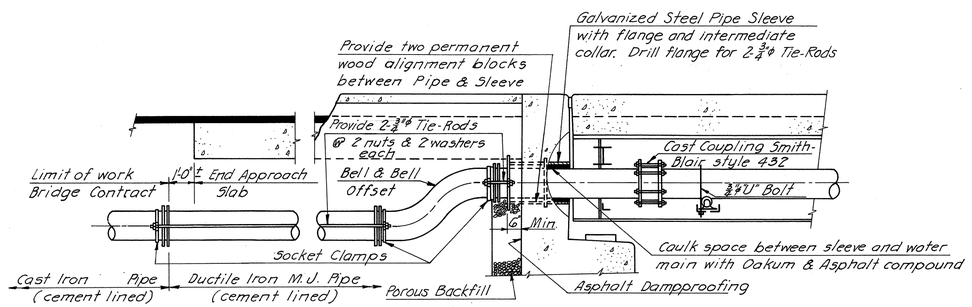
PIPE SLEEVE DETAIL FOR GAS MAIN



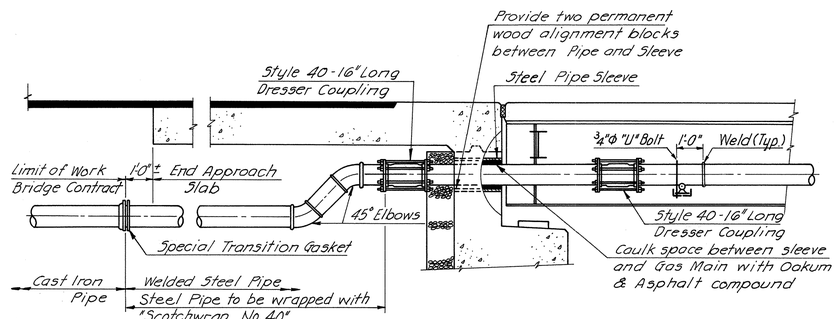
20" WATER MAIN DETAIL AT ABUTMENTS
Scale: ⅜"=1'-0"



△ ELECTRICAL CONDUIT SUPPORT
Scale: ½"=1'-0"



8" WATER MAIN DETAIL AT ABUTMENTS
Scale: ⅜"=1'-0"



GAS MAIN DETAIL AT ABUTMENT
Scale: ⅜"=1'-0"

NOTES:
For General Notes, see Sheet 1
For Framing Plan, see Sheet 9
For Diaphragm Details, see Sheet 12
For Superstructure Cross Section, see Sheet 11

	BY	DATE
MADE	DLA	10-67
CHECKED	WEO	12-67
IN CHARGE	WEO	

NO.	REVISION	BY	DATE
△	Rev. No. VEPCO Conduits	DGT	11/27/74

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B51
BELVIDERE STREET OVER DOWNTOWN EXPRESSWAY

UTILITY DETAILS

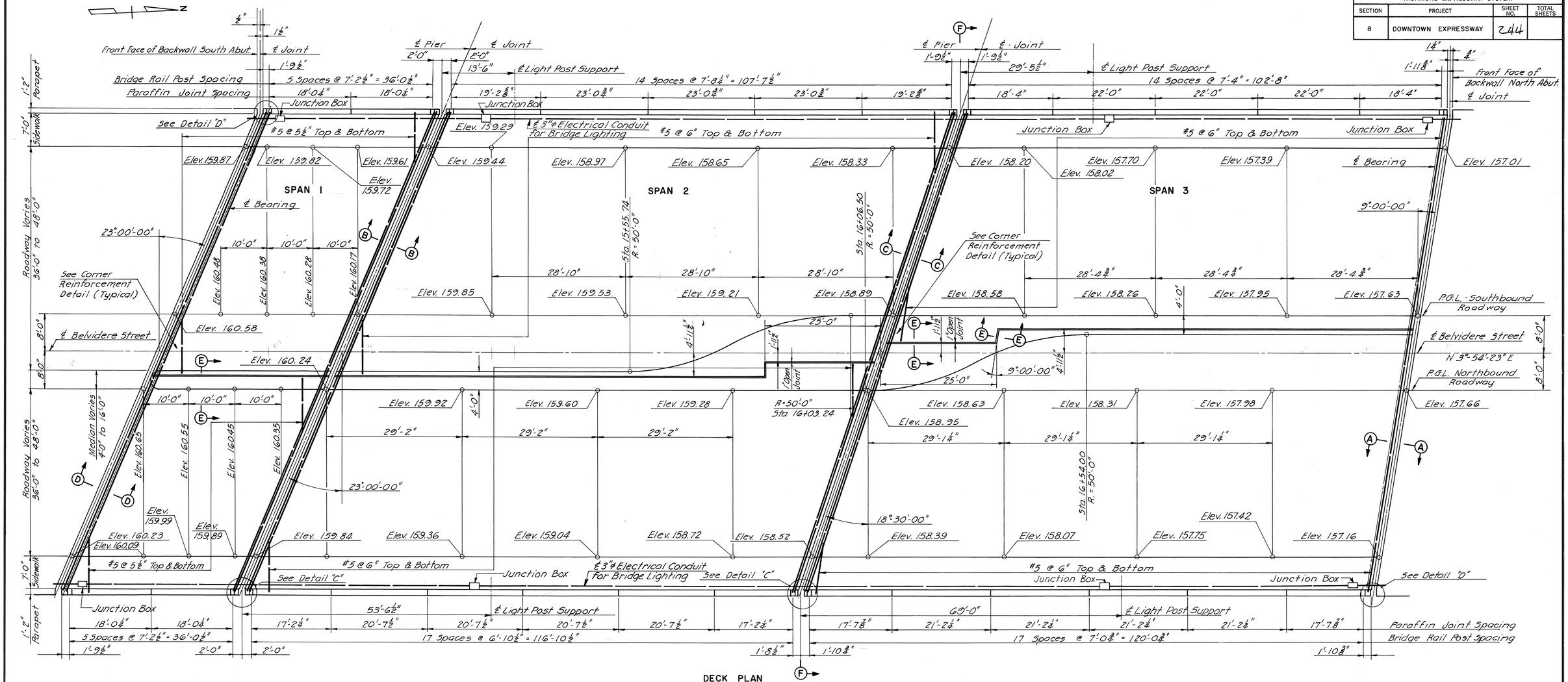
AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

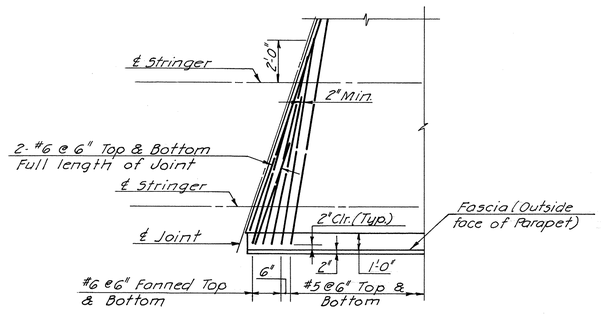
SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 13 OF 21

243

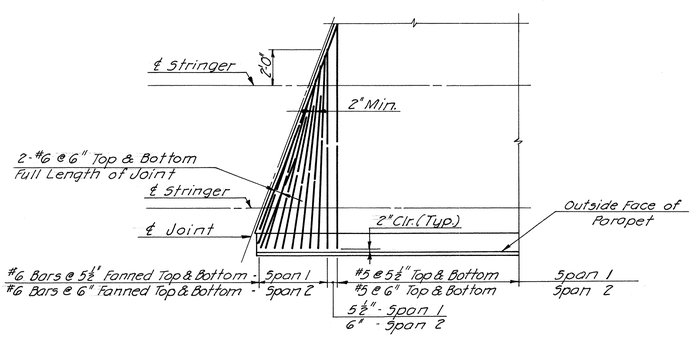
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	244	



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



TYPICAL CORNER REINFORCEMENT DETAIL
(Pier 2 - Span 3)
Outside Face of Parapet Shown (Median Joint Similar)
Scale: ¼" = 1'-0"



TYPICAL CORNER REINFORCEMENT DETAIL
(Spans 1 & 2)
Outside Face of Parapet Shown (Median Joint Similar)
Scale: ¼" = 1'-0"

NOTES:
For General Notes, see Sheet 1
For Typical Deck Cross Section, see Sheet 11.
For Joint Details, see Sheet 15.
For Sections and Details, see Sheet 15.
For Typical Parapet Elevation, see Sheet 15.

AS BUILT

	BY	DATE				
MADE	DLA	9-67				
CHECKED	WEO	12-67				
IN CHARGE	WEO		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B51
BELVIDERE STREET OVER
DOWNTOWN EXPRESSWAY
DECK PLAN

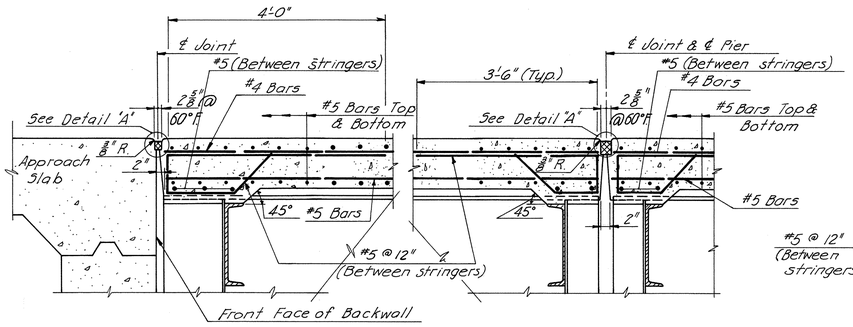
AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 14 OF 21

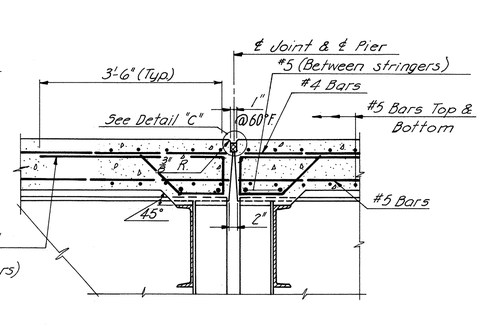
244

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	245	

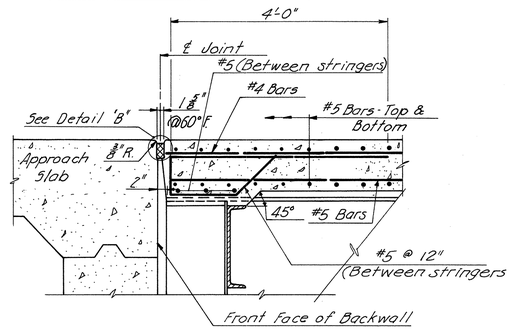


SECTION A-A
Scale: 3/4" = 1'-0"

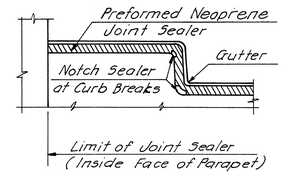
SECTION B-B
Scale: 3/4" = 1'-0"



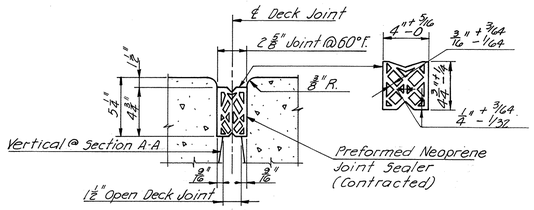
SECTION C-C
Scale: 3/4" = 1'-0"



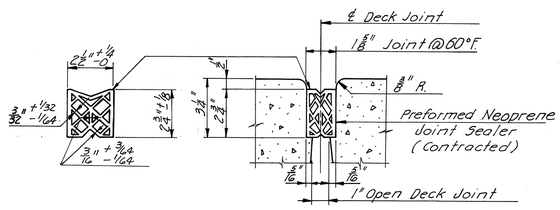
SECTION D-D
Scale: 3/4" = 1'-0"



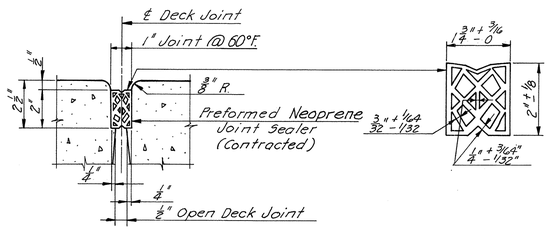
TREATMENT OF JOINT AT CURB AND MEDIAN
No Scale



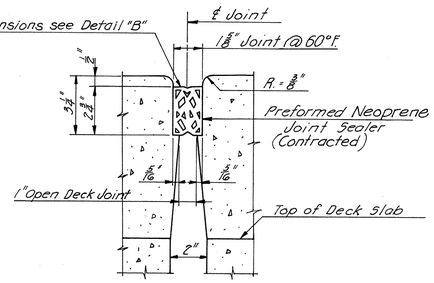
DETAIL "A"
No Scale



DETAIL "B"
Scale: 3" = 1'-0"

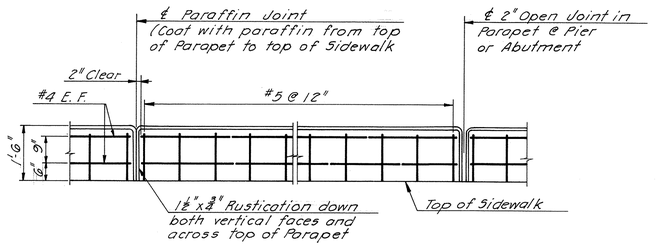


DETAIL "C"
Scale: 3" = 1'-0"

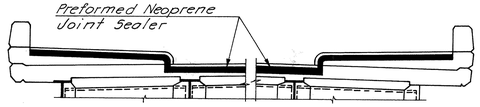


SECTION E-E
Scale: 3" = 1'-0"

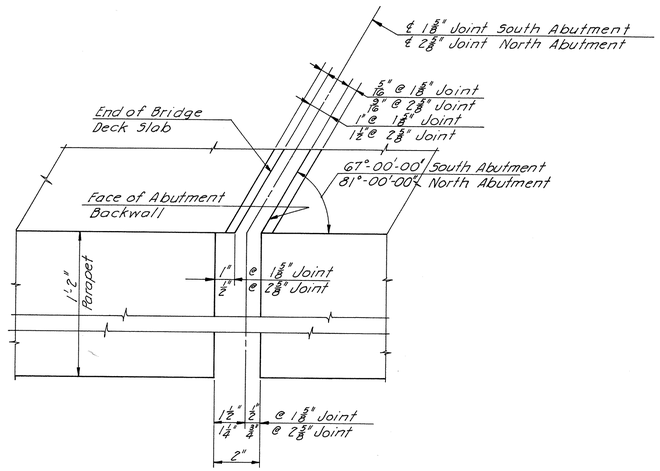
Note to Contractor:
It is absolutely essential that the openings for the preformed neoprene joint sealers be accurately formed and constructed to smooth, and straight lines. The size of the opening shall be adjusted to allow for anticipated dead load rotation of the ends of the slab and for the temperature at the time of construction.



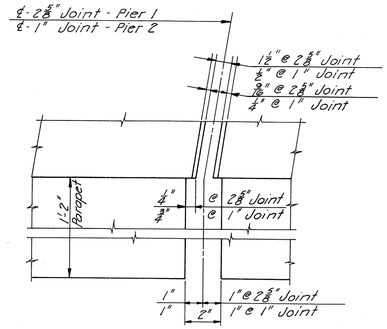
TYPICAL PARAPET ELEVATION
Scale: 1/2" = 1'-0"



SECTION F-F
No Scale



DETAIL "D"
No Scale



DETAIL "C"
No Scale

NOTES:
For Typical Deck Cross Section, see Sheet 11
For Deck Plan, see Sheet 14.

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	DLA	9-67				
CHECKED	WEO	12-67				
IN CHARGE	WEO					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B51
BELVIDERE STREET OVER DOWNTOWN EXPRESSWAY
JOINT DETAILS

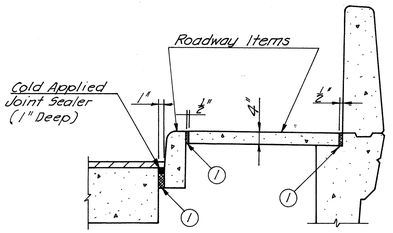
AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 15 OF 21

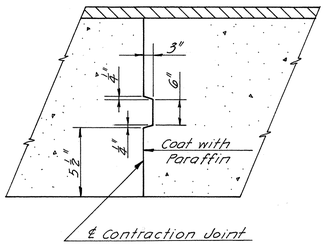
245

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	246	

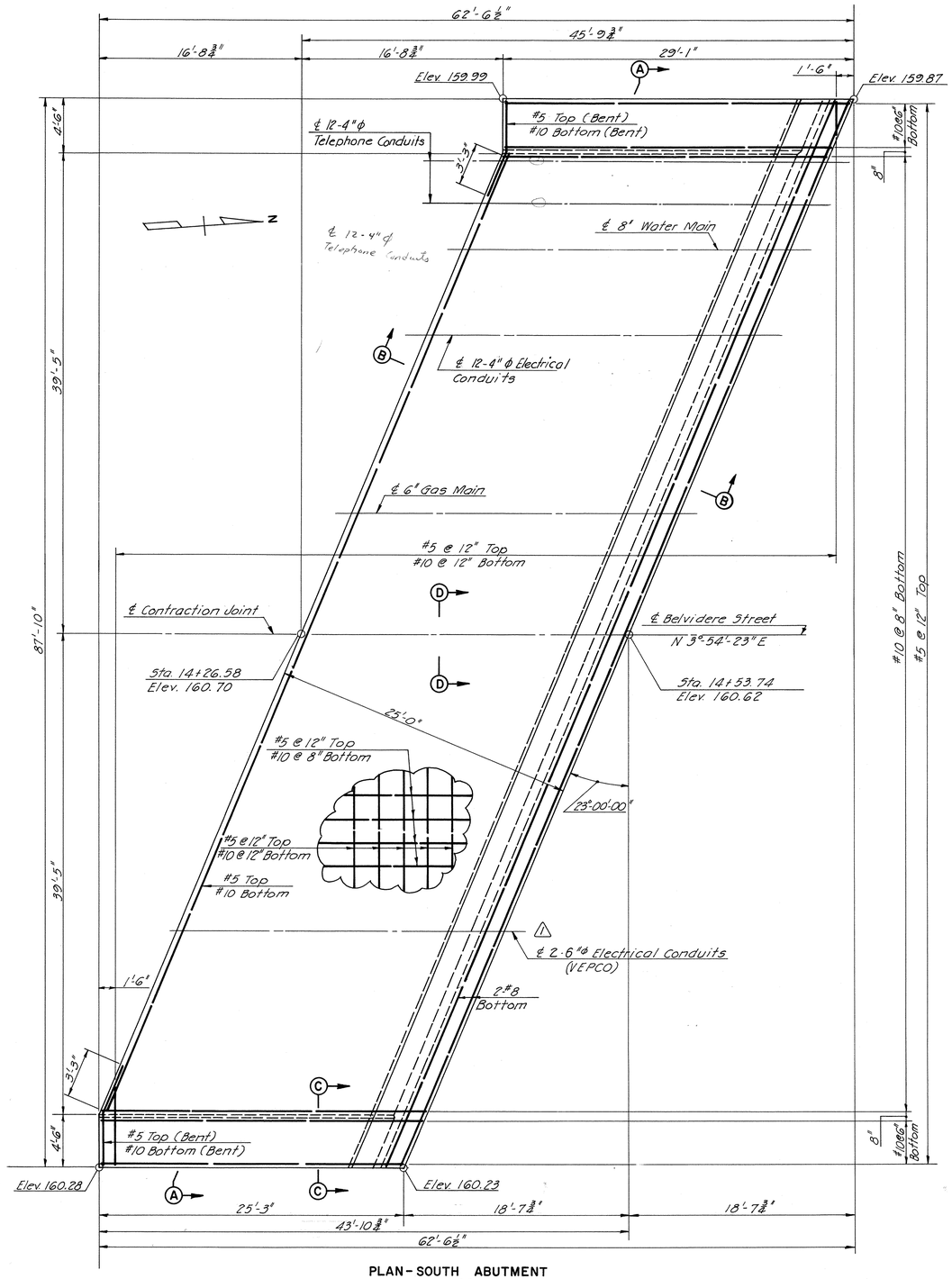


(1) = Preformed Expansion Joint Material

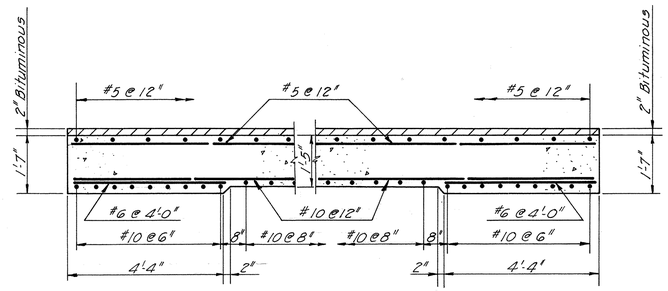
SECTION C-C
Scale: 1"=1'-0"



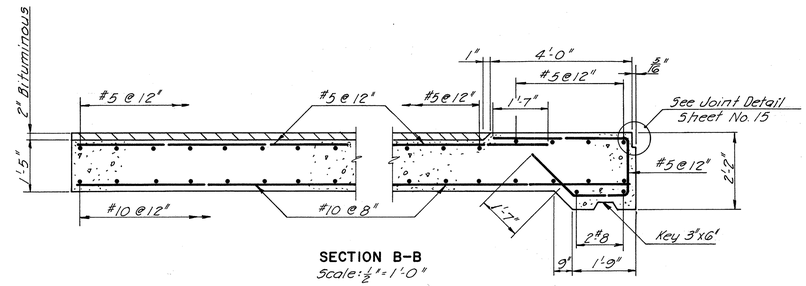
SECTION D-D
(CONTRACTION JOINT DETAIL)
No Scale



PLAN - SOUTH ABUTMENT
Scale: 3/16"=1'-0"



SECTION A-A
Scale: ½"=1'-0"



SECTION B-B
Scale: ½"=1'-0"

NOTES:
All reinforcing steel shall be 2" Clear.
ELEVATIONS SHOWN ARE TO TOP OF CONCRETE.

