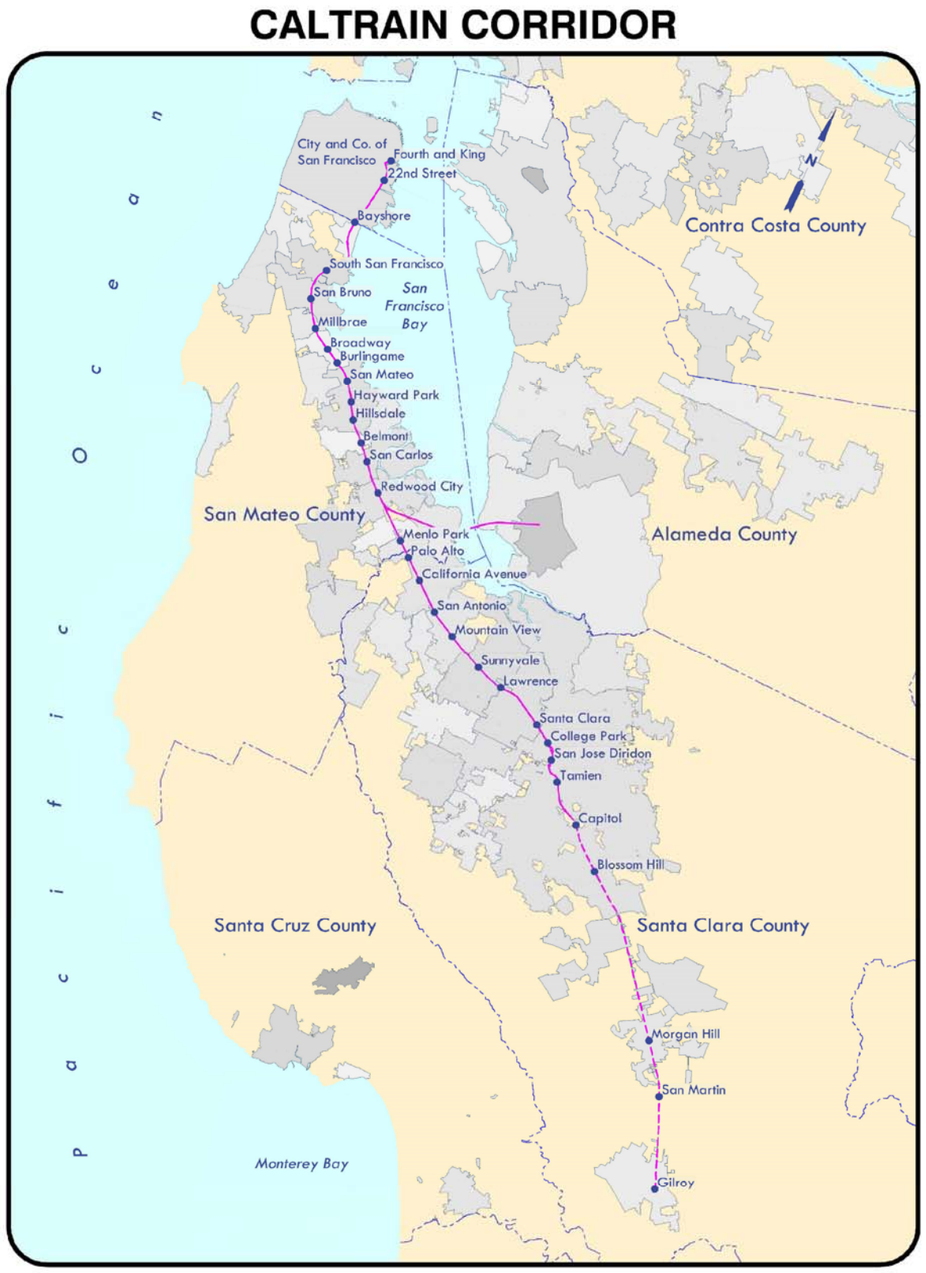

ELECTRIFICATION STANDARD DRAWINGS

PENINSULA CORRIDOR JOINT POWERS BOARD

OVERHEAD CONTACT SYSTEM
BASIC DESIGN: ASSEMBLIES

JANUARY 1, 2024

INDEX OF DRAWINGS

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REV	DATE	BY	CHK	APP	DESCRIPTION
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PENINSULA CORRIDOR JOINT POWERS BOARD

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
BASIC DESIGN ASSEMBLIES
INDEX OF DRAWINGS
SHEET 1 OF 2

CADD FILE NAME: W0012

REV:

EDITION: 01012024

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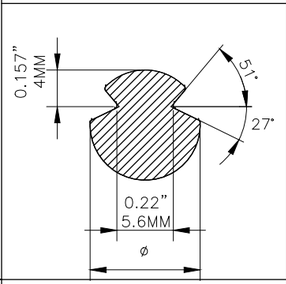
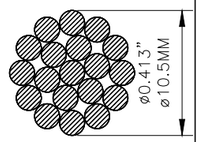
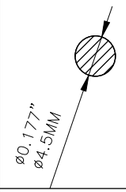
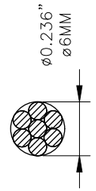
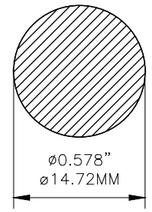
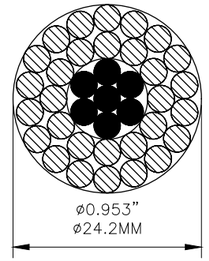
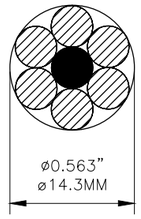
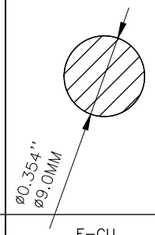
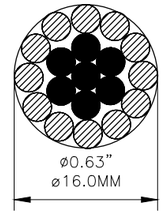
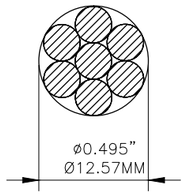
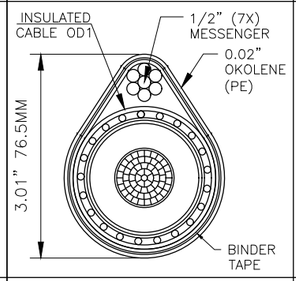
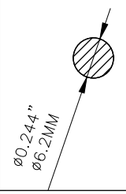
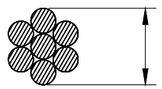
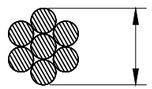
CADD FILE NAME: W0013

REV:

EDITION: 01012024

STANDARD DRAWING NO.: **W0013**

		CONTACT WIRE AC 107	MESSENGER WIRE BZ II 70/19	DROPPER WIRE BZ II 10/49	CANTILEVER DROPPER WIRE 6.0-SE-BK1570	JUMPER WIRE E-CU 95X259	REINFORCEMENT CONDUCTOR AND BYPASS FEEDER EAGLE ACSR 556	STATIC WIRE PENGUIN ACSR 4/0	ELECTRICAL CONNECTION E-CU 35X133	SHUNT WIRE DORKING ACSR 96
										
MATERIAL		CU AG 01	BZ-II	BZ-II	STAINLESS STEEL	E-CU	AL/ST	AL/ST	E-CU	AL/ST
SECC.	MM² (IN²)	107 (0.166)	65.81 (0.1)	9.6 (0.01)	16 (0.02)	99.7 (0.15)	347.81 (0.539)	125.1 (0.194)	35 (0.054)	152.81 (0.237)
DIAMETER	MM (IN)	ø12.3 (0.484)	ø10.5 (0.413)	ø4.5 (0.177)	ø6 (0.236)	ø14.7 (0.578)	ø24.2 (0.953)	ø14.3 (0.563)	ø9 (0.354)	ø16.0 (0.63)
WIRES	(N°-ø)	1-12.3 (0.484)	19	49-0.5	7	259-0.7	30/7-3.46MM/3.46MM 30/7-0.1362IN/0.1362IN	6/1-4.77MM/4.77MM 6/1-0.1878IN/0.1878IN	133-0.6	12/7-3.2/3.2
WEIGHT	N/M (LB/FT)	9.5 (0.65)	5.96 (0.41)	0.89 (0.061)	1.38 (0.0946)	9.35 (0.641)	12.7 (0.871)	4.25 (0.291)	3.53 (0.242)	6.95 (0.476)
NOMINAL FORCE	KN (LB)	37.45 (8419)	38.64 (8687)	–	19.64 (4415.25)	–	123.66 (27800)	37.14 (8350)	–	83.21 (18706.349)
MOD. ELAST.	KN/MM² (LB/IN²)	–	105 (14753025)	–	–	–	80.4 ($11.6x10^6$)	79.46 ($11.5x10^6$)	–	103.26 (14508675)
COEF. OF EXTENSION	10^{-6}/K (1/F)	17.0 ($9.44x10^{-6}$)	17.0 ($9.44x10^{-6}$)	–	–	–	17.8 ($9.9x10^{-6}$)	19.1 ($10.6x10^{-6}$)	–	15.3 ($8.50x10^{-6}$)
NORM		EN 50149	DIN 48201	DIN 43138	EN 12385-4	DIN 43138	ASTM B 232	ASTM B 232	DIN 43138	ASTM B 232

		MESSENGER FOR FEEDER CABLE EHS 7-STRAND GALV. STEEL WIRE	1/C 750 KCMIL, 46KV CU, CABLE BOUND TO 1/2" MESS. WIRE	HEAD SPAN DROPPER BZ II 16/84	SPAN WIRE DROPPER WITH SINGLE SPAN WIRE BZ II 25/7	SPAN WIRE DROPPER WITH TWO SPAN WIRE BZ II 50/7
						
MATERIAL		GALV. STEEL	COPPER	BZ-II	BZ-II	BZ-II
SECC.	MM² (IN²)	96.58 (0.150)	380 (0.5890) CU	16.3 (0.025)	24.25 (0.038)	49.48(0.077)
DIAMETER	MM (IN)	ø12.57 (0.495)	ø76.45 (3.01) OD / ø60.45 (2.38) OD1	ø6.2 (0.244)	ø6.3 (0.248)	ø9.0 (0.354)
WIRES	(N°-ø)	7 STRAND	61	84-0.5	7	7
WEIGHT	N/M (LB/FT)	7.54 (0.517)	78.586 (5.383)	1.52 (0.104)	2.18 (0.149)	4.46 (0.306)
NOMINAL FORCE	KN (LB)	119.6 (26900)	–	–	14.24 (3201)	28.58 (6425)
MOD. ELAST.	KN/MM² (LB/IN²)	206.843 ($30x10^6$)	–	–	–	–
COEF. OF EXTENSION	10^{-6}/K (1/F)	$12.3x10^{-6}$ ($6.83x10^{-6}$)	–	–	–	–
NORM		ASTM A475	AEIC CS8 & ICEA S-93-639/S-97-682	DIN 43138	DIN 48201	DIN 48201

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PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CATENARY WIRES

CADD FILE NAME: W6001

REV:

EDITION: 01012024

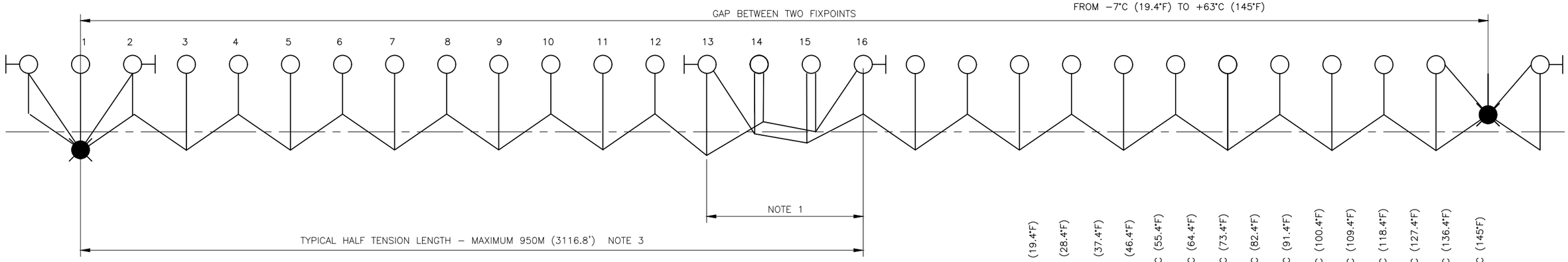
STANDARD DRAWING NO.: W6001

NOTES:

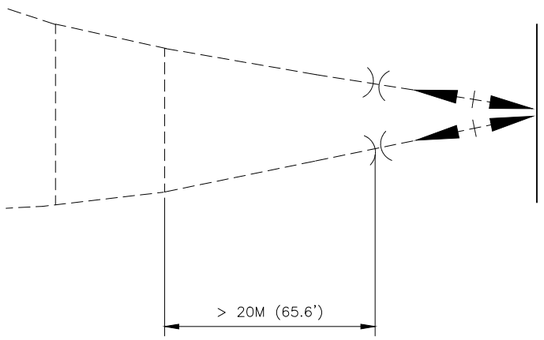
1. OVERLAP TYPES: 3–SPAN NON INSULATED
   3–SPAN INSULATED
   5–SPAN NON INSULATED – IF NECESSARY
   5–SPAN INSULATED – IF NECESSARY

2. MAXIMUM ELONGATION BY THERMAL EXPANSION: 0,000017/K X 70K X 950M = 1,1305M (44.51'')
   – alpha = 0,000017/K FACTOR OF THERMAL EXPANSION (9.44 X 10^{-6} /F)
   – TEMPERATURE RANGE 70 K (–7°C TO 63°C) (20°F TO 145°F)
   – MAXIMUM HALF TENSION LENGTH 950M (3116.8')

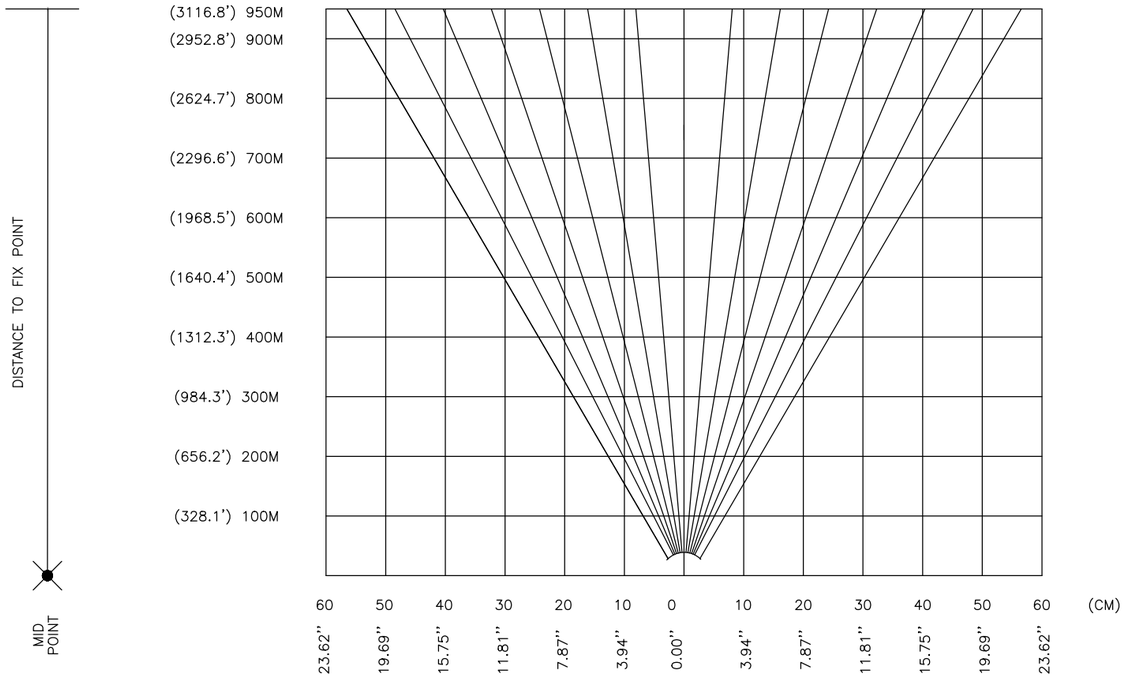
3. A MAXIMUM HALF TENSION LENGTH OF 3116.8' WILL BE USED.
   THE MOVEMENT OF HINGED CANTILEVERS AND OF TENSION WHEEL
   IS ACCEPTABLE, BECAUSE OF RELATIVELY SMALL TEMPERATURE RANGE
   FROM –7°C (19.4°F) TO +63°C (145°F)



TYPICAL FULL TENSION LENGTH
PLAN
NTS



END SECTION OF TYPICAL FULL TENSION LENGTH
ELEVATION
NTS



ADJUSTMENT SCHEMATIC

REV	DATE	BY	CHK	APP	DESCRIPTION
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PENINSULA CORRIDOR JOINT POWERS BOARD

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
TYPICAL TENSION LENGTH

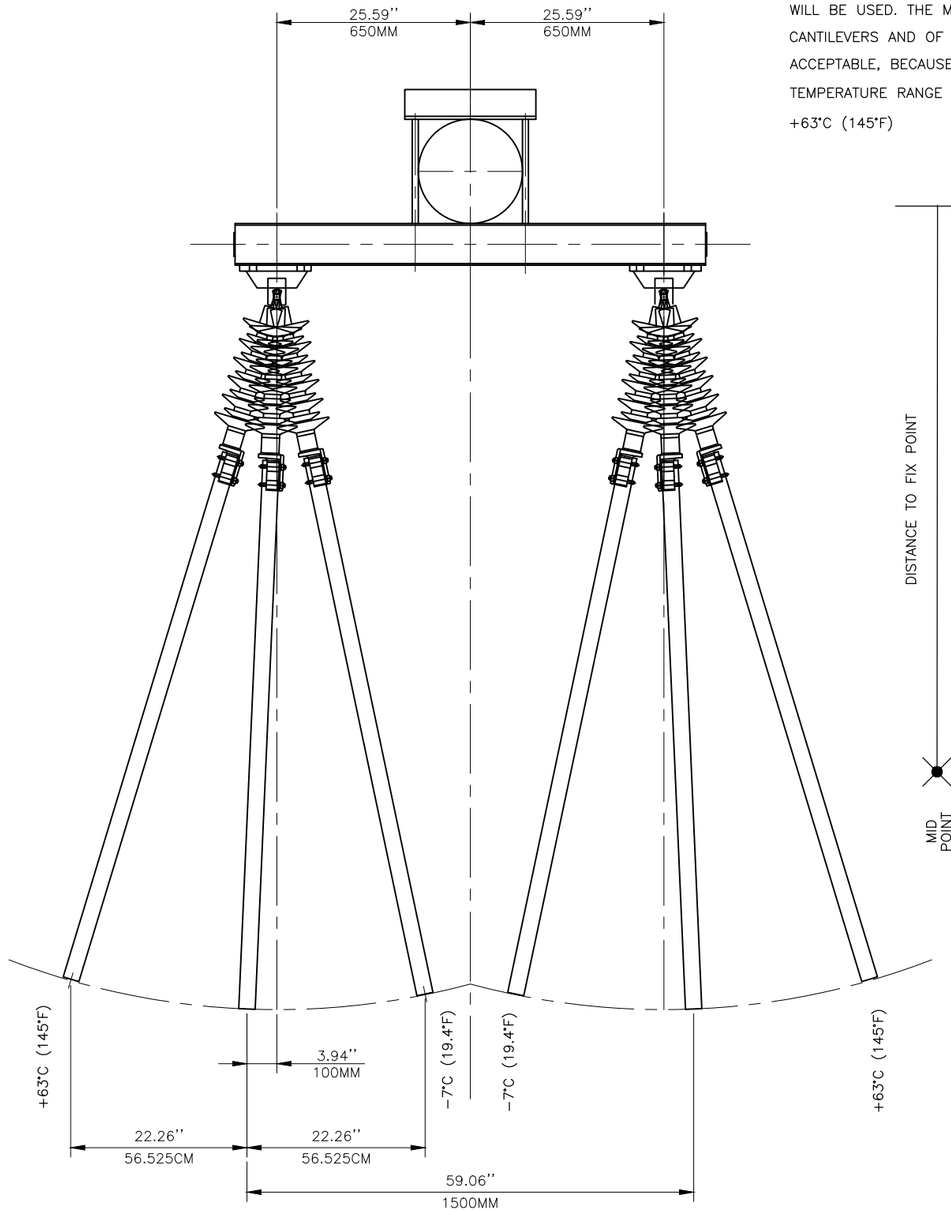
CADD FILE NAME: W6002
REV:
EDITION: 01012024
STANDARD DRAWING NO.: W6002

NOTE 2:

A MAXIMUM HALF TENSION LENGTH OF 3116.8' WILL BE USED. THE MOVEMENT OF HINGED CANTILEVERS AND OF TENSION WHEEL IS ACCEPTABLE, BECAUSE OF RELATIVELY SMALL TEMPERATURE RANGE FROM −7°C (19.4°F) TO +63°C (145°F)

NOTE 1:

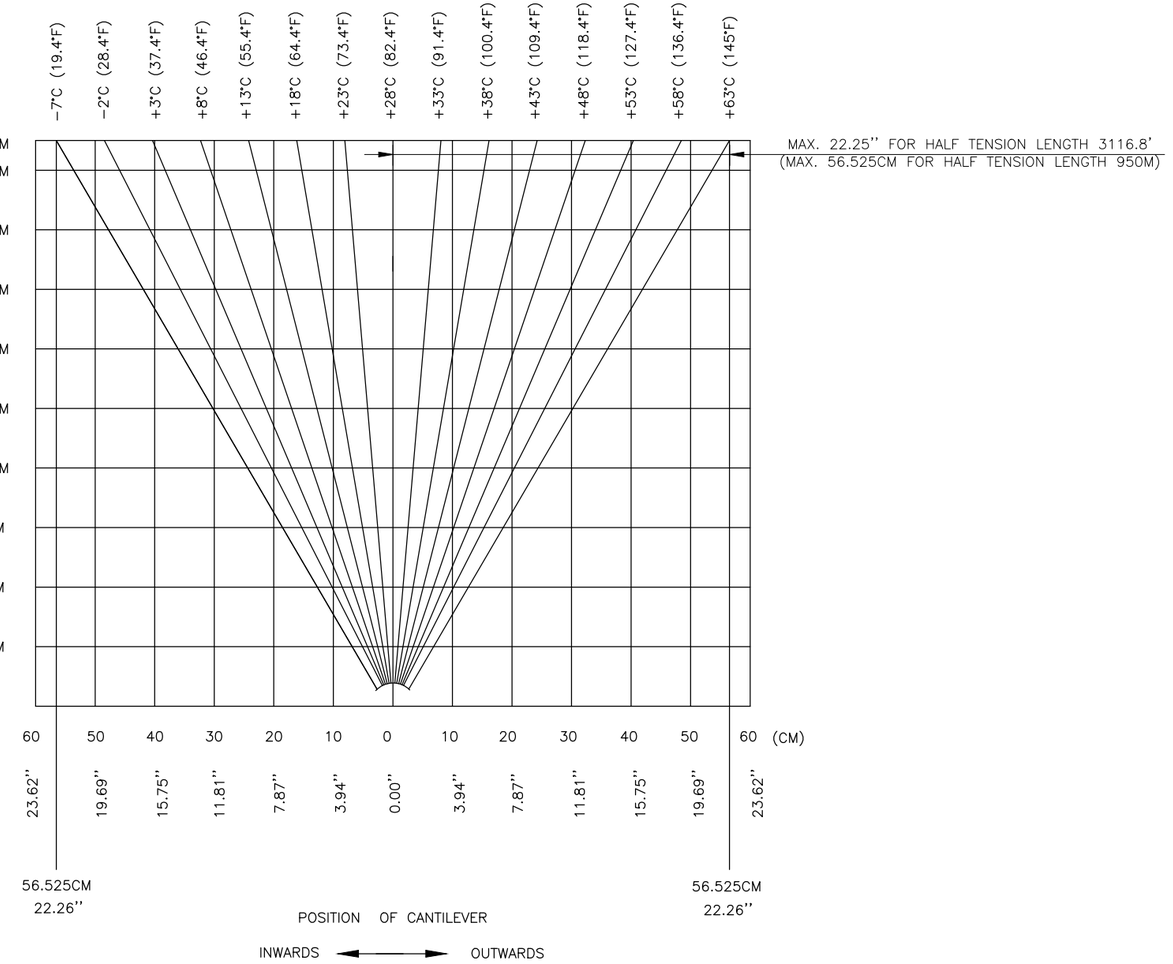
WHEN THE TEMPERATURE RAISES, THE OVERLAP CANTILEVERS HAVE TO MOVE APART FROM EACH OTHER



MIDDLE POSITION OF CANTILEVERS / MOVED POSITION

PLAN

NTS



ADJUSTMENT SCHEMATIC

NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
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REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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STANDARD DRAWINGS

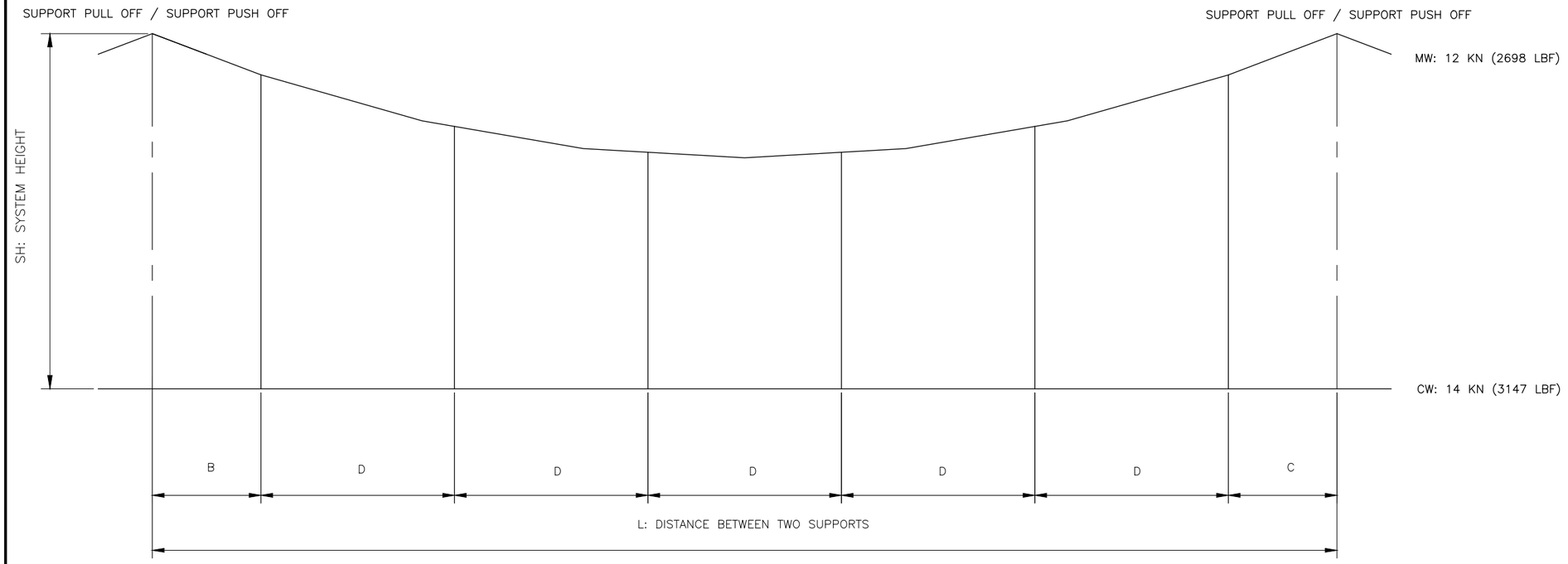
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
POSITION OF CANTILEVER

CADD FILE NAME: W6003

REV:

EDITION: 01012024

STANDARD DRAWING NO.: W6003



NOTES:

1. MAX. DISTANCE OF DROPPER D = 12M (39.4')
2. NUMBER OF DROPPERS: 2 OR 4 OR 6 OR 8 (EXAMPLE DRAWN WITH 6 DROPPERS)
3. DROPPER SPACING B AND C DEPENDS ON THE RADIAL LOAD AT THE SUPPORT. CHOOSE FROM TABLE BELOW.
4. DISTANCE D – DISTANCE BETWEEN DROPPERS
5. DISTANCE B/C – DISTANCE BETWEEN SUPPORT AND FIRST/LAST DROPPER
6. DISTANCE D DEPENDS ON L AND B AND C – MUST BE CALCULATED CONSIDERING L / B / C
7. TABLE 1 AND TABLE 2 CAN BE USED INTERCHANGEABLY, HOWEVER, IN SITUATIONS WHERE RUNS CONTAIN HIGHER RADIAL LOADS, TABLE 2 SHOULD BE USED EXCLUSIVELY.

TENSION IN REGISTRATION ARM	TO 150 N (33.72 LBF)	TO 200 N (44.96 LBF)	TO 240 N (53.95 LBF)	TO 400 N (89.92 LBF)	TO 650 N (146.13 LBF)	TO 850 N (191.09 LBF)	TO 1100 N (247.29 LBF)	TO 1200 N (269.77 LBF)
B AND C	2 M (6.56')	2.5 M (8.20')	4M (13.12')	5M (16.40')	7M (22.97')	8M (26.25')	10M (32.81')	12M (39.37')

FIELD / SPAN LENGTH AND DROPPER DISTANCE

TABLE 1

NTS

TENSION IN REGISTRATION ARM	TO 110 N (24.729 LBF)	TO 150 N (33.72 LBF)	TO 200 N (44.96 LBF)	TO 240 N (53.95 LBF)	TO 400 N (89.92 LBF)	TO 650 N (146.13 LBF)	TO 850 N (191.09 LBF)	TO 1000 N (224.81 LBF)	TO 1100 N (247.29 LBF)	TO 1200 N (269.77 LBF)	TO 1800 N (404.656 LBF)
B AND C	2M (6.56')	3.0M (9.84'')	4M (13.12')	5M (16.40')	6M (19.68')	7M (22.97')	8M (26.25')	9M (29.53')	10M (32.81')	11M (36.09')	12M (39.37')

FIELD / SPAN LENGTH AND DROPPER DISTANCE FOR HIGH RADIAL LOAD UP TO 1800 N (404.656 LBF)

TABLE 2

NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
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REV	DATE	BY	CHK	APP	DESCRIPTION

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
TYPICAL SPAN LENGTH

CADD FILE NAME: W6004

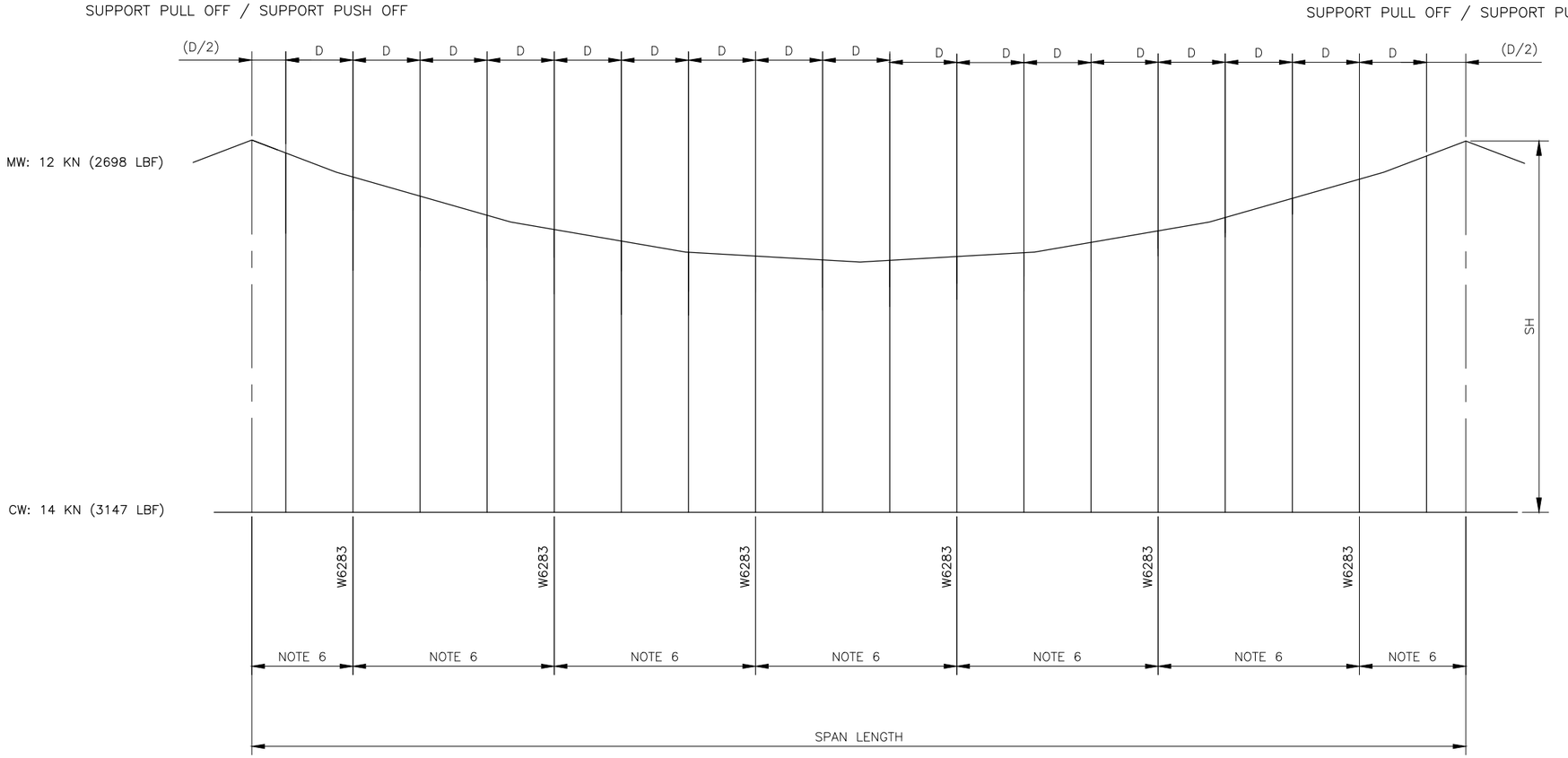
REV:

EDITION: 01012024

STANDARD DRAWING NO.: W6004

NOTES:

1. SYSTEM HEIGHT IN STATION DEPENDS ON STRUCTURE AND DETAIL DESIGN.
2. STANDARD SYSTEM HEIGHT: 1.60M (63").
3. NUMBER OF DROPPERS DEPENDS ON SPAN LENGTH.
4. DROPPER ACCORDING TO DRAWING W6283 AND W6844.
5. MAX. DROPPER DISTANCE D: FOR CWH 22' = 22'–10' = 12' (3.66M)
   FOR CWH 18' = 18'–10' = 8' (2.44M)
   FOR CWH 17' = 17'–10' = 7' (2.13M)
6. STANDARD CURRENT CARRYING HANGERS REQUIRED TO ACHIEVE NECESSARY ELECTRIC PERFORMANCE. INSTALLED IN TENSION TO CARRY FULL CONTACT WIRE WEIGHT. DRAWING REFERENCE W6283.
7. SAFETY HANGERS ARE REQUIRED IN AREAS LEGALLY ACCESSIBLE TO THE PUBLIC TO ACHIEVE MINIMUM 10' CLEARANCE FROM TOP OF RAIL TO THE FALLEN TAIL OF BROKEN CONTACT WIRE. THESE HANGERS ARE TO BE INSTALLED WITH ZERO TENSION. DRAWING REFERENCE W6844.



FIELD / SPAN LENGTH AND DROPPER DISTANCE – PUBLIC AREA

ELEVATION

NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
TYPICAL SPAN LENGTH
ACCESSIBLE TO THE PUBLIC

CADD FILE NAME: W6005

REV: | EDITION: 01012024

STANDARD DRAWING NO.: W6005

AREMA CHAPTER 33 – TABLE 33–2–2

VOLTAGE	DISTANCE IN AIR – NORMAL CLEARANCE PHASE TO GROUND	
TYPE	DYNAMIC	STATIC
AC 25 KV NON–POLLUTED	205 MM 8.00 INCHES	270 MM 10.50 INCHES
AC 25 KV POLLUTED	255 MM 10.00 INCHES	320 MM 12.50 INCHES

AREMA CHAPTER 33 – TABLE 33–2–2

VOLTAGE	DISTANCE IN AIR – MINIMUM CLEARANCE PHASE TO GROUND	
Type	DYNAMIC	STATIC
AC 25 KV NON–POLLUTED	155 MM 6.00 INCHES	205 MM 8.00 INCHES
AC 25 KV POLLUTED	205 MM 8.00 INCHES	255 MM 10.00 INCHES

EN 50119 TABLE 3, EDITION 2009

VOLTAGE	DISTANCE IN AIR	
TYPE	DYNAMIC	STATIC
FOR 2X25KV AC SYSTEM A 180° PHASE DIFFERENCE APPEARS BETWEEN PARTS COMMON TO THE ENERGIZED ATF AND PARTS COMMON TO THE ENERGIZED CATENARY SYSTEM	305 MM 12.00 INCHES	550 MM 21.50 INCHES

NOTE:

CLEARANCE BASED ON THE CALTRAIN DESIGN CRITERIA ELECTRIFICATION SECTION 21.14.8 AND CPUC – SED – 2 SECTION 5.10.1

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
ELECTRICAL CLEARANCE
25 KV AC

CADD FILE NAME: W6006

REV:

EDITION: 01012024

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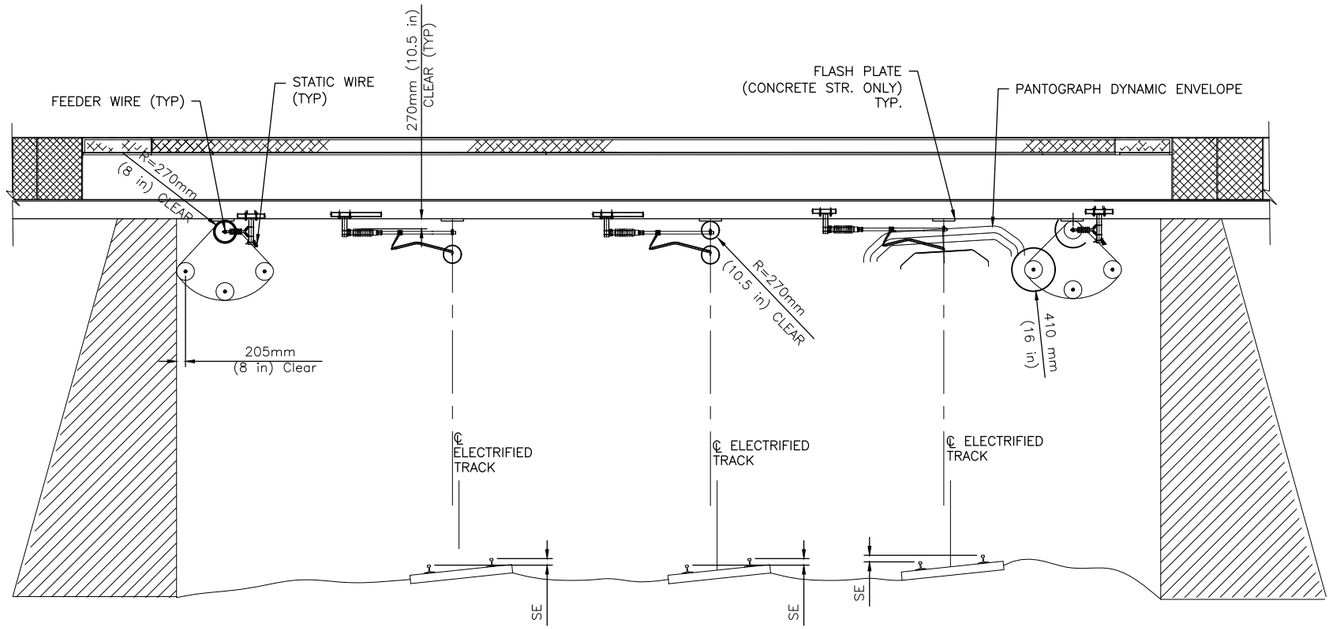
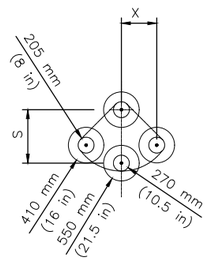


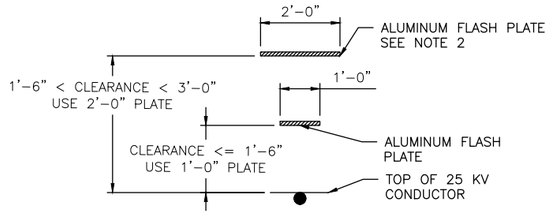
OVERHEAD BRIDGE CLEARANCE

NOTES

1. ELECTRICAL CLEARANCE FROM ENERGIZED PARTS OF THE OCS OR VEHICLE TO GROUNDED STRUCTURES SHALL BE AS RECOMMENDED BY AREMA CHAPTER 33, TABLE 33–2–2, WHICH REQUIRES A NORMAL MINIMUM STATIC CLEARANCE OF 270mm (10.5 IN) FOR 25KV AC. FOR CONCRETE STRUCTURES ONLY, A FLASH PLATE SHALL BE PROVIDED ABOVE LIVE PARTS WHEN THE SEPARATION OF THE OCS TO THE BOTTOM OF BRIDGE IS LESS THAN 0.914m (3 FT).
2. FLASH PLATES TO BE INSTALLED CENTERED OVER CATENARY AND FEEDER WIRES. INSTALL FLASH PLATES AS REQUIRED TO BUTT TOGETHER AND MAINTAIN CONDUCTORS CENTERED UNDERNEATH. BUTT JOINT BETWEEN PLATES TO BE ALIGNED WITH JOINT BETWEEN BRIDGE BEAMS.
3. STRUT INSERTS SHALL BE CAST IN PLACE TO SUPPORT FLASH PLATES FOR ALL NEW BRIDGES. FOR EXISTING CONCRETE BRIDGES, MECHANICAL INSERTS SHALL BE INSTALLED.
4. PROVIDE (4) ANCHORS MINIMUM PER PLATE ALONG THE ENTIRE LENGTH OF THE FLASH PLATE.
5. EACH ALUMINUM FLASH PLATE SHALL BE JUMPERED TO THE NEXT. THE END PLATE SHALL BE TAPPED TO THE BONDING LOOP.
6. NORMAL MINIMUM STATIC CLEARANCE BETWEEN 25 KV FEEDER AND ENERGIZED CATENARY OR PANTOGRAPH SHALL BE 550mm (21.5 IN) AS REQUIRED BY EN–50119, TABLE 3, EDITION 2009.
7. THE NORMAL CLEARANCE FOR OVERHEAD BRIDGES (TOP OF RAIL ELEVATION TO BOTTOM OF BRIDGE ELEVATION) – SHALL BE CALCULATED AS REQUIRED BY AREMA CHAPTER 33, FIGURE 33–2–3.
8. MAXIMUM SAG AND BLOW OFF MUST BE CONSIDERED, WHEN DETERMINING CLEARANCE TO CONDUCTORS IN SPAN.
9. SITE SPECIFIC EVALUATIONS SHALL BE PERFORMED FOR EACH BRIDGE LOCATION.



CONDUCTOR SAG AND SWAY BETWEEN SUPPORTS FIGURE 2



FLASH PLATE SIZING

ABBREVIATIONS:

S = MAXIMUM VERTICAL SAG OF FEEDER.

X = MAXIMUM HORIZONTAL SWAY OF FEEDER DUE TO WIND.

SE = SUPERELEVATION

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					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

Bin Zhang

DEPUTY DIRECTOR, ENGINEERING

Caltrain

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STANDARD DRAWINGS

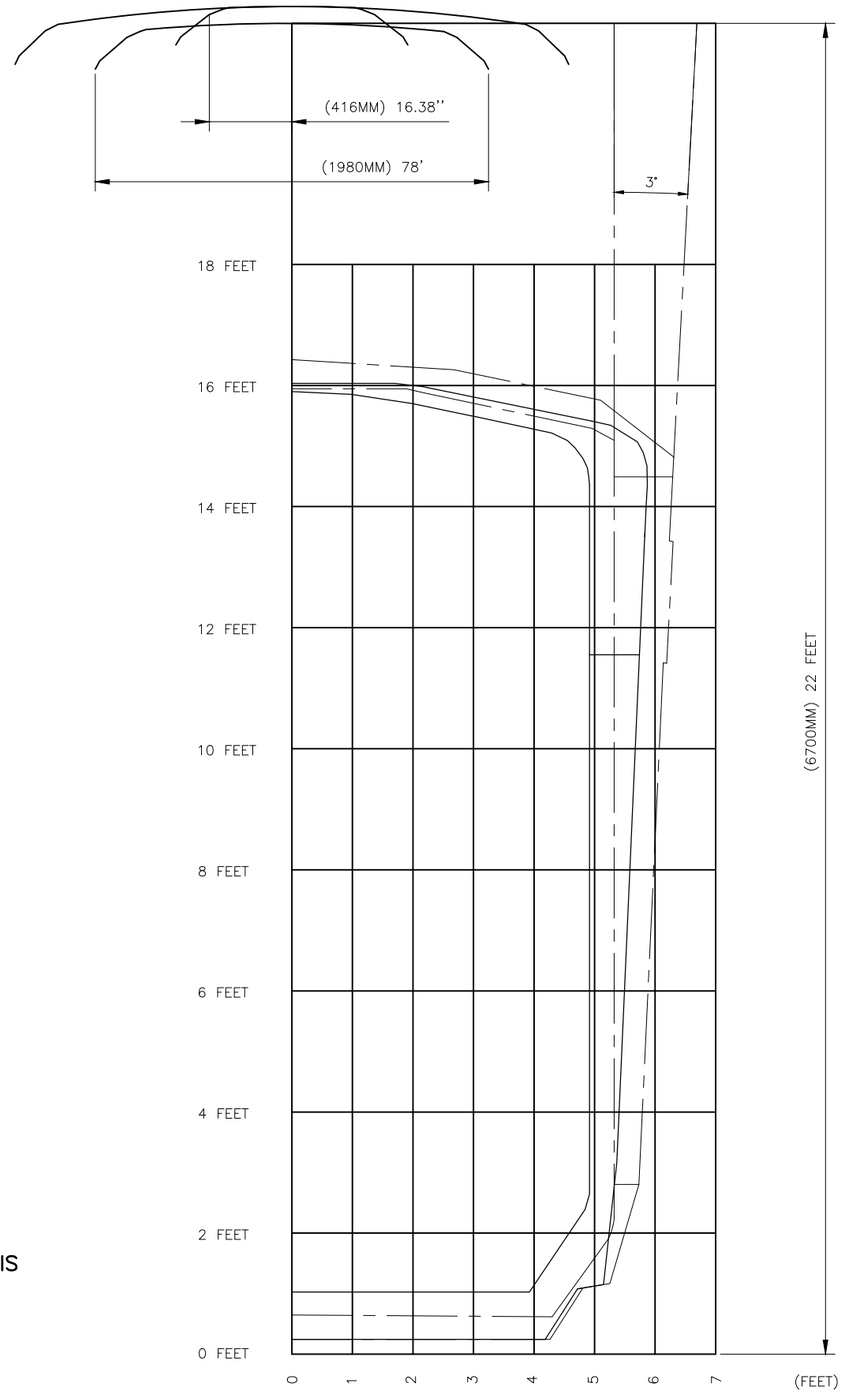
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
OVERHEAD BRIDGE CLEARANCE

CADD FILE NAME: W6006A

REV:

EDITION: 01012024

STANDARD DRAWING NO.: W6006A



PANTOGRAPH ANALYSIS

ELEVATION

NTS

STATIC/DYNAMIC CALTRAIN ENVELOPE

LATERAL MOVEMENT STADLER 100%:	16.38''	(41.6 CM)
LATERAL MOVEMENT STADLER 70%:	11.46''	(29.12 CM)

ADOPTION:

PANTOGRAPH SWAY:	1.8''	(4.57 CM)
POLE & FOUNDATION DEFLECTION:	2.1''	(5.33 CM)
CW STAGGER ERECTION TOLERANCE:	1''	(2.54 CM)
STAGGER EFFECT:	1''	(2.54 CM)
TOTAL 100%:	22.28''	(56.58 CM)
TOTAL 70%:	17.36''	(44.1 CM)
DISTANCE TO EDGE OF PANTOGRAPH:	3''	(7.62 CM)
TOTAL 100%:	25.28''	(64.2 CM)
TOTAL 70%:	20.36''	(51.72 CM)

REMAINING PLACE FOR WIND DEVIATION:

39'' – 25.28'' =	13.72''	(34.85 CM)	100%
39'' – 20.36'' =	18.64''	(47.4 CM)	70%

WIND LOAD ON CATENARY: 9 N/M (0.0514 LBF/INCH)

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STANDARD DRAWINGS

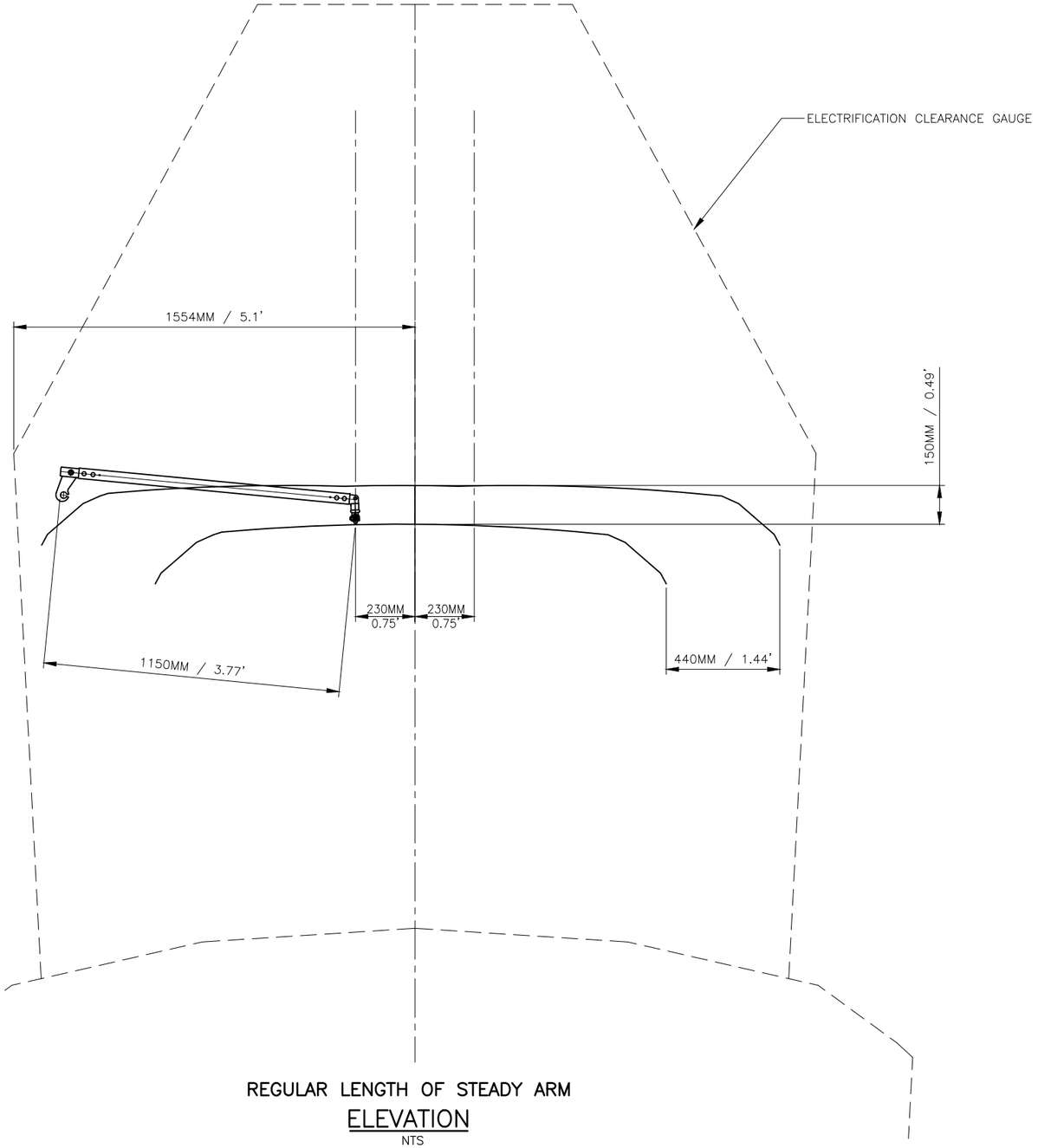
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
PANTOGRAPH ANALYSIS

CADD FILE NAME: W6007

REV:

EDITION: 01012024

STANDARD DRAWING NO.: **W6007**



REGULAR LENGTH OF STEADY ARM

ELEVATION

NTS

LENGTH OF STEADY ARM	STAGGER
1050MM (3.445')	330MM (1.083')
1150MM (3.773')	230MM (0.754')
1200MM (3.937')	200MM (0.656')
1250MM (4.101')	150MM (0.492')
1300MM (4.265')	100MM (0.328')
1350MM (4.429')	50MM (0.164')
1400MM (4.593')	0MM (0')

NOTES:

DIMENSION: MM / FEET

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
ANALYSIS OF REGULAR LENGTH
STEADY ARM

CADD FILE NAME: W6008

REV:

EDITION: 01012024

STANDARD DRAWING NO.: **W6008**

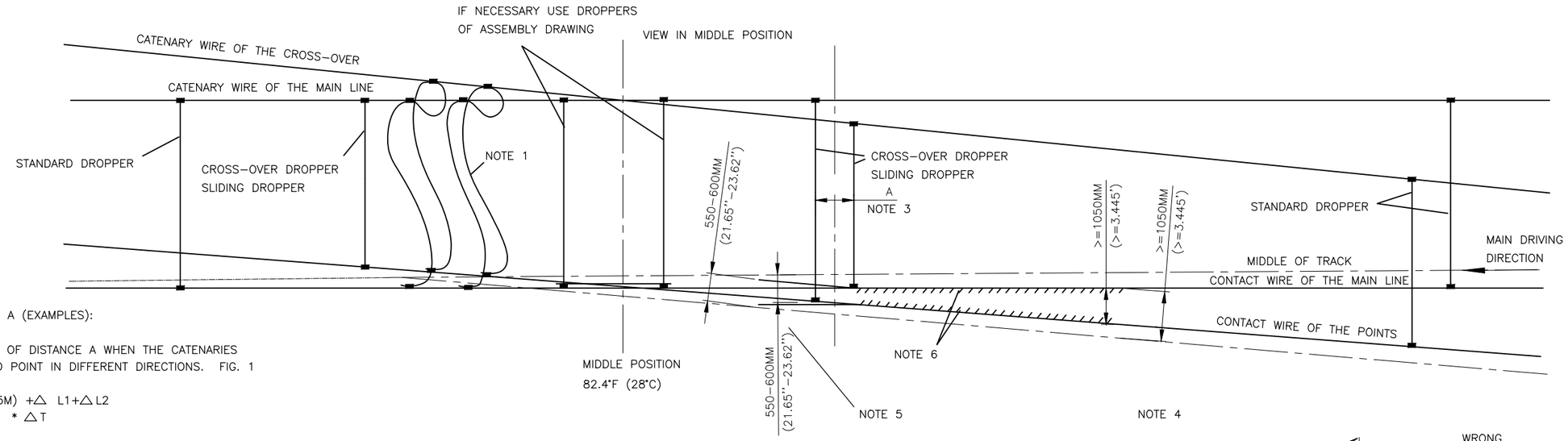

FIG. 3

TURNOUT ARRANGEMENT

NTS

CALCULATION OF A (EXAMPLES):

1. EXPLANATION OF DISTANCE A WHEN THE CATENARIES HAVE THE FIXED POINT IN DIFFERENT DIRECTIONS. FIG. 1

A = 5.9'' (0.15M) +△ L1+△L2
△L = alpha * L * △T
△T = T1– TO

WHERE: L = DISTANCE FROM DROPPER TO FIXED POINT
alpha = COEFF. OF LINEAR EXPANSION $1.70*10^{-5}$/K ($9.44*10^{-6}$/F)
TO = 145°F (63°C) END TEMPERATURE
T1 = AMBIENT WIRE TEMPERATURE

EXAMPLE:
L1 = 492.12' (150M) (POINT)
L2 = 1312.33' (400M) (MAIN LINE)
T1= (28°C) 82.4°F
△T = (35°C) 95°F
△L1 = 3.54'' (0.09M)
△L2 = 9.45'' (0.24M)
A = 5.9'' (0.15M) + 3.54'' (0.09M) + 9.45'' (0.24M) = 18.9'' (0.48M)

(AMBIENT WIRE TEMPERATURE = MIDDLE TEMPERATURE) FOR THIS EXAMPLE

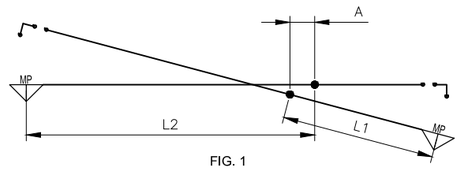

FIG. 1

2. EXPLANATION OF DISTANCE A WHEN BOTH CATENARIES HAVE THE FIXED POINT IN SAME DIRECTIONS. FIG. 2

A = 5.9'' (15) + △L1–△L2 WHEN L1 > L2
A = 5.9'' (15) + △L2 –△L1 WHEN L2 > L1

EXAMPLE:
L1 = 492.12' (150M)
L2 = 1312.33' (400M)
T1 = (28°C) 82.4°F
L1 < L2

A = 5.9'' (0.15M) + 9.45'' (0.24M)
– 3.54'' (0.09M) = 18.9'' (0.48M)
L1 = 1312.33' (400M)
L2 = 492.12' (150M)
T1 = (28°C) 82.4°F
L2 < L1
A = 5.9'' (0.15M) + 9.45'' (0.24M) – 3.54'' (0.09M) = 18.9'' (0.48M)
(AMBIENT WIRE TEMPERATURE = MIDDLE TEMPERATURE) FOR THIS EXAMPLE

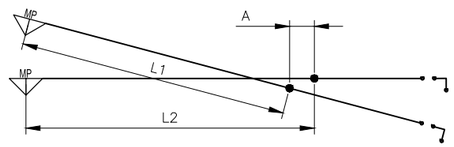

FIG. 2

NOTES:

1. THE ELECTRICAL CONNECTION IS TO BE MADE ON THE CONTACT WIRE WHICH RUNS–OUT IN THE MAIN DRIVING DIRECTION AFTER THE CROSSING. (FIG. 3)
2. ADJUST THE FIRST DROPPER SO THAT THE OUT OF RUNNING CONTACT WIRE FLOATS IN THE CONTACT WIRE BRIDGE.
3. DISTANCE BETWEEN CROSS–OVER DROPPERS A; THERMAL EXPANSION OF THE CONTACT WIRES + SAFETY MARGIN OF 5.90'' (15CM) MUST BE CONSIDERED. (FIG. 3)
4. THE CONDUCTORS OVER THE TURNOUTS SHALL BE ARRANGED IN SUCH A WAY THAT THE TWO CONTACT WIRES USED WILL TOUCH ONLY ONE SIDE OF THE CONTACT STRIP WHEN A VEHICLE TRAVELS ON THE MAIN LINE AND IN THE MAIN DRIVING DIRECTION AT POSITION A. POSITION A IS THE LOCATION WHERE THE CROSSING CONTACT WIRE COMES IN CONTACT WITH THE PANTOGRAPH. (FIG. 4 and 5)
5. THE TWO CROSSING CONTACT WIRES SHOULD BE INSTALLED WITH CROSS–OVER DROPPERS AT THE SLIP–ON POINT, AND SHOULD BE POSITIONED EXACTLY PARALLEL TO THE PANTOGRAPH CONTACT STRIP. (FIG. 3)
6. S : IN FRONT OF AND BEHIND THE CROSSING NO BIG CLAMPS (ALLOWED: DROPPER CLAMPS) ARE TO BE INSTALLED AT THE CONTACT WIRE (HATCHED CONTACT WIRE). THAT MEANS IN THE AREA OF THE PANTOGRAPH RAMP. (FIG. 3)
7. ENLARGEMENT OF STANDARD STAGGER 230MM (9.06'') CAN BECOME NECESSARY

