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 XREFS: TTB A Size.dwg | IMAGES:  
 PLOTTED: Jun 28, 2016 - 12:52:19pm By: AnderLS

NUMBER	TITLE	SHEETS																								
SA-001	TROLLEY STANDARDS DRAWING INDEX	5																								
<b>SPECIAL PARTS AND DESIGNATIONS</b>																										
SA-097	SPECIALWORK MATERIAL LIST	2																								
SA-098	MASTER MATERIAL LIST USAGE REFERENCE	4																								
SA-099	MASTER MATERIAL LIST	4																								
SA-100	SYMBOLS AND ABBREVIATIONS	3																								
SA-101	STRAIN PLATE	1																								
SA-102	STEEL POLE COLLAR	1																								
SA-103	WOOD POLE EYEBOLT ASSEMBLY	1																								
SA-104	WOOD POLE DOWN GUY ASSEMBLY	1																								
SA-106	COMPRESSION POLE BRACKET POLE COLLAR	1																								
SA-107	STAINLESS STEEL EYEBOLT	1																								
SA-108	BRACKET ARM POLE END CAP	1																								
SA-109	BRACKET ARM ARM END CAP	1																								
SA-110	BRACKET ARM SPAN END CAP	1																								
SA-111	WOOD POLE MOUNTING BRACKET	1																								
SA-112	3 1/2" TUBE SOCKET PLATE	1																								
SA-113	3 1/2" TUBE TEE SLIPFIT & SOCKET	1																								
SA-114	BRACKET ARM POLE END CAP WITH BOTTOM TAB	1																								
<b>SPECIAL ASSEMBLIES AND SYSTEM CRITERIA</b>																										
SA-151	SPECIALWORK INSULATED JUMPER ASSEMBLY	1																								
SA-152	TROLLEY WIRE DEADEND ASSEMBLY	2																								
SA-153	STAGING DEADEND ASSEMBLY	1																								
<table border="1"> <tr> <td>No.</td> <td>REVISION</td> <td>BY</td> <td>APPD</td> <td>DATE</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> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>		No.	REVISION	BY	APPD	DATE																<table border="1"> <tr> <td>           STD DET DEVELOPMENT:            A WOLAK             APPROVED:            D CRIPPEN             DSGN/DWN:            D GREER/BFB         </td> <td>  </td> <td>           METRO TRANSIT DIVISION            TROLLEY STANDARDS   <b>INDEX</b> </td> <td>           DATE:            APRIL 2008             STD DET NO:            SA-001             SHT NO:            1 5         </td> </tr> </table>	STD DET DEVELOPMENT: A WOLAK  APPROVED: D CRIPPEN  DSGN/DWN: D GREER/BFB		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>INDEX</b>	DATE: APRIL 2008  STD DET NO: SA-001  SHT NO: 1 5
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NUMBER	TITLE	SHEETS
SA-161	SPECIALWORK DEVICE REFERENCE POINT LOCATIONS	1
SA-163	SPECIALWORK SWITCH CONTACTOR CONFIGURATION	1
SA-164	TROLLEY WIRE SUPPORT SPAN ATTACHMENT CRITERIA	4
SA-165	FROG INDUCTION CONTROL SYSTEM	6
SA-166	ADJUSTMENT POINT	1
SA-167	INSULATION COVERED GUY WIRE REQUIREMENT CRITERIA	1
SA-170	TROLLEY COACH TRAVEL AREA IN CONSTRUCTION ZONE	1
SA-190	TEMPORARY INSULATION BOARD	1

**SUPPORTING STRUCTURES**

<del>SA-201</del>	<del>STANDARD STEEL POLE</del> SEE SP-201	4
SA-202	WOOD POLE FRAMING DETAILS	1
SA-211	OFFSET FOUNDATION (ANCHOR BASE POLE)	7
SA-212	STANDARD FOUNDATION (EMBEDDED STEEL POLE)	4
SA-213	STANDARD FOUNDATION (ANCHOR BASE STEEL POLE)	7
SA-214	WOOD POLE SETTING STANDARD	3
SA-215	EMBEDDED STEEL POLE INSTALLATION	3
SA-216	ANCHOR BASE STEEL POLE INSTALLATION	4
SA-221	BUILDING EYEBOLT INSTALLATION	5
SA-231	DOWN GUY	1
SA-232	SIDEWALK GUY	2
SA-233	HEAD GUY	1
SA-234	BRACKET ARM GUY	2

				STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: APRIL 2008
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NUMBER	TITLE	SHEETS
<b>TROLLEY WIRE SUPPORT ASSEMBLIES</b>		
SA-300	TANGENT SPAN TWO-WAY TRAFFIC W/ K& M HANGERS	1
SA-301	TANGENT SPAN TWO-WAY TRAFFIC	1
SA-302	HOLDUP TANGENT SPAN TWO-WAY TRAFFIC	1
SA-303	INVERTED TANGENT SPAN TWO-WAY TRAFFIC	1
SA-304	HOLDDOWN TANGENT SPAN TWO-WAY TRAFFIC	1
SA-305	BRIDLE TANGENT SPAN TWO-WAY TRAFFIC	2
SA-306	DOUBLE BRIDLE TANGENT SPAN TWO-WAY TRAFFIC	2
SA-307	1° TO 5° CURVE SPAN W/ 2' CURVE RAILS TWO-WAY TRAFFIC	2
SA-308	5.5° TO 7.5° CURVE SPAN W/ 4' CURVE RAILS TWO-WAY TRAFFIC	2
SA-309	TANGENT SPAN THREE TRACKS	1
SA-310	8° TO 30° CURVE SPAN W/ CURVE SEGMENTS TWO-WAY TRAFFIC	2
SA-311	TANGENT SPAN ONE-WAY TRAFFIC	1
SA-312	HOLDUP TANGENT SPAN ONE-WAY TRAFFIC	1
SA-313	INVERTED TANGENT SPAN ONE-WAY TRAFFIC	1
SA-314	HOLDDOWN TANGENT SPAN ONE-WAY TRAFFIC	1
SA-315	BRIDLE TANGENT SPAN ONE-WAY TRAFFIC	2
SA-316	DOUBLE BRIDLE TANGENT SPAN ONE-WAY TRAFFIC	2
SA-317	1° TO 5° CURVE SPAN W/ 2' CURVE RAILS ONE-WAY TRAFFIC	2
SA-318	5.5° TO 7.5° CURVE SPAN W/ 4' CURVE RAILS ONE-WAY TRAFFIC	1
SA-320	8° TO 30° CURVE SPAN W/ CURVE SEGMENT ONE-WAY TRAFFIC	2
SA-321	DOUBLE FEEDER SPAN TWO-WAY TRAFFIC	3

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NUMBER	TITLE	SHEETS
SA-322	SINGLE FEEDER SPAN TWO-WAY TRAFFIC	2
SA-325	EQUALIZER SPAN TWO-WAY TRAFFIC	1
SA-331	DOUBLE FEEDER SPAN ONE-WAY TRAFFIC	3
SA-332	SINGLE FEEDER SPAN ONE-WAY TRAFFIC	2
SA-333	SECTIONALIZING SPAN ONE-WAY TRAFFIC	1
SA-334	TROLLEY WIRE SPREADER BAR	1
SA-341	STEEL POLE BRACKET ASSEMBLY TANGENT CONSTRUCTION	2
SA-342	STEEL POLE BRACKET ASSEMBLY CURVE CONSTRUCTION	2
SA-343	STEEL POLE BRACKET ASSEMBLY COMPRESSION TYPE	4
SA-345	STEEL POLE BRACKET ASSEMBLY UNDERSLING CONSTRUCTION	2
SA-348	STEEL POLE HOLDDOWN BRACKET ASSEMBLY	2
SA-349	STEEL POLE TANGENT FEEDER BRACKET ASSEMBLY	3
SA-351	WOOD POLE BRACKET ASSEMBLY TANGENT CONSTRUCTION	2
SA-352	WOOD POLE BRACKET ASSEMBLY CURVE CONSTRUCTION	2
SA-355	WOOD POLE BRACKET ASSEMBLY UNDERSLING CONSTRUCTION	2
SA-358	WOOD POLE HOLDDOWN BRACKET ASSEMBLY TANGENT CONST	2
SA-361	TRAFFIC MAST ARM TROLLEY SUPPORT	1
SA-370	SPAN WIRES LIMITED SPACE TYPICAL VARIANCES	2
SA-371	SWITCH & CURVE SEGMENT PULLOFFS	9
SA-372	CROSSOVER HOLDUP SPAN	2
SA-373	CONVENTIONAL CURVE WITH CURVE RAILS	4

				STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: APRIL 2008
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NUMBER	TITLE	SHEETS
<b>SPECIAL DETAILS</b>		
SA-401	LIGHTNING ARRESTERS AT FEEDER RISER POLES	6
SA-402	FEEDER RISER POLE	3
SA-403	STEEL POLE FEEDER RISER WITH STREETLIGHT	1
SA-411	DUCTBANK CONCRETE ENCASED	2
<b>PURCHASE REQUIREMENTS</b>		
SP-201	STANDARD STEEL POLE PURCHASE REQUIREMENTS	13

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		STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>INDEX</b>	DATE: <b>APRIL 2008</b>
		APPROVED: <b>D CRIPPEN</b>			STD DET NO: <b>SA-001</b>
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**SPECIALWORK MATERIAL LIST**

ITEM #	DESCRIPTION	WABCO CAT. NO.
1	15° WSE, RH, IC, RS	55964-3001
2	15° WSE, LH, IC, RS	55964-3002
3	15° WSE, RH, IC, RC	55964-3005
4	15° WSE, LH, IC, RC	55964-3006
5	15° WSE, RH, IS, RS	55973-3001
6	15° WSE, LH, IS, RS	55973-3002
7	15° WSE, RH, IS, RC	55973-3003
8	15° WSE, LH, IS, RC	55973-3004
9	15° WTR, RH, IC, RC	55979-3001
10	15° WTR, LH, IC, RC	55979-3002
11	15° WTR, RH, IC, RS	55979-3005
12	15° WTR, LH, IC, RS	55979-3006
13	15° WTR, RH, IS, RC	55981-3001
14	15° WTR, LH, IS, RC	55981-3002
15	15° WTR, RH, IS, RS	55981-3003
16	15° WTR, LH, IS, RS	55981-3004
17	30° WSE, RH, IC, RS	56425-3001
18	30° WSE, LH, IC, RS	56425-3002
19	30° WSE, RH, IC, RC	56425-3003
20	30° WSE, LH, IC, RC	56425-3004
21	30° WSE, RH, IS, RS	57143-3001
22	30° WSE, LH, IS, RS	57143-3002
23	30° WSE, RH, IS, RC	57143-3003
24	30° WSE, LH, IS, RC	57143-3004
25	30° WTR, RH, IS, RC	56596-3005
26	30° WTR, LH, IS, RC	56596-3006
27	30° WTR, RH, IS, RS	56596-3007
28	30° WTR, LH, IS, RS	56596-3008
29	30° WTR, RH, IC, RC	56597-3001
30	30° WTR, LH, IC, RC	56597-3002
31	30° WTR, RH, IC, RS	56597-3005
32	30° WTR, LH, IC, RS	56597-3006
33	17° RXO	17872 A OR B
34	27° RXO	17874 A OR B
35	30° RXO	55968-3003
36	37° RXO	17877 A OR B
37	45° RXO	55967-3003
38	50° RXO	57857-3007
39	60° RXO	55966-3001
40	90° RXO	55965-3001
41	30°- 60° XOCS, RH	57123-3001
42	30°- 60° XOCS, LH	57123-3002
43	30°- 45° XOCS, LH	55969-3001

No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
**A WOLAK**

APPROVED:  
**D CRIPPEN**

DSGN/DWN:  
**D GREER**



METRO TRANSIT DIVISION  
TROLLEY STANDARDS

**SPECIAL WORK  
MATERIAL LIST**

DATE:  
**APRIL 2008**

STD DET NO:  
**SA-097**

SHT NO:  
**1 2**

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**SPECIALWORK MATERIAL LIST**

ITEM #	DESCRIPTION	WABCO CAT. NO.
44	58° TO 65° AXO	18438
45	66° TO 90° AXO	18437
46	15° Y, IND, ILH, RST RH	59503-3004
47	23° WSE, RH, IC, RS	55961-3001
48	23° WSE, LH, IC, RS	55961-3002
49	23° WTR, RH, IC, RS	55978-3001
50	23° WTR, LH, IC, RS	55978-3002
51	45° WSE, RH, IC, RS	56593-3001
52	45° WSE, LH, IC, RS	56593-3002
53	45° WSE, RH, IC, RC	56593-3005
54	45° WSE, LH, IC, RC	56593-3006
55	45° WSE, RH, IS, RS	57904-3001
56	45° WSE, LH, IS, RS	57904-3002
57	45° WSE, RH, IS, RC	57904-3005
58	45° WSE, LH, IS, RC	57904-3006
59	45° WTR, RH, IC, RC	56595-3005
60	45° WTR, LH, IC, RC	56595-3006
61	45° WTR, RH, IC, RS	56595-3007
62	45° WTR, LH, IC, RS	56595-3008
63	45° WTR, RH, IS, RC	56592-3005
64	45° WTR, LH, IS, RC	56592-3006
65	45° WTR, RH, IS, RS	56592-3007
66	45° WTR, LH, IS, RS	56592-3008

## LEGEND

- RH = RIGHT HAND SWITCH
- LH = LEFT HAND SWITCH
- IC = INSULATION IN CURVE
- IS = INSULATION IN STRAIGHT
- WSE = ELECTRICALLY OPERATED INDUCTIVE SWITCH
- WTR = TRAILING SWITCH
- RXO = RIGID CROSSOVER
- RC = RESET TO CURVE
- RS = RESET TO STRAIGHT
- XOCS = CROSSOVER CURVE SEGMENT
- Y = Y SWITCH
- IND = ELECTRICALLY OPERATED INDUCTIVE SWITCH
- ILH = INSULATION IN LH OF Y
- RST RH = RESET TO RH OF Y
- AXO = ADJUSTABLE CROSSOVER

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				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-097
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**MASTER MATERIAL LIST**

ITEM #	METRO STANDARD SA- WHICH USES THE ITEM
01	153,165,190,300,301,302,303,304,305,306,307,309,311,312,313,314,315,316,317,321,322,325,331,332,334,345,348,355,358
02	190,301,302,305,306,309,311,312,315,316,355,345
03	152,166,167,233,300,301,302,303,304,305,306,307,308,309,310,311,312,313,314,315,316,317,318,320,321,322,325,331,332,342,343,345,348,352,370,371,372,373,355,358
04	152,233,300,301,302,303,304,305,306,307,308,309,310,311,312,313,314,315,316,317,318,320,321,322,325,331,332,342,343,345,348,352,370,371,372,373,355,358
05	152,166,233,300,301,302,303,304,305,306,307,308,309,310,311,312,313,314,315,316,317,318,320,321,322,325,331,332,342,343,345,348,352,370,371,372,373,355,358
06	152,166,233,300,301,302,303,304,305,306,307,308,309,310,311,312,313,314,315,316,317,318,320,321,322,325,331,332,342,343,345,348,352,370,371,372,373,355,358
07	152,233,300,301,302,303,304,305,306,307,308,309,310,311,312,313,314,315,316,317,318,320,321,322,325,331,332,342,343,345,348,352,370,371,372,373,355,358
08	152,166,167,233,300,301,302,303,304,305,306,307,308,309,310,311,312,313,314,315,316,317,318,320,321,322,325,331,332,342,343,345,348,352,370,371,372,373,355,358
09	152,305,306,310,315,316,331,371,372
10	153,303,304,307,308,313,314,317,318,334,342,345,348,352,370,373,358
11	152,310,342,343,345,348,352,371,372,355,358
12	310,320,322,325,332,342,343,345,352,370,371,373
13	152,166,167,231,232,233,305,306,315,316,371,373
14	152,153,231,232,233,305,306,315,316,371,373
15	166,233,305,306,315,316,341,342,345,348,349,351,352,371,373,355,358
16	152,166,167,231,232,233,305,306,315,316,371,373
17	152,153,233,234,305,306,315,316,341,342,345,348,349,351,352,371,373,355,358
18	167,310,372
19	167
20	343
21	321,322,331,332
22	321,322,325,331,332
23	153,321,331
24	361
25	310,320,342,352
26	321,322,331,332
27	321,322,331,332
28	341,348,349,351,361,358
29	333
30	341,349,351,361

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**MASTER MATERIAL LIST**

ITEM #	METRO STANDARD SA- WHICH USES THE ITEM
31	341,349,351,361
32	325
33	325
34	152,153
35	163,165
36	361
37	333
38	152
39	152,308,348,358
40	321,331,342,345,352
41	321,322,325,331,332,349
42	349
43	*
44	WFSC ONLY
45	WFSC ONLY
46	WFSC ONLY
47	WFSC ONLY
48	*
49	349
50	349
51	349
52	349
53	307,317,342,352,373
54	308,318,342,352,373
55	234,341,342,345,348,349,351,352,355,358
56	234,341,342,345,348,349,351,352,355,358
57	341,342,345,348,349,351,352,358
58	300,345
59	402
60	321,322,331,332,349,402
61	231,232
62	231
63	232
64	232
65	232,351
66	232
67	401
68	402
69	402
70	321,331,372
71	402
72	165
73	WFSC ONLY

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**MASTER MATERIAL LIST**

ITEM #	METRO STANDARD SA- WHICH USES THE ITEM
74	190
75	190
76	325
77	401,411
78	401
79	341,349,351
80	321,331,341,343,349,351,361,401
81	401
82	232
83	401
84	343,361
85	401
86	402
87	361
88	361
89	361
90	234,341,342,345,348,349,351,352,355,358
91	401
92	373
93	401
94	103,351,352,355,358
95	103
96	103,351,352,355,358
97	104,351,352,355,358
98	104
99	103,104,351,352
100	321,331
101	152,321,331
102	152,164,233,234,300,301,302,303,304,305,306,307,308,309,310,311,312,313,314,315,316,317,318,320,321,322,325,331,332,341,342,343,345,348,349,371,372,373,355,358
103	152,164,233,234,300,301,302,303,304,305,306,307,308,309,310,311,312,313,314,315,316,317,318,320,321,322,325,331,332,371,372,373
104	231,232
105	*
106	343
107	SEE PLANS FOR FREQUENCY OF USE (USED WITH SA-221)
108	341,349,351,352,348,355,345,342,358
109	341,349,351
110	342,345,348,352,355,358
111	351,352,355,358
112	ATL BASE TRACK SPREADER
113	ATL BASE TRACK SPREADER

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MASTER MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01		DETROIT CLAMP ASSY	WABCO	19293-3007
02		AGC TANGENT SPAN HANGER	WABCO	19360-2000
03		GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04		GUY GRIP DEADEND	PREFORMED	CDE-3106
05		WIRE ROPE CLIP, 5/16"	CROSBY	G450
06		FRICITION TAPE, 3/4" (6 WRAPS)		
07		THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08		GUY STRAND	COPPERWELD	8M
09		BULL RING	WABCO	18567-2000
10		HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
11		7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
12		7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
13		GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	506
14		GUY GRIP DEADEND	PREFORMED	CDE-3115
15		WIRE ROPE CLIP, 3/8"	CROSBY	G450
16		GUY STRAND	COPPERWELD	16M
17		THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
18		GUY STRAND, COVERED	COPPERWELD	8MI
19		GUY STRAND, COVERED	COPPERWELD	16MI
20		EYEBOLT	WABCO	11933-2000
21		7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6360
22		CLAMP STRAIN EYE	WABCO	10571-2000
23		7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6260
24		TROLLEY WIRE SUPPORT ASSY	WABCO	54962-3003
25		CURVE SEGMENT 8-12 DEG TYPE C	WABCO	22301-3014
		CURVE SEGMENT 13-27 DEG TYPE C	WABCO	22302-3005
		CURVE SEGMENT 28-47 DEG TYPE C	WABCO	22303-3005
26		TYPE PH-4 POS FEED SPAN HANGER	WABCO	54937-3002
27		TYPE PH-5 NEG FEED SPAN HANGER	WABCO	54936-3002
28		INSULATOR SPOOL	WABCO	16835-2000
29		TYPE TCL CLEVIS TIP 4/0	WABCO	54950-3002
30		TROLLEY SUPPORT-LARGE PIPE ARMS	WABCO	54940-4001
31		SPRING DETROIT CLAMP	WABCO	54959-3001
32		TYPE PH-5 NEG FEED SPAN HANGER	WABCO	54936-3001
33		TYPE PH-4 POS FEED SPAN HANGER	WABCO	54937-3001
34		TYPE T DOUBLE EAR STRAIN CLAMP	WABCO	17700-2000
35		CLAMP-INSUL LEAD WIRE	WABCO	19655-2000
36		7/8 TRANSLITE STRAIN INSUL W/ ADJUST END FITTINGS	WABCO	54980-6385
37		NO-BO SECTION INSUL	WABCO	55025-3001
38		7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6200

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		STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>MASTER MATERIAL LIST                  USAGE REFERENCE</b>	DATE: <b>APRIL 2008</b>
		APPROVED: <b>D CRIPPEN</b>				STD DET NO: <b>SA-099</b>
		DSGN/DWN: <b>D GREER/BFB</b>				SHT NO: <b>1 4</b>
No.	REVISION	BY	APPD	DATE		

MASTER MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
39		5/8" SHACKLE	WABCO	13722-2000
40		7/8 TRANSLITE STRAIN INSUL CL-90	WABCO	54995-6120
41		H.S.P. FEEDER CLAMP ASSY, BRONZE	WABCO	19879-2000
42		FEEDER CLAMP, BRONZE	WABCO	19790-4004
43				
44		RUNNER, 6 FT TYPE C, 8 TO 12 DEG	WABCO	21375-2000
45		PLATE-STRAIN 5 TO 12 DEG	WABCO	20290-2000
46		SINGLE CURVE HANGER, TYPE A-2	WABCO	14072-2000
47		DOUBLE CURVE HANGER, TYPE A-2	WABCO	14073-2000
48		5/8" U-BOLT GALVANIZED	VARIES	VARIES
49		COMPRESSION CONNECTOR COPPER, LONG BARREL, TIN PLATED, FLARED	ANDERSON/ SQUARE D	VHCL- 2/0-12BNF
50		COMPRESSION CONNECTOR COPPER, LONG BARREL, TIN PLATED, FLARED	ANDERSON/ SQUARE D	VHCL- 500-12BNF
51		MULTI-LOK TIES (18") NYLON COATED	BAND-IT	AE714
52		TUF NEOPRENE AIR HOSE SLEEVE 1.5" ID x 2.0625" OD (BLACK)	McMASTER- CARR	3 BRAID
53		CURVE RAIL (1° TO 5°, 2' LG)	K & M	851 B412/0
54		CURVE RAIL (5.5° TO 7.5°, 4' LG)	K & M	851 B412/1
55		PHILLYSTRAN (3/8")	PHILLYSTRAN INC	HPTG 6700I
56		PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC	PLP 2755
57		FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 5" DIA x 1/4"	STRONGWELL	EXTREN SERIES 525
58		TANGENT SPAN HANGER	K & M	C-1728-01
59		CONDUIT CLAMP WITH 2" MTG SCREW		
60		FEED SPAN CABLE, 500 KNM CU UNSHIELDED, 5KV EPR WITH PVC JACKET		
61		GUY GUARD, 8 FT FOR USE ON 3/16" TO 1/2" STRAND	PREFORMED	PG 5518
62		POWER INSTALLED SCREW ANCHOR	CHANCE	E102-1219
63		POWER INSTALLED SCREW ANCHOR	CHANCE	C102-1260
64		POLE PLATE, 2 1/2" PIPE	JOSLYN	J0521
65		LAG SCREW, FETTER DRIVE, 1/2" x 4"	JOSLYN	J8754
66		END FITTING, 2 1/2" PIPE	COOPER POWER SYSTEM	DG5G1
67		CLOVERLEAF EPOXIROD STANDOFF	CHANCE	C653-1038
68		UNIVERSAL SERVICE CONNECTOR	BURNDY	KVSU34
69		SEALING BUSHING, TYPE KR WITH TYPE M CABLE SUPPORT, 2 1/2" CONDUIT	O-Z-GEDNEY	KR250 & RPLG-2001-1
70		EYEBOLT, 5/8" x 6" WITH 2 NUTS & LOCKWASHER		

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					STD DET DEVELOPMENT: A WOLAK	 King County Department of Transportation	METRO TRANSIT DIVISION TROLLEY STANDARDS  MASTER MATERIAL LIST USAGE REFERENCE	DATE: FEB 2013
					APPROVED: D CRIPPEN			STD DET NO: SA-099
					DSGN/DWN: D GREER/BFB			SHT NO: 2 4
No.	REVISION	BY	APPD	DATE				

MASTER MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
71		WATERTIGHT STR STRAIN RELIEF CONN, 1 1/2" CONDUIT	O-Z-GEDNEY	SR 15012 H.D. GALV
72		INDUCTIVE CONTROL SYSTEM RECEIVER INDUCTIVE CONTROL SYSTEM ANTENNA	UNITRAC UNITRAC	320100-16X 320310-4X
73		ANCHOR SHACKLE	JOSLYN	J2742
74		4' x 8' x 1/2" EXTERIOR PLYWOOD		
75		U-BOLT TO FIT 4/0 TROLLEY WIRE		
76		4/0 STRANDED INSUL CABLE		
77		ELECT WARNING TAPE, 6" YELLOW	BRADY	UT 20-Y6
78		CONNECTOR, PARALLEL CLAMP	BURNDY	QPX342C
79		5/8"-11 UNC x 3/8" STUD		
80		3/4" x 0.03" SS BANDING TYPE 201	BAND-IT	C206
81		CONNECTOR, SERVICE, SPLIT BOLT	BURNDY	KS20
82		2 1/2" DIA ASTM A53 GRB STD WT GALV STEEL PIPE		
83		MOLDING, PLASTIC, GROUND WIRE, 1/2" x 1/16" x 8'	JOSLYN	PM128
84		SCHED 40 PVC, GREY, SPLIT		
85		1000 VOLT DC ARRESTER, 907 MCOV	IMPULSE	P/N 1057
86		GALV RIGID STEEL CONDUIT		
87		5/8"-11 UNC x 6" THREADED ROD, GALV ASTM A36	5/8"-11 UNC x 6" THREADED R GALV ASTM A36	
88		5/8"-11 UNC HVY HEX JAM NUT GALV ASTM A563 GRA		
89		11/16" LOCKWASHER		
90		HEAVY PIPE CLAMP, GALV	GRINNELL	FIG 216
91		STAPLES, ROLLED POINT, GALV, 2" x 1/2" x 0.162"	JOSLYN	J156
92		ANGLE CLAMP, DUCTILE IRON	ANDERSON/ SQUARE D	82860-2000
93		STAPLES, ROLLED POINT, GALV, 1 3/4" x 1/4" x 0.148"	JOSLYN	J1673
94		5/8" OVAL EYEBOLT WITH NUT	JOSLYN	J94XX
95		3/4" OVAL EYEBOLT WITH NUT	JOSLYN	J95XX
96		SQ CURVED WASHER 3" x 3" x 1/4", 11/16" DIA	JOSLYN	J113
97		3/4" MACHINE BOLT	JOSLYN	J89XX
98		GUY HOOK, 3/4"	STANLEY FLAGG	P133AX
99		SQ CURVED WASHER 3" x 3" x 1/4", 13/16" DIA	JOSLYN	J6823
100		EPPOXIROD DEADEND ARM	CHANCE	COEH36DP
101		STRAIN PLATE	METRO STD	SA-101

No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
A WOLAK

APPROVED:  
D CRIPPEN

DSGN/DWN:  
D GREER/BFB



METRO TRANSIT DIVISION  
TROLLEY STANDARDS

**MASTER MATERIAL LIST  
USAGE REFERENCE**

DATE:  
APRIL 2008

STD DET NO:  
SA-099

SHT NO:  
3 4

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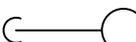
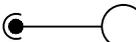


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STANDARD #

SYMBOLS

DESCRIPTION

		EXISTING WOOD POLE
SA-202 & SA-214		INSTALL WOOD POLE
		REMOVE WOOD POLE
		EXISTING DIRECT EMBEDMENT STEEL POLE
SA-201,SA-212 & SA-215		INSTALL DIRECT EMBEDMENT STEEL POLE
		REMOVE DIRECT EMBEDMENT STEEL POLE
		EXISTING ANCHOR BASE STEEL POLE
SA-201,SA-213 & SA-216		INSTALL ANCHOR BASE STEEL POLE
		REMOVE ANCHOR BASE STEEL POLE
		EXISTING BUILDING EYEBOLT
SA-107 & SA-221		INSTALL NEW BUILDING EYEBOLT
		EXISTING DOWN GUY ON POLE
SA-231		INSTALL DOWN GUY ON POLE
		EXISTING SIDEWALK GUY ON POLE
SA-232		INSTALL SIDEWALK GUY ON POLE
		EXISTING HEAD GUY, POLE TO POLE
SA-233		INSTALL HEAD GUY, POLE TO POLE
		EXISTING POLE BRACKET
SA-351 & SA-352		INSTALL WOOD POLE BRACKET
SA-341 & SA-342		INSTALL STEEL POLE BRACKET
		TRAFFIC SIGNAL MAST ARM

				STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>SYMBOLS AND          ABBREVIATIONS</b>	DATE: JULY 2016
				APPROVED: D CRIPPEN			STD DET NO: SA-100
				DSGN/DWN: D GREER/BFB/LSA			SHT NO: 1 3
No.	REVISION	BY	APPD	DATE			

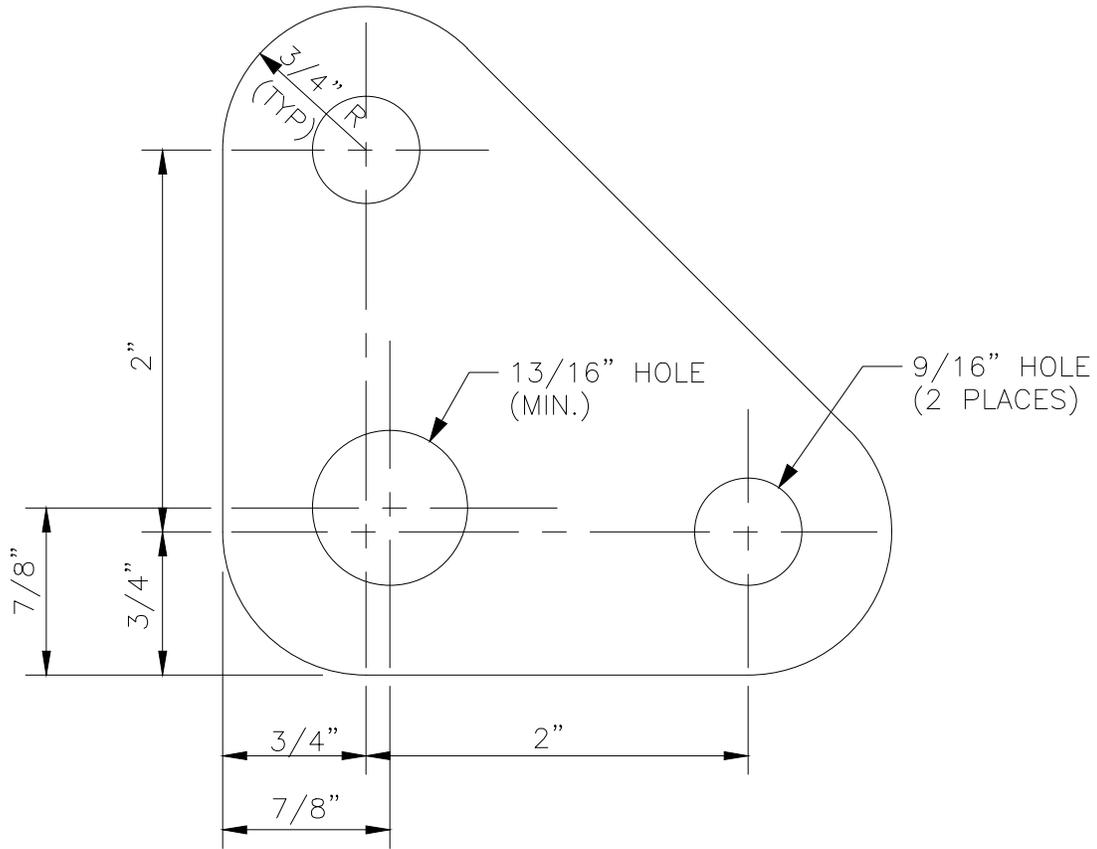


# ABBREVIATIONS

BEB	BUILDING EYEBOLT	
CS	CURVE SEGMENT	
DCH	DOUBLE CURVE HANGER	
LHI	LEFT HAND INDUCTIVE SWITCH	
RHI	RIGHT HAND INDUCTIVE SWITCH	
LHD	LEFT HAND DIRECTIONAL SWITCH	
RHD	RIGHT HAND DIRECTIONAL SWITCH	
LHT	LEFT HAND TRAILING SWITCH	
RHT	RIGHT HAND TRAILING SWITCH	
RXO	RIGID CROSSOVER	
XOCS	RIGID CROSSOVER AND CURVE SEGMENT ASSEMBLY	
IS	INSULATION IN THE STRAIGHT	
IC	INSULATION IN THE CURVE	
RS	RESET TO STRAIGHT	
C	SEATTLE CITY LIGHT	}
L	LUMINAIRE, SED	
M	METRO	
S	TRAFFIC SIGNAL, SED	
T	TELEPHONE	
V	CABLE TV	PRESENTED IN VARIOUS JOINT USE POLE COMBINATIONS
8M, 16M	COPPERWELD GUY WIRE	
8MI, 16MI	COPPERWELD GUY WIRE, COVERED	

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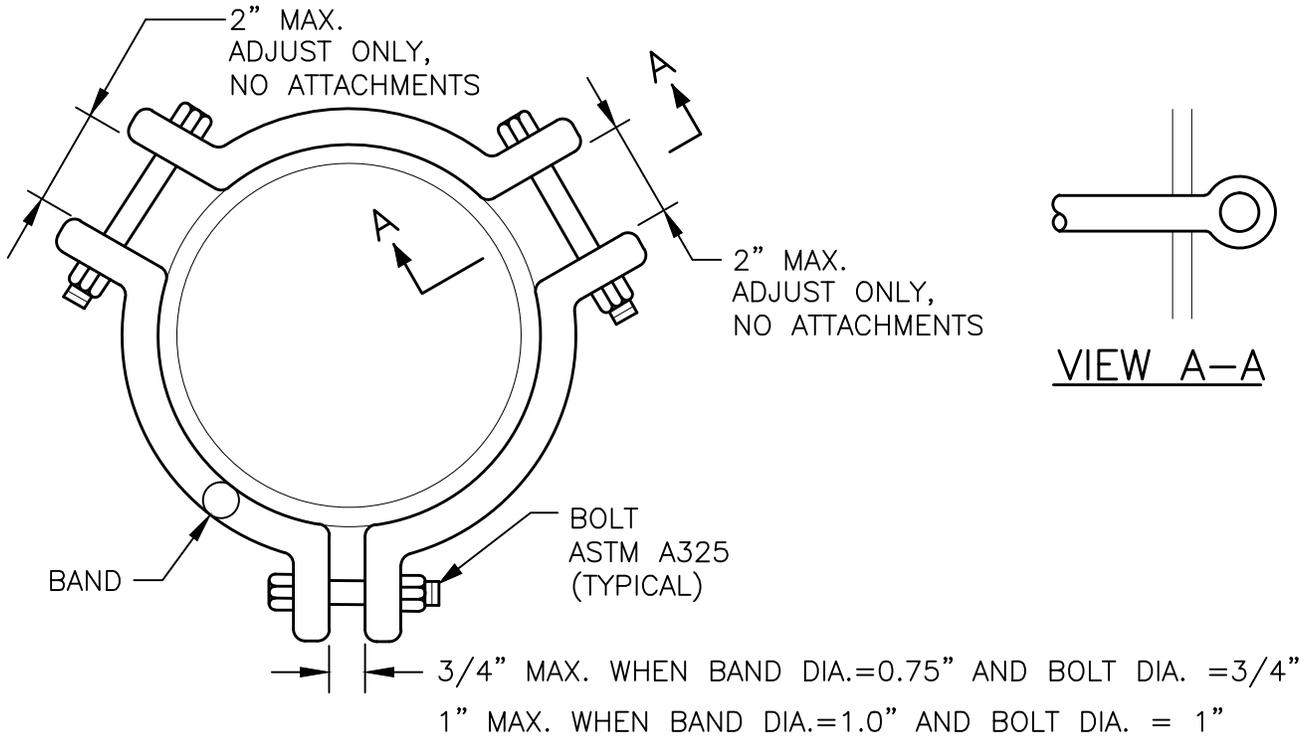
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					APPROVED: D CRIPPEN		<b>SYMBOLS AND ABBREVIATIONS</b>	STD DET NO: SA-100
					DSGN/DWN: D GREER/BFB/LSA			SHT NO: 3 3
No.	REVISION	BY	APPD	DATE				



MATERIAL: ASTM A36 1/2" STEEL PLATE  
 HOT DIP GALVANIZE AFTER  
 FABRICATION.

NOTE: USED ON DOUBLE FEEDER SPANS  
 AND DEADENDS.

				STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: JULY 2016
				APPROVED: D CRIPPEN			STD DET NO: SA-101
				DSGN/DWN: D GREER/BFB/LSA		STRAIN PLATE	SHT NO: 1 1
No.	REVISION	BY	APPD	DATE			



COLLAR MAX LOAD=2500 LB			
DIAMETER RANGE	POLE SIZE		BAND & BOLT DIA.
	BUTT $\phi$	ATT HT	
4.25" - 5.5"	8"	19' - 24'	.75"
6" - 7.25"	10"	19' - 29'	.75"
7" - 8.25"	11"	19' - 29'	.75"
8" - 9.25"	12"	19' - 29'	.75"
9" - 10.25"	13"	19' - 29'	.75"
10" - 11.25"	14"	19' - 29'	.75"
11" - 12.25"	15"	19' - 29'	.75"

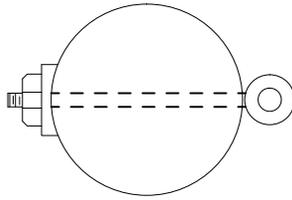
COLLAR MAX LOAD=5000 LB			
DIAMETER RANGE	POLE SIZE		BAND & BOLT DIA.
	BUTT $\phi$	ATT HT	
9" - 10.25"	13"	19' - 29'	1"
10" - 11.25"	14"	19' - 29'	1"
11" - 12.25"	15"	19' - 29'	1"

NOTES

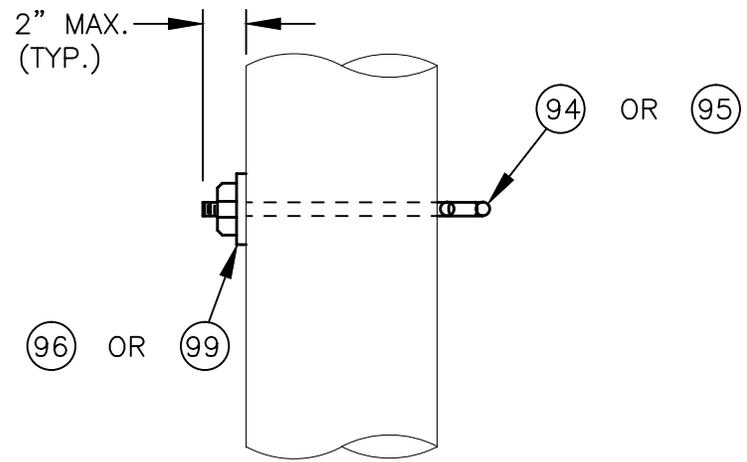
- CONTACT KORTICK MFG CO AT: 5600 3RD ST, SAN FRANCISCO, CA (415) 822-6660
- MAXIMUM NUMBER OF ATTACHMENTS PER COLLAR IS ONE, UNLESS APPROVED BY THE ENGINEER.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
		STD DET DEVELOPMENT: A WOLAK APPROVED: D CRIPPEN DSGN/DWN: D GREER/BFB/LSA		METRO TRANSIT DIVISION TROLLEY STANDARDS  STEEL POLE COLLAR
No.	REVISION	BY APPD DATE		DATE: JULY 2016 STD DET NO: SA-102 SHT NO: 1 1



PLAN



WOOD POLE EYEBOLT

NOTES:

- WOOD POLE EYEBOLTS SHALL HAVE A MINIMUM DIAMETER OF 5/8". 5/8" DIAMETER EYEBOLTS SHALL BE USED FOR WOOD POLE ATTACHMENT OF ALL SINGLE 8M TANGENT WORK SPANS. 3/4" DIAMETER EYEBOLTS SHALL BE USED FOR ALL OTHER WOOD POLE ATTACHMENTS.
- MULTIPLE CABLE ATTACHMENTS TO 3/4" DIAMETER EYEBOLTS SHALL BE LIMITED TO A RESOLVED (RESULTANT) DESIGN TENSION OF 5000 LBS @ 60 DEGREES F.

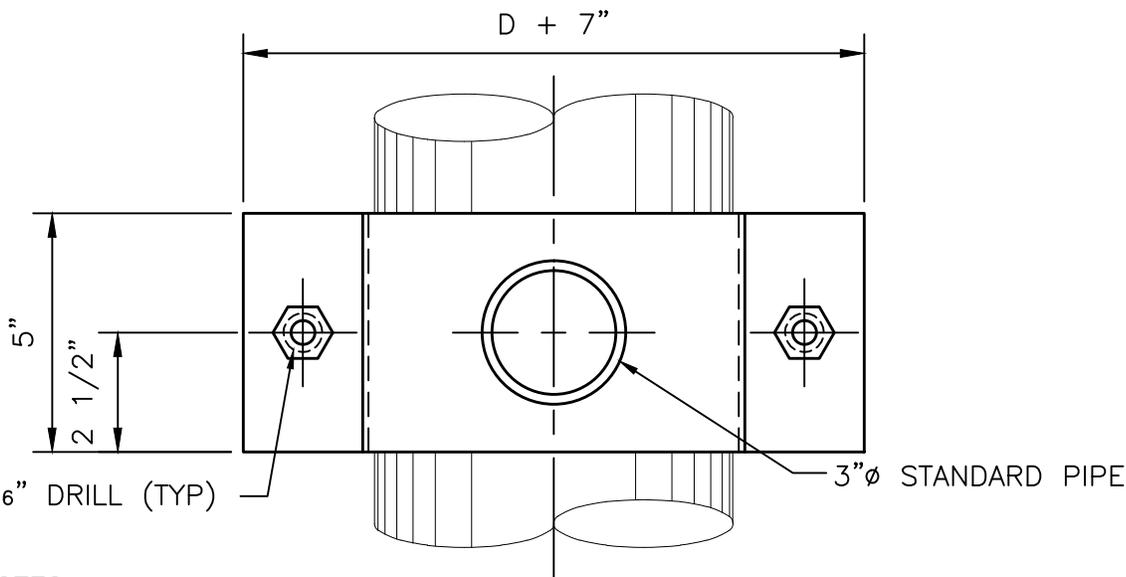
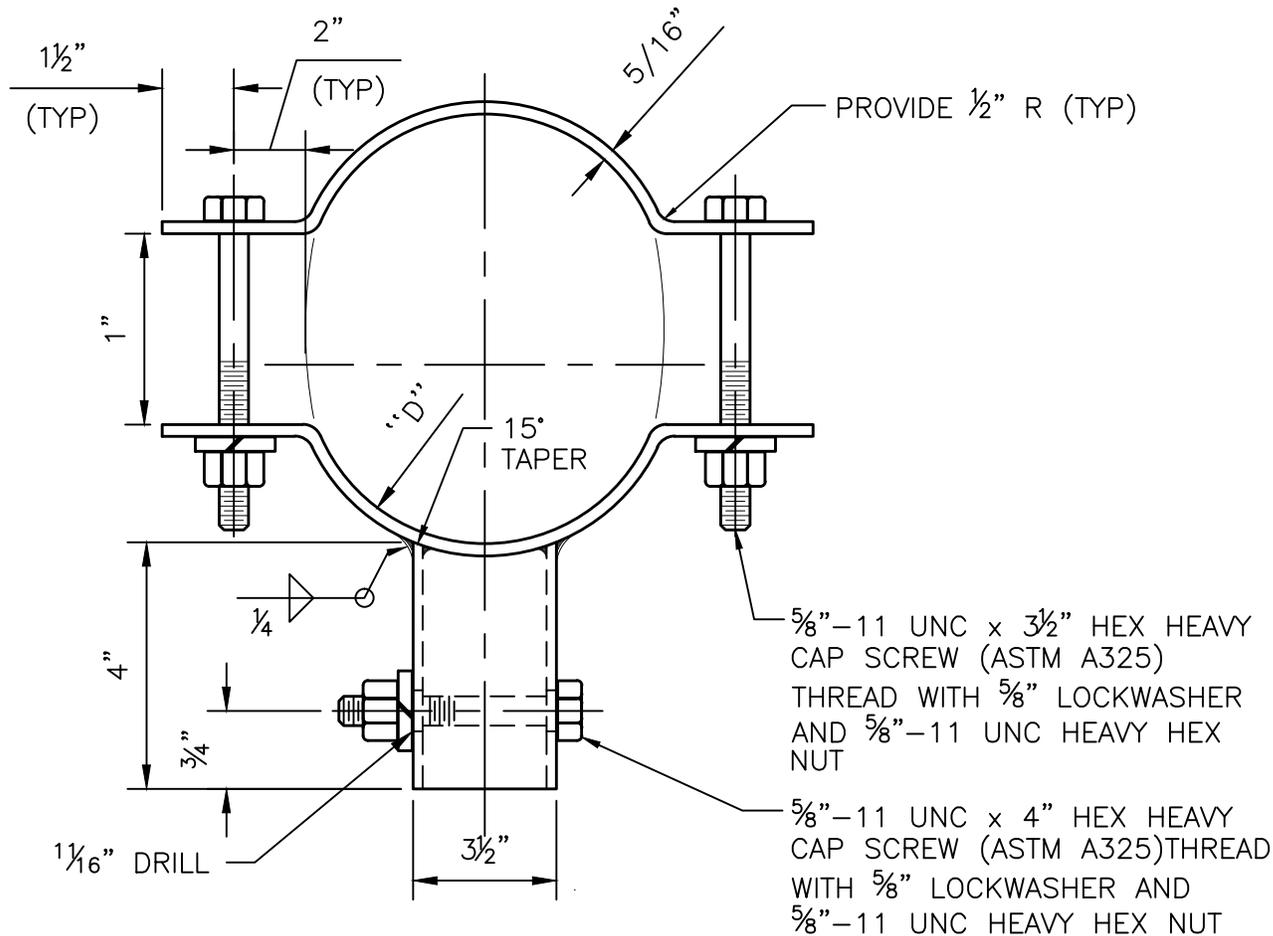
MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
94	*	5/8" OVAL EYEBOLT W/ NUT	JOSLYN	J94XX
95	*	3/4" OVAL EYEBOLT W/ NUT	JOSLYN	J95XX
96	*	SQ CURVED WASHER 3"x3"x <sup>1</sup> / <sub>4</sub> ", <sup>1</sup> / <sub>16</sub> " DIA	JOSLYN	J113
99	*	SQ CURVED WASHER 3"x3"x <sup>1</sup> / <sub>4</sub> ", <sup>13</sup> / <sub>16</sub> " DIA	JOSLYN	J6823

				STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS  WOOD POLE EYEBOLT ASSEMBLY	DATE: JULY 2016
				APPROVED: D CRIPPEN			STD DET NO: SA-103
				DSGN/DWN: D GREER/BFB/LSA			SHT NO: 1 1
No.	REVISION	BY	APPD	DATE			

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**NOTES**

1. DIMENSION "D" TO BE FIELD MEASURED AT DESIGN ATTACHMENT HEIGHT.
2. MATERIAL FOR COLLARS SHALL BE ASTM A-36 STEEL. HOT DIP GALVANIZE METAL AFTER FABRICATION.

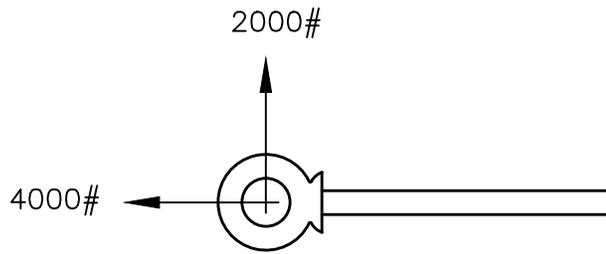
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APPROVED: D CRIPPEN
DSGN/DWN: D GREER/BFB/LSA

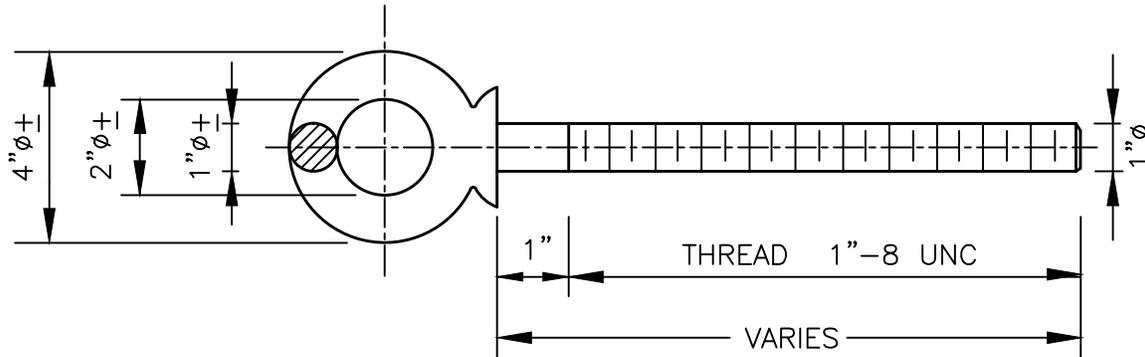


METRO TRANSIT DIVISION  
 TROLLEY STANDARDS  
  
 COMPRESSION  
 POLE END CAP  
 POLE COLLAR

DATE:	JULY 2016
STD DET NO:	SA-106
SHT NO:	1 1



ALLOWABLE DEAD LOAD AT 60°.



**NOTES:**

1. EYEBOLT SHALL BE 1" DROP FORGED, STAINLESS STEEL, SHOULDER PATTERN; MADE FROM TYPE 316 STAINLESS STEEL, UNC-2 THREADS, ELECTRO-POLISHED FINISH.
2. EYEBOLT SHALL BE MCGRAW-EDISON, CAMPBELL CHAIN M-29-ST 640-5015, MCMASTER-CARR 3032T49. NUMBERS ARE FOR 6" LENGTH; OTHER LENGTHS ARE SPECIAL.
3. MATERIAL YIELD STRESS SHALL BE 30,000 PSI MIN. TENSILE STRESS SHALL BE 75,000 PSI MIN.

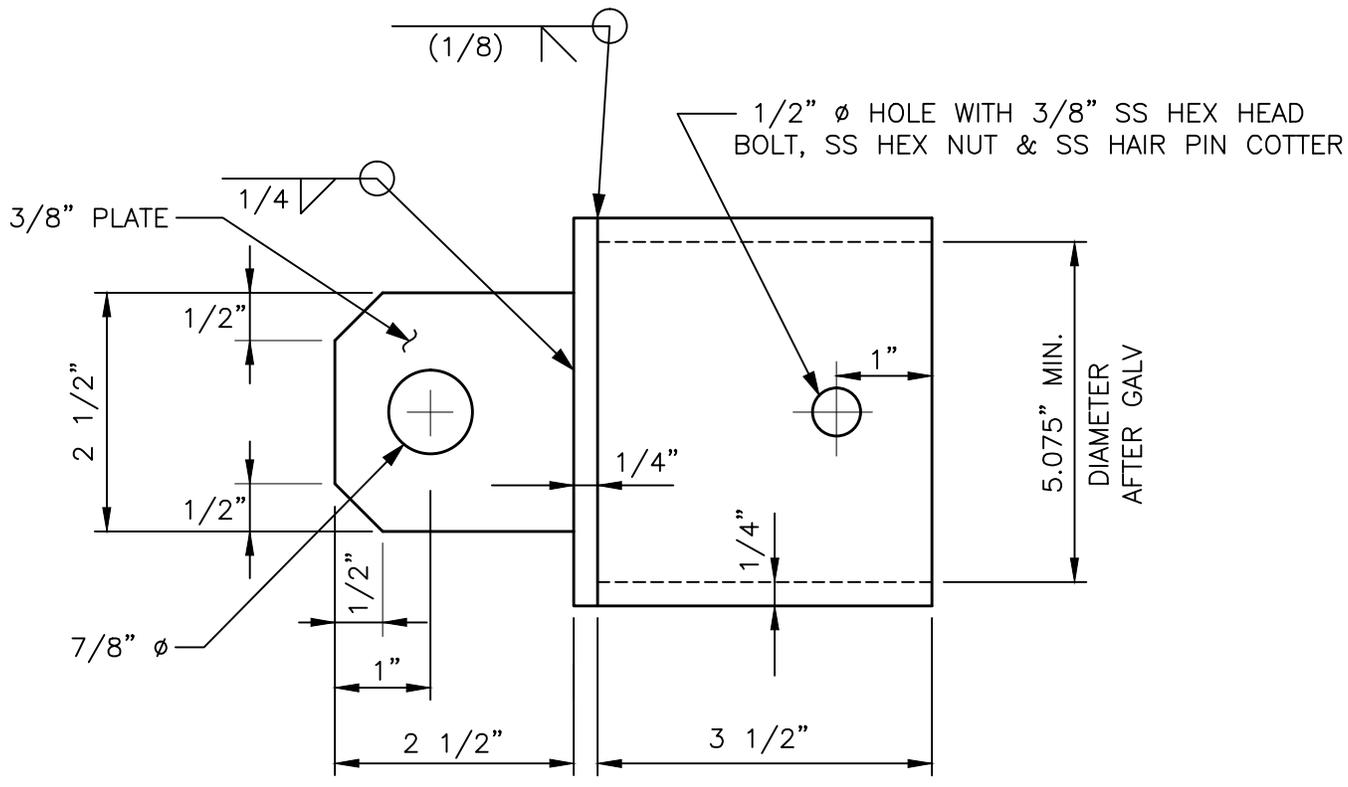
**DESIGN NOTES:**

1. THE DEAD LOAD + LIVE LOAD IS 2 TIMES THE ALLOWABLE DEAD LOAD AT 60°. THE BREAKING LOAD IS 4 TIMES THE ALLOWABLE DEAD LOAD AT 60°.

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				APPROVED: D CRIPPEN			STD DET NO: SA-107
				DSGN/DWN: D GREER/BFB/LSA			SHT NO: 1 1
No.	REVISION	BY	APPD	DATE			

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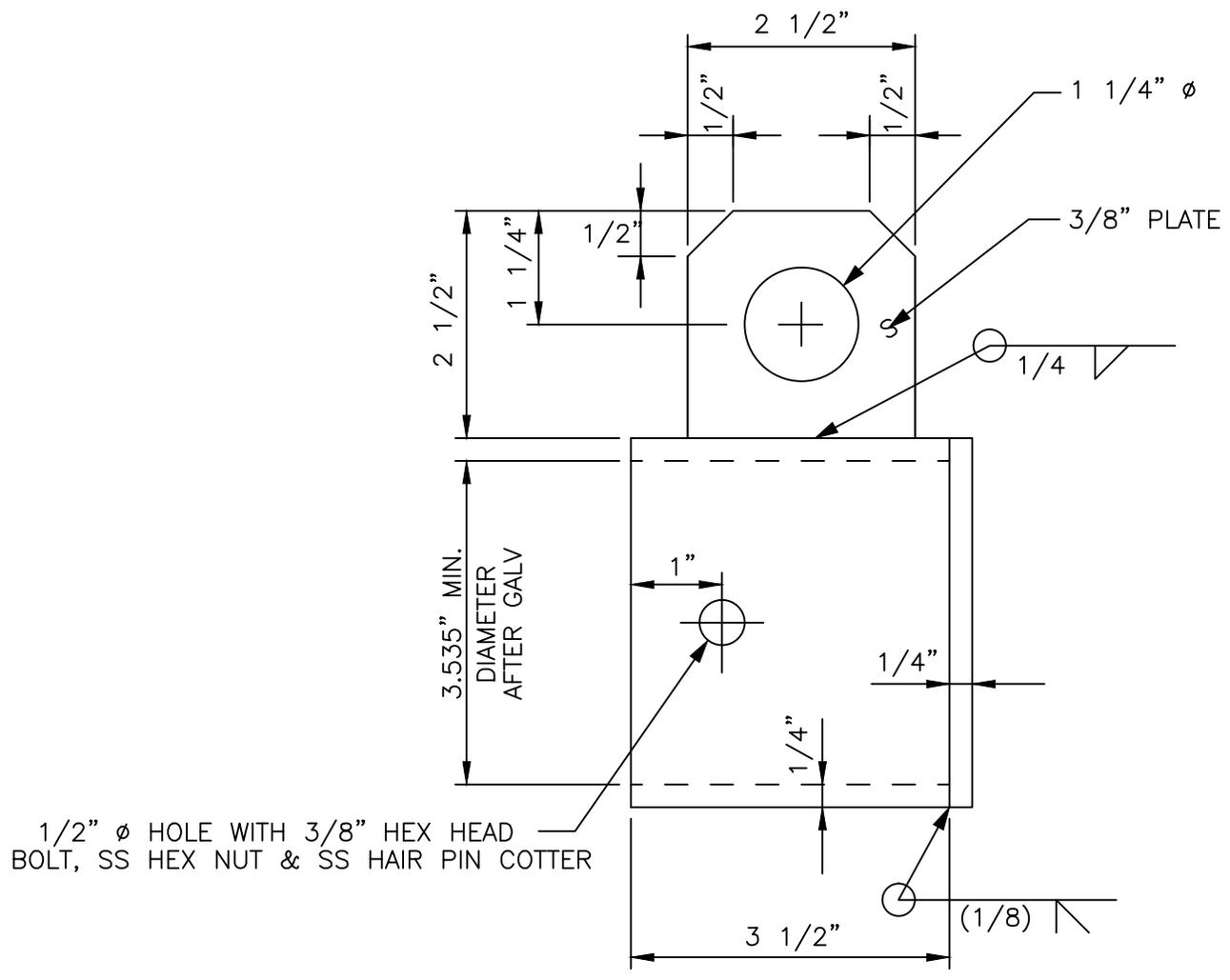


POLE END CAP DETAIL

NOTES:

1. GALVANIZE AFTER FABRICATION.

				STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS  BRACKET ARM POLE END CAP	DATE: JULY 2016
				APPROVED: D CRIPPEN			STD DET NO: SA-108
				DSGN/DWN: D GREER/BFB/LSA			SHT NO: 1 1
No.	REVISION	BY	APPD	DATE			

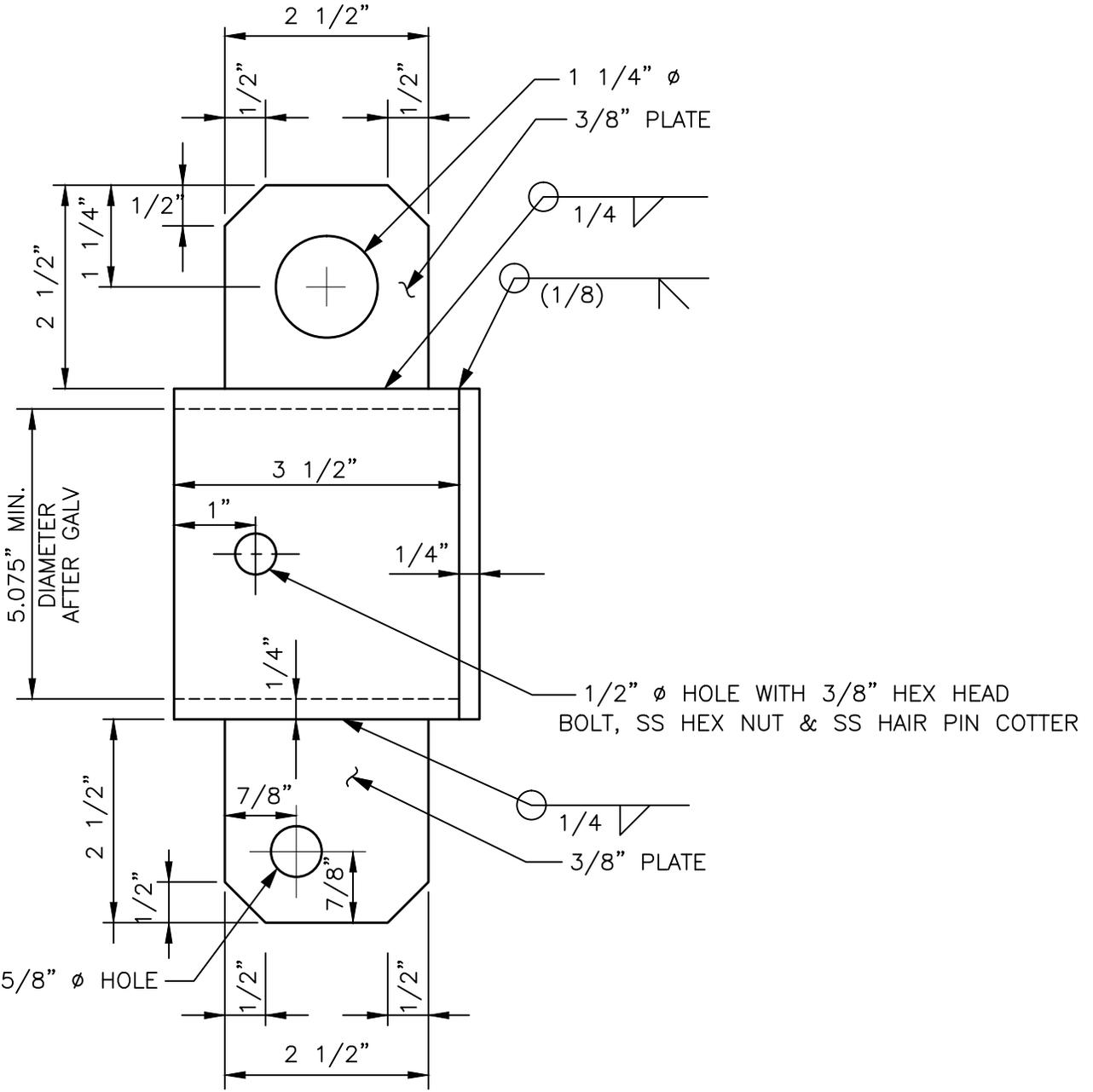


### ARM END CAP DETAIL

#### NOTES:

1. GALVANIZE AFTER FABRICATION.

				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: JULY 2016	
				APPROVED: <b>D CRIPPEN</b>			BRACKET ARM ARM END CAP		STD DET NO: SA-109	
				DSGN/DWN: <b>D GREER/TMB/LSA</b>					SHT NO: 1 1	
No.	REVISION	BY	APP'D	DATE						



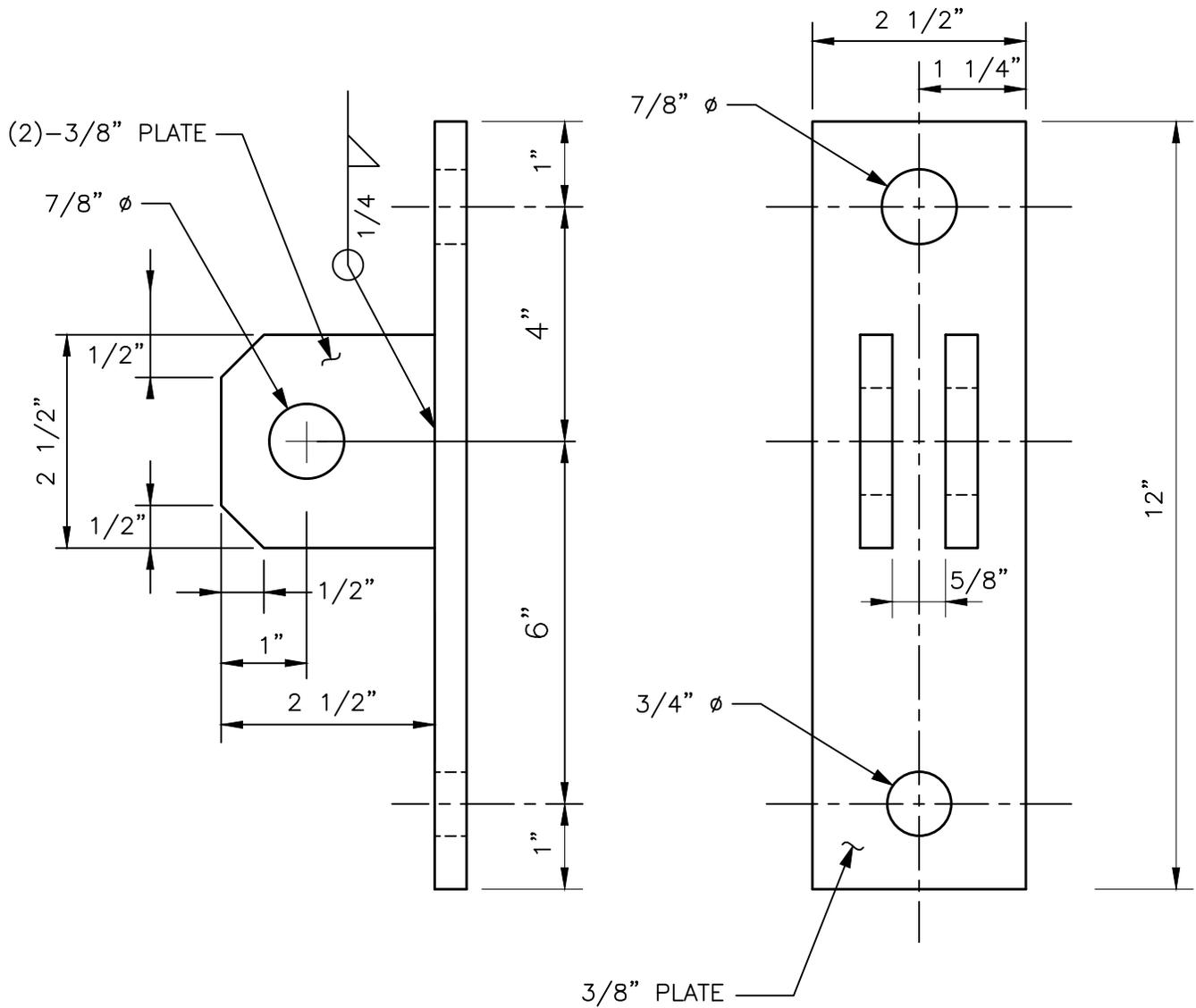
UNDERSLING END CAP DETAIL

NOTES:

1. GALVANIZE AFTER FABRICATION.

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				STD DET DEVELOPMENT: A WOLAK			METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: JULY 2016	
				APPROVED: D CRIPPEN			BRACKET ARM SPAN END CAP		STD DET NO: SA-110	
				DSGN/DWN: D GREER/BFB/LSA					SHT NO: 1 1	
No.	REVISION	BY	APPD	DATE						



WOOD POLE  
MOUNTING BRACKET DETAIL

**NOTES:**

1. GALVANIZE AFTER FABRICATION.

No.	REVISION	BY	APPD	DATE

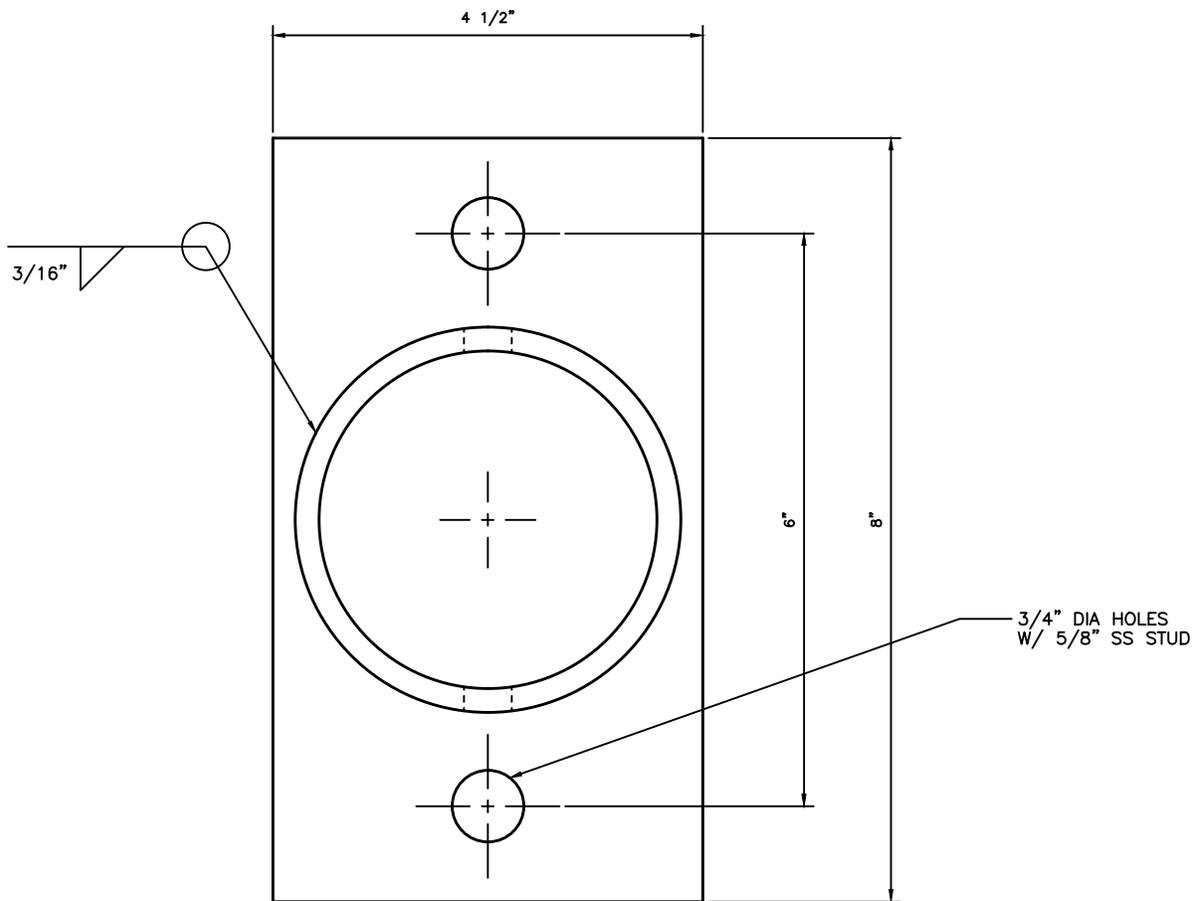
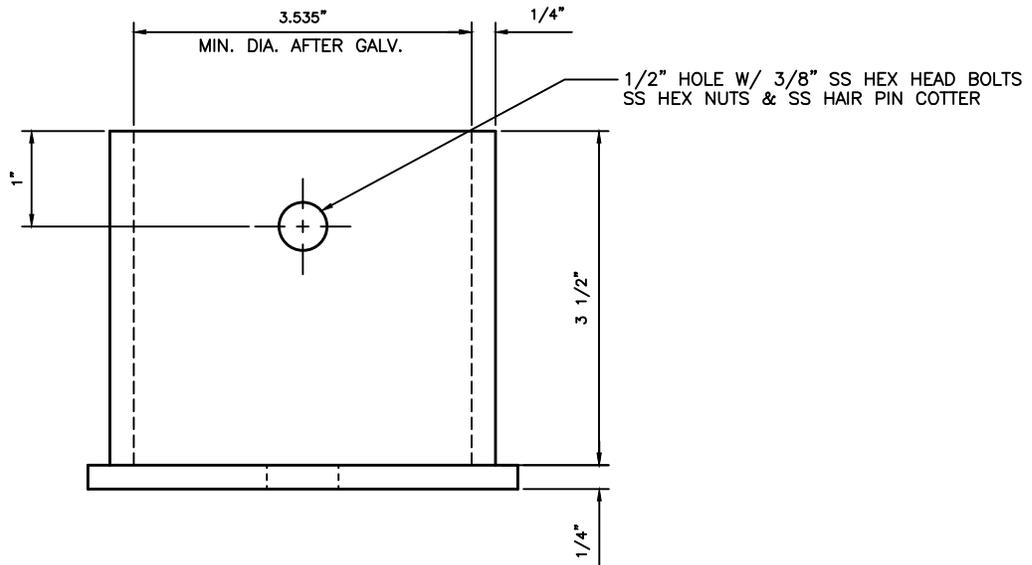
STD DET DEVELOPMENT: A WOLAK
APPROVED: D CRIPPEN
DSGN/DWN: D GREER/BFB/LSA



METRO TRANSIT DIVISION  
 TROLLEY STANDARDS

**WOOD POLE  
 MOUNTING BRACKET**

DATE: JULY 2016
STD DET NO: SA-111
SHT NO: 1 1

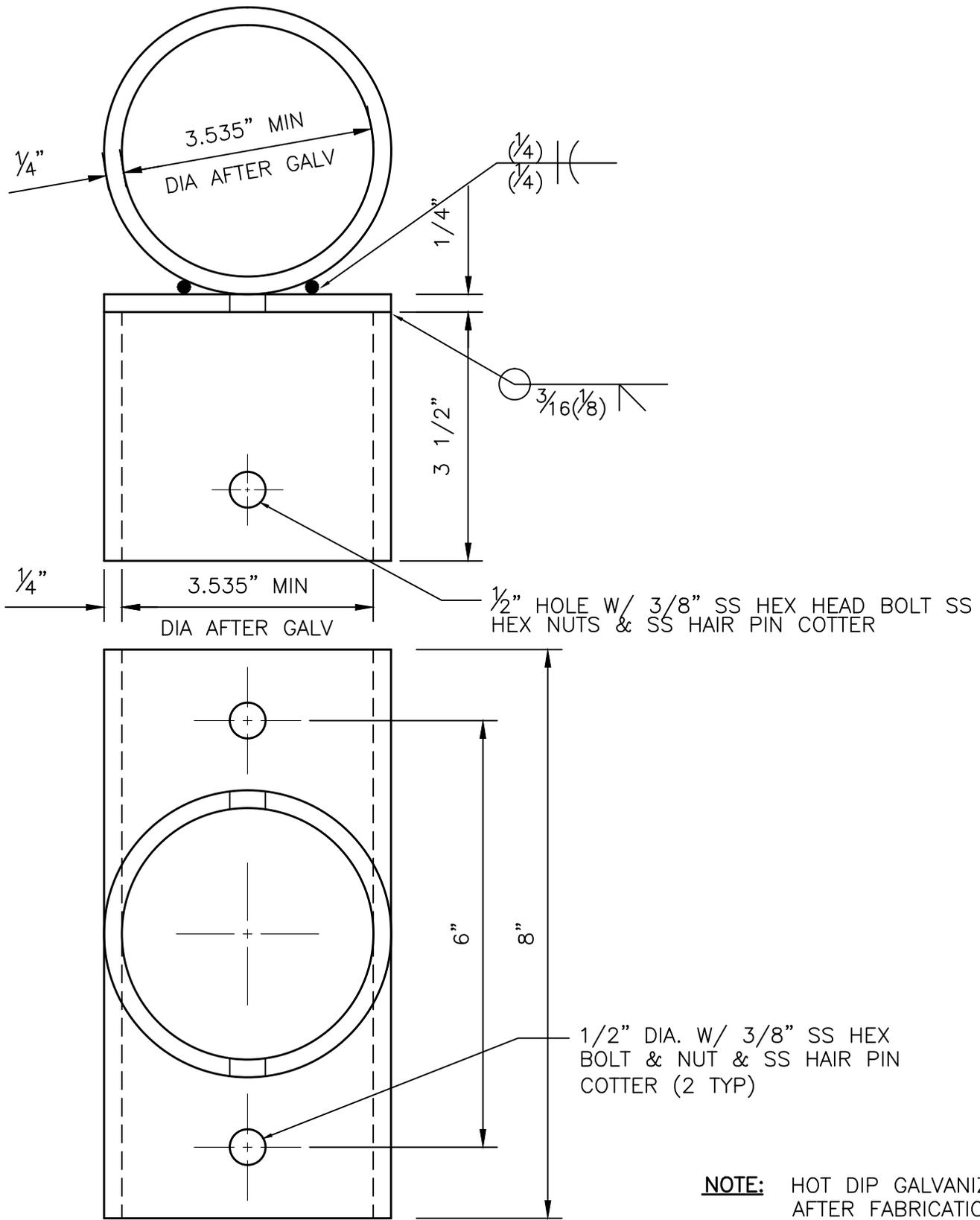


**NOTE:** HOT DIP GALVANIZE AFTER FABRICATION

**3.5" TUBE SOCKET PLATE**

				STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: JULY 2016
				APPROVED: D CRIPPEN		3.5" TUBE SOCKET PLATE	STD DET NO: SA-112
				DSGN/DWN: D GREER/BFB/LSA			SHT NO: 1 1
No.	REVISION	BY	APPD	DATE			

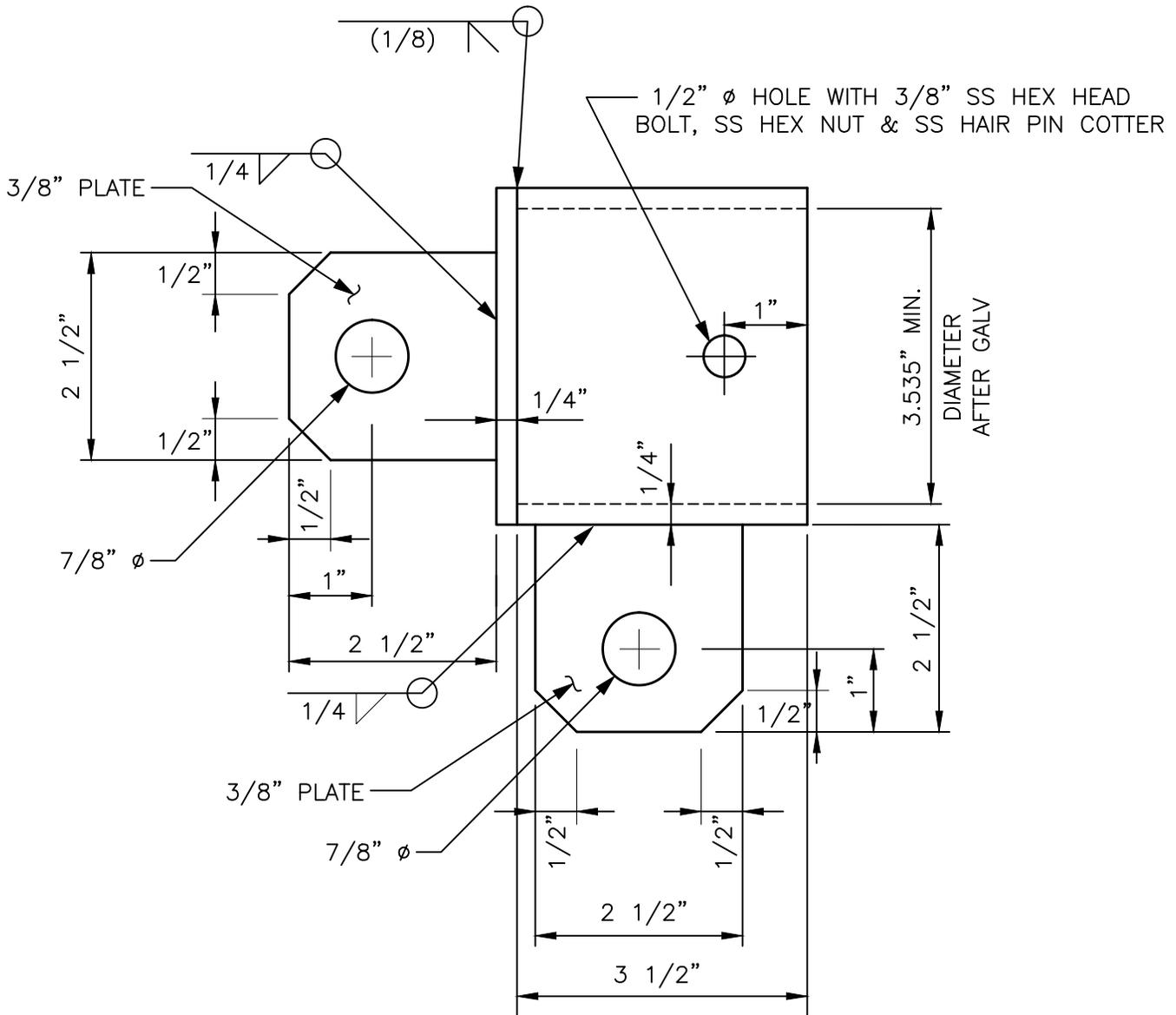
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 XREFS: TTB A Size.dwg | IMAGES:  
 PLOTTED: Jul 08, 2016 -04:44:48pm By anders



**NOTE:** HOT DIP GALVANIZE  
AFTER FABRICATION

**3.5" TUBE TEE SLIPFIT & SOCKET**

				STD DET DEVELOPMENT: A WOLAK			METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: JULY 2016	
				APPROVED: D CRIPPEN			3.5" TUBE TEE SLIPFIT & SOCKET		STD DET NO: SA-113	
				DSGN/DWN: D GREER/BFB/LSA					SHT NO: 1 1	
No.	REVISION	BY	APPD	DATE						



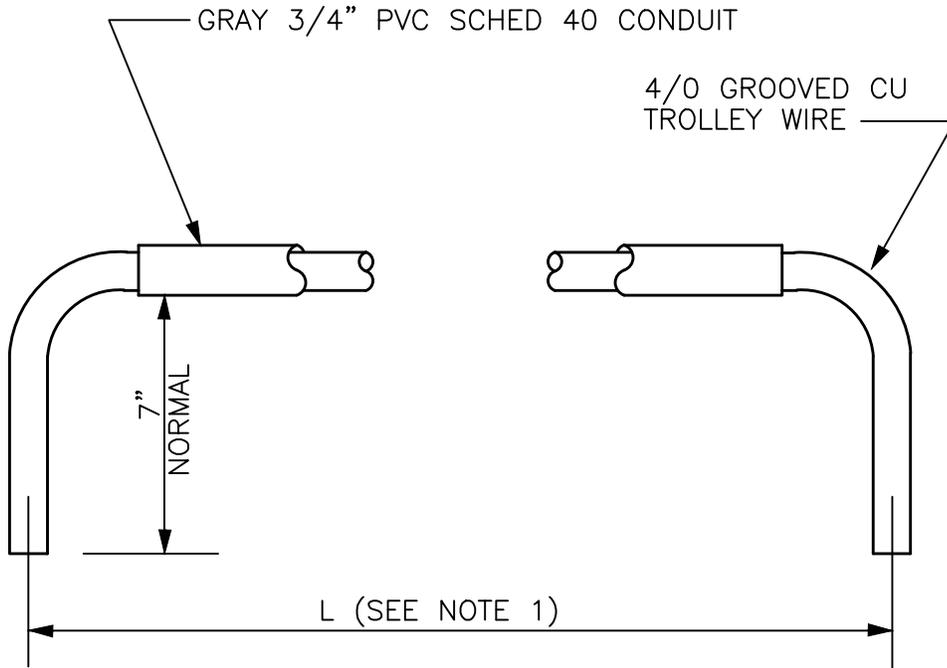
**POLE END CAP WITH BOTTOM TAB DETAIL**

**NOTES:**

1. GALVANIZE AFTER FABRICATION.

				STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS  BRACKET ARM POLE END CAP WITH BOTTOM TAB	DATE: JULY 2016
				APPROVED: D CRIPPEN			STD DET NO: SA-114
				DSGN/DWN: D GREER/BFB/LSA			SHT NO: 1 1
No.	REVISION	BY	APPD	DATE			

V:\Library & Standards\Working Documents\Trolley\Details\SA Border Replace Complete\SA-151-153.dwg | Layout: SA-151  
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 PLOTTED: Jul 12, 2016-03:18:25pm By anders

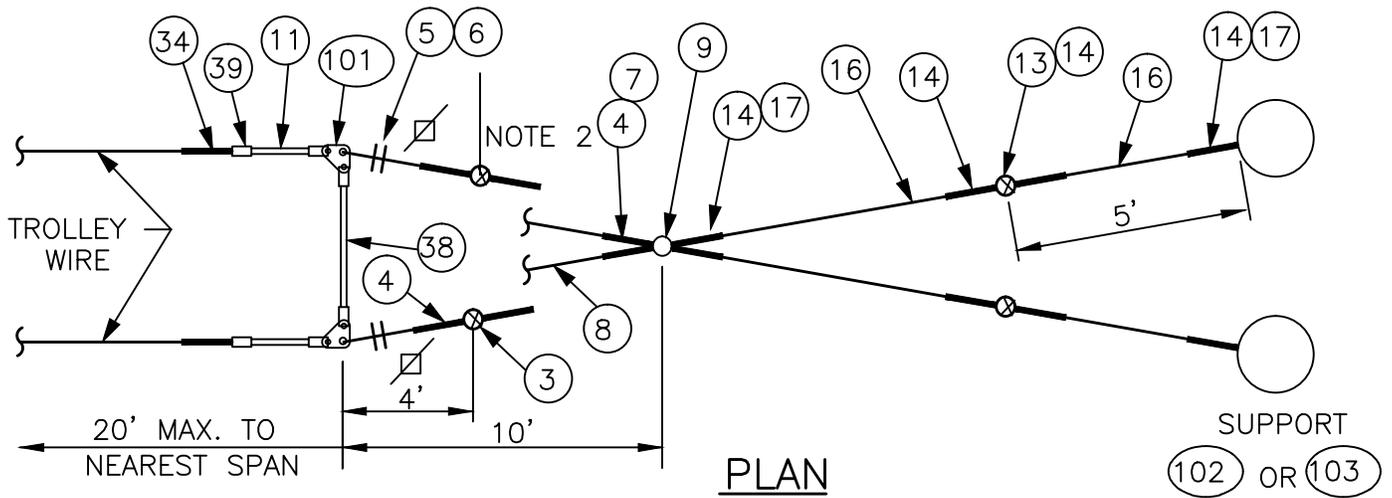


NOTES:

1. JUMPER WIRE AND ASSOCIATED INSULATING SLEEVE SHALL BE FIELD CUT TO LENGTH AS REQUIRED FOR EACH SPECIAL WORK DEVICE.

				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: <b>JULY 2016</b>	
				APPROVED: <b>D CRIPPEN</b>			SPECIAL WORK INSULATED JUMPER ASSEMBLY		STD DET NO: <b>SA-151</b>	
				DSGN/DWGN: <b>D GREER/CMSILSA</b>					SHT NO: <b>1 1</b>	
No.	REVISION	BY	APPD	DATE						





**DEAD END ASSEMBLY (B)**

**NOTES**

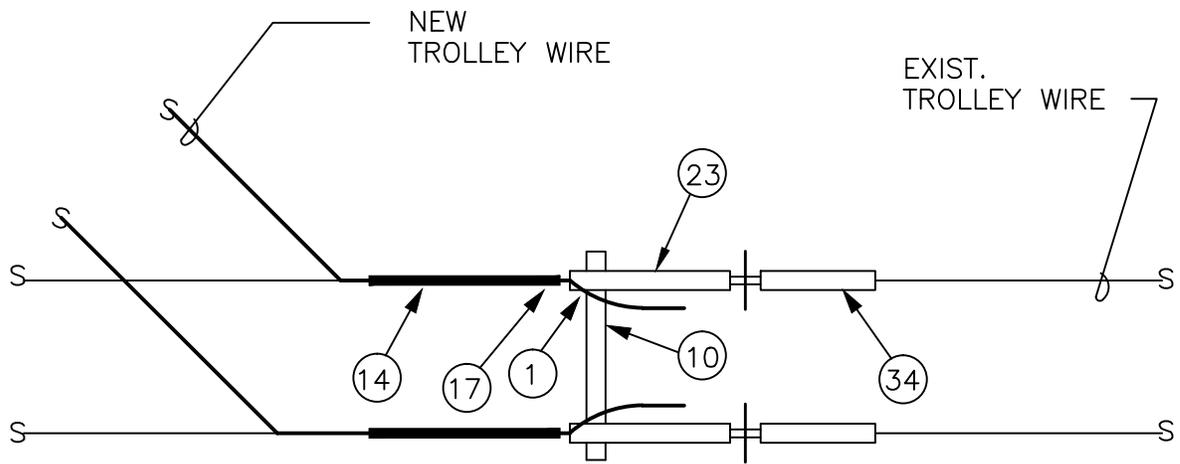
1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS SHOWN ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.