AS BUILT

	BY	DATE				
MADE	TOJ	10-67				
CHECKED	WEO	12-67	1	Rev. No Vepco Conduits	DGT	11-12-74
IN CHARGE	WEO		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B51
BELVIDERE STREET OVER
DOWNTOWN EXPRESSWAY
APPROACH SLAB
SOUTH ABUTMENT

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

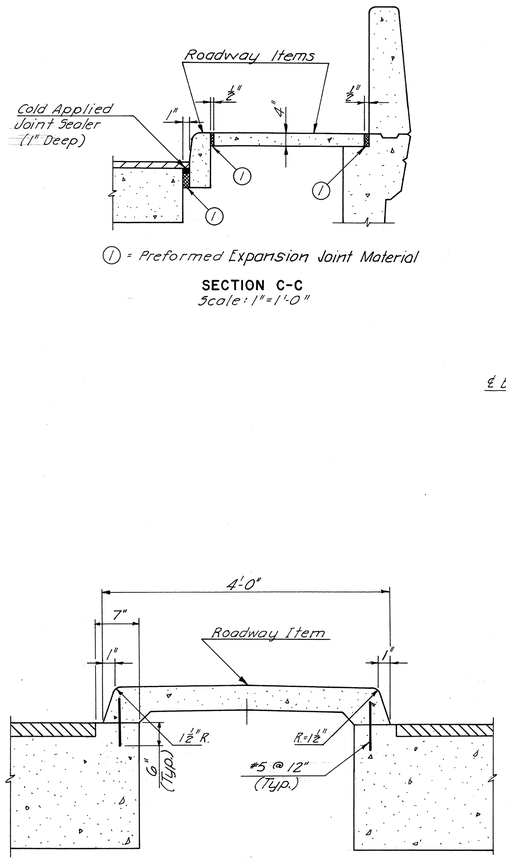
SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 16 OF 21

246

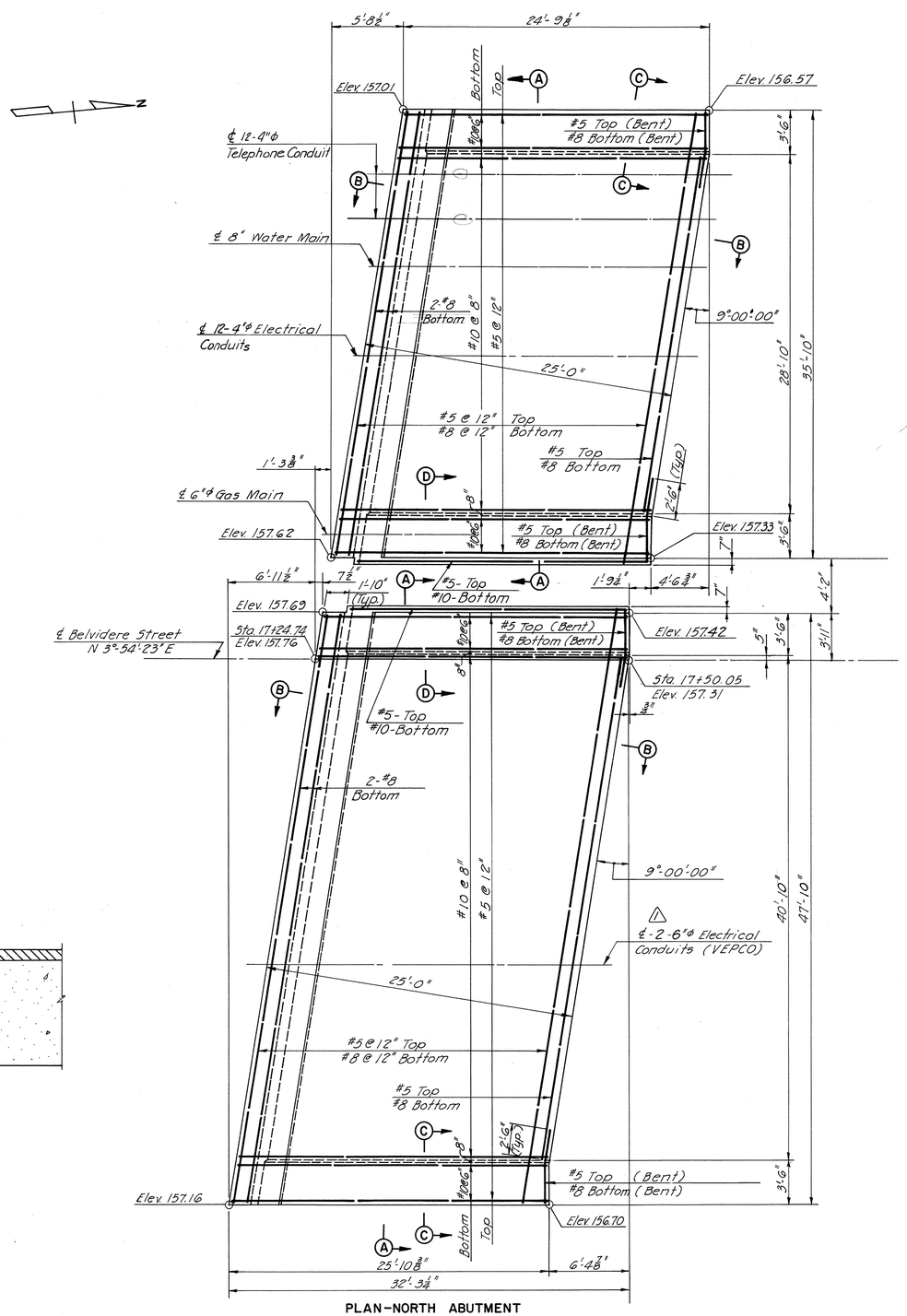
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	247	

① = Preformed Expansion Joint Material

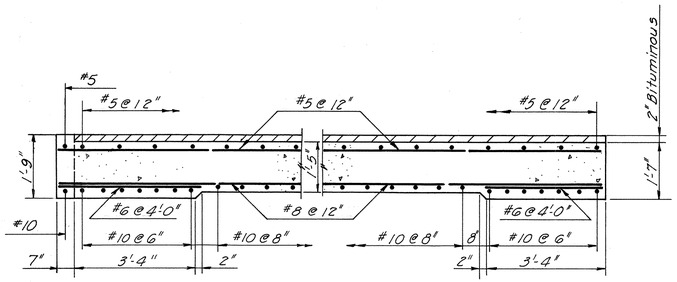
SECTION C-C
Scale: 1"=1'-0"



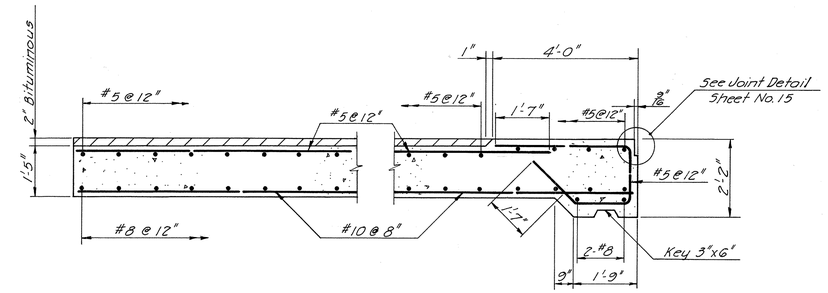
SECTION D-D
Scale: 1"=1'-0"



PLAN-NORTH ABUTMENT
Scale: ⅜"=1'-0"



SECTION A-A
Scale: ½"=1'-0"



SECTION B-B
Scale: ½"=1'-0"

NOTES:
All reinforcing steel shall be 2" Clear.
ELEVATIONS SHOWN ARE TO TOP OF CONCRETE.

AS BUILT

	BY	DATE
MADE	TDJ	10-67
CHECKED	WEO	12-67
IN CHARGE	WEO	

NO.	REVISION	BY	DATE
1	Rev. No. VEPCO Conduits	DGT	1/1270

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

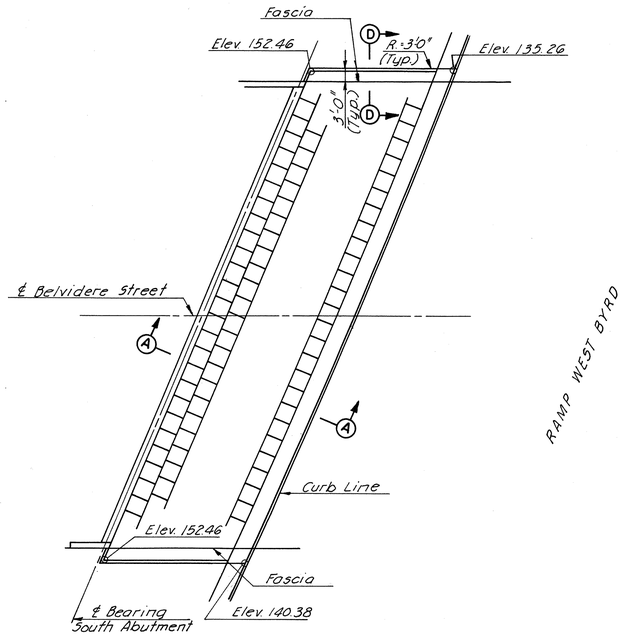
STRUCTURE B51
BELVIDERE STREET OVER DOWNTOWN EXPRESSWAY
APPROACH SLAB NORTH ABUTMENT

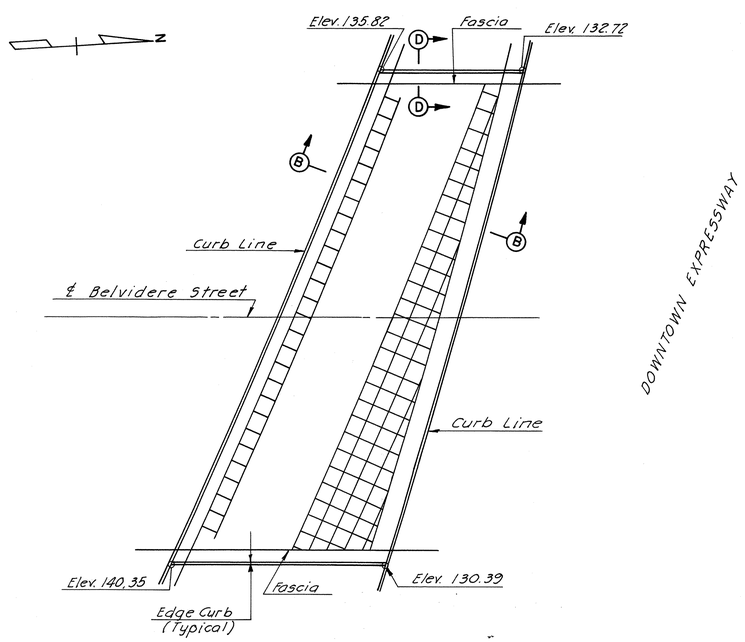
AMERICAN ENGINEERS
Richmond, Virginia

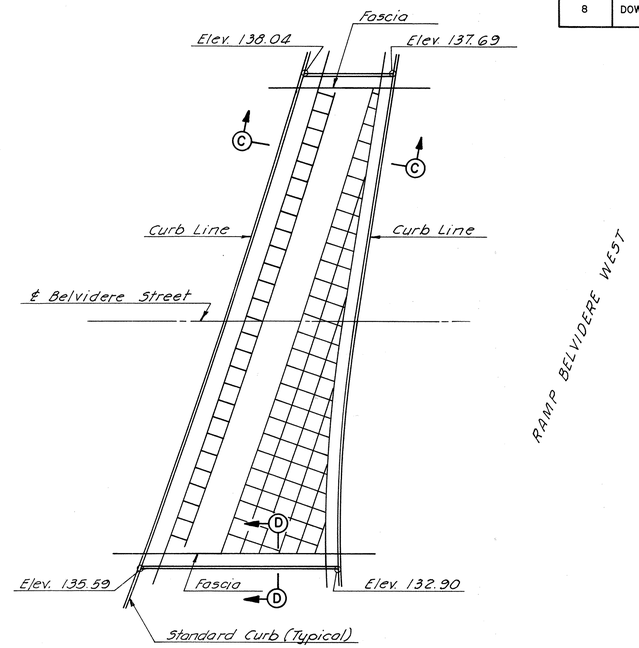
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 17 OF 21

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	248	

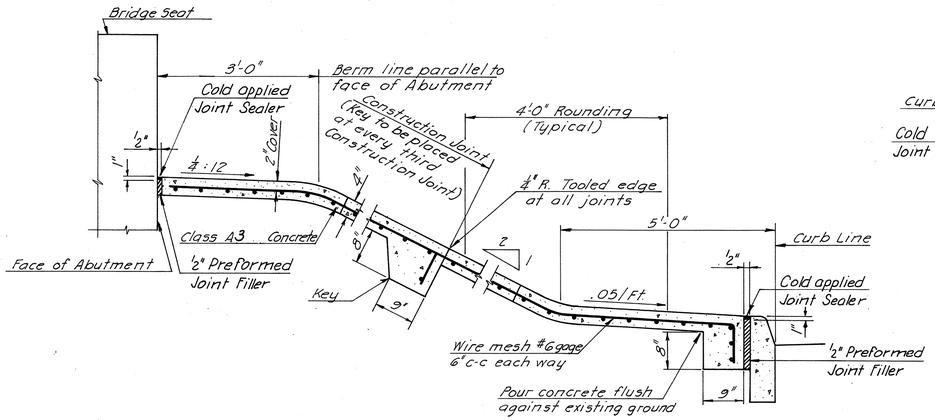




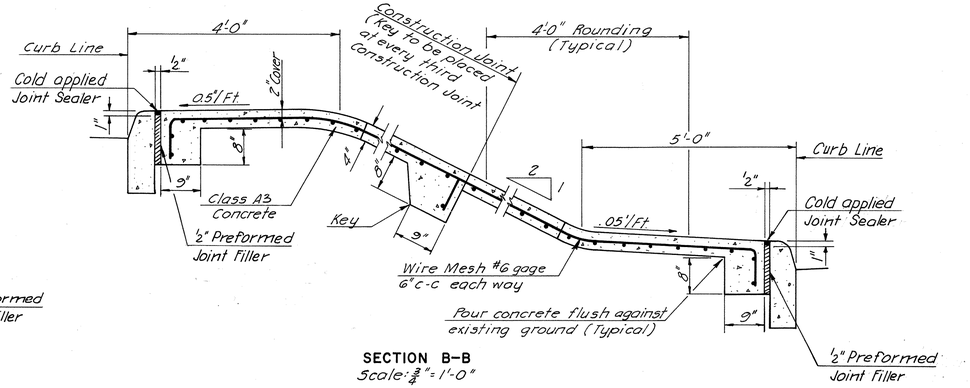


SOUTH ABUTMENT

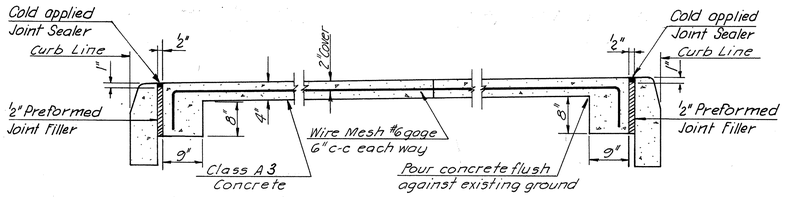
PLAN-SLOPE PROTECTION
No Scale



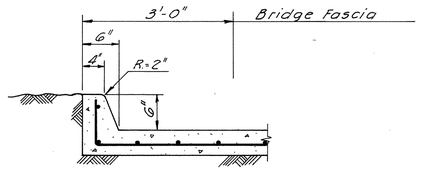
SECTION A-A
Scale: ¾"=1'-0"



SECTION B-B
Scale: ¾"=1'-0"



SECTION C-C
Scale: ¾"=1'-0"



SECTION D-D
No Scale

NOTES:

The item "Concrete Slope Protection" shall include the excavation of or the placing and compaction of any embankment material necessary to bring the surface of the paved slopes to the finished elevations shown on the plans.

"Concrete Slope Protection" shall be paid for at the contract unit price per square yard, which price shall include the concrete slab including wire mesh and joint sealer.

The slab shall be constructed in 4'0" x 4'0" panels, placed in horizontal courses, alternate panels poured in a staggered pattern with adjacent panels poured later. The slab shall be Class A3 concrete of such consistency that it can be placed without the use of top forms, the surface shall be finished with a wood float.

Reinforcement shall consist of wire mesh #6 gage, 6" c-c each way, placed at the center of the slab, and continuous through construction joints.

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TDJ	10-67				
CHECKED	WEO	12-67				
IN CHARGE	WEO					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B51
BELVIDERE STREET OVER
DOWNTOWN EXPRESSWAY

SLOPE PROTECTION DETAILS

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 18 OF 21

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	249	

BORING 8-59

Elev.	Casing Blows/Ft.	Spoon Blows Per 6"		Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
160.1	5	2	4	S-1	0'-2'	160.1	Fill: Red CLAY, little c Sand, trace Organic Silt
	6	4	3				
	10					157.1	
	14						
155.1	18						
	19	2	3	S-2	5'-7'		Red CLAY, trace Gravel
	24	5	5				
	29						
	59						
150.1	50						
	54	56	72	S-3	10'-12'	149.0	Red CLAY, some Sand, little Gravel
	81	22	22				
	39						
	78					145.1	
145.1	49						
	38	10	8	S-4	15'-17'		Yellow SILT & CLAY, some Sand, little Gravel
	47	8	9				
	40						
	40						
140.1	26						
	61	37	23	S-5	20'-22'		
▼ 138.6	23	25	42				Yellow SILT & CLAY, some m-f Sand
	27						
	25						
135.1	50						
	48	5	6	S-6	25'-27'	133.3	
	33	8	5				
	36						
	31						
130.1	OPEN						
		6	6	S-7	30'-32'		
		8	10				
125.1							
		7	8	S-8	35'-37'		
		8	9				
120.1							
		3	3	S-10	45'-47'		
		8	10				Green CLAY & SILT, trace Sand, trace Organic Silt (MARL)
115.1							
		4	6	S-11	50'-52'		
		10	13				
110.1							
		5	6	S-12	55'-57'		
		9	13				
105.1							
		4	5	S-13	60'-62'		
		7	9				
							Bottom of Hole Elev. 103.1

BORING 8-60

Elev.	Casing Blows/Ft.	Spoon Blows Per 6"		Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
158.9	3	3	2	S-1	0'-2'	158.9	Fill: Tan SAND, little m-f Gravel, trace Red Clay, trace Organic Silt
	3	2	2				
	8						
	6						
153.9	6						
	6	4	3	S-2	5'-7'		
	7	3	3				
	11						
	19						
148.9	20					148.9	
	19	9	8	S-3	10'-12'		
	20	6	6				Red CLAY, and c-m Sand, little Black Ash little Gravel; little Limonite
	32						
	20						
▼ 143.9	37						
	78	10	6	S-4	15'-17'		
	75	20	32				
	80						
	35						
138.9	35						
	65	26	11	S-5	20'-22'	138.0	
	62	4	7				
	55						Yellow SAND and Gravel, some Green Silt & Clay
	50						
133.9	58						
	57	5	5	S-6	25'-27'	132.0	
	56	8	10				
	OPEN						
128.9		4	6	S-7	30'-32'		
		7	11				
123.9							
		4	7	S-8	35'-37'		
		6	8				
118.9							
		3	9	S-9	40'-42'		Green CLAY & SILT, trace f Sand (MARL)
		23	95				
113.9							
		2	7	S-10	45'-47'		
		19	45				
108.9							
		3	10	S-11	50'-52'		
		25	112				
103.9							
		8	13	S-12	55'-57'		
		12	24	S-13	58'-60'		
		23	24				
							Bottom of Hole Elev. 98.9

BORING 8-61

Elev.	Casing Blows/Ft.	Spoon Blows Per 6"		Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
158.0	P	1	1	S-1	0'-2'	158.0	Fill: Gray-Brown CLAYEY SILT, some Yellow-Tan Silty Clay, little m-f Sand
	1	0	1				
	4	1	1	S-2	2'-4'	155.0	
	4	1	1				
153.0	8	7	6	S-3	4'-6'		
	10	3	3				
	14						
	17						
148.0	14						
	30						
	20	5	7	S-4	10'-12'		Brown c-f SAND, some Clayey Silt, trace m-f Gravel, trace cinders
	17	3	5				
	20						
	20						
▼ 143.0	20						
142.0	24	11	15	S-5	15'-17'		
	44	25	17				
	54						
	35					139.0	
138.0	20						Wash-Tan m-f SAND, some Clayey Silt
	OPEN	4	2	S-6	20'-22'	137.0	
		4	4				
133.0							
		4	3	S-7	25'-27'		
		5	7				
128.0							
		4	4	S-8	30'-32'		
		5	9				
123.0							
		4	6	S-9	35'-37'		
		7	8				
118.0							
		4	1	S-10	40'-42'		
		13	22				Gray-Green SILTY CLAY, little m-f Sand, trace Organic (MARL)
113.0							
		10	28	S-11	45'-47'		
		28	23				
108.0							
		11	20	S-12	50'-52'		
		36	20				
103.0							
		7	7	S-13	55'-57'		
		10	14				
98.0							
		5	5	S-14	60'-62'	96.5	
		12	21				
						94.5	Wash-Gray-Green m-f SAND, some Clayey Silt, some Organic
	2min.			C-1	63.5'-65		Gray LIMESTONE (C-1 22% Rec.)
93.0	1min.						
88.0							
							Wash-Green-Gray m-f SAND, some Black Particles
83.0							
	1min.			C-2	77.5'-81	80.5	
	2min.						
78.0	1min.						
	2min.						Gray & Black GRANITE (C-2 67% Rec.)
	1min.						
							Bottom of Hole Elev. 76.3

AS BUILT

GENERAL NOTES

(1) The first elevation noted is the existing ground surface.
(2) ▼ denotes the ground water level as measured.
(3) (a) Casing Blows are the blows per foot for a 300 pound hammer falling 24 inches except where noted otherwise.
(b) Also noted in Casing Blows column (where applicable) are rock drilling times in minutes per foot.
(4) (a) Spoon Blows are the blows per 6 inches for a 2" O.D., 1⅜ I.D. Split Spoon Sampler using a 140 pound hammer falling 30 inches.
(b) W denotes penetration under weight of hammer.
(c) P denotes penetration by hydraulic pressure.
(5) (a) Samples designated by an "S" number indicate Split Spoon Samples.
(b) Samples designated by a "U" number indicate Undisturbed Shelby Tube Samples (3 3/8 " Ø).
(c) Samples designated by a "C" number indicate 1 3/16" Ø (AX) Rock Cores.
(6) Samples descriptions are based on field visual identification by the boring inspector.
(7) Abbreviation and quantitative terms:

c-coarse	trace	1-10%
m-medium	little	10-20%
f-fine	some	20-35%
	and	35-50%

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.M.S.	8-10-67				
CHECKED	W.E.O.	8-11-67				
IN CHARGE	W.E.O.					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 51
BELVIDERE STREET OVER
DOWNTOWN EXPRESSWAY