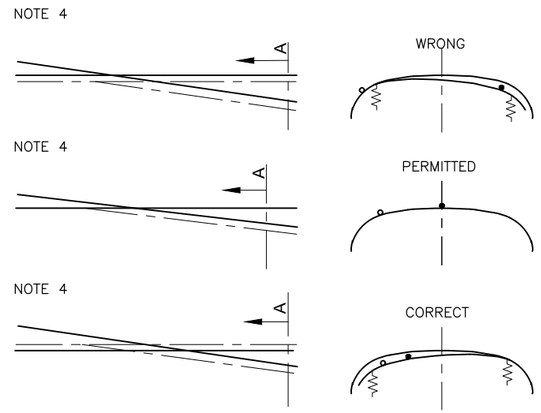

FIG. 4

CONTACT WIRE POSITION

NTS

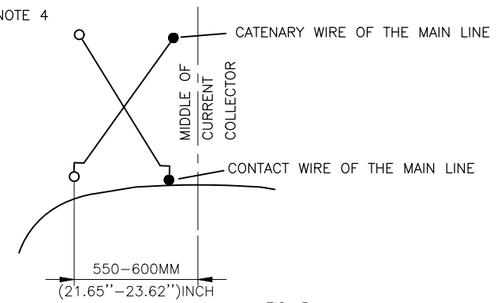

FIG. 5

CROSS-OVER DROPPER

NTS

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PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:
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DEPUTY DIRECTOR, ENGINEERING

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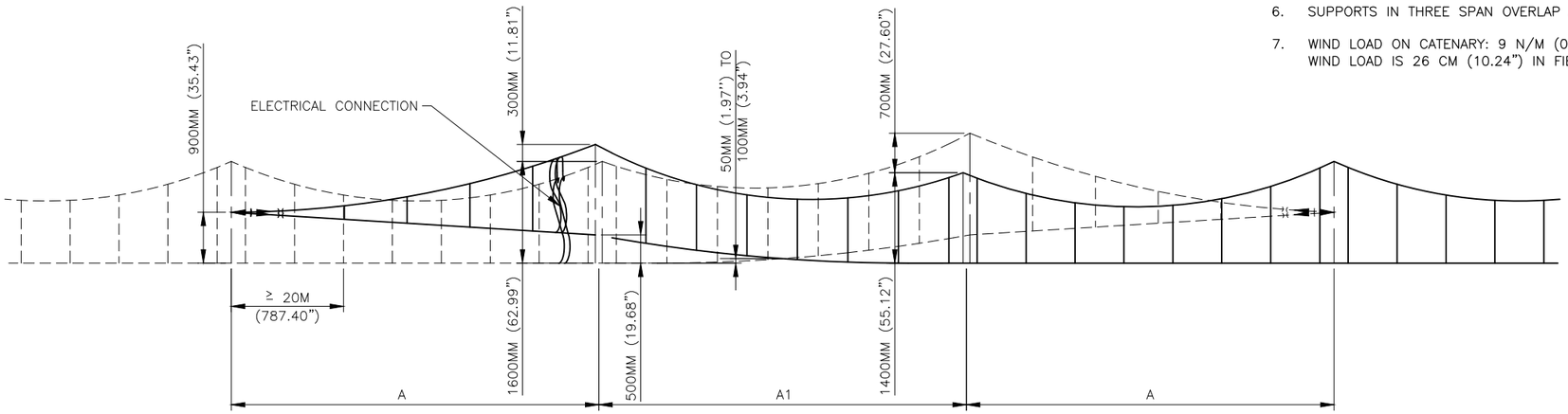
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
TURNOUT PRINCIPLES

CADD FILE NAME: W6015
REV:
EDITION: 01012024
STANDARD DRAWING NO.: W6015

NOTES:

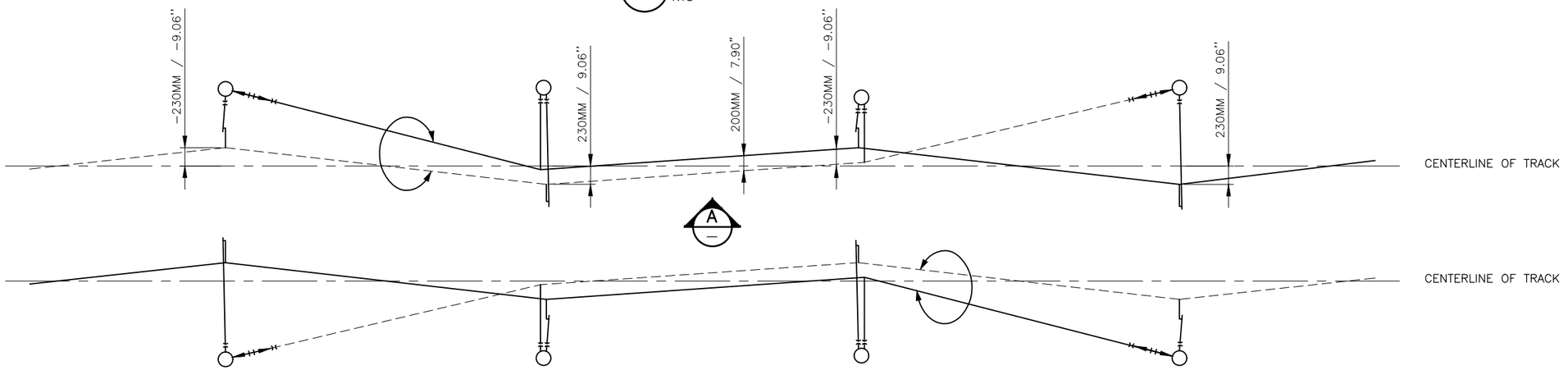
1. A = 55M / 180.4' (NORMAL)
2. A1 = 55M / 180.4' (NORMAL)
3. IN DETAIL DESIGN PHASE SPAN A CAN BE ENLARGED / REDUCED IF NECESSARY
   CHECK OF WIND DEVIATION AND RADIAL FORCE NECESSARY
4. AT INCREASING TEMPERATURES OVERLAPPING CANTILEVERS HAVE TO MOVE APART FROM EACH OTHER
5. FOR CHOICE OF CANTILEVER, SEE DRAWING W6022
6. SUPPORTS IN THREE SPAN OVERLAP ARE ACCORDING TO: W6022
7. WIND LOAD ON CATENARY: 9 N/M (0.0514 LBF/INCH) – MAXIMUM DISPLACEMENT OF CATENARY BY WIND LOAD IS 26 CM (10.24") IN FIELD A1 = 55M (180.4')



THREE SPAN OVERLAP

A ELEVATION

NTS



THREE SPAN OVERLAP

PLAN

NTS

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
THREE SPAN OVERLAP
MINIMUM RADIUS:
R = 7500M (24606')

CADD FILE NAME: W6018

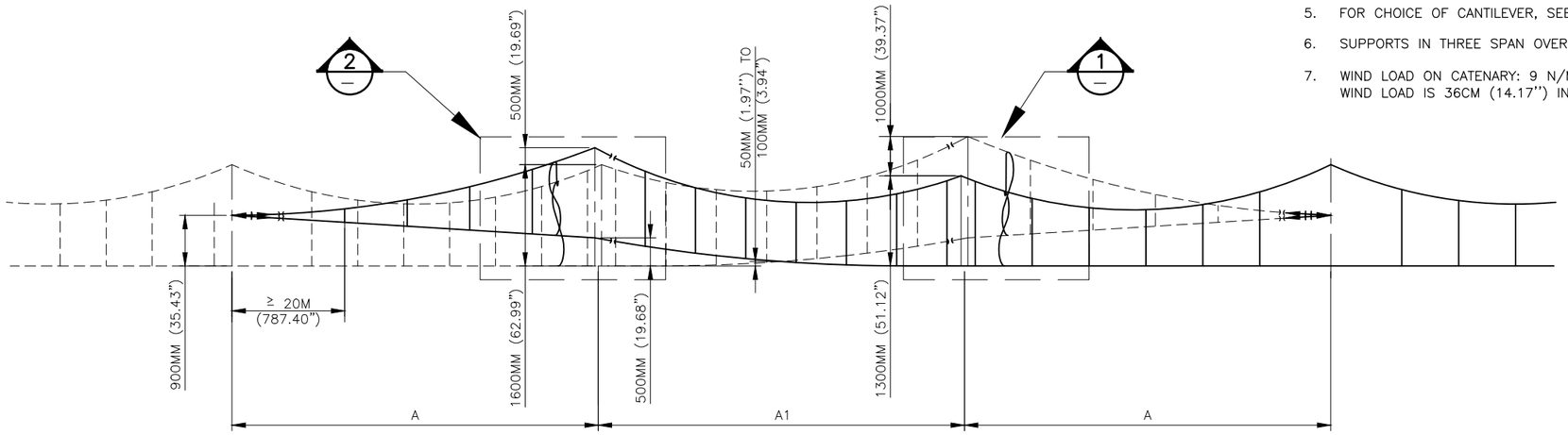
REV:

EDITION: 01012024

STANDARD DRAWING NO.: **W6018**

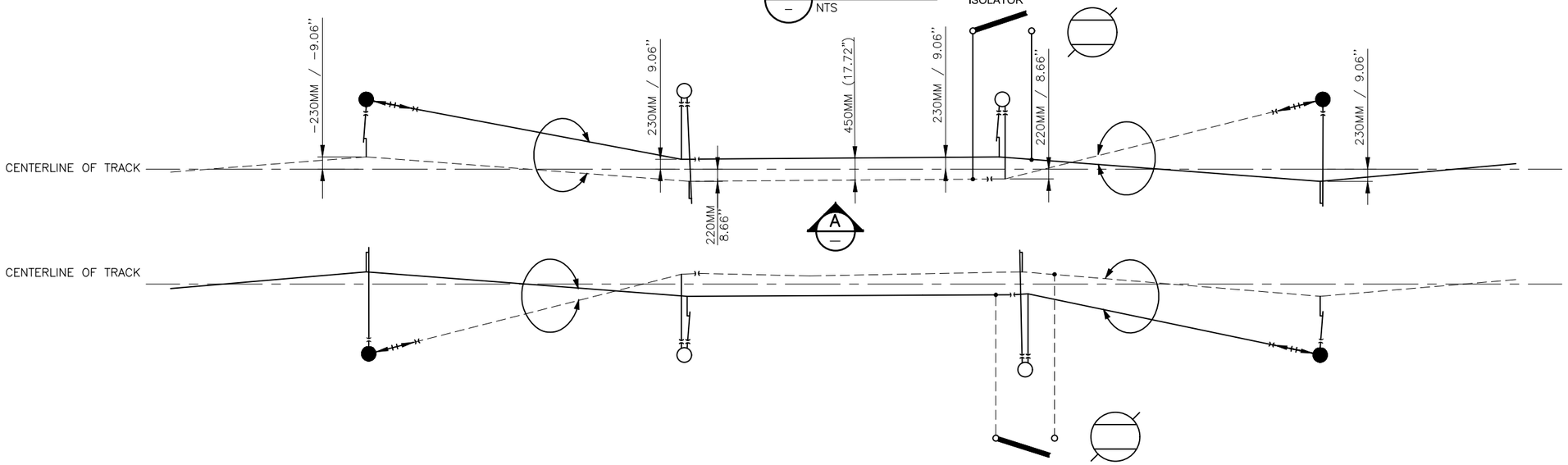
NOTES:

1. A = 55M / 180.4' (NORMAL)
2. A1 = 55M / 180.4' (NORMAL)
3. IN DETAIL DESIGN PHASE SPAN A CAN BE ENLARGED / REDUCED IF NECESSARY CHECK OF WIND DEVIATION AND RADIAL FORCE NECESSARY
4. AT INCREASING TEMPERATURES OVERLAPPING CANTILEVERS HAVE TO MOVE APART FROM EACH OTHER
5. FOR CHOICE OF CANTILEVER, SEE DRAWING W6101
6. SUPPORTS IN THREE SPAN OVERLAP ARE ACCORDING TO: W6101
7. WIND LOAD ON CATENARY: 9 N/M (0.0514 LBF/INCH) – MAXIMUM DISPLACEMENT OF CATENARY BY WIND LOAD IS 36CM (14.17") IN FIELD A1 = 55M (180.4')



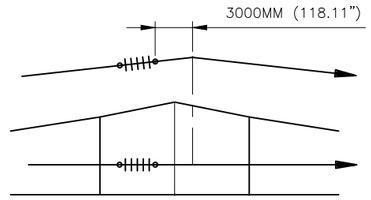
THREE SPAN INSULATED OVERLAP

A ELEVATION
NTS



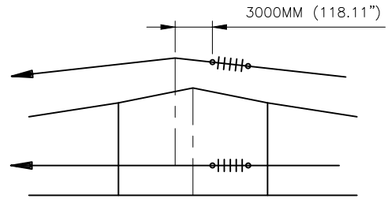
THREE SPAN INSULATED OVERLAP

PLAN
NTS



INSULATION

1 DETAIL
NTS



INSULATION

2 DETAIL
NTS

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
THREE SPAN INSULATED OVERLAP
STRAIGHT LINE / BIG CURVE

CADD FILE NAME: W6019

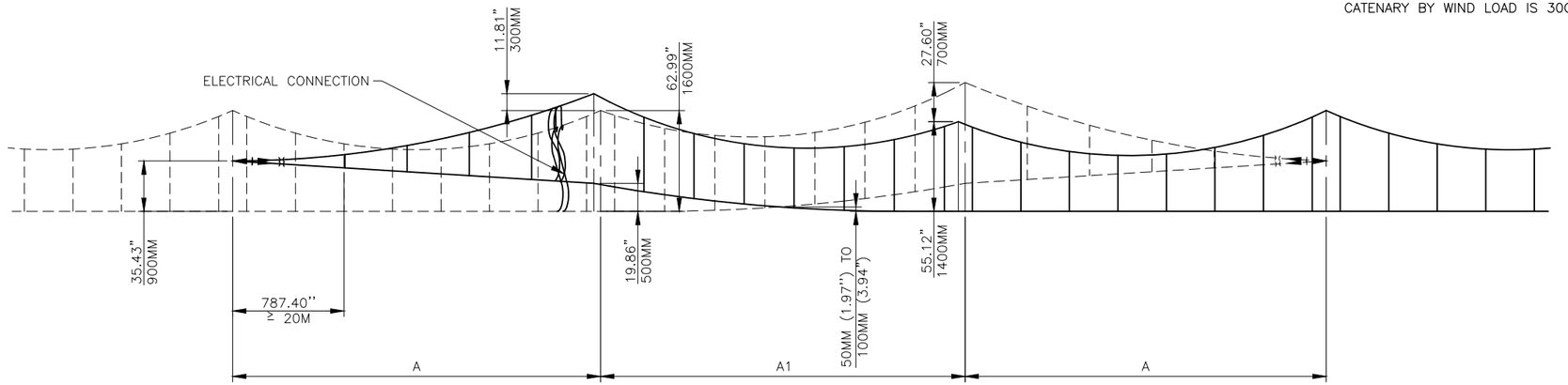
REV:

EDITION: 01012024

STANDARD DRAWING NO.: W6019

NOTES:

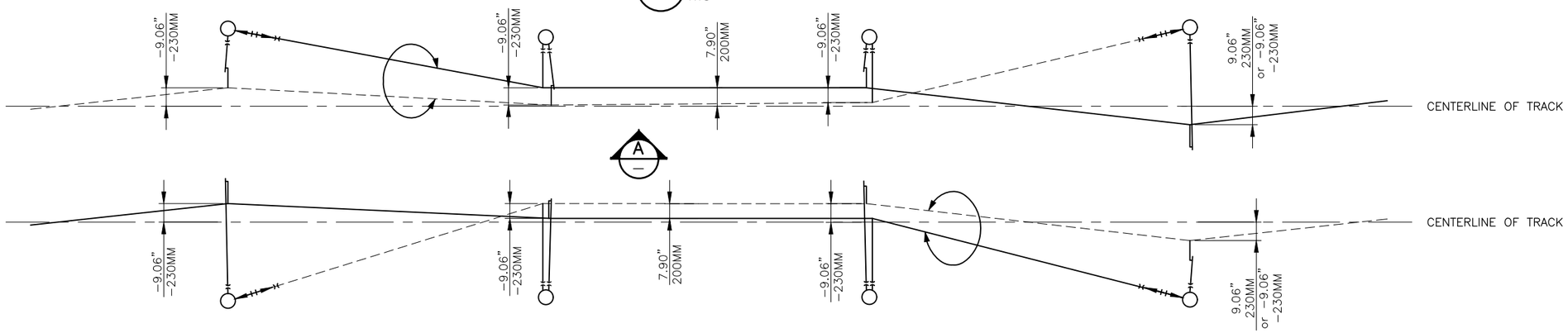
1. A = 55M / 180.4' (NORMAL)
2. A1 = 55M / 180.4' (NORMAL)
3. IN DETAIL DESIGN PHASE SPAN A CAN BE ENLARGED / REDUCED IF NECESSARY CHECK OF WIND DEVIATION AND RADIAL FORCE NECESSARY
4. AT INCREASING TEMPERATURES OVERLAPPING CANTILEVERS HAVE TO MOVE APART FROM EACH OTHER
5. FOR CHOICE OF CANTILEVER, SEE DRAWING W6022
6. SUPPORTS IN THREE SPAN OVERLAP ARE ACCORDING TO: W6022
7. WIND LOAD ON CATENARY: 9 N/M (0.0514 LBF/INCH) – MAXIMUM DISPLACEMENT OF CATENARY BY WIND LOAD IS 30CM (11.81") IN FIELD A1 = 55M (180.4')



THREE SPAN OVERLAP

A ELEVATION

NTS



THREE SPAN OVERLAP

PLAN

NTS

NOTE:

FOR CURVED TRACK: R < 1900 M (6233.6') USE 5 SPAN OVERLAP

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
THREE SPAN OVERLAP
1900M (6233.6') <= R < 5900M (19357.0')

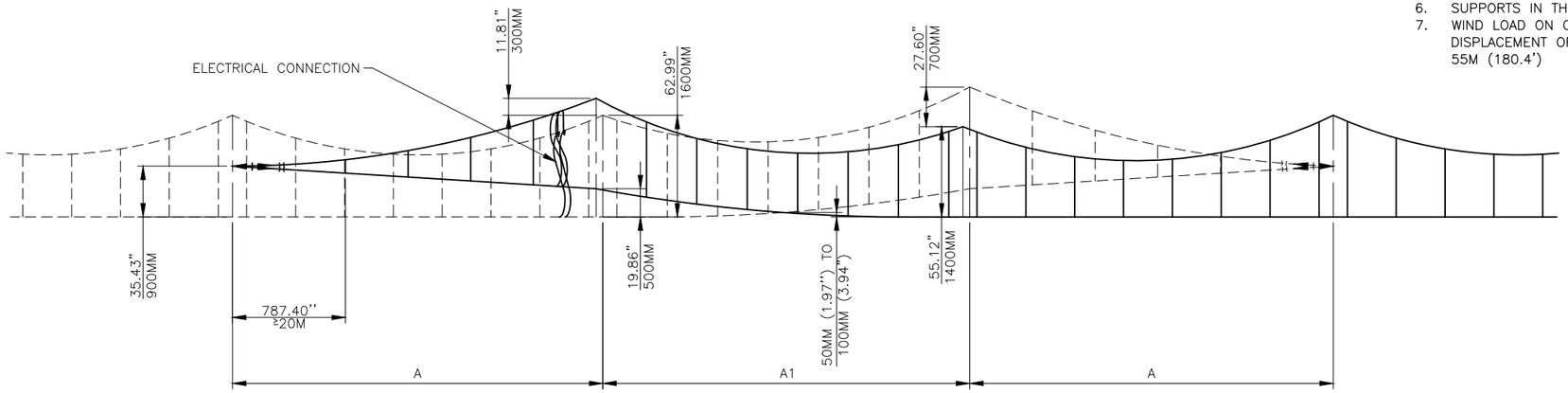
CADD FILE NAME: W6020

REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6020**

NOTES:

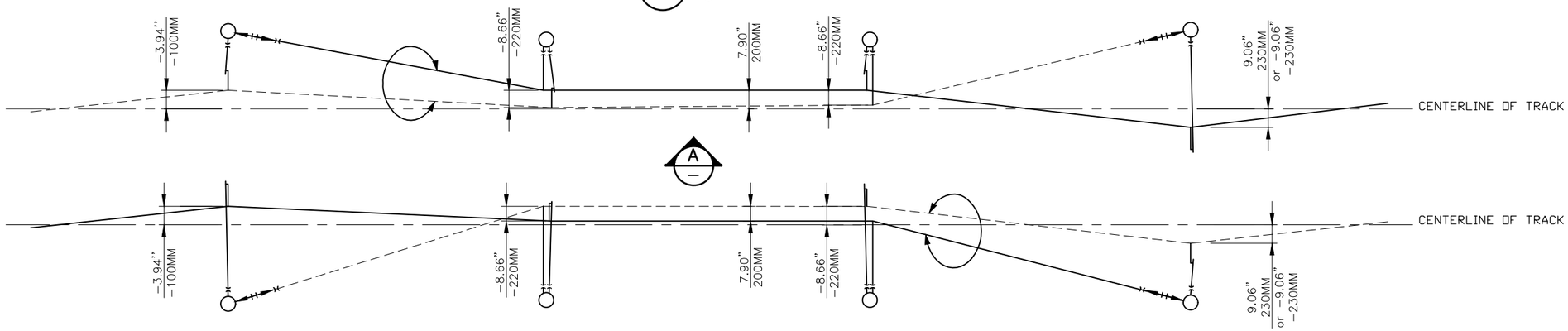
1. A = 55M / 180.4' (NORMAL)
2. A1 = 55M / 180.4' (NORMAL)
3. IN DETAIL DESIGN PHASE SPAN A CAN BE ENLARGED / REDUCED IF NECESSARY CHECK OF WIND DEVIATION AND RADIAL FORCE NECESSARY
4. AT INCREASING TEMPERATURES OVERLAPPING CANTILEVERS HAVE TO MOVE APART FROM EACH OTHER
5. FOR CHOICE OF CANTILEVER, SEE DRAWING W6022
6. SUPPORTS IN THREE SPAN OVERLAP ARE ACCORDING TO: W6022
7. WIND LOAD ON CATENARY: 9 N/M (0.0514 LBF/INCH) – MAXIMUM DISPLACEMENT OF CATENARY BY WIND LOAD IS 30CM (11.81") IN FIELD A1 = 55M (180.4')



THREE SPAN OVERLAP

A ELEVATION

NTS



THREE SPAN OVERLAP

PLAN

NTS

NOTE:

USE ONLY FOR CURVED TRACK WITH THIS STAGGER ARRANGEMENT: 5900M <= R < 7500M (19356.96' <= R < 24606.91')

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					01012024 EDITION

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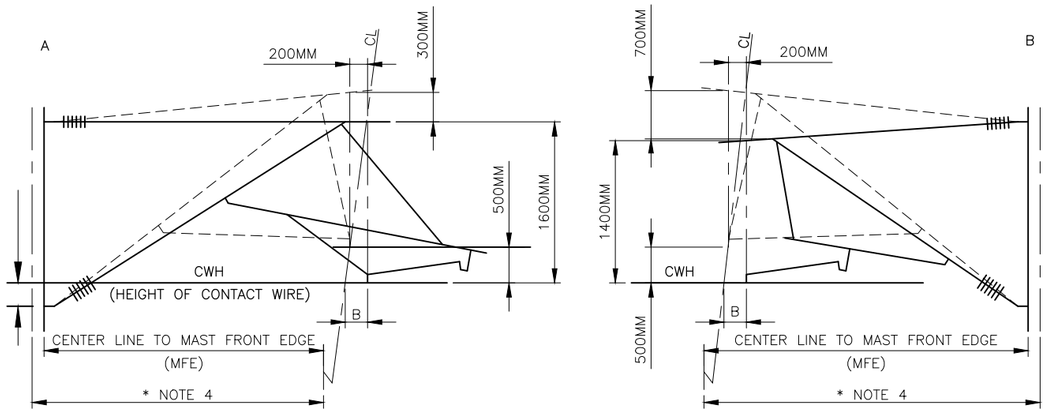
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
THREE SPAN OVERLAP
5900M <= R < 7500M
(19356.96' <= R < 24606.91')

CADD FILE NAME: W6021

REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6021**



CANTILEVER ARRANGEMENT FOR TANGENT LINE TO CURVE

ELEVATION

NTS

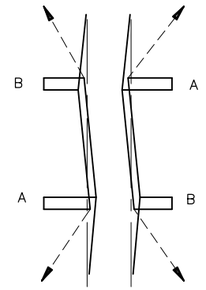
CL = CENTER LINE

DIMENSION "B" = STAGGER

NOTES:

1. VALID FOR NON INSULATED OVERLAP.
2. STAGGER ARRANGEMENT ACC. TO W6020 – 1900M <= R < 5900M PICTURE 3)
   W6021– 5900M <= R < 7500M PICTURE 2)
   W6018 – MIN. RADIUS 7500M PICTURE 1)
3. STEADY ARM IS ALWAYS TO BE INSTALLED WITH TENSION LOAD
* 4. DISTANCE CENTER OF POLE TO CENTER OF TRACK ABOUT 3.00M
   (EDGE OF MAST TO CENTERLINE OF TRACK – 2.85M)
5. CONVERSION OF VALUES:

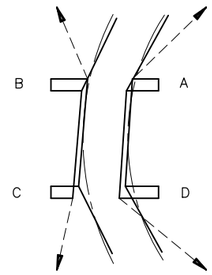
1600MM	:	62.99''	CONVERSION OF VALUES:		
1400MM	:	55.12''	7500M	:	24606.30'
700MM	:	27.56''	5900M	:	19356.96'
500MM	:	19.69''	1900M	:	6233.60'
300MM	:	11.81''	3.00M	:	9.84'
200MM	:	7.87''	2.85M	:	9.35'



PICTURE 1)
CANTILEVER CHOICE
TANGENT LINE TO CURVE 7500M

PLAN

NTS



PICTURE 2) 3)
CANTILEVER CHOICE
CURVE R < 7500M TO R = 1900M

PLAN

NTS

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CANTILEVERS IN 3–SPAN OVER–
LAP STRAIGHT LINE / CURVE

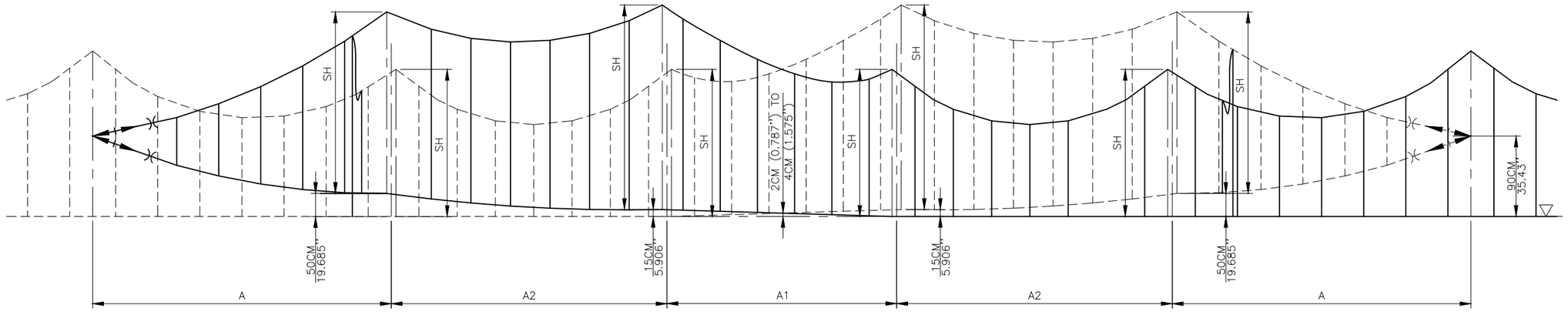
CADD FILE NAME: W6022

REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6022**

NOTES:

1. FOR CANTILEVER ARRANGEMENT, SEE DRAWING W6025



COURSE OF CONTACT WIRE
IS PARABOLIC COURSE

A2 = A1 + 32.81' (10M)

FIVE SPAN OVERLAP

ELEVATION

NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

Bin Zhang

DEPUTY DIRECTOR, ENGINEERING

Caltrain

1250 San Carlos Avenue
San Carlos, CA 94070

STANDARD DRAWINGS

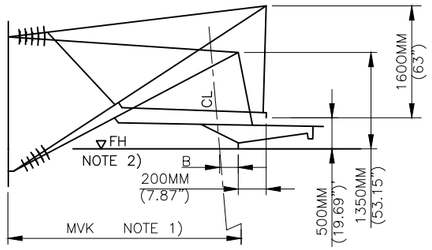
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
FIVE SPAN OVERLAP
VIEW TO CATENARY

CADD FILE NAME: W6023

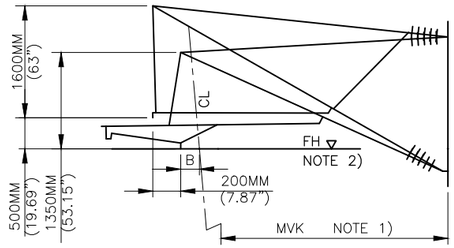
REV: | EDITION: 01012024

STANDARD DRAWING NO.: W6023

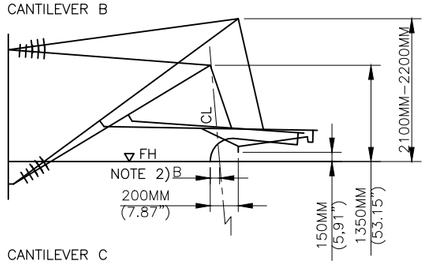
CANTILEVER A



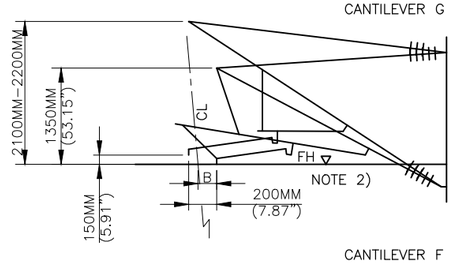
CANTILEVER H



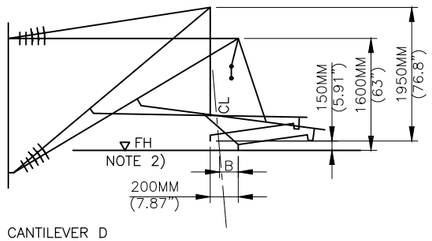
CANTILEVER B



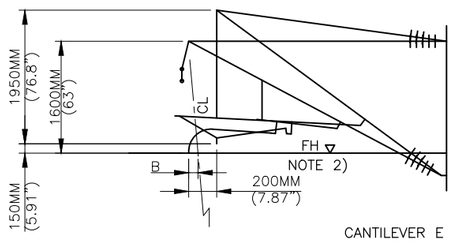
CANTILEVER G



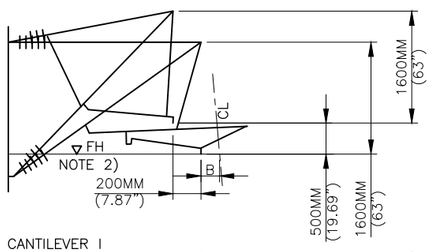
CANTILEVER C



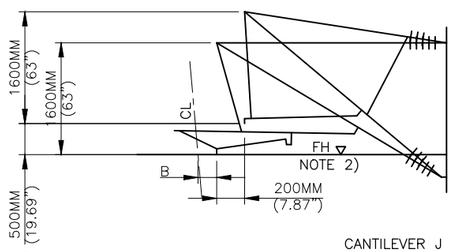
CANTILEVER F



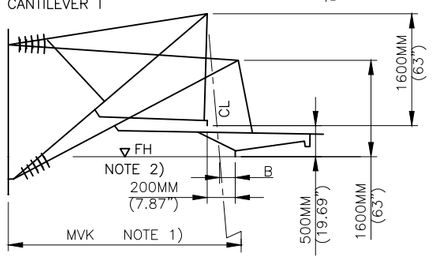
CANTILEVER D



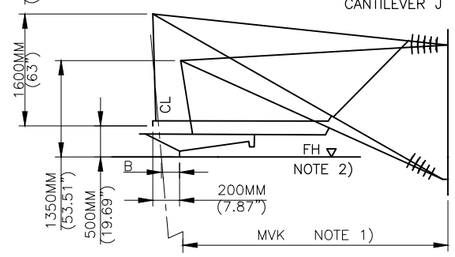
CANTILEVER E



CANTILEVER I



CANTILEVER J



CANTILEVER ARRANGEMENT FOR TANGENT LINE TO CURVE

ELEVATION

NTS

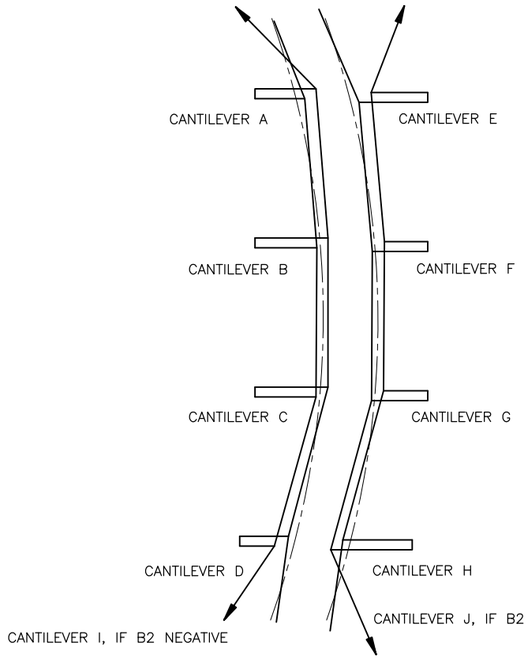
DIMENSION "B" = STAGGER

NOTES:

DEVIATIONS OF SYSTEM HEIGHT IN CURVE ARE POSSIBLE.
STEADY ARM IS ALWAYS TO BE INSTALLED WITH MECH. TENSION.
FOR CANTILEVER ARRANGEMENT, SEE DRAWING W6023.

1) MVK = FACE OF POLE TO CENTER LINE OF TRACK

2) FH = CONTACT WIRE HEIGHT



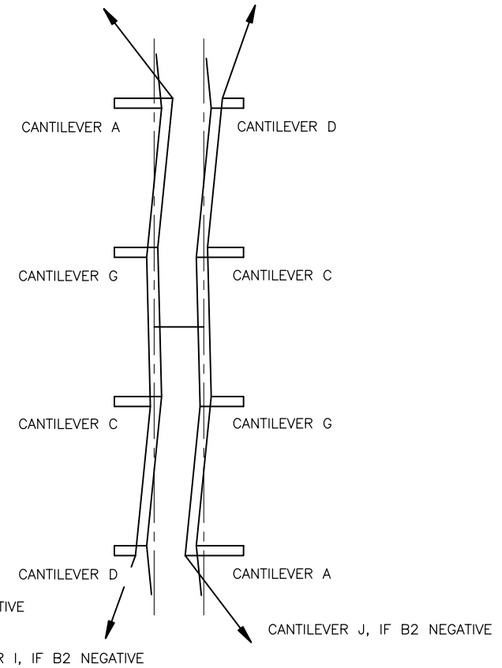
TO BE USED FOR
B5 = −1 CM (0.39")
TO −3 CM (1.18")

B2 ACC. TO DETAIL DESIGN

CANTILEVER CHOICE FIVE SPAN OVERLAP

PLAN

NTS



TO BE USED FOR
B5 = +23 CM (9.06")

B2 ACC. TO DETAIL DESIGN

B5 = VARIABLE STAGGER CALCULATED BASED ON THE RADIUS OF THE CURVE AND THE LENGTHS OF THE SPANS ADJACENT TO THE SUPPORT WHERE IT IS APPLIED.

CANTILEVER CHOICE FIVE SPAN OVERLAP

PLAN

NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

Bin Zhang

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Caltrain

1250 San Carlos Avenue
San Carlos, CA 94070

STANDARD DRAWINGS

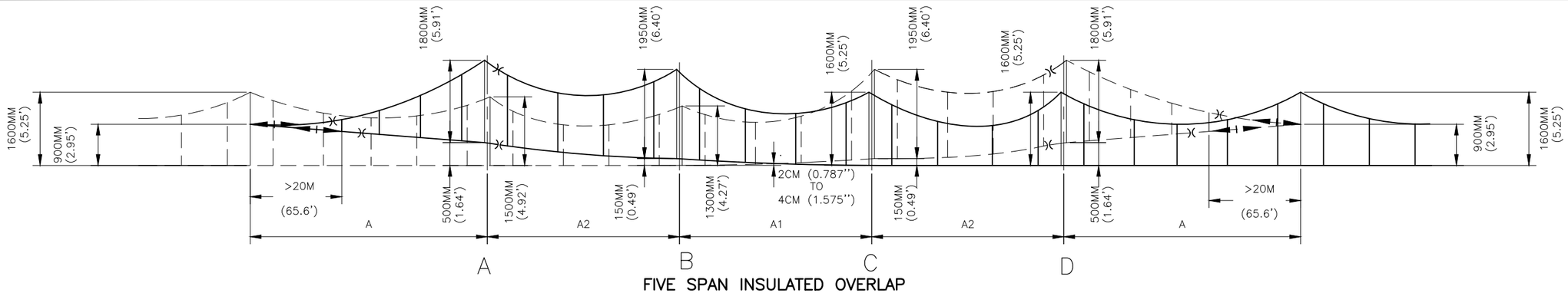
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
FIVE SPAN OVERLAP
CANTILEVER

CADD FILE NAME: W6025

REV:

EDITION: 01012024

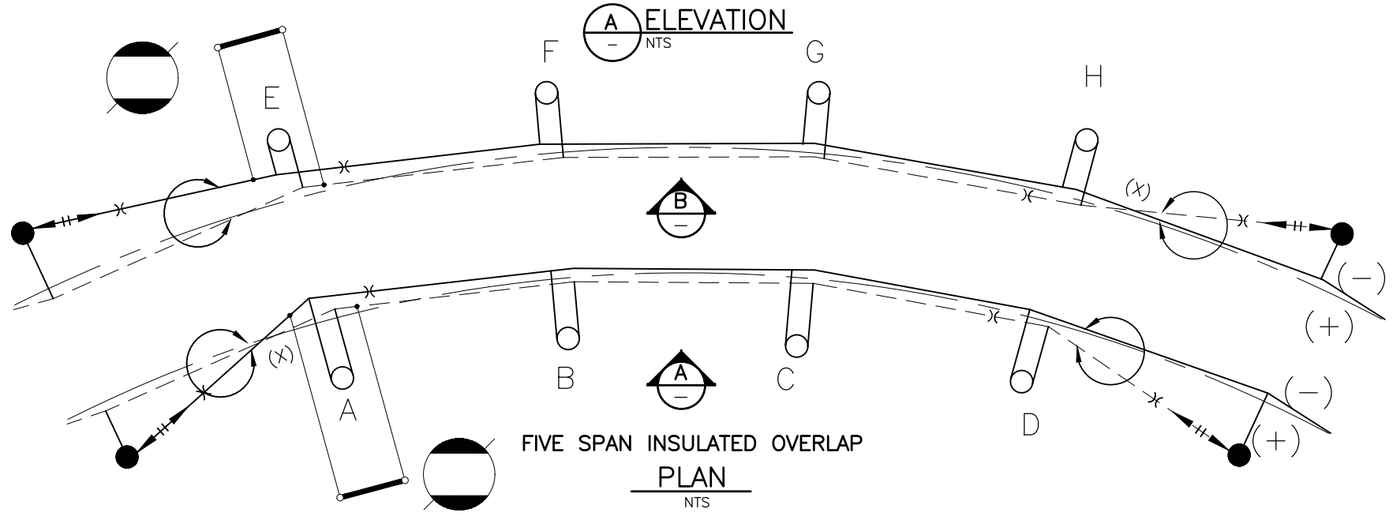
STANDARD DRAWING NO.: W6025



FIVE SPAN INSULATED OVERLAP

A – ELEVATION

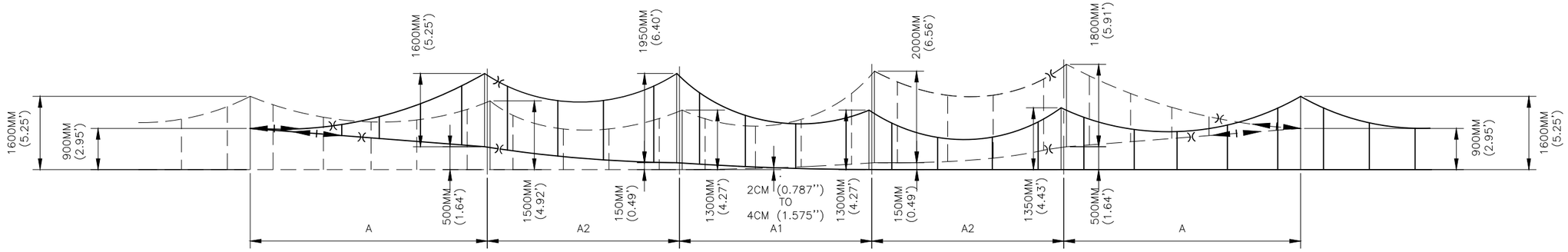
NTS



FIVE SPAN INSULATED OVERLAP

PLAN

NTS



FIVE SPAN INSULATED OVERLAP

B – ELEVATION

NTS

NOTE:

DIMENSION: MM (FEET)

NOTES:

1. FOR CANTILEVER ARRANGEMENT, SEE DRAWING W6029.
2. JUMPERS NOT SHOWN IN ELEVATION VIEW.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

Bin Zhang

DEPUTY DIRECTOR, ENGINEERING

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1250 San Carlos Avenue
San Carlos, CA 94070

STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
FIVE SPAN INSULATED OVERLAP
R < 1000M (3280.8')

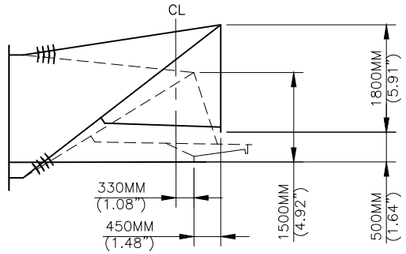
CADD FILE NAME: W6027

REV:

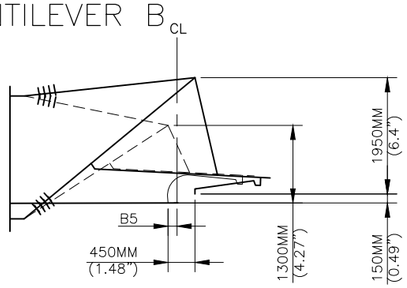
EDITION: 01012024

STANDARD DRAWING NO.: W6027

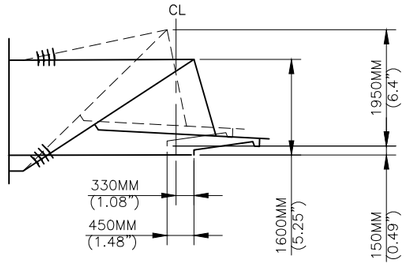
CANTILEVER A



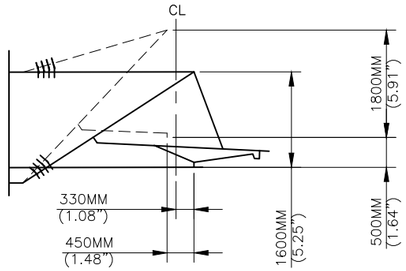
CANTILEVER B



CANTILEVER C



CANTILEVER D

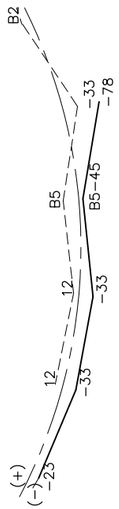


CANTILEVER A

CANTILEVER B

CANTILEVER C

CANTILEVER D



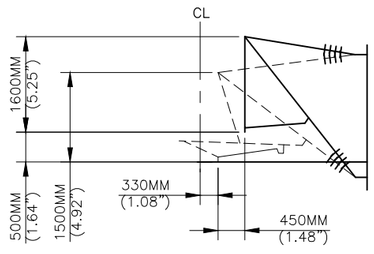
CANTILEVER E

CANTILEVER F

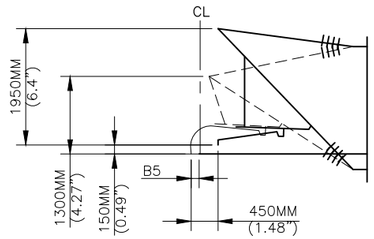
CANTILEVER G

CANTILEVER H

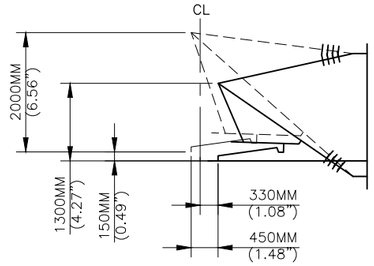
CANTILEVER E



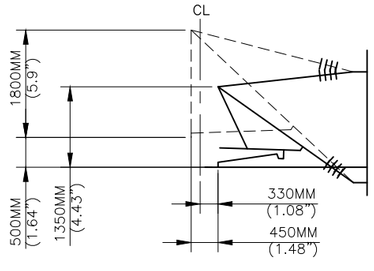
CANTILEVER F



CANTILEVER G



CANTILEVER H



NOTES:

1. FOR CANTILEVER ARRANGEMENT, SEE DRAWING W6027.
2. FOR B5, SEE DRAWING W6025.

NOTES:

DIMENSION: MM (FEET)

CANTILEVER ARRANGEMENT FOR FIVE SPAN INSULATED OVERLAP

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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DEPUTY DIRECTOR, ENGINEERING

Caltrain

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San Carlos, CA 94070

STANDARD DRAWINGS

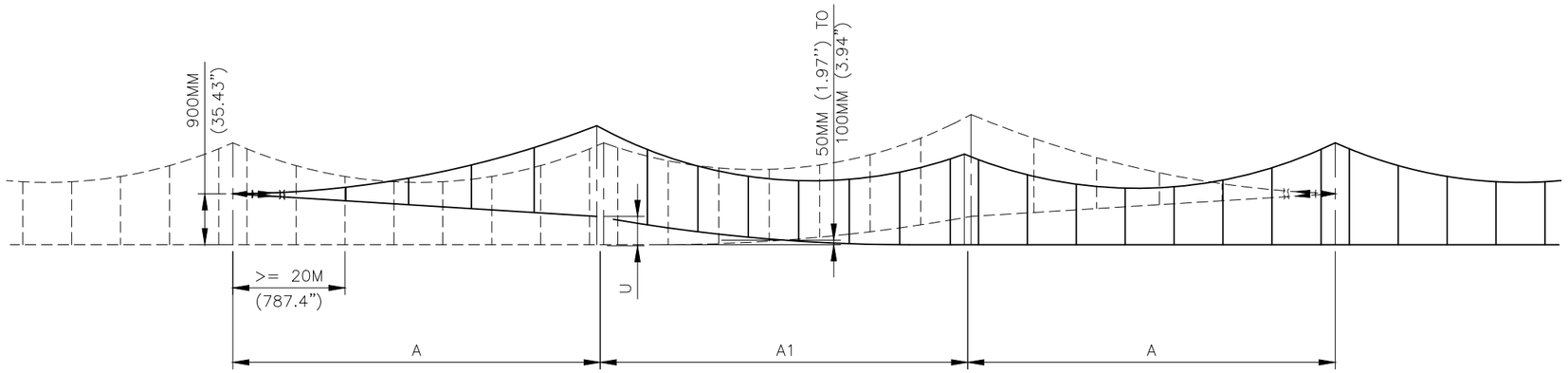
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
FIVE SPAN INSULATED OVERLAP
CANTILEVER R < 1000M
(CANTILEVER R < 3280.8')

CADD FILE NAME: W6029

REV:

EDITION: 01012024

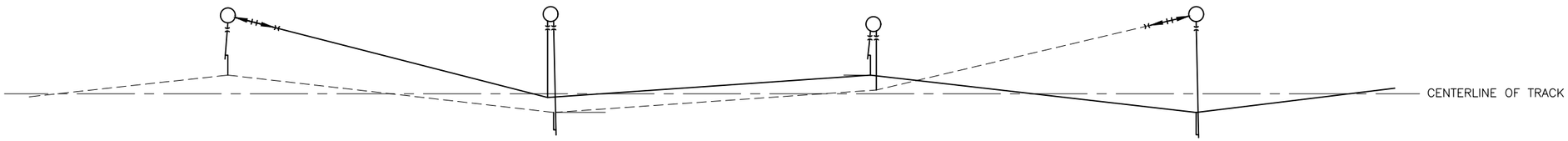
STANDARD DRAWING NO.: **W6029**



UPLIFT IN THREE SPAN OVERLAP / INSULATED OVERLAP

A — ELEVATION

NTS



A

UPLIFT IN THREE SPAN OVERLAP / INSULATED OVERLAP

PLAN

NTS

NOTES:

1. A : ACCORDING TO DETAIL DESIGN
2. A1 : ACCORDING TO DETAIL DESIGN
3. IN DETAIL DESIGN PHASE SPAN A / A1 CAN BE ENLARGED / REDUCED IF NECESSARY
   CHECK OF WIND DEVIATION AND RADIAL FORCE NECESSARY
4. UPLIFT U NORMALLY 50 CM (19.69") IF A1 IS BETWEEN 55 M AND 50 M (180.45' TO 164.04')
   UPLIFT U FOR A1 = 45 M (147.64') MUST BE ABOUT 40 CM (15.75") OR 45 CM (17.72").
   ROOF FOR U = 40 CM (15.75") IS 6 CM (2.36")
   ROOF FOR U = 45 CM (17.72") IS 7 CM (2.76")
5. VALID FOR DRAWINGS: W6018
   W6019
   W6020
   W6021
   W6022

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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San Carlos, CA 94070

STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
GENERAL STATEMENT FOR
THREE SPAN OVERLAP
INSULATED / NON INSULATED

CADD FILE NAME: W6032

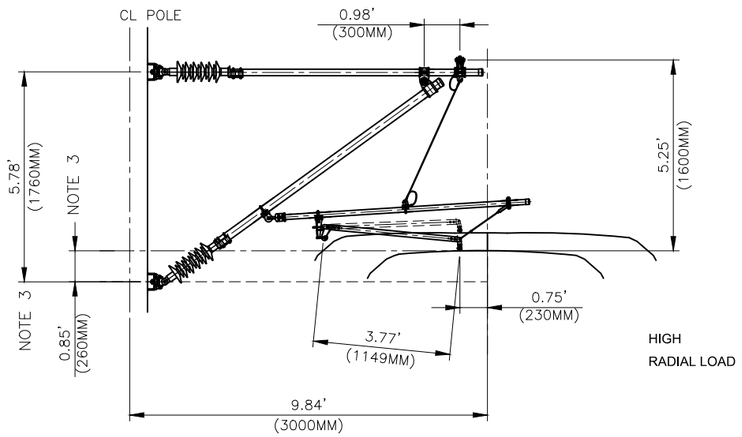
REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6032**

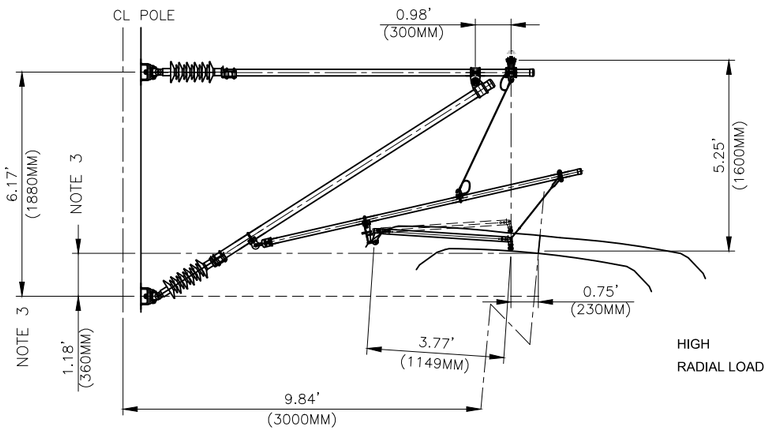
NOTES:

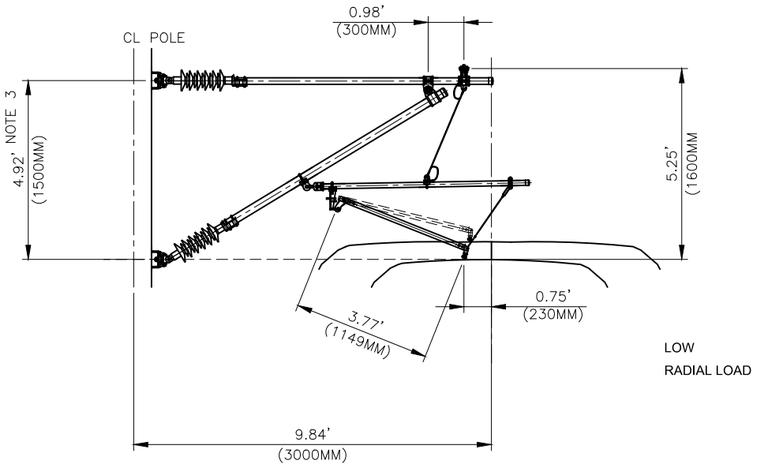
1. DIMENSION: FEET (MM)
2. STANDARD LENGTH OF STEADY ARM: 1150MM / 3.773 FEET
3. DEVIATIONS OF HEIGHTS MAY OCCUR

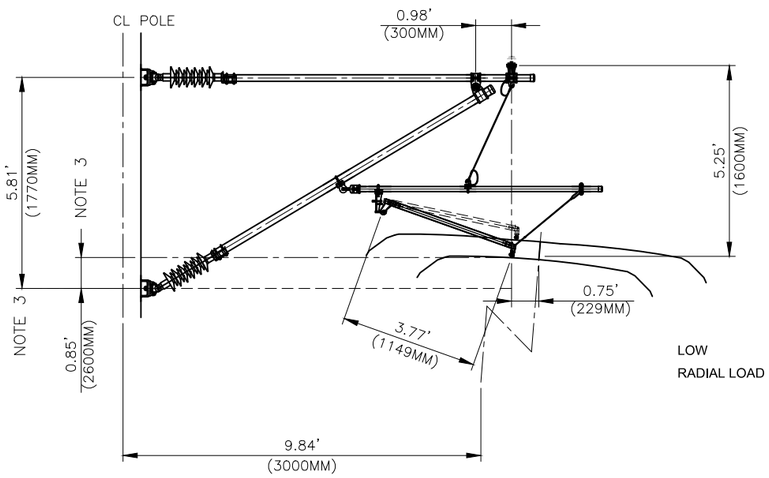
STRAIGHT TRACK



CURVE TRACK







CANTILEVER GEOMETRY / STEADY ARM LENGTH FOR STRAIGHT TRACK

ELEVATION

NTS

CANTILEVER GEOMETRY / STEADY ARM LENGTH FOR CURVED TRACK

ELEVATION

NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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DEPUTY DIRECTOR, ENGINEERING

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San Carlos, CA 94070

STANDARD DRAWINGS

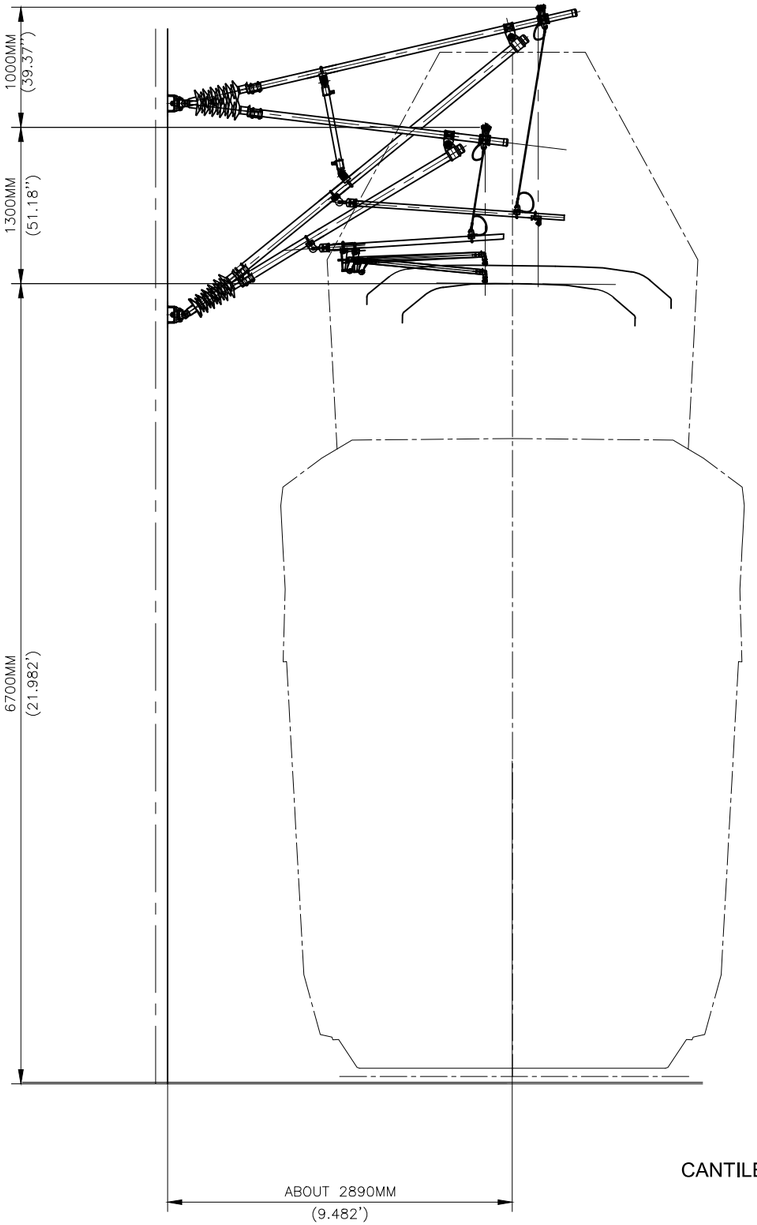
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
LENGTH OF STEADY ARM
AND CANTILEVER GEOMETRY

CADD FILE NAME: W6100

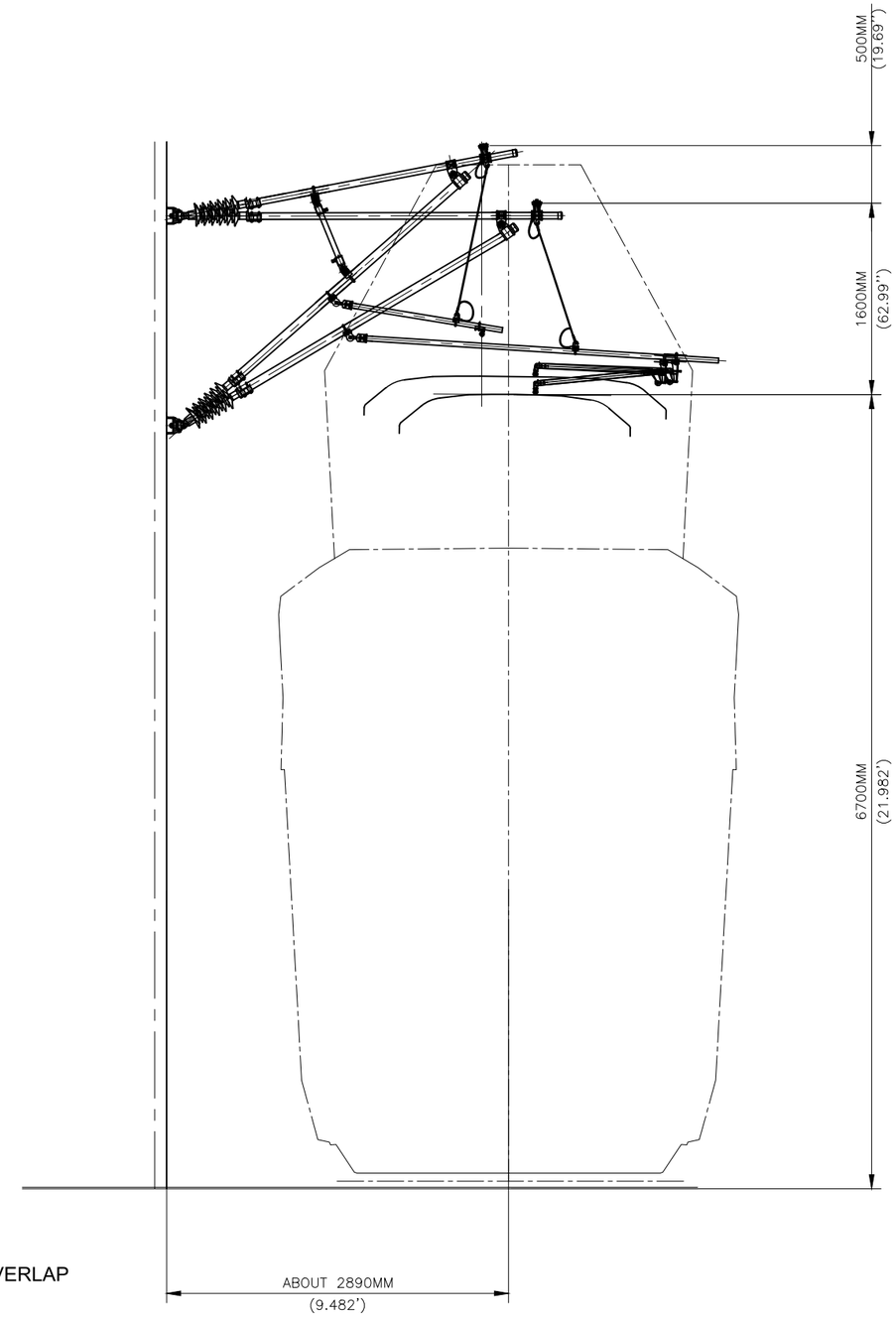
REV:

EDITION: 01012024

STANDARD DRAWING NO.: **W6100**



NOTE:
TO BE USED FOR STRAIGHT LINE AND LARGE CURVE



CANTILEVER ARRANGEMENT IN 3-SPAN INSULATED OVERLAP

ELEVATION

NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

Bin Zhang

DEPUTY DIRECTOR, ENGINEERING

Caltrain

1250 San Carlos Avenue
San Carlos, CA 94070

STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CANTILEVER ARRANGEMENT FOR
3–SPAN INSULATED OVERLAP

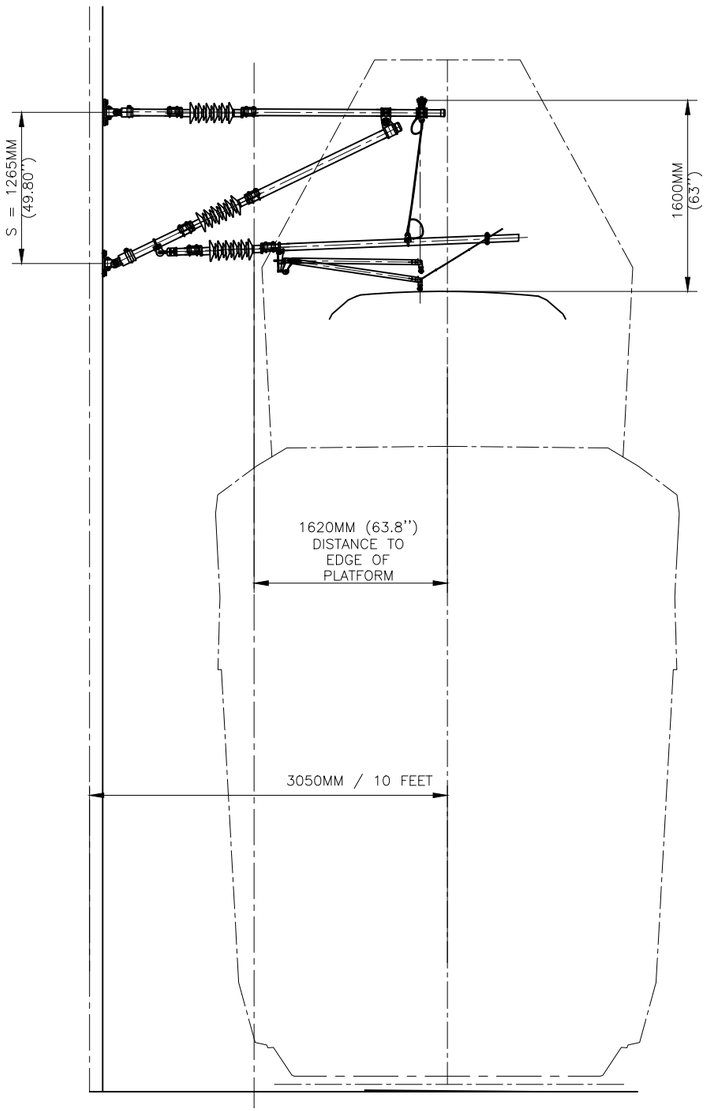
CADD FILE NAME: W6101

REV: | EDITION: 01012024

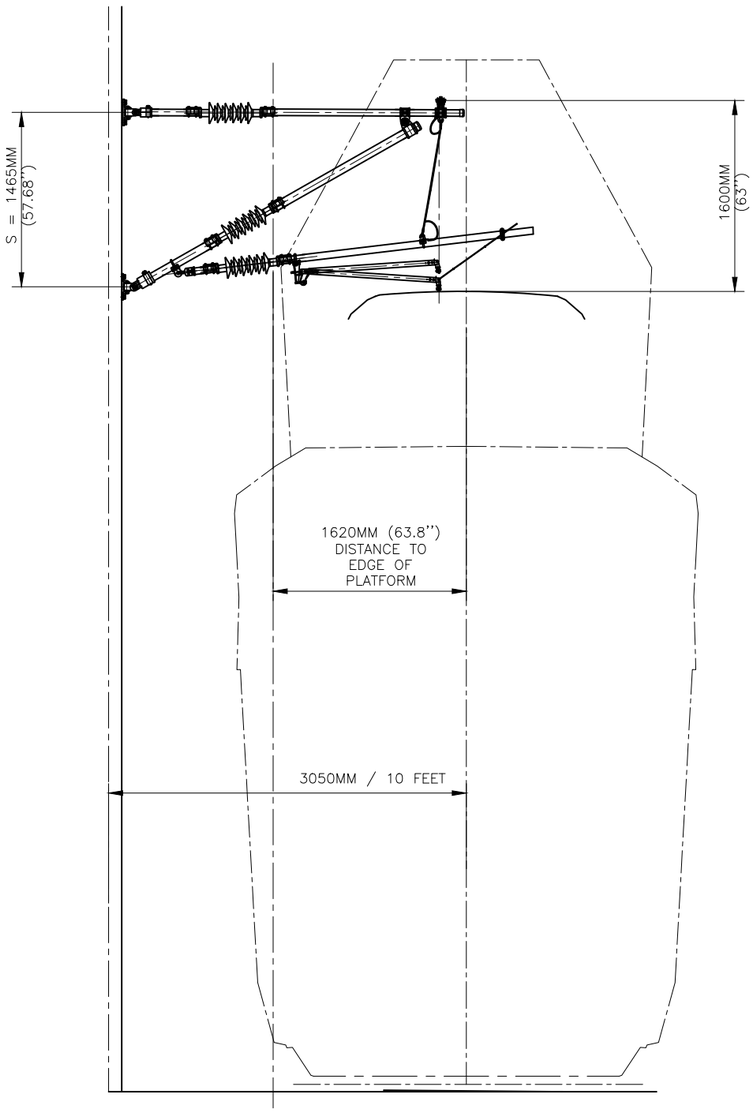
STANDARD DRAWING NO.: **W6101**

GENERAL NOTES:

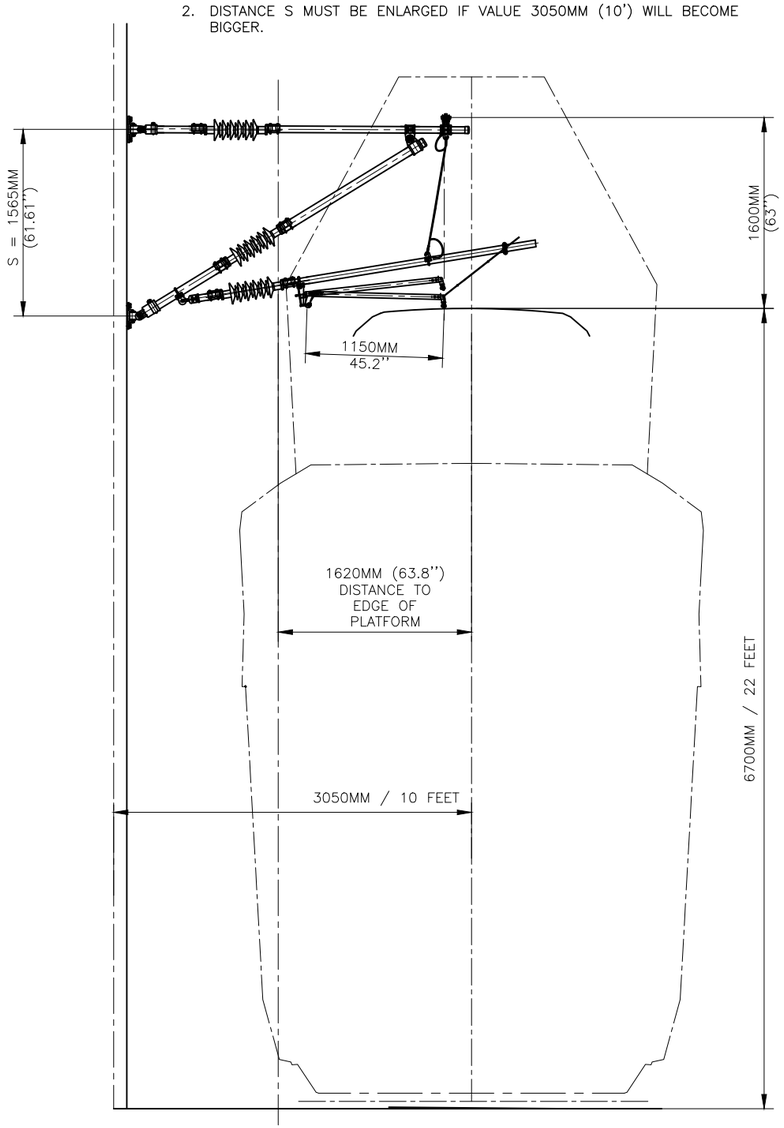
1. IN CASE OF SPACE PROBLEMS, THE STEADY ARM MUST BE SHORTENED AND S VALUE MUST BE CHECKED FOR VARIATION.
   ADOPTION: STEADY ARM CAN BE SHORTENED BECAUSE OF LESS MOVEMENT OF TRAIN / PANTOGRAPH IN STATION / PLATFORM AREA.
2. DISTANCE S MUST BE ENLARGED IF VALUE 3050MM (10') WILL BECOME BIGGER.



NOTE:
CANT: 0MM (0") ; DISTANCE OF CL 3050MM (10')



NOTE:
CANT: 0MM (0") ; DISTANCE OF CL 3050MM (10')



NOTE:
CANT: 0MM (0") ; DISTANCE OF CL 3050MM (10')

CANTILEVER PULL OFF ARRANGEMENTS WITH OFFSET INSULATION

ELEVATION

NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:
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DEPUTY DIRECTOR, ENGINEERING

Caltrain
1250 San Carlos Avenue
San Carlos, CA 94070

STANDARD DRAWINGS

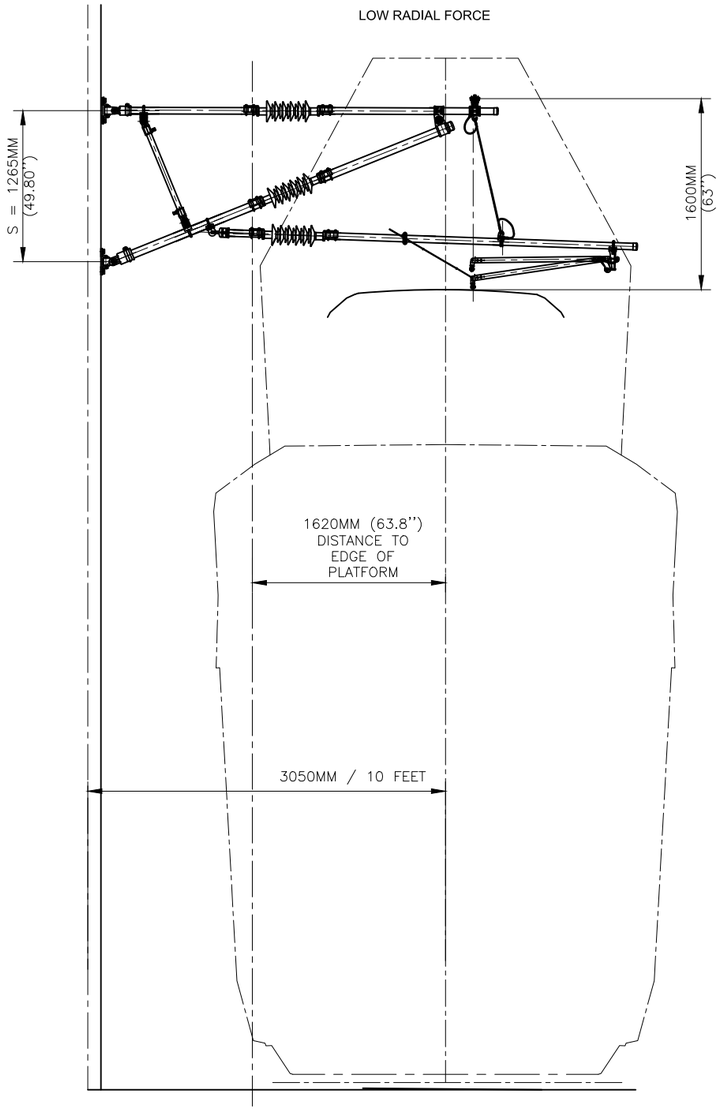
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
OFFSET INSULATION
ANALYSES – PLATFORM AREA
SHEET 1 OF 2

CADD FILE NAME: W6102
REV:
EDITION: 01012024
STANDARD DRAWING NO.: **W6102**

GENERAL NOTE:

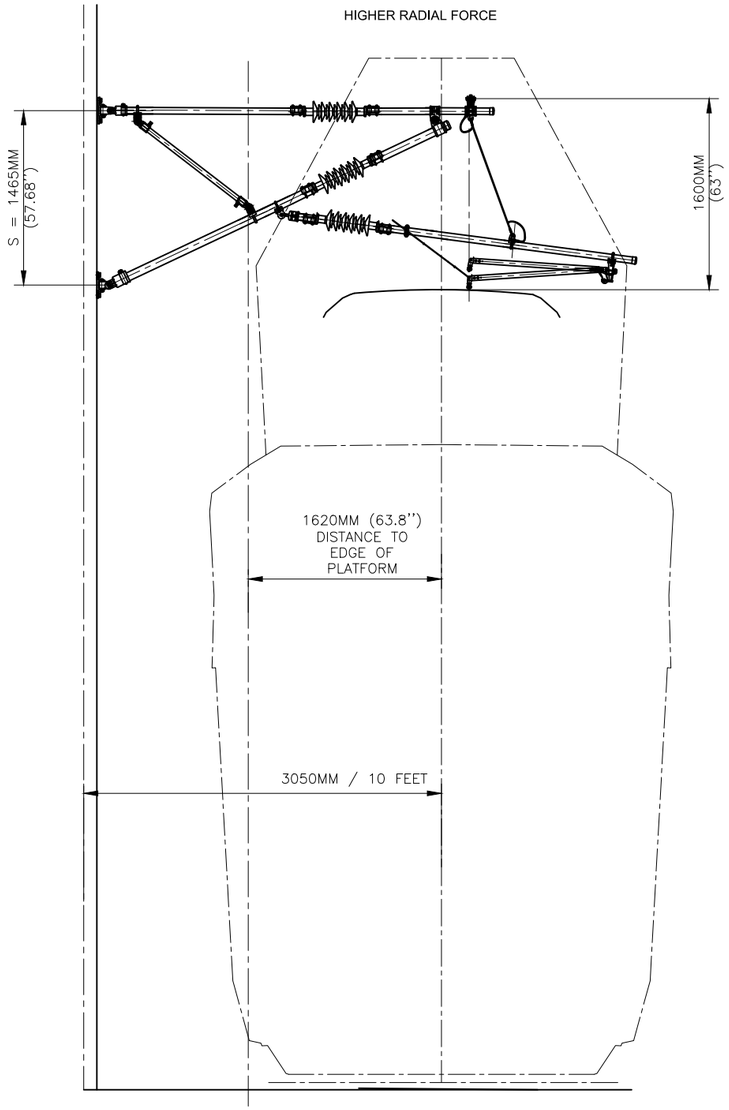
1. DISTANCE S MUST BE CHECKED IF VALUE 3050MM (10') WILL BECOME BIGGER.

LOW RADIAL FORCE



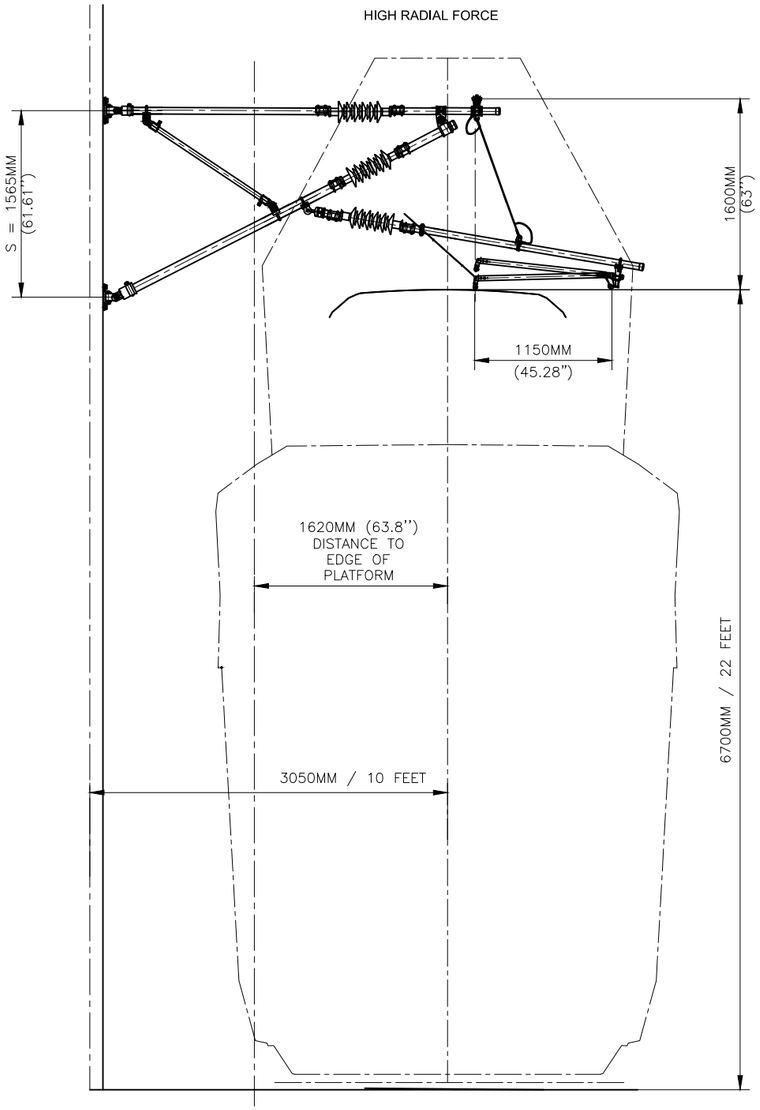
CANT: 0MM (0") ; DISTANCE OF CL 3050MM (10')

HIGHER RADIAL FORCE



NOTE:
CANT: 0MM (0") ; DISTANCE OF CL 3050MM (10')

HIGH RADIAL FORCE



NOTE:
CANT: 0MM (0") ; DISTANCE OF CL 3050MM (10')

CANTILEVER PUSH OFF ARRANGEMENTS WITH OFFSET INSULATION

ELEVATION

NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

Bin Zhang

DEPUTY DIRECTOR, ENGINEERING

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San Carlos, CA 94070

STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
OFFSET INSULATION
ANALYSES – PLATFORM AREA
SHEET 2 OF 2

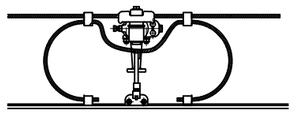
CADD FILE NAME: W6103

REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6103**

NOTES:

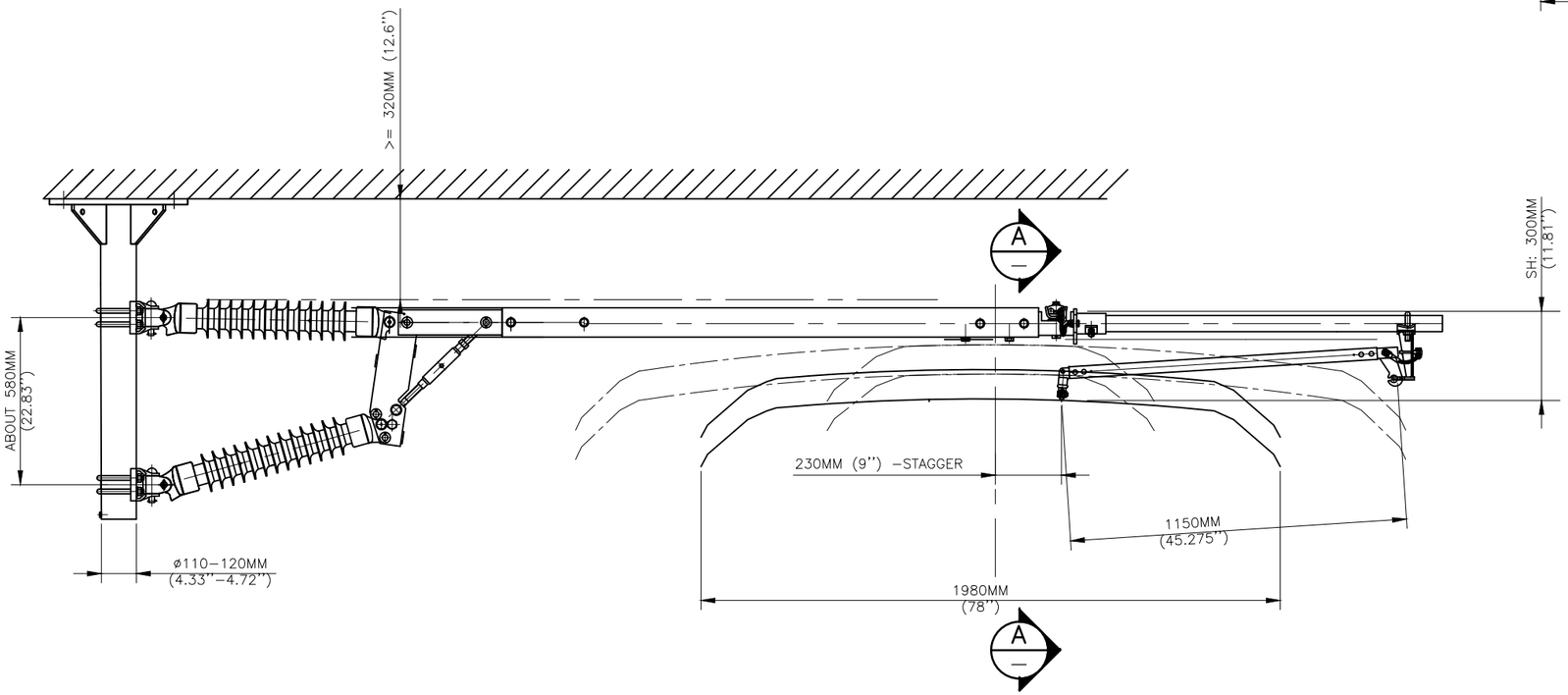
1. ASSEMBLY DRAWING: W6260
2. DISTANCE SHALL BE CONSTANT FOR STRAIGHT LINE AND CURVE.



ELECTRICAL CONNECTION AT CANTILEVER

SECTION A-A

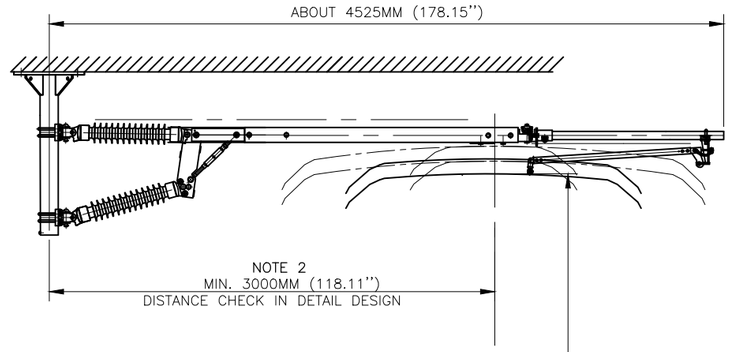
NTS

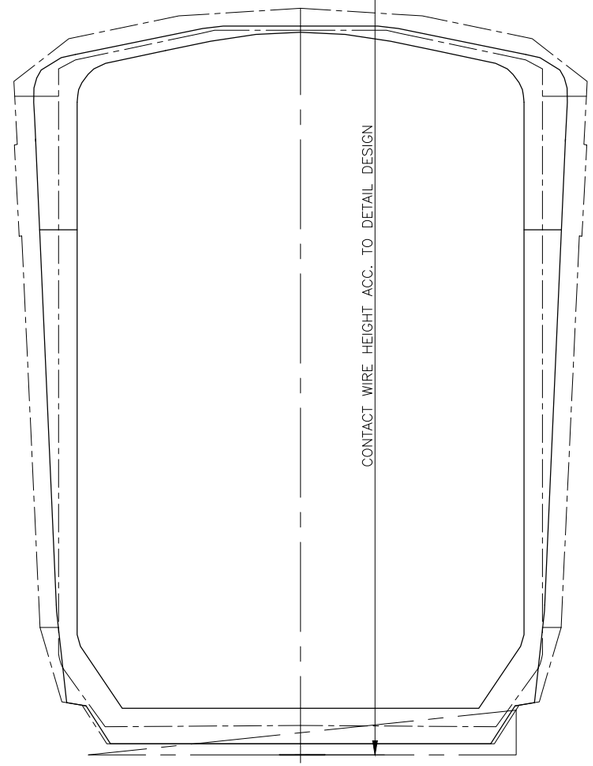


CANTILEVER PUSH OFF TYPE FOR UNDER BRIDGE SECTION

ELEVATION

NTS





CANTILEVER LENGTH FOR UNDER BRIDGE SECTION

ELEVATION

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

Bin Zhang

DEPUTY DIRECTOR, ENGINEERING

Caltrain

1250 San Carlos Avenue
San Carlos, CA 94070

STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CANTILEVER UNDER BRIDGE SECTION
SYSTEM HEIGHT 30 CM (11.81")
SHEET 1 OF 2

CADD FILE NAME: W6104

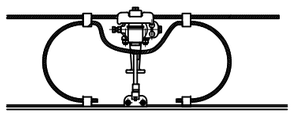
REV:

EDITION: 01012024

STANDARD DRAWING NO.: **W6104**

NOTES:

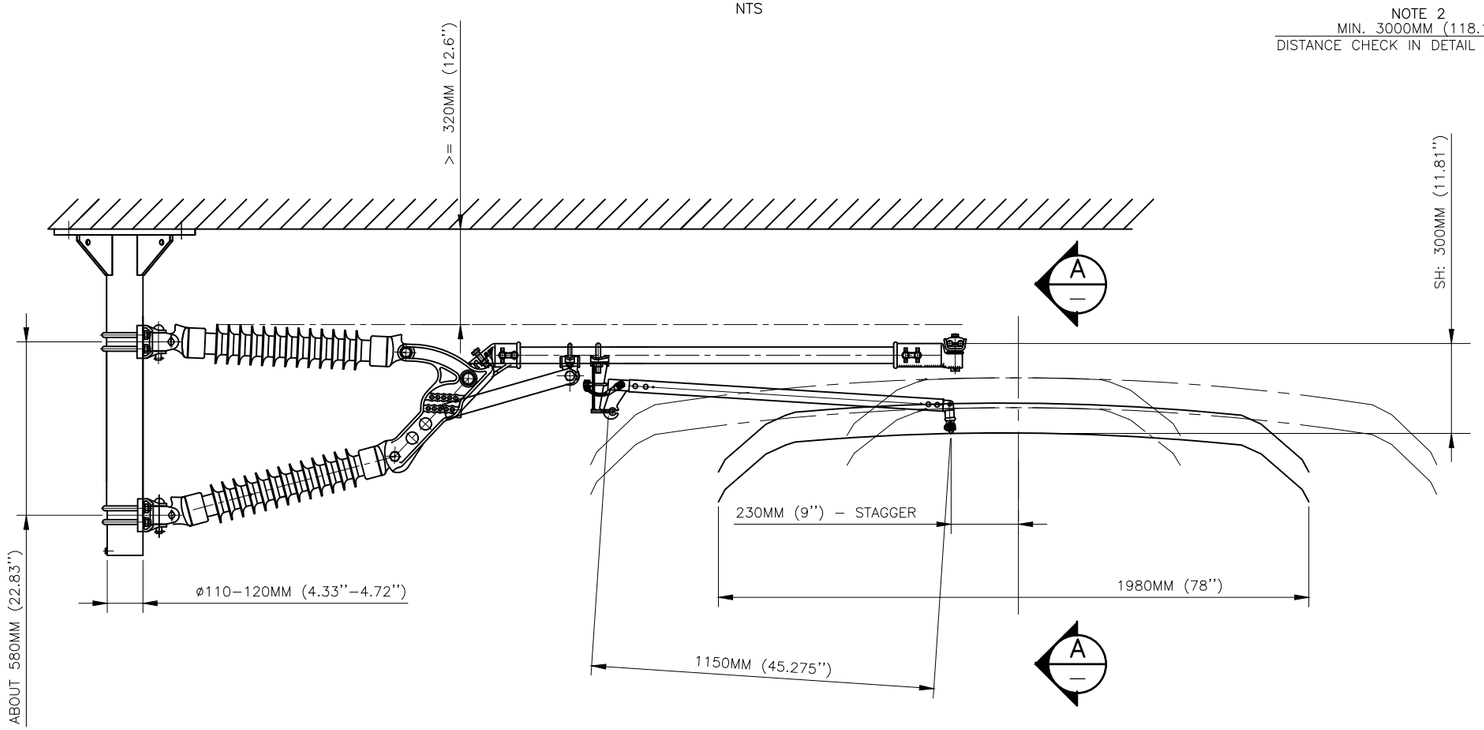
1. ASSEMBLY DRAWING: W6261
2. DISTANCE SHALL BE CONSTANT FOR STRAIGHT LINE AND CURVE.



ELECTRICAL CONNECTION AT CANTILEVER

SECTION A-A

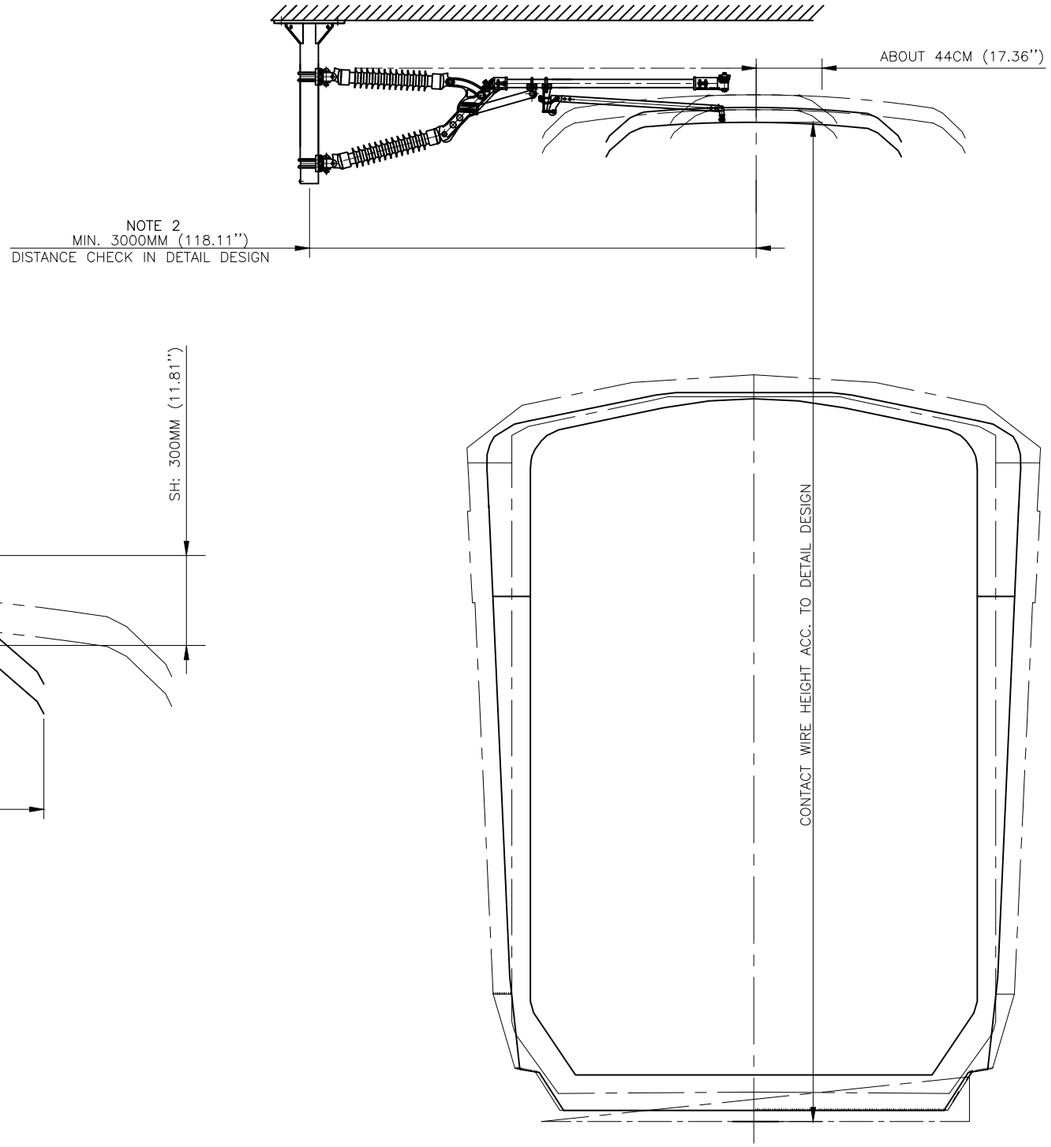
NTS



CANTILEVER PULL OFF TYPE FOR UNDER BRIDGE SECTION

ELEVATION

NTS



CANTILEVER LENGTH FOR UNDER BRIDGE SECTION

ELEVATION

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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STANDARD DRAWINGS

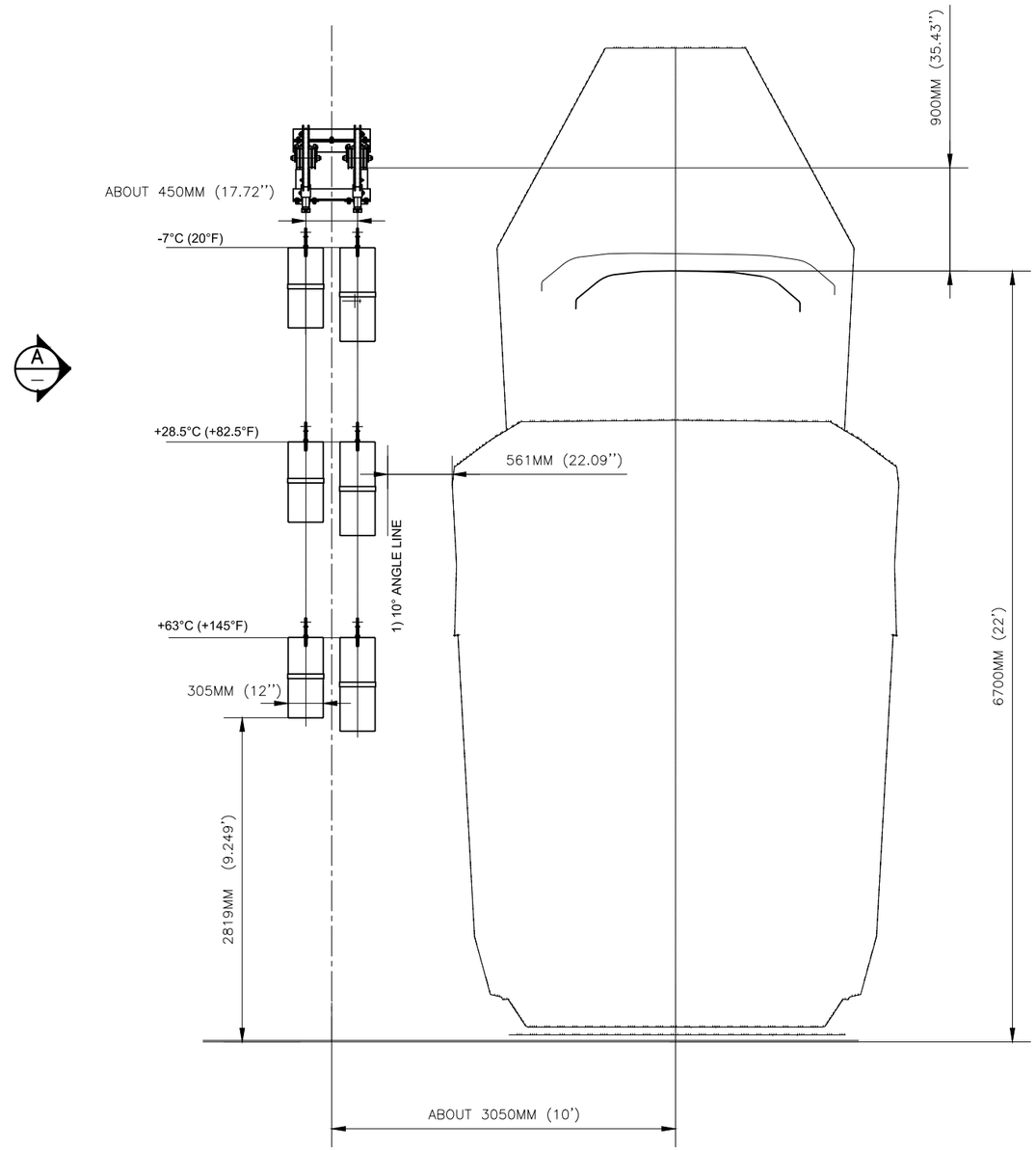
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CANTILEVER UNDER BRIDGE SECTION
SYSTEM HEIGHT 30 CM (11.81")
SHEET 2 OF 2

CADD FILE NAME: W6105

REV:

EDITION: 01012024

STANDARD DRAWING NO.: **W6105**



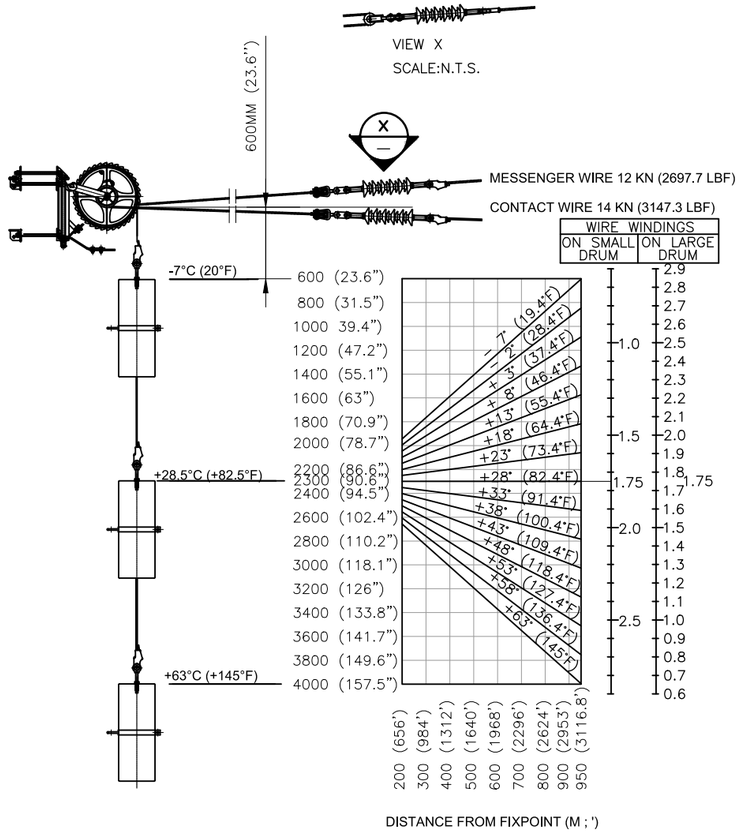
TENSIONING WHEEL DEVICE

ELEVATION

NTS

NOTE:

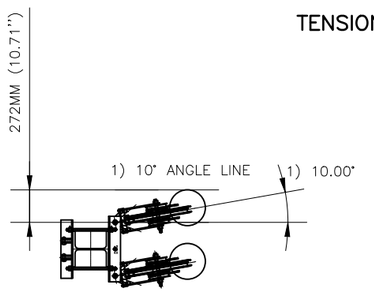
DIMENSION: MM (FEET)



TENSIONING WHEEL DEVICE ADJUSTMENT

A ELEVATION

NTS



TENSIONING WHEEL DEVICE ROTATION

PLAN

NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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STANDARD DRAWINGS

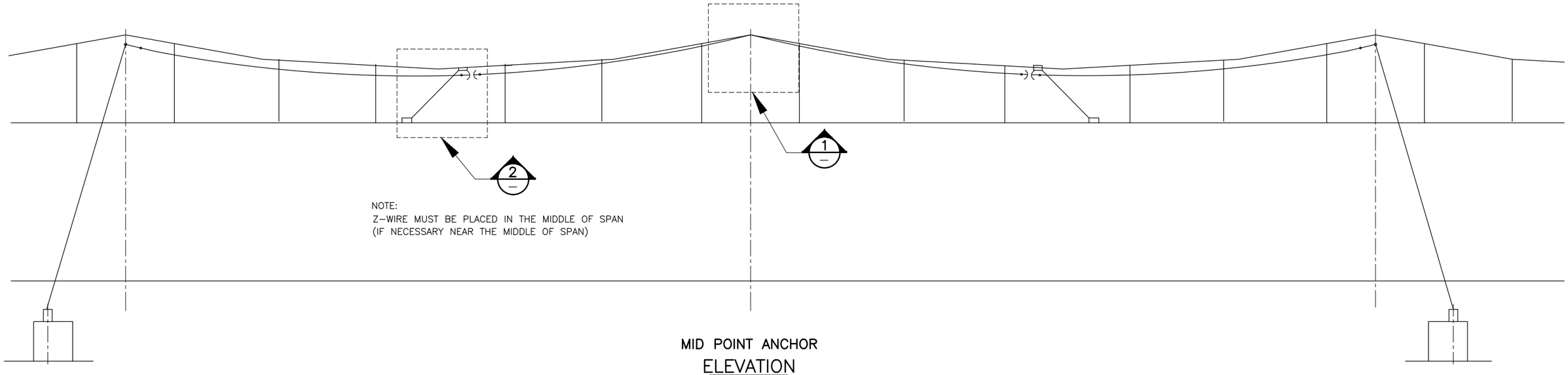
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
ADJUSTMENT OF WHEEL
TENSIONING DEVICE
BW–01

CADD FILE NAME: W6106

REV:

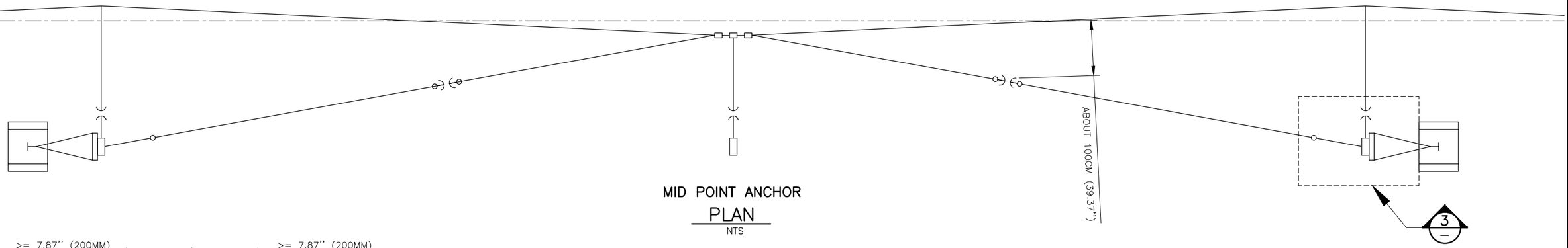
EDITION: 01012024

STANDARD DRAWING NO.: **W6106**

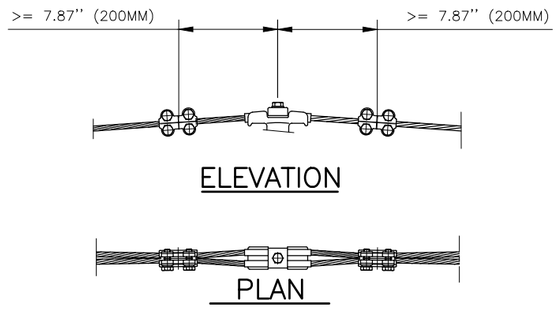


NOTE:
Z-WIRE MUST BE PLACED IN THE MIDDLE OF SPAN
(IF NECESSARY NEAR THE MIDDLE OF SPAN)

MID POINT ANCHOR
ELEVATION
NTS



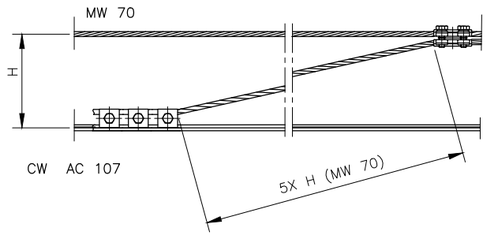
MID POINT ANCHOR
PLAN
NTS



ELEVATION

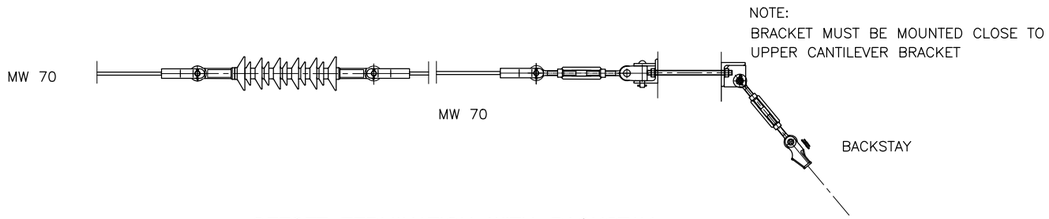
PLAN

MESSENGER WIRE AREA
1 DETAIL
NTS



Z-WIRE ARRANGEMENT
2 DETAIL
NTS

NOTE:
ASSEMBLY DRAWING: SEE
DWG W6277 FOR BOM



OFFSET TERMINATION WITH BACKSTAY
3 DETAIL
NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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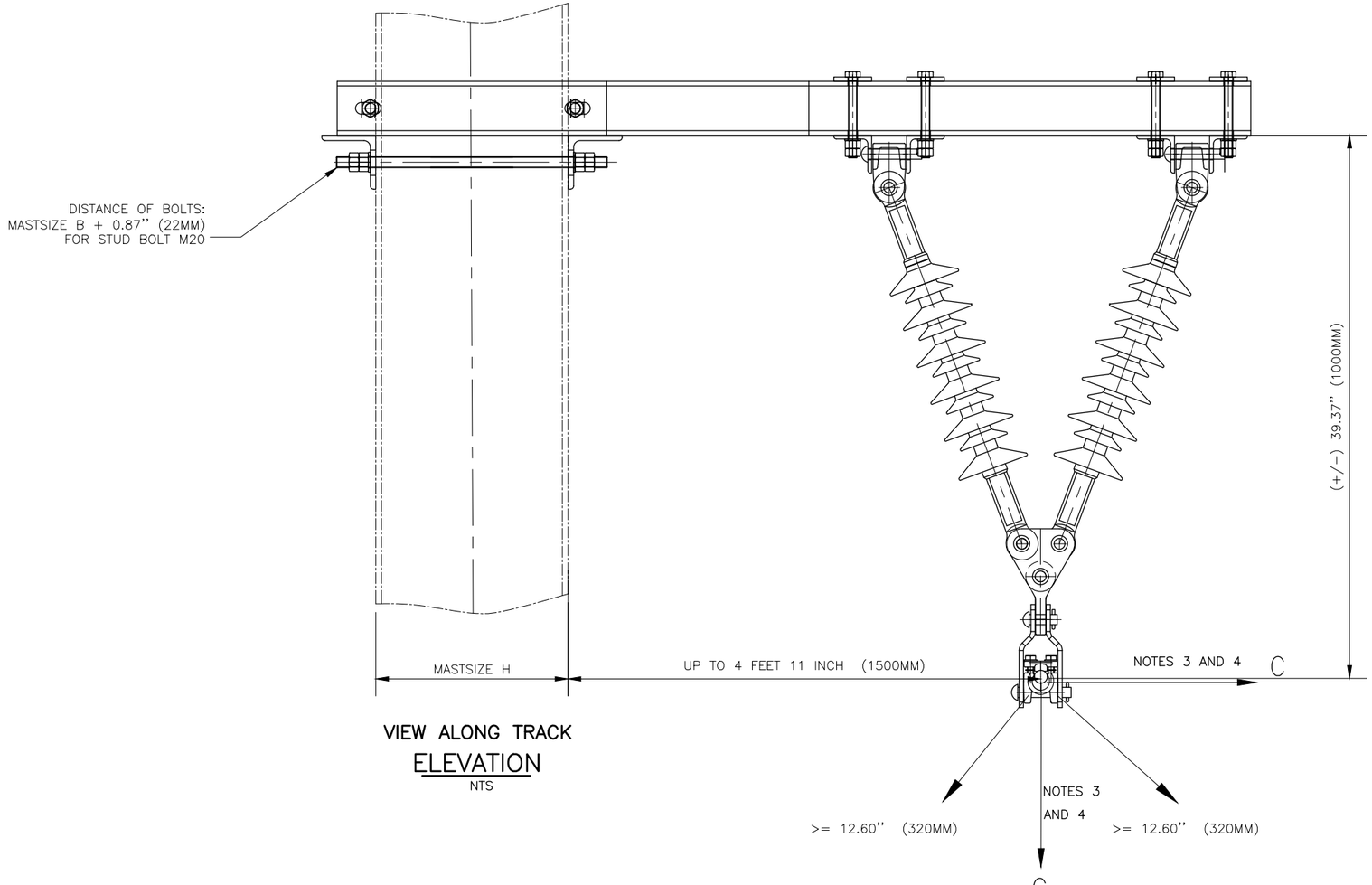
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
MID POINT ANCHOR

CADD FILE NAME: W6108
REV:
EDITION: 01012024
STANDARD DRAWING NO.: W6108

NOTES:

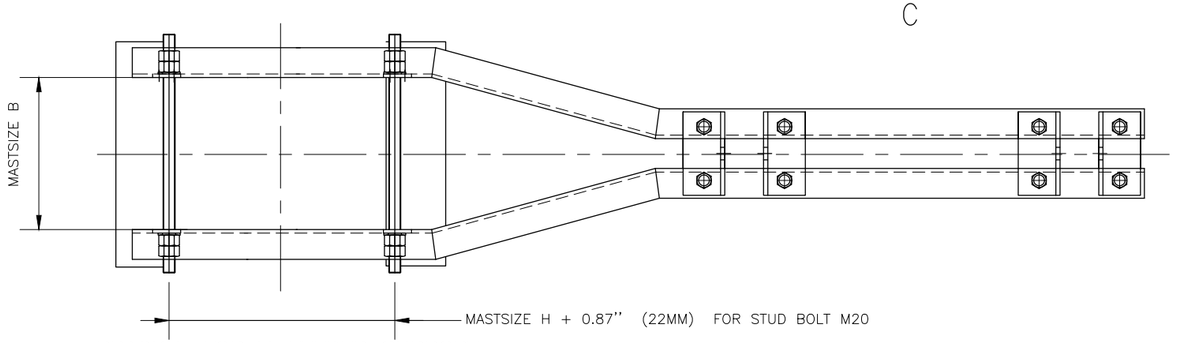
1. ASSEMBLY DRAWING: SEE DWG W6298 FOR BOM
2. LENGTH OF PARTS ACC. TO MASTSIZE AND DETAIL DESIGN
3. MAXIMUM WORKING LOAD: FORCE C = 2698 LBF (12 KN) (VERTICAL OR HORIZONTAL)
4. STRUCTURAL CHECK REQUIRED FOR LOADS > 1124 LBF (5 KN))



VIEW ALONG TRACK

ELEVATION

NTS



BRACKET FOR V-FEEDER SUPPORT

PLAN

NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
V- FEEDER SUPPORT AT
RECTANGULAR STEELMAST

CADD FILE NAME: W6109

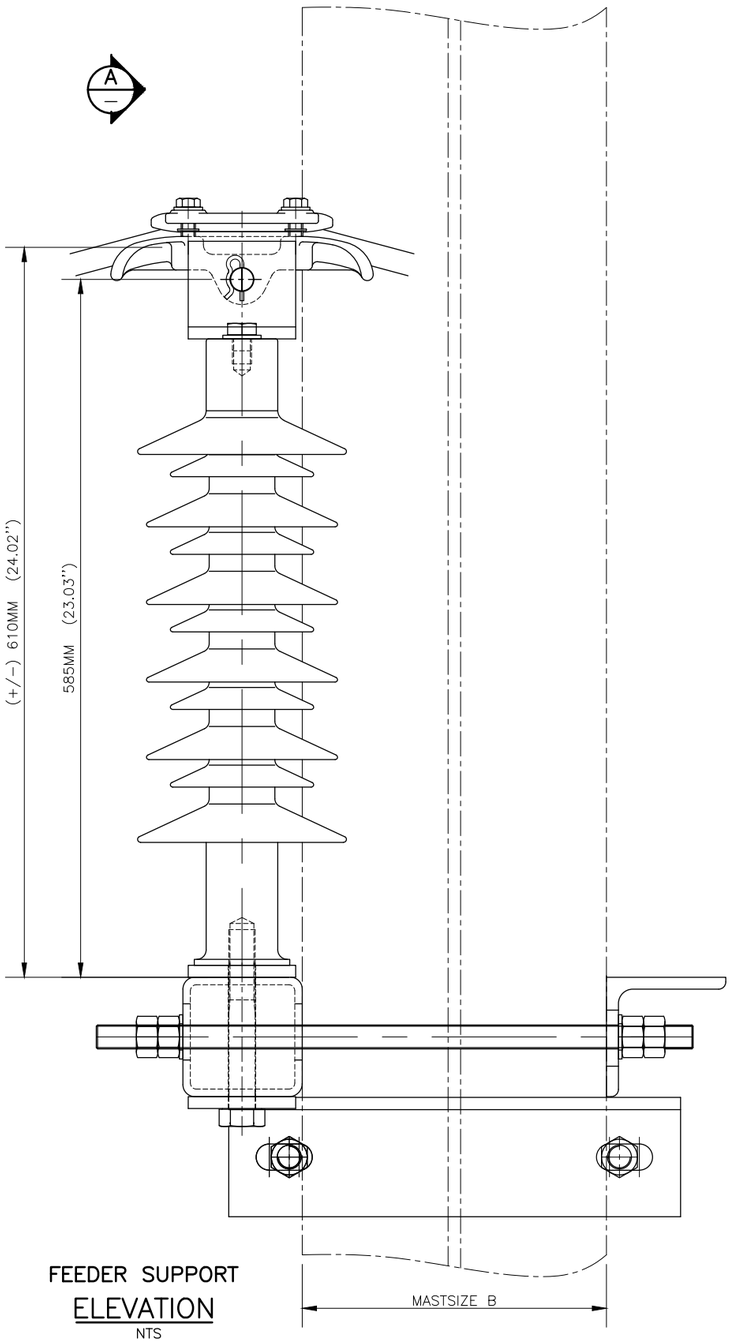
REV:

EDITION: 01012024

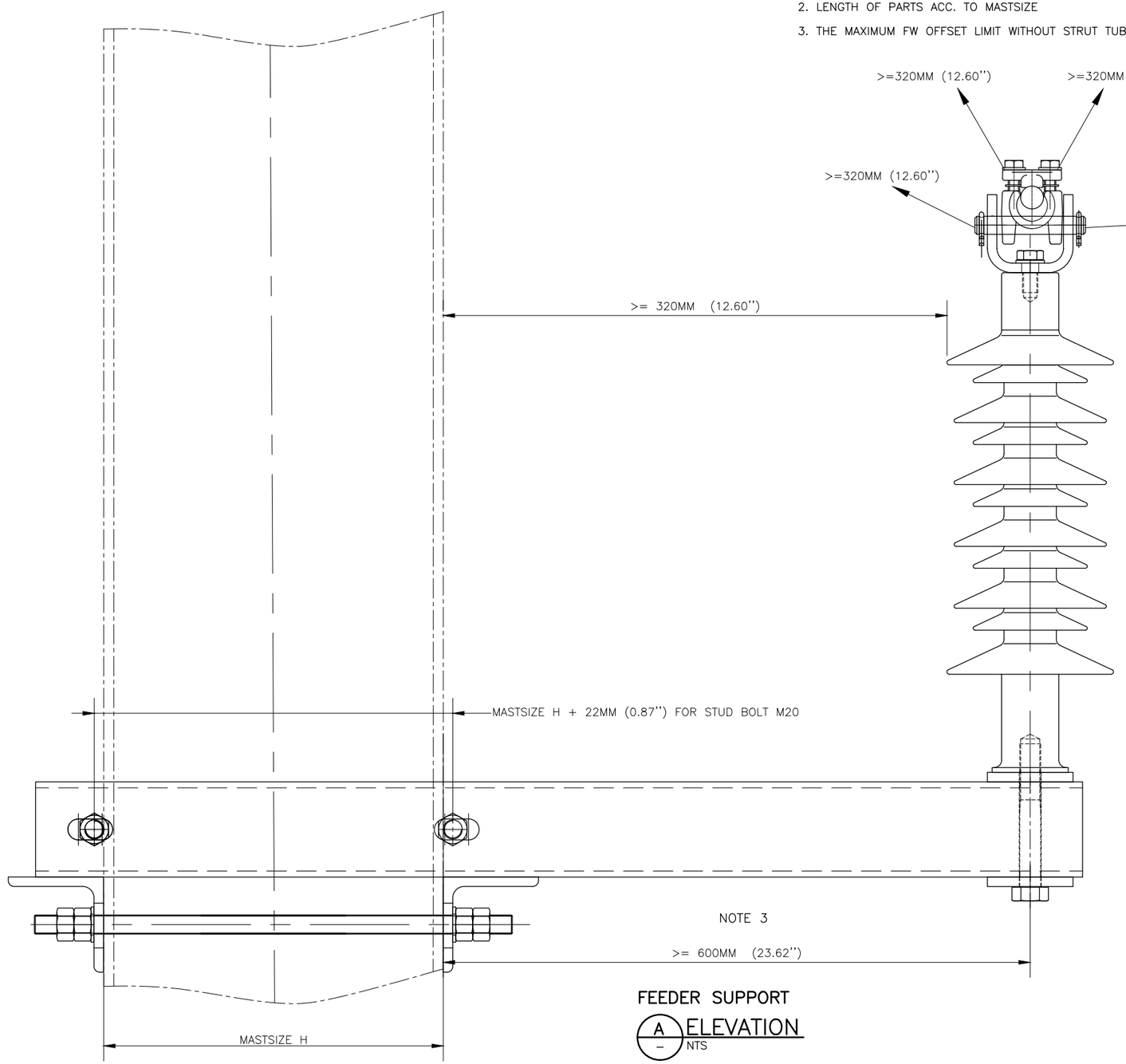
STANDARD DRAWING NO.: **W6109**

NOTES:

1. ASSEMBLY DRAWING: SEE DWG W6297 FOR BOM
2. LENGTH OF PARTS ACC. TO MASTSIZE
3. THE MAXIMUM FW OFFSET LIMIT WITHOUT STRUT TUBE IS 6.5' OFFSET



FEEDER SUPPORT
ELEVATION
NTS



FEEDER SUPPORT
A ELEVATION
NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:
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STANDARD DRAWINGS

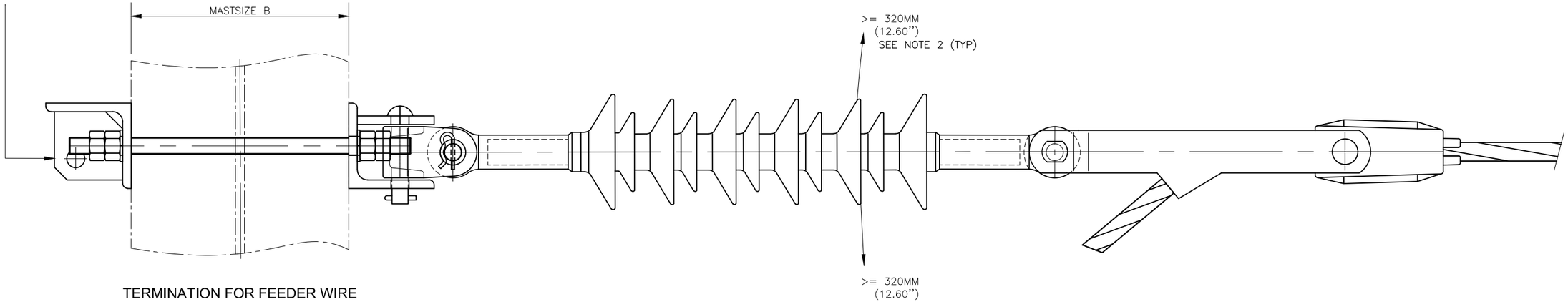
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
FEEDER SUPPORT AT
RECTANGULAR STEELMAST

CADD FILE NAME: W6110
REV:
EDITION: 01012024
STANDARD DRAWING NO.: W6110

NOTE:

1. ASSEMBLY DRAWING: SEE DWG W6282 FOR BOM LENGTH OF PARTS ACC. TO MASTSIZE
2. FOR ELECTRICAL CLEARANCE SEE DRAWING W6006

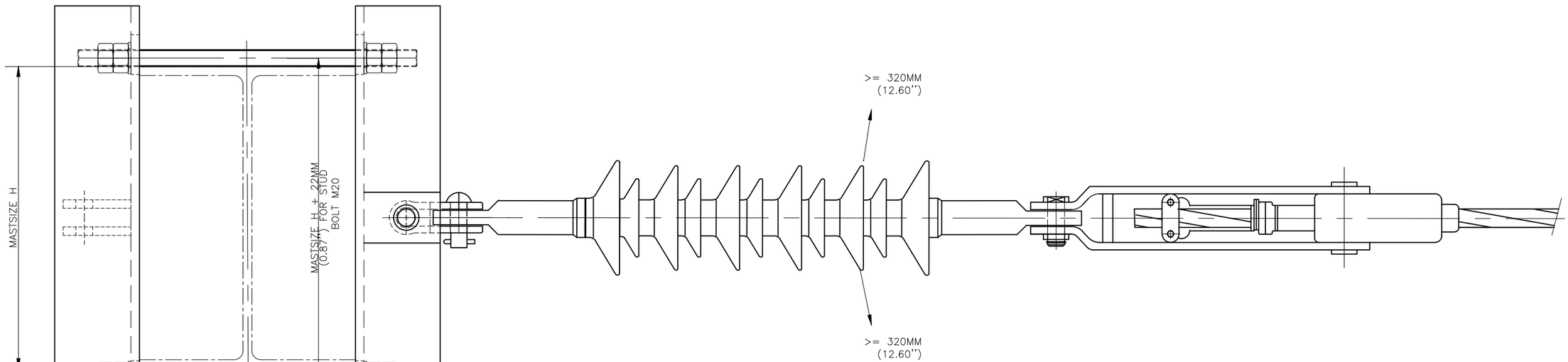
CONNECTION FOR BACKSTAY ANCHOR, IF NECESSARY ACC. TO DETAIL DESIGN



TERMINATION FOR FEEDER WIRE

ELEVATION

NTS



VIEW FROM THE TOP

PLAN

NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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STANDARD DRAWINGS

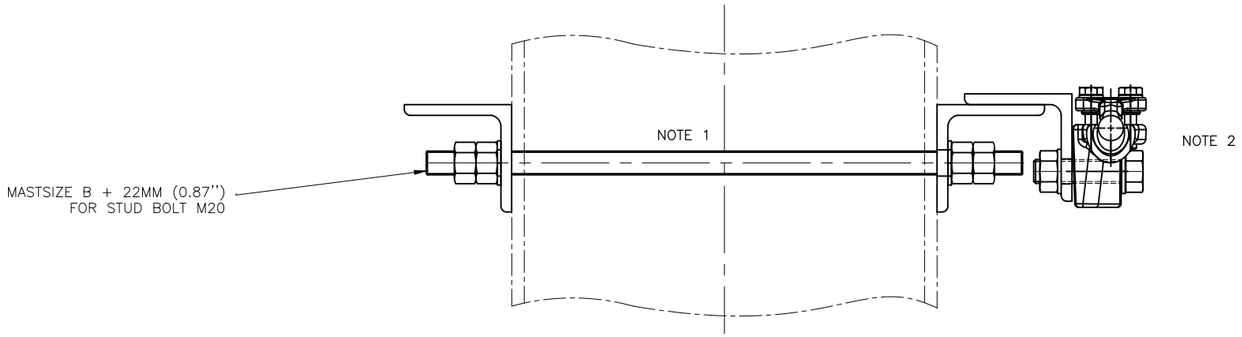
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
TERMINATION ARRANGEMENT
FOR FEEDER WIRE
FT–06

CADD FILE NAME: W6111

REV:

EDITION: 01012024

STANDARD DRAWING NO.: **W6111**



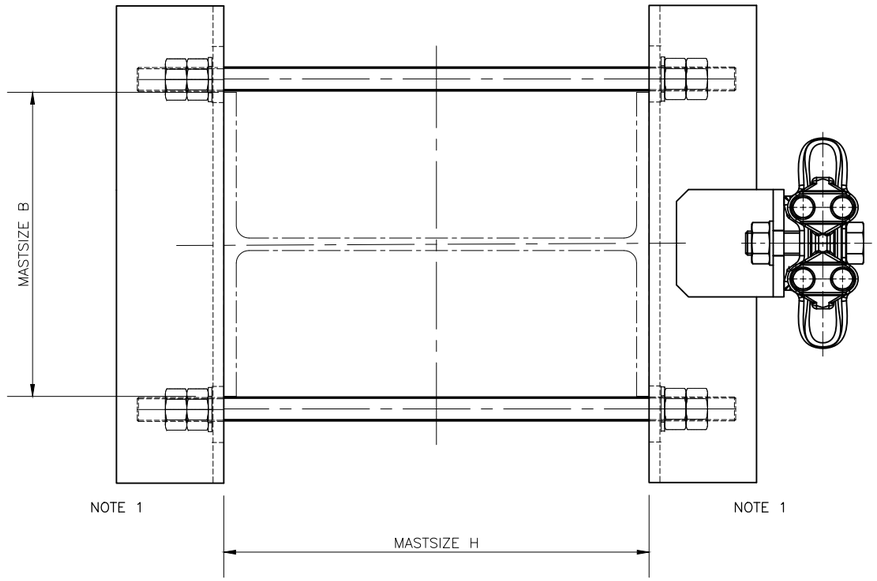
STATIC WIRE SUPPORT

ELEVATION

NTS

NOTES:

1. LENGTH OF PARTS ACC. TO MASTSIZE.
2. ALTERNATE MOUNTING OF SW CLAMP DIRECTLY TO THE POLE WITH A PRE DRILLED HOLE IN THE FLANGE.



