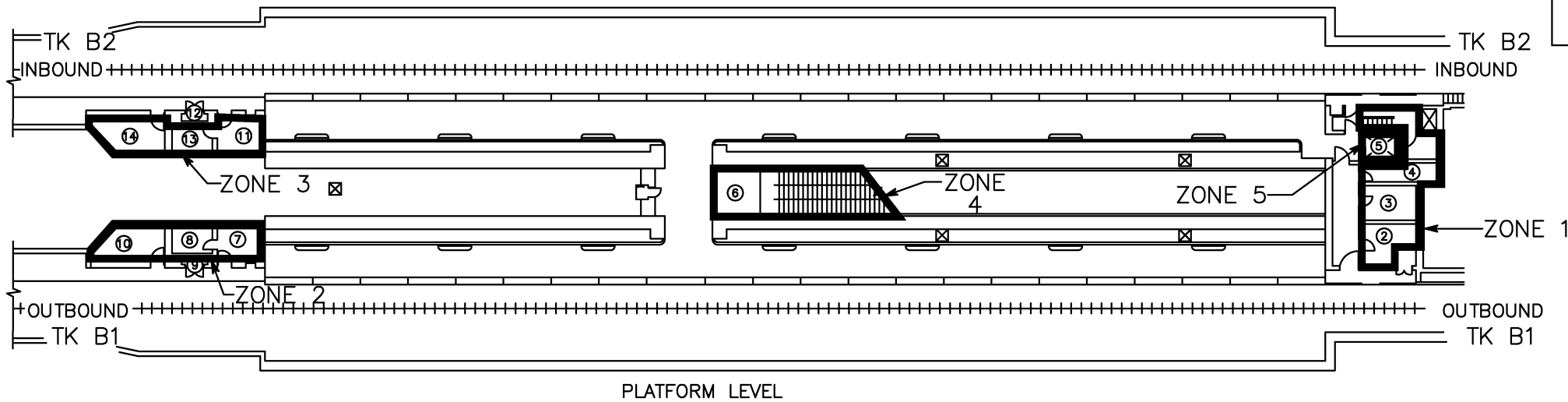
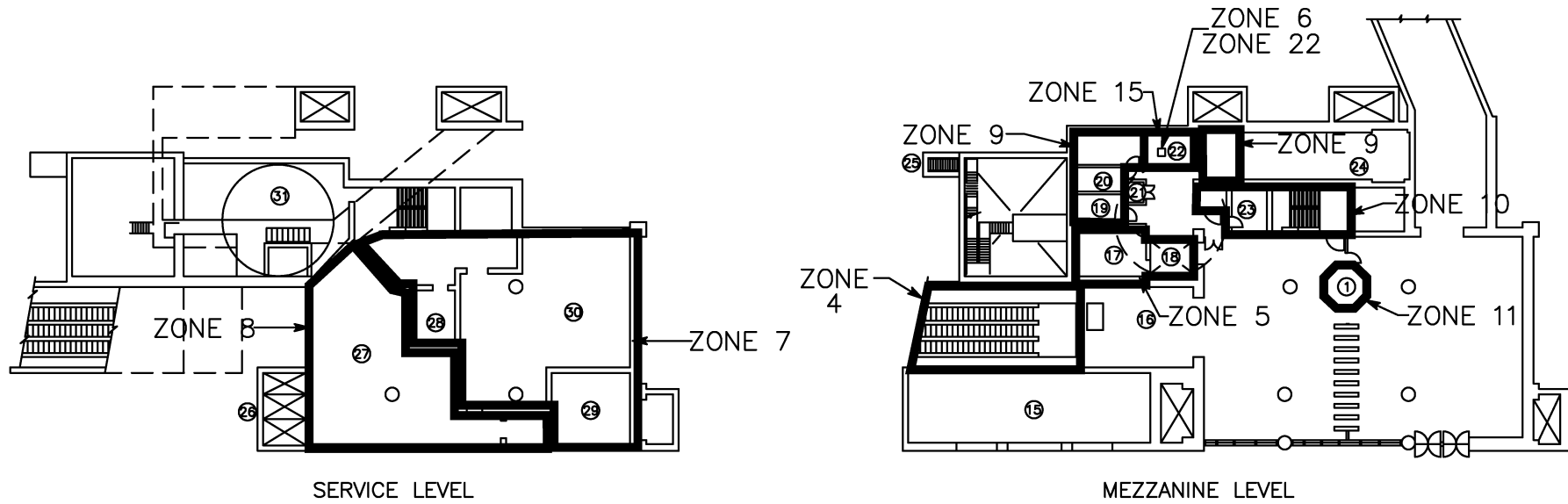


ZONE SCHEDULE			
ZONE	LOCATION	ZONE	LOCATION
1	PLATFORM(NORTH END CROSS ADIT.)	8	CHILLER PLANT B4
2	PLATFORM (SOUTH END O.B.)	9	MEZZANINE SERVICE ROOMS
3	PLATFORM (SOUTH END I.B.)	10	MEZZANINE SERVICE ROOMS
4	ESCALATOR	11	KIOSK
5	ELEVATOR	15	SEWAGE EJECTOR B9
6	SPRINKLER FLOW VALVE	22	MAIN LINE FLOW VALVE & SPRINKLER TEMPER SWITCH
7	A.C SERVICE ROOM		

ROOM SCHEDULE	
ROOM NO.	DESCRIPTION
1	KIOSK
2	TRAIN CONTROL ROOM
3	COMMUNICATIONS ROOM
4	ELECTRICAL PANEL ROOM
5	ELEVATOR
6	ESCALATOR VAULT
7	DISPATCHER'S ROOM
8	OPERATIONS ROOM
9	FIRE EQUIPMENT ROOM
10	ELECTRICAL VAULT ROOM
11	DISPATCHER'S ROOM
12	FIRE EQUIPMENT ROOM
13	OPERATIONS ROOM
14	ELECTRICAL VAULT ROOM
15	MECHANICAL EQUIPMENT PIT
16	ESCALATOR VAULT
17	ELEVATOR MACHINE ROOM
18	ELEVATOR
19	MEN'S TOILET
20	WOMEN'S TOILET
21	FIRE EQUIPMENT ROOM
22	CLEANERS & WATER SERV. RM.
23	ELECTRICAL ROOM
24	FUTURE ESCALATOR
25	EMERGENCY ACCESS DOOR
26	FAN EXHAUST
27	CHILLER ROOM
28	BATTERY ROOM
29	FAN ROOM
30	A.C. SWITCHBOARD ROOM
31	REEDIE DRIVE VENT SHAFT



This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	JRR	6-00
		DATE
DRAWN	JMR	6-00
		DATE
CHECKED		DATE
APPROVED		DATE
UPDATED		DATE

REFERENCE DRAWINGS	
NUMBER	DESCRIPTION

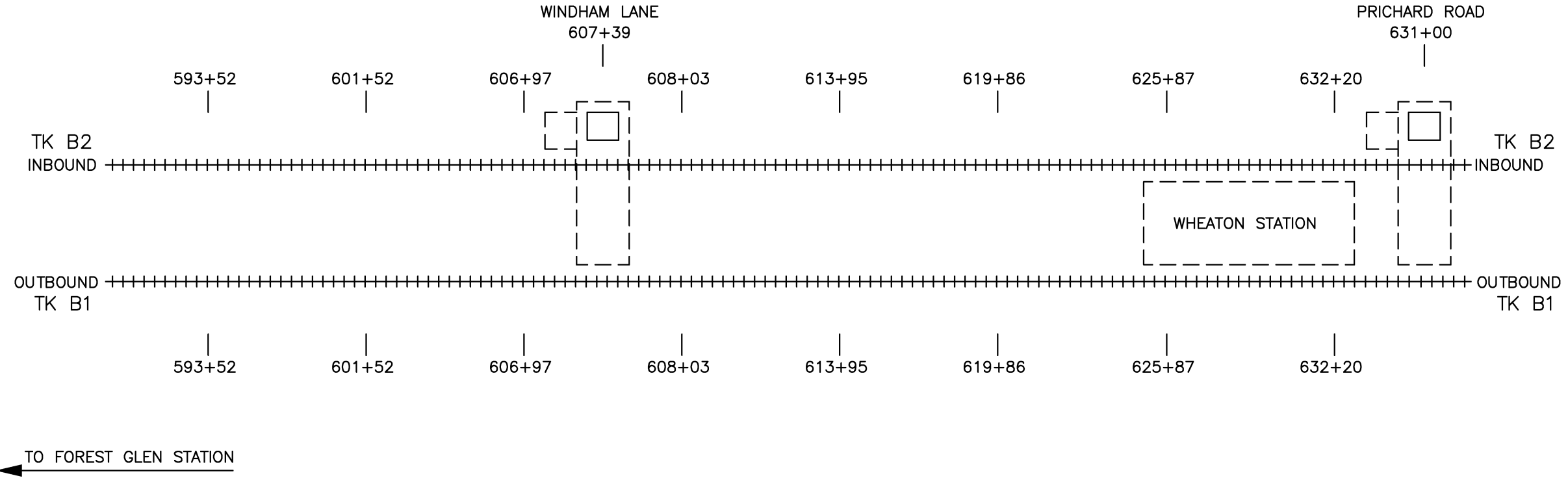
REVISIONS		
DATE	BY	DESCRIPTION
08/2001	SYSP	Revised and issued by the Authority

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____ APPROVED *[Signature]* May 3, 2001
DIRECTOR DATE

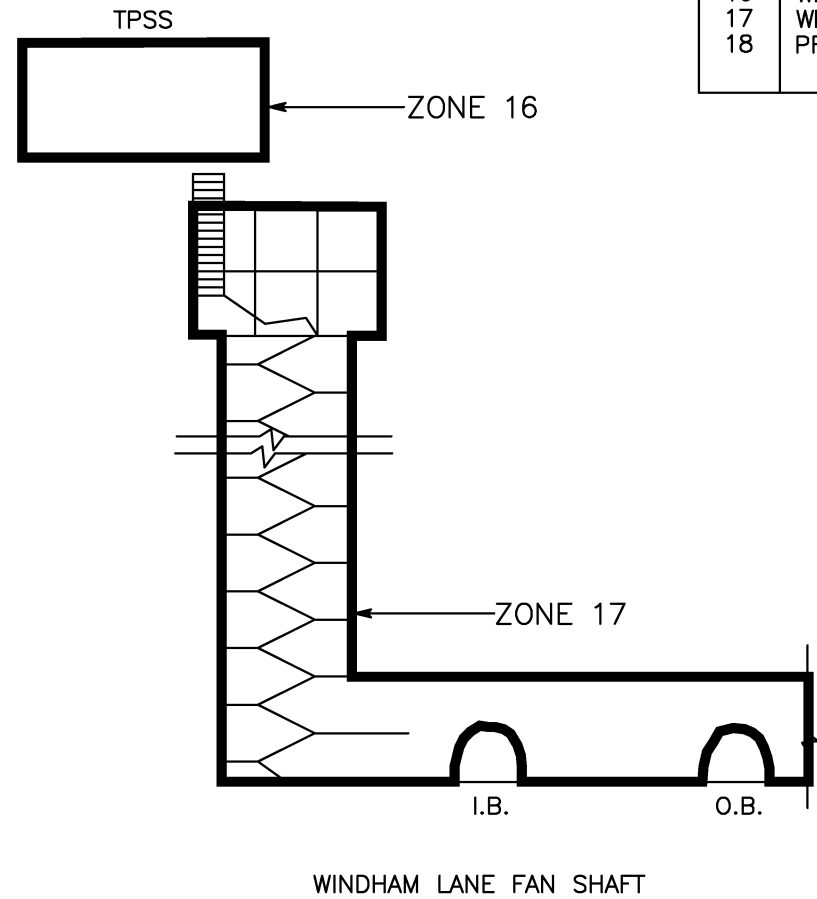
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SCALE NONE	DRAWING NO. ST-CM-KCS-013



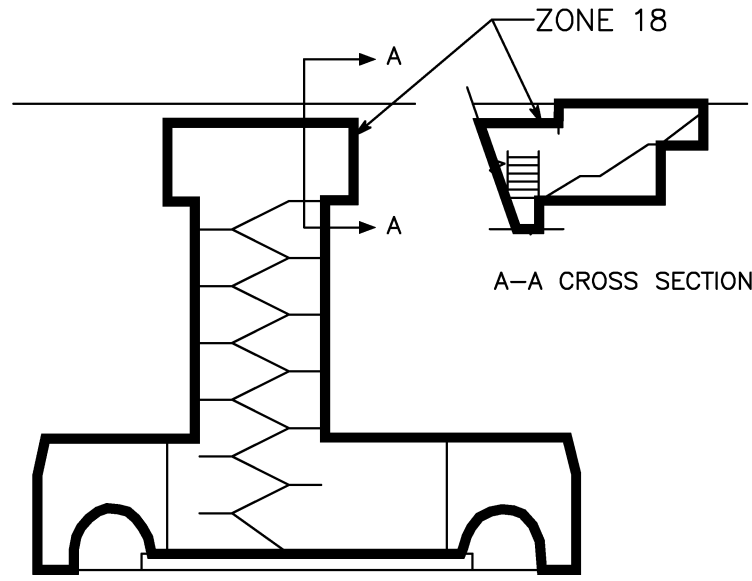
This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED <u>JRR</u> 8-00 DATE	REFERENCE DRAWINGS		REVISIONS		WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF SYSTEMS	TYPICAL EXAMPLE OF KIOSK DATA FILES	
DRAWN <u>JMR</u> 8-00 DATE	NUMBER	DESCRIPTION	DATE	BY			DESCRIPTION
CHECKED _____ DATE			08/2001	SYSP			Revised and issued by the Authority
APPROVED _____ DATE			2-92	FL			CONFIGURATION UPDATED
UPDATED _____ DATE							
					SUBMITTED _____ DATE	APPROVED <u>[Signature]</u> May 3, 2001 DIRECTOR DATE	SCALE NONE
						DRAWING NO. ST-CM-KCS-014	MXXXX-XXX

ZONE SCHEDULE	
ZONE	LOCATION
16	WINDHAM LANE TPSS
17	WINDHAM LANE FAN SHAFT
18	PRICHARD ROAD VENT SHAFT



WINDHAM LANE FAN SHAFT



PRICHARD ROAD VENT SHAFT

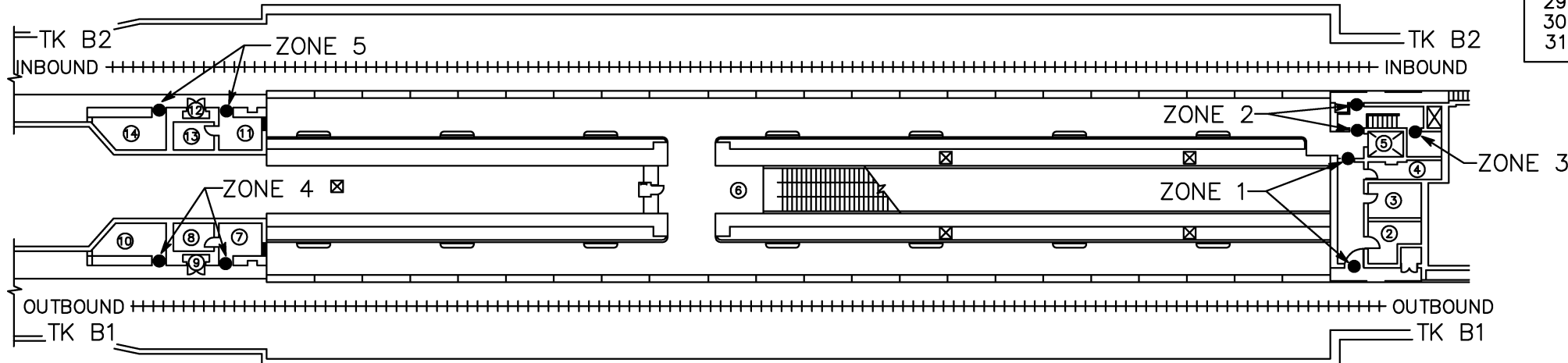
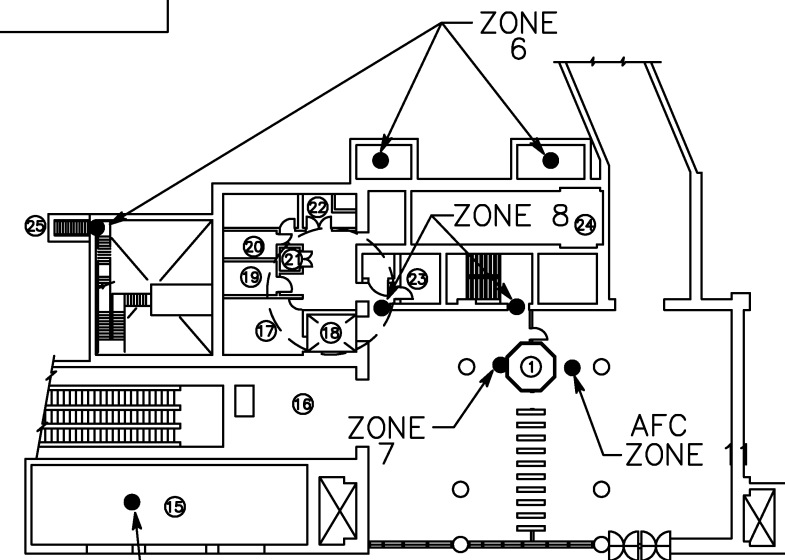
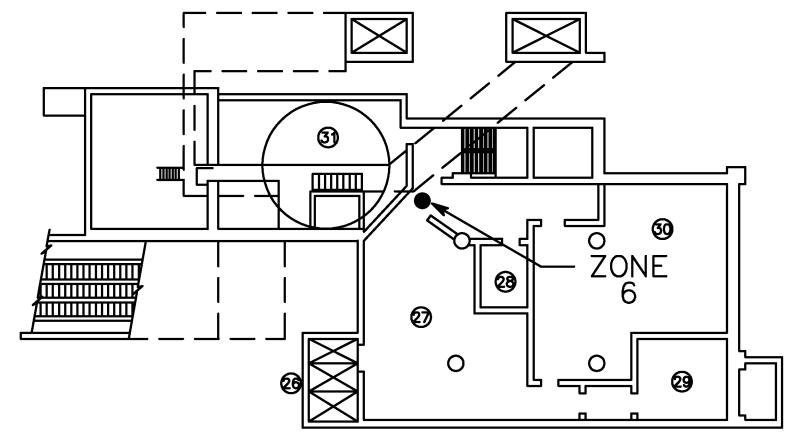
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DRAWN <u>NDL</u> <u>5-00</u> DATE	NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION	UE&C URBAN SERVICES GIBBS & HILL TRANSPORTATION DIVISION WASHINGTON, D.C.		SCALE NONE	DRAWING NO. WH-3
CHECKED _____ DATE			2-92	FL	CONFIGURATION UPDATED			REV-1	
APPROVED _____ DATE						SUBMITTED _____			

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED <u>JRR</u> <u>8-00</u> DATE	REFERENCE DRAWINGS		REVISIONS			WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY		TYPICAL EXAMPLE OF KIOSK DATA FILES	
DRAWN <u>JMR</u> <u>8-00</u> DATE	NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION	DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF SYSTEMS		SCALE NONE	DRAWING NO. ST-CM-KCS-015
CHECKED _____ DATE			08/2001	SYSP	Revised and issued by the Authority			REV-1	
APPROVED _____ DATE						SUBMITTED _____			
UPDATED _____ DATE						APPROVED <u>[Signature]</u> <u>May 3, 2001</u> DIRECTOR DATE			

ZONE SCHEDULE			
ZONE	LOCATION	ZONE	LOCATION
1	PLATFORM (NORTH, CORRIDOR)	7	KIOSK
2	PLATFORM (NORTH, STAIRWAY)	8	MEZZANINE SERVICE ROOMS
3	PLATFORM (CART STORAGE ROOM)	9	MECHANICAL EQUIPMENT PIT
4	PLATFORM (VAULT O.B.)	10	SPARE
5	PLATFORM (NORTH, VAULT I.B.)	11	AFC
6	CHILLER PLANT, EXHAUST & EMERGENCY ACCESS DOOR		

ROOM SCHEDULE	
ROOM NO.	DESCRIPTION
1	KIOSK
2	TRAIN CONTROL ROOM
3	COMMUNICATIONS ROOM
4	ELECTRICAL PANEL ROOM
5	ELEVATOR
6	ESCALATOR VAULT
7	DISPATCHER'S ROOM
8	OPERATIONS ROOM
9	FIRE EQUIPMENT ROOM
10	ELECTRICAL VAULT ROOM
11	DISPATCHER'S ROOM
12	FIRE EQUIPMENT ROOM
13	OPERATIONS ROOM
14	ELECTRICAL VAULT ROOM
15	MECHANICAL EQUIPMENT PIT
16	ESCALATOR VAULT
17	ELEVATOR MACHINE ROOM
18	ELEVATOR
19	MEN'S TOILET
20	WOMEN'S TOILET
21	FIRE EQUIPMENT ROOM
22	CLEANERS & WATER SERV. RM.
23	ELECTRICAL ROOM
24	FUTURE ESCALATOR
25	EMERGENCY ACCESS DOOR
26	FAN EXHAUST
27	CHILLER ROOM
28	BATTERY ROOM
29	FAN ROOM
30	A.C. SWITCHBOARD ROOM
31	REEDIE DRIVE VENT SHAFT

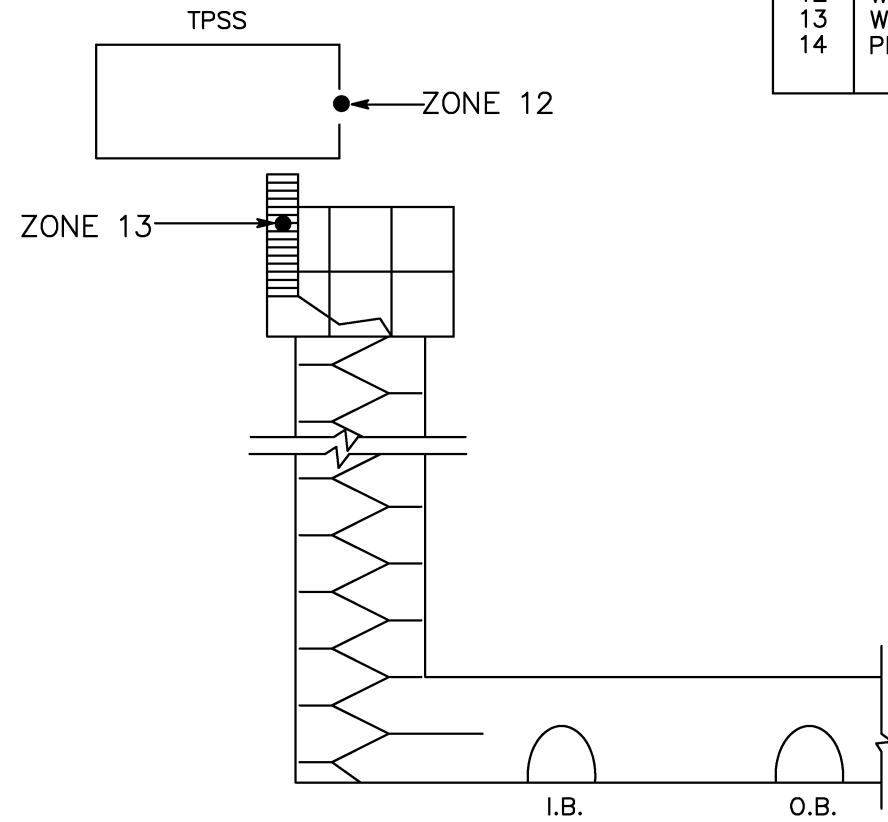


DESIGNED <u>Miyako</u> 12-80	REFERENCE DRAWINGS	REVISIONS	WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY UE&C URBAN SERVICES GIBBS & HILL TRANSPORTATION DIVISION WASHINGTON, D.C. SUBMITTED _____	KIOSK DATA FILE WHEATON INTRUSION ZONES SCALE NONE DRAWING NO. WH-4 REV-1
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APPROVED _____				

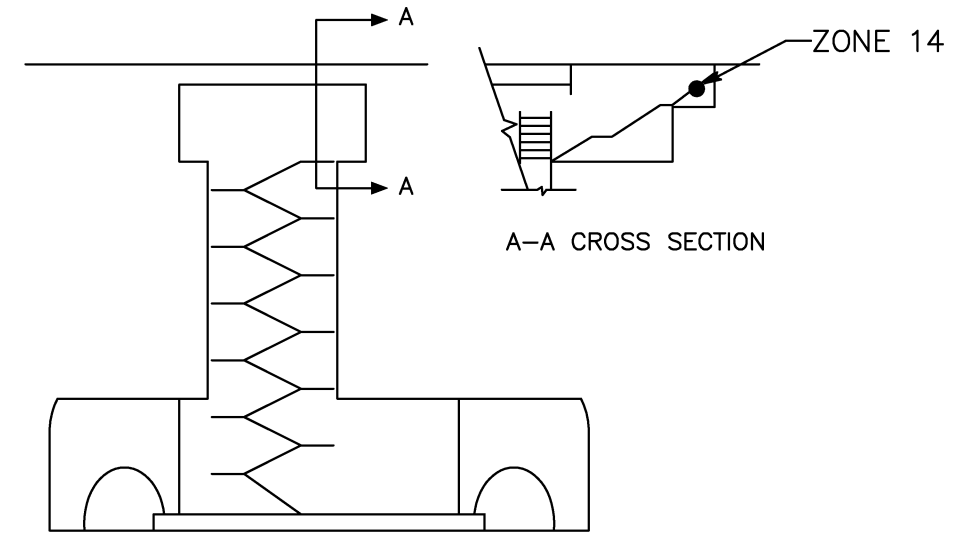
This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED <u>JRR</u> 6-00	REFERENCE DRAWINGS	REVISIONS	WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF SYSTEMS SUBMITTED _____ DATE _____	TYPICAL EXAMPLE OF KIOSK DATA FILES SCALE NONE DRAWING NO. ST-CM-KCS-016
DRAWN <u>JMR</u> 6-00	NUMBER DESCRIPTION DATE BY DESCRIPTION	08/2001 SYSP Revised and issued by the Authority		
CHECKED _____				
APPROVED _____				
UPDATED _____			APPROVED <u>[Signature]</u> May 3, 2001 DIRECTOR DATE	

ZONE SCHEDULE	
ZONE	LOCATION
12	WINDHAM LANE TPSS
13	WINDHAM LANE FAN SHAFT B-7
14	PRICHARD ROAD VENT SHAFT B-12



WINDHAM LANE FAN SHAFT

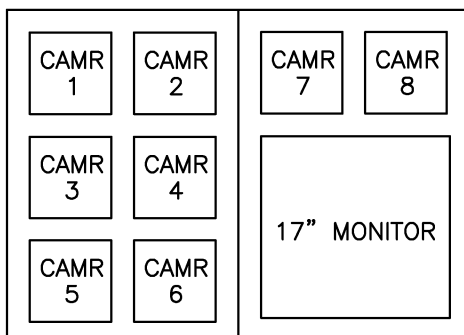


PRICHARD ROAD VENT SHAFT

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

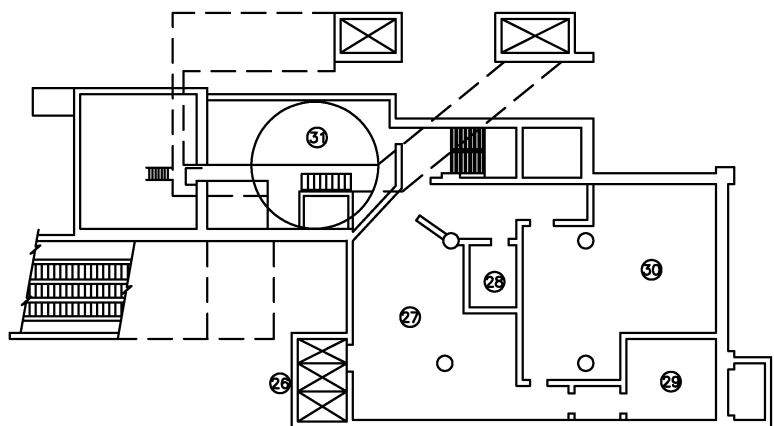
DESIGNED <u>JRR</u> 6-00 DATE	<table border="1"> <thead> <tr> <th colspan="2">REFERENCE DRAWINGS</th> <th colspan="3">REVISIONS</th> </tr> <tr> <th>NUMBER</th> <th>DESCRIPTION</th> <th>DATE</th> <th>BY</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>08/2001</td> <td>SYSP</td> <td>Revised and issued by the Authority</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	REFERENCE DRAWINGS		REVISIONS			NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION			08/2001	SYSP	Revised and issued by the Authority											WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF SYSTEMS		TYPICAL EXAMPLE OF KIOSK DATA FILES	
REFERENCE DRAWINGS		REVISIONS																												
NUMBER		DESCRIPTION	DATE	BY	DESCRIPTION																									
			08/2001	SYSP	Revised and issued by the Authority																									
DRAWN <u>JMR</u> 6-00 DATE	SUBMITTED _____ DATE _____		APPROVED <u>[Signature]</u> May 3, 2001 DIRECTOR DATE		SCALE NONE	DRAWING NO. ST-CM-KCS-018																								
CHECKED _____ DATE																														
APPROVED _____ DATE																														
UPDATED _____ DATE																														

KIOSK MONITOR

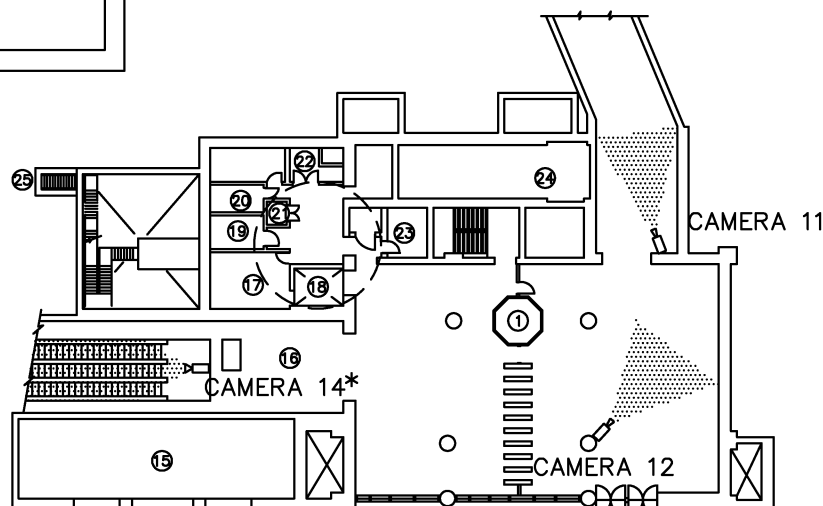


NOTE:
CAMERAS NOT SHOWN ON
INDIVIDUAL MONITORS APPEAR
ON 17-INCH MONITOR VIA
SEQUENTIAL SWITCHER.

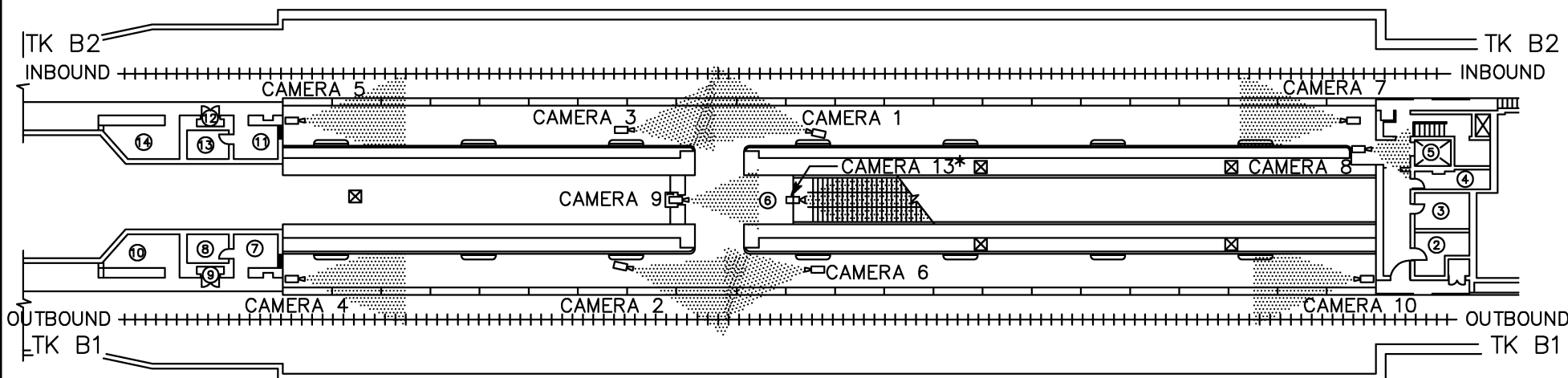
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ROOM NO.	DESCRIPTION
1	KIOSK
2	TRAIN CONTROL ROOM
3	COMMUNICATIONS ROOM
4	ELECTRICAL PANEL ROOM
5	ELEVATOR
6	ESCALATOR VAULT
7	DISPATCHER'S ROOM
8	OPERATIONS ROOM
9	FIRE EQUIPMENT ROOM
10	ELECTRICAL VAULT ROOM
11	DISPATCHER'S ROOM
12	FIRE EQUIPMENT ROOM
13	OPERATIONS ROOM
14	ELECTRICAL VAULT ROOM
15	MECHANICAL EQUIPMENT PIT
16	ESCALATOR VAULT
17	ELEVATOR MACHINE ROOM
18	ELEVATOR
19	MEN'S TOILET
20	WOMEN'S TOILET
21	FIRE EQUIPMENT ROOM
22	CLEANERS & WATER SERV. RM.
23	ELECTRICAL ROOM
24	FUTURE ESCALATOR
25	EMERGENCY ACCESS DOOR
26	FAN EXHAUST
27	CHILLER ROOM
28	BATTERY ROOM
29	FAN ROOM
30	A.C. SWITCHBOARD ROOM
31	REEDIE DRIVE VENT SHAFT



SERVICE LEVEL



MEZZANINE LEVEL



PLATFORM LEVEL

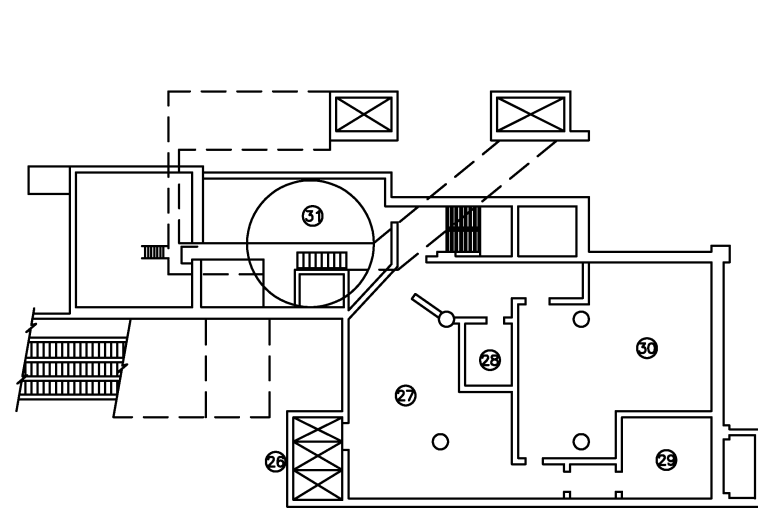
* TO BE INSTALLED UNDER
CONTRACT 1Z402L JANUARY
1994.

DESIGNED <u>MIYAKO</u> <u>12-90</u> DATE	REFERENCE DRAWINGS	REVISIONS	WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY UE&C URBAN SERVICES GIBBS & HILL TRANSPORTATION DIVISION WASHINGTON, D.C. SUBMITTED _____	KIOSK DATA FILE WHEATON CCTV
DRAWN <u>NLI</u> <u>6-93</u> DATE	NUMBER DESCRIPTION	DATE BY DESCRIPTION		
CHECKED _____ DATE				SCALE NONE
APPROVED _____ DATE				DRAWING NO. WH-7
				REV-1

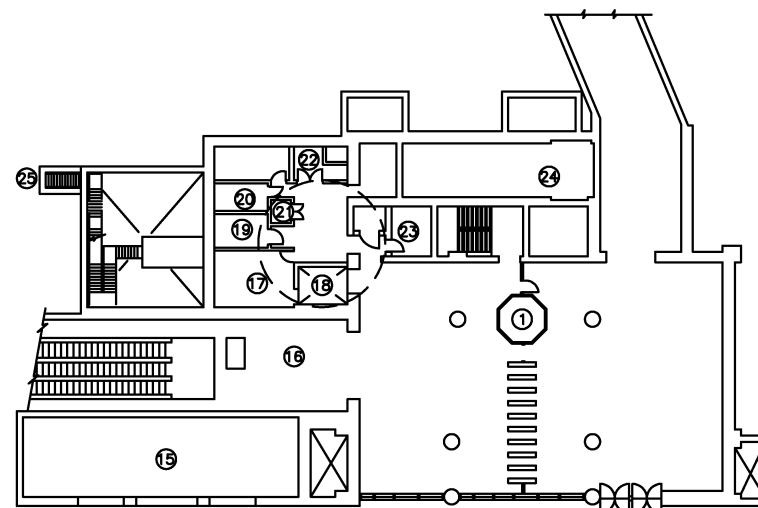
This Drawing Reflects a WMATA
standard design approach.
Project specific drawings must be
developed by the Contractor
which reflect this Design Philosophy

DESIGNED <u>JRR</u> <u>6-00</u> DATE	REFERENCE DRAWINGS	REVISIONS	WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF SYSTEMS SUBMITTED _____ DATE _____	TYPICAL EXAMPLE OF KIOSK DATA FILES
DRAWN <u>JMR</u> <u>6-00</u> DATE	NUMBER DESCRIPTION	DATE BY DESCRIPTION		
CHECKED _____ DATE				SCALE NONE
APPROVED _____ DATE				DRAWING NO. ST-CM-KCS-019
UPDATED _____ DATE				

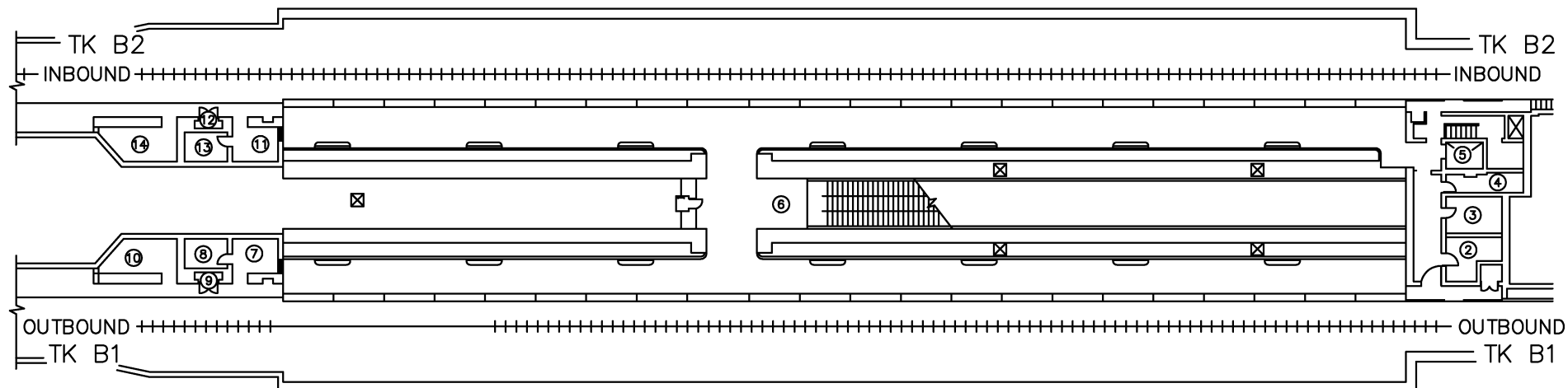
LEGEND:
 ESCALATOR NUMBER



SERVICE LEVEL




MEZZANINE LEVEL



PLATFORM LEVEL

ROOM SCHEDULE	
ROOM NO.	DESCRIPTION
1	KIOSK
2	TRAIN CONTROL ROOM
3	COMMUNICATIONS ROOM
4	ELECTRICAL PANEL ROOM
5	ELEVATOR
6	ESCALATOR VAULT
7	DISPATCHER'S ROOM
8	OPERATIONS ROOM
9	FIRE EQUIPMENT ROOM
10	ELECTRICAL VAULT ROOM
11	DISPATCHER'S ROOM
12	FIRE EQUIPMENT ROOM
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15	MECHANICAL EQUIPMENT PIT
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24	FUTURE ESCALATOR
25	EMERGENCY ACCESS DOOR
26	FAN EXHAUST
27	CHILLER ROOM
28	BATTERY ROOM
29	FAN ROOM
30	A.C. SWITCHBOARD ROOM
31	REEDIE DRIVE VENT SHAFT

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

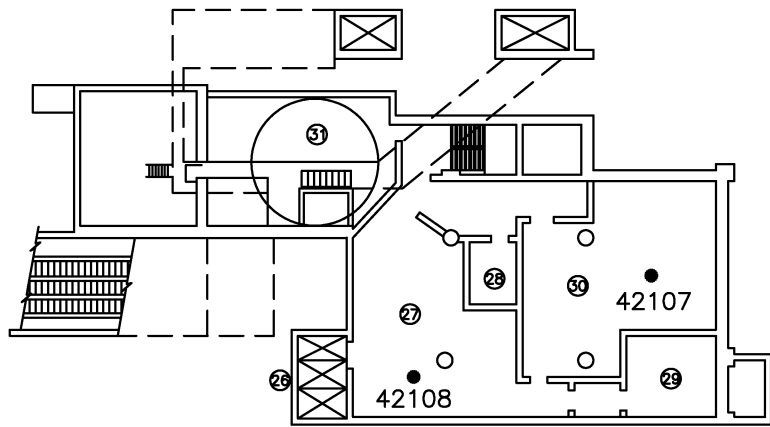
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NUMBER		DESCRIPTION	DATE	BY																			
			08/2001	SYSP																			
DRAWN JMR 6-00 DATE																							
CHECKED _____ DATE																							
APPROVED _____ DATE																							
UPDATED _____ DATE																							

WHEATON PARKING GARAGE EXT.	
ELEVATOR CAB #1	42200
ELEVATOR CAB #2	42201
ELECTRICAL & ELEVATOR MACHINE ROOM	42202

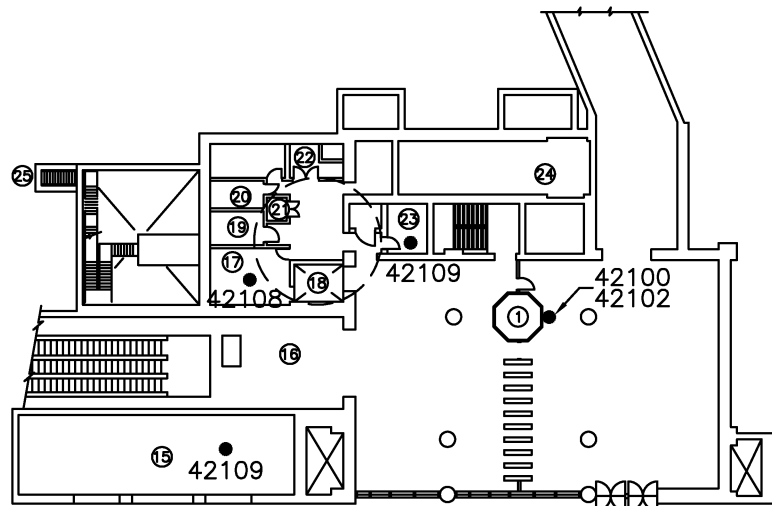
LEGEND:

- WAYSIDE TELEPHONE
- ☒ EMERGENCY TRIP STATION TELEPHONE

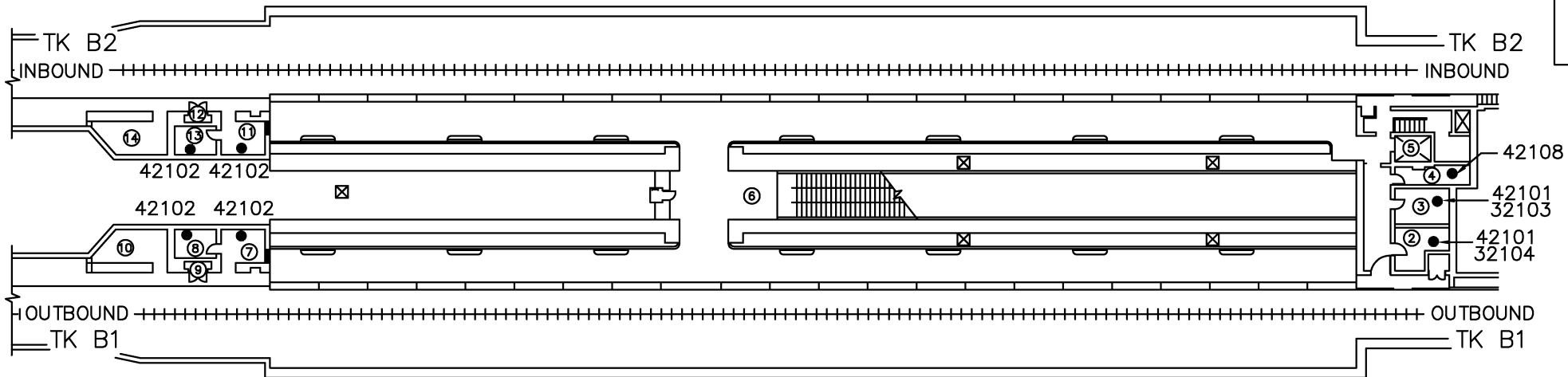
ROOM SCHEDULE	
ROOM NO.	DESCRIPTION
1	KIOSK
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SERVICE LEVEL



MEZZANINE LEVEL

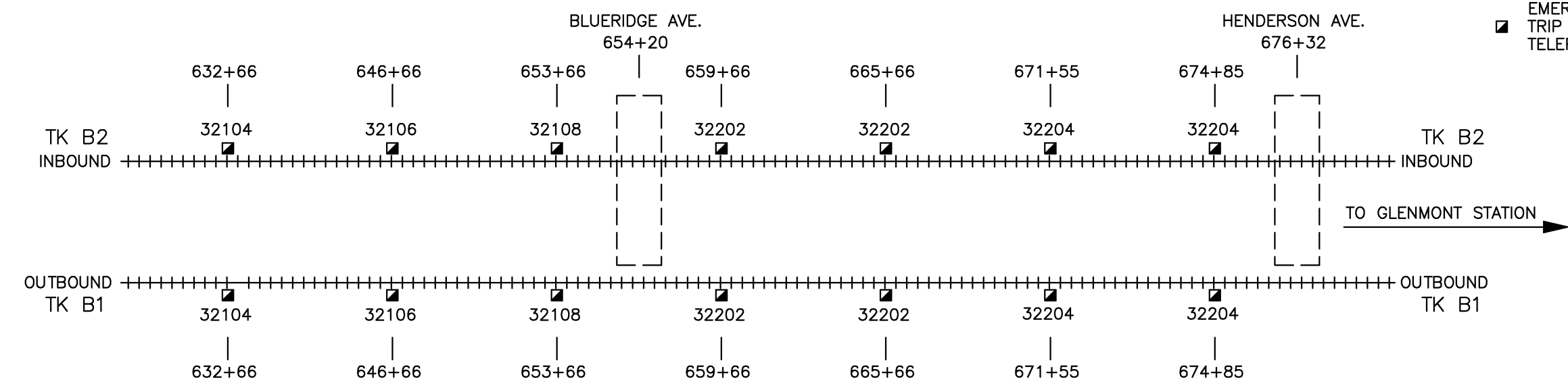
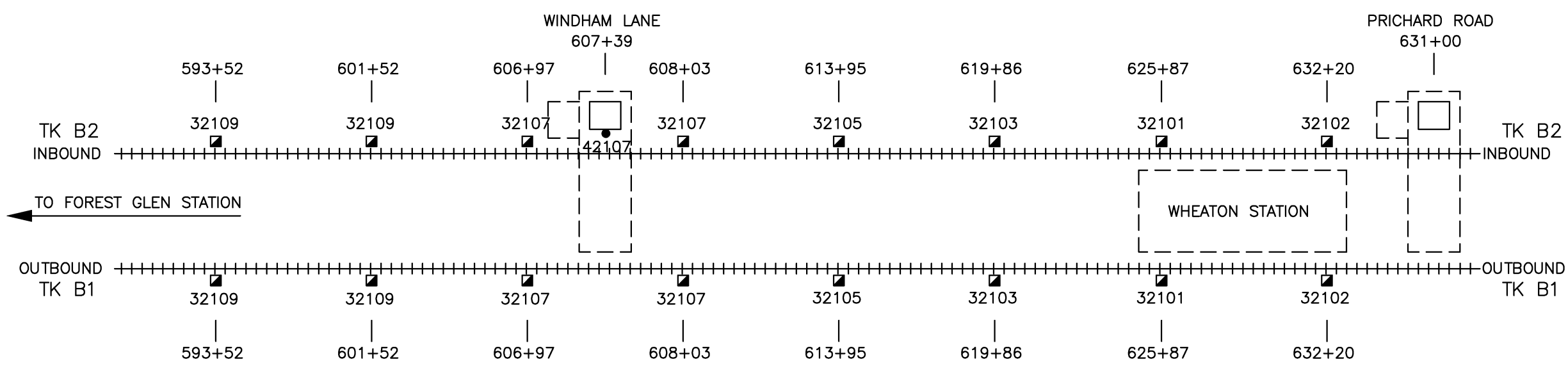


PLATFORM LEVEL

DESIGNED FL 5-83	REFERENCE DRAWINGS	REVISIONS	WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY		KIOSK DATA FILE WHEATON TELEPHONE LOCATIONS AND NUMBERS
DRAWN NDL 5-83	NUMBER DESCRIPTION	DATE BY DESCRIPTION	UE&C URBAN SERVICES GIBBS & HILL TRANSPORTATION DIVISION WASHINGTON, D.C.	SUBMITTED _____	
CHECKED _____					SCALE NONE
APPROVED _____					DRAWING NO. WH-9
					REV-1

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED JBR 5-00	REFERENCE DRAWINGS	REVISIONS	WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY		TYPICAL EXAMPLE OF KIOSK DATA FILES
DRAWN JMR 5-00	NUMBER DESCRIPTION	DATE BY DESCRIPTION	DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF SYSTEMS		
CHECKED _____				SUBMITTED _____	SCALE NONE
APPROVED _____				APPROVED DIRECTOR <i>[Signature]</i> May 3, 2001	DRAWING NO. ST-CM-KCS-021
UPDATED _____				DATE _____	



- LEGEND:
- WAYSIDE TELEPHONE
 - EMERGENCY TRIP STATION TELEPHONE

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	JRR	6-00
		DATE
DRAWN	JMR	6-00
		DATE
CHECKED		DATE
APPROVED		DATE
UPDATED		DATE

REFERENCE DRAWINGS	
NUMBER	DESCRIPTION

REVISIONS		
DATE	BY	DESCRIPTION
08/2001	SYSP	Revised and issued by the Authority

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

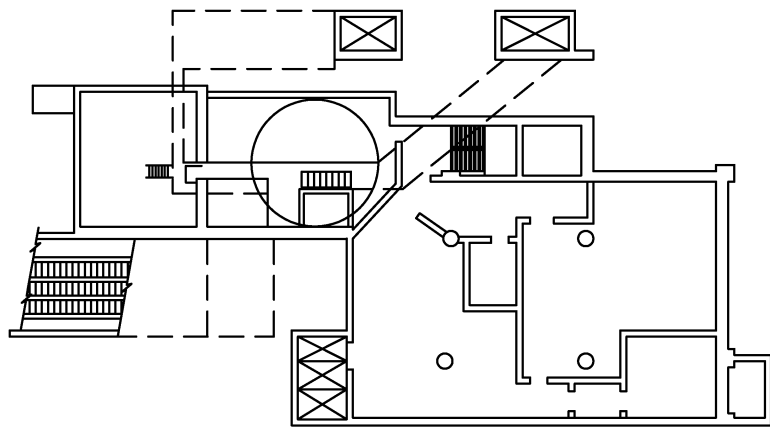
DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____

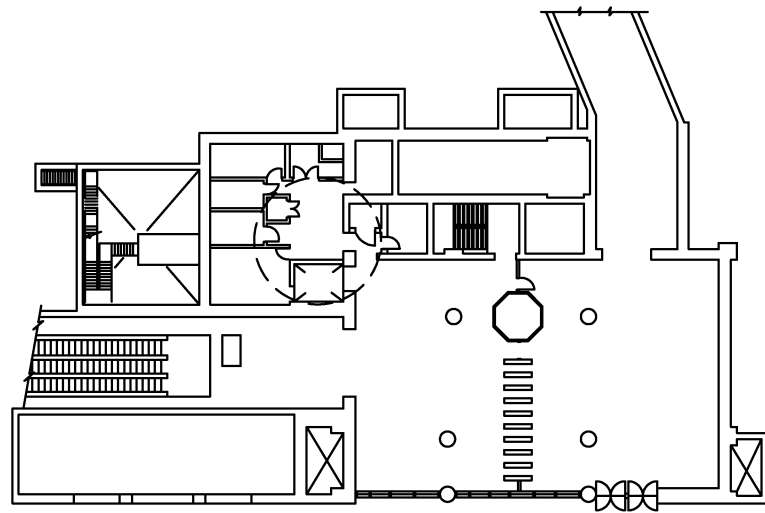
APPROVED *[Signature]* DATE May 3, 2001

DIRECTOR

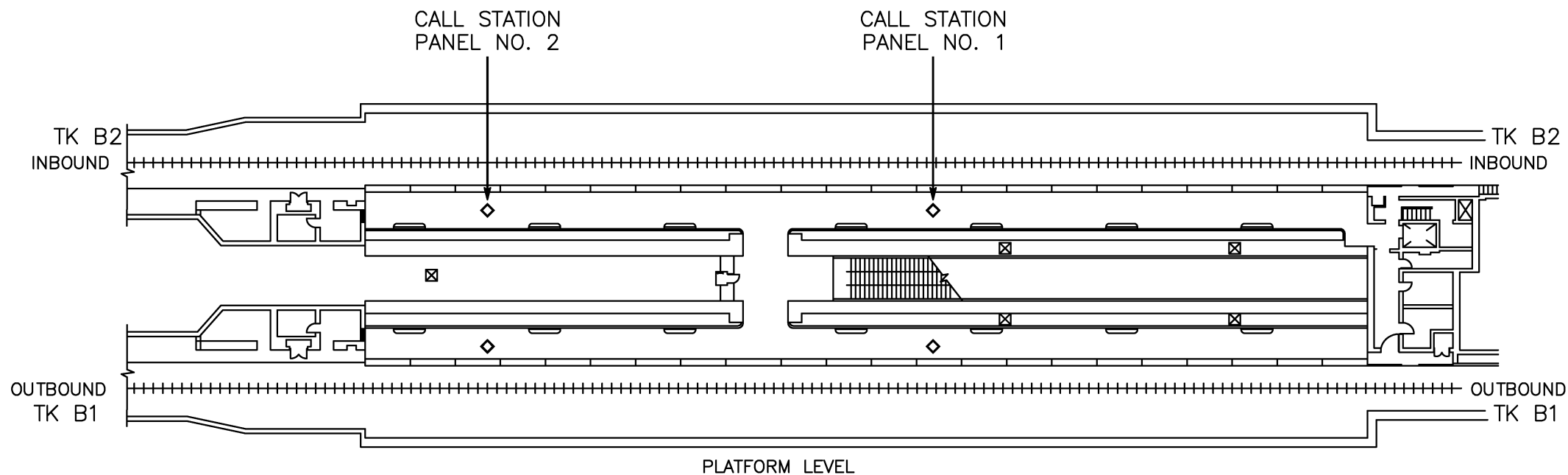
TYPICAL EXAMPLE OF KIOSK DATA FILES	
SCALE NONE	DRAWING NO. ST-CM-KCS-022



SERVICE LEVEL



MEZZANINE LEVEL



PLATFORM LEVEL

DESIGNED <u>FL</u>	DATE <u>5-93</u>	REFERENCE DRAWINGS		REVISIONS			WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY		KIOSK DATA FILE WHEATON PERS CALL STATION LOCATIONS	
DRAWN <u>NDL</u>	DATE <u>5-93</u>	NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION	UE&C URBAN SERVICES GIBBS & HILL TRANSPORTATION DIVISION WASHINGTON, D.C.		SCALE NONE	DRAWING NO. WH-11
CHECKED _____	DATE _____			5-93	FL	CONFIGURATION UPDATED	SUBMITTED _____			REV-1
APPROVED _____	DATE _____									

DESIGNED <u>JRR</u>	DATE <u>8-00</u>	REFERENCE DRAWINGS		REVISIONS			WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY		TYPICAL EXAMPLE OF KIOSK DATA FILES	
DRAWN <u>JMR</u>	DATE <u>8-00</u>	NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION	DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF SYSTEMS		SCALE NONE	DRAWING NO. ST-CM-KCS-023
CHECKED _____	DATE _____			08/2001	SYSP	Revised and issued by the Authority	SUBMITTED _____			
APPROVED _____	DATE _____						APPROVED <i>[Signature]</i> <u>May 3, 2001</u>			
UPDATED _____	DATE _____						DATE _____			

FILE NO.	DRAWING NO.	TITLE
<u>KEY PLAN AND INDEX OF DRAWINGS</u>		
		COVER
MXXXX-XX	COMMCSI-KPI-1	KEY PLAN
MXXXX-XX	COMMCSI-KPI-2	INDEX OF DRAWINGS
MXXXX-XX	COMMCSI-KPI-3	INDEX OF DRAWINGS
MXXXX-XX	COMMCSI-KPI-4	GENERAL NOTES, SYMBOLS, ABBREVIATIONS
<u>GENERALS</u>		
MXXXX-XX	COMMCSI-GEN-17	TYPICAL EQUIPMENT RACKS & CABINET GROUNDING DETAILS
MXXXX-XX	COMMCSI-GEN-18	TYPICAL SHIELD AND GROUND SCHEME FOR COMMUNICATIONS CABLES
MXXXX-XX	COMMCSI-GEN-19	TYPICAL PASSENGER STATION MDF CABINET
<u>PUBLIC ADDRESS SYSTEM</u>		
MXXXX-XX	COMMCSI-PA-1	SYSTEM DIAGRAM SH. 1
MXXXX-XX	COMMCSI-PA-2	SYSTEM DIAGRAM SH. 2
MXXXX-XX	COMMCSI-PA-3	SYSTEM DIAGRAM SH. 3
<u>PASSENGER STATION CLOSED CIRCUIT TELEVISION SYSTEM</u>		
MXXXX-XX	COMMCSI-CCTV-1	TYPICAL BLOCK DIAGRAM
MXXXX-XX	COMMCSI-CCTV-2	TEST/PATCH PANEL DETAILS

FILE NO.	DRAWING NO.	TITLE
<u>PASSENGER STATION FIRE AND INTRUSION ALARM SYSTEM</u>		
MXXXX-XX	COMMCSI-FIA-1	TYPICAL FIA SYSTEM BLOCK DIAGRAM
MXXXX-XX	COMMCSI-FIA-2	TYPICAL FIA SYSTEM PICTORIAL WIRING DIAGRAM
MXXXX-XX	COMMCSI-FIA-3	TYPICAL FIA SCHEMATIC OF INTERFACES
MXXXX-XX	COMMCSI-FIA-4	TYPICAL FIA SCHEMATIC OF FIA INTERFACES
MXXXX-XX	COMMCSI-FIA-5	TYPICAL CONFIGURATIONS OF REMOTE ANCILLARY BUILDINGS
MXXXX-XX	COMMCSI-FIA-6	TYPICAL FIA DETECTOR CONFIGURATIONS IN FIRE AND INTRUSION ZONES
MXXXX-XX	COMMCSI-FIA-7	TYPICAL FIA SCHEMATIC CONFIGURATIONS FOR FIRE AND INTRUSION ALARMS
MXXXX-XX	COMMCSI-FIA-8	TYPICAL FIA FAN SHUT DOWN INTERFACE CONFIGURATIONS
MXXXX-XX	COMMCSI-FIA-9	TYPICAL FIA FA/FAN SHUT DOWN INTERFACE BOX
MXXXX-XX	COMMCSI-FIA-10	TYPICAL FIA DISTRIBUTION FRAME LAYOUT
MXXXX-XX	COMMCSI-FIA-11	TYPICAL FIA DUCT DETECTOR INSTALLATION DETAILS
MXXXX-XX	COMMCSI-FIA-12	TEMPORARY FIA SYSTEM
<u>CARRIER TRANSMISSION SYSTEM</u>		
MXXXX-XX	COMMCSI-CTS-1	TYPICAL CTS BLOCK DIAGRAM FOR OC-1 FIBER OPTIC SYSTEM
MXXXX-XX	COMMCSI-CTS-2	TYPICAL CTS BLOCK DIAGRAM FOR OC-3 FIBER OPTIC SYSTEM
<u>FIBER OPTIC SYSTEM</u>		
MXXXX-XX	COMMCSI-FOS-1	TYPICAL FIBER OPTIC SYSTEM OC-1 BLOCK DIAGRAM
MXXXX-XX	COMMCSI-FOS-2	TYPICAL FIBER OPTIC SYSTEM OC-3 BLOCK DIAGRAM

FILE NO.	DRAWING NO.	TITLE
<u>PASSENGER STATION TELEPHONE SYSTEM</u>		
MXXXX-XX	COMMCSI-TEL-1	TYPICAL TELEPHONE SYSTEM BLOCK DIAGRAM
MXXXX-XX	COMMCSI-TEL-2	TYPICAL CABLING DETAILS FOR TELEPHONE INSTRUMENTS ALONG RIGHT-OF-WAY
MXXXX-XX	COMMCSI-TEL-3	TYPICAL WALL MOUNTED TELEPHONE AND BOOTH INSTALLATION DETAILS
MXXXX-XX	COMMCSI-TEL-4	TYPICAL AUTOMATIC ENERGY MANAGEMENT SYSTEM (AEMS)
MXXXX-XX	COMMCSI-TEL-5	KEY TELEPHONE EQUIPMENT RACK LAYOUT
<u>PASSENGER EMERGENCY REPORTING SYSTEM</u>		
MXXXX-XX	COMMCSI-PERS-1	TYPICAL BLOCK DIAGRAM
MXXXX-XX	COMMCSI-PERS-2	KIOSK PERS CONTROL PANEL LAYOUT
MXXXX-XX	COMMCSI-PERS-3	KIOSK PERS CONTROL PANEL RESET WIRING DIAGRAM
MXXXX-XX	COMMCSI-PERS-4	TYPICAL CALL STATION PANEL
MXXXX-XX	COMMCSI-PERS-5	PERS CALL STATION PANEL MOUNTING BRACKET
MXXXX-XX	COMMCSI-PERS-6	TYPICAL CALL STATION PANEL SCHEMATIC
MXXXX-XX	COMMCSI-PERS-7	TYPICAL CALL STATION PANEL INSTALLATION DETAILS
MXXXX-XX	COMMCSI-PERS-8	PERS CALL STATION PANEL INSTALLATION DETAILS
MXXXX-XX	COMMCSI-PERS-9	PERS/APAAS STATION EQUIPMENT ROOM RACK LAYOUT
MXXXX-XX	COMMCSI-PERS-10	PAS/MUTING CIRCUITRY

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED JRR 6-DATE	REFERENCE DRAWINGS		REVISIONS		WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF SYSTEMS	INDEX OF DRAWINGS
DRAWN JMR 6-DATE	NUMBER	DESCRIPTION	DATE	BY		
CHECKED					Revised and issued by the Authority	
APPROVED						
UPDATED						

SUBMITTED _____ DATE _____ APPROVED DIRECTOR *[Signature]* May 3, 2001 DATE

SCALE NONE DRAWING NO. ST-CM-KPI-002

ABBREVIATIONS

ADA	-	AUDIO DISTRIBUTION AMPLIFIER
AEMS	-	AUTOMATIC ENERGY MANAGEMENT SYSTEM
AFC	-	AUTOMATIC FARE COLLECTION
APAAS	-	AUTOMATIC PUBLIC ADDRESS ANNOUNCEMENT SYSTEM
ALC	-	AUTOMATIC LEVEL CONTROL
AMP	-	AMPLIFIER
AØ	-	POWER PHASE
ANC	-	ANCILLARY
ANS-VCA	-	AMBIENT NOISE SENSOR
AWG	-	AMERICAN WIRE GAUGE
CTS	-	CARRIER TRANSMISSION SYSTEM
CD	-	COMBINATION DETECTOR (FIXED TEMP./RATE OF RISE)
CDF	-	COMBINED DISTRIBUTION FRAME
CCTV	-	CLOSED CIRCUIT TELEVISION
COMPLIM	-	COMPRESSOR/LIMITER
DEQ	-	DIGITAL EQUALIZER
DTS	-	DATA TRANSMISSION SYSTEM
DS1	-	DIGITAL SIGNAL DESIGNATION FOR 1.544bps DATA RATE
DB	-	DISTRIBUTION (LINE TERMINAL) BLOCK
ETS	-	EMERGENCY TRIP STATION
EOL	-	END-OF-LINE
EG	-	EQUIPMENT GROUND
EIA	-	ELECTRONICS INDUSTRIES ASSOCIATION
FA	-	FIRE ALARM
FIA	-	FIRE AND INTRUSION ALARM
FIA/COMM	-	FIA/COMMUNICATIONS
FIA-DF	-	FIRE/INTRUSION ALARM-DISTRIBUTION FRAME
FIA/FAN	-	FIRE ALARM/FAN (SHUTDOWN)
FOS	-	FIBER OPTIC SYSTEM
FTD	-	FIXED TEMPERATURE DETECTOR
E&M SIGNALING	-	(TELEPHONE SWITCHING SYSTEMS) A TECHNIQUE FOR TRANSFORM INFORMATION BETWEEN A TRUNK CIRCUIT AND A SEPARATE SIGNALING CIRCUIT OVER LEADS DESIGNATED "E" AND "M". THE "M" LEAD TRANSMITS TO THE SIGNALING CIRCUIT AND THE "E" LEAD TRANSMITS TO THE TRUCK.
GETS	-	GARAGE EMERGENCY TELEPHONE SYSTEM
IAU	-	INTERROGATION ACCESS UNIT
ID	-	IONIZATION DETECTOR
KCS	-	KIOSK COMMUNICATION SYSTEM
K1	-	CALL INITIATION
K2	-	TALK/LISTEN CONTROL
JB	-	JUNCTION BOX
JGB	-	JACKSON GRAHAM BUILDING
LED	-	LIGHT EMITTING DIODE
LI-3	-	LINE INTERFACE UNIT, MODE 3
LSTPU	-	LIFE SAFETY TAPE PLAYBACK UNIT
MDF	-	MAIN DISTRIBUTION FRAME
MIC-ANS	-	AMBIENT NOISE SENSOR MICROPHONE
MICRF-1	-	WIRELESS MICROPHONE TRANSMITTER AND RECEIVER
MISC	-	MISCELLANEOUS
MRS	-	MOBILE RADIO SYSTEM
N.C.	-	NORMALLY CLOSED CONTACT
N.O.	-	NORMALLY OPEN CONTACT
N	-	NEUTRAL
OC-3	-	OPTICAL SIGNAL DESIGNATION FOR 155.52Mbps DATA RATE
OCC	-	OPERATION CONTROL CENTER
PA	-	PUBLIC ADDRESS
PAS	-	PUBLIC ADDRESS SYSTEM
P/O	-	PART OF
PB	-	PROTECTOR BLOCK
PERS	-	PASSENGER EMERGENCY REPORTING SYSTEM

PR	-	PAIRS IN CABLE
PROT	-	2 PAIR LINE PROTECTOR BLOCK
PTZ	-	PAN, TILT AND ZOOM
PLJ	-	PRIMARY LOCAL JURISDICTION
PTT	-	PUSH TO TALK
PWR	-	POWER DISTRIBUTION SYSTEM
RLU	-	RECEIVE LOGIC UNIT
RPTR	-	REPEATER (OFFICE)
RTU	-	REMOTE TERMINAL UNIT
SP	-	SPARE
STA.	-	STATION
SMADS	-	STATION MONITOR AND DISPLAY SYSTEM
TEL	-	STATION TELEPHONE SYSTEM
TPA	-	TRUNK PROCESSOR & ALARM UNIT
TB	-	TERMINAL BLOCK
TLU	-	TRANSMIT LOGIC UNIT
TYP.	-	TYPICAL
TC/COMM	-	TRAIN CONTROL/COMMUNICATIONS
T-1	-	TRANSMISSION LINE CARRYING DS1 SIGNAL
TS	-	TERMINAL STRIP
UN	-	UNASSIGNED
VOCALPR	-	VOICE PRE-AMP/PROCESSOR

FIA LEGENDS

INTRUSION DETECTORS

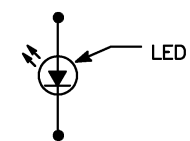
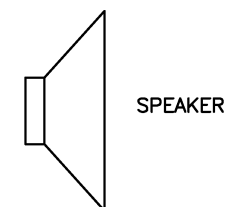
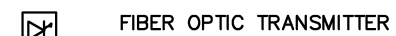
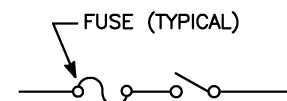
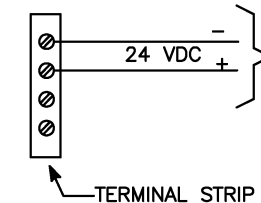
(P)	PUSHBUTTON
(M)	MAGNETIC
(KS)	KEY SWITCH
(F)	FOIL
(K)	RELAY ASSOCIATED WITH FOIL, LIMIT SWITCH OR TRIP WIRE
(S)	30 AWG TRIP WIRE
(L)	LIMIT SWITCH

FIRE DETECTORS

(I)	IONIZATION DETECTOR
(FT)	FIXED TEMPERATURE DETECTOR
()	DETECTOR WITH ANCILLARY CONTACTS
(FV)	FLOW VALVE
(D)	DUCT DETECTOR
(C)	COMBINATION DETECTOR
(MP)	MANUAL PULL STATION

SYMBOLS

	MULTILINE DESK TYPE TELEPHONE INSTRUMENT
	SINGLE LINE WALL MOUNTED TYPE TELEPHONE INSTRUMENT
	SINGLE LINE DESK TYPE TELEPHONE INSTRUMENT
	EMERGENCY TELEPHONE MOUNTED IN ETS ENCLOSURE
	EMERGENCY TELEPHONE
	RJ-11 TELEPHONE JACK



This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	JRR	DATE		REFERENCE DRAWINGS		REVISIONS	
DRAWN	JMR	DATE		NUMBER	DESCRIPTION	DATE	BY
CHECKED		DATE				08/2001	SYSP
APPROVED		DATE					Revised and issued by the Authority
UPDATED		DATE					

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____

APPROVED May 3, 2001
DIRECTOR DATE

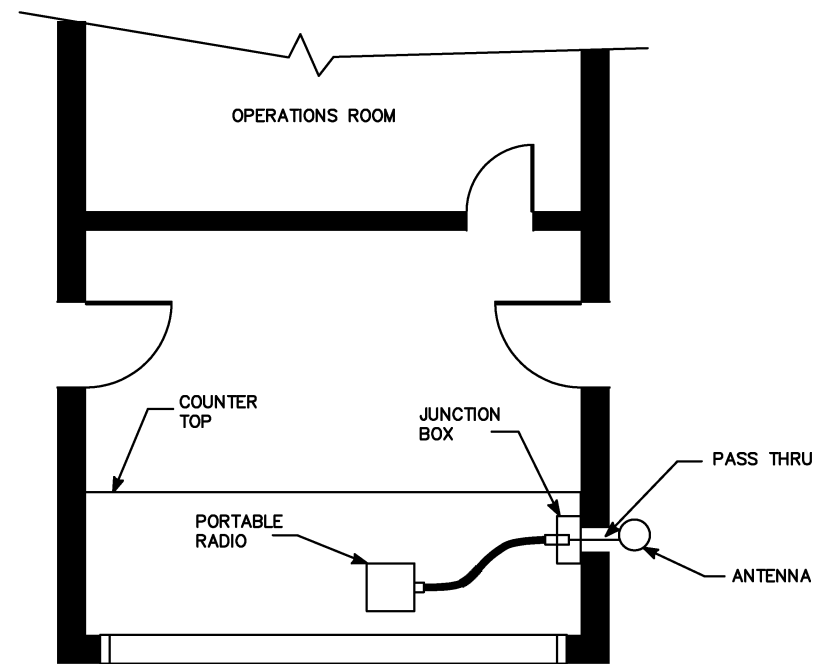
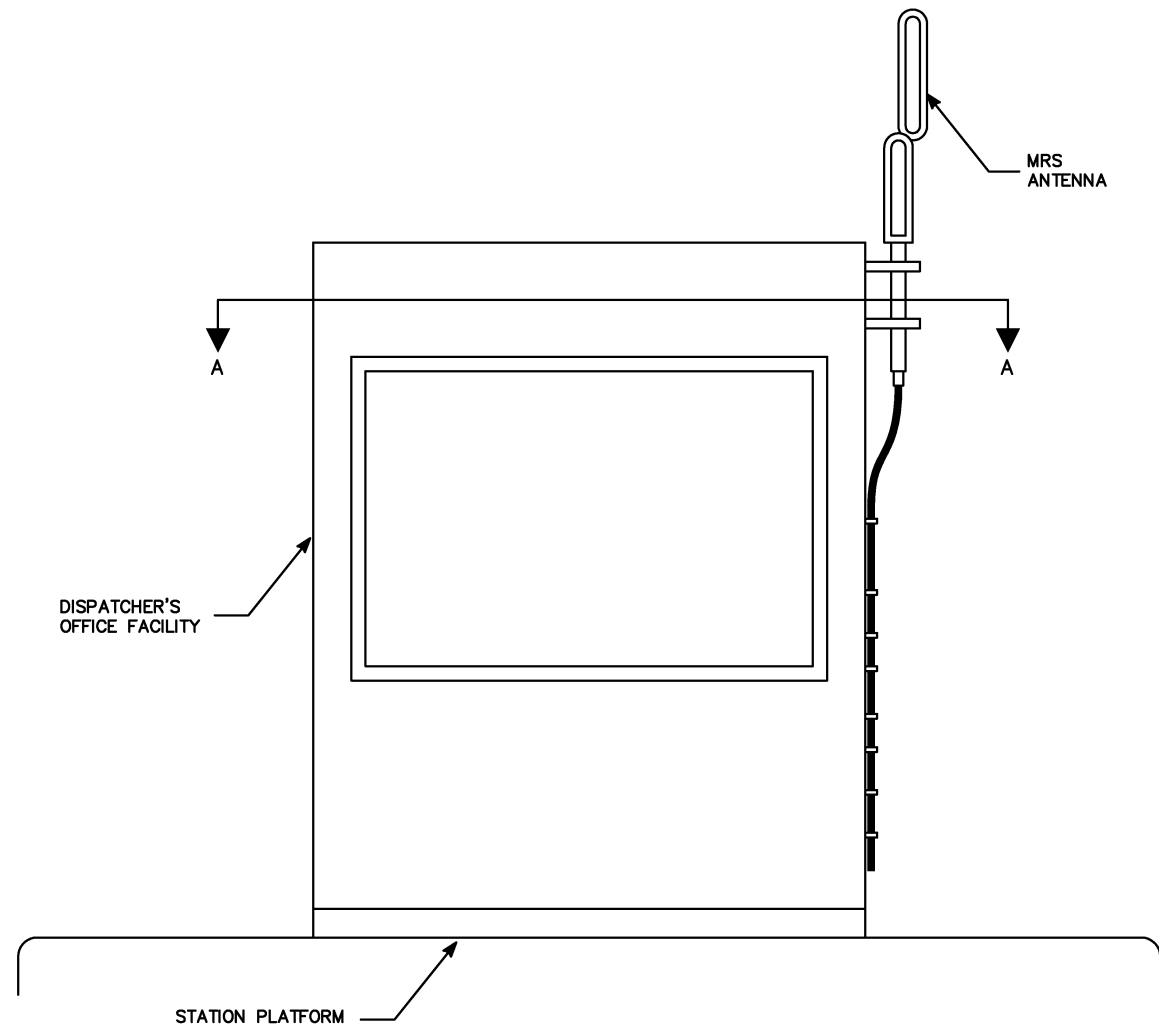
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DRAWING NO. ST-CM-KPI-004

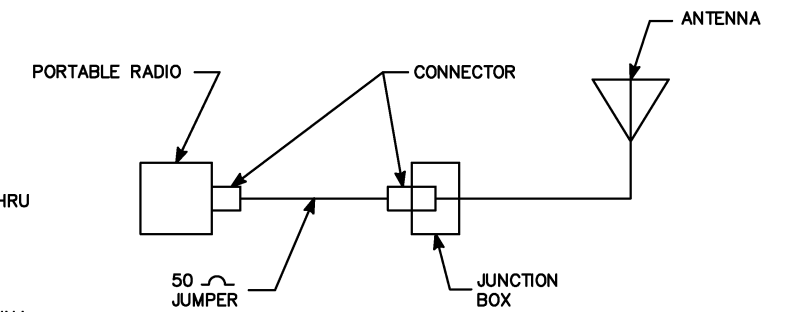
GENERAL NOTES, SYMBOLS, ABBREVIATIONS

NOTES:

1. INSTALLATION HEIGHT OF THE MRS ANTENNA TO BE APPROVED BY THE ENGINEER.
2. ANTENNA LEAD-IN CABLE TO BE SECURED TO DISPATCHER'S OFFICE WITH THE PROPER SIZE "C" CLAMPS, NO MORE THAN 8" APART.



SECTION AA



BLOCK DIAGRAM

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	JRR	1-00	REFERENCE DRAWINGS		REVISIONS		
			NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION
DRAWN	JMR	1-00			08/2001	SYSP	Revised and issued by the Authority
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OFFICE OF SYSTEMS

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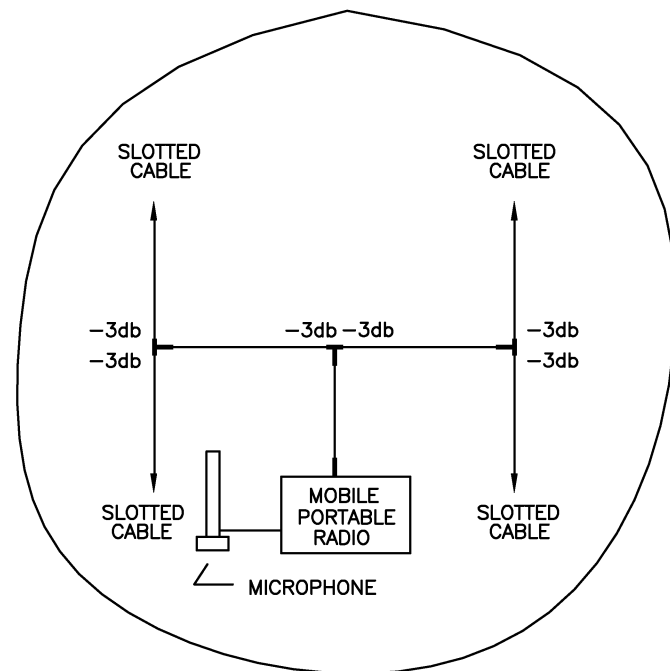
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TYPICAL END-OF-LINE DISPATCHER
MRS ABOVE GROUND INSTALLATION

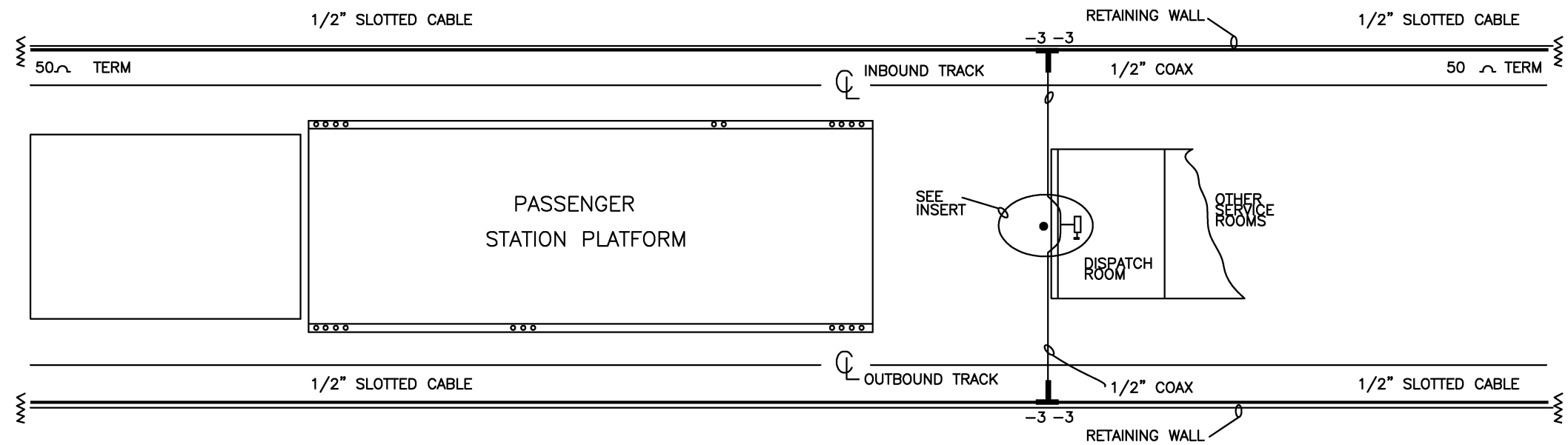
DRAWING NO.
ST-CM-MRS-001

NOTES:

1. THE CONTRACTOR SHALL MAINTAIN SUFFICIENT DISTANCE FROM THE SLOTTED CABLE SYSTEM USED FOR NORMAL MRS OPERATION IN THE COMMUNICATIONS EQUIPMENT ROOM (APPROXIMATELY 5 FEET OF SEPARATION).
2. THE 1/2" SLOTTED CABLE SHALL BE INSTALLED TO COVER ALL OF PASSENGER STATION LIMITS.



INSERT



This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	FJH	6-00
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DRAWN	JMR	6-00
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REFERENCE DRAWINGS	
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DATE	BY	SYSP	DESCRIPTION
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DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____ APPROVED DIRECTOR *[Signature]* May 3, 2001 DATE _____

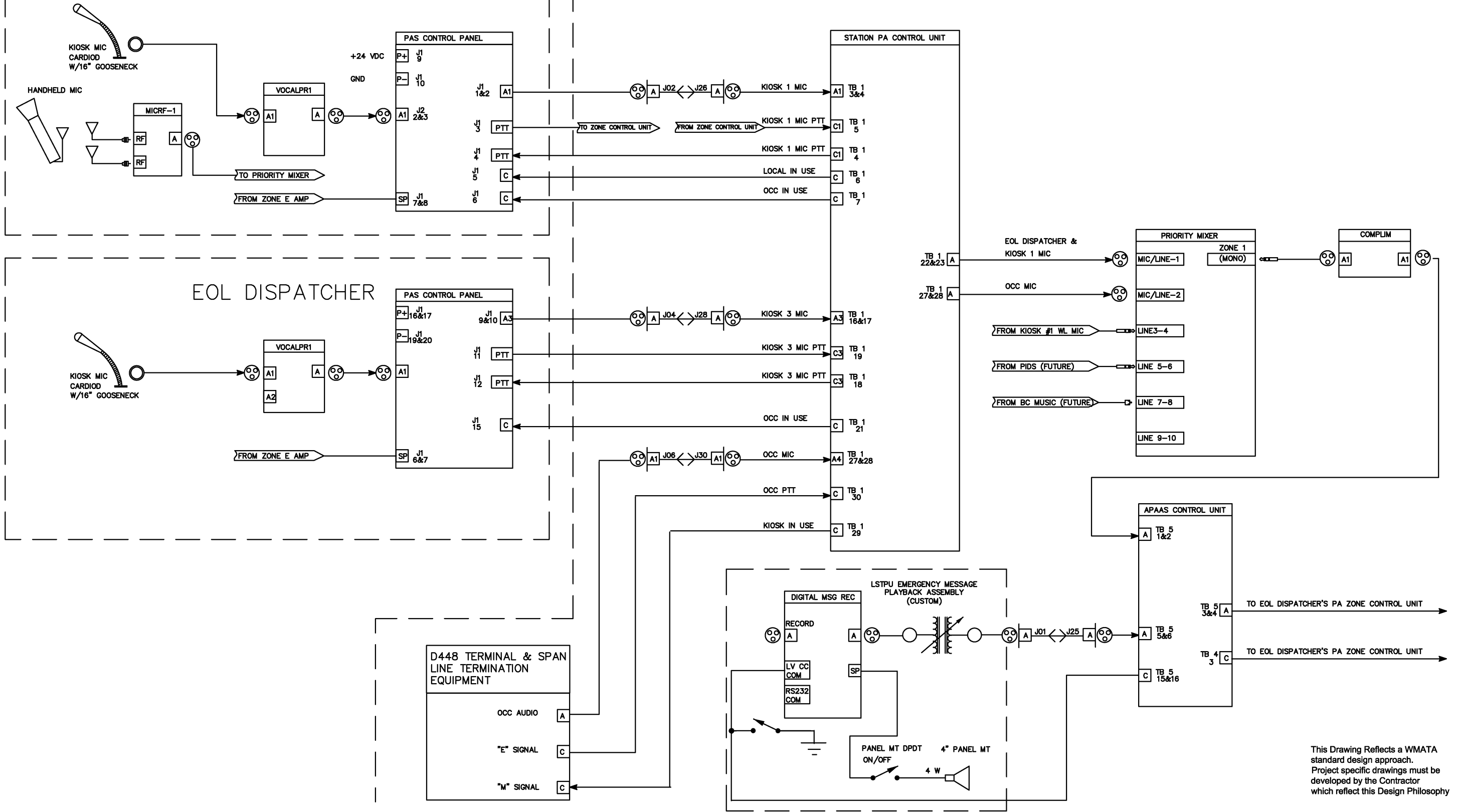
TYPICAL END-OF-LINE DISPATCHER MRS BELOW GROUND INSTALLATION

SCALE NONE DRAWING NO. ST-CM-MRS-002

COMMUNICATIONS EQUIPMENT ROOM

KIOSK

EOL DISPATCHER



MATCH LINE SYSTEM DIAGRAM SH. 2

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	JRR	4-00	REFERENCE DRAWINGS		REVISIONS	
DRAWN	JMR	4-00	NUMBER	DESCRIPTION	DATE	BY
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UPDATED						

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
 DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
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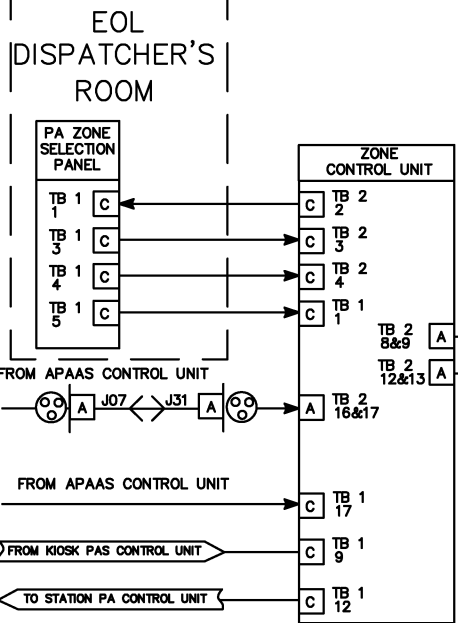
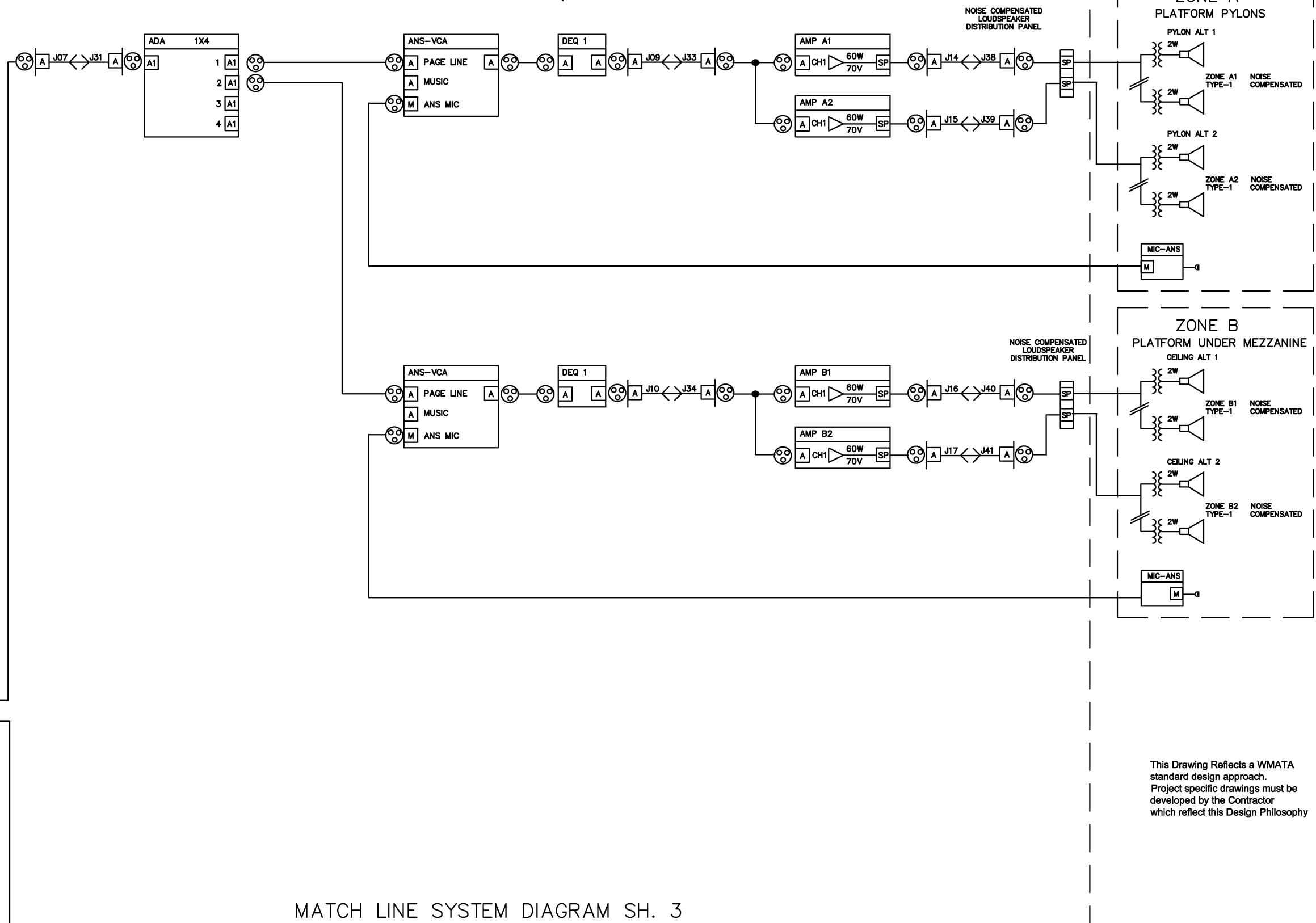
SUBMITTED _____ DATE _____ APPROVED _____ DATE May 3, 2001

SYSTEM DIAGRAM SH. 1

SCALE NONE DRAWING NO. ST-CM-PA-001

MATCH LINE SYSTEM DIAGRAM SH. 1

COMMUNICATIONS EQUIPMENT ROOM



MATCH LINE SYSTEM DIAGRAM SH. 3

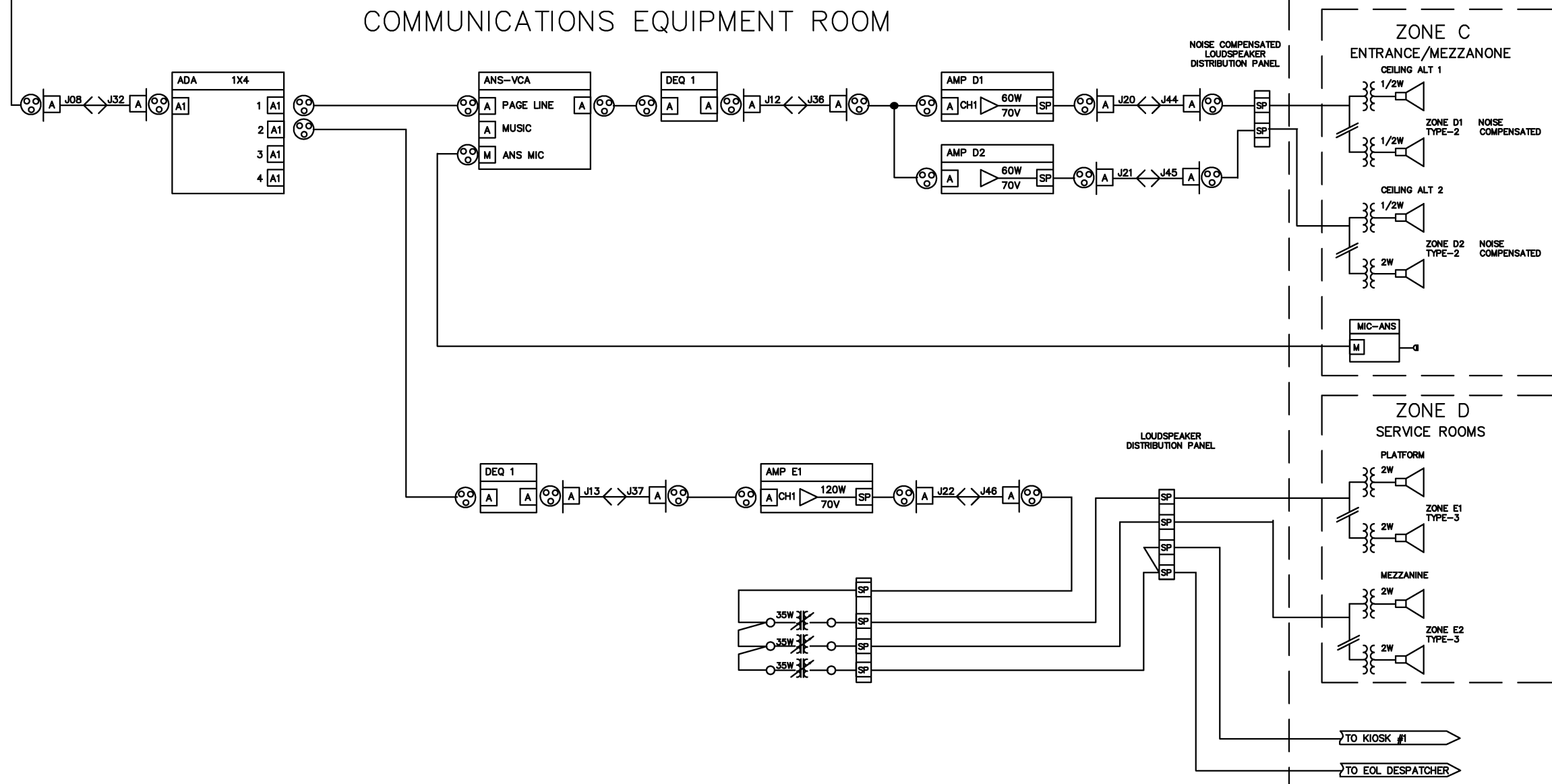
This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

SYSTEM DIAGRAM SH. 2

DESIGNED JRR DATE 1/08	REFERENCE DRAWINGS <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NUMBER</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	NUMBER	DESCRIPTION									REVISIONS <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>DATE</th> <th>BY</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>08/2001</td> <td>SYSP</td> <td>Revised and issued by the Authority</td> </tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	DATE	BY	DESCRIPTION	08/2001	SYSP	Revised and issued by the Authority										WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF SYSTEMS	DRAWING NO. ST-CM-PA-002
NUMBER	DESCRIPTION																												
DATE	BY	DESCRIPTION																											
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DRAWN JMR DATE 1/08	CHECKED DATE	APPROVED DATE	SUBMITTED DATE	APPROVED DIRECTOR <i>[Signature]</i> DATE May 3, 2001	SCALE NONE																								

MATCH LINE SYSTEM DIAGRAM SH. 2

COMMUNICATIONS EQUIPMENT ROOM



This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	DATE	REFERENCE DRAWINGS		REVISIONS		
		NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION
JRR	4-00			08/2001	SYSP	Revised and issued by the Authority
JMR	4-00					

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DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

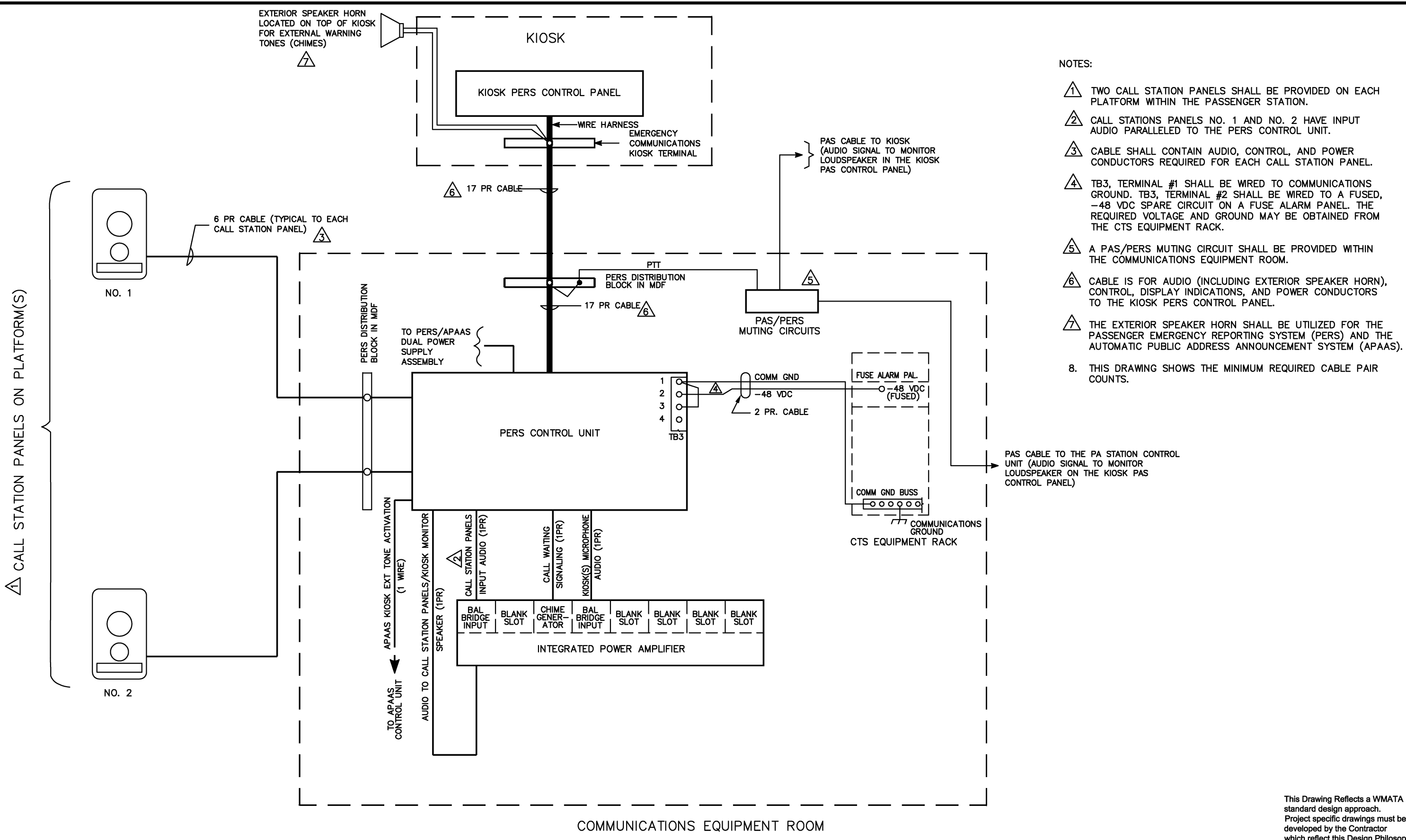
SUBMITTED _____ DATE _____

APPROVED *[Signature]* DATE May 3, 2001

SYSTEM DIAGRAM SH. 3

SCALE NONE

DRAWING NO. ST-CM-PA-003



DESIGNED	JRR	1-00
		DATE
DRAWN	JMR	1-00
		DATE
CHECKED		DATE
APPROVED		DATE
UPDATED		DATE

REFERENCE DRAWINGS	
NUMBER	DESCRIPTION

REVISIONS			
DATE	BY	SYSP	DESCRIPTION
08/2001			Revised and issued by the Authority

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DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____

APPROVED *[Signature]* DATE **May 3, 2001**

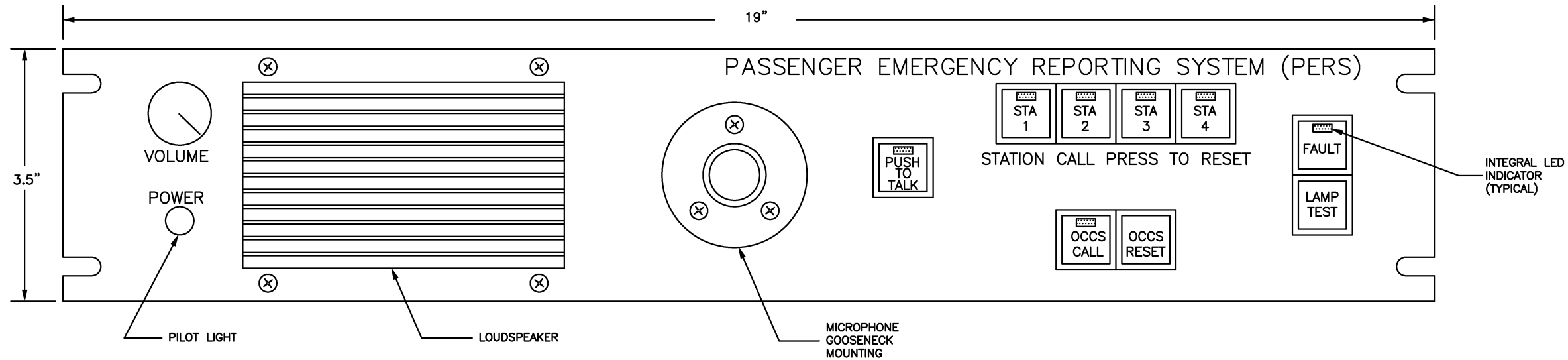
DIRECTOR

TYPICAL BLOCK DIAGRAM	
SCALE NONE	DRAWING NO. ST-CM-PERS-001

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NOTES:

1. THE "POWER" INDICATOR ILLUMINATES GREEN.
2. THE "FAULT" INDICATOR ILLUMINATES FLASHING AMBER WHEN ACTIVATED.
3. THE "LAMP TEST" AND "OCCS RESET" PUSHBUTTONS ARE WHITE (NON-ILLUMINATING).
4. THE "OCCS CALL" PUSHBUTTON AND EACH CALL STATION PUSHBUTTONS ARE WHITE WITH RED LED. THE "LAMP TEST" PUSHBUTTON TESTS ALL INDICATORS EXCEPT "POWER". THE CALL STATION PUSHBUTTONS ARE PUSH LOCK/PUSH RELEASE OPERATION. ALL OTHER PUSHBUTTONS ARE MOMENTARY OPERATION.
5. THIS DRAWING ILLUSTRATES THE APPROXIMATE LAYOUT OF THE KIOSK PERS CONTROL PANEL. THE ACTUAL CONFIGURATION OF THE PANEL MAY VARY.

