Appendix F. Reference Drawings

Provided as a separate PDF Portfolio Document.

Reference Drawings are provided solely for the Proposer's reference and are without representation or warranty by RMTA, except where specifically stated otherwise. Proposer shall be solely responsible for the Project design and RMTA shall have no liability or obligation as a result of the design work contained in this document. This document is subject to change without notice.

APPENDIX F: REFERENCE DRAWINGS

The purpose of the Appendix F Reference Drawings is to provide a supplemental reference to accompany the scope and technical requirements of the RFP and RMTA DOES NOT REPRESENT OR WARRANT THAT THE INFORMATION CONTAINED HEREIN IS EITHER COMPLETE OR ACCURATE OR IN CONFORMITY WITH THE REQUIREMENTS OF RFP. All Proposers are advised that the Work to be undertaken under the RFP is to be performed by the winning Proposer, and each Proposer, by submitting a proposal, understands and agrees that RMTA shall not be responsible or liable in any respect for any losses whatsoever suffered by any Proposer by reason of any use of any information contained herein. Each Proposer further acknowledges and agrees that, by submitting a proposal, (a) if and to the extent it or anyone on its behalf uses any of such information in any way, such use is made on the basis that the Proposer, and not RMTA, has approved and is responsible for such information, and (b) the Proposer is capable of conducting and is obligated hereunder to conduct any and all studies, analyses, diligence and investigations as it deems advisable to verify or supplement such information, and that any use of such information is in all respects at each Proposer's own risk and in its own discretion.

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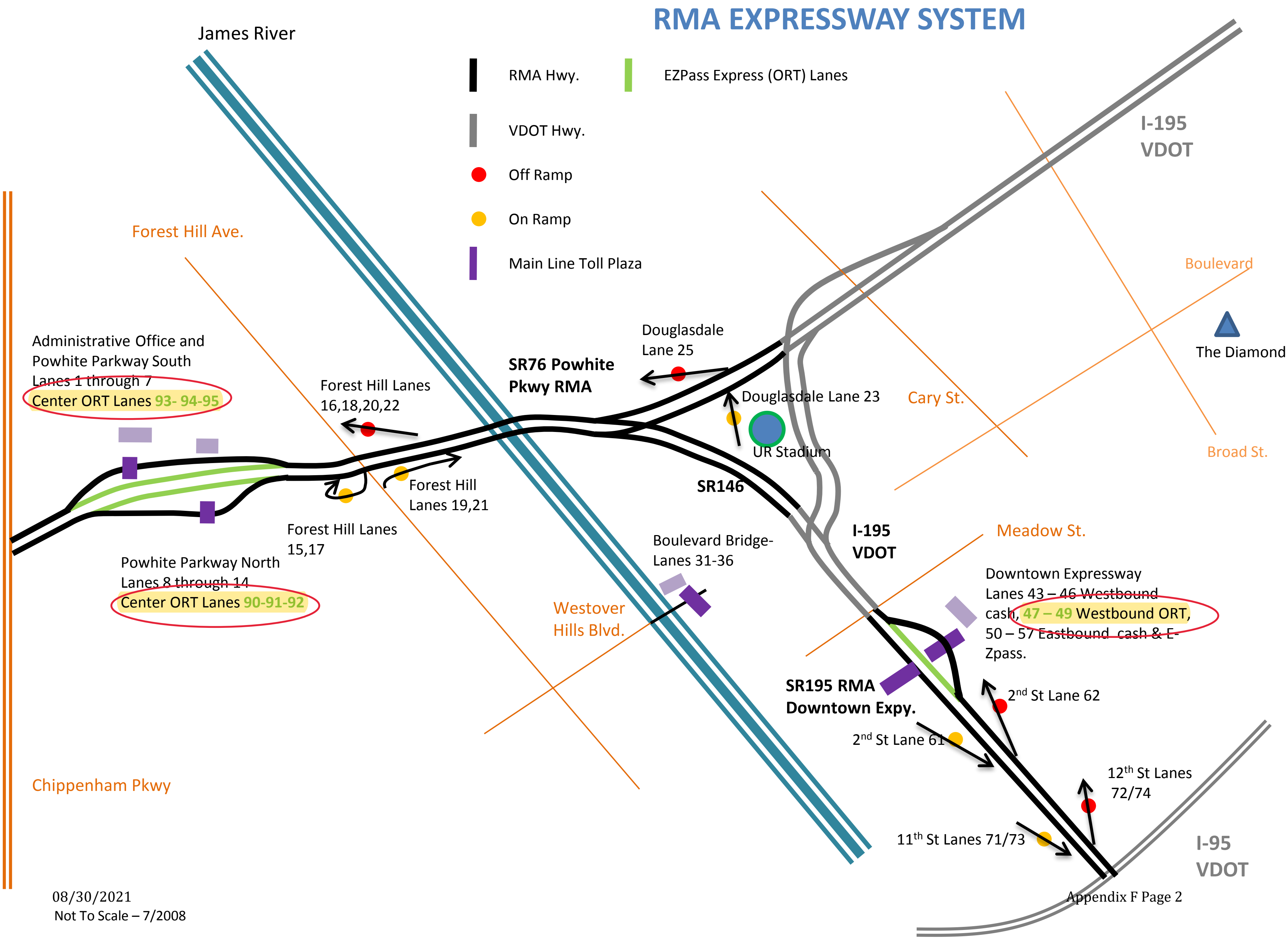

RMA EXPRESSWAY SYSTEM
James River
RMA Hwy.
EZPass Express (ORT) Lanes
VDOT Hwy.
Off Ramp
On Ramp
Main Line Toll Plaza
I-195
VDOT
Forest Hill Ave.
Boulevard
The Diamond
Administrative Office and
Powhite Parkway South
Lanes 1 through 7
Center ORT Lanes 93- 94-95
Douglasdale
Lane 25
SR76 Powhite
Pkwy RMA
Forest Hill Lanes
16,18,20,22
Douglasdale Lane 23
Cary St.
UR Stadium
Broad St.
Forest Hill
Lanes 19,21
SR146
Forest Hill Lanes
15,17
I-195
VDOT
Meadow St.
Powhite Parkway North
Lanes 8 through 14
Center ORT Lanes 90-91-92
Boulevard Bridge-
Lanes 31-36
Downtown Expressway
Lanes 43 – 46 Westbound
cash, 47 – 49 Westbound ORT,
50 – 57 Eastbound cash & E-
Zpass.
Westover
Hills Blvd.
SR195 RMA
Downtown Expy.
2nd St Lane 62
2nd St Lane 61
12th St Lanes
72/74
Chippenham Pkwy
11th St Lanes 71/73
I-95
VDOT
Not To Scale – 7/2008

08/30/2021

DTE TOLL PLAZA

ORIGINAL PLANS

ADMINISTRATION BUILDING & TOLL PLAZA

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	70	

AS BUILT

LEGEND

- Bituminous Concrete Paved Shoulder
- Concrete Bridge Approach Slabs
- Existing Pavement to be Resurfaced
- Bituminous Concrete Pavement
- 6" Plain P.C.C. Base topped with 2" Bituminous Concrete type S-5.
- Longitudinal Joint
- Construction Joint
- Transverse Joint

Note:
For Curb Transition Detail 'B' See Sheet ___
For profile see sheet ___

	BY	DATE	NO.	REVISION	BY	DATE
			5	Add Sidewalk	DGT	2-76
			4	Rev. Median Section & delete GR to Parkwood Ave.	HMW	11-3-75
			3	Add pavement Details	R.K.L.	8/21/75
MADE			2	Revise walk loc. Toll Plaza	P.H.T.	10-5-74
CHECKED			1	Rev. Park. Area	P.H.T.	3-28-74
IN CHARGE			NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

PAVEMENT PLAN
STA. 232+00 TO STA. 247+00

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: 1" = 50'
CONTRACT NO.: 8
SHEET NO. ___ OF ___

70

RICHMOND EXPRESSWAY SYSTEM	SHEET NO.	TOTAL SHEETS
TOLL FACILITIES	3	38

PLAN
DOWNTOWN BARRIER PLAZA

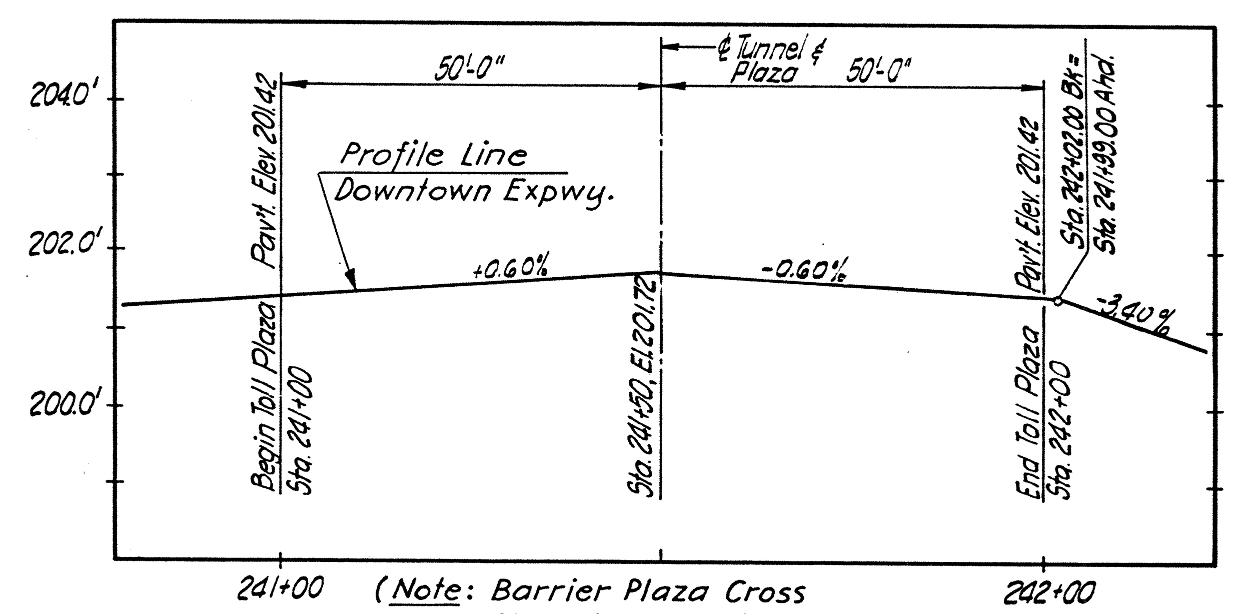
3/32" = 1'-0"

LEGEND:

- ⊘ Location of future traffic signal.
- ○ Traffic signal
- Automatic Toll Machine, (N.I.C.)
- Future Automatic Toll Machine,
- Toll Booth
- ● Proposed Coin Tube
- ⊗ Future Coin Tube

NOTES:

1) To be placed by Toll Equipment Contractor prior to the paving, under this Contract.
2) Tunnel drainage trough to begin at the building foundation.
3) C.O.D.P. = Clean out drain pipe.
4) Sections A-A, B-B and C-C appear on Sheet 6.



(Note: Barrier Plaza Cross Slope to be 0%)

PROFILE AT DOWNTOWN BARRIER PLAZA

Scale: Horiz: 1" = 20'
Vert: 1" = 2'

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	W. J. W.	5-68	2	Added Heating Duct For Treadle Drain	P.H.T.	2-75
CHECKED	D. E. N.	5-68	1	Final Check	D.E.N.	6-68
IN CHARGE H.D.S.			NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

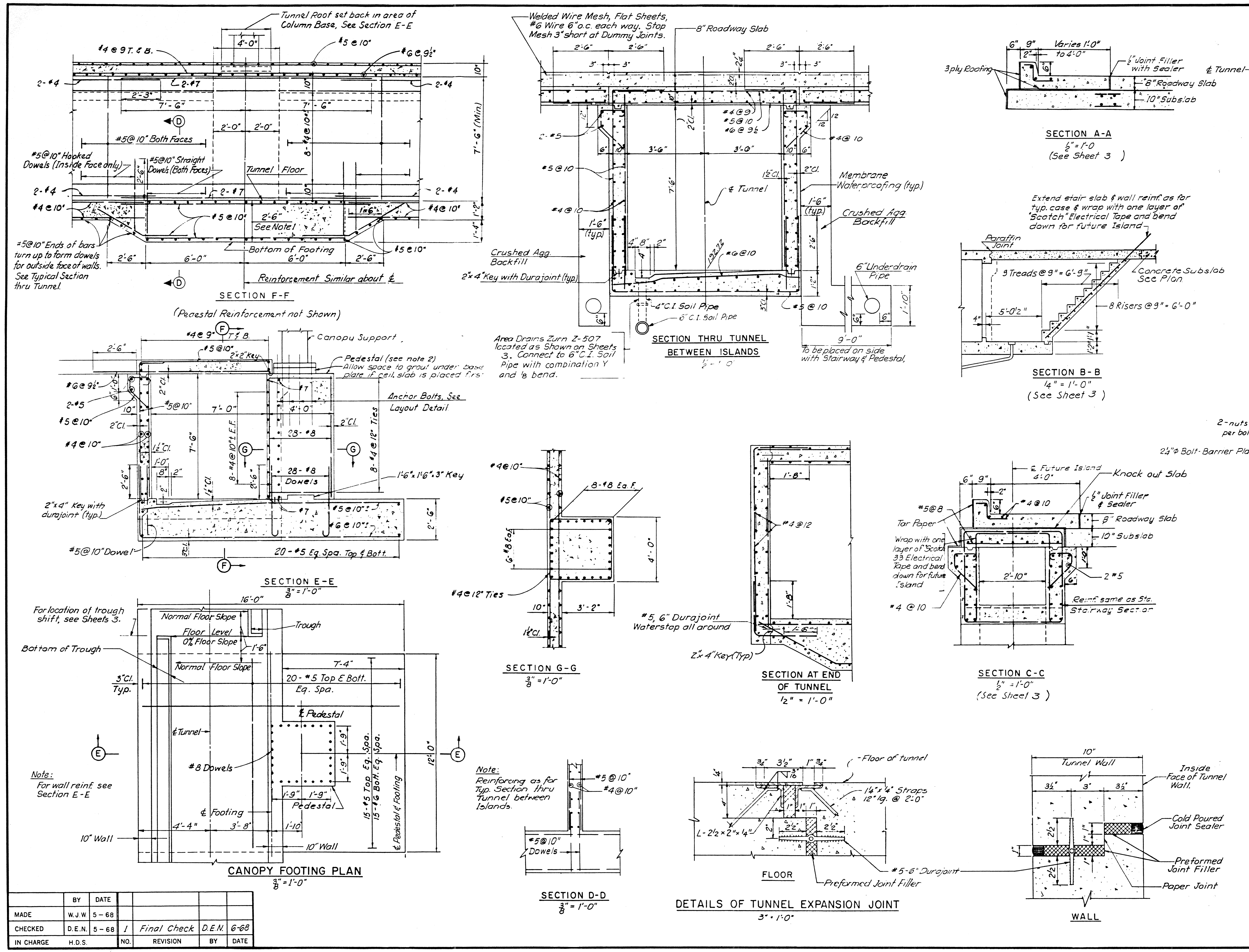
DOWNTOWN BARRIER PLAZA
PLAN

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

SCALE: AS NOTED
CONTRACT NO.: TF-3
SHEET NO. 3 OF

RICHMOND EXPRESSWAY SYSTEM
SECTION | PROJECT | SHEET NO. | TOTAL SHEETS
TF-3 | TOLL FACILITIES | 5 | 38
℄ Tunnel
50'-0"
40'-0"
10"Concrete Slab to follow grade of roadway longitudinally and is to be level transversely (Both sides of Tunnel)
Notes: (Continued)
7. For Island bumper blocks to receive 1½"φ Conduit, see sheet 11. For conduit termination, see Detail "A" sheet 10.
Cutout at all Islands with booths (see note 3).
Crushed Agg. Backfill
6" U.D. Pipe (typ)
NOTES:
1. Elevation 'A' at the Downtown Expressway Barrier Plaza = 202.05
2. For Pavement Profiles, see Sheets 3 and 4
3. Heat Duct cut outs at Islands E, F, N and O
Knock outs provided at all future island barriers A,B,C,P and Q
For details, see Sheet 8
4. For coin tube recess details, see Sheet 8
5. For conduit placement zone, see Sheet 8
6. For conduit layout, see Sheets 11 through 14
SECTION F-F
Aluminum pipe Railing
3" I.D. Pipe Sleeve (Flush with top of Conc.)
Dowels #10's 1'-6" long, 3'-4" o.c.
(Dowels shall be Omitted when Abutting Bit. Conc. Pvmt.)
TRANSVERSE SECTION
ALUMINUM RAILING
(For additional railing details, see sheet 7
Wire mesh reinforcement to stop 3" short of dummy joints
Dummy Joints ½" Deep ¼" Wide (Typ) See Plan Sheets
½" Preformed Joint Filler with sealer (typ).
PLAN OF ISLAND WITH STAIRWAY
(For traffic light locations see plan sheets)
For Details See Sheet 10
BOLT LAYOUT AT TRAFFIC LIGHT BASE
not to scale
DETAIL OF ANCHOR BOLT FOR TOLL BOOTH
For Location see Island Plan this Sheet
SECTION D-D
SECTION A-A
SECTION E-E
SECTION B-B
NOTE:
Section B-B typical for islands E, F, N & O. For all other Islands use Section E-E.
SECTION C-C
Membrane Waterproofing
Area drain Wade, W-1394SBT or equal.
4" C.I. soil pipe from stairwell connect to 6" C.I. soil pipe with comb. Y and ⅛ bend.
STEP DETAIL
No Scale
Abrasive Non-slip Nosing
R.P.C.C. : Reinforced, Portland Cement Concrete
AS BUILT
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BARRIER PLAZA
ISLAND AND TUNNEL DETAILS
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY
SCALE: AS NOTED
CONTRACT NO.: TF-3
SHEET NO. 5 OF
BY DATE
MADE W.J.W. 5-68
CHECKED D.E.N. 5-68
IN CHARGE H.D.S.
NO. REVISION BY DATE

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-3	TOLL FACILITIES	6	38



AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

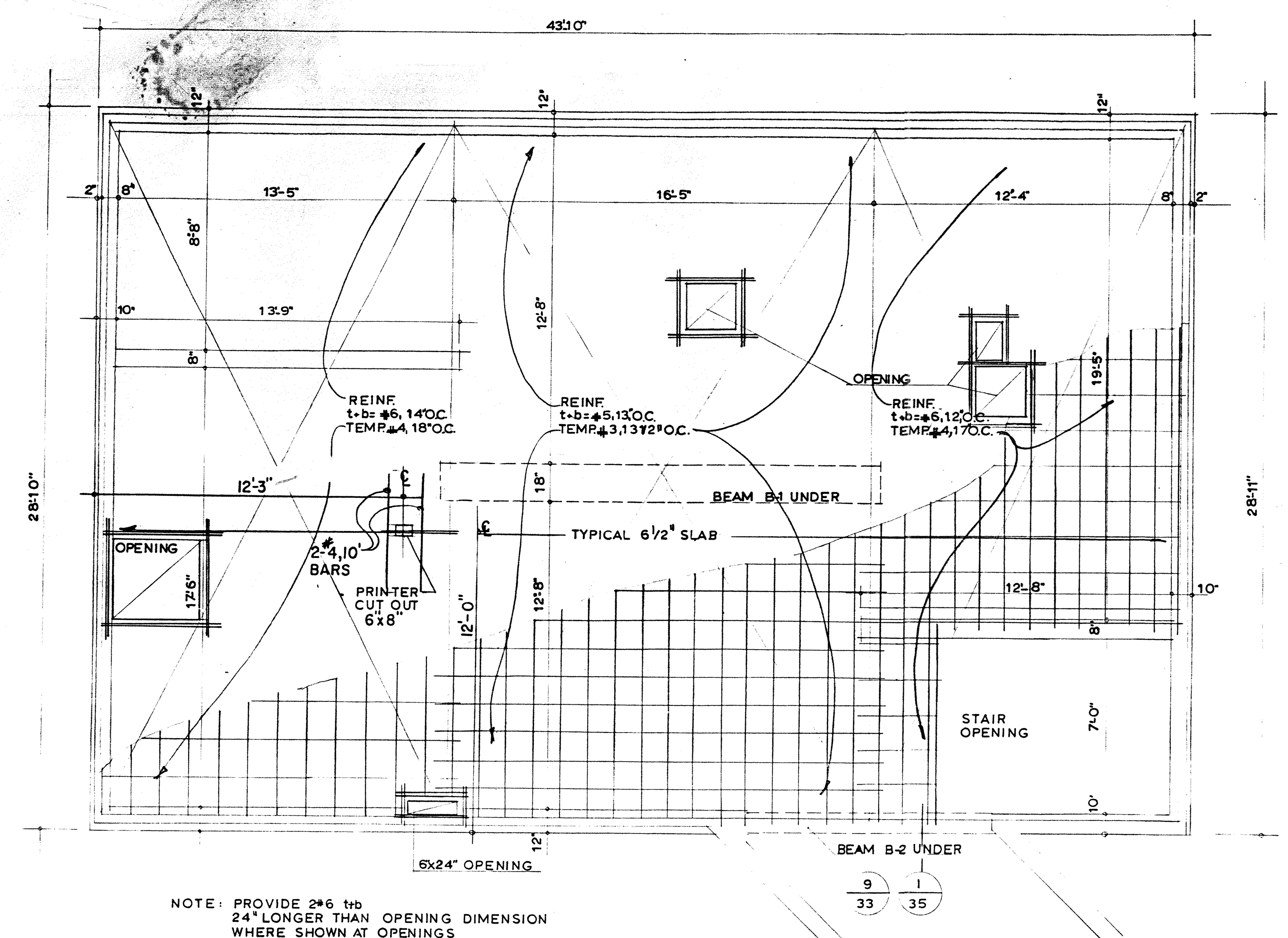
BARRIER PLAZA
TUNNEL DETAILS

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

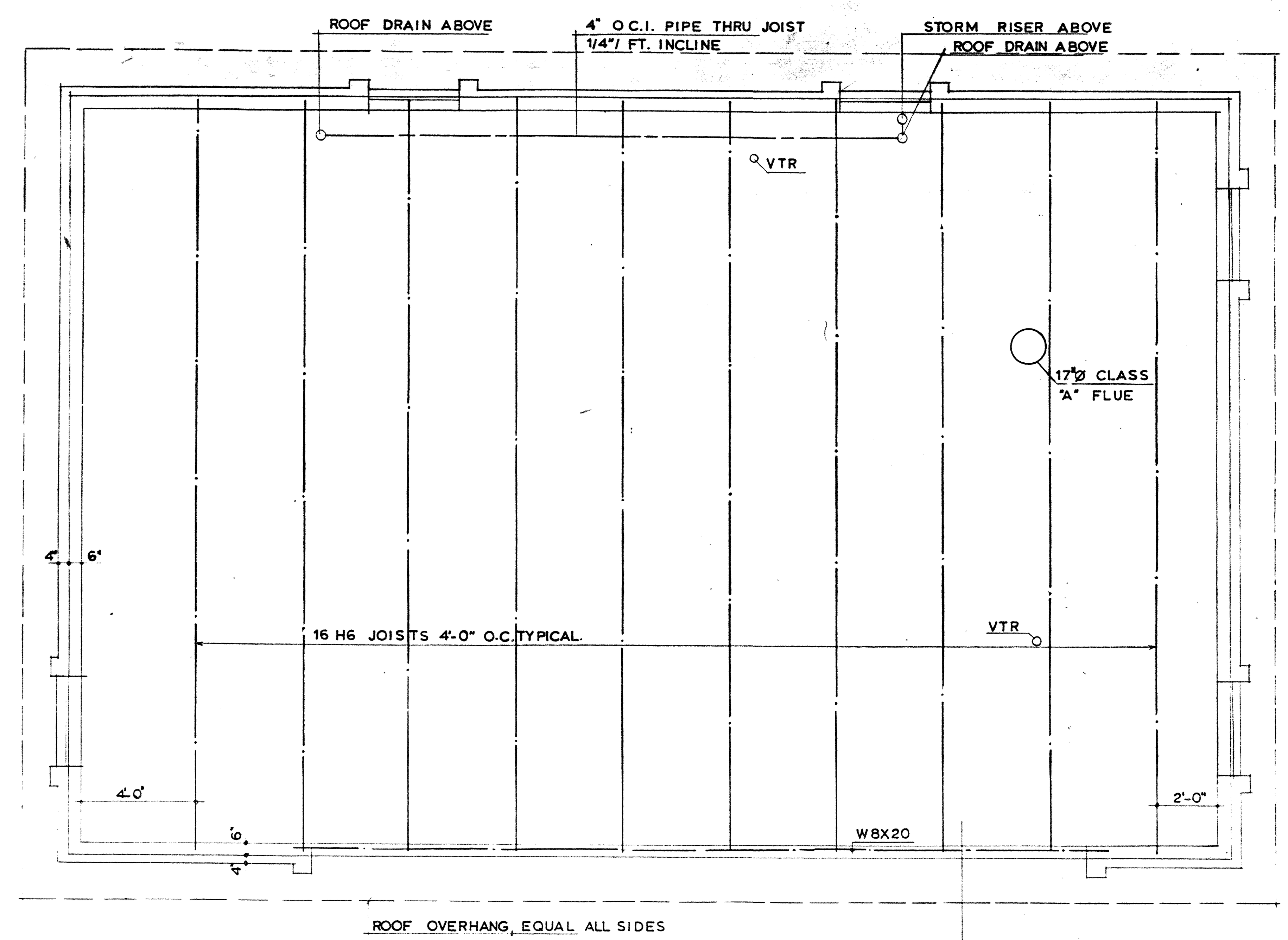
SCALE: AS NOTED
CONTRACT NO.: TF-3
SHEET NO. 6 OF

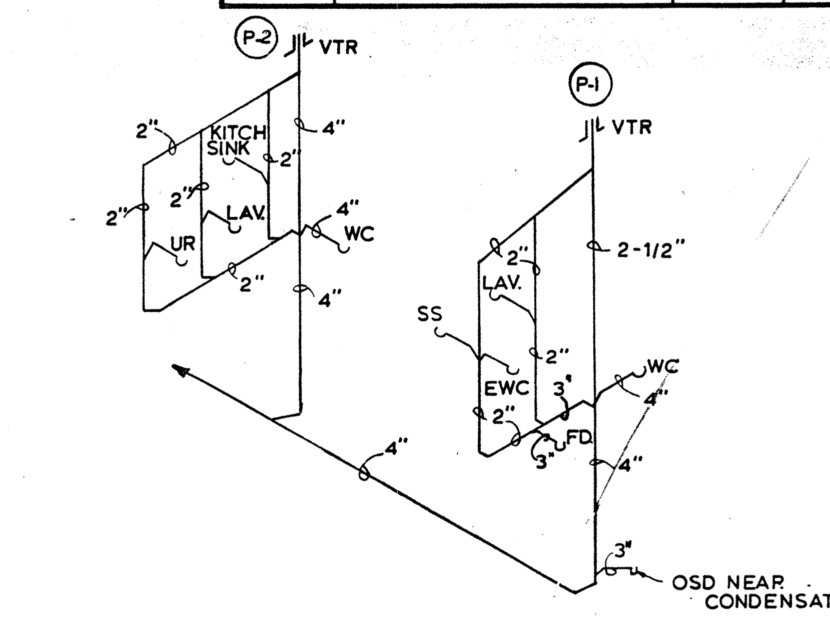
	BY	DATE	NO.	REVISION	BY	DATE
MADE	W.J.W.	5-68				
CHECKED	D.E.N.	5-68	1	Final Check	D.E.N.	6-68
IN CHARGE	H.D.S.					

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO	TOTAL SHEETS
TF-3	UTILITY BUILDING	31	38

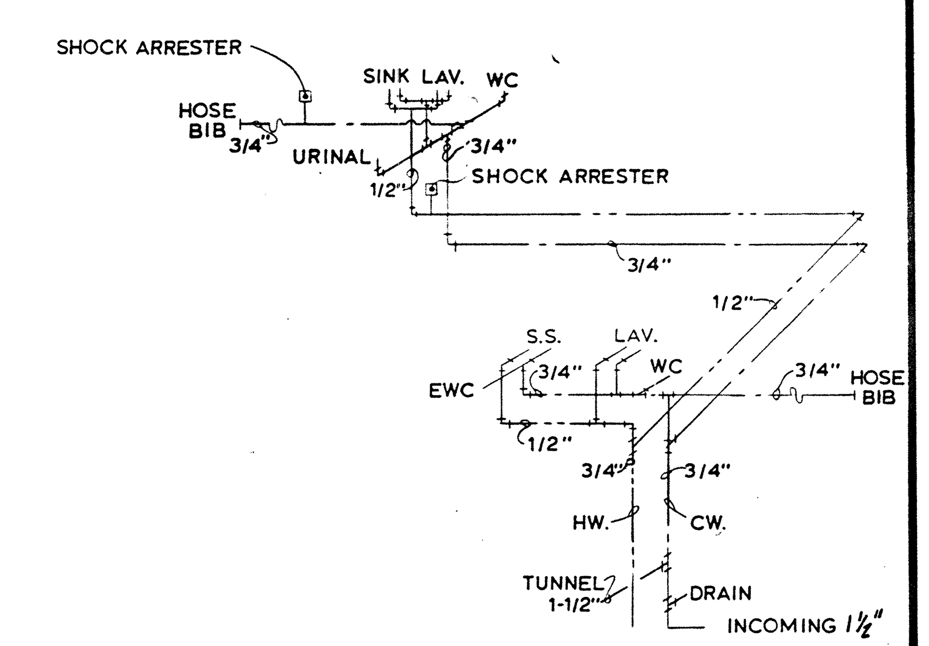


NOTE: PROVIDE 2#6 t+b 24" LONGER THAN OPENING DIMENSION WHERE SHOWN AT OPENINGS

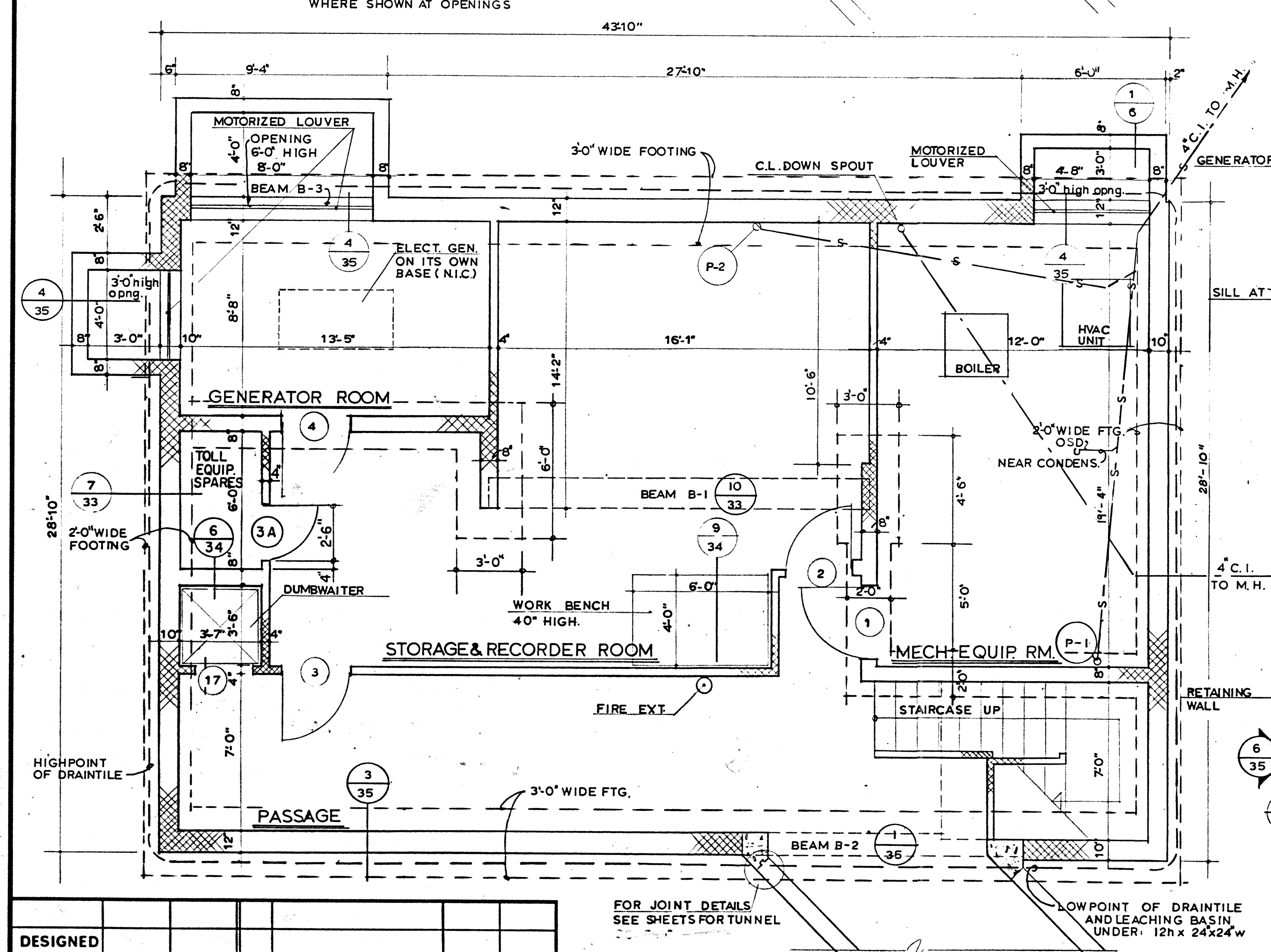




SOIL WASTE & VENT DIAGRAM

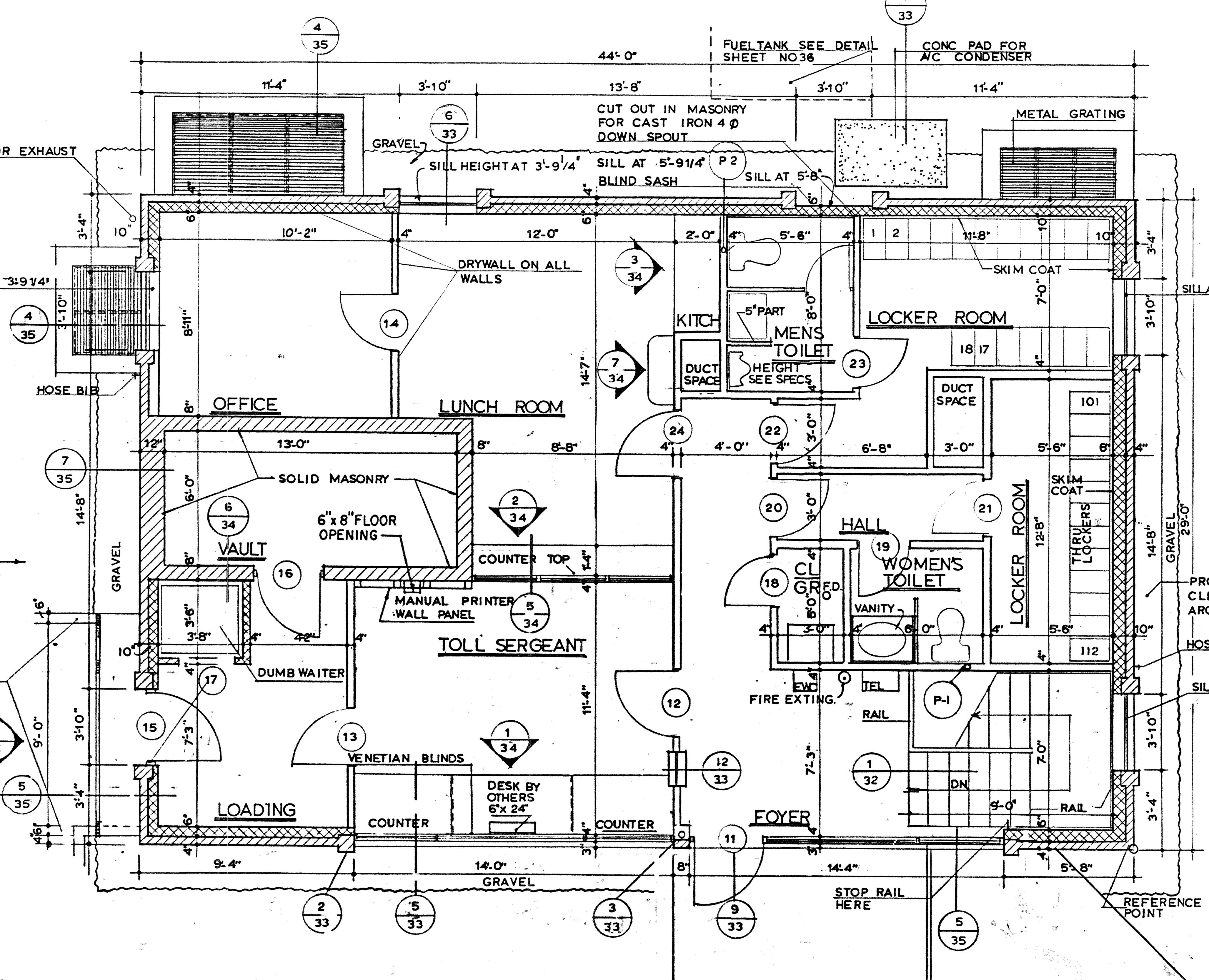


WATER PIPING DIAGRAM



FOR JOINT DETAILS SEE SHEETS FOR TUNNEL

LOWPOINT OF DRAINTILE AND LEACHING BASIN UNDER: 12h x 24x24w



LEGEND

- CONCRETE
- BRICK MASONRY
- CONCRETE MASONRY
- CONCRETE MASONRY 33% SOLID, CONCRETE FILLED
- WOOD STUD PARTITION FACED BOTH SIDES
- WINDOW
- VOID IN MASONRY
- ITEMS BY OTHERS
- A.D. AREA DRAIN
- F.D. FLOOR DRAIN
- O.S.D. OPEN SITE DRAIN

AS BUILT

DESIGNED				
DRAWN				
CHECKED	1	Rev. Manual Printer Wall Panel Cutout Room	F.H.T.	2/75
IN CHARGE	NO.	REVISION	BY	DATE

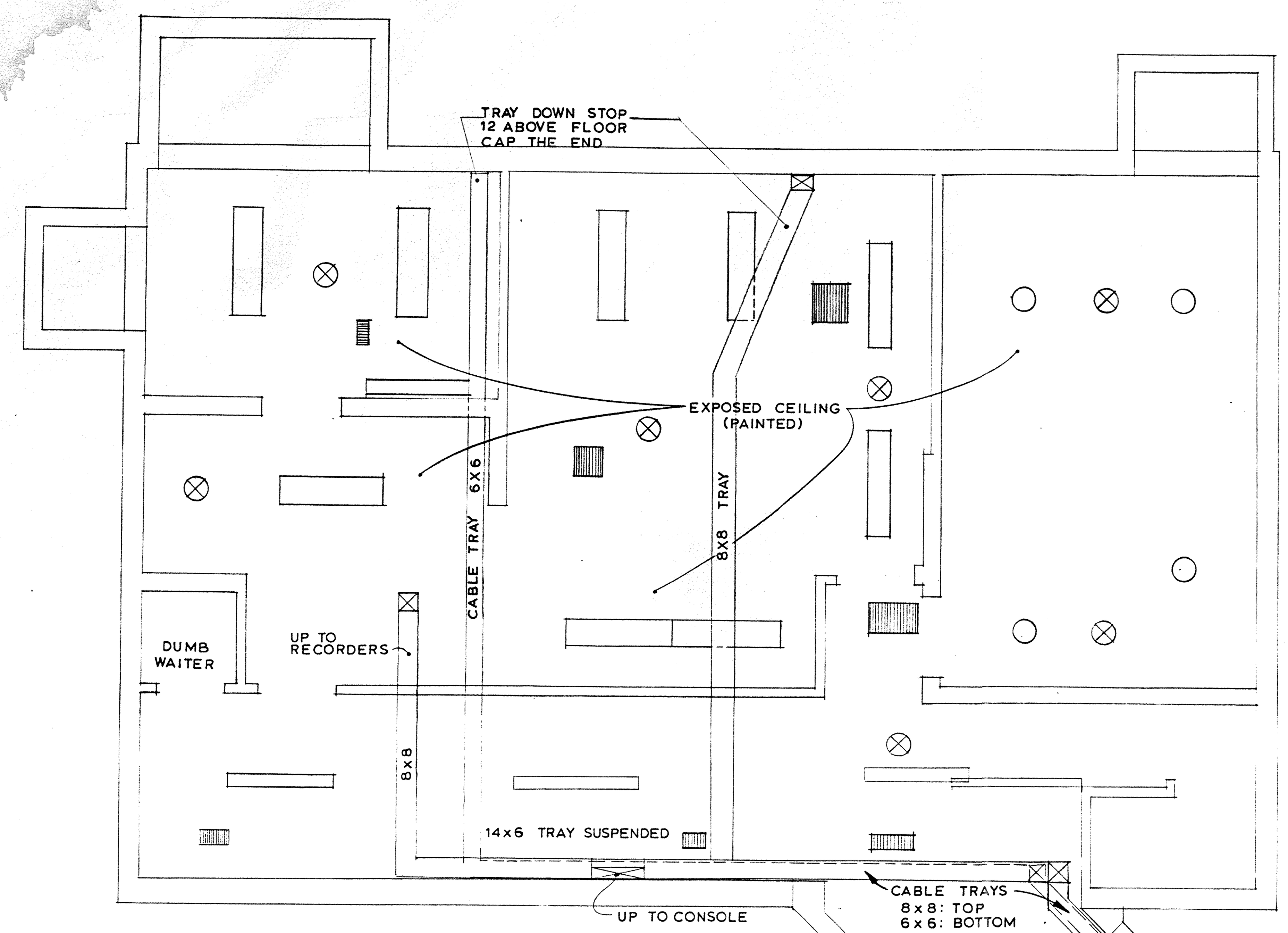
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

UTILITY BUILDING
PLANS
ARCHITECTURAL & STRUCTURAL

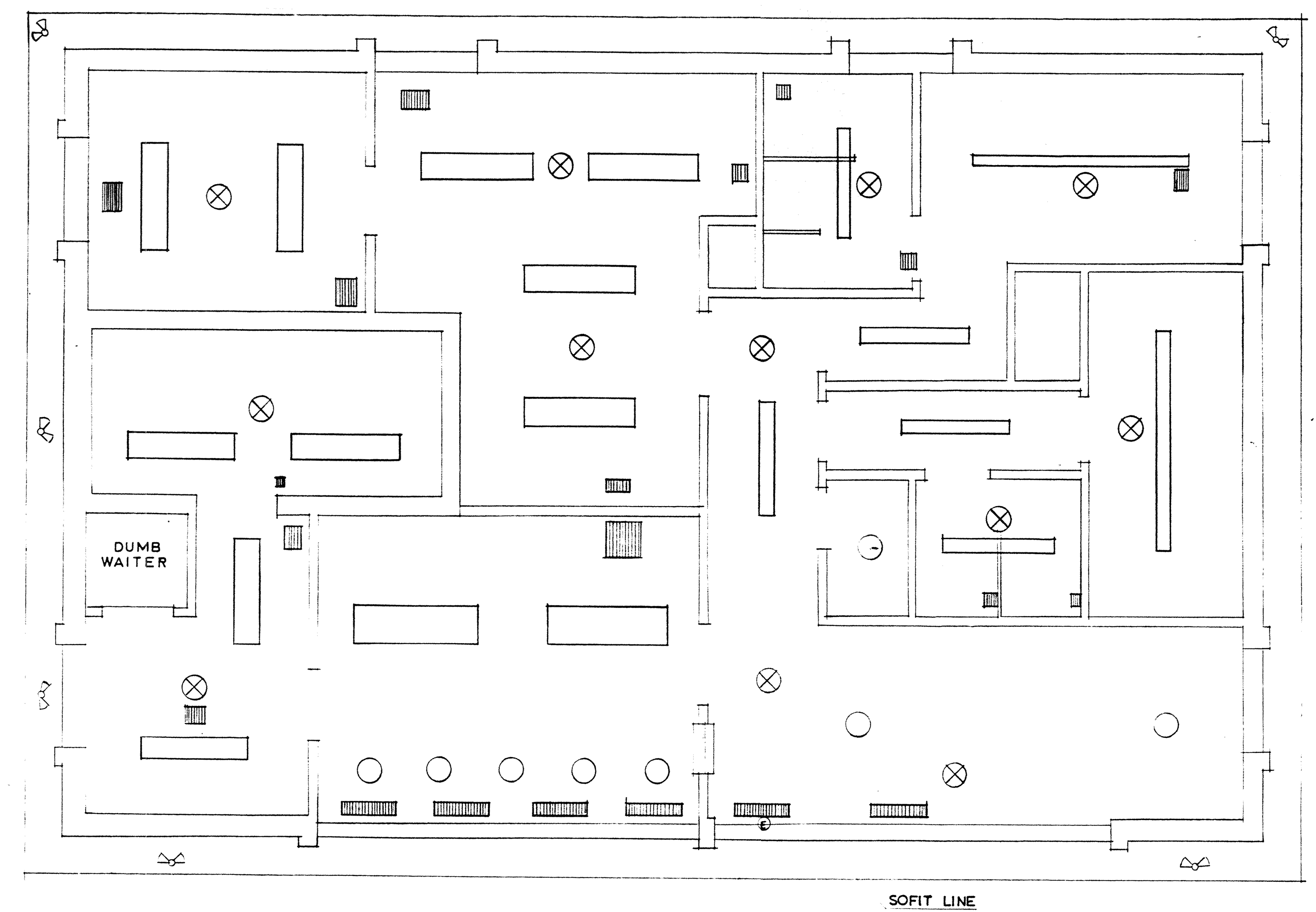
SCALE 1/4"=1'-0"
DATE Sept. 15, 74
SHEET 31 OF 38

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

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO	TOTAL SHEETS
TF-3	UTILITY BUILDING	37	38



BASEMENT CEILING PLAN



FIRST FLOOR CEILING PLAN

LEGEND

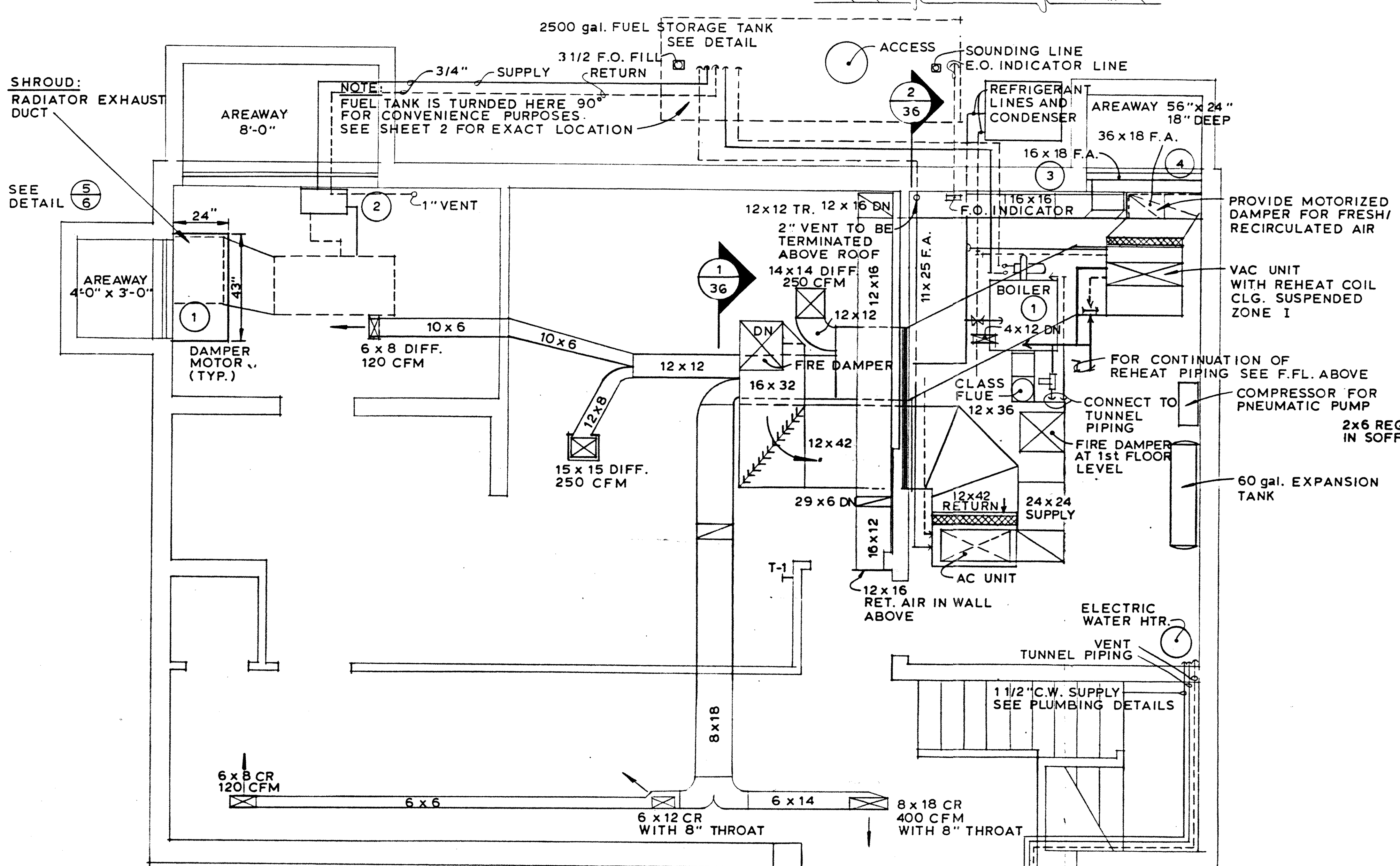
- PARTITION
- 6x12 DUCT (SIZE)
- FLUORESCENT FIXTURE
- INCANDESCENT FIXTURE
- EMERGENCY INCANDESCENT FIXTURE
- CLG. AIR REGISTER
- EXHAUST FAN

ABBREVIATIONS

- TR TOP REGISTER
- CR CEILING REGISTER
- CFM CUB. FT./MIN.
- CW COLD WATER

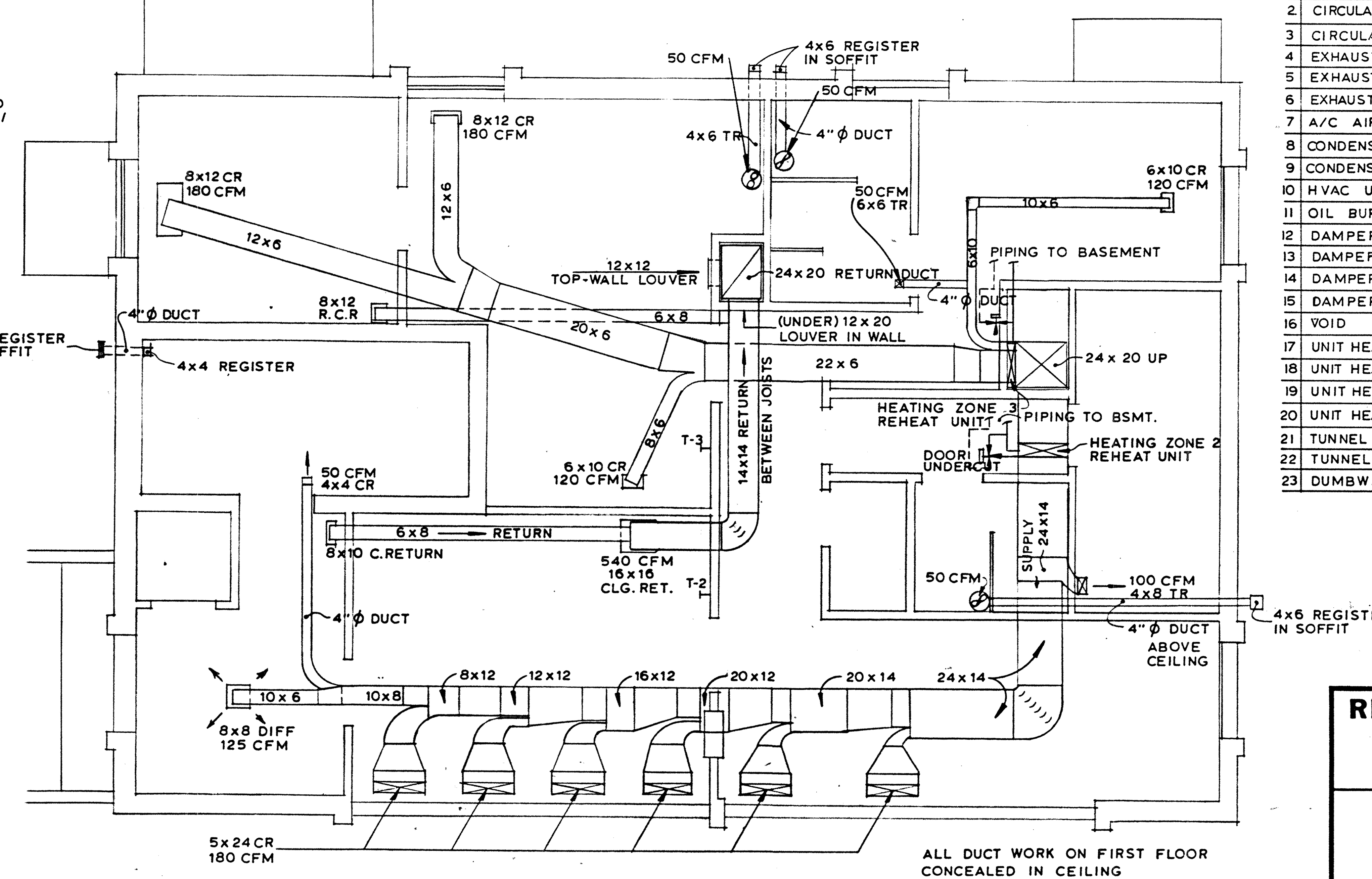
MOTOR SCHEDULE

1.	INLINE PUMP, TUNNEL HW. 3	32 GPM	42 FT. HEAD	3/4 HP	208/3/60	
2.	CIRCULATOR 1	12 GPM	12 FT. HEAD	1/6 HP	115/1/60	
3	CIRCULATOR 2	12 GPM	12 FT HEAD	1/6 HP	115/1/60	
4	EXHAUST FAN, KITCHEN	50 CFM			115/1/60	50 W
5	EXHAUST FAN, MEN TOILET	50 CFM			115/1/60	50 W
6	EXHAUST FAN, FEM. TOIL.	50 CFM			115/1/60	50 W
7	A/C AIRHANDL. UNIT	3000 CFM		2 HP	208/3/60	
8	CONDENSING UNIT 1	3000 CFM		2 HP	208/3/60	30 KW
9	CONDENSING UNIT 2	1300 CFM		1 HP	208/3/60	10 KW
10	HVAC UNIT	1300 CFM		1 HP	208/3/60	10 KW
11	OIL BURNER			1/3 HP	115/1/60	
12	DAMPER MOTOR 1			1/6 HP	115/1/60	
13	DAMPER MOTOR 2	SEE BASEMENT		1/6 HP	111/1/60	
14	DAMPER MOTOR 3	HEATING PLAN		1/6 HP	115/1/60	
15	DAMPER MOTOR 4			1/6 HP	115/1/60	
16	VOID					
17	UNIT HEATER 1			1/3 HP	115/1/60	
18	UNIT HEATER 2	BARRIER PLAZA BOOTHS		1/3 HP	115/1/60	
19	UNIT HEATER 3			1/3 HP	115/1/60	
20	UNIT HEATER 4			1/3 HP	115/1/60	
21	TUNNEL HEATER 1			1/5 HP	115/1/60	
22	TUNNEL HEATER 2			1/5 HP	115/1/60	
23	DUMBWAITER			1 HP	208/3/60	



BASEMENT HEATING PLAN

NOTE:
PROVIDE CLEANOUTS AND ACCESS PANELS WHERE CODE AND CONVENIENCE REQUIRES.



FIRST FLOOR HEATING PLAN

AS BUILT

DESIGNED	KL.	9-15-74				
DRAWN	KL.	9-15-74				
CHECKED	KL.	9-15-74				
IN CHARGE J.P.F.			NO.	REVISION	BY	DATE

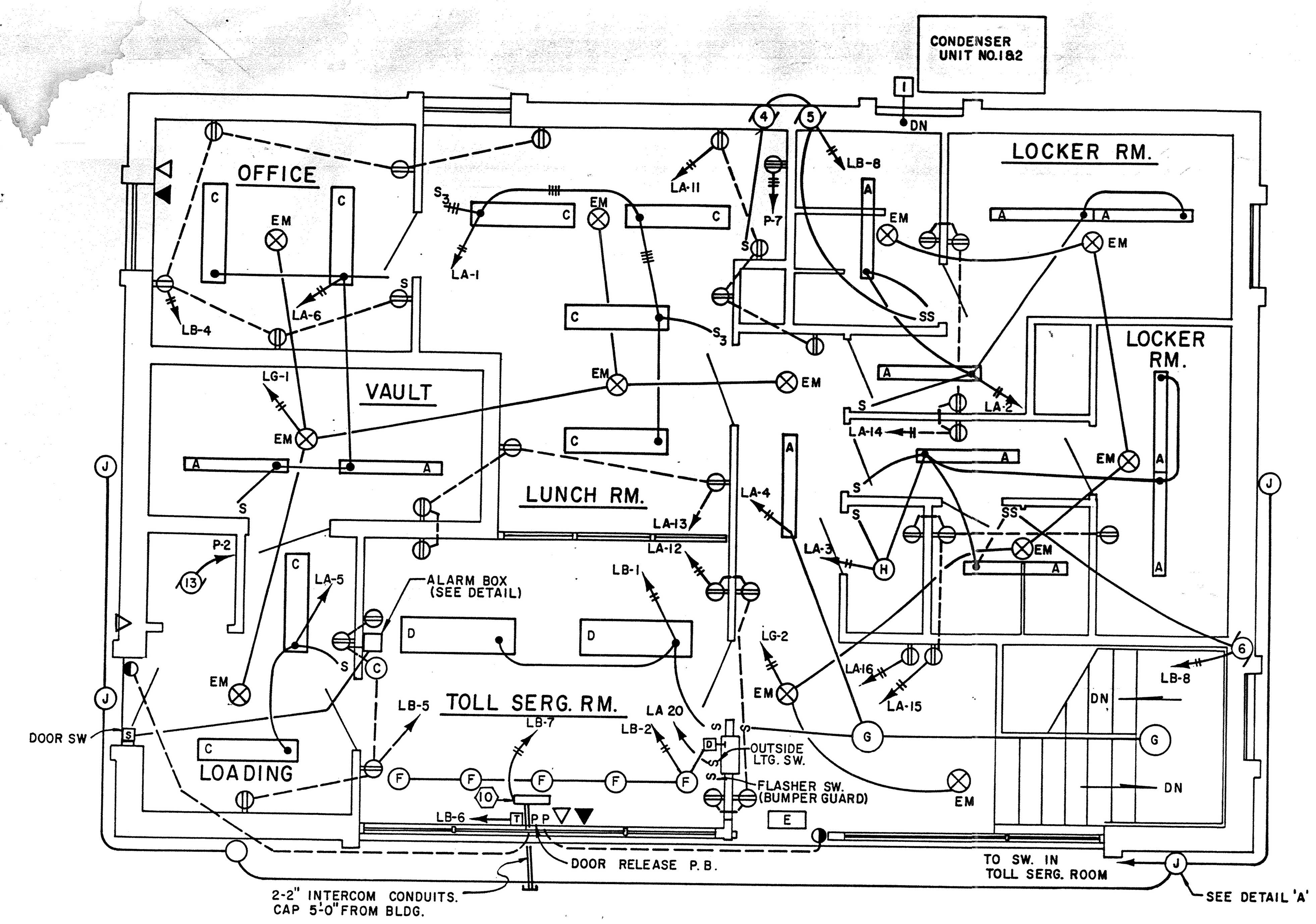
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

UTILITY BUILDING
MECHANICAL PLANS & SCHEDULES

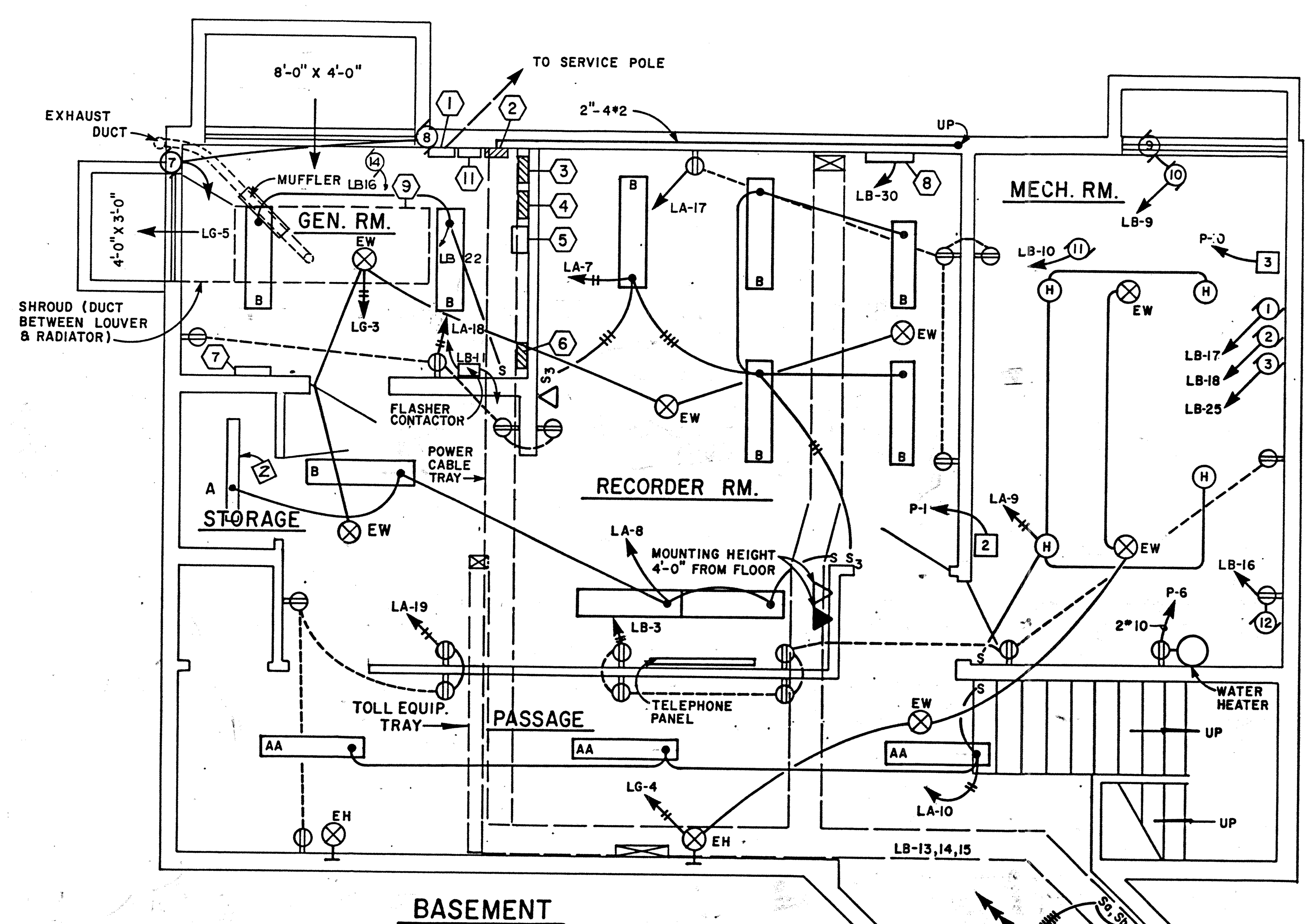
SCALE 1/4"=1-0"
DATE Sept. 15, 74
SHEET 37 OF 38

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

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO	TOTAL SHEETS
TF-3	UTILITY BUILDING	38	38



FIRST FLOOR
1/4"=1'-0"



BASEMENT
1/4"=1'-0"

LEGEND

- FLUORESCENT FIXTURE, LETTER INDICATES TYPE.
- INCANDESCENT FIXTURE, LETTER INDICATES TYPE.
- EMERGENCY LIGHT- IN CEILING
- EMERGENCY LIGHT- WALL MOUNTED
- EXIT LIGHT
- DIMMER
- DUPLEX WALL RECEPTACLE OUTLET
- RANGE RECEPTACLE
- S SINGLE POLE SWITCH
- S_3 THREE WAY SWITCH
- P DOOR RELEASE SYSTEM
- TELEPHONE OUTLET
- INTERCOM SYSTEM TELEPHONE OUTLET
- ELECTRIC CLOCK OUTLET
- TRANSFORMER FOR DOOR RELEASE SYSTEM
- PANEL BOARD
- WIRING CONCEALED IN WALLS OR CEILING
- WIRING CONCEALED IN FLOOR
- LA-3 HOME RUN WITH PANEL & CIRC. DESIGNATION

1. CURRENT TRANSFORMER & METERING EQUIPMENT
2. MAIN DISTRIBUTION PANEL BOARD - P
3. PANEL BOARD - LA
4. PANEL BOARD - LB
5. AUTO TRANSFER SWITCH
6. EMERGENCY GENERATOR PANEL-LG
7. GENERATOR CONTROL PANEL
8. RECORDER ROOM PANEL BOARD-R
9. GENERATOR SET (45 KW CONTINUOUS)
10. INTER-COM PANEL
11. DISCONNECT SWITCH (400 A) & FUSES (225 A)

1. CIRCU. PUMP # 1 (ZONE-1), 1/6 HP, 115 V, 1Ø, 60~, 2#12
2. CIRCU. PUMP # 2 (ZONE-2) 1/6 HP, 115 V, 1Ø 60~, 2#12
3. CIRCU. PUMP # 3 (TUNNEL), 3/4HP, 208 V, 3Ø, 60 ~ 4#12
4. EXHAUST FAN (KITCHEN)
5. EXHAUST FAN (MEN TOILET)
6. EXHAUST FAN (WOMEN TOILET)

ALL 1/12 HP, 115 V, 1Ø, 60~, 3#12

7. DAMPER MOTOR # 1
8. DAMPER MOTOR # 2
9. DAMPER MOTOR # 3
10. DAMPER MOTOR # 4

ALL 1/6 HP, 115 V, 60~, 1Ø, 2#12, 1+2 CONNECTED TO GENERATOR CONTROLS, 3+4 CONNECTED TO H & V CONTROLS

11. OIL BURNER, 1/3 HP 115 V, 1Ø, 60~ 2#12
12. SPARE 2#12
13. DUMBWAITER 1 HP, 208 V, 3Ø, 60~, 4#12

[1] CONDENSER UNIT # 1 (2 HP&30 KW) & CONDENSER UNIT # 2 (2 HP&10 KW)
[2] A/C AIRHANDLING UNIT (2 HP)
[3] HVAC UNIT (1 HP)
14. GENERATOR DAY TANK PUMP

GENERAL NOTES:
FOR LIGHTING FIXTURE SCHEDULE SEE SPEC'S
TOLL ISLAND 'J' BETWEEN LANES 10 & 11 REQUIRES NO INDIVIDUAL CT.

MAIN DISTRIBUTION PANEL-P

120/208 V, 3Ø, 4W, SN, 42 POLES, 600A BUS — WESTINGHOUSE TYPE CDP

CIRC. NO.	POLE	TRIP	DESCRIPTION
1	2	20 A	AC UNIT # 3 (2HP)
2	2	20 A	SPARE
3	2	20 A	SPARE
4	3	20 A	SPARE
5	3	50 A	KITCHEN UNIT 8.5 KW
6	2	30 A	ELECT. W.H. UTILITY (4 KW)
7	2	20 A	DUMB WAITER
8	2	20 A	AC UNIT
9	3	30 A	SPARE
10	3	50 A	HVAC UNIT (1 HP & 10 KW)
11	3	50 A	SPARE
12	3	150 A	CONDENSERS, #1 & #2 (@ 43.0 KW)
13	3	150 A	PANEL BOARD LA
14	3	150 A	PANEL BOARD LB
15	3		SPACE
16	3		SPACE

PANEL BOARD-LB

120/208 V, 3Ø, 4W, SN, 42 POLES, 225 A BUS — WESTINGHOUSE TYPE WBA

CIRC. NO.	POLE	TRIP	DESCRIPTION
1,2	1	20A	LTG. 1st. FLOOR
3,4,5	1	20A	RECEPT. 1st. FLOOR & BASEMENT DR. ALARM
6	1	20A	DOOR RELEASE SYSTEM
7	1	20A	INTERCOM PANEL
8	1	20A	EXHAUST FANS (THREE)
9	1	20A	DAMPER MOTORS #3 & #4
10	1	20A	OIL BURNER
11	1	20A	FLASHER, CONTACTOR (BUMPER GUARD)
12	1	20A	TUNNEL HEATER FANS (THREE)
13,14,15	1	20A	LIGHTING TUNNEL ('A'+'B' LIGHTS)
16	1	20A	LIGHTING TUNNEL
17	1	20A	CIRCULATOR PUMP #1
18	1	20A	CIRCULATOR PUMP #2
19	1	20A	STAIRCASE LTG. (TUNNEL)
20	3	50A	AIR COMPRESSOR (CONTROLS)
21	1	20A	SPARE
22	1	20A	LIGHTS GENERATOR RM.
23	1	20A	LIGHTING TUNNEL ('C' LIGHTS)
24	1	20A	SPARE
25	3	20A	CIRCULATOR PUMP #3 (TUNNEL)
26	3	50A	TOLL ISLAND "E"
27	3	50A	P/BD-R (RECORD RM.)
28	3	50A	TOLL ISLANDS "F" & "H"
29	3	50A	TOLL ISLAND "G"
30	3	50A	TOLL ISLAND "I"
31	3	50A	TOLL ISLAND "K"
32	3	50A	TOLL ISLAND "M"
33	3	50A	TOLL ISLANDS "L" & "N"
34	3	50A	TOLL ISLAND "O"

PANEL BOARD-LA

120/208 V, 3Ø, 4W, SN, 32 POLES, 225A BUS — WESTINGHOUSE TYPE WBA

CIRC. NO.	POLE	TRIP	DESCRIPTION
1,2,3, 4,5,6	1	20 A	LTG. 1st FLOOR
7,8,9, 10	1	20 A	LTG. BASEMENT
11,12,13, 14,15	1	20 A	RECEPTACLES 1st FLOOR
16	1	20 A	ELECT. WATER COOLER
17,18 19	1	20 A	RECEPTACLES BASEMENT
20	1	20 A	OUTSIDE FLOOD LIGHTING
21	1	20 A	SPARE
22	1	20 A	SPARE
23	1	20 A	SPARE
24	1	20 A	SPARE
25	1	20 A	SPARE
26	1	20 A	SPARE
27	1	20 A	SPARE
28	1	20 A	SPARE
29,30	1		SPACE
31,32	1		SPACE

PANEL BOARD - R

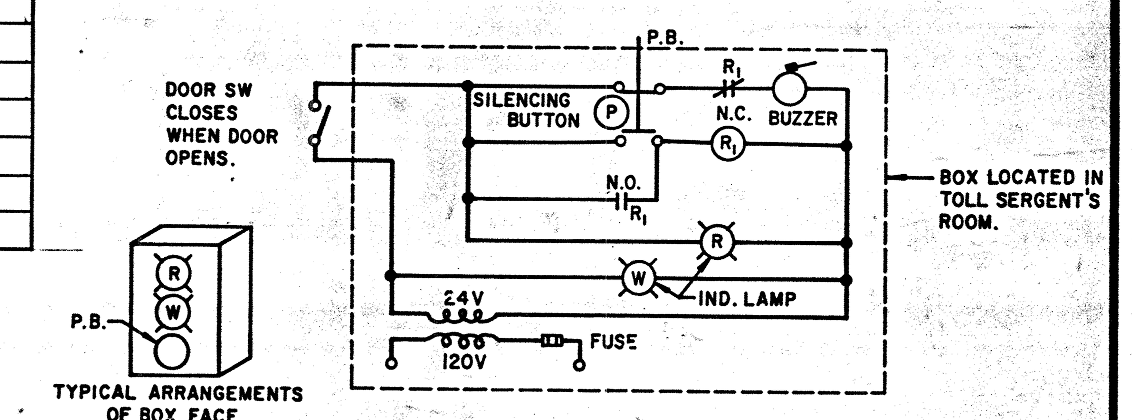
120/208V, 3Ø, 4W, SN, 10 POLES, 100 A BUS — WESTINGHOUSE TYPE WBA

CIRC. NO.	POLE	TRIP	DESCRIPTION
1 to 16	1	20A	RECORDER ROOM CIRCS.
17 to 20	1		SPACES

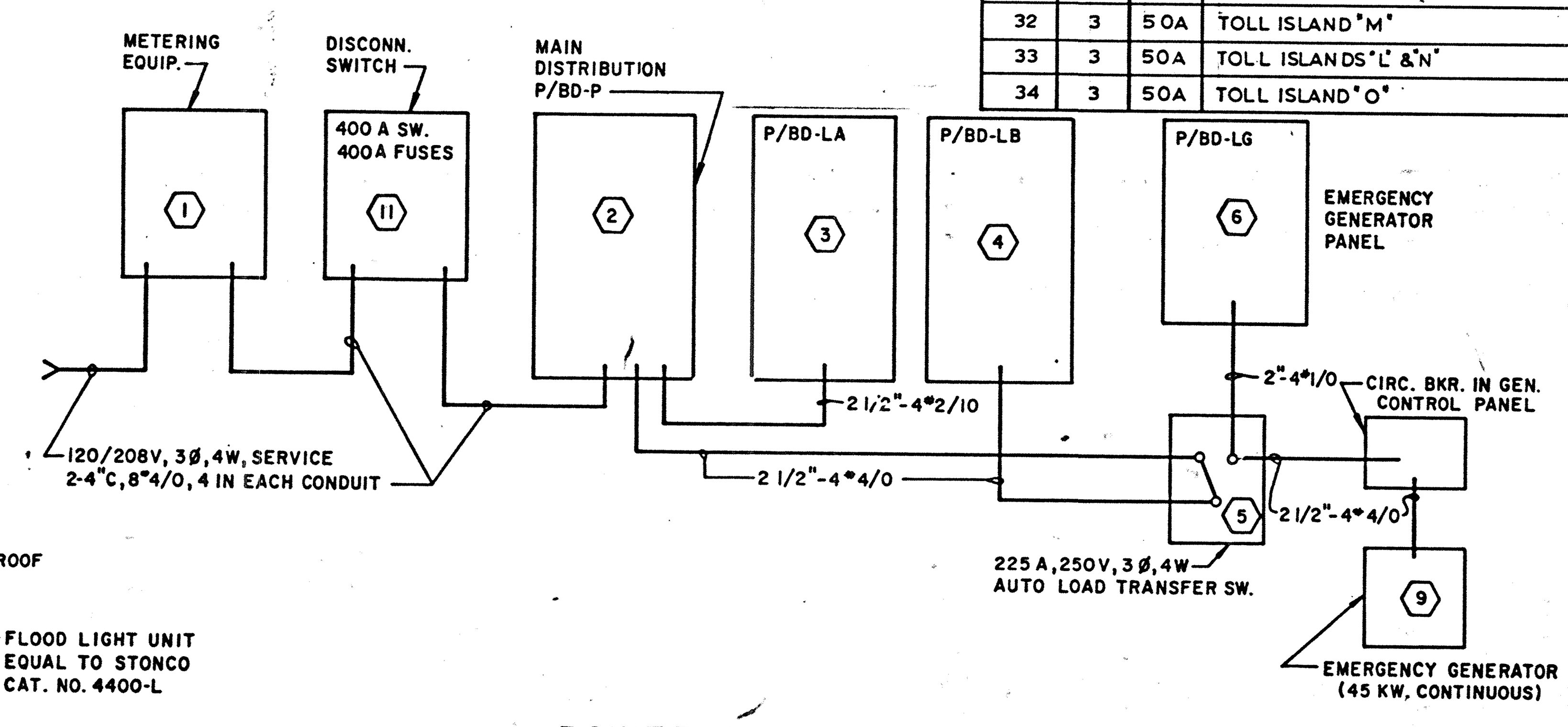
PANEL BOARD - LG

120/208V, 3Ø, 4W, 10 POLES, 100 A BUS — WESTINGHOUSE TYPE WBA.

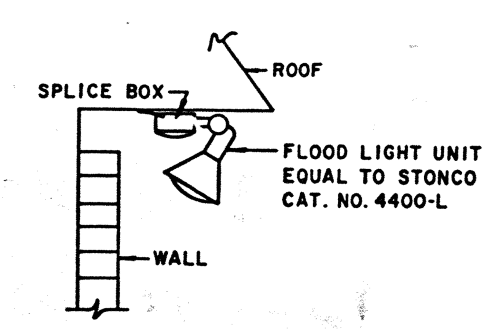
CIRC. NO.	POLE	TRIP	DESCRIPTION
1	1	20 A	LTG. 1 ST. FLOOR (EMG.)
2	1	20A	LTG. 1 ST. FLOOR (EMG.)
3	1	20A	LTG. BASEMENT (EMG.)
4	1	20 A	LTG BASEMENT (EMG)
5	1	20A	DAMPER MOTORS #1 & #2
6	1	20A	SPARE
7	1	20 A	SPARE
8	1		SPACE
9	1		SPACE
10	1		SPACE



ALARM SYSTEM
NO SCALE



POWER RISER DIAGRAM
NO SCALE



OUTSIDE LIGHTING
DETAIL A

DESIGNED					
DRAWN		2	Added New Room Adjust Printer Cutout	PHT.	2/75
CHECKED		1	PANEL LB-CHANGE CTS. 26,28,29,30,31; ADD 32,33,34	KL	10-17-74
IN CHARGE		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

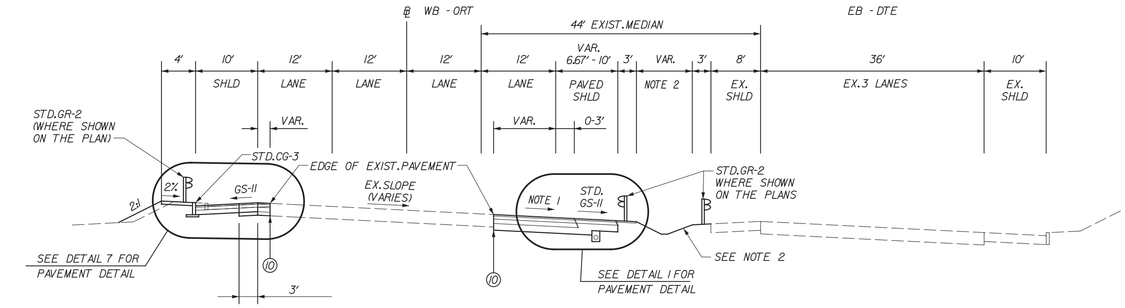
UTILITY BUILDING
ELECTRICAL

SCALE AS NOTED
DATE
SHEET 38 OF 38

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

DOWNTOWN EXPRESSWAY (DTE) OPEN ROAD TOLLING

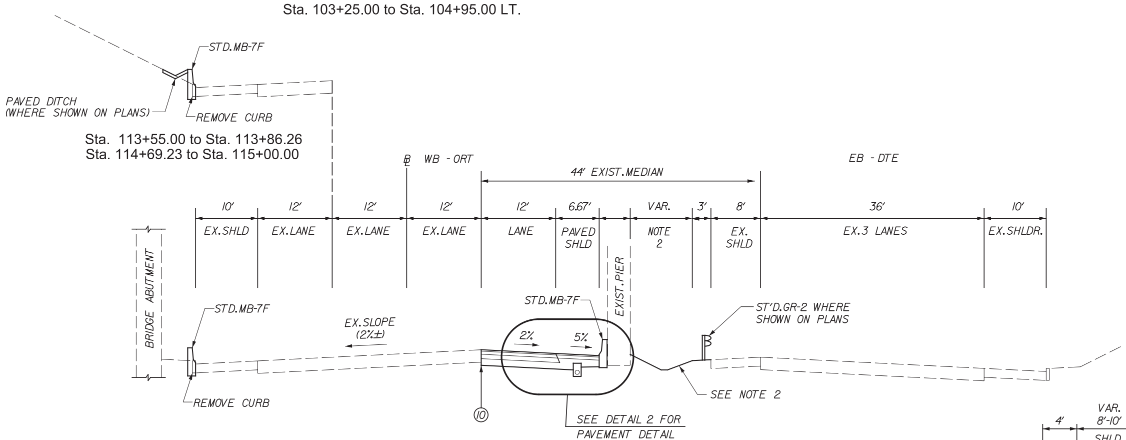
ORIGINAL PLANS



STA. 103+25 TO
104+95 ONLY

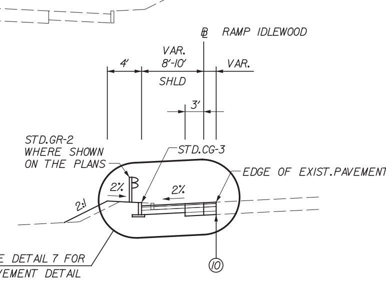
WB-ORT (RTE. 195)

Sta. 100+00.00 to Sta. 113+86.26 RT.
Sta. 114+69.23 to Sta. 115+00.00 RT.
Sta. 103+25.00 to Sta. 104+95.00 LT.



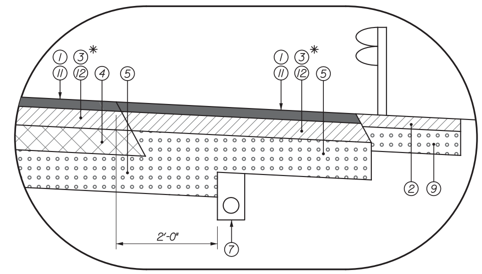
WB-ORT AT MEADOW STREET BRIDGE

Sta. 113+86.26 to Sta. 114+69.23 RT.
Sta. 113+55.00 to Sta. 115+00.00 LT.



RAMP IDLEWOOD

Sta. 10+00.00 to Sta. 15+32.07

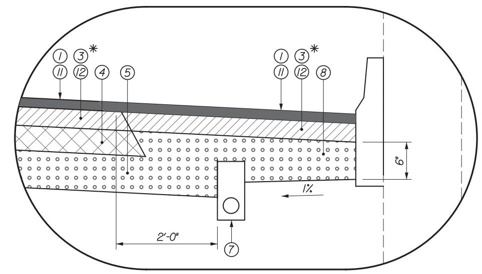


DETAIL 1

NTS

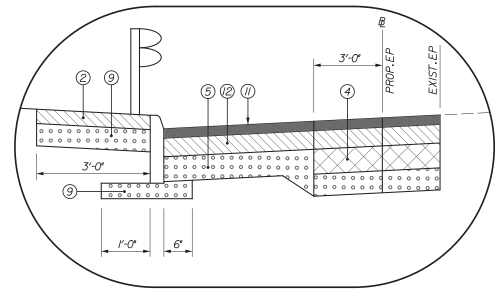
* USE ⑪ & ⑫ WB ORT STA.100+00 TO 115+00

USE ① & ③ WB ORT STA.115+00 TO END OF PROJECT



DETAIL 2

NTS



DETAIL 7

NTS

LEGEND

1. SURFACE COURSE, 1 1/2 IN. ASPHALT CONCRETE TYPE SMA-9.5 @ 165 LBS./SY.
2. INTERMEDIATE COURSE, 2.0 IN. ASPHALT CONCRETE TYPE IM-19.0A
3. INTERMEDIATE COURSE, 3.0 IN. ASPHALT CONCRETE TYPE SMA-19.0
4. BASE COURSE, 4.0 IN. ASPHALT CONCRETE TYPE BM-25.0A
5. SUBBASE, 6.0 IN. UNTREATED AGGREGATE MATERIAL TYPE I, SIZE NO.21-B
6. MILL EXISTING PAVEMENT TO A DEPTH OF 1.5 IN. AND OVERLAY WITH ASPHALT CONCRETE TYPE SMA-9.5 @ 165 LBS./SY.
7. STD.UD-4 UNDERDRAIN REQ'D.
8. SUBBASE, VAR. THICKNESS, UNTREATED AGGREGATE MATERIAL TYPE I, SIZE NO.21-B
9. SUBBASE, 4.0 IN., UNTREATED AGGREGATE MATERIAL TYPE I, SIZE NO.21-B
10. SAWCUT
11. 1 1/2 IN. ASPHALT CONCRETE TYPE SM-9.5A @ 165 LBS./SY.
12. 3 IN. ASPHALT CONCRETE TYPE IM-19.0A
13. LEVELING COURSE, VAR. DEPTH ASPHALT CONCRETE TYPE SMA-19.0, 2" MIN.
14. REMOVE AND REPLACE EXISTING PAVEMENT ALONG THE EDGE AS SHOWN IN VDOT STD.WP-2. SEE DETAIL 9 SHT 2(3) FOR REPLACED PAVEMENT
15. VAR.DEPTH, ASPHALT CONCRETE TYPE BM-25.0, 3" MIN.
16. NOT USED
17. HYDRAULIC CEMENT CONCRETE SIDEWALK, 4"
18. NOT USED
19. SURFACE COURSE, VAR. DEPTH ASPHALT CONCRETE TYPE SMA-9.5, 1.5" MIN.