BORING LOGS

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: 1"=6' VERT.
CONTRACT NO.: 8
SHEET NO. 19 OF 21

249

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	250	

BORING 8-63

Elev.	Casing Blows/Ft.	Spoon Blows Per 6"		Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
156.5						156.5	
	8	4	9	S-1	0'-2'		Fill: Brown SAND, and Gravel
	23	17	13				
	12					153.5	
	10						
151.5	32						
	16	2	1	S-2	5'-7'		
	14	2	2				
	7						Gray SAND, and Gravel
	5						
146.5	32						
	51	3	5	S-3	10'-12'		
	40	15	12				
	57						
	31						
141.5	48					141.5	
	55	5	6	S-4	15'-17'		Red-Yellow CLAY & SILT, some m-f Sand, little Gravel
	59	10	7				
	OPEN					137.5	
136.5							
		4	4	S-5	20'-22'		
		5	8				Gray-Yellow CLAY & SILT, some f Sand, some Limonite
						131.5	
131.5							
	5	7	S-6	25'-27'			
	10	15					Green CLAY & SILT (MARL)
126.5	▼						
	6	14	S-7	29'-31'			
	15	25					
							Bottom of Hole Elev. 125.5

BORING 8-65

Elev.	Casing Blows/Ft.	Spoon Blows Per 6"		Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
158.3						158.3	
	25	10	7	S-1	0'-2'		
	21	6	8				
	30						
	40						
153.3	55						
	39	13	9	S-2	5'-7'		
	69						
	92						Fill: Red CLAY, and c-f GRAVEL, little c-f Sand
	91						
148.3	72						
	40	14	15	S-3	10'-12'		
	58	13	11				
	60						
	79						
143.3	82					143.3	
	77	42	22	S-4	15'-17'		
▼ 141.3	89	20	19				Red CLAY & SILT, some Gravel, some Sand
	76						
	46						
138.3	39	17	7	S-5	19'-21'	138.8	
	46	8	14				Reddish-Yellow CLAY & SILT, some m-f Sand, little Limonite, trace Organic
	OPEN	3	6				
		7	6	S-6	23'-24'		
		8	12				
133.3						133.3	
	600#			7U	25'-26.4		
				8U	26.5-27.6		
		3	4	S-9	27.6-29		
		5	7				
128.3							
123.3							
		2	3	S-10	35'-37'		
		5	6				
118.3							
	5	5	S-11	40'-42'			
	7	12					
113.3							
	5	6	S-12	45'-47'			
	8	20					Green CLAY & SILT, little f Sand, trace Organic Silt, trace m Gravel (MARL)
108.3							
	8	12	S-13	50'-52'			
	15	19					
103.3							
	5	5	S-14	55'-57'			
	8	11					
98.3							
	4	4	S-15	60'-62'			
	7	15				96.5	
			C-1	63'-65'		94.8	Black m-f SAND (C-1 0% Rec.)
93.3	4min.					93.3	
	75/4"		S-16	65'-65.3		92.3	LIMESTONE fragments
	3min.		C-2	65.3-67		91.3	LIMESTONE (C-2 30% Rec.)
		19	24	S-17	67.5-69		
		30	40				
88.3							
							Green SAND, some Silt and Limestone fragments
83.3	▼						
	2min.			C-3	75'-80'		
	2min.						GRANITE; Bed Rock
	1min.						(C-3 85% Rec.)
	1min.						
78.3	2min.						
							Bottom of Hole Elev. 78.3

BORING 8-66

Elev.	Casing Blows/Ft.	Spoon Blows Per 6"		Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
159.1						159.1	
	4	7	6	S-1	0'-2'		Fill: Red-Brown SILTY CLAY, and m-f Sand, trace Cinders, Brick, m-f Gravel
	7	3	4				
	11	5	7	S-2	2'-4'		
	2	10	8				
154.1	1	2	1	S-3	4'-6'		
	1	1	2				
	3						
	8					151.0	
	14						
149.1	18						
	15	10	10	S-4	10'-12'		
	19	8	12				Red-Brown-Gray CLAYEY SILT, and m-f Sand, trace m-f Gravel, trace Cinders, trace Organic (Damp)
	14						
144.1	12						
	9						
	9	5	4	S-5	15'-17'	148.2	
	15	4	4				
▼ 141.1	13						Red-Yellow-Tan m-f SAND, and Silty Clay (Damp)
	12					140.2	
139.1	11						
	9	2	1	S-6	20'-22'		
	18	2	1				Tan c-f SAND, little Silty Clay, lenses f White Sand (Wet)
	14						
	16						
134.1	15						
	OPEN	3	4	S-7	25'-27'		
		5	6			132.5	
129.1							
		3	4	S-8	30'-32'		
		6	6				
124.1							
		3	5	S-9	35'-37'		
		6	8				
119.1							
	8	11	S-10	40'-42'			
	22	23					Gray-Green CLAYEY SILT, and m-f Sand, trace Organic (MARL) (Damp)
114.1							
	6	10	S-11	45'-47'			
	17	24					
109.1							
	9	12	S-12	50'-52'			
	21	32					
104.1							
	9	11	S-13	55'-57'			
	12	14					
99.1							
	5	8	S-14	60'-62'			
	8	8					
94.1	▼						
	11	100/2"	S-15	65'-65.7		93.4	Gray-Green & Black m-f SAND, trace Tan f Sand, trace c Blue Sand
							Bottom of Hole Elev. 92.4

	BY	DATE				
MADE	J.M.S.	8-10-67				
CHECKED	W.E.O.	8-11-67				
IN CHARGE	W.E.O.		NO.	REVISION	BY	DATE

GENERAL NOTES

(1) The first elevation noted is the existing ground surface.
(2) ▼ denotes the ground water level as measured.
(3) (a) Casing Blows are the blows per foot for a 300 pound hammer falling 24 inches except where noted otherwise.
(b) Also noted in Casing Blows column (where applicable) are rock drilling times in minutes per foot.
(4) (a) Spoon Blows are the blows per 6 inches for a 2" O.D., 1⅜ I.D. Split Spoon Sampler using a 140 pound hammer falling 30 inches.
(b) W denotes penetration under weight of hammer.
(c) P denotes penetration by hydraulic pressure.
(5) (a) Samples designated by an "S" number indicate Split Spoon Samples.
(b) Samples designated by a "U" number indicate Undisturbed Shelby Tube Samples (3 3/8 " ϕ).
(c) Samples designated by a "C" number indicate 1 3/16" ϕ (AX) Rock Cores.
(6) Samples descriptions are based on field visual identification by the boring inspector.
(7) Abbreviation and quantitative terms:

c-coarse	trace	1-10%
m-medium	little	10-20%
f-fine	some	20-35%
	and	35-50%

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B51
BELVIDERE STREET OVER
DOWNTOWN EXPRESSWAY

BORING LOGS

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: 1"= 6' VERT.
CONTRACT NO.: 8
SHEET NO. 20 OF 21

250

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	251	

BORING 8-67

Elev.	Casing Blows/Ft.	Spoon Blows Per 6"	Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
158.3	10	8 10	S-1	0'-2'	158.3	Fill: Brown-Gray c-f SAND, and Silt, little Cinders, little Brick, little Organic Silt
	12	17 10				
	26					
	19					
153.3	17					
	12	2 2	S-2	5'-7'		
	14	2 1				
	19					
	14				149.0	
148.3	14					
	14	3 1	S-3	10'-12'		Red m-f SAND, some Clayey Silt, little m Gravel, trace Organic Silt
	13	2 2				
	12					
	17				144.3	
▼ 143.3	16					
	12	8 4	S-4	15'-17'		Tan-Brown m-f SAND, some Silt, trace Cinders, trace Organic Silt
	27	3 6				
	33					
	24				139.3	
138.3	19					
	25	9 11	S-5	20'-22'		Tan m-f SAND, some Silt, some m-f Gravel
	34	4 6				
	30					
	38				134.0	
133.3	34					
	30	3 4	S-6	25'-27'		
	34	6 6				
	36					
	OPEN					
128.3						
		3 3	S-7	30'-32'		
		5 9				
123.3						
		4 5	S-8	35'-37'		
		6 8				
118.3						
		5 9	S-9	40'-42'		Gray-Green CLAYEY SILT, trace f Sand (MARL)
		13 34				
113.3						
		9 11	S-10	45'-47'		
		24 47				
108.3						
		15 19	S-11	50'-52'		
		20 54				
103.3						
		9 14	S-12	55'-57'		
		17 24				
96.3 ▼						
		4 6	S-13	60'-62'		
		7 10				
						Bottom of Hole Elev. 96.3

BORING 8-68

Elev.	Casing Blows/Ft.	Spoon Blows Per 6"	Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
157.0	10	4 5	S-1	0'-2'	157.0	
	31	6 5				Fill: Tan-Brown m-f SAND, some Silt, little m-f Gravel, trace Organic, trace Cinders
	30					
	25					
152.0	27					
	13	5 4	S-2	5'-7'		
	12	6 6			150.0	
	21					
	17					
147.0	35					
	12	2 3	S-3	10'-12'		
	5	1 1				
	10					
	10					Brown m-f SAND, little Silt, little m-f Gravel, trace Organic
142.0	10					
	5	2 4	S-4	15'-17'		
	12	3 4				
▼ 139.0	21					
	34					
137.0	21					
	10	8 10	S-5	20'-22'		
	12/6"	11 8				
	OPEN					
132.0						
		3 4	S-6	25'-27'	131.0	
		6 11				
127.0						
		3 4	S-7	30'-32'		
		6 9				
		8 8				
122.0		5 7				
		3 3	S-8	35'-37'		
		7 11				
117.0						
		4 8	S-9	40'-42'		Gray-Green CLAYEY-SILT, little m-f Sand, trace Organic (MARL)
		18 32				
112.0		5 7	S-10	45'-47'		
		12 75				
107.0						
		4 4	S-11	50'-52'		
		8 14				
102.0						
		5 7	S-12	55'-57		
		8 9				
97.0						
		3 9	S-13	60'-62'	96.0	Gray-Green SILT, and m-f Sand, trace f Gravel (MARL)
		12 30			94.0	
	3min.		C-1	63'-68'		LIMESTONE 94.0 to 93.0, 4 pieces, 3 fragments recovered
92.0	3min.					
	6min.					
	4min.					
	2min.				89.0	
87.0						
						No Spoon Sample, Wash sample indicates dark m-f SAND. Possibly decomposed Granite
82.0						
	▼					
	2min.		C-2	78.5-84	78.5	
77.0	3min.					
	3min.					
	3min.					Gray-Green GRANITE, little Feldspar
	3min.					(C-2 8% Rec.)
	4min.					
72.0	5min.		C-3	84'-88'		
	5min.					(C-3 88% Rec.)
	6min.					
	7min.					
						Bottom of Hole Elev. 69.0

BORING 8-69

Elev.	Casing Blows/Ft.	Spoon Blows Per 6"	Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
155.5	2	2 1	S-1	0'-2'	155.5	
	2	2 2			153.5	Fill: Dark-Brown m-f SAND, some Silty Clay trace Cinders, trace Gravel, trace Organic
	5	8 6	S-2	2'-4'		
	11	6 4				
150.5	11	4 4	S-3	4'-6'		
	10	4 4				
	8					
	9					
	10					
145.5	11					
	10	2 2	S-4	10'-12'		Red-Brown m-f SAND, and Silty Clay, trace f Gravel (soft)
	7	3 3				
	5					
	3					
140.5	5					
	7	4 6	S-5	15'-17'		
	7	6 6				
	5					
	6				136.7	
▼ 135.5	4					
	OPEN	5 5	S-6	20'-22'		Tan m-f SAND, some Silty Clay, trace f Gravel
		7 8				
130.5						
		9 9	S-7	25'-27'	129.5	
		10 9				
125.5						
		4 5	S-8	30'-32'		
		5 6				
120.5						
		5 6	S-9	35'-37'		
		8 16				
115.5						
		13 24	S-10	40'-42'		Gray-Green SILTY CLAY, some f Sand, trace Organic, trace Mica (MARL) (Damp)
		21 23				
110.5						
		7 17	S-11	45'-47'		
		35 41				
105.5						
		4 12	S-12	50'-52'		
		14 16				
100.5						
		5 5	S-13	55'-57'		
		8 8				
					96.5	
95.5						
		14 22	S-14	60'-62'		
		29 44				
90.5						
		20 25	S-15	65'-67'		Gray-Green c-f SAND, some Silty Clay, trace Mica, trace shell (Damp)
		26 32				
83.5 ▼						
		21 38	S-16	70'-72'		
		67 105				
						Bottom of Hole Elev. 84.0

GENERAL NOTES

(1) The first elevation noted is the existing ground surface.
(2) ▼ denotes the ground water level as measured.
(3) (a) Casing Blows are the blows per foot for a 300 pound hammer falling 24 inches except where noted otherwise.
(b) Also noted in Casing Blows column (where applicable) are rock drilling times in minutes per foot.
(4) (a) Spoon Blows are the blows per 6 inches for a 2" O.D., 1⅜ I.D. Split Spoon Sampler using a 140 pound hammer falling 30 inches.
(b) W denotes penetration under weight of hammer.
(c) P denotes penetration by hydraulic pressure.
(5) (a) Samples designated by an "S" number indicate Split Spoon Samples.
(b) Samples designated by a "U" number indicate Undisturbed Shelby Tube Samples (3 3/8 " ∅).
(c) Samples designated by a "C" number indicate 1 3/16" ∅ (AX) Rock Cores.
(6) Samples descriptions are based on field visual identification by the boring inspector.
(7) Abbreviation and quantitative terms:

c-coarse	trace	1-10%
m-medium	little	10-20%
f-fine	some	20-35%
	and	35-50%

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.M.S.	8-10-67				
CHECKED	W.E.O.	8-11-67				
IN CHARGE	W.E.O.					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B51
BELVIDERE STREET OVER
DOWNTOWN EXPRESSWAY

BORING LOGS

AMERICAN ENGINEERS
Richmond, Virginia

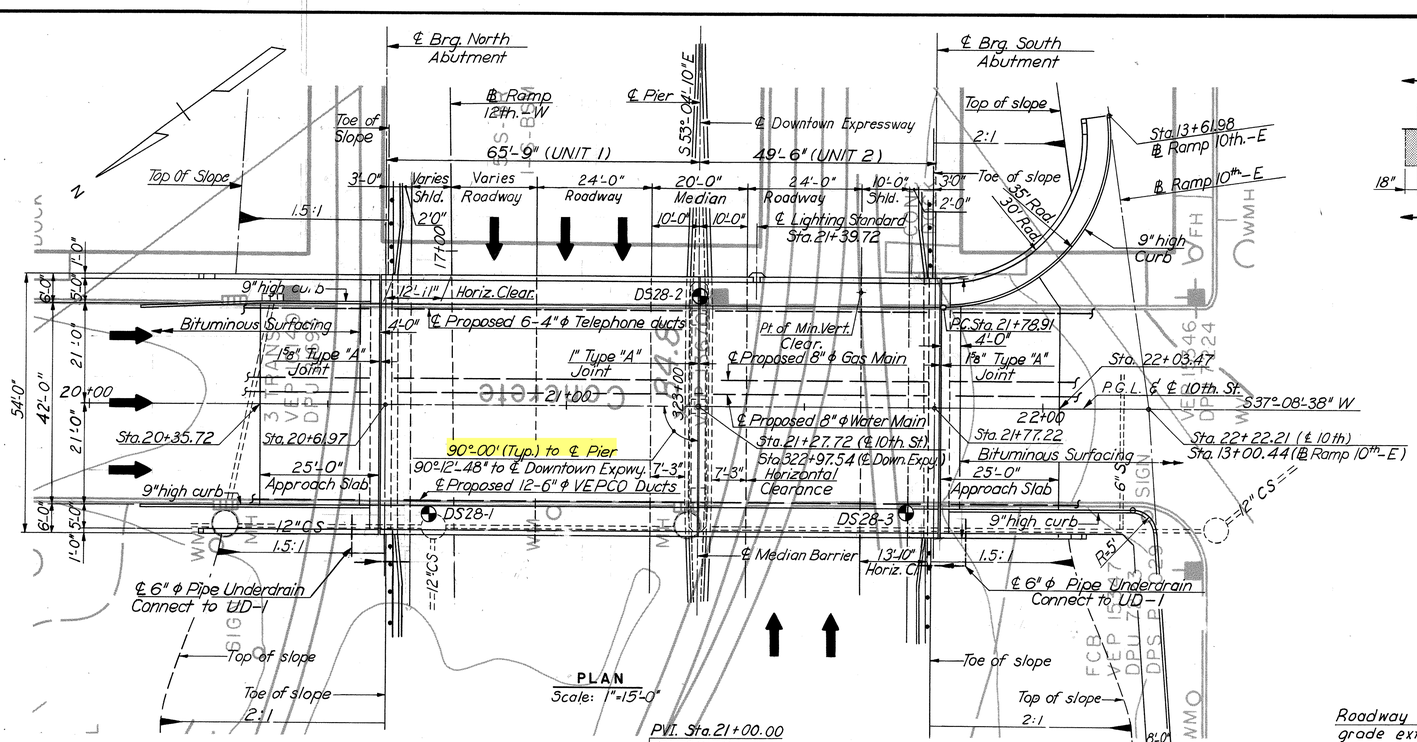
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

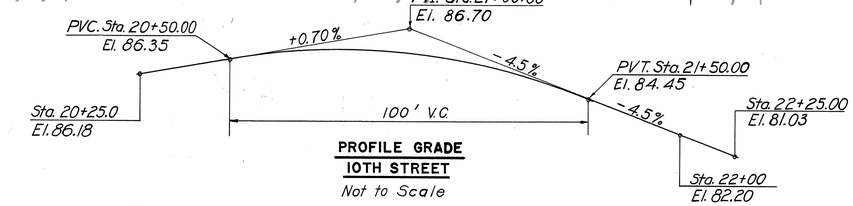
SCALE: 1" = 6' VERT.
CONTRACT NO.: 8
SHEET NO. 21 OF 21

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	204	

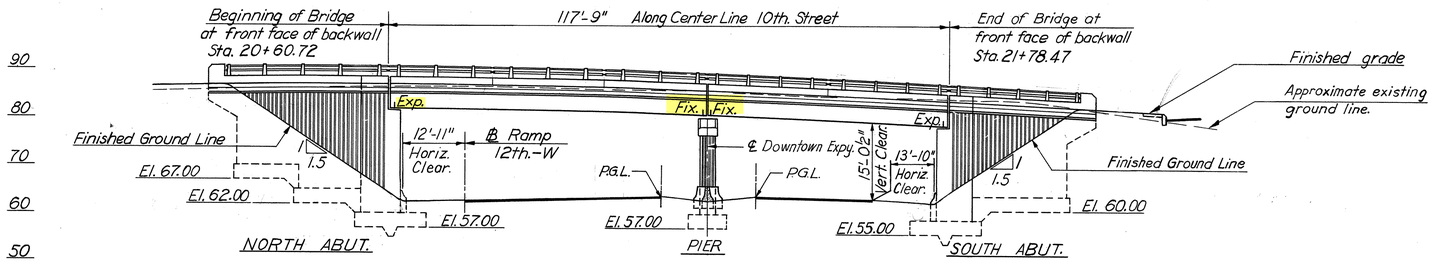
INDEX

NO.	DESCRIPTION
1	General Plan and Elevation
2	General Notes and Quantities
3	North Abutment
4	North Abutment Details (1)
5	North Abutment Details (2)
6	~~North Abutment Details (3)~~ Void
7	South Abutment
8	South Abutment Details (1)
9	South Abutment Details (2)
10	South Abutment Details (3)
11	Pier
12	Framing Plan
13	Cross Section and Utility Details
14	Deck Plans
15	Joint Details
16	Approach Slabs
17	Boring Logs
S1	Standard Shoe Details
S3	Standard Aluminum Railing Details (2 Rails)
S4	Standard Electrical Details (Bridges Carrying City Streets)
S7	Standard Architectural Details
S8	Standard Architectural Details
S9	Standard Architectural Details
S10	Standard Conduit Installation Details
S11	Standard Utility Support Details at Bridge Abutments

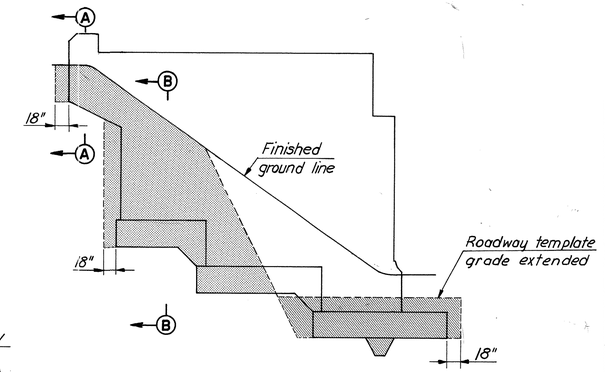




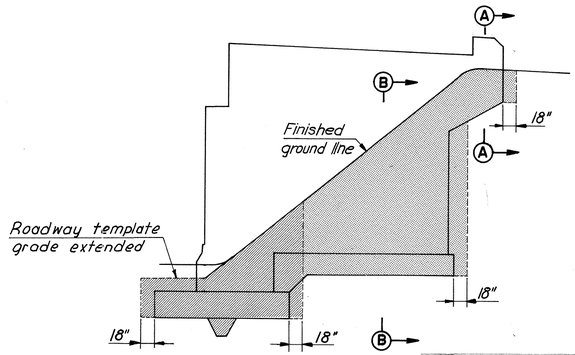
PROFILE GRADE
10TH STREET
Not to Scale



ELEVATION
Scale 1"=15'



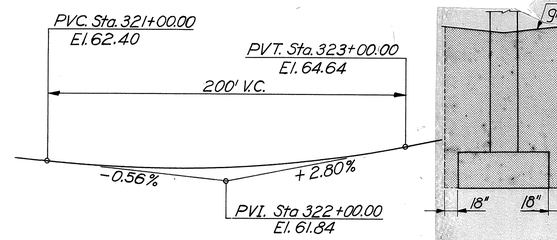
NORTH ABUT.



