

MATERIALS LIST II (ITEMS 101 - 200)

ITEM NO.	DESCRIPTION	MANUFACTURER AND PART NO.
INSULATORS		
101	STRAIN INSULATOR, 5/8" CLEVIS & CLEVIS AT RIGHT ANGLE, 36"	IMPulse 54984-6360
102	STRAIN INSULATOR, 5/8" CLEVIS & CLEVIS IN SAME PLANE, 36"	IMPulse 54985-6360
103	STRAIN INSULATOR, 5/8" CLEVIS & EYE AT RIGHT ANGLE, 36"	IMPulse 54961-6368
104	STRAIN INSULATOR, 5/8" CLEVIS & EYE IN SAME PLANE, 36"	IMPulse 55289-6368
105	STRAIN INSULATOR, 5/8" EYE & EYE AT RIGHT ANGLE, 36"	IMPulse 56261
106	STRAIN INSULATOR, 5/8" EYE & EYE IN SAME PLANE, 36"	IMPulse 55263
107	STRAIN INSULATOR, 5/8" CLEVIS & CLEVIS IN SAME PLANE, 26"	IMPulse 54990-6265
108	STRAIN INSULATOR, 7/8" CLEVIS & CLEVIS IN SAME PLANE, 12"	IMPulse 54975-6121
109	STRAIN INSULATOR, 7/8" CLEVIS & EYE AT RIGHT ANGLE, 12"	IMPulse 60360-6127
110	STRAIN INSULATOR, 7/8" ADJUSTABLE EYE	IMPulse 54980-6385
111	STRAIN INSULATOR, 5/8" EYE & EYE IN SAME PLANE, 15"	IMPulse 55629-6150
112	NO-BO SECTION INSULATOR	IMPulse 55025-3001, PHOENIX MINING 9400
113	NO-BO SECTION INSULATOR WITH MAGNETIC ARC BLOWOUT UNIT	IMPulse 55030-3001, PHOENIX MINING 9401
114	SECTION INSULATOR WITH GLIDE, NON-COMMUTATING	IMPulse 54674-3003
115	SECTION INSULATOR WITH GLIDE, COMMUTATING	IMPulse 54674-3004
116	SECTION INSULATOR WITH GLIDE, COMMUTATING, WITH YOKE ASSEMBLY	IMPulse 54674-3005
117	SECTION INSULATOR WITH GLIDE, NON-COMMUTATING, WITH YOKE ASSEMBLY	IMPulse 54674-3006
118	SECTION INSULATOR WITH GLIDE, COMMUTATING, WITH YOKE ASSEMBLY AND MAGNETIC ARC BLOWOUT UNIT	IMPulse 60376-3001
119	MAGNETIC ARC BLOWOUT UNIT	IMPulse 57201-3001, PHOENIX MINING 9416
120	INSULATOR YOKE, TYPE S	IMPulse 21089-2000, PHOENIX MINING 4245
121	INSULATOR STRUT FOR 2" SCH 40 PIPE	IMPulse 56909-3001
122	INSULATED ADJUSTABLE SPACER	IMPulse 54982-3001
123	INSULATED RUNNER, 14.5"	IMPulse 56391-4001, PHOENIX MINING 9405
124	INSULATOR ROD, 7/8", LENGTH TO SUIT	IMPulse 55070
125	NO-BO YOKE AND SUSPENSION ASSEMBLY	IMPulse 55025-3005
126	INSULATED HORIZONTAL STITCH, 2" SADDLE	IMPulse 57183-3004
127	STRAIN INSULATOR, 7/8" EYE & EYE IN SAME PLANE, 13"	IMPulse 56262-6132
128	NOT USED	
129	SECTION INSULATOR WITH GLIDE, 102"	IMPulse 675118
130	NOT USED	
CURVE SEGMENTS		
131	FLEXIBLE CURVE SEGMENT, 3'-5'	IMPulse 58686-3006
132	FLEXIBLE CURVE SEGMENT, 5'-8'	IMPulse 58686-3002
133	FLEXIBLE CURVE SEGMENT, 8'-10'	IMPulse 58686-3003
134	FLEXIBLE CURVE SEGMENT, 10'-15'	IMPulse 58686-3004
135	1/2 CURVE SEGMENT, ADJUSTABLE 5'-12", TYPE C-2 WITHOUT TIPS	IMPulse 22301-3021
136	1/2 CURVE SEGMENT, ADJUSTABLE 13'-27", TYPE C-2 WITHOUT TIPS	IMPulse 22302-3011
137	CURVE SEGMENT, ADJUSTABLE 5'-12", TYPE C-2 WITHOUT TIPS	IMPulse 22301-3019
138	CURVE SEGMENT, ADJUSTABLE 13'-27", TYPE C-2 WITHOUT TIPS	IMPulse 22302-3009
139	CURVE SEGMENT, ADJUSTABLE 28'-47", TYPE C-2 WITHOUT TIPS	IMPulse 22303-3008
140	NOT USED	
141	NOT USED	
142	NOT USED	
143	NOT USED	
144	NOT USED	
145	NOT USED	
146	NOT USED	
147	NOT USED	
148	NOT USED	
149	NOT USED	
150	NOT USED	

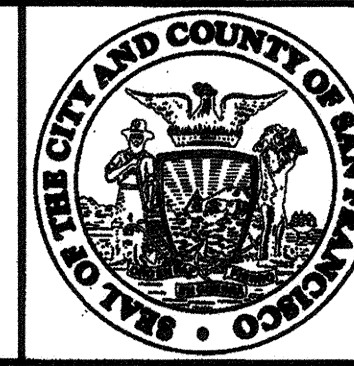
ITEM NO.	DESCRIPTION	MANUFACTURER AND PART NO.
CROSSOVERS		
151	RIGID 23' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 1XR WITH GLIDE	IMPulse 60890-3001
152	RIGID 27' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 1XR WITH GLIDE	IMPulse 59290-3001
153	RIGID 30' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 1XR WITH GLIDE	IMPulse 60401-3001
154	RIGID 35' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 1XR WITH GLIDE	IMPulse 675885
155	RIGID 40' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 1XR WITH GLIDE	IMPulse 675883
156	RIGID 45' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 1XR WITH GLIDE	IMPulse 675884
157	RIGID 50' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 1XR WITH GLIDE	IMPulse 60354-3001
158	RIGID 55' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 1XR WITH GLIDE	IMPulse 675882
159	NOT USED	
160	NOT USED	
161	NOT USED	
162	NOT USED	
163	NOT USED	
164	INSULATED RIGID 15' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 2XR WITH GLIDE	IMPulse 60301-3001
165	INSULATED RIGID 23' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 2XR WITH GLIDE	IMPulse 60304-3001
166	INSULATED RIGID 27' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 2XR WITH GLIDE	IMPulse 60355-3001
167	INSULATED RIGID 35' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 2XR WITH GLIDE	IMPulse 60356-3001
168	INSULATED RIGID 40' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 2XR WITH GLIDE	IMPulse 60357-3001
169	INSULATED RIGID 45' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 2XR WITH GLIDE	IMPulse 60358-3001
170	INSULATED RIGID 50' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 2XR WITH GLIDE	IMPulse 675878
171	INSULATED RIGID 55' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 2XR WITH GLIDE	IMPulse 60359-3001
172	INSULATED RIGID 60' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 2XR WITH GLIDE	IMPulse 675879
173	INSULATED RIGID 70' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 2XR WITH GLIDE	IMPulse 675880
174	INSULATED RIGID 75' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 2XR WITH GLIDE	IMPulse 675881
175	INSULATED RIGID 90' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 2XR WITH GLIDE	IMPulse 60743
176	NOT USED	
177	INSULATED RIGID 15' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 4XR	IMPulse 060280
178	INSULATED RIGID 23' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 4XR	IMPulse 58849
179	INSULATED RIGID 27' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 4XR	IMPulse 674662
180	INSULATED RIGID 30' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 4XR	IMPulse 55968
181	INSULATED RIGID 35' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 4XR	IMPulse 673658
182	INSULATED RIGID 37' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 4XR	IMPulse 58862
183	INSULATED RIGID 40' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 4XR	IMPulse 673659
184	INSULATED RIGID 45' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 4XR	IMPulse 55967, PHOENIX MINING 4845
185	INSULATED RIGID 50' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 4XR	IMPulse 57857, PHOENIX MINING 4850
186	INSULATED RIGID 55' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 4XR	IMPulse 60009, PHOENIX MINING 4855
187	INSULATED RIGID 60' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 4XR	IMPulse 55966, PHOENIX MINING 4860
188	INSULATED RIGID 70' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 4XR	IMPulse 57194
189	INSULATED RIGID 75' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 4XR	IMPulse 59059
190	INSULATED RIGID 90' DEEP RUNNER CROSSOVER ASSEMBLY, TYPE 4XR	IMPulse 55965, PHOENIX MINING 4890
191	NOT USED	
192	NOT USED	
193	NOT USED	
194	NOT USED	
195	NOT USED	
196	NOT USED	
197	NOT USED	
198	NOT USED	
199	NOT USED	
200	NOT USED	

FOR ORIGINAL SIGNATURES, SEE CL-12941, REV 0

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NO.	DATE	DESCRIPTION	REVISION	CHECKED	APPROVED
4	5/21/03	ADDED ITEMS 175 AND 177, REVISED MANUFACTURER AND PART NOS	CD	mm	CLW
3	02/08/2010	REVISED ITEM DESCRIPTIONS, MANUFACTURERS AND PART NOS	SML	TP	JW
2	06/01/2008	ADDED ITEM 151	SML	TP	CCW
1	04/10/2008	REVISED ITEMS 108, 120, 123, 126, 128, 135, 136 AND BORDER TEXT	SML	TP	JW

DESIGNED	T. PHANG
DRAWN	A. RYKOV
CHECKED	E. VIRAY
REVIEWED	A. HOE
RECOMMENDED	Y. GU
APPROVED	W. NELSON
DATE	OCTOBER 3, 2001



CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL RAILWAY

APPROVED
VINCE HARRIS
FOR THE EXECUTIVE DIRECTOR / CEO

MUNI METRO SYSTEM / TROLLEY COACH SYSTEM

CONTRACT

CL-12941

REVISION

4

**OVERHEAD CONTACT SYSTEM
MATERIALS LIST II (ITEMS 101-200)**

MATERIALS LIST III (ITEMS 201 - 300)

ITEM NO.	DESCRIPTION	MANUFACTURER AND PART NO.
SWITCHES		
201	15' ELECTRIC FROG AND CROSSOVER ASSEMBLY, TYPE WSE-2S, LEFT HAND, INSULATION IN STRAIGHT, STAINLESS STEEL FLIPPER (SEE PLAN FOR FLIPPER RESET DIRECTION)	IMPulse 55973-3006
202	15' ELECTRIC FROG AND CROSSOVER ASSEMBLY, TYPE WSE-2S, RIGHT HAND, INSULATION IN STRAIGHT, STAINLESS STEEL FLIPPER (SEE PLAN FOR FLIPPER RESET DIRECTION)	IMPulse 55973-3005
203	15' ELECTRIC FROG AND CROSSOVER ASSEMBLY, TYPE WSE-2S, LEFT HAND, INSULATION IN CURVE, STAINLESS STEEL FLIPPER (SEE PLAN FOR FLIPPER RESET DIRECTION)	IMPulse 55964-3010
204	15' ELECTRIC FROG AND CROSSOVER ASSEMBLY, TYPE WSE-2S, RIGHT HAND, INSULATION IN CURVE, STAINLESS STEEL FLIPPER (SEE PLAN FOR FLIPPER RESET DIRECTION)	IMPulse 55964-3009
205	15' TRAILING FROG AND CROSSOVER ASSEMBLY, TYPE WTR, LEFT HAND, INSULATION IN STRAIGHT, STAINLESS STEEL FLIPPER	IMPulse 55981-3010
206	15' TRAILING FROG AND CROSSOVER ASSEMBLY, TYPE WTR, RIGHT HAND, INSULATION IN STRAIGHT, STAINLESS STEEL FLIPPER	IMPulse 55981-3009
207	15' TRAILING FROG AND CROSSOVER ASSEMBLY, TYPE WTR, LEFT HAND, INSULATION IN CURVE, STAINLESS STEEL FLIPPER	IMPulse 55979-3012
208	15' TRAILING FROG AND CROSSOVER ASSEMBLY, TYPE WTR, RIGHT HAND, INSULATION IN CURVE, STAINLESS STEEL FLIPPER	IMPulse 55979-3011
209	30' ELECTRIC FROG AND CROSSOVER ASSEMBLY, W/ CONTACTOR, TYPE WSE-2S, LEFT HAND, INSULATION IN STRAIGHT, STAINLESS STEEL FLIPPER (SEE PLAN FOR FLIPPER RESET DIRECTION)	IMPulse 57143-3008
210	30' ELECTRIC FROG AND CROSSOVER ASSEMBLY, W/ CONTACTOR, TYPE WSE-2S, RIGHT HAND, INSULATION IN STRAIGHT, STAINLESS STEEL FLIPPER (SEE PLAN FOR FLIPPER RESET DIRECTION)	IMPulse 57143-3007
211	30' ELECTRIC FROG AND CROSSOVER ASSEMBLY, W/ CONTACTOR, TYPE WSE-2S, LEFT HAND, INSULATION IN CURVE, STAINLESS STEEL FLIPPER (SEE PLAN FOR FLIPPER RESET DIRECTION)	IMPulse 56425-3010
212	30' ELECTRIC FROG AND CROSSOVER ASSEMBLY, W/ CONTACTOR, TYPE WSE-2S, RIGHT HAND, INSULATION IN CURVE, STAINLESS STEEL FLIPPER (SEE PLAN FOR FLIPPER RESET DIRECTION)	IMPulse 56425-3009
213	30' TRAILING FROG AND CROSSOVER ASSEMBLY, TYPE WTR, LEFT HAND, INSULATION IN STRAIGHT, STAINLESS STEEL FLIPPER	IMPulse 56596-3008
214	30' TRAILING FROG AND CROSSOVER ASSEMBLY, TYPE WTR, RIGHT HAND, INSULATION IN STRAIGHT, STAINLESS STEEL FLIPPER	IMPulse 56596-3007
215	30' TRAILING FROG AND CROSSOVER ASSEMBLY, TYPE WTR, LEFT HAND, INSULATION IN CURVE, STAINLESS STEEL FLIPPER	IMPulse 56597-3014
216	30' TRAILING FROG AND CROSSOVER ASSEMBLY, TYPE WTR, RIGHT HAND, INSULATION IN CURVE, STAINLESS STEEL FLIPPER	IMPulse 56597-3013
217	10' FROG, SOLID BODY, LEFT HAND, SHALLOW BODY, FEED THROUGH TYPE	IMPulse 20771-2000, PHOENIX MINING 9015
218	10' FROG, SOLID BODY, RIGHT HAND, SHALLOW BODY, FEED THROUGH TYPE	IMPulse 20770-2000, PHOENIX MINING 9014
219	10' FROG ASSEMBLY, LRV, RIGHT HAND, SHALLOW BODY, FEED THROUGH TYPE WITH GLIDERS	IMPulse 675888
220	10' FROG ASSEMBLY, LRV, LEFT HAND, SHALLOW BODY, FEED THROUGH TYPE WITH GLIDERS	IMPulse 675889
221	12' ELECTRIC FROG ASSEMBLY, LRV, LEFT HAND, TWIN COILS, WITH GLIDERS	IMPulse 60374-3001
222	12' ELECTRIC FROG ASSEMBLY, LRV, RIGHT HAND, TWIN COILS, WITH GLIDERS	IMPulse 60374-3002
223	6' SPRING FROG, RIGHT HAND WITH GLIDERS	IMPulse 60433-3001
224	6' SPRING FROG, LEFT HAND WITH GLIDERS	IMPulse 60433-3002
225	45' TRAILING FROG AND CROSSOVER ASSEMBLY, TYPE WTR, RIGHT HAND, INSULATION IN CURVE, STAINLESS STEEL FLIPPER	IMPulse 56595-3009
226	45' TRAILING FROG AND CROSSOVER ASSEMBLY, TYPE WTR, LEFT HAND, INSULATION IN CURVE, STAINLESS STEEL FLIPPER	IMPulse 56595-3010
227	45' ELECTRIC FROG AND CROSSOVER ASSEMBLY, TYPE WSE-2S, RIGHT HAND, INSULATION IN CURVE, STAINLESS STEEL FLIPPER (SEE PLAN FOR FLIPPER RESET DIRECTION)	IMPulse 56593-3007
228	45' ELECTRIC FROG AND CROSSOVER ASSEMBLY, TYPE WSE-2S, LEFT HAND, INSULATION IN CURVE, STAINLESS STEEL FLIPPER (SEE PLAN FOR FLIPPER RESET DIRECTION)	IMPulse 56593-3008
229	45' ELECTRIC FROG AND CROSSOVER ASSEMBLY, TYPE WTEP, RIGHT HAND, INSULATION IN CURVE, STAINLESS STEEL FLIPPER (SEE PLAN FOR FLIPPER RESET DIRECTION)	IMPulse 60816-3003
230	45' ELECTRIC FROG AND CROSSOVER ASSEMBLY, TYPE WTEP, LEFT HAND, INSULATION IN CURVE, STAINLESS STEEL FLIPPER (SEE PLAN FOR FLIPPER RESET DIRECTION)	IMPulse 60816-3004
231	30' ELECTRIC FROG AND CROSSOVER ASSEMBLY, TYPE WSE-2S, RIGHT HAND, INSULATION IN CURVE, STAINLESS STEEL FLIPPER (SEE PLAN FOR FLIPPER RESET DIRECTION)	IMPulse 56425-3011
232	30' ELECTRIC FROG AND CROSSOVER ASSEMBLY, TYPE WSE-2S, LEFT HAND, INSULATION IN CURVE, STAINLESS STEEL FLIPPER (SEE PLAN FOR FLIPPER RESET DIRECTION)	IMPulse 56425-3012
233	NOT USED	
234	NOT USED	
235	NOT USED	
MISCELLANEOUS		
236	ANTENNA ASSEMBLY AND REQUIRED MOUNTING HARDWARE	IMPulse 320310-X, MAC Products MacElek EL999001
237	ELECTRIC FROG CONTACTOR FOR 2/0 TO 4/0 GROOVED WIRE, WITH #12 INSULATED WIRE, LENGTH AS REQUIRED	IMPulse 22549-2000
238	CONTROL CONTACTOR COMPLETE FOR 2/0 TO 4/0 GROOVED WIRE, SHOE AND PANTOGRAPH	IMPulse 54671-3001
239	INDICATOR LIGHT LAMP ASSEMBLY, WITH #12 INSULATED WIRE, LENGTH AS REQUIRED, INCLUDES MESSENGER WIRE AND MOUNTING HARDWARE AS REQUIRED. FOR SPAN MOUNTED SIGNALS, USE SPAN WIRE FRAME, SIGNAL ENGINEERING #6156117	IMPulse 212100-22X, MAC Products MacElek 2-981 01
240	SWITCH CONTROL RECEIVER UNIT, INCLUDE ALL CABLES FROM ANTENNA TO RECEIVER TO SWITCH	MAC Products TBD600

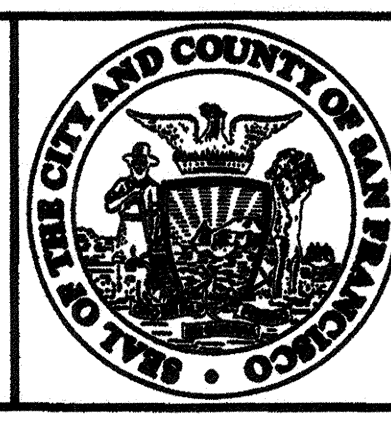
ITEM NO.	DESCRIPTION	MANUFACTURER AND PART NO.
MISCELLANEOUS		
241	LIGHT SWITCH, TYPE TEP-2	IMPulse 21894-2000
242	RELAY BOX WITH MOUNTING FRAME	-
243	SIGN, REFLECTIVE, ALUMINUM, 18" x 24", 4" HIGH BLACK COLORED LETTERS READING "MUNI SIGNAL" ON YELLOW COLORED BACKGROUND, WITH ATTACHMENTS TO POLE OR SPAN WIRE	-
244	SHACKLE, 3/4"	IMPulse 70709-2000
245	SHACKLE, 5/8"	IMPulse 13722-2000
246	SHACKLE, 5/8", WITH LOCK NUT	IMPulse 86661-2000
247	SHACKLE, 1/2"	IMPulse 60188-3001
248	BULLRING, 5/8" x 3" DIAMETER	IMPulse 18562-2000, PHOENIX MINING 8911
249	BULLRING, 3/4" x 3" DIAMETER	IMPulse 18567-2000
250	YOKE SUSPENSION	IMPulse 18969-2000
251	EXTENSION STEEL STRAP, LENGTH AS REQUIRED	IMPulse 93734
252	EYEBOLT, 7/8" Ø, STAINLESS STEEL, LENGTH AS SHOWN, WITH STAINLESS STEEL WASHER (OGEE SHAPE) FOR 7/8" Ø BOLT	-
253	EYEBOLT, 1" Ø, STAINLESS STEEL, LENGTH AS SHOWN, WITH STAINLESS STEEL WASHER (OGEE SHAPE) FOR 1" BOLT	-
254	EYEBOLT, 1/2" x 6" WITH NUTS AND WASHERS	IMPulse 11933-2000
255	EYEBOLT ASSEMBLY FOR WOOD POLE, GALVANIZED ASTM A 489, LENGTH TO SUIT, 1/2" Ø WITH GALVANIZED 1/4" x 3" x 3" CURVED STEEL WASHER AND GALVANIZED STEEL NUT	-
256	GALVANIZED 1/4" x 3" x 3" CURVED STEEL WASHER AND GALVANIZED STEEL NUT	-
257	GUIDE CASTING ASSEMBLY FOR 2" PIPE	IMPulse 11817-2000
258	OUTER SPAN HOLDER FOR 2" PIPE	IMPulse 14245-2000
259	PIPE CAP FOR 2" GALVANIZED STEEL PIPE	IMPulse 56030-4001
260	STEEL PIPE, 2" Ø, SCH 40, GALVANIZED	-
261	POLE BAND PER STD. DWG. A-1652, REV. 5 (3 PIECE)	KORTICK
262	INSULATOR FEEDER SPAN SUPPORT	IMPulse 17706-2000
263	GROUNDING CONNECTOR (4/0)	IMPulse 674210
264	GROUNDING CONNECTOR (350 KCMIL)	IMPulse 674754
265	LIVE SPACER, TYPE T OR TC AS APPLICABLE, LENGTH TO SUIT	IMPulse
266	STA-STRAP HEAVY CABLE TIE	PANDUIT PLT-5EH
267	TREE GUARD, PLASTIC CABLE, LENGTH TO SUIT	PREFORMED LINE PRODUCTS PTG-0201
268	CABLE TIES, STEEL LOCKING TOOTH	PANDUIT PLT2S-CO
269	PIPE ARM, 3/4" Ø, GALVANIZED STEEL, SCH 80	IMPulse 60580
270	PIPE ARM, 1/2" Ø, GALVANIZED STEEL, SCH 40	IMPulse 677262
271	HINGE	IMPulse 56062-3002
272	HINGE BRACKET ASSEMBLY	IMPulse 56904
273	UNIVERSAL SPACER BAR, COPPER OR GALVANIZED STEEL, LENGTH TO SUIT	IMPulse 18718, PHOENIX MINING 4000, PHOENIX MINING 4005
274	SUPPORT ROD ASSEMBLY FOR STEEL POLE, GALVANIZED, 1/2" Ø, LENGTH TO SUIT	IMPulse 55786
275	SUPPORT ROD ASSEMBLY FOR WOOD POLE, GALVANIZED, 1/2" Ø, LENGTH TO SUIT	IMPulse 14176
276	CLEVIS FITTING	IMPulse 15278
277	PIPE, 1-1/4" Ø, GALVANIZED STEEL, SCH 40, THREADED AT BOTH ENDS, LENGTH AS REQUIRED	-
278	PIPE END, 1-1/4" Ø, GALVANIZED STEEL	IMPulse 11818
279	HORIZONTAL ADAPTER, 1-1/4" Ø PIPE	IMPulse 14356
280	MINE HANGER	IMPulse 14629
281	CLEVIS, 5/8"	IMPulse 15573
282	STUD, 5/8" Ø x 1-7/8"	IMPulse 22483
283	TURNBUCKLE, 5/8" x 6", JAW AND EYE	IMPulse 95683-3008
284	BAR, GALVANIZED STEEL, 1-1/4" x 3/8" x 28" LONG, WITH 3 HOLES 1/2" Ø	-
285	POLE BAND ASSEMBLY, DOUBLE HINGE	IMPulse 57217-3002
286	PIPE CLAMP, 2" Ø PIPE, DROP	IMPulse 56024-3001
287	INSULATED STEADY ARM	IMPulse 56303-3001
288	NOT USED	-
289	EYE FITTING, 2" Ø PIPE	IMPulse 56463-3002
290	THIMBLE, 3/8" OPENING	IMPulse 56626-4003
291	CLIP, 3/8" GUY WIRE	IMPulse 56574-3001
292	STEADY ARM ASSEMBLY, SQUARE TUBE	IMPulse 60437-3002, PHOENIX MINING 7487
293	LRV FEED FITTING	IMPulse 60557-3001
294	INDICATOR LAMP ASSEMBLY	IMPulse 60980-4002
295	NOT USED	-
296	NOT USED	-
297	NOT USED	-
298	NOT USED	-
299	NOT USED	-
300	NOT USED	-

FOR ORIGINAL SIGNATURES. SEE CL-12942, REV 0

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NO.	DATE	DESCRIPTION	REVISION	CHECKED	APPROVED
5	11/23/09	REVISED ITEM 239, ADDED ITEM 294	SM	SM	TP
4	08/10/2012	REVISED ITEM DESCRIPTIONS, MANUFACTURERS AND PART NOS	CD	SM	OCW
3	02/08/2010	REVISED ITEM DESCRIPTIONS, MANUFACTURERS AND PART NOS	SM	TP	JW
2	06/15/2008	ADDED ITEMS 229-232, REVISED ITEMS 250, 266-268, 273 AND 274	SM	TP	OCW
1	04/10/08	REVISED ITEMS 225 TO 228, 231, 241, 261, 269, 274, 287, 292, 293 AND BORDER TEXT	SM	TP	JW

DESIGNED	T. PHANG
DRAWN	A. RYKOV
CHECKED	E. VIRAY
REVIEWED	A. HOE
RECOMMENDED	Y. GU
APPROVED	W. NELSON
DATE	OCTOBER 3, 2001



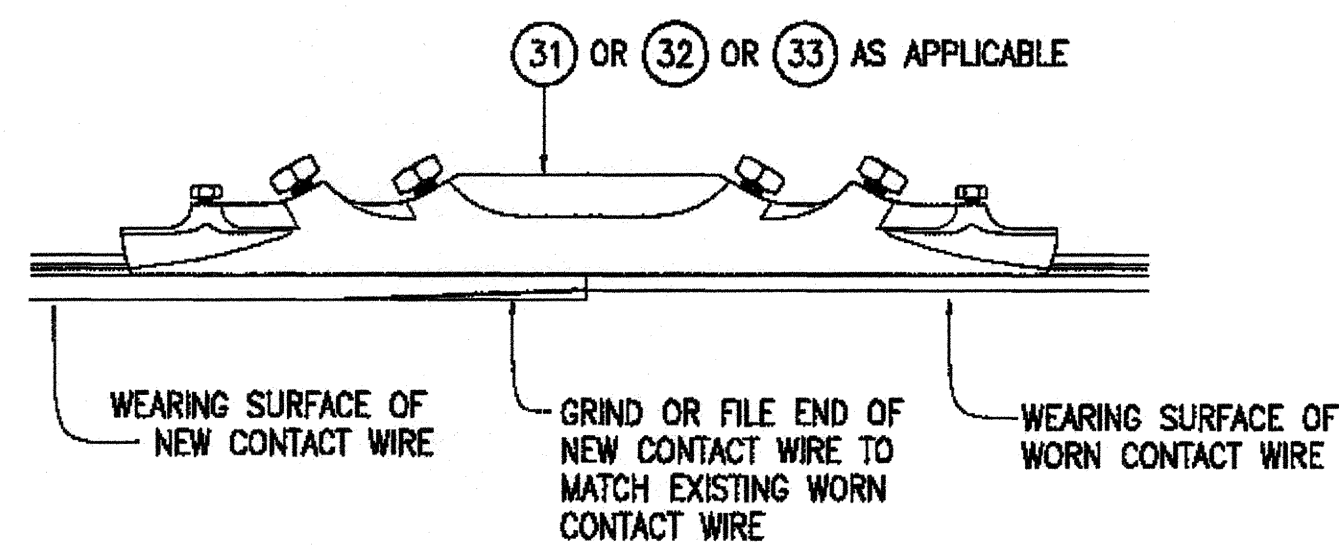
CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL RAILWAY

APPROVED
VINCE HARRIS
FOR THE EXECUTIVE DIRECTOR / CEO

STANDARD DRAWING

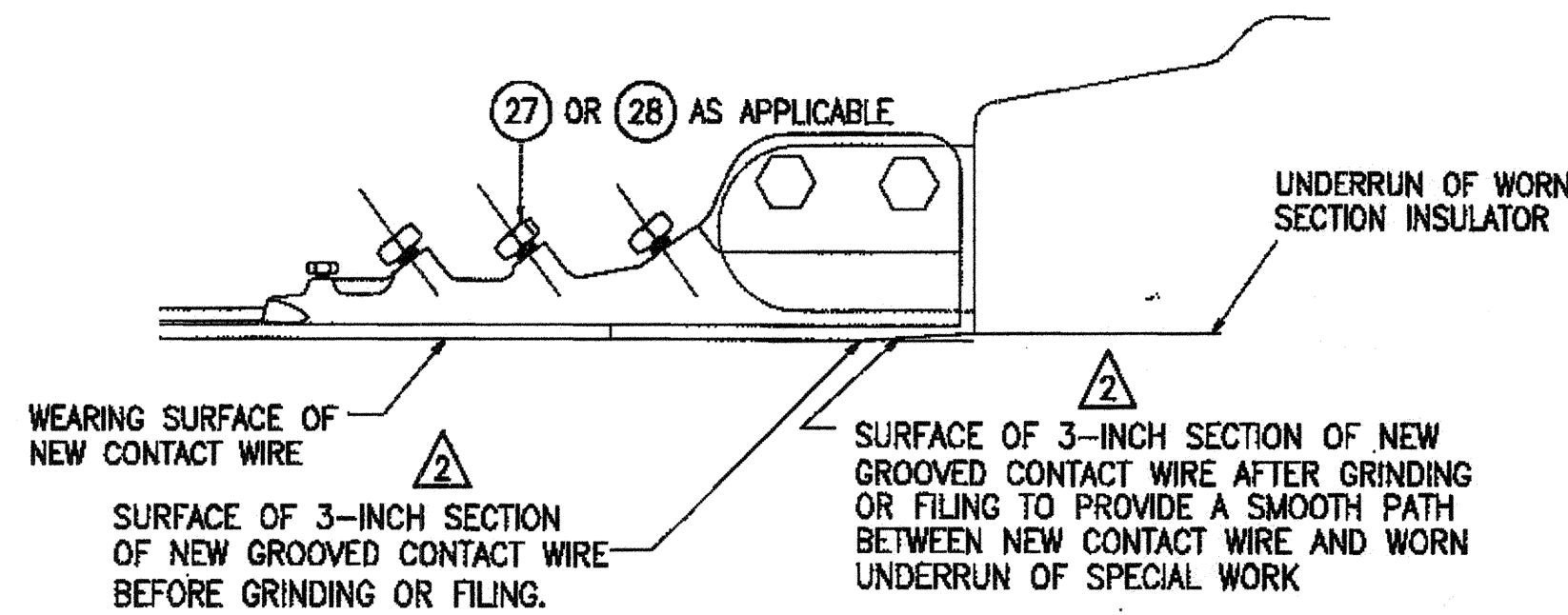
**OVERHEAD CONTACT SYSTEM
MATERIALS LIST III (ITEMS 201-300)**

CONTRACT	
DRAWING	
CL-12942	
REVISION	
5	



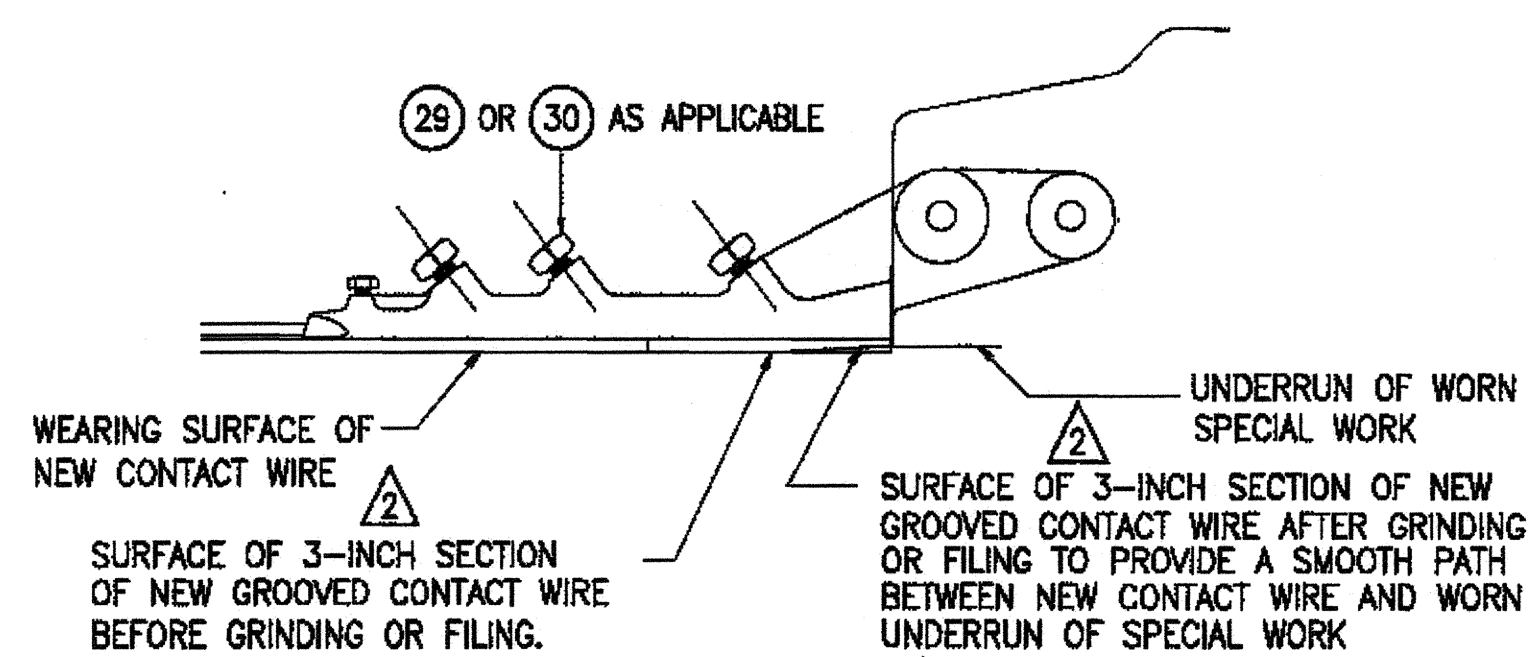
METHOD OF SPLICING (N) CONTACT WIRE TO (E) CONTACT WIRE

DETAIL 1



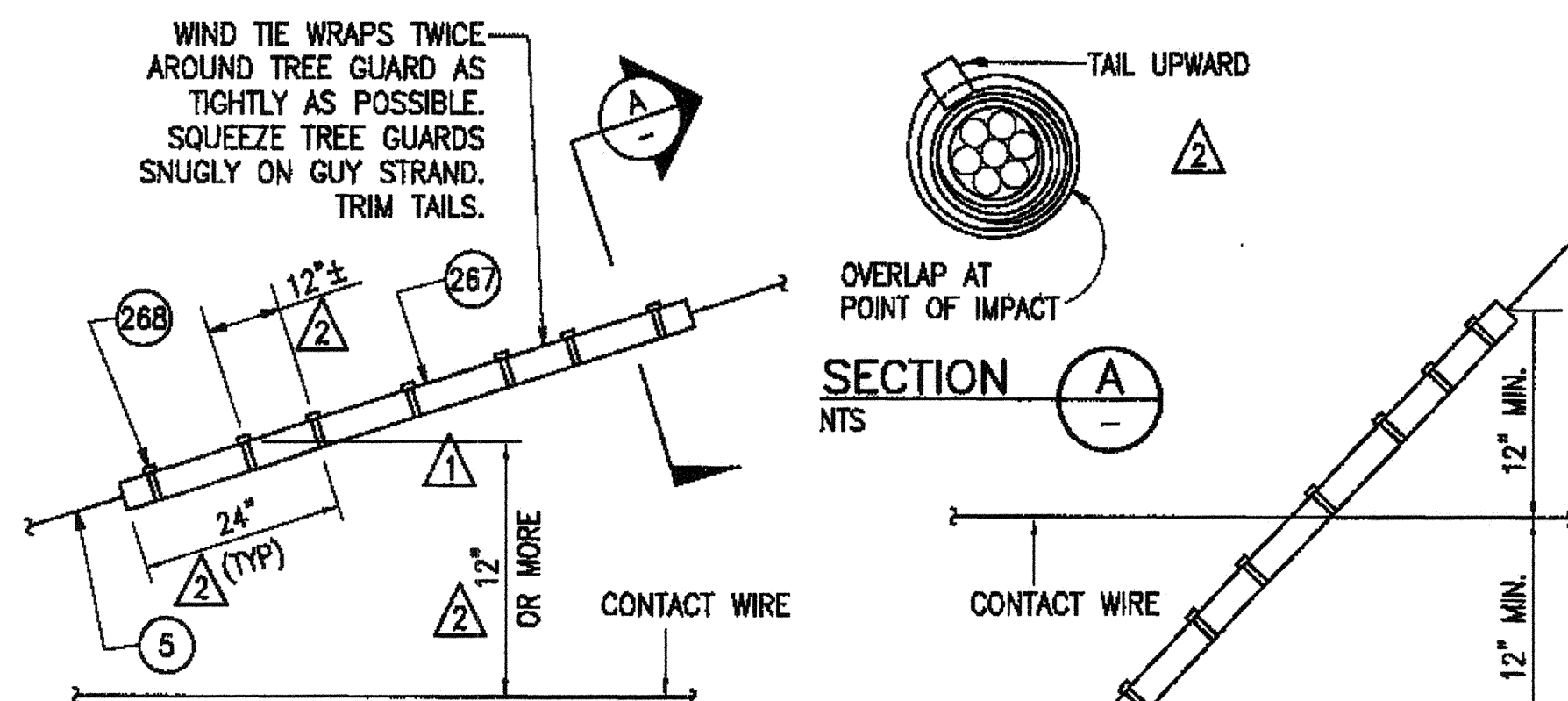
(N) CONTACT WIRE TO (E) SPECIAL WORK (WITH SECTION INSULATOR)