NOTES

1. SEE PROFILES FOR CROSS SLOPES.
2. SEE CROSS SECTIONS FOR DITCH LOCATIONS AND INVERTS.
3. SEE SHEET 2(3) FOR DITCH TYPICAL SECTION.

10' 0 10' 20'
SCALE: 1"=10'

REVISIONS

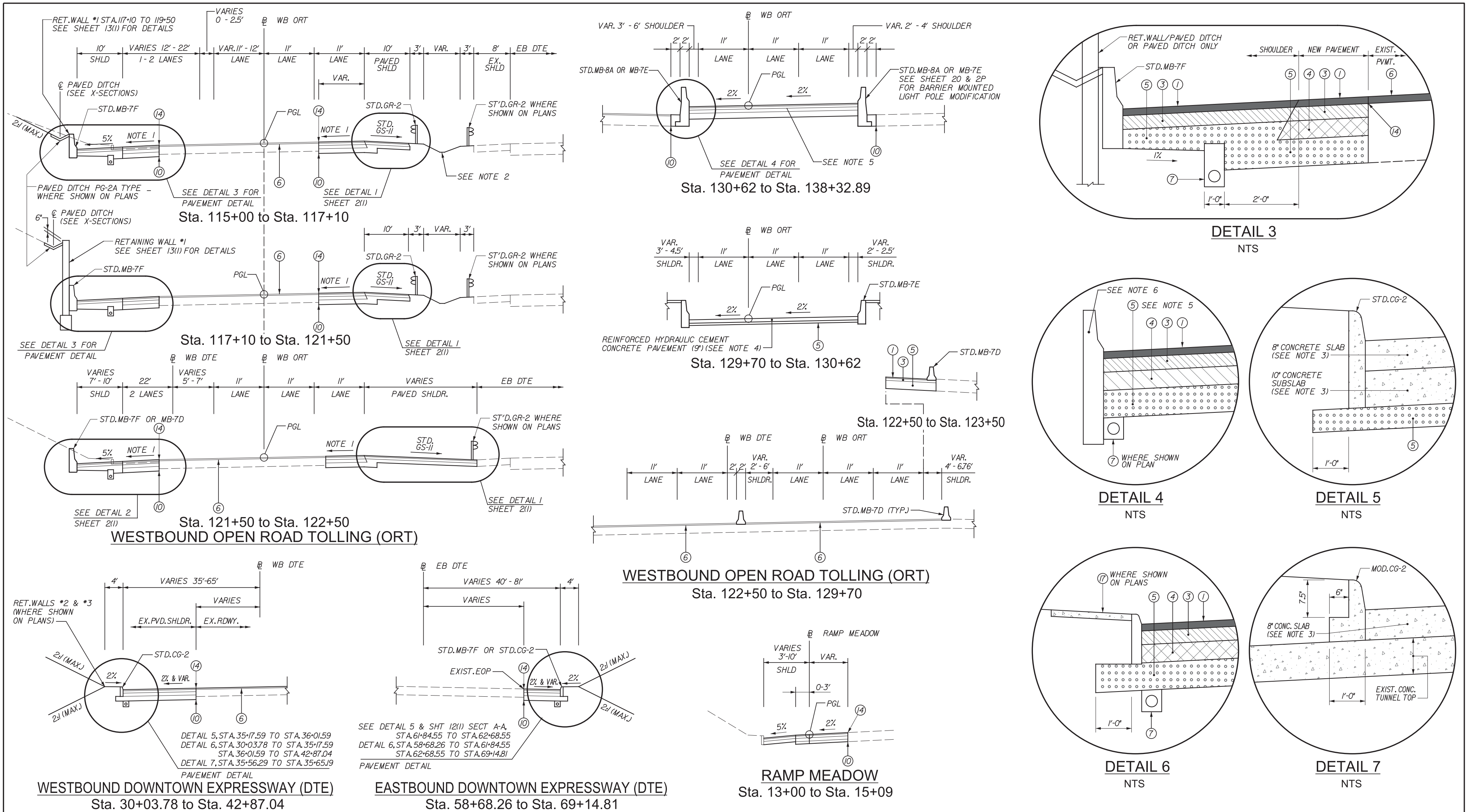
D487010 2(1).dgn
Tuesday, March 15, 2011

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

RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

TYPICAL SECTIONS

Scale:	Date:	Contract No.:	Sheet:
1" = 10'-0"	FEB. 25, 2011	DTEORT-2011	2(1)



LEGEND

1. SURFACE COURSE, 1 1/2 IN. ASPHALT CONCRETE TYPE SMA-9.5 @ 165 LBS./S.Y.
2. INTERMEDIATE COURSE, 2.0 IN. ASPHALT CONCRETE TYPE IM-19.0A
3. INTERMEDIATE COURSE, 3.0 IN. ASPHALT CONCRETE TYPE SMA-19.0
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7. STD. UD-4 UNDERDRAIN REQ'D.
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12. 3 IN. ASPHALT CONCRETE TYPE IM-19.0A
13. LEVELING COURSE, VAR. DEPTH ASPHALT CONCRETE TYPE SMA-19.0, 2" MIN.
14. REMOVE AND REPLACE EXISTING PAVEMENT ALONG THE EDGE AS SHOWN IN VDOT STD. WP-2. SEE DETAIL 9 SHT 2(3) FOR REPLACED PAVEMENT
15. VAR. DEPTH, ASPHALT CONCRETE TYPE BM-25.0, 3" MIN.
16. NOT USED
17. HYDRAULIC CEMENT CONCRETE SIDEWALK, 4"
18. NOT USED
19. SURFACE COURSE, VAR. DEPTH ASPHALT CONCRETE TYPE SMA-9.5, 1.5" MIN.

NOTES

1. SEE PROFILES FOR CROSS SLOPES.
2. SEE CROSS SECTIONS FOR DITCH LOCATIONS AND INVERTS.
3. SEE TOLL PLAZA PLANS FOR PAVEMENT DETAILS. 10" SLAB NOT REQ'D. OVER EXISTING TUNNEL.
4. SEE SHEET 2M FOR DETAILS.
5. ASPHALT LAYERS SHALL BE PLACED UPON EXISTING CONCRETE SLAB FROM STATION 130+62 TO 131+47
6. ST'D. MB-7 & MB-8A BARRIER SHALL BE DOWELLED TO EXISTING 10" CONC. SLAB STA. 130+62 TO 131+47 IN ACCORDANCE WITH ST'D. MB-7D. COST FOR DOWELLING SHALL BE INCIDENTAL TO THE COST OF CONC. BARRIER.

10' 0 10' 20'
SCALE: 1"=10'

REVISIONS
9-16-11 REVISED WB-DTE & EB-DTE SECTIONS AND NOTE 3. ADDED DETAIL 7.

D4870102(2).dgn
Tuesday, September 20, 2011

HNTB
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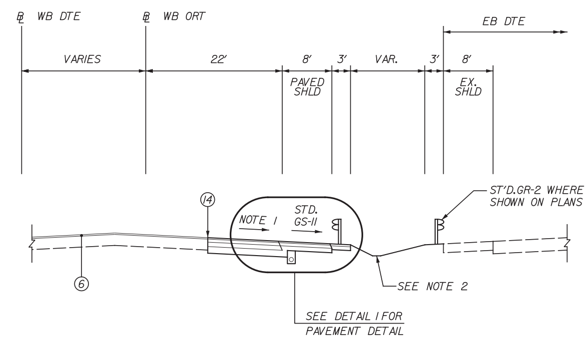
RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

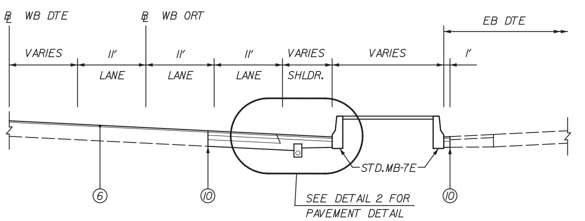
TYPICAL SECTIONS

Scale:	Date:	Contract No.:	Sheet:
1"=10'-0"	FEB. 25, 2011	DTEORT-2011	2(2)

Level 1 Check Print Stamp
Name(Print) Signature Date
Originator
Checker
Backchecker
Updater
Validator

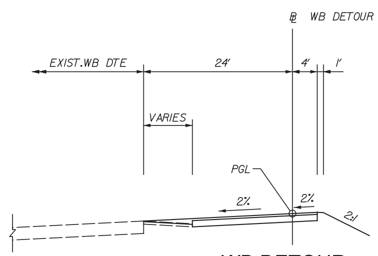


STA. 139+58.61 TO STA. 145+47.05



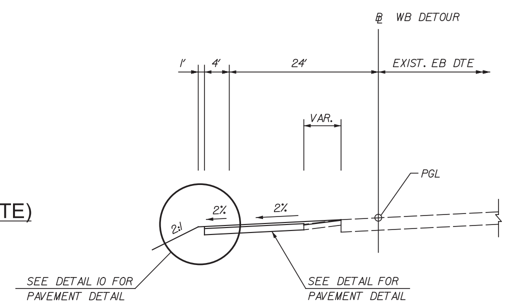
STA. 138+32.89 TO STA. 139+58.61

WESTBOUND DOWNTOWN EXPRESSWAY (DTE)



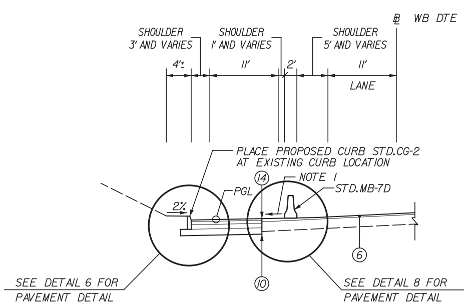
WB DETOUR

STA. 22+00.00 to STA. 26+00.00



WB DETOUR

STA. 17+00.00 to STA. 22+00.00

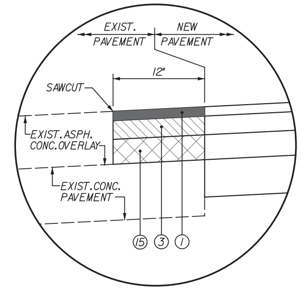


RAMP LINDEN

STA. 9+80.00 TO STA. 19+44.11

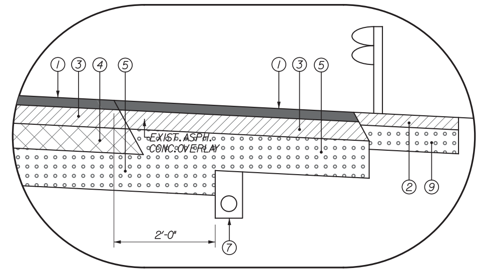
LEGEND

1. SURFACE COURSE, 1 1/2 IN. ASPHALT CONCRETE TYPE SMA-9.5 @ 165 LBS./SY.
2. INTERMEDIATE COURSE, 2.0 IN. ASPHALT CONCRETE TYPE IM-19.0A
3. INTERMEDIATE COURSE, 3.0 IN. ASPHALT CONCRETE TYPE SMA-19.0
4. BASE COURSE, 4.0 IN. ASPHALT CONCRETE TYPE BM-25.0A
5. SUBBASE, 6.0 IN. UNTREATED AGGREGATE MATERIAL TYPE I, SIZE NO.21-B
6. MILL EXISTING PAVEMENT TO A DEPTH OF 1.5" AND OVERLAY WITH ASPHALT CONCRETE TYPE SMA-9.5 @ 165 LBS./SY.
7. STD.UD-4 UNDERDRAIN REQ'D.
8. SUBBASE, VAR. THICKNESS, UNTREATED AGGREGATE MATERIAL TYPE I, SIZE NO.21-B
9. SUBBASE, 4.0 IN. UNTREATED AGGREGATE MATERIAL TYPE I, SIZE NO.21-B
10. SAWCUT
11. 1 1/2 IN. ASPHALT CONCRETE TYPE SM-9.5A @ 165 LBS./SY.
12. 3 IN. ASPHALT CONCRETE TYPE IM-19.0A
13. LEVELING COURSE, VAR. DEPTH ASPHALT CONCRETE TYPE SMA-19.0, 2" MIN.
14. REMOVE AND REPLACE EXISTING PAVEMENT ALONG THE EDGE AS SHOWN IN VDOT STD.WP-2. SEE DETAIL 9 SHT 2(3) FOR REPLACED PAVEMENT
15. VAR. DEPTH, ASPHALT CONCRETE TYPE BM-25.0, 3" MIN.
16. NOT USED
17. HYDRAULIC CEMENT CONCRETE SIDEWALK, 4"
18. NOT USED
19. SURFACE COURSE, VAR. DEPTH ASPHALT CONCRETE TYPE SMA-9.5, 1.5" MIN.



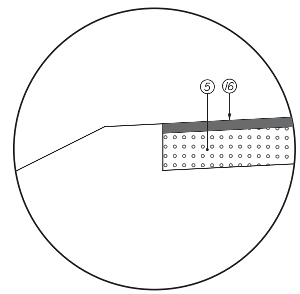
DETAIL 9

NTS



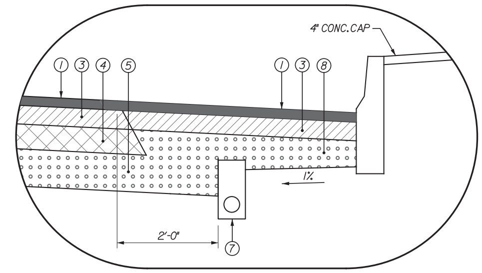
DETAIL 1

NTS



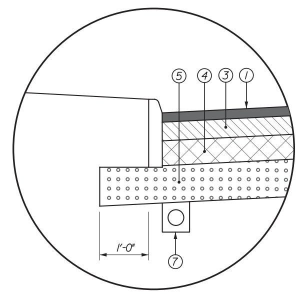
DETAIL 10

NTS



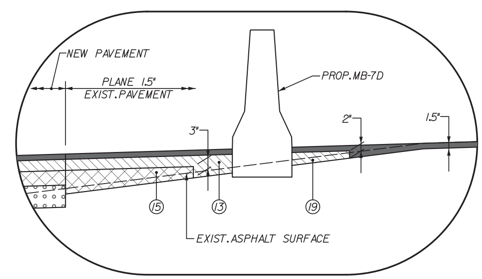
DETAIL 2

NTS



DETAIL 6

NTS



DETAIL 8

NTS

NOTES

1. SEE PROFILES FOR CROSS SLOPES.
2. SEE CROSS SECTIONS FOR DITCH LOCATIONS AND INVERTS.
3. SEE SHEET 2L(3) FOR DITCH TYPICAL SECTION.

SCALE: 1"=10'

RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

TYPICAL SECTIONS

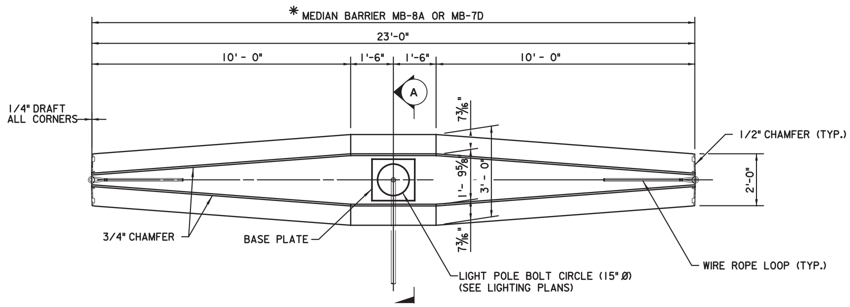
HNTB
2900 S. QUINCY STREET, SUITE 200
ARLINGTON, VIRGINIA
(703) 824-5100

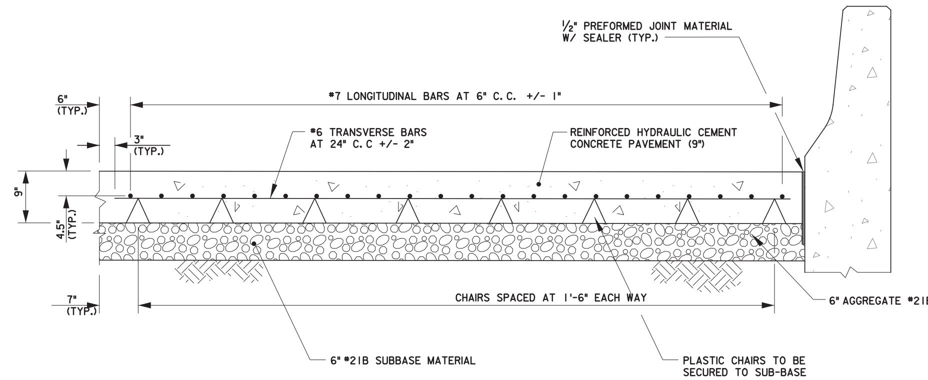
Scale:	Date:	Contract No.:	Sheet:
1" = 10'-0"	FEB. 25, 2011	DTEORT-2011	2(3)

1 10-8-12 REVISED RAMP LINDEN TYP. LANE WIDTHS
REVISIONS

D4870102(3).dgn
Wednesday, October 03, 2012

✳ PAYMENT FOR CONCRETE BARRIER TYPES MB-7D, 7E, 7F & 8A IS PAID ON A LINEAR FOOT BASIS. VARIATIONS IN WIDTH REQUIRED FOR LIGHT POLE INSTALLATIONS UP TO 3'-0" IN WIDTH IS INCIDENTAL TO THE CONTRACT UNIT PRICE FOR CONCRETE BARRIER. COST OF LONGITUDINAL CONDUIT, JUNCTION BOXES, METAL CONDUIT SHALL BE INCIDENTAL TO THE UNIT PRICE BID FOR CONCRETE BARRIER.



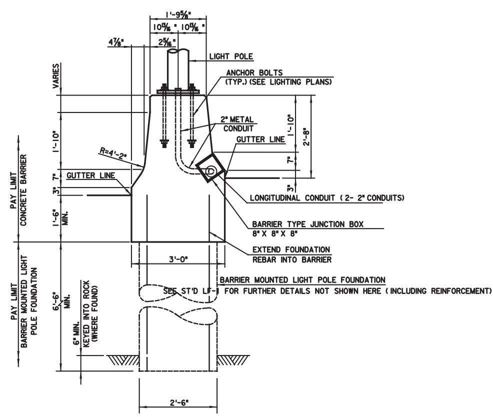


WB ORT ZONE CONCRETE PAVEMENT SECTION

NTS

NOTES:

1. CONTRACTOR SHALL SUBMIT POUR SEQUENCE PRIOR TO POUR FOR APPROVAL BY THE ENGINEER.
2. SEE VDOT STANDARD PR-3 AND PR-6 FOR DETAILS NOT SHOWN ON THIS SHEET.
3. SLAB CONCRETE SHALL BE TYPE A4, HIGH EARLY CONCRETE.
4. REINFORCING BARS SHALL BE GLASSFIBER REINFORCED POLYMER MATERIAL. SEE SPEC. SECTION 316 FOR DETAILS.
5. REINFORCING BARS SHALL BE SECURED USING PLASTIC TIES, NYLON TIES, OR PLASTIC SNAP TIES. NO METAL TIES OR TIES CONTAINING METAL SHALL BE USED.
6. ALL WORK SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND AS DIRECTED BY THE ENGINEER.
7. PLASTIC OR NON-METALLIC (NON CORROSIVE) CHAIRS SHALL BE USED TO ELEVATE REBAR AT LOCATIONS SHOWN.
8. REBAR SHALL BE SECURED TO CHAIRS.
9. CHAIRS SHALL BE SECURED TO 6" SUB-BASE BY METHOD(S) APPROVED BY ENGINEER.
10. CONTRACTOR SHALL COORDINATE WITH TOLL PROVIDER PRIOR TO POURING CONCRETE AND PRIOR TO SAW-CUTTING JOINTS TO FACILITATE TOLL PROVIDER INSTALLATION OF PAVEMENT LOOPS, CONDUITS OR OTHER PAVEMENT ITEMS REQUIRED FOR OPEN ROAD TOLLING OPERATIONS.



SECTION (A)

BARRIER MOUNTED LIGHT POLE DETAILS

STA. 123+88 RT. WB-ORT
STA. 125+40 RT. WB-ORT
STA. 126+87 RT. WB-ORT
STA. 128+38 RT. WB-ORT
STA. 129+86 RT. WB-ORT
STA. 132+47 RT. WB-ORT
STA. 134+01 RT. WB-ORT
STA. 135+53 RT. WB-ORT
STA. 137+00 RT. WB-ORT
STA. 138+57 RT. WB-ORT

D487010 2M.dgn
Tuesday, March 15, 2011

REVISIONS

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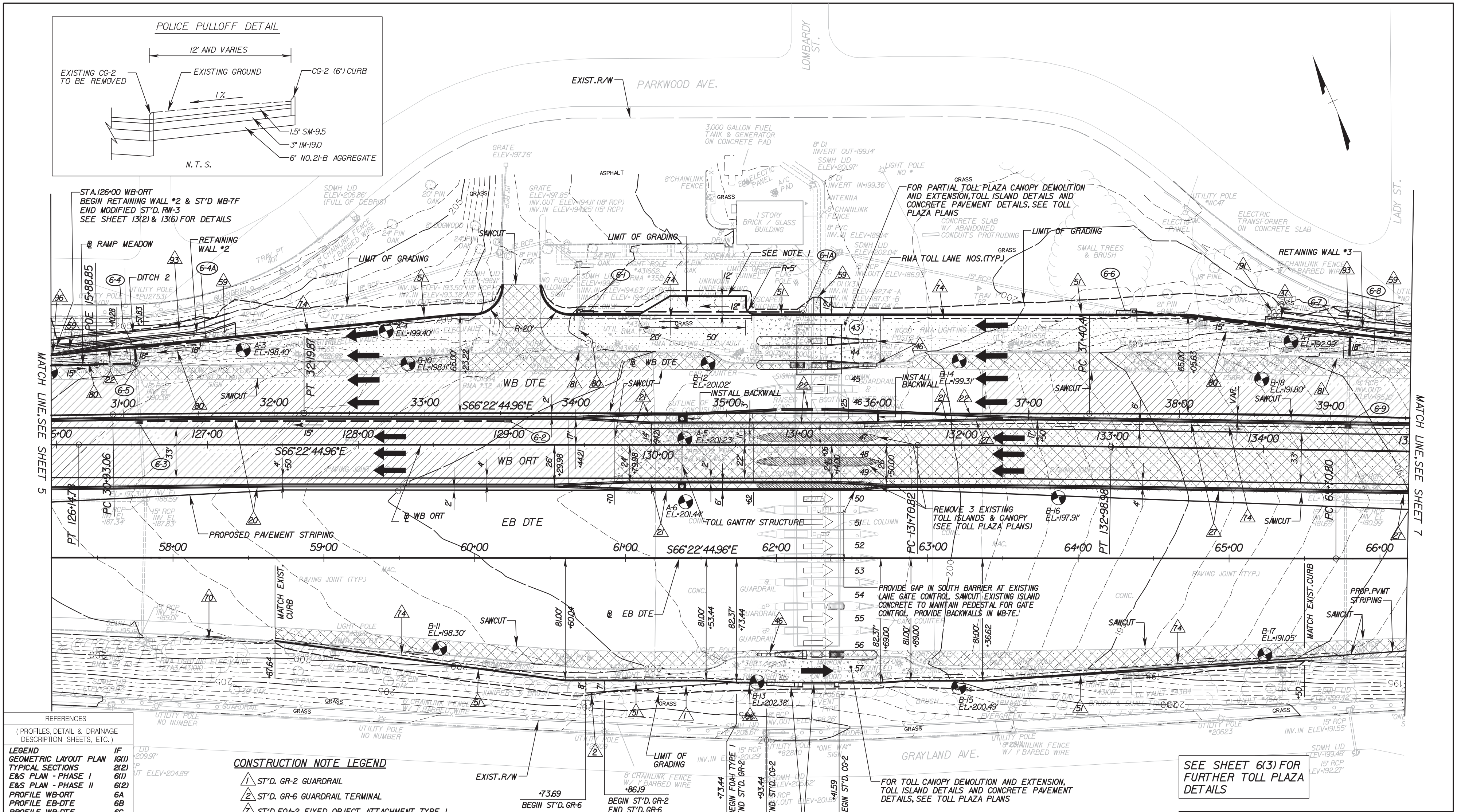
(703) 824-5100

RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

ROADWAY DETAILS
BARRIER MOUNTED LIGHT POLE
& ORT ZONE CONCRETE PAVING

Scale:	Date:	Contract No.:	Sheet:
NTS	FEB. 25, 2011	DTEORT-2011	2M



REFERENCES	
(PROFILES, DETAIL & DRAINAGE DESCRIPTION SHEETS, ETC.)	
LEGEND	1F
GEOMETRIC LAYOUT PLAN	1G(1)
TYPICAL SECTIONS	2(2)
E&S PLAN - PHASE I	6(1)
E&S PLAN - PHASE II	6(2)
PROFILE WB-ORT	6A
PROFILE EB-DTE	6B
PROFILE WB-DTE	6C
TOLL PLAZA PLANS	12(1)-12(4)
DRAINAGE TABULATIONS	1K
RET. WALLS #2 & #3	13(2)
MEDIAN BARRIER PROFILES	20
MEDIAN BARRIER DETAILS	2M,2P
IMPACT ATTENUATOR	20(1)

7	10-8-12	ADDED POLICE PULLOFF AREA
6	5-18-12	REVISED BARRIER LT OF WB-ORT BASELINE
5	12-7-11	REVISED BARRIER TYPES LT. OF WB-ORT BASELINE
4	11-30-11	REVISED EDGE OF PAVEMENT ALONG EB-DTE
3	11-8-11	ADDED GR-6 TERMINAL ON EB-DTE STA.60+65
2	9-30-11	REVISED RETAINING WALL 2, ADDED MB-7F
		REVISIONS

D4870106.dgn
Wednesday, October 03, 2012

CONSTRUCTION NOTE LEGEND

- 1 ST'D. GR-2 GUARDRAIL
- 2 ST'D. GR-6 GUARDRAIL TERMINAL
- 7 ST'D. FOA-2 FIXED OBJECT ATTACHMENT TYPE I
- 20 ST'D. MB-7D - 32" CONCRETE MEDIAN BARRIER
- 21 ST'D. MB-7E - 32" CONCRETE MEDIAN BARRIER
- 22 ST'D. MB-7F - 32" CONCRETE MEDIAN BARRIER
- 27 ST'D. MB-8A - 32" CONCRETE BIFURCATED MEDIAN BARRIER (0' TO 4' BIFURCATED)
- 37 CAST-IN PLACE RETAINING WALL
- 45 IMPACT ATTENUATOR (TL-3 >45 MPH DES.SP)
- 46 IMPACT ATTENUATOR (TL-2 <45 MPH DES.SP)
- 51 ST'D. CG-2 CURB
- 59 HYDRAULIC CEMENT CONCRETE SIDEWALK, 4"
- 70 NON-PERFORATED OUTLET PIPE
- 74 ST'D. UD-4 UNDERDRAIN
- 80 REMOVE EXISTING PIPE
- 81 REMOVE EXISTING DRAINAGE STRUCTURE
- 91 CLASS I DRY RIPRAP
- 93 PAVED DITCH PG-2A, TYPE E
- 96 ST'D. FOA-1 FIXED OBJECT ATTACHMENT TYPE I

PAVEMENT LEGEND

- PROPOSED ASPHALT SHOULDER
- PROPOSED ASPHALT PAVEMENT
- PROPOSED CONCRETE PAVEMENT
- PROPOSED ASPHALT PLANING & OVERLAY
- DEMOLITION OF PAVEMENT

NOTE:

1. CONTRACTOR SHALL REFER TO POLICE PULLOFF DETAIL.

30' 0 30' 60'
SCALE: 1" = 30'

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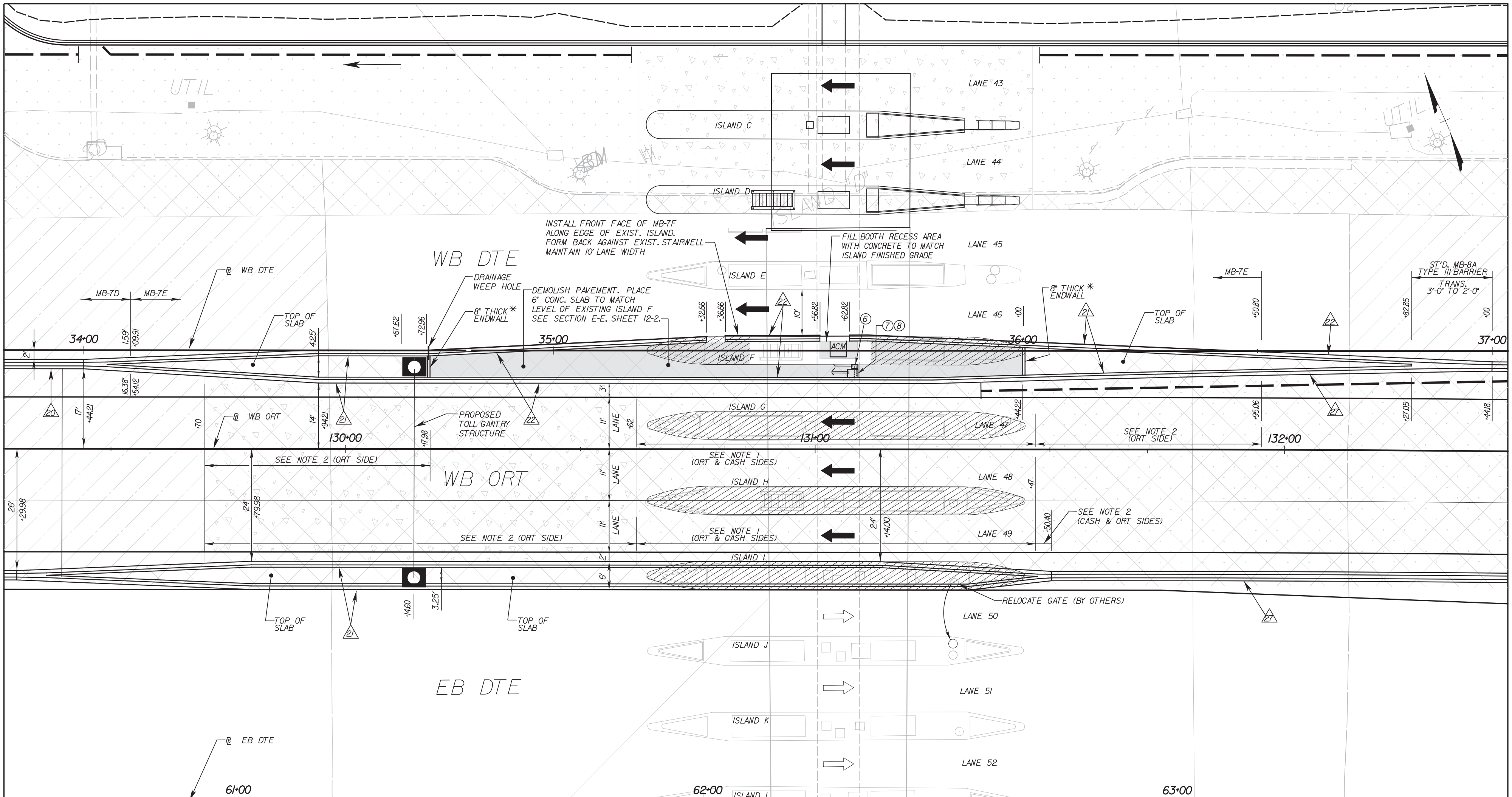
rma RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

ROADWAY PLAN
STA. 126+00.00 TO STA. 135+00.00 WB ORT

Scale:	Date:	Contract No.:	Sheet:
1" = 30'-0"	FEB. 25, 2011	DTEORT-2011	6



NOTES

1) PROVIDE DOWELS FROM BARRIER TO EXISTING CONCRETE SLAB MAXIMUM 3" INTO SLAB AT 2' SPACING. ST'D BARRIER DETAILS MODIFIED FOR ADJUSTED CONCRETE QUANTITY & DOWELING.

2) PROVIDE ADDITIONAL CONCRETE DEPTH TO ST'D DETAIL FOR 18" TOTAL FOOTING DEPTH.

THE ABOVE BARRIER FOOTING MODIFICATION SHALL BE PAID AS "MEDIAN BARRIER FOOTING MODIFICATIONS" BY L.F.

TOLL EQUIPMENT LEGEND (SEE SHEET 11(13) FOR DETAILS)

- 6 SURFACE MOUTED JUNCTION BOX, 12" X 12" X 12" MIN. DIMENSIONS
- 7 SURFACE MOUTED JUNCTION BOX, 24" LONG X 18" X 18" MIN. DIMENSIONS
- 8 CONCRETE PAD FOR EACH JUNCTION BOX

* ENDWALLS SHALL HAVE 2 ROWS OF #4 HORIZONTAL BARS @ 8" C/C (VERTICALLY) DOWELED INTO THE MB-7F BARRIERS.

PAVEMENT LEGEND

- PROPOSED CONCRETE SLAB
- PROPOSED ASPHALT PAVEMENT
- PROPOSED CONCRETE PAVEMENT
- PROPOSED ASPHALT PLANING & OVERLAY
- DEMOLITION OF PAVEMENT
- PROPOSED DEMOLITION OF CONCRETE ISLAND

CONSTRUCTION NOTE LEGEND

- 20 ST'D. MB-7D - 32" CONCRETE MEDIAN BARRIER
- 21 ST'D. MB-7E - 32" CONCRETE MEDIAN BARRIER
- 22 ST'D. MB-7F - 32" CONCRETE MEDIAN BARRIER
- 27 ST'D. MB-8A - 32" CONCRETE MEDIAN BARRIER

B	5-18-12	REVISED BARRIER STA 131+95 TO 132+27 AND ADDED BARRIER FOOTING NOTES
A	12-7-11	ADDED SHEET
REVISIONS		

D48701O6(3).dgn
Friday, June 08, 2012

10' 0 10' 20'
SCALE: 1" = 10'

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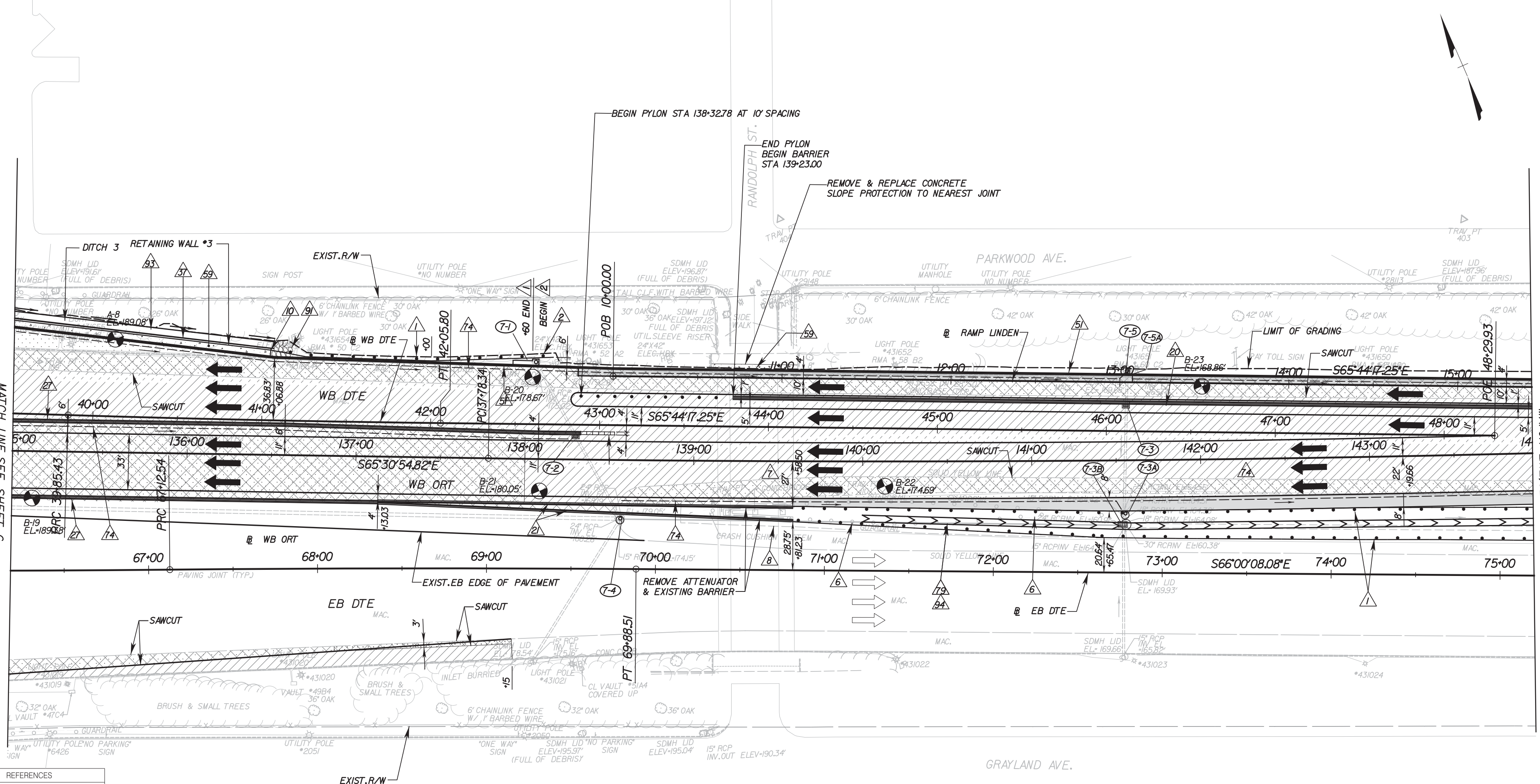
ROADWAY PLAN AT TRAFFIC GANTRY

Scale:	Date:	Contract No.:	Sheet:
1" = 10'-0"	FEB. 25, 2011	DTEORT-2011	6(3)



REFERENCES	
(PROFILES, DETAIL & DRAINAGE DESCRIPTION SHEETS, ETC.)	
LEGEND	1F
GEOMETRIC LAYOUT PLAN	1G(1)
TYPICAL SECTIONS	2(3)
E&S PLAN - PHASE I	7(1)
E&S PLAN - PHASE II	7(2)
PROFILE WB-ORT	7A
PROFILE EB-DTE	7B
PROFILE WB-DTE	7C
PROFILE RAMP LINDEN	7D
DRAINAGE TABULATIONS	1K
RETAINING WALL *3	13(2)
MEDIAN BARRIER PROFILES	2O
MEDIAN BARRIER DETAILS	2M,2P
IMPACT ATTENUATOR	2Q(1)

REVISIONS	
11	10-8-12 REVISED BARRIER ON RAMP, ADDED PYLONS
9	REVISED BARRIER RIGHT OF WB-ORT BASELINE

D4870107 .dgn
Tuesday, October 02, 2012

CONSTRUCTION NOTE LEGEND

1. ST'D. GR-2 GUARDRAIL
2. ST'D. GR-6 GUARDRAIL
6. REMOVAL OF EXISTING GUARDRAIL
7. ST'D. FOA-2 FIXED OBJECT ATTACHMENT TYPE I
8. ST'D. FOA-2 FIXED OBJECT ATTACHMENT TYPE II
10. ST'D. FOA-1 FIXED OBJECT ATTACHMENT TYPE I
20. ST'D. MB-7D - 32" CONCRETE MEDIAN BARRIER
21. ST'D. MB-7E - 32" CONCRETE MEDIAN BARRIER
27. ST'D. MB-8A - 32" CONCRETE BIFURCATED MEDIAN BARRIER (0' TO 4' BIFURCATED)
37. CONCRETE GRAVITY WALL (RW-3)
45. IMPACT ATTENUATOR (TL-3>45mph DESIGN SPEED)
51. ST'D. CG-2 CURB
59. HYDRAULIC CEMENT CONCRETE SIDEWALK, 4"
74. ST'D. UD-4 UNDERDRAIN
79. ST'D. EC-2 PROTECTIVE COVERING
91. CLASS I DRY RIPRAP
93. PAVED DITCH PG-2A, TYPE E
94. GRADED FLAT BOTTOM DITCH

PAVEMENT LEGEND

- PROPOSED ASPHALT SHOULDER
- PROPOSED ASPHALT PAVEMENT
- PROPOSED CONCRETE PAVEMENT
- PROPOSED ASPHALT PLANING & OVERLAY
- DEMOLITION OF PAVEMENT

30' 0 30' 60'
SCALE: 1" = 30'

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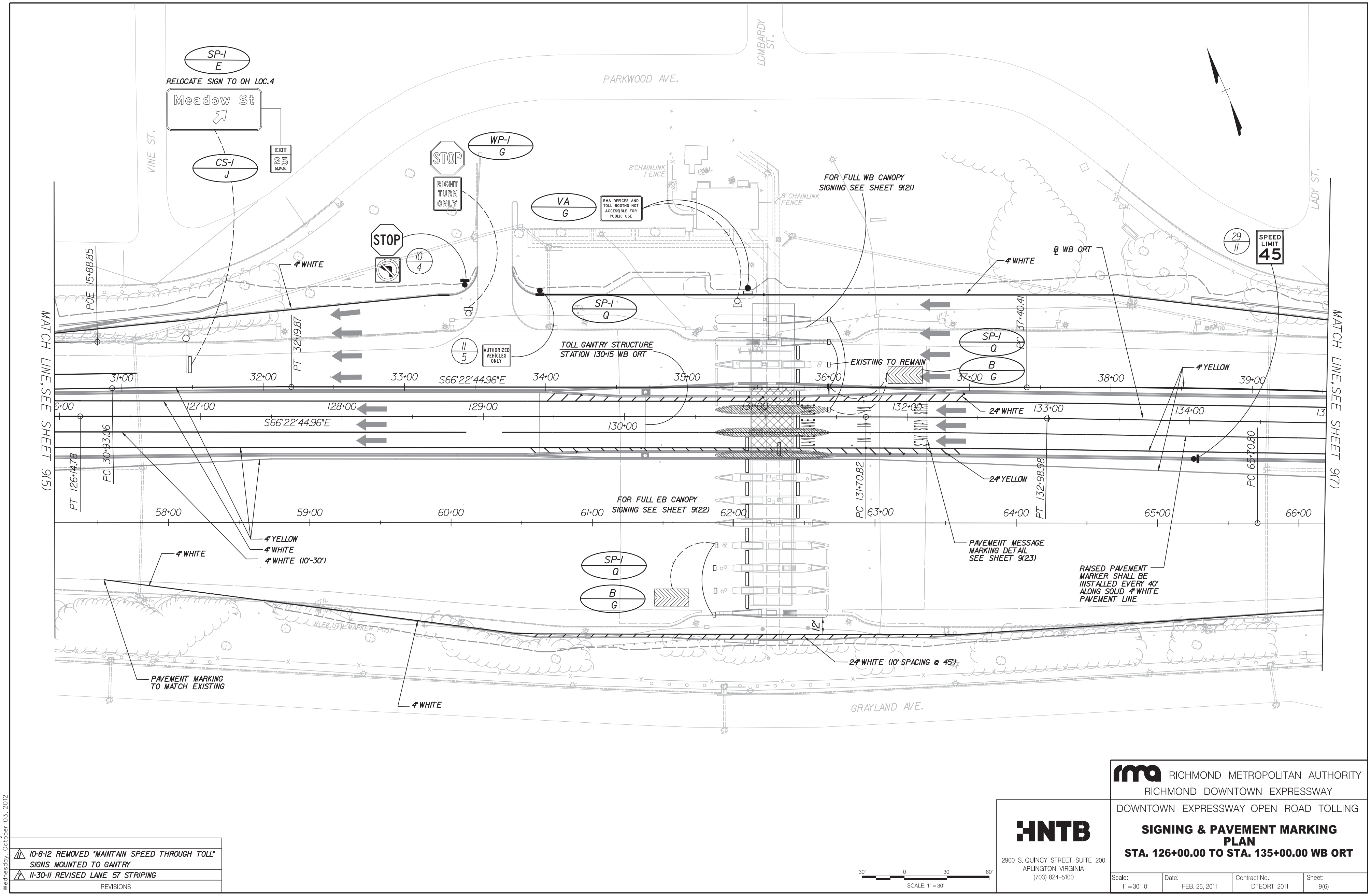
ROADWAY PLAN
STA. 135+00.00 TO STA. 144+00.00 WB ORT

Scale:	Date:	Contract No.:	Sheet:
1" = 30'-0"	FEB. 25, 2011	DTEORT-2011	7


SP-I E
RELOCATE SIGN TO OH LOC.4
Meadow St
EXIT 25
CS-I J
VINE ST.
PARKWOOD AVE.
LOMBARDY ST.
LADY ST.
STOP
RIGHT TURN ONLY
WP-I G
VA G
RMA OFFICES AND TOLL BOOTHS NOT ACCESSIBLE FOR PUBLIC USE
10 4
11 5
AUTHORIZED VEHICLES ONLY
FOR FULL WB CANOPY SIGNING SEE SHEET 9(21)
℄ WB ORT
4" WHITE
29 11
SPEED LIMIT 45
SP-I Q
B G
TOLL GANTRY STRUCTURE STATION 130+15 WB ORT
EXISTING TO REMAIN
4" YELLOW
24" WHITE
24" YELLOW
S66°22'44.96"E
POE 15+88.85
PT 32+19.87
PC 37+40.41
PT 126+14.78
PC 30+93.06
PC 131+70.82
PT 132+98.98
PC 65+70.80
MATCH LINE, SEE SHEET 9(5)
MATCH LINE, SEE SHEET 9(7)
FOR FULL EB CANOPY SIGNING SEE SHEET 9(22)
PAVEMENT MESSAGE MARKING DETAIL SEE SHEET 9(23)
RAISED PAVEMENT MARKER SHALL BE INSTALLED EVERY 40' ALONG SOLID 4" WHITE PAVEMENT LINE
4" YELLOW
4" WHITE
4" WHITE (10'-30')
PAVEMENT MARKING TO MATCH EXISTING
24" WHITE (10' SPACING @ 45')
GRAYLAND AVE.
8' CHAINLINK FENCE
T48701(09(06).dgn Wednesday, October 03, 2012
10-8-12 REMOVED "MAINTAIN SPEED THROUGH TOLL" SIGNS MOUNTED TO GANTRY
11-30-11 REVISED LANE 57 STRIPING
REVISIONS
SCALE: 1" = 30'
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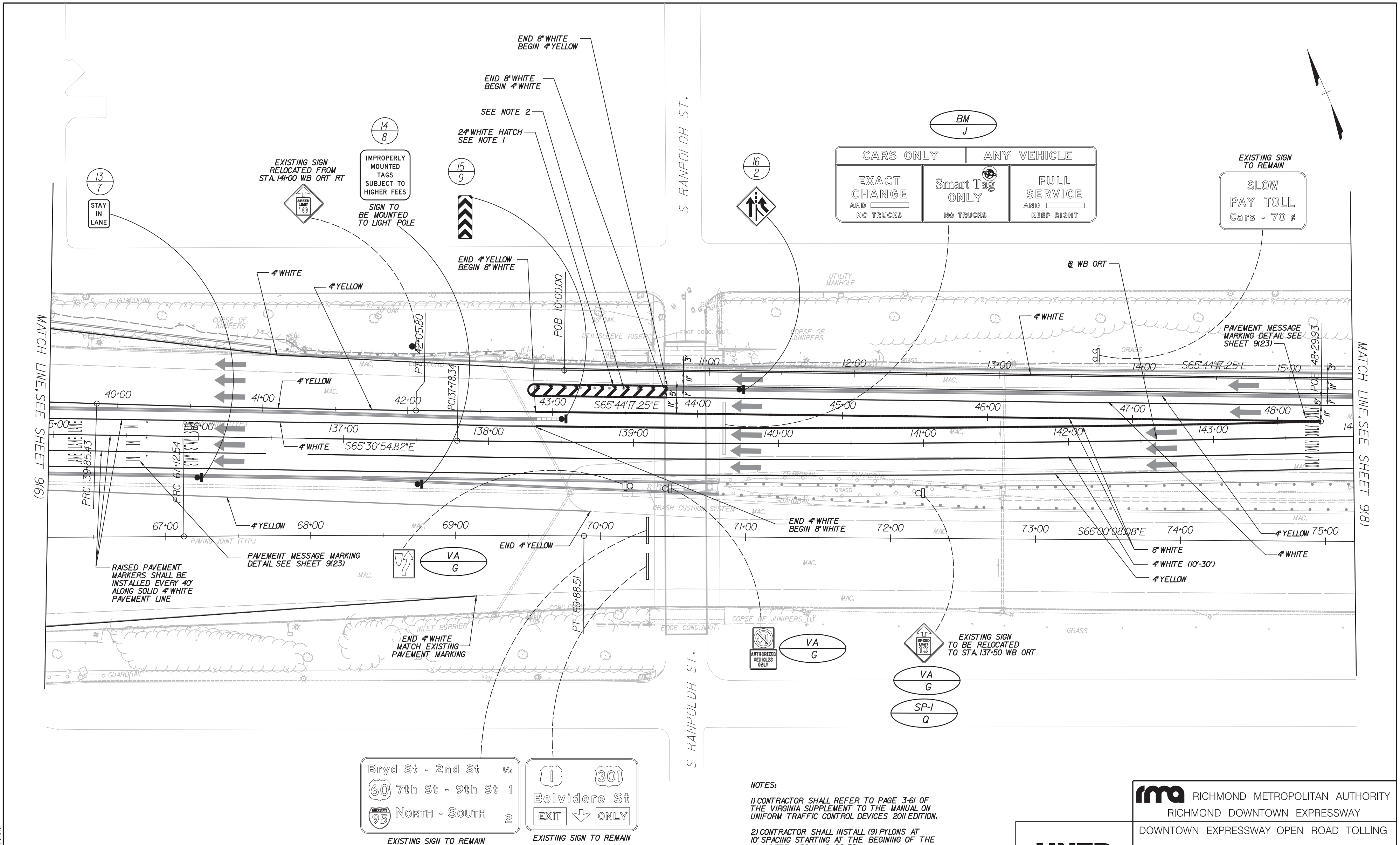
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING
SIGNING & PAVEMENT MARKING PLAN
STA. 126+00.00 TO STA. 135+00.00 WB ORT
Scale: 1" = 30'-0"
Date: FEB. 25, 2011
Contract No.: DTEORT-2011
Sheet: 9(6)



NOTES:

1) CONTRACTOR SHALL REFER TO PAGE 3-61 OF THE VIRGINIA SUPPLEMENT TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES 2011 EDITION.

2) CONTRACTOR SHALL INSTALL (9) PYLONS AT 10' SPACING STARTING AT THE BEGINING OF THE CONCRETE MEDIAN BARRIER

1	10-8-12	REVISED BARRIER RAMP LINDON ADDED HATCH
		REVISIONS

SCALE: 1" = 30'

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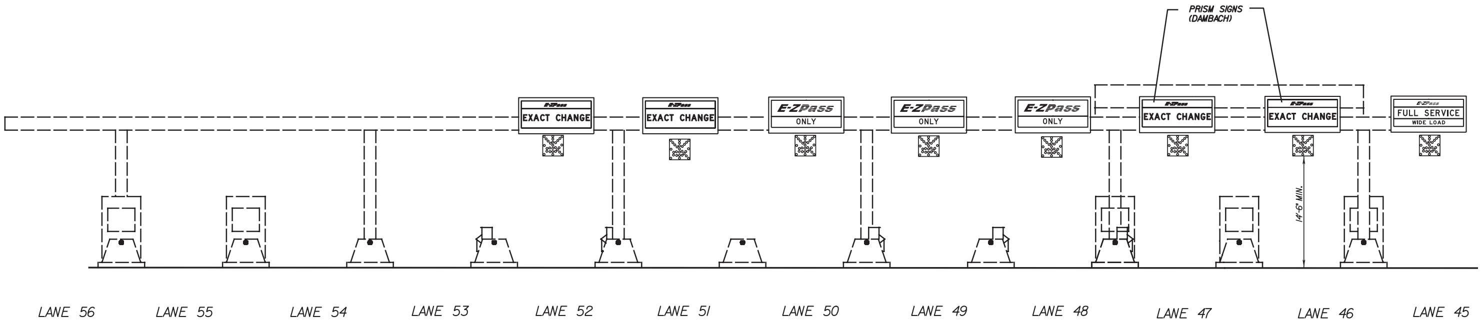
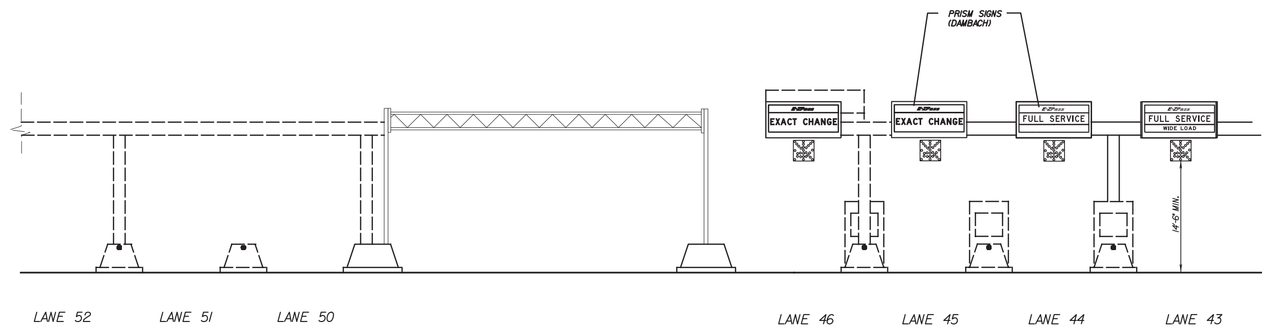
SIGNING & PAVEMENT MARKING PLAN
STA. 135+00.00 TO STA. 144+00.00 WB ORT

Scale:	Date:	Contract No.:	Sheet:
1" = 30'-0"	FEB. 25, 2011	DTEORT-2011	9(7)

EXISTING CANOPY SIGNS AND LANE CONTROL SIGNALS SHALL BE RELOCATED, REMOVED AND SALVAGED IN ACCORDANCE WITH MAINTENANCE OF TRAFFIC PLAN PHASING SHEETS IH(1) THRU IH(19). PAYMENT FOR INTERMEDIATE RELOCATIONS SHALL BE INCLUDED IN THE TOLL PLAZA ELECTRICAL WORK PAY ITEM



WB EXISTING TOLL PLAZA



WB PROPOSED TOLL PLAZA

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Tuesday, March 15, 2011

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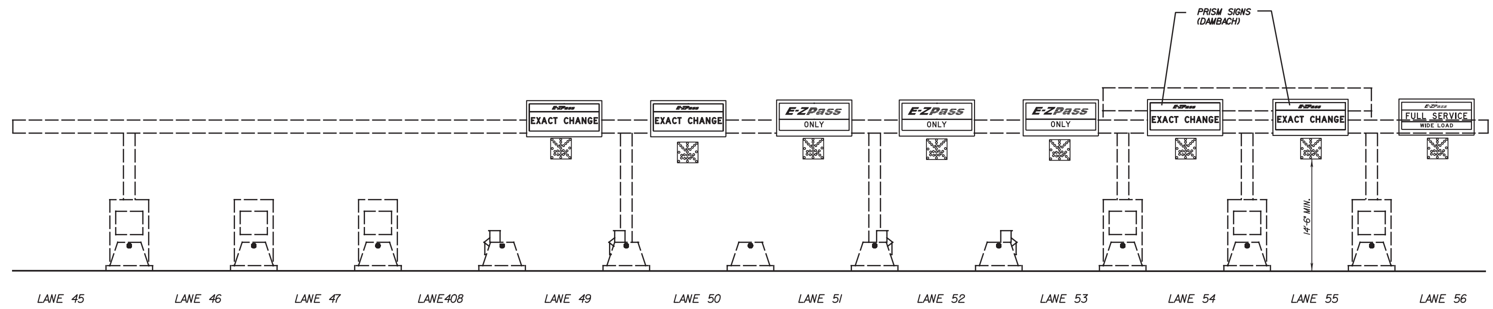
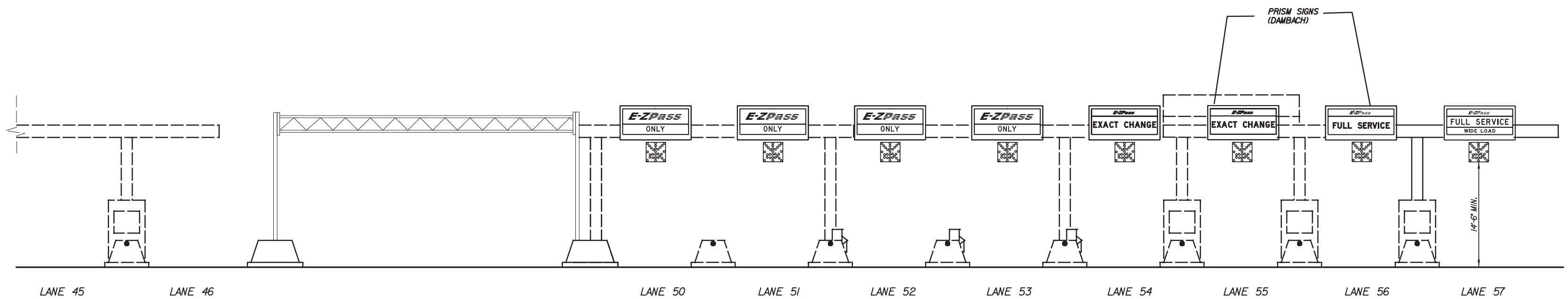
SIGNING & PAVEMENT MARKING
PLAZA CANOPY SIGN ELEVATIONS
WESTBOUND

Scale:	Date:	Contract No.:	Sheet:
NONE	FEB. 25, 2011	DTEORT-2011	9(21)

EXISTING CANOPY SIGNS AND LANE CONTROL SIGNALS SHALL BE RELOCATED, REMOVED AND SALVAGED IN ACCORDANCE WITH MAINTENANCE OF TRAFFIC PLAN PHASING (SHEETS IH(1) THRU IH(19). PAYMENT FOR INTERMEDIATE RELOCATIONS SHALL BE INCLUDED IN THE TOLL PLAZA ELECTRICAL WORK PAY ITEM.



EB EXISTING TOLL PLAZA



EB PROPOSED TOLL PLAZA

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Tuesday, March 15, 2011

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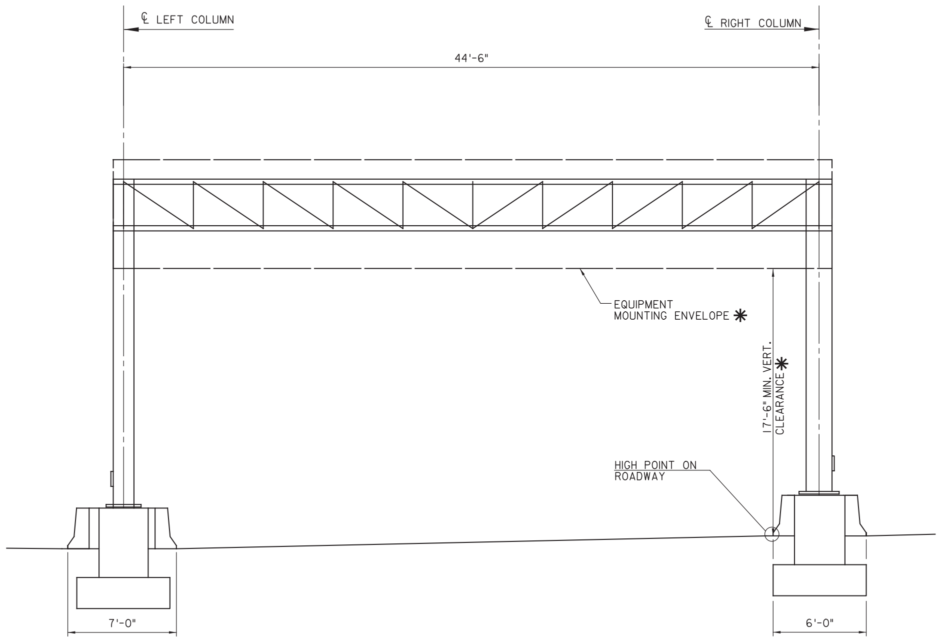
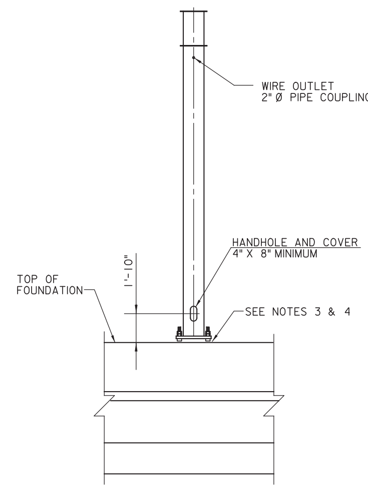
SIGNING & PAVEMENT MARKING
PLAZA CANOPY SIGNING ELEVATIONS
EASTBOUND

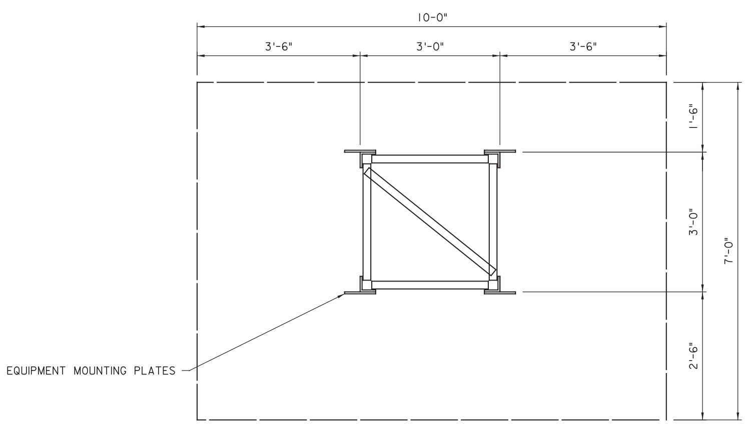
Scale:	Date:	Contract No.:	Sheet:
NONE	FEB. 25, 2011	DTEORT-2011	9(22)



TYPICAL GANTRY STRUCTURE ELEVATION
(LOOKING EAST)
SCALE: 1/4" = 1'-0"



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



TYPICAL SECTION
EQUIPMENT MOUNTING ENVELOPE ✻
SCALE: 3/4" = 1'-0"

NOTE:
THE EQUIPMENT MOUNTING PLATES SHALL BE INCLUDED WITH THE GANTRY. THE CONTRACTOR SHALL COORDINATE SIZE, NUMBER AND LOCATION OF PLATES WITH THE TOLL INTEGRATOR PRIOR TO GANTRY FABRICATION. THE TOLL INTEGRATOR IS RESPONSIBLE FOR INSTALLATION OF TOLL EQUIPMENT TO THE PLATES INCLUDING ANY OTHER SUPPORT BRACKETS OR MEMBERS REQUIRED.

✻ NOTE: THE EQUIPMENT MOUNTING ENVELOPE AND VERTICAL CLEARANCE FOR THE GANTRY SHALL BE CONFIRMED BY THE ENGINEER AND OWNER'S SELECTED TOLL INTEGRATOR.

OVERHEAD TOLL GANTRY NOTES

GENERAL

1. ALL DIMENSIONS SHOWN ARE APPROXIMATE. THE CONTRACTOR SHALL DETERMINE ALL SPAN LENGTHS, END FRAME HEIGHTS, COLUMN HEIGHTS AND ROADWAY DIMENSIONS REQUIRED TO INSTALL THE STRUCTURE.
2. THE CONTRACTOR SHALL COORDINATE THE FOUNDATION DESIGN WITH ALL OTHER EXISTING AND PROPOSED WORK IN THE VICINITY OF THE GANTRY.
3. THE MAXIMUM SPACE BETWEEN THE BOTTOM OF THE BASE PLATE AND THE TOP OF THE FOUNDATION SHALL BE NO MORE THAN THE DIAMETER OF THE ANCHOR BOLT PLUS ONE INCH.
4. NO MORTAR, GROUT, OR CONCRETE SHALL BE PLACED BETWEEN BOTTOM OF BASE PLATE AND TOP OF PEDESTAL.
5. FOUNDATION RECOMMENDATIONS ARE PROVIDED IN SECTION 5.3.4 OF THE FINAL GEOTECHNICAL REPORT BY FROEHLING & ROBERTSON DATED NOVEMBER 18, 2010.

DESIGN

ALL DESIGN AND DETAILS OF CONSTRUCTION SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF THE FOLLOWING:

A. 2002 (17TH EDITION) AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, WITH INTERIMS THROUGH 2004

B. 2009 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS

LIVE LOAD: THE WIND LOAD SHALL BE CALCULATED USING AN IMPORTANCE FACTOR (Ip) = 1.0

DEAD LOAD:
A. 10 PSF APPLIED OVER THE ENTIRE AREA OF STRUCTURE IN ADDITION TO THE SELF WEIGHT OF THE STRUCTURE.
B. A SINGLE 200 LB LOAD APPLIED TO ANY AND ALL NODES, CHORDS AND CONNECTIONS ON THE STRUCTURE.

CAMBER: THE OVERHEAD TOLLING GANTRY SHALL HAVE A RESIDUAL UPWARD CAMBER OF SPAN/1000.

MATERIALS

STRUCTURAL STEEL:	
HSS SHAPES & TUBING	ASTM A500 GRADE B
WIDE FLANGE SHAPES	ASTM A709
ALL OTHER SHAPES AND PLATES	ASTM A36 MIN.
CONCRETE:	
CONCRETE	F'c = 3,000 PSI
REINFORCING STEEL	ASTM A615 GRADE 60
BOLTS:	
HIGH STRENGTH BOLTS	ASTM A325
ANCHOR BOLTS	ASTM F1554

ALL STEEL ITEMS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123 OR A153

WELDING

WELDING AND WELDING INSPECTION FOR STRUCTURES SHALL CONFORM TO THE CURRENT EDITIONS OF THE ANSI/AASHTO/AWS D1.5-02 BRIDGE WELDING CODE AND ANSI/AWS D1.1-02 STRUCTURAL WELDING CODE. WELDING OF STRUCTURAL ALUMINUM, IF APPLICABLE, SHALL CONFORM TO AWS D1.2-03. E70XX LOW HYDROGEN ELECTRODES SHALL BE USED FOR STRUCTURAL STEEL WELDS. NO WELDING OF ALUMINUM SHALL BE PERMITTED.

BOLTED CONNECTIONS

HIGH STRENGTH BOLTS SHALL BE ASTM A325. THREADS SHALL BE EXCLUDED FROM THE SHEAR PLANE. UNLESS OTHERWISE NOTED, FIELD CONNECTIONS SHALL BE BOLTED USING HIGH STRENGTH BOLTS AND BOLT SIZE SHALL BE MIN. 3/4" DIAMETER. BUTT WELDS SHALL BE FULL (COMPLETE) PENETRATION WELDS. PROVIDE BACKUP PLATES AS REQUIRED.

DESIGN INTENT

THESE ARE DESIGN CRITERIA DOCUMENTS: PRELIMINARY PLANS NOT TO BE USED FOR CONSTRUCTION. THESE PLANS ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY, INTENDED TO ESTABLISH THE PROPOSED PROJECT'S DESIGN AND CONSTRUCTION INTENT QUALITY, AND CHARACTER. CONTRACTOR SHALL USE THESE PLANS IN ACCORDANCE WITH THE SPECIFICATIONS.

THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND DETAILING OF THE GANTRY STRUCTURE AND FOUNDATIONS. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER AND TOLL INTEGRATOR AS NECESSARY FOR REQUIRED EQUIPMENT LOCATIONS AND LOADING AND ANY DESIGN RESTRICTIONS OR REQUIREMENTS.

RICHMOND METROPOLITAN AUTHORITY
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SIGNING AND PAVEMENT MARKING
TOLL GANTRY ELEVATION

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AS SHOWN	FEB. 25, 2011	DTEORT-2011	9(29)

REVISIONS

T4870109(29).dgn
Tuesday, March 15, 2011

GENERAL NOTES

1. VIRGINIA DEPARTMENT OT TRANSPORTATION 2007 ROAD AND BRIDGE SPECIFICATIONS,2008 ROAD AND BRIDGE STANDRADS, 2006 TRAFFIC ENGINEERING MANUAL,THE CONTRACT DOCUMENTS AND THE CONTRACT PLANS ARE THE GOVERNING PROVISIONS APPLICABLE TO THIS PROJECT.

2. THE LIGHTING DESIGN REFLECTED IN THESE DRAWINGS CONFORMS WITH I.E.S. DESIGN CRITERIA AND STANDARDS, AND VDOT'S REQUIREMENTS AS FOLLOWS:
   * MINIMUM ILLUMINANCE, 0.2 Fc
   * AVERAGE MAINTAINED ILLUMINANCE, 0.6-0.9 Fc ON THE MAINLINE, 1.0 Fc ON RAMPS AND AT BIFURCATION POINTS
   * UNIFORMITY RATIO (AVERAGE TO MINIMUM), SHALL BE BETWEEN 4:1 AND 3:1 OR LESS
   * LIGHT LOSS FACTOR: 0.65
   * VEILING LUMINANCE RATIO, LESS THAN 0.30

3. LIGHT POLE LENGTH RANGES AS SHOWN ON THE PLANS ARE APPROXIMATE; ACTUAL LENGTHS SHALL BE DETERMINED BY THE CONTRACTOR IN THE FIELD AS REQUIRED TO ACHIEVE THE REQUIRED LUMINAIRE MOUNTING HEIGHT, BEFORE ORDERING ANY POLES.

4. JUNCTION BOXES SHALL CONFORM WITH VDOT ST'D JB R1 OR JB R2 AS SHOWN.

5. CONDUIT LOCATIONS AS SHOWN ARE DIAGRAMMATIC. FIELD ADJUSTMENTS SHALL BE MADE AS REQUIRED TO STAY WITHIN THE LIMITS OF CONSTRUCTION, OUT OF DITCH LINES, AWAY FROM GUARDRAIL AND FENCE POSTS, AND TO CLEAR OBSTRUCTIONS.

6. STATION AND OFFSET REFERENCES TO LIGHT POLE FOUNDATIONS ARE BASED ON CONSTRUCTION BASE LINE.

7. MOUNTING HEIGHTS SHOWN ON THE PLANS SHALL BE ADHERED TO WITHIN A TOLERANCE OF 1 Ft, AND SHALL IN NO CASE BE LESS THAN THE MOUNTING HEIGHTS SHOWN.

8. ALL NON-DIRECTIONALLY DRILLED UNDERGROUND CONDUITS SHALL BE INSTALLED IN ACCORDANCE WITH VDOT ST'D ECI-1.

9. CONDUCTOR CABLES TERMINATING IN BOXES OR LIGHT POLES SHALL BE TEST CAPPED AND HAVE A SLACK OF 3 FT PER CONDUCTOR.

10. 4 #6 AWG CONDUCTORS SHALL BE USED BETWEEN ADJACENT JUNCTION BOX AND SIGN STRUCTURE FOR SIGN LIGHTING.

11. 150 WATT H.P.S. LUMINAIRES SHALL BE USED FOR SIGN LIGHTING.

12. BEFORE CONNECTING SIGN LUMINAIRES, THE CONTRACTOR SHALL MAKE SURE THAT BALLAST TAPS ARE SELECTED FOR PROPER VOLTAGE OPERATION.

13. THE EQUIPMENT GROUNDING CONDUCTOR (EGC) IS INCIDENTAL TO THE COST OF NEW CONDUIT. THE EGC SHALL BE THE SAME SIZE AS THE LARGEST POWER CONDUCTOR.

14. ALL ELECTRICAL SERVICE ENCLOSURES SHALL MEET NEMA 3R SPECIFICATIONS AND REQUIREMENTS

15. INSTALLATION OF ELECTRICAL SERVICES SHALL BE COORDINATED WITH DOMINION VIRGINIA POWER BY THE CONTRACTOR.

16. ALL LIGHTING POLES SHALL BE PROVIDED WITH NON-CORROSIVE, METALLIC IDENTIFICATION TAGS, SIZED AS REQUIRED, BEARING THE POLE OWNER AND MAINTAINER, RMA/VDOT, THE GAUGE AND LENGTH OF THE LIGHT POLE, THE CIRCUIT NUMBER, CIRCUIT PHASE, 6 DIGIT POLE NUMBERS: FIRST 3 DIGITS OF THE POLE NUMBER WILL DESIGNATE THE SERVICE PANEL NUMBER AND THE LAST 3 DIGITS WILL DESIGNATE THE NUMBER OF THE POLE CONNECTED TO EACH SERVICE PANEL NUMBER IN THIS FORMAT:

```
                RMA/VDOT
CIRCUIT NUMBER - 1/A/001001 - 6 DIGIT POLE NUMBER
                 |
                 |__________ CIRCUIT PHASE
                  SP #001
                     |
                     |_____ 3 DIGIT SERVICE PANEL NUMBER
                  3GA. /50FT.- LIGHT POLE LENGTH
                   |
                   |______ LIGHT POLE GAUGE
```

17. LIGHT POLE NUMBERS SHALL BE DETERMINED BY THE CONTRACTOR IN THE FIELD USING THE FOLLOWING GUIDELINES:
    a) LIGHT POLE NUMBER MUST BE ASSIGNED IN CHRONOLOGICAL ORDER TO CORRESPOND WITH THE DIRECTION OF VEHICLE APPROACH.
    b) THE FIRST LIGHT POLE OF EACH SERVICE PANEL SHALL BE NUMBERED 001 AND CONTINUE SEQUENTIALLY THROUGHOUT THE LIGHT POLE CHAIN(S) UNTIL THE LAST LIGHT POLE CONNECTED TO THE SAME SERVICE PANEL IS NUMBERED.
    c) LIGHT POLES ON RAMPS SHALL BE NUMBERED CHRONOLOGICALLY AS PART OF THE MAINLINE LIGHT POLES IN THE DIRECTION OF VEHICLE APPROACH.

18. THE CONTRACTOR SHALL CONTACT NRO MAINTENANCE MANAGEMENT, XXX FOR MAINTENANCE CONCERNS. LIGHT POLE AND SERVICE IDENTIFICATION TAGS/DECALS, SERVICE INSPECTIONS, FINAL FIELD INSPECTION, AND VDOT UTILITY IDENTIFICATION AND MARKING.

19. ALL UTILITIES SHALL BE LOCATED AND MARKED PRIOR TO INITIATION OF CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING MISS UTILITY AND SCHEDULING THE LOCATION OF UNDERGROUND UTILITIES. EXISTING RMA CONDUITS AND CABLES SHALL ALSO BE LOCATED AND MARKED.

20. ALL CONDUCTORS IN JUNCTION BOXES, POLES AND EQUIPMENT ENCLOSURES SHALL BE PROVIDED WITH INDIVIDUAL BRASS TAGS, DIE STAMPED WITH SERVICE PANEL NUMBER, PHASE AND CIRCUIT IDENTIFICATIONS. CONDUCTORS SHALL BE NEATLY ARRANGED AND SUPPORTED ON CABLE RACKS.

21. CONDUITS ENTERING JUNCTION BOXES SHALL BE INSTALLED AS SHOWN ON THE PLANS. CONDUITS SHALL EXTEND 2" MIN TO 3" MAX. BEYOND THE INSIDE WALL OF THE JUNCTION BOXES. ALL CONDUITS INSTALLED INSIDE JUNCTION BOXES SHALL BE LEVELED WITH THE FRAME AND COVER, AND SHALL BE SQUARE TO THE INSIDE WALL OF THE JUNCTION BOXES.

22. OFFSET AND CONVENTIONAL LIGHTING POLES SHALL BE ALUMINUM OR STEEL.

23. ALL LIGHTING POLES SHALL BE EQUIPPED WITH ANCHOR BOLT COVERS.

24. LIGHTING POLES THAT ARE PLACED BEHIND GUARDRAILS, RETAINING WALLS AND/OR MEDIAN BARRIERS SHALL BE INSTALLED ON NON-FRANGIBLE TRANSFORMER BASES (NF) AS SHOWN ON THE PLANS.

25. LIGHTS POLES THAT ARE NOT PROTECTED BY GUARDRAIL, RETAINING WALLS OR MEDIAN BARRIERS SHALL BE INSTALLED ON FRANGIBLE TRANSFORMER BASES (F) AS SHOWN ON THE PLANS.

26. LIGHT POLES INSTALLED ON BARRIERS OR WALLS SHALL BE INSTALLED WITHOUT TRANSFORMER BASES AS SHOWN ON THE PLANS.

27. LIGHT POLE FOUNDATIONS THAT SUPPORT FRANGIBLE TRANSFORMER BASES SHALL BE INSTALLED SUCH THAT NO PORTION OF THE FOUNDATION EXTENDS MORE THAN 4" ABOVE THE FINAL GRADE.

28. TRANSFORMER BASES SHALL INCLUDE BOLT COVERS.

29. TRANSFORMER BASE HEIGHTS SHALL BE CALCULATED INTO THE TOTAL LIGHT POLE LENGTH TO ACHIEVE THE REQUIRED LIGHT FIXTURE MOUNTING HEIGHT.

30. TRANSFORMER BASES SHALL BE EQUIPPED WITH HINGED COVERS THAT INCLUDE A LOCKING MECHANISM AND SHALL COMPLY WITH VDOT ST'D LP-2.

31. NON-WALL MOUNTED OFFSET AND CONVENTIONAL LIGHTING POLE FOUNDATIONS SHALL BE IN ACCORDANCE WITH VDOT ST'D.LF-1. TYPE A, AS INDICATED ON THE PLANS.

32. CONDUITS, JUNCTION CHAMBERS, AND ANCHOR BOLTS SPECIFIED TO BE INSTALLED INTO BARRIERS AND/OR WALLS ARE INCIDENTAL TO THE COST OF THE BARRIERS AND/OR WALLS AND SHALL BE COORDINATED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.

33. ALL PROPOSED EMPTY CONDUITS SHALL HAVE A PULL-LINE INSTALLED. TOTAL COST ASSOCIATED WITH THE PULL LINE SHALL BE INCIDENTAL TO THE CONDUIT PAY ITEM.

34. REMOVAL AND SALVAGE OF LIGHT POLE SHALL INCLUDE LIGHT POLE, TRANSFORMER BASE, BRACKET ARM, LIGHT FIXTURE, FOUNDATION AND ASSOCIATED JUNCTION BOX.