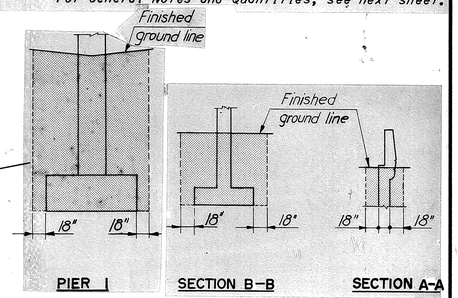
SOUTH ABUT.

BORINGS: Indicates location of 2½"ϕ cased hole boring.
For boring data, see Boring Logs sheet.

NOTE: For General Notes and Quantities, see next sheet.



PROFILE GRADE
DOWNTOWN EXPRESSWAY
Not to Scale



PAYMENT LIMITS FOR STRUCTURE EXCAVATIONS
No Scale

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.B.M.	12-67	2	As Built	TEM	7-77
CHECKED	A.B.P.	3-68	1	North East WW	TEM	6-74
IN CHARGE	P.R.Y.					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-60
10TH STREET OVER
DOWNTOWN EXPRESSWAY

GENERAL PLAN AND ELEVATION

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 1 OF 17

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	205	

GENERAL NOTES

ROADWAY CAPACITY: One 42'-0" clear roadway. Two 5'0" sidewalks. Dead Load-Includes 15 lbs. per sq.ft. for future wearing surface. Live Loads-HS20-44 loading and B.P.R. modified for military vehicles.

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

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 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 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. All other concrete shall be Class A3. All exposed edges and corners shall have a 3/4" 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 Details sheets and the Contract Special Provisions for types and details.

All reinforcing steel shall conform 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. Specification A36 except as noted.
All field connections shall be made with high strength bolts.
High strength bolts shall be 7/8" diameter unless otherwise noted and shall conform to A.S.T.M. Specifications A325.

BENCH MARKS: See Reference Ties and Field Control Data sheet in highway plans.

C-56 Plug, corner E. Cary St. and S. 10th St., Elev. 77.32

FINAL QUANTITIES

	STRUCTURE EXCAVATION C.Y.	CONCRETE CLASS A3 C.Y.	CONCRETE CLASS A3 BR. APPR. SLABS C.Y.	CONCRETE CLASS A4 C.Y.	REINFORCING STEEL LBS.	STRUCTURAL STEEL LBS.	ALUMINUM BR. RAILING (2 RAILS) L.F.	POROUS BACKFILL C.Y.	DAMP-PROOFING S.Y.	UNDERDRAIN 6"ϕ L.F.	GAS MAIN 8"ϕ L.F.	WATER MAIN 8"ϕ L.F.	CONDUIT 6"ϕ VEPCO L.F.	CONDUIT 4" ϕ TELEPHONE L.F.	METAL CONDUIT 3"ϕ L.F.	
SUPERSTRUCTURE				229.19	48,894	176,516	235.3				171	173	2037	1018.5	879	
NORTH ABUTMENT	1418	445.53			35,711		69.2	129	272	132						
PIER I	194	85.47			18,598											
SOUTH ABUTMENT	960	441.36			35,887		75.8	133	280	137						
APPROACH SLABS			118.03		26,018											
TOTAL	2572	972.36	118.03	229.19	165,018	176,516	380.3	262	552	269	171	173	2037	1018.5	879	

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EVR	3-68	2	AS BUILT	HMW	5-76
CHECKED	A.B.P.	12-68	1	N. Abut & Total quant.	TEM	6-74
IN CHARGE	P.R.Y.					

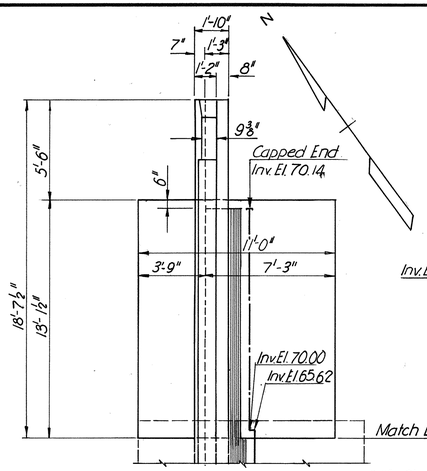
AS BUILT

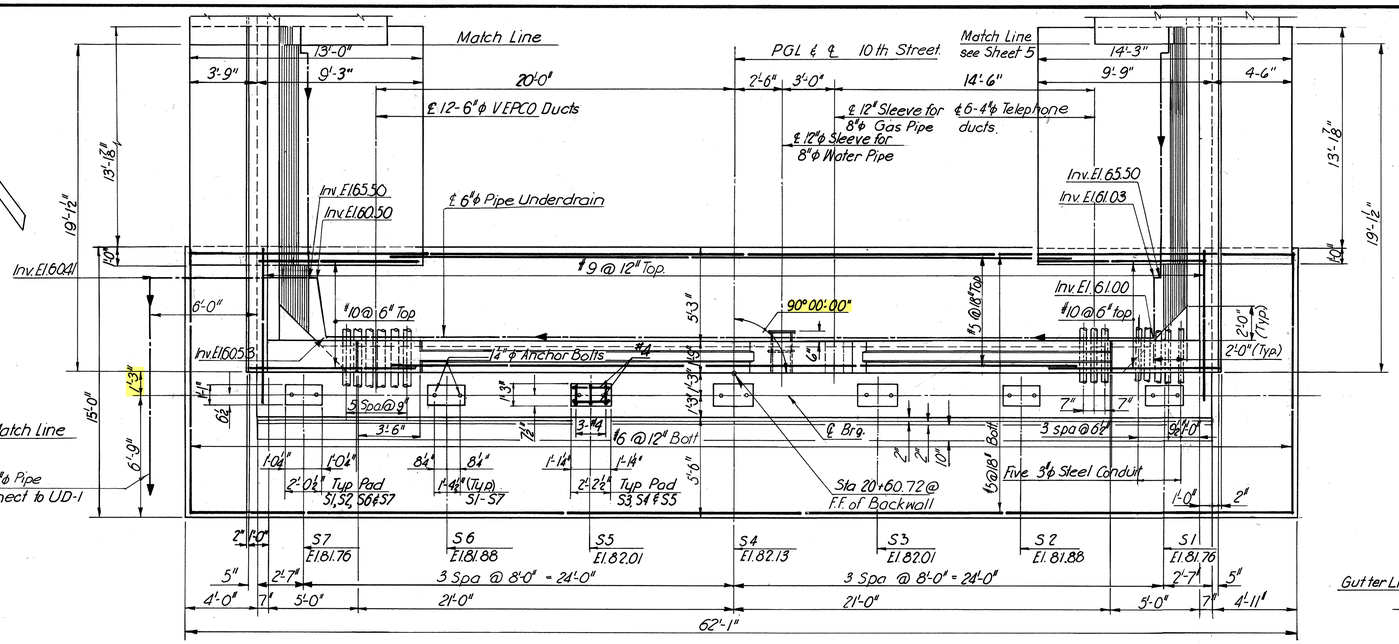
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY
BRIDGE B-60
10TH STREET OVER DOWNTOWN EXPRESSWAY
GENERAL NOTES AND QUANTITIES

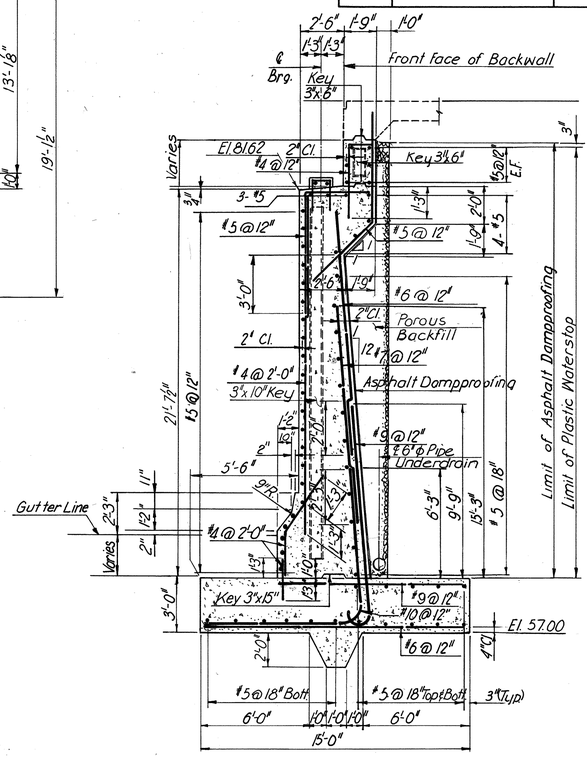
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 2 OF 17

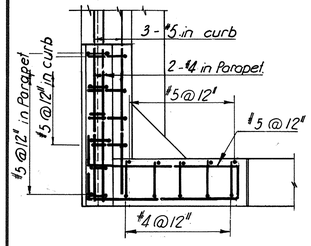
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
		206	



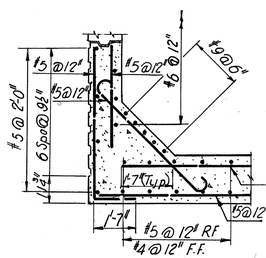




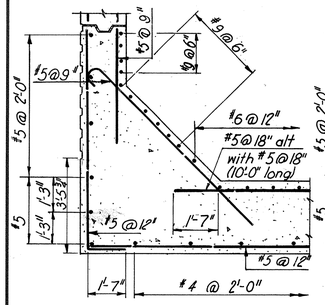
SECTION A-A
Scale 1/4"=1'-0"



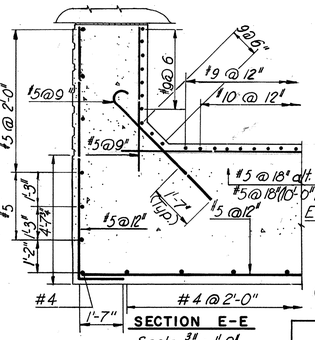
VIEW B-B
Scale 3/8"=1'-0"



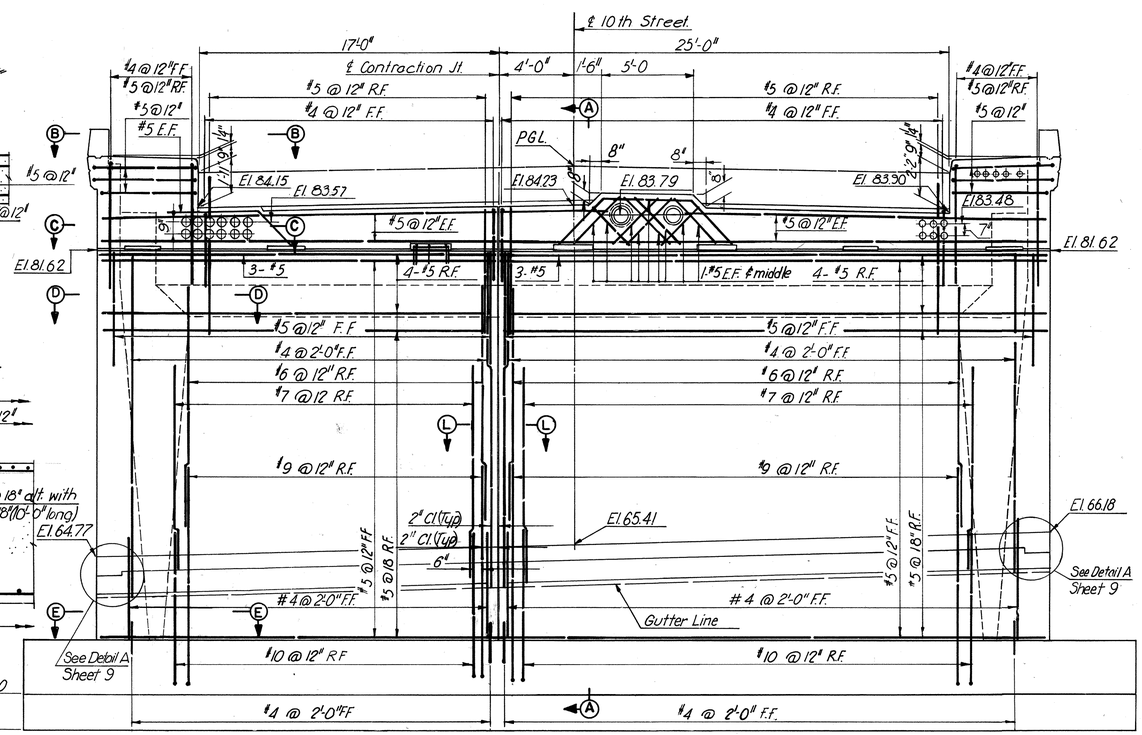
SECTION C-C
Scale 3/8"=1'-0"



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



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



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

LEGEND:
F.F. denotes Front Face
R.F. denotes Rear Face
E.F. denotes Each Face

NOTES

For anchor bolts and treatment of pads, see Standard Shoe Details sheet.

For details of architectural treatment of abutment wingwalls, see Standard Architectural Details sheets.

For railing details, see Standard Aluminum Railing (2 Rails) sheet.

For treatment of ducts and piping thru abutment backwall, see Standard Electrical Details (Bridges Carrying City Streets), Standard Conduit Installation Details and Standard Utility Support Details of Bridge Abutments sheets.

For Section L-L, see North Abutment Details (1) sheet.

FOUNDATION NOTES

Footings shall be founded at the elevation shown on the Plans unless otherwise directed by the Engineer due to conditions at the site during construction. In such cases, the Engineer will determine the extent of redesign necessary and will advise the Contractor before construction begins.

The foundation is designed for an allowable bearing pressure of:

Abutment at El. 57.00 - 3.0 tons per square foot
NW Wingwall at El. 62.00 - 3.0 tons per square foot
NE & NW Wingwall at El. 67.00 - 2.0 tons per square foot
NE Wingwall at El. 62.00 - 2.5 tons per square foot

	BY	DATE				
MADE	E.F.	1-68	2	As Built	TEM	7-77
CHECKED	T.E.M.	5-68	1	North East W.W.	TEM	6-74
IN CHARGE	P.R.Y.		NO.	REVISION	BY	DATE

AS BUILT

Note: Adjust backwall reinforcing as required to clear utilities.

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

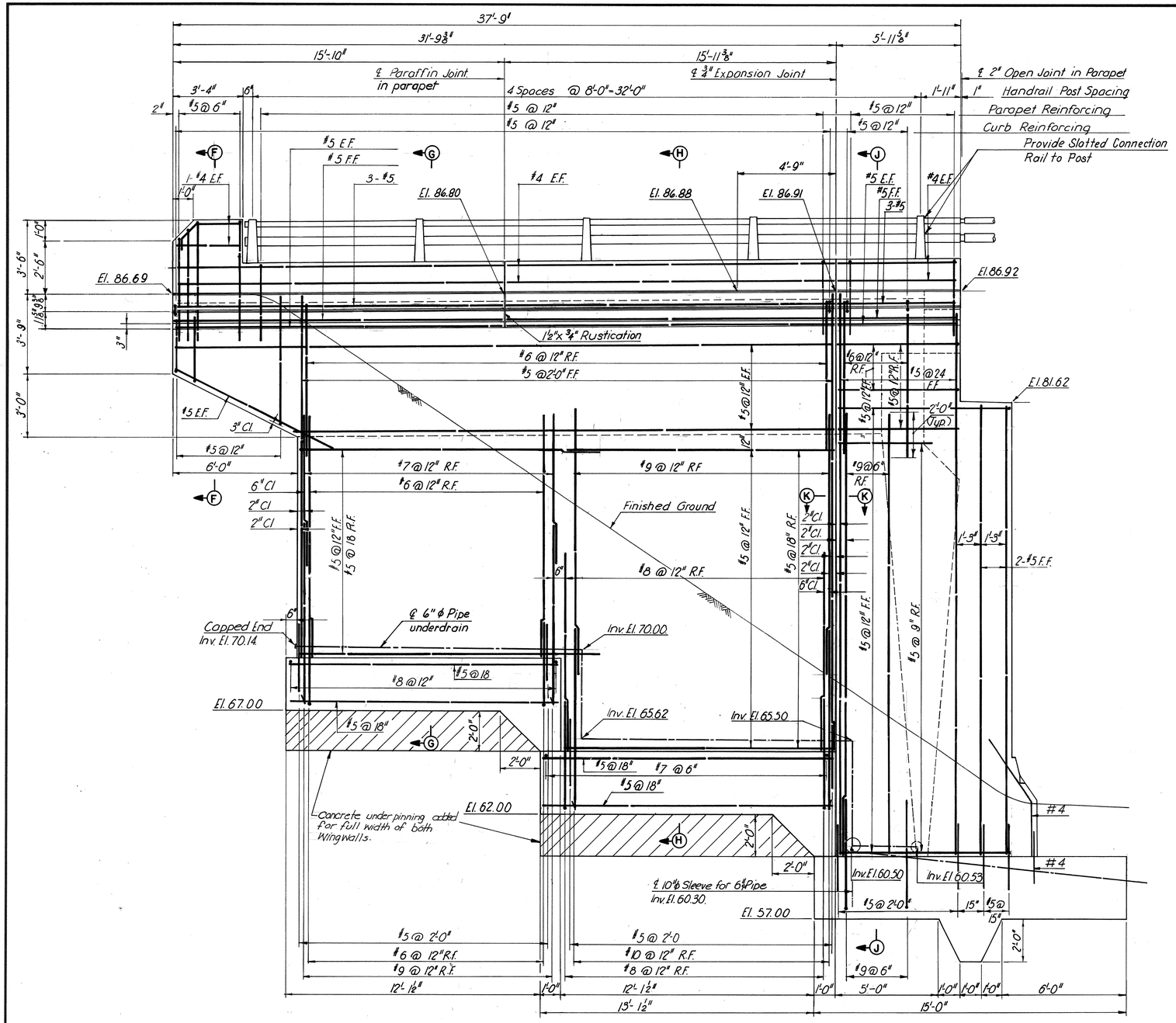
BRIDGE B-60
10TH STREET OVER DOWNTOWN EXPRESSWAY
NORTH ABUTMENT

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 3 OF 17

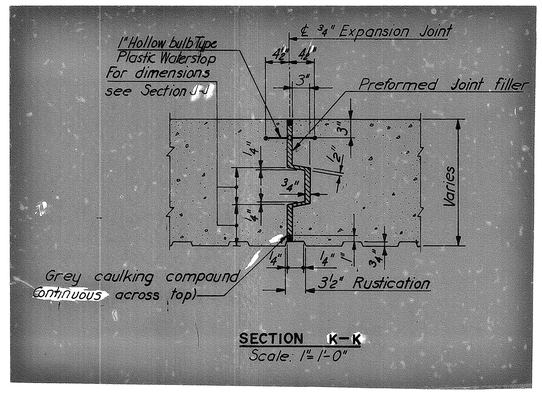
206

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	207	

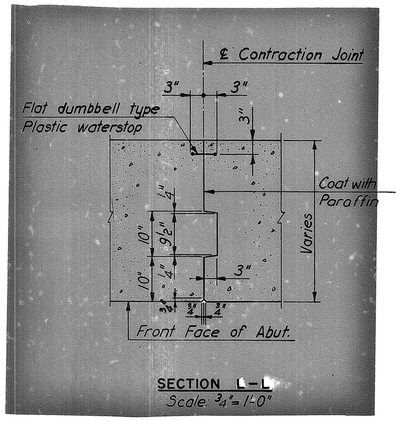


NORTHWEST WINGWALL ELEVATION
Scale ⅜"=1'-0"

NORTHEAST WINGWALL ELEVATION (OPPOSITE HAND)



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



SECTION L-L
Scale: ¾"=1'-0"

NOTE

For Sections F-F thru J-J, see North Abutment Details (2) Sheet.