DETAIL 2



(N) CONTACT WIRE TO (E) SPECIAL WORK (WITHOUT SECTION INSULATOR)

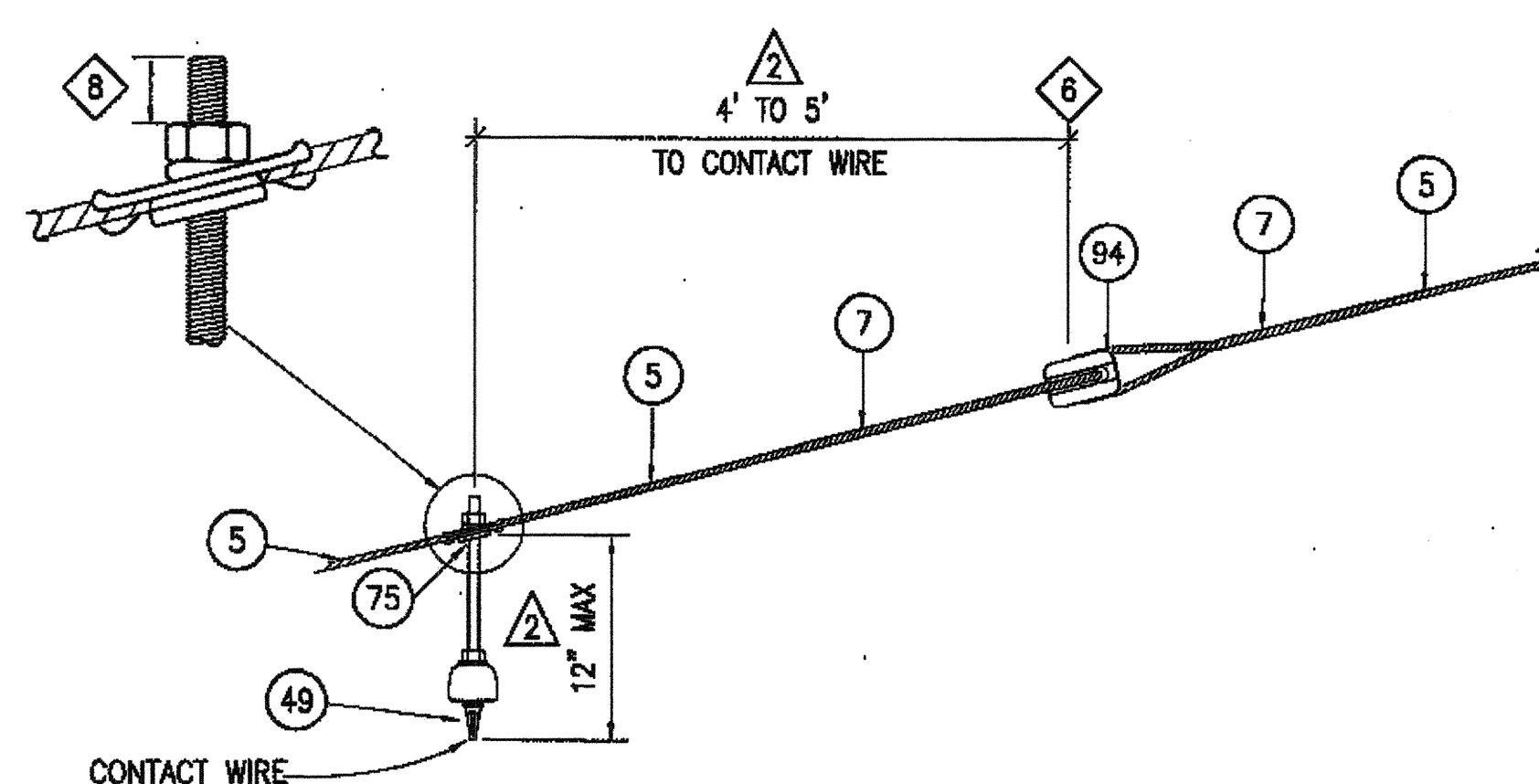
DETAIL 3



ELEVATION NTS

TREE GUARD DETAIL NTS

PLAN NTS



CONTACT WIRE/GUYWIRE SEPARATION

DETAIL 6

SHEET NOTES FOR OVERHEAD CONTACT SYSTEM DETAIL DRAWINGS:

- PROVIDE STRAIN INSULATOR, ITEM 108 OR 109, WHERE CONNECTS TO SWITCH FROG, CURVE SEGMENT, DEAD END CLAMP, CROSSOVER ASSEMBLY, AND ALL ENERGIZED OVERHEAD COMPONENTS.
- PROVIDE 5/8" ϕ STUD, NUT AND BEVELED WASHERS. AXIS OF STUD SHALL BE VERTICAL. LENGTH OF STUD AS REQUIRED TO PROVIDE FULL ENGAGEMENT WITH ALL NUT THREADS PLUS AN ADDITIONAL 1/4" PROTRUSION.
- PROVIDE TWO PORCELAIN INSULATORS, ITEM 94, AND FOUR PREFORMS, ITEM 7 AS SHOWN IF THE DISTANCE BETWEEN CLAMPS IS 18 FT OR MORE, OTHERWISE DELETE THESE ITEMS.
- DO NOT STRIP CABLE TO ATTACH CLAMP.
- STRIP CABLE TO ATTACH CLAMP, WRAP EXPOSED CABLE WITH TWO LAYERS OF ELECTRICAL TAPE AND TWO COATS OF INSULATING VARNISH.
- THE ADJUSTABLE HEIGHT HANGER WITH INSULATOR, ITEM 75, SHALL BE ADJUSTED TO MAINTAIN THE REQUIRED CONTACT WIRES HEIGHT AND PROVIDE THE NECESSARY SEPARATION. PROVIDE PORCELAIN INSULATORS, ITEM 94, AND PREFORMS, ITEM 7, ON BOTH SIDES OF THE ADJUSTABLE HANGER AT 4 FT TO 5 FT AWAY FROM THE ADJUSTABLE HANGER.
- PROVIDE APPROPRIATE JUMPER WIRE ASSEMBLY, ITEM 13, AND NO-BO INSULATOR, ITEM 112, WHERE INDICATED ON THE LAYOUT PLAN. PROVIDE A PERMANENT MAGNETIC BLOWOUT ASSEMBLY (ITEMS 119 AND 123) ON THE FIRST INSULATED RUNNER SECTION OF ALL CROSSOVERS, SECTION INSULATORS AND FROG ASSEMBLIES.
- CUT UNUSED LENGTH OF STUD TO 1" AFTER FINAL ADJUSTMENT, DO NOT DAMAGE STUD THREADS.
- REPLACE STRAIN INSULATOR, ITEM 108, WITH ONE EACH OF ITEM 120 AND 248, AND TWO OF ITEM 108 WHERE CONNECTS TO INSIDE OF CURVE SEGMENT.
- SUBSTITUTE STRANDWISE, ITEMS 8 OR 9 FOR PREFORM, ITEM 6 OR 7, WHERE THERE IS INSUFFICIENT SPACE FOR PREFORM INSTALLATION. PREFORM SHALL NOT BE CUT TO FIT.
- WHERE NO DISTANCE IS SHOWN, THE LOCATION OF ALL GUY WIRE INSULATORS SHALL COMPLY WITH APPLICABLE G.O. 95 REQUIREMENTS.
- THE CLAMP HEIGHT FOR THE BOTTOM GUY WIRE SHALL BE 18 FT WITH A TENSION AS SHOWN ON LAYOUT PLAN.
- IF LENGTH IS MORE THAN 4 FT, PROVIDE INSULATOR, ITEM 94, 4 FT TO 5 FT FROM CONTACT WIRE. EITHER USE PREFORM, ITEM 7 OR STRANDWISE, ITEM 8, TO INSTALL THE INSULATOR.
- INSTALL CURVE FITTING/CURVE HANGER IN THE DIRECTION OF PULL OF CONTACT WIRE.
- DELETE ITEMS 4, 6, AND 97, WHERE CONTROL WIRE IS ATTACHED TO PULL-OFF.
- NOT USED.
- NOT ALL DETAILS SHOWN HERE ARE TO BE USED. REFER TO LAYOUT PLANS AND NOTES FOR APPLICABLE DETAILS.
- MAINTAIN SUFFICIENT FREE AREA ABOVE ENCLOSURE MOUNTING PLATE TO PERMIT ENCLOSURE TO BE LIFTED FREE OF PLATE WITHOUT CONFLICT.
- PROVIDE NEW EYEBOLT UTILIZING THE HOLE USED BY THE EXISTING EYEBOLT TO BE REPLACED, UON.
- ADJUST GUYWIRE TENSION UP TO 500 LB MAXIMUM TO BRING THE HEIGHT OF TROLLEYWIRES AS INDICATED ON THE LAYOUT PLAN.
- PROVIDE NEW 1-1/2" ϕ HDPE CONDUIT WITH STRAP TO THE POLE. RUN THE NEW ANTENNA CABLES AND CONTROL WIRES INSIDE THE HDPE CONDUIT.
- FIELD VERIFY DIMENSIONS OF POLE TOP PRIOR TO ADAPTOR PLATE FABRICATION. ADAPTOR PLATE SHALL CONFORM TO ASTM A-36 AND TENON SHALL CONFORM TO ASTM B-53 GRADE B. TENON AND ADAPTOR PLATE SHALL BE HOT DIP GALVANIZED PER ASTM A-153 AND PAINTED TO MATCH POLE COLOR. BEFORE WELDING TO EXISTING POLE, THOROUGHLY CLEAN AND/OR GRIND ALL SURFACES TO REMOVE RUST, PAINT OR OTHER FOREIGN MATERIALS IN AREA TO BE WELDED. ALL WELDING SHALL CONFORM TO AWS D1.1 AND SHALL BE PERFORMED BY CERTIFIED WELDER WITH E70 SERIES ELECTRODES.

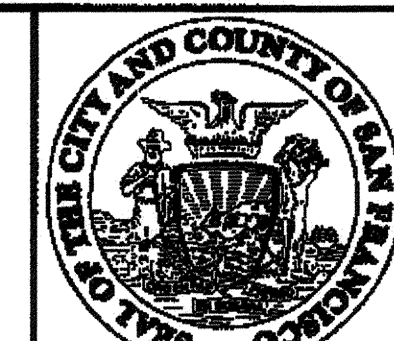
FOR ORIGINAL SIGNATURES, SEE CL-12945, REV 0

THE ENGINEER OF RECORD FOR THE LAYOUT PLANS SHALL BE RESPONSIBLE FOR THE PROPER USAGE AND APPLICATION OF THESE DETAILS.

I:\emp\m02\values\MCP-2\Overhead\Design\Standard_Details\STD_CL-12945_Rev4.dwg atung Thu Sep 02 2010 3:07 pm
 BORDER REVISED 09/04/05

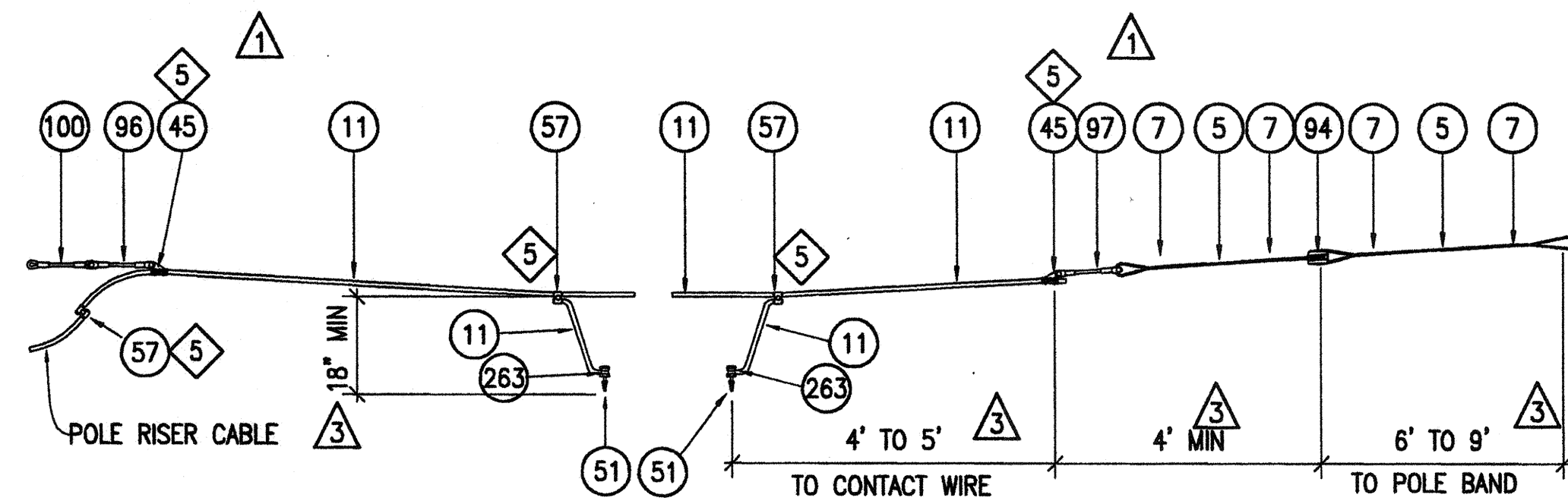
NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
4	11/27/07	ADDED NOTE 22.			SML TP CCW
3	06/01/09	REVISED DETAIL 4 AND NOTES TITLE; DELETE DETAIL 5	SML	TP	CCW
2	04/10/08	ADDED NOTES 18 TO 21; REVISED NOTES, DIMENSIONS, AND BORDER TEXT	SML	TP	JW
1	09/10/07	REVISED NOTE 6 AND DETAIL 4	CD	SML	JW

DESIGNED	T. PHANG
DRAWN	M. LUC
CHECKED	E. VIRAY
REVIEWED	A. HOE
RECOMMENDED	Y. GU
APPROVED	W. NELSON
DATE	OCTOBER 15, 2001



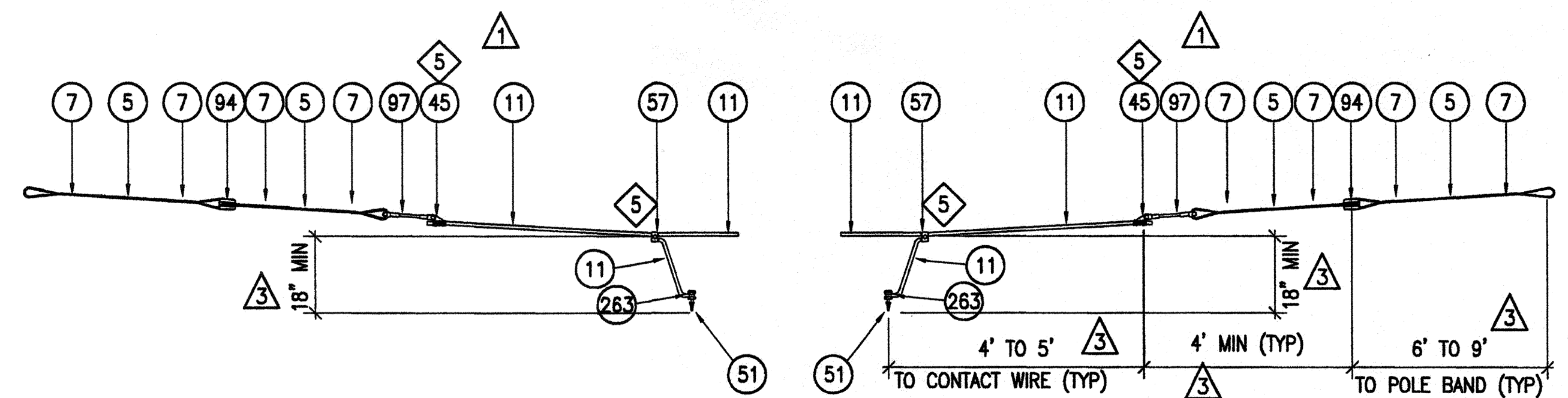
CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL RAILWAY
 APPROVED
 VINCE HARRIS
 FOR THE EXECUTIVE DIRECTOR / CEO

MUNI METRO SYSTEM / TROLLEY COACH SYSTEM		CONTRACT
		DRAWING
		CL-12945
OVERHEAD CONTACT SYSTEM		REVISION
DETAIL 1		4



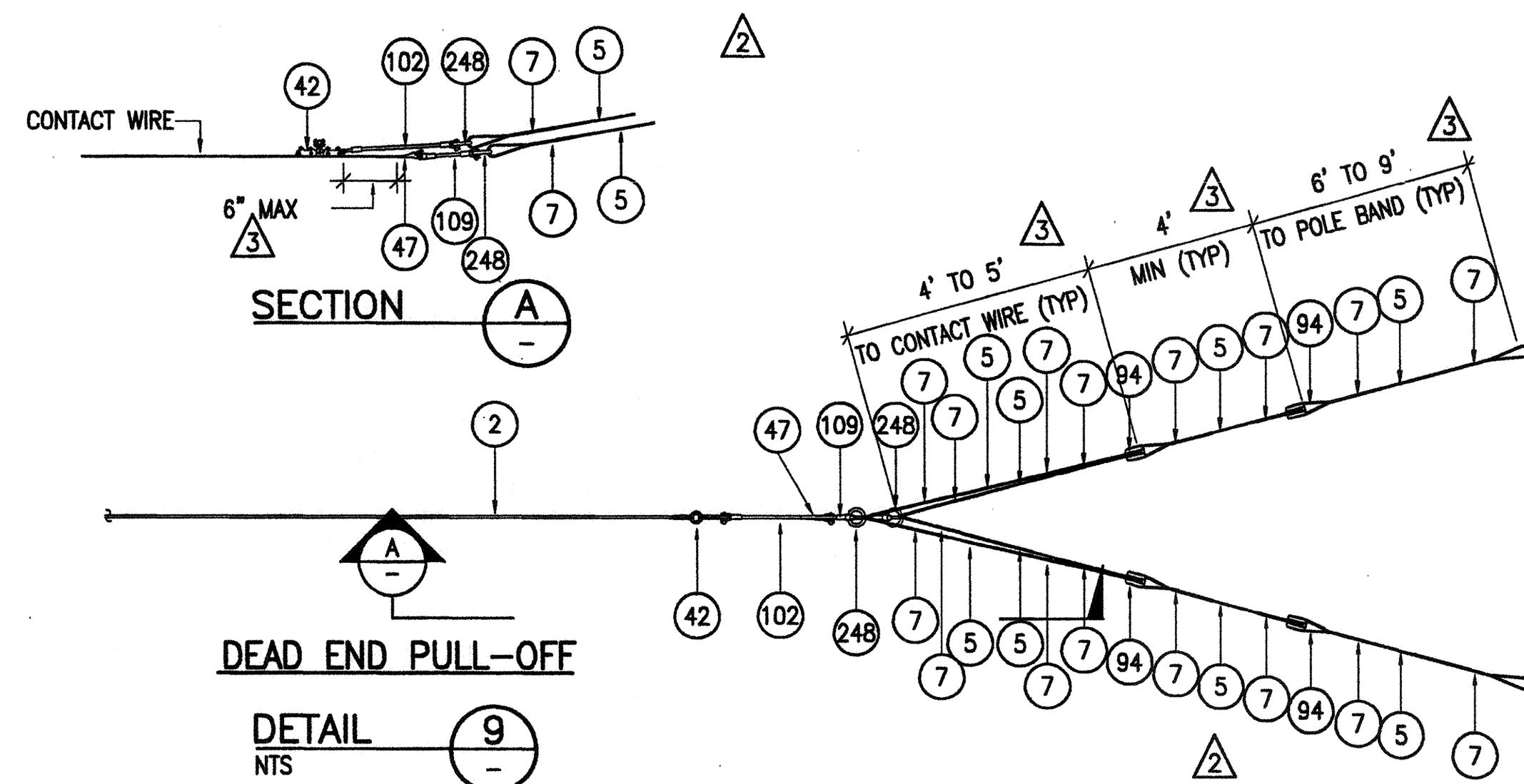
AUXILIARY FEED SPAN (POSITIVE/NEGATIVE)

DETAIL 7
NTS



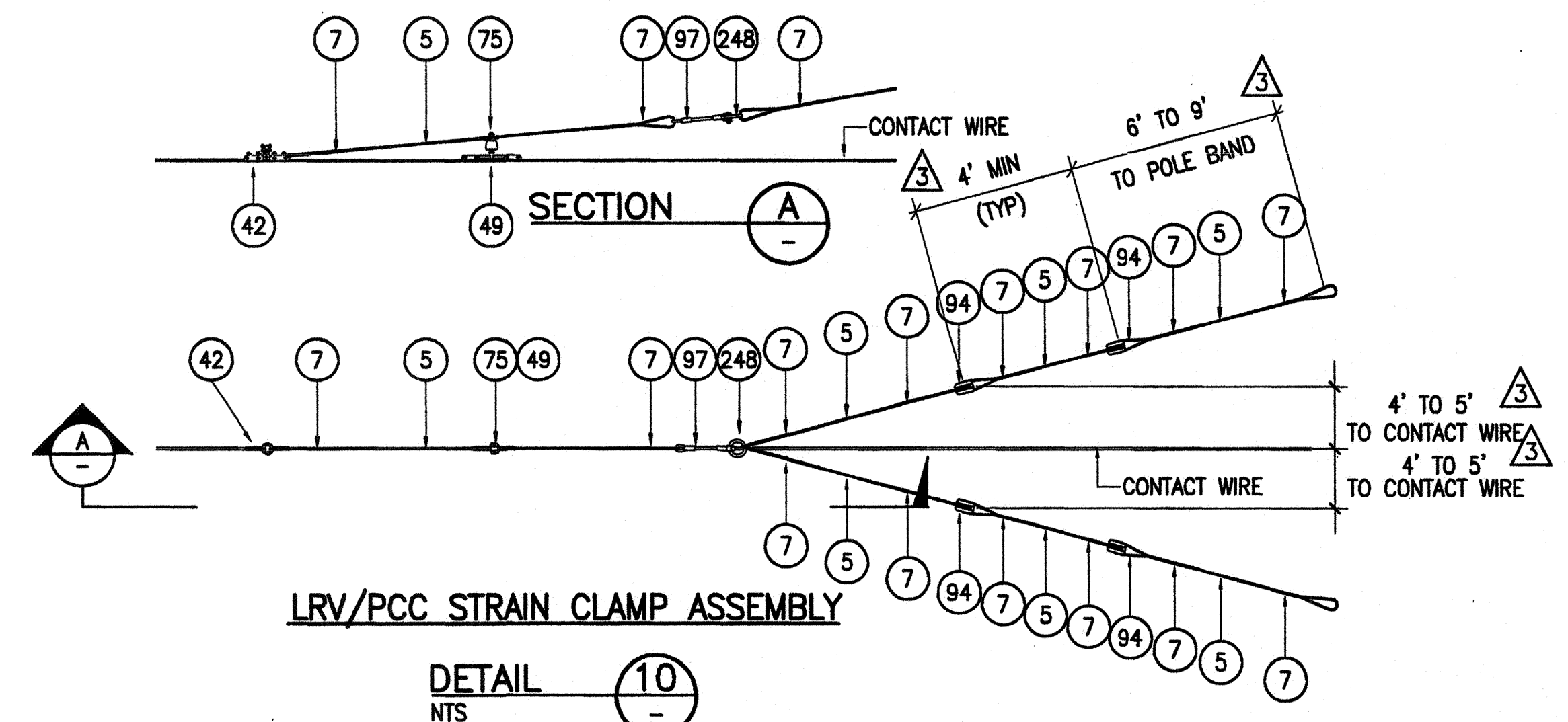
AUXILIARY EQUALIZER SPAN (POSITIVE/NEGATIVE)

DETAIL 8
NTS



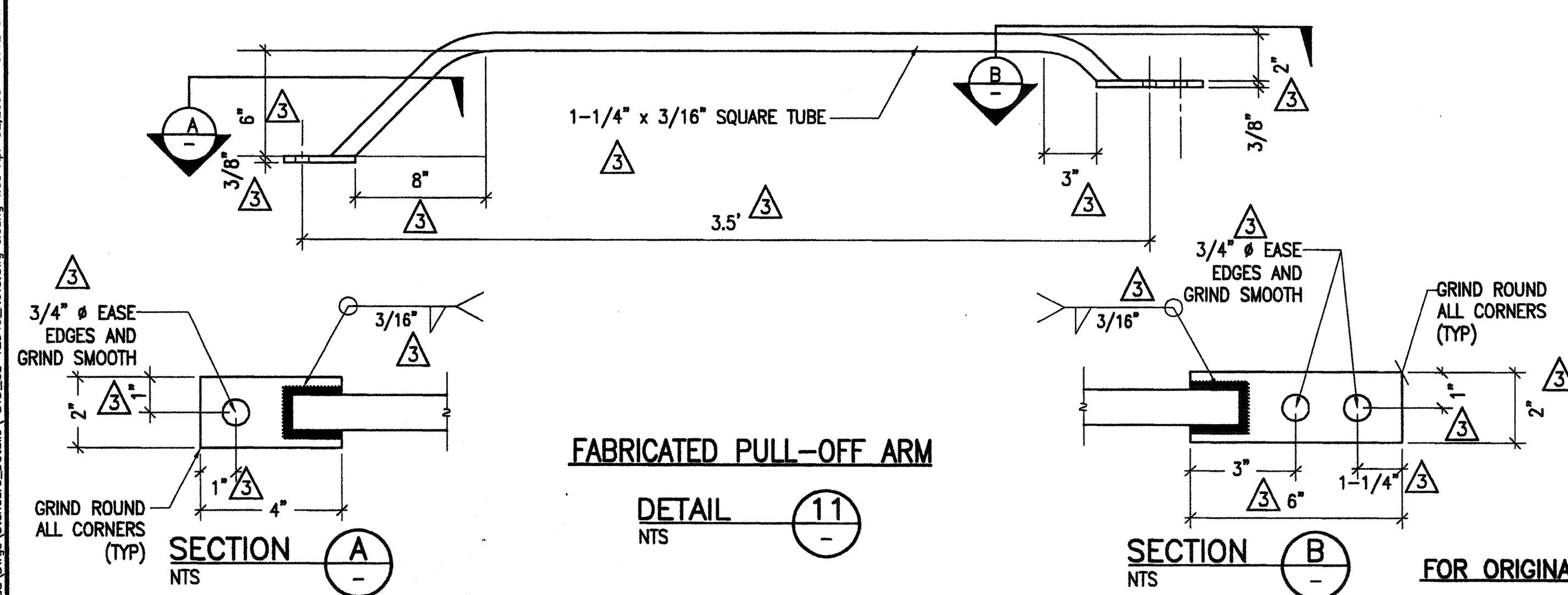
DEAD END PULL-OFF

DETAIL 9
NTS



LRV/PCC STRAIN CLAMP ASSEMBLY

DETAIL 10
NTS

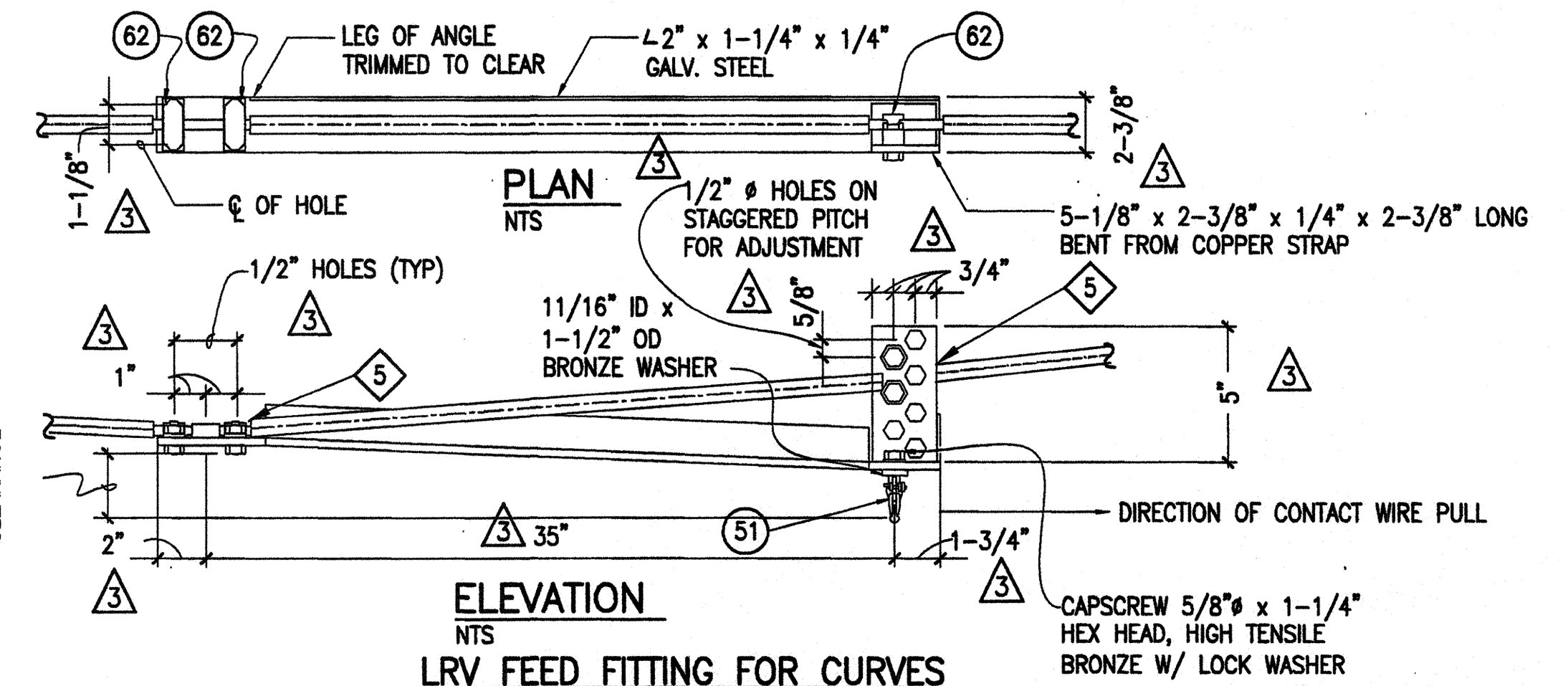


FABRICATED PULL-OFF ARM

DETAIL 11
NTS

SECTION B
NTS

FOR ORIGINAL SIGNATURES. SEE DRAWING NO. CL-12946 REV.0



LRV FEED FITTING FOR CURVES

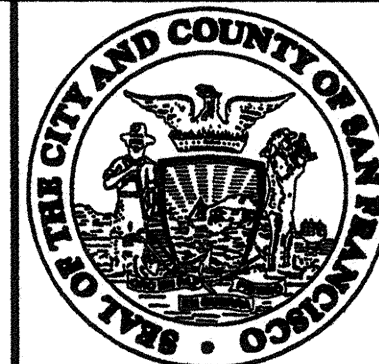
DETAIL 12
NTS

THE ENGINEER OF RECORD FOR THE LAYOUT PLANS SHALL BE RESPONSIBLE FOR THE PROPER USAGE AND APPLICATION OF THESE DETAILS.