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Tuesday, March 15, 2011

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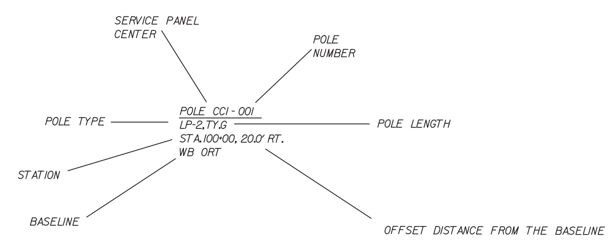
LIGHTING & ELECTRICAL DISTRIBUTION GENERAL NOTES

Scale:	Date:	Contract No.:	Sheet:
NONE	FEB. 25, 2011	DTEORT-2011	10(2A)

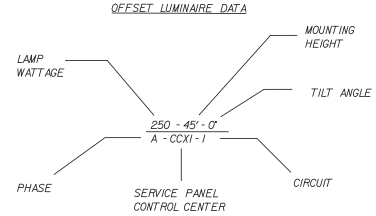
LEGEND	DESCRIPTION
	QUAD 400 WATT, MH, FORWARD THROW, FULL CUTOFF LUMINAIRES, 40 Ft MOUNTING HEIGHT ON NEW LIGHT POLE ON BARRIER. SEE SHEET 10(16) FOR ALUMINUM MOUNTING BRACKETS.
	400 WATT, HPS, FORWARD THROW, CUTOFF LUMINAIRES, 55 Ft MOUNTING HEIGHT WITH 7.5Ft ARM ON NEW LIGHT POLE WITH CONCRETE FOUNDATION LF-1 SEE SHEET 10(16) FOR ALUMINUM ARM DETAILS.
	250 WATT, HPS, FORWARD THROW, CUTOFF LUMINAIRES, 40 Ft MOUNTING HEIGHT ON NEW LIGHT POLE WITH NON-FRANGIBLE TRANSFORMER BASE AND CONCRETE FOUNDATION LF-1
F	250 WATT, HPS, FORWARD THROW, CUTOFF LUMINAIRES, 40 Ft MOUNTING HEIGHT ON NEW LIGHT POLE WITH FRANGIBLE TRANSFORMER BASE AND CONCRETE FOUNDATION LF-1
	70 WATT, HPS, WALLPACK TYPE IV, UNDERBRIDGE LIGHTING LUMINAIRES
	150 WATT, HPS, WALLPACK TYPE IV, UNDERBRIDGE LIGHTING LUMINAIRES
	REMOVE AND SALVAGE EXISTING LIGHT POLE
	EXISTING LIGHT POLE WITH NEW ELECTRICAL CONNECTION
R1	JUNCTION BOX JB-R1
	EXPOSED 6"X6"X6" WALL/GIRDER SURFACE MOUNTED NEMA 3R JUNCTION BOX
	JUNCTION CHAMBER (8"H x 8"W x 8"D) INSIDE BARRIER
	JUNCTION CHAMBER (8"H x 8"W x 12"D) INSIDE BARRIER
	TEE JUNCTION BOX
	EXISTING JUNCTION BOX TO BE MODIFIED
	EXISTING SERVICE PANEL/CONTROL CENTER
	GALVANIZED RIGID STEEL CONDUIT RISER BETWEEN JUNCTION BOX EMBEDDED IN WALL/BARRIER OR SURFACE MOUNTED AND JUNCTION BOX INSTALLED IN GROUND
A B C	OVERHEAD SIGN STRUCTURE - LUMINAIRE PHASE CONNECTIONS
A C	BRIDGE MOUNTED SIGN STRUCTURE-LUMINAIRE PHASE CONNECTIONS

LEGEND	DESCRIPTION
	PROPOSED DIRECTIONALLY DRILLED CONDUIT (NUMBER AND SIZE OF CONDUITS PER PLAN SHEET CALLOUTS)
RL	PROPOSED ROADWAY LIGHTING CONDUIT
	PROPOSED CONDUIT IN BARRIER (NUMBER AND SIZE OF CONDUITS PER PLAN SHEET CALLOUTS)
	PROPOSED ONE 1" GALVANIZED RIGID STEEL (GRS) CONDUIT
	EXISTING CONDUIT

POLE DATA



OFFSET LUMINAIRE DATA



T4870110(02B).dgn
Tuesday, March 15, 2011

REVISIONS

HNTB
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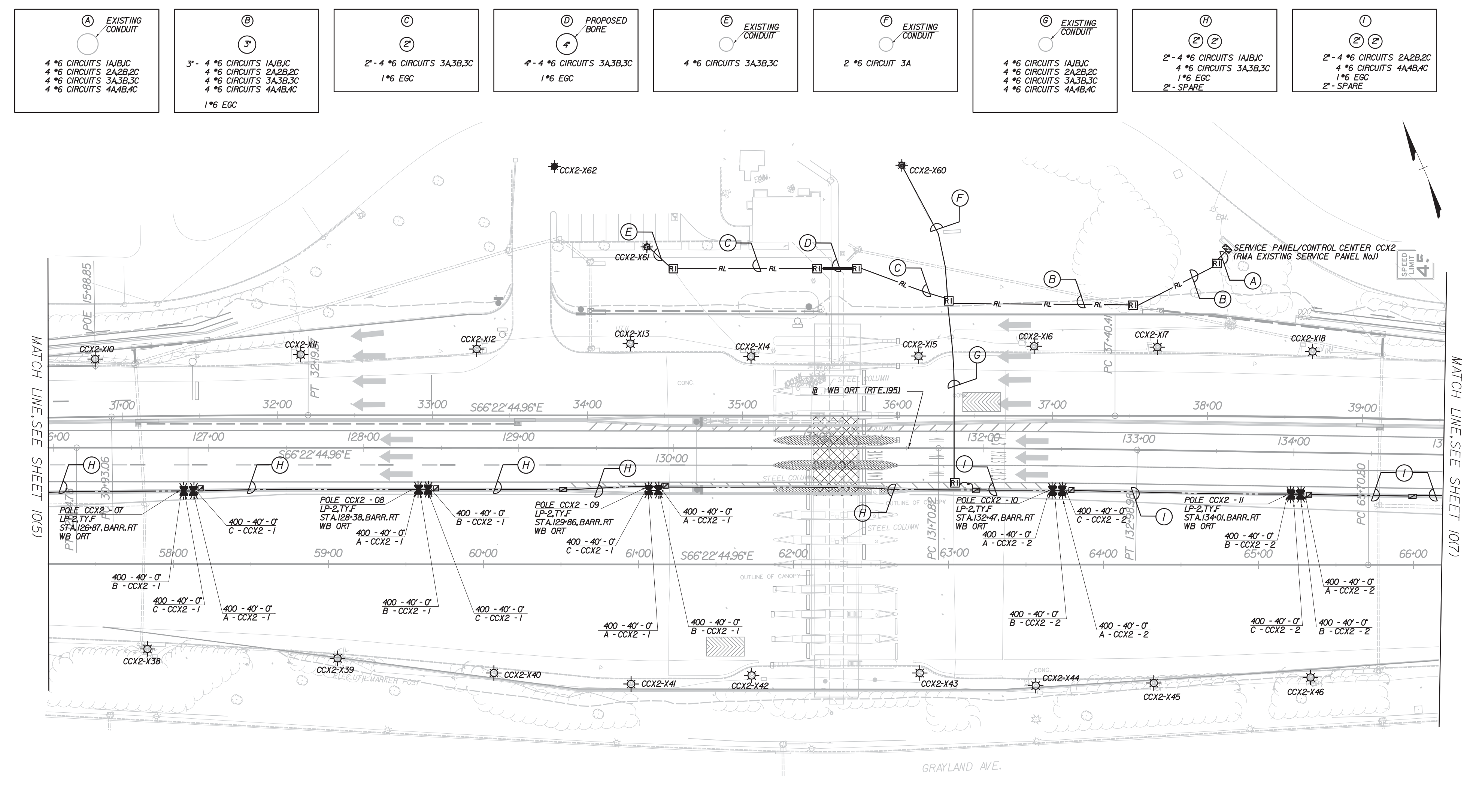
(703) 824-5100

RMA RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

LIGHTING & ELECTRICAL DISTRIBUTION LEGEND

Scale:	Date:	Contract No.:	Sheet:
NONE	FEB. 25, 2011	DTEORT-2011	10(2B)



RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

LIGHTING & ELECTRICAL DISTRIBUTION PLANS
STA. 126+00.00 TO STA. 135+00.00 WB ORT

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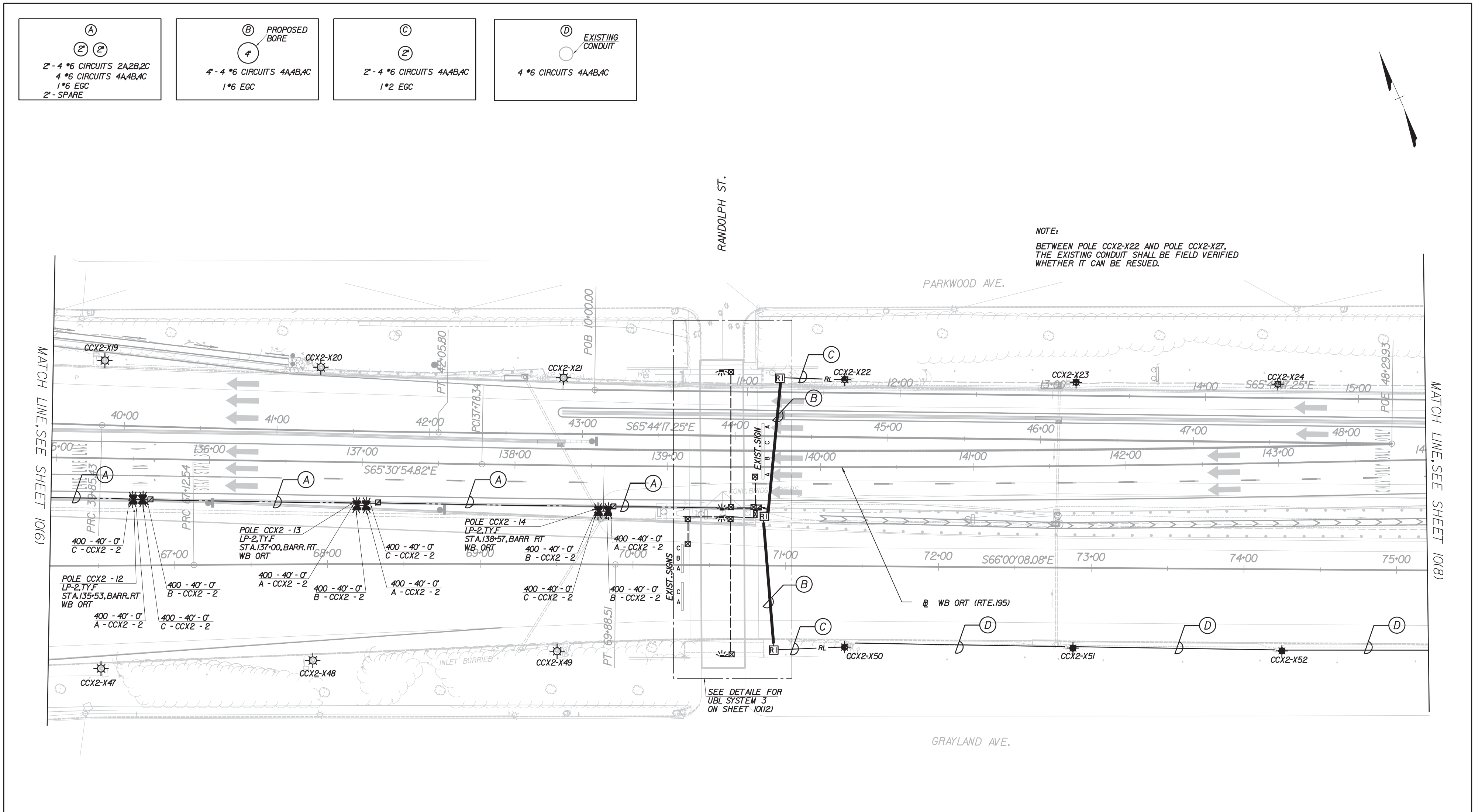
(703) 824-5100

SCALE: 1" = 30'

Scale:	Date:	Contract No.:	Sheet:
1" = 30'-0"	FEB. 25, 2011	DTEORT-2011	10(6)

REVISIONS

T4870110(06).dgn
Tuesday, March 15, 2011



T487010(07).dgn
Tuesday, March 15, 2011

REVISIONS

SCALE: 1" = 30'

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RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

LIGHTING & ELECTRICAL DISTRIBUTION PLANS
STA. 135+00.00 TO STA. 144+00.00 WB ORT

Scale:	Date:	Contract No.:	Sheet:
1" = 30'-0"	FEB. 25, 2011	DTEORT-2011	10(7)

SERVICE PANEL / CONTROL CENTER NO.CCXI

(VDOT EXISTING SERVICE PANEL NO.XXX)

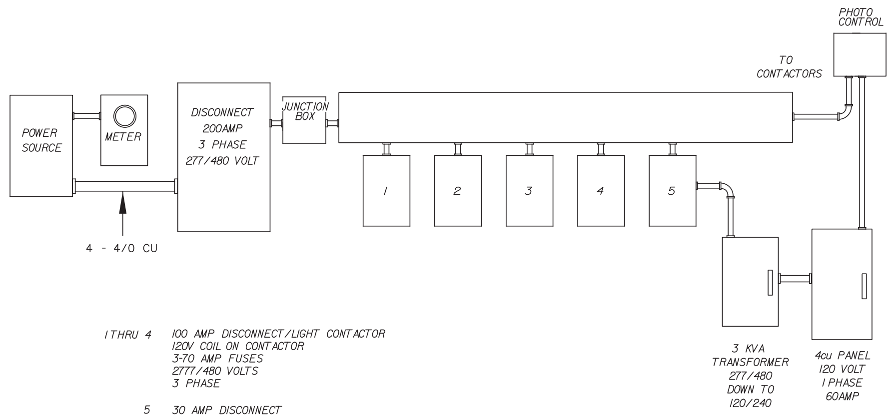
STANDARD	TYPE	VOLTAGE	SAFETY SWITCH		
			VOLTAGE	AMPERE RATING	FUSE
--	--	277/480	--	--	--

CCXI DISTRIBUTION CENTER

AMPERE RATING		CIRCUIT NO.	CIRCUIT NO.	AMPERE RATING	
CONTACTOR	CIRCUIT BREAKER			CIRCUIT BREAKER	CONTACTOR
20 *	15 *	1	2		
20 *	15 *	3	4		
20 *	15 *	5	6		
		7	8		
		9	10		
		11	12		
		13	14		
		15	16		
		17	18		
		19	20		
		21	22		
		23	24		

*: PROPOSED CIRCUIT ARRANGEMENT TO MATCH THE EXISTING CIRCUIT.

VDOT EXISTING SERVICE PANEL ARRANGEMENT



1 THRU 4 100 AMP DISCONNECT/LIGHT CONTACTOR
120V COIL ON CONTACTOR
3-70 AMP FUSES
2777/480 VOLTS
3 PHASE

5 30 AMP DISCONNECT
3-6 AMP FUSES
277/480VOLTS
3 PHASE

NOTE:

1. TRANSFORMER FEED BY *10 THNN ON 6AMP FUSES.
2. LIGHTING CONTACTORS ARE BUILT-IN TO DISCONNECTS 1 THRU 4.
3. DISCONNECTS FEED WITH 3*2 THNN CU AND 1*8 CU.

RMA EXISTING SERVICE PANEL NO.1 ARRANGEMENT

INFO PROVIDED BY HARRIS & SON ELECTRIC CO. TEL:(804) 254-3507

T487011O(14).dgn
Tuesday, March 15, 2011

REVISIONS

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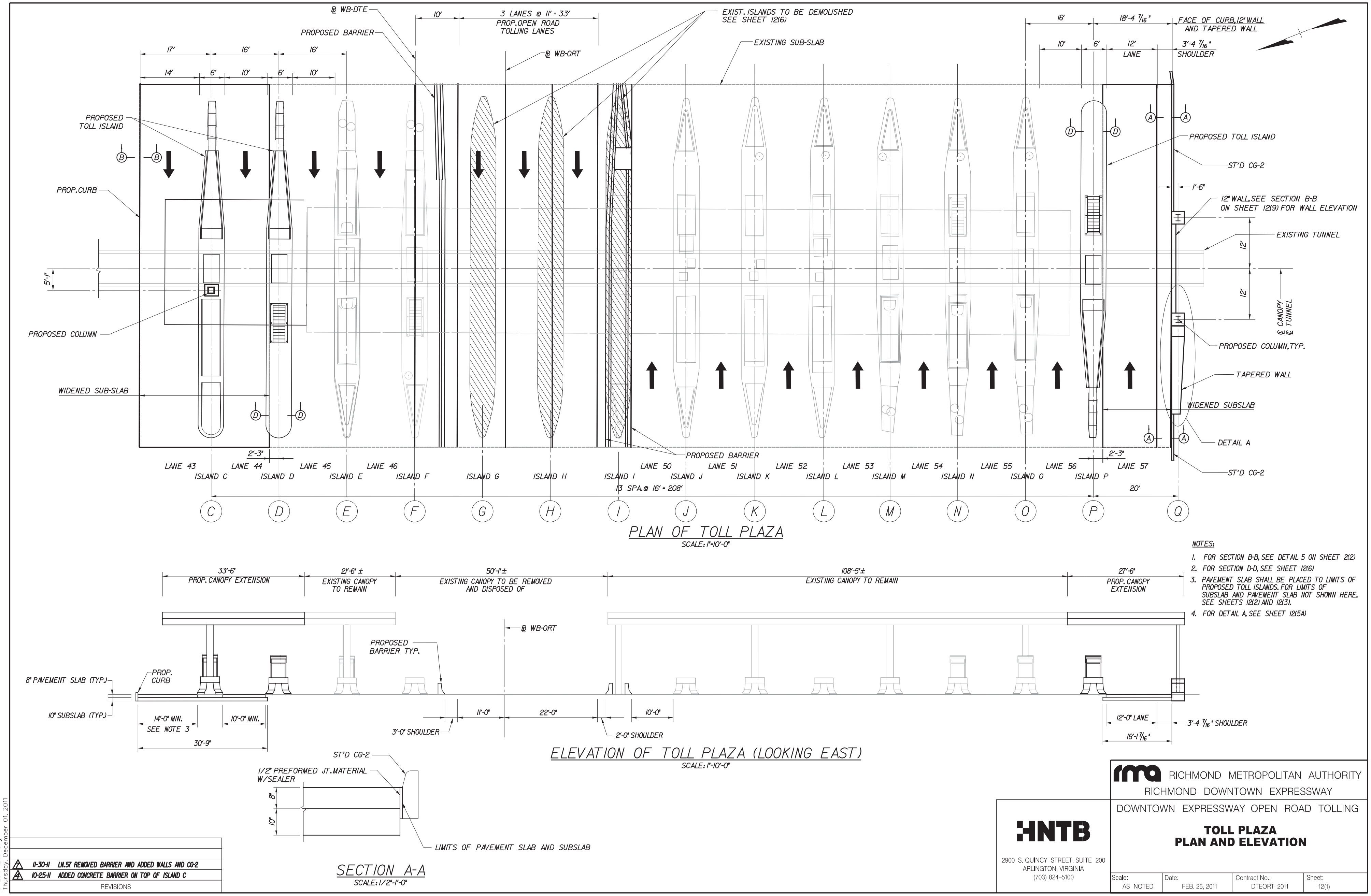
RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

LIGHTING & ELECTRICAL DISTRIBUTION

SERVICE PANEL/CONTROL CENTER ARRANGEMENT

Scale:	Date:	Contract No.:	Sheet:
NONE	FEB, 25, 2011	DTEORT-2011	10(14)



PLAN OF TOLL PLAZA
SCALE: 1"=10'-0"
ELEVATION OF TOLL PLAZA (LOOKING EAST)
SCALE: 1"=10'-0"
SECTION A-A
SCALE: 1/2"=1'-0"
EXIST. ISLANDS TO BE DEMOLISHED SEE SHEET 12(6)
EXISTING SUB-SLAB
PROPOSED BARRIER
3 LANES @ 11' = 33'
PROP. OPEN ROAD TOLLING LANES
PROPOSED TOLL ISLAND
PROP. CURB
PROPOSED COLUMN
WIDENED SUB-SLAB
FACE OF CURB, 12" WALL AND TAPERED WALL
ST'D CG-2
12" WALL, SEE SECTION B-B ON SHEET 12(9) FOR WALL ELEVATION
EXISTING TUNNEL
PROPOSED COLUMN, TYP.
TAPERED WALL
WIDENED SUBSLAB
DETAIL A
13 SPA. @ 16' = 208'
PROP. CANOPY EXTENSION
EXISTING CANOPY TO REMAIN
EXISTING CANOPY TO BE REMOVED AND DISPOSED OF
8" PAVEMENT SLAB (TYP.)
10" SUBSLAB (TYP.)
1/2" PREFORMED JT. MATERIAL W/SEALER
LIMITS OF PAVEMENT SLAB AND SUBSLAB
NOTES:
1. FOR SECTION B-B, SEE DETAIL 5 ON SHEET 2(2)
2. FOR SECTION D-D, SEE SHEET 12(6)
3. PAVEMENT SLAB SHALL BE PLACED TO LIMITS OF PROPOSED TOLL ISLANDS. FOR LIMITS OF SUBSLAB AND PAVEMENT SLAB NOT SHOWN HERE, SEE SHEETS 12(2) AND 12(3).
4. FOR DETAIL A, SEE SHEET 12(5A)
11-30-11 LN.57 REMOVED BARRIER AND ADDED WALLS AND CG-2
10-25-11 ADDED CONCRETE BARRIER ON TOP OF ISLAND C
REVISIONS
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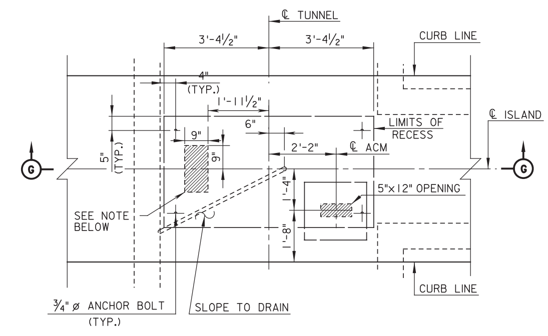
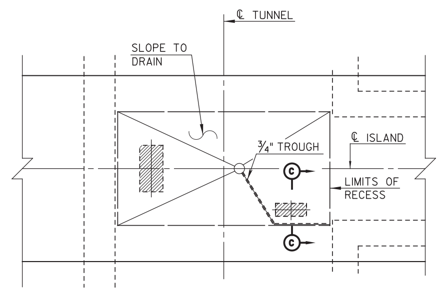
RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING
TOLL PLAZA PLAN AND ELEVATION
Scale: AS NOTED
Date: FEB. 25, 2011
Contract No.: DTEORT-2011
Sheet: 12(1)



PLAN OF TOLL BOOTH RECESS

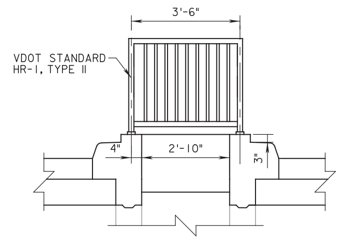
SCALE: ½" = 1'-0"

NOTE: 18" X 9" OPENING IN TUNNEL CEILING IS EXISTING. TOP 5" OF OPENING IS CAPPED WITH UNREINFORCED CONCRETE. CONTRACTOR SHALL REMOVE CAP AND MAINTAIN OPENING THROUGH ISLAND.



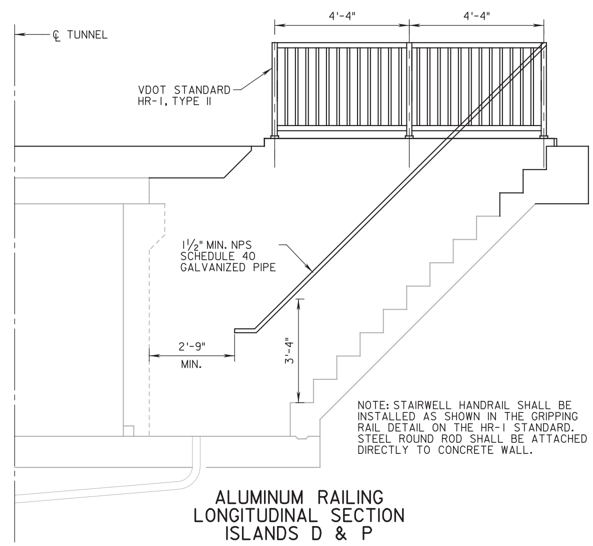
PLAN OF TOLL BOOTH DRAINAGE

SCALE: ½" = 1'-0"



ALUMINUM RAILING
TRANSVERSE SECTION
ISLANDS D & P

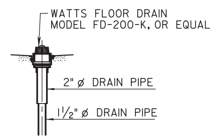
SCALE: ½" = 1'-0"



NOTE: STAIRWELL HANDRAIL SHALL BE INSTALLED AS SHOWN IN THE GRIPPING RAIL DETAIL ON THE HR-1 STANDARD. STEEL ROUND ROD SHALL BE ATTACHED DIRECTLY TO CONCRETE WALL.

ALUMINUM RAILING
LONGITUDINAL SECTION
ISLANDS D & P

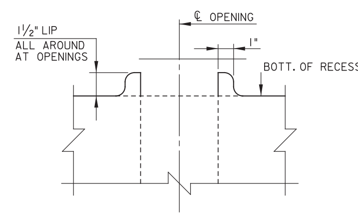
SCALE: ½" = 1'-0"



FLOOR DRAIN DETAIL

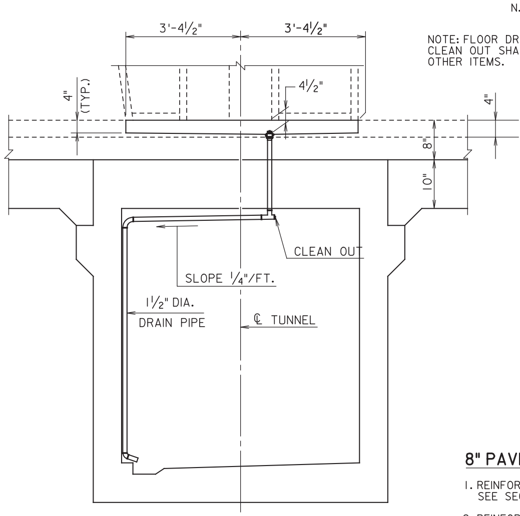
N.T.S.

NOTE: FLOOR DRAIN, PVC DRAIN PIPE AND CLEAN OUT SHALL BE INCIDENTAL TO OTHER ITEMS.



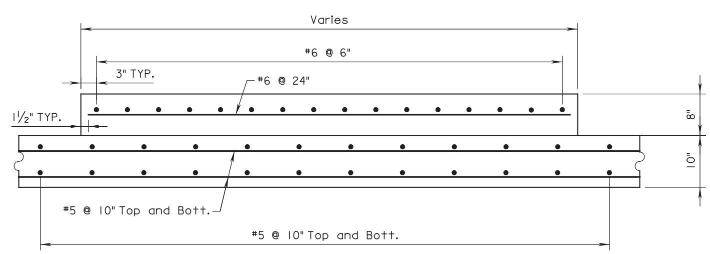
SECTION C-C

SCALE: 3" = 1'-0"



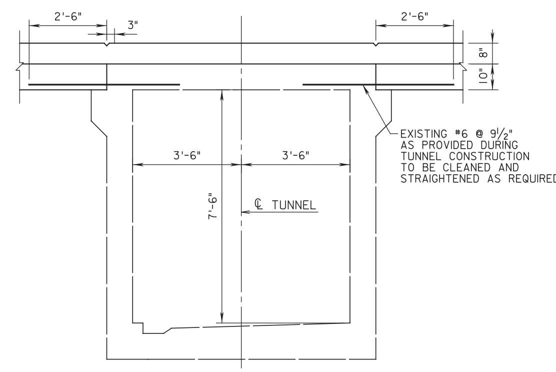
SECTION G-G

N.T.S.



8" PAVEMENT SLAB
AND 10" SUBSLAB DETAILS

SCALE: 1" = 1'-0"



SECTION THRU TUNNEL
BETWEEN ISLANDS

SCALE: ½" = 1'-0"

8" PAVEMENT SLAB NOTES

1. REINFORCING BARS SHALL BE GLASSFIBER REINFORCED POLYMER (GFRP). SEE SECTION 316 FOR GFRP DETAILS.
2. REINFORCING BARS SHALL BE SECURED USING PLASTIC TIES, NYLON TIES, OR PLASTIC SNAP TIES. NO METAL TIES SHALL BE USED.
3. PLASTIC OR NON-METALLIC CHAIRS SHALL BE USED TO ELEVATE REBAR AT LOCATIONS SHOWN. CHAIRS SHALL BE SECURED TO 10" SLAB BY METHOD(S) APPROVED BY THE ENGINEER.
4. CONTRACTOR TO COORDINATE PLACEMENT OF LOOPS WITH TOLL INTEGRATOR AND ENGINEER PRIOR TO POURING CONCRETE.
5. CONCRETE SHALL BE CLASS A4.
6. SEE VDOT STANDARD PR-3 FOR DETAILS NOT SHOWN ON THIS SHEET.

10" SUBSLAB NOTES

1. REINFORCING BARS SHALL BE ASTM A615, GRADE 60.
2. CONCRETE SHALL BE CLASS A3.
3. DOWELS CONNECTING PROPOSED AND EXISTING SUB-SLABS SHALL BE #6 BARS SPACED AT 18" O.C. DOWELS SHALL PROJECT A MINIMUM OF 9" INTO NEW AND EXISTING CONCRETE.

B4870112(04).dgn
Tuesday, October 25, 2011

1	10-25-11 MODIFIED DIMENSIONS ON SECTION G-G
REVISIONS	

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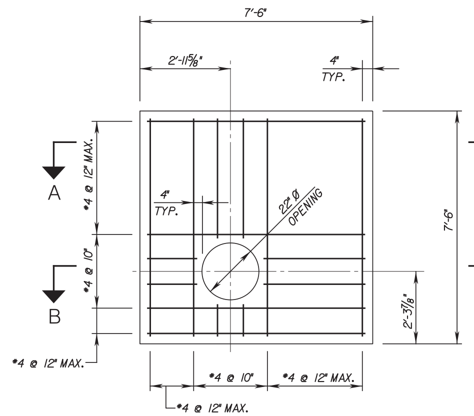
(703) 824-5100

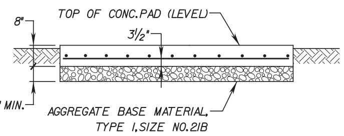
RMA RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

TOLL PLAZA
TOLL ISLAND DETAILS

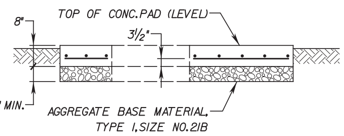
Scale:	Date:	Contract No.:	Sheet:
AS NOTED	FEB. 25, 2011	DTEORT-2011	12(4)



PLAN



SECTION A-A



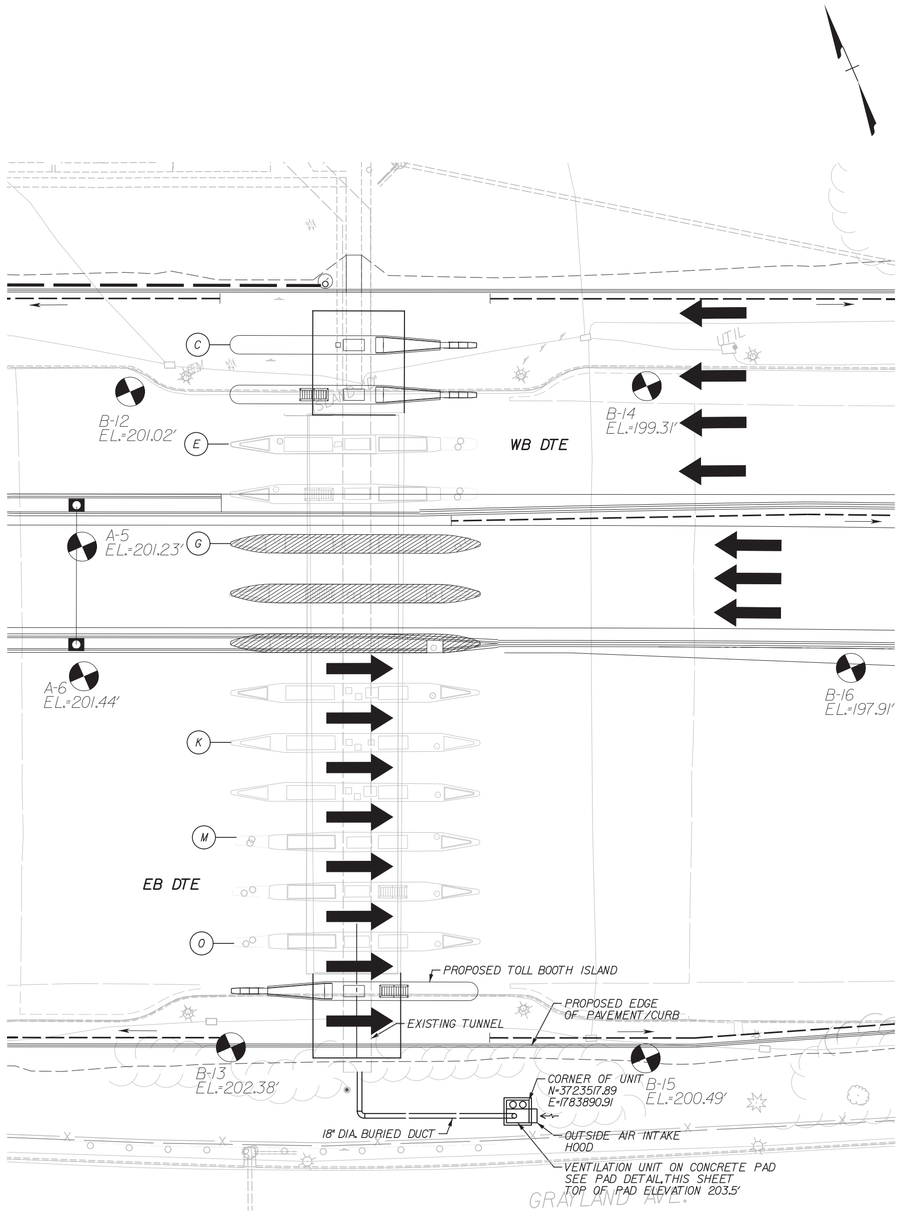
SECTION B-B

NOTES

1. CONCRETE SHALL BE CLASS A3. DEFORMED REINFORCING BARS SHALL CONFORM TO ASTM A615 GRADE 60.
2. PAD DIMENSIONS AND LAYOUT SHOWN SHALL BE USED FOR THE CONTRACT SPECIFIED TRANE OAI UNIT. IF A DIFFERENT UNIT IS APPROVED, CONTRACTOR IS REQUIRED TO SUBMIT PAD LAYOUT TO THE ENGINEER FOR REVIEW AND APPROVAL.
3. CONTRACTOR SHALL INSTALL THE BURIED DUCT ABOVE THE TOP OF PAD ELEVATION PRIOR TO POURING PAD CONCRETE.
4. CONTRACTOR SHALL VERIFY DIMENSIONS OF ACTUAL CURB AND UNIT SUPPLIED AND SUBMIT ANY DISCREPENCIES BETWEEN THE PAD LAYOUT AND UNIT TO THE ENGINEER.

PAD LAYOUT

NTS



PLAN

20' 0 20' 40'

SCALE: 1" = 20'

GENERAL MECHANICAL NOTES:

1. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF VIRGINIA MECHANICAL CODE
2. VISIT SITE AND NOTE EXISTING CONDITION AFFECTING THE WORK PRIOR TO BIDDING. RELOCATION OF EXISTING SYSTEMS FOR THE INSTALLATION OF NEW WORK SHALL BE INCLUDED IN THE SCOPE OF THIS PROJECT.
3. COORDINATE ALL MECHANICAL WORK WITH THAT OF OTHER TRADES TO ENSURE PROPER AND ADEQUATE INTERFACE OF THEIR WORK WITH THE WORK OF THIS CONTRACTOR.
4. DEMOLITION: REMOVE ALL WORK AS INDICATED. REMOVE OR REROUTE EXISTING WORK TO SUIT NEW WORK. DO ALL CORE DRILLING, CUTTING AND PATCHING FOR INSTALLATION OF NEW WORK. EXISTING EQUIPMENT AND DEVICE SHALL BE REMOVED FROM SITE AT THE DIRECTION OF THE ENGINEER.
5. DAMAGES: CORRECT ALL DAMAGE TO EXISTING FINISHES, TUNNEL WALLS, FLOOR AND CEILING, OR SYSTEMS ASSOCIATED WITH THE INSTALLATION OF NEW WORK.
6. DRAWINGS ARE SCHEMATIC REPRESENTATION OF THE WORK TO BE PERFORMED AND ARE NOT INTENDED TO SHOW ALL DETAIL OF THE WORK. VERIFY LOCATIONS AND MEASUREMENTS OF ALL ITEMS AT PROJECT SITE PRIOR TO FABRICATION AND INSTALLATION.
7. PROVIDE NEC MINIMUM CODE CLEARANCE IN FRONT OF ANY ELECTRICAL EQUIPMENT (FRONT, BELOW, ABOVE, ETC.). ARRANGE EQUIPMENT SO THAT EQUIPMENT ACCESS CLEARANCE INDICATED ON DRAWINGS OR AS RECOMMENDED BY MANUFACTURER ARE PROVIDED.
8. PROVIDE ALL OFFSETS, FITTINGS AND TRANSITIONS REQUIRED TO CONNECT TO MECHANICAL EQUIPMENT.
9. ITEMS NOTED "TYPICAL" ON ANY DRAWING SHEET APPLY TO THE ENTIRE DRAWING SET.
10. REFER TO ELECTRICAL DRAWINGS FOR POWER CONNECTIONS TO MECHANICAL EQUIPMENT.

ABBREVATIONS

FRP FIBER REINFORCED PLASTIC

OSA OUTSIDE AIR

REVISIONS

M487011A(1).dgn
Tuesday, March 15, 2011

HNTB

2900 S. QUINCY STREET, SUITE 200
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RICHMOND METROPOLITAN AUTHORITY

RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

MECHANICAL PLAN

Scale:	Date:	Contract No.:	Sheet:
1" = 20'-0"	FEB. 25, 2011	DTEORT-2011	14(1)

DOWNTOWN EXPRESSWAY (DTE) OPEN ROAD TOLLING

TOLL GANTRY SHOP DRAWINGS
AND STRUCTURAL CALCULATIONS

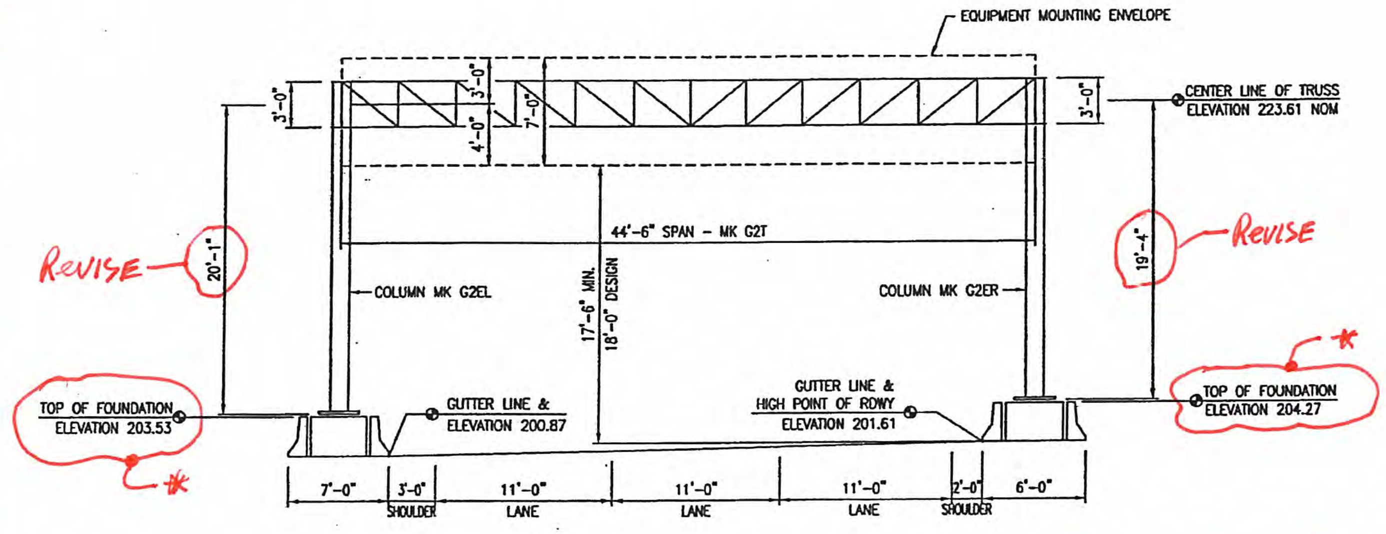
SHOP DRAWING REVIEW

Review is for general compliance with contract documents. No responsibility for correctness of dimensions, details, quantities, and safety during fabrication and erection shall remain with the contractor.

☐ No Exceptions Taken
☒ Make Corrections Noted
☐ Amend and Resubmit
☐ Rejected - See Remarks

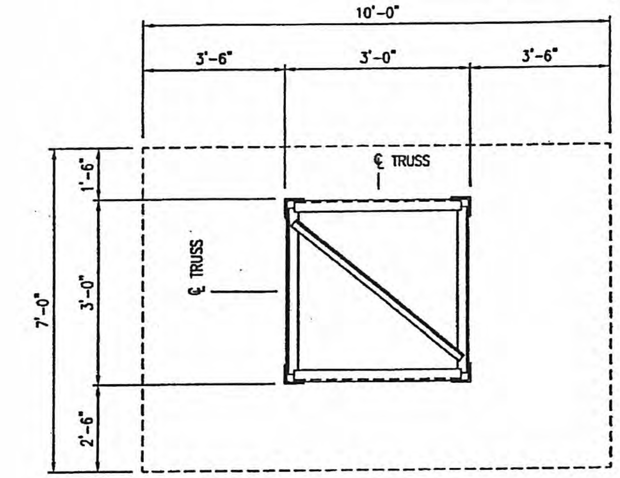
HNTB Corporation

By AN Date 12/15/11

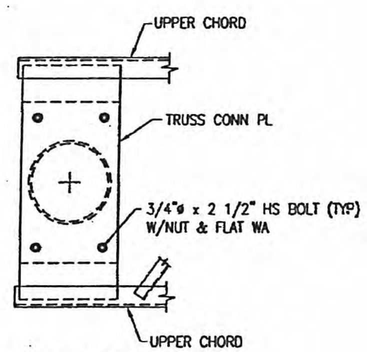


ELEVATION
(LOOKING EAST)

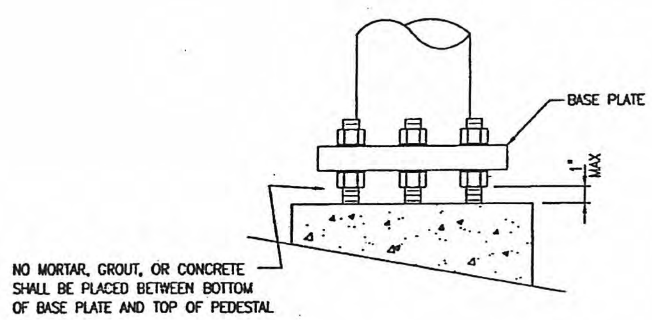
* Top of Foundation shall be 1½" min. above the top of barrier



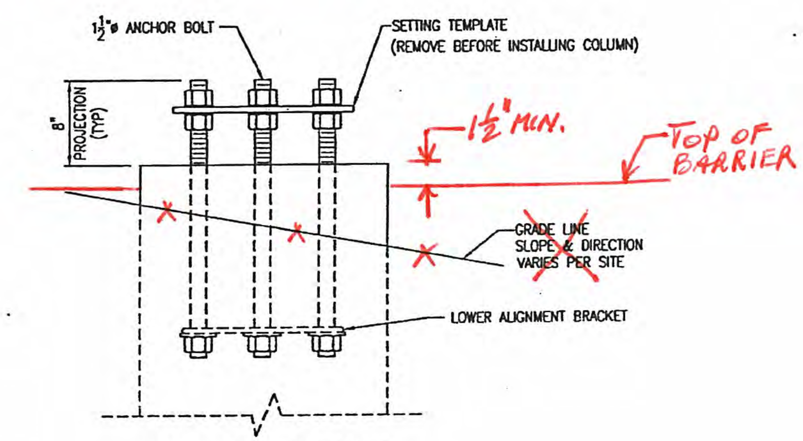
TYPICAL SECTION
EQUIPMENT MOUNTING ENVELOPE



UPPER CONNECTION DETAIL
(LEFT COLUMN SHOWN. RIGHT COLUMN SIMILAR)



BASE PLATE ERECTION



FOUNDATION ELEVATION

GENERAL NOTES:

STRUCTURE DESIGN PER AASHTO STANDARD SPECS. FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRS AND TRAFFIC SIGNALS, 2009 5th EDITION.

DESIGN WIND SPEED 90 MPH.

ALL WELDING PER AWS D1.1 (LATEST EDITION).

STRUCTURE DESIGN, ANCHOR BOLT & FOUNDATION DESIGN BY HURTT FABRICATING CORP.

EQUIPMENT MOUNTING BRACKETS & HARDWARE BY OTHERS.

FOUNDATION & ROADWAY ELEVATIONS PROVIDED BY VENTURE ELECTRIC CO. ON 8-27-11.

THE ELEVATIONS SHOWN ARE FOR REFRENCE AND RELATIONSHIP ONLY AND MAY NOT BE THE ACTUAL SITE ELEVATIONS.

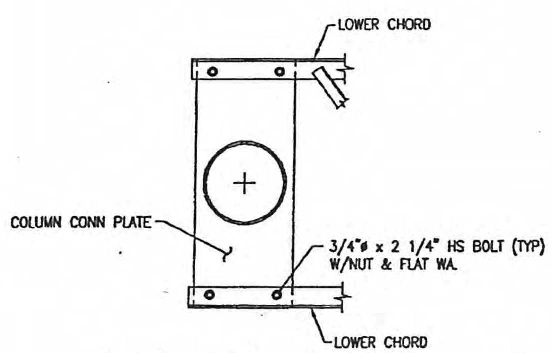
17'-6" MINIMUM (18'-0" DESIGN) CLEARANCE FROM THE HIGH POINT OF THE ROADWAY TO THE BOTTOM OF THE EQUIPMENT MOUNTING ENVELOPE.

THE TRUSS TO COLUMN HIGH STRENGTH BOLT CONNECTIONS SHALL BE INSTALLED USING THE "TURN-OF-NUT" METHOD PER SECTION 407.06(b)3 OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS 2002.

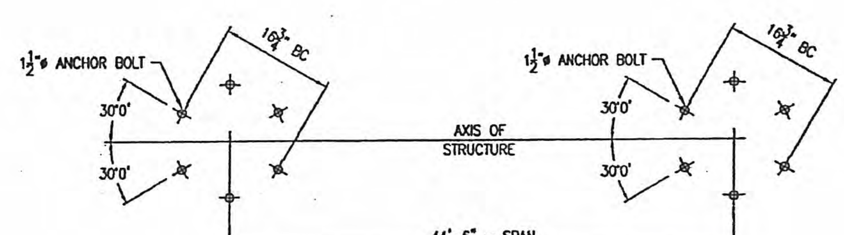
ANCHOR NOTE:

USE STEEL SETTING & LOWER ALIGNMENT BRACKET TO ASSURE PROPER ANCHOR BOLT LAYOUT & ALIGNMENT.

REUSE SETTING TEMPLATE AT SIMILAR LOCATIONS.



LOWER CONNECTION DETAIL
(LEFT COLUMN SHOWN. RIGHT COLUMN SIMILAR)



ANCHOR BOLT LAYOUT
GANTRY

REV:

FOR	#	DATE	FOR	#	DATE	FOR	#	DATE
PRINTS ISSUED								
PE	E	10-18-11	APP	E	12-13-11			
PE	E	12-13-11						
H-DIST	6	12-13-11						
INSP	1	12-13-11						

COMMONWEALTH OF VIRGINIA
David L. Cowell
Lic. No. 030335
PROFESSIONAL ENGINEER
12-13-11

HURTT FABRICATING CORP.
P.O. BOX 128
MARCELINE, MO 64658

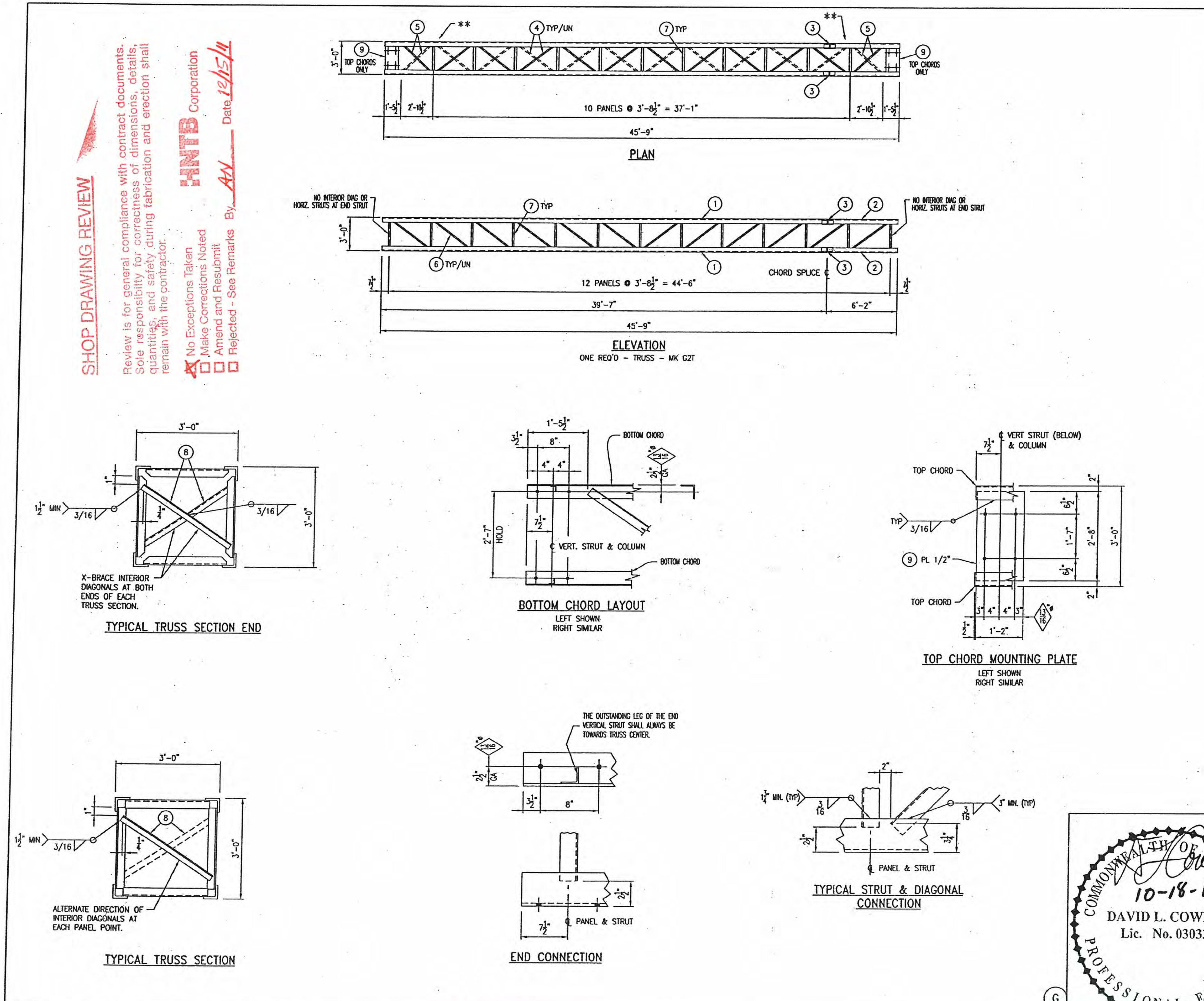
CUSTOMER: VENTURE ELECTRIC CO.

PROJECT: CONTRACT NO. DTEORT-2011 DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING PROJECT RICHMOND METROPOLITAN AUTHORITY

SUBJECT: ERECTION DIAGRAM FOR TOLL GANTRY

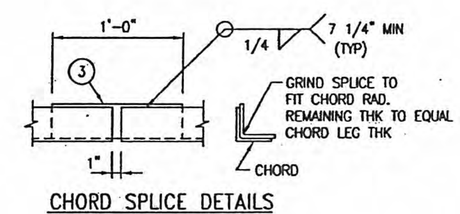
FILE: 5953 OH E1B		DATE: 10-13-11	PKG: A	
PRINTED FOR: RICHMOND METRO AUTHORITY	DR BY: TAP	CH BY: CLH	JOB NO: HF-5953	SHEET E1

G



BILL OF MATERIAL

QTY	MK	DESCRIPTION	LENGTH	REMARKS
4	1	L 4 x 4 x 3/8	39'-6 1/2"	
4	2	L 4 x 4 x 3/8	6'-1 1/2"	
4	3	L 4 x 4 x 3/8	1'-0"	
20	4	L 2 1/2 x 2 1/2 x 1/4	4'-0 1/2"	
4	5	L 2 1/2 x 2 1/2 x 1/4	3'-7 1/8"	
24	6	L 2 x 2 x 3/16	4'-0 1/2"	
48	7	L 2 x 2 x 3/16	2'-7"	
13	8	L 2 x 2 x 3/16	3'-7"	
2	9	PL 1/2 X 14	2'-8"	
8	END COLUMN	3/4"ø HSB	2 1/4"	W/NUT & FLAT WASHER
8		3/4"ø HSB	2 1/2"	W/NUT & FLAT WASHER



CAMBER NOTES:

PROVIDE 1" OF CAMBER AT CENTERLINE OF TRUSS

MATERIAL SPECIFICATIONS:

STEEL CHORDS – ASTM A572 GR 50, A529 GR 50 or A709 GR 50 (50 KSI MIN YIELD)
OTHER STEEL SHAPES, PLATES AND BARS – ASTM A709 GR 36 or A36
GALVANIZE AFTER FAB PER ASTM A123

HS BOLTS – ASTM A325 TYPE 1
NUTS – ASTM A563 DH
WASHERS – ASTM F436
GALVANIZE HARDWARE PER ASTM A153

REV:

PRINTS ISSUED								
FOR	#	DATE	FOR	#	DATE	FOR	#	DATE
PE	E	10-18-11						
HDST	10	12-13-11						
INSP	1	12-13-11						
APP	E	12-13-11						

HURTT FABRICATING CORP.
P.O. BOX 128
MARCELINE, MO 64658

CUSTOMER: VENTURE ELECTRIC CO.

PROJECT: CONTRACT NO. DTEORT-2011
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING PROJECT
RICHMOND METROPOLITAN AUTHORITY

SUBJECT: FABRICATION DETAILS FOR TOLL GANTRY TRUSS

FILE: 5953 OH GANTRY TRUSS	DATE: 10-13-11	PKG: A		
PRINTED FOR: RICHMOND METRO AUTHORITY	DR BY: TAP	CH BY: CLH	JOB NO: HF-5953	SHEET 1 OF 2

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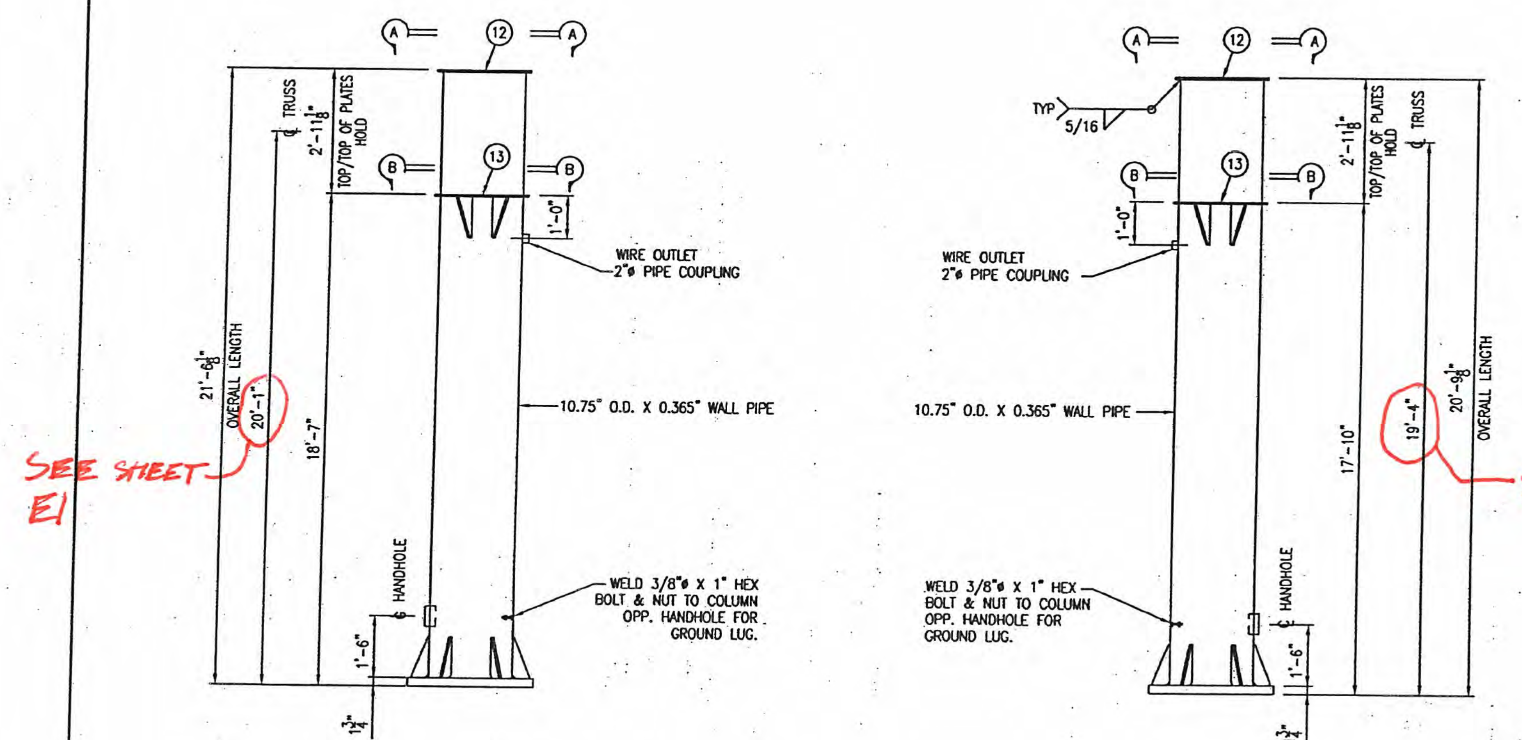
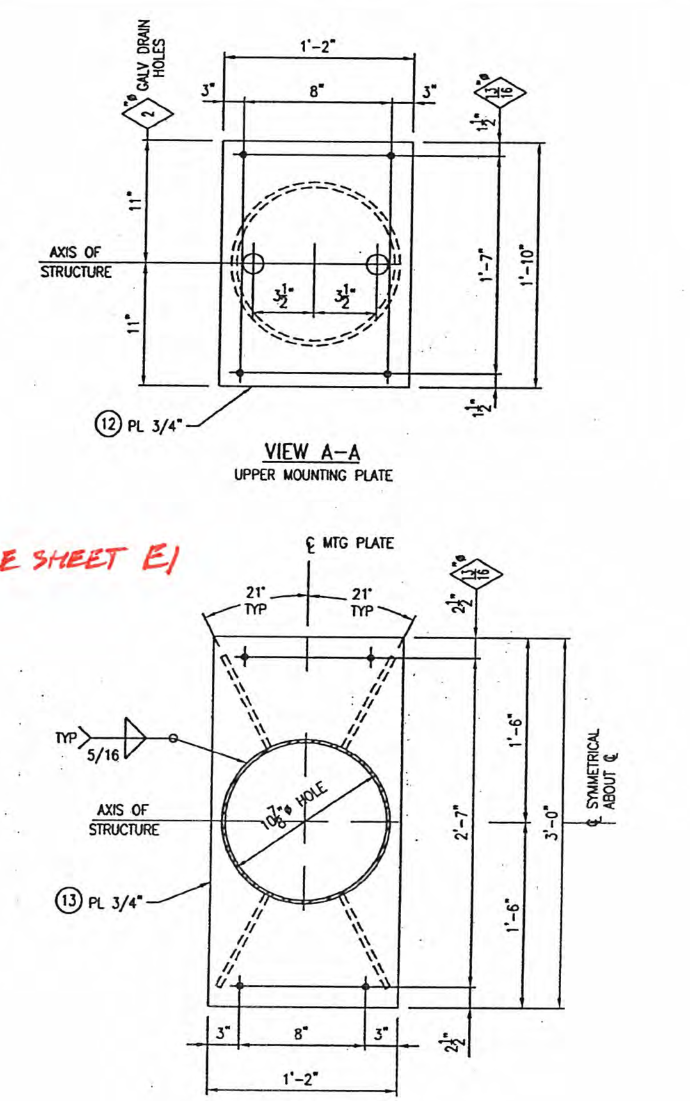


LEFT END COLUMN DETAIL

ONE REQ'D – MK G2EL

RIGHT END COLUMN DETAIL

ONE REQ'D – MK G2ER



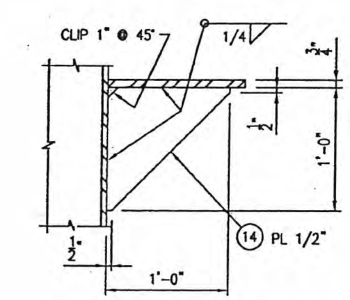
VIEW A–A

UPPER MOUNTING PLATE

SECTION B–B

LOWER MOUNTING PLATE

QTY	MK	DESCRIPTION	LENGTH	REMARKS
1	G2EL	10.75" O.D. x 0.365" WALL PIPE	21'-4 7/8"	
1	G2ER	10.75" O.D. x 0.365" WALL PIPE	20'-7 7/8"	
2	10	PL 1 3/4 x 22 3/4"ø		
12	11	PL 3/4 x 5	1'-0"	
2	12	PL 3/4 x 14	1'-10"	
2	13	PL 3/4 x 14	3'-0"	
8	14	PL 1/2 x 12	1'-0"	
2	HF	PL 2 x 5 1/2	0'-8"	
2	HC	PL 1/8 x 5 1/2	0'-8"	
2	HG	GASKET 1/16 x 5 1/2	0'-8"	NEOPRENE
8	HAND HOLE	3/8"ø RD HD MS	3/4"	(A307)
2	GROUND LUG	3/8"ø HEX BOLT	1"	W/NUT (A307)
2		2"ø PIPE COUPLING & PLUG		



TRUSS CONNECTION GUSSET

REQUIRED @ BOTTOM CONNECTION ONLY

SHOP DRAWING REVIEW

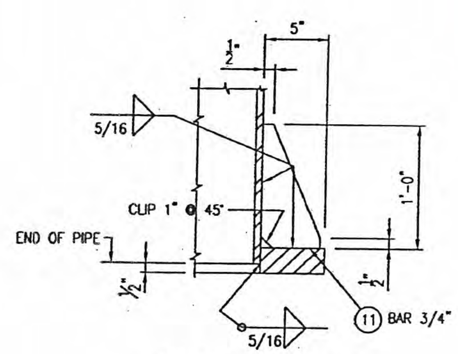
Review is for general compliance with contract documents. Sole responsibilty for correctness of dimensions, details, quantities, and safety during fabrication and erection shall remain with the contractor.

- ☐ No Exceptions Taken
- ☒ Make Corrections Noted
- ☐ Amend and Resubmit
- ☐ Rejected - See Remarks

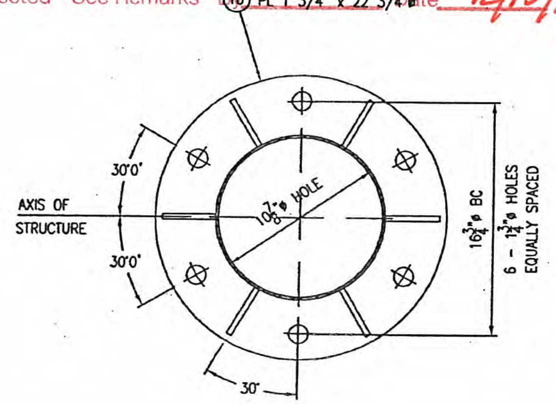
HNTB Corporation

AN

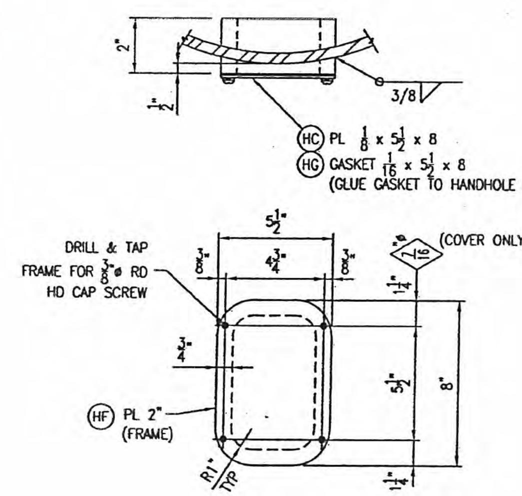
Date 12/15/11



BASE PLATE WELD & GUSSET DETAIL



BASE PLATE DETAIL



HANDHOLE DETAIL

MATERIAL SPECIFICATIONS:

COLUMN PIPE – A500 GR B or API 5L X42, X52, or X60 (42 KSI MIN. YIELD)
STEEL BARS & PLATES – ASTM A709 GR 36 or A36
GALV. STEEL AFTER FAB PER ASTM A123

STD BOLTS, NUTS, & WASHERS – ASTM A307
GALV. HARDWARE PER ASTM A153

COMMONWEALTH OF VIRGINIA
DAVID L. COWELL
Lic. No. 030335
PROFESSIONAL ENGINEER
10-18-11

REV:

PRINTS ISSUED								
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PE	E	10-18-11						
HD15	10	12-13-11						
INSP	1	12-13-11						
APP	E	12-13-11						

HURTT FABRICATING CORP.
P.O. BOX 128
MARCELINE, MO 64658

CUSTOMER: VENTURE ELECTRIC CO.

PROJECT: CONTRACT NO. DTEORT-2011
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING PROJECT
RICHMOND METROPOLITAN AUTHORITY

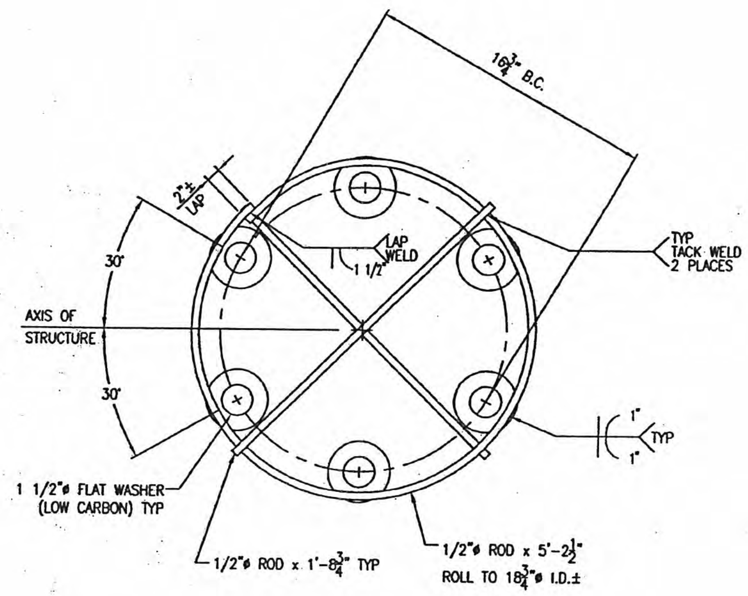
SUBJECT: FABRICATION DETAILS FOR TOLL GANTRY END COLUMNS

FILE: 5953 GANTRY END COLUMN	DATE: 10-13-11	PKG: A		
PRINTED FOR: RICHMOND METRO AUTHORITY	DR BY: TAP	CH BY: CLH	JOB NO: HF-5953	SHEET 2 OF 2

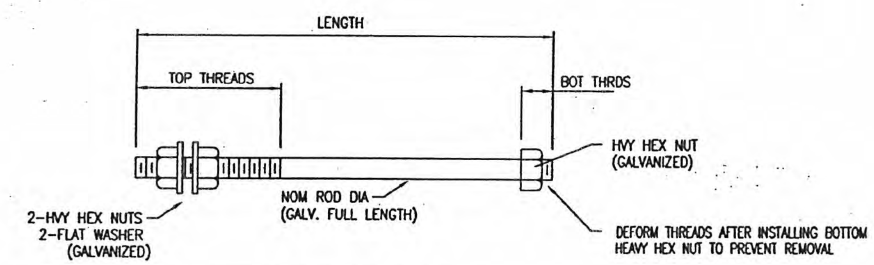
G

BILL OF MATERIAL

QTY	MK	DESCRIPTION	LENGTH	REMARKS
2	HOOP	1/2"ø ROD	5'-2 1/2"	BLACK
4		1/2"ø ROD	1'-8 3/4"	BLACK
12		1 1/2" FLAT WASHER		LOW CARBON
2	TEMP	PL 3/8 x 22 3/4"ø		BLACK
12	AB11H	1 1/2" NOM ROD DIA	3'-4"	
36		1 1/2" HEAVY HEX NUT		GALV
24		1 1/2" FLAT WASHER		GALV



ALIGNMENT BRACKET
2 - REQ'D



ANCHOR BOLT DETAIL

QTY	MK	ROD SIZE NOM DIA	LENGTH	TOP THRDS	BOT THRDS
12	AB11H	1 1/2"	3'-4"	8"	2"

SHOP DRAWING REVIEW

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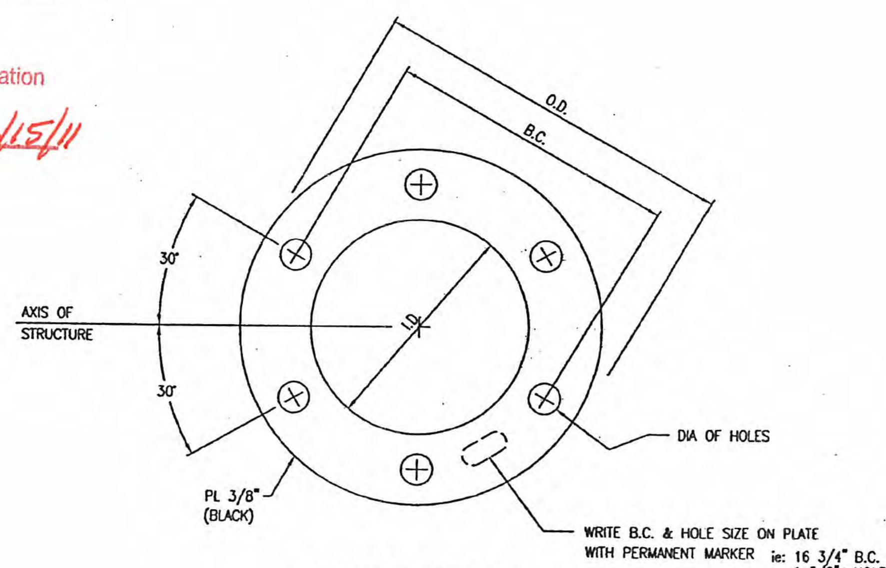
- [x] No Exceptions Taken
- [ ] Make Corrections Noted
- [ ] Amend and Resubmit
- [ ] Rejected - See Remarks

HNTB Corporation

By AN Date 12/15/11



SETTING TEMPLATE

QTY	O.D.	B.C.	I.D.	DIA OF HOLES
2	22 3/4"	16 3/4"	10 3/4"	1 5/8"ø

MATERIAL SPECIFICATIONS:

STEEL PLATES, BARS & RODS – ASTM A709 GR 36 or A36
BRACKET WASHERS – LOW CARBON STANDARD PATTERN
SHIP ALIGNMENT BRACKETS & SETTING TEMPLATE BLACK

ANCHOR BOLT ROD – ASTM F1554 GR 55 (55 KSI MIN YIELD)
NUTS – ASTM A194 GR 2H OR A563 DH
WASHERS – ASTM F436
GALV ENTIRE ROD, NUTS, AND WASHERS PER ASTM A153 CL C

REV:

PRINTS ISSUED

FOR	#	DATE	FOR	#	DATE	FOR	#	DATE
PE	E	10-18-11						
H-drill		10-20-11						
APP	E	12-13-11						

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DAVID L. COWELL
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PROFESSIONAL ENGINEER
10-18-11

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P.O. BOX 128
MARCELINE, MO 64658

CUSTOMER: VENTURE ELECTRIC CO.

PROJECT: CONTRACT NO. DTEORT-2011
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING PROJECT
RICHMOND METROPOLITAN AUTHORITY

SUBJECT: ANCHOR BOLT FABRICATION DETAILS FOR TOLL GANTRY STRUCTURE

FILE: 5953 ANCHOR BOLT		DATE: 10-13-11	PKG: A	
PRINTED FOR: RICHMOND METRO AUTHORITY	DR BY: TAP	CH BY: CLH	JOB NO: HF-5953	SHEET AB1

COWELL ENGINEERING
STRUCTURAL ENGINEERS

October 18, 2011

Craig Hengstenberg
Hurtt Fabricating
P.O. Box 128
Marceline, MO 64658

RE: Independent Review
Sign Structures and Foundations
Project: HF - 5953 Toll Gantry Structure
Richmond, VA

Dear Craig:

This office has reviewed the drawings provided for the above referenced project to determine compliance with the AASHTO standards entitled: Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (2003) and AASHTO Standard Specifications for Highway Bridges (2002), and the VDOT Road and Bridge Standards.

The review consisted of verifying the input values from the supplied drawings, comparing the drawing against the referenced standard/specification and performing computations to verify some of the computer generated numbers when needed.

Cowell Engineering, LLC has the required independent status necessary for review. Neither the company nor any of its employees have any affiliations (past or present) with any manufacturer, supplier, or contractor associated with traffic structures.

Based upon this review and to the best of my knowledge and belief, the submitted drawings are in compliance with the pertinent passages of the above referenced AASHTO specifications.

Yours very truly,
COWELL ENGINEERING

David L. Cowell, P.E.
W.O. # 11040

COMMONWEALTH OF VIRGINIA
David L. Cowell
Lic. No. 030335
PROFESSIONAL ENGINEER
10-18-11

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Saint Louis, Missouri 63143
314.644.4002 OFFICE
314.644.1988 FAX
www.cowelleng.com

HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN, version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

Truss # = GN
File Name: 5953GNTY.DAT
Hurtt Job # = HF 5953
Item # =
State Job # =
State Project = DTEORT-2011
DOWNTOWN EXPY

County = RICHMOND, VA
VMS (Y/N) = N

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16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * * * TRUSS DESIGN * * * * * * * * * *

TRUSS DIMENSIONS (FT)			PANEL LENGTH (FT)	
LENGTH	DEPTH	WIDTH	CENTER	END
44.50	3.00	3.00	3.71	1.85

WIND VELOCITY MPH	NUMBER OF SIGNS	DIST L	WALK DESIGN LENGTH	WALK DESIGN WGT/FT	NUMBER OF PANELS CENTER	NUMBER OF PANELS END
90.00	2	0.00	0.00	0.00	10	4

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16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * * TRUSS DESIGN * * * * * * * * * *

S I G N D A T A

SIGN NO.	SIGN LENGTH	nids	SIGN HEIGHT	CD	Kz	DISTANCE FROM LS	DISTANCE CENTER	ECCN	WGT
1	33.00	6	1.50	1.30	1.00	5.75	22.25	-2.25	1816.00
2	44.00	8	0.25	1.30	1.00	-38.50	22.25	1.50	6044.00

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HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN, version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * * * TRUSS DESIGN * * * * * * * * * * *

TRUSS DEPTH = 3.00 FEET
TRUSS WIDTH = 3.00 FEET
DEFLECTION = 0.372 IN.
CAMBER REQUIRED = 0.906 IN.

	L-WIND FORCE (LBS.)	L-DEAD WEIGHT (LBS.)	R-WIND FORCE (LBS.)	R-DEAD LOAD (LBS.)
CASE 1	0.0	5440.4	0.00	5440.4
CASE 2	1979.2	5440.4	1979.20	5440.4
CASE 3	989.6	6364.0	989.60	6364.0

COMMONWEALTH OF VIRGINIA
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16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * * * TRUSS CHORDS * * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	NUMBER OF 0.625" BOLTS(A325)	NUMBER OF 0.75" BOLTS(A325)	NUMBER OF 0.875" BOLTS(A325)
45.00	4	4.00	3.00	2.00

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
4x4x.375	50.00	2.86	2.10	0.79	1764.00

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	18620.4	6510.6	23269.4	6.69
CASE 2	26535.4	9278.1	30948.3	7.17
CASE 3	25127.1	8785.7	30948.3	6.79

COMMONWEALTH OF VIRGINIA
10-18-11
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OVERHEAD ANGLE SIGN SUPPORT DESIGN, version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * * * WIND DIAGONAL * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.62	20	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2.5x2.5x.25	36.00	1.19	0.71	0.49	378.55

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	11268.4	0.00
CASE 2	1661.3	1396.0	14986.9	0.45
CASE 3	830.6	698.0	14986.9	0.22

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16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * WIND DIAGONAL END PANEL * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
3.32	8	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2.5x2.5x.25	36.00	1.19	0.71	0.49	108.80

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	11268.4	0.00
CASE 2	1193.7	1003.1	14986.9	0.32
CASE 3	596.8	501.6	14986.9	0.16

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16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * * * WIND STRUT * * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
2.75	30	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	201.30

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	14905.6	0.00
CASE 2	989.6	1384.1	19824.4	0.27
CASE 3	494.8	692.0	19824.4	0.13

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OVERHEAD ANGLE SIGN SUPPORT DESIGN, version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * * DEAD LOAD DIAGONAL * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.62	20	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	225.28

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	7865.1	11000.1	19800.0	2.83
CASE 2	7865.1	11000.1	26334.0	2.12
CASE 3	8716.5	12190.9	26334.0	2.35

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OVERHEAD ANGLE SIGN SUPPORT DESIGN, version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * DEAD LOAD DIAGONAL END PANEL * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
3.32	8	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	64.75

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	5651.4	7904.1	19800.0	2.03
CASE 2	5651.4	7904.1	26334.0	1.53
CASE 3	6263.2	8759.8	26334.0	1.69

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OVERHEAD ANGLE SIGN SUPPORT DESIGN, version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * * * DEAD LOAD VERTICAL * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
2.75	30	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	201.30

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	4685.2	6552.7	14905.6	1.68
CASE 2	4685.2	6552.7	19824.4	1.27
CASE 3	5192.4	7262.1	19824.4	1.40

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Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * * * INTERIOR DIAGONAL * * * * * * * * * *

LENGTH = 3.55 NUMBER REQUIRED = 15

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	LENGTH OF 0.19" FILLET WELD	LEAST ROG	WEIGHT
1.75x1.75x0.13	36.00	0.42	1.50	0.35	76.75

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	9849.5	1.50
CASE 2	27.3	13.6	13099.8	0.01
CASE 3	0.0	0.0	13099.8	0.00

COMMONWEALTH OF VIRGINIA
DAVID L. COWELL
Lic. No. 030335
PROFESSIONAL ENGINEER
10-18-11

HURTT FABRICATING CORP., MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
Version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:49

* * * * * * * * * * * COLUMN DESIGN * * * * * * * * * * *

HEIGHT (FT) TOTAL	HEIGHT (FT) TRUSS	DIAMETER (IN)	THICKNESS (IN)	YIELD STRENGTH (KSI)	WEIGHT (LB)
21.83	20.08	10.75	0.3650	42	885

	AXIAL (LBS)	MOMENT (FT-LB)	TORQUE (FT-LB)	SHEAR (LBS)	FA ALLOW	FB ALLOW	FV ALLOW	CSR
CASE 1 COMBINATION 1	6271	60672	0	0	8637	27720	13860	0.940
CASE 2 COMBINATION 1	6271	80056	24395	2246	11487	36868	18434	0.995
CASE 2 COMBINATION 2	6271	76940	14637	1477	11487	36868	18434	0.912
CASE 3 COMBINATION 1	7152	78220	12197	1266	11487	36868	18434	0.927
CASE 3 COMBINATION 2	7152	78385	7318	833	11487	36868	18434	0.918

COMMONWEALTH OF VIRGINIA
10-18-11
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HURTT FABRICATING CORP., MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
Version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:49

* * * * * * * * * TRUSS MOUNTING PLATE * * * * * * * * * *

WIDTH A [IN]	WIDTH B [IN]	THICKNESS C [IN]	GUSSET DEPTH D [IN]	THICKNESS E [IN]	WEIGHT [LBS]
36.00	13.75	0.750	12.00	0.500	177

WELD SIZE-W2 (1/16")	WELD SIZE-W3 (1/16")
5	4

COMMONWEALTH OF VIRGINIA
10-18-11
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HURTT FABRICATING CORP., MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
Version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:49

* * * * * * * * * * ANCHOR BOLT DESIGN * * * * * * * * * *

DIAMETER [IN]	EMBEDMENT LENGTH [IN]	YIELD STRENGTH (KSI)	MAXIMUM TENSION [LBS]	WEIGHT [LBS]
2.50	50.00	55.00	61229	323

* * * * * * * * * * * BASE PLATE * * * * * * * * * * *

DIMENSIONS [IN]	BOLT SPACING [IN] X	BOLT SPACING [IN] Y	EDGE DISTANCE [IN]	WEIGHT [LBS]
18.25 x 18.25 x 2.00	10.75	10.75	3.75	188.89

WELD SIZE-W4 (1/16")
5.00

Total Weight of Column Plates & Anchor Bolts = 1573.64 LBS.
Total Weight of Truss, Column, Plates & Anchor Bolts = 2972.28 LBS.

COMMONWEALTH OF VIRGINIA
DAVID L. COWELL
Lic. No. 030335
PROFESSIONAL ENGINEER
10-18-11

HURTT FABRICATING CORP.
MARCELINE, MO.

Vertical (Single Pole) Pipe Support for Cantilever
Using More Than 4 Anchor Bolts

TRUSS NUMBER	Gantry
OUR JOB NUMBER	HF-5953
RUN DATE	10-17-2011

The end column will be attached to a concrete footing using
6 - 1.5 in. anchor bolts with a Fy= 55 KSI,
with a bolt circle of 16.75 inches having a S = 35.4 cu-in

Check Bolt 1.5 inch diameter, Tensile Area = 1.41 Sq in
Root Area = 1.29 Sq in

Bolt Tension	=	38.23	Kips/bolt
Bolt Shear	=	0.37	Kips/bolt
Bolt Torsion	=	5.83	Kips/bolt

Increase allowable by 1.33 because of wind loads.
Ft = .5(Fy)1.33 = 36.67 Ksi Fv = .3(Fy)1.33 = 21.95 Ksi

fv = (0.37 + 5.83)K / 1.29 Sq in= 4.81 Ksi
fv < Fv or 4.81 ksi < 21.945 ksi OK

ft = 38.23 K / 1.41 Sq in= 27.12 Ksi
ft < Ft or 27.12 ksi < 36.67 ksi OK

k= Fv/Ft= 0.60 $(fv)^2 + (k*ft)^2 < Fv^2$
23.10 + 263.36 = 286.5 < 482 OK

Use the 1.5 inch anchor bolts.
and minimum edge distance of 2.25 in < 3 in OK

Weld base plate to pipe with 5/16" fillet welds & 6 - 3/4" thick stiffener plates located 30 degrees off the centerline of the hole with 5/16" fillet welds. . Capacity of the 5/16" weld and the the stiffner plates will exceed the strength of the pipe column.