VIEW FROM THE TOP

PLAN

NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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STANDARD DRAWINGS

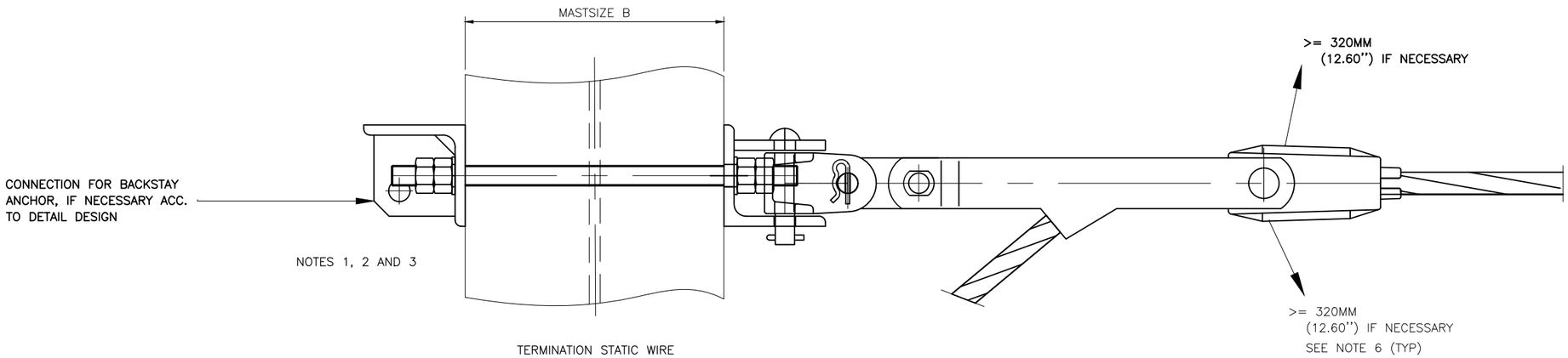
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
SINGLE SUPPORT
FOR STATIC WIRE

CADD FILE NAME: W6112

REV:

EDITION: 01012024

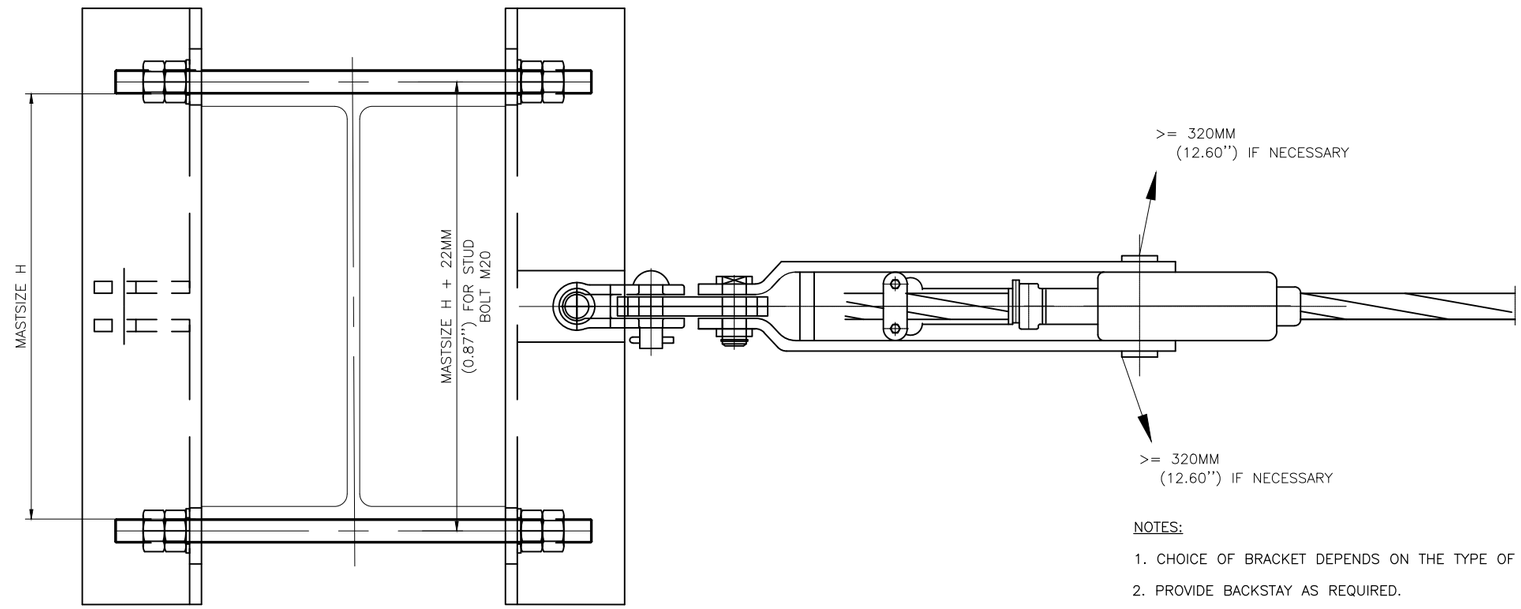
STANDARD DRAWING NO.: W6112



TERMINATION STATIC WIRE

ELEVATION

NTS



VIEW FROM THE TOP

PLAN

NTS

NOTES:

1. CHOICE OF BRACKET DEPENDS ON THE TYPE OF POLE.
2. PROVIDE BACKSTAY AS REQUIRED.
3. POLE ORIENTATION ACC: TO DETAIL DESIGN.
4. ASSEMBLY DRAWING: SEE DWG W6281 FOR BOM.
5. LENGTH OF PARTS ACC. TO MASTSIZE.
6. FOR ELECTRICAL CLEARANCE SEE DRAWING W6006.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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STANDARD DRAWINGS

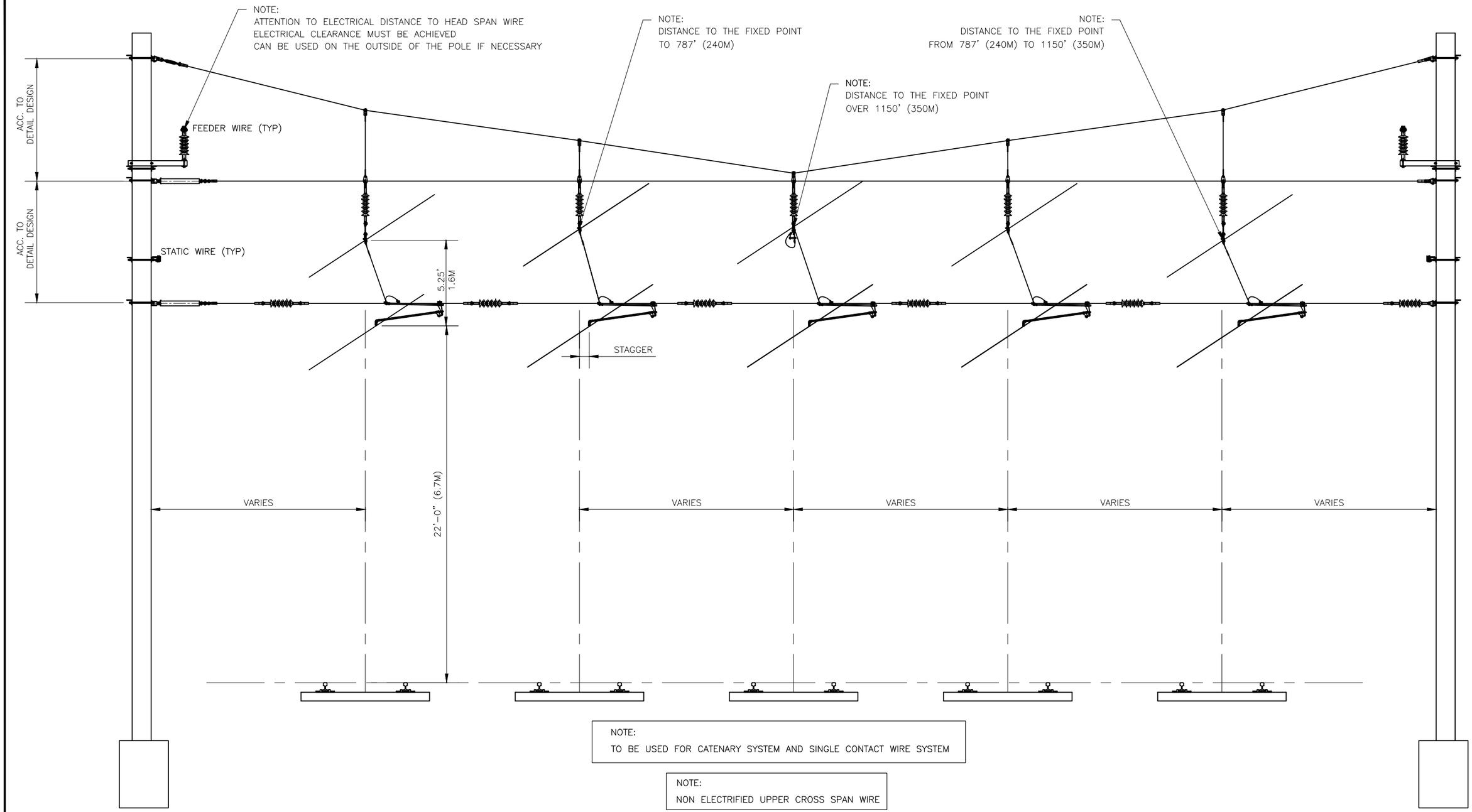
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
TERMINATION ARRANGEMENT
FOR STATIC WIRE
FT–05

CADD FILE NAME: W6114

REV:

EDITION: 01012024

STANDARD DRAWING NO.: **W6114**



NOTE:
TO BE USED FOR CATENARY SYSTEM AND SINGLE CONTACT WIRE SYSTEM

NOTE:
NON ELECTRIFIED UPPER CROSS SPAN WIRE

NOTE:
ASSEMBLY DRAWING: SEE DWG W6289 FOR BOM

HEAD SPAN TYPE 1 ARRANGEMENT

ELEVATION

NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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STANDARD DRAWINGS

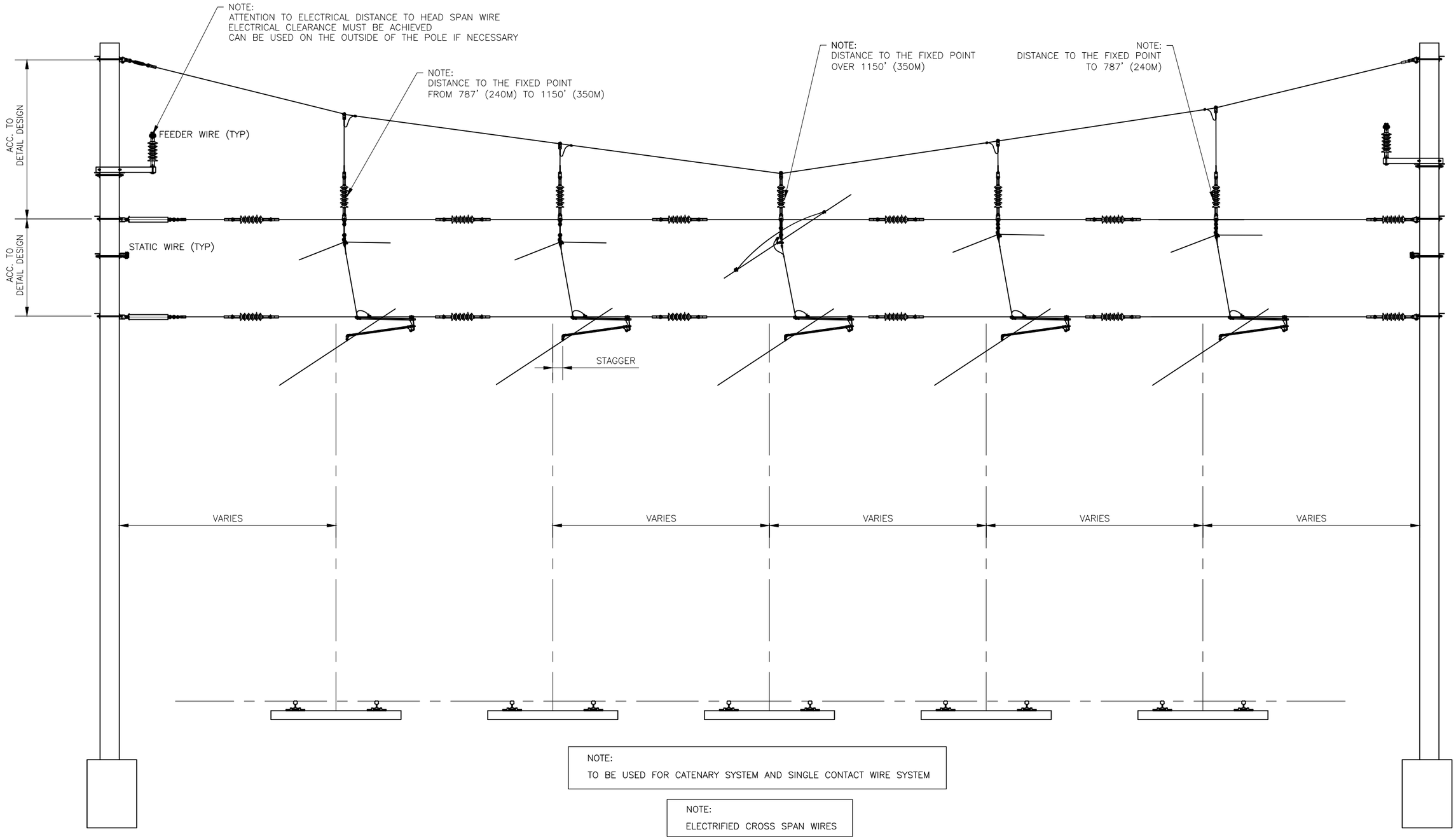
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
HEAD SPAN TYPE 1
ARRANGEMENT

CADD FILE NAME: W6116

REV:

EDITION: 01012024

STANDARD DRAWING NO.: **W6116**



NOTE:
TO BE USED FOR CATENARY SYSTEM AND SINGLE CONTACT WIRE SYSTEM

NOTE:
ELECTRIFIED CROSS SPAN WIRES

NOTE:
ASSEMBLY DRAWING: SEE DWG W6293 FOR BOM

HEAD SPAN TYPE 2 ARRANGEMENT

ELEVATION

NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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San Carlos, CA 94070

STANDARD DRAWINGS

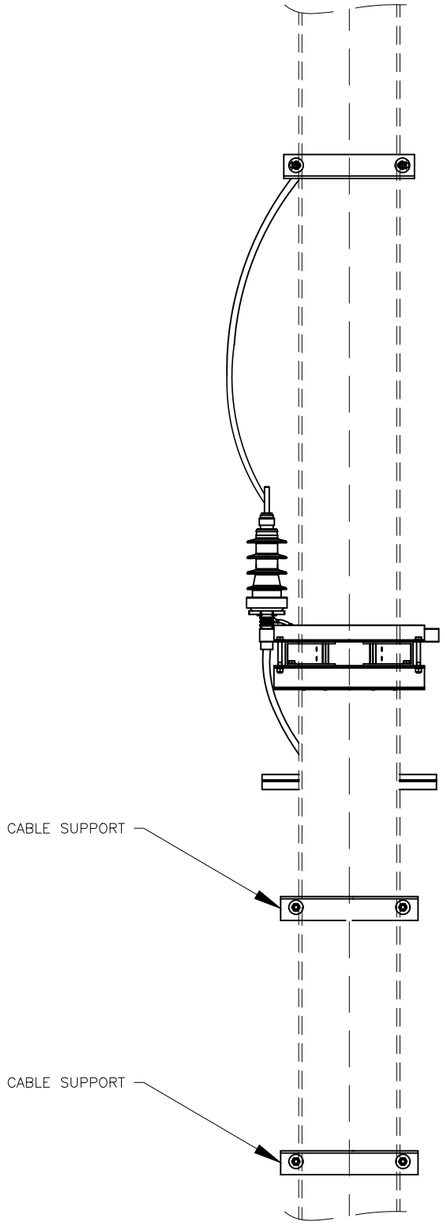
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
HEAD SPAN TYPE 2
ARRANGEMENT

CADD FILE NAME: W6117

REV:

EDITION: 01012024

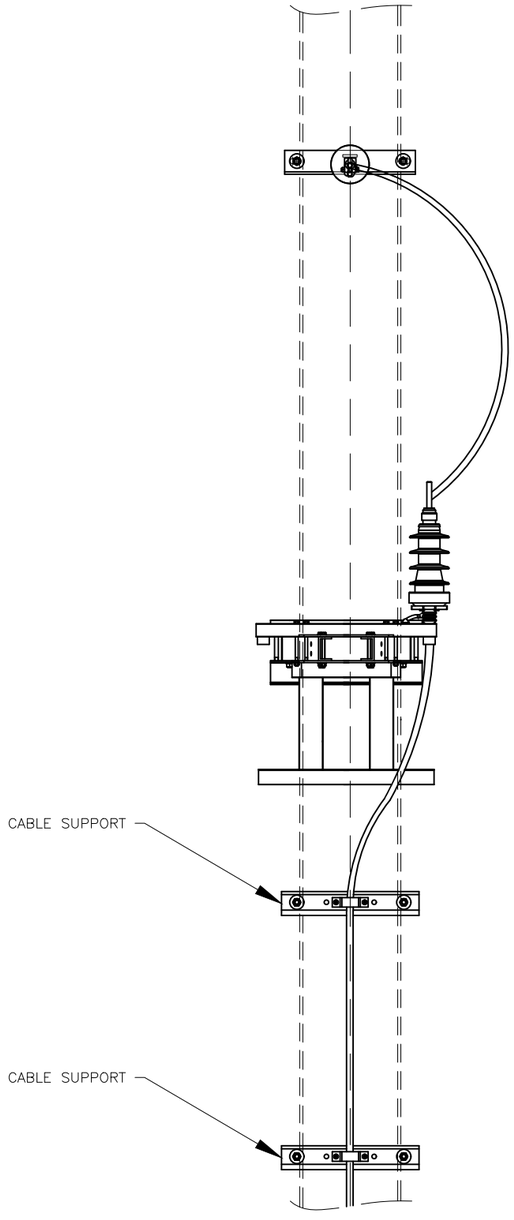
STANDARD DRAWING NO.: W6117



BACK SIDE

A ELEVATION

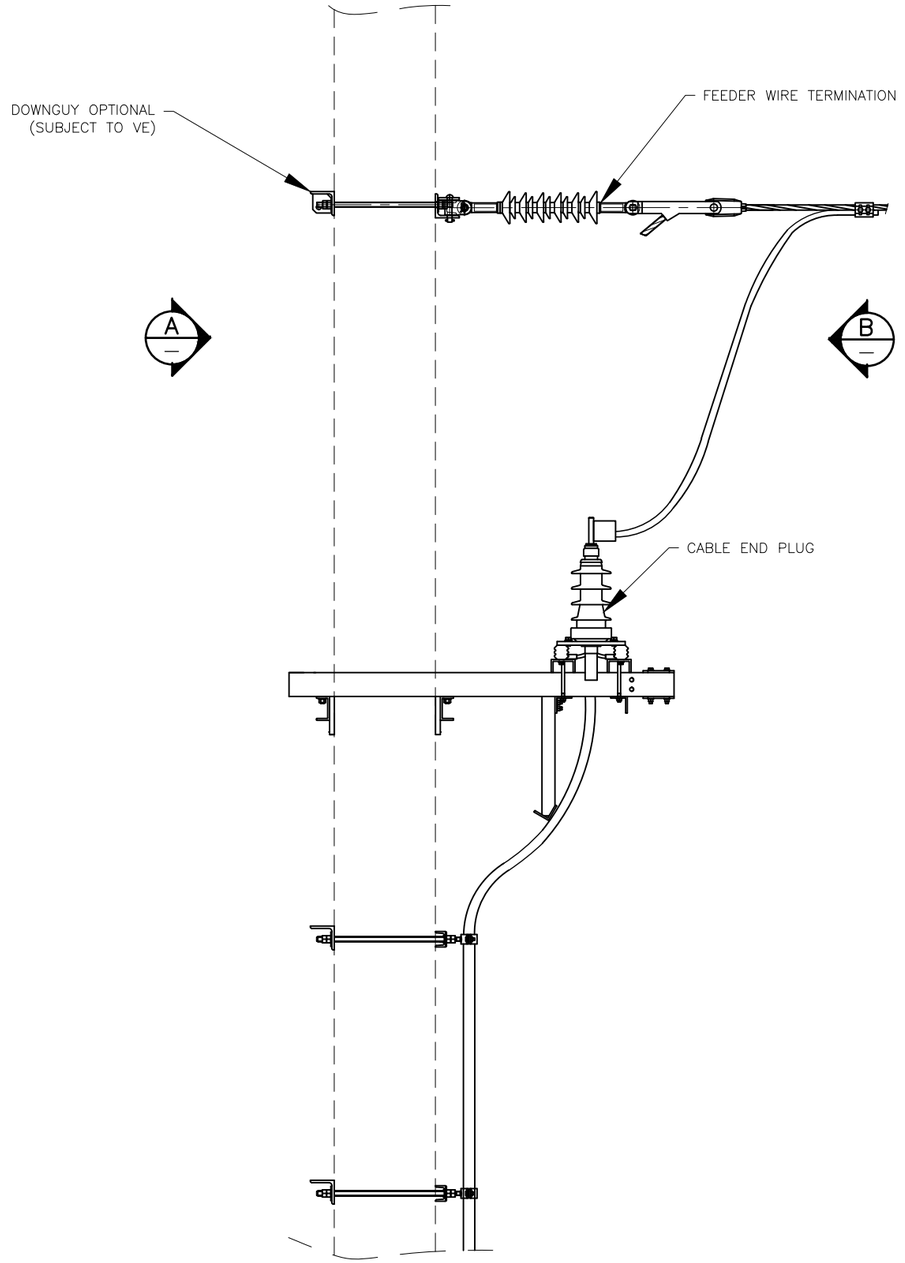
NTS



FRONT SIDE

B ELEVATION

NTS



FEEDER ARRANGEMENT WITH CABLE PLUG IN CONNECTION

ELEVATION

NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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1250 San Carlos Avenue
San Carlos, CA 94070

STANDARD DRAWINGS

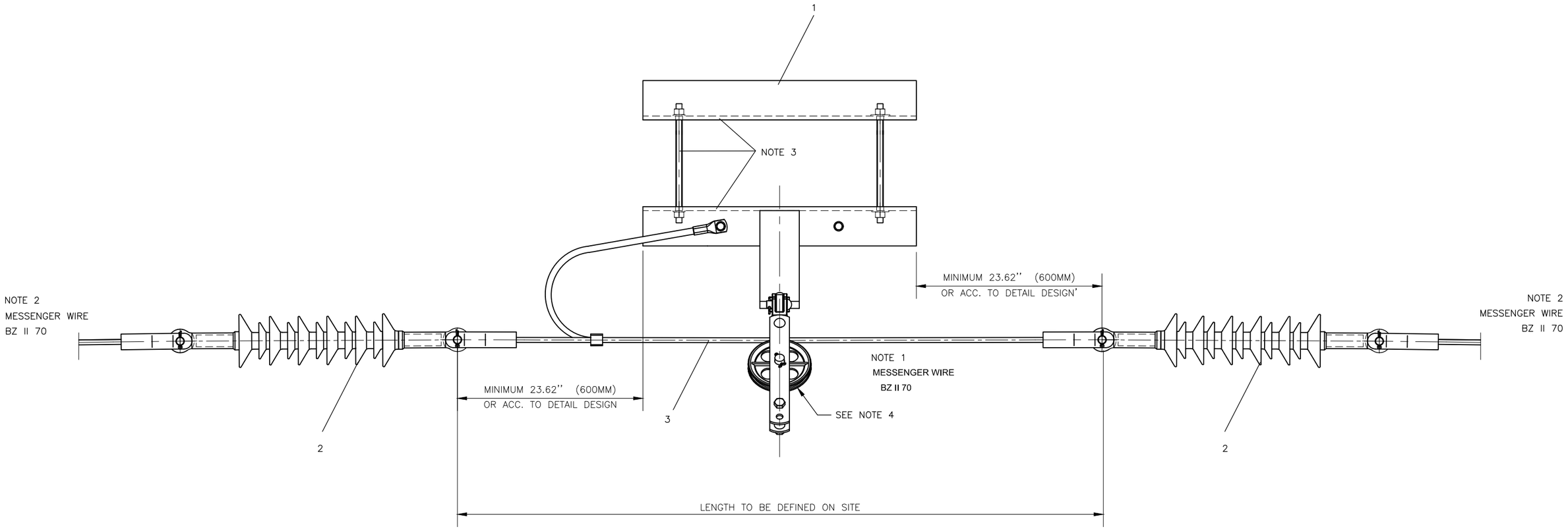
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
FEEDER ARRANGEMENT
AT RECTANGULAR MAST WITH
CABLE PLUG IN CONNECTION PH-01

CADD FILE NAME: W6118

REV:

EDITION: 01012024

STANDARD DRAWING NO.: **W6118**



INSULATION ARRANGEMENT OF MID POINT ANCHOR WIRE WITH PULLEY SUPPORT

ELEVATION

NTS

NOTES:

1. LENGTH AS NEEDED
2. CONTINUING CONNECTION ACC. TO DETAIL DESIGN
3. LENGTH / DIMENSIONS ACC. TO PORTAL SIZE
4. PULLEY IS TILTED

	A						
	1	MESSENGER WIRE BZ II 70/19	.	3	DIN 48201		NOTE 1
	2	CUT IN INSULATION FOR MW	.	2			
	1	PULLEY SUPPORT , COMPLETE	.	1			.
PIECES		DESCRIPTION	MATERIAL	PART	DWG-NO/STANDARD	KG/PC.	REMARKS/ID-NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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San Carlos, CA 94070

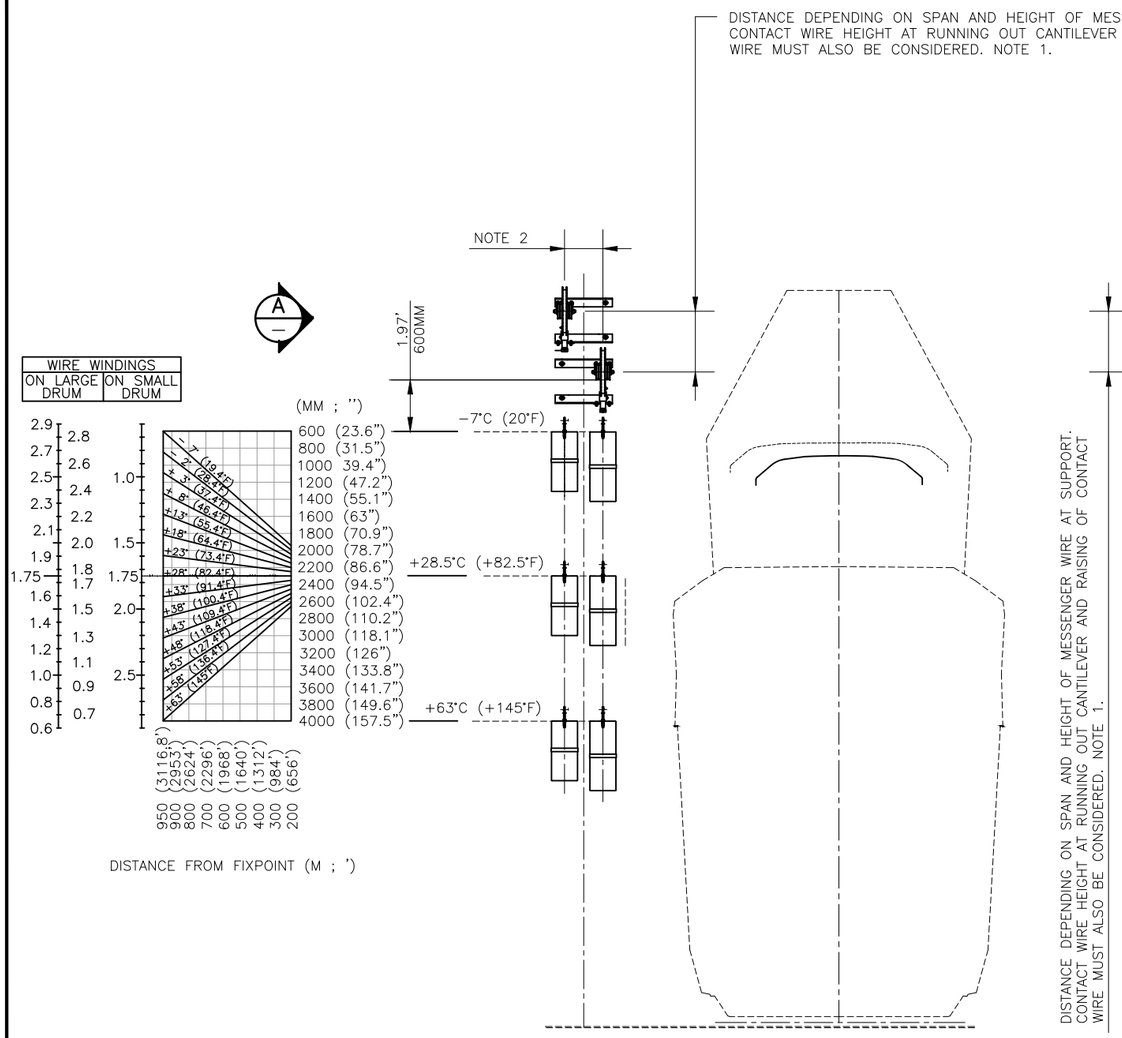
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
INSULATION ARRANGEMENT OF
MID POINT ANCHOR WIRE
WITH PULLEY SUPPORT

CADD FILE NAME: W6122

REV: | EDITION: 01012024

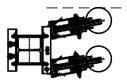
STANDARD DRAWING NO.: **W6122**



TENSION WHEELS VERTICALLY ARRANGED

ELEVATION

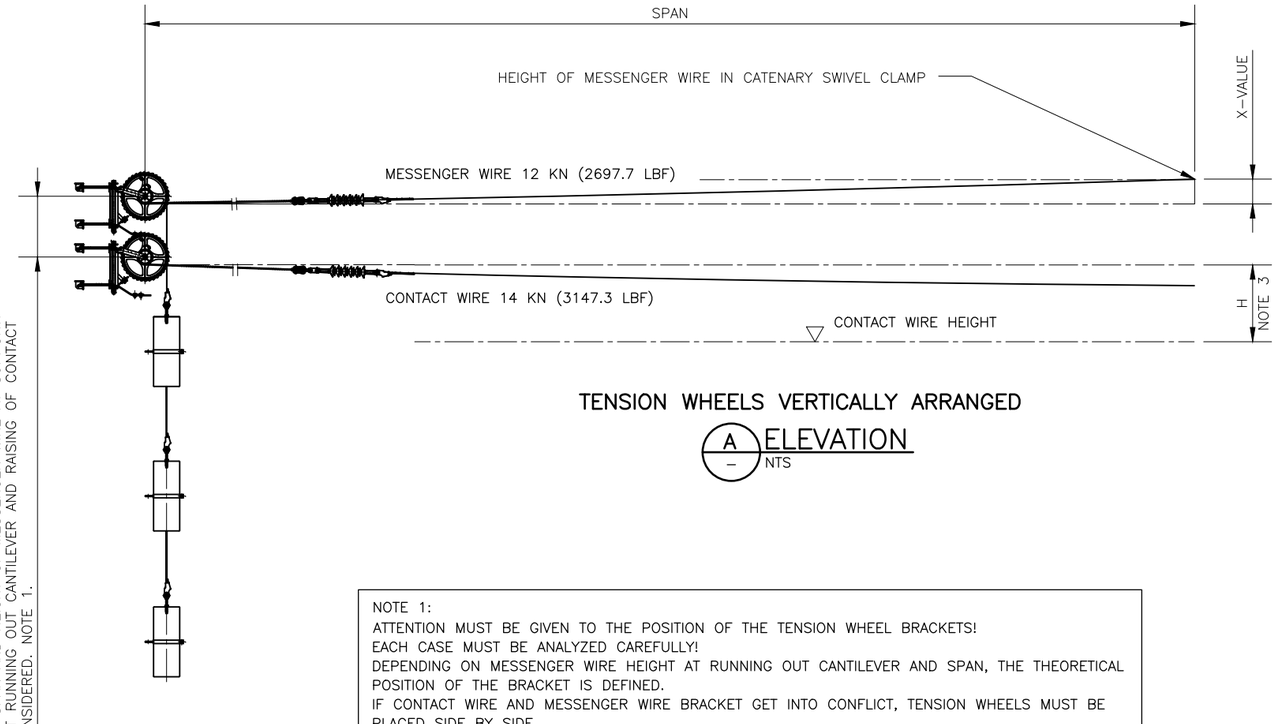
NTS



TENSION WHEELS VERTICALLY ARRANGED

PLAN

NTS



TENSION WHEELS VERTICALLY ARRANGED

A ELEVATION

NTS

NOTE 1:
ATTENTION MUST BE GIVEN TO THE POSITION OF THE TENSION WHEEL BRACKETS!
EACH CASE MUST BE ANALYZED CAREFULLY!
DEPENDING ON MESSENGER WIRE HEIGHT AT RUNNING OUT CANTILEVER AND SPAN, THE THEORETICAL POSITION OF THE BRACKET IS DEFINED.
IF CONTACT WIRE AND MESSENGER WIRE BRACKET GET INTO CONFLICT, TENSION WHEELS MUST BE PLACED SIDE BY SIDE.

SPAN	MAXIMUM X–VALUE
10.00M (32.81')	0.23M (9.06")
12.50M (41.01')	0.29M (11.42")
15.00M (49.21')	0.36M (14.17")
17.50M (57.41')	0.43M (16.93")
20.00M (65.62')	0.50M (19.69")
22.50M (73.82')	0.58M (22.83")
25.00M (82.02')	0.66M (25.98")
27.50M (90.22')	0.74M (29.13")
30.00M (98.43')	0.83M (32.68")
32.50M (106.63')	0.92M (36.22")
35.00M (114.83')	1.01M (39.76")

NOTE 2:
HORIZONTAL DISTANCE OF TENSION WHEELS DEPENDS ON MASTSIZE!
EACH CASE MUST BE ANALYZED CAREFULLY!
ATTENTION MUST BE GIVEN TO CONFLICT OF STUD BOLT AND TENSION WHEEL SUSPENSION

NOTE 3:
CONTACT WIRE RAISING FROM RUNNING OUT CANTILEVER TO TENSION WHEEL: 1CM/M (0.394"/39.4")
CONTACT WIRE WHEEL POSITION DEPENDING ON END–SPAN LENGTH.
MAXIMUM VALUE FOR H=900MM (35.43").
EXAMPLE: IF THE CONTACT WIRE HEIGHT AT RUNNING OUT CANTILEVER IS 500MM (19.69") AND END–SPAN HAS A LENGTH OF 20M (787.4"), THE HEIGHT OF TENSION WHEEL IS 50CM (19.69") PLUS 1CMx20 (0.01x787.4"). IN TOTAL H=70CM (27.56").

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REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

Bin Zhang

DEPUTY DIRECTOR, ENGINEERING

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1250 San Carlos Avenue
San Carlos, CA 94070

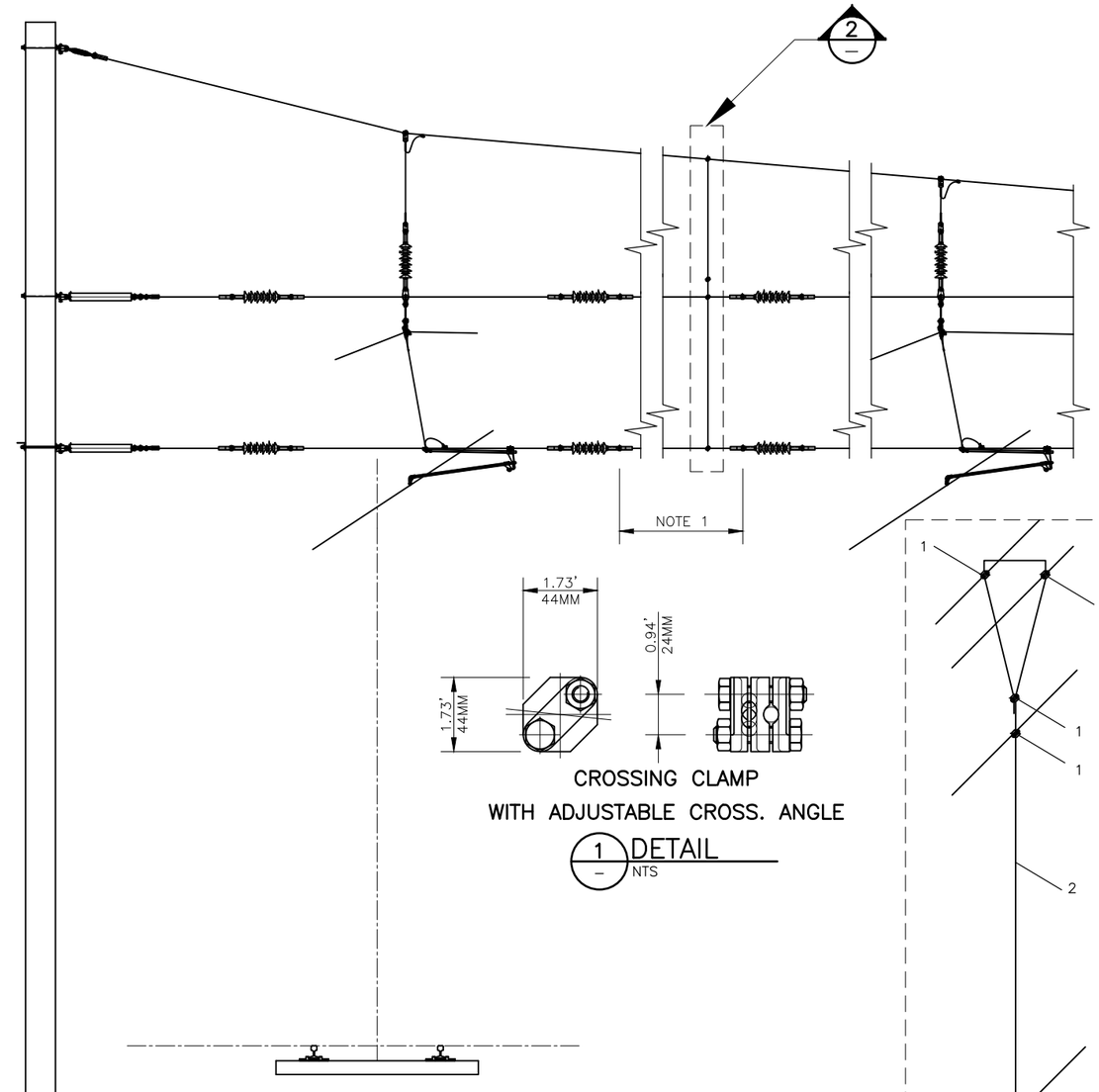
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
ADJUSTMENT OF MESSENGER WIRE
WHEEL TENSIONING DEVICE
FOR SHORT SPANS

CADD FILE NAME: W6125

REV: | EDITION: 01012024

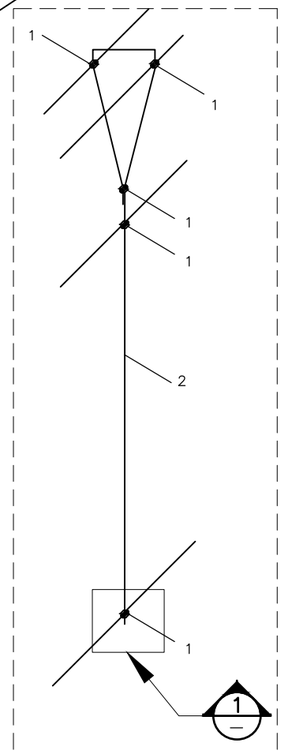
STANDARD DRAWING NO.: **W6125**



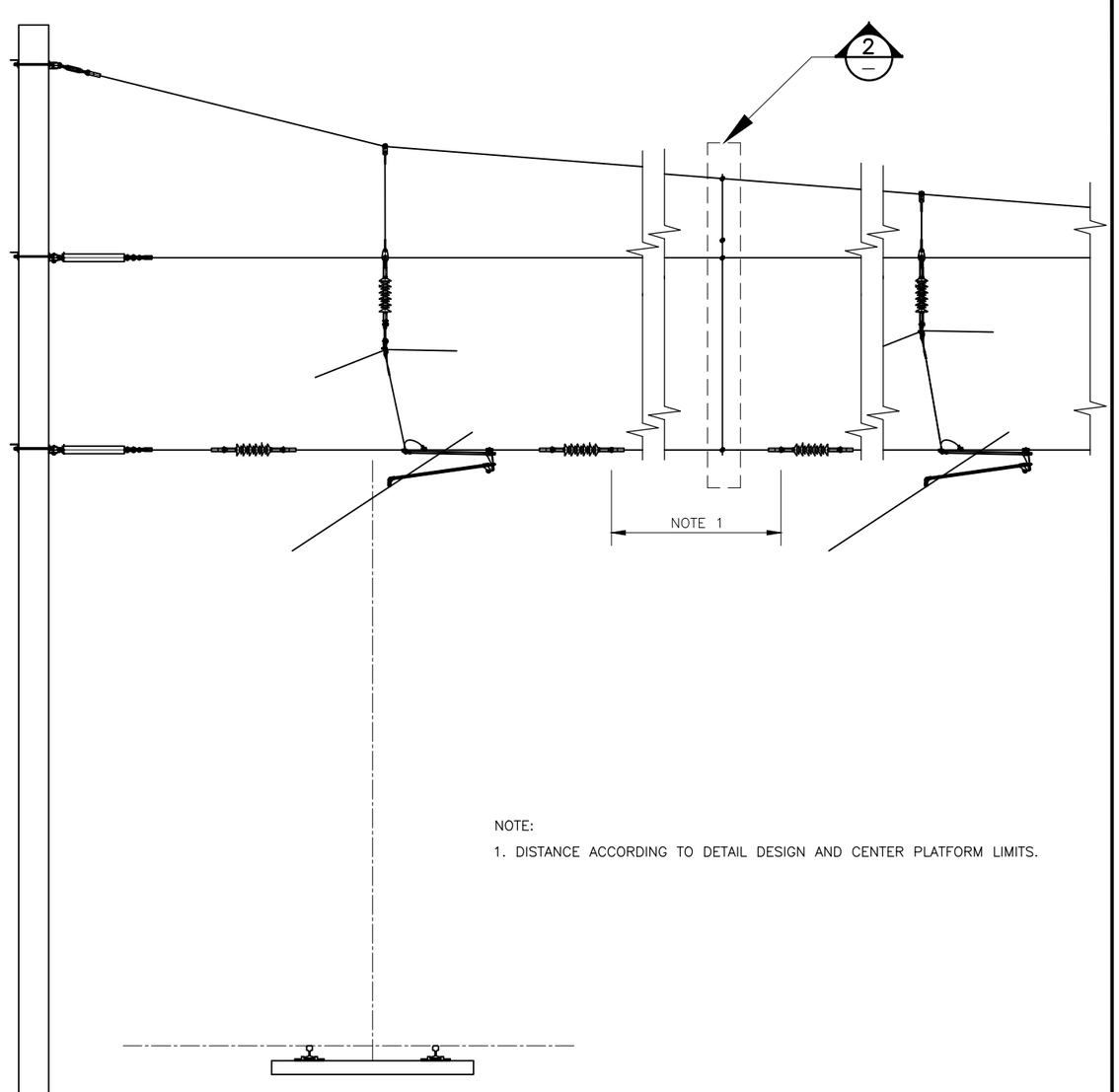
CROSSING CLAMP
WITH ADJUSTABLE CROSS. ANGLE

1 DETAIL
– NTS

EARTHING OF CROSS SPAN WIRES
FOR HEAD SPAN TYPE 2
ELEVATION
NTS



EARTHING OF CROSS SPAN WIRES
2 DETAIL
– NTS



NOTE:
1. DISTANCE ACCORDING TO DETAIL DESIGN AND CENTER PLATFORM LIMITS.

EARTHING OF CROSS SPAN WIRES
FOR HEAD SPAN TYPE 1
ELEVATION
NTS

PIECES	DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.
– 1	BZ II 70/19		2	W6001		.
– 5	CROSSING CLAMP FOR CATENARY SYSTEM		1	.		

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

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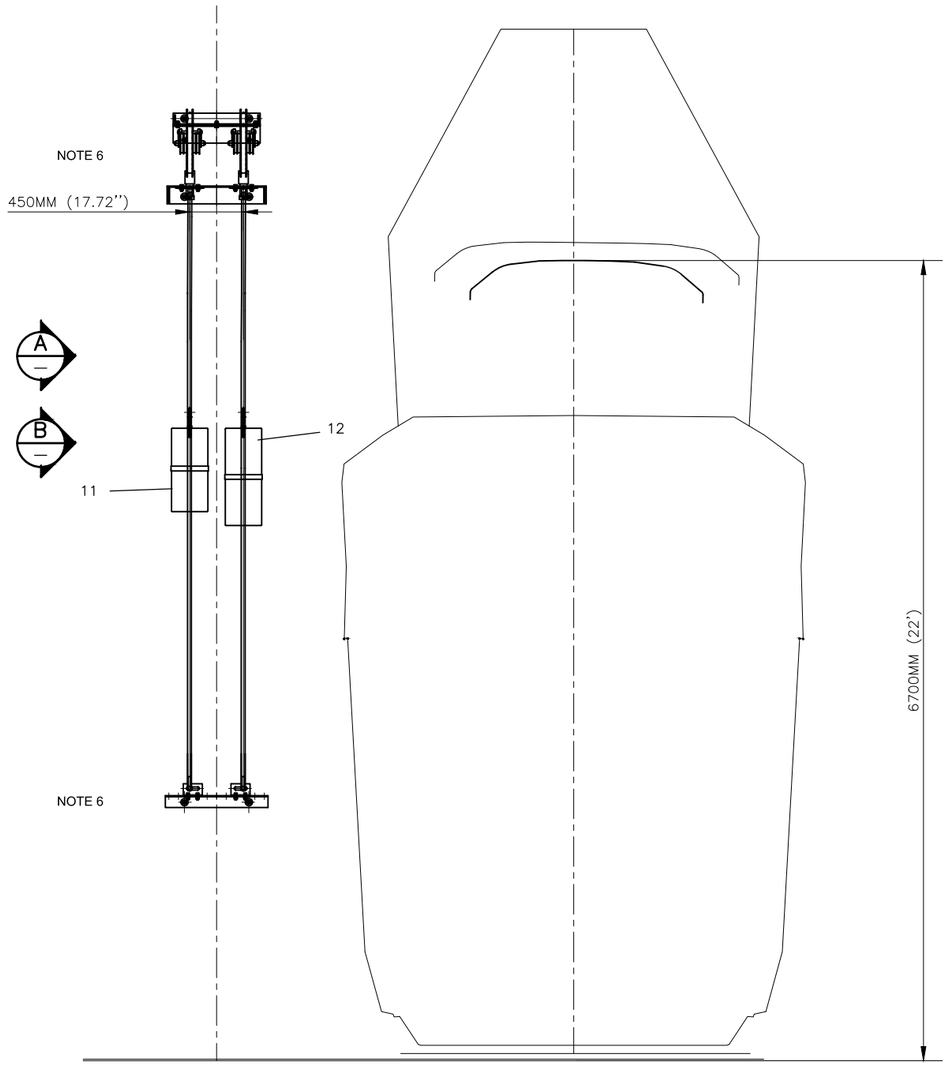
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
ARRANGEMENT AND EARTHING OF
CROSS SPAN WIRES ABOVE
PLATFORM AREAS / EQUAL SITUATIONS

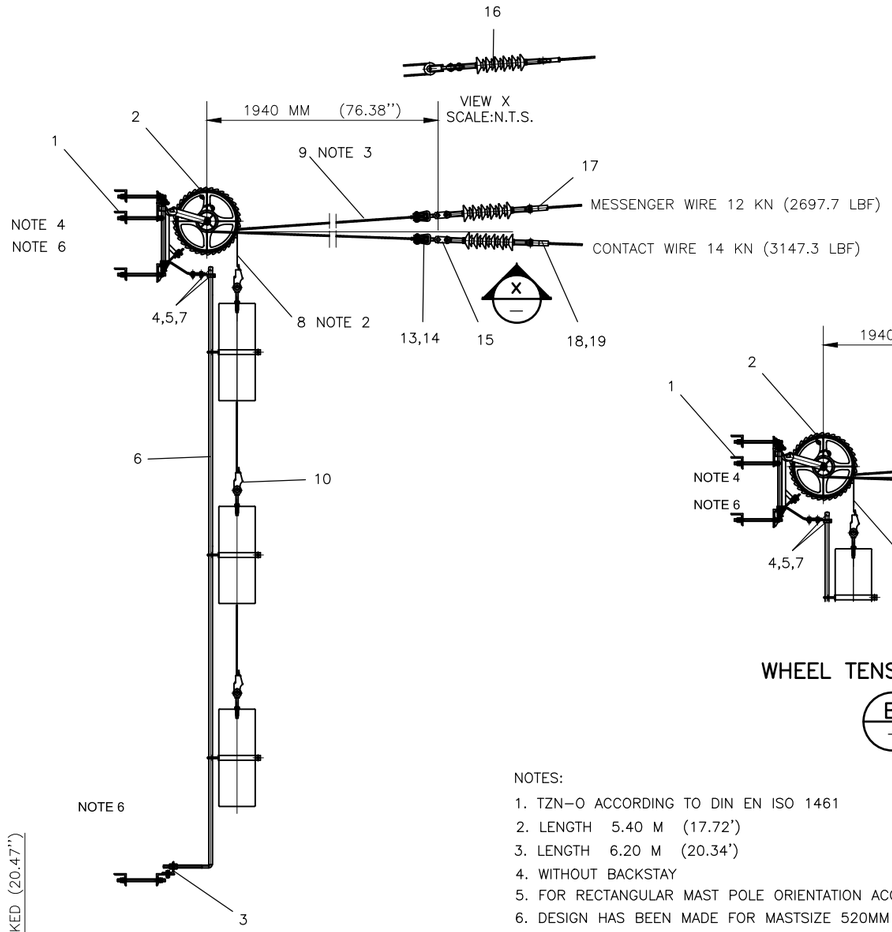
CADD FILE NAME: W6131
REV:
EDITION: 01012024
STANDARD DRAWING NO.: **W6131**



WHEEL TENSIONING DEVICE

ELEVATION

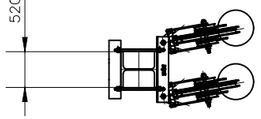
NTS



WHEEL TENSIONING DEVICE BW–01

A ELEVATION

NTS



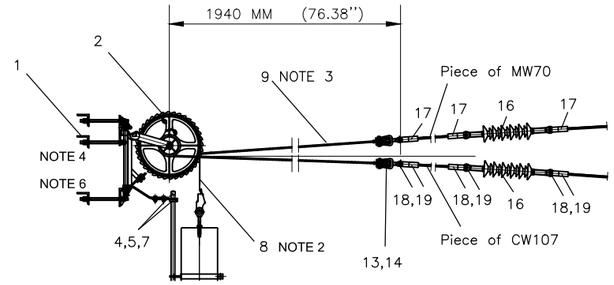
NOTE 5

NOTE 6

WHEEL TENSIONING DEVICE

PLAN

NTS



WHEEL TENSIONING DEVICE BW–01B

B ELEVATION

NTS

NOTES:

1. TZN–O ACCORDING TO DIN EN ISO 1461
2. LENGTH 5.40 M (17.72')
3. LENGTH 6.20 M (20.34')
4. WITHOUT BACKSTAY
5. FOR RECTANGULAR MAST POLE ORIENTATION ACC. TO LAYOUT PLANS.
6. DESIGN HAS BEEN MADE FOR MASTSIZE 520MM (20.47"). AND TENSION WHEEL DISTANCE 450MM (17.72") DOUBLE. FOR SMALLER MASTSIZE DESIGN MUST BE CHECKED AND DRAWINGS MUST BE UPDATED.
7. WHEREVER POSSIBLE USE–HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS).