C:\pwworkspace\cl-12946\Drawings\Standard_Details\STD_CL-12946_Rev3.dwg, plotting Wed Apr 02 2008 - 9:12 am

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
3	4/10/08	REVISED DIMENSIONS AND BORDER TEXT		SM	JW
2	10/23/08	REVISED DETAIL 9		TP	SM
1	3/8/02	ADD NOTE 5		TP	EGV

DESIGNED	T. PHANG
DRAWN	M. LUC
CHECKED	E. VIRAY
REVIEWED	A. HOE
RECOMMENDED	Y. GU
APPROVED	W. NELSON
DATE	OCTOBER 4, 2001



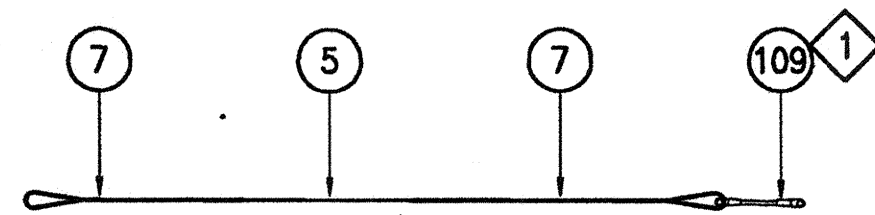
CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL RAILWAY

APPROVED
VINCE HARRIS
FOR DIRECTOR OF TRANSPORTATION

MUNI METRO SYSTEM / TROLLEY COACH SYSTEM

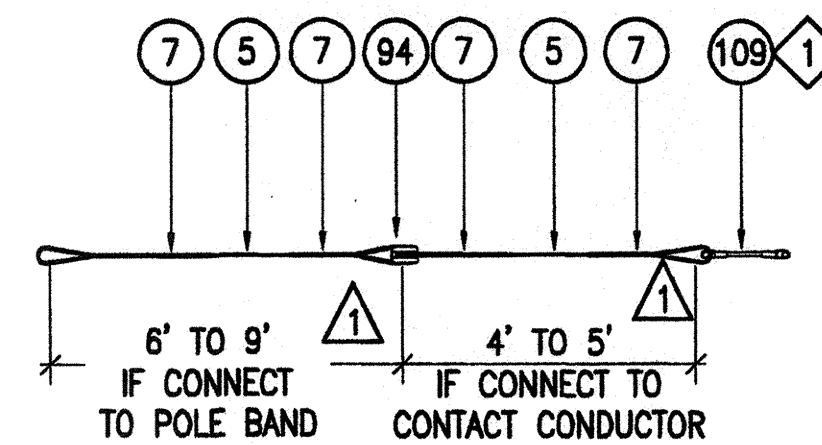
OVERHEAD CONTACT SYSTEM
DETAIL II

CONTRACT	
DRAWING	CL-12946
REVISION	3



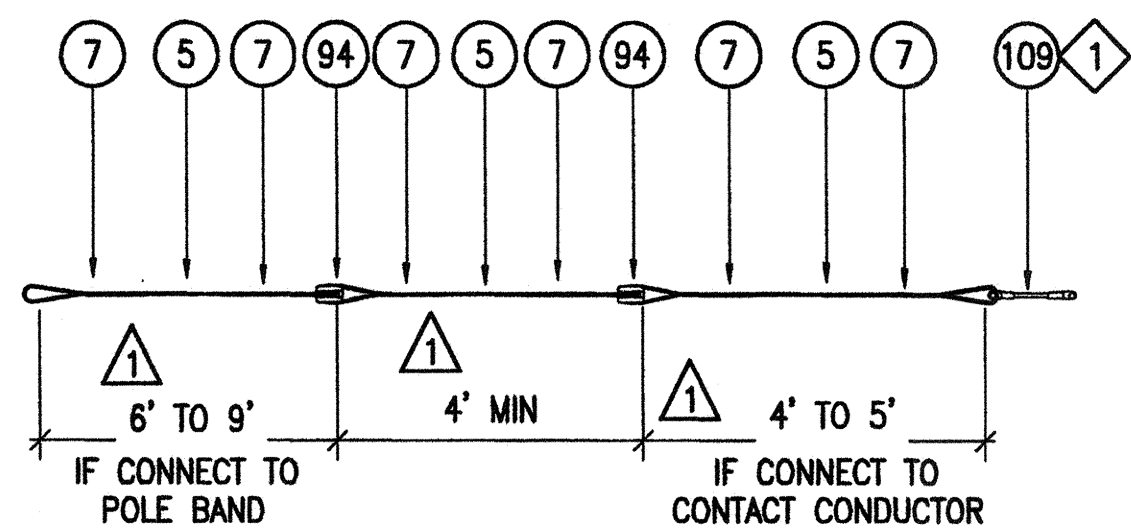
PULL-OFF (WITHOUT INSULATOR)

DETAIL 13
NTS



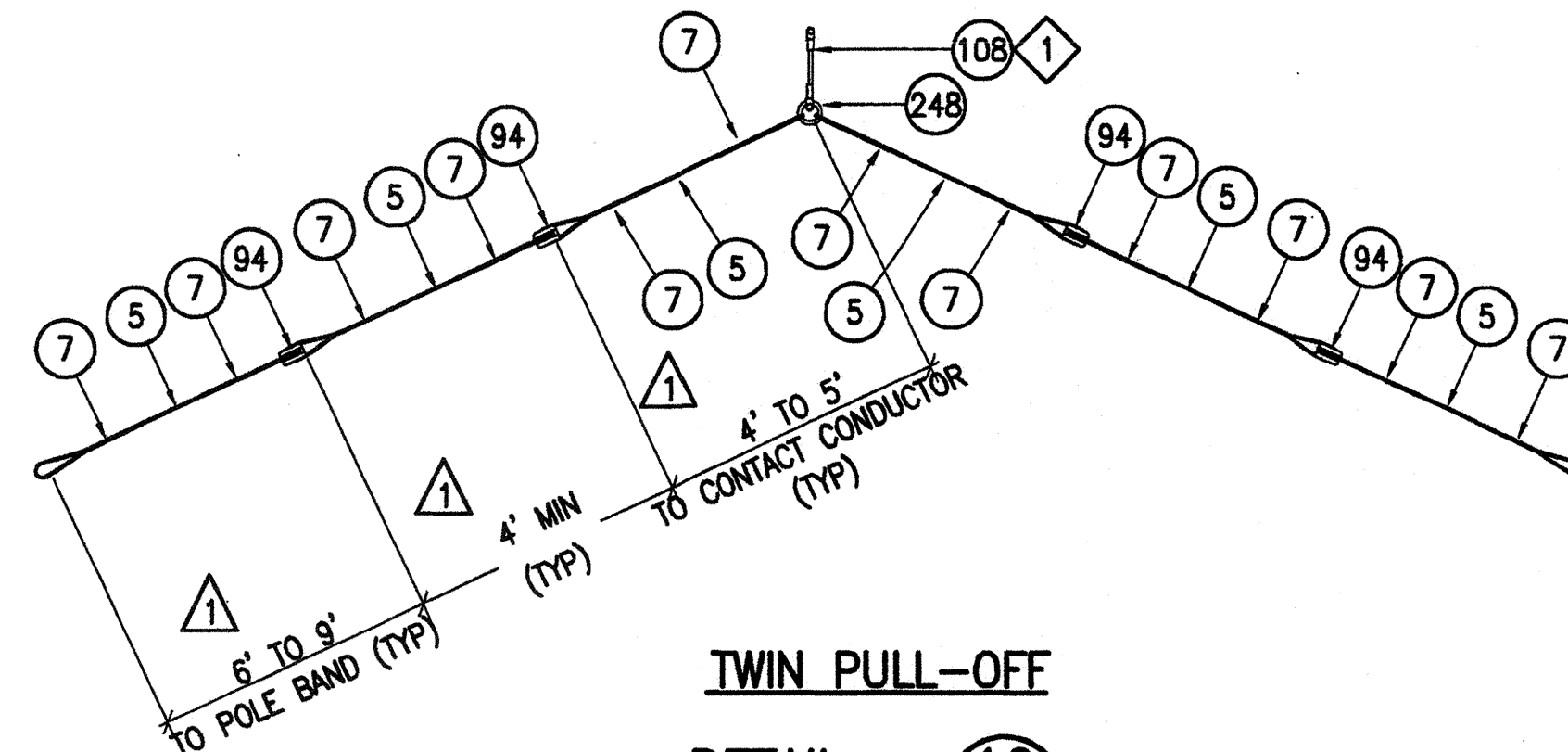
PULL-OFF (1 INSULATOR)

DETAIL 14
NTS



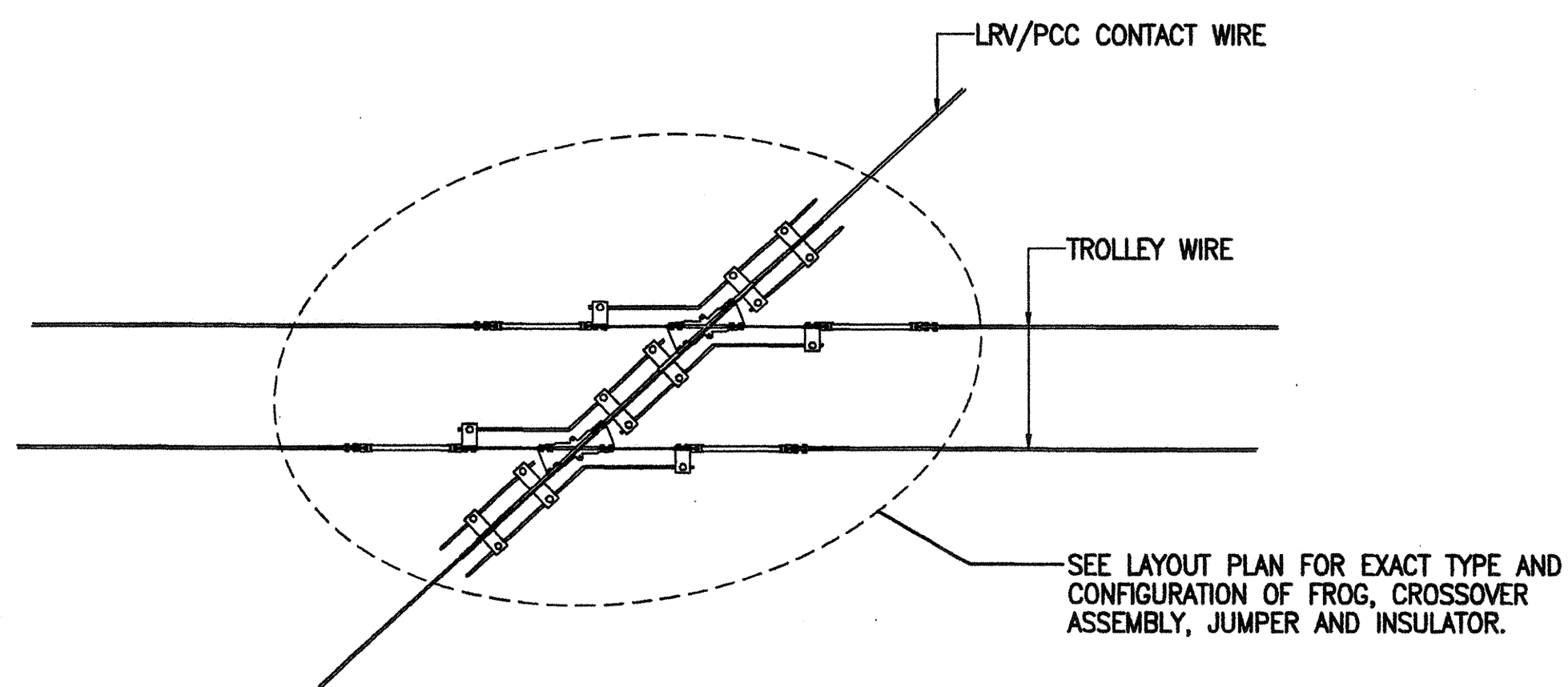
PULL-OFF (2 INSULATORS)

DETAIL 15
NTS



TWIN PULL-OFF

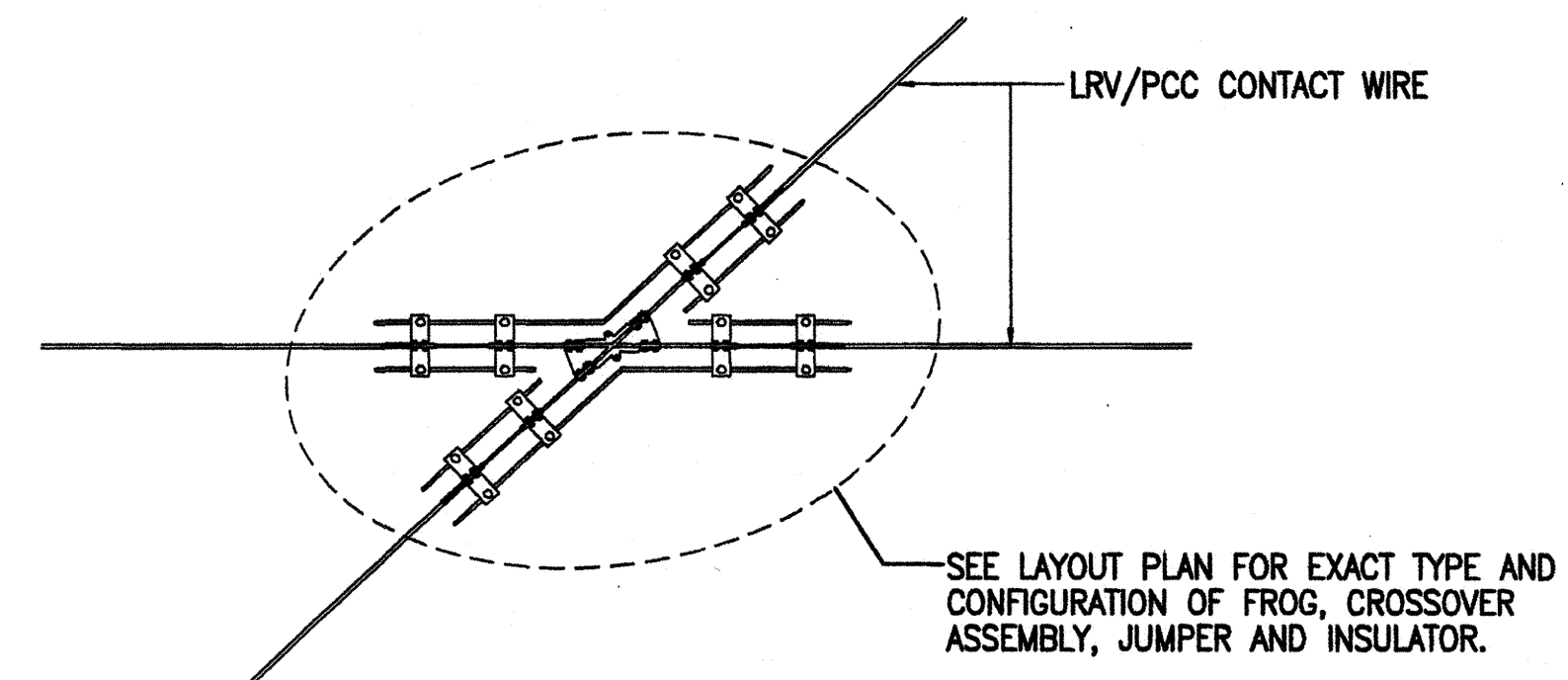
DETAIL 16
NTS



LRV/PCC/TROLLEY COACH CROSSOVER

DETAIL 17
NTS

FOR ORIGINAL SIGNATURES, SEE CL-12947, REV 0



LRV/PCC CROSSOVER

DETAIL 18
NTS

THE ENGINEER OF RECORD FOR THE LAYOUT PLANS SHALL BE RESPONSIBLE FOR THE PROPER USAGE AND APPLICATION OF THESE DETAILS.

\\snp\lan\02\aharasa\MCAP_2\Overhead\Draws\Standard_Details\ STD_CL-12947_Rev1.dwg ailing Wed Apr 02,2008 - 9:14 am
 BORDER REVISED 09/06/05

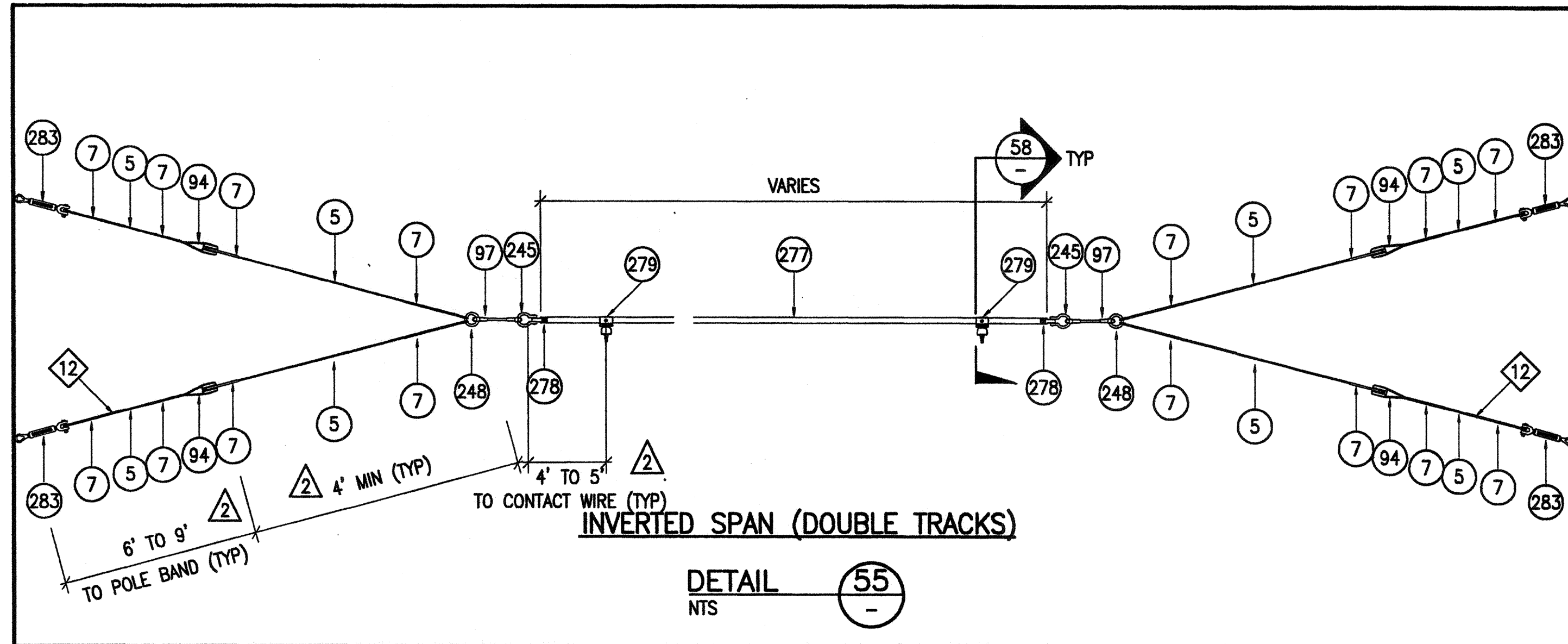
NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
1	4/10/06	REVISED DIMENSIONS AND BORDER TEXT			

DESIGNED	T. PHANG
DRAWN	M. LUC
CHECKED	E. VIRAY
REVIEWED	A. HOE
RECOMMENDED	Y. GU
APPROVED	W. NELSON
DATE	OCTOBER 4, 2001

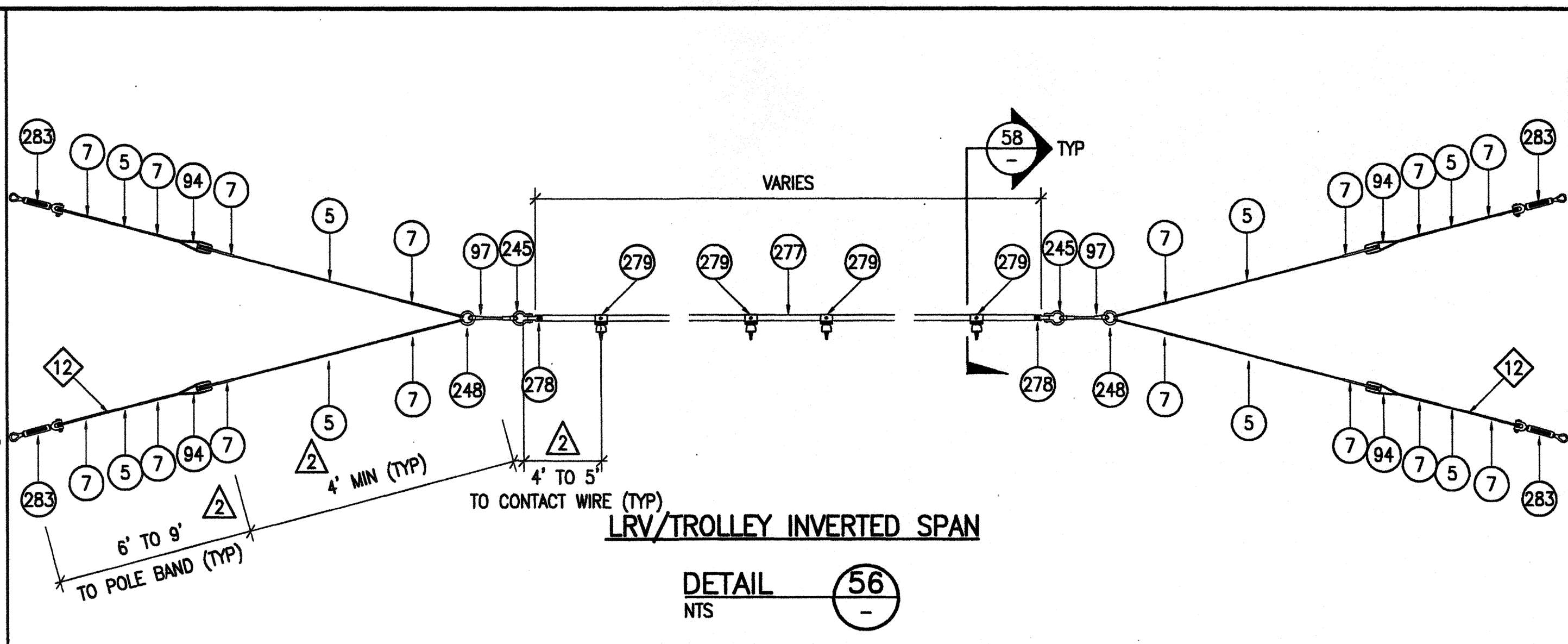


CITY AND COUNTY OF SAN FRANCISCO
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 FOR DIRECTOR OF TRANSPORTATION

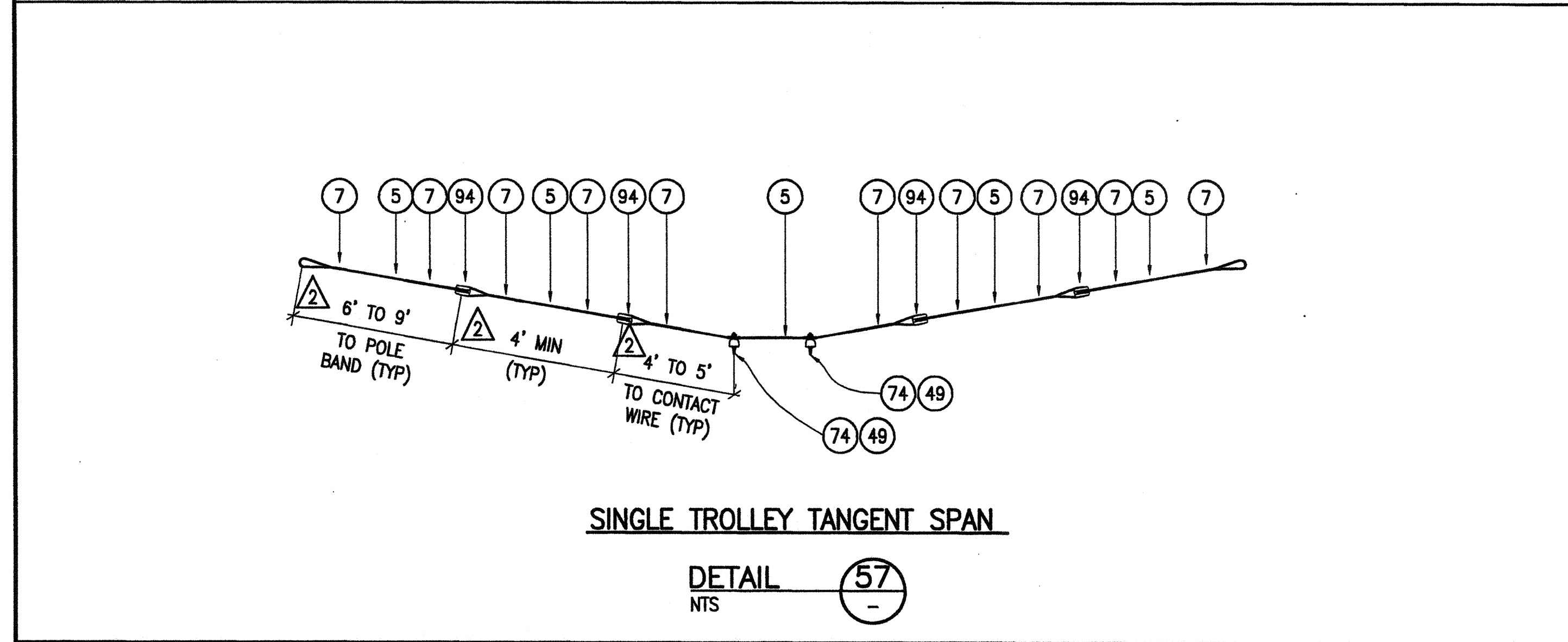
MUNI METRO SYSTEM / TROLLEY COACH SYSTEM		CONTRACT
OVERHEAD CONTACT SYSTEM DETAIL III		DRAWING CL-12947
		REVISION 1



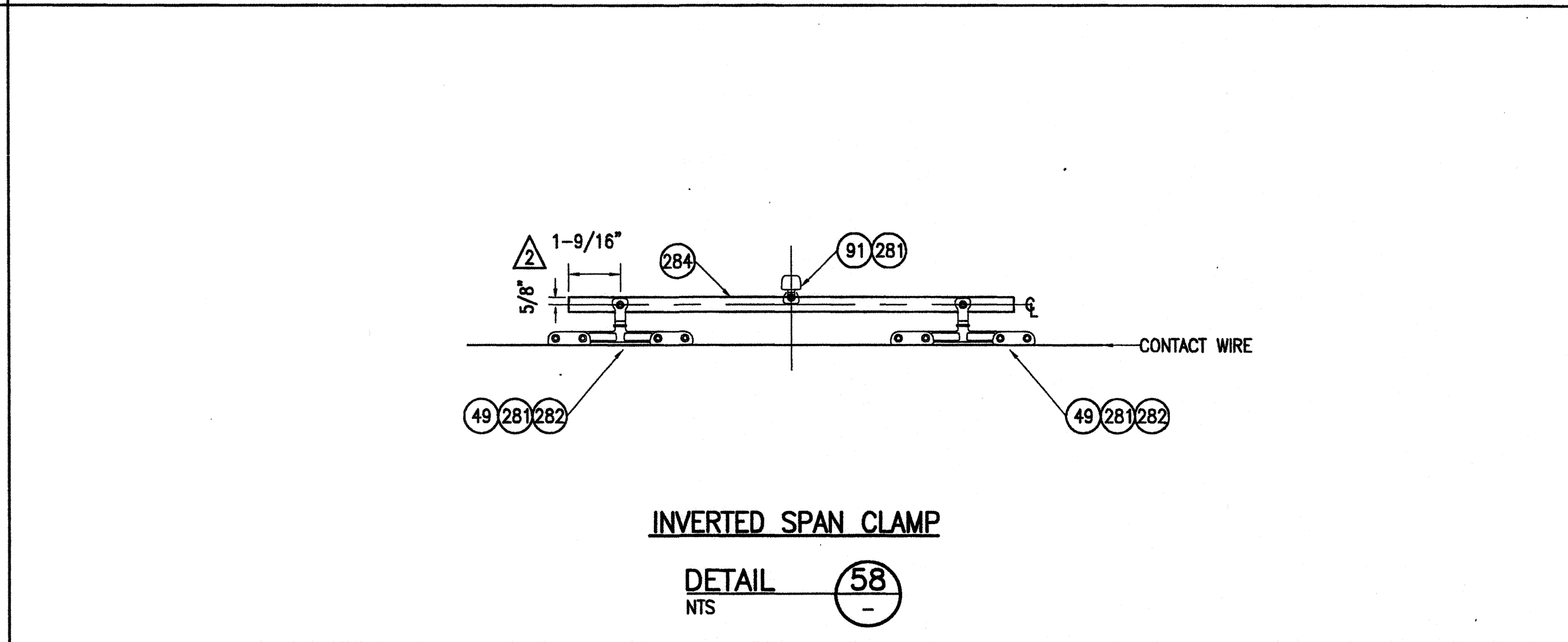
DETAIL 55
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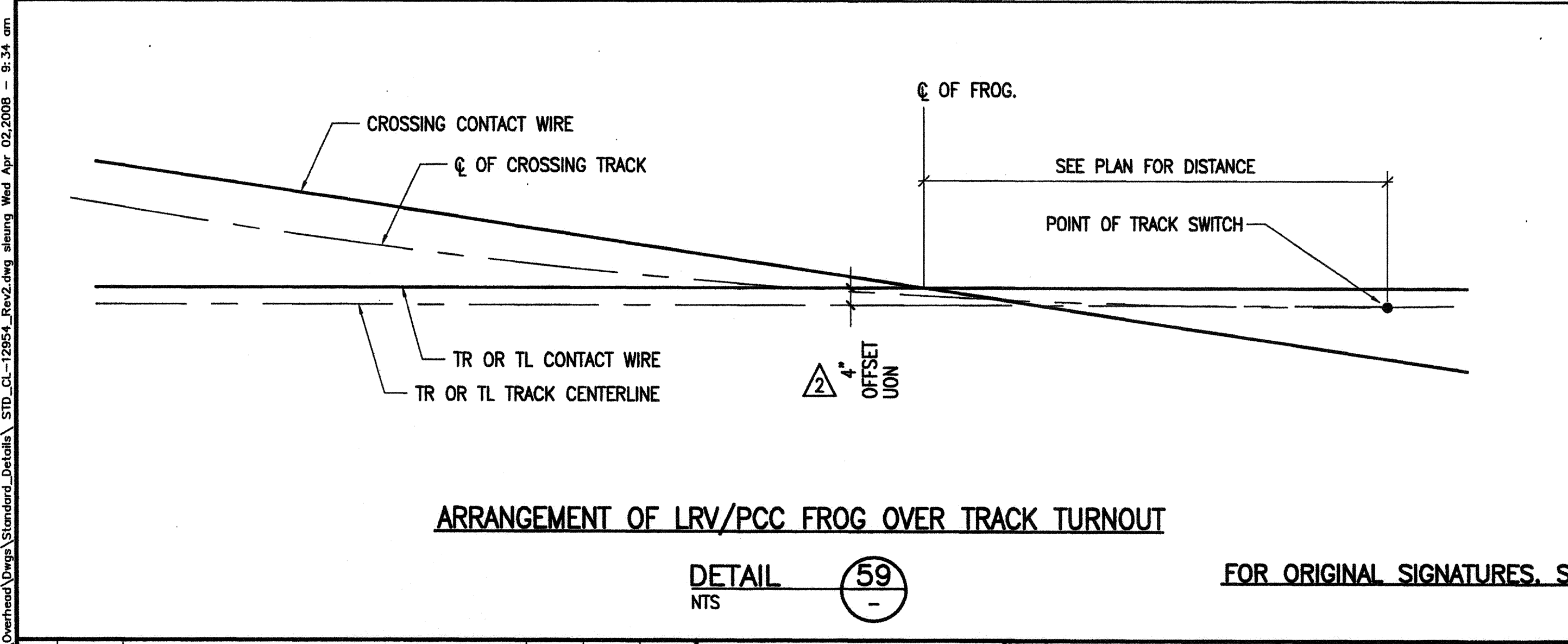
DETAIL 56
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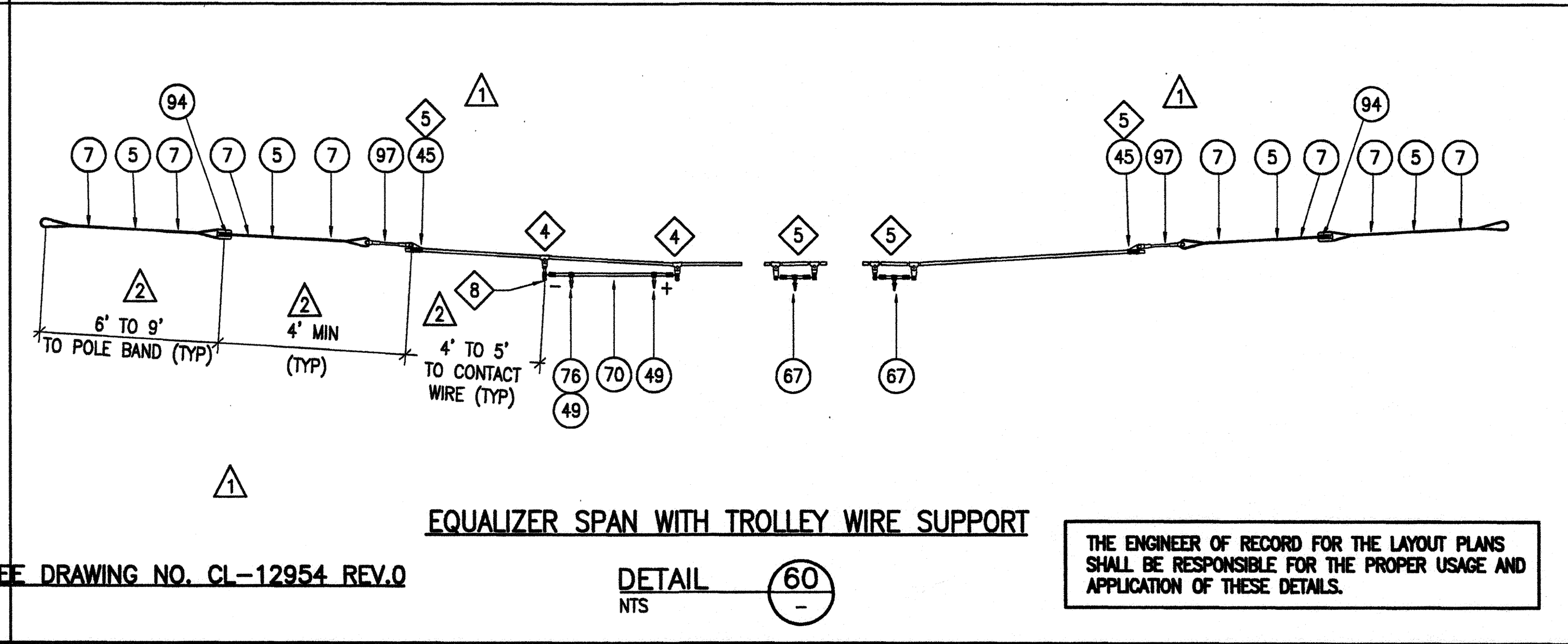
DETAIL 57
NTS



DETAIL 58
NTS



DETAIL 59
NTS



DETAIL 60
NTS

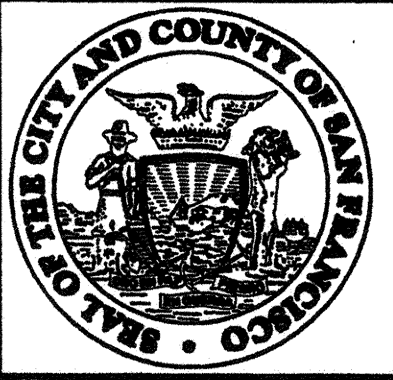
FOR ORIGINAL SIGNATURES, SEE DRAWING NO. CL-12954 REV.0

THE ENGINEER OF RECORD FOR THE LAYOUT PLANS SHALL BE RESPONSIBLE FOR THE PROPER USAGE AND APPLICATION OF THESE DETAILS.