Plate Fy = 36 KSI, Fb = .66(Fy) = 24.00 Ksi

Check Base Plate Thickness of Dia. = 22.75 inch & 1.75 inch thickness

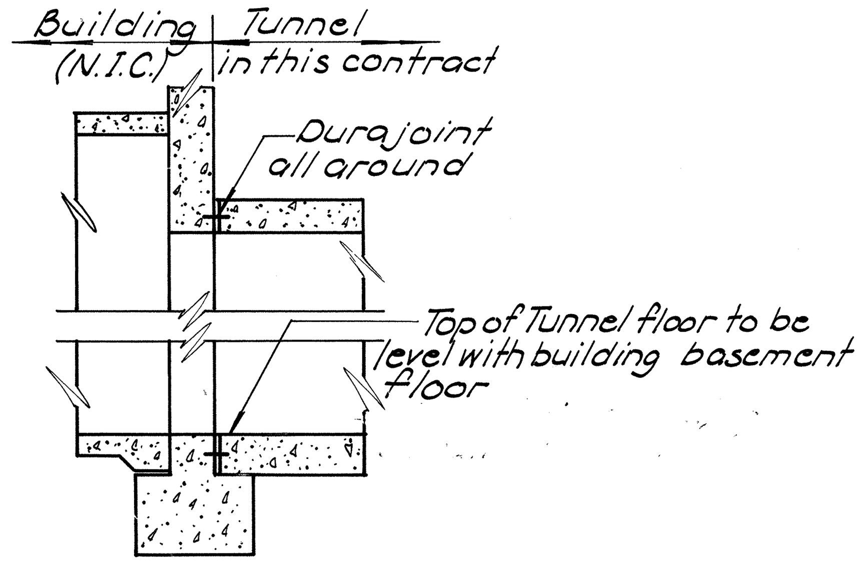
Distance between gussets =	9.67	in		Moment =	9[illegible]	in-kips
width of resistance =	6.00	in				
plate thickness required =	1.70	<	1.75	in		OK

COMMONWEALTH OF VIRGINIA
DAVID L. COWELL
Lic. No. 030335
PROFESSIONAL ENGINEER
10-18-11

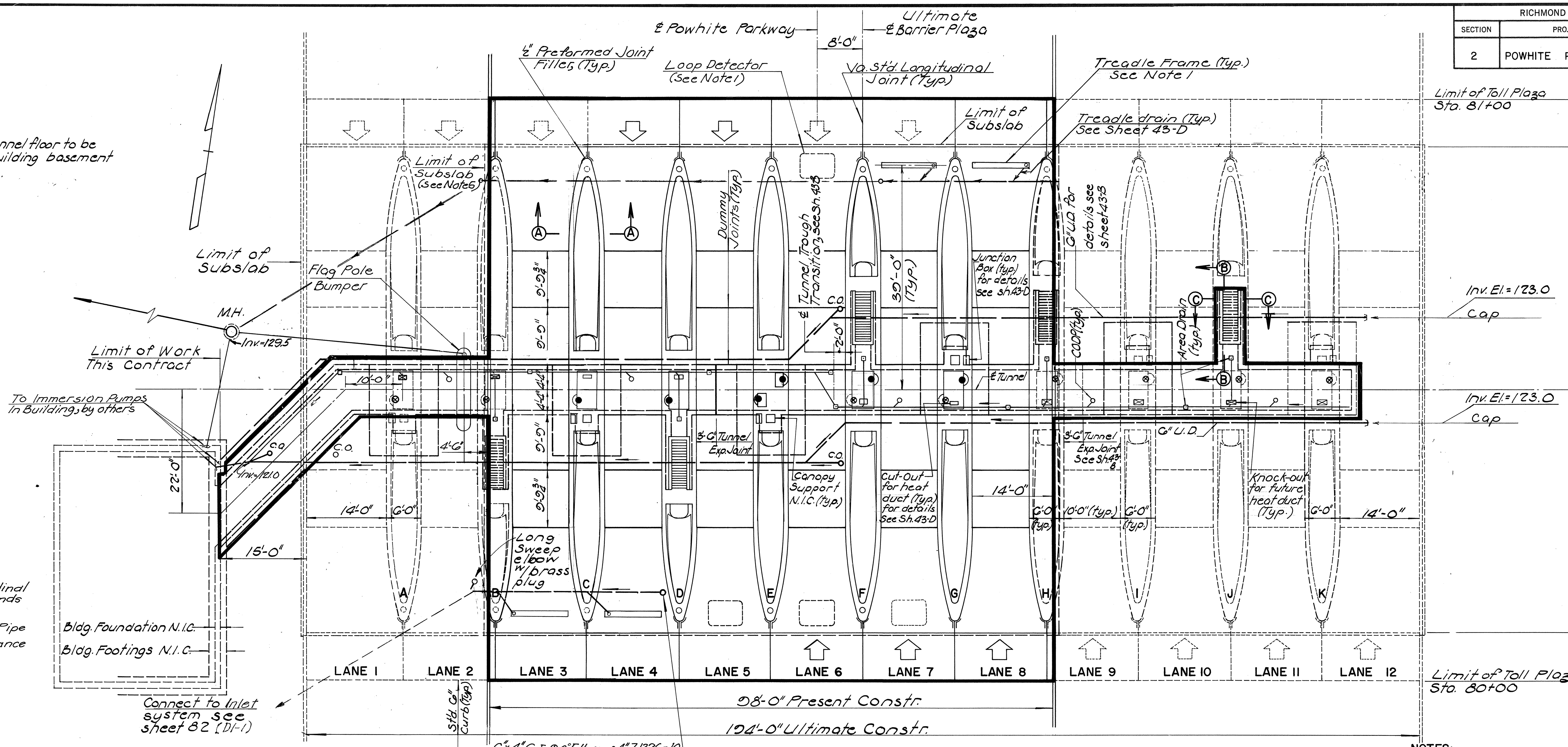
NORTHBOUND POWHITE PARKWAY TOLL PLAZA

ORIGINAL PLANS - ADMINISTRATION BUILDING & TOLL PLAZA

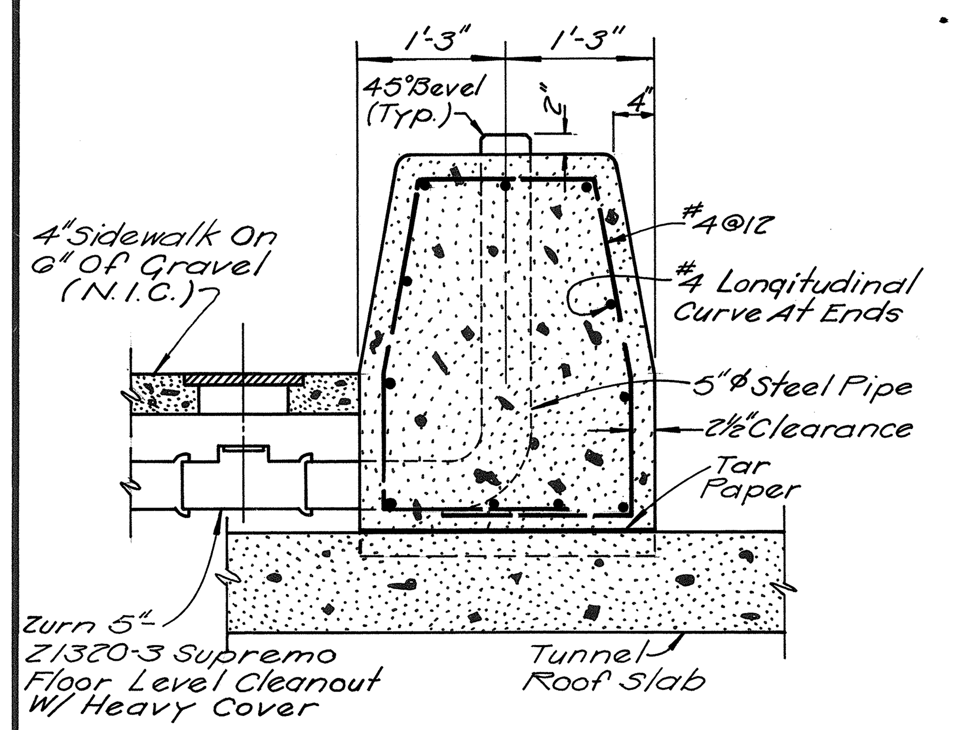
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	43	188



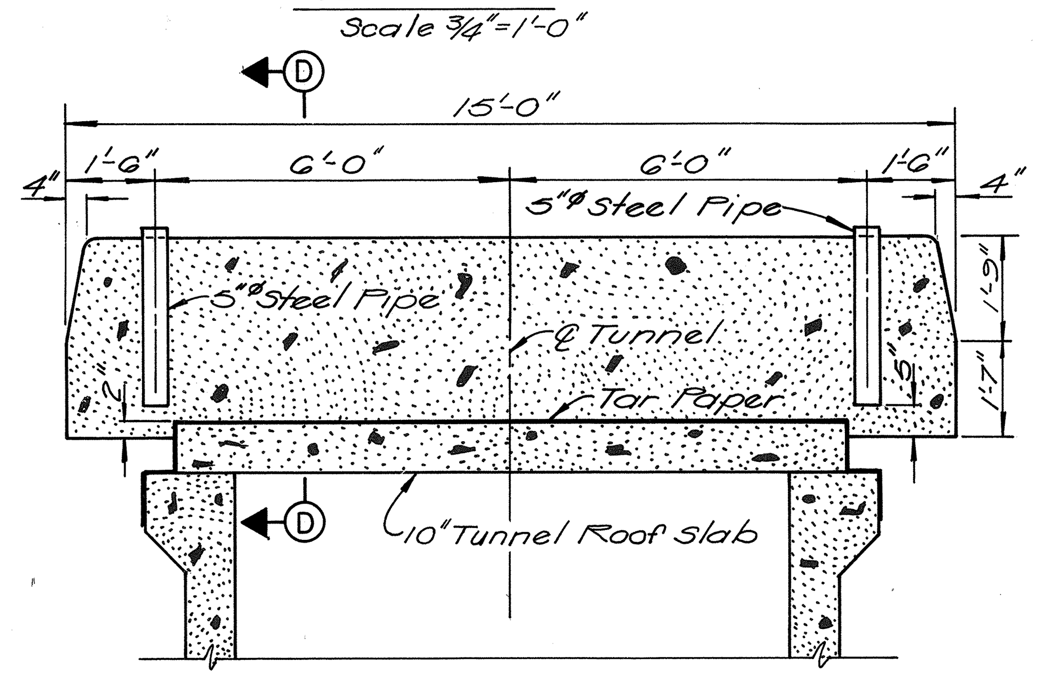
SECTION E-E
not to scale



PLAN
POWHITE PARKWAY BARRIER PLAZA
3/32" = 1'-0"



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



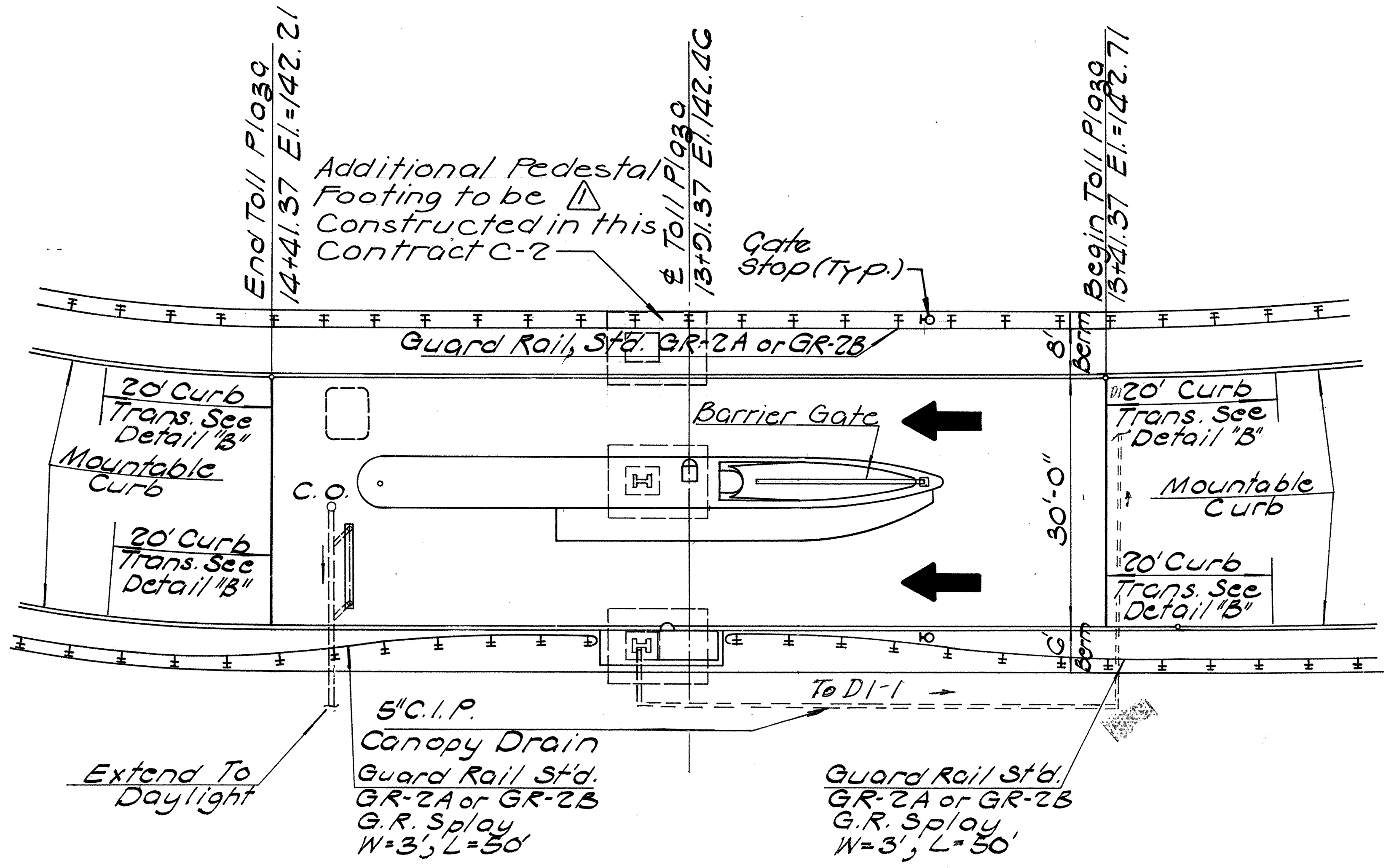
LONGITUDINAL SECTION THRU FLAG POLE BUMPER
Scale 3/8"=1'-0"

NOTES:

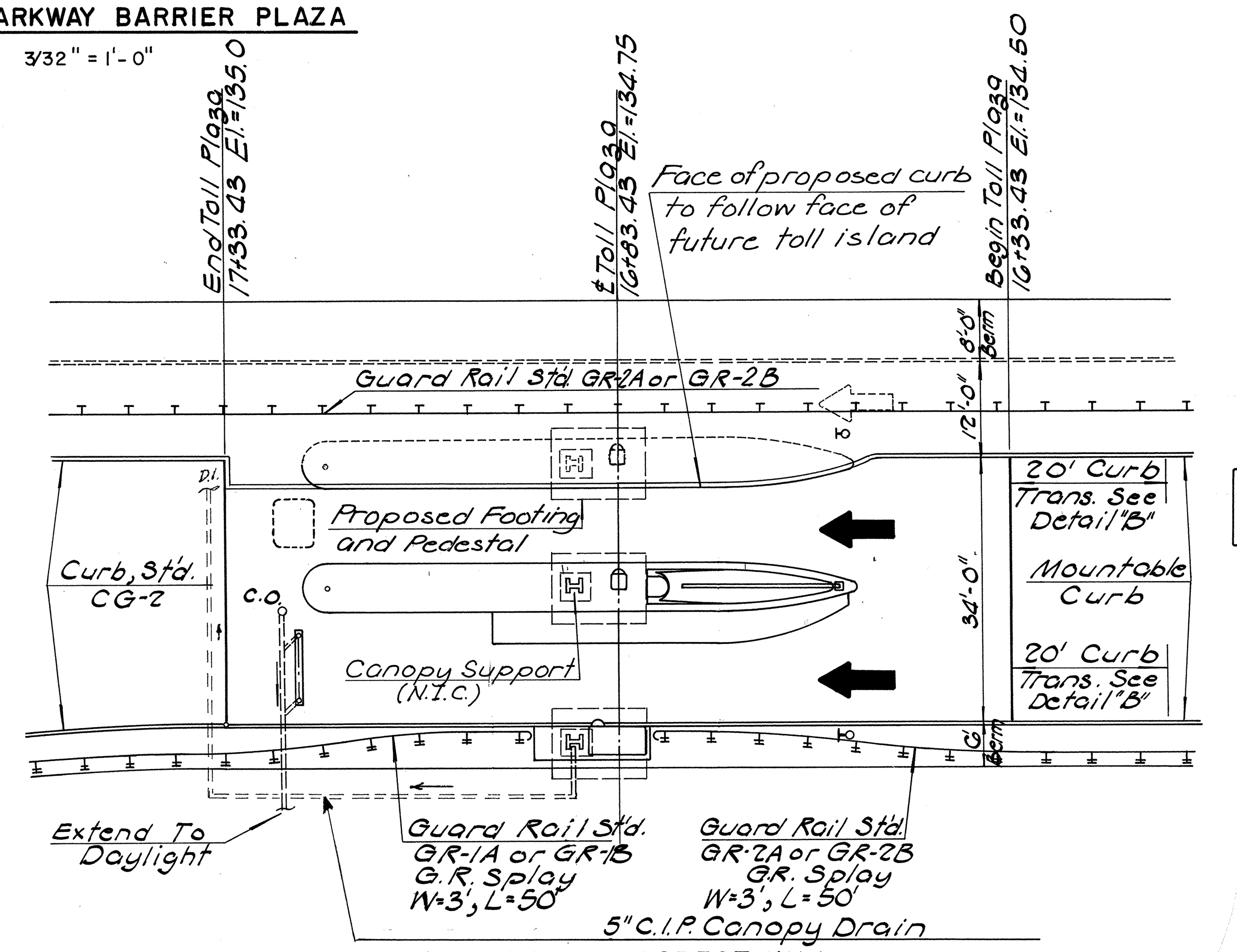
1) To be placed by Toll Equipment Contractor prior to the paving, under this Contract.
2) Tunnel drainage trough to begin at the building foundation.
3) C.O.D.P. = Clean out Drain Pipe.
4) Sections A-A, B-B and C-C appear on sheet 43-B.
5) Place 5/8"ϕ Longitudinal hook bolts for future widening.

LEGEND:

- Location of future traffic signal.
- Traffic signal, (N.I.C.)
- Automatic Toll Machine, (N.I.C.)
- Future Automatic Toll Machine
- Toll Booth, (N.I.C.)
- Prop. Coin Tubes
- Future Coin Tubes



RAMP FOREST HILL - EAST
1/16" = 1'-0"



RAMP EAST - FOREST HILL
1/16" = 1'-0"

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

MAINLINE & RAMP

TOLL PLAZA PLANS

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

SCALE: As Noted
CONTRACT NO.: C-2
SHEET NO. 43 OF 188

	BY	DATE	NO.	REVISION	BY	DATE
MADE	GP	8/70	2	As Built	JRC	6-73
CHECKED	RWG		△	Rev. per Addendum 5, Amendment 4, Added Footing Pedestal	PMT GP	2/22/71
IN CHARGE JPF						


RICHMOND EXPRESSWAY SYSTEM
SECTION 2 | PROJECT POWHITE PARKWAY | SHEET NO. 43-A | TOTAL SHEETS 188
℄ Tunnel
50'-0"
40'-0"
10"Concrete Slab to follow grade of roadway longitudinally and is to be level transversely (Both sides of Tunnel)
Notes: (Continued)
7. For Island bumper blocks to receive 1½"φ Conduit, see sheet 43-G. For conduit termination, see Detail "A" sheet 43-F.
SECTION F-F
¼"=1'-0"
Notes:
1. Elev "A" at the Powhite Parkway Barrier Plaza = 134.08
2. For Pavement Profiles see sheets 83, 91 and 92.
3. Heat Duct cutouts at Islands C, D, F and G. Knock outs provided at all future Island locations. For details see sheet 43-D.
4. For coin tube recess details see sheet 43-D.
5. For Conduit placement zone see sheets 43-D & 43-F. For Conduit Layout see sheets 43-G through 43-I.
TRANSVERSE SECTION
ALUMINUM RAILING
½"=1'-0"
(For additional railing details, see sheet 43-C)
PLAN OF ISLAND WITH STAIRWAY
¼"=1'-0"
BOLT LAYOUT AT TRAFFIC LIGHT BASE
not to scale
SECTION D-D
½"=1'-0"
SECTION A-A
½"=1'-0"
SECTION E-E
½"=1'-0"
SECTION B-B
½"=1'-0"
NOTE:
Section B-B typical for Islands C, D, F & G. For all other Islands use Section E-E.
SECTION C-C
½"=1'-0"
STEP DETAIL
No Scale
DETAIL OF ANCHOR BOLT FOR TOLL BOOTH
3"=1'-0"
For Location see Island Plan this Sheet
* For dual lane Ramp Plaza this line is the bottom of Booth Pad and Roadway Pav't.
R.P.C.C. : Reinforced Portland Cement Concrete
AS BUILT
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY
BARRIER PLAZA
ISLAND AND TUNNEL DETAILS
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY
SCALE: AS NOTED
CONTRACT NO.: C-2
SHEET NO. 43-A OF 188
MADE W.J.W. 5-68
CHECKED D.E.N. 5-68
IN CHARGE H.D.S.
1 As Built JRC 6-73
NO. REVISION BY DATE

Notes:

1) Top & Bot. of Canopy footing will parallel slope of Tunnel floor.

2) Canopy Pedestal shall be vertical at all times.

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	43-B	188

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

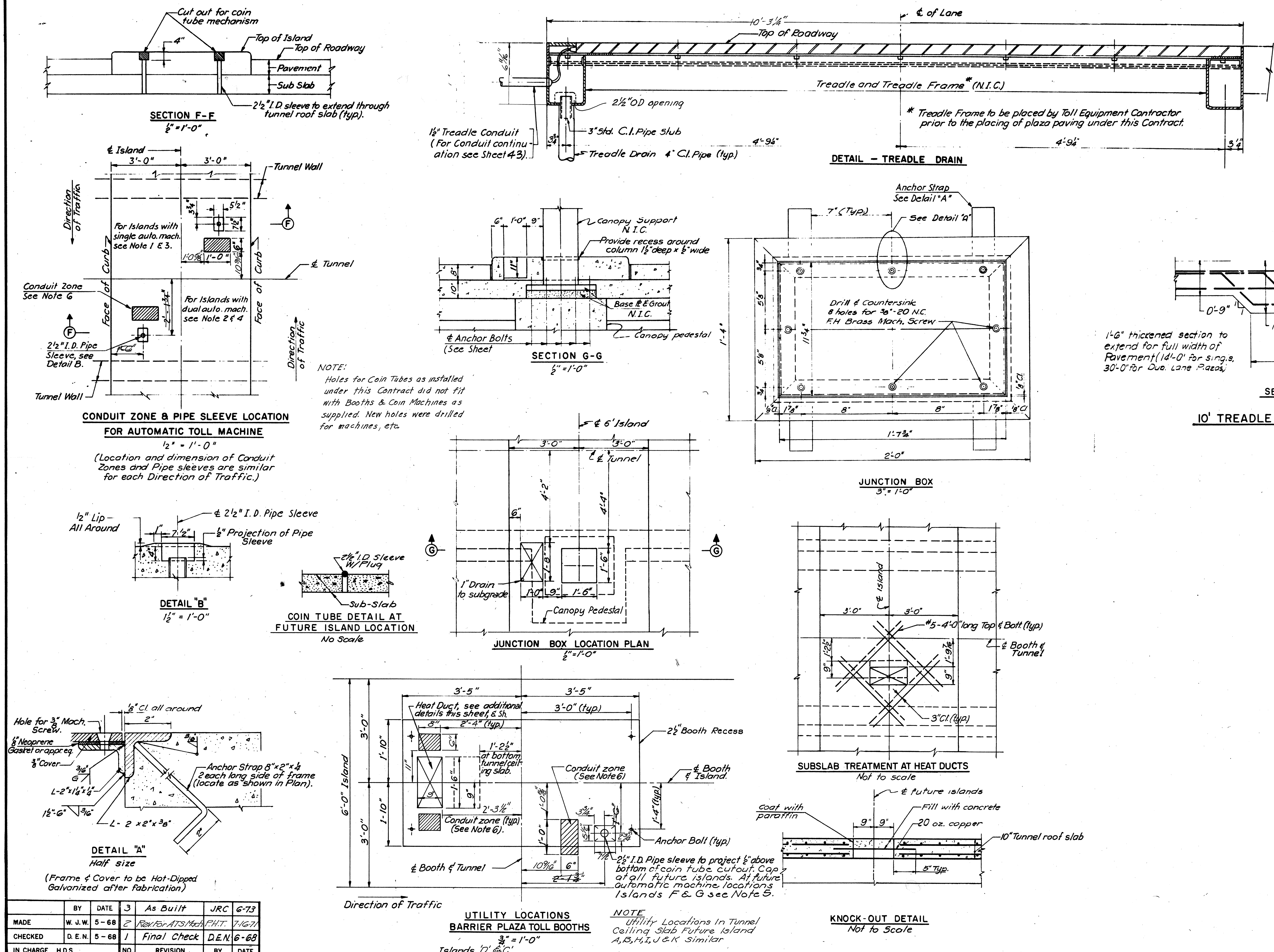
BARRIER PLAZA
TUNNEL DETAILS

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

SCALE: AS NOTED
CONTRACT NO.: C-2
SHEET NO. 43-B OF 188

	BY	DATE	NO.	REVISION	BY	DATE
MADE	W.J.W.	5-68	2	As Built	JRC	6-73
CHECKED	D.E.N.	5-68	1	Final Check	D.E.N.	6-68
IN CHARGE	H.D.S.		NO.	REVISION	BY	DATE

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	43-D	188



	BY	DATE	NO.	REVISION	BY	DATE
MADE	W. J. W.	5-68	3	As Built	JRC	6-73
CHECKED	D. E. N.	5-68	2	Rev. For ATS Mach.	P.H.T.	7-16-71
IN CHARGE	H.D.S.		1	Final Check	D.E.N.	6-68

NOTES:

1. Islands C & D will have a single coin tube and tube recess for automatic machine.
2. Islands E, F & G will have dual coin tubes and tube recesses for automatic machines. One location at each island will be for future automatic machines. See conduit layouts and Note 5.
4. All future island locations will have a single coin tube. Sleeve to be threaded and plugged.
5. For coin tube recesses at future automatic machine locations, plug 2½ I.D. sleeve at bottom of recess, then coat bottom and sides of recess with paraffin and fill with concrete.
6. Conduits to or from toll booths or automatic machines are to be placed totally within zones shown. For Conduit Layouts and details see Sheets 43-F through 43-I.

AS BUILT

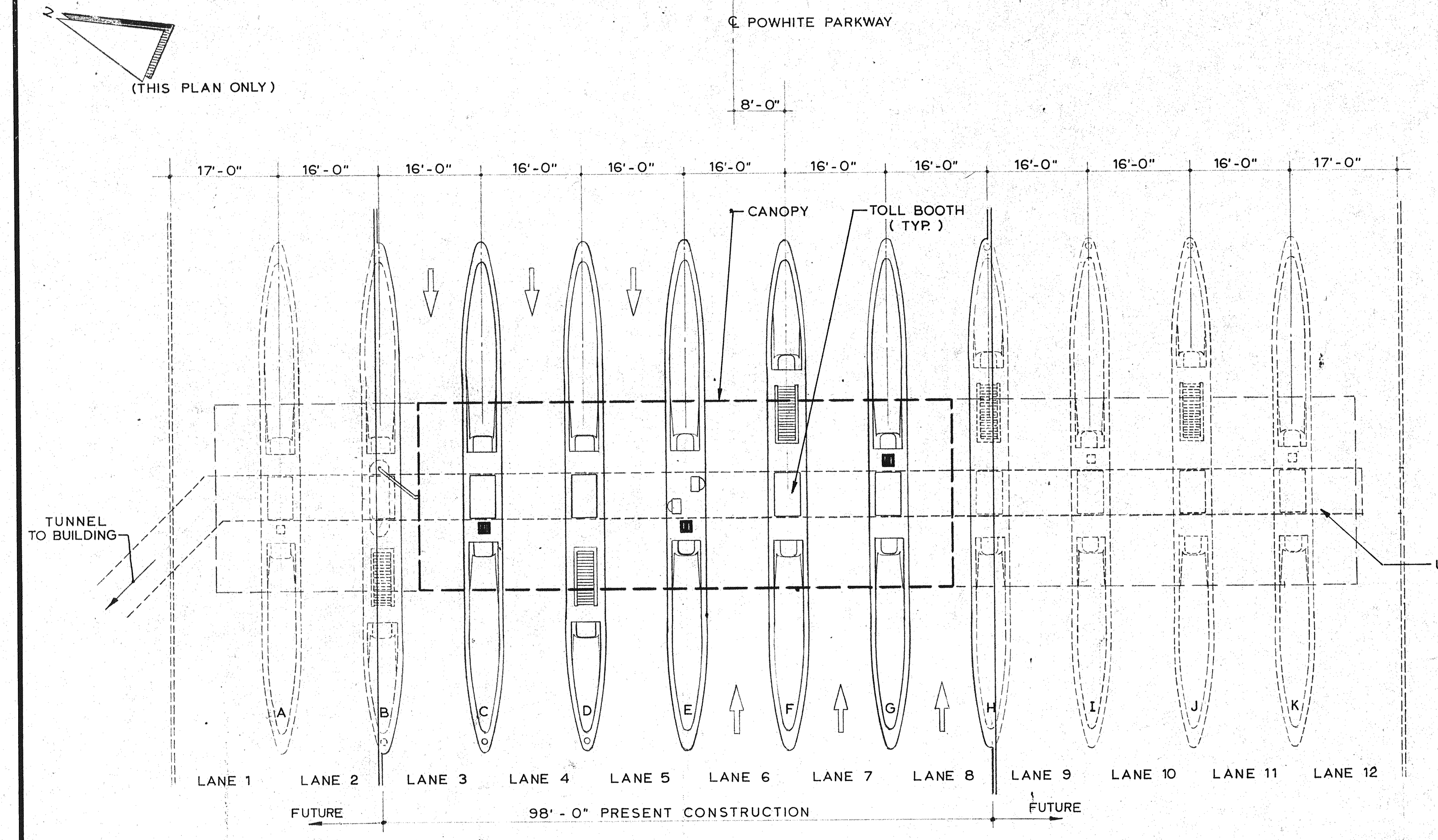
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

MISCELLANEOUS DETAILS

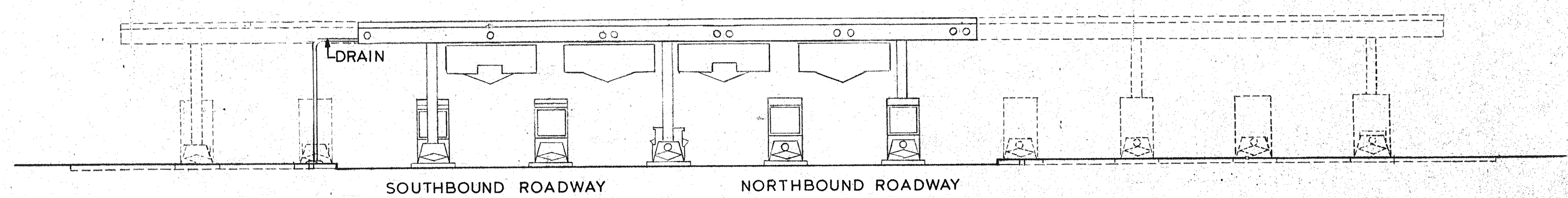
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS NOTED
CONTRACT NO.: C-2
SHEET NO. 43-D OF 188

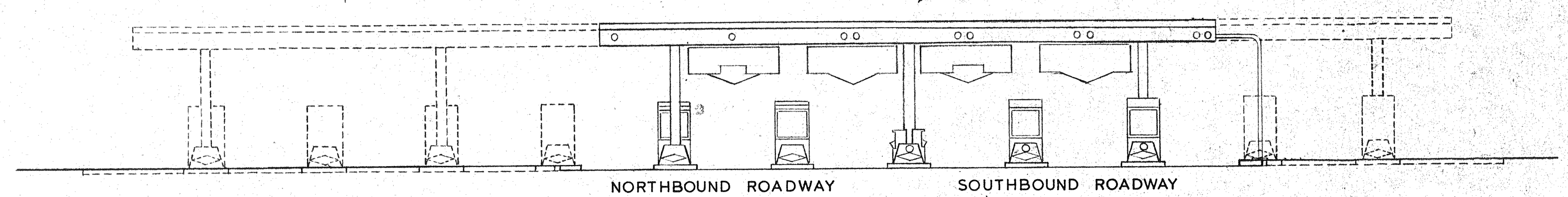
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-2	TOLL FACILITIES	12	26



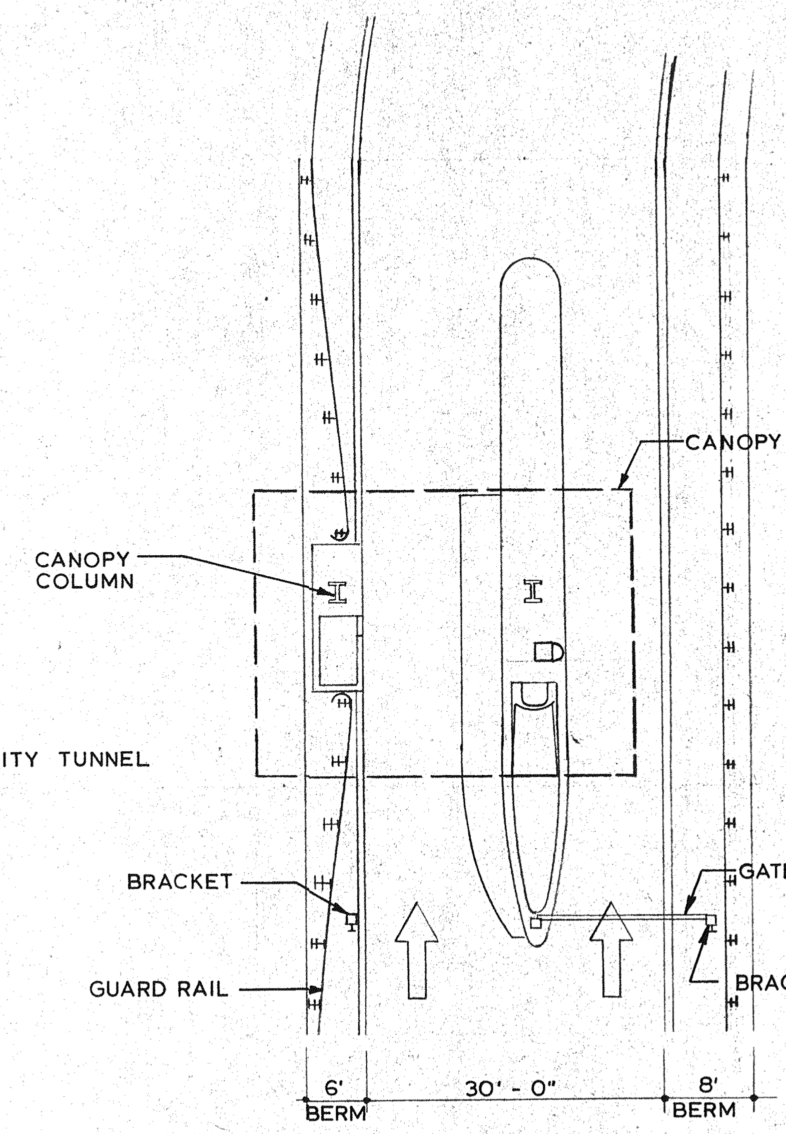
PLAN



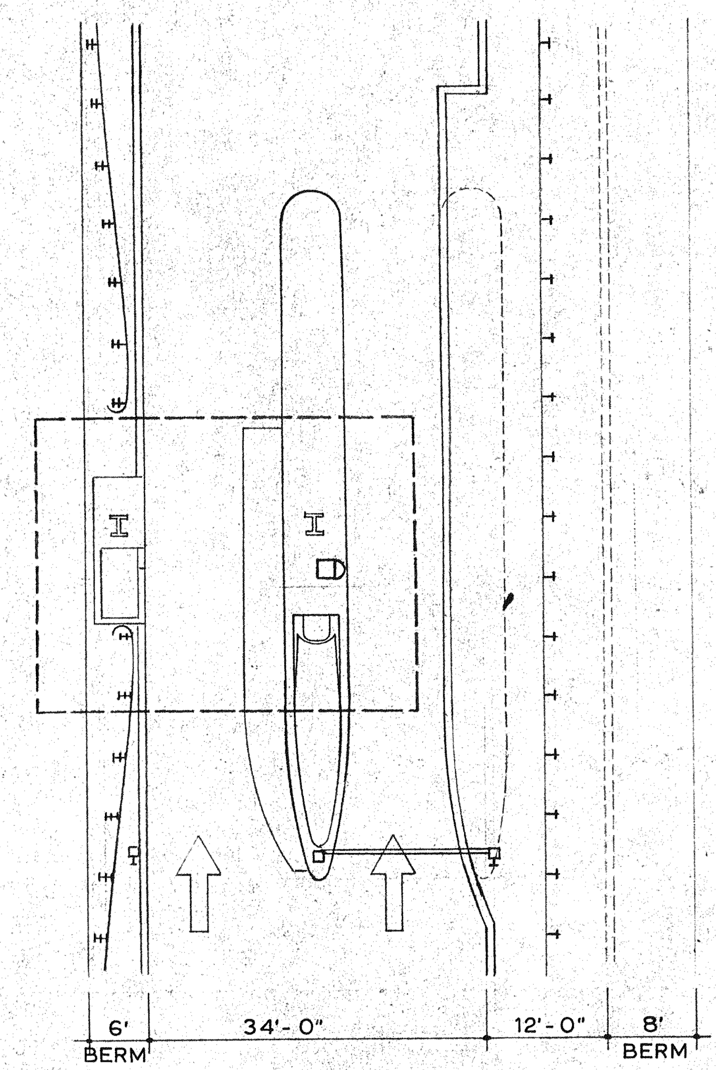
EAST ELEVATION



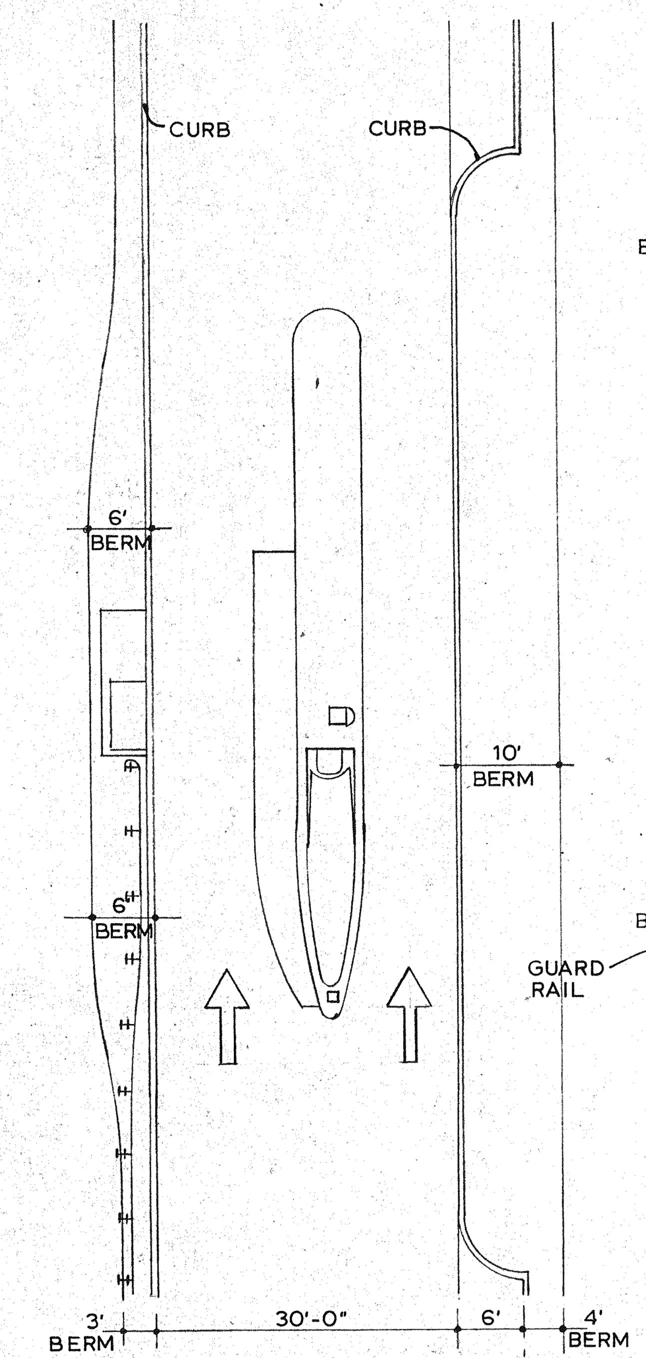
WEST ELEVATION



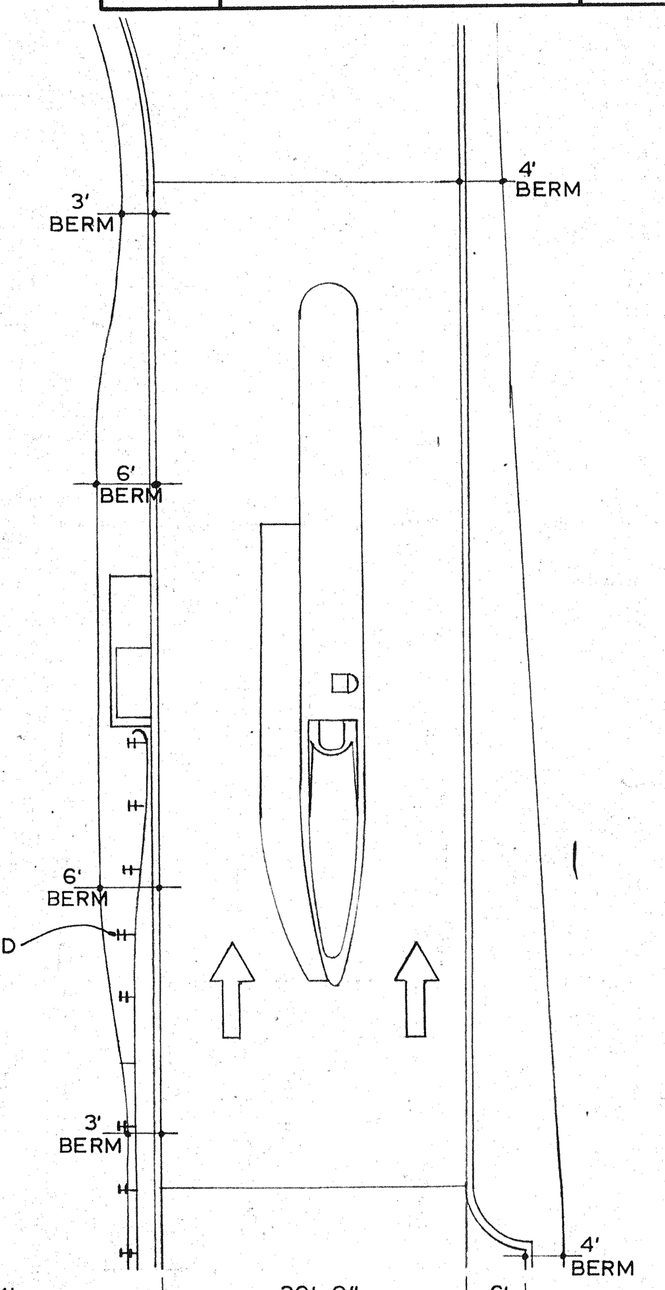
PLAN
RAMP FOREST HILL - EAST



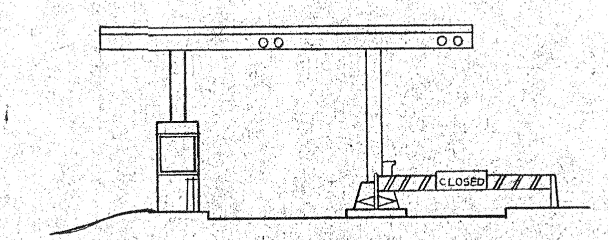
PLAN
RAMP EAST - FOREST HILL



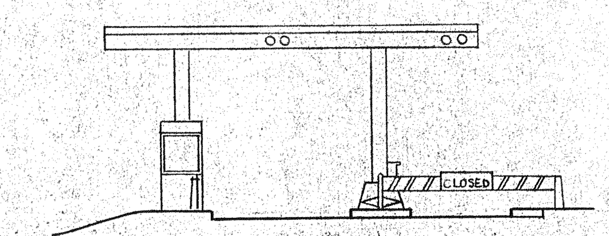
PLAN
RAMP DOUGLASDALE - NORTH



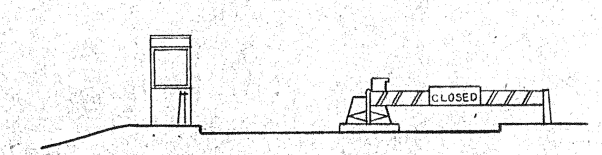
PLAN
RAMP NORTH - DOUGLASDALE



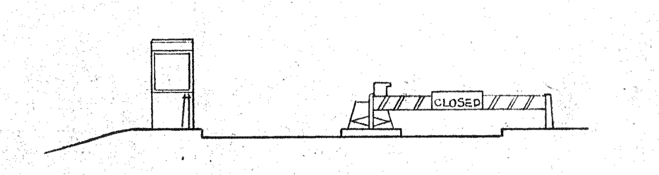
ELEVATION
RAMP FOREST HILL - EAST



ELEVATION
RAMP EAST - FOREST HILL



ELEVATION
RAMP DOUGLASDALE - NORTH



ELEVATION
RAMP NORTH - DOUGLASDALE

NOTE:
THIS SHEET IS INTENDED FOR ORIENTATION ONLY. PARTS OF THE WORK SHOWN HERE ARE INCLUDED IN THIS CONTRACT.

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

TOLL FACILITIES
PLANS & ELEVATIONS

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

SCALE: 1/16" = 1'-0"
CONTRACT NO.: TF-2
SHEET NO. 1b OF 15

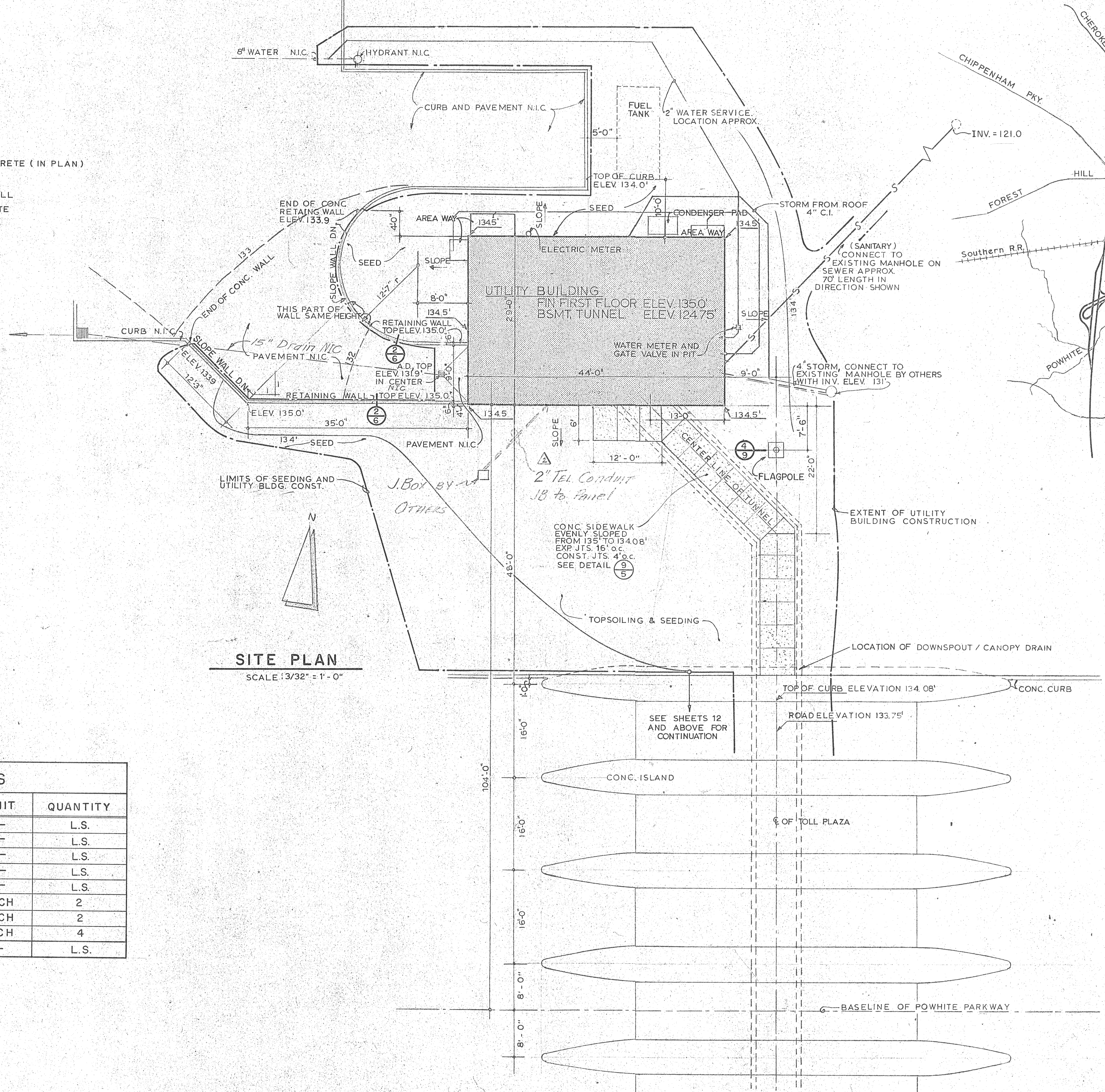
	BY	DATE				
MADE	R.M.	7-31-71				
CHECKED	KL.	2-20-72				
IN CHARGE J.P.F.			NO.	REVISION	BY	DATE

INDEX OF SHEETS

LEGEND

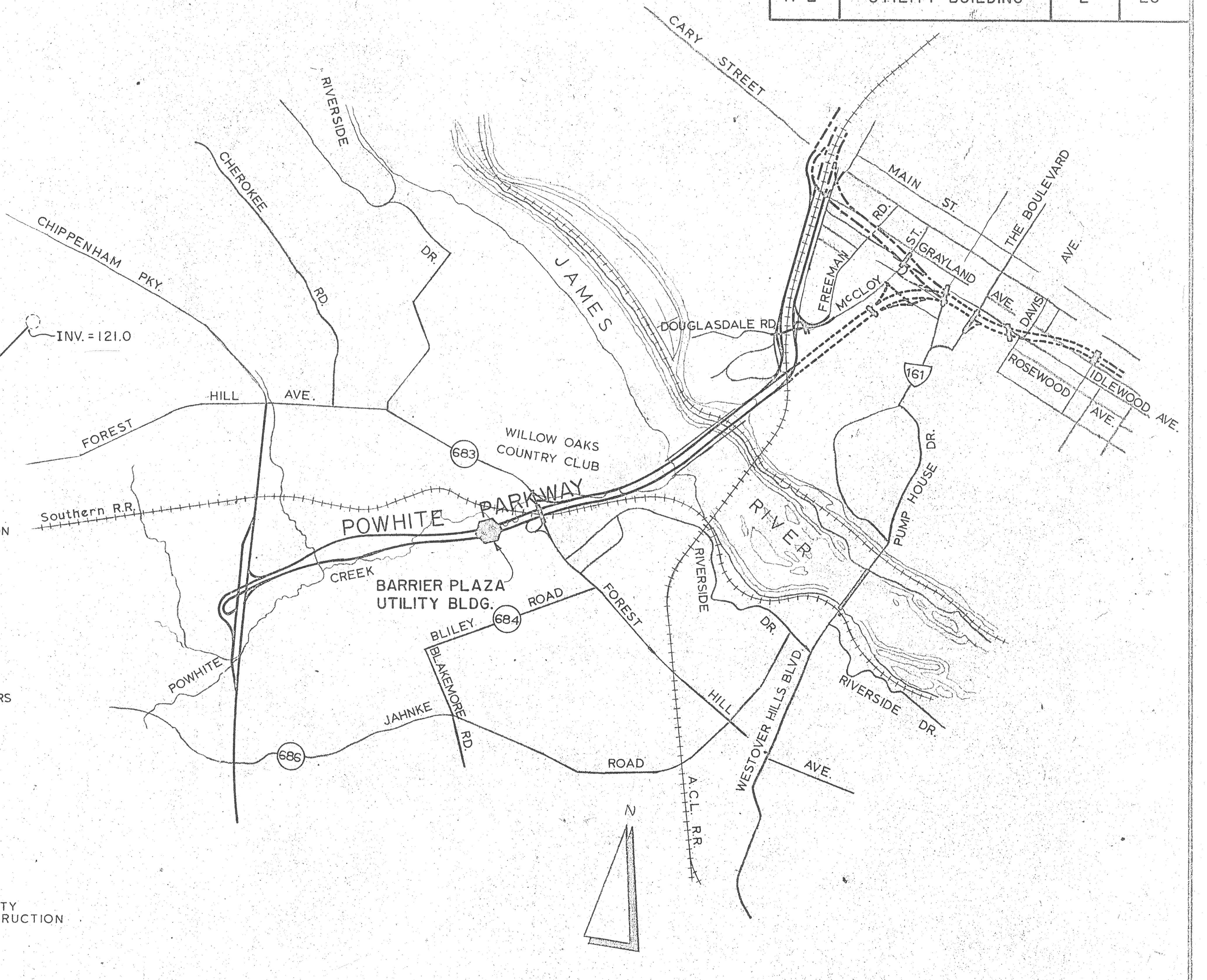
133	EXISTING GRADE LINES
134	PROPOSED GRADE LINES
	PROPOSED SIDEWALK OR CONCRETE (IN PLAN)
	PROPOSED CONC. CURB N.I.C.
	PROPOSED CONC. RETAINING WALL
	EXTENT OF CONTRACT, SEE NOTE
—S—S—	PROPOSED SANITARY SEWER
	PROPOSED STORM SEWER
	DETAIL NUMBER / SHEET NUMBER
N.I.C.	NOT IN CONTRACT
A.D.	AREA DRAIN

NOTE:
FOR UTILITY BLDG. AND IMMEDIATE SURROUNDINGS.



SITE PLAN

SCALE 3/32" = 1'-0"



VICINITY MAP

NO SCALE

SUMMARY OF PAY ITEMS

ITEM DESCRIPTION	UNIT	QUANTITY
Utility Building - General Construction	—	L.S.
Utility Building and Tunnel - Plumbing	—	L.S.
Utility Building and Tunnel - HVAC	—	L.S.
Utility Building and Tunnel - Electrical	—	L.S.
Canopy at Barrier Plaza	—	L.S.
Ramp Plaza With Canopy	EACH	2
Ramp Plaza Without Canopy	EACH	2
Installation of Toll Booth at Barrier Toll Plaza	EACH	4
Mobilization	—	L.S.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	KL.	7-31-71	△	Tel. Conduit Added	JRL	7/72
CHECKED	KL.	2-20-72	△	4" Storm Pipe	RTC	6/72
IN CHARGE J.P.F.						

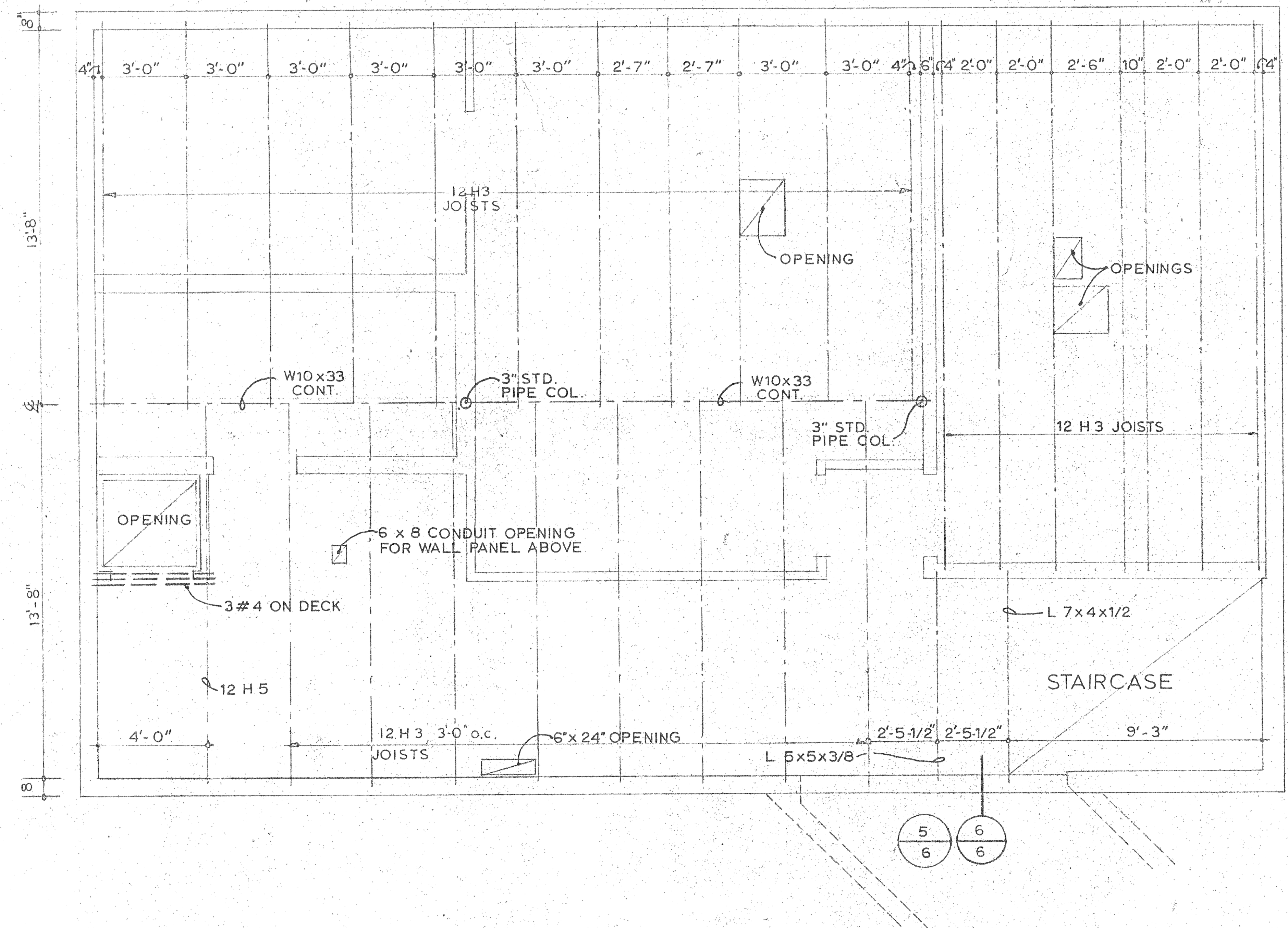
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

UTILITY BUILDING
SITE PLANS

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

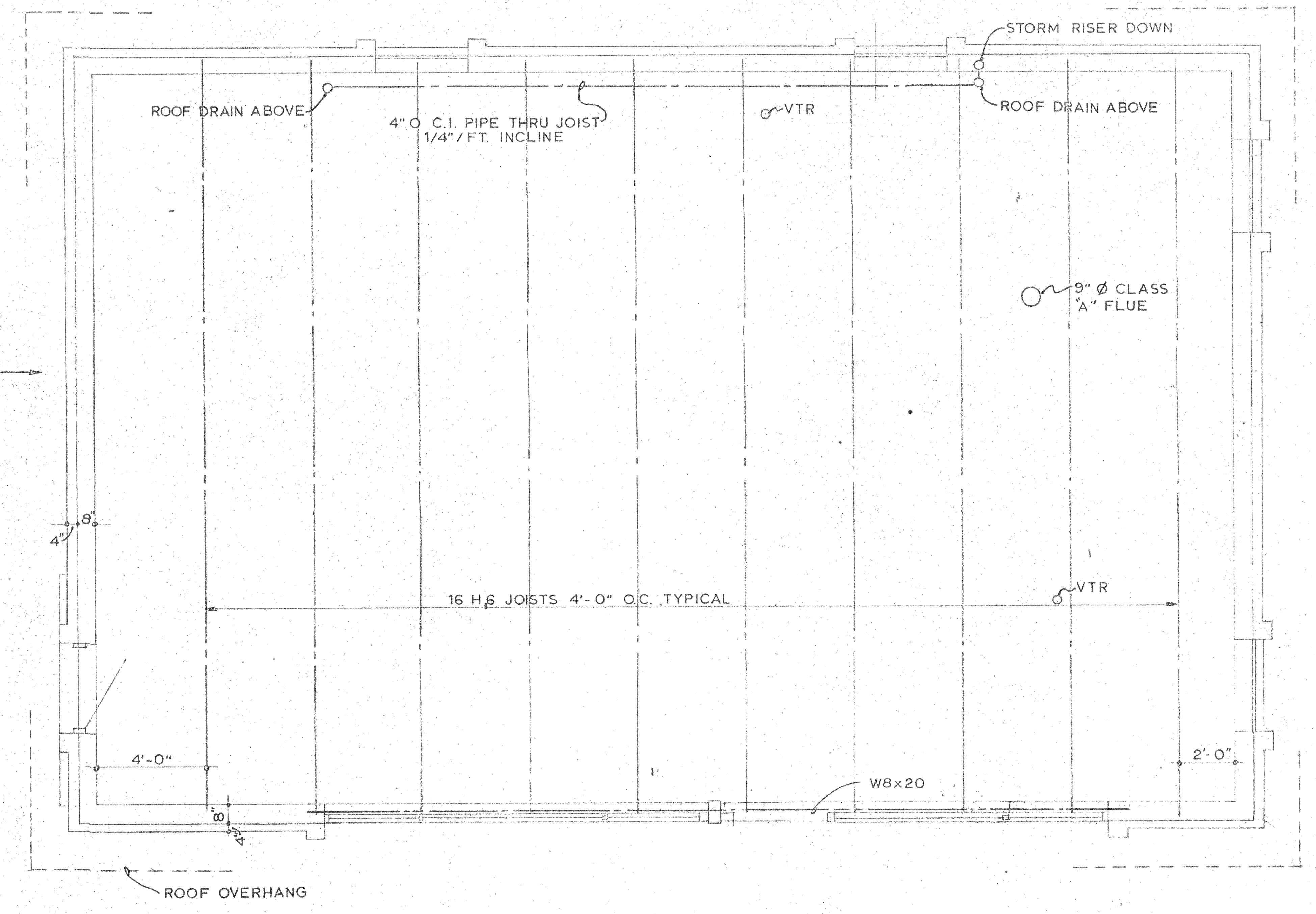
SCALE: AS SHOWN
CONTRACT NO.: TF-2
SHEET NO. 2 OF 11

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-2	UTILITY BUILDING	3	26

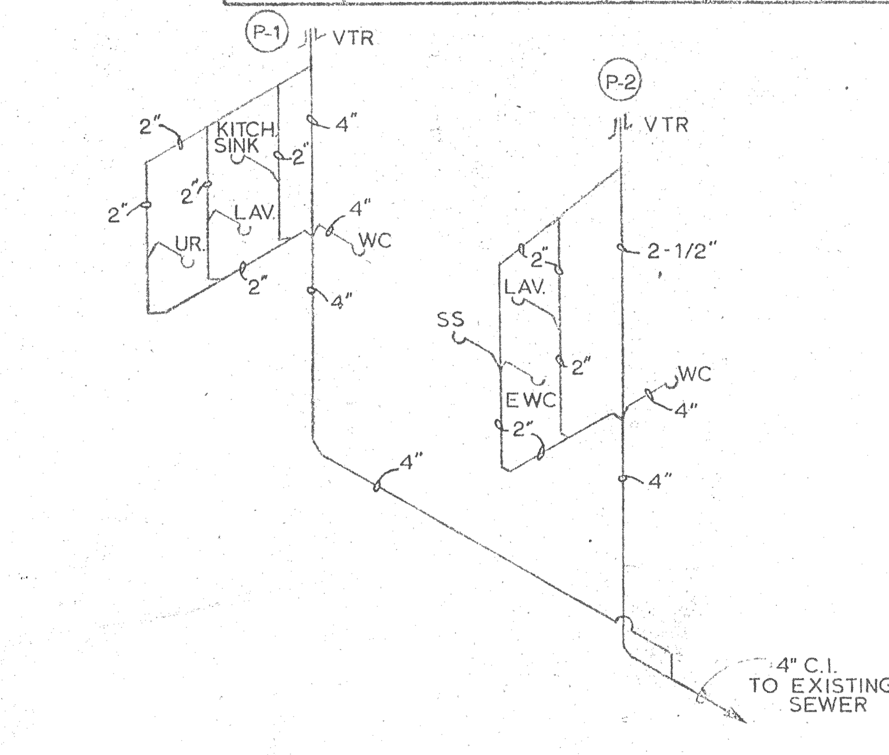


NOTE:
BRIDGING OF JOISTS IS NOT INDICATED

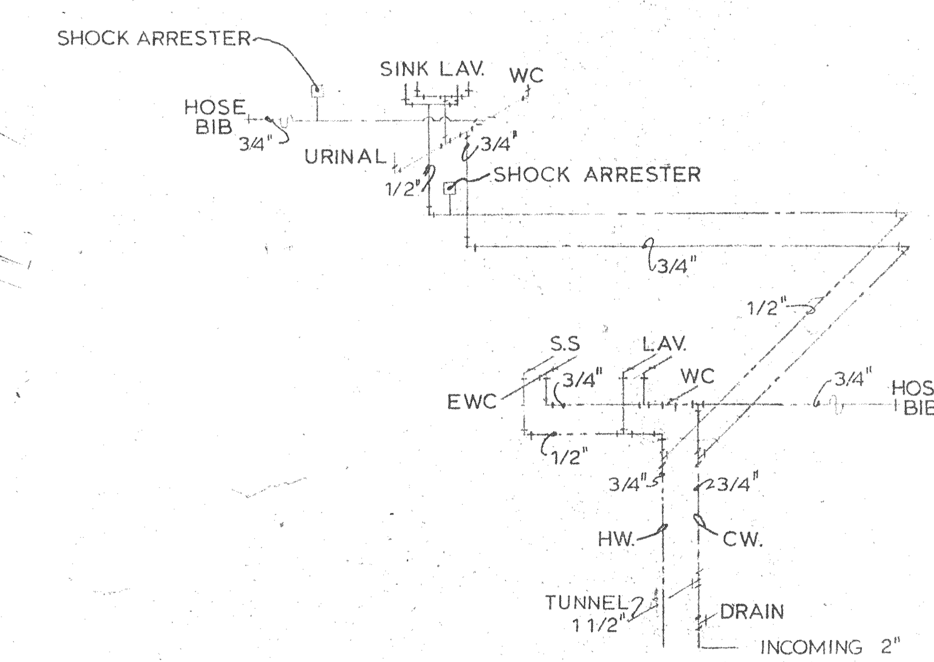
BASEMENT DECK PLAN
SCALE: 1/4" = 1'-0"



ROOF DECK PLAN
SCALE: 1/4" = 1'-0"



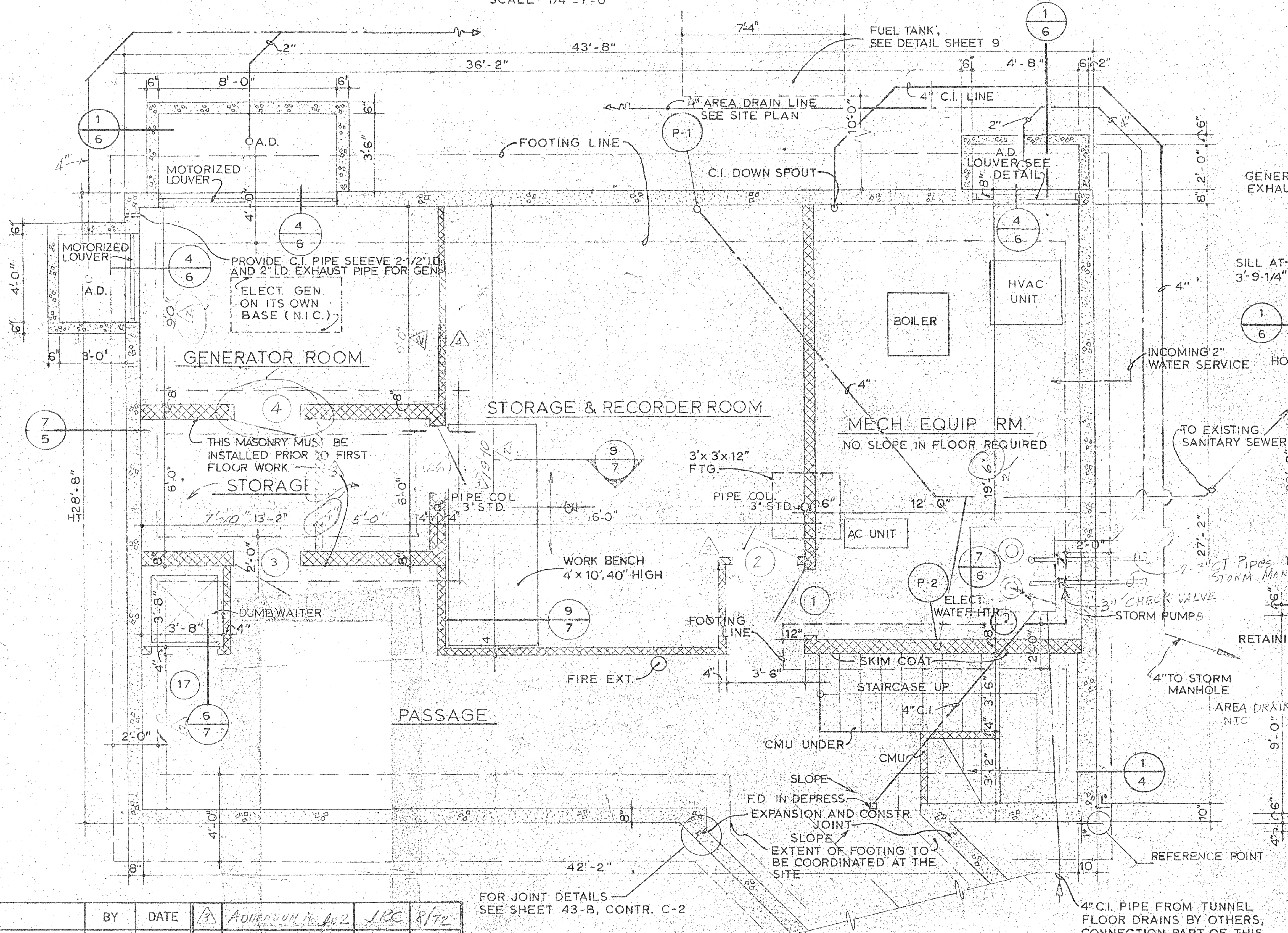
SOIL WASTE & VENT DIAGRAM



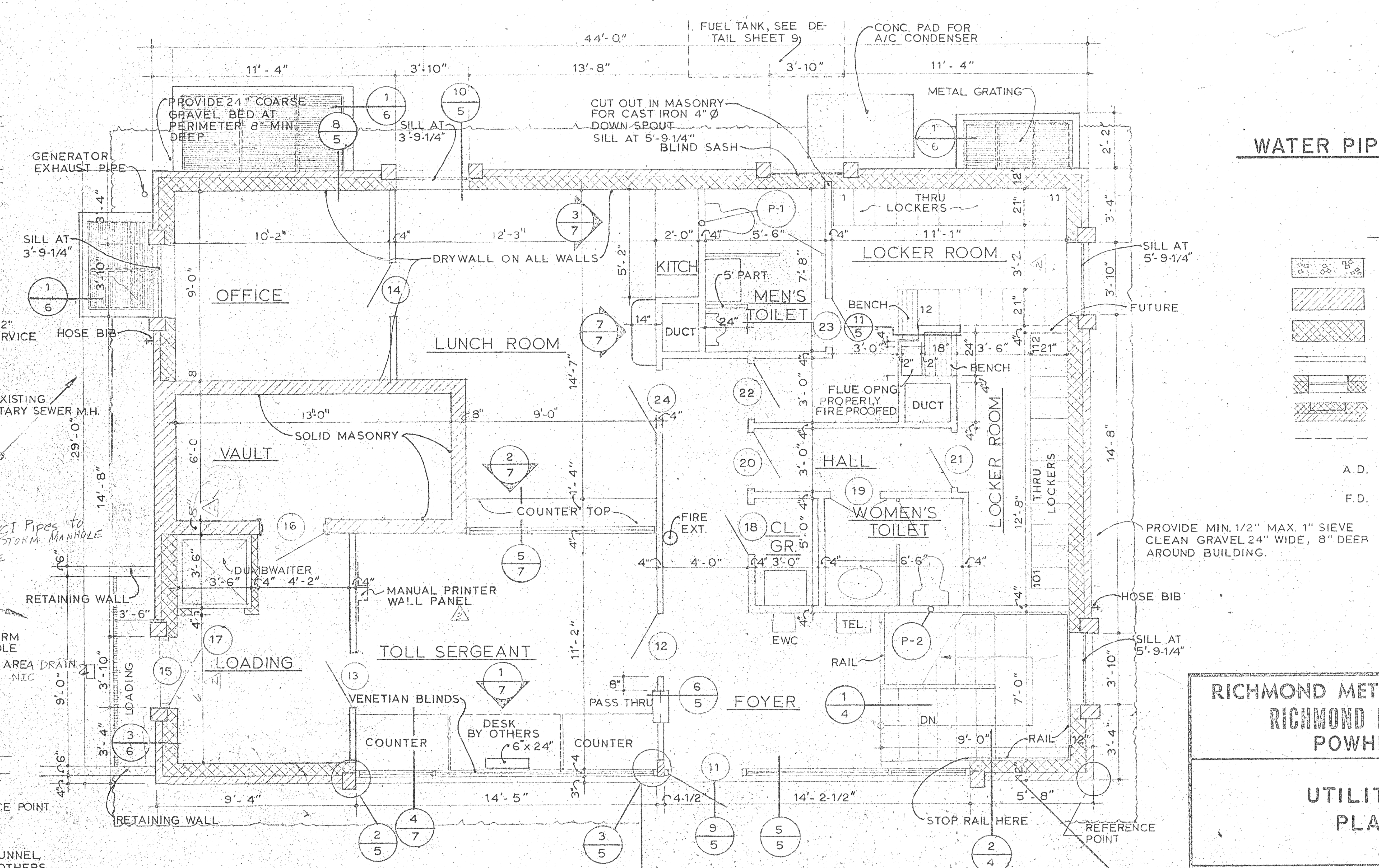
WATER PIPING DIAGRAM

LEGEND

- CONCRETE
- BRICK MASONRY
- CONCRETE MASONRY
- WOOD STUD PARTITION
- WINDOW
- VOID IN MASONRY
- ITEMS BY OTHERS
- A.D. AREA DRAIN
- F.D. FLOOR DRAIN



BASEMENT FLOOR PLAN
SCALE: 1/4" = 1'-0"



FIRST FLOOR PLAN
SCALE: 1/4" = 1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	R.B.M.	7-31-71	3	ADDENDUM No. 2	JRC	8/72
CHECKED	K.L.	7-31-71	2	Revise Dispensing	JRC	7/72
IN CHARGE	J.P.F.		1	STORM PUMPS	RTC	6/72

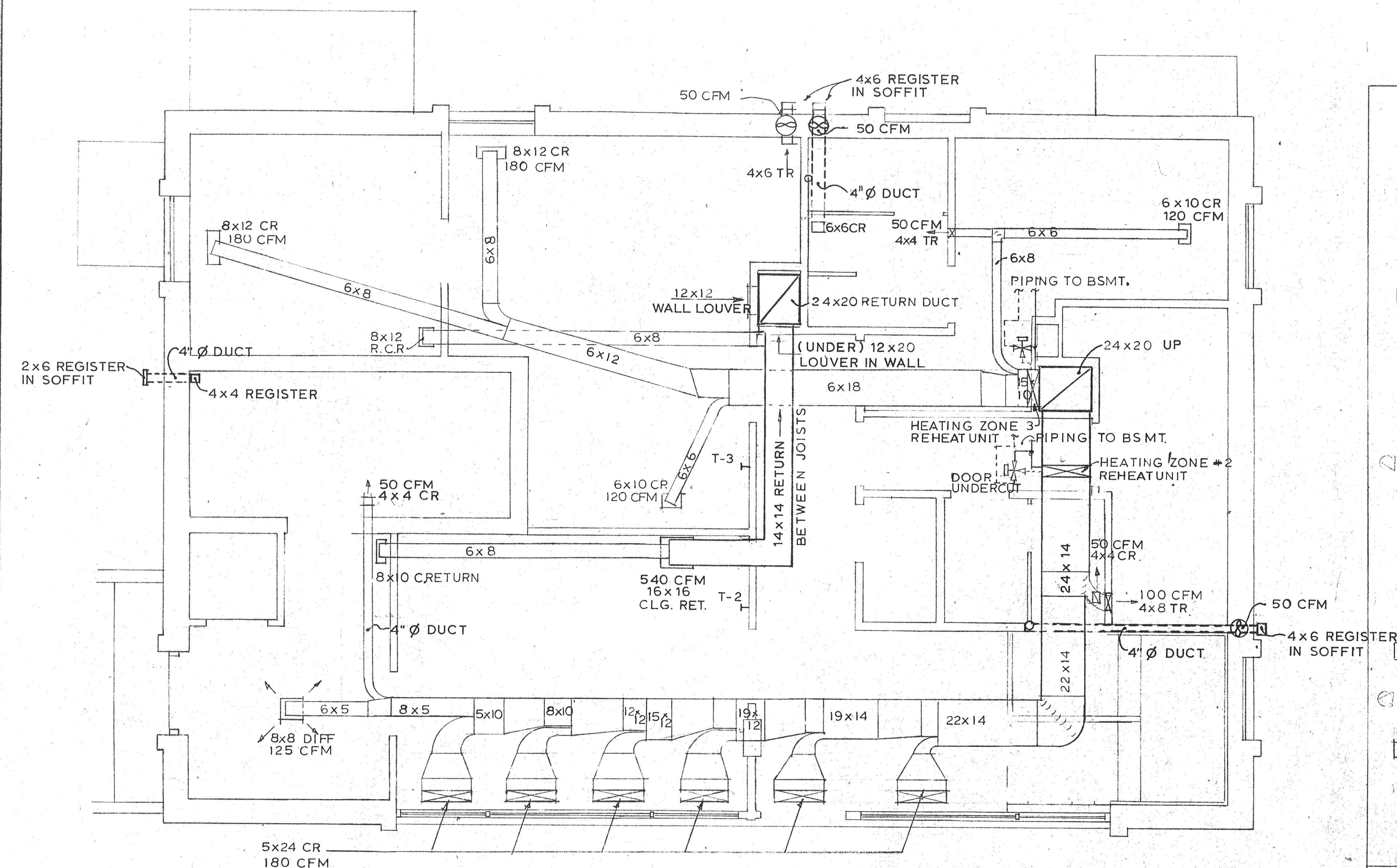
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

UTILITY BUILDING
PLANS & MISC.

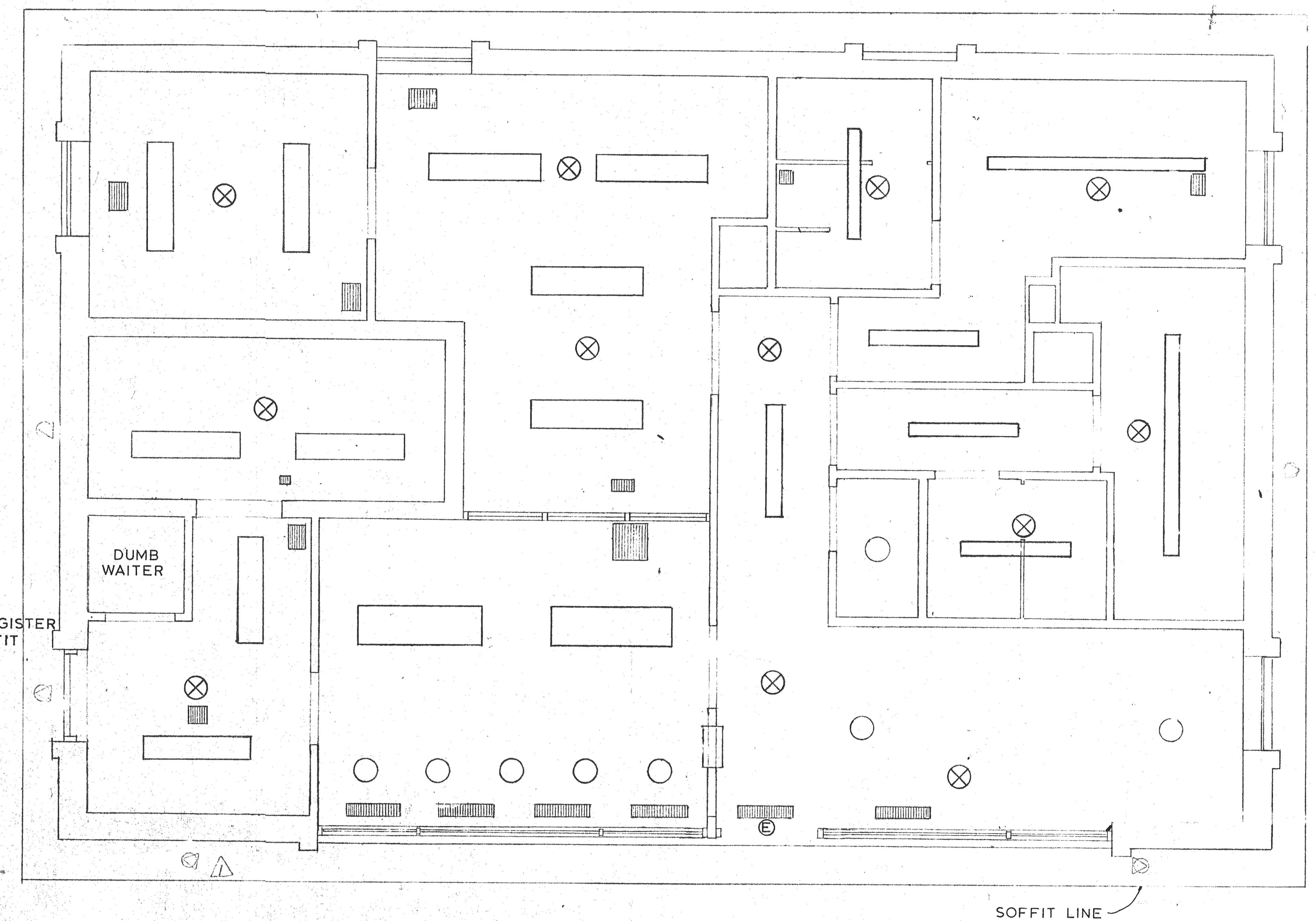
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1/4" = 1'-0"
CONTRACT NO. TF-2
SHEET NO. 3 OF 11

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-2	UTILITY BUILDING	8	26



FIRST FLOOR HEATING PLAN



FIRST FLOOR CEILING PLAN

LEGEND

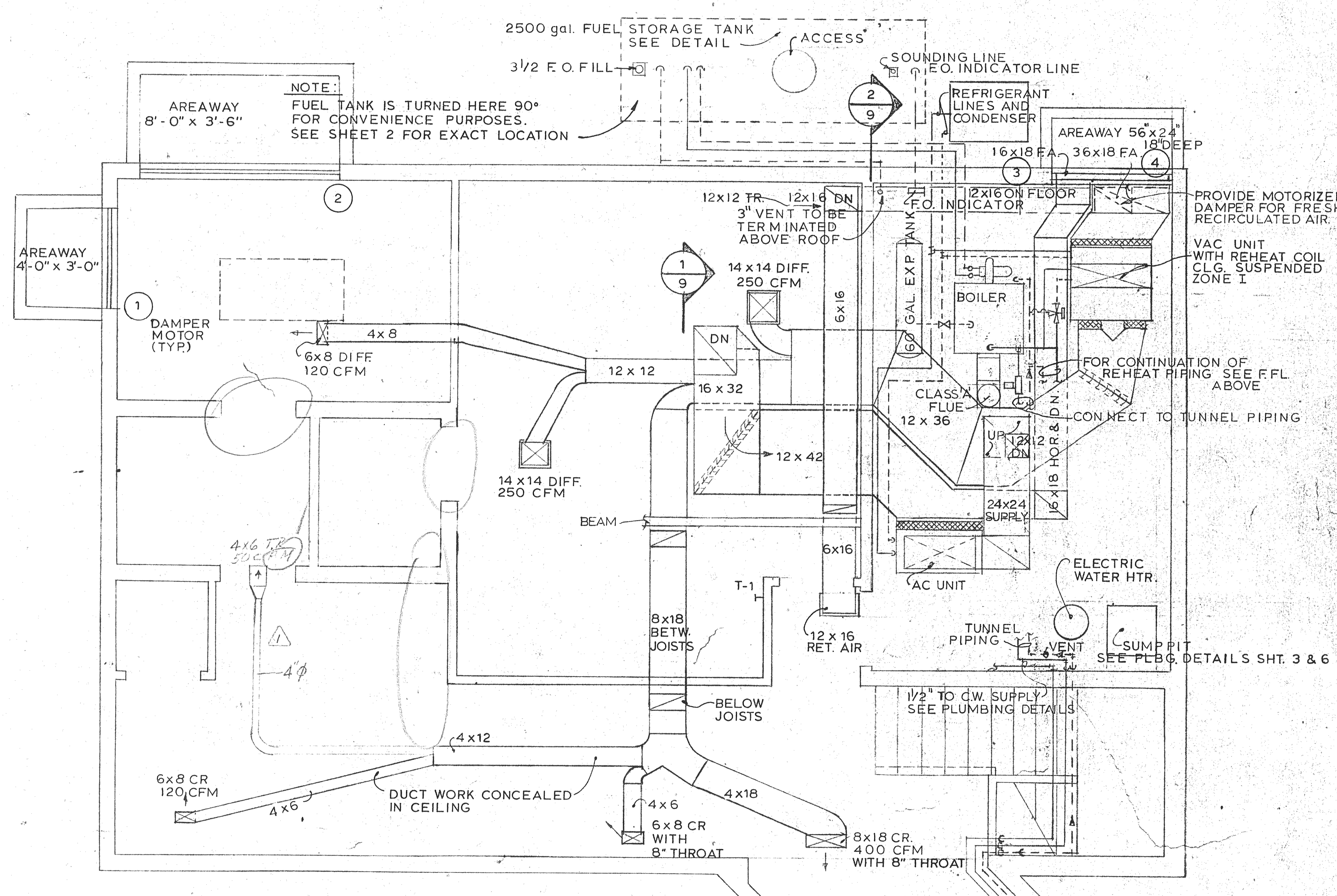
	PARTITION
6x12	DUCT (SIZE)
	FLUORESCENT FIXTURE
	INCANDESCENT FIXTURE
	EMERGENCY INCAND. FIXTURE
	CLG. AIR REGISTER
	EXHAUST FAN

ABBREVIATIONS

TR	TOP REGISTER
CR	CEILING REGISTER
CFM	CUB. FT./MIN.
CW	COLD WATER

MOTOR SCHEDULE

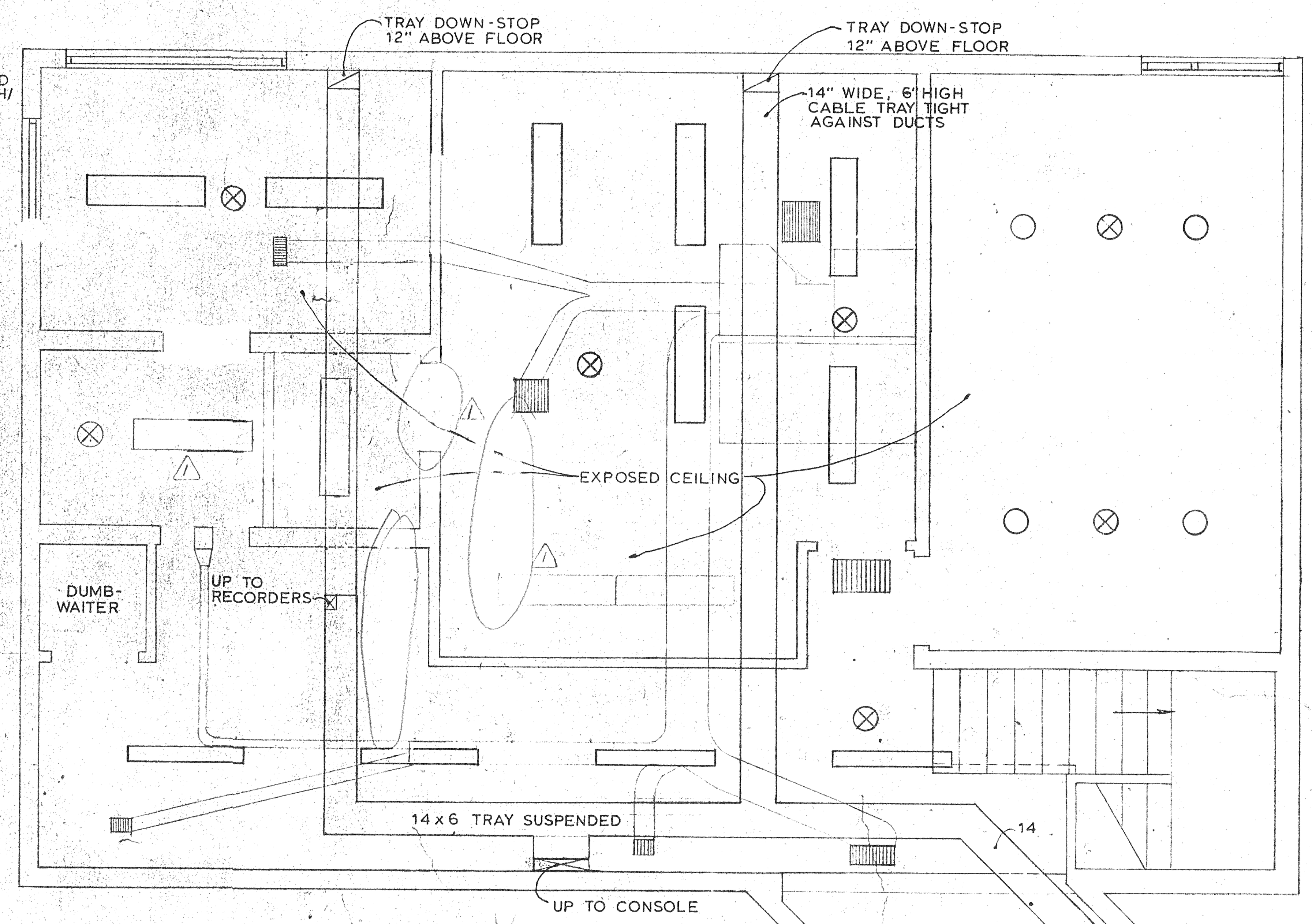
1.	INLINE PUMP, TUNNEL HW. 3	32 GPM.	42 FT HEAD	3/4 HP	208/3/60	
2.	CIRCULATOR 1	12 GPM.	12 FT HEAD	1/6 HP	115/1/60	
3.	CIRCULATOR 2	12 GPM.	12 FT HEAD	1/6 HP	115/1/60	
4.	EXHAUST FAN, KITCHEN	50 CFM.			115/1/60	50 W
5.	EXHAUST FAN, MEN TOILET	50 CFM.			115/1/60	50 W
6.	EXHAUST FAN, FEMALE TOILET	50 CFM			115/1/60	50W
7.	A/C AIRHANDL. UNIT	3000 CFM		2 HP	208/3/60	
8.	CONDENSING UNIT 1	3000 CFM		2 HP	208/3/60	30 KW
9.	CONDENSING UNIT 2	1300 CFM		1 HP	208/3/60	10 KW
10.	HVAC UNIT	1300 CFM		1 HP	208/3/60	10 KW
11.	OIL BURNER			1/3 HP	115/1/60	
12.	DAMPER MOTOR 1	SEE BASEMENT HEATING PLAN		1/6 HP	115/1/60	
13.	DAMPER MOTOR 2			1/6 HP	115/1/60	
14.	DAMPER MOTOR 3			1/6 HP	115/1/60	
15.	DAMPER MOTOR 4			1/6 HP	115/1/60	
16.	SEWAGE EJECTOR			1/5 HP	115/1/60	
17.	UNIT HEATER 1	BARRIER PL. BOOTHS		1/3 HP	115/1/60	
18.	UNIT HEATER 2			1/3 HP	115/1/60	
19.	UNIT HEATER 3			1/3 HP	115/1/60	
20.	UNIT HEATER 4			1/3 HP	115/1/60	
21.	TUNNEL HEATER 1			1/5 HP	115/1/60	
22.	TUNNEL HEATER 2			1/5 HP	115/1/60	
23.	DUMBWAITER			1 HP	208/3/60	
	FOR RAMPS. (TOTAL 4) ELECTROMODE ELECT. HEATER				240 V 1/60	3 KW



BASEMENT HEATING PLAN

2" H.W. SUPPLY
2" H.W. RETURN
1 1/2" C.W.