**MATERIAL LIST**

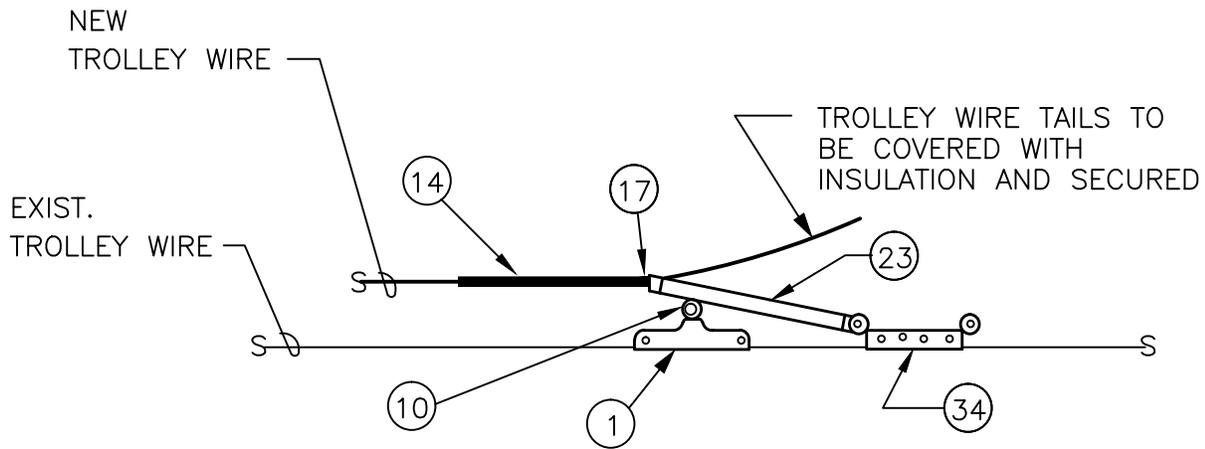
ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	2	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	6	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	2	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
09	1	BULL RING	WABCO	18567-2000
11	2	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
13	2	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	506
14	8	GUY GRIP DEADEND	PREFORMED	CDE-3115
16	VARIES	GUY STRAND	COPPERWELD	16M
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
34	2	TYPE T DOUBLE EAR STRAIN CLAMP	WABCO	17700-2000
38	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6200
39	2	5/8" SHACKLE	WABCO	13722-2000
101	2	STRAIN PLATE	METRO STD	SA-101
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

V:\Library & Standards\Working Documents\Trolley\Details\SA BORDER REPLACEMENT PROJECT 6-11-2015\SA Border Replace Complete\SA-151-153.dwg | Layout: SA-152.2  
 XREFS: TTB A Size.dwg | IMAGES:  
 PLOTTED: Jul 12, 2016 - 03:21:25pm By: anders

				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>TROLLEY WIRE          DEADEND ASSEMBLY</b>	DATE: <b>JULY 2016</b>
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: <b>SA-152.2</b>
				DSGN/DWN: <b>D GREER/TMBLSA</b>			SHT NO: <b>2 2</b>
No.	REVISION	BY	APPD	DATE			



PLAN



ELEVATION

SCALE: NONE

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
10	1	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
14	2	GUY GRIP DEADEND	PREFORMED	CDE-3115
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
23	2	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6260
34	2	TYPE T DOUBLE EAR STRAIN CLAMP	WABCO	17700-2000

No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
A WOLAK

APPROVED:  
D CRIPPEN

DSGN/DWN:  
D GREER\TMB\LSA



METRO TRANSIT DIVISION  
TROLLEY STANDARDS

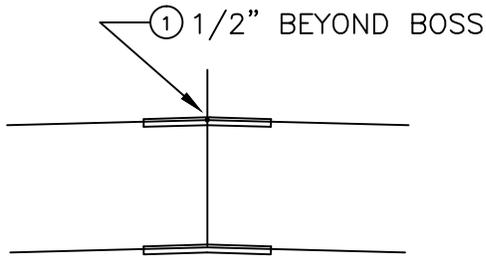
STAGING  
DEADEND ASSEMBLY

DATE:  
JULY 2016

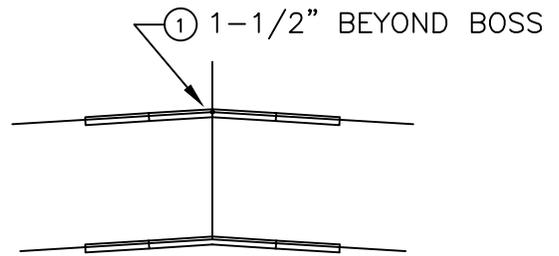
STD DET NO:  
SA-153

SHT NO:  
1 1

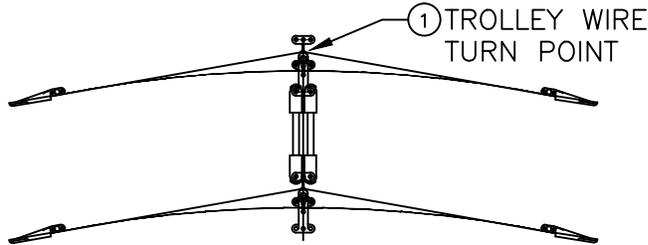
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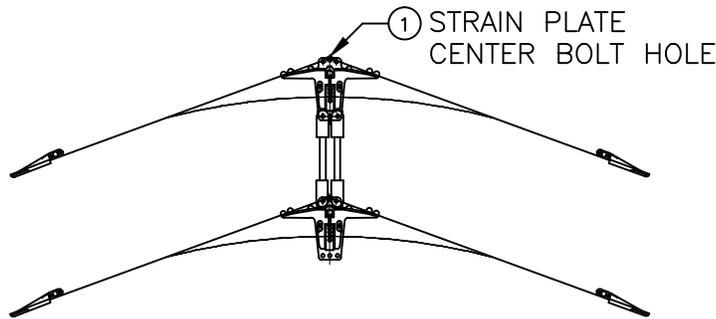
1°–5° CURVE RAIL



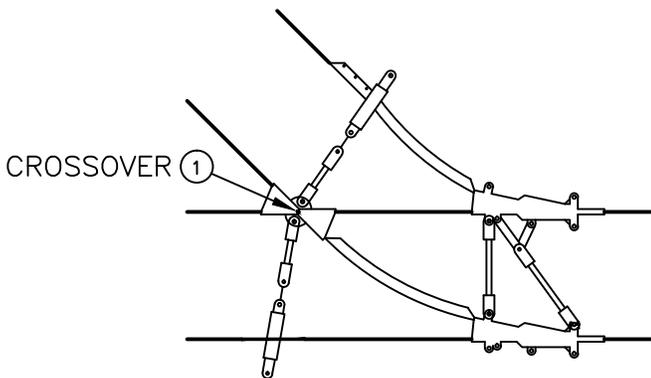
5.5°–7.5° CURVE RAIL



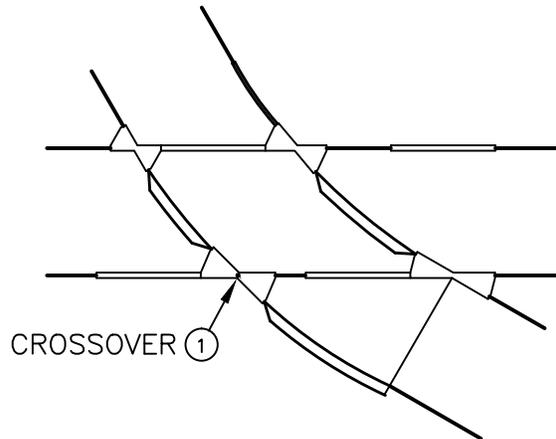
8°–12° & 13°–27° CURVE SEGMENT



28°–47° CURVE SEGMENT



SWITCH OR TRAILING FROG



CROSSOVER/CURVE SEGMENT

① DEVICE REFERENCE POINT

V:\Library & Standards\Working Documents\Trolley\Details\SA Border Replace Complete\SA-161&163.dwg | Layout: SA-161  
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No.	REVISION	BY	APPD	DATE

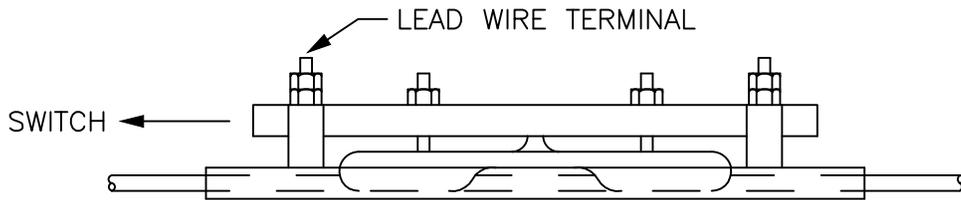
STD DET DEVELOPMENT: A WOLAK
APPROVED: D CRIPPEN
DSGN/DWN: D GREER/CMS/LSA



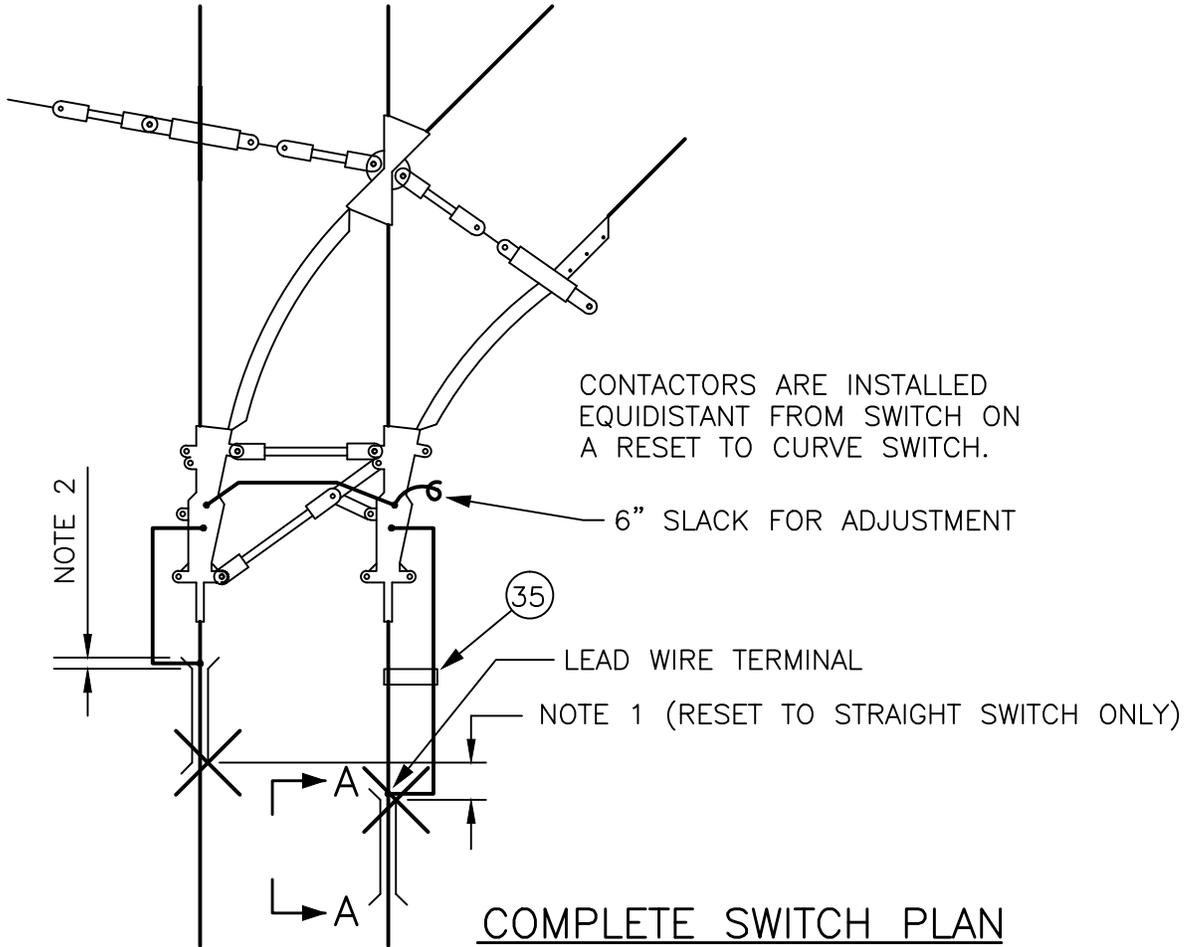
METRO TRANSIT DIVISION  
TROLLEY STANDARDS

SPECIAL WORK DEVICE  
REFERENCE POINT  
LOCATIONS

DATE: JULY 2016
STD DET NO: SA-161
SHT NO: 1 1



CONTACTOR ELEVATION A-A



COMPLETE SWITCH PLAN

NOTES

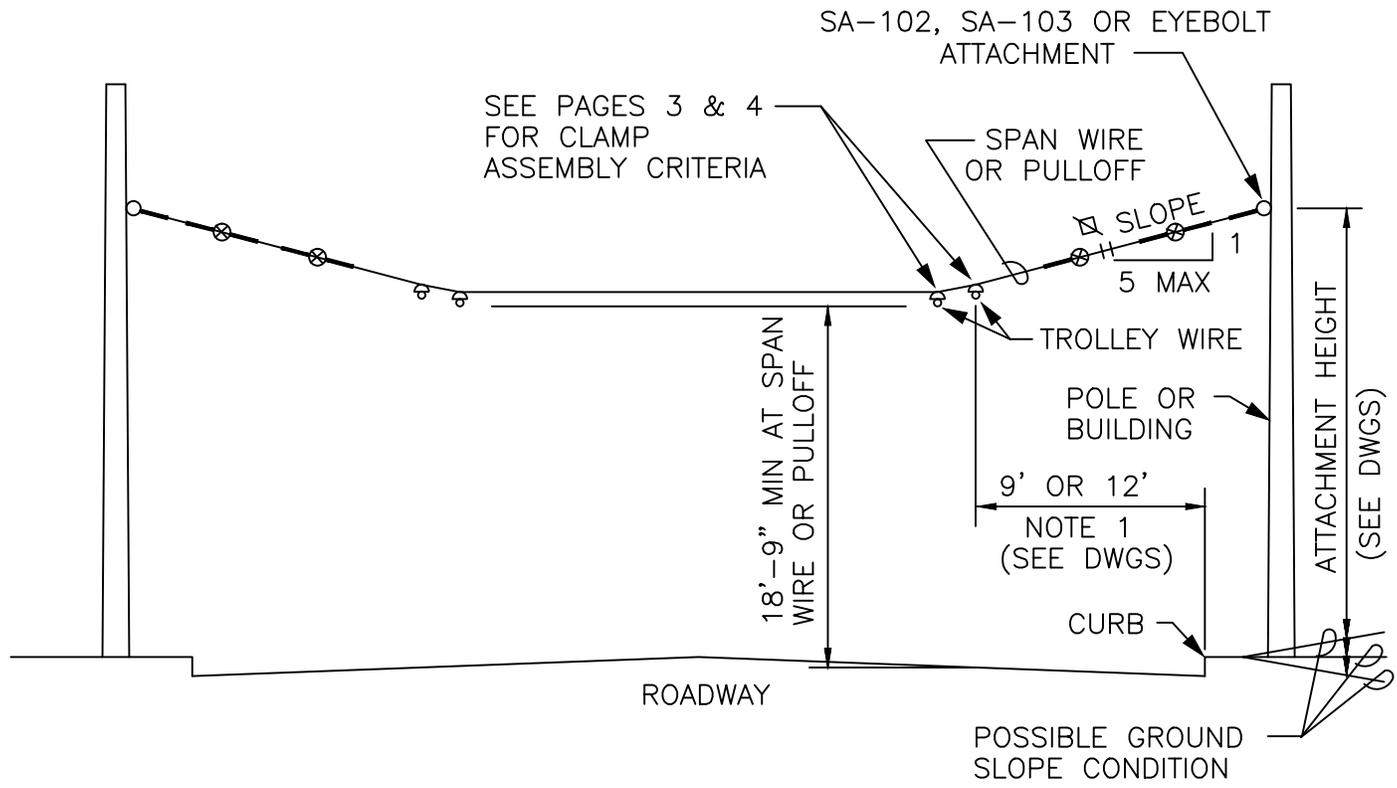
1. PROVIDE A 4-1/2" INTERVAL BETWEEN OPPOSITE POLARITY CONTACTORS. MEASURE FROM POINT OF CONTACT WITH TROLLEY SHOE AND CONTACTOR.
2. PROVIDE A 1" OVERLAP BETWEEN CONTACTOR AND END OF SWITCH TROLLEY WIRE CLAMP.

MATERIAL LIST

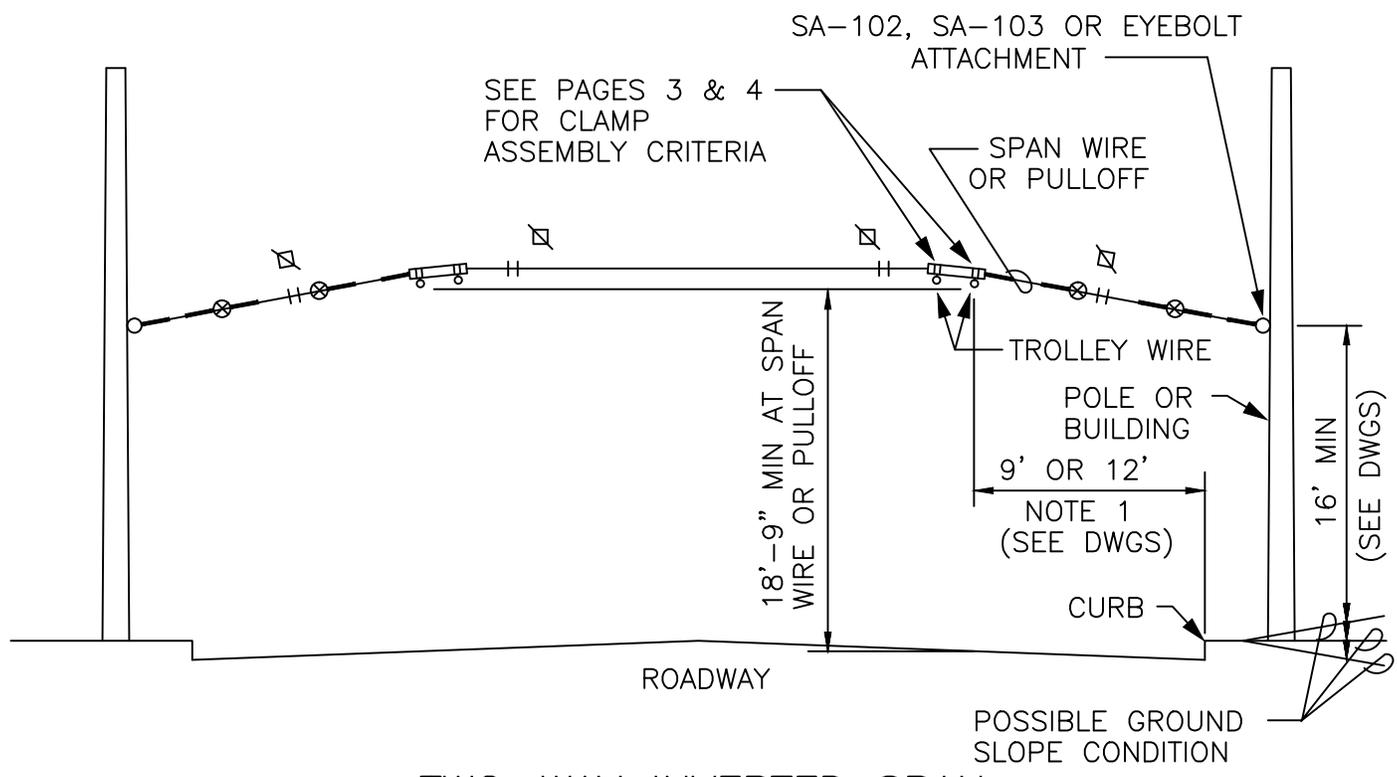
ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
35	AS REQD	CLAMP, INSUL LEAD WIRE	WABCO	19655-2000

				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  SPECIAL WORK DEVICE SWITCH CONTACTOR CONFIGURATION	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-163
				DSGN/DWN: <b>D GREER/CMS/LSA</b>			SHT NO: 1 1
No.	REVISION	BY	APPD	DATE			

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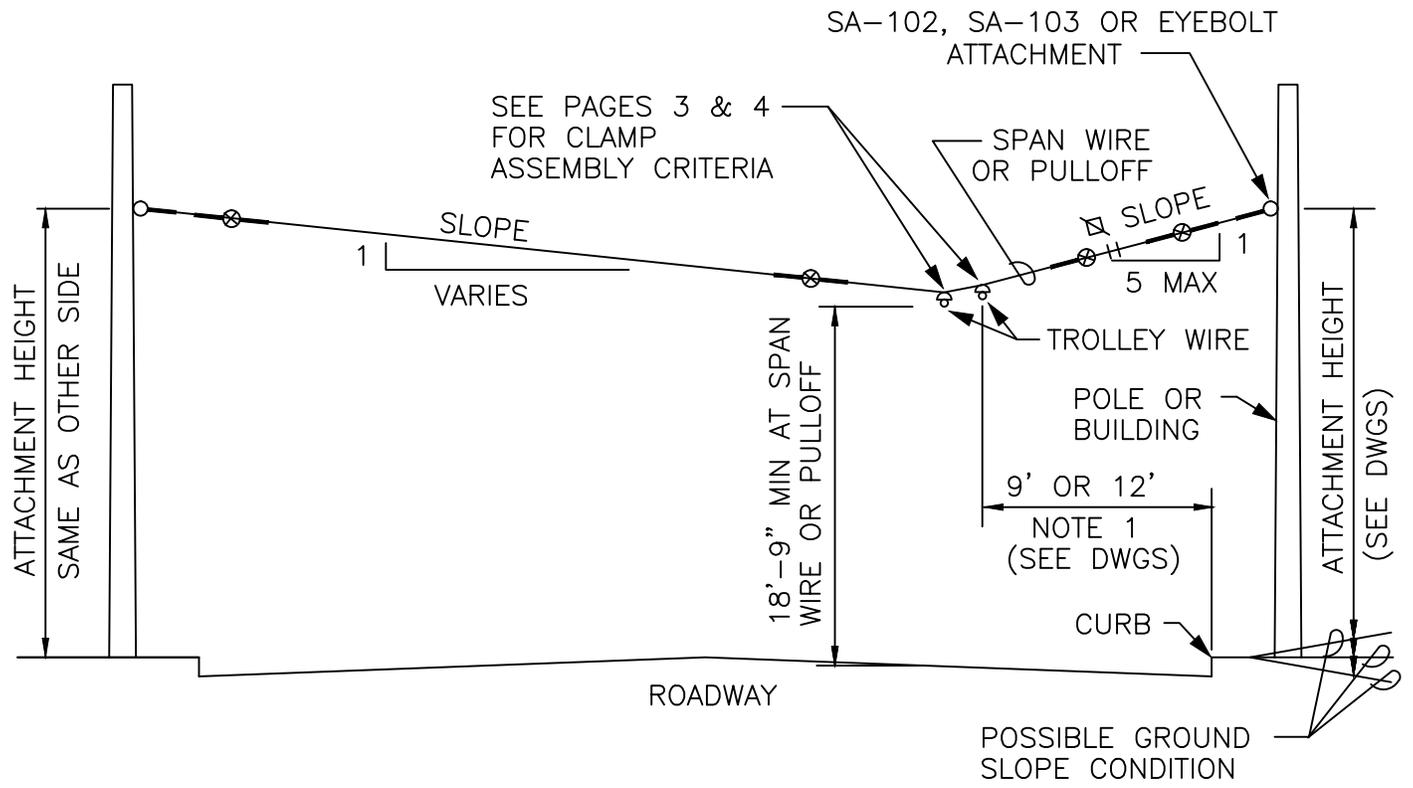
**TWO-WAY TANGENT SPAN**



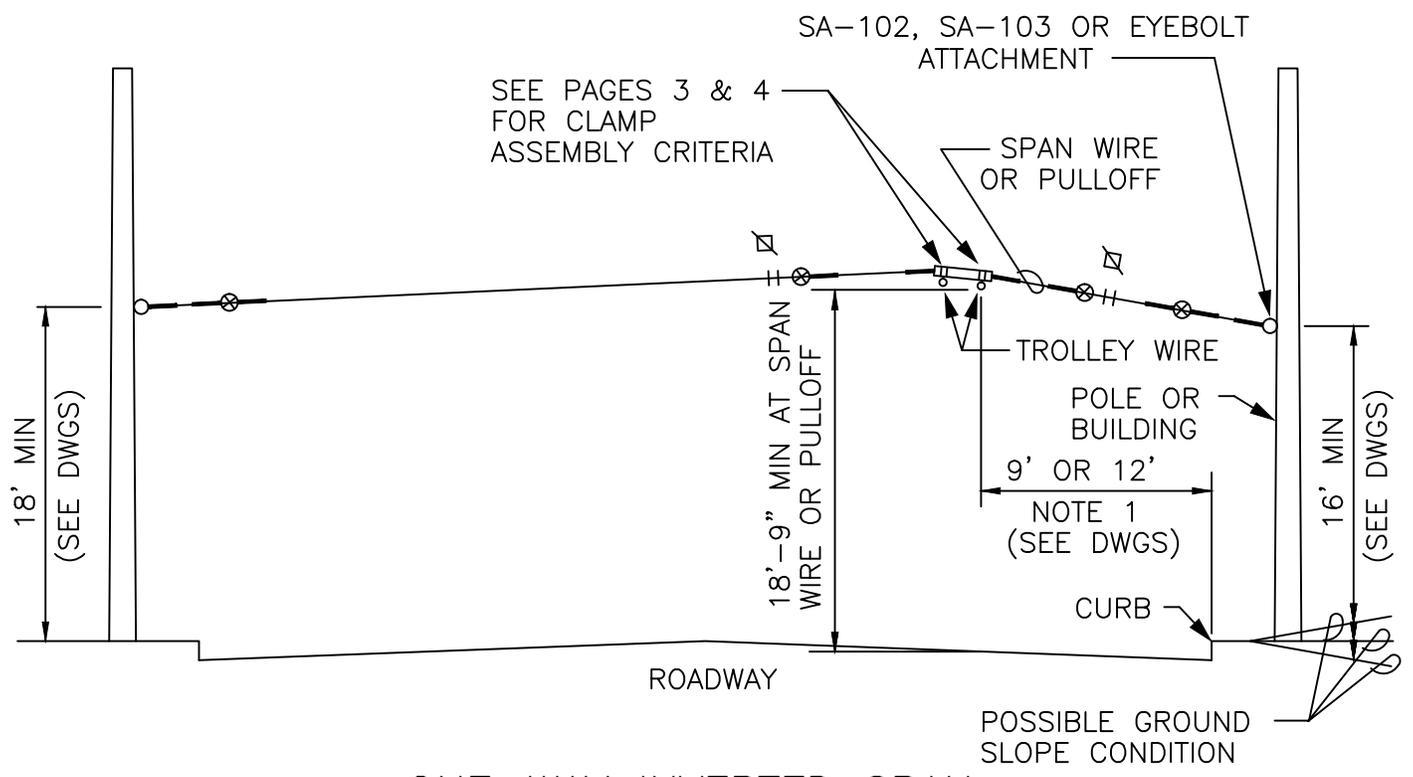
**TWO-WAY INVERTED SPAN**

				STD DET DEVELOPMENT: <b>A WOLAK</b>		 <b>King County</b> Department of Transportation	METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: <b>JULY 2016</b>	
				APPROVED: <b>D CRIPPEN</b>					STD DET NO: <b>SA-164.1</b>	
				DSGN/DWN: <b>D GREER/DOW/LSA</b>					SHT NO: <b>1 4</b>	
No.	REVISION	BY	APPD	DATE						

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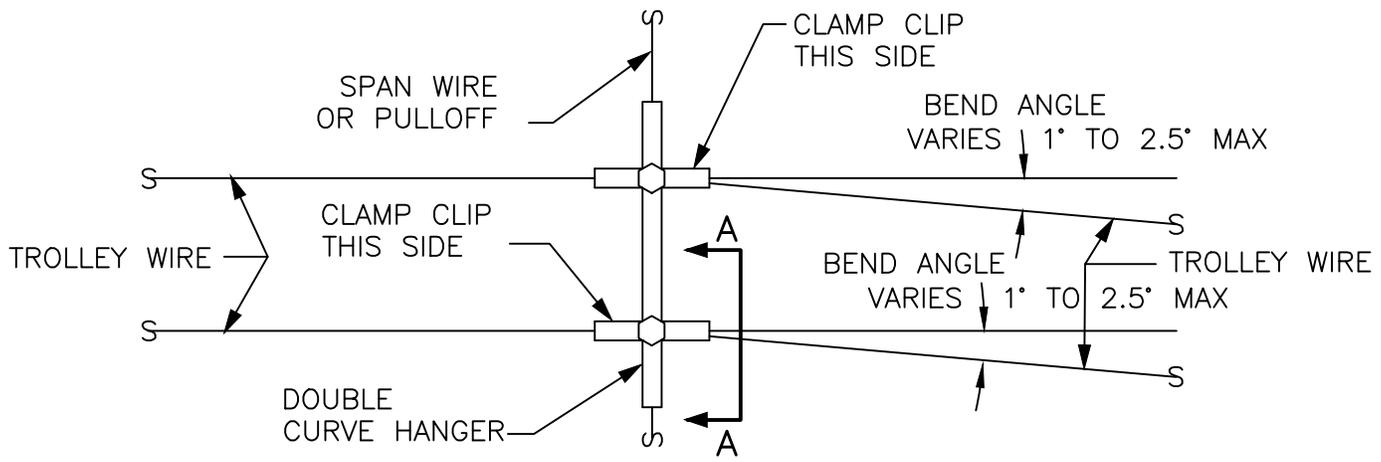
### ONE-WAY TANGENT SPAN



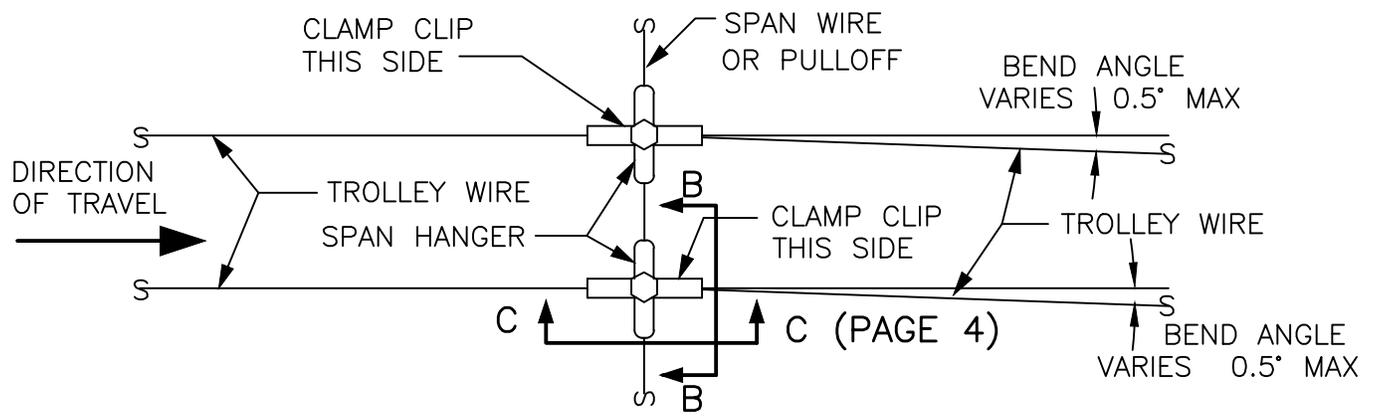
### ONE-WAY INVERTED SPAN

				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: <b>JULY 2016</b>	
				APPROVED: <b>D CRIPPEN</b>			TROLLEY WIRE SUPPORT SPAN ATTACHMENT CRITERIA		STD DET NO: <b>SA-164.2</b>	
				DSGN/DWN: <b>D GREER/DOW/LSA</b>					SHT NO: <b>2 4</b>	
No.	REVISION	BY	APPD	DATE						

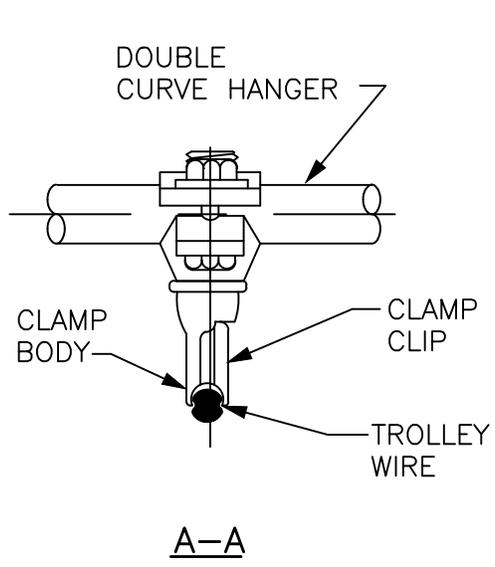
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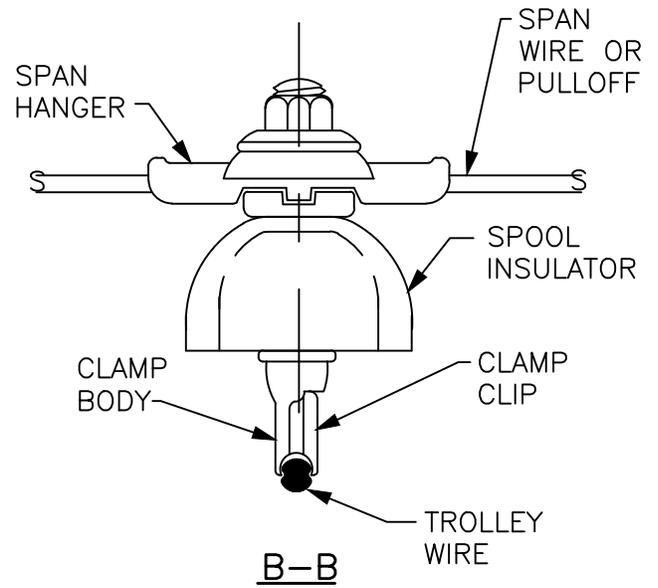
**DOUBLE CURVE HANGER SPAN**



**TANGENT SPAN WITH CURVATURE**



**A-A**



**B-B**

**CLAMP ASSEMBLY CRITERIA**

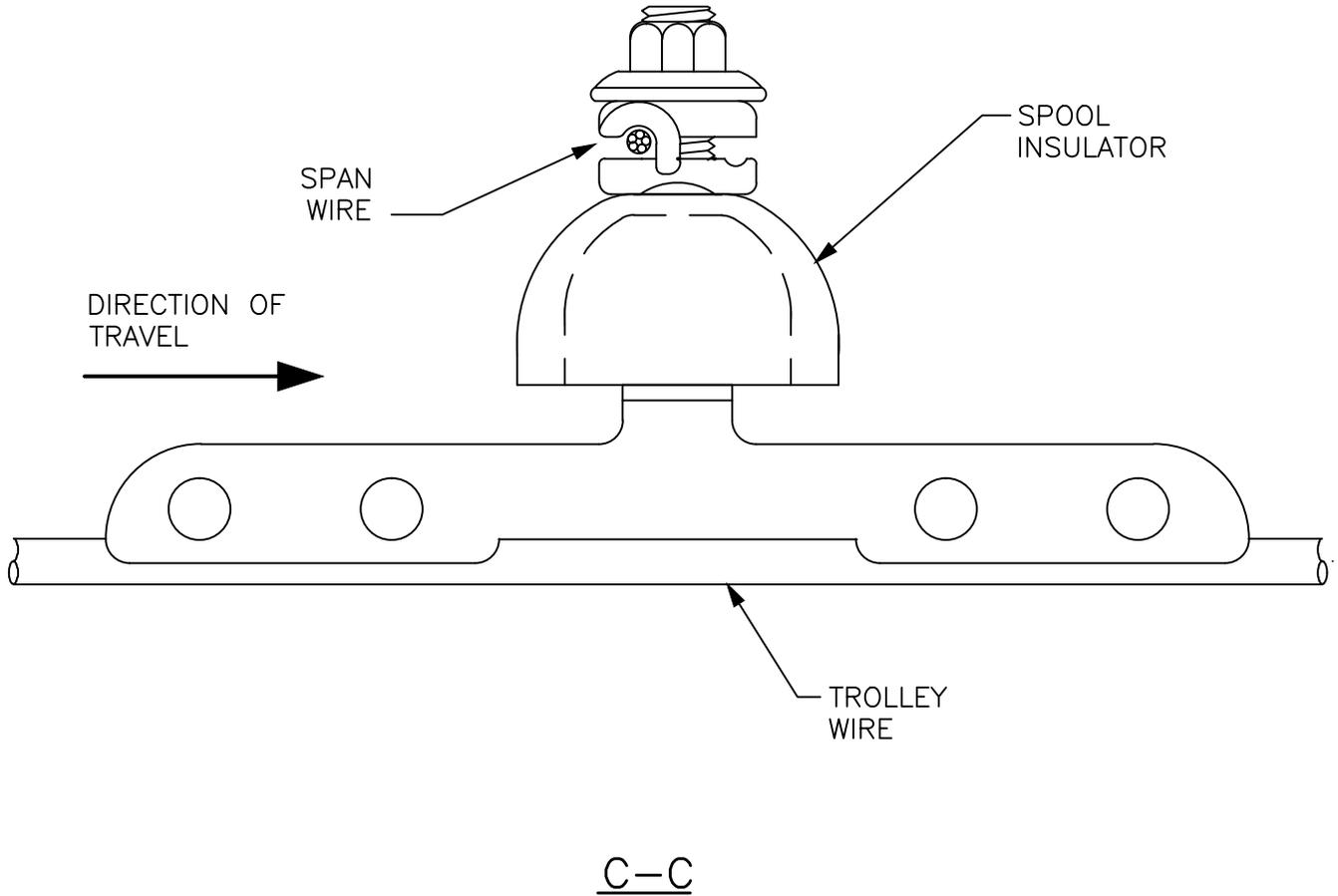
No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
**A WOLAK**  
 APPROVED:  
**D CRIPPEN**  
 DSGN/DWN:  
**D GREER/TMB/LSA**



METRO TRANSIT DIVISION  
 TROLLEY STANDARDS  
**TROLLEY WIRE  
 SUPPORT SPAN  
 ATTACHMENT CRITERIA**

DATE:	JULY 2016
STD DET NO:	SA-164.3
SHT NO:	3 4



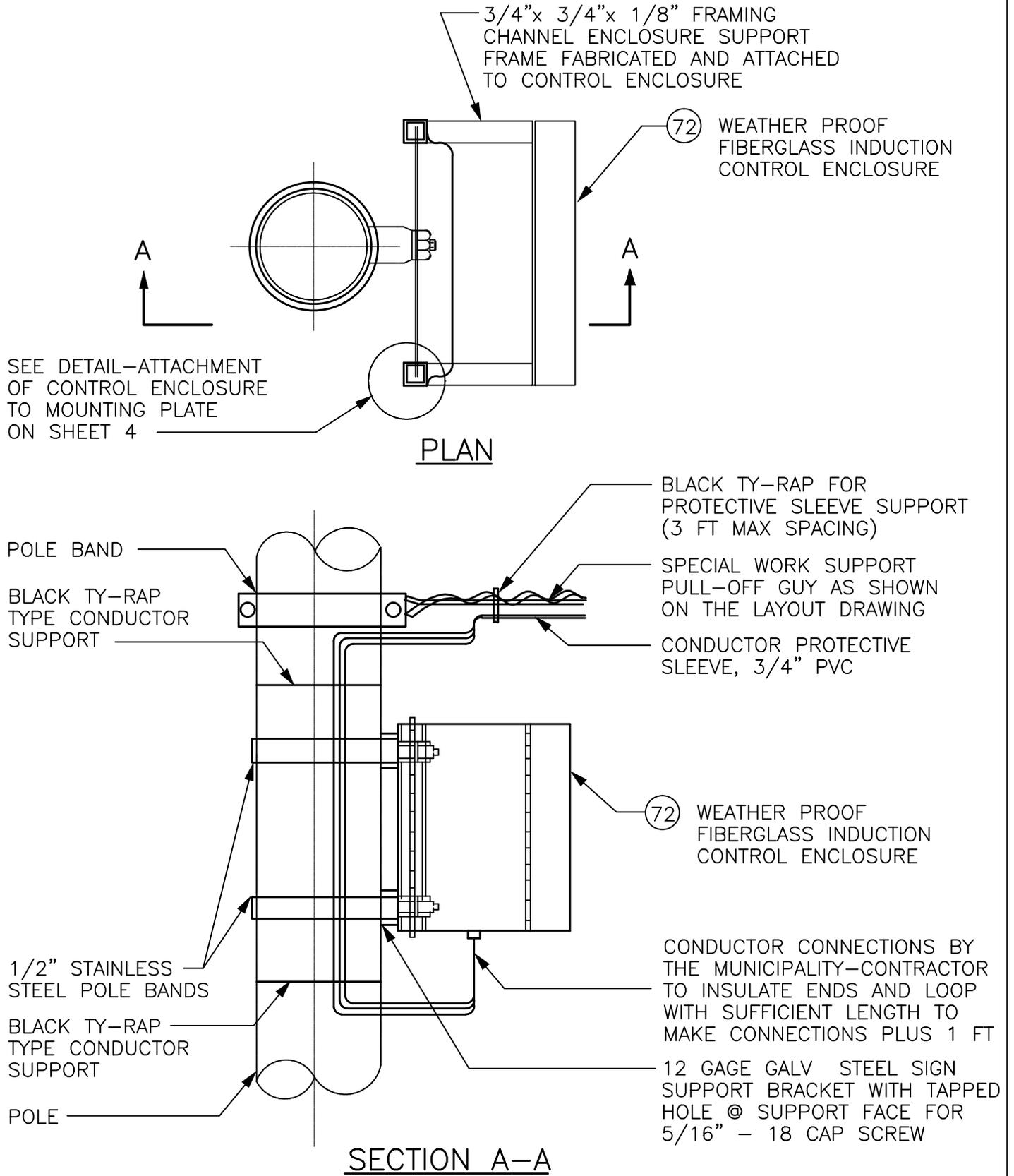
**NOTES**

1. 9' IS NORMAL FOR EXTENDED ZONES OF TANGENT SPANS WHERE NO PARKING IS ALLOWED. 12' IS NORMAL FOR EXTENDED ZONES OF TANGENT SPANS WHERE PARKING IS ALLOWED.

V:\Library & Standards\Working Documents\Trolley\Details\SA Border Replace Complete\SA-164.1-4.dwg | Layout: SA-164.4  
 XREFS: TTB A Size.dwg | IMAGES:  
 PLOTTED: Jul 12, 2016--05:30:42pm By anders

				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>TROLLEY WIRE          SUPPORT SPAN          ATTACHMENT CRITERIA</b>		DATE: JULY 2016	
				APPROVED: <b>D CRIPPEN</b>					STD DET NO: SA-164.4	
				DSGN/DWN: <b>D GREER/TMB/LSA</b>					SHT NO: 4 4	
No.	REVISION	BY	APPD	DATE						

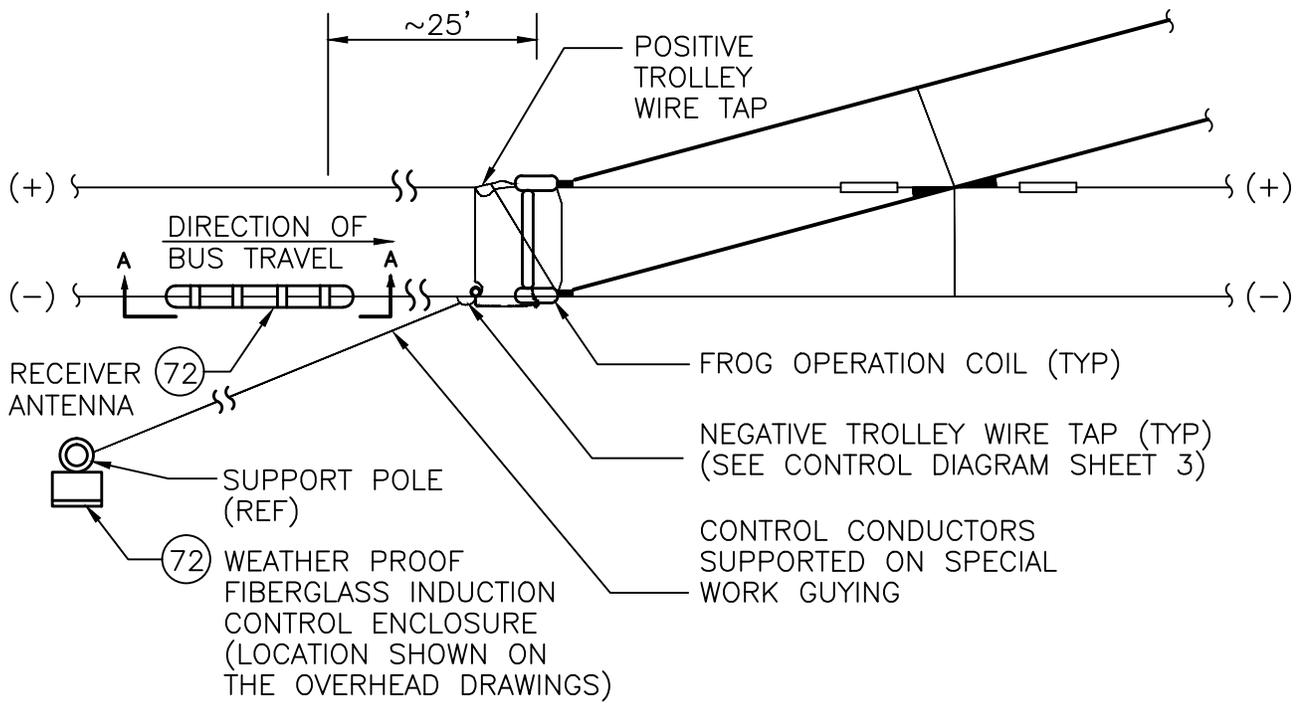
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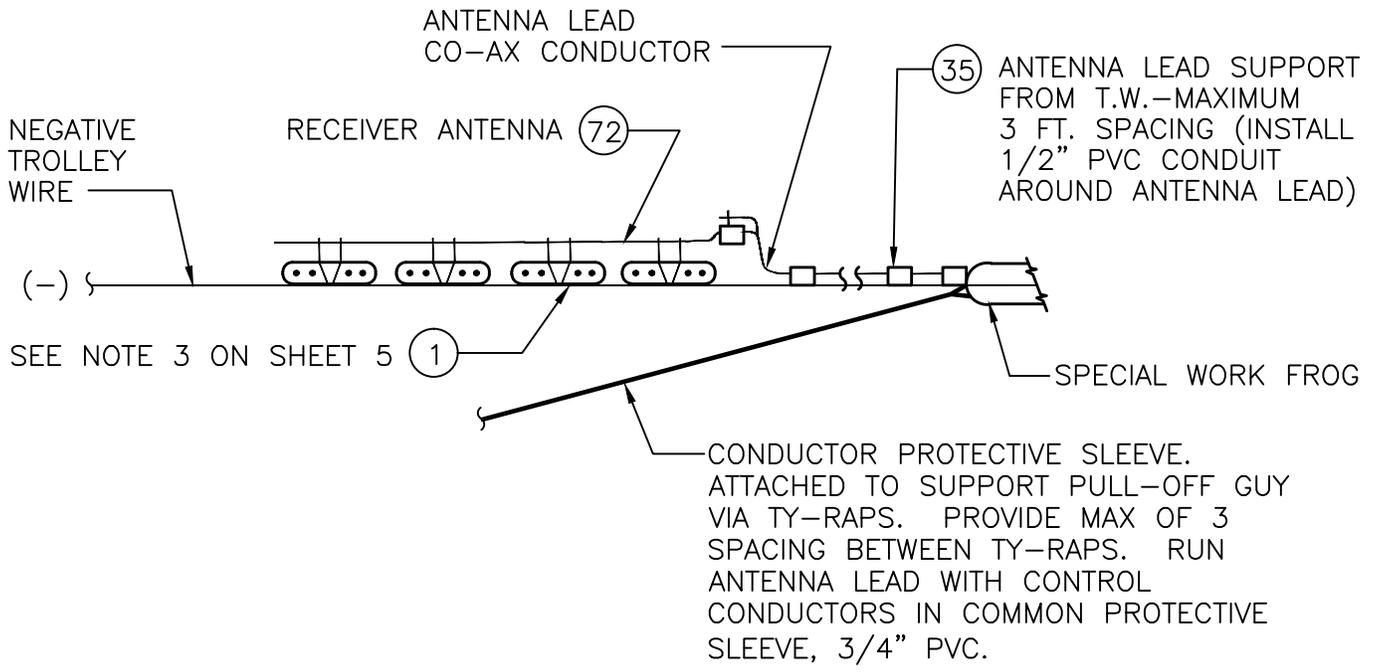
**INDUCTION CONTROL ENCLOSURE POLE ASSEMBLY**

				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-165.1
				DSGN/DWN: <b>D GREER/CMS/LSA</b>			SHT NO: 1 6
No.	REVISION	BY	APPD	DATE			

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 XREFS: TTB A Size.dwg | IMAGES:  
 PLOTTED: Sep 08, 2016 - 11:12:42am By: anders



**FROG INDUCTION CONTROL  
 ASSEMBLY PLAN**

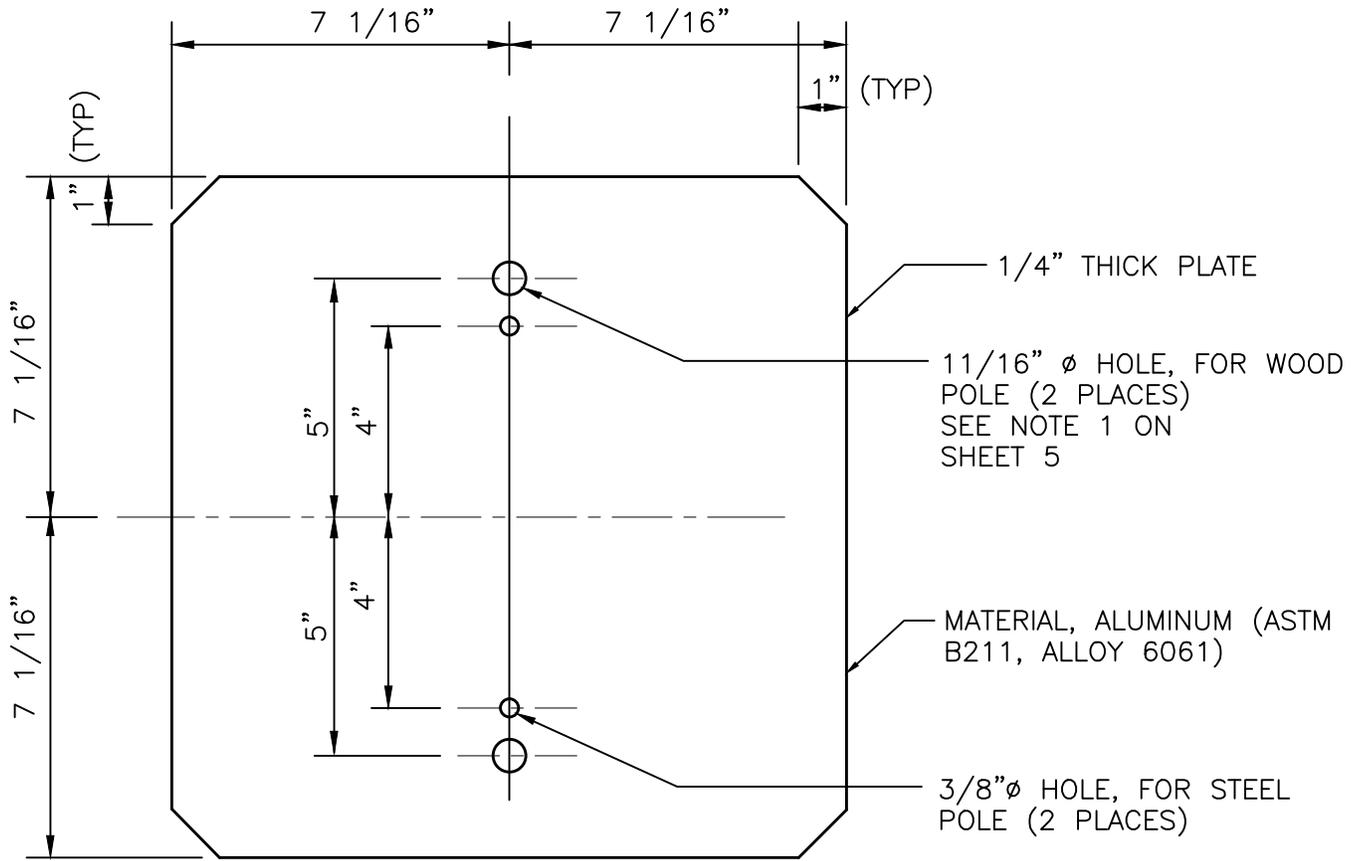


**SECTION A-A**

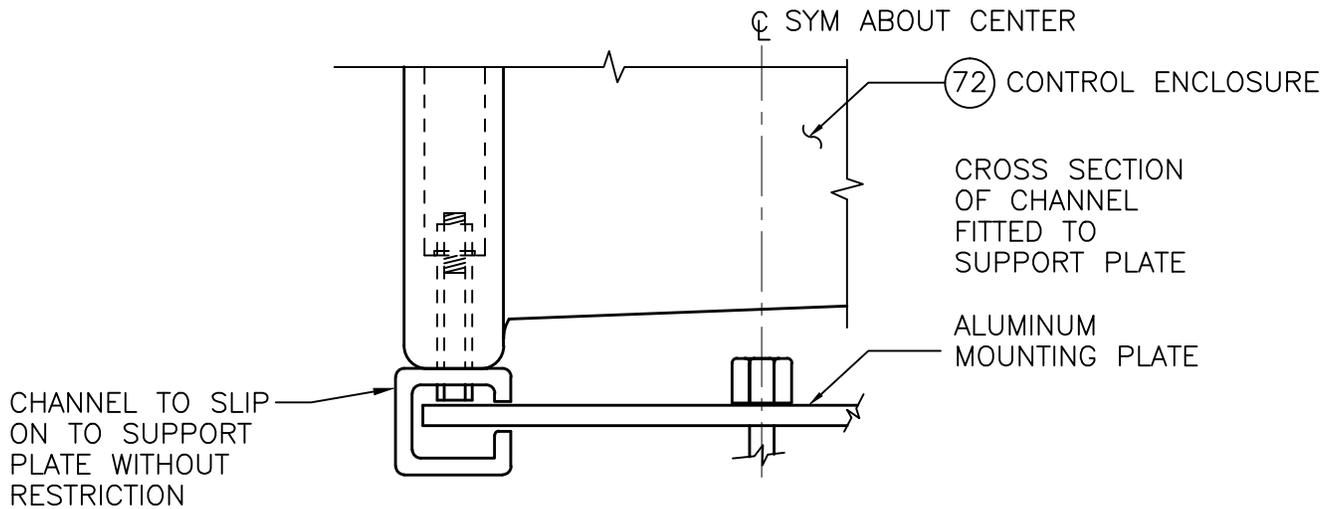
				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>FROG INDUCTION          CONTROL SYSTEM</b>	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>				STD DET NO: SA-165.2
				DSGN/DWN: <b>D GREER/CMS/LSA</b>				SHT NO: 2 6
No.	REVISION	BY	APPD	DATE				



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 XREFS: TTB A Size.dwg | IMAGES:  
 PLOTTED: Sep 08, 2016 - 11:10:37am By: andenis



**ALUMINUM MOUNTING PLATE DETAIL**



**DETAIL-ATTACHMENT OF CONTROL ENCLOSURE TO MOUNTING PLATE**

				STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS  FROG INDUCTION CONTROL SYSTEM	DATE: JULY 2016
				APPROVED: D CRIPPEN			STD DET NO: SA-165.4
				DSGN/DWN: D GREER/CMS/LSA			SHT NO: 4 6
No.	REVISION	BY	APPD	DATE			

**GENERAL NOTES**

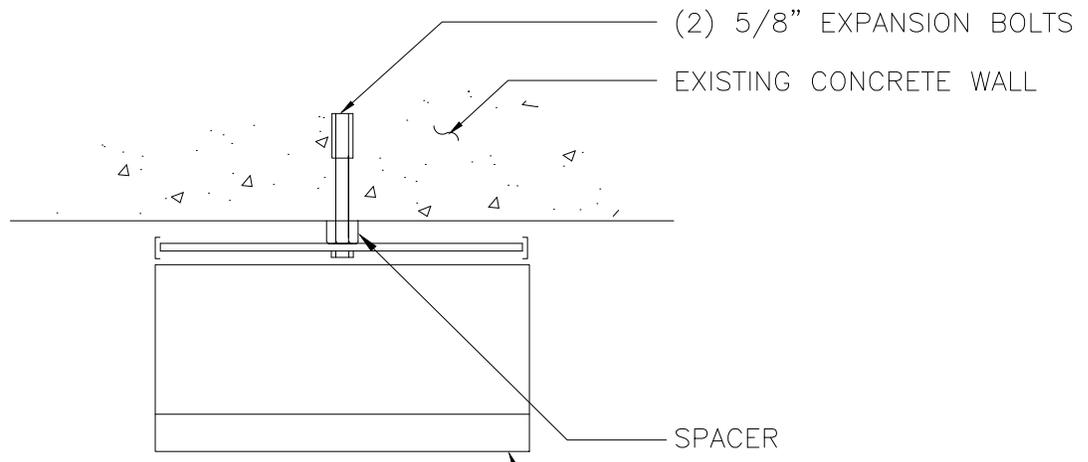
1. WHERE THE SUPPORT POLE IS WOOD, THE CONTROL ENCLOSURE MOUNTING PLATE SHALL BE ATTACHED DIRECTLY TO THE POLE BY MEANS OF ONE HOT-DIP GALVANIZED 5/8-INCH DIAMETER HEX HEAD THROUGH BOLT WITH ATTACHMENT NUT AND WASHER MOUNTED THROUGH THE TOP HOLE OF THE SUPPORT PLATE AND ONE HOT-DIP GALVANIZED 5/8-INCH BY 6-INCH GIMLET POINT HEX HEAD LAG SCREW MOUNTED THROUGH THE BOTTOM HOLE OF THE SUPPORT PLATE.
  
2. THE CONTROL ENCLOSURE SHALL BE LOCATED IN PROXIMITY OF THE PULL-OFF CABLE ATTACHMENTS AT THE SUPPORT POLE. THE ENCLOSURE SHALL, AS PRACTICAL, BE LOCATED AT THE SIDE OF THE POLE FACING THE CURB. THE ENCLOSURE MAY BE INSTALLED EITHER ABOVE OR BELOW THE PULL-OFF GUY CABLE ATTACHMENT AT THE POLE, AS SUITABLE, TO PREVENT CONFLICT WITH OTHER ATTACHMENTS TO THE POLE. THE ENCLOSURE SHALL BE SO LOCATED ON THE POLE THAT CONFLICTS WILL NOT BE INTRODUCED TO ACCESSIBILITY OF EXISTING UTILITIES AND POLE CLIMBING SPACES. ON JOINT USE POLES HAVING A CROSS-ARM, THE ENCLOSURE SHALL BE MOUNTED ON THE CROSS-ARM TO PREVENT CONFLICT WITH CLIMBING SPACE. WHERE A JOINT USE POLE IS WITHOUT A CROSS-ARM, THE CONTRACTOR SHALL COORDINATE ENCLOSURE MOUNTING SPACE WITH THE JOINT USE OWNERS OF THE POLE.
  
3. THE HOLES FORMED IN THE ANTENNA WEB FOR MOUNTING OF THE ANTENNA MAY BE ENLARGED TO ACCOMMODATE THE 5/8-INCH DIAMETER BOLTS REQUIRED FOR ANTENNA ATTACHMENT TO THE SUPPORTING TROLLEY WIRE CLAMPS.

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	4	DETROIT CLAMP ASSY	WABCO	19293-3007
35	AS REQD	CLAMP, INSUL LEAD WIRE	WABCO	19655-2000
72	1	INDUCTIVE CONTROL SYSTEM RECEIVER	UNITRAC	320100-16X
	1	INDUCTIVE CONTROL SYSTEM ANTENNA	UNITRAC	320310-4X

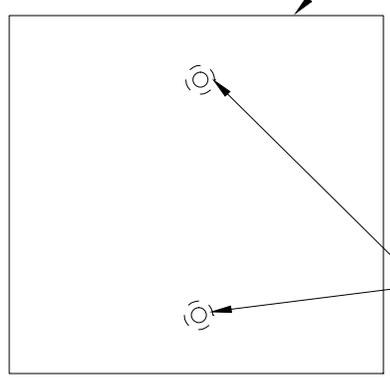
No.                      REVISION                      BY                      APPD                      DATE				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  FROG INDUCTION CONTROL SYSTEM	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-165.5
				DSGN/DWN: <b>D GREER/CMS/LSA</b>			SHT NO: 5    6

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 PLOTTED: Sep 08, 2016 - 11:08:17am By: anders



PLAN SECTION

2 1/2" MINIMUM  
 CLEARANCE FROM  
 CEILING, OR  
 OBSTRUCTIONS ABOVE



ELEVATION

INSTALLATION ON EXISTING CONCRETE  
 OR MASONRY WALL

No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
**A WOLAK**

APPROVED:  
**D CRIPPEN**

DSGN/DWN:  
**D GREER/CMS/LSA**

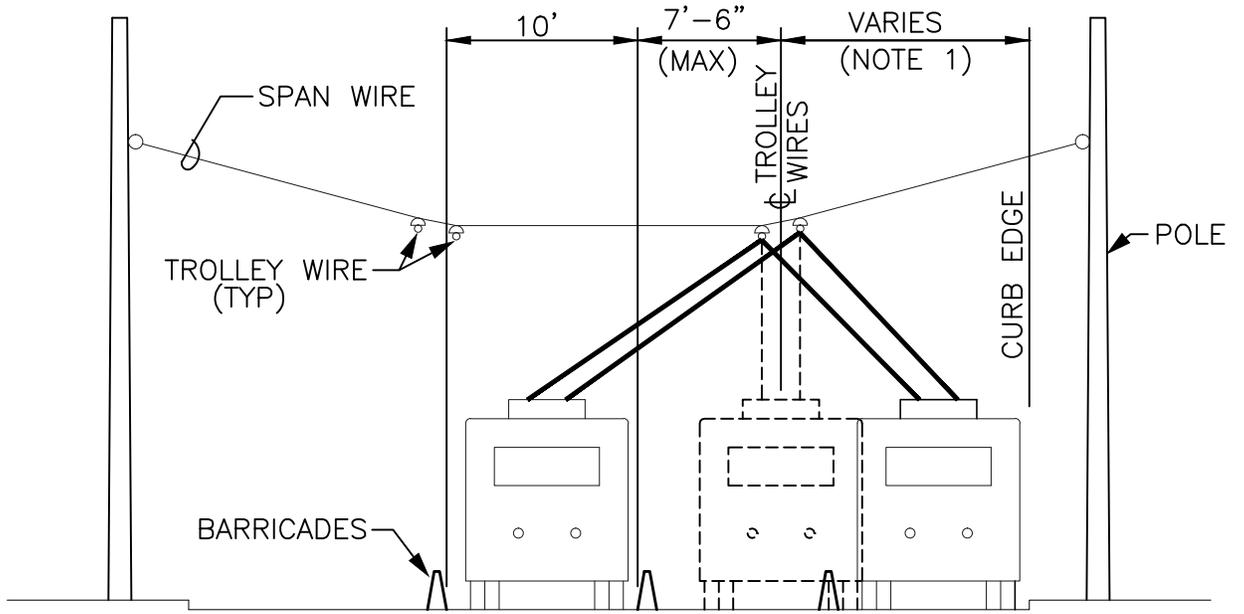


METRO TRANSIT DIVISION  
 TROLLEY STANDARDS

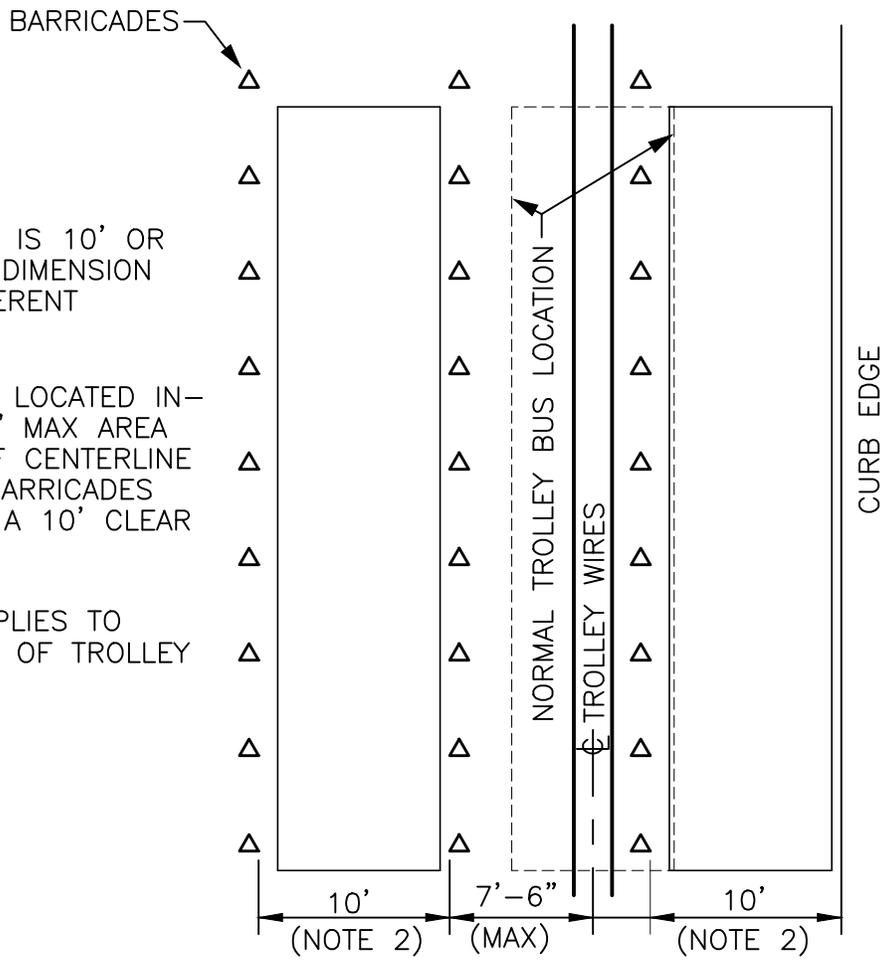
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 CONTROL SYSTEM**

DATE: <b>JULY 2016</b>
STD DET NO: <b>SA-165.6</b>
SHT NO: <b>6 6</b>





**ELEVATION**



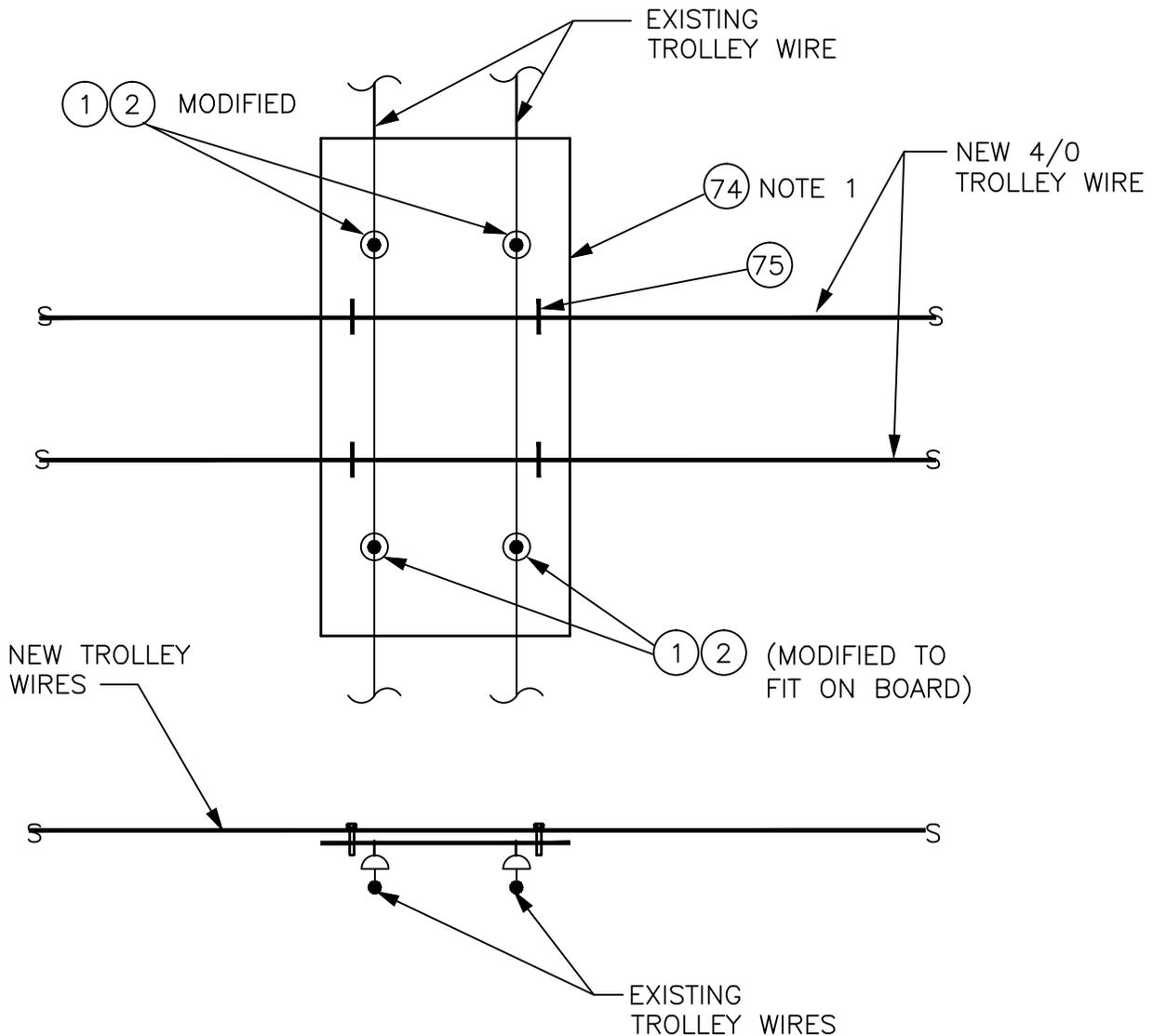
**PLAN**

**NOTES:**

1. NORMAL DIMENSION IS 10' OR 13', BUT EXISTING DIMENSION WILL VARY AT DIFFERENT LOCATIONS.
2. BARRICADES TO BE LOCATED INSIDE OF THE 7'-6" MAX AREA ON EITHER SIDE OF CENTERLINE TROLLEY WIRES. BARRICADES SHALL ALSO FORM A 10' CLEAR TRAVEL LANE.
3. THIS STANDARD APPLIES TO STRAIGHT SECTIONS OF TROLLEY WIRE ONLY.

V:\Library & Standards\Working Documents\Trolley\Details\SA Border Replace Complete\SA-170-171.dwg | Layout: SA-170  
 XREFS: TTB A Size.dwg | IMAGES:  
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				STD DET DEVELOPMENT: <b>A WOLAK</b>		 <b>King County</b> Department of Transportation	METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			TROLLEY COACH TRAVEL AREA IN CONSTRUCTION ZONE		STD DET NO: SA-170
				DSGN/DWN: <b>D GREER/DOW/LSA</b>					SHT NO: 1 1
No.	REVISION	BY	APPD	DATE					



**NOTES:**

1. 4' x 8' SIZE IS A MINIMUM. USE 2 OR MORE WHEN REQUIRED.

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	4	DETROIT CLAMP ASSY	WABCO	19293-3007
02	4	AGC TANGENT SPAN HANGER	WABCO	19360-2000
74	1	4' X 8' X 1/2" EXTERIOR PLYWOOD		
75	4	U BOLT, FOR 4/0 TROLLEY WIRE		

V:\Library & Standards\Working Documents\Trolley\Details\SA\_BORDER REPLACEMENT PROJECT 6-11-2015\SA\_BORDER Replace Completed\SA-190.dwg | Layout: SA-190  
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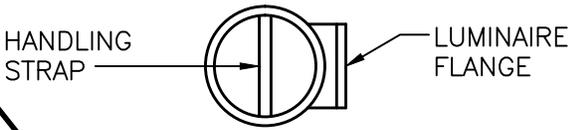
No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
**A WOLAK**  
 APPROVED:  
**D CRIPPEN**  
 DSGN/DWN:  
**D GREER/TMB/LSA**

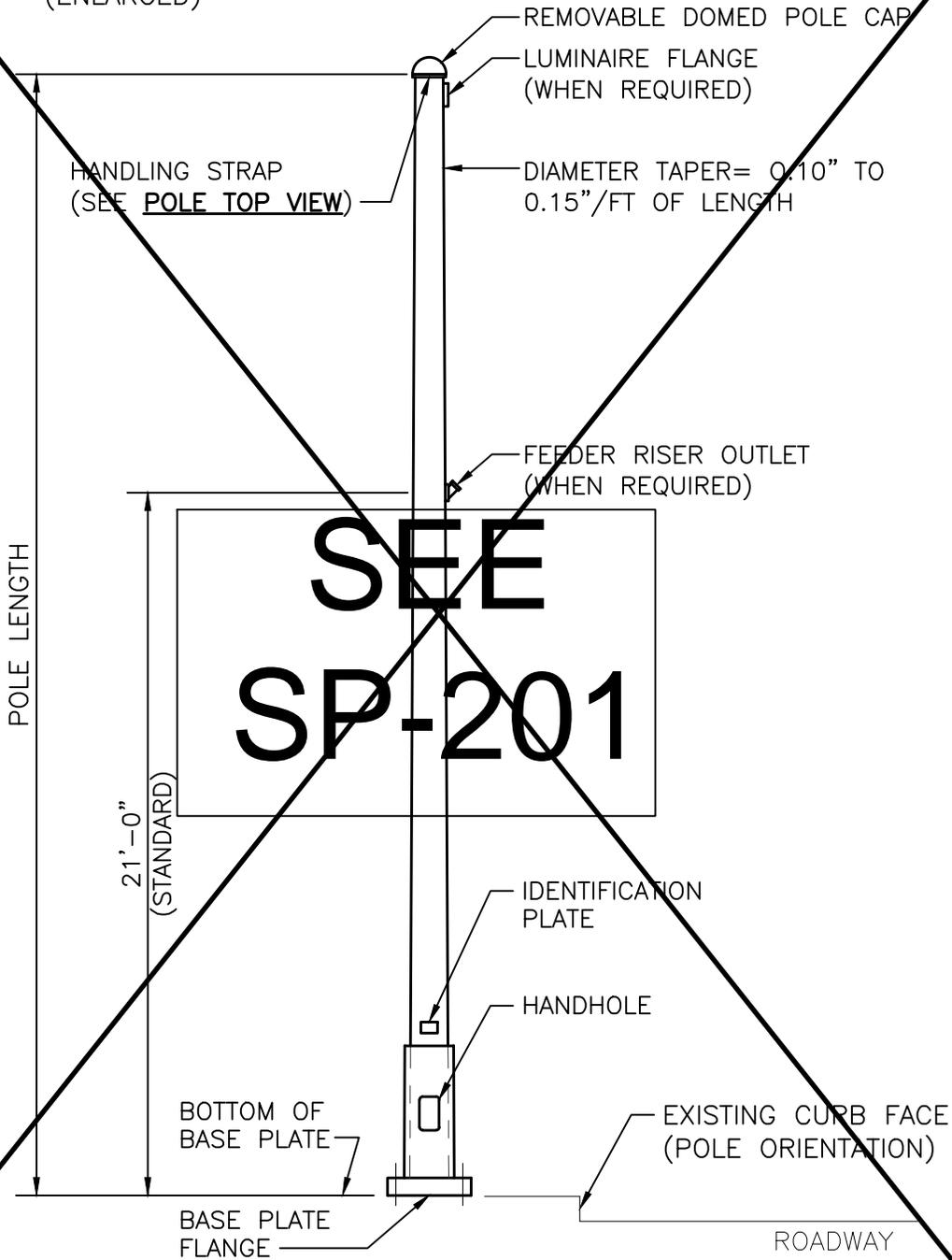


METRO TRANSIT DIVISION  
 TROLLEY STANDARDS  
 TEMPORARY  
 INSULATION BOARD

DATE:	JULY 2016
STD DET NO:	SA-190
SHT NO:	1 1



**POLE TOP VIEW**  
(ENLARGED)



**ANCHOR BASE STEEL POLE**

**SEE  
SP-201**

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No.	REVISION	BY	APPD	DATE

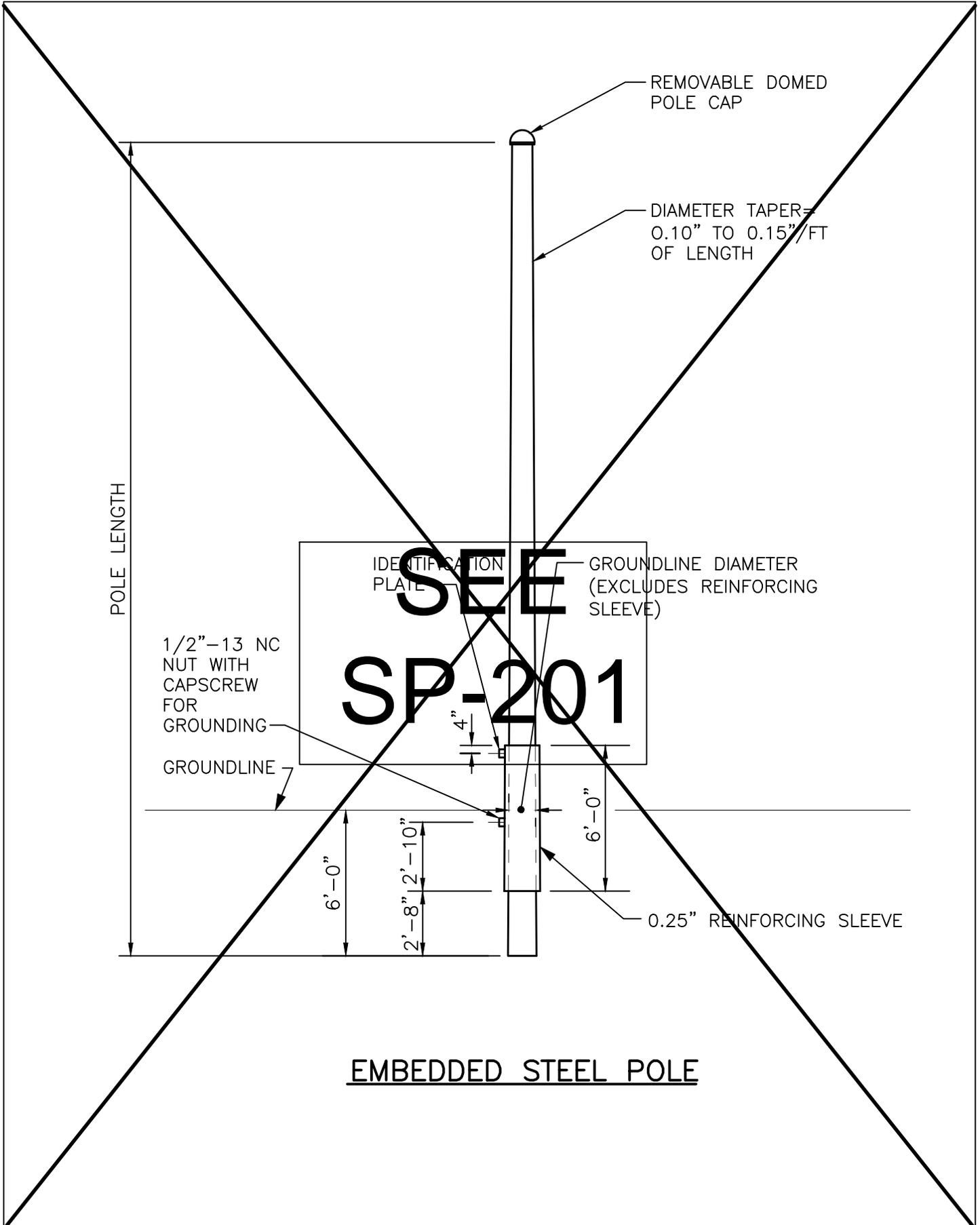
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**A WOLAK**  
 APPROVED:  
**D CRIPPEN**  
 DSGN/DWN:  
**D GREER/TMB/LSA**



METRO TRANSIT DIVISION  
 TROLLEY STANDARDS  
  
**STANDARD STEEL POLE**

DATE:	JULY 2016
STD DET NO:	SA-201.1
SHT NO:	1 4

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**EMBEDDED STEEL POLE**

				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: <b>JULY 2016</b>	
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: <b>SA-201.2</b>			
				DSGN/DWN: <b>D GREER/TMB/LSA</b>			SHT NO: <b>2 4</b>			
No.	REVISION	BY	APPD	DATE			<b>STANDARD STEEL POLE</b>			

# POLE SCHEDULE OF ALLOWABLE LOADS

ALLOWABLE TROLLEY OVERHEAD LOADS ON POLES AT 60° F WITH TROLLEY WIRE TENSION = 2000 LB. (EQUIVALENT HORIZONTAL LOAD IS APPLIED AT 25 FT)

POLE TYPE	ALLOWABLE LOADS				REFERENCE DATA					
	POLE USERS: TOH/LIGHT		POLE USERS: TOH/LIGHT/TRAFFIC		POLE STYLE	STANDARD LENGTH (FEET)	GRD LINE DIA (IN)	GROUND LINE YIELD MOMENT (LB-FT)	POLE FOUNDATION TYPE	
	GROUND LINE MOMENT (LB-FT) <b>(NOTE 1)</b>	EQUIVALENT LOAD (LB)	GROUND LINE MOMENT (LB-FT) <b>(NOTE 1,2)</b>	EQUIVALENT LOAD (LB)						
SA-201H	40,000	1600	10,000	400	EMBEDDED	35	12	100,000	SA-212B	
SA-201K	80,000	3200	50,000	2000				14	180,000	SA-212D
SA-201M	155,000	6200	125,000	5000				15	330,000	SA-212F
SA-201V	40,000	1600	10,000	400	ANCHOR BASE	33.5	12	100,000	SA-213B	
SA-201X	80,000	3200	50,000	2000				14	180,000	SA-213D
SA-201Z	155,000	6200	125,000	5000				15	330,000	SA-213F
SA-201ZZ	185,000	7400	155,000	6200				15	390,000	SA-213F
SA-201V	40,000	1600	10,000	400	ANCHOR BASE SEATTLE BASE	28.5	12	100,000	SA-213B	
SA-201X	80,000	3200	50,000	2000				12	180,000	SA-213D
SA-201Y	125,000	5000	90,000	1800				12	270,000	SA-213F
SA-201Z	155,000	6200	125,000	5000				12	330,000	SA-213F

SEE  
SP-201

## NOTES

### 1. REDUCE ALLOWABLE LOADS FOR:

- A. TROLLEY WIRE TENSION OF 1500# AT 60° F 10%
- B. FOR EACH ELECTRIC LINE, COMMUNICATION LINE, OR SERVICE DROP ATTACHED TO POLE EXCEPT AT DEAD ENDS AND ANGLES 5000 LB-FT (200 LB)
- C. DEAD ENDS, ANGLES, AND GUYS FOR ELECTRIC AND COMMUNICATION LINES AND SERVICE DROPS REQUIRE ADDITIONAL REDUCTIONS.

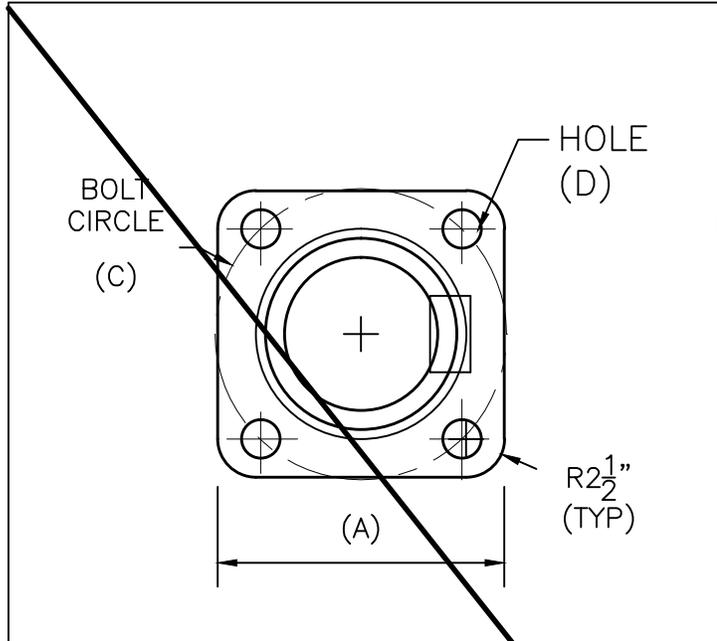
### 2. REDUCE ALLOWABLE LOADS FOR:

- A. TRAFFIC SPAN WITH OVER 4 HEADS OR SIGNS FOR EACH ADDITIONAL HEAD OR SIGN 6000 LB-FT (240 LB)
- B. 2 TRAFFIC SPANS AT 90° ±10° W/ OVER 5 HEADS OR SIGNS TOTAL FOR EACH ADDITIONAL HEAD OR SIGN 5000 LB-FT (200 LB)
- C. TRAFFIC ARM WITH OVER 4 HEADS OR SIGNS FOR EACH ADDITIONAL HEAD OR SIGN 15000 LB-FT (600 LB)

STD DET DEVELOPMENT: <b>A WOLAK</b>						METRO TRANSIT DIVISION TROLLEY STANDARDS			DATE: JULY 2016
APPROVED: <b>D CRIPPEN</b>						STANDARD STEEL POLE			STD DET NO: SA-201.3
DSGN/DWN: <b>D GREER/TMB/LSA</b>									SHT NO: 3 4
No.	REVISION	BY	APPD	DATE					

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**BASE PLATE FLANGE**

**BASE PLATE FLANGE DIMENSIONS**  
(INCHES)

POLE TYPE	PLATE WIDTH (A)	PLATE THICKNESS (B)	BOLT CIRCLE (C)	HOLE DIA (D)
<b>BASE STYLE: STANDARD</b>				
SA-201-V	18x18	1 3/4	18	2 1/16
SA-201-X	20x20	2	20	2 5/16
SA-201-Z	23x23	2 1/2	22	2 13/16
SA-201-ZZ	23x23	2 1/2	22	2 13/16
<b>BASE STYLE: CHIEF SEATTLE</b>				
SA-201-V	23x23	1 3/4	18	2 1/16
SA-201-X	23x23	2	20	2 5/16
SA-201-Y	23x23	2 1/4	22	2 13/16
SA-201-Z	23x23	2 1/2	22	2 13/16

**GENERAL NOTES**

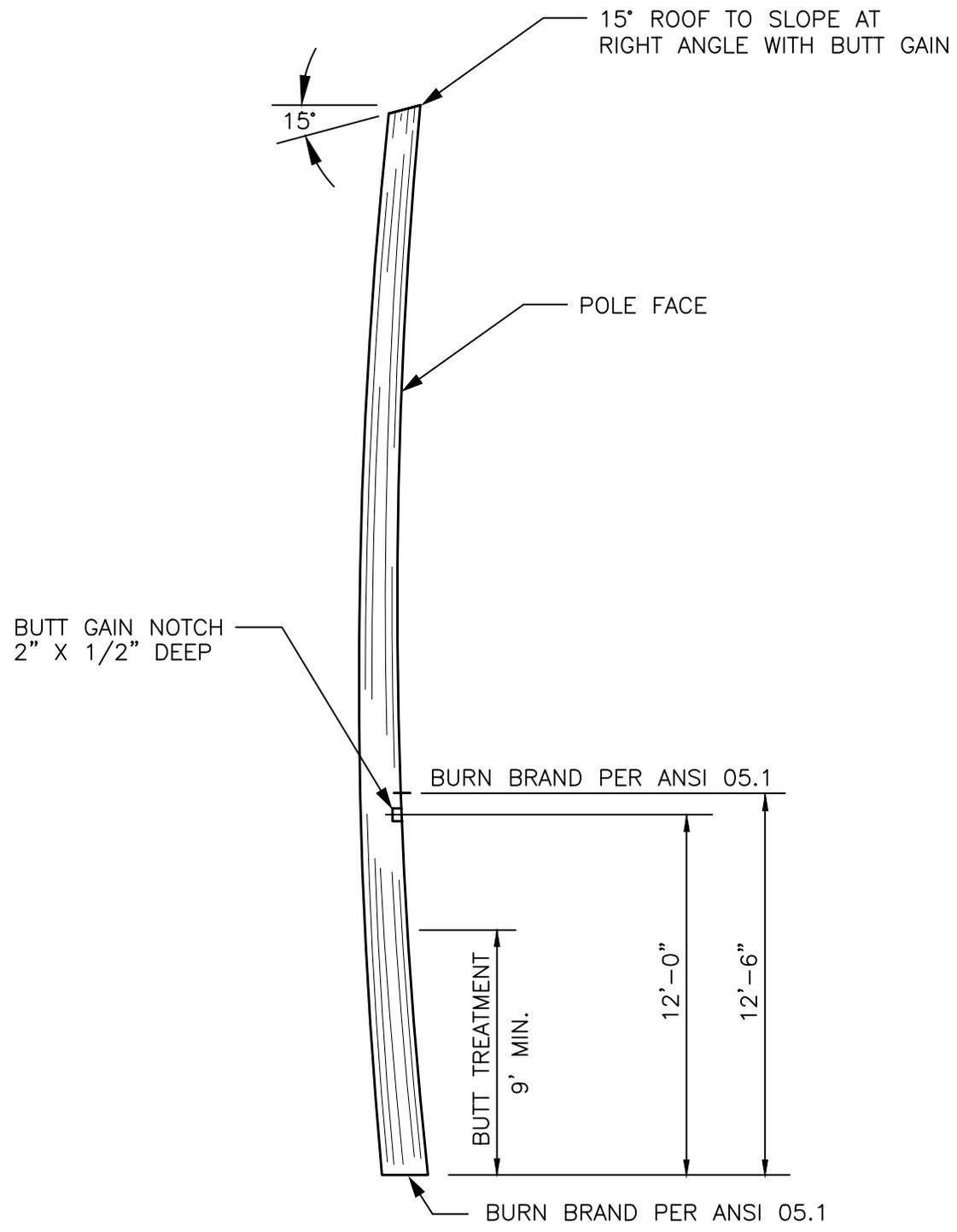
**INSTALLATION:**

- A. HANDLING OF POLES SHALL BE DONE ONLY BY THE ANCHOR BOLT HOLES IN THE BASE PLATE, THE HANDLING STRAP AT THE POLE TOP, OR A PAD-EYE BOLTED TO THE POLE TOP PLATE.
- B. POLES SHALL BE STORED AND TRANSPORTED HORIZONTALLY, SUPPORTED BY THE BASE PLATES, AND WITH A NEW SCRAP OF CARPETING WITHIN THE TOP FOOT OF THE POLE.
- C. ZINC REPAIR PAINT SHALL BE AS SPECIFIED IN SECTION 05121 OF THIS CONTRACT.
- D. GALVANIZING REPAIR COMPOUND SHALL BE AS SPECIFIED IN SECTION 05121 OF THIS CONTRACT.

**SEE  
SP-201**

				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>		STANDARD STEEL POLE	STD DET NO: SA-201.4
				DSGN/DWN: <b>D GREER/TMB/LSA</b>		SHT NO: 4 4	
No.	REVISION	BY	APPD	DATE			

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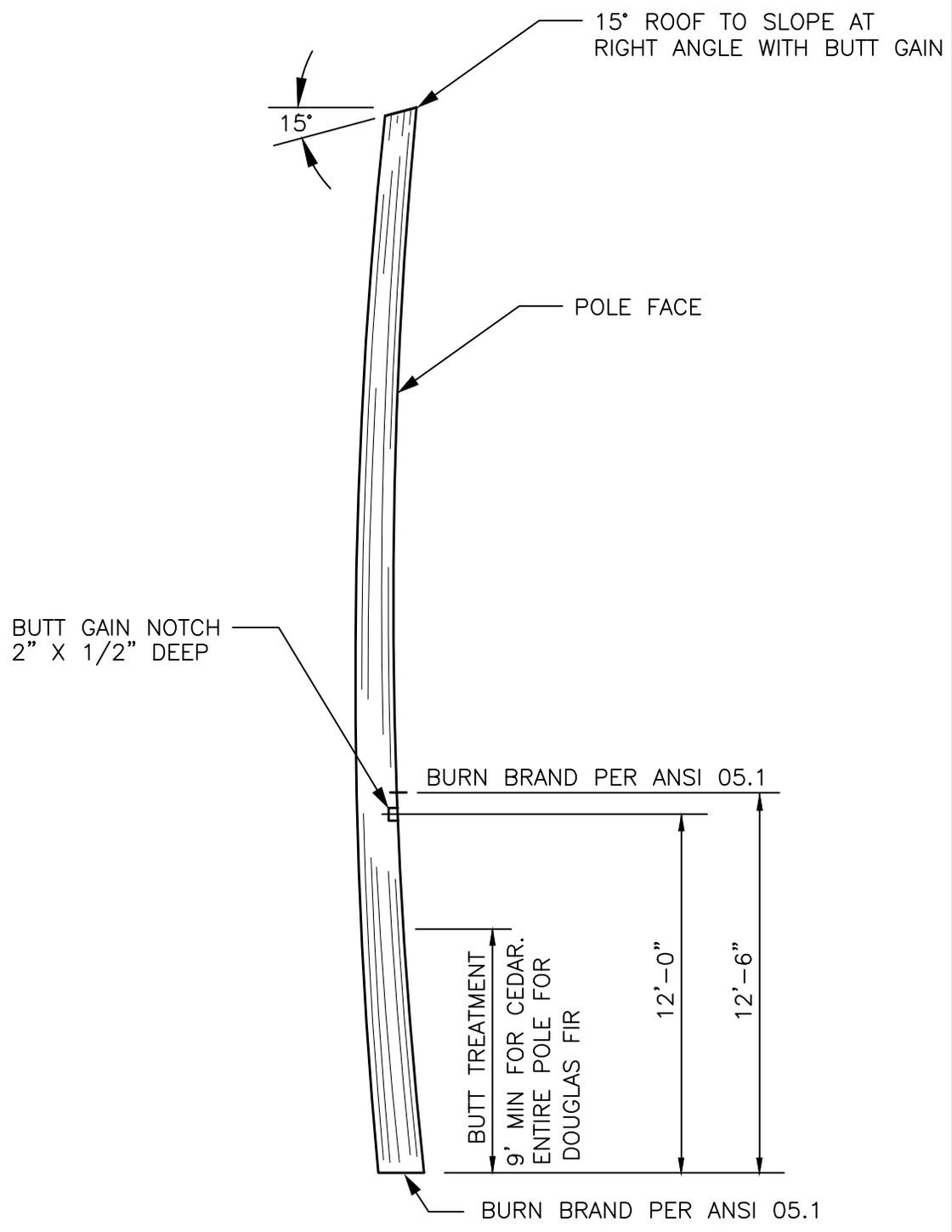


NOTES

1. POLE SHALL BE CLASS 1, WESTERN RED CEDAR, PER ANSI 05.1-LATEST EDITION.
2. METAL TAGS AND NAILS FOR BURN BRAND ARE NOT ALLOWED.

				STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>WOOD POLE          FRAMING DETAILS</b>	DATE: JULY 2016
				APPROVED: D CRIPPEN			STD DET NO: SA-202
				DSGN/DWN: D GREER/DOW/LSA			SHT NO: 1 1
No.	REVISION	BY	APPD	DATE			

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**NOTES**

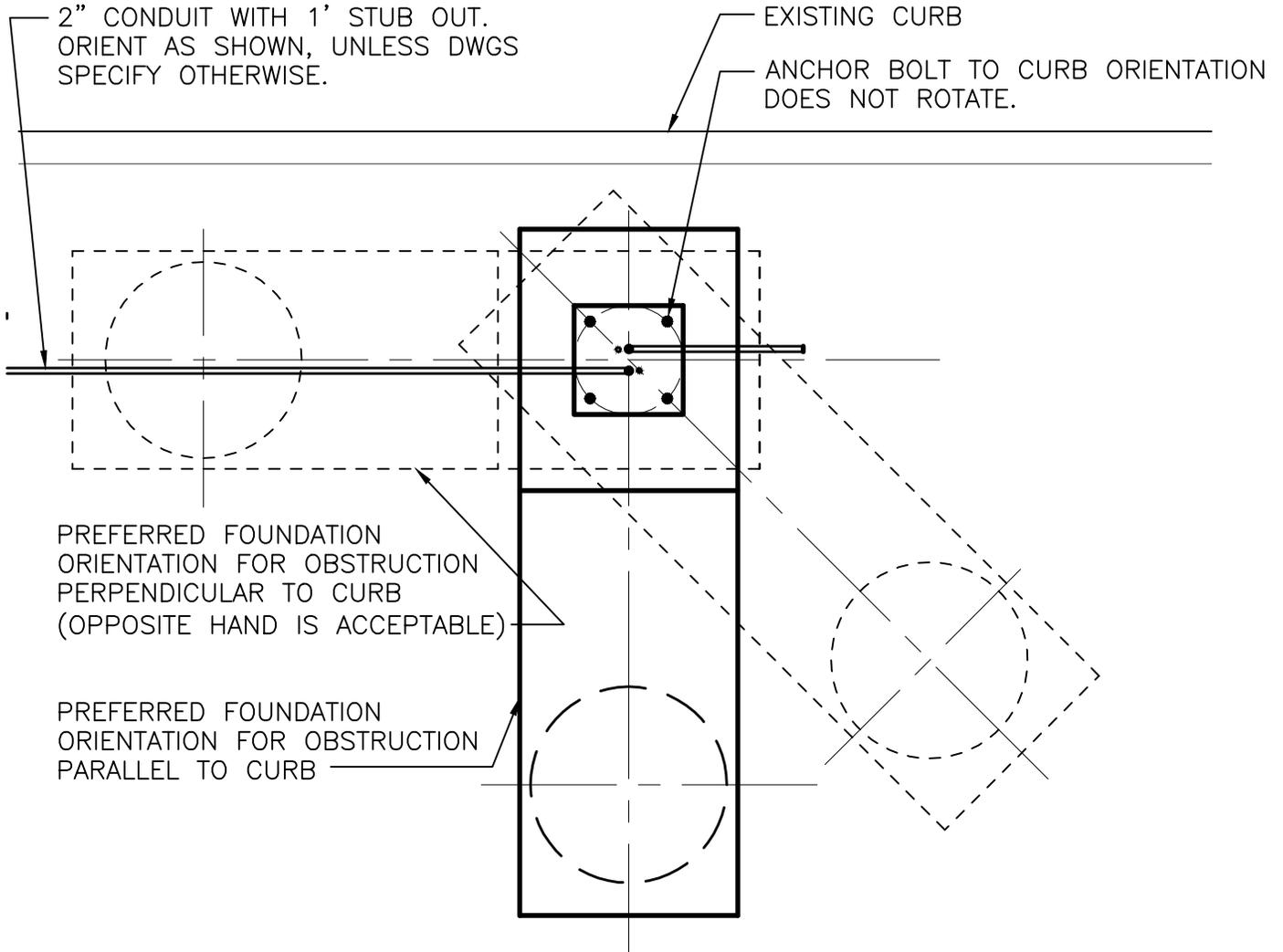
1. POLE SHALL BE CLASS 1, WESTERN RED CEDAR OR DOUGLAS FIR, PER ANSI 05.1-LATEST EDITION.
2. METAL TAGS AND NAILS FOR BURN BRAND ARE NOT ALLOWED.

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				APPROVED: <b>D CRIPPEN</b>			<b>WOOD POLE          FRAMING DETAILS</b>		STD DET NO: SA-202A
				DSGN/DWN: <b>D GREER/DOW/LSA</b>					SHT NO: 1 1
No.	REVISION	BY	APPD	DATE					

## DETAILS FOR SHTS 2,3 & 4

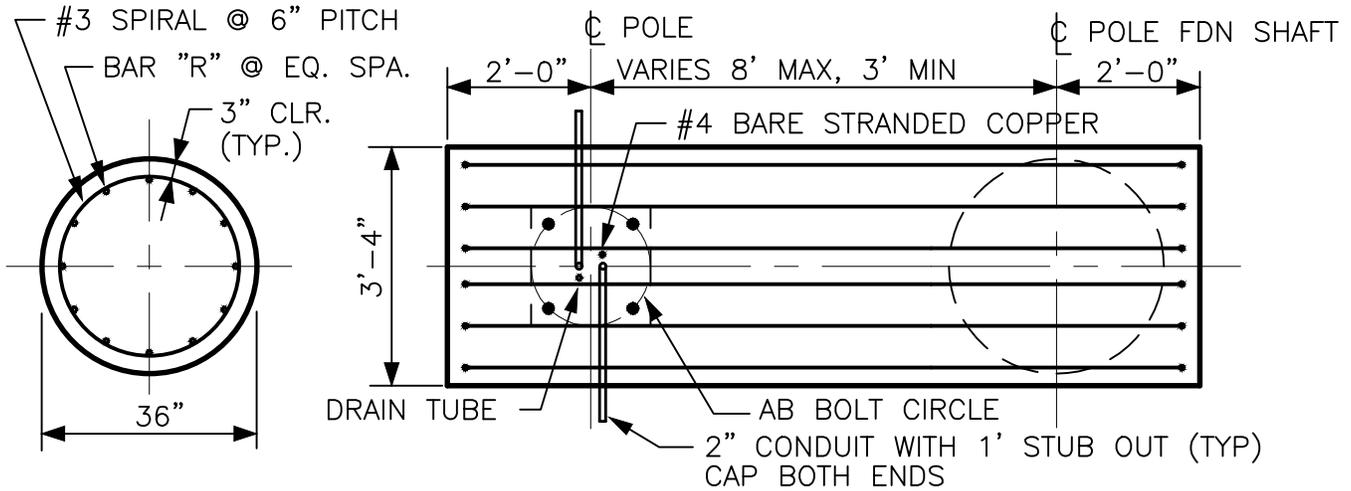
FOUNDATION TYPE	NORMAL WORKING MOMENT (LB-FT)	DIMENSIONS					REBAR QUANTITIES					
		A	P	G	B	D	R*	T	V	W	Y	Z
SA-211B	40,000	2'-4"	9"	6.5"	2.5"	8'-6"	8-#8	4-#7	6-#7	6-#7	#4@6"	4-#7
SA-211D	80,000	2'-8"	10"	7"	3"	10'-6"	12-#8	4-#8	6-#8	6-#8	#5@5"	4-#8
SA-211F	155,000	3'-0"	11.5"	8"	3.5"	13'-0"	12-#8	4-#8	6-#8	6-#8	#5@4"	4-#8

\* ADD (1) #8 VERTICAL FOR GROUNDING



### ORIENTATION PLAN

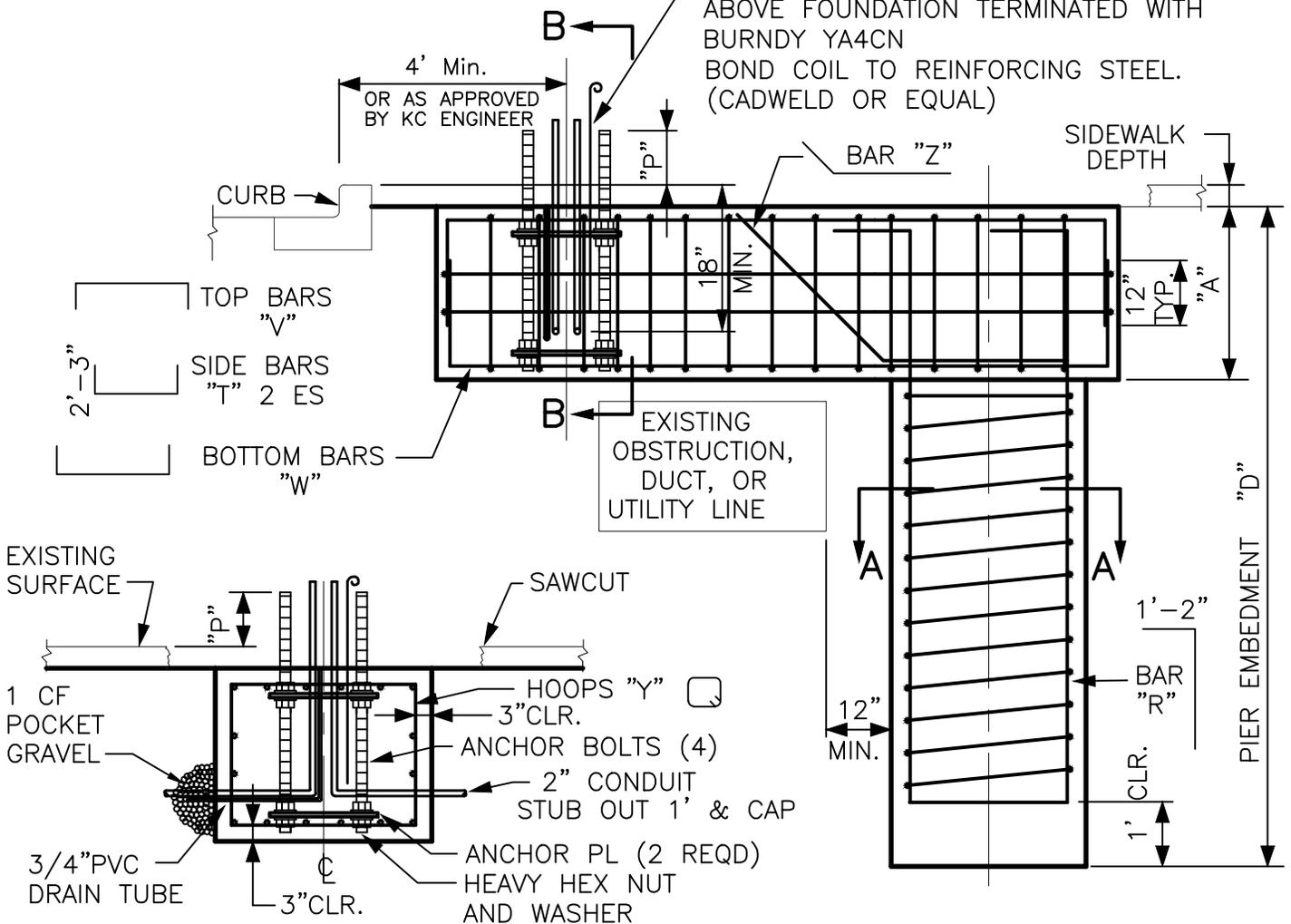
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						APPROVED: D CRIPPEN				STD DET NO: SA-211.1		
						DSGN/DWN: D GREER/DOW/LSA				SHT NO: 1 7		
No.	REVISION	BY	APPD	DATE								



**SECTION A-A**

**PLAN**

COIL 4' OF #4 BARE STRANDED COPPER ABOVE FOUNDATION TERMINATED WITH BURNDY YA4CN BOND COIL TO REINFORCING STEEL. (CADWELD OR EQUAL)



**SECTION B-B**

**ELEVATION**

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 XREFS: TTB A Size.dwg | IMAGES:  
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No.	REVISION	BY	APPD	DATE

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APPROVED: D CRIPPEN
DSGN/DWN: D GREER/DOW/LSA

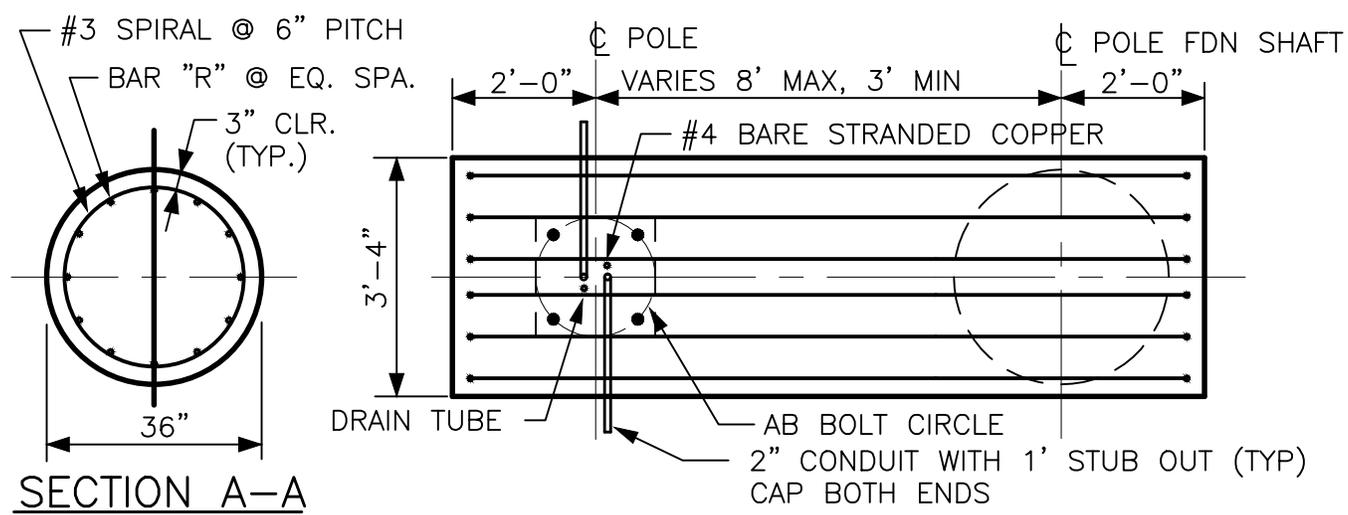


METRO TRANSIT DIVISION  
TROLLEY STANDARDS

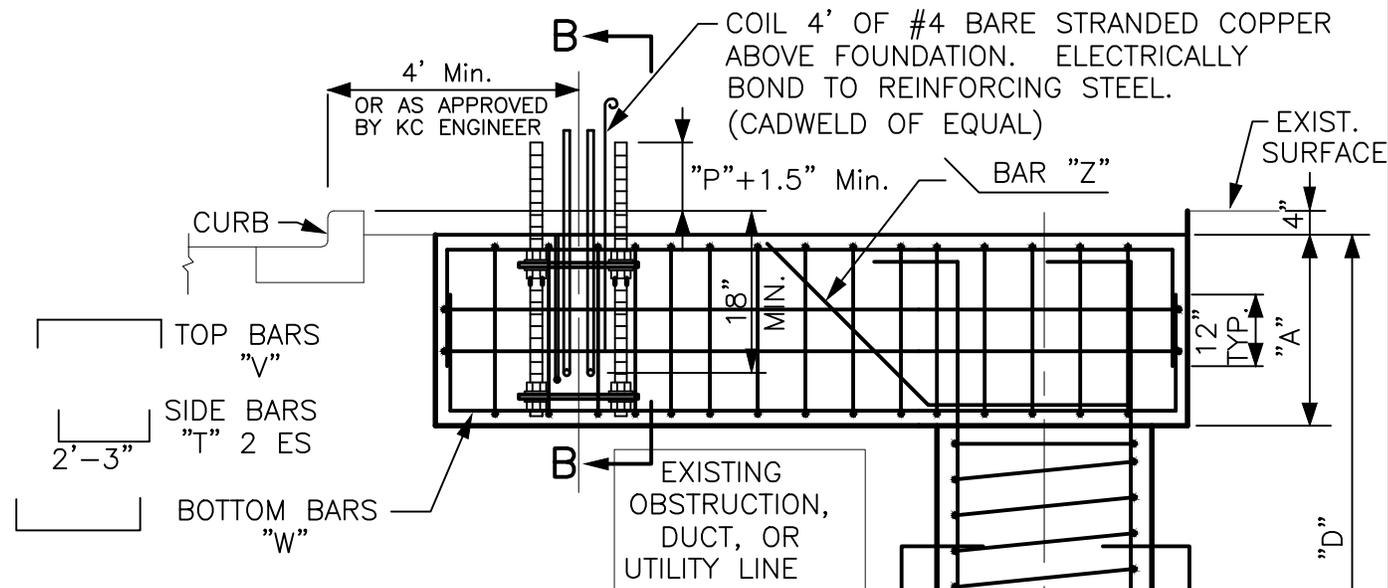
**OFFSET FOUNDATION  
ANCHOR BASE STEEL POLE  
(WITH SIDEWALK)**

DATE: JULY 2016
STD DET NO: SA-211.2
SHT NO: 2 7

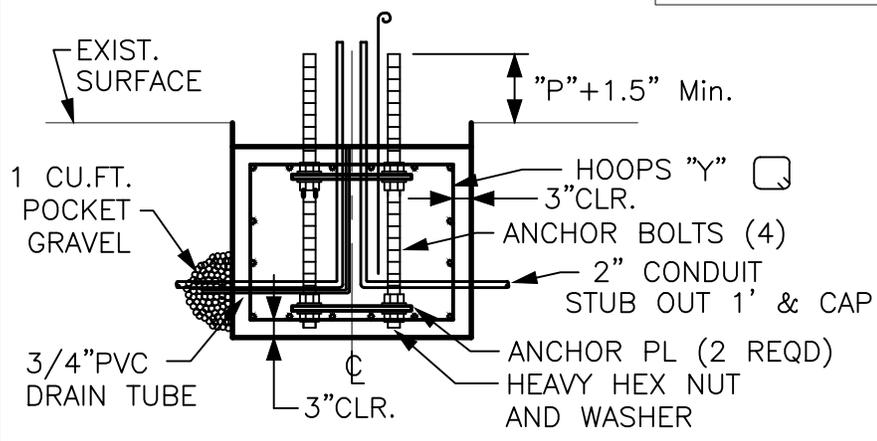
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**PLAN**



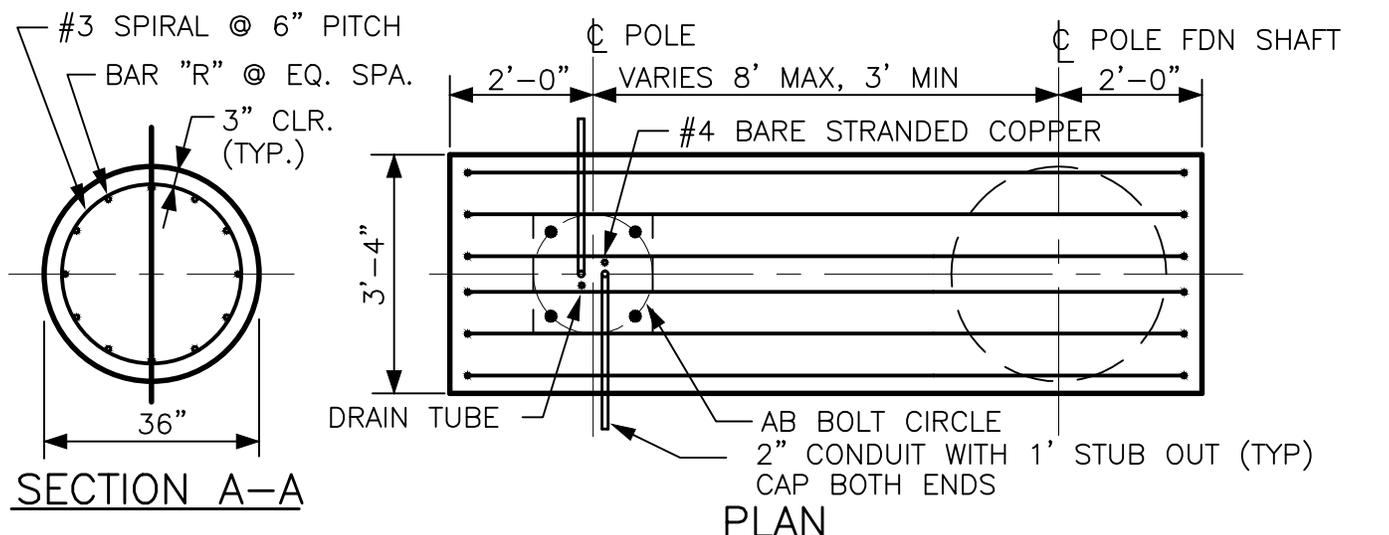
**ELEVATION**



**SECTION B-B**

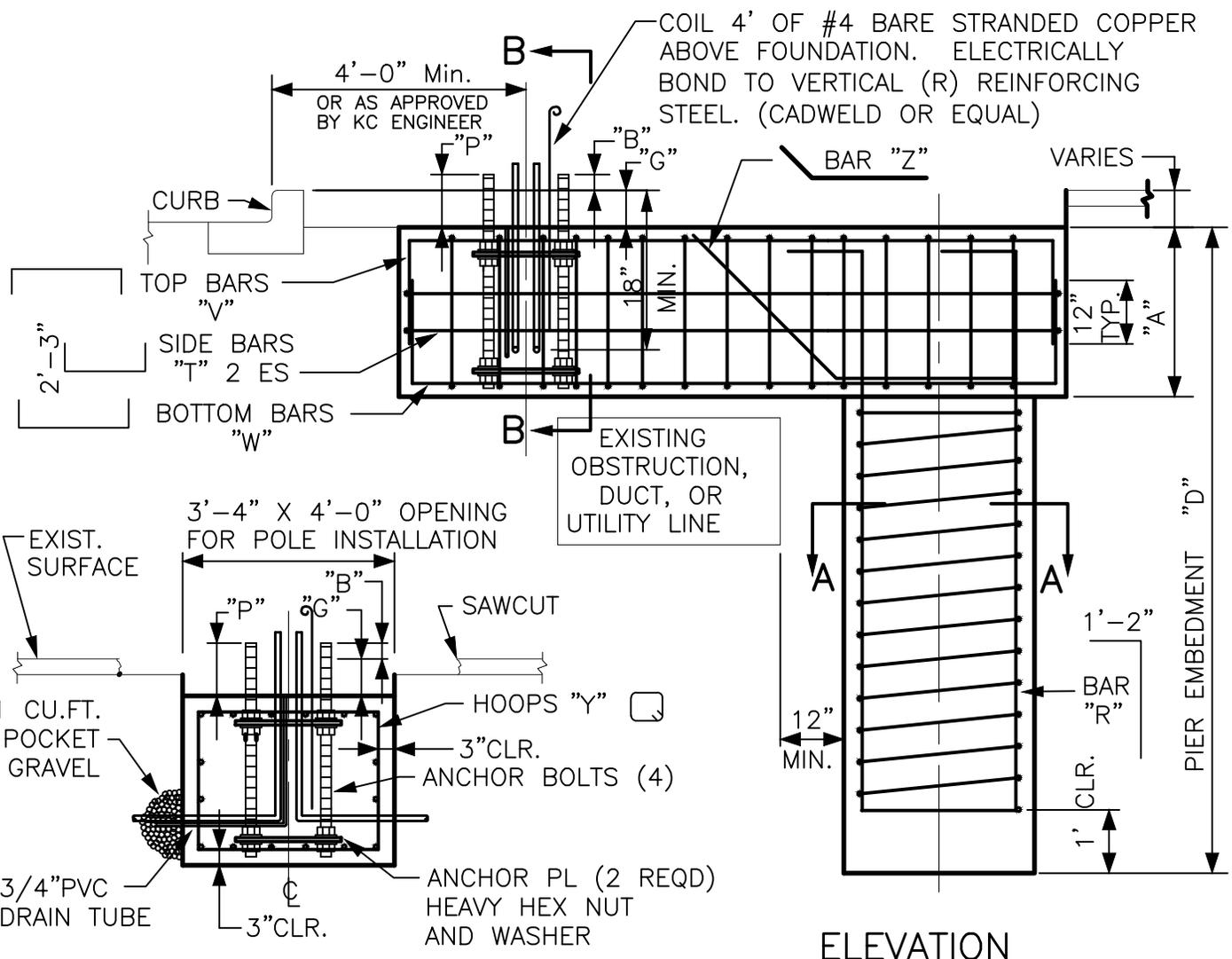
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				APPROVED: D CRIPPEN			STD DET NO: SA-211.3
				DSGN/DWN: D GREER/DOW/LSA			SHT NO: 3 7
No.	REVISION	BY	APPD	DATE			

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**SECTION A-A**

**PLAN**



**SECTION B-B**

**ELEVATION**

No.	REVISION	BY	APPD	DATE

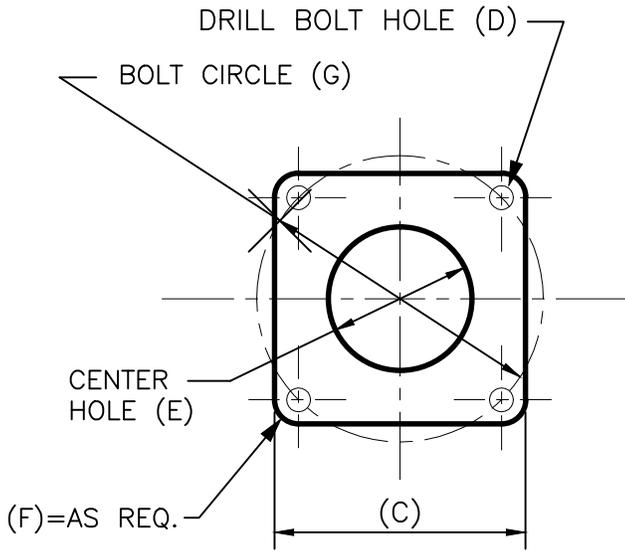
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 APPROVED:  
 D CRIPPEN  
 DSGN/DWN:  
 D GREER/DOW/LSA



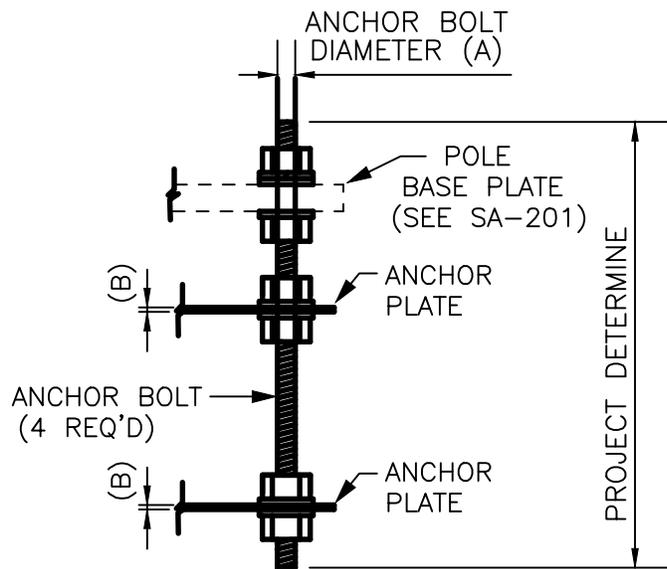
METRO TRANSIT DIVISION  
 TROLLEY STANDARDS  
 OFFSET FOUNDATION  
 ANCHOR BASE POLE  
 (CHIEF SEATTLE BASE)

DATE:	JULY 2016
STD DET NO:	SA-211.4
SHT NO:	4 7

FOUNDATION TYPE	ANCHOR BOLT DIAM. (INCHES) (A)	ANCHOR PLATE DIMENSIONS (INCHES)					
		PLATE THICK. (B)	PLATE WIDTH (C)	BOLT HOLE (D)	CENTER HOLE (E)	CORNER RADIUS (F)	BOLT CIRCLE (G)
SA-211B	1 3/4	3/8	16 X 16	1 7/8	12 1/2	1 5/8	18
SA-211D	2	3/8	18 X 18	2 1/8	14	2	20
SA-211F	2 1/2	1/2	20 X 20	2 5/8	15	2 1/4	22



**ANCHOR PLATE  
DETAIL**



**TYP. ANCHOR BOLT**  
COMPLETE WITH 6 NUTS  
6 FLAT WASHERS & 1 LOCK WASHER

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No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT: A WOLAK
APPROVED: D CRIPPEN
DSGN/DWN: D GREER/TMB/LSA



METRO TRANSIT DIVISION TROLLEY STANDARDS
OFFSET FOUNDATION ANCHOR BASE POLE

DATE: JULY 2016
STD DET NO: SA-211.5
SHT NO: 5 7

## GENERAL NOTES

### 1. CONCRETE AND REINFORCING STEEL

- 1.1 All work shall be done per City of Seattle Board of Public Works Rules: Chapter 40.4 – Street and Sidewalk Pavement Opening and Restoration Rules if in Street Right Of Way.
- 1.2 Concrete shall be City of Seattle Class AX air entrained, 3/4” max aggregate, and with a minimum compressive strength of 4000 PSI at 28 days.
- 1.3 All reinforcing bars shall be deformed billet steel conforming to ASTM A615 Grade 60.
- 1.4 Minimum clear concrete cover shall be 3 inches.
- 1.5 Reinforcing details and fabrication shall be as recommended in ACI 315 ”Details & Detailing of Concrete Reinforcement.”
- 1.6 No construction joints shall be permitted.

### 2. ANCHOR PLATES, BOLTS, NUTS AND WASHERS

- 2.1 Anchor bolts including nuts and flat washers shall conform to ASTM F1554–99 Grade 105 class 2a including supplementary requirements S2, S3, and S5. Threads shall conform to the ANSI Standard B1.1 for UNC thread. Anchor bolts shall have 36 inches of thread on exposed end and 12 inches of thread on the embedded end, or shall be fully threaded.
- 2.2 Anchor plates shall conform to ASTM A36.

### 3. GALVANIZING

- 3.1 Anchor plates, anchor bolts, anchor bolt nuts and washers shall be hot-dip galvanized in conformance to ASTM A153 or ASTM A123.

### 4. SOIL

- 4.1 Embedment depth is adequate for three times the working moment in cohesive soils of  $c=1000\text{PSF}$  and  $\phi=0^\circ$  or better and cohesionless soils of  $c=0\text{PSF}$  and  $\phi=26^\circ$  or better.

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					APPROVED: D CRIPPEN		OFFSET FOUNDATION ANCHOR BASE POLE	STD DET NO: SA-211.6
					DSGN/DWN: D GREER/BFB/LSA			SHT NO: 6 7
No.	REVISION	BY	APPD	DATE				

GENERAL NOTES

4.2 Embedment depth is adequate for three times the working moment in cohesive soils of  $c=1000\text{PSF}$  and  $\phi=0^\circ$  or better and cohesionless soils of  $c=0\text{PSF}$  and  $\phi=26^\circ$  or better.

5. SUBMITTALS

5.1 Reinforcing steel shop drawings and certificate of compliance.

5.2 Concrete mix proportions, admixtures and slump.

5.3 Anchor plate, anchor bolt, anchor bolt nuts and washers certificates of compliance.

5.4 A test report shall be provided in accordance with ASTM F1554-99 and supplementary requirements.

6. INSPECTION

6.1 Concrete shall not be placed until the Engineer has inspected the excavation, the grounding, the anchor bolts, and the placement of the reinforcing bar cage.

7. ANCHOR BOLT SETTING

7.1 Cover exposed anchor bolt threads and nuts with at least 3 layers of plastic tape before placing concrete.

7.2 Anchor bolt template shall be used temporarily at the top of anchor bolts for accurate positioning and aligning.

8. CONDUIT

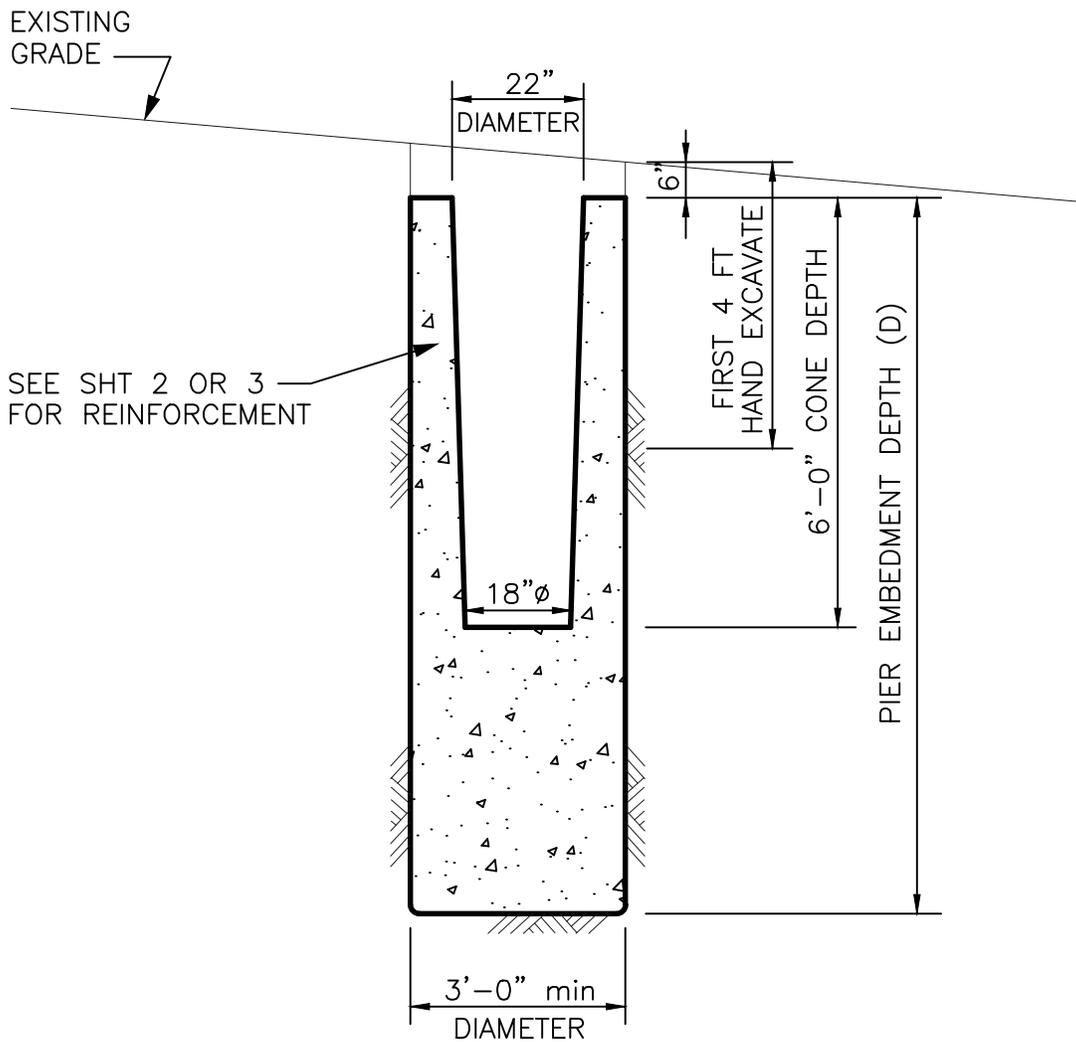
8.1 Conduit from foundation shall be schedule 80 PVC.  
Conduit bends shall have a minimum radius of 12”.

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					APPROVED: D CRIPPEN			STD DET NO: SA-211.7
					DSGN/DWN: D GREER/DOW/LSA			SHT NO: 7 7
No.	REVISION	BY	APPD	DATE				

EMBEDDED FOUNDATION SCHEDULE				
FOUNDATION TYPE	NORMAL WORKING MOMENT (LB-FT)	PIER EMBEDMENT DEPTH (D) (FEET)	REBAR REQUIREMENTS	
			VERTICAL*	SPIRAL TIES
SA-212-B	40,000	8.5	8-#8	#3 @ 6"
SA-212-D	80,000	10.5	12-#8	#3 @ 6"
SA-212-F	155,000	13	12-#8	#3 @ 6"

\*ADD (1) #8 VERTICAL FOR GROUNDING



### INCLINED CONDITION & CONE DETAIL

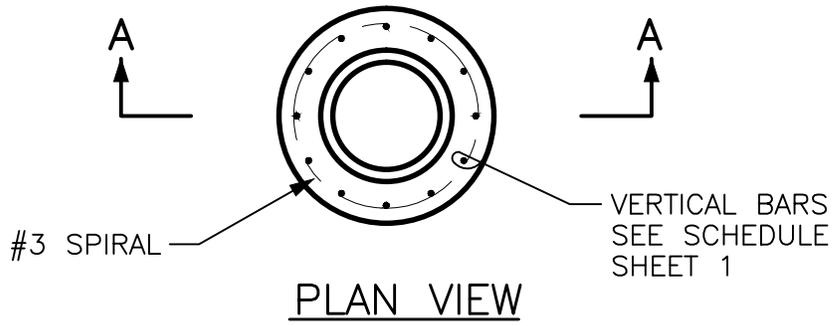
REBAR NOT SHOWN FOR CLARITY

#### NOTES

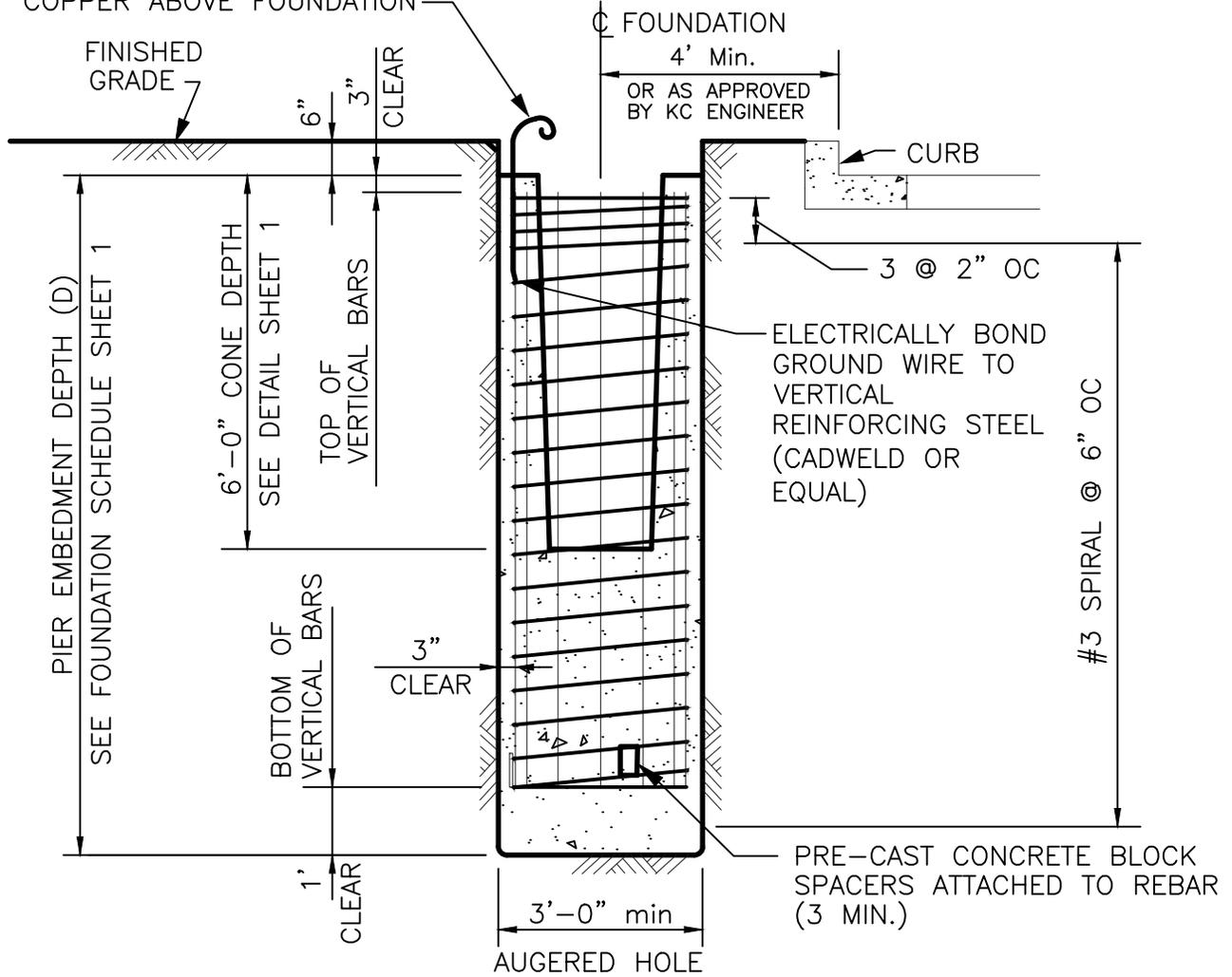
- SEE SHEET 4 FOR GENERAL NOTES.

				STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: JULY 2016
				APPROVED: D CRIPPEN		EMBEDDED STEEL POLE STANDARD FOUNDATION	STD DET NO: SA-212.1
				DSGN/DWN: D GREER/BFB/LSA			SHT NO: 1 6
No.	REVISION	BY	APPD	DATE			

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 XREFS: TTB A Size.dwg | IMAGES:  
 PLOTTED: Jul 21, 2016 - 10:13:46am By anders



COIL 4' OF #4 BARE STRANDED COPPER ABOVE FOUNDATION



**SECTION A-A  
WITHOUT SIDEWALK**

**NOTES**

1. SEE SHEET 4 FOR GENERAL NOTES.

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XREFS: TTB A Size.dwg | IMAGES:  
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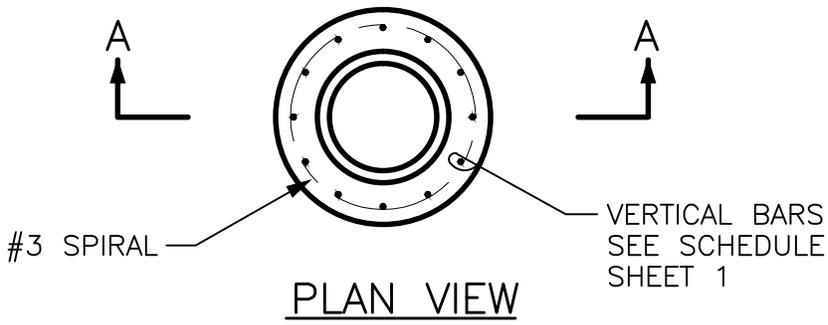
No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT: <b>A WOLAK</b>
APPROVED: <b>D CRIPPEN</b>
DSGN/DWN: <b>D GREER/BFB/LSA</b>

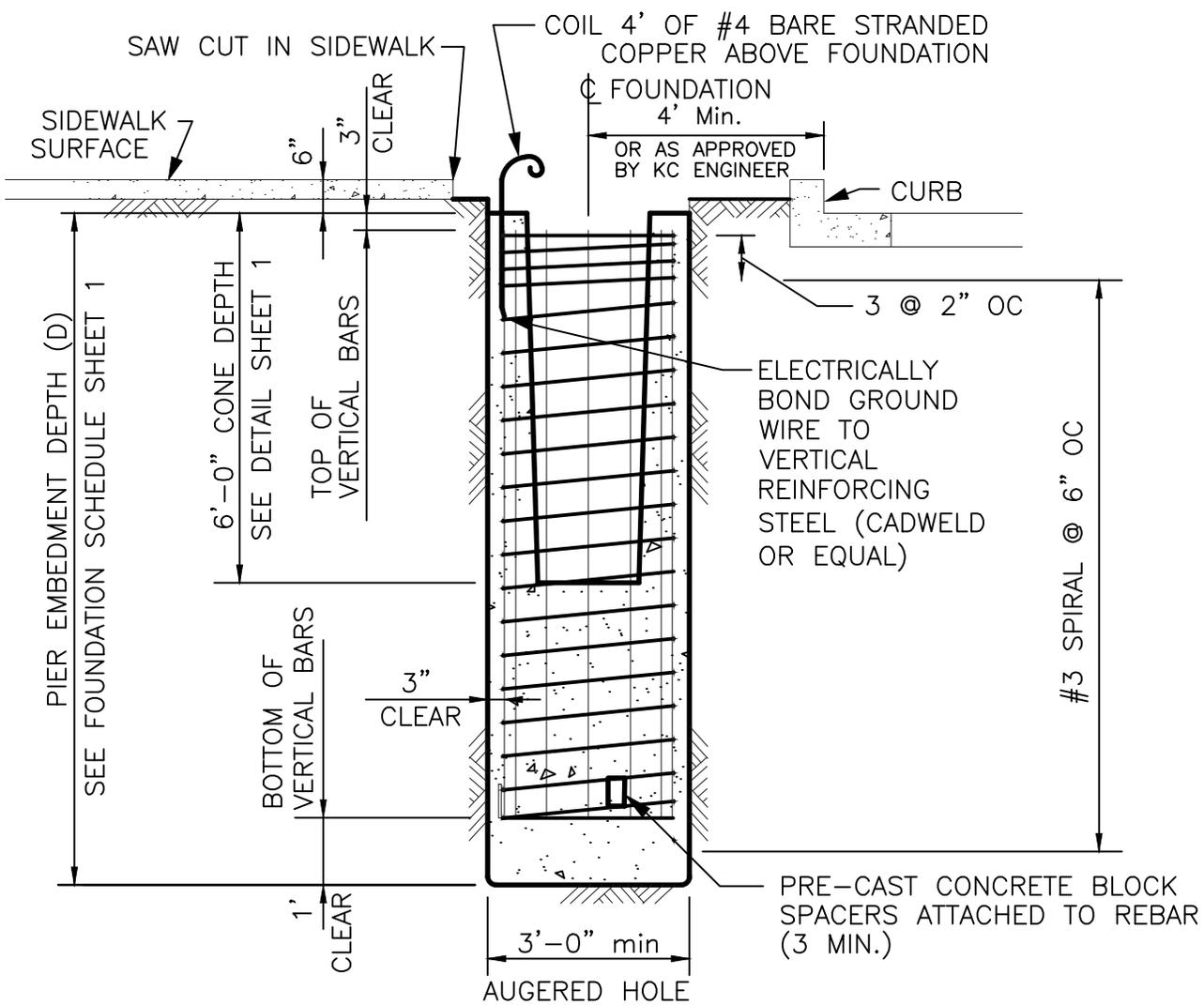


METRO TRANSIT DIVISION TROLLEY STANDARDS
<b>EMBEDDED STEEL POLE STANDARD FOUNDATION</b>

DATE: <b>JULY 2016</b>
STD DET NO: <b>SA-212.2</b>
SHT NO: <b>2 6</b>



**PLAN VIEW**



**SECTION A-A  
WITH SIDEWALK**

**NOTES**

- 1. SEE SHEET 4 FOR GENERAL NOTES.

V:\Library & Standards\Working Documents\Trolley\Details\SA Border Replace Complete\SA-212.1-6.dwg | Layout: SA-212.3  
 XREFS: TTB A Size.dwg | IMAGES:  
 PLOTTED: Jul 21, 2016 - 10:17:18am By anders

No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT: <b>A WOLAK</b>
APPROVED: <b>D CRIPPEN</b>
DSGN/DWN: <b>D GREER/BFB/LSA</b>



METRO TRANSIT DIVISION  
 TROLLEY STANDARDS  
  
**EMBEDDED STEEL POLE  
 STANDARD FOUNDATION**

DATE: <b>JULY 2016</b>
STD DET NO: <b>SA-212.3</b>
SHT NO: <b>3 6</b>

GENERAL NOTES

1. CONCRETE

- 1.1 All work shall be done per City of Seattle Board of Public Works Rules: Chapter 40.4 – Street and Sidewalk Pavement Opening and Restoration Rules if in Street Right Of Way.
- 1.2 Concrete shall be City of Seattle Class AX air entrained, 3/4” max aggregate, and with a minimum compressive strength of 4000 PSI at 28 days.
- 1.3 All reinforcing bars shall be deformed billet steel conforming to ASTM A615 Grade 60.
- 1.4 Minimum clear concrete cover shall be 3 inches.
- 1.5 Reinforcing details and fabrication shall be as recommended in ACI 315 "Details & Detailing of Concrete Reinforcement."
- 1.6 No construction joints shall be permitted.

2. SOIL

- 2.1 Embedment depth is based upon research report numbers 105–1, 105–2 Resistance of a drilled shaft footing to overturning loads by Texas Transportation Institute, 1968.
- 2.2 Embedment depth is adequate for three times the working moment in cohesive soils of  $c=1000\text{PSF}$  and  $\phi=0^\circ$  or better and cohesionless soils of  $c=0\text{PSF}$  and  $\phi=26^\circ$  or better.

3. SUBMITTALS

- 3.1 Reinforcing steel shop drawings and certificate of compliance.
- 3.2 Concrete mix proportions, admixtures and slump.

4. INSPECTION

- 4.1 Concrete shall not be placed until the Engineer has inspected the excavation, the grounding, the cone, and the placement of the reinforcing bar cage.

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 PLOTTED: Jul 21, 2016 - 10:17:46am By anders

					STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS  EMBEDDED STEEL POLE STANDARD FOUNDATION	DATE: JULY 2016
					APPROVED: D CRIPPEN			STD DET NO: SA-212.4
					DSGN/DWN: D GREER/BFB/LSA			SHT NO: 4 6
No.	REVISION	BY	APPD	DATE				

3/4" Ø HOLE  
(TYP)

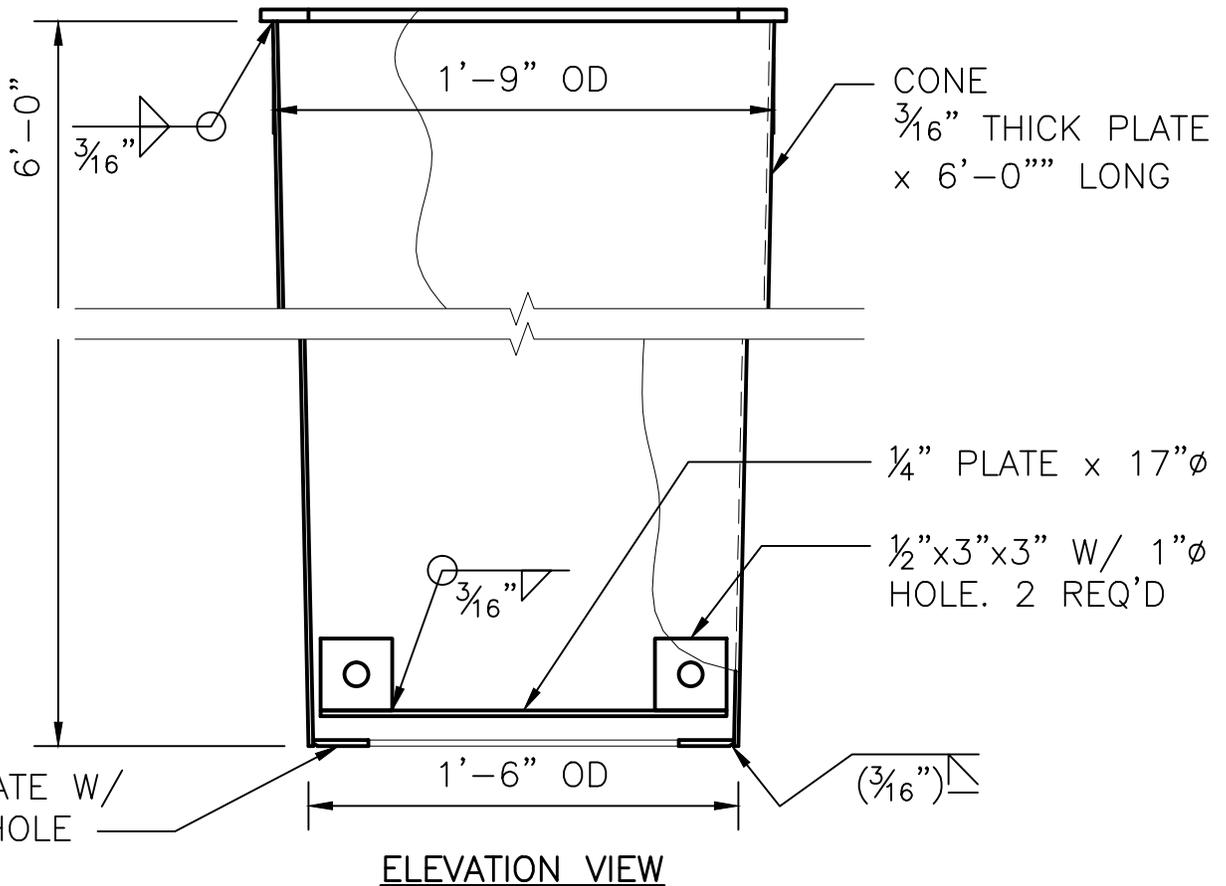
Ø1'-9"

22"x22"x5/8" PLATE  
W/ 18" Ø HOLE

PLAN VIEW

**NOTE:**

ALL MATERIAL SHALL  
BE ASTM A36.



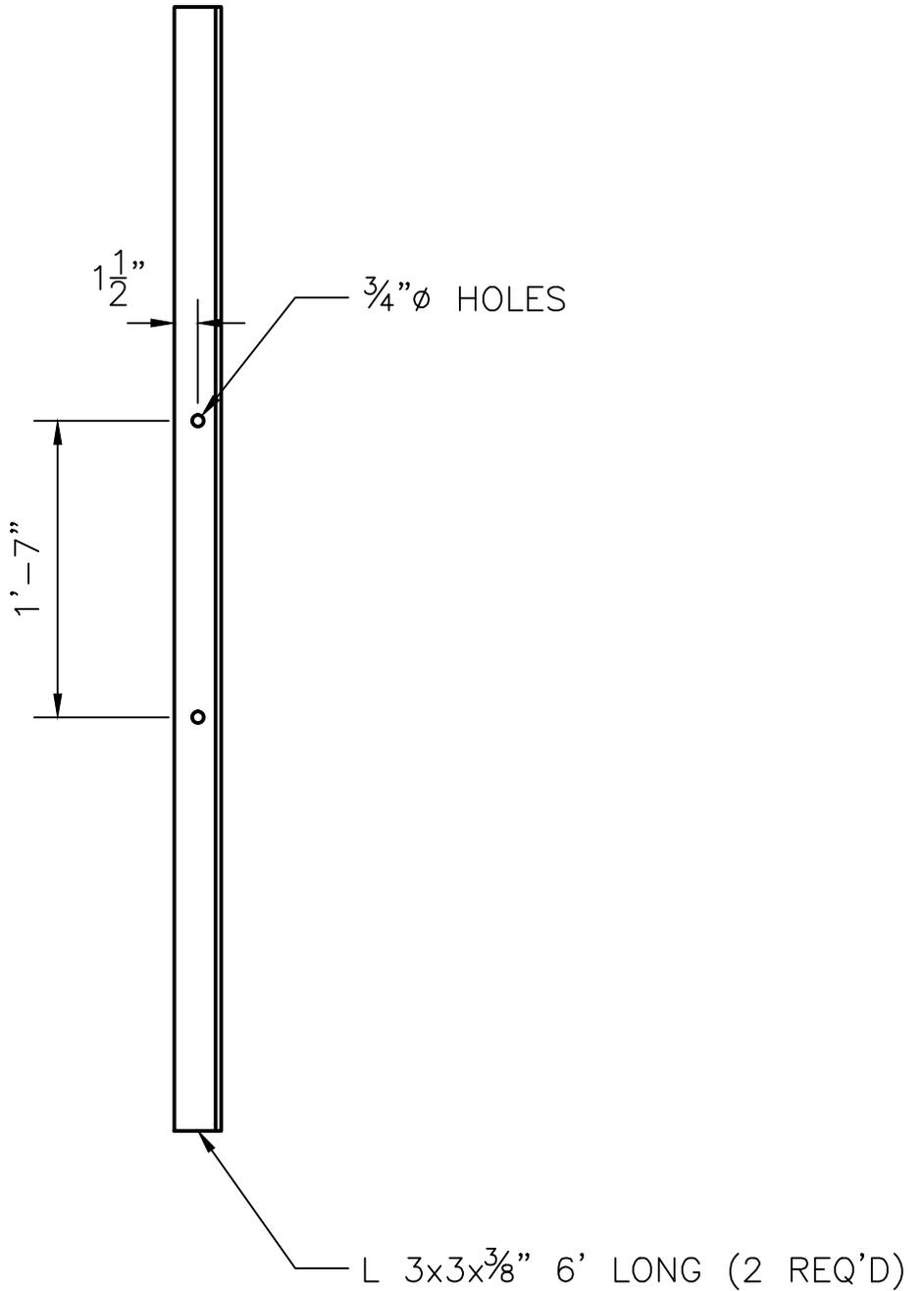
ELEVATION VIEW

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 PLOTTED: Jul 21, 2016 - 10:18:15am By anders

				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS <b>EMBEDDED STEEL POLE FOUNDATION          INTERIOR CONE FORM          FOR SA-212</b>		DATE: JULY 2016	
				APPROVED: <b>D CRIPPEN</b>					STD DET NO: SA-212.5	
				DSGN/DWN: <b>D GREER/BFB/LSA</b>					SHT NO: 5 6	
No.	REVISION	BY	APPD	DATE						

**NOTE:**

MATERIAL SHALL BE  
ASTM A36.



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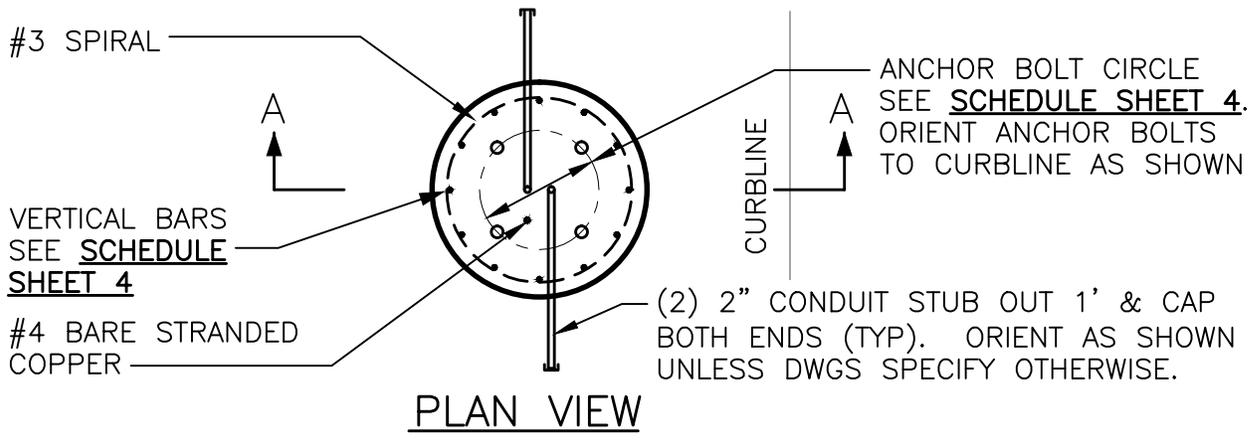
No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT: A WOLAK
APPROVED: D CRIPPEN
DSGN/DWN: D GREER/BFB/LSA

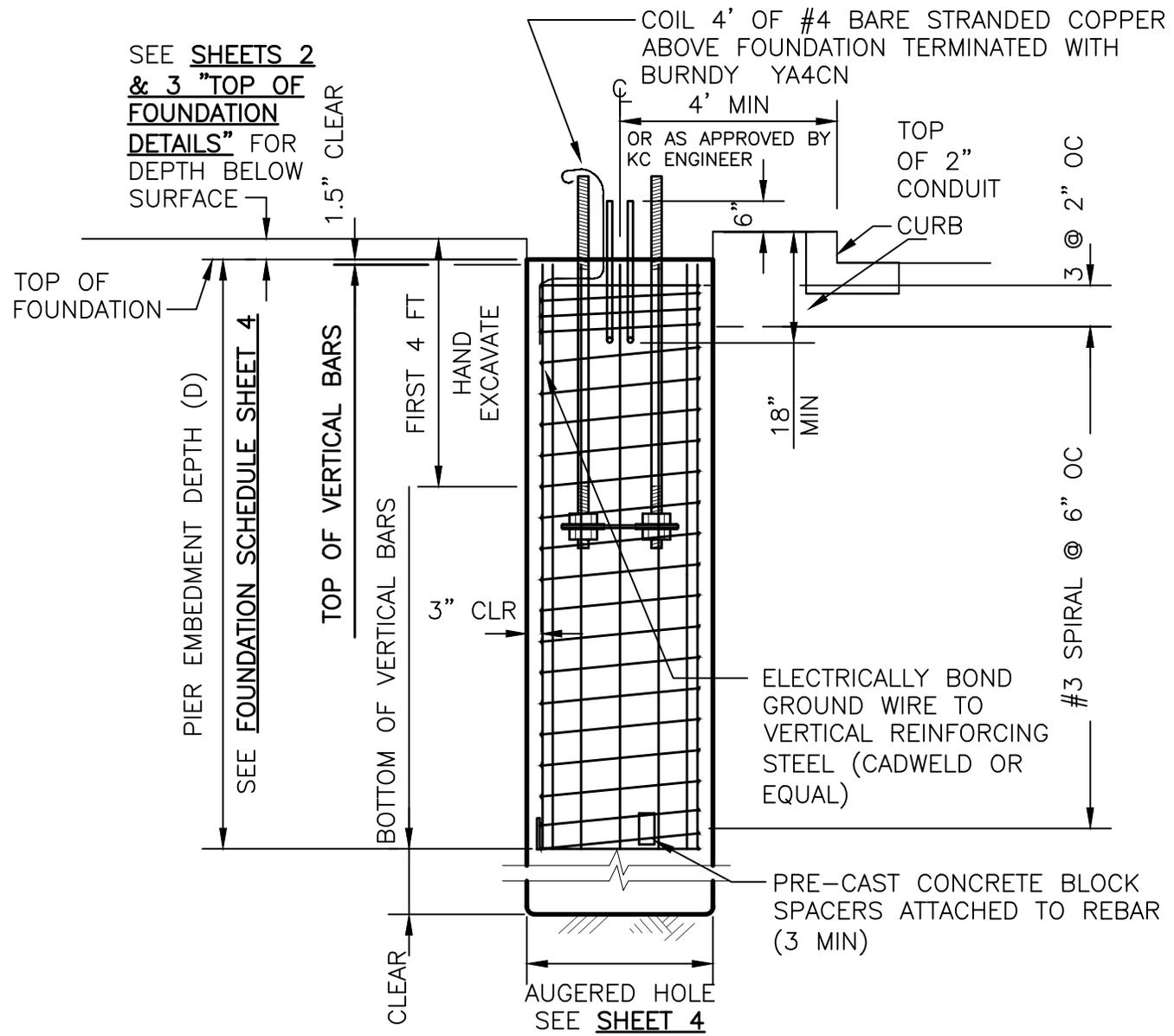


METRO TRANSIT DIVISION  
TROLLEY STANDARDS  
EMBEDDED STEEL POLE FOUNDATION  
INTERIOR CONE FORM  
FOR SA-212

DATE: JULY 2016
STD DET NO: SA-212.6
SHT NO: 6 6



**PLAN VIEW**



**SECTION A-A**

**NOTES**

- 1. SEE SHEETS 6 & 7 FOR GENERAL NOTES.

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No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
 A WOLAK  
 APPROVED:  
 D CRIPPEN  
 DSGN/DWN:  
 D GREER/TMB/LSA



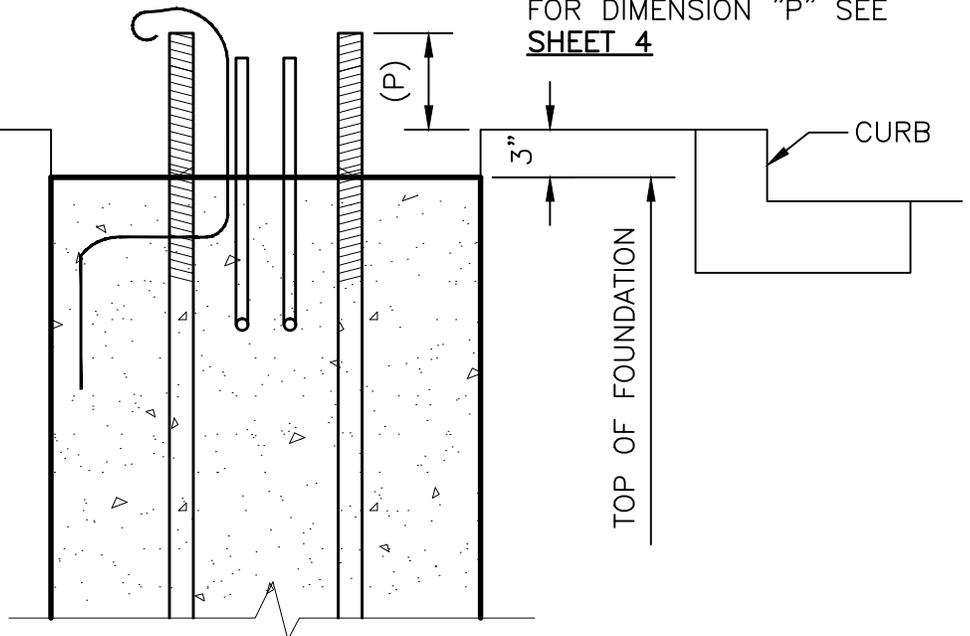
METRO TRANSIT DIVISION  
 TROLLEY STANDARDS  
**ANCHOR BASE STEEL POLE  
 STANDARD FOUNDATION**

DATE:	JULY 2016
STD DET NO:	SA-213.1
SHT NO:	1 7

FINISH GRADE

FOR DIMENSION "P" SEE SHEET 4

ALL FOUNDATIONS SHALL BE THIS TYPE UNLESS SPECIFIED OTHERWISE ON DRAWINGS. SEE SHEET 4 FOR INCLINED DETAILS

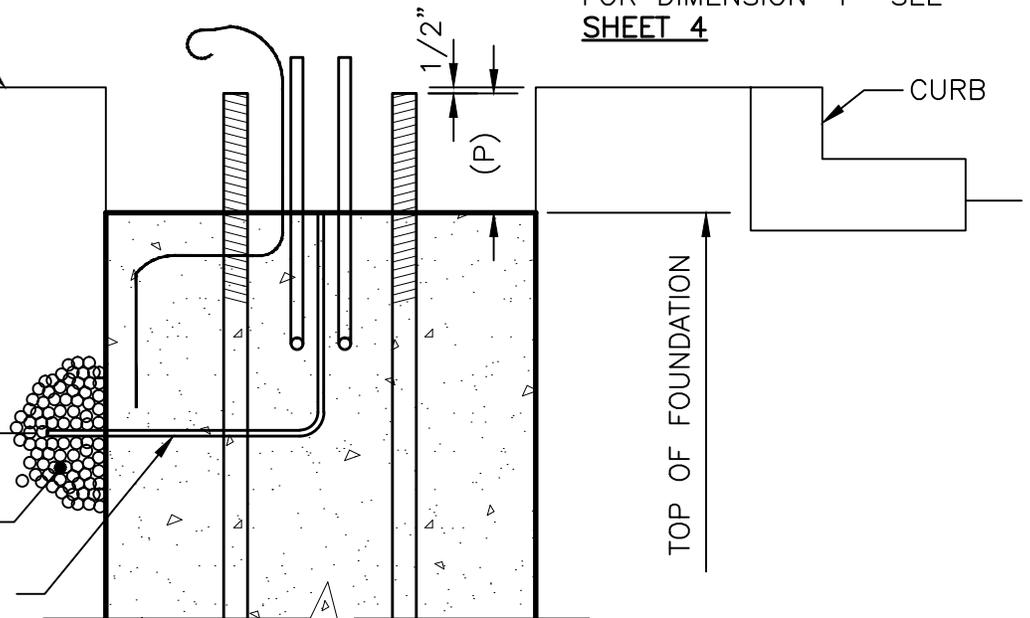


**STANDARD CONDITION**  
TOP OF FOUNDATION DETAILS

FINISH GRADE

FOR DIMENSION "P" SEE SHEET 4

24"  
1/2 CUBIC FOOT GRAVEL POCKET  
3/4" PVC DRAIN TUBE



**BURIED CONDITION**  
TOP OF FOUNDATION DETAILS  
SEE SHEET 4 FOR INCLINED DETAILS

V:\Library & Standards\Working Documents\Trolley\Details\SA Border Replace Complete\SA-213 1-7.dwg | Layout: SA-213.2 XREFS: TTB A Size.dwg | IMAGES: PLOTTED: Jul 21, 2016 - 10:21:48am By: anders

No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
A WOLAK

APPROVED:  
D CRIPPEN

DSGN/DWN:  
D GREER/TMB/LSA



METRO TRANSIT DIVISION  
TROLLEY STANDARDS

**ANCHOR BASE STEEL POLE  
STANDARD FOUNDATION**

DATE: JULY 2016
STD DET NO: SA-213.2
SHT NO: 2 7

FINISH GRADE

24"

FOR DIMENSIONS "P" & "G"  
SEE **SHEET 4**

CURB

TOP OF FOUNDATION

1/2 CUBIC FOOT  
GRAVEL POCKET

3/4" PVC DRAIN TUBE

**CHIEF SEATTLE CONDITION**  
**TOP OF FOUNDATION DETAILS**  
USE ONLY WHERE NOTED ON DRAWINGS

FINISH GRADE

(P)

(G)

ANCHOR BOLT TEMPLATE  
REQUIRED

ANCHOR BOLTS  
AND ANCHOR  
PLATE PER  
**SHEET 5**

PIER EMBEDMENT DEPTH (D)

TOP OF FOUNDATION

**CHIEF SEATTLE CONDITION**  
**INCLINED DETAILS**  
REBAR NOT SHOWN FOR CLARITY

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No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT: A WOLAK
APPROVED: D CRIPPEN
DSGN/DWN: D GREER/TMB/LSA



METRO TRANSIT DIVISION  
TROLLEY STANDARDS

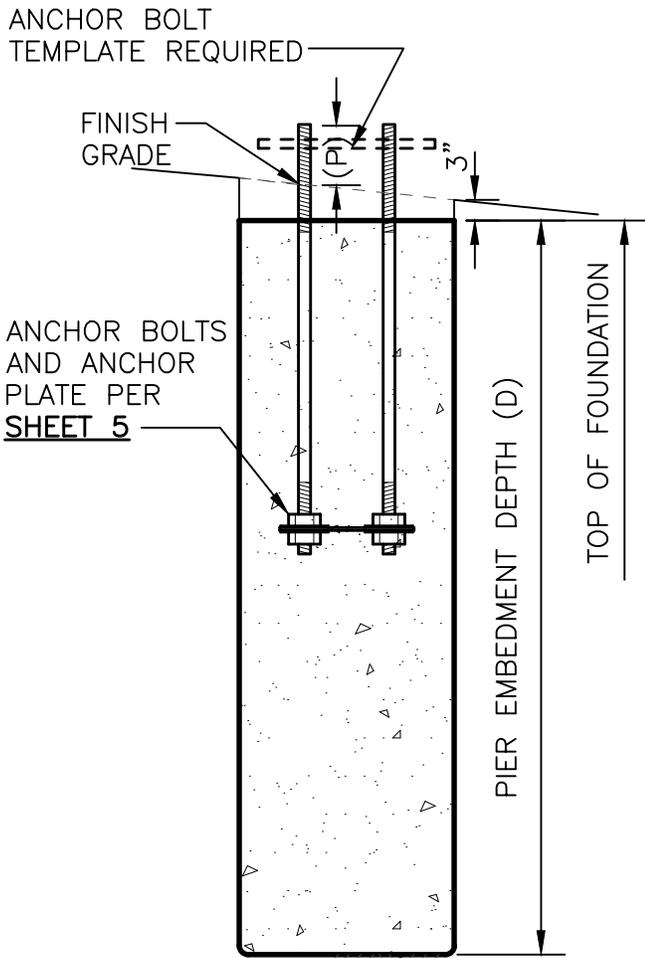
**ANCHOR BASE STEEL POLE  
STANDARD FOUNDATION**

DATE: JULY 2016
STD DET NO: SA-213.3
SHT NO: 3 7

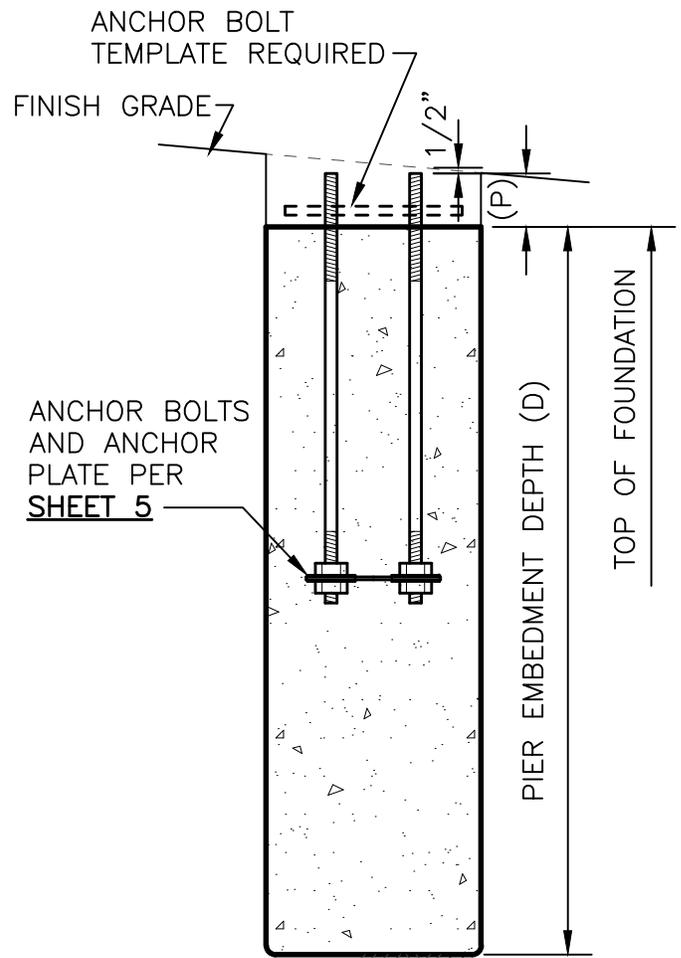
## ANCHOR BASE FOUNDATION SCHEDULE

FOUNDATION TYPE	POLE My STANDARD/ MAXIMUM (KIP-FT)	PIER EMBEDMENT DEPTH (D)		PIER DIAMETER (FEET)	REBAR REQUIREMENTS		BOLT CIRCLE ANCHOR	BOLT PROJ ANCHOR	ONLY CHIEF SEATTLE
		4 BLOWS PER FT	2 BLOWS PER FT		VERTICAL*	CONTINUOUS TIES			
SA-213-A	110/180	9	14	3'-0"	8-#8	#3	15"	8.5"	6"
SA-213-B	110/180	9	14	3'-0"	8-#8	#3	18"	9"	6.5"
SA-213-D	180/270	10.5	16	3'-0"	12-#8	#3	20"	10"	7"
SA-213-F	330/400	13	19	3'-0"	12-#9	#3	22"	11.5"	8"
SA-213-H	600/600	15.5	21	3'-6"	14-#9	#3	24"	12"	8½"

\*ADD (1) #8 VERTICAL FOR GROUNDING



**STANDARD CONDITION  
INCLINED DETAILS**  
REBAR NOT SHOWN FOR CLARITY



**BURIED CONDITION  
INCLINED DETAILS**  
REBAR NOT SHOWN FOR CLARITY

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No.	REVISION	BY	APPD	DATE

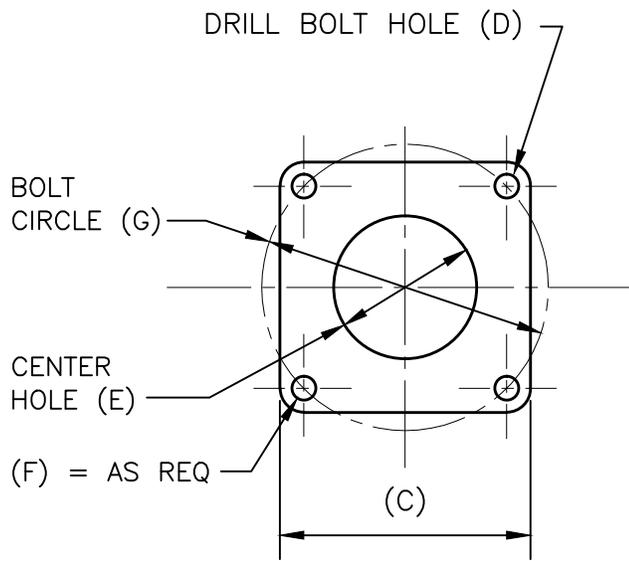
STD DET DEVELOPMENT: A WOLAK
APPROVED: D CRIPPEN
DSGN/DWN: D GREER/BFB/LSA



METRO TRANSIT DIVISION TROLLEY STANDARDS
<b>ANCHOR BASE STEEL POLE STANDARD FOUNDATION</b>

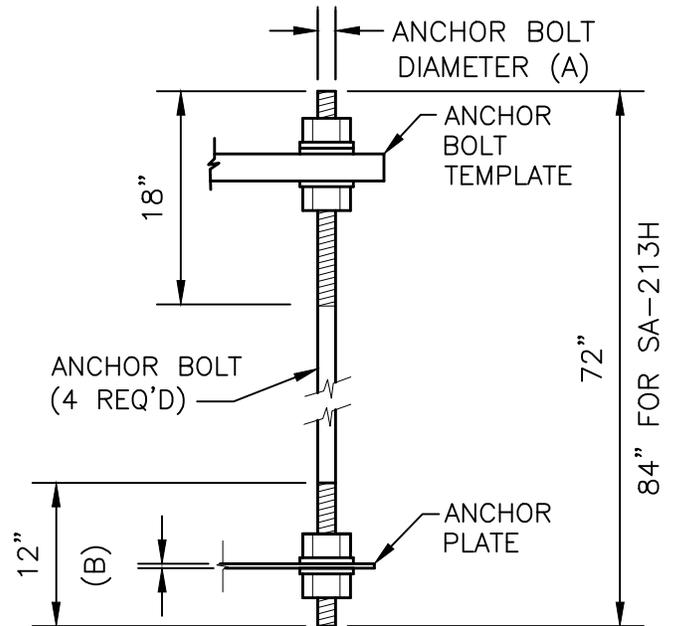
DATE: JULY 2016
STD DET NO: SA-213.4
SHT NO: 4 7

FOUNDATION TYPE	ANCHOR BOLT DIAMETER (INCHES) (A)	ANCHOR PLATE DIMENSIONS (INCHES)					
		PLATE THICKNESS (B)	PLATE WIDTH (C)	BOLT HOLE (D)	CENTER HOLE (E)	CORNER RADIUS (F)	BOLT CIRCLE (G)
SA-213-A	1 1/2	3/8	16 X 16	1 5/8	10 1/2	1 1/2	15
SA-213-B	1 3/4	3/8	16 X 16	1 7/8	12 1/2	1 5/8	18
SA-213-D	2	3/8	18 X 18	2 1/8	14	2	20
SA-213-F	2 1/2	3/8	20 X 20	2 5/8	15	2 1/4	22
SA-213-H	2 3/4	1/2	22 X 22	2 7/8	16 1/2	2 1/2	24



**ANCHOR PLATE  
DETAIL**

SEE GENERAL NOTES SHEETS 6 & 7



**TYPICAL ANCHOR BOLT**

COMPLETE WITH 4 NUTS 4 FLAT WASHERS & 1 LOCK WASHER.

SEE GENERAL NOTES/SHEETS 6 & 7

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 XREFS: TTB A Size.dwg | IMAGES:  
 PLOTTED: Jul 21, 2016 - 10:23:09am By: anders

No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT: A WOLAK
APPROVED: D CRIPPEN
DSGN/DWN: D GREER/TMB/LSA



METRO TRANSIT DIVISION  
TROLLEY STANDARDS

**ANCHOR BASE STEEL POLE  
STANDARD FOUNDATION**

DATE: JULY 2016
STD DET NO: SA-213.5
SHT NO: 5 7

# GENERAL NOTES

## 1. CONCRETE AND REINFORCING STEEL

- 1.1 All work shall be done per Seattle Sidewalk and Street Paving and Restoration Rules and Regulations if in Street Right Of Way.
- 1.2 Concrete shall be City of Seattle Class AX air entrained, 3/4" max aggregate, and with a minimum compressive strength of 4000 PSI at 28 days.
- 1.3 All reinforcing bars shall be deformed billet steel conforming to ASTM A615 Grade 60.
- 1.4 Minimum clear concrete cover shall be 3" from sides and bottom and 1" from the top
- 1.5 Reinforcing details and fabrication shall be as recommended in ACI 315 "Details & Detailing of Concrete Reinforcement."
- 1.6 No construction joints shall be permitted.

## 2. ANCHOR PLATES, BOLTS, NUTS AND WASHERS

- 2.1 Anchor bolts including nuts and flat washers shall conform to ASTM F1554-07 Grade 105 Class 2A including supplementary requirements S2, S3 and S5. Threads shall conform to the ANSI Standard B1.1 for UNC thread. Anchor bolts shall have 18 inches of thread on exposed end and 12 inches of thread on the embedded end.
- 2.2 Anchor plates shall conform to ASTM A36.

## 3. GALVANIZING

- 3.1 Anchor plates, anchor bolts, anchor bolt nuts and washers shall be hot-dip galvanized in conformance to ASTM 2329 and ASTM A123.

## 4. SOIL

- 4.1 Embedment depth is adequate for three times the working moment in cohesive soils of  $c=1000\text{PSF}$  and  $\phi=0^\circ$  or better and cohesionless soils of  $c=0\text{PSF}$  and  $\phi=26^\circ$  or better.

## 5. SUBMITTALS

- 5.1 Reinforcing steel shop drawings and certificate of compliance.
- 5.2 Concrete mix proportions, admixtures and slump.
- 5.3 Anchor plate, anchor bolt, anchor bolt nuts and washers certificates of compliance.
- 5.4 A test report shall be provided in accordance with ASTM F1554-07 and supplementary requirements.

(continued, sheet 7 of 7)

					STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: JULY 2016
					APPROVED: D CRIPPEN		<b>ANCHOR BASE STEEL POLE STANDARD FOUNDATION</b>	STD DET NO: SA-213.6
					DSGN/DWN: D GREER/BFB/LSA			SHT NO: 6 7
No.	REVISION	BY	APPD	DATE				

# GENERAL NOTES

(continued from sheet 6 of 7)

## 6. INSPECTION

6.1 Concrete shall not be placed until the King County Project Representative has inspected the excavation, the grounding, the anchor bolts, and the placement of the reinforcing bar cage.

## 7. ANCHOR BOLT SETTING

7.1 Cover exposed anchor bolt threads and nuts with at least 3 layers of plastic tape before placing concrete.

7.2 Anchor bolt template shall be used temporarily at the top of anchor bolts for accurate positioning and aligning.

7.3 Anchor bolts shall not exceed  $\frac{1}{8}$ " from vertical over the entire length of bolt upon completion of foundation.

## 8. CONDUIT

8.1 Conduit from foundation shall be schedule 80 PVC. Conduit bends shall have a minimum radius of 12".

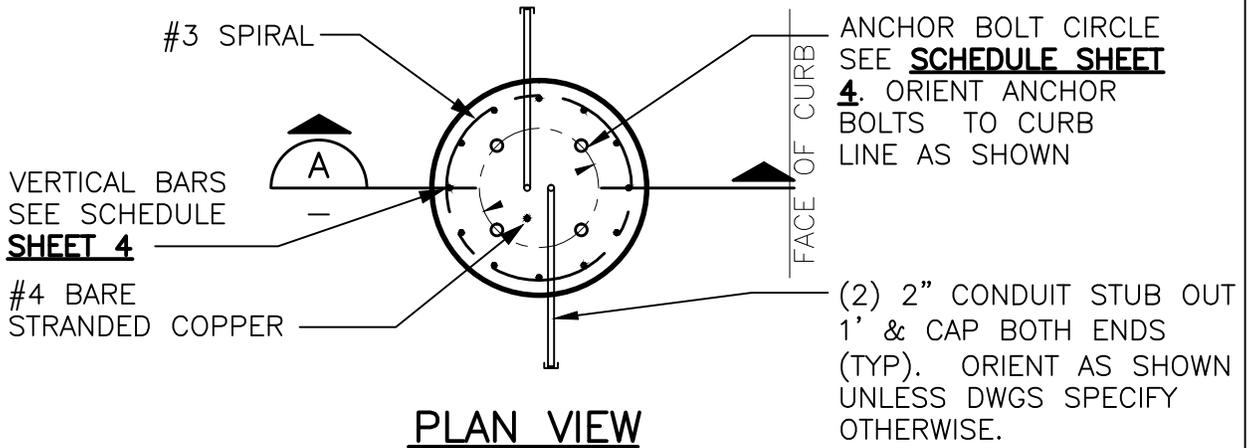
## 9. COMPRESSION CONNECTION

9.1 Compression connection shall be Burndy YA4CN. One-Hole HYlug/Code Conductor-Long Barrel installed per manufacturer's specifications.