\\nmap\sva02\shares\mcap\2\Overhead\Draws\Standard_Details\STD_CL-12954_Rev2.dwg, sheet Wed Apr 02 2008 11:34 am

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
2	4/10/08	REVISED DIMENSIONS AND BORDER TEXT			
1	3/8/02	ADD NOTE 5			

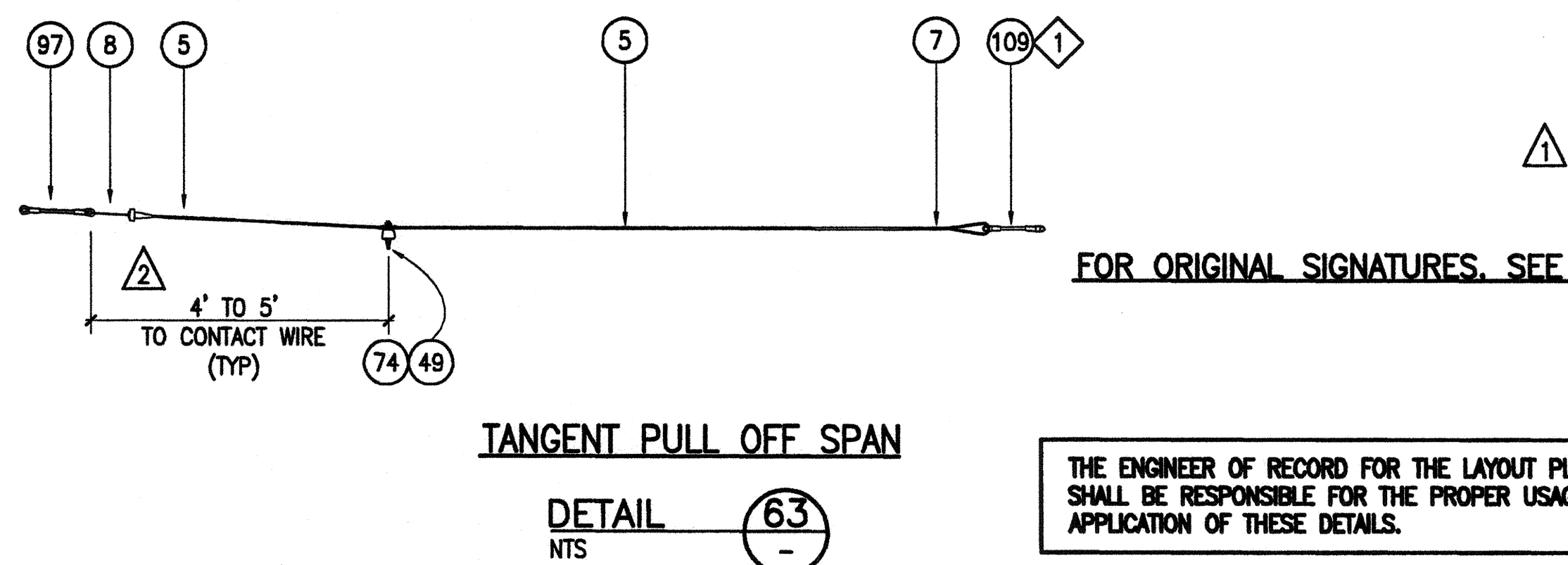
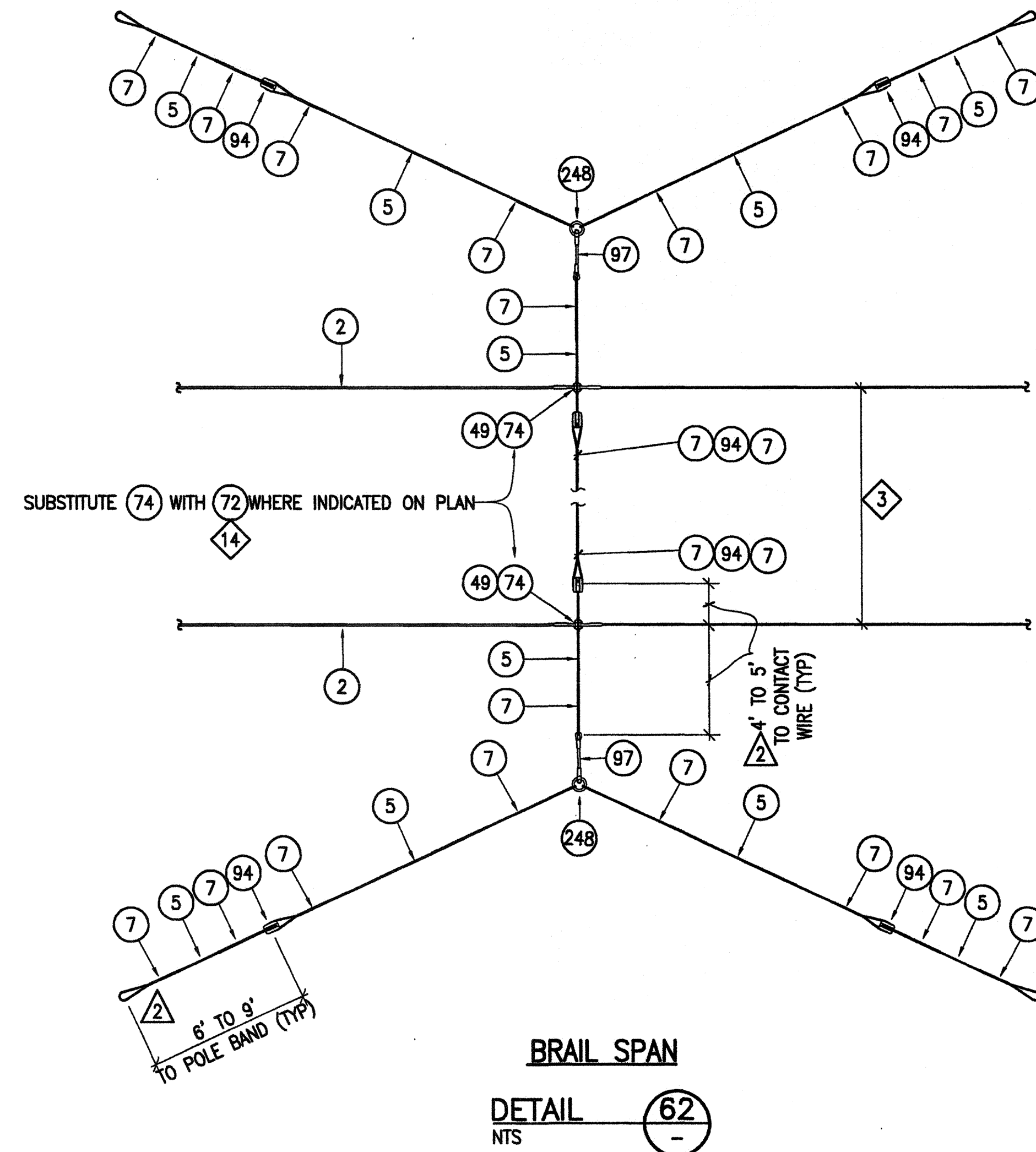
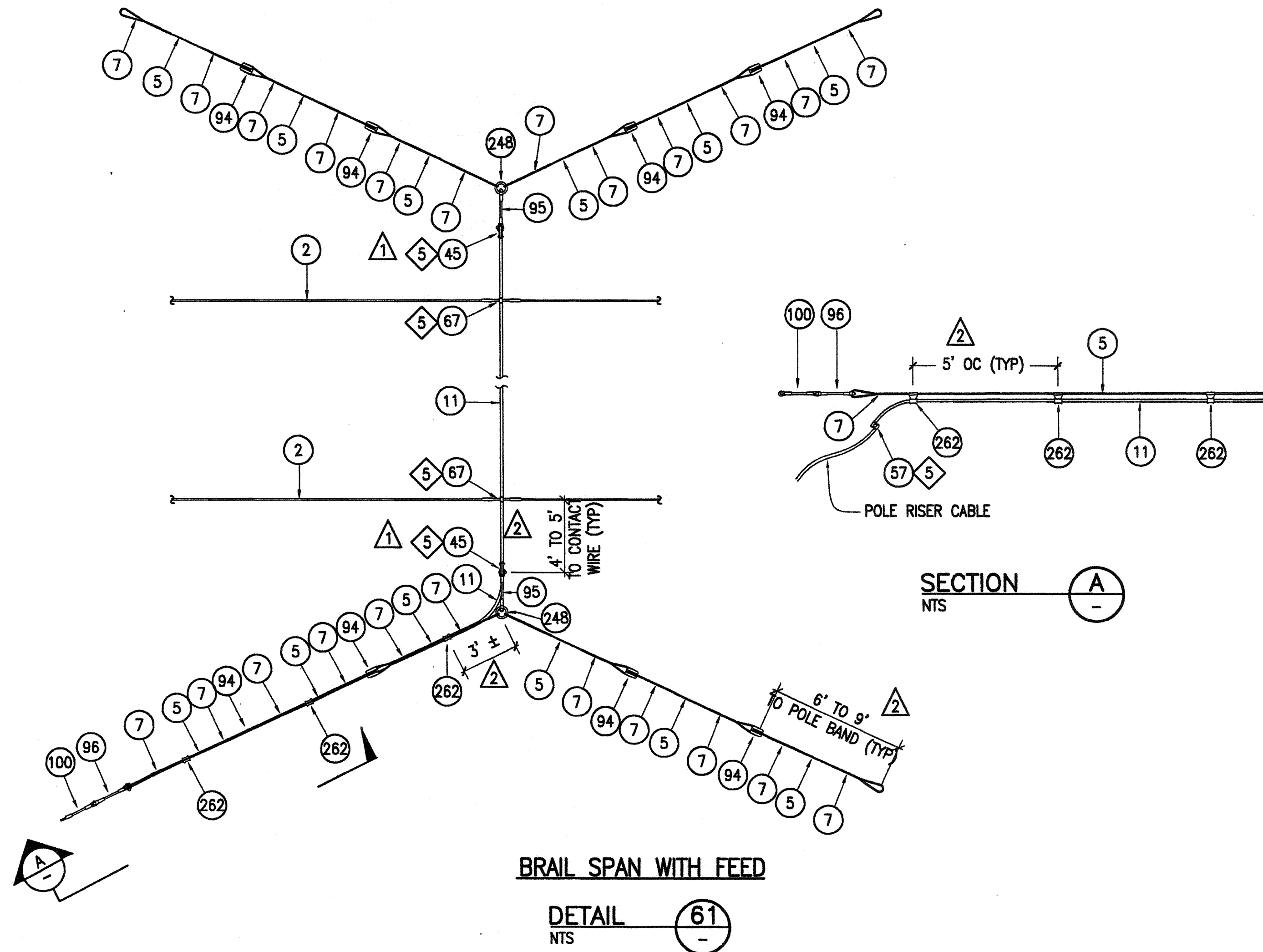
DESIGNED	T. PHANG
DRAWN	M. LUC
CHECKED	E. VIRAY
REVIEWED	A. HOE
RECOMMENDED	Y. GU
APPROVED	W. NEILSON
DATE	OCTOBER 4, 2001



CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL RAILWAY
APPROVED
VINCE HARRIS
FOR DIRECTOR OF TRANSPORTATION

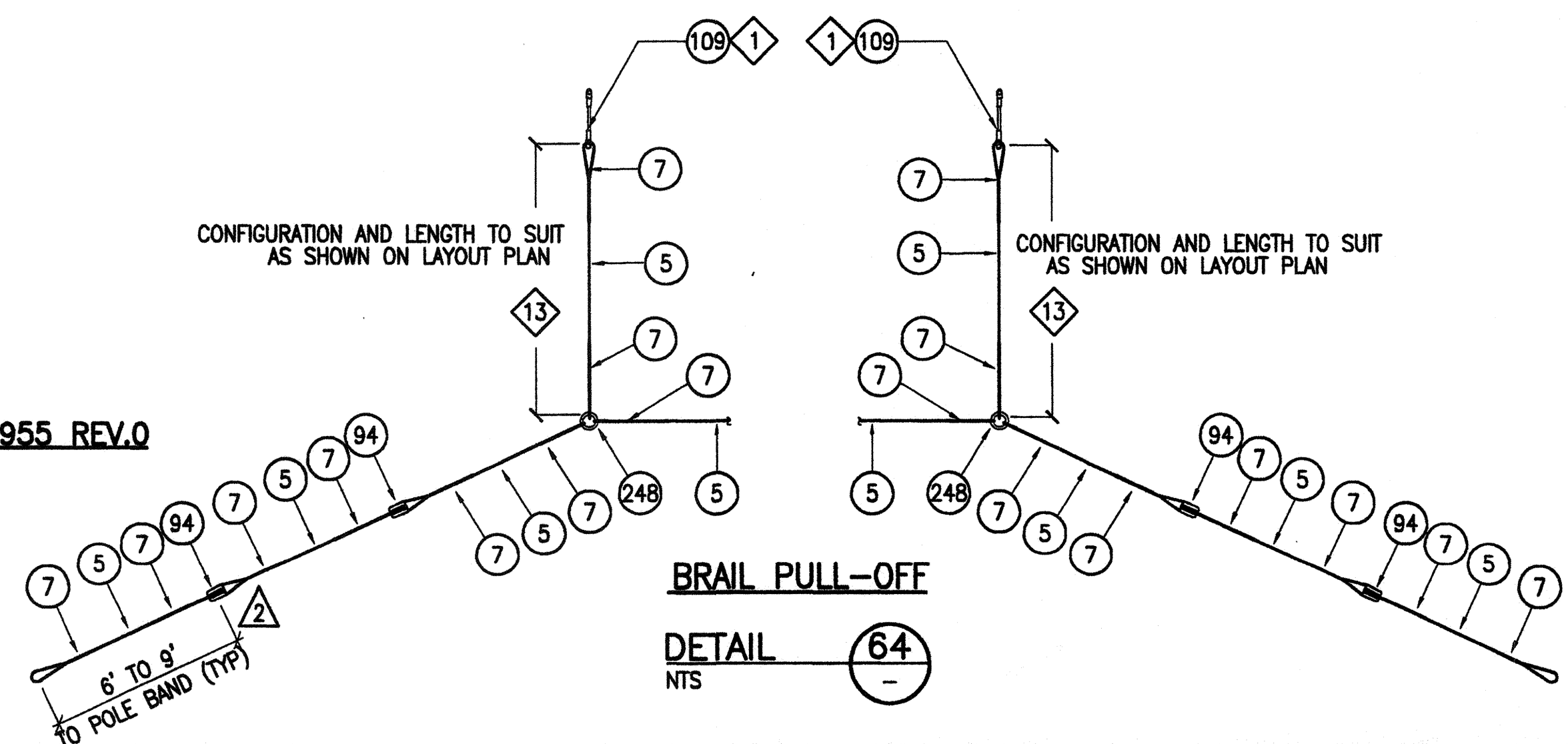
MUNI METRO SYSTEM / TROLLEY COACH SYSTEM
**OVERHEAD CONTACT SYSTEM
DETAIL X**

CONTRACT	
DRAWING	CL-12954
REVISION	2



FOR ORIGINAL SIGNATURES. SEE DRAWING NO. CL-12955 REV.0

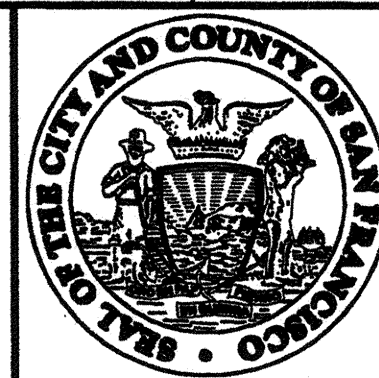
THE ENGINEER OF RECORD FOR THE LAYOUT PLANS SHALL BE RESPONSIBLE FOR THE PROPER USAGE AND APPLICATION OF THESE DETAILS.



C:\temp\02\values\MCAP_2\Overhead\Draws\Standard_Details\STD_CL-12955_Rev2.dwg, sheeting, Wed Apr 02, 2008 - 9:40 am

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
2	4/10/08	REVISED DIMENSIONS AND BORDER TEXT			
1	3/8/02	ADDED NOTE 5			

DESIGNED	M. ACOSTA
DRAWN	M. LUC
CHECKED	E. VIRAY
REVIEWED	A. HOE
RECOMMENDED	Y. GU
APPROVED	W. NEILSON
DATE	OCTOBER 3, 2001

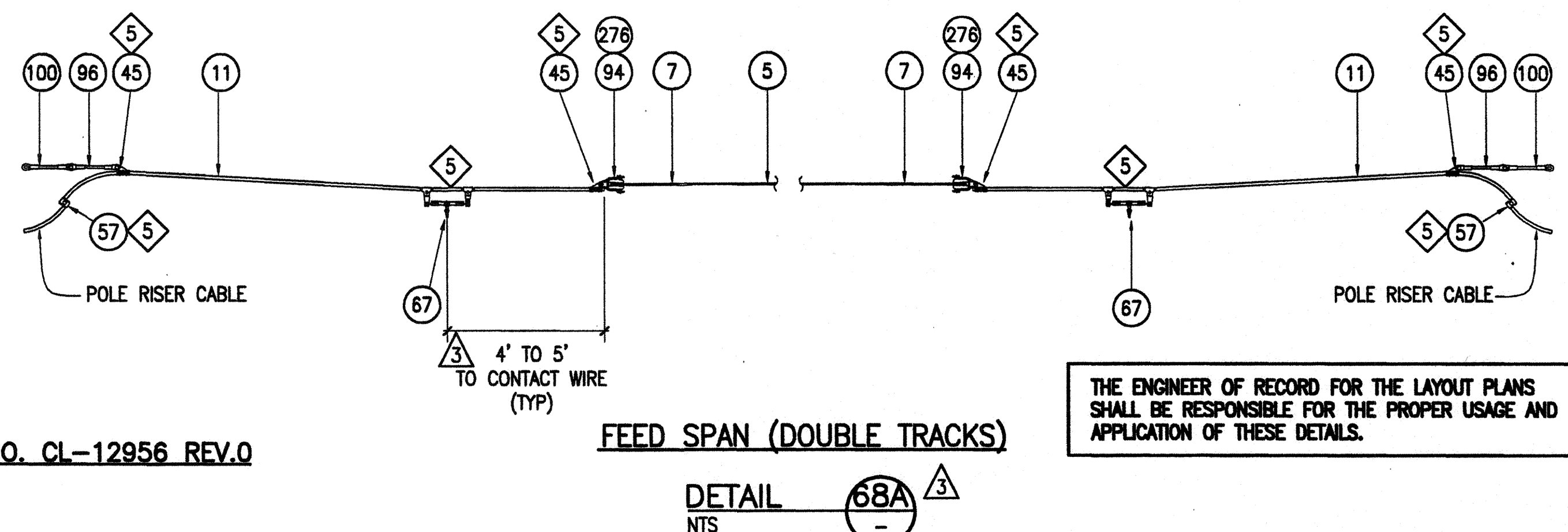
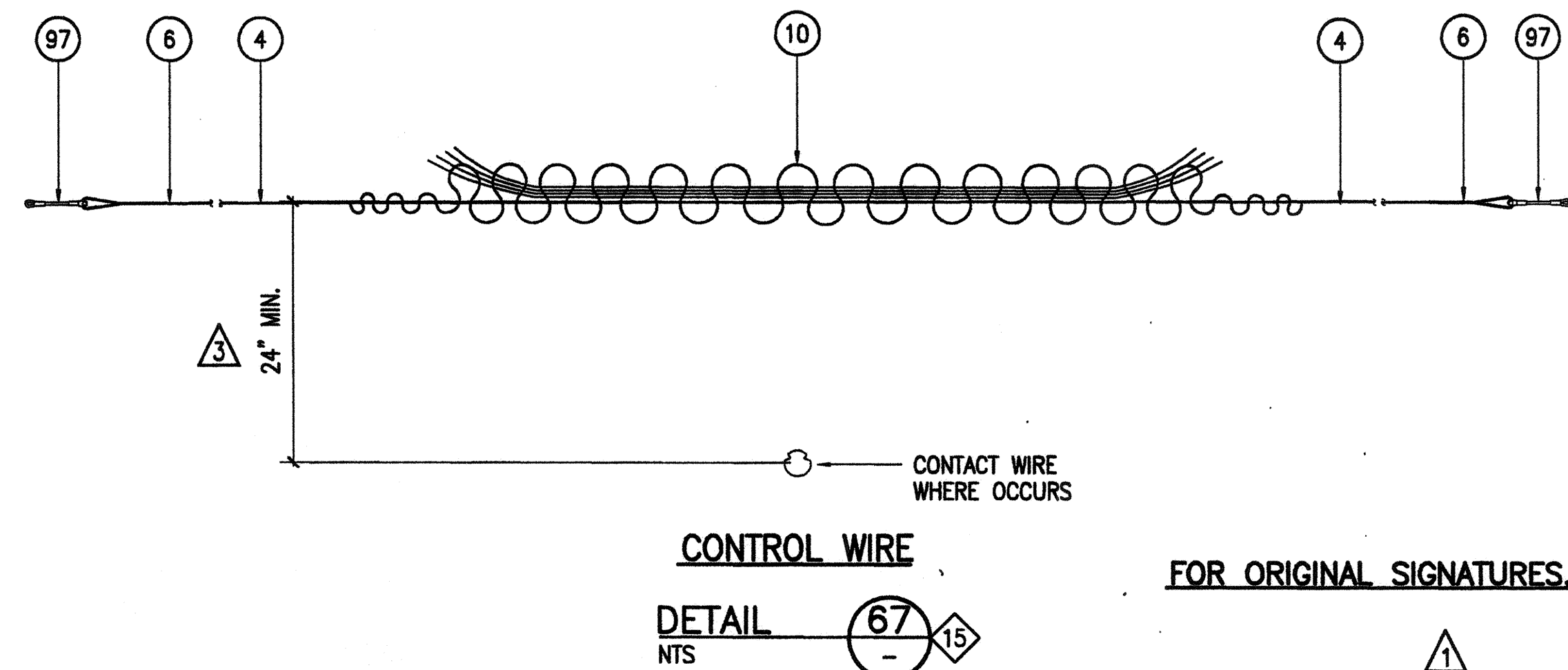
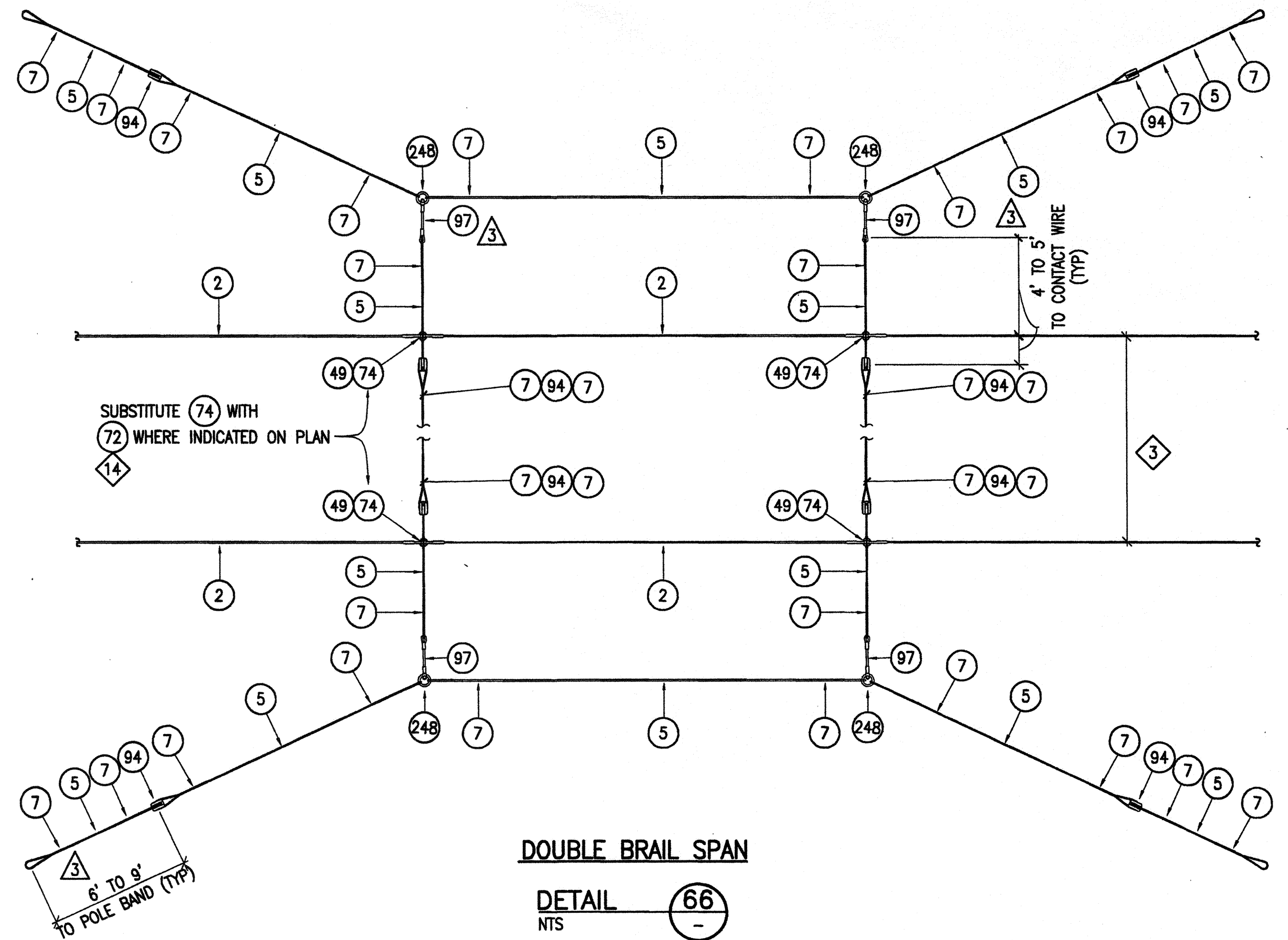
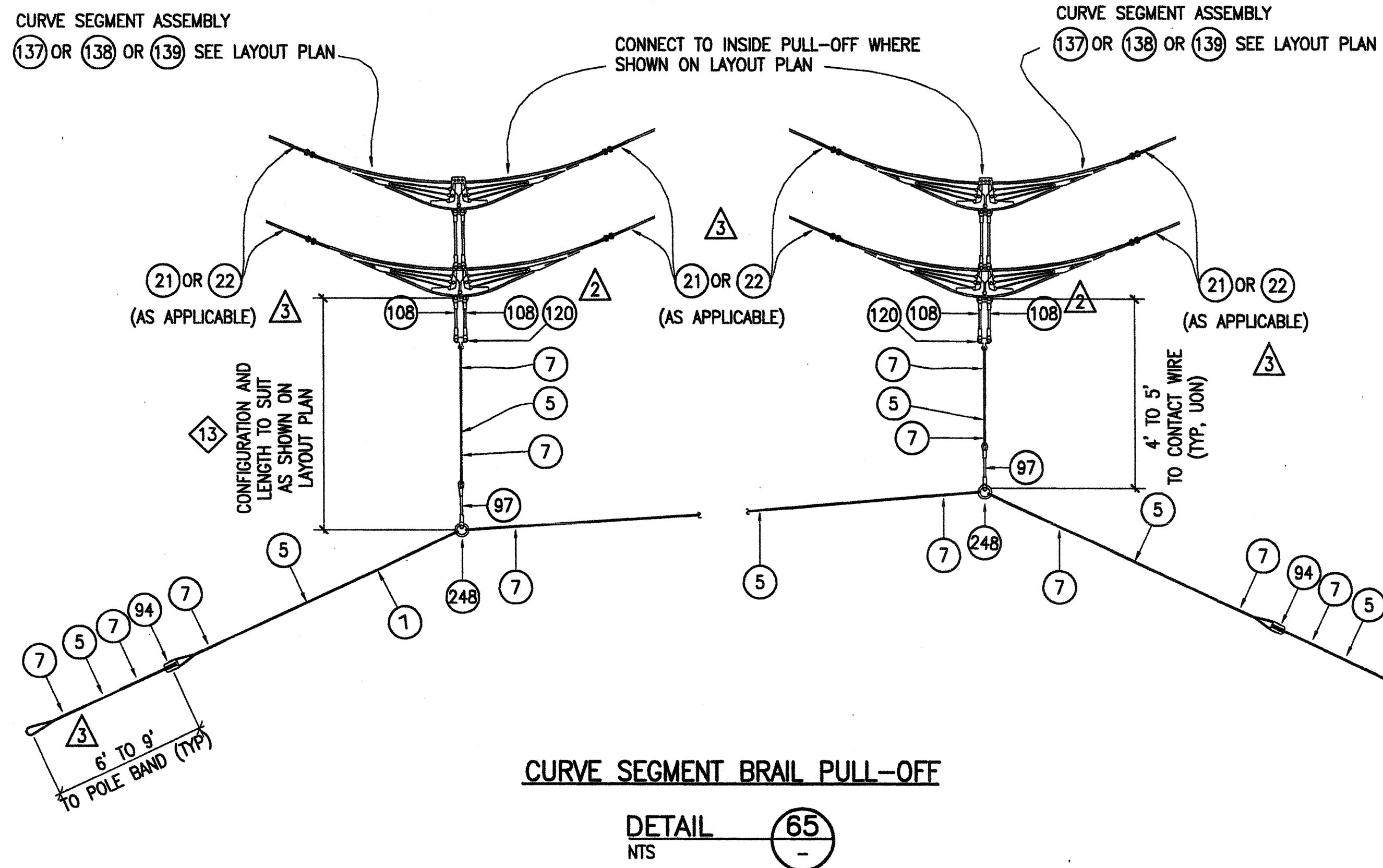


CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL RAILWAY
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 FOR DIRECTOR OF TRANSPORTATION

MUNI METRO SYSTEM / TROLLEY COACH SYSTEM

**OVERHEAD CONTACT SYSTEM
 DETAIL XI**

CONTRACT	
DRAWING	CL-12955
REVISION	2

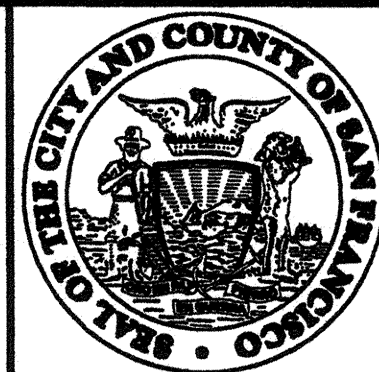


FOR ORIGINAL SIGNATURES, SEE DRAWING NO. CL-12956 REV.0

C:\temp\m02\frames\MCAP_2\Overhead\Draws\Standard_Details\STD_CL-12956_Rev3.dwg sheet Wed Apr 02, 2008 - 9:40 am
 BORDER REVISED 09/06/05

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
3	11/02	REVISED DETAIL 65, DIMENSIONS AND BORDER TEXT			
2	06/28/02	REVISED MATERIAL NUMBER AS SHOWN			
1	03/08/02	ADDED DETAIL 68			

DESIGNED	M. ACOSTA
DRAWN	M. LUC
CHECKED	E. VIRAY
REVIEWED	A. HOE
RECOMMENDED	Y. GU
APPROVED	W. NELSON
DATE	OCTOBER 3, 2001



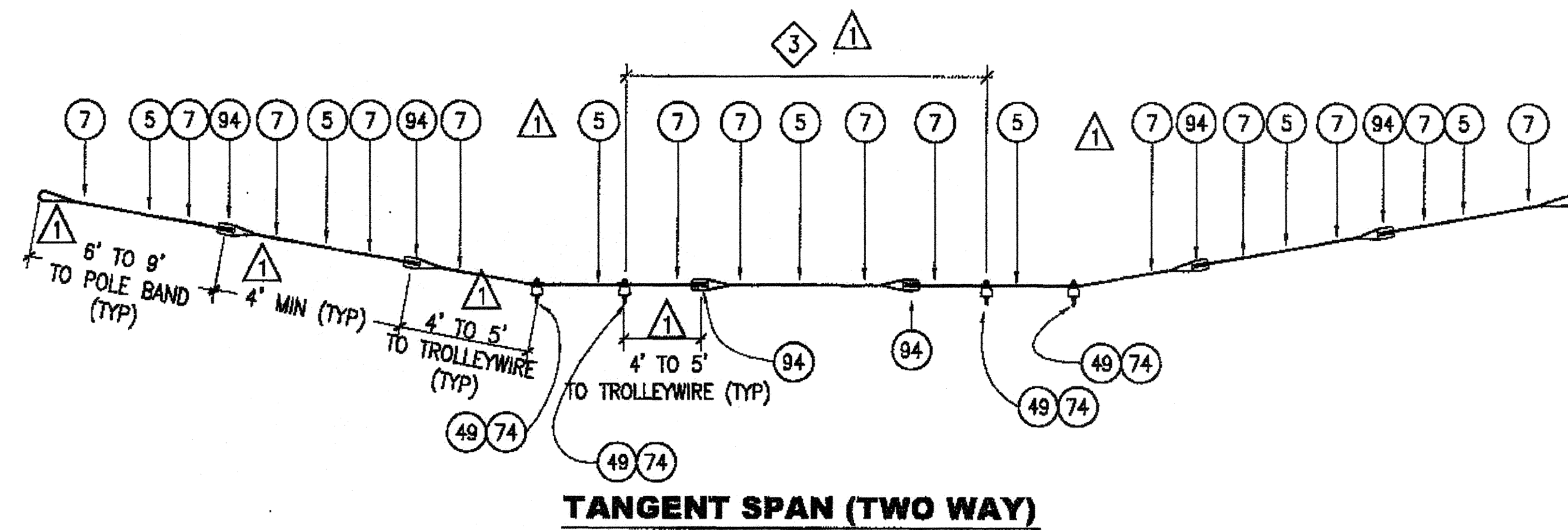
CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL RAILWAY

APPROVED
VINCE HARRIS
FOR DIRECTOR OF TRANSPORTATION

MUNI METRO SYSTEM / TROLLEY COACH SYSTEM

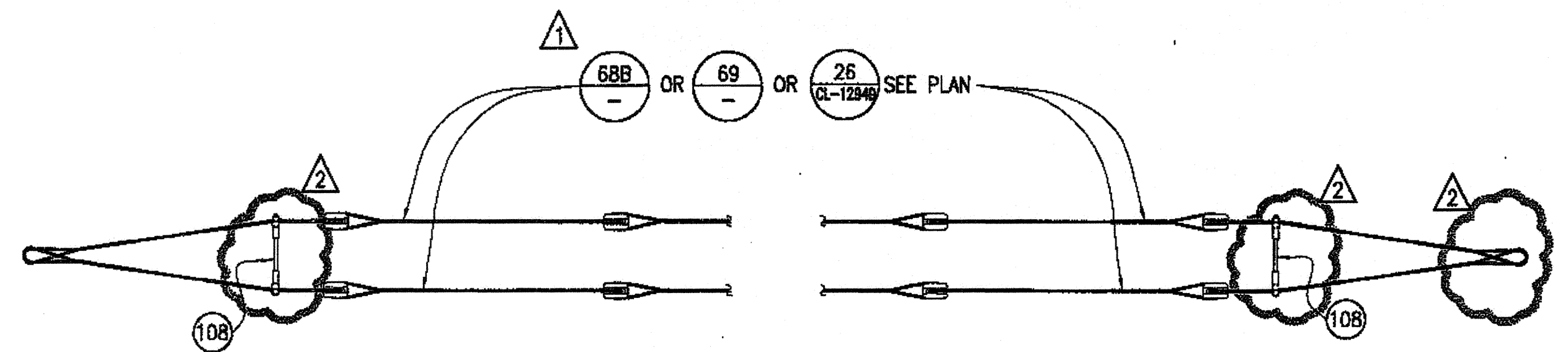
OVERHEAD CONTACT SYSTEM
DETAIL XII

CONTRACT	
DRAWING	
CL-12956	
REVISION	
3	



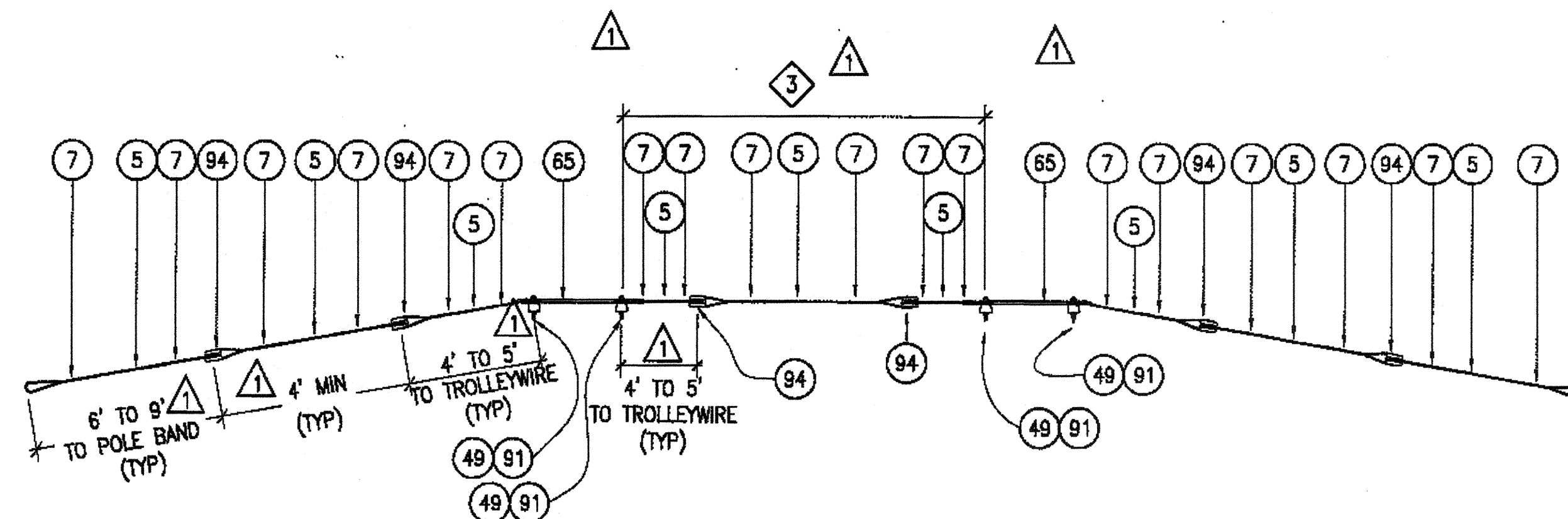
TANGENT SPAN (TWO WAY)