NOTE:
PROVIDE CLEANOUTS AND ACCESS PANELS WHERE CODE AND CONVENIENCE REQUIRES.



BASEMENT CEILING PLAN

	BY	DATE				
MADE	R.B.M.	7-31-71				
CHECKED	KL.	7-31-71	1	ADD. #1 & #2 REV.	JRC	8-72
IN CHARGE	J.P.F.		NO.	REVISION	BY	DATE

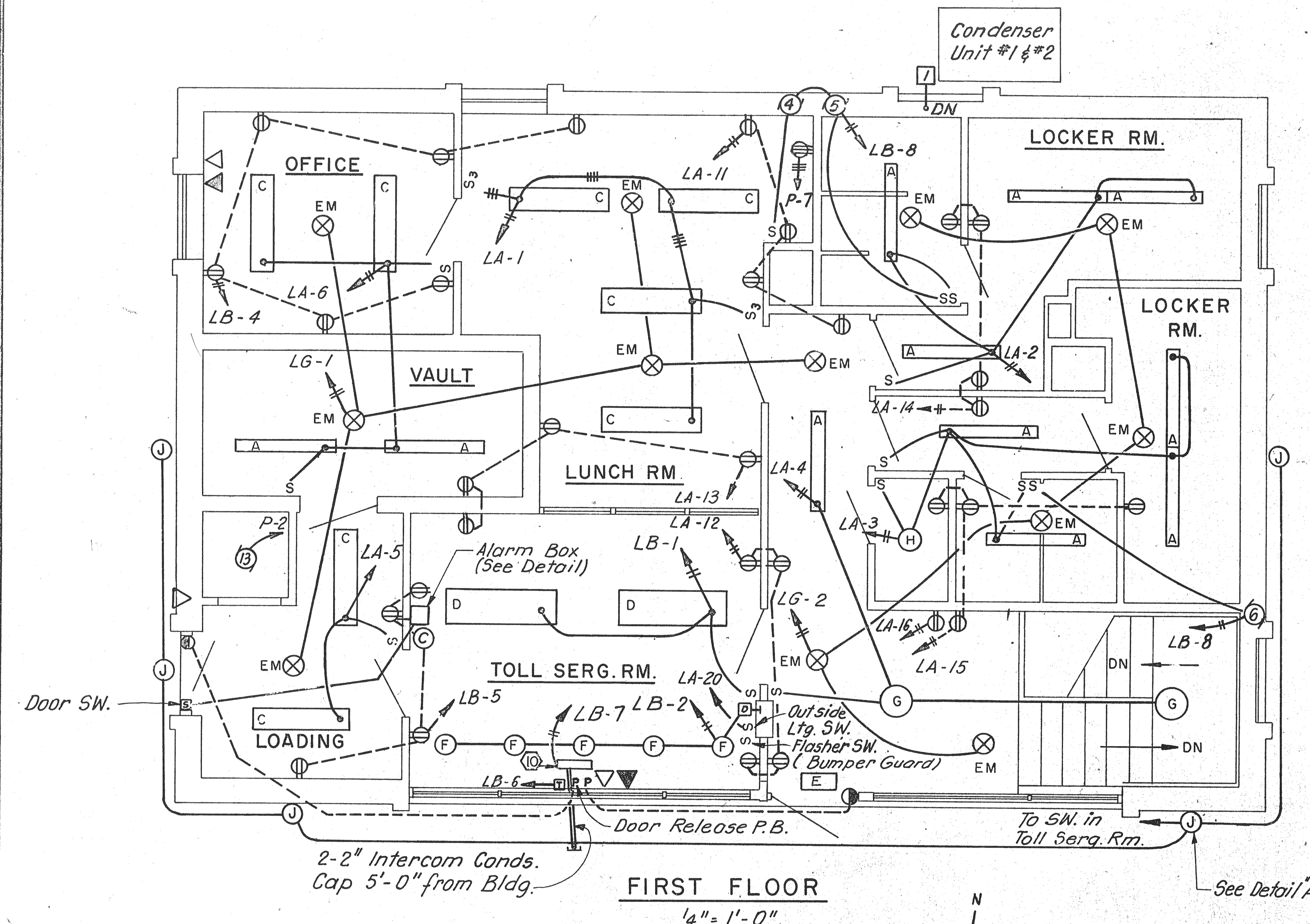
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

UTILITY BUILDING
HTG/AC AND REFL. CLG. PLAN

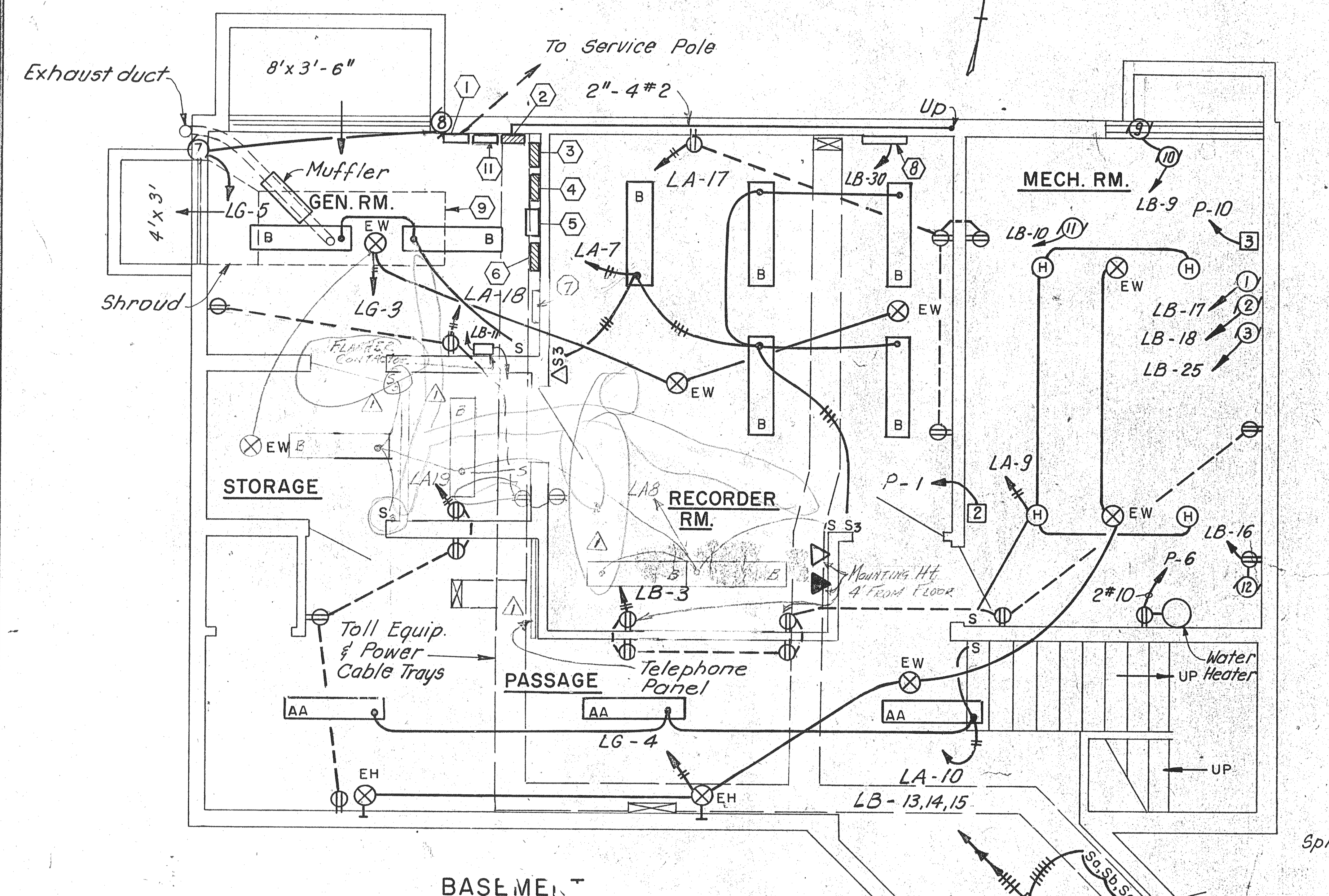
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: NOT TO SCALE
CONTRACT NO.: TF-2
SHEET NO. 8 OF 11

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF2	UTILITY BUILDING	10	26



FIRST FLOOR
1/4" = 1'-0"



BASEMENT
1/4" = 1'-0"

LEGEND

- Fluorescent Fixture, Letter indicates type.
- Incandescent Fixture, Letter indicates type.
- Emergency Light - in ceiling
- Emergency Light - Wall Mounted
- Exit Light
- Dimmer
- Duplex Wall Receptacle Outlet
- Range Receptacle
- S Single Pole Switch
- S_3 Threeway Switch
- P Door Release system
- Telephone Outlet
- Intercom. System telephone Outlet.
- Electric clock outlet
- Transformer for Door Release system
- Panel Board
- Wiring Concealed in Walls or Ceiling
- Wiring Concealed in Floor.
- LA-3 Home run with Panel & Circ. Designation

1. Current Transformer & Metering Equipment
2. Main Distribution Panel Board - P
3. Panel Board - LA
4. Panel Board - LB
5. Auto - Transfer Switch
6. Emergency Generator Panel - LG
7. Generator Control Panel.
8. Recorder Room Panel Board - R
9. Generator Set (45 KW. Continuous)
10. Inter Com. Panel
11. Disconnect. SW. (400A.) & Fuses (225A.)

1. Circu. Pump #1 (Zone-1), 1/6 HP, 115V, 1ϕ, 60 ∼, 2#12
2. Circu. Pump #2 (Zone-2), 1/6 HP, 115V, 1ϕ, 60 ∼, 2#12
3. Circu. Pump #3 (Tunnel), 3/4 HP, 208V, 3ϕ, 60 ∼, 4#12
4. Exhaust Fan (Kitchen)
5. Exhaust Fan (Men toilet)
6. Exhaust Fan (Women toilet) } all 1/12 HP, 115V, 1ϕ, 60 ∼, 4#12
7. Damper Motor #1
8. Damper Motor #2
9. Damper Motor #3
10. Damper Motor #4 } all 1/6 HP, 115V, 1ϕ, 60 ∼, 2#12 #1 & 2 Connected to generator Controls; 3 & 4 Connected to H&V Controls
11. Oil Burner, 1/3 HP, 115V, 1ϕ, 60 ∼, 2#12
12. Storm Sewage Ejector 1/5 HP, 115V, 1ϕ, 60 ∼, 2#12
13. Dumb Waiter 1 HP, 208V, 3ϕ, 60 ∼, 4#12

- 1 Condenser Unit #1 (2HP & 30 KW) & Condenser Unit #2 (1HP & 10 KW)
- 2 A/C Airhandling Unit (2HP)
- 3 HVAC Unit (1HP)

General Notes:
1- For Lighting Fixture Schedule see Spec's.

MAIN DISTRIBUTION PANEL-P

120/208V, 3ϕ, 4W, SN, 42 Poles, 600A BUS } Westinghouse Type CDP

Circ. No.	Pole	Trip	Description
1	2	20A	AC Air handling Unit (2HP)
2	2	20A	Dumb Waiter (1HP)
3	2	20A	Spare
4	3	20A	Spare
5	3	20A	Spare
6	2	30A	Elect. W.H. Utility (4KW)
7	2	50A	Kitchen Unit (8.5 KW)
8	2	30A	Spare
9	3	30A	Spare
10	3	50A	HVAC Unit (1HP & 10KW)
11	3	50A	Spare
12	3	150A	Condensers, #1 & #2 (@ 43.0KW)
13	3	150A	Panel Board - LA
14	3	150A	Panel Board - LB
15	3		Space
16	3		Space

PANEL BOARD-LB

120/208V, 3ϕ, 4W, SN, 42 Poles, 225A BUS } Westinghouse Type WBA

Circ. No.	Pole	Trip	Description
1, 2	1	20A	Ltg. 1st Floor
3,4,5	1	20A	Recept. 1st Fl. & Basement
6	1	20A	Door Release system
7	1	20A	Intercom Panel
8	1	20A	Exhaust Fans (three)
9	1	20A	Damper Motors #3 & #4
10	1	20A	Oil Burner
11	1	20A	Flasher, Contactor (Bumper Guard)
12	1	20A	Tunnel Heater Fans (two)
13,14,15	1	20A	Ltg. Tunnel
16	1	20A	Storm Sewage Ejector
17	1	20A	Circulator. Pump #1
18	1	20A	Circulator Pump #2
19	1	20A	Stair Case Ltg. (Tunnel)
20,21	1	20A	Spare
22,23,24	1	20A	Spare
25	3	20A	Circulator Pump #3 (Tunnel)
26	3	50A	Toll Isl. "C" C.B. Panel-1
27	3	50A	Toll Isls. "D, E & F" C.B. Panel-2
28	3	50A	Toll Isls. "G, H & I" C.B. Panel-3
29	3	50A	Future Isls. "J & K" C.B. Panel-4
30	3	50A	P/BD-R (Record Rm)

PANEL BOARD-LA

120/208V, 3ϕ, 4W, SN, 32 Poles, 225A BUS } Westinghouse Type WBA

Circ. No.	Pole	Trip	Description
1,2,3, 4,5,6	1	20A	Ltg. 1st Floor
7,8,9, 10	1	20A	Ltg. Basement
11,12,13 14,15	1	20A	Receptacles 1st Floor
16	1	20A	Elect. Water Cooler
17,18 19	1	20A	Receptacles Basement
20	1	20A	Out side flood Ltg.
21	1	20A	Spare
22	1	20A	Spare
23	1	20A	Spare
24	1	20A	Spare
25	1	20A	Spare
26	1	20A	Spare
27	1	20A	Spare
28	1	20A	Spare
29,30	1		Space
31,32	1		Space

PANEL BOARD - R

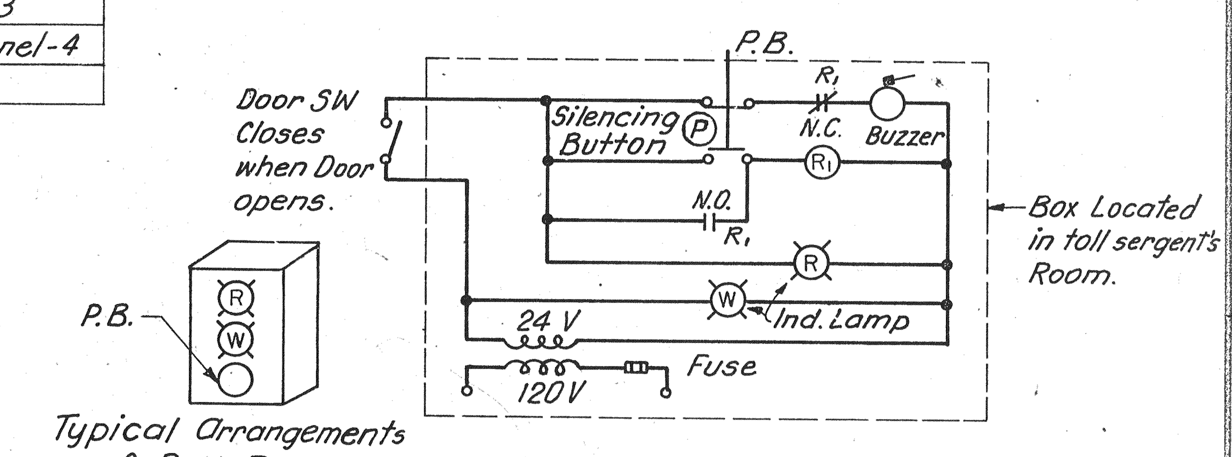
120/208V, 3ϕ, 4W, SN: 20 Poles, 100A Bus } Westinghouse Type WBA

Circ. No.	Pole	Trip	Description
1 to 16	1	20A	Recorder Room Circs.
17 to 20	1		Spaces

PANEL BOARD - LG

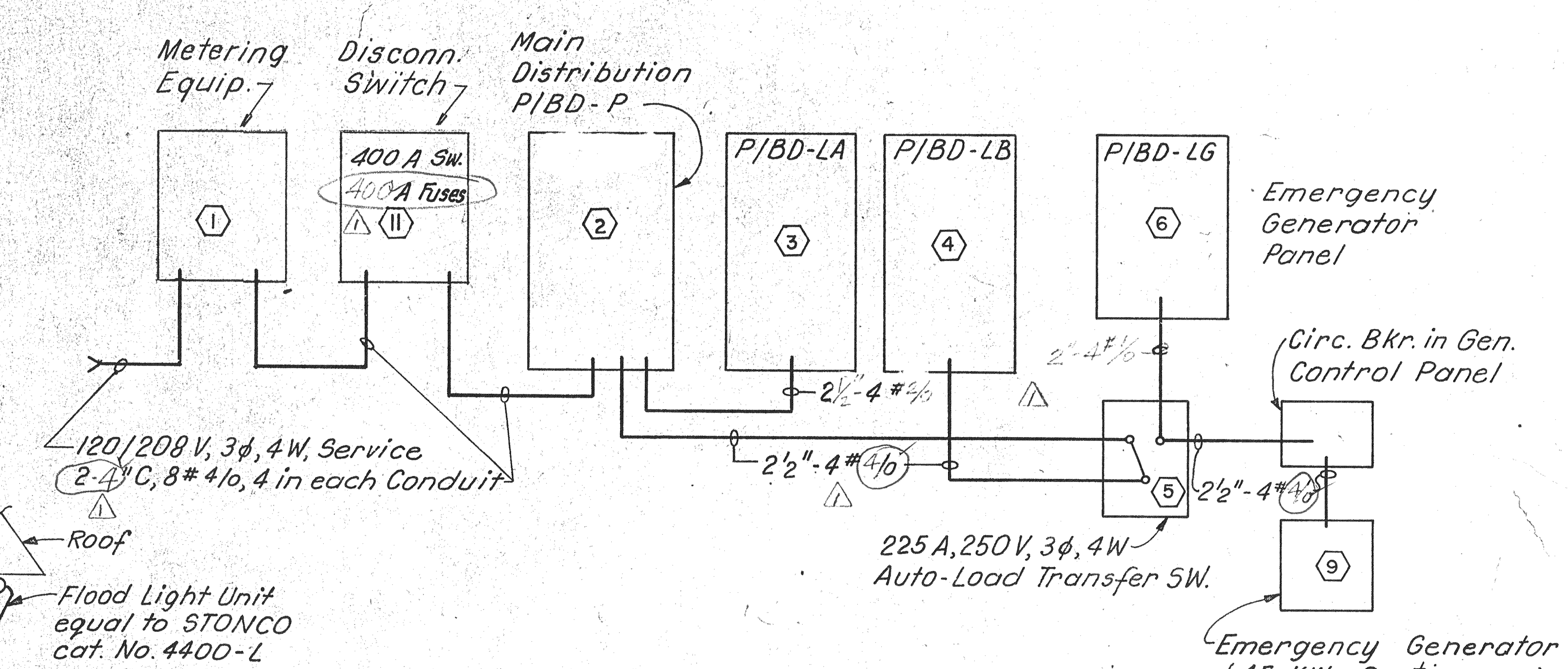
120/208V, 3ϕ, 4W, SN. 10 Poles, 100A BUS } Westinghouse Type WBA

Circ. No.	Pole	Trip	Description
1	1	20A	Ltg. 1st Floor (Emg.)
2	1	20A	Ltg. 1st Floor (Emg.)
3	1	20A	Ltg. Basement (Emg.)
4	1	20A	Ltg. Basement (Emg.)
5	1	20A	Damper Motors #1 & #2
6	1	20A	Spare
7	1	20A	Spare
8	1		Space
9	1		Space
10	1		Space

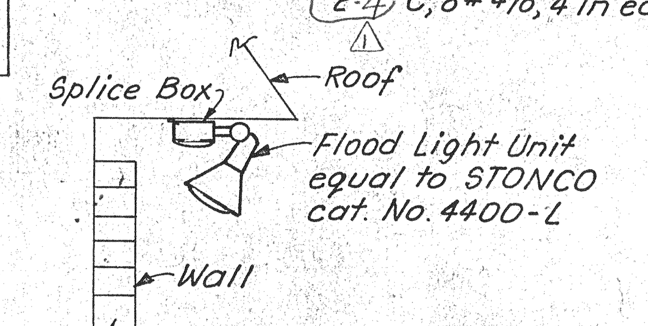


Typical Arrangements of Box Face

ALARM SYSTEM
No Scale



POWER RISER DIAGRAM
No Scale



OUTSIDE LIGHTING DETAIL A

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

UTILITY BUILDING
ELECTRICAL

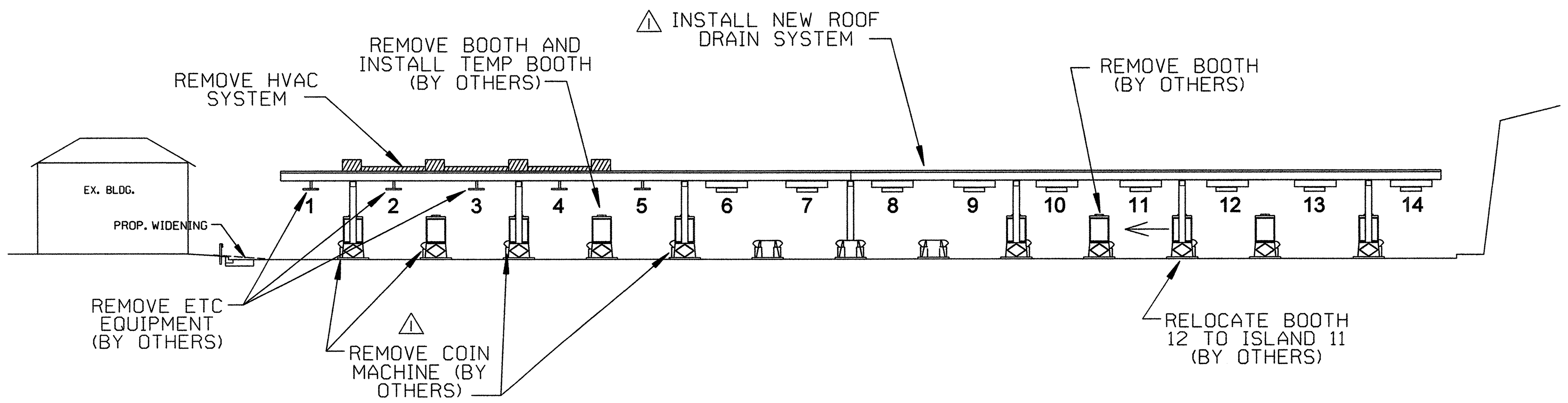
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS NOTED
CONTRACT NO.: TF-2
SHEET NO. 10 OF 27

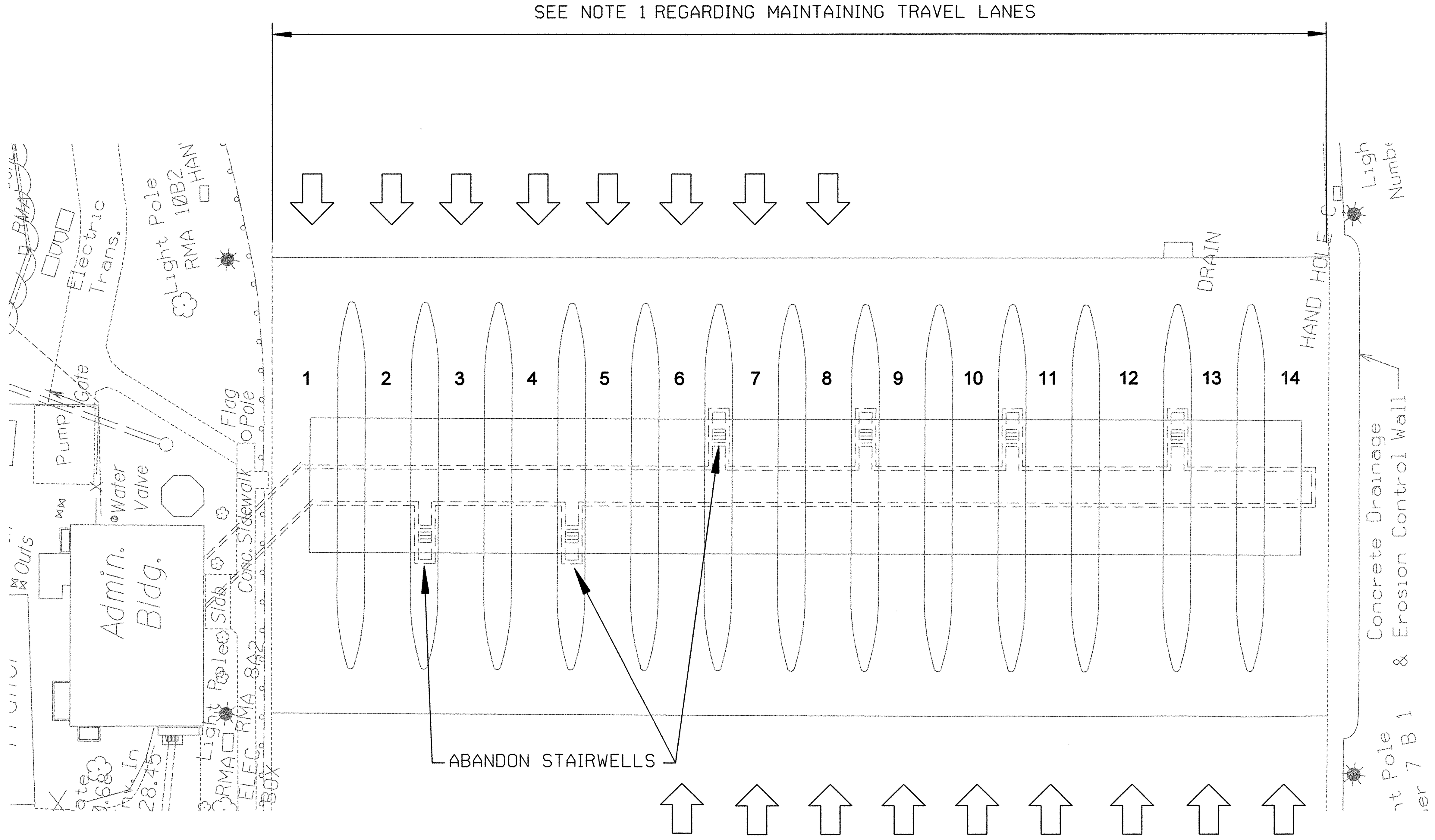
	BY	DATE				
MADE	L.S.	3-2-72				
CHECKED	H.C.A.	3-2-72		Rev. For Add. #3	J.R.C.	8-72
IN CHARGE	P.G.P.		NO.	REVISION	BY	DATE

NORTHBOUND POWHITE PARKWAY TOLL PLAZA

2006 PLANS FOR DEMOLITION OF PORTION OF TOLL PLAZA



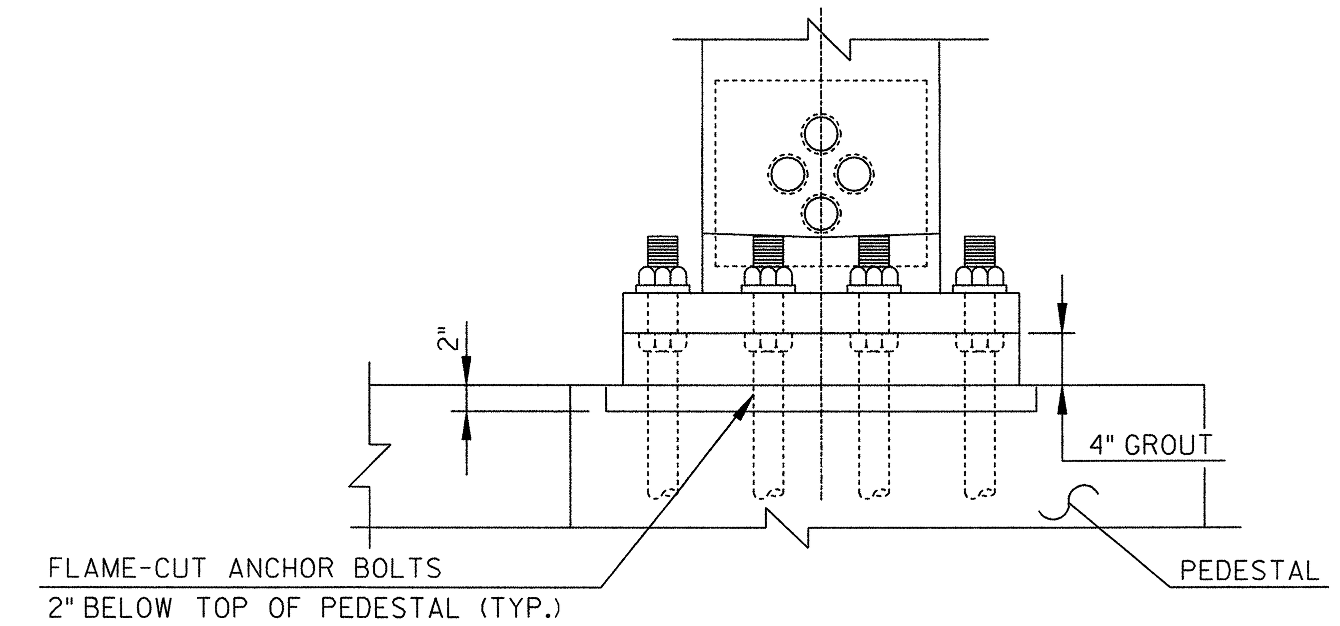
STAGE IIB ELEVATION



STAGE IIB PLAN

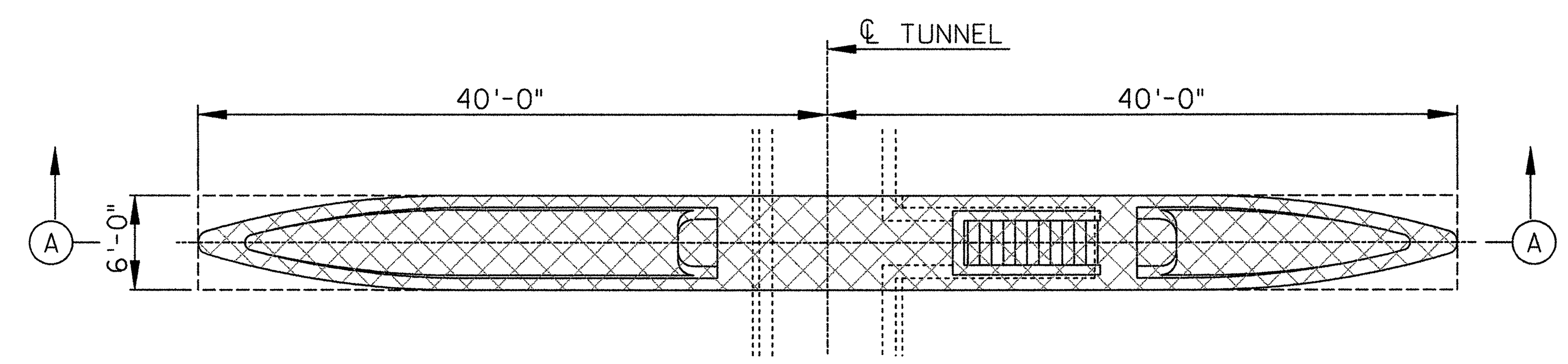
NOTES:

1. CONTRACTOR SHALL COORDINATE WITH ENGINEER WHO WILL PROVIDE SINGLE AND/OR LANE CLOSURES FOR PERIODS LESS THAN 24 HOURS, OR FOR WEEKENDS, TO CREATE WORK ZONE, AS DESCRIBED IN CONTRACT DOCUMENTS.
2. CONTRACTOR SHALL COORDINATE WITH ENGINEER TO ALLOW APPROPRIATE SCHEDULING OF TOLL PLAZA MODIFICATION WORK TO BE PERFORMED BY OTHERS.
3. NO WORK IMPACTING SB TRAVEL LANES SHALL BE ALLOWED BETWEEN 3:00 PM AND 7:00 PM, MONDAY THROUGH FRIDAY.
4. NO WORK IMPACTING NB TRAVEL LANES SHALL BE ALLOWED BETWEEN 6:00 AM AND 10:00 AM, MONDAY THROUGH FRIDAY.
5. FOR ADDITIONAL SEQUENCE NOTES, SEE MAINTENANCE OF TRAFFIC SHEET OF APPROPRIATE STAGE.
6. CONTRACTOR SHALL MAKE EVERY EFFORT TO SALVAGE EXISTING HVAC UNITS. SEE SPECIAL PROVISIONS.



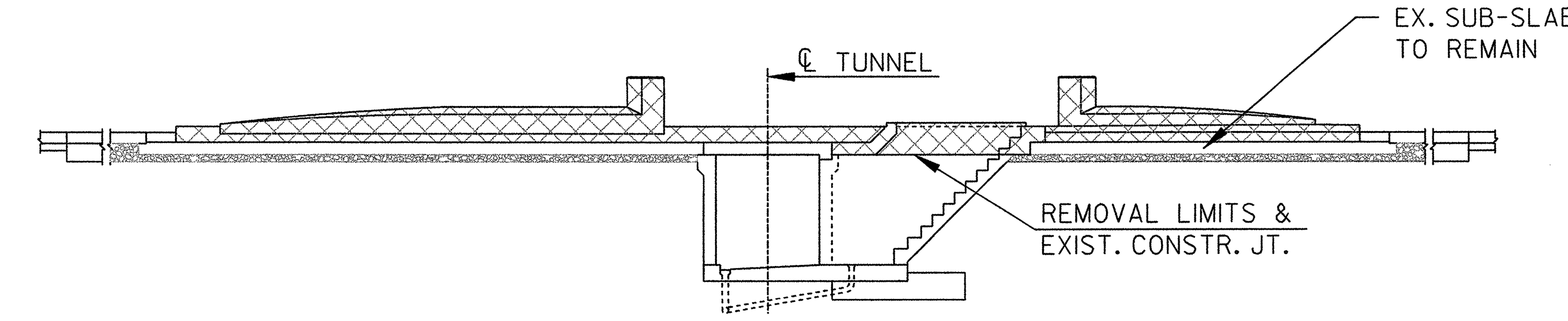
CANOPY SUPPORT REMOVAL

NOT TO SCALE



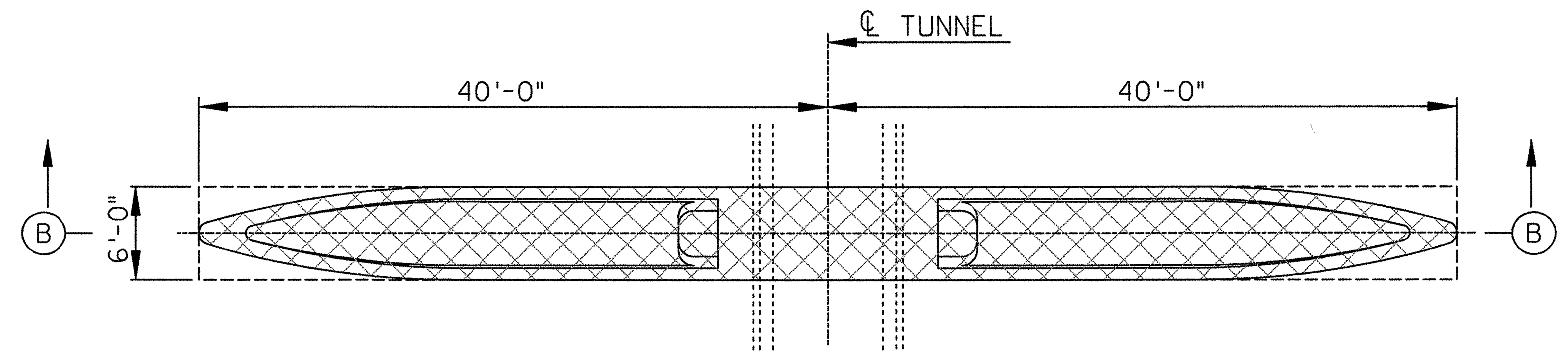
ISLAND DEMOLITION PLAN - ISLAND WITH STAIRS

NOT TO SCALE



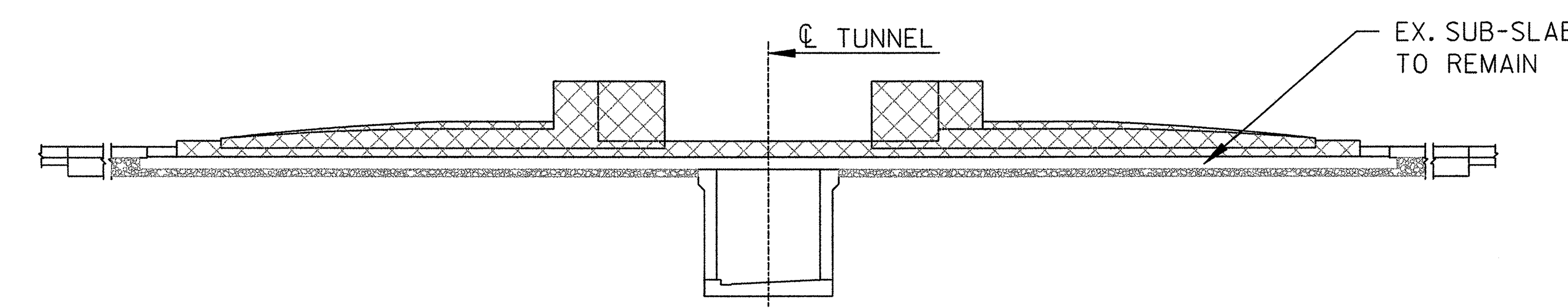
SECTION A-A

NOT TO SCALE



ISLAND DEMOLITION PLAN - ISLAND WITHOUT STAIRS

NOT TO SCALE



SECTION B-B

NOT TO SCALE

REVISIONS
ADDENDUM NO.2: 5/17/06
ADDENDUM NO.1: 5/10/06

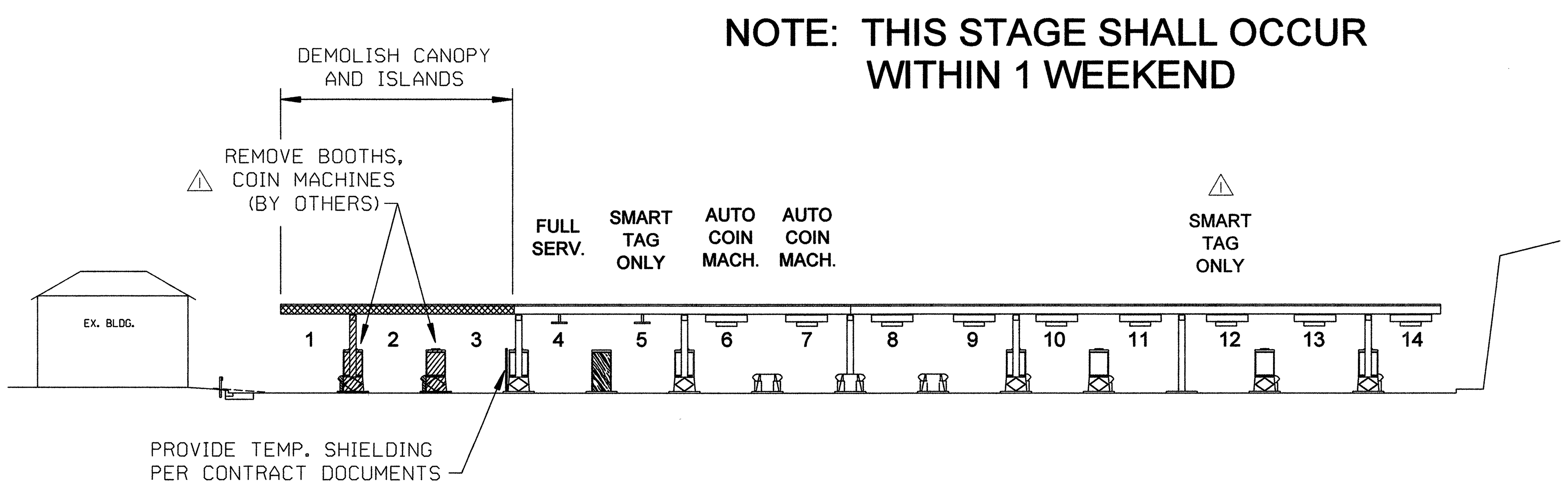
HNTB
9175 GUILFORD ROAD, SUITE 100
COLUMBIA, MARYLAND 21046
(301) 543-1000

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

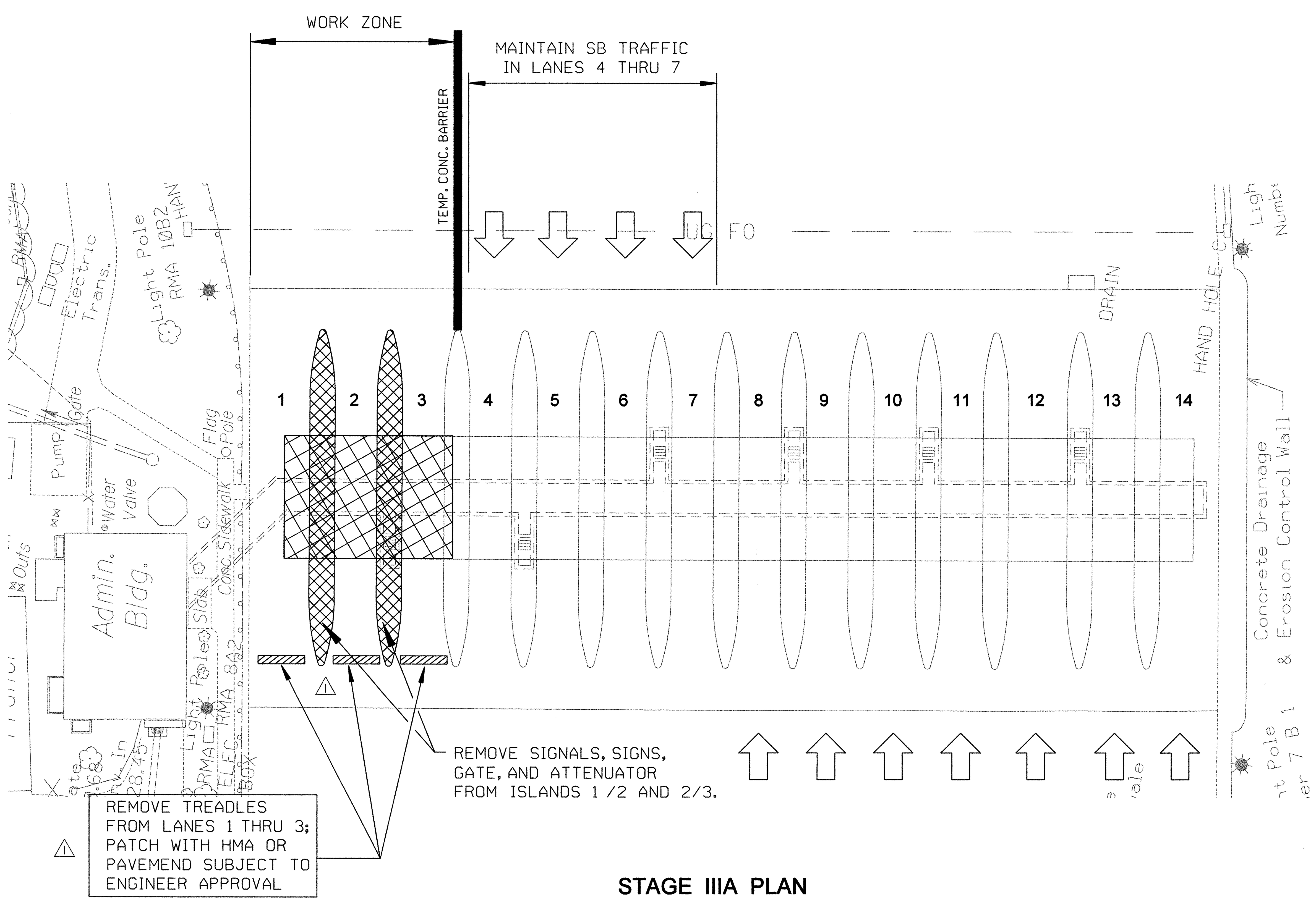
POWHITE PARKWAY EXPRESS TOLL LANES PROJECT
EX. TOLL PLAZA MODIFICATIONS
STAGE IIB

Scale:	Date:	Contract No.:	Sheet:
1" = 20'	07/20/06	PEL-2006	30 of 161

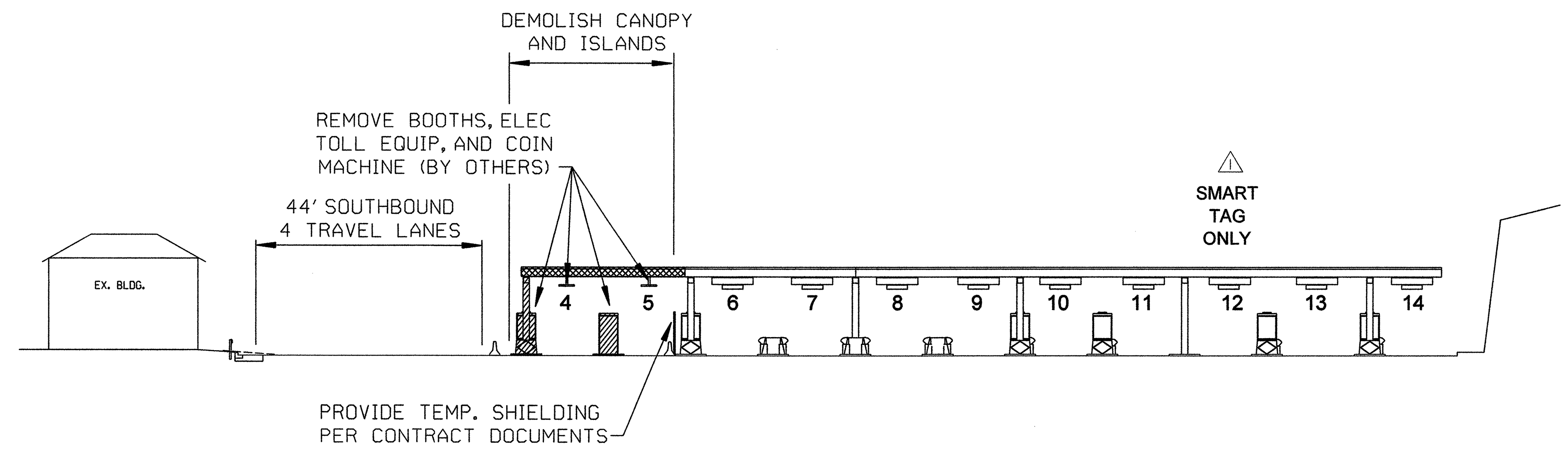
NOTE: THIS STAGE SHALL OCCUR WITHIN 1 WEEKEND



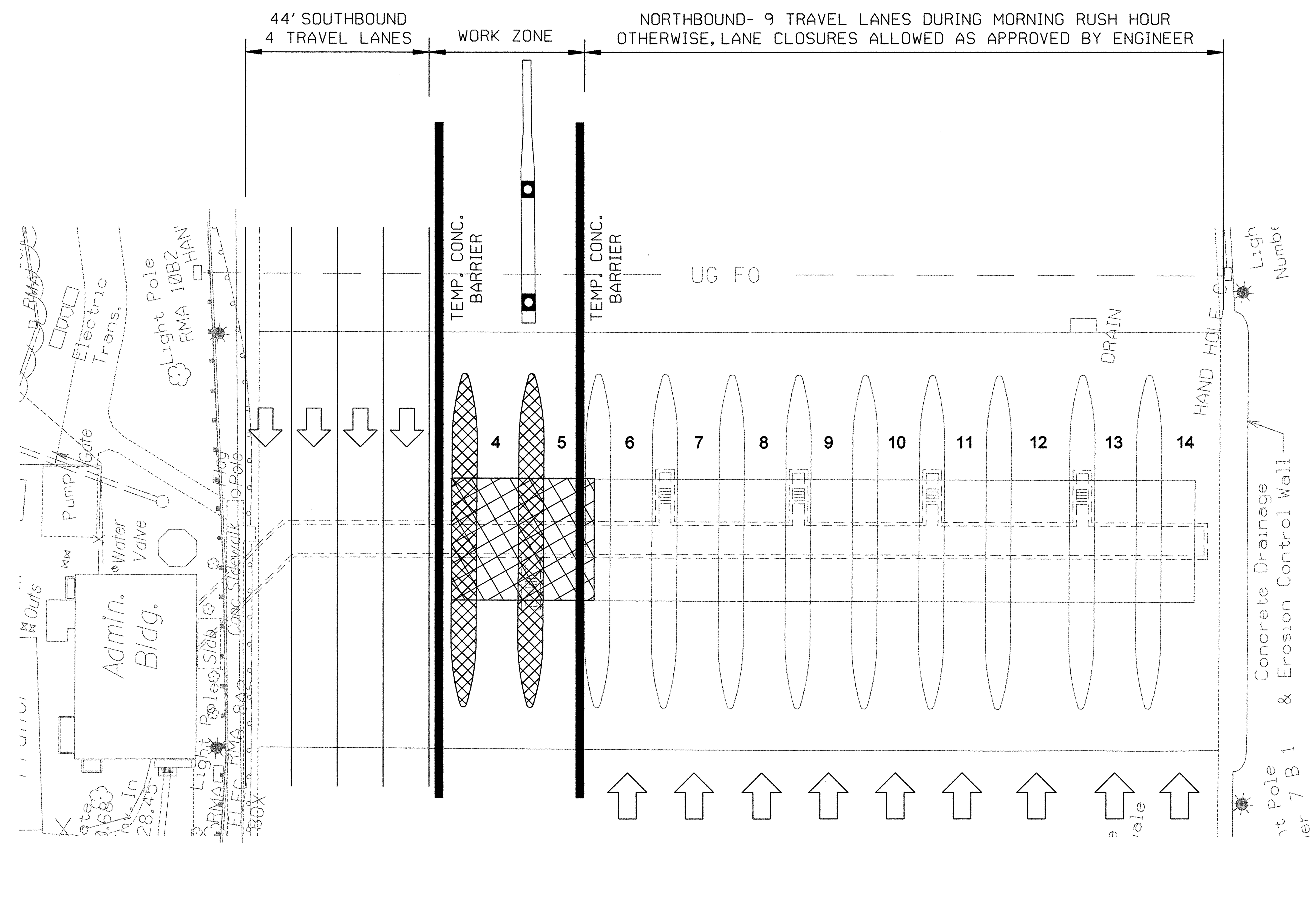
STAGE IIIA ELEVATION



STAGE IIIA PLAN



STAGE IIIB ELEVATION



STAGE IIIB PLAN

NOTES:

1. CONTRACTOR SHALL COORDINATE WITH ENGINEER WHO WILL PROVIDE SINGLE AND/OR MULTIPLE LANE CLOSURES FOR PERIODS LESS THAN 24 HOURS, OR FOR WEEKENDS, TO CREATE WORK ZONE, AS DESCRIBED IN CONTRACT DOCUMENTS.
2. CONTRACTOR SHALL COORDINATE WITH ENGINEER TO ALLOW APPROPRIATE SCHEDULING OF TOLL PLAZA MODIFICATION WORK TO BE PERFORMED BY OTHERS.
3. NO WORK IMPACTING SB TRAVEL LANES SHALL BE ALLOWED BETWEEN 3:00 PM AND 7:00 PM, MONDAY THROUGH FRIDAY.
4. NO WORK IMPACTING NB TRAVEL LANES SHALL BE ALLOWED BETWEEN 6:00 AM AND 10:00 AM, MONDAY THROUGH FRIDAY.
5. FOR ADDITIONAL SEQUENCE NOTES, SEE MAINTENANCE OF TRAFFIC SHEET OF APPROPRIATE STAGE.

ADDENDUM NO. 1: 5/10/06
REVISIONS

HNTB
9175 GUILFORD ROAD, SUITE 100
COLUMBIA, MARYLAND 21046
(301) 543-1000

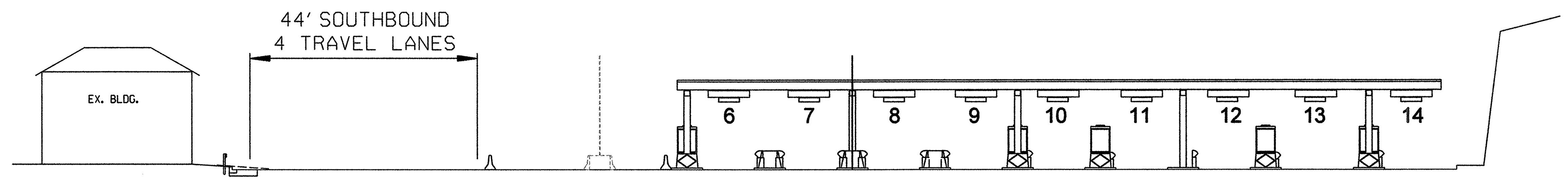
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

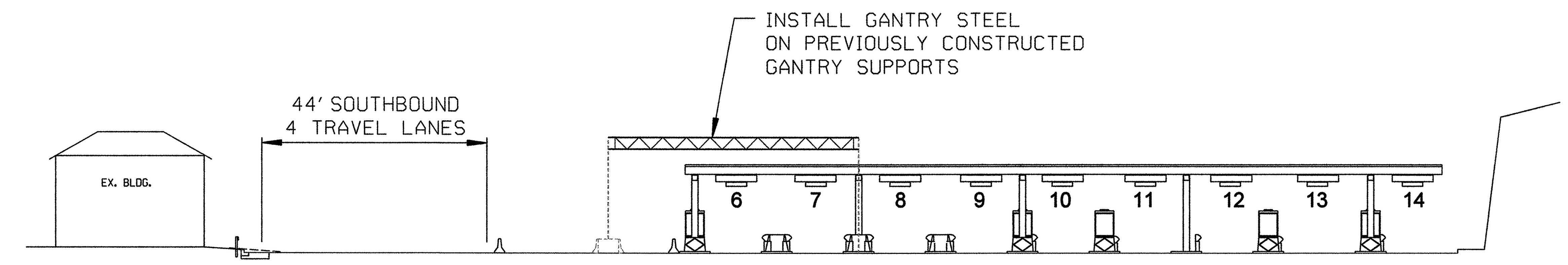
EX. TOLL PLAZA MODIFICATIONS STAGES IIIA & IIIB

Scale:	Date:	Contract No.:	Sheet:
1" = 20'	07/20/06	PEL-2006	31 of 161

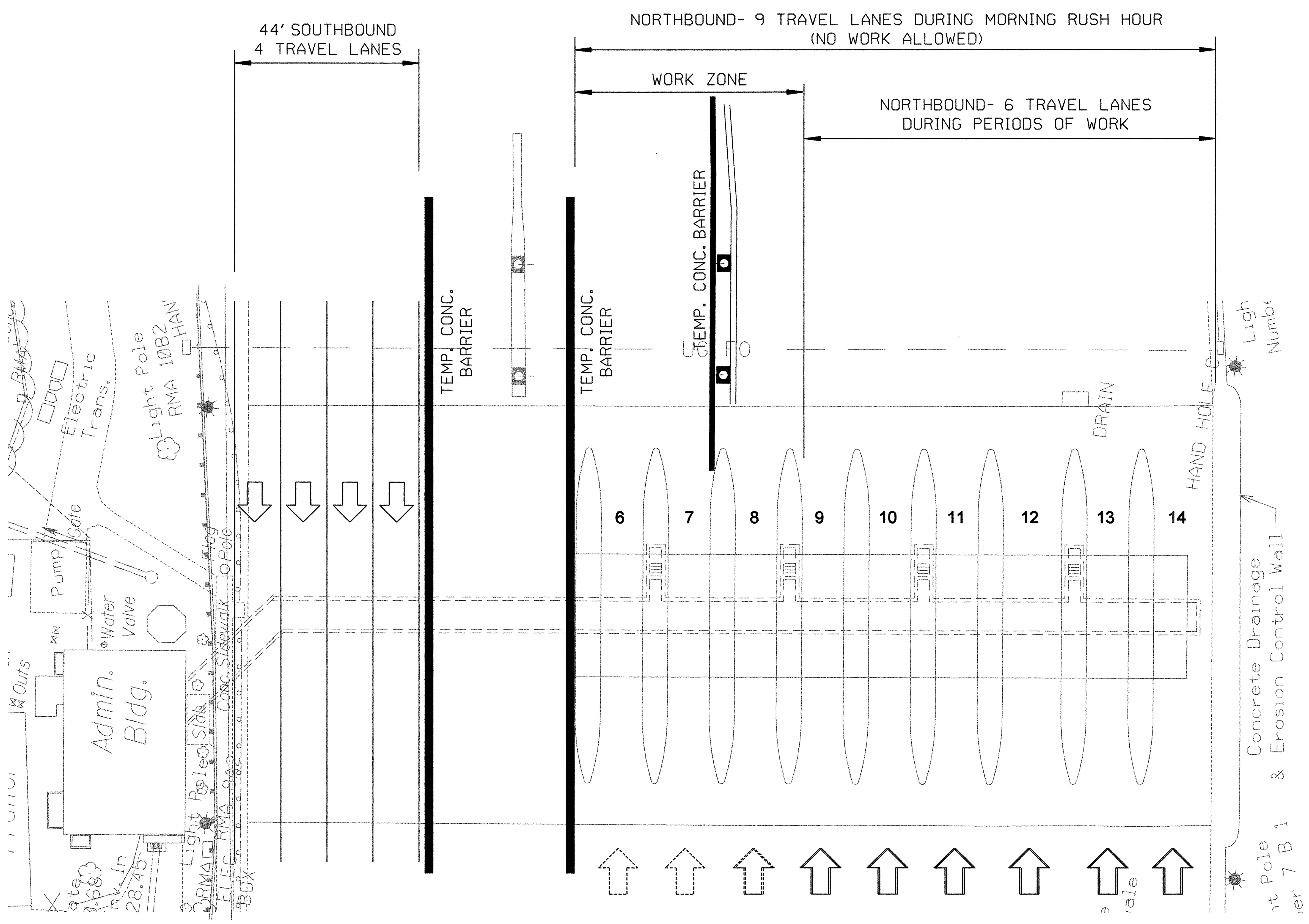
08/30/2021



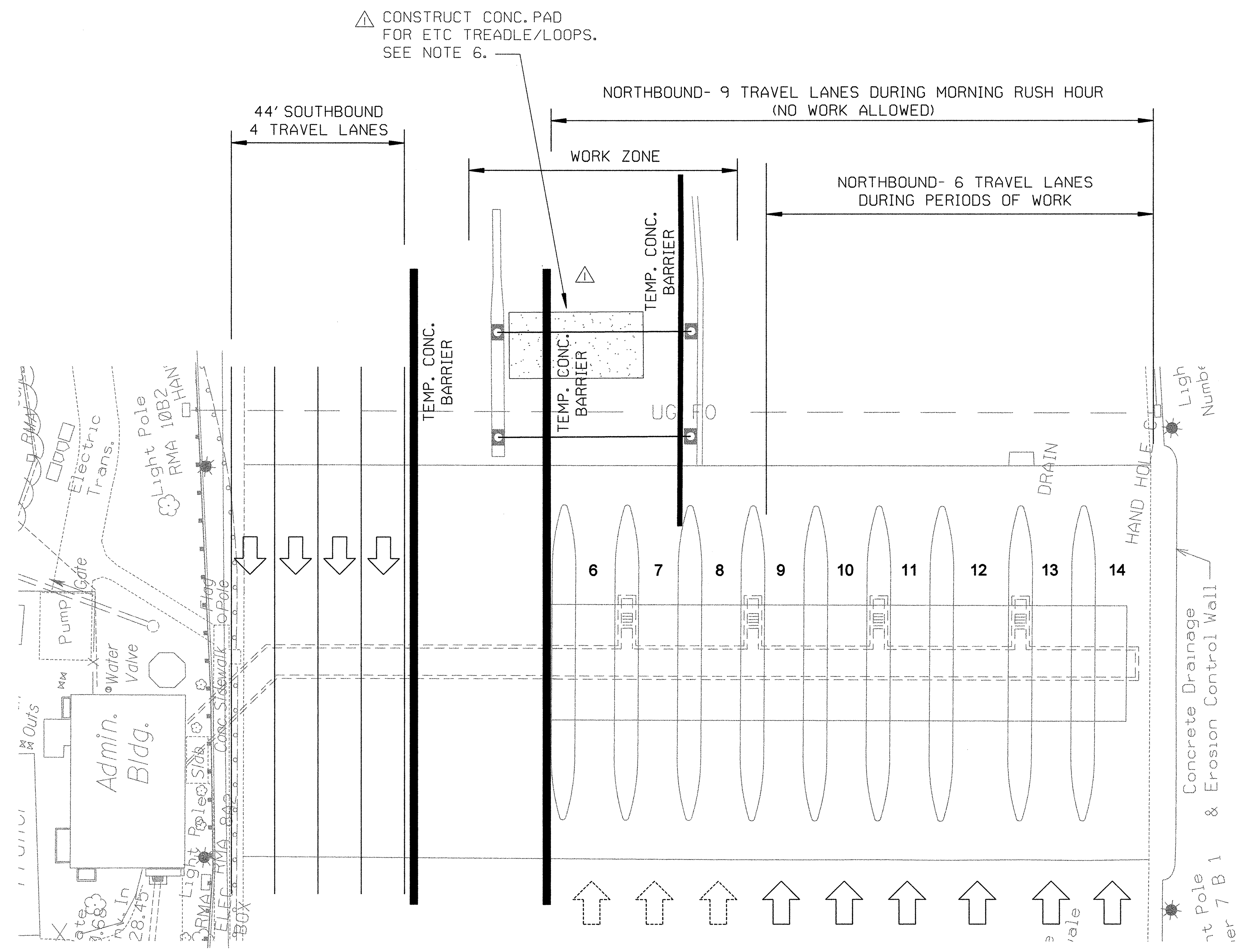
STAGE IIIC ELEVATION



STAGE IIID ELEVATION



STAGE IIIC PLAN



STAGE IIID PLAN

NOTES:

⚠ 1. CONTRACTOR SHALL COORDINATE WITH ENGINEER WHO WILL PROVIDE SINGLE AND/OR MULTIPLE LANE CLOSURES FOR PERIODS LESS THAN 24 HOURS, OR FOR WEEKENDS, TO CREATE WORK ZONE, AS DESCRIBED IN CONTRACT DOCUMENTS.

2. CONTRACTOR SHALL COORDINATE WITH ENGINEER TO ALLOW APPROPRIATE SCHEDULING OF TOLL PLAZA MODIFICATION WORK TO BE PERFORMED BY OTHERS.

3. NO WORK IMPACTING SB TRAVEL LANES SHALL BE ALLOWED BETWEEN 3:00 PM AND 7:00 PM, MONDAY THROUGH FRIDAY.

4. NO WORK IMPACTING NB TRAVEL LANES SHALL BE ALLOWED BETWEEN 6:00 AM AND 10:00 AM, MONDAY THROUGH FRIDAY.

5. FOR ADDITIONAL SEQUENCE NOTES, SEE MAINTENANCE OF TRAFFIC SHEET OF APPROPRIATE STAGE.

⚠ 6. CONC. PAD FOR TREADLE SHALL BE CONSTRUCTED OVER A ONE WEEKEND PERIOD, BETWEEN FRI. 10:00 A.M. AND MON. 6:00 A.M. HIGH-EARLY STRENGTH CONCRETE SHALL BE USED.

⚠ ADDENDUM NO. 1: 5/10/06

REVISIONS

HNTB

9175 GUILFORD ROAD, SUITE 100
COLUMBIA, MARYLAND 21046
(301) 543-1000

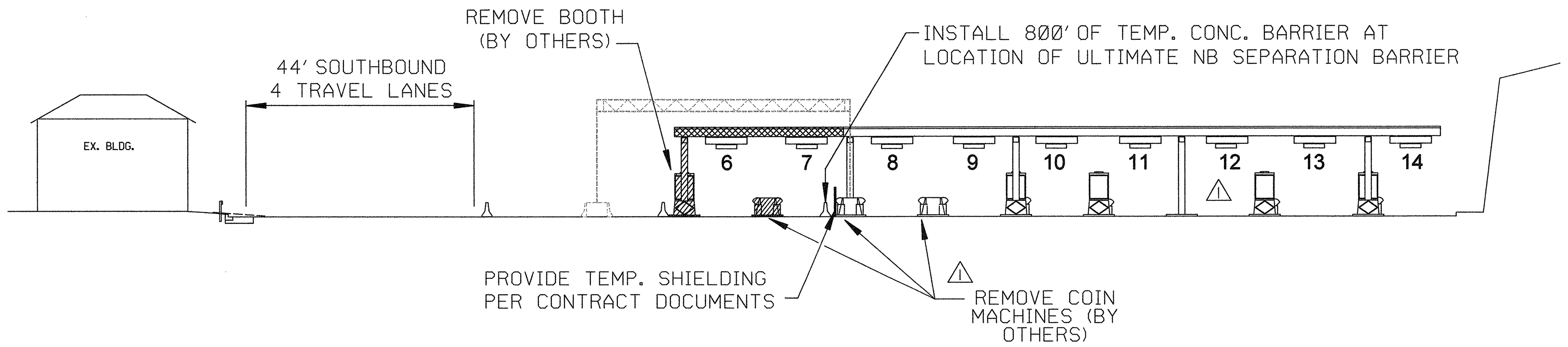
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS
TOLL LANES PROJECT

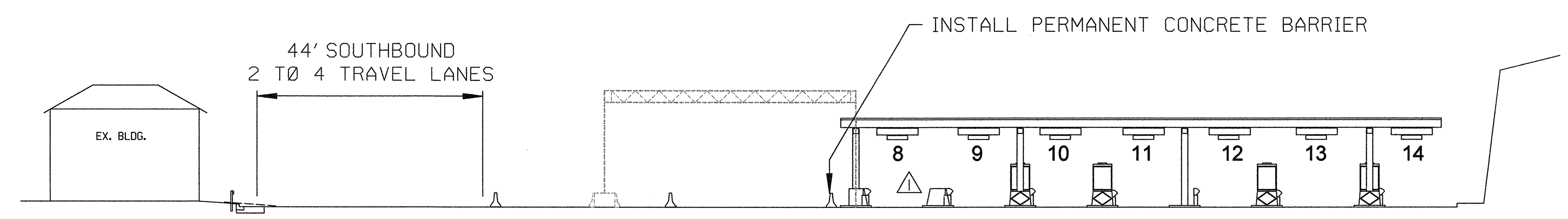
EX. TOLL PLAZA MODIFICATIONS
STAGES IIIC & IIID

Scale:	Date:	Contract No.:	Sheet:
1" = 20'	07/20/06	PEL-2006	32 of 161

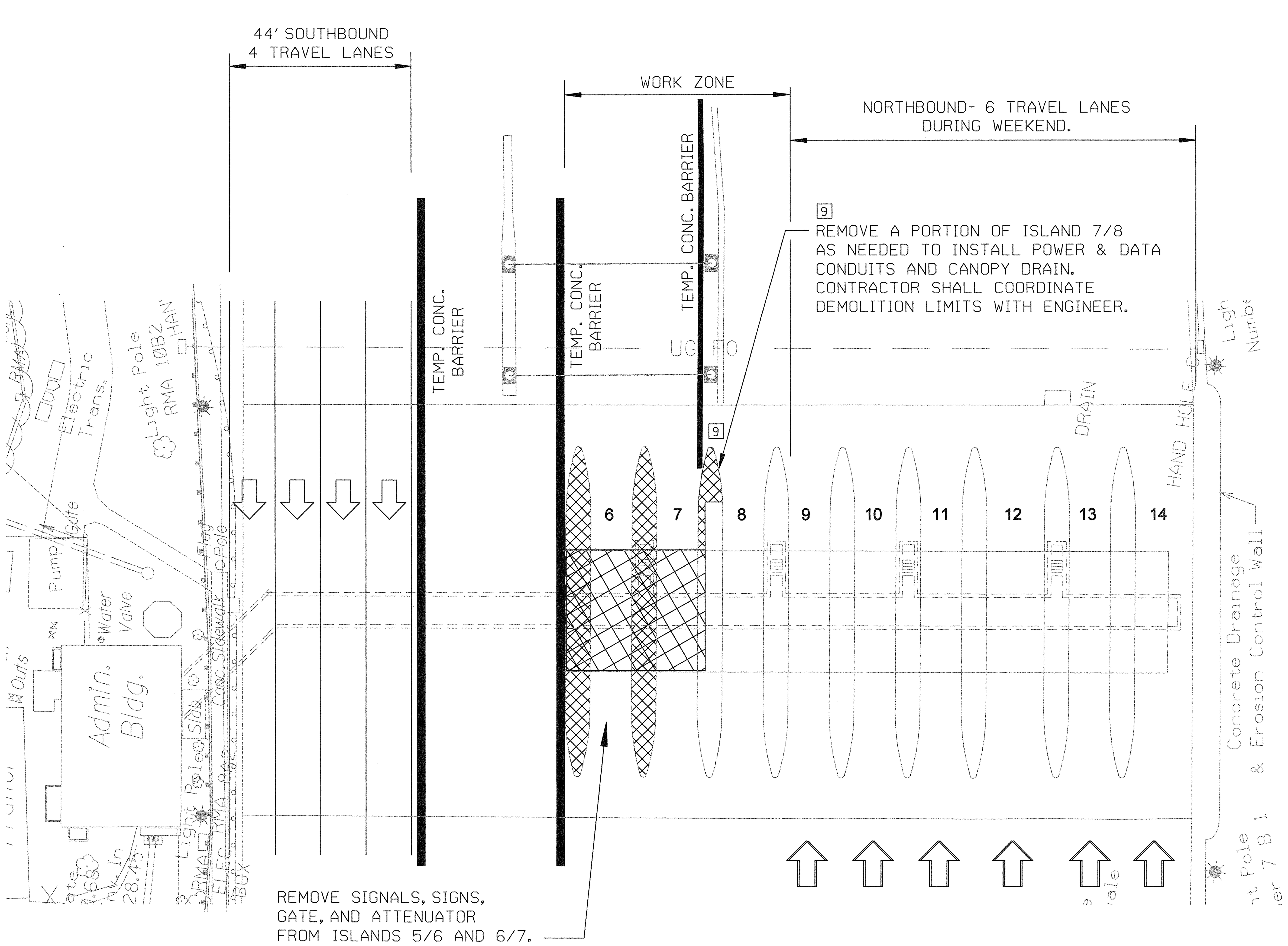
STAGES IVA AND IVB SHALL OCCUR WITHIN 1 WEEKEND.



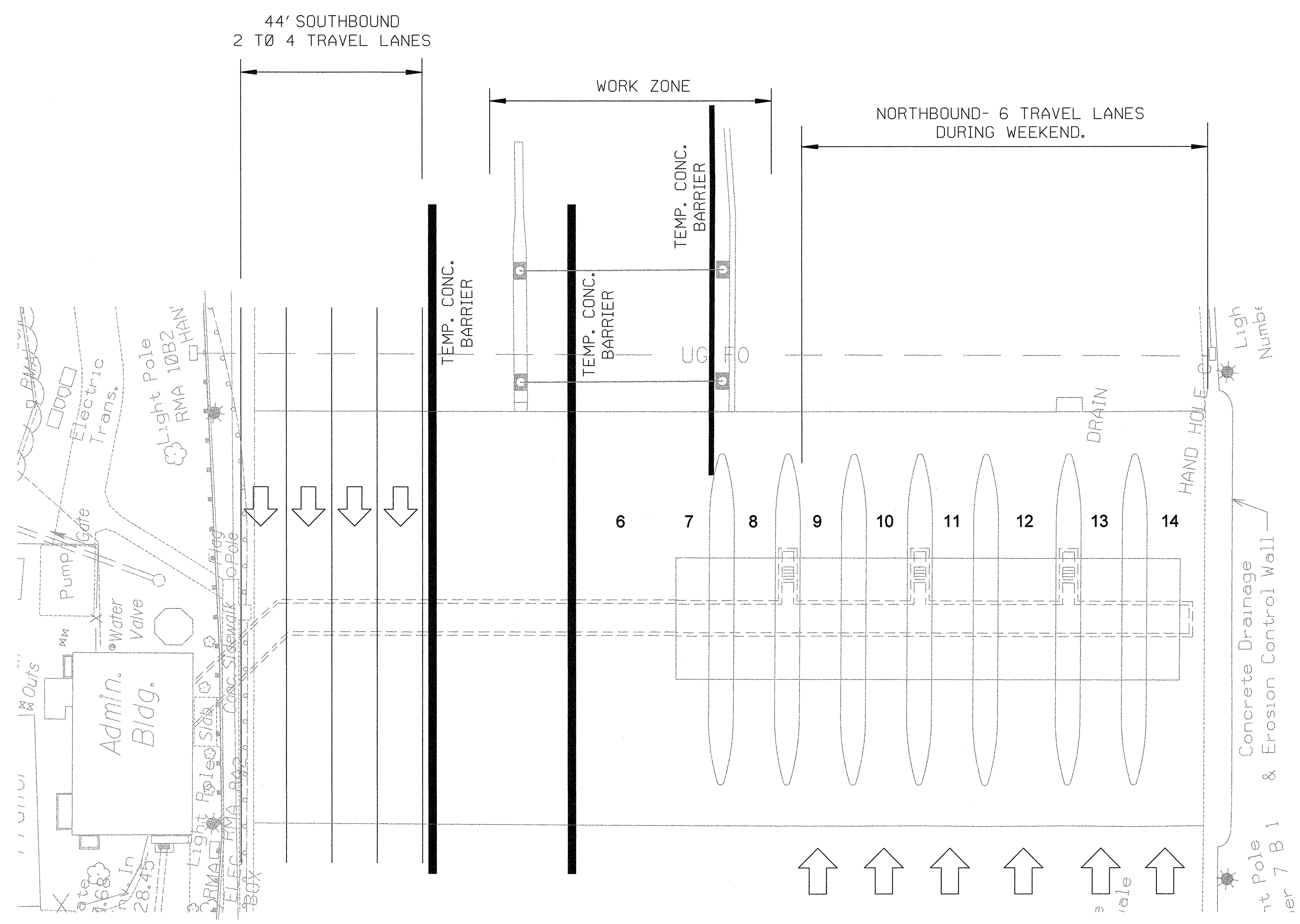
STAGE IVA ELEVATION



STAGE IVB ELEVATION



STAGE IVA PLAN



STAGE IVB PLAN

NOTES:

1. CONTRACTOR SHALL COORDINATE WITH ENGINEER WHO WILL PROVIDE SINGLE AND/OR MULTIPLE LANE CLOSURES FOR PERIODS LESS THAN 24 HOURS, OR FOR WEEKENDS, TO CREATE WORK ZONE, AS DESCRIBED IN CONTRACT DOCUMENTS.
2. CONTRACTOR SHALL COORDINATE WITH ENGINEER TO ALLOW APPROPRIATE SCHEDULING OF TOLL PLAZA MODIFICATION WORK TO BE PERFORMED BY OTHERS.
3. NO WORK IMPACTING SB TRAVEL LANES SHALL BE ALLOWED BETWEEN 3:00 PM AND 7:00 PM, MONDAY THROUGH FRIDAY.
4. NO WORK IMPACTING NB TRAVEL LANES SHALL BE ALLOWED BETWEEN 6:00 AM AND 10:00 AM, MONDAY THROUGH FRIDAY.
5. FOR ADDITIONAL SEQUENCE NOTES, SEE MAINTENANCE OF TRAFFIC SHEET OF APPROPRIATE STAGE.

REVISIONS
9 3/5/08: REVISED SHEET - SEE SHEET 1C
ADDENDUM NO. 1: 5/10/06

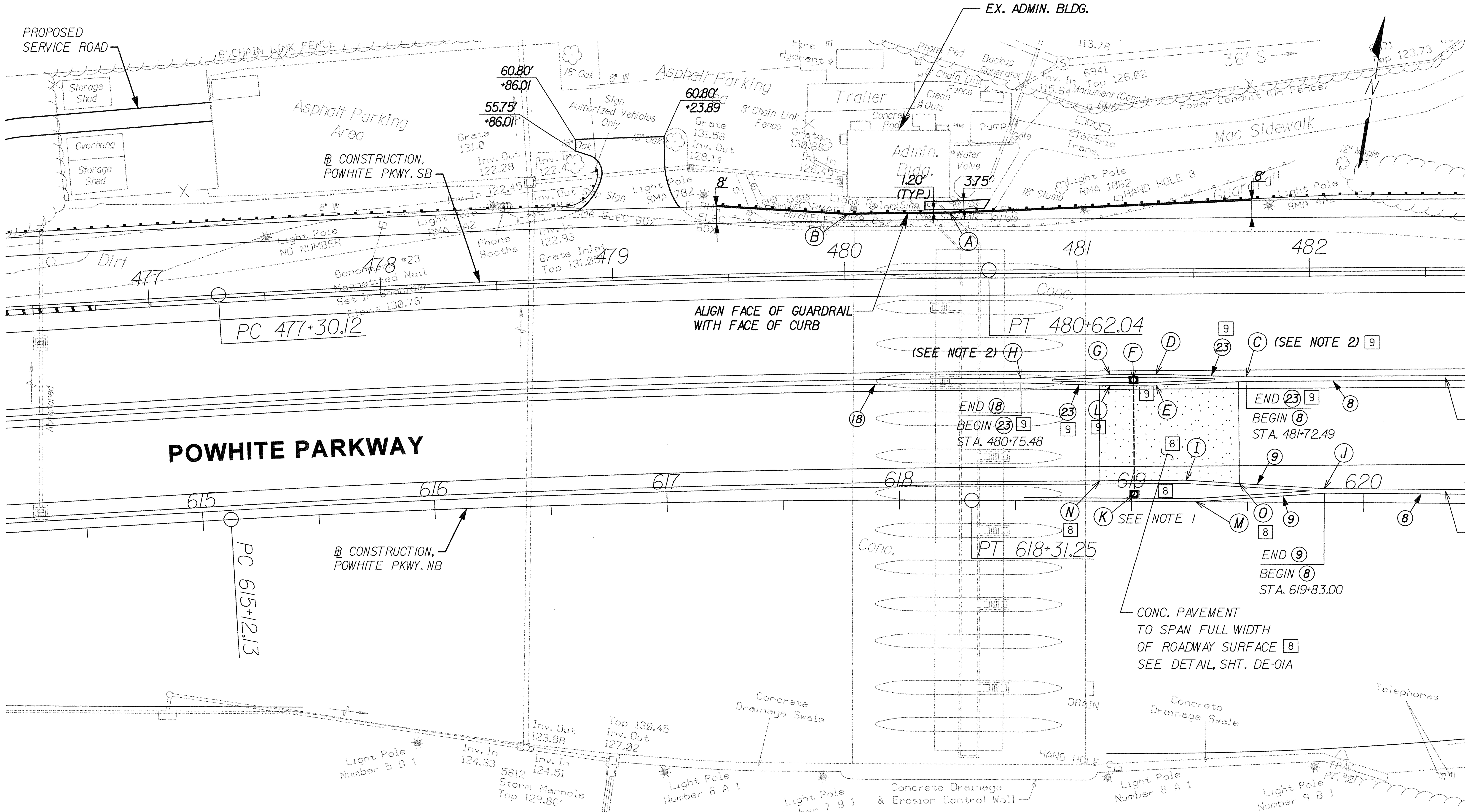
HNTB
9175 GUILFORD ROAD, SUITE 100
COLUMBIA, MARYLAND 21046
(301) 543-1000

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

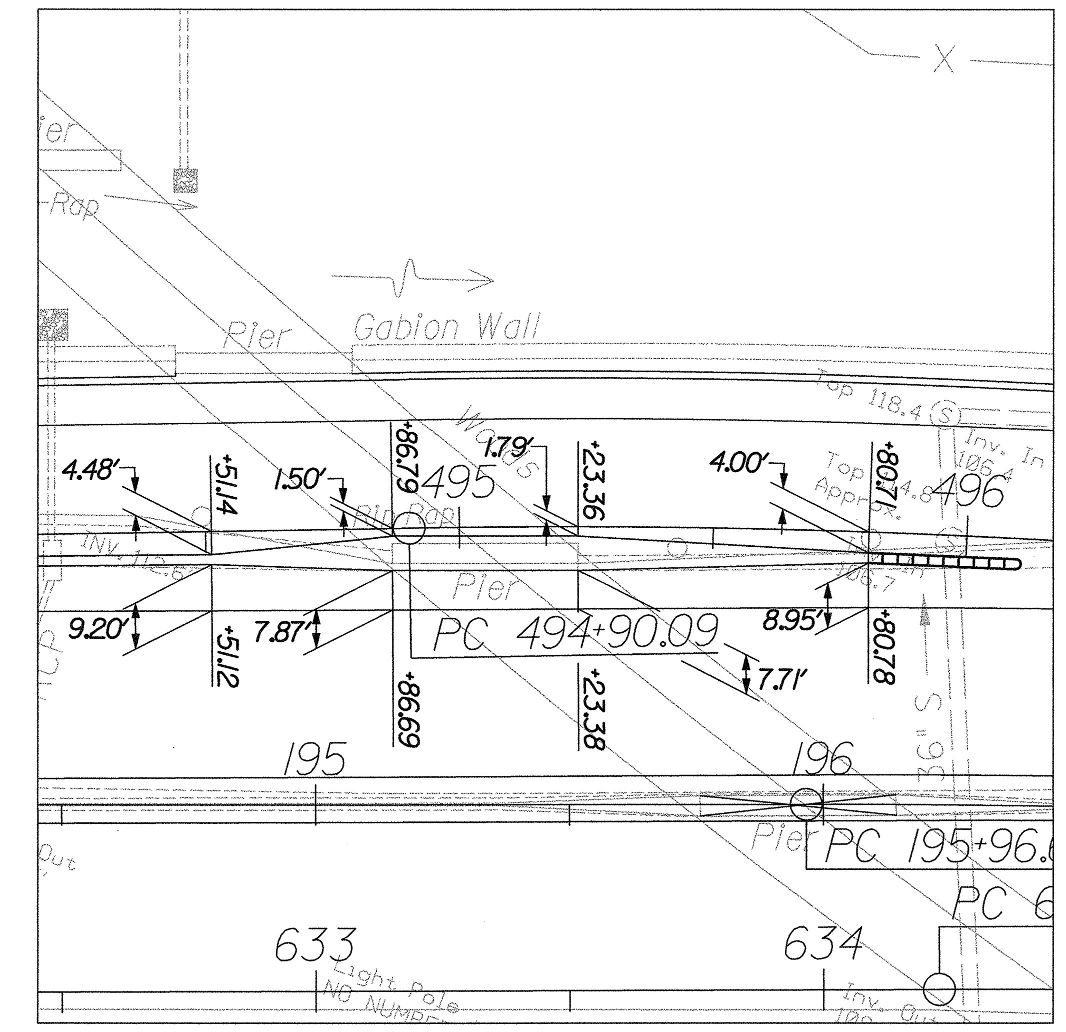
POWHITE PARKWAY EXPRESS TOLL LANES PROJECT
EX. TOLL PLAZA MODIFICATIONS
STAGES IVA & IVB

Scale:	Date:	Contract No.:	Sheet:
1" = 20'	3/06/08	PEL-2006	33 of 161

08/30/2021



PLAN AT EX. TOLL PLAZA



BARRIER TRANSITION PLAN AT POWHITE PARKWAY SB RAILROAD BRIDGE PIER

HORIZONTAL CONTROL POINT SCHEDULE

POINT NO.	LOCATION	DESCRIPTION	
A	STA. 480+45.49, 25.00' LT., POWHITE PKWY. SB	FACE OF CURB	
B	STA. 480+01.69, 25.00' LT., POWHITE PKWY. SB	FACE OF CURB	
C	STA. 481+72.49, 47.02' RT., POWHITE PKWY. SB	END BARRIER HORIZONTAL TRANSITION; END 50" BARRIER HEIGHT	
D	STA. 481+33.63, 45.67' RT., POWHITE PKWY. SB	BEGIN BARRIER TRANSITION	9
E	STA. 481+33.63, 50.33' RT., POWHITE PKWY. SB	BEGIN BARRIER TRANSITION	8 9
F	STA. 481+23.98, 48.00' RT., POWHITE PKWY. SB	CENTER GANTRY FOUNDATION TY. 2A	8 9
G	STA. 481+13.96, 45.67' RT., POWHITE PKWY. SB	END BARRIER TRANSITION	9
H	STA. 480+75.48, 47.02' RT., POWHITE PKWY. SB	BEGIN BARRIER HORIZONTAL TRANSITION; BEGIN 50" BARRIER HEIGHT	
I	STA. 619+23.59, 9.33' LT., POWHITE PKWY. NB	BEGIN BARRIER TRANSITION	
J	STA. 619+83.00, 5.97' LT., POWHITE PKWY. NB	END BARRIER TRANSITION	
K	STA. 619+1.21, 2.95' LT., POWHITE PKWY. NB	CENTER GANTRY FOUNDATION TY. 2B	8
L	STA. 481+13.96, 50.33' RT., POWHITE PKWY. SB	END BARRIER TRANSITION	8 9
M	STA. 619+27.81, 0.00', POWHITE PKWY. NB	BEGIN BARRIER TRANSITION	
N	STA. 618+86.36, POWHITE PKWY. NB	LIMIT OF 9" CONC. PAVEMENT	8 10
O	STA. 619+46.36, POWHITE PKWY. NB	LIMIT OF 9" CONC. PAVEMENT	8 10

NOTES:

1. SEE SHEETS SM-40 AND SM-41 FOR GANTRY FOUNDATION DETAILS.
2. [9] TRANSITION FROM THE 32" BARRIER HEIGHT TO A 50" BARRIER HEIGHT OVER A DISTANCE OF 6 FEET. SEE THE VDOT STANDARDS PAGE 501.55 FOR ADDITIONAL BARRIER TRANSITION DETAILS.
3. [9] 2-1" CONDUITS TO BE INSTALLED IN CONCRETE MEDIAN BARRIER FROM GANTRY LOCATION TO DVAS POLE AT APPROXIMATE STA. 184+12. SEE SHEET L-07 FOR MORE DETAILS.
4. [9] 2-1" CONDUITS TO BE INSTALLED IN CONCRETE MEDIAN BARRIER FROM GANTRY LOCATION TO DVAS CAMERA MOUNTED ON LIGHT POLE LP-15. SEE SHEET L-07 FOR MORE DETAILS.