	BY	DATE				
MADE	E.F.	2-68	2	AS BUILT	H.M.N	5-74
CHECKED	T.E.M.	5-68	1	North East W.W.	T.E.M	6-74
IN CHARGE	P.R.Y.		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-60

10TH STREET OVER DOWNTOWN EXPRESSWAY

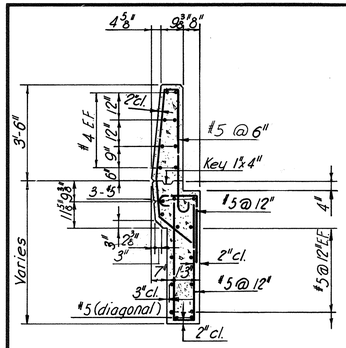
NORTH ABUTMENT DETAILS (1)

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

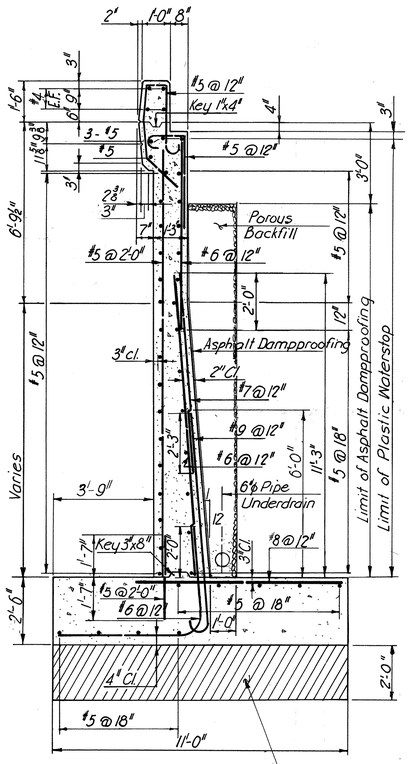
SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 4 OF 17

207

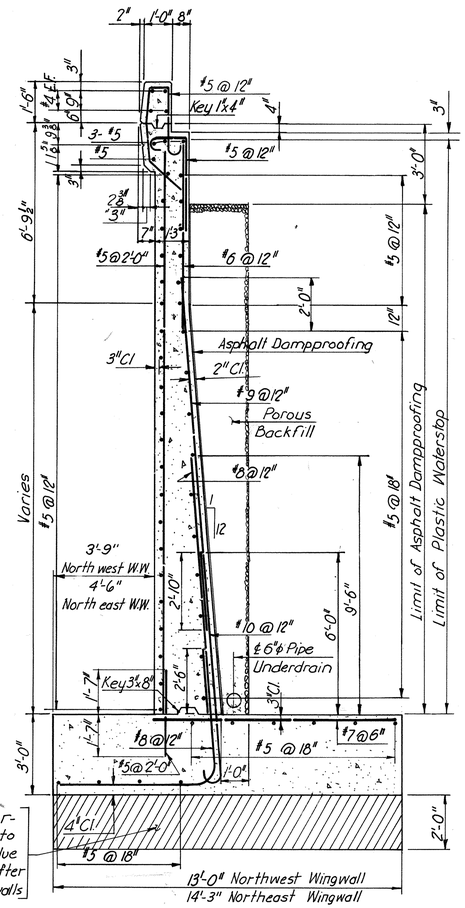
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	208	



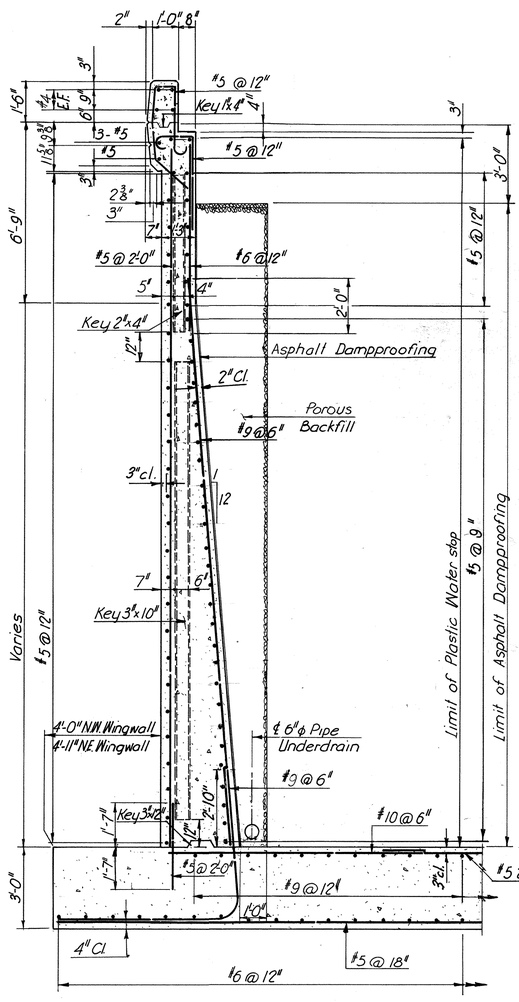
SECTION F-F
Scale 3/8"=1'-0"



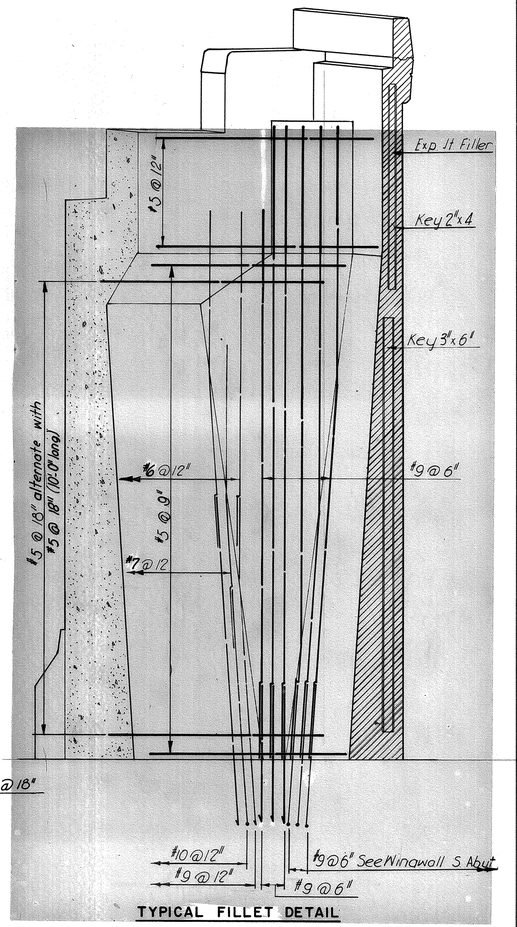
SECTION G-G
Scale 3/8"=1'-0"



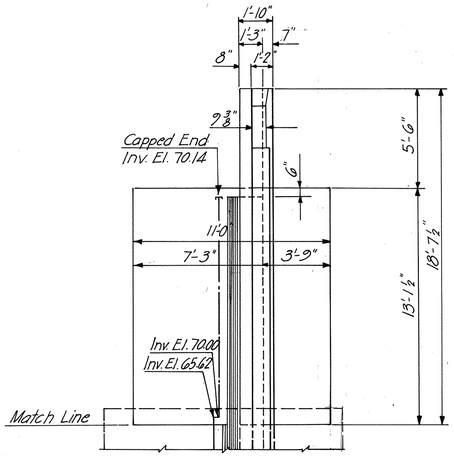
SECTION H-H
Scale 3/8"=1'-0"



SECTION J-J
Scale 3/8"=1'-0"



TYPICAL FILLET DETAIL



PARTIAL PLAN NORTHEAST WINGWALL
Scale 1/4"=1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	E.F.	1-68	2	As Built	T.E.M.	7-77
CHECKED	T.E.M.	5-68	1	Northeast W.Wadd.	TEM	6-74
IN CHARGE	P.R.Y.					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-60
10TH STREET OVER
DOWNTOWN EXPRESSWAY

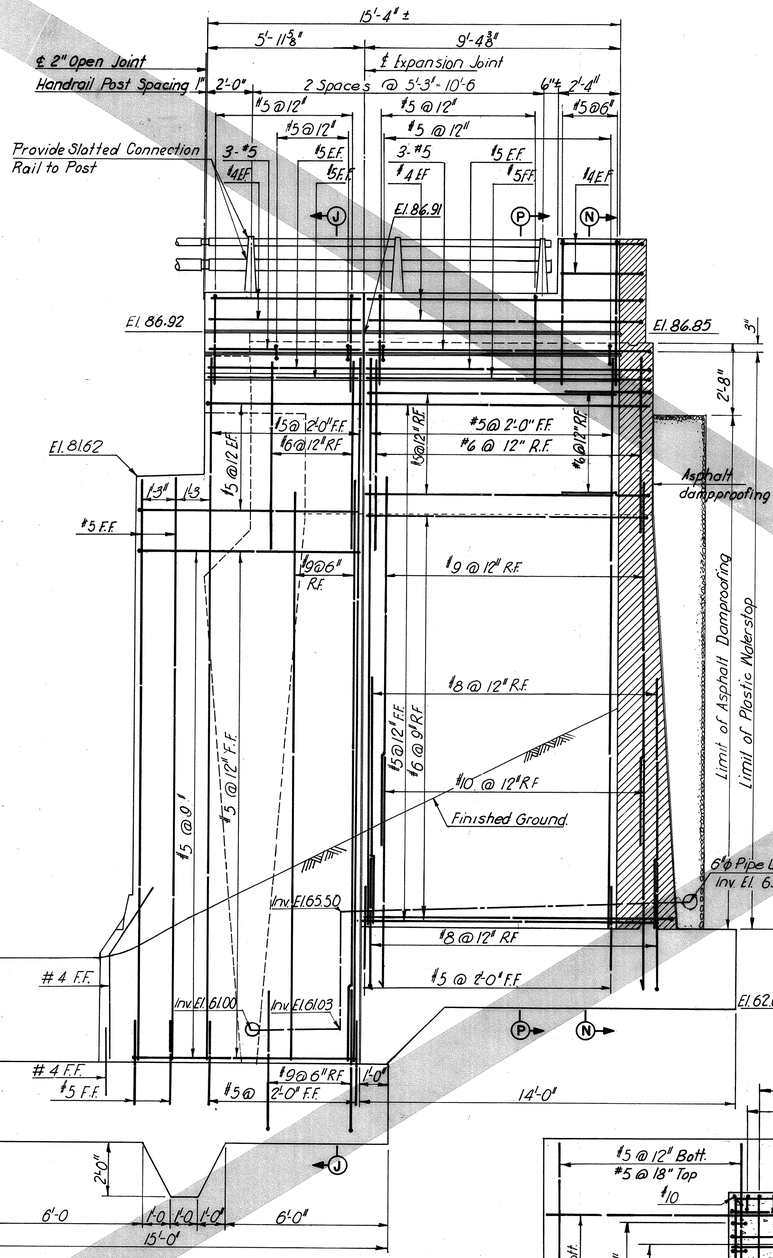
NORTH ABUTMENT DETAILS (2)

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 5 OF 17

208

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	209	



NOTE

For Section J-J, see North Abutment Details (2) Sheet 5

THIS SHEET VOIDED

	BY	DATE				
MADE	E.F.	2.66				
CHECKED	T.E.M	5-68	1	Voided	T.E.M	6-74
IN CHARGE	P.R.Y.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-60

10TH STREET OVER DOWNTOWN EXPRESSWAY

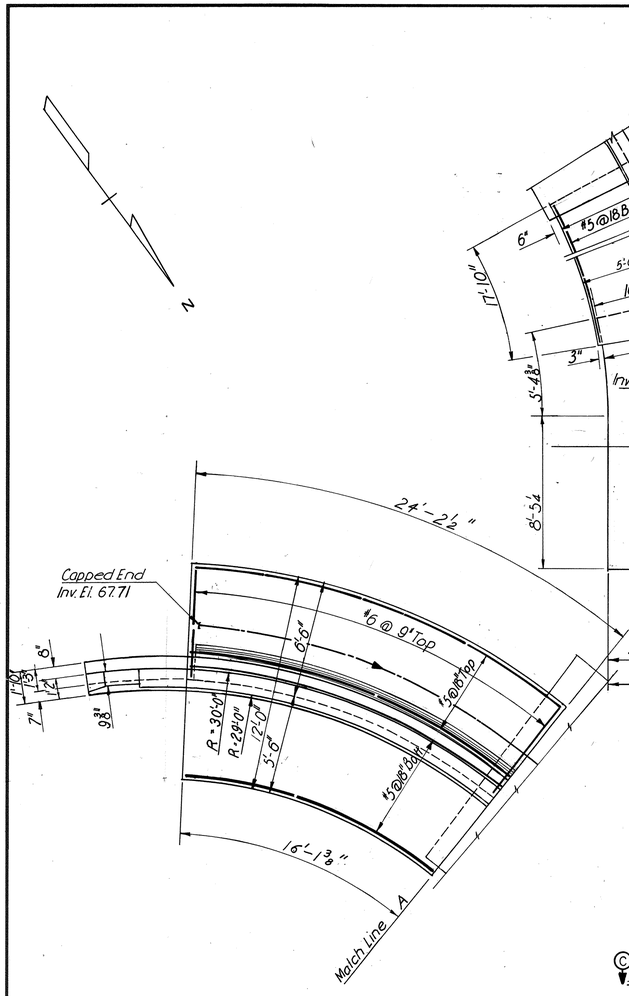
NORTH ABUTMENT DETAILS (3)

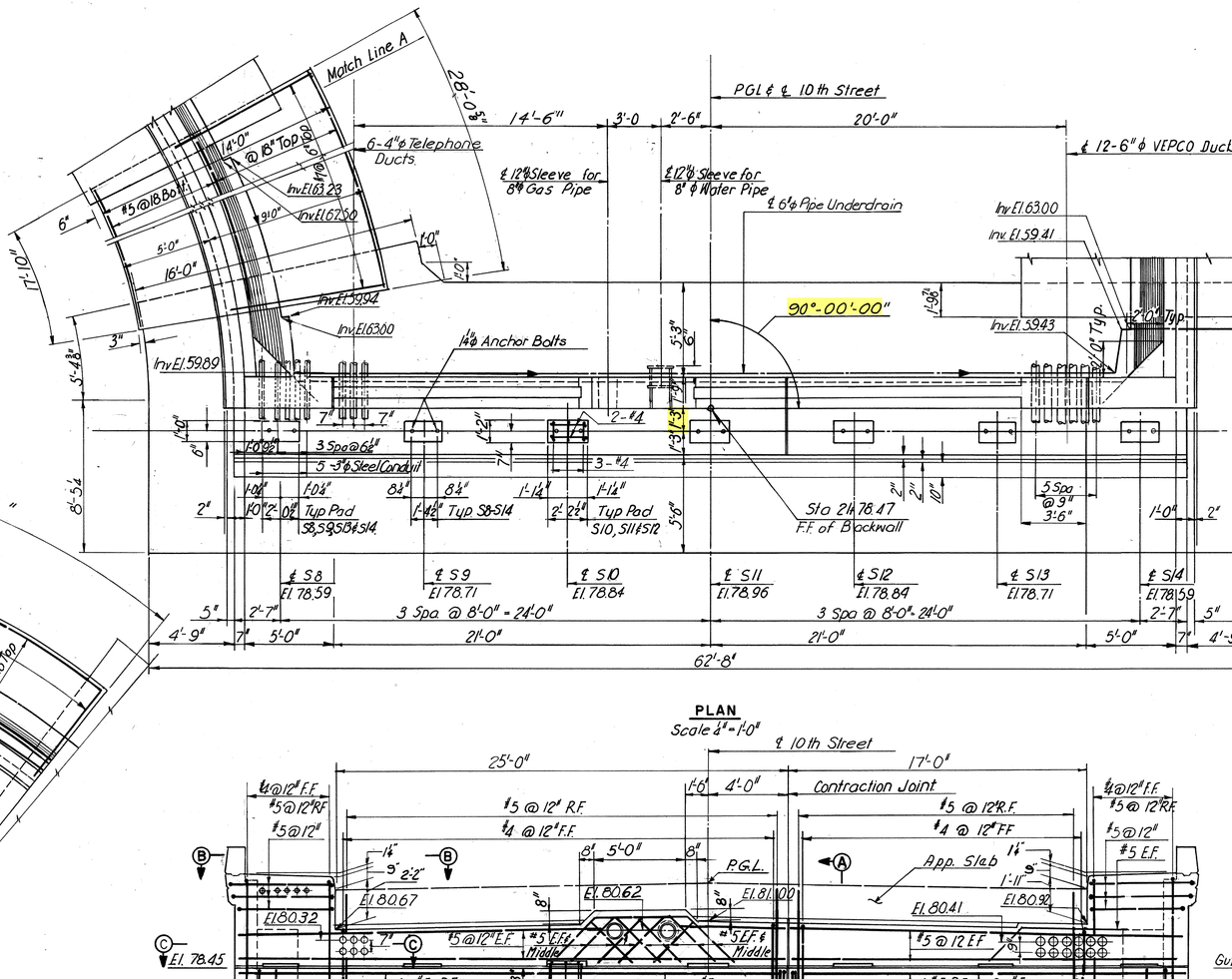
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

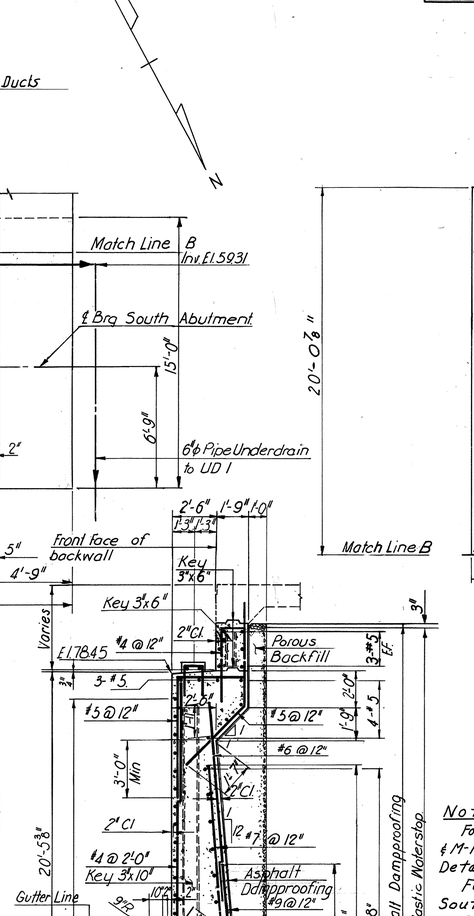
SCALE: AS SHOWN
CONTRACT NO. 9
SHEET NO. 6 OF 17

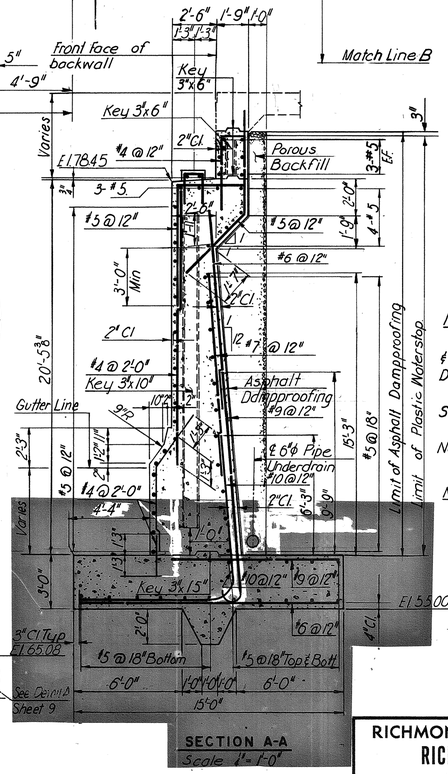
209

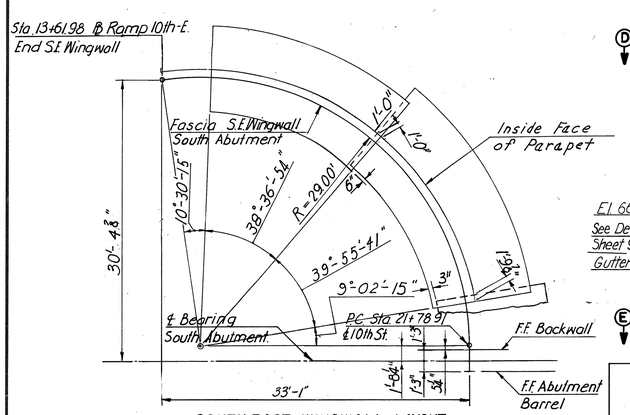
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	210	



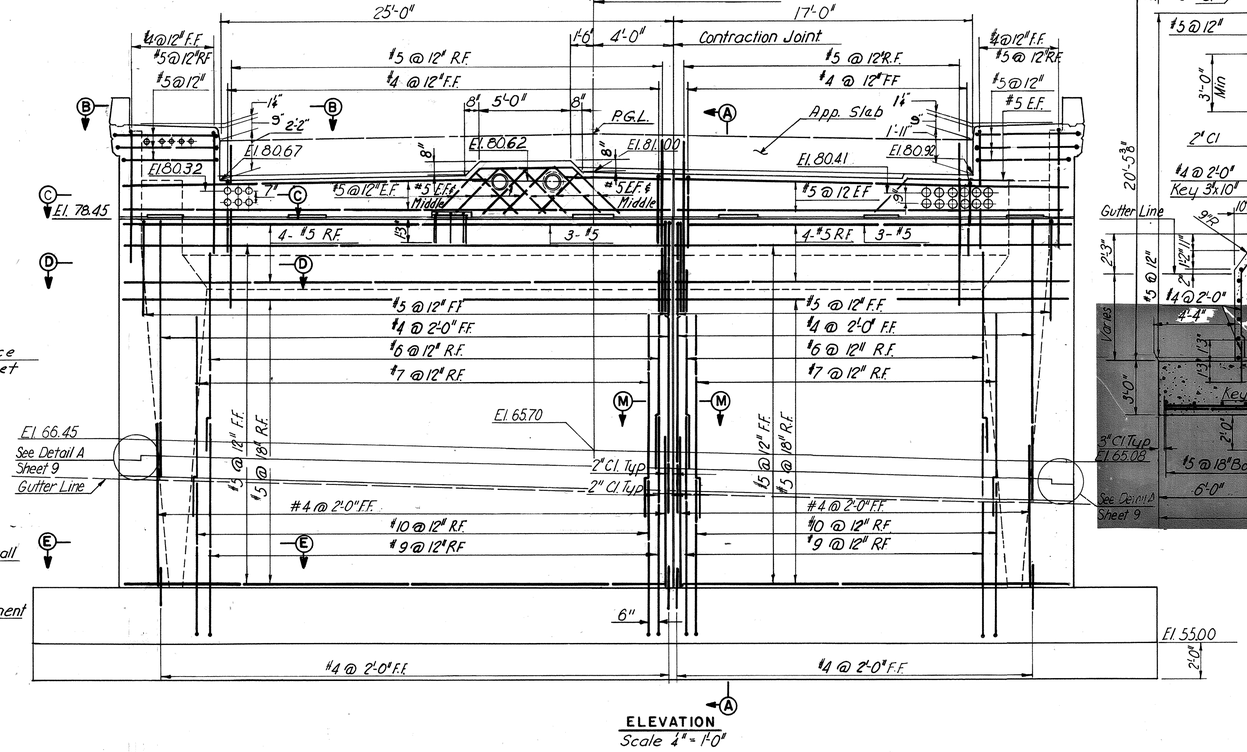








SOUTH EAST WINGWALL LAYOUT
Not to scale



Note:
For Section B-B, C-C, D-D, E-E, & M-M, and Detail A, see South Abutment Details (2).
For Footing Plan, see South Abutment Details (3).
For legend, Notes and Foundation Notes, see South Abutment Details (3).

Note:
Adjust backwall reinforcing as required to clear utilities.