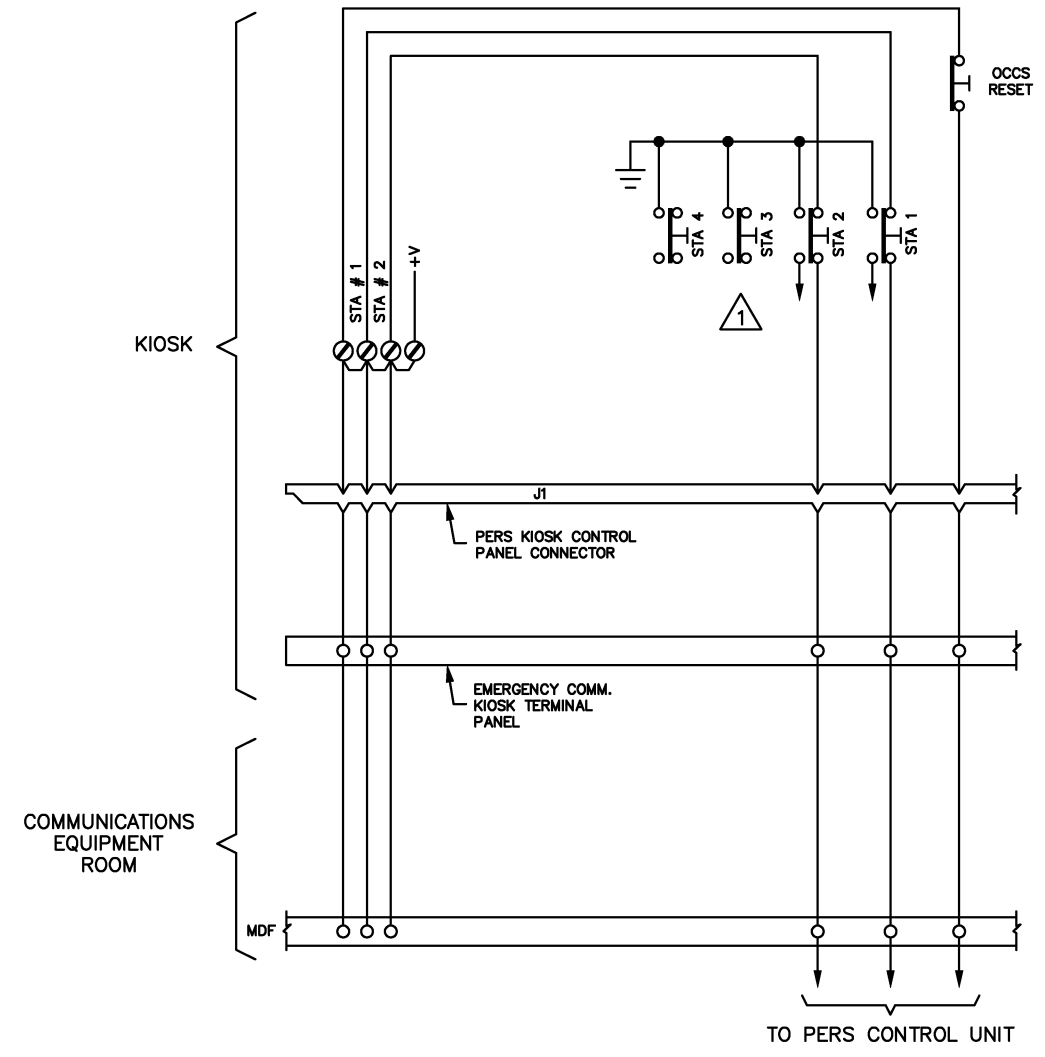


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DESIGNED <u>JRR</u> 1-00 DATE DRAWN <u>JMR</u> 1-00 DATE CHECKED _____ DATE APPROVED _____ DATE UPDATED _____ DATE	REFERENCE DRAWINGS <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NUMBER</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	NUMBER	DESCRIPTION									REVISIONS <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>DATE</th> <th>BY</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>08/2001</td> <td>SYSP</td> <td>Revised and issued by the Authority</td> </tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	DATE	BY	DESCRIPTION	08/2001	SYSP	Revised and issued by the Authority										WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF SYSTEMS SUBMITTED _____ DATE _____ APPROVED <i>[Signature]</i> May 3, 2001 DIRECTOR DATE	KIOSK PERS CONTROL PANEL LAYOUT SCALE NONE DRAWING NO. ST-CM-PERS-002
NUMBER	DESCRIPTION																												
DATE	BY	DESCRIPTION																											
08/2001	SYSP	Revised and issued by the Authority																											

NOTES:

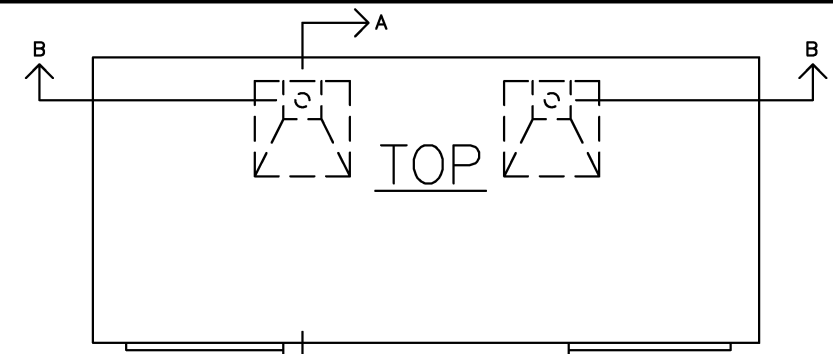
⚠ PUSHBUTTON FOR PANEL 3 AND 4 SHALL NOT BE CONNECTED.



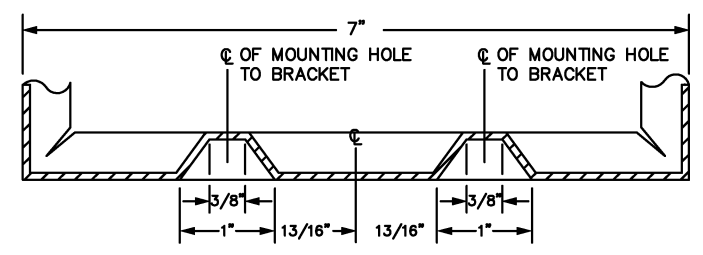
SINGLE KIOSK, SINGLE PLATFORM CONFIGURATION

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DESIGNED	JRR	1-00	REFERENCE DRAWINGS		REVISIONS		WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY		KIOSK PERS CONTROL PANEL RESET WIRING DIAGRAM	
		DATE	NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION	DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF SYSTEMS		SCALE
DRAWN	JMR	1-00			08/2001	SYSP	Revised and issued by the Authority	SUBMITTED		NONE
CHECKED		DATE						APPROVED <i>[Signature]</i>		DRAWING NO.
APPROVED		DATE						May 3, 2001		ST-CM-PERS-003
UPDATED		DATE						DATE		

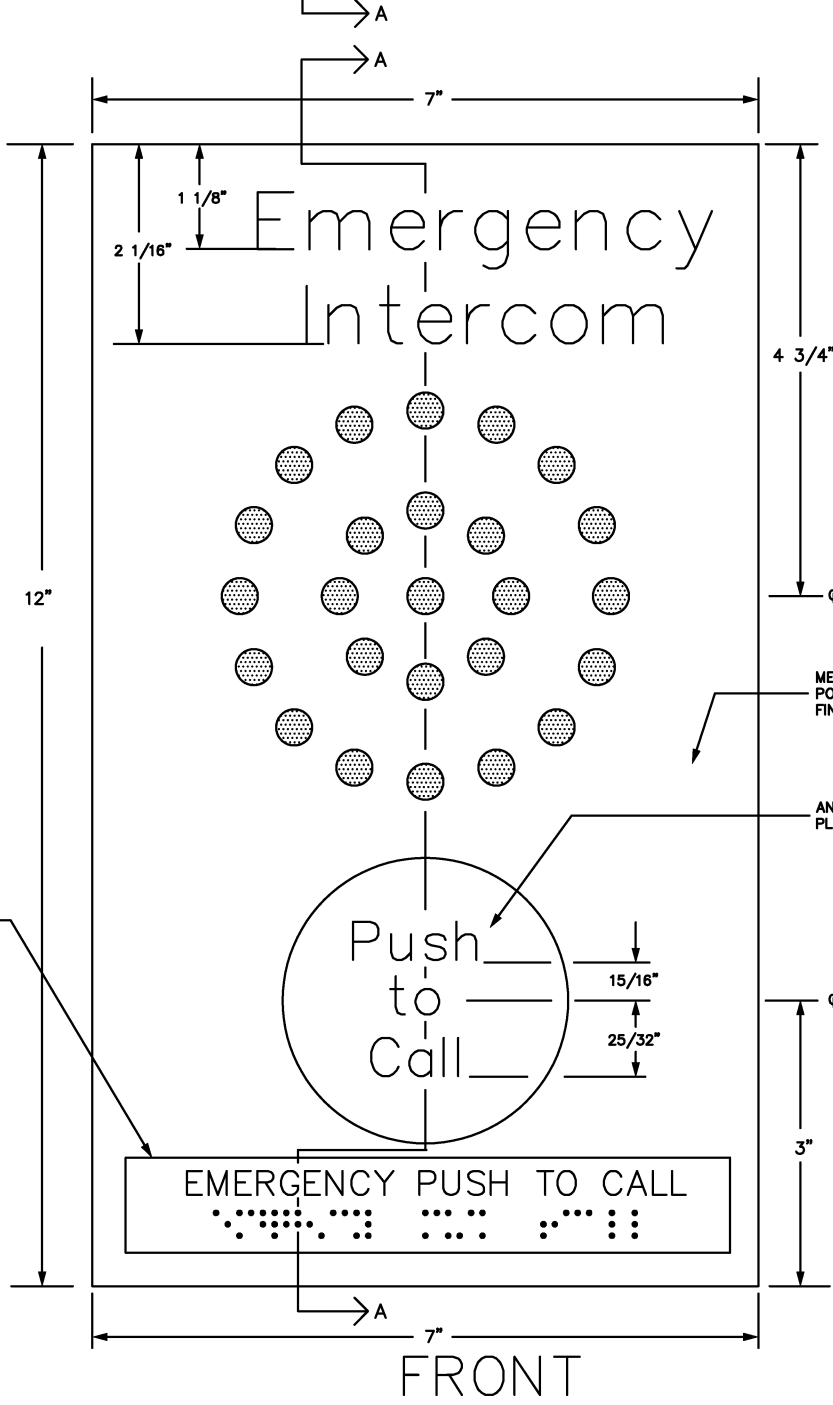


SECTION B-B

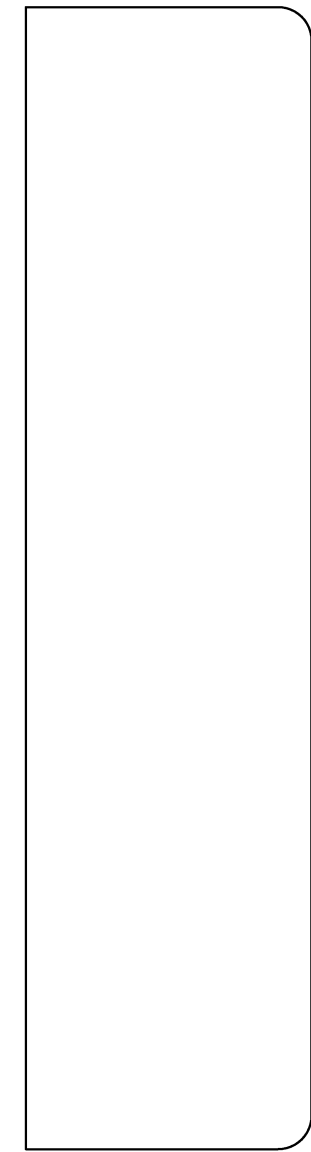
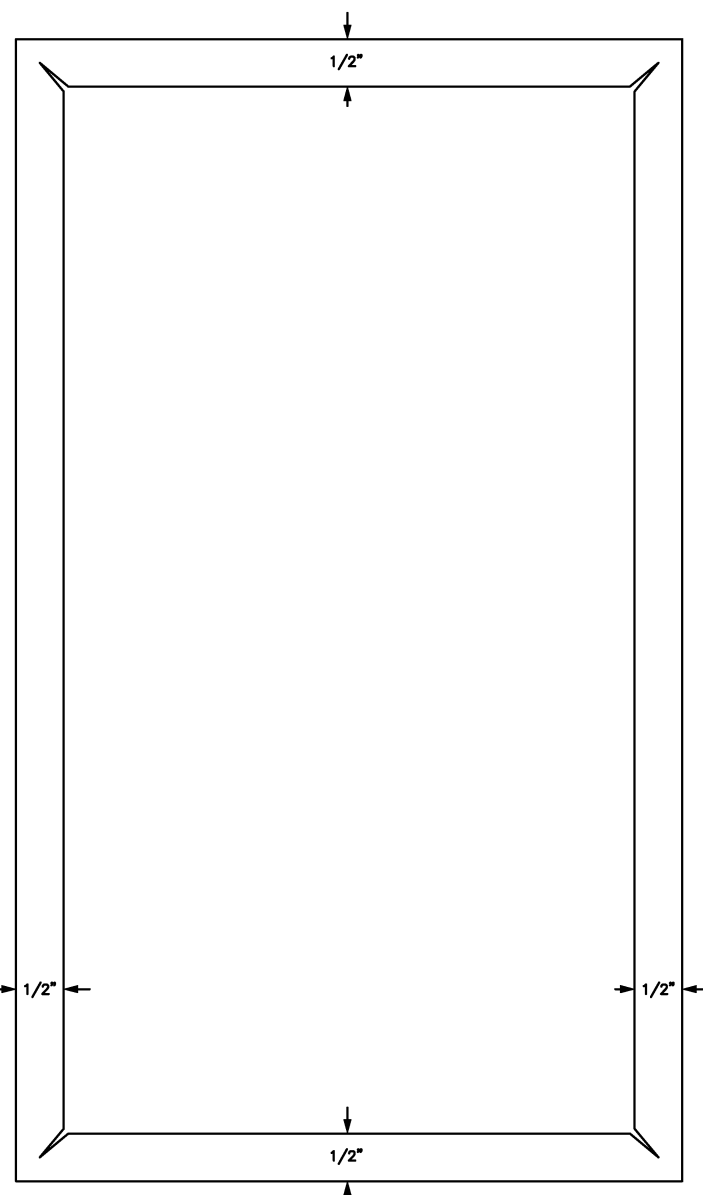
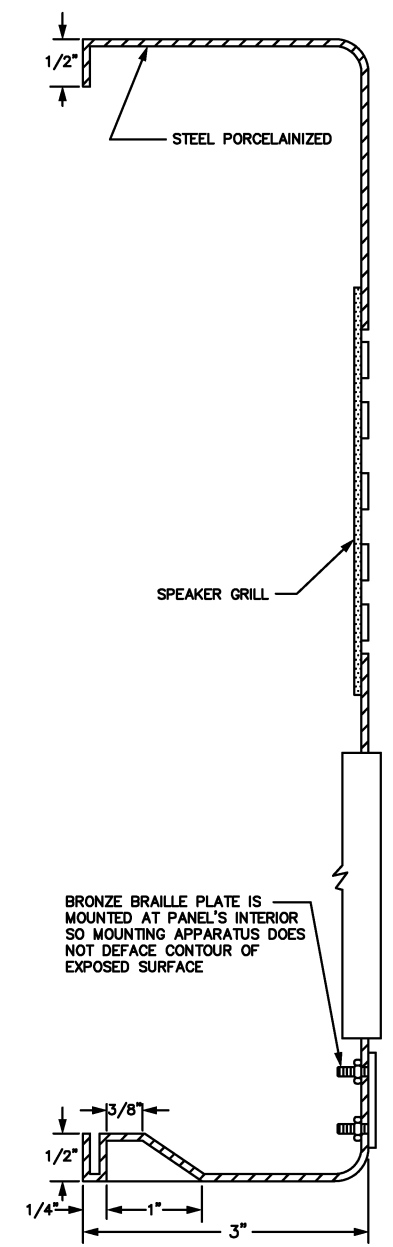


NOTES:

1. A SEPARATE PLATE ATTACHED TO THE CALL STATION, CONSISTS OF RAISED LETTERS AND BRAILLE SYMBOLS. PLATE DIMENSION SHALL BE 1" X 6 1/4".
2. THIS DRAWING ILLUSTRATES THE APPROXIMATE CONFIGURATION OF THE CALL STATION PANEL. THE ACTUAL CONFIGURATION OF THE CALL STATION PANEL MAY VARY.



SECTION A-A



BACK

SIDE

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

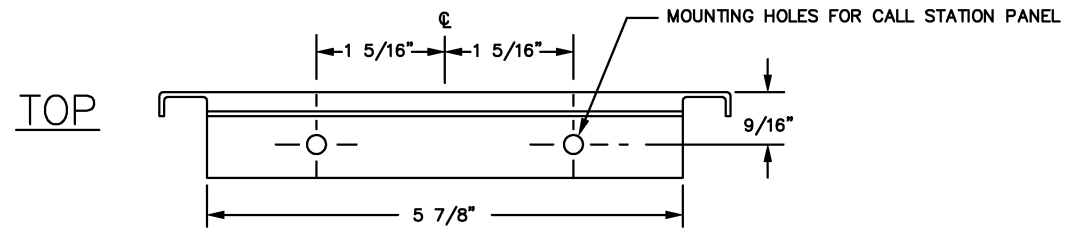
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			NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION
DRAWN	JMR	1-00			08/2001	SYSP	Revised and issued by the Authority
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APPROVED							
UPDATED							

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
 DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
 OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____ APPROVED *[Signature]* May 3, 2001
 DIRECTOR DATE

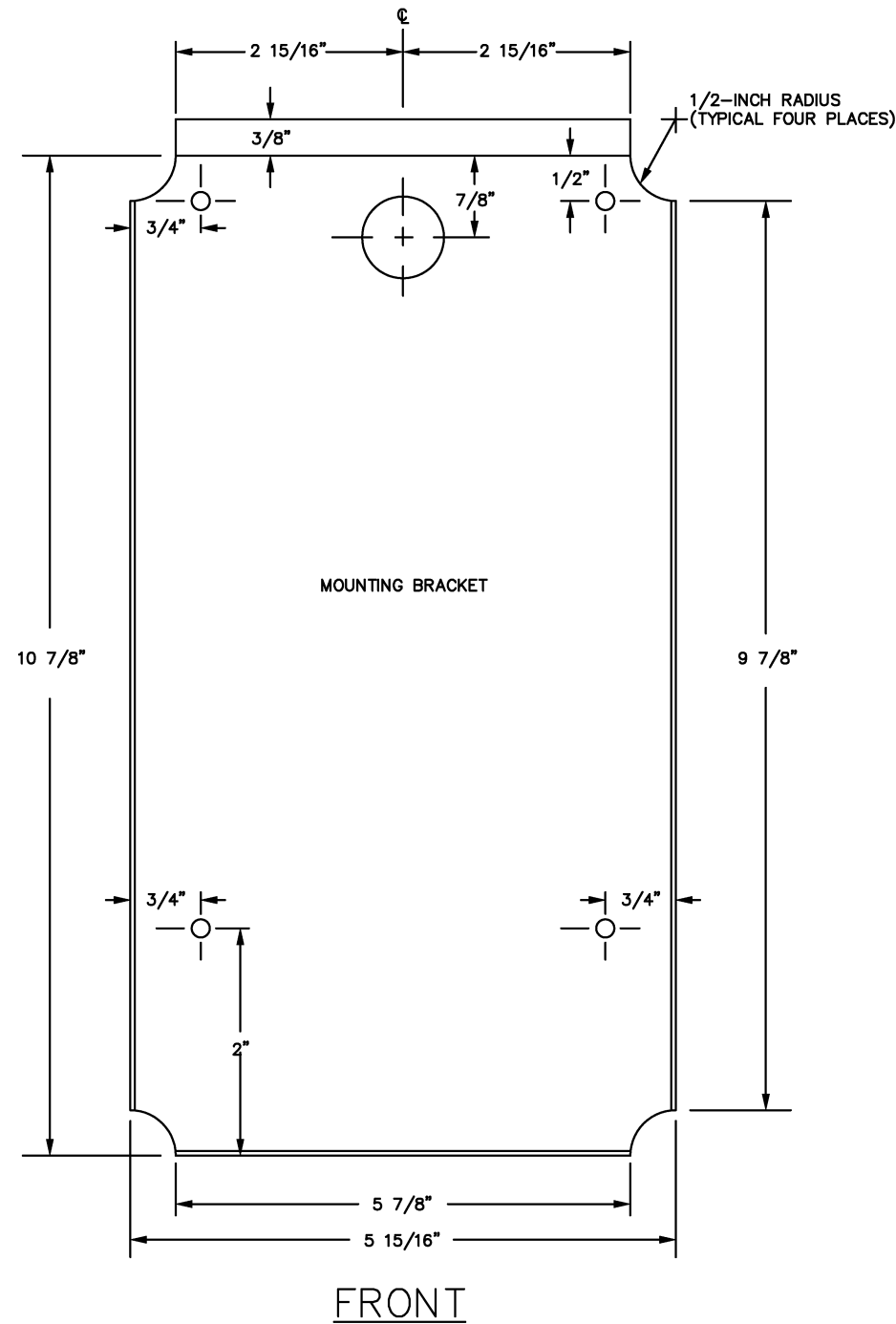
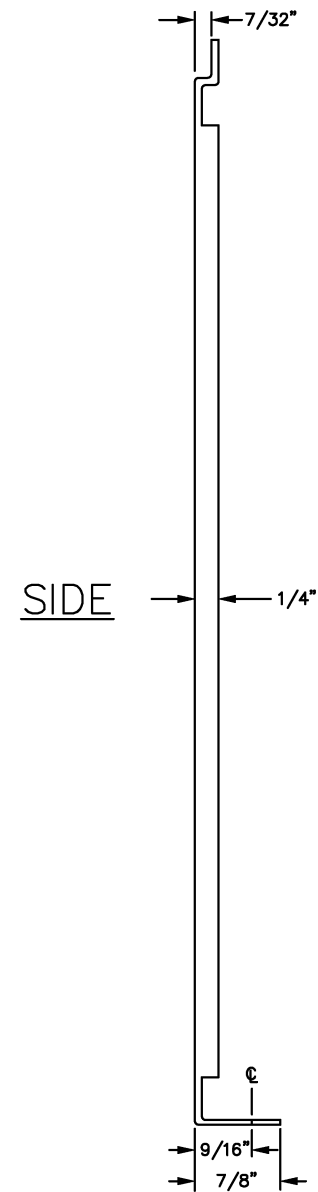
TYPICAL CALL STATION PANEL

SCALE NONE DRAWING NO. ST-CM-PERS-004



NOTES:

1. THIS DRAWING ILLUSTRATES APPROXIMATE CONFIGURATION OF MOUNTING BRACKET. THE ACTUAL CONFIGURATION OF THE MOUNTING BRACKET MAY VARY.



This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

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REVISIONS		
DATE	BY	DESCRIPTION
08/2001	SYSP	Revised and issued by the Authority

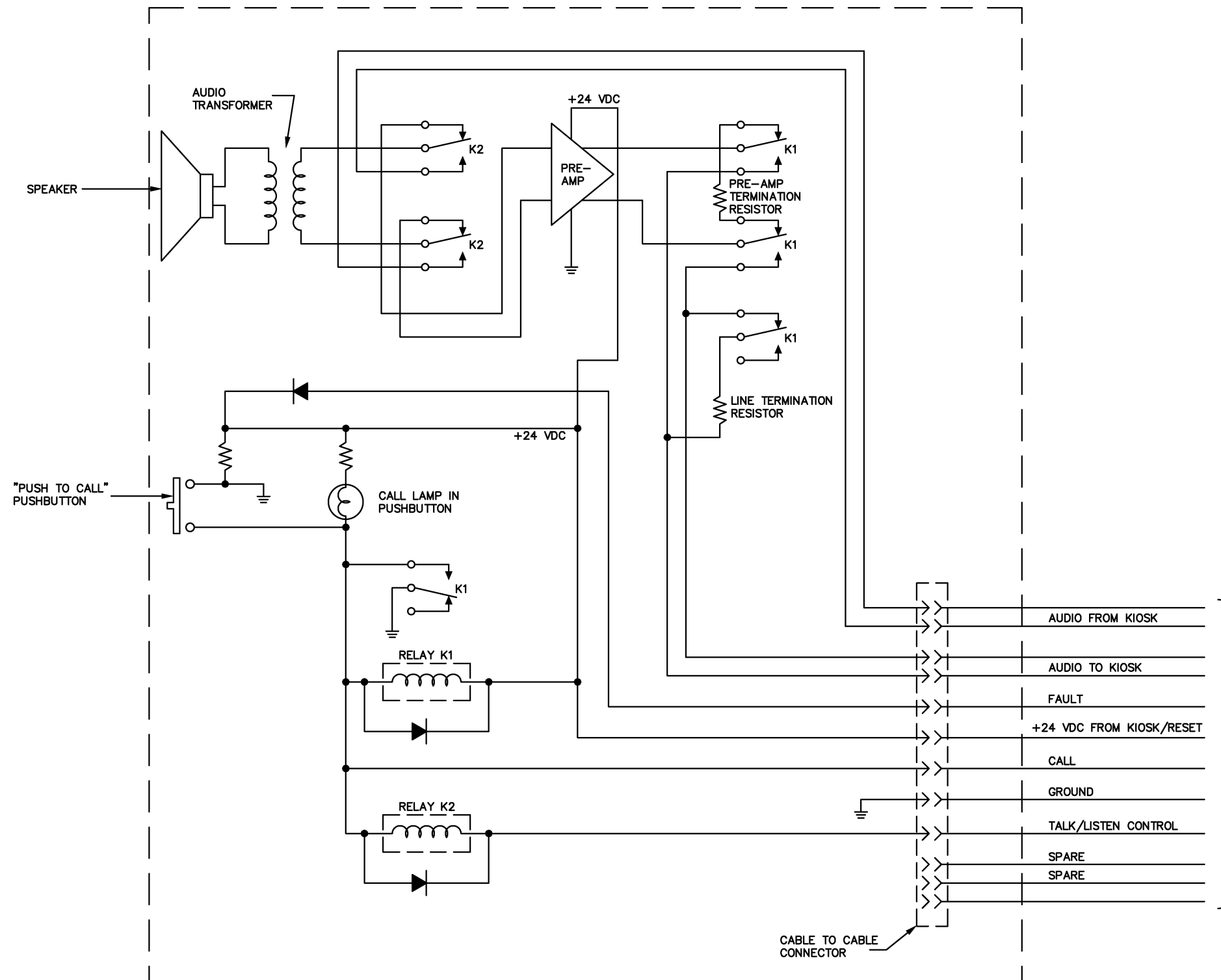
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

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OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____

APPROVED *[Signature]* May 3, 2001
DIRECTOR DATE

PERS CALL STATION PANEL MOUNTING BRACKET	
SCALE NONE	DRAWING NO. ST-CM-PERS-005



NOTES:

1. THIS IS A CONCEPTUAL DRAWING ILLUSTRATING REQUIRED AUDIO AND FUNCTIONS OF THE CALL STATION PANEL. THE ACTUAL CIRCUITRY MAY VARY.
2. FAULT CIRCUIT IN CALL STATION PANEL DETECTS LOSS OF +24 VDC TO CALL STATION PANEL.
3. ALL RELAYS ARE SHOWN DE-ENERGIZED.

RELAY FUNCTION LEGEND:

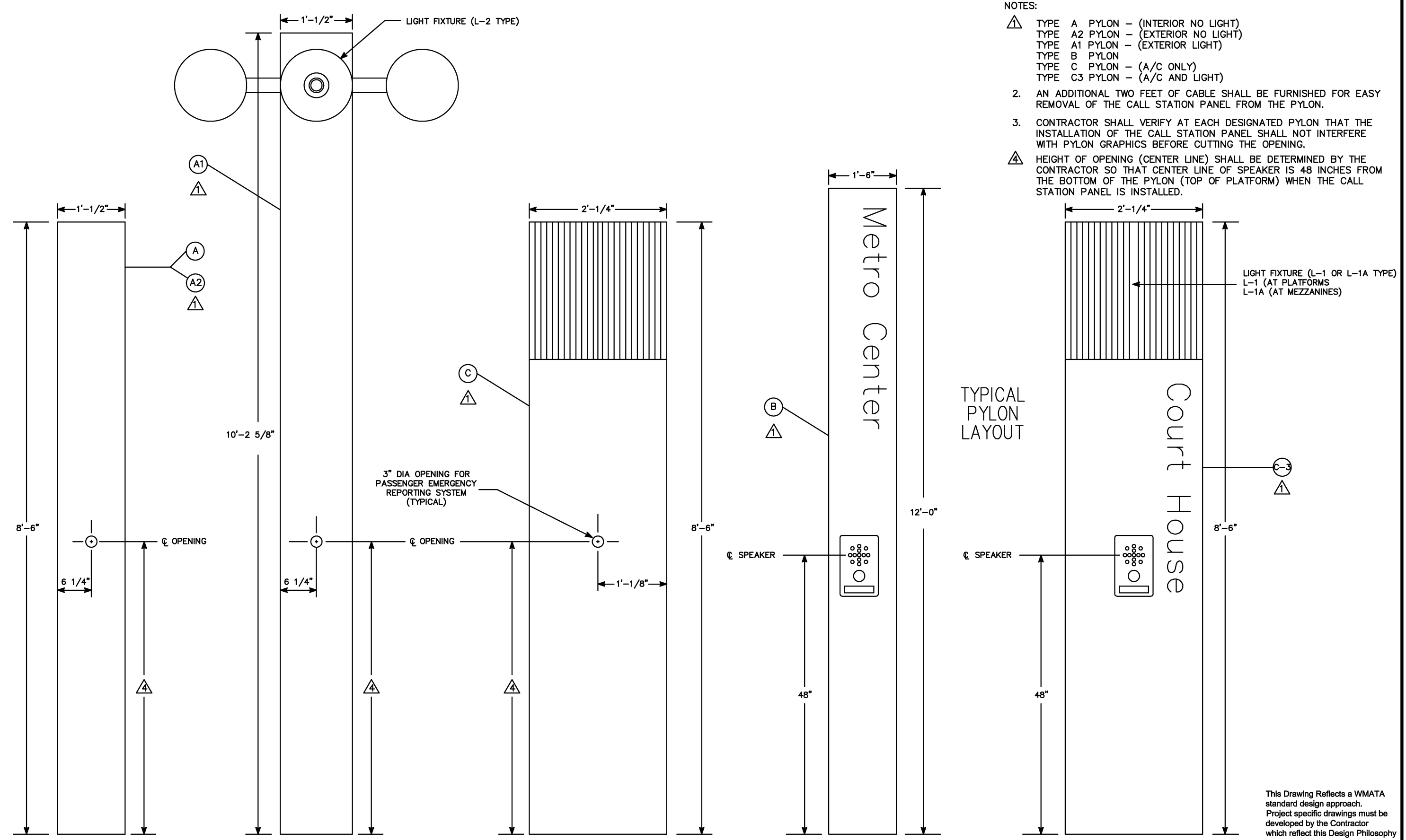
- K1 CALL INITIATION
K2 TALK/LISTEN CONTROL

CALL STATION PANEL

6 PR. (MIN.) CABLE TO PERS CONTROL UNIT IN COMM. EQUIP. ROOM VIA MDF

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED <u>JRR</u> DATE <u>1-00</u>	REFERENCE DRAWINGS		REVISIONS		WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY			TYPICAL CALL STATION PANEL SCHEMATIC	
DRAWN <u>JMR</u> DATE <u>1-00</u>	NUMBER	DESCRIPTION	DATE	BY	DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF SYSTEMS			SCALE	DRAWING NO.
CHECKED _____ DATE _____			<u>08/2001</u>	<u>SYSP</u>	SUBMITTED _____ DATE _____			NONE	<u>ST-CM-PERS-006</u>
APPROVED _____ DATE _____					APPROVED <i>[Signature]</i> DATE <u>May 3, 2001</u>				
UPDATED _____ DATE _____									



- NOTES:
- △ TYPE A PYLON - (INTERIOR NO LIGHT)
 - △ TYPE A2 PYLON - (EXTERIOR NO LIGHT)
 - △ TYPE A1 PYLON - (EXTERIOR LIGHT)
 - △ TYPE B PYLON
 - △ TYPE C PYLON - (A/C ONLY)
 - △ TYPE C3 PYLON - (A/C AND LIGHT)
2. AN ADDITIONAL TWO FEET OF CABLE SHALL BE FURNISHED FOR EASY REMOVAL OF THE CALL STATION PANEL FROM THE PYLON.
 3. CONTRACTOR SHALL VERIFY AT EACH DESIGNATED PYLON THAT THE INSTALLATION OF THE CALL STATION PANEL SHALL NOT INTERFERE WITH PYLON GRAPHICS BEFORE CUTTING THE OPENING.
- △ HEIGHT OF OPENING (CENTER LINE) SHALL BE DETERMINED BY THE CONTRACTOR SO THAT CENTER LINE OF SPEAKER IS 48 INCHES FROM THE BOTTOM OF THE PYLON (TOP OF PLATFORM) WHEN THE CALL STATION PANEL IS INSTALLED.

LIGHT FIXTURE (L-1 OR L-1A TYPE)
 L-1 (AT PLATFORMS)
 L-1A (AT MEZZANINES)

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

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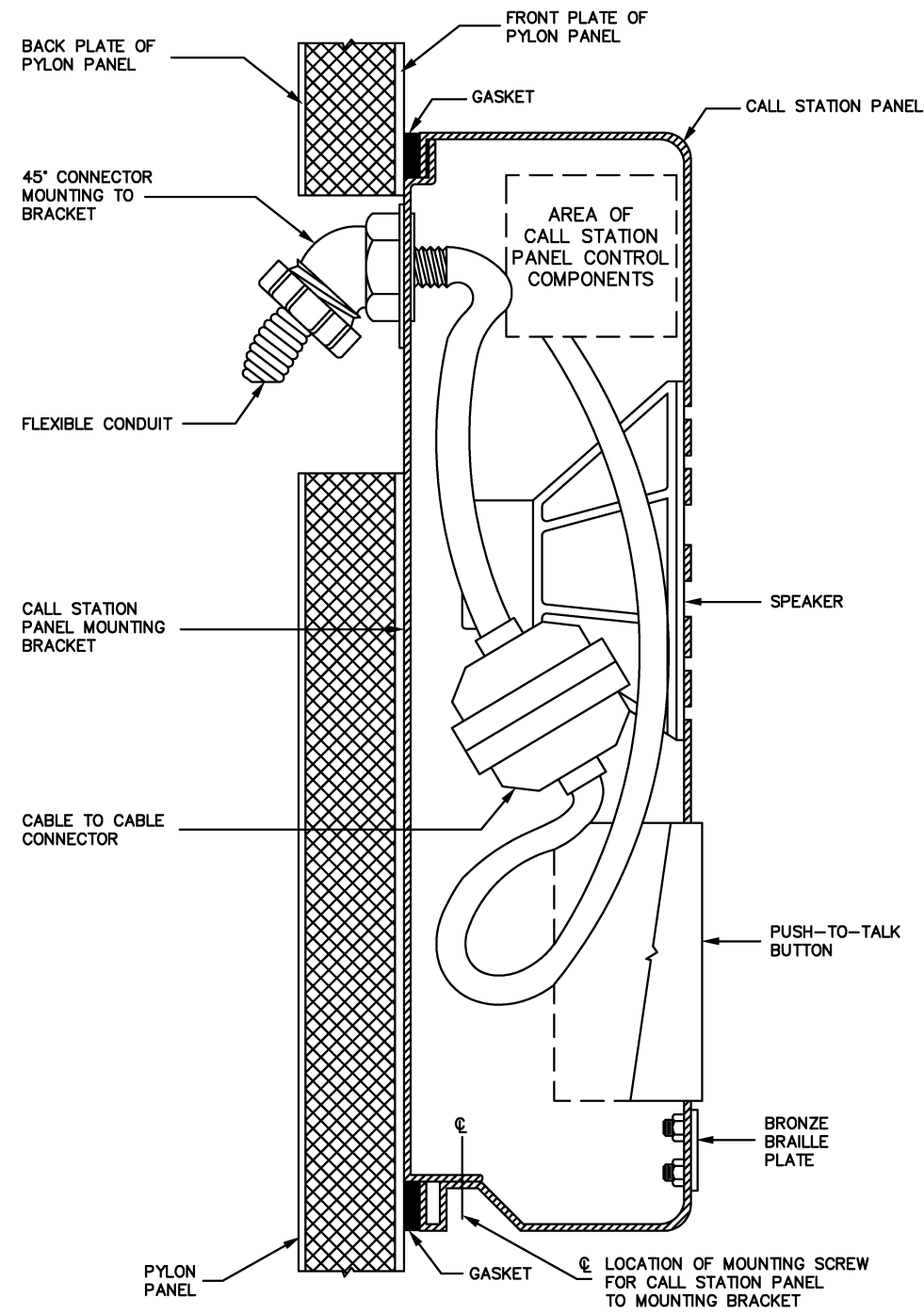
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____ APPROVED *[Signature]* DIRECTOR May 3, 2001 DATE _____

TYPICAL CALL STATION PANEL INSTALLATION DETAILS

SCALE NONE DRAWING NO. ST-CM-PERS-007



NOTES:

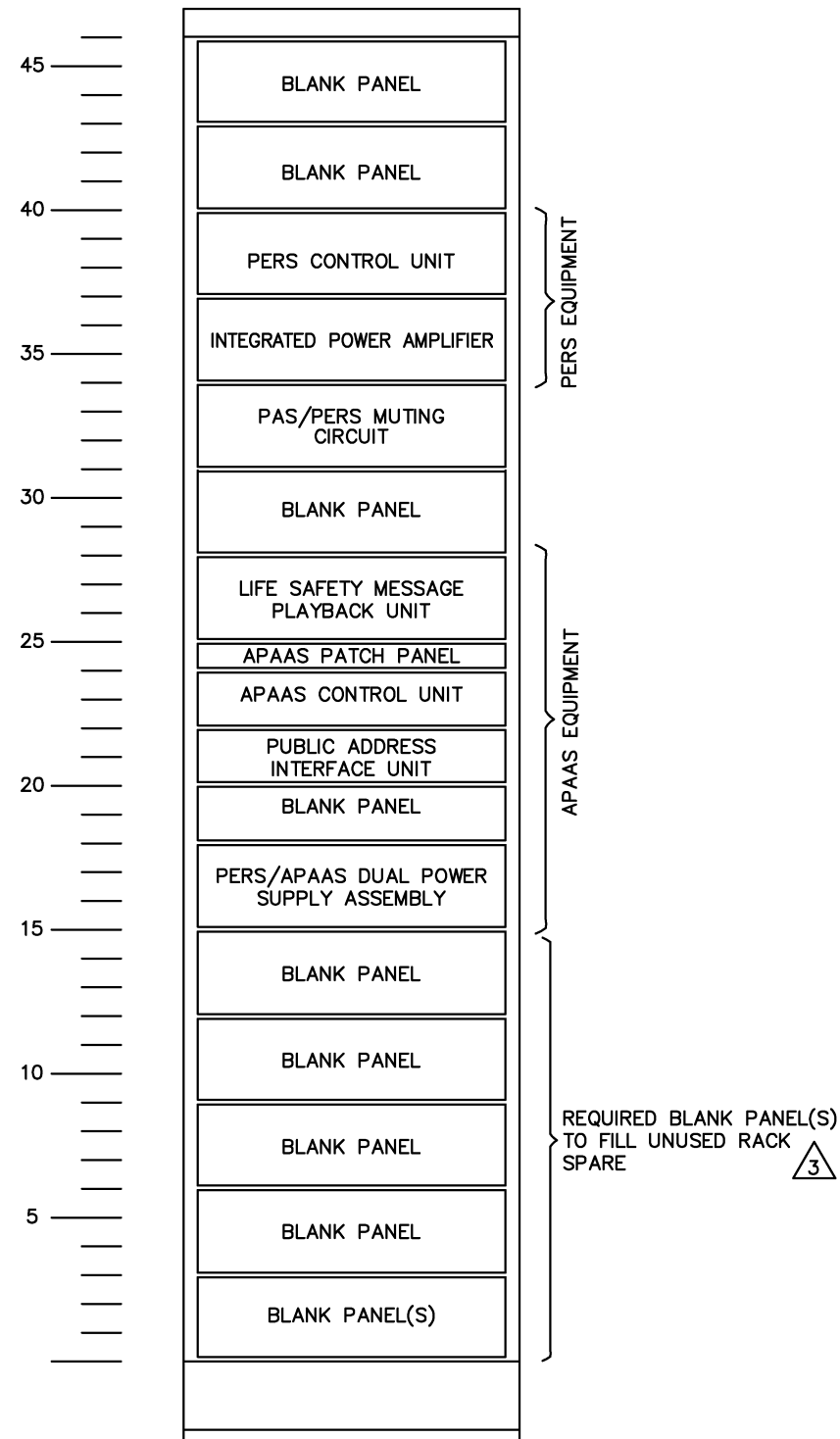
1. MOUNTING HOLES IN THE PYLON PANEL SHALL BE DRILLED AND TAPPED. MOUNTING APPARATUS SHALL PENETRATE BOTH THE FRONT PLATE AND BACK PLATE OF THE PYLON PANEL.
2. DRAWING SHOWS POSSIBLE AREA OF CONTROL COMPONENTS WITHIN THE CALL STATION PANEL. ACTUAL CONFIGURATION AND LAYOUT MAY VARY.
3. THE CALL STATION PANEL SHALL BE SECURED TO THE PYLON VIA THE MOUNTING BRACKET.
4. A GASKET MATCHING THE DIMENSIONS OF THE CALL STATION SHALL BE USED TO PROVIDE A WATER TIGHT SEAL BETWEEN THE CALL STATION AND THE PYLON.

CALL STATION PANEL INSTALLED ON A PYLON

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED <u>JBR</u> <u>1-00</u> DATE	REFERENCE DRAWINGS		REVISIONS		WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY		PERS CAL STATION PANEL INSTALLATION DETAILS	
DRAWN <u>JMR</u> <u>1-00</u> DATE	NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION	DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF SYSTEMS		SCALE NONE
CHECKED _____ DATE			08/2001	SYSP	Revised and issued by the Authority	SUBMITTED _____ DATE _____		DRAWING NO. ST-CM-PERS-008
APPROVED _____ DATE						APPROVED <i>[Signature]</i> DIRECTOR	May 3, 2001 DATE	
UPDATED _____ DATE								

PERS/APAAS
EQUIPMENT RACK



FRONT VIEW

NOTES:

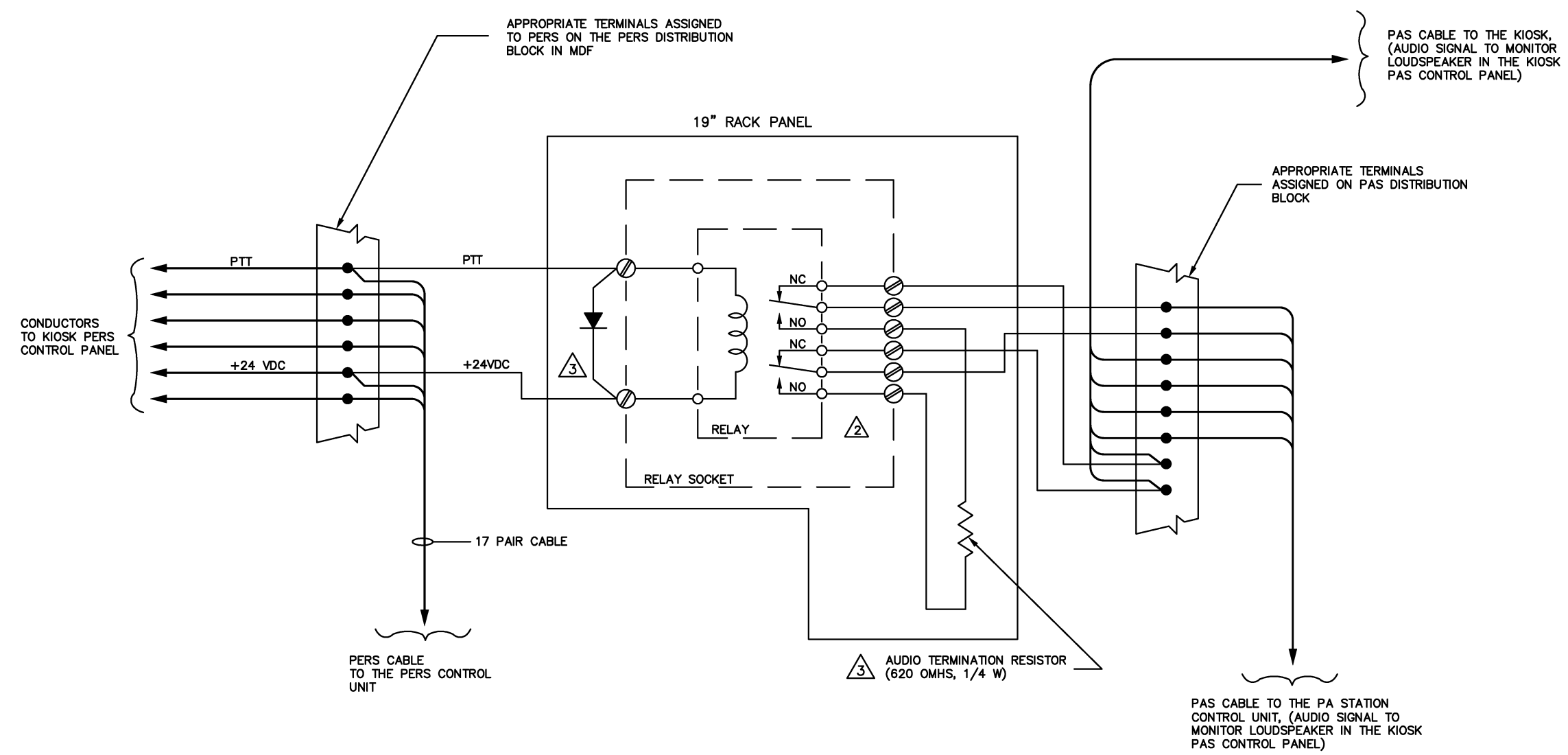
1. THE OPEN EQUIPMENT RACK SHALL HAVE 46 RACK UNITS OF PANEL SPACE AS DEFINED IN EIA STANDARD RS-310-C.
2. BLANK PANELS INDICATED SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
3. BLANK PANEL HEIGHTS SHALL NOT BE GREATER THAN 3 RACK UNITS EACH.
4. BLANK PANELS SHALL BE 0.125 INCHES THICK ALUMINUM; FINISH SHALL BE CLEAR ANODIZED.
5. BLANK PANEL MOUNTING CUT OUTS SHALL BE IN ACCORDANCE WITH EIA STANDARD RS-310-C.
6. THIS DRAWING SHOWS THE TYPICAL SPACING OF EQUIPMENT. THE CONTRACTOR SHALL DETERMINE THE SPACE REQUIRED FOR THE EQUIPMENT TO BE INSTALLED.

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED <u>JRR</u> 1-00 DATE	REFERENCE DRAWINGS		REVISIONS		WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY		PERS/APAAS STATION EQUIPMENT ROOM RACK LAYOUT	
DRAWN <u>JMR</u> 1-00 DATE	NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION	DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF SYSTEMS		SCALE NONE
CHECKED _____ DATE			08/2001	SYSP	Revised and issued by the Authority	SUBMITTED _____ DATE		DRAWING NO. ST-CM-PERS-009
APPROVED _____ DATE						APPROVED <u>[Signature]</u> May 3, 2001 DIRECTOR DATE		
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NOTES:

1. THE REQUIRED COMPONENTS FOR THE KIOSK PAS/PERS MUTING CIRCUITRY CONSIST OF:
 - 1 AUDIO RELAY
 - 1 RELAY SOCKET W/HOLD-DOWN SPRING
 - 1 DIODE
 - 1 TERMINATION RESISTOR
- 2 THE RELAY SOCKET AND RELAY SHALL BE INSTALLED ON THE BACK SIDE OF THE 19" BLANK PANEL ON THE PERS/APAAS EQUIPMENT RACK.
- 3 THE DIODE AND TERMINATION RESISTOR SHALL BE INSTALLED ON THE RELAY SOCKET.



This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

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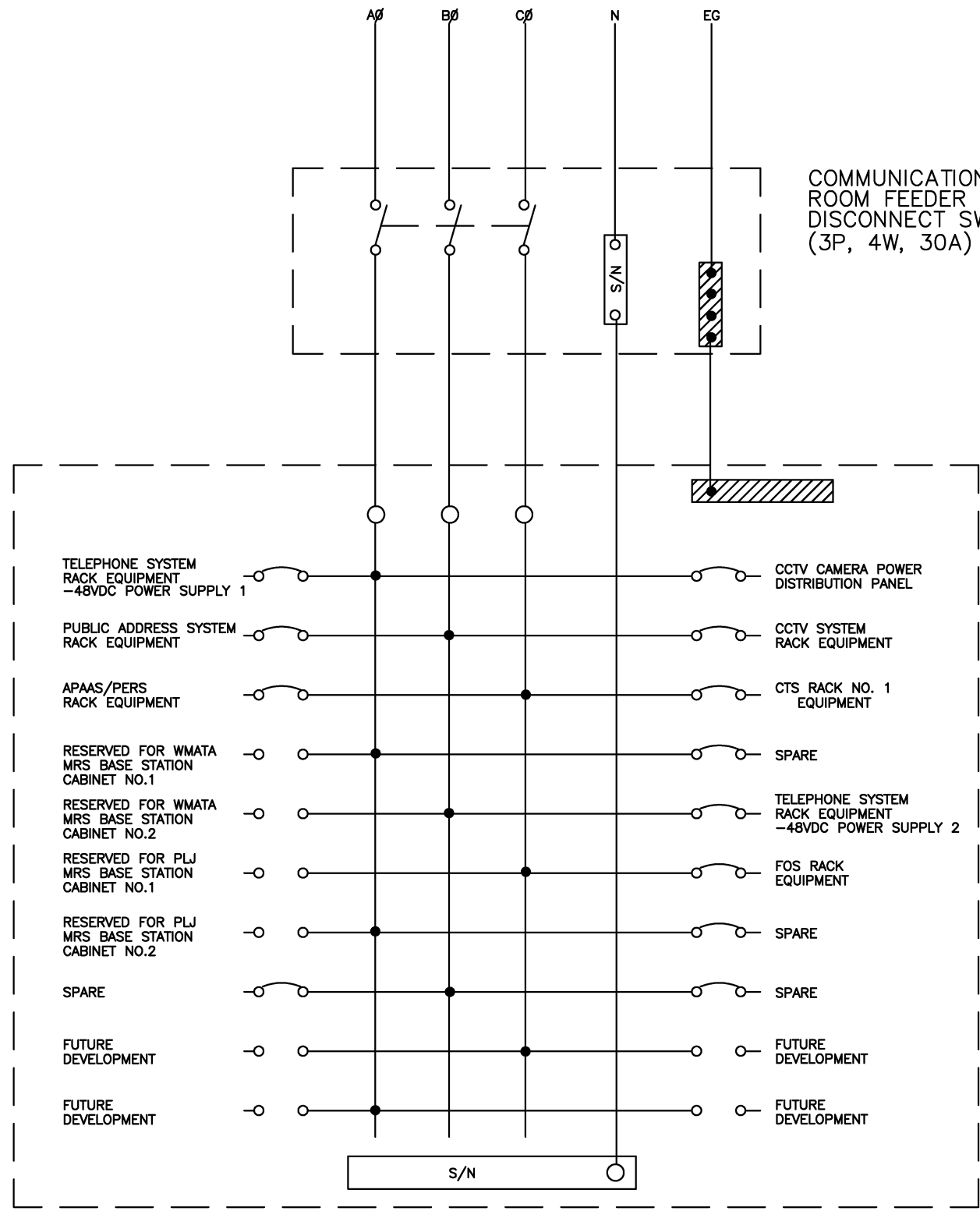
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OFFICE OF SYSTEMS

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APPROVED *[Signature]* May 3, 2001
DIRECTOR DATE

PAS/PERS MUTING CIRCUITRY	
SCALE NONE	DRAWING NO. ST-CM-PERS-010



COMMUNICATIONS EQUIPMENT ROOM FEEDER DISCONNECT SWITCH (NIC) (3P, 4W, 30A)

COMMUNICATIONS EQUIPMENT ROOM POWER DISTRIBUTION PANELBOARD

NOTES:

1. INDICATES ISOLATED SOLID NEUTRAL BUS
2. INDICATES GROUND BUS
3. DRAWING SHOWS TYPICAL CIRCUIT BREAKER DESIGNATIONS AND CONFIGURATION FOR PANELBOARD. THE CONTRACTOR SHALL CONFIGURE EACH PANELBOARD FOR OPTIMUM PHASE LOAD BALANCE.
3. CIRCUIT BREAKER RATINGS SHALL BE SELECTED BY THE CONTRACTOR TO ACCOMMODATE FACILITIES/SYSTEMS DESIGNS. SPARE CIRCUIT BREAKERS SHALL HAVE A RATING OF 15 AMPERES.

LEGEND:

- CCTV CLOSSED CIRCUIT TELEVISION
- CTS CARRIER TRANSMISSION SYSTEM
- AØ POWER PHASE
- N NEUTRAL
- EG EQUIPMENT GROUND
- FOS FIBER OPTIC SYSTEM
- APAAS AUTOMATIC PUBLIC ADDRESS ANNOUNCEMENT SYSTEM
- PERS PASSENGER EMERGENCY REPORTING SYSTEM
- PLJ PRIMARY LOCAL JURISDICTION

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OFFICE OF SYSTEMS

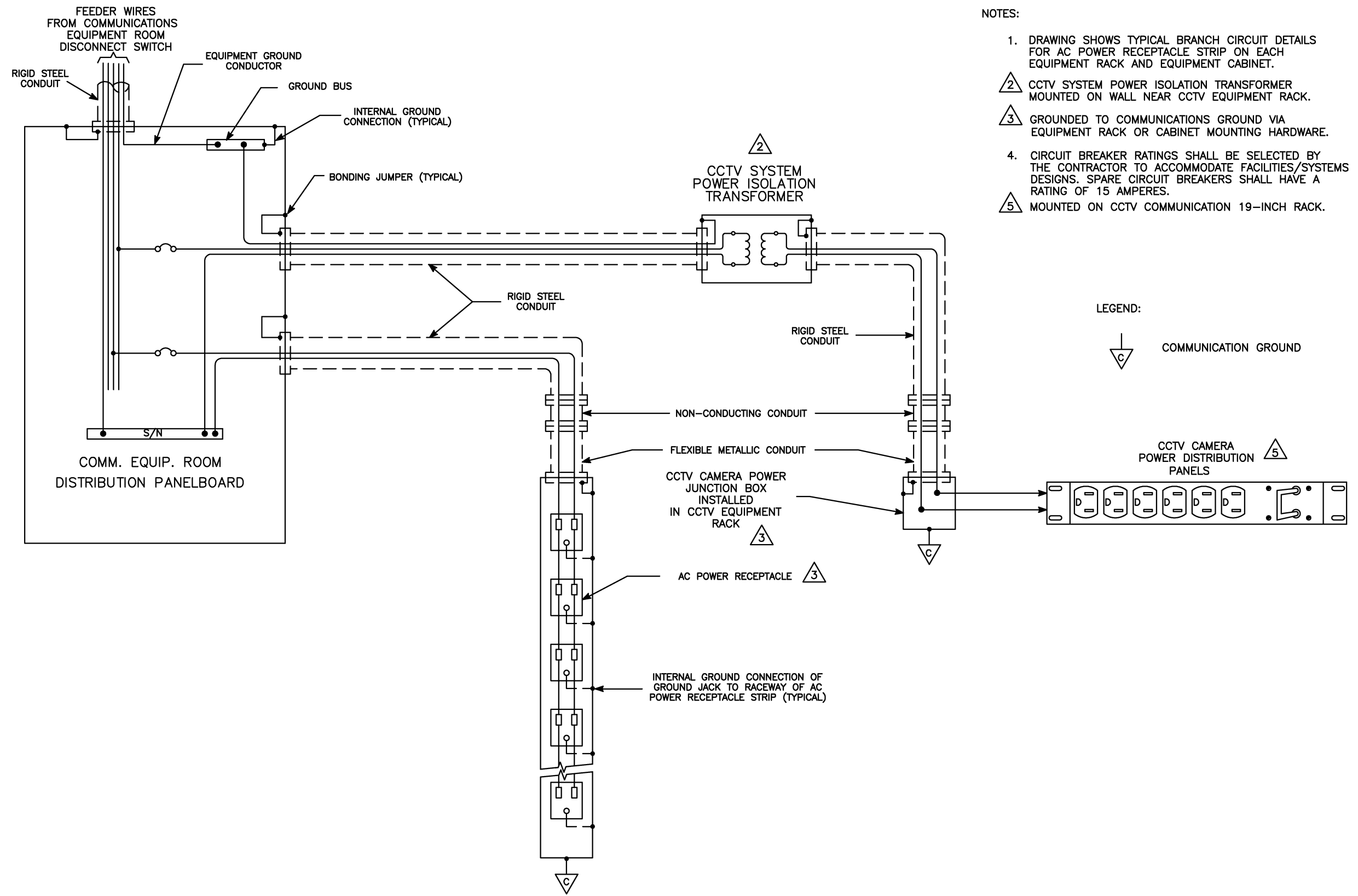
SUBMITTED _____ DATE _____

APPROVED DIRECTOR May 3, 2001 DATE

TYPICAL COMMUNICATIONS EQUIPMENT ROOM POWER DISTRIBUTION


SCALE NONE

DRAWING NO. ST-CM-PWR-001



- NOTES:
1. DRAWING SHOWS TYPICAL BRANCH CIRCUIT DETAILS FOR AC POWER RECEPTACLE STRIP ON EACH EQUIPMENT RACK AND EQUIPMENT CABINET.
 2. CCTV SYSTEM POWER ISOLATION TRANSFORMER MOUNTED ON WALL NEAR CCTV EQUIPMENT RACK.
 3. GROUNDED TO COMMUNICATIONS GROUND VIA EQUIPMENT RACK OR CABINET MOUNTING HARDWARE.
 4. CIRCUIT BREAKER RATINGS SHALL BE SELECTED BY THE CONTRACTOR TO ACCOMMODATE FACILITIES/SYSTEMS DESIGNS. SPARE CIRCUIT BREAKERS SHALL HAVE A RATING OF 15 AMPERES.
 5. MOUNTED ON CCTV COMMUNICATION 19-INCH RACK.

LEGEND:
 COMMUNICATION GROUND

CCTV CAMERA POWER DISTRIBUTION PANELS 

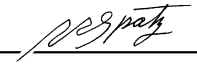
This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

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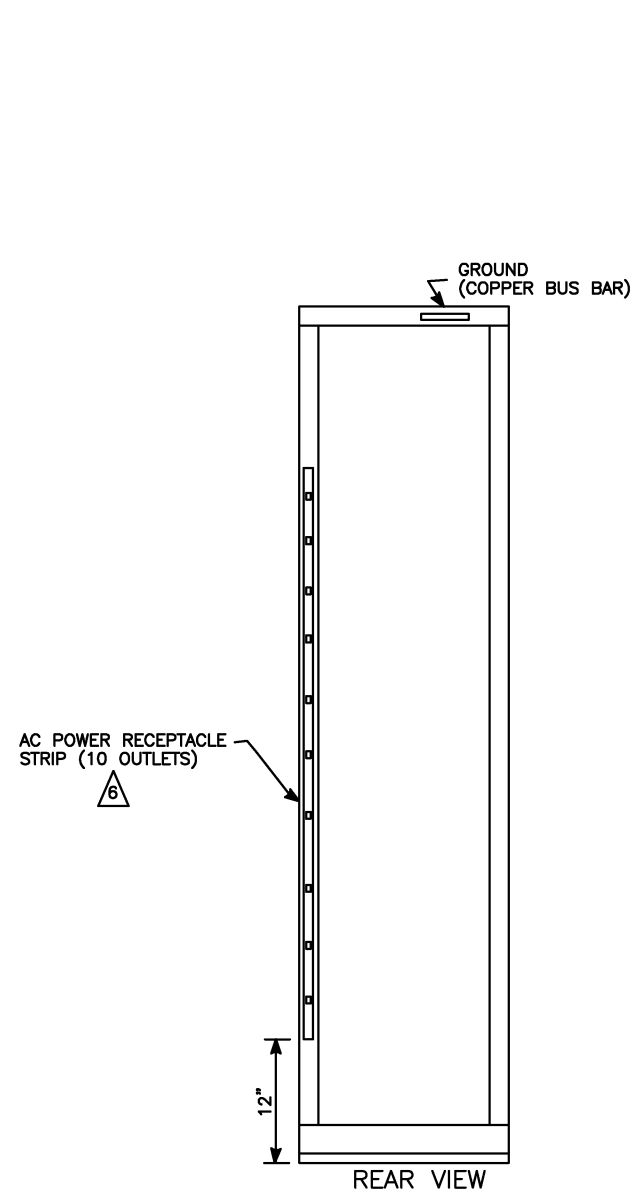
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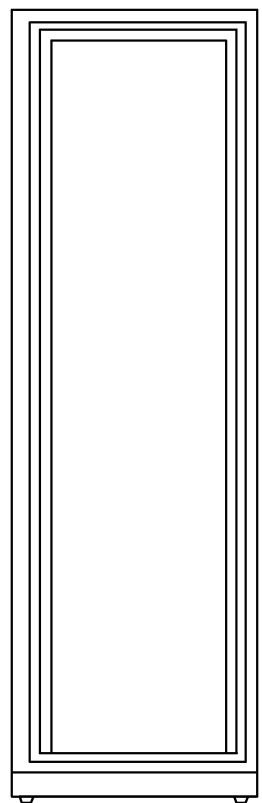
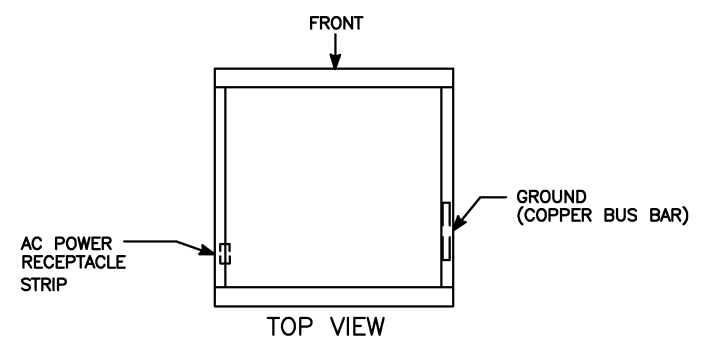
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SUBMITTED _____ DATE _____ APPROVED  DIRECTOR May 3, 2001 DATE

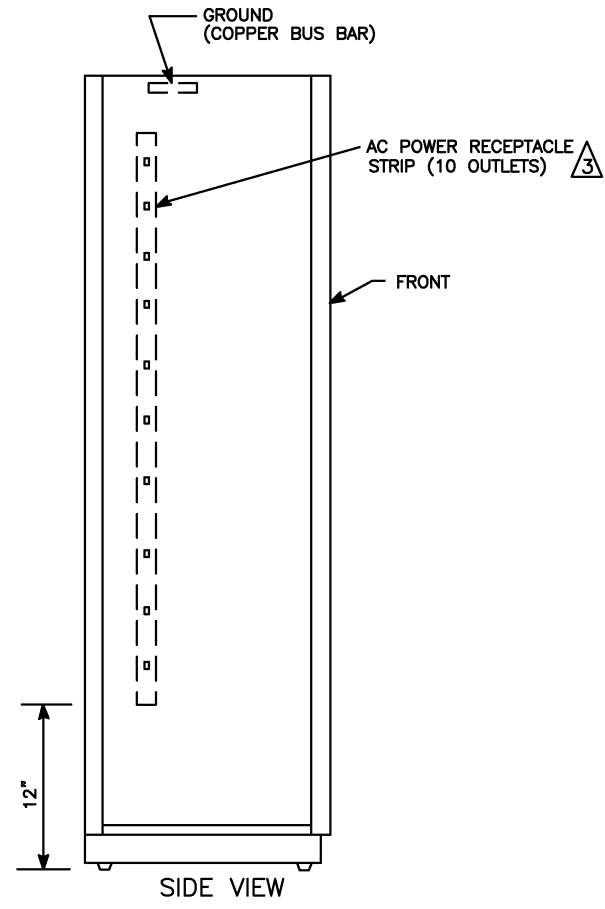
TYPICAL COMMUNICATIONS EQUIPMENT ROOM POWER CIRCUIT DETAILS	
SCALE NONE	DRAWING NO. ST-CM-PWR-002



EQUIPMENT RACK



EQUIPMENT CABINET



NOTES:

1. AN AC POWER RECEPTACLE STRIP SHALL BE PROVIDED ON EACH EQUIPMENT RACK AND IN EACH EQUIPMENT CABINET (EXCEPTION: FIA COMMON CONTROL UNIT).
2. EACH EQUIPMENT RACK AND EQUIPMENT CABINET AC POWER RECEPTACLE STRIP SHALL BE WIRED AS A SEPARATE BRANCH CIRCUIT TO THE EMERGENCY POWER DISTRIBUTION PANELBOARD(S) IN THE COMMUNICATIONS EQUIPMENT ROOM.
- ³ EXACT LOCATION OF THE AC POWER RECEPTACLE STRIP WITHIN EACH EQUIPMENT CABINET SHALL BE DETERMINED BY THE CONTRACTOR.
4. REAR DOOR IS NOT SHOWN IN THE EQUIPMENT CABINET DETAIL.
5. THE CONTRACTOR SHALL PROVIDE AN APPROPRIATE PASSAGEWAY FOR POWER CONDUCTORS/CONDUIT AND GROUND WIRE AT THE TOP OF THE EQUIPMENT CABINET.
- ⁶ THE AC POWER RECEPTACLE STRIP ON THE CTS EQUIPMENT RACK SHALL CONTAIN ONLY 6 OUTLETS.

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

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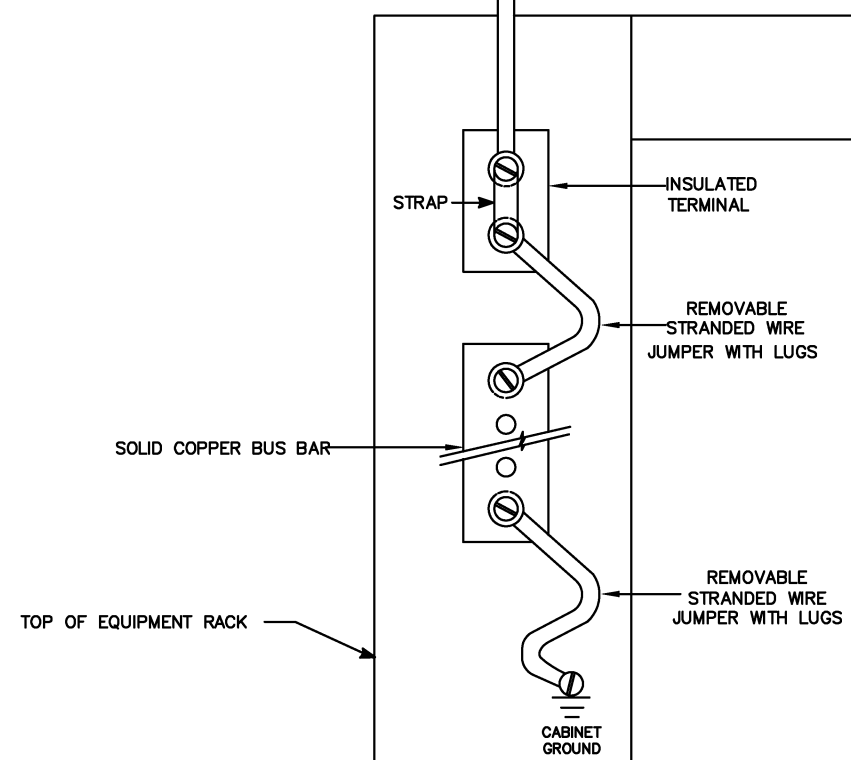
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APPROVED *[Signature]* May 3, 2001
DIRECTOR DATE

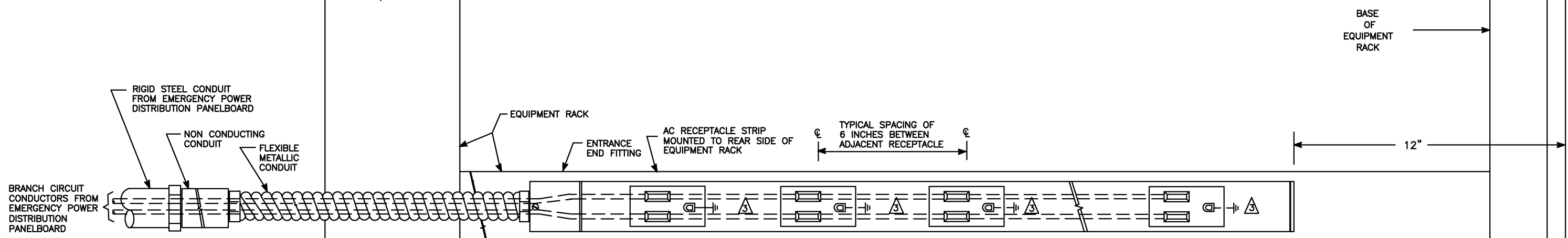
TYPICAL EQUIPMENT RACKS AND CABINETS AC POWER DETAILS	
SCALE NONE	DRAWING NO. ST-CM-PWR-003

GROUND WIRE TO THE COMMUNICATIONS GROUND BUS BAR IN THE COMMUNICATIONS EQUIPMENT ROOM

STRANDED INSULATED 6 AWG



- NOTES:
- DRAWING SHOWS THE INSTALLATION AND WIRING OF THE AC RECEPTACLE STRIP ON AN EQUIPMENT RACK. INSTALLATION AND WIRING OF THE AC RECEPTACLE STRIP IN AN EQUIPMENT CABINET SHALL BE IDENTICAL TO THAT OF AN EQUIPMENT RACK.
 - THE RACEWAY BASE OF THE AC RECEPTACLE STRIP SHALL BE ELECTRICALLY CONNECTED (GROUNDED) TO THE EQUIPMENT RACK VIA THE MOUNTING HARDWARE. TO ENSURE THAT THE RACEWAY BASE IS GROUNDED TO THE EQUIPMENT RACK, A GROUND CLAMP SHALL BE PROVIDED INSIDE THE AC RECEPTACLE STRIP AT THE TOP MOUNTING HARDWARE.
 - THE RACEWAY BASE OF THE AC RECEPTACLE STRIP SHALL SERVE AS A GROUNDING CONDUCTOR. THE GROUND JACK OF EACH RECEPTACLE IN THE AC RECEPTACLE STRIP SHALL BE ELECTRICALLY CONNECTED TO THE RACEWAY BASE.
 - EACH EQUIPMENT RACK AND CABINET IS ISOLATED FROM BUILDING STRUCTURE AND INDIVIDUALLY GROUNDED TO THE COMMUNICATIONS GROUND BUS BAR IN THE COMMUNICATIONS EQUIPMENT ROOM. HENCE, THE GROUND JACK OF EACH RECEPTACLE IN THE AC RECEPTACLE STRIP IS GROUNDED TO THE COMMUNICATIONS GROUND.



REAR VIEW OF EQUIPMENT RACK

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

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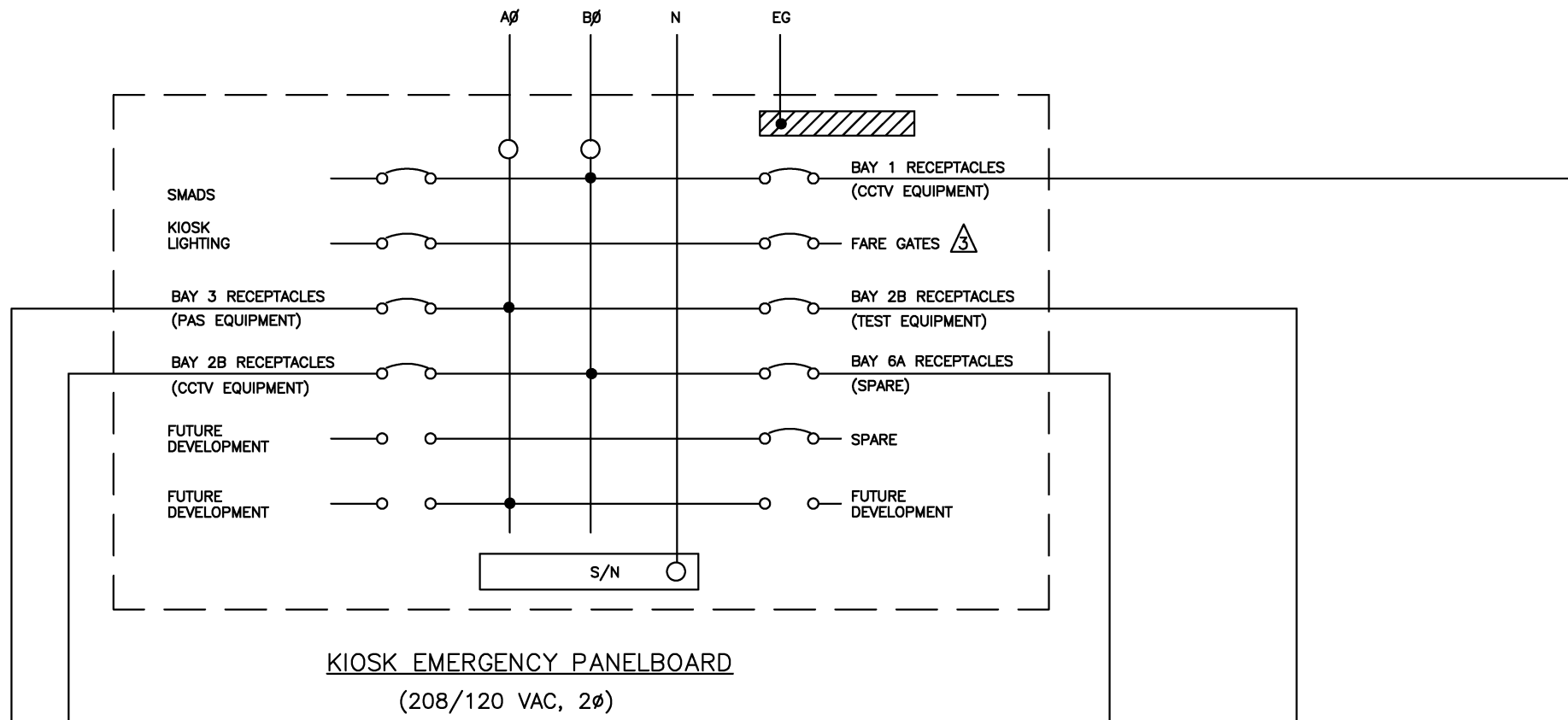
APPROVED DIRECTOR *[Signature]* May 3, 2001 DATE

TYPICAL EQUIPMENT RACK AND CABINET AC POWER DETAILS

SCALE NONE

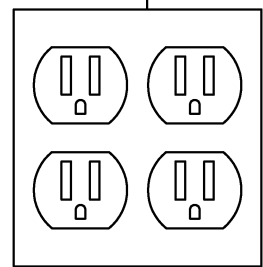
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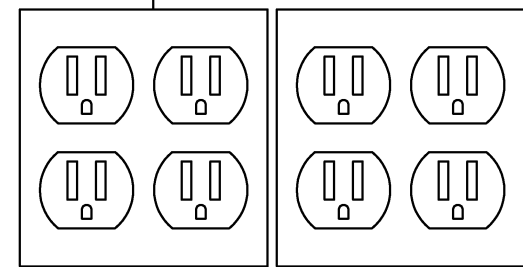


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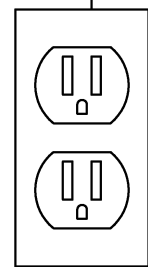
1. THE KIOSK EMERGENCY PANELBOARD IS PROVIDED BY OTHERS IN EACH KIOSK. EACH PANELBOARD WILL BE EQUIPPED WITH EIGHT SINGLE-POLE CIRCUIT BREAKERS.
2. INDICATES ISOLATED SOLID NEUTRAL BUS
 INDICATES GROUND BUS
3. CIRCUIT WIRING FOR THIS CIRCUIT BREAKER WILL BE PROVIDED BY OTHERS.
4. THE EXACT LOCATION OF THE RECEPTACLES WITHIN EACH KIOSK BAY SHALL BE APPROVED BY THE ENGINEER.
5. CIRCUIT BREAKER RATINGS SHALL BE SELECTED BY THE CONTRACTOR TO ACCOMMODATE FACILITIES/SYSTEMS DESIGNS. SPARE CIRCUIT BREAKERS SHALL HAVE A RATING OF 15 AMPERES.
6. ABBREVIATIONS:
 AØ POWER PHASE
 N NEUTRAL
 EG EQUIPMENT GROUND
 CCTV CLOSED CIRCUIT TELEVISION
 SMADS STATION MONITORING AND DISPLAY SYSTEM
 PAS PUBLIC ADDRESS SYSTEMS



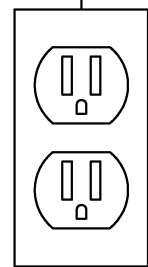
DUPLEX RECEPTACLE IN TWO-GANG ENCLOSURE
PAS
BAY 3



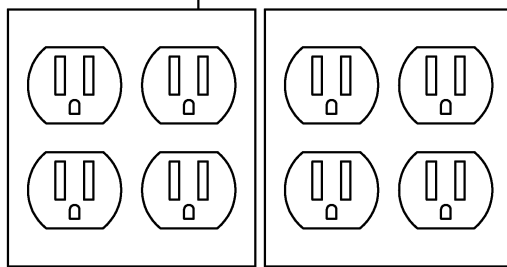
DUPLEX RECEPTACLES IN TWO-GANG ENCLOSURES
CCTV
BAY 2B



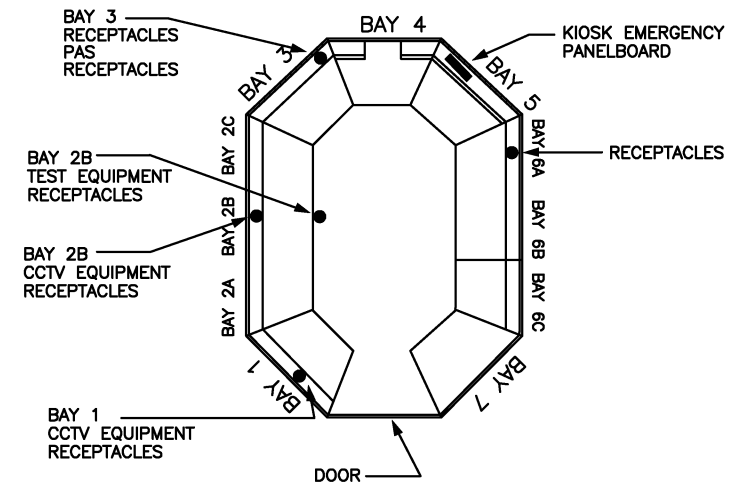
DUPLEX RECEPTACLE IN SINGLE-GANG ENCLOSURE
BAY 6A



DUPLEX RECEPTACLE IN SINGLE-GANG ENCLOSURE
BAY 2B



DUPLEX RECEPTACLES IN TWO-GANG ENCLOSURES
CCTV
BAY 1



KEY PLAN

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED <u>JRR</u> <u>8-00</u> DATE	<table border="1"> <thead> <tr> <th colspan="2">REFERENCE DRAWINGS</th> <th colspan="2">REVISIONS</th> </tr> <tr> <th>NUMBER</th> <th>DESCRIPTION</th> <th>DATE</th> <th>BY</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>08/2001</td> <td>SYSP</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	REFERENCE DRAWINGS		REVISIONS		NUMBER	DESCRIPTION	DATE	BY			08/2001	SYSP									WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF SYSTEMS	
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			08/2001	SYSP																			
DRAWN <u>JMR</u> <u>8-00</u> DATE	SUBMITTED _____ DATE _____		APPROVED <u>[Signature]</u> <u>May 3, 2001</u> DIRECTOR DATE																				
CHECKED _____ DATE	SCALE NONE		DRAWING NO. ST-CM-PWR-005																				
APPROVED _____ DATE																							
UPDATED _____ DATE																							

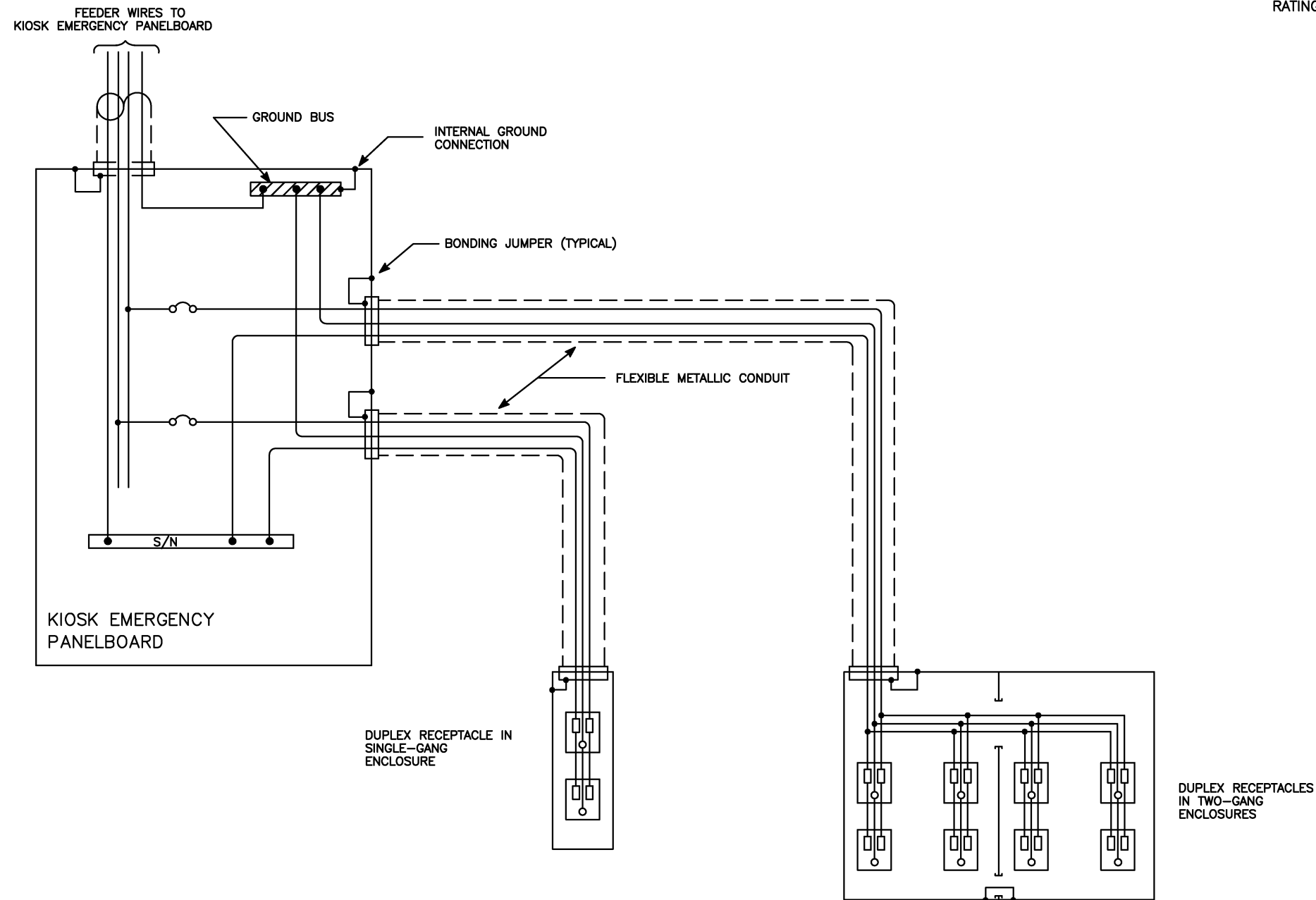
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
 DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
 OFFICE OF SYSTEMS

NEW KIOSK POWER DISTRIBUTION

SCALE NONE
 DRAWING NO. ST-CM-PWR-005

NOTES:

1. DRAWING SHOWS TYPICAL BRANCH CIRCUIT DETAILS FOR DUPLEX RECEPTACLES PROVIDED IN THE KIOSK FOR THE POWERING OF COMMUNICATIONS SYSTEM AND FACILITIES EQUIPMENT.
2. CIRCUIT BREAKER RATINGS SHALL BE SELECTED BY THE CONTRACTOR TO ACCOMMODATE FACILITIES/SYSTEMS DESIGNS. SPARE CIRCUIT BREAKERS SHALL HAVE A RATING OF 15 AMPERES.



This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	JBR	1-00
		DATE
DRAWN	JMR	1-00
		DATE
CHECKED		DATE
APPROVED		DATE
UPDATED		DATE

REFERENCE DRAWINGS	
NUMBER	DESCRIPTION

REVISIONS			
NUMBER	DATE	BY	DESCRIPTION

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

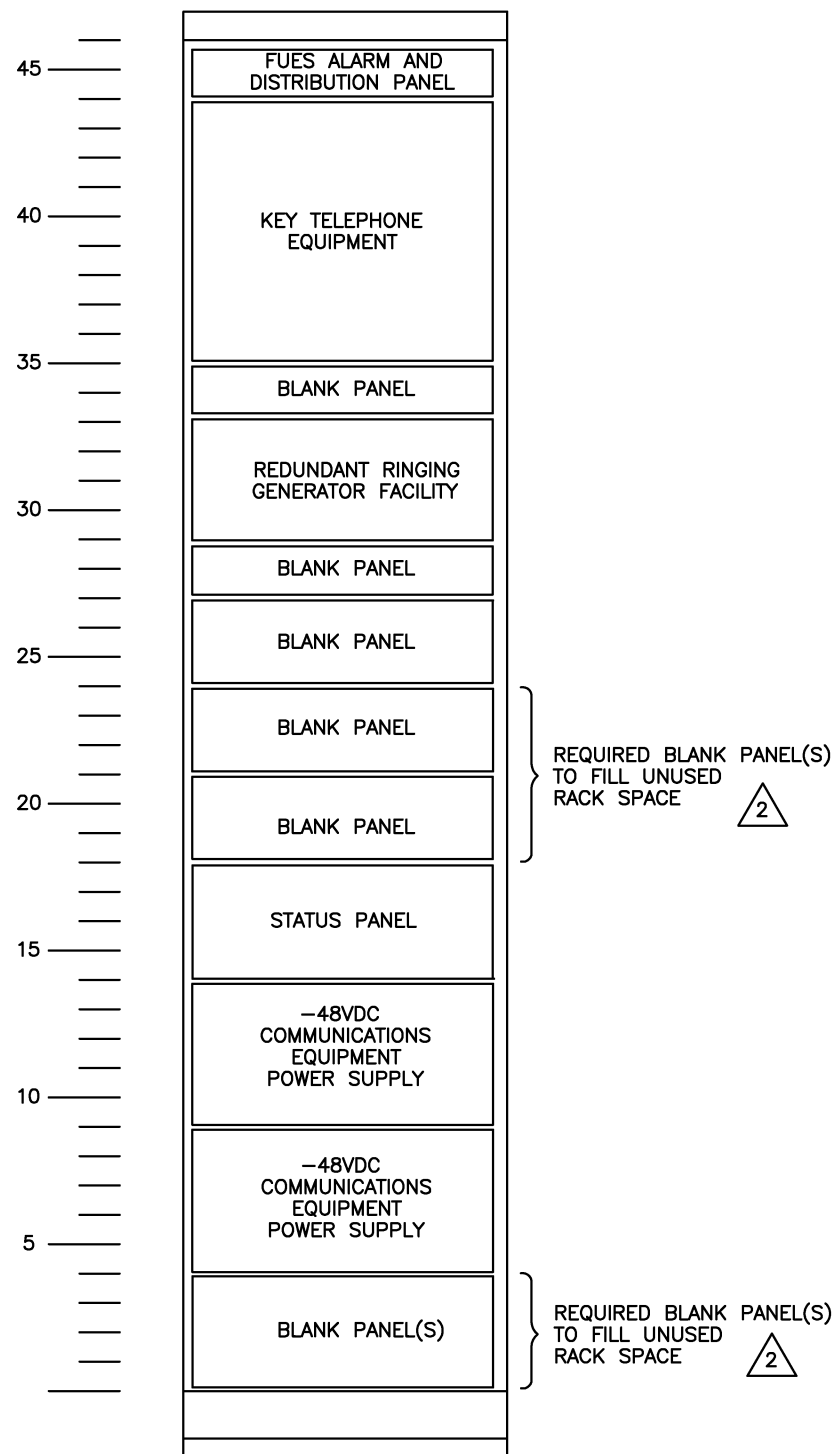
DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____

APPROVED *[Signature]* May 3, 2001
DIRECTOR DATE

TYPICAL KIOSK POWER CIRCUIT DETAILS	
SCALE NONE	DRAWING NO. ST-CM-PWR-006

KEY TELEPHONE/-48 VDC POWER EQUIPMENT RACK



FRONT VIEW

NOTES:

1. THE CONTRACTOR SHALL PROVIDE THE -48 VDC POWER SYSTEM IN THE PROVIDED 23-INCH EQUIPMENT RACK FOR THE KEY TELEPHONE SYSTEM.
2. BLANK PANEL HEIGHTS SHALL NOT BE GREATER THAN 3 RACKS UNITS EACH.
3. BLANK PANELS SHALL BE 0.125 INCHES THICK, ALUMINUM. FINISH SHALL BE CLEAR ANODIZED.
4. BLANK PANEL MOUNTING CUT OUTS SHALL BE IN ACCORDANCE WITH EIA STANDARD RS-310-C.
5. BLANK PANELS INDICATED SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
6. THIS DRAWING SHOWS THE TYPICAL SPACING OF EQUIPMENT. THE CONTRACTOR SHALL DETERMINE THE SPACE REQUIRED FOR THE EQUIPMENT TO BE INSTALLED.
7. THE OPEN EQUIPMENT RACK SHALL HAVE 46 RACK UNITS OF PANEL SPACE AS DETERMINE IN EIA STANDARD RS-310-C.

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	JRR	1-00
		DATE
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		DATE
CHECKED		DATE
APPROVED		DATE
UPDATED		DATE

REFERENCE DRAWINGS	
NUMBER	DESCRIPTION

REVISIONS			
NUMBER	DATE	BY	DESCRIPTION

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

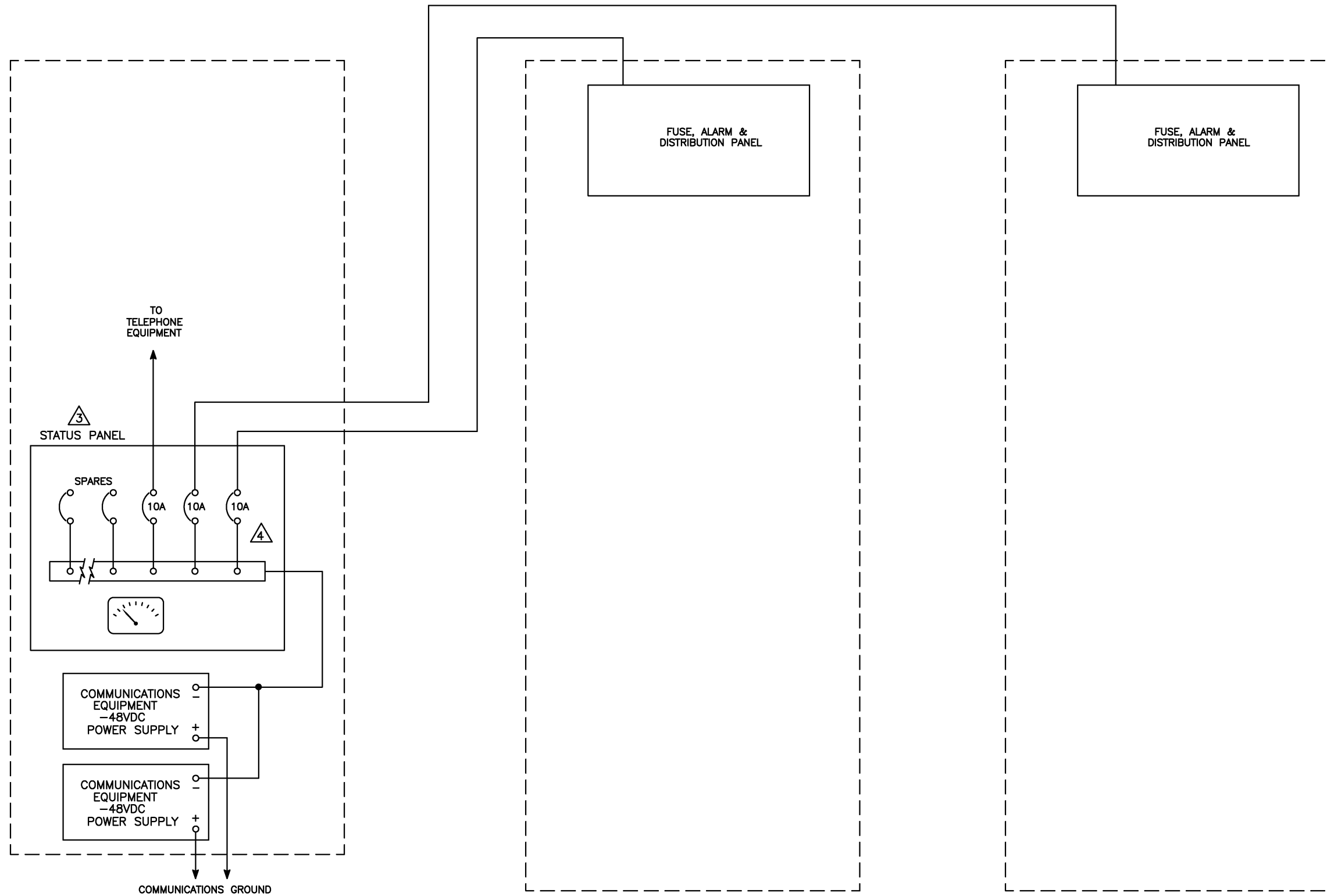
DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____ APPROVED *[Signature]* DIRECTOR May 3, 2001 DATE

-48VDC POWER RACK LAYOUT	
SCALE NONE	DRAWING NO. ST-CM-PWR-007

NOTES:

1. DRAWING SHOWS TYPICAL EQUIPMENT AND CONFIGURATION IN THE COMMUNICATIONS EQUIPMENT ROOM.
 2. PROVIDED EQUIPMENT AND CONFIGURATION MAY VARY IN EACH PASSENGER STATION.
- 3 NOT ALL CONNECTIONS TO THE STATUS PANEL ARE SHOWN.
4 CONTRACTOR SHALL PROVIDE CIRCUIT BREAKERS WITH ANCILLARY ALARM CONTACTS.