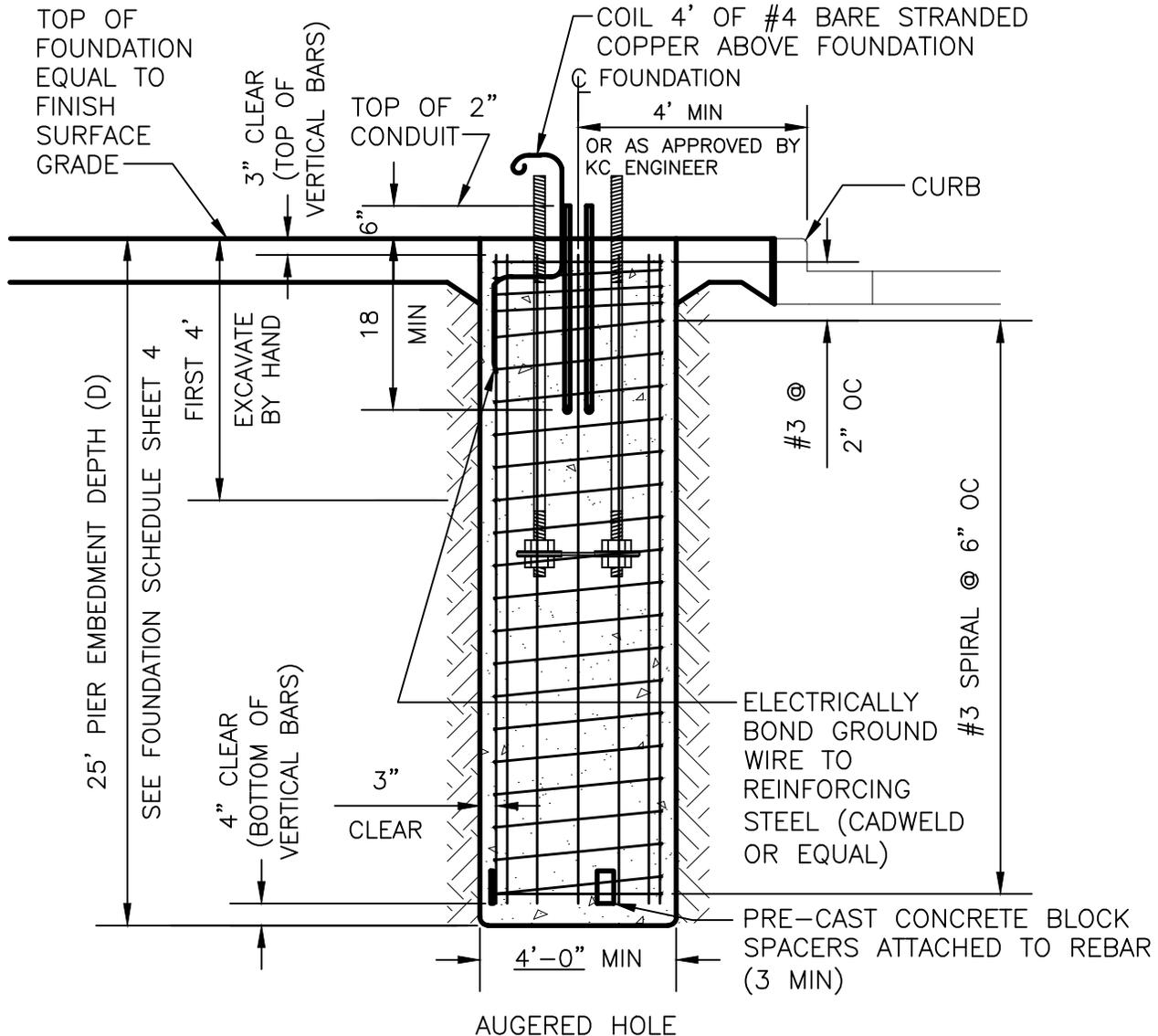
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					STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>ANCHOR BASE STEEL POLE          STANDARD FOUNDATION</b>	DATE: JULY 2016
					APPROVED: D CRIPPEN			STD DET NO: SA-213.7
					DSGN/DWN: D GREER/DOW/LSA			SHT NO: 7 7
No.	REVISION	BY	APPD	DATE				

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**PLAN VIEW**



**AUGERED HOLE**

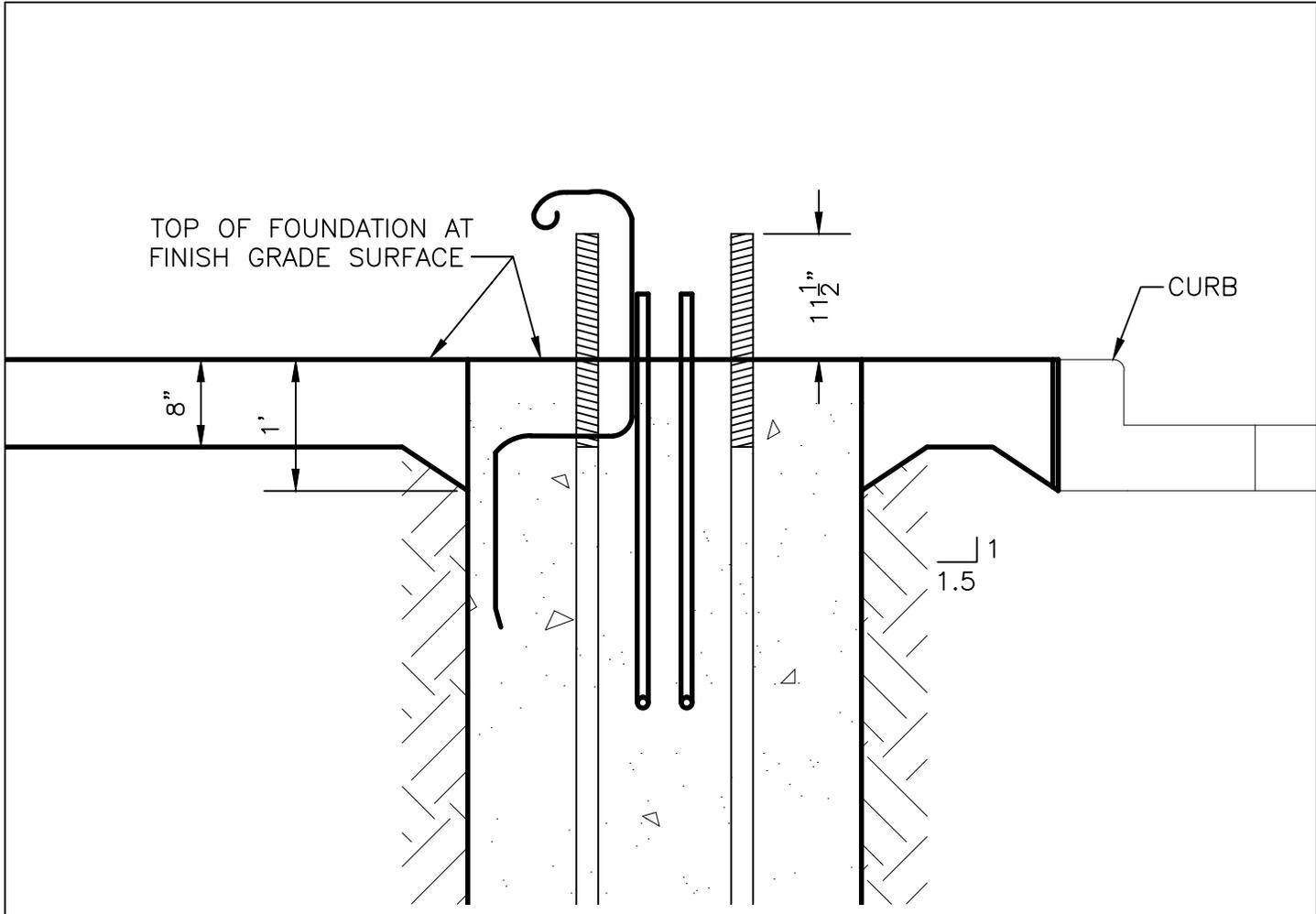
**SECTION VIEW A/-**

**NOTES**

1. SEE SHEETS 6 & 7 FOR GENERAL NOTES.

				STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS  SPECIAL FOUNDATION ANCHOR BASE STEEL POLE	DATE: JULY 2016
				APPROVED: D CRIPPEN			STD DET NO: SA-213.1(S)
				DSGN/DWN: D GREER/BFB/LSA			SHT NO: 1 7
No.	REVISION	BY	APPD	DATE			

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 XREFS: TTB A Size.dwg | IMAGES:  
 PLOTTED: Aug 09, 2016-06:03:07pm By: anders



TYPICAL  
TOP OF POLE FOUNDATION  
DETAIL  
 SCALE: 3/4" = 1'-0"

No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
 A WOLAK

APPROVED:  
 D CRIPPEN

DSGN/DWN:  
 D GREER/BFB/LSA



METRO TRANSIT DIVISION  
 TROLLEY STANDARDS

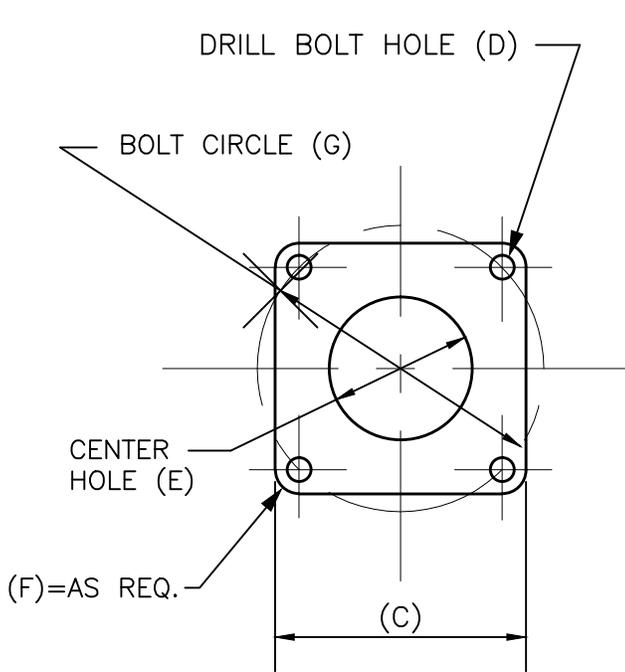
**SPECIAL FOUNDATION  
 ANCHOR BASE  
 STEEL POLE**

DATE: JULY 2016
STD DET NO: SA-213.2(S)
SHT NO: 2 7

ANCHOR BASE FOUNDATION SCHEDULE						
FOUNDATION TYPE	GROUND LINE $M_u$ (LB-FT)	PIER EMBEDMENT DEPTH (D) (FEET)	REBAR REQUIREMENTS		ANCHOR BOLT CIRCLE	ANCHOR BOLT PROJ. "P"
			VERTICAL	CONTINUOUS TIES		
SA-213-(S)	480,000	25	16-#9	#3	22"	11.5"

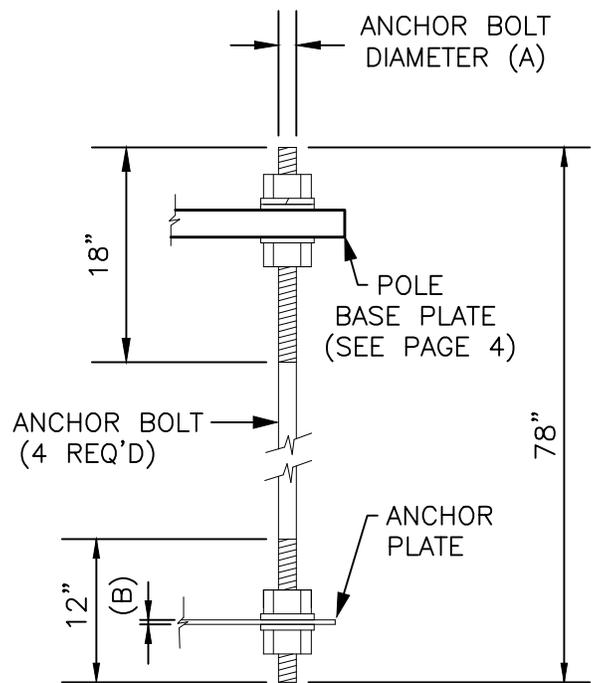
					STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: JULY 2016
					APPROVED: D CRIPPEN			STD DET NO: SA-213.4(S)
					DSGN/DWN: D GREER/AJW/LSA		ANCHOR BASE FOUNDATION SCHEDULE	SHT NO: 4 7
No.	REVISION	BY	APPD	DATE				

FOUNDATION TYPE	ANCHOR BOLT DIAM. (INCHES) (A)	ANCHOR PLATE DIMENSIONS (INCHES)					
		PLATE THICK. (B)	PLATE WIDTH (C)	BOLT HOLE (D)	CENTER HOLE (E)	CORNER RADIUS (F)	BOLT CIRCLE (G)
SA-213-(S)	2 1/2	1/2	20 X 20	2 5/8	15	2 1/4	22



**ANCHOR PLATE  
DETAIL**

SEE GENERAL NOTES SHEET 6 & 7



**TYPICAL ANCHOR BOLT**

COMPLETE WITH 4 NUTS  
4 FLAT WASHERS & 1 LOCK WASHER  
SEE GENERAL NOTES SHEET 6 & 7

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No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT: A WOLAK
APPROVED: D CRIPPEN
DSGN/DWN: D GREER/AJW/LSA



METRO TRANSIT DIVISION  
TROLLEY STANDARDS

**SPECIAL FOUNDATION  
ANCHOR BASE  
STEEL POLE**

DATE: JULY 2016
STD DET NO: SA-213.5(S)
SHT NO: 5 7

# GENERAL NOTES

## 1. CONCRETE AND REINFORCING STEEL

- 1.1 All work shall be done per City of Seattle Board of Public Works Rules: Chapter 40.4 – Street and Sidewalk Pavement Opening and Restoration Rules if in Street Right Of Way.
- 1.2 Concrete shall be City of Seattle Class AX air entrained, 3/4” max aggregate, and with a minimum compressive strength of 4000 PSI at 28 days.
- 1.3 All reinforcing bars shall be deformed billet steel conforming to ASTM A615 Grade 60.
- 1.4 Minimum clear concrete cover shall be 3 inches.
- 1.5 Reinforcing details and fabrication shall be as recommended in ACI 315 "Details & Detailing of Concrete Reinforcement."
- 1.6 No construction joints shall be permitted.

## 2. ANCHOR PLATES, BOLTS, NUTS AND WASHERS

2.1 Anchor bolts including nuts and flat washers shall conform to ASTM F1554–99 Grade 105 Class 2A including supplementary requirements S2,S3,and S5. Threads shall conform to the ANSI Standard B1.1 for UNC thread. Anchor bolts shall have 18 inches of thread on exposed end and 12 inches of thread on the embedded end.

2.2 Anchor plates shall conform to ASTM A36.

## 3. GALVANIZING

3.1 Anchor plates, anchor bolts, anchor bolt nuts and washers shall be hot-dip galvanized in conformance to ASTM A153 or ASTM A123.

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					STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS  SPECIAL FOUNDATION ANCHOR BASE STEEL POLE	DATE: JULY 2016
					APPROVED: D CRIPPEN			STD DET NO: SA-213.6(S)
					DSGN/DWN: D GREER/AJW/LSA			SHT NO: 6 7
No.	REVISION	BY	APPD	DATE				

# GENERAL NOTES

## 4. SUBMITTALS

- 4.1 Reinforcing steel shop drawings and certificate of compliance.
- 4.2 Concrete mix proportions, admixtures and slump.
- 4.3 Anchor plate, anchor bolt, anchor bolt nuts and washers certificates of compliance.
- 4.4 A test report shall be provided in accordance with ASTM F1554-99 and supplementary requirements.

## 5. INSPECTION

- 5.1 Concrete shall not be placed until the Engineer has inspected the excavation, the grounding, the anchor bolts, and the placement of the reinforcing bar cage.

## 6. ANCHOR BOLT SETTING

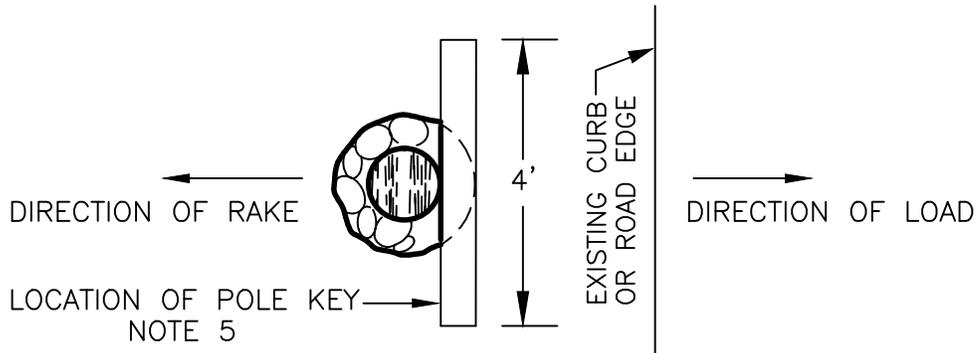
- 6.1 Cover exposed anchor bolt threads and nuts with at least 3 layers of plastic tape before placing concrete.
- 6.2 Anchor bolt template shall be used temporarily at the top of anchor bolts for accurate positioning and aligning.

## 7. CONDUIT

- 7.1 Conduit from foundation shall be schedule 80 PVC.  
Conduit bends shall have a minimum radius of 12”.

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					STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS  SPECIAL FOUNDATION ANCHOR BASE STEEL POLE	DATE: JULY 2016
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					DSGN/DWN: D GREER/AJW/LSA			SHT NO: 7 7
No.	REVISION	BY	APPD	DATE				

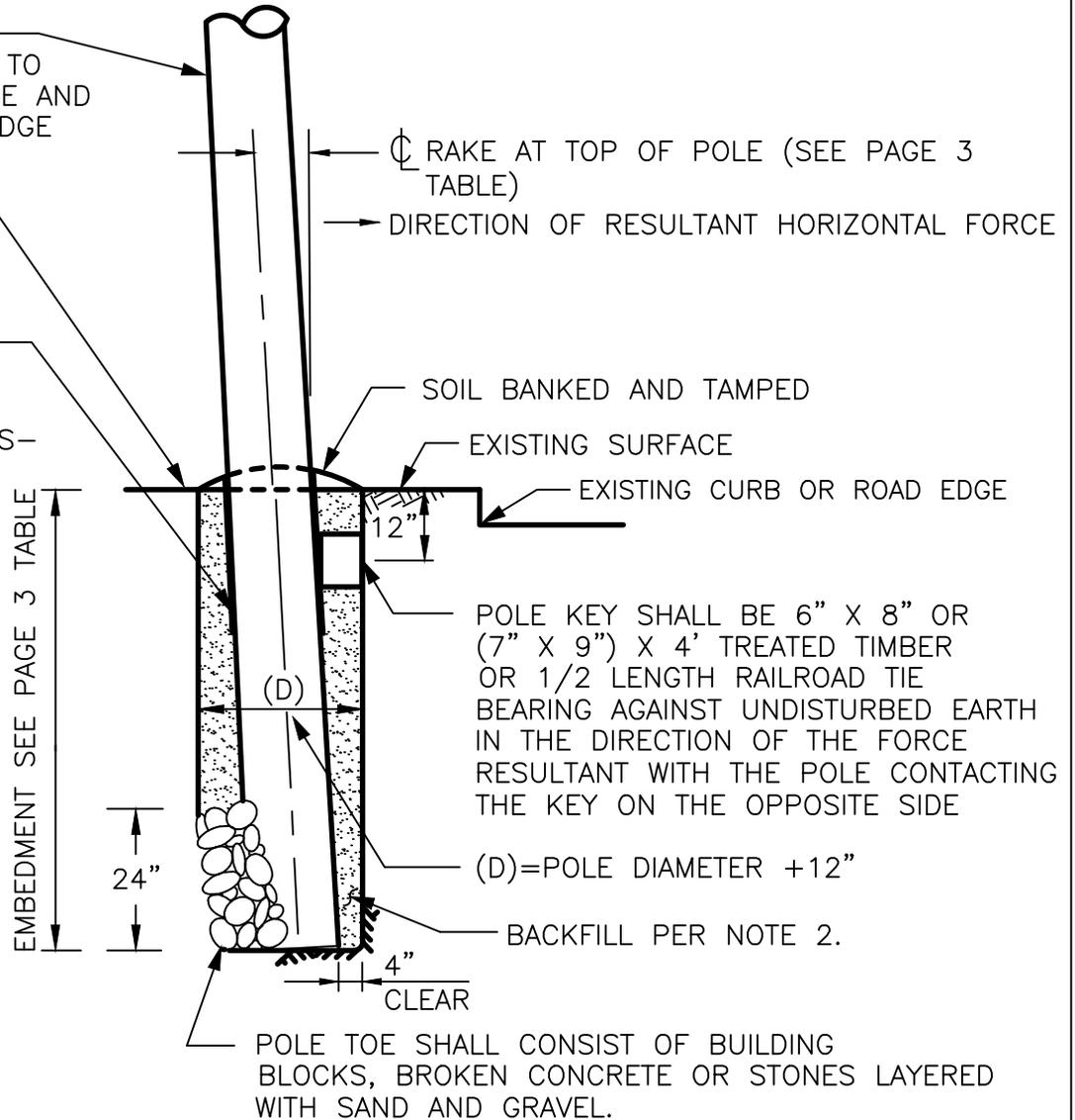


**PLAN**

POLE FACE SHALL BE PARALLEL TO CURB OR ROAD EDGE AND AWAY FROM ROAD EDGE

EMBEDMENT IS MEASURED FROM LOW POINT IF GROUND IS SLOPED

GROUNDLINE PRESERVATIVE WRAP (TENINO WOOD PRESERVATIVES-CUNAP WRAP)



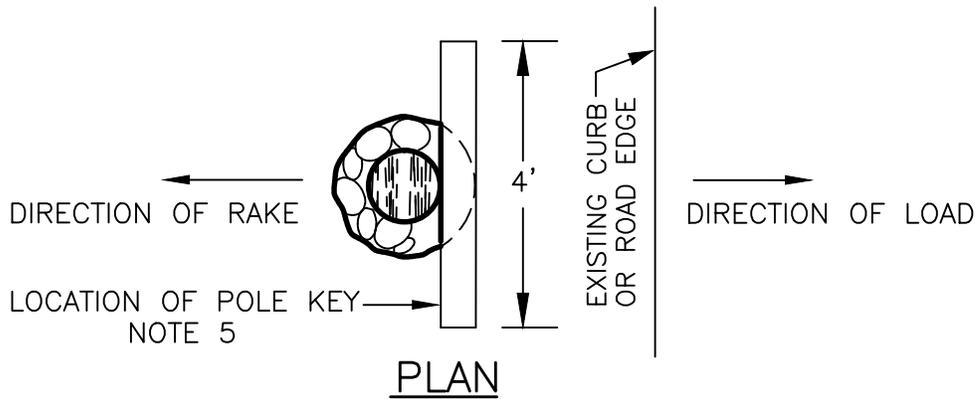
**ELEVATION**

**NOTES**

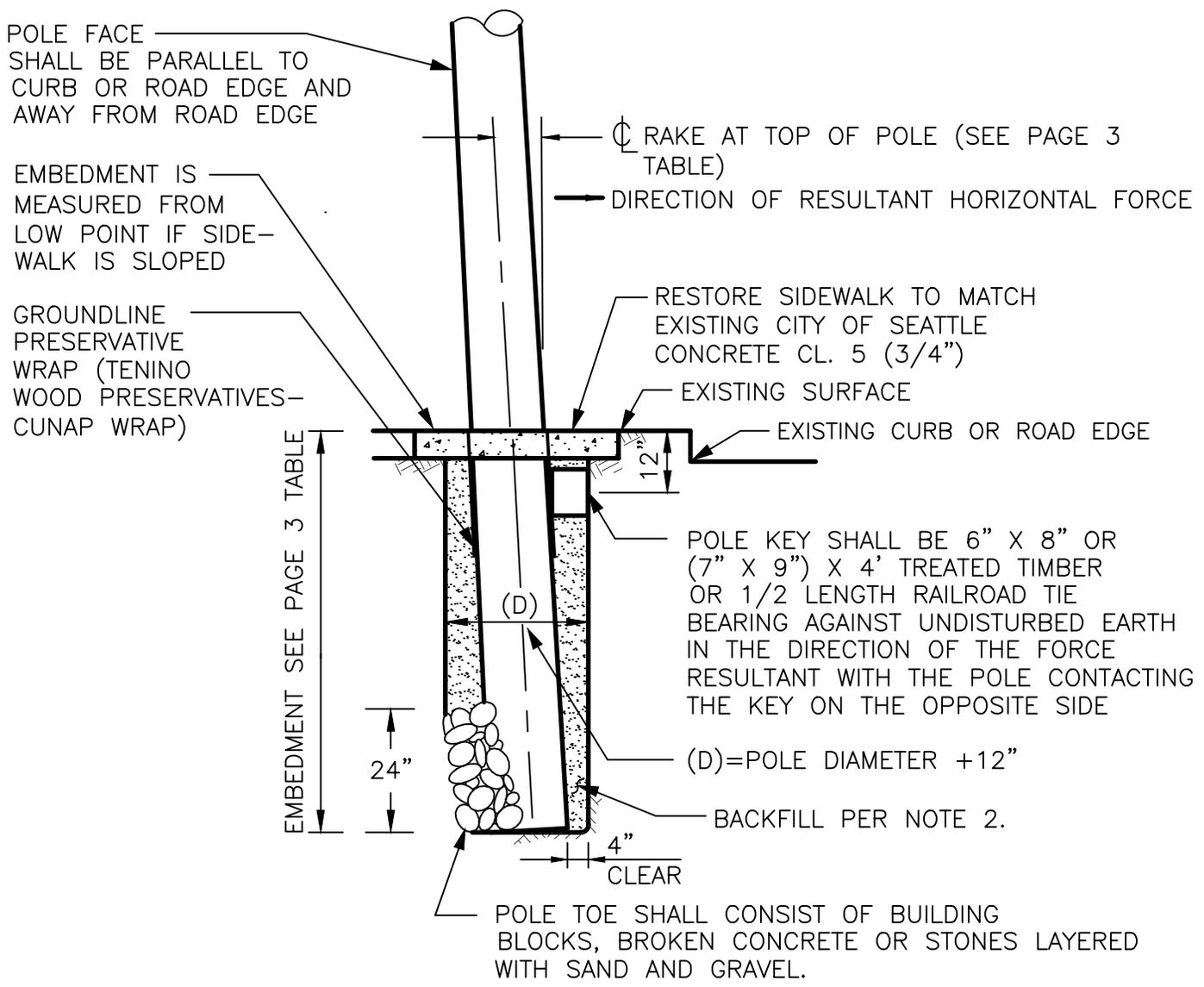
1. SEE SHEET 3 FOR GENERAL NOTES.

				STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: JULY 2016
				APPROVED: D CRIPPEN		WOOD POLE SETTING STANDARD (WITHOUT SIDEWALK)	STD DET NO: SA-214.1
				DSGN/DWN: D GREER/TMB/LSA			SHT NO: 1 3
No.	REVISION	BY	APPD	DATE			

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**PLAN**



**ELEVATION**

**NOTES**

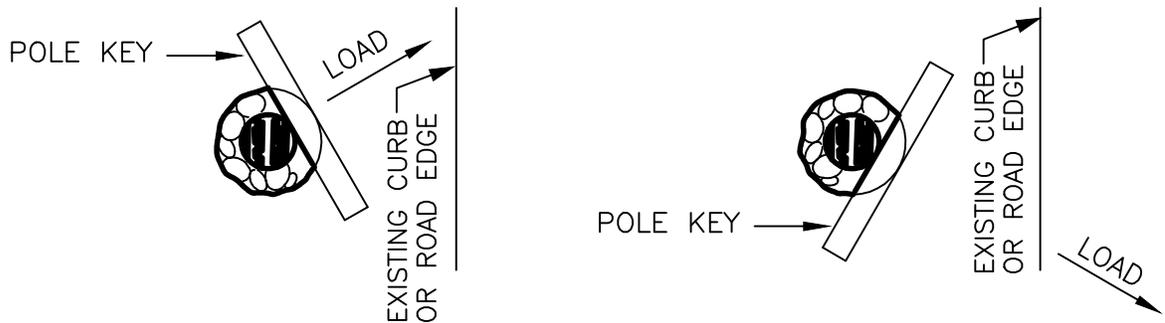
1. SEE SHEET 3 FOR GENERAL NOTES.

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>WOOD POLE          SETTING STANDARD          (WITH SIDEWALK)</b>	DATE: <b>JULY 2016</b>
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: <b>SA-214.2</b>
				DSGN/DWN: <b>D GREER/TMB/LSA</b>			SHT NO: <b>2 3</b>
No.	REVISION	BY	APPD	DATE			

NOTES:

1. THIS DETAIL APPLIES TO SOIL FREE OF PEAT, MUCK OR OTHER ORGANIC MATTER. SOILS HAVING THE ABOVE MENTIONED QUALITIES SHALL REQUIRE SPECIAL INVESTIGATION.
2. SOIL USED FOR BACKFILL SHALL BE WELL GRADED SAND AND GRAVEL MIX FREE FROM SOD, GRASS, WEEDS AND ALL SIMILAR ORGANIC MATERIALS AND SUITABLY DRY FOR COMPACTION. SAND AND GRAVEL MIX CAN BE EITHER EXCAVATED SOIL OR IMPORTED.
3. ALL WATER IN HOLE SHALL BE REMOVED BEFORE SETTING AND TAMPING THE HOLE.
4. IN BACKFILLING, THE SAND AND GRAVEL MIX SHALL BE REPLACED IN EVEN LAYERS APPROXIMATELY 6" THICK AND FIRMLY AND THOROUGHLY TAMPED TO A DRY DENSITY NOT LESS THAN THE NATURAL IN-PLACE DRY DENSITY OF THE SURROUNDING EARTH. IF HAND TAMPING BARS ARE USED, NOT MORE THAN ONE PERSON SHALL SHOVEL WHILE THREE PERSONS ARE TAMPING.
5. POLE KEY SHALL BE INSTALLED PERPENDICULAR TO DIRECTION OF LOAD, AND MAY NOT BE PARALLEL TO EXISTING CURB OR ROAD EDGE. SEE PLAN EXAMPLES BELOW.



6. DELETE POLE KEY & POLE TOE IF POLE IS GUYED WITH SA-231, SA-232, OR SA-233.

EMBEDMENT AND RAKE SCHEDULE				
POLE LENGTH (ft)	EMBEDMENT (ft)	RAKE		
		UNGUYED	GUYED	BRACKET ARM
35	8'-0"	17"	7"	7"
40	8'-0"	20"	8"	8"

					STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: <b>JULY 2016</b>
					APPROVED: <b>D CRIPPEN</b>		STD DET NO: <b>SA-214.3</b>	
					DSGN/DWN: <b>D GREER/TMB/LSA</b>		WOOD POLE SETTING STANDARD	SHT NO: <b>3 3</b>
No.	REVISION	BY	APPD	DATE				

RAKE BACK FACE OF POLE  
1/8" PER FT MAXIMUM

1/2" X FULL DEPTH EXPANSION  
JOINT MAT'L ALL AROUND AT  
SIDEWALK/POLE SURFACE

POUR NON-SHRINK  
GROUT KEY SEPARATELY

CITY OF SEATTLE CONCRETE  
CLASS 5 (3/4"), 6" DEPTH,  
4'x6' MINIMUM

4" DEPTH  
EXPANSION  
JOINT

EXISTING  
CURB

EXISTING  
SIDEWALK

CONNECT GROUND  
WIRE TO EXISTING  
CAP SCREW

COLD TAR SHAFT  
EXTERIOR TO 3" ABOVE  
INSTALLATION GRADE  
AND BOTTOM 18" OF  
SHAFT INTERIOR

FILL CONE WITH COMPACTED  
DRY AND CLEAN SAND HAVING  
THE FOLLOWING GRADING:

SIEVE SIZE	% PASSING
US NO. 8	95-100
US NO. 16	60-70
US NO. 30	15-25
US NO. 50	0-5
US NO. 100	0-2
US NO. 200	0-1

THE FRACTURE SHALL BE 10%.  
THIS MATERIAL IS CRUSHED  
SAND.

FOR FOUNDATION  
DETAILS SEE  
**SA-212**

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No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
**A WOLAK**

APPROVED:  
**D CRIPPEN**

DSGN/DWN:  
**D GREER/BFB/LSA**



METRO TRANSIT DIVISION  
TROLLEY STANDARDS

**EMBEDDED STEEL POLE  
INSTALLATION  
WITH SIDEWALK**

DATE:  
**JULY 2016**

STD DET NO:  
**SA-215.1**

SHT NO:  
**1 3**

RAKE BACK FACE OF POLE  
 $\frac{1}{8}$ " PER FT MAXIMUM

12"  
 $\frac{1}{8}$ "

CONNECT GROUND  
 WIRE TO EXISTING  
 CAP SCREW

EXISTING GRADE

1"

3"

1"

$\frac{1}{2}$ " X FULL DEPTH  
 EXPANSION JOINT MATERIAL  
 ALL AROUND

CITY OF SEATTLE CONCRETE  
 CLASS 5 ( $\frac{3}{4}$ " ), 6" DEPTH,  
 5'-6" X 5'

2% SLOPE

EXISTING  
 CURB

1  
 $\frac{1}{2}$

POUR NON-SHRINK GROUT KEY  
 SEPARATELY

COLD TAR SHAFT  
 EXTERIOR TO 3"  
 ABOVE INSTALLATION  
 GRADE AND BOTTOM  
 18" OF SHAFT  
 INTERIOR

FILL CONE WITH COMPACTED  
 DRY AND CLEAN SAND HAVING  
 THE FOLLOWING GRADING:

FOR FOUNDATION  
 DETAILS SEE  
SA-212

SIEVE SIZE                      % PASSING

US NO. 8	95-100
US NO. 16	60-70
US NO. 30	15-25
US NO. 50	0-5
US NO. 100	0-2
US NO. 200	0-1

THE FRACTURE SHALL BE 10%.  
 THIS MATERIAL IS CRUSHED  
 SAND.

No.	REVISION	BY	APPD	DATE

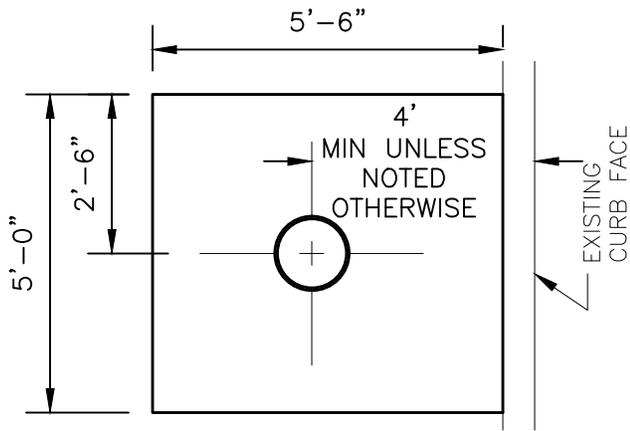
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APPROVED: D CRIPPEN
DSGN/DWN: D GREER/BFB/LSA



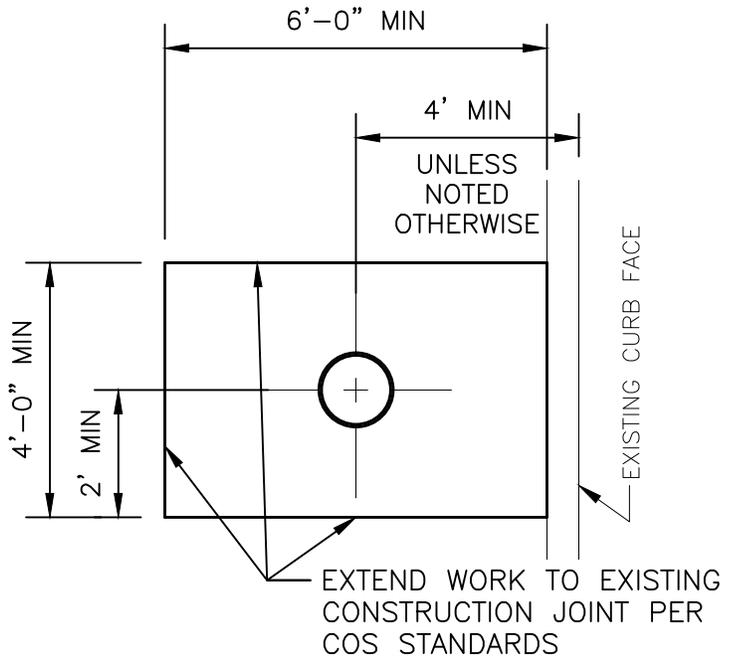
METRO TRANSIT DIVISION  
 TROLLEY STANDARDS

**EMBEDDED STEEL POLE  
 INSTALLATION  
 WITHOUT SIDEWALK**

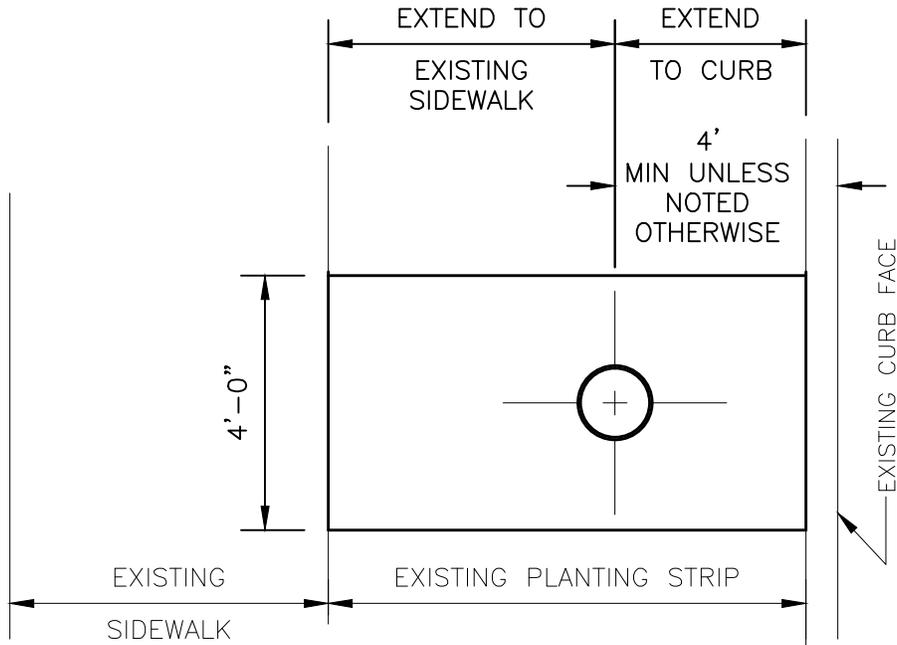
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STD DET NO: SA-215.2
SHT NO: 2 3



**NO SIDEWALK  
CONDITION**



**EXISTING SIDEWALK  
CONDITION**



**EXISTING SIDEWALK  
& PLANTING STRIP  
CONDITION**

No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
**A WOLAK**

APPROVED:  
**D CRIPPEN**

DSGN/DWN:  
**D GREER/BFB/LSA**

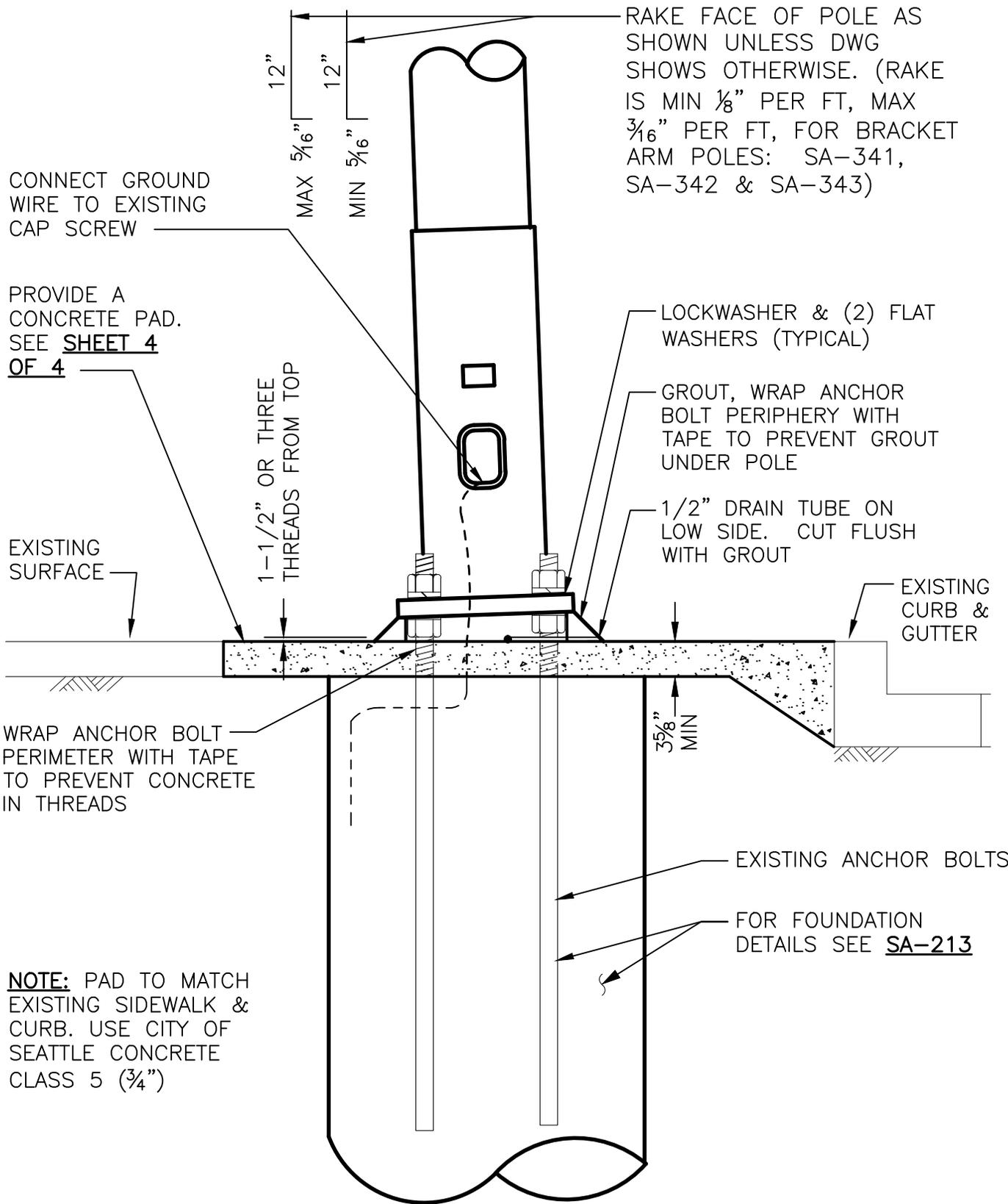


METRO TRANSIT DIVISION  
TROLLEY STANDARDS

**EMBEDDED STEEL POLE  
INSTALLATION**

DATE:	JULY 2016
STD DET NO:	SA-215.3
SHT NO:	3 3

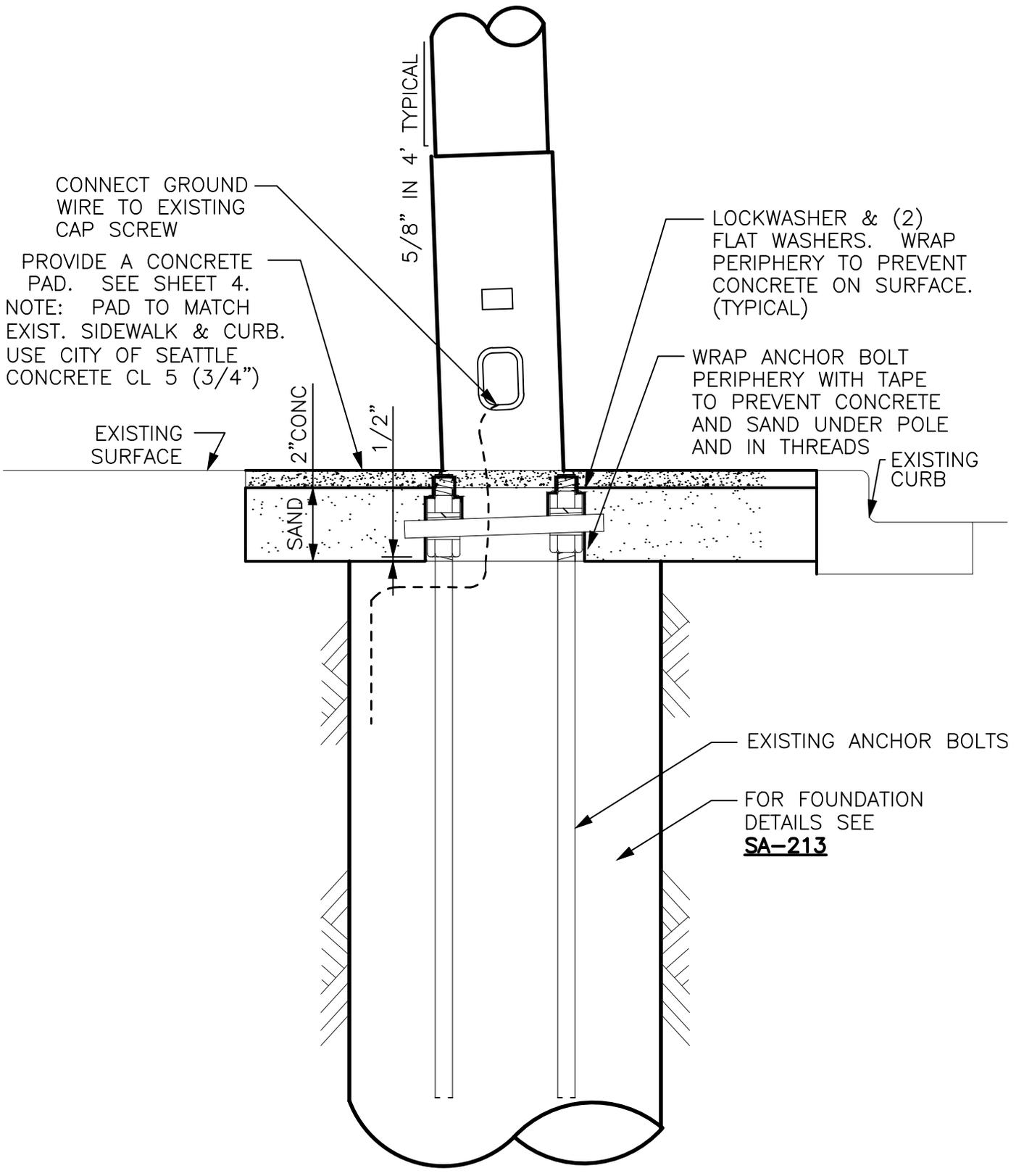
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**STANDARD CONDITION**

ALL FOUNDATIONS SHALL BE THIS TYPE, UNLESS NOTED OTHERWISE ON DRAWINGS

				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>STEEL POLE INSTALLATION          ANCHOR BASE</b>	DATE: <b>JULY 2016</b>
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: <b>SA-216.1</b>
				DSGN/DWN: <b>D GREER/CMS/LSA</b>			SHT NO: <b>1 4</b>
No.	REVISION	BY	APPD	DATE			



CONNECT GROUND WIRE TO EXISTING CAP SCREW

PROVIDE A CONCRETE PAD. SEE SHEET 4.  
NOTE: PAD TO MATCH EXIST. SIDEWALK & CURB. USE CITY OF SEATTLE CONCRETE CL 5 (3/4")

LOCKWASHER & (2) FLAT WASHERS. WRAP PERIPHERY TO PREVENT CONCRETE ON SURFACE. (TYPICAL)

WRAP ANCHOR BOLT PERIPHERY WITH TAPE TO PREVENT CONCRETE AND SAND UNDER POLE AND IN THREADS

EXISTING ANCHOR BOLTS

FOR FOUNDATION DETAILS SEE **SA-213**

**BURIED CONDITION**

USE ONLY WHERE NOTED ON DWGS

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No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT: <b>A WOLAK</b>
APPROVED: <b>D CRIPPEN</b>
DSGN/DWN: <b>D GREER/CMS/LSA</b>

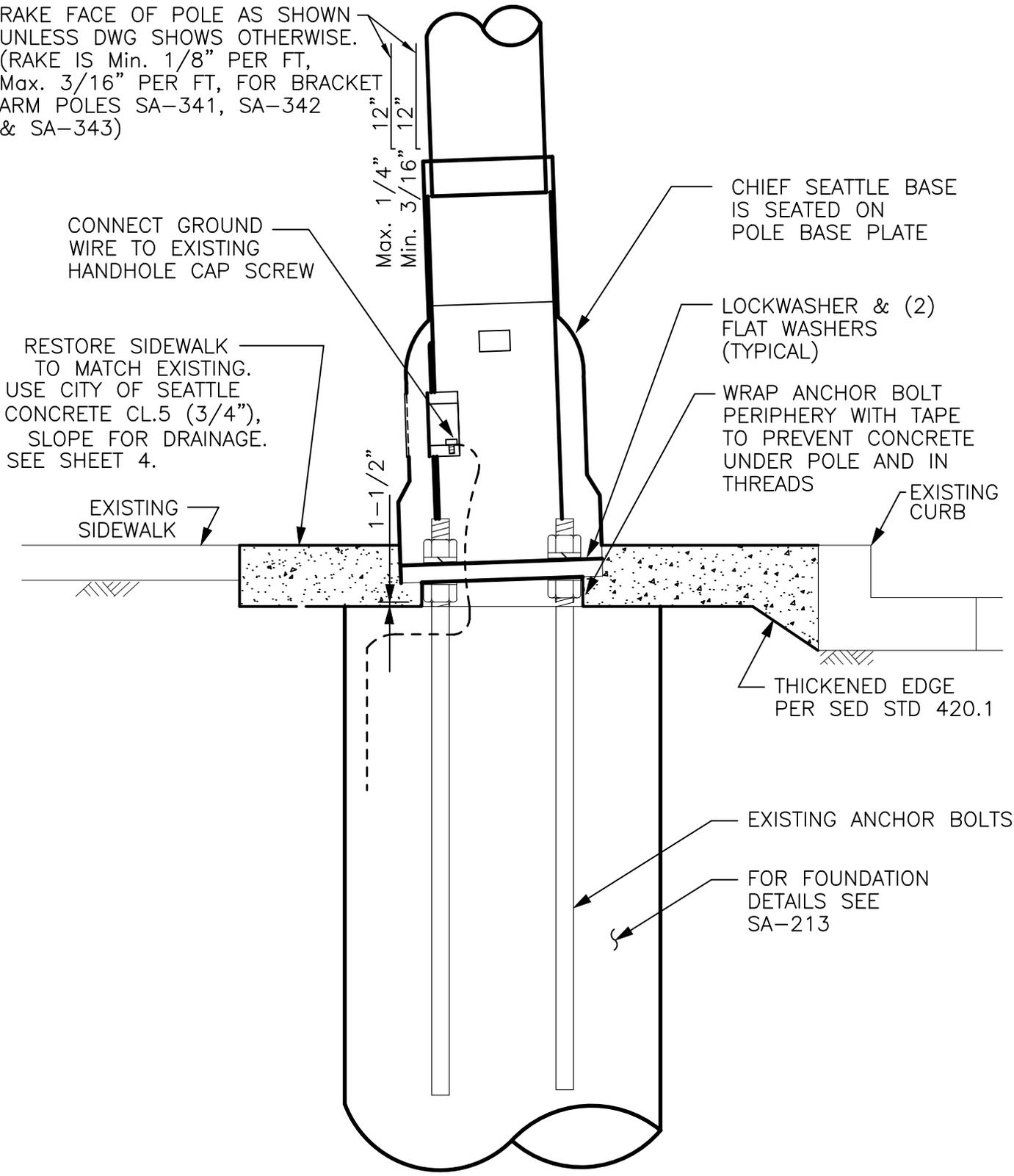


METRO TRANSIT DIVISION  
TROLLEY STANDARDS

**STEEL POLE INSTALLATION  
ANCHOR BASE**

DATE: <b>JULY 2016</b>
STD DET NO: <b>SA-216.2</b>
SHT NO: <b>2 4</b>

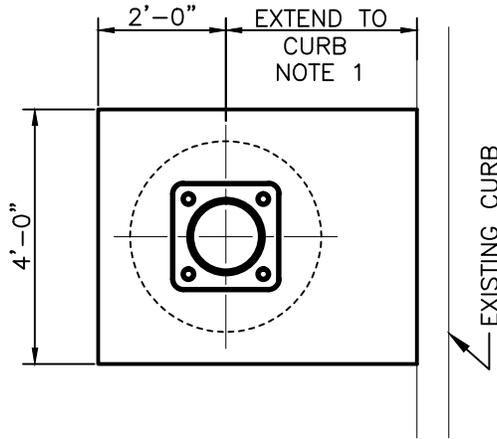
RAKE FACE OF POLE AS SHOWN UNLESS DWG SHOWS OTHERWISE. (RAKE IS Min. 1/8" PER FT, Max. 3/16" PER FT, FOR BRACKET ARM POLES SA-341, SA-342 & SA-343)



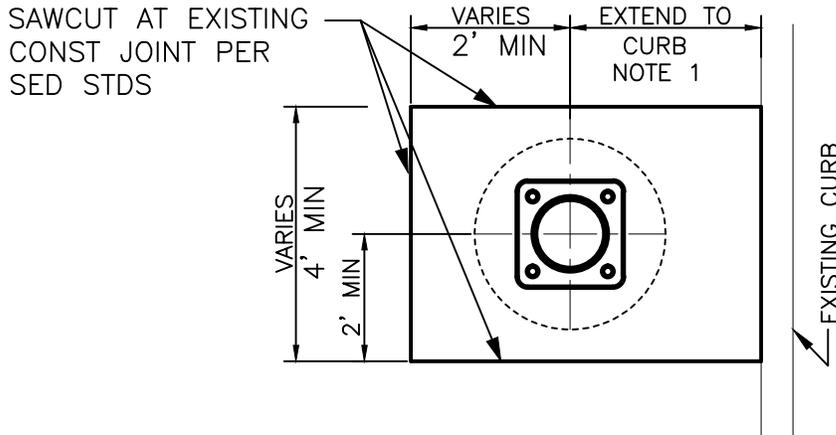
**CHIEF SEATTLE CONDITION**  
 USE ONLY WHERE NOTED ON DWGS

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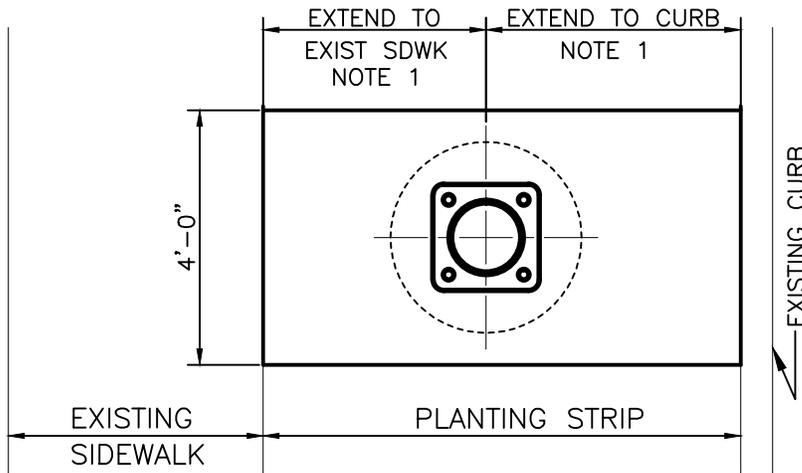
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				APPROVED: <b>D CRIPPEN</b>					STD DET NO: <b>SA-216.3</b>	
				DSGN/DWN: <b>D GREER/CMS/LSA</b>					SHT NO: <b>3 4</b>	
No.	REVISION	BY	APPD	DATE						



**NO SIDEWALK CONDITION**



**EXISTING SIDEWALK CONDITION**



**EXISTING SIDEWALK & PLANTING STRIP CONDITION**

**NOTE 1:** 2 FT MIN DIMENSION MAY BE USED IF DIMENSION EXCEEDS 6 FT.

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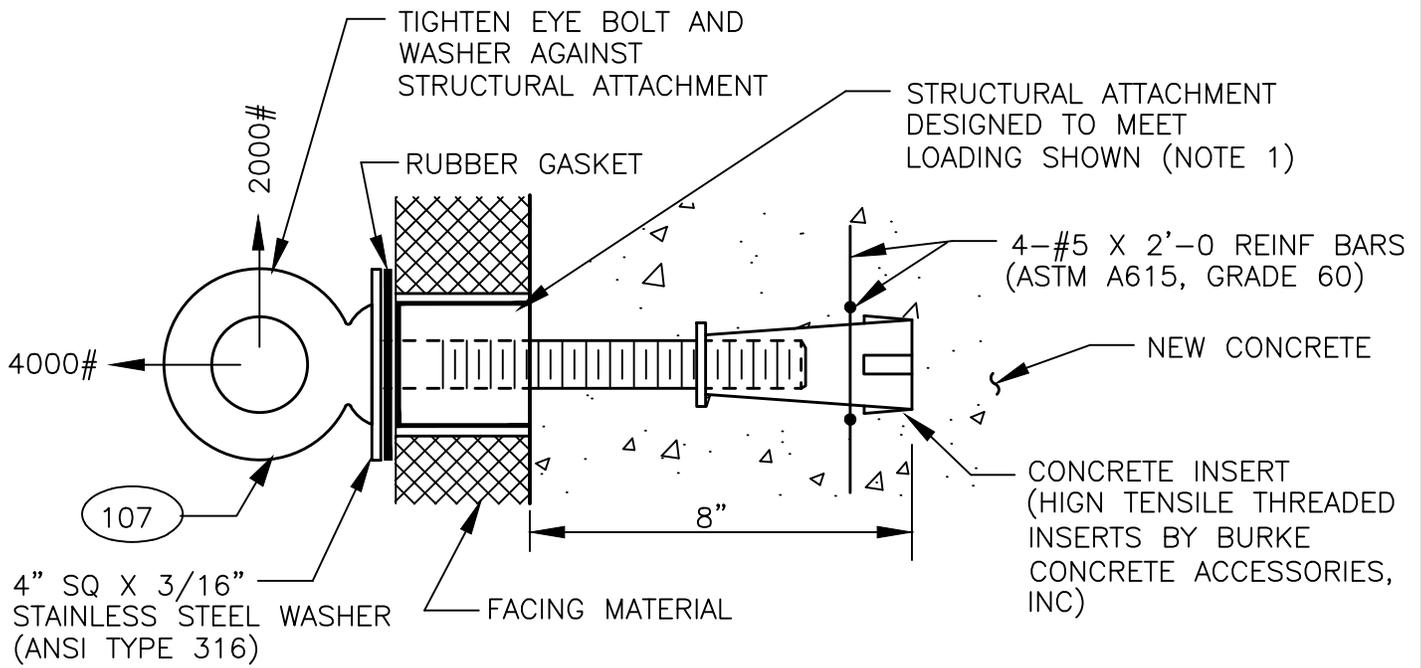
No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT: <b>A WOLAK</b>
APPROVED: <b>D CRIPPEN</b>
DSGN/DWN: <b>D GREER/CMS/LSA</b>

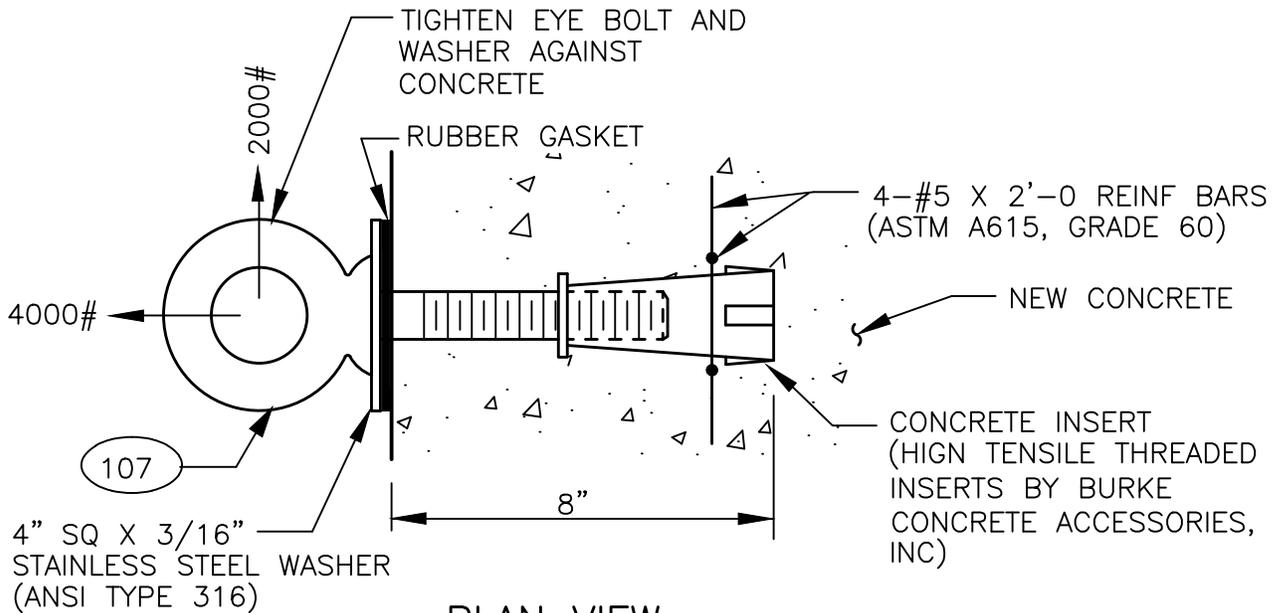


METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: <b>JULY 2016</b>
<b>STEEL POLE INSTALLATION ANCHOR BASE</b>	STD DET NO: <b>SA-216.4</b>
	SHT NO: <b>4 4</b>





PLAN VIEW W/FACING



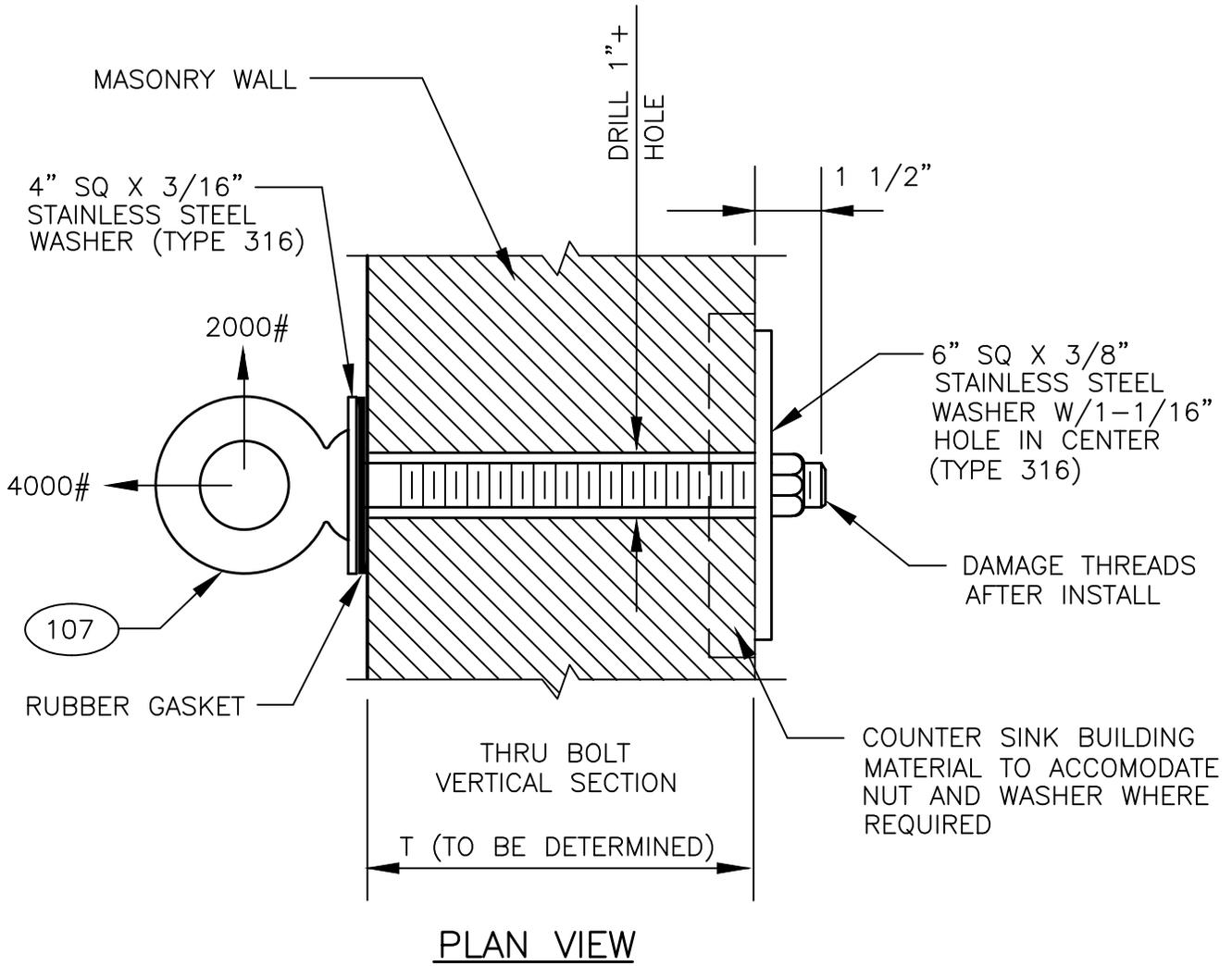
PLAN VIEW

**NOTES:**

1. TO PREVENT SPALLING, DEFLECTION RESULTING FROM SHEAR LOADING SHALL NOT ALLOW THE EYEBOLT TO CONTACT BUILDING FACING MATERIAL.
2. INSTALL EYEBOLT EYE IN A HORIZONTAL ORIENTATION.
3. A TWO FOOT MINIMUM SPACING IS REQUIRED BETWEEN EYEBOLTS.

				STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: JULY 2016
				APPROVED: D CRIPPEN		BLDG EYEBOLT INSTALLATION (NEW CONCRETE STRUCTURE)	STD DET NO: SA-221.2
				DSGN/DWN: D GREER/TMB/LSA			SHT NO: 2 5
No.	REVISION	BY	APPD	DATE			

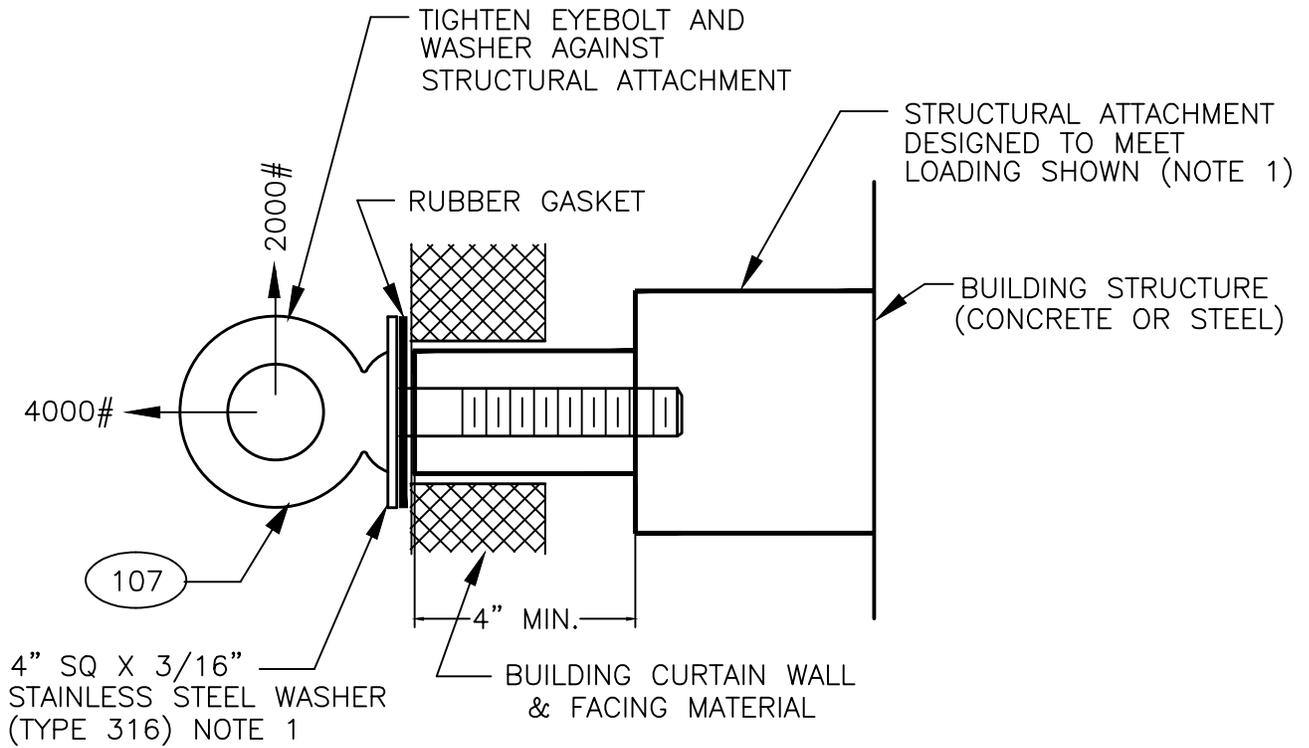
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 PLOTTED: Jul 21, 2016 - 03:52:59pm By anders



**NOTES:**

1. A TWO FOOT MINIMUM SPACING IS REQUIRED BETWEEN EYEBOLTS.
2. INSTALL EYEBOLT EYE IN A HORIZONTAL ORIENTATION.

				STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>BLDG EYEBOLT INSTALLATION          (MASONRY STRUCTURE)</b>	DATE: JULY 2016
				APPROVED: D CRIPPEN			STD DET NO: SA-221.3
				DSGN/DWN: D GREER/TMB/LSA			SHT NO: 3 5
No.	REVISION	BY	APPD	DATE			



PLAN VIEW

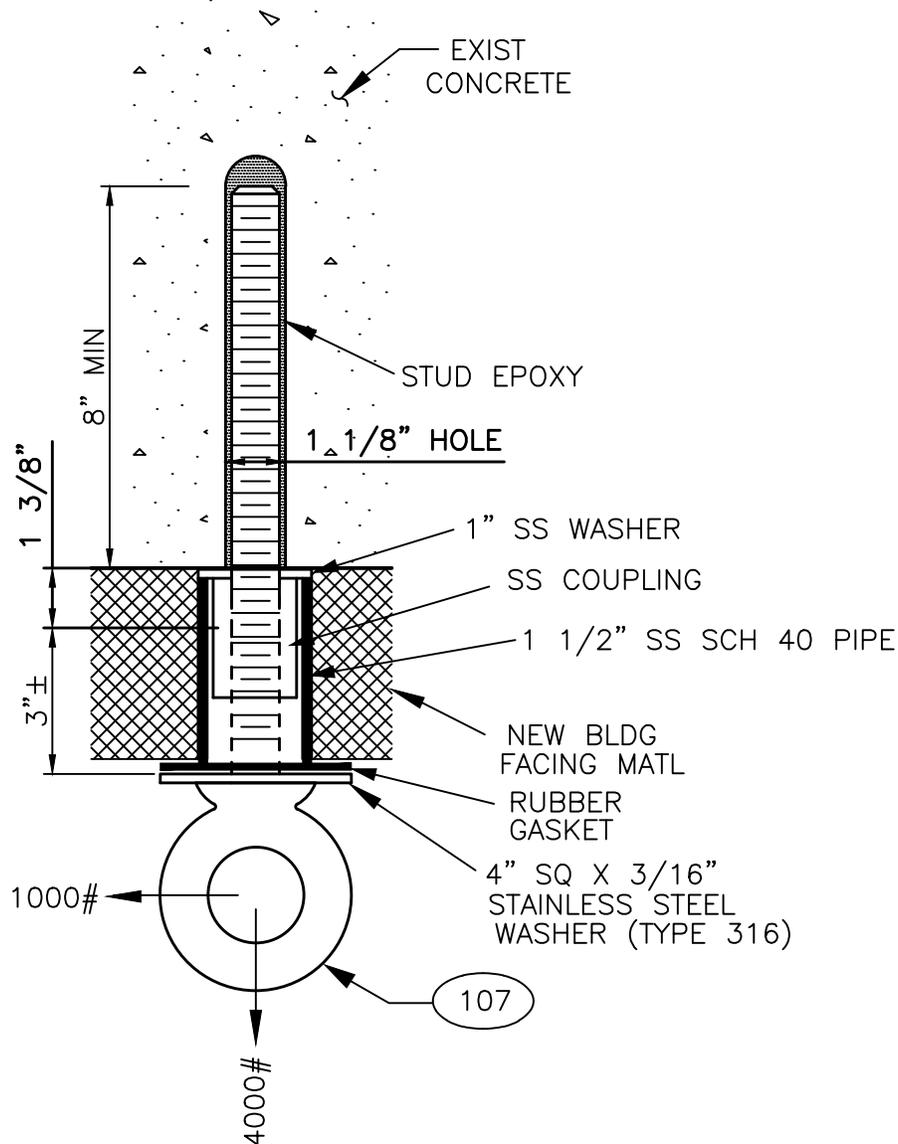
**NOTES:**

1. TO PREVENT BREAKAWAY, DEFLECTION RESULTING FROM SHEAR FORCE SHALL NOT ALLOW THE STRUCTURAL ATTACHMENT TO CONTACT EXISTING BUILDING FACING MATERIAL.
2. INSTALL EYEBOLT EYE IN A HORIZONTAL ORIENTATION.
3. A TWO FOOT MINIMUM SPACING IS REQUIRED BETWEEN EYEBOLTS.

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				STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: JULY 2016
				APPROVED: D CRIPPEN		BLDG EYEBOLT INSTALLATION (CURTAIN WALL STRUCTURE)	STD DET NO: SA-221.4
				DSGN/DWN: D GREER/TMB/LSA			SHT NO: 4 5
No.	REVISION	BY	APPD	DATE			

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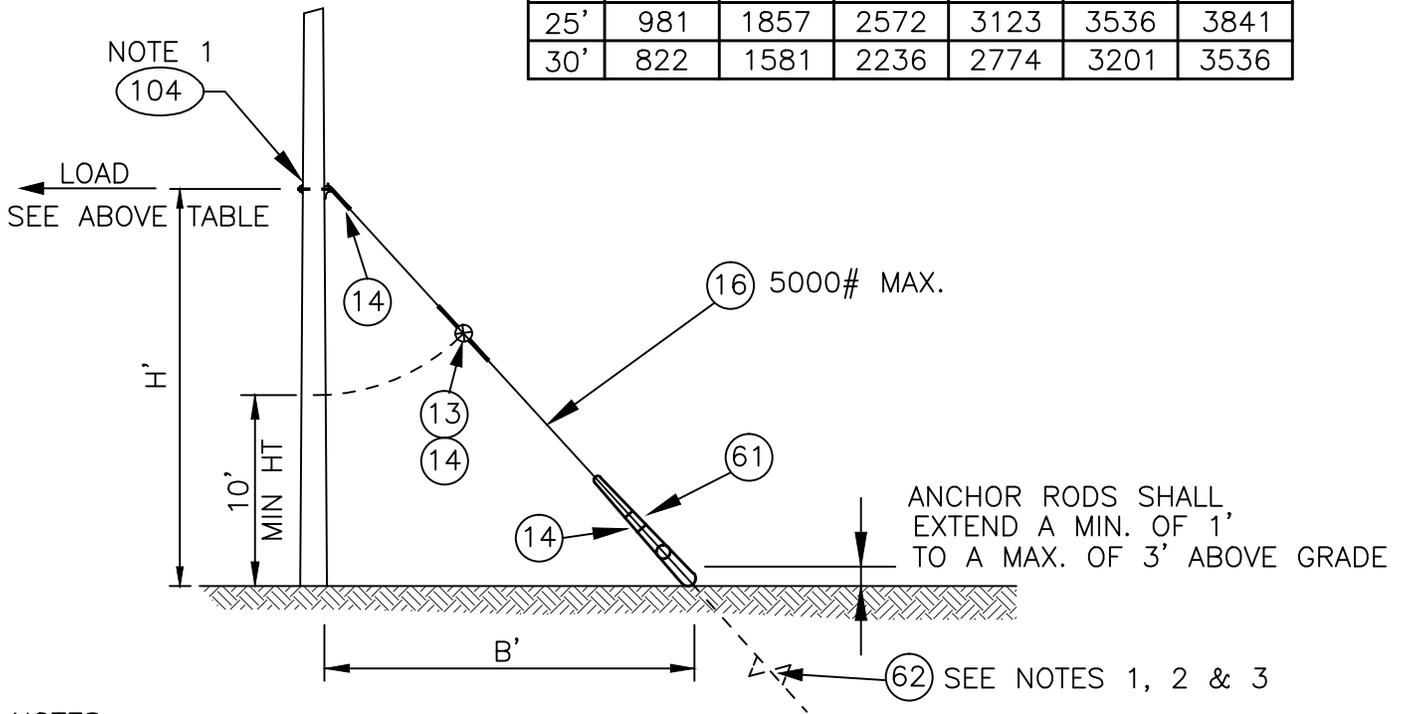
PLAN VIEW W/ FACING MATERIAL

**NOTES:**

1. INSTALL EYEBOLT EYE IN A HORIZONTAL ORIENTATION.
2. USE ITW RAMSET/REDHEAD EPCON EPOXY ANCHORING SYSTEM TO SET THE STUD. AN EPCON E101 HAND TOOL INJECTOR WITH AN E24 NOZZLE SHALL BE USED TO INJECT CERAMIC 6 EPOXY. INSTALL PER THE MANUFACTURES RECOMMENDATIONS.
3. TO PREVENT SPALLING, DEFLECTION RESULTING FROM SHEAR LOADING SHALL NOT ALLOW THE EYEBOLT TO CONTACT BUILDING FACING MATERIAL.
4. EYEBOLT SHOULDER SHALL BE SEATED.
5. A TWO FOOT MINIMUM SPACING IS REQUIRED BETWEEN ADJACENT EYEBOLTS.

				STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: JULY 2016
				APPROVED: D CRIPPEN		BLDG EYEBOLT INSTALLATION (EXISTING CONCRETE STRUCTURE WITH FACING)	STD DET NO: SA-221.5
				DSGN/DWN: D GREER/TMB/LSA			SHT NO: 5 5
No.	REVISION	BY	APPD	DATE			

ALLOWABLE LOADS/ ITEM 16						
H \ B	5'	10'	15'	20'	25'	30'
15'	1581	2774	3536	4000	4287	4472
20'	1213	2236	3000	3536	3904	4160
25'	981	1857	2572	3123	3536	3841
30'	822	1581	2236	2774	3201	3536



**NOTES**

1. INSTALLATION HEIGHT AND LOCATION OF ANCHOR IS INDICATED ON THE OVERHEAD DWGS.
2. SCREW ANCHOR SHALL HAVE TWO 8" HELIXES FOR GLACIAL TILL WITH A 1-1 1/2" HUB CAPABLE OF DEVELOPING 7000 FT-LBS MAXIMUM WORKING TORQUE. THE ANCHOR ROD SHALL BE 1" DIA. WITH A TRIPLE EYE.
3. MINIMUM INSTALLATION TORQUE FOR THE SCREW ANCHORS SHALL BE 3500 FOOT-LBS THIS TORQUE VALUE WILL REQUIRE THE USE OF 7 SHEAR PINS FOR USE WITH THE A.B. CHANCE TORQUE INDICATOR, CATALOG # C303-044.

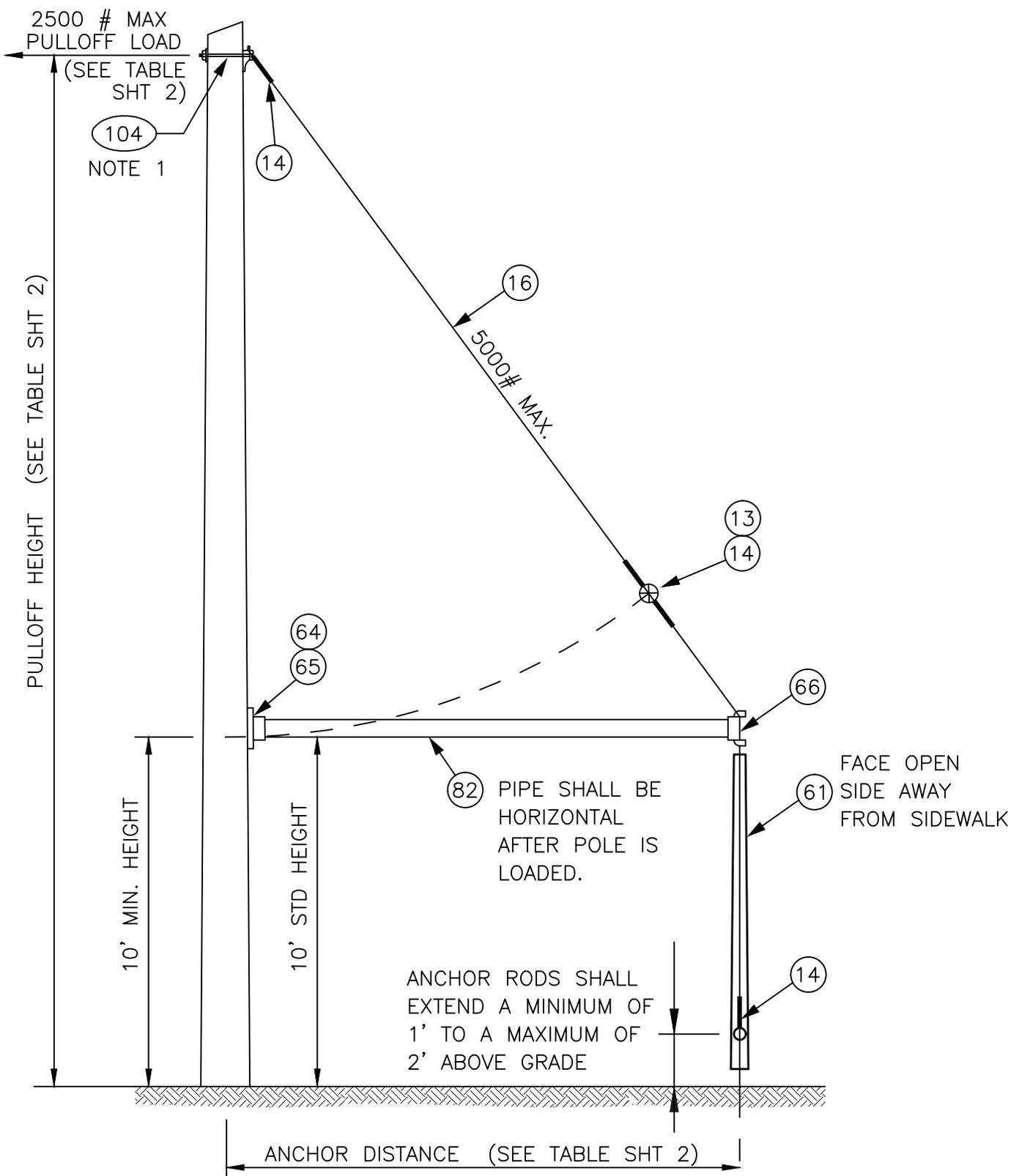
**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
13	1	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	506
14	4	GUY GRIP DEADEND	PREFORMED	CDE-3115
16	VARIABLES	GUY STRAND	COPPERWELD	16M
61	1	GUY GUARD, 8 FT, FOR USE ON 3/16" TO 1/2" STRAND	PREFORMED	PG 5518
62	1	POWER INSTALLED SCREW ANCHOR	CHANCE	E102-1219
104	VARIABLES	WOOD POLE DOWNGUY ASSEMBLY	METRO STD	SA-104

STD DET DEVELOPMENT: <b>A WOLAK</b>					METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: JULY 2016
APPROVED: <b>D CRIPPEN</b>					<b>DOWN GUY</b>		STD DET NO: SA-231
DSGN/DWN: <b>D GREER/TMB/LSA</b>							SHT NO: 1 1
No.	REVISION	BY	APPD	DATE			

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 PLOTTED: Sep 08, 2016 - 11:23:38am By: anders



SEE SHEET 2, FOR NOTES AND MATERIAL LIST.

				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: JULY 2016	
				APPROVED: <b>D CRIPPEN</b>			SIDEWALK GUY		STD DET NO: SA-232.1	
				DSGN/DWN: <b>D GREER/TMB/LSA</b>					SHT NO: 1 2	
No.	REVISION	BY	APPD	DATE						

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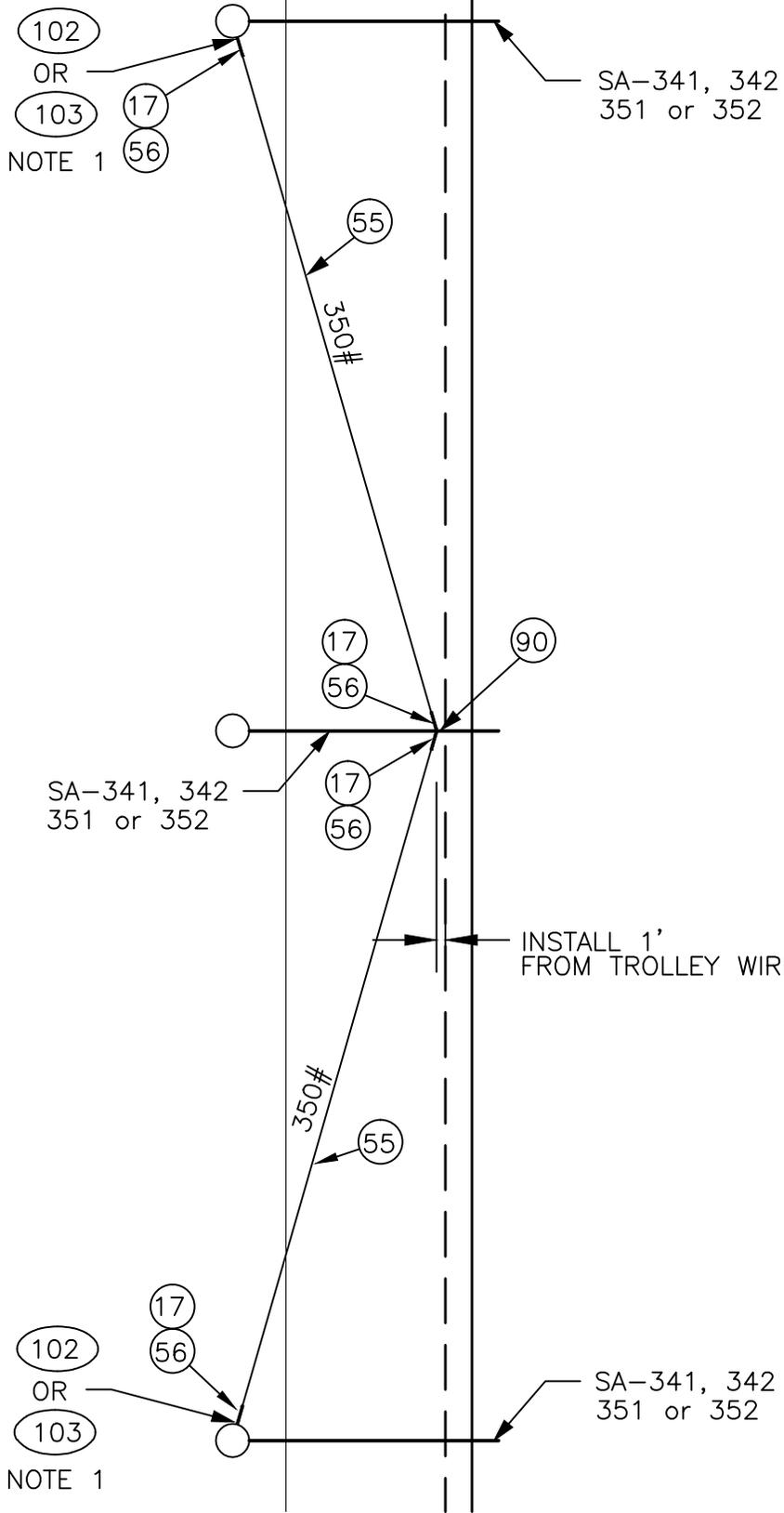
**NOTES**

- 1 A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. GUY TENSION IS INDICATED ON THE OVERHEAD DRAWINGS.
- 2 PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "X". PROVIDE TWO WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
- 3 SEE SA-167 FOR INSULATED GUY CRITERIA.

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
SA-233L-----GUY TENSIONS 0-2500 LBS				
03	2	GUY STRAIN INSUL	WABCO	31504-3060
04	5	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" 6 WRAPS		
07	2	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M-NOTE 3
SA-233H-----GUY TENSIONS 2500-5000 LBS				
06	AS REQD	FRICTION TAPE, 3/4" 6 WRAPS		
13	2	GUY STRAIN INSUL	WABCO	31506-3060
14	5	GUY GRIP DEADEND	PREFORMED	CDE-3115
15	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
16	VARIES	GUY STRAND	COPPERWELD	16M-NOTE 3
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
ALSO SA-233L & SA-233H				
102	VARIES	STEEL POLE COLLAR	METRO	SA-102
103	VARIES	WOOD POLE EYEBOLT	METRO	SA-103

No.	REVISION	BY	APPD	DATE	STD DET DEVELOPMENT: <b>A WOLAK</b>  APPROVED: <b>D CRIPPEN</b>  DSGN/DWN: <b>D GREER/BFB/LSA</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>STANDARD          HEAD GUY</b>	DATE: <b>JULY 2016</b>  STD DET NO: <b>SA-233</b>  SHT NO: <b>1 1</b>
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No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
**A WOLAK**  
 APPROVED:  
**D CRIPPEN**  
 DSGN/DWN:  
**D GREER/DOW/LSA**



METRO TRANSIT DIVISION  
 TROLLEY STANDARDS  
  
 BRACKET ARM GUY

DATE:	JULY 2016
STD DET NO:	SA-234.1
SHT NO:	1 2

## MATERIAL LIST

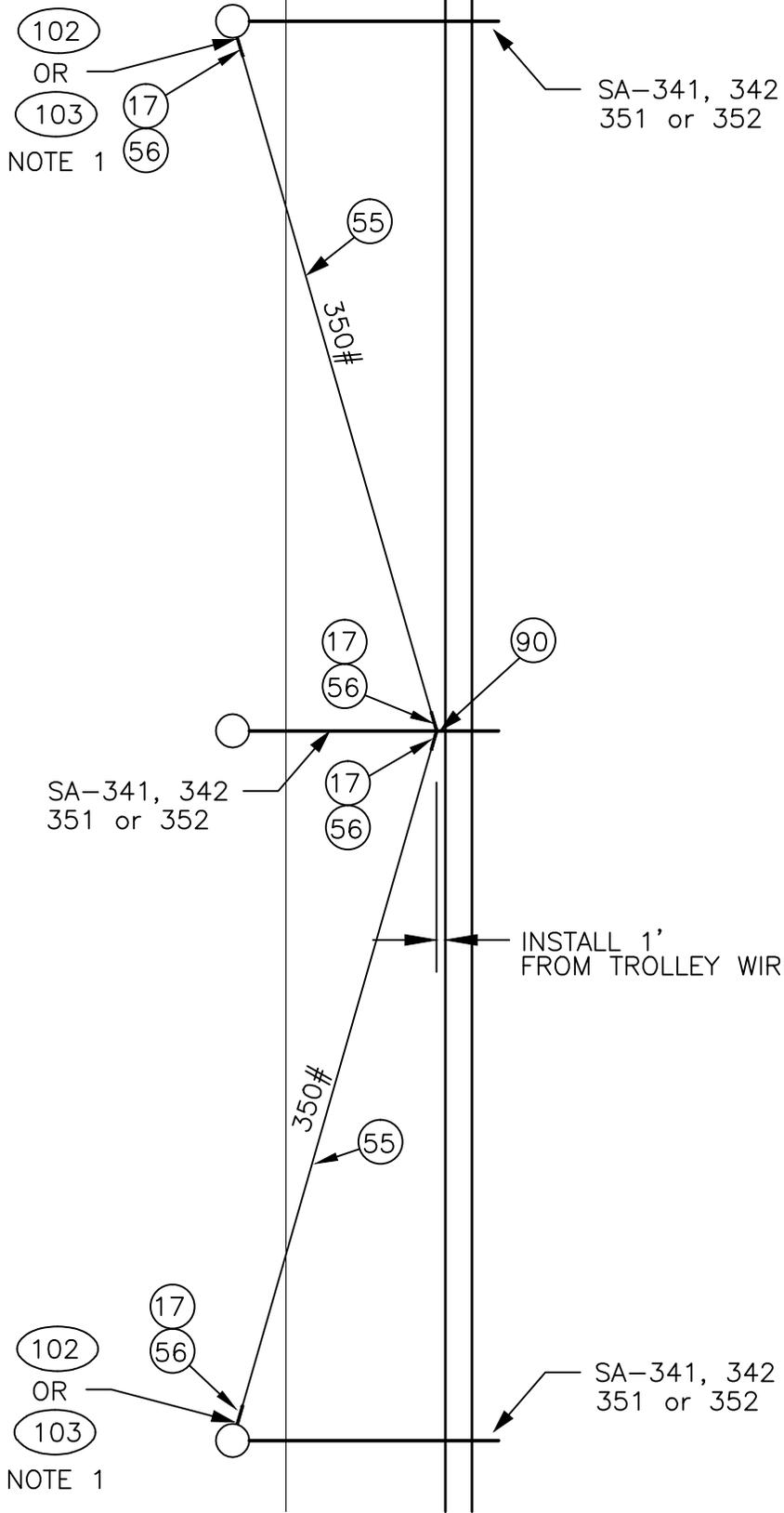
ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
17	4	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
55	VARIES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC	HPTG 67001
56	4	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC	PLP2755
90	1	HEAVY PIPE CLAMP, GALV 3" IPS	GRINNELL	FIG. 216
102	VARIES	FORGED 3-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD EYEBOLT	METRO STD	SA-103

### NOTE

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103. INSTALLATION HEIGHT IS 1 FOOT ABOVE THE BRACKET ARM UNLESS DRAWINGS SPECIFY OTHERWISE.