DETAIL 68B
NTS



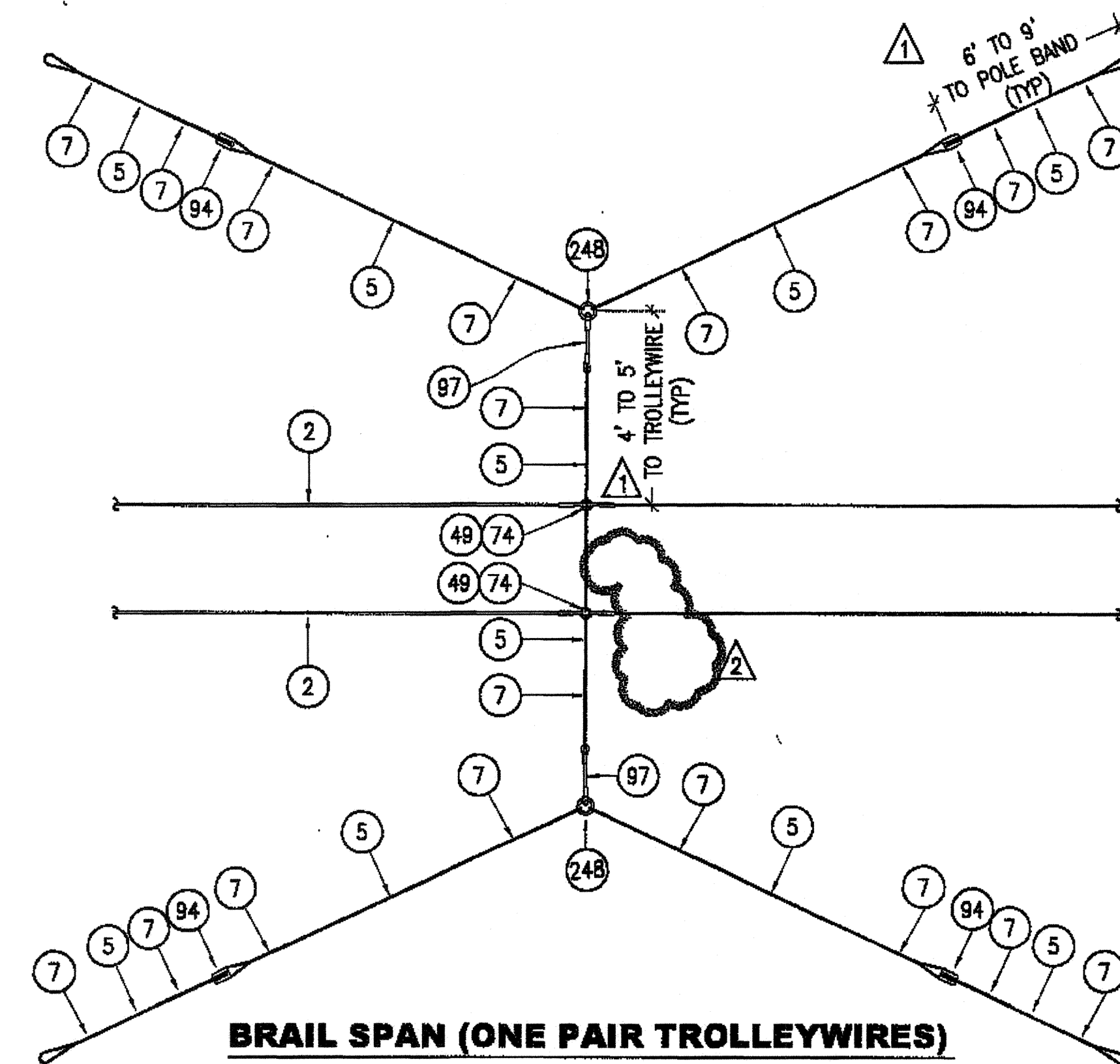
DOUBLE SPANS SEPARATOR (PLAN)

DETAIL 71
NTS



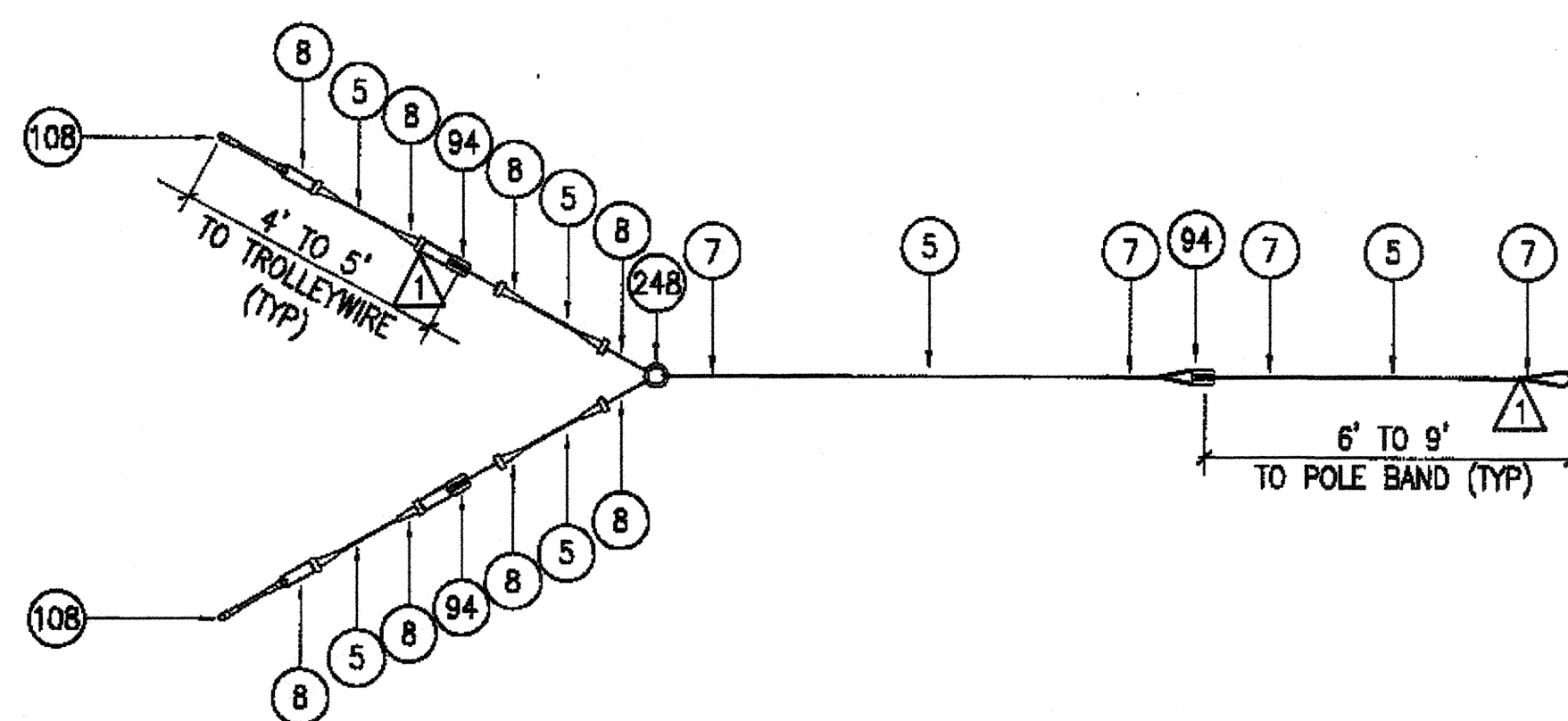
INVERTED TANGENT SPAN

DETAIL 69
NTS



BRAIL SPAN (ONE PAIR TROLLEYWIRES)

DETAIL 72
NTS



SWITCH SIDE PULLOFF

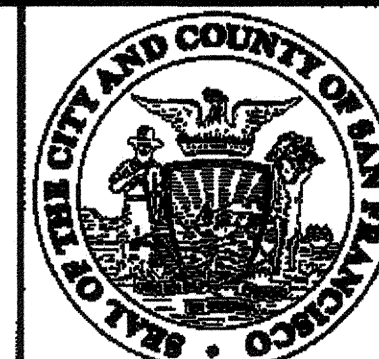
DETAIL 70
NTS

FOR ORIGINAL SIGNATURES. SEE DRAWING NO. CL-14239 REV.0

THE ENGINEER OF RECORD FOR THE LAYOUT PLANS SHALL BE RESPONSIBLE FOR THE PROPER USAGE AND APPLICATION OF THESE DETAILS.

\lan021\lan02\lhorres\MCA\AP_2\Overhead\Draws\Standard_Details\STD_01-14239_Rev2.dwg, alany Wed Jun 03 2009 9:08 am
 2 4/15/08 REVISOR: JWH
 1 4/15/08 REVISOR: JWH
 NO. DATE DESCRIPTION REVISIONS
 REVISIONS
 BORDER REVISED 09/06/05

DESIGNED	E. VIRAY
DRAWN	J. GUADAMUZ
CHECKED	T. PHANG
REVIEWED	A. HOE
RECOMMENDED	E. EVANGELISTA
APPROVED	W. NEILSON
DATE	FEBRUARY 3, 2003



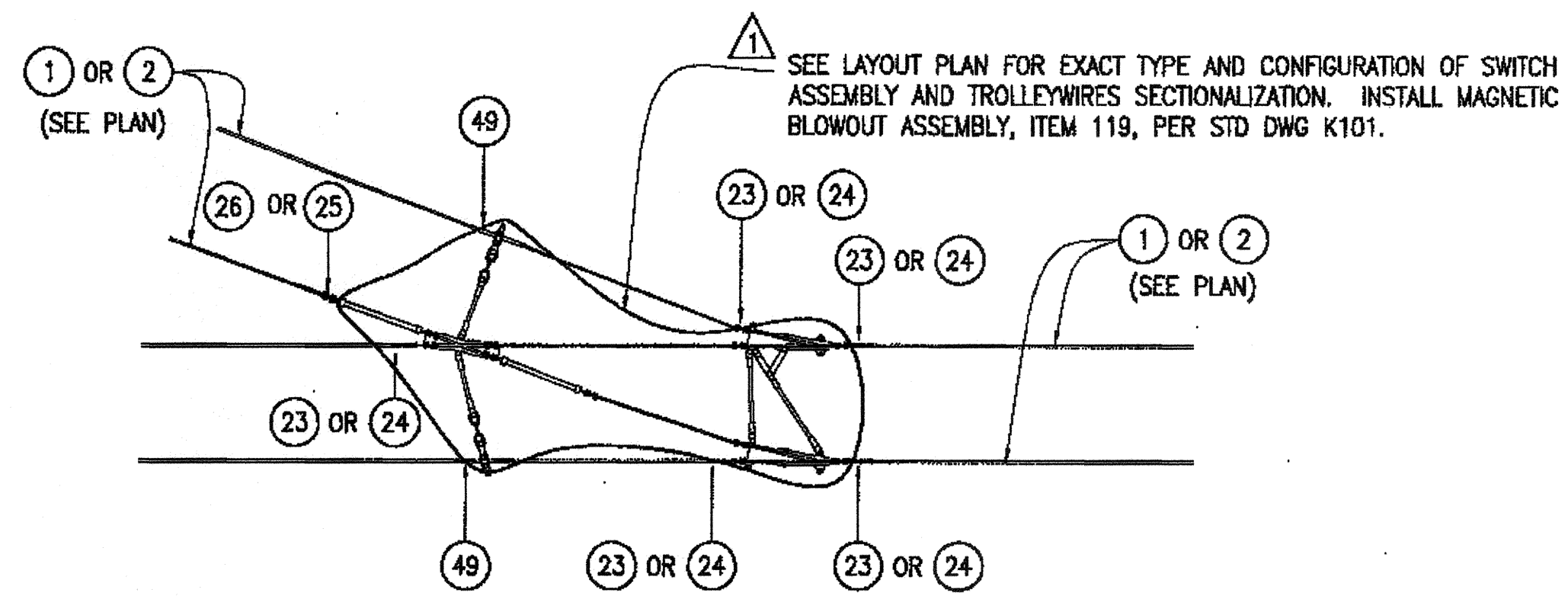
CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL RAILWAY

APPROVED
VINCE HARRIS
FOR THE EXECUTIVE DIRECTOR / CEO

MUNI METRO SYSTEM / TROLLEY COACH SYSTEM

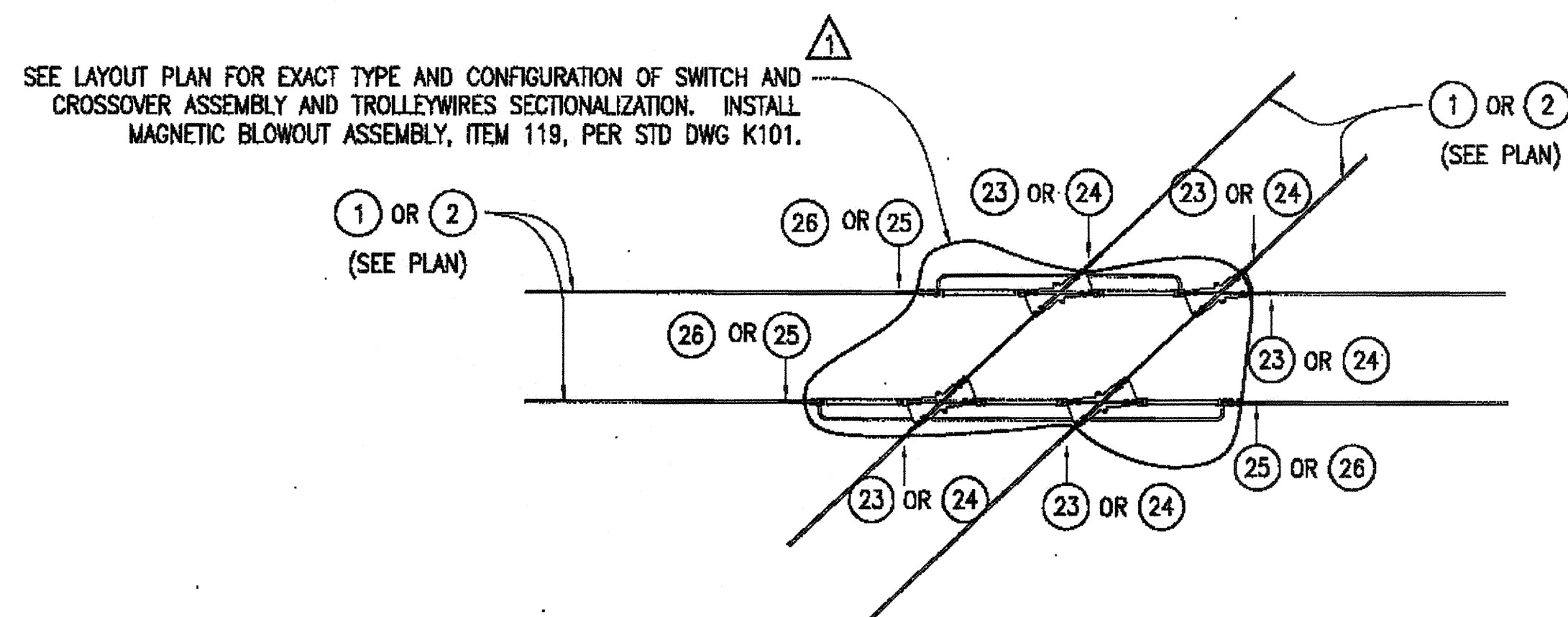
**OVERHEAD CONTACT SYSTEM
DETAIL XIII**

CONTRACT	
DRAWING	CL-14239
REVISION	
	2



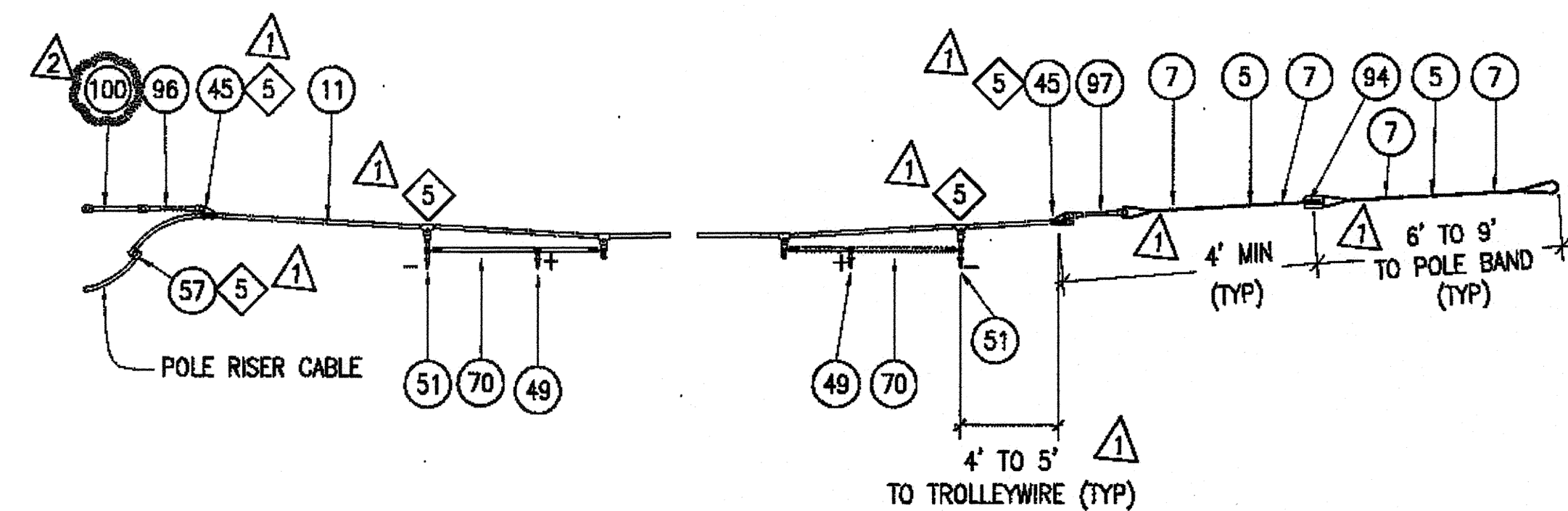
TROLLEY LEADING OR TRAILING SWITCH, INSULATION IN CURVE

DETAIL 77
NTS



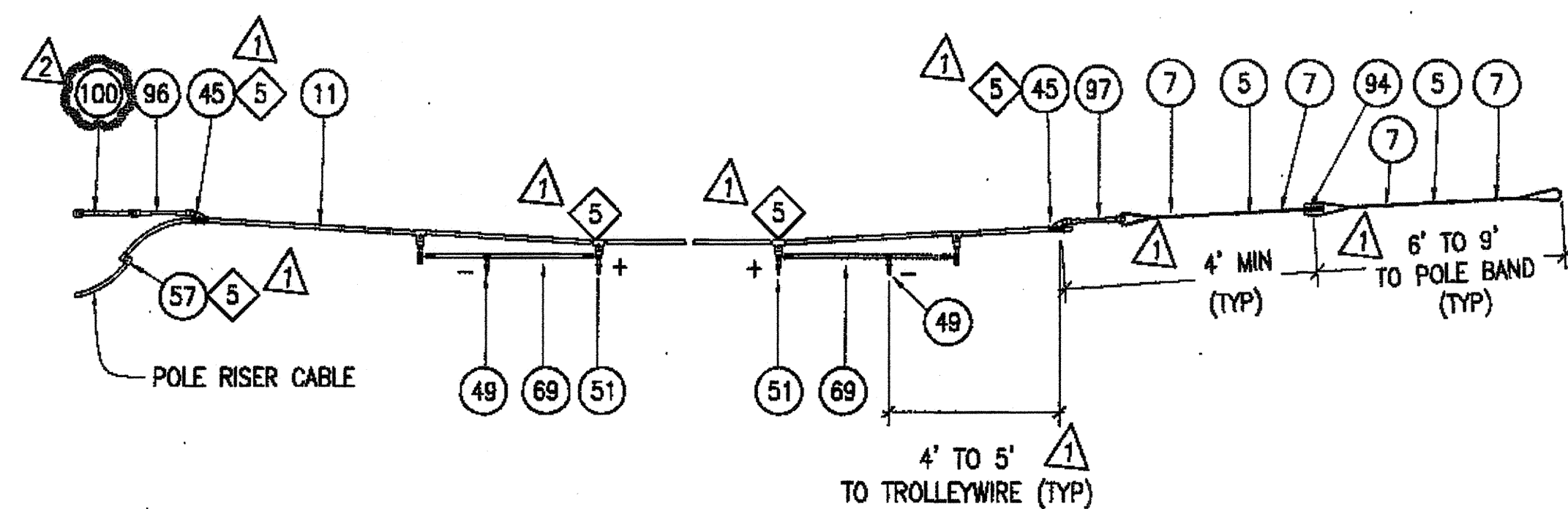
CROSSOVER

DETAIL 78
NTS



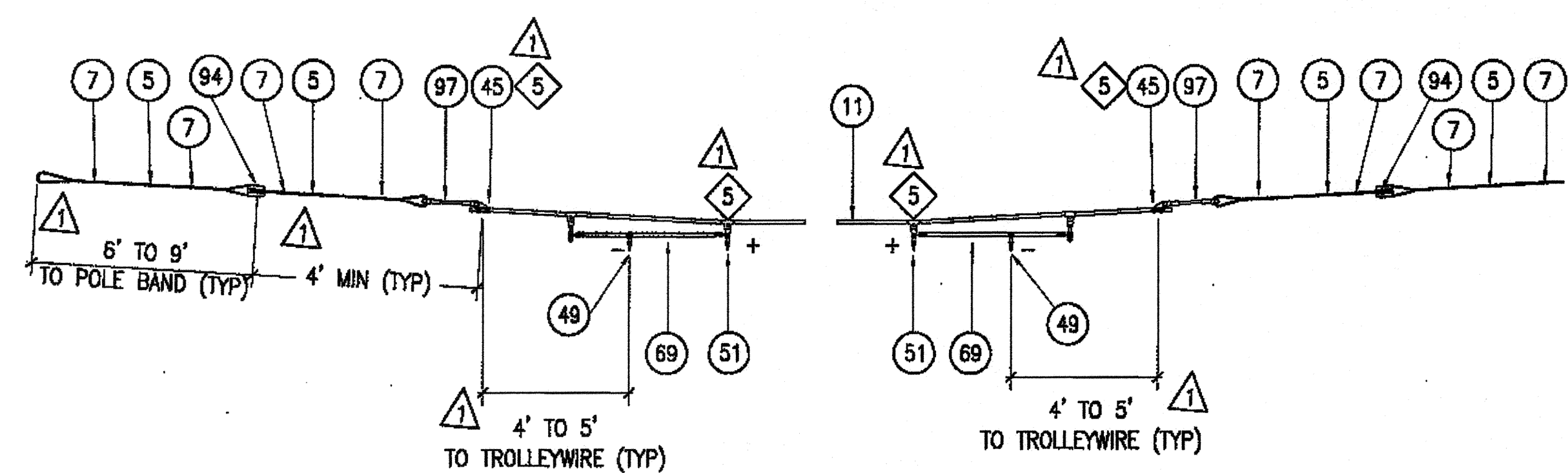
NEGATIVE FEED SPAN (-F)

DETAIL 80
NTS



POSITIVE FEED SPAN (+F)

DETAIL 79
NTS



POSITIVE EQUALIZER SPAN (+E)

DETAIL 81
NTS

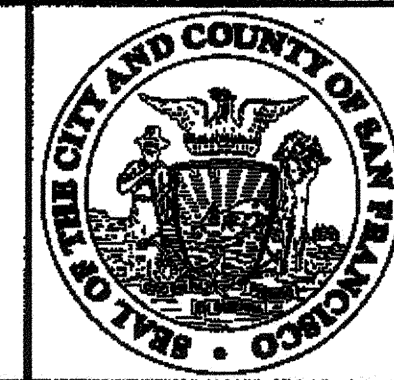
FOR ORIGINAL SIGNATURES, SEE DRAWING NO. CL-14241 REV.0

THE ENGINEER OF RECORD FOR THE LAYOUT PLANS SHALL BE RESPONSIBLE FOR THE PROPER USAGE AND APPLICATION OF THESE DETAILS.

E:\Overhead\Draws\Standard\Detail\CL-14241_Rev2.dwg created Wed Nov 24, 2010 -- 8:51 am

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
2	11/24/10	REVISED DETAILS 79 AND 80			
1	04/10/08	REVISED NOTES, DIMENSIONS AND BORDER TEXT			

DESIGNED	E. VIBAY
DRAWN	J. GUADALUPE
CHECKED	T. PHANG
REVIEWED	A. HOE
RECOMMENDED	E. EVANGELISTA
APPROVED	W. NELSON
DATE	FEBRUARY 3, 2003



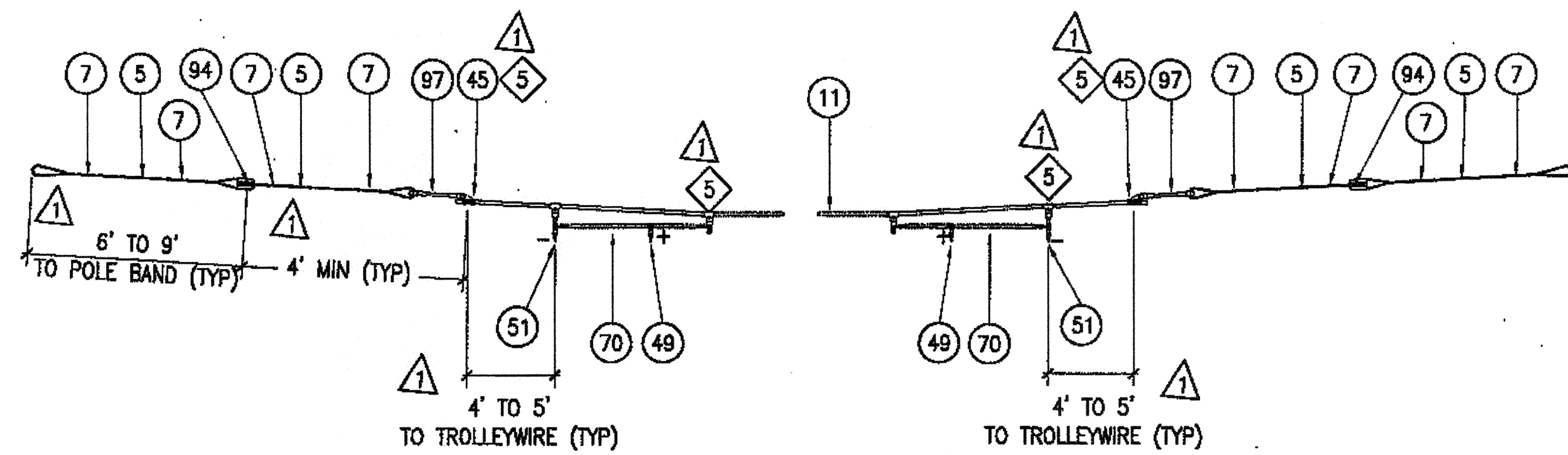
CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL RAILWAY

APPROVED
VINCE HARRIS
FOR THE EXECUTIVE DIRECTOR / CEO

MUNI METRO SYSTEM / TROLLEY COACH SYSTEM

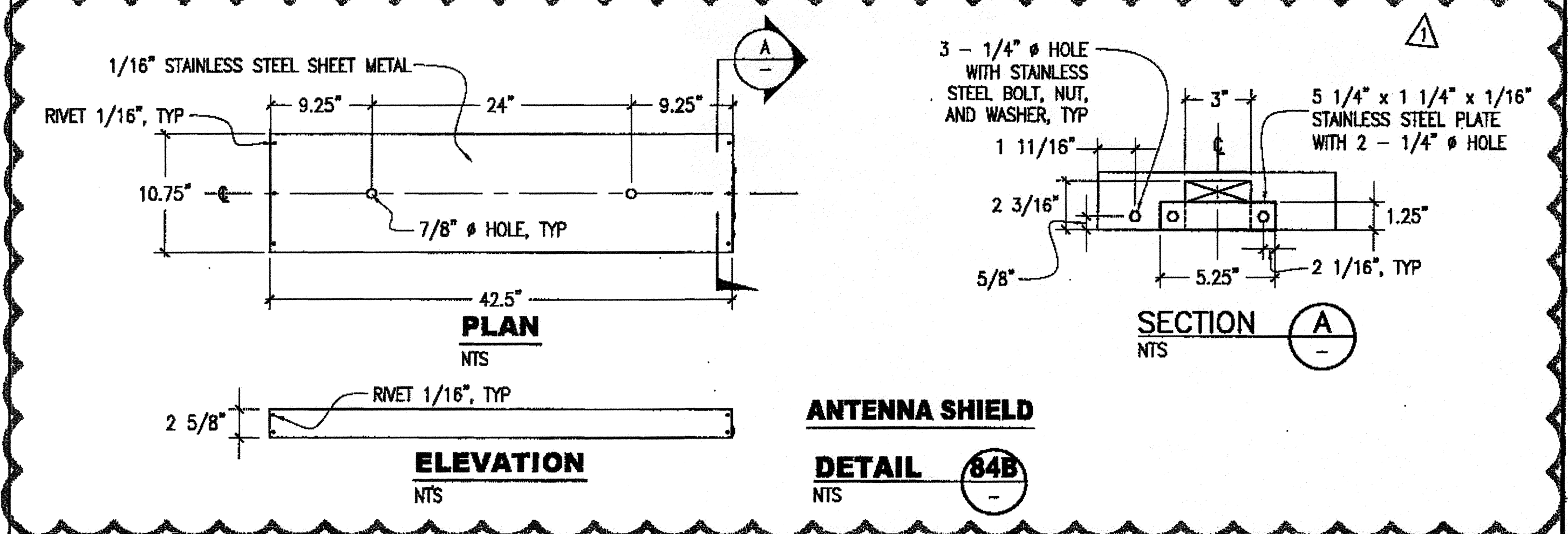
**OVERHEAD CONTACT SYSTEM
DETAIL XV**

CONTRACT	
DRAWING	CL-14241
REVISION	2



NEGATIVE EQUALIZER SPAN (-E)