KEY TELEPHONE/-48 VDC POWER EQUIPMENT RACK
(23")

CTS
EQUIPMENT RACK
(19")

FOS
EQUIPMENT RACK
(19" OR 23")

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	JRR	1-00
		DATE
DRAWN	JMR	1-00
		DATE
CHECKED		DATE
APPROVED		DATE
UPDATED		DATE

REFERENCE DRAWINGS	
NUMBER	DESCRIPTION

REVISIONS		
DATE	BY	DESCRIPTION
08/2001	SYSP	Revised and issued by the Authority

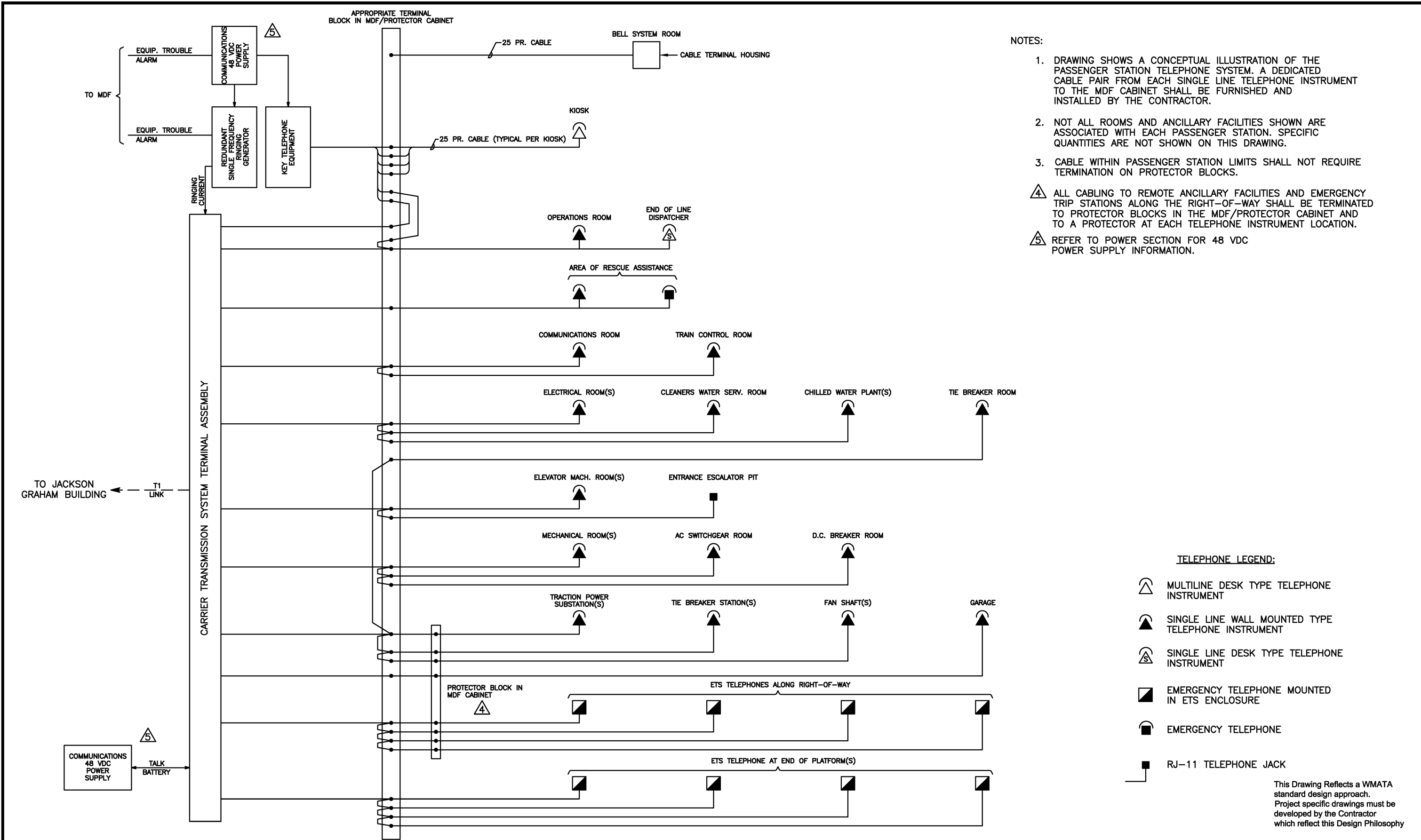
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____

APPROVED *[Signature]* May 3, 2001
DIRECTOR DATE







SCALE NONE	DRAWING NO. ST-CM-PWR-008
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NOTES:

1. DRAWING SHOWS A CONCEPTUAL ILLUSTRATION OF THE PASSENGER STATION TELEPHONE SYSTEM. A DEDICATED CABLE PAIR FROM EACH SINGLE LINE TELEPHONE INSTRUMENT TO THE MDF CABINET SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
2. NOT ALL ROOMS AND ANCILLARY FACILITIES SHOWN ARE ASSOCIATED WITH EACH PASSENGER STATION. SPECIFIC QUANTITIES ARE NOT SHOWN ON THIS DRAWING.
3. CABLE WITHIN PASSENGER STATION LIMITS SHALL NOT REQUIRE TERMINATION ON PROTECTOR BLOCKS.
4. ALL CABLING TO REMOTE ANCILLARY FACILITIES AND EMERGENCY TRIP STATIONS ALONG THE RIGHT-OF-WAY SHALL BE TERMINATED TO PROTECTOR BLOCKS IN THE MDF/PROTECTOR CABINET AND TO A PROTECTOR AT EACH TELEPHONE INSTRUMENT LOCATION.
5. REFER TO POWER SECTION FOR 48 VDC POWER SUPPLY INFORMATION.

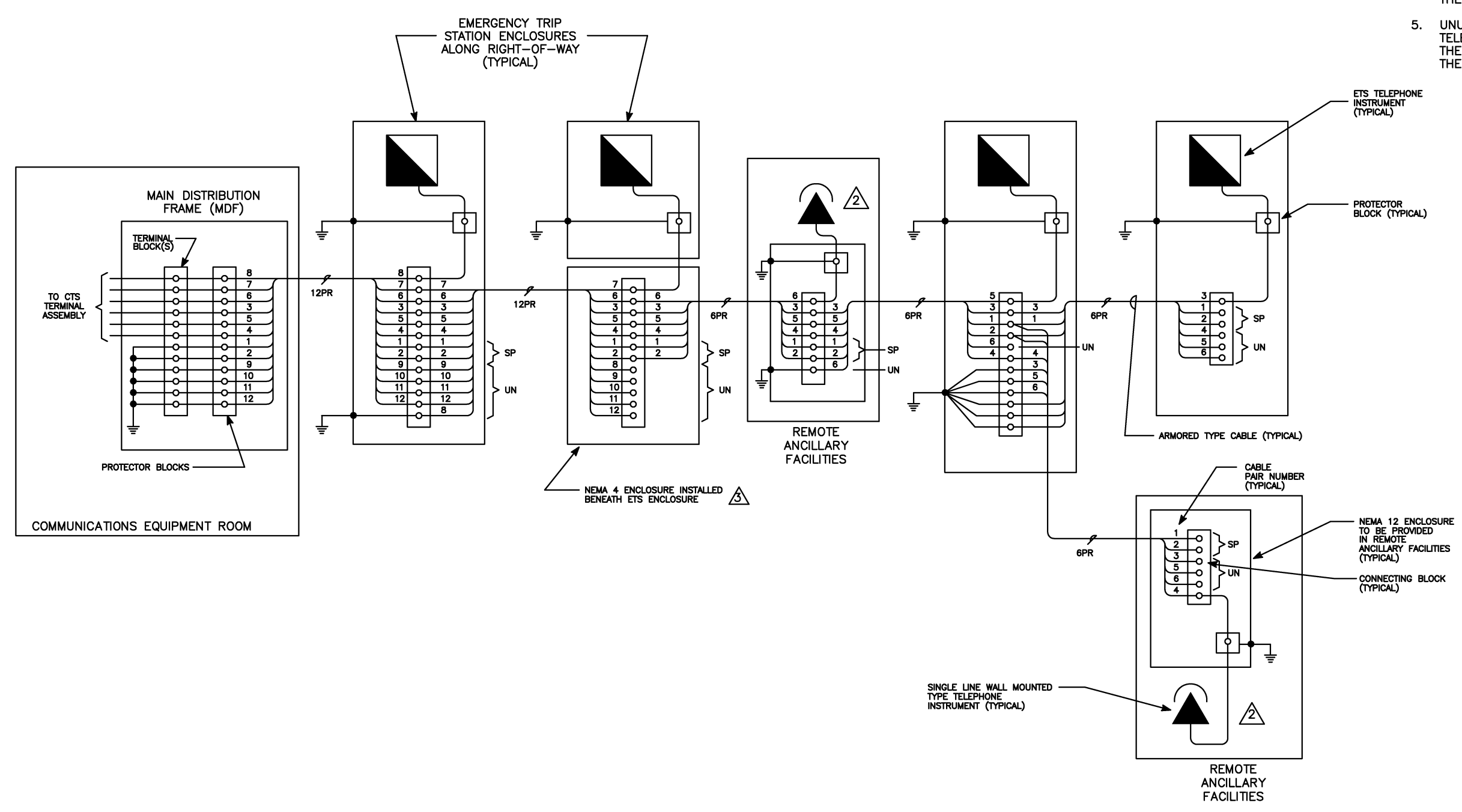
TELEPHONE LEGEND:

-  MULTILINE DESK TYPE TELEPHONE INSTRUMENT
-  SINGLE LINE WALL MOUNTED TYPE TELEPHONE INSTRUMENT
-  SINGLE LINE DESK TYPE TELEPHONE INSTRUMENT
-  EMERGENCY TELEPHONE MOUNTED IN ETS ENCLOSURE
-  EMERGENCY TELEPHONE
-  RJ-11 TELEPHONE JACK

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED <u>JRR</u> 1-00 DATE DRAWN <u>JMR</u> 1-00 DATE CHECKED _____ DATE APPROVED _____ DATE UPDATED _____ DATE	REFERENCE DRAWINGS <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NUMBER</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	NUMBER	DESCRIPTION									REVISIONS <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>DATE</th> <th>BY</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>08/2001</td> <td>SYSP</td> <td>Revised and issued by the Authority</td> </tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	DATE	BY	DESCRIPTION	08/2001	SYSP	Revised and issued by the Authority										WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF SYSTEMS SUBMITTED _____ DATE _____ APPROVED  DIRECTOR May 3, 2001 DATE	TYPICAL TELEPHONE SYSTEM BLOCK DIAGRAM SCALE NONE DRAWING NO. ST-CM-TEL-001
NUMBER	DESCRIPTION																												
DATE	BY	DESCRIPTION																											
08/2001	SYSP	Revised and issued by the Authority																											

- NOTES:
- DRAWING SHOWS A TYPICAL ARMORED TELEPHONE CABLE RUN TO TELEPHONE INSTRUMENTS ALONG THE RIGHT-OF-WAY.
 - THE TELEPHONE INSTRUMENT IN EACH REMOTE ANCILLARY FACILITIES IS MOUNTED TO THE ASSOCIATED NEMA 12 ENCLOSURE.
 - ENCLOSURE SHALL BE PROVIDED BY THE CONTRACTOR, WHEN REQUIRED.
 - CABLE PAIRS NO. 1 AND NO. 2 SHALL BE ASSIGNED AS SPARES IN EACH ARMORED TELEPHONE CABLE OF THE CABLE RUN (CONTINUOUSLY WIRED TO THE COMMUNICATIONS EQUIPMENT ROOM).
 - UNUSED PAIRS SHALL BE GROUNDED AT THE TELEPHONE INSTRUMENT LOCATION NEAREST TO THE COMMUNICATIONS EQUIPMENT ROOM, VIA THE GROUNDED STUD AT THAT LOCATION.



- LEGEND:
- UN = UNASSIGNED
 - SP = SPARE
 - ETS = EMERGENCY TRIP STATION
 - PR = PAIRS IN CABLE

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	JRR	1-00
		DATE
DRAWN	JMR	1-00
		DATE
CHECKED		DATE
APPROVED		DATE
UPDATED		DATE

REFERENCE DRAWINGS	
NUMBER	DESCRIPTION

REVISIONS		
DATE	BY	DESCRIPTION
08/2001	SYSP	Revised and issued by the Authority

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

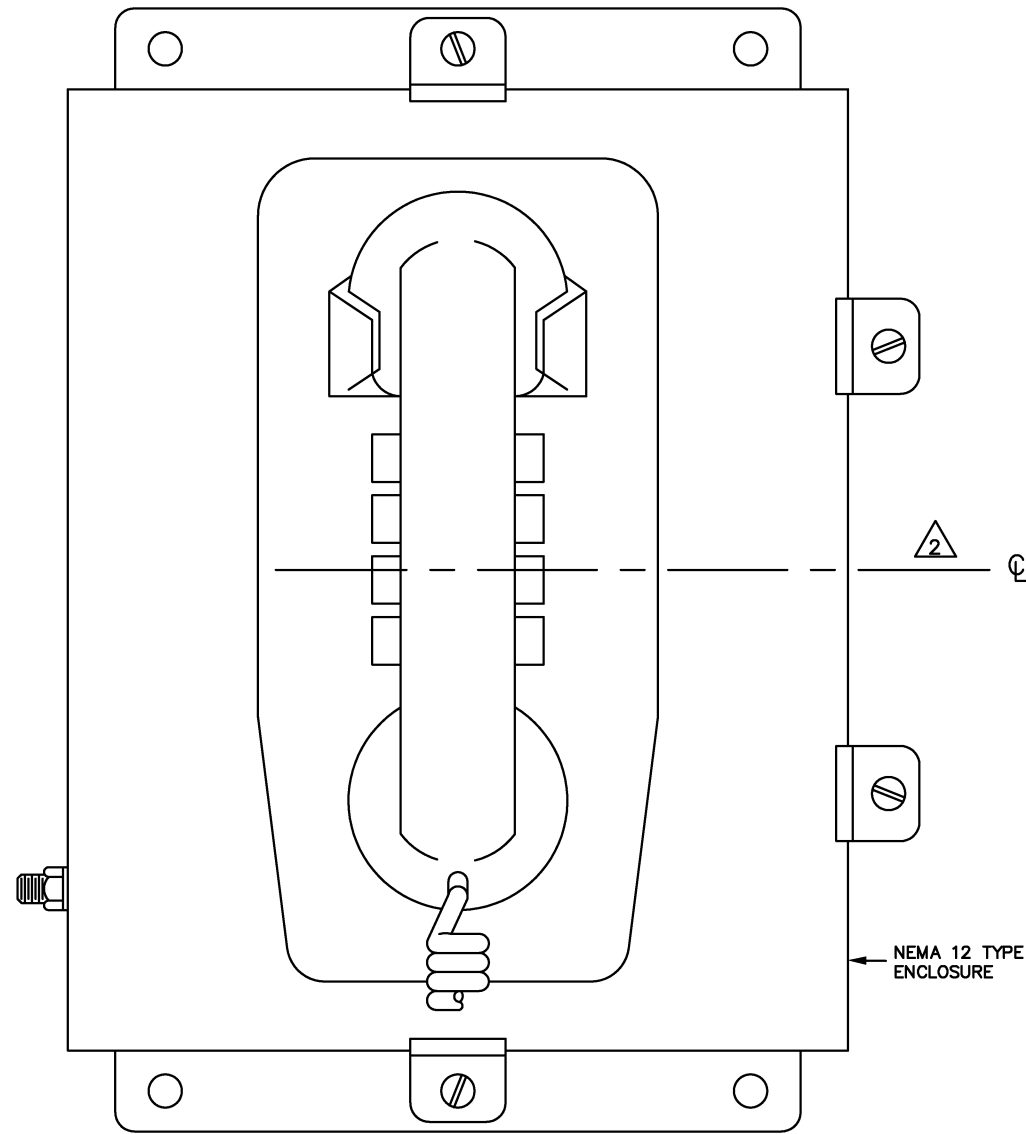
DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____ APPROVED *[Signature]* May 3, 2001
DIRECTOR DATE

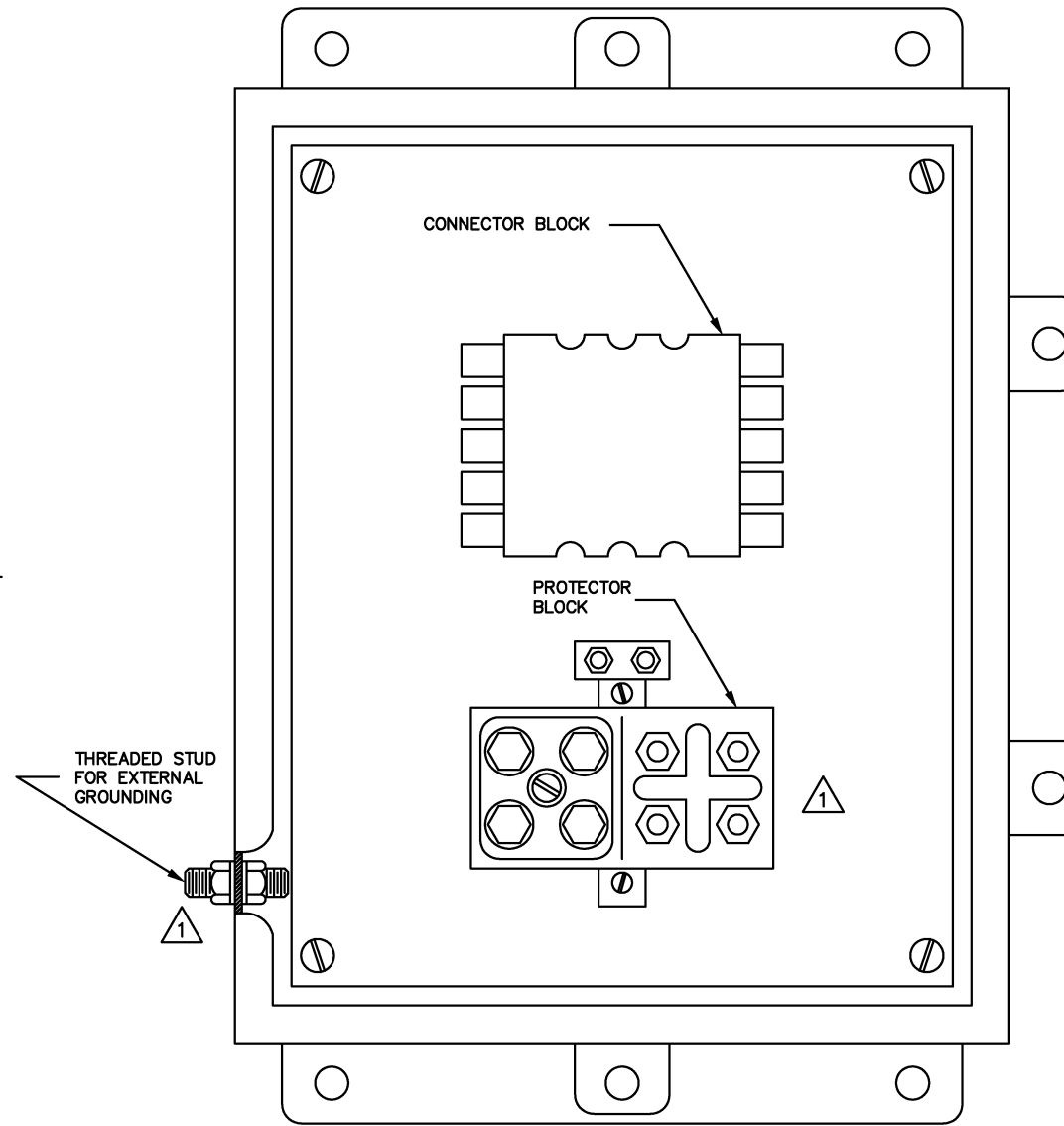
TYPICAL CABLING DETAILS FOR TELEPHONE INSTRUMENTS ALONG RIGHT-OF-WAY	
SCALE NONE	DRAWING NO. ST-CM-TEL-002

NOTES:

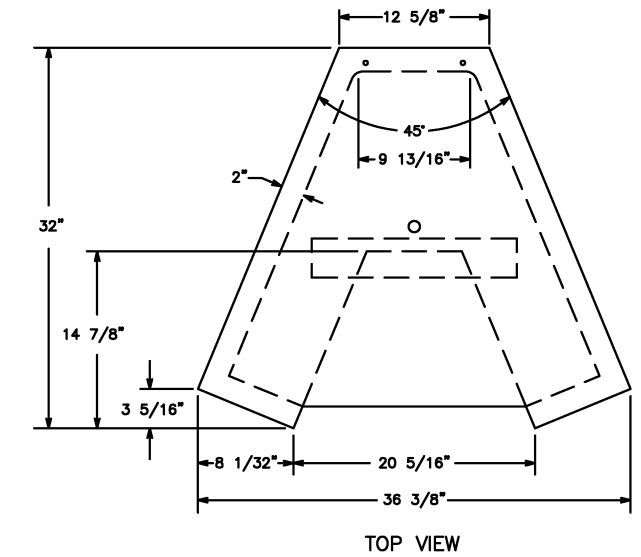
- ① PROTECTOR BLOCKS AND EXTERNAL GROUNDING STUDS SHALL BE FURNISHED AND INSTALLED IN REMOTE LOCATIONS ONLY.
- ② ϕ OF WALL MOUNT PHONES SHALL NOT EXCEED 54 INCHES. FROM FINISHED FLOOR LEVEL.



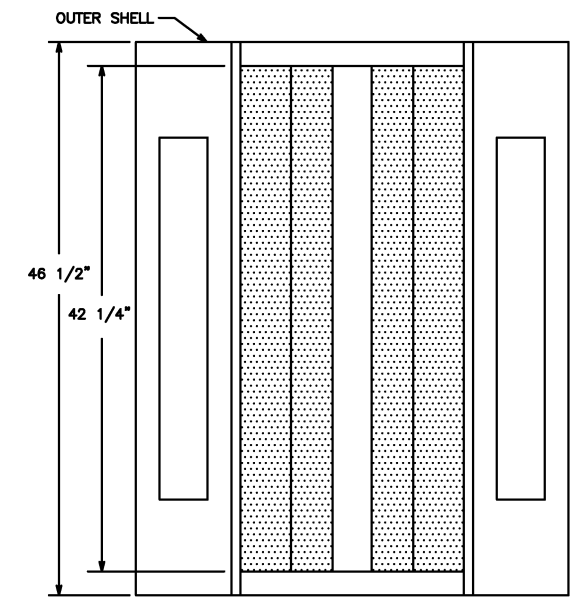
FRONT VIEW



WALL MOUNTED TELEPHONE
CONNECTOR BLOCK AND PROTECTOR
BLOCK DETAILS



TOP VIEW



FRONT VIEW

TELEPHONE BOOTH

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

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		DATE
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		DATE
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APPROVED		DATE
UPDATED		DATE

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DATE	BY	DESCRIPTION
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WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____

APPROVED DIRECTOR *[Signature]* May 3, 2001 DATE

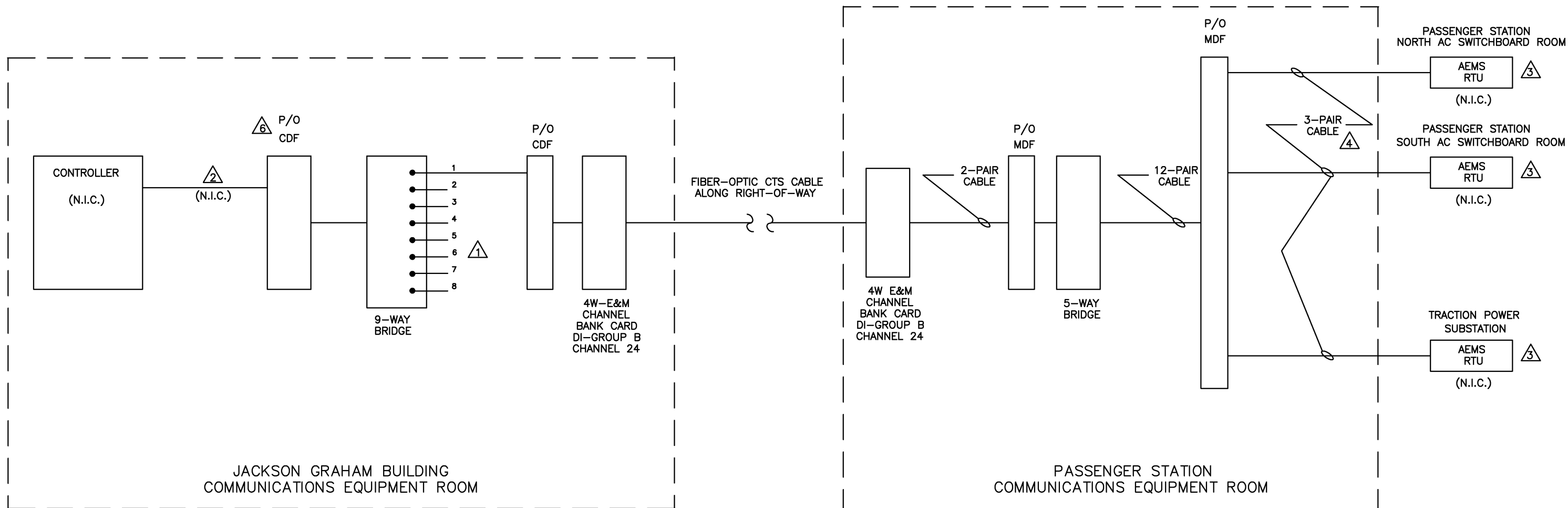
TYPICAL WALL MOUNTED TELEPHONE AND BOOTH INSTALLATION DETAILS

SCALE NONE

DRAWING NO. ST-CM-TEL-003

NOTES:

- 1 REMAINING PORTS TO BE USED FOR FUTURE STATIONS.
- 2 TO BE WIRED BY OTHERS.
- 3 RTU'S TO BE PROVIDED BY OTHERS.
- 4 CABLE PAIRS OUTSIDE OF THE STATION SHALL BE ARMORED DIRECT BURIAL TYPE, TO BE TERMINATED ON PROTECTOR BLOCKS AT BOTH ENDS.
- 5. ALL CABLES BETWEEN RTU'S AND CHANNEL BANKS AND CONTROLLER TO CHANNEL BANKS SHALL BE SHIELDED.
- 6 THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER TO OBTAIN CDF WIRING BLOCK ASSIGNMENTS.



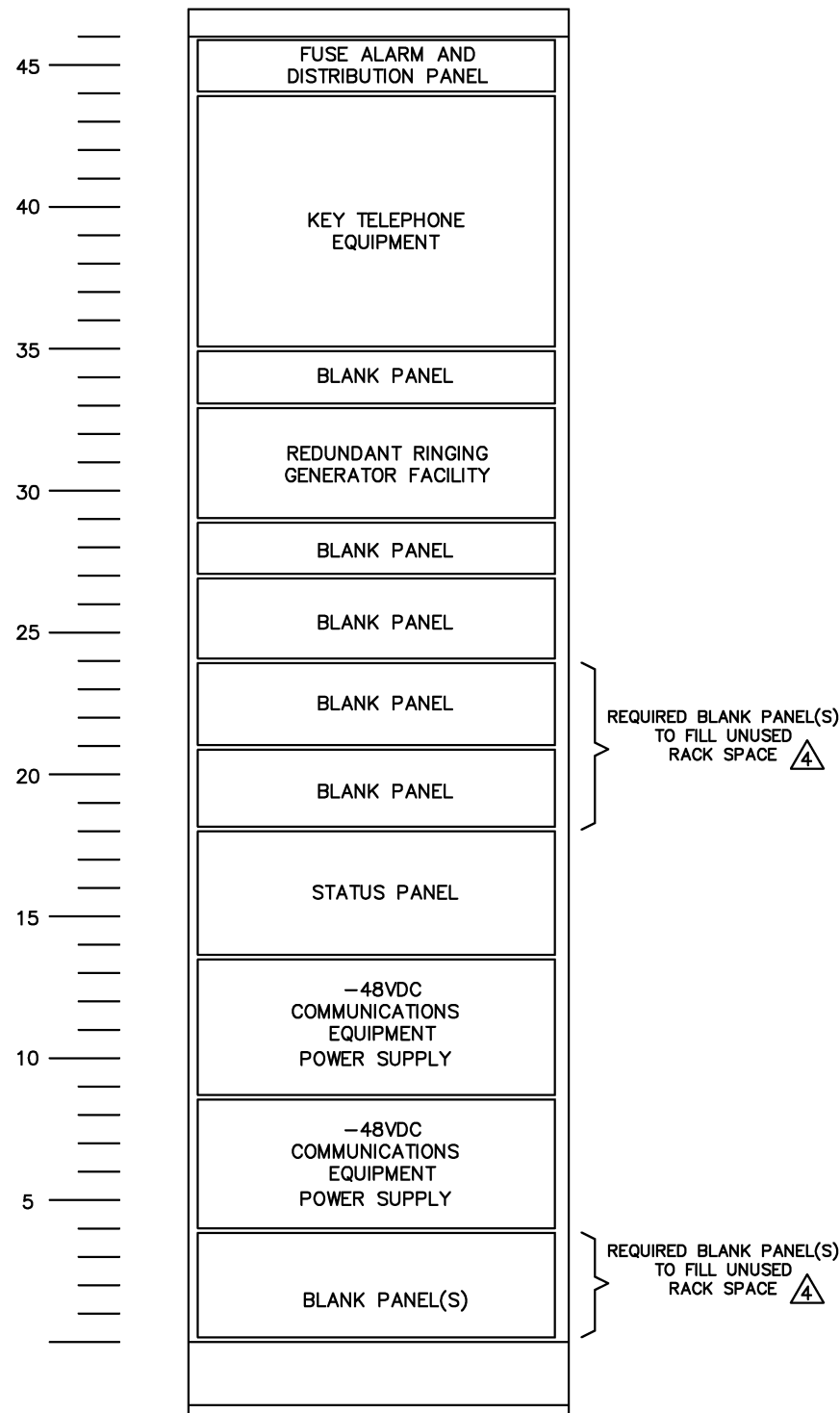
This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	JRR	12-99	DATE	REFERENCE DRAWINGS		REVISIONS	
DRAWN	JMR	12-99	DATE	NUMBER	DESCRIPTION	DATE	BY
CHECKED			DATE			08/2001	SYSP
APPROVED			DATE				
UPDATED			DATE				

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
 DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
 OFFICE OF SYSTEMS
 SUBMITTED _____ DATE _____ APPROVED *[Signature]* May 3, 2001 DATE _____
 DIRECTOR

TYPICAL AUTOMATIC ENERGY MANAGEMENT SYSTEM (AEMS)
 SCALE NONE DRAWING NO. ST-CM-TEL-004

KEY TELEPHONE/-48 VDC POWER
EQUIPMENT RACK



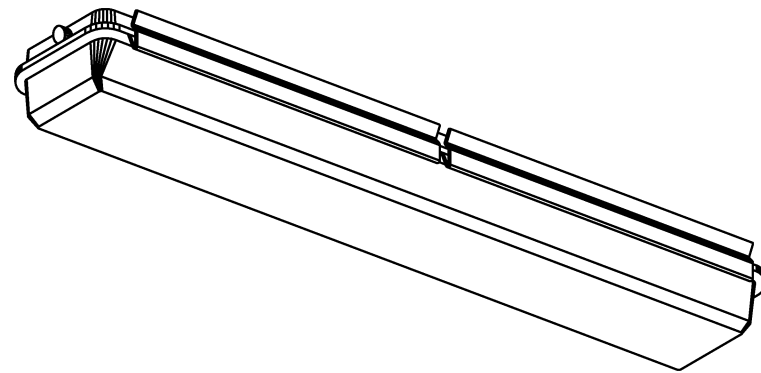
FRONT VIEW

NOTES:

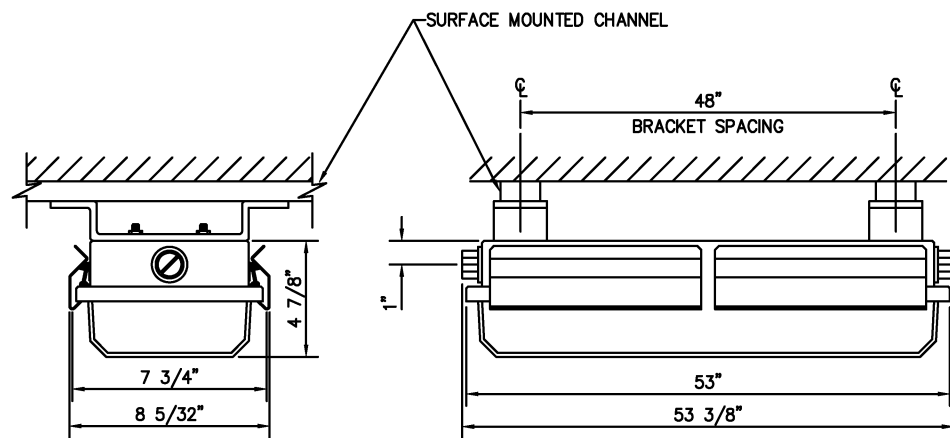
1. CONTRACTOR SHALL PROVIDE A 23-INCH OPEN EQUIPMENT RACK FOR THE PASSENGER STATION TELEPHONE SYSTEM.
2. THE OPEN EQUIPMENT RACK SHALL HAVE 46 RACK UNITS OF PANEL SPACE AS DEFINED IN EIA STANDARD RS-310-C.
3. BLANK PANELS INDICATED SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
4. BLANK PANEL HEIGHTS SHALL NOT BE GREATER THAN 3 RACK UNITS EACH.
5. BLANK PANELS SHALL BE 0.125 INCHES THICK ALUMINUM. FINISH SHALL BE CLEAR ANODIZED.
6. BLANK PANEL MOUNTING CUT OUTS SHALL BE IN ACCORDANCE WITH EIA STANDARD RS-310-C.
7. THIS DRAWING SHOWS THE TYPICAL SPACING OF EQUIPMENT. THE CONTRACTOR SHALL DETERMINE THE SPACE REQUIRED FOR THE EQUIPMENT TO BE INSTALLED.

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

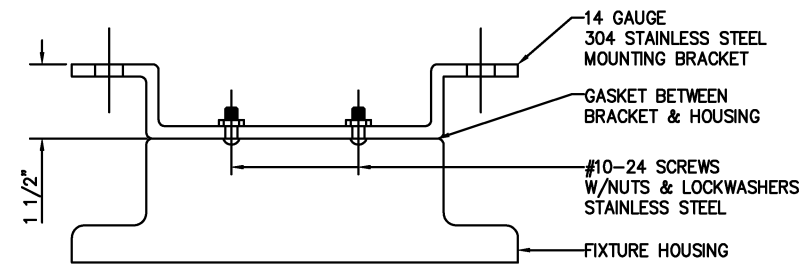
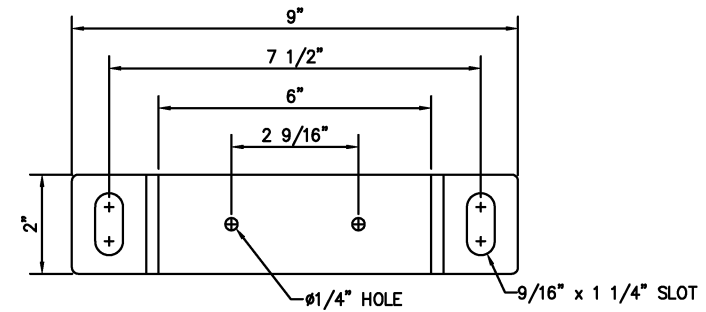
DESIGNED <u>JRR</u> 1-00 DATE DRAWN <u>JMR</u> 1-00 DATE CHECKED _____ DATE APPROVED _____ DATE UPDATED _____ DATE	REFERENCE DRAWINGS <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NUMBER</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	NUMBER	DESCRIPTION											REVISIONS <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>DATE</th> <th>BY</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>08/2001</td> <td>SYSP</td> <td>Revised and issued by the Authority</td> </tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	DATE	BY	DESCRIPTION	08/2001	SYSP	Revised and issued by the Authority										WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF SYSTEMS SUBMITTED _____ DATE _____ APPROVED <u>[Signature]</u> May 3, 2001 DIRECTOR DATE	KEY TELEPHONE EQUIPMENT RACK LAYOUT SCALE NONE DRAWING NO. ST-CM-TEL-005
NUMBER	DESCRIPTION																														
DATE	BY	DESCRIPTION																													
08/2001	SYSP	Revised and issued by the Authority																													



FIXTURE TYPE 4
(TYPE 4A IS TWO-IN-TANDEM TYPE 4 FIXTURES - SEE NOTE 4)



MOUNTING DETAIL



BRACKET DETAIL

NOTES:

1. FIXTURE MANUFACTURED BY GUTH LIGHTINGS "RAILTITE" MODEL GAR OR APPROVED EQUAL WITH ONE F32T8/WW RAPID START LAMP. BALLAST TO BE HIGH POWER FACTOR TYPE.
2. FIXTURE TYPE 4 IS USED IN TUNNEL AREAS, SURFACE MOUNTED, AND SUITABLE FOR HIGH PRESSURE HOSE DOWN CAPABILITY.
3. INSTALL WALL MOUNTED FIXTURES WITH THE COVER HINGE ON TOPSIDE.
4. INSTALL TYPE 4A OVER SAFETY WALK IN DOUBLE-TRACK TUNNELS WITH CENTER SAFETY WALK.

DESIGNED	D. VANCOTT	1-97
		DATE
DRAWN	L. POWELL	1-97
		DATE
CHECKED	J. KROLIK	1-97
		DATE
APPROVED	R. GANERWAL	1-97
		DATE

REFERENCE DRAWINGS	
NUMBER	DESCRIPTION

REVISIONS		
DATE	BY	DESCRIPTION
08/2001	ENGA	Revised and issued by the Authority

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

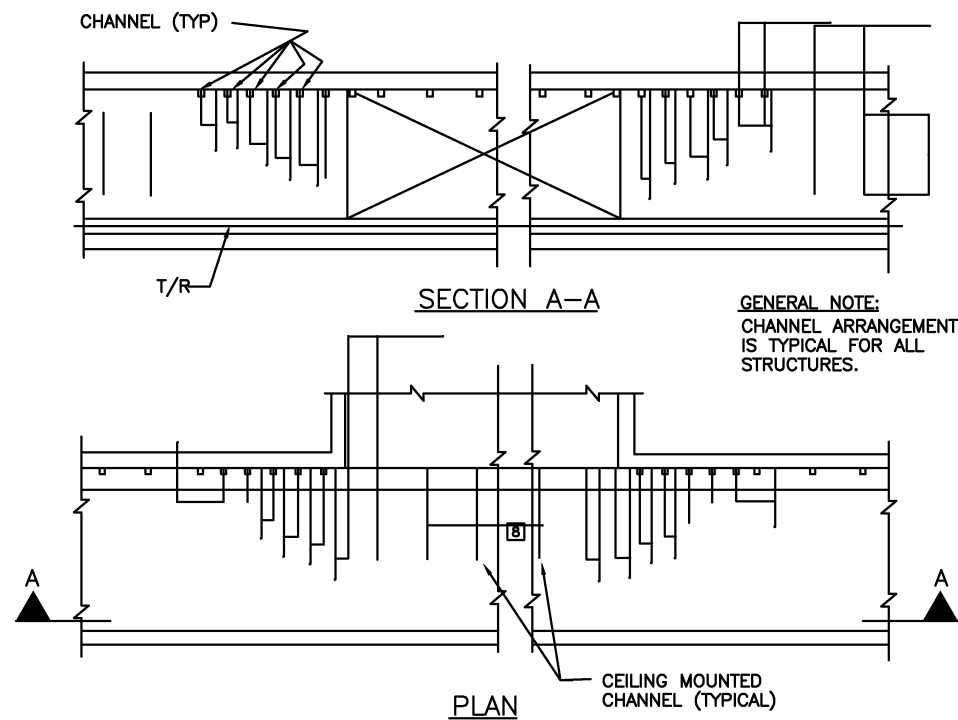
SUBMITTED _____ DATE _____

APPROVED *[Signature]* May 3, 2001
DIRECTOR DATE

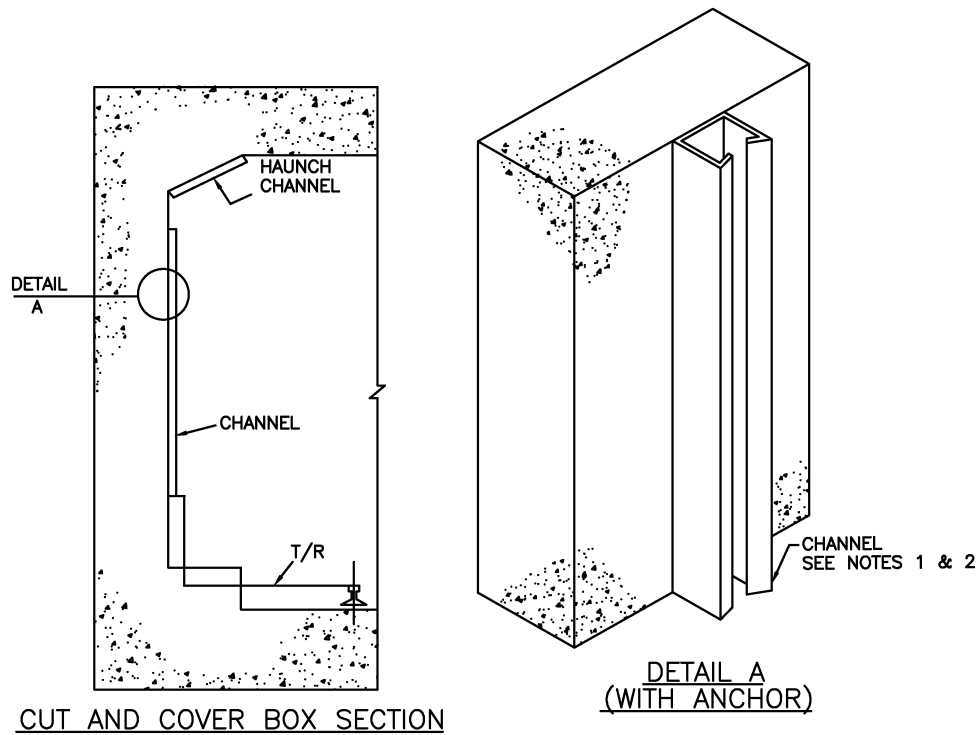
ELECTRICAL STANDARD DRAWING
TUNNEL LIGHT FIXTURE TYPE 4/4A

SCALE _____ DRAWING NO. ST-E-014

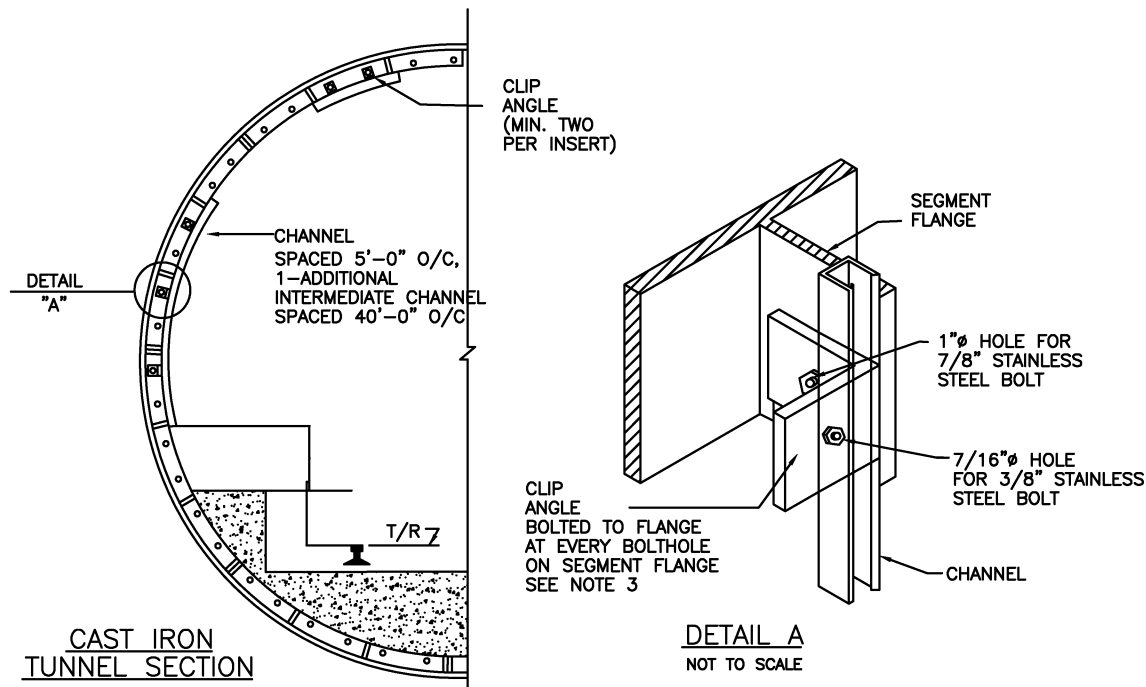
N.T.S.



CHANNEL ARRANGEMENT TO CIRCUMVENT
FULL OPENING IN TUNNEL WALL
DETAIL No 10



CHANNEL MOUNTING FOR
REINFORCED CONCRETE SECTION
DETAIL NO. 12



CAST IRON
TUNNEL SECTION
& FABRICATED STEEL
TUNNEL SECTION
CHANNEL MOUNTING
FOR CIRCULAR EARTH TUNNEL
DETAIL NO.14

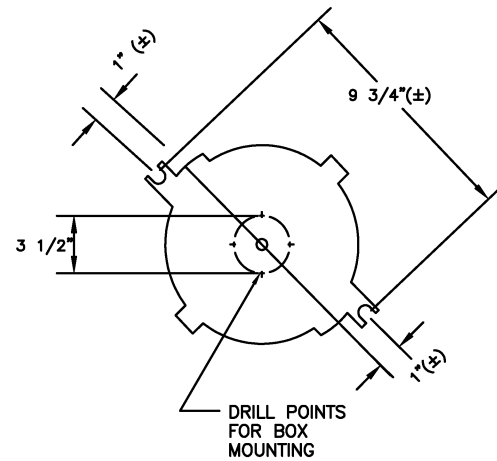
NOTES

1. CHANNEL SHALL BE ALIGNED VERTICALLY. HAUNCH CHANNEL SHALL LINE UP WITH WALL CHANNEL.
2. CHANNEL SHALL BE MOUNTED WITH 3/8" SELF-DRILLED STAINLESS STEEL EXPANSION BOLTS 16" ON CENTER MAXIMUM SO AS TO PROVIDE A MINIMUM PULL-OUT LOAD RATING OF 1000 POUND PER LINEAR FOOT OF CHANNEL. THE MINIMUM EMBEDMENT OF EXPANSION BOLTS SHALL BE 3 1/2".
3. SURFACE CHANNEL SHALL BE MOUNTED USING 3/8" STAINLESS STEEL BOLTS TO CLIP ANGLES 16" ON CENTER SO AS TO PROVIDE A MINIMUM PULL-OUT LOAD RATING OF 1000 POUNDS PER LINEAR FOOT.

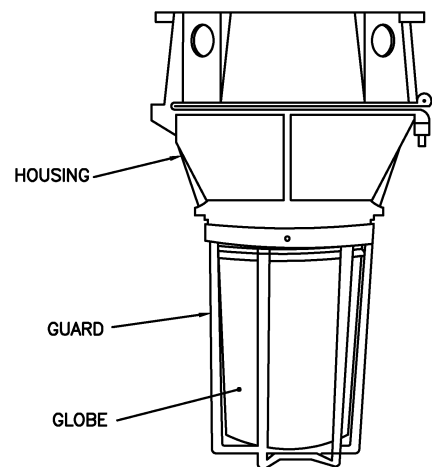
DESIGNED			REFERENCE DRAWINGS		REVISIONS		
NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
LEVINE		11-88					
PRYOR		11-88	08/2001	ENGA			Revised and issued by the Authority
W. PREECE		12-88					
K. KNIGHT		12-88					
R. GANERIWAL		12-88					

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF ENGINEERING AND ARCHITECTURE	
SUBMITTED	DATE
APPROVED DIRECTOR	DATE

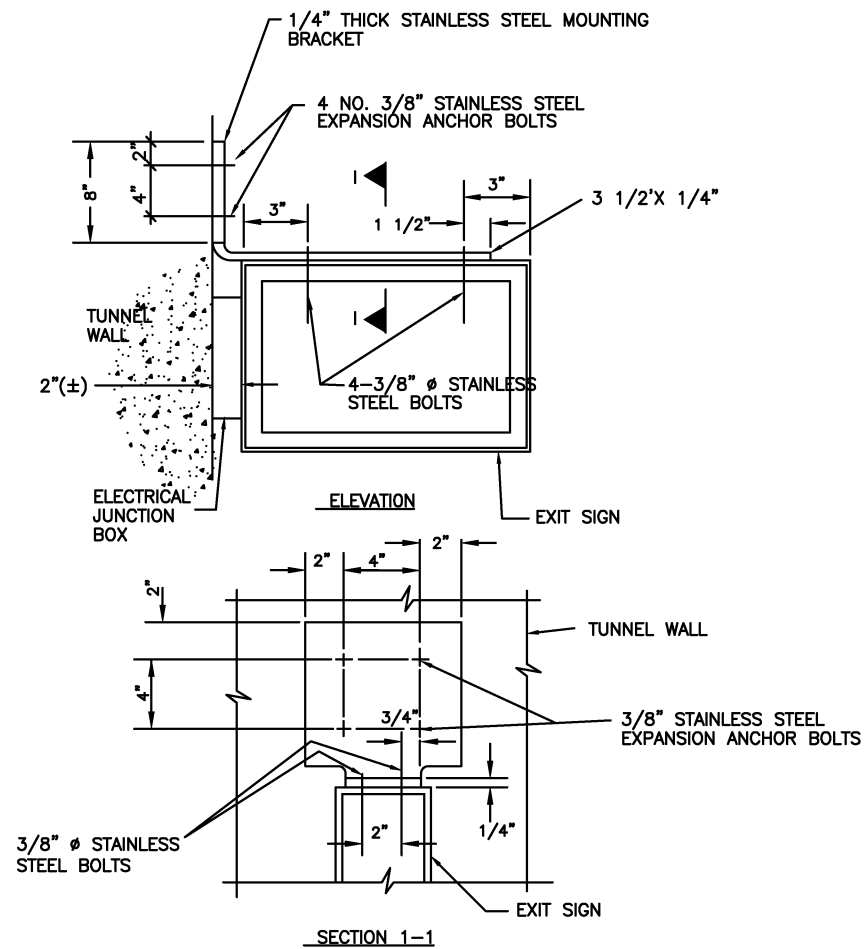
ELECTRICAL STANDARD DRAWING MISCELLANEOUS DETAILS	
SCALE	DRAWING NO.
1/8"=1'-0"	ST-E-015



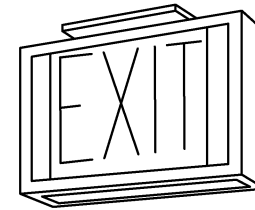
BASE PLATE DETAIL
TYPE 7A FIXTURE



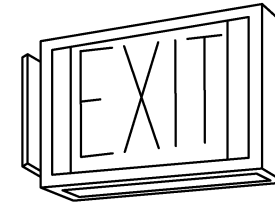
TYPE 7A FIXTURE



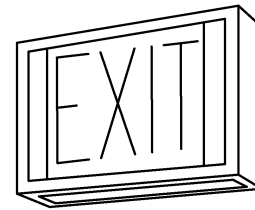
MOUNTING DETAIL FOR TYPE "X" FIXTURE
FIXTURE LOCATED ADJACENT TO TRACK IN TUNNEL



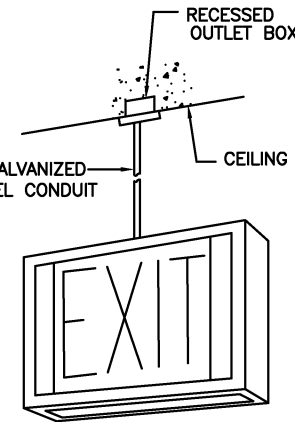
TOP MOUNTED



SIDE MOUNTED



BACK MOUNTED

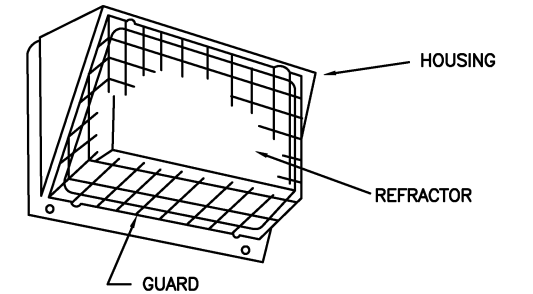


PENDANT MOUNTED

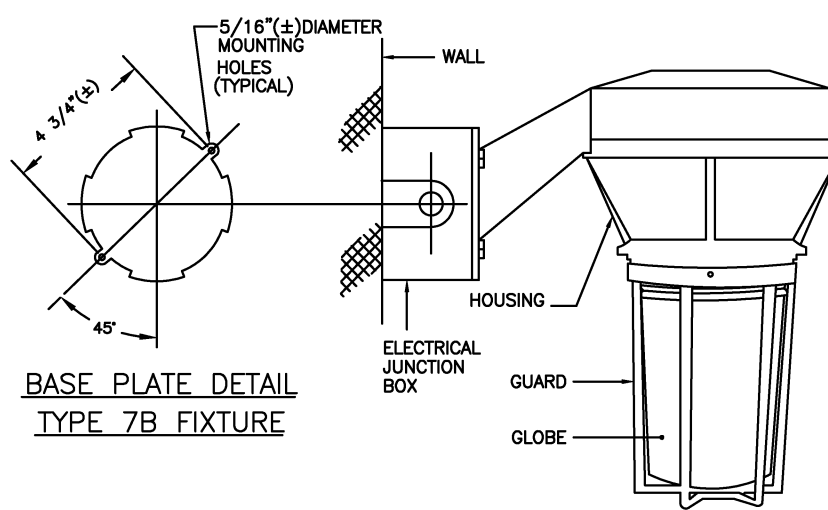
TYPE "X" FIXTURE

FIXTURE TYPE 7A,7B & 7C
USE IN VENT AND FAN SHAFTS

FIXTURE TYPE 8
USE IN SUBSTATION TRANSFORMER COURT
YARD, BUILDING EXTERIOR WALL.

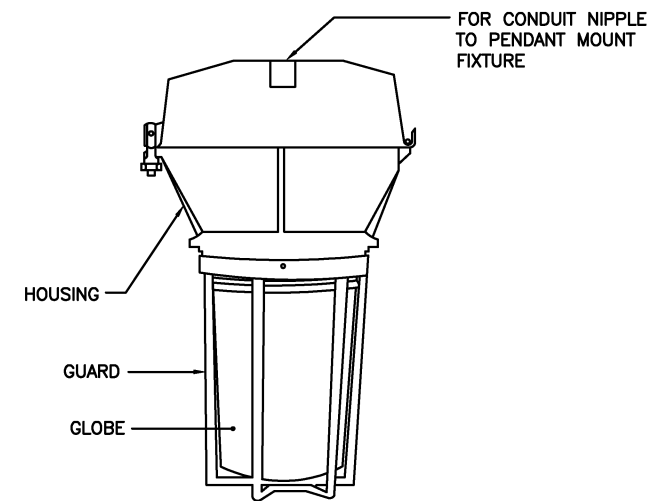


TYPE 8 FIXTURE



BASE PLATE DETAIL
TYPE 7B FIXTURE

TYPE 7B FIXTURE



TYPE 7C FIXTURE

DESIGNED	DATE	REFERENCE DRAWINGS		REVISIONS	
		NUMBER	DESCRIPTION	DATE	DESCRIPTION
D. VANCOTT	7-83			08/2001	Revised and issued by the Authority
MASSEY	7-83				
CHU	9-84				
PRASAD	10-88				

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

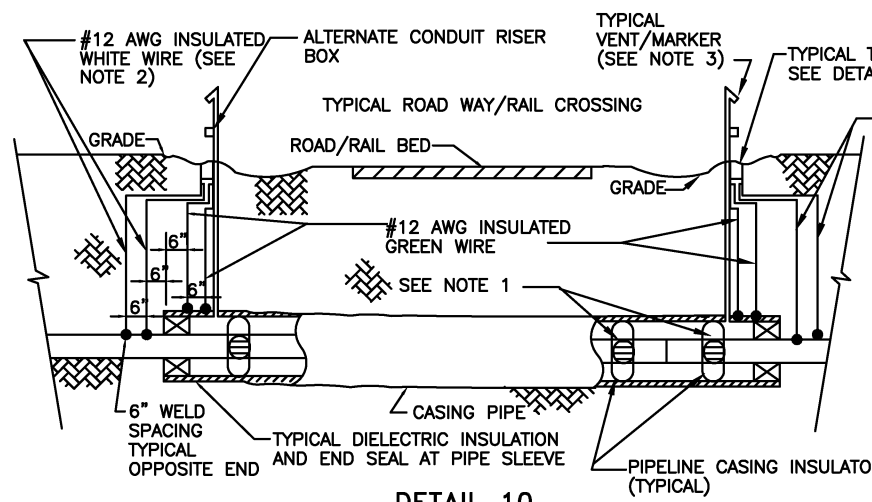
SUBMITTED _____ DATE _____

APPROVED *[Signature]* May 3, 2001
DIRECTOR DATE

ELECTRICAL STANDARD DRAWING
LIGHT FIXTURE TYPES X,7A,7B AND 8

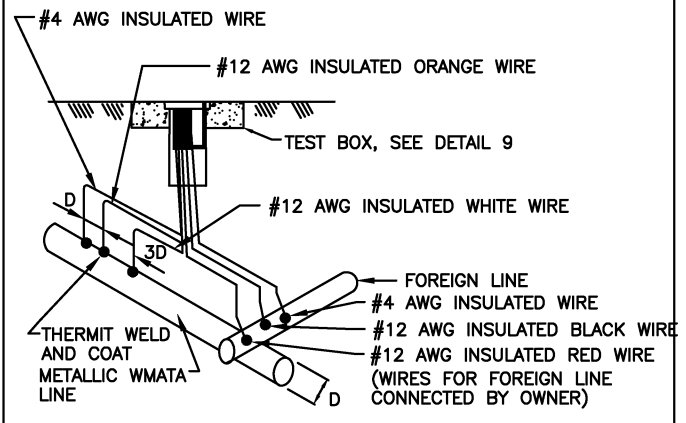
SCALE
N.T.S.

DRAWING NO.
ST-E-026

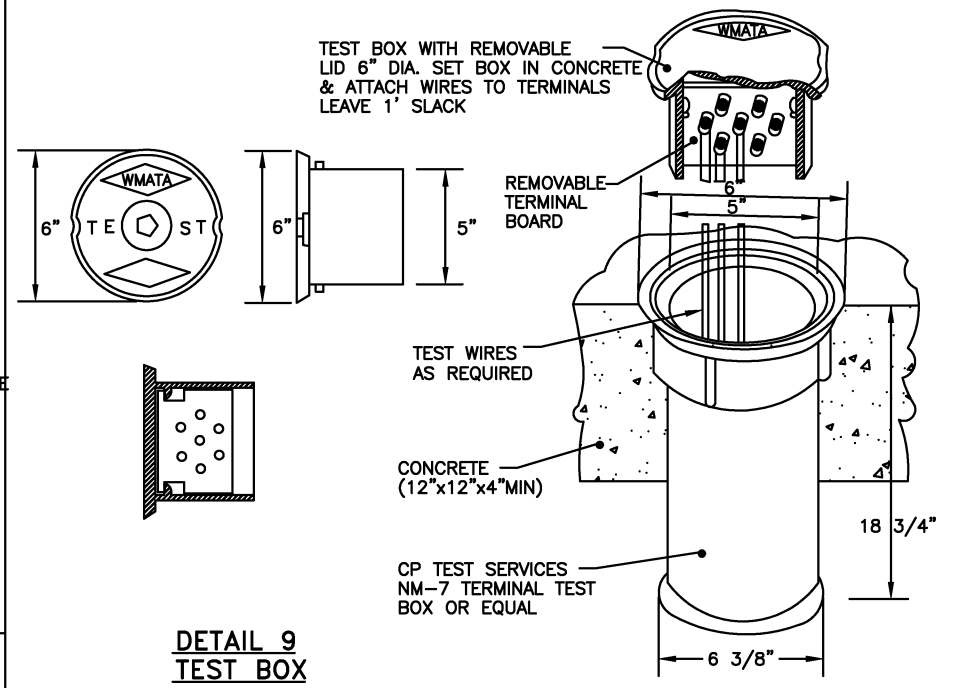


DETAIL 10
TEST WIRES FOR ENCASED
PIPE & ROADWAY/RAIL CROSSING

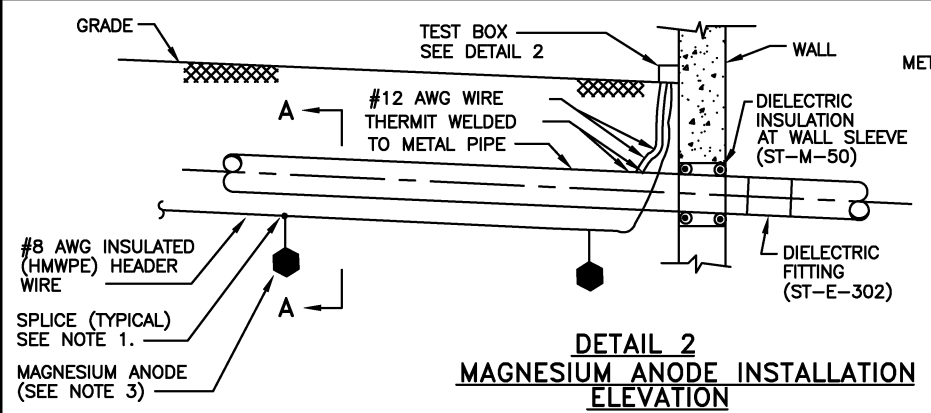
- NOTES:**
1. CASING INSULATORS SHALL BE INSTALLED AT A MAXIMUM SPACING OF 10 FEET. ADDITIONAL INSULATORS SHALL BE INSTALLED A MAXIMUM OF 12 INCHES FROM CASING ENDS.
 2. WHITE WIRE SHALL BE PLACED ON THE NORTH OR EAST END OF THE ENCASED PIPE OR DIELECTRIC INSULATOR.
 3. VENT/MARKER MAY BE OPTIONAL AND SHALL COMPLY WITH LOCAL CODE AND PIPE LINE COMPANY REQUIREMENTS. COORDINATE THE LOCATION OF VENT/MARKER WITH WIRES, CASING INSULATORS AND END SEALS.



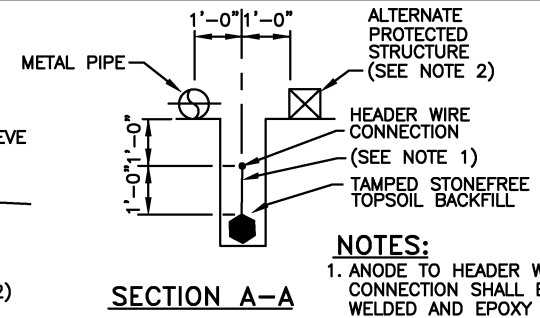
DETAIL 7
TEST STATION



DETAIL 9
TEST BOX

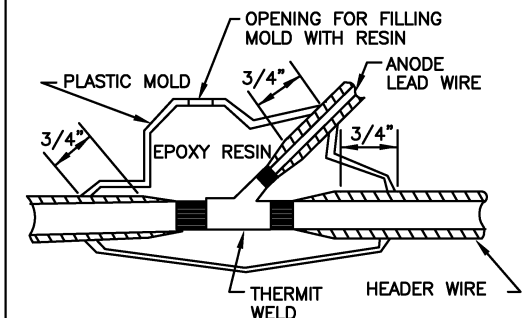


DETAIL 2
MAGNESIUM ANODE INSTALLATION
ELEVATION

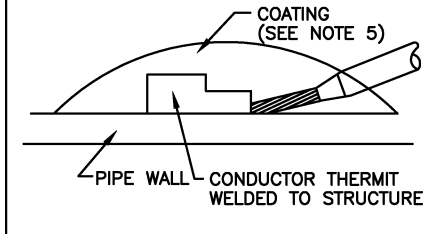


SECTION A-A

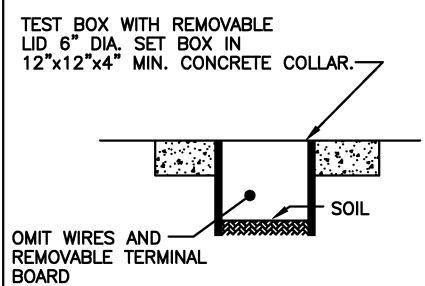
- NOTES:**
1. ANODE TO HEADER WIRE CONNECTION SHALL BE THERMIT WELDED AND EPOXY ENCAPSULATED (DETAIL 5)
 2. SIMILAR ANODE-TO-STRUCTURE DISTANCE SHALL APPLY TO OTHER STRUCTURES, SUCH AS TANKS, PILES, AND PIPING CONDUIT.
 3. PROVIDE ANODE SIZE, TYPE AND SPACING AS SHOWN ON CATHODIC PROTECTION PLAN.



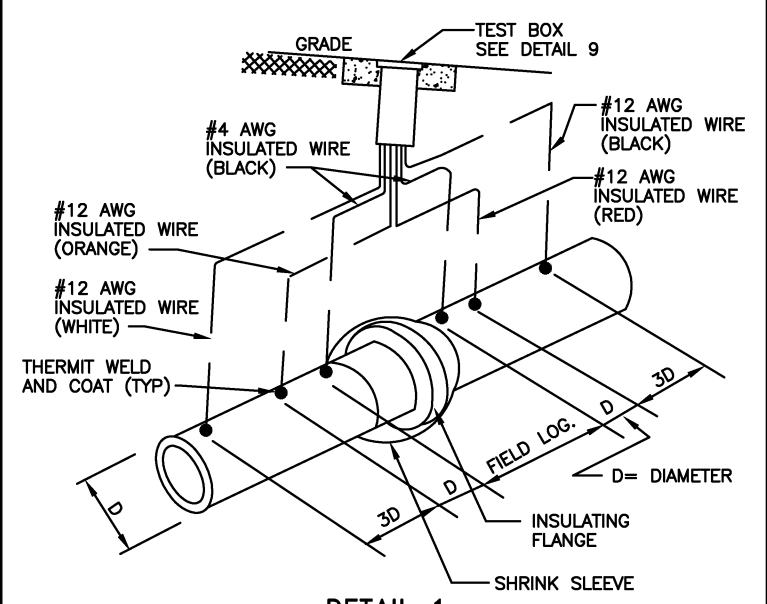
DETAIL 5
EPOXY INSULATED CABLE SPLICE



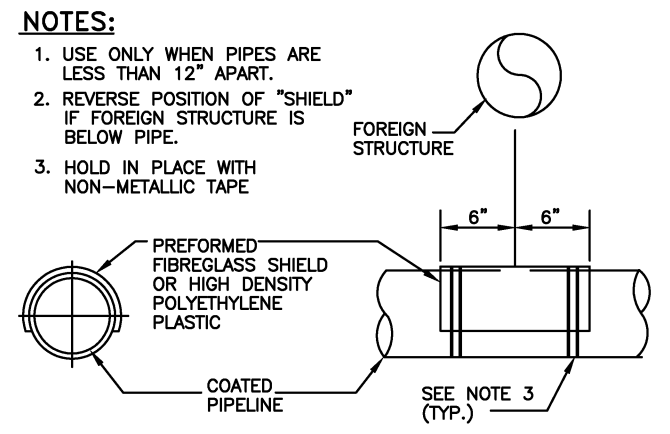
DETAIL 4
BOND TO PIPES



DETAIL 3
TEST ACCESS HOLE

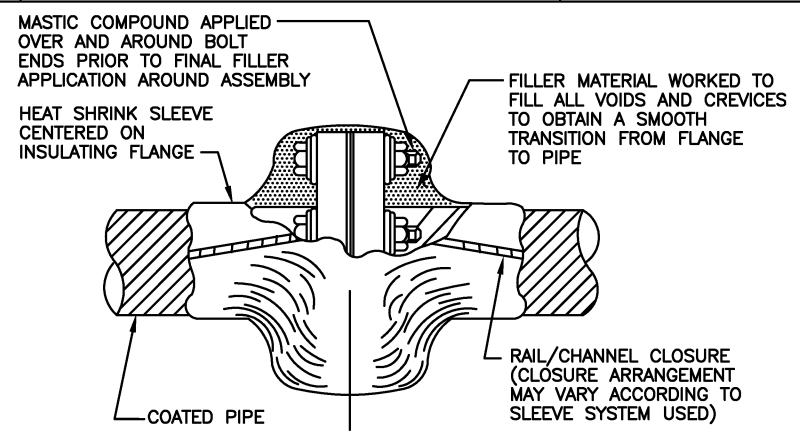


DETAIL 1
TEST POINT FOR UNDERGROUND
DIELECTRIC FITTING



DETAIL 6
SEPARATOR TO AVOID ELECTRICAL CONTACT

- NOTES:**
1. USE ONLY WHEN PIPES ARE LESS THAN 12" APART.
 2. REVERSE POSITION OF "SHIELD" IF FOREIGN STRUCTURE IS BELOW PIPE.
 3. HOLD IN PLACE WITH NON-METALLIC TAPE



NOTE: SEE HEAT SHRINKABLE SLEEVE INSTALLATION PROCEDURES SUPPLIED BY MANUFACTURER FOR COMPLETE INSTRUCTIONS.

DETAIL 8
COATING OF INSULATING FLANGE

GENERAL NOTES:

1. NIPPLES TO BE WELDED TO FLANGES BEFORE ASSEMBLING INSULATING MATERIAL.
2. TAG ALL WIRES AT TEST BOX TO IDENTIFY WHICH PIPE OR WHICH SIDE OF FLANGE THEY ARE WELDED ON.
3. FLANGE INSULATION AS PER DWG. ST-E-302.
4. MAINTAIN SPACING AS SHOWN WHENEVER POSSIBLE. SEE ADDITIONAL CATHODIC PROTECTION DESIGN CONTRACT DRAWINGS.
5. CATHODICALLY PROTECTED WMATA METAL PIPES SHALL BE EPOXY COATED.
6. FOR ADDITIONAL DETAILS SEE DWG ST-E-302, 303, 304.
7. MAINTAIN A MINIMUM 12" CLEARANCE BETWEEN WMATA AND FOREIGN STRUCTURES. STRUCTURES SHALL NOT BE IN CONTACT UNDER ANY CIRCUMSTANCES. IF 12" MINIMUM CLEARANCE IS IMPOSSIBLE TO MAINTAIN SEE DETAIL 6.

DESIGNED	G.G. BRADY	3-82
DRAWN	R. DERR	3-82
CHECKED	J.R. THOMSON	3-82
APPROVED	K.J. MOODY	3-82
UPDATED	J. BUMANIS	12-88

NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION
ST-E-302	CATHODIC PROTECTION DETAILS SHEET 2 OF 2	08/2001	ENGA	Revised and issued by the Authority
ST-E-303	CORROSION CONTROL SYSTEM TESTING DETAILS SHEET 1 OF 2			
ST-E-304	CORROSION CONTROL SYSTEM TESTING DETAILS SHEET 2 OF 2			

NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION
ST-E-302	CATHODIC PROTECTION DETAILS SHEET 2 OF 2	08/2001	ENGA	Revised and issued by the Authority
ST-E-303	CORROSION CONTROL SYSTEM TESTING DETAILS SHEET 1 OF 2			
ST-E-304	CORROSION CONTROL SYSTEM TESTING DETAILS SHEET 2 OF 2			

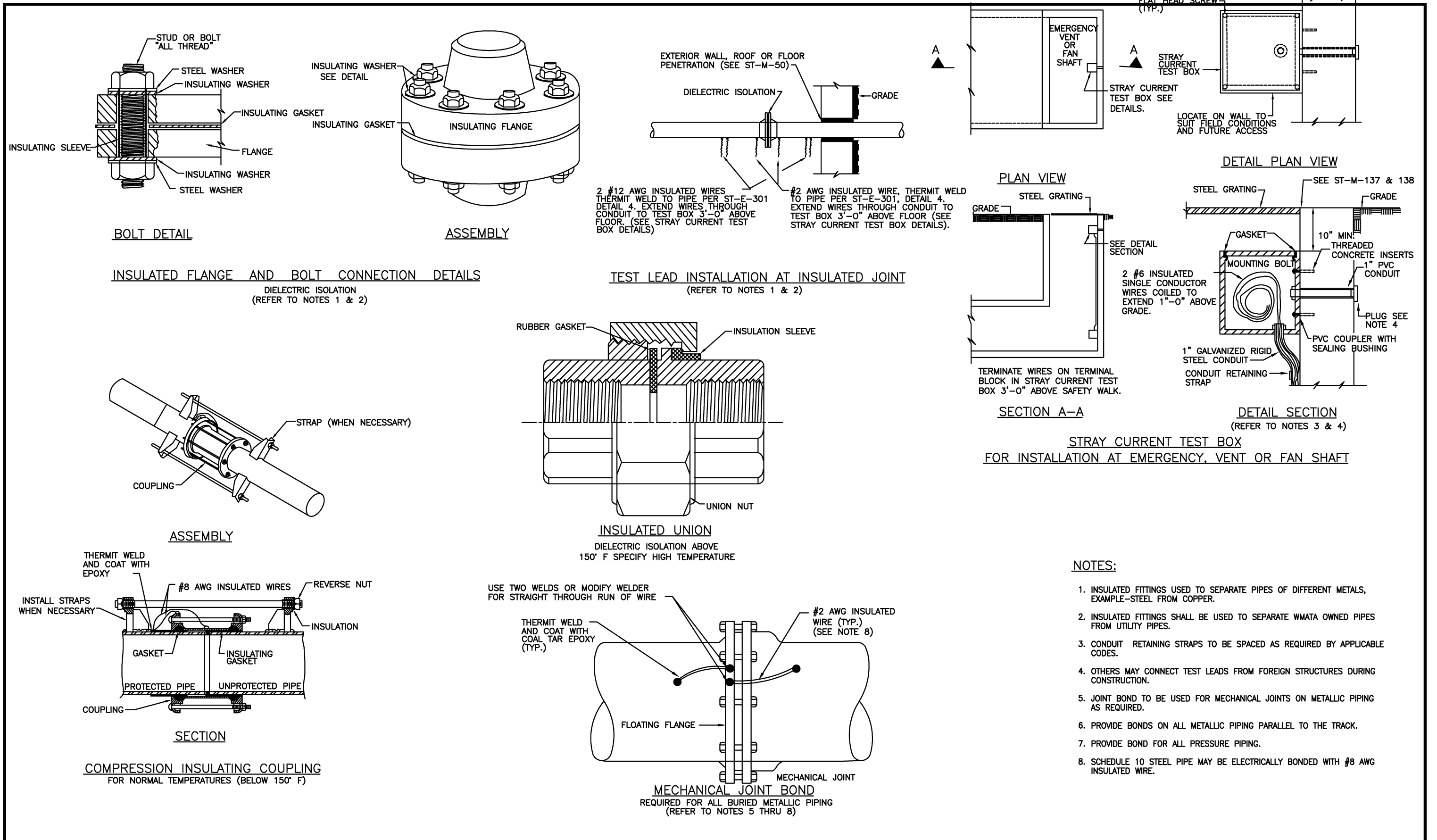
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED _____ DATE _____ APPROVED _____ DIRECTOR _____ May 3, 2001 DATE _____

ELECTRICAL STANDARD DRAWING
CATHODIC PROTECTION DETAILS
SHEET 1 OF 2

SCALE: NOT TO SCALE
DRAWING NO.: ST-E-301



DESIGNED		DATE		REFERENCE DRAWINGS		REVISIONS	
NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
ST-E-301	CATHODIC PROTECTION DETAILS SHEET 1 OF 2	08/2001	ENGA	Revised and issued by the Authority			
ST-E-303	CORROSION CONTROL SYSTEM TESTING DETAILS SHEET 1 OF 2						
ST-E-304	CORROSION CONTROL SYSTEM TESTING DETAILS SHEET 2 OF 2						

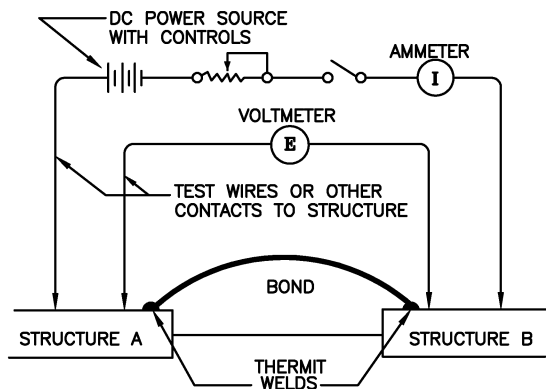
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED _____ DATE _____ APPROVED _____ DIRECTOR _____ May 3, 2001 DATE _____

ELECTRICAL STANDARD DRAWING
CATHODIC PROTECTION DETAILS
SHEET 2 OF 2

SCALE: NOT TO SCALE
DRAWING NO.: ST-E-302



NOTE:
VOLTMETER CONTACTS TO STRUCTURE MUST BE CLOSE ENOUGH TO WELDS TO ENSURE THAT STRUCTURE RESISTANCE IS NOT SIGNIFICANT.

FORMULA FOR DETERMINING RESISTANCE OF SINGLE BOND USING TEST DATA:

$$R_T = \Delta E / \Delta I$$

WHERE: R_T = RESISTANCE OF ONE BOND (OHMS)

ΔE = INCREMENTAL CHANGE IN POTENTIAL (VOLTS)
 ΔI = INCREMENTAL CHANGE IN CURRENT (AMPERES)

FORMULA FOR CALCULATING THEORETICAL RESISTANCE OF SINGLE BOND:

$$R_C = (L) \times (R_L)$$

WHERE: R_C = CALCULATED RESISTANCE OF ONE BOND (OHMS)

L = LENGTH (FEET)

R_L = RESISTANCE (OHMS/FOOT) FROM WIRE TABLE FOR BOND WIRE USED.

FORMULA FOR CALCULATING THEORETICAL RESISTANCE BETWEEN STRUCTURES CONNECTED BY MULTIPLE BONDS IN PARALLEL:

$$R_{CP} = R_C / N$$

WHERE: R_{CP} = CALCULATED RESISTANCE OF MULTIPLE BOND WIRES IN PARALLEL (OHMS)

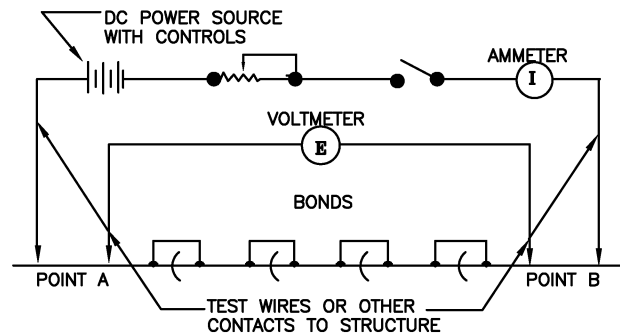
R_C = CALCULATED RESISTANCE OF ONE BOND WIRE (OHMS)

N = NUMBER OF BOND WIRES IN PARALLEL

DETAIL 1

SINGLE BOND AND MULTIPLE BONDS IN PARALLEL (EXCEPT REINFORCING STEEL)

TEST HOOK-UP REQUIREMENTS	
TEST TITLE	DETAIL
ELECTRICAL CONTINUITY	1,2,3
ABOVE GRADE INSULATING JOINT RESISTANCE	4
STRUCTURE-TO-ANODE RESISTANCE	5
ANODE-TO-EARTH RESISTANCE	6
SOIL RESISTIVITY	7
BURIED INSULATING FITTING RESISTANCE	8 (ST-E-304)
RAIL-TO-EARTH RESISTANCE	9 (ST-E-304)



FORMULA FOR CALCULATING THEORETICAL RESISTANCE OF STRUCTURE WITH MULTIPLE BONDS IN SERIES:

$$R_{CS} = R_C \times N + P \frac{L}{A}$$

WHERE: R_{CS} = CALCULATED RESISTANCE OF A NUMBER OF BONDS IN SERIES (OHMS)

R_C = CALCULATED RESISTANCE OF ONE BOND (OHMS)

N = NUMBER OF BONDS IN SERIES

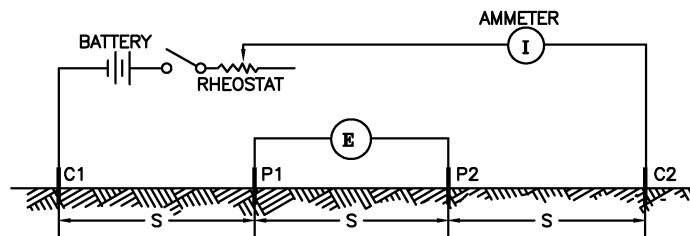
P = RESISTIVITY OF STRUCTURE (OHM-CM)

L = LENGTH OF STRUCTURE (CM)

A = CROSS SECTIONAL AREA OF STRUCTURE (CM²)

DETAIL 2

MULTIPLE BONDS IN SERIES



$$\rho = 191.5 \times "S" \times \frac{\Delta E}{I}$$

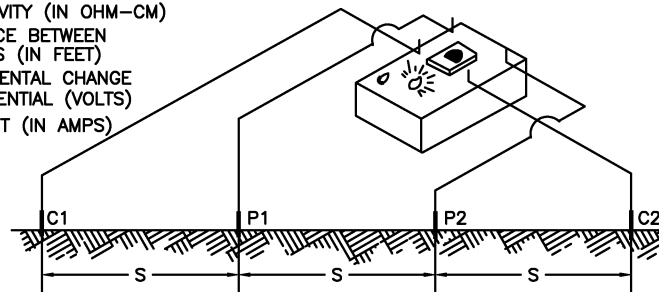
BATTERY, VOLTMETER, AMMETER METHOD (DO NOT USE THIS METHOD WHERE STRAY CURRENTS EXIST)

ρ - RESISTIVITY (IN OHM-CM)

S - DISTANCE BETWEEN PROBES (IN FEET)

ΔE - INCREMENTAL CHANGE IN POTENTIAL (VOLTS)

I - CURRENT (IN AMPS)



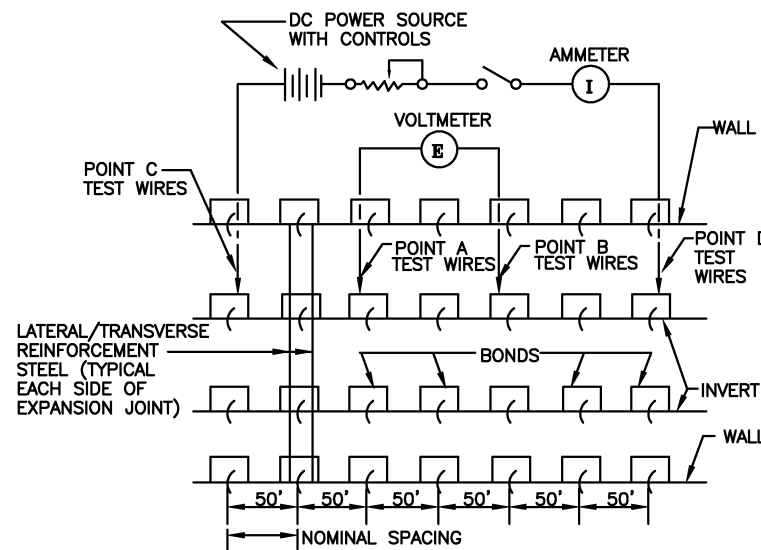
$\rho = 191.5 \times "S" \times \text{METER READING}$
RESISTIVITY INSTRUMENT METHOD (PREFERRED METHOD)

DETAIL 7

SOIL RESISTIVITY

NOTES:

- PIN DEPTH SHOULD BE SMALL COMPARED TO DISTANCE "S"
- IF SPACINGS CANNOT BE MADE EQUIDISTANT, A CONNECTION FACTOR MUST BE APPLIED.
- "S" SHOULD EQUAL DEPTH OF ANODE OR DEPTH OF SOIL MEASURED.



NOTES:

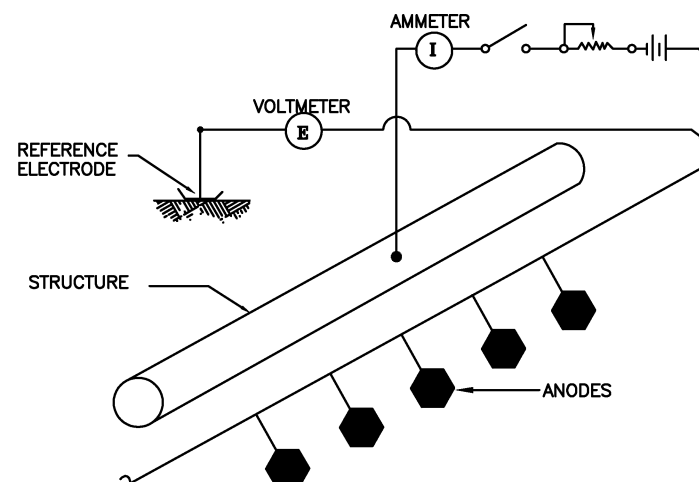
- BONDS ARE BETWEEN SECTIONS OF STEEL REINFORCEMENT IN TUNNELS, STATIONS AND RETAINING WALLS. NOMINAL SPACING 50' BUT MAY VARY.
- TEST WIRES MAY BE CONNECTED TO BONDS IN WALLS IF MORE CONVENIENT.

FORMULA:

SEE FORMULA FOR CALCULATING MULTIPLE BONDS IN PARALLEL IN DETAIL 1.

DETAIL 3

MULTIPLE BONDS IN PARALLEL ON REINFORCING STEEL

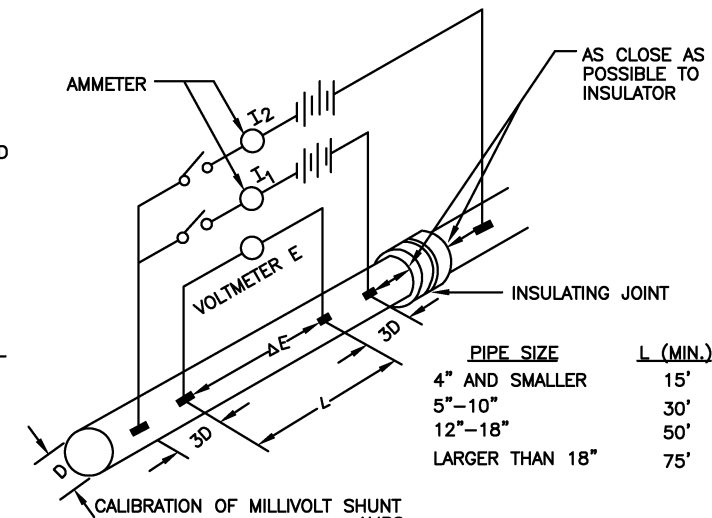


FORMULA FOR DETERMINING ANODE-TO-EARTH RESISTANCE:

$$R_{AE} = \frac{\Delta E}{\Delta I}$$

DETAIL 6

ANODE-TO-EARTH RESISTANCE



PIPE SIZE	L (MIN.)
4" AND SMALLER	15'
5"-10"	30'
12"-18"	50'
LARGER THAN 18"	75'

$$K = \frac{I}{\Delta E_1} = \frac{\text{AMPS}}{\text{MILLIVOLT}}$$

WHERE $\Delta E_1 = E_1 - E_0$

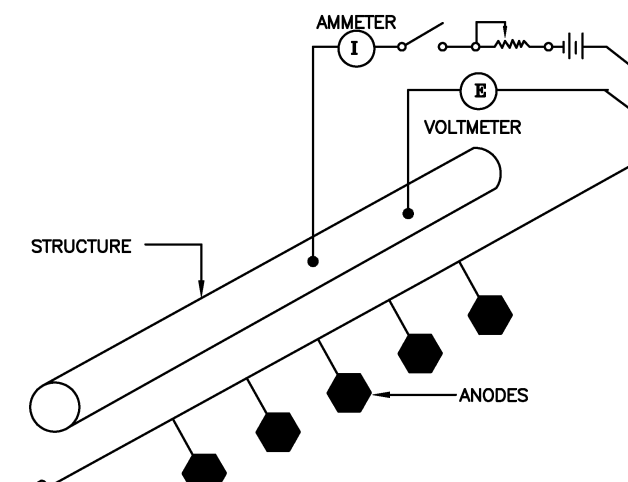
CALCULATION OF INSULATING JOINT ELECTRICAL LEAKAGE:

$$\% \text{ LEAKAGE} = \frac{\Delta E_2 \times K \times 100}{I_2}$$

WHERE $\Delta E_2 = E_2 - E_0$

DETAIL 4

ABOVE GRADE INSULATING JOINT RESISTANCE



FORMULA FOR DETERMINING STRUCTURE-TO-ANODE RESISTANCE:

$$R_{SA} = \frac{\Delta E}{\Delta I}$$

DETAIL 5

STRUCTURE-TO-ANODE RESISTANCE

DESIGNED K.J. MOODY 3-82
DATE
DRAWN D.H. MILNER 3-82
DATE
CHECKED J.R. THOMSON 3-82
DATE
APPROVED K.J. MOODY 3-82
DATE
UPDATED G.G. BRADY 9-88

REFERENCE DRAWINGS	
NUMBER	DESCRIPTION
ST-E-301	CATHODIC PROTECTION DETAILS SHEET 1 OF 2
ST-E-302	CATHODIC PROTECTION DETAILS SHEET 2 OF 2
ST-E-304	CORROSION CONTROL SYSTEM TESTING DETAILS SHEET 2 OF 2

REVISIONS		
DATE	BY	DESCRIPTION
08/2001	ENGA	Revised and issued by the Authority

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

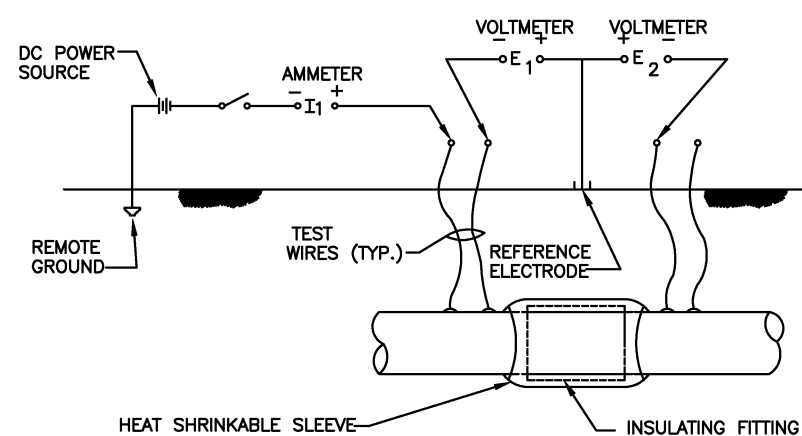
SUBMITTED _____ DATE _____

APPROVED [Signature] May 3, 2001
DIRECTOR DATE

ELECTRICAL STANDARD DRAWING
CORROSION CONTROL SYSTEM TESTING DETAILS
SHEET 1 OF 2

SCALE
NOT TO SCALE

DRAWING NO.
ST-E-303

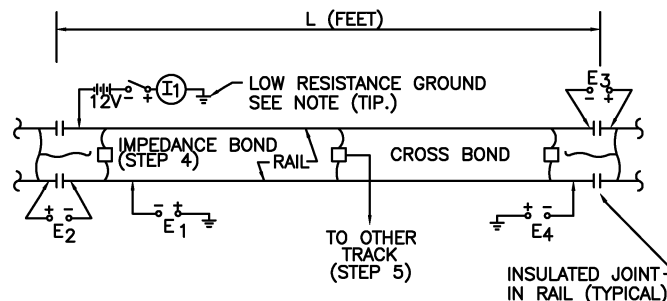


ΔE_2 SHALL BE ≤ 0
 WHERE $\Delta E_2 = E_{2(c)} - E_{2(o)}$
 (C) = CURRENT CIRCUIT CLOSED
 (O) = CURRENT CIRCUIT OPEN

1. SET UP INSTRUMENTATION AS SHOWN. PLACE REFERENCE ELECTRODE IN CONTACT WITH THE SOIL DIRECTLY ABOVE THE INSULATING FITTING BEING TESTED.
2. CLOSE SWITCH IN I_1 CIRCUIT. READ AND RECORD CURRENT I_1 , AND VOLTAGE $E_{1(c)}$.
3. OPEN SWITCH IN THE I_1 CIRCUIT. READ AND RECORD VOLTAGE $E_{1(o)}$.
4. CLOSE SWITCH IN THE I_1 CIRCUIT. READ AND RECORD CURRENT I_1 , AND VOLTAGE $E_{2(c)}$.
5. OPEN SWITCH IN I_1 CIRCUIT. READ AND RECORD VOLTAGE $E_{2(o)}$. THE VALUE OF $E_{2(c)}$ MINUS $E_{2(o)}$ SHALL BE LESS THAN OR EQUAL TO ZERO.

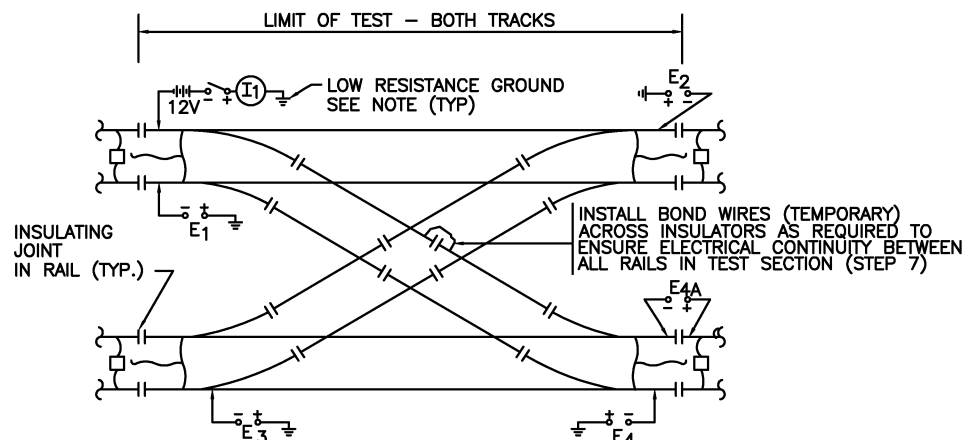
**BURIED INSULATING FITTING
 RESISTANCE TEST
 DETAIL 8**

TEST HOOK UP REQUIREMENTS	
TEST TITLE	DETAIL
ELECTRICAL CONTINUITY	1,2+3 (DWG. ST-E-303)
ABOVE GRADE INSULATING JOINT RESISTANCE	4 (DWG. ST-E-303)
STRUCTURE-TO-ANODE RESISTANCE	5 (DWG. ST-E-303)
ANODE-TO-EARTH RESISTANCE	6 (DWG. ST-E-303)
SOIL RESISTIVITY	7 (DWG. ST-E-303)
BURIED INSULATING FITTING RESISTANCE	8
RAIL-TO-EARTH RESISTANCE	9



NOTE
 GROUND RESISTANCE TO BE ON THE ORDER OF 1/100 (OR LESS) OF THE TRACK-TO-EARTH RESISTANCE FOR THE SECTION BEING TESTED.

**TYPICAL MAIN TRACK SECTION
 FIGURE 1**



NOTE
 GROUND RESISTANCE TO BE ON THE ORDER OF 1/100 (OR LESS) OF THE TRACK-TO-EARTH RESISTANCE FOR THE SECTION BEING TESTED.

**TYPICAL DOUBLE CROSSOVER
 FIGURE 2**

**RAIL-TO-EARTH RESISTANCE
 DETAIL 9**

EQUIPMENT/MATERIAL REQUIREMENTS:

- DC AMMETER, MULTI-SCALE, MAXIMUM SHUNT DROP OF 20 MV SENSITIVITY, OR MILLIVOLT METER AND SHUNTS, ACCURATE TO WITHIN 1% OF FULL SCALE, COVERING FULL SCALE RANGES: 0-1, 0-10, 0-100 AMPERES.
- DC VOLTMETER, CENTER ZERO, MINIMUM SENSITIVITY, 50,000 OHM/VOLT, ACCURATE TO WITHIN 1% OF FULL SCALE, COVERING THE FOLLOWING FULL SCALE RANGES: 0-10, AND 0-100 MILLIVOLTS, 0-1, 0-10, 0-100 VOLTS.
- DC POWER SOURCE: RECHARGEABLE WET-CELL BATTERIES, SIX OR 12 VOLT.
- TEST WIRE: FOUR 10-FOOT LEADS, 4 REELS (MIN. 100' EACH). ALL WIRES MUST BE SINGLE CONDUCTOR, STRANDED COPPER, SIZE TO SUIT TEST CONDITIONS.
- REFERENCE HALF-CELL: 7/8 INCH DIAMETER BY EIGHT INCHES LONG, SATURATED COPPER-COPPER SULFATE.