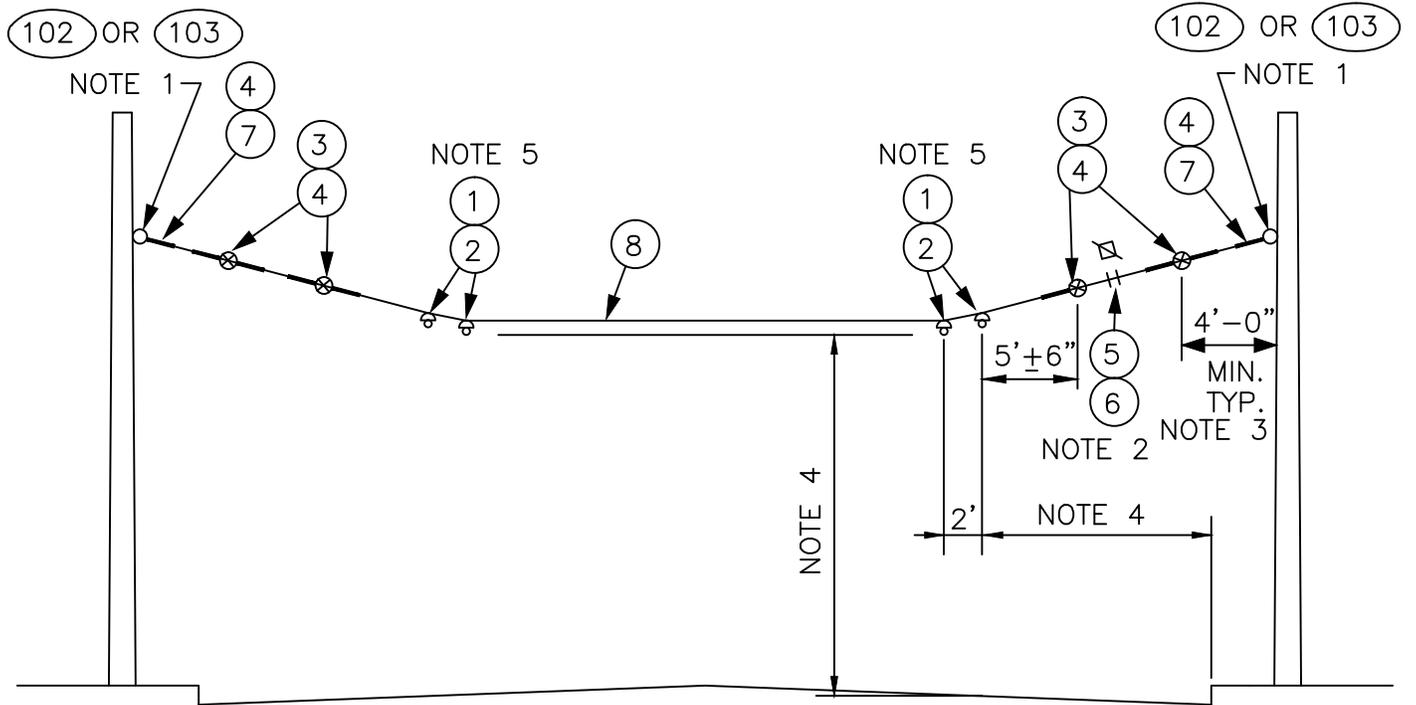
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					STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: JULY 2016
					APPROVED: <b>D CRIPPEN</b>		STD DET NO: SA-234.2	
					DSGN/DWN: <b>D GREER/DOW/LSA</b>		BRACKET ARM GUY	SHT NO: 2 2
No.	REVISION	BY	APPD	DATE				



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				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: JULY 2016	
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-234		SHT NO: 1 1	
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No.	REVISION	BY	APPD	DATE						



**NOTES**

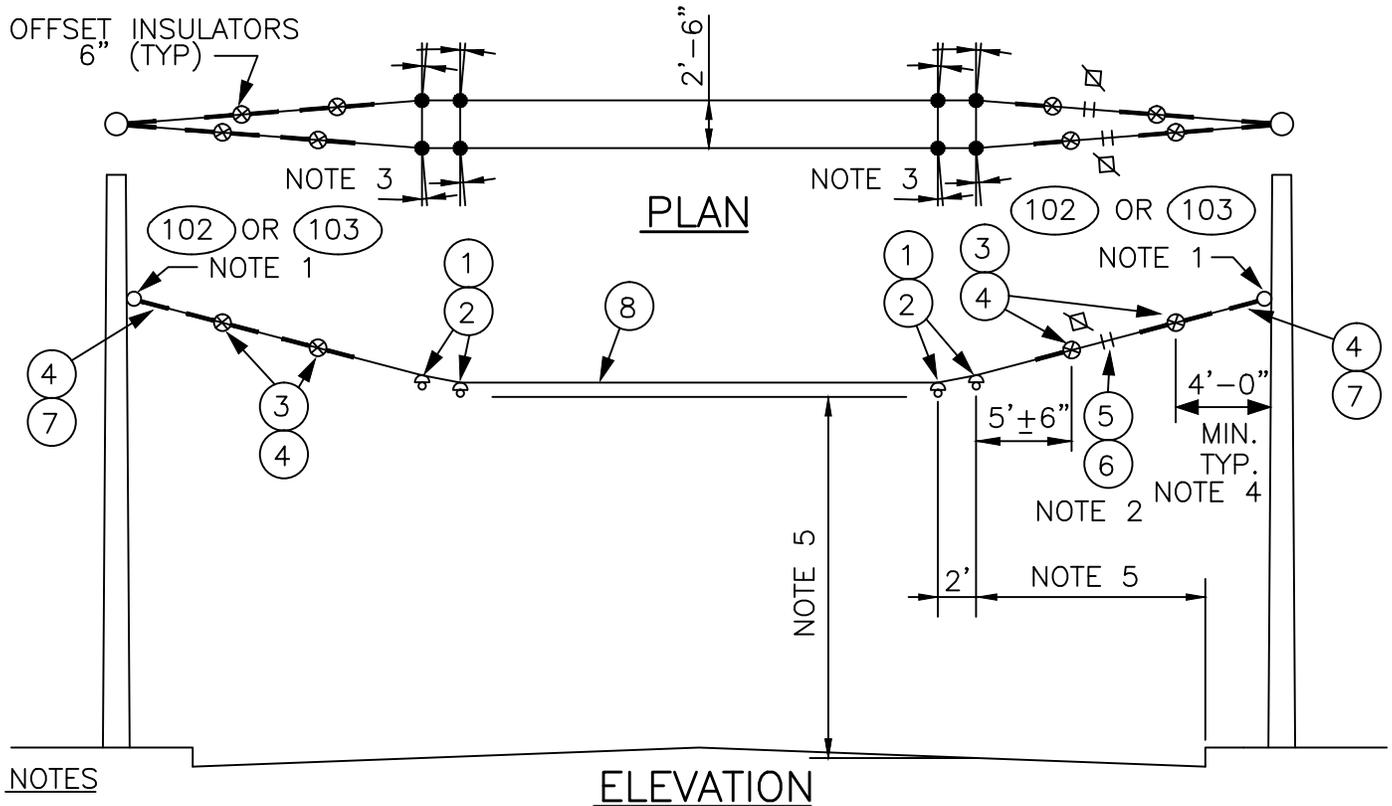
1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. SEE SA-370 FOR LIMITED SPACE VARIANCES.
4. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.
5. MAXIMUM ANGLE IS 0.5°. SEE SA-307, PLAN VIEW.

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	4	DETROIT CLAMP ASSY	WABCO	19293-3007
02	4	AGC TANGENT SPAN HANGER	WABCO	19360-2000
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	9	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	2	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIABLES	GUY STRAND	COPPERWELD	8M
102	VARIABLES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIABLES	WOOD POLE EYEBOLT	METRO STD	SA-103

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>TANGENT SPAN          BRACKET ARM GUY</b>	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-301
				DSGN/DWN: <b>D GREER/TMB/LSA</b>			SHT NO: 1 1
No.	REVISION	BY	APPD	DATE			



**NOTES**

**ELEVATION**

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⌘". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. MAXIMUM ANGLE 1°, 0.5° PER SPAN HANGER.
4. SEE SA-370 FOR LIMITED SPACE VARIANCES.
5. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	8	DETROIT CLAMP ASSY	WABCO	19293-3007
02	8	AGC TANGENT SPAN HANGER	WABCO	19360-2000
03	8	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	18	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIABLES	GUY STRAND	COPPERWELD	8M
102	VARIABLES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIABLES	WOOD POLE EYEBOLT	METRO STD	SA-103

STD DET DEVELOPMENT:  
A WOLAK

APPROVED:  
D CRIPPEN

DSGN/DWN:  
D GREER/TMB/LSA



METRO TRANSIT DIVISION  
TROLLEY STANDARDS

HOLDUP TANGENT SPAN  
TWO-WAY TRAFFIC

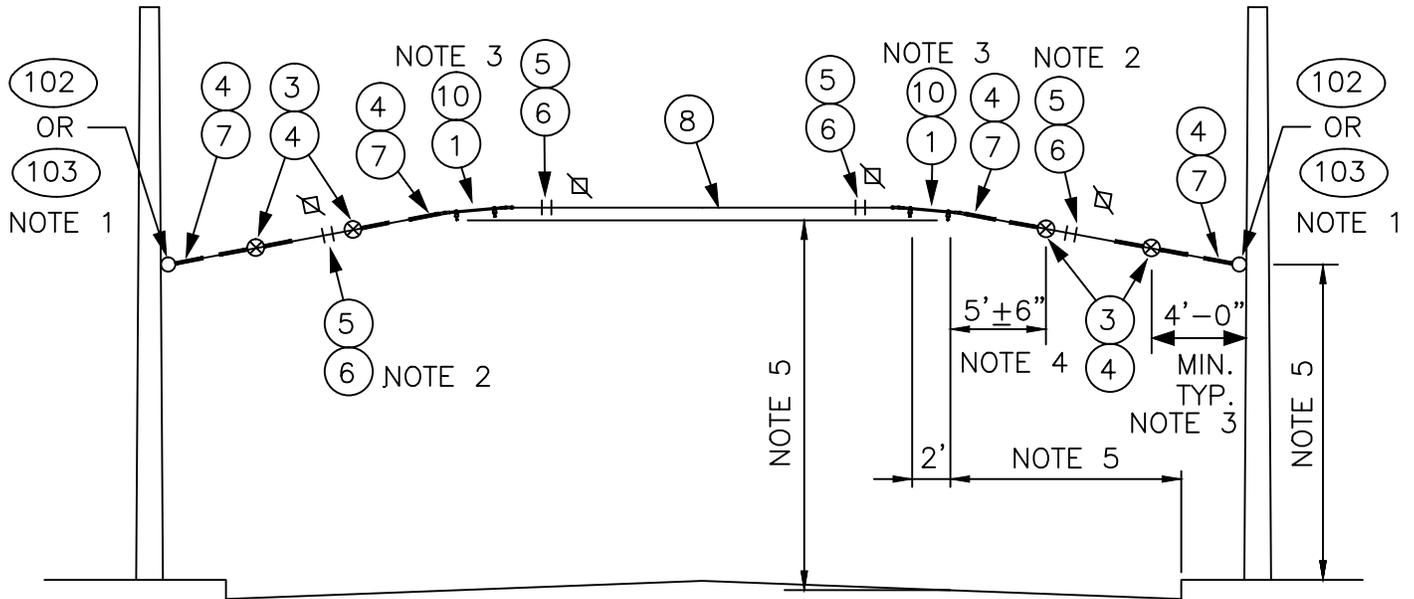
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JULY 2016

STD DET NO:  
SA-302

SHT NO:  
1 1

No.	REVISION	BY	APPD	DATE

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**NOTES**

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. MAXIMUM ANGLE 0.5 DEGREE. SEE SA-307, PLAN VIEW.
4. SEE SA-370 FOR LIMITED SPACE VARIANCES.
5. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

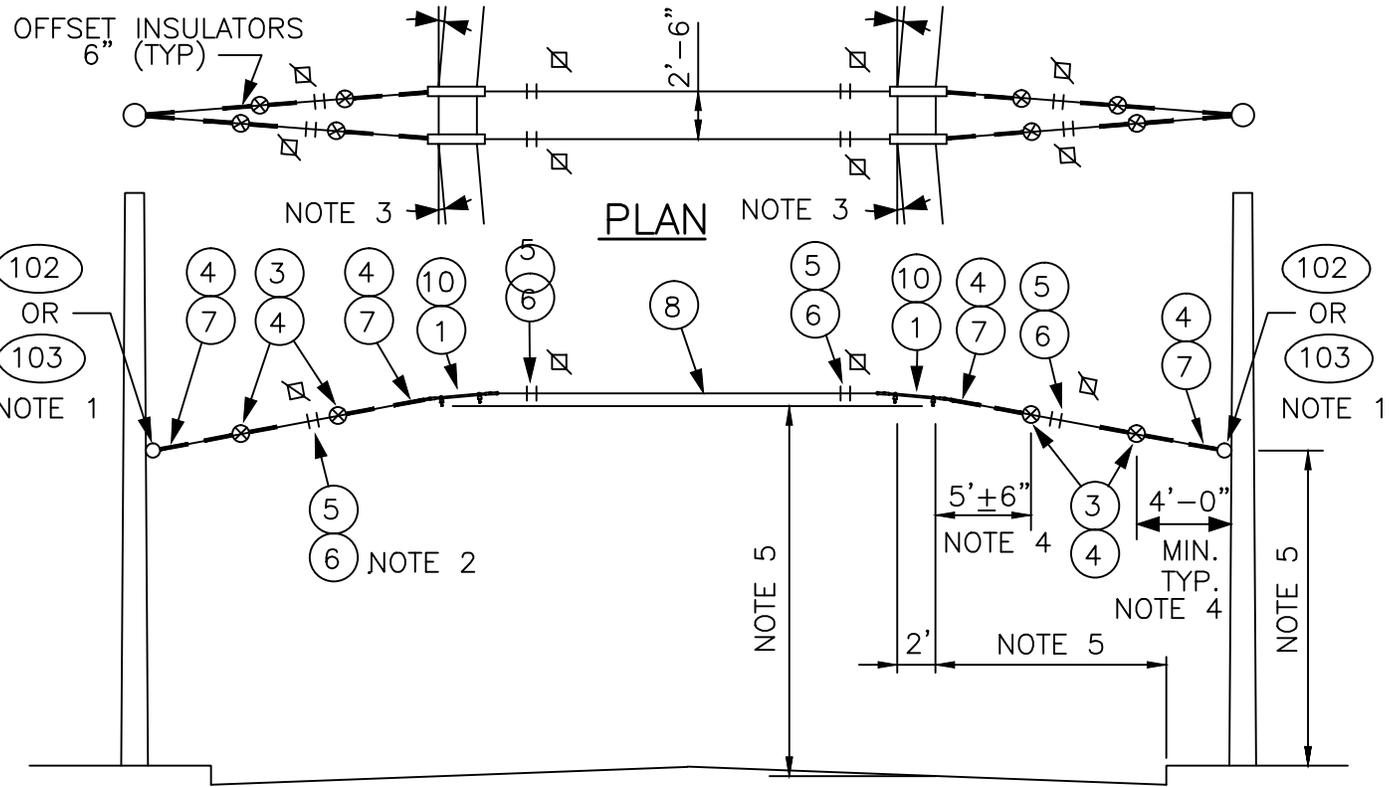
**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	4	DETROIT CLAMP ASSY	WABCO	19293-3007
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	10	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	8	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIABLES	GUY STRAND	COPPERWELD	8M
10	2	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
102	VARIABLES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIABLES	WOOD POLE EYEBOLT	METRO STD	SA-103

				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>INVERTED TANGENT SPAN          TWO-WAY TRAFFIC</b>	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-303
				DSGN/DWN: <b>D GREER/TMB/LSA</b>			SHT NO: 1 1
No.	REVISION	BY	APPD	DATE			

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**NOTES**

**ELEVATION**

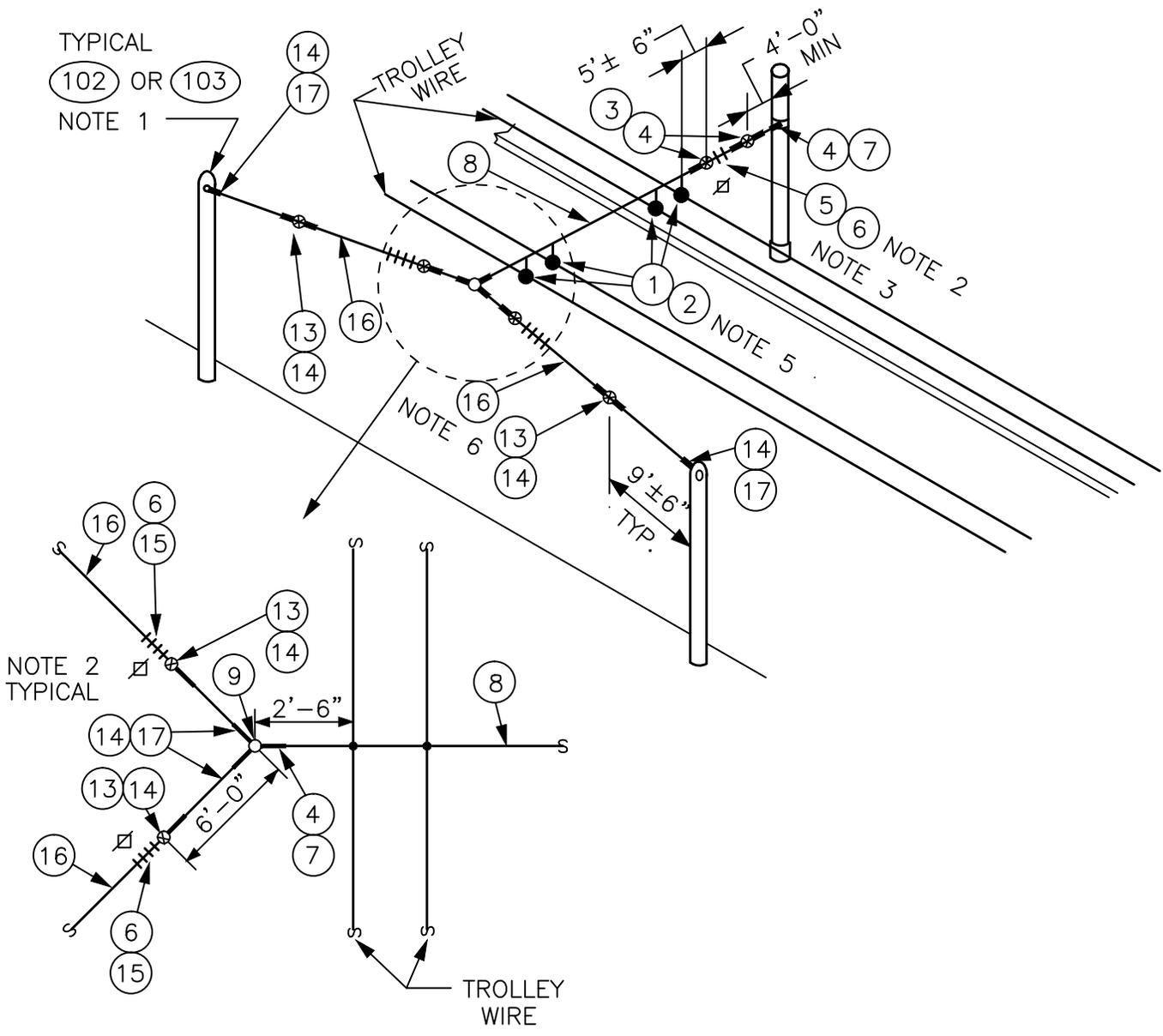
1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. MAXIMUM ANGLE 1°, 0.5° PER DOUBLE CURVE HANGER.
4. SEE SA-370 FOR LIMITED SPACE VARIANCES.
5. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	8	DETROIT CLAMP ASSY	WABCO	19293-3007
03	8	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	20	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	16	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	8	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIABLES	GUY STRAND	COPPERWELD	8M
10	4	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
102	VARIABLES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIABLES	WOOD POLE EYEBOLT	METRO STD	SA-103

No.		REVISION		BY	APPD	DATE	STD DET DEVELOPMENT: <b>A WOLAK</b>  APPROVED: <b>D CRIPPEN</b>  DSGN/DWN: <b>D GREER/TMB/LSA</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>HOLDDOWN TANGENT SPAN          TWO-WAY TRAFFIC</b>	DATE: JULY 2016
							STD DET NO: SA-304			
							SHT NO: 1 1			

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No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
**A WOLAK**

APPROVED:  
**D CRIPPEN**

DSGN/DWN:  
**D GREER/TMB/LSA**

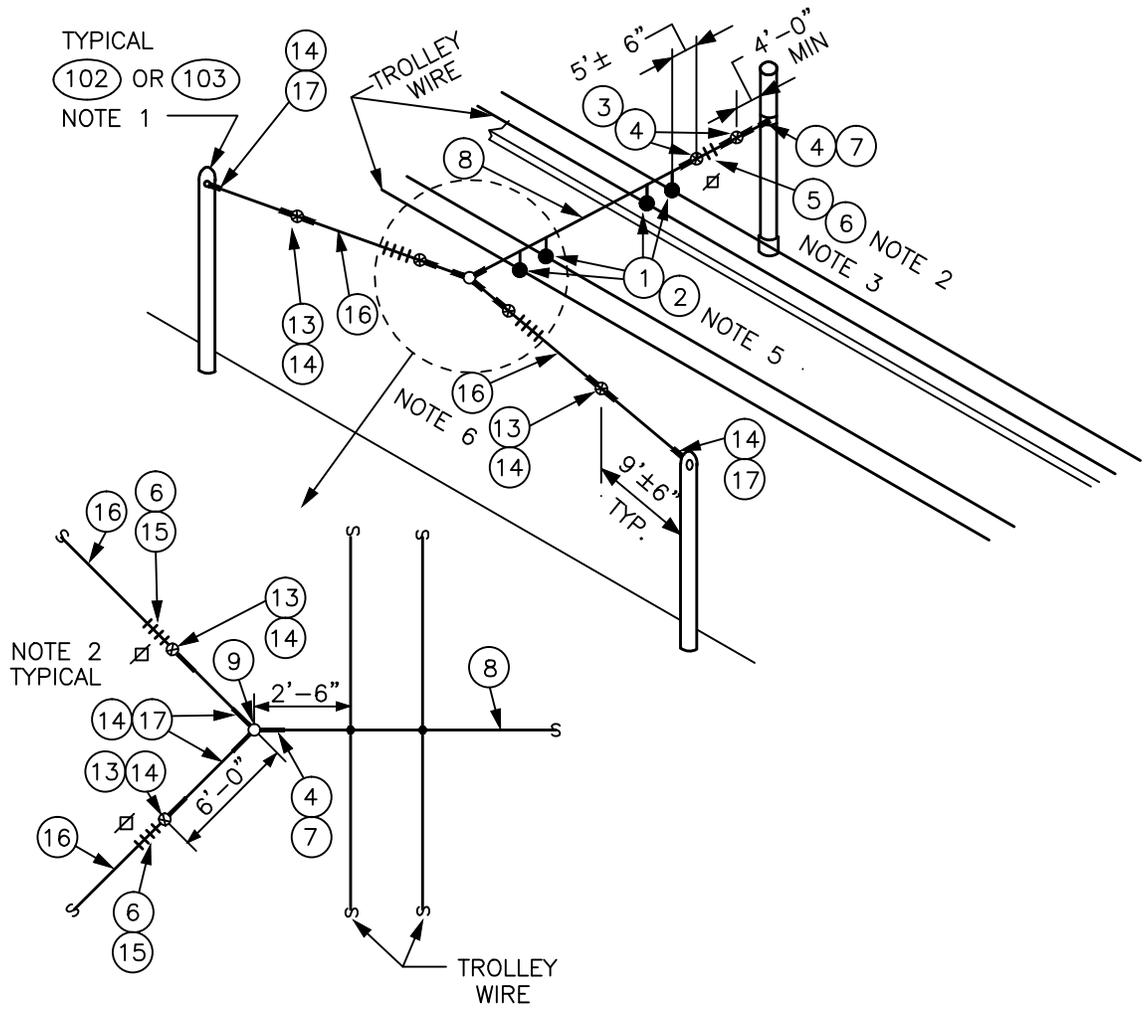


METRO TRANSIT DIVISION  
 TROLLEY STANDARDS

**BRIDLE TANGENT SPAN  
 TWO-WAY TRAFFIC**

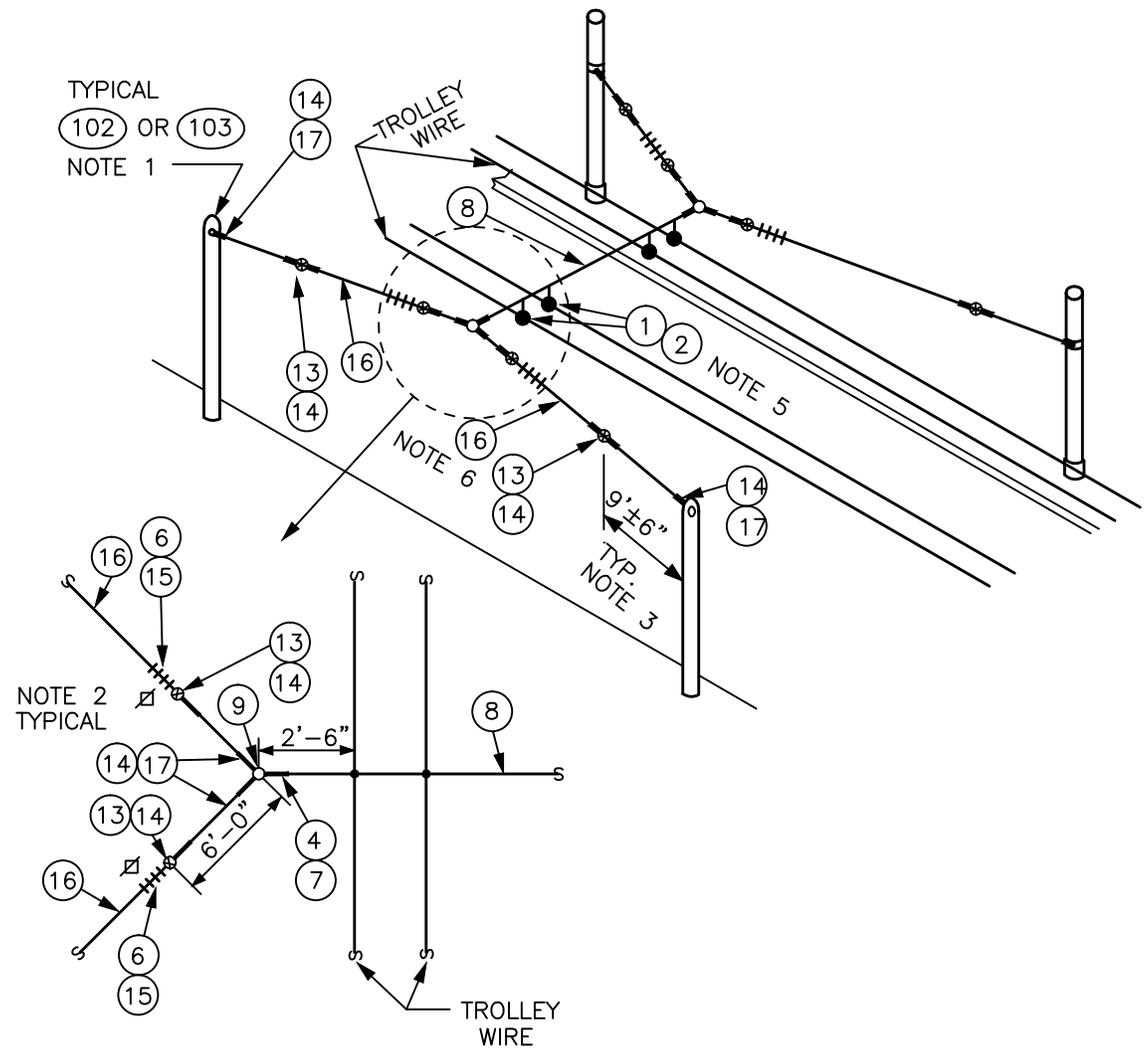
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				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-305.2
				DSGN/DWN: <b>D GREER/TMB/LSA</b>			SHT NO: 2 2
No.	REVISION	BY	APPD	DATE			

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No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
**A WOLAK**

APPROVED:  
**D CRIPPEN**

DSGN/DWN:  
**D GREER/TMB/LSA**



METRO TRANSIT DIVISION  
 TROLLEY STANDARDS

**DOUBLE BRIDLE  
 TANGENT SPAN  
 TWO-WAY TRAFFIC**

DATE: <b>JULY 2016</b>
STD DET NO: <b>SA-306.1</b>
SHT NO: <b>1 2</b>

**MATERIAL LIST**

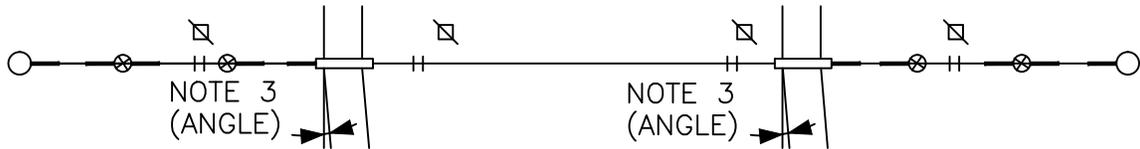
ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	4	DETROIT CLAMP ASSY	WABCO	19293-3007
02	4	AGC TANGENT SPAN HANGER	WABCO	19360-2000
03	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	VARIES	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	VARIES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
09	2	BULL RING	WABCO	18567-2000
13	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	506
14	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3115
15	VARIES	WIRE ROPE CLIP, 3/8"	CROSBY	G450
16	VARIES	GUY STRAND	COPPERWELD	16M
17	VARIES	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

**NOTES**

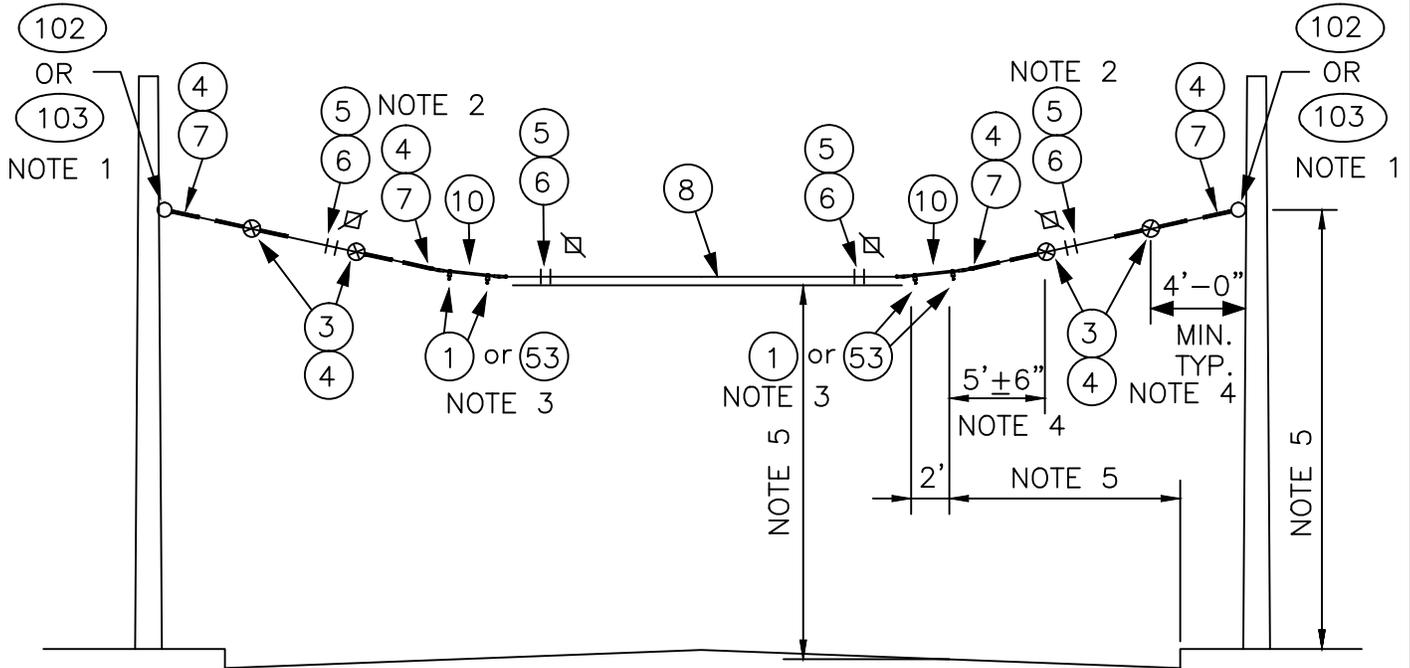
1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "☒". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. SEE SA-370 FOR LIMITED SPACE VARIANCES.
4. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.
5. MAXIMUM ANGLE IS 0.5°. SEE SA-307, PLAN VIEW.
6. IF LOAD SHOWN ON OVERHEAD DRAWINGS IS LESS THAN 2500 LBS, THEN ITEM 8 MAY BE USED INSTEAD OF ITEM 16. THE ASSOCIATED ITEMS SHALL ALSO BE CHANGED I.E. 3 FOR 13, 4 FOR 14, 5 FOR 15 AND 7 FOR 17.

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  DOUBLE BRIDLE TANGENT SPAN TWO-WAY TRAFFIC	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-306.2
				DSGN/DWN: <b>D GREER/TMB/LSA</b>			SHT NO: 2 2
No.	REVISION	BY	APPD	DATE			



PLAN



ELEVATION

NOTES

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. ANGLE VARIES FROM 1° TO 5°. USE ITEM 1 FOR 1° TO 2.5° ANGLE. USE ITEM 53 FOR 3° TO 5° ANGLE.
4. SEE SA-370 FOR LIMITED SPACE VARIANCES.
5. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>1° TO 5° CURVE SPAN WITH          2 FOOT CURVE RAILS          TWO-WAY TRAFFIC</b>	DATE: <b>JULY 2016</b>
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: <b>SA-307.1</b>
				DSGN/DWN: <b>D GREER/TMB/LSA</b>			SHT NO: <b>1 2</b>
No.	REVISION	BY	APPD	DATE			

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	VARIES	DETROIT CLAMP ASSY	WABCO	19293-3007
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	10	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	8	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	2	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
53	VARIES	CURVE RAIL (3° TO 5° 2 FT LG)	K & M	851 B412/0
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

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No.	REVISION	BY	APPD	DATE	STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  1° TO 5° CURVE SPAN WITH 2 FOOT CURVE RAILS TWO-WAY TRAFFIC	DATE: JULY 2016
					APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-307.2
					DSGN/DWN: <b>D GREER/TMB/LSA</b>			SHT NO: 2 2

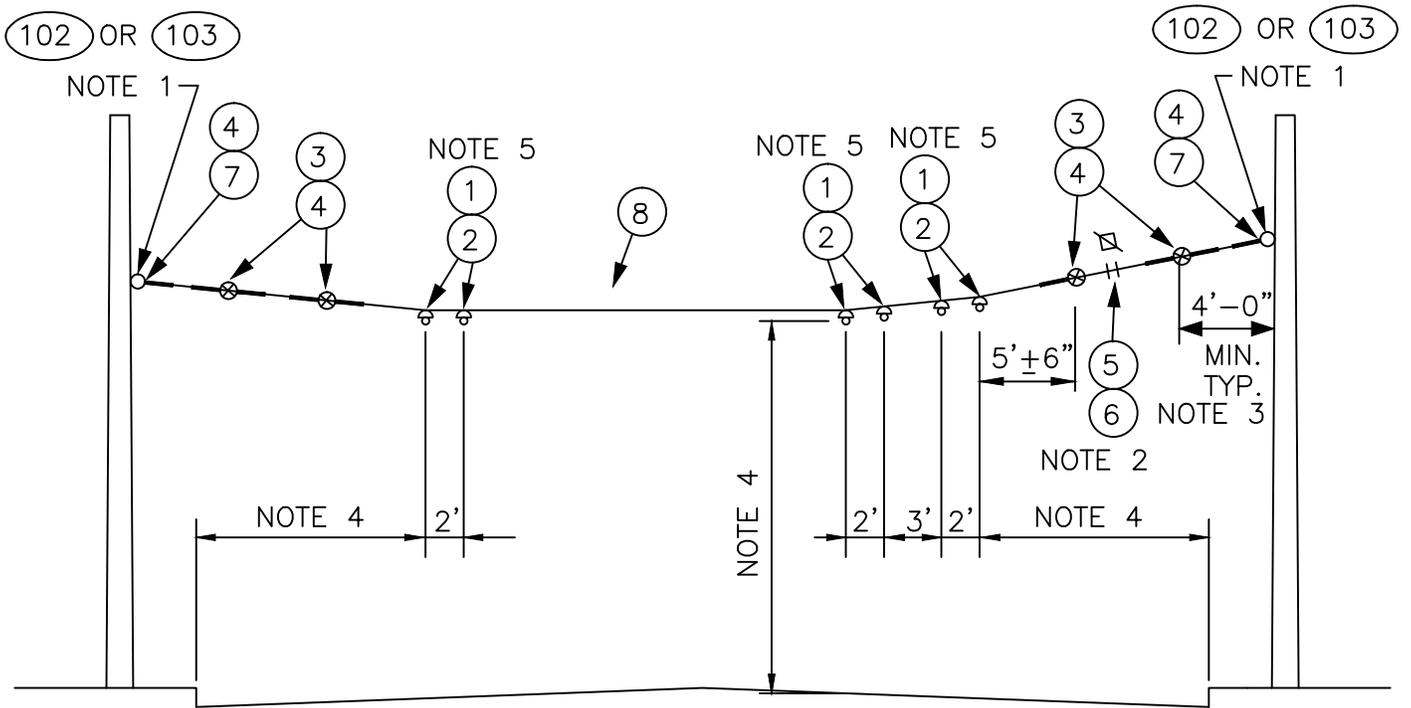


**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	6	GUY STRAIN INSUL, CABLE OD MAX: 1/2"	PORCELAIN 504 PRODUCTS CO.	
04	15	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	10	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	6	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIABLES	GUY STRAND	COPPERWELD	8M
10	2	HI-LITE DOUBLE CURVE HANGER		54962-3001
39	1	5/8" SHACKLE	WABCO	13722-2000
54	VARIABLES	CURVE RAIL (5.5° TO 7.5° 4 FT LG)	K&M	851 B412/1
102	VARIABLES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	VARIABLES
103	VARIABLES	WOOD POLE EYEBOLT	METRO STD	SA-103

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No.	REVISION	BY	APPD	DATE	STD DET DEVELOPMENT: <b>A WOLAK</b>	 METRO TRANSIT DIVISION TROLLEY STANDARDS  5.5° TO 7.5° CURVE SPAN WITH 4 FOOT CURVE RAILS TWO-WAY TRAFFIC	DATE: JULY 2016
					APPROVED: <b>D CRIPPEN</b>		STD DET NO: SA-308.2
					DSGN/DWN: <b>D GREER/TMB/LSA</b>		SHT NO: 2 2



**NOTES**

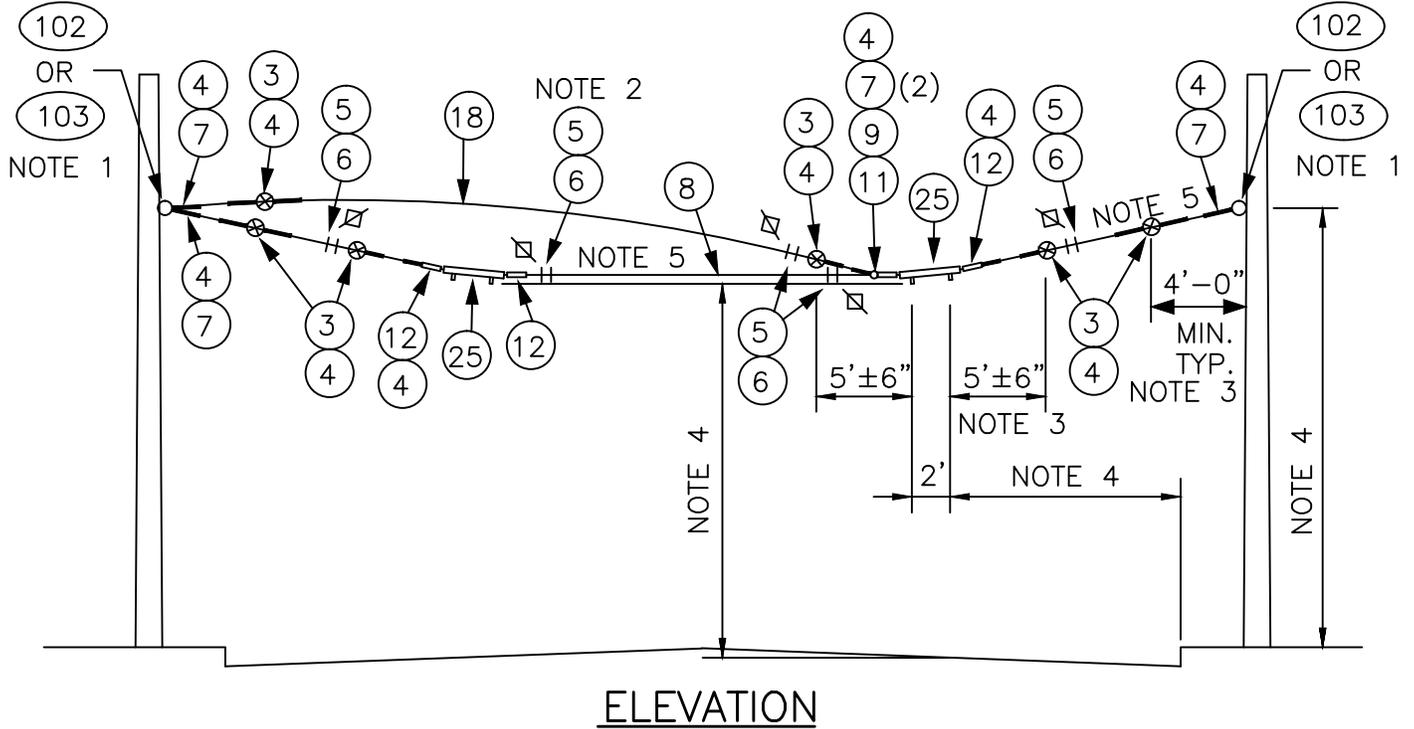
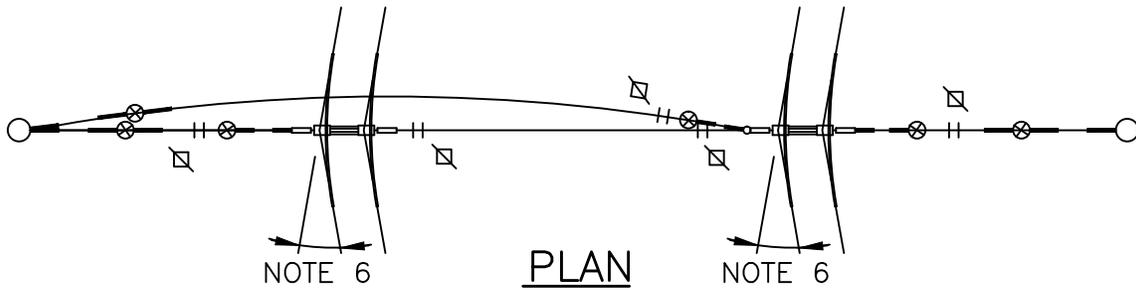
1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. SEE SA-370 FOR LIMITED SPACE VARIANCES.
4. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.
5. MAXIMUM ANGLE IS 0.5°. SEE SA-307, PLAN VIEW.

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	6	DETROIT CLAMP ASSY	WABCO	19293-3007
02	6	AGC TANGENT SPAN HANGER	WABCO	19360-2000
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	9	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	2	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIABLES	GUY STRAND	COPPERWELD	8M
102	VARIABLES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIABLES	WOOD POLE EYEBOLT	METRO STD	SA-103

No.				REVISION		BY	APPD	DATE	STD DET DEVELOPMENT: <b>A WOLAK</b>  APPROVED: <b>D CRIPPEN</b>  DSGN/DWN: <b>D GREER/TMB/LSA</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>TANGENT SPAN          THREE TRACKS</b>	DATE: JULY 2016
STD DET NO: SA-309												
SHT NO: 1 1												

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**NOTES**

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. SEE SA-371 FOR LIMITED SPACE VARIANCES. SEE SA-167 FOR INSULATED GUY CRITERIA.
4. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.
5. INSIDE PULLOFF MAY NOT BE REQUIRED, SEE DRAWINGS FOR EACH INSTALLATION.
6. ANGLE VARIES FROM 8° TO 30°.

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No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT: <b>A WOLAK</b>
APPROVED: <b>D CRIPPEN</b>
DSGN/DWN: <b>D GREER/TMB/LSA</b>



METRO TRANSIT DIVISION  
 TROLLEY STANDARDS  
  
 8° TO 30° CURVE SPAN  
 WITH CURVE SEGMENTS  
 TWO-WAY TRAFFIC

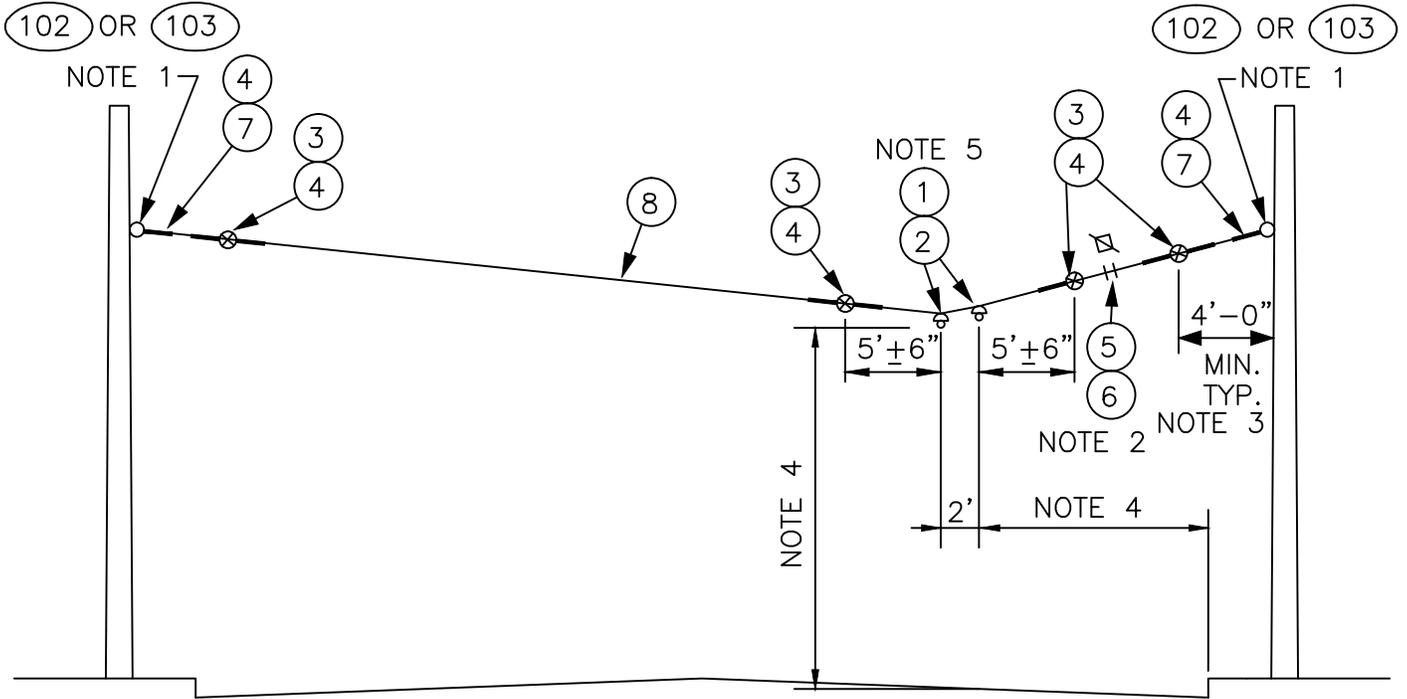
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STD DET NO: <b>SA-310.1</b>
SHT NO: <b>1 2</b>

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	6	GUY STRAIN INSUL	PORCELAIN	504
04	15	GUY GRIP DEADEND	PRODUCTS CO PREFORMED	CDE-3106
05	10	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS	FRICTION TAPE, 3/4" (6 WRAPS)		
07	REQD	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
09	VARIES	BULL RING	WABCO	18567-2000
11	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
12	3	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
18	VARIES	GUY STRAND, COVERED	COPPERWELD	8M
25	VARIES	CURVE SEGMENT 8-12 DEG TYPE C	WABCO	22301-3014
	VARIES	CURVE SEGMENT 13-27 DEG TYPE C	WABCO	22302-3005
	SEE	CURVE SEGMENT 28-47 DEG TYPE C	WABCO	22303-3005
102	PLAN VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

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					STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS  8° TO 30° CURVE SPAN WITH CURVE SEGMENTS TWO-WAY TRAFFIC	DATE: JULY 2016
					APPROVED: D CRIPPEN			STD DET NO: SA-310.2
					DSGN/DWN: D GREER/TMB/LSA			SHT NO: 2 2
No.	REVISION	BY	APPD	DATE				



**NOTES**

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. SEE SA-370 FOR LIMITED SPACE VARIANCES.
4. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.
5. MAXIMUM ANGLE IS 0.5°. SEE SA-317 PLAN VIEW.

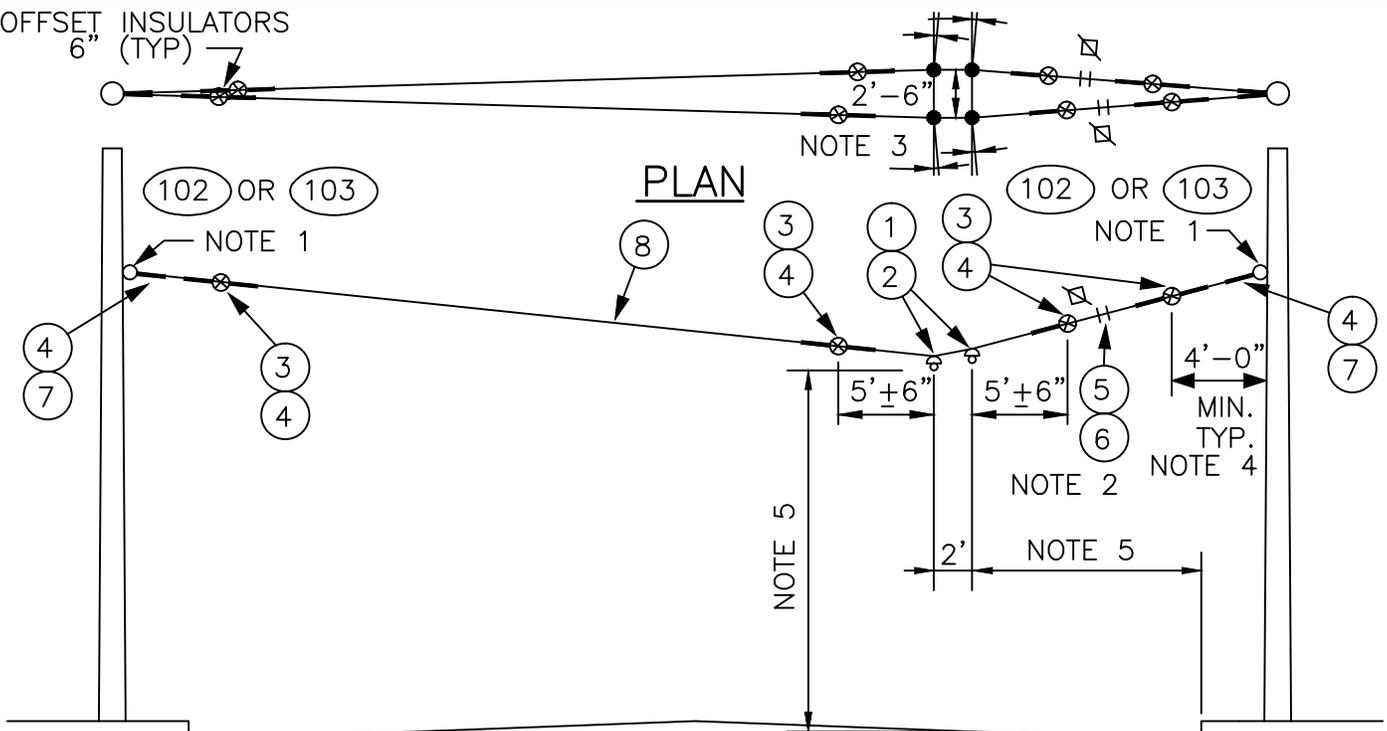
**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
02	2	AGC TANGENT SPAN HANGER	WABCO	19360-2000
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	9	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	2	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIABLES	GUY STRAND	COPPERWELD	8M
102	VARIABLES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIABLES	WOOD POLE EYEBOLT	METRO STD	SA-103

				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: <b>JULY 2016</b>
				APPROVED: <b>D CRIPPEN</b>		TANGENT SPAN ONE-WAY TRAFFIC	STD DET NO: <b>SA-311</b>
				DSGN/DWN: <b>D GREER/TMB/LSA</b>			SHT NO: <b>1 1</b>
No.	REVISION	BY	APPD	DATE			

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OFFSET INSULATORS  
6" (TYP)



**NOTES**

**ELEVATION**

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. MAXIMUM ANGLE 1°, 0.5° PER SPAN HANGER.
4. SEE SA-370 FOR LIMITED SPACE VARIANCES.
5. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	4	DETROIT CLAMP ASSY	WABCO	19293-3007
02	4	AGC TANGENT SPAN HANGER	WABCO	19360-2000
03	8	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	18	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIABLES	GUY STRAND	COPPERWELD	8M
102	VARIABLES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIABLES	WOOD POLE EYEBOLT	METRO STD	SA-103

STD DET DEVELOPMENT:  
A WOLAK

APPROVED:  
D CRIPPEN

DSGN/DWN:  
D GREER/TMB/LSA

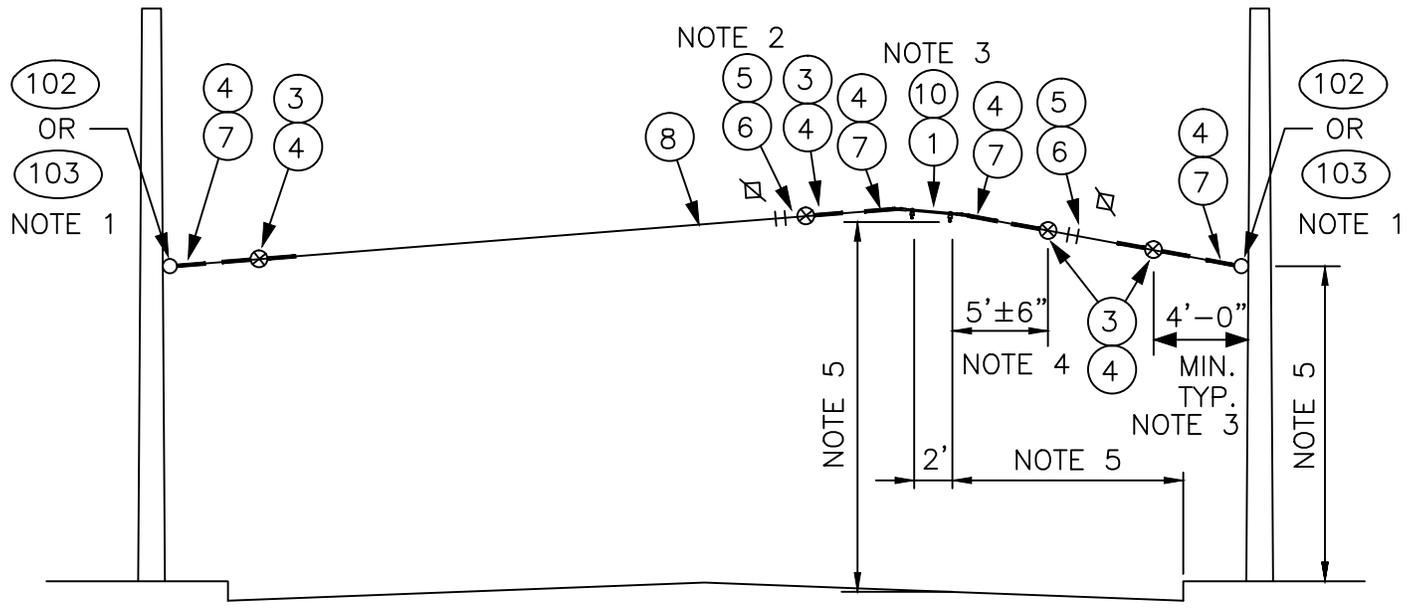


METRO TRANSIT DIVISION  
TROLLEY STANDARDS  
  
HOLDUP TANGENT SPAN  
ONE-WAY TRAFFIC

DATE:  
JULY 2016  
STD DET NO:  
SA-312  
SHT NO:  
1 1

No.	REVISION	BY	APPD	DATE

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**NOTES**

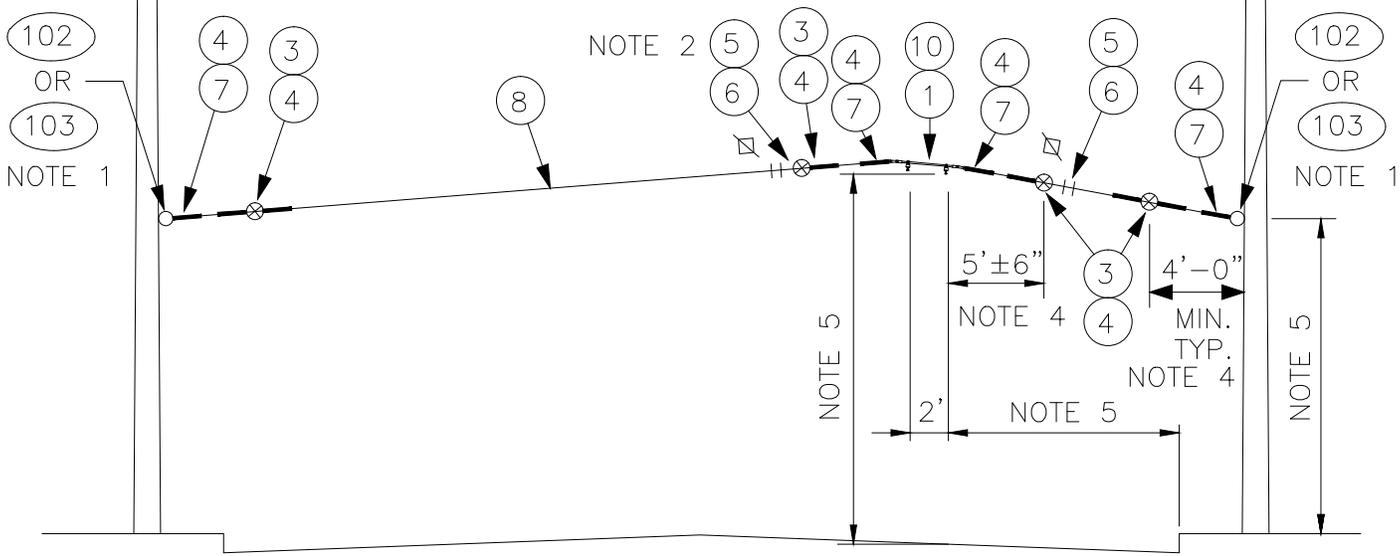
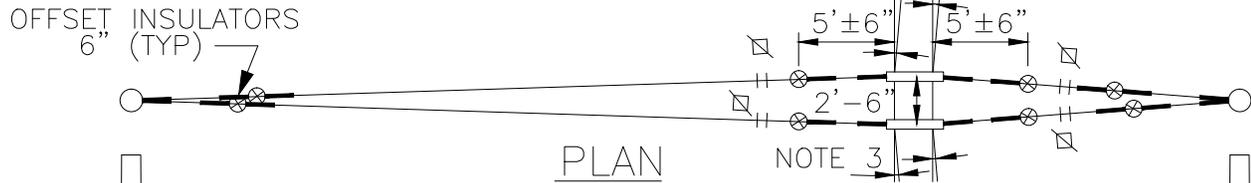
1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "X". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. MAXIMUM ANGLE 0.5°. SEE SA-317, PLAN VIEW.
4. SEE SA-370 FOR LIMITED SPACE VARIANCES.
5. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	10	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	1	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

STD DET DEVELOPMENT: <b>A WOLAK</b>					METRO TRANSIT DIVISION TROLLEY STANDARDS			DATE: <b>JULY 2016</b>
APPROVED: <b>D CRIPPEN</b>					<b>INVERTED TANGENT SPAN          ONE-WAY TRAFFIC</b>			STD DET NO.: <b>SA-313</b>
DSGN/DWN: <b>D GREER/TMB/LSA</b>								SHT NO.: <b>1 1</b>
No.	REVISION	BY	APPD	DATE				

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NOTES

ELEVATION

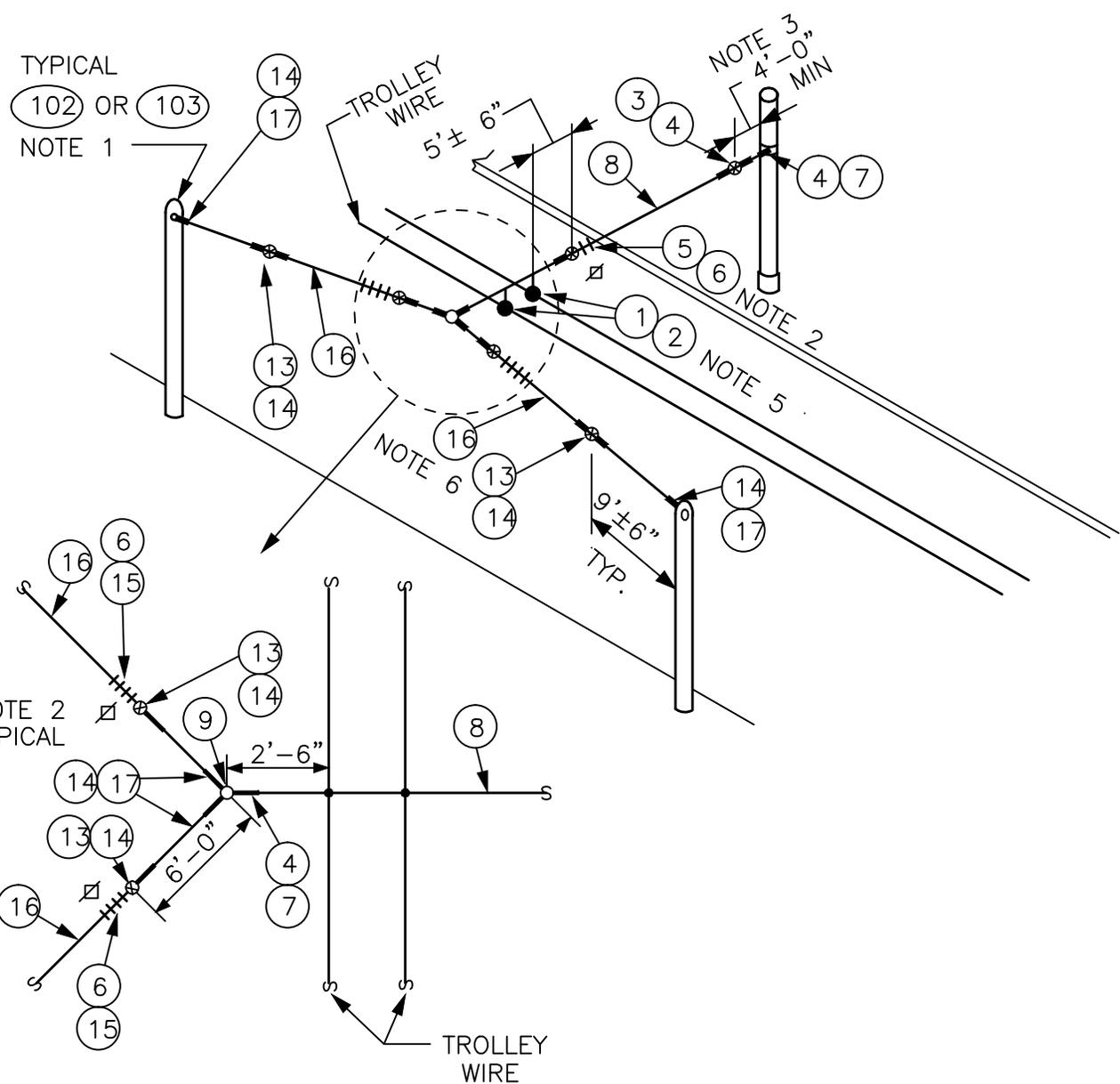
1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. MAXIMUM ANGLE 1 DEGREE, 0.5° PER DOUBLE CURVE HANGER.
4. SEE SA-370 FOR LIMITED SPACE VARIANCES.
5. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	4	DETROIT CLAMP ASSY	WABCO	19293-3007
03	8	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	20	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	8	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	8	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIABLES	GUY STRAND	COPPERWELD	8M
10	2	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
102	VARIABLES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIABLES	WOOD POLE EYEBOLT	METRO STD	SA-103

No.	REVISION	BY	APPD	DATE	STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>HOLDDOWN TANGENT SPAN          ONE-WAY TRAFFIC</b>	DATE: <b>JULY 2016</b>
					APPROVED: <b>D CRIPPEN</b>			STD DET NO: <b>SA-314</b>
					DSGN/DWN: <b>D GREER/TMB/LSA</b>			SHT NO: <b>1 1</b>

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No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
**A WOLAK**

APPROVED:  
**D CRIPPEN**

DSGN/DWN:  
**D GREER/TMB/LSA**



METRO TRANSIT DIVISION  
 TROLLEY STANDARDS

**BRIDLE TANGENT SPAN  
 ONE-WAY TRAFFIC**

DATE: <b>JULY 2016</b>
STD DET NO: <b>SA-315.1</b>
SHT NO: <b>1 2</b>

**MATERIAL LIST**

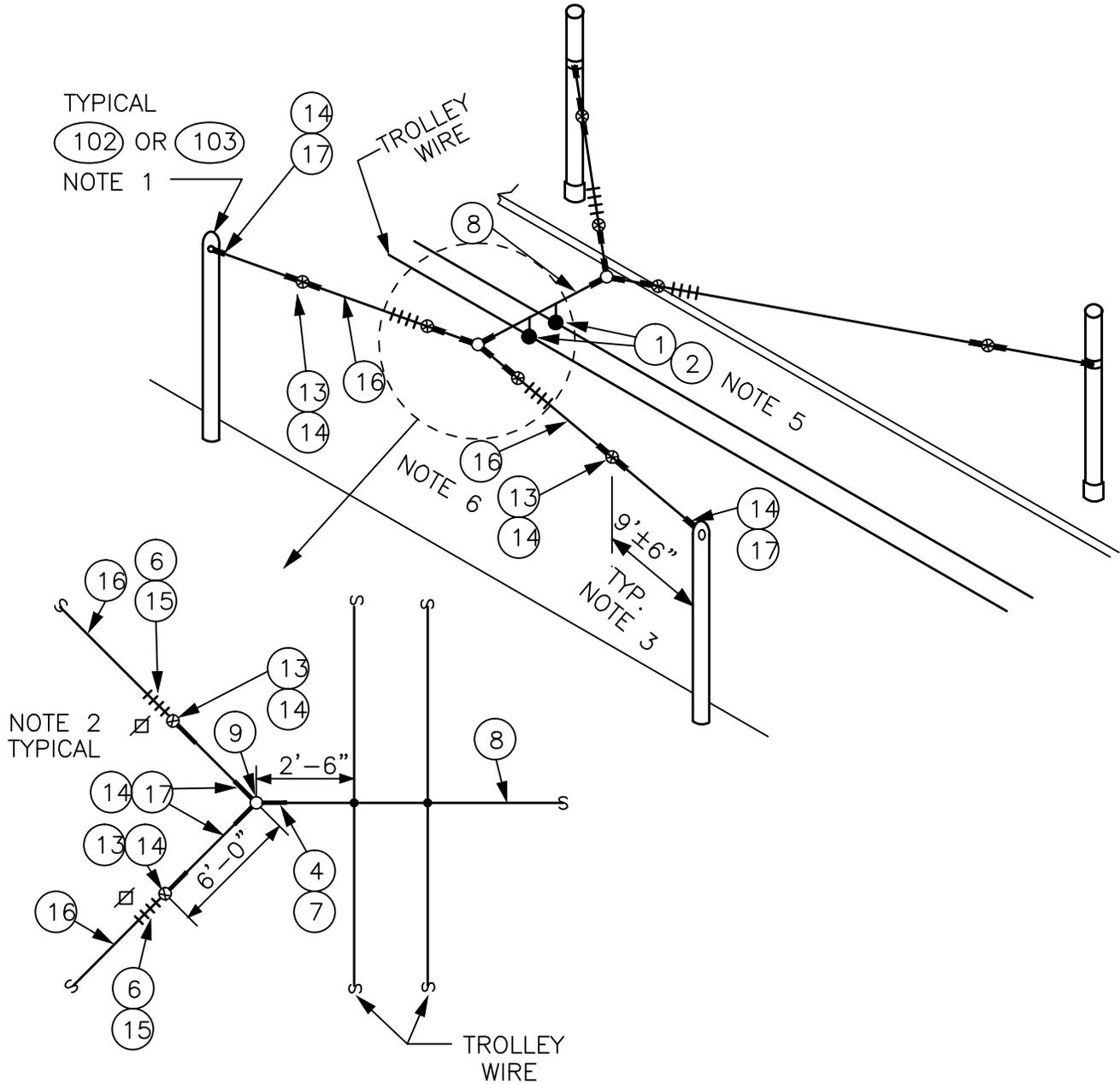
ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
02	2	AGC TANGENT SPAN HANGER	WABCO	19360-2000
03	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	VARIES	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	VARIES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
09	1	BULL RING	WABCO	18567-2000
13	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	506
14	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3115
15	VARIES	WIRE ROPE CLIP, 3/8"	CROSBY	G450
16	VARIES	GUY STRAND	COPPERWELD	16M
17	VARIES	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

**NOTES**

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "☒". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. SEE SA-370 FOR LIMITED SPACE VARIANCES.
4. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.
5. MAXIMUM ANGLE IS 0.5°. SEE SA-307, PLAN VIEW.
6. IF LOAD SHOWN ON OVERHEAD DRAWINGS IS LESS THAN 2500 LBS, THEN ITEM 8 MAY BE USED INSTEAD OF ITEM 16. THE ASSOCIATED ITEMS SHALL ALSO BE CHANGED I.E. 3 FOR 13, 4 FOR 14, 5 FOR 15 AND 7 FOR 17.

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					STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>BRIDLE TANGENT SPAN                  ONE-WAY TRAFFIC</b>	DATE: JULY 2016
					APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-315.2
					DSGN/DWN: <b>D GREER/TMB/LSA</b>			SHT NO: 2 2
No.	REVISION	BY	APPD	DATE				



No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
 A WOLAK

APPROVED:  
 D CRIPPEN

DSGN/DWN:  
 D GREER/TMB/LSA



METRO TRANSIT DIVISION  
 TROLLEY STANDARDS

DOUBLE BRIDLE  
 TANGENT SPAN  
 ONE-WAY TRAFFIC

DATE: JULY 2016
STD DET NO: SA-316.1
SHT NO: 1 2

**MATERIAL LIST**

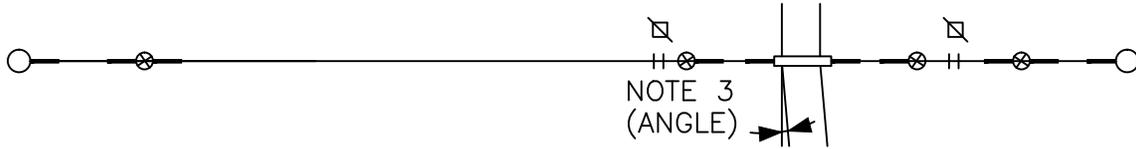
ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
02	2	AGC TANGENT SPAN HANGER	WABCO	19360-2000
03	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	VARIES	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	VARIES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
09	2	BULL RING	WABCO	18567-2000
13	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	506
14	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3115
15	VARIES	WIRE ROPE CLIP, 3/8"	CROSBY	G450
16	VARIES	GUY STRAND	COPPERWELD	16M
17	VARIES	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

**NOTES**

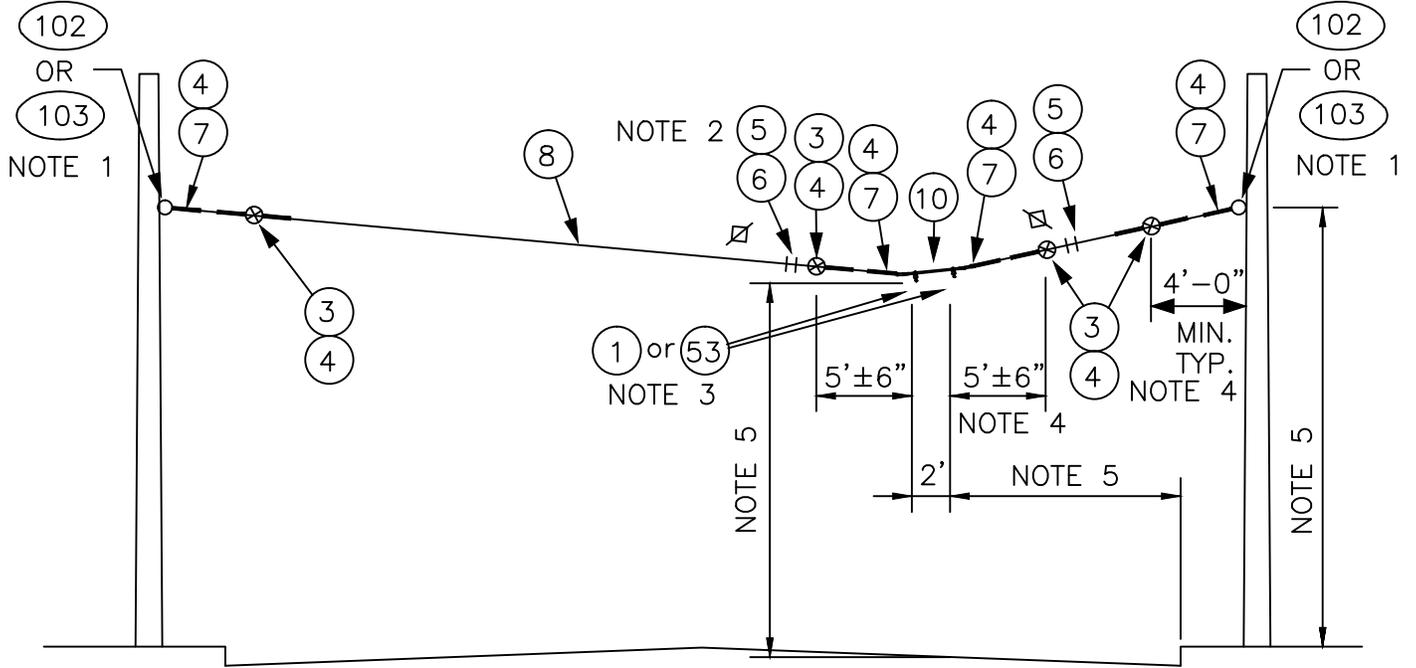
1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "N". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. SEE SA-370 FOR LIMITED SPACE VARIANCES.
4. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.
5. MAXIMUM ANGLE IS 0.5°. SEE SA-307, PLAN VIEW.
6. IF LOAD SHOWN ON OVERHEAD DRAWINGS IS LESS THAN 2500 LBS, THEN ITEM 8 MAY BE USED INSTEAD OF ITEM 16. THE ASSOCIATED ITEMS SHALL ALSO BE CHANGED I.E. 3 FOR 13, 4 FOR 14, 5 FOR 15 AND 7 FOR 17.

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  DOUBLE BRIDLE TANGENT SPAN ONE-WAY TRAFFIC	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-316.2
				DSGN/DWN: <b>D GREER/TMB/LSA</b>			SHT NO: 2 2
No.	REVISION	BY	APPD	DATE			



PLAN



ELEVATION

NOTES

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. ANGLE VARIES FROM 1° TO 5°. USE ITEM 1 FOR 1° TO 2.5° ANGLE. USE ITEM 53 FOR 3° TO 5° ANGLE.
4. SEE SA-370 FOR LIMITED SPACE VARIANCES.
5. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  1° TO 5° CURVE SPAN WITH 2 FOOT CURVE RAILS ONE-WAY TRAFFIC	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-317.1
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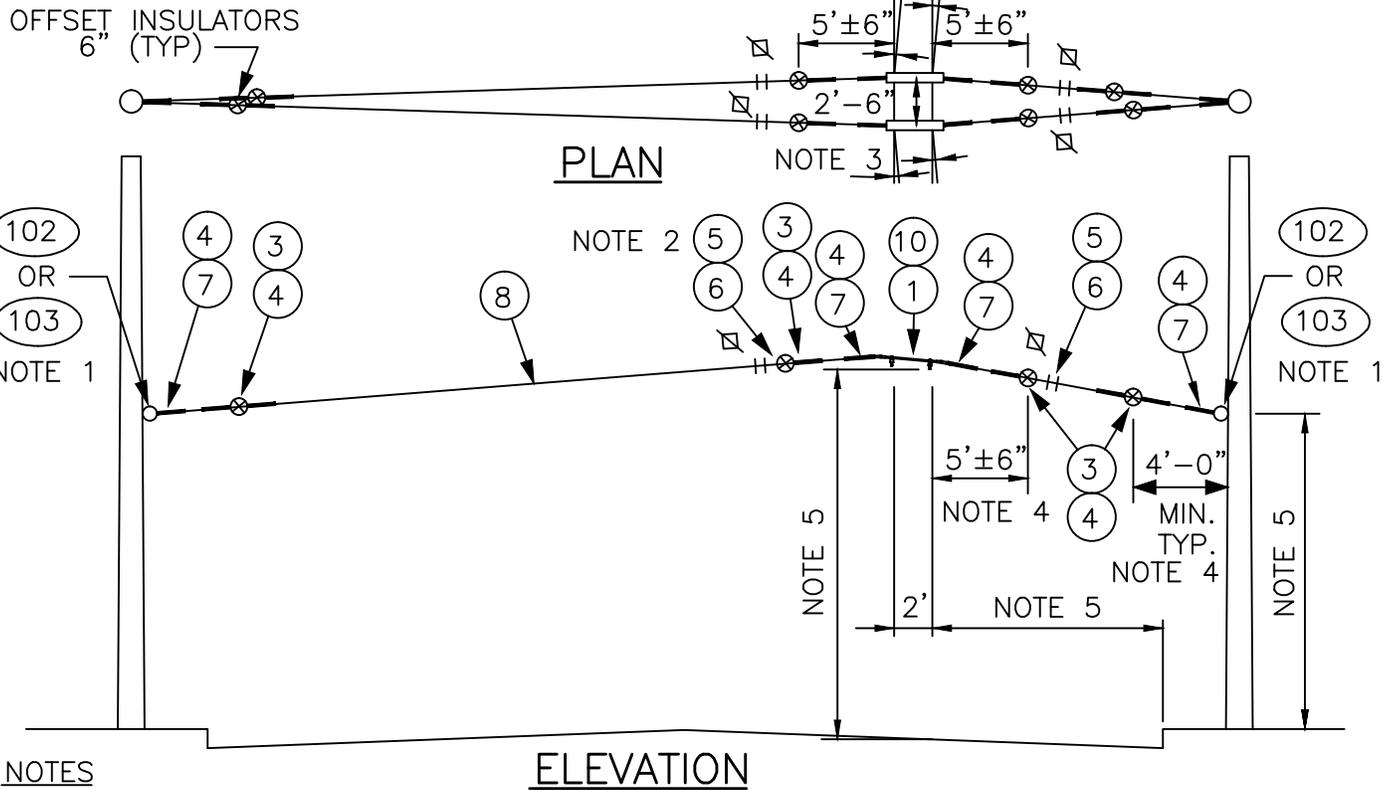
MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	VARIABLES	DETROIT CLAMP ASSY	WABCO	19293-3007
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	10	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIABLES	GUY STRAND	COPPERWELD	8M
10	1	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
53	VARIABLES	CURVE RAIL (1° TO 5° 2 FT LG)	K & M	851 B412/0
102	VARIABLES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIABLES	WOOD POLE EYEBOLT	METRO STD	SA-103

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					STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  1° TO 5° CURVE SPAN WITH 2 FOOT CURVE RAILS ONE-WAY TRAFFIC	DATE: JULY 2016
					APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-317.2
					DSGN/DWN: <b>D GREER/TMB/LSA</b>			SHT NO: 2 2
No.	REVISION	BY	APPD	DATE				

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**NOTES**

**ELEVATION**

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. MAXIMUM ANGLE 1 DEGREE, 0.5° PER DOUBLE CURVE HANGER.
4. SEE SA-370 FOR LIMITED SPACE VARIANCES.
5. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	4	DETROIT CLAMP ASSY	WABCO	19293-3007
03	8	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	20	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	8	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	8	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	2	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS  5.5° TO 7.5° CURVE SPAN WITH 4 FOOT CURVE RAILS ONE-WAY TRAFFIC	DATE: JULY 2016
APPROVED: <b>D CRIPPEN</b>				STD DET NO: SA-318
DSGN/DWN: <b>D GREER/TMB/LSA</b>				SHT NO: 1 1
No.	REVISION	BY	APPD	DATE

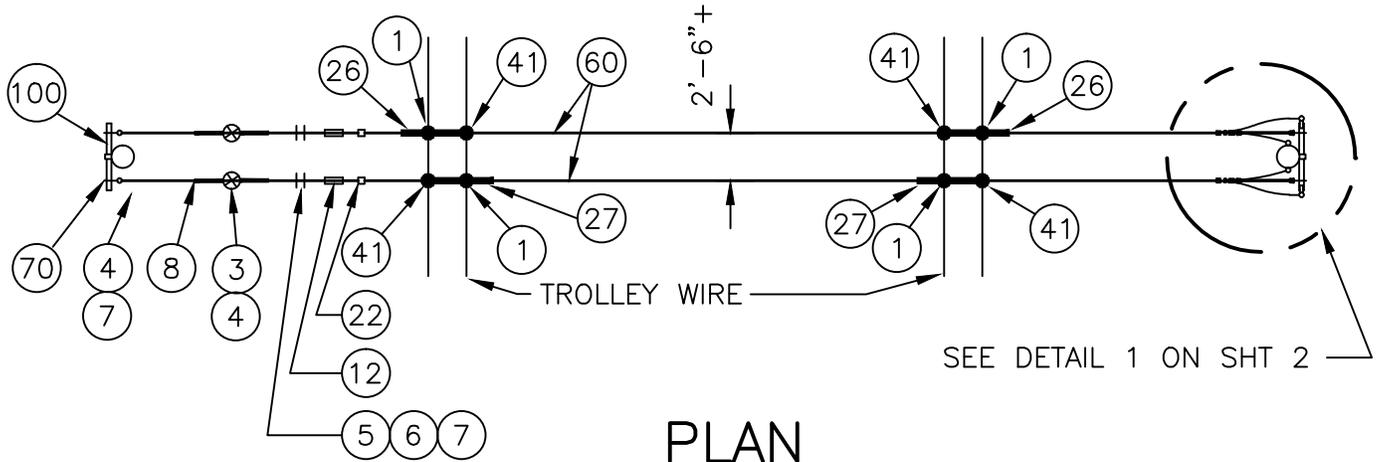


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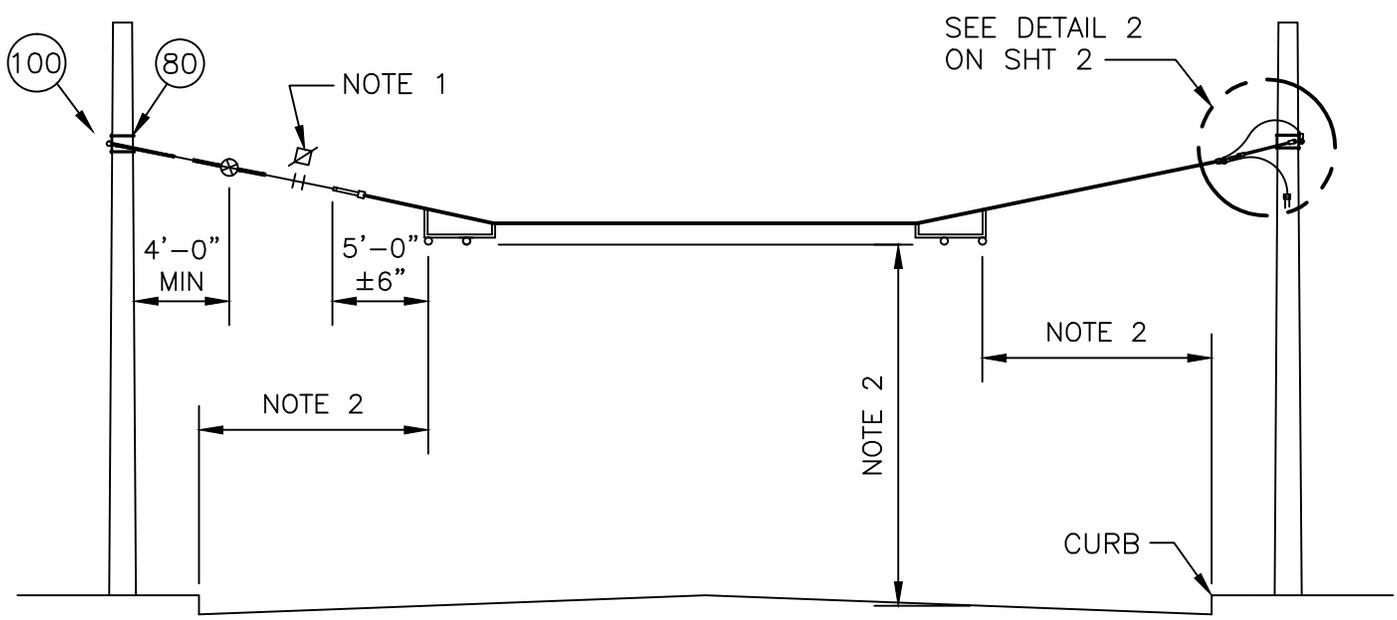
ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	10	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICITION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
12	1	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
25	VARIES (SEE PLAN)	CURVE SEGMENT 8-12 DEG TYPE C CURVE SEGMENT 13-27 DEG TYPE C CURVE SEGMENT 28-47 DEG TYPE C	WABCO WABCO WABCO	22301-3014 22302-3005 22303-3005
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

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				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS  8' TO 30' CURVE SPAN WITH CURVE SEGMENT ONE-WAY TRAFFIC		DATE: JULY 2016	
				APPROVED: <b>D CRIPPEN</b>					STD DET NO: SA-320.2	
				DSGN/DWN: <b>D GREER/TMB/LSA</b>					SHT NO: 2 2	
No.	REVISION	BY	APPD	DATE						



**PLAN**



**ELEVATION**

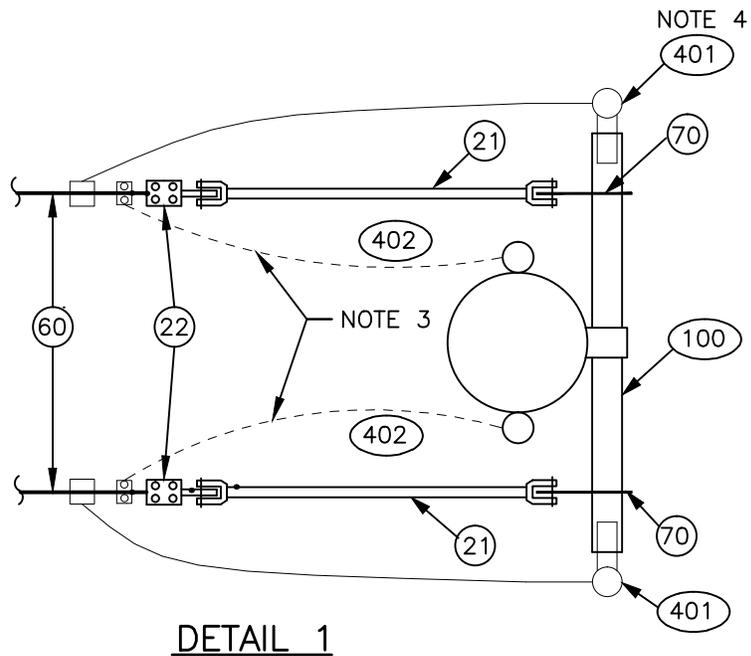
**NOTES:**

1. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "□". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
2. SEE SA-164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
3. CONNECT FEEDER RISER TO FEED SPAN. SEE SA-402.
4. INSTALL LIGHTNING ARRESTERS PER SA-401.

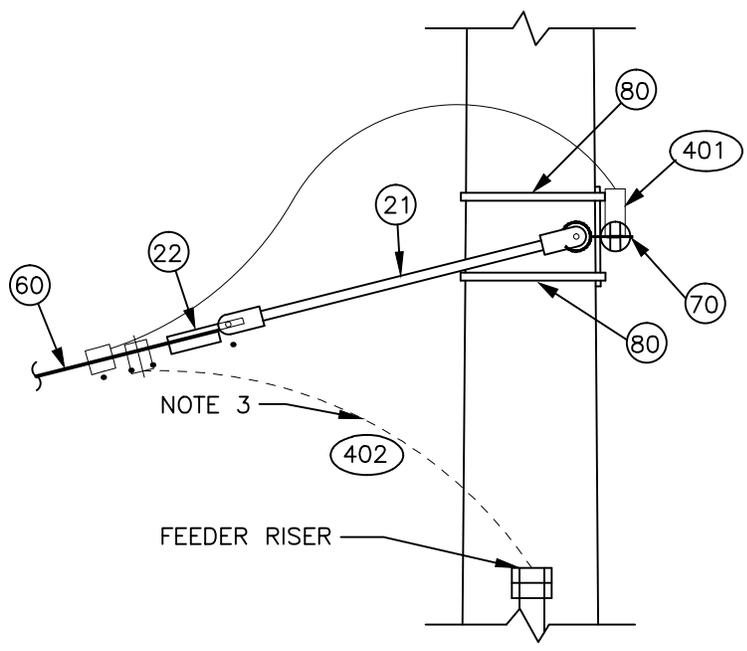
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				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: <b>JULY 2016</b>	
				APPROVED: <b>D CRIPPEN</b>			<b>DOUBLE FEEDER SPAN          TWO-WAY TRAFFIC</b>		STD DET NO: <b>SA-321.1</b>	
				DSGN/DWN: <b>D GREER/BFB/LSA</b>					SHT NO: <b>1 3</b>	
No.	REVISION	BY	APPD	DATE						

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DETAIL 1



DETAIL 2

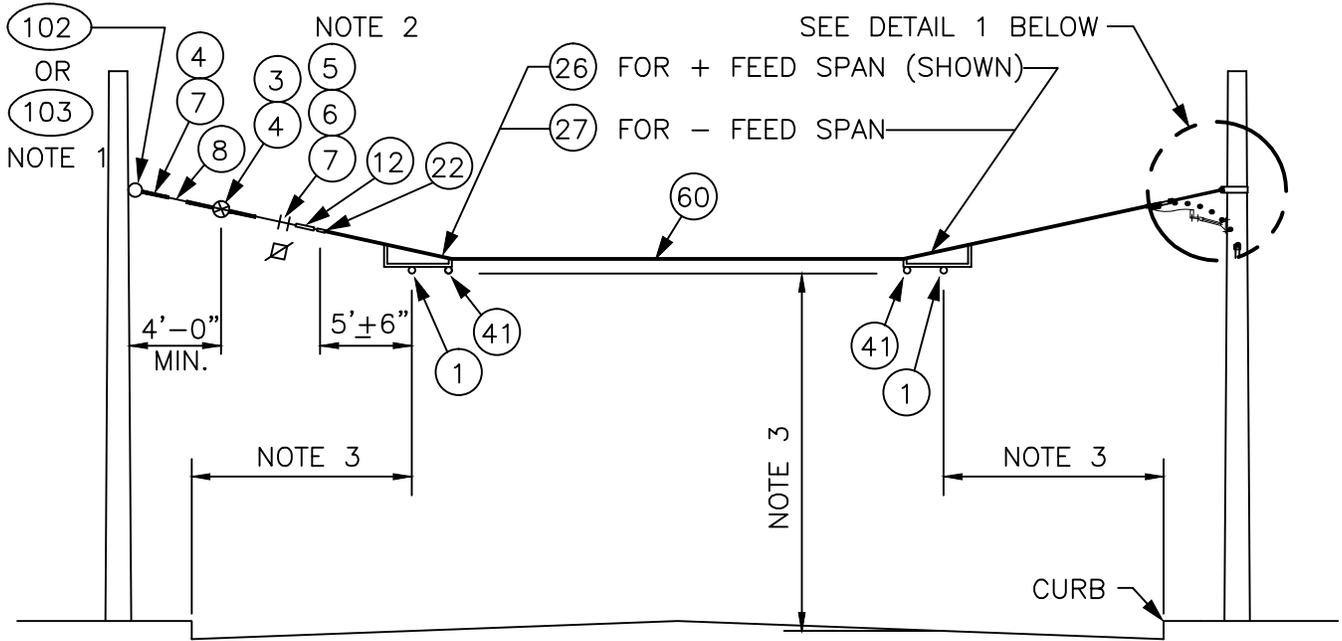
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				APPROVED: <b>D CRIPPEN</b>			STD DET NO: <b>SA-321.2</b>
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No.	REVISION	BY	APPD	DATE			

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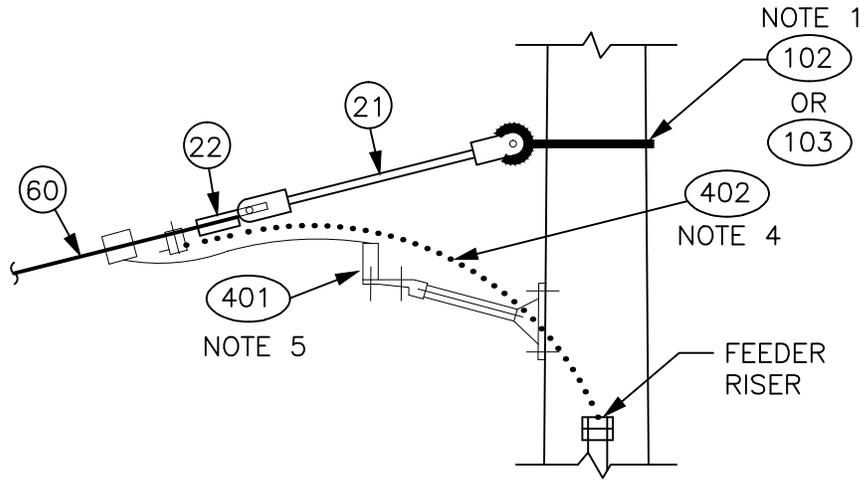
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01	4	DETROIT CLAMP ASSEMBLY	WABCO	19293-3007
03	2	GUY STRAIN INSULATOR	PORCELAIN PRODUCTS CO	504
04	6	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQ'D	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" x HD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
12	2	7/8 TRANSLITE STRAIN INSULATOR CL-CL	WABCO	55339-6120
21	2	7/8 TRANSLITE STRAIN INSULATOR CL-CL	WABCO	54975-6360
22	4	CLAMP STRAIN EYE	WABCO	10571-2000
26	2	TYPE PH-4 POSITIVE FEED SPAN HANGER	WABCO	54937-3002
27	2	TYPE PH-5 NEGATIVE FEED SPAN HANGER	WABCO	54936-3002
41	4	HSP FEEDER CLAMP ASSEMBLY, BRONZE	WABCO	19879-2000
60	AS REQ'D	FEED SPAN CABLE 500 KCM CU, UNSHIELDED, 5 KV EPR W/ PVC JACKET		
70	4	EYEBOLT, 5/8"x6" W/ 2 NUTS & LOCKWASHER		
80	AS REQ'D	3/4" x 0.030" SS BANDING TYPE 201	BAND-IT	C206
100	2	EPOXIROD DEADEND ARM	CHANCE	C653-1023
401	AS REQ'D	LIGHTNING ARRESTER	METRO STANDARD	SA-401
402	AS REQ'D	FEEDER RISER	METRO STANDARD	SA-402

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>DOUBLE FEEDER SPAN                  TWO-WAY TRAFFIC</b>	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-321.3
				DSGN/DWN: <b>D GREER/BFB/LSA</b>			SHT NO: 3 3
No.	REVISION	BY	APPD	DATE			



**ELEVATION**



**DETAIL 1**

**NOTES:**

1. A POLE COLLAR, OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⚡". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. SEE SA-164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
4. CONNECT FEEDER RISER TO FEED SPAN. SEE SA-402.
5. INSTALL LIGHTNING ARRESTERS PER SA-401.