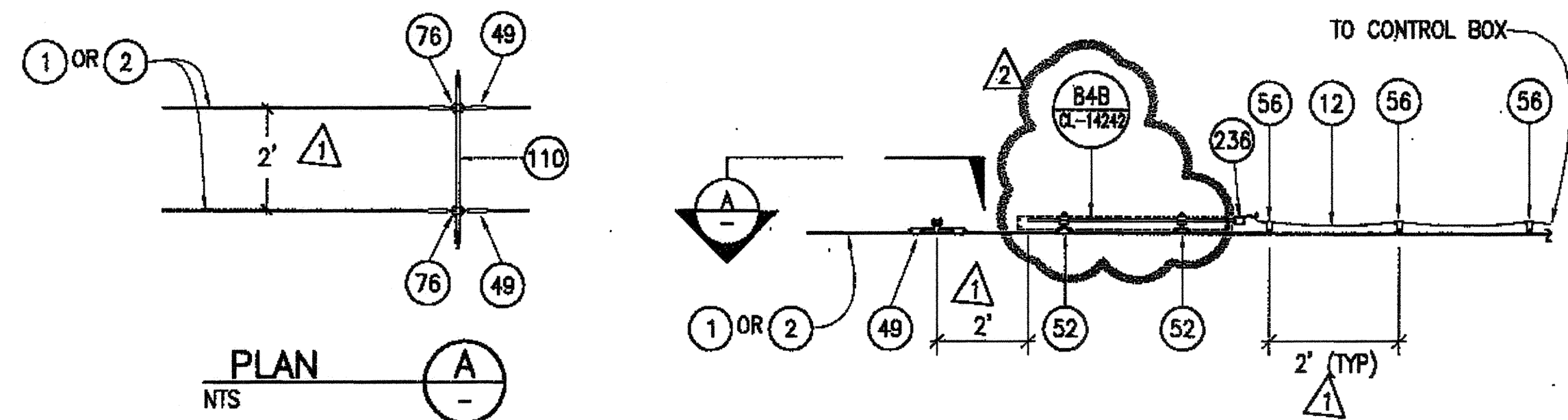
DETAIL 82
NTS



ANTENNA SHIELD

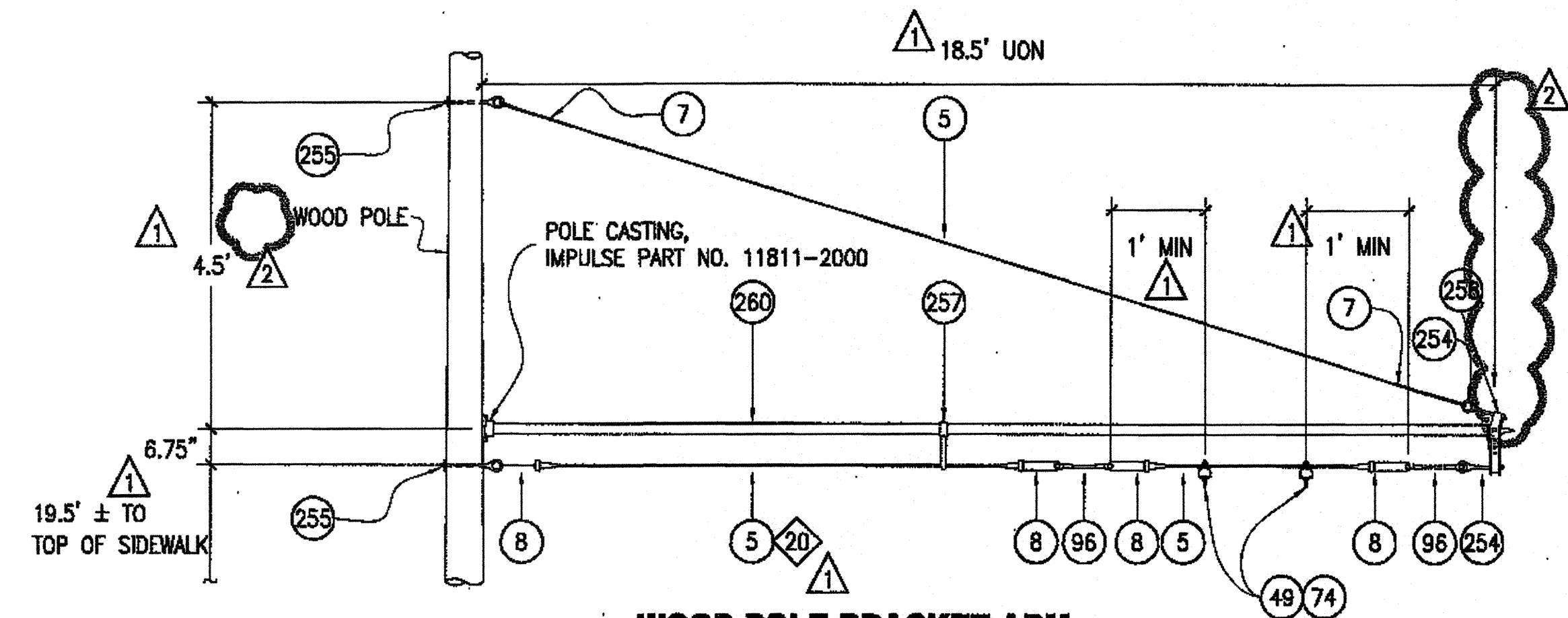
ELEVATION
NTS

DETAIL 84B
NTS



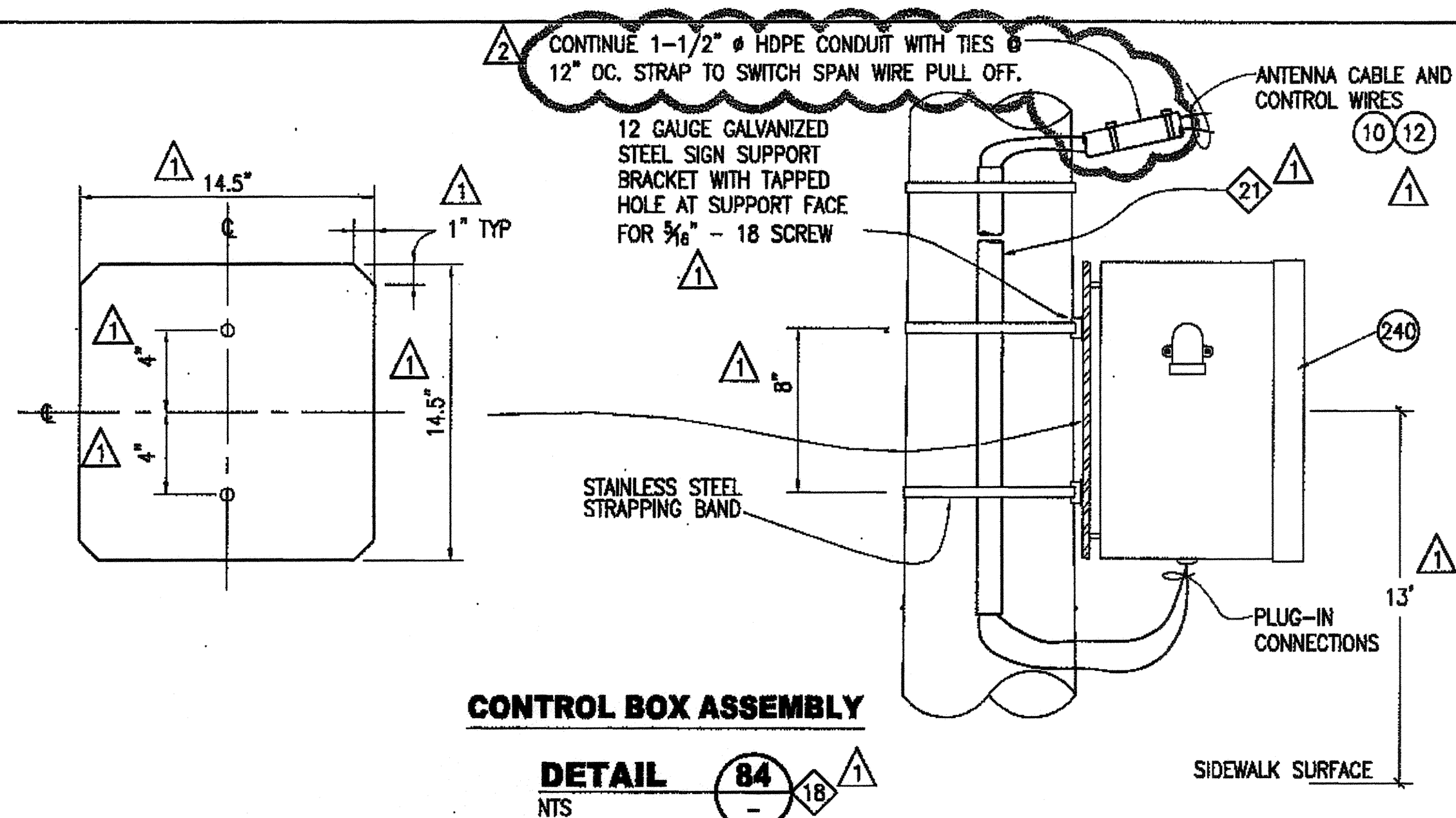
ANTENNA MOUNTING AND CONNECTING WIRE

DETAIL 83
NTS



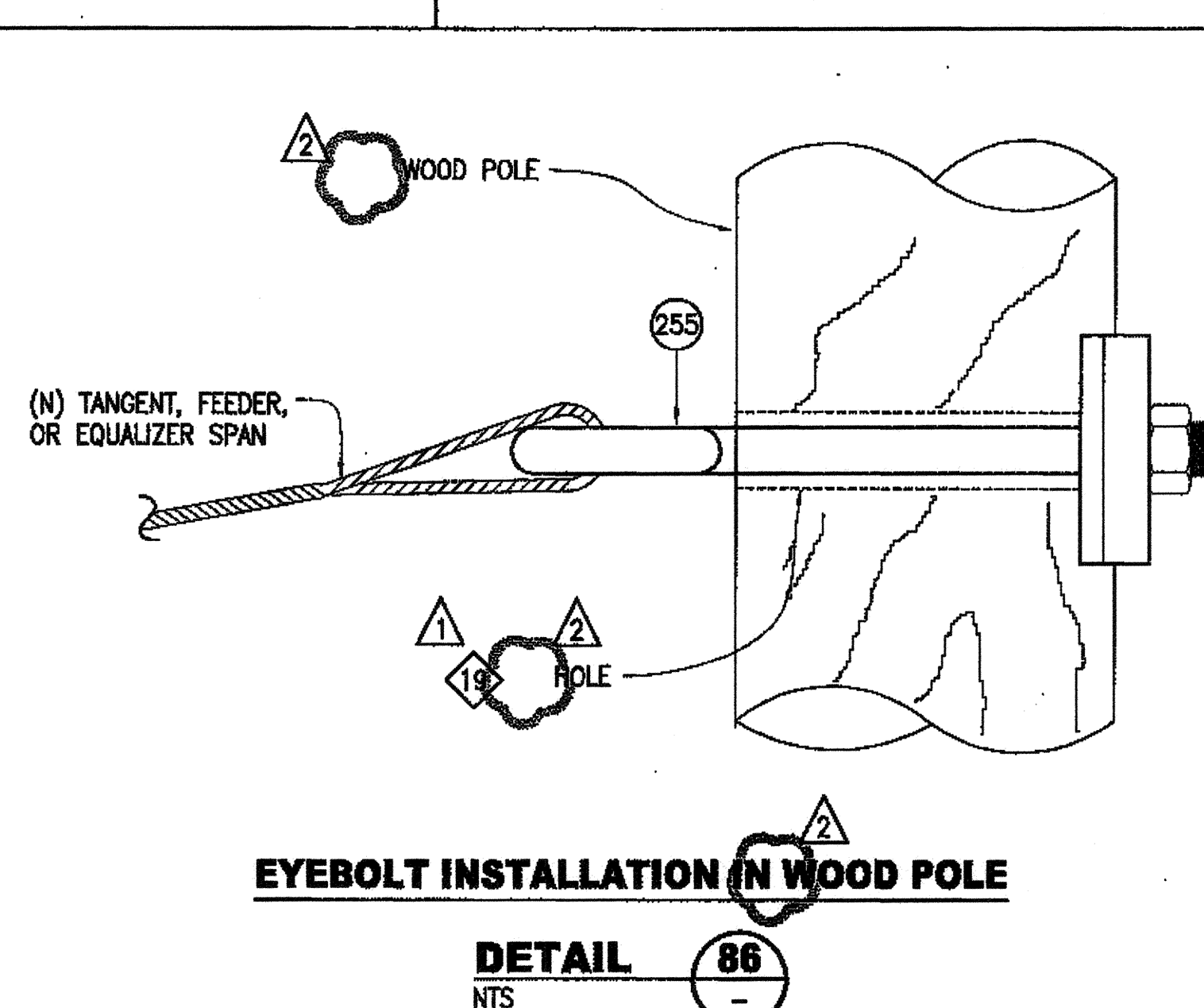
WOOD POLE BRACKET ARM

DETAIL 85
NTS



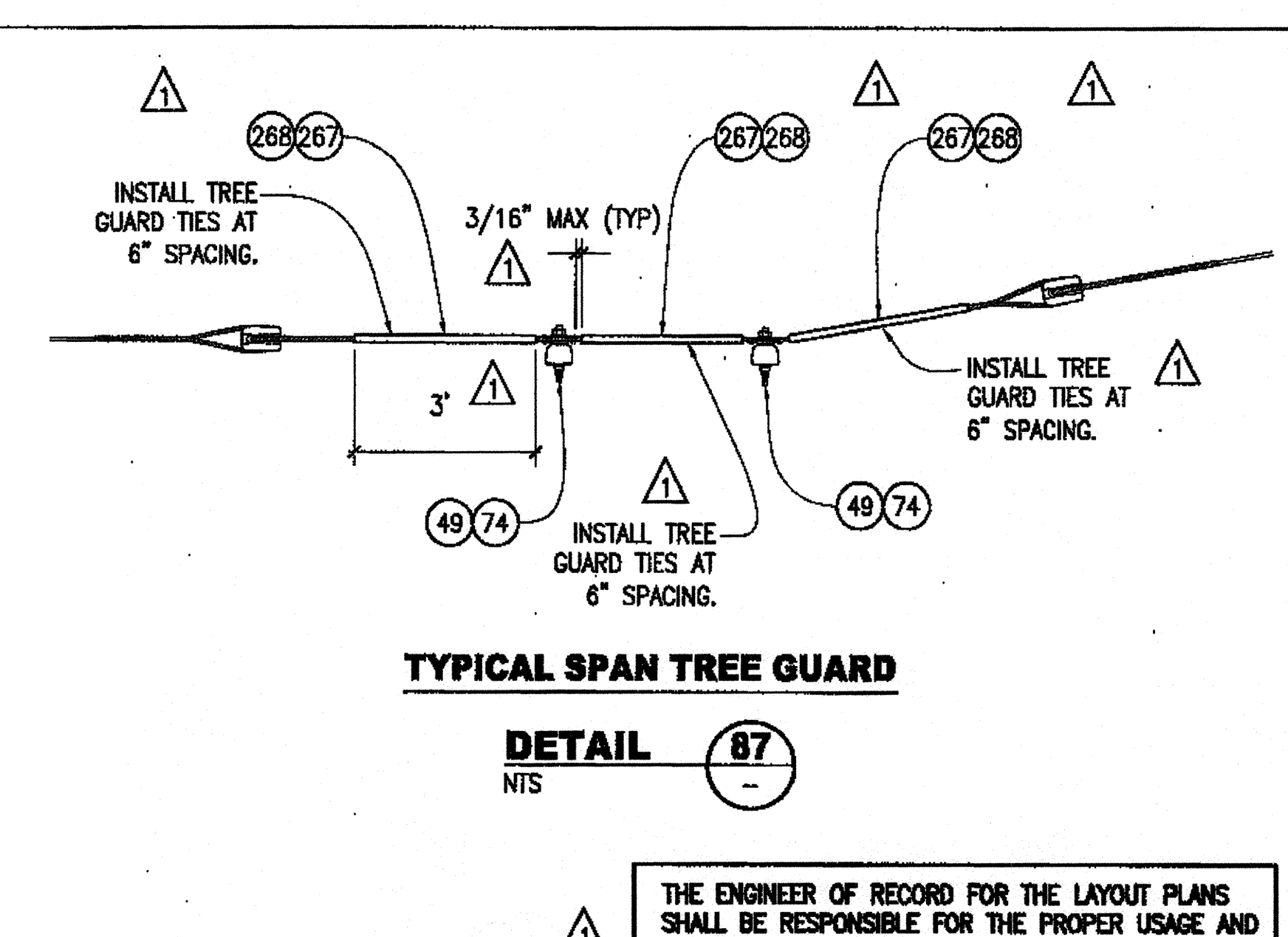
CONTROL BOX ASSEMBLY

DETAIL 84
NTS



EYEBOLT INSTALLATION IN WOOD POLE

DETAIL 86
NTS



TYPICAL SPAN TREE GUARD

DETAIL 87
NTS

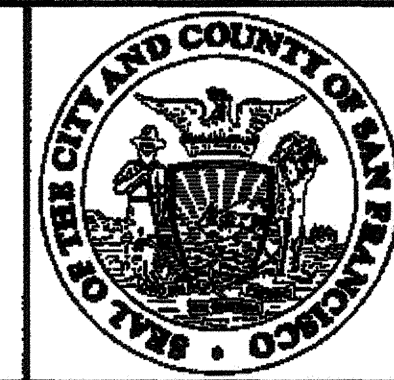
THE ENGINEER OF RECORD FOR THE LAYOUT PLANS SHALL BE RESPONSIBLE FOR THE PROPER USAGE AND APPLICATION OF THESE DETAILS.

FOR ORIGINAL SIGNATURES, SEE DRAWING NO. CL-14242 REV.0

F:\Overhead\Drawg\Standard_Details\Working\rdm\STD_CL-14242_Rev2.dwg ctdm Wed Nov 03 2010 11:10 pm

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
2	11/3/10	ADDED DETAIL 84B, REVISED DETAIL 83, 84, 85, & 86			
1	4/10/08	ADDED MATERIALS 10, 12; REVISED NOTES, DIMENSIONS AND BORDER TEXT			

DESIGNED	E. VIRAY
DRAWN	J. GUADALUPE
CHECKED	T. PHANG
REVIEWED	A. HOE
RECOMMENDED	E. EVANGELISTA
APPROVED	W. NELSON
DATE	FEBRUARY 3, 2003



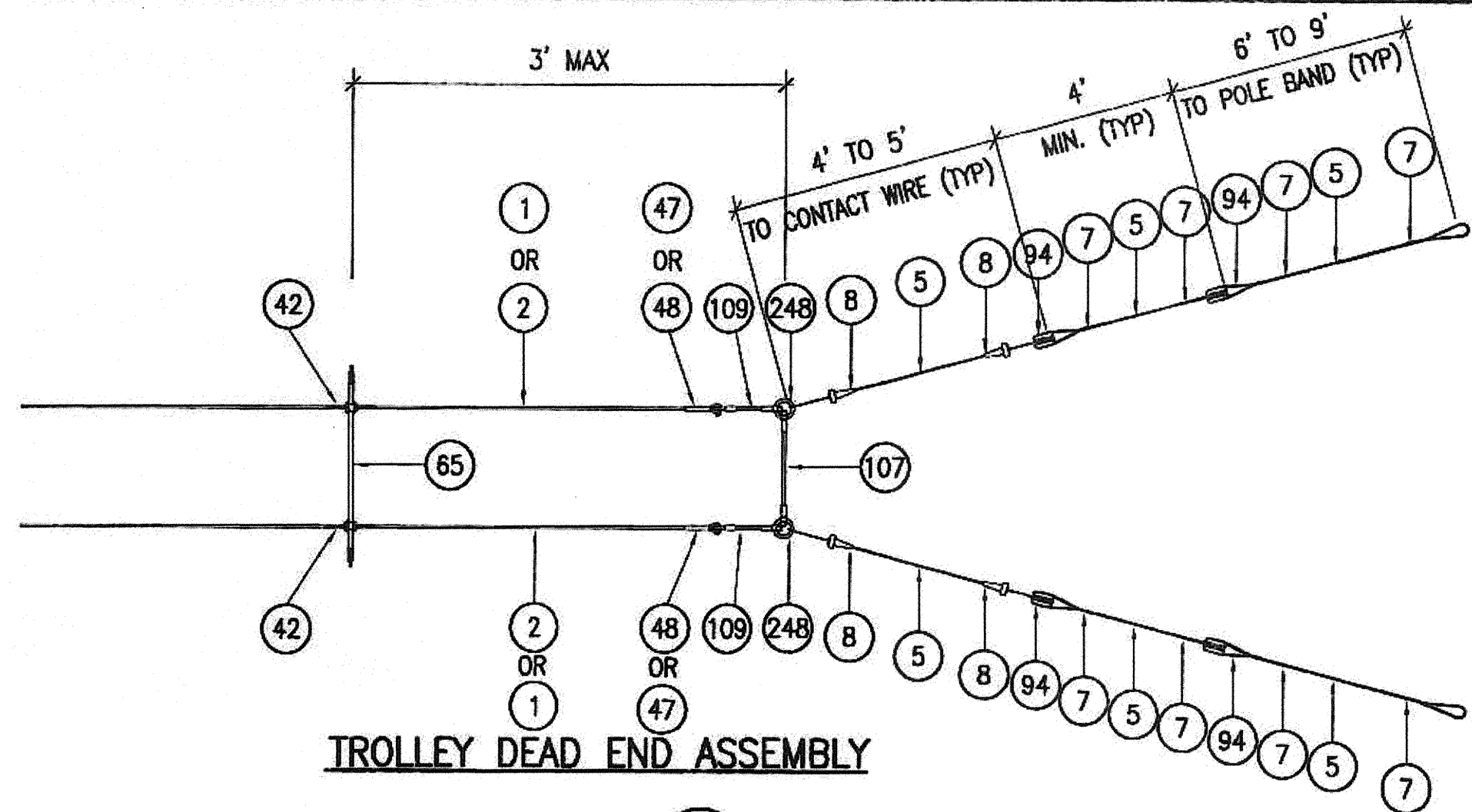
CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL RAILWAY

APPROVED
VINCE HARRIS
FOR THE EXECUTIVE DIRECTOR / CEO

MUNI METRO SYSTEM / TROLLEY COACH SYSTEM

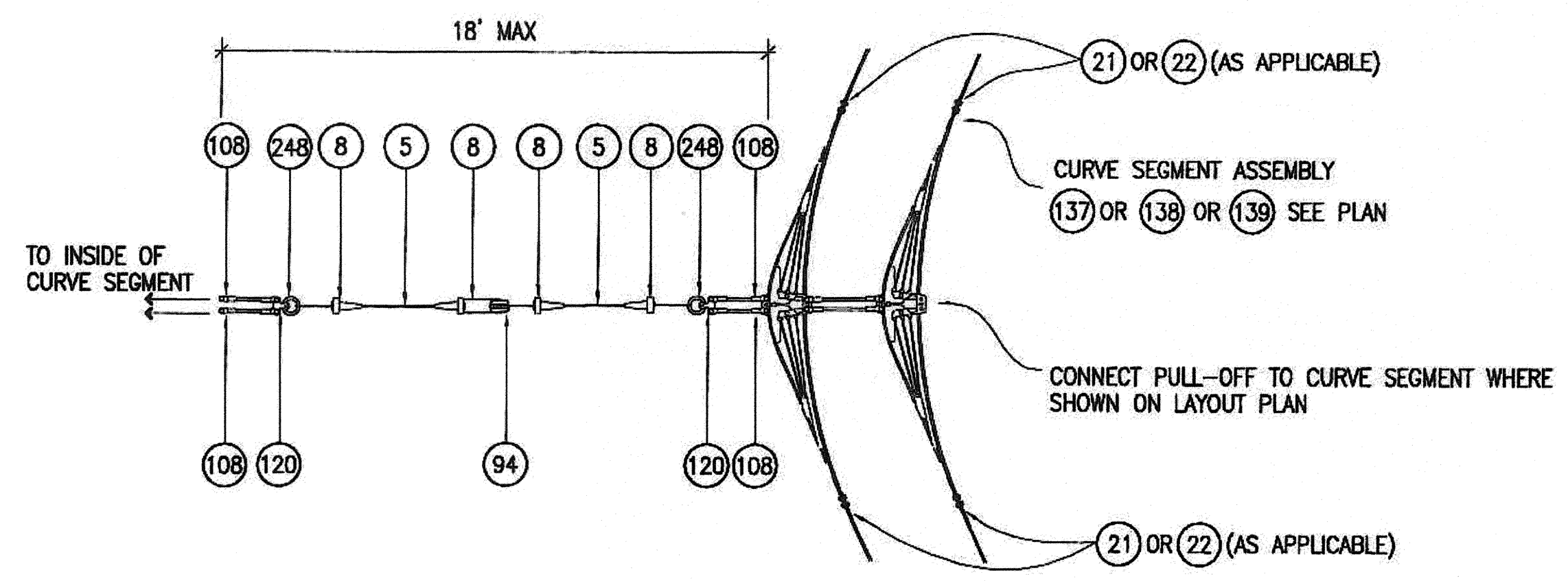
**OVERHEAD CONTACT SYSTEM
DETAIL XVI**

CONTRACT	
DRAWING	CL-14242
REVISION	2



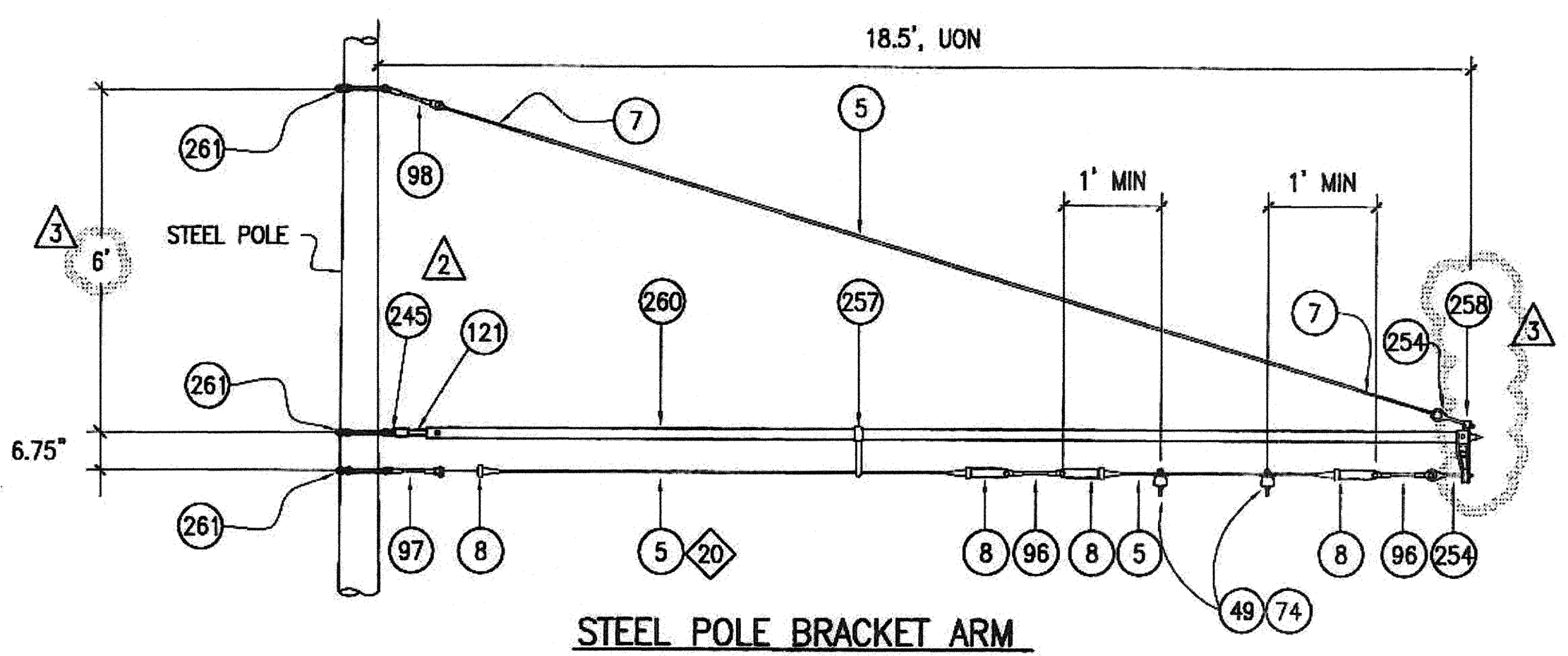
TROLLEY DEAD END ASSEMBLY

DETAIL 88
NTS



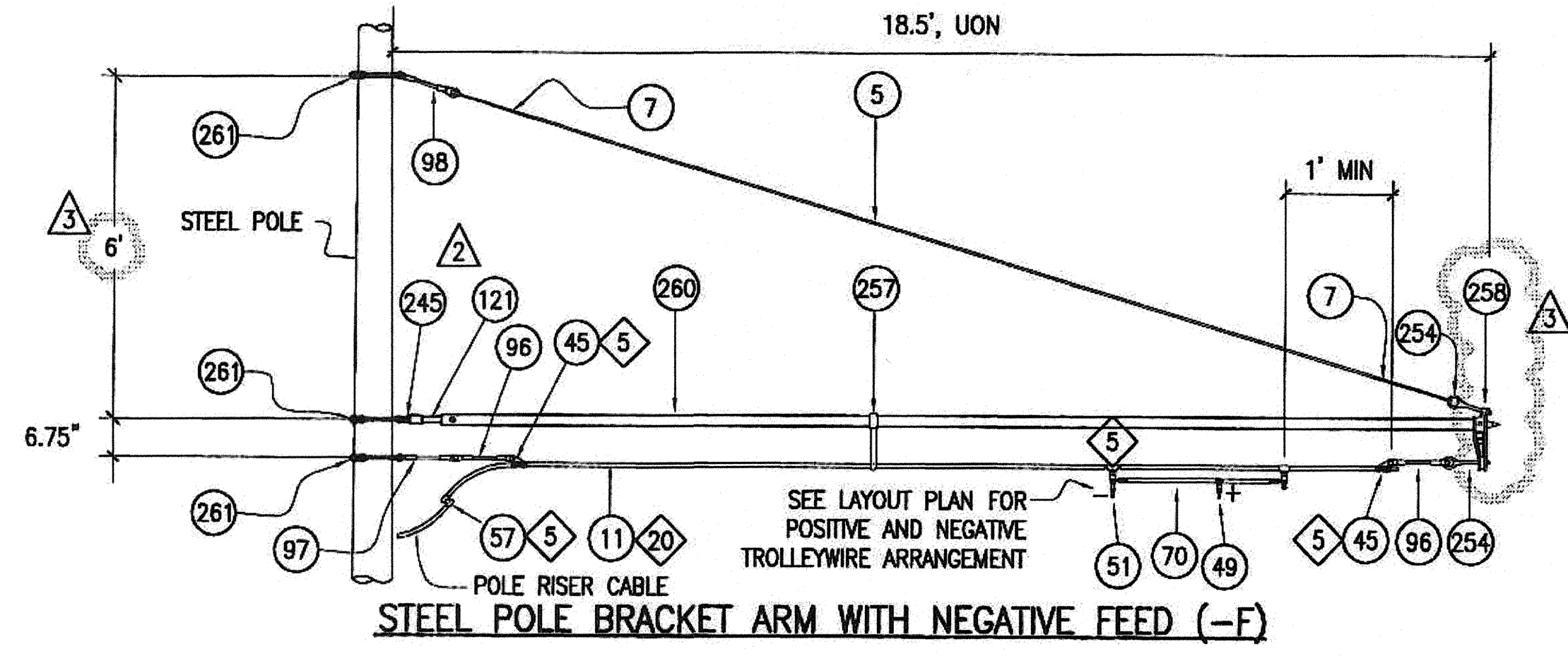
CURVE SEGMENT TO CURVE SEGMENT PULL-OFF (SHORT)

DETAIL 89
NTS



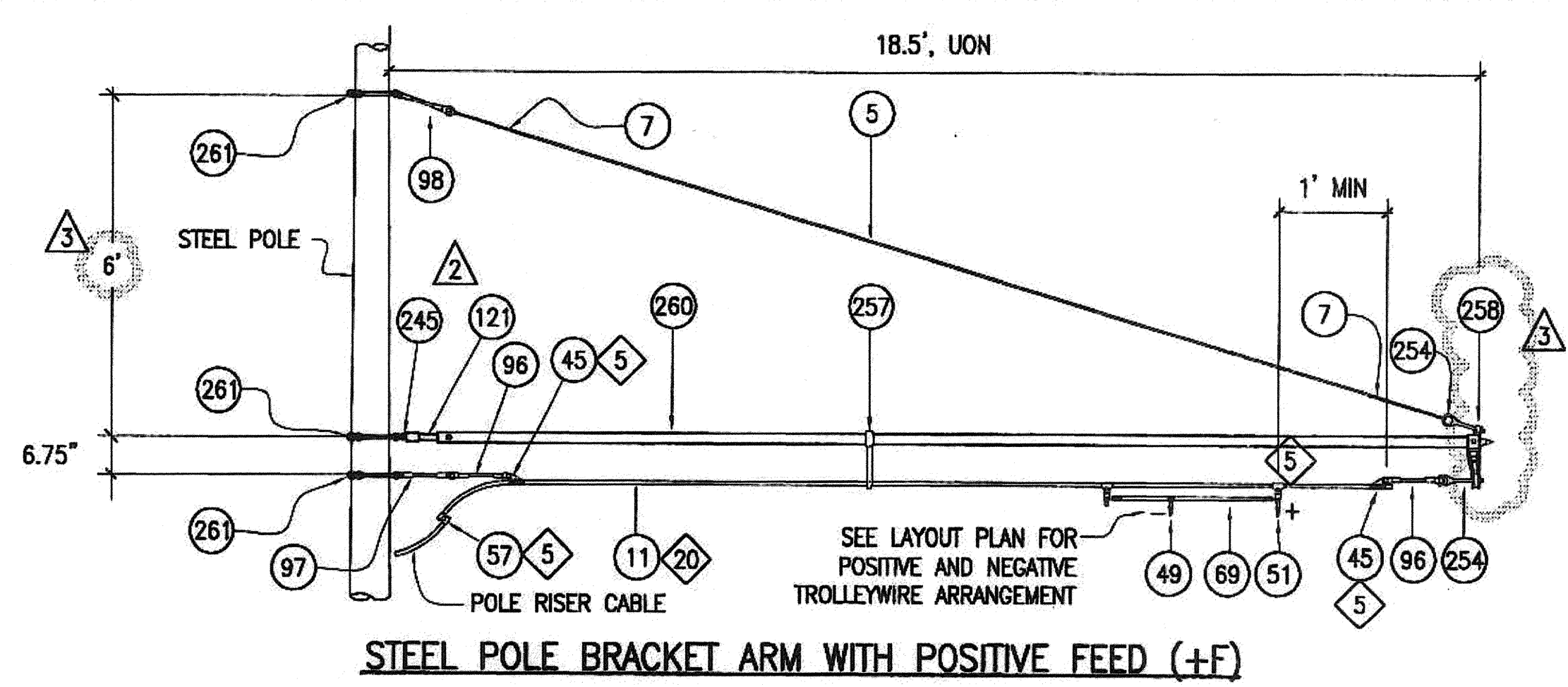
STEEL POLE BRACKET ARM

DETAIL 90
NTS



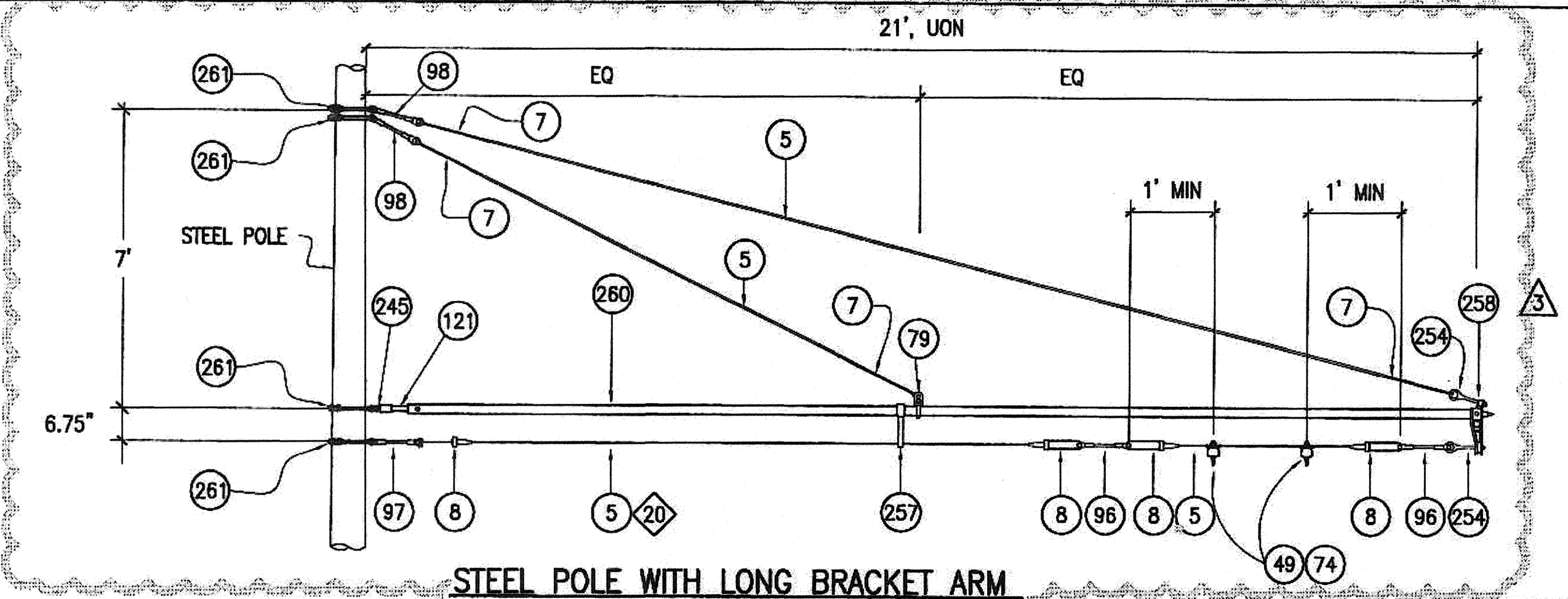
STEEL POLE BRACKET ARM WITH NEGATIVE FEED (-F)

DETAIL 91
NTS



STEEL POLE BRACKET ARM WITH POSITIVE FEED (+F)

DETAIL 92
NTS



STEEL POLE WITH LONG BRACKET ARM

DETAIL 93
NTS

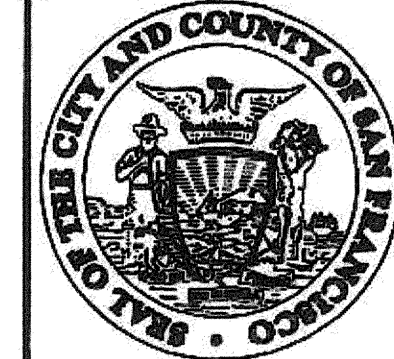
FOR ORIGINAL SIGNATURES, SEE CL-17193, REV 0

THE ENGINEER OF RECORD FOR THE LAYOUT PLANS SHALL BE RESPONSIBLE FOR THE PROPER USAGE AND APPLICATION OF THESE DETAILS.