PROCEDURE:

1. PERFORM POWER SHUT DOWN FOR BOTH TRACKS, COMPLETE TRACTION POWER SHUT DOWN IN TEST ZONE.
2. THE TRACK SECTION TO BE TESTED SHALL BE VISUALLY EXAMINED TO ENSURE THERE IS NO DEBRIS, WATER OR OTHER CONDUCTIVE MATERIAL IN ELECTRICAL CONTACT WITH THE METALLIC TRACK COMPONENTS WHICH COULD RESULT IN LOW EFFECTIVE TRACK-TO-EARTH RESISTANCE.
3. ELECTRICALLY ISOLATE SECTIONS OF TRACK TO BE TESTED. THE SIGNAL SYSTEM CONNECTIONS WILL NOT MATERIALLY REDUCE THE RAIL-TO-EARTH RESISTANCE.
4. REMOVE WIRE CONNECTIONS FROM ACROSS RAIL INSULATORS OR AT THE IMPEDANCE BONDS.
5. DISCONNECT CROSS BONDS BETWEEN TRACK SECTION BEING TESTED AND OTHER TRACK.
6. DISCONNECT TRACTION POWER SUBSTATION NEGATIVE FEEDER WIRES FROM TRACK SECTION BEING TESTED (NOTE: SWITCHES WITHIN SUBSTATIONS CAN BE OPENED).
7. ENSURE ELECTRICAL CONTINUITY BETWEEN THE RAILS WITHIN THE INSULATED TRACK SECTION BEING TESTED BY THE USE OF THE EXISTING WIRES AT IMPEDANCE BONDS OR BY INSTALLING TEMPORARY WIRE CONNECTIONS BETWEEN THE RAILS.
8. **MAIN TRACK SECTIONS (REFER TO FIGURE 1)**

- A. ESTABLISH CURRENT CIRCUIT (I_1)
- B. ESTABLISH RAIL-TO-EARTH VOLTAGE (E_1) MEASURING CIRCUIT.
- C. OBTAIN CHANGE IN VOLTAGE (E_1) PER AMPERE OF TEST CURRENT (I_1) (TAKE AVERAGE OF 3 SETS OF MEASUREMENTS).
- D. CALCULATE THE EFFECTIVE TRACK-TO-EARTH RESISTANCE (OHMS) AS THE CHANGE IN VOLTS (E_1) PER AMPERE OF CURRENT (I_1)

$$R_{1-1} = \frac{\Delta E_1}{\Delta I_1} \quad R_{1-1} - \text{EXPRESSED IN OHMS}$$

$$E_1 - \text{EXPRESSED IN VOLTS}$$

$$I_1 - \text{EXPRESSED IN AMPS}$$

E. REPEAT FOR E_2 , E_3 , AND E_4 .

9. **TRACK SECTIONS WITH CROSSOVERS AND TURNOUTS (REFER TO FIGURE 2)**

- A. ESTABLISH CURRENT CIRCUIT (I_1)
- B. ESTABLISH RAIL-TO-EARTH VOLTAGE (E_1) MEASURING CIRCUIT.
- C. OBTAIN CHANGE IN VOLTAGE (E_1) PER AMPERE OF TEST CURRENT (I_1) (TAKE AVERAGE OF 3 SETS OF MEASUREMENTS).
- D. CALCULATE THE EFFECTIVE TRACK-TO-EARTH RESISTANCE (OHMS) AS THE CHANGE IN (E_1) VOLTS PER AMPERE OF CURRENT (I_1)

$$R_{1-1} = \frac{\Delta E_1}{\Delta I_1} \quad R_{1-1} - \text{EXPRESSED IN OHMS}$$

$$E_1 - \text{EXPRESSED IN VOLTS}$$

$$I_1 - \text{EXPRESSED IN AMPS}$$

E. REPEAT FOR E_2 , E_3 , E_4 AND E_{4A} .

DESIGNED	G. BRADY	7-98
DRAWN	R. THOMAS	7-98
CHECKED	G.G. BRADY	7-98
APPROVED	R. GANERWAL	7-98

REFERENCE DRAWINGS	
NUMBER	DESCRIPTION
ST-E-301	CATHODIC PROTECTION DETAILS SHEET 1 OF 2
ST-E-302	CATHODIC PROTECTION DETAILS SHEET 2 OF 2
ST-E-303	CORROSION CONTROL SYSTEM TESTING DETAILS SHEET 1 OF 2

REVISIONS	
DATE	DESCRIPTION
08/2001	Revised and issued by the Authority

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
 OFFICE OF ENGINEERING AND ARCHITECTURE

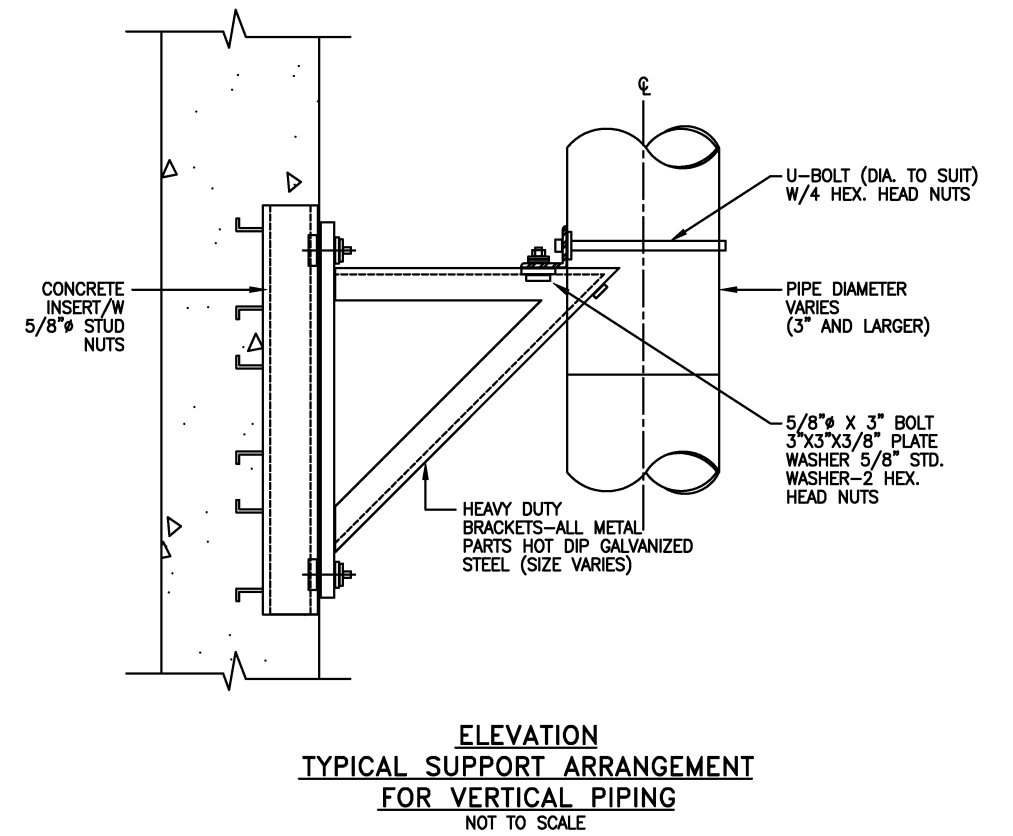
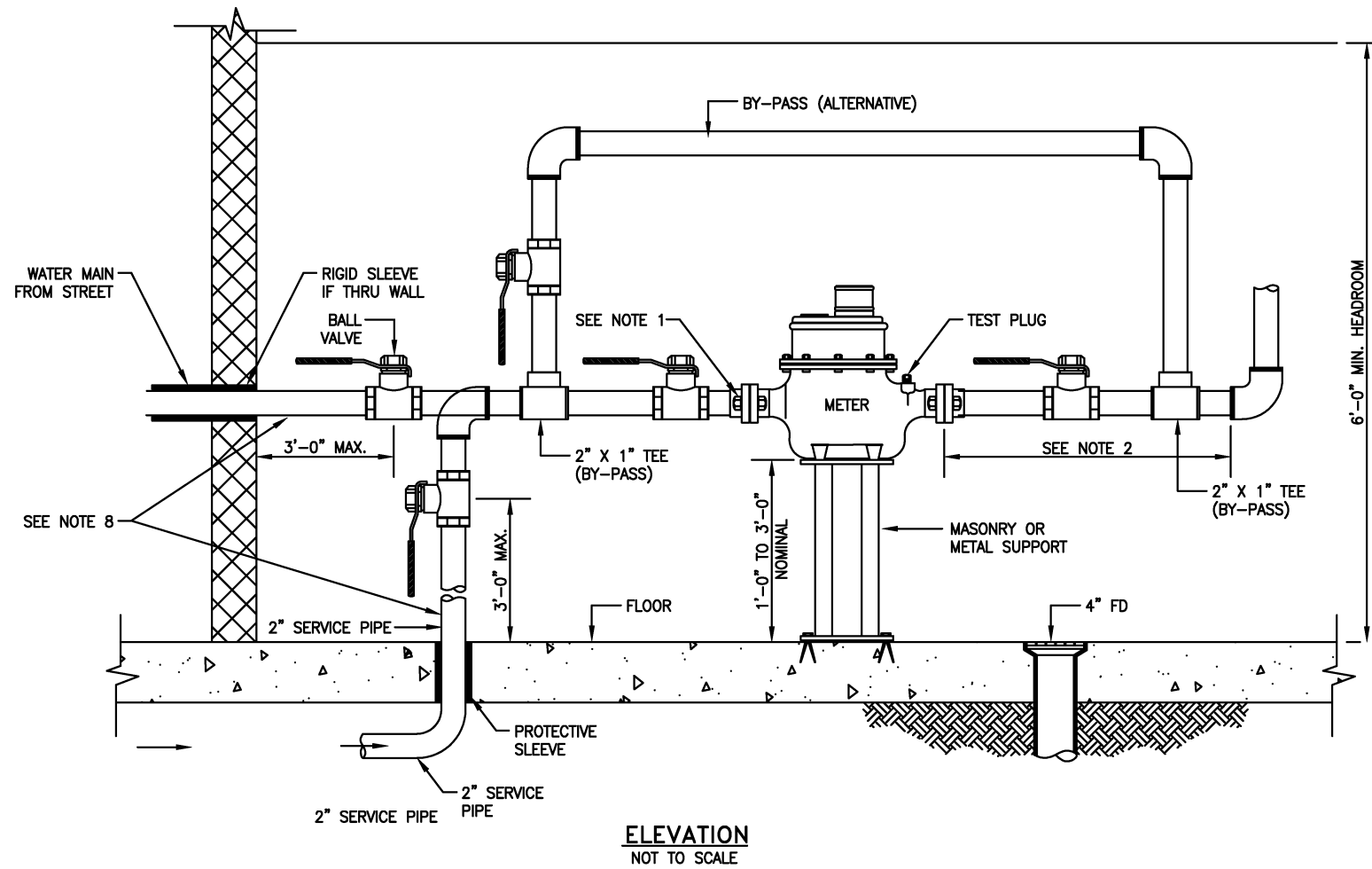
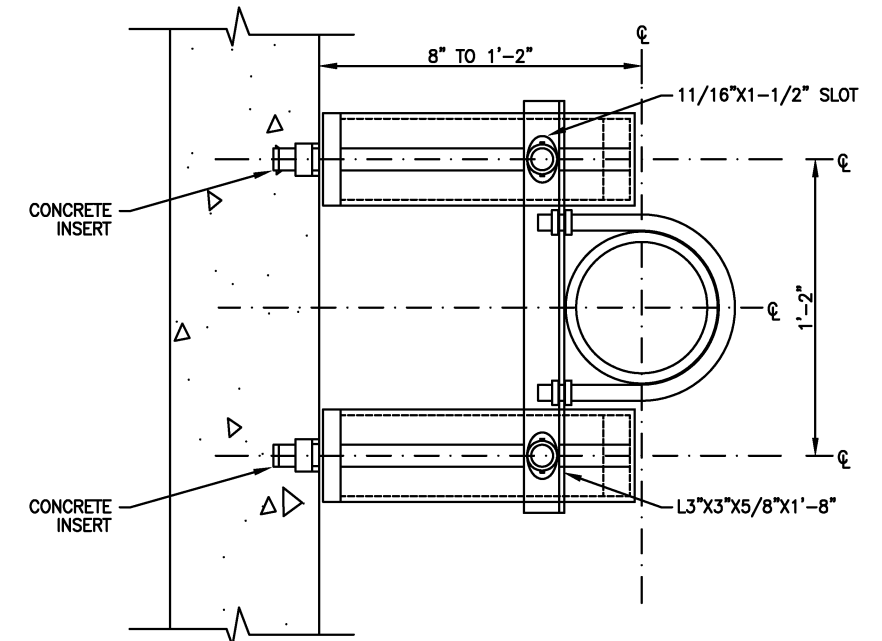
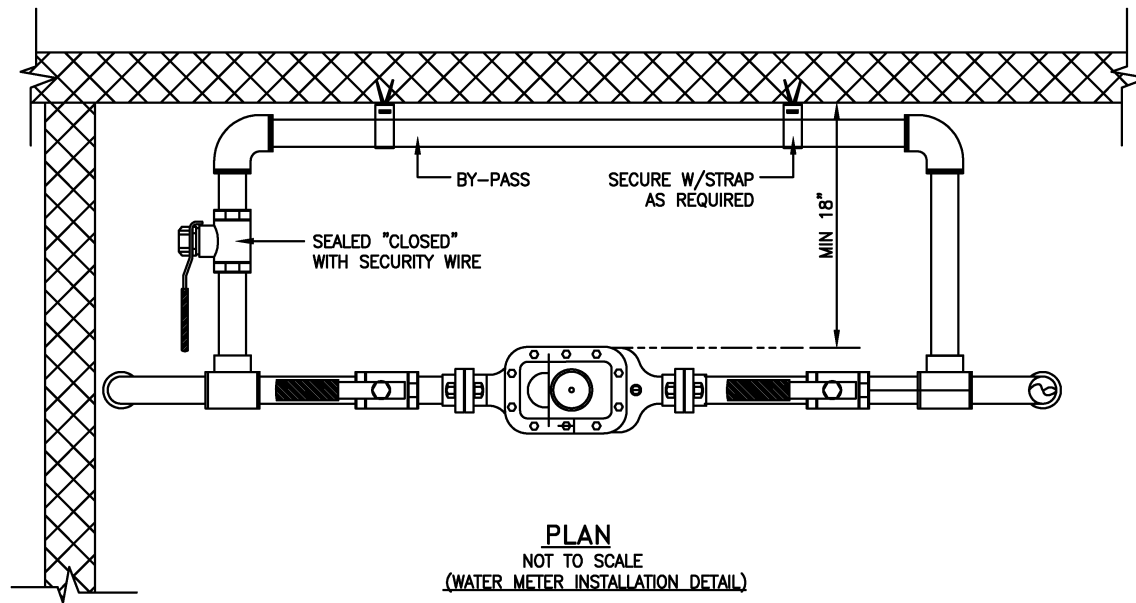
SUBMITTED _____ DATE _____ APPROVED _____ DIRECTOR _____ May 3, 2001 DATE _____

**ELECTRICAL STANDARD DRAWING
 CORROSION CONTROL SYSTEM TESTING DETAILS
 SHEET 2 OF 2**

SCALE: NOT TO SCALE DRAWING NO. ST-E-304

NOTES:

1. FLANGE BOLTS SHALL BE READILY ACCESSIBLE.
2. 10" MINIMUM TURBULENCE COMPENSATOR ZONE REQUIRED AT BOTH SIDES OF METER.
3. PROVIDE 6" TEST SLEEVE FOR TESTING PER CODE.
4. ALL VALVES ARE BALL TYPE
5. METER TO BE SET HORIZONTALLY.
6. THE WATER METER INSTALLATION SHALL BE IN COMPLIANCE WITH THE REQUIREMENTS OF THE LOCAL JURISDICTION.
7. INDICATE ANTI-SIPHON DEVICE REQUIREMENTS.
8. ISOLATE PIPES PER STANDARD SPECIFICATION, SECTION 13110 & STANDARD DWG. ST-E-302.



DESIGNED	C.M. BISHOP	08-86
		DATE
DRAWN	S.A. HOWARD	08-86
		DATE
CHECKED	C.M. BISHOP	08-86
		DATE
APPROVED	C.M. BISHOP	02-88
		DATE
UPDATED	ENGA (PAF)	08-00
		DATE

REFERENCE DRAWINGS	
NUMBER	DESCRIPTION

REVISIONS		
DATE	BY	DESCRIPTION
08/2001	ENGA	Revised and issued by the Authority

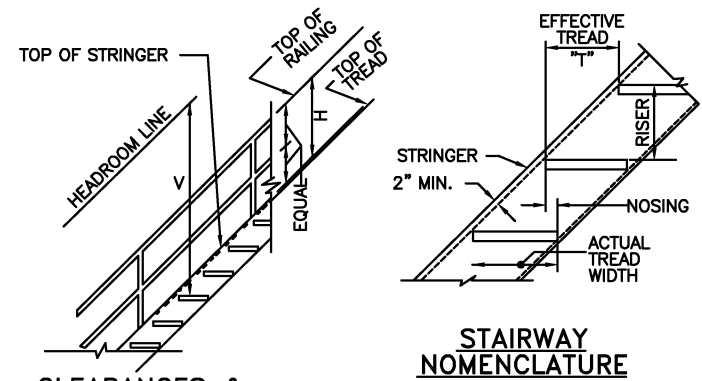
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED _____ DATE _____ APPROVED *Harry J. ...* DIRECTOR May 3, 2001 DATE

MECHANICAL STANDARD DRAWING
WATER SERVICE DETAILS

SCALE: NOT TO SCALE DRAWING NO. ST-M-011

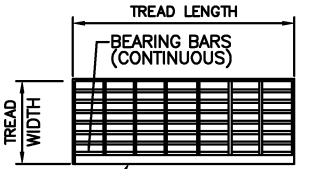


CLEARANCES & HANDRAIL HEIGHTS

METAL STAIRWAY DETAILS

DIMENSIONS

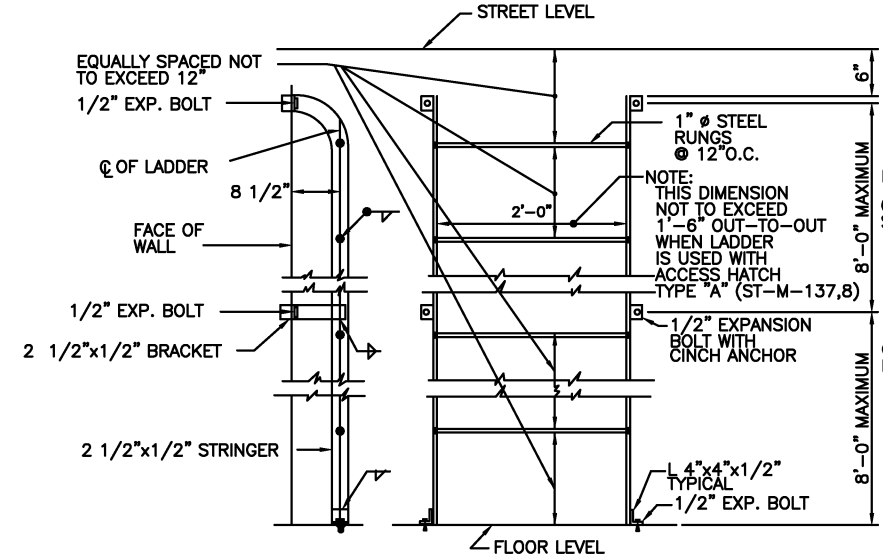
H	RAIL HEIGHT	2'-6" MIN.
V	(HEADROOM)	6'-8" MIN.
R	(RISER)	7" MAX.
T	(TREAD)	11" MIN.



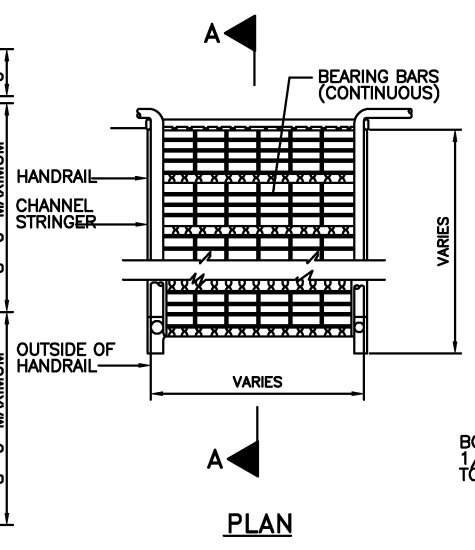
BEARING BAR GUIDE

BEARING BARS	MAXIMUM TREAD LENGTH
3/4" x 3/16"	UP TO 2'-3"
1" x 3/16"	2'-3" TO 3'-6"
1 1/2" x 3/16"	3'-6" TO 5'-6"

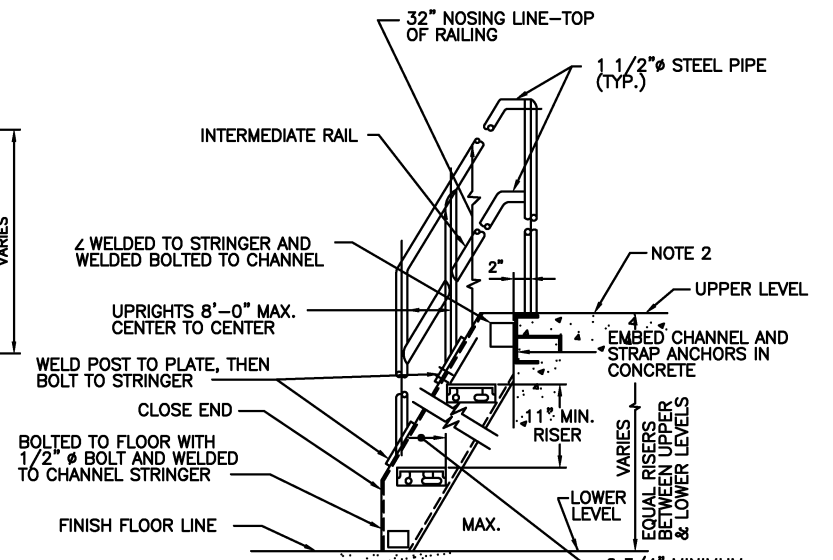
TREAD DETAILS



SIDE ELEVATION FRONT ELEVATION METAL FIXED LADDER (TYPE 1)

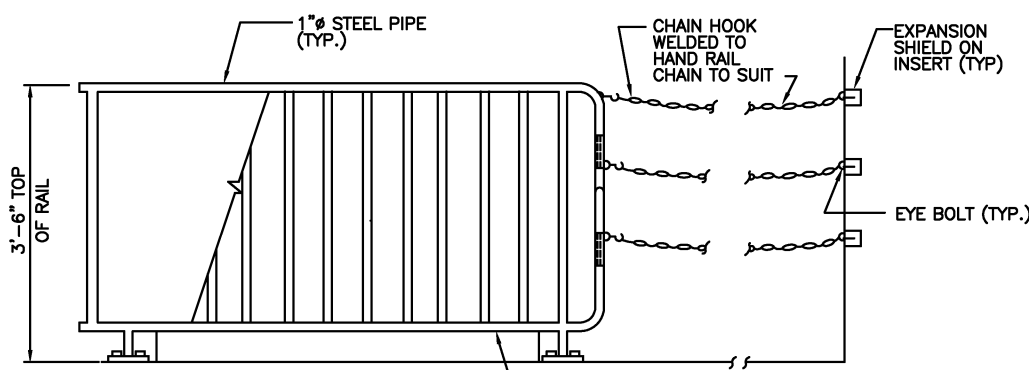


METAL SHIP'S LADDER

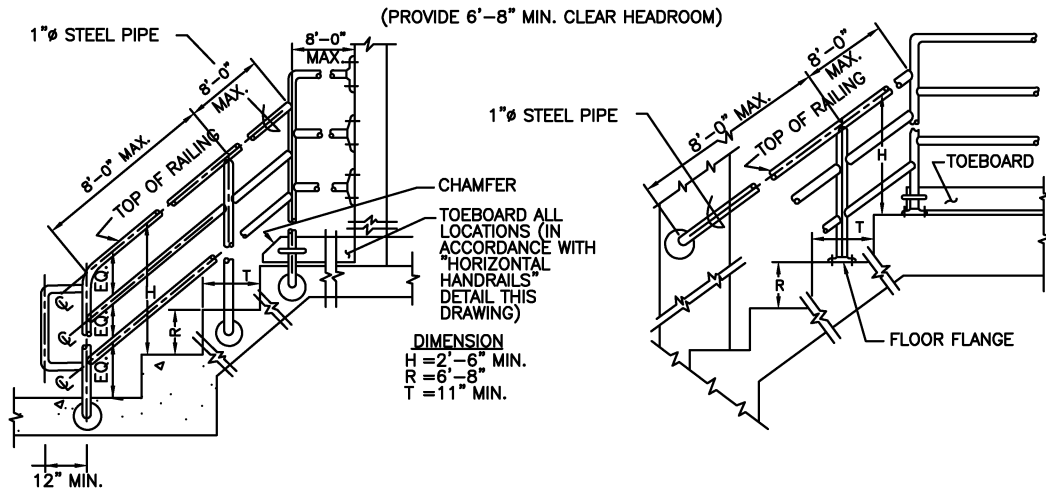


NOTE:
STRUCTURAL SUPPORT TO BE DESIGNED IN ACCORDANCE WITH LOCAL REQUIREMENTS.

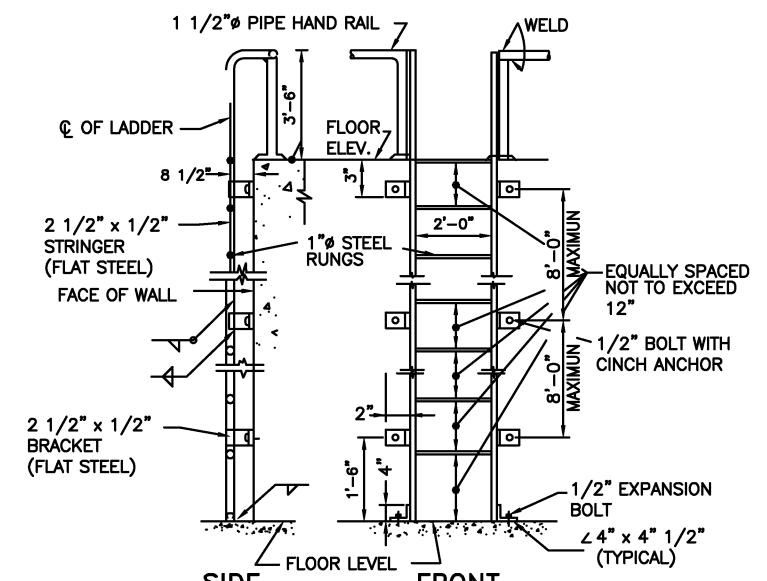
SECTION A-A



HORIZONTAL HANDRAIL (FLOOR MOUNTED) (SHOWING CHAIN GUARD ARRANGEMENT WHERE APPLICABLE)



CONCRETE STAIRWAY DETAILS



SIDE ELEVATION FRONT ELEVATION METAL FIXED LADDER (TYPE 2)

GENERAL NOTES

1. ALL METAL PARTS SHALL BE HOT DIP GALVANIZED STEEL.
2. TOEBOARDS SHALL BE PROVIDED IN ACCORDANCE WITH OSHA STANDARDS.

DESIGNED			REFERENCE DRAWINGS			REVISIONS		
DATE	BY	DESCRIPTION	NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION	DATE
08-88	A.C. CHAWLA				08/2001	ENGA	Revised and issued by the Authority	
08-88	D.F. HERBERT							
08-88	C.M. BISHOP							
02-88	C.M. BISHOP							

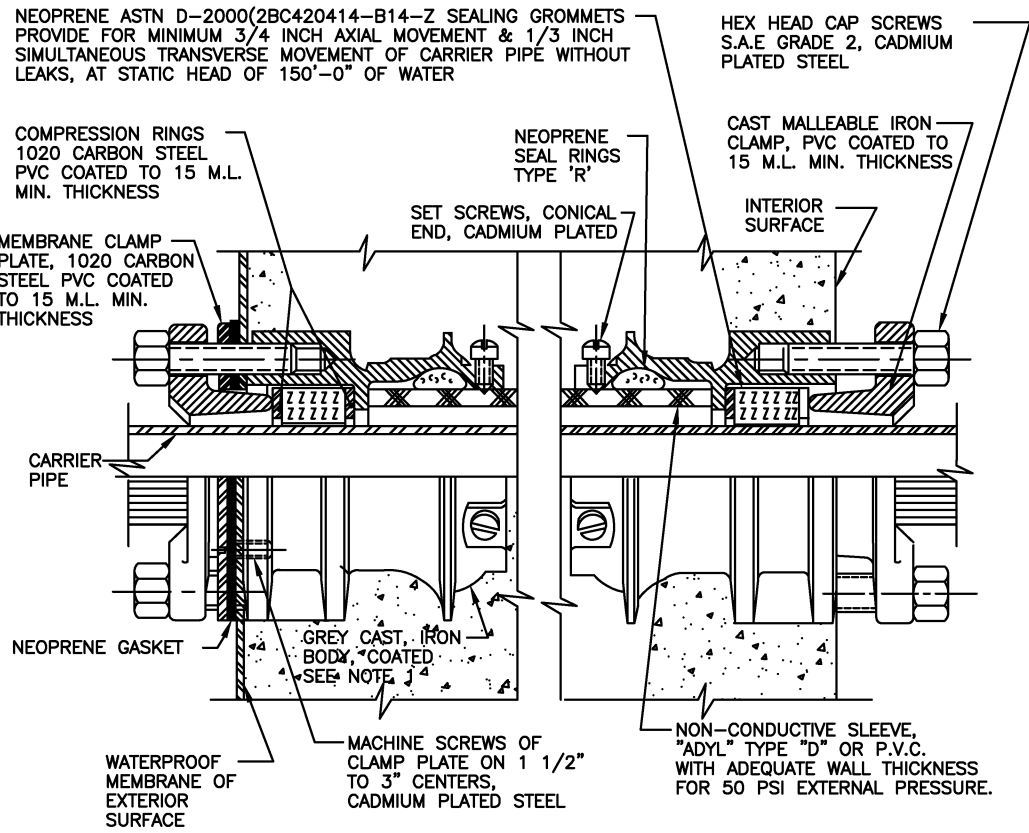
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED _____ DATE _____ APPROVED *[Signature]* DIRECTOR May 3, 2001 DATE

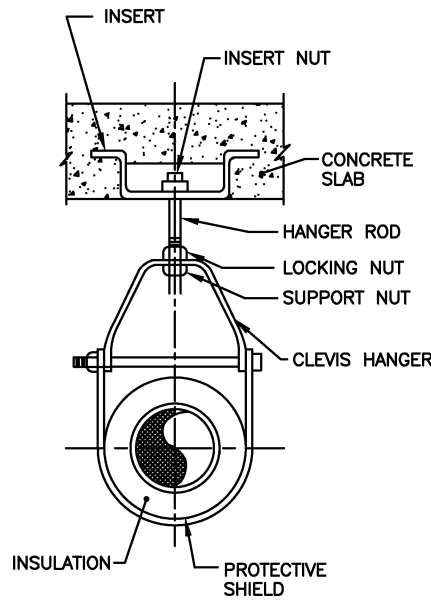
MECHANICAL STANDARD DRAWING
STAIRS, LADDERS
AND HANDRAILS

SCALE: NOT TO SCALE DRAWING NO. ST-M-012



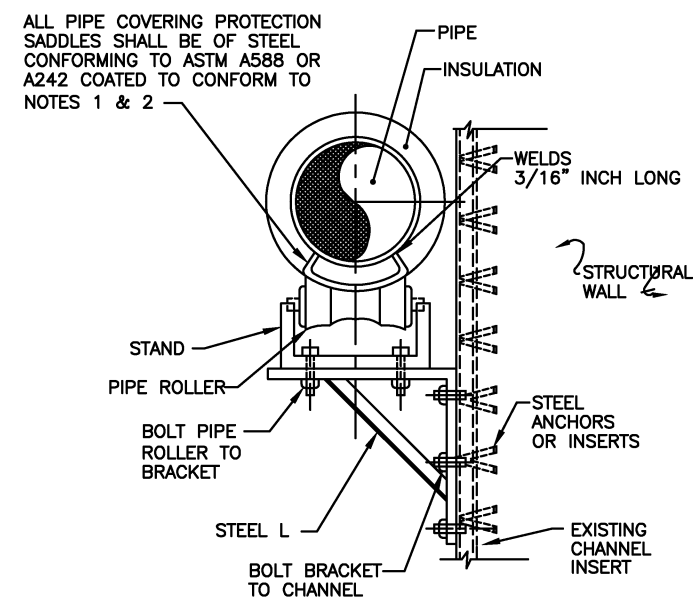
PIPE SLEEVE EXTERIOR STRUCTURAL ELEMENTS TYPE "H"

FOR INSTALLATION BELOW GROUND (INSTALL IN PAIRS AS SHOWN)



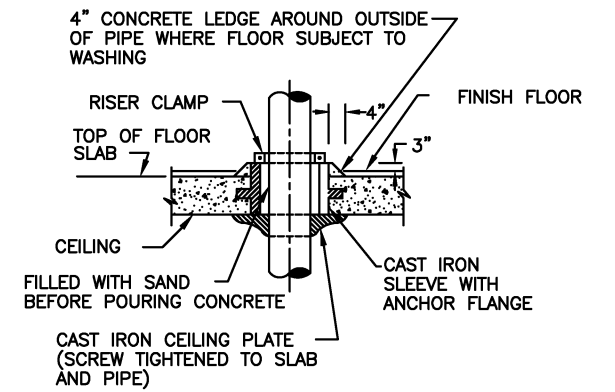
PIPE HANGER DETAIL

SEE NOTE #3

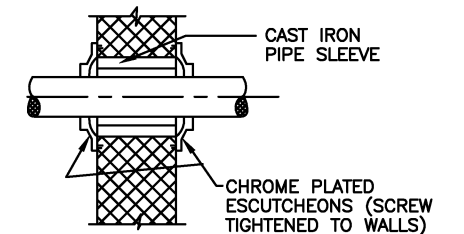


PIPE SUPPORT BRACKET DETAIL

SEE NOTE #3



FLOOR AND CEILING PENETRATION



INTERIOR WALL PENETRATION

NOTE 1
COATING SHALL BE SELF-CURING, INORGANIC ZINC SILICATE CONFORMING TO SPECIFICATION MIP-P-23236 (SHIPS, CLASS 3). DRY FILM THICKNESS OF 3 TO 5 MILS. COATING SHALL BE "DIMETCOTE NO. 6" OR APPROVED EQUAL.

NOTE 2
ALL PIPE COVERING PROTECTION SADDLES SHALL BE WELDED AT 4 CORNERS ONLY COAT WELDS PER NOTE 1.

NOTE 3
PROVIDE STAINLESS STEEL SUPPORTS WHERE LOCATED IN THE TUNNEL AND UNDER PLATFORM PLENUM. AT OTHER LOCATIONS USE HOT DIPPED GALVANIZED.

DESIGNED			REFERENCE DRAWINGS		REVISIONS	
DATE	NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION	
10-71			08/2001	ENGA	Revised and issued by the Authority	
10-71						
04-71						
04-71						

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

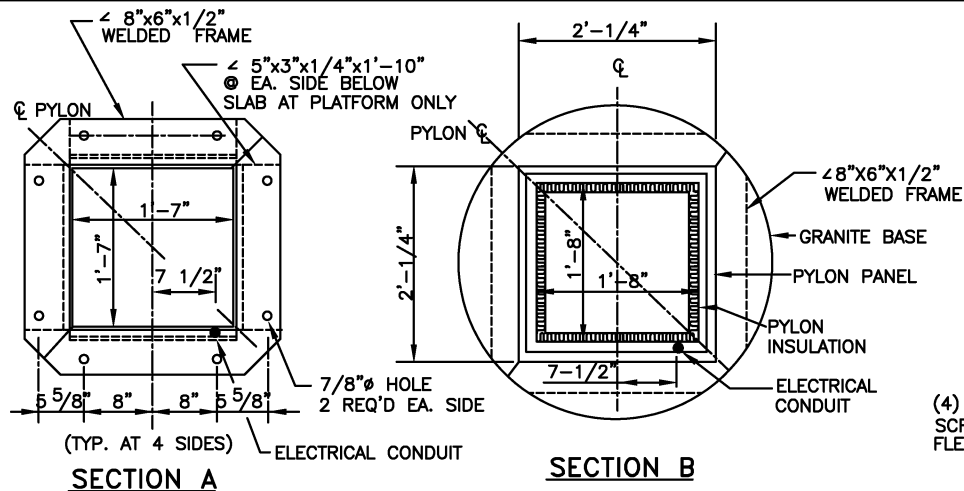
SUBMITTED _____ DATE _____

APPROVED *[Signature]* DIRECTOR May 3, 2001 DATE

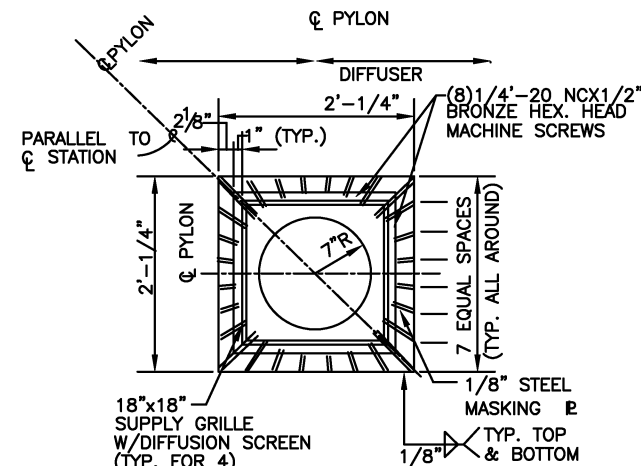
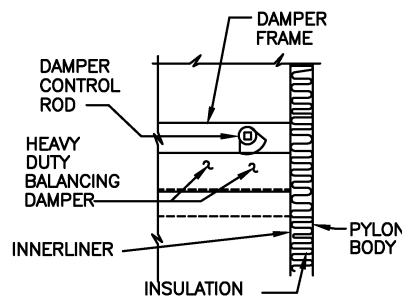
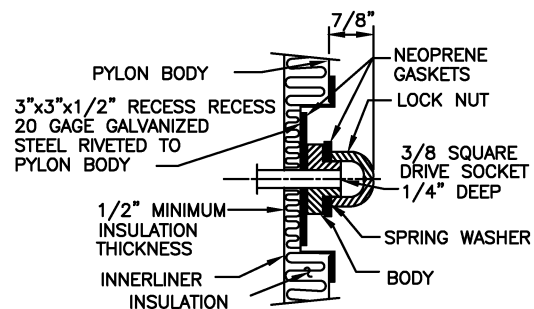
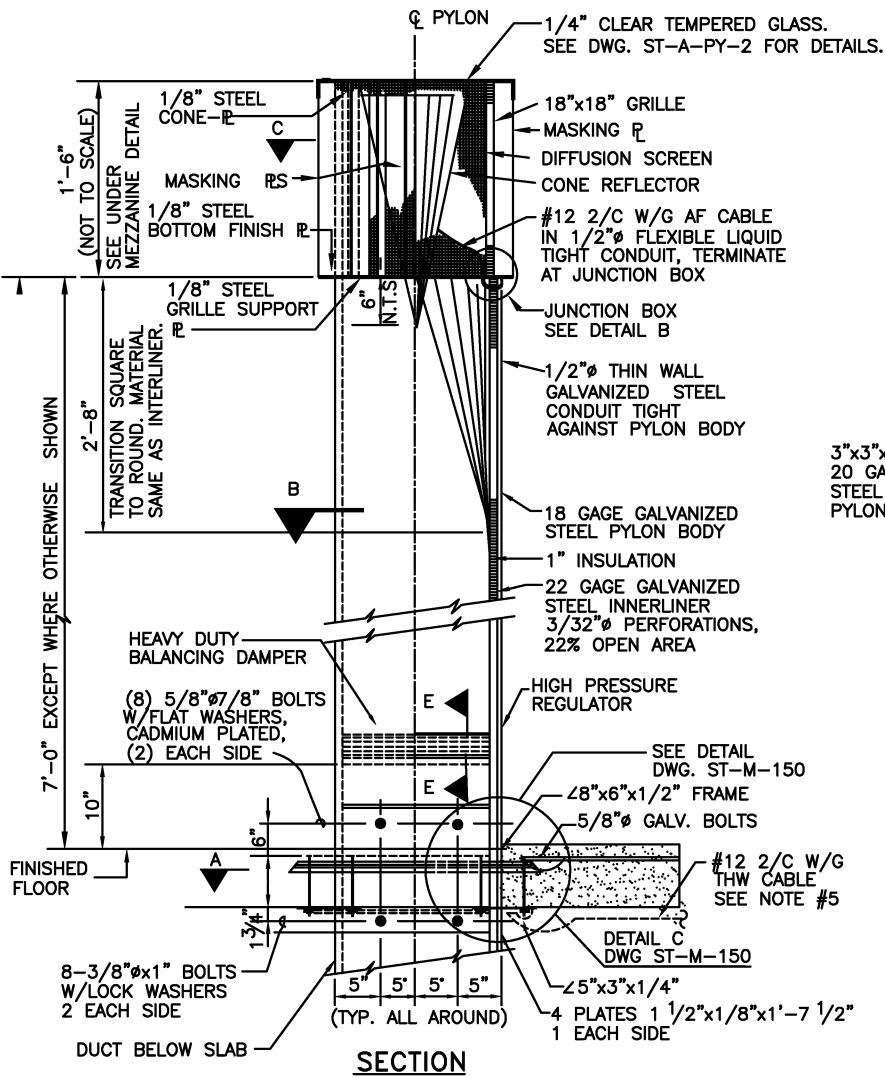
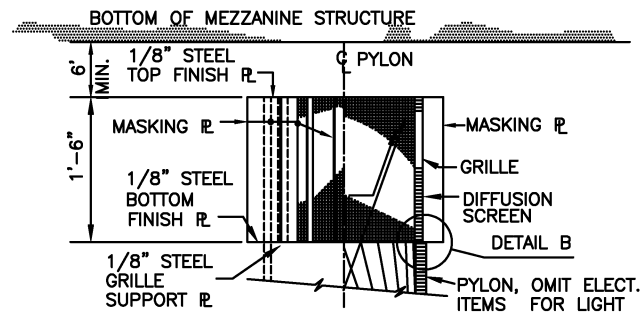
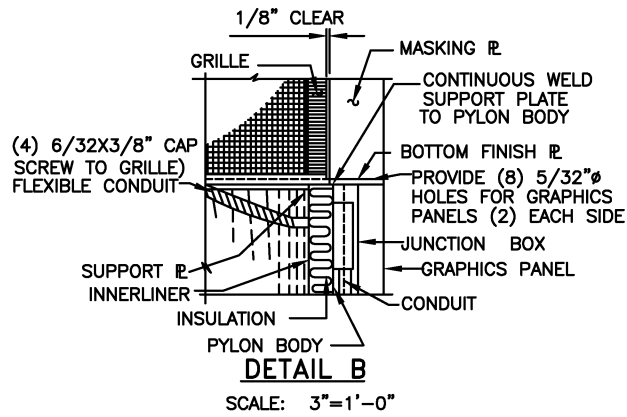
MECHANICAL STANDARD DRAWING
MECHANICAL DETAILS

SCALE NOT TO SCALE

DRAWING NO. ST-M-050



NOTE: DO NOT PLACE ELECTRICAL CONDUIT AT CORNER OF PYLON



NOTES:

- EXTERIOR SIDE OF STEEL CONE SHALL BE FINISHED IN BAKED ENAMEL; FED. COLOR 37038 BLACK COLOR TO MATCH SAMPLE ON FILE IN THE OFFICE OF THE ENGINEER.
- MASKING, GRILLE SCREEN AND LOUVER COLOR SHALL BE FINISHED IN BAKED ENAMEL BROWN COLOR NO. 20040 PER FEDERAL STANDARD NO. 5954 PUBLICATION DATE JAN 1968.
- PYLON BODY SHALL BE FABRICATED FROM PRIME SHEETS, NO TRANSVERSE SEAMS OF ANY KIND SHALL BE USED. LONGITUDINAL SEAMS SHALL BE OF PITTSBURGH TYPE.
- MATERIALS, BOLTS, ELECTRICAL ITEMS AND COATINGS SHALL BE SIMILAR FOR ALL AIR CONDITIONING PYLONS.
- CONTRACTOR SHALL PROVIDE ADEQUATE LENGTH OF 2 CONDUCTORS AND GROUND WIRE TO MAKE THE NECESSARY CONNECTIONS.
- LAMP SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH REQUIREMENTS SPECIFIED IN SECTION 15806 (AIR CONDITIONING PYLON).
- GRAPHICS PANELS WILL BE FURNISHED AND INSTALLED UNDER SEPARATE CONTRACT. CONSTRUCT FINISH FLOOR AFTER ATTACHMENT OF SUPPORTS TO 8" X 6" X 1/2" FRAME.
- SEE ST-A-PY-2 FOR PYLON TYPE & LIGHT FIXTURE DESIGNATION.

TYPICAL PYLON DETAIL (SHOWING) PLATFORM ATTACHMENT)

DESIGNED	DATE	NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION
K.S. PARROTT	04-71	ST-M-090	AIR CONDITIONING PYLON-SHEET 3 AND PYLON THERMOSTAT MOUNTING DETAILS	08/2001	ENGA	Revised and issued by the Authority
W. SULLMAN	04-71	ST-M-150	AIR CONDITIONING PYLON-SHEET 2			
I.M. SOLOMON	04-71					
R.S. O'NEAL	04-71					

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

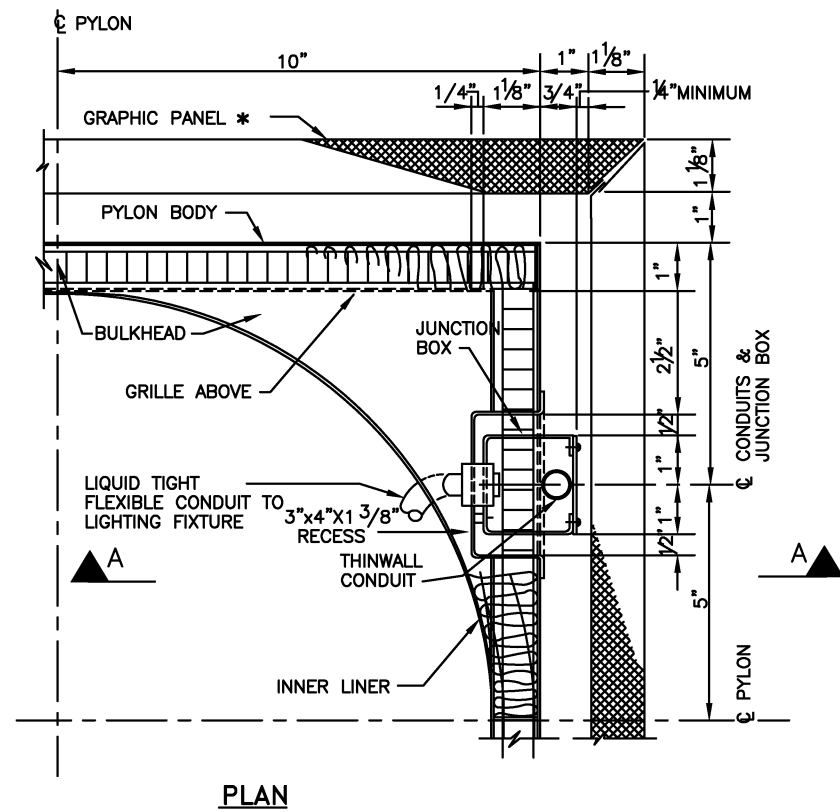
SUBMITTED _____ DATE _____

APPROVED *[Signature]* DIRECTOR May 3, 2001 DATE

MECHANICAL STANDARD DRAWING
AIR CONDITIONING PYLON
SHEET 1

SCALE 1"=1'-0" AND AS NOTED

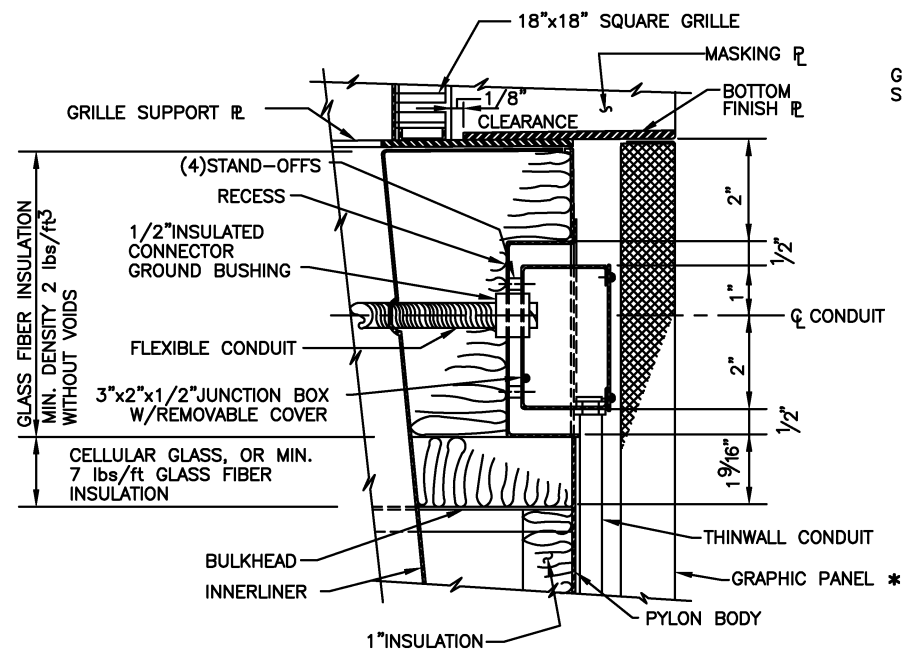
DRAWING NO. ST-M-083



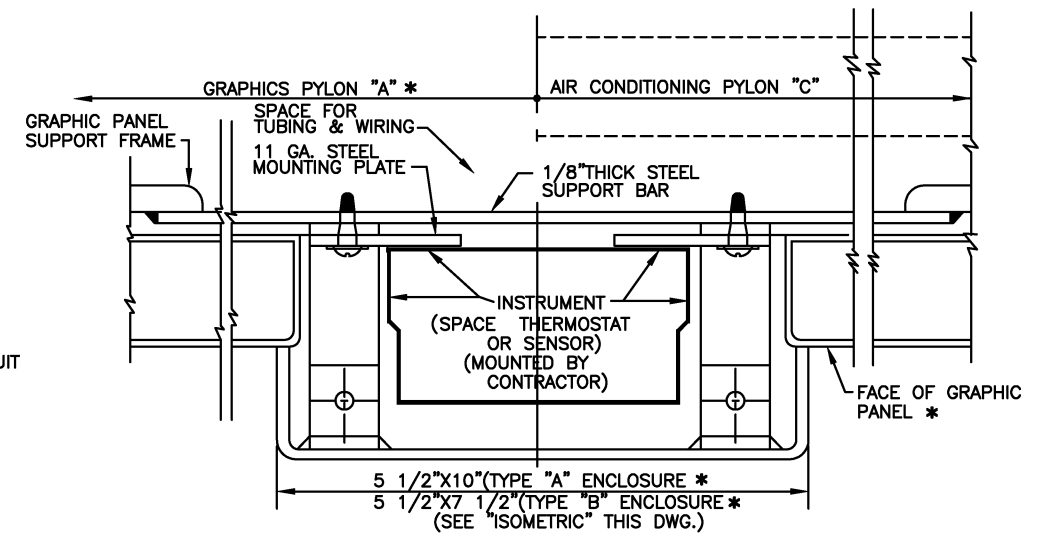
PLAN

JUNCTION BOX DETAIL FOR PYLON LIGHT

SCALE: 6"=1'-0"



SECTION A-A

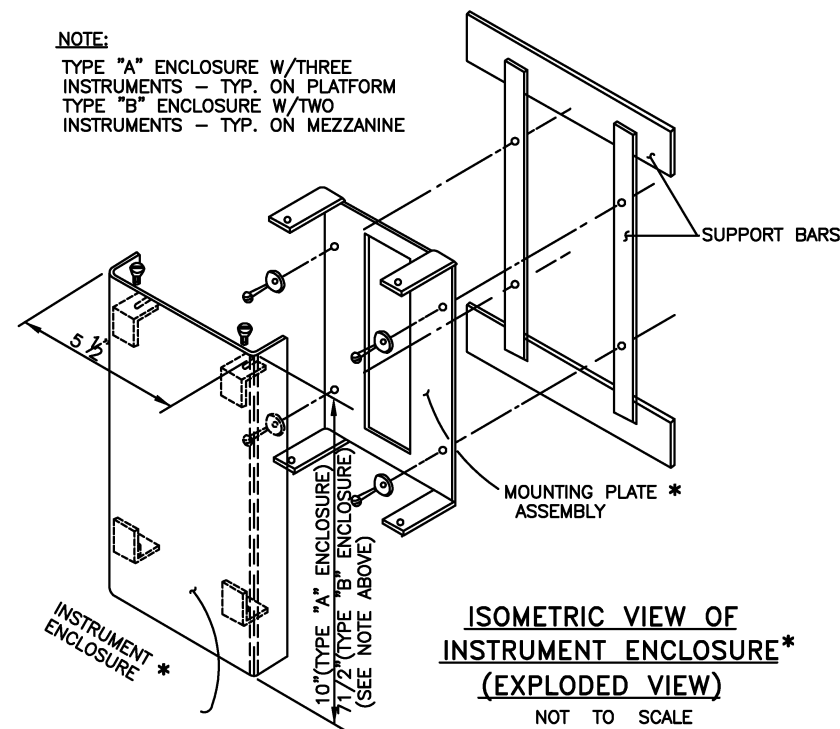


SECTIONAL PLAN AT INSTRUMENT ENCLOSURE

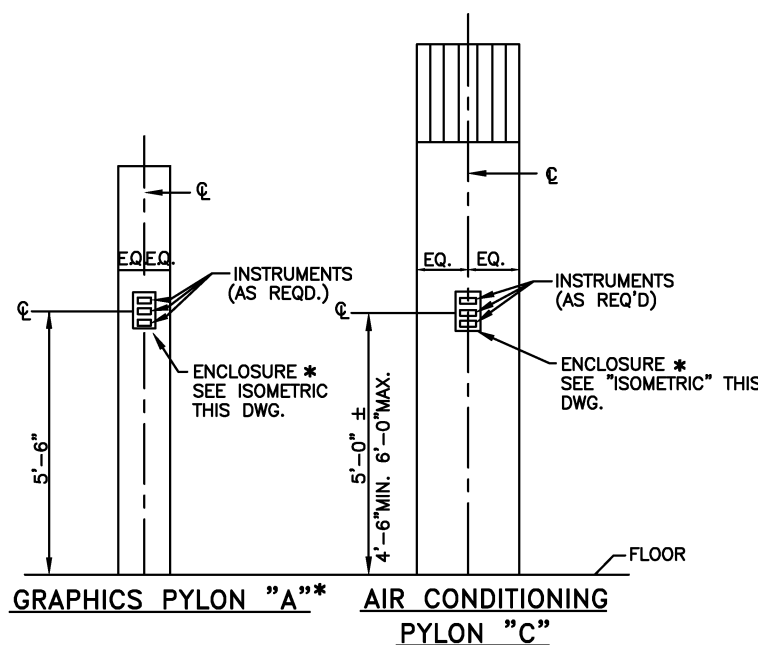
SCALE: FULL SIZE

NOTE : THE CONTRACTOR SHALL COORDINATE THE LOCATION & INSTALLATION OF INSTRUMENTS WITH THE GRAPHIC PANEL CONTRACTOR SHALL PROVIDE TEMPORARY MOUNTING OF INSTRUMENTS WHEN NECESSARY.

NOTE:
TYPE "A" ENCLOSURE W/THREE INSTRUMENTS - TYP. ON PLATFORM
TYPE "B" ENCLOSURE W/TWO INSTRUMENTS - TYP. ON MEZZANINE



ISOMETRIC VIEW OF INSTRUMENT ENCLOSURE* (EXPLODED VIEW)
NOT TO SCALE



PYLON THERMOSTAT MOUNTING

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

* DENOTES WORK PERFORMED BY GRAPHICS CONTRACTOR.

DESIGNED	K.S. PARROTT	5-71	NUMBER	DESCRIPTION	DATE	BY	REVISIONS	DESCRIPTION
DRAWN	W. SULLMAN	5-71	ST-M-083	AIR CONDITIONING PYLON-SHT.1	08/2001	ENGA	Revised and issued by the Authority	
CHECKED	I.M. SOLOMON	5-71	ST-A-PY-001	ARCHITECTURAL STANDARD DRAWING PYLON BASE DETAILS				
APPROVED	R.S. O'NEAL	5-71	ST-A-PY-002	ARCHITECTURAL STANDARD DRAWING PYLON LIGHT FIXTURE BASE DETAILS				
			ST-M-150	AIR CONDITIONING PYLON-SHEET 2				

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED

DATE

APPROVED DIRECTOR

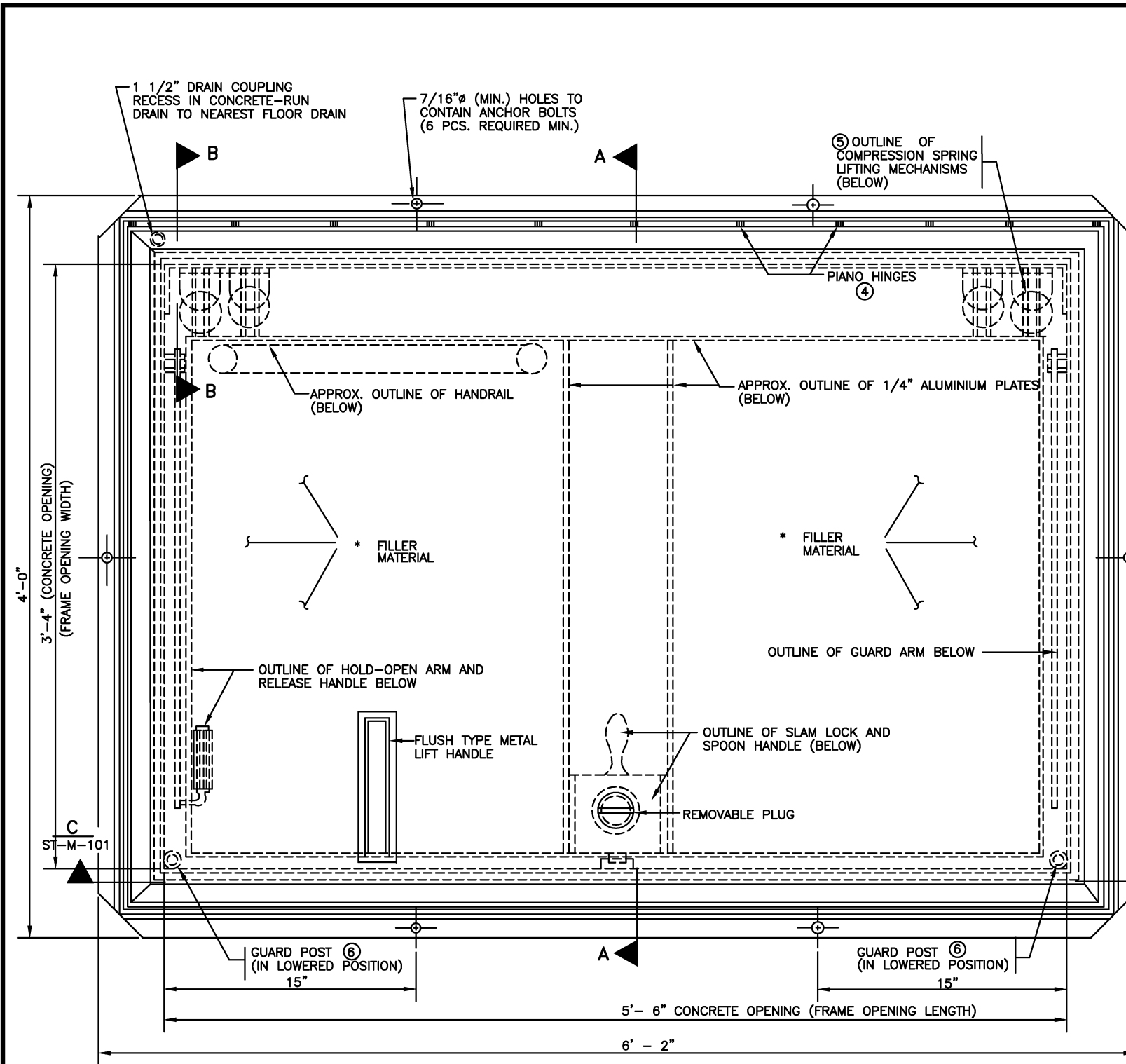
May 3, 2001
DATE

SCALE AS NOTED

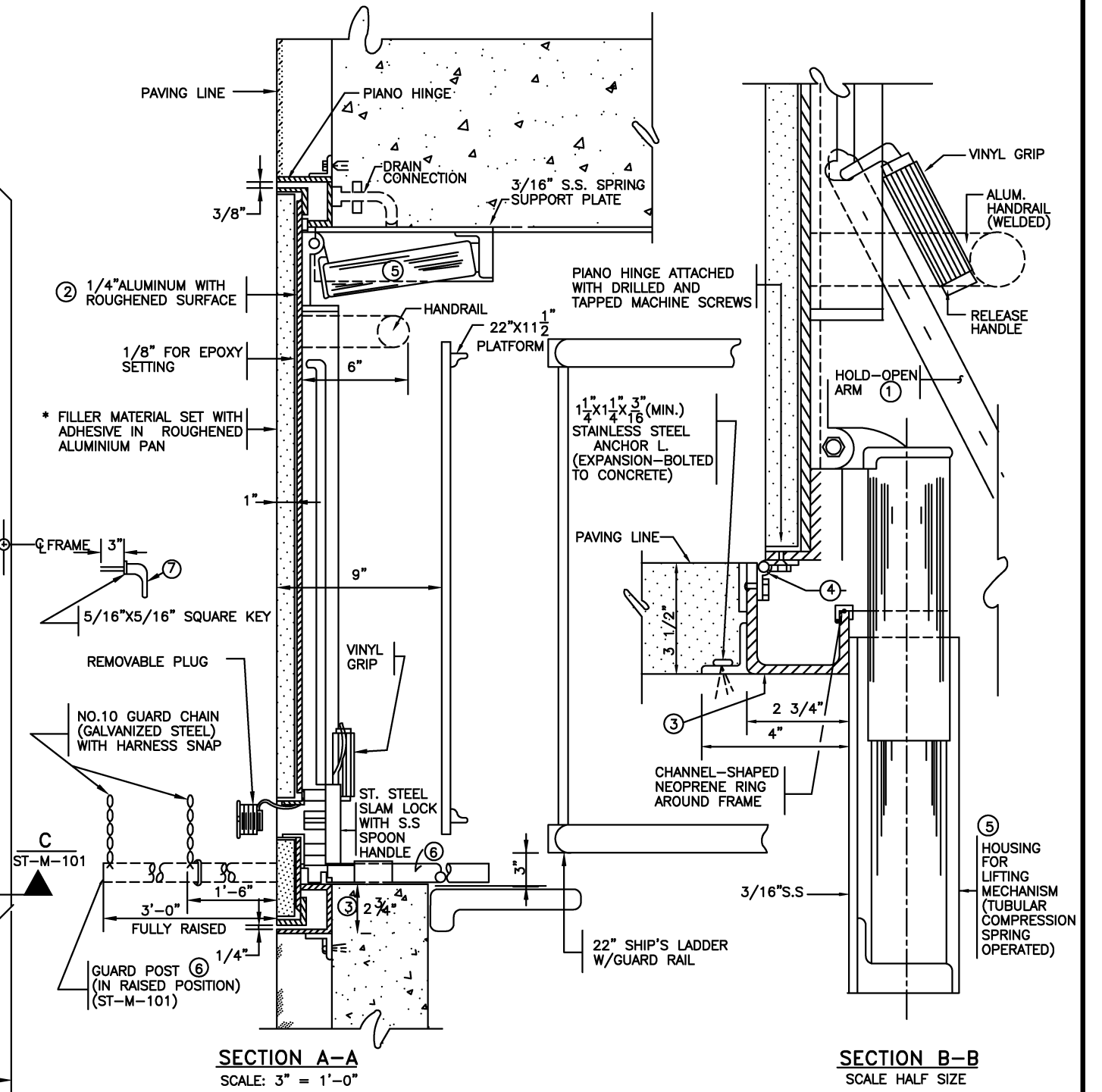
DRAWING NO.

ST-M-090

MECHANICAL STANDARD DRAWING
AIR CONDITIONING PYLON SHEET 3
& PYLON THERMOSTAT MOUNTING DETAILS



PLAN
NOT TO SCALE



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

SECTION B-B
SCALE HALF SIZE

DETAIL W/HATCH DOOR OPEN

- NOTES :**
1. FILLER MATERIAL SHALL BE COMPATIBLE WITH ADJACENT PAVED SURFACE.
 2. SEE DWG. NO. ST-M-101 FOR "PARTIAL MATERIAL LIST".
 3. ALL HARDWARE TO BE STAINLESS STEEL.

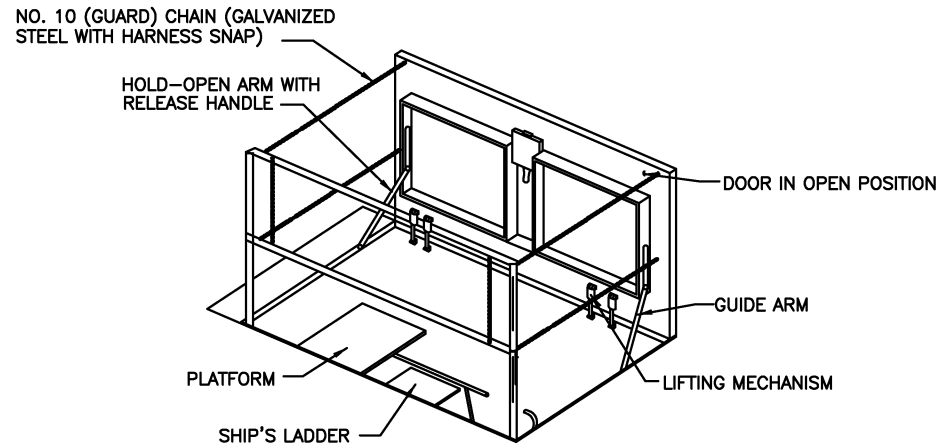
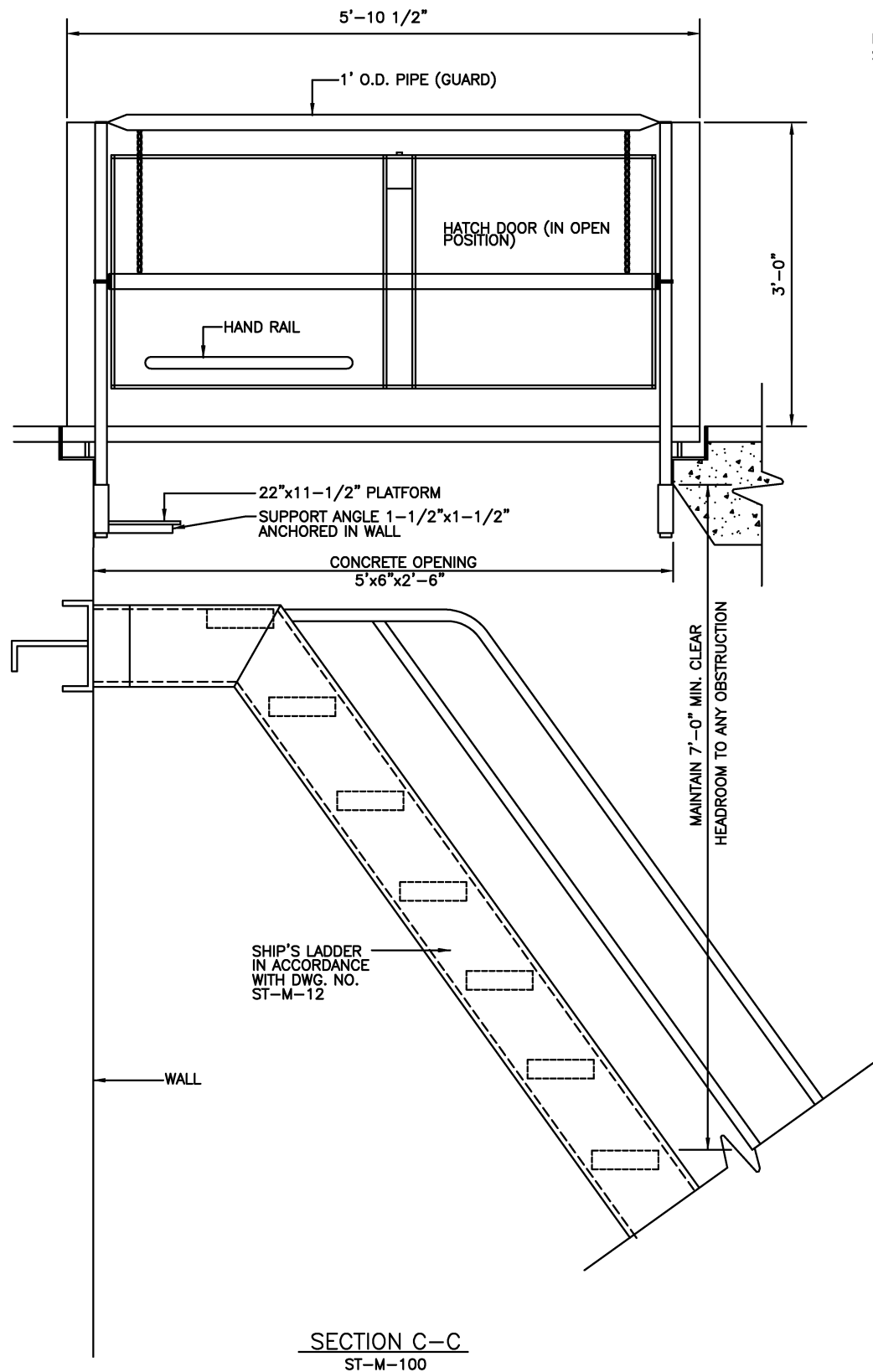
DESIGNED	DATE	REFERENCE DRAWINGS		REVISIONS	
		NUMBER	DESCRIPTION	DATE	DESCRIPTION
A.S. GILL	11-71	ST-M-101	MECHANICAL STANDARD DRAWING MAINTENANCE	08/2001	Revised and issued by the Authority
S.A. HOWARD	11-71		HATCH FOR ESCALATOR AND ELEVATOR MACHINE		
I.M. SOLOMON	08-72		ROOM SHEET 2 OF 2		
R.S. O'NEIL	11-72				

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

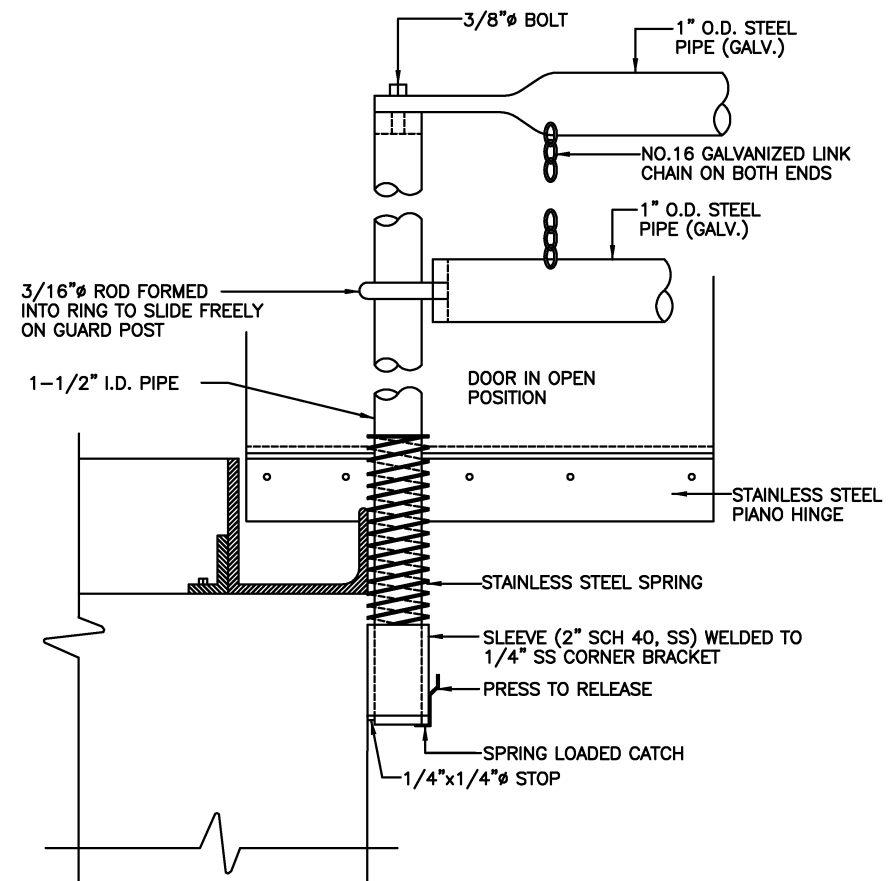
SUBMITTED _____ DATE _____
APPROVED _____ DATE May 3, 2001
DIRECTOR

MECHANICAL STANDARD DRAWING
MAINTENANCE HATCH FOR ESCALATOR
AND ELEVATOR MACHINE ROOM SHEET 1 OF 2

SCALE: NOT TO SCALE
DRAWING NO. ST-M-100



ISOMETRIC



DETAIL OF GUARD POST

PARTIAL MATERIAL LIST:

- ① HEAVY DUTY AUTOMATIC HOLD-OPEN ARM WITH VINYL GRIP.
- ② 1/4" ALUMINUM COVER (REINFORCED FOR 300 LBS. PER SQ. FOOT LIVE LOAD).
- ③ FRAME (AS REQUIRED)
- ④ STAINLESS STEEL 2" PIANO HINGE WITH STAINLESS STEEL PINS.
- ⑤ STAINLESS STEEL COMPRESSION SPRING LIFTING MECHANISM. NUMBER AS REQUIRED TO PROVIDE MAXIMUM OPENING OF 50 LBS
- ⑥ 1-1/2" ID STEEL GUARD POST. (GALV.).
- ⑦ 5/16"x5/16" SQUARE KEY AND HANDLE FOR UNLOCKING SLAM TYPE LOCK ON MATCH DOOR.

GENERAL NOTES:

1. SUITABLE ARRANGEMENT SHALL BE MADE TO STORE GUARD CHAINS WHEN NOT IN USE.
2. DOOR SERVES AS GUARD WHEN IN OPEN POSITION.
3. ALL ALUMINUM IN CONTACT WITH CONCRETE SHALL BE BITUMINOUS COATED.

SECTION C-C
ST-M-100

DESIGNED	A.S.GILL	12-71 DATE	REFERENCE DRAWINGS		REVISIONS	
			NUMBER	DESCRIPTION	DATE	DESCRIPTION
DRAWN	S.A. HOWARD	12-71 DATE			08/2001	ENGA Revised and issued by the Authority
CHECKED	I.M. SOLOMON	1-72 DATE				
APPROVED	R.S. O'NEIL	1-72 DATE				

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED

DATE

APPROVED
DIRECTOR

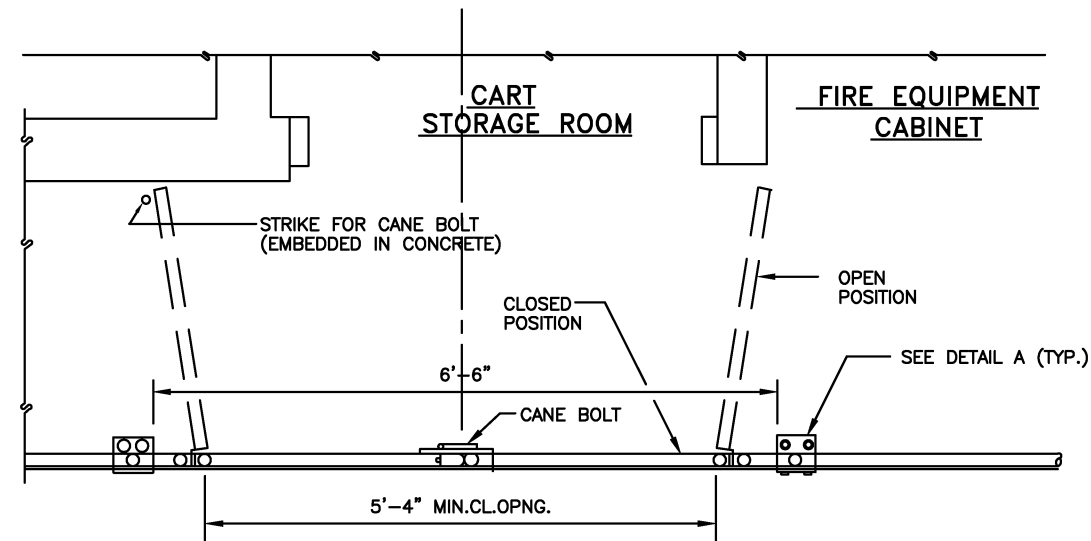
May 3, 2001
DATE

SCALE
NOT TO SCALE

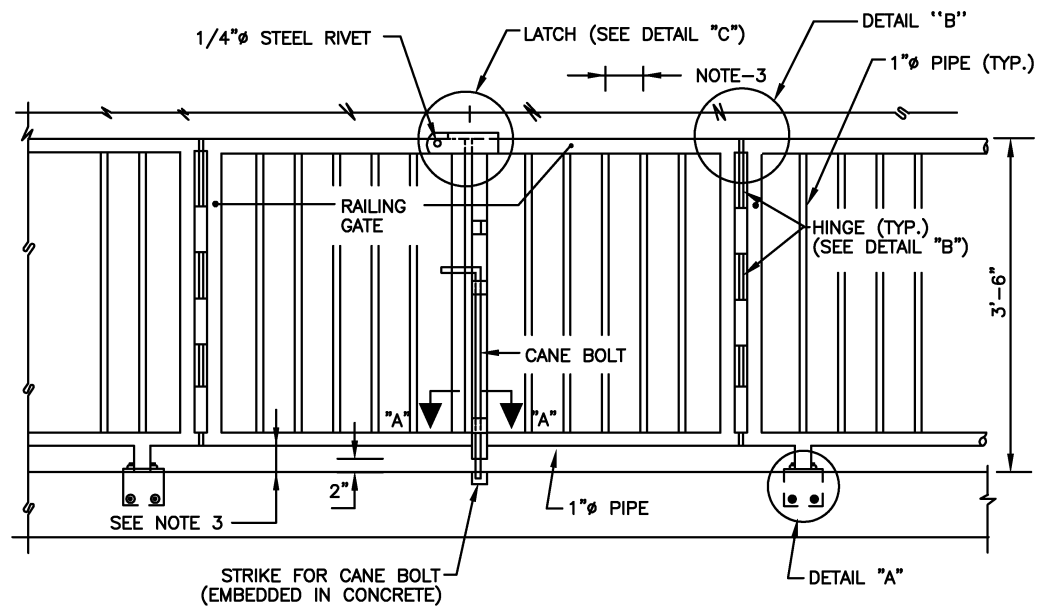
DRAWING NO.

ST-M-101

MECHANICAL STANDARD DRAWING
MAINTENANCE HATCH FOR ESCALATORS AND
ELEVATOR MACHINE ROOM SHEET 2 OF 2



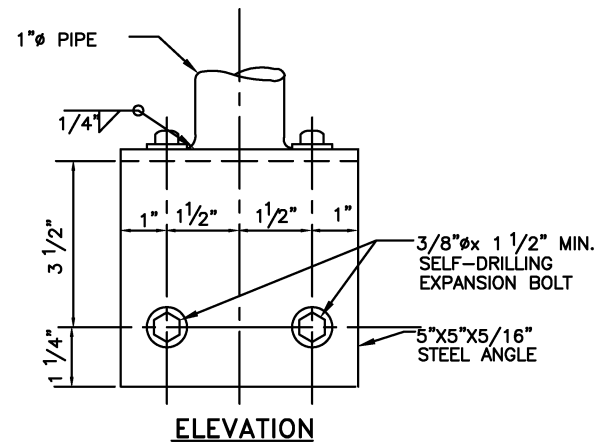
PLAN



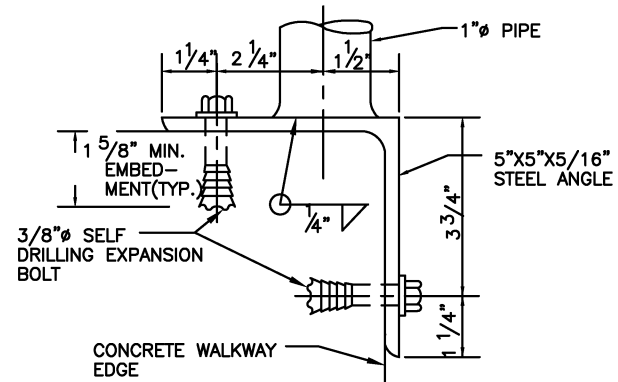
RAILING GATE ELEVATION
(FROM SAFETY WALK SIDE)

NOTES

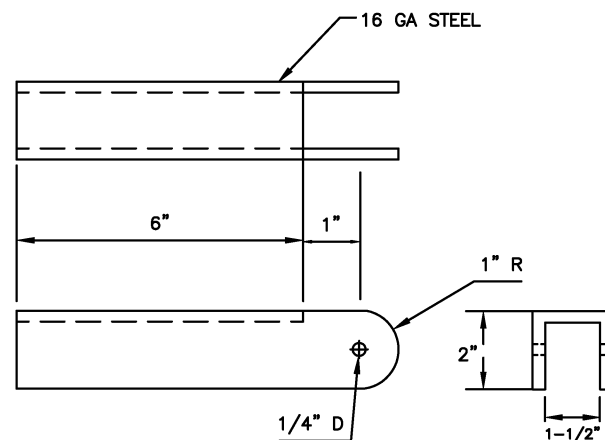
1. BOND AND GROUND HANDRAILS IN ACCORDANCE WITH SPECIFICATIONS.
2. HAND RAILS SHALL BE INSTALLED PLUMB.
3. LIMIT OPENING DIMENSIONS TO PREVENT PASSAGE OF A 4"Ø SPHERE.
4. PIPE SIZES SHOWN ARE NOMINAL, SCHEDULE 40.



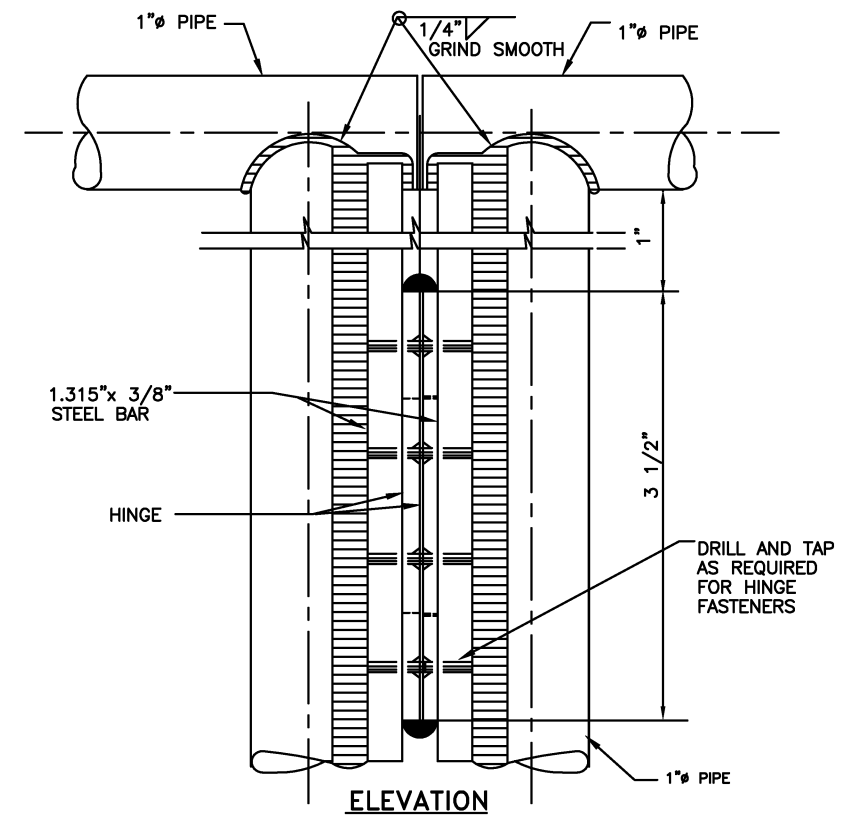
ELEVATION



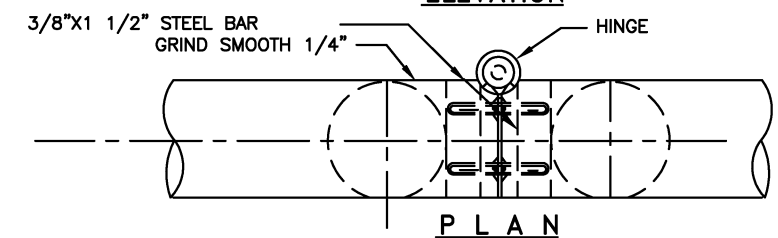
SECTION
DETAIL "A"
SCALE 1/2" = 1"



LATCH
DETAIL "C"
NOT TO SCALE
(GRIND OFF ALL SHARP EDGES)

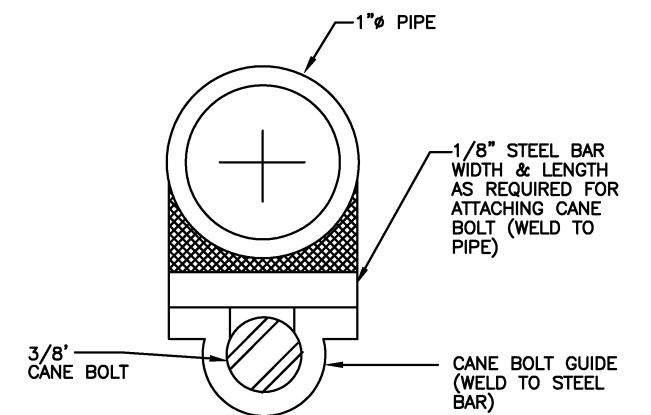


ELEVATION



PLAN

DETAIL "B"
SCALE 3/4" = 1"



SECTION "A-A"
NOT TO SCALE

DESIGNED		DATE		NUMBER		DESCRIPTION		DATE		BY		DESCRIPTION	
A.S. GILL	12-71	DATE		ST-M-012	STAIRS, LADDERS & HANDRAILS	08/2001	ENGA	Revised and issued by the Authority					
B.U. CHARUHAS	2-72	DATE											
I.M. SOLOMON	3-72	DATE											
R.S. O'NEAL	4-72	DATE											

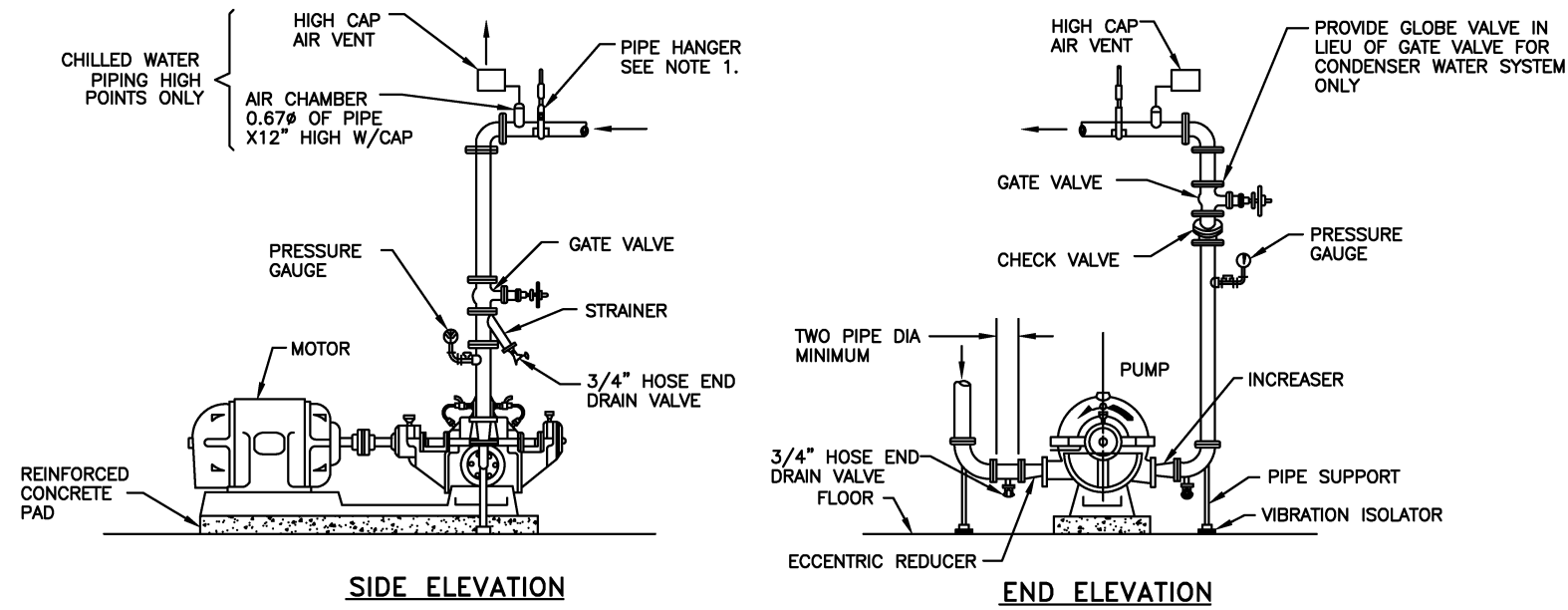
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED _____ DATE _____ APPROVED *[Signature]* DIRECTOR May 3, 2001 DATE

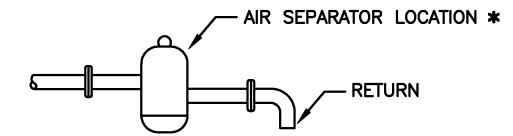
MECHANICAL DESIGN DRAWING
RAILING GATE FOR
CART STORAGE AREA

SCALE 1" = 1'-0" AND AS NOTED DRAWING NO. ST-M-102

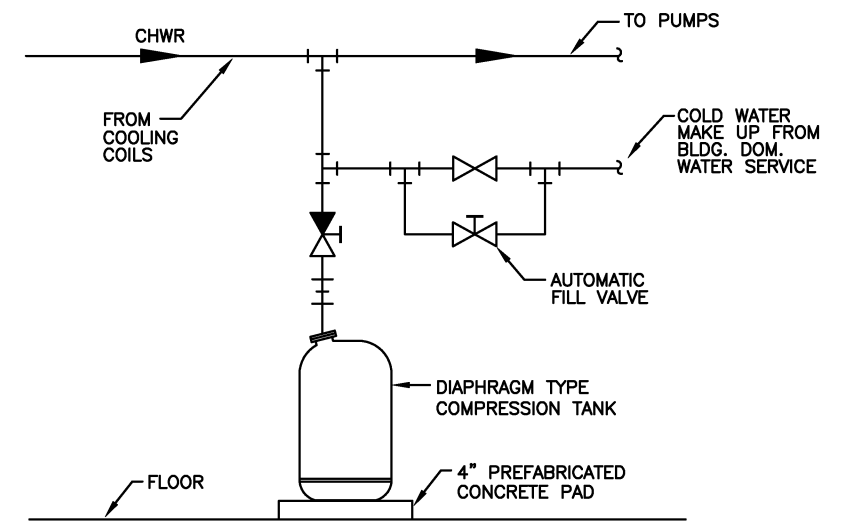


PUMP PIPING CONNECTION DETAIL
(SEE NOTE 3. THIS SHEET)

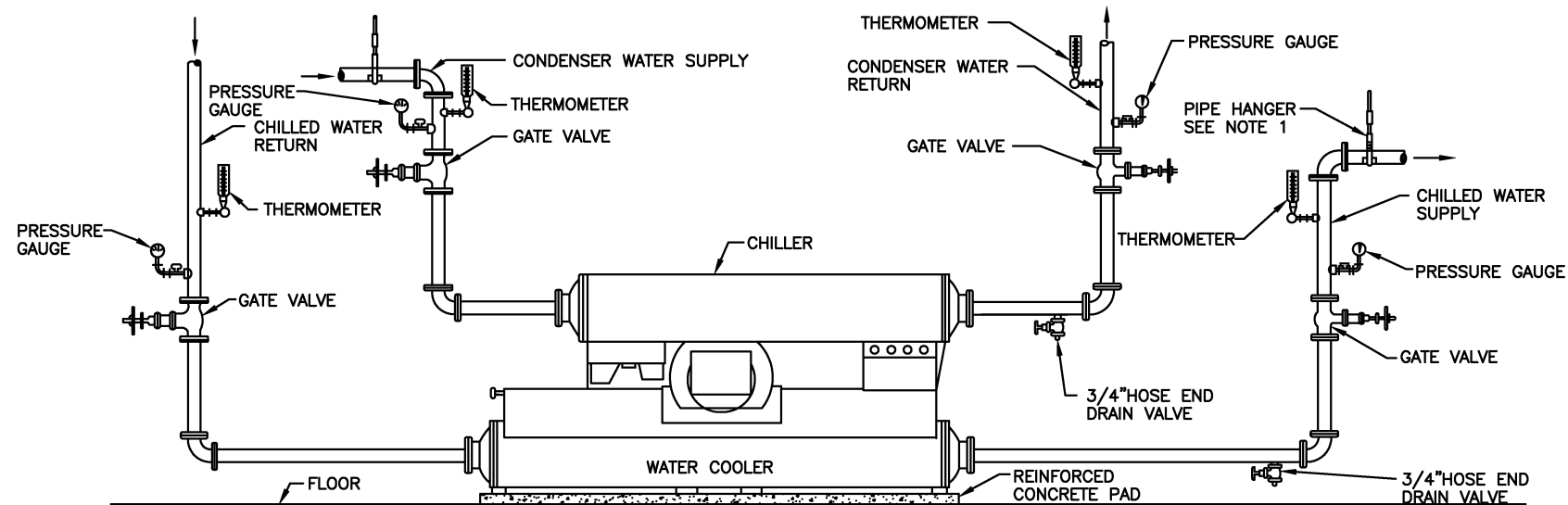
* PROVIDE AIR SEPARATOR AT HIGH POINT IN SYSTEM



AIR SEPARATOR LOCATION



CHILLED WATER-COMPRESSION TANK PIPING CONNECTION DETAIL



CHILLER PIPING CONNECTION DETAIL
(SEE NOTE 2.)

NOTES:

1. ALL PIPING 6 INCH AND LARGER SHALL BE SUPPORTED BY SPRING TYPE HANGERS- REFER TO SPECIFICATION.
2. PASS ARRANGEMENT SHOWN FOR WATER COOLER AND CONDENSER OF CHILLER IS DIAGRAMATIC.
3. SEE DRAWING DD-M-157 FOR WATER TREATMENT OF CONDENSER AND CHILLED WATER SYSTEMS.
4. SEE DRAWING DD-M-141 FOR APPROXIMATE LOCATION OF AEMS SENSORS. COORDINATE WITH CHILLER MANUFACTURER FOR EXACT LOCATIONS.
5. PROVIDE FLEXIBLE CONNECTIONS FOR PUMPS AND CHILLERS IF REQUIRED
6. FOR HEAT TRACER DETAIL SEE DRAWING DD-M-60.

DESIGNED	S.K. BAGI	07-72
DATE		
DRAWN	G.L. HARRISON	07-72
DATE		
CHECKED	I.M. SOLOMON	08-72
DATE		
APPROVED	R.S. O'NEAL	08-72
DATE		

REFERENCE DRAWINGS	
NUMBER	DESCRIPTION
ST-M-141	TYP. INSTALLATION OF HEATING TAPE FOR PIPING

REVISIONS	
DATE	DESCRIPTION
08/2001	Revised and issued by the Authority

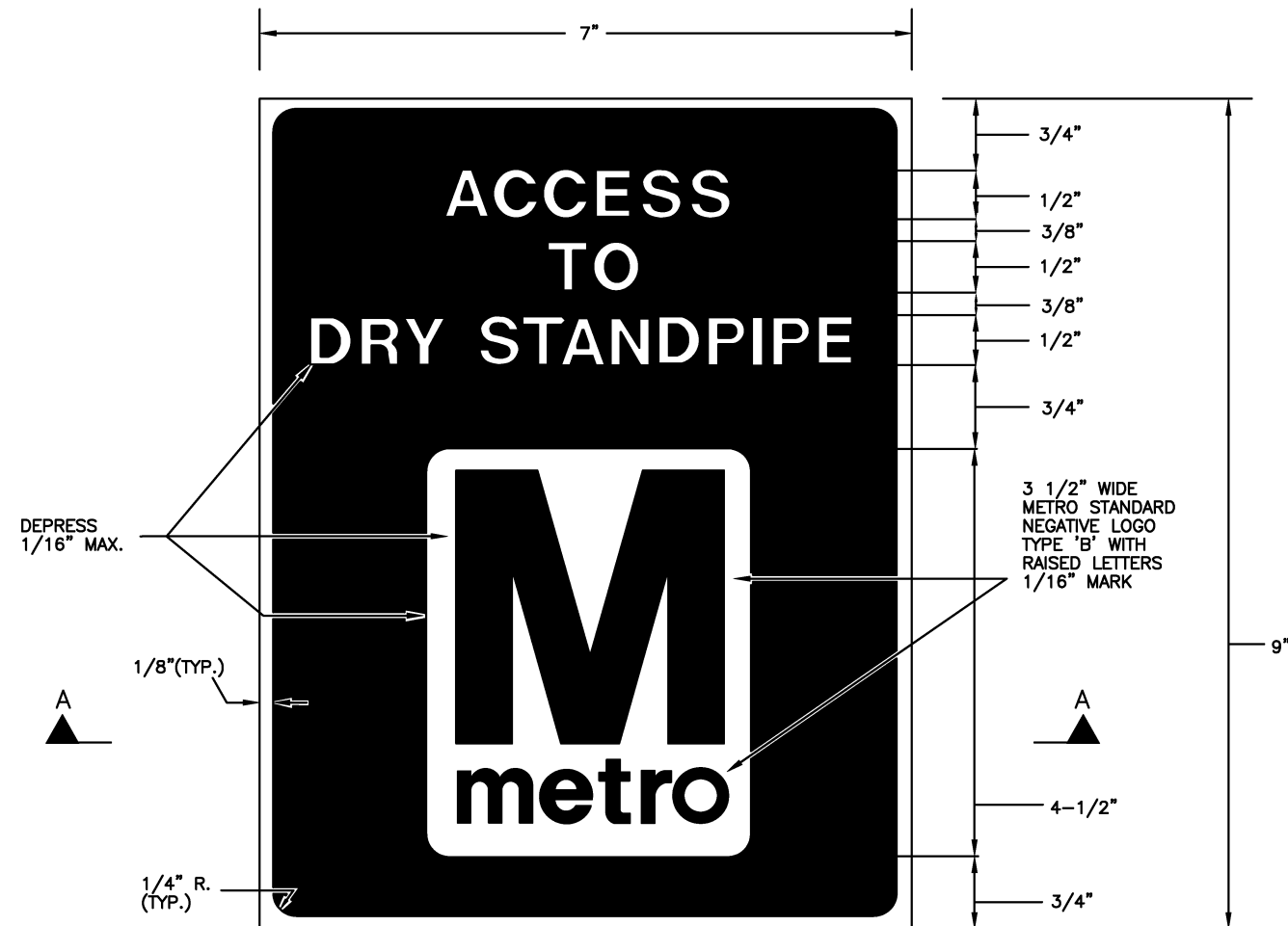
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED _____ DATE _____ APPROVED DIRECTOR *[Signature]* May 3, 2001 DATE

MECHANICAL STANDARD DRAWING
CHILLED WATER PLANT DETAILS

SCALE: NOT TO SCALE DRAWING NO. ST-M-118



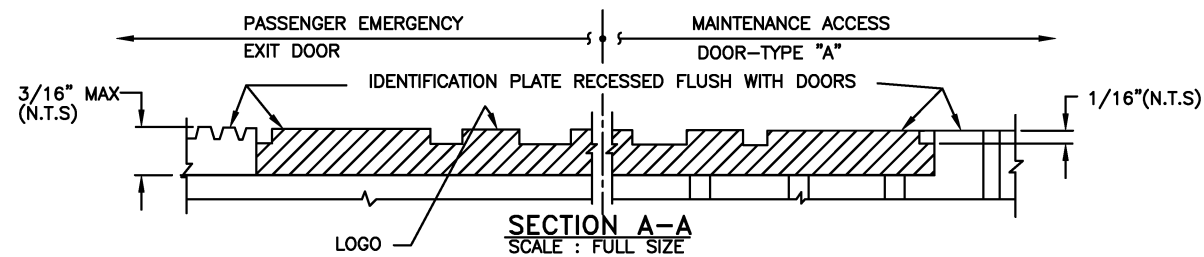
GENERAL NOTE

ALL SIGN LETTERING SHALL BE HELVETICA MEDIUM STYLE. COPY SHALL CONFORM TO THE SIZES AND ARRANGEMENTS SHOWN.