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: <b>JULY 2016</b>
				APPROVED: <b>D CRIPPEN</b>		SINGLE FEEDER SPAN TWO-WAY TRAFFIC	STD DET NO: <b>SA-322.1</b>
				DSGN/DWN: <b>D GREER/BFB/LSA</b>			SHT NO: <b>1 2</b>
No.	REVISION	BY	APPD	DATE			

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
03	1	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO	504
04	3	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	2	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
12	1	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
21	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6360
22	2	CLAMP STRAIN EYE	WABCO	10571-2000
26	2/0	TYPE PH-4 POS FEED SPAN HANGER	WABCO	54937-3002
27	0/2	TYPE PH-5 NEG FEED SPAN HANGER	WABCO	54936-3002
41	2	H.S.P. FEEDER CLAMP ASSY, BRONZE	WABCO	19879-2000
60	AS REQD	FEED SPAN CABLE 500 KCM CU, UNSHIELDED 5 KV EPR W/ PVC JACKET		
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103
401	AS REQD	LIGHTNING ARRESTER	METRO STD	SA-401
402	AS REQD	FEEDER RISER	METRO STD	SA-402

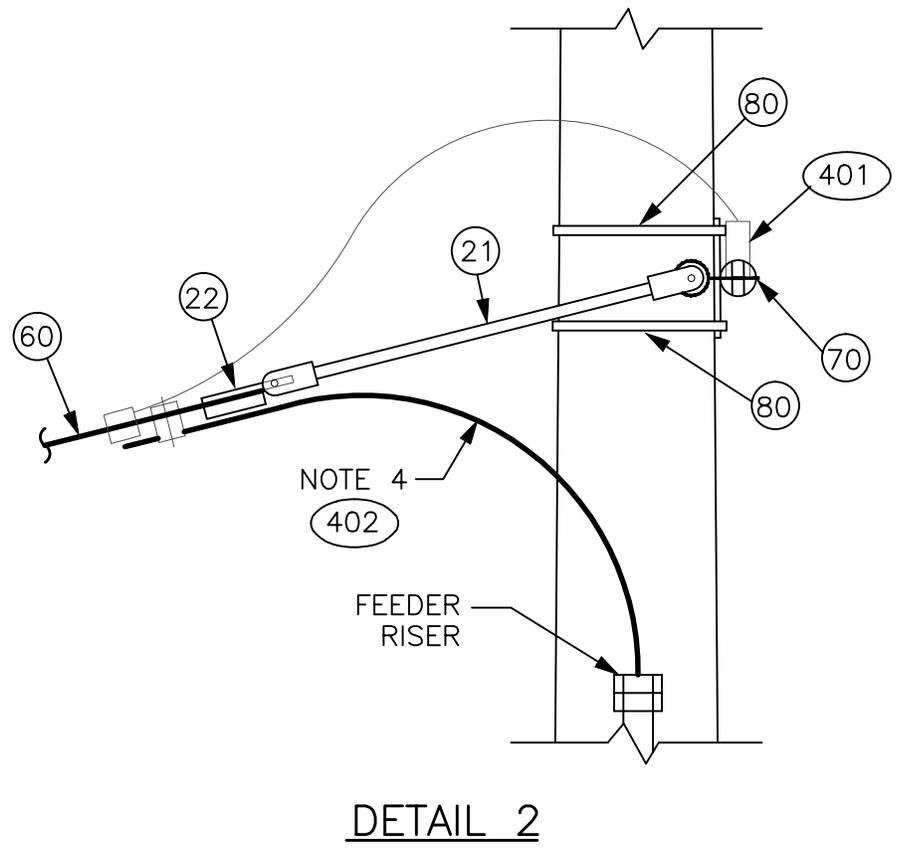
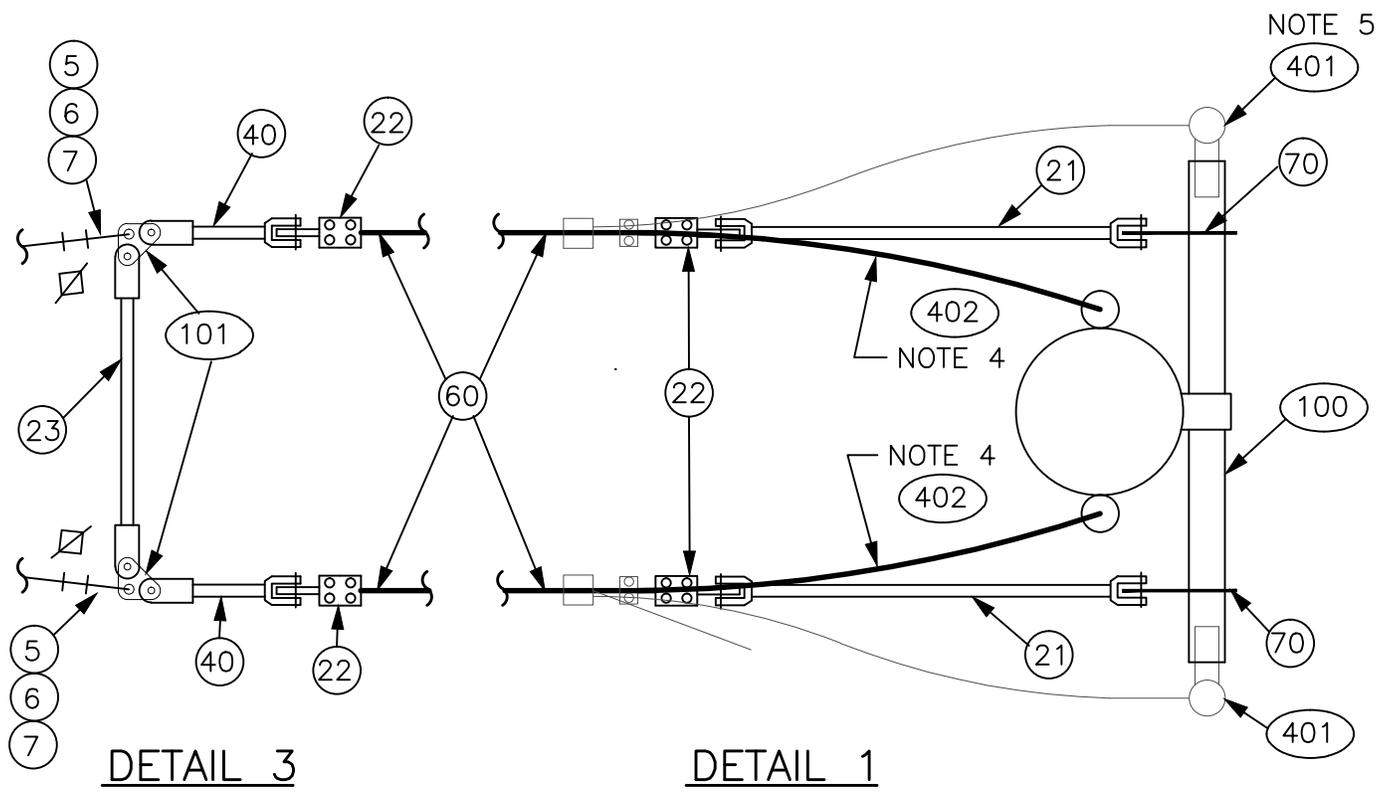
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				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  SINGLE FEEDER SPAN TWO-WAY TRAFFIC	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-322.2
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No.	REVISION	BY	APPD	DATE			





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No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
**A WOLAK**

APPROVED:  
**D CRIPPEN**

DSGN/DWN:  
**D GREER/MM/LSA**



METRO TRANSIT DIVISION  
 TROLLEY STANDARDS

**DOUBLE FEEDER SPAN  
 ONE-WAY TRAFFIC**

DATE:  
**JULY 2016**

STD DET NO:  
**SA-331.2**

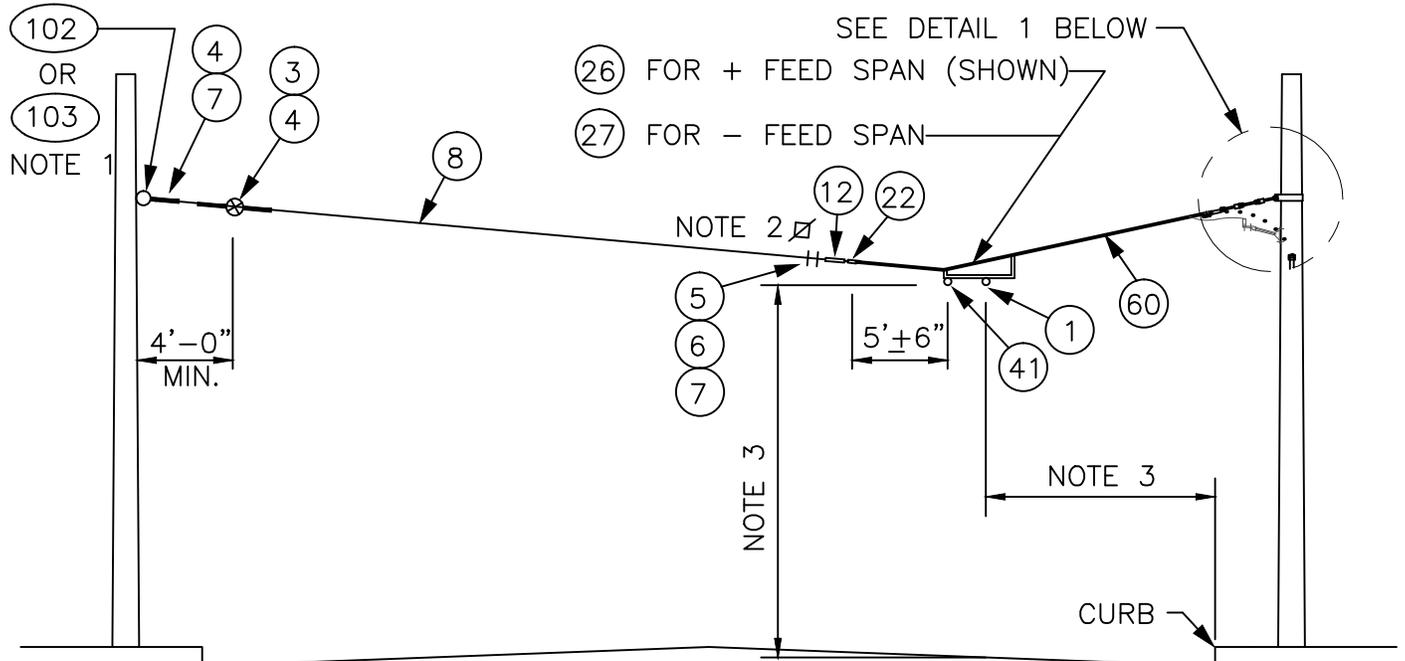
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**2 3**

**MATERIAL LIST**

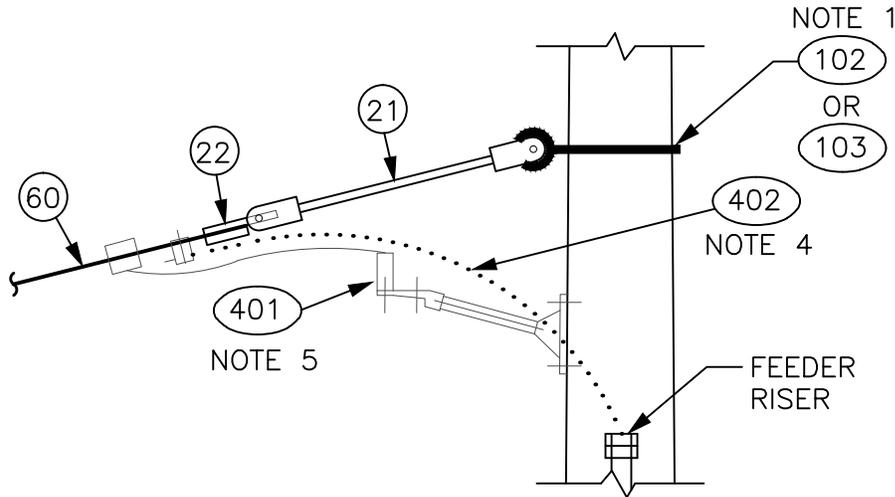
ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
03	3	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	10	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	6	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
09	1	BULL RING	WABCO	18567-2000
21	2	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6360
22	4	CLAMP STRAIN EYE	WABCO	10571-2000
23	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6260
26	1	TYPE PH-4 POS FEED SPAN HANGER	WABCO	54937-3002
27	1	TYPE PH-5 NEG FEED SPAN HANGER	WABCO	54936-3002
40	2	7/8 TRANSLITE STRAIN INSUL CL-90	WABCO	54995-6120
41	2	H.S.P. FEEDER CLAMP ASSY, BRONZE	WABCO	19879-2000
60	AS REQD	FEED SPAN CABLE 500 KCM CU, UNSHIELDED, 5KV EPR W/ PVC JACKET		
70	2	EYEBOLT, 5/8" x 6", WITH 2 NUTS & LOCKWASHER		
80	AS REQD	3/4" x 0.03" SS BANDING TYPE 201	BAND-IT	C206
100	VARIES	EPOXIROD DEADEND ARM	CHANCE	C653-1023
101	2	STRAIN PLATE	METRO STD	SA-101
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103
401	AS REQD	LIGHTNING ARRESTER	METRO STD	SA-401
402	AS REQD	FEEDER RISER	METRO STD	SA-402

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>DOUBLE FEEDER SPAN                  ONE-WAY TRAFFIC</b>	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-331.2
				DSGN/DWN: <b>D GREER/MM/LSA</b>			SHT NO: 2 3
No.	REVISION	BY	APPD	DATE			



**ELEVATION**



**DETAIL 1**

**NOTES:**

1. A POLE COLLAR, OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "∕". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. SEE SA-164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
4. CONNECT FEEDER RISER TO FEED SPAN. SEE SA-402.
5. INSTALL LIGHTNING ARRESTERS PER SA-401.

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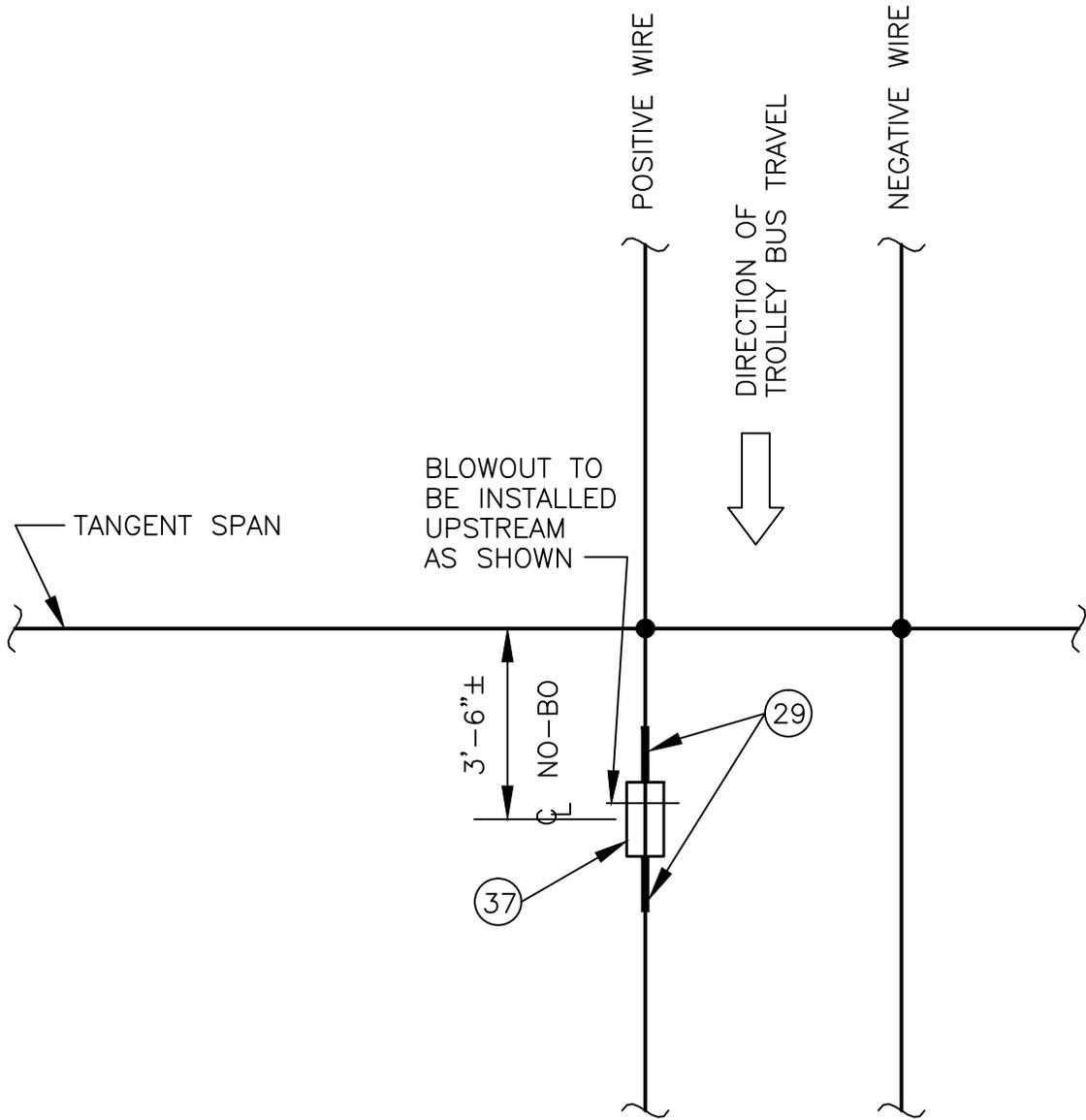
				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>SINGLE FEEDER SPAN          ONE-WAY TRAFFIC</b>	DATE: <b>JULY 2016</b>
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: <b>SA-332.1</b>
				DSGN/DWN: <b>D GREER/MM/LSA</b>			SHT NO: <b>1 2</b>
No.	REVISION	BY	APPD	DATE			

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	1	DETROIT CLAMP ASSY	WABCO	19293-3007
03	1	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	3	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	2	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
12	1	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
21	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6360
22	2	CLAMP STRAIN EYE	WABCO	10571-2000
26	1/0	TYPE PH-4 POS FEED SPAN HANGER	WABCO	54937-3002
27	0/1	TYPE PH-5 NEG FEED SPAN HANGER	WABCO	54936-3002
41	1	H.S.P. FEEDER CLAMP ASSY, BRONZE	WABCO	19879-2000
60	AS REQD	FEED SPAN CABLE 500 KCM CU, UNSHIELDED, 5KV EPR W/ PVC JACKET		
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103
401	AS REQD	LIGHTNING ARRESTER	METRO STD	SA-401
402	AS REQD	FEEDER RISER	METRO STD	SA-402

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  SINGLE FEEDER SPAN ONE-WAY TRAFFIC	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-332.2
				DSGN/DWN: <b>D GREER/MM/LSA</b>			SHT NO: 2 2
No.	REVISION	BY	APPD	DATE			



PLAN

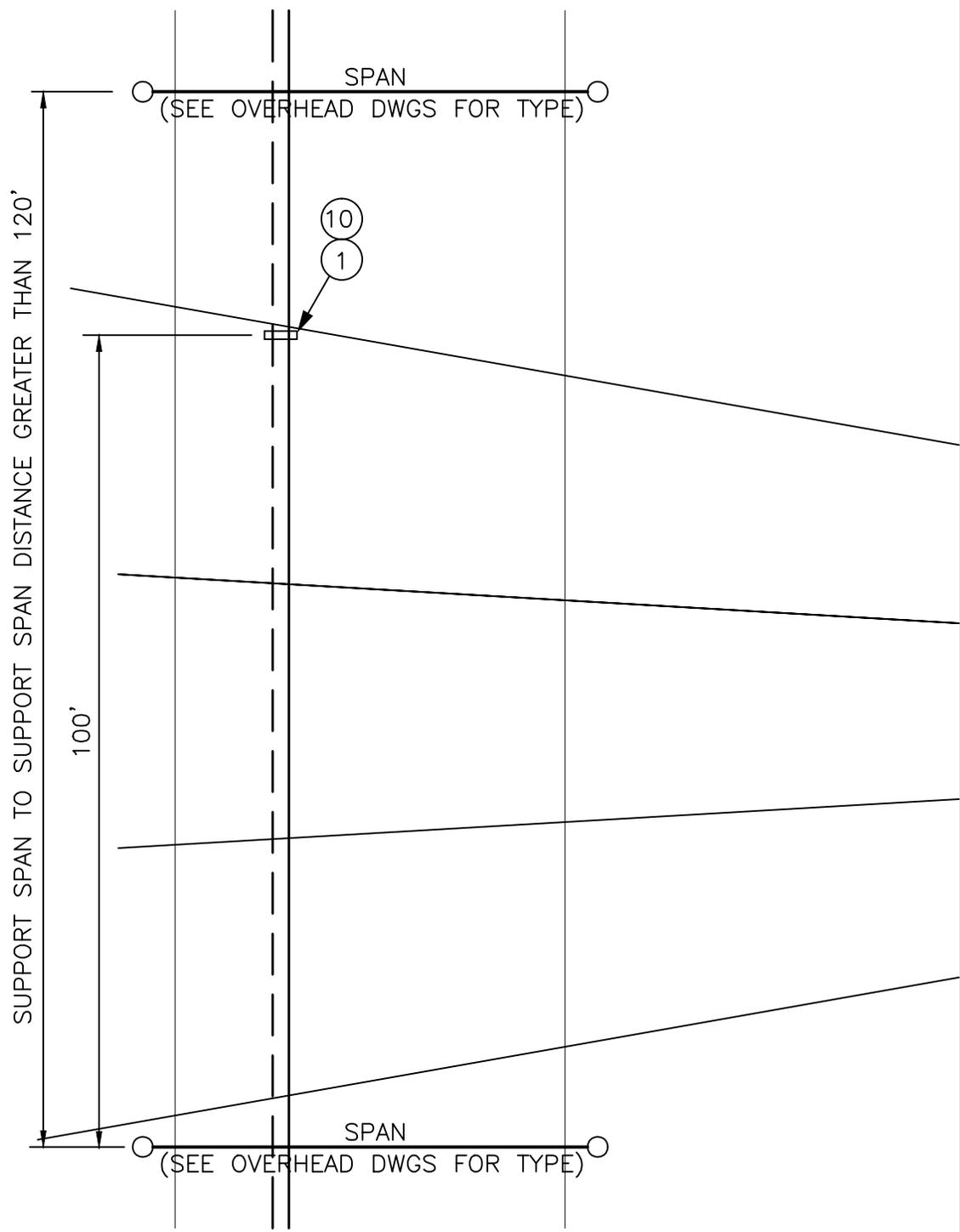
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ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
29	2	TYPE TCL CLEVIS TIP 4/0	WABCO	54950-3002
37	1	NO-BO SECTION INSUL	WABCO	55025-3001

				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  SECTIONALIZING SPAN ONE-WAY TRAFFIC	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-233
				DSGN/DWN: <b>D GREER/TMB/LSA</b>			SHT NO: 1 1
No.	REVISION	BY	APPD	DATE			

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MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
10	1	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001

No.	REVISION	BY	APPD	DATE	STD DET DEVELOPMENT: <b>A WOLAK</b>  APPROVED: <b>D CRIPPEN</b>  DSGN/DWN: <b>D GREER/DOW/LSA</b>	 METRO TRANSIT DIVISION TROLLEY STANDARDS  TROLLEY WIRE SPREADER BAR	DATE: JULY 2016
					STD DET NO: SA-334		
					SHT NO: 1 1		



MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
15	3	WIRE ROPE CLIP, 3/8"	CROSBY	G450
17	3	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
28	2	INSULATOR SPOOL	WABCO	16835-2000
30	2	TROLLEY SUPPORT-LARGE PIPE ARMS	WABCO	54940-4001
31	2	SPRING DETROIT CLAMP	WABCO	54959-3001
55	VARIABLES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	1	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIABLES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 3 1/2" Ø X 1/2"	MORRISON MOLDED FG	EXTREN SERIES 525
79	2	5/8"-11 UNC X 1 3/8" STUD		
80	VARIABLES	3/4" STAINLESS STEEL BANDING	BAND-IT	TYPE 201
90	1	HEAVY PIPE CLAMP, GALV, 3" IPS	GRINNELL	FIG. 216
102	2	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
109	1	MAST ARM ARM END CAP	METRO STD	SA-109

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				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>STEEL POLE                  BRACKET ASSEMBLY                  TANGENT CONSTRUCTION</b>		DATE: JULY 2016	
				APPROVED: <b>D CRIPPEN</b>					STD DET NO: SA-341.2	
				DSGN/DWN: <b>D GREER/MM/LSA</b>					SHT NO: 2 2	
No.	REVISION	BY	APPD	DATE						



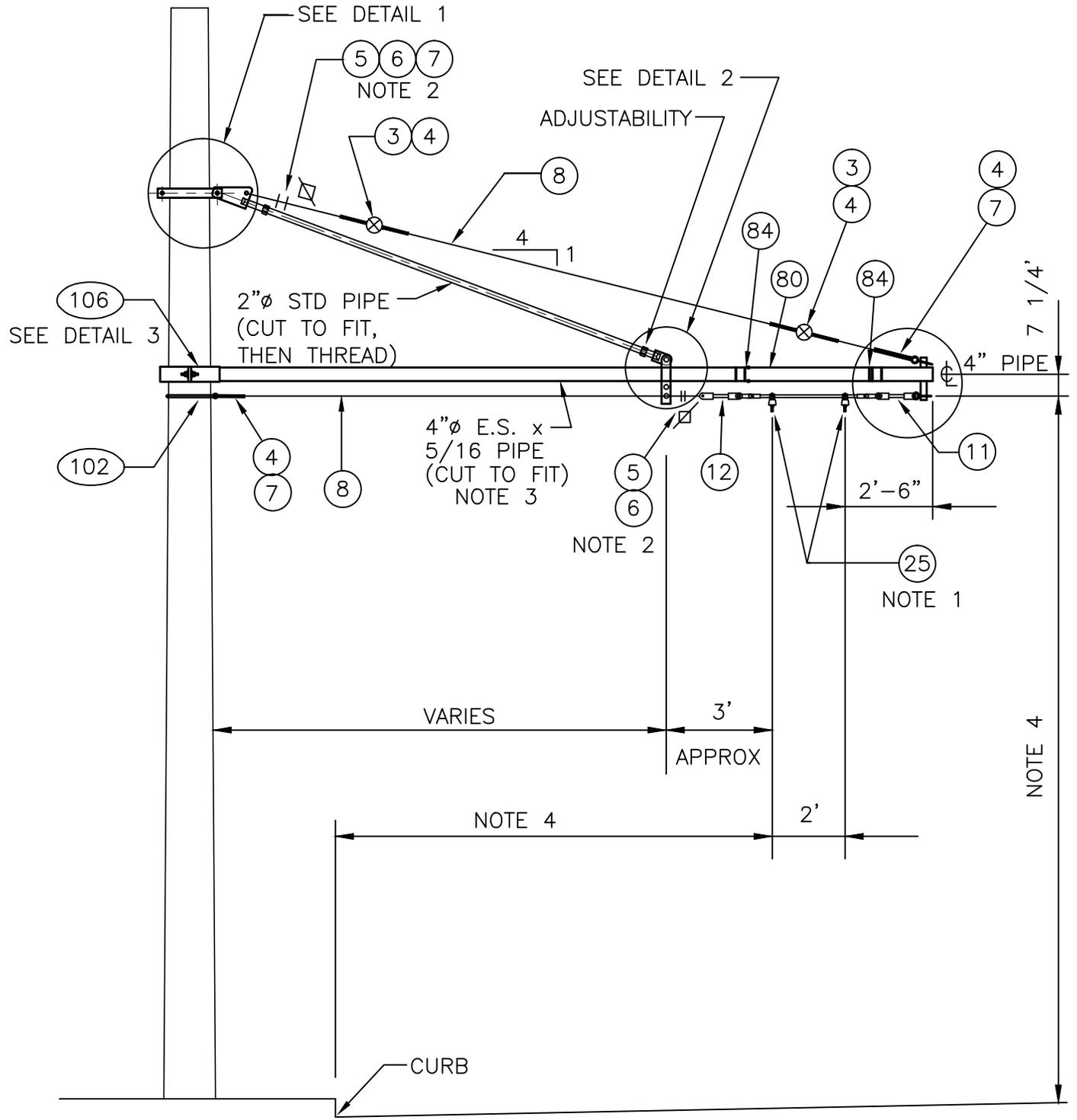
MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	2	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIABLES	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	VARIABLES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIABLES	GUY STRAND	COPPERWELD	8M
10	VARIABLES	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
11	VARIABLES	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
12	VARIABLES	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
15	3	WIRE ROPE CLIP, 3/8"	CROSBY	G450
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
25	VARIABLES SEE PLAN	CURVE SEGMENT 8-12 DEG TYPE C CURVE SEGMENT 13-27 DEG TYPE C CURVE SEGMENT 28-47 DEG TYPE C	WABCO WABCO WABCO	22301-3014 22302-3005 22303-3005
40	VARIABLES	7/8 TRANSLITE STRAIN INSUL CL-90	WABCO	54995-6120
53	VARIABLES	CURVE RAIL (1° TO 5° 2 FT LG)	K & M	851 B412/0
54	VARIABLES	CURVE RAIL (5.5° TO 7.5° 4 FT LG)	K & M	851 B412/1
55	VARIABLES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	1	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIABLES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 5" Ø X 1/4"	STRONGWELL	EXTREN SERIES 525
90	1	HEAVY PIPE CLAMP, GALV	GRINNELL	FIG. 216
102	3	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
110	1	MAST ARM UNDERSLING END CAP	METRO STD	SA-110

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  STEEL POLE BRACKET ASSEMBLY CURVE CONSTRUCTION	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-342.2
				DSGN/DWN: <b>D GREER/MM/LSA</b>			SHT NO: 2 2
No.	REVISION	BY	APPD	DATE			

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No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
**A WOLAK**

APPROVED:  
**D CRIPPEN**

DSGN/DWN:  
**D GREER/CMS/LSA**

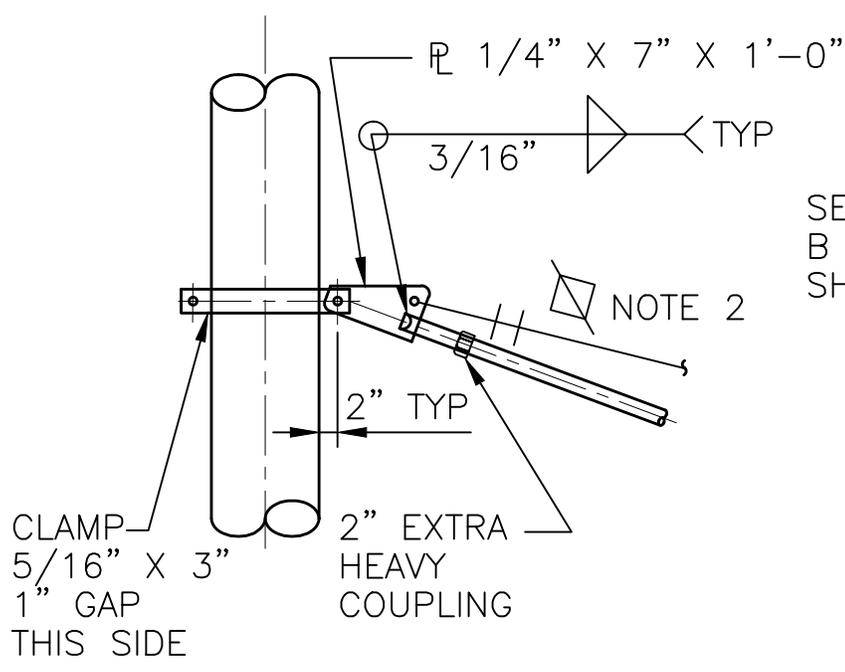


METRO TRANSIT DIVISION  
TROLLEY STANDARDS

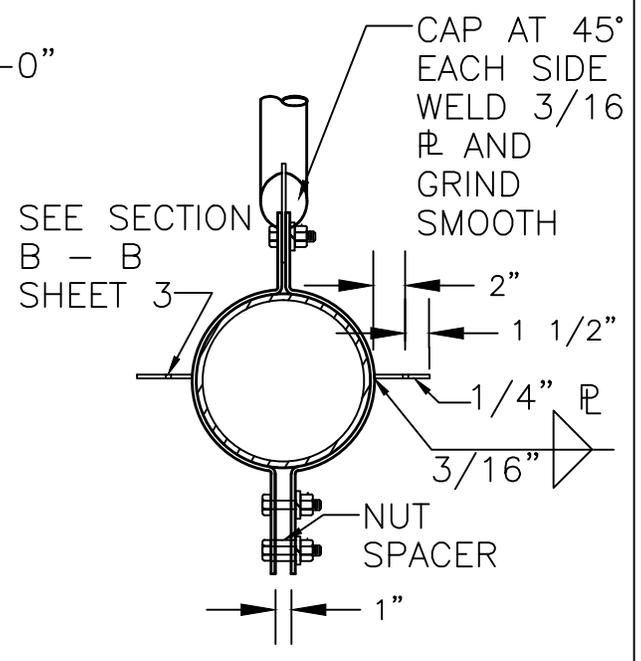
**STEEL POLE  
BRACKET ASSEMBLY  
COMPRESSION TYPE**

DATE: <b>JULY 2016</b>
STD DET NO: <b>SA-343.1</b>
SHT NO: <b>1 4</b>

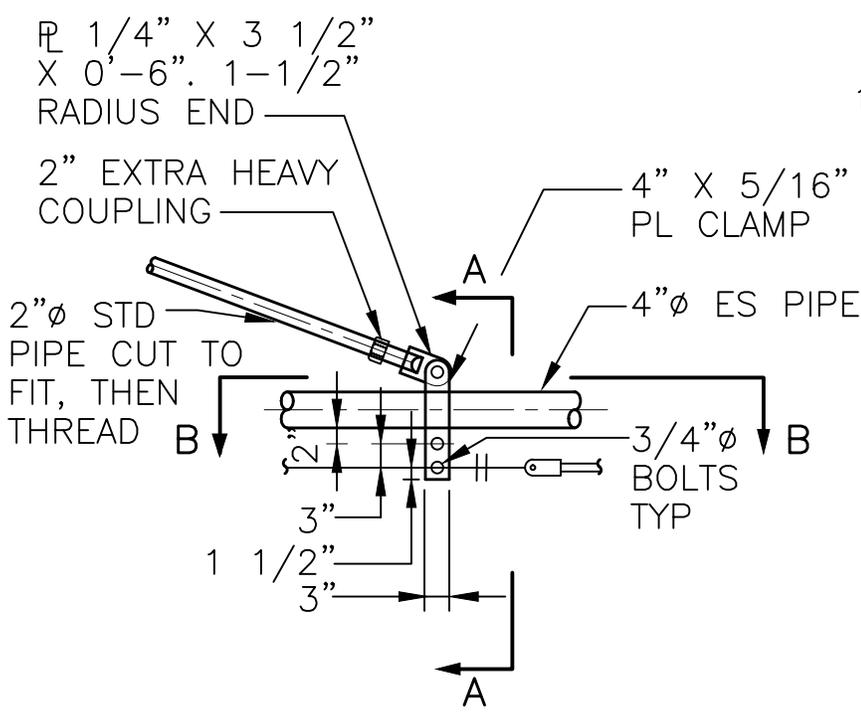
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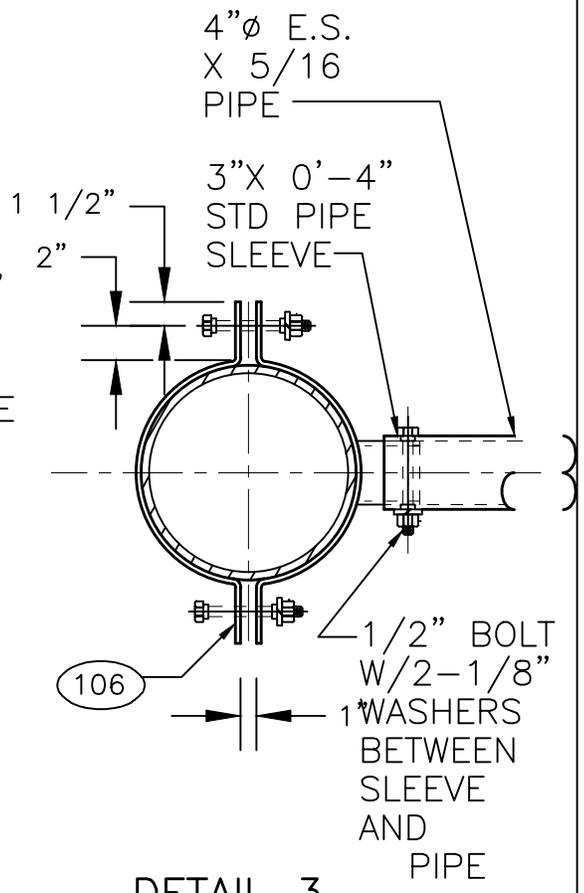
**DETAIL 1**



**SECTION A-A**

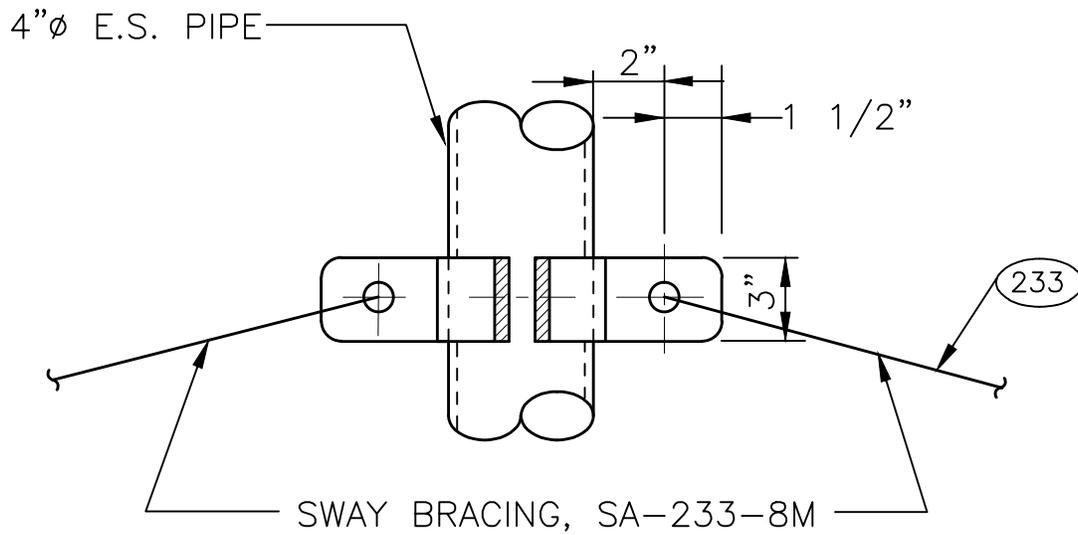


**DETAIL 2**

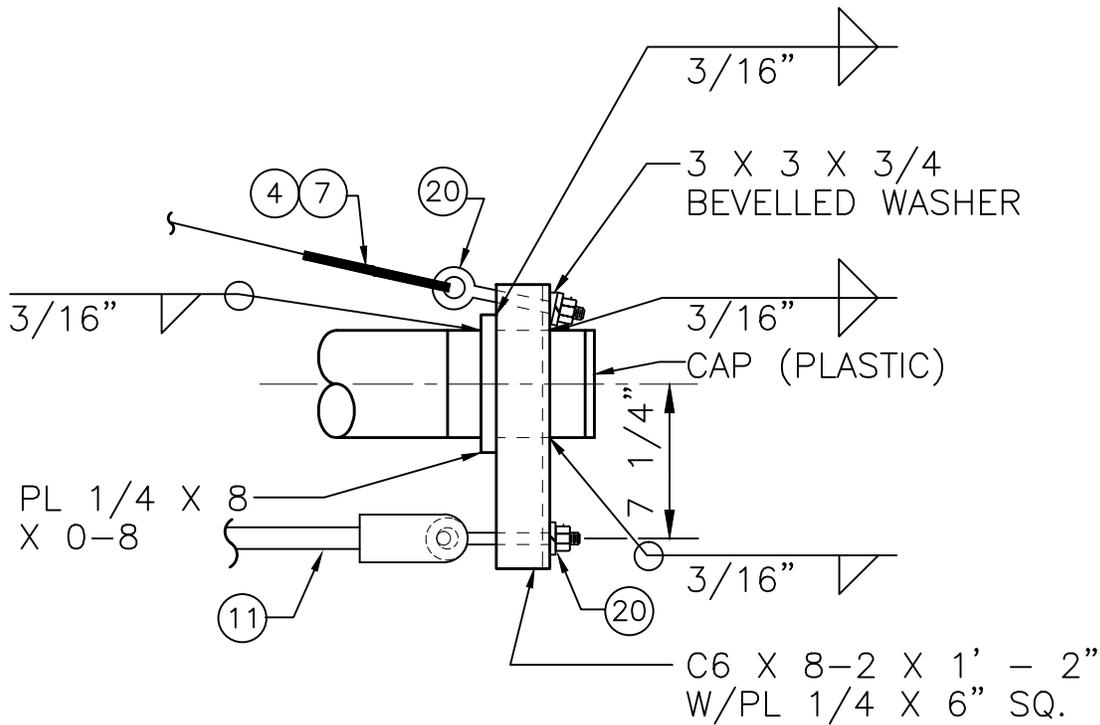


**DETAIL 3**

				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>STEEL POLE          BRACKET ASSEMBLY          COMPRESSION TYPE</b>	DATE: <b>JULY 2016</b>
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: <b>SA-343.2</b>
				DSGN/DWN: <b>D GREER/CMS/LSA</b>			SHT NO: <b>2 4</b>
No.	REVISION	BY	APPD	DATE			



SECTION B-B



DETAIL 4

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				STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: JULY 2016
				APPROVED: D CRIPPEN			STD DET NO: SA-343.3
				DSGN/DWN: D GREER/CMS/LSA			SHT NO: 3 4
No.	REVISION	BY	APPD	DATE			

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	2	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	6	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	3	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIABLES	GUY STRAND	COPPERWELD	8M
11	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
12	1	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
20	2	EYEBOLT	WABCO	11933-2000
80	VARIABLES	3/4" STAINLESS STEEL BANDING	BAND-IT	TYPE 201
84	4 LF	SCHED 40 PVC, GREY, SPLIT		
102	VARIABLES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
106	1	COMPRESSION POLE BRACKET COLLAR	METRO STD	SA-106
233	2	SWAY BRACING, SA-233-8M	METRO STD	SA-233

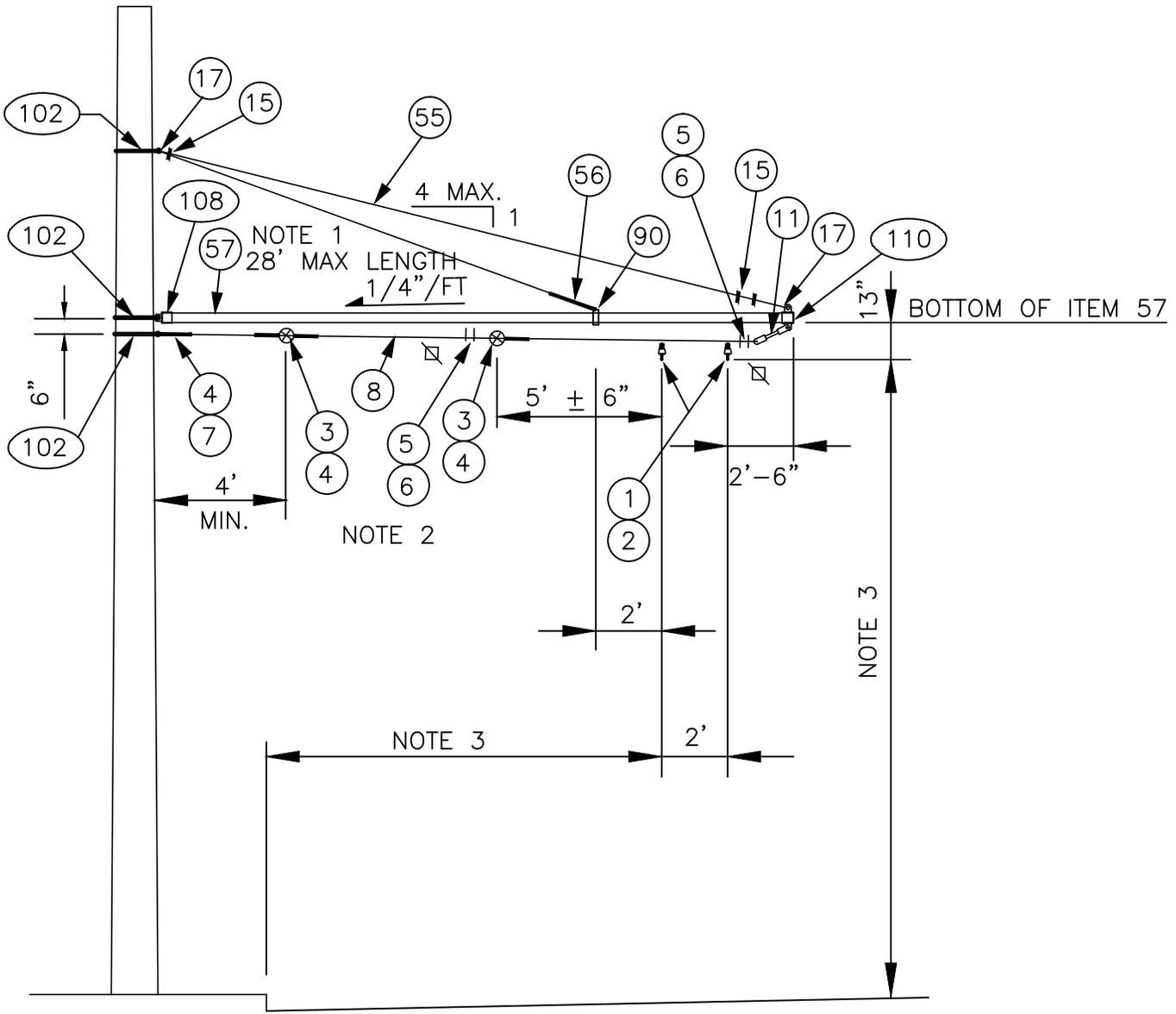
NOTES:

- OVERHEAD DRAWINGS TO INDICATE CURVE SEGMENT TO BE INSTALLED. MAXIMUM ANGLE OF CURVE SEGMENT IS 35 DEGREES. MAXIMUM CHANGE IN STREET GRADIENT IS ±5%
- PROVIDE TENSION ADJUSTMENT POINT AT LOCATION INDICATED BY "□". PROVIDE WIRE ROPE CLIPS AT THIS LOCATION. SEE SA-166.
- THE PIPE BRACKET SHALL BE 4" DIAMETER EXTRA STRONG ASTM A53, GRADE B GALVANIZED STEEL PIPE. MAXIMUM PIPE LENGTH IS 18 FT.
- SEE SA-164 FOR HORIZONTAL AND VERTICAL DIMENSIONS TO THE TROLLEY WIRE.

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				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STEEL POLE BRACKET ASSEMBLY COMPRESSION TYPE		STD DET NO: SA-343.4
				DSGN/DWN: <b>D GREER/CMS/LSA</b>					SHT NO: 4 4
No.	REVISION	BY	APPD	DATE					

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**NOTES:**

1. DRILL 1/2" HOLE IN TUBE TO MATCH HOLE IN ITEMS 108 & 110 FOR INSERTION OF 3/8" SS BOLT.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. SEE SA-164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
4. HANG CLAMP (ITEM 1) VERTICAL BY ADJUSTING SPAN HANGER (ITEM 2).

				STD DET DEVELOPMENT: <b>A WOLAK</b>		 <b>King County</b> Department of Transportation	METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			<b>STEEL POLE          BRACKET ASSEMBLY          UNDERSLING CONSTRUCTION</b>		STD DET NO: SA-345.1
				DSGN/DWN: <b>D GREER/AJW/LSA</b>					SHT NO: 1 2
No.	REVISION	BY	APPD	DATE					

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
02	2	AGC TANGENT SPAN HANGER	WABCO	19360-2000
03	2	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	4	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	1	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
11	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
15	3	WIRE ROPE CLIP, 3/8"	CROSBY	G450
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
55	VARIES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	1	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 5" Ø X 1/4"	STRONGWELL	EXTREN SERIES 525
90	1	HEAVY PIPE CLAMP, GALV	GRINNELL	FIG. 216
102	3	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
110	1	MAST ARM UNDERSLING END CAP	METRO STD	SA-110

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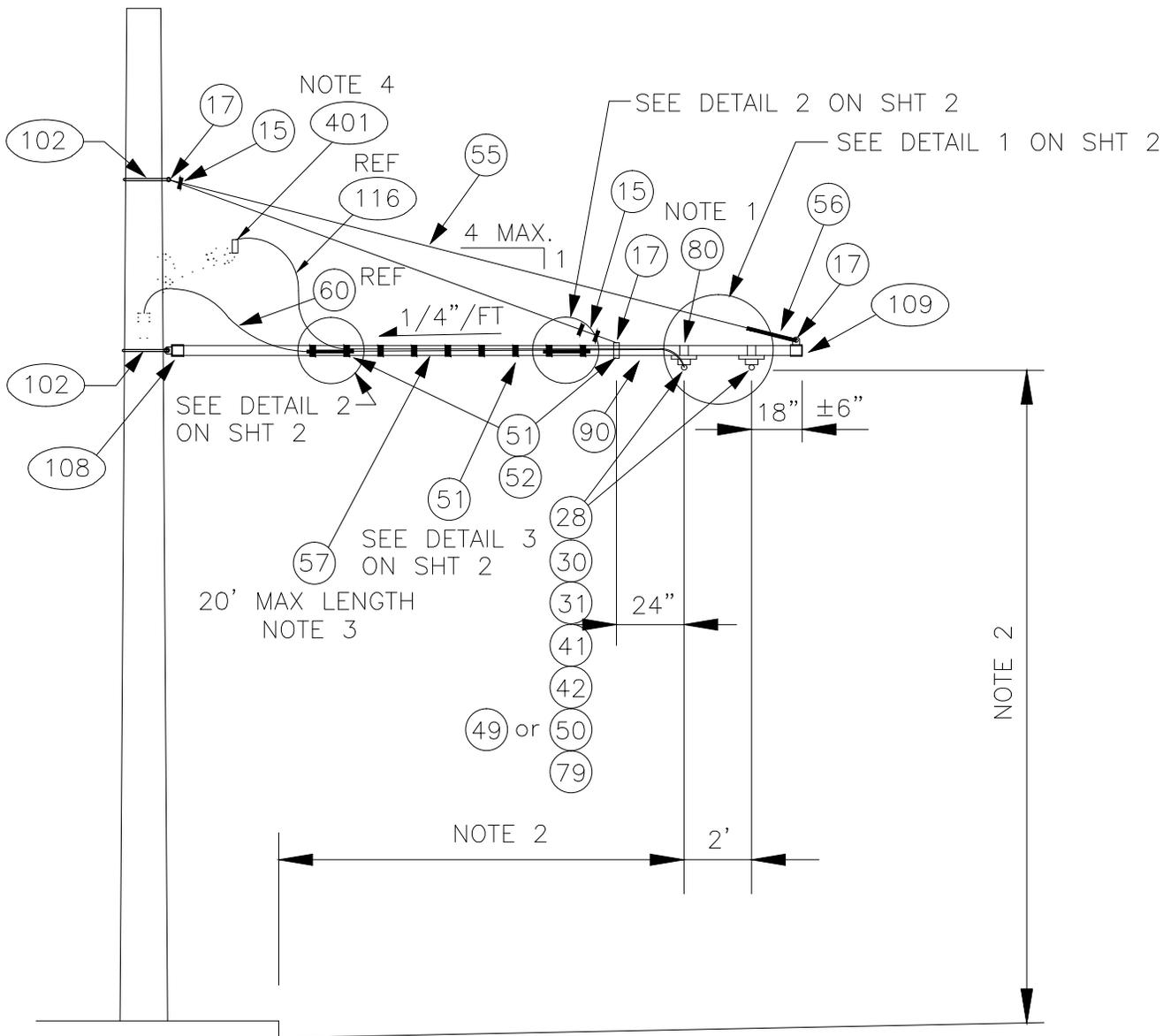
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				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-345.2
				DSGN/DWN: <b>D GREER/AJW/LSA</b>			SHT NO: 2 2
No.	REVISION	BY	APPD	DATE			



ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	10	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	1	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
11	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
15	3	WIRE ROPE CLIP, 3/8"	CROSBY	G450
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
28	2	INSULATOR SPOOL	WABCO	16835-2000
39	1	5/8" SHACKLE	WABCO	13722-2000
55	VARIES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	1	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 5" Ø X 1/4"	STRONGWELL	EXTREN SERIES 525
90	1	HEAVY PIPE CLAMP, GALV	GRINNELL	FIG. 216
102	4	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
110	1	MAST ARM UNDERSLING END CAP	METRO STD	SA-110

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		 <b>King County</b> Department of Transportation	METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			<b>STEEL POLE          HOLDDOWN BRACKET ASSEMBLY          TANGENT CONSTRUCTION</b>		STD DET NO: SA-348.2
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No.	REVISION	BY	APPD	DATE					



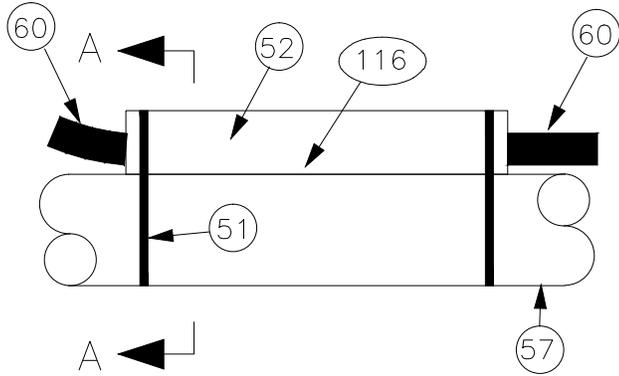
NOTES:

1. STAINLESS STEEL BANDING SHALL BE WRAPPED DOUBLE THICKNESS AROUND ITEM 57 PRIOR TO CLAMPING.
2. SEE SA-164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
3. DRILL 1/2" HOLE IN TUBE TO MATCH HOLE IN ITEMS 108 & 109 FOR INSERTION OF 3/8" SS BOLT.
4. 60, 116 & 401 SHOWN FOR REFERENCE ONLY, SEE SA-401 FOR DETAILS. DOUBLE NEGATIVE FEEDER REQUIRES ONLY ONE SA-401.

				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: <b>JULY 2016</b>
				APPROVED: <b>D CRIPPEN</b>			STEEL POLE TANGENT FEEDER BRACKET ASSEMBLY		STD DET NO: <b>SA-349.1</b>
				DSGN/DWN: <b>D GREER/MM/LSA</b>					SHT NO: <b>1 3</b>
No.	REVISION	BY	APP'D	DATE					

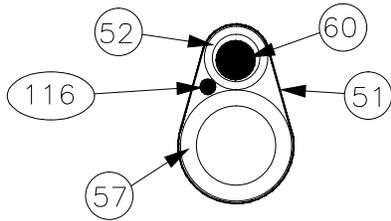
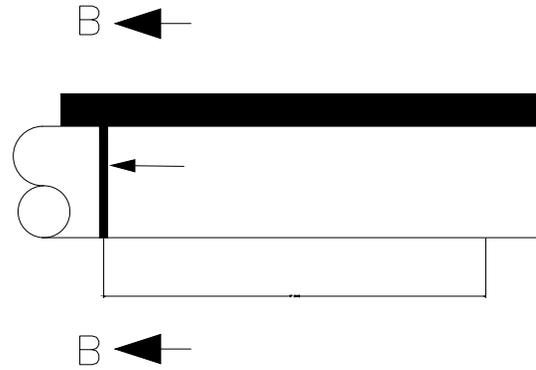
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DOUBLE FEEDER

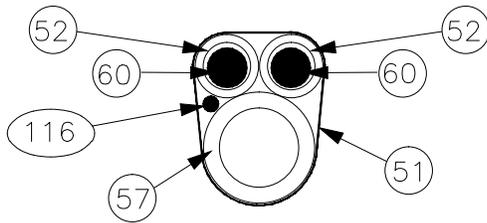


DETAIL 2

SINGLE FEEDER



VIEW A-A  
SINGLE FEEDER



VIEW A-A  
DOUBLE FEEDER

No.	REVISION	BY	APP'D	DATE

STD DET DEVELOPMENT: <b>A WOLAK</b>
APPROVED: <b>D CRIPPEN</b>
DSGN/DWN: <b>D GREER/MM/LSA</b>



METRO TRANSIT DIVISION  
TROLLEY STANDARDS

**STEEL POLE  
TANGENT FEEDER  
BRACKET ASSEMBLY**

DATE: <b>JULY 2016</b>
STD DET NO: <b>SA-349.2</b>
SHT NO: <b>2 3</b>

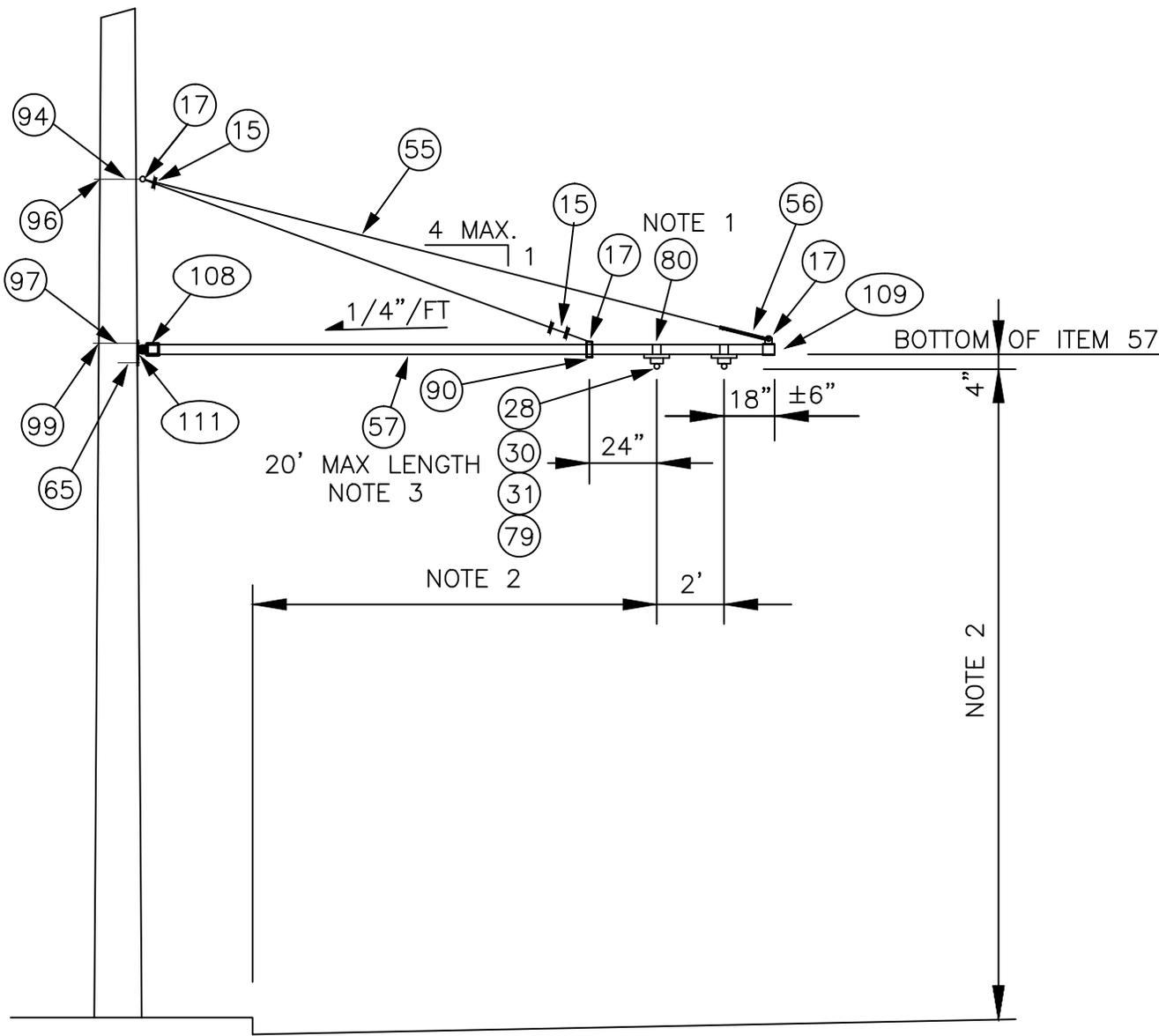
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MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
15	3	WIRE ROPE CLIP, 3/8"	CROSBY	G450
17	3	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
28	2	INSULATOR SPOOL	WABCO	16835-2000
30	2	TROLLEY SUPPORT-LARGE PIPE ARMS	WABCO	54940-4001
31	2	SPRING DETROIT CLAMP	WABCO	54959-3001
41	VARIABLES	H. S. P. FEEDER CLAMP ASSY, BRONZE	WABCO	19880-2000
42	VARIABLES	FEEDER CLAMP, BRONZE	WABCO	19790-4004
49	VARIABLES	COMPRESSION CONNECTOR COPPER-LONG BARREL-TIN PLATED-FLARED	ANDERSON/ SQUARE D	VHCL- 2/0-12BNF
50	VARIABLES	COMPRESSION CONNECTOR COPPER-LONG BARREL-TIN PLATED-FLARED	ANDERSON/ SQUARE D	VHCL- 500-12BNF
51	AS REQD	MULTI-LOK TIES (18") NYLON COATED	BAND-IT	AE714
52	2 12" PIECES	TUF NEOPRENE AIR HOSE SLEEVE 1.5" ID X 2.0625" OD (BLACK)	MCMaster-CARR	3 BRAID
55	VARIABLES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	1	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIABLES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 3 1/2" Ø X 1/2"	MORRISON MOLDED FG	EXTREN SERIES 525
60	AS REQD	FEED SPAN CABLE 500 KCM CU, UNSHIELDED, 5 KV EPR W/ PVC JACKET		
79	2	5/8"-11 UNC X 1 3/8" STUD		
80	VARIABLES	3/4" STAINLESS STEEL BANDING	BAND-IT	TYPE 201
90	1	HEAVY PIPE CLAMP, GALV, 3" IPS	GRINNELL	FIG. 216
102	2	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
109	1	MAST ARM END CAP	METRO STD	SA-109
116	VARIABLES	WIRE, 2 OR 5 KV, #4 AWG CU, JACKETED, UNSHIELDED		

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  STEEL POLE TANGENT FEEDER BRACKET ASSEMBLY	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-349.3
				DSGN/DWN: <b>D GREER/MM/LSA</b>			SHT NO: 3 3
No.	REVISION	BY	APPD	DATE			



**NOTES:**

1. STAINLESS STEEL BANDING SHALL BE WRAPPED DOUBLE THICKNESS AROUND ITEM 57 PRIOR TO CLAMPING.
2. SEE SA-164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
3. DRILL 1/2" HOLE IN TUBE TO MATCH HOLE IN ITEMS 108 & 109 FOR INSERTION OF 3/8" SS BOLT.

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		 <b>King County</b> Department of Transportation	METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: JULY 2016	
				APPROVED: <b>D CRIPPEN</b>					STD DET NO: SA-351.1	
				DSGN/DWN: <b>D GREER/MM/LSA</b>					SHT NO: 1 2	
No.	REVISION	BY	APPD	DATE			<b>WOOD POLE          BRACKET ASSEMBLY          TANGENT CONSTRUCTION</b>			

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
15	3	WIRE ROPE CLIP, 3/8"	CROSBY	G450
17	3	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
28	2	INSULATOR SPOOL	WABCO	16835-2000
30	2	TROLLEY SUPPORT-LARGE PIPE ARMS	WABCO	54940-4001
31	2	SPRING DETROIT CLAMP	WABCO	54959-3001
55	VARIABLES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	1	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIABLES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 3 1/2" Ø X 1/2"	MORRISON MOLDED FG	EXTREN SERIES 525
65	1	LAG SCREW, FETTER DRIVE, 1/2" X 4"	JOSLYN	J8754
79	2	5/8" -11 UNC X 1 3/8" STUD		
80	VARIABLES	3/4" STAINLESS STEEL BANDING	BAND-IT	TYPE 201
90	1	HEAVY PIPE CLAMP, GALV, 3" IPS	GRINNELL	FIG. 216
94	1	5/8" OVAL EYEBOLT W/ NUT	JOSLYN	J94XX
96	1	SQ CURVED WASHER 3" X 3" X 1/4", 11/16" DIA	JOSLYN	J113
97	1	3/4" MACHINE BOLT	JOSLYN	J89XX
99	1	SQ CURVED WASHER 3" X 3" X 1/4", 13/16" DIA	JOSLYN	J6823
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
109	1	MAST ARM ARM END CAP	METRO STD	SA-109
111	1	WOOD POLE MOUNTING BRACKET	METRO STD	SA-111

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  WOOD POLE BRACKET ASSEMBLY TANGENT CONSTRUCTION	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-351.2
				DSGN/DWN: <b>D GREER/MM/LSA</b>			SHT NO: 2 2
No.	REVISION	BY	APPD	DATE			



**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	2	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICITION TAPE, 3/4" (6 WRAPS)		
07	VARIES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	VARIES	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
11	VARIES	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
12	VARIES	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
15	3	WIRE ROPE CLIP, 3/8"	CROSBY	G450
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
25	VARIES SEE PLAN	CURVE SEGMENT 8-12 DEG TYPE C CURVE SEGMENT 13-27 DEG TYPE C CURVE SEGMENT 28-47 DEG TYPE C	WABCO WABCO WABCO	22301-3014 22302-3005 22303-3005
40	VARIES	7/8 TRANSLITE STRAIN INSUL CL-90	WABCO	54995-6120
53	VARIES	CURVE RAIL (1° TO 5° 2 FT LG)	K & M	851 B412/0
54	VARIES	CURVE RAIL (5.5° TO 7.5° 4 FT LG)	K & M	851 B412/1
55	VARIES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	1	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 5" Ø X 1/4"	MORRISON MOLDED FG	EXTREN SERIES 525
90	1	HEAVY PIPE CLAMP, GALV	GRINNELL	FIG. 216
94	2	5/8" OVAL EYEBOLT W/ NUT	JOSLYN	J94XX
96	2	SQ CURVED WASHER 3" X 3" X 1/4", 11/16" DIA	JOSLYN	J113
97	1	3/4" MACHINE BOLT	JOSLYN	J89XX
99	1	SQ CURVED WASHER 3" X 3" X 1/4", 13/16" DIA	JOSLYN	J6823
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
110	1	MAST ARM UNDERSLING END CAP	METRO STD	SA-110
111	1	WOOD POLE MOUNTING BRACKET	METRO STD	SA-111

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				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-352.2
				DSGN/DWN: <b>D GREER/MM/LSA</b>			SHT NO: 2 2
No.	REVISION	BY	APPD	DATE			



MATERIAL LIST

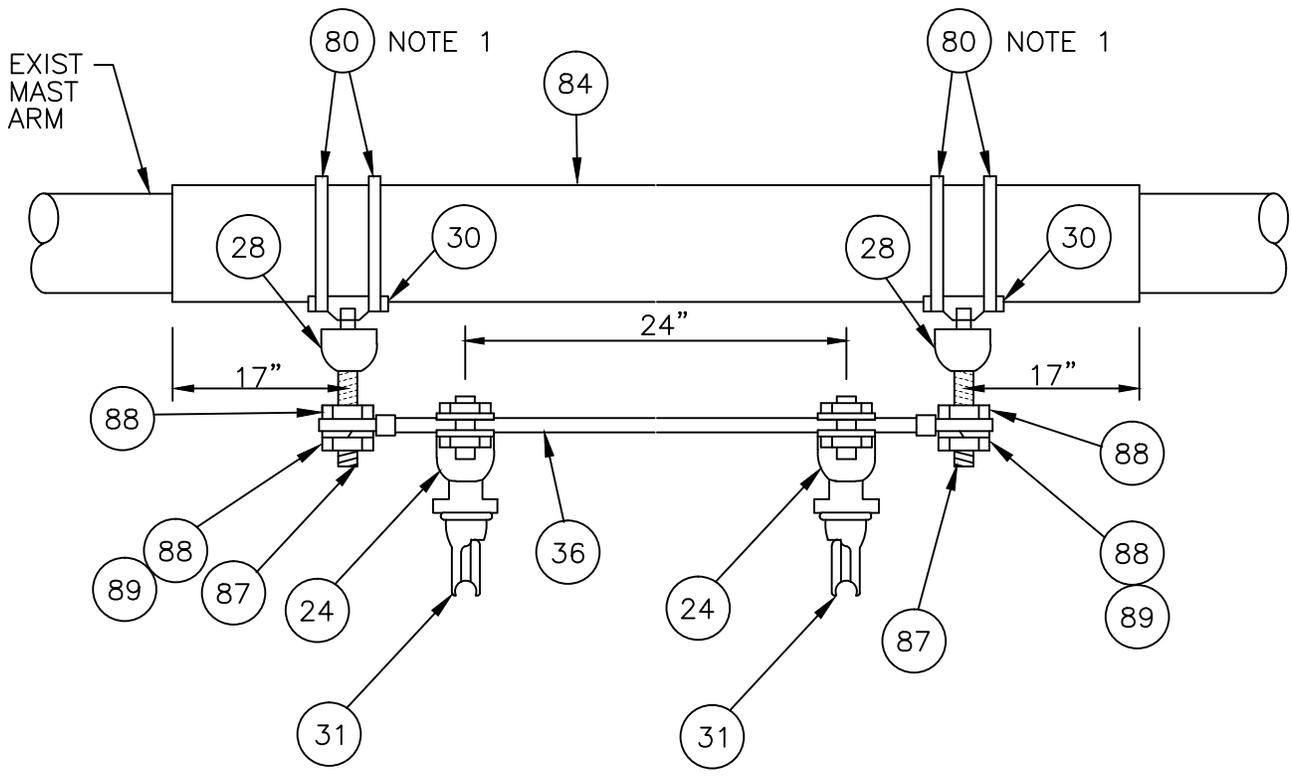
ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
02	2	AGC TANGENT SPAN HANGER	WABCO	19360-2000
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	10	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIABLES	GUY STRAND	COPPERWELD	8M
11	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
15	3	WIRE ROPE CLIP, 3/8"	CROSBY	G450
55	VARIABLES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	1	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIABLES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 5" Ø X 1/4"	STRONGWELL	EXTREN SERIES 525
90	1	HEAVY PIPE CLAMP, GALV	GRINNELL	FIG. 216
94	2	5/8" OVAL EYEBOLT WITH NUT	JOSLYN	J94XX
96	2	SQ CURVED WASHER 3" x 3" x 1/4" 11/16" DIA	JOSLYN	J113
97	1	3/4" MACHINE BOLT	JOSLYN	J89XX
102	3	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
110	1	MAST ARM UNDERSLING END CAP	METRO STD	SA-110
111	1	WOOD POLE MOUNTING BRACKET	METRO STD	SA-111

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				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: JULY 2016	
				APPROVED: <b>D CRIPPEN</b>			WOOD POLE HOLDDOWN BRACKET ASSEMBLY		STD DET NO: SA-355.2	
				DSGN/DWN: <b>D GREER/MM/LSA</b>			TANGENT CONSTRUCTION		SHT NO: 2 2	
No.	REVISION	BY	APPD	DATE						







**NOTES:**

1. STAINLESS STEEL BANDING SHALL BE WRAPPED DOUBLE THICKNESS AROUND POLE COVERING MATERIAL PRIOR TO CLAMPING.
2. MATERIAL FOR THREADED RODS AND NUTS SHALL BE ASTM CLASS A-307 STEEL.
3. HOT DIP GALVANIZE ALL METAL AFTER FABRICATION.

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
24	2	TROLLEY WIRE SUPPORT ASSY	WABCO	54962-3003
28	2	INSULATOR SPOOL	WABCO	16835-2000
30	2	TROLLEY SUPPORT-LARGE PIPE ARMS	WABCO	54940-4001
31	2	SPRING DETROIT CLAMP	WABCO	54959-3001
36	1	7/8 TRANSLITE STRAIN INSUL W/ ADJUST END FITTINGS	WABCO	54980-6385
80	AS REQD	3/4" STAINLESS STEEL BANDING	BAND-IT	TYPE 201
84	6 LF	SCHED 40 PVC, GREY, SPLIT		
87	2	5/8"-11 UNC X 6" THREADED ROD, GALV, ASTM A36		
88	4	5/8"-11 UNC HVY HEX JAM NUT, GALV, ASTM A563 GRA		
89	2	11/16" LOCKWASHER		

STD DET DEVELOPMENT:  
A WOLAK

APPROVED:  
D CRIPPEN

DSGN/DWN:  
D GREER/TMB/LSA



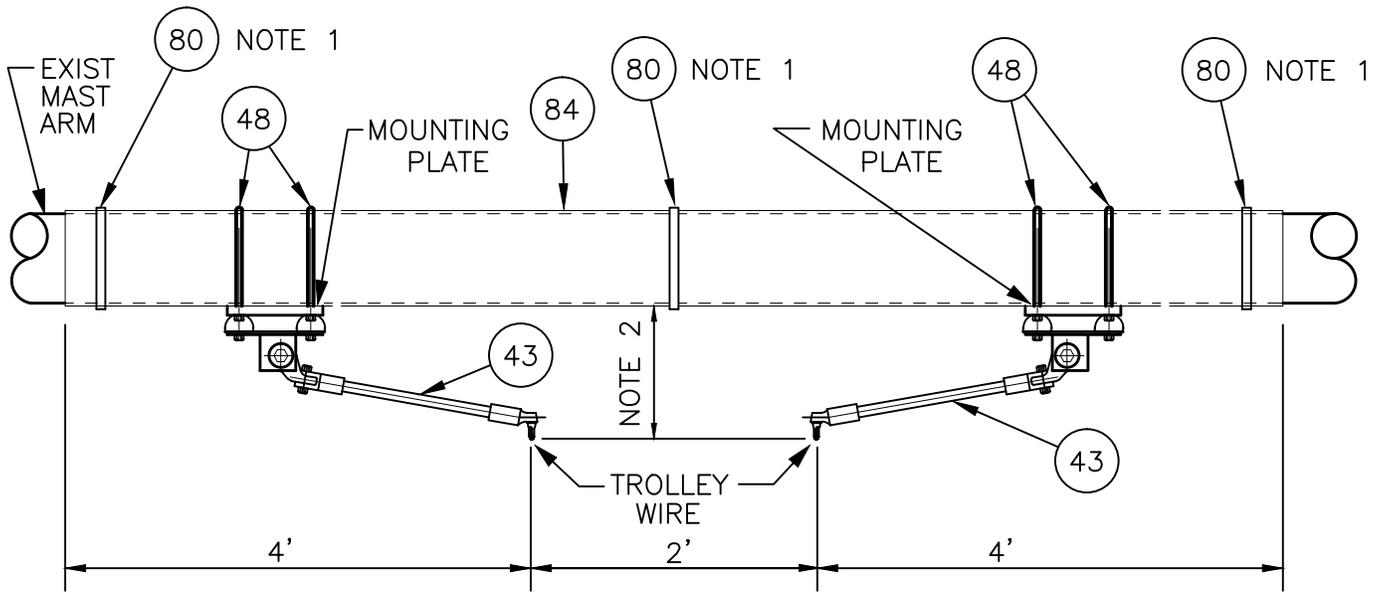
METRO TRANSIT DIVISION  
TROLLEY STANDARDS  
  
TRAFFIC MAST ARM  
TROLLEY SUPPORT

DATE:  
JULY 2016  
STD DET NO:  
SA-361  
SHT NO:  
1 1

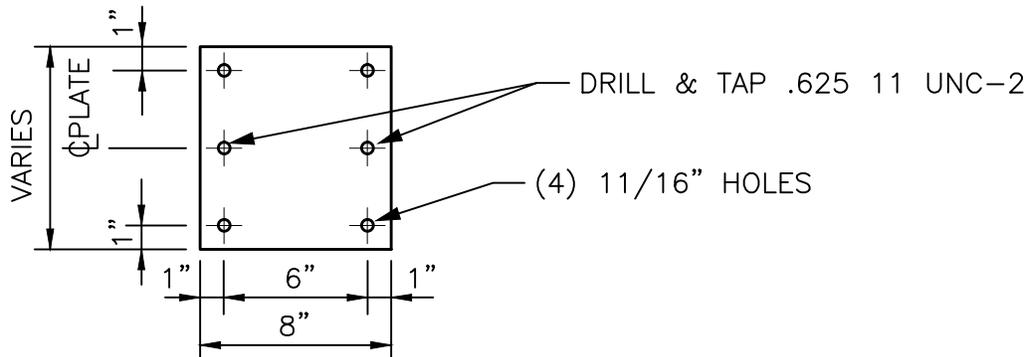
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### OUTBOARD MOUNTING



### 3/4" MOUNTING PLATE

(2 REQ'D)

**NOTES:**

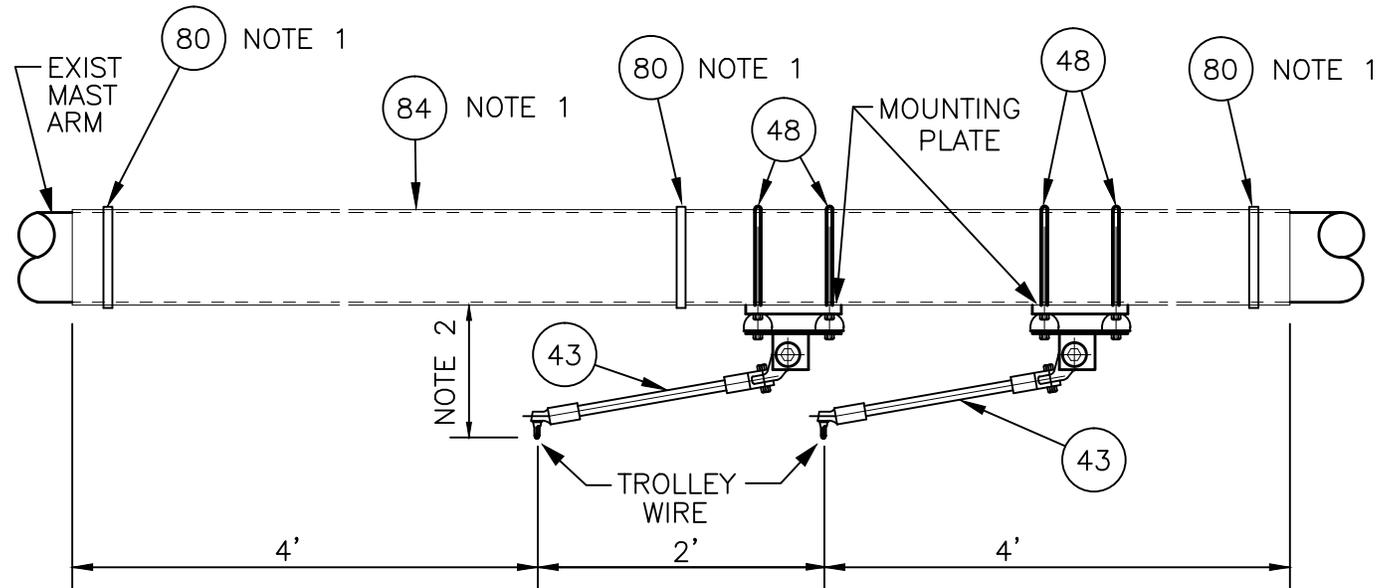
1. STAINLESS STEEL BANDING SHALL BE WRAPPED DOUBLE THICKNESS AROUND POLE COVERING MATERIAL PRIOR TO CLAMPING. PLACE SPLIT DOWN ON ITEM 84.
2. DISTANCE VARIES. ITEMS 43 & 48 NOT REQ'D WHEN GREATER THAN 18". USE OFFSET MOUNTING (SHEET 2) WHEN SPACE LIMITS USE OF OUTBOARD MOUNTING.

#### MATERIAL LIST

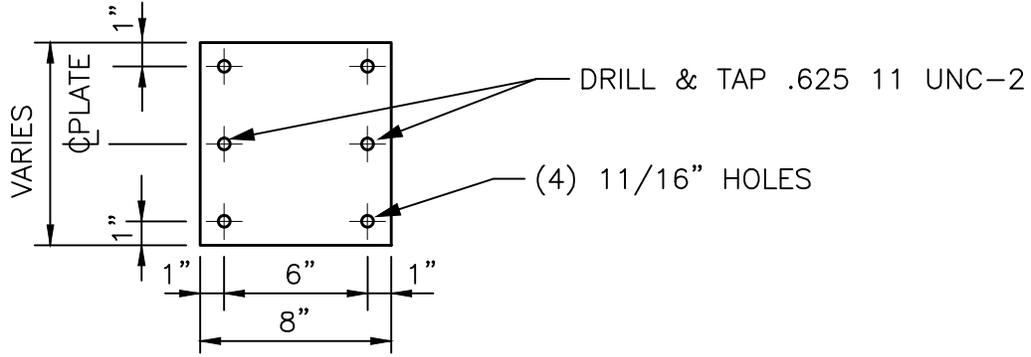
ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
43	2	TROLLEY WIRE SUPPORT ASSY	WABCO	59690-3001
48	4	5/8" U-BOLT GALV		
80	AS REQD	3/4" X 0.030" SS BANDING TYPE 201	BAND-IT	C206
84	10 LF	SCHED 40 PVC, GREY, SPLIT		

				STD DET DEVELOPMENT: <b>A WOLAK</b>		 <b>King County</b> Department of Transportation	METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: <b>JULY 2016</b>
				APPROVED: <b>D CRIPPEN</b>			TRAFFIC MAST ARM TROLLEY SUPPORT	STD DET NO: <b>SA-362.1</b>
				DSGN/DWN: <b>D GREER/DOW/LSA</b>			SHT NO: <b>1 2</b>	
No.	REVISION	BY	APPD	DATE				

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 PLOTTED: Jul 27, 2016 02:09:07pm By: anders



**OFFSET MOUNTING**



**3/4" MOUNTING PLATE**  
(2 REQ'D)

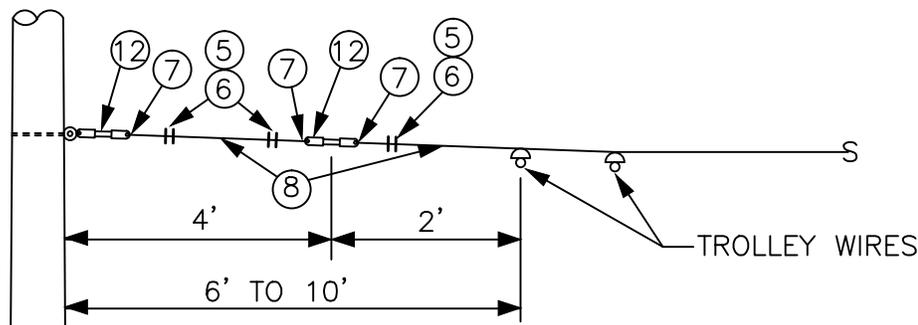
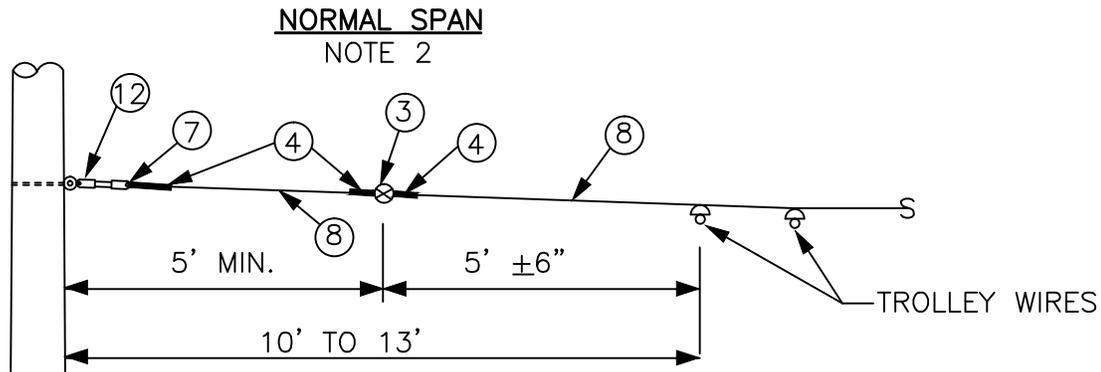
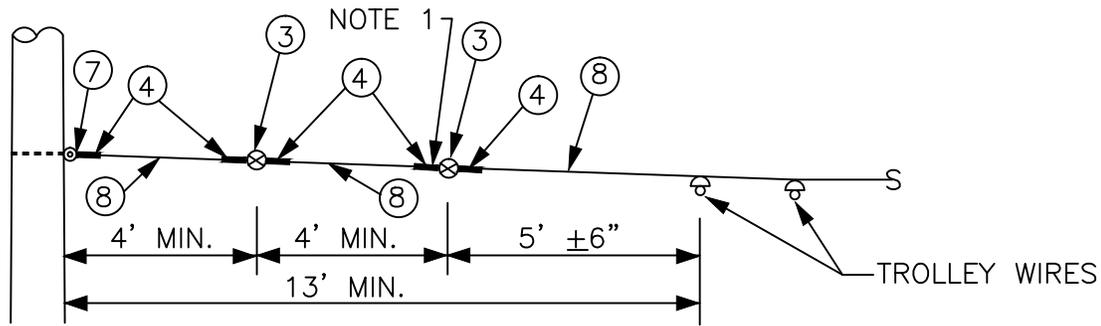
**NOTES:**

1. STAINLESS STEEL BANDING SHALL BE WRAPPED DOUBLE THICKNESS AROUND POLE COVERING MATERIAL PRIOR TO CLAMPING. PLACE SPLIT DOWN ON ITEM 84.
2. DISTANCE VARIES. ITEMS 43 & 48 NOT REQ'D WHEN GREATER THAN 18". USE OUTBOARD MOUNTING (SEE PAGE 1) WHEN LESS THAN 9", OR ROTATE ONE ITEM 43 15° OUT OF THE PAPER & ONE ITEM 43 15° INTO THE PAPER.

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
43	2	TROLLEY WIRE SUPPORT ASSY	WABCO	59690-3001
48	4	5/8" U-BOLT GALV	VARIES	VARIES
80	AS REQD	3/4" X 0.030" SS BANDING TYPE 201	BAND-IT	C206
84	10 LF	SCHED 40 PVC, GREY, SPLIT		

No.	REVISION	BY	APPD	DATE	STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS  TRAFFIC MAST ARM TROLLEY SUPPORT	DATE: JULY 2016
					APPROVED: D CRIPPEN			STD DET NO: SA-362.2
					DSGN/DWN: D GREER/DOW/LSA			SHT NO: 2 2



**NOTES:**

- WHERE ADJUSTABILITY IS REQUIRED, REPLACE GUY GRIP DEADEND (ITEM 4) WITH WIRE ROPE CLIPS (ITEM 5 & 6). SEE SA-166.
- INCLUDES SA-301, SA-302, SA-305, SA-311, SA-312 & SA-315.

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	VARIABLES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIABLES	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	VARIABLES	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICITION TAPE, 3/4" (6 WRAPS)		
07	VARIABLES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIABLES	GUY STRAND	COPPERWELD	8M
12	VARIABLES	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120

STD DET DEVELOPMENT:  
A WOLAK

APPROVED:  
D CRIPPEN

DSGN/DWN:  
D GREER/TMB/LSA



METRO TRANSIT DIVISION  
TROLLEY STANDARDS

SPAN WIRES  
LIMITED SPACE  
TYPICAL VARIANCES

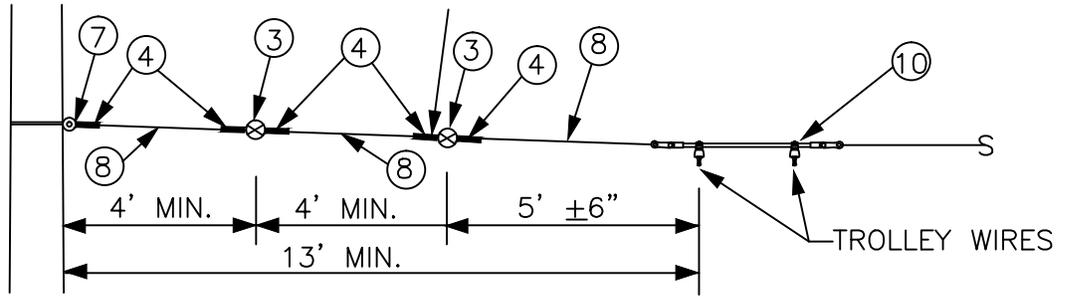
DATE:  
JULY 2016

STD DET NO:  
SA-370.1

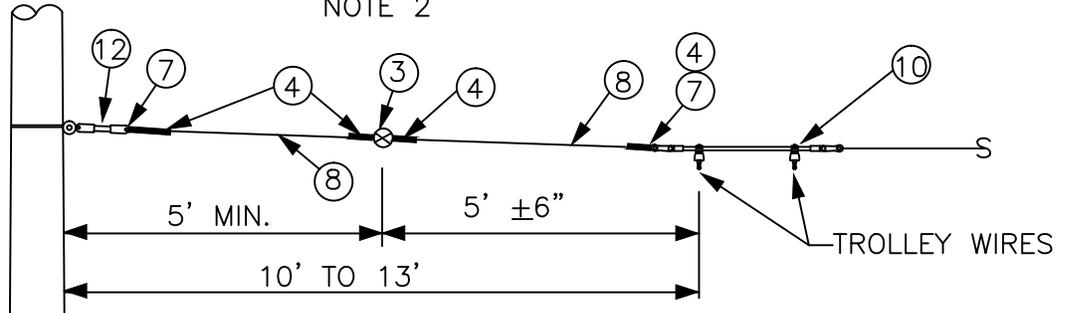
SHT NO:  
1 2

No.	REVISION	BY	APPD	DATE

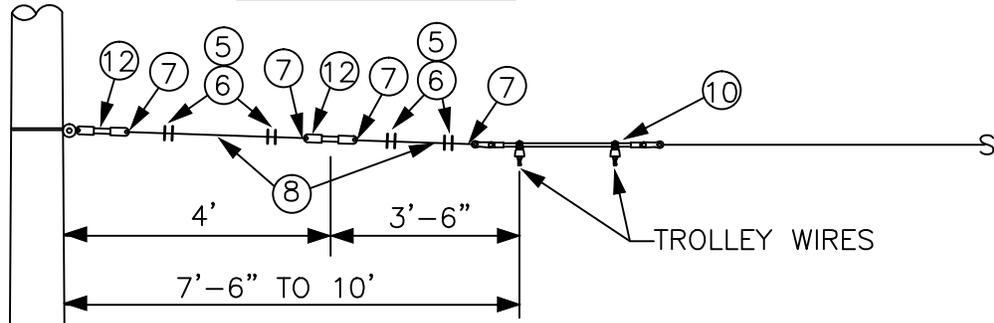
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**NORMAL SPAN**  
NOTE 2



**ALTERNATE SPAN A**



**ALTERNATE SPAN B**

**NOTES:**

- WHERE ADJUSTABILITY IS REQUIRED, REPLACE GUY GRIP DEADEND (ITEM 4) WITH WIRE ROPE CLIPS (ITEM 5 & 6). SEE SA-166.
- INCLUDES SA-303, SA-304, SA-307, SA-308, SA-313 & SA-314, SA-317 & SA-318.