	BY	DATE				
MADE	E.F.	1-68				
CHECKED	DSB	5-68	1	As Built	TEM	7-77
IN CHARGE	P.R.Y.		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-60

10TH STREET OVER DOWNTOWN EXPRESSWAY

SOUTH ABUTMENT

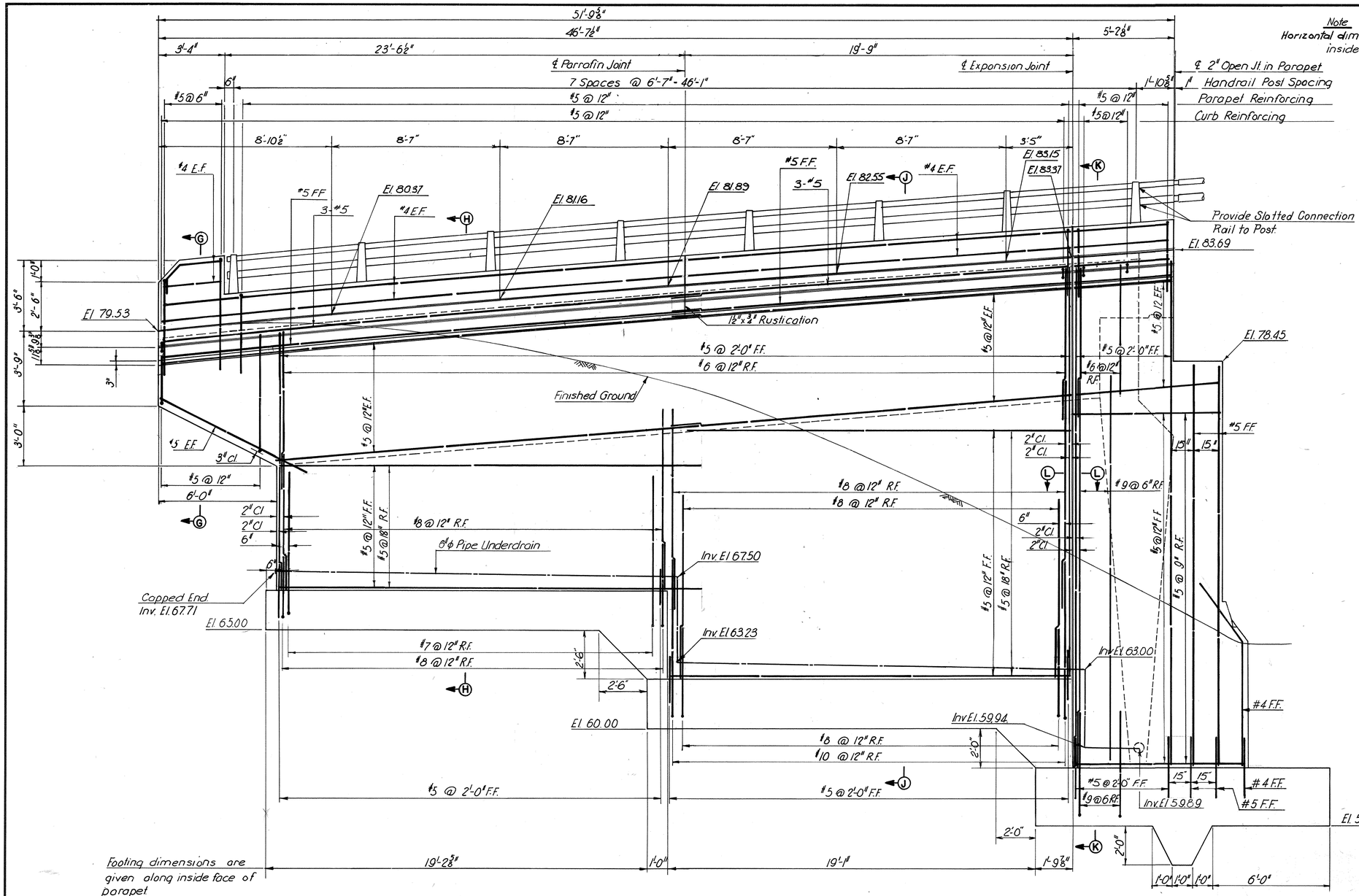
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 7 OF 17

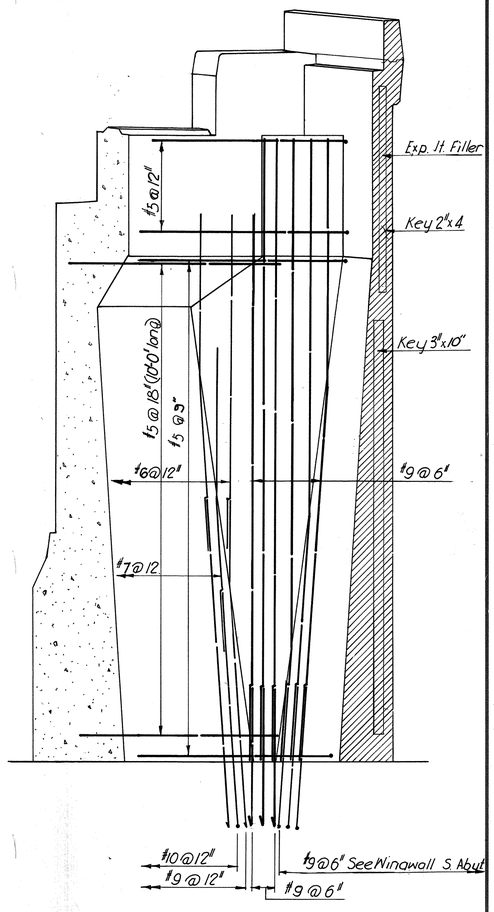
210

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	211	

Note
Horizontal dimensions are given along inside face of parapet.



SOUTHEAST WINGWALL ELEVATION
Scale ⅜" = 1'-0"



TYPICAL FILLET DETAIL
No Scale

Note
For Sections G-G thru K-K, see South Abutment Details (3).

AS BUILT

	BY	DATE				
MADE	E.F.	1-68				
CHECKED	T.E.M.	5-68	1	As Built	TEM	7-77
IN CHARGE	P.R.Y.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

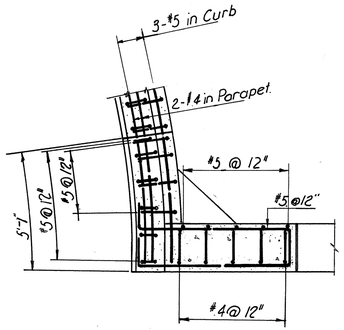
BRIDGE B-60
10TH STREET OVER
DOWNTOWN EXPRESSWAY
SOUTH ABUTMENT DETAILS (1)

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

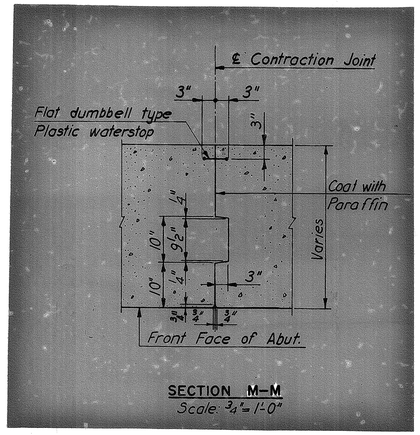
SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 8 OF 17

211

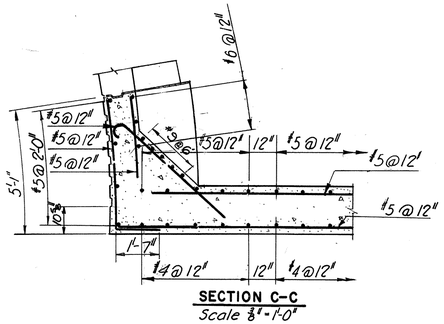
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	212	



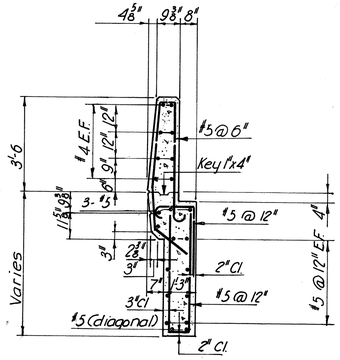
SECTION B-B
Scale $\frac{3}{8}$"=1'-0"



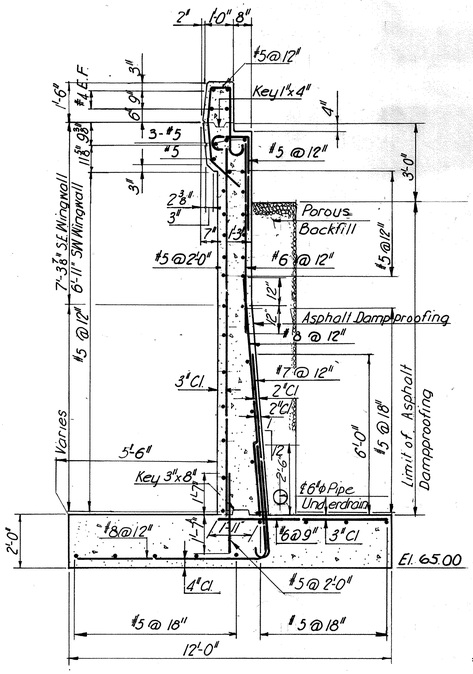
SECTION M-M
Scale $\frac{3}{4}$"=1'-0"


#6@12"
#5@12"
#5@12"
#5

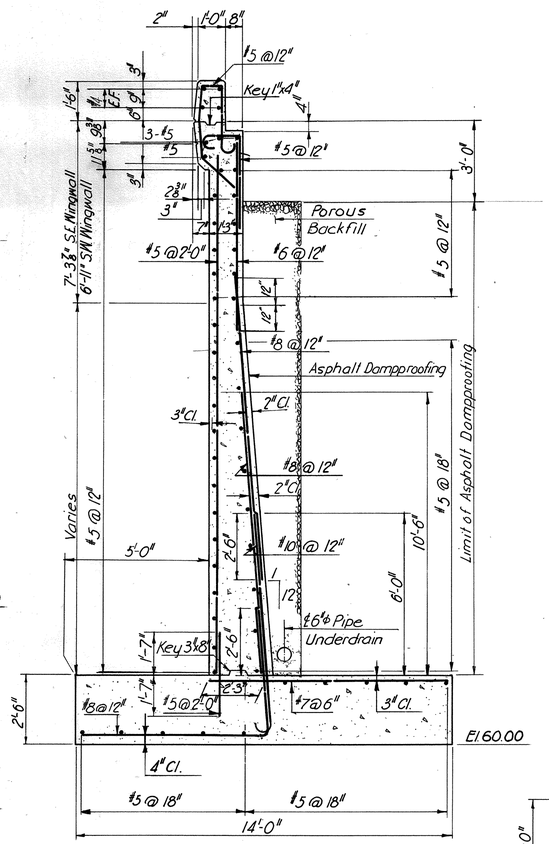
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	213	



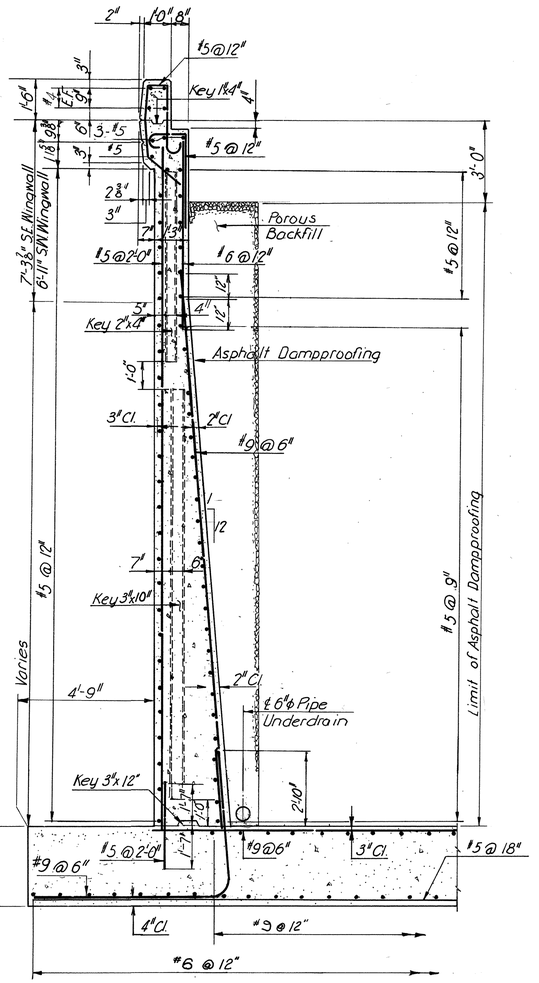
SECTION G-G
Scale $\frac{3}{8}$"=1'-0"



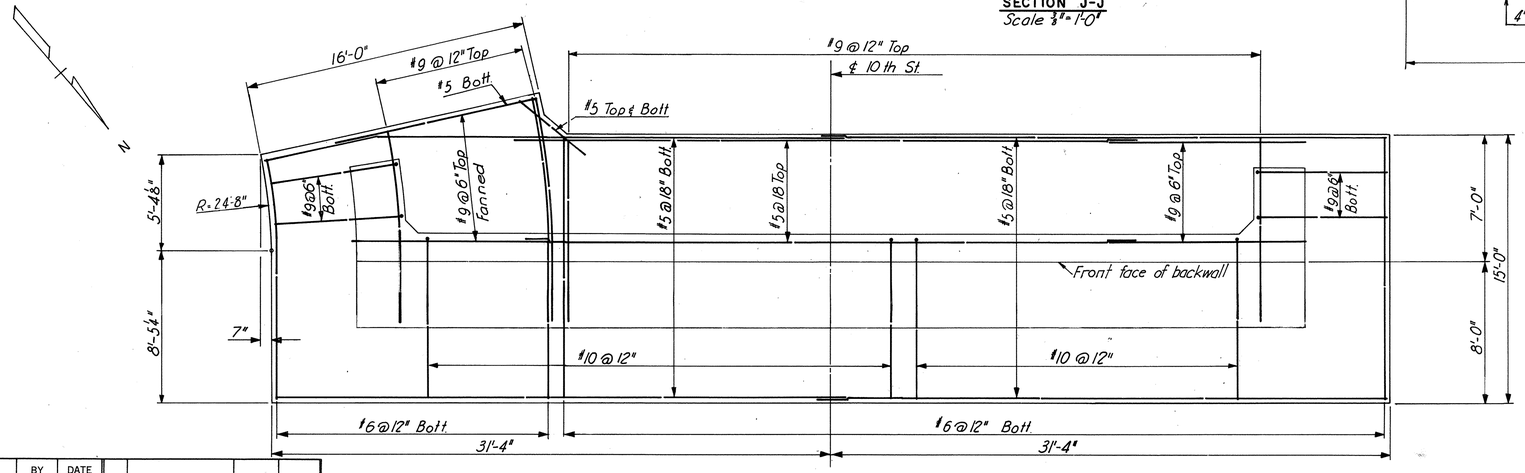
SECTION H-H
Scale $\frac{3}{8}$"= 1'-0"



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



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



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

LEGEND:
F.F. denotes Front Face
R.F. denotes Rear Face
E.F. denotes Each Face

NOTES:
For anchor bolts and treatment of pads, see Standard Shoe Details sheet.
For architectural treatment of abutment wingwalls, see Standard Architectural Details sheets.
For railing details, see Standard Aluminum Railing (2 Rails) sheet.
For treatment of ducts and piping thru abutment backwall, see Standard Electrical Details (Bridges Carrying City Streets), Standard Conduit Installation Details and Standard Utility Support Details at Bridge Abutments.

FOUNDATION NOTES:
Footings shall be founded at the elevation shown on the Plans unless otherwise directed by the Engineer due to conditions at the site during construction. In such cases, the Engineer will determine the extent of redesign necessary and will advise the Contractor before construction begins.

The foundation is designed for an allowable bearing pressure of:
Abutment at El. 55.00 - 2.5 tons per square foot.
SE Wingwall at El. 60.00 - 2.0 tons per square foot.
SE Wingwall at El. 65.00 - 2.0 tons per square foot.
SW Wingwall at El. 60.00 - 2.0 tons per square foot.

	BY	DATE				
MADE	E.F.	1-68				
CHECKED	DSB	5-68	1	As Built	TEM	7-77
IN CHARGE	P.R.Y.		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-60
10TH STREET OVER
DOWNTOWN EXPRESSWAY

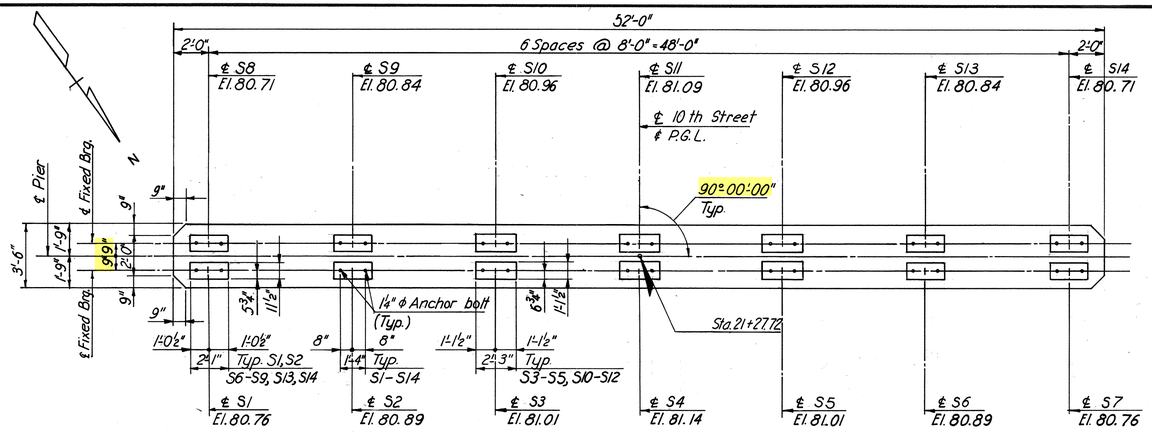
SOUTH ABUTMENT DETAILS (3)

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

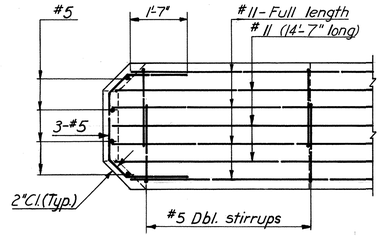
SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 10 OF 17

213

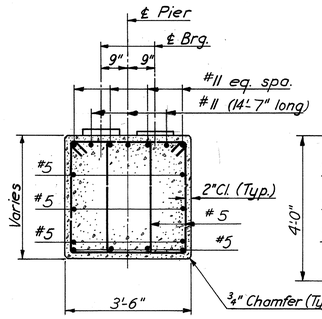
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	214	



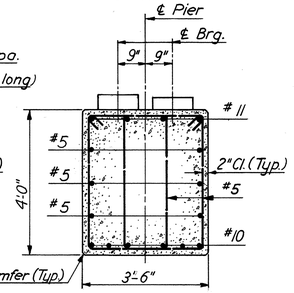
PLAN
Scale: ¼"=1'-0"



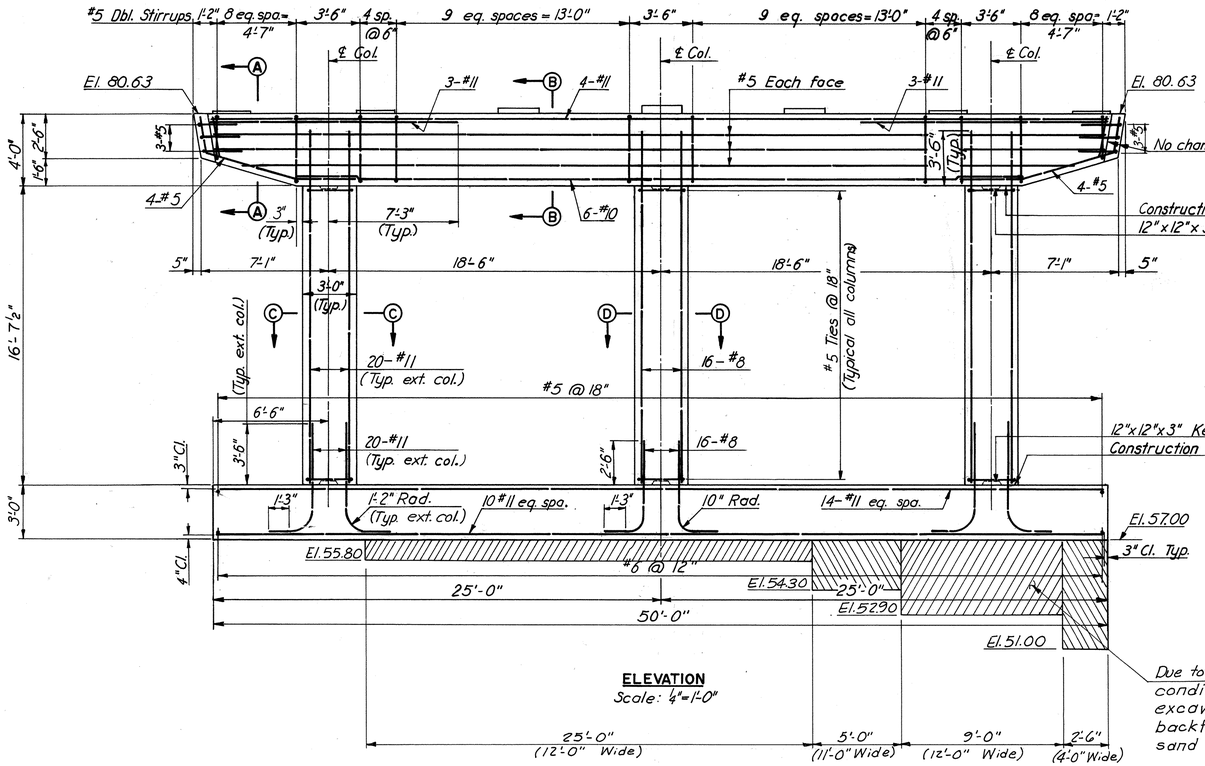
PLAN OF PIER CAP SHOWING REINFORCING DETAILS
Scale: ½"=1'-0"



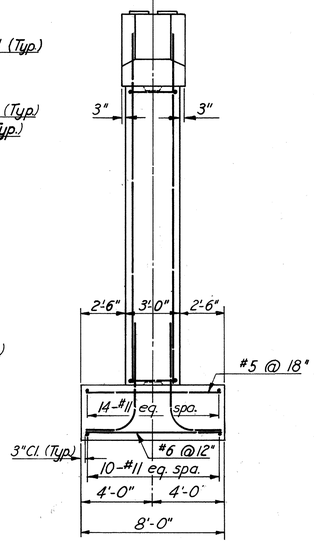
SECTION A-A
Scale: ½"=1'-0"



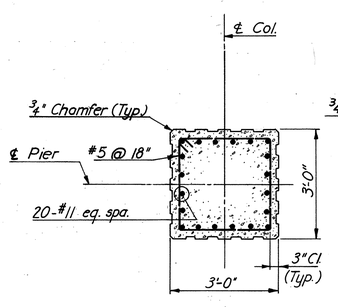
SECTION B-B
Scale: ½"=1'-0"



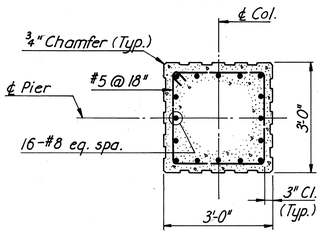
ELEVATION
Scale: ¼"=1'-0"



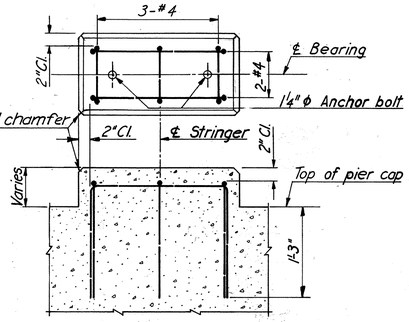
SIDE ELEVATION
Scale: ¼"=1'-0"



SECTION C-C
Scale: ½"=1'-0"



SECTION D-D
Scale: ½"=1'-0"



REINFORCING DETAILS FOR BEARING PADS AT S3 — S5 AND S10 — S12
Scale: 1"=1'-0"

NOTES:

For anchor bolt details and treatment of pads, see Standard Shoe Details sheet.