F:\Overhead\Draws\Standard_Details\ STD. CL-17193_Rev3.dwg c:\dwid Mem. Apr. 08.2012 - 4:37 pm

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
3	04/11/12	ADD DETAIL 93, REMOVE MATERIAL 259			
2	02/08/11	ADD MATERIAL 245	CD	SL	CW
1	05/26/08	ADD DETAILS 90, 91, AND 92	CD	TP	CW

DESIGNED	R. MAU
DRAWN	R. MAU
CHECKED	T. PHANG
REVIEWED	J. WANG
RECOMMENDED	T. PHANG
APPROVED	J. WANG
DATE	5/21/2008



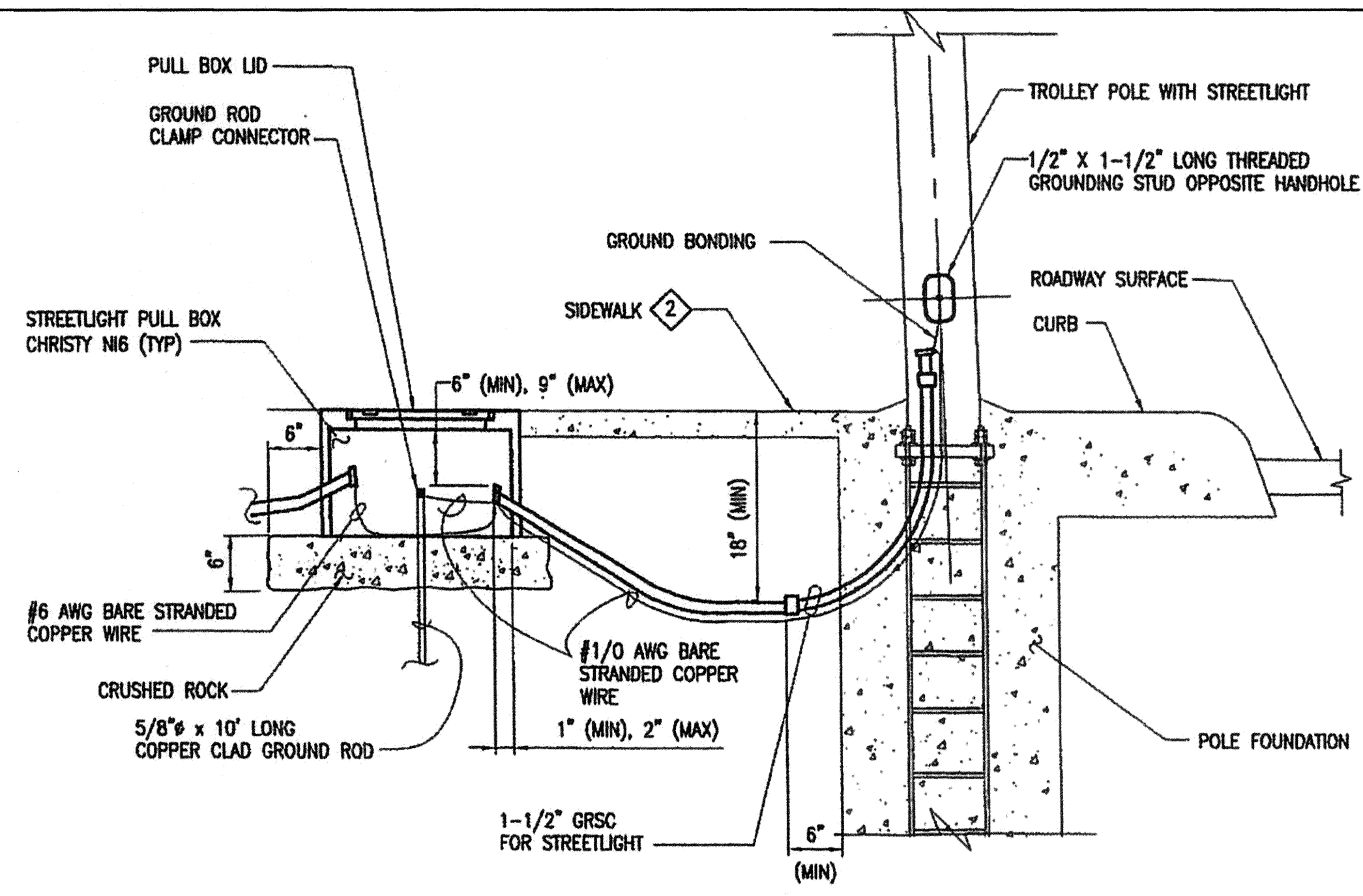
CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED
GREGG WILCOX
for the EXECUTIVE DIRECTOR / CEO

MUNI METRO SYSTEM / TROLLEY COACH SYSTEM

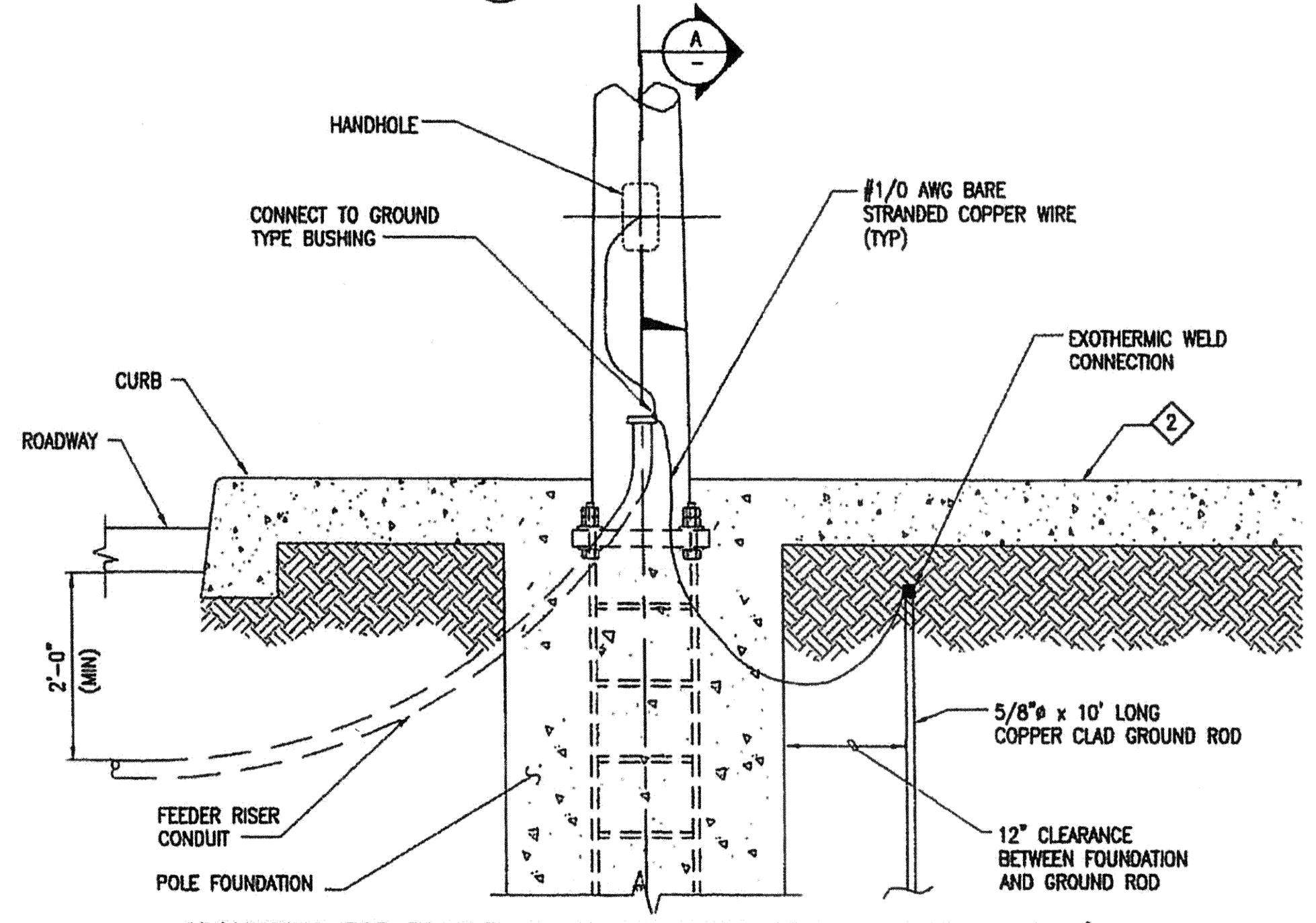
OVERHEAD CONTACT SYSTEM
DETAIL XVII

CONTRACT	DRAWING	REVISION
	CL-17193	
		3



GROUNDING FOR TROLLEY POLE WITH STREETLIGHT 3

1
-
NTS

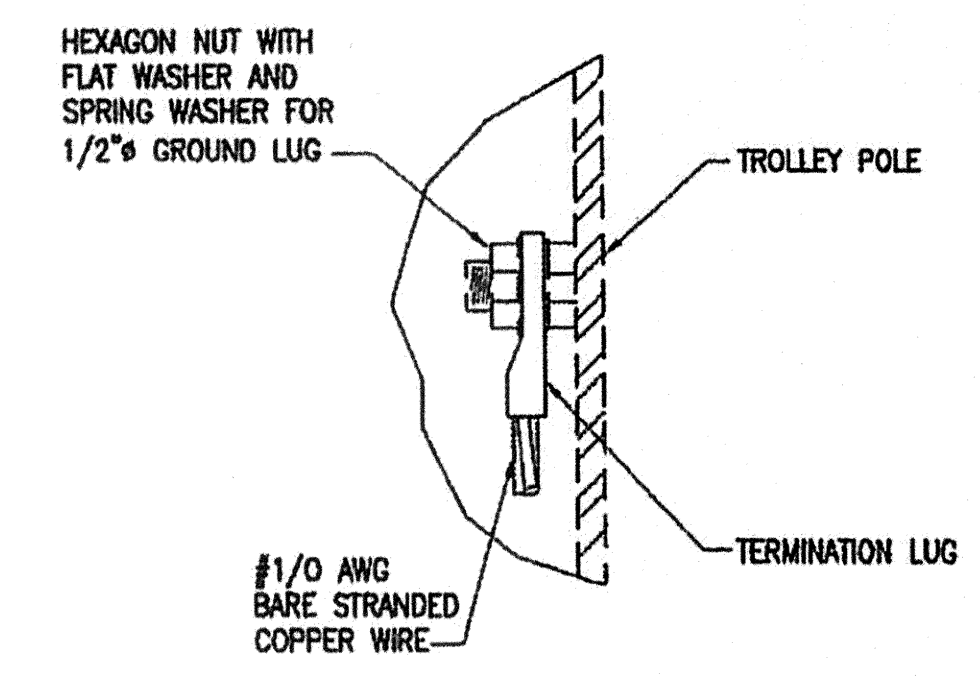


GROUNDING FOR TROLLEY POLE AND RISER WITHOUT STREETLIGHT 2

2
-
NTS

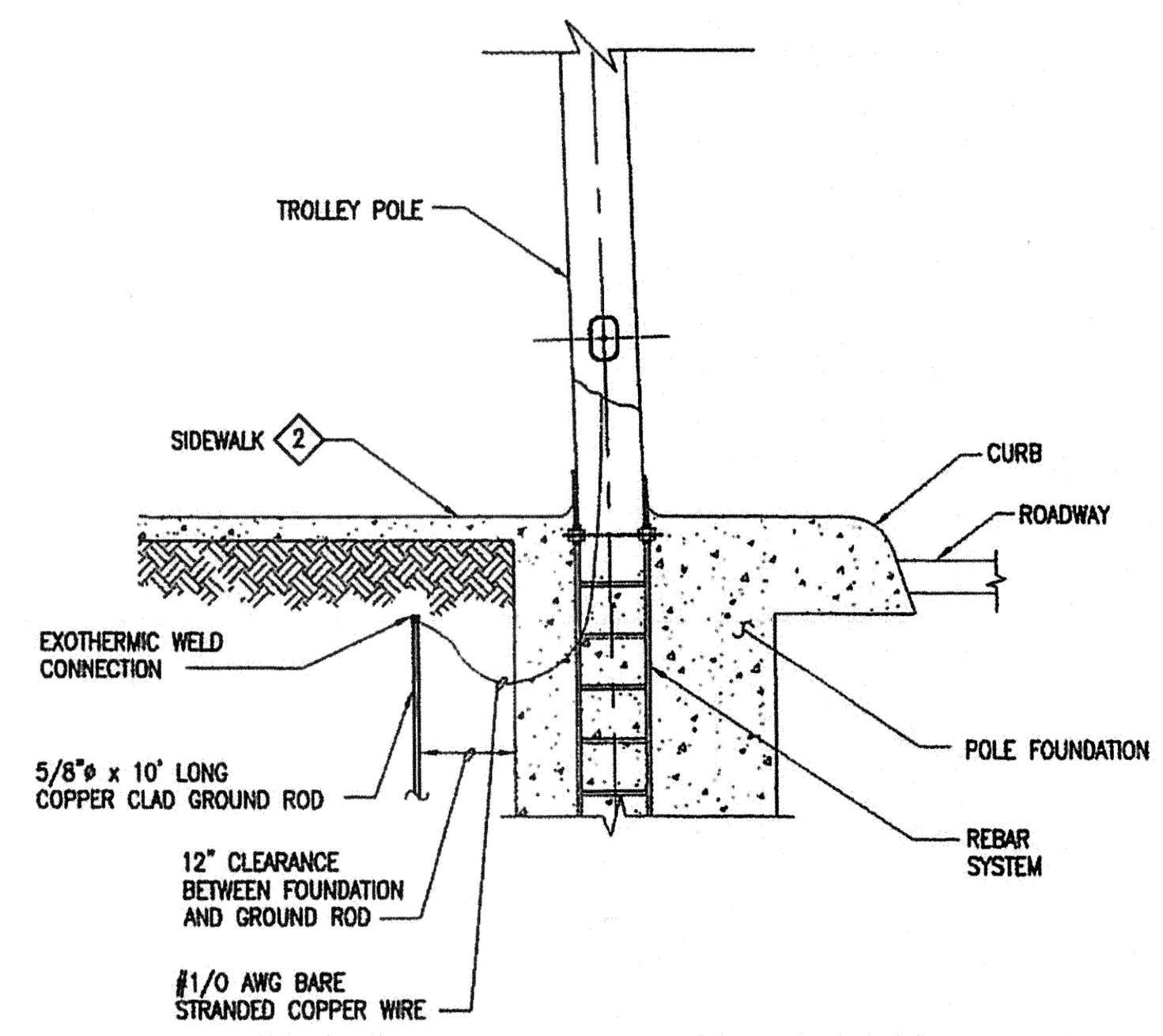
NOTES:

- GROUND NEW TROLLEY POLES PER BELOW DETAILS.
- SAWCUT ALONG EXISTING SIDEWALK JOINT. RECONSTRUCT SIDEWALK TO MATCH EXISTING.
- F/1 GROUND ROD IN STREETLIGHT PULL BOX. CONNECT #1/0 AMERICAN WIRE GAGE (AWG) BARE STRANDED COPPER WIRE TO TROLLEY POLE AS SHOWN IN DETAIL "A" AND TO GROUND ROD AS SHOWN IN DETAIL "1". THE SAME GROUND ROD MAY BE USED FOR BOTH TROLLEY POLE GROUNDING AND STREETLIGHT SERVICE GROUNDING. SEE DPW STD DWG 49,092 FOR STREETLIGHT SERVICE REQUIREMENTS.
- F/1 GROUND ROD ADJACENT TO TROLLEY POLE AND CONNECT #1/0 AWG BARE STRANDED COPPER WIRE TO TROLLEY POLE AS SHOWN IN DETAIL "A" AND TO GROUND ROD USING EXOTHERMIC WELD AS SHOWN IN DETAIL 3.



GROUND WIRE ATTACHMENT

A
-
NTS

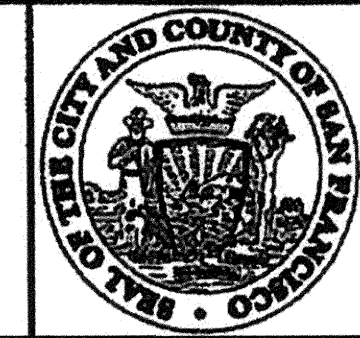


GROUNDING FOR TROLLEY POLE WITHOUT STREETLIGHT 4

3
-
NTS

NO.	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
REVISIONS					

DESIGNED: *[Signature]*
 DRAWN: *[Signature]*
 CHECKED: *[Signature]*
 RECOMMENDED: *[Signature]*
 APPROVED: *[Signature]*
 DATE: 2/1/09



CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

APPROVED
[Signature]
 for the EXECUTIVE DIRECTOR / CEO

MUNI METRO SYSTEM / TROLLEY COACH SYSTEM

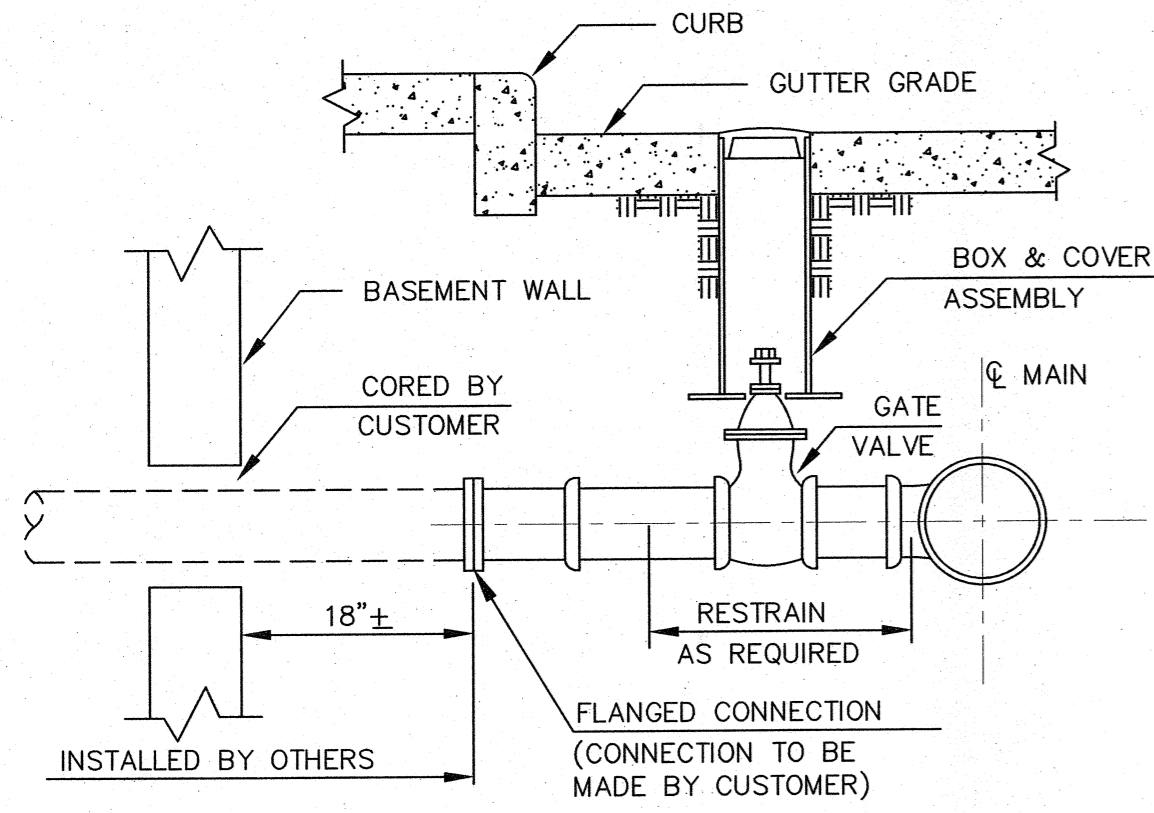
CONTRACT	
DRAWING	
CL-17465	
REVISION	

ELECTRICAL STANDARD DRAWING
TROLLEY POLE GROUNDING DETAILS

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
 STANDARD DRAWING

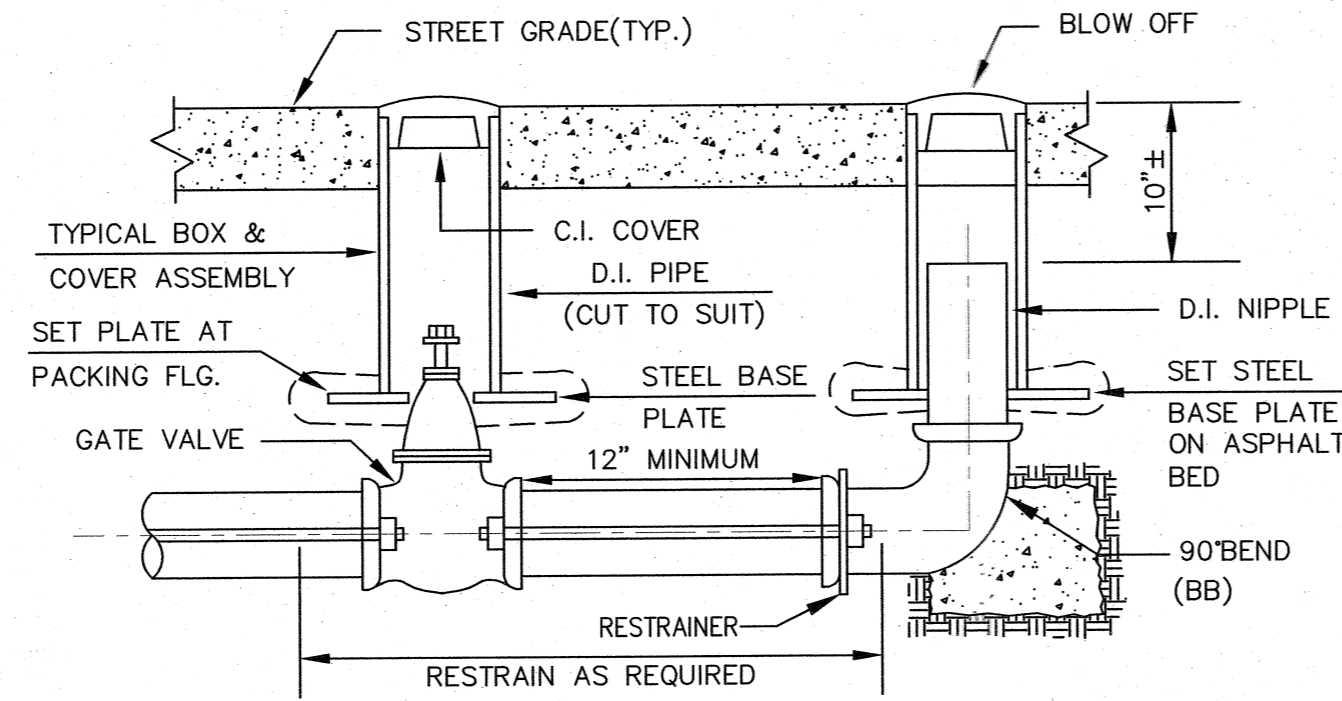
TRACTION POWER, OVERHEAD
 CL-17465

C:\Users\mngreen\Desktop\MBERT STD PLANS\CL-17465_GROUNDING.dwg mngreen Wed Jul 29 2015 - 8:08 pm



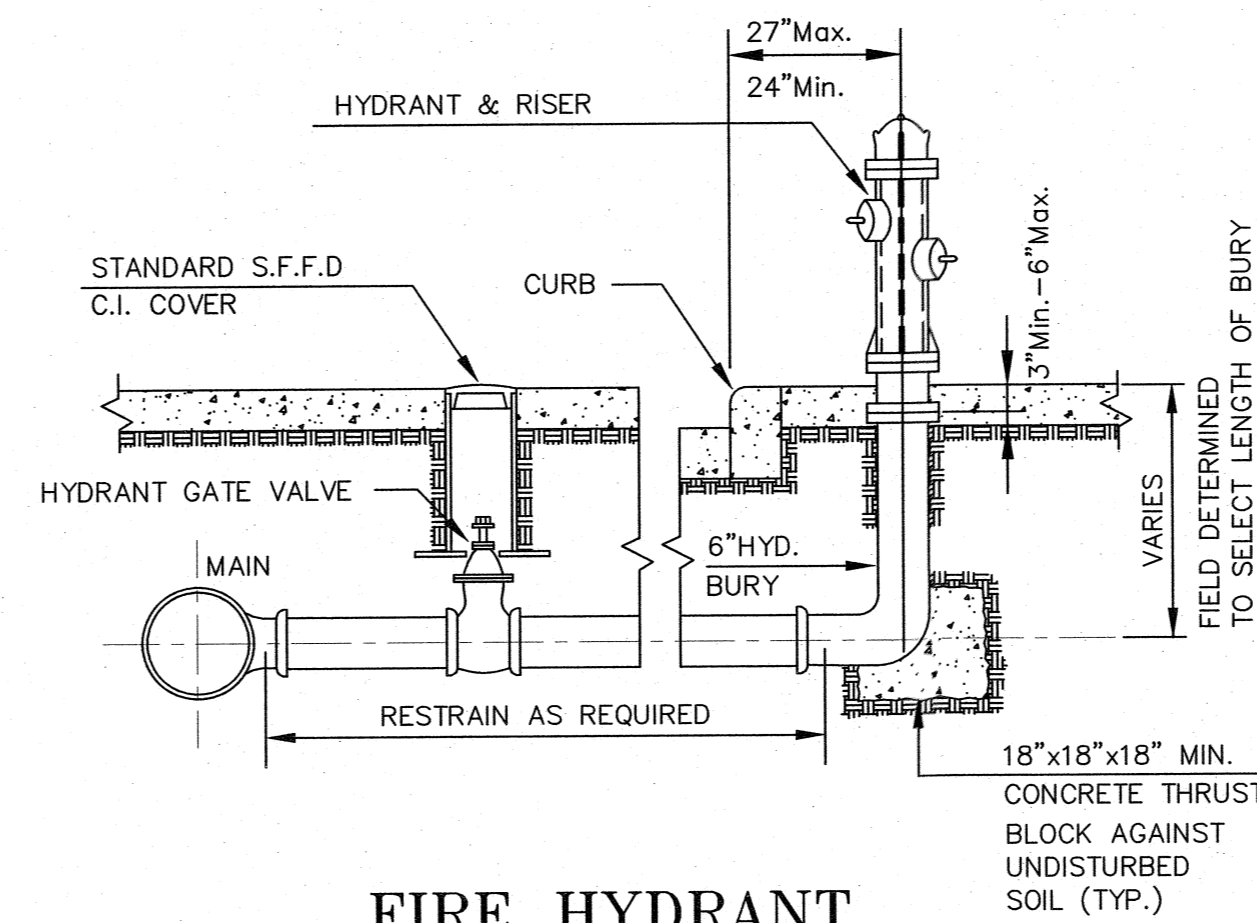
BASEMENT AREA FIRE SERVICE

SCALE: NTS



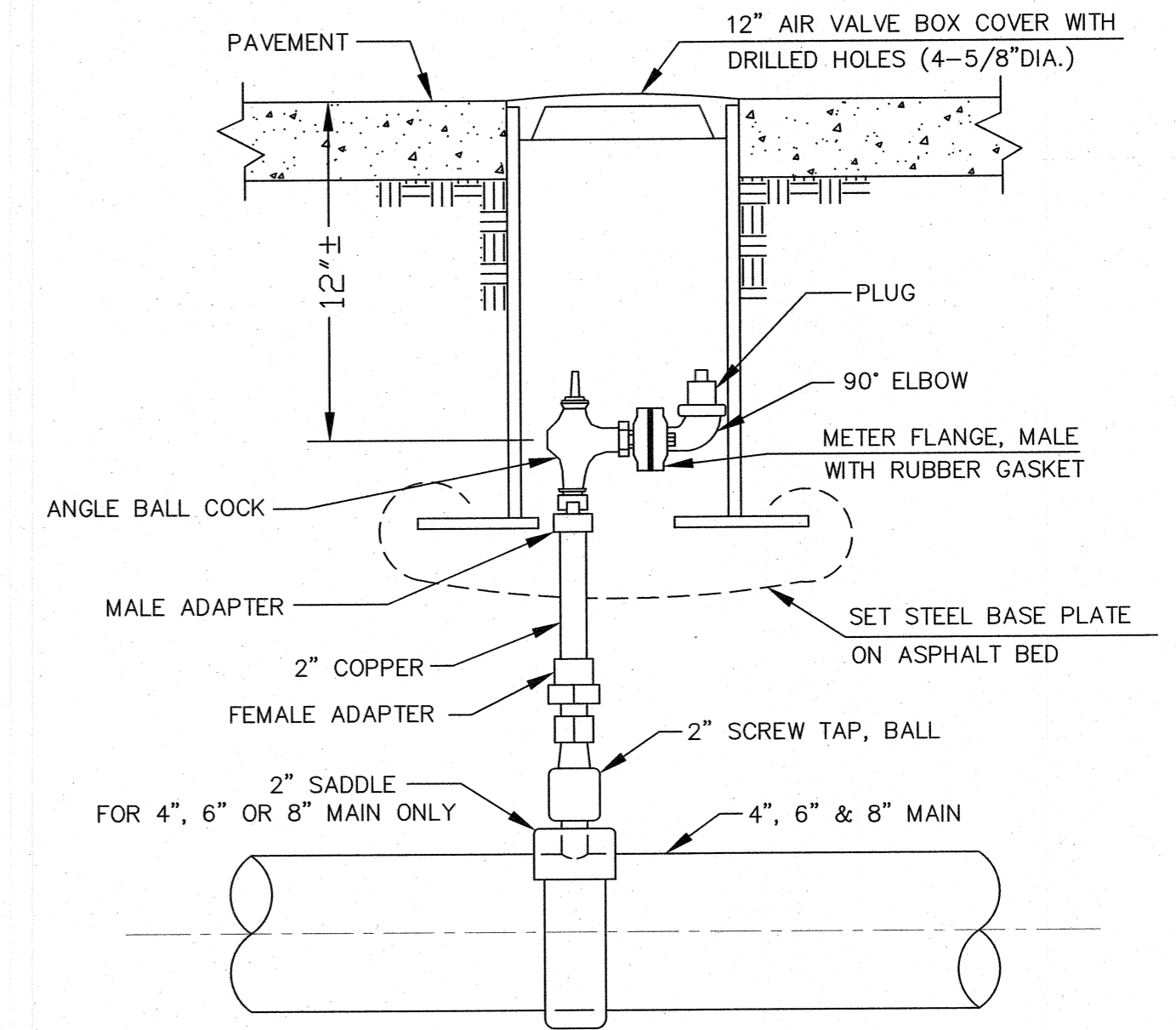
4", 6" & 8" BLOW OFF

SCALE: NTS



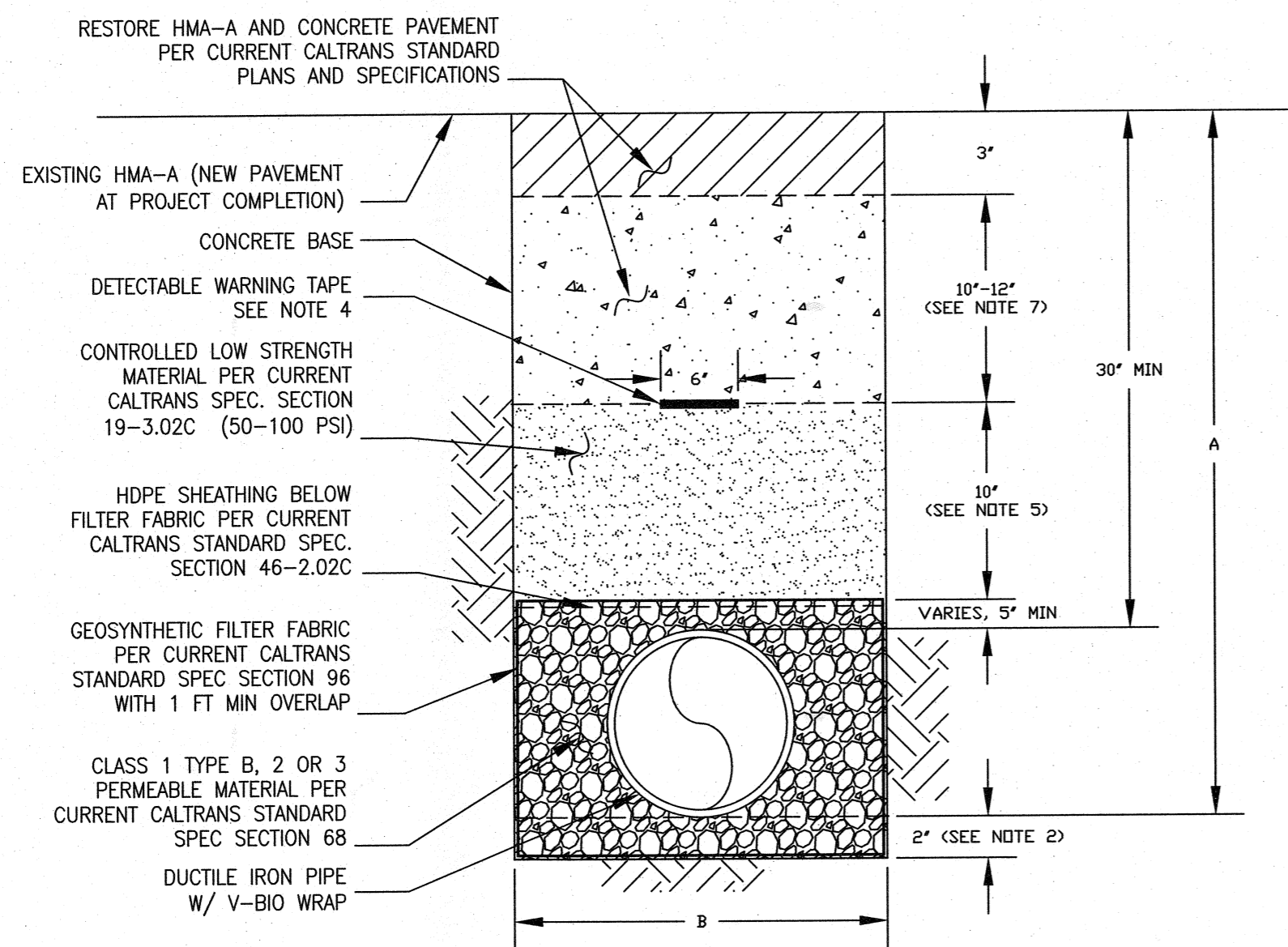
FIRE HYDRANT

SCALE: NTS



2" AIR VALVE & BLOW OFF

SCALE: NTS



NOMINAL PIPE DIAMETER	MIN. DEPTH TO PIPE BOTTOM, A	MIN. TRENCH WIDTH, B
1", 2"	24"	12"
4", 6", 8"	34"-38"	24"
12"	42"	30"
16"	46"	36"
24"	54"	48"

NOTES:

- MINIMUM TRENCH DEPTHS AND TRENCH WIDTHS MUST BE ADHERED TO UNLESS APPROVED OTHERWISE BY THE CITY DISTRIBUTION DIVISION.
- OVEREXCAVATING FOR BEDDING IS NOT REQUIRED UNLESS:
 - BOTTOM OF TRENCH EXCAVATION IS IN BEDROCK, WHERE BEDDING SHALL BE 6" THICK.
 - FOR 24" DIA. PIPE, WHERE BEDDING SHALL BE 4" THICK.
 - REQUIRED BY THE CITY REPRESENTATIVE
- TRENCH CONSTRUCTION SHALL CONFORM TO OSHA AND CAL OSHA.
- DETECTABLE WARNING TAPE SHALL BE 6" WIDE, 5 MIL THICKNESS BLUE METALLIC WARNING TAPE WITH THE WORDS "CAUTION; BURIED WATER".
- DETAIL APPLIES TO WATER PIPELINES WITH DEPTH TO TOP OF PIPE LESS THAN 42".
- ENSURE PERMEABLE MATERIAL IS PLACED PROPERLY UNDER PIPE.
- CONCRETE BASE SHALL BE 10" THICK EXCEPT AT INTERSECTIONS WHERE IT SHALL BE 12" THICK.

WATER WORK TRENCH DETAIL FOR CALTRANS RIGHT OF WAY

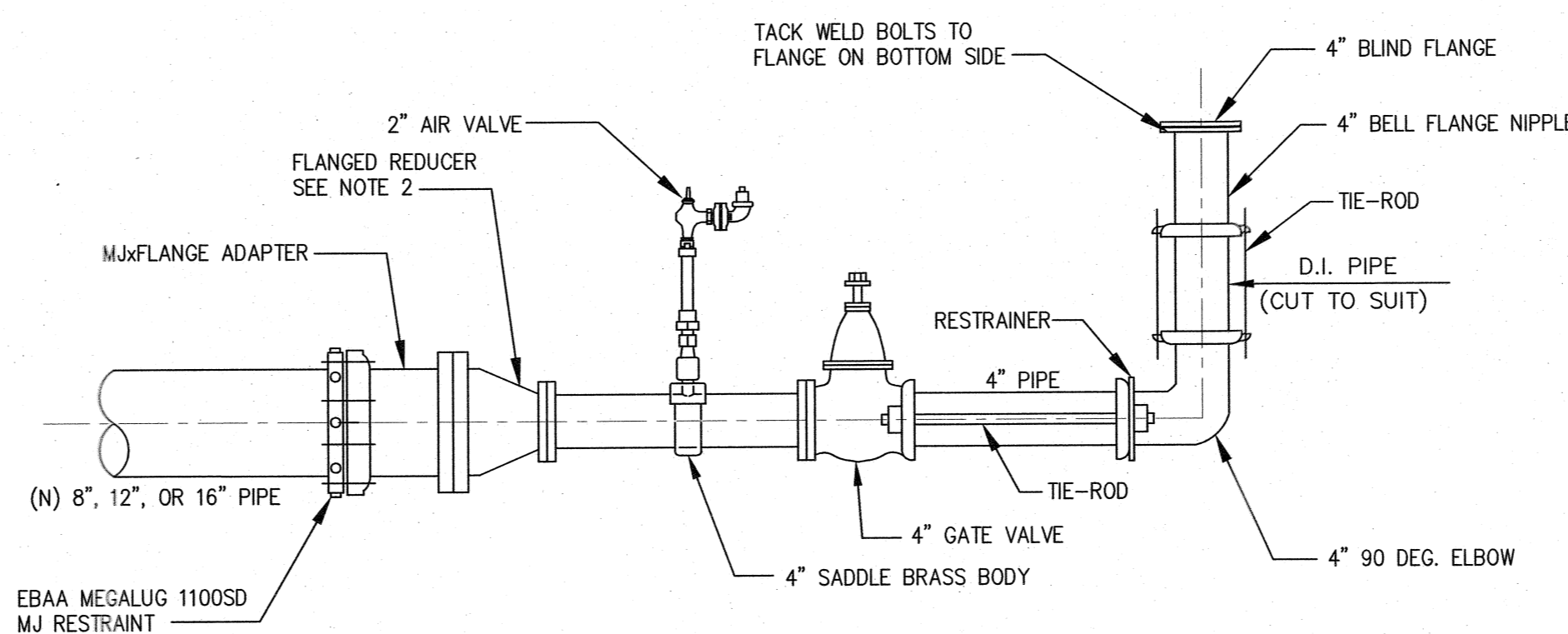
SCALE: NTS

G.V.	BOX	B.O.	BOX
2"	6"	2"	12"
4"	6"	4"	6"-6"
6"	6"	6"	6"-8"
8"	8"	8"	8"-12"
12"	8"		
16"	8"		

NOTE: SEE BLOW OFF DETAILS FOR TYPICAL BOX & COVER ASSEMBLY DETAIL.