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	VARIES	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	VARIES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	VARIES	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
12	VARIES	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120

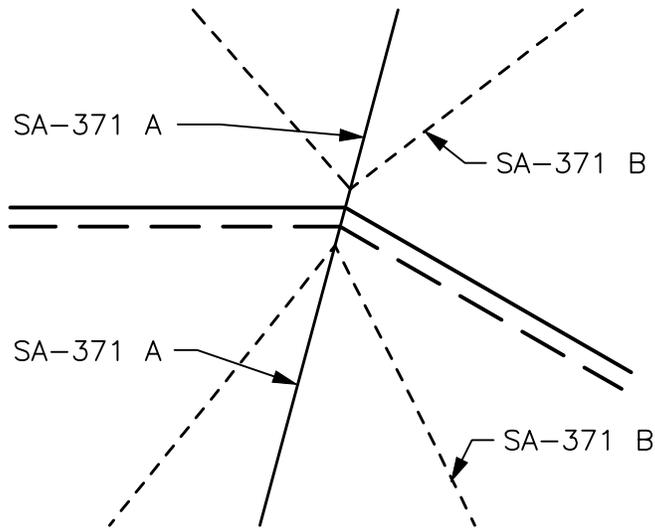
STD DET DEVELOPMENT:  
A WOLAK  
APPROVED:  
D CRIPPEN  
DSGN/DWN:  
D GREER/TMB/LSA



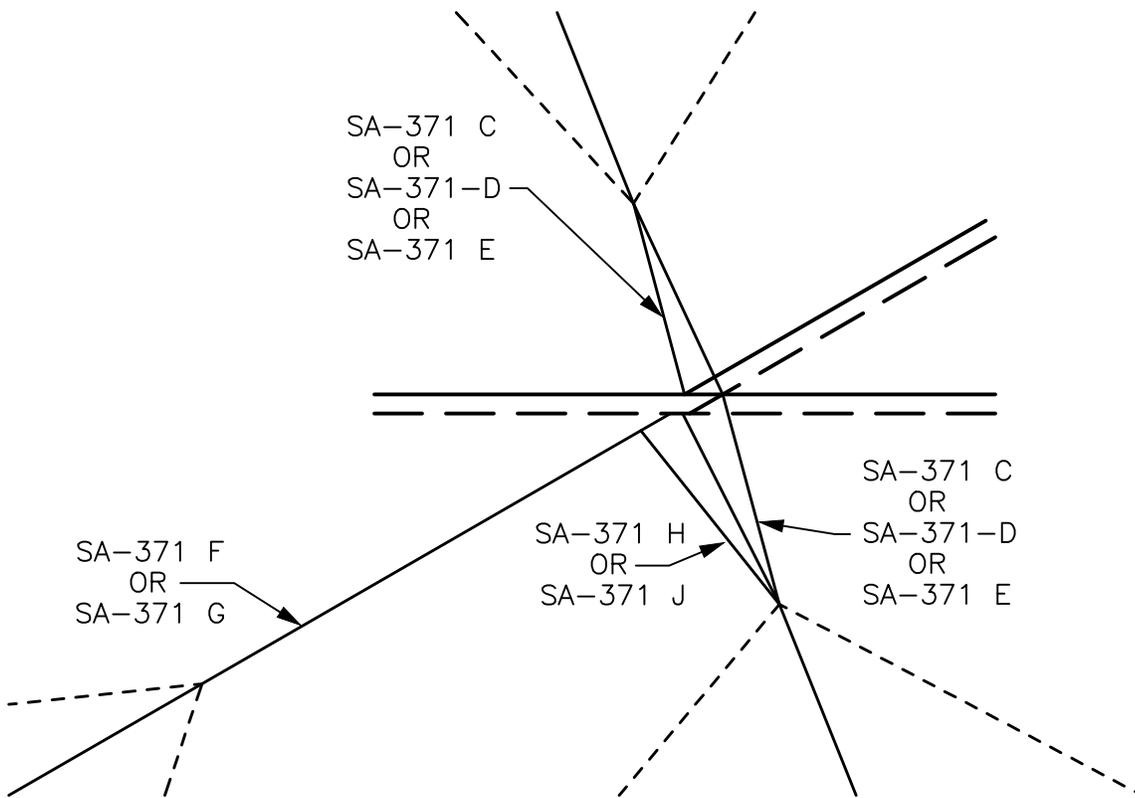
METRO TRANSIT DIVISION  
TROLLEY STANDARDS  
SPAN WIRES  
LIMITED SPACE  
TYPICAL VARIANCES

DATE:  
JULY 2016  
STD DET NO:  
SA-370.2  
SHT NO:  
2 2

No.	REVISION	BY	APPD	DATE



CURVE SEGMENT PULLOFFS



SWITCH PULLOFFS

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No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT: <b>A WOLAK</b>
APPROVED: <b>D CRIPPEN</b>
DSGN/DWN: <b>D GREER/TMB/LSA</b>



METRO TRANSIT DIVISION  
TROLLEY STANDARDS

**SWITCH &  
CURVE SEGMENT  
PULLOFFS**

DATE: <b>JULY 2016</b>
STD DET NO: <b>SA-371.1</b>
SHT NO: <b>1 9</b>

**NOTES**

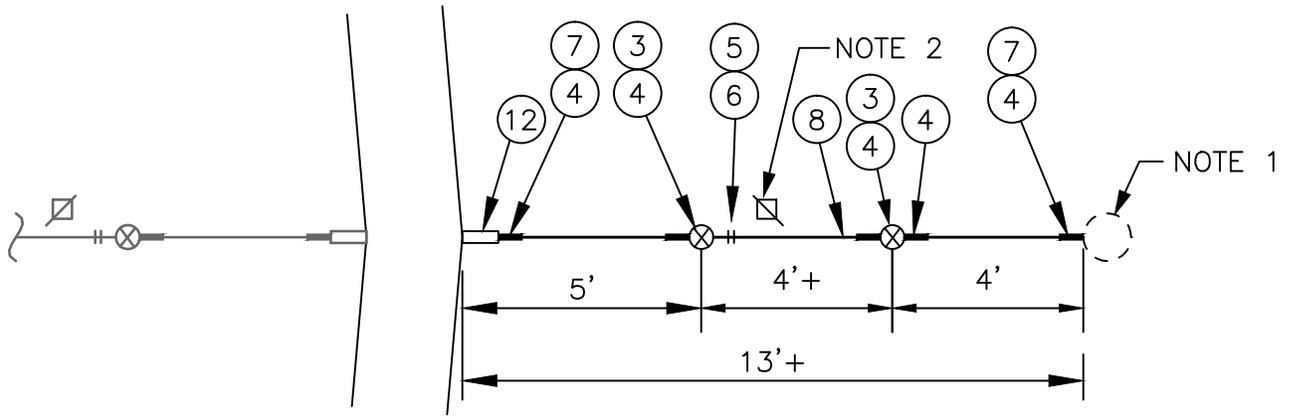
1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "□". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. LOCATION OF ADJUSTMENT POINT, INSULATORS AND USE OF INSULATED GUY STRAND GUY STRAND SHALL MEET SA-167 REQUIREMENTS.
4. OUTSIDE PULLOFFS ARE SHOWN FOR CURVE SEGMENTS, INSIDE PULLOFFS ARE SIMILAR. INSIDE PULLOFFS ARE SHOWN FOR SWITCHES, OUTSIDE PULLOFFS ARE SIMILAR.
5. TROLLEY WIRE TO STRUCTURAL ATTACHMENT DISTANCE DETERMINES IF A SHORT, MEDIUM OR LONG VERSION IS USED FOR SA-371 A THROUGH SA-371 E.
6. TROLLEY WIRE GEOMETRY AS SHOWN ON THE OVERHEAD DRAWINGS DETERMINES WHICH SA-371 A THROUGH SA-371 K TO USE.

**MATERIAL LIST**

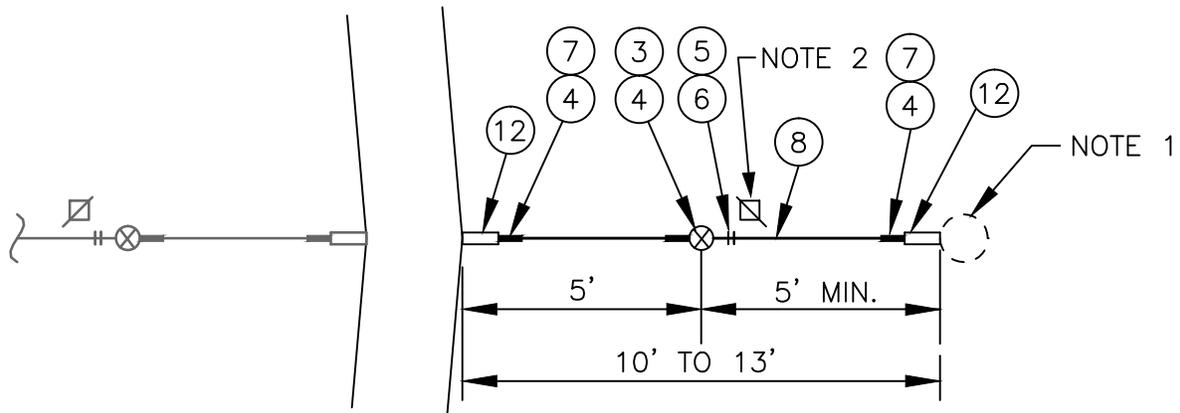
ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
09	*	BULL RING	WABCO	18567-2000
11	*	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
12	*	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
102	VARIABLES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIABLES	WOOD POLE EYEBOLT	METRO STD	SA-103
GUY TENSIONS- 0-2700 LBS				
03	*	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	*	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	*	WIRE ROPE CLIP, 5/16"	CROSBY	G450
07	*	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIABLES	GUY STRAND	COPPERWELD	8M
GUY TENSIONS- 2700-5000 LBS				
13	*	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	506
14	*	GUY GRIP DEADEND	PREFORMED	CDE-3115
15	*	WIRE ROPE CLIP, 3/8"	CROSBY	G450
16	VARIABLES	GUY STRAND	COPPERWELD	16M
17	*	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
43	*	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	56273-6120

No.	REVISION	BY	APPD	DATE	STD DET DEVELOPMENT: <b>A WOLAK</b>  APPROVED: <b>D CRIPPEN</b>  DSGN/DWN: <b>D GREER/TMB/LSA</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  SWITCH & CURVE SEGMENT PULLOFFS	DATE: JULY 2016  STD DET NO: SA-371.2  SHT NO: 2 9
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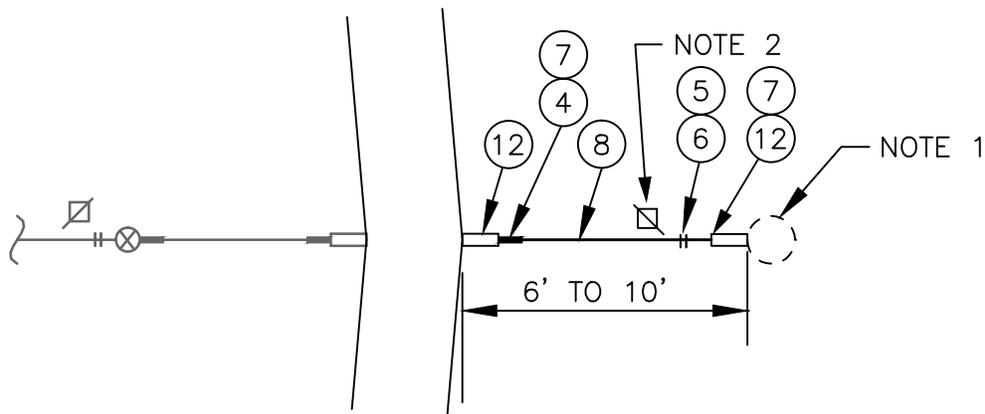
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SA-371 A (LONG)



SA-371 A (MEDIUM)



SA-371 A (SHORT)

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No.	REVISION	BY	APPD	DATE

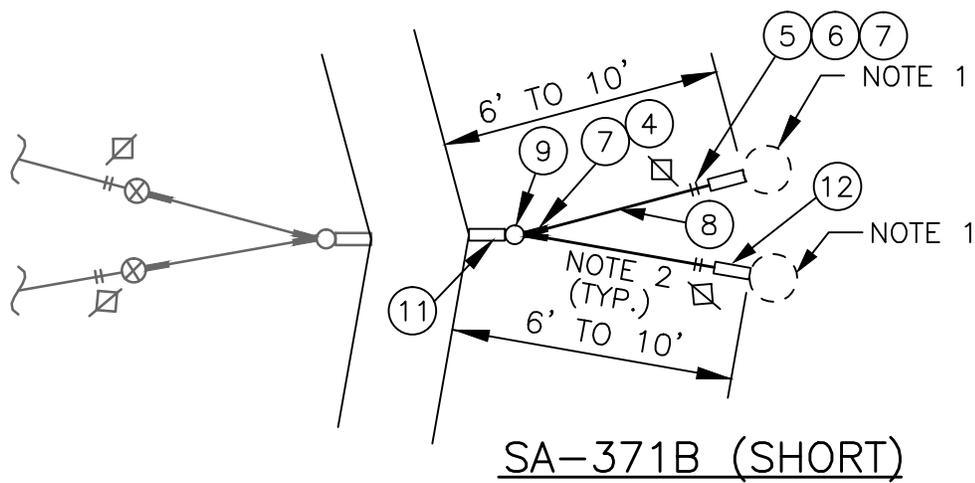
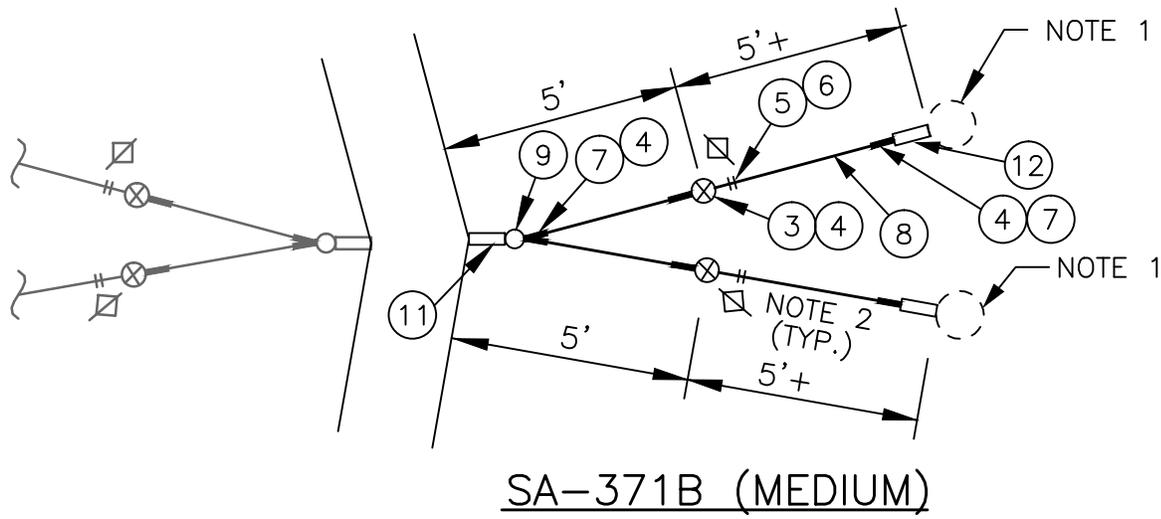
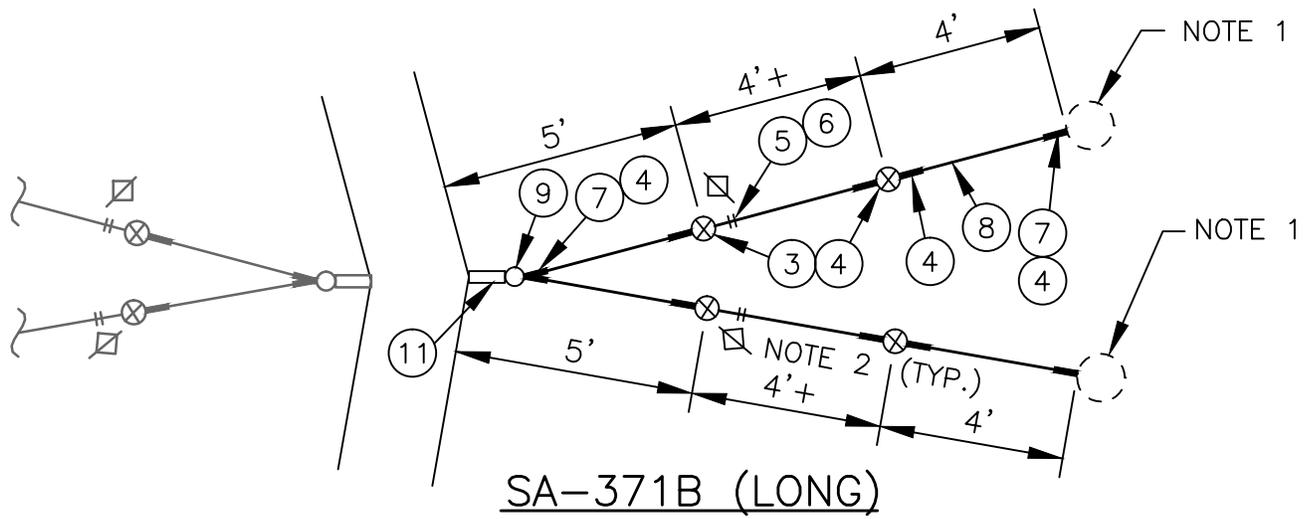
STD DET DEVELOPER: <b>A WOLAK</b>
APPROVED: <b>D CRIPPEN</b>
DSGN/DWN: <b>D GREER/TMB/LSA</b>



METRO TRANSIT DIVISION  
TROLLEY STANDARDS

**SWITCH &  
CURVE SEGMENT  
PULLOFFS**

DATE: <b>JULY 2016</b>
STD DET NO: <b>SA-371.3</b>
SHT NO: <b>3 9</b>



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No.	REVISION	BY	APPD	DATE

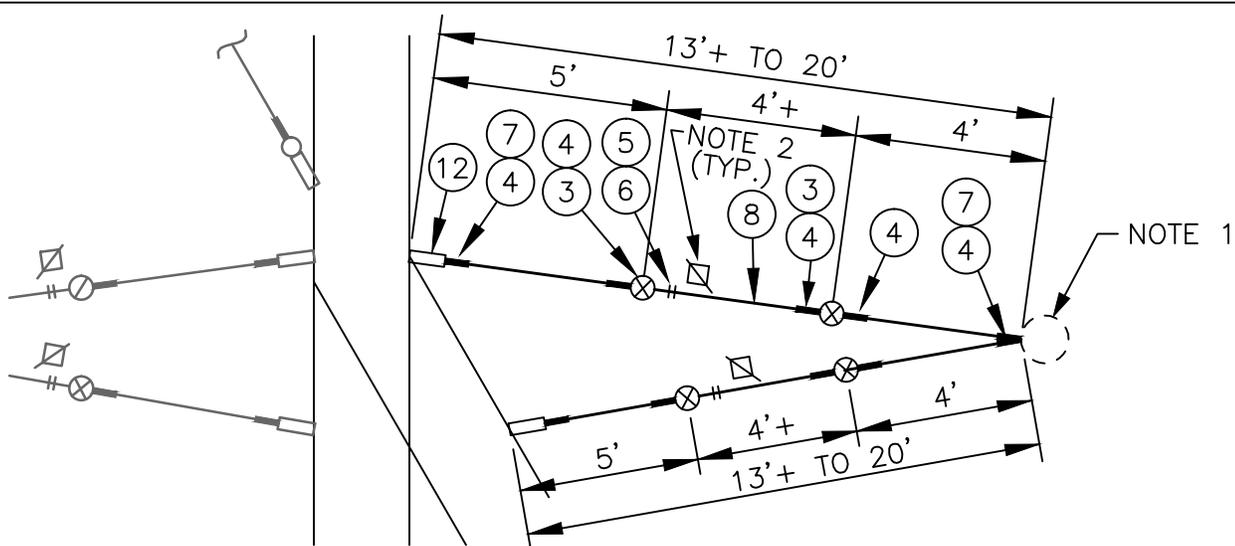
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 APPROVED:  
**D CRIPPEN**  
 DSGN/DWN:  
**D GREER/TMB/LSA**



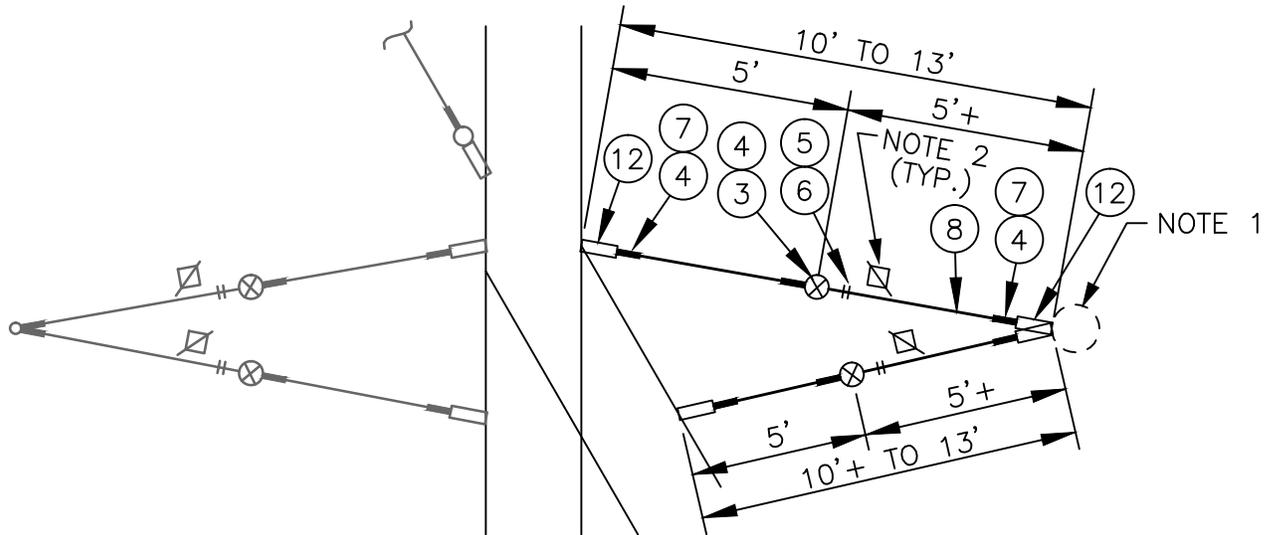
METRO TRANSIT DIVISION  
 TROLLEY STANDARDS  
  
**SWITCH &  
 CURVE SEGMENT  
 PULLOFFS**

DATE:	JULY 2016
STD DET NO.:	SA-371.4
SHT NO.:	4 9

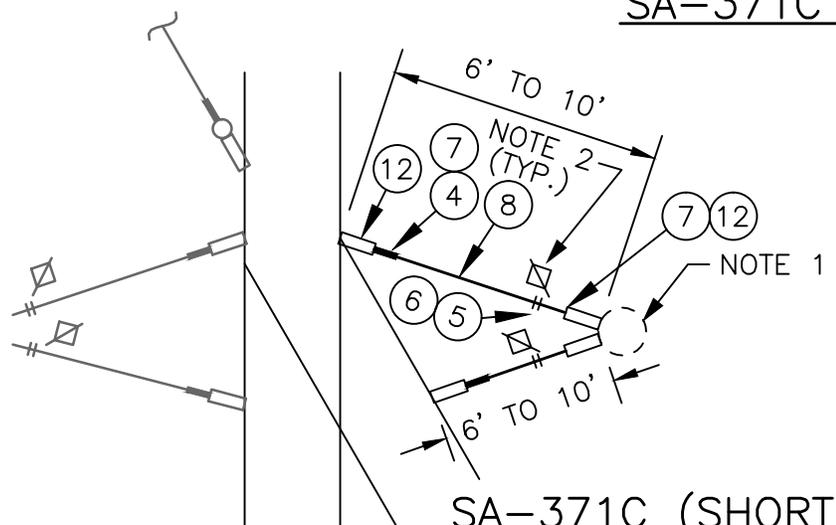
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**SA-371C (LONG)**



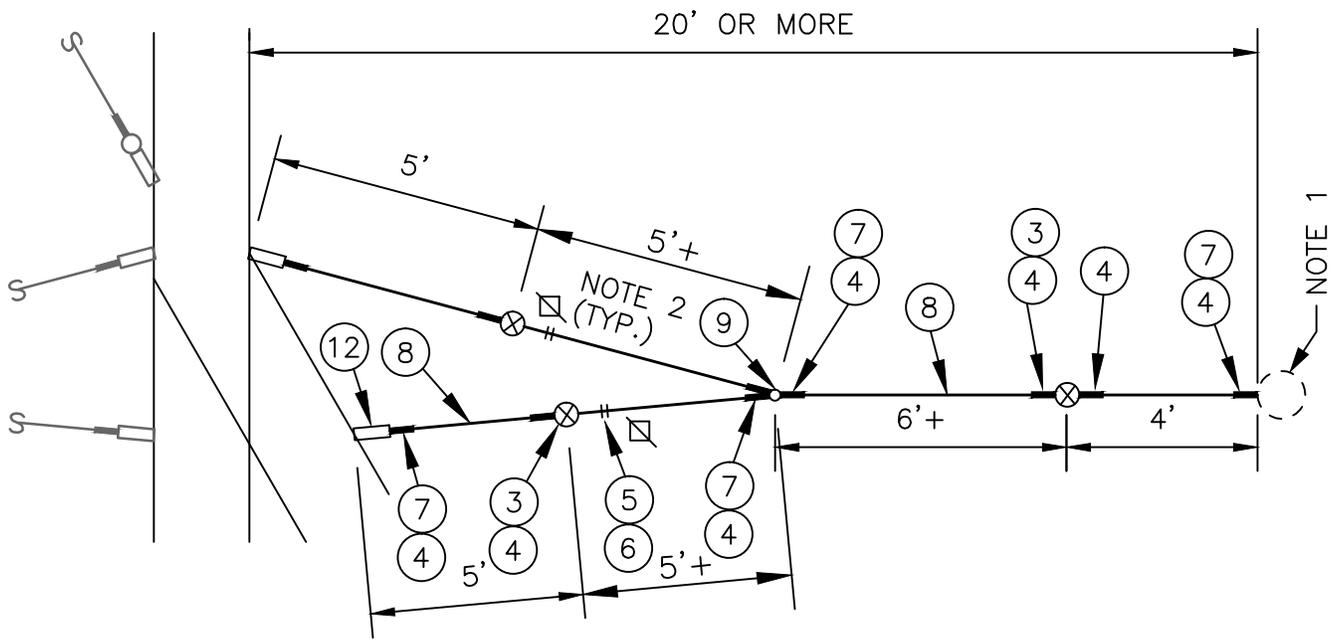
**SA-371C (MEDIUM)**



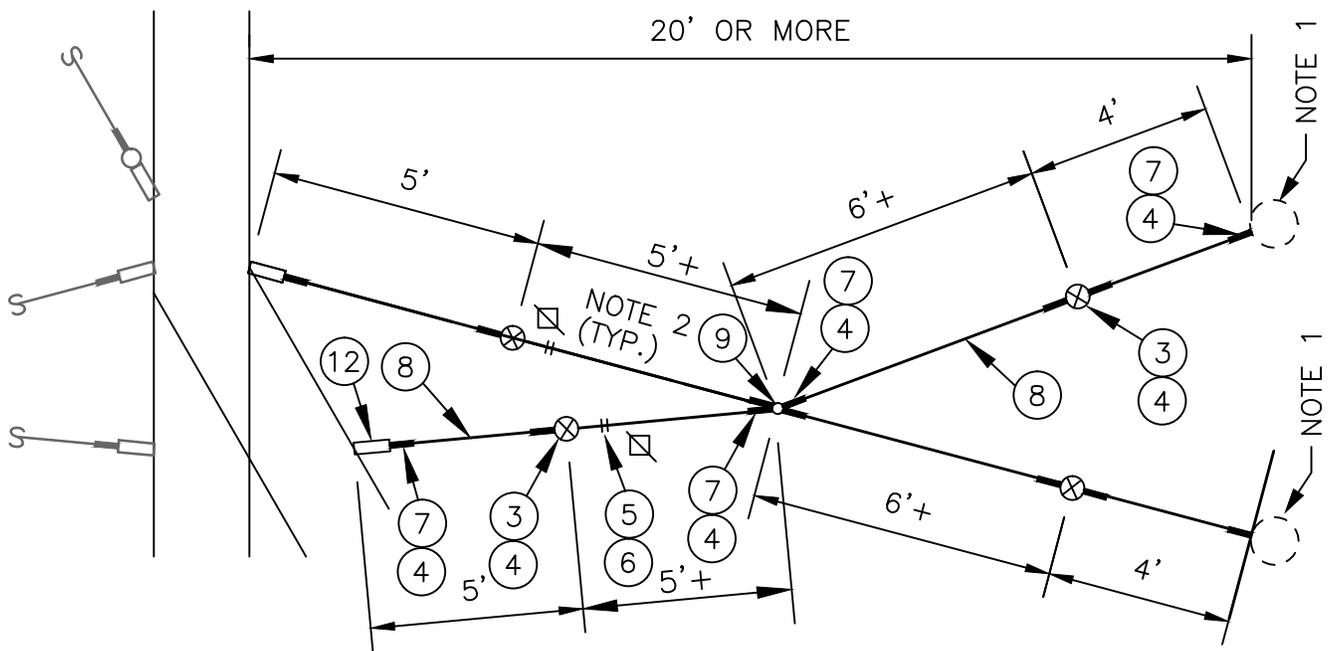
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				APPROVED: <b>D CRIPPEN</b>			STD DET NO: <b>SA-371.5</b>
				DSGN/DWN: <b>D GREER/TMB/LSA</b>			SHT NO: <b>5 9</b>
No.	REVISION	BY	APPD	DATE			

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**SA-371D**



**SA-371E**

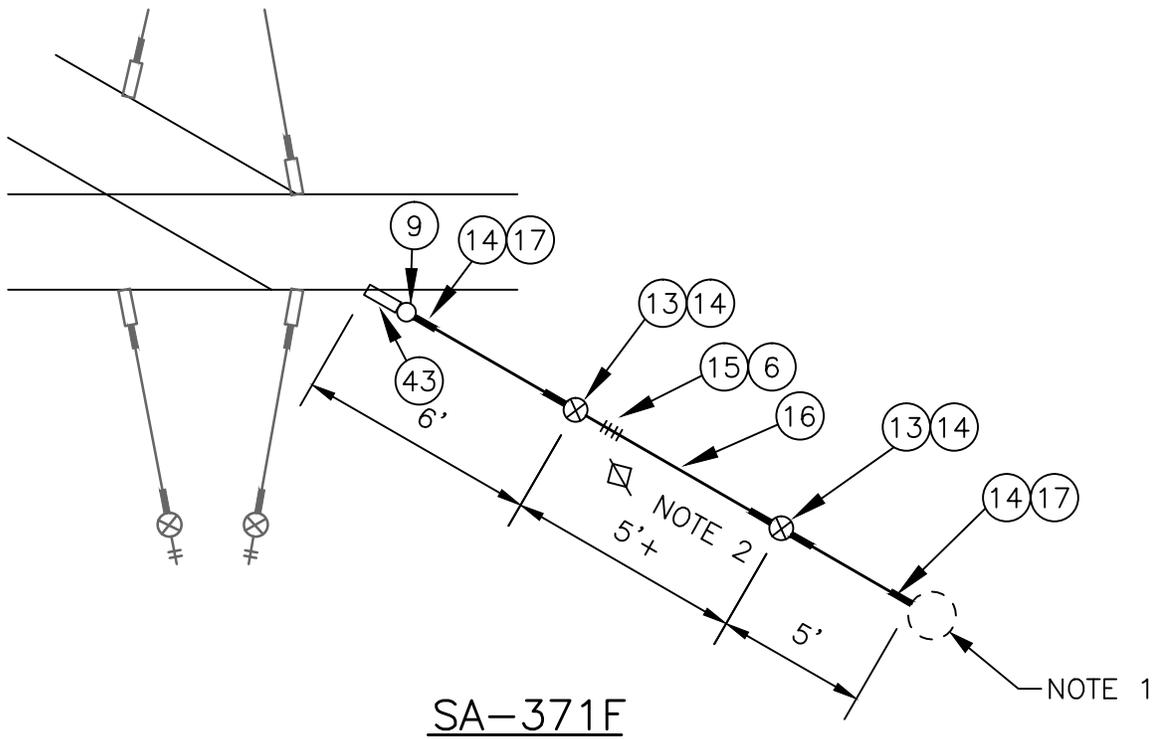
No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
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 APPROVED:  
**D CRIPPEN**  
 DSGN/DWN:  
**D GREER/TMB/LSA**

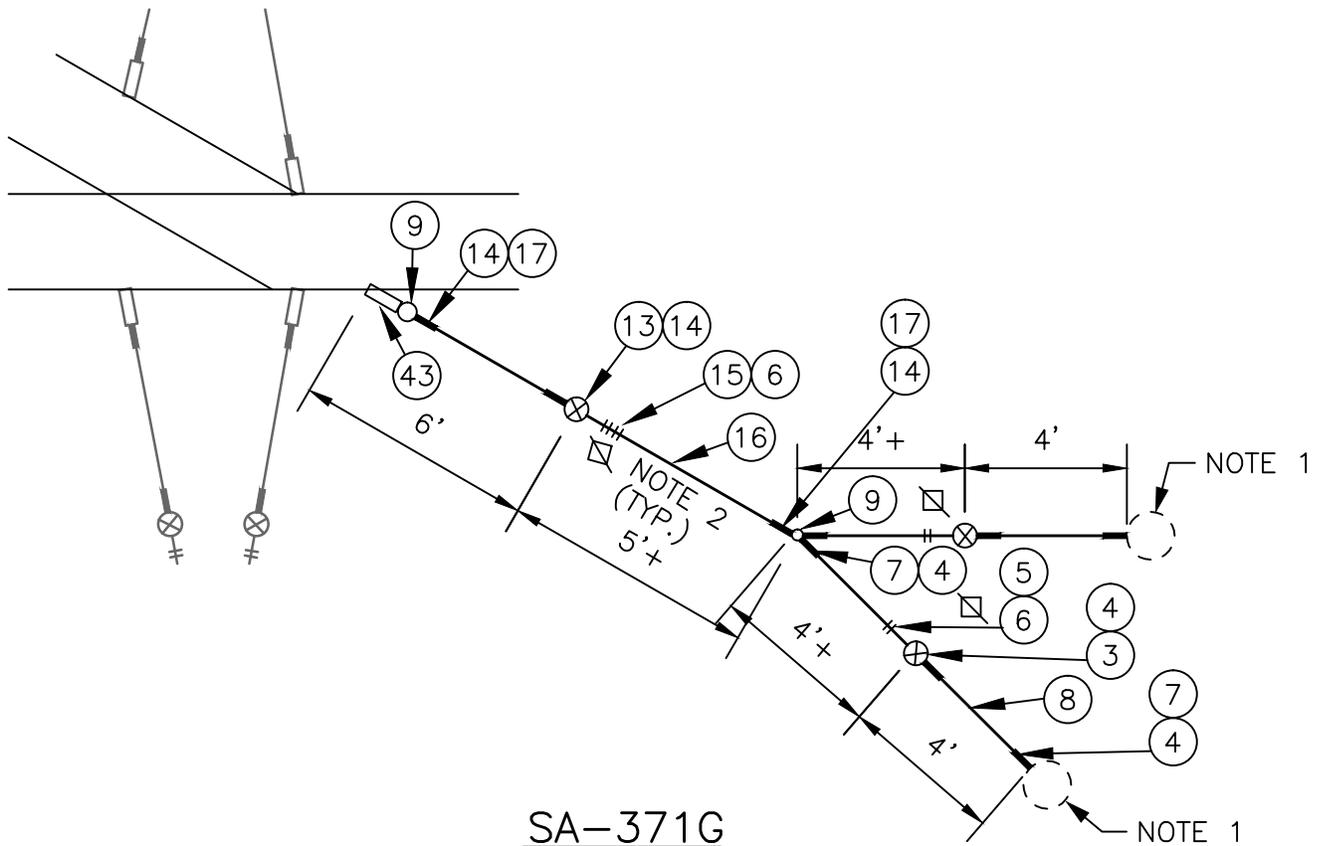


METRO TRANSIT DIVISION  
 TROLLEY STANDARDS  
**SWITCH  
 PULLOFFS**

DATE:	JULY 2016
STD DET NO.:	SA-371.6
SHT NO.:	6 9



SA-371F



SA-371G

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No.	REVISION	BY	APPD	DATE

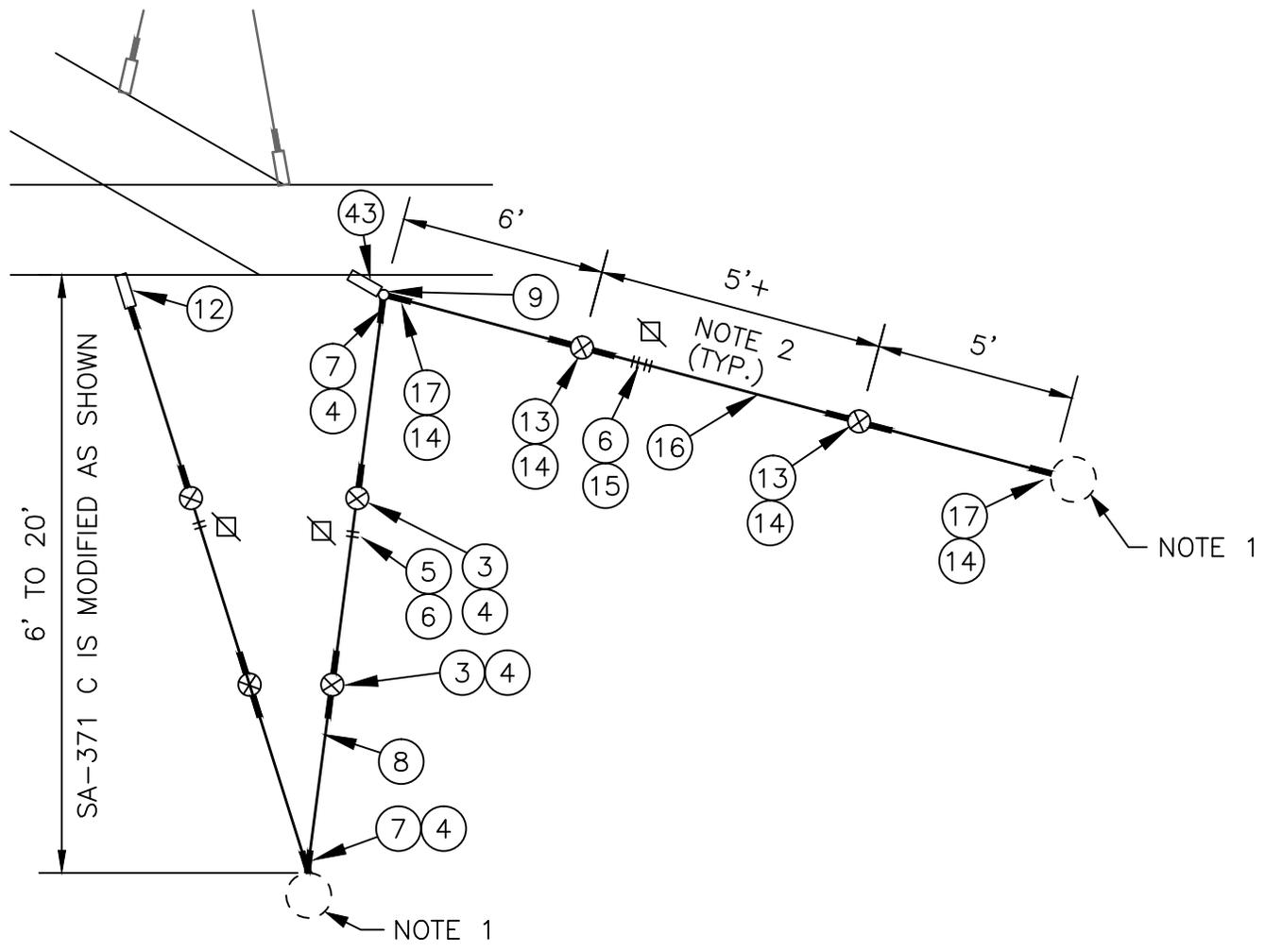
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APPROVED: <b>D CRIPPEN</b>
DSGN/DWN: <b>D GREER/TMB/LSA</b>



METRO TRANSIT DIVISION TROLLEY STANDARDS
SWITCH PULLOFFS

DATE: JULY 2016
STD DET NO: SA-371.7
SHT NO: 7 9

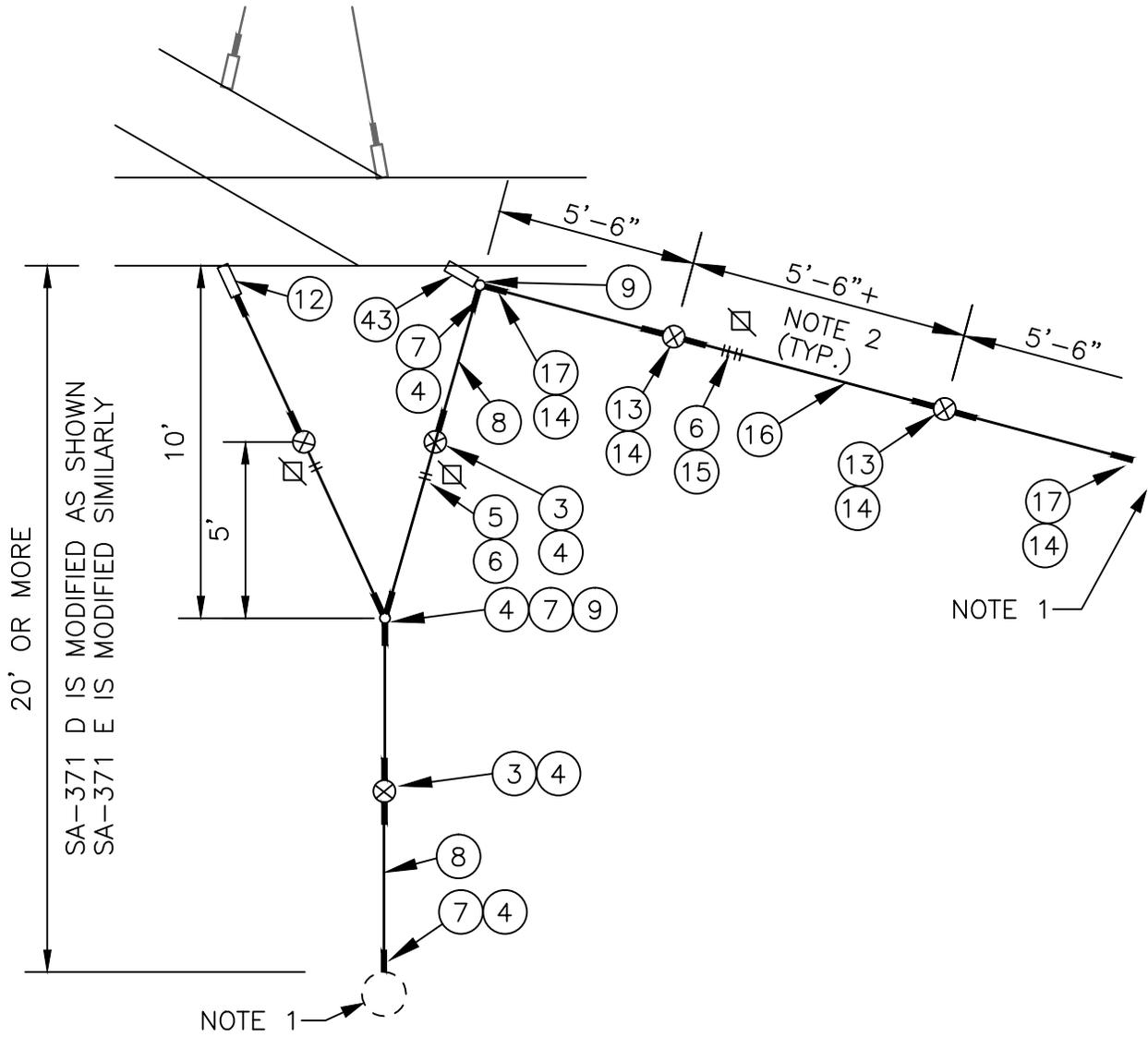
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SA-371H

				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: <b>JULY 2016</b>	
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: <b>SA-371.8</b>			
				DSGN/DWN: <b>D GREER/TMB/LSA</b>			SWITCH PULLOFFS		SHT NO: <b>8 9</b>	
No.	REVISION	BY	APPD	DATE						

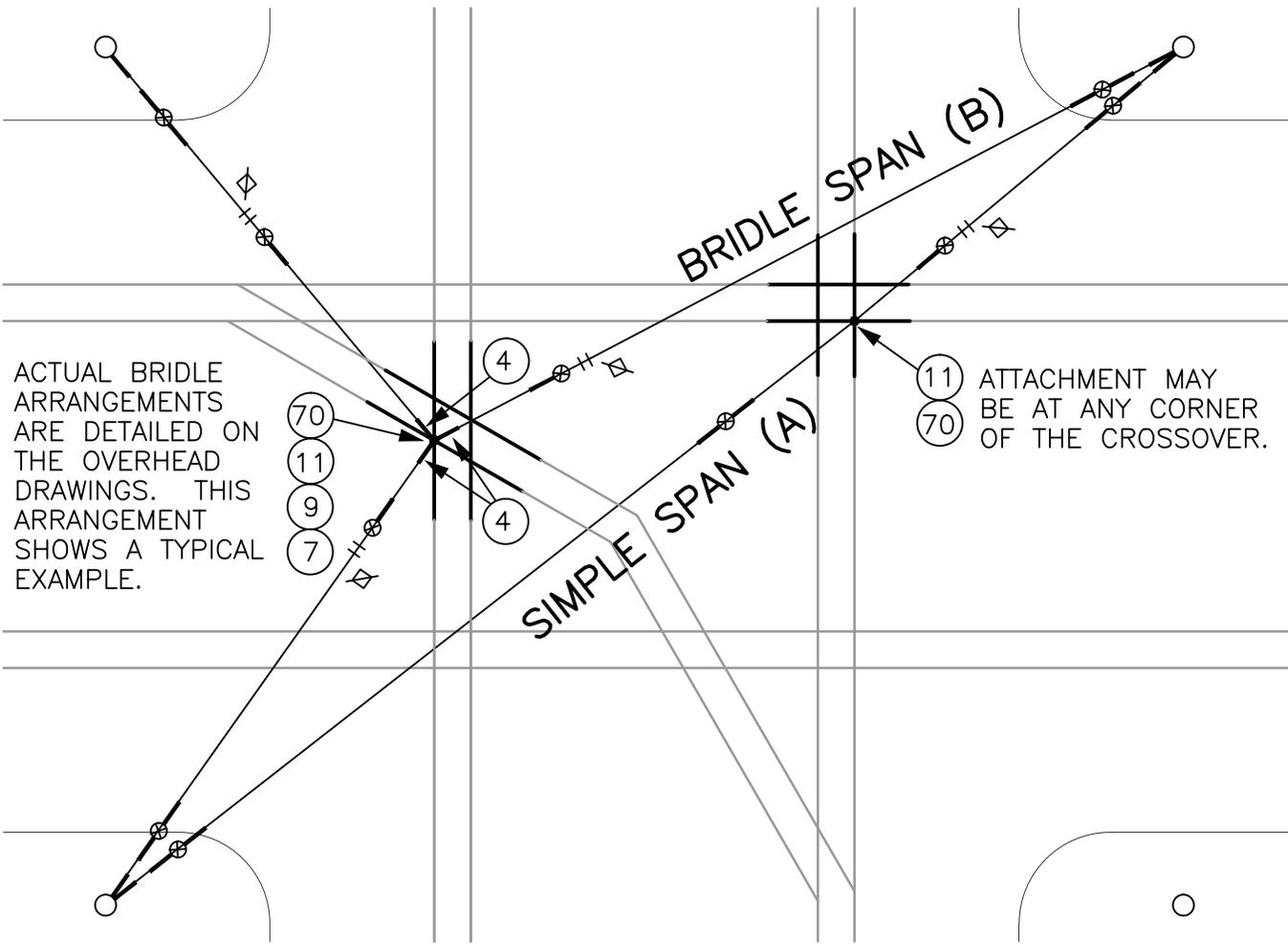
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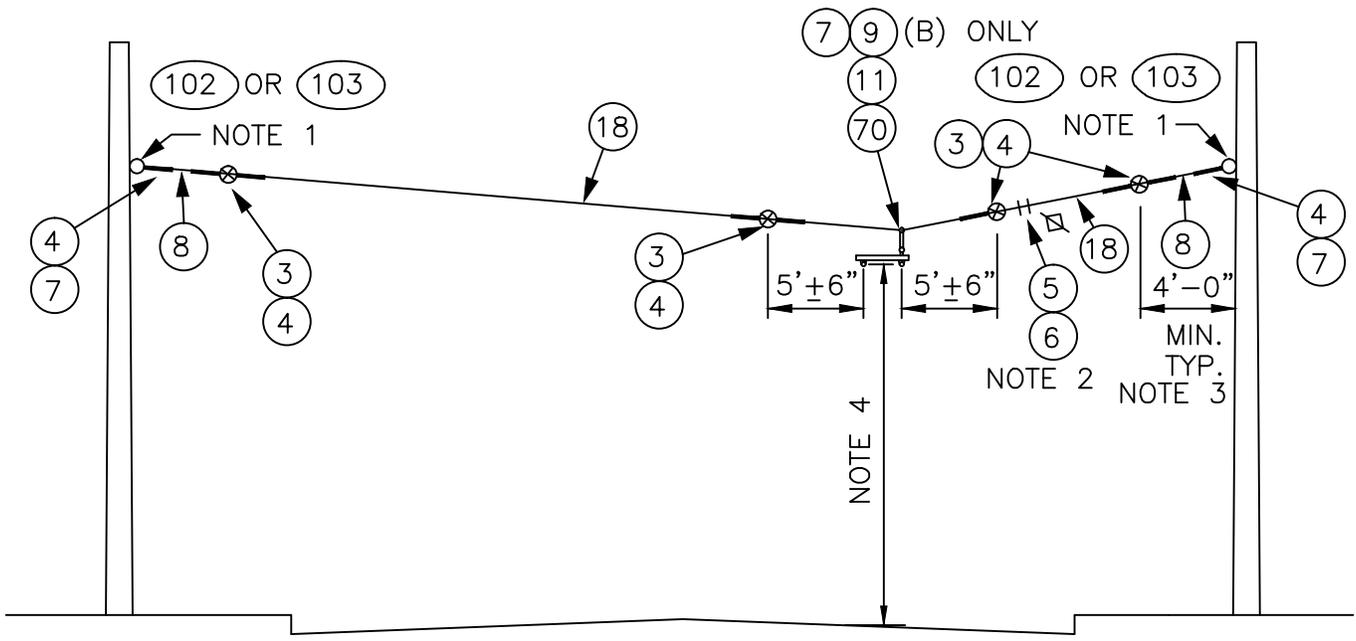
SA-371J

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				APPROVED: <b>D CRIPPEN</b>			SWITCH PULLOFFS		STD DET NO: <b>SA-371.9</b>	
				DSGN/DWN: <b>D GREER/TMB/LSA</b>					SHT NO: <b>9 9</b>	
No.	REVISION	BY	APPD	DATE						

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 PLOTTED: Jul 27, 2016 05:27:00pm By anders



PLAN



No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
**A WOLAK**

APPROVED:  
**D CRIPPEN**

DSGN/DWN:  
**D GREER/TMB/LSA**



METRO TRANSIT DIVISION  
 TROLLEY STANDARDS

**CROSSOVER HOLDUP**  
 SIMPLE SPAN (A)  
 BRIDLE SPAN (B)

DATE:	JULY 2016
STD DET NO:	SA-372.1
SHT NO:	1 2

**NOTES**

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "N". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. SEE SA-370 FOR LIMITED SPACE VARIANCES. SEE SA-167 FOR INSULATED GUY CRITERIA.
4. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

**MATERIAL LIST (A)**

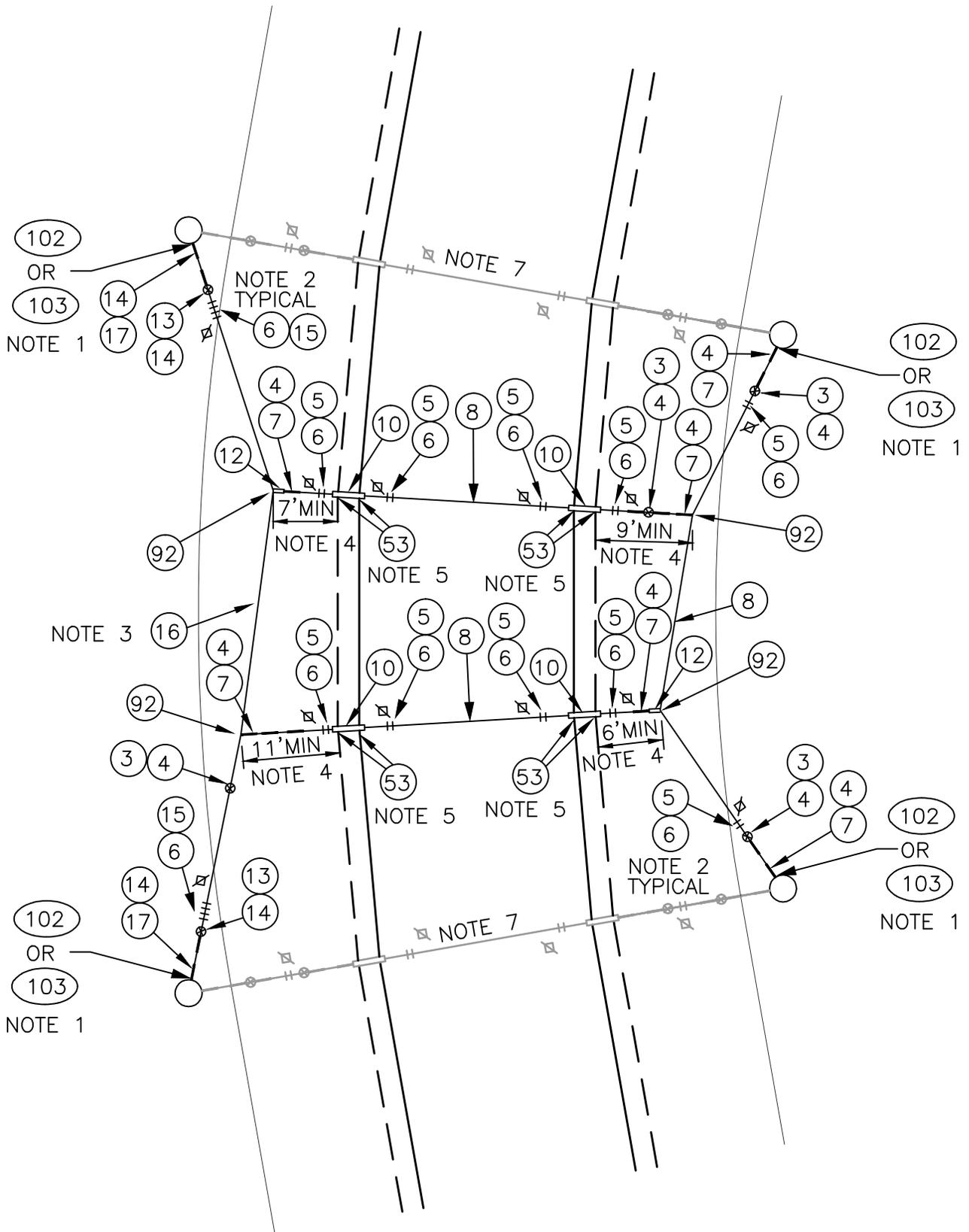
ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	9	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	2	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
11	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
18	VARIES	GUY STRAND, COVERED	COPPERWELD	8MI
70	1	EYEBOLT, 5/8" X 6" W/2 NUTS & LOCKWASHER		
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

**MATERIAL LIST (B)**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	6	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	15	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	6	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	6	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
09	1	BULL RING	WABCO	18567-2000
11	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
18	VARIES	GUY STRAND, COVERED	COPPERWELD	8MI
70	1	EYEBOLT, 5/8" X 6" W/2 NUTS & LOCKWASHER		
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>CROSSOVER HOLDUP                  SPAN NOTES                  &amp; MATERIAL</b>		DATE: JULY 2016	
				APPROVED: <b>D CRIPPEN</b>					STD DET NO: SA-372.2	
				DSGN/DWN: <b>D GREER/TMB/LSA</b>					SHT NO: 2 2	
No.	REVISION	BY	APPD	DATE						

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**MULTI RAIL CURVE TWO WAY TRAFFIC**

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No.	REVISION	BY	APPD	DATE

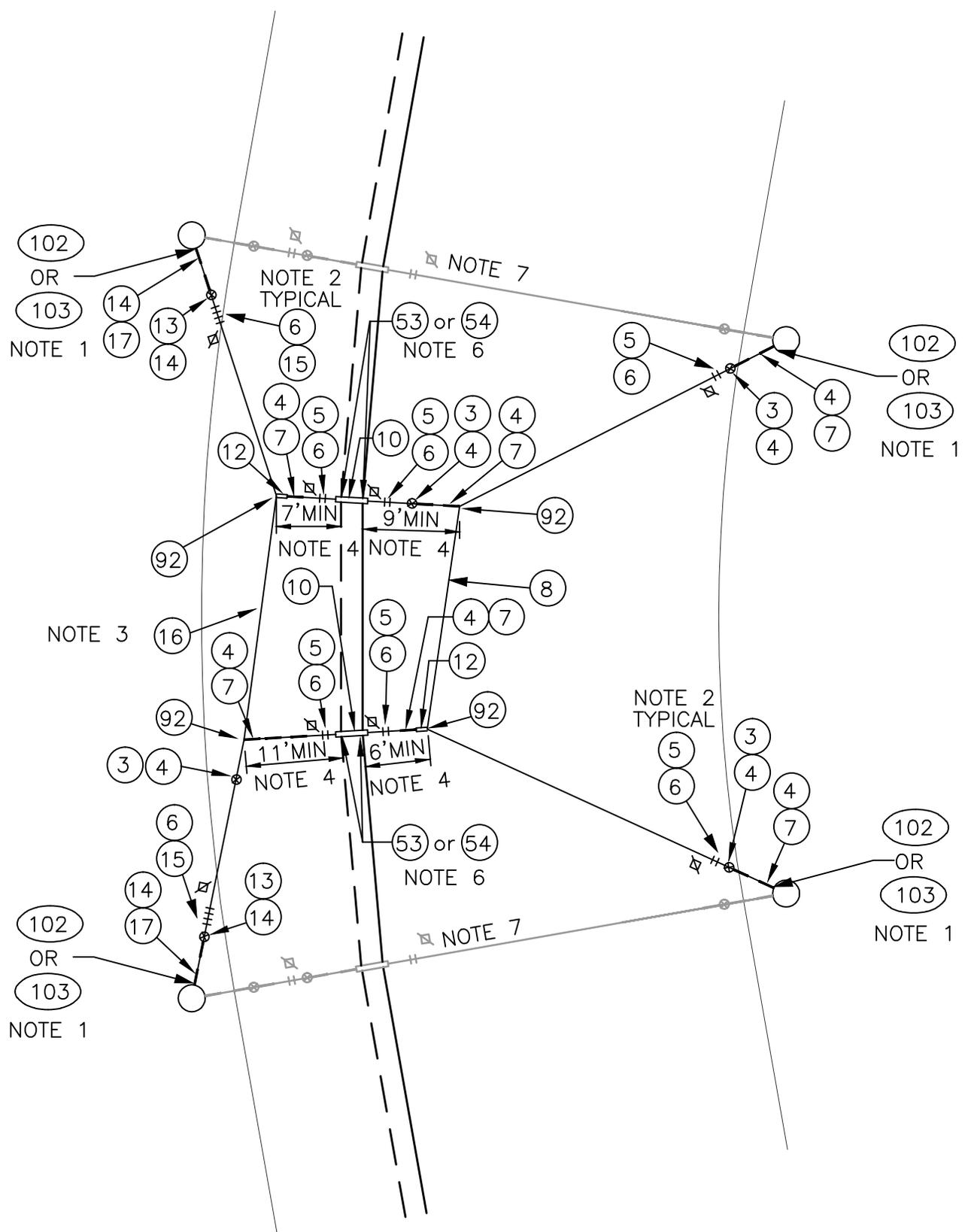
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**A WOLAK**  
 APPROVED:  
**D CRIPPEN**  
 DSGN/DWN:  
**D GREER/DOW/LSA**



METRO TRANSIT DIVISION  
 TROLLEY STANDARDS  
**CONVENTIONAL CURVE  
 WITH CURVE RAILS**

DATE:	JULY 2016
STD DET NO:	SA-373.1
SHT NO:	1 4

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### MULTI RAIL CURVE ONE WAY TRAFFIC

No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
**A WOLAK**  
 APPROVED:  
**D CRIPPEN**  
 DSGN/DWN:  
**D GREER/DOW/LSA**



METRO TRANSIT DIVISION  
 TROLLEY STANDARDS  
**CONVENTIONAL CURVE  
 WITH CURVE RAILS**

DATE:	JULY 2016
STD DET NO:	SA-373.2
SHT NO:	2 4



**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	VARIES	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	VARIES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	VARIES	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
12	VARIES	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
13	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	506
14	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3115
15	VARIES	WIRE ROPE CLIP, 3/8"	CROSBY	G450
16	VARIES	GUY STRAND	COPPERWELD	16M
17	VARIES	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
53	VARIES	CURVE RAIL (<1° TO 5° 2 FT LG)	K & M	851 B412/0
54	VARIES	CURVE RAIL (>5° TO 7.5° 4 FT LG)	K & M	851 B412/1
92	VARIES	ANGLE CLAMP, DUCTILE IRON	ANDERSON/ SQUARE D	82860-2000
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

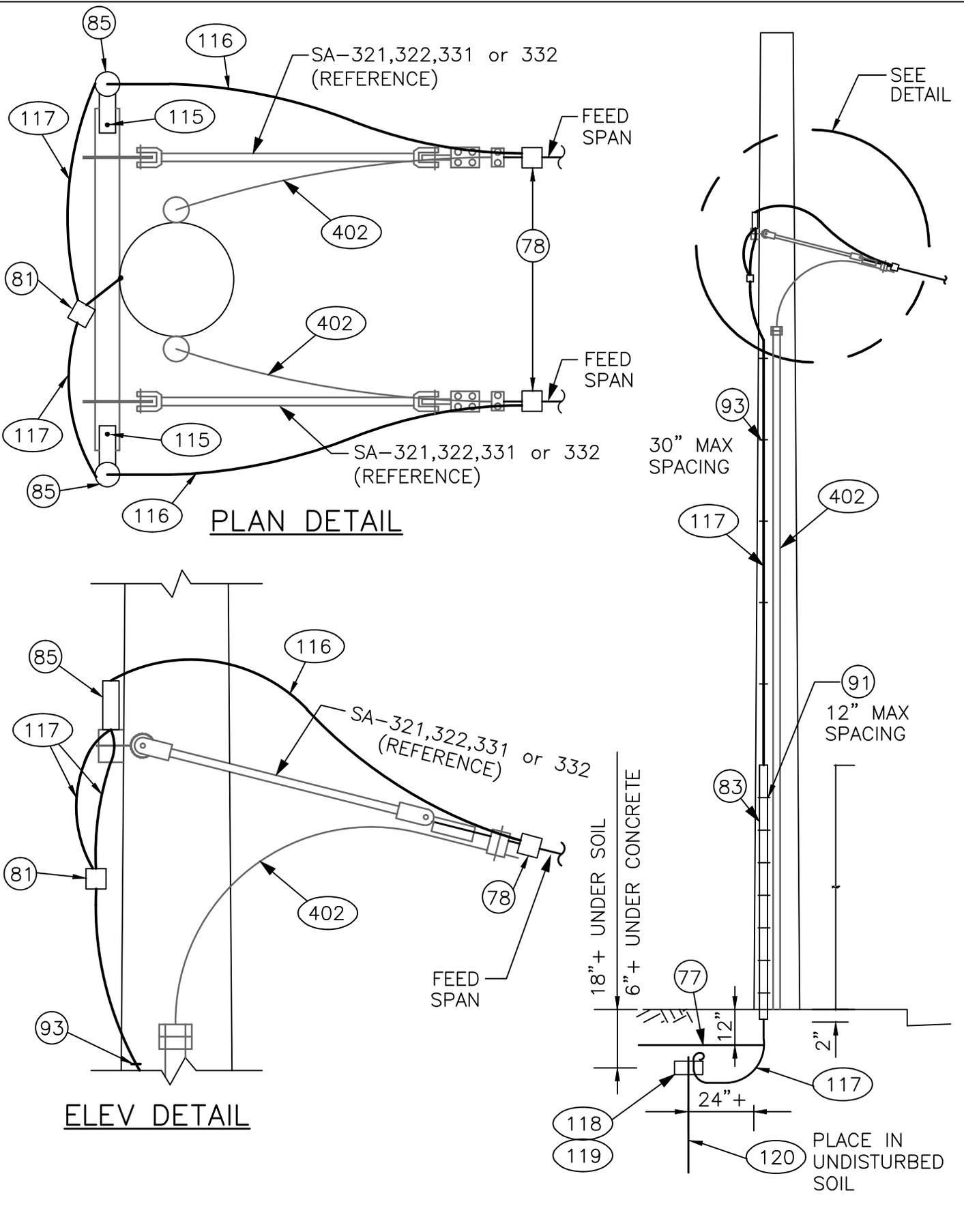
**NOTES**

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "N". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. IF LOAD SHOWN ON OVERHEAD DRAWINGS IS LESS THAN 2500 LBS, THEN ITEM 8 MAY BE USED INSTEAD OF ITEM 16. THE ASSOCIATED ITEMS SHALL ALSO BE CHANGED I.E. 3 FOR 13, 4 FOR 14, 5 FOR 15 AND 7 FOR 17.
4. THE DISTANCE FROM THE TROLLEY WIRE TO THE SUPPORT CATENARY WIRE SHALL BE AS SHOWN ON THE OVERHEAD DRAWINGS. THE DISTANCES ON SA-373 ARE SHOWN TO DEFINE PARTS REQUIRED FOR DISTANCE RANGES ONLY.
5. ANGLE VARIES FROM 1° TO 5°.
6. USE ITEM 53 WHEN ANGLE VARIES FROM 1° TO 5°. USE ITEM 54 WHEN ANGLE VARIES FROM 5° TO 7.5°. TROLLEY WIRE SHALL NOT BE TIED TOGETHER AS SHOWN ON SHEET 1 WHEN USING ITEM 54. USE SHEET 2, IF TWO WAY TROLLEY WIRE USES ITEM 54, AND TREAT EACH TRACK SEPARATELY.
7. END SPAN SHOWN FOR REFERENCE ONLY, ACTUAL SPAN USED SHALL BE DEFINED ON THE OVERHEAD DRAWINGS.

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					STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: JULY 2016
					APPROVED: <b>D CRIPPEN</b>		CONVENTIONAL CURVE WITH CURVE RAILS	STD DET NO: SA-373.4
					DSGN/DWN: <b>D GREER/DOW/LSA</b>			SHT NO: 4 4
No.	REVISION	BY	APPD	DATE				

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No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
**A WOLAK**  
 APPROVED:  
**D CRIPPEN**  
 DSGN/DWN:  
**D GREER/MM/LSA**

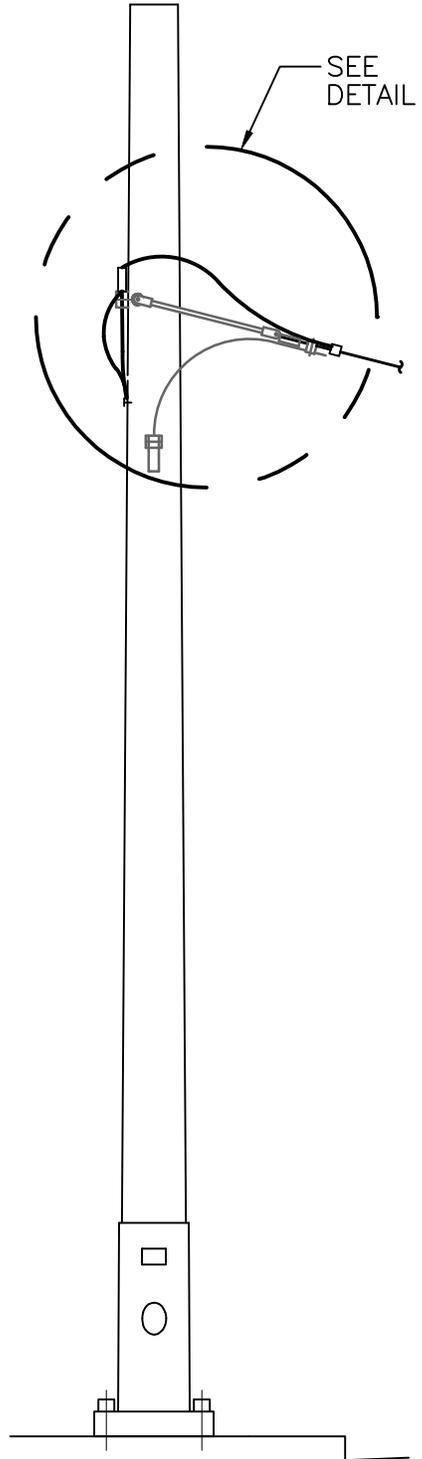
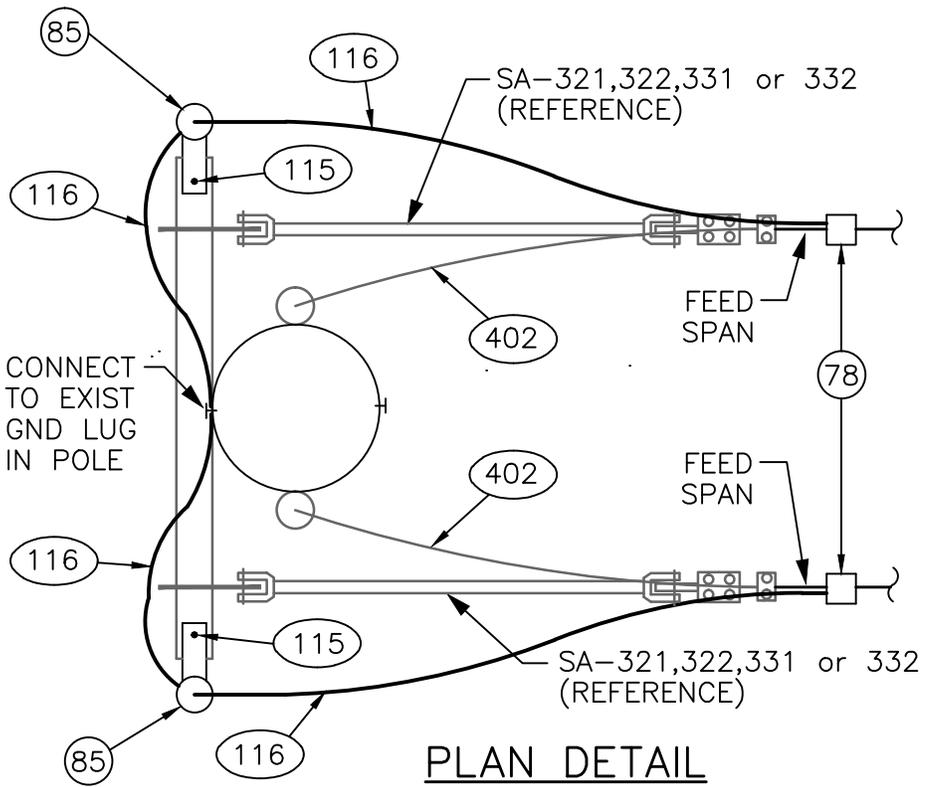


METRO TRANSIT DIVISION  
 TROLLEY STANDARDS  
**LIGHTNING ARRESTERS  
 DOUBLE FEEDER RISER  
 (WOOD POLE)**

DATE:	JULY 2016
STD DET NO:	SA-401.1
SHT NO:	1 6



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 PLOTTED: Jul 27, 2016 05:50:13pm By anders



No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
**A WOLAK**

APPROVED:  
**D CRIPPEN**

DSGN/DWN:  
**D GREER/MM/LSA**

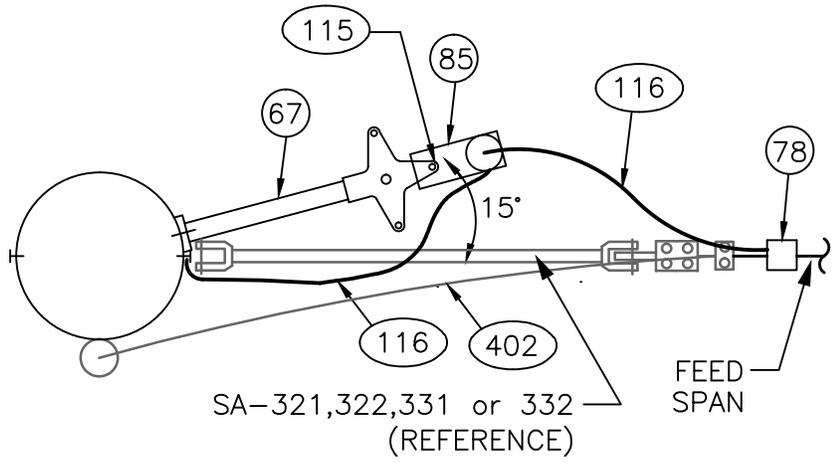


METRO TRANSIT DIVISION  
 TROLLEY STANDARDS

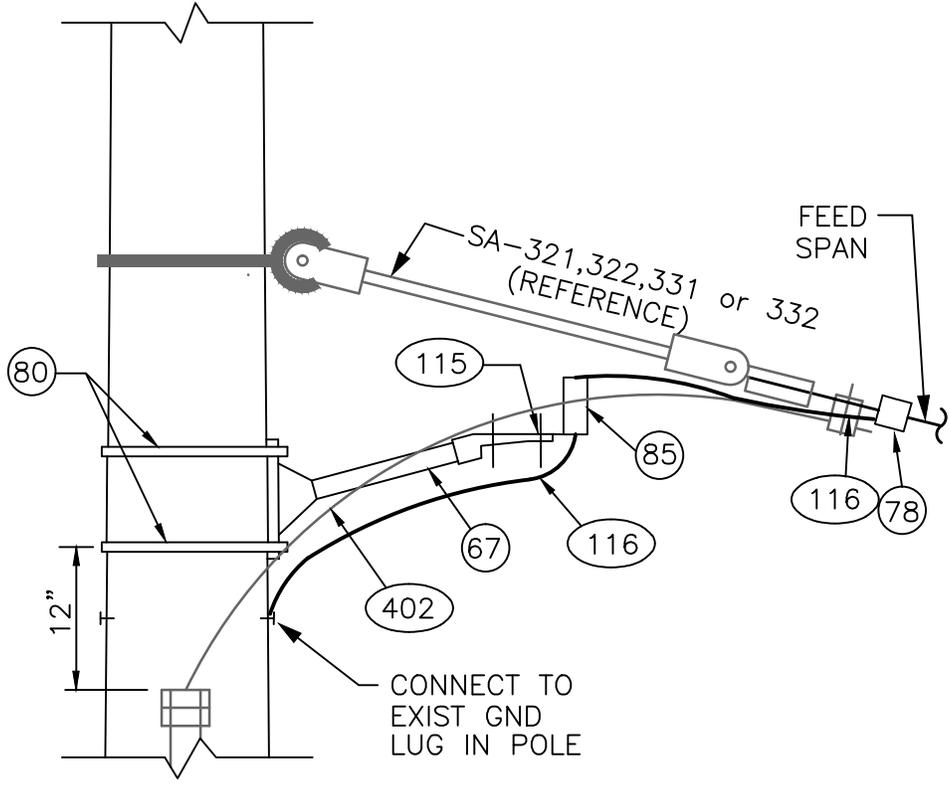
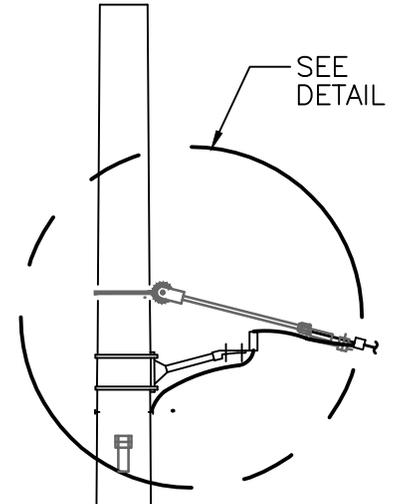
**LIGHTNING ARRESTERS  
 DOUBLE FEEDER RISER  
 (STEEL POLE)**

DATE: <b>JULY 2016</b>
STD DET NO: <b>SA-401.3</b>
SHT NO: <b>3 6</b>

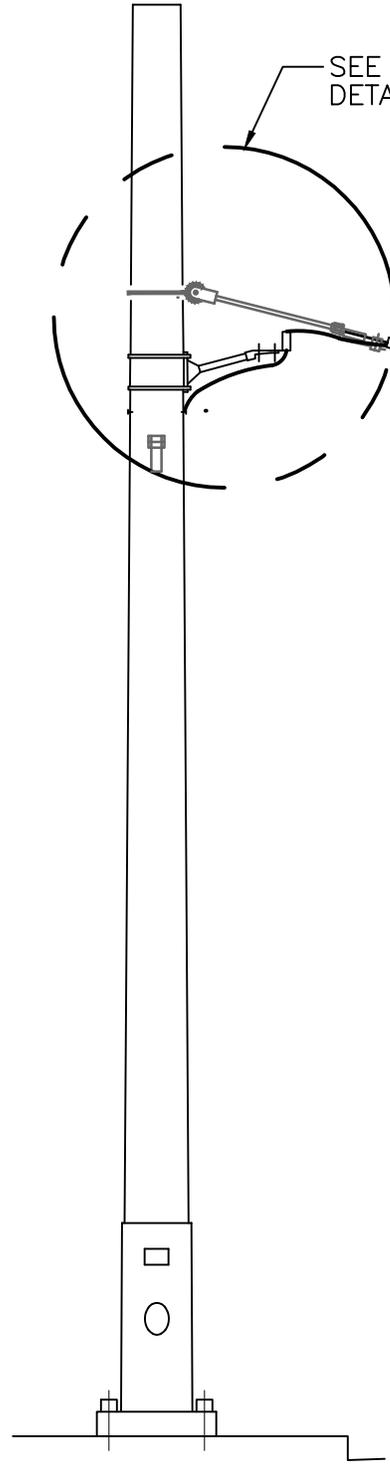
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**PLAN DETAIL**



**ELEV DETAIL**



No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
**A WOLAK**  
 APPROVED:  
**D CRIPPEN**  
 DSGN/DWN:  
**D GREER/MM/LSA**



METRO TRANSIT DIVISION  
 TROLLEY STANDARDS  
**LIGHTNING ARRESTERS  
 SINGLE FEEDER RISER  
 (STEEL POLE)**

DATE:	JULY 2016
STD DET NO:	SA-401.4
SHT NO:	4 6

**WOOD POLE SINGLE FEEDER MATERIAL LIST (SEE PAGE 2)**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
67	1	CLOVERLEAF EPOXIROD STANDOFF	CHANCE	C653-1038
77	AS REQD	ELEC WARNING TAPE, 6" YELLOW	BRADY	UT 20-Y6
78	1	CONNECTOR, PARALLEL CLAMP	BURNDY	QPX342C
83	1	MOLDING, PLASTIC, GROUND WIRE, 1/2" X 1/16" X 8'	JOSLYN	PM128
85	1	1000 VOLT DC ARRESTOR 970 MCOV	IMPULSE	P/N 1057
91	AS REQD	STAPLES, ROLLED POINT, GALV, 2" X 1/2" X 0.162"	JOSLYN	J156
93	AS REQD	STAPLES, ROLLED POINT, GALV, 1 3/4" X 1/4" X 0.148"	JOSLYN	J1673
115	1	STAINLESS STEEL BOLT WITH WASHERS & LOCK WASHERS		
116	*	WIRE, 2 OR 5 KV, #4 AWG CU, JACKETED, UNSHIELDED		
117	VARIES	WIRE, #6 AWG CU, SOLID, SOFT, 0.031" POLYETHYLENE INSULATED		
118	1	GROUND ROD CLAMP	COPPERWELD	ABH58
119	AS REQD	CONDUCTIVE & ANTI-SEIZE COMPOUND (KOPR-SHIELD)	THOMAS & BETTS	CP-8 OR CP-16
120	1	GROUND ROD, 5/8" X 10'	COPPERWELD OR JOSLYN	GR5810 J8340
121	2	LAG SCREW, FETTER DRIVE, 5/8" X 5"	JOSLYN	J8765
402	AS REQD	FEEDER RISER	METRO STD	SA-402

**STEEL POLE SINGLE FEEDER MATERIAL LIST (SEE PAGE 4)**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
67	1	CLOVERLEAF EPOXIROD STANDOFF	CHANCE	C653-1038
78	1	CONNECTOR, PARALLEL CLAMP	BURNDY	QPX342C
80	AS REQD	3/4" X 0.030" SS BANDING TYPE 201	BAND-IT	C206
85	1	1000 VOLT DC ARRESTOR 970 MCOV	IMPULSE	P/N 1057
115	1	STAINLESS STEEL BOLT WITH WASHERS & LOCK WASHERS		
116	*	WIRE, 2 OR 5 KV, #4 AWG CU, JACKETED, UNSHIELDED		
402	AS REQD	FEEDER RISER	METRO STD	SA-402

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  LIGHTNING ARRESTER SINGLE FEEDER RISER MATERIAL LIST	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-401.5
				DSGN/DWN: <b>D GREER/MM/LSA</b>			SHT NO: 5 6
No.	REVISION	BY	APPD	DATE			

**WOOD POLE DOUBLE FEEDER MATERIAL LIST (SEE PAGE 1)**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
77	AS REQD	ELEC WARNING TAPE, 6" YELLOW	BRADY	UT 20-Y6
78	2	CONNECTOR, PARALLEL CLAMP	BURNDY	QPX342C
81	1	CONNECTOR, SERVICE, SPLIT BOLT	BURNDY	KS20
83	1	MOLDING, PLASTIC, GROUND WIRE, 1/2" X 1/16" X 8'	JOSLYN	PM128
85	2	1000 VOLT DC ARRESTOR 970 MCOV	IMPULSE	P/N 1057
91	AS REQD	STAPLES, ROLLED POINT, GALV, 2" X 1/2" X 0.162"	JOSLYN	J156
93	AS REQD	STAPLES, ROLLED POINT, GALV, 1 3/4" X 1/4" X 0.148"	JOSLYN	J1673
115	2	STAINLESS STEEL BOLT WITH WASHERS & LOCK WASHERS		
116	*	WIRE, 2 DR 5 KV, #4 AWG CU, JACKETED, UNSHIELDED		
117	VARIES	WIRE, #6 AWG CU, SOLID, SOFT, 0.031" POLYETHYLENE INSULATED		
118	1	GROUND ROD CLAMP	COPPERWELD	ABH58
119	AS REQD	CONDUCTIVE & ANTI-SEIZE COMPOUND (KOPR-SHIELD)	THOMAS & BETTS	CP-8 DR CP-16
120	1	GROUND ROD, 5/8" X 10'	COPPERWELD OR JOSLYN	GR5810 J8340
402	AS REQD	FEEDER RISER	METRO STD	SA-402

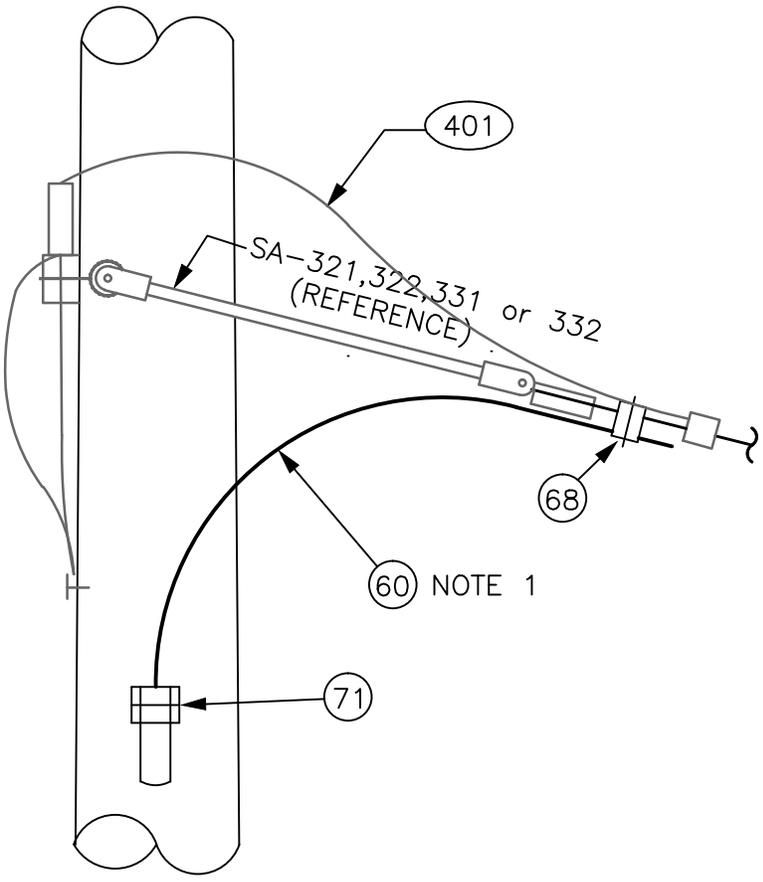
**STEEL POLE DOUBLE FEEDER MATERIAL LIST (SEE PAGE 3)**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
78	2	CONNECTOR, PARALLEL CLAMP	BURNDY	QPX342C
85	2	1000 VOLT DC ARRESTOR 970 MCOV	IMPULSE	P/N 1057
115	2	STAINLESS STEEL BOLT WITH WASHERS & LOCK WASHERS		
116	*	WIRE, 2 DR 5 KV, #4 AWG CU, JACKETED, UNSHIELDED		
402	AS REQD	FEEDER RISER	METRO STD	SA-402

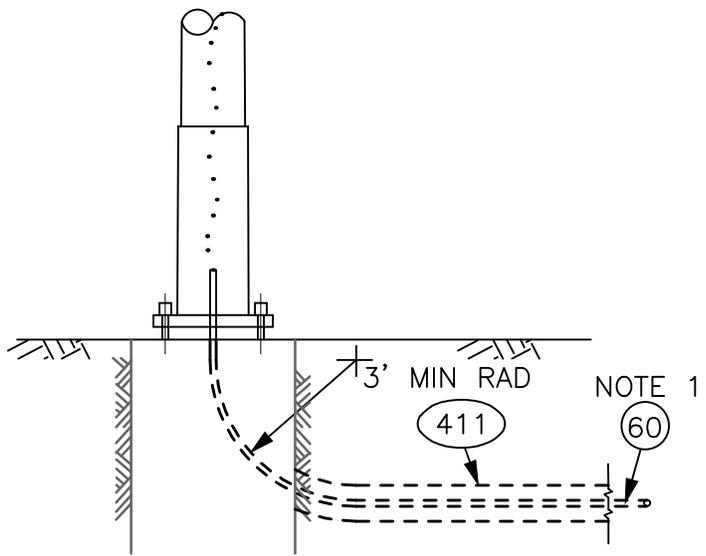
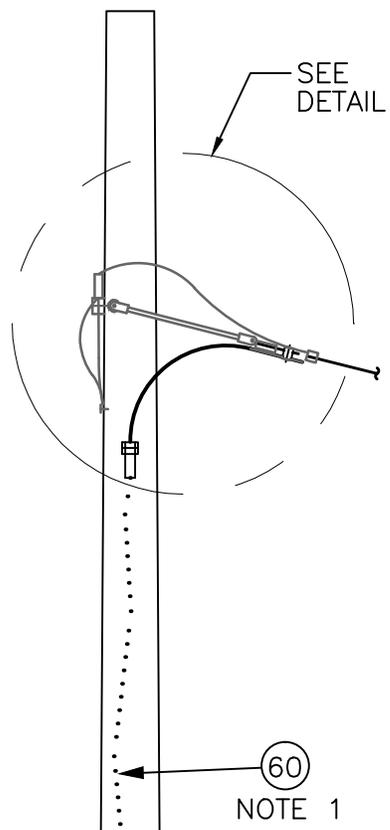
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				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>LIGHTNING ARRESTERS                  DOUBLE FEEDER                  MATERIAL LIST</b>	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-401.6
				DSGN/DWN: <b>D GREER/MM/LSA</b>			SHT NO: 6 6
No.	REVISION	BY	APPD	DATE			

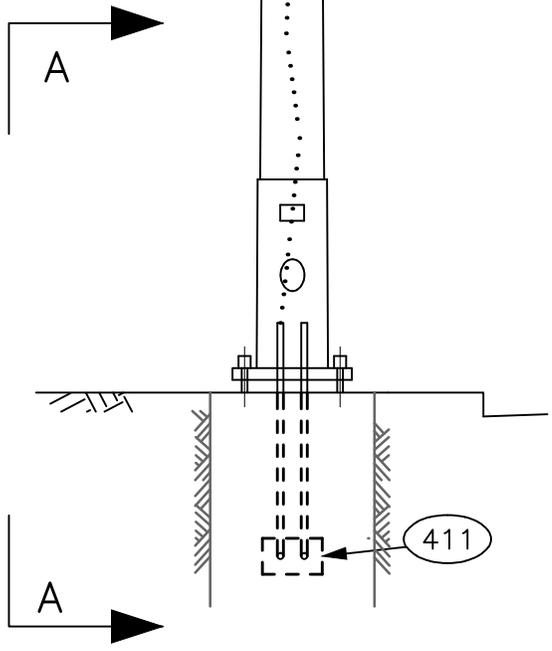
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**ELEV DETAIL**



**SECTION A-A**



No.	REVISION	BY	APPD	DATE

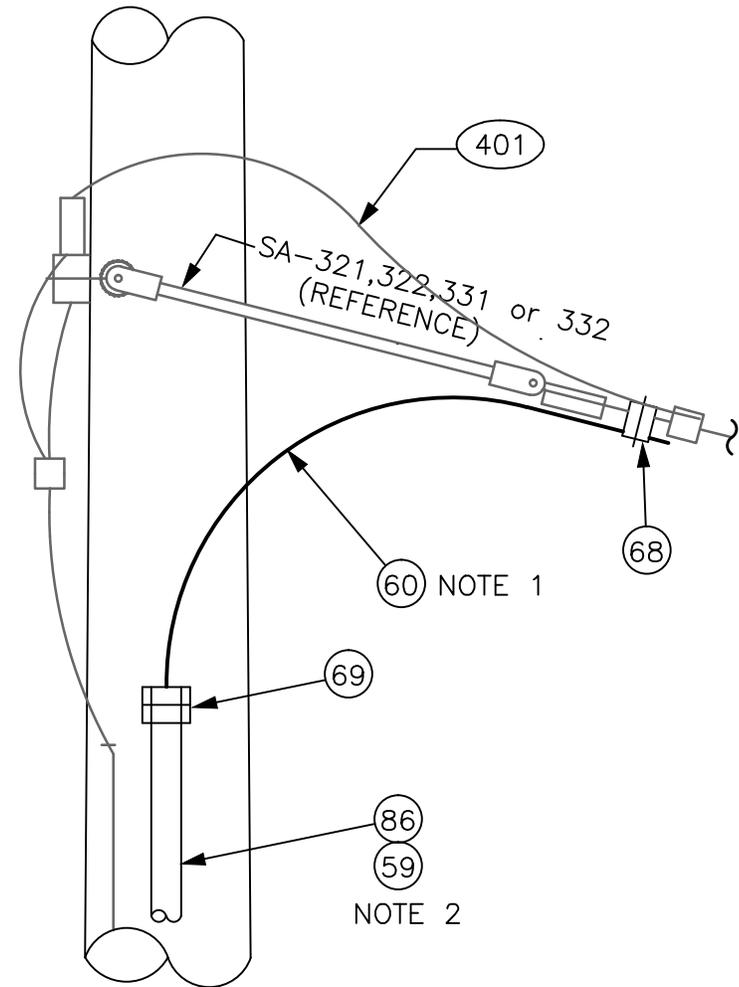
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**A WOLAK**  
 APPROVED:  
**D CRIPPEN**  
 DSGN/DWN:  
**D GREER/MM/LSA**



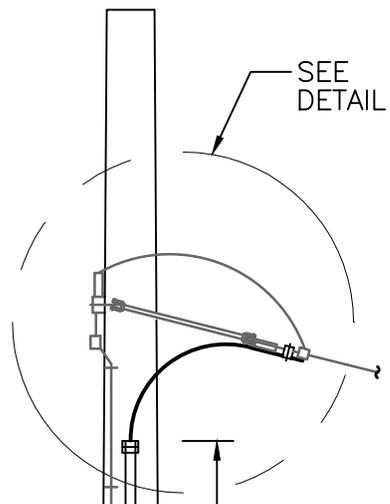
METRO TRANSIT DIVISION  
 TROLLEY STANDARDS  
**FEEDER RISER  
 (STEEL POLE)**

DATE:	JULY 2016
STD DET NO:	SA-402.1
SHT NO:	1 3

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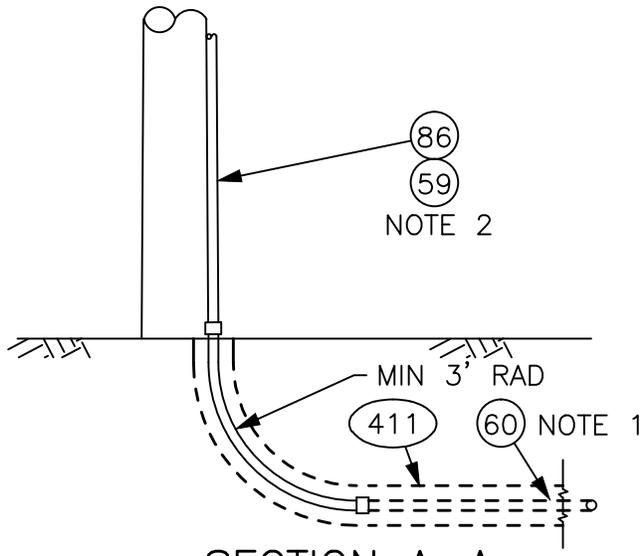


**ELEV DETAIL**

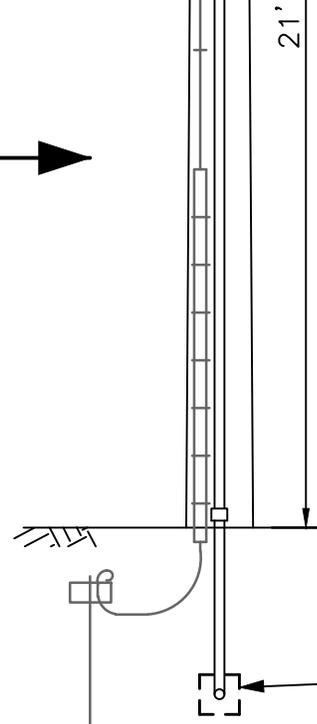
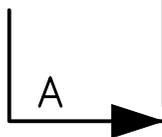
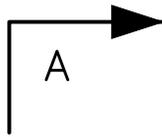


86  
59  
NOTE 2

86  
59  
NOTE 2



**SECTION A-A**



No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
**A WOLAK**  
 APPROVED:  
**D CRIPPEN**  
 DSGN/DWN:  
**D GREER/MM/LSA**



METRO TRANSIT DIVISION  
 TROLLEY STANDARDS  
**FEEDER RISER  
 (WOOD POLE)**

DATE: <b>JULY 2016</b>
STD DET NO: <b>SA-402.2</b>
SHT NO: <b>2 3</b>

**STEEL POLE MATERIAL LIST (SEE PAGE 1)**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
60	AS REQD	FEED SPAN CABLE 500 KCM CU, UN-SHIELDED, 5 KV EPR W/ PVC JACKET		
68	1 or 2	UNIVERSAL SERVICE CONNECTOR	BURNDY	KVSU 34
71	1 or 2	WATERTIGHT STR STRAIN RELIEF CONN 1 1/2" CONDUIT	□-Z-GEDNEY	SR 15012 H. D. GALV.
401	AS REQD	LIGHTNING ARRESTER	METRO STD	SA-401
411	AS REQD	DUCTBANK	METRO STD	SA-411

**WOOD POLE MATERIAL LIST (SEE PAGE 2)**

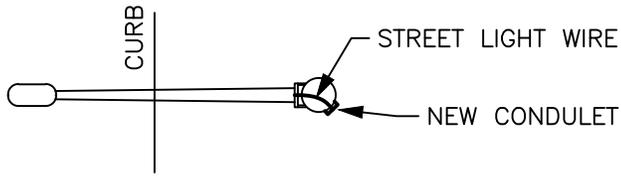
ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
59	AS REQD	CONDUIT CLAMP W/2" MTG SCREW		
60	AS REQD	FEED SPAN CABLE 500 KCM CU, UN-SHIELDED, 5 KV EPR W/ PVC JACKET		
68	1 or 2	UNIVERSAL SERVICE CONNECTOR	BURNDY	KVSU 34
69	1 or 2	SEALING BUSHING, TYPE KR W/ TYPE M CABLE SUPPORT 2-1/2" CONDUIT	□-Z-GEDNEY	KR250 & RPLG-2001-1
86	AS REQD	GALV RIGID STEEL CONDUIT		
401	AS REQD	LIGHTNING ARRESTER	METRO STD	SA-401
411	AS REQD	DUCTBANK	METRO STD	SA-411

**NOTES:**

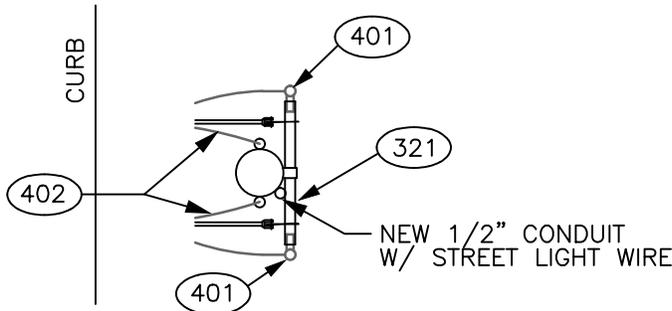
- ITEM 60 SHALL INCLUDE SUFFICIENT LENGTH TO CONNECT FEED SPAN WITH VAULT SHOWN ON DRAWINGS. COIL 20' AT VAULT END, AND COIL 10' AT FEED SPAN END.
- ITEMS 59 & 86 TO MEET REQUIREMENTS OF SEATTLE CITY LIGHT SPEC U7-10. SINGLE RISER IS SHOWN, A SECOND CONDUIT SHALL BE ADDED FOR DOUBLE FEED RISER.
- ITEM 86 & 411 CONDUIT TO BE PLASTIC COATED GALV RIGID STEEL IN BENDS.