STANDPIPE IDENTIFICATION PLATE

SCALE : FULL SIZE

- NOTES:
1. STANDPIPE IDENTIFICATION PLATE SHALL BE MILLED FROM 3/16"(MAX.) STEEL PLATE. LETTERING AND LOGO SHALL BE SIZED AND RAISED/OR DEPRESSED AS NOTED. STEEL PLATE SHALL BE GALVANIZED AFTER FABRICATION.
 2. DOOR FABRICATOR SHALL RECESS IDENTIFICATION PLATES IN SINGLE LEAF MAINTENANCE ACCESS DOORS AND PASSENGER EMERGENCY EXIT DOORS IN ACCORDANCE WITH LOCATIONS SHOWN ON DWG. NO.'S ST-M-106 AND ST-M-9. PROVIDE STANDPIPE IDENTIFICATION PLATE ONLY WHERE STANDPIPES ARE REQUIRED
 3. STANDPIPE IDENTIFICATION PLATES SHALL BE FURNISHED AND INSTALLED BY DOOR MANUFACTURER OR FABRICATOR



DESIGNED			REFERENCE DRAWINGS		REVISIONS	
NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY
6-72	ST-M-137	08/2001	ENGA	Revised and issued by the Authority		
9-72	ST-M-138					
11-72						
11-72						

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

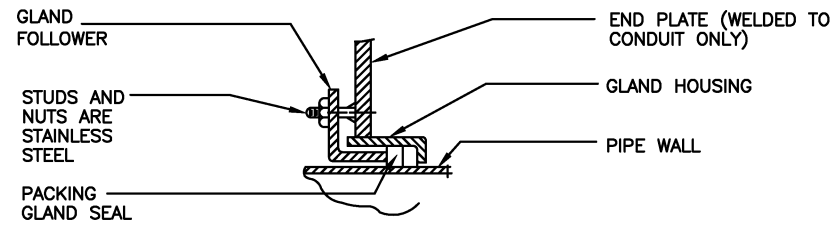
SUBMITTED _____ DATE _____

APPROVED *[Signature]* DIRECTOR May 3, 2001 DATE

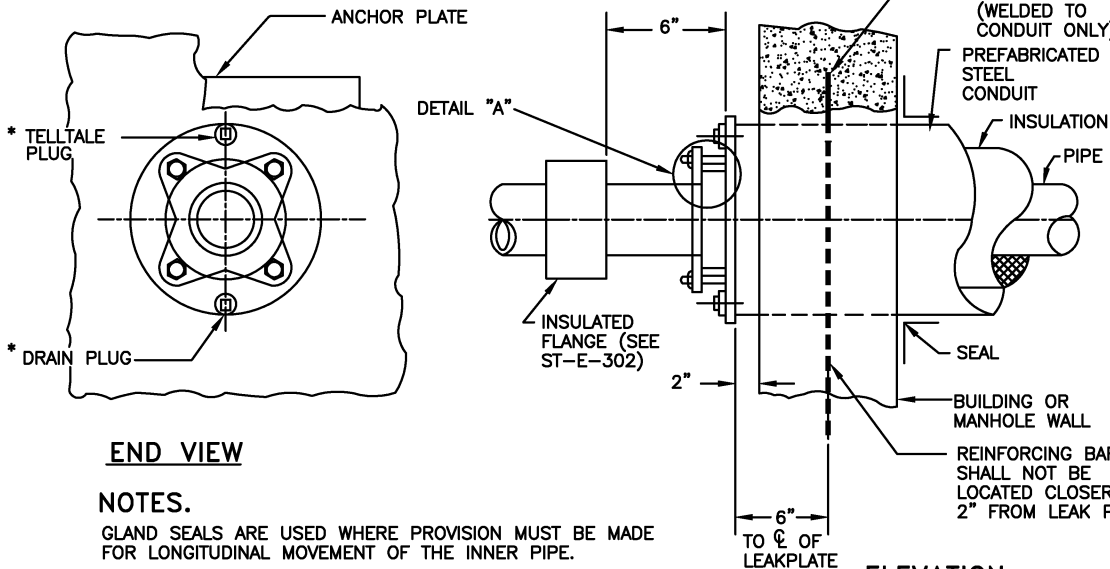
MECHANICAL STANDARD DRAWING
STANDPIPE IDENTIFICATION PLATE

SCALE AS NOTED

DRAWING NO. ST-M-119



DETAIL "A"



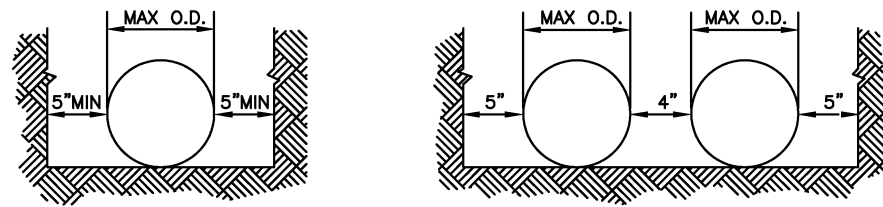
END VIEW

NOTES.

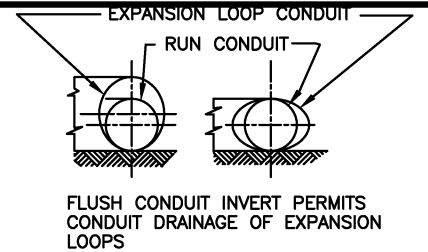
GLAND SEALS ARE USED WHERE PROVISION MUST BE MADE FOR LONGITUDINAL MOVEMENT OF THE INNER PIPE.

* REMOVE TELLTALE PLUG AND INSTALL TELLTALE PIPE EXTENDING TO THE TOP OR ABOVE THE MANHOLE. TERMINATE WITH MUSHROOM HEAD OR GOOSENECK. REMOVE DRAIN PLUG AND REPLACE WITH NIPPLE.

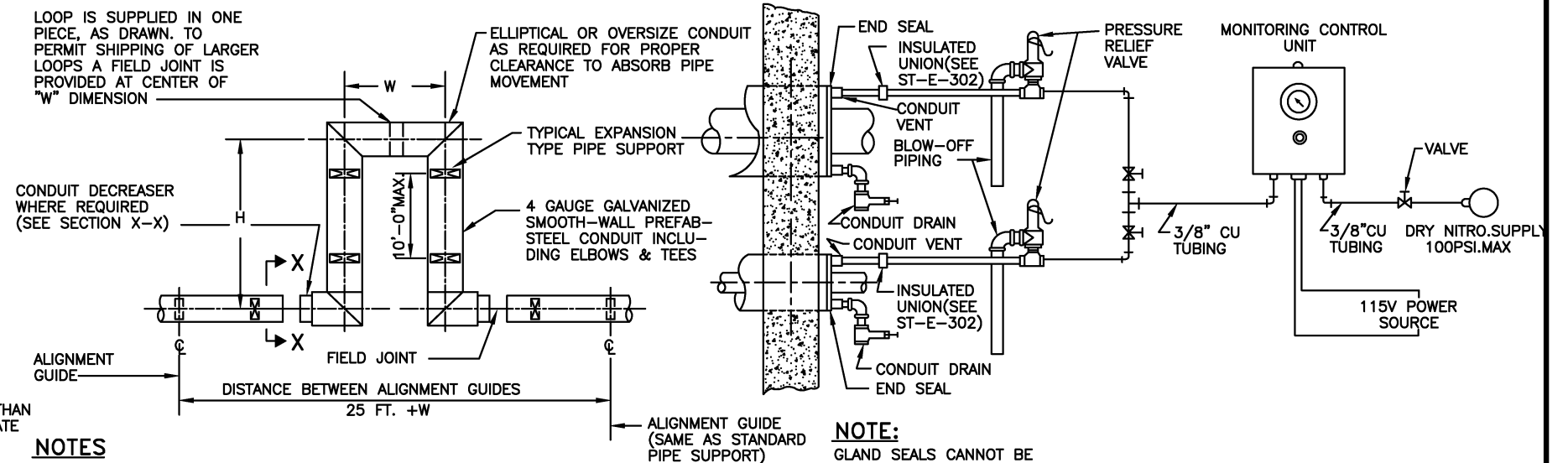
DETAIL OF BUILDING OR MANHOLE WALL ENTRY WITH GLAND SEAL



MINIMUM DISTANCE BETWEEN CONDUITS AND TRENCH WALLS



SECTION X-X



NOTE:

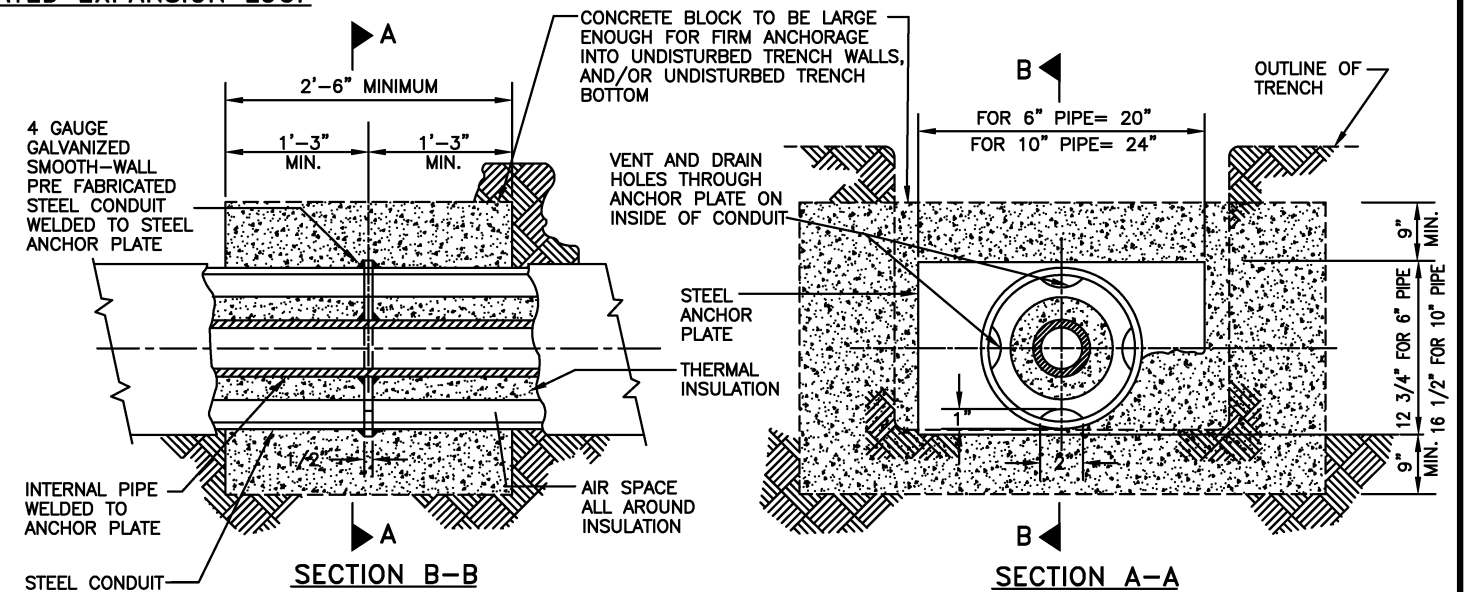
GLAND SEALS CANNOT BE USED WITH MONITORED CONDUIT SYSTEM.

SCHEMATIC PIPING DIAGRAM FOR MONITORED CONDUIT SYSTEM

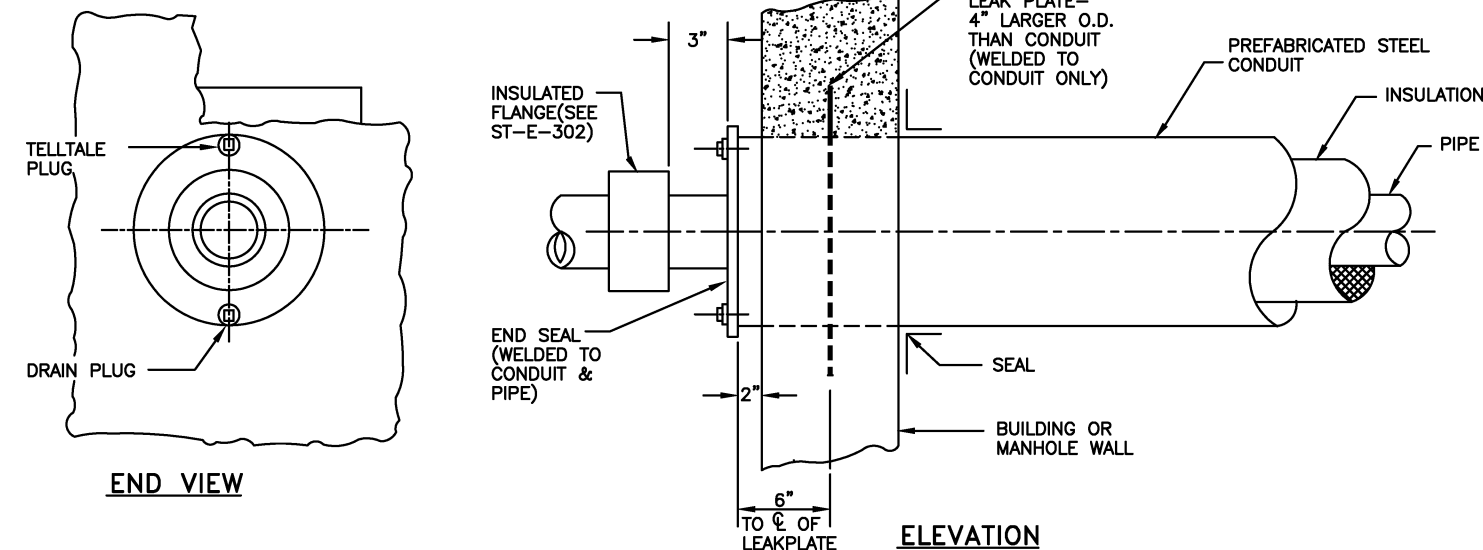
NOTES

1. SIZE OF EXPANSION LOOPS ARE BASED ON JOB REQUIREMENTS
2. ALL LOOP CONDUITS ARE ASPHALT COATED AND WRAPPED SAME AS STRAIGHT SECTIONS.
3. SEE CONTRACT DRAWINGS FOR EXPANSION LOOP DIMENSIONS W AND H.

DETAIL OF FABRICATED EXPANSION LOOP



DETAIL OF STANDARD ANCHOR CONSTRUCTION



END VIEW

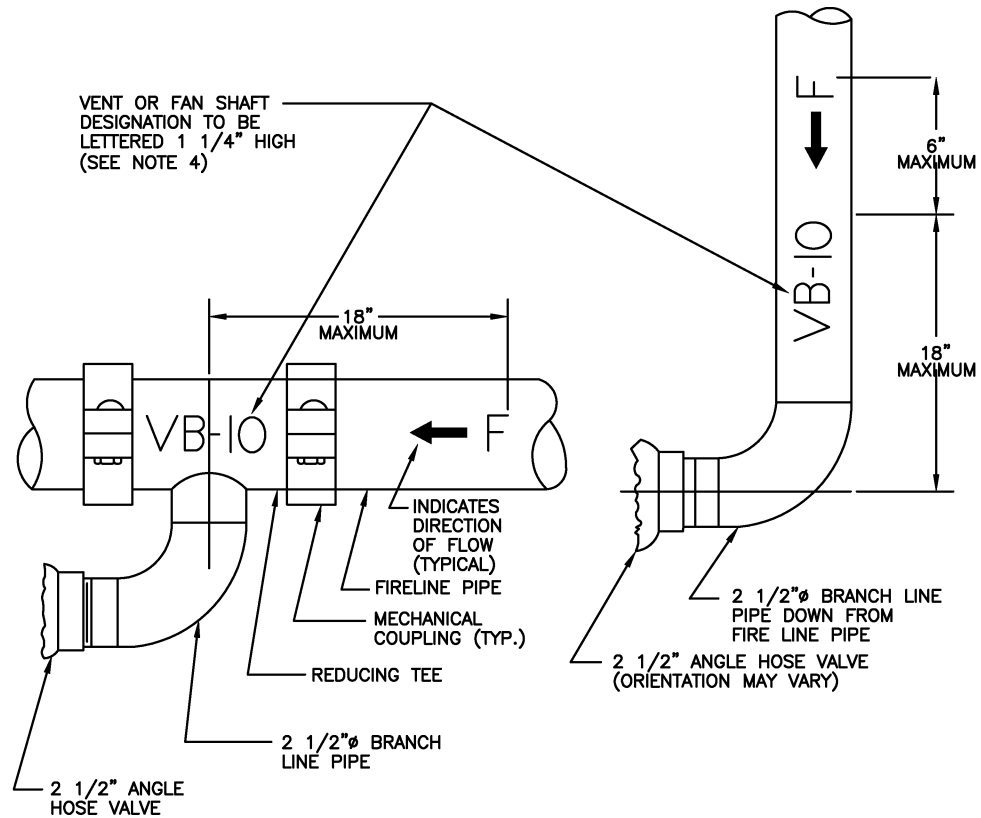
ELEVATION

DETAIL OF BUILDING OR MANHOLE WALL ENTRY WITH END SEAL

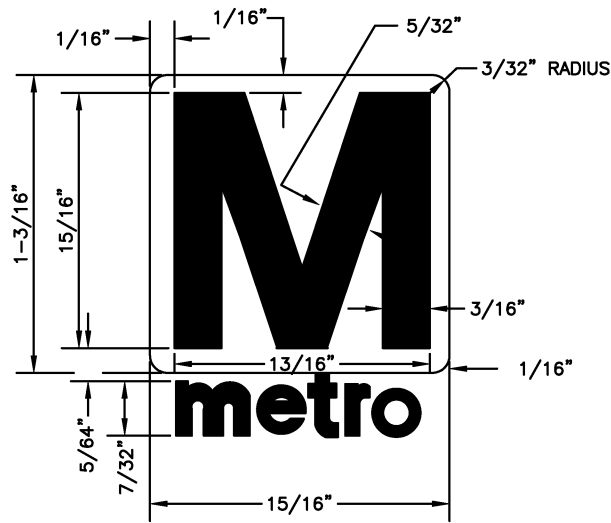
DESIGNED	D.S. GILL	12-74	REFERENCE DRAWINGS		REVISIONS	
			NUMBER	DESCRIPTION	DATE	DESCRIPTION
DRAWN	L. PROCYK	12-74			08/2001	ENGA
CHECKED	D. HOWE	7-78				
APPROVED	T. HANSEN	7-78				

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
 DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
 OFFICE OF ENGINEERING AND ARCHITECTURE
 SUBMITTED _____ DATE _____ APPROVED *[Signature]* DIRECTOR May 3, 2001 DATE

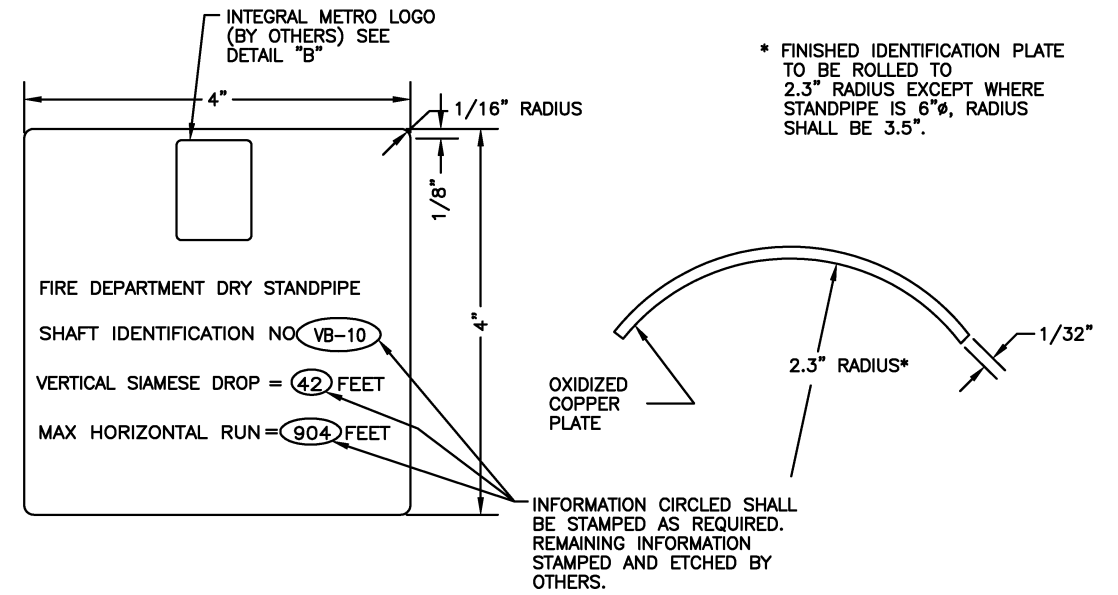
MECHANICAL STANDARD DRAWING
 TYPICAL CHILLED WATER PIPING
 CONDUIT DETAILS
 SCALE NONE DRAWING NO. ST-M-122



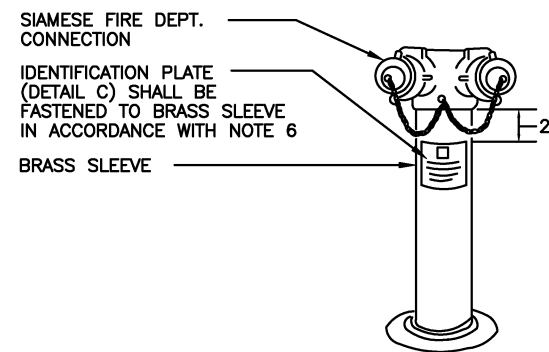
IN CIRCULAR & NATM EARTH TUNNELS IN OTHER TUNNELS
ANGLE HOSE VALVE IDENTIFICATION



DETAIL B
METRO LOGO



DETAIL C
SIAMESE FIRE DEPARTMENT CONNECTION IDENTIFICATION PLATE
DETAIL



SIAMESE FIRE DEPARTMENT CONNECTION
IDENTIFICATION PLATE INSTALLATION
DETAIL

NOTES:

1. IDENTIFICATION PLATES TO BE PROVIDED BY CONTRACTOR.
2. CONTRACT DRAWINGS SHALL GIVE THE ESSENTIAL DATA FOR COMPLETION OF THE IDENTIFICATION PLATES.
3. LETTERING—WHITE ENAMEL FILLED & HELVETICA MEDIUM (SIAMESE IDENTIFICATION PLATE ONLY).
4. LETTERING FOR ANGLE HOSE VALVE TO BE VISIBLE FROM TRACK.
5. IN DOUBLE BOX TUNNELS PROVIDE LETTERING FOR ANGLE HOSE VALVE ON BOTH SIDES.
6. IDENTIFICATION PLATE SHALL BE FASTENED TO THE BRASS SLEEVE OF FREE STANDING. SIAMESE FIRE DEPARTMENT CONNECTION AS FOLLOWS.
 - a. STAMP REQ'D DATA ON TAG BEFORE INSTALLATION.
 - b. RIVET TAG TO PIPE SLEEVE W/SIX (6) 1/8" DIA. BRASS RIVETS EQUALLY SPACED 3 ON TOP AND 3 ON BOTTOM EITHER FLAT HEAD OR PAN HEAD TYPE WITH HEAD FILED TO MAX. 1/16" THICKNESS IF NOT AVAILABLE IN THAT THICKNESS.
 - c. DRILL HOLES W/MIN CLEARANCE TO PROVIDE A TIGHT FIT AFTER RIVETS ARE SET.
 - d. INSERT RIVETS FROM INSIDE SO THAT RIVET HEAD IS INSIDE SLEEVE PEEN RIVET W/RIVET SET ON PLATE.

DESIGNED	D.M. KERR	1-75 DATE	REFERENCE DRAWINGS		REVISIONS		
			NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION
DRAWN	C. BUITRAGO	1-75 DATE	DD-M-129	ABOVE GRADE SIAMESE FIRE DEPARTMENT CONNECTION	08/2001	ENGA	Revised and issued by the Authority
CHECKED	J. BUMANIS	2-75 DATE	DD-M-155	PLUMBING AND FIRE PROTECTION SYMBOLS			
APPROVED	D. HOWE	4-75 DATE					

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
 OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED

DATE

APPROVED
 DIRECTOR

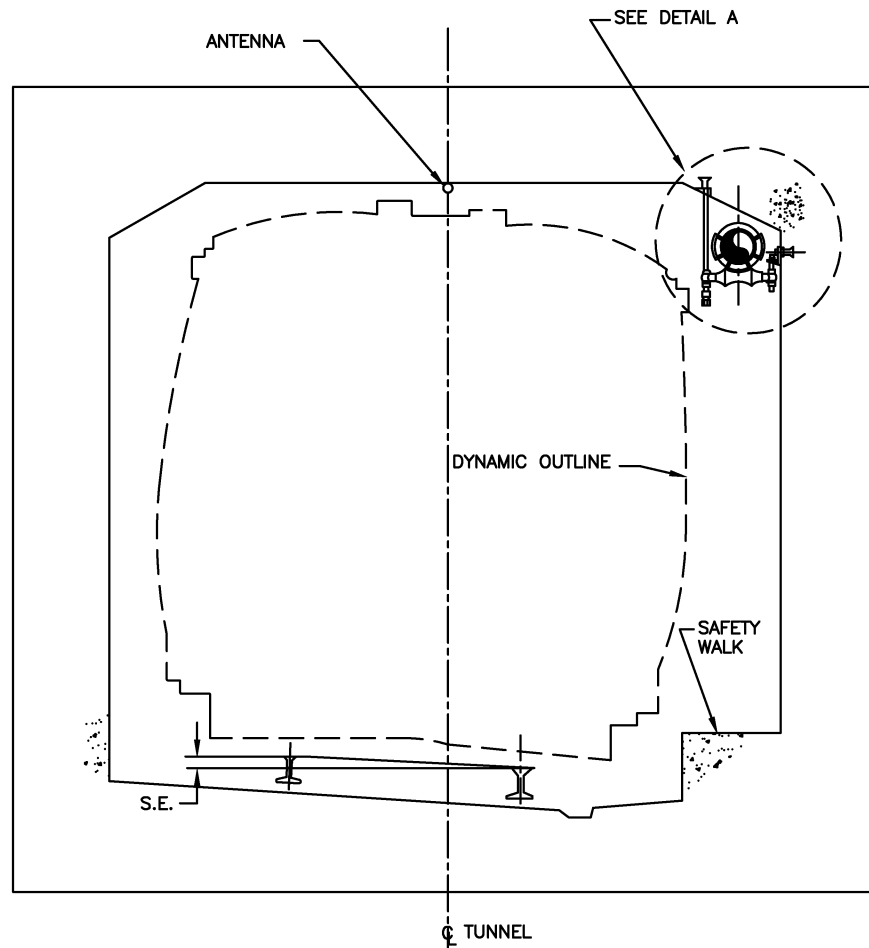
May 3, 2001
 DATE

SCALE
 NONE

DRAWING NO.

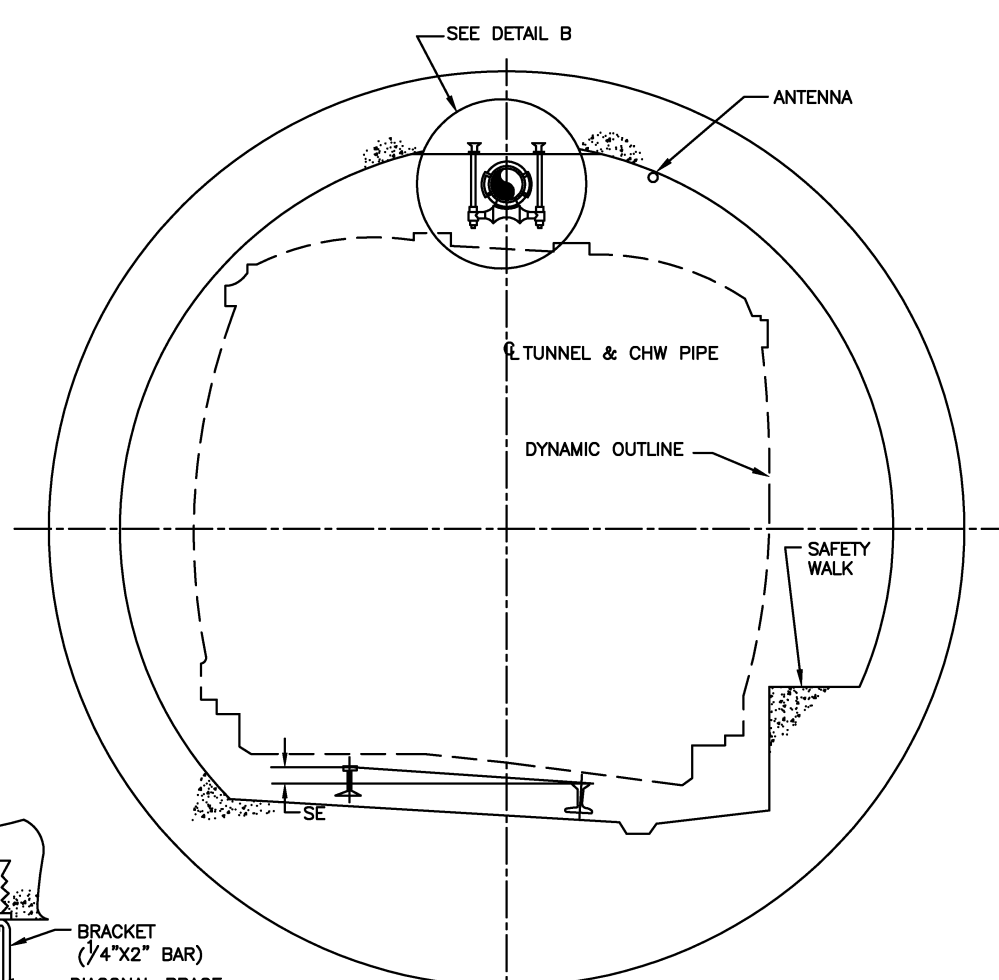
ST-M-130

MECHANICAL STANDARD DRAWING
ANGLE HOSE VALVE IDENTIFICATION & SIAMESE
FIRE DEPARTMENT CONNECTION IDENTIFICATION
PLATE DETAILS



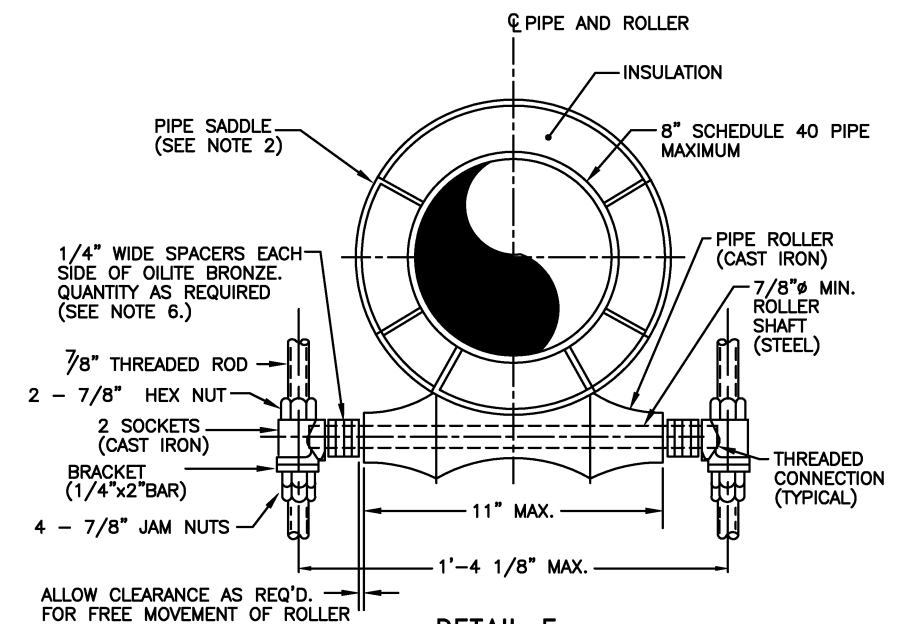
SECTION: CUT AND COVER TUNNEL

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



SECTION: CIRCULAR TUNNEL

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

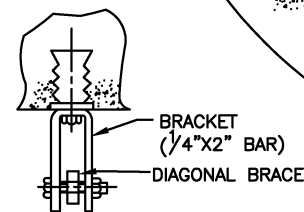


DETAIL F
SCALE 3" = 1'-0"

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

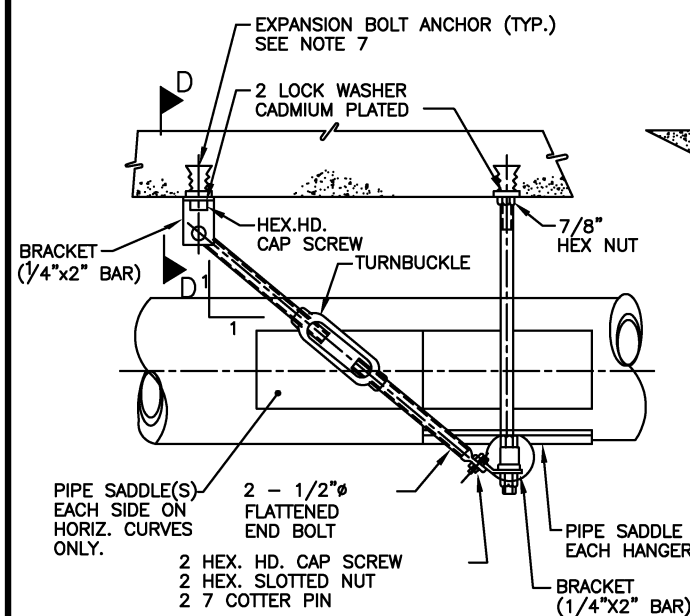
NOTES:

1. THREADED RODS, FLATTENED END BOLTS, BRACKETS, CAP SCREWS, HEX AND JAM NUTS SHALL BE STAINLESS STEEL. ALL COMPONENTS OF PIPE HANGAR ASSEMBLY, EXCEPT PIPE ROLLER, NUTS, AND LOCK WASHERS SHALL BE STAINLESS STEEL. NUTS AND WASHERS SHALL BE STAINLESS STEEL.
2. PIPE SADDLES SHALL BE STEEL CONFORMING TO ASTM A 588 OR A 242, AND SHALL BE COATED. COATING SHALL BE SELF CURING, INORGANIC ZINC SILICATE CONFORMING TO SPECIFICATION MIL-23-236 (SHIPS, CLASS 3) DRY THICKNESS 3 TO 5 MILS. COATING SHALL BE DIMETCOTE NO. 6", OR APPROVED EQUAL.
3. ALL PIPE SADDLES SHALL BE WELDED AT 4 CORNERS ONLY. COAT WELDS PER NOTE 2.
4. TUNNEL AND DYNAMIC OUTLINE CONFIGURATION ILLUSTRATED HEREON DEPICT WORST CLEARANCE CONDITIONS ESTABLISHED BY KNOWN SIZE AND TOLERANCE VALUES FOR THE TYPES OF TUNNELS SHOWN.
5. PIPE HANGER CONFIGURATION, LOCATION REQUIREMENTS, AND MINIMUM CLEARANCES ARE ESTABLISHED HEREON FOR THE SINGLE TRACK TUNNEL TYPES SHOWN. PIPE HANGER CONFIGURATION FOR DOUBLE TRACK TUNNEL OF THE SAME TYPES SHALL BE IDENTICAL TO THAT SHOWN, AND INSTALLED AT A LOCATION COMPATIBLE WITH OTHER INSTALLATIONS WITH IN THE TUNNEL STRUCTURE.
6. REARRANGEMENT OF OILITE BRONZE SPACERS PROVIDES LATERAL ADJUSTMENT OF PIPE ROLLER. INSTALL CHILLED WATER PIPE AS SHOWN (DETAIL F) WITH SPACERS EVENLY DISTRIBUTED EACH SIDE OF PIPE ROLLER, AND ADJUST IF NECESSARY AFTER COMPLETE INSTALLATION OF LINE. TO SHIFT POSITION OF PIPE ROLLER, DIS-ASSEMBLE ROLLER ASSEMBLY (ROLLER, SHAFT, AND END SOCKETS), AND SLIDE SPACERS TO LEFT OR RIGHT AS REQUIRED TO POSITION ROLLER DIRECTLY BELOW CHILLED WATER PIPE.
7. EXPANSION ANCHOR BOLT PER STANDARD SPECIFICATION SECTION 15205.



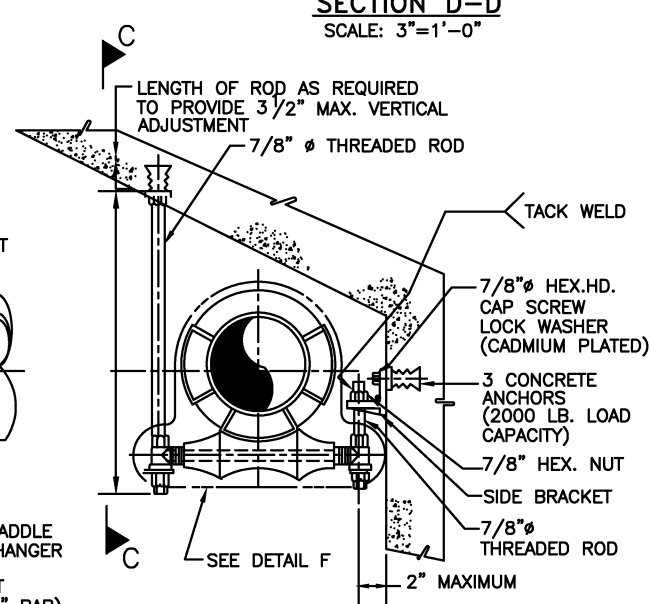
SECTION D-D

SCALE: 3" = 1'-0"



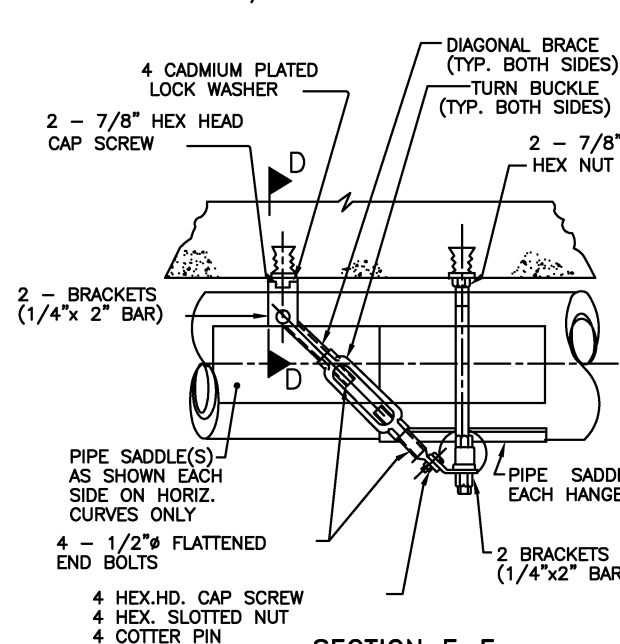
SECTION C-C

SCALE: 11/2" = 1'-0"



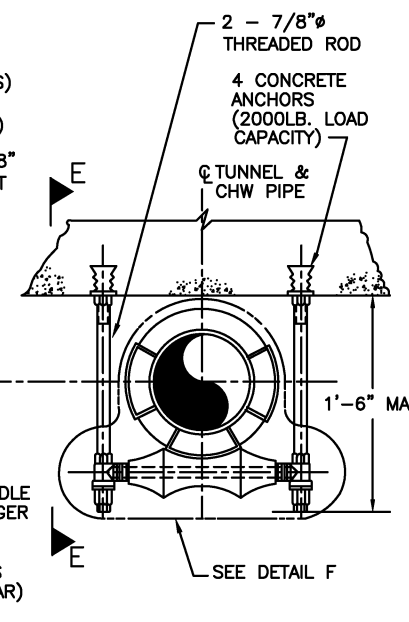
DETAIL A

SCALE: 11/2" = 1'-0"



SECTION E-E

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



DETAIL B

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

DESIGNED			REFERENCE DRAWINGS			REVISIONS		
DATE	BY	DESCRIPTION	NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION	
02-75	B.D. BROWN				08/2001	ENGA	Revised and issued by the Authority	
02-75	L. PROCYK							
03-75	D.S. GRILL							
07-75	T. HANSEN							

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED

DATE

APPROVED DIRECTOR

Harry J. ...

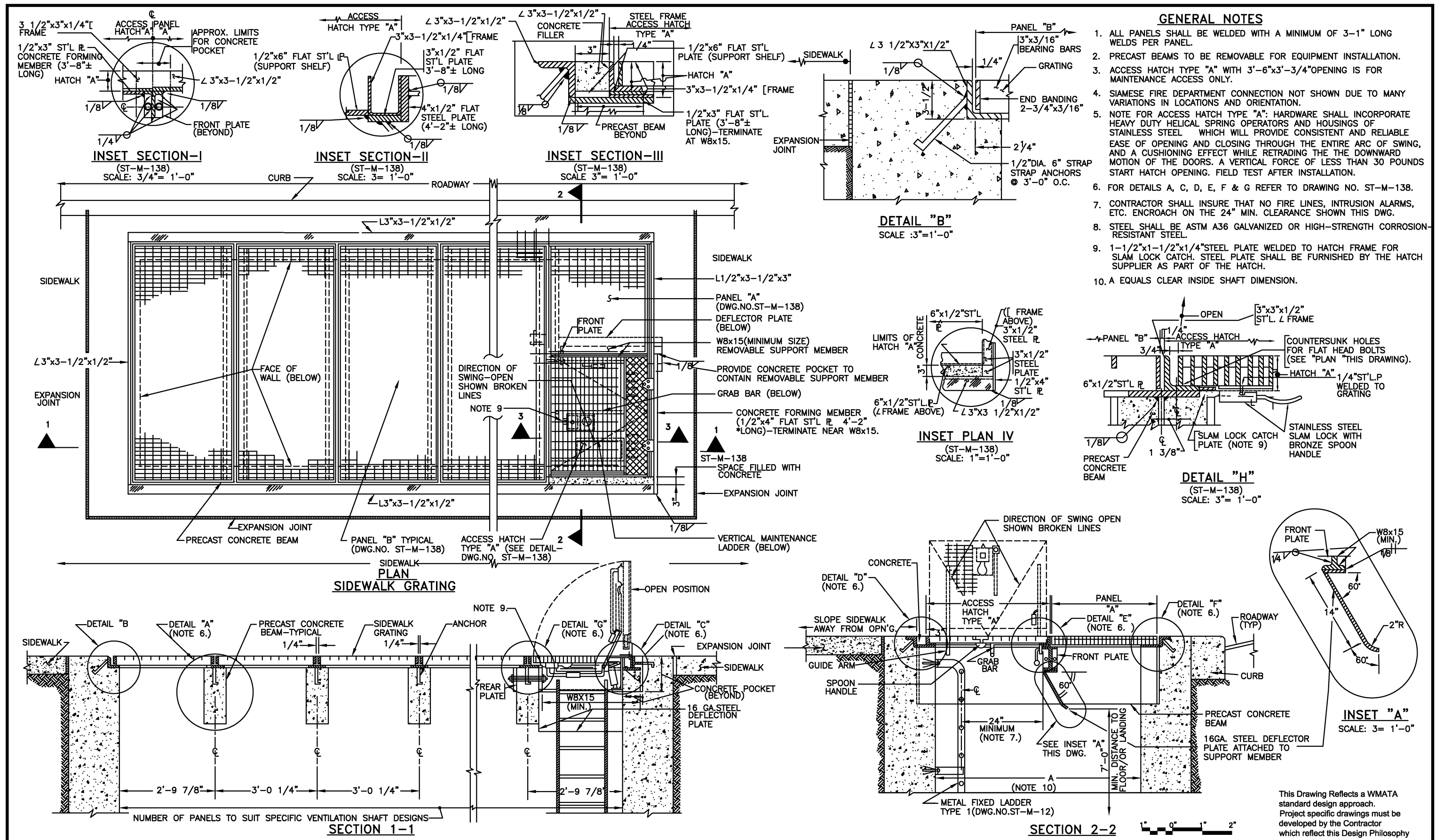
May 3, 2001
DATE

SCALE
AS NOTED

DRAWING NO.

ST-M-134

MECHANICAL STANDARD DRAWINGS
CHILLED WATER PIPE HANGER SECTIONS AND DETAILS
CUT AND COVER AND CIRCULAR TUNNELS



- GENERAL NOTES**
- ALL PANELS SHALL BE WELDED WITH A MINIMUM OF 3-1" LONG WELDS PER PANEL.
 - PRECAST BEAMS TO BE REMOVABLE FOR EQUIPMENT INSTALLATION.
 - ACCESS HATCH TYPE "A" WITH 3'-6"x3'-3/4" OPENING IS FOR MAINTENANCE ACCESS ONLY.
 - SIAMESE FIRE DEPARTMENT CONNECTION NOT SHOWN DUE TO MANY VARIATIONS IN LOCATIONS AND ORIENTATION.
 - NOTE FOR ACCESS HATCH TYPE "A": HARDWARE SHALL INCORPORATE HEAVY DUTY HELICAL SPRING OPERATORS AND HOUSINGS OF STAINLESS STEEL WHICH WILL PROVIDE CONSISTENT AND RELIABLE EASE OF OPENING AND CLOSING THROUGH THE ENTIRE ARC OF SWING, AND A CUSHIONING EFFECT WHILE RETRADING THE THE DOWNWARD MOTION OF THE DOORS. A VERTICAL FORCE OF LESS THAN 30 POUNDS START HATCH OPENING. FIELD TEST AFTER INSTALLATION.
 - FOR DETAILS A, C, D, E, F & G REFER TO DRAWING NO. ST-M-138.
 - CONTRACTOR SHALL INSURE THAT NO FIRE LINES, INTRUSION ALARMS, ETC. ENCROACH ON THE 24" MIN. CLEARANCE SHOWN THIS DWG.
 - STEEL SHALL BE ASTM A36 GALVANIZED OR HIGH-STRENGTH CORROSION-RESISTANT STEEL.
 - 1-1/2"x1-1/2"x1/4" STEEL PLATE WELDED TO HATCH FRAME FOR SLAM LOCK CATCH. STEEL PLATE SHALL BE FURNISHED BY THE HATCH SUPPLIER AS PART OF THE HATCH.
 - A EQUALS CLEAR INSIDE SHAFT DIMENSION.

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

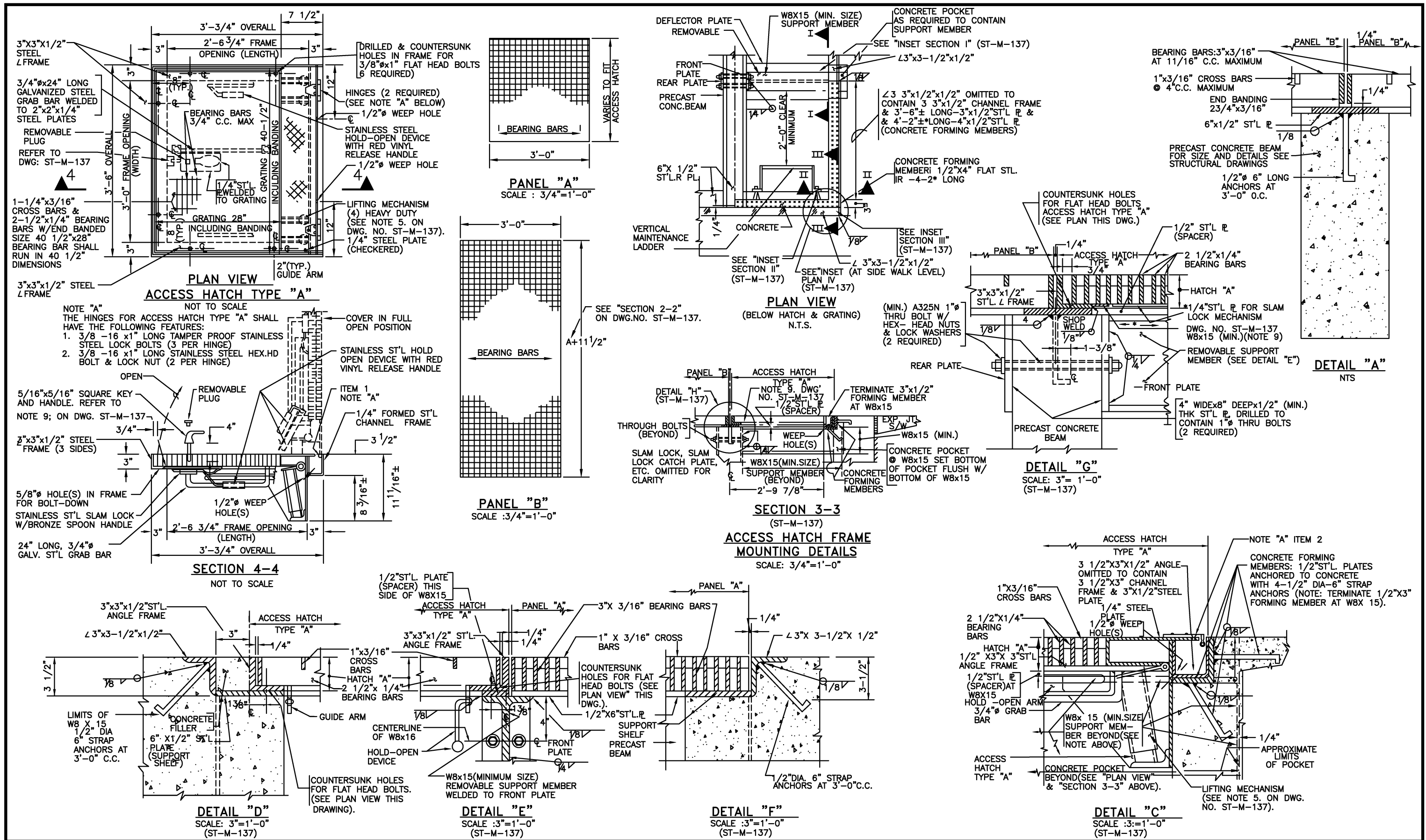
DESIGNED		DATE		REFERENCE DRAWINGS		REVISIONS	
NUMBER	DESCRIPTION	DATE	BY	NUMBER	DESCRIPTION	DATE	BY
2-76	P. EASLEY	08/2001	ENGA	ST-M-138	FRAMES AND GRATINGS SHT.2	08/2001	ENGA
3-76	L. PROCYK			ST-S-004	DRAINAGE AND VENTILATION STRUCTURES TYPICAL		
					DETAILS AND REINFORCEMENT		
10-76	D. HOWE			ST-M-012	STAIRS, LADDERS AND HANDRAILS		
10-76	T. HANSEN						

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
 DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
 OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED _____ DATE _____
 APPROVED _____ DATE _____

MECHANICAL STANDARD DRAWING
 FRAMES AND GRATINGS SHT.1 OF 2

SCALE: 3/4"=1'-0"
 DRAWING NO. ST-M-137



DESIGNED		DATE		DESCRIPTION		DATE		BY		DESCRIPTION	
P. EASLEY	3-76	ST-M-137	08/2001	FRAMES AND GRATINGS SHEET 1 OF 2	ENGA	Revised and issued by the Authority					
L. PROCYK	3-76	ST-S-004		DRAINAGE AND VENTILATION STRUCTURES TYPICAL							
D. HOWE	10-76			DETAILS AND REINFORCEMENT							
T. HANSEN	10-76										

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

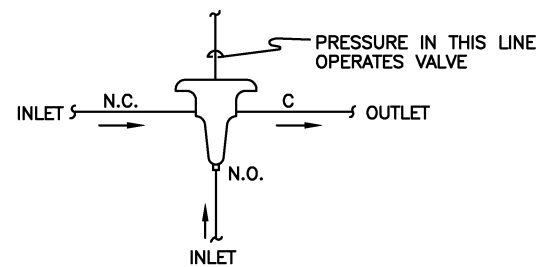
DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED _____ DATE _____ APPROVED _____ DIRECTOR _____ DATE May 3, 2001

MECHANICAL STANDARD DRAWING
FRAMES AND GRATINGS SHT. 2 OF 2

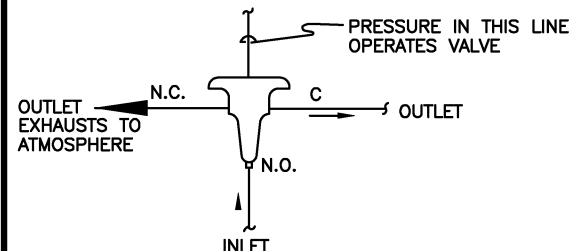
SCALE AS NOTED DRAWING NO. ST-M-138

SYMBOLS



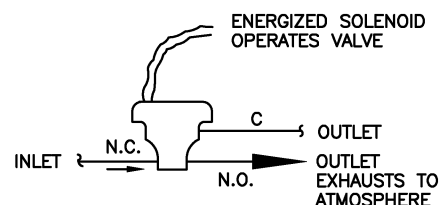
AIR VALVE

3-WAY, 2 POSITION
PNEUMATICALLY OPERATED
DOUBLE INLET, SINGLE OUTLET
TYPICAL FOR AV-2



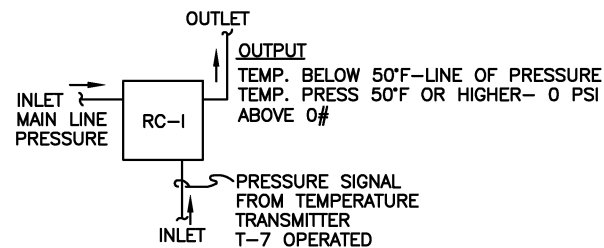
AIR VALVE

3-WAY, 2 POSITION
PNEUMATICALLY OPERATED
SINGLE INLET, DOUBLE OUTLET
TYPICAL FOR AV-1, AV-3, AV-4



AIR VALVE

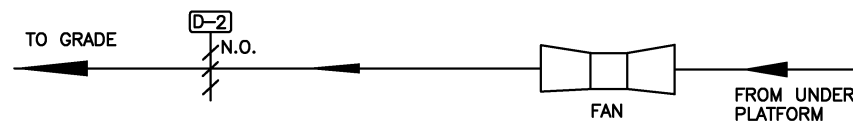
3-WAY, 2 POSITION
ELECTRICALLY OPERATED
SINGLE INLET, DOUBLE OUTLET
TYPICAL FOR EP-2, EP-4, EP-5, EP-7



RECEIVER-CONTROLLER

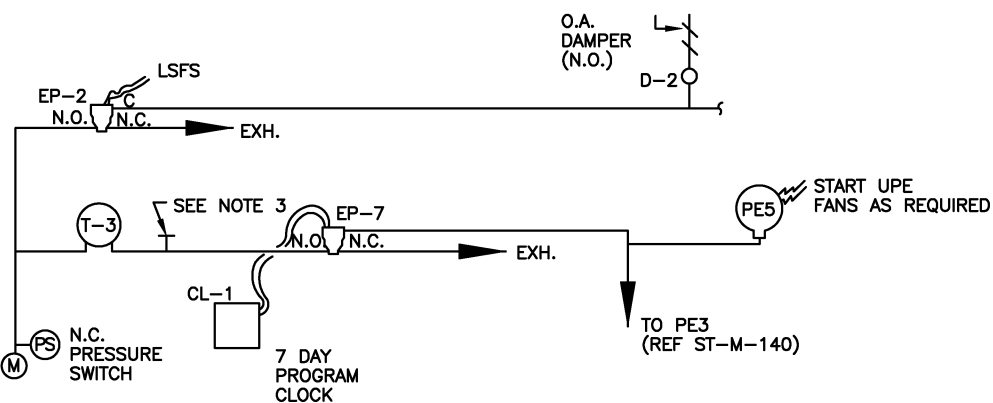
TWO POSITION, REVERSE ACTING

NOTE: FOR ADDITIONAL SYMBOLS AND ABBREVIATIONS SEE DRAWING DD-M-153



FLOW DIAGRAM

SPACE THERMOSTAT LOCATE ON STATION PLATFORM (MIDWAY)



**CONTROL DIAGRAM
UNDER PLATFORM EXHAUST FANS**

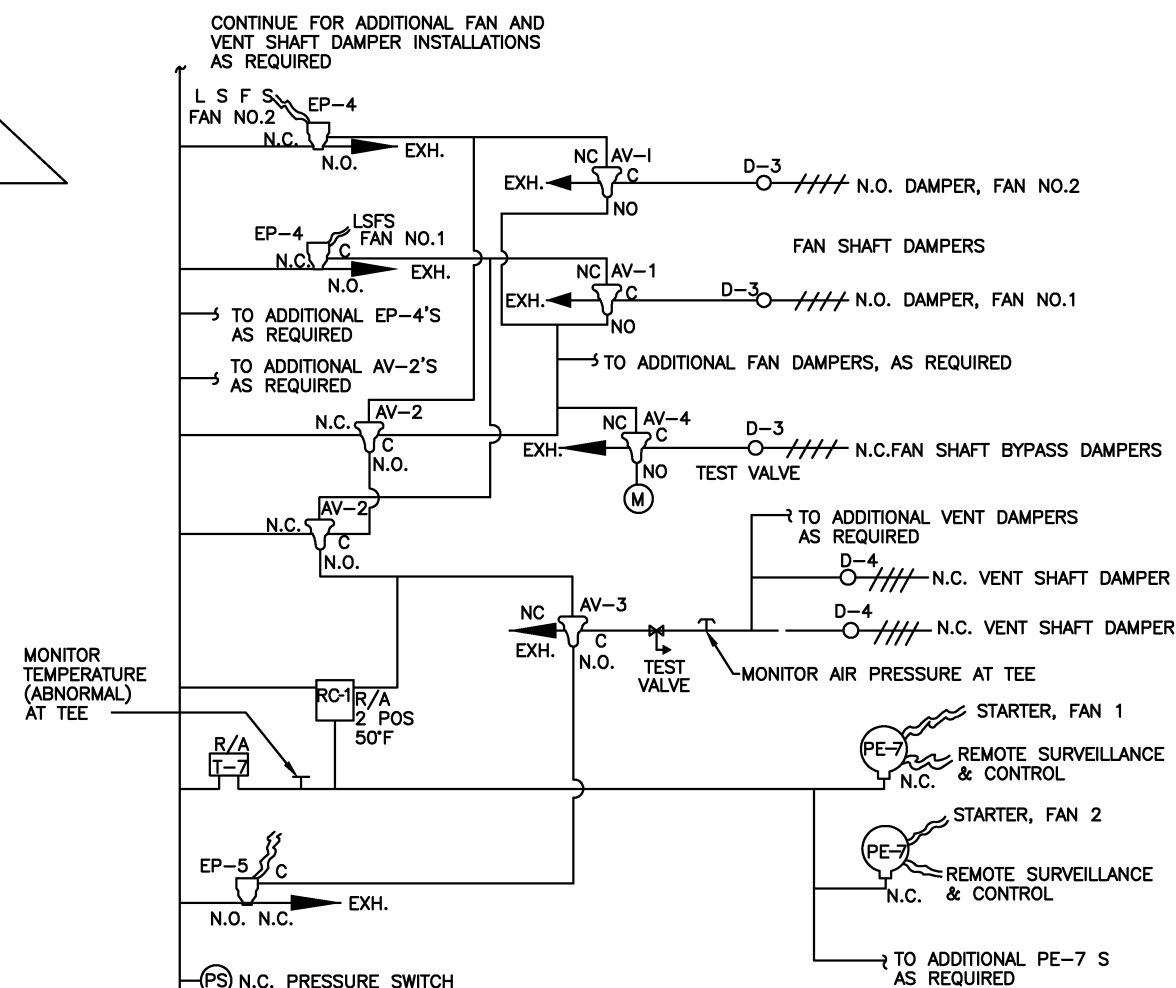
SEQUENCE OF OPERATION

AUTOMATIC OPERATION- WHEN TEMPERATURE AT SPACE THERMOSTAT T-3 RISES ABOVE 70°F, THE UNDER PLATFORM EXHAUST FANS SHALL BE STARTED THROUGH PNEUMATIC-ELECTRIC SWITCH PE-5. WHEN UNDER PLATFORM EXHAUST FANS ARE STARTED, SOLENOID AIR VALVE EP-2 IS ENERGIZED, OPENING THE OUTSIDE AIR DAMPERS THROUGH DAMPER OPERATOR D-2

7 DAY PROGRAM CLOCK CL-1 SHALL STOP THE UNDER PLATFORM EXHAUST FANS THROUGH EP-7 AS PROGRAMED. **EMERGENCY OPERATION**- "EMERGENCY ON" CONTACTS ENERGIZE THROUGH THE REMOTE SUPERVISORY CONTROL SYSTEM SHALL START ALL FANS AND "EMERGENCY OFF" CONTACTS SHALL STOP ALL FANS.

GENERAL NOTES

- DAMPERS AND ASSOCIATED CONTROL DEVICES OF DOME RELIEF, VENT SHAFTS AND FAN SHAFTS WILL BE FURNISHED AND INSTALLED UNDER SECTION 15900, CONTROL EQUIPMENT, OF THE SPECIFICATIONS.
- SUBWAY VENTILATION FANS AND UNDER PLATFORM EXHAUST FANS SHALL BE REVERSIBLE. NORMAL MODE OF OPERATION IS EXHAUST, WITH THE SUBWAY VENTILATION FANS EXHAUSTING AIR FROM THE TUNNEL AND THE UNDER PLATFORM EXHAUST FANS EXHAUSTING AIR FROM THE TRACK AREA AT PLATFORM LEVEL. SUBWAY VENTILATION FANS AND UNDER PLATFORM EXHAUST FANS SHALL BE REVERSIBLE TO OPERATE AS SUPPLY FANS IN EITHER THE AUTOMATIC OR EMERGENCY CONTROL SETTING.
- PROVIDE TEE FOR PORTABLE RECORDING DEVICE.
- ELECTRIC SIDE OF PNEUMATIC CONTROL SYSTEM AND ELECTRICAL SCHEMATIC DIAGRAMS FOR REMOTE SURVEILLANCE AND CONTROL ARE NOT SHOWN ON THIS DRAWING.



**CONTROL DIAGRAM
TUNNEL VENTILATION**

NOTE: DAMPER OPERATORS SHALL HAVE PILOT POSITIONERS

SEQUENCE OF OPERATION

- AUTOMATIC OPERATION**-WHEN TUNNEL TEMPERATURE RISES ABOVE 50°F, TUNNEL TEMPERATURE TRANSMITTER T-7, THROUGH RECEIVER-CONTROLLER RC-1, AIR VALVES AV-2 AND AV-1 AND DAMPER OPERATOR D-3, SHALL OPEN FAN DISCHARGE DAMPERS; THROUGH RC-1, AV-3 AND DAMPER OPERATOR D-4 SHALL OPEN VENT SHAFT DAMPERS; AND THROUGH RC-1, AV-2, AV-4, AND OPERATOR D-5, SHALL OPEN FAN BYPASS DAMPERS VENT. WHEN TUNNEL TEMPERATURE EXCEEDS 95°F, SUBWAY VENTILATION FANS ARE STARTED IN SEQUENCE THROUGH PNEUMATIC-ELECTRIC SWITCHES PE-7. AS EACH FAN IS STARTED, THE DAMPER SHALL OPEN THROUGH EP-4, AV-1, AND D-3; DAMPERS OF NON OPERATING FANS SHALL CLOSE THROUGH EP-4, AV-2, AV-1, AND D-3; AND FAN BYPASS DAMPERS SHALL CLOSE THROUGH EP-4, AV-2, AV-4, AND D-4. ON A FALL IN TEMPERATURE, FANS SHALL STOP IN REVERSE ORDER, DAMPER OF EACH STOPPED FAN CLOSING; WHEN ALL FANS ARE STOPPED, FAN DAMPERS AND BYPASS DAMPERS SHALL OPEN. ON A DECREASE IN TEMPERATURE BELOW 50°F, ALL VENT SHAFT, FAN DISCHARGE, AND FAN BYPASS DAMPERS SHALL CLOSE.
- "EMERGENCY ON" OPERATION**- RELAY CONTACTS CLOSED BY REMOTE CONTROL SHALL ENERGIZE SOLENOID AIR VALVE EP-5 WHICH WILL CLOSE ALL VENT SHAFT DAMPERS THROUGH AV-3 AND OPERATOR D-4. ALL FANS SHALL BE SEQUENTIALLY STARTED ELECTRICALLY. AS THE FANS ARE STARTED, BYPASS DAMPERS SHALL BE CLOSED THROUGH EP-4, AV-2, AV-4, AND OPERATOR D-5, AND FAN DISCHARGE DAMPERS SHALL OPEN THROUGH EP-4, AV-1, AND DAMPER OPERATOR D-3.
- "EMERGENCY OFF" OPERATION**-RELAY CONTACTS CLOSED BY REMOTE CONTROL WILL ENERGIZE CONTROL CIRCUIT RELAY, OPENING ITS CONTACTS, STOPPING ALL FANS.
- FAIL-SAFE OPERATION**-LOSS OF CONTROL AIR PRESSURE SHALL CLOSE ALL VENT SHAFT DAMPERS, CLOSE ALL FAN BYPASS DAMPERS, OPEN ALL FAN DISCHARGE DAMPERS, START ALL FANS IN SEQUENCE. PROVIDE A REMOTE INDICATION THROUGH CLOSURE OF SURVEILLANCE SWITCH CONTACTS, AND PERMIT REMOTE ELECTRICAL CONTROL.
- MAINTENANCE OPERATION**- LOCAL MODE SELECTOR SWITCH WILL PERMIT LOCAL CONTROL OF FANS FOR MAINTENANCE OR EMERGENCY OPERATION. VENT SHAFT AND BYPASS DAMPER OPERATION MAY BE TESTED BY EXHAUSTING CONTROL AIR TO DAMPERS BY MEANS OF 3-WAY AIR VALVE.

DESIGNED	E.L. PENNINGTON	01-77	REFERENCE DRAWINGS		REVISIONS	
			NUMBER	DESCRIPTION	DATE	BY
DATE			ST-M-140	STANDARD PNEUMATIC CONTROL AND FLOW DIAGRAM,	08/2001	ENGA
DRAWN	D.H. KERR	11-77		CHILLED WATER SUPPLY AND AIR CONDITON UNIT		
DATE			ST-M-142	REMOTE SURVEILLANCE AND CONTROL DIAGRAM		
CHECKED	W.D. BROWN	11-77		SUBWAY VENTILATION FANS		
DATE			ST-M-143	REMOTE SURVEILLANCE AND CONTROL DIAGRAM		
APPROVED	T. HANSEN	09-77		UNDER PLATFORM EXHAUST FANS.		
DATE			DD-M-153	AIR CONDITIONING & VENTILATION SYMBOLS		

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED

DATE

APPROVED DIRECTOR

[Signature]

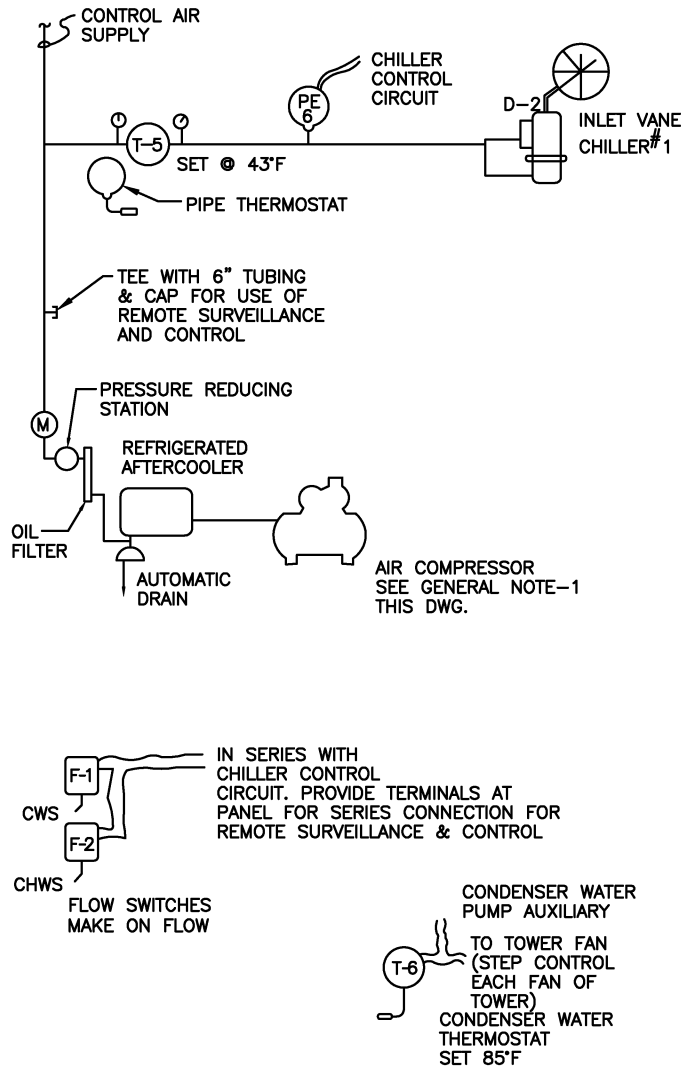
May 3, 2001
DATE

SCALE
NOT TO SCALE

DRAWING NO.

ST-M-139

**MECHANICAL STANDARD DRAWING
STANDARD PNEUMATIC CONTROL & FLOW DIAGRAMS
TUNNEL VENTILATION & UNDER PLATFORM
EXHAUST FANS**



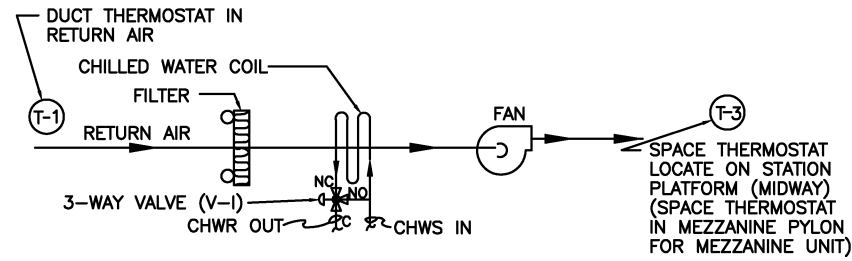
CONTROL DIAGRAMS

CHILLED WATER SUPPLY

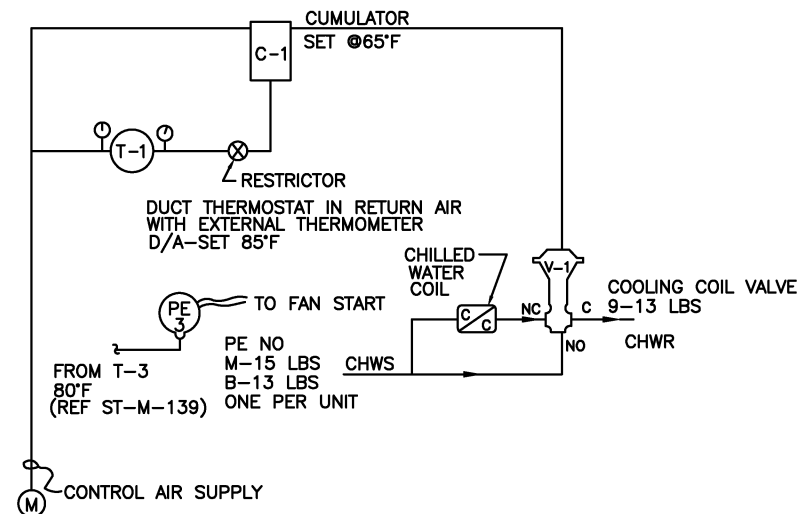
TYPICAL FOR SINGLE CHILLER INSTALLATIONS

SEQUENCE OF OPERATION

CHILLED WATER PUMP IS STARTED AND STOPPED MANUALLY BY AEMS OPERATOR. WHEN CHILLED WATER PUMP IS OPERATING, CHILLED WATER SUPPLY THERMOSTAT T-5 STARTS CHILLER AND THROUGH INTERLOCK, STARTS CONDENSER WATER PUMP BY MAKING CIRCUIT OF PE SWITCH PE-6. THE CHILLER IS PREVENTED FROM OPERATING BY FLOW SWITCHES F-1 AND F-2 UNTIL FLOW IS ESTABLISHED IN THE CHILLED WATER AND CONDENSER WATER MAINS. WHEN CHILLER IS STARTED, T-5 MAINTAINS ITS SETTING BY MODULATING COMPRESSOR INLET VANE THROUGH OPERATOR D-2. WHEN CONDENSER WATER PUMP IS STARTED, CONDENSER WATER THERMOSTAT T-6 IS PLACED IN CONTROL OF TOWER FANS. T-6 MAINTAINS ITS SETTING BY CYCLING FANS IN STEPS.



FLOW DIAGRAM



CONTROL DIAGRAM

AIR CONDITIONING UNITS

(TYPICAL FOR THREE-WAY VALVE CONTROL WITH TWO POSITION FUNCTION ONLY)

SEQUENCE OF OPERATION

WHEN TEMPERATURE AT SPACE THERMOSTAT T-3 RISES ABOVE 80°F, THE AIR CONDITIONING UNIT FAN IS STARTED THROUGH PE-3. RETURN AIR THERMOSTAT T-1 (OR SPACE THERMOSTAT FOR MEZZANINES) OPENS VALVE V-1 TO MAINTAIN THE THERMOSTAT SETTING (85°F). IF THE SPACE TEMPERATURE FALLS BELOW 78°F, THE AIR CONDITIONING UNIT FAN SHALL STOP AND V-1 SHALL RETURN TO ITS NORMAL POSITION. TIME CLOCK CL-1 SHALL STOP THE AIR CONDITIONING UNITS FANS THROUGH EP-7 AND PE-3 AS PROGRAMMED SEE ST-M-139.

GENERAL NOTES

- CONTROL AIR FOR THE INDIVIDUAL STATIONS AND FOR CHILLED WATER PLANT IS PROVIDED BY AN AIR COMPRESSOR AT RELATED CHILLED WATER PLANT. A REFRIGERATED AFTERCOOLER IS PROVIDED TO LOWER THE MAIN AIR DEW POINT BELOW -10°F. MAIN AIR IS SUPPLIED THROUGH A FILTER AND REDUCING STATION WHICH SHALL MAINTAIN 20 PSIG MAIN AIR PRESSURE.
- IN ADDITION TO THE CONTROLS INDICATED, PROVIDE LOCAL H.O.A. SWITCH FOR ALL AIR CONDITIONING UNITS (A.C.U.'S).
- ELECTRIC SIDE OF PNEUMATIC CONTROL SYSTEM AND ELECTRICAL SCHEMATIC DIAGRAMS FOR REMOTE SURVEILLANCE AND CONTROL ARE NOT SHOWN ON THIS DRAWING.

DESIGNED	E. PENNINGTON	1-77
DRAWN	W.D. BROWN	1-77
CHECKED	D. HOWE	9-77
APPROVED	T. HANSEN	11-77

REFERENCE DRAWINGS		REVISIONS	
NUMBER	DESCRIPTION	DATE	BY
ST-M-139	STANDARD PNEUMATIC CONTROL AND FLOW DIAGRAMS TUNNEL VENTILATION AND UNDER PLATFORM EXHAUST FAN	08/2001	ENGA

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED _____ DATE _____

APPROVED _____ DATE May 3, 2001

MECHANICAL STANDARD DRAWING
STANDARD PNEUMATIC CONTROL AND FLOW
DIAGRAMS CHILLED WATER SUPPLY AND AIR
CONDITIONING UNITS

SCALE: NO SCALE

DRAWING NO. ST-M-140

TABLE 1

WATTS PER FOOT REQUIRED WITH 1.0" THICK CELLULAR GLASS INSULATION (SEE NOTE-8)

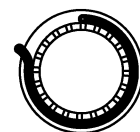
PIPE SIZE	WATTS PER FT.	INSULATION PIPE SIZE
1/2"	2.7	3/4"
3/4"	3.1	1"
1"	3.5	1 1/4"
1 1/2"	4.5	2"
2"	5.2	2 1/2"
3"	7.0	3 1/2"
4"	8.4	4 1/2"
5"	10.2	6"
6"	11.3	7"
7"	13.0	8"
8"	14.5	9"
9"	16.0	10"
10"	17.5	10"
12"	20.5	12"

TABLE 2

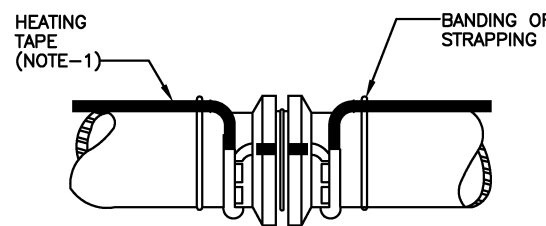
FITTINGS - HEAT SINKS
MINIMUM WATTS REQUIRED WITH 1.0" THICK CELLULAR GLASS INSULATION (SEE NOTE-8)

PIPE SIZE	VALVE (WATT)	CHECK VALVE (WATT)	PIPE* SUPPORT (WATT)	FLANGE (WATT)
1/2"	2.7	2.7	8.1	2.0
3/4"	3.1	3.1	8.5	2.3
1"	5.3	4.4	8.8	2.6
1 1/2"	9.0	6.8	9.0	3.4
2"	10.4	7.8	9.4	3.9
3"	21.0	10.5	10.0	5.3
4"	25.2	12.5	10.5	6.3
5"	30.6	15.3	11.0	7.8
6"	33.9	17.0	11.5	8.5
7"	39.0	19.5	12.0	9.8
8"	43.5	21.8	12.5	14.5
9"	48.0	24.0	13.0	16.0
10"	52.5	26.3	14.0	17.5
12"	69.0	31.0	15.6	20.7

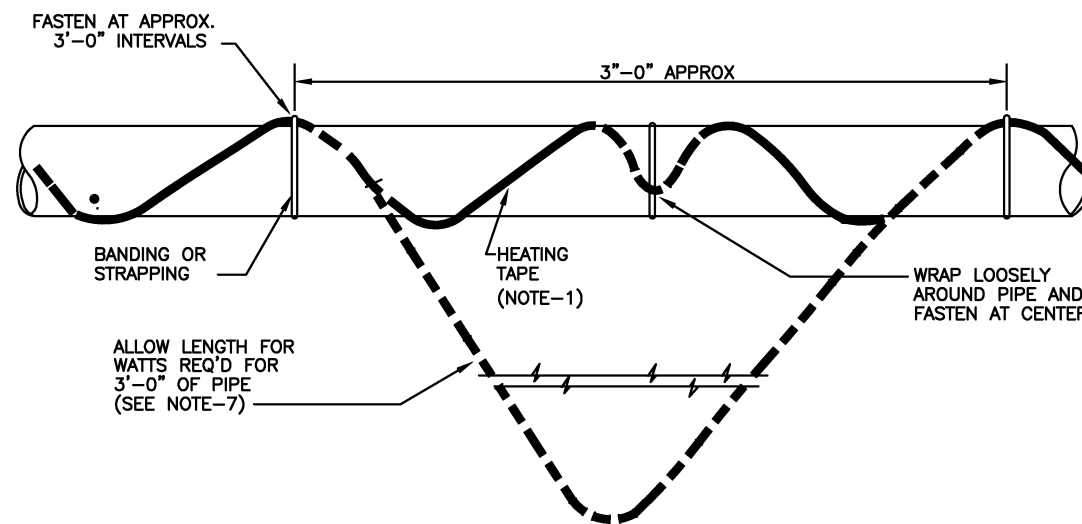
* SEE NOTE-6



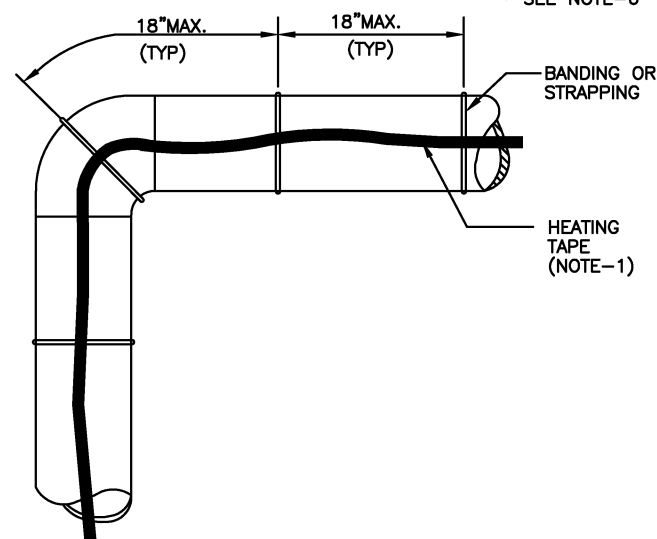
END VIEW



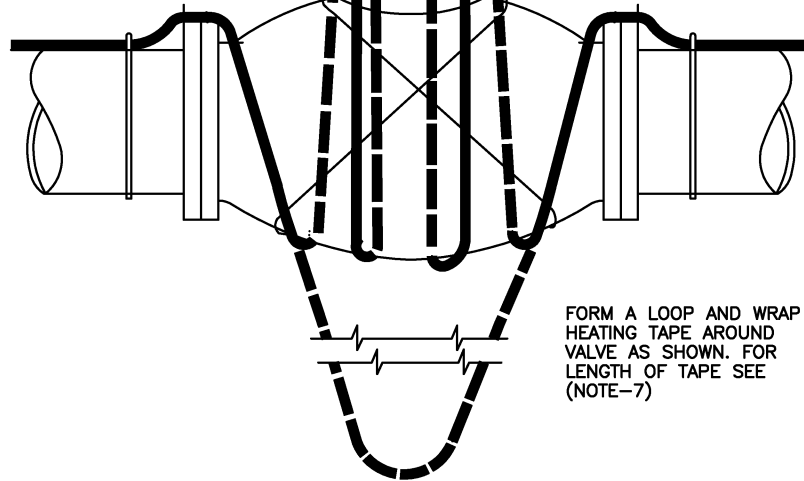
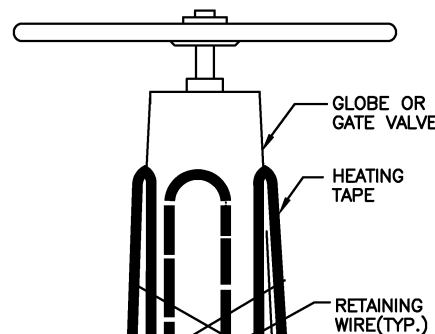
**ELEVATION
HEATING TAPE ON PIPE FLANGE**



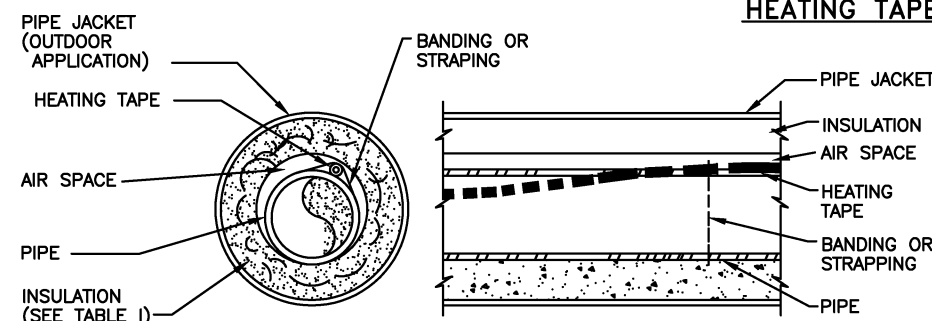
HEATING TAPE INSTALLATION ON PIPE



HEATING TAPE ON ELBOW



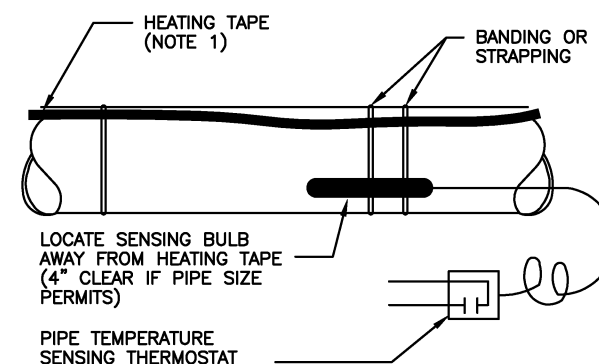
HEATING TAPE ON GATE OR GLOBE VALVE



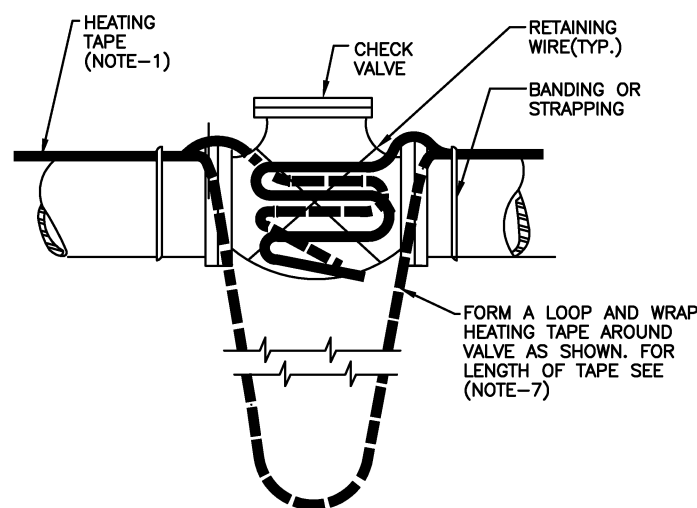
END VIEW

INSULATION FOR HEATING TAPE

ELEVATION



THERMOSTAT BULB INSTALLATION



HEATING TAPE ON CHECK VALVE

NOTES

1. PROVIDE REQUIRED WATTS PER FOOT BY A SINGLE TAPE ALONG THE SIDE OF, OR SPIRALING AROUND THE PIPE OR BY MULTIPLE TAPES PARALLELING THE PIPE.
2. DO NOT BEND TAPE TOO SHARPLY (MINIMUM BENDING RADIUS IS 6 TIMES THE TAPE DIAMETER).
3. DO NOT ALLOW TAPES TO OVERLAP OR TOUCH.
4. DO NOT PULL TAPES TIGHT. ALLOW FOR HEAT EXPANSION.
5. BANDING OR STRAPPING - MAXIMUM SPACE BETWEEN FASTENERS - 18 INCHES;
 - A. STRAPPING - 1/2" X .020 STAINLESS STEEL STRAP AND CLIPS FOR APPLICATIONS ABOVE 10 WATTS/FT.
 - B. WIRE - 18 GAUGE (.047" DIA.) DEAD SOFT ANNEALED STAINLESS STEEL WIRE, FOR APPLICATION TO AND INCLUDING 10 WATTS/FT.
 - C. GLASS TAPE - ACCEPTABLE FOR APPLICATIONS BELOW 6 WATTS/FT.
6. NOT REQUIRED IF INSULATED PIPE SUPPORTS ARE USED.
7. L = LENGTH OF HEATING TAPE REQUIRED IN FEET. (PER FOOT OF PIPE)

$$L = \frac{\text{WATTS (PER FT. OF PIPE) REQUIRED (TABLE 1 OR 2)}}{\text{HEATING TAPE OUTPUT WATTS/FT.}}$$
8. IF 2.0" THICK INSULATION IS PROVIDED. REDUCE WATTS PER FOOT BY 35%.

DESIGNED	DATE	REFERENCE DRAWINGS		REVISIONS	
		NUMBER	DESCRIPTION	DATE	DESCRIPTION
J.F. SAUER	4-78			08/2001	Revised and issued by the Authority
D.H. KERR	4-78				
D. LEWIS	1-79				
T. HANSEN	1-79				

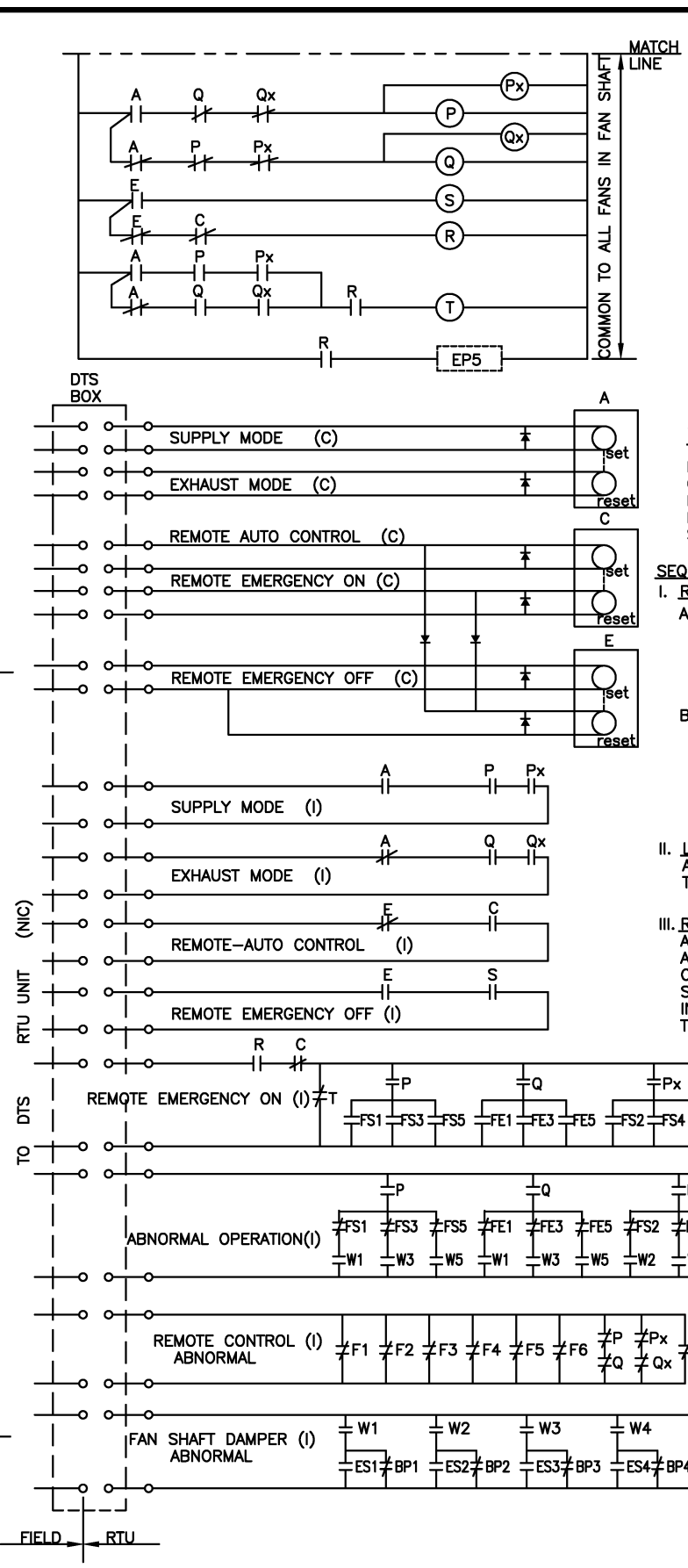
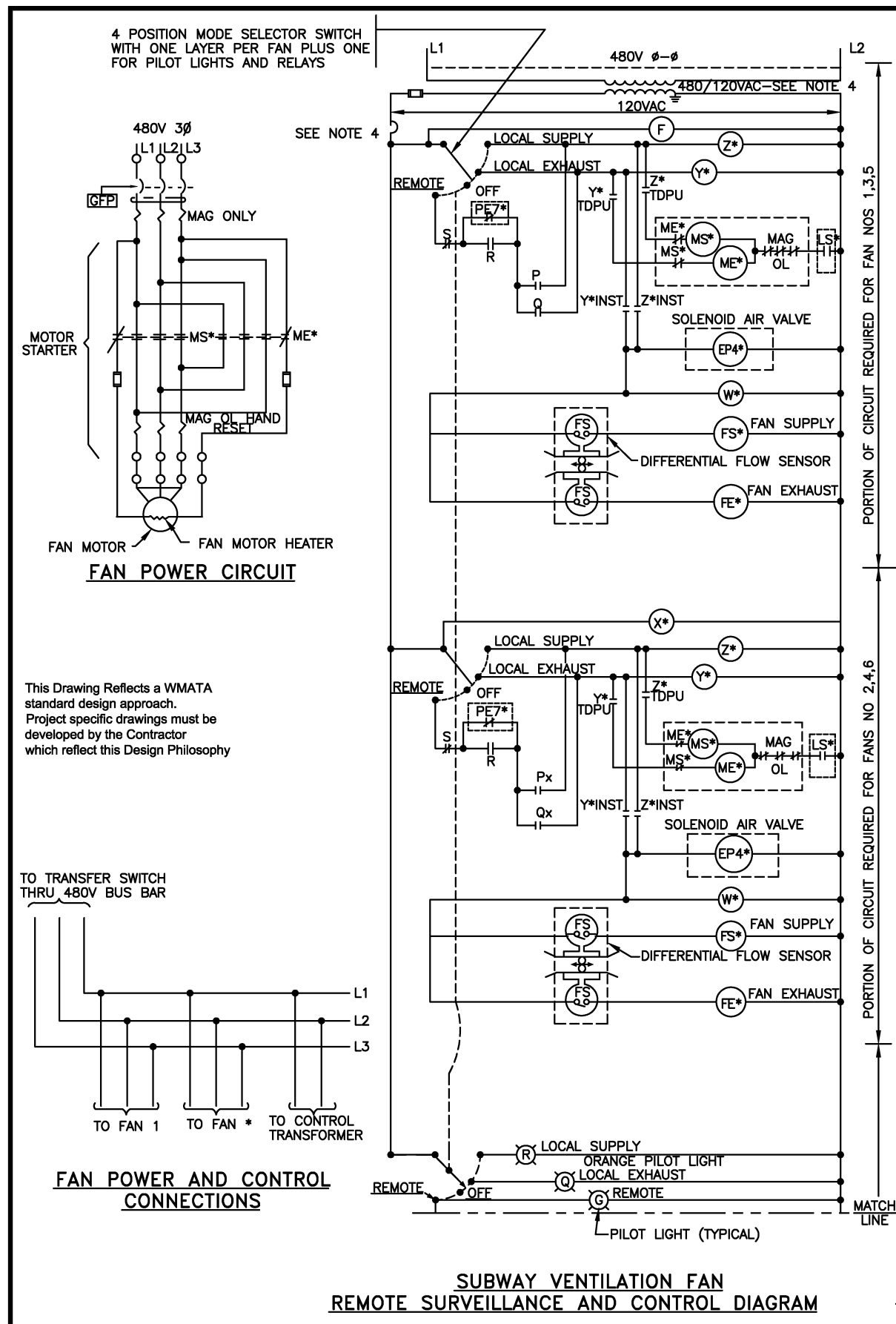
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED _____ DATE _____ APPROVED *[Signature]* DIRECTOR May 3, 2001 DATE

**MECHANICAL STANDARD DRAWING
TYPICAL INSTALLATIONS OF
HEATING TAPE FOR PIPING**

SCALE NONE DRAWING NO. ST-M-141



RELAY SCHEDULE							
RELAY	CONTACTS N.O.	CONTACTS N.C.	USED INST	CONTACTS PROVIDED N.O.	CONTACTS PROVIDED N.C.	FORM C	RELAY TYPE(SEE NOTES 2,3,5,6)
A	3	3	-	-	-	5	POTTER & BRUMFIELD LATCHING KBP20DG24
C	1	2	-	-	-	5	POTTER & BRUMFIELD LATCHING KBP20DG24
E	2	2	-	-	-	5	POTTER & BRUMFIELD LATCHING KBP20DG24
P	7	2	-	8	4	-	GE CR120B08422
Px	7	2	-	8	4	-	GE CR120B08422
Q	7	2	-	8	4	-	GE CR120B08422
Qx	7	2	-	8	4	-	GE CR120B08422
R	9	-	-	10	2	-	GE CR120B10222
S	1	6	-	2	8	-	GE CR120B02822
T	-	1	-	2	2	-	GE CR122BT02222D TDE 40 Sec
X*	-	1	-	2	2	-	GE CR122B02222
FS*	1	1	-	4	2	-	GE CR122BT04222B TDD 20 Sec
FE*	1	1	-	4	2	-	GE CR122BT04222B TDD 20 Sec
W*	3	-	-	4	2	-	GE CR122BT04222D TDE 40 Sec
Y*	1	-	1	-	-	2	AGASTAT 7012 AEMLL - 20 Sec DELAY
Z*	1	-	1	-	-	2	AGASTAT 7012 AEMLL - 20 Sec DELAY
F	-	-	-	-	-	-	

ABBREVIATIONS

TDPU-TIME DELAY PICK UP
 LS-FAN DAMPER LIMITS EACH
 GFP-GROUND FAULT PROTECTION
 PS-PRESSURE SURVEILLANCE SWITCH
 FS-SUPPLY MODE AIR FLOW RELAY
 SEE ST-AC-49 FOR ADDITIONAL ABBREVIATIONS AND SYMBOLS.

ES-FAN DAMPER END SWITCH
 BP-BYPASS DAMPER LIMIT SWITCH
 MS-SUPPLY MOTOR STARTER
 ME-EXHAUST MODE MOTOR STARTER
 FE-EXHAUST MODE AIR FLOW RELAY

SEQUENCE OF OPERATION

I. REMOTE CONTROL MODE OPERATIONS

A. WITH CONTROL AIR - SEQUENCE AS DESCRIBED ON ST-M-139 AFTER MODE SELECTED REMOTELY THROUGH RELAYS A,C,E,P OR Px, AND Q OR Qx. PE-7 CONTACT CLOSURE ENERGIZERS EP-4, OPENING DISCHARGE DAMPERS AND ENERGIZING TIME DELAY RELAY W THROUGH INSTANTANEOUS CONTACT OF RELAY Y OR Z. FAN DAMPER LIMIT SWITCH CONTACT CLOSURE AND TDPU CONTACT CLOSURE OF RELAY Y OR Z WILL START FAN.

B. WITHOUT CONTROL AIR - DESIRED MODE SELECTED REMOTELY. LOSS OF CONTROL AIR SHALL OPEN ALL FAN DISCHARGE DAMPERS AND CLOSE PE-7 CONTACTS, STARTING ALL FANS AS DESCRIBED IN PARAGRAPH A.

1. EMERGENCY ON/OFF MODE OPERATION - RELAY C RESET, SELECTED REMOTELY WILL ENERGIZE RELAY R, CLOSING ITS CONTACTS AND STARTING EACH FAN IN SEQUENCE THROUGH TIME DELAY RELAYS Y OR Z. RELAY E SET, SELECTED REMOTELY, WILL ENERGIZE RELAY S OPENING CONTACTS IN EACH FAN CONTROL CIRCUIT, STOPPING ALL FANS.

II. LOCAL MANUAL OPERATION-
 ALL FANS ARE STARTED SEQUENTIALLY ACCORDING TO MODE SELECTED BY MANUAL MODE SELECTOR SWITCH THROUGH TIME DELAY RELAY Y OR Z FOR LOCAL EXHAUST MODE AND LOCAL SUPPLY MODE, RESPECTIVELY.

III. REMOTE SURVEILLANCE-
 AN ABNORMAL OPERATION INDICATION WILL BE TRANSMITTED WHEN A FAN SHOULD BE OPERATING BUT PROPER AIR FLOW IS NOT ESTABLISHED. A REMOTE CONTROL ABNORMAL INDICATION WILL BE TRANSMITTED ON LOSS OF CONTROL OF AIR PRESSURE. ON LOCAL MODE SELECTION OTHER THAN REMOTE, ON LACK OF REMOTELY SELECTED DIRECTION, OR BLOWN FUSE OR TRIPPED CIRCUIT BREAKER. A FAN SHAFT DAMPER ABNORMAL INDICATION WILL BE TRANSMITTED WHEN THE FANS SHOULD BE OPERATING BUT THE FAN DAMPER HAS FAILED TO OPEN OR THE BYPASS DAMPER HAS FAILED TO CLOSE.