DOUBLE	DOUBLE							
B	A							
3	1	PIN 19X52 WITH ß–SPLINT PIN		19			
3	1	TERMINATION CLAMP FOR CONTACT WIRE		18			
3	1	TERMINATION CLAMP FOR MESSENGER WIRE		17			
2	2	COMPOSITE INSULATOR		16			
–	2	LINK PLATE WITH BOLTS		15			
2	2	SWIVEL CLEVIS WITH EYE ROD		14			
2	2	PULLEY		13			
1	1	BALANCE WEIGHT SET 14 KN – CW		12			
1	1	BALANCE WEIGHT SET 12 KN – MW		11			
2	2	WEDGE CLAMP FOR MULTI STRAND WIRE		10			
2	2	STEEL WIRE, MULTI STRAND 50MM²	NOTE 3	9			
2	2	STEEL WIRE, MULTI STRAND 50MM²	NOTE 2	8			
2	2	TUBE CAP FOR Ø32MM (1.26")		7			
2	2	STEEL TUBE 32MMx3.5MM (1.26"x0.138")	E355 NOTE1	6	EN 10305–1(GB/T8161–1999)		L=5000MM
2	2	HEXAGON HEAD SCREW M8x16	A2	5	ISO 4017		
2	2	ADJUSTING COLLAR A 35		4			
1	1	BRACKET FOR WEIGHT GUIDE		3			
2	2	TENSIONING WHEEL ASSEMBLY 20 KN		2			
1	1	BRACKET FOR DOUBLE TENSIONING WHEEL		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

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PENINSULA CORRIDOR JOINT POWERS BOARD

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
TENSIONING WHEEL ASSEMBLY
12 / 14 kN
BW–01 / BW–01B

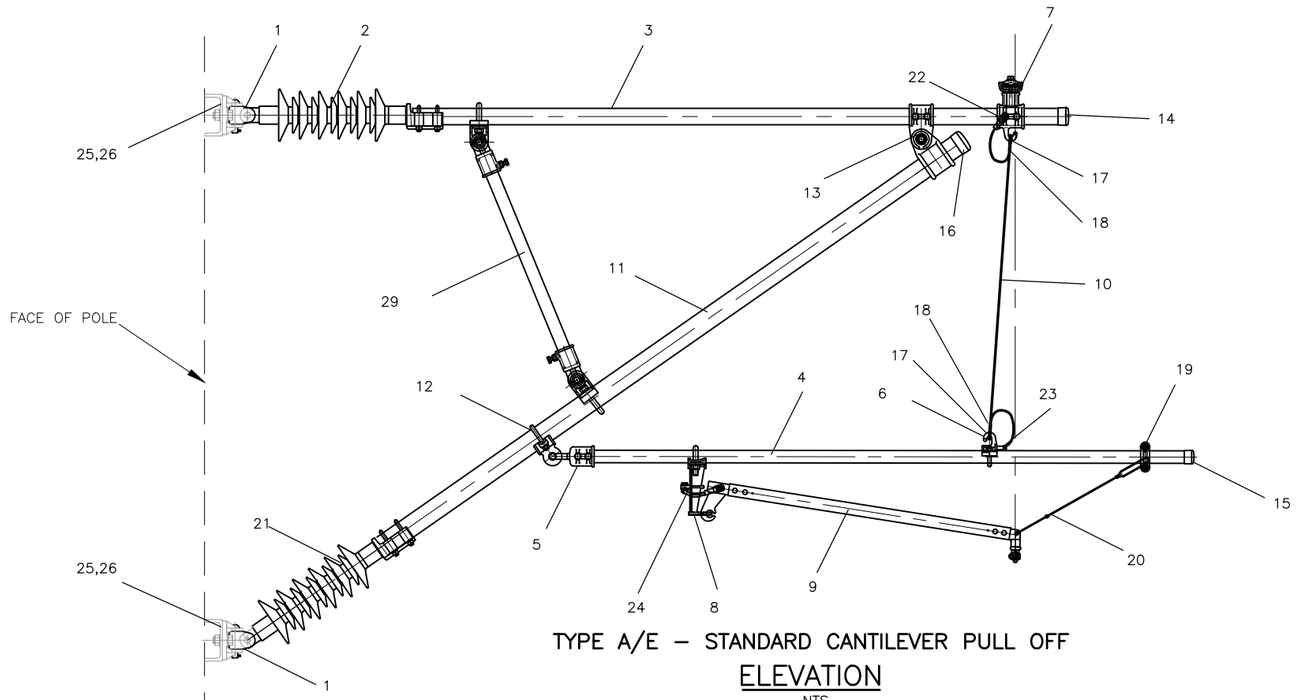
CADD FILE NAME: W6250

REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6250**

NOTES:

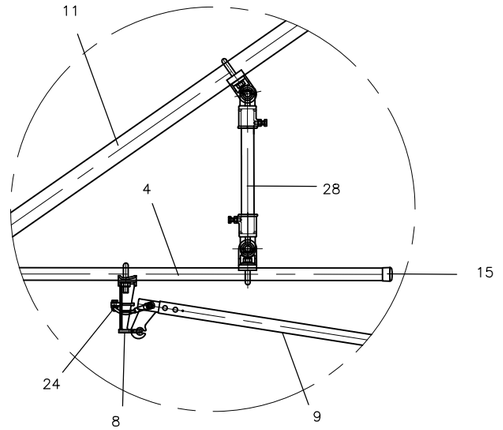
1. MAXIMUM DISTANCE SURFACE OF MAST TO CENTERLINE OF TRACK 5.20 M (17.06')
2. STANDARD DISTANCE SURFACE OF MAST TO CENTERLINE OF TRACK UP TO 3.50 M (11.48')
3. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)



TYPE A/E – STANDARD CANTILEVER PULL OFF

ELEVATION

NTS

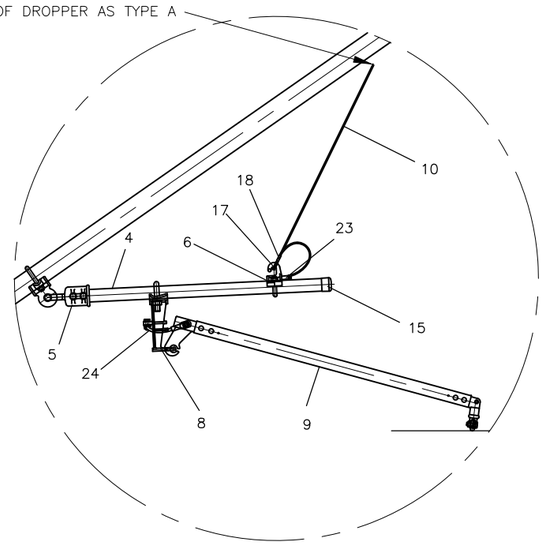


TYPE D/H – CANTILEVER PULL OFF FOR HIGH RADIAL LOAD

ELEVATION

NTS

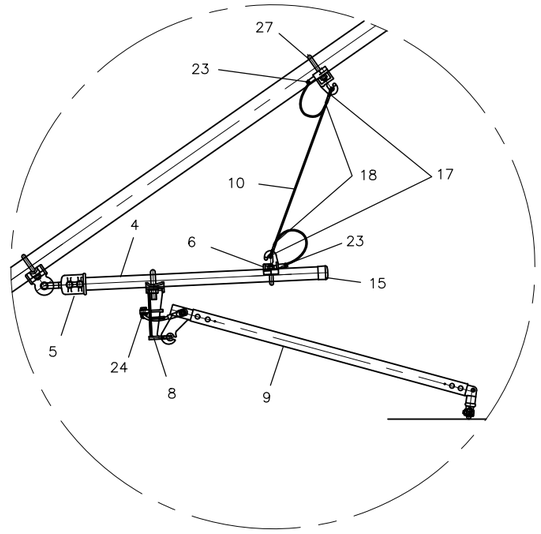
SUSPENSION OF DROPPER AS TYPE A



TYPE B/F – CANTILEVER PULL OFF WITHOUT WINDSTAY

ELEVATION

NTS



TYPE C/G – CANTILEVER PULL OFF WITHOUT WINDSTAY AND DROPPER AT HOOK CLAMP

ELEVATION

NTS

NOTE	1.	1.	1.	1.	2.	2.	2.	2.							
	H	G	F	E	D	C	B	A							
	TYPE D WITH DIAGONAL TUBE	TYPE C WITH DIAGONAL TUBE	TYPE B WITH DIAGONAL TUBE	TYPE A WITH DIAGONAL TUBE	FOR HIGH RADIAL LOAD / STIFFENING NECESSARY	WITHOUT WINDSTAY, DROPPER AT HOOK CLAMP	WITHOUT WINDSTAY, DROPPER AT MW–CLAMP	WITH WINDSTAY, DROPPER AT MW–CLAMP	DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.
	1	1	1	1	–	–	–	–	DIAGONAL TUBE ø42		29			
	1	–	–	–	1	–	–	–	DIAGONAL TUBE ø42		28			
	–	1	–	–	–	1	–	–	HOOK CLAMP FOR TUBE ø70		27			
	1	2	2	2	1	2	2	2	BETA–SPLINT PIN	1.4462	26			
	1	2	2	2	1	2	2	2	PIN 19X100	A2	25			
	1	1	1	1	1	1	1	1	ELECTRICAL CONNECTION		24			
	–	2	1	1	–	2	1	1	CABLE LUG 10–25 S	CU TIN–PLATED	23			
	–	–	1	1	–	–	1	1	CABLE LUG 12–25 S	CU TIN–PLATED	22			
	1	1	1	1	1	1	1	1	COMPOSITE INSULATOR EYE/CAP ø70		21			
	–	–	–	1	–	–	–	1	WIND STAY FOR STEADY ARM		20			
	–	–	–	1	–	–	–	1	EYE CLAMP FOR WIND STAY ø42		19			
	–	2	2	2	–	2	2	2	COMPRESS. SLEEVE B16	A2	18			
	–	2	2	2	–	2	2	2	THIMBLE 35	A2	17			
	1	1	1	1	1	1	1	1	TUBE CAP ø70	PVC	16			
	1	1	1	1	1	1	1	1	TUBE CAP ø42	PVC	15			
	1	1	1	1	1	1	1	1	TUBE CAP ø55	PVC	14			
	1	1	1	1	1	1	1	1	TUBE CONNECTING BRACKET ø55/70		13			
	1	1	1	1	1	1	1	1	EYE CLAMP FOR TUBE ø70		12			
	1	1	1	1	1	1	1	1	TUBE ø70X6 LENGTH AS NEEDED	ALMGSI1F31	11			
	–	1	1	1	–	1	1	1	WIRE 6–SE–BK 1570 SZ	STAINLESS STEEL	10			
	1	1	1	1	1	1	1	1	STEADY ARM LENGTH AS NEEDED		9			
	1	1	1	1	1	1	1	1	DROP BRACKET FOR ø42		8			
	1	1	1	1	1	1	1	1	CATENARY SWIVEL CLAMP TUBE ø55		7			
	–	1	1	1	–	1	1	1	HOOK CLAMP FOR TUBE ø42		6			
	1	1	1	1	1	1	1	1	HOOK END FITTING FOR TUBE ø42		5			
	1	1	1	1	1	1	1	1	TUBE ø42X4 LENGTH AS NEEDED	ALMGSI1F31	4			
	1	1	1	1	1	1	1	1	TUBE ø55X6 LENGTH AS NEEDED	ALMGSI1F31	3			
	1	1	1	1	1	1	1	1	COMPOSITE INSULATOR EYE/CAP ø55		2			
	2	2	2	2	2	2	2		SWIVEL JOINT		1			
	PIECES								DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CANTILEVER PULL OFF
CA–01

CADD FILE NAME: W6253

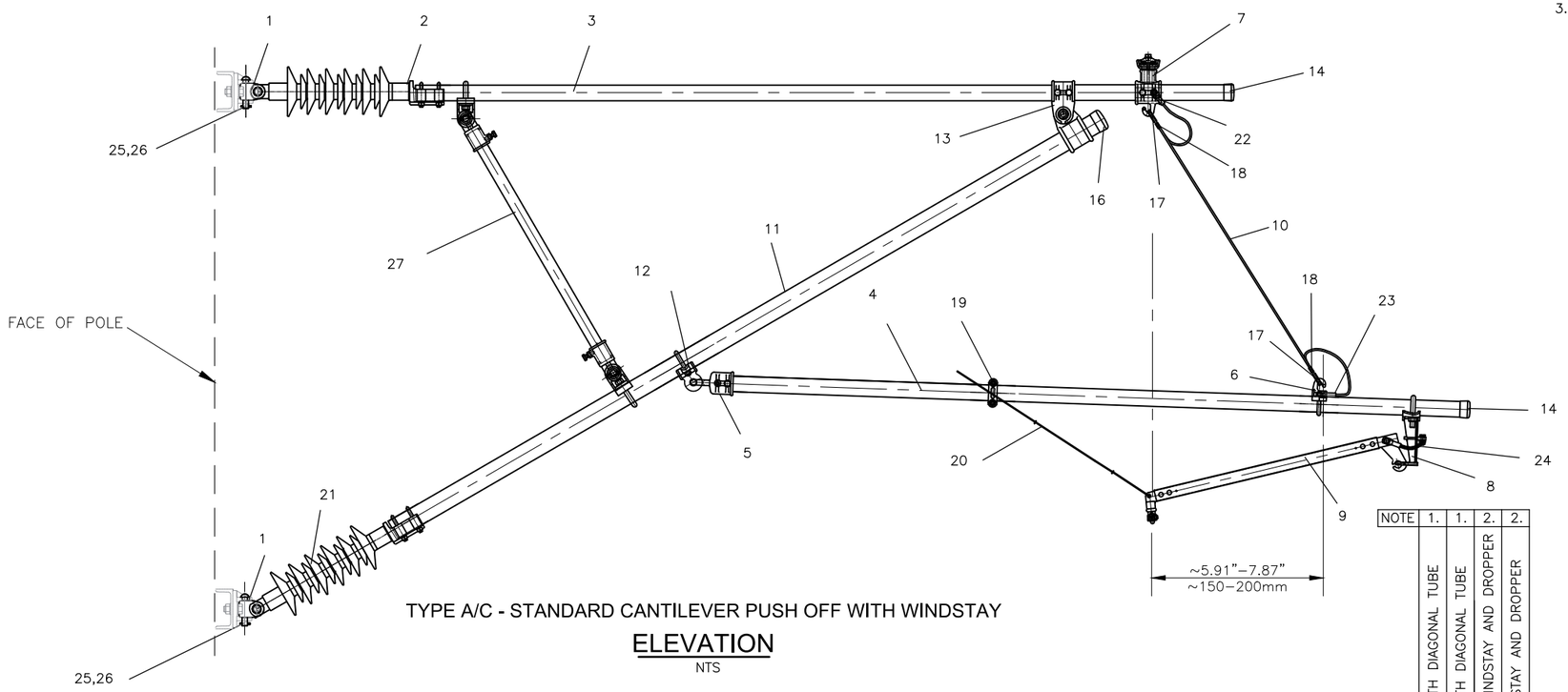
REV:

EDITION: 01012024

STANDARD DRAWING NO.: **W6253**

NOTES:

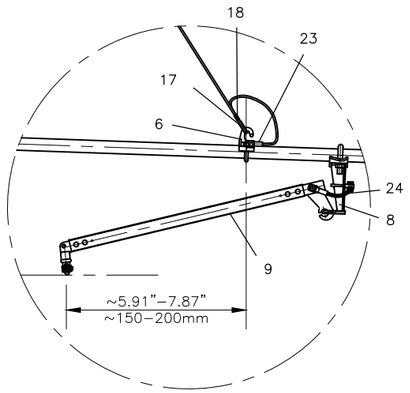
1. MAXIMUM DISTANCE SURFACE OF MAST TO CENTERLINE OF TRACK 5.20 M (17.06')
2. STANDARD DISTANCE SURFACE OF MAST TO CENTERLINE OF TRACK UP TO 3.50 M (11.48')
3. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)



TYPE A/C - STANDARD CANTILEVER PUSH OFF WITH WINDSTAY

ELEVATION

NTS



TYPE B/D - STANDARD CANTILEVER PUSH OFF WITHOUT WINDSTAY

ELEVATION

NTS

NOTE	1.	1.	2.	2.						
	TYPE B WITH DIAGONAL TUBE	TYPE A WITH DIAGONAL TUBE	WITHOUT WINDSTAY AND DROPPER	WITH WINDSTAY AND DROPPER						
D	C	B	A							
1	1	–	–	DIAGONAL TUBE ø42		27				
2	2	2	2	BETA–SPLINT PIN	1.4462	26				
2	2	2	2	PIN 19X100	A2	25				
1	1	1	1	ELECTRICAL CONNECTION		24				
1	1	1	1	CABLE LUG 10–25 S	CU TIN–PLATED	23				
1	1	1	1	CABLE LUG 12–25 S	CU TIN–PLATED	22				
1	1	1	1	COMPOSITE INSULATOR EYE/CAP ø70		21				
–	1	–	1	WIND STAY FOR STEADY ARM		20				
–	1	–	1	EYE CLAMP FOR WIND STAY FOR TUBE ø55		19				
2	2	2	2	COMPRESS. SLEEVE B16	A2	18				
2	2	2	2	THIMBLE 35	A2	17				
1	1	1	1	TUBE CAP ø 70	PVC	16				
2	2	2	2	TUBE CAP ø55	PVC	14				
1	1	1	1	TUBE CONNECTING BRACKET ø 55 /ø70		13				
1	1	1	1	EYE CLAMP FOR TUBE ø70		12				
1	1	1	1	TUBE ø70 X 6 LENGTH AS USED	ALMGSI1F31	11				
1	1	1	1	WIRE 6–SE–BK 1570 SZ	STAINLESS STEEL	10				
1	1	1	1	STEADY ARM LENGTH AS USED		9				
1	1	1	1	DROP BRACKET FOR ø55		8				
1	1	1	1	CATENARY SWIVEL CLAMP FOR ø55		7				
1	1	1	1	HOOK CLAMP FOR TUBE ø55		6				
1	1	1	1	HOOK END FITTING FOR ø55		5				
1	1	1	1	TUBE ø55 X 6 LENGTH AS USED	ALMGSI1F31	4				
1	1	1	1	TUBE ø55 X 6 LENGTH AS USED	ALMGSI1F31	3				
1	1	1	1	COMPOSITE INSULATOR EYE/CAP ø55		2				
2	2	2	2	SWIVEL JOINT		1				
PIECES				DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD		KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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Caltrain

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San Carlos, CA 94070

STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CANTILEVER PUSH OFF
CA–02

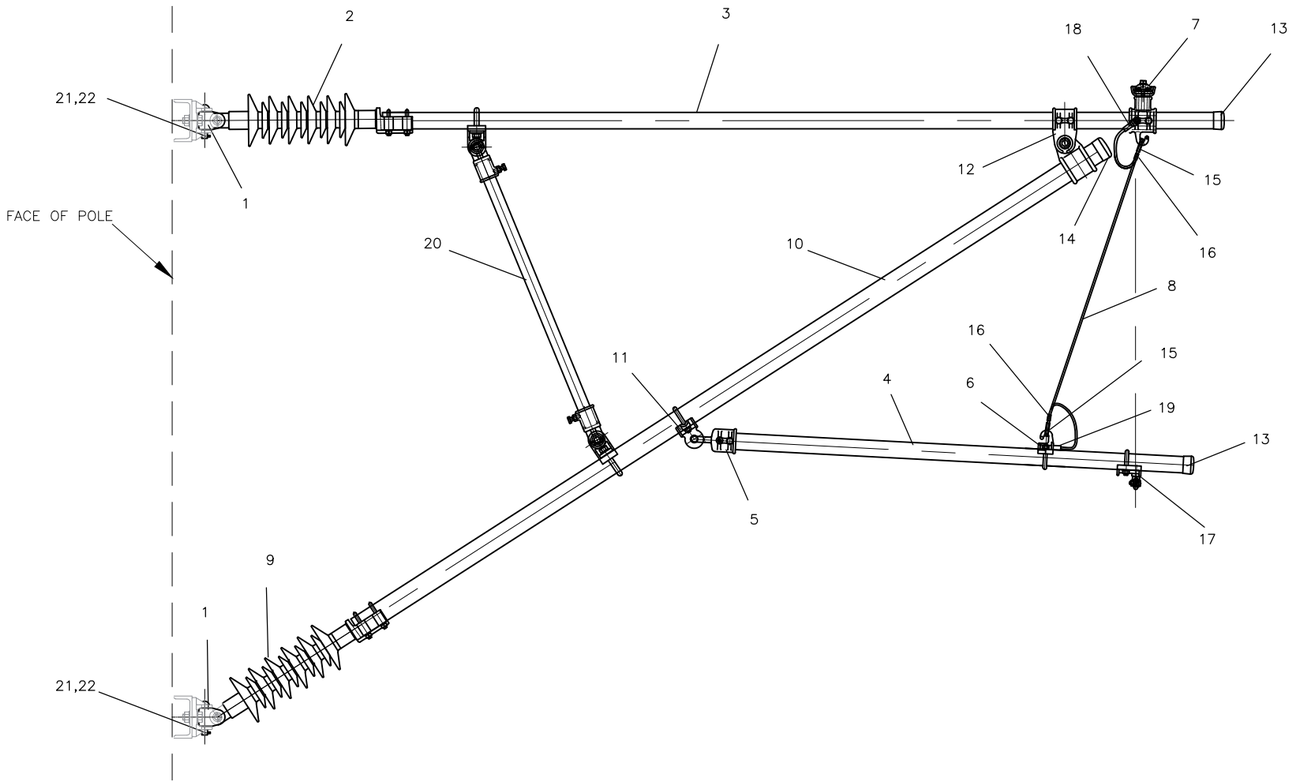
CADD FILE NAME: W6254

REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6254**

NOTES:

1. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)



STANDARD CANTILEVER RUNNING OUT

ELEVATION

NTS

CANTILEVER WITH DIAGONAL TUBE

	PIECES	DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.
	A						
	2	BETA–SPLINT PIN	1.4462	22			
	2	PIN 19X100	A2	21			
	1	DIAGONAL TUBE ø42		20			
	1	CABLE LUG 10–25 S	CU TIN–PLATED	19	shape DIN 46235		
	1	CABLE LUG 12–25 S	CU TIN–PLATED	18	shape DIN 46235		
	1	CW–HOLDER FOR TUBE ø 55	G–Al	17			
	2	COMPRESS. SLEEVE B16	A2	16			
	2	THIMBLE 35	A2	15	DIN 43154		
	1	TUBE CAP ø70	PVC	14			
	2	TUBE CAP ø55	PVC	13			
	1	TUBE CONNECTING BRACKET ø55/ø70	G–Al	12			
	1	EYE CLAMP FOR TUBE ø70	G–Al	11			
	1	TUBE ø70 X 6 LENGTH AS NEEDED	ALMGSI1F31	10			
	1	COMPOSITE INSULATOR EYE/CAP ø70		9			
	1	WIRE 6–SE–BK 1570 SZ	STAINLESS STEEL	8			
	1	CATENARY SWIVEL CLAMP FOR TUBE ø55	G–Al	7			
	1	HOOK CLAMP FOR TUBE ø55	G–Al	6			
	1	HOOK END FITTING FOR TUBE ø55	G–Al	5			
	1	TUBE ø55 X 6 LENGTH AS NEEDED	ALMGSI1F31	4			
	1	TUBE ø55 X 6 LENGTH AS NEEDED	ALMGSI1F31	3			
	1	COMPOSITE INSULATOR EYE/CAP ø55		2			
	2	SWIVEL JOINT	ALSI7MG0,3	1			

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					01012024 EDITION

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PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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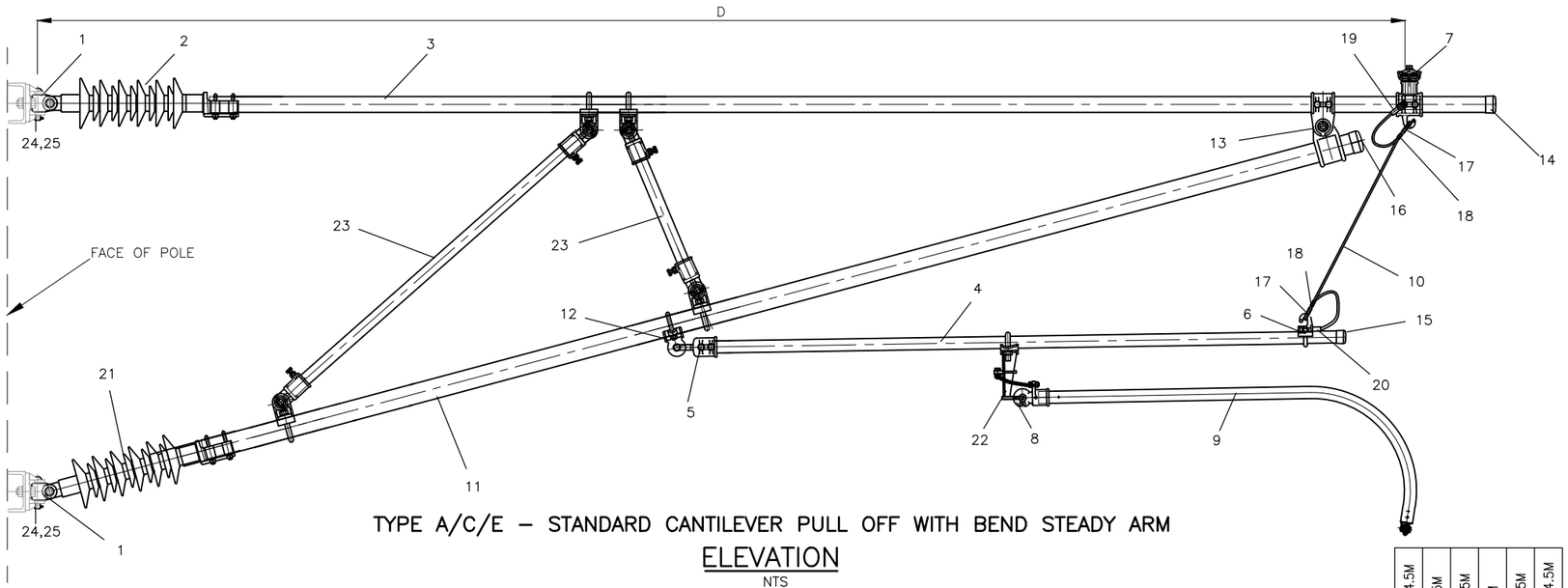
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CANTILEVER
OUT OF RUNNING
CA–05

CADD FILE NAME: W6255

REV: | EDITION: 01012024

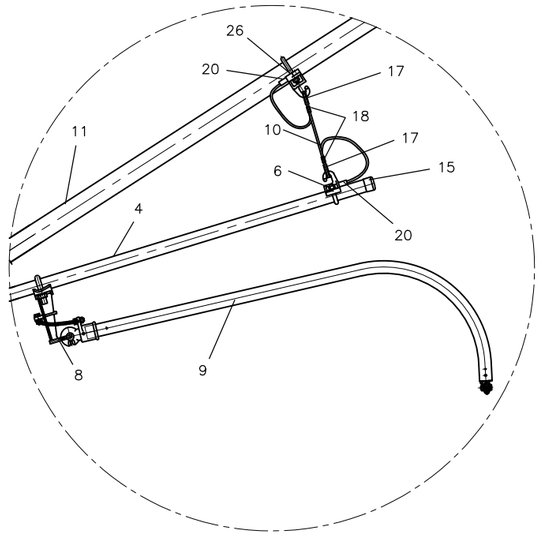
STANDARD DRAWING NO.: **W6255**



TYPE A/C/E – STANDARD CANTILEVER PULL OFF WITH BEND STEADY ARM

ELEVATION

NTS



TYPE B/D/F – STANDARD CANTILEVER PULL OFF – DROPPER AT HOOK CLAMP WITH BEND STEADY ARM

ELEVATION

NTS

NOTES:

1. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

F	E	D	C	B	A	DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.
1	–	1	–	1	–	HOOK CLAMP FOR TUBE ø70		26			
2	2	2	2	2	2	BETA–SPLINT PIN	1.4462	25			
2	2	2	2	2	2	PIN 19X100	A2	24			
–	–	1	1	2	2	DIAGONAL TUBE ø42, COMPLETE		23			
1	1	1	1	1	1	ELECTRICAL CONNECTION		22			
1	1	1	1	1	1	COMPOSITE INSULATOR EYE/CAP ø70		21			
2	1	2	1	2	1	CABLE LUG 10–25 S	CU TIN–PLATED	20	shape DIN 46235		
–	1	–	1	–	1	CABLE LUG 12–25 S	CU TIN–PLATED	19	shape DIN 46235		
2	2	2	2	2	2	COMPRESS. SLEEVE B16	A2	18			
2	2	2	2	2	2	THIMBLE 35	A2	17	DIN 43154		
1	1	1	1	1	1	TUBE CAP ø70	PVC	16			
1	1	1	1	1	1	TUBE CAP ø42	PVC	15			
1	1	1	1	1	1	TUBE CAP ø55	PVC	14			
1	1	1	1	1	1	TUBE CONNECTING BRACKET ø55/ø70		13			
1	1	1	1	1	1	EYE CLAMP FOR TUBE ø70		12			
1	1	1	1	1	1	TUBE ø70X6 LENGTH AS NEEDED	ALMGSI1F31	11			
1	1	1	1	1	1	WIRE 6–SE–BK 1570 SZ	STAINLESS STEEL	10			
1	1	1	1	1	1	STEADY ARM BENT		9			
1	1	1	1	1	1	DROP BRACKET FOR ø42		8			
1	1	1	1	1	1	CATENARY SWIVEL CLAMP FOR TUBE ø55		7			
1	1	1	1	1	1	HOOK CLAMP FOR TUBE ø42		6			
1	1	1	1	1	1	HOOK END FITTING FOR TUBE ø42		5			
1	1	1	1	1	1	TUBE ø42X4 LENGTH AS NEEDED	ALMGSI1F31	4			
1	1	1	1	1	1	TUBE ø55X6 LENGTH AS NEEDED	ALMGSI1F31	3			
1	1	1	1	1	1	COMPOSITE INSULATOR EYE/CAP ø55		2			
2	2	2	2	2	2	SWIVEL JOINT		1			

NO DIAGONAL TUBE, DROPPER AT HOOK CLAMP D≤4.5M
NO DIAGONAL TUBE, DROPPER AT MW–CLAMP D≤4.5M
1 DIAGONAL TUBE, DROPPER AT HOOK CLAMP D≤4.5M
1 DIAGONAL TUBE, DROPPER AT MW–CLAMP D≤4.5M
2 DIAGONAL TUBE, DROPPER AT HOOK CLAMP D>4.5M
2 DIAGONAL TUBE, DROPPER AT MW–CLAMP D>4.5M

PIECES

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

Bin Zhang

DEPUTY DIRECTOR, ENGINEERING

Caltrain

1250 San Carlos Avenue
San Carlos, CA 94070

STANDARD DRAWINGS

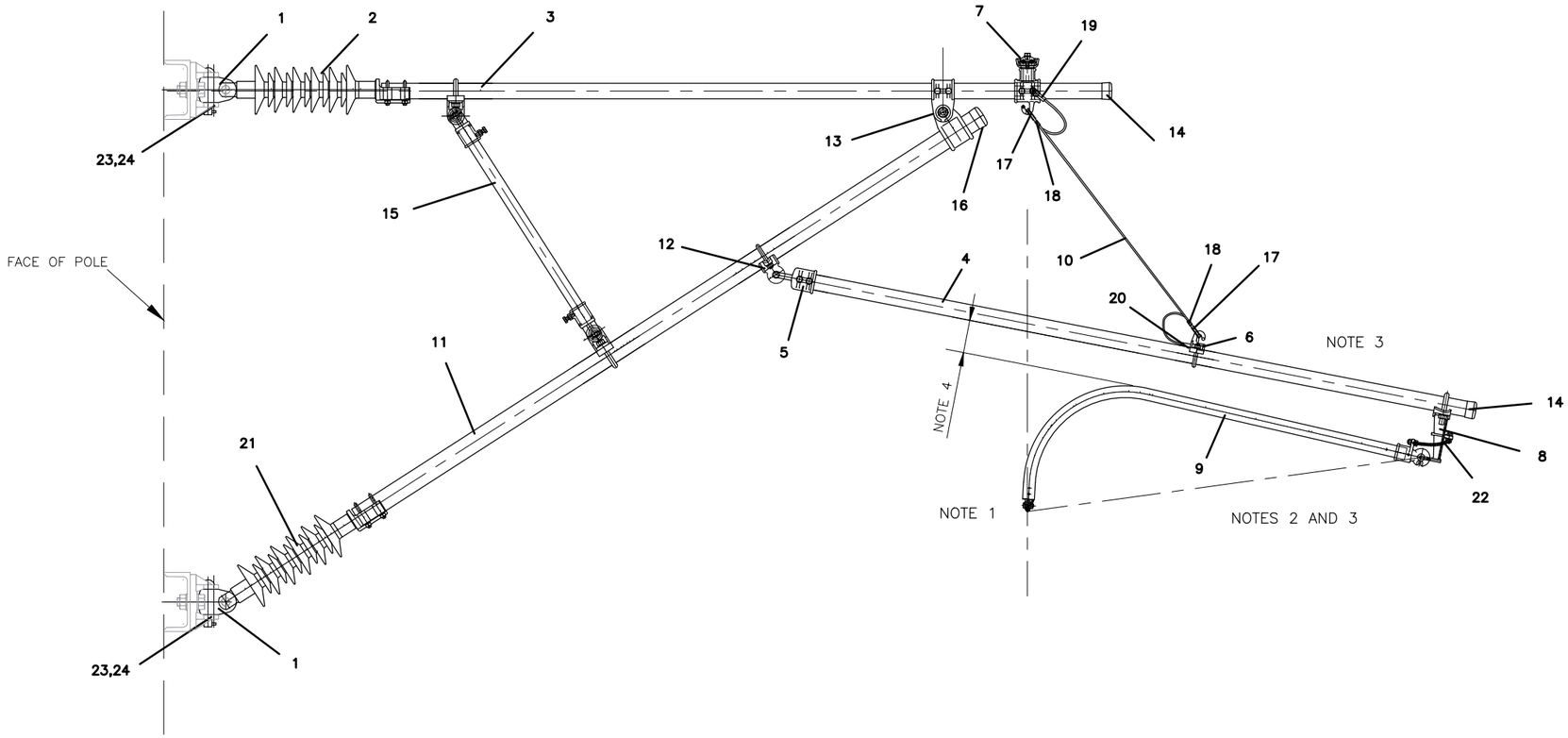
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CANTILEVER PULL OFF
WITH BENT STEADY ARM
CA–10

CADD FILE NAME: W6256

REV:

EDITION: 01012024

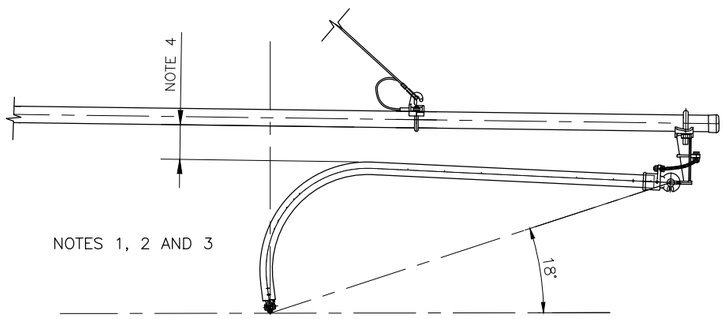
STANDARD DRAWING NO.: **W6256**



STANDARD CANTILEVER PUSH OFF WITH BENT STEADY ARM

ELEVATION

NTS



STANDARD CANTILEVER PUSH OFF WITH BENT STEADY ARM
REGISTRATION TUBE WITH NEARLY NO INCLINATION

ELEVATION

NTS

NOTES:

1. MAXIMUM WORKING LOAD:
   F = 404.65 LBF (1.8 kN)
2. INCLINATION OF BENT STEADY ARM TO BE CACULATED IN DETAIL DESIGN
   – DEPENDING ON RADIAL FORCE AND DROPPER DISTANCE.
   ACCORDING TO THIS RESULTING INCLINATION THE REGISTRATION TUBE MUST BE ADJUSTED
3. THE REGISTRATION TUBE CAN BE INSTALLED WITH NO INCLINATION IN SPECIAL CIRCUMSTANCES TO ACHIEVE CLEARANCE FROM PASSING PANTOGRAPH.

   FOR THIS IT IS NECESSARY TO MAKE A CALCULATION OF BENT STEADY ARM INCLINATION DEPENDING ON RADIAL FORCE AND DROPPER DISTANCE. THIS INCLINATION MUST FIT TO INCLINATION TO REGISTRATION TUBE. THIS TO AVOID COLLISION BETWEEN REGISTRATION TUBE AND BENT STEADY ARM.IF NECESSARY CHANGE RADIAL FORCE AND DROPPER DISTANCE BY MODIFICATION IN DETAIL DESIGN.

   A REGISTRATION TUBE WITH NEARLY NO INCLINATION NEEDS TO HAVE A BENT STEADY ARM INCLINATION OF ABOUT 18°
4. DISTANCE REGISTRATION TUBE TO BENT STEADY ARM IS TWO TIMES THE REAL UPLIFT PLUS 1.97'' (50MM) FOR SAFTEY DISTANCE = 9.843'' (250MM)
5. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

	A						
	2	BETA–SPLINT PIN	1.4462	24			
	2	PIN 19X100	A2	23			
	1	ELECTRICAL CONNECTION		22			
	1	COMPOSITE INSULATOR EYE/CAP ø70		21			
	1	CABLE LUG 10–25 S	CU TIN–PLATED	20	shape DIN 46235		
	1	CABLE LUG 12–25 S	CU TIN–PLATED	19	shape DIN 46235		
	2	COMPRESS. SLEEVE B16	A2	18			
	2	THIMBLE 35	A2	17	DIN 43154		
	1	TUBE CAP ø70	PVC	16			
	1	DIAGONAL TUBE ø42, COMPLETE		15			
	2	TUBE CAP ø55	PVC	14			
	1	TUBE CONNECTING BRACKET ø55/ø70		13			
	1	EYE CLAMP FOR TUBE ø70	G–Al	12			
	1	TUBE ø70 X 6 LENGTH AS NEEDED	ALMGSI1F31	11			
	1	WIRE 6–SE–BK 1570 SZ	STAINLESS STEEL	10			
	1	STEADY ARM BENT		9			
	1	DROP BRACKET FOR ø55		8			
	1	CATENARY SWIVEL CLAMP FOR TUBE ø55	G–Al	7			
	1	HOOK CLAMP FOR TUBE ø55	G–Al	6			
	1	HOOK END FITTING FOR TUBE ø55	G–Al	5			
	1	TUBE ø55 X 6 LENGTH AS NEEDED	ALMGSI1F31	4			
	1	TUBE ø55 X 6 LENGTH AS NEEDED	ALMGSI1F31	3			
	1	COMPOSITE INSULATOR EYE/CAP ø55		2			
	2	SWIVEL JOINT	ALSI7MG0,3	1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CANTILEVER PUSH OFF
WITH BENT STEADY ARM
CA–11

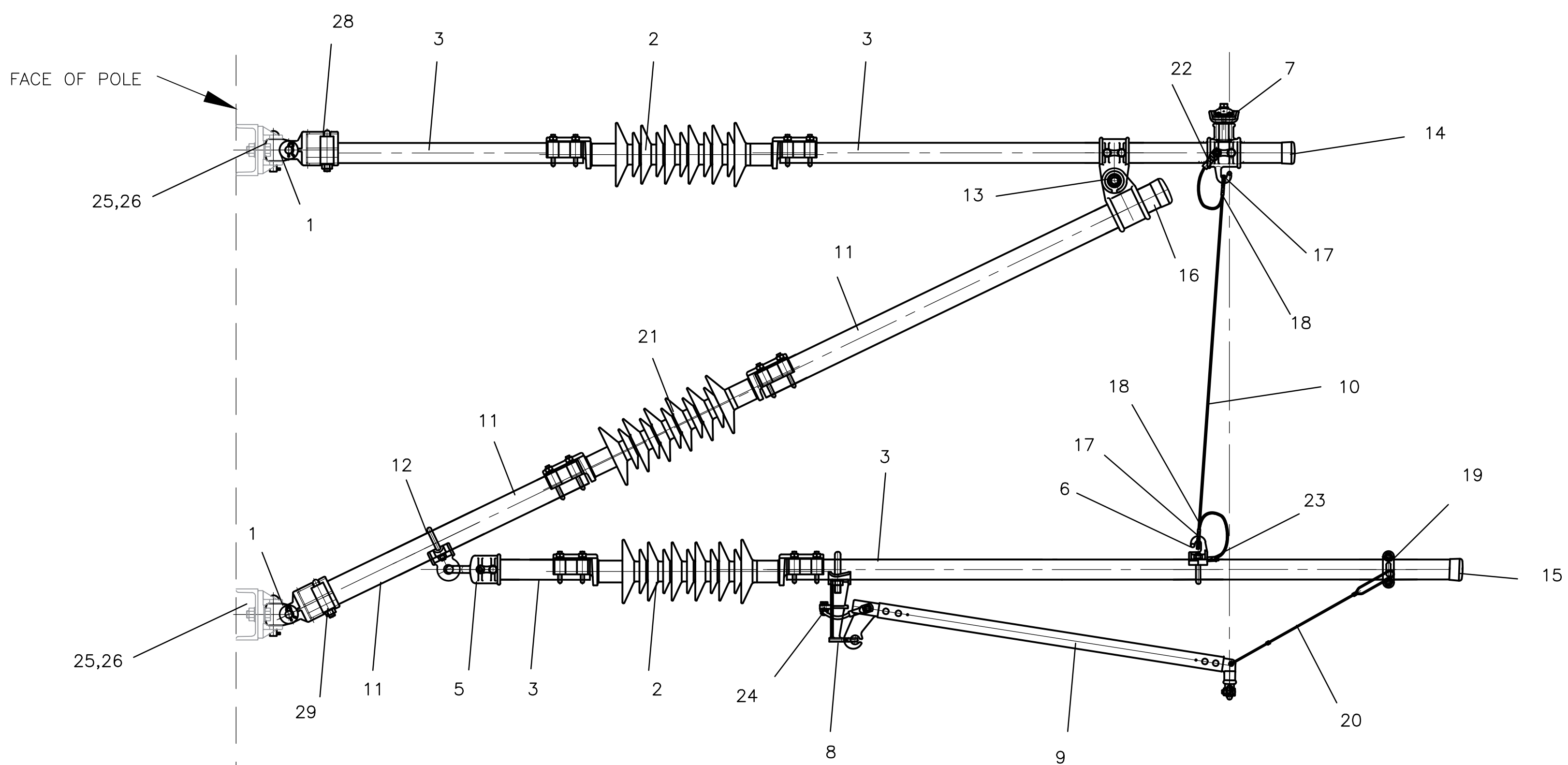
CADD FILE NAME: W6257

REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6257**

NOTES:

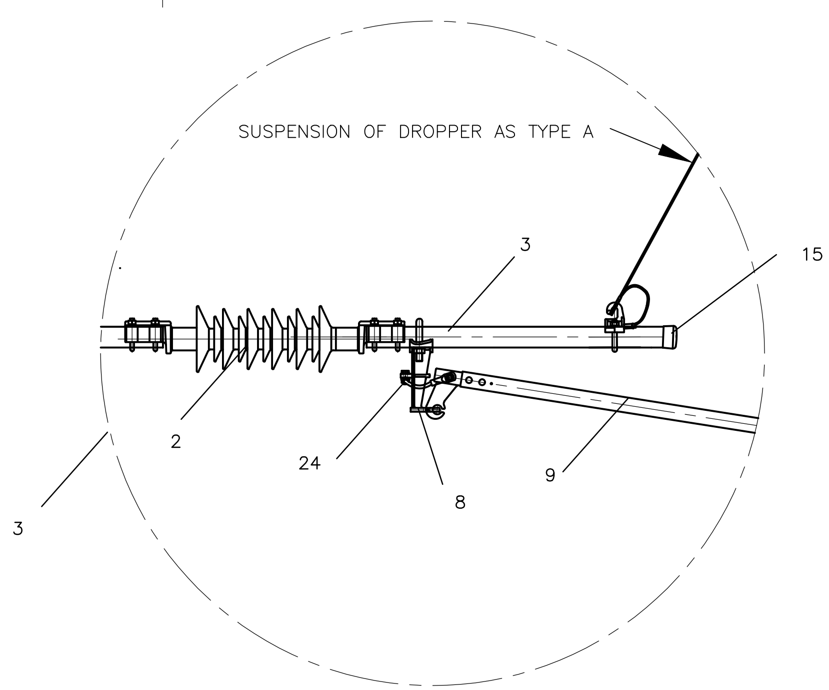
1. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)



TYPE A - CANTILEVER PULL OFF WITH OFFSET INSULATION

ELEVATION

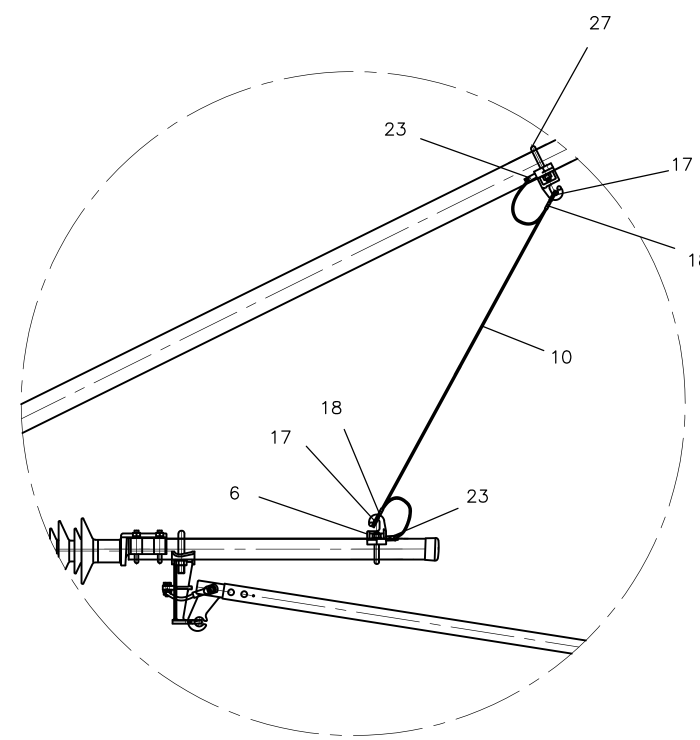
NTS



TYPE B - CANTILEVER PULL OFF WITH OFFSET INSULATION

ELEVATION

NTS



TYPE C - CANTILEVER PULL OFF WITH OFFSET INSULATION

ELEVATION

NTS

C: WITHOUT WINDSTAY, DROPPER AT HOOK CLAMP	B: WITHOUT WINDSTAY, DROPPER AT MW–CLAMP	A: WITH WINDSTAY, DROPPER AT MW–CLAMP	DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.
1	1	1	CLEVIS FOR TUBE ø70		29			
1	1	1	CLEVIS FOR TUBE ø55		28			
1	–	–	HOOK CLAMP FOR TUBE ø70		27			
2	2	2	BETA–SPLINT PIN	1.4462	26			
2	2	2	PIN 19X100	A2	25			
1	1	1	ELECTRICAL CONNECTION		24			
2	1	1	CABLE LUG 10–25 S	CU TIN–PLATED	23			
–	1	1	CABLE LUG 12–25 S	CU TIN–PLATED	22			
1	1	1	COMPOSITE INSULATOR CAP/CAP ø70		21			
–	–	1	WIND STAY FOR STEADY ARM		20			
–	–	1	EYE CLAMP FOR WIND STAY ø55		19			
2	2	2	COMPRESS. SLEEVE B16	A2	18			
2	2	2	THIMBLE 35	A2	17			
1	1	1	TUBE CAP ø70	PVC	16			
1	1	1	TUBE CAP ø55	PVC	15			
1	1	1	TUBE CAP ø55	PVC	14			
1	1	1	TUBE CONNECTING BRACKET ø55/70		13			
1	1	1	EYE CLAMP FOR TUBE ø70		12			
2	2	2	TUBE ø70X6 LENGTH AS NEEDED	ALMGSI1F31	11			
1	1	1	WIRE 6–SE–BK 1570 SZ	STAINLESS STEEL	10			
1	1	1	STEADY ARM LENGTH AS NEEDED		9			
1	1	1	DROP BRACKET FOR ø55		8			
1	1	1	CATENARY SWIVEL CLAMP TUBE ø55		7			
1	1	1	HOOK CLAMP FOR TUBE ø55		6			
1	1	1	HOOK END FITTING FOR TUBE ø55		5			
					4			
4	4	4	TUBE ø55X6 LENGTH AS NEEDED	ALMGSI1F31	3			
2	2	2	COMPOSITE INSULATOR CAP/CAP ø55		2			
2	2	2	SWIVEL JOINT		1			
PIECES								

REV	DATE	BY	CHK	APP	DESCRIPTION	REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION						

PENINSULA CORRIDOR JOINT POWERS BOARD

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CANTILEVER WITH
OFFSET INSULATION
CA–12

CADD FILE NAME: W6258

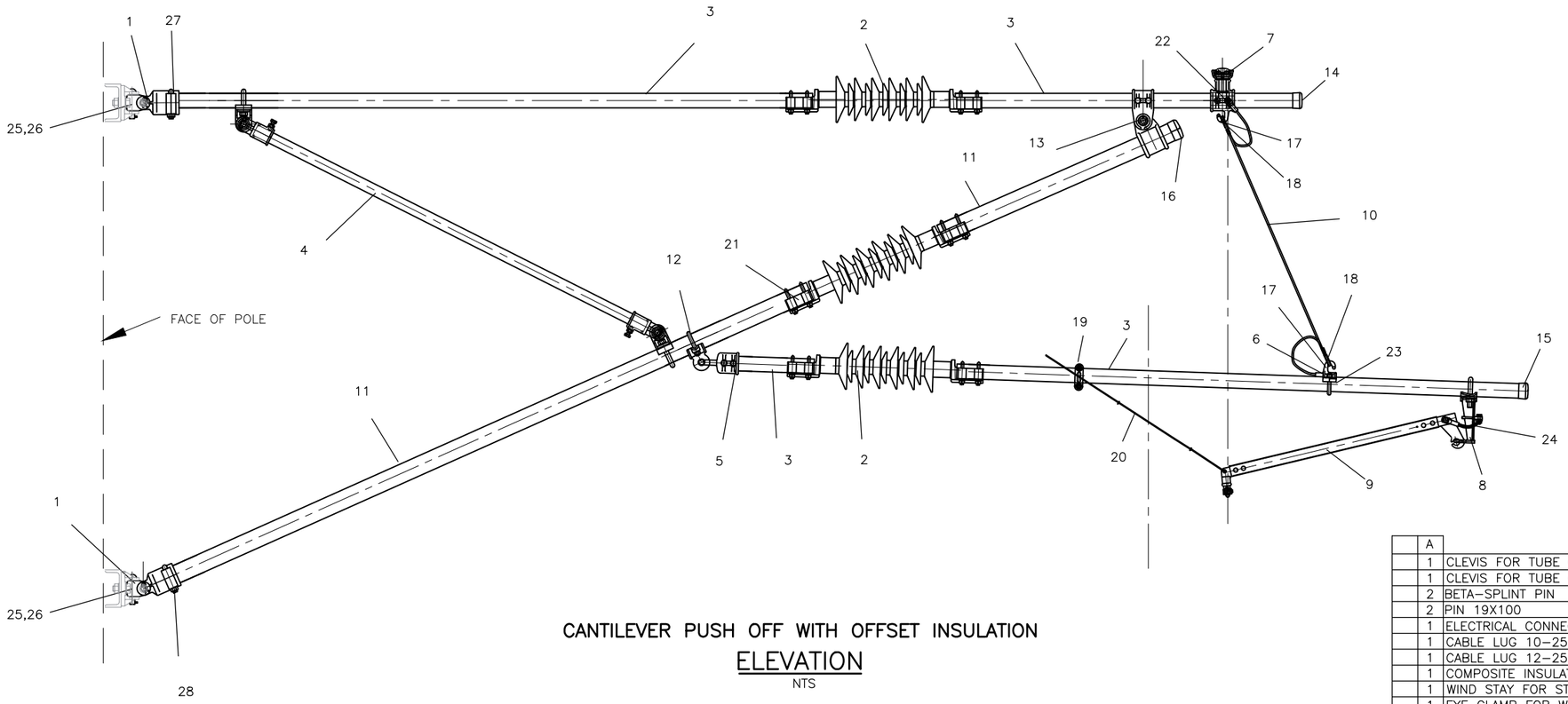
REV:

EDITION: 01012024

STANDARD DRAWING NO.: **W6258**

NOTES:

1. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)



CANTILEVER PUSH OFF WITH OFFSET INSULATION

ELEVATION

NTS

	A						
	1	CLEVIS FOR TUBE ø70		28			
	1	CLEVIS FOR TUBE ø55		27			
	2	BETA-SPLINT PIN	1.4462	26			
	2	PIN 19X100	A2	25			
	1	ELECTRICAL CONNECTION		24			
	1	CABLE LUG 10-25 S	CU TIN-PLATED	23			
	1	CABLE LUG 12-25 S	CU TIN-PLATED	22			
	1	COMPOSITE INSULATOR CAP/CAP ø70		21			
	1	WIND STAY FOR STEADY ARM		20			
	1	EYE CLAMP FOR WIND STAY ø55		19			
	2	COMPRESS. SLEEVE B16	A2	18			
	2	THIMBLE 35	A2	17			
	1	TUBE CAP ø70	PVC	16			
	1	TUBE CAP ø55	PVC	15			
	1	TUBE CAP ø55	PVC	14			
	1	TUBE CONNECTING BRACKET ø55/70		13			
	1	EYE CLAMP FOR TUBE ø70		12			
	2	TUBE ø70X6 LENGTH AS NEEDED	ALMGSI1F31	11			
	1	WIRE 6-SE-BK 1570 SZ	STAINLESS STEEL	10			
	1	STEADY ARM LENGTH AS NEEDED		9			
	1	DROP BRACKET FOR ø55		8			
	1	CATENARY SWIVEL CLAMP TUBE ø55		7			
	1	HOOK CLAMP FOR TUBE ø55		6			
	1	HOOK END FITTING FOR TUBE ø55		5			
	1	DIAGONAL TUBE ø42		4			
	4	TUBE ø55X6 LENGTH AS NEEDED	ALMGSI1F31	3			
	2	COMPOSITE INSULATOR CAP/CAP ø55		2			
	2	SWIVEL JOINT		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG-NO/STANDARD	KG/PC.	REMARKS/ID-NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CANTILEVER WITH
OFFSET INSULATION
CA-13

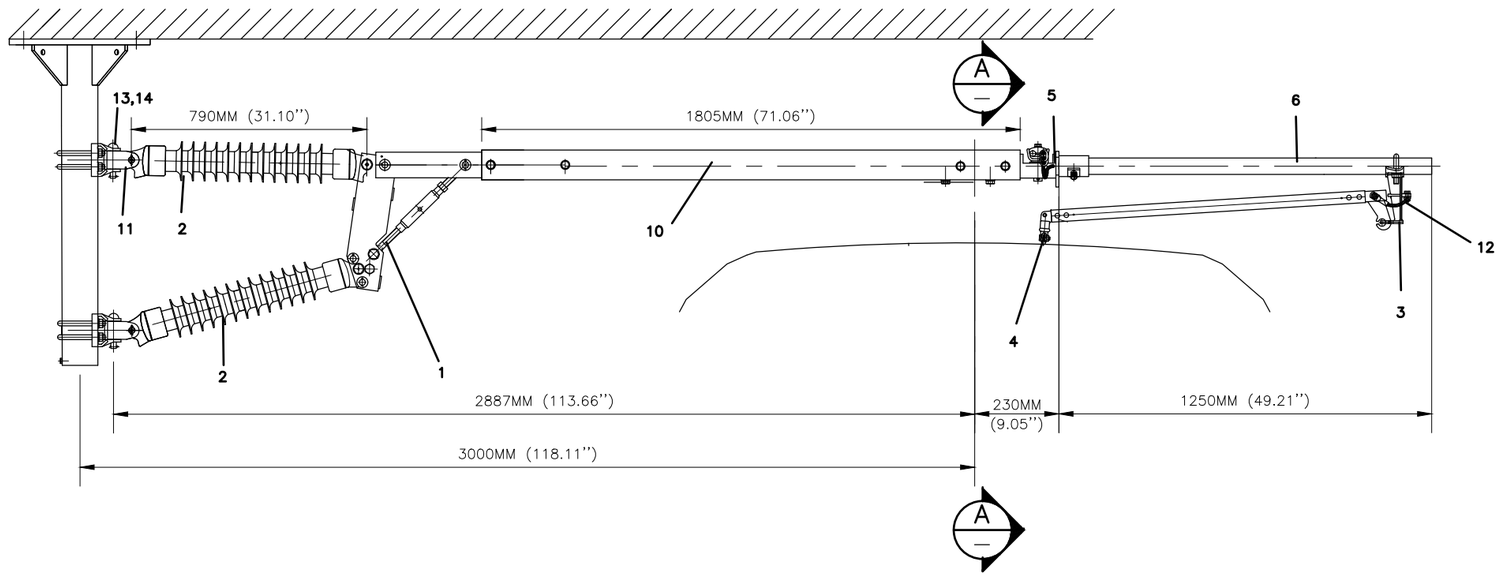
CADD FILE NAME: W6259

REV: | EDITION: 01012024

STANDARD DRAWING NO.: W6259

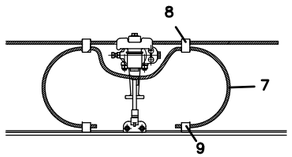
NOTES:

1. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)



CANTILEVER PUSH OFF TYPE FOR UNDER BRIDGE SECTION

ELEVATION



ELECTRICAL CONNECTION AT CANTILEVER

SECTION A–A

B	A							
	2	BETA–SPLINT PIN	1.4462	14			
	2	PIN 19X100	A2	13			
	1	ELECTRICAL CONNECTION		12			
	2	SWIVEL JOINT		11			
	1	CANTILEVER TUBE 100X100X6		10			
	2	CONTACT WIRE FEEDER CLAMP		9			
	2	WIRE FEEDER CLAMP		8			
	1	WIRE 95X259 L AS REQUIRED.		7			
	1	TUBE 55X6 L AS REQUIRED		6			
	1	CATENARY SWIVEL CLAMP		5			
	1	STEADY ARM L AS NEEDED		4			STANDARD L:1150MM
	1	DROP BRACKET		3			
	2	RODURFLEX–INSULATOR		2			
	1	CANTILEVER ARM, COMPL.		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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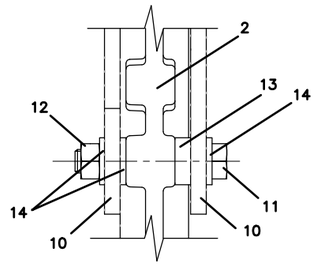
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CANTILEVER UNDER BRIDGE SECTION
PUSH OFF ASSEMBLY
CA–14

CADD FILE NAME: W6260

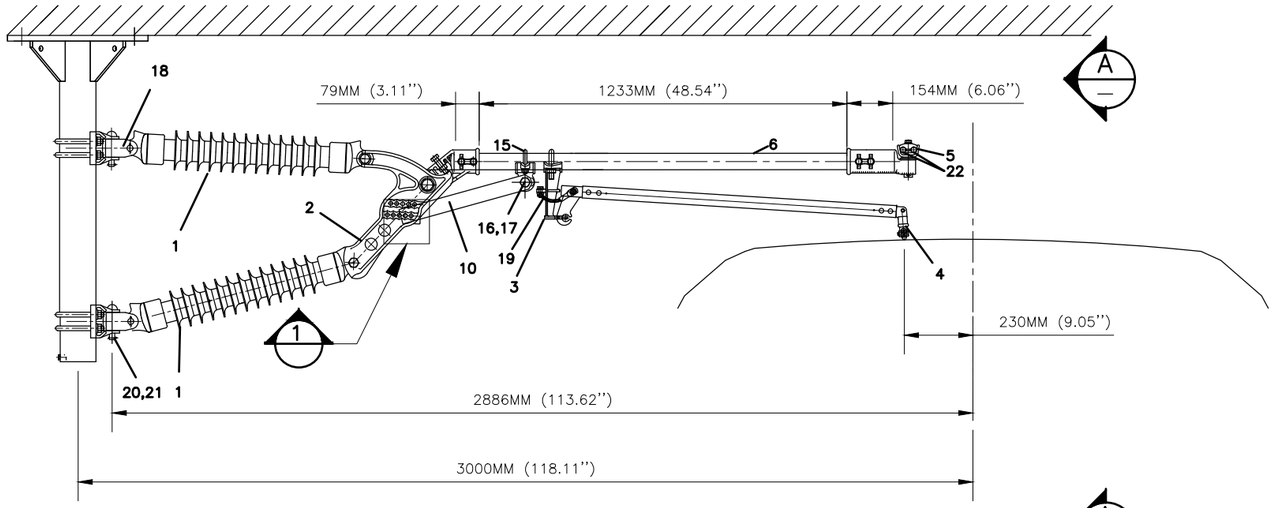
REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6260**