LEGEND

- (8) Modified MB-7D, Concrete Median Barrier
- (9) Modified MB-7E, Concrete Median Barrier
- (18) Modified MB-8A, Type I Conc. Med. Barrier, See Sht. DE-02
- [9] (23) Std MB-12B, Conc. Med. Barrier

10	4/10/08: REVISED SHEET - SEE SHEET 1C
9	3/5/08: REVISED SHEET - SEE SHEET 1C
8	10/03/07: REVISED GANTRY AREA - SEE SHEET 1C
2	7/20/06: ADDED SHEET
	REVISIONS

DE-06 OF 06

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

MISCELLANEOUS DETAILS

HNTB
9175 GUILFORD ROAD, SUITE 100
COLUMBIA, MARYLAND 21046
(301) 543-1000

Scale:	Date:	Contract No.:	Sheet:
1" = 30'	3/06/08	PEL-2006	47 of 161

LEGEND

△ (1)	Std. GR-2, Guardrail, (1A) Std. GR-2A	9 (12)	Std. MB-3, Blocked Out W-Beam Median Barrier
(2)	Std. GR-7, Guardrail Terminal	△ (13)	Std. CG-7, Comb. 4" Curb & Gutter
(3)	Std. GR-9, Guardrail Terminal	△ (14)	Std. CG-3, Standard 4" Curb
9 (4)	Impact Attenuator (TL-3, > 55 MPH) (4A) (TL-2, > 40 MPH)	(15)	Constant Slope Concrete Median Barrier, See Sheet DE-04
(5)	Std. GR-FOA-2, Fixed Object Attachment, Type I	(16)	4" Concrete Sidewalk Per Section 504 Of Standard Specifications
(6)	Std. GR-FOA-2, Fixed Object Attachment, Type II	△ (17)	Std. GR-8, Guardrail (Weak Post)
(7)	Std. MB-5, W-Beam Median Barrier, Weak Post	△ (17A)	Std. GR-8A, Guardrail (Weak Post)
△ (8)	Modified MB-7D, Concrete Median Barrier	△ (18)	Modified MB-8A, Type I Conc. Med. Barrier, See Sht. DE-02
△ (9)	Modified MB-7E, Concrete Median Barrier	△ (19)	Std. MB-8A, Type II Conc. Med. Barrier
△ (10)	Modified MB-7F, Concrete Median Barrier	△ (20)	Std. MB-8A, Type III Conc. Med. Barrier
△ (11)	Modified MB-8A Conc. Median Barrier, Ty. III, See Sheet DE-02	9 (21)	Std. CG-6, Comb. 6" Curb & Gutter
		9 (22)	Std. GR-11, Guardrail Terminal

NOTES:

2 1 1. SEE SHEET DE-06 FOR BARRIER TYPES AND TRANSITIONS AT NB GANTRY STRUCTURE.

8 6 △ 2. CONCRETE MEDIAN BARRIER, MODIFIED TYPE 7D, FROM STA. 476+76.84 TO STA. 484+25 SHALL MATCH 2'-9" HEIGHT STANDARD AS SHOWN ON SHT. DE-02.

8 6

10 4/10/08: REVISED SHEET - SEE SHEET 1C
9 3/5/08: REVISED SHEET - SEE SHEET 1C
8 10/03/07: REVISED SHEET - SEE SHEET 1C
6 5/2/07: REVISED SHEET - SEE SHEET 1B
5 3/27/07: REVISED SHEET - SEE SHEET 1B
2 7/20/06: REVISED SHEET - SEE SHEET 1B
1 6/23/06: SEE SHEET 1A
△ ADDENDUM NO. 2: 5/17/06
REVISIONS

HNTB

9175 GUILFORD ROAD, SUITE 100
COLUMBIA, MARYLAND 21046
(301) 543-1000

RP-4 OF 7

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

ROADWAY PAVEMENT PLAN
STA. 472+65 TO STA. 486+50
℄ CONSTR. POWHITE PARKWAY SB

Scale:	Date:	Contract No.:	Sheet:
1" = 50'	3/06/08	PEL-2006	61 of 161

POWHITE PARKWAY TOLL PLAZA

TOLL GANTRY SHOP DRAWINGS
AND STRUCTURAL CALCULATIONS

NOTE:

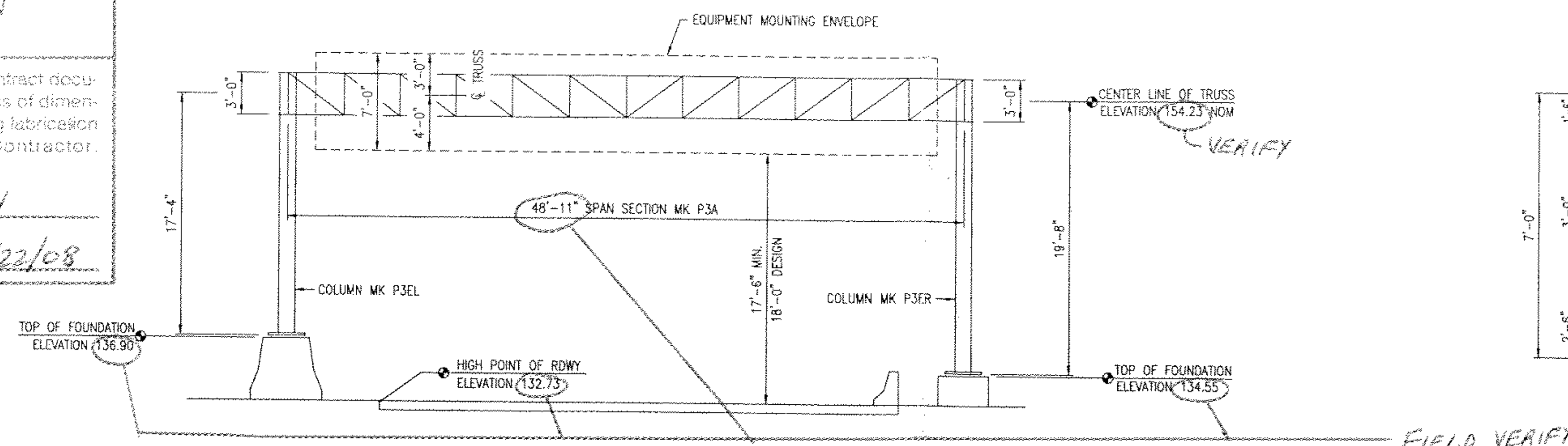
Pages 72 -95 Show the Submittal for the Powhite NB Gantry located near the Northbound Powhite Parkway Toll Plaza

Pages 96-121 Show the Submittal for the Powhite SB Gantry located near the Southbound Powhite Parkway Toll Plaza

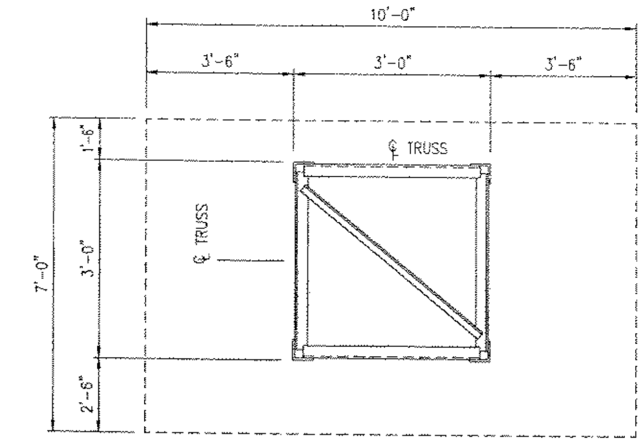
SHOP DRAWING REVIEW
HNTB Corporation

Review is for general compliance with contract documents. Sole responsibility for correctness of dimensions, details, quantities and safety during fabrication and erection shall remain with the Contractor.

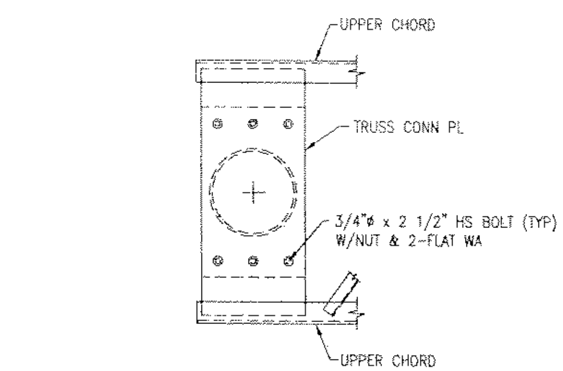
- [ ] No Exceptions Taken
- [x] Make Correction Noted By AN
- [ ] Amend and Resubmit
- [ ] Rejected -- See Remarks Date 3/22/08



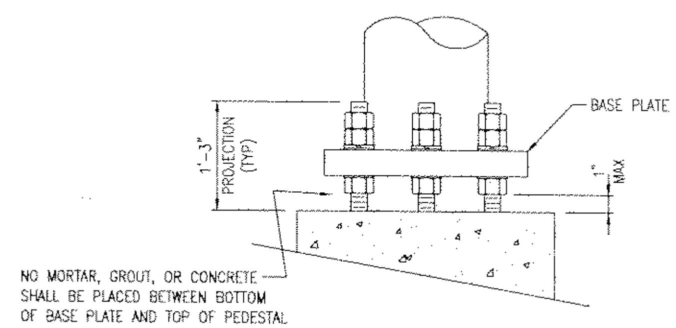
ELEVATION
STR. GANTRY NB @ STA 619+01.21



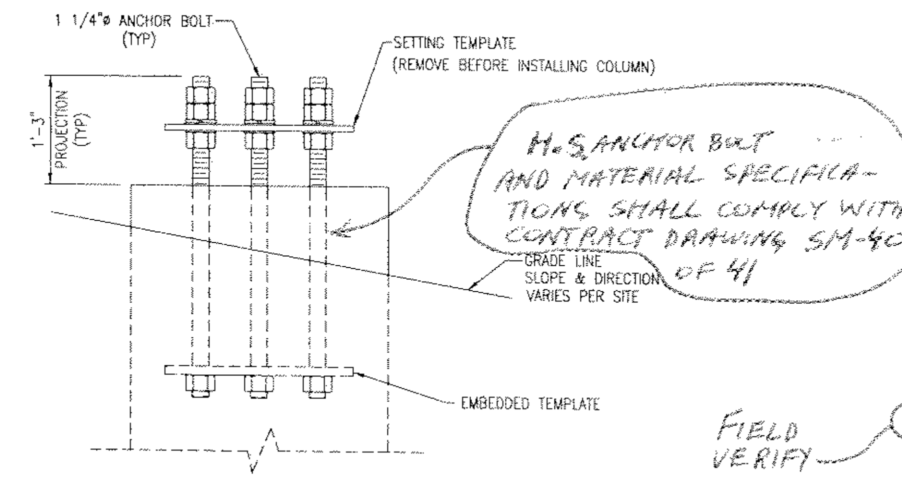
TYPICAL SECTION
EQUIPMENT MOUNTING ENVELOPE



UPPER CONNECTION DETAIL
(LEFT COLUMN SHOWN. RIGHT COLUMN SIMILAR)



BASE PLATE ERECTION



TYPICAL FOUNDATION ELEVATION

GENERAL NOTES:

STRUCTURE DESIGN PER AASHTO STANDARD SPECS. FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRS AND TRAFFIC SIGNALS, 1994 EDITION.

DESIGN WIND SPEED 80 MPH.

ALL WELDING PER AWS D1.1 (LATEST EDITION).

STRUCTURE DESIGN BY HURTT FABRICATING CORP.

ANCHOR BOLT & FOUNDATION DESIGN BY HNTB.

EQUIPMENT MOUNTING BRACKETS & HARDWARE BY OTHERS.

FOUNDATION & ROADWAY ELEVATIONS PROVIDED BY VENTURE ELECTRIC CO. ON 2-5-08.

FIELD VERIFY

THE ELEVATIONS SHOWN ARE FOR REFRENCE AND RELATIONSHIP ONLY AND ARE NOT THE ACTUAL SITE ELEVATIONS.

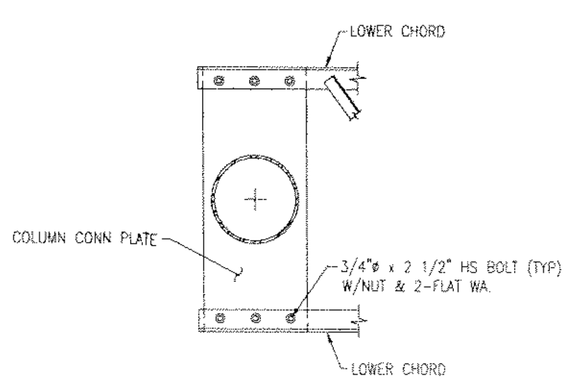
17'-6" MINIMUM (18'-0" DESIGN) CLEARANCE FROM THE HIGH POINT OF THE ROADWAY TO THE BOTTOM OF THE EQUIPMENT MOUNTING ENVELOPE.

THE TRUSS TO COLUMN HIGH STRENGTH BOLT CONNECTIONS SHALL BE INSTALLED USING THE "TURN-OF-NUT" METHOD PER SECTION 407.06(b)3 OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS 2002.

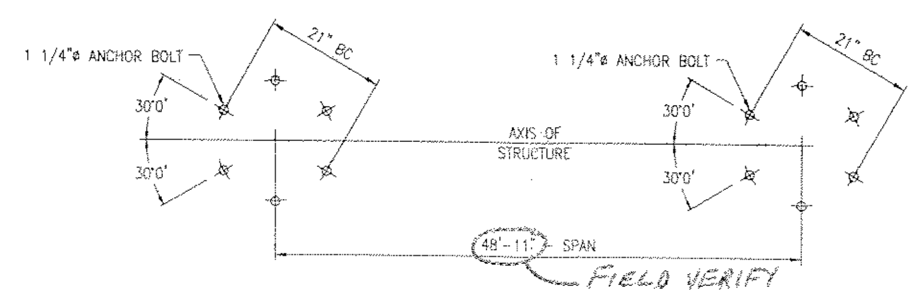
ANCHOR NOTE:

USE STEEL SETTING & EMBEDDED TEMPLATES TO ASSURE PROPER ANCHOR BOLT LAYOUT & ALIGNMENT.

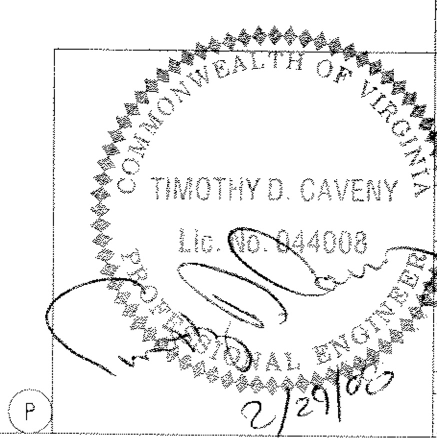
REUSE SETTING TEMPLATE AT SIMILAR LOCATIONS.



LOWER CONNECTION DETAIL
(LEFT COLUMN SHOWN. RIGHT COLUMN SIMILAR)



ANCHOR BOLT LAYOUT
LOC. GANTRY NB



REV:

PRINTS ISSUED								
FOR	#	DATE	FOR	#	DATE	FOR	#	DATE

HURTT FABRICATING CORP.
P.O. BOX 128
MARCELINE, MO 64658

CUSTOMER: VENTURE ELECTRIC CO.

PROJECT: CONTRACT NO. PEL-2006
POWHITE PARKWAY EXPRESS LANES PROJECT
RICHMOND METROPOLITAN AUTHORITY

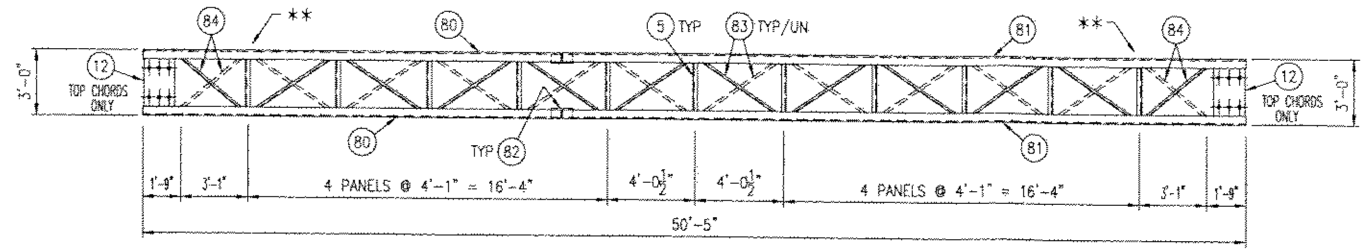
SUBJECT: ERECTION DIAGRAM FOR LOC. NORTH BOUND GANTRY @ STA 619+01.21

FILE: 4671 OH E1 PKG F	DATE: 2-13-08		PKG: F
PRINTED FOR: RICHMOND METRO AUTHORITY	DR BY: JBS	CH BY: TAP	JOB NO: HF-4871	SHEET: E1

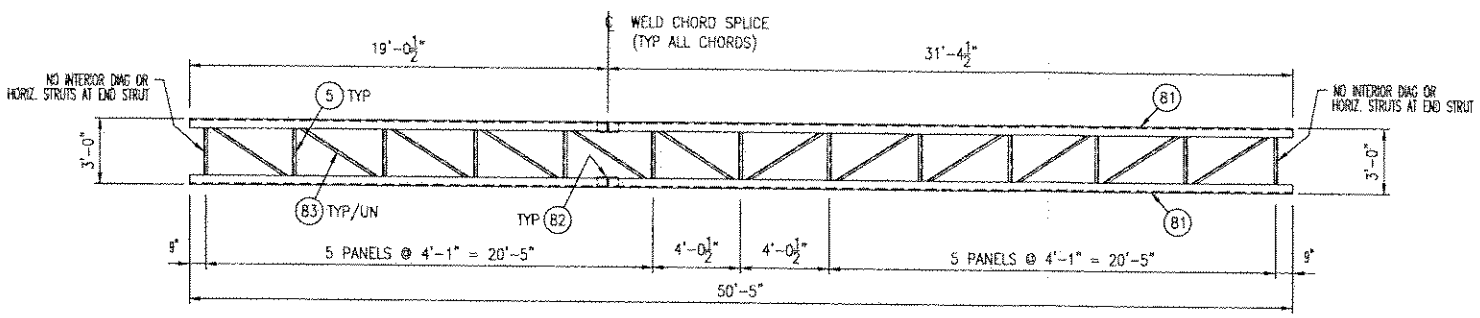
P

BILL OF MATERIAL

QTY	MK	DESCRIPTION	LENGTH	REMARKS
4	80	L 4 x 4 x 3/8	19'-0"	
4	81	L 4 x 4 x 3/8	31'-4"	
4	82	L 4 x 4 x 3/8	1'-0"	
44	83	L 2 x 2 x 3/16	4'-4 1/8"	
4	84	L 2 x 2 x 3/16	3'-9"	
48	5	L 2 x 2 x 3/16	2'-7"	
13	6	L 2 x 2 x 3/16	3'-7"	
2	12	PL 1/2 X 17	2'-8"	
24	END COLUMN	3/4"φ HSB	2 1/2"	W/NUT & 2-FLAT WASHER



PLAN



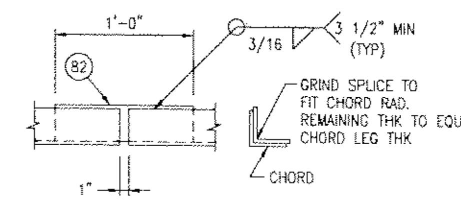
ELEVATION

ONE REQ'D - SPAN SECTION - MK P3A

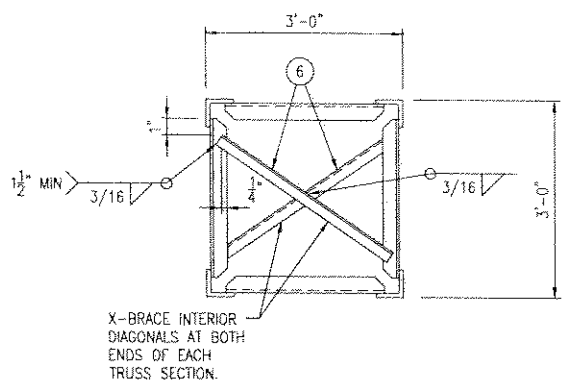
SHOP DRAWING REVIEW
HNTB Corporation

Review is for general compliance with contract documents. Sole responsibility for correctness of dimensions, details, quantities and safety during fabrication and erection shall remain with the Contractor.

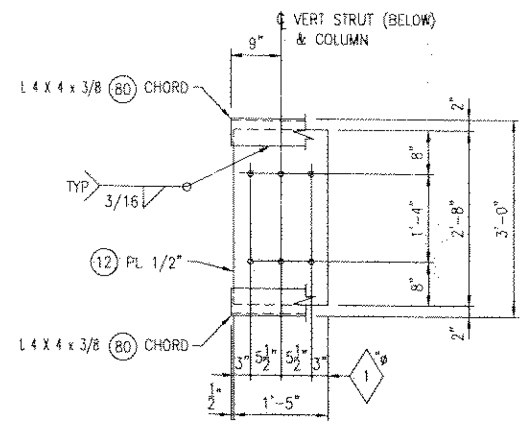
☒ No Exceptions Taken
☐ Make Correction Noted By AN
☐ Amend and Resubmit
☐ Rejected - See Remarks Date 3/22/08



WELD CHORD SPLICE

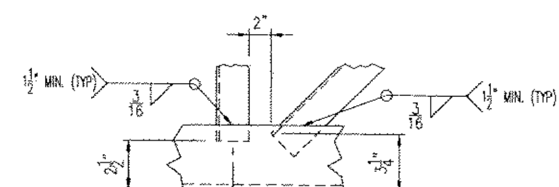


TYPICAL TRUSS SECTION END



TOP CHORD MOUNTING PLATE

LEFT SECTION SHOWN
RIGHT SECTION SIMILAR



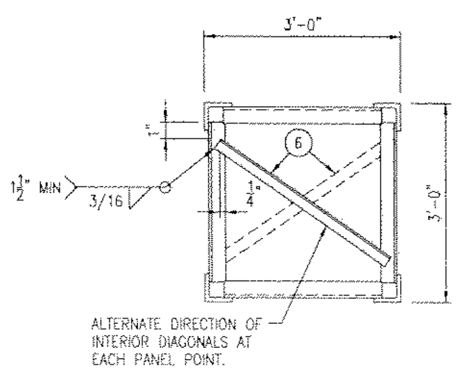
TYPICAL STRUT & DIAGONAL CONNECTION

CAMBER NOTES:

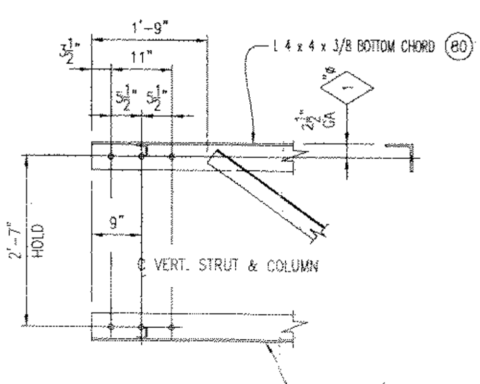
PROVIDE ¾" OF CAMBER AT CENTERLINE OF TRUSS

MATERIAL SPECIFICATIONS:

STEEL SHAPES & PLATE - ASTM A36
GALVANIZE AFTER FAB PER ASTM A123
HS BOLTS - ASTM A325 TYPE 1
NUTS - ASTM A563 DH
WASHERS - ASTM F436
GALVANIZE HARDWARE PER ASTM A153



TYPICAL TRUSS SECTION



BOTTOM CHORD LAYOUT

LEFT SECTION SHOWN
RIGHT SECTION SIMILAR

REV:

PRINTS ISSUED								
FOR	#	DATE	FOR	#	DATE	FOR	#	DATE

COMMONWEALTH OF VIRGINIA
TIMOTHY D. CAVENY
Lic. No. 044008
PROFESSIONAL ENGINEER
2/29/08

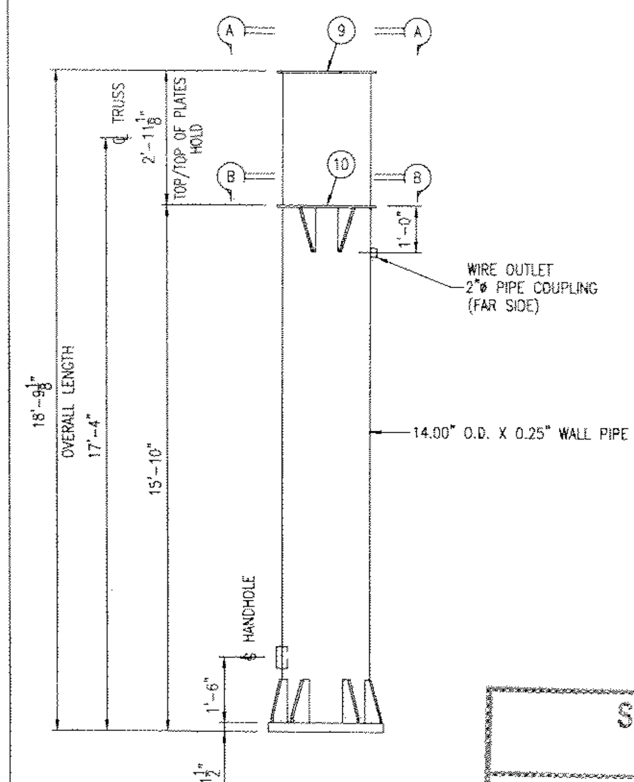
HURTT FABRICATING CORP.
P.O. BOX 128
MARCELINE, MO 64658

CUSTOMER: VENTURE ELECTRIC CO.

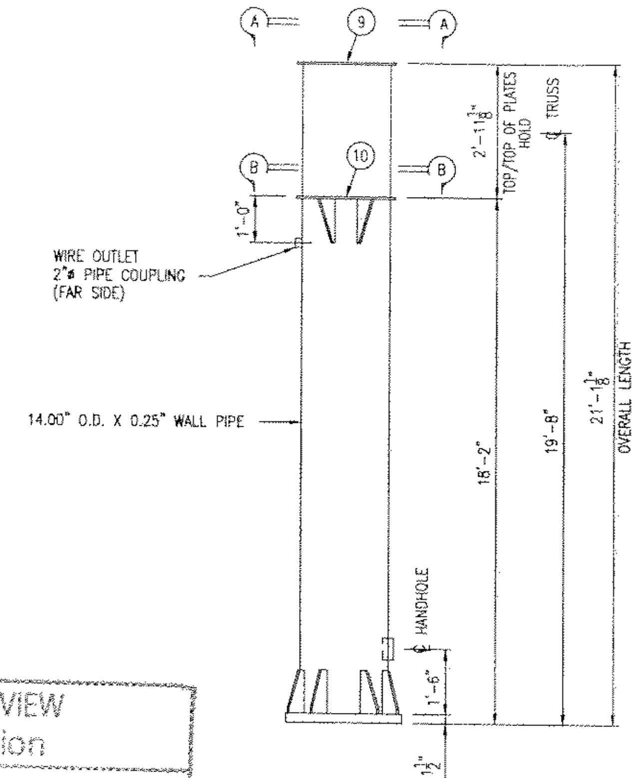
PROJECT: CONTRACT NO. PEL-2006
POWHITE PARKWAY EXPRESS LANES PROJECT
RICHMOND METROPOLITAN AUTHORITY

SUBJECT: FABRICATION DETAILS FOR GANTRY TRUSS
LOC. NORTH BOUND GANTRY

FILE: 4871 OH GANTRY TRUSS PKG F | DATE: 2-13-08 | PKG: F
PRINTED FOR: RICHMOND METRO AUTHORITY | DR BY: JBS | CH BY: TAP | JOB NO: HF-4871 | SHEET 1 OF 2

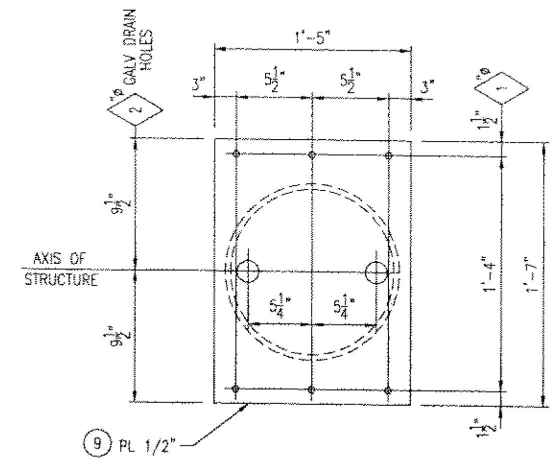


LEFT END COLUMN DETAIL
ONE REQ'D – MK P3EL

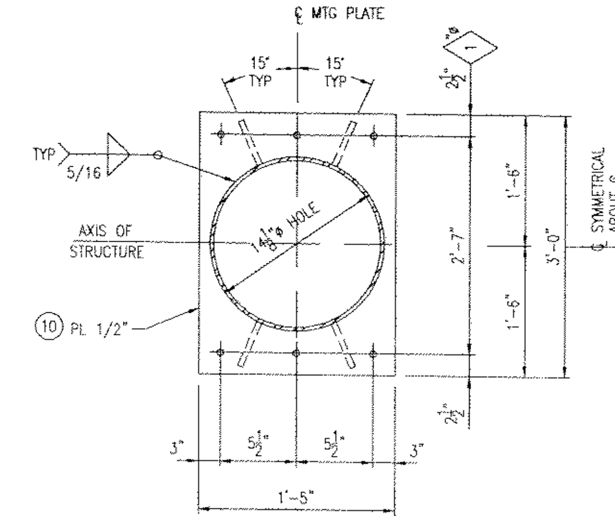


RIGHT END COLUMN DETAIL
ONE REQ'D – MK P3ER

SHOP DRAWING REVIEW
HNTB Corporation
Review is for general compliance with contract documents. Sole responsibility for correctness of dimensions, details, quantities and safety during fabrication and erection shall remain with the Contractor
☒ No Exceptions Taken
☐ Make Correction Noted By AN
☐ Amend and Resubmit
☐ Rejected – See Remarks Date 3/22/08

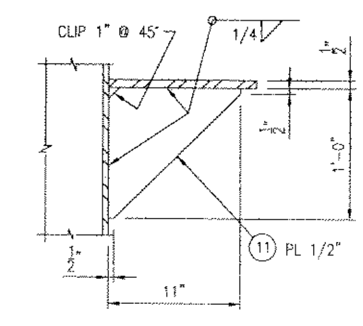


VIEW A–A
UPPER MOUNTING PLATE

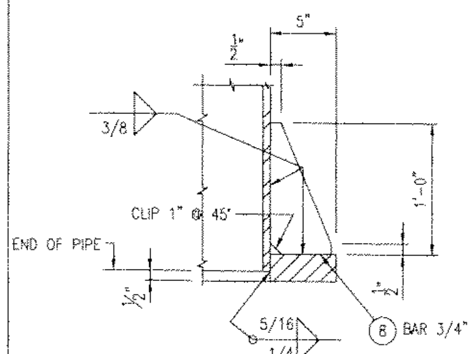


SECTION B–B
LOWER MOUNTING PLATE

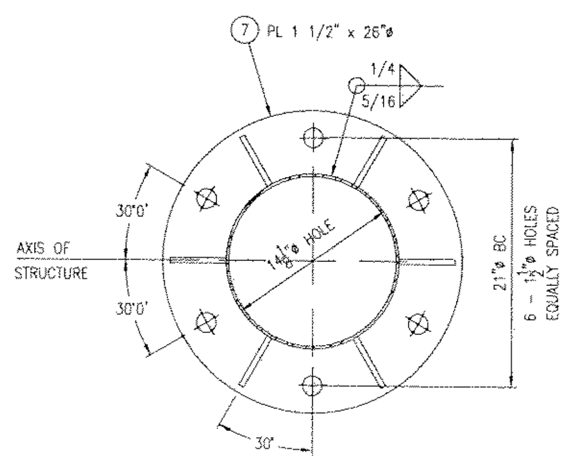
BILL OF MATERIAL				
QTY	MK	DESCRIPTION	LENGTH	REMARKS
1	P3EL	14.00" O.D. x 0.25" WALL PIPE	18'–8 1/8"	
1	P3ER	14.00" O.D. x 0.25" WALL PIPE	21'–0 1/8"	
2	7	PL 1 1/2 x 26"ø		
12	8	PL 3/4 x 5	1'–0"	
2	9	PL 1/2 x 17	1'–7"	
2	10	PL 1/2 x 17	3'–0"	
8	11	PL 1/2 x 11	1'–0"	
2	HF	PL 2 x 5 1/2	0'–8"	
2	HC	BAR 5 1/2 x 1/8	0'–8"	
2	CB	BAR 1 x 1/4	0'–1 1/2"	
2	GROUND LUG	1/2"ø HEX NUT		A307
4	HAND HOLE	3/8"ø HEX BOLT	1 1/4"	W/LOCKNUT (A307)
4		3/8"ø RD HD CAP SCREW	3/4"	W/LOCK WASHER (A307)
2		3/16"ø GALV. CHAIN	1'–6"	
2		2"ø PIPE COUPLING & PLUG		



TRUSS CONNECTION GUSSET
REQUIRED @ BOTTOM CONNECTION ONLY

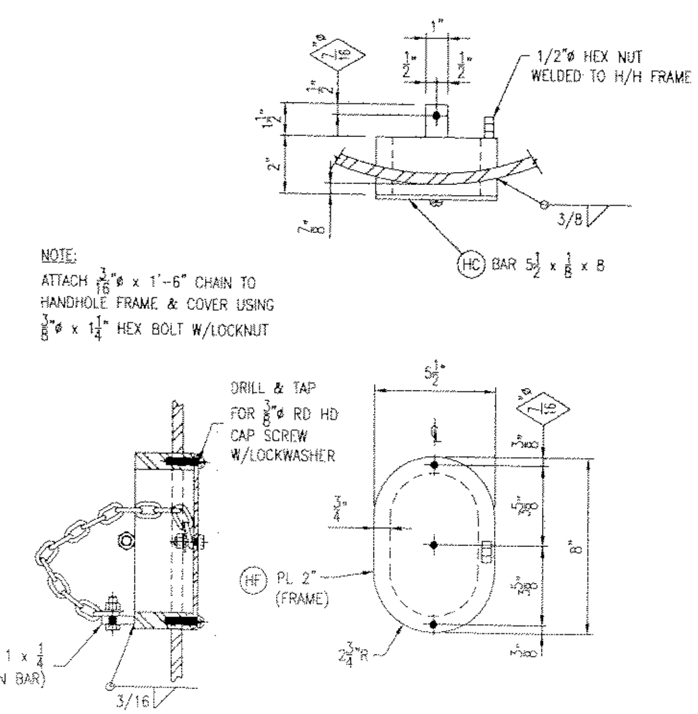


BASE PLATE WELD & GUSSET DETAIL



BASE PLATE DETAIL

NOTE:
ATTACH 3/16"ø x 1'–6" CHAIN TO HANDHOLE FRAME & COVER USING 3/8"ø x 1¼" HEX BOLT W/LOCKNUT



HANDHOLE DETAIL

MATERIAL SPECIFICATIONS:
COLUMN PIPE – A500 GR B or API 5L X42, X52, or X60
(42 KSI MIN. YIELD)
STEEL BARS & PLATES – ASTM A36
GALV. STEEL AFTER FAB PER ASTM A123

STD BOLTS, NUTS, & WASHERS – ASTM A307
GALV. HARDWARE PER ASTM A153

COMMONWEALTH OF VIRGINIA
TIMOTHY D. CAVENY
Lic. No. 034008
PROFESSIONAL ENGINEER
2/29/08

REV:								
PRINTS ISSUED								
FOR	#	DATE	FOR	#	DATE	FOR	#	DATE

HURTT FABRICATING CORP.
P.O. BOX 128
MARCELINE, MO 64658

CUSTOMER: VENTURE ELECTRIC CO.

PROJECT: CONTRACT NO. PEL-2006
POWHITE PARKWAY EXPRESS LANES PROJECT
RICHMOND METROPOLITAN AUTHORITY

SUBJECT: FABRICATION DETAILS FOR GANTRY END COLUMNS
LOC. NORTH BOUND GANTRY

FILE: 4671 GANTRY END COLUMN PKG F	DATE: 2-13-08	PKG: F		
PRINTED FOR: RICHMOND METRO AUTHORITY	DR BY: JBS	CH BY: TAP	JOB NO: HF-4671	SHEET 2 OF 2

P

COWELL ENGINEERING

STRUCTURAL ENGINEERS

February 29, 2008

Craig Hengstenberg
Hurtt Fabricating
P.O. 128
Marceline, MO 64658

RE: Independent Review
Sign Structures and Foundations
Project: HF - 4871
Gantry Sign Location:

Dear Craig:

This office has reviewed the drawings provided for the above referenced project to determine compliance with the AASHTO standards entitled: Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals (1994) and AASHTO Standard Specifications for Highway Bridges (1996), and the VDOT Road and Bridge Standards.

The review consisted of verifying the input values from the supplied drawings, comparing the drawing against the referenced standard/specification and performing computations to verify some of the computer generated numbers when needed.

Cowell Engineering, LLC has the required independent status necessary for review. Neither the company nor any of its employees have any affiliations (past or present) with any manufacturer, supplier, or contractor associated with traffic structures.

Based upon this review and to the best of my knowledge and belief, the submitted drawings are in compliance with the pertinent passages of the above referenced AASHTO specifications.

Yours very truly,
COWELL ENGINEERING

COMMONWEALTH OF VIRGINIA
TIMOTHY D. CAVENY
Lic. No. 044008
PROFESSIONAL ENGINEER

2/29/08

Timothy D. Caveny, P.E., S.E.
W.O. #07087

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Saint Louis, Missouri 63143
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314.644.1988 FAX
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HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

Truss # = GNB
File Name: 4871GANB.DAT
Hurtt Job # = HF 4871
Item # =
State Job # = RICH EXPY
State Project = PEL 2006

County = RMA

Although extensive measures have been taken to insure the correctness of this program, the presence of undetected errors in the program or material is possible. Therefore, the application of judgement is required on the correctness of the output and its proper application to the intended use. The program material contained herein is supplied without representation or warranty of any kind. Cowell Engineering LLC and San4dSoft therefore assume no responisbility and shall have no liability, consequential or otherwise, of any kind arising from the use of the program or any part thereof.

SHEETS 1-12 FOR TRUSS DESIGN ONLY

SHOP DRAWING REVIEW
HNTB Corporation

Review is for general compliance with contract documents. Sole responsibility for correctness of dimensions, details, quantities and safety during fabrication and erection shall remain with the Contractor.

- [x] No Exceptions Taken
- [ ] Make Correction Noted By AN
- [ ] Amend and Resubmit
- [ ] Rejected – See Remarks Date 3/22/08

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Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * * TRUSS DESIGN * * * * * * * * * *

TRUSS DIMENSIONS (FT)			PANEL LENGTH (FT)	
LENGTH	DEPTH	WIDTH	CENTER	END
48.92	3.00	3.00	4.08	4.06

WIND VELOCITY MPH	NUMBER OF SIGNS	WALK DESIGN DIST L	LENGTH	WGT/FT	NUMBER OF PANELS CENTER	END
80.00	1	0.00	0.00	0.00	10	2

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15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * * * TRUSS DESIGN * * * * * * * * * *

S I G N   D A T A

SIGN NO.	SIGN LENGTH	SIGN HEIGHT	CD	CH	DISTANCE FROM LS	DISTANCE CENTER	ECCN	WGT
1	46.92	1.00	1.30	1.00	1.00	24.46	-3.50	0.00

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15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * * TRUSS DESIGN * * * * * * * * * *

TRUSS DEPTH = 3.00 FEET
TRUSS WIDTH = 3.00 FEET
DEFLECTION = 0.101 IN.
CAMBER REQUIRED = 0.688 IN.

	L-WIND FORCE (LBS.)	L-DEAD WEIGHT (LBS.)	R-WIND FORCE (LBS.)	R-DEAD LOAD (LBS.)
CASE 1	0.0	1464.3	0.00	1464.3
CASE 2	2171.9	1464.3	2171.90	1464.3
CASE 3	1086.0	2343.3	1085.95	2343.3

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HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * * TRUSS CHORDS * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	NUMBER OF 0.625" BOLTS(A325)	NUMBER OF 0.75" BOLTS(A325)	NUMBER OF 0.875" BOLTS(A325)
49.42	4	2.00	2.00	1.00

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
4x4x.375	36.00	2.86	2.10	0.79	1937.26

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	3715.5	1299.1	16447.6	1.33
CASE 2	13519.0	4726.9	23026.7	3.47
CASE 3	10975.3	3837.5	23026.7	2.82

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OVERHEAD ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * * WIND DIAGONAL * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.92	20	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	240.11

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	6627.6	0.00
CASE 2	1943.0	2717.4	9278.6	0.50
CASE 3	971.5	1358.7	9278.6	0.25

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OVERHEAD ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * WIND DIAGONAL END PANEL * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.90	4	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	47.86

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	6672.5	0.00
CASE 2	1936.4	2708.3	9341.5	0.50
CASE 3	968.2	1354.1	9341.5	0.25

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15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * * WIND STRUT * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
2.75	26	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	174.46

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	14590.6	0.00
CASE 2	1086.0	1518.8	20426.9	0.28
CASE 3	543.0	759.4	20426.9	0.14

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15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * * DEAD LOAD DIAGONAL * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.92	20	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	240.11

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	1310.0	1832.1	19800.0	0.47
CASE 2	1310.0	1832.1	27720.0	0.34
CASE 3	2159.3	3019.9	27720.0	0.55

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Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * DEAD LOAD DIAGONAL END PANEL * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.90	4	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	47.86

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	1305.6	1826.0	19800.0	0.47
CASE 2	1305.6	1826.0	27720.0	0.33
CASE 3	2152.0	3009.8	27720.0	0.55

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15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * * DEAD LOAD VERTICAL * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
2.75	26	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	174.46

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	732.2	1024.0	14590.6	0.26
CASE 2	732.2	1024.0	20426.9	0.19
CASE 3	1206.8	1687.9	20426.9	0.31

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OVERHEAD ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
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Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * * INTERIOR DIAGONAL * * * * * * * * * *

LENGTH = 3.55 NUMBER REQUIRED = 13

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	LENGTH OF 0.19" FILLET WELD	LEAST ROG	WEIGHT
1.75x1.75x0.13	36.00	0.42	1.50	0.35	66.52

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HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY NB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:49

Truss # = GANï File Name: 4871GTNB.DTA
Hurtt Job # = HF 4871
Item # =
State Job # = RICH EXPY
State Project = PEL 2006

County = RMA

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SHEETS 1-10 & EXTRA CHECKS FOR
COLUMN DESIGN ONLY

COMMONWEALTH OF VIRGINIA
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PROFESSIONAL ENGINEER

2/29/08

HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY NB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:49

* * * * * * * * * * TRUSS DESIGN * * * * * * * * * *

TRUSS DIMENSIONS (FT)

LENGTH	DEPTH	WIDTH	PANEL LENGTH(FT)	NUMBER OF PANELS
24.46	3.00	3.00	4.08	6

WIND VELOCITY MPH	NUMBER OF SIGNS	WALK DESIGN DIST L	LENGTH	WGT/FT
80.00	1	0.00	0.00	0.00

S I G N D A T A

SIGN NO.	SIGN LENGTH	SIGN HEIGHT	CD	CH	DISTANCE FROM LS	DISTANCE CENTER	ECCN	WGT
1	23.46	1.00	1.30	1.00	1.00	12.73	-3.50	352.00

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Structure Name : GTY NB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:49

* * * * * * * * * * TRUSS DESIGN * * * * * * * * * *

TRUSS DEPTH = 3.00 FEET
TRUSS WIDTH = 3.00 FEET
DEFLECTION = 0.118 IN.
CAMBER REQUIRED = 0.412 IN.

	WIND SHEAR (LBS.)	DEAD WEIGHT (LBS.)	WIND MOMENT (FT.-LBS.)	DEAD-W MOMENT (FT.-LBS.)
CASE 1	0.0	1806.8	0.00	22273.4
CASE 2	2149.6	1806.8	26712.11	22273.4
CASE 3	1074.8	2675.2	13356.06	32928.4

* * * * * * * * * * TRUSS CHORDS * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	NUMBER OF 0.625" BOLTS(A325)	NUMBER OF 0.75" BOLTS(A325)	NUMBER OF 0.875" BOLTS(A325)
25.21	4	2.00	2.00	1.00

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
4x4x.38	36.00	2.86	2.10	0.79	988.23

	FORCE (PSI)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	4760.6	1664.5	16451.3	1.71
CASE 2	13976.8	4887.0	23031.9	3.59
CASE 3	11424.0	3994.4	23031.9	2.93

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CANTILEVER ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY NB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:49

* * * * * * * * * * * COLUMN DESIGN * * * * * * * * * * *

HEIGHT (FT) TOTAL	HEIGHT (FT) TRUSS	DIAMETER (IN)	THICKNESS (IN)	YIELD STRENGTH (KSI)	WEIGHT (LB)
21.43	19.68	14.00	0.2500	42	787

	AXIAL (LBS)	MOMENT (FT-LB)	TORQUE (FT-LB)	SHEAR (LBS)	FA ALLOW	FB ALLOW	FV ALLOW	CSR
CASE 1 COMBINATION 1	2794	22273	0	0	14275	27720	13860	0.283
CASE 2 COMBINATION 1	2794	52645	26712	2510	19984	38808	19404	0.518
CASE 2 COMBINATION 2	2794	43434	16027	1651	19984	38808	19404	0.402
CASE 3 COMBINATION 1	3663	44032	13356	1415	19984	38808	19404	0.405
CASE 3 COMBINATION 2	3663	42162	8014	931	19984	38808	19404	0.380

Ø for overhead span

Max mom @ BASE = 2172 (19.67) = 42,723

$$M_{design} = \sqrt{42,723^2 + (.2)(42,723)^2} = 43,569$$

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CANTILEVER ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY NB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:49

* * * * * * * * * TRUSS MOUNTING PLATE * * * * * * * * *

WIDTH A [IN]	WIDTH B [IN]	THICKNESS C [IN]	GUSSET DEPTH D [IN]	THICKNESS E [IN]	WEIGHT [LBS]
36.00	17.00	0.500	12.00	0.500	149

WELD SIZE-W2 (1/16")	WELD SIZE-W3 (1/16")
5	4

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CANTILEVER ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
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Structure Name : GTY NB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:49

* * * * * * * * * * ANCHOR BOLT DESIGN * * * * * * * * * *

DIAMETER [IN]	EMBEDMENT LENGTH [IN]	YIELD STRENGTH (KSI)	MAXIMUM TENSION [LBS]	WEIGHT [LBS]
2.00	40.00	55.00	31499	171

* * * * * * * * * * * BASE PLATE * * * * * * * * * * *

DIMENSIONS [IN]	BOLT SPACING [IN] X	BOLT SPACING [IN] Y	EDGE DISTANCE [IN]	WEIGHT [LBS]
21.50 x 21.50 x 2.00	14.00	14.00	3.75	262.16

WELD SIZE-W4 (1/16")
5.00

Total Weight of Column Plates & Anchor Bolts = 1369.44 LBS.
Total Weight of Truss, Column, Plates & Anchor Bolts = 2824.26 LBS.

COMMONWEALTH OF VIRGINIA
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2/29/08

COWELL ENGINEERING
STRUCTURAL ENGINEERS

PROJECT Hf-4871
LOCATION Richmond Virginia
CLIENT Hoch Fab
BY TDC DATE 6/27/07 W.O.#
CHECK DATE SHEET OF

CHECK BASE PLATE

$M_{actual} = 43{,}569 \quad \therefore \ \underline{ok}$

M_{max} @ BASE $= 2860(20) = 57{,}200$ ft-Lbs

$M_{DESIGN} = \sqrt{57{,}200^2 + [(.2)(57{,}200)]^2} = 58{,}333$

$T = \dfrac{4(58{,}333 \text{ ft-Lbs})}{6(1.75')} - \left(\dfrac{1914.8 + 799}{6}\right) = 21{,}770^{\#}$

452.3

$V = \sqrt{2859^2 + .2(2859)^2} = 2916^{\#}$

using $1\frac{1}{4}$" ϕ A.B. $\quad A_t = .969 \text{ in}^2 \quad$ Assum 55 ksi

$F_v = 0.3(55) = 16.5$ ksi $\quad F_t = 0.5(55) = 27.5$ ksi

$f_v = \dfrac{2916}{.969} = 3009.3 \quad f_t = \dfrac{21{,}770}{.969} = 22{,}466.4$

$CSR = \left(\dfrac{3.00}{16.5(4/3)}\right)^2 + \left(\dfrac{22.5}{27.5(4/3)}\right)^2 = 0.395 < 1.0$

.376

BENDING of PL Between Bolts.

$L = 20"(\pi)/6 = 10.47" \quad M_{PL} = \dfrac{Pl}{8} = \dfrac{21.8(10.47")}{8} = 28.5 \text{ in-k}$

$f_{bPL} = \dfrac{28.5 \text{ k-in}(6)}{6(1.5)^2} = 12.7$ ksi

Weld to BASE PL

$f_t = \dfrac{21.7^k}{4.5 \times 2 \times .375} = 6.4 \text{ ksi} < .3(70) = 21 \text{ ksi}$

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2/29/08

COWELL ENGINEERING
STRUCTURAL ENGINEERS

PROJECT Hf-4871
LOCATION Richmond Va
CLIENT Hurtt Fab
BY TDC DATE 6/27/07 W.O.#
CHECK DATE SHEET OF

Weld of Gusset to CoL.

$$f_v = \frac{21.7^k}{11.5 \times 2 \times .375} = 2.5 \text{ ksi}$$ ok

STRESS ON Gusset

$$f_t = \frac{21.7^k}{4.5 \times .75} = 6.5 \text{ ksi}$$ ok

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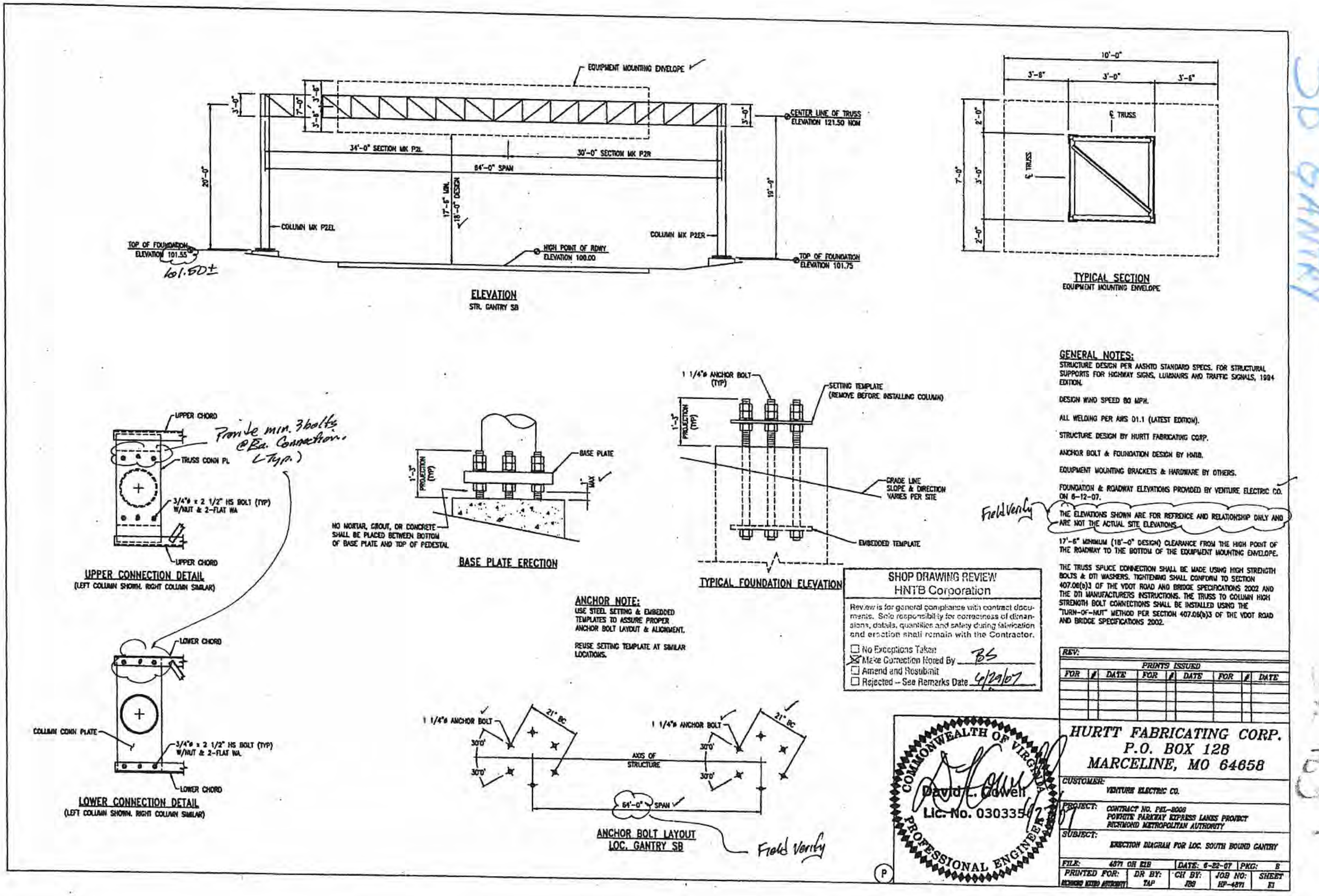
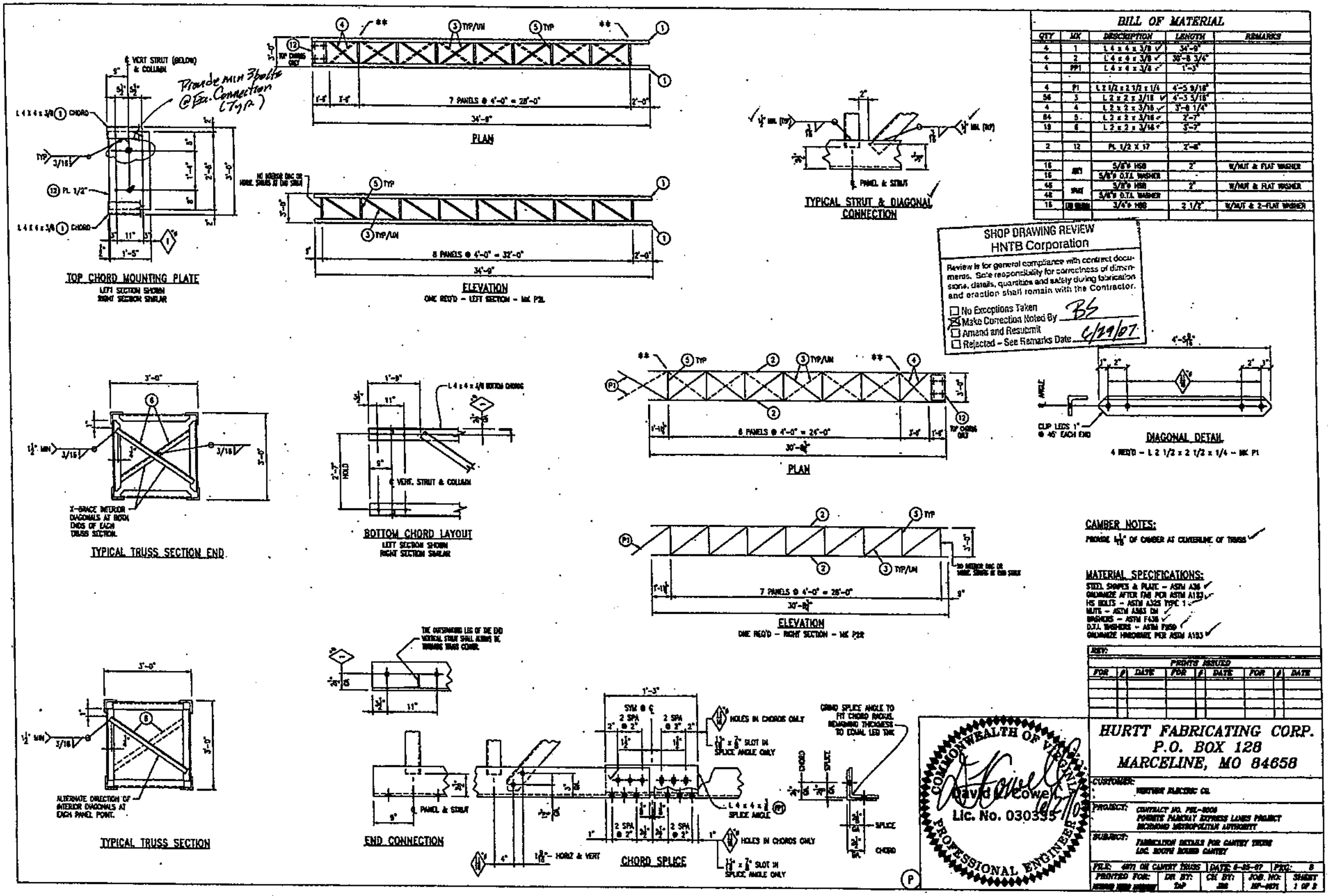
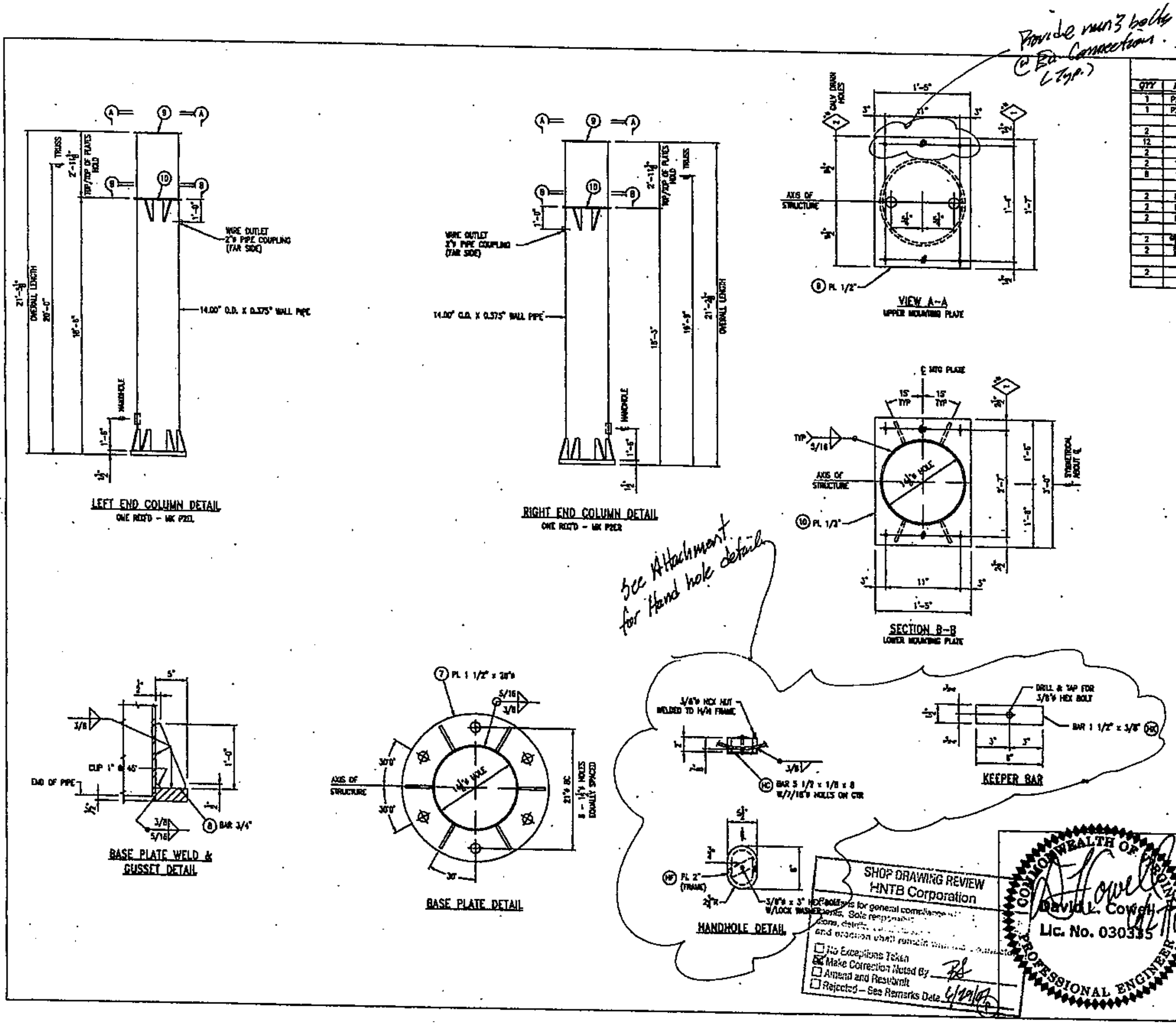

SB GANTRY
EQUIPMENT MOUNTING ENVELOPE
CENTER LINE OF TRUSS ELEVATION 121.50 NOM
34'-0" SECTION MK P2L
30'-0" SECTION MK P2R
64'-0" SPAN
17'-6" MIN. 18'-0" DESIGN
COLUMN MK P2EL
COLUMN MK P2ER
TOP OF FOUNDATION ELEVATION 101.55
101.50±
HIGH POINT OF RDWY ELEVATION 100.00
TOP OF FOUNDATION ELEVATION 101.75
ELEVATION
STR. GANTRY SB
10'-0"
3'-6"
3'-0"
℄ TRUSS
TYPICAL SECTION
EQUIPMENT MOUNTING ENVELOPE
UPPER CHORD
Provide min. 3 bolts @ Ea. Connection. (Typ.)
TRUSS CONN PL
3/4"ø x 2 1/2" HS BOLT (TYP) W/NUT & 2-FLAT WA
UPPER CONNECTION DETAIL
(LEFT COLUMN SHOWN. RIGHT COLUMN SIMILAR)
BASE PLATE
1'-3" PROJECTION (TYP)
NO MORTAR, GROUT, OR CONCRETE SHALL BE PLACED BETWEEN BOTTOM OF BASE PLATE AND TOP OF PEDESTAL
BASE PLATE ERECTION
1 1/4"ø ANCHOR BOLT (TYP)
SETTING TEMPLATE (REMOVE BEFORE INSTALLING COLUMN)
GRADE LINE SLOPE & DIRECTION VARIES PER SITE
EMBEDDED TEMPLATE
TYPICAL FOUNDATION ELEVATION
ANCHOR NOTE:
USE STEEL SETTING & EMBEDDED TEMPLATES TO ASSURE PROPER ANCHOR BOLT LAYOUT & ALIGNMENT.
REUSE SETTING TEMPLATE AT SIMILAR LOCATIONS.
LOWER CHORD
COLUMN CONN PLATE
3/4"ø x 2 1/2" HS BOLT (TYP) W/NUT & 2-FLAT WA
LOWER CONNECTION DETAIL
(LEFT COLUMN SHOWN. RIGHT COLUMN SIMILAR)
1 1/4"ø ANCHOR BOLT
21" BC
30'0"
AXIS OF STRUCTURE
64'-0" SPAN
ANCHOR BOLT LAYOUT
LOC. GANTRY SB
Field Verify
GENERAL NOTES:
STRUCTURE DESIGN PER AASHTO STANDARD SPECS. FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRS AND TRAFFIC SIGNALS, 1994 EDITION.
DESIGN WIND SPEED 80 MPH.
ALL WELDING PER AWS D1.1 (LATEST EDITION).
STRUCTURE DESIGN BY HURTT FABRICATING CORP.
ANCHOR BOLT & FOUNDATION DESIGN BY HNTB.
EQUIPMENT MOUNTING BRACKETS & HARDWARE BY OTHERS.
FOUNDATION & ROADWAY ELEVATIONS PROVIDED BY VENTURE ELECTRIC CO. ON 6-12-07.
Field Verify
THE ELEVATIONS SHOWN ARE FOR REFRENCE AND RELATIONSHIP ONLY AND ARE NOT THE ACTUAL SITE ELEVATIONS.
17'-6" MINIMUM (18'-0" DESIGN) CLEARANCE FROM THE HIGH POINT OF THE ROADWAY TO THE BOTTOM OF THE EQUIPMENT MOUNTING ENVELOPE.
THE TRUSS SPLICE CONNECTION SHALL BE MADE USING HIGH STRENGTH BOLTS & DTI WASHERS. TIGHTENING SHALL CONFORM TO SECTION 407.06(b)3 OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS 2002 AND THE DTI MANUFACTURERS INSTRUCTIONS. THE TRUSS TO COLUMN HIGH STRENGTH BOLT CONNECTIONS SHALL BE INSTALLED USING THE "TURN-OF-NUT" METHOD PER SECTION 407.06(b)3 OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS 2002.
SHOP DRAWING REVIEW
HNTB Corporation
Review is for general compliance with contract documents. Sole responsibility for correctness of dimensions, details, quantities and safety during fabrication and erection shall remain with the Contractor.
No Exceptions Taken
Make Correction Noted By BS
Amend and Resubmit
Rejected – See Remarks Date 6/29/07
COMMONWEALTH OF VIRGINIA
David L. Gowell
Lic. No. 030335
PROFESSIONAL ENGINEER
REV:
PRINTS ISSUED
FOR # DATE FOR # DATE FOR # DATE
HURTT FABRICATING CORP.
P.O. BOX 128
MARCELINE, MO 64658
CUSTOMER: VENTURE ELECTRIC CO.
PROJECT: CONTRACT NO. PEL-2008
POWHITE PARKWAY EXPRESS LANES PROJECT
RICHMOND METROPOLITAN AUTHORITY
SUBJECT: ERECTION DIAGRAM FOR LOC. SOUTH BOUND GANTRY
FILE: 4871 OH E1B
DATE: 6-22-07
PKG: B
PRINTED FOR: RICHMOND METRO AUTHORITY
DR BY: TAP
CH BY: JBS
JOB NO: HP-4871
SHEET E1



BILL OF MATERIAL

QTY	MK	DESCRIPTION	LENGTH	REMARKS
4	1	L 4 x 4 x 3/8	34'-9"	
4	2	L 4 x 4 x 3/8	30'-8 3/4"	
4	PP1	L 4 x 4 x 3/8	1'-3"	
4	P1	L 2 1/2 x 2 1/2 x 1/4	4'-5 9/16"	
56	3	L 2 x 2 x 3/16	4'-3 5/16"	
4	4	L 2 x 2 x 3/16	3'-8 1/4"	
84	5	L 2 x 2 x 3/16	2'-7"	
18	6	L 2 x 2 x 3/16	3'-7"	
2	12	PL 1/2 X 17	2'-8"	
16	[illegible]	5/8"ø HSB	2"	W/NUT & FLAT WASHER
16		5/8"ø D.T.I. WASHER		
48	[illegible]	5/8"ø HSB	2"	W/NUT & FLAT WASHER
48		5/8"ø D.T.I. WASHER		
16	[illegible]	3/4"ø HSB	2 1/2"	W/NUT & 2-FLAT WASHER



BILL OF MATERIAL

QTY	MK	DESCRIPTION	LENGTH	REMARKS
1	P2EL	14.00" O.D. x 0.375" WALL PIPE	21'-4 1/8"	
1	P2ER	14.00" O.D. x 0.375" WALL PIPE	21'-1 1/8"	
2	7	PL 1 1/2 x 28"Ø		
12	8	PL 3/4 x 5	1'-0"	
2	9	PL 1/2 x 17	1'-7"	
2	10	PL 1/2 x 17	3'-0"	
8	11	PL 1/2 x 11	1'-0"	
2	HF	PL 2 x 5 1/2	0'-6"	
2	HC	BAR 5 1/2 x 1/8	0'-6"	
2	HK	BAR 1 1/2 x 3/8	0'-6"	
2	[illegible]	3/8"Ø HEX NUT		A307
2	[illegible]	3/8"Ø HEX BOLT	3"	W/LOCK WASHER (A307)
2		2"Ø PIPE COUPLING & PLUG		

MATERIAL SPECIFICATIONS:

COLUMN PIPE – A500 GR B or API 5L X42, X52, or X60 (42 KSI MIN. YIELD)
STEEL BARS & PLATES – ASTM A36
GALV. STEEL AFTER FAB PER ASTM A123

STD BOLTS, NUTS, & WASHERS – ASTM A307
GALV. HARDWARE PER ASTM A153

REV:

PRINTS ISSUED								
FOR	#	DATE	FOR	#	DATE	FOR	#	DATE

HURTT FABRICATING CORP.
P.O. BOX 128
MARCELINE, MO 64658

CUSTOMER: VENTURE ELECTRIC CO.

PROJECT: CONTRACT NO. PEL-2006
POWHITE PARKWAY EXPRESS LANES PROJECT
RICHMOND METROPOLITAN AUTHORITY

SUBJECT: FABRICATION DETAILS FOR GANTRY END COLUMNS
LOC. SOUTH BOUND GANTRY

FILE: 4071 GANTRY END COLUMN | DATE: 6-26-07 | PREV: 8

PRINTED FOR: [illegible] | DR BY: TLP | CH BY: [illegible] | JOB NO: HF-4071 | SHEET 2 OF 2

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HNTB Corporation
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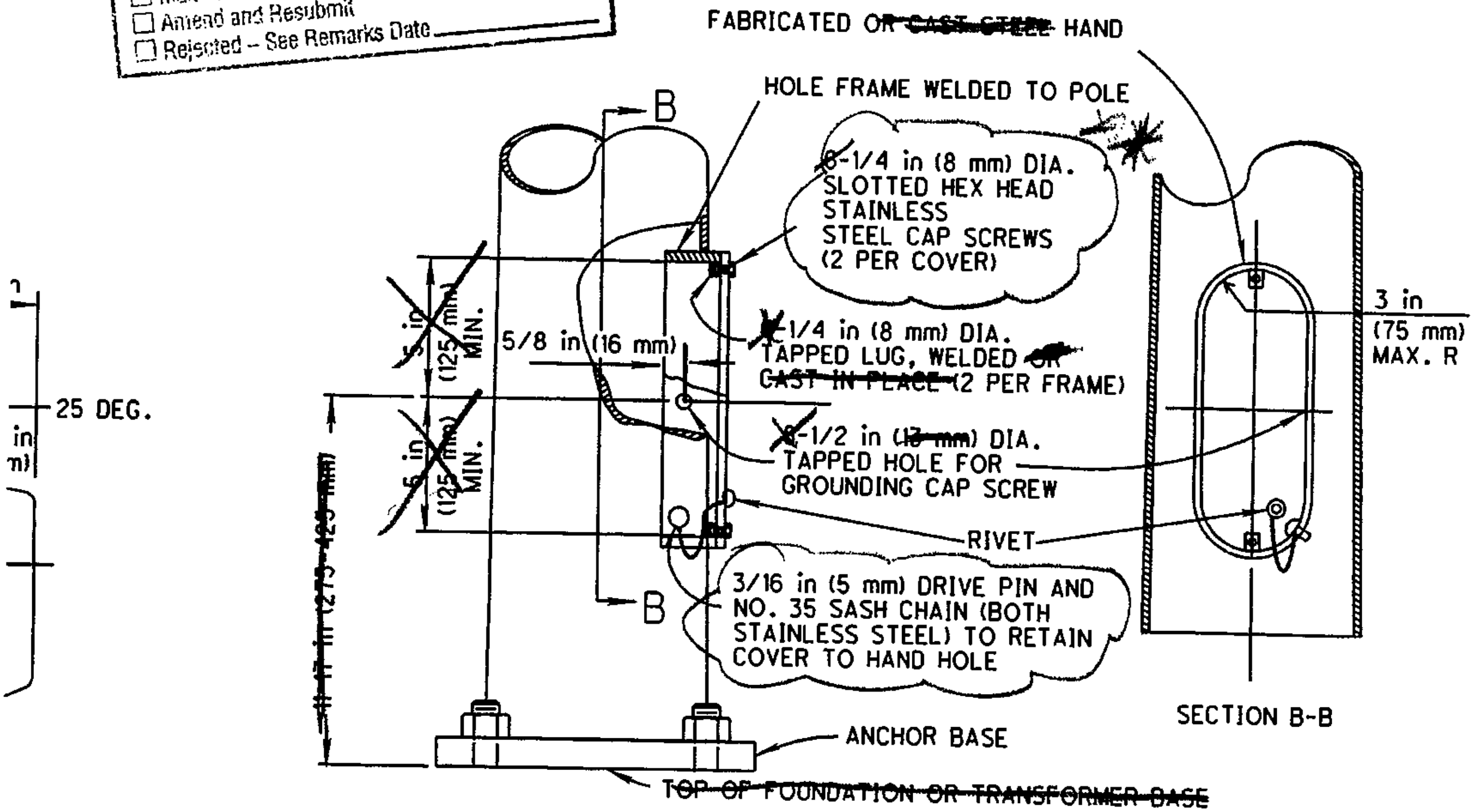
☐ No Exceptions Taken
☐ Make Correction Noted By
☐ Amend and Resubmit
☐ Rejected -- See Remarks Date

nc = National Coarse



HAND HOLE WITH COVER

~~(SEE NOTES 1 & 2)~~

HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

Truss # = GT
Hurtt Job # = HF 4871
Item # =
State Job # = RICH EXPY
State Project = PEL 2006

County = RMA

FOR TRUSS DESIGN

SHOP DRAWING REVIEW
HNTB Corporation

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- [x] No Exceptions Taken
- [ ] Make Correction Noted By BS
- [ ] Amend and Resubmit
- [ ] Rejected – See Remarks Date 6/29/07

COMMONWEALTH OF VIRGINIA
David L. Cowell
Lic. No. 030335
PROFESSIONAL ENGINEER
6/29/07

HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * * TRUSS DESIGN * * * * * DLC:03.24.2007 - A15L3*

TRUSS DIMENSIONS (FT)			PANEL LENGTH (FT)	
LENGTH	DEPTH	WIDTH	CENTER	END
64.00	3.00	3.00	4.00	4.00

WIND VELOCITY MPH	NUMBER OF SIGNS	DIST L	WALK DESIGN LENGTH	WALK DESIGN WGT/FT	NUMBER OF PANELS CENTER	NUMBER OF PANELS END
80.00	1	0.00	0.00	0.00	14	2

HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * * * * TRUSS DESIGN * * * * DLC:03.24.2007 - A15L3*

SIGN DATA

SIGN NO.	SIGN LENGTH	SIGN HEIGHT	CD	CH	DISTANCE FROM LS	DISTANCE CENTER	ECCN	WGT
1	62.00	1.00	1.30	1.00	1.00	32.00	-3.00	0.00

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HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * * * TRUSS DESIGN * * * * * DLC:03.24.2007 - A15L3*

TRUSS DEPTH = 3.00 FEET
TRUSS WIDTH = 3.00 FEET
DEFLECTION = 0.295 IN.
CAMBER REQUIRED = 1.063 IN.

	L-WIND FORCE (LBS.)	L-DEAD WEIGHT (LBS.)	R-WIND FORCE (LBS.)	R-DEAD LOAD (LBS.)
CASE 1	0.0	1914.8	0.00	1914.8
CASE 2	2858.7	1914.8	2858.73	1914.8
CASE 3	1429.4	3068.1	1429.36	3068.1

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6/27/07

HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * * * * TRUSS CHORDS * * * * DLC:03.24.2007 - A15L3*

LENGTH FT	NUMBER REQUIRED	NUMBER OF 0.625" BOLTS(A325)	NUMBER OF 0.75" BOLTS(A325)	NUMBER OF 0.875" BOLTS(A325)
64.50	4	3.00	2.00	2.00

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
4x4x.375	36.00	2.86	2.10	0.79	2528.40

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	6132.9	2144.4	16535.9	2.20
CASE 2	22856.7	7991.8	23150.2	5.86
CASE 3	18420.3	6440.7	23150.2	4.73

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HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * * * WIND DIAGONAL * * * * * DLC:03.24.2007 - A15L3*

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.85	28	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	331.63

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	6809.4	0.00
CASE 2	2523.0	3528.7	9533.2	0.65
CASE 3	1261.5	1764.4	9533.2	0.32

COMMONWEALTH OF VIRGINIA
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6/2?/07

HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * * WIND DIAGONAL END PANEL * * * * DLC:03.24.2007- A15L

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.85	4	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	47.38

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	6809.4	0.00
CASE 2	2523.0	3528.7	9533.2	0.65
CASE 3	1261.5	1764.4	9533.2	0.32

COMMONWEALTH OF VIRGINIA
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9/2/07

HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * * * WIND STRUT * * * * * DLC:03.24.2007 - A15L3*

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
2.75	34	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	228.14

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	14590.6	0.00
CASE 2	1429.4	1999.1	20426.9	0.37
CASE 3	714.7	999.6	20426.9	0.18

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6/27/07

HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * * DEAD LOAD DIAGONAL * * * * DLC:03.24.2007 - A15L3*

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.85	28	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	331.63

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	1690.0	2363.6	19800.0	0.61
CASE 2	1690.0	2363.6	27720.0	0.43
CASE 3	2789.9	3902.0	27720.0	0.72

COMMONWEALTH OF VIRGINIA
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HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * DEAD LOAD DIAGONAL END PANEL * * * DLC:03.24.2007 - A15

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.85	4	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	47.38

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	1690.0	2363.6	19800.0	0.61
CASE 2	1690.0	2363.6	27720.0	0.43
CASE 3	2789.9	3902.0	27720.0	0.72

COMMONWEALTH OF VIRGINIA
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6/27/07

HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * DEAD LOAD VERTICAL * * * * * DLC:03.24.2007 - A15L3

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
2.75	34	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	228.14

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	957.4	1339.0	14590.6	0.34
CASE 2	957.4	1339.0	20426.9	0.25
CASE 3	1580.6	2210.6	20426.9	0.41

COMMONWEALTH OF VIRGINIA
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7/07

HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * * * INTERIOR DIAGONAL * * * * DLC:03.24.2007 - A15L3

LENGTH = 3.55 NUMBER REQUIRED = 17

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	LENGTH OF 0.19" FILLET WELD	LEAST ROG	WEIGHT
1.75x1.75x0.13 ✓	36.00	0.42	1.50	0.35	86.98

← 2x2x3/16

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PROFESSIONAL ENGINEER
7/07

HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY SB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:17

Truss # = GA
Hurtt Job # = HF 4871
Item # =
State Job # = RICH EXPY
State Project = PEL 2006

County = RMA

* FOR END COLUMN DESIGN.ONLY *

* * * * * * * * * * TRUSS DESIGN * * * * * * * * * *

TRUSS DIMENSIONS (FT)

LENGTH	DEPTH	WIDTH	PANEL LENGTH (FT)	NUMBER OF PANELS
32.00	3.00	3.00	4.00	8

WIND VELOCITY MPH	NUMBER OF SIGNS	WALK DESIGN DIST L	LENGTH	WGT/FT
80.00	1	0.00	0.00	0.00

S I G N D A T A

SIGN NO.	SIGN LENGTH	SIGN HEIGHT	CD	CH	DISTANCE FROM LS	DISTANCE CENTER	ECCN	WGT
1	31.00	1.00	1.30	1.00	1.00	16.50	-3.00	0.00

SHOP DRAWING REVIEW
HNTB Corporation

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☒ No Exceptions Taken
☐ Make Correction Noted By
☐ Amend and Resubmit
☐ Rejected – See Remarks Date 6/29/07

COMMONWEALTH OF VIRGINIA
David L. Cowell
Lic. No. 030335
PROFESSIONAL ENGINEER
6/27/07

HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY SB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:17

* * * * * * * * * * TRUSS DESIGN * * * * * * DLC:03.24.20

TRUSS DEPTH = 3.00 FEET
TRUSS WIDTH = 3.00 FEET
DEFLECTION = 0.185 IN.
CAMBER REQUIRED = 0.569 IN.