NOTES:

- RELAYS ARE SHOWN IN DE-ENERGIZED CONDITION. LATCH RELAYS ARE SHOWN IN THE REST STATE.
- TYPE OF RELAYS SHALL BE IN ACCORDANCE WITH RELAY SCHEDULE OR APPROVED EQUAL.
- REPLACE ASTRIK (*) WITH IDENTIFICATION NUMBER OF FAN CONTROLLED.
- CONTROL TRANSFORMER KVA RATING AND CIRCUIT BREAKER TRIP SETTING TO BE DETERMINED BASED ON TOTAL DEMAND LOAD CONNECTED TO THE TRANSFORMER SECONDARY.
- SETTINGS FOR TIME DELAY RELAYS FS,FE,W,Y AND Z ARE APPROXIMATE ONLY. FINAL SETTINGS SHALL BE DETERMINED IN CONSULTATION WITH FAN MANUFACTURER. TIME DELAY SETTING FOR RELAYS Y AND Z SHALL BE SUFFICIENT FOR FAN TO SLOW REVERSE WITHOUT DAMAGE TO FAN AND /OR MOTOR. TIME SETTING FOR RELAY W SHALL BE SUFFICIENT FOR FAN TO SLOW REVERSE AND REACH FULL SPEED.
- ADD 10 SECONDS FOR FAN SEQUENCING FOR EACH ADDITIONAL FAN TO TIME DELAY RELAYS W,Y AND Z.
- SEE CONTRACT DRAWINGS FOR CONDUIT AND WIRING ARRANGEMENTS.

DESIGNED	E. PENNINGTON	04-79	DATE	NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION
DRAWN	L. PROCK	04-79	DATE	DD-M-153	AIR CONDITIONING AND VENTILATION SYMBOLS	08/2001	ENGA	Revised and issued by the Authority
CHECKED	D. LEWIS	04-79	DATE	ST-M-139	STANDARD PNEUMATIC CONTROL AND AIR FLOW DIAGRAMS, TUNNEL VENTILATION AND UNDER PLATFORM EXHAUST FANS			
APPROVED	R. GANERWAL	08-82	DATE					

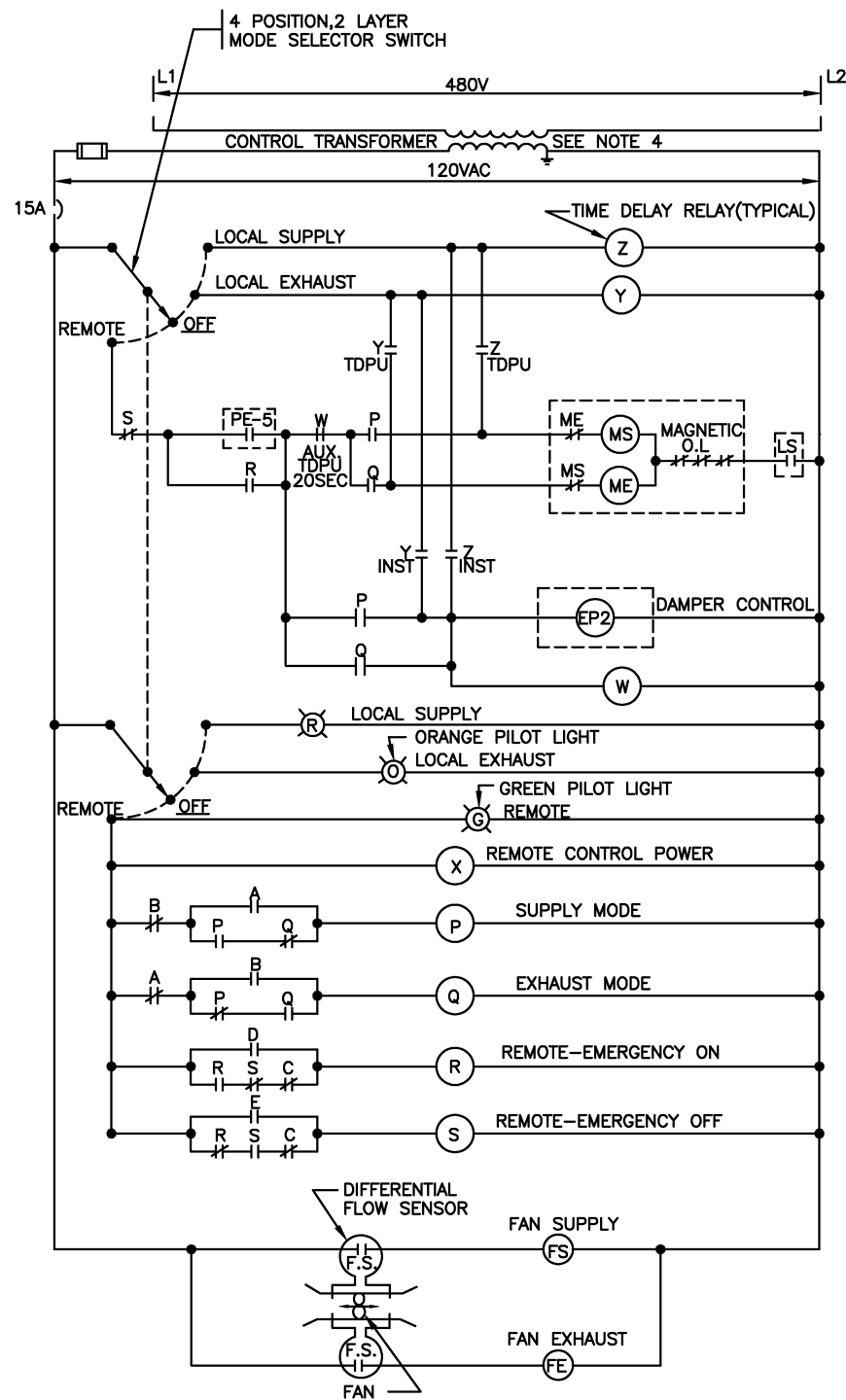
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

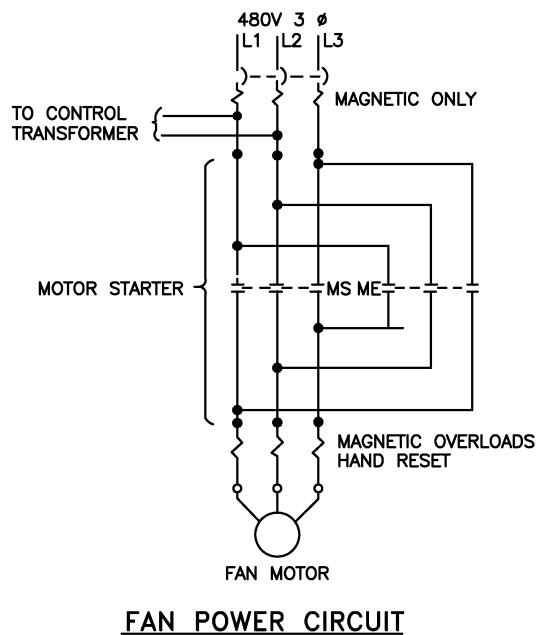
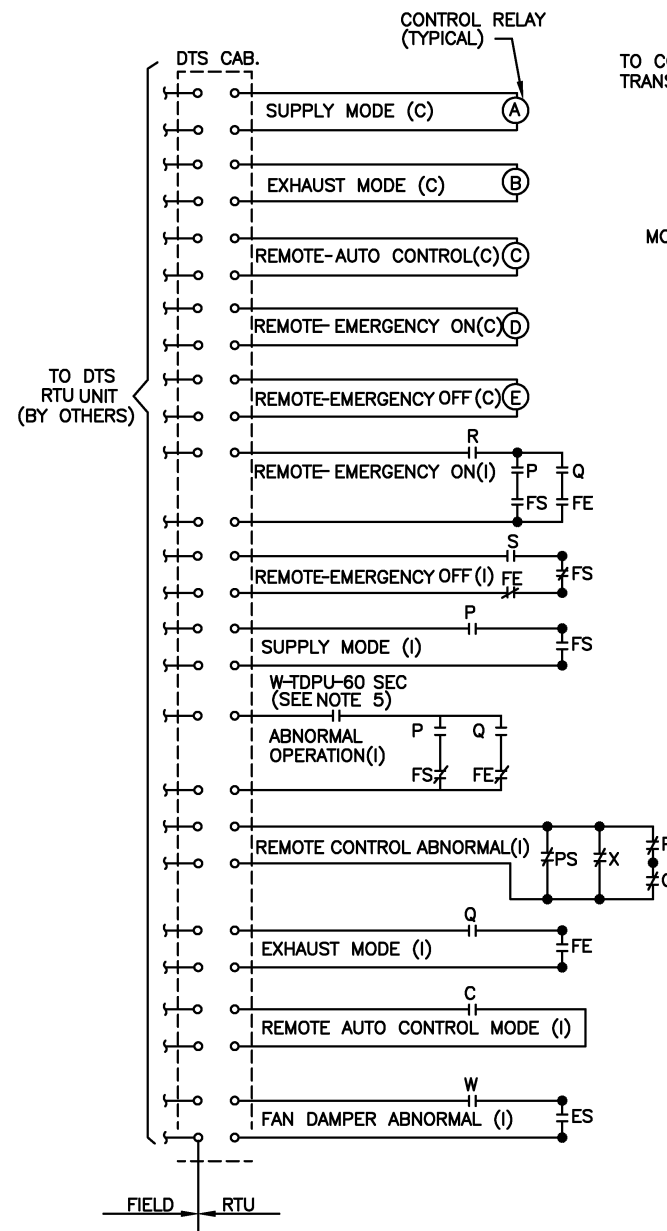
SUBMITTED _____ DATE _____ APPROVED _____ DIRECTOR _____ May 3, 2001 DATE _____

MECHANICAL STANDARD DRAWING
REMOTE SURVEILLANCE AND CONTROL DIAGRAM
SUBWAY VENTILATION FANS

SCALE NOT TO SCALE DRAWING NO. ST-M-142



**UNDER PLATFORM EXHAUST FANS
REMOTE SURVEILLANCE AND CONTROL DIAGRAM**



RELAY SCHEDULE							RELAY TYPE (SEE NOTES 2,5,6)
RELAY	CONTACTS USED		CONTACTS PROVIDED		AUXILIARY FORM 'C'		
	N.O.	N.C.	INST	N.O.	N.C.		
A	1	1	-	2	2	-	GE CR120AD02248AA
B	1	1	-	2	2	-	GE CR120AD02248AA
C	-	2	-	2	2	-	GE CR120AD02248AA
D	1	-	-	2	2	-	GE CR120AD02248AA
E	1	-	-	2	2	-	GE CR120AD02248AA
P	4	2	-	4	4	-	GE CR120B04422
Q	3	2	-	4	4	-	GE CR120B04422
R	3	1	-	4	4	-	GE CR120B04422
S	2	2	-	3	3	-	GE CR120B03322
FS	2	2	-	3	3	-	GE CR120B03322
FE	1	2	-	3	3	-	GE CR120B03322
X	-	1	-	2	2	-	GE CR120B02222
W	2	-	-	2	2	1TDPU	AGASTAT 7012 AEMT, 1st STEP 20 Sec., 2nd STEP 60 Sec
Y	1	-	1N.O.	2	2	2INST.	AGASTAT 7012 AEMLL, 20 SECOND DELAY
Z	1	-	1N.O.	2	2	2INST.	AGASTAT 7012 AEMLL, 20 SECOND DELAY

NOTES

- ALL RELAY CONTACTS SHOWN WITH RELAY DE-ENERGIZED.
- RELAYS SHALL BE TYPE INDICATED IN RELAY SCHEDULE OR APPROVED EQUAL.
- CONTROL AIR PRESSURE SENSOR (PS) SHALL BE LOCATED IN CONTROL AIR MAIN AS CLOSE AS PRACTICAL TO TEMPERATURE TRANSMITTER T-3. SENSOR CONTACTS SHALL CLOSE ON LOSS OF AIR PRESSURE BELOW, MINIMUM REQUIRED TO OPERATE CONTROLS (DETERMINED IN CONSULTATION WITH CONTROLS MANUFACTURER).
- CONTROL TRANSFORMER KVA RATING TO BE DETERMINED BASED ON TOTAL DEMAND LOAD CONNECTED TO TRANSFORMER SECONDARY.
- SETTINGS INDICATED FOR TIME DELAY RELAYS W, Y AND Z ARE APPROXIMATE ONLY. FINAL SETTINGS SHALL BE DETERMINED IN CONSULTATION WITH FAN MANUFACTURER. TIME DELAY SETTINGS FOR RELAYS Y AND Z AND FIRST STEP SETTING FOR RELAY W SHALL BE SUFFICIENT FOR FAN TO SLOW AND REVERSE WITHOUT DAMAGE TO FAN AND/OR MOTOR. SECOND STEP DELAY SETTING FOR RELAY W SHALL BE SUFFICIENT FOR FAN TO SLOW, REVERSE AND REACH FULL SPEED.
- SEE CONTRACT DRAWINGS FOR CONDUITS AND WIRING ARRANGEMENT.

ABBREVIATIONS

- | | |
|--|----------------------------------|
| TDPU - TIME DELAY PICK UP | MS - SUPPLY MODE MOTOR STARTER |
| LS - DAMPER LIMIT SWITCH | ME - EXHAUST MODE MOTOR STARTER |
| PS - AIR PRESSURE SURVEILLANCE SWITCH | FS - SUPPLY MODE AIR FLOW RELAY |
| RTU - REMOTE TERMINAL UNIT | FE - EXHAUST MODE AIR FLOW RELAY |
| SEE DD-M-153 FOR ADDITIONAL ABBREVIATIONS AND SYMBOLS. | ES - FAN DAMPER END SWITCH |

SEQUENCE OF OPERATIONS

- REMOTE CONTROL MODE OPERATION**
 - WITH CONTROL AIR** - SEQUENCE AS DESCRIBED ON ST-M-139 AFTER MODE SELECTED REMOTELY THROUGH RELAYS A, B, C, D. OR E AND P OR Q. PE-5 CONTACT CLOSURE ENERGIZES EP-2 TO OPEN THE OUTSIDE AIR DAMPERS AND ENERGIZES THE TIME DELAY W THROUGH P OR Q RELAY CONTACTS. DAMPER LIMIT SWITCH LS AND RELAY W CONTACT CLOSURES WILL START FAN.
 - WITHOUT CONTROL AIR** - DESIRED MODE SELECTED REMOTELY. LOSS OF CONTROL AIR SHALL OPEN OUTSIDE AIR DAMPERS.
 - EMERGENCY ON/OFF MODE OPERATION** - RELAY (D), SELECTED REMOTELY, WILL ENERGIZE RELAY (R), CLOSING ITS CONTACTS AND STARTING FAN THROUGH TIME DELAY RELAY (W) CONTACTS AND DAMPER LIMIT SWITCH (LS) CONTACTS. RELAY (E), SELECTED REMOTELY, WILL ENERGIZE RELAY (S), OPENING ITS NORMALLY CLOSED CONTACTS, STOPPING THE FAN.
- LOCAL MANUAL OPERATION**
FAN IS STARTED IN DIRECTION SELECTED ACCORDING TO MANUAL MODE SELECTOR SWITCH THROUGH TIME DELAY RELAYS Y AND Z FOR LOCAL EXHAUST MODE AND LOCAL SUPPLY MODE RESPECTIVELY.
- REMOTE SURVEILLANCE**
AN ABNORMAL OPERATION INDICATION WILL BE TRANSMITTED WHEN THE FAN SHOULD BE OPERATING BUT AIR FLOW, AS MEASURED BY FLOW SENSOR, IS NOT ESTABLISHED. A REMOTE CONTROL ABNORMAL INDICATION WILL BE TRANSMITTED ON LOSS OF CONTROL AIR PRESSURE ON LOCAL MODE SELECTION OTHER THAN REMOTE, OR LACK OF DIRECTION SELECTED REMOTELY.

DESIGNED	E. PENNINGTON BAUER	04-79
DATE		
DRAWN	L. PROCYK	04-79
DATE		
CHECKED	D. LEWIS	08-82
DATE		
APPROVED	R. GANERWAL	08-82
DATE		

REFERENCE DRAWINGS	
NUMBER	DESCRIPTION
ST-M-139	STANDARD PNEUMATIC CONTROL & FLOW DIAGRAM
	TUNNEL VENTILATION AND UNDER PLATFORM EXHAUST FANS
DD-M-153	AIR CONDITIONING & VENTILATION SYMBOLS
ST-TC-075-004	DATA TRANSMISSION SYSTEM (DTS) INTERFACE CABINETS
	A.C. SERVICE/SWITCHBOARD ROOM (NEAR)
ST-TC-075-008	DATA TRANSMISSION SYSTEM (DTS) INTERFACE CABINETS
	A.C. SERVICE/SWITCHBOARD ROOM (FAR)

REVISIONS		
DATE	BY	DESCRIPTION
08/2001	ENGA	Revised and issued by the Authority

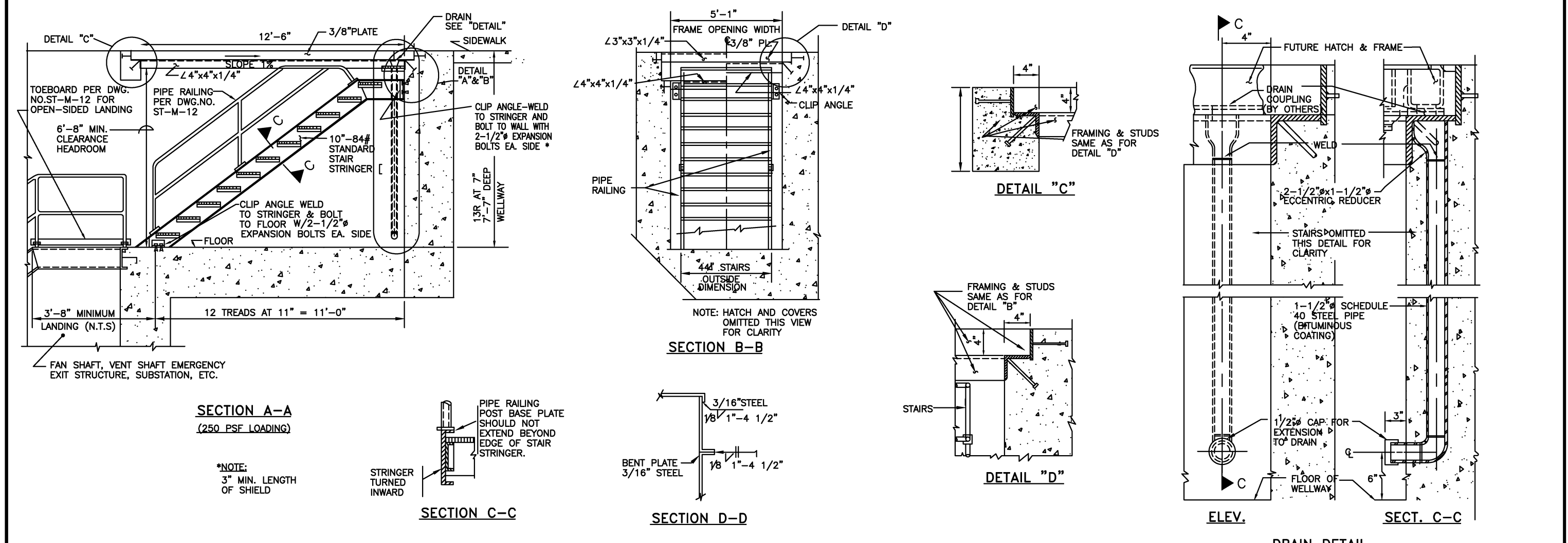
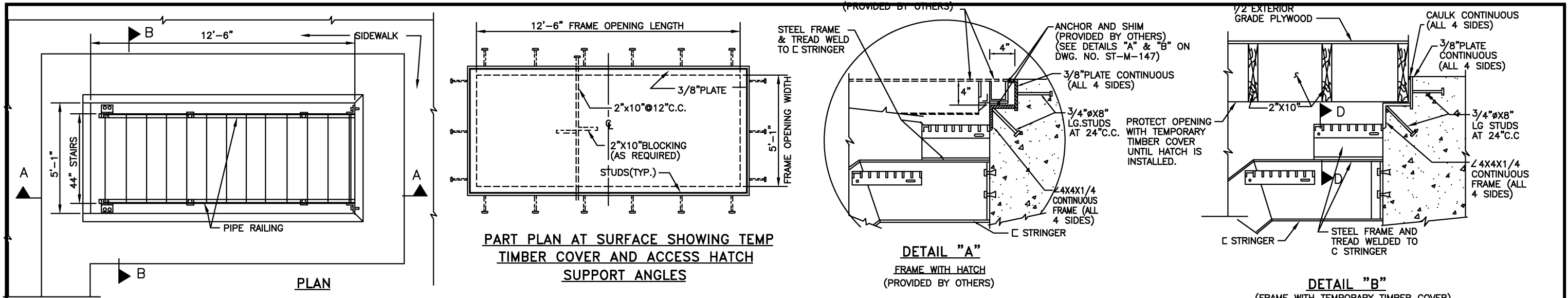
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED _____ DATE _____ APPROVED _____ DIRECTOR _____ May 3, 2001 DATE

MECHANICAL STANDARD DRAWING
REMOTE SURVEILLANCE AND CONTROL DIAGRAM
UNDER PLATFORM EXHAUST FANS

SCALE: NOT TO SCALE DRAWING NO. ST-M-143



DESIGNED		DATE		NUMBER		DESCRIPTION		DATE		BY		DESCRIPTION	
JS/OS/PE	5-83	DATE		ST-M-012	STAIRS, LADDERS AND HANDRAILS	08/2001	ENGA	Revised and issued by the Authority					
DRAWN	JS/PE	5-83	DATE	ST-M-147	ACCESS HATCH FOR STAIRS-250 PSF LOADING								
CHECKED	JS/PE	8-83	DATE										
APPROVED			DATE										

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED _____ DATE _____

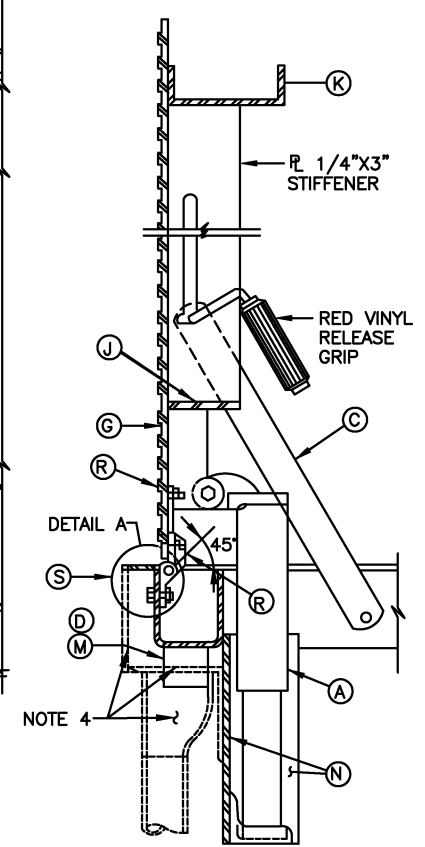
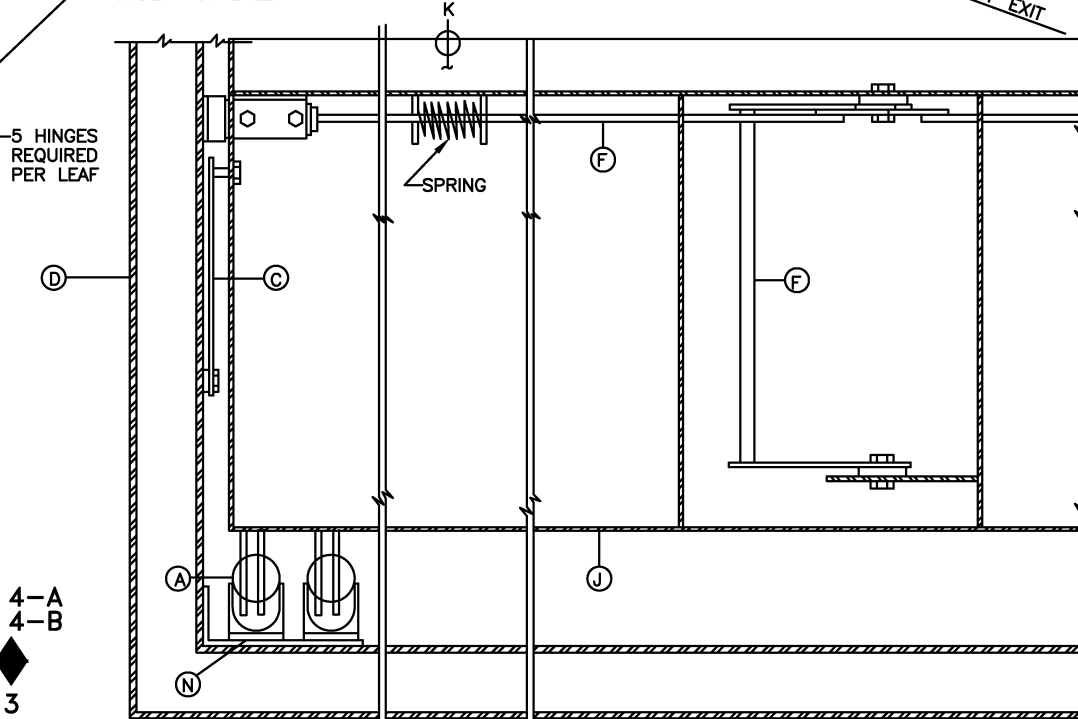
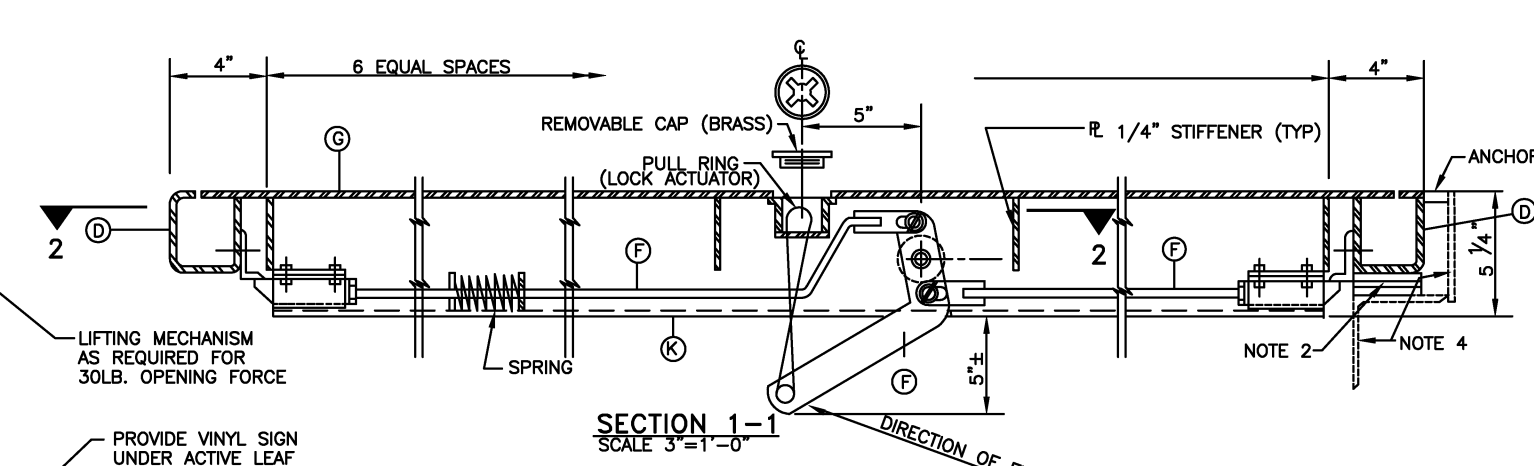
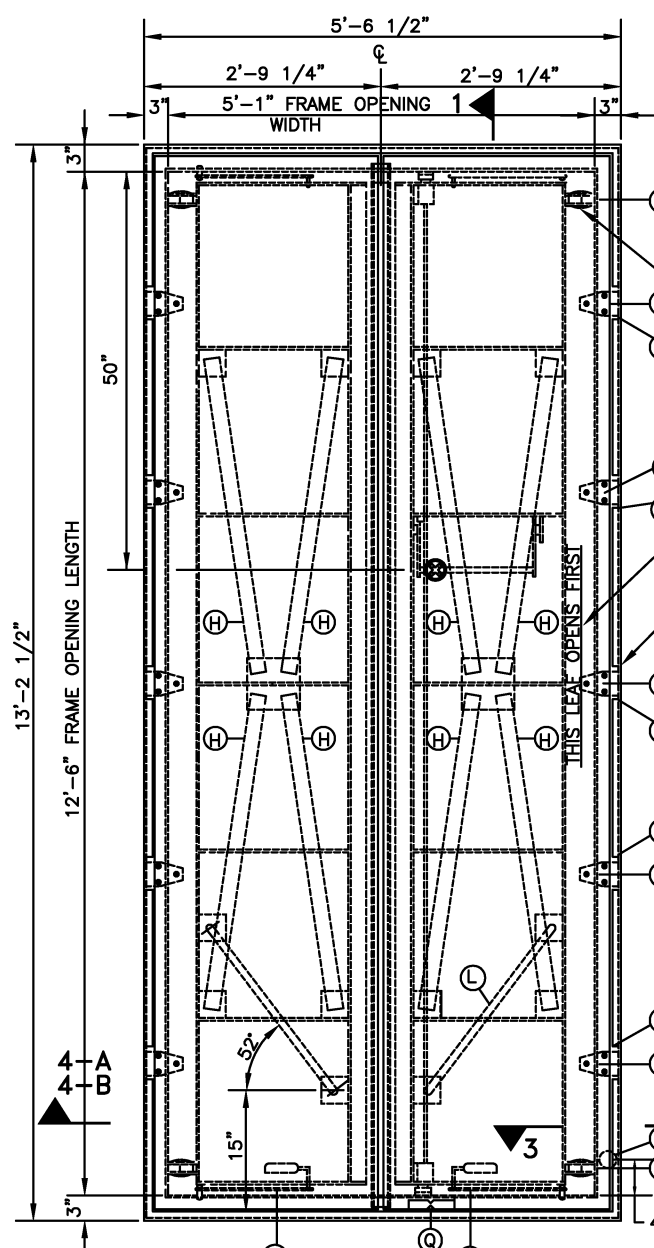
APPROVED *Harry J. [Signature]* DIRECTOR May 3, 2001 DATE

MECHANICAL STANDARD DRAWING

HATCH FRAME OPENING AND STAIR ARRANGEMENT
FOR PASSENGER EMERGENCY & MAINTENANCE ACCESS
250 PSF LOADING

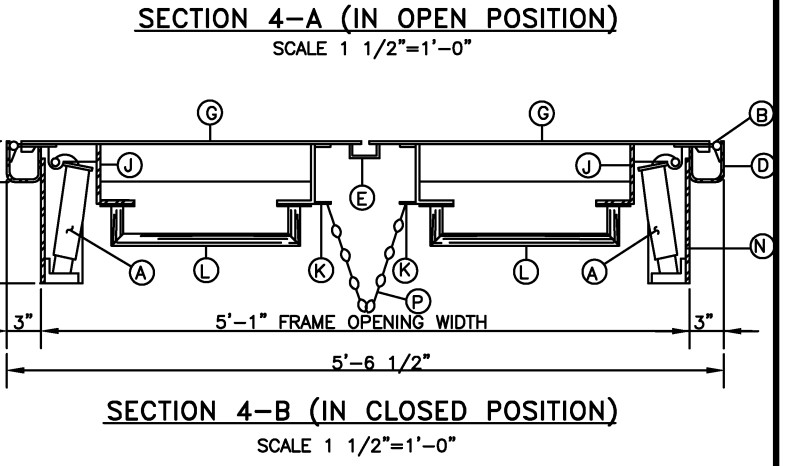
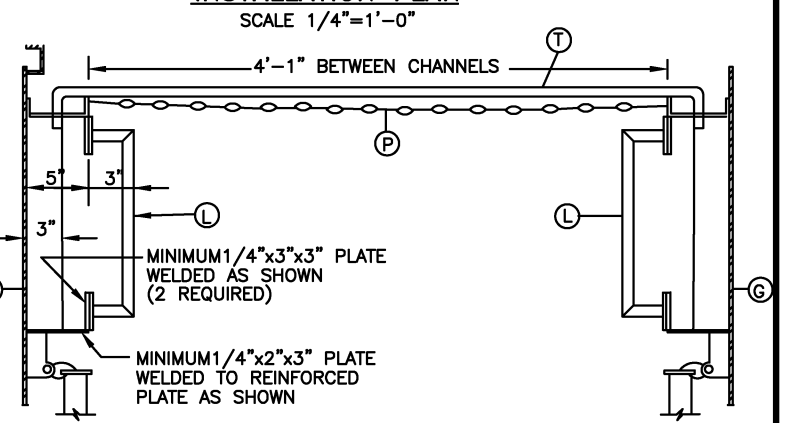
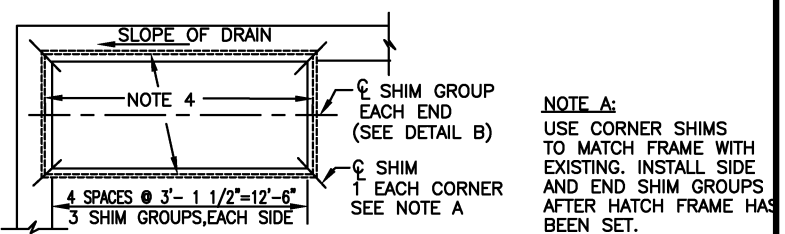
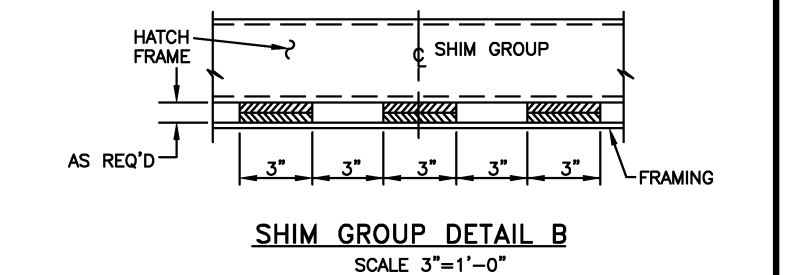
SCALE NONE

DRAWING NO. ST-M-145



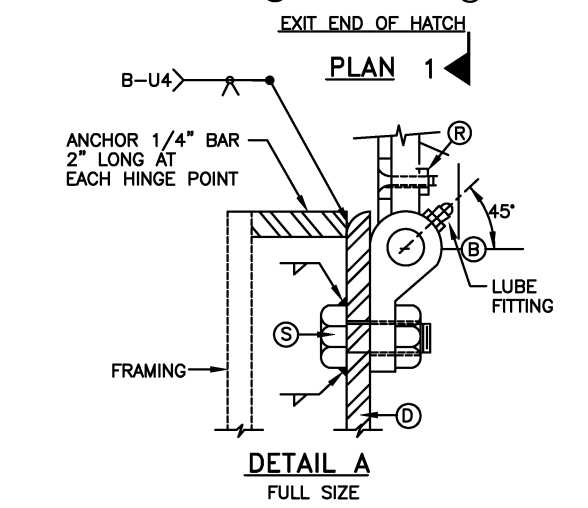
INSTALLATION NOTES

- DO NOT REDUCE SIZE OF 1 1/2"Ø OF DRAIN WHEN EXTENDING TO DRY WELL OR DISPOSAL SYSTEM.
- THE HATCH IS TO BE CLOSED WHEN BEING HANDLED. DO NOT RACK OR TWIST FRAME WHEN SETTING SHIM AS REQUIRED TO ASSURE THAT HATCH RESTS ON FRAME ALL AROUND.
- FRAME AREAS IN CONTACT WITH CONCRETE SHALL BE COATED WITH BITUMINOUS PAINT.
- FRAME OPENING AND DRAIN IN ACCORDANCE WITH DRAWING NO. ST-M-145.



LEGEND

- (A) SPECIAL CARBON STEEL COMPRESSION SPRING LIFTING MECHANISM ASSEMBLY (SPRING INCLUDED).
- (B) 4"x4" FORGED STAINLESS STEEL HINGES & PINS WITH 2 LUBE FITTINGS PER HINGE.
- (C) HEAVY DUTY STAINLESS STEEL AUTOMATIC LOCK-OPEN ARM WITH RED VINYL RELEASE GRIP.
- (D) 1/4" STAINLESS STEEL (TYPE 316) CHANNEL FRAME ALL AROUND.
- (E) CENTER DRIP CHANNEL WELDED TO L.H. LEAF AND CUT INTO MAIN CHANNEL FRAME AT EACH END-ALUMINUM.
- (F) STAINLESS STEEL EMERGENCY EXIT DEVICE.
- (G) 1/4" ALUMINUM DIAMOND PATTERN COVER PLATE.
- (H) CROSS MEMBERS WELDED TO UNDERSIDE OF STIFFENERS TO PROVIDE TORSIONAL STABILITY OF DOOR LEAFS-ALUMINUM.
- (J) 1/4"x3" REINFORCEMENT PLATE-ALUMINUM.
- (K) 6" [2.83. ALUMINUM
- (L) 1 1/2"Ø SCHEDULE 40 ALUMINUM HANDRAIL.
- (M) DRAIN 1-1/2"x 1-1/2" LONG-GALVANIZED STEEL PIPE.
- (N) 1/4" SUPPORT PLATES WELDED TO FRAME TYPICAL AT FOUR CORNERS.
- (P) GALVANIZED CHECK CHAIN.
- (Q) FLUSH GRIP HANDLE.
- (R) MINIMUM 3/8"-16x1" TAMPER PROOF STAINLESS STEEL LOCK BOLTS (3 PER HINGE). LENGTH AS REQUIRED.
- (S) MINIMUM 3/8"-16x1" STAINLESS STEEL HEX HD BOLT AND LOCK NUT (2 PER HINGE). LENGTH AS REQUIRED.
- (T) STAY BAR

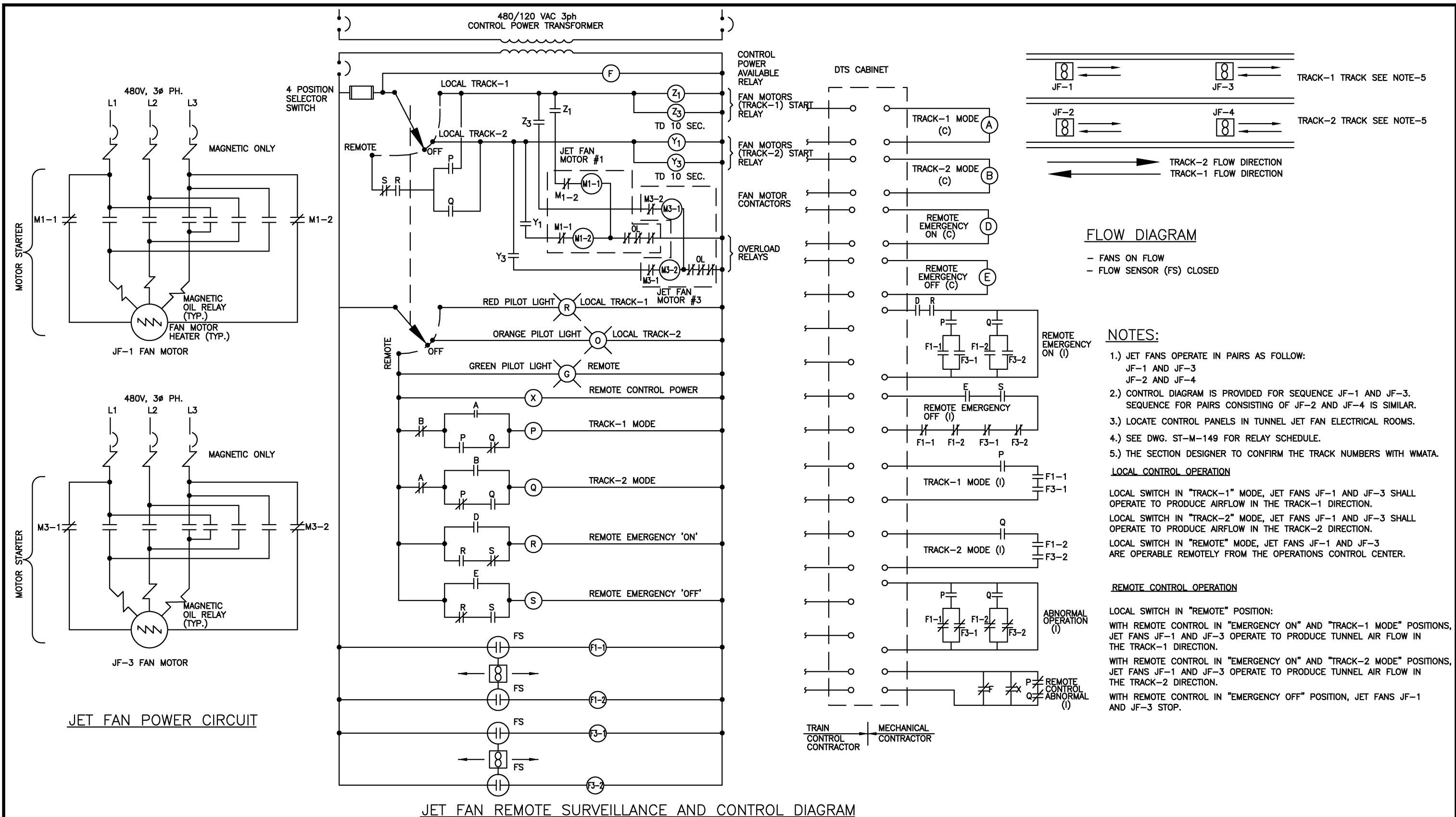


DESIGNED		DATE		NUMBER		DESCRIPTION		DATE		BY		DESCRIPTION	
JS/PE	5-83	5-83	ST-M-145	HATCH FRAME OPENING AND STAIR ARRANGEMENT FOR PASSENGER EMERGENCY AND MAINTENANCE ACCESS 250 PSF LOADING		08/2001	ENGA	Revised and issued by the Authority					
DRAWN		DATE		NUMBER		DESCRIPTION		DATE		BY		DESCRIPTION	
CHECKED		DATE		NUMBER		DESCRIPTION		DATE		BY		DESCRIPTION	
APPROVED		DATE		NUMBER		DESCRIPTION		DATE		BY		DESCRIPTION	

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
 DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
 OFFICE OF ENGINEERING AND ARCHITECTURE

MECHANICAL STANDARD DRAWING
 ACCESS HATCH FOR STAIRS
 250 PSF LOADING

SCALE: 1"=1'-0" AND AS NOTED
 DRAWING NO. ST-M-147



JET FAN REMOTE SURVEILLANCE AND CONTROL DIAGRAM

JET FAN POWER CIRCUIT

FLOW DIAGRAM

- FANS ON FLOW
- FLOW SENSOR (FS) CLOSED

NOTES:

- 1.) JET FANS OPERATE IN PAIRS AS FOLLOW:
JF-1 AND JF-3
JF-2 AND JF-4
- 2.) CONTROL DIAGRAM IS PROVIDED FOR SEQUENCE JF-1 AND JF-3.
SEQUENCE FOR PAIRS CONSISTING OF JF-2 AND JF-4 IS SIMILAR.
- 3.) LOCATE CONTROL PANELS IN TUNNEL JET FAN ELECTRICAL ROOMS.
- 4.) SEE DWG. ST-M-149 FOR RELAY SCHEDULE.
- 5.) THE SECTION DESIGNER TO CONFIRM THE TRACK NUMBERS WITH WMATA.

LOCAL CONTROL OPERATION

LOCAL SWITCH IN "TRACK-1" MODE, JET FANS JF-1 AND JF-3 SHALL OPERATE TO PRODUCE AIRFLOW IN THE TRACK-1 DIRECTION.
LOCAL SWITCH IN "TRACK-2" MODE, JET FANS JF-1 AND JF-3 SHALL OPERATE TO PRODUCE AIRFLOW IN THE TRACK-2 DIRECTION.
LOCAL SWITCH IN "REMOTE" MODE, JET FANS JF-1 AND JF-3 ARE OPERABLE REMOTELY FROM THE OPERATIONS CONTROL CENTER.

REMOTE CONTROL OPERATION

LOCAL SWITCH IN "REMOTE" POSITION:
WITH REMOTE CONTROL IN "EMERGENCY ON" AND "TRACK-1 MODE" POSITIONS, JET FANS JF-1 AND JF-3 OPERATE TO PRODUCE TUNNEL AIR FLOW IN THE TRACK-1 DIRECTION.
WITH REMOTE CONTROL IN "EMERGENCY ON" AND "TRACK-2 MODE" POSITIONS, JET FANS JF-1 AND JF-3 OPERATE TO PRODUCE TUNNEL AIR FLOW IN THE TRACK-2 DIRECTION.
WITH REMOTE CONTROL IN "EMERGENCY OFF" POSITION, JET FANS JF-1 AND JF-3 STOP.

DESIGNED	R. PATEL	9-98
DATE		
DRAWN	C. BUETRAGO	9-98
DATE		
CHECKED	J. BUMANIS	9-98
DATE		
APPROVED	R. GANERWAL	9-98
DATE		

REFERENCE DRAWINGS	
NUMBER	DESCRIPTION
ST-M-149	REMOTE SURVEILLANCE AND CONTROL DIAGRAM
	DOMES EXHAUST FANS
DD-M-153	AIR CONDITIONING & VENTILATION SYMBOLS

REVISIONS		
DATE	BY	DESCRIPTION
08/2001	ENGA	Revised and issued by the Authority

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

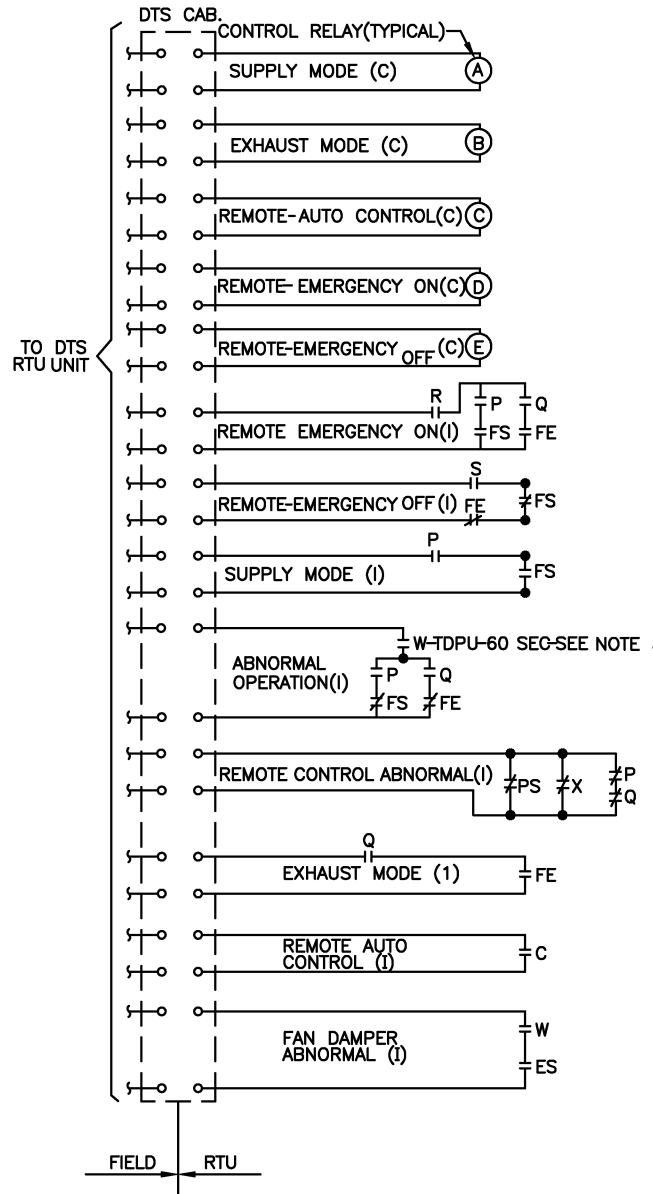
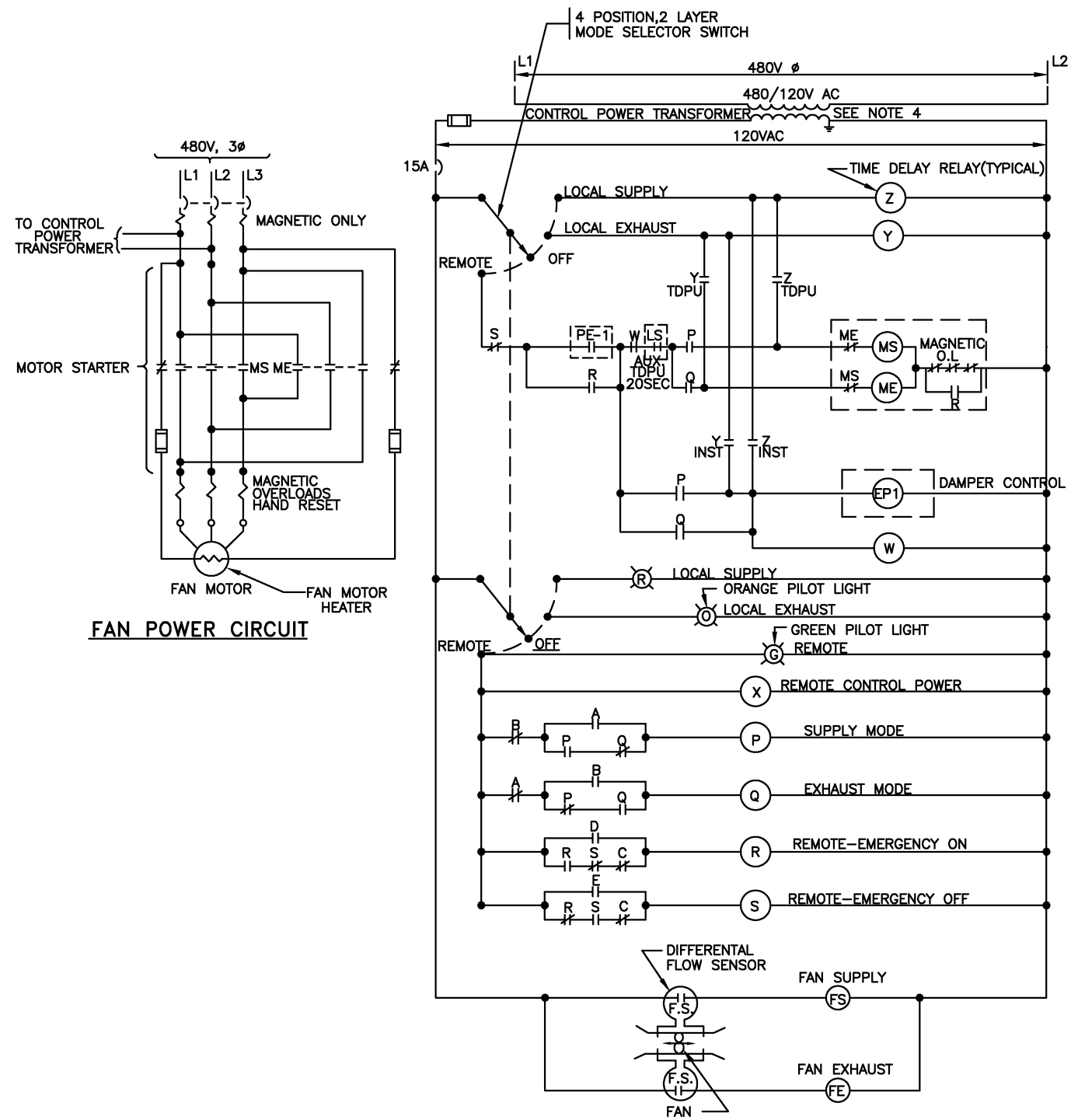
SUBMITTED _____ DATE _____

APPROVED _____ DATE May 3, 2001

MECHANICAL STANDARD DRAWING
STANDARD CONTROL AND FLOW DIAGRAMS
JET FANS

SCALE
NOT TO SCALE

DRAWING NO.
ST-M-148



**DOME EXHAUST FAN
REMOTE SURVEILLANCE AND CONTROL DIAGRAM**

RELAY SCHEDULE							
RELAY	CONTACTS USED			CONTACTS PROVIDED			RELAY TYPE (SEE NOTES 2,5,6)
	N.O.	N.C.	INST	N.O.	N.C.	AUXILIARY FORM 'C'	
A	1	1	-	2	2	-	GE CR120AD02248AA
B	1	1	-	2	2	-	GE CR120AD02248AA
C	-	2	-	2	2	-	GE CR120AD02248AA
D	1	-	-	2	2	-	GE CR120AD02248AA
E	1	-	-	2	2	-	GE CR120AD02248AA
P	4	2	-	4	4	-	GE CR120B04422
Q	3	2	-	4	4	-	GE CR120B04422
R	4	1	-	4	4	-	GE CR120B04422
S	2	2	-	3	3	-	GE CR120B03322
F S	2	2	-	3	3	-	GE CR120B3322
X	-	1	-	2	2	-	GE CR120B02222
W	2	-	-	2	2	1TDPU	AGASTAT 7012 AEMT, 1st STEP 20 Sec., 2nd STEP 60 Sec
Y	1	-	1N.O.	2	2	2INST.	AGASTAT 7012 AEMLL, 20 SECOND DELAY
Z	1	-	1N.O.	2	2	2INST.	AGASTAT 7012 AEMLL, 20 SECOND DELAY

NOTES

- ALL RELAY CONTACTS SHOWN WITH RELAY DE-ENERGIZED.
- RELAYS SHALL BE TYPE INDICATED IN RELAY SCHEDULE OR APPROVED EQUAL.
- CONTROL AIR PRESSURE SENSOR PS SHALL BE LOCATED IN CONTROL AIR MAIN AS CLOSE AS PRACTICAL TO TEMPERATURE TRANSMITTER T-2. SENSOR CONTACTS SHALL CLOSE ON LOSS OF AIR PRESSURE BELOW, MINIMUM REQUIRED TO OPERATE CONTROLS (DETERMINED IN CONSULTATION WITH CONTROLS MANUFACTURER).
- CONTROL TRANSFORMER KVA RATING TO BE DETERMINED BASED ON TOTAL DEMAND LOAD CONNECTED TO TRANSFORMER SECONDARY.
- SETTINGS INDICATED FOR TIME DELAY RELAYS W, Y AND Z ARE APPROXIMATE ONLY. FINAL SETTINGS SHALL BE DETERMINED IN CONSULTATION WITH FAN MANUFACTURER. TIME DELAY SETTINGS FOR RELAYS Y AND Z AND FIRST STEP SETTING FOR RELAY W SHALL BE SUFFICIENT FOR FAN TO SLOW AND REVERSE WITHOUT DAMAGE TO FAN AND/OR MOTOR. SECOND STEP DELAY SETTING FOR RELAY W SHALL BE SUFFICIENT FOR FAN TO SLOW, REVERSE AND REACH FULL SPEED.
- SEE CONTRACT DRAWINGS FOR CONDUITS AND WIRING ARRANGEMENT.

ABBREVIATIONS

- | | |
|--|----------------------------------|
| TDPU - TIME DELAY PICK UP | MS - SUPPLY MODE MOTOR STARTER |
| LS - DAMPER LIMIT SWITCH | ME - EXHAUST MODE MOTOR STARTER |
| PS - AIR PRESSURE SURVEILLANCE SWITCH | FS - SUPPLY MODE AIR FLOW RELAY |
| RTU - REMOTE TERMINAL UNIT | FE - EXHAUST MODE AIR FLOW RELAY |
| SEE ST-AC-49 FOR ADDITIONAL ABBREVIATIONS AND SYMBOLS. | ES - FAN DAMPER END SWITCH |

SEQUENCE OF OPERATIONS

- REMOTE CONTROL MODE OPERATION -**
 - WITH CONTROL AIR -** SEQUENCE AS DESCRIBED ON ST-M-148 AFTER MODE SELECTED REMOTELY THROUGH RELAYS A,B,C,D. OR E AND P OR Q. PE-1 CONTACT CLOSURE ENERGIZES EP-1 TO OPEN FAN DISCHARGE DAMPERS AND ENERGIZES TIME DELAY RELAY W THROUGH P OR Q CONTACTS. DAMPER LIMIT SWITCH LS AND TIME DELAY RELAY W CONTACT CLOSURES WILL START FAN.
 - WITHOUT CONTROL AIR-DESIRED MODE SELECTED REMOTELY.** LOSS OF CONTROL AIR SHALL OPEN FAN DISCHARGE DAMPERS.
 - EMERGENCY ON/OFF MODE OPERATION -** RELAY D, SELECTED REMOTELY, WILL ENERGIZE RELAY R, CLOSING ITS CONTACTS AND STARTING FAN THROUGH TIME DELAY RELAY W CONTACTS AND DAMPER LIMIT SWITCH LS CONTACTS. RELAY E, SELECTED REMOTELY, WILL ENERGIZE RELAY S, OPENING ITS NORMALLY CLOSED CONTACTS, STOPPING THE FAN.
- LOCAL MANUAL OPERATION -**
FAN IS STARTED IN DIRECTION SELECTED ACCORDING TO MANUAL MODE SELECTOR SWITCH THROUGH TIME DELAY RELAYS Y AND Z FOR LOCAL EXHAUST MODE AND LOCAL SUPPLY MODE RESPECTIVELY.
- REMOTE SURVEILLANCE -**
AN ABNORMAL OPERATION INDICATION WILL BE TRANSMITTED WHEN THE FAN SHOULD BE OPERATING BUT AIR FLOW, AS MEASURED BY FLOW SENSOR, IS NOT ESTABLISHED. A REMOTE CONTROL ABNORMAL INDICATION WILL BE TRANSMITTED ON LOSS OF CONTROL AIR PRESSURE, ON LOCAL MODE SELECTION OTHER THAN REMOTE, OR LACK OF REMOTELY SELECTED DIRECTION OR TRIPPED CIRCUIT BREAKER OR BLOWN FUSE. FAN DAMPER ABNORMAL INDICATION WILL BE TRANSMITTED WHEN THE FAN SHOULD BE OPERATING BUT FAN DAMPER HAS FAILED TO OPEN.

DESIGNED	ED PENNINGTON	07-83	REFERENCE DRAWINGS		REVISIONS		
			NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION
DRAWN	ED PENNINGTON	07-83	DD-M-153	AIR CONDITIONING & VENTILATION SYMBOLS	08/2001	ENGA	Revised and issued by the Authority
CHECKED	DEL LEWIS	04-84					
APPROVED	R. GANERWAL	04-84					

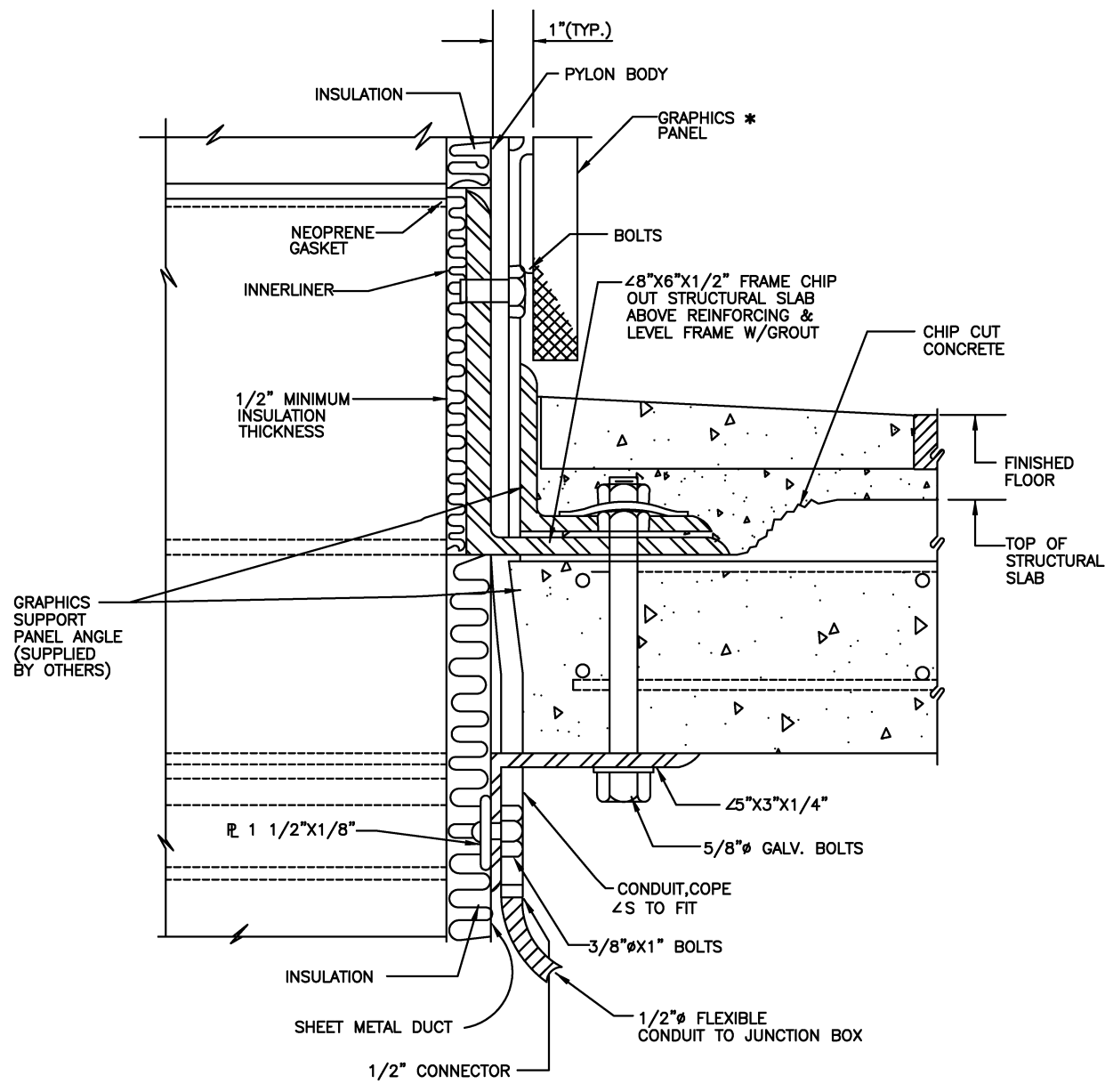
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED _____ DATE _____ APPROVED _____ DIRECTOR _____ May 3, 2001 DATE _____

MECHANICAL STANDARD DRAWING
REMOTE SURVEILLANCE AND CONTROL DIAGRAM
DOME EXHAUST FANS

SCALE: NOT TO SCALE DRAWING NO.: ST-M-149



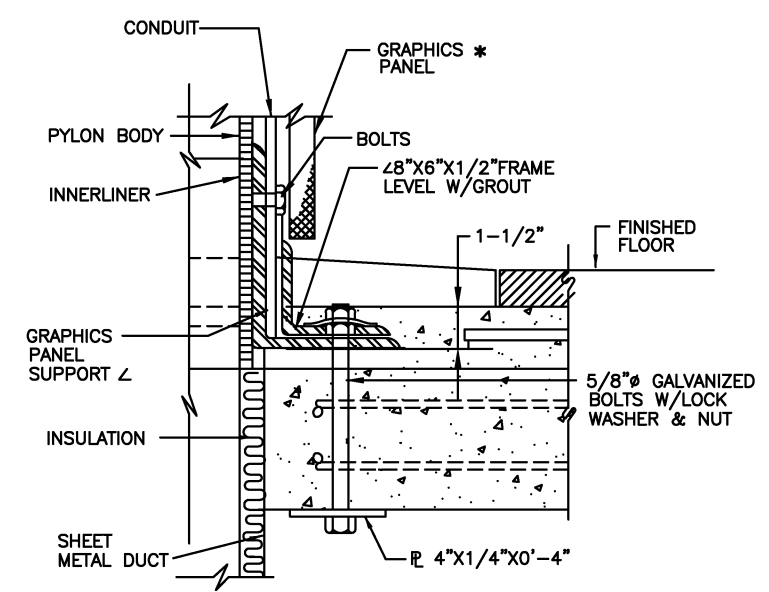
PLATFORM ATTACHMENT

SEE DETAIL F FOR MEZZANINE ATTACHMENT

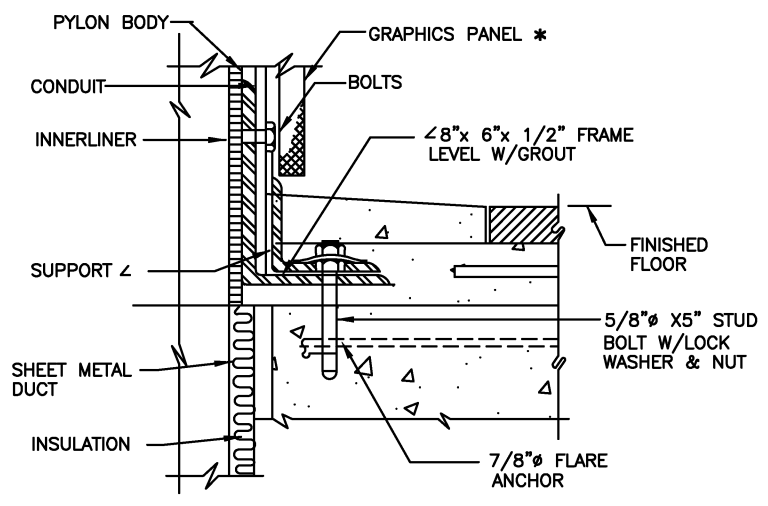
DETAIL C

SCALE 6" = 1' - 0"

GENERAL NOTE:
SEE DRAWING ST-A-PY-2 FOR PYLON LIGHTING FIXTURE DETAILS.



PREFERRED MEZZ. ATTACHMENT



**ALTERNATE ATTACHMENT USE ONLY
WHERE PREFERRED IS NOT FEASIBLE**

DETAIL F
SCALE: 3"=1'-0"

* DENOTES WORK PERFORMED BY GRAPHICS CONTRACTOR

DESIGNED		DATE		NUMBER		DESCRIPTION		DATE		BY		DESCRIPTION	
K.S. PARROTT	4-71	4-71	4-71	ST-M-083	AIR CONDITIONING PYLON-SHEET 1	08/2001	ENGA	Revised and issued by the Authority					
M. SULLIVAN	4-71	4-71	4-71										
J.M. SOLOMON	4-71	4-71	4-71										
R.S. O'NEAL	4-71	4-71	4-71										

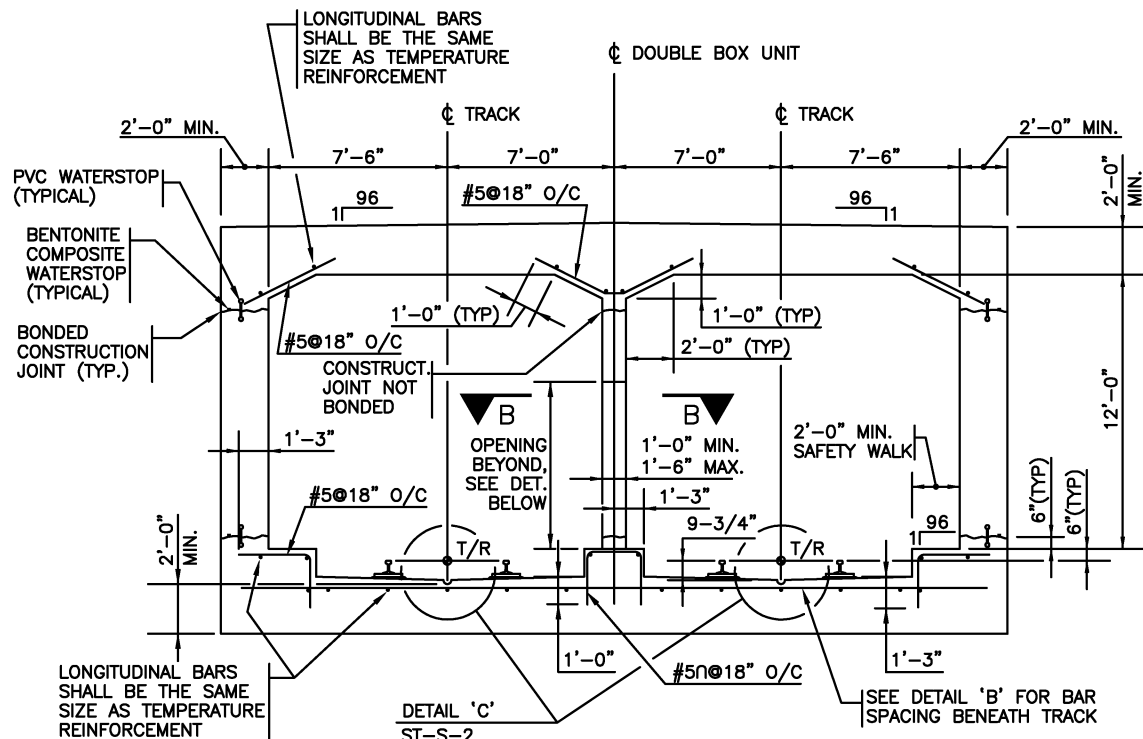
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

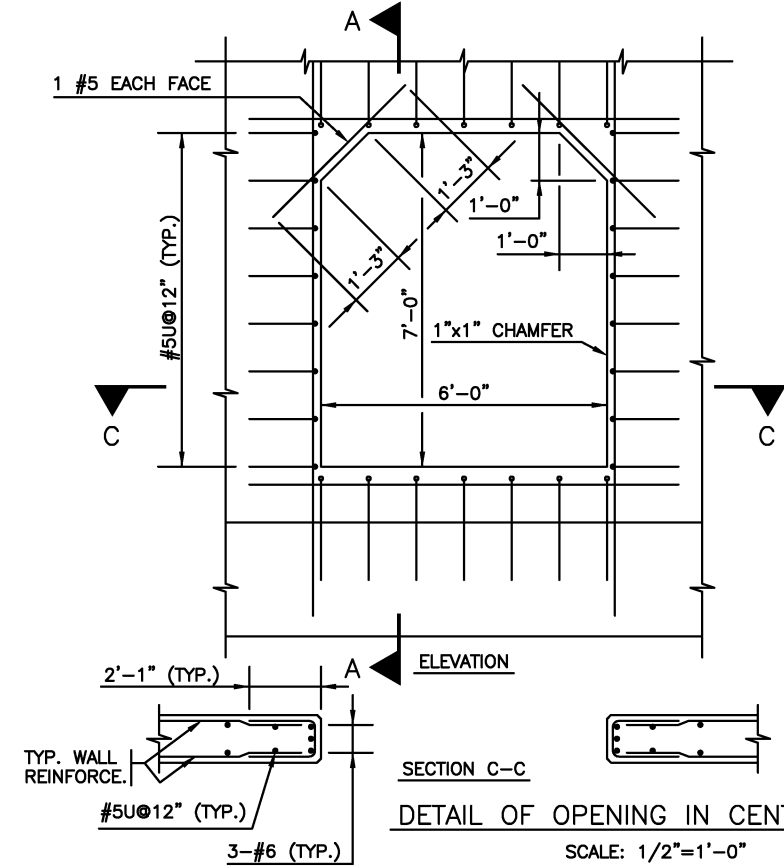
SUBMITTED _____ DATE _____ APPROVED *[Signature]* DIRECTOR May 3, 2001 DATE _____

MECHANICAL STANDARD DRAWING
AIR CONDITIONING PYLON
SHEET 2

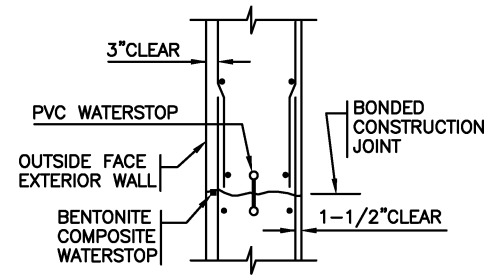
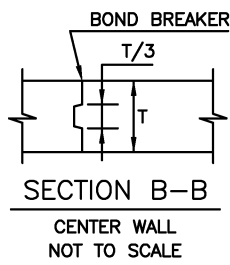
SCALE AS NOTED DRAWING NO. ST-M-150



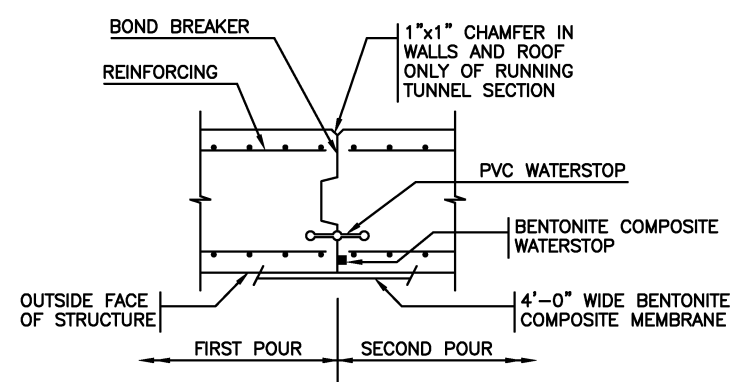
DOUBLE BOX DETAILS, TANGENT SECTION
SCALE: 1/4"=1'-0"



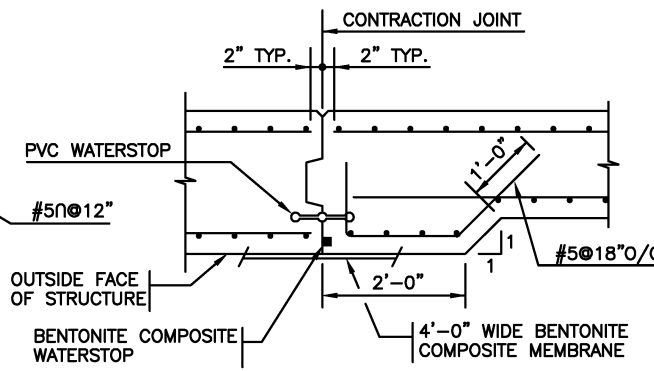
DETAIL OF OPENING IN CENTER WALL
SCALE: 1/2"=1'-0"



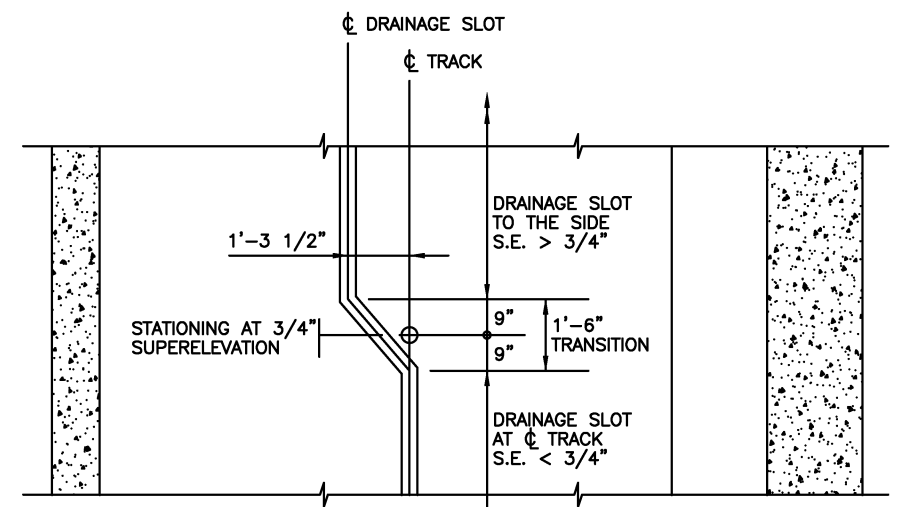
CONSTRUCTION JOINT
SCALE: 1/2"=1'-0"



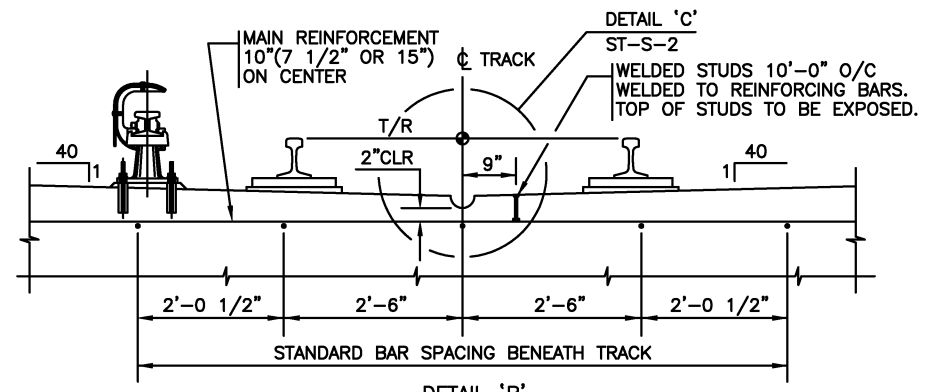
CONTRACTION JOINT
SCALE: 3/4"=1'-0"



TRANSITION DETAIL
SCALE: 3/4"=1'-0"



TYPICAL INVERT TRANSITION AT 3/4" S.E.
SCALE: 1/2"=1'-0"



DETAIL 'B'
SCALE: 3/4"=1'-0"

NOTES:

1. CONCRETE COVER FOR REINFORCEMENT PER ACI 318-95 UNLESS OTHERWISE NOTED.
2. THE LIMITATIONS ON THE PLACEMENT OF REINFORCING STEEL IN THE TRACKBED ARE SHOWN ON DD-TW-1.
3. THE MAXIMUM LENGTH BETWEEN TRANSVERSE CONTRACTION JOINTS, AS MEASURED ALONG THE INSIDE FACE OF THE WALL NEAREST THE CURVE CENTER, SHALL BE 50 FEET.
4. BENTONITE COMPOSITE WATERSTOP, AND PVC WATERSTOP (DUMBELL TYPE, CENTER BULB, 9 INCH WIDTH, 1/2" STEM THICKNESS, 3/4" BULBS) ARE TYPICAL FOR EXTERIOR TRANSVERSE CONTRACTION AND CONSTRUCTION (NO CENTER BULB) JOINTS IN ROOFS, WALLS AND INVERT SLABS INCLUDE BOND BREAKER AT CONTRACTION JOINTS ONLY.
5. BENTONITE COMPOSITE WATERSTOP TO BE PLACED BETWEEN PVC WATERSTOP AND EXTERIOR FACE OF WALL OR SLAB AS SHOWN. THE MINIMUM SIZE OF BENTONITE COMPOSITE WATERSTOP SHALL BE 3/4" THICK AND 1" WIDE. THE MINIMUM CONCRETE COVERAGE OF THE BENTONITE COMPOSITE WATERSTOP SHALL BE 2" OR IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.
6. FOR MEMBRANE WATERPROOFING AND PROTECTION DETAILS, SEE DRAWINGS DD-S-130 THRU DD-S-133.

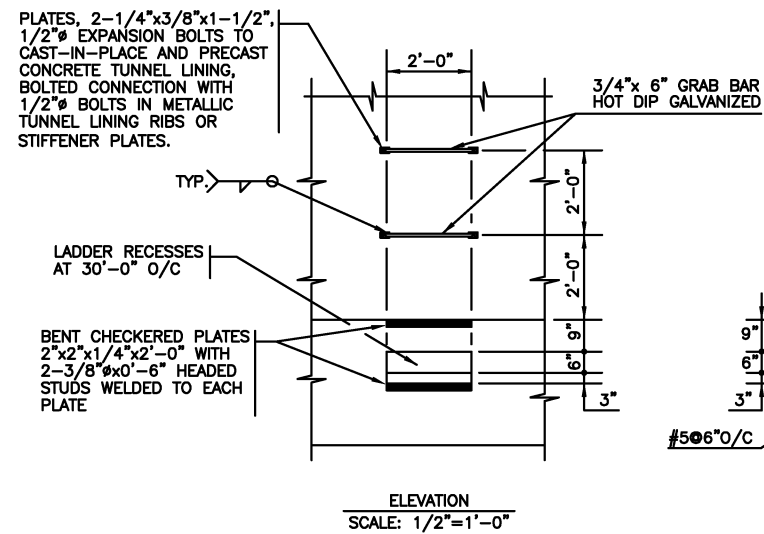
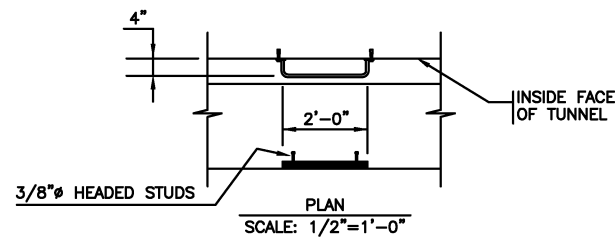
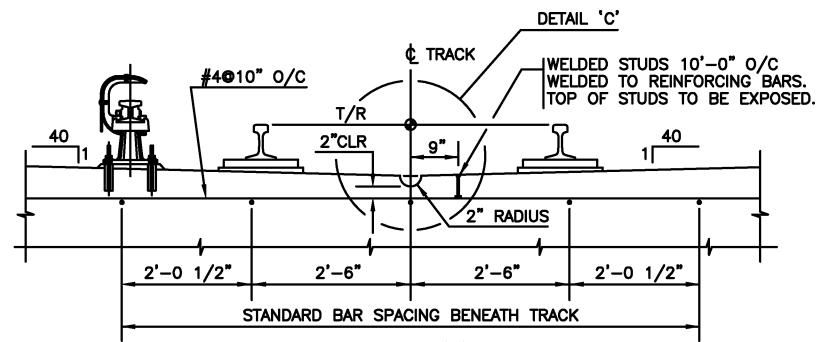
DESIGNED		REFERENCE DRAWINGS		REVISIONS	
C. BELLAM	1-88	NUMBER	DESCRIPTION	DATE	DESCRIPTION
J. SOUCY	1-88			08/2001	ENGA Revised and issued by the Authority
A.B.	2-88				
KNIGHT	2-88				

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED _____ DATE _____ APPROVED _____ DIRECTOR _____ May 3, 2001

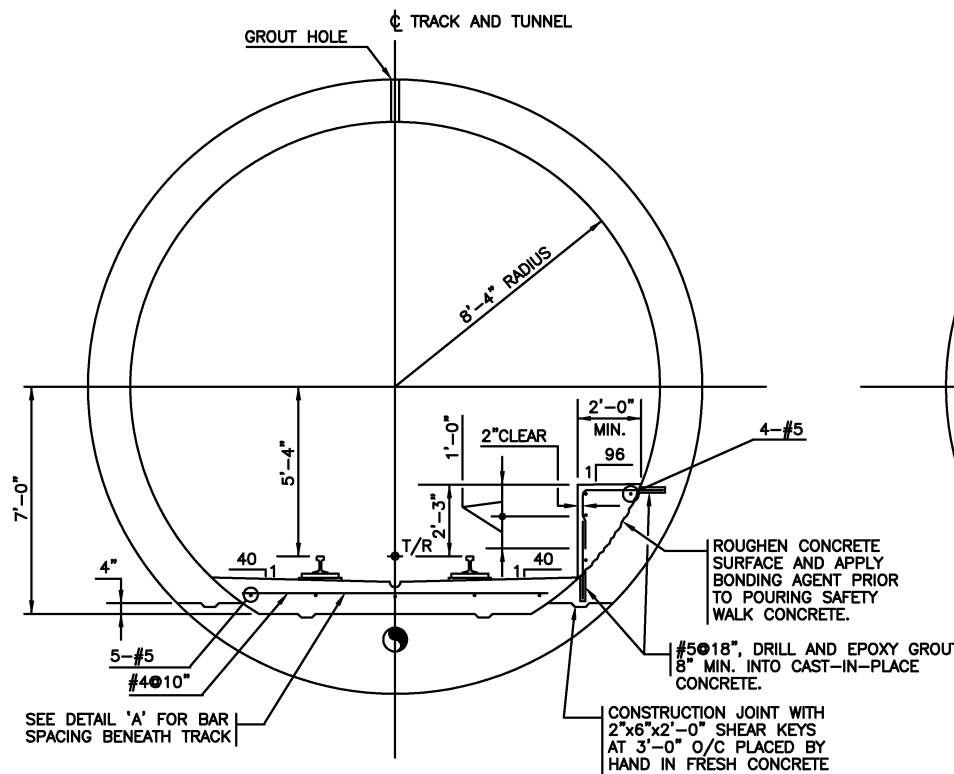
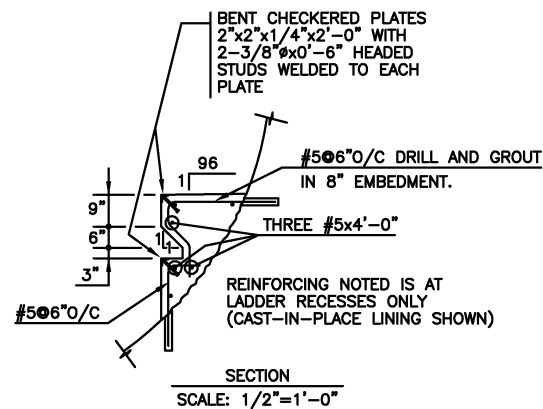
STRUCTURAL STANDARD DRAWING
CUT AND COVER SECTIONS
TYPICAL DETAILS AND REINFORCEMENT

SCALE AS SHOWN DRAWING NO. ST-S-001

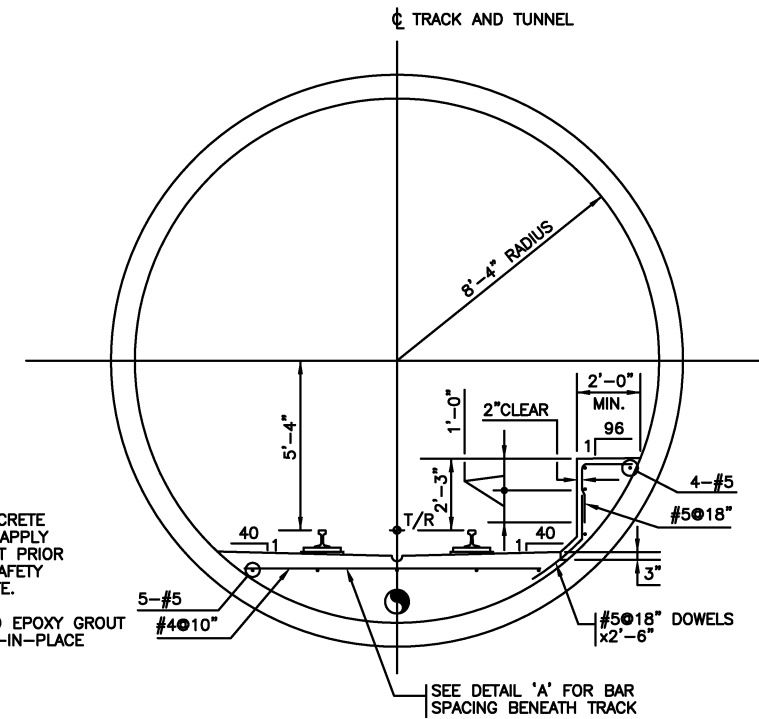


TYPICAL SAFETY WALK LADDER RECESS DETAIL

NOTE: ALL STRUCTURAL STEEL IN SAFETY WALK LADDER DETAIL SHALL BE GALVANIZED.

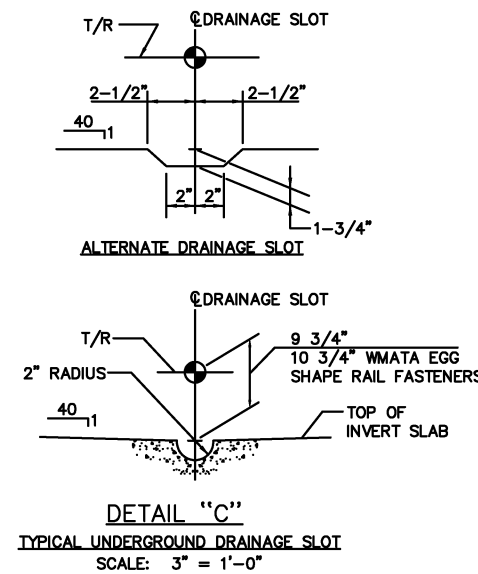


TYPICAL CIRCULAR EARTH TUNNEL
CAST IN PLACE TUNNEL LINING
TANGENT SECTION



NOTE: FOR MUD SLAB SEE DWG. DD-S-121.

TYPICAL CIRCULAR EARTH TUNNEL
METALLIC OR PRECAST TUNNEL LINING
TANGENT SECTION

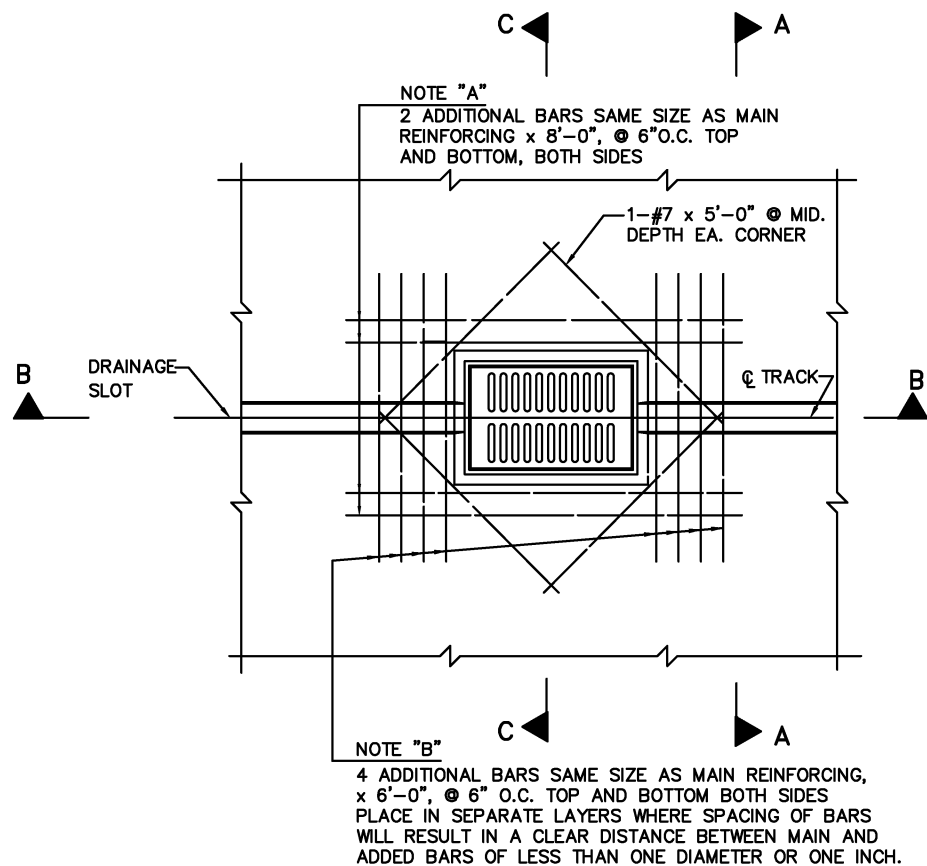


- NOTES:
1. FOR DETAILS OF INVERT TRANSITION AT 3/4" SUPERELEVATION, SEE DRAWING NO. ST-S-1.
 2. ALL STEEL USED IN SAFETY WALK LADDER SHALL BE GALVANIZED.
 3. CONCRETE PROTECTION FOR REINFORCING STEEL IS AS SHOWN ON DETAILS.
 4. THE LIMITATIONS ON THE PLACEMENT OF REINFORCING STEEL IN THE TRACKBED ARE SHOWN ON DD-TW -1.

DESIGNED		REFERENCE DRAWINGS		REVISIONS	
NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION	
1-88		08/2001	ENGA	Revised and issued by the Authority	
1-88					
2-88					
2-88					

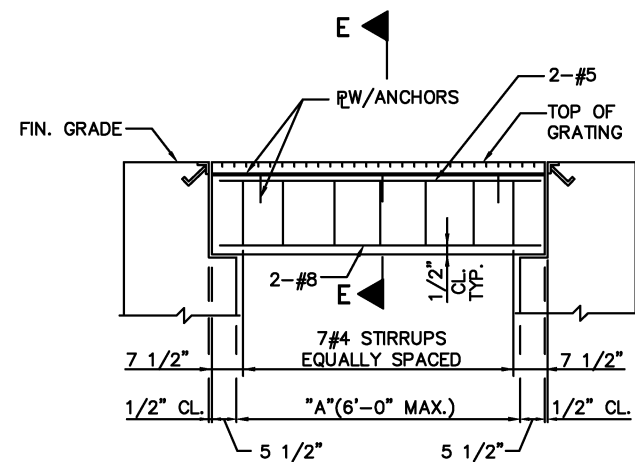
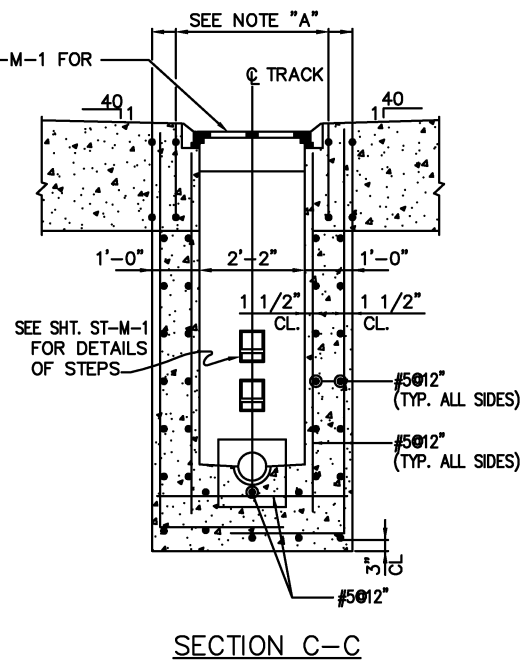
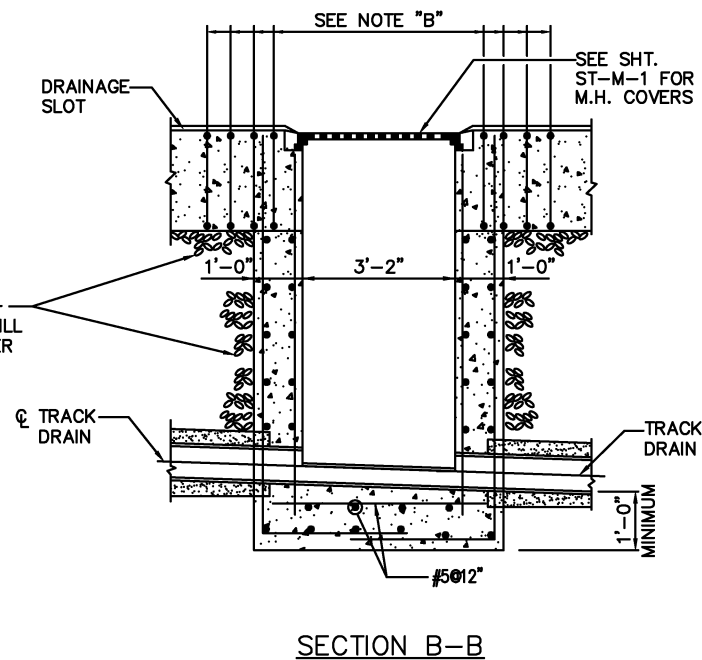
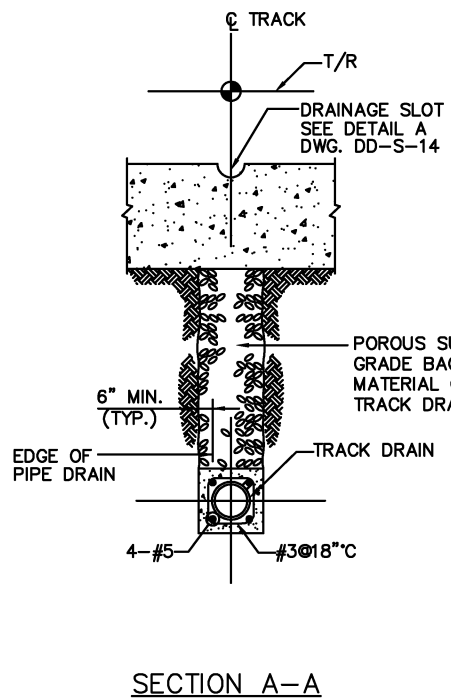
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF ENGINEERING AND ARCHITECTURE	
SUBMITTED	DATE
APPROVED DIRECTOR	DATE
May 3, 2001	

STRUCTURAL STANDARD DRAWING EARTH TUNNEL TYPICAL DETAILS AND REINFORCEMENT	
SCALE AS SHOWN	DRAWING NO. ST-S-002

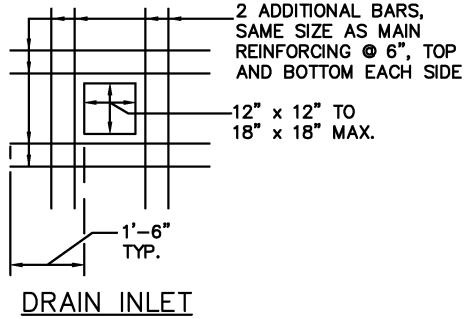
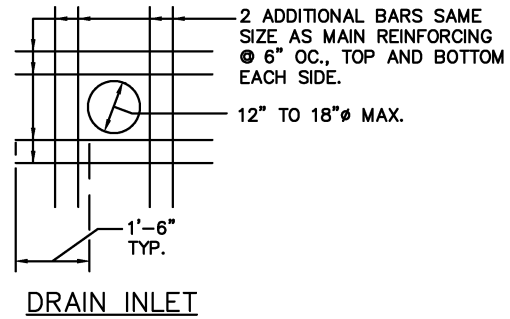
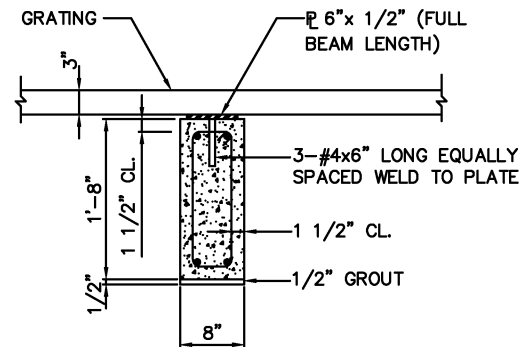


PLAN

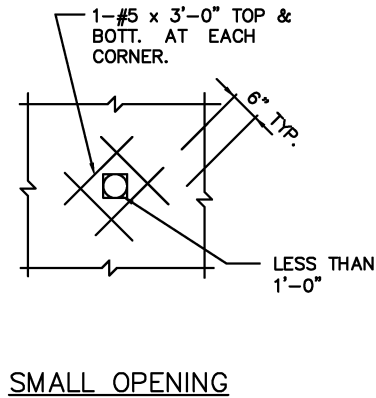
STANDARD MANHOLE REINFORCING



TYPICAL REMOVABLE PRECAST BEAM FOR GRATING SUPPORT AT FAN AND VENT SHAFTS
MAXIMUM SPACING 3'-4" O.C.



TYPICAL ADDITIONAL REINFORCING AT OPENINGS



NOTES:

1. CONCRETE PROTECTION FOR REINFORCING STEEL IS AS SHOWN ON DETAILS.
2. CONCRETE f_c = 3500 PSI.
3. STEEL REINFORCEMENT ASTM A615 GRADE 60.
4. ALL MISC. STEEL SHALL BE HOT-DIP GALVANIZED.