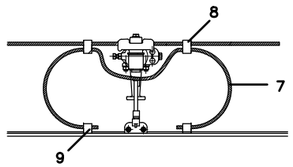


FRONT VIEW – CONNECTION PART 10 TO 2

1 / – DETAIL
NTS



CANTILEVER PULL OFF TYPE FOR UNDER BRIDGE SECTION
ELEVATION



ELECTRICAL CONNECTION AT CANTILEVER
SECTION A–A

NOTES:
1. COAT WITH LUBRICATION
2. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

	A						
	2	CUPAL SHEET		22			
	2	BETA–SPLINT PIN	1.4462	21			
	2	PIN 19X100	A2	20			
	1	ELECTRICAL CONNECTION		19			
	2	SWIVEL JOINT		18			
	1	HEX. HEAD NUT M20	A2 NO.2	17	DIN EN ISO 4032		
	1	HEX. HEAD SCREW M20X55	A2	16	DIN EN ISO 4017		
	1	EYE CLAMP FOR TUBE Ø55		15			
	3	WASHER A12	A2	14	DIN EN ISO 7089		
	1	WASHER A14	A2	13	DIN 7989		
	1	HEX. HEAD NUT M12	A2	12	DIN EN ISO 4032		
	1	HEX. HEAD BOLT M12X80	A2 NO.2	11	DIN EN ISO 4014		
	2	SUPPORT CANTILEVER TUBE L=455MM		10			
	2	CONTACT WIRE FEEDER CLAMP		9			
	2	WIRE FEEDER CLAMP		8			
	1	WIRE 95X259 L AS REQUIRED.		7			
	1	TUBE 55X6 L AS REQUIRED		6			
	1	CATENARY SWIVEL CLAMP		5			
	1	STEADY ARM L AS NEEDED		4			STANDARD L:1150MM
	1	DROP BRACKET		3			
	1	CANTILEVER ARM		2			
	2	RODURFLEX–INSULATOR		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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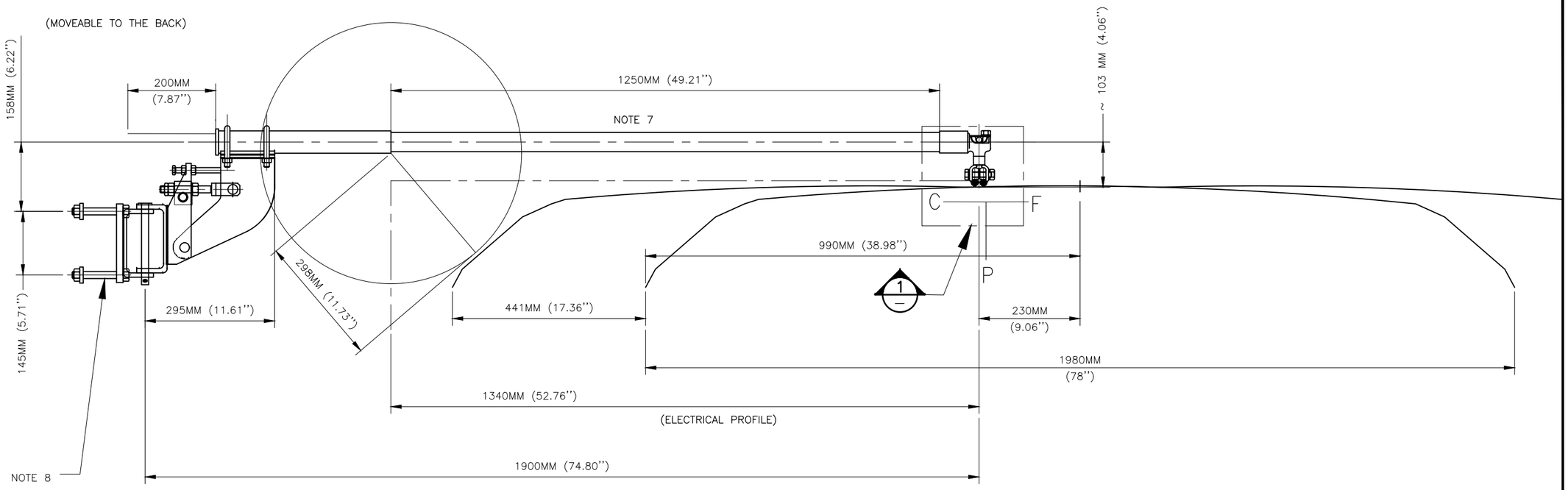
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CANTILEVER UNDER BRIDGE SECTION
PULL OFF ASSEMBLY
CA–15

CADD FILE NAME: W6261
REV:
EDITION: 01012024
STANDARD DRAWING NO.: **W6261**

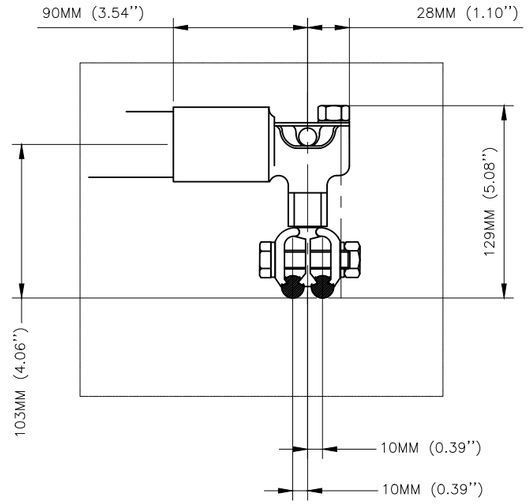


UNDERBRIDGE SUSPENSION FOR 2 CONTACT WIRES
ELEVATION
NTS

NOTES:

1.	MAX. DEFLECTION OF INSULATING ARM		mm/N	0.3 (0.175 INCH/LBF)
2.	MIN. BENDING BREAKING MOMENT OF THE INSULATING ARM		Nm	3500 (2581.47 LBF FT)
3.	TENSILE BREAKING LOAD OF THE INSULATING ARM		kN	100 (22480.89 LBF)
4.	MAX. WORKING LOAD:	P	N	175 (39.34 LBF)
		F	N	650 (146.13 LBF)
		C	N	250 (56.20 LBF)
5.	IMPULSE WITHSTAND VOLTAGE		kV >	500
6.	WET POWER FREQUENCY WITHSTAND VOLTAGE		kV	150

7. MATERIAL: FIBER GLASS
8. THE STRENGTH / LOAD CAPACITY OF THE SUPPORTING DROP TUBE (NOT SHOWN) MUST BE CALCULATED / VERIFIED



DOUBLE CONTACT WIRE CLAMP
1/– DETAIL
NTS

NOTES:

1. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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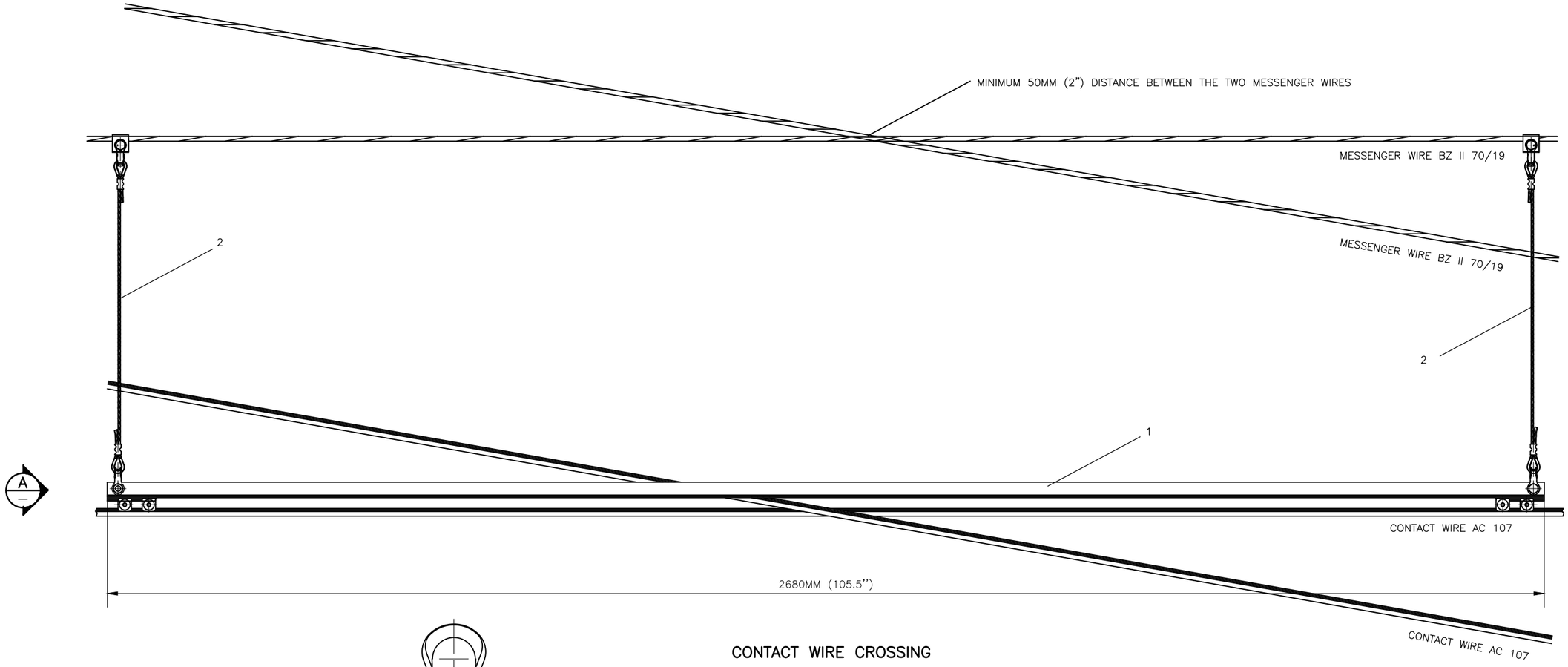
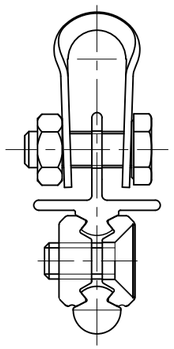
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
UNDERBRIDGE SUSPENSION FOR
2 CONTACT WIRES
CA–23

CADD FILE NAME: W6265
REV: | EDITION: 01012024
STANDARD DRAWING NO.: **W6265**



CONTACT WIRE CROSSING
ELEVATION
NTS



CONTACT WIRE CROSSING
A — ELEVATION
NTS

NOTES:

1. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

	2	DROPPER FOR CROSSING		2			
	1	CW CROSSING		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG-NO/STANDARD	KG/PC.	REMARKS/ID-NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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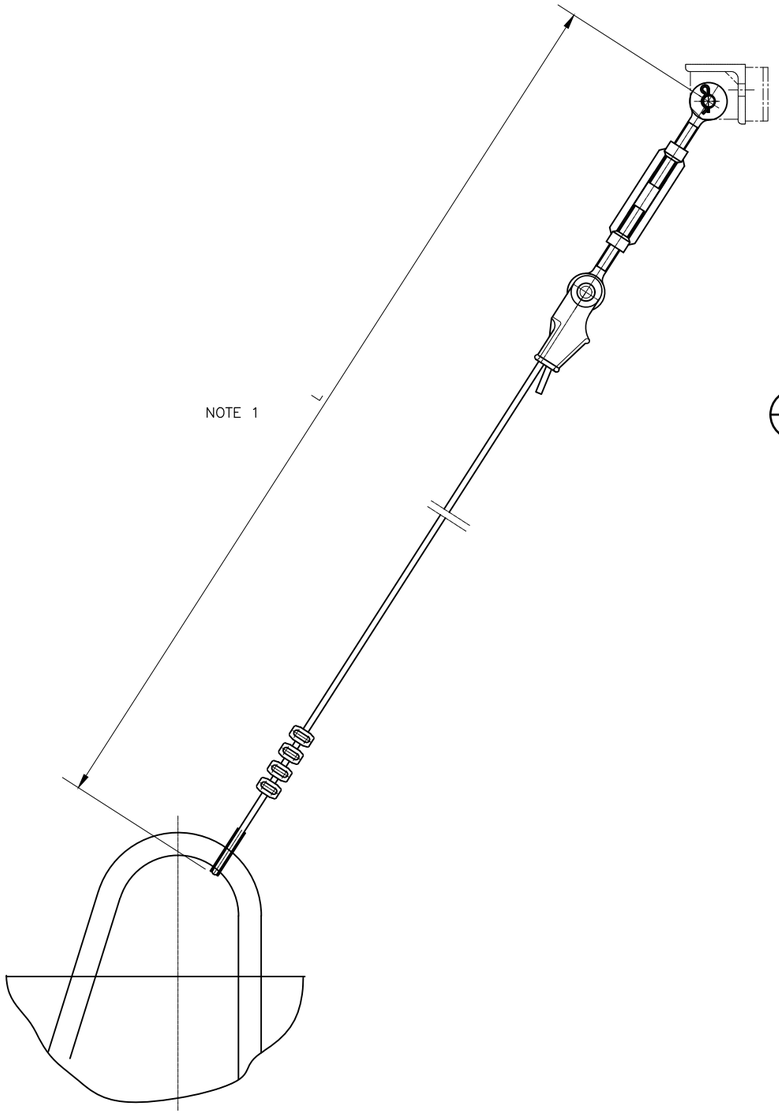
San Carlos, CA 94070

STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CONTACT WIRE CROSSING
WITH DROPPERS
CC-01

CADD FILE NAME: W6272
REV:
EDITION: 01012024
STANDARD DRAWING NO.: **W6272**



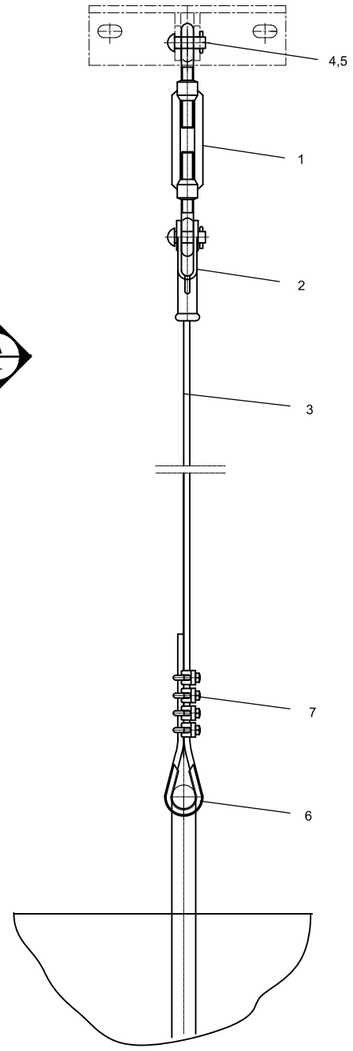
SINGLE / DOUBLE BACKSTAY

A ELEVATION

NTS

NOTE 4
NOTE 5

TYPE A
DG-01
(2) DG-01



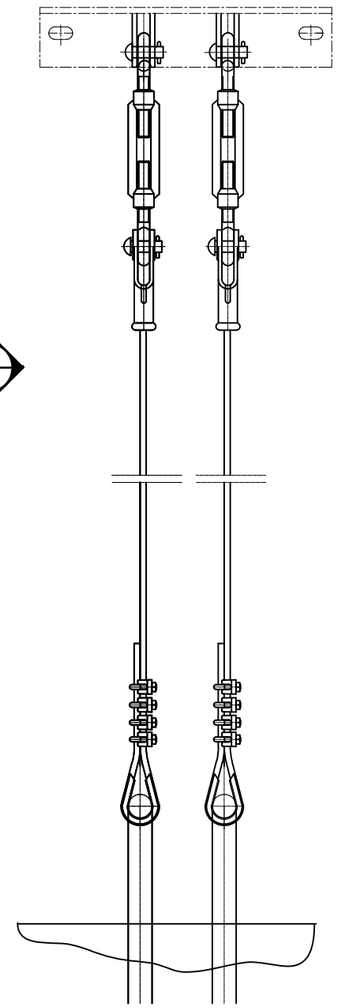
SINGLE BACKSTAY

ELEVATION

NTS

NOTE 3

TYPE B
DG-02



DOUBLE BACKSTAY

ELEVATION

NTS

NOTES:

1. L IS TO BE MEASURED
2. MIN. BREAKING LOAD 64.3 KN (14455.22 LBF)
3. DG-02 FOR TERMINATION WITH 2 WIRES:
   BWA
4. DG-01 FOR TERMINATION WITH 1 WIRE:
   1 x FW
   1 x SW
   TWA
   TERMINATION MID POINT (ONE SIDE)
5. (2)DG-01 FOR 2 TERMINATIONS WITH 1 WIRE:
   2 x FW
   2 x MID POINT
   FTA
6. BOM ITEM #2, 3 AND 7 OR APPROVED EQUIVALENT
7. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

B	A						
8	4	WIRE CLAMP Ø10	A2	7			
2	1	THIMBLE 70S	A2	6	DIN 43154		
2	1	BETA SPLINT	STAINLESS STEEL	5			
2	1	PIN Ø19X52	A2	4	DIN 43161		
2	1	WIRE 18X7 D=10MM (1960N/MM²)	STEEL	3	DIN EN 12385-4		NOTE 2
2	1	WEDGE-TYPE DEAD END CLAMP		2			
2	1	TURNBUCKLE M20 EYE/EYE		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG-NO/STANDARD	KG/PC.	REMARKS/ID-NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

Bin Zhang

DEPUTY DIRECTOR, ENGINEERING

Caltrain

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San Carlos, CA 94070

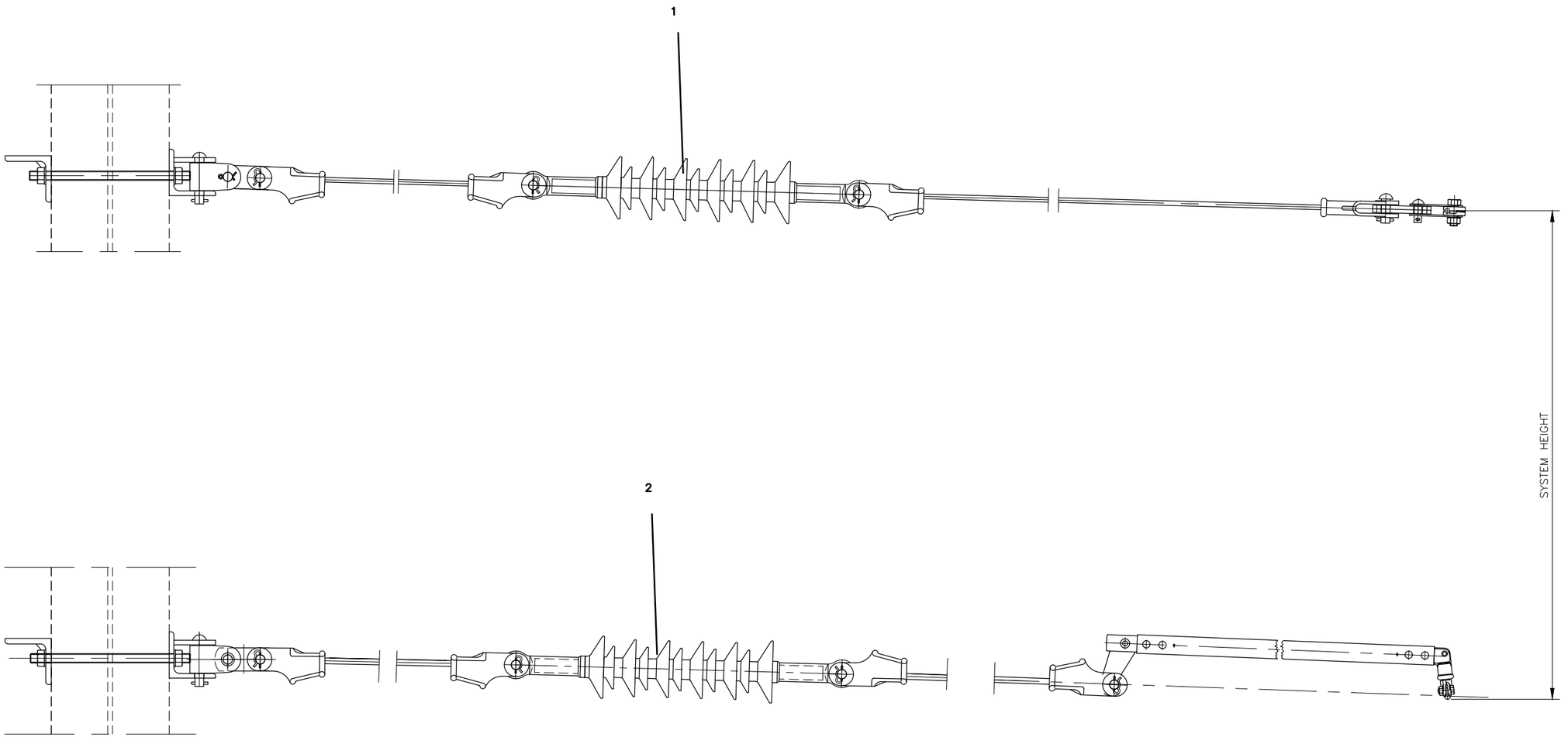
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
SINGLE / DOUBLE BACKSTAY
DG-01/(2)DG-01/DG-02

CADD FILE NAME: W6273

REV: | EDITION: 01012024

STANDARD DRAWING NO.: W6273



PULL OFF TERMINATION FOR CATENARY

ELEVATION

NTS

NOTES:

1. POLE ORIENTATION ACCORDING TO LAYOUT PLANS
2. W6276 IS A GENERAL ARRANGEMENT. IT SHOWS PULL OFF TERMINATION FOR MESSENGER AND CONTACT WIRE TOGETHER
3. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

	A							
	1	PULL OFF TERMINATION FOR CW		2				
	1	PULL OFF TERMINATION FOR MW		1				
PIECES		DESCRIPTION	MATERIAL	PART	DWG-NO/STANDARD		KG/PC.	REMARKS/ID-NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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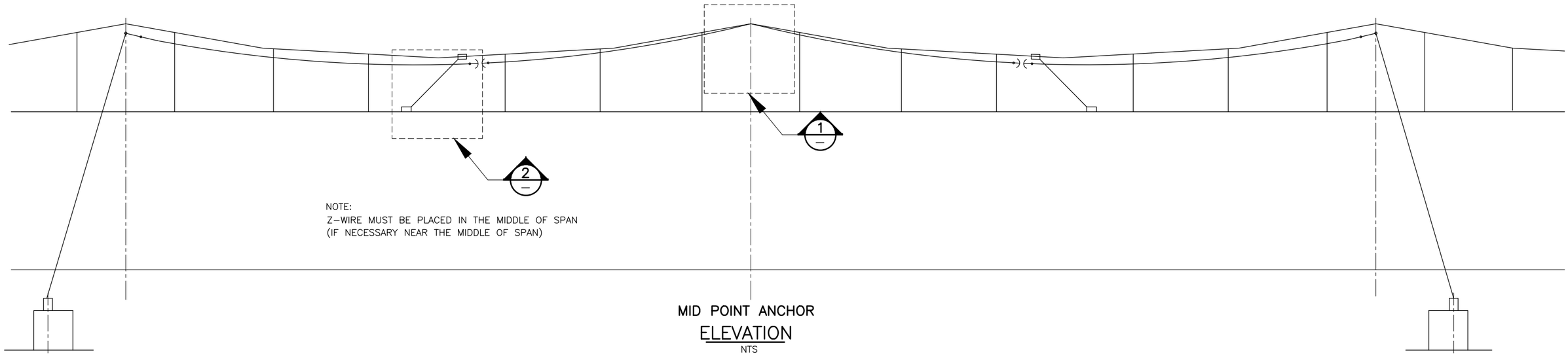
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
PULL OFF TERMINATION
FOR CATENARY AC 107 / BZ II 70/19
PO-02/PO-01

CADD FILE NAME: W6276

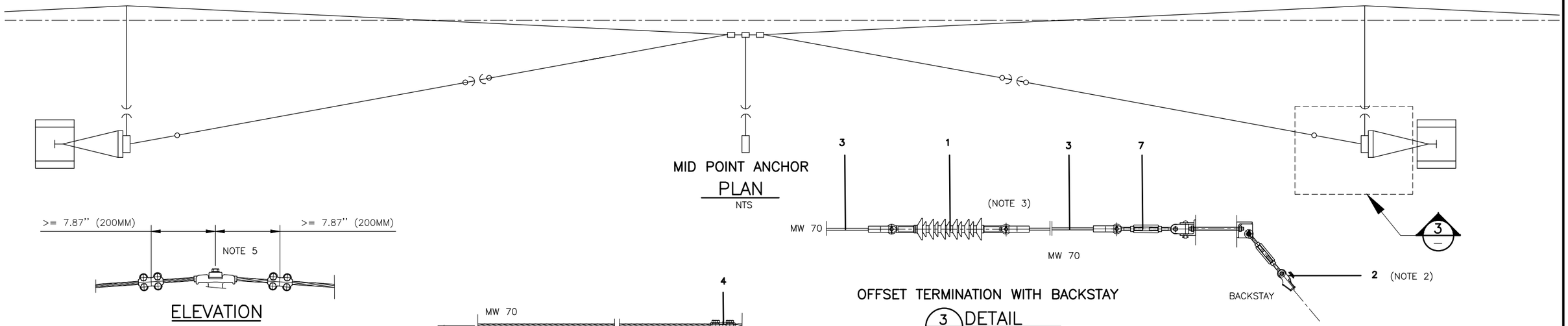
REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6276**



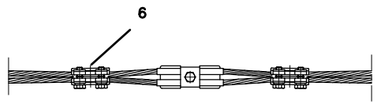
NOTE:
Z–WIRE MUST BE PLACED IN THE MIDDLE OF SPAN
(IF NECESSARY NEAR THE MIDDLE OF SPAN)

MID POINT ANCHOR
ELEVATION
NTS



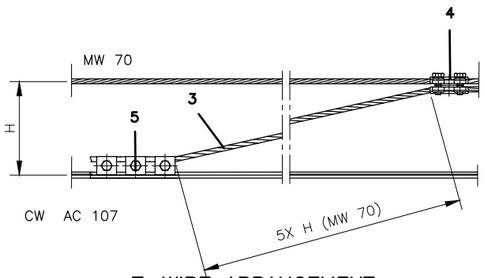
MID POINT ANCHOR
PLAN
NTS

ELEVATION



PLAN

MESSENGER WIRE AREA
1 DETAIL
NTS



Z–WIRE ARRANGEMENT
2 DETAIL
NTS

OFFSET TERMINATION WITH BACKSTAY
3 DETAIL
NTS

NOTES:
1. IF POLE IS A SELF SUPPORTING POLE, NO DOWN GUY IS NECESSARY
2. DIFFERENT PIECES WITH DIFFERENT LENGTH
3. FT–03, WITHOUT PART 8
4. SEE DWG W6108 FOR REST OF DETAILS
5. MESSENGER WIRE CLAMP MUST BE USED
6. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

	A						
	2	TURNBUCKLE M20 EYE/EYE		7			
	2	CONNECTION CLAMP MID POINT TO MW WIRE		6			
	6	CONNECTION CLAMP Z TO CW WIRE		5			
	2	CONNECTION CLAMP Z TO MW WIRE		4			
	5	MW BZ II 70		3		W6001	NOTE 2
	2	BACKSTAY		2		W6273/A	NOTE 1
	2	FIXED TERMINATION WITH OFFSET INSULATION		1		W6280/A	NOTE 3
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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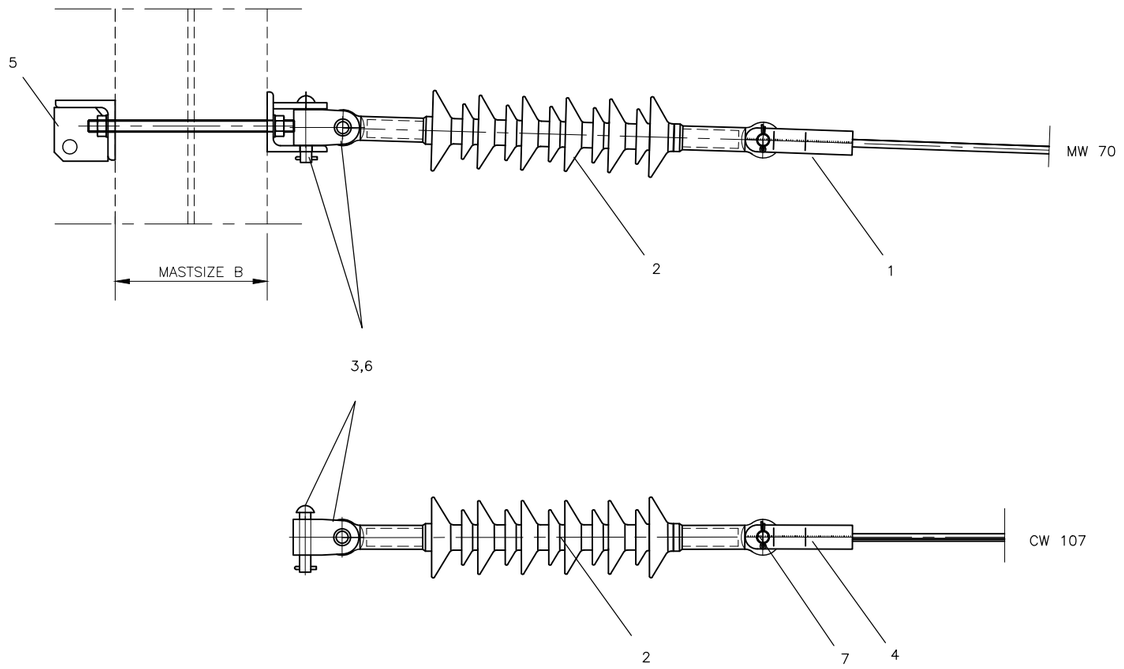
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
MID POINT ANCHOR ASSEMBLY
MP–01

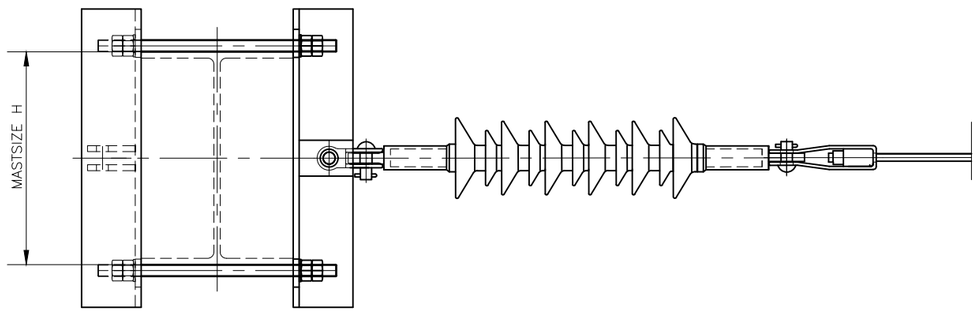
CADD FILE NAME: W6277
REV:
EDITION: 01012024
STANDARD DRAWING NO.: **W6277**



FIXED TERMINATION CW / MW

ELEVATION

NTS



VIEW FROM THE TOP

PLAN

NTS

NOTE:

1. CHOICE OF BRACKET DEPENDS ON THE TYPE OF POLE
2. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

FOR CW AC107	FOR MW 70/19							
B	A							
1	–	PIN ø19X52 WITH ß–SPLINT PIN	A2	7				
1	1	PIN ø19X100 WITH ß–SPLINT PIN	A2	6				
1	1	BRACKET FOR FIXED TERMINATION		5				
1	–	TERMINATION CLAMP FOR CW		4				
1	1	SWIVEL JOINT		3				
1	1	COMPOSITE INSULATOR		2				
–	1	TERMINATION CLAMP FOR MW		1				
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD		KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

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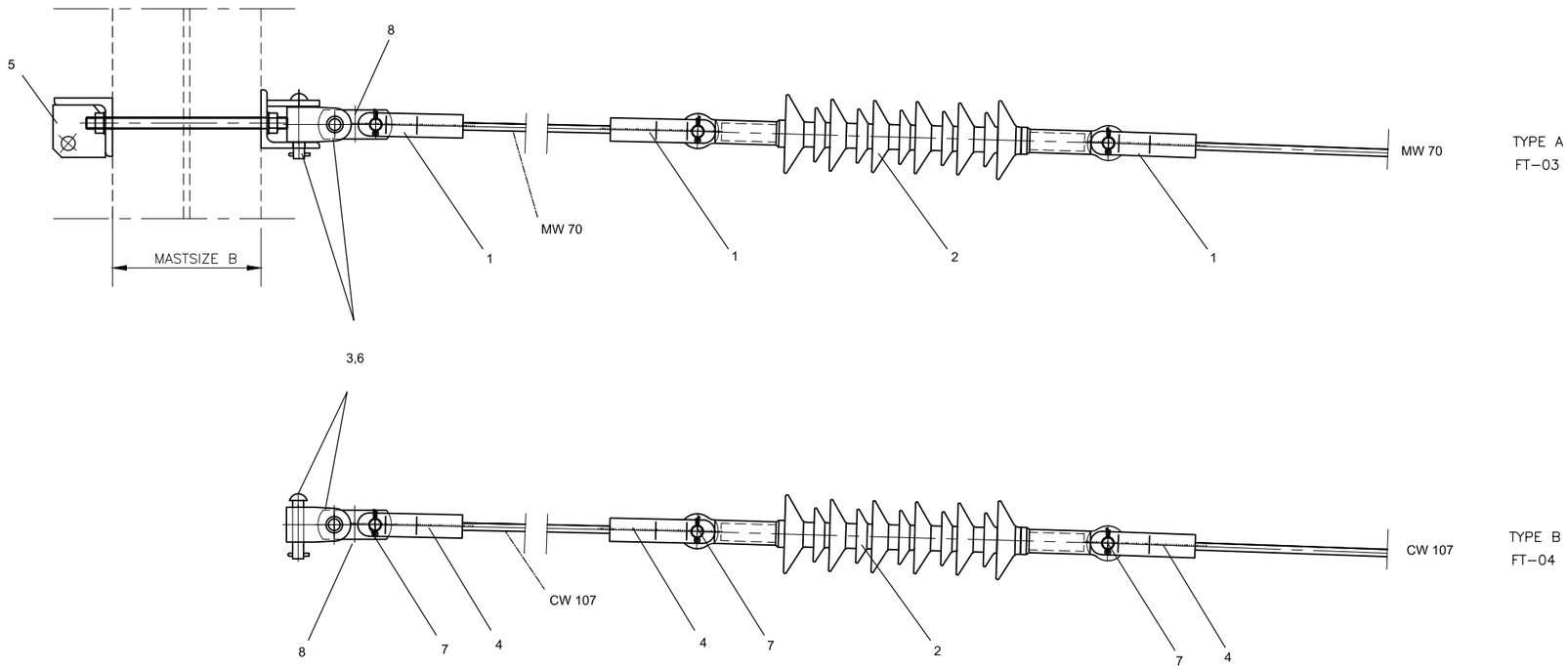
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
FIXED TERMINATION FOR CONTACT AND MESSENGER WIRE
FT–02/FT–01

CADD FILE NAME: W6279

REV: | EDITION: 01012024

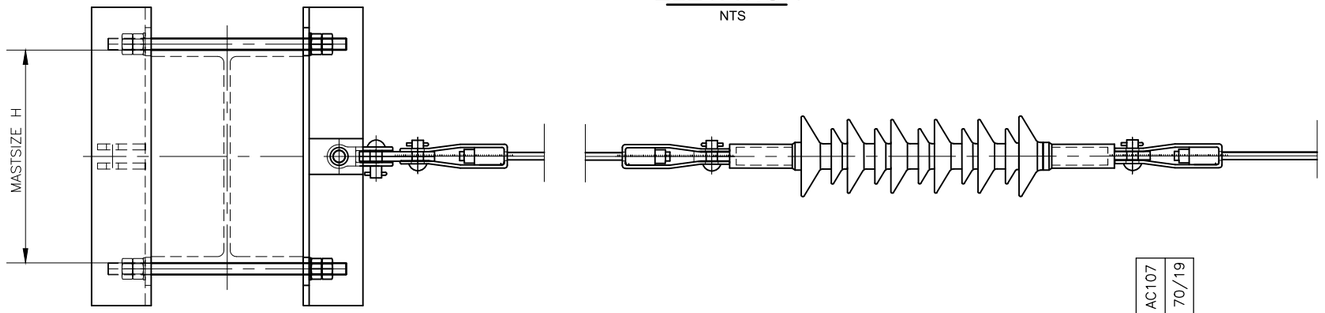
STANDARD DRAWING NO.: **W6279**



FIXED TERMINATION CW / MW WITH OFFSET INSULATION

ELEVATION

NTS



VIEW FROM THE TOP

PLAN

NTS

NOTE:

1. CHOICE OF BRACKET DEPENDS ON THE TYPE OF POLE
2. TO BE USED DUE TO SAFETY REASONS.
   FOR EXAMPLE, IF THE ELECTRICAL DISTANCE IS CRITICAL.
   THE DETAIL DESIGNER HAS TO FIX THE POSITIONING.
3. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS).

FOR CW AC107	FOR MW 70/19	PIECES	DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.
B	A							
2	2	LINK PLATE		AL	8			
3	–	PIN ø19X52 WITH ß–SPLINT PIN		A2	7			
1	1	PIN ø19X100 WITH ß–SPLINT PIN		A2	6			
1	1	BRACKET FOR FIXED TERMINATION			5			
3	–	TERMINATION CLAMP FOR CW			4			
1	1	SWIVEL JOINT			3			
1	1	COMPOSITE INSULATOR			2			
–	3	TERMINATION CLAMP FOR MW			1			

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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STANDARD DRAWINGS

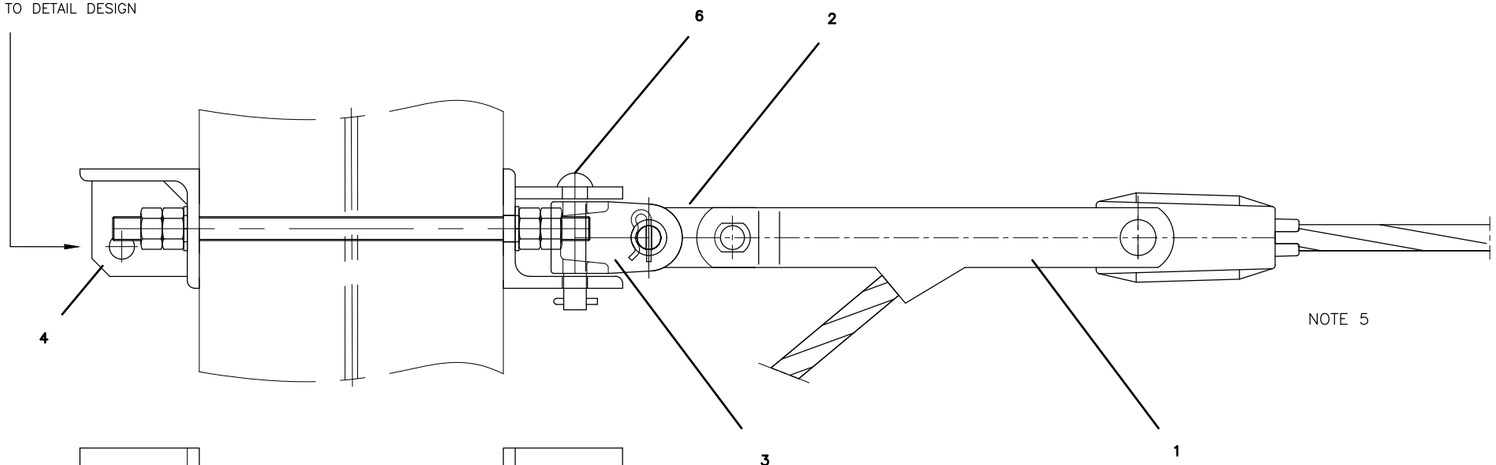
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
FIXED TERMINATION FOR CW
/ MW WITH OFFSET INSULATION
FT–04/FT–03

CADD FILE NAME: W6280

REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6280**

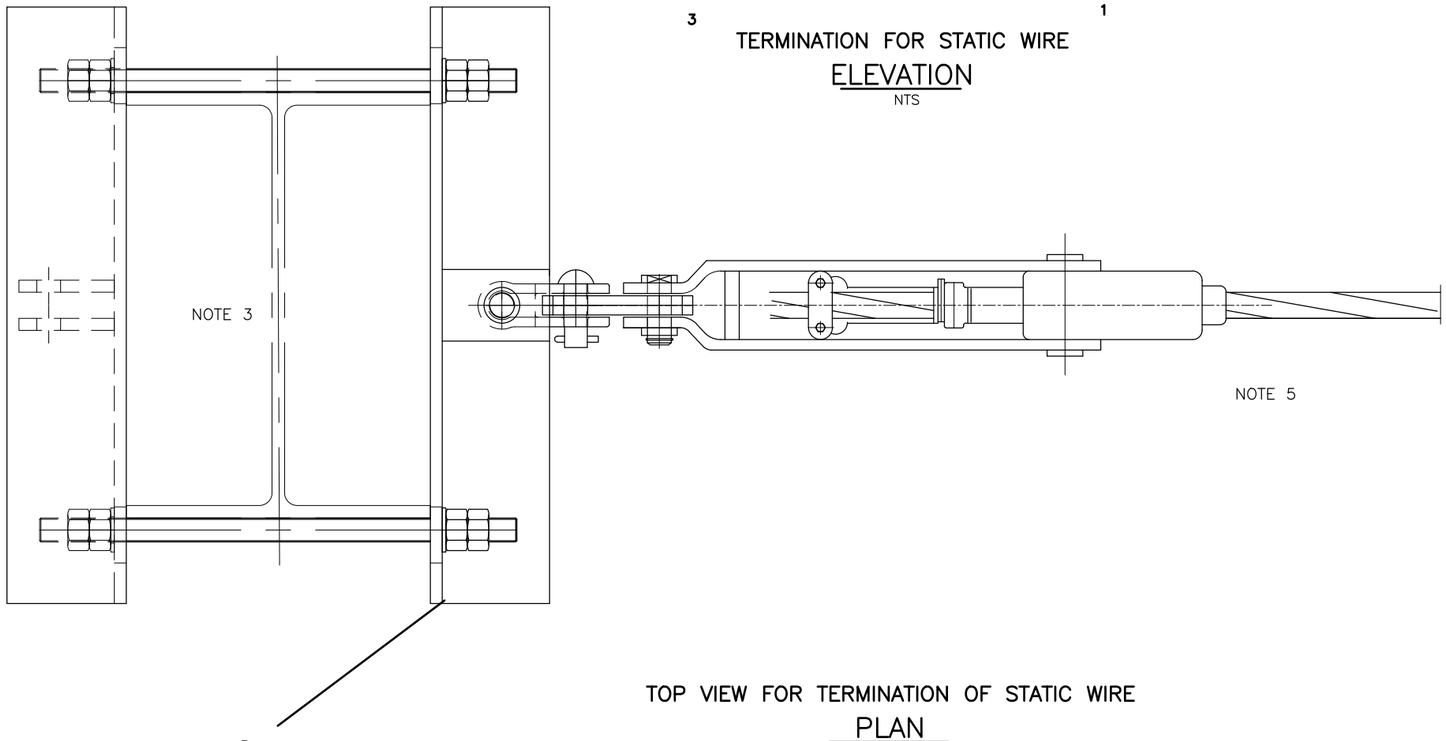
CONNECTION FOR BACKSTAY
ANCHOR, IF NECESSARY ACC.
TO DETAIL DESIGN



TERMINATION FOR STATIC WIRE

ELEVATION

NTS



TOP VIEW FOR TERMINATION OF STATIC WIRE

PLAN

NTS

NOTES:

1. CHOICE OF BRACKET DEPENDS ON THE TYPE OF POLE
2. PROVIDE BACKSTAY AS REQUIRED
3. POLE ORIENTATION ACC: TO DETAIL DESIGN
4. SEE DWG W6114 FOR REST OF DETAILS
5. GROUNDING OF STATIC WIRE SIMILAR TO DRAWING W5240
6. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS).

FOR STATIC WIRE WITHOUT BACKSTAY	FOR STATIC WIRE WITH BACKSTAY	DESCRIPTION	MATERIAL	PART	DWG-NO/STANDARD	KG/PC.	REMARKS/ID-NO.
B	A	PIECES					
1	1	PIN ø19X100 WITH ß-SPLINT PIN	A2	6			
1	1	BRACKET FOR FIXED TERMINATION		5			NOTE 1
–	1	BACKSTAY ANCHOR		4			NOTE 2
1	1	SWIVEL JOINT		3			
2	2	LINK PLATE		2			
1	1	TERMINATION CLAMP FOR STATIC WIRE		1			

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

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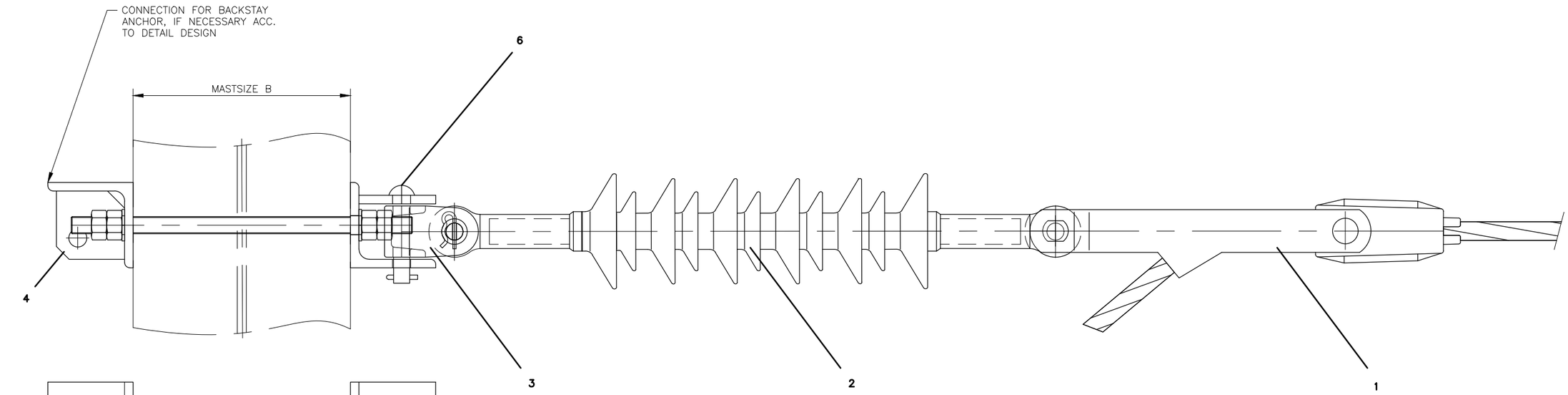
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
TERMINATION FOR STATIC WIRE
FT-05

CADD FILE NAME: W6281

REV: | EDITION: 01012024

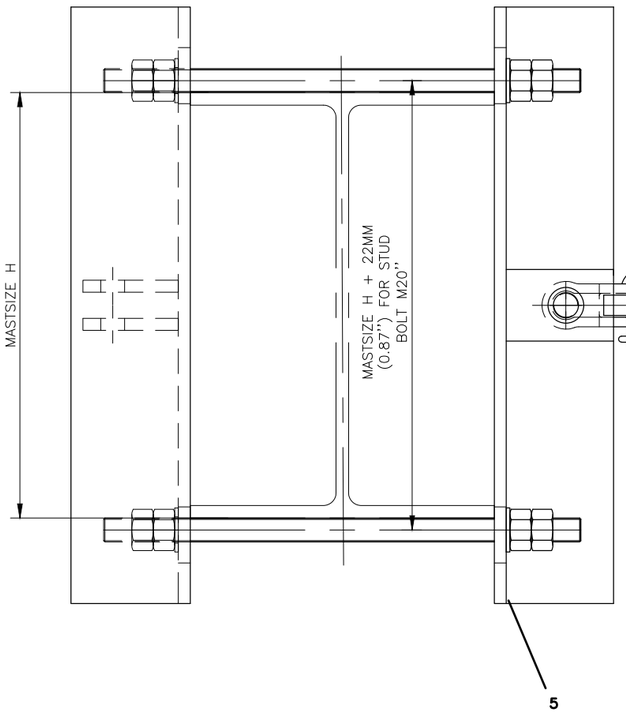
STANDARD DRAWING NO.: **W6281**



TERMINATION FOR FEEDER WIRE

ELEVATION

NTS



TOP VIEW FOR TERMINATION OF FEEDER WIRE

PLAN

NTS

NOTE:

LENGTH OF PARTS ACC. TO MASTSIZE

NOTES:

1. CHOICE OF BRACKET DEPENDS ON THE TYPE OF POLE
2. PROVIDE BACKSTAY AS REQUIRED
3. SEE DWG W6111 FOR REST OF DETAILS
4. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS).

FOR FEEDER WIRE WITHOUT BACKSTAY	FOR FEEDER WIRE WITH BACKSTAY							
B	A							
1	1	PIN ø19X100 WITH 8–SPLINT PIN	A2	6			
1	1	BRACKET FOR FIXED TERMINATION		5			NOTE 1
–	1	BACKSTAY ANCHOR		4			NOTE 2
1	1	SWIVEL JOINT		3			
1	1	COMPOSITE INSULATOR TYPE 3		2			
1	1	TERMINATION CLAMP F. FEEDER WIRE		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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STANDARD DRAWINGS

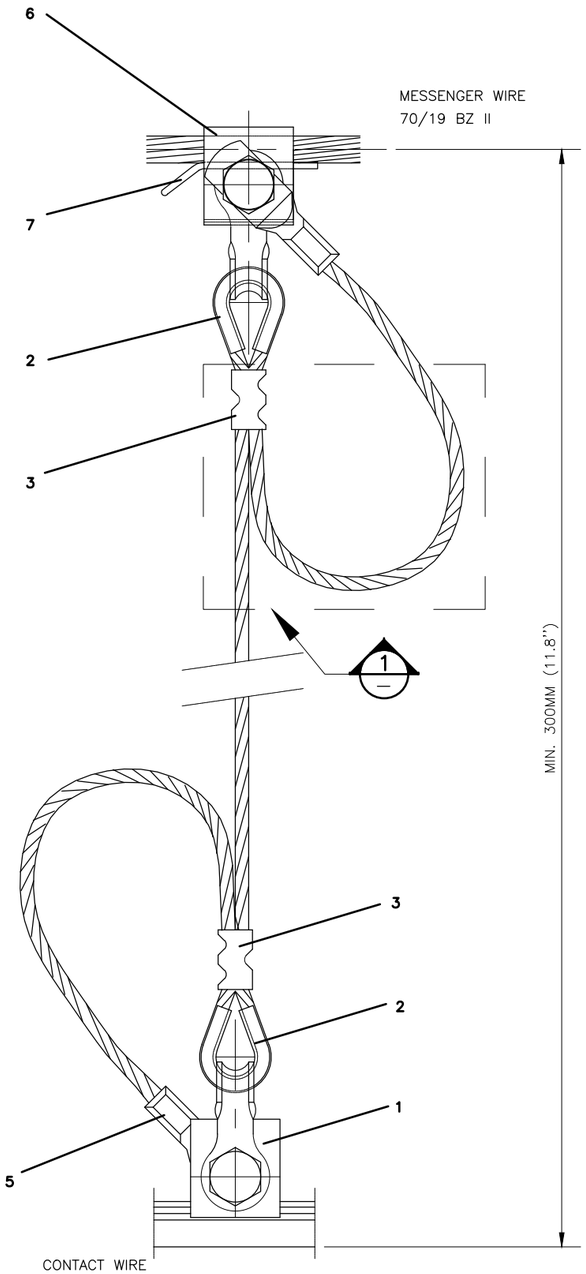
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
TERMINATION FOR FEEDER WIRE
FT–06

CADD FILE NAME: W6282

REV:

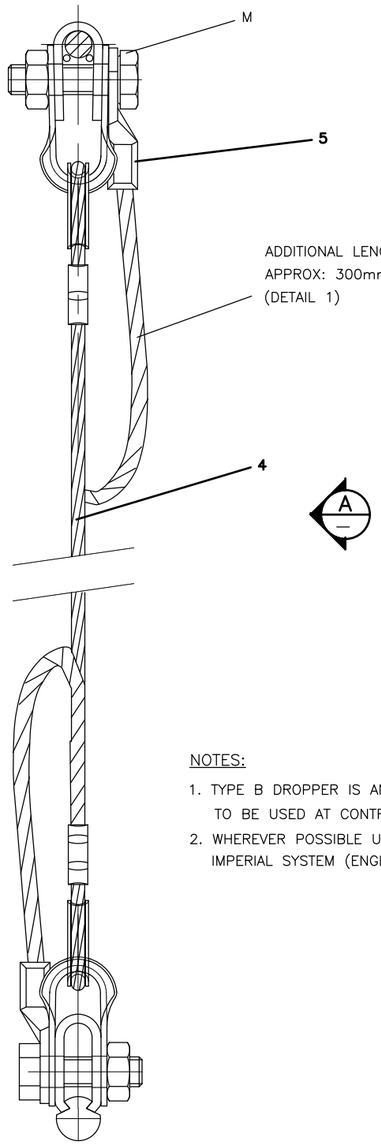
EDITION: 01012024

STANDARD DRAWING NO.: W6282



DROPPER 10x49 – TYPE A

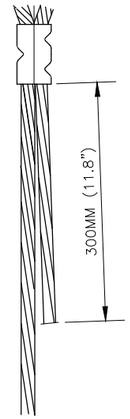
A ELEVATION
– NTS



DROPPER 10x49 – TYPE A

ELEVATION

NTS



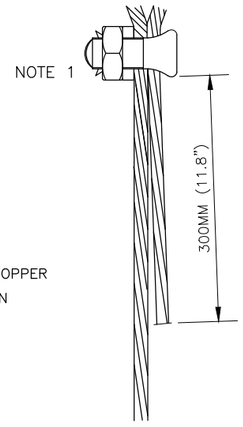
END SECTION OF DROPPER

TYPE A

1 DETAIL
– NTS

NOTES:

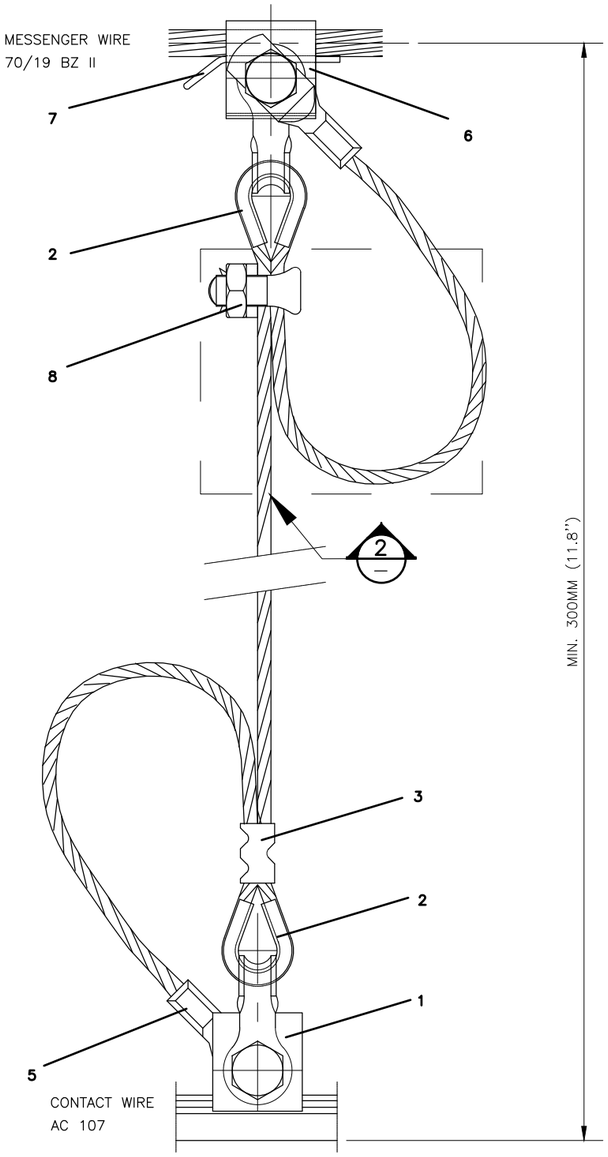
1. TYPE B DROPPER IS AN ALTERNATIVE DROPPER TO BE USED AT CONTRACTOR DISCRETION
2. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)



END SECTION OF DROPPER

TYPE B

2 DETAIL
– NTS



DROPPER 10x49 – TYPE B

ELEVATION NOTE 2

NTS

B	A							
1	–	SLOTTED BOLT CLAMP KS20	COPPER	8			
1	1	CLIP FOR 70MM²	BZ II	7	DIN 48300		
1	1	DROPPER CLAMP FOR MW 70MM²	A2	6			
2	2	CABLE LUG 10-16 FOR WIRE 10MM²	E-CUF20	5	DIN 46235		
1	1	WIRE BZ II 10X49 (LENGTH AS NEEDED)	CUMG0.4	4	DIN 43138		
1	2	COMPRESSION SPLICE F. WIRE 10MM² (D=4.5MM)	E-CUF20	3			
2	2	THIMBLE FOR WIRE 10X49	A2	2	DIN 43154		
1	1	DROPPER CLAMP FOR CW	A2	1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG-NO/STANDARD	KG/PC.	REMARKS/ID-NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

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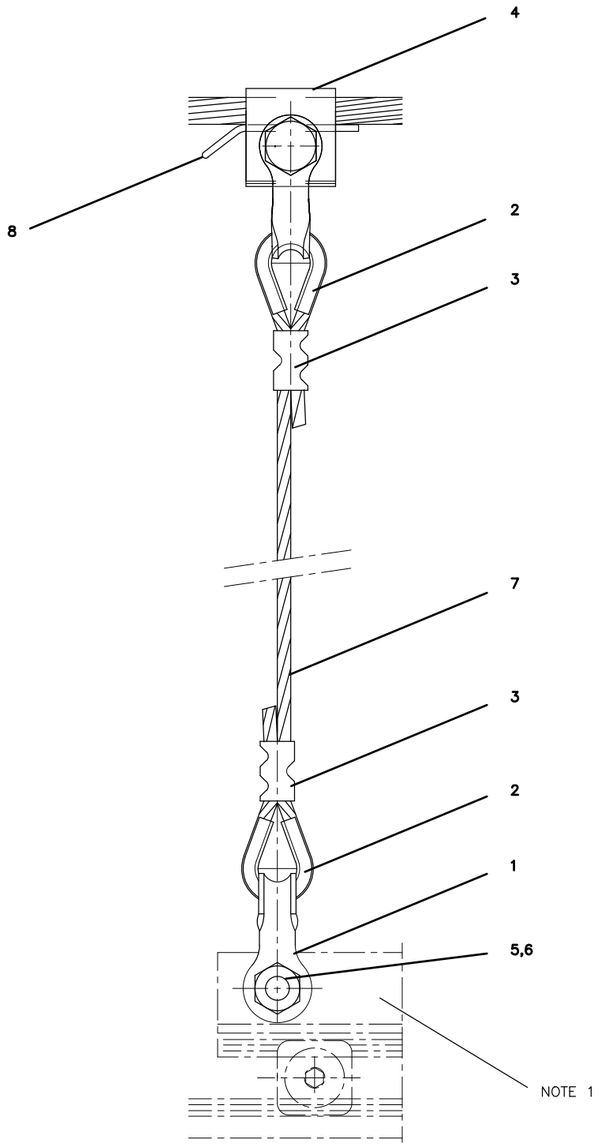
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
DROPPER 10x49
HA-01

CADD FILE NAME: W6283

REV: | EDITION: 01012024

STANDARD DRAWING NO.: W6283



DROPPER FOR CONTACT WIRE CROSSING

ELEVATION

NTS

NOTE:

1. CW CROSSING IS ACCORDING TO: W6272 DRAWING
2. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS).

B	A						
–	1	CLIP FOR 70MM²	BZII	8	DIN 48300		
–	1	WIRE BZ II 10X49 (LENGTH AS NEEDED)	CUMG0.4	7	DIN 43138		
–	1	HEXAGON NUT M10	A2	6	DIN 4032		
–	1	HEXAGON HEAD BOLT M10X30	A2–70	5			
–	1	DROPPER CLAMP FOR MW 70/19	A2	4			
–	2	COMPRESSION SPLICE F. WIRE 10MM² (D=4.5MM)	E–CUF20	3			
–	2	THIMBLE FOR WIRE 10X49	A2	2			
–	1	DROPPER CLIP	A2	1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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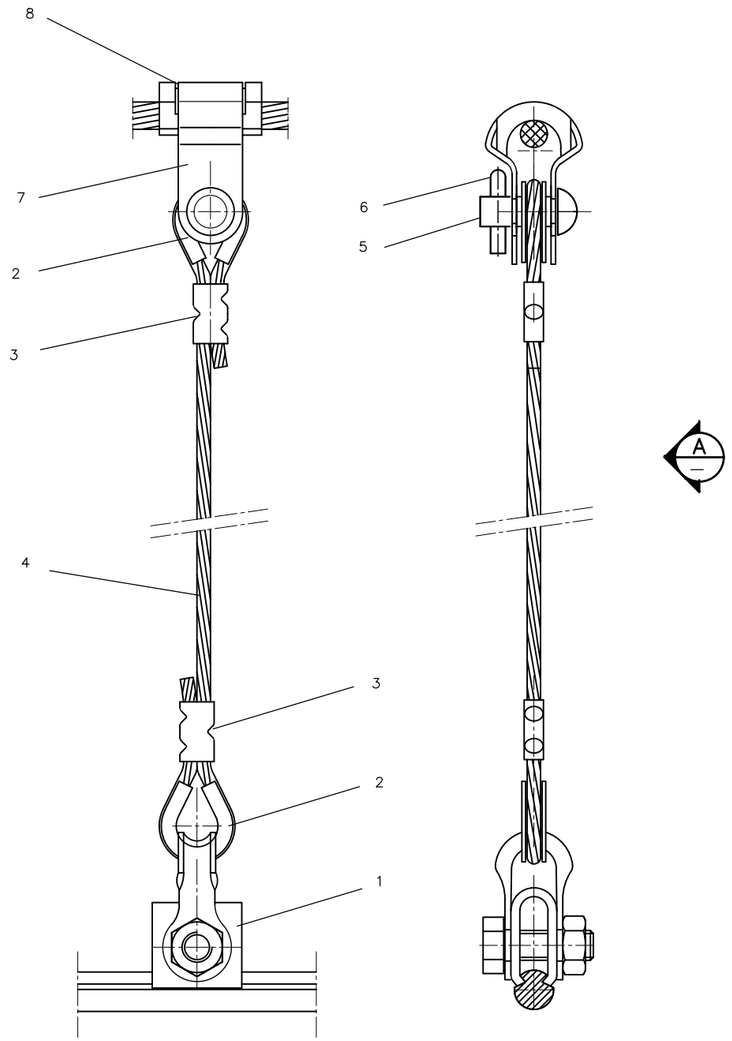
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
DROPPER FOR CONTACT
WIRE CROSSING
HA–02

CADD FILE NAME: W6284

REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6284**



SLIDING DROPPER 10x49

A ELEVATION

– NTS

SLIDING DROPPER 10x49

ELEVATION

NTS

NOTES:

1. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

B	A						
–	1	PLASTIC SLIDING INSERT	PA	8	DIN 43147–D1		
–	1	SLIDING DROPPER CLIP	A2	7	DIN 43147–D2		
–	1	SPLINT 5X29	A2	6	DIN EN ISO 1234		
–	1	BOLT 10X26	Cu	5	DIN 43161		
–	1	WIRE BZ II 10X49 (L AS REQUIRED)	CUMG0.4	4	DIN 43138		
–	2	COMPRESSION SPLICE F. WIRE 10MM² (D=4.5MM)	E–CUF20	3			
–	2	THIMBLE FOR WIRE 10X49	A2	2			
–	1	DROPPER CLAMP FOR CW AC 107		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

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San Carlos, CA 94070

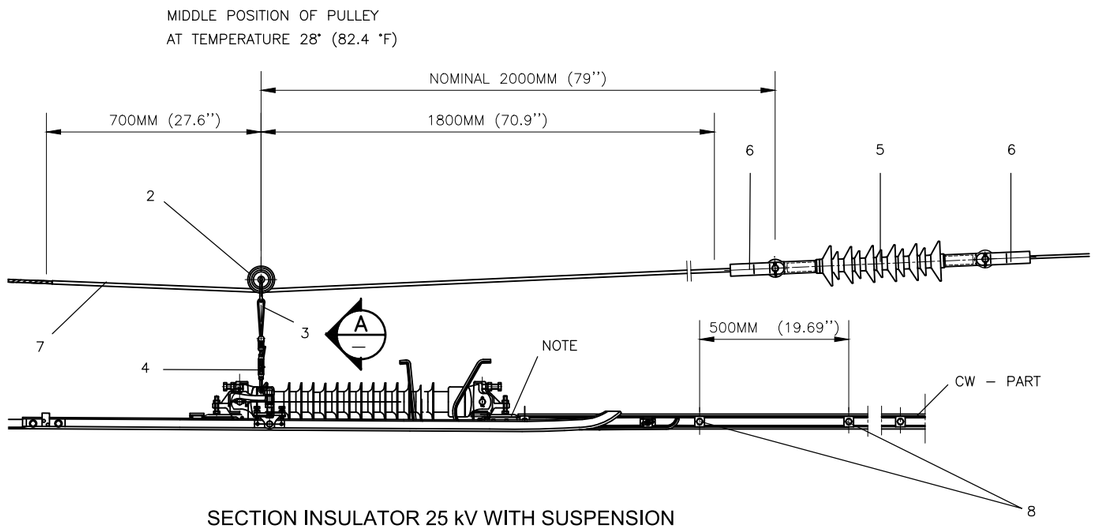
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
SLIDING DROPPER 10x49
HA–03

CADD FILE NAME: W6285

REV: | EDITION: 01012024

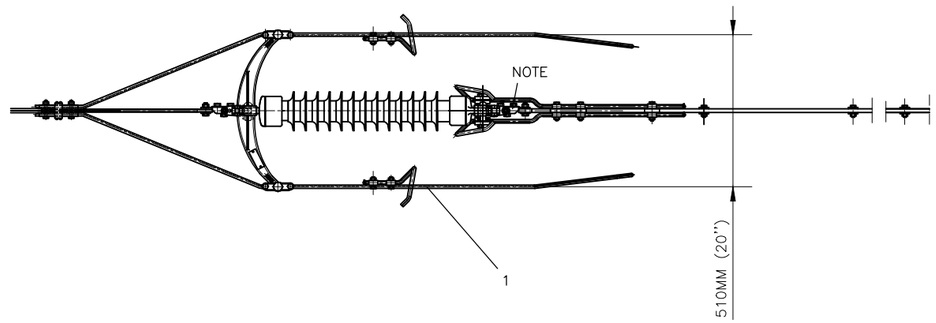
STANDARD DRAWING NO.: **W6285**



SECTION INSULATOR 25 kV WITH SUSPENSION

ELEVATION

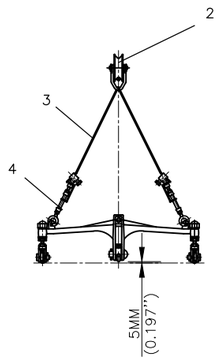
NTS



SECTION INSULATOR 25 kV

PLAN

NTS



SUSPENSION

A – ELEVATION

NTS

NOTES:

1. INSTRUCTIONS FOR MOUNTING:
   TO MEET THE NECESSARY HOLDING STRENGTH, CONTACT WIRE TERMINATION CLAMPS ARE TO BE SECURED BY SCREWING DOWN THE FOUR ATTACHMENT SCREWS, M12, WITH A SPANNER WRENCH.
   TIGHTENING TORQUE: 56 NM (41.3 LBF FT)
2. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

B	A							
–	4	PARALLEL GROOVED CLAMP		8			
–	1	SHRINKING HOSE FOR WIRE 70/19	POLYOLEFIN	7	FTMM 28/9–A/U		
–	2	TERMINATION CLAMP		6			
–	1	INSULATOR FOR SECTION INSULATOR		5			
–	2	TURNBUCKLE M8	G–CUSN	4			
–	2	COPPER WIRE ø4MM	E–CU F31	3			
–	1	SUPPORT WHEEL	G–CUSN	2			
–	1	SECTION INSULATOR 25KV		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

Bin Zhang

DEPUTY DIRECTOR, ENGINEERING

Caltrain

1250 San Carlos Avenue
San Carlos, CA 94070

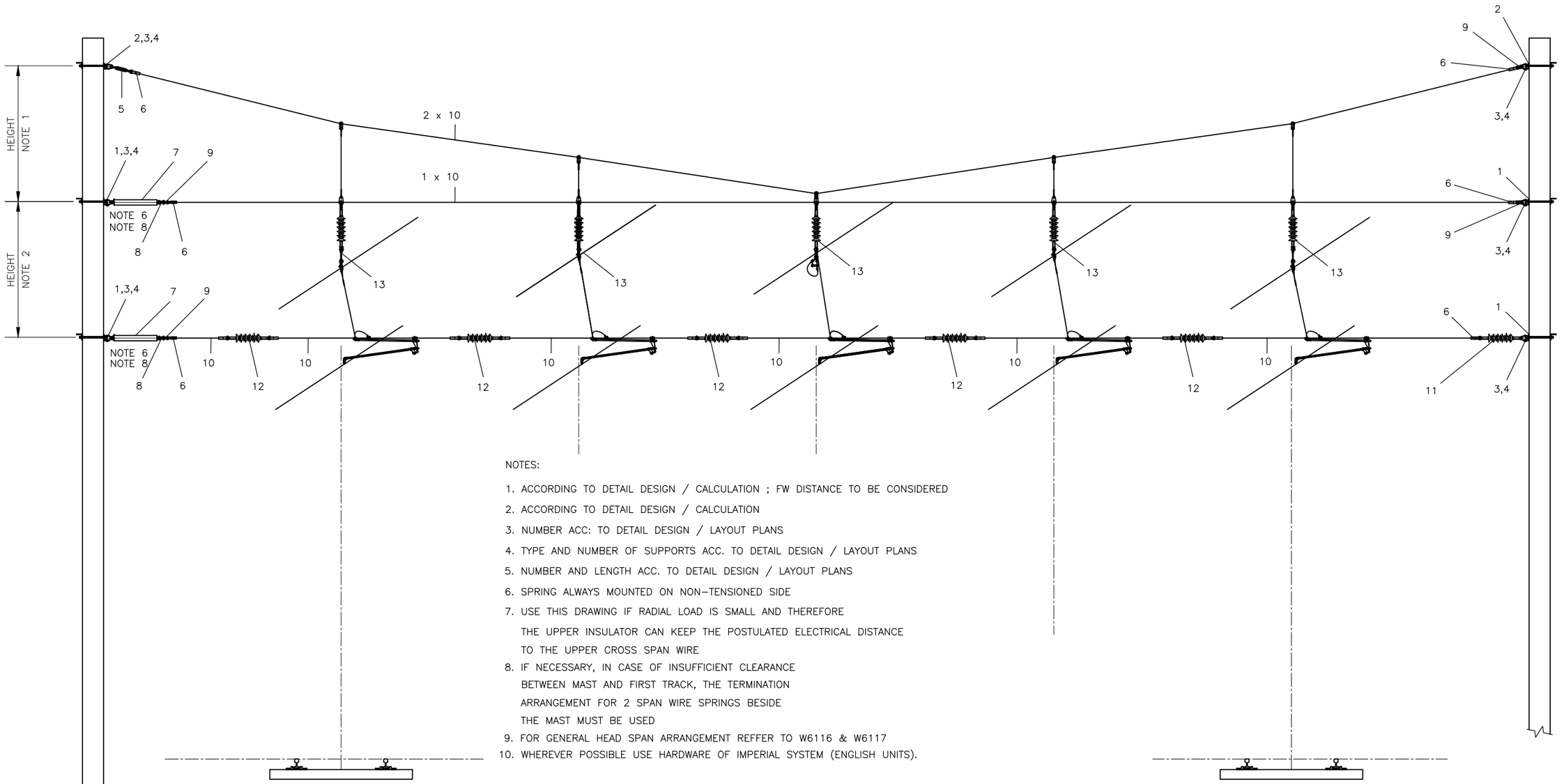
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
SECTION INSULATOR 25 kV
WITH SUSPENSION
SI–01

CADD FILE NAME: W6287

REV: | EDITION: 01012024

STANDARD DRAWING NO.: W6287



NOTES:

1. ACCORDING TO DETAIL DESIGN / CALCULATION ; FW DISTANCE TO BE CONSIDERED
2. ACCORDING TO DETAIL DESIGN / CALCULATION
3. NUMBER ACC: TO DETAIL DESIGN / LAYOUT PLANS
4. TYPE AND NUMBER OF SUPPORTS ACC. TO DETAIL DESIGN / LAYOUT PLANS
5. NUMBER AND LENGTH ACC. TO DETAIL DESIGN / LAYOUT PLANS
6. SPRING ALWAYS MOUNTED ON NON-TENSIONED SIDE
7. USE THIS DRAWING IF RADIAL LOAD IS SMALL AND THEREFORE THE UPPER INSULATOR CAN KEEP THE POSTULATED ELECTRICAL DISTANCE TO THE UPPER CROSS SPAN WIRE
8. IF NECESSARY, IN CASE OF INSUFFICIENT CLEARANCE BETWEEN MAST AND FIRST TRACK, THE TERMINATION ARRANGEMENT FOR 2 SPAN WIRE SPRINGS BESIDE THE MAST MUST BE USED
9. FOR GENERAL HEAD SPAN ARRANGEMENT REFFER TO W6116 & W6117
10. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS).

HEAD SPAN FOR CATENARY SYSTEM

ELEVATION

NTS

A						
NOTE 4	SUPPORTS		13			NOTE 4
NOTE 3	CUT IN INSULATION FOR SPAN WIRE		12			NOTE 3
1	COMPOSITE INSULATOR TYPE 3		11			
NOTE 5	WIRE BZ II 70/19		10	DIN 48201		
10	LINK PLATE		9			
2	LINK PLATE WITH PINS		8			
2	SPRING FOR INDICATORY WIRE		7			
8	MW TERMINATION CLAMP		6			
2	TURNBUCKLE		5			
8	PIN 19x100 WITH BETA SPLINT PIN		4			
8	SWIVEL JOINT		3			
2	DOUBLE TERMINATION BRACKET AT RECTANGULAR MAST		2			
4	SINGLE TERMINATION BRACKET AT RECTANGULAR MAST		1			
PIECES	DESCRIPTION	MATERIAL	PART	DWG-NO/STANDARD	KG/PC.	REMARKS/ID-NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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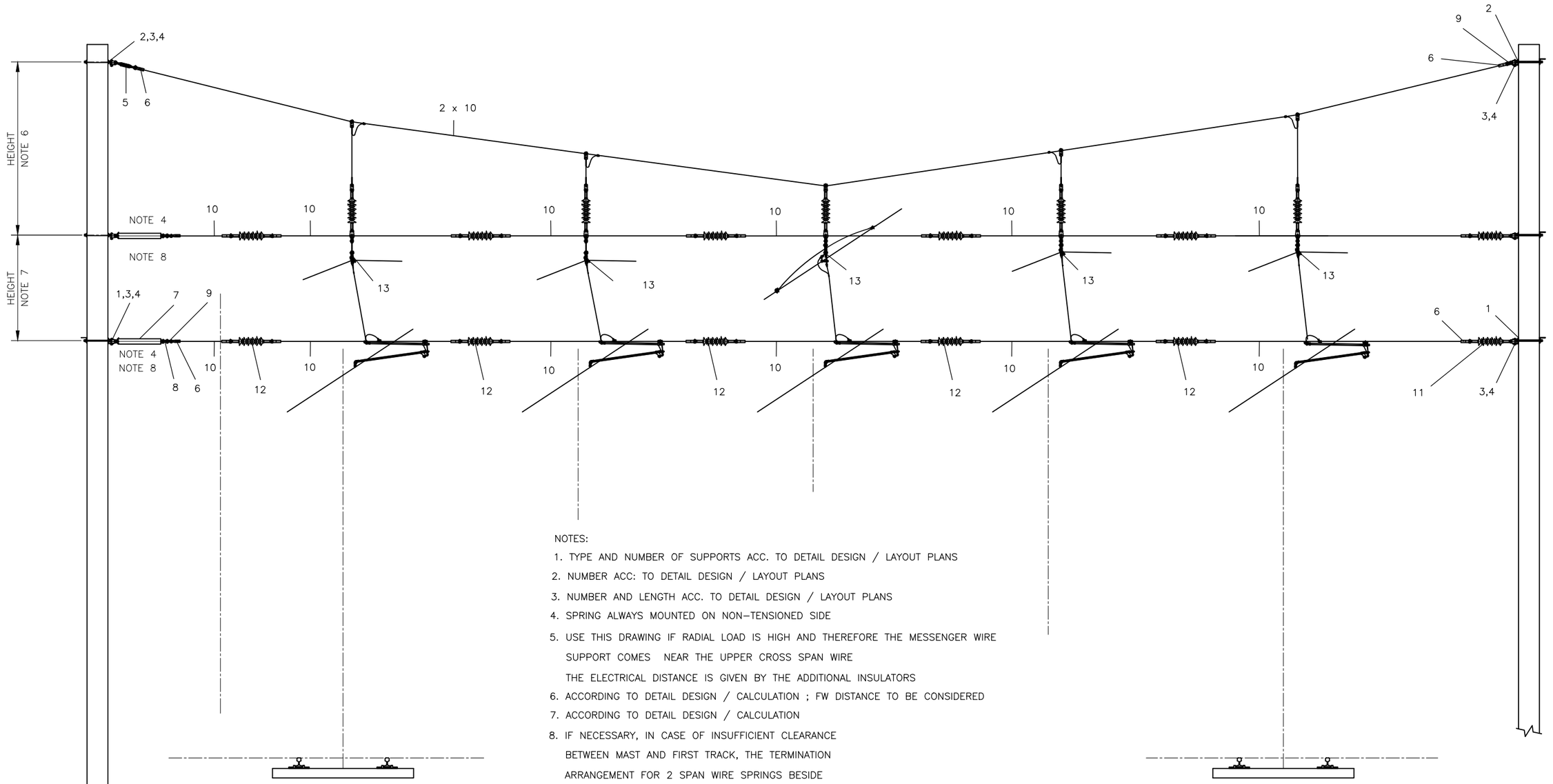
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
HEAD SPAN FOR CATENARY SYSTEM
HS-01

CADD FILE NAME: W6289

REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6289**



NOTES:

1. TYPE AND NUMBER OF SUPPORTS ACC. TO DETAIL DESIGN / LAYOUT PLANS
2. NUMBER ACC: TO DETAIL DESIGN / LAYOUT PLANS
3. NUMBER AND LENGTH ACC. TO DETAIL DESIGN / LAYOUT PLANS
4. SPRING ALWAYS MOUNTED ON NON-TENSIONED SIDE
5. USE THIS DRAWING IF RADIAL LOAD IS HIGH AND THEREFORE THE MESSENGER WIRE SUPPORT COMES NEAR THE UPPER CROSS SPAN WIRE
   THE ELECTRICAL DISTANCE IS GIVEN BY THE ADDITIONAL INSULATORS
6. ACCORDING TO DETAIL DESIGN / CALCULATION ; FW DISTANCE TO BE CONSIDERED
7. ACCORDING TO DETAIL DESIGN / CALCULATION
8. IF NECESSARY, IN CASE OF INSUFFICIENT CLEARANCE BETWEEN MAST AND FIRST TRACK, THE TERMINATION ARRANGEMENT FOR 2 SPAN WIRE SPRINGS BESIDE THE MAST MUST BE USED
9. FOR GENERAL HEAD SPAN ARRANGEMENT REFFER TO W6116 & W6117
10. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS).

HEAD SPAN FOR CATENARY SYSTEM

ELEVATION

NTS

A					
NOTE 1	SUPPORTS	13			NOTE 1
NOTE 2	CUT IN INSULATION FOR SPAN WIRE	12			NOTE 2
2	COMPOSITE INSULATOR	11			
NOTE 3	WIRE BZ II 70/19	10	DIN 48201		
8	LINK PLATE	9			
2	LINK PLATE WITH PINS	8			
2	SPRING FOR INDICATORY WIRE	7			
8	MW TERMINATION CLAMP	6			
2	TURNBUCKLE	5			
8	PIN 19x100 WITH BETA SPLINT PIN	4			
8	SWIVEL JOINT	3			
2	DOUBLE TERMINATION BRACKET (RECTANG. MAST)	2			
4	SINGLE TERMINATION BRACKET (RECTANG. MAST)	1			
PIECES	DESCRIPTION	PART	DWG-NO/STANDARD	KG/PC.	REMARKS/ID-NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

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San Carlos, CA 94070

STANDARD DRAWINGS

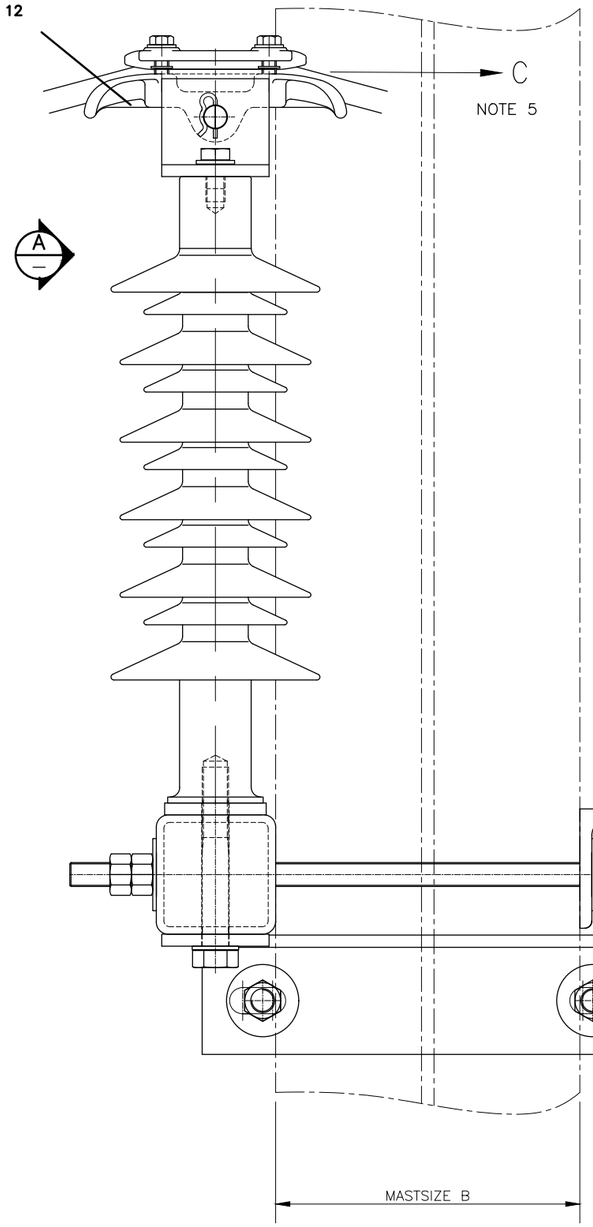
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
HEAD SPAN FOR CATENARY SYSTEM
HS-02

CADD FILE NAME: W6293

REV:

EDITION: 01012024

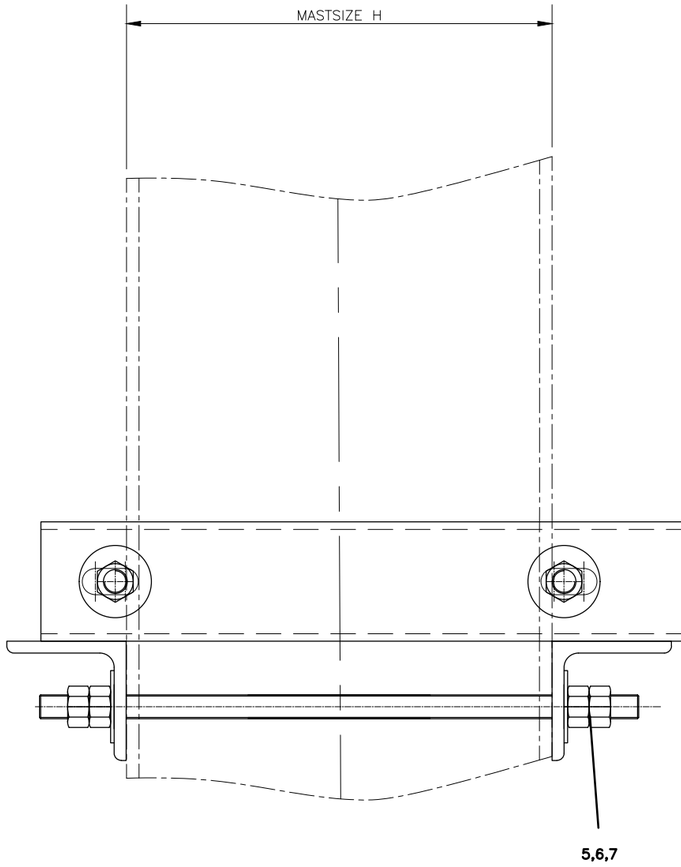
STANDARD DRAWING NO.: **W6293**



FEEDER SUPPORT AT RECTANGULAR MASTS

ELEVATION

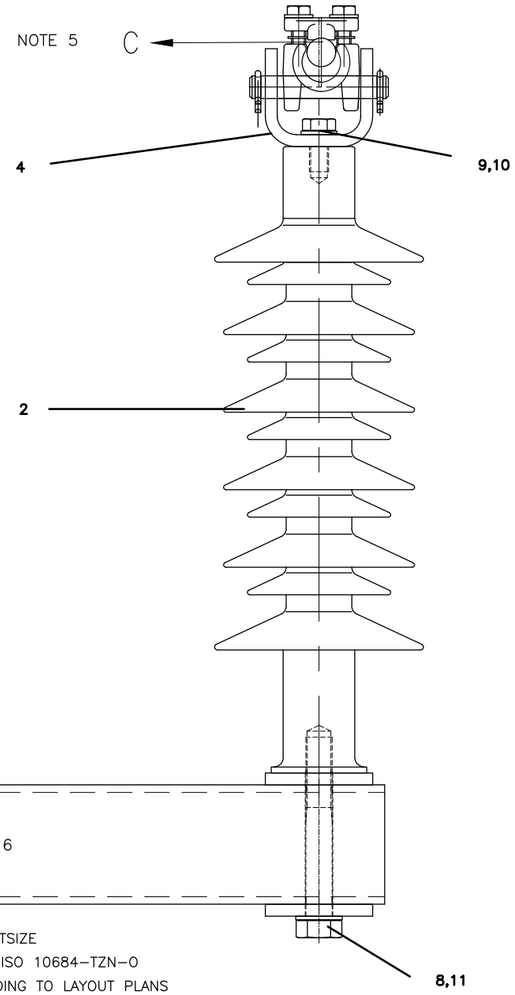
NTS



FEEDER SUPPORT AT RECTANGULAR MASTS

A ELEVATION

NTS



NOTES:

1. LENGTH DEPENDS ON MASTSIZE
2. COATING ACC. TO DIN EN ISO 10684–TZN–O
3. POLE ORIENTATION ACCORDING TO LAYOUT PLANS
4. SEE DWG W6110 FOR REST OF DETAILS
5. MAXIMUM WORKING LOAD: FORCE C = 596 LBF (2,65 KN)
   FORCE C CAN OPERATE IN EVERY HORIZONTAL DIRECTION AND CAN BE A RESULT OUT OF DIFFERENT FORCES (e.g. RADIAL LOAD, WIND LOAD, DIFFERENT SPAN LENGTH)
6. THE MAXIMUM FW OFFSET LIMIT WITHOUT STRUT TUBE IS 6.5' OFFSET
7. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS).

FOR RECTANGULAR MAST A

PIECES	DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.
1	FEEDER WIRE CLAMP	G–AL	12			
1	HEXAGON HEAD SCREW M22x150	8.8 NOTE 2	11	DIN EN ISO 4017		
1	HEXAGON HEAD SCREW M16x35	8.8 NOTE 2	10	DIN EN ISO 4017		
1	WASHER M16	200HV NO.2	9	DIN EN ISO 7089		
1	WASHER M22	200HV NO.2	8	DIN EN ISO 7089		
4	STUD BOLT M20	8.8 NOTE 2	7	DIN 976–1		NOTE 1
16	NUT M20	8 NOTE 2	6	DIN EN ISO 4032		
8	WASHER FOR M20	200HV NO.2	5	DIN EN ISO 7093		
1	BRACKET FOR FEEDER WIRE CLAMP		4			
1	SUPPORTING STRUCTURE FOR POSTINSULATOR		3			NOTE 1
1	COMPOSITE INSULATOR		2			
3	BACK ANGLE WITHOUT EARTHING		1			NOTE 1

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

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1250 San Carlos Avenue
San Carlos, CA 94070

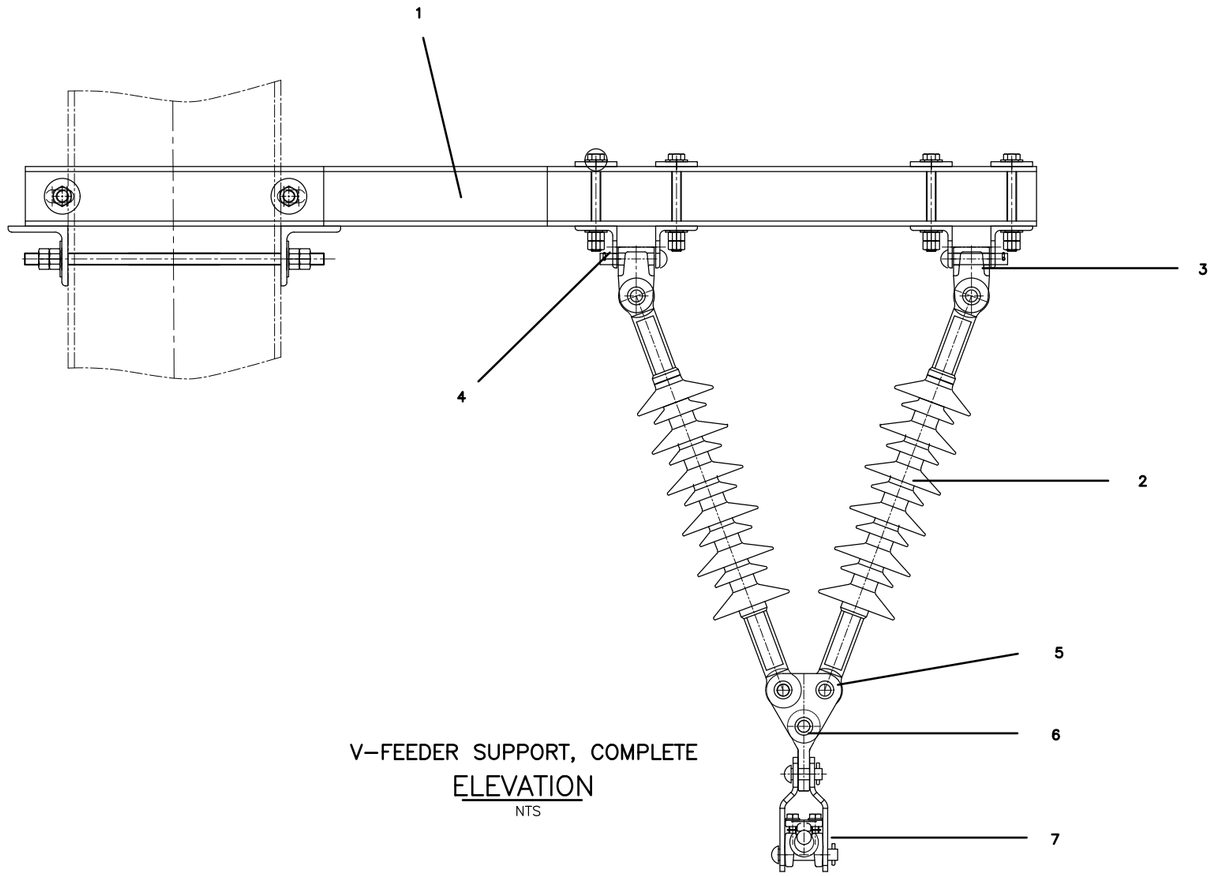
STANDARD DRAWINGS

ELECTRIFICATION PROJECT OVERHEAD CONTACT SYSTEM FEEDER WIRE SUPPORT, VERTICAL AT RECTANGULAR MAST

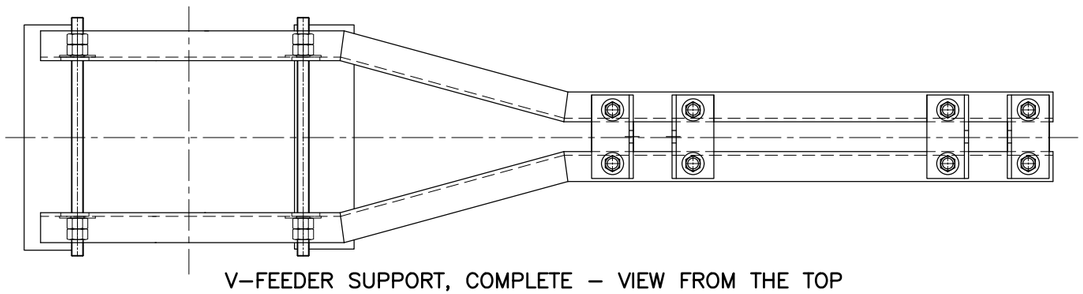
CADD FILE NAME: W6297

REV: | EDITION: 01012024

STANDARD DRAWING NO.: W6297



V–FEEDER SUPPORT, COMPLETE
ELEVATION
NTS



V–FEEDER SUPPORT, COMPLETE – VIEW FROM THE TOP
PLAN
NTS

NOTES:

1. LENGTH DEPENDS ON MASTSIZE AND DISTANCE
2. POLE ORIENTATION ACCORDING TO LAYOUT PLANS
3. SEE DWG W6109 FOR REST OF DETAILS
4. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS).

B	A	FOR RECTANGULAR MAST					
–	1	FEEDER WIRE CLAMP, COMPLETE	G–AL	7			
–	1	TWISTED EYE–EYE CONNECTOR		6			
–	1	THREE HOLE TRIANGULAR CLEVIS LINK		5			
–	2	BOLT ø19x100 WITH ß–SPLINT		4			
–	2	SWIVEL JOINT		3			
–	2	COMPOSITE INSULATOR		2			
–	1	SUPPORTING STRUCTURE FOR V–FEEDER SUPPORT		1			NOTE 1
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

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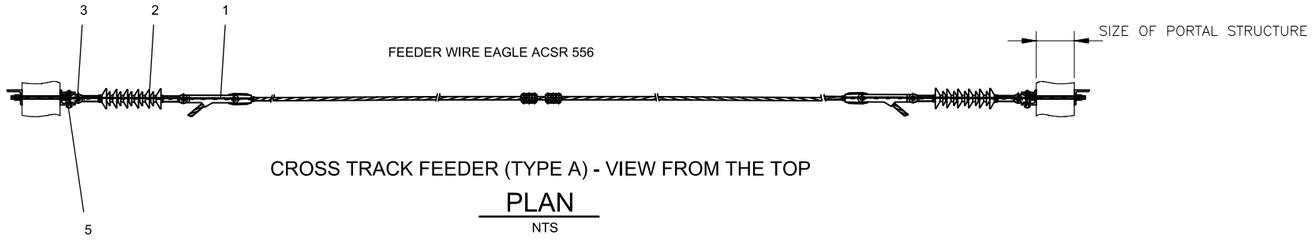
San Carlos, CA 94070

STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
SUPPORTING STRUCTURE FOR
V–FEEDER SUPPORT, COMPLETE

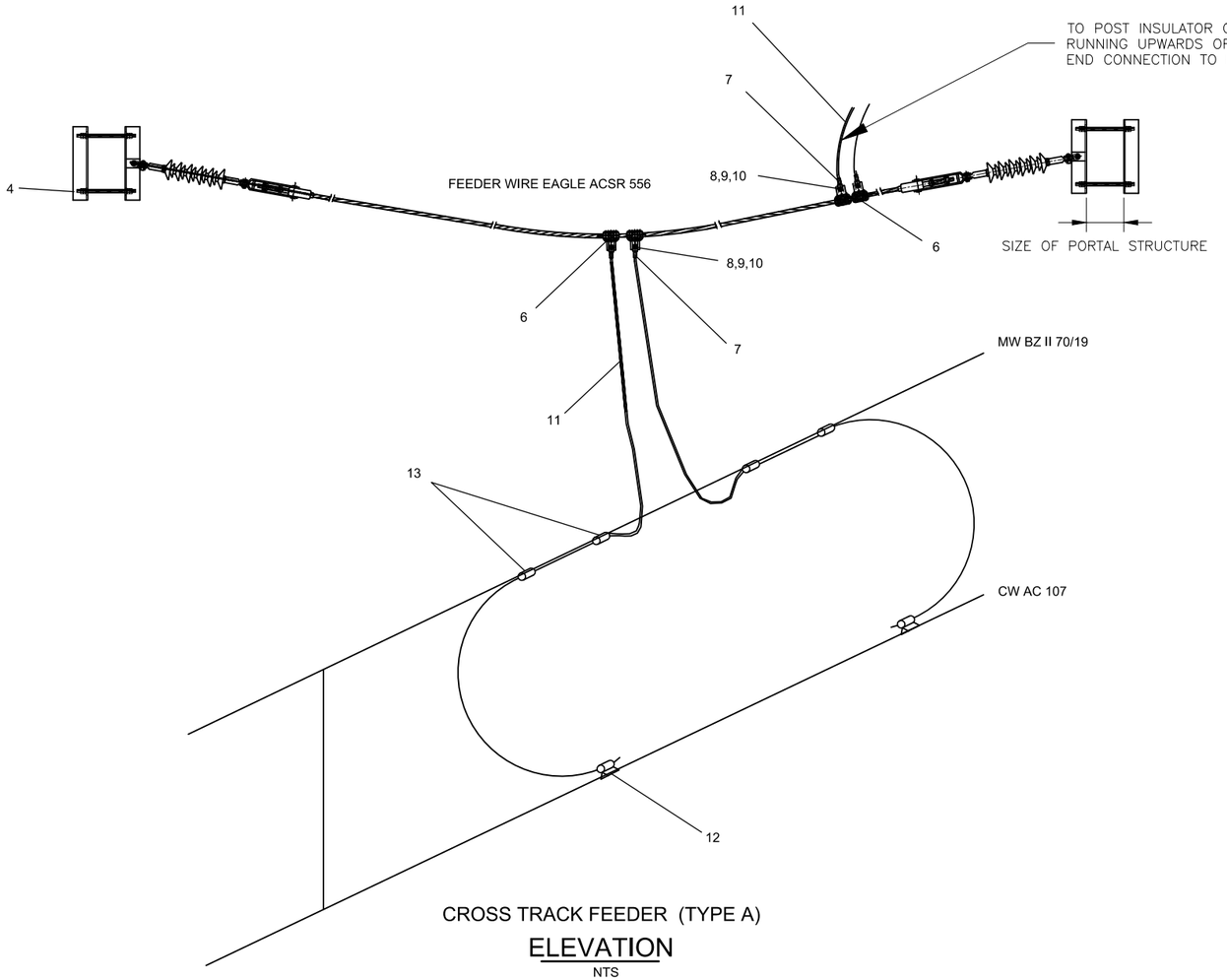
CADD FILE NAME: W6298
REV:
EDITION: 01012024
STANDARD DRAWING NO.: W6298



CROSS TRACK FEEDER (TYPE A) - VIEW FROM THE TOP

PLAN

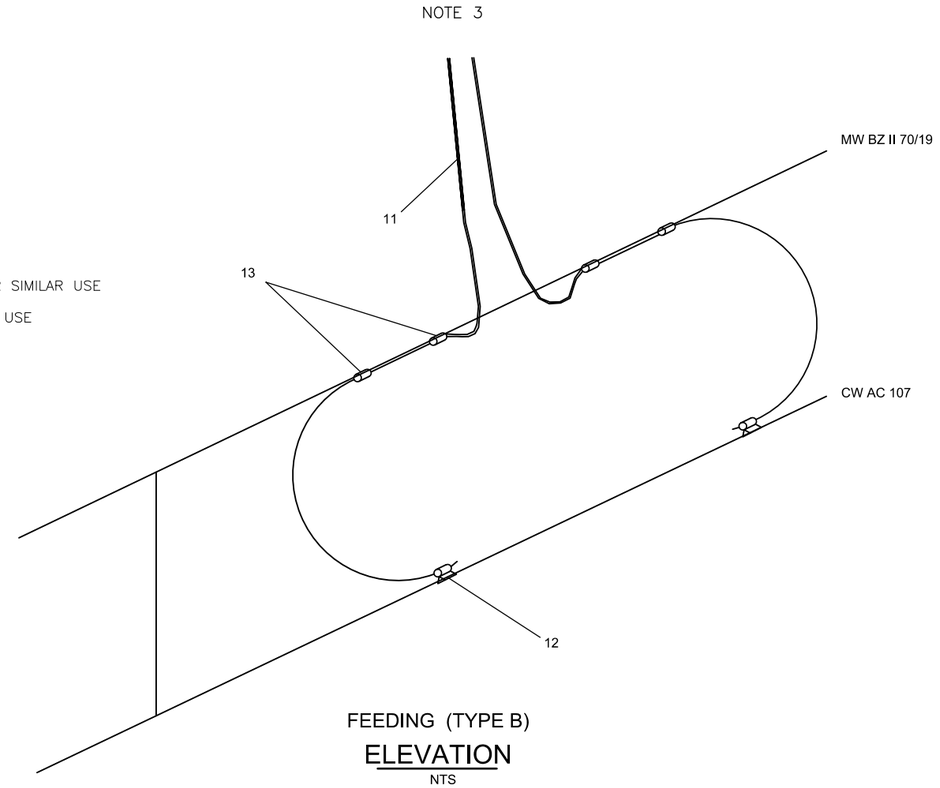
NTS



CROSS TRACK FEEDER (TYPE A)

ELEVATION

NTS



FEEDING (TYPE B)

ELEVATION

NTS

NOTES:

1. CHOICE OF BRACKET DEPENDS ON THE TYPE OF STRUCTURE
2. LENGTH TO BE DEFINED
3. CABLE GOING TO MOD
   CABLE LUG DELIVERY PART OF DISCONNECTOR
4. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS).

FEEDING	CROSS TRACK FEEDER						
B	A						
4	4	WIRE FEEDER CLAMP JW95F-MW70		13			
2	2	CONTACT WIRE FEEDER CLAMP JW95F-CW AC 107		12			
2	4	WIRE E-CU 95x259	E-CU	11	DIN 43138		NOTE 2
–	8	WASHER M12	A2	10	ISO 7089		
–	4	NUT M12	A2	9	ISO 4032		
–	4	HEXAGON HEAD SCREW M12x50	A2	8	ISO 4017		
–	4	COMPRESSION TYPE CABLE LUG 12x120 S	TIN PLATED	7	DIN 46235		
–	4	AL-T FLAT CONNECTOR		6			
–	2	PIN ø19X100 WITH 8-SPLINT PIN	A2	5			
–	2	BRACKET FOR FIXED TERMINATION		4			NOTE 1
–	2	SWIVEL JOINT		3			
–	2	COMPOSITE INSULATOR TYPE 3		2			
–	2	TERMINATION CLAMP F. FEEDER WIRE		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG-NO/STANDARD	KG/PC.	REMARKS/ID-NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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San Carlos, CA 94070

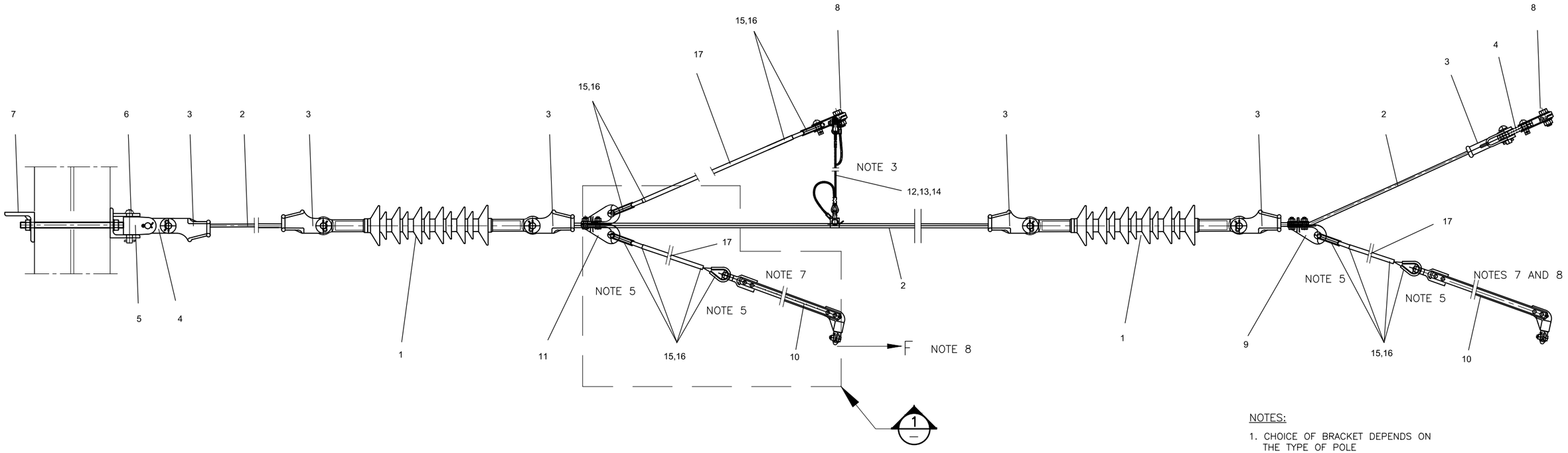
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CROSS TRACK FEEDER
AND FEEDING DETAIL
CT-01

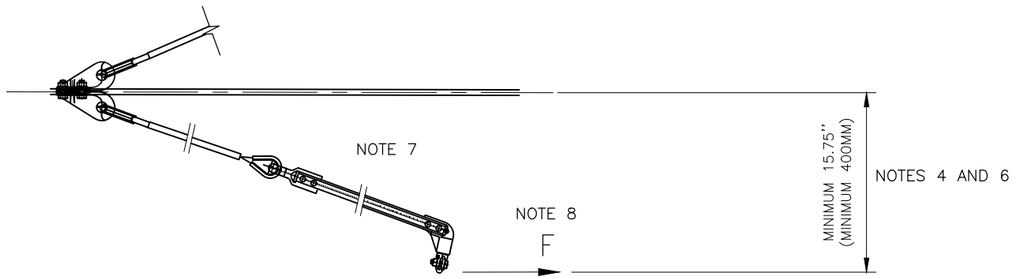
CADD FILE NAME: W6301

REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6301**



PULL OFF TERMINATION FOR CATENARY
FOR LOW RADIAL FORCE
ELEVATION
NTS



STEADY ARM OF PULL OFF TERMINATION
FOR CATENARY FOR LOW RADIAL FORCE
1 DETAIL
NTS

NOTE:
POLE ORIENTATION ACCORDING TO LAYOUT PLANS
PRESENTATION FOR 2 TRACKS

NOTES:

1. CHOICE OF BRACKET DEPENDS ON THE TYPE OF POLE
2. LENGTH AS NEEDED
3. USE DROPPER IF NECESSARY
4. MINIMUM 15.75" (400MM) FROM ALL ELECTRIFIED (TRACKS) CONTACT WIRES
5. PART 10,11,15,16,17 TO BE ASSEMBLED ON SITE
6. RADIAL FORCE AND DROPPER DISTANCE MUST BE CONSIDERED TO CREATE MINIMUM 15.75" (400MM) DISTANCE
7. STEADY ARM LENGTH 3.94' (1200MM) IF NECESSARY DEFINITION OF ENLARGED STEADY ARM MUST BE DONE IN DETAIL DESIGN
8. STEADY ARM: MAXIMUM WORKING LOAD 449.62 LBF (2KN)
9. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS).

FOR 3 TRACKS	FOR 2 TRACKS						
B	A						
5	3	WIRE 6-SE-BK 1570 SZ	STAINLESS STEEL	17			
10	6	COMPRESS. SLEEVE B16	A2	16			
10	6	THIMBLE 35	A2	15			
2	1	DROPPER CLAMP FOR MW 70		14			
2	1	DROPPER CLIP FOR 70		13			
2	1	DROPPER 10x49		12			
2	1	DOUBLE CROSS SPAN EYE CLAMP		11			
3	2	HEAD SPAN STEADY ARM		10			NOTE 7
1	1	CROSS SPAN EYE CLAMP		9			
3	2	HEAD SPAN WIRE CLAMP FOR MW		8			
1	1	BRACKET FOR FIXED TERMINATION		7			NOTE 1
1	1	PIN ø19X100 WITH 8-SPLINT PIN	A2	6			
1	1	SWIVEL JOINT		5			
4	4	LINK PLATE	AL	4			
8	6	WEDGE TYPE DEAD END CLAMP		3			
4	3	MW BZ II 70/19		2	DIN 48201		NOTE 2
3	2	INSULATOR		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG-NO/STANDARD	KG/PC.	REMARKS/ID-NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:
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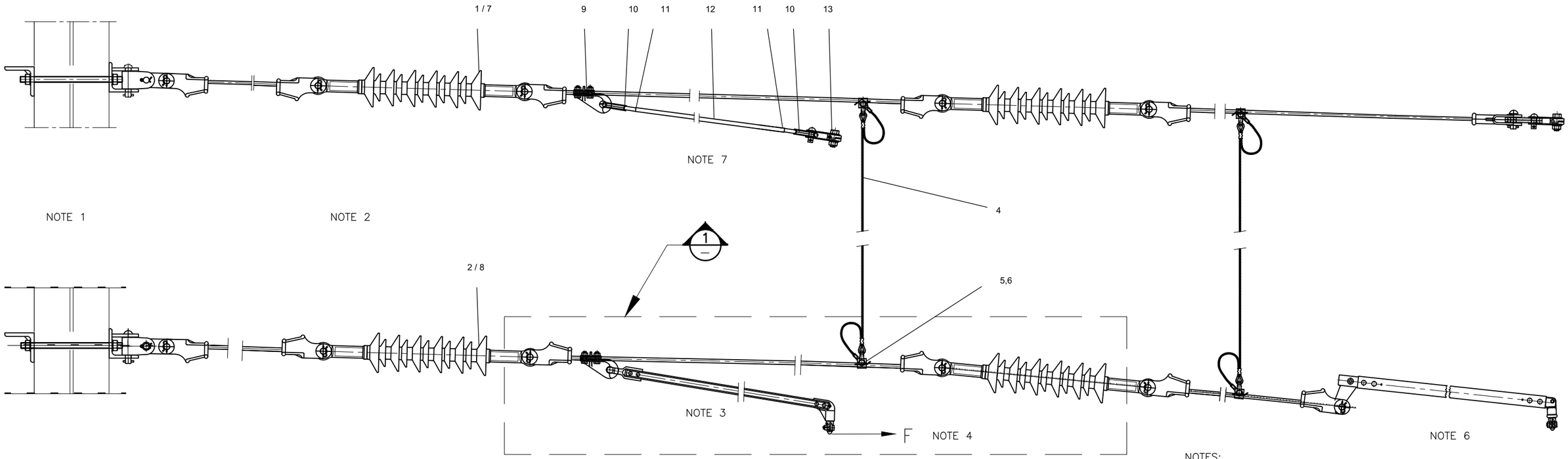
San Carlos, CA 94070

STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
PULL OFF TERMINATION FOR
CATENARY WITH LOW RADIAL FORCE
OVER TWO/THREE TRACKS PO-04

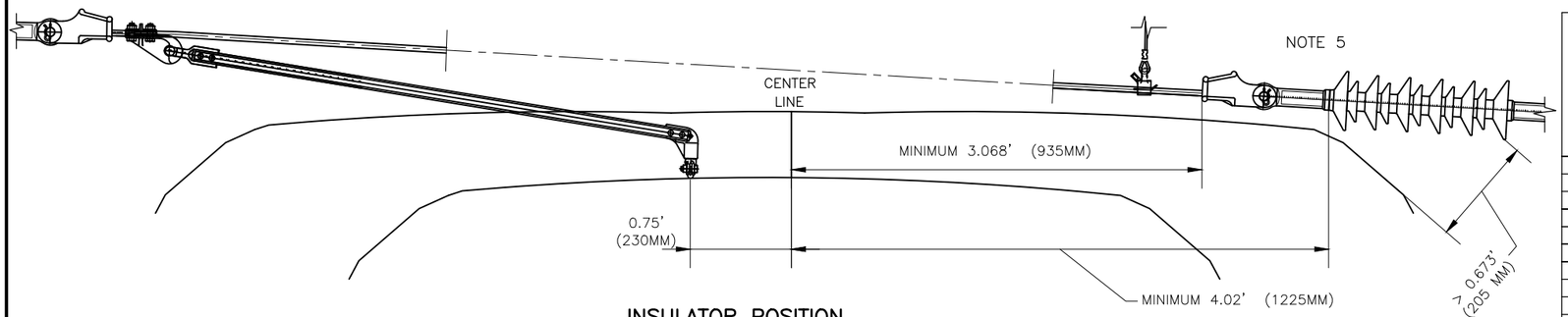
CADD FILE NAME: W6312
REV:
EDITION: 01012024
STANDARD DRAWING NO.: **W6312**



PULL OFF TERMINATION FOR CATENARY
FOR HIGH RADIAL FORCE

ELEVATION

NTS



INSUTATOR POSITION

1 DETAIL
– NTS

NOTES:

1. POLE ORIENTATION ACCORDING TO LAYOUT PLANS
2. PRESENTATION FOR 2 TRACKS
3. STEADY ARM LENGTH 3.94' (1200MM) FOR STAGGER 0' TO 0.75' (0 TO 230MM) IF NECESSARY DEFINITION OF ENLARGED STEADY ARM MUST BE DONE IN DETAIL DESIGN
4. STEADY ARM: MAXIMUM WORKING LOAD 449.62 LBF (2KN)
5. CONSTRUCTION TO MAINTAIN NECESSARY CLEARANCES TO AVOID CLASH BETWEEN PANTOGRAPH AND INSULATOR
6. STANDARD LENGTH 3.77' (1150 MM) FOR 0.75' (230 MM) STAGGER ACCORDING TO W6008.
7. PART 9,10,11,12,13 TO BE ASSEMBLED ON SITE
8. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

FOR 3 TRACKS	FOR 2 TRACKS	PIECES	DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.
B	A							
2	1		HEAD SPAN WIRE CLAMP FOR MW		13			
2	1		WIRE 6–SE–BK 1570 SZ	STAINLESS STEEL	12			
4	2		COMPRESS. SLEEVE B16	A2	11			
4	2		THIMBLE 35	A2	10			
2	1		CROSS SPAN EYE CLAMP		9			
1	–		PULL OFF TERMINATION FOR CW		8			
1	–		PULL OFF TERMINATION FOR MW		7			
3	2		DROPPER CLAMP FOR MW 70		6			
3	2		DROPPER CLIP FOR 70		5			
3	2		DROPPER 10x49		4			
–	–		–		3			
–	1		PULL OFF TERMINATION FOR CW		2			
–	1		PULL OFF TERMINATION FOR MW		1			

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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San Carlos, CA 94070

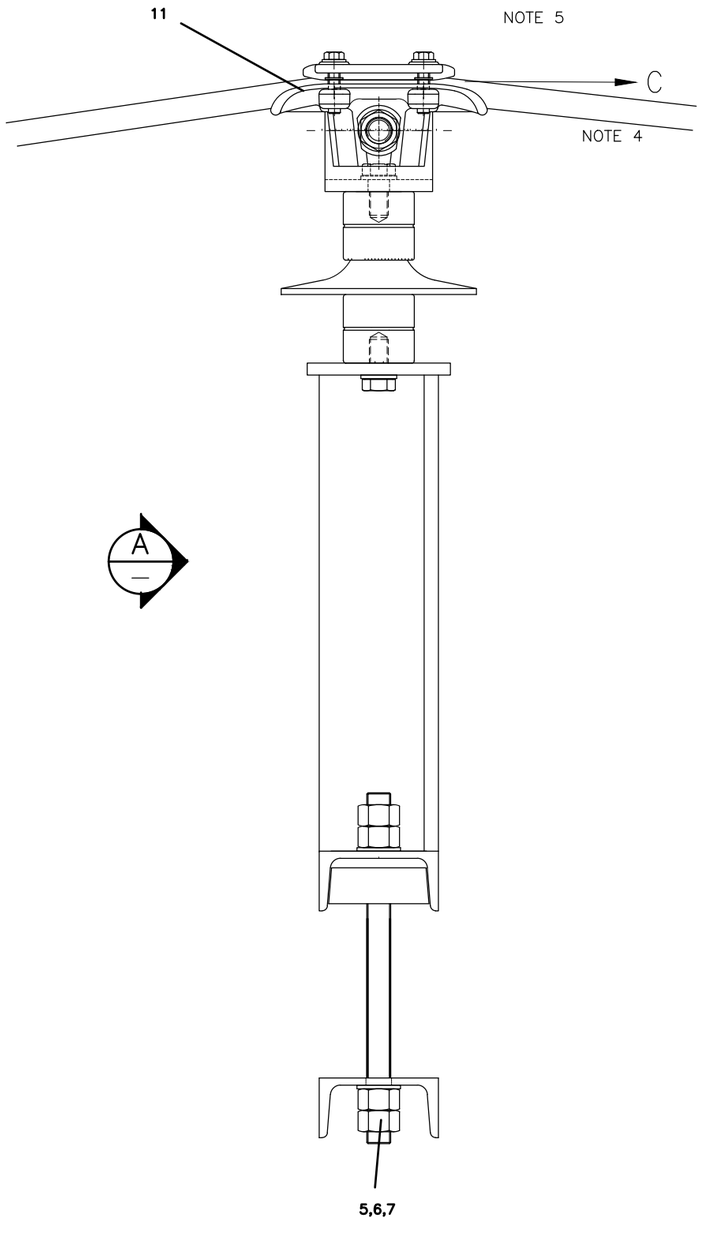
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
PULL OFF TERMINATION
FOR CATENARY
OVER TWO/THREE TRACKS PO–03

CADD FILE NAME: W6315

REV: | EDITION: 01012024

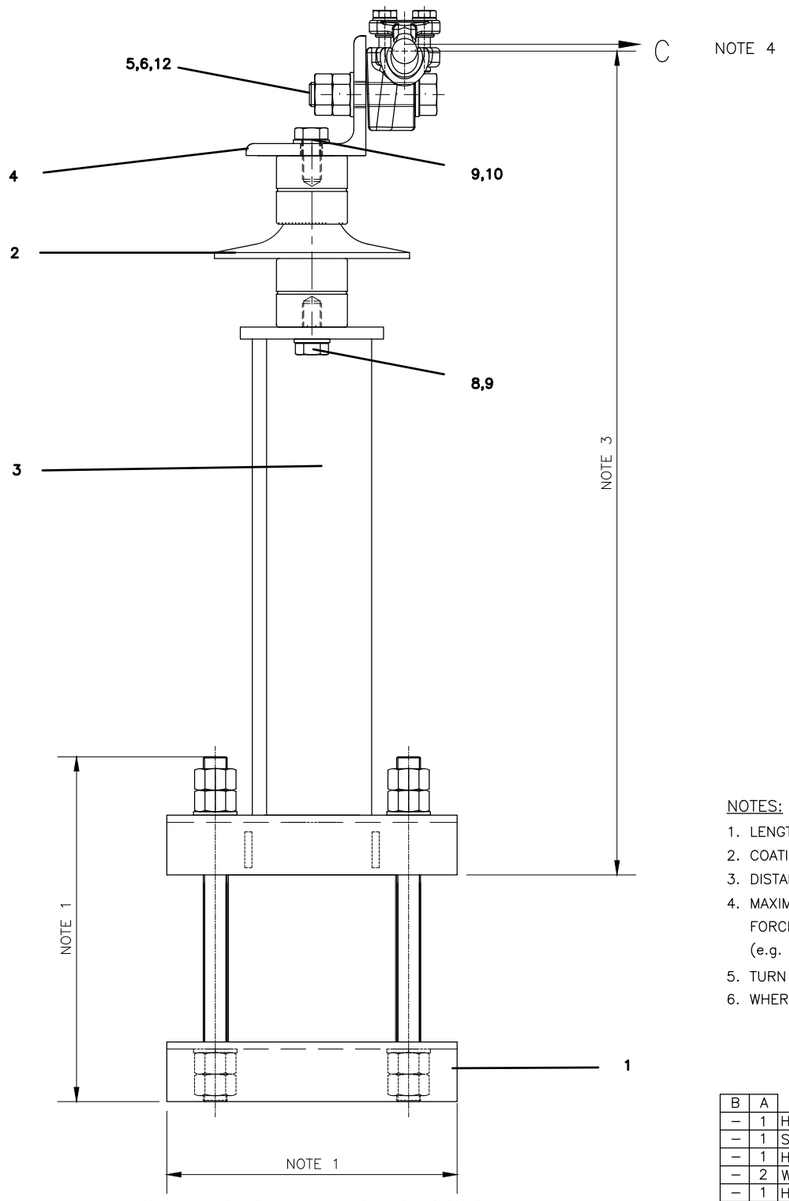
STANDARD DRAWING NO.: W6315



INSULATED STATIC WIRE SUPPORT
VERTICAL AT MULTIPLE TRACK CANTILEVER

ELEVATION

NTS



INSULATED STATIC WIRE SUPPORT
VERTICAL AT MULTIPLE TRACK CANTILEVER

A – ELEVATION

NTS

NOTES:

1. LENGTH DEPENDS ON BEAMSIZE
2. COATING ACC. TO DIN EN ISO 10684–TZN–O
3. DISTANCE DEPENDS ON DETAIL DESIGN
4. MAXIMUM WORKING LOAD: FORCE C = 416 LBF (1.85 KN)
   FORCE C CAN OPERATE IN EVERY HORIZONTAL DIRECTION AND CAN BE A RESULT OUT OF DIFFERENT FORCES (e.g. RADIAL LOAD, WIND LOAD, DIFFERENT SPAN LENGTH)
5. TURN CLAMP IN CORRECT POSITION
6. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

B	A							
–	1	HEX. HEAD SCREW M20x100	8.8 NOTE2	12	ISO 4017		
–	1	STATIC WIRE CLAMP	G–AL	11			
–	1	HEXAGON HEAD SCREW M16x30	8.8 NOTE2	10	DIN EN ISO 4017		
–	2	WASHER M16	200HV NOTE2	9	DIN EN ISO 7089		
–	1	HEXAGON HEAD SCREW M16x30	8.8 NOTE2	8	DIN EN ISO 4017		
–	2	STUD BOLT M20	8.8 NOTE2	7	DIN 976–1		NOTE 1
–	10	NUT M20	8 NOTE2	6	DIN EN ISO 4032		
–	6	WASHER FOR M20	200HV NOTE2	5	DIN EN ISO 7089		
–	1	ANGLE FOR STATIC WIRE CLAMP		4			
–	1	SUPPORTING STRUCTURE FOR POSTINSULATOR		3			NOTES 1 AND 3
–	1	COMPOSITE INSULATOR 130MM		2			
–	1	U–PROFILE FOR CLAMPING		1			NOTE 1
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

Bin Zhang

DEPUTY DIRECTOR, ENGINEERING

Caltrain

1250 San Carlos Avenue
San Carlos, CA 94070

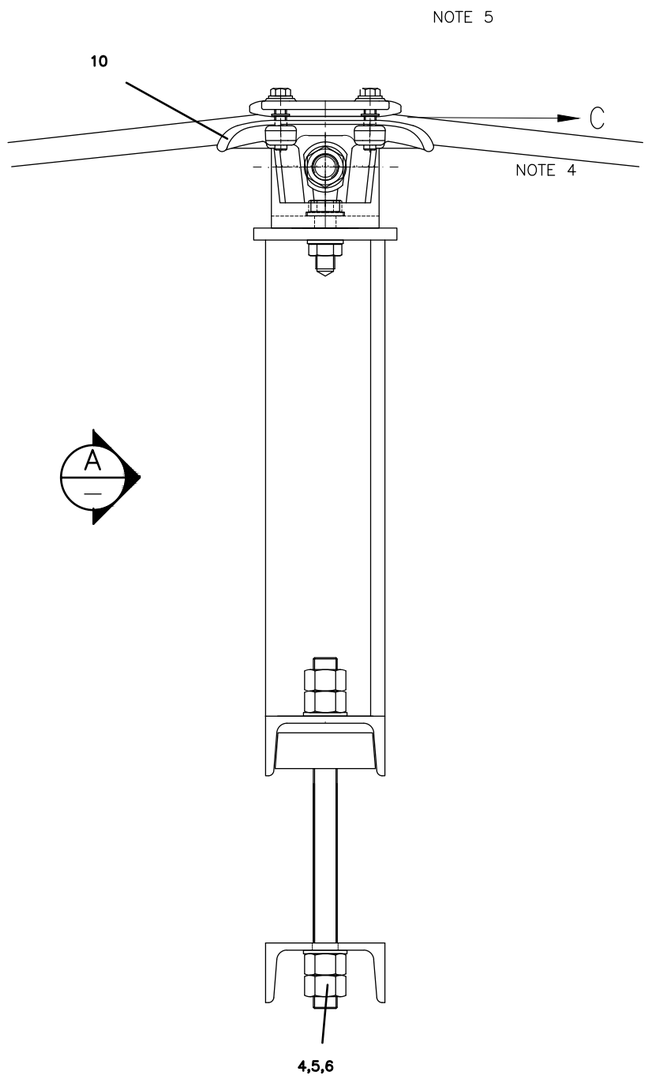
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
INSULATED STATIC WIRE SUPPORT
VERTICAL
AT MULTIPLE TRACK CANTILEVER

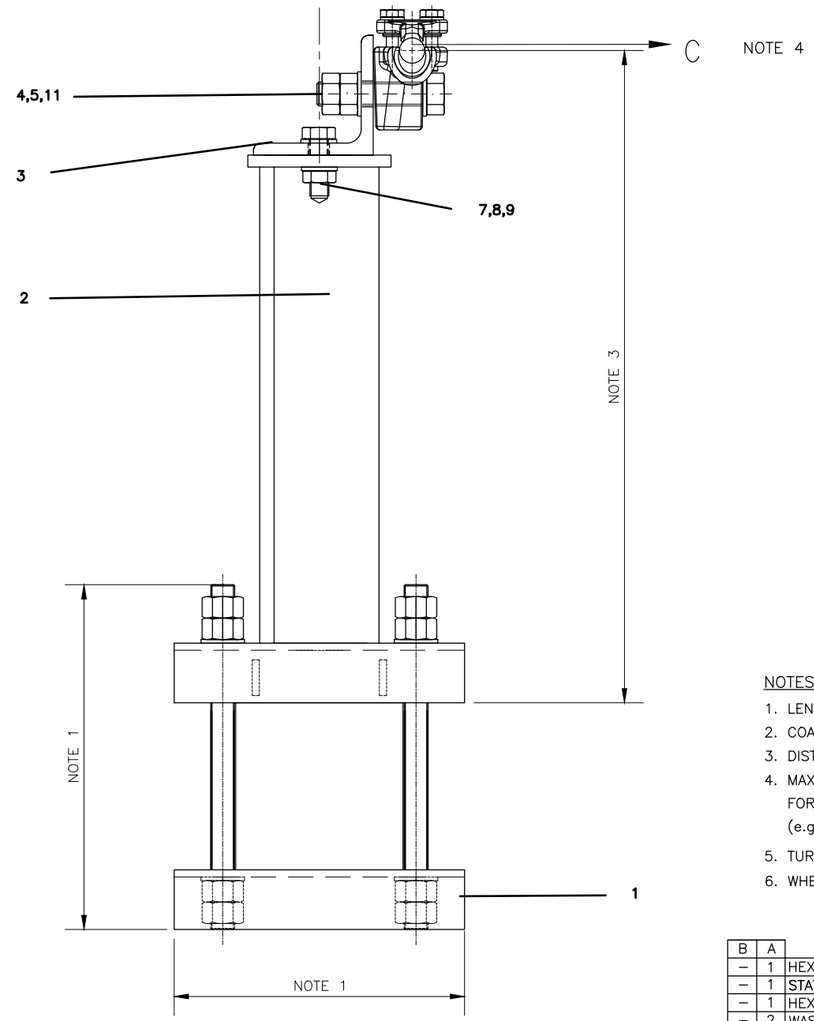
CADD FILE NAME: W6316

REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6316**



STATIC WIRE SUPPORT
VERTICAL AT MULTIPLE TRACK CANTILEVER
ELEVATION
NTS



STATIC WIRE SUPPORT
VERTICAL AT MULTIPLE TRACK CANTILEVER
A – ELEVATION
NTS

NOTES:

1. LENGTH DEPENDS ON BEAMSIZE
2. COATING ACC. TO DIN EN ISO 10684–TZN–O
3. DISTANCE DEPENDS ON DETAIL DESIGN
4. MAXIMUM WORKING LOAD: FORCE C = 562 LBF (2.50 KN)
   FORCE C CAN OPERATE IN EVERY HORIZONTAL DIRECTION AND CAN BE A RESULT OUT OF DIFFERENT FORCES (e.g. RADIAL LOAD, WIND LOAD, DIFFERENT SPAN LENGTH)
5. TURN CLAMP IN CORRECT POSITION
6. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS).

B	A							
–	1	HEX. HEAD SCREW M20x100	8.8 NOTE2	11	ISO 4017		
–	1	STATIC WIRE CLAMP	G–AL	10			
–	1	HEXAGON HEAD SCREW M16x50	8.8 NOTE2	9	DIN EN ISO 4017		
–	2	WASHER M16	200HV NOTE2	8	DIN EN ISO 7089		
–	1	HEXAGON NUT M16	8 NOTE2	7	DIN EN ISO 4032		
–	2	STUD BOLT M20	8.8 NOTE2	6	DIN 976–1		NOTE 1
–	10	NUT M20	8 NOTE2	5	DIN EN ISO 4032		
–	6	WASHER FOR M20	200HV NOTE2	4	DIN EN ISO 7089		
–	1	ANGLE FOR STATIC WIRE SUPPORT		3			
–	1	SUPPORTING STRUCTURE – ADAPTER		2			NOTES 1 AND 3
–	1	U–PROFILE FOR CLAMPING		1			NOTE 1
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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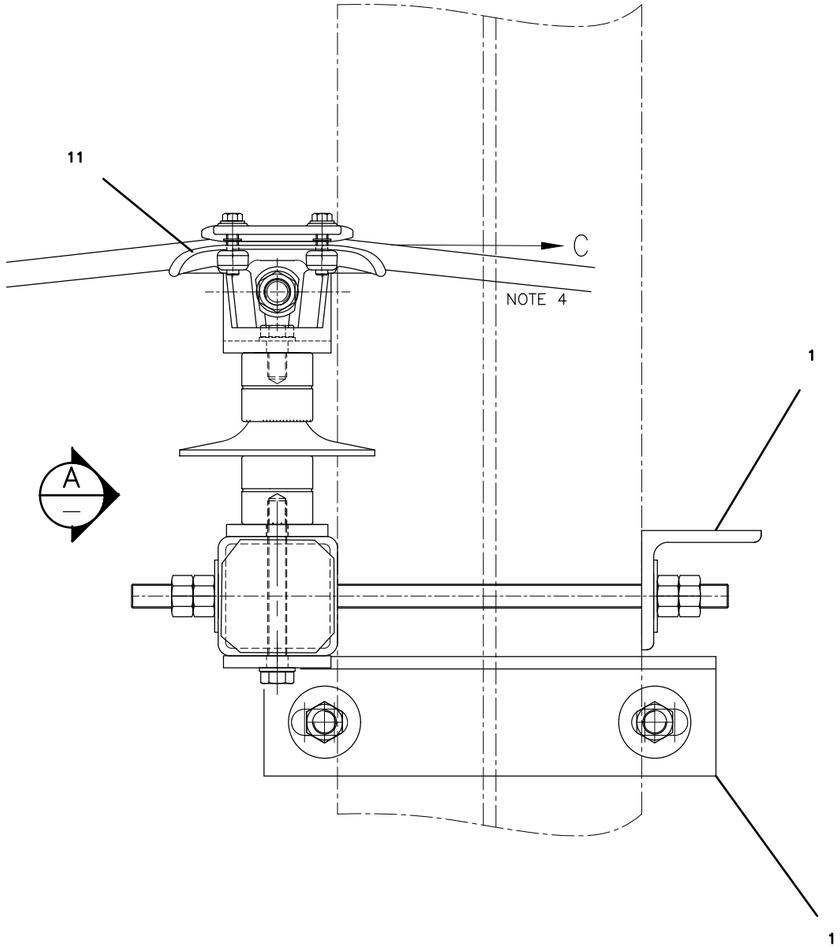
San Carlos, CA 94070

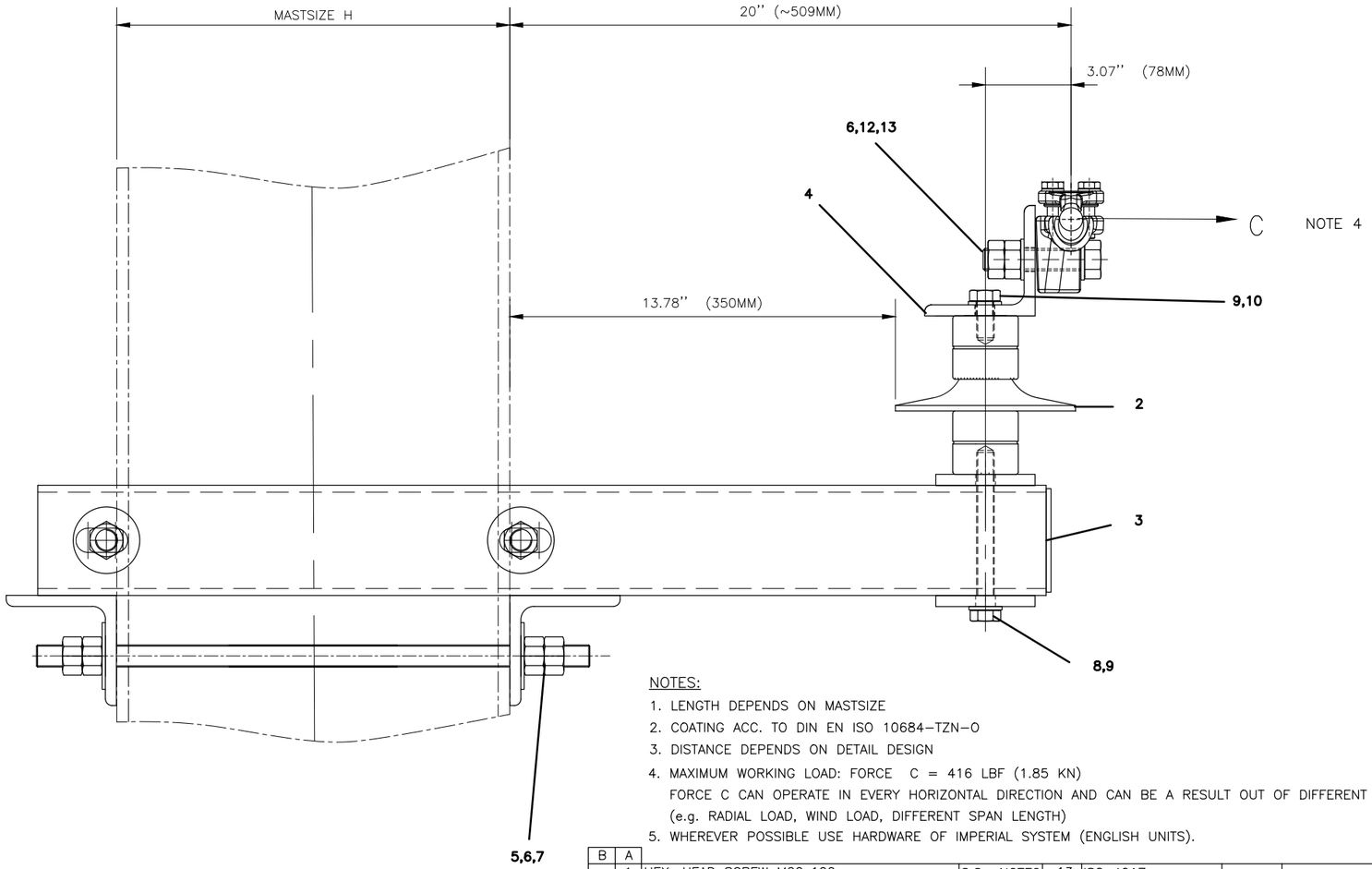
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
STATIC WIRE SUPPORT
VERTICAL
AT MULTIPLE TRACK CANTILEVER

CADD FILE NAME: W6317
REV:
EDITION: 01012024
STANDARD DRAWING NO.: W6317



INSULATED STATIC WIRE SUPPORT
VERTICAL AT MASTSIZE H
A ELEVATION
NTS



INSULATED STATIC WIRE SUPPORT
VERTICAL AT MASTSIZE H
A ELEVATION
NTS

NOTES:

1. LENGTH DEPENDS ON MASTSIZE
2. COATING ACC. TO DIN EN ISO 10684–TZN–O
3. DISTANCE DEPENDS ON DETAIL DESIGN
4. MAXIMUM WORKING LOAD: FORCE C = 416 LBF (1.85 KN)
   FORCE C CAN OPERATE IN EVERY HORIZONTAL DIRECTION AND CAN BE A RESULT OUT OF DIFFERENT FORCES (e.g. RADIAL LOAD, WIND LOAD, DIFFERENT SPAN LENGTH)
5. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS).

B	A							
–	1	HEX. HEAD SCREW M20x100	8.8 NOTE2	13	ISO 4017		
–	2	WASHER FOR M20	200HV NOTE2	12	DIN EN ISO 7089		
–	1	STATIC WIRE CLAMP	G–AL	11			
–	1	HEXAGON HEAD SCREW M16x30	8.8 NOTE2	10	DIN EN ISO 4017		
–	1	WASHER M16	200HV NOTE2	9	DIN EN ISO 7089		
–	1	HEXAGON HEAD SCREW M16x140	8.8 NOTE2	8	DIN EN ISO 4017		
–	4	STUD BOLT M20	8.8 NOTE2	7	DIN 976–1		NOTE 1
–	18	NUT M20	8 NOTE 2	6	DIN EN ISO 4032		
–	8	WASHER FOR M20	200HV NOTE2	5	DIN EN ISO 7093		
–	1	ANGLE FOR STATIC WIRE CLAMP		4			
–	1	SUPPORTING STRUCTURE FOR INSULATOR		3			NOTES 1 AND 3
–	1	COMPOSITE INSULATOR 130MM		2			
–	3	CLAMPING ANGLE		1			NOTE 1
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:
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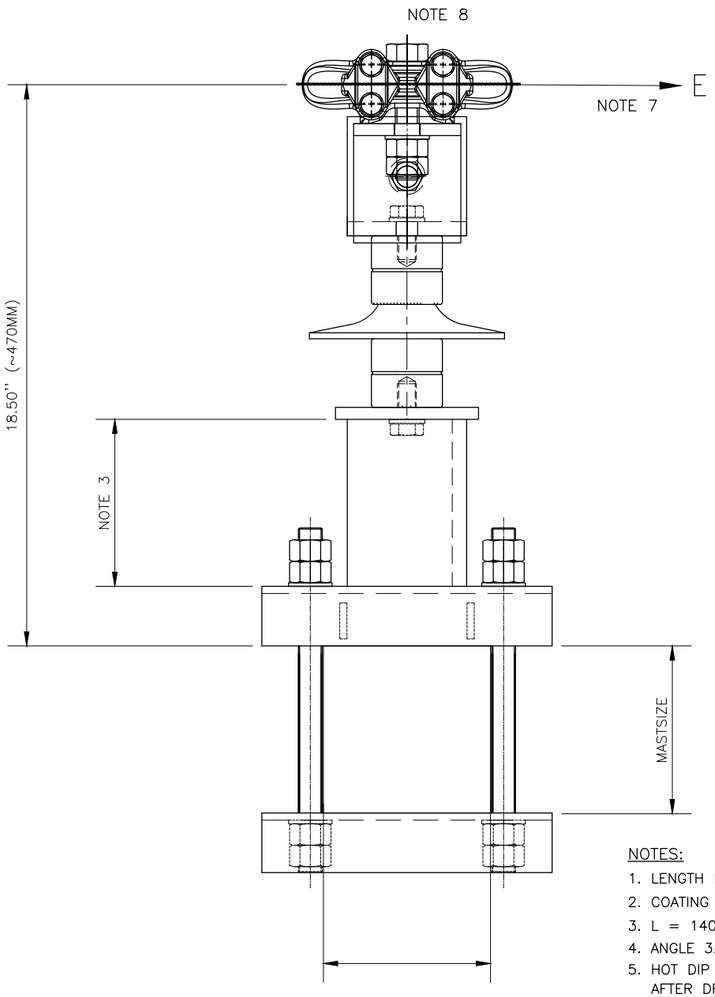
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
INSULATED STATIC WIRE SUPPORT
VERTICAL AT MASTSIZE H

CADD FILE NAME: W6318
REV:
EDITION: 01012024
STANDARD DRAWING NO.: W6318

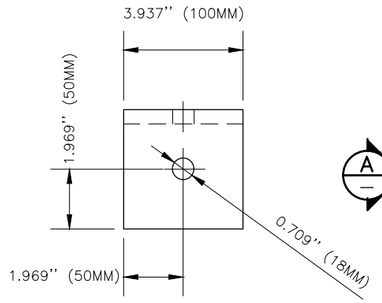


MASTSIZE MINIMUM 5.51'' (140MM)

HORIZONTAL STATIC WIRE SUPPORT

PLAN

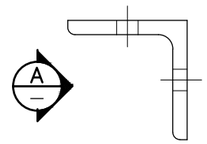
NTS



PART 8

PLAN

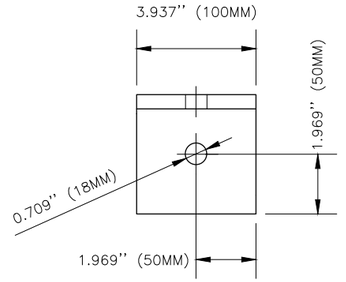
NTS



PART 8

ELEVATION

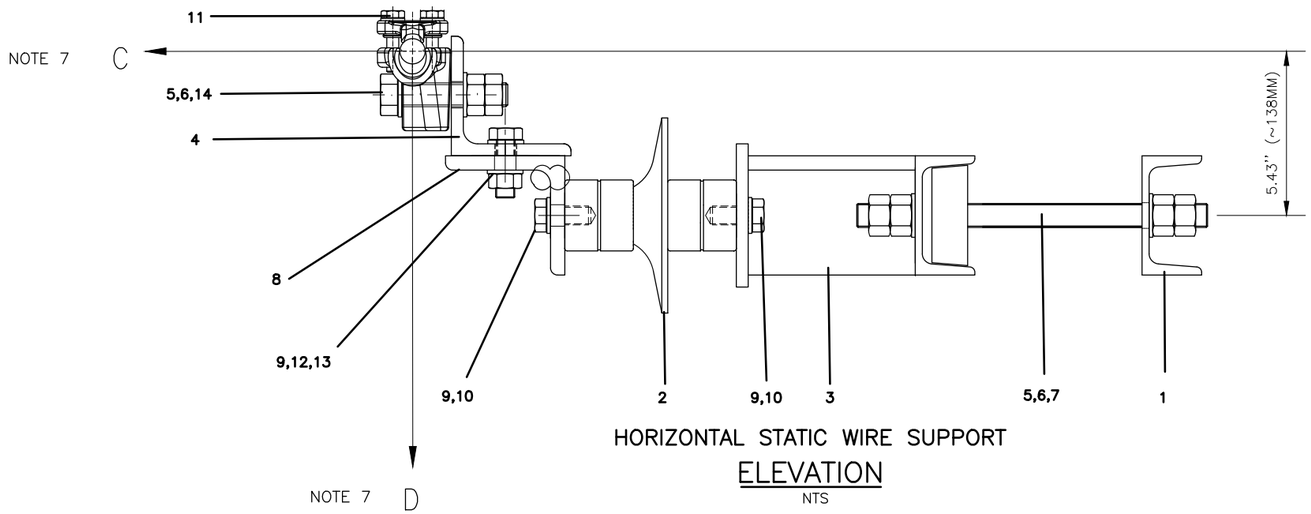
NTS



PART 8

A ELEVATION

NTS



HORIZONTAL STATIC WIRE SUPPORT

ELEVATION

NTS

NOTES:

1. LENGTH DEPENDS ON MASTSIZE
2. COATING ACC. TO DIN EN ISO 10684–TZN–O
3. L = 140MM (5.51'') OR TO BE DEFINED IN DETAIL DESIGN IF NECESSARY
4. ANGLE 3.937''x3.937''x0.472''
5. HOT DIP GALVANIZED ACC. TO DIN EN ISO 1461 (MIN. THICKNESS: 85 µm) AFTER DRILLING
6. ATTENTION: DIMENSIONS OF MAST MUST BE CONSIDERED, WHEN DESIGNING U–PROFILES
   (NOT DIMENSION OF MULTIPLE TRACK CANTILEVER)
7. MAXIMUM WORKING LOAD: FORCE C + D + E = 416 LBF (1.85 KN)
   FORCE C + D + E CAN OPERATE IN EVERY DIRECTION AND CAN BE A RESULT OUT OF DIFFERENT FORCES
   (e.g. RADIAL LOAD, WIND LOAD, DIFFERENT SPAN LENGTH, WEIGHT)
8. TURN CLAMP IN CORRECT POSITION
9. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS).

B	A							
–	1	HEX. HEAD SCREW M20x100	8.8 NOTE2	14	ISO 4017		
–	1	NUT M16	8 NOTE2	13	DIN EN ISO 4032		
–	1	HEXAGON HEAD SCREW M16x50	8.8 NOTE2	12	DIN EN ISO 4017		
–	1	STATIC WIRE CLAMP	G–AL	11			
–	2	HEXAGON HEAD SCREW M16x30	8.8 NOTE2	10	DIN EN ISO 4017		
–	4	WASHER M16	200HV NO.2	9	DIN EN ISO 7089		
–	1	ANGLE 100x100x12 NOTE 4	NOTE 5	8	DIN EN 10056–1		
–	2	STUD BOLT M20	8.8 NO.2	7	DIN 976–1		NOTE 1
–	10	NUT M20	8 NO.2	6	DIN EN ISO 4032		
–	6	WASHER FOR M20	200HV NO.2	5	DIN EN ISO 7089		
–	1	ANGLE FOR STATIC WIRE CLAMP		4			
–	1	SUPPORTING STRUCTURE FOR POST INSULATOR		3			NOTE 1 , 3 AND 6
–	1	COMPOSITE INSULATOR 130MM		2			
–	1	U–PROFILE FOR CLAMPING		1			NOTE 1 NOTE 6
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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San Carlos, CA 94070

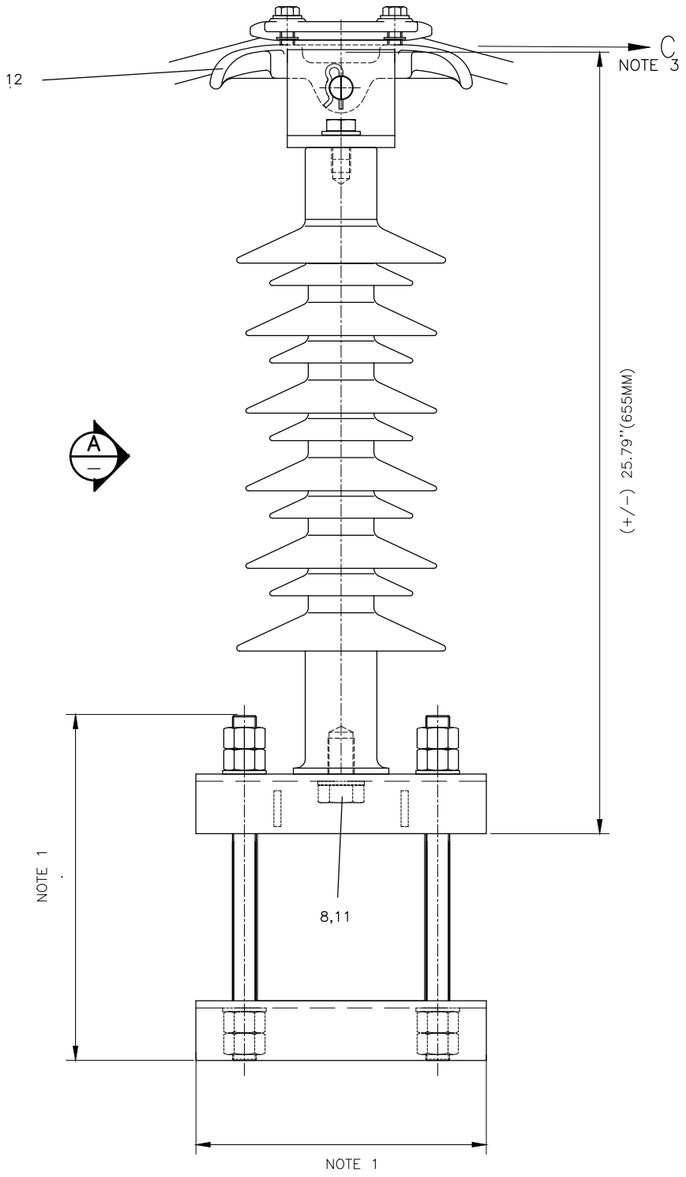
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
INSULATED STATIC WIRE SUPPORT
HORIZONTAL
AT MAST

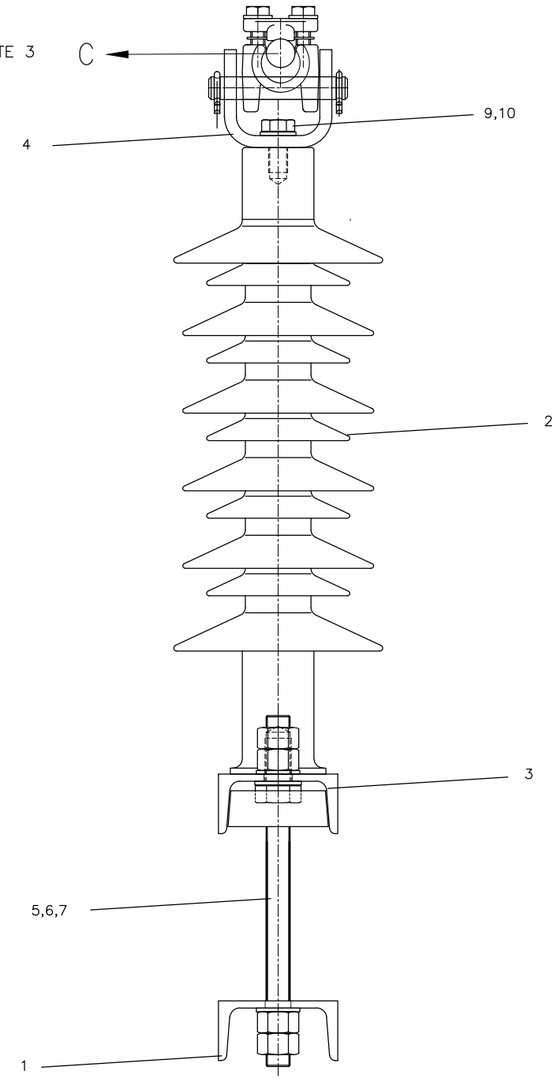
CADD FILE NAME: W6319

REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6319**



FEEDER WIRE SUPPORT, VERTICAL
FOR MULTIPLE TRACK CANTILEVER
ELEVATION
NTS



FEEDER WIRE SUPPORT, VERTICAL
FOR MULTIPLE TRACK CANTILEVER
A
–
ELEVATION
NTS

NOTES:
1. LENGTH DEPENDS ON SIZE OF STEEL PART PROFILE
2. COATING ACC. TO DIN EN ISO 10684–TZN–O
3. MAXIMUM WORKING LOAD: FORCE C = 596 LBF (2.65 KN)
   FORCE C CAN OPERATE IN EVERY HORIZONTAL DIRECTION AND CAN BE A RESULT OUT OF DIFFERENT FORCES (e.g. RADIAL LOAD, WIND LOAD, DIFFERENT SPAN LENGTH)
4. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS).

FOR RECTANGULAR STEEL PART PROFILE							
B	A						
–	1	FEEDER WIRE CLAMP	G–AL	12			
–	1	HEXAGON HEAD SCREW M22x35	8.8 NOTE 2	11	DIN EN ISO 4017		
–	1	HEXAGON HEAD SCREW M16x35	8.8 NOTE 2	10	DIN EN ISO 4017		
–	1	WASHER M16	200HV NOTE 2	9	DIN EN ISO 7089		
–	1	WASHER M22	200HV NOTE 2	8	DIN EN ISO 7089		
–	2	STUD BOLT M20	8.8 NOTE 2	7	DIN 976–1		NOTE 1
–	8	NUT M20	8 NOTE 2	6	DIN EN ISO 4032		
–	4	WASHER FOR M20	200HV NOTE 2	5	DIN EN ISO 7089		
–	1	BRACKET FOR FEEDER WIRE CLAMP		4			
–	1	U–PROFILE FOR INSULATOR		3			NOTE 1
–	1	COMPOSITE INSULATOR		2			
–	1	U–PROFILE FOR CLAMPING		1			NOTE 1
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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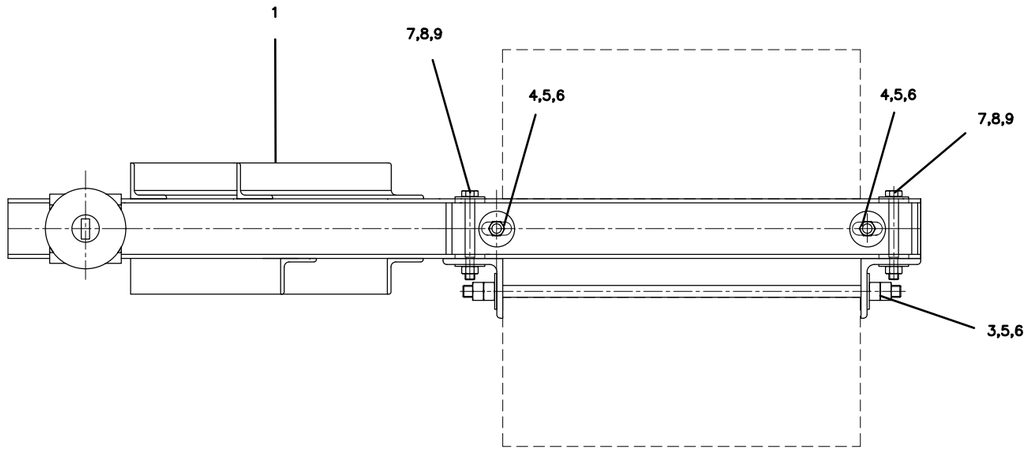
San Carlos, CA 94070

STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
FEEDER WIRE SUPPORT, VERTICAL
FOR MULTIPLE TRACK CANTILEVER

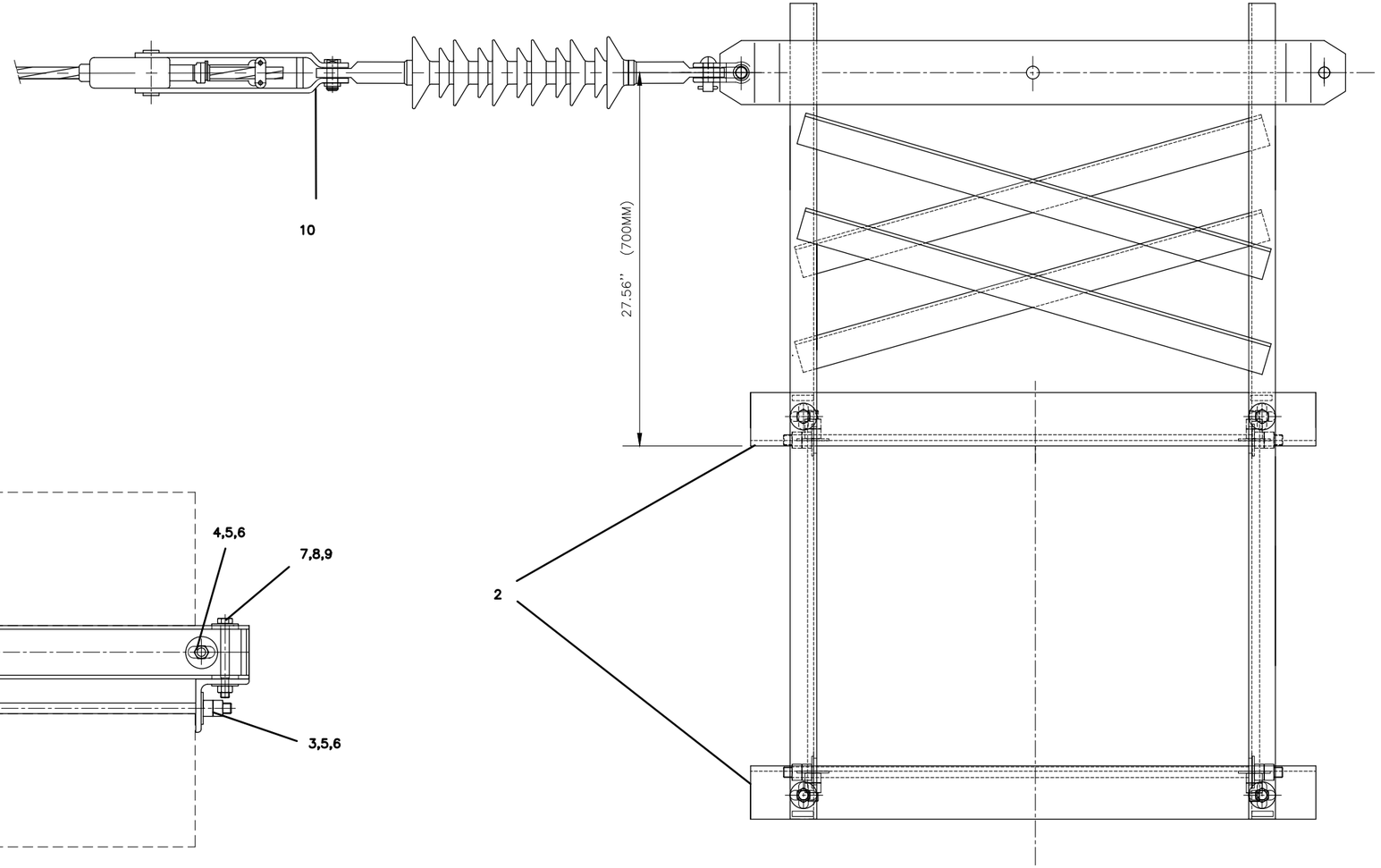
CADD FILE NAME: W6320
REV:
EDITION: 01012024
STANDARD DRAWING NO.: **W6320**



SINGLE FEEDER WIRE TERMINATION TRAVERSE

ELEVATION

NTS



SINGLE FEEDER WIRE TERMINATION TRAVERSE

PLAN

NTS

NOTE:
1. LENGTH ACCORDING TO MASTSIZE
2. HOT DIP GALVANIZED ACCORDING TO DIN EN ISO 10684 tZn-o
3. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS).

	A						
	1	FEEDER TERMINATION		10			
	4	HEXAGON HEAD SCREW M16x140	5.6 NOTE2	9	DIN EN ISO 4014		
	4	HEXAGON NUT M16	6 NOTE2	8	DIN EN ISO 4032		
	8	WASHER FOR M16	200HV NOTE2	7	DIN EN ISO 7093		
	8	WASHER FOR M20	200HV NOTE2	6	DIN EN ISO 7093		
	16	HEXAGON NUT M20	6 NOTE2	5	DIN EN ISO 4032		
	2	STUD BOLT M20	5.6 NOTE2	4	DIN 976-1		NOTE 1
	2	STUD BOLT M20	5.6 NOTE2	3	DIN 976-1		NOTE 1
	2	SUPPORTING ANGLE		2			NOTE 1
	1	TERMINATION TRAVERSE		1			NOTE 1
PIECES		DESCRIPTION	MATERIAL	PART	DWG-NO/STANDARD	KG/PC.	REMARKS/ID-NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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DEPUTY DIRECTOR, ENGINEERING

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1250 San Carlos Avenue
San Carlos, CA 94070

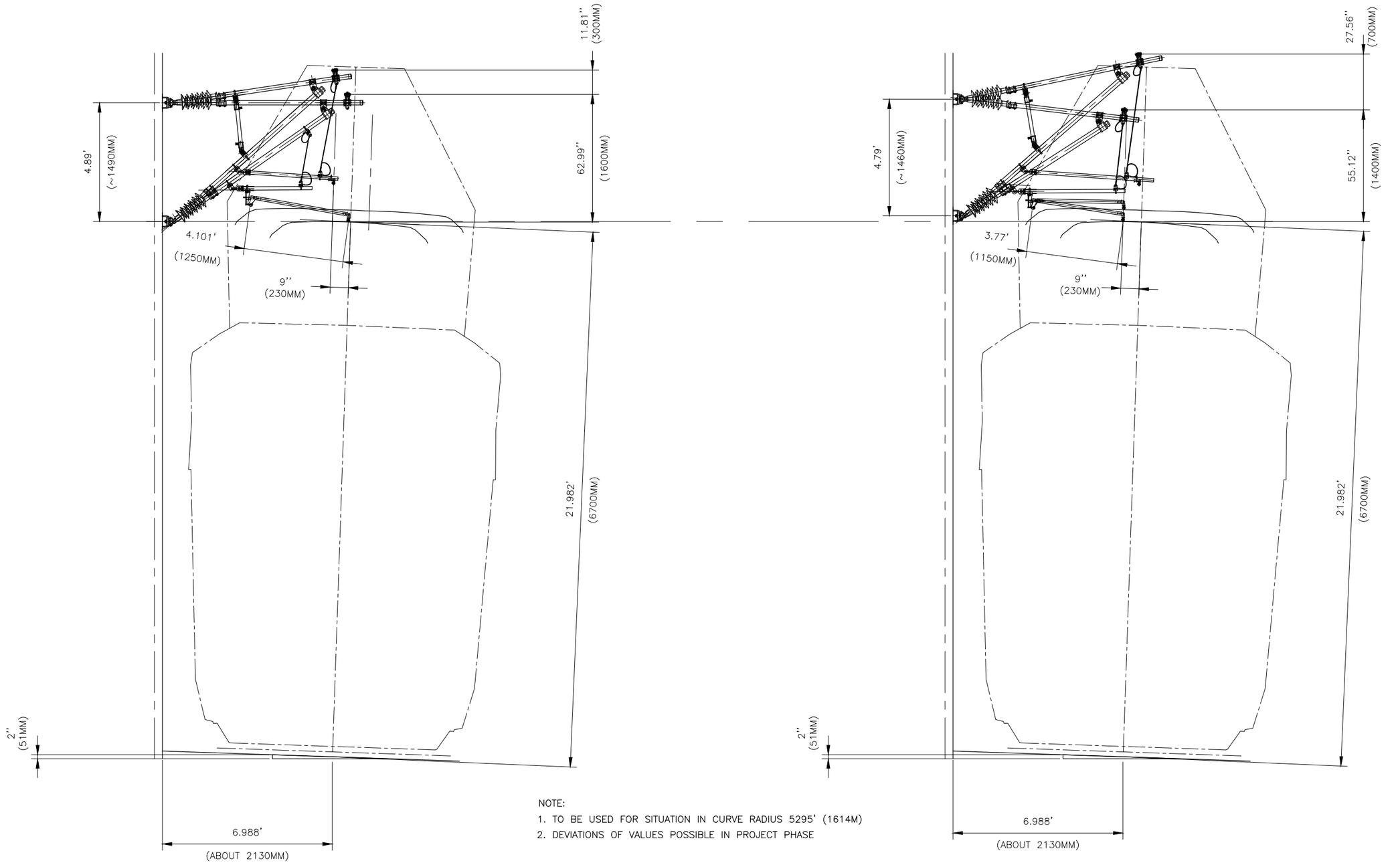
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
SINGLE TERMINATION TRAVERSE
FOR FEEDER WIRE

CADD FILE NAME: W6324

REV: | EDITION: 01012024

STANDARD DRAWING NO.: W6324



NOTE:

1. TO BE USED FOR SITUATION IN CURVE RADIUS 5295' (1614M)
2. DEVIATIONS OF VALUES POSSIBLE IN PROJECT PHASE

CANTILEVER ARRANGEMENT IN 3–SPAN OVERLAP

ELEVATION

NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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STANDARD DRAWINGS

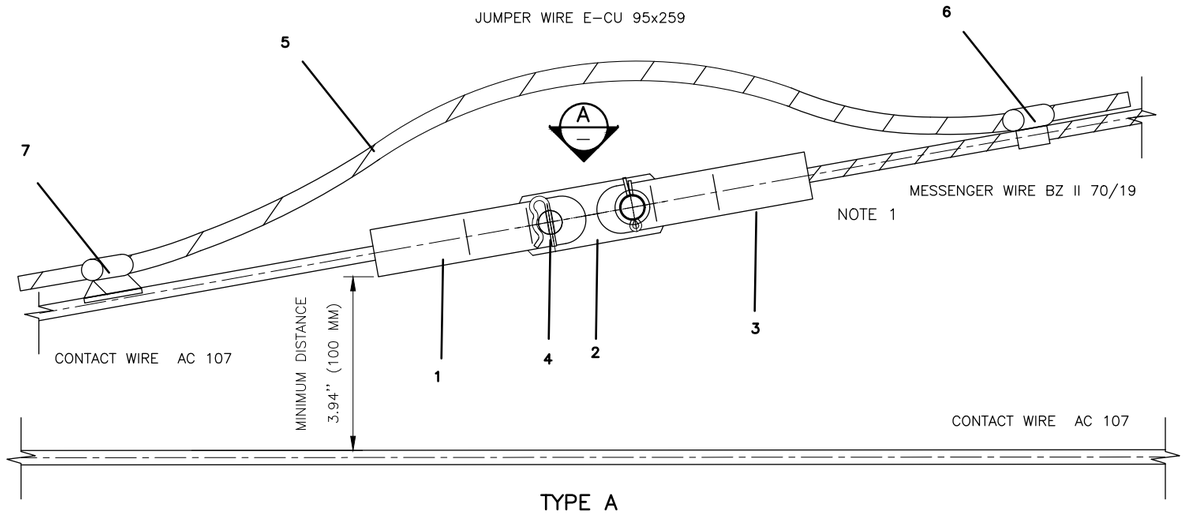
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CANTILEVER ARRANGEMENT FOR
3–SPAN OVERLAP
CURVE–RADIUS = 5295'

CADD FILE NAME: W6330

REV:

EDITION: 01012024

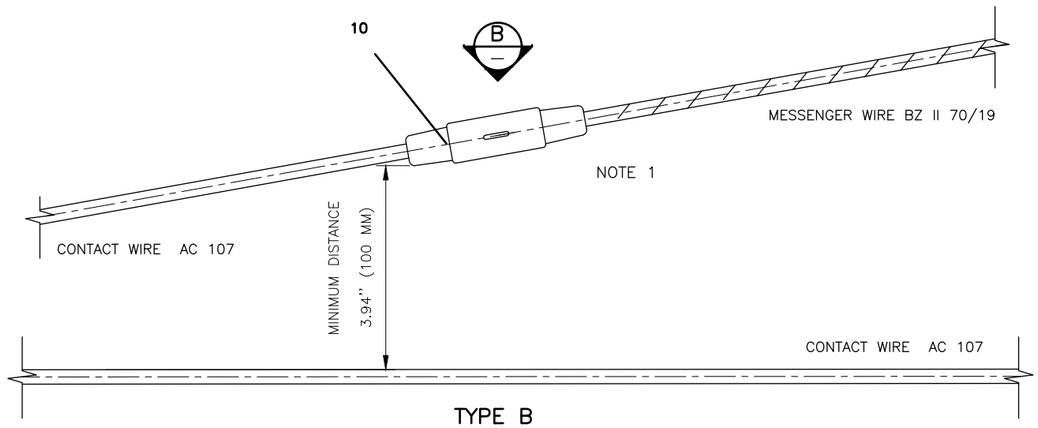
STANDARD DRAWING NO.: **W6330**



TYPE A

TRANSITION CATENARY CW/MW TO CATENARY CW/CW FOR UNDER BRIDGE AREA

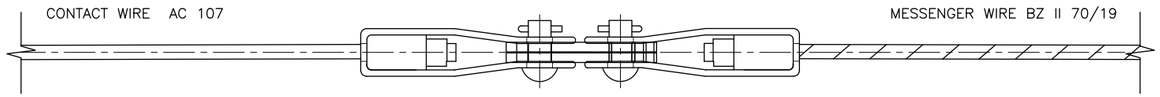
1 — DETAIL
NTS



TYPE B

CONICAL COUPLING OF TRANSITION CATENARY CW/MW
TO CATENARY CW/CW FOR UNDER BRIDGE AREA

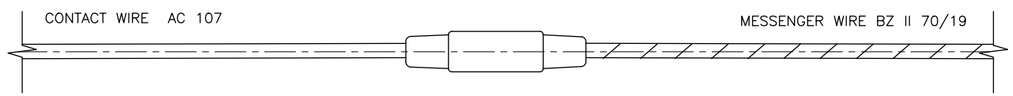
1 — DETAIL
NTS



TYPE A

TOP VIEW – TRANSITION MW TO CW FOR UNDER BRIDGE AREA

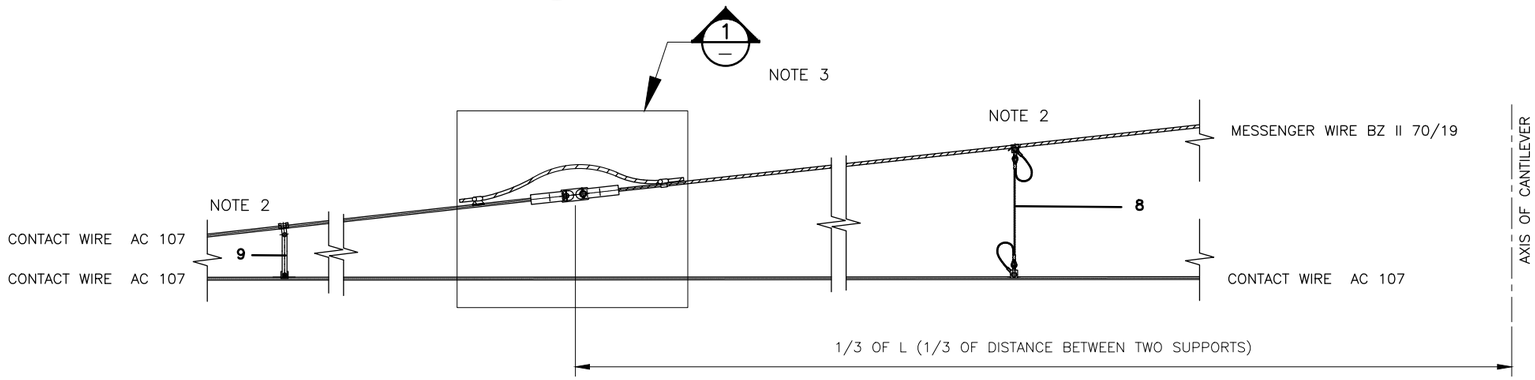
A — PLAN
NTS



TYPE B

CONICAL COUPLING OF TRANSITION CATENARY CW/MW
TO CATENARY CW/CW FOR UNDER BRIDGE AREA

B — PLAN
NTS



TRANSITION CATENARY CW/MW TO CATENARY CW/CW FOR UNDER BRIDGE AREA

ELEVATION
NTS

NOTES:

1. INCLINATION OF MW/CW TRANSITION ACCORDING TO DETAIL DESIGN
2. NUMBER AND LENGTH ACCORDING TO DETAIL DESIGN / CANTILEVER-DROPPER CALCULATION
3. TYPE A OR TYPE B CAN BE USED (ONLY TYPE A IS SHOWN HERE)
4. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

B	A							
1	–	CONE CONNECTOR – CONICAL COUPLING		10			
x	x	SLIDING DROPPER LOW HEIGHT RIGID TYPE (HA-04)		9			NOTE 2
x	x	DROPPER 10x49 (HA-01)		8			NOTE 2
–	1	CONTACT WIRE FEEDER CLAMP 95F/CW AC107		7			
–	1	WIRE FEEDER CLAMP JW95f-MW70		6			
–	1	JUMPER WIRE E-CU 95x259	E-Cu	5	DIN 43138		
–	1	PIN ø19x52 WITH ß-SPLINT PIN	A2	4	.		
–	1	TERMINATION CLAMP FOR MW	.	3			
–	2	LINK PLATE	.	2			
–	1	TERMINATION CLAMP FOR CW	.	1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG-NO/STANDARD	KG/PC.	REMARKS/ID-NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

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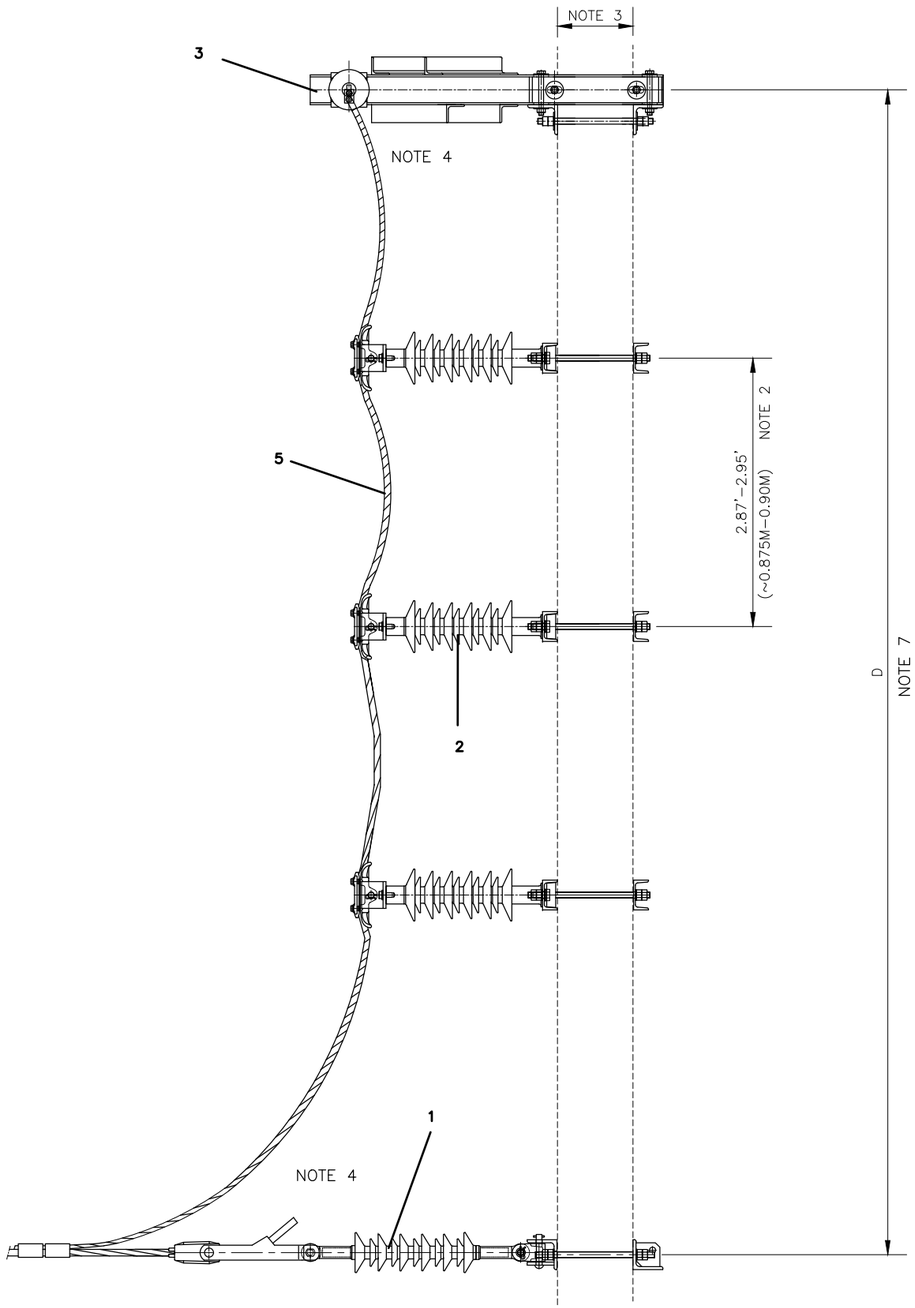
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
TRANSITION CATENARY CW/MW
TO CATENARY CW/CW
FOR UNDER BRIDGE AREA

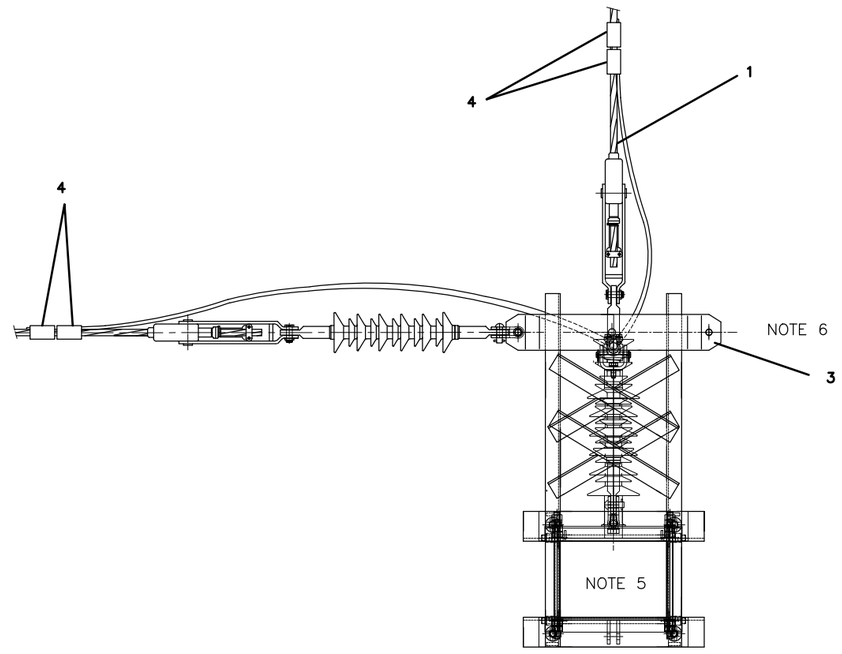
CADD FILE NAME: W6331
REV:
EDITION: 01012024
STANDARD DRAWING NO.: W6331



ALLOCATION OF JUMPER FOR FEEDER ANCHOR TO CROSS FEEDER AT POLE

ELEVATION

NTS



ALLOCATION OF JUMPER FOR FEEDER ANCHOR TO CROSS FEEDER AT POLE

PLAN

NTS

NOTES:

1. LENGTH DEPENDING ON DISTANCE D
2. 2 SUPPORTS FOR DISTANCE D = 8.86' (2.70M)
   3 SUPPORTS FOR DISTANCE D = 11.48' (3.50M)
3. MASTSIZE TO BE CONSIDERED FOR CONSTRUCTIONS
4. ELECTRICAL DISTANCE TO BE CONSIDERED ACCORDING TO W6006
5. RECTANGULAR MAST
6. TERMINATION CAN ALSO BE ON THE OTHER SIDE
7. DISTANCE D CAN BE FLEXIBLE ; NEW QUANTITY OF COMPONENTS MUST BE DEFINED IN DETAIL DESIGN
8. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

	A						
	1	EAGLE ACSR 556		5			NOTE 1
	4	PARALLEL GROOVE CLAMP		4			
	1	SINGLE TERMINATION TRAVERSE		3			
NOTE 2		FEEDER WIRE SUPPORT, VERTICAL		2			NOTE 7
	1	TERMINATION F. FEEDER WIRE FT–06		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

Bin Zhang

DEPUTY DIRECTOR, ENGINEERING

Caltrain

1250 San Carlos Avenue
San Carlos, CA 94070