	WIND SHEAR (LBS.)	DEAD WEIGHT (LBS.)	WIND MOMENT (FT.-LBS.)	DEAD-W MOMENT (FT.-LBS.)
CASE 1	0.0	1897.7	0.00	30362.8
CASE 2	2829.0	1897.7	45821.48	30362.8
CASE 3	1414.5	3034.0	22910.74	48591.2

* * * * * * * * * * TRUSS CHORDS * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	NUMBER OF 0.625" BOLTS(A325)	NUMBER OF 0.75" BOLTS(A325)	NUMBER OF 0.875" BOLTS(A325)
32.75	4	3.00	2.00	2.00

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
4x4x.38	36.00	2.86	2.10	0.79	1283.80

	FORCE (PSI)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	5402.6	1889.0	16535.9	1.94
CASE 2	20108.2	7030.8	23150.2	5.16
CASE 3	16271.9	5689.5	23150.2	4.17

COMMONWEALTH OF VIRGINIA
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6/27/07

HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY SB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:17

* * * * * * * * * * WIND DIAGONAL * * * * * * DLC:03.24.2

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
4.45	14	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19 ✓	36.00	0.72	0.39	0.39	152.05

	FORCE (PSI)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	8098.3	0.00
CASE 2	4095.6	5728.1	11337.6	1.05
CASE 3	2047.8	2864.1	11337.6	0.53

* * * * * * * * * * WIND DIAGONAL END PANEL* * * * * * DLC:03.24.2

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
3.89	2	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	18.98

	FORCE (PSI)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	10461.2	0.0[illegible]
CASE 2	3578.5	5004.8	14645.7	0.9[illegible]
CASE 3	1789.2	2502.4	14645.7	[illegible]

COMMONWEALTH OF VIRGINIA
David L. [illegible]swell
Lic. No. 030335
PROFESSIONAL ENGINEER
6/27/07

HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY SB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:17

* * * * * * * * * * WIND STRUT * * * * * * DLC:03.24.2

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
2.75	16	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19✓	36.00	0.72	0.39	0.39	107.36

	FORCE (PSI)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	14590.6	0.00
CASE 2	2530.4	3539.0	20426.9	0.65
CASE 3	1265.2	1769.5	20426.9	0.32

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6/27/07

HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY SB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:17

* * * * * * * * * * DEAD LOAD DIAGONAL * * * * * * DLC:03.24.2

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
4.45	16	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	173.77

	FORCE (PSI)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	1535.8	2147.9	19800.0	0.55
CASE 2	1535.8	2147.9	27720.0	0.39
CASE 3	2530.7	3539.4	27720.0	0.65

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6/27/07

HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY SB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:17

* * * * * * * * * * DEAD LOAD VERTICAL * * * * * * DLC:03.24.2

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
2.75	18	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	120.78

	FORCE (PSI)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	948.8	1327.0	14590.6	0.34
CASE 2	948.8	1327.0	20426.9	0.24
CASE 3	1563.5	2186.7	20426.9	0.40

* * * * * * * * * * INTERIOR DIAGONAL * * * * * * DLC:03.24.2

LENGTH = 3.55 NUMBER REQUIRED = 8

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	LEAST ROG	WEIGHT
1.75x1.75x0.13	36.00	0.42	0.35	40.93

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HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY SB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:17

* * * * * * * * * TRUSS MOUNTING PLATE * * * * * * DLC:03.24.20

WIDTH A [IN]	WIDTH B [IN]	THICKNESS C [IN]	GUSSET DEPTH D [IN]	THICKNESS E [IN]	WEIGHT [LBS]
36.00	17.00	0.500	12.00	0.500	149

WELD SIZE-W2 (1/16")	WELD SIZE-W3 (1/16")
5	4

COMMONWEALTH OF VIRGINIA
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HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY SB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:17

* * * * * * * * * * * COLUMN DESIGN * * * * * * * DLC:03.24.2

HEIGHT (FT) TOTAL	TRUSS	DIAMETER (IN)	THICKNESS (IN)	YIELD STRENGTH (KSI)	WEIGHT (LB)
21.75	20.00	14.00	0.2500	42	799

	AXIAL (LBS)	MOMENT (FT-LB)	TORQUE (FT-LB)	SHEAR (LBS)	FA ALLOW	FB ALLOW	FV ALLOW	CSR
CASE 1 COMBINATION 1	2897	30363	0.0	0.0	14027	27720	13860	0.380
CASE 2 COMBINATION 1	2897	70357	45821	3207	19637	38808	19404	0.778
CASE 2 COMBINATION 2	2897	58305	27493	2110	19637	38808	19404	0.568
CASE 3 COMBINATION 1	4033	62334	22911	1766	19637	38808	19404	0.589
CASE 3 COMBINATION 2	4033	60369	13746	1162	19637	38808	19404	0.548

ϕ for OVERHEAD SPAN

Max Mom @ BASE = 2860 (20') = 57,200 ft-Lbs

$M_{DESIGN} = \sqrt{(57{,}200^2) + [(.2)(57{,}200)]^2} = 58{,}333$ ft-Lbs

∴ DESIGN IS Conservative

COMMONWEALTH OF VIRGINIA
David L. Cowell
Lic. No. 030335
PROFESSIONAL ENGINEER
6/27/07

COWELL ENGINEERING
STRUCTURAL ENGINEERS

PROJECT Hf-4871
LOCATION Richmond Virginia
CLIENT Hurtt Fab
BY TDC DATE 6/27/07 W.O.#
CHECK DATE SHEET 1 OF 2

CHECK BASE PLATE

M_{max} @ BASE = 2860 (20) = 57,200 ft-Lbs

$M_{DESIGN} = \sqrt{57{,}200^2 + [(.2)(57{,}200)]^2} = 58{,}333$

$T = \dfrac{4(58{,}333 \text{ ft-Lbs})}{6\,(1.75')} - \left(\dfrac{1914.8 + 799}{6}\right) = 21{,}770^{\#}$

452.3

$V = \sqrt{2859^2 + .2(2859)^2} = 2916^{\#}$

using $1\frac{1}{4}$" ϕ A.B. $A_t = .969 \text{ in}^2$ Assum 55 ksi (NOT By Hurtt fab)

$F_V = 0.3(55) = 16.5$ ksi $F_T = 0.5(55) = 27.5$ ksi

$f_v = \dfrac{2916}{.969} = 3009.3$ $f_t = \dfrac{21{,}770}{.969} = 22{,}466.4$

$CSR = \left(\dfrac{3.00}{16.5(4/3)}\right)^2 + \left(\dfrac{22.5}{27.5(4/3)}\right)^2 = 0.395 < 1.0$ (Anchor Bolt SIZE SEEMS REASONABLE)

.376

BENDING of PL Between Bolts.

$L = 20"(\pi)/6 = 10.47"$ $M_{PL} = \dfrac{Pl}{8} = \dfrac{21.8\,(10.47")}{8} = 28.5$ in-k

$f_{bPL} = \dfrac{28.5 \text{ k-in} (6)}{6\,(1.5)^2} = 12.7$ ksi

Weld to BASE PL

$f_t = \dfrac{21.7^k}{4.5 \times 2 \times .375} = 6.4$ ksi $< .3(70) = 21$ ksi

COMMONWEALTH OF VIRGINIA
David L. Cowell
Lic. No. 030335
PROFESSIONAL ENGINEER
6/27/07

COWELL ENGINEERING
STRUCTURAL ENGINEERS

PROJECT HF-4871
LOCATION Richmond Va
CLIENT Hutt Fab
BY TDC DATE 6/27/07 W.O.#
CHECK DATE SHEET 2 OF 2

Weld of Gusset to CoL.

$$f_v = \frac{21.7^k}{11.5 \times 2 \times .375} = 2.5 \text{ ksi}$$ ok S

STRESS ON Gusset

$$f_t = \frac{21.7^k}{4.5 \times .75} = 6.5 \text{ ksi.}$$ ok S

SHOP DRAWING REVIEW
HNTB Corporation

Review is for general compliance with contract documents. Sole responsibility for correctness of dimensions, details, quantities and safety during fabrication and erection shall remain with the Contractor.

☒ No Exceptions Taken
☐ Make Correction Noted By BS
☐ Amend and Resubmit
☐ Rejected – See Remarks Date 6/29/07

COMMONWEALTH OF VIRGINIA
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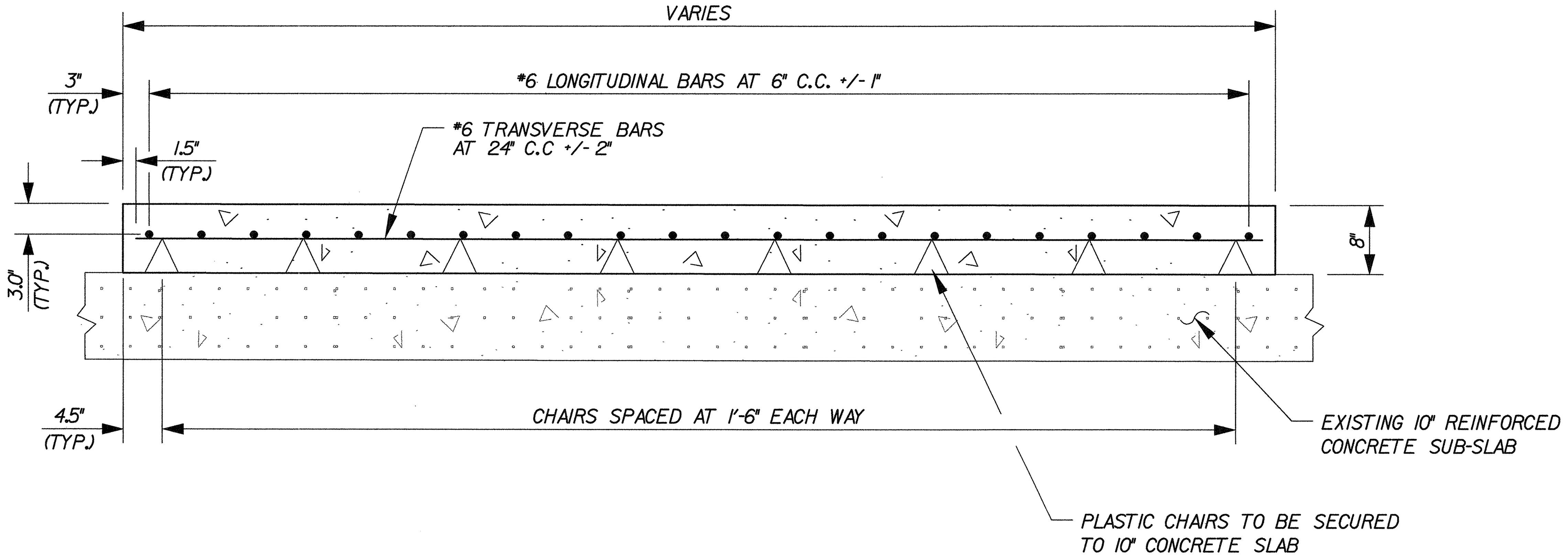
6/27/07

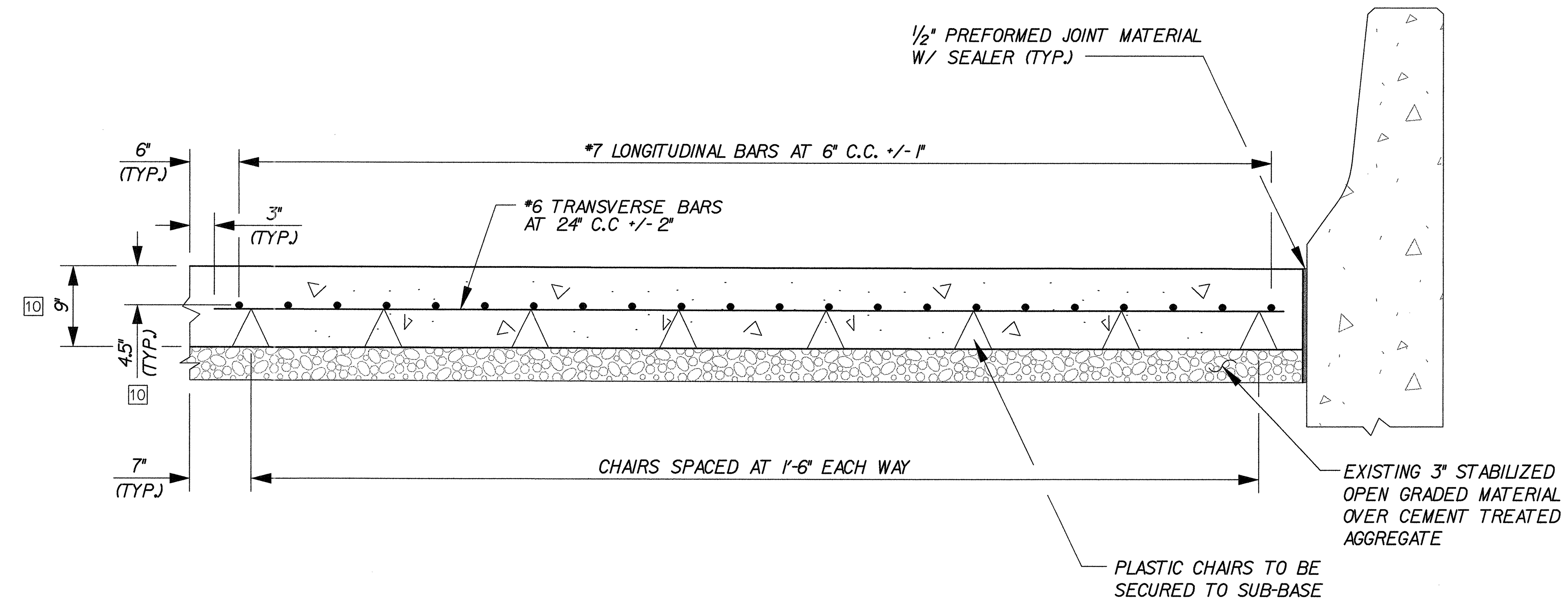
SOUTHBOUND POWHITE PARKWAY TOLL PLAZA

ORIGINAL PLANS - ADMINISTRATION BUILDING & TOLL PLAZA



PROPOSED TOLL PLAZA 8" PAVEMENT SLAB SECTION

NTS



9

PROPOSED EXPRESS LANE 9" PAVEMENT SLAB SECTION

NTS

NOTES:

1. CONTRACTOR TO SUBMIT POUR SEQUENCE PRIOR TO POUR FOR APPROVAL BY THE ENGINEER.
2. SEE VDOT SPECIFICATION PR-3 AND PR-6 FOR DETAILS NOT SHOWN ON THIS SHEET.
3. SLAB CONCRETE SHALL BE TYPE A4, HIGH EARLY CONCRETE WITH NON-METALLIC FIBERGLASS ADDITIVE.
4. REINFORCING BARS SHALL BE V-ROD REINFORCING BARS MANUFACTURED BY CONCRETE PROTECTION SYSTEMS INC. OR ENGINEER APPROVED EQUAL.
5. REINFORCING BARS SHALL BE SECURED USING PLASTIC TIES, NYLON TIES, OR PLASTIC SNAP TIES. NO METAL TIES OR TIES CONTAINING METAL SHALL BE USED.
6. ALL WORK SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND AS DIRECTED BY THE ENGINEER.
7. PLASTIC OR NON-METALLIC (NON CORROSIVE) CHAIRS SHALL BE USED TO ELEVATE REBAR AT LOCATIONS SHOWN.
8. REBAR SHALL BE SECURED TO CHAIRS.
9. CHAIRS SHALL BE SECURED TO 10" SLAB OR 3" SUB-BASE BY METHOD(S) APPROVED BY ENGINEER.
10. CONTRACTOR TO COORDINATE PLACEMENT OF LOOPS WITH ORT CONTRACTOR PRIOR TO POURING CONCRETE AND PRIOR TO SAW-CUTTING JOINTS.

10	4/10/08: REVISED SHEET - SEE SHEET 1C
9	3/5/08: REVISED SHEET - SEE SHEET 1C
8	10/03/07: ADDED SHEET.
	REVISIONS

DE-01A

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

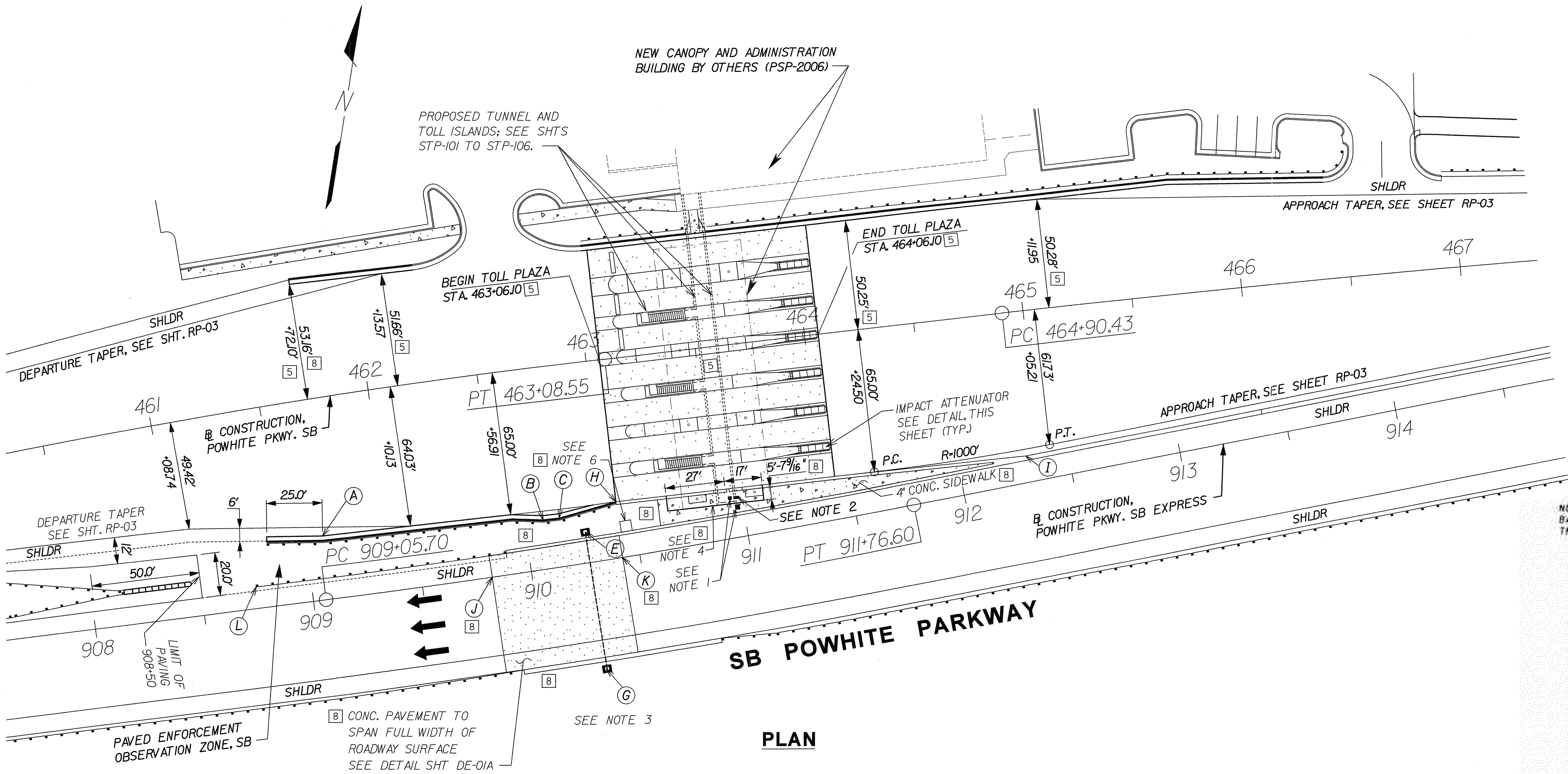
HNTB

9175 GUILFORD ROAD, SUITE 100
COLUMBIA, MARYLAND 21046
(301) 543-1000

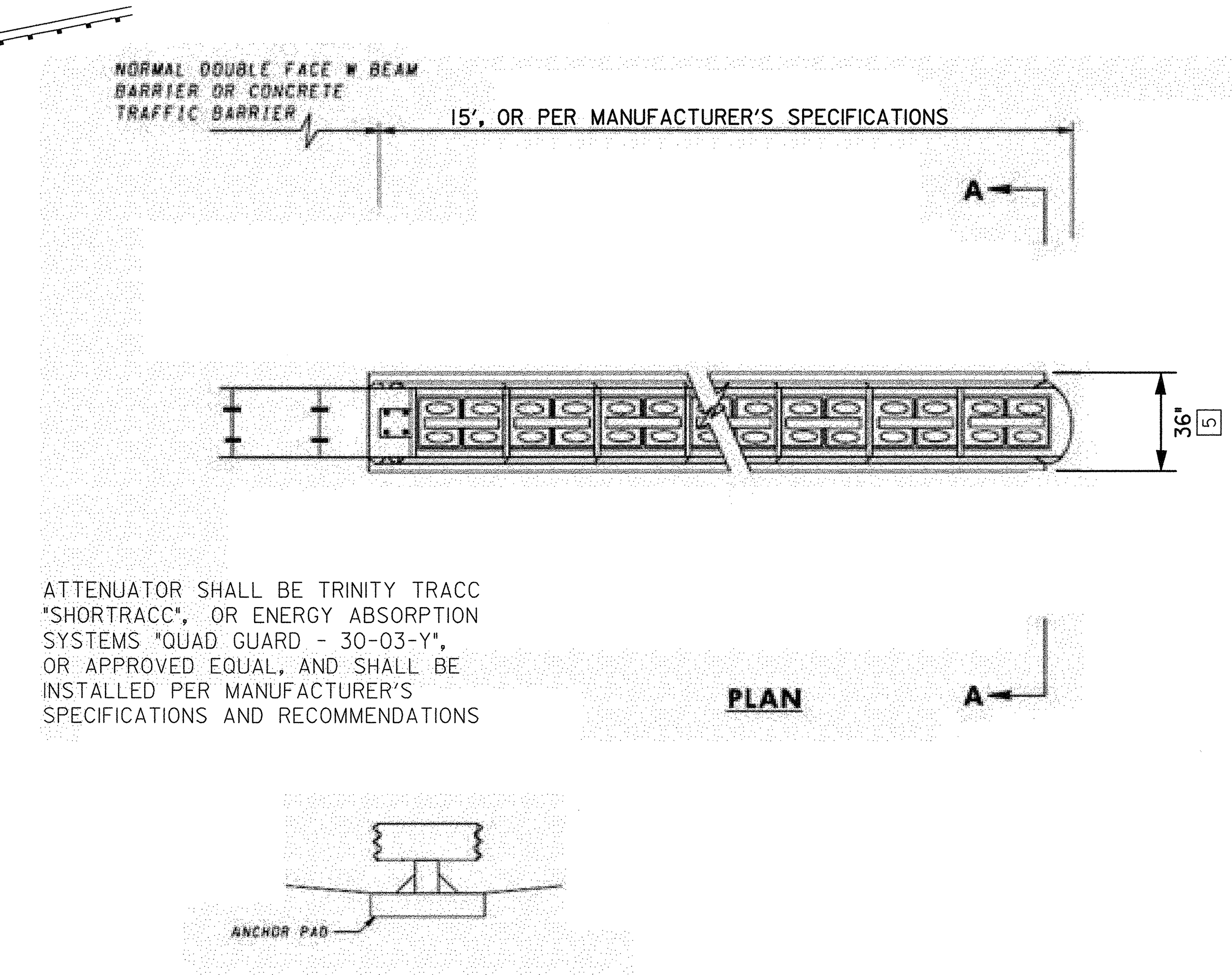
POWHITE PARKWAY EXPRESS
TOLL LANES PROJECT

MISCELLANEOUS ROADWAY DETAILS

Scale:	Date:	Contract No.:	Sheet:
NONE	3/06/08	PEL-2006	42A of 161



PLAN



ATTENUATOR SHALL BE TRINITY TRACC "SHORTRACC", OR ENERGY ABSORPTION SYSTEMS "QUAD GUARD - 30-03-Y", OR APPROVED EQUAL, AND SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS

PLAN

SECTION A-A

TOLL ISLAND ATTENUATOR DETAIL

NOT TO SCALE

HORIZONTAL CONTROL POINT SCHEDULE

	POINT NO.	LOCATION	DESCRIPTION	
	(A)	STA. 461+69.06, 62.55' RT., POWHITE PKWY. SB	EDGE OF GUTTER PAN	
	(B)	STA. 462+71.5, 69.35' RT., POWHITE PKWY. SB	FACE OF CURB (SET BACK FOR INLET)	
	(C)	STA. 462+79.00, 69.35' RT., POWHITE PKWY. SB	FACE OF CURB (SET BACK FOR INLET)	
8				
	(E)	STA. 910+27, 14.00' LT., POWHITE PKWY. SB EXPRESS	CENTER GANTRY FOUNDATION TY. I	
8				
	(G)	STA. 910+27, 50.00' RT., POWHITE PKWY. SB EXPRESS	CENTER GANTRY FOUNDATION TY. I	
5	(H)	STA. 463+06.05, 65.00' RT., POWHITE PKWY. SB	FACE OF CURB/END OF BARRIER	
	(I)	STA. 464+93.82, 65.67' RT., POWHITE PKWY. SB	BEGIN MEDIAN BARRIER TRANSITION	
8	(J)	STA. 909+82, 0.00' RT., POWHITE PKWY. SB EXPRESS	LIMIT OF 9" CONC. PAVEMENT	10
8	(K)	STA. 910+42, 0.00' RT., POWHITE PKWY. SB EXPRESS	LIMIT OF 9" CONC. PAVEMENT	10
	(L)	STA. 908+75, 10.00' LT., POWHITE PKWY. SB EXPRESS	BEGIN GUARD RAIL	

NOTES:

1. ELECTRICAL EQUIPMENT TO BE INSTALLED BY OTHERS.
2. MECHANICAL EQUIPMENT TO BE INSTALLED BY OTHERS.
3. SEE SHEET SM-40 FOR GANTRY FOUNDATION DETAILS.
4. 8 LIMITS OF 10" BASE SLAB WITH 8" (MAX) SURFACE SLAB PER SHEET STP-105 SECTION A-A.
5. 8 SEE SHEET DE-05A FOR SPOT ELEVATIONS BETWEEN EXPRESS LANE AND TOLL PLAZA.
6. 8 SEE SHEET DE-05A FOR CONCRETE PAD FOR ORT EQUIPMENT ENCLOSURE.

10	4/10/08: REVISED SHEET - SEE SHEET 1C
8	10/03/07: REVISED SHEET - SEE SHEET 1C
5	3/27/07: REVISED DIMENSION - SEE SHEET 1B
1	6/23/06: ADDED SHEET
	REVISIONS

DE-05 OF 06

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

MISCELLANEOUS DETAILS
NEW TOLL PLAZA

HNTB
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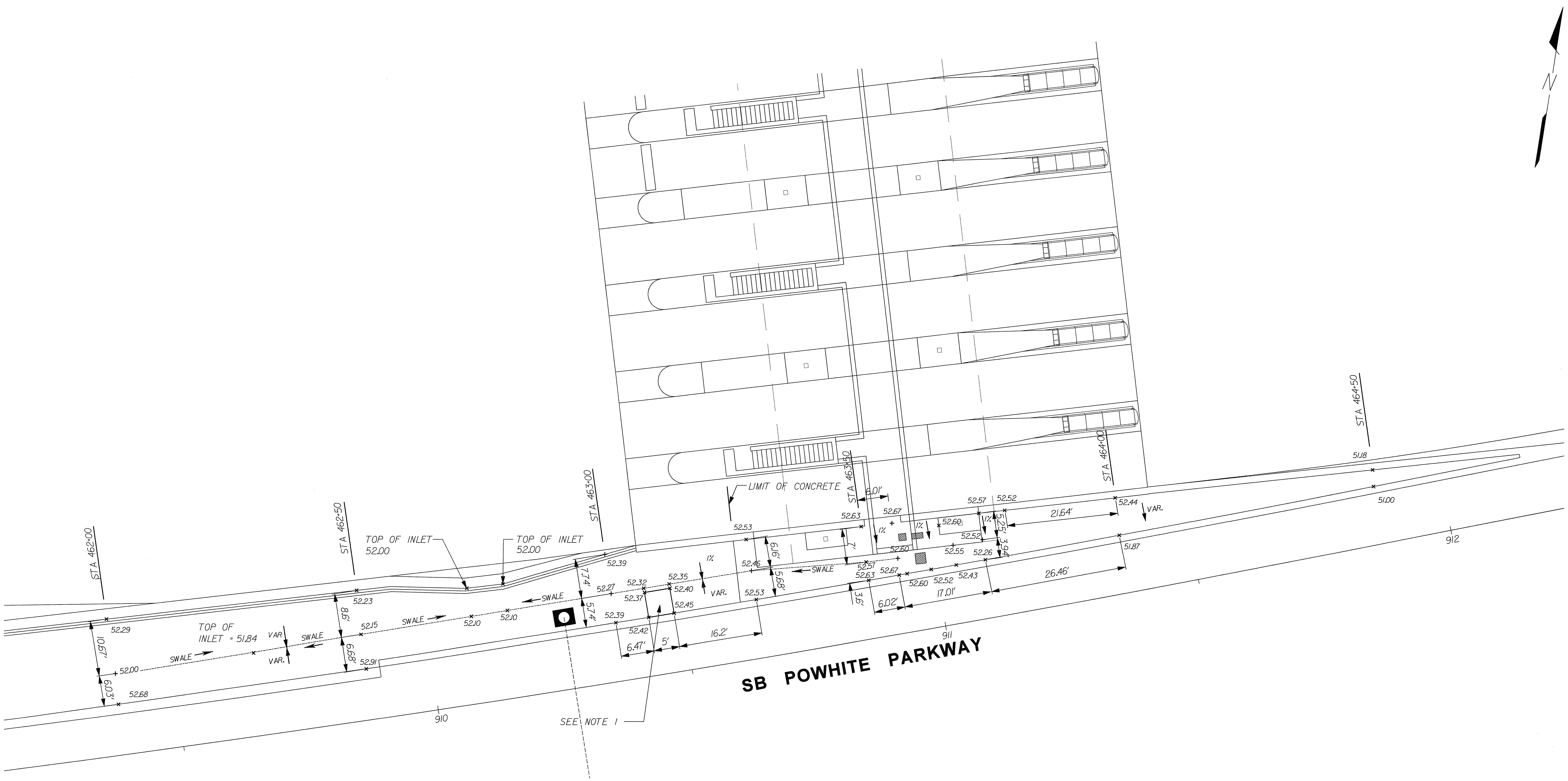
Scale:	Date:	Contract No.:	Sheet:
1" = 30'	3/06/08	PEL-2006	46 of 161



NOTES:

1. CONCRETE PAD FOR ORT EQUIPMENT ENCLOSURE. COORDINATE EXACT LOCATION AND REQUIRED DEPTH OF PAD WITH ORT CONTRACTOR.
2. COORDINATE PLACEMENT OF ORT CONDUITS AND EQUIPMENT WITH ORT CONTRACTOR PRIOR TO STARTING WORK.

PLAN

DE-05A OF 06

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

MISCELLANEOUS DETAILS
NEW TOLL PLAZA

HNTB
9175 GUILFORD ROAD, SUITE 100
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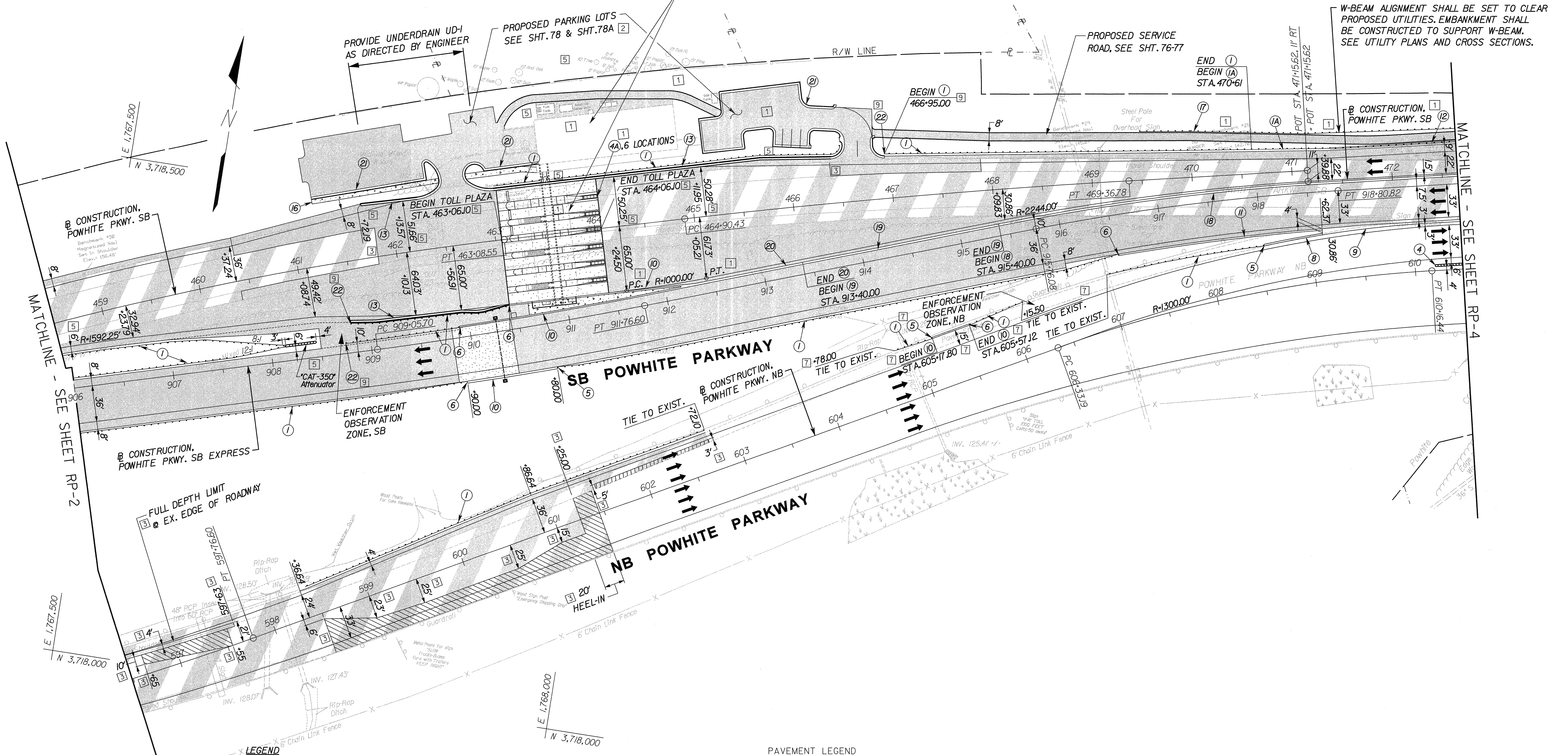
Scale:	Date:	Contract No.:	Sheet:
1" = 10'	10/03/07	PEL-2006	46A of 161

8 10/3/07: ADDED SHEET
REVISIONS

NOTES:

[1] 1. FOR TUNNEL AND TOLL PLAZA DETAILS, SEE SHTS DE-05 AND STP-101 THRU STP-106



LEGEND

(1) St'd. GR-2, Guardrail, (1A) St'd. GR-2A	[9] (12) St'd. MB-3, Blocked Out W-Beam Median Barrier
(2) St'd. GR-7, Guardrail Terminal	(13) St'd. CG-7, Comb. 4" Curb & Gutter
(3) St'd. GR-9, Guardrail Terminal	(14) St'd. CG-3, Standard 4" Curb
[9] (4) Impact Attenuator (TL-3, > 55 MPH) (4A) (TL-2, > 40 MPH)	(15) Constant Slope Concrete Median Barrier, See Sheet DE-04
(5) St'd. GR-FOA-2, Fixed Object Attachment, Type I	(16) 4" Concrete Sidewalk Per Section 504 Of Standard Specifications
(6) St'd. GR-FOA-2, Fixed Object Attachment, Type II	(17) St'd. GR-8, Guardrail (Weak Post)
(7) St'd. MB-5, W-Beam Median Barrier, Weak Post	(17A) St'd. GR-8A, Guardrail (Weak Post)
(8) Modified MB-7D, Concrete Median Barrier	(18) Modified MB-8A, Type I Conc. Med. Barrier, See Sht. DE-02
(9) Modified MB-7E, Concrete Median Barrier	(19) St'd. MB-8A, Type II Conc. Med. Barrier
(10) Modified MB-7F, Concrete Median Barrier	(20) St'd. MB-8A, Type III Conc. Med. Barrier
(11) Modified MB-8A Conc. Median Barrier, Ty. III, See Sheet DE-02	[9] (21) St'd. CG-6, Comb. 6" Curb & Gutter
	[9] (22) St'd. GR-11, Guardrail Terminal

PAVEMENT LEGEND

- PROPOSED FULL DEPTH PAVING
- PROPOSED RESURFACING
- FLEXIBLE PAVEMENT PLANING AREA
- PAVEMENT REMOVAL

REVISIONS
[9] 3/5/08: REVISED SHEET - SEE SHEET 1C
[7] 5/22/07: REVISED SHEET - SEE SHEET 1C
[5] 3/27/07: REVISED SHEET - SEE SHEET 1B
[3] 10/17/06: REVISED SHEET - SEE SHEET 1B
[2] 7/20/06: SEE SHEET 1B
[1] 6/23/06: SEE SHEET 1A
[2] ADDENDUM NO. 2: 5/17/06: REPLACED SHEET

HNTB

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RP-3 OF 7

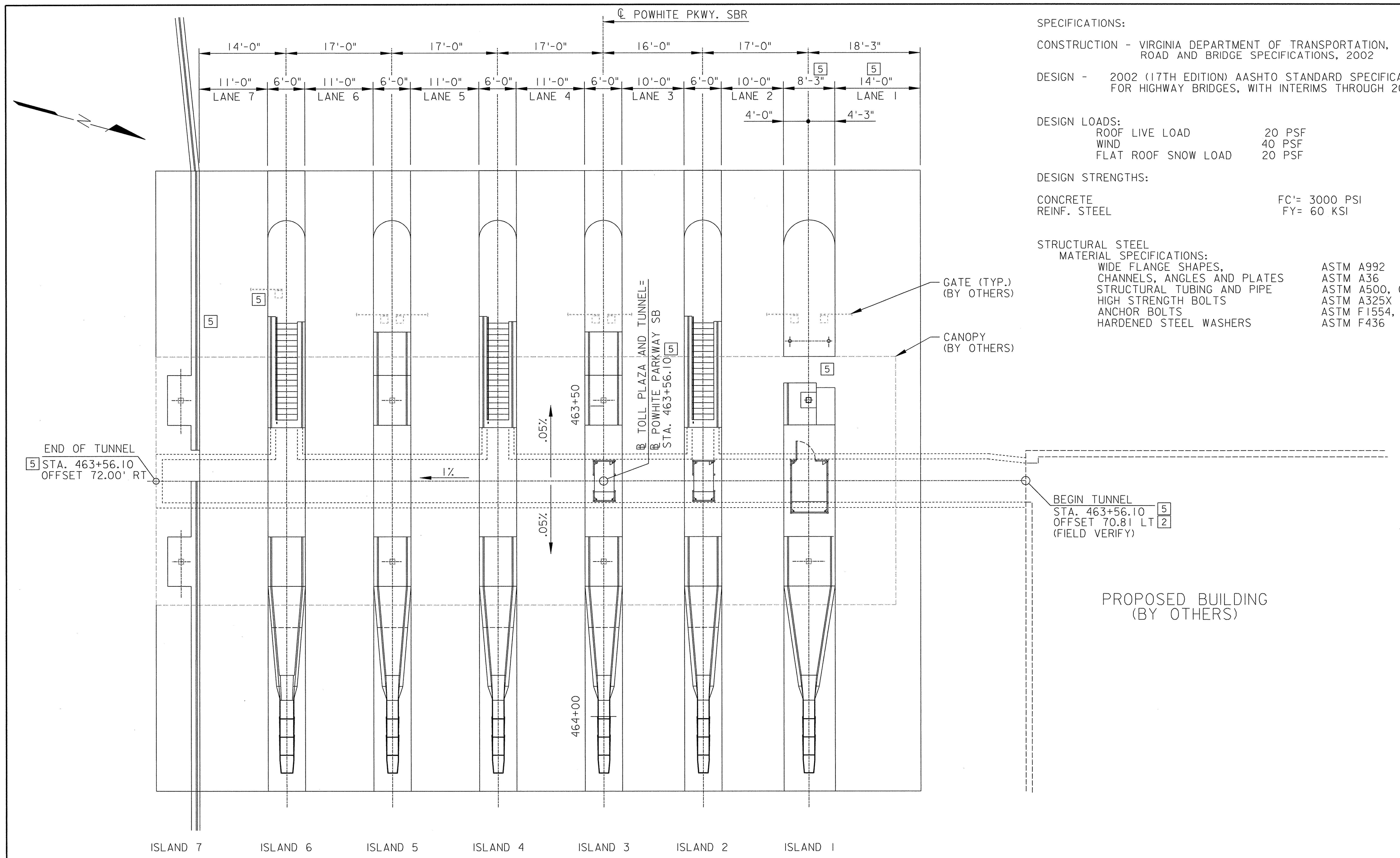
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

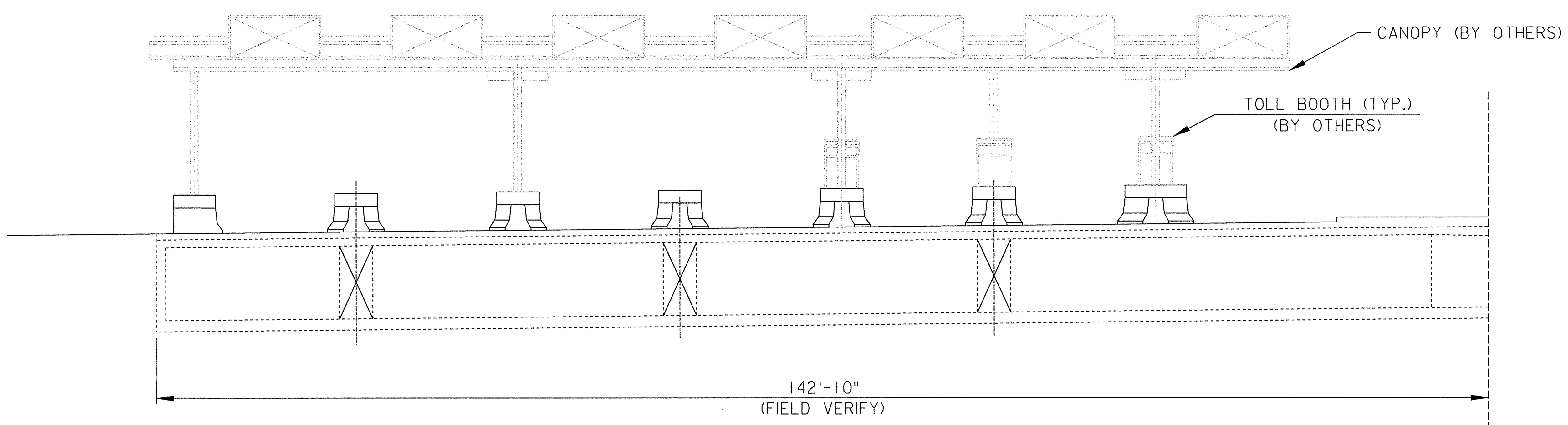
ROADWAY PAVEMENT PLAN
STA. 458+50 TO STA. 472+65
℄ CONSTR. POWHITE PARKWAY SB

Scale:	Date:	Contract No.:	Sheet:
1" = 50'	3/06/08	PEL-2006	60 of 161

08/30/2021



PLAN OF TOLL PLAZA
SCALE: 1" = 10'-0"



ELEVATION OF TOLL PLAZA
SCALE: 1" = 10'-0"

5	3/27/07:	REVISED ISLANDS 1, 6 & 7
2	7/20/06:	REVISED SHEET SIZE AND TITLE BLOCK
1	6/23/06:	ADDED SHEET

REVISIONS

SPECIFICATIONS:

CONSTRUCTION - VIRGINIA DEPARTMENT OF TRANSPORTATION, ROAD AND BRIDGE SPECIFICATIONS, 2002

DESIGN - 2002 (17TH EDITION) AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, WITH INTERIMS THROUGH 2004

DESIGN LOADS:

ROOF LIVE LOAD	20 PSF
WIND	40 PSF
FLAT ROOF SNOW LOAD	20 PSF

DESIGN STRENGTHS:

CONCRETE	FC'= 3000 PSI
REINF. STEEL	FY= 60 KSI

STRUCTURAL STEEL
MATERIAL SPECIFICATIONS:

WIDE FLANGE SHAPES,	ASTM A992
CHANNELS, ANGLES AND PLATES	ASTM A36
STRUCTURAL TUBING AND PIPE	ASTM A500, GRADE C
HIGH STRENGTH BOLTS	ASTM A325X
ANCHOR BOLTS	ASTM F1554, GRADE 55
HARDENED STEEL WASHERS	ASTM F436

GENERAL NOTES:

ALL SHOP CONNECTIONS SHALL BE WELDED AND ALL FIELD CONNECTIONS SHALL BE BOLTED.

ALL STRUCTURAL STEEL SHALL BE HOT-DIP GALVANIZED PER ASTM A123, UNLESS OTHERWISE NOTED. ALL BOLTS, ANCHOR BOLTS, WASHERS AND NUTS SHALL BE HOT-DIP GALVANIZED PER ASTM A153. THE LOWER CANOPY FRAMING STEEL SHALL BE PAINTED, SEE SPECIAL PROVISIONS.

ALL METAL ROOF DECK SHALL BE 3", 22 GAGE, WIDE RIB TYPE B, GALVANIZED, WITH THE MINIMUM PROPERTIES DEFINED BY THE STEEL DECK INSTITUTE (SDI).

7/8" DIAMETER BOLTS SHALL BE USED FOR THE CANOPY STRUCTURE AND 3/4" DIAMETER BOLTS FOR ROOF SCREEN STRUCTURES.

ALL SHOP AND FIELD WELDING SHALL BE PERFORMED BY QUALIFIED WELDERS IN ACCORDANCE WITH AWS D1.1-2002 USING E70XX ELECTRODES.

ALL HOLES REQUIRED IN STRUCTURAL STEEL MEMBERS FOR PIPING AND DUCTWORK SHALL BE SHOWN ON THE SHOP DRAWINGS AND BE MADE N THE SHOP. NO HOLES SHALL BE CUT IN THE FIELD WITHOUT APPROVAL OF THE ARCHITECT/ENGINEER.

ALL BOLTED CONNECTIONS SHALL BE BEARING TYPE, NON SLIP-CRITICAL, TIGHTENED TO A "SNUG-TIGHT CONDITION" AS DEFINED BY AISC.

THE FRAME OF THE STEEL SKELETON SHALL BE CARRIED UP TRUE AND PLUMB AND TEMPORARY BOLTING AND BRACING SHALL BE INTRODUCED TO SAFELY CARRY ALL LOADS TO WHICH THE STRUCTURE MAY BE SUBJECTED, INCLUDING EQUIPMENT AND OPERATION OF SAME. INDIVIDUAL COLUMNS MUST BE BRACED BEFORE BEAM CONNECTIONS ARE MADE AND BRACING SHALL BE LEFT IN PLACE AS LONG AS MAY BE REQUIRED FOR SAFETY.

AFTER COMPLETION OF ERECTION, THE OWNER SHALL ENGAGE AN INDEPENDENT TESTING AGENCY TO INSPECT HIGH STRENGTH BOLTED CONNECTIONS, TO PERFORM TESTS, AND TO PREPARE TEST REPORTS. THE TESTING AGENCY SHALL CONDUCT AND INTERPRET TESTS AND STATE IN EACH REPORT WHETHER THE TEST RESULTS COMPLY WITH THE REQUIREMENTS AND SPECIFICALLY STATE ANY DEVIATIONS THERE FROM. THE TESTING SHALL CONFORM TO THE REQUIREMENTS FOUND IN THE AISC "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 AND A490 BOLTS", DATED JUNE 2000, WITH SUPPLEMENTS. BOLTS THAT ARE NEITHER NON SLIP CRITICAL NOR SUBJECT TO DIRECT TENSION NEED NOT BE INSPECTED FOR BOLT TENSION OTHER THAN TO INSURE THAT THE PLIES OF THE CONNECTED ELEMENT HAVE BEEN BROUGHT INTO SNUG CONTACT. THE INDEPENDENT TESTING AGENCY SHALL SUBMIT THE INTENDED TEST PROCEDURES TO THE STRUCTURAL ENGINEER FOR REVIEW PRIOR TO BEGINNING TESTING.

FOUNDATIONS

FOUNDATIONS FOR THIS STRUCTURE AND SPREAD FOOTINGS BEARING ON EITHER FIRM VIRGIN SOIL OR COMPACTED STRUCTURAL FILL WITH AN ALLOWABLE BEARING CAPACITY OF 3000 PSF IN ACCORDANCE WITH THE OWNER'S GEOTECHNICAL ENGINEER'S REPORT BY FROEHLING & ROBERTSON, INC. DATED OCTOBER, 2005. THE OWNER'S GEOTECHNICAL ENGINEER SHALL VERIFY, PRIOR TO POURING, THAT THE SOIL IS CAPABLE OF SUSTAINING SUCH A LOAD.

PREPARATION OF SOIL AND SUBGRADE BENEATH FOOTINGS AND SLABS ON GRADE SHALL BE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE OWNER'S GEOTECHNICAL ENGINEER'S REPORT AND THE PROJECT SPECIFICATIONS.

ALL BACKFILL BEHIND TUNNNEL WALLS SHALL BE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE OWNER'S GEOTECHNICAL ENGINEER'S REPORT AND THE PROJECT SPECIFICATIONS.

ALL WALLS SUBJECT TO LATERAL LOAD DUE TO UNBALANCED FILL SHALL BE BRACED PLUMB UNTIL BACKFILL HAS BEEN PLACED AND COMPACTED AND SHALL REMAIN BRACED UNTIL THE PERMANENT STRUCTURE ABOVE AND BELOW IS IN PLACE AND CAPABLE OF RESISTING ALL LOADS.

THE CONTRACTOR SHALL VERIFY ALL FIELD MEASUREMENTS, EXISTING DIMENSION, ELEVATIONS, AND THE SHAPES OF SIZES OF EXISTING STRUCTURAL MEMBERS SHOWN ON THE CONTRACT DRAWINGS PRIOR TO BEGINNING WORK. THE ARCHITECT/ENGINEER SHALL BE NOTIFIED IN WRITING OF ALL DISCREPANCIES THAT WOULD RESULT IN REVISIONS TO THE CONTRACT DRAWINGS.

THE CONTRACTOR SHALL VERIFY ALL DRAWINGS FOR COORDINATION BETWEEN TRADES. HE SHALL LOCATE SLOTS, SLEEVES AND TRENCHES AS REQUIRED FOR MECHANICAL TRADES AND PROVIDE AND INSTALL ANCHORS, INSERTS, HANGERS, ETC. AS REQUIRED FOR VARIOUS OTHER TRADES.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND ERECTION OF ALL TEMPORARY BRACING, FORMWORK, SHEETING, SHORING AND UNDERPINNING NECESSARY TO PERFORM THE WORK.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR SAFETY PRECAUTIONS AND PROGRAMS AS THEY RELATE TO THE WORK OF THIS PROJECT.

THE CONTRACTOR SHALL SUBMIT THE REQUIRED SHOP DRAWINGS FOR REVIEW PRIOR TO BEGINNING WORK. THE CONTRACTOR SHALL CHECK ALL DIMENSIONS AND ACCEPT FULL RESPONSIBILITY FOR DIMENSIONAL CORRECTNESS. UNDER NO CIRCUMSTANCES SHALL REPRODUCTIONS OF CONTRACT DRAWINGS BE USED AS SHOP DRAWINGS.

ALL STRUCTURAL STEEL SHOP DRAWINGS SHALL BE PREPARED UNDER THE DIRECT SUPERVISION OF PROFESSIONAL ENGINEER REGISTERED IN THE COMMONWEALTH OF VIRGINIA.

STP-101

HNTB
9175 GUILFORD ROAD, SUITE 100
COLUMBIA, MARYLAND 21046
(301) 543-1000

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS
TOLL LANES PROJECT

TOLL PLAZA
PLAN AND ELEVATION

Scale:	Date:	Contract No.:	Sheet:
1" = 10'	3/27/07	PEL-2006	158B of 161

9	3/5/08: REVISED SHEET - SEE SHEET 1C
5	3/27/07: REVISED TUNNEL LOCATION AND DETAILS
2	7/20/06: REVISED SHEET SIZE AND TITLE BLOCK
1	6/23/06: ADDED SHEET

REVISIONS

STP-102

HNTB
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COLUMBIA, MARYLAND 21046
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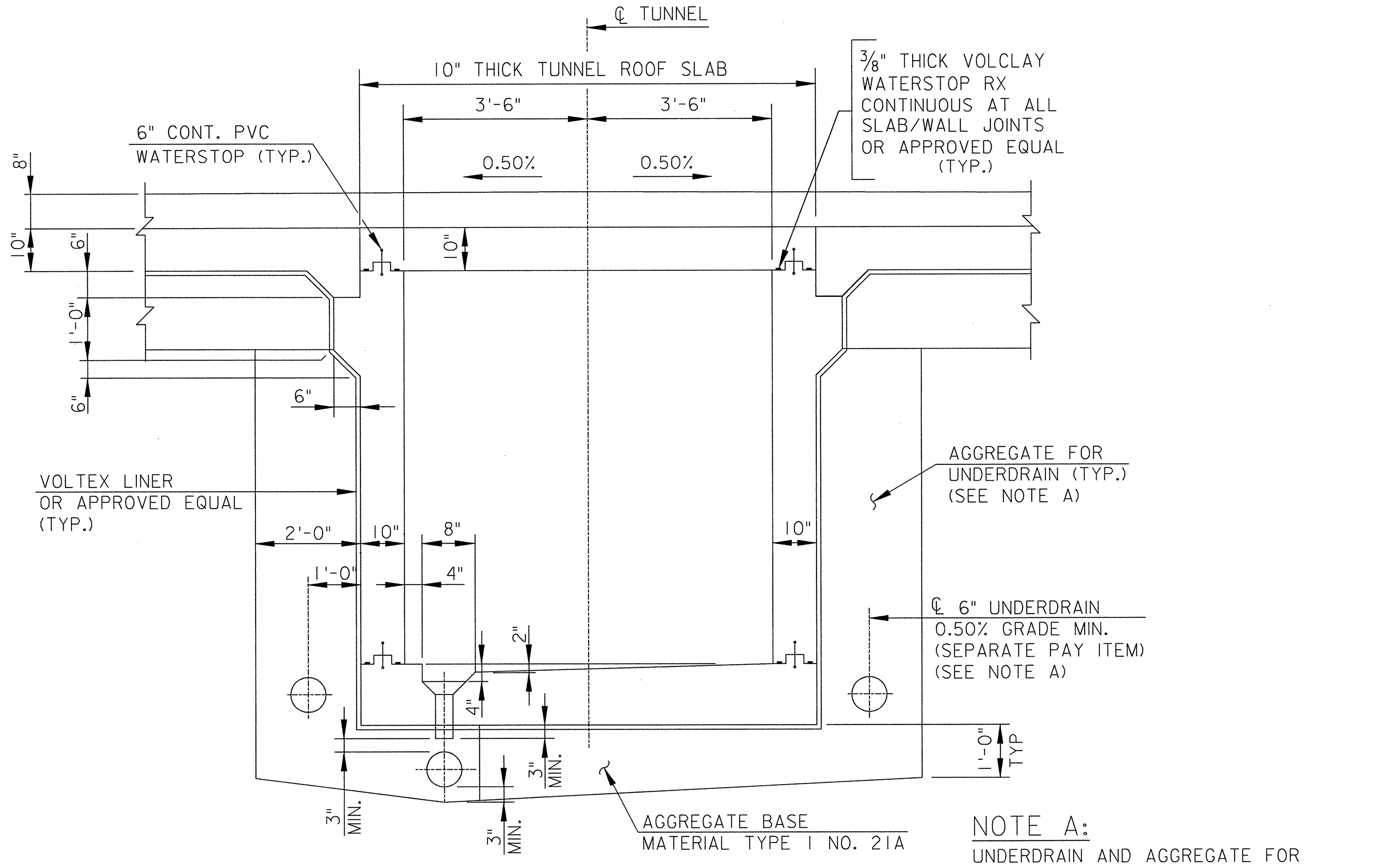
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS
TOLL LANES PROJECT

TOLL PLAZA
TUNNEL PLAN & ELEVATION

Scale:	Date:	Contract No.:	Sheet:
AS SHOWN	3/06/08	PEL-2006	158C of 161

08/30/2021

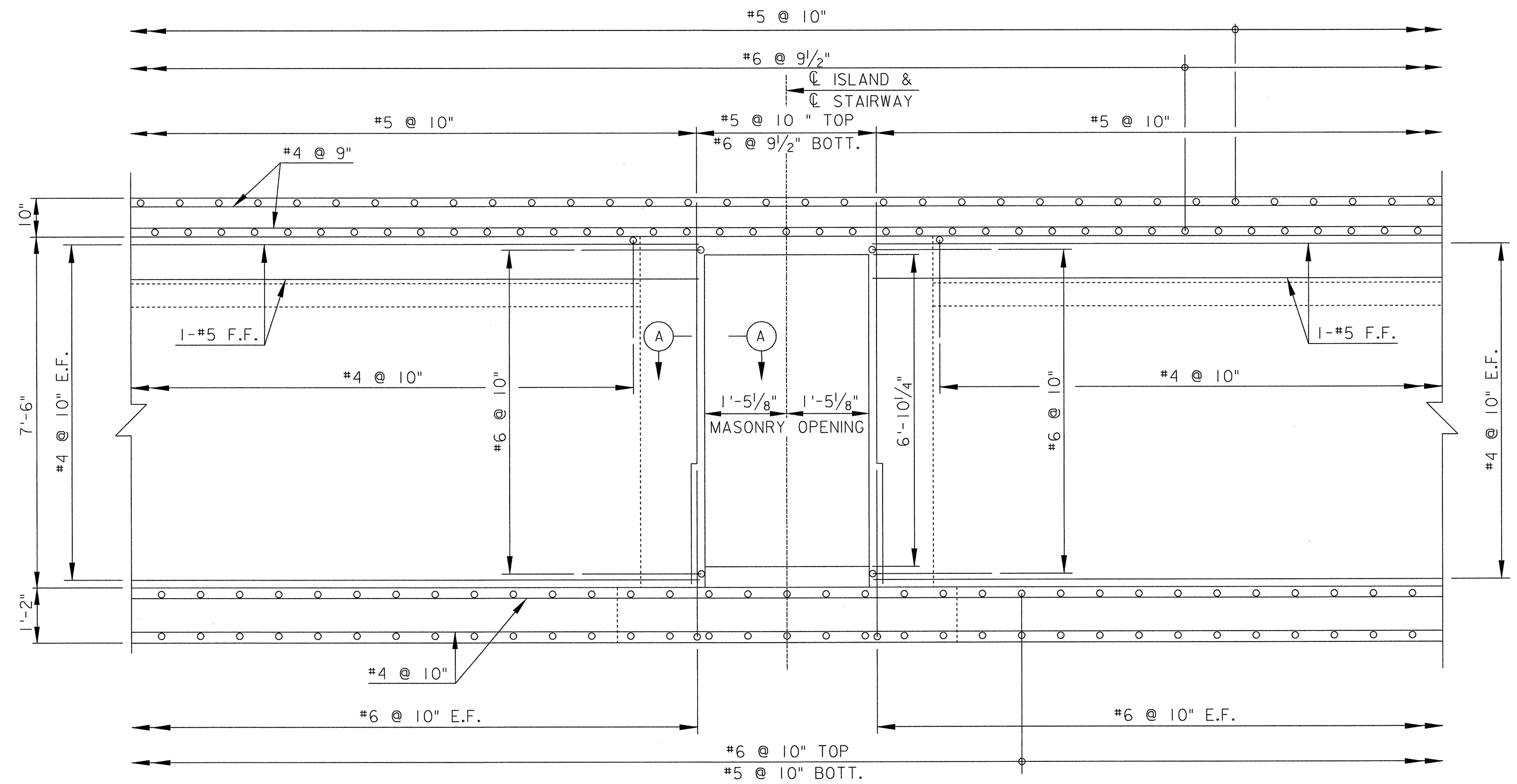


TYPICAL SECTION - BETWEEN ISLANDS

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

NOTE A:

UNDERDRAIN AND AGGREGATE FOR UNDERDRAIN SHALL BE PLACED AROUND THE OUTLINE OF THE STAIR WELLS. UNDERDRAIN SHALL BE SLOPED TO DRAIN.

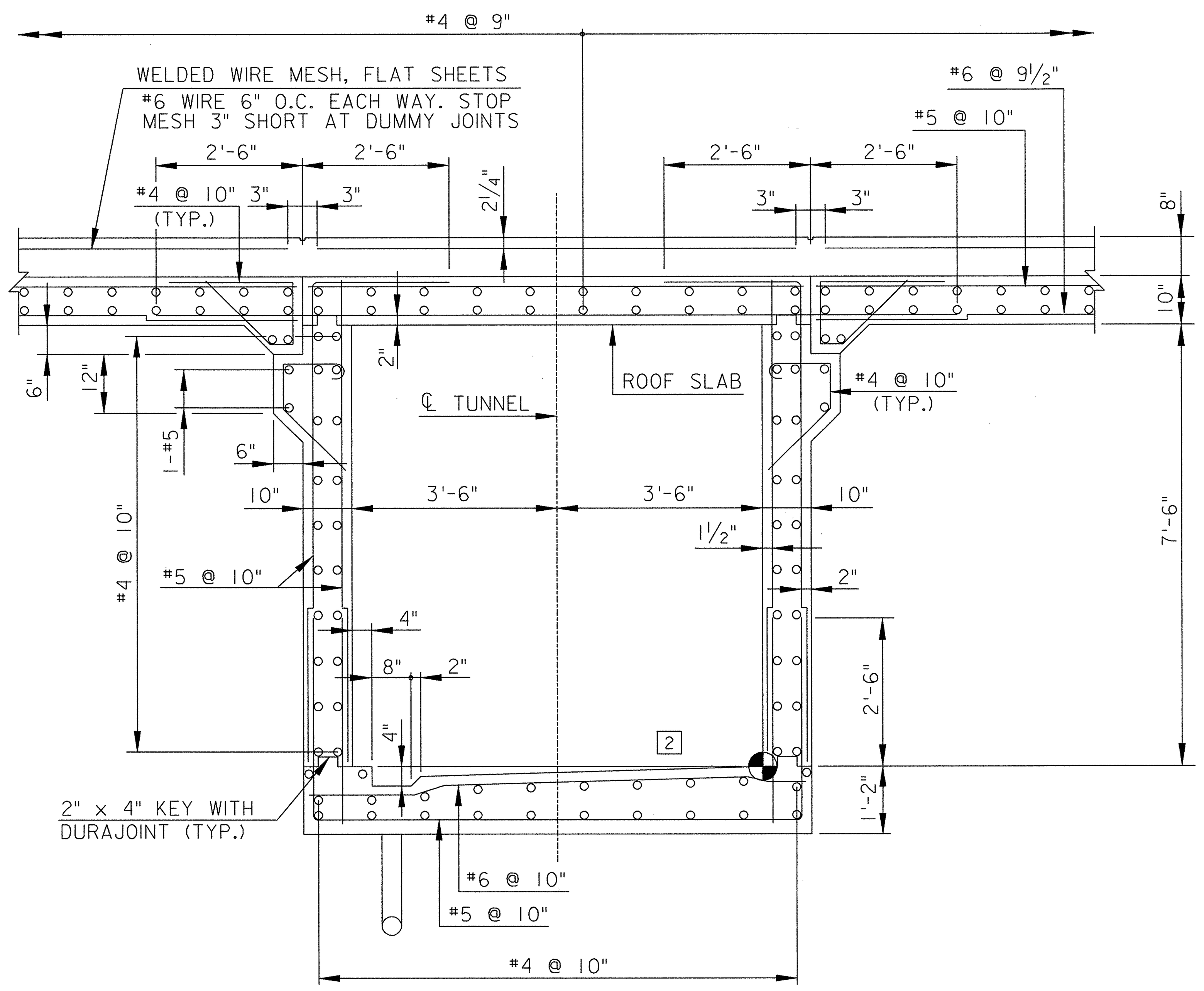


TUNNEL LONGITUDINAL SECTION AT STAIRWAY ENTRANCE

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

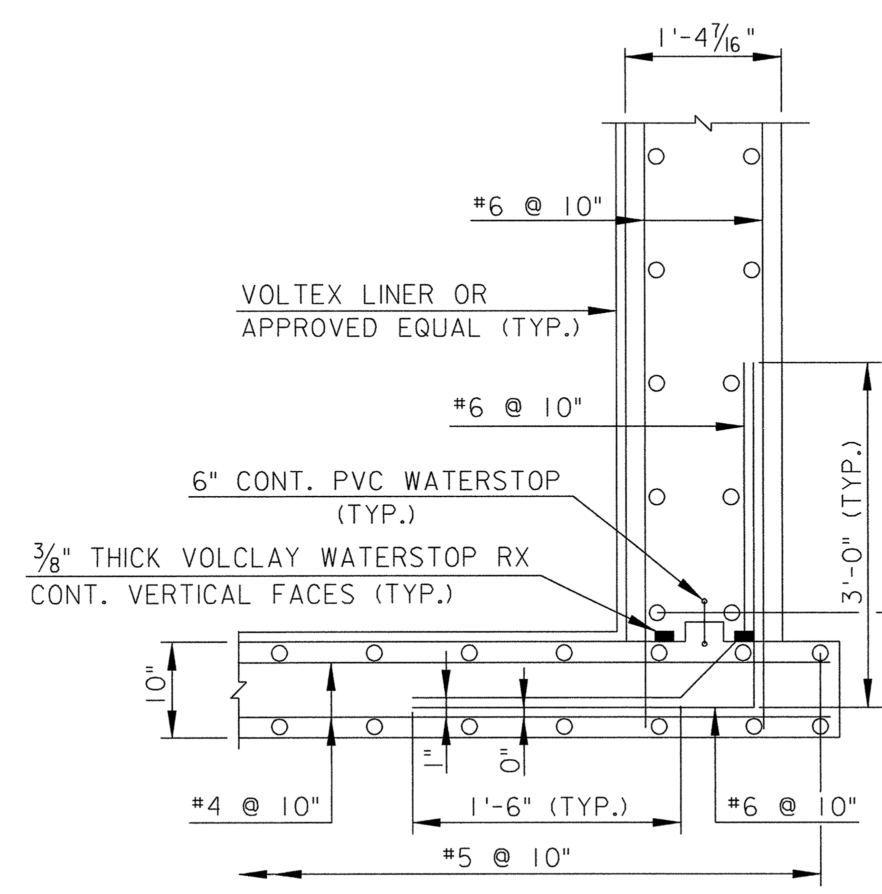
NOTE A:

MASONRY OPENING SHALL BE FIELD VERIFIED AT EXISTING POWHITE TOLL PLAZA WITH ENGINEER.



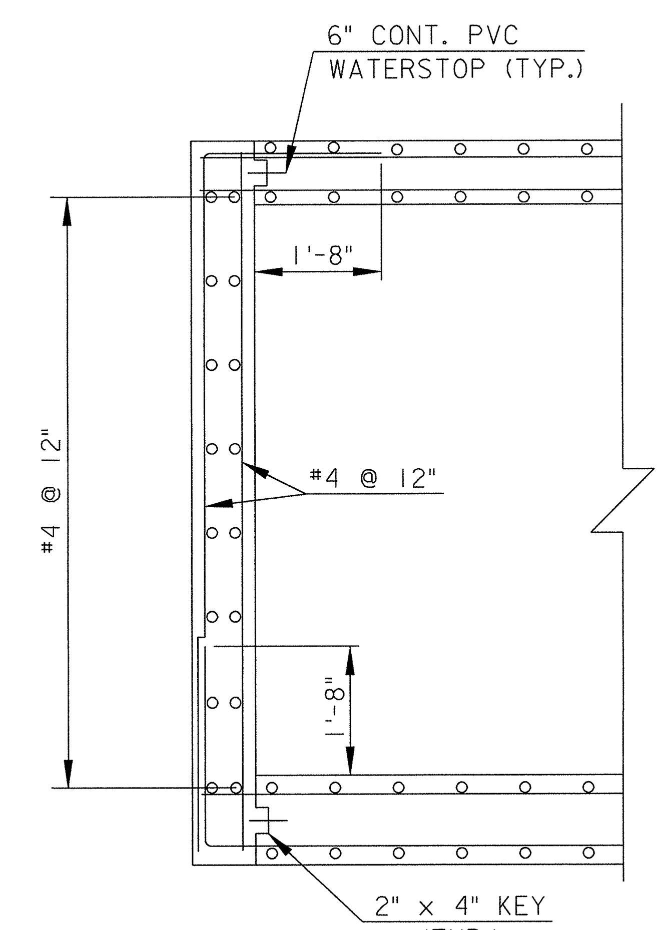
TUNNEL TYPICAL SECTION

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



SECTION A-A

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



SECTION AT END OF TUNNEL

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

REVISIONS	
5	3/27/07: REMOVED AND UPDATED DETAILS
2	7/20/06: REVISED SHEET - SEE SHEET 1B
1	6/23/06: ADDED SHEET

STP-106A

HNTB

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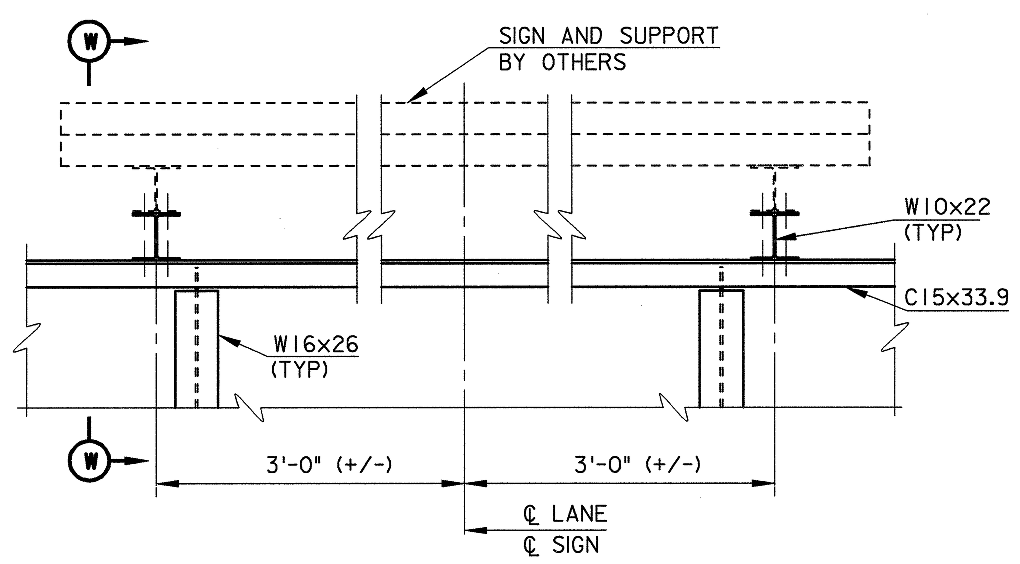
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

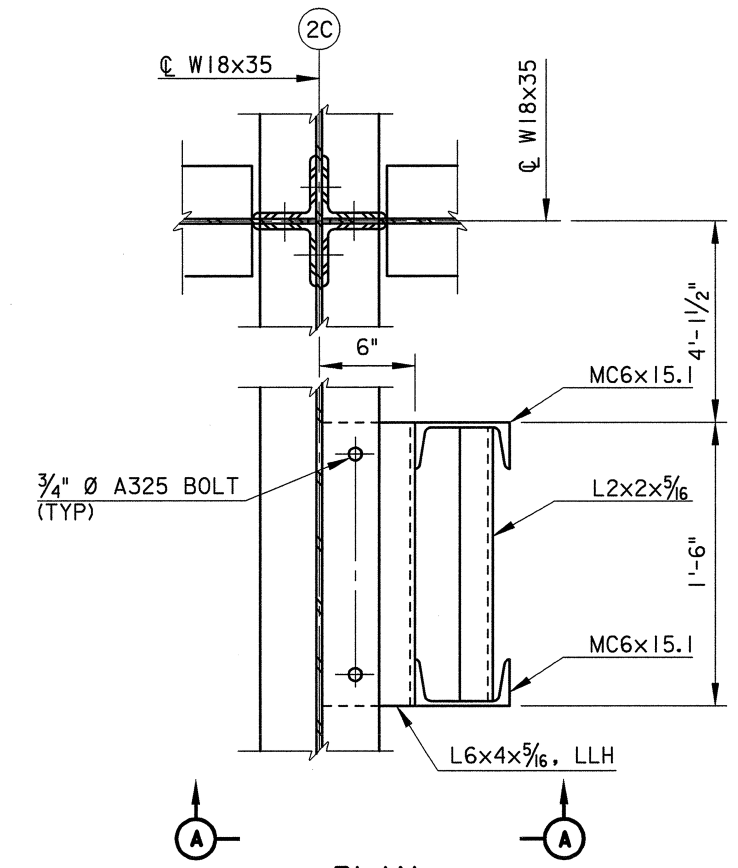
POWHITE PARKWAY EXPRESS TOLL LANES PROJECT
TOLL PLAZA
MISCELLANEOUS TUNNEL DETAILS-1

Scale:	Date:	Contract No.:	Sheet:
AS SHOWN	3/27/07	PEL-2006	158G1 of 161



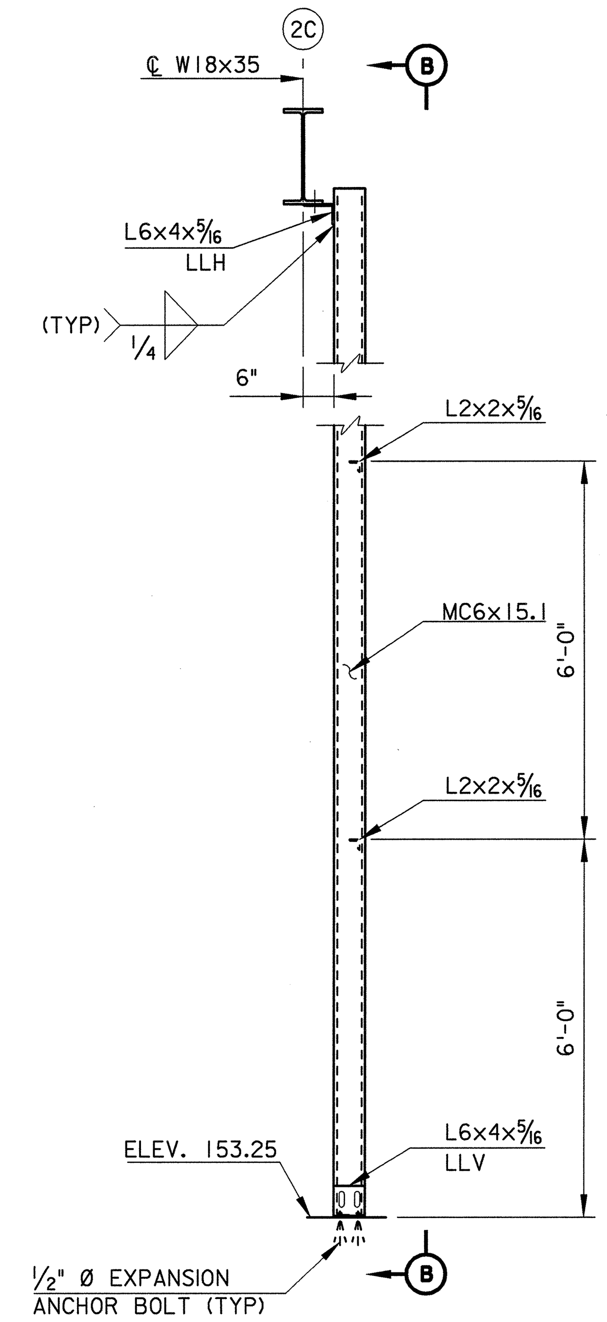
NOTE: LOCATION OF W16x26 MAY BE ADJUSTED TO ACCOMODATE W6x9 SIGN BRACKET CONNECTIONS.