For details of architectural treatment of piers, see Standard Architectural Details sheet.

FOUNDATION NOTE:

Foundation elevation is approximate and may be varied to suit field conditions as directed by the Engineer. Vertical column reinforcing shall not be cut until this elevation is established.

Where elevation changes by more than two feet, redesign will be required.

Pier foundation is designed for an allowable bearing pressure of 3 tons per square foot.

	BY	DATE				
MADE	EVR	11-67				
CHECKED	TEM	2-68	1	As Built	TEM	7-77
IN CHARGE	PRY		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

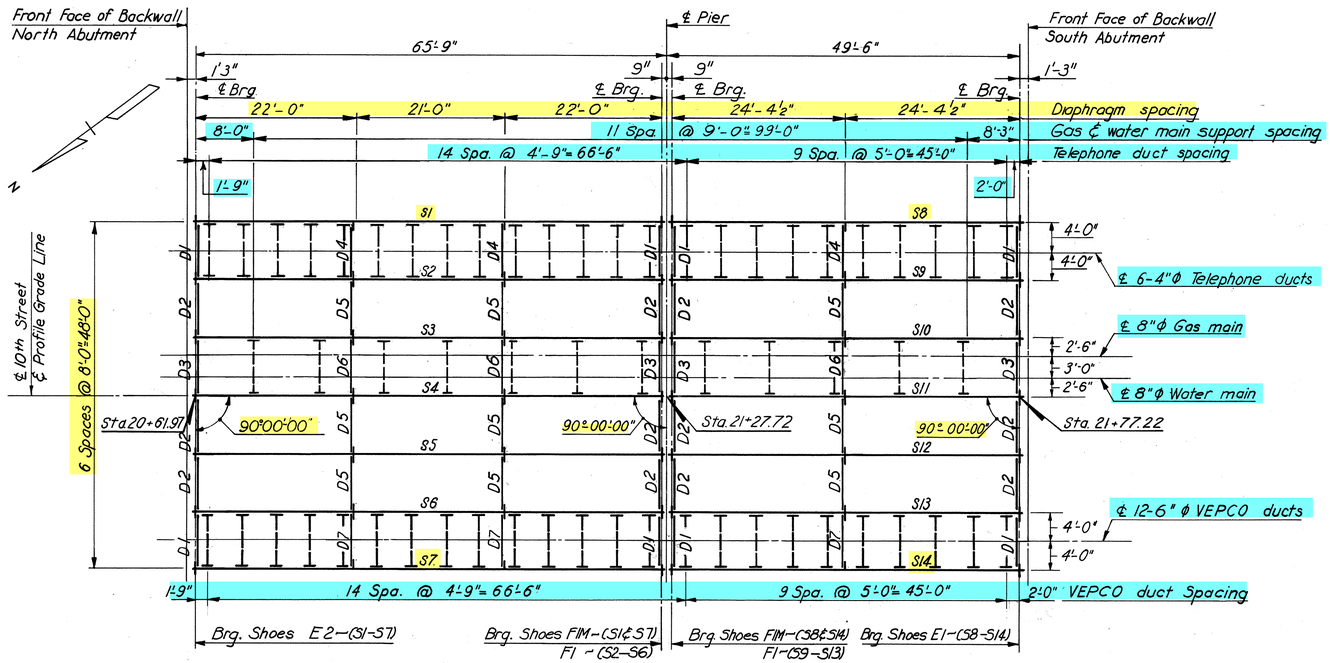
BRIDGE B-60
10TH STREET OVER DOWNTOWN EXPRESSWAY
PIER

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

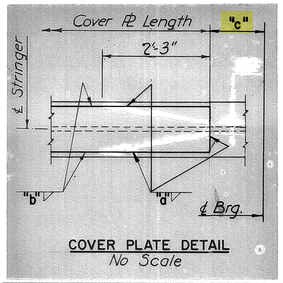
SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 11 OF 17

214

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	215	

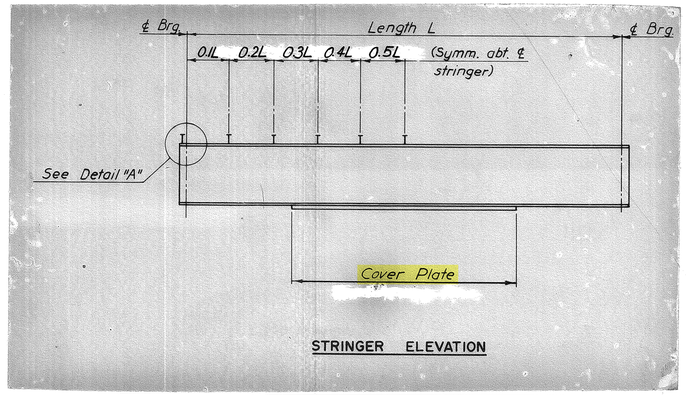


FRAMING PLAN
Scale: 1"=10'



COVER PLATE DETAIL
No Scale

COVER PLATE SCHEDULE				
STR.	COVER PL.	"a"	"b"	"c"
S1,S6,S7	10½x1¼	½"	5/16"	5'-3"
S2-S5	10½x1⅛	½"	5/16"	5'-9"



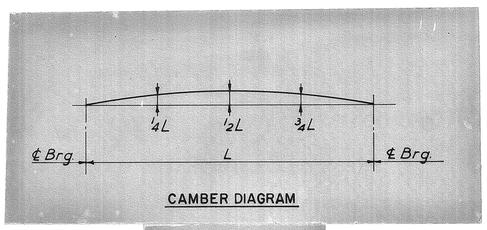
STRINGER ELEVATION

STRINGER SCHEDULE

STRINGER	LENGTH ℄ BRG. TO ℄ BRG.	COVER PLATE	SHEAR STUD SPACING 0.1L	0.2L	0.3L	0.4L	0.5L
S1 ~ 36 WF 150	65'-0"	10½ x 1¼ x 54'-6"	6½"	8"	10½"	13"	15"
S2 ~		10½ x 1⅛ x 53'-6"	7"			12½"	14"
S3 ~		10½ x 1⅛ x 53'-6"					
S4 ~		10½ x 1⅛ x 53'-6"					
S5 ~		10½ x 1⅛ x 53'-6"					
S6 ~		10½ x 1¼ x 54'-6"	7"			12½"	14"
S7 ~	65'-0"	10½ x 1¼ x 54'-6"	6½"	8"	10½"	13"	15"
S8 ~	48'-9"	No Cover Plates	7½"	9"	10½"	13½"	15½"
S9 ~						12½"	14"
S10 ~							
S11 ~							
S12 ~							
S13 ~						12½"	14"
S14 ~ 36 WF 150	48'-9"	No Cover Plates	7½"	9"	10½"	13½"	15½"

Note: Lengths shown are horizontal distances measured along centerlines of stringers.

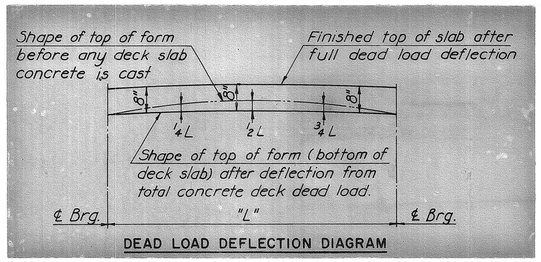
SHOE SCHEDULE			
EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E1	7	F1	10
E2	7	FIM	4



CAMBER DIAGRAM

CAMBER SCHEDULE			
STR.	¼L	½L	¾L
S2 S4-S6	3 3/8"	4 5/8"	3 3/8"
S1,S3 S7	3½"	4 5/8"	3½"
S8-S14	1¼"	1¼"	¾"

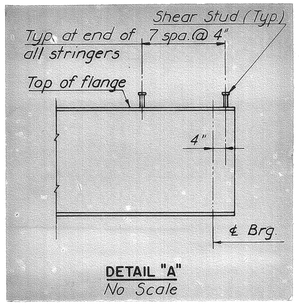
NOTE TO FABRICATOR:
The above stringers shall be fabricated with an upward camber amounting to the tabulated value.
This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.
Dimensions are in inches.



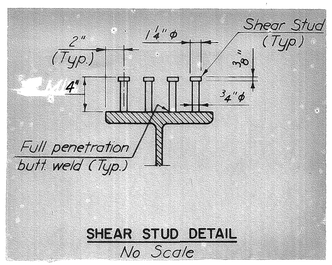
DEAD LOAD DEFLECTION DIAGRAM

DEFLECTION SCHEDULE		
STR.	¼L & ¾L	½L
S1,S3,S5-S7	¾"	1⅛"
S2, S4	⅜"	1"
S8-S14	⅜"	½"

NOTE TO CONTRACTOR:
The above deflections 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 for by adjusting forms to vary the thickness of the concrete bolster between the bottom of the slab and the top of stringer, without alteration of the slab thickness.



DETAIL "A"
No Scale



SHEAR STUD DETAIL
No Scale

SHEAR STUD NOTE:
Capacity = 3,400 lbs. per stud.
The contractor may, if he elects, use three ¾" diameter studs at the same longitudinal spacing in lieu of the four ¾" diameter studs shown.
Stud rows shall be placed parallel to the main deck reinforcing.
Shear stud spacing shown is maximum spacing.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	E.V.R.	11-67				
CHECKED	T.E.M.	2-68	1	As Built	TEM	7-77
IN CHARGE	P.R.Y.					

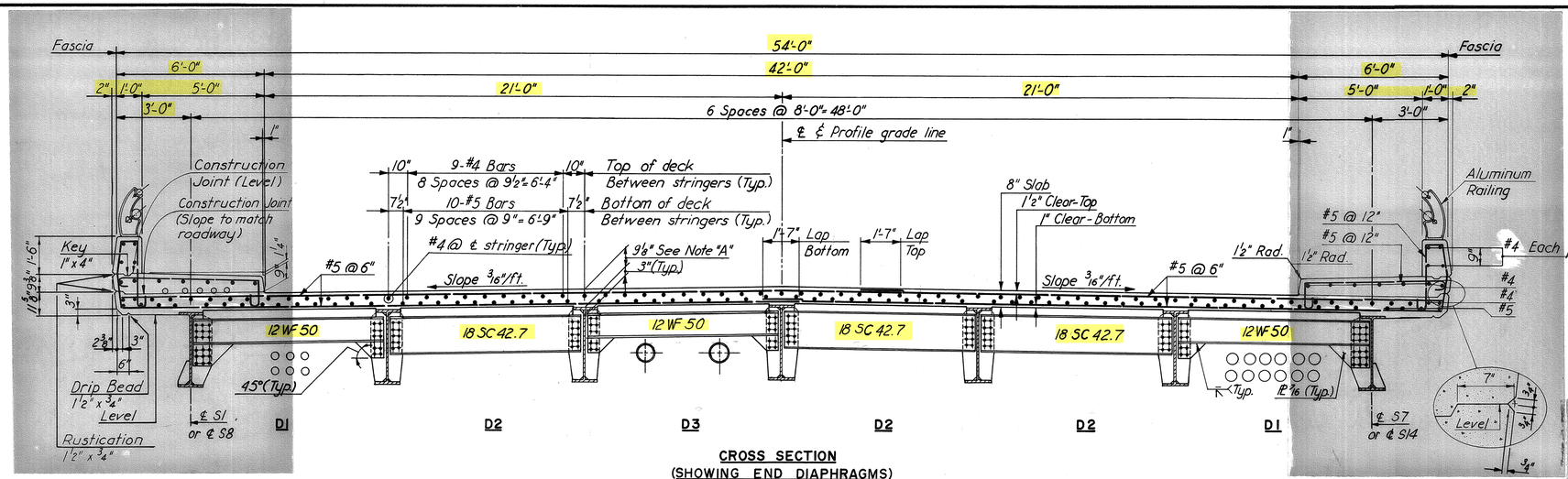
AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY
BRIDGE B-60
10TH STREET OVER DOWNTOWN EXPRESSWAY
FRAMING PLAN

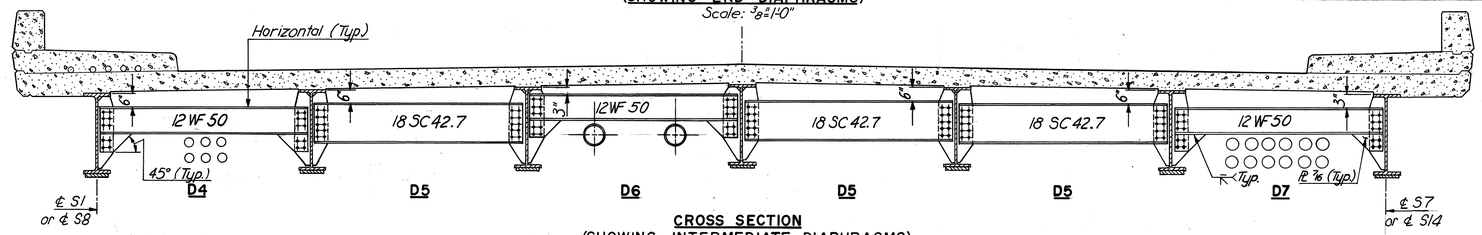
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 12 OF 17

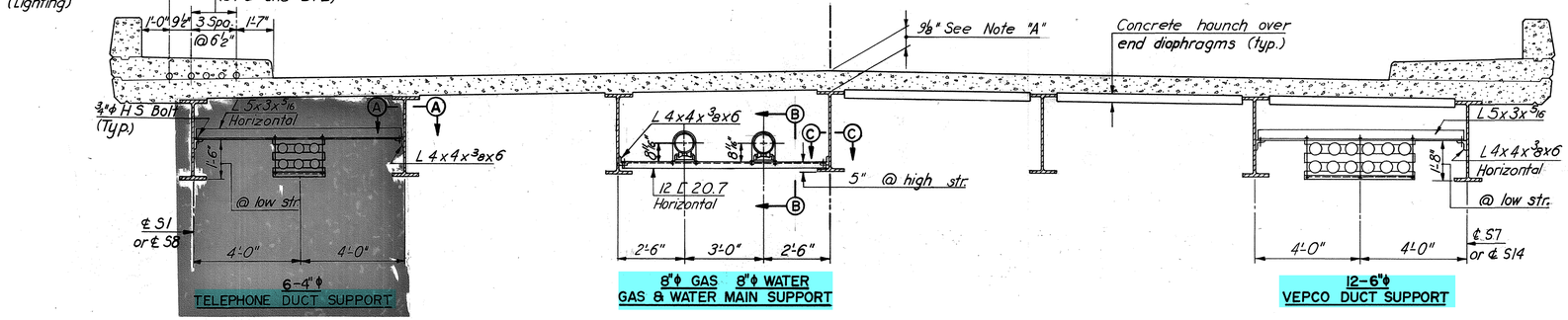
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	216	



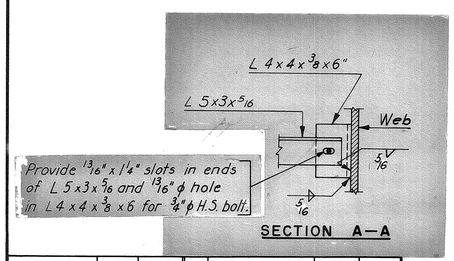
CROSS SECTION
(SHOWING END DIAPHRAGMS)
Scale: 3/8" = 1'-0"

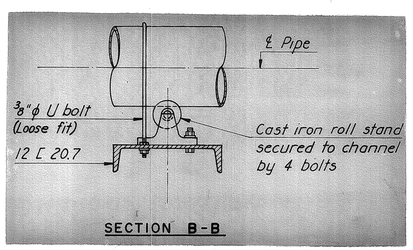


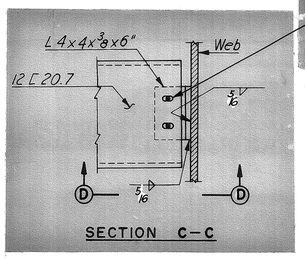
CROSS SECTION
(SHOWING INTERMEDIATE DIAPHRAGMS)
Scale: 3/8" = 1'-0"

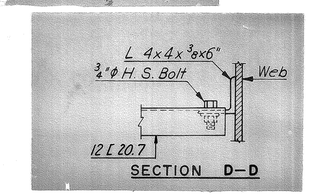


CROSS SECTION
(SHOWING UTILITY SUPPORTS ONLY)
Scale: 3/8" = 1'-0"

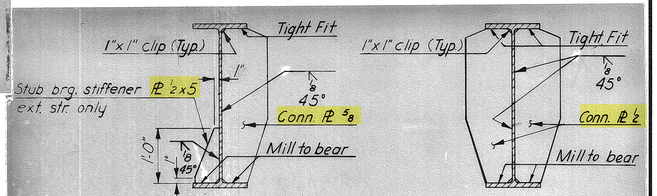






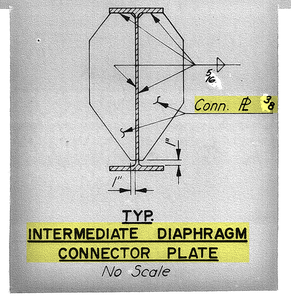


NOTE "A":
Dimension shown is measured from top of stringer to top of slab at the intersection of the centerline of stringer and the centerline of bearing. At exterior stringers this is measured to the cross slope extended. This dimension may be varied between bearings as required to care for variation in camber, except that no portion of the stringer flange may fall within the 8" slab.



TYP END DIAPHRAGM CONNECTOR PLATE AT EXTERIOR STRINGER
No Scale

TYP END DIAPHRAGM CONNECTOR PLATE AT INTERIOR STRINGER
No Scale



No Scale

NOTES:
For spacing and location of utility supports and diaphragms, see Framing Plan sheet.

For Basic Attachment Details for cement asbestos conduit, see Standard Conduit Installation Details sheet.

For details showing gas and water mains thru abutments, see Standard Utility Support Details At Bridge Abutments sheet.

	BY	DATE				
MADE	EVR	10-9				
CHECKED	T.E.M.	2-68	1	As Built	TEM	7-77
IN CHARGE	P.R.Y.		NO.	REVISION	BY	DATE

AS BUILT

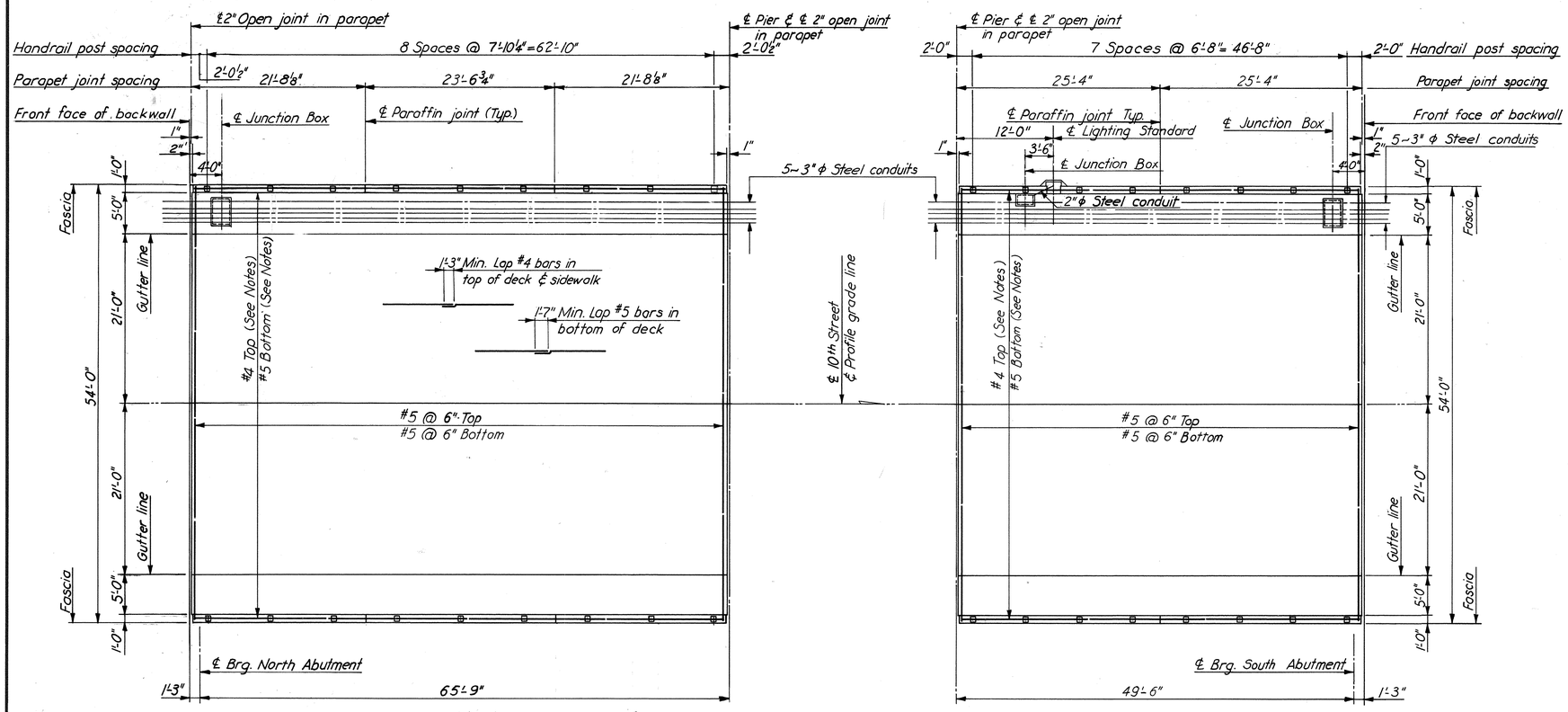
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY
BRIDGE B-60
10TH STREET OVER DOWNTOWN EXPRESSWAY
CROSS SECTION AND UTILITY DETAILS

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 13 OF 17

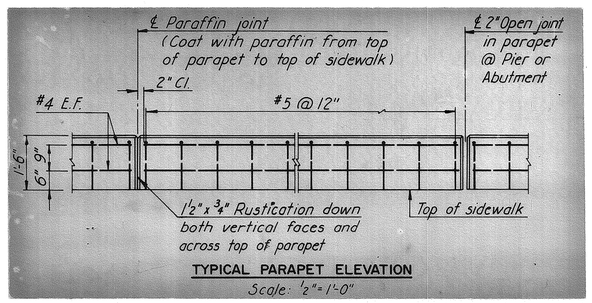
216

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	217	

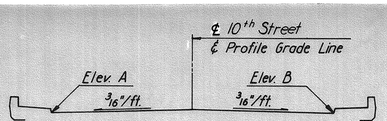


PLAN – UNIT 1
Scale: ⅛" = 1'-0"

PLAN – UNIT 2
Scale: ⅛" = 1'-0"



TYPICAL PARAPET ELEVATION
Scale: ½" = 1'-0"



(LOOKING IN DIRECTION OF STATIONING)

PAVEMENT ELEVATIONS

STATION	ELEV. A	℄ & P.G.L.	ELEV. B	STATION	ELEV. A	℄ & P.G.L.	ELEV. B
20+20	—	*86.14	—	+27.72	85.00	85.32	85.00
+30		*86.21		+30	84.92	85.25	84.92
+40	*85.95	*86.28	*85.82	+40	84.55	84.87	84.55
+50	*86.02	*86.35	*86.02	+50	84.12	84.45	84.12
+60	86.07	86.39	86.07	+60	83.67	84.00	83.67
+60.72	86.07	86.40	86.07	+70	83.22	83.55	83.22
+70	86.06	86.39	86.06	+78.47	82.84	83.17	82.84
+80	86.00	86.33	86.00	+80	82.79	83.10	82.77
+90	85.89	86.21	85.89	+90	*82.24	*82.65	*82.32
21+00	85.72	86.05	85.72	22+00	*81.56	*82.20	*81.92
+10	85.51	85.83	85.51	+10	—	*81.75	—
+20	85.24	85.57	85.24				

* Elevations shown are given to top of bituminous surfacing.