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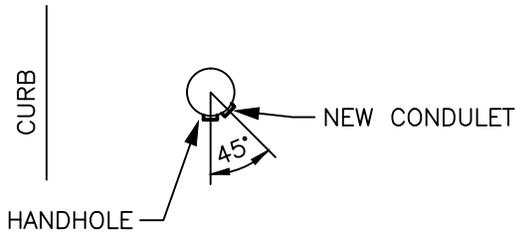
				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>FEEDER RISER                  MATERIAL LIST</b>	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-402.3
				DSGN/DWN: <b>D GREER/DOW/LSA</b>			SHT NO: 3 3
No.	REVISION	BY	APPD	DATE			



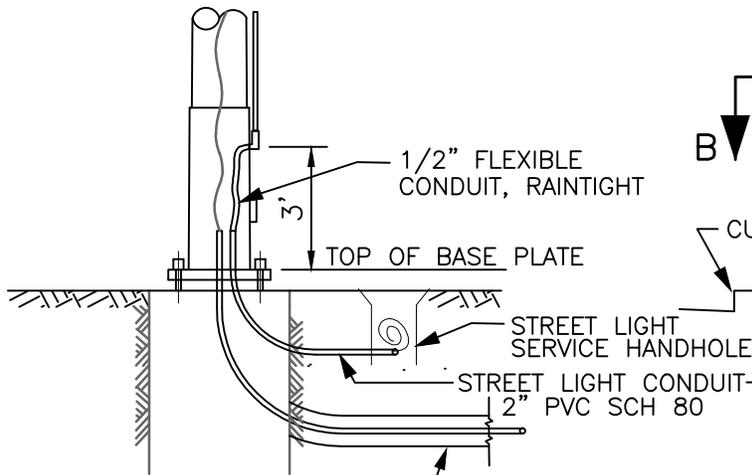
PLAN D-D



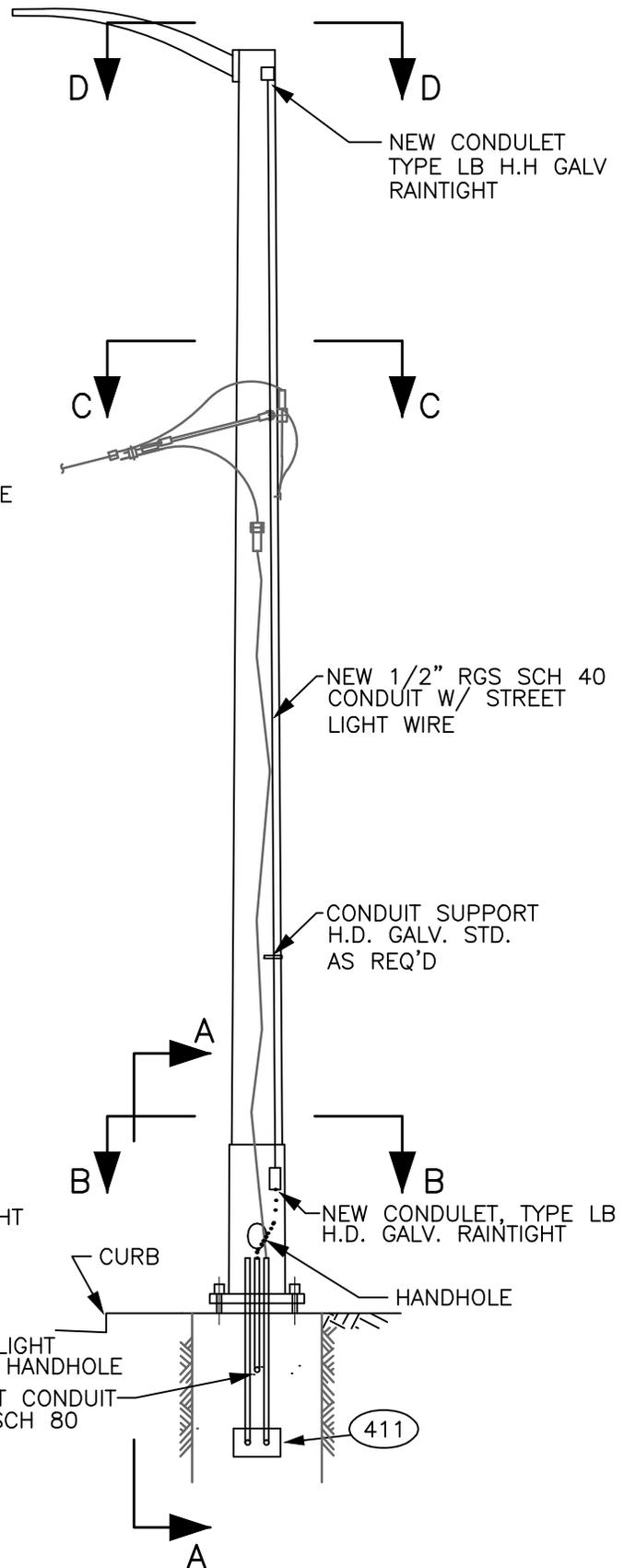
PLAN C-C



PLAN B-B



ELEVATION A-A



STD DET DEVELOPMENT:  
A WOLAK

APPROVED:  
D CRIPPEN

DSGN/DWN:  
D GREER/MM/LSA



METRO TRANSIT DIVISION  
TROLLEY STANDARDS  
**STEEL POLE FEEDER RISER  
WITH STREETLIGHT  
SPECIAL DETAILS**

DATE:	JULY 2016
STD DET NO.:	SA-403
SHT NO.:	1 1

No.	REVISION	BY	APPD	DATE

NEW SURFACE  
TO MATCH EXIST.  
PATCH ROADWAY  
PER SED STDS.

EXISTING SURFACE

CONTROLLED  
DENSITY FILL

36"  
MINIMUM  
NOTE 7

(77) ELECTRICAL  
WARNING TAPE  
BRADY UT-20-Y6

12"

4"  
COVER

#4 REBAR (4)

#3 TIES @ 18"

PVC DUCTS  
SIZE PER DWGS

3" MIN.  
COVER

RED CONCRETE ENCASEMENT

4"  
COVER

3"

### CONCRETE ENCASED DUCTBANK

SCALE: NOT TO SCALE

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No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT: A WOLAK
APPROVED: D CRIPPEN
DSGN/DWN: D GREER/DOW/LSA



METRO TRANSIT DIVISION TROLLEY STANDARDS
DUCTBANK CONCRETE ENCASED

DATE: JULY 2016
STD DET NO: SA-411.1
SHT NO: 1 2

## NOTES:

1. PVC conduit, fittings, and solvent shall meet the requirements of USDC Commercial Standard CS 207, UL 651, ASTM 2564, NEMA TC2, NEMA TC6 & NEMA TC9.
2. All work shall meet the requirements of City of Seattle Board of Public Works Rules: Chapter 4.40 – Street and Sidewalk Pavement Opening and Restoration Rules if duct is in Street Right of Way.
3. Concrete for duct shall develop a minimum compressive strength of 3000 PSI at 28 days, and shall be colored red by adding ten pounds of iron oxide per cubic yard of concrete. Max. aggregate size shall be 3/8”.
4. All reinforcing bars shall be deformed billet steel and shall meet the requirements of ASTM A615 Grade 60. All detailing of reinforcement shall meet the requirements of the MANUAL OF STANDARD PRACTICE For Detailing Reinforced Concrete Structures ACI-315 current edition.
5. Compacted trench backfill shall be suitable excavated native material, that is acceptable to the engineer. Backfill shall be firmly and thoroughly machine tamped to 95% maximum dry density under streets or sidewalks, and 90% maximum dry density under landscaped or unimproved areas.
6. Pavement patching shall meet the requirements of City of Seattle Department of Engineering Standard Plan No. 404A, if the duct is in street.
7. Burial depth shall be 48” minimum at street intersections (maximum depth shall be 72”). Maximum grade shall be 10%. Minimum grade shall be 0.25%.
8. Plastic coated GRS conduit shall be used to accommodate horizontal direction changes greater than 15°. The sweep shall be effected with a 12.5 ft minimum radius, and PVC adapter couplings as required. The

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					APPROVED: <b>D CRIPPEN</b>		<b>DUCTBANK CONCRETE ENCASED</b>	STD DET NO: SA-411.2
					DSGN/DWN: <b>D GREER/DOW/LSA</b>			SHT NO: 2 2
No.	REVISION	BY	APPD	DATE				

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NUMBER	TITLE	SHEETS
SA-500	DRAWING INDEX	1
SA-501	MASTER MATERIAL LIST	3
SA-511	TANGENT SPAN	1
SA-515	BRIDLE SPAN	1
SA-541	STEEL POLE BRACKET ASSEMBLY TANGENT CONST	2
SA-542	STEEL POLE BRACKET ASSEMBLY CURVE CONST	2
SA-549	STEEL POLE TANGENT FEEDER BRACKET ASSEMBLY	3
SA-551	WOOD POLE BRACKET ASSEMBLY TANGENT CONST	2
SA-552	WOOD POLE BRACKET ASSEMBLY CURVE CONST	2
SA-553	CONCRETE ATTACHMENT BRACKET ASSEMBLY CURVE CONST	2
SA-557	WOOD POLE BRACKET ASSEMBLY CURVE CONST (2 TRACKS)	2
SA-559	WOOD POLE TANGENT FEEDER BRACKET ASSEMBLY	3
SA-571	SPECIALWORK PULLOFFS	5
SA-572	DEAD END ASSEMBLY	2
SA-590	TEMPORARY INSULATION BOARD	1

					STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>WATERFRONT          STREETCAR          DRAWING INDEX</b>	DATE: <b>JULY 2016</b>
					APPROVED: <b>D CRIPPEN</b>			STD DET NO: <b>SA-500</b>
					DSGN/DWN: <b>D GREER/DOW/LSA</b>			SHT NO: <b>1 1</b>
No.	REVISION	BY	APP'D	DATE				

**MASTER MATERIAL LIST**

ITEM #	METRO STANDARD SA- WHICH USES THE ITEM
01	511, 515, 571, 590
02	511, 515, 590
03	511, 515, 542, 549, 552, 553, 557, 559, 571, 572
04	511, 515, 542, 549, 552, 553, 557, 559, 571, 572
05	511, 515, 542, 552, 553, 557, 571, 572
06	511, 515, 542, 552, 553, 557, 571, 572
07	511, 515, 542, 549, 552, 553, 557, 559, 571, 572
08	511, 515, 542, 549, 552, 553, 557, 559, 571, 572
09	515, 571, 572
10	549, 559
11	542, 549, 552, 553, 557, 559, 572
12	542, 552, 553, 557, 571
13	572
14	572
15	572
16	572
17	541, 542, 549, 551, 552, 553, 557, 559, 572
18	*
19	*
20	*
21	*
22	*
23	*
24	*
25	*
26	*
27	*
28	541, 542, 551, 552, 553, 557
29	*
30	541, 551
31	541, 551
32	*
33	*
34	*
35	*
36	*
37	*
38	542, 552, 553, 557
39	*
40	571
41	549, 559
42	549, 559

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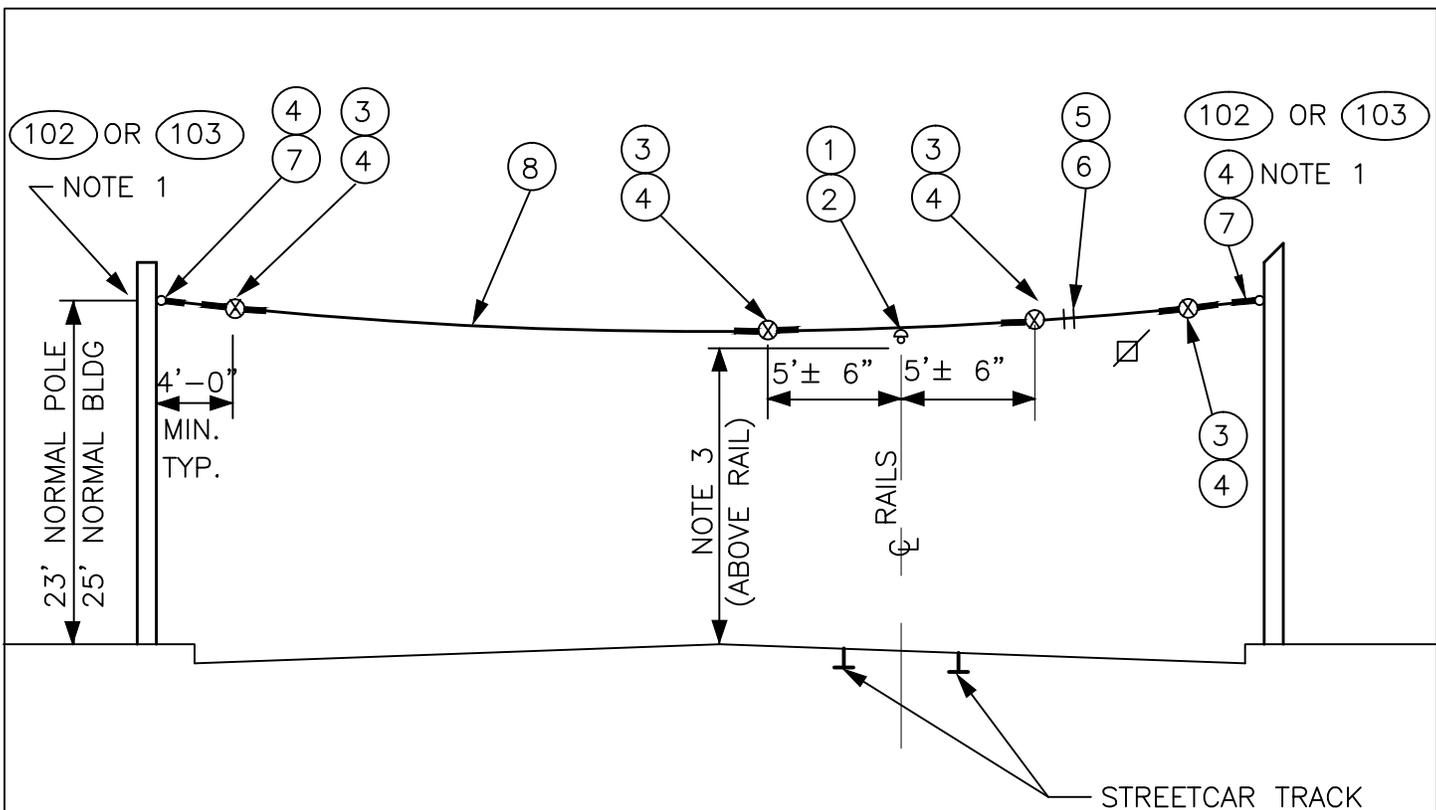
No.	REVISION	BY	APPD	DATE	STD DET DEVELOPMENT: <b>A WOLAK</b>	 King County Department of Transportation	METRO TRANSIT DIVISION TROLLEY STANDARDS  WFSC MASTER MATERIAL LIST SPECIAL DETAILS	DATE: JULY 2016
					APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-501.1
					DSGN/DWN: <b>D GREER/DOW/LSA</b>			SHT NO: 1 2

MASTER MATERIAL LIST

ITEM #	METRO STANDARD SA- WHICH USES THE ITEM
43	*
44	542, 552, 553, 557
45	542, 552, 553, 557
46	571
47	542, 552, 553, 557, 571
48	*
49	549, 559
50	549, 559
51	549, 559
52	549, 559
53	542, 552, 553, 557
54	542, 552, 553, 557
55	541, 542, 549, 551, 552, 553, 557, 559
56	541, 542, 549, 551, 552, 553, 557, 559
57	541, 542, 549, 551, 552, 553, 557, 559
58	*
59	*
60	549, 559
61	*
62	*
63	*
64	*
65	551, 552, 557, 559
66	*
67	*
68	*
69	*
70	*
71	*
72	*
73	571
74	590
75	590
76	*
77	*
78	*
79	541, 551
80	541, 551
81	*
82	*
83	*
84	*

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No.	REVISION	BY	APPD	DATE	STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS  WFSC MASTER MATERIAL LIST USAGE REFERENCE	DATE: JULY 2016
					APPROVED: D CRIPPEN			STD DET NO: SA-501.2
					DSGN/DWN: D GREER/DOW/LSA			SHT NO: 2 2



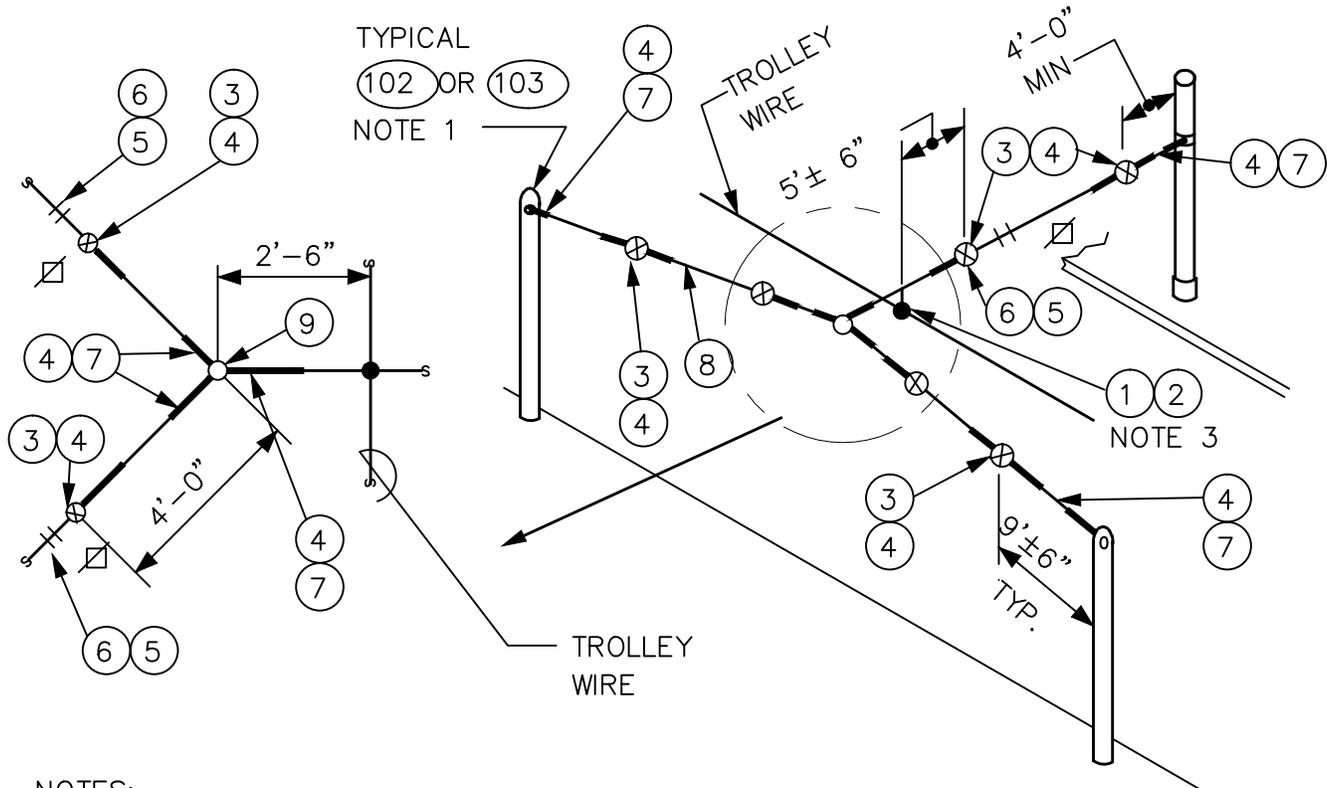
**NOTES:**

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT TO BE INDICATED AS REQUIRED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊘". PROVIDE WIRE ROPE CLIPS AT EACH LOCATION. SEE SA-166.
3. SEE SA-164 FOR VERTICAL DIMENSION TO TROLLEY WIRE.

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	1	DETROIT CLAMP ASSY	WABCO	19293-3007
02	1	AGC TANGENT SPAN HANGER	WABCO	19360-2000
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	9	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	2	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

No.      REVISION      BY      APPD      DATE				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>TANGENT SPAN</b>	DATE: <b>JULY 2016</b>
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: <b>SA-511</b>
				DSGN/DWN: <b>D GREER/TMB/LSA</b>			SHT NO: <b>1 1</b>



NOTES:

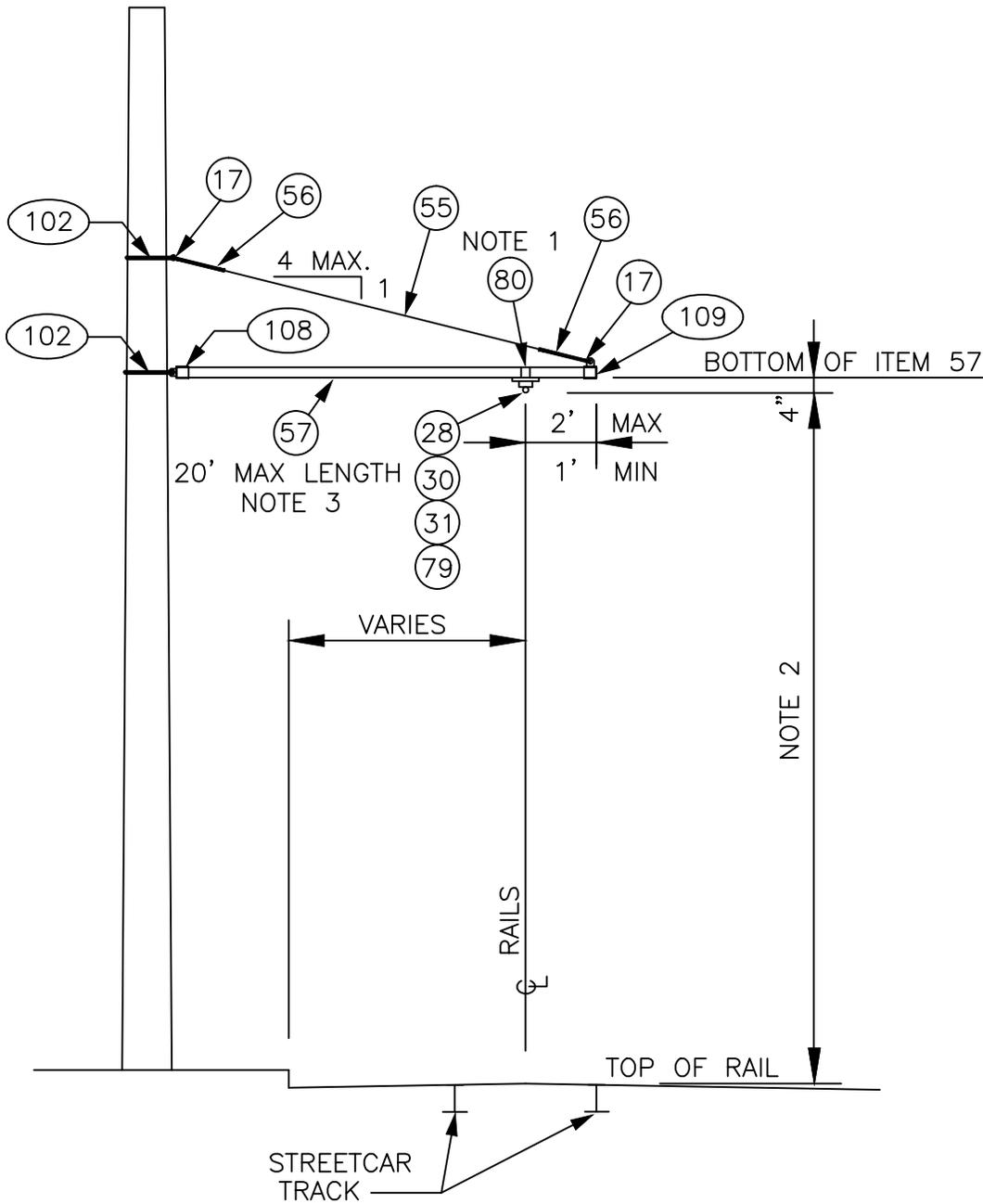
1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT TO BE INDICATED AS REQUIRED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY " . PROVIDE WIRE ROPE CLIPS AT EACH LOCATION. SEE SA-166.
3. SEE SA-164 FOR VERTICAL DIMENSION TO TROLLEY WIRE.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	1	DETROIT CLAMP ASSY	WABCO	19293-3007
02	1	AGC TANGENT SPAN HANGER	WABCO	19360-2000
03	6	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	15	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	6	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	6	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIABLES	GUY STRAND	COPPERWELD	8M
09	1	BULL RING	WABCO	18567-2000
102	VARIABLES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIABLES	WOOD POLE EYEBOLT	METRO STD	SA-103

No.	REVISION	BY	APPD	DATE	STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS  BRIDLE SPAN	DATE: JULY 2016
					APPROVED: D CRIPPEN			STD DET NO: SA-515
					DSGN/DWN: D GREER/TMB/LSA			SHT NO: 1 1

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**NOTES:**

1. STAINLESS STEEL BANDING SHALL BE WRAPPED DOUBLE THICKNESS AROUND ITEM 57 PRIOR TO CLAMPING.
2. SEE SA-164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
3. DRILL 1/2" HOLE IN TUBE TO MATCH HOLE IN ITEMS 108 & 109 FOR INSERTION OF 3/8" SS BOLT.

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				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: JULY 2016	
				APPROVED: <b>D CRIPPEN</b>			STEEL POLE BRACKET ASSEMBLY TANGENT CONSTRUCTION		STD DET NO: SA-541.1	
				DSGN/DWN: <b>D GREER/MM/LSA</b>					SHT NO: 1 2	
No.	REVISION	BY	APPD	DATE						

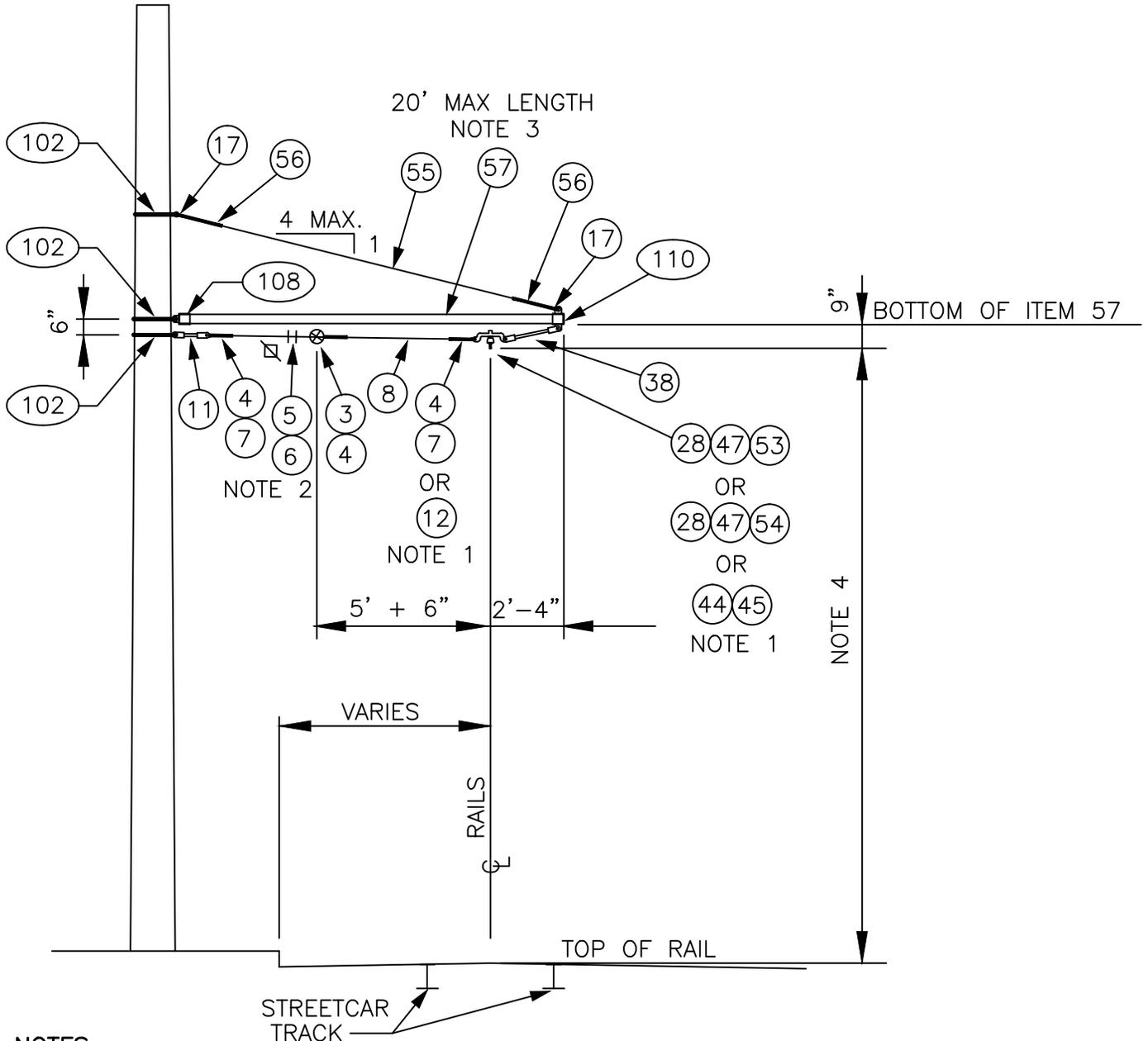
MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
28	1	INSULATOR SPOOL	WABCO	16835-2000
30	1	TROLLEY SUPPORT-LARGE PIPE ARMS	WABCO	54940-4001
31	1	SPRING DETROIT CLAMP	WABCO	54959-3001
55	VARIES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	2	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 3 1/2" Ø X 1/2"	MORRISON MOLDED FG	EXTREN SERIES 525
79	1	5/8" -11 UNC X 1 3/8" STUD		
80	VARIES	3/4" STAINLESS STEEL BANDING	BAND-IT	TYPE 201
102	2	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
109	1	MAST ARM ARM END CAP	METRO STD	SA-109

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  STEEL POLE BRACKET ASSEMBLY TANGENT CONSTRUCTION	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-541.2
				DSGN/DWN: <b>D GREER/MM/LSA</b>			SHT NO: 2 2
No.	REVISION	BY	APPD	DATE			

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**NOTES:**

1. ITEMS 4,7,28,50 & 53 TO BE USED FOR 1° TO 5° ANGLE TURN. ITEMS 4, 7,28,47 & 54 TO BE USED FOR 5° TO 7.5° ANGLE TURN. ITEMS 12,44, & 45 TO BE USED FOR 8° OR GREATER ANGLE TURN. SEGMENTS SHALL NOT BE USED FOR ANGLES GREATER THAN 12° WHEN POLE IS ON INSIDE OF CURVE.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. DRILL 1/2" HOLE IN TUBE TO MATCH HOLE IN ITEMS 108 & 109 FOR INSERTION OF 3/8" SS BOLT.
4. SEE SA-164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.

				STD DET DEVELOPMENT: <b>A WOLAK</b>		 <b>King County</b> Department of Transportation	METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			<b>STEEL POLE          BRACKET ASSEMBLY          CURVE CONSTRUCTION</b>	STD DET NO: SA-542.1
				DSGN/DWN: <b>D GREER/MM/LSA</b>			SHT NO: 1 2	
No.	REVISION	BY	APPD	DATE				

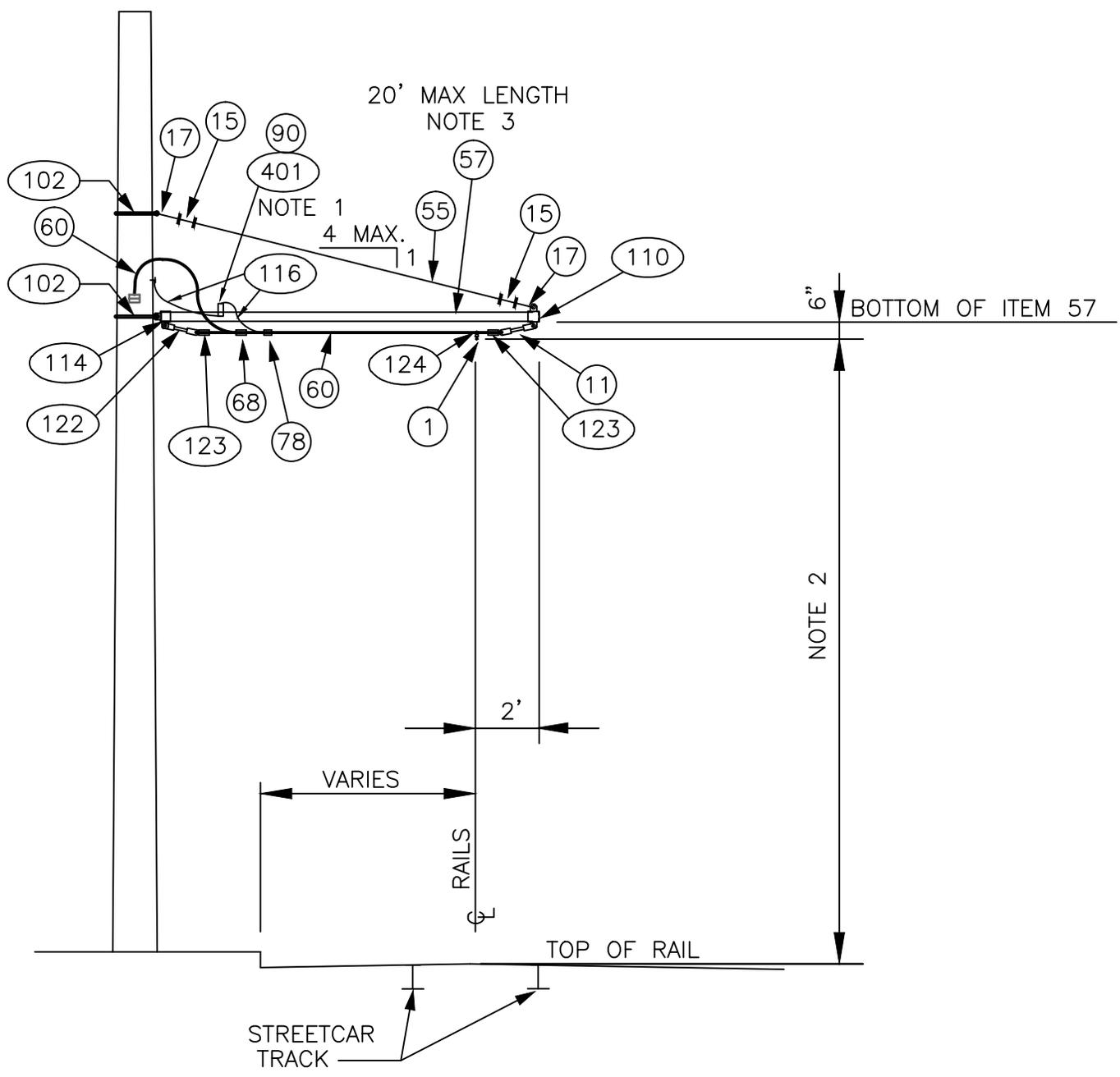
MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	1	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIABLES	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICITION TAPE, 3/4" (6 WRAPS)		
07	VARIABLES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIABLES	GUY STRAND	COPPERWELD	8M
11	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
12	VARIABLES	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
28	VARIABLES	INSULATOR SPOOL	WABCO	16835-2000
38	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6200
44	VARIABLES	RUNNER, 6 FT TYPE C, 8 TO 12 DEG	WABCO	21375-2000
45	VARIABLES	PLATE-STRAIN 5 TO 12 DEG	WABCO	20290-2000
47	VARIABLES	DOUBLE CURVE HANGER TYPE A-2	WABCO	14073-2000
53	VARIABLES	CURVE RAIL	K & M	851 B412/0
54	VARIABLES	CURVE RAIL	K & M	851 B412/1
55	VARIABLES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	2	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIABLES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 3 1/2" Ø X 1/2"	MORRISON MOLDED FG	EXTREN SERIES 525
102	3	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
110	1	MAST ARM UNDERSLING END CAP	METRO STD	SA-110

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  STEEL POLE BRACKET ASSEMBLY CURVE CONSTRUCTION	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-542.2
				DSGN/DWN: <b>D GREER/MM/LSA</b>			SHT NO: 2 2
No.	REVISION	BY	APPD	DATE			

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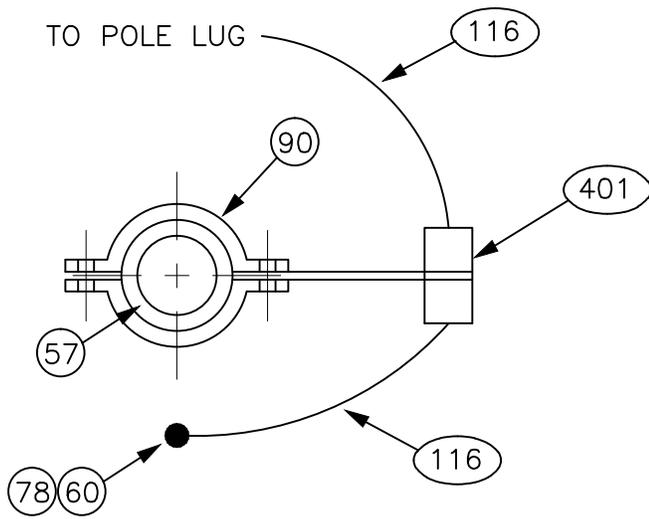


**NOTES:**

1. SEE DETAIL 1 ON SHEET 2 FOR DETAILS.
2. SEE SA-164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
3. DRILL 1/2" HOLE IN TUBE TO MATCH HOLE IN ITEMS 110 & 114 FOR INSERTION OF 3/8" SS BOLT.
4. ALL FERROUS METAL SHOULD BE HOT DIP GALV. AFTER FABRICATION.

					STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: JULY 2016	
					APPROVED: D CRIPPEN		STEEL POLE TANGENT FEEDER BRACKET ASSEMBLY	STD DET NO: SA-549.1	
					DSGN/DWN: D GREER/MM/LSA			SHT NO: 1 3	
No.	REVISION	BY	APPD	DATE					

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**DETAIL 1**  
 LIGHTNING ARRESTOR ATTACHMENT DETAIL  
 INSTALL CLAMP & ARRESTOR AT TWO FEET FROM POLE

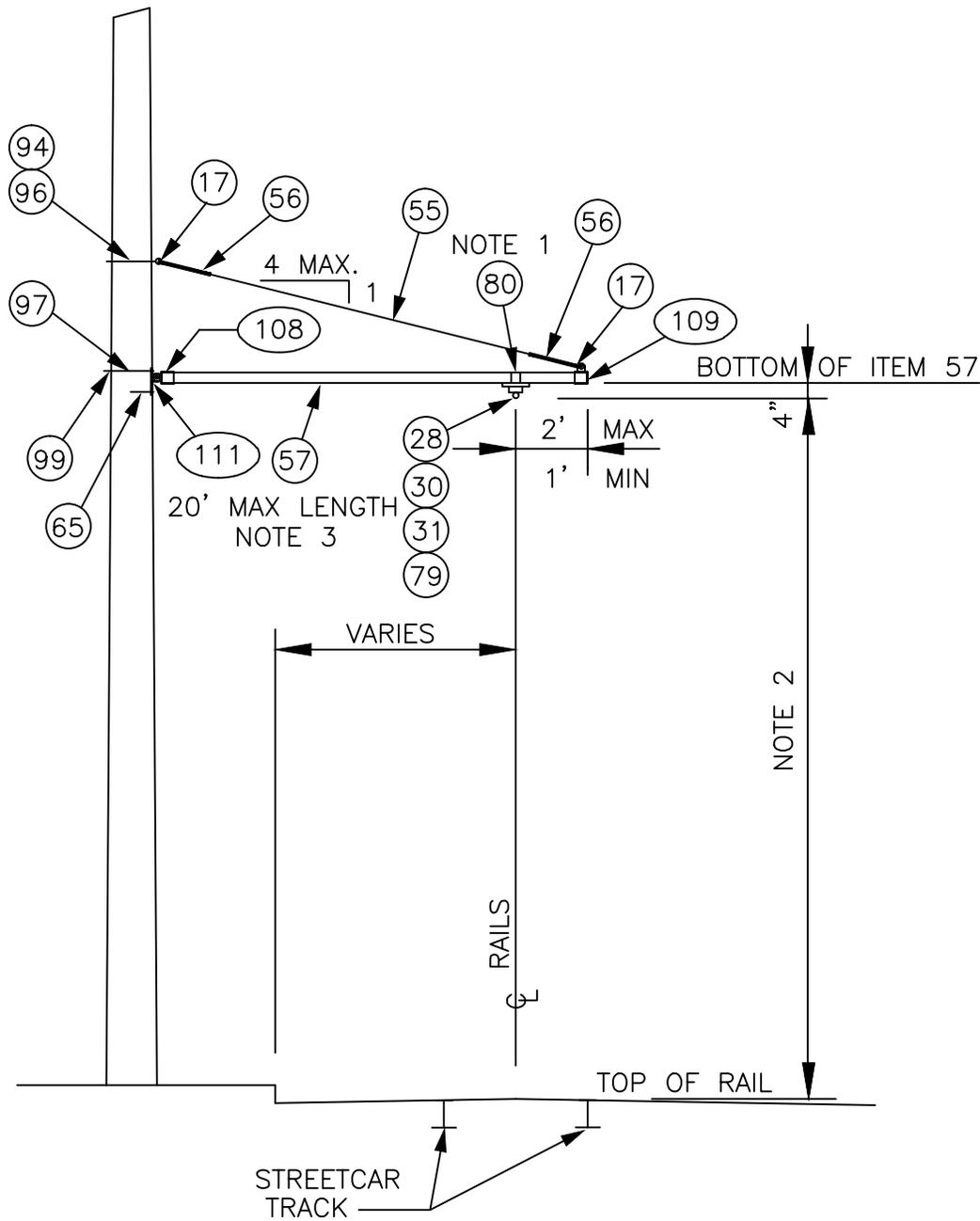
					STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: <b>JULY 2016</b>
					APPROVED: <b>D CRIPPEN</b>		<b>STEEL POLE          TANGENT FEEDER          BRACKET ASSEMBLY</b>	STD DET NO: <b>SA-549.2</b>
					DSGN/DWN: <b>D GREER/TMB/LSA</b>			SHT NO: <b>2 3</b>
No.	REVISION	BY	APPD	DATE				

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	1	DETROIT CLAMP ASSY	WABCO	19293-3007
11	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
15	4	WIRE ROPE CLIP, 3/8"	CROSBY	G450
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
55	AS REQD	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
57	VARIABLES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 3 1/2" Ø X 1/2"	MORRISON MOLDED FG	EXTREN SERIES 525
60	AS REQD	FEED SPAN CABLE		
68	1	UNIVERSAL SERVICE CONNECTOR	BURNDY	KVSU34
78	1	CONNECTOR, PARALLEL CLAMP	BURNDY	QPX342C
90	1	HEAVY PIPE CLAMP, GALV, 3" IPS	GRINNELL	FIG. 216
102	2	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
110	1	MAST ARM UNDERSLING END CAP	METRO STD	SA-110
114	1	MAST ARM POLE END CAP W/ BOT. TAB	METRO STD	SA-114
116	VARIABLES	WIRE, 2 OR 5 KV, #4 AWG CU, JACKETED, UNSHIELDED		
122	1	7/8 TRANSLITE STRAIN INSUL CL-TB	WABCO	54982-3001
123	2	FEEDER-TYPE E DEAD END	WABCO	21590-2000
124	1	CLAMP ASSEMBLY	WABCO	54936-3006
401	1	LIGHTNING ARRESTOR	METRO STD	SA-401

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		METRO TRANSIT DIVISION TROLLEY STANDARDS  STEEL POLE TANGENT FEEDER BRACKET ASSEMBLY	DATE: JULY 2016
				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-549.3
				DSGN/DWN: <b>D GREER/TMB/LSA</b>			SHT NO: 3 3
No.	REVISION	BY	APPD	DATE			



**NOTES:**

1. STAINLESS STEEL BANDING SHALL BE WRAPPED DOUBLE THICKNESS AROUND ITEM 57 PRIOR TO CLAMPING.
2. SEE SA-164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
3. DRILL 1/2" HOLE IN TUBE TO MATCH HOLE IN ITEMS 108 & 109 FOR INSERTION OF 3/8" SS BOLT.

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				STD DET DEVELOPMENT: <b>A WOLAK</b>		 <b>King County</b> Department of Transportation	METRO TRANSIT DIVISION TROLLEY STANDARDS		DATE: JULY 2016	
				APPROVED: <b>D CRIPPEN</b>			<b>WOOD POLE          BRACKET ASSEMBLY          TANGENT CONSTRUCTION</b>		STD DET NO: SA-551.1	
				DSGN/DWN: <b>D GREER/MM/LSA</b>					SHT NO: 1 2	
No.	REVISION	BY	APPD	DATE						

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
28	1	INSULATOR SPOOL	WABCO	16835-2000
30	1	TROLLEY SUPPORT-LARGE PIPE ARMS	WABCO	54940-4001
31	1	SPRING DETROIT CLAMP	WABCO	54959-3001
55	VARIABLES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	2	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIABLES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 3 1/2" Ø X 1/2"	MORRISON MOLDED FG	EXTREN SERIES 525
65	1	LAG SCREW, FETTER DRIVE, 1/2" X 4"	JOSLYN	J8754
79	1	5/8"-11 UNC X 1 3/8" STUD		
80	VARIABLES	3/4" STAINLESS STEEL BANDING	BAND-IT	TYPE 201
94	1	5/8" OVAL EYEBOLT W/ NUT	JOSLYN	J94XX
96	1	SQ CURVED WASHER 3" X 3" X 1/4", 11/16" DIA	JOSLYN	J113
97	1	3/4" MACHINE BOLT	JOSLYN	J89XX
99	1	SQ CURVED WASHER 3" X 3" X 1/4", 13/16" DIA	JOSLYN	J6823
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
109	1	MAST ARM ARM END CAP	METRO STD	SA-109
111	1	WOOD POLE MOUNTING BRACKET	METRO STD	SA-111

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				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-551.2
				DSGN/DWN: <b>D GREER/MM/LSA</b>			SHT NO: 2 2
No.	REVISION	BY	APPD	DATE			



**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	1	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	VARIES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
11	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
12	VARIES	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
28	VARIES	INSULATOR SPOOL	WABCO	16835-2000
38	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6200
44	VARIES	RUNNER, 6 FT TYPE C, 8 TO 12 DEG	WABCO	21375-2000
45	VARIES	PLATE-STRAIN 5 TO 12 DEG	WABCO	20290-2000
47	VARIES	DOUBLE CURVE HANGER TYPE A-2	WABCO	14073-2000
53	VARIES	CURVE RAIL	K & M	851 B412/0
54	VARIES	CURVE RAIL	K & M	851 B412/1
55	VARIES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	2	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 3 1/2" Ø X 1/2"	MORRISON MOLDED FG	EXTREN SERIES 525
65	1	LAG SCREW, FETTER DRIVE, 1/2" X 4"	JOSLYN	J8754
94	2	5/8" OVAL EYEBOLT W/ NUT	JOSLYN	J94XX
96	2	SQ CURVED WASHER 3" X 3" X 1/4", 11/16" DIA	JOSLYN	J113
97	1	3/4" MACHINE BOLT	JOSLYN	J89XX
99	1	SQ CURVED WASHER 3" X 3" X 1/4", 13/16" DIA	JOSLYN	J6823
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
110	1	MAST ARM UNDERSLING END CAP	METRO STD	SA-110
111	1	WOOD POLE MOUNTING BRACKET	METRO STD	SA-111

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				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-552.2
				DSGN/DWN: <b>D GREER/MM/LSA</b>			SHT NO: 2 2
No.	REVISION	BY	APPD	DATE			



**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	1	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	VARIES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
11	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
12	VARIES	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
28	VARIES	INSULATOR SPOOL	WABCO	16835-2000
38	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6200
44	VARIES	RUNNER, 6 FT TYPE C, 8 TO 12 DEG	WABCO	21375-2000
45	VARIES	PLATE-STRAIN 5 TO 12 DEG	WABCO	20290-2000
47	VARIES	DOUBLE CURVE HANGER TYPE A-2	WABCO	14073-2000
53	VARIES	CURVE RAIL	K & M	851 B412/0
54	VARIES	CURVE RAIL	K & M	851 B412/1
55	VARIES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	2	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 3 1/2" Ø X 1/2"	MORRISON MOLDED FG	EXTREN SERIES 525
107	3	STAINLESS STEEL EYEBOLT	METRO STD	SA-107
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
110	1	MAST ARM UNDERSLING END CAP	METRO STD	SA-110

**NOTES:**

- INSTALL ITEM 107 PER SA-221.

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				APPROVED: <b>D CRIPPEN</b>			STD DET NO: SA-553.2
				DSGN/DWN: <b>D GREER/MM/LSA</b>			SHT NO: 2 2
No.	REVISION	BY	APPD	DATE			



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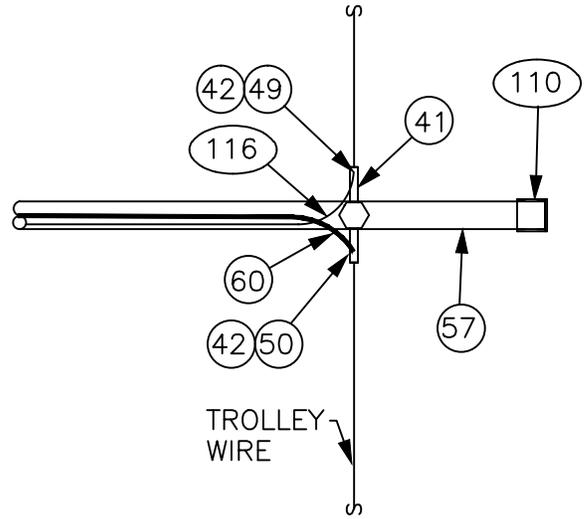
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03	1	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIABLES	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	VARIABLES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIABLES	GUY STRAND	COPPERWELD	8M
11	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
12	VARIABLES	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
28	VARIABLES	INSULATOR SPOOL	WABCO	16835-2000
38	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6200
44	VARIABLES	RUNNER, 6 FT TYPE C, 8 TO 12 DEG	WABCO	21375-2000
45	VARIABLES	PLATE-STRAIN 5 TO 12 DEG	WABCO	20290-2000
47	VARIABLES	DOUBLE CURVE HANGER TYPE A-2	WABCO	14073-2000
53	VARIABLES	CURVE RAIL	K & M	851 B412/0
54	VARIABLES	CURVE RAIL	K & M	851 B412/1
55	VARIABLES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	2	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIABLES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 3 1/2" Ø X 1/2"	MORRISON MOLDED FG	EXTREN SERIES 525
65	1	LAG SCREW, FETTER DRIVE, 1/2" X 4"	JOSLYN	J8754
94	2	5/8" OVAL EYEBOLT W/ NUT	JOSLYN	J94XX
96	2	SQ CURVED WASHER 3" X 3" X 1/4", 11/16" DIA	JOSLYN	J113
97	1	3/4" MACHINE BOLT	JOSLYN	J89XX
99	1	SQ CURVED WASHER 3" X 3" X 1/4", 13/16" DIA	JOSLYN	J6823
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
110	1	MAST ARM UNDERSLING END CAP	METRO STD	SA-110
111	1	WOOD POLE MOUNTING BRACKET	METRO STD	SA-111

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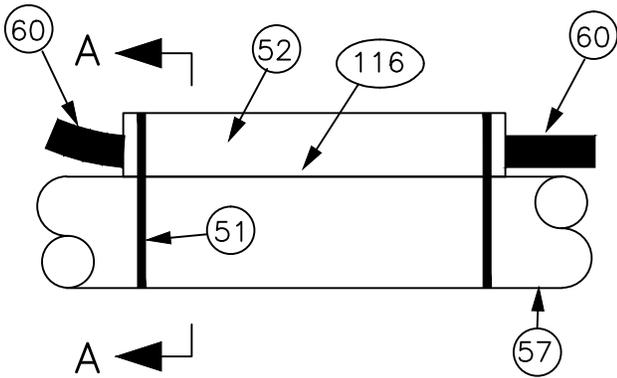
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No.	REVISION	BY	APPD	DATE			



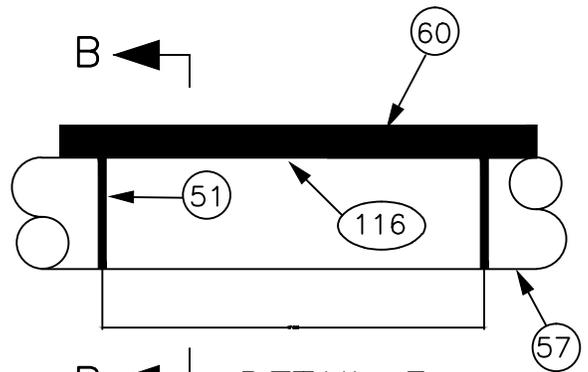
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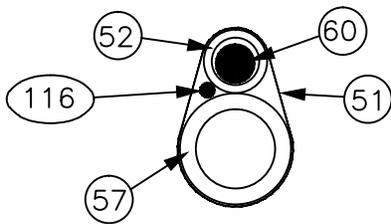
**DETAIL 1**  
POSITIVE FEEDER



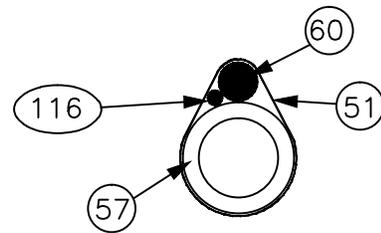
**DETAIL 2**



**DETAIL 3**



**VIEW A-A**  
POSITIVE FEEDER



**VIEW B-B**  
POSITIVE FEEDER

No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT: <b>A WOLAK</b>
APPROVED: <b>D CRIPPEN</b>
DSGN/DWN: <b>D GREER/MM/LSA</b>



METRO TRANSIT DIVISION  
TROLLEY STANDARDS

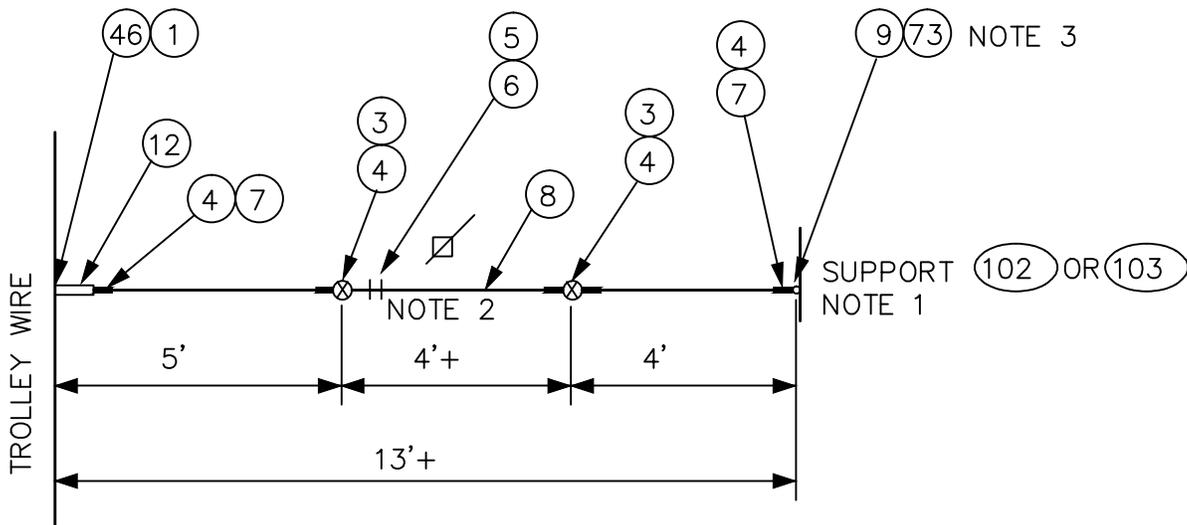
**WOOD POLE  
TANGENT FEEDER  
BRACKET ASSEMBLY**

DATE: <b>JULY 2016</b>
STD DET NO: <b>SA-559.2</b>
SHT NO: <b>2 3</b>

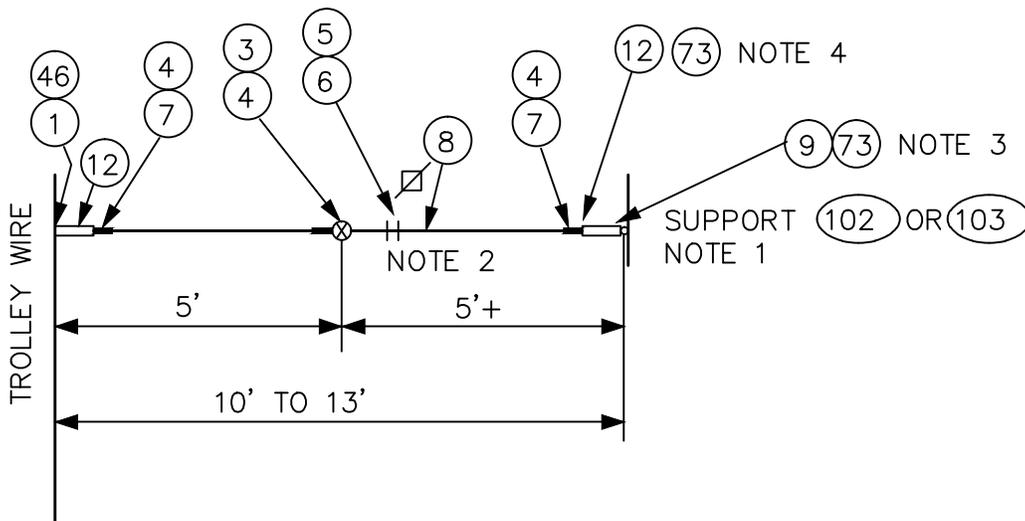


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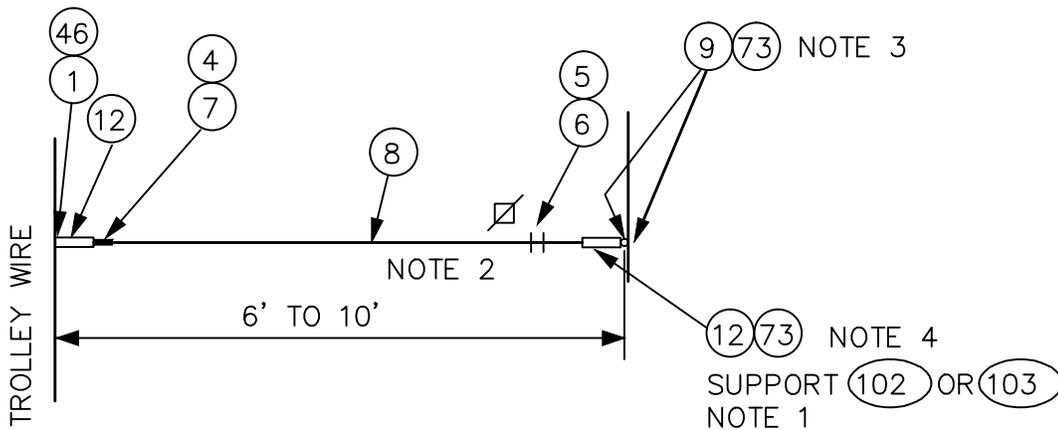
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**B**

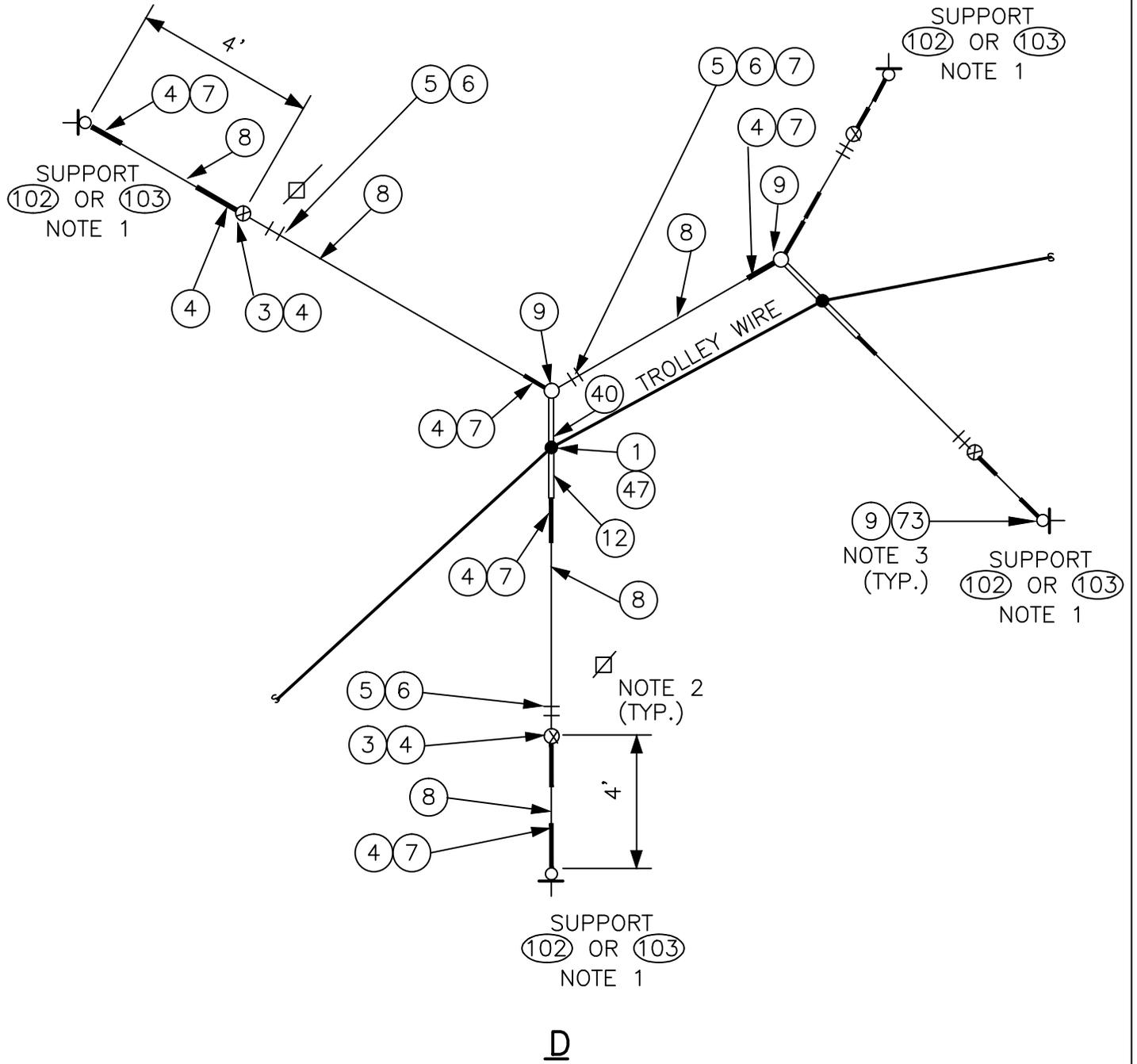


**C**



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No.	REVISION	BY	APPD	DATE			

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No.	REVISION	BY	APPD	DATE

STD DET DEVELOPMENT:  
**A WOLAK**

APPROVED:  
**D CRIPPEN**

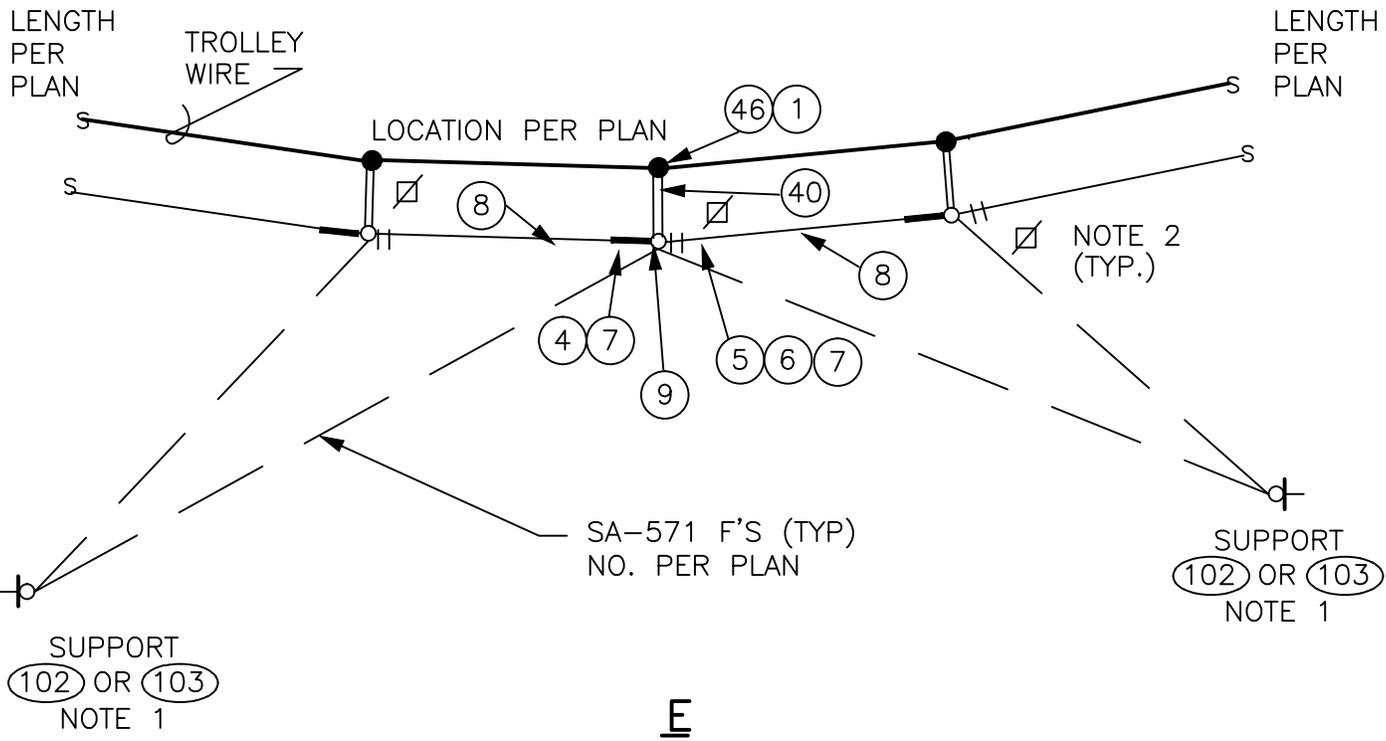
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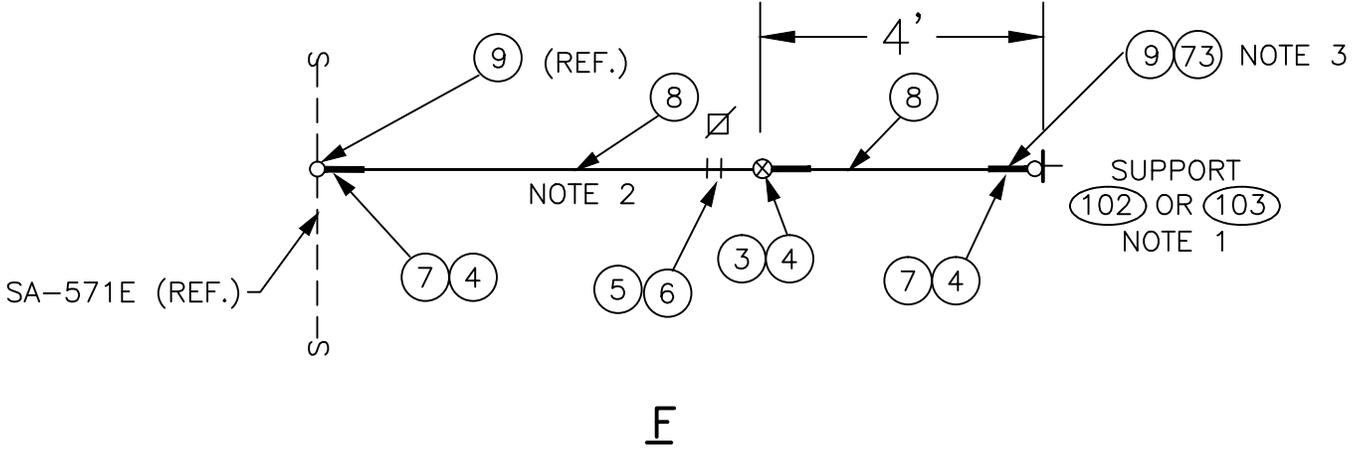
METRO TRANSIT DIVISION  
 TROLLEY STANDARDS

**SPECIALWORK  
 PULLOFF**

DATE: <b>JULY 2016</b>
STD DET NO: <b>SA-571.2</b>
SHT NO: <b>2 5</b>



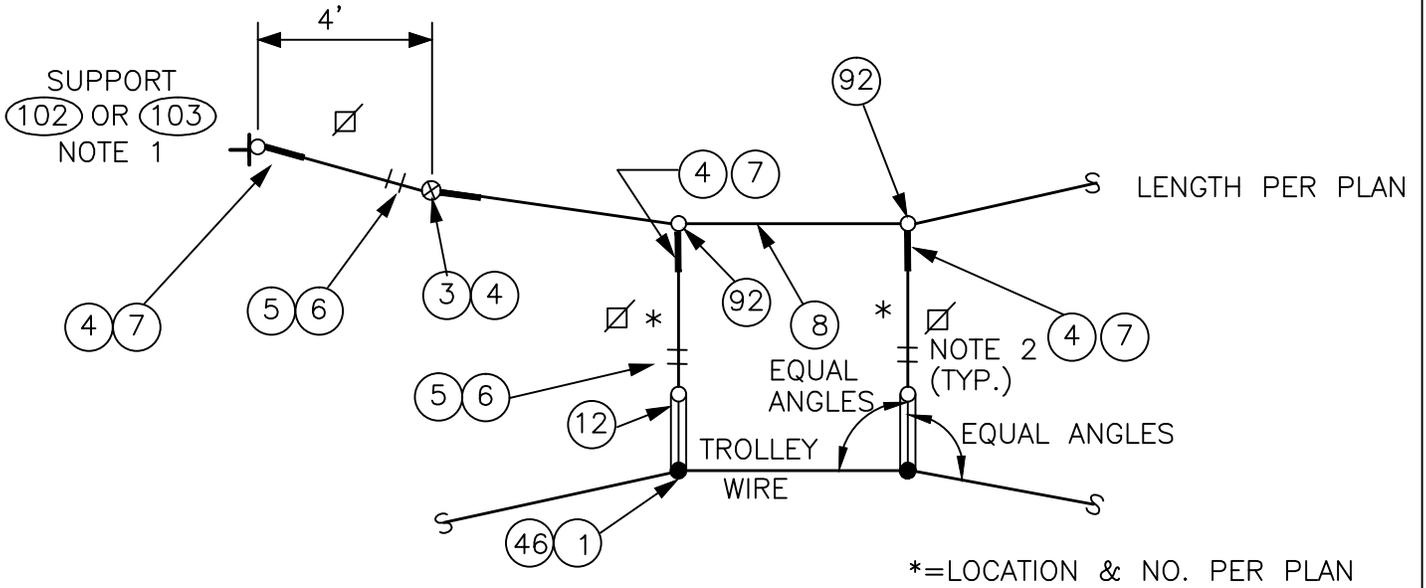
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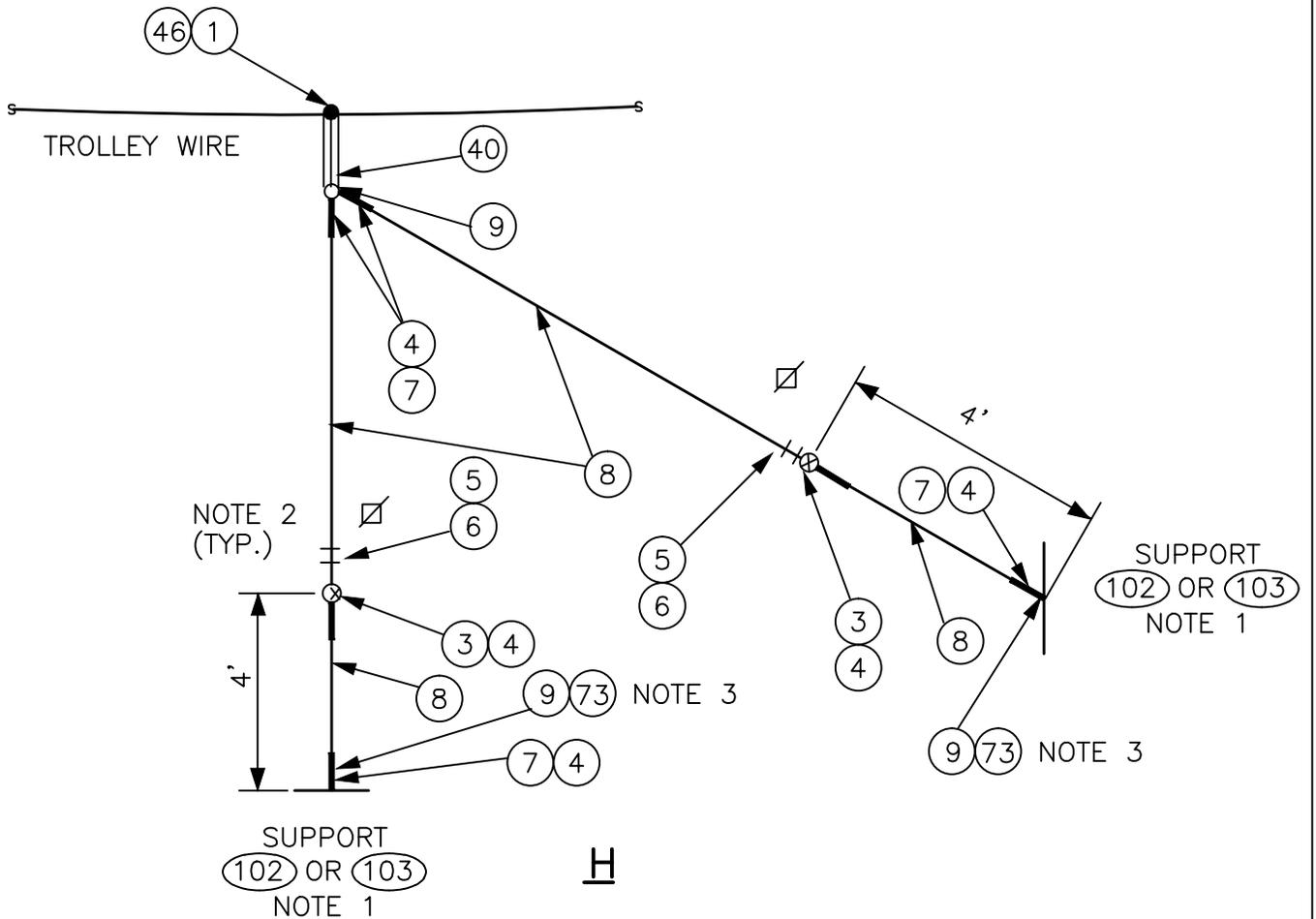
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				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>SPECIALWORK          PULLOFF</b>		DATE: <b>JULY 2016</b>	
				APPROVED: <b>D CRIPPEN</b>					STD DET NO: <b>SA-571.3</b>	
				DSGN/DWN: <b>D GREER/TMB/LSA</b>					SHT NO: <b>3 5</b>	
No.	REVISION	BY	APPD	DATE						



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V:\Library & Standards\Working Documents\Trolley\Details\SA\_BORDER REPLACEMENT PROJECT 6-11-2015\SA\_BORDER Replace Completed\SA-571.1-5.dwg | Layout: SA-571.4  
 XREFS: V:\Library & Standards\Working Documents\Trolley\Details\SA\_BORDER REPLACEMENT PROJECT 6-11-2015\SA\_BORDER Replace Completed\ITB A Size.dwg | IMAGES:  
 PLOTTED: Aug 08, 2016-11:32:59pm By: AnderLS

				STD DET DEVELOPMENT: <b>A WOLAK</b>			METRO TRANSIT DIVISION TROLLEY STANDARDS  <b>SPECIALWORK          PULLOFF</b>		DATE: JULY 2016	
				APPROVED: <b>D CRIPPEN</b>					STD DET NO: SA-571.4	
				DSGN/DWN: <b>D GREER/TMB/LSA</b>					SHT NO: 4 5	
No.	REVISION	BY	APPD	DATE						

**NOTES:**

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT TO BE INDICATED AS REQUIRED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "☒". PROVIDE WIRE ROPE CLIPS AT EACH LOCATION. SEE SA-166.
3. ITEMS 9 & 73 REQUIRED WHEN MORE THAN TWO PULLOFFS AND/OR SPANS ATTACH TO SAME SUPPORT.
4. ITEM 73 REQUIRED WITH ITEM 12 IF SUPPORT IS AN EYEBOLT.

**MATERIAL LIST**

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
09	*	BULL RING	WABCO	18567-2000
12	*	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
40	*	7/8 TRANSLITE STRAIN INSUL CL-90	WABCO	54995-6120
GUY TENSIONS----- 0-3000 LBS				
01	*	DETROIT CLAMP ASSY	WABCO	19293-3007
03	*	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	*	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	*	WIRE ROPE CLIP, 5/16"	CROSBY	G450
07	*	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
46	*	SINGLE CURVE HANGER TYPE A-2	WABCO	14072-2000
47	*	DOUBLE CURVE HANGER TYPE A-2	WABCO	14073-2000
73	*	ANCHOR SHACKLE	JOSLYN	J2742
92	*	ANGLE CLAMP	ANDERSON/ SQUARE D	82860-2000
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

STD DET DEVELOPMENT:  
A WOLAK

APPROVED:  
D CRIPPEN

DSGN/DWN:  
D GREER/TMB/LSA



METRO TRANSIT DIVISION  
TROLLEY STANDARDS

**SPECIALWORK  
PULLOFF**

DATE:  
JULY 2016

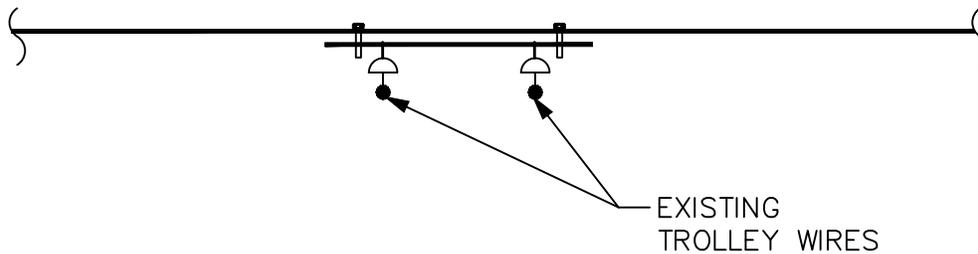
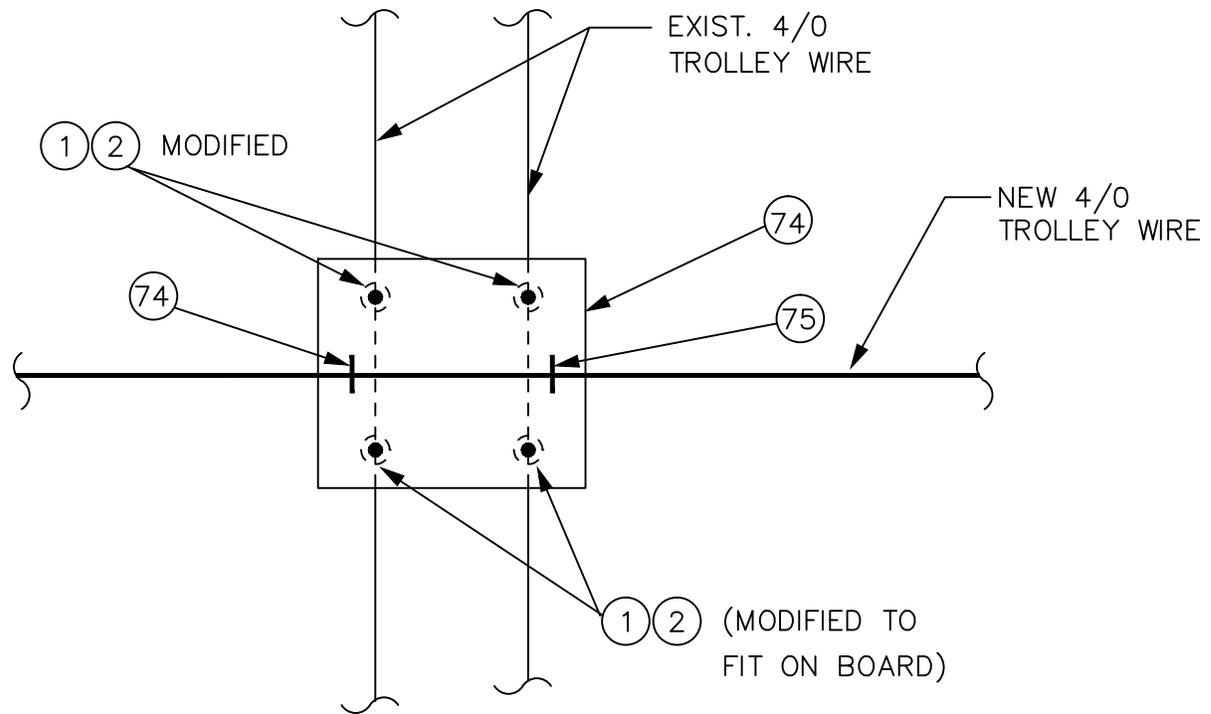
STD DET NO:  
SA-571.5

SHT NO:  
5 5

No.	REVISION	BY	APPD	DATE







MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	4	DETROIT CLAMP ASSY	WABCO	19293-3007
02	4	AGC TANGENT SPAN HANGER	WABCO	19360-2000
74	1	4 X 4 X 1/2" EXTERIOR PLYWOOD		
75	4	U BOLT, FOR 4/0 TROLLEY WIRE		

				STD DET DEVELOPMENT: A WOLAK		METRO TRANSIT DIVISION TROLLEY STANDARDS	DATE: JULY 2016
				APPROVED: D CRIPPEN		STD DET NO: SA-590	
				DSGN/DWN: D GREER/TMB/LSA		SHT NO: 1 1	
No.	REVISION	BY	APPD	DATE		TEMPORARY INSULATION BOARD	