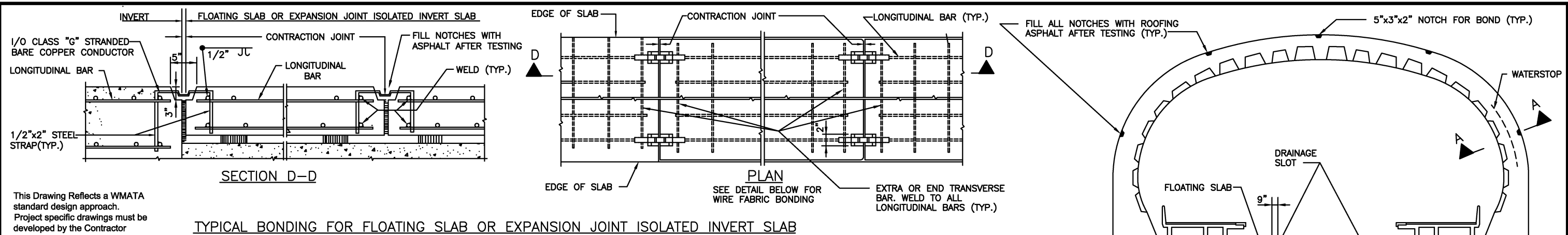
DESIGNED	C. BELLAM	1-88	REFERENCE DRAWINGS		REVISIONS	
			NUMBER	DESCRIPTION	DATE	BY
DRAWN	J. SOUCY	1-88	DD-M-149	DRAINAGE DETAILS AND CASTING	08/2001	ENGA
CHECKED			ST-M-137	FRAMES AND GRATINGS		
APPROVED						

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED _____ DATE _____ APPROVED _____ DIRECTOR _____ May 3, 2001 DATE _____

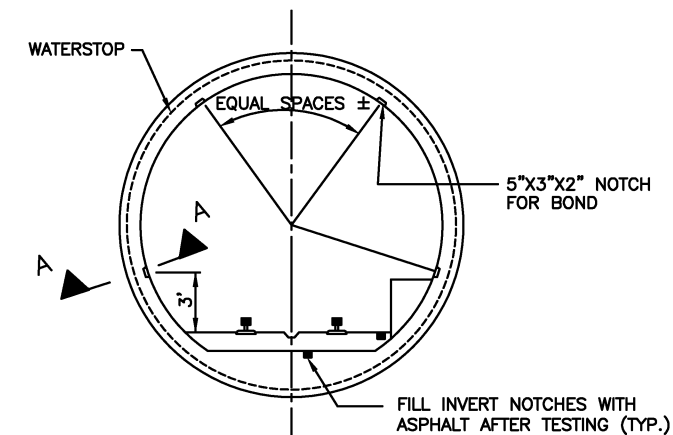
STRUCTURAL STANDARD DRAWING
DRAINAGE AND VENTILATION STRUCTURES
TYPICAL DETAILS AND REINFORCEMENT

SCALE 1/2"=1'-0" DRAWING NO. ST-S-004

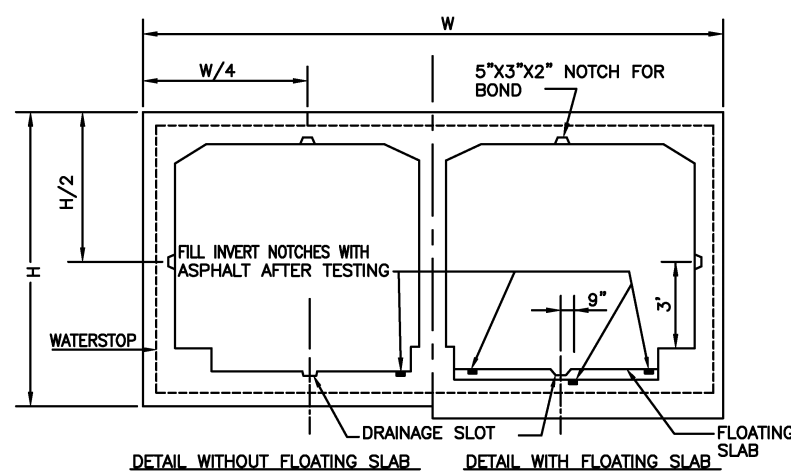


This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

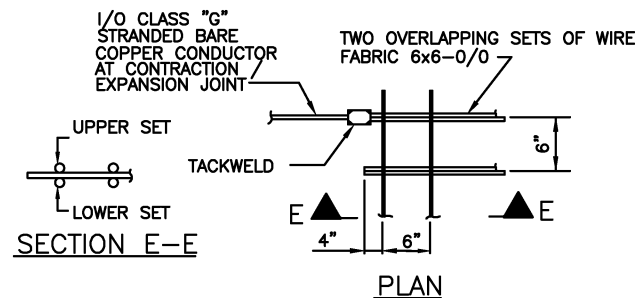
TYPICAL BONDING FOR FLOATING SLAB OR EXPANSION JOINT ISOLATED INVERT SLAB



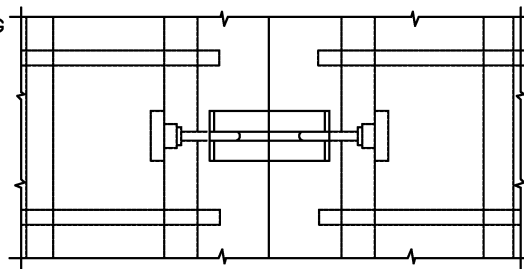
TYPICAL CAST-IN-PLACE TUNNEL LINING



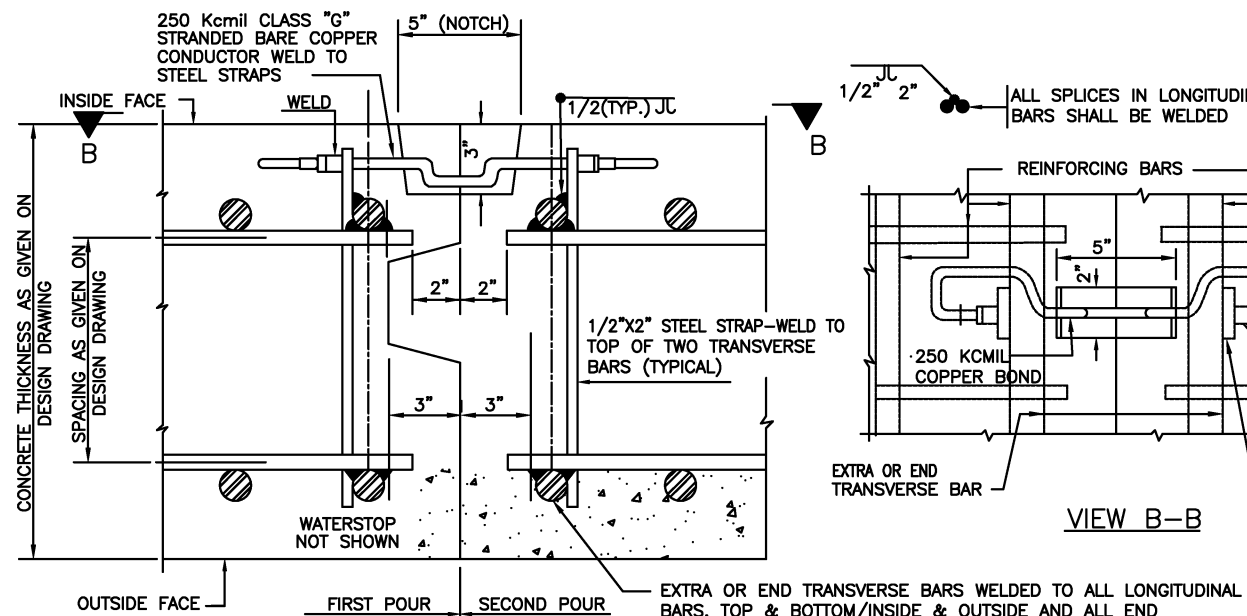
TYPICAL CUT & COVER BOX



NOTE: TACKWELD ADJACENT MATS AT 20' MAXIMUM INTERVALS IN LENGTH.
WIRE FABRIC BONDING DETAIL



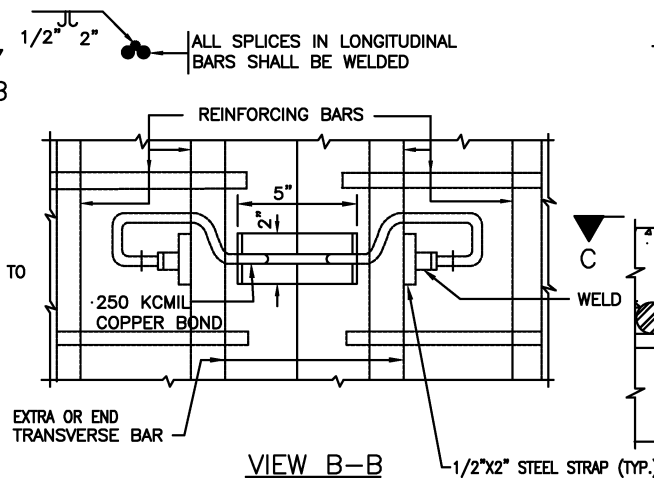
SECTION C-C



NOTE: THE BONDING ASSEMBLY MAY BE SHOP OR FIELD WELDED

SECTION A-A

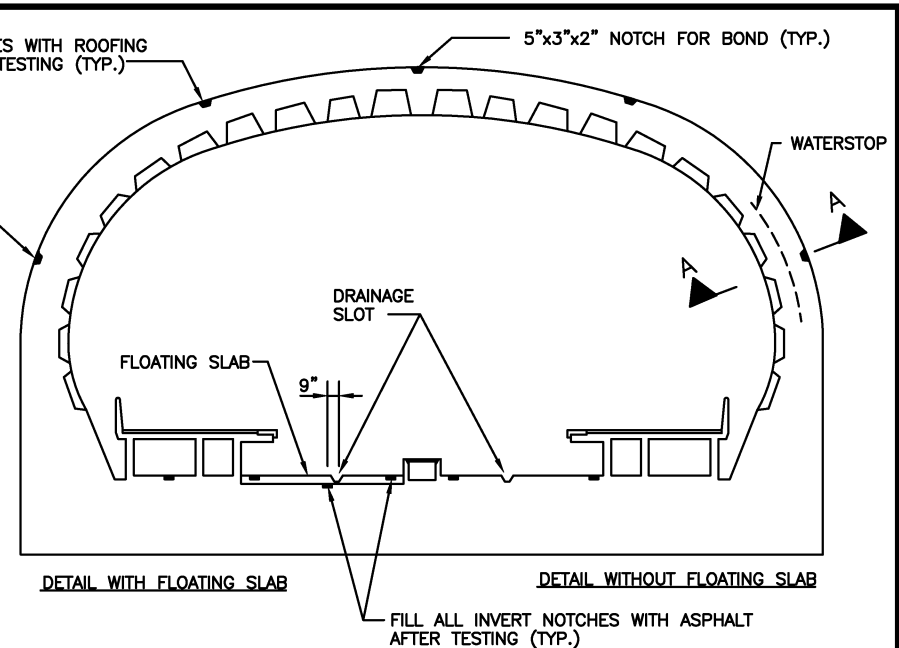
TYPICAL BONDING DETAILS



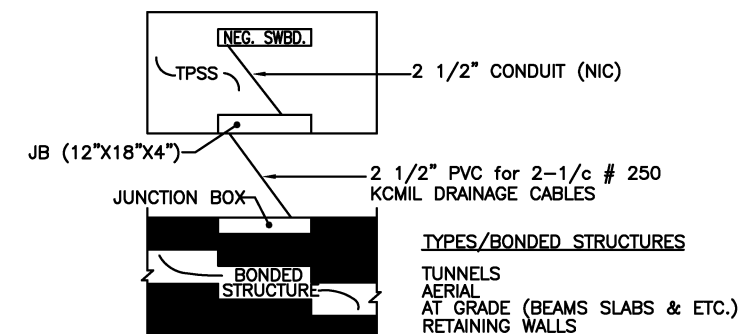
VIEW B-B

NOTE: THE BONDING ASSEMBLY SHALL BE SHOP WELDED

OPTIONAL BONDING DETAILS



TYPICAL CUT & COVER STATION



DRAINAGE CABLE ROUTING DIAGRAM
REFER TO NOTE 4

NOTES

- BONDS SHALL BE LOCATED AT THE CONTRACTION JOINT AT EACH END OF A STRUCTURAL UNIT AS SHOWN. MINIMUM ONE BOND PER TRACK IN INVERT AND/OR CEILING AND MINIMUM ONE BOND PER TWENTY FEET RISE IN WALLS STARTING AT 3 FT. ABOVE FINISHED FLOOR.
- BOND LOCATIONS SHOWN ARE APPROXIMATE. ADJUST AS REQUIRED TO AVOID ELECTRICAL CONDUITS, ETC. LOCATE INVERT BONDS ONE FOOT FROM SAFETY WALK/WALL AND IN AN AREA WHERE IT WILL NOT INTERFERE WITH THE RAIL, RAIL FASTENERS, GROUT PADS, ETC.
- TYPICAL BONDING DETAILS SHALL APPLY TO ROCK TUNNELS WITH CONCRETE LININGS, RETAINING WALLS, AERIAL STRUCTURES AND ALL STRUCTURES IN CONTACT WITH EARTH.
- IN AREA OF TPSS INSTALL 2-250 KCMIL COPPER BONDS, ONE END OF EACH WELDED TO REINFORCING STEEL IN BONDED STRUCTURE, ROUTE OTHER ENDS OF BONDS INTO A JUNCTION BOX IN BONDED STRUCTURE.
FROM JUNCTION BOX ROUTE ONE 2 1/2" PVC CONDUIT & TWO 1/C-250K KCMIL INSULATED CABLES TO JB IN THE DC NEGATIVE SWITCHBOARD AREA OF THE TRACTION SUBSTATION FOR FUTURE CONNECTION BY OTHERS. TAG WIRE & PROVIDE PIGTAILS SUFFICIENT IN LENGTH TO REACH NEGATIVE SWITCHBOARD VIA CABLE TRAY. SEE DIAGRAM THIS SHEET.
JUNCTION BOXES TO BE CONVENIENTLY LOCATED FOR SIMPLEST CONDUIT ROUTING.
- ALL STRUCTURES IN CONTACT WITH EARTH SHALL HAVE THE PERIMETER ELEMENTS BONDED BY METHODS SIMILAR TO THOSE INDICATED ON THIS DRAWING TO FORM A CONTINUOUS DOUBLE CAGE, AND ADJACENT UNITS SHALL BE BONDED TOGETHER. WHERE IT IS NECESSARY TO PLACE THE COPPER CONDUCTOR IN EARTH IT SHALL BE INSULATED.
- ALL BONDING NOTCHES IN THE INVERTS AND WALLS SHALL BE ACCESSIBLE FOR FUTURE MONITORING AND TESTING AFTER CONSTRUCTION IS COMPLETE.
- CONTRACTOR SHALL LEAVE A 3 FT. PIGTAIL BOND FOR FOLLOWING CONTRACT.

DESIGNED		REFERENCE DRAWINGS		REVISIONS	
DATE	BY	NUMBER	DESCRIPTION	DATE	DESCRIPTION
7-88	C.A. BELLUM	ST-S-021	ELECTRICAL BONDING OF REINFORCING STEEL, SECTIONS & DETAILS SHEET 2 of 2	08/2001	ENGA Revised and issued by the Authority
7-88	L. RINALDI	ST-S-022	TYPICAL ELECTRICAL BONDING FOR STRUCTURES		
7-88	A. BUMANIS	ST-S-023	ELECTRICAL BONDING DETAILS TYPICAL POST TENSIONED GIRDERS		
7-88	K.G. KNIGHT				

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED _____ DATE _____ APPROVED _____ DIRECTOR _____ May 3, 2001

STRUCTURAL STANDARD DRAWING
ELECTRICAL BONDING OF REINFORCING STEEL, SECTIONS AND DETAILS
SHEET 1 OF 2

SCALE NONE DRAWING NO. ST-S-007

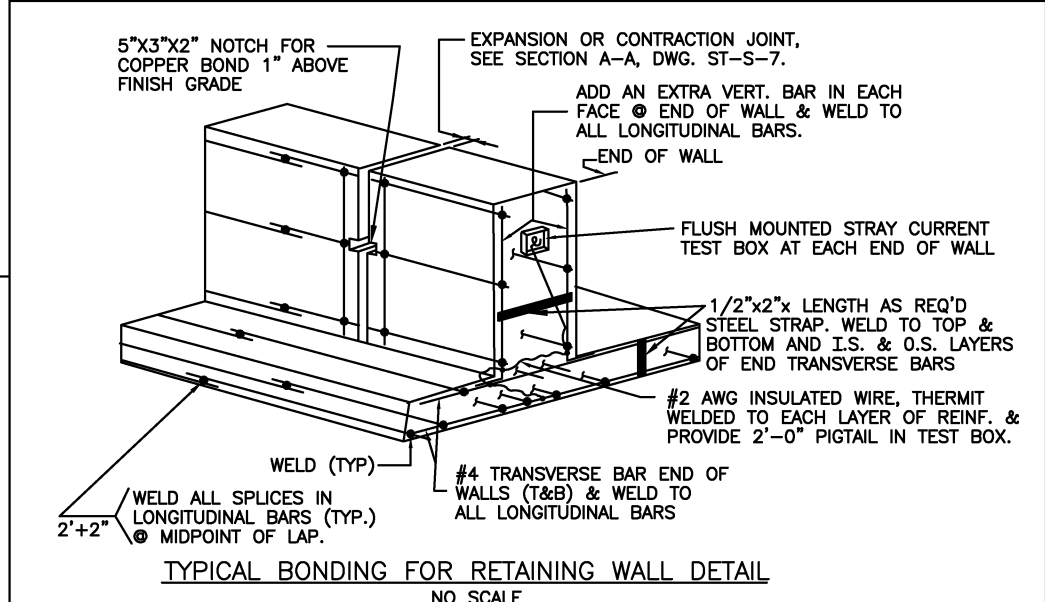
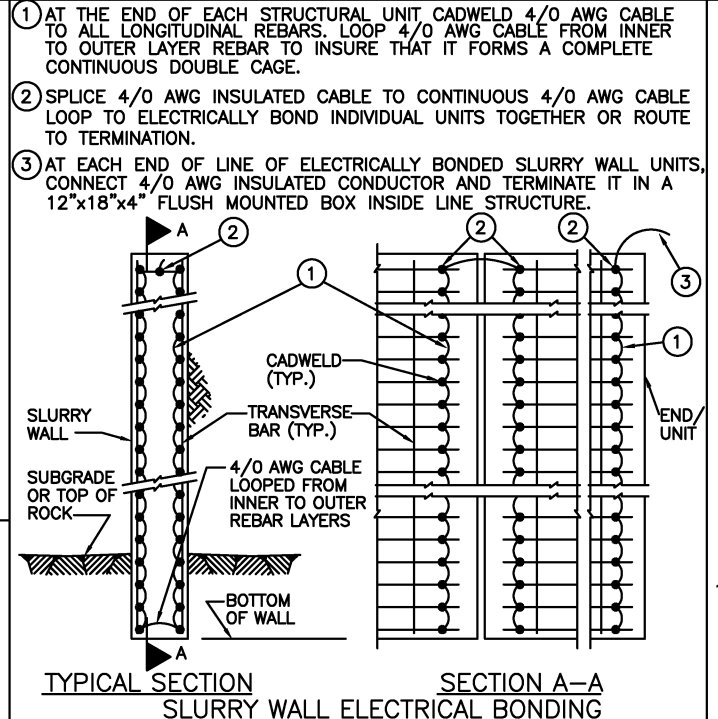
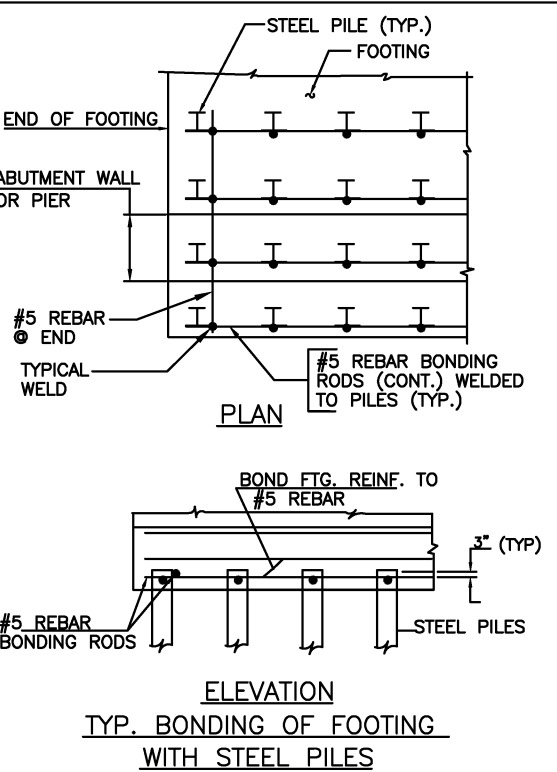
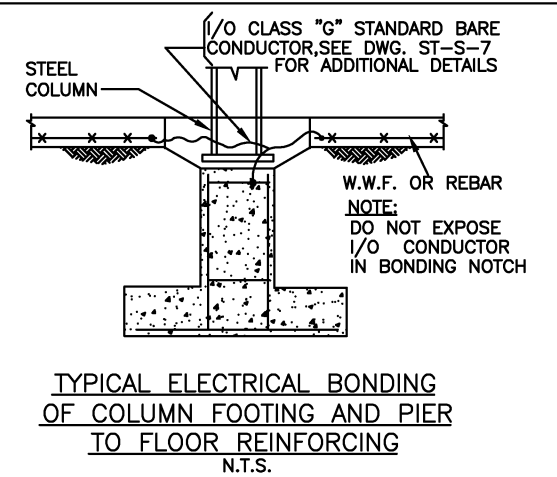
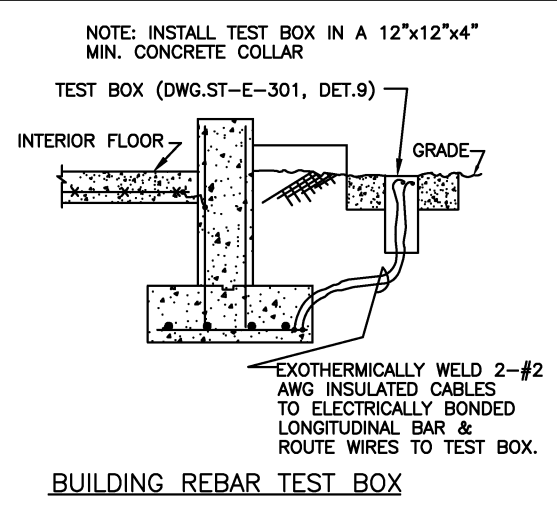
LOADS					
STRUCTURES	DEAD LOADS (DL)	LIVE LOADS (LL) AND OTHER LOADS		DESIGN LOADING COMBINATIONS AND ALLOWABLE UNIT STRESSES	
		VERTICAL	HORIZONTAL		
DECK STRUCTURE DECK ELEMENTS (DECKING AND HORIZONTAL SUPPORTING FRAMEWORK)	OWN WEIGHT	ROADWAY LOADS			LOADING SHALL CONSIST OF THE FOLLOWING: DL + LL + I + E + H AT 100% OF UNIT STRESS -OR- DL + LL + I + E + H + LF + W AT 125% OF UNIT STRESS, WHICHEVER IS GREATER. NOTE: THE VALUE OF LL IS THE MAXIMUM TOTAL LIVE LOAD OBTAINED BY COMBINING THE VARIOUS LIVE LOADS THAT MIGHT EXIST AT ONE TIME.
		1. BASIC LOADING (LL) HS 25-44 APPLICABLE REFERENCES. * ART. 3.7, 3.11, 3.23 TO 3.29	LONGITUDINAL FORCES (LF) ART. 3.9 EXCEPT REFERENCE TO ART. 3.12		
	2. IMPACT (I) ART. 3.8	WIND LOADS (W) 20 PSF ON EXPOSED AREA OF VEHICLES AND EQUIPMENT. BUT NOT LESS THAN 100 LBS. PER LINEAR FOOT OF DECK STRUCTURE APPLIED NORMAL TO THE DIRECTION IN WHICH LENGTH IS MEASURED.			
		3. NUMBER AND WIDTH TRAFFIC LANES DRAWINGS OR SPECIFIED.	LATERAL EARTH (E) AND HYDROSTATIC (H) PRESSURE, SAME AS FOR EXCAVATION RETAINING STRUCTURES.		
		4. ART. 3.12 (REDUCTION IN LOAD DOES NOT APPLY.)			
		OPERATING LOADS FROM CONSTRUCTION EQUIPMENT (LL) WITH NOT LESS THAN 50% IMPACT.			
		SIDEWALK AND PEDESTRIAN ISLAND LOADS (LL) 250 PSF, OR VEHICULAR LOADS, WHICHEVER ARE GREATER.			
	UTILITY FACILITIES TO BE SUPPORTED ARE SHOWN ON THE UTILITY PLANS.				
RAILINGS	OWN WEIGHT	(LL) ART. 3.14.1 AND 3.14.2			
CURBS AND SIDEWALKS		150 PSF	(LL) ART. 3.14.1 AND 3.14.2		
EXCAVATION - RETAINING STRUCTURE WALL SYSTEM (ELEMENTS IN CONTACT WITH EARTH, EXCEPT LAGGING)	OWN WEIGHT AND REACTIONS FROM DEAD LOADS OF DECK STRUCTURE AND BRACING SYSTEM	REACTIONS FROM ALL LIVE LOADS, EXCLUDING IMPACT ON DECK STRUCTURE (LL)	LATERAL EARTH PRESSURE DUE TO WEIGHT OF SOIL AND SURCHARGE (E)	DL + LL + E + H AT 120% OF UNIT STRESS	
			HYDROSTATIC PRESSURE (H)		
			AXIAL LOADS FROM END BULKHEAD WHERE APPLICABLE (E) AND (H)		
BRACING SYSTEM MAIN MEMBERS (MEMBERS CARRYING DIRECT LOADS INCLUDING STRUTS AND WALES)			SIMPLE BEAM REACTIONS FROM WALL SYSTEMS (E) AND (H)	DL + LL + E + H AT 100% OF UNIT STRESS	
			AXIAL LOADS FROM END WALLS WHERE APPLICABLE (E) AND (H)		
SECONDARY BRACING		AXIAL LOAD EQUAL TO 2% OF THE DESIGN AXIAL LOAD IN THE BRACED MAIN MEMBER		120% OF UNIT STRESS	

CRITERIA

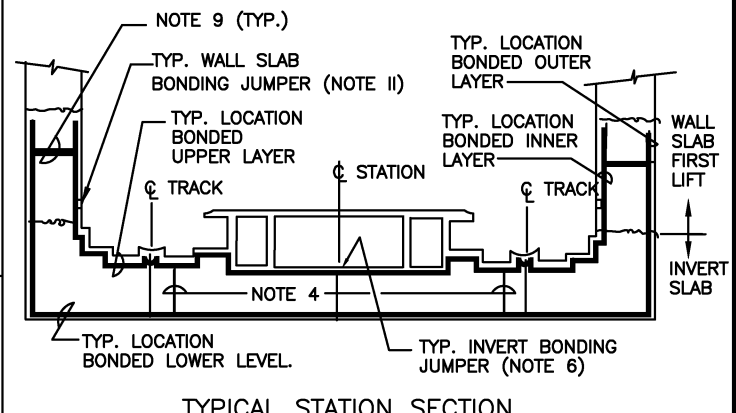
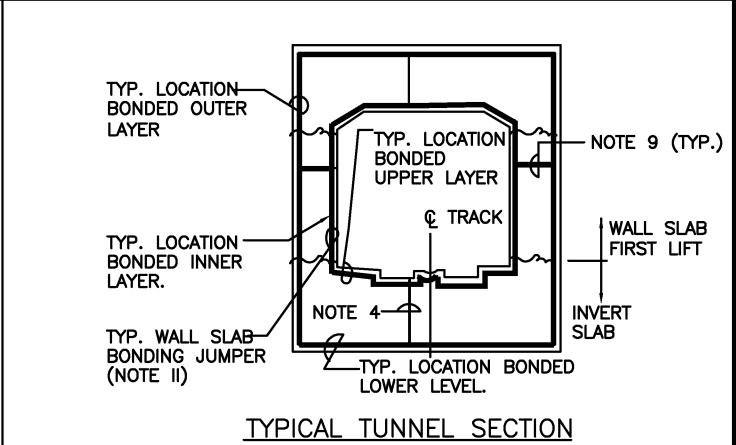
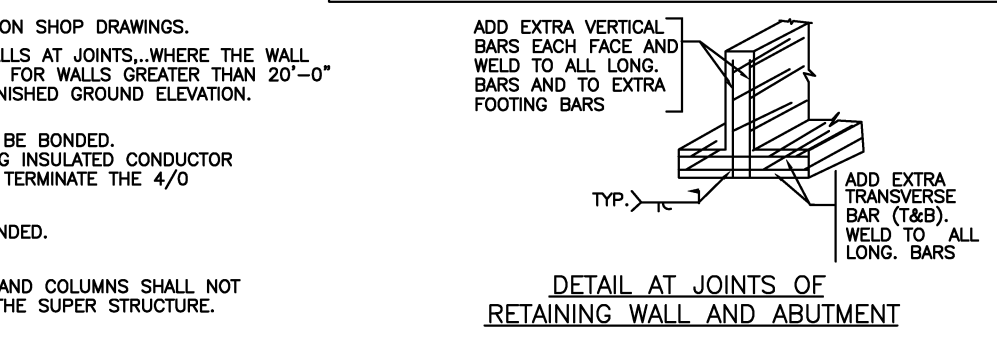
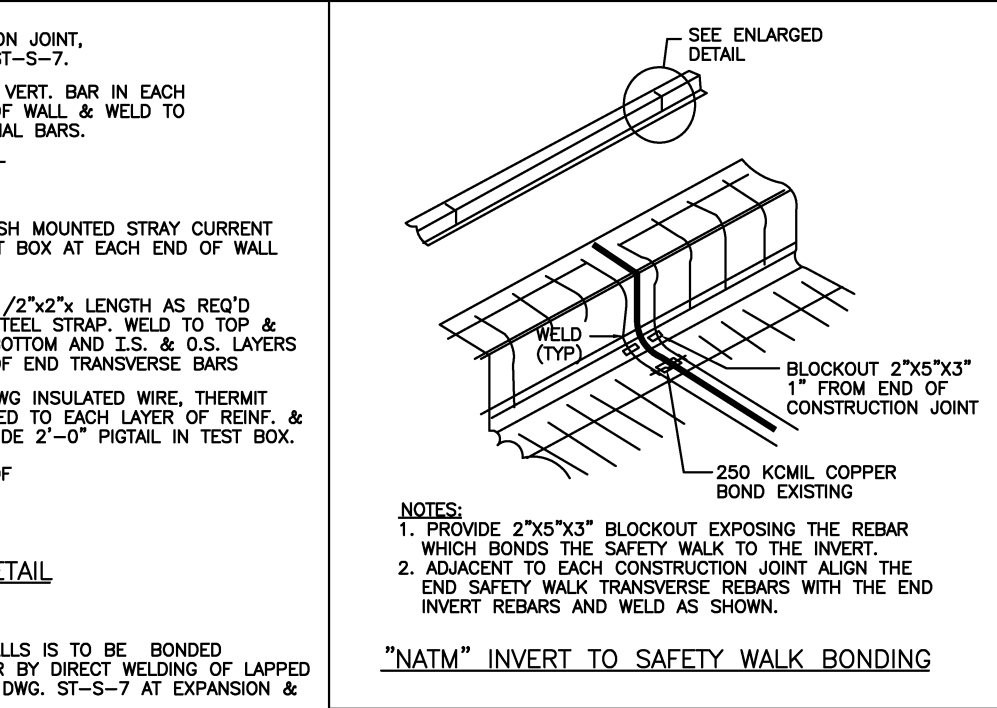
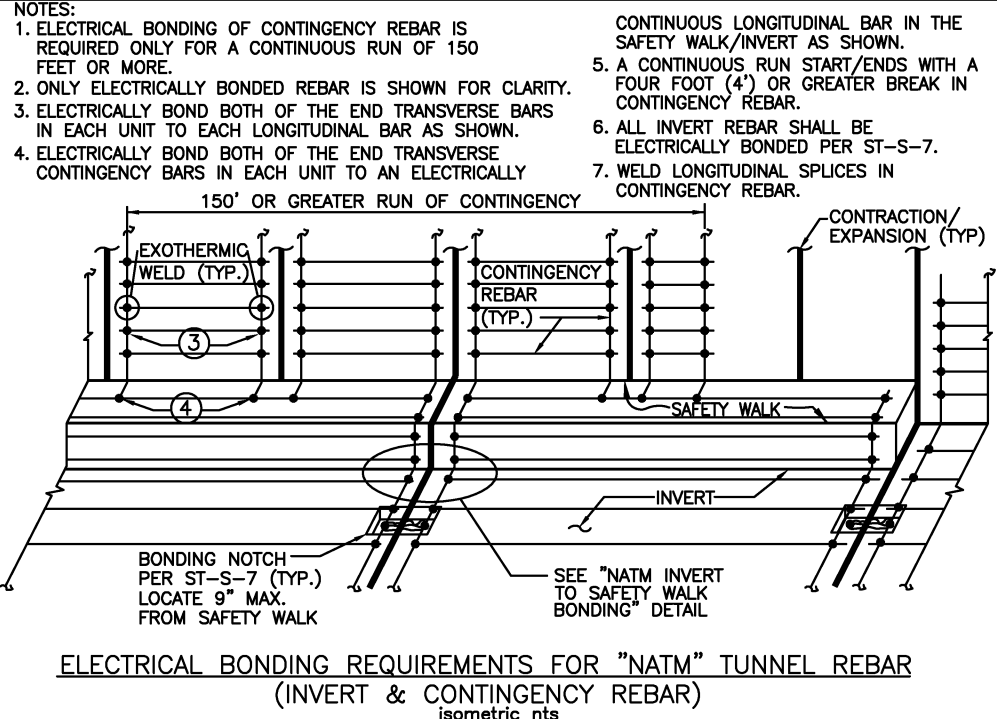
- TEMPORARY EARTH RETAINING AND DECK STRUCTURES SHALL BE DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS SHOWN ON THIS DRAWING, ON THE DRAWING TITLED 'LATERAL PRESSURES FOR THE DESIGN OF TEMPORARY EARTH RETAINING STRUCTURES', AND APPLICABLE SPECIFICATIONS.
- UNLESS MODIFIED BY THE CONTRACT DRAWINGS AND SPECIFICATIONS THE STRUCTURAL DESIGN SHALL BE GOVERNED BY THE CURRENT EDITIONS OF THE FOLLOWING MANUALS, CODES OR SPECIFICATIONS.
 - ROADWAY DECK: 'STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES OF THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS' EXCEPT DEFLECTION DUE TO LIVE LOAD PLUS IMPACT SHALL NOT EXCEED 1/600 OF THE SPAN
 - TEMPORARY RETAINING STRUCTURES AND OTHER TEMPORARY STRUCTURES:
 - STEEL: 'SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS' OF THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION
 - WELDING: 'STRUCTURAL WELDING CODE OF THE AMERICAN WELDING SOCIETY' D1.1.
 - REINFORCING CONCRETE: 'BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE' OF THE AMERICAN CONCRETE INSTITUTE
 - LUMBER: 'NATIONAL DESIGN SPECIFICATION FOR STRESS-GRADE LUMBER AND ITS FASTENERS' OF THE NATIONAL FOREST PRODUCTS ASSOCIATION
- THE CONTRACTOR SHALL SUBMIT FOR REVIEW BY THE ENGINEER COMPLETE COMPUTATIONS AND WORKING DRAWINGS FOR TEMPORARY STRUCTURES. THE DESIGN SHALL BE IN ACCORDANCE WITH THE GIVEN LOADS ON THIS SHEET AND GOOD ENGINEERING PRACTICE, AND WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- EARTH RETAINING STRUCTURES SHALL BE ANALYZED FOR THE VARIOUS CONDITIONS THAT MAY OCCUR DURING THE LIFE OF THE STRUCTURE. SUCH AS THE SEVERAL STAGES OF EXCAVATION, CONSTRUCTION, INSTALLATION, REMOVAL AND RELOCATION OF STRUTS. THE WORKING DRAWINGS SHALL SHOW CONSTRUCTION SEQUENCE AND DETAILS OF POSTING, DIAGONAL LACING, WEB STIFFENERS, ETC.
- WHERE THE LOADING CONDITIONS ON OPPOSITE SIDES OF AN EXCAVATION ARE NOT EQUAL, THE STABILITY OF THE TEMPORARY RETAINING STRUCTURE SHALL BE ANALYZED TO TAKE THIS CONDITION INTO ACCOUNT.
- SOLDIER BEAMS MAY BE CONSIDERED FULLY BRACED IN THE PLANE OF THE WALL.
- THE LOADS IN WALES AND STRUTS FOR FLEXIBLE OR RIGID WALL SYSTEMS SHALL BE COMPUTED BY ASSUMING THE WALL TO BE HINGED AT A SUPPORT POINT BELOW THE BOTTOM OF THE EXCAVATION AND AT EACH STRUT EXCEPT THE TOP ONE.
- STRUTS SHALL BE PRESTRESSED TO 50% OF THEIR MAXIMUM DESIGN LOAD.
- ALL COMPRESSION MEMBER CONNECTIONS:
 - SHALL BE DESIGNED FOR THE MAXIMUM COMPRESSIVE LOAD (CLD), COMBINED WITH GREATER OF THE ACTUAL SHEAR OR SHEAR EQUAL TO 10% CLD.
 - THE CONNECTIONS SHOULD BE DESIGNED FOR THE GREATER OF ACTUAL TENSION OR TENSION EQUAL TO 10% CLD AND COMBINED WITH THE GREATER OF ACTUAL SHEAR OR SHEAR EQUAL TO 10% CLD.
- WHERE THE BOTTOM OF THE TRACK-DRAIN TRENCH IS BELOW A 1-VERTICAL, TO 2-HORIZONTAL INFLUENCE LINE FROM THE BOTTOM OF THE INVERT AT THE SIDE OF EXCAVATION. ADEQUATE BRACING TO RESIST LATERAL PRESSURES SHALL BE INSTALLED IN THE TRACK-DRAIN TRENCH.
- THE CONTRACTOR MAY SUBMIT ALTERNATIVE TEMPORARY EARTH-SUPPORT STRUCTURES FOR REVIEW BY THE ENGINEER.

* REFERENCES ARE TO ARTICLES IN 'THE STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES', SIXTEENTH EDITION OF THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS 1996.

DESIGNED <u>A. BUMANIS</u> 9-88 DATE	REFERENCE DRAWINGS		REVISIONS		WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF ENGINEERING AND ARCHITECTURE	STRUCTURAL STANDARD DRAWING CRITERIA FOR THE DESIGN OF TEMPORARY STRUCTURES		
DRAWN <u>R.L.</u> 12-88 DATE	NUMBER	DESCRIPTION	DATE	BY		DESCRIPTION	SCALE	DRAWING NO.
CHECKED <u>A.B.</u> 1-89 DATE			08/2001	ENGA		Revised and issued by the Authority	NONE	ST-S-009
APPROVED <u>KNIGHT</u> 1-89 DATE								
			SUBMITTED		DATE	APPROVED DIRECTOR	May 3, 2001 DATE	



- NOTES:
- REINFORCING IN RETAINING WALLS, FOOTINGS, ABUTMENTS & OTHER WALLS IS TO BE BONDED AS SHOWN ON THIS DWG. BOND ALL CONTIGUOUS COMPONENTS EITHER BY DIRECT WELDING OF LAPPED REINF. STEEL AT CONSTRUCTION JOINTS OR AS PER SECTION A-A ON DWG. ST-S-7 AT EXPANSION & CONTRACTION JOINTS.
 - SHOW ALL WELDING & REINF. STEEL REQ'D FOR ELECTRICAL BONDING ON SHOP DRAWINGS.
 - INSTALL BONDING NOTCHES ON THE TRACK SIDE OF THE RETAINING WALLS AT JOINTS, WHERE THE WALL IS 20'-0" OR LESS USE ONE BOND AT FINISHED GROUND ELEVATION. FOR WALLS GREATER THAN 20'-0" INSTALL A SECOND BOND HALFWAY BETWEEN THE FOOTING AND THE FINISHED GROUND ELEVATION.
 - PILES:
 - REINFORCEMENT FROM PRECAST CONCRETE PILES NEED NOT BE BONDED.
 - SOLDIER PILES SHALL BE BONDED TOGETHER USING 4/0 AWG INSULATED CONDUCTOR EXOTHERMICALLY WELDED TO PILES. AT EACH END OF PILES TERMINATE THE 4/0 CONDUCTOR IN A BOX INSIDE THE LINE STRUCTURE.
 - EPOXY COATED REBAR & WIRE MESH SHALL NOT BE ELECTRICALLY BONDED.
 - FOR ADDITIONAL BONDING NOTES SEE DWG. ST-S-7.
 - BRIDGE PIERS AND PIER PILES, AND REINFORCEMENT IN THE FOOTING AND COLUMNS SHALL NOT BE MADE ELECTRICALLY CONTINUOUS AND SHALL NOT BE BONDED TO THE SUPER STRUCTURE.



- NOTES :
- GENERAL
- ALL WELDING FOR ELECTRICAL BONDING OF REINFORCING STEEL SHALL CONFORM TO ANSI/AWS D1.1-92 AND ANSI/AASHTO/AWS D1-S-88 WITH 1992, 1995 AND LATER REVISIONS, USING E70XX ELECTRODES.
 - FIELD ADJUSTMENTS TO BE AS REQUIRED TO AVOID INTERFERENCE.
- INVERT SLAB
- ALL LONGITUDINAL BARS IN UPPER AND LOWER LAYERS SHALL BE MADE ELECTRICALLY CONTINUOUS BY WELDING AT LAPS.
 - UPPER AND LOWER LAYERS SHALL BE BONDED TOGETHER BOTH SIDES OF EACH CONTRACTION JOINT.
 - TRANSVERSE BARS IN UPPER AND LOWER LAYERS BOTH SIDES OF EACH CONTRACTION JOINT SHALL BE MADE ELECTRICALLY CONTINUOUS BY WELDING LAPS. ALL LONGITUDINAL BARS SHALL BE WELDED TO THESE TRANSVERSE BARS.
 - PROVIDE BONDING JUMPER ACROSS EACH CONTRACTION AND EXPANSION JOINTS.
- WALL SLAB
- LONGITUDINAL BARS IN INNER AND OUTER LAYERS SHALL BE MADE ELECTRICALLY CONTINUOUS BY WELDING AT LAPS.
 - AT CONTRACTION OR EXPANSION JOINTS ALL LONGITUDINAL BARS SHALL BE WELDED TO THE END TRANSVERSE BAR. THE END TRANSVERSE BARS OF EACH MAT SHALL BE WELDED AT THE LAPS TO MAKE A CONTINUOUS ELECTRICAL LOOP. THE END TRANSVERSE BARS SHALL BE CONNECTED TO EACH OTHER BY JUMPER BARS WELDED TO EACH LAYER.
 - INNER AND OUTER LAYERS SHALL BE BONDED TOGETHER BOTH SIDES OF EACH CONTRACTION JOINT.
 - VERTICAL BARS IN INNER AND OUTER LAYERS BOTH SIDES OF CONTRACTION JOINT SHALL BE MADE ELECTRICALLY CONTINUOUS BY WELDINGS AT LAPS
 - PROVIDE BONDING JUMPER ACROSS EACH CONTRACTION JOINT AT A HEIGHT 1 FOOT ABOVE FINISH FLOOR OR FINISH GRADE.
- ELECTRICALLY BONDED CONTINUOUS DOUBLE CAGE EXAMPLES & GUIDES

DESIGNED		DATE		NUMBER		DESCRIPTION		DATE		BY		REVISIONS	
G. G. BRADY	8-98	08/2001	ENG A	ST-S-007	ELECTRICAL BONDING OF REINFORCING	08/2001	ENG A	Revised and issued by the Authority					
DRAWN	D. PRIME	8-98			STEEL SECTIONS & DETAILS								
CHECKED	J. BUMANIS	8-98			SHEET 1 OF 2								
APPROVED	R. FENG	8-98			TYPICAL ELECTRICAL BONDING FOR STRUCTURES								
					ELECTRICAL BONDING DETAILS								
					TYPICAL POST TENSIONED GIRDERS								

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED _____ DATE _____

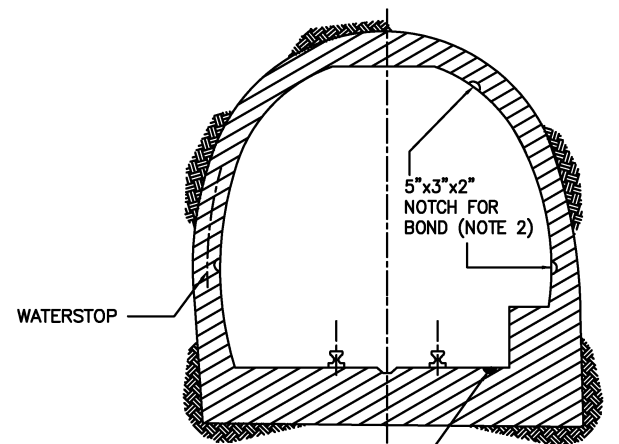
APPROVED _____ DIRECTOR _____

May 3, 2001

STRUCTURAL STANDARD DRAWING
ELECTRICAL BONDING OF REINFORCING STEEL
SECTIONS & DETAILS, SHEET 2 OF 2

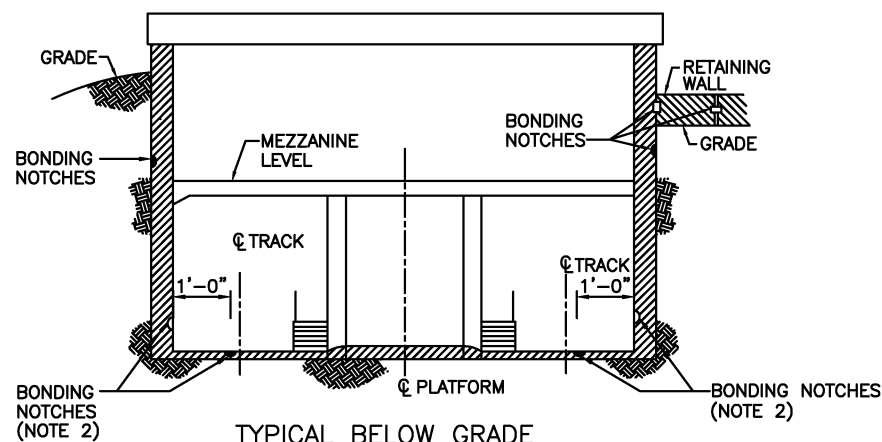
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DRAWING NO. ST-S-021

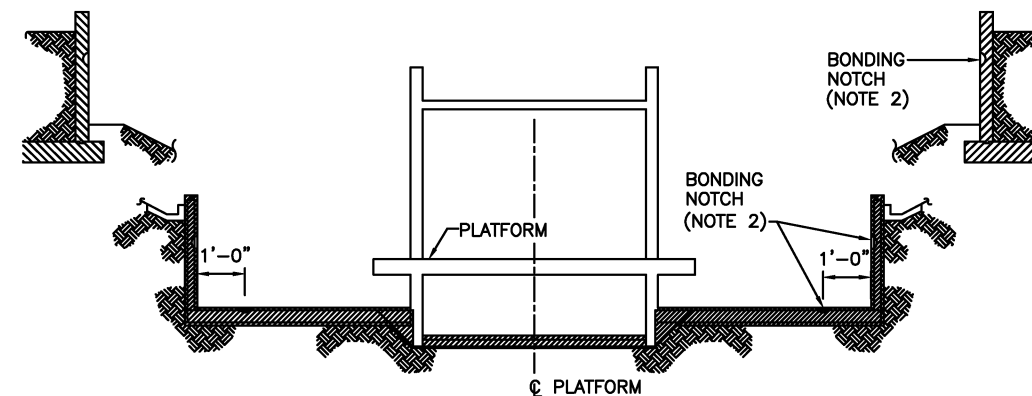


FILL BONDING NOTCH AFTER TESTING WITH ASPHALT

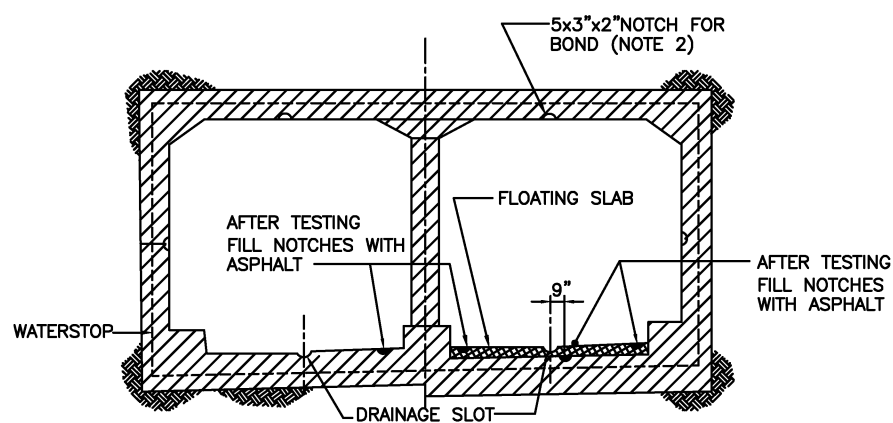
TYPICAL HORSESHOE TUNNEL LINING



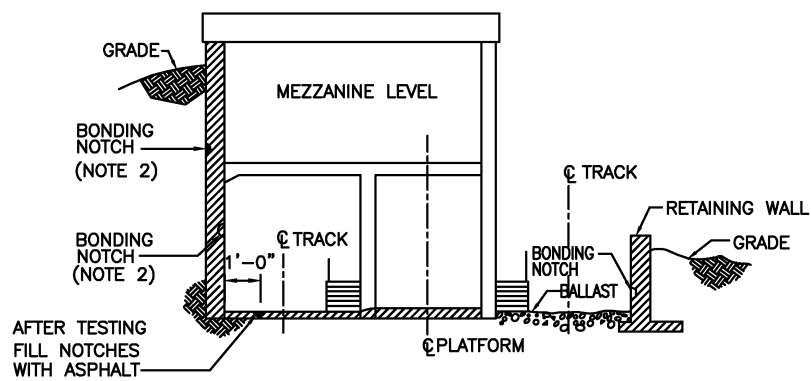
TYPICAL BELOW GRADE (NOT BURIED)



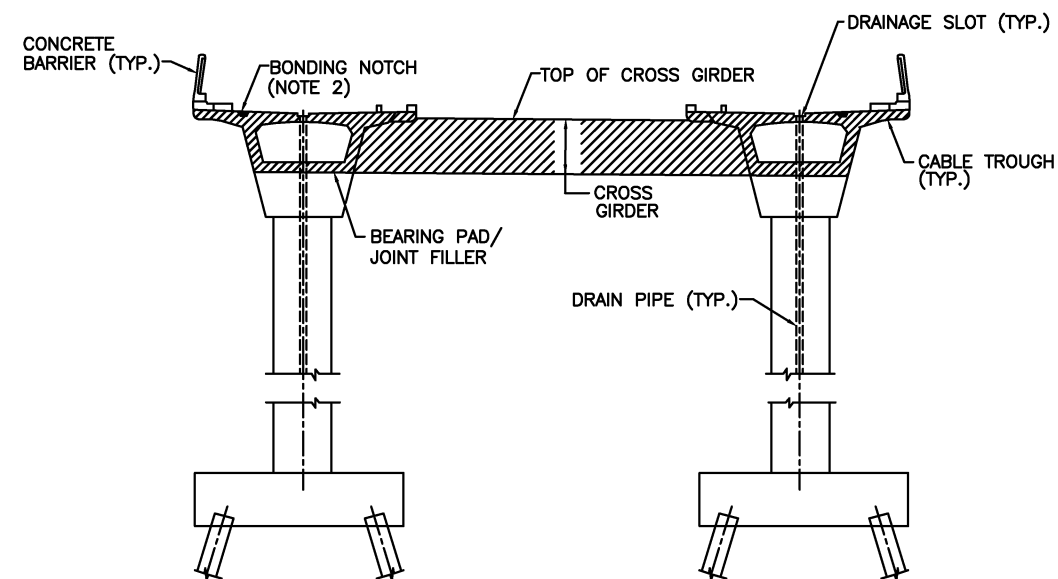
RETAINED AT-GRADE (TYP.)



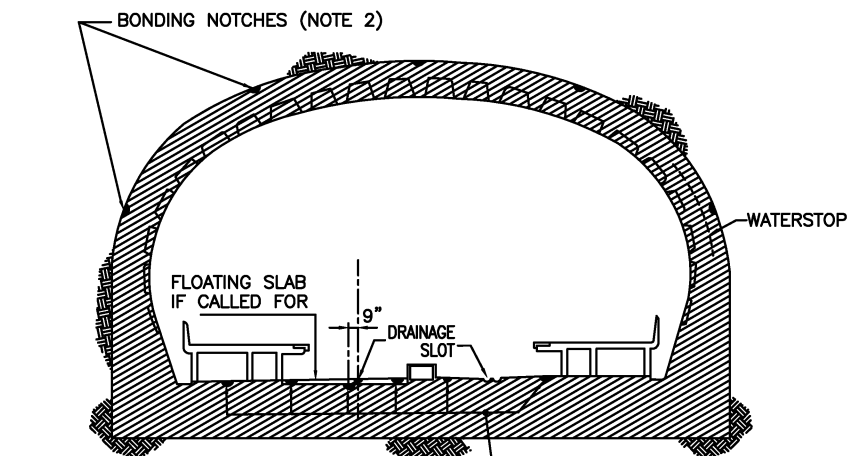
DETAIL WITHOUT FLOATING SLAB
DETAIL WITH FLOATING SLAB
TYPICAL CUT & COVER BOX



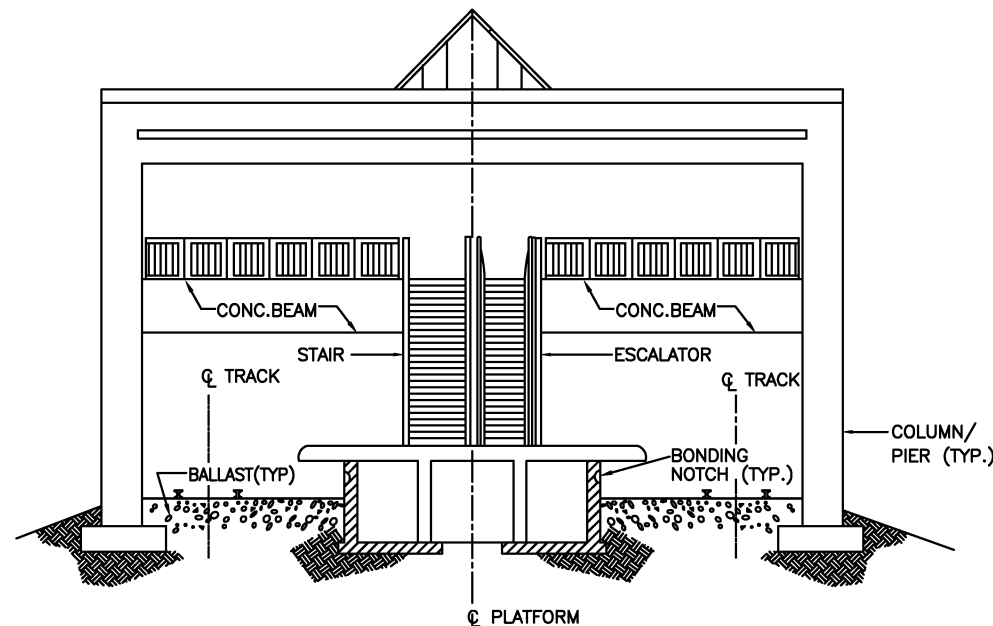
TYPICAL PARTIAL RETAINED



AERIAL STRUCTURE



DETAIL WITH FLOATING SLAB
DETAIL WITHOUT FLOATING SLAB
TYPICAL CUT & COVER STATION



TYPICAL AT-GRADE

NOTES:

- UNLESS OTHERWISE INDICATED ON THE CONTRACT DRAWINGS, ALL STRUCTURES IN CONTACT WITH THE EARTH, AND AERIAL STRUCTURES AS SHOWN ON THIS DRAWING, WILL HAVE THE PERIMETER ELEMENTS SHOWN CROSS-HATCHED, BONDED BY METHODS SIMILAR TO THOSE INDICATED ON STANDARD DRAWING ST-S-7, ST-S-21 AND ST-S-23.
- ONLY BONDING NOTCHES IN INVERT AND THOSE EXPOSED TO BACKFILLING ARE TO BE FILLED WITH ASPHALT AFTER TESTING.

LEGEND:

ELECTRICALLY BONDED STRUCTURES

DESIGNED		REFERENCE DRAWINGS		REVISIONS		
NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION		
G.G. BRADY	8-98	ST-S-007	ELECTRICAL BONDING OF REINFORCING	08/2001	ENGA	Revised and issued by the Authority
C. BUITRAGO	8-98	ST-S-021	ELECTRICAL BONDING OF REINFORCING			
J. BUMANIS	8-98	ST-S-023	ELECTRICAL BONDING DETAILS			
R. FENG	8-98		TYPICAL POST TENSIONED GIRDERS			

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

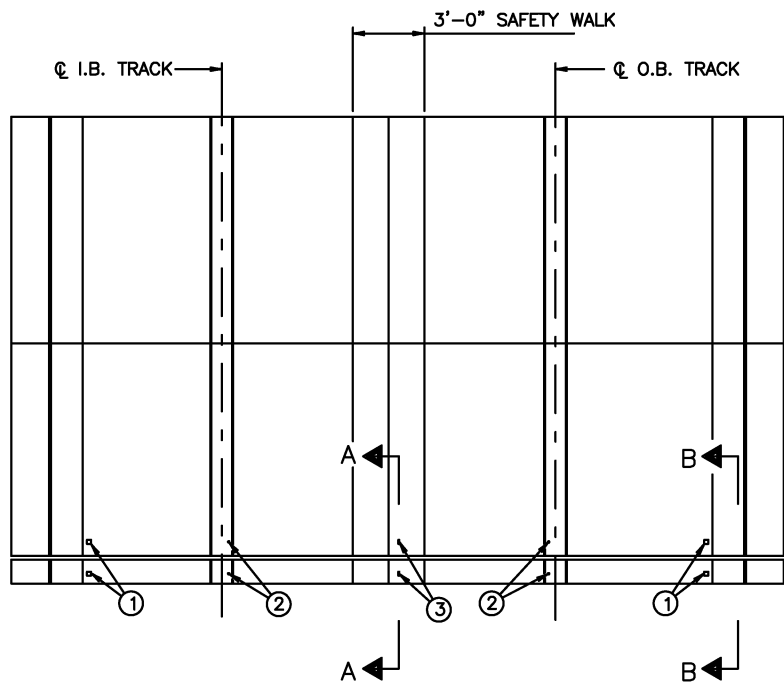
SUBMITTED _____ DATE _____

APPROVED DIRECTOR May 3, 2001

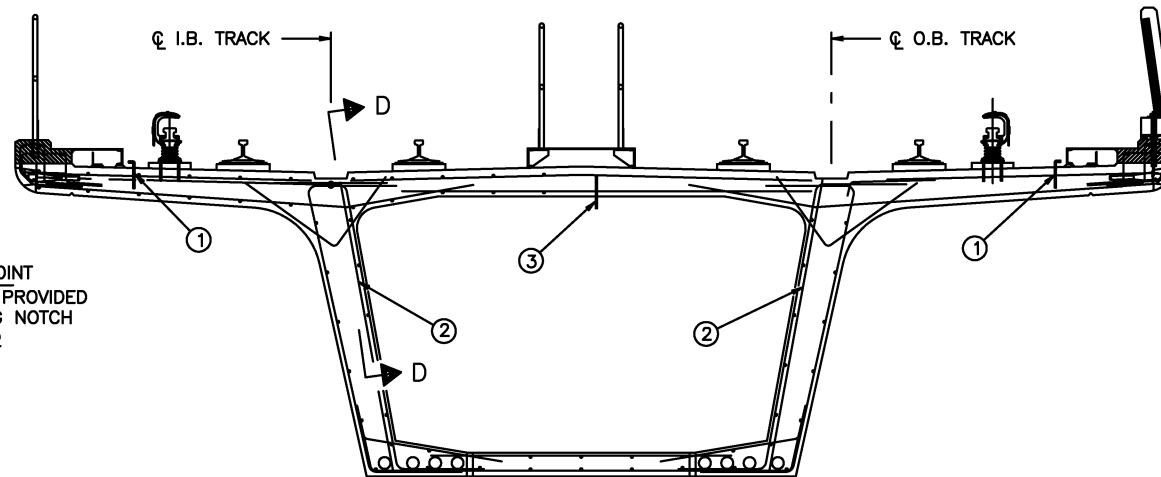
STRUCTURAL STANDARD DRAWING
TYPICAL ELECTRICAL BONDING
FOR STRUCTURES

SCALE
NOT TO SCALE

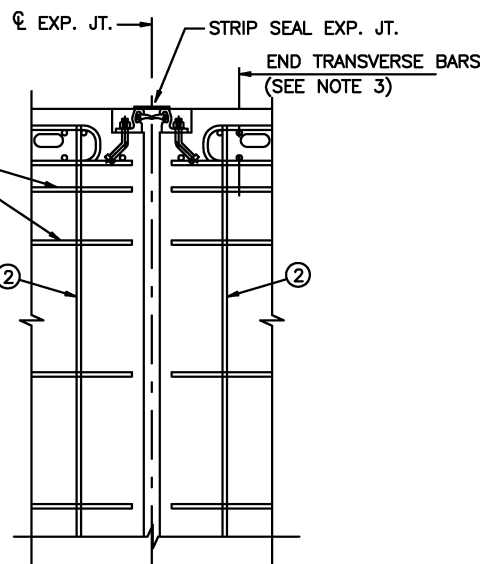
DRAWING NO.
ST-S-022



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

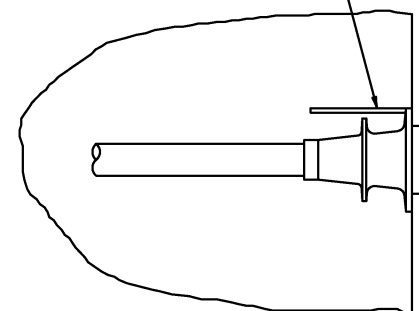


CROSS SECTION
SCALE: 3/8" = 1'-0"

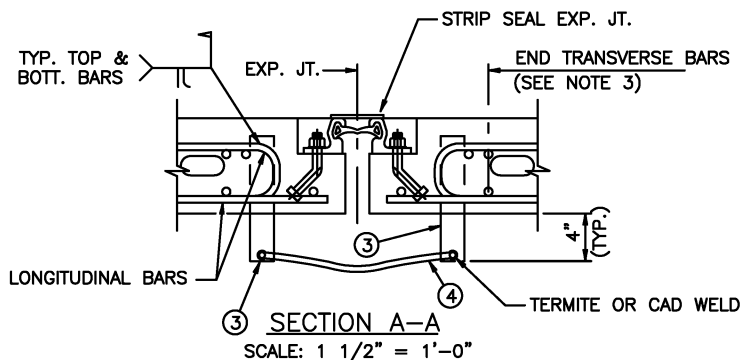


SECTION D-D
SCALE: 1/2" = 1'-0"

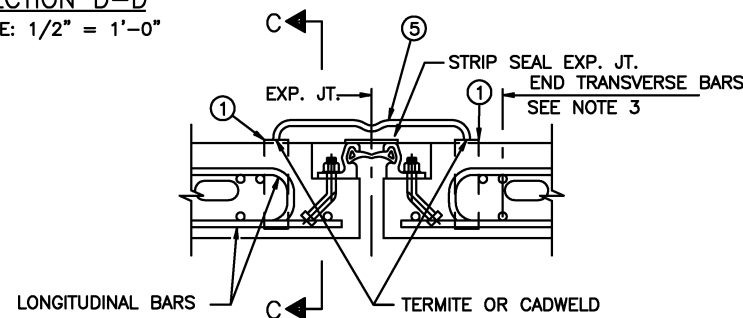
#4 (GRADE 40) x 12" LONG REINF. BAR SHOP BUTT WELDED TO TENDON ANCHOR PLATES AND REBAR CAGE PRIOR TO CASTING. SEE NOTE 6 FOR OPTIONAL METHOD.



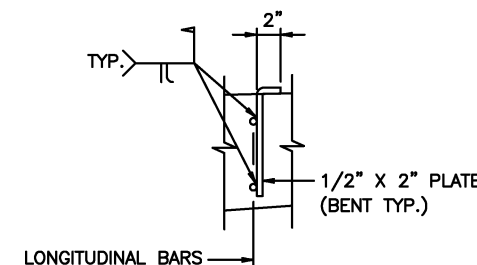
ANCHOR DETAIL
SCALE: 1" = 1'-0"



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



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



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

ELECTRICAL BONDING NOTES

- FOR GENERAL REQUIREMENTS, NOTES, SECTIONS AND DETAILS. SEE DWG. ST-S-7 FOR SUPPLEMENTAL DATA.
- ALL LONGITUDINAL REINFORCING STEEL SHALL BE BONDED TO FORM A CONTINUOUS ELECTRICAL BONDING SYSTEM IN ACCORDANCE WITH NOTES 3 AND 4. CONTINUITY BETWEEN INDIVIDUAL SEGMENTS IS PROVIDED BY AN ELECTRICAL BONDING NOTCH LOCATED ON THE INSIDE WEB AS DETAILED ON DWG. NO. ST-S-7.
- BONDING IS TO BE ACCOMPLISHED BY WELDING EACH UNIT'S END TRANSVERSE BARS TO ALL LONGITUDINAL BARS AND ALL END TRANSVERSE BARS WELDED TOGETHER TO FORM A COMPLETE CONTINUOUS CAGE.
- BONDING ACROSS THE JOINTS BY INSULATED COPPER CABLE WELDED TO STEEL STRAPS OR BENT PLATES BY CADWELD OR THERMITE WELD CONNECTION. THE BONDING CABLE SHALL BE ACCESSIBLE FOR FUTURE TESTING AND MONITORING.
- ELECTRICAL BONDING IS NOT REQUIRED FOR THE FOLLOWING:
 - C.I.P. CONCRETE PILES.
 - EPOXY COATED REBAR.
 - ACOUSTICAL BARRIERS.
- OPTIONAL METHOD: ELECTRICALLY BOND THE DUCT (TRUMPET) TO AN ELECTRICALLY BONDED LONGITUDINAL REBAR OR END TRANSVERSE BAR IN THE STRUCTURE WITH A #4 REBAR OR A #2 AWG WIRE/CABLE TO THE ADDITIONAL #4 REBAR EXTENDED FROM THE INVERT.

LEGEND

- BENT PLATE 1/2" x 2" FOR ELECTRICAL BOND CONNECTION. SEE SECTION B-B TYPICAL AT ABUTMENTS AND AT EXPANSION JOINTS IN DECK SLAB. WELDED TO TOP SIDE OF TWO LONGITUDINAL BARS.
- ADDITIONAL #4 REINFORCING BARS ACROSS END TRANSVERSE BARS AT LOCATIONS SHOWN AND WELDED TO EVERY BAR. TYPICAL IN END DIAPHRAGMS AT EACH DECK JOINT.
- STEEL STRAP 1/2" x 2" WELDED TO TOP SIDE OF TWO LONGITUDINAL BARS. SEE SECTION A-A TYPICAL AT ABUTMENTS AND AT EXPANSION JOINTS IN DECK SLAB.
- 250 "KCMIL" INSULATED COPPER CABLE FOR ELECTRICAL BOND (TYP. ALL BONDS UNLESS NOTED.) CABLE AS INSTALLED SHALL HAVE 5" ADDITIONAL (SLACK) LENGTH TO PROVIDE FOR JOINT MOVEMENTS.
- 250 "KCMIL" 2KV INSULATED COPPER CONDUCTOR FOR ELECTRICAL BOND. CABLE AS INSTALLED SHALL HAVE 5" ADDITIONAL (SLACK) LENGTH TO PROVIDE FOR JOINT MOVEMENTS.

DESIGNED		DATE		NUMBER		DESCRIPTION		DATE		BY		DESCRIPTION	
G. G. BRADY	8-98	8-98	ST-S-007	ELECTRICAL BONDING OF REINFORCING STEEL SECTIONS & DETAILS SHEET 1 OF 2	08/2001	ENGA	Revised and issued by the Authority						
D. PRIME	8-98	8-98	ST-S-021	ELECTRICAL BONDING OF REINFORCING STEEL SECTIONS & DETAILS SHEET 2 OF 2									
J. BUMANIS	9-98	9-98	ST-S-022	TYPICAL ELECTRICAL BONDING FOR STRUCTURES									
R. FENG	9-98												

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED

DATE

APPROVED DIRECTOR

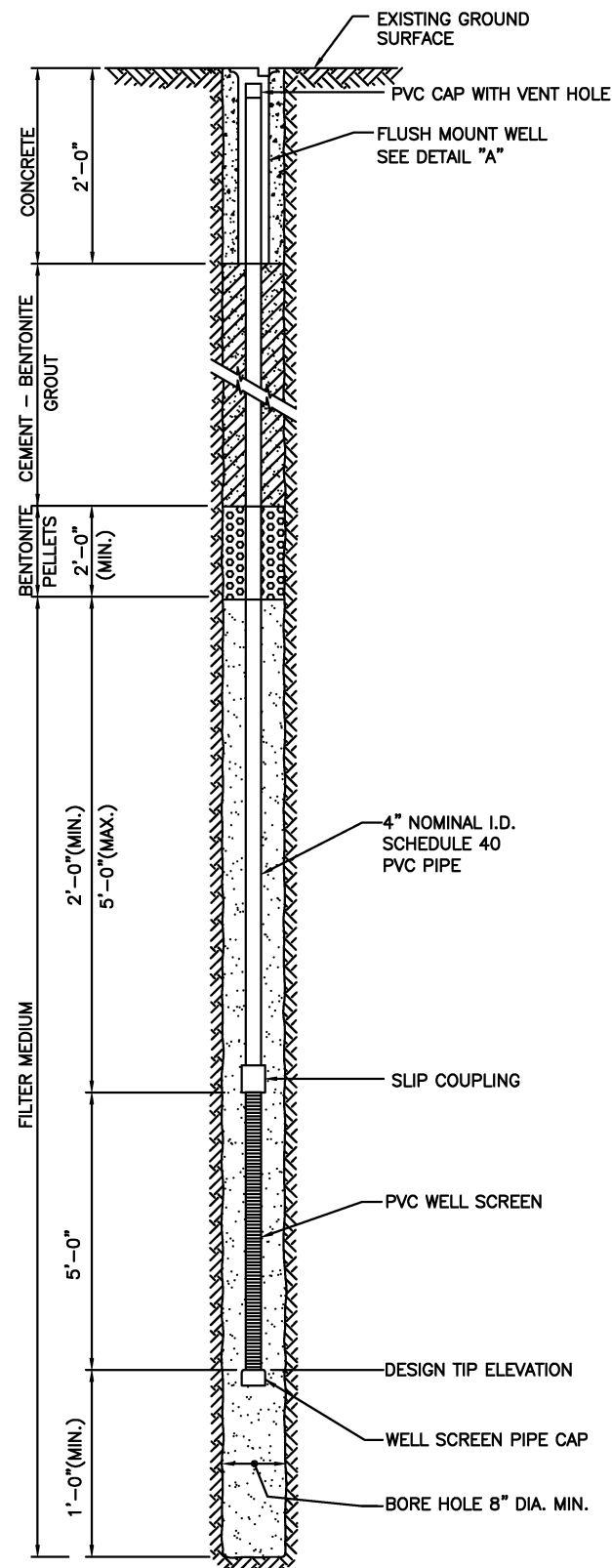
May 3, 2001
DATE

STRUCTURAL STANDARD DRAWING
ELECTRICAL BONDING DETAILS
TYPICAL POST TENSIONED GIRDERS

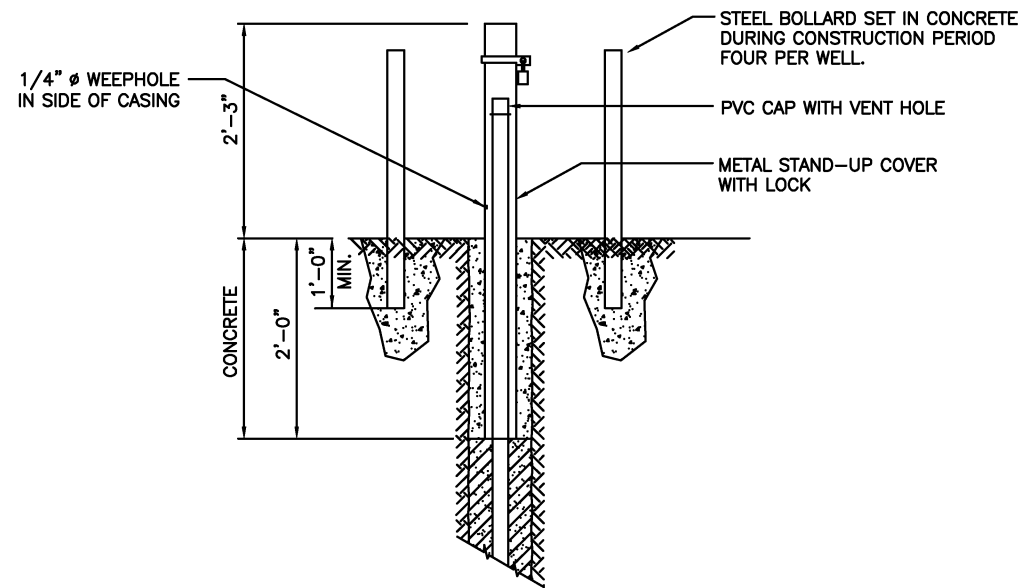
SCALE
AS NOTED

DRAWING NO.

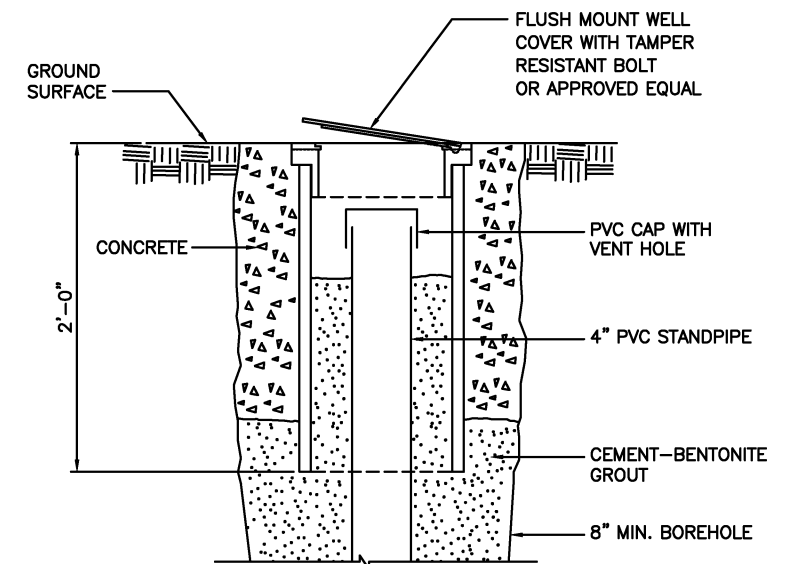
ST-S-023



PIEZOMETER



DETAIL OF STAND-UP COVER



DETAIL "A"
FLUSH MOUNT WELL

NOTES:

1. WELL SCREEN SHALL CONSIST OF 4" NOMINAL I.D. PVC SLOTTED PIPE.
2. FILTER MEDIUM SHALL CONSIST OF APPROVED SAND FILTER.
3. APPROVED FLUSH MOUNT WELL COVERS SHALL BE USED WHERE PIEZOMETER IS INSTALLED IN PAVEMENT OR MAINTAINED VEGETATION.
4. APPROVED STAND-UP COVER WITH LOCK SHALL BE USED WHERE PIEZOMETER IS INSTALLED IN UNMAINTAINED AREAS.
5. BENTONITE PELLET SEAL WILL BE ALLOWED TO SET FOR 24 HOURS BEFORE EMPLACEMENT OF GROUT.
6. PERMANENT MONITORING WELLS SHALL HAVE METRO "M" CAP.

DESIGNED	DAUGHERTY	6-88	REFERENCE DRAWINGS		REVISIONS		
			NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION
DRAWN					08/2001	ENGA	Revised and issued by the Authority
CHECKED							
APPROVED							

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

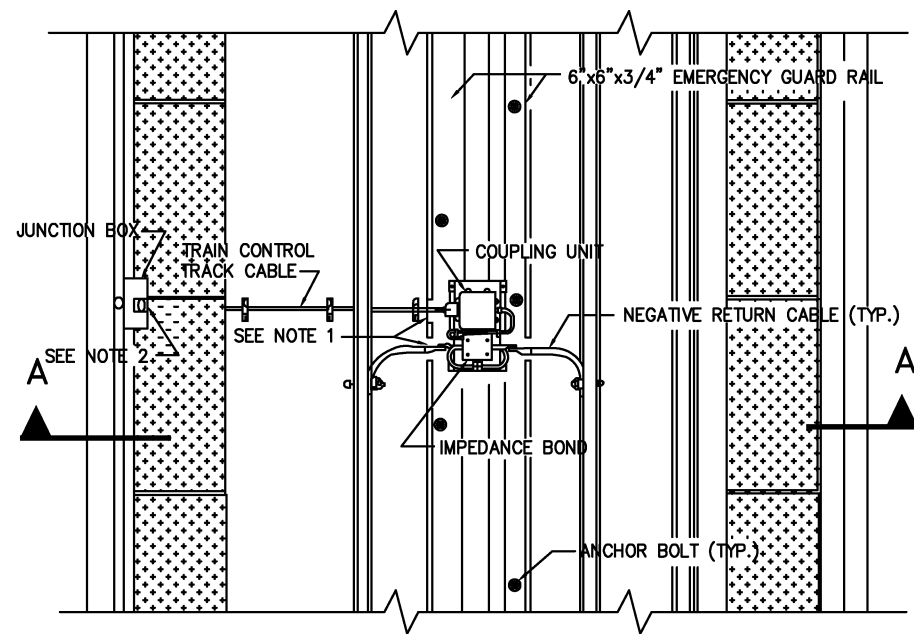
DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF ENGINEERING AND ARCHITECTURE

SUBMITTED _____ DATE _____ APPROVED _____ DIRECTOR _____ May 3, 2001 DATE _____

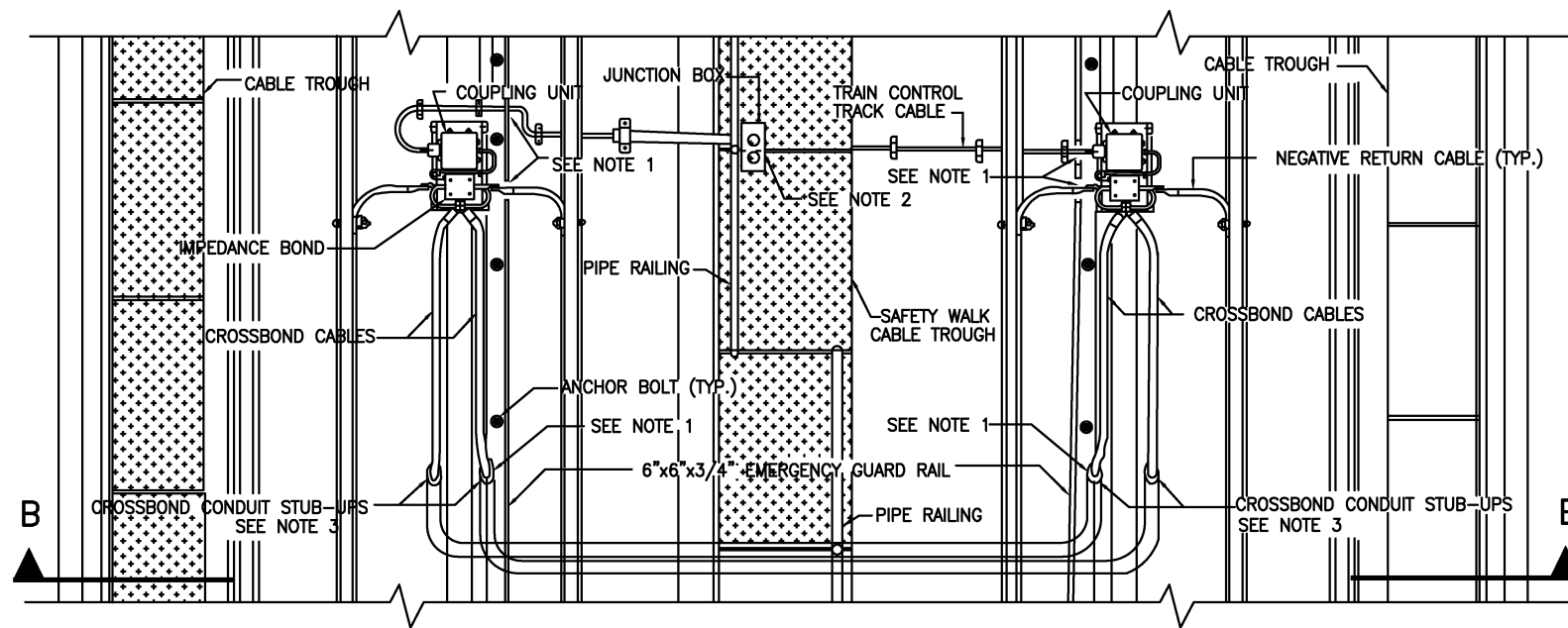
SOIL & GEOLOGICAL STANDARD DRAWING

PIEZOMETER DETAILS

SCALE NOT TO SCALE	DRAWING NO. ST-SO-001
-----------------------	--------------------------

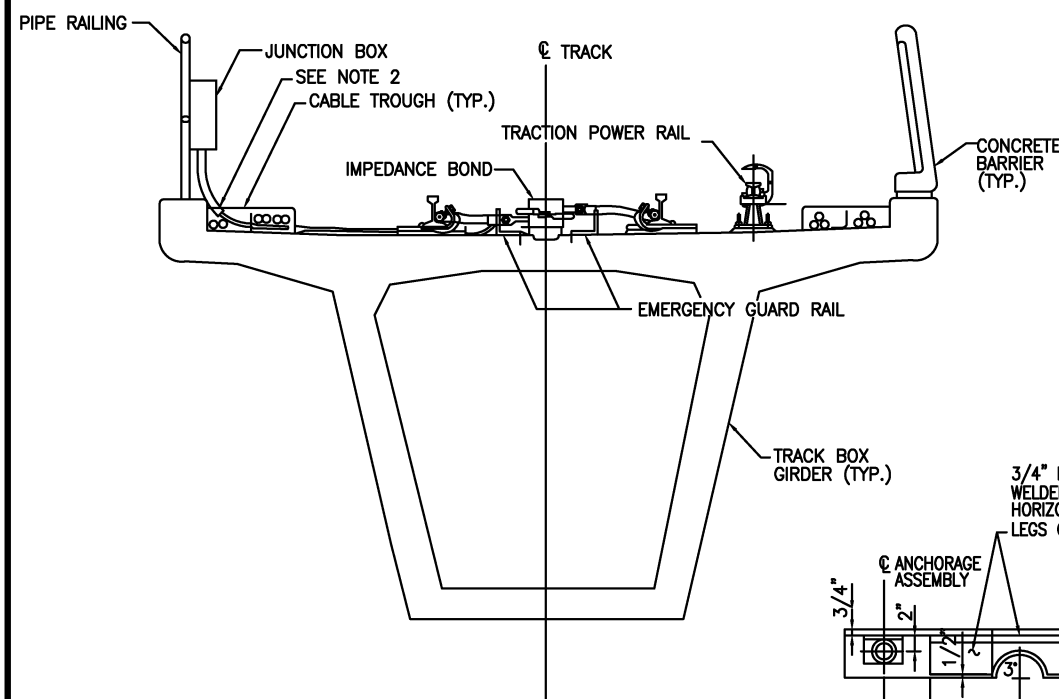


PLAN

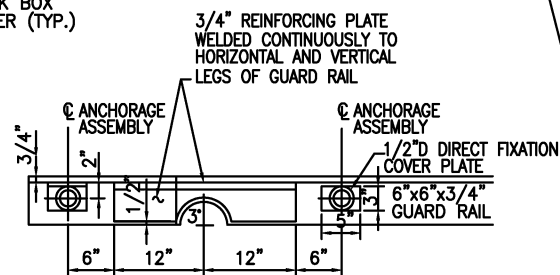


PLAN

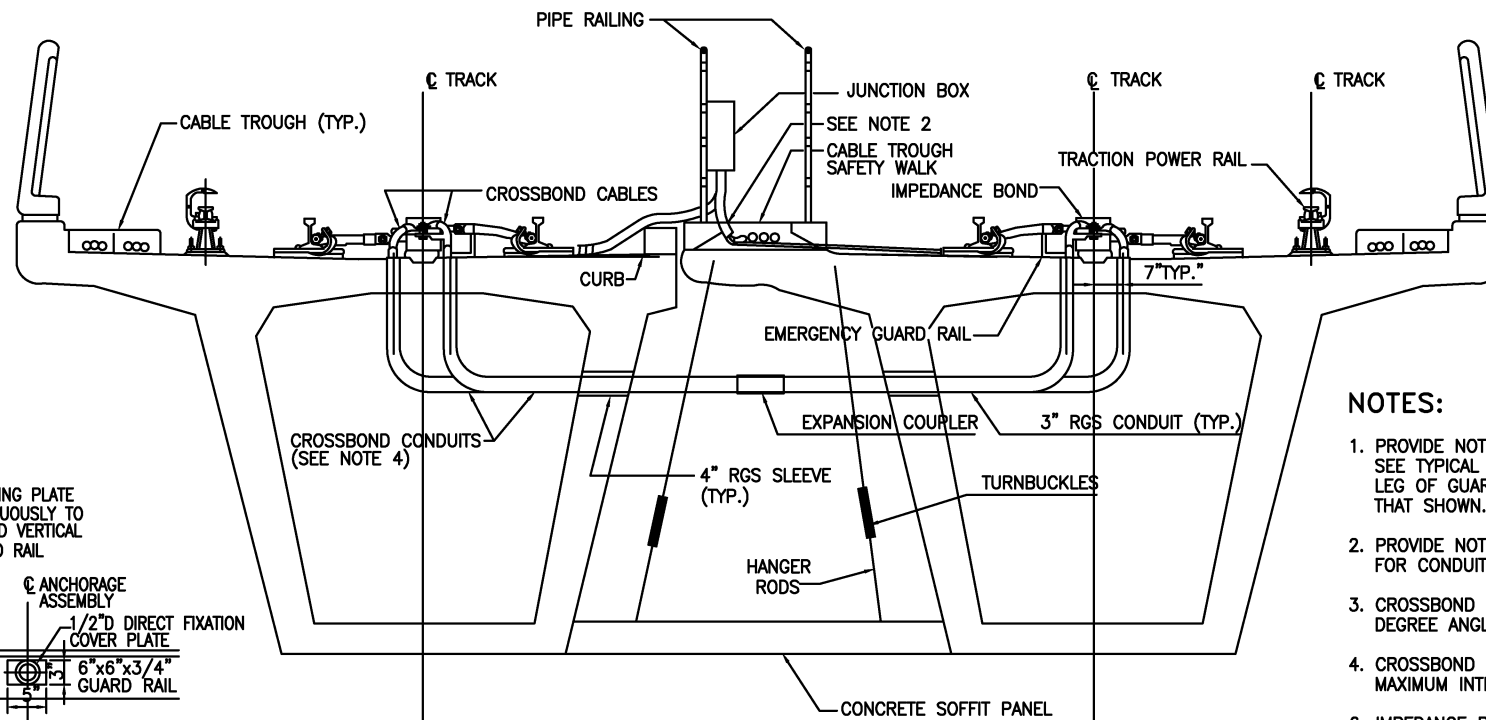
This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy



SECTION A-A
TYPICAL IMPEDANCE BOND INSTALLATION
SINGLE TRACK STRUCTURE



TYPICAL DETAIL
NOTCH IN GUARD RAIL
NOT TO SCALE



SECTION B-B
TYPICAL IMPEDANCE BOND INSTALLATION
DOUBLE TRACK STRUCTURE

NOTES:

1. PROVIDE NOTCH IN EMERGENCY GUARD RAIL. SEE TYPICAL DETAIL. NOTCHES IN VERTICAL LEG OF GUARD RAIL TO BE SIMILAR TO THAT SHOWN.
2. PROVIDE NOTCH IN CABLE TROUGH COVER FOR CONDUIT ENTRANCE.
3. CROSSBOND CONDUITS TO STUB UP AT 45 DEGREE ANGLE
4. CROSSBOND CONDUITS TO BE PROVIDED AT MAXIMUM INTERVALS OF 2000 FT.
6. IMPEDANCE BONDS COUPLING UNITS, CABLES AND ASSOCIATED HARDWARE TO BE INSTALLED BY THE TRAIN CONTROL CONTRACTOR.

DESIGNED	D. HARRIS	12-87
DRAWN	E. HAVY	12-87
CHECKED	A. JORDAN	12-87
APPROVED	C. BISHOP	12-87
UPDATED	R. GANERMAN	9-96

NUMBER	DESCRIPTION	DATE	BY

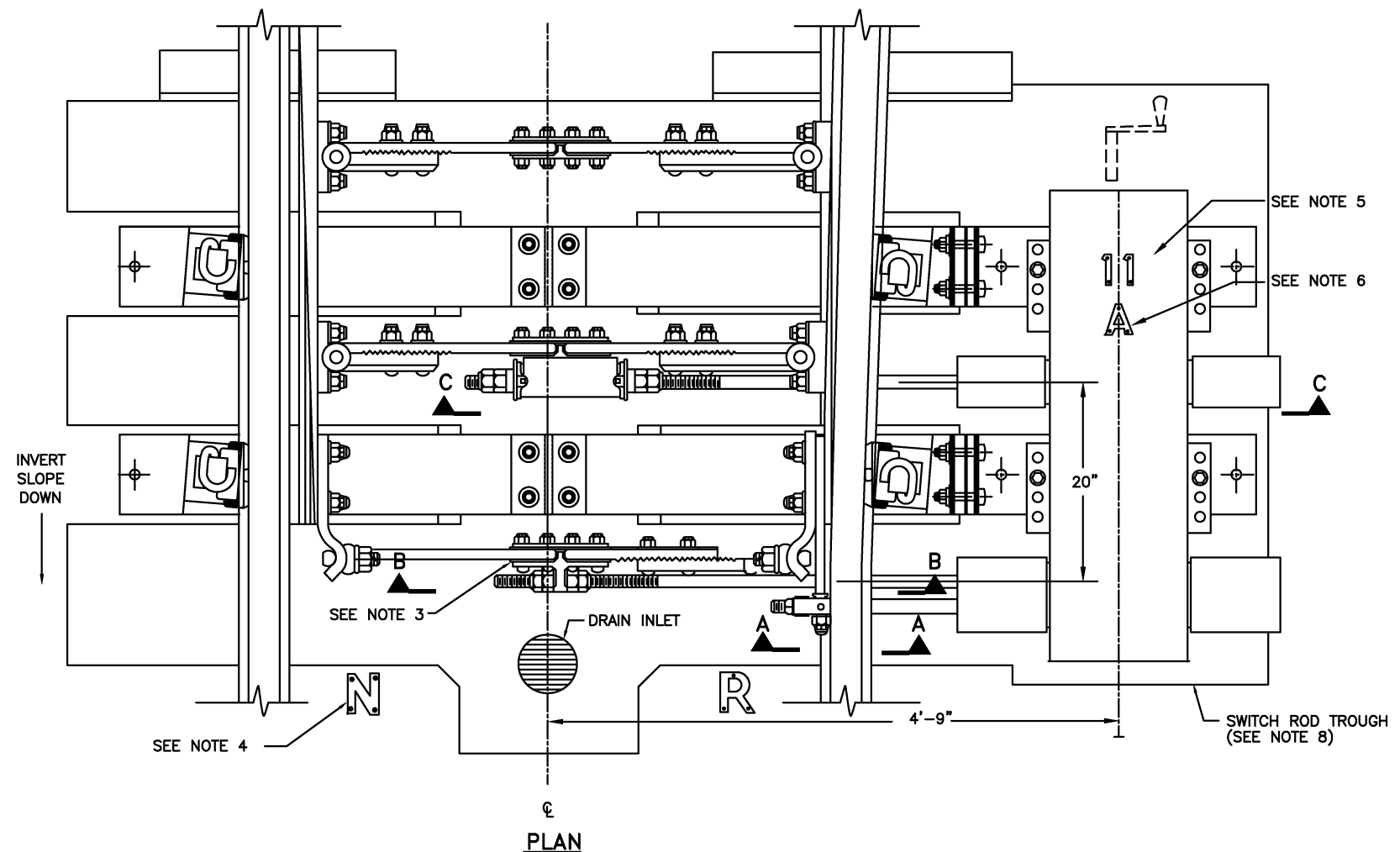
DATE	BY	SYSP	DESCRIPTION
08/2001			Revised and issued by the Authority

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
 DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
 OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____ APPROVED _____ DIRECTOR _____ May 3, 2001 DATE

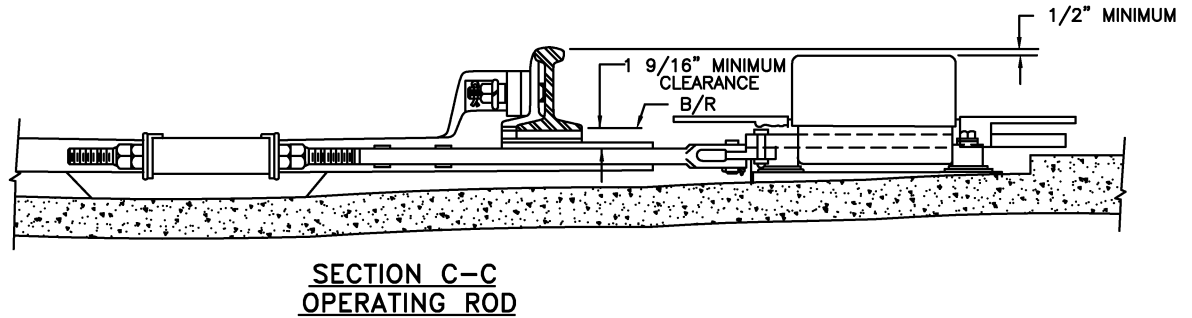
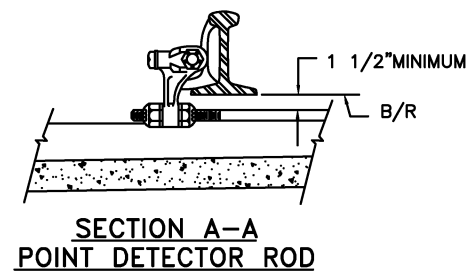
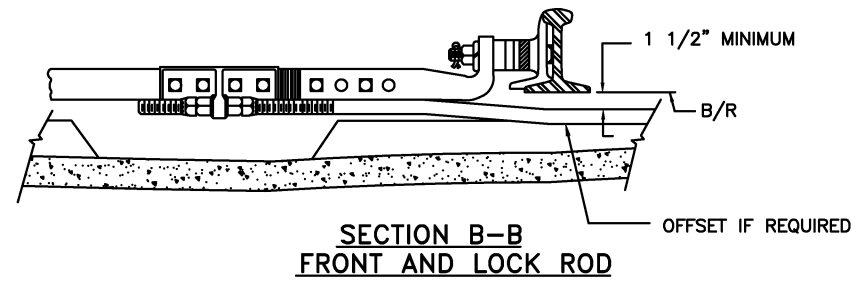
TRAIN CONTROL DESIGN DRAWING
 TYPICAL IMPEDANCE BOND INSTALLATION
 AERIAL STRUCTURES

SCALE 1/2"=1'-0" DRAWING NO. ST-TC-014



NOTES

1. PAINTING SHALL BE IN ACCORDANCE WITH INSTRUCTIONS FOR PAINTING AAR SIGNAL SECTION, MANUAL PART 110. THE FINISH COLOR SHALL BE BLACK.
2. SWITCH AND LOCK MOVEMENT SHALL MEET THE MINIMUM REQUIREMENTS ESTABLISHED BY AAR SIGNAL SECTION SPECIFICATION 101. MANUAL PART 104.
3. FRONT ROD SHALL BE INSULATED USING HARD FIBER INSULATION. FIBER SHALL MEET THE MINIMUM REQUIREMENTS OF AAR SIGNAL SECTION SPECIFICATION 13-52 MANUAL PART 58.
4. THE LETTERS "N" AND "R" SHALL BE MADE OF MALLEABLE CAST METAL, NOT LESS THAN FOUR (4) INCHES HIGH. PAINTED WHITE AND SHALL BE SECURELY FASTENED TO THE CONCRETE IN THE LOCATION SHOWN.
5. THE NUMBERS AND LETTERS INSTALLED ON THE SWITCH AND LOCK MOVEMENT SHALL CORRESPOND TO THE NUMBER OF THE LEVER CONTROLLING THE SWITCH OPERATION. THE NUMBER SHALL BE OF MALLEABLE CAST METAL, NOT LESS THAN THREE (3) INCHES HIGH, PAINTED WHITE, AND SHALL BE SECURELY FASTENED TO THE COVER OF THE SWITCH AND LOCK MOVEMENT.
6. WHERE TWO SWITCHES ARE PART OF A CROSSOVER AND ARE OPERATED BY ONE LEVER REPEATER RELAY, THE NUMBER OF THE SWITCH SHALL BE SUPPLEMENTED BY THE LETTER "A" OR "B" CENTERED DIRECTLY UNDER THE SWITCH NUMBER.
7. LAYOUT SHOWN TO REPRESENT PHYSICAL REQUIREMENTS OF INSTALLATION. NOT INTENDED TO SHOW SPECIFIC TYPE OF EQUIPMENT OR PARTS IN LAYOUT.
8. SEE DD-S-69 AND DD-S-70 FOR SWITCH ROD TROUGH DETAILS AND DIMENSIONS.