NOTES:

For location and spacing of deck, parapet and sidewalk reinforcing, see Cross Section and Utility Details sheet.

For location and spacing of reinforcing in haunch over end diaphragms, see Joint Details sheet.

For lighting standard base, junction box details and additional reinforcing, see Standard Electrical Details sheet S4.

	BY	DATE				
MADE	EVR	10-67				
CHECKED	T.E.M	2-68	1	As Built	TEM	7-77
IN CHARGE	P.R.Y.		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

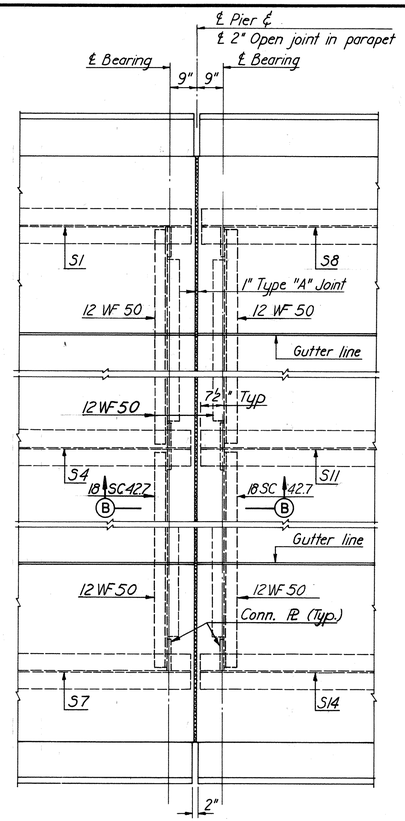
BRIDGE B-60
10TH STREET OVER DOWNTOWN EXPRESSWAY

DECK PLANS

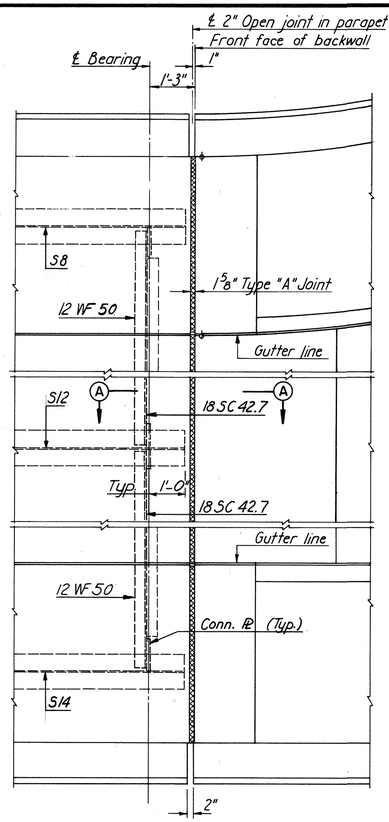
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 14 OF 17

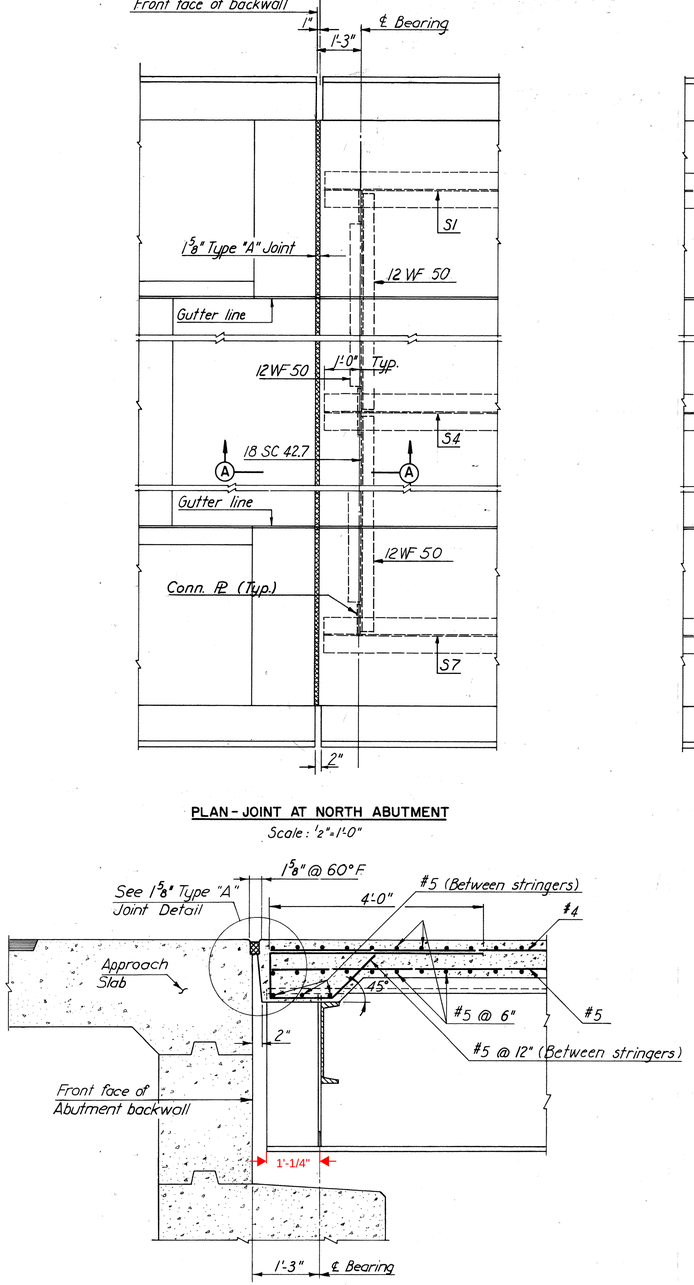
PLAN - JOINT AT NORTH ABUTMENT
Scale: 1/2"=1'-0"



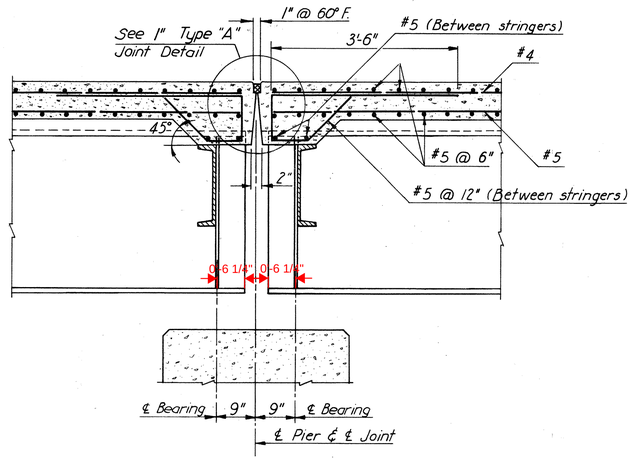
PLAN - JOINT AT PIER
Scale: 1/2"=1'-0"



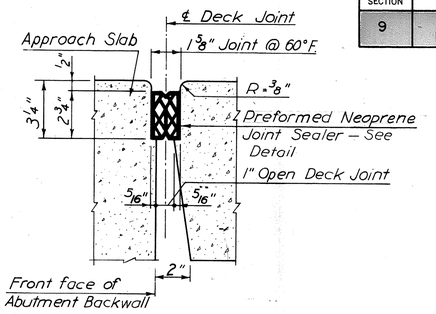
PLAN - JOINT AT SOUTH ABUTMENT
Scale: 1/2"=1'-0"



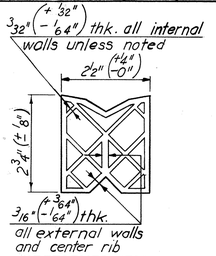
SECTION A-A
Scale: 3/4"=1'-0"



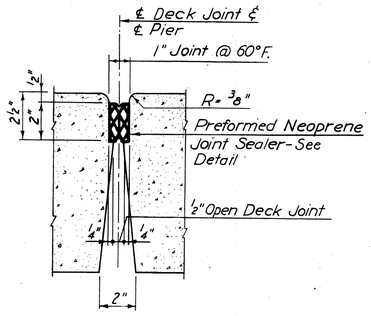
SECTION B-B
Scale: 3/4"=1'-0"



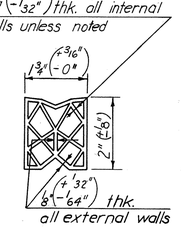
1 5/8" TYPE "A" JOINT
Scale: 3"=1'-0"



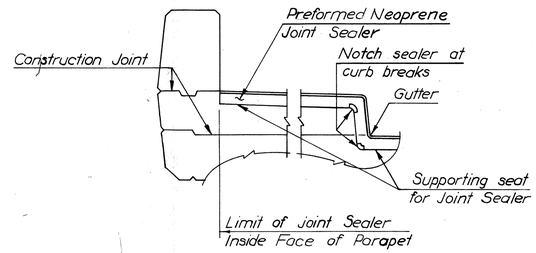
PREFORMED NEOPRENE JOINT SEALER FOR 1 5/8" TYPE "A" JOINT
Scale: Half size



1" TYPE "A" JOINT
Scale: 3"=1'-0"



PREFORMED NEOPRENE JOINT SEALER FOR 1" TYPE "A" JOINT
Scale: Half size



TREATMENT OF TYPE "A" JOINT AT CURB
No Scale

NOTE TO CONTRACTOR:
It is absolutely essential that the openings for the preformed Neoprene joint sealers be accurately formed and constructed to smooth, straight lines. The size of the opening shall be adjusted to allow for anticipated dead load rotation of the ends of the slab and for the temperature at the time of construction.

AS BUILT

	BY	DATE
MADE	A.B.P.	9-67
CHECKED	TEM	2-68
IN CHARGE	P.R.Y.	

NO.	REVISION	BY	DATE
1	As Built	TEM	7-77

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	218	

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-60

10TH STREET OVER DOWNTOWN EXPRESSWAY

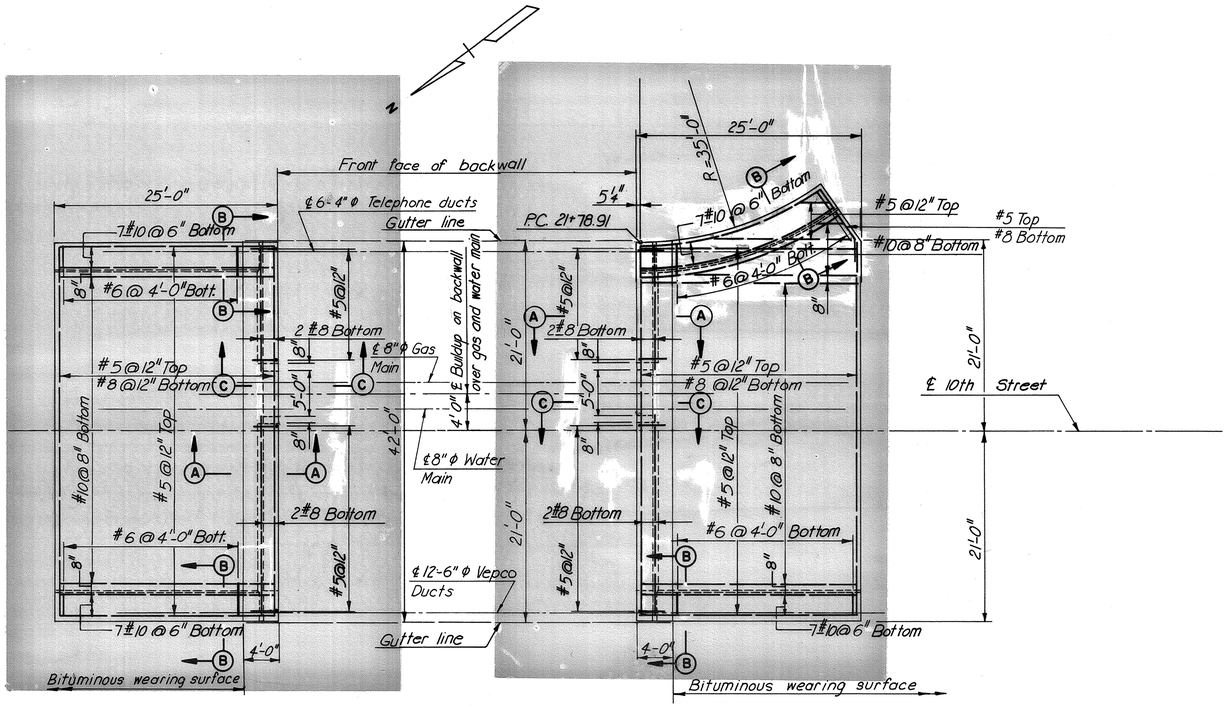
JOINT DETAILS

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 15 OF 17

218

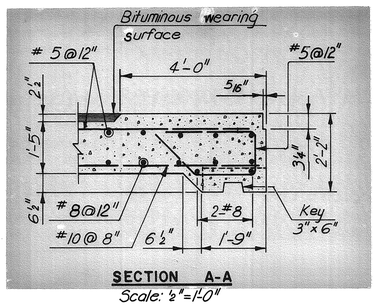
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	219	



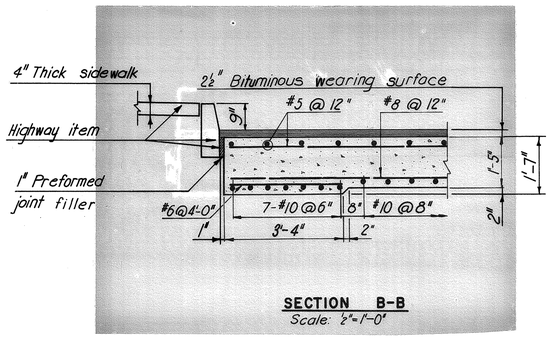
NORTH APPROACH SLAB
Scale : ⅛"=1'-0"

SOUTH APPROACH SLAB
Scale: ⅛"=1'-0"

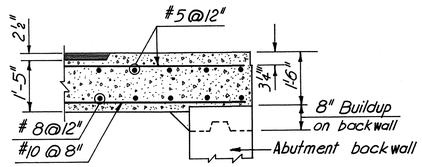
NOTE:
All reinforcing steel shall be 2" min. clear from edge of bar to edge of concrete.



SECTION A-A
Scale: ½"=1'-0"



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



SECTION C-C
Scale: ½"=1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	elm	12-67				
CHECKED	TEM	2-68	1	As Built	TEM	7-77
IN CHARGE	PRY					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-60
10TH STREET OVER
DOWNTOWN EXPRESSWAY
APPROACH SLABS

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 16 OF 17

219

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	220	

BORING DS28-1

Elev.	Casing Blows/Ft	Spoon Blows Per 6"		Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
86.0	5	5	3	S-1	0'-2'	86.0	Brown c-f SAND, little Clayey Silt, trace c-f Gravel, trace Cinders (Fill)
	4	3	4				
	3					83.0	
	3						
81.0	1	1	1	S-2	4'-6'		
	2	1	1				
	4						
	6						Brown CLAYEY SILT, little c-f Sand, trace m-f Gravel
	5						
76.0	1	2	2	S-3	9'-11'		
	2	3	5				
	3						
	3					73.0	
	13						
71.0	14	13	15	S-4	14'-16'		
	24	24	26				
	33						Brown CLAYEY SILT, trace f Sand
	29						
	31						
66.0	29	7	11	S-5	19'-21'		
	19	18	20				
	24						
	28					63.0	
	33						
61.0	34	11	12	S-6	24'-26'		
	29	14	13				Brown m-f SAND, some Clayey Silt
	21						
	32					58.0	
	100						
56.0	37	26	65	S-7	29'-30.4'		
	34	100					
	17						
	26						
	36						
51.0	24	100		S-8	34'-34.3'		
	43						
	65						
	86						
	110						
46.0	19	100		S-9	39'-39.2'		Brown c-f SAND, some c-f Gravel, trace Silt
	28						
	60						
	115						
	135						
41.0	48	100		S-10	44'-44.1'		
	92						
	99						
	110						
	123						
36.0	62	100		S-11	49'-49.2'		
	294						
	OPEN						
31.0		100		S-12	54'-54.1'		
	↓					30.0	
	6 min.			C-1	56'-61'		(C-1: 95% Rec)
	6 min.						
	7 min.						Gray Hard GRANITE
26.0	10 min.						
	9 min.						

Bottom of Hole, Elev. 25.0

BORING DS28-2

Elev.	Casing Blows/Ft	Spoon Blows Per 6"		Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
85.0	10		8	S-1	.5'-2.5'	85.0	Black CINDERS & BRICKS, little c-f Sand, trace Clayey Silt (Fill)
	9	6	6				
	6	3					
	6					81.5	
80.0	5	8	5	S-2	4'-6'		
	5	8	11				
	11						
	12						
	12						
75.0	28	6	12	S-3	9'-11'		
	30	15	20				
	32						
	35						
	43						
70.0	30	5	8	S-4	14'-16'		
	25	12	11				Brown CLAYEY SILT, trace f Sand
	26						
	24						
	40						
65.0	47	10	17	S-5	19'-21'		
	47	21	24				
	39						
	38						
	50						
60.0	34	18	19	S-6	24'-26'		
	34	17	17				
	52						
	79					56.5	
	256						
55.0	40	100	100	S-7	29'-30'		
	69						
	92						
	120						
	145						Brown c-f SAND, some c-f Gravel, trace Clayey Silt
50.0	78	40	54	S-8	34'-36'		
	100	72	81				
	78						
	85						
	100						
45.0		35	51	S-9	39'-41'		
		60	62				

Bottom of Hole, Elev. 44.0

BORING DS28-3

Elev.	Casing Blows/Ft	Spoon Blows Per 6"		Sample No.	Sample Depth	Strata Elev.	Materials & Remarks
84.0	15	20	20	S-1	0'-2'	84.0	Brown SILT and c-f Sand, little m-f Gravel, trace Brick, trace Cinders
	8	10	8				
	5					81.5	
	3						
79.0	7	16	8	S-2	4'-6'		
	9	7	11				
	12						
	13						
	8						
74.0	5	4	4	S-3	9'-11'		
	8	6	4				
	13						
	17						
	15						
69.0	14	4	9	S-4	14'-16'		
	17	12	13				Brown CLAYEY SILT, trace f Sand
	13						
	21						
	26						
64.0	16	7	9	S-5	19'-21'		
	17	13	14				
	19						
	24						
	25						
59.0	23	8	10	S-6	24'-26'		
	29	19	20				
	33						
	41						
	44						
54.0	46	19	13	S-7	29'-31'		
	51	21	40				
	75						
	71					51.5	
	70						
49.0	49	73	48	S-8	34'-36'		
	66	31	28				
	89						
	110						
	186						
44.0	24	61	90	S-9	39'-40.5'		
	35	100	100				
	108						
	120						
	145						Brown c-f SAND, some c-f Gravel, trace Clayey Silt
39.0	81	61	100	S-10	44'-44.8'		
	121						
	158						
	723						
	OPEN						
34.0		100		S-11	49'-49.1'		
29.0		100		S-12	54'-54.1'		
	↓						
	8 min			C-1	57.5'-62.5'	26.5	(C-1: 90% Rec)
	6 min						
24.0	5 min						
	5 min						Gray Hard GRANITE
	6 min						

Bottom of Hole, Elev. 21.5

Note:
For location of boring holes, see General Plan and Elevation sheet.

Notes:
(1) The first elevation noted is the existing ground surface.
(2) ▼ denotes the ground water level as measured.
(3) (a) Casing Blows are the blows per foot for a 300 pound hammer falling 24 inches except where noted otherwise.
(b) Also noted in Casing Blows column (where applicable) are rock drilling times in minutes per foot.
(4) (a) Spoon Blows are the blows per 6 inches for a 2" OD, 1⅜" ID Split Spoon Sampler using a 140 pound hammer falling 30 inches.
(b) W denotes penetration under weight of hammer.
(c) P denotes penetration by hydraulic pressure.
(5) (a) Samples designated by an "S" number indicate Split Spoon Samples.
(b) Samples designated by a "U" number indicate Undisturbed Shelby Tube Samples (3⅞" Ø).
(c) Samples designated by a "C" number indicate 1⅛" Ø (AX) Rock Cores.
(6) Sample descriptions are based on field visual identification by the boring inspector.
(7) Abbreviation and quantitative terms:

c-coarse		trace	1-10 %
m-medium		little	10-20 %
f-fine		some	20-35 %
		and	35-50 %

	BY	DATE	NO.	REVISION	BY	DATE
MADE	H.F.					
CHECKED	A.B.					
IN CHARGE	E.P.R.					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-60
10TH STREET OVER DOWNTOWN EXPRESSWAY
BORING LOGS

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 17 OF 17

220