DETAIL U
SCALE: 3/4" = 1'-0"

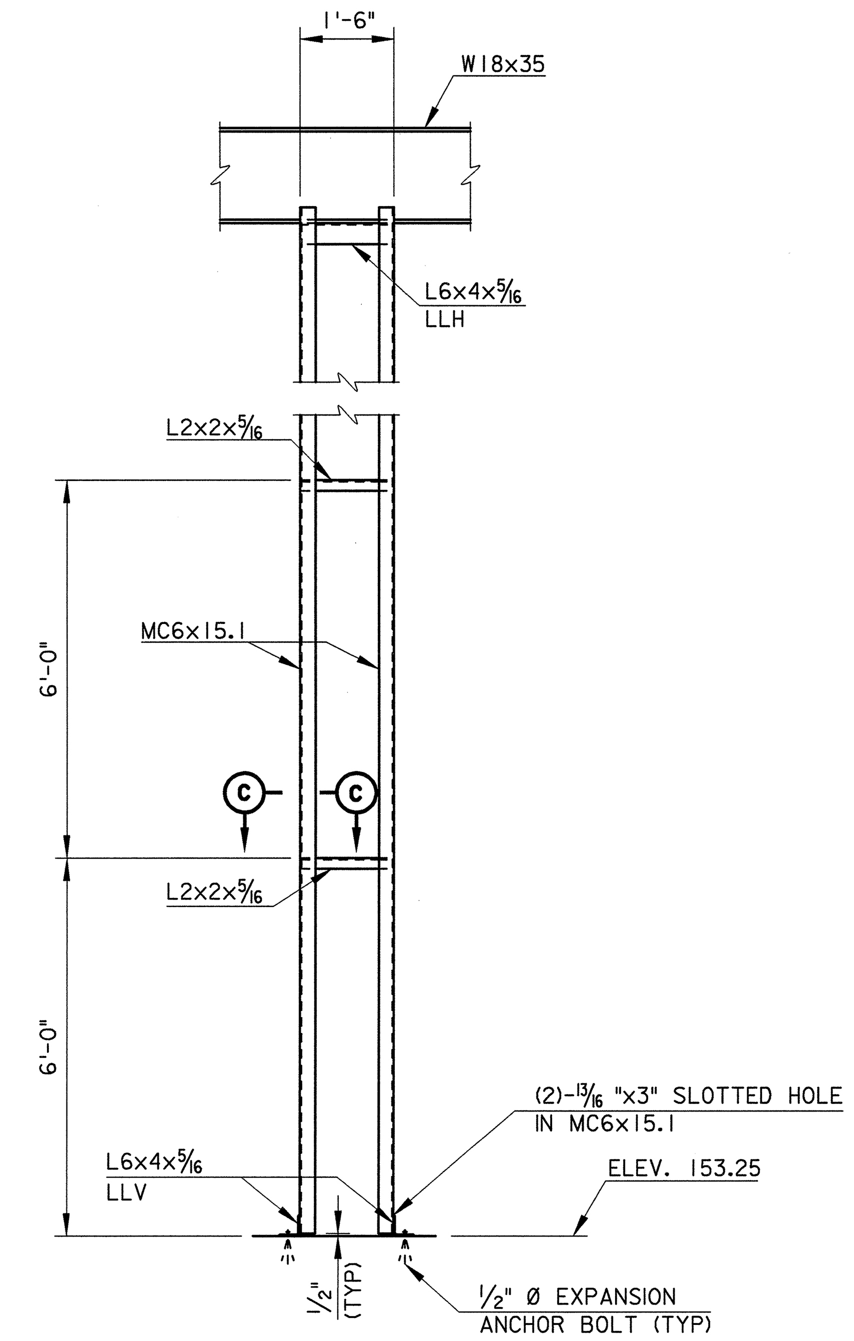


PLAN

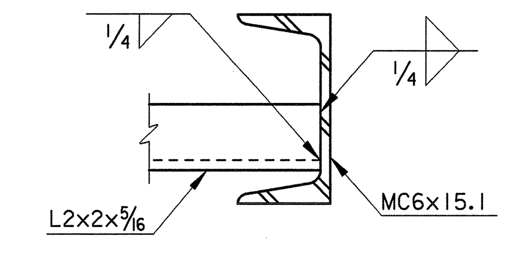
LADDER SUPPORT DETAIL
SCALE: 1 1/2" = 1'-0"



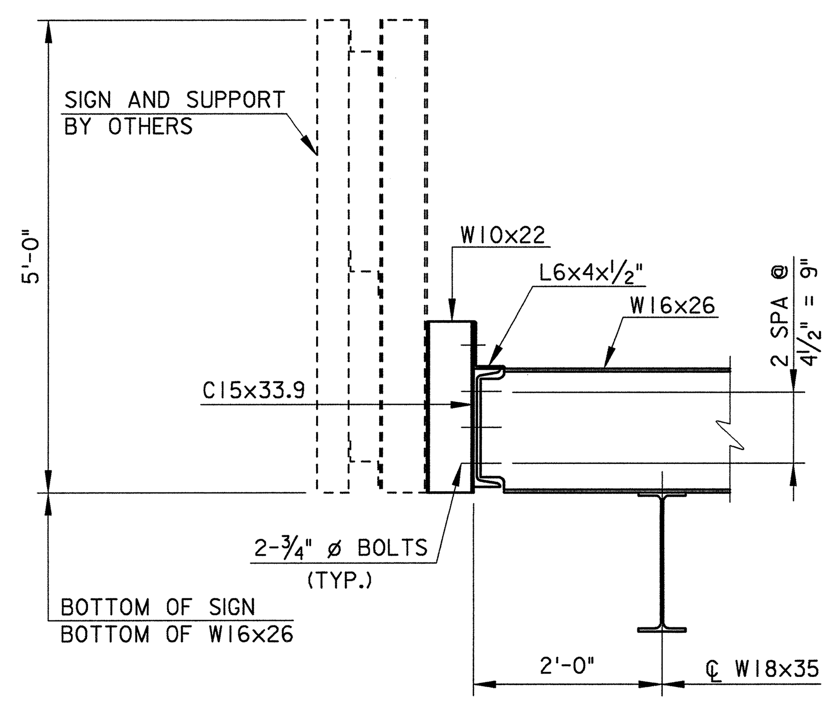
VIEW A-A
SCALE: 1/2" = 1'-0"



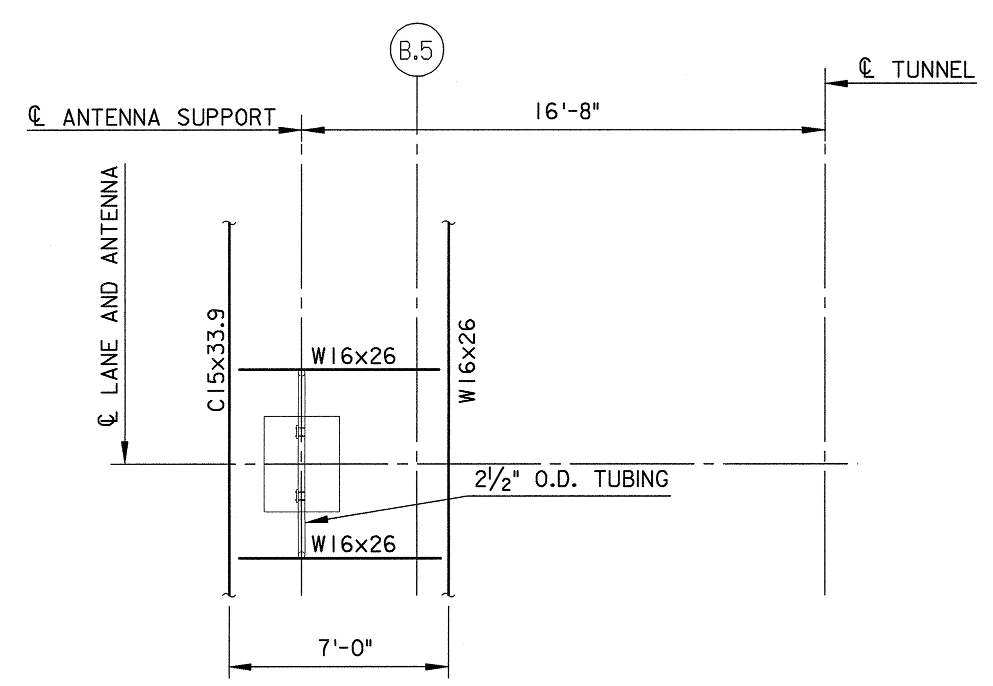
VIEW B-B
SCALE: 1/2" = 1'-0"



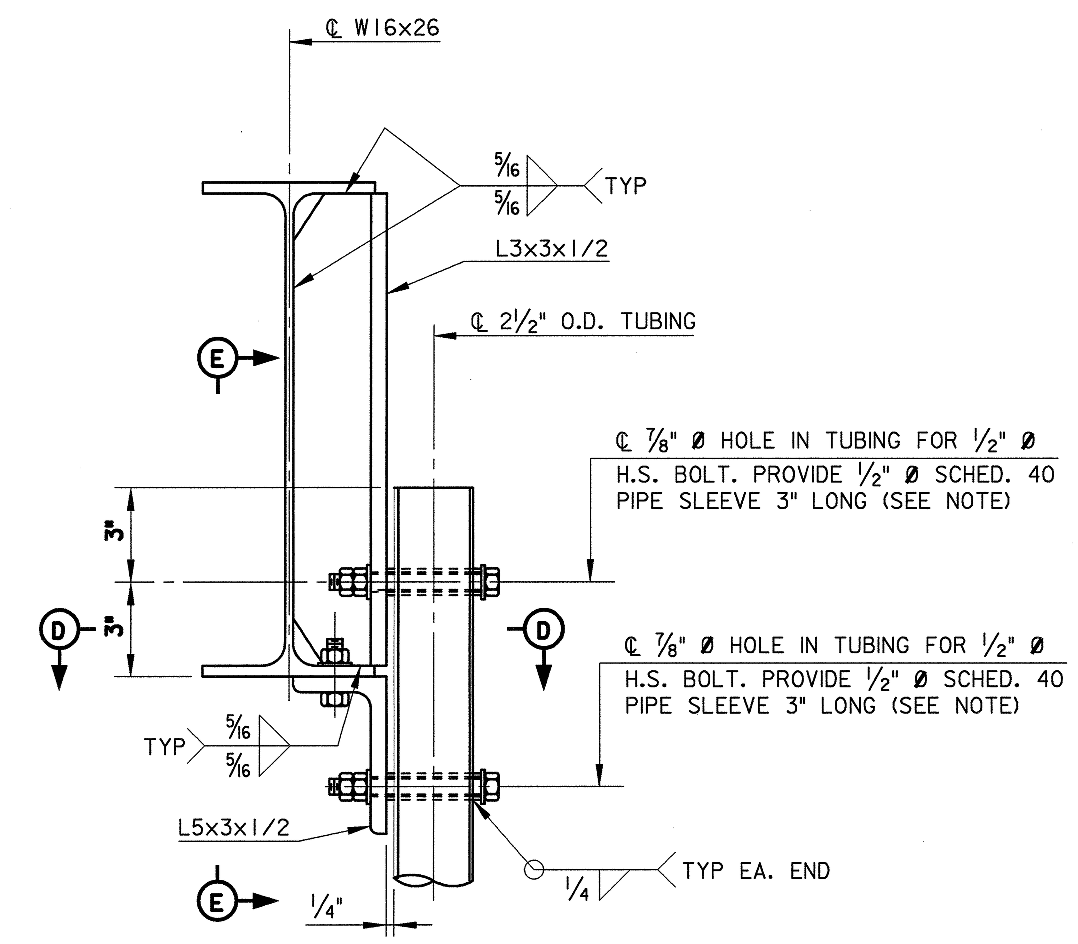
SECTION C-C
SCALE: 3" = 1'-0"



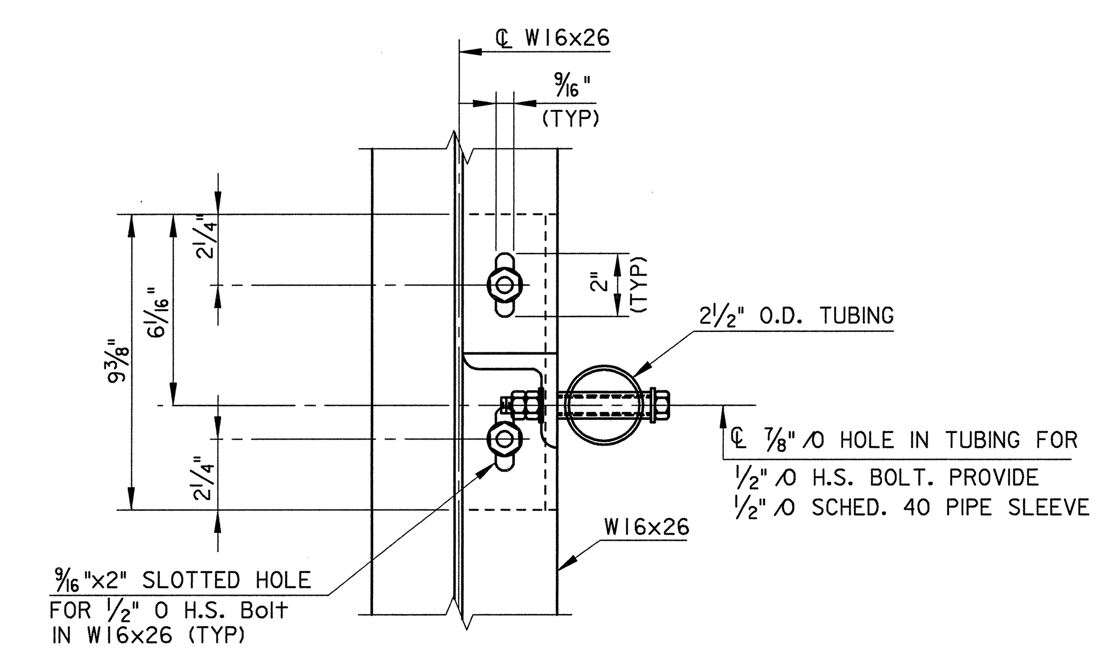
SECTION W-W
SCALE: 3/4" = 1'-0"



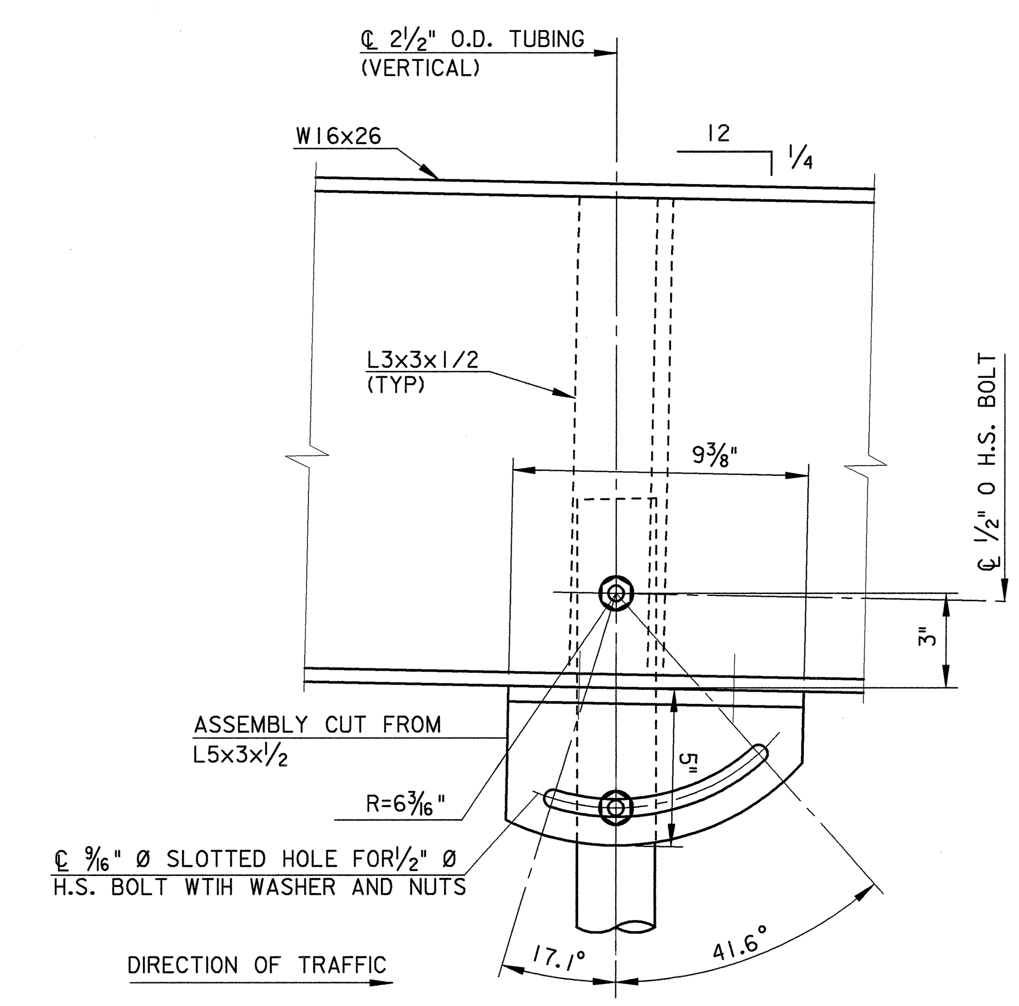
PARTIAL ANTENNA SUPPORT PLAN
SCALE: 1/4" = 1'-0"



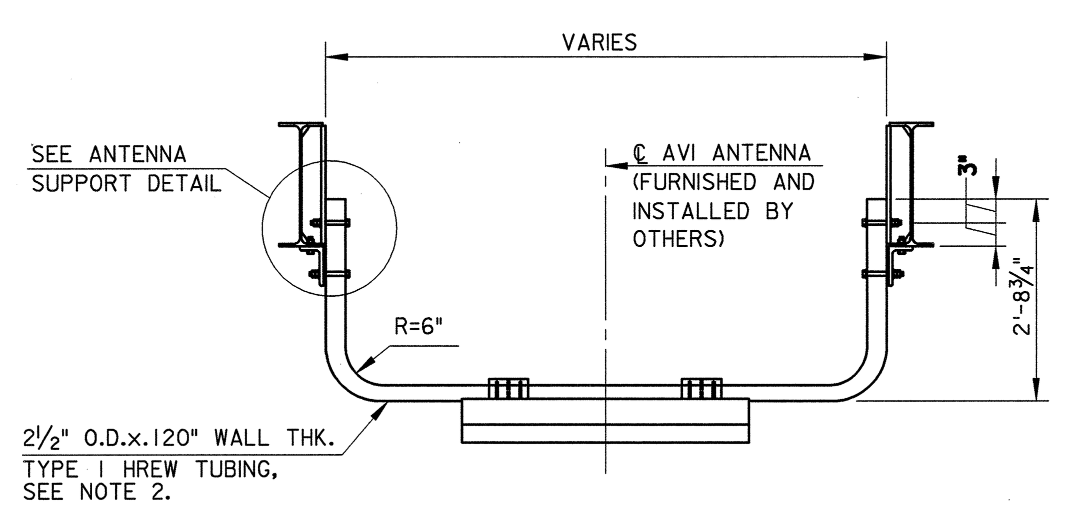
ANTENNA SUPPORT DETAIL
Scale: 3" = 1'-0"



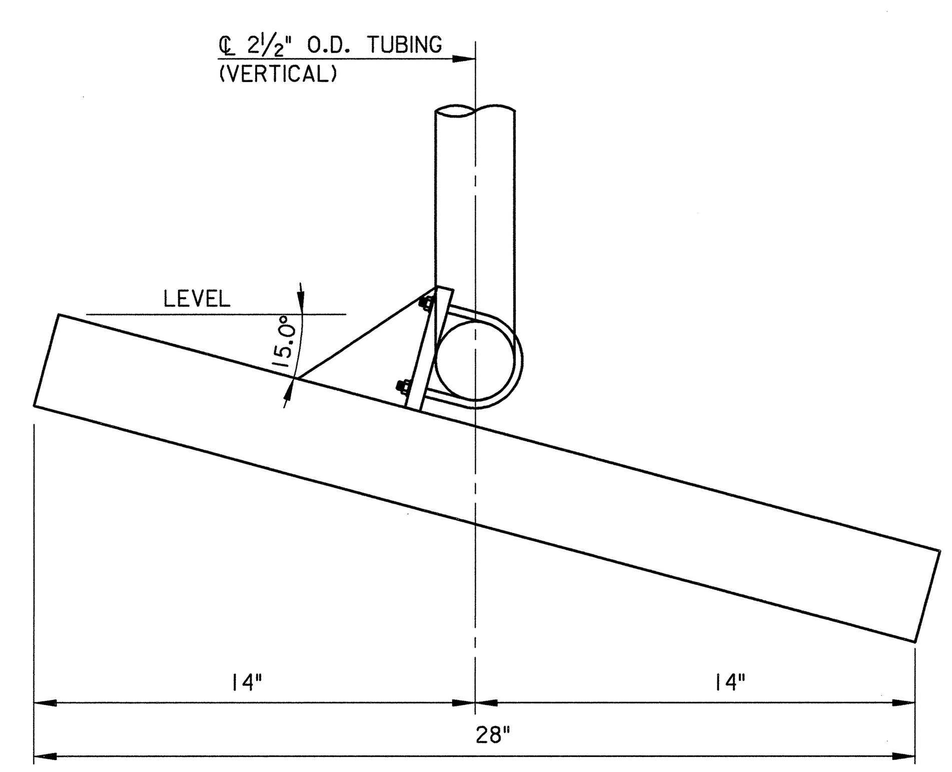
SECTION D-D
Scale: 3" = 1'-0"



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



TYPICAL ANTENNA SUPPORT
(LOOKING IN THE DIRECTION OF TRAFFIC)
SCALE: 3/4" = 1'-0"



ELEVATION
ANTENNA POSITION DETAIL
SCALE: 3" = 1'-0"

NOTES:

1. FOR INSTALLATION OF ELECTRICAL INFRASTRUCTURE AND EQUIPMENT SEE ELECTRICAL DRAWINGS.
2. ANTENNA SUPPORT BRACKETS SHALL BE FABRICATED FROM ASTM 513 TYPE I HOT-ROLLED ELECTRICWELDED (HREW) MECHANICAL TUBING.
3. STEEL MEMBERS AND PLATES FOR ANTENNA SUPPORT SHALL BE ASTM A709, GRADE 36 GALVANIZED TO ASTM-123.
4. THE C15x33.9 AND W16x26 MEMBERS ARE CANOPY STEEL.

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RICHMOND, VA 23219
TEL: 804.523.3300
FAX: 804.523.3330

ARCHITECT:
HNTB
HNTB ARCHITECTURE
The HNTB Companies
ARCHITECTS ENGINEERS PLANNERS

MEP / STRUCTURAL:
HANKINS & ANDERSON
4880 SADLER ROAD
SUITE 300
GLEN ALLEN, VA 23060
TEL: 804.285.4171
FAX: 804.217.8520

CIVIL / LANDSCAPE:
HNTB CORPORATION
9175 GUILFORD ROAD
COLUMBIA, MD 21046
TEL: 301.543.1000
FAX: 301.498.5070

RICHMOND METROPOLITAN AUTHORITY
POWHITE PARKWAY SPLIT PLAZA TOLL FACILITY
RICHMOND, VIRGINIA

DATE	7/20/2006
ISSUED FOR CONSTRUCTION	
PROJECT NO.	PSP-2006
DRAWN BY	CR
CHECKED BY	BS
APPROVED BY	BCC

REVISION	DATE	DESCRIPTION
1	6/23/06	REVISED SHEET

SHEET TITLE & NUMBER

STRUCTURAL TOLL PLAZA

CANOPY DETAILS

STP-110

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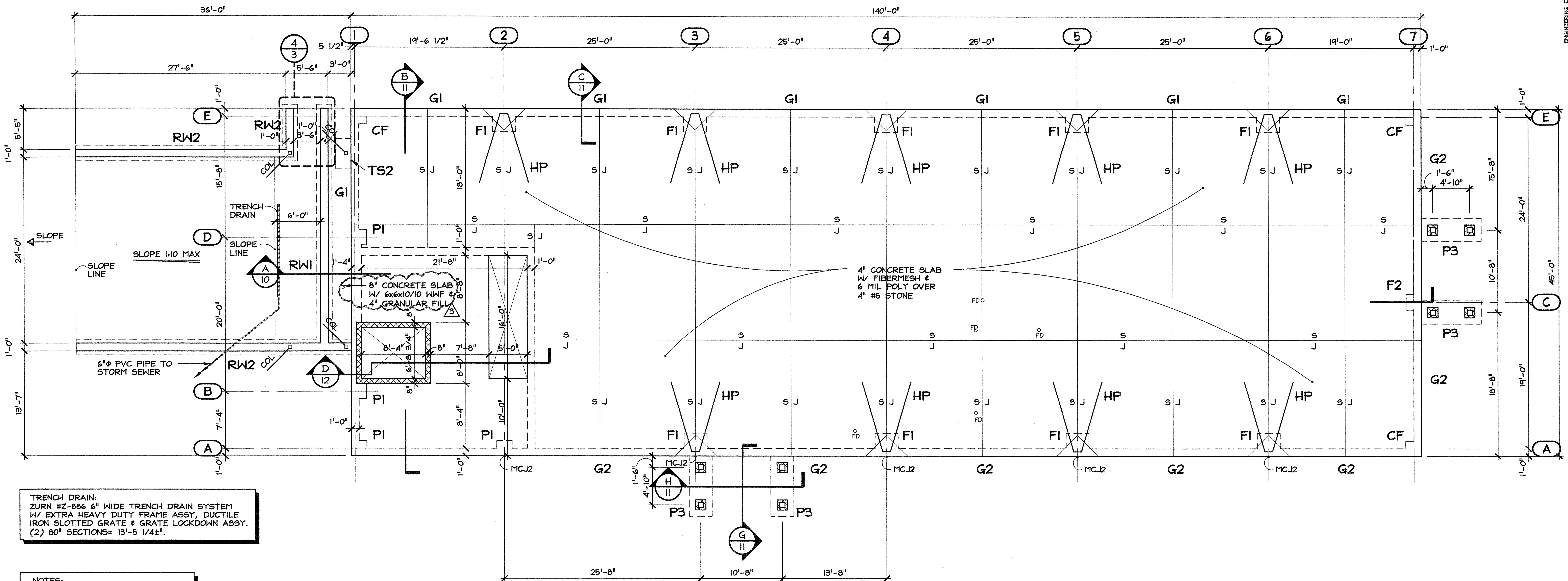
STRUCTURAL NOTES:

1. CONCRETE: f'c = 3500psi SLABS, f'c = 3000psi FOOTINGS AND WALLS.
2. RE-STEEL: f'u = 60 KSI.
3. ANCHOR BOLTS SHALL BE ASTM A36 STEEL.
4. ALL RE-STEEL SHALL BE LAPPED A MIN. OF 36 BAR DIA'S (UNLESS NOTED OTHERIWISE).
5. ALL REINFORCING STEEL UTILIZED IN THE MASONRY WALLS SHALL BE #4 RODS FURNISHED IN 5'-4" LENGHTS FOR THE FULL HEIGHT OF THE WALLS. RODS EMBEDDED IN FOOTINGS SHALL BE HOOKED.
6. ACCURATELY POSITION, SUPPORT, & SECURE IN PLACE ALL STEEL REINFORCING & WIRE FABRIC USING CHAIRS, BOLSTERS, BAR SUPPORTS, & SPACERS SIZED AND SHAPED FOR ADEQUATE SUPPORT OF REINFORCING DURING CONCRETE PLACEMENT.

   MIN COVERAGE @ FOOTINGS: 3"
   MIN COVERAGE @ SLABS / WALLS: 1 1/2"
7. SOIL BEARING CAPACITY: 2000 PSF NET (ASSUMED).
8. CURING COMPOUND AND SEALER SHALL BE (BASF BUILDING PRODUCTS) SONNEBORN KURE-N-SEAL. CURING COMPOUND SHALL BE APPLIED IMMEDIATELY FOLLOWING CONCRETE FINISHING, AND IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN SPECIFICATIONS.
9. GRANULAR FILL: #57 OR #5 (AS NOTED) STONE THICKNESS: 4"
10. VAPOR BARRIER: 1 LAYER 6 MIL POLY.
11. SLAB REINFORCING: 6 x 6 x 10/10 WWM & FIBERMESH (BASEMENT), FIBERMESH (1st FLOOR)
12. ALL CONCRETE JOINTS SHALL BE FILLED WITH A NO-TRACK FILLER.
13. * REFER TO THE METAL BUILDING MANUFACTURERS ANCHOR BOLT PLAN FOR QUANTITY, SIZE, AND LOCATION OF ALL ANCHOR BOLTS. ***VERY IMPORTANT***
14. ALL MASONRY PIERS SHALL BE FULLY BONDED.
15. ALL MASONRY WALLS SHALL BE FULLY BONDED AT INTERSECTIONS.
16. ALL MASONRY CORES WITH RODS SHALL BE FILLED WITH CONCRETE.
17. ALL MASONRY WALLS SHALL HAVE DUR-O-WAL HORZ TRUSS REINFORCING @ 24" ABOVE GRADE & 16" BELOW GRADE.
18. ALL MASONRY BELOW GRADE & OTHER INTERIOR MASONRY SHALL BE STANDARD UNITS, ASTM C 90, TYPE 1, NORMAL WEIGHT, NOMINAL 8"x16"x8" UNLESS NOTED OTHERWISE ON THE DRAWINGS.
19. MORTAR SHALL BE IN ACCORDANCE WITH ASTM C 270, TYPE M FOR BELOW GRADE APPLICATIONS, AND TYPE S FOR ALL OTHER MASONRY.
20. STRIKE EXPOSED JOINTS FOR MASONRY CONCAVE. STRIKE ALL UNEXPOSED JOINTS FLUSH.
21. ALL MASONRY WALLS SHALL HAVE EXPANSION JOINTS AT A MAXIMUM 25' (12' FROM (MASONRY) BUILDING CORNERS) OR CLOSER IF SO INDICATED ON THE DRAWINGS. ALL JOINTS SHALL CONTAIN A FIBER EXPANSION MATERIAL AND SHALL BE CAULKED WITH A TWO PART POLYSULFIDE CAULKING. ALL JOINTS IN FIRE WALLS SHALL BE CAULKED WITH A FIRE CAULKING. SEE EXTERIOR ELEVATIONS FOR LOCATIONS OF MASONRY EXPANSION JOINTS (MCJ'S). MCJ SHALL EXTEND FULL HIEGHT OF MASONRY.
22. ALL EXPOSED EXTERIOR PRE-COLORED OR UNFINISHED MASONRY SHALL BE SEALED WITH TWO COATS OF ENVIROSEAL DOUBLE 7 BLOCK SEALANT AS MANUFACTURED BY HARRIS SPECIALTY CHEMICALS, INC., OR AN APPROVED EQUAL.
23. ALL WALLS PENETRATING THE FLOOR SLAB SHALL HAVE A 1/2" EXPANSION JOINT (E.J.) AT THE FLOOR LINE.
24. EXPANSION JOINT MATERIAL AT WALLS TO SLAB SHALL BE 1/2" ASPHALT IMPREGNATED FIBERBOARD.
25. ALL CONCRETE WALLS ABOVE GRADE SHALL BE PLUGGED AND RUBBED.
26. PROVIDE SHORING ADEQUATE TO PREVENT DAMAGE OR MOVEMENT OF THE RETAINING WALLS PRIOR TO BACK FILLING. RETAINING WALLS SHALL BE EVENLY BACK FILLED ON BOTH SIDES OF THE WALL TO THE LOW SIDE GRADE LINE BEFORE BACK FILLING ABOVE THE LOW GRADE LINE. ALL BACK FILL SHALL BE COMPACTED WHEN PLACED AND PRIOR TO PLACING ANOTHER LIFT, TO 95% OPTIMUM DENSITY BASED ON STANDARD PROCTOR.
27. ALL BASEMENT WALLS SHALL BE BACKFILLED ENTIRELY W/ #5 STONE.
28. PROVIDE PERIMETER INSULATION ALONG ALL EXTERIOR WALLS (1" RIGID).
29. THE BOTTOM OF ALL FOOTINGS SHALL BE A MINIMUM OF 18" BELOW FINISHED GRADE.
30. ALL CONCRETE WORK SHALL BE PERFORMED IN ACCORDANCE WITH ACI 318, LATEST EDITION.
31. ALL FOOTINGS SHALL BEAR ON ORIGINAL EARTH. FILL COMPACTED TO 95% PROCTOR OR FLOWABLE FILL.



TRENCH DRAIN:
ZURN #Z-886 6" WIDE TRENCH DRAIN SYSTEM W/ EXTRA HEAVY DUTY FRAME ASSY, DUCTILE IRON SLOTTED GRATE & GRATE LOCKDOWN ASSY. (2) 80" SECTIONS= 13'-5 1/4±".

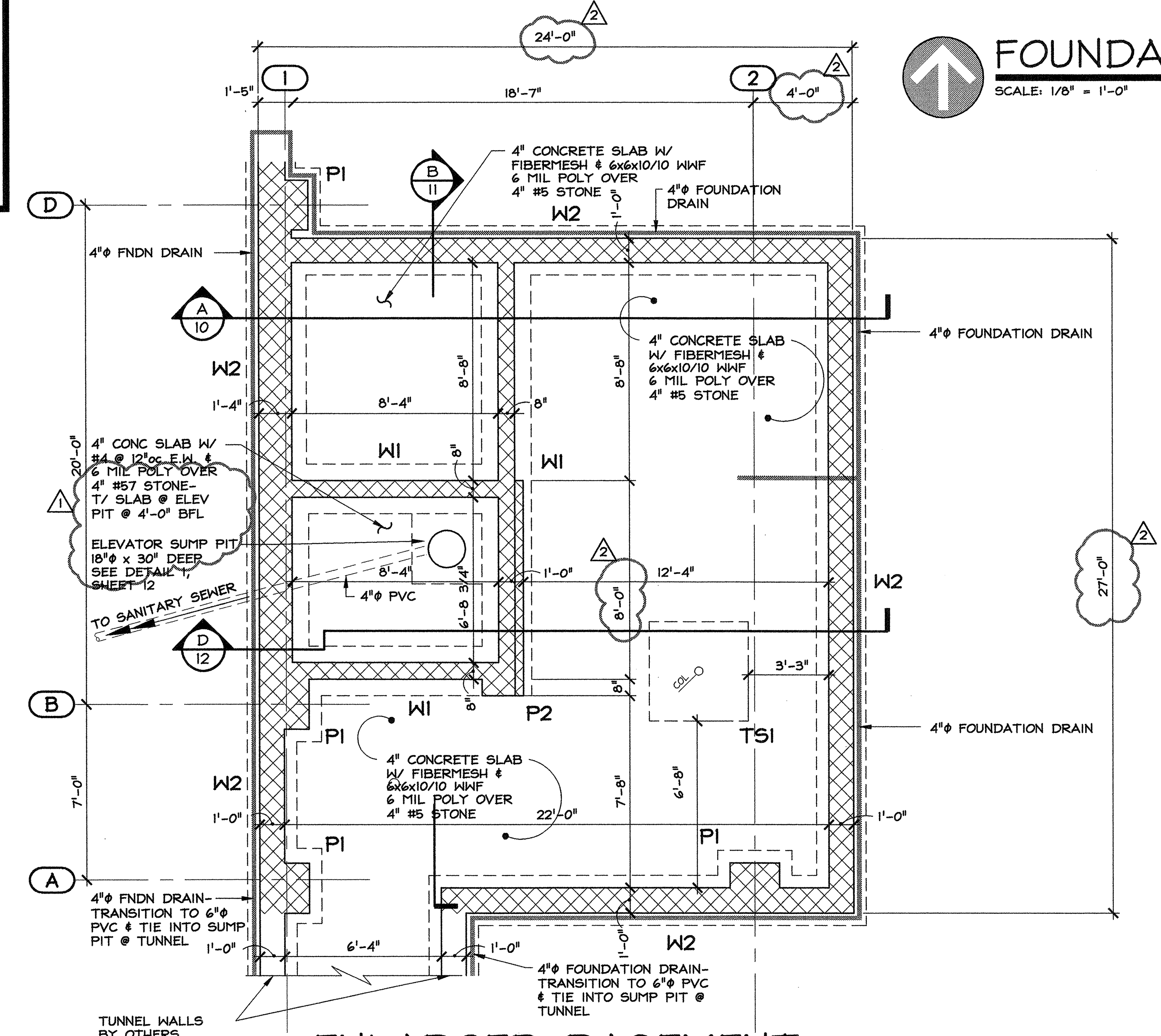
NOTES:
FOR RODS @ MASONRY JAMBS, SEE FLOOR PLAN FOR DOOR LOCATIONS.

MASONRY FINISH AS CALLED FOR ON THE ELEVATIONS SHALL EXTEND 1 COURSE BELOW GRADE.

PROVIDE POSITIVE SLOPE FOR DRAINAGE @ ALL EXTERIOR CONCRETE SLABS. SEE ALSO SITE PLANS.

FOR CONCRETE SLAB ELEV'S, SEE FLOOR PLAN.

FOUNDATION PLAN
SCALE: 1/8" = 1'-0"



ENLARGED BASEMENT FOUNDATION PLAN
SCALE: 1/4" = 1'-0"

FOOTING SCHEDULE

MARK	DIMENSION SIZE L	W	D	pier/wall H	bff B	PIER X	Y	STEEL M	N	O	P	HAIRPIN (HP) #	Q	R	ANCHOR BOLT (AB) QTY	#	L
CF	2-0	2-0	2-0					3 #4	3 #4						SEE	NOTE	#13
F1	3-0	3-0	2-0					4 #4	4 #4			4	1-0	9-0	SEE	NOTE	#13
F2	2-0	2-0	2-0					3 #4	3 #4						SEE	NOTE	#13
G1		1-0	2-0						2 #4						SEE	NOTE	#13
G2		1-0	2-0						2 #4	#4 @ 48"							
P1	3-0	3-0	1-0	VAR.	VAR.	2-0	2-0	4 #4	4 #4	4 #4					SEE	NOTE	#13
P2	2-0	2-0	1-0	13-0	4-0	1-4	1-4		4 #4	4 #4					2	1/2"	1-4
P3	3-0	8-0	1-0	5-4		1-4	1-4	#4 @ 8"	#4 @ 8"						4	3/4"	1-0
RW1	SEE DETAIL																
RW2	SEE DETAIL																
TS1	4-0	4-0	1-0		4"			5 #4	5 #4						4	3/4"	1-0
TS2	4-0	2-0	1-6		4"			#4 @ 8"	#4 @ 8"						4	3/4"	1-6
W1		2-0	1-0						2 #4	#4 @ 16"							
W2		2-0	1-0						2 #4	#4 @ 8"							

NOTE: G2, P1, P2, RW1; EXTEND RE-STEEL THRU COLUMN FOOTINGS.

DO NOT SCALE DRAWING FOR DIMENSIONS

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REVISION:

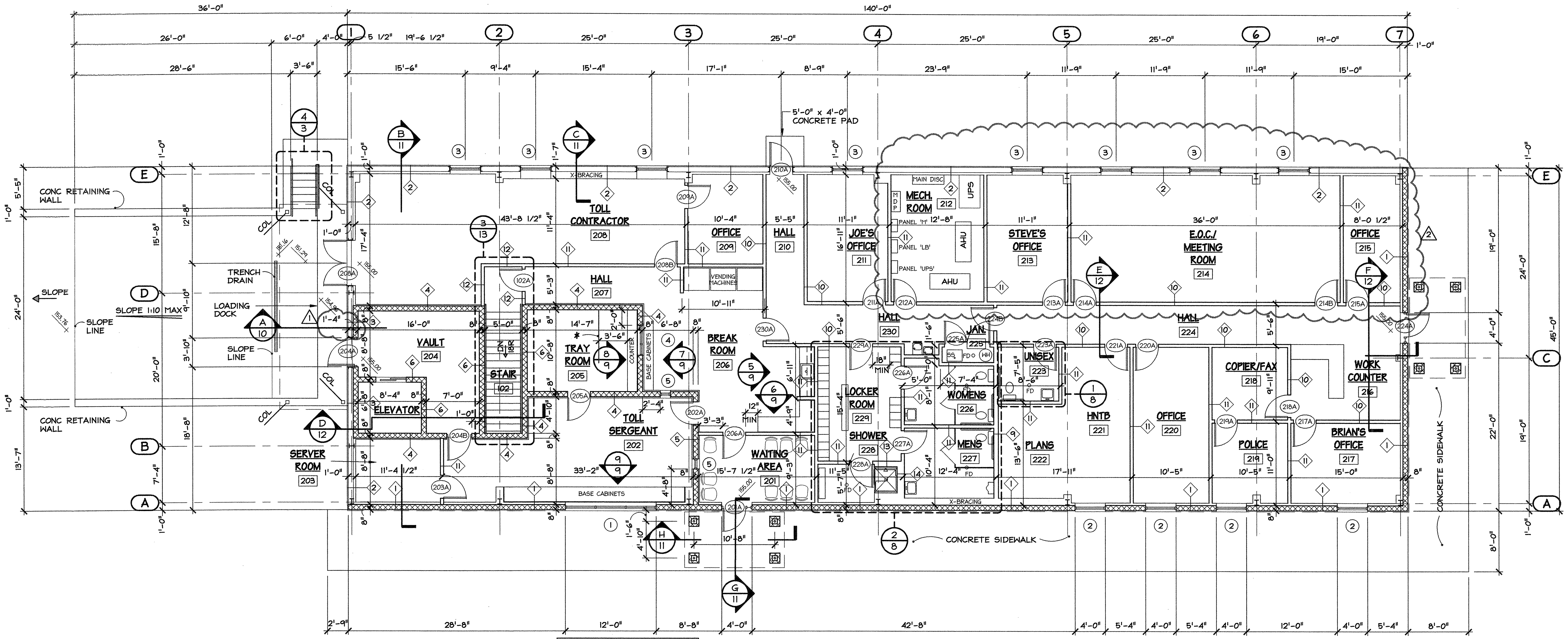
NO.	DATE:	DESCRIPTION:
.	10.11.06	ISSUED FOR CONSTRUCTION
1	10.24.06	ELEVATOR SUMP
2	11.07.06	REVISED/ADDED DIMENSIONS
3	12.08.06	REV. DOCK SLAB THICKNESS

PROPOSED BUILDING FOR:
RICHMOND METROPOLITAN AUTORITY
6234 POWHITE PARKWAY . CITY of RICHMOND . VIRGINIA

FOUNDATION PLAN

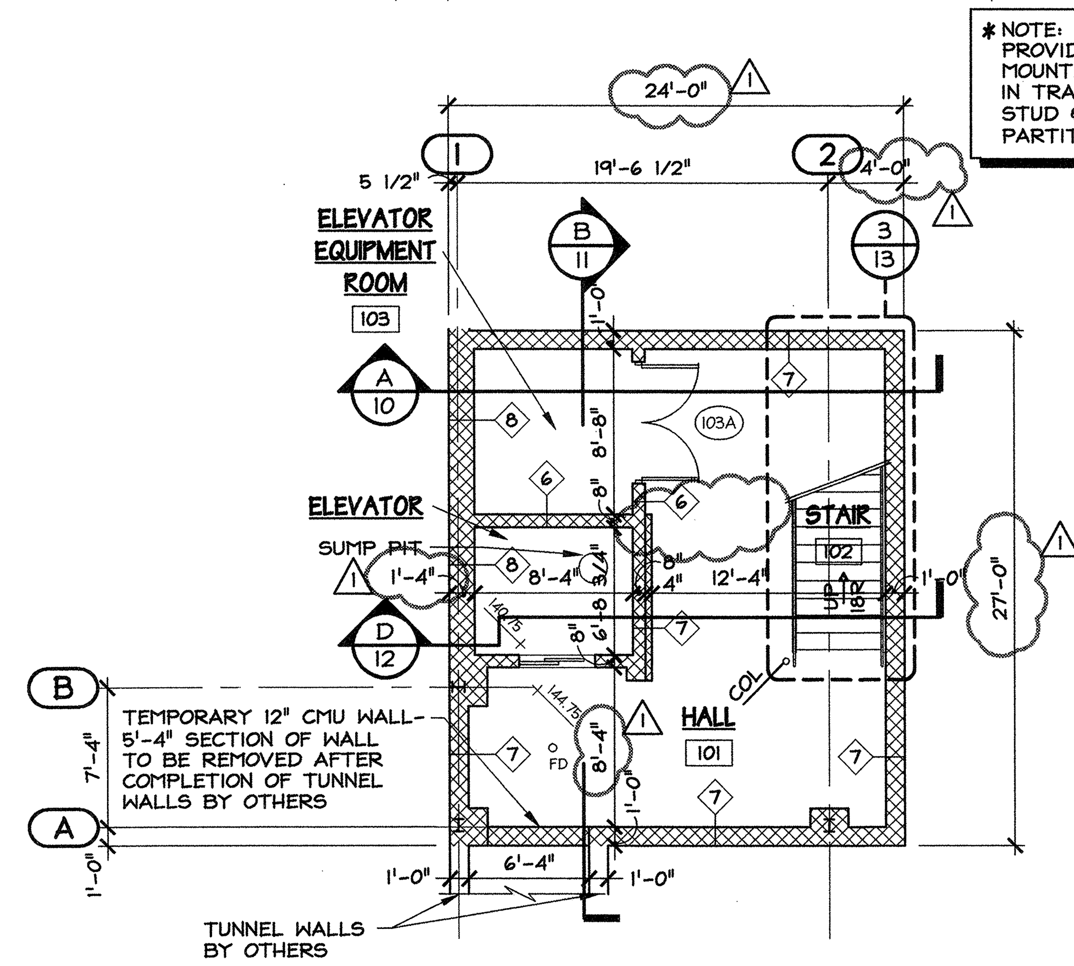
DRAWN BY: RANDY HOOKER CHECKED BY: RFN
SCALE: 1/8" = 1'-0" DATE: OCTOBER 11, 2006 PROJECT NO: 06357

DRAWING NO:
2 of 16



*NOTE:
PROVIDE FLOOR / WALL MOUNTED TOILET PARTION IN TRAY ROOM OR METAL STUD & GYPSUM BOARD PARTITION- LENGTH= 7'

FLOOR PLAN
SCALE: 1/8" = 1'-0"



BASEMENT FLOOR PLAN
SCALE: 1/8" = 1'-0"

WALL LEGEND

1. 8" SPLIT FACE CMU WALL TO 3'-4" AFF- METAL BUILDING WALL BEGINS AT 3'-4" AFF- W/ INTERIOR 4" x 20ga STEEL STUD WALL W/ 3 1/2" R-11 FG BATT INSUL W/ VAPOR BARRIER & 5/8" GYPSUM BOARD. PROVIDE VINYL BACKED R-19 FG INSULATION FROM TOP OF STUD WALL TO TOP OF METAL BUILDING WALL.
2. METAL BUILDING WALL W/ INTERIOR 4" x 20ga STEEL STUD WALL W/ 3 1/2" R-11 FG BATT INSUL W/ VAPOR BARRIER & 5/8" GYPSUM BOARD. PROVIDE VINYL BACKED R-19 FG INSULATION FROM TOP OF STUD WALL TO TOP OF METAL BUILDING WALL.
3. METAL BUILDING WALL W/ INTERIOR 8" CMU WALL.
4. 8" CMU WALL W/ 1 1/2" x 20ga HAT CHANNELS & 5/8" GYPSUM BOARD.
5. 8" CMU WALL W/ 1 1/2" x 20ga HAT CHANNELS & 5/8" GYPSUM BOARD EACH FACE.
6. 8" CMU WALL.
7. 12" CMU WALL.
8. 16" CMU WALL.
9. 6" x 20ga METAL STUDS @ 24oc W/ 5/8" GYPSUM BOARD EACH FACE.
10. 1 HOUR RATED WALL ASSEMBLY - UL DESIGN #U419 4" x 20ga METAL STUDS @ 24oc W/ 3 1/2" FG SOUND BATTS & 5/8" FIRE RATED GYPSUM BOARD EACH FACE.
11. 4" x 20ga METAL STUDS @ 24oc W/ 3 1/2" FG SOUND BATTS & 5/8" GYPSUM BOARD EACH FACE.
12. 4" x 20ga METAL STUDS @ 24oc W/ 3 1/2" R-13 FG BATT INSULATION W/ VAPOR BARRIER & 5/8" EXTERIOR GRADE GYPSUM BOARD ON INTERIOR FACE OF STAIRWELL & 5/8" GYPSUM BOARD ON TOLL CONTRACTOR & HALL FACE OF WALL.
13. 8" x 20ga METAL STUDS @ 24oc W/ 3 1/2" FG SOUND BATTS & 5/8" GYPSUM BOARD EACH FACE.
14. 11 1/2" CHASE WALL- 2 1/4" AIR SPACE BETWEEN 4" x 20ga STEEL STUD WALLS W/ 5/8" GYPSUM BOARD.

NOTE: PROVIDE MOISTURE RESISTANT GYPSUM BOARD IN ALL TOILET ROOMS, SHOWER & STAIR.

DO NOT SCALE DRAWING FOR DIMENSIONS

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REVISION:

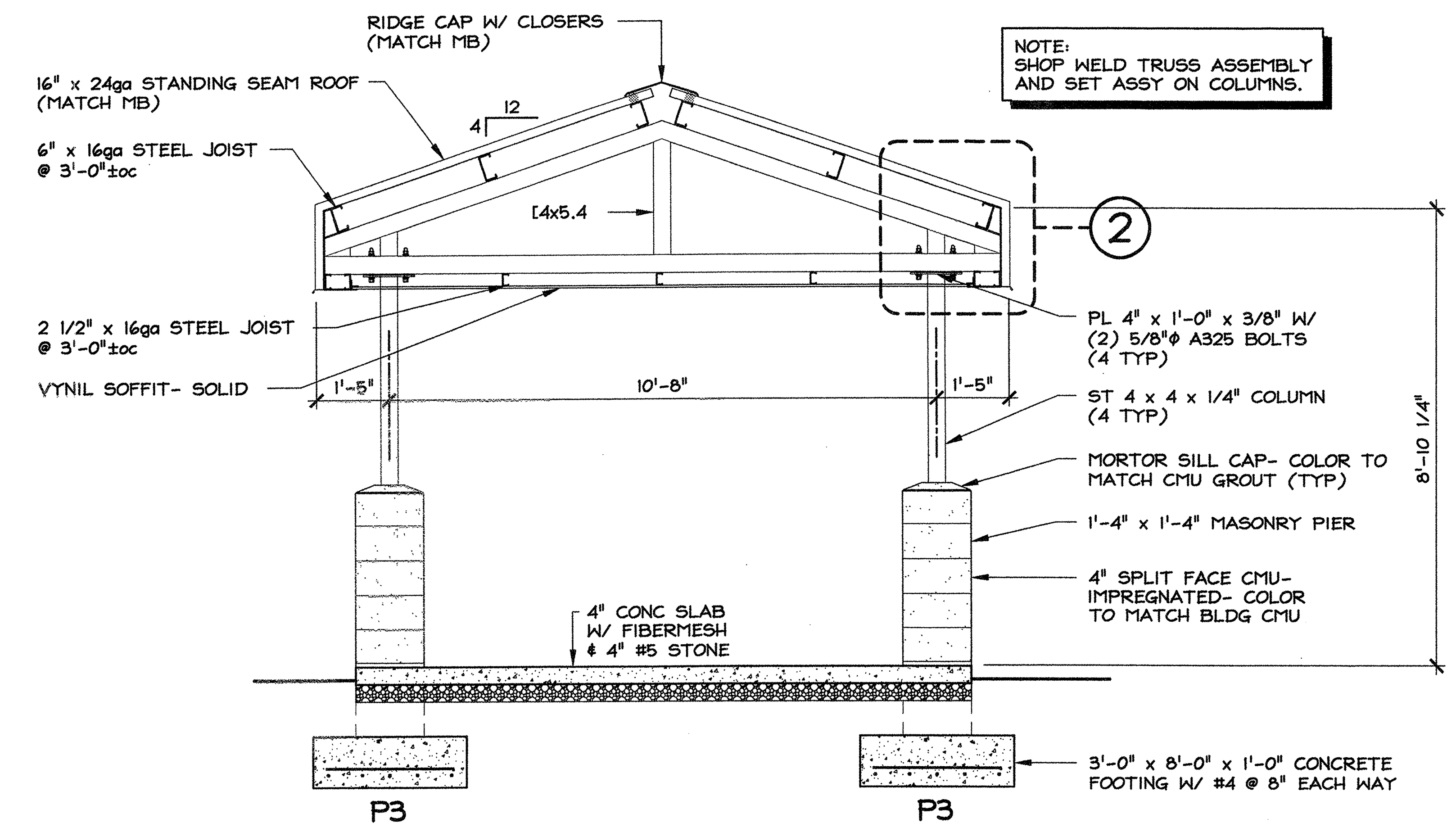
NO.	DATE:	DESCRIPTION:
.	10.11.06	ISSUED FOR CONSTRUCTION
1	11.07.06	REVISED/ADDED DIMENSIONS
2	11.27.06	MOVED WALLS & WINDOWS

PROPOSED BUILDING FOR:
RICHMOND METROPOLITAN AUTORITY
6234 POWHITE PARKWAY . CITY of RICHMOND . VIRGINIA

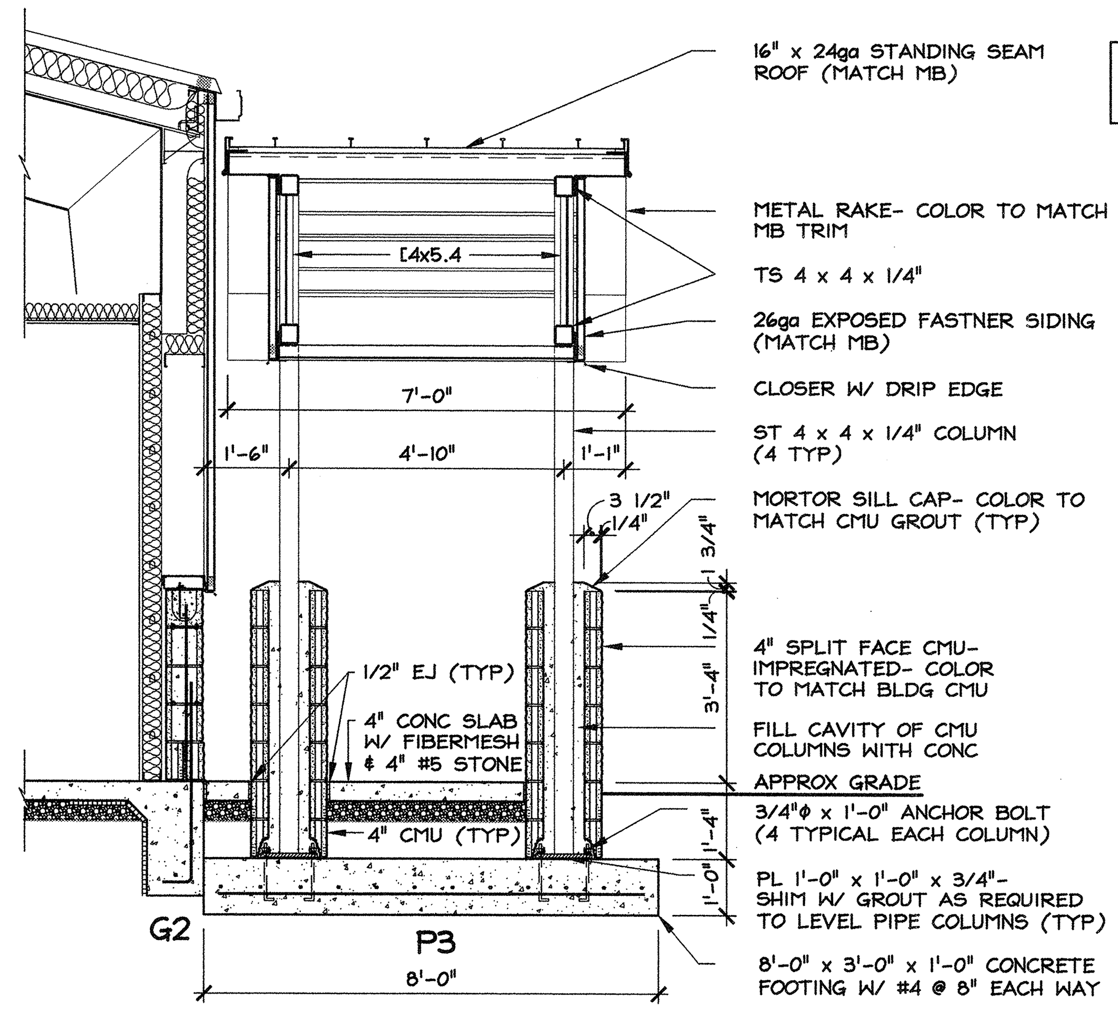
FLOOR PLAN

DRAWN BY: RANDY HOOKER CHECKED BY: LTC
SCALE: 1/8" = 1'-0" DATE: OCTOBER 11, 2006 PROJECT NO: 06357

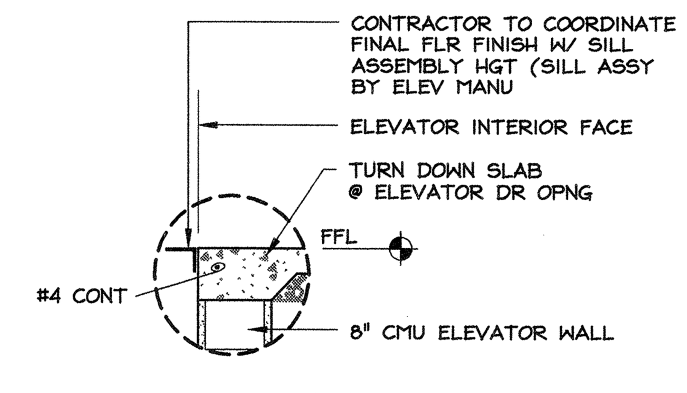
DRAWING NO:
4 of 16



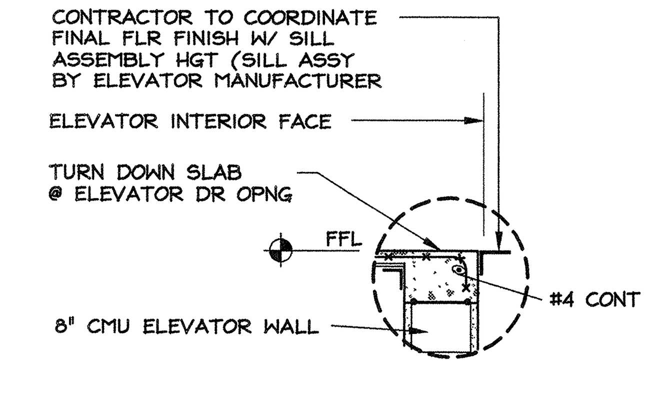
SECTION H/11
SCALE: 3/8" = 1'-0"



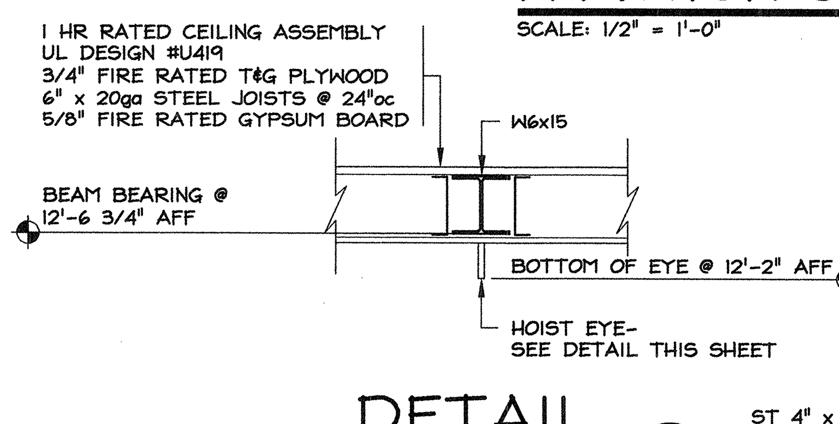
SECTION G/11
SCALE: 3/8" = 1'-0"



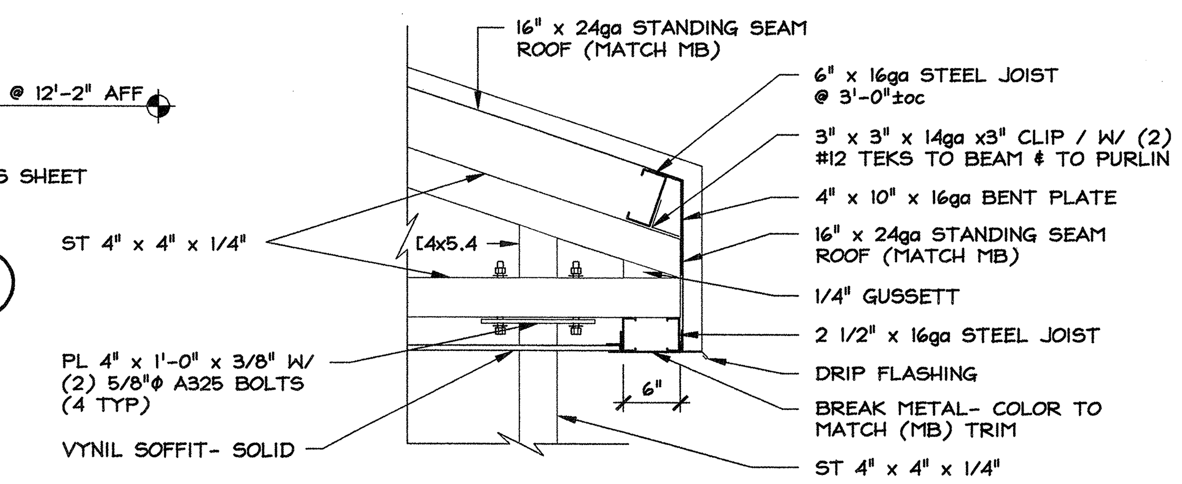
ELEVATOR SILL 1
SCALE: 1/2" = 1'-0"



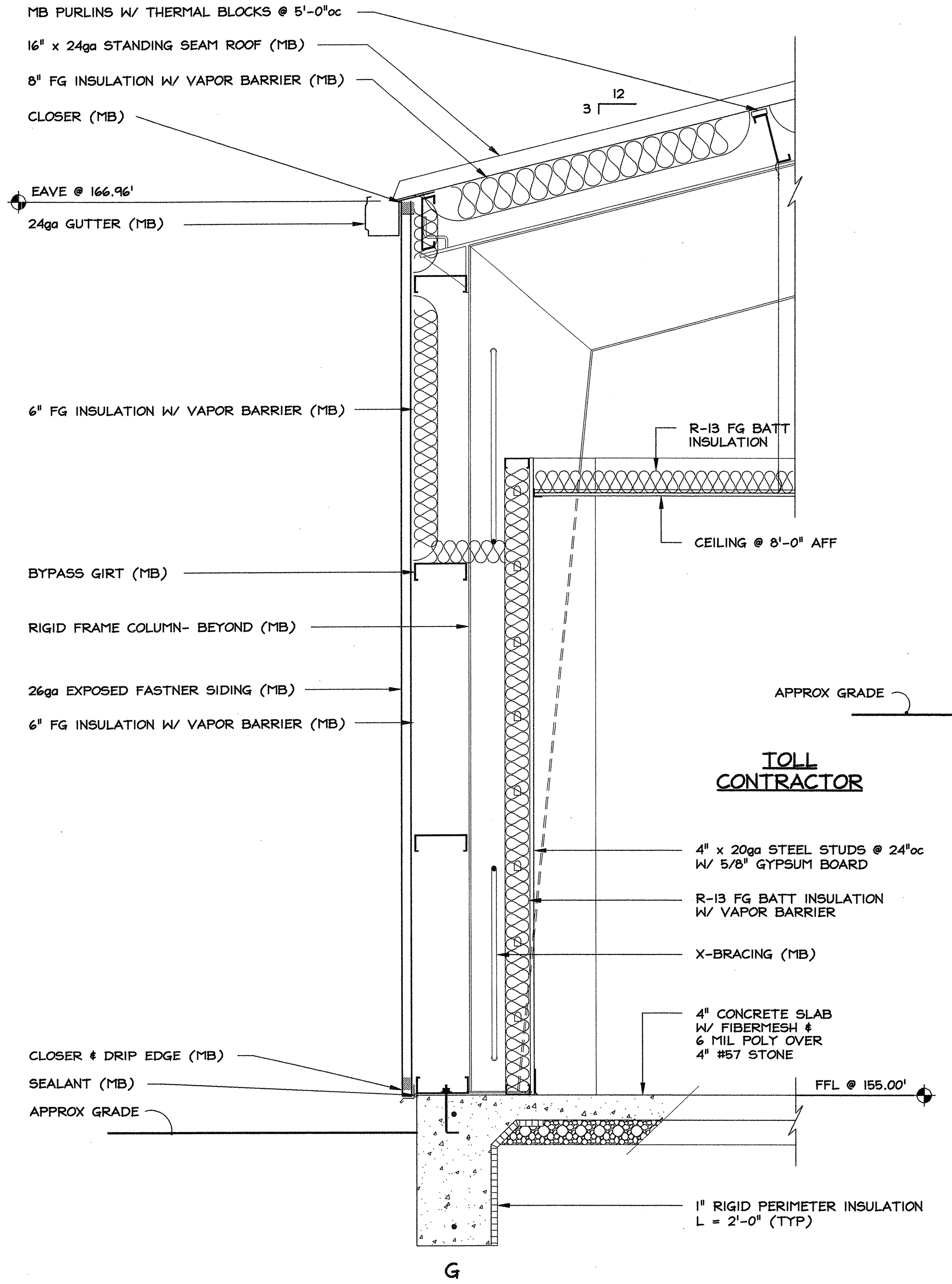
ELEVATOR SILL 2
SCALE: 1/2" = 1'-0"



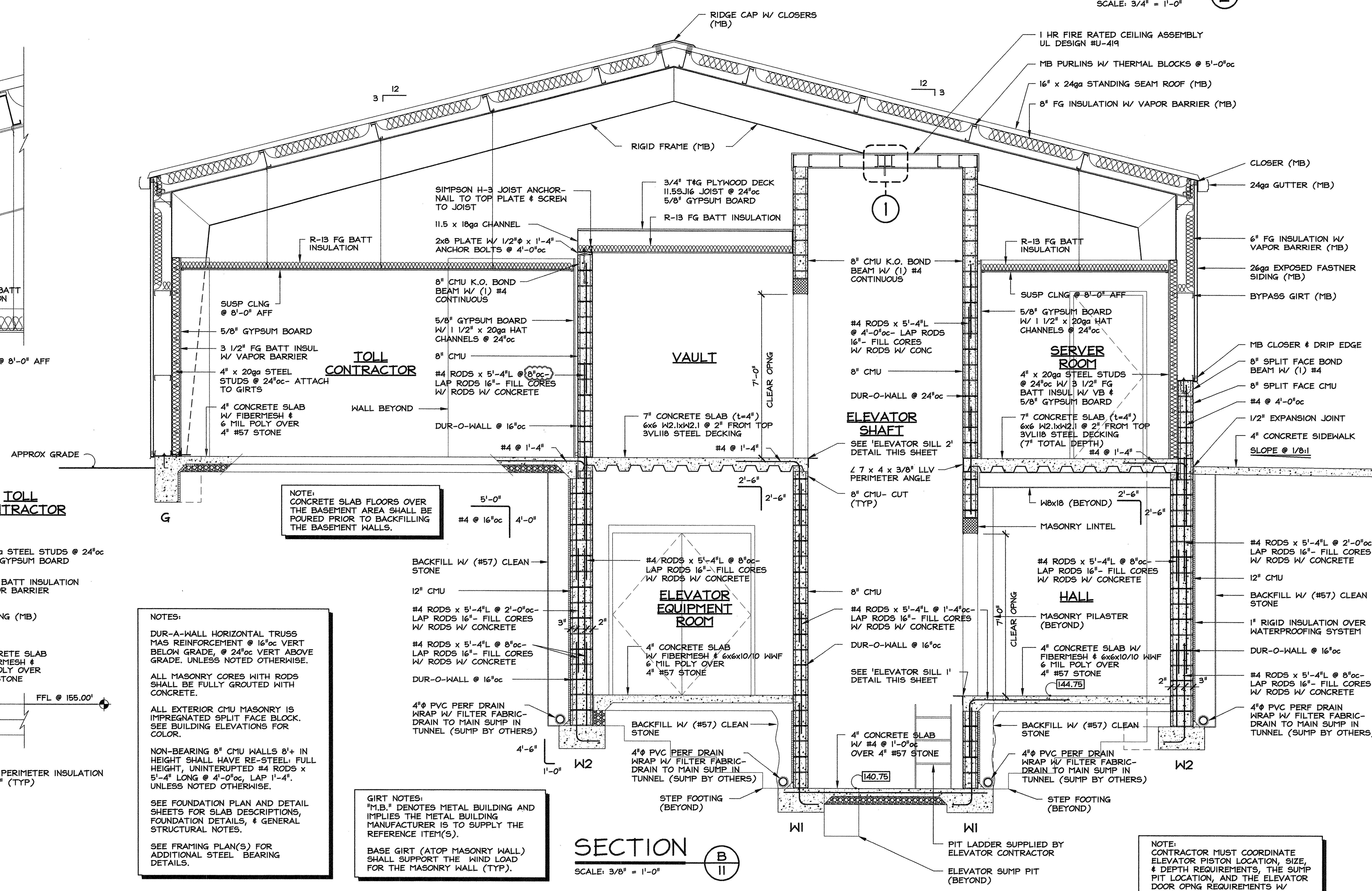
DETAIL 1
SCALE: 3/4" = 1'-0"



DETAIL 2
SCALE: 3/4" = 1'-0"



SECTION C/11
SCALE: 3/4" = 1'-0"



SECTION B/11
SCALE: 3/8" = 1'-0"

NOTES:

DUR-A-WALL HORIZONTAL TRUSS MAS REINFORCEMENT @ 16"oc VERT BELOW GRADE, @ 24"oc VERT ABOVE GRADE. UNLESS NOTED OTHERWISE.

ALL MASONRY CORES WITH RODS SHALL BE FULLY GROUTED WITH CONCRETE.

ALL EXTERIOR CMU MASONRY IS IMPREGNATED SPLIT FACE BLOCK. SEE BUILDING ELEVATIONS FOR COLOR.

NON-BEARING 8" CMU WALLS 8'+ IN HEIGHT SHALL HAVE RE-STEEL: FULL HEIGHT, UNINTERUPTED #4 RODS x 5'-4" LONG @ 4'-0"oc, LAP 1'-4". UNLESS NOTED OTHERWISE.

SEE FOUNDATION PLAN AND DETAIL SHEETS FOR SLAB DESCRIPTIONS, FOUNDATION DETAILS, & GENERAL STRUCTURAL NOTES.

SEE FRAMING PLAN(S) FOR ADDITIONAL STEEL BEARING DETAILS.

GIRT NOTES:

"M.B." DENOTES METAL BUILDING AND IMPLIES THE METAL BUILDING MANUFACTURER IS TO SUPPLY THE REFERENCE ITEM(S).

BASE GIRT (ATOP MASONRY WALL) SHALL SUPPORT THE WIND LOAD FOR THE MASONRY WALL (TYP).

NOTE:
CONTRACTOR MUST COORDINATE ELEVATOR PISTON LOCATION, SIZE, & DEPTH REQUIREMENTS, THE SUMP PIT LOCATION, AND THE ELEVATOR DOOR OPNG REQUIREMENTS W/ ELEVATOR CONTRACTOR.

DO NOT SCALE DRAWING FOR DIMENSIONS

EDA
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REVISION: NO.	DATE:	DESCRIPTION:
	12/11/06	ISSUED FOR CONSTRUCTION

PROPOSED BUILDING FOR:
RICHMOND METROPOLITAN AUTORITY
6234 POWHITE PARKWAY , CITY of RICHMOND , VIRGINIA

BUILDING SECTIONS

DRAWN BY: RANDY HOOKER | CHECKED BY: RFN
SCALE: 3/4" = 1'-0" | DATE: December 11, 2006 | PROJECT NO: 06357

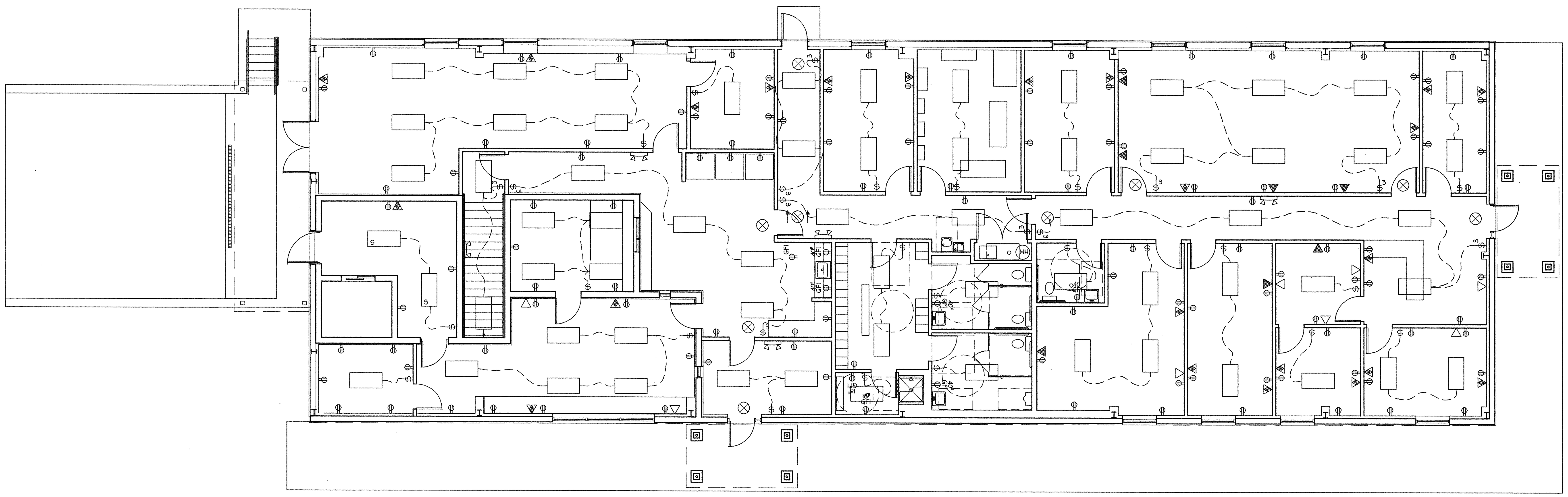
DRAWING NO:
11 of 16

ELECTRICAL SCHEDULE

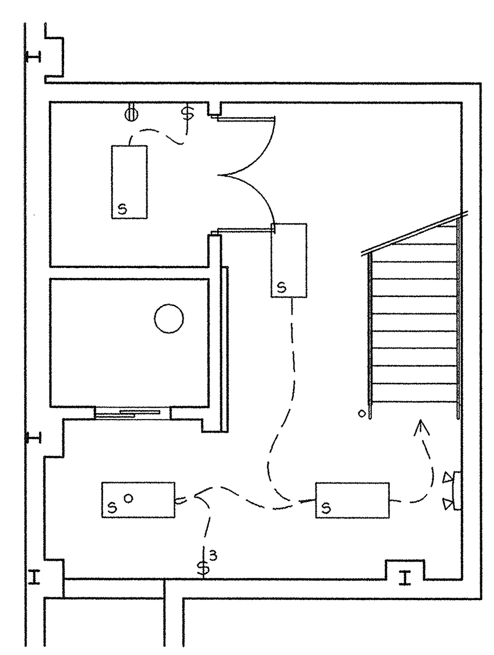
MARK	DESCRIPTION
↑⊗↑	EXIT LIGHT W/ DIRECTIONAL ARROW OPTION & BATTERY PACK
	EMERGENCY EGRESS LIGHT W/ BATTERY PACK
	2x4 LAY-IN FLUORESCENT 120V, W/ (4) 40 WATT TUBES W/ PRISMATIC LENS
S	2x4 SURFACE MTD FLUORESCENT 120V, W/ (4) 40 WATT TUBES W/ PRISMATIC LENS
$	SINGLE POLE SWITCH
$3	THREE-WAY SWITCH
	DUPLEX OUTLET, 120 VOLT
GFI	DUPLEX OUTLET, 120 VOLT W/ GROUND FAULT INTERUPT (GFI)
▽	TELE OUTLET, PROVIDE BOX AND PULL STRING
▼	DATA LINK OUTLET, PROVIDE BOX AND PULL STRING
	TELE / DATA LINK OUTLET, PROVIDE BOX AND PULL STRING
WH	ELECTRICAL WATER HEATER, 120V / 2000W ENERGY EFFICIENT TYPE
	WATER COOLER, ADA COMPLIANT, BI-LEVEL, 120 VOLT

ELECTRICAL NOTES

1. THE ELECTRICAL WORK SHALL BE PER THE NATIONAL ELECTRICAL CODE AND ALSO CONFORM TO THE REQUIREMENTS OF THE LOCAL POWER COMPANY AND THE CITY OF RICHMOND, VIRGINIA.
2. THE ELECTRICAL CONTRACTOR SHALL DETERMINE THE ELECTRICAL SERVICE REQUIREMENTS AND VERIFY THE VOLTAGE AVAILABLE FOR THE ELECTRICAL SERVICE.
3. ALL MECHANICAL AND ELECTRICAL EQUIPMENT SHALL BE U.L. APPROVED.
4. THE ELECTRICAL CONTRACTOR SHALL FURNISH ANY AND ALL ACCESSORY MATERIAL AND LABOR AS REQUIRED TO INSURE THE PROPER OPERATION AND CODE COMPLIANCE OF ALL MECHANICAL AND ELECTRICAL EQUIPMENT.
5. THE CONTRACTOR SHALL SUPPLY AND INSTALL ALL POWER WIRING AND ASSOCIATED ITEMS (SWITCHES, STARTERS, FUSES, BREAKERS, PANEL BOXES, CUT-OFFS FOR THE PROPOSED MECHANICAL EQUIPMENT, I.E., HEATING, AIR CONDITIONING, FANS, LOUVERS, ETC. WHICH WILL BE SUPPLIED BY THE MECHANICAL CONTRACTOR. THE MECHANICAL CONTRACTOR SHALL PROVIDE AND INSTALL ALL LOW VOLTAGE CONTROL WIRING.
6. CONTRACTOR SHALL VERIFY EXACT LOCATION AND RATING OF EQUIPMENT TO BE INSTALLED AND ACCOMMODATE ELECTRICAL INTERFACES AS RECOMMENDED BY THE MANUFACTURER.
7. ALL WIRING SHALL HAVE COPPER CONDUCTORS. WIRE INSULATION RATING SHALL MATCH OR EXCEED EQUIPMENT RATING.
8. WHERE PERMITTED BY CODE AND AUTHORITY HAVING JURISDICTION, TYPE MC CABLE MAY BE USED.
9. DO NOT MIX RECEPTACLE CIRCUITS WITH LIGHTING CIRCUITS.
10. LABEL CIRCUITS ON PANELS AND JUNCTION BOX COVERS USING EMBOSSED OR PRINTED SELF-ADHESIVE TAPE.
11. PROVIDE FOR ANY ADDITIONAL EGRESS / EXIT LIGHTING AS REQUIRED BY THE FIRE MARSHALL'S OFFICE.
12. THE ELECTRICAL CONTRACTOR SHALL ROUGH-IN TELEPHONE / DATA COMMUNICATION BOXES WITH 3/4"⌀ CONDUIT AND SHALL EXTEND EMPTY CONDUIT 4" ABOVE THE CEILING. THE OWNER SHALL BE RESPONSIBLE FOR THE INSTALLATION OF THE PHONE / DATA COMMUNICATIONS SYSTEM.
13. ALL EGRESS LIGHTING (INCLUDING BATTERY PACKS) & EXTERIOR WALL PACK FIXTURES SHALL HAVE A 5-YR. (MIN.) WARRANTY.
14. PANEL BOXES, DISCONNECTS, ETC. SHALL BE SQUARE D OR G.E. BRAND OR EQUAL AS APPROVED BY ENGINEER.
15. ALL WIRING SHALL BE CONCEALED WHERE POSSIBLE.
16. ELECTRICAL OUTLETS IN THE TOILETS AND @ BREAK RM SINK COUNTER SHALL BE GFI DUPLEX OUTLETS. MOUNT OUTLETS ABOVE THE LAVATORIES / COUNTERS.
17. OWNER SHALL PAY ANY POWER COMPANY CHARGES FOR PERMANENT POWER.
18. CONTRACTOR TO MAKE ALL ARRANGEMENTS FOR ELECTRICAL SERVICE TO INCLUDE LOAD LETTER.
19. COORDINATE ALL WORK WITH THE MECHANICAL CONTRACTOR AND OTHER TRADES AS APPROPRIATE.



FIRST FLOOR
ELECTRICAL LAYOUT PLAN
SCALE: 1/8" = 1'-0"



BASEMENT
ELECTRICAL LAYOUT PLAN
SCALE: 1/8" = 1'-0"

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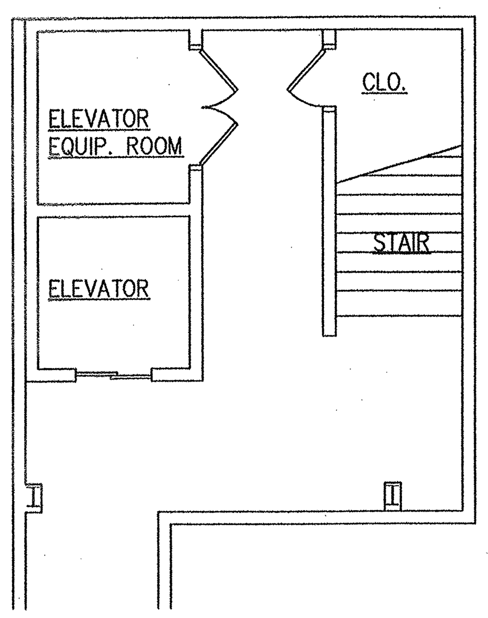
PROPOSED BUILDING FOR:
RICHMOND METROPOLITAN AUTORITY
6234 POWHITE PARKWAY . CITY of RICHMOND . VIRGINIA
ELECTRICAL LAYOUT PLAN
DRAWN BY: RANDY HOOKER CHECKED BY: LTC
SCALE: 1/8" = 1'-0" DATE: December 11, 2006 PROJECT NO: 06357

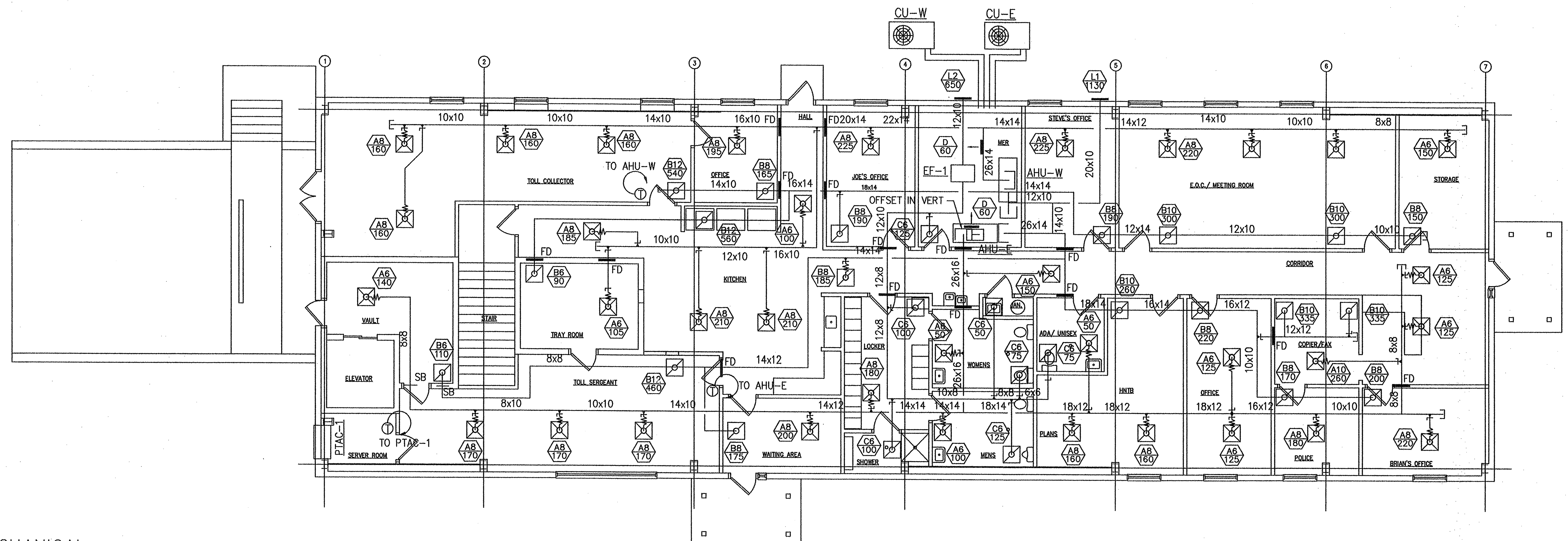
DRAWING NO:
15 of 16

DO NOT SCALE DRAWING FOR DIMENSIONS



BASEMENT FLOOR PLAN – MECHANICAL

SCALE: 1/8" = 1'-0"



FIRST FLOOR PLAN – MECHANICAL

SCALE: 1/8" = 1'-0"

SPLIT SYSTEM AIR COOLED HEAT PUMP SCHEDULE

INDOOR UNIT

UNIT NUMBER	LOCATION AND AREAS SERVED	FAN DATA: CFM	FAN DATA: OA	FAN DATA: EXTERNAL S.P. IN. H_2O	FAN DATA: TOTAL S.P. IN. H_2O	MOTOR DATA: HP	MOTOR DATA: RPM	MOTOR DATA: V	MOTOR DATA: PH	MOTOR DATA: HZ	DX COOLING COIL DATA: NO. ROWS	FPI	NO. CKTS.	FACE AREA S. F.	EAT °F DB / LAT °F WB	SENS. MBH	TOTAL MBH	HEATING COIL DATA: CFM	EAT °F / LAT °F	CAPACITY MBH	ELECTRIC COIL DATA: V	PH	HZ	KW	SELECTION BASED ON: MANUFACTURER	MODEL NUMBER
AHU-E	EAST OFFICES	2915	650	0.75	2.00	2	1725	230	3	60	4	12	1	11.2	81 / 67	75.8	99.2	2915	59 / 78	61.5	230	3	60	35	AM STD	TWE120A3
AHU-W	WEST OFFICES	2965	480	0.75	2.00	2	1725	230	3	60	4	12	1	11.2	80 / 60	76.7	95.9	2965	62 / 78	50.9	230	3	60	35	AM STD	TWE120A3

OUTDOOR CONDENSING UNIT

UNIT NUMBER	COMPRESSOR DATA: NO.	INPUT KW EA.	V	PH	HZ	CONDENSER FAN DATA: HP	CFM	V	PH	HZ	SELECTION BASED ON: MANUFACTURER	MODEL NUMBER	REMARKS
CU-E	1	9.84	230	3	60	1	8200	230	1	60	AM STD	TWA120A3	
CU-W	1	9.84	230	3	60	1	8200	230	1	60	AM STD	TWA120A3	

PACKAGED AIR CONDITIONING UNIT SCHEDULE

UNIT NUMBER	LOCATION AND AREAS SERVED	COOLING COIL DATA: CFM	OA	COOLING TOTAL BTU/HR	HEATING COIL DATA: CFM	OA	HEATING CAPACITY BTU/HR	ELECTRIC COIL DATA: V	PH	HZ	KW	FAN DATA: CFM	MOTOR DATA: WATTS	V	PH	HZ	SELECTION BASED ON: MANUFACTURER	MODEL NUMBER	REMARKS
PTAC-1	SERVER ROOM	300	50	11,700	310	50	10,600	230	1	60	2.0	310	1114	230	1	60	MCQUAY	PSHA1012EZ	

AIR DISTRIBUTION DEVICE SCHEDULE

UNIT NUMBER	SERVICE	SHAPE	MATERIAL	FRAME	FINISH	ACCESSORIES	SELECTION BASED ON: MANUFACTURER	MODEL NUMBER	REMARKS
A	SUPPLY	SQUARE	ALUMINUM	LAY IN	WHITE	OBD	TITUS	RAS	
B	RETURN	SQUARE	ALUMINUM	LAY IN	WHITE	OBD	TITUS	PAR	
C	EXHAUST	SQUARE	ALUMINUM	LAY IN	WHITE	OBD	TITUS	PAR	
D	SUPPLY	RECT	ALUMINUM	SURFACE	WHITE	OBD	TITUS	3FL	8x6
L1	O A INTAKE	RECT	ALUMINUM	SURFACE	WHITE	SB,BD,BS	RUSKIN	ELF211D	30x24
L2	EXHAUST	SQUARE	ALUMINUM	SURFACE	WHITE	SB,BD,BS	RUSKIN	ELF211D	18x18

GENERAL FAN SCHEDULE

UNIT NUMBER	LOCATION AND AREAS SERVED	TYPE	CFM	TOTAL S.P. IN. H_2O	FAN RPM	MOTOR DATA: HP	RPM	V	PH	HZ	SELECTION BASED ON: MANUFACTURER	MODEL NUMBER	REMARKS
EF-1	GENERAL EXHAUST	INLINE	650	1.00	UNIT	1/2	1330	115	1	60	PENNBARRY	Z102H	

MECHANICAL GENERAL NOTES

ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE APPLICABLE STATE AND LOCAL CODES.

THE ROUTING OF ALL DUCTWORK AND PIPING AS SHOWN ON THE DRAWING ARE DIAGRAMMATIC ONLY, INTENDING TO SHOW GENERAL RUNS AND LOCATIONS OF EQUIPMENT, DUCTWORK PIPING AND SPEACIALTIES. THE CONTRACTOR SHALL COORDINATE WORK WITH ALL OTHER TRADES.

NO DUCTWORK OR PIPING SHALL BE ROUTED OVER ELECTRIAL EQUIPMENT.

ALL DUCTWORK AND PIPING SHALL BE ROUTED CONCEALED IN WALLS OR ABOVE CEILING EXCEPT IN MECHANICAL EQUIPMENT ROOM WHERE EXPOSED WORK IS ACCEPTABLE.

ALL DUCTWORK SHALL BE CONSTRUCTED AND INSTALLED PER SMACNA.

SUPPLY DUCTWORK SHALL BE LINED, GALVANIZED SHEET METAL WITH INSULATED FLEXIBLE BRANCH DUCTWORK NOT TO EXCEED 10'-0" IN LENGTH.

RETURN AIR AND OUTSIDE AIR DUCTWORK SHALL BE LINED, GALVANIZED SHEET METAL.

EXHAUST DUCTWORK SHALL BE GALVANIZED SHEET METAL. EXHAUST DUCTWORK FROM THE SHOWER ROOM SHALL BE ALUMINUM UNTIL IT CONNECTS TO THE MAIN DUCT.

PROVIDE FIRE DAMPERS AND ACCESS DOORS AS SHOWN.

PROVIDE SECURITY BARS AT ALL VAULT WALL PENETRATIONS.

PROVIDE ELECTRICAL DISCONNECTS FOR ALL MECHANICAL EQUIPMENT.

PROVIDE TYPE L COPPER REFRIGERANT LINES AS SIZED BY THE EQUIPMENT MANUFACTURER.

PROVIDE CONDENSATE TRAPS AND DRAINS TO NEAREST FLOOR DRAIN AND TERMINATE WITH AN AIR GAP.

MECHANICAL SYMBOLS

SYMBOL	DESCRIPTION
A / #	NEW DIFFUSER DESIGNATION (TOP – TYPE/NECK DIAMETER , BOTTOM – CFM)
	NEW EQUIPMENT
	NEW DUCT
	NEW SUPPLY DIFFUSER
	NEW R/A OR EXHAUST GRILLE
	FLEXIBLE DUCT
T	THERMOSTAT
	SPIN-IN TAP WITH VOLUME DAMPER
	SPIN-IN TAP W/O VOLUME DAMPER
	MANUAL VOLUME DAMPER
— RL —	REFRIGERANT LIQUID PIPE
— RG —	REFRIGERANT GAS PIPE

MECHANICAL ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
BD	BACKDRAFT DAMPER
BS	BIRD SCREEN
CU	CONDENSING UNIT
EF	EXHAUST FAN
OBD	OPPOSED BLADE DAMPER
RA	RETURN AIR
SA	SUPPLY AIR
SB	SECURITY BARS
FD	FIRE DAMPER WITH ACCESS DOOR

PROJ. NO.: CJ60007F
PROJ. MGR.: CS
DESIGNED BY: CLM
DRAWN BY: EFM
CHECKED BY: CS
DATE: 11-30-06

REVISIONS

DRAWING TITLE
FLOOR PLANS, LEGEND, NOTES AND SCHEDULES – MECHANICAL

PROJECT
PROPOSED BUILDING FOR:
RICHMOND METROPOLITAN AUTHORITY

2200 Gordon Lane
Richmond, Virginia 23223
804 - 222 - 9066
SOUTHWORTH MECHANICAL CORPORATION

SHEET NO.
M-1
1 OF 1