ABBREVIATION

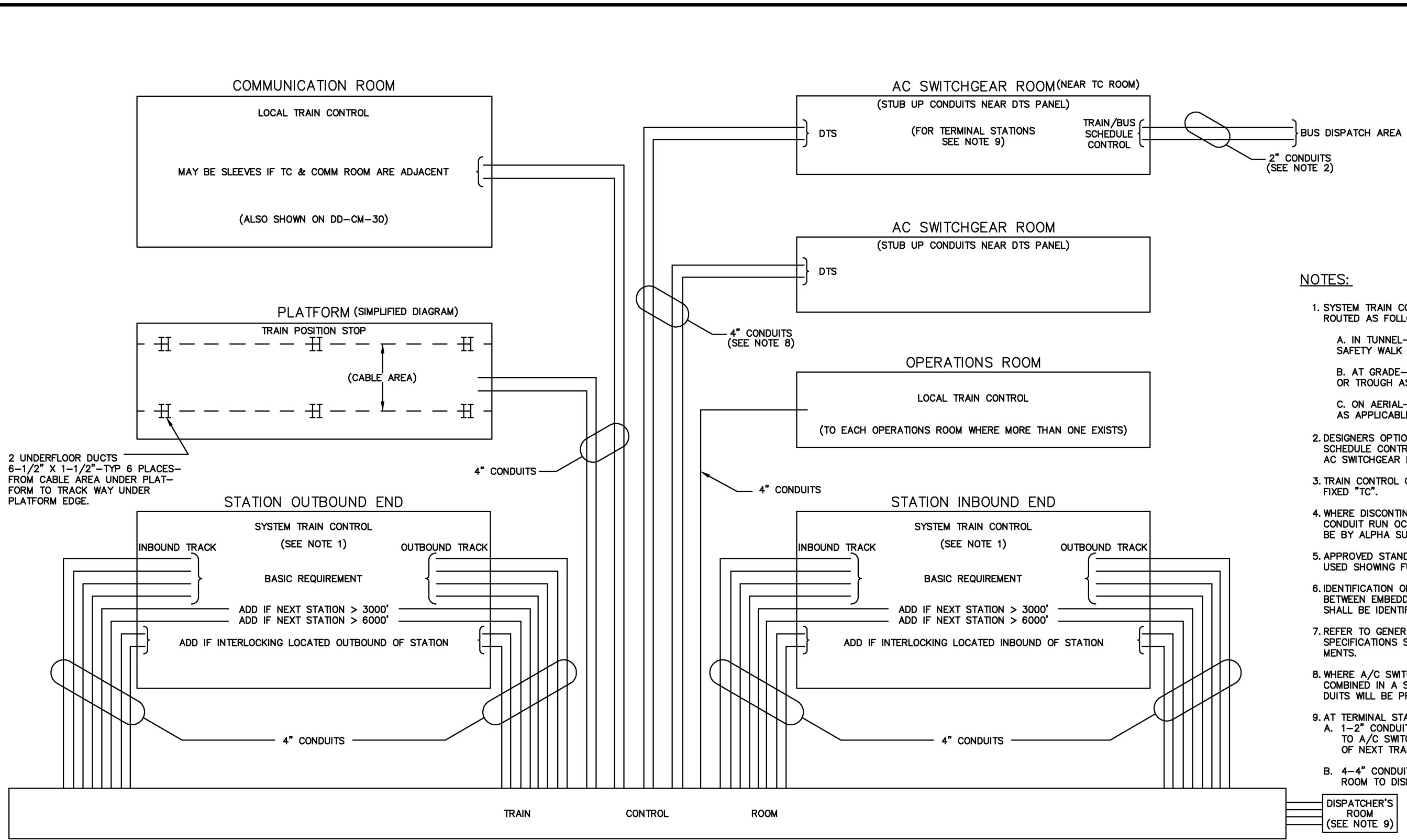
AAR- ASSOCIATION OF AMERICAN RAILROADS

B/R - BASE OF RAIL

☉ - CENTER LINE

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	MCLEAN	9-28-70	REFERENCE DRAWINGS		REVISIONS		WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY	TRAIN CONTROL DESIGN DRAWING	SWITCH AND LOCK MOVEMENT DIRECT FIXATION	FOR NUMBERS 8, 10, AND 15 TURNOUTS
DATE			NUMBER	DESCRIPTION	DATE	BY				
DRAWN	BRANDENBERG	9-70	DD-S-69,70	DETAILS FOR SWITCH MACHINE ROD RECESSES	08/2001	SYSP	Revised and issued by the Authority	DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT		
CHECKED	HIMMEL	10-70	DD-T-16	TYPE 1 SPECIAL TRACKWORK FLOATING SLABS [1]						
APPROVED	ONEIL	10-70						SUBMITTED		
UPDATED	GANERWAL	9-98						APPROVED		
DATE								DIRECTOR		
								May 3, 2001		
								SCALE		
								1 1/2"=1'-0"		
								DRAWING NO.		
								ST-TC-019		



NOTES:

1. SYSTEM TRAIN CONTROL CONDUITS ARE ROUTED AS FOLLOWS:
 - A. IN TUNNEL—STUB UP IN SINGLE ROW THRU SAFETY WALK ALONG WALL.
 - B. AT GRADE—TO DUCT BANK, GRADE BEAM OR TROUGH AS APPLICABLE.
 - C. ON AERIAL—TO GRADE BEAMS OR TROUGH AS APPLICABLE.
2. DESIGNERS OPTION TO ROUTE TRAIN/BUS SCHEDULE CONTROL CONDUITS FROM EITHER AC SWITCHGEAR ROOM.
3. TRAIN CONTROL CONDUITS SHALL BE PREFIXED "TC".
4. WHERE DISCONTINUITY OF AN INDIVIDUAL CONDUIT RUN OCCURS, IDENTIFICATION SHALL BE BY ALPHA SUFFIX, (TC1, TC1A, TC1B, ETC.)
5. APPROVED STANDARD SYMBOLS ONLY WILL BE USED SHOWING FULL CONTINUITY OF CONDUITS.
6. IDENTIFICATION OF ANY TRANSITION POINT BETWEEN EMBEDDED AND EXPOSED CONDUIT SHALL BE IDENTIFIED.
7. REFER TO GENERAL PROVISIONS AND STANDARD SPECIFICATIONS SECTION 1601 FOR REQUIREMENTS.
8. WHERE A/C SWITCHBOARD EQUIPMENT IS COMBINED IN A SINGLE ROOM, 2-4" CONDUITS WILL BE PROVIDED.
9. AT TERMINAL STATIONS ADD.
 - A. 1-2" CONDUIT FROM TRAIN CONTROL ROOM TO A/C SWITCHBOARD ROOM FOR CONTROL OF NEXT TRAIN SIGN.
 - B. 4-4" CONDUITS FROM TRAIN CONTROL ROOM TO DISPATCHER'S ROOM.

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	F. BRASSFIELD	10-74	REFERENCE DRAWINGS		REVISIONS	
DRAWN	M. FRAZIER	10-74	NUMBER	DESCRIPTION	DATE	BY
CHECKED	L. HIMMEL	10-74	ST-CM-030	COMMUNICATIONS RISER DIAGRAM	08/2001	SYSP
APPROVED	T. HANSEN	1-75				
UPDATED	R. GANERWAL	8-88				

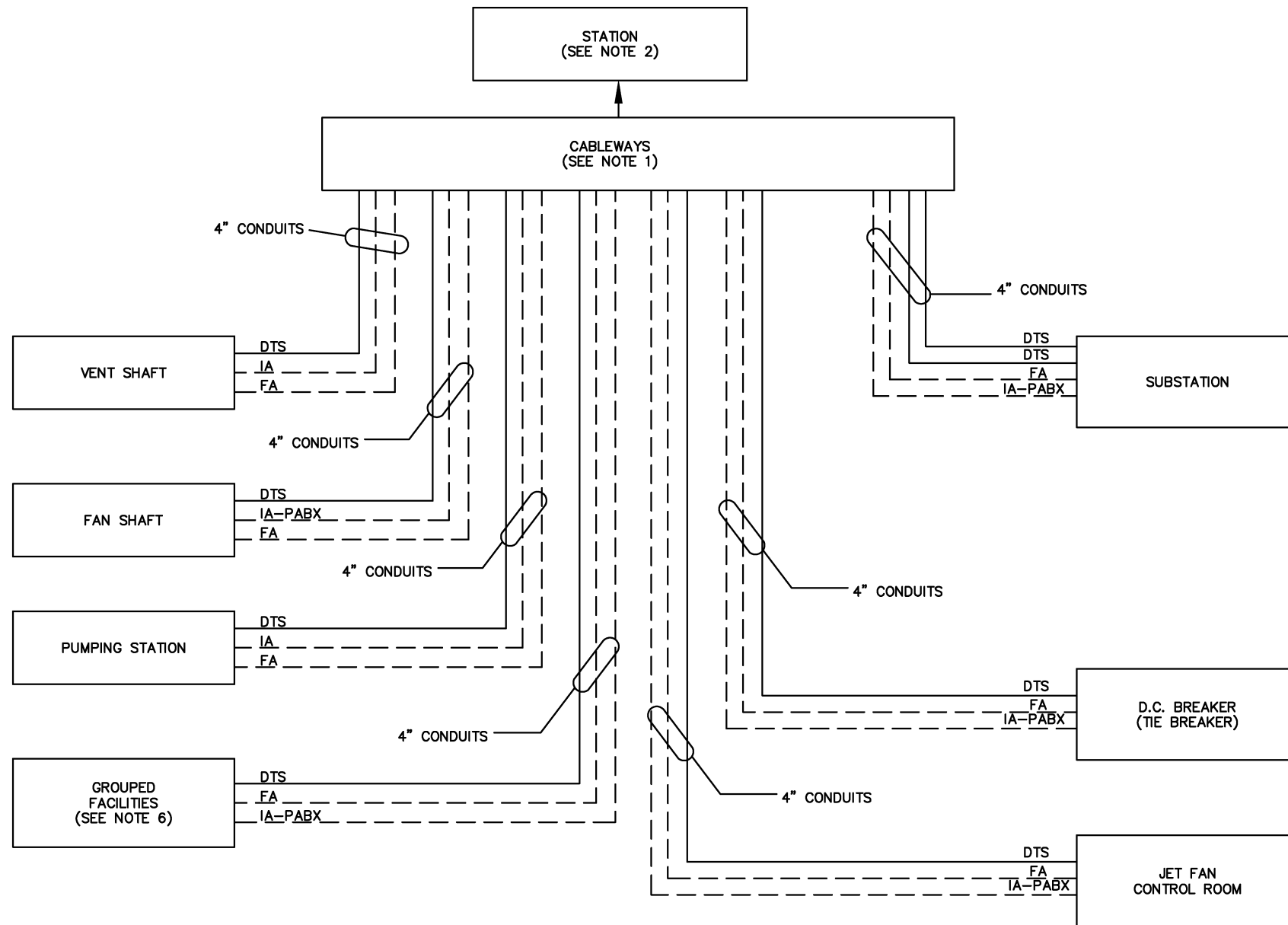
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____ APPROVED DIRECTOR *[Signature]* May 3, 2001 DATE

TRAIN CONTROL DESIGN DRAWING
TYPICAL TRAIN CONTROL CONDUIT RISER DIAGRAM
FOR PASSENGER STATION

SCALE NONE DRAWING NO. ST-TC-033



LEGEND

- TRAIN CONTROL
- - - - COMMUNICATIONS (SEE DD-CM-61)
- DTS DATA TRANSMISSION SYSTEM
- IA INTRUSION ALARM
- FA FIRE ALARM
- PABX PRIVATE AUTOMATIC BRANCH EXCHANGE

NOTES

1. MAINLINE DUCTBANKS, TUNNEL WALLS, CABLE TROUGHS OR GRADE BEAMS NORMALLY PROVIDE CABLE PASSAGE MEANS TO OR NEAR THE REMOTE FACILITY. CONDUITS TO BE PROVIDED ARE FROM A CABLEWAY INTO THE REMOTE FACILITY, (e.g CONDUIT FROM NEAREST POINT ON TUNNEL WALL TO A REMOTE SUBSTATION) CONDUIT NOT TO BE PLACED ON TUNNEL WALLS.
2. SEE DRAWINGS DD-TC-33 AND DD-CM-30 FOR CABLE ENTRANCE TO TRAIN CONTROL AND COMMUNICATIONS ROOMS.
3. CONDUIT RUNS ARE SCHEMATIC AND DEPICT THE SIZE OF ACCESS. INSTALL CONDUITS OR SLEEVES AS REQUIRED FROM CABLEWAYS TO REMOTE FACILITIES
4. CONDUIT QUANTITIES SHOWN ARE FOR ILLUSTRATIVE PURPOSES ONLY. EXACT QUANTITIES TO BE COORDINATED WITH THE AUTHORITY.
5. DEPENDING ON FACILITY CHARACTERISTICS, ADDITIONAL CONDUITS MAY BE REQUIRED FOR FACILITY NOT SHOWN ON THIS DRAWING
6. WHEN REMOTE FACILITY ARE HOUSED WITHIN THE SAME BUILDING, ROUTES (SLEEVES, BLOCKOUTS, EXPOSED OR EMBEDDED CONDUIT) SHALL BE PROVIDED AS PASSAGE MEANS FROM EACH ROOM TO A CENTRAL COLLECTING POINT. 4-4" CONDUITS SHALL BE PROVIDED FROM THIS POINT TO THE RIGHT-OF-WAY CABLEWAY.
7. SEE DD-CM-30 FOR COMMUNICATIONS CONDUIT REQUIREMENTS AT ELEVATOR INSTALLATION REMOVED FROM STATION LIMITS.

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

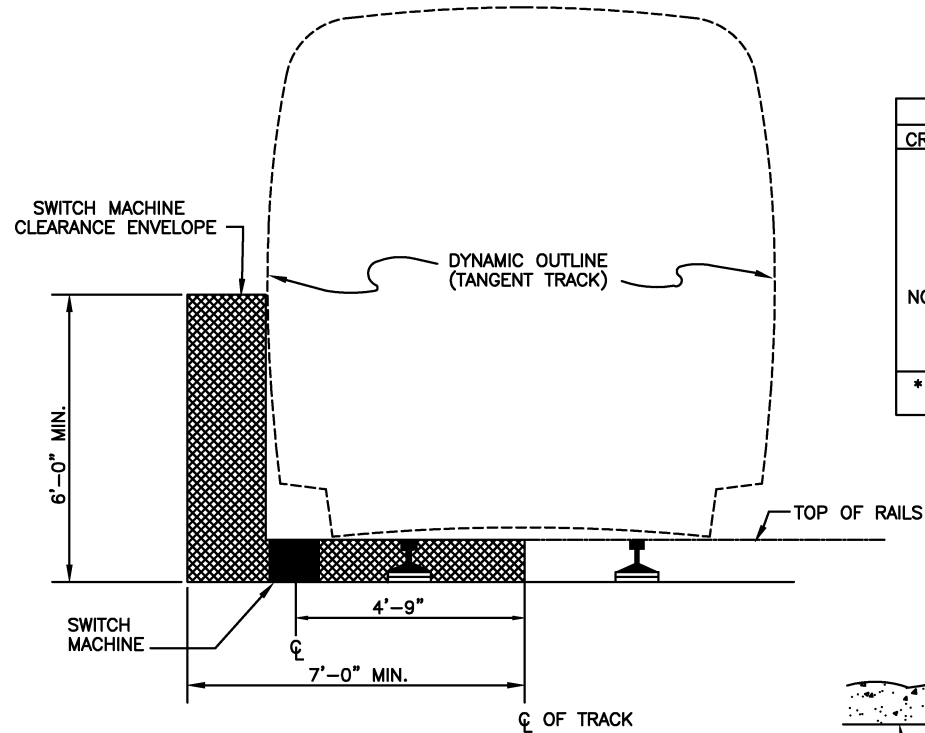
DESIGNED	E. HARVEY	9-75	DATE	REFERENCE DRAWINGS		REVISIONS	
DRAWN	D. MILNER	10-75	DATE	NUMBER	DESCRIPTION	DATE	BY
CHECKED	L. HIMMEL	11-75	DATE	ST-CM-030	TYP. COMM. CONDUIT RISER DIA-STATIONS	08/2001	SYSP
APPROVED	T. HANSEN	11-75	DATE	ST-TC-033	TYP. T.C. CONDUIT RISER DIA. STATIONS		
UPDATED	R. GANERWAL	8-98	DATE	ST-CM-061	TYP. COMM. CONDUIT RISER DIAG. REMOTE FAC.		

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
 DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
 OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____ APPROVED *[Signature]* DIRECTOR May 3, 2001 DATE _____

TRAIN CONTROL DESIGN DRAWING
TRAIN CONTROL CONDUIT
RISER DIAGRAM AND REMOTE FACILITIES

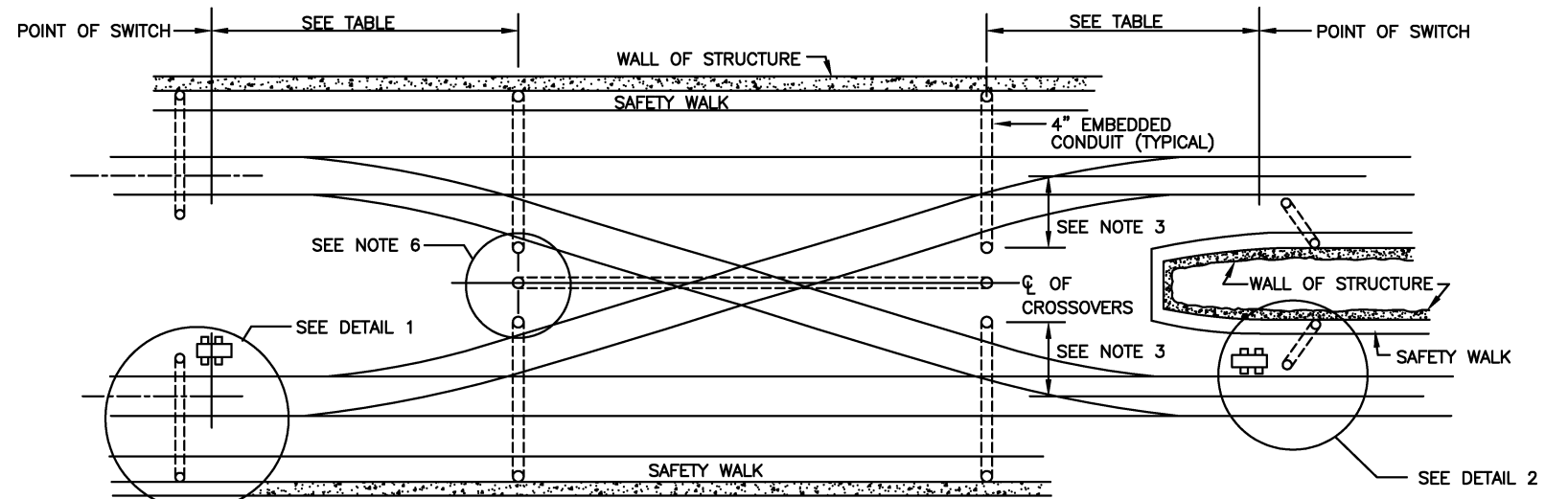
SCALE NONE DRAWING NO. ST-TC-037



SECTION A-A

TABLE	
CROSSOVERS	DISTANCE TO PS.*
NO. 8	44 FEET
NO. 10	49 FEET
NO. 15	65 FEET
NO. 6 EQUIL.	35 FEET

* OFFSET PVC CONDUITS 1'-0" ON 14'-0" TRACK CENTERS

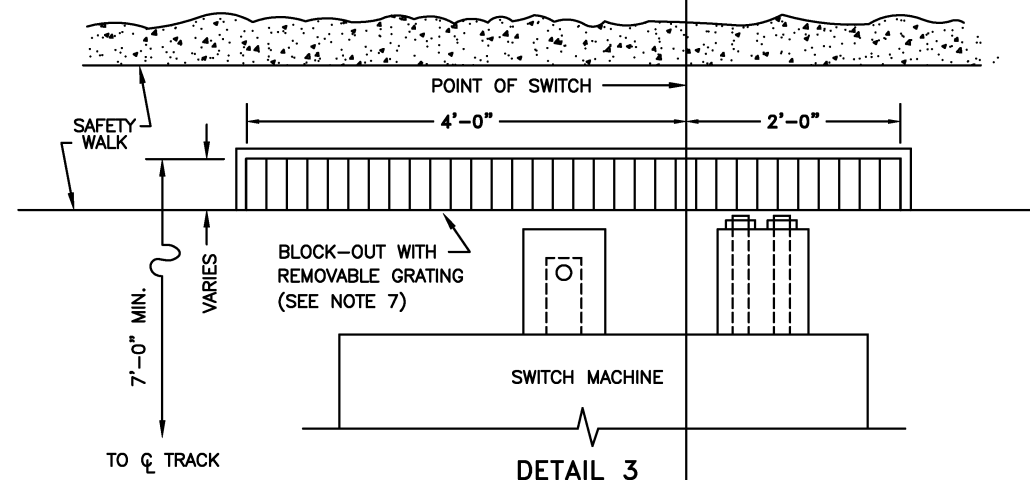


PLAN 2

EMBEDDED CONDUIT ARRANGEMENT-TUNNEL INSTALLATION
ALL TRACK CENTERS

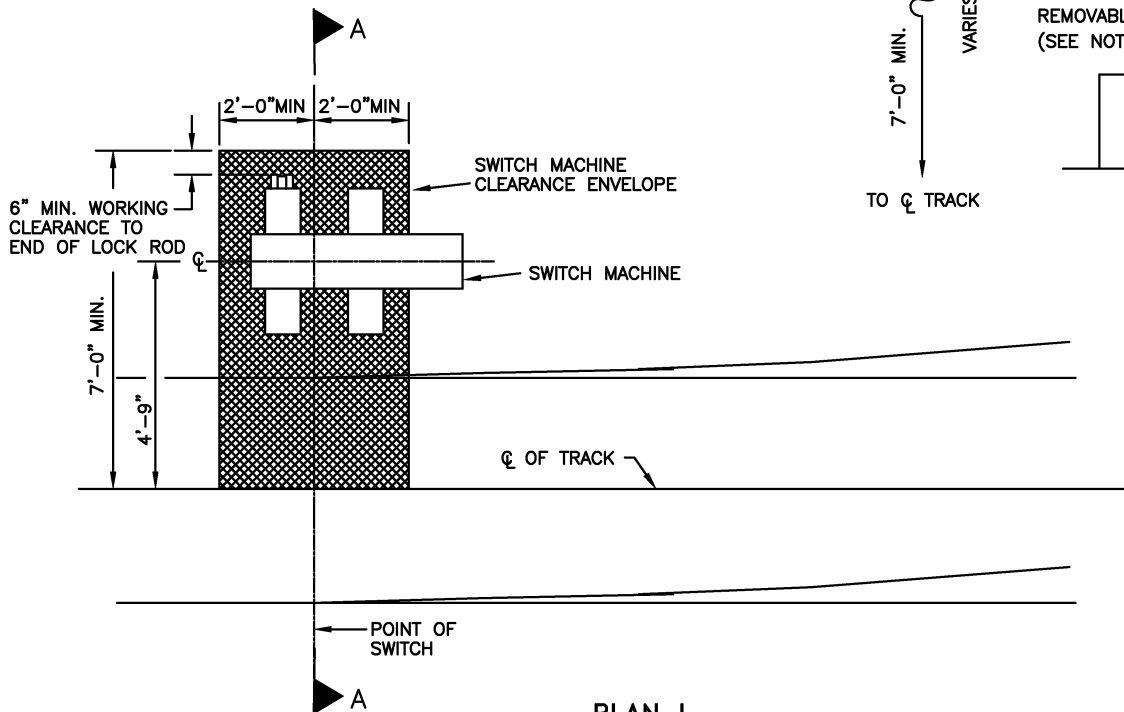
NOTES

1. ALL CONDUITS ARE TO BE 4" PVC. SEE SCHED. 40.
2. CONDUITS STUBBING THROUGH THE INVERT SHALL BE PLUMB AND FLUSH. CONDUITS STUBBING UP THROUGH THE SAFETY WALK SHALL TERMINATE 1/2" ABOVE THE SURFACE AND 3 1/2" FROM CENTERLINE OF CONDUIT TO THE TUNNEL WALL. ALL CONDUIT ENDS SHALL BE TEMPORARILY PLUGGED.
3. THE DIMENSION BETWEEN CONDUIT STUB-UP AND THE CENTERLINE OF TRACK IS TO BE 6'-9" FOR 14'-0" TRACK CENTERS AND 7'-9" FOR ALL OTHERS.
4. WHERE DISTANCE BETWEEN CENTERLINE OF INVERT STUB-UP AND STRUCTURAL WALL IS LESS THAN 4 FEET, SAFETY WALK STUB-UP TO BE OFFSET IN DIRECTION OF NEAREST TRAIN CONTROL ROOM TO ACCOMMODATE BENDING RADIUS OF CONDUITS
5. SEE REFERENCE DRAWINGS FOR ADDITIONAL TRAIN CONTROL CONDUIT REQUIREMENTS WITHIN THIS AREA.
6. CONDUITS STUBBING UP THROUGH FLOATING SLAB SHALL BE IN ACCORDANCE WITH DETAIL 'B' ON DD-S-67, IF ISSUED.
7. WHERE NECESSARY FOR SWITCH ROD CLEARANCE, PROVIDE A BLOCK-OUT WITH REMOVABLE GRATING IN SAFETY WALK.



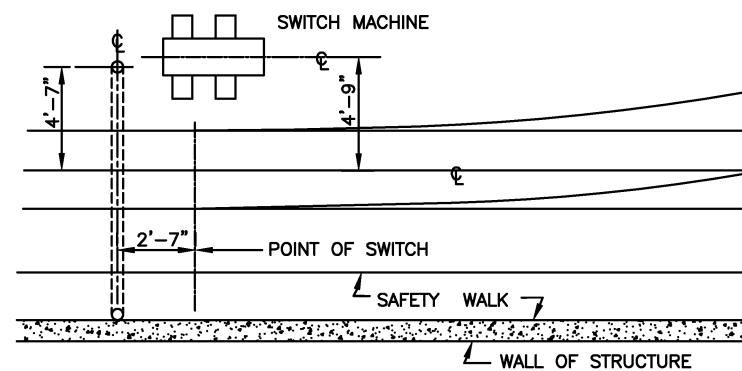
DETAIL 3

BLOCK-OUT AND GRATING TO PROVIDE SWITCH ROD CLEARANCE



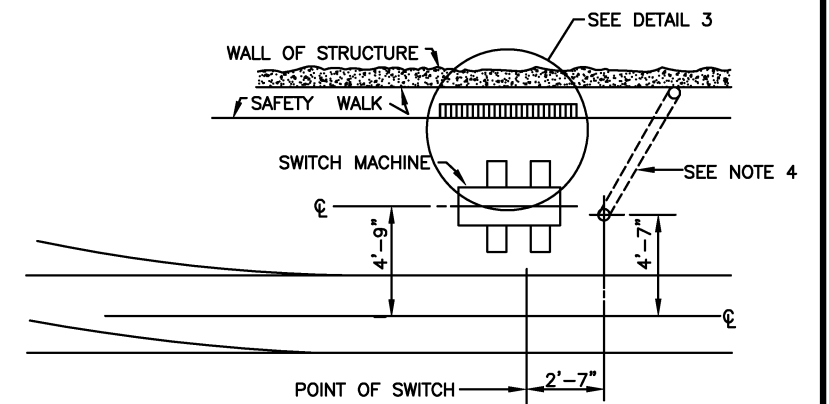
PLAN 1

CLEARANCE ENVELOPE
BALLASTED AND DIRECT FIXATION TRACK



DETAIL 1

CONDUIT ARRANGEMENT WITH SWITCH MACHINE ON SIDE OPPOSITE THE SAFETY WALK



DETAIL 2

CONDUIT ARRANGEMENT WITH SWITCH MACHINE ON SAME SIDE AS THE SAFETY WALK

DESIGNED	DE FRANCESCO	2-76
DRAWN	BRANDENBERG	2-76
CHECKED	BRASSFIELD	2-76
APPROVED	ONEIL	2-76
UPDATED	GANERWAL	9-98

NUMBER	DESCRIPTION	DATE	BY
ST-TC-2	EMBEDDED CONDUIT ARRANGEMENT	08/2001	SISP
DD-TC-33	TYPICAL TC CONDUITS FOR PASSENGER STA.		

REVISIONS	
DATE	DESCRIPTION
	Revised and issued by the Authority

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED

DATE

APPROVED DIRECTOR

[Signature]

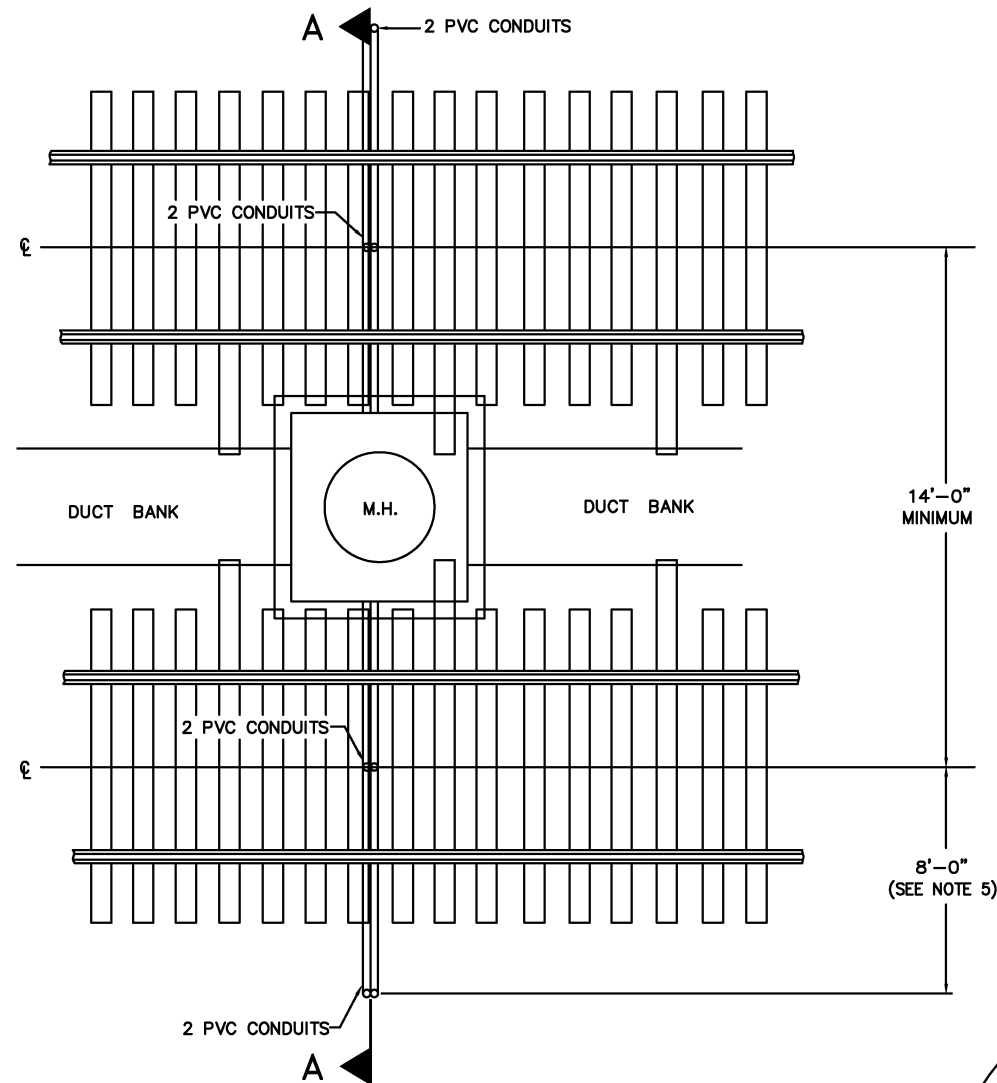
May 3, 2001
DATE

SCALE
NOT TO SCALE

DRAWING NO.

ST-TC-040

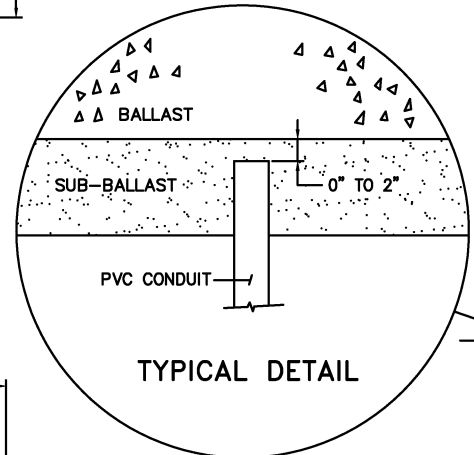
TRAIN CONTROL DESIGN DRAWING
SWITCH MACHINE CLEARANCE AND
TUNNEL CONDUIT REQUIREMENTS



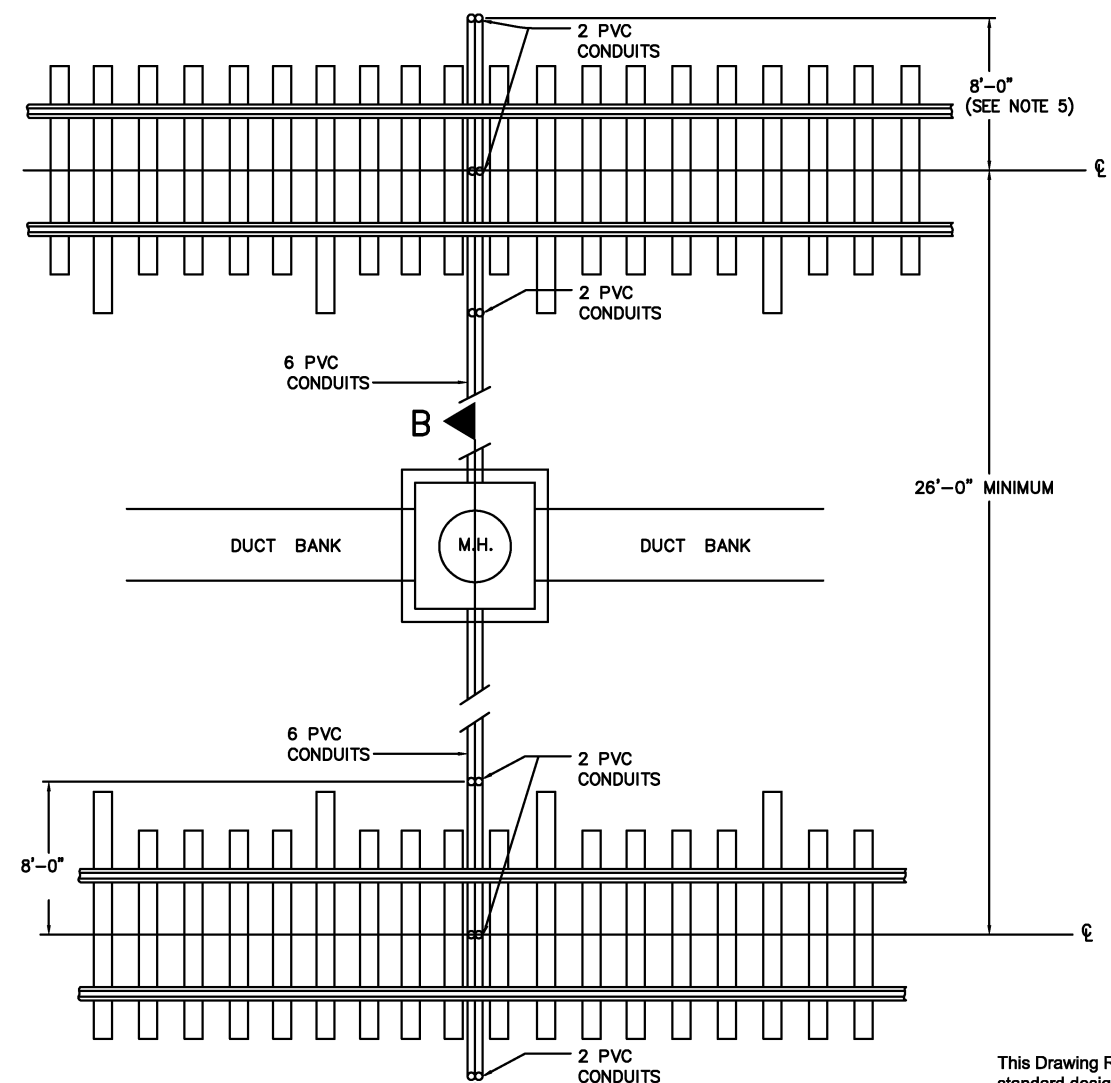
PLAN

NOTES

1. IN AT-GRADE TRACK AREAS, MANHOLES ARE TO BE PROVIDED AT 400 FT. MAXIMUM SPACING AND WITHIN 50 FT. OF ALL CROSSOVERS AND TURNOUTS.
2. CONDUITS TO BE PROVIDED AT EVERY MANHOLE, EXCEPT WITHIN STATION LIMITS.
3. ALL CONDUITS TO BE CAPPED AND STAKED. STAKES ARE TO BE PRESERVED THROUGHOUT ALL STAGES OF TRACK CONSTRUCTION.
4. DUCT BANK SIZE AND CONFIGURATION MAY VARY DEPENDING ON FIELD CONDITIONS.
5. IN BALLASTED RETAINED CUT SECTIONS WHERE RETAINING WALLS ARE USED, CONDUIT WILL EXTEND TO 6'-0" FROM TRACK CENTER LINE.
6. ALL CONDUITS SHALL BE 2 1/2", EXCEPT AT MANHOLES WITHIN 50' OF CROSSOVERS AND TURNOUTS WHERE 4" CONDUITS SHALL BE INSTALLED. ALL CONDUITS ARE TO BE SCHEDULE 80 UL LISTED OR BETTER.



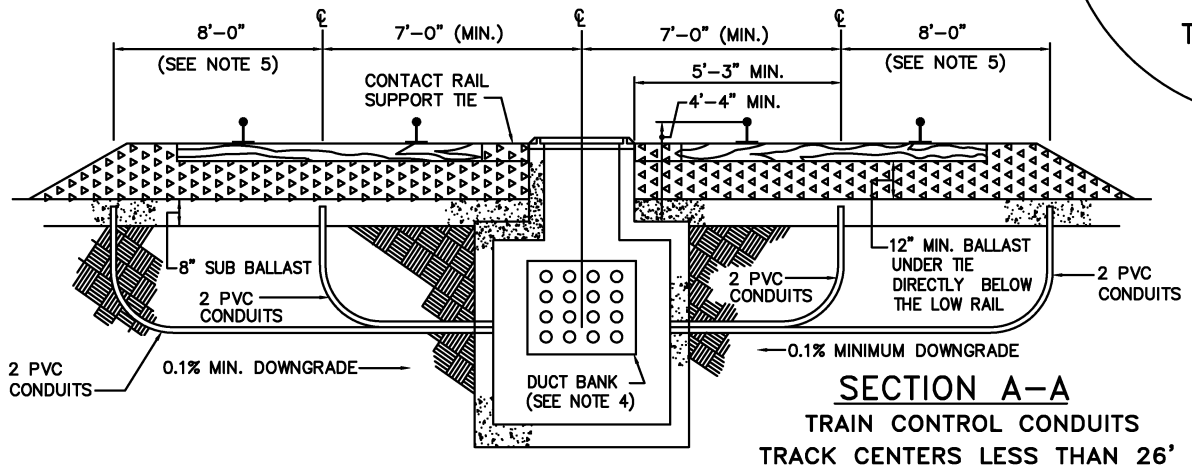
TYPICAL DETAIL



SECTION B-B

TRAIN CONTROL CONDUITS
TRACK CENTERS 26' OR GREATER

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy



SECTION A-A

TRAIN CONTROL CONDUITS
TRACK CENTERS LESS THAN 26'

DESIGNED	DEFRANCESCO	2-76
DRAWN	BRANDENBERG	2-76
CHECKED	BRASSFIELD	7-76
APPROVED	R. O'NEIL	7-76
UPDATED	R. GANERWAL	9-98

REFERENCE DRAWINGS	
NUMBER	DESCRIPTION

REVISIONS		
DATE	BY	DESCRIPTION
08/2001	SYSP	Revised and issued by the Authority

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____

APPROVED *[Signature]* DIRECTOR May 3, 2001 DATE

TRAIN CONTROL DESIGN DRAWING
TRAIN CONTROL CONDUITS-AT GRADE

SCALE: NOT TO SCALE

DRAWING NO. ST-TC-041

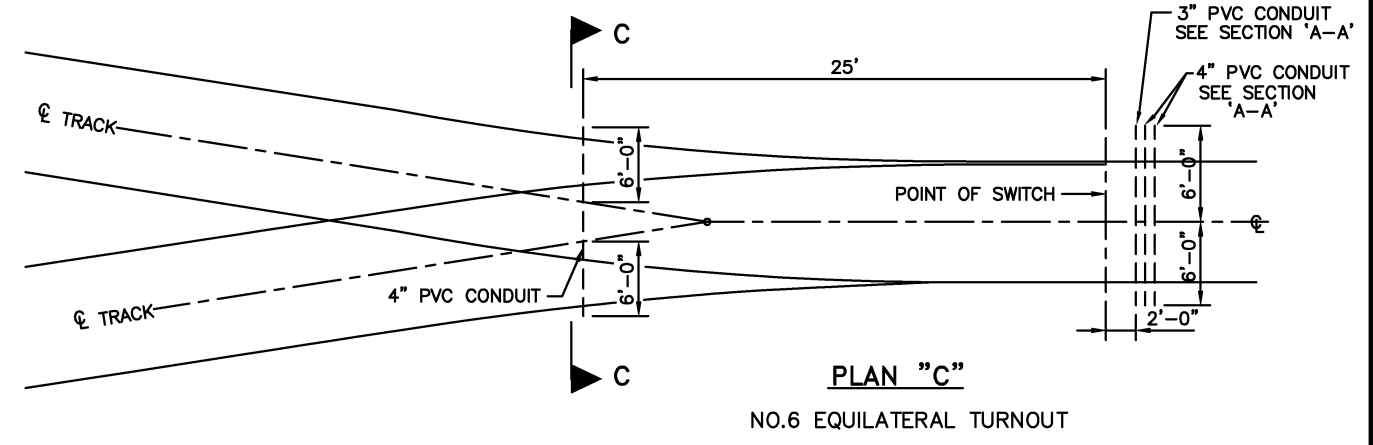
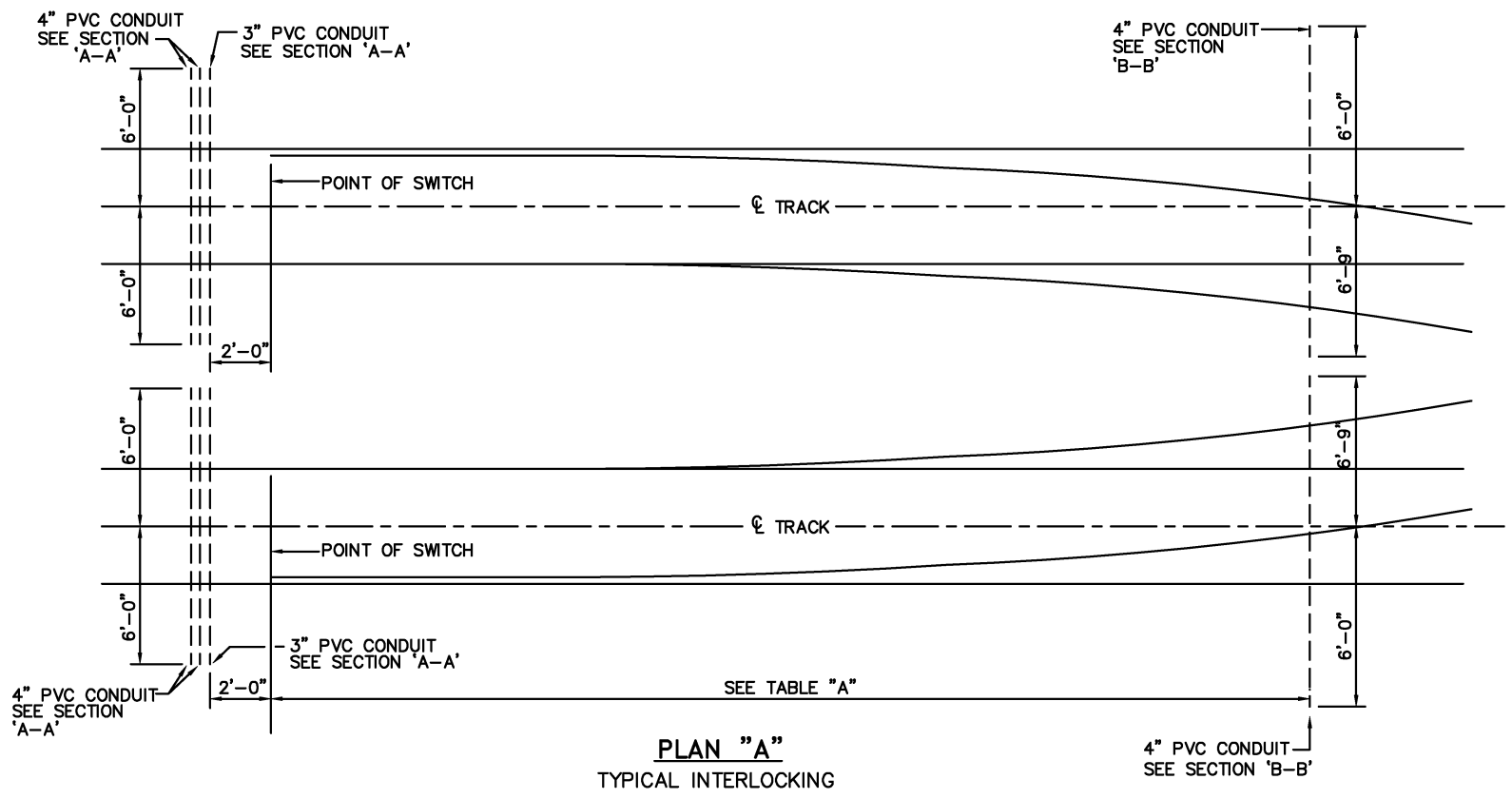
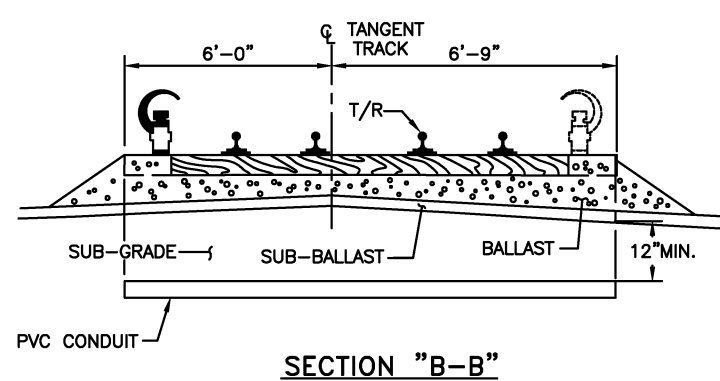
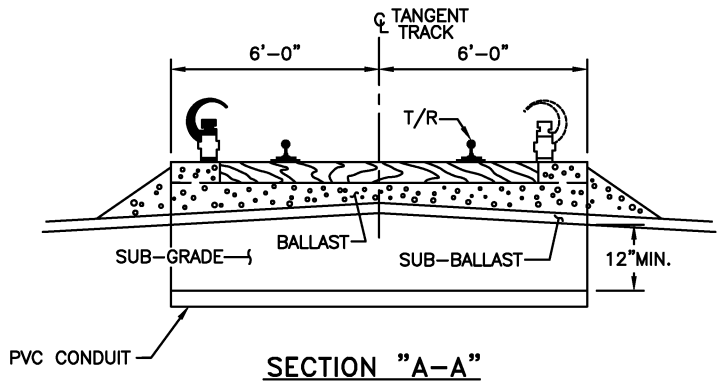
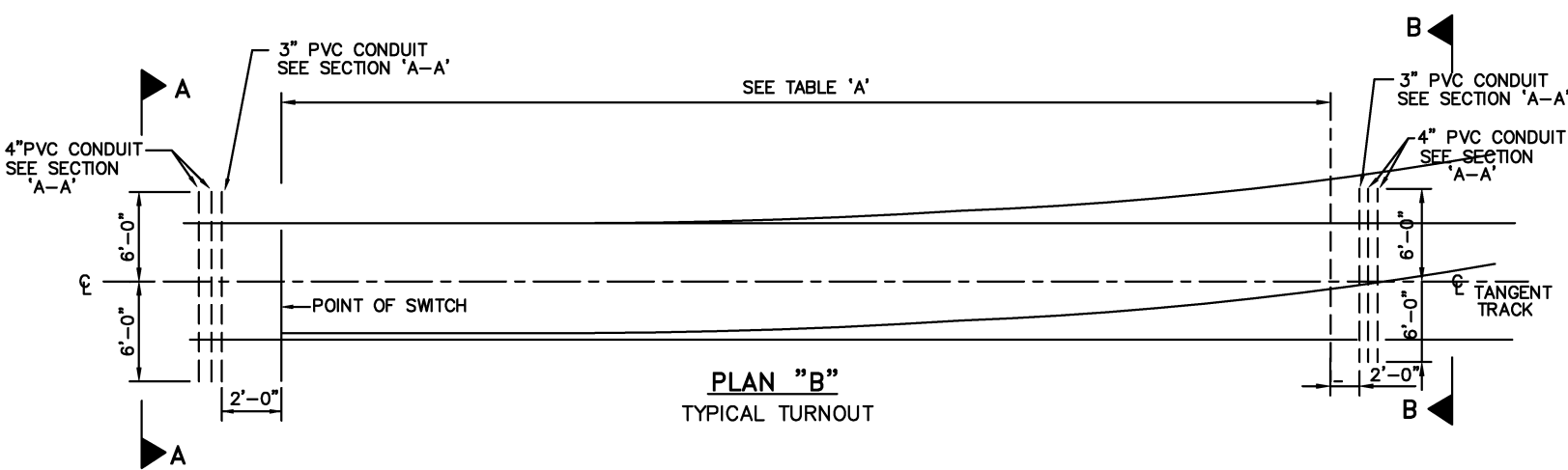
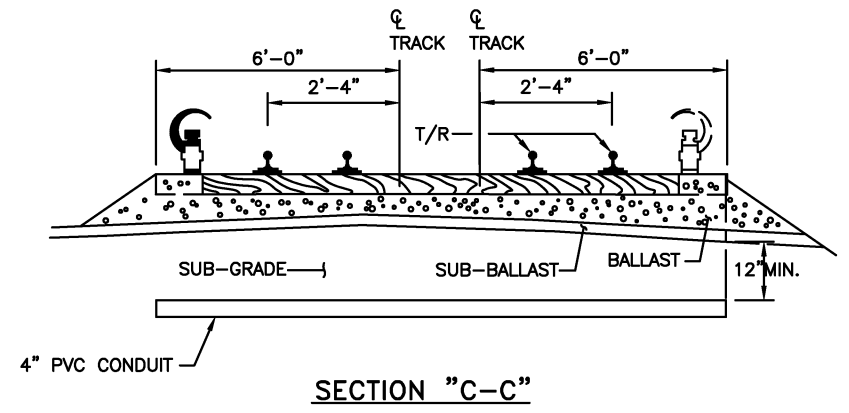


TABLE "A"	
TURNOUT NUMBER	DISTANCE TO POINT OF SW.
6	35'-0"
8	35'-0"
10	42'-0"
15	70'-0"



This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

NOTES:

1. ALL CONDUITS SHALL BE PLUGGED. PROVISIONS SHALL BE MADE (MARKERS, STAKES, ETC.) SUCH THAT CONDUIT LOCATION WILL BE EVIDENT AFTER COMPLETION OF TRACK INSTALLATION.
2. ALL ADJACENT TRACK CROSSING CONDUITS SHALL HAVE A TEN (10) INCH MINIMUM ϕ TO ϕ SEPARATION.
3. THIS DRAWING DOES NOT APPLY TO TURNOUTS AND SWITCHES IN YARDS.
4. ALL CONDUITS SHALL BE PVC SCHEDULE 80, UL APPROVED.

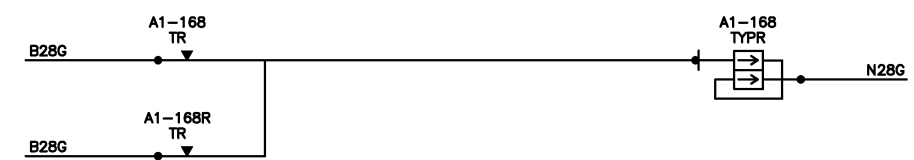
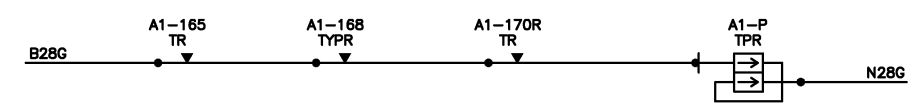
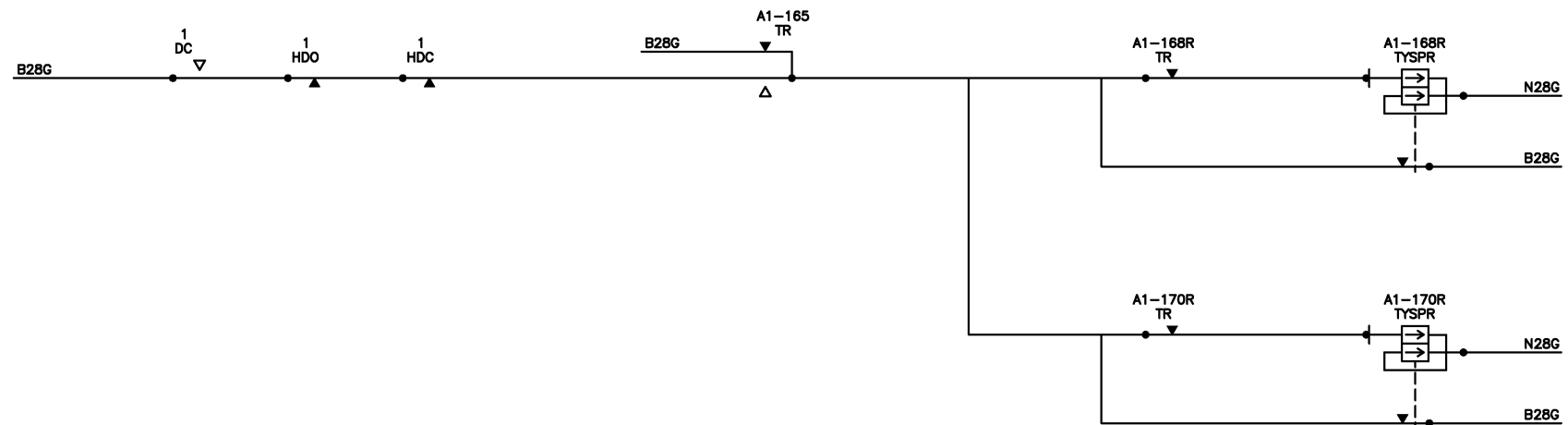
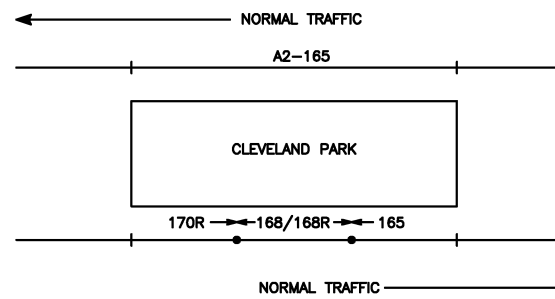
DESIGNED	J. DEFRANCESCO	3-76	DATE	REFERENCE DRAWINGS		REVISIONS	
DRAWN	P. BRANDENBERG	6-76	DATE	NUMBER	DESCRIPTION	DATE	BY
CHECKED	F. BRASSFIELD	3-77	DATE			08/2001	SYSP
APPROVED	T. HANSEN	3-77	DATE				
UPDATED	R. GANERWAL	8-98	DATE				

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
 DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
 OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____ APPROVED *[Signature]* DIRECTOR May 3, 2001 DATE

TRAIN CONTROL DESIGN DRAWING
 CONDUIT REQUIREMENTS FOR TURNOUTS
 AT GRADE

SCALE: NOT TO SCALE DRAWING NO. ST-TC-042



This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	DATE	REFERENCE DRAWINGS		REVISIONS	
		NUMBER	DESCRIPTION	DATE	DESCRIPTION
GAH	6-00			08/2001	Revised and issued by the Authority
DRAWN	DATE				
CHECKED	DATE				
APPROVED	DATE				
UPDATED	DATE				

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____ APPROVED *[Signature]* DIRECTOR May 3, 2001 DATE

EXAMPLE **PLATFORM TRACK REPEATER CIRCUITS**

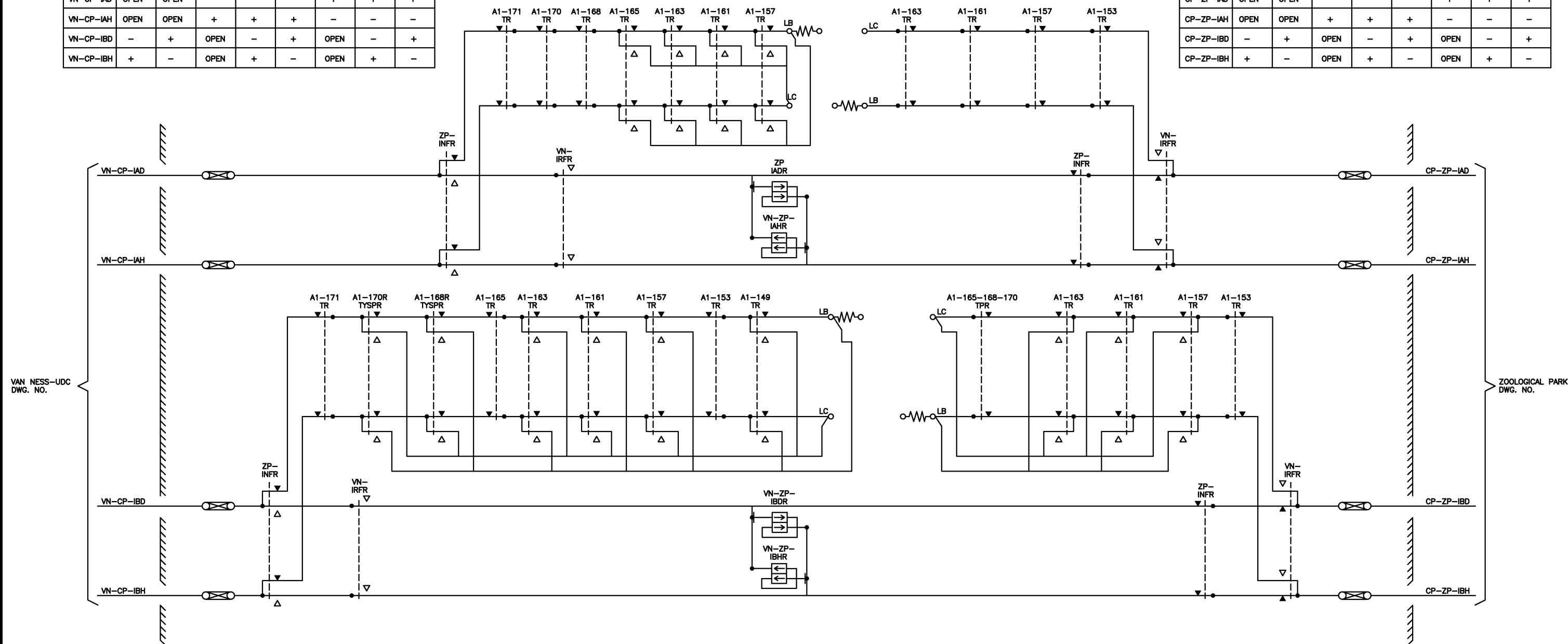
SCALE NONE DRAWING NO. ST-TC-A5-C-001

CONTACT ASSIGNMENT RULES:

1. **CASCADE REPEATERS** - CONTACT ASSIGNED TO THE AH/AD CIRCUIT SHALL BE FROM A CASCADE REPEATER OF RELAY WHOSE CONTACTS ARE ASSIGNED TO THE BH/BD CIRCUIT.
2. **COMBINATION REPEATER** - WHEN CONTACTS ARE USED IN THE AH/AD CIRCUIT, THE PICKUP CIRCUIT SHALL CONTAIN CONTACTS OF THE RELAYS OR A CASCADE REPEATER OF THE RELAYS WHOSE CONTACTS ARE USED TO POLE CHANGE THE BH/BD CIRCUITS.
3. **MULTIPLE REPEATER** - THE SAME RELAY IN THE AH/AD AND BH/BD CIRCUITS.

CONTROL WIRE ENERGIZED FOR UNOCCUPIED TRACK	ENCODE CHART							
	A1-171	A1-170 RTYSP	A1-168 RTYSP	A1-165	A1-163	A1-161 A1-157	A1-153	A1-149
VN-CP-IAD	OPEN	OPEN	-	-	-	+	+	+
VN-CP-IAH	OPEN	OPEN	+	+	+	-	-	-
VN-CP-IBD	-	+	OPEN	-	+	OPEN	-	+
VN-CP-IBH	+	-	OPEN	+	-	OPEN	+	-

CONTROL WIRE ENERGIZED FOR UNOCCUPIED TRACK	ENCODE CHART							
	A1-153	A1-157 A1-161	A1-163	A1-165-168-170				
CP-ZP-IAD	OPEN	OPEN	-	-	-	+	+	+
CP-ZP-IAH	OPEN	OPEN	+	+	+	-	-	-
CP-ZP-IBD	-	+	OPEN	-	+	OPEN	-	+
CP-ZP-IBH	+	-	OPEN	+	-	OPEN	+	-



This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	DATE	REFERENCE DRAWINGS		REVISIONS	
		NUMBER	DESCRIPTION	DATE	DESCRIPTION
GMH	6-00			08/2001	Revised and issued by the Authority
DRAWN	DATE				
CHECKED	DATE				
APPROVED	DATE				
UPDATED	DATE				

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____ APPROVED *[Signature]* DATE May 3, 2001

SPEED COMMAND HD LINE CIRCUITS - TRACK 1	
SCALE NONE	DRAWING NO. ST-TC-A5-C-003

CONTACT ASSIGNMENT RULES:

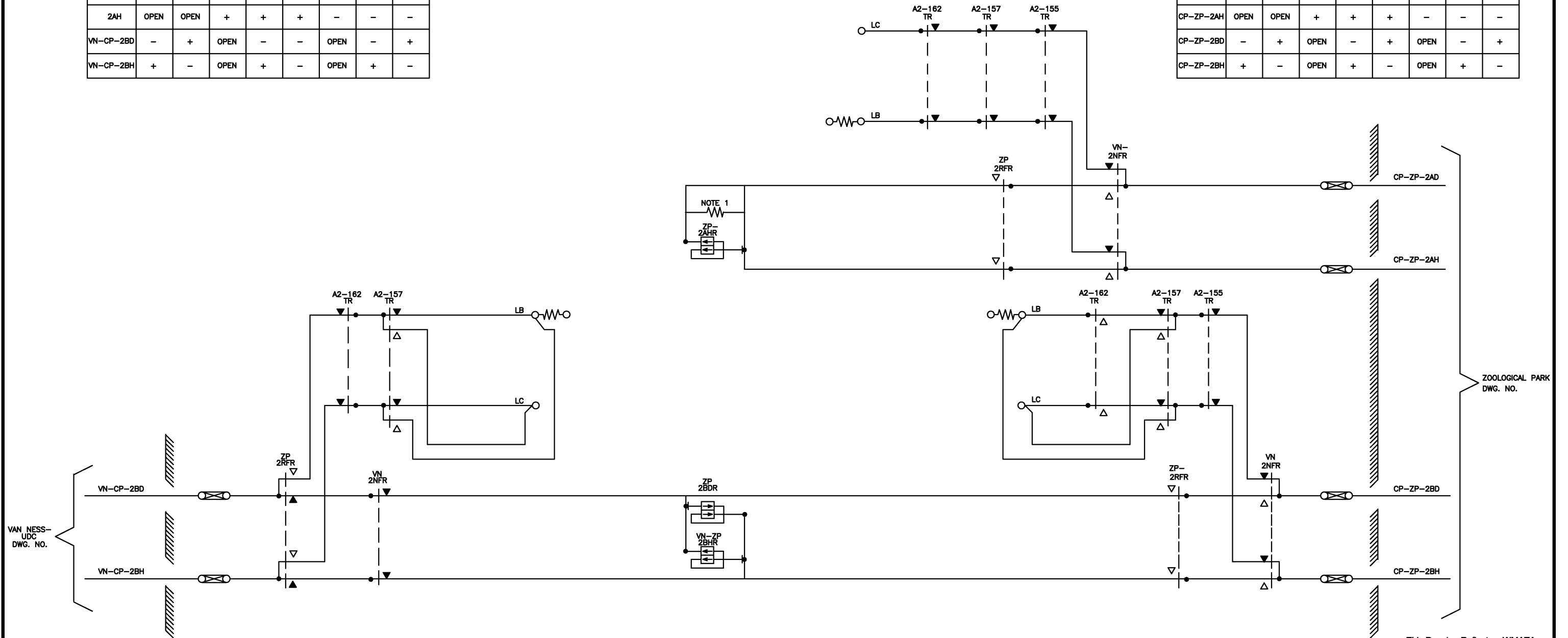
- CASCADE REPEATERS** - WHEN USING CASCADE REPEATER RELAYS IN THIS CIRCUIT, THE RELAYS USED FOR FREQUENCY SELECTION SHALL BE CASCADE REPEATERS OF THE RELAYS USED IN CODE RATE SELECTION.
- MULTIPLE REPEATERS** - WHEN USING MULTIPLE REPEATER RELAYS IN THIS CIRCUIT, THE SAME RELAYS SHALL BE USED FOR BOTH CODE RATE & FREQUENCY SELECTION.
- COMBINATION REPEATERS** - WHEN USING COMBINATION REPEATERS IN THIS CIRCUIT, THE COMBINATION RELAYS USED FOR FREQUENCY SELECTION SHALL BE REPEATERS OF THE RELAYS USED FOR CODE RATE SELECTION.

NOTES:

- RESISTANCE VALUE SHALL BE THE EQUIVALENT OF A VITAL RELAY'S RESISTANCE WITH THE COILS CONNECTED IN SERIES.

CONTROL WIRE ENERGIZED FOR UNOCCUPIED TRACK	ENCODE CHART							
	A2-162	A2-157						
2AD	OPEN	OPEN	-	-	-	+	+	+
2AH	OPEN	OPEN	+	+	+	-	-	-
VN-CP-2BD	-	+	OPEN	-	-	OPEN	-	+
VN-CP-2BH	+	-	OPEN	+	-	OPEN	+	-

CONTROL WIRE ENERGIZED FOR UNOCCUPIED TRACK	ENCODE CHART							
	A2-155	A2-157	A2-162					
CP-ZP-2AD	OPEN	OPEN	-	-	-	+	+	+
CP-ZP-2AH	OPEN	OPEN	+	+	+	-	-	-
CP-ZP-2BD	-	+	OPEN	-	+	OPEN	-	+
CP-ZP-2BH	+	-	OPEN	+	-	OPEN	+	-



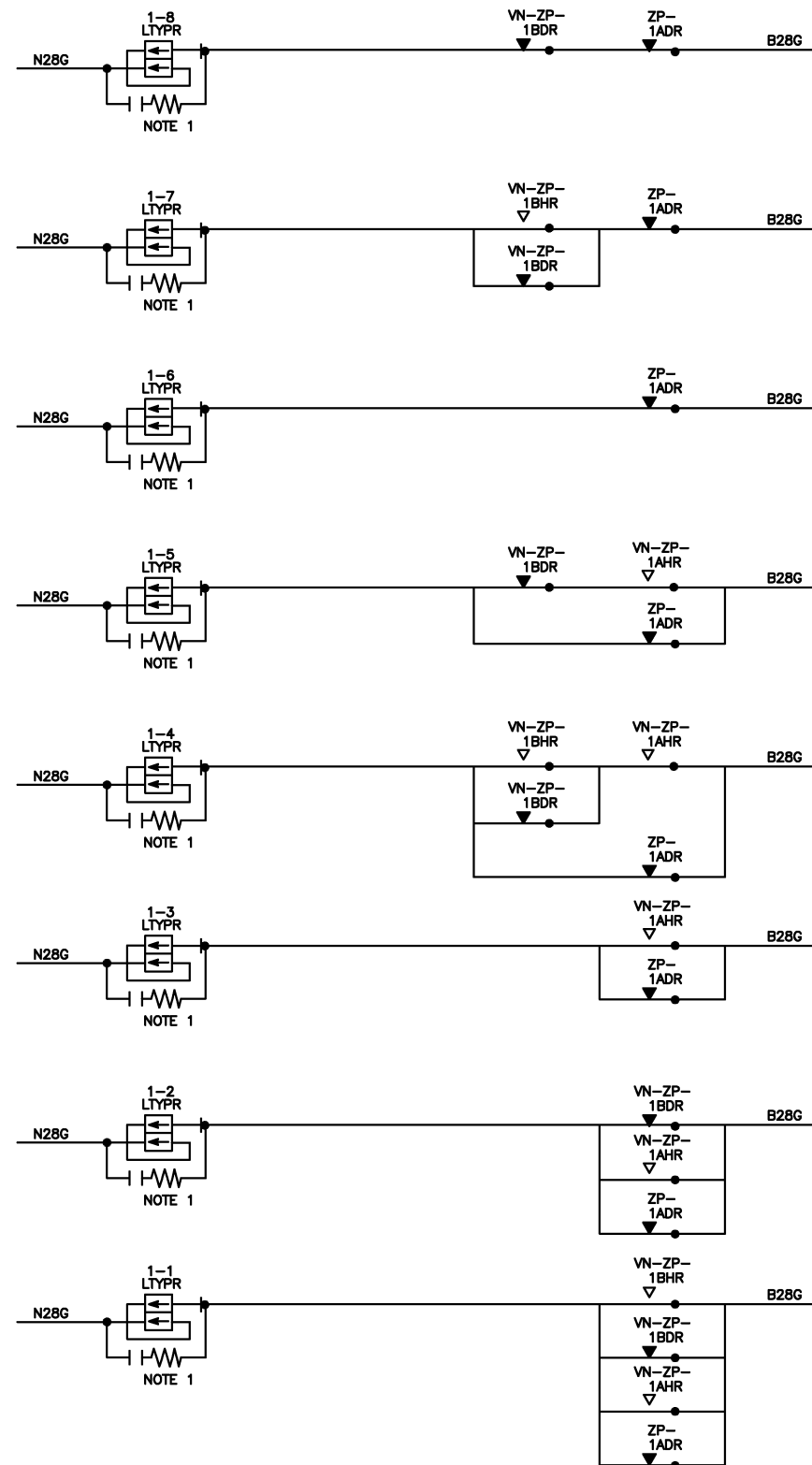
VAN NESS-UDC DWG. NO.

ZOOLOGICAL PARK DWG. NO.

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	DATE	NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION
GAH	6-00			08/2001	SYSP	Revised and issued by the Authority
DRAWN	DATE					
CHECKED	DATE					
APPROVED	DATE					
UPDATED	DATE					

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY		SPEED COMMAND HD LINE CIRCUITS - TRACK 2	
DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF SYSTEMS		SCALE NONE	
SUBMITTED	DATE	APPROVED DIRECTOR	DRAWING NO. ST-TC-A5-C-004
		<i>respat</i>	May 3, 2001



- NOTES: 1. ALL DECODING RELAYS SHALL BE SUPPRESSED TO PROVIDE 1 SECOND SLOW RELEASE.
2. A SINGLE ARROW POINTING UP INDICATES THAT THAT LTYPR IS ENERGIZED WHEN THE CORRESPONDING LINE POLARITIES ARE RECEIVED FROM EITHER DIRECTION.
3. A BLANK BOX INDICATES THAT THAT LTYPR IS DE-ENERGIZED WHEN THE CORRESPONDING LINE POLARITIES ARE RECEIVED FROM EITHER DIRECTION.

DECODE CHART

NOYES 2 & 3

	1-1 LTYPR (A1-147)	1-2 LTYPR (A1-144)	1-3 LTYPR (A1-137)	1-4 LTYPR (A1-134)	1-5 LTYPR (A1-130R)	1-6 LTYPR (A1-128)	1-7 LTYPR (A1-125) (A1-120)	1-8 LTYPR (A1-117)
ZOOLOGICAL PARK TRACK 1 NORMAL								
VAN NESS TRACK 1 REVERSE								
	↑							
	↑	↑						
	↑	↑	↑					
	↑	↑	↑	↑				
	↑	↑	↑	↑	↑			
	↑	↑	↑	↑	↑	↑		
	↑	↑	↑	↑	↑	↑	↑	
	↑	↑	↑	↑	↑	↑	↑	↑
CONTROL WIRE ENERGIZED FOR UNOCCUPIED TRACK								
1AD	OPEN	OPEN	-	-	-	+	+	+
1AH	OPEN	OPEN	+	+	+	-	-	-
1BD	-	+	OPEN	-	+	OPEN	-	+
1BH	+	-	OPEN	+	-	OPEN	+	-

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	GAH	6-00	DATE	NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION
DRAWN	JMR	6-00	DATE			08/2001	SYSP	Revised and issued by the Authority
CHECKED			DATE					
APPROVED			DATE					
UPDATED			DATE					

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

LINE TRACK REPEATER DECODE CIRCUITS -
TRACK 1

SUBMITTED _____ DATE _____

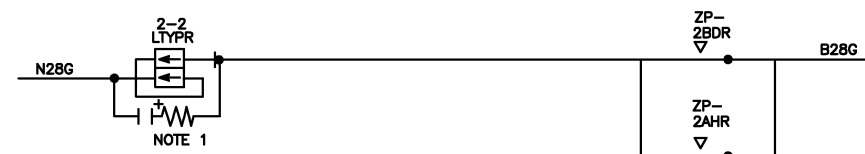
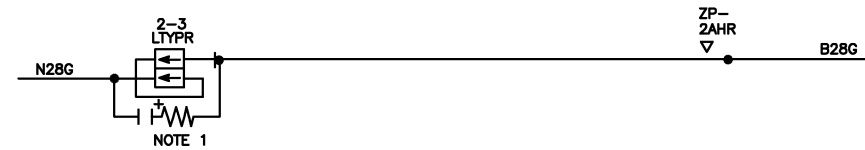
APPROVED *respat* May 3, 2001
DIRECTOR DATE

SCALE
NONE

DRAWING NO.
ST-TC-A5-C-005

NOTES:

1. ALL DECODING RELAYS SHALL BE SUPPRESSED TO PROVIDE 1 SECOND SLOW RELEASE.
2. A SINGLE ARROW POINTING UP INDICATES THAT THAT LTYPR IS ENERGIZED WHEN THE CORRESPONDING LINE POLARITIES ARE RECEIVED FROM EITHER DIRECTION.
3. A BLANK BOX INDICATES THAT THAT LTYPR IS DE-ENERGIZED WHEN THE CORRESPONDING LINE POLARITIES ARE RECEIVED FROM EITHER DIRECTION.



DECODE CHART

NOYES 2 & 3

VAN NESS - UDC TRACK 2 NORMAL	2-1 LTYPR (A2-180)																	
ZOOLOGICAL PARK TRACK 2 REVERSE	2-1 LTYPR (A2-143) (A2-137)	2-2 LTYPR (A2-134) (A2-132)	2-3 LTYPR (A2-128R) (A2-124) (A2-118)															
	↑																	
	↑	↑																
	↑	↑	↑															
	↑	↑	↑	↑														
	↑	↑	↑	↑	↑													
	↑	↑	↑	↑	↑	↑												
	↑	↑	↑	↑	↑	↑	↑											
CONTROL WIRE ENERGIZED FOR UNOCCUPIED TRACK																		
2AD	OPEN	OPEN	-	-	-	+	+	+										
2AH	OPEN	OPEN	+	+	+	-	-	-										
2BD	-	+	OPEN	-	+	OPEN	-	+										
2BH	+	-	OPEN	+	-	OPEN	+	-										

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED GAH 6-00 DATE	REFERENCE DRAWINGS		REVISIONS	
DRAWN JMR 6-00 DATE	NUMBER	DESCRIPTION	DATE	BY
CHECKED			08/2001	SYSP
APPROVED				
UPDATED				

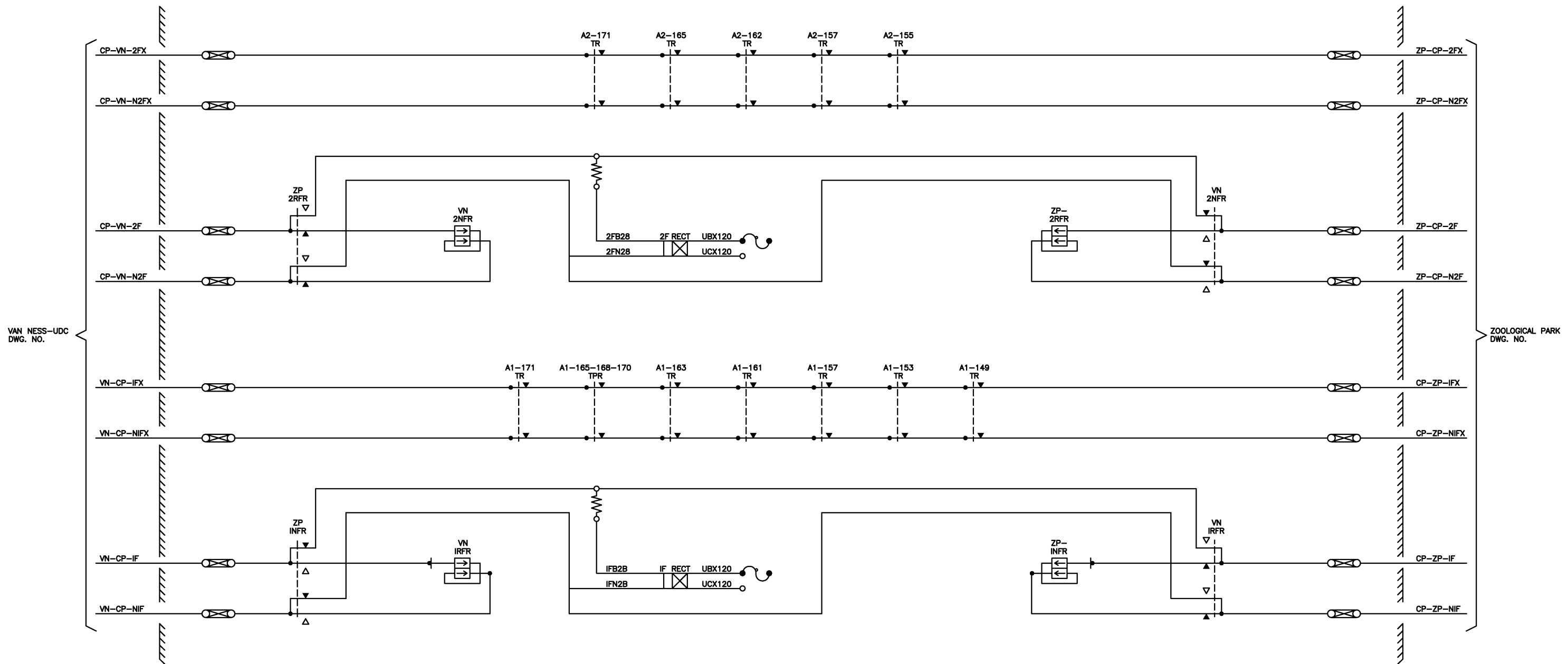
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____ APPROVED DIRECTOR *[Signature]* May 3, 2001 DATE

LINE TRACK REPEATER DECODE CIRCUITS - TRACK 2

SCALE NONE DRAWING NO. ST-TC-A5-C-006



VAN NESS-UDC
DWG. NO.

ZOOLOGICAL PARK
DWG. NO.

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	DATE	REFERENCE DRAWINGS		REVISIONS	
GAH	6-00	NUMBER	DESCRIPTION	DATE	DESCRIPTION
DRAWN	6-00			08/2001	SYSP Revised and issued by the Authority
CHECKED	DATE				
APPROVED	DATE				
UPDATED	DATE				

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____

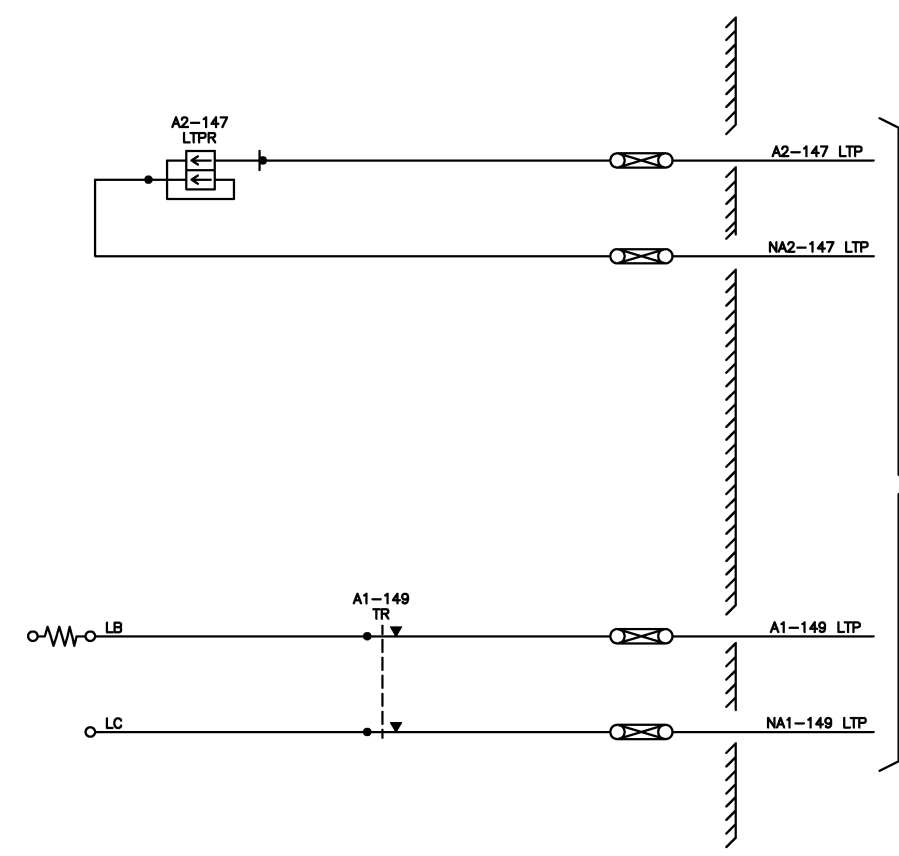
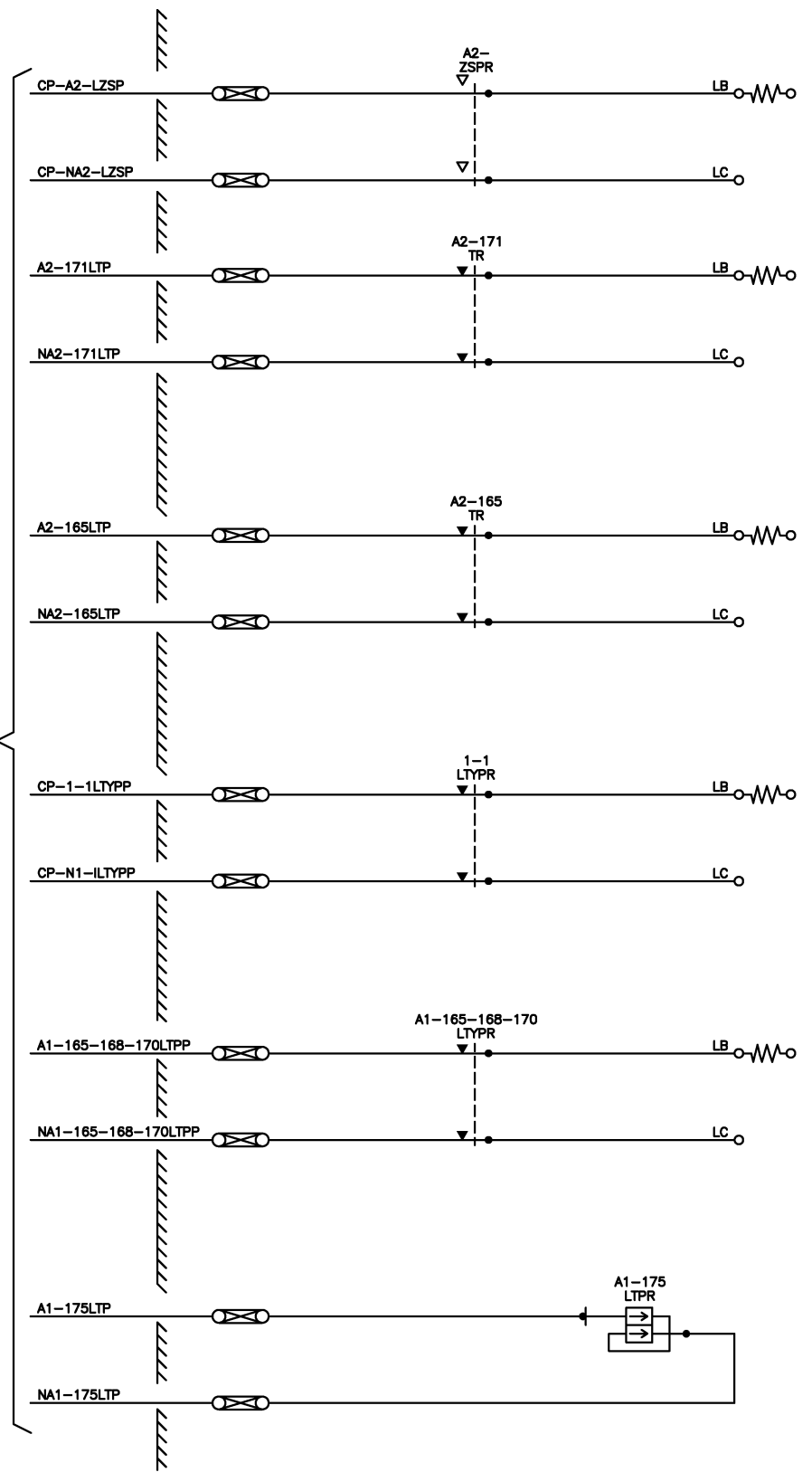
APPROVED *respat* DATE May 3, 2001

TRAFFIC INITIATION & CONTROL LINE CIRCUITS
EXAMPLE
TRACK 1 & 2

SCALE NONE

DRAWING NO. ST-TC-A5-C-007

VAN NESS-UDC
DWG. NO.
ATCA6-C-013



ZOOLOGICAL PARK
DWG. NO.

This Drawing Reflects a WMATA
standard design approach.
Project specific drawings must be
developed by the Contractor
which reflect this Design Philosophy

DESIGNED	DATE	REFERENCE DRAWINGS		REVISIONS		
		NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION
GMH	8-00			08/2001	SYSP	Revised and issued by the Authority
DRAWN	DATE					
CHECKED	DATE					
APPROVED	DATE					
UPDATED	DATE					

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____

APPROVED *[Signature]* DATE May 3, 2001

DIRECTOR

LINE REPEATER CIRCUITS

SCALE: NONE

DRAWING NO. ST-TC-A5-C-009

WMATA

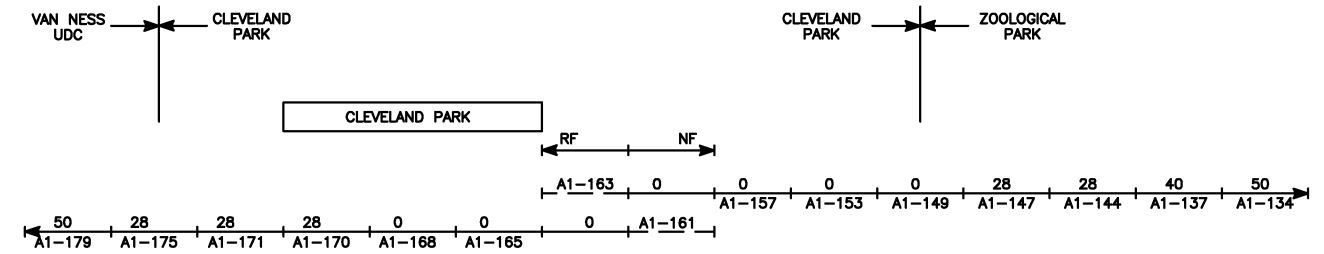
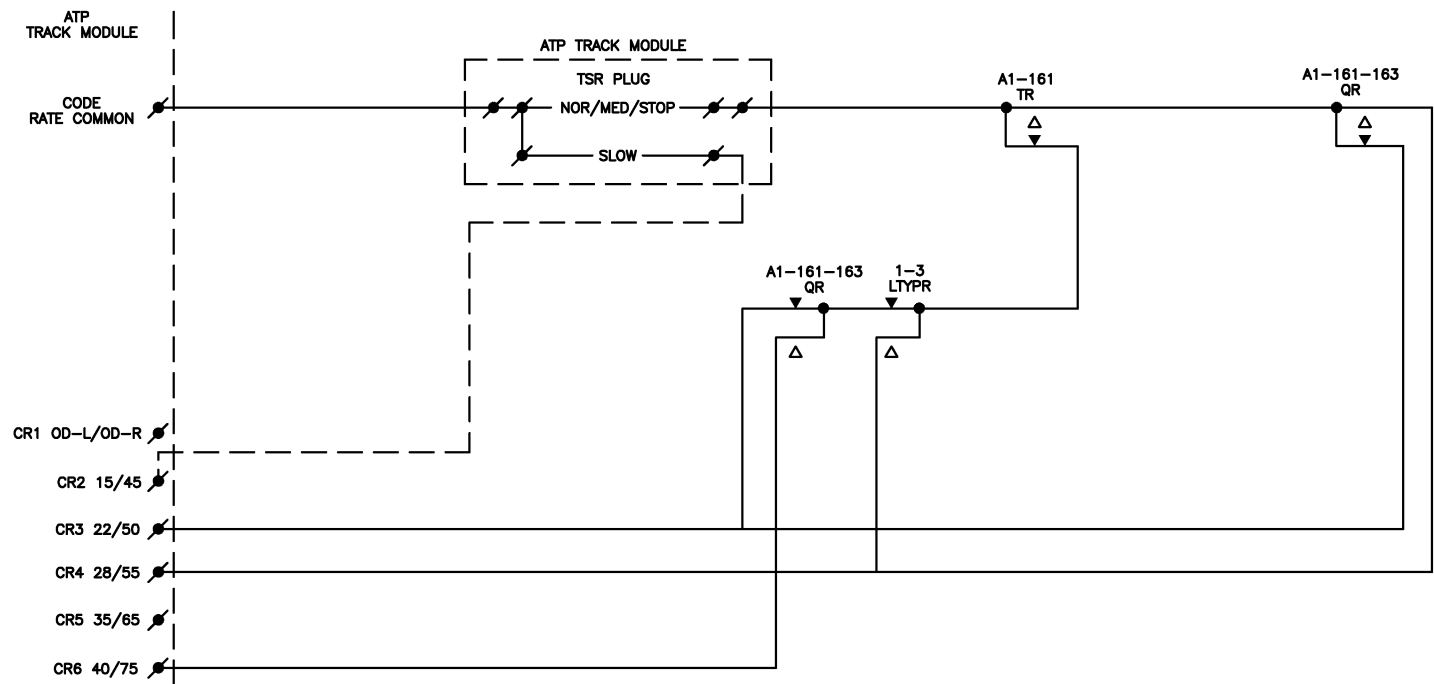
CLEVELAND PARK

A05

EXAMPLE LOCATION

This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED <u>GAH</u> <u>6-00</u> DATE	REFERENCE DRAWINGS		REVISIONS		WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY		COVER SHEET		
DRAWN <u>JMR</u> <u>6-00</u> DATE	NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION	DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT OFFICE OF SYSTEMS		SCALE NONE	DRAWING NO. ST-TC-A5-G-001
CHECKED _____ DATE			08/2001	SYSP	Revised and issued by the Authority	SUBMITTED _____ DATE _____		APPROVED <i>[Signature]</i> <u>May 3, 2001</u> DIRECTOR DATE	
APPROVED _____ DATE									
UPDATED _____ DATE									



TSR PLUG

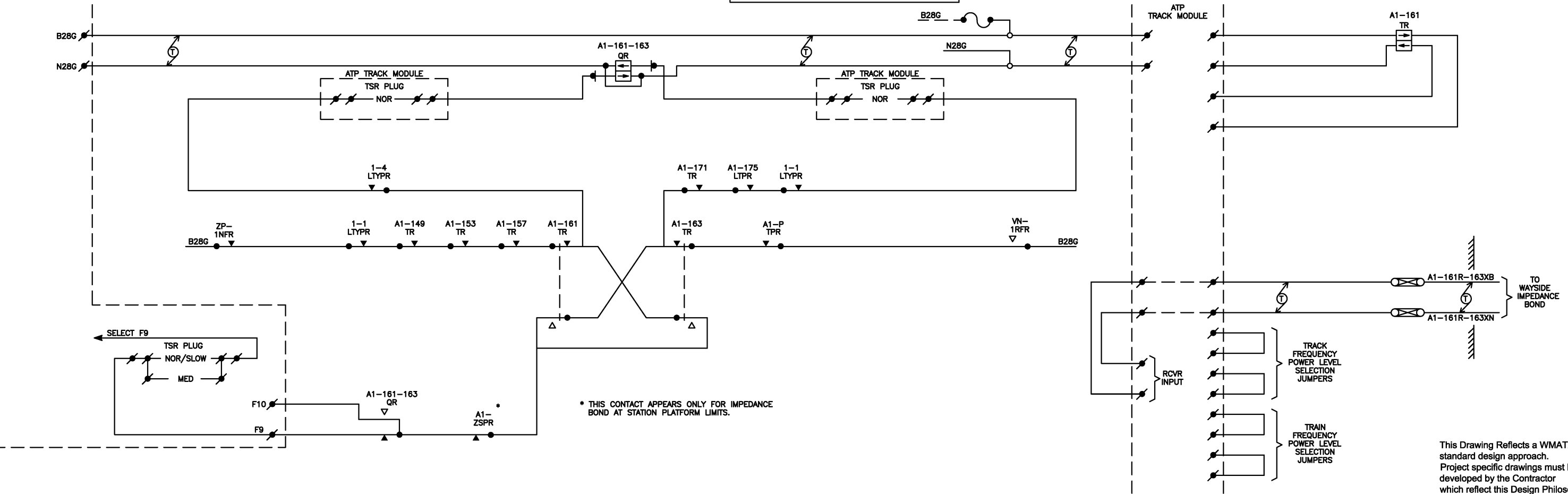
A1-163		A1-161	
NORMAL	50MPH	NORMAL	50MPH
MEDIUM	40MPH	MEDIUM	28MPH
SLOW	15MPH	SLOW	15MPH
STOP	0MPH	STOP	0MPH

SPEED LIMIT CHART

CR	F9	F10	HZ
1	OD-L	OD-R	3.0
2	15	45	4.5
3	22	50	6.83
4	28	55	10.1
5	35	65	15.3
6	40	75	21.5

- CONTACT ASSIGNMENT RULES:**
- CASCADE REPEATERS** - WHEN USING CASCADE REPEATER RELAYS IN THIS CIRCUIT, THE RELAYS USED FOR FREQUENCY SELECTION SHALL BE CASCADE REPEATERS OF THE RELAYS USED IN CODE RATE SELECTION.
 - MULTIPLE REPEATERS** - WHEN USING MULTIPLE REPEATER RELAYS IN THIS CIRCUIT, THE SAME RELAYS SHALL BE USED FOR BOTH CODE RATE AND FREQUENCY SELECTION.
 - COMBINATION REPEATERS** - WHEN USING COMBINATION REPEATERS IN THIS CIRCUIT, THE COMBINATION RELAYS USED FOR FREQUENCY SELECTION SHALL BE REPEATERS OF THE RELAYS USED FOR CODE RATE SELECTION.

NOTE: "QR" RELAY AND ASSOCIATED 28-VOLT ENERGY MUST BE WIRED EXACTLY AS SHOWN.



This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	DATE	NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION
GAH	6-00			08/2001	SYSP	Revised and issued by the Authority
DRAWN	JMR					
CHECKED						
APPROVED						
UPDATED						

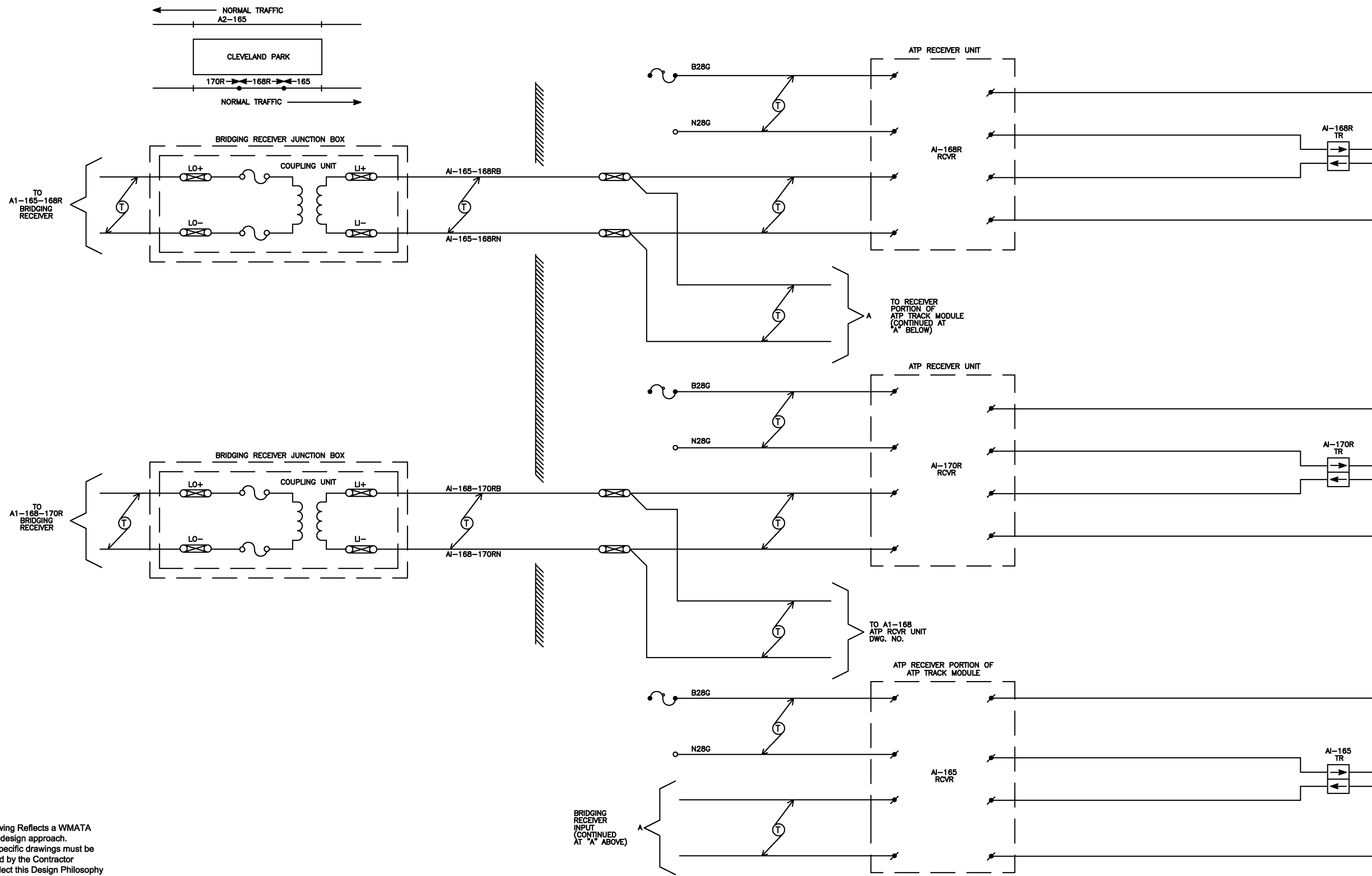
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____ APPROVED DIRECTOR *respatz* May 3, 2001 DATE _____

SPEED LIMIT COMAND CIRCUIT
A1-161-163 QR

SCALE NONE DRAWING NO. ST-TC-A5-S-005



This Drawing Reflects a WMATA standard design approach. Project specific drawings must be developed by the Contractor which reflect this Design Philosophy

DESIGNED	DATE	REFERENCE DRAWINGS		REVISIONS	
		NUMBER	DESCRIPTION	DATE	DESCRIPTION
GAH	6-00			08/2001	Revised and issued by the Authority
DRAWN	DATE				
CHECKED	DATE				
APPROVED	DATE				
UPDATED	DATE				

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 DEPARTMENT OF TRANSIT SYSTEM DEVELOPMENT
 OFFICE OF SYSTEMS

SUBMITTED _____ DATE _____ APPROVED *[Signature]* DATE May 3, 2001
 DIRECTOR

BRIDGING RECEIVER TRACK CIRCUITS
 A1-165, A1-168R & A1-170R

SCALE NONE DRAWING NO. ST-TC-A5-S-024