BOX & COVER SIZES

SCALE: NTS



NOTES:

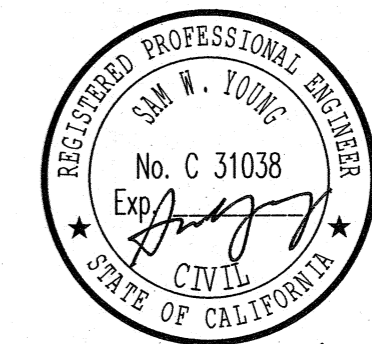
- ALL PUSH-ON JOINTS SHALL BE RESTRAINED WITH FIELD LOK GASKETS.
- 8"x4" REDUCER, 12"x4" REDUCER, OR 16"x6" WITH 6"x4" REDUCER.
- PROVIDE TEMPORARY BLOCKING/SUPPORT FOR FLUSHING ASSEMBLY AS NECESSARY.

4" FLUSHING ASSEMBLY

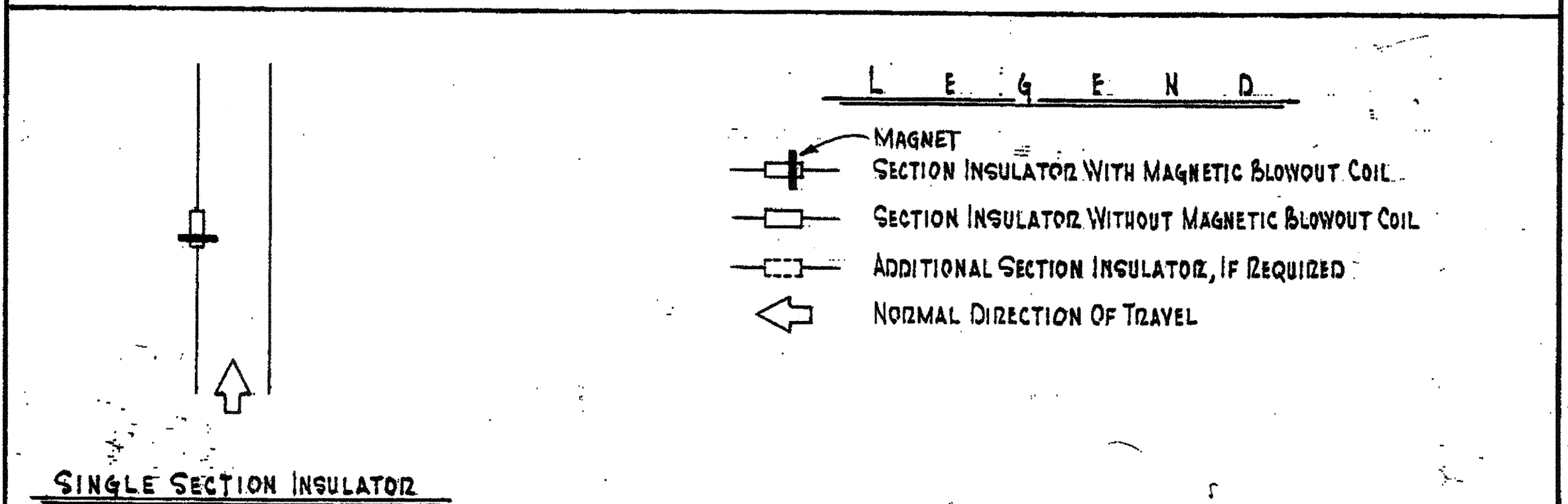
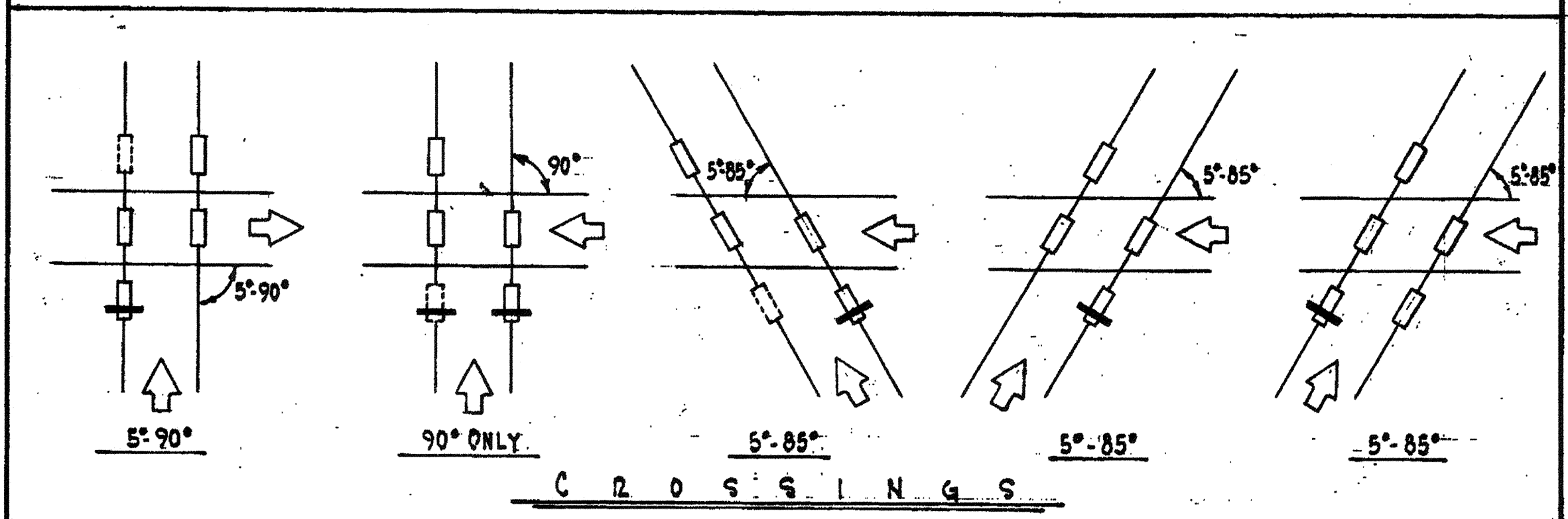
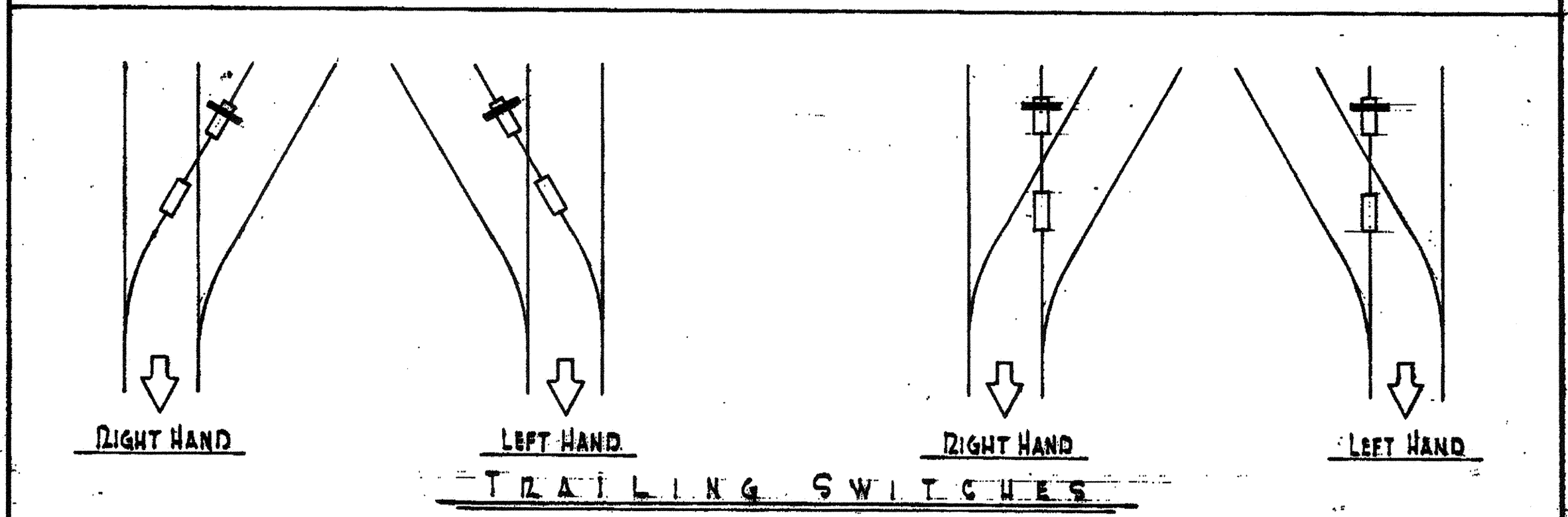
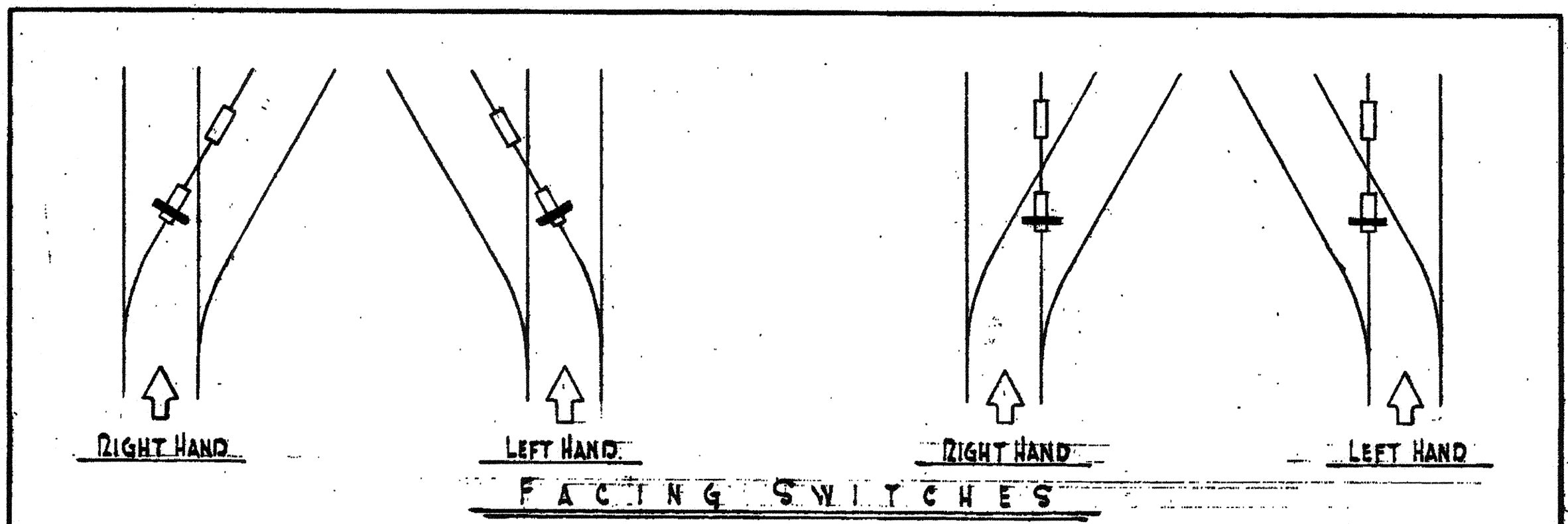
SCALE: NTS

GENERAL NOTES:

- ALL MATERIALS SHOWN ON THE PLANS SHALL BE ASSEMBLED & INSTALLED BY THE CONTRACTOR EXCEPT WHERE NOTED OTHERWISE.
- ALL FITTINGS 2" OR LESS SHALL BE BRASS UNLESS OTHERWISE SHOWN ON THE PLANS.
- PLUGS FOR AIR VALVES & BLOW OFF ASSEMBLIES SHALL BE LUBRICATED WITH "NO OXIDE" GREASE & INSTALLED HAND TIGHT.
- METER BOXES SHALL NOT BE LOCATED IN DRIVEWAYS OR IN SIDEWALK FLAGS THAT CONTAIN OTHER UTILITIES.
- ALL METER TO BE INSTALLED BY WATER DEPARTMENT EXCEPT WHERE NOTED.



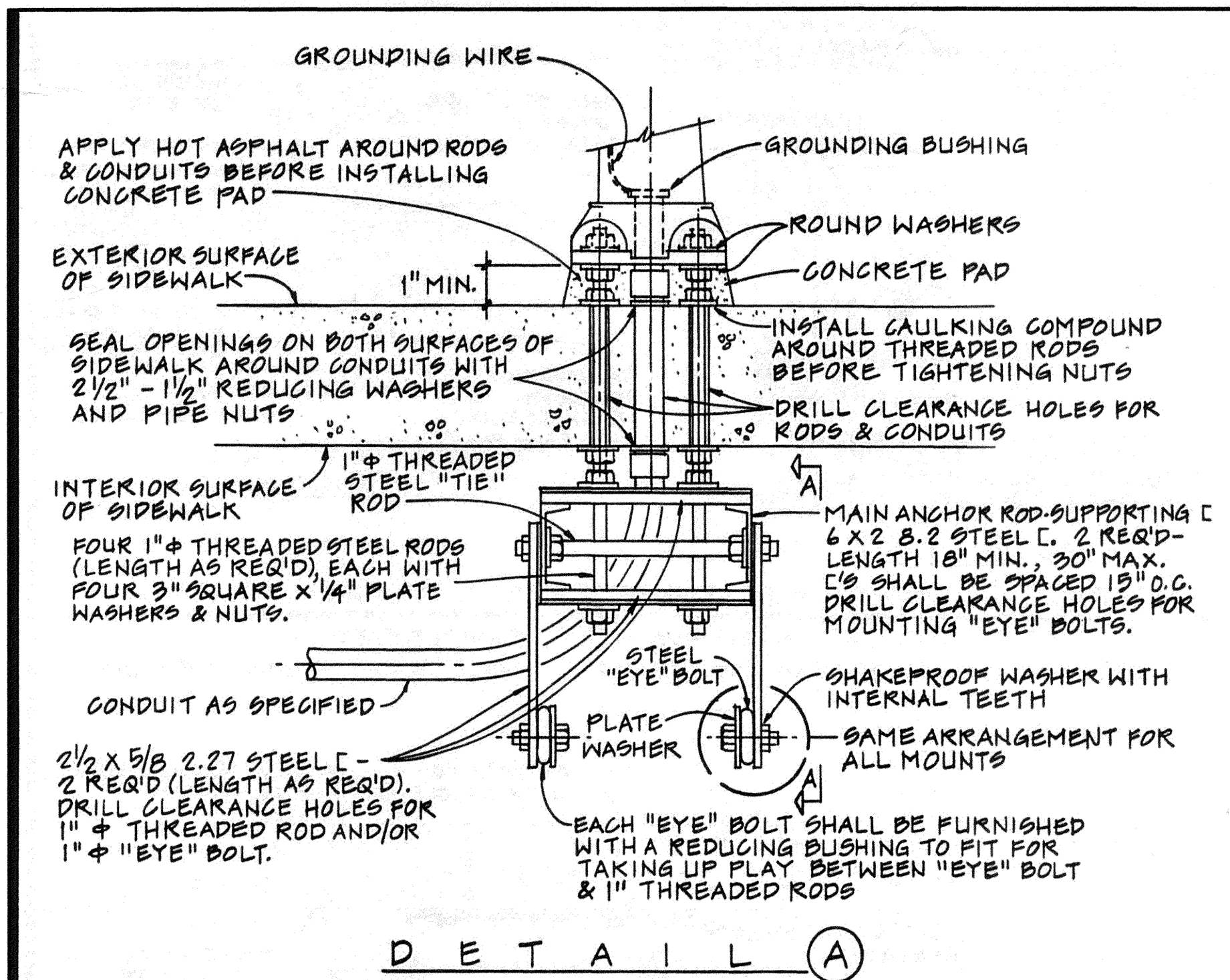
NO.	DATE	DESCRIPTION	BY	APPROVED
REVISIONS CAUTION: CHECK WITH TRACING TO SEE IF YOU HAVE LATEST REVISION				
CITY AND COUNTY OF SAN FRANCISCO PUBLIC UTILITIES COMMISSION SAN FRANCISCO WATER DEPARTMENT				
STANDARD PLAN FOR DUCTILE IRON PIPE MAIN INSTALLATIONS				
SECTION ENGINEER	DESIGNED BY	DRAWN BY	DATE	
<i>S. Young</i>	<i>J. Lum</i>	<i>J. Lum</i>	07/1/16	
CHECKED BY	SCALE	DRAWING NO.	AS SHOWN	REVISOR NO.
<i>R. Tan</i>		E-4969R-C		0



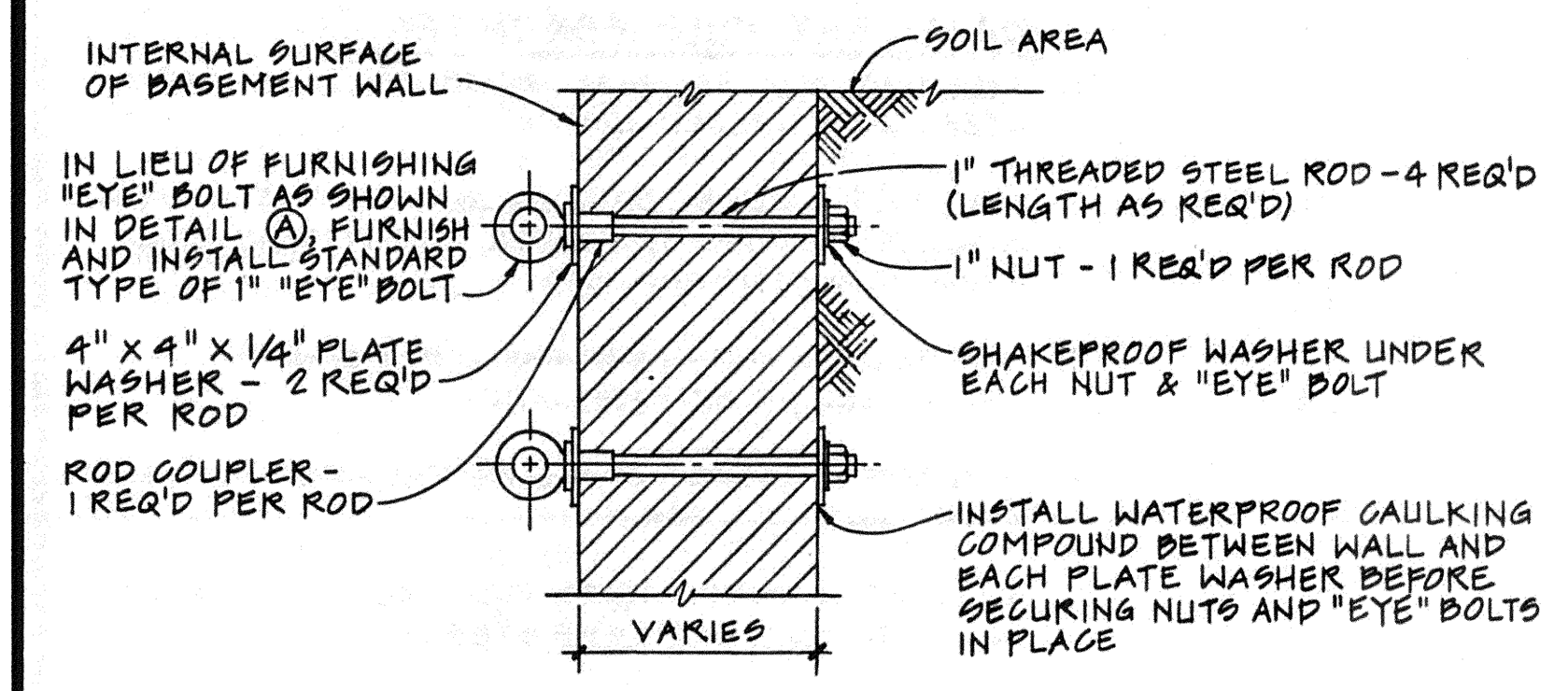
CITY AND COUNTY OF SAN FRANCISCO		PUBLIC UTILITIES COMMISSION							
HETCH HETCHY WATER AND POWER									
TRANSIT POWER FACILITIES									
LOCATION OF MAGNETIC BLOWOUT EQUIPPED SECTION INSULATORS									
NO.	DATE	DESCRIPTION	BY	APPROV.	BY	DATE	SCALE	DATE	REVISION NO.
REVISIONS				BY <u>G.S.</u> DATE <u>FEB. 1982</u> BY <u>T.S.I.L.</u> DATE <u>85</u> BY <u>A.E. Collins</u> DATE <u>85</u>		APPROVED <u>[Signature]</u> SCALE <u>NONE</u> APPROVED <u>[Signature]</u> DATE <u>FEB. 1982</u>		DRAWING NO. <u>K-101</u> REVISION NO. <u>0</u>	

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
 STANDARD DRAWING

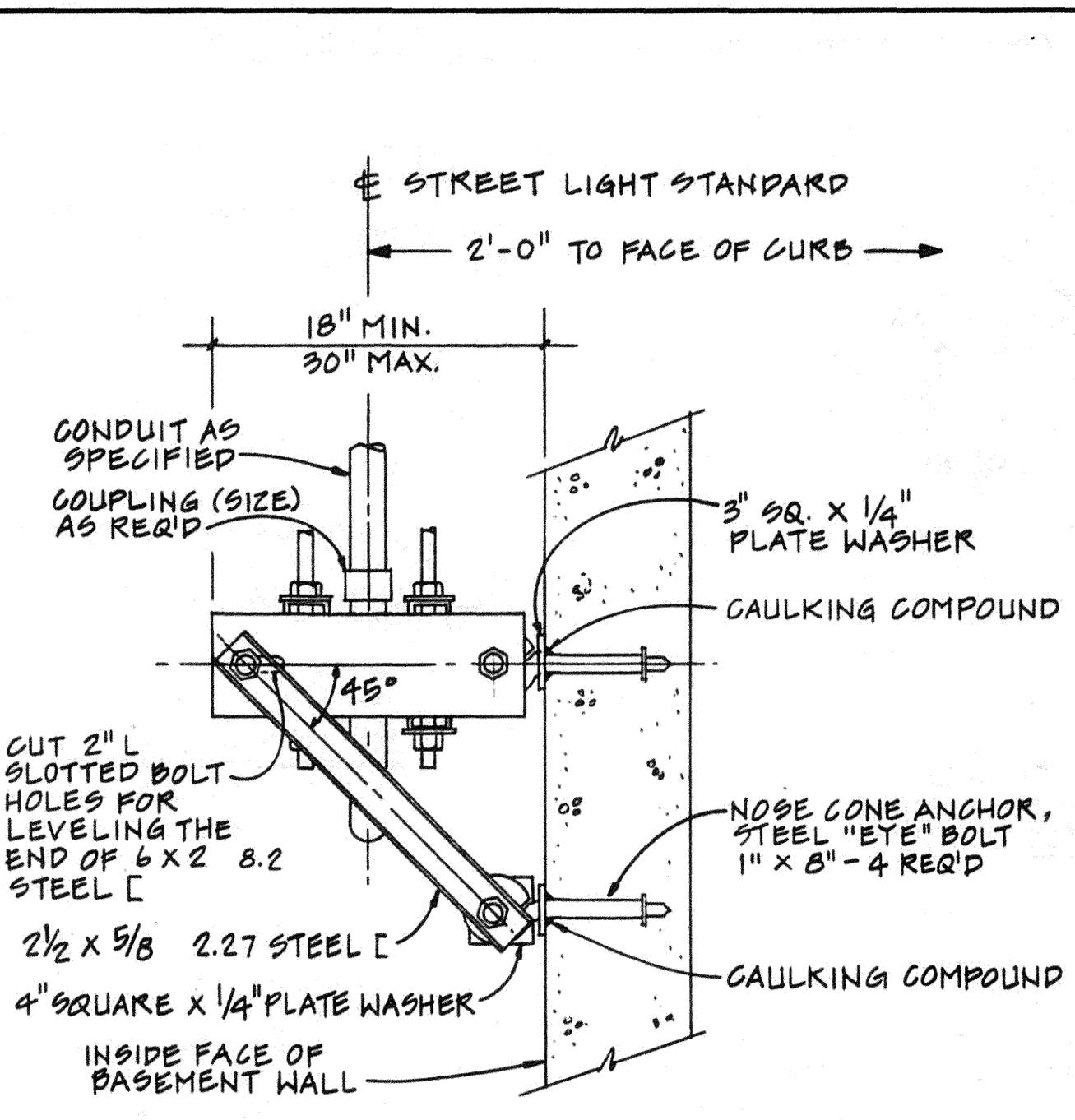
OVERHEAD
 K-101 REV 0



DETAIL A
 FOR CONCRETE WALLS ONLY. SEE DETAIL B BELOW FOR ALTERNATE INSTALLATION OF FOUNDATION "EYES" FOR NON-CONCRETE AND HOLLOW-BLOCK WALLS AND REINFORCED CONCRETE BEAMS

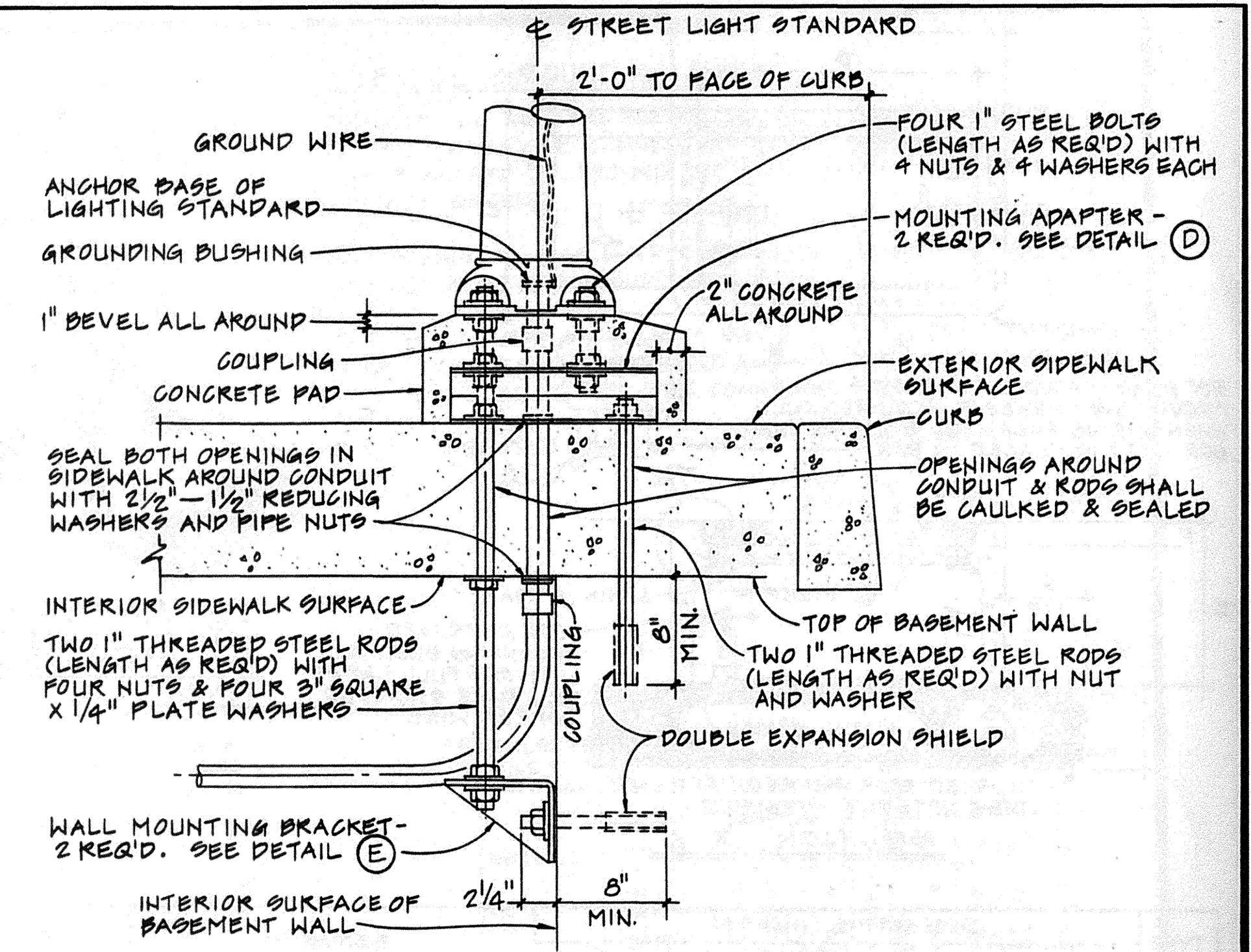


DETAIL B
 ALTERNATE INSTALLATION OF FOUNDATION "EYES" FOR NON-CONCRETE AND HOLLOW-BLOCK WALLS AND REINFORCED CONCRETE BEAMS
TYPE II BASEMENT FOUNDATION

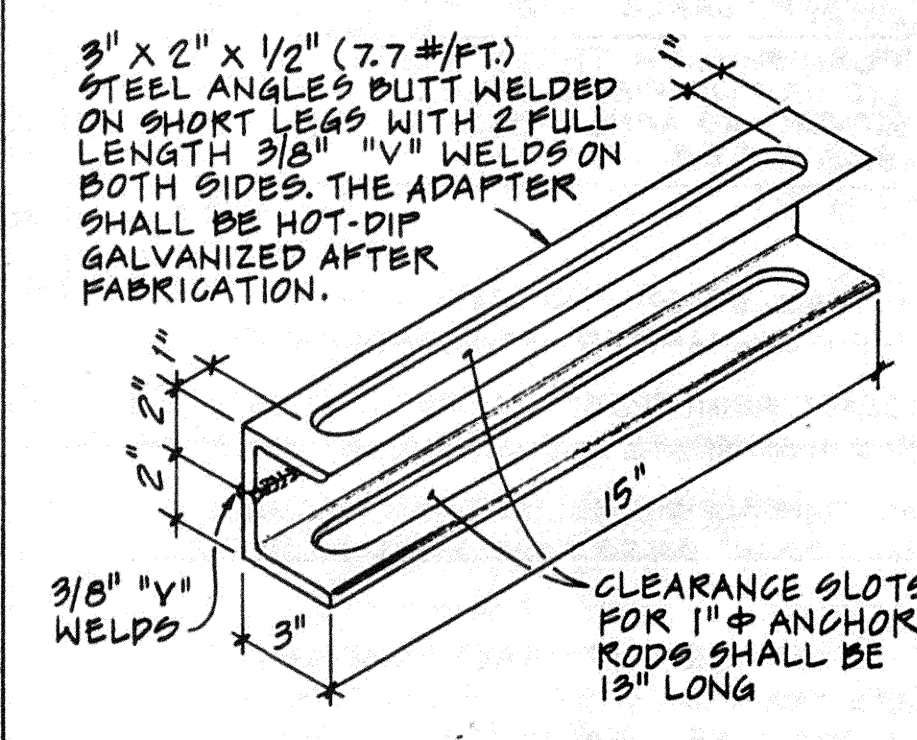


ELEVATION A-A

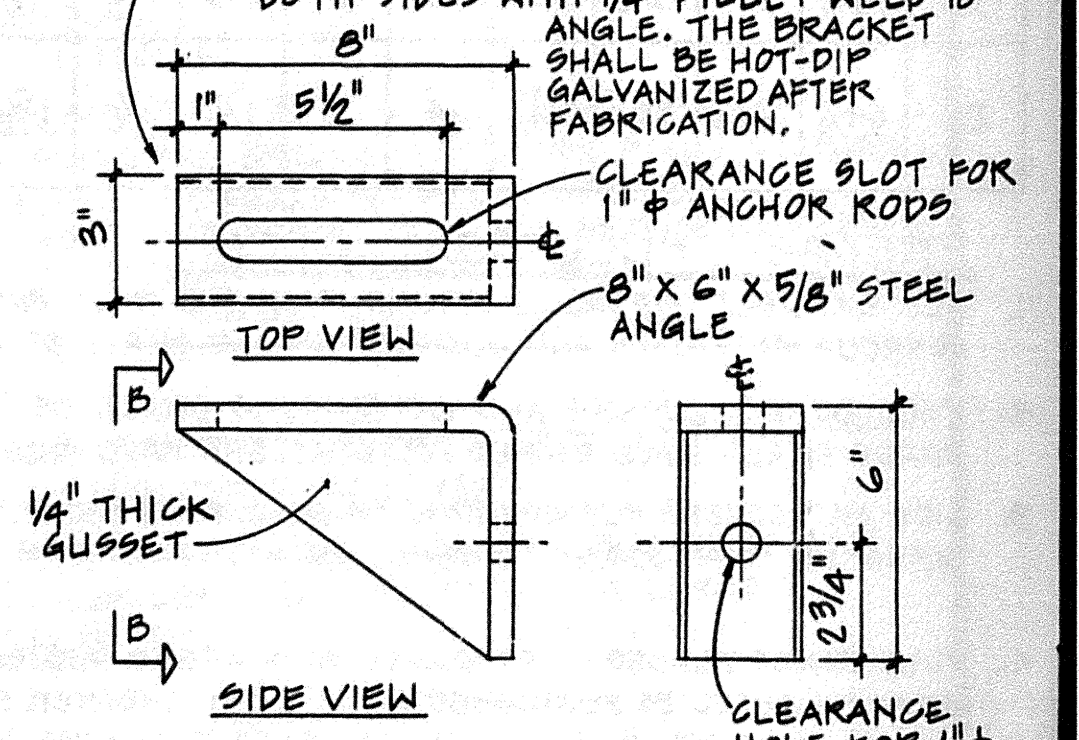
LEGEND
 C CHANNEL



DETAIL C



DETAIL D
 MOUNTING ADAPTER



DETAIL E
 WALL MOUNTING BRACKET

TYPE III BASEMENT FOUNDATION

NOTE:
 ALL MATERIALS FURNISHED AND INSTALLED FOR BASEMENT FOUNDATIONS SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION. WHERE GALVANIZED COATING IS REMOVED DURING WELDING, CONTRACTOR SHALL COVER SUCH EXPOSED SURFACES WITH ZINC PRIMER. AFTER INSTALLATION CONTRACTOR SHALL PRIME PAINT THE EXPOSED SURFACES OF THE BASEMENT MOUNTING MATERIAL.

REFERENCES SHEET FILE NOS OF SURVEY, PLANS, ETC., USED		CITY AND COUNTY OF SAN FRANCISCO DEPARTMENT OF PUBLIC WORKS BUREAU OF ENGINEERING	
TYPE II AND TYPE III BASEMENT FOUNDATIONS FOR STREET LIGHTS		SCALE NONE	
DESIGNED BY: EDS	DATE: 3-87	APPROVED: [Signature]	DATE: 5/1/87
DRAWN BY: Y.L.	DATE: 3-87	APPROVED: [Signature]	DATE: 5/1/87
TRACED BY: Y.L.	DATE: 5-87	APPROVED: [Signature]	DATE: 5/1/87
CHECKED BY: C.P.	DATE: 5-87	APPROVED: [Signature]	DATE: 5/1/87
SECTION ENG. [Signature]	DATE: 5/1/87	SECTION ENG. [Signature]	DATE: 5/1/87
REFERENCES	DESCRIPTION	BY	DATE
TABLE OF CHANGES CAUTION: CHECK WITH TRACING TO SEE IF YOU HAVE LATEST REVISION			
SHEET OF SHEETS		49,094	

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
 STANDARD DRAWING
 STREET LIGHTING
 49,094

C:\Users\mpresan\Desktop\NMBRT\LOCK\NMBRT STD PLANS\ STD PLAN_49094_S1_SF_POLE FOUNDATION.dwg mpreman Thu Dec 03 2015 5:00 PM
 BORDER REVISED 11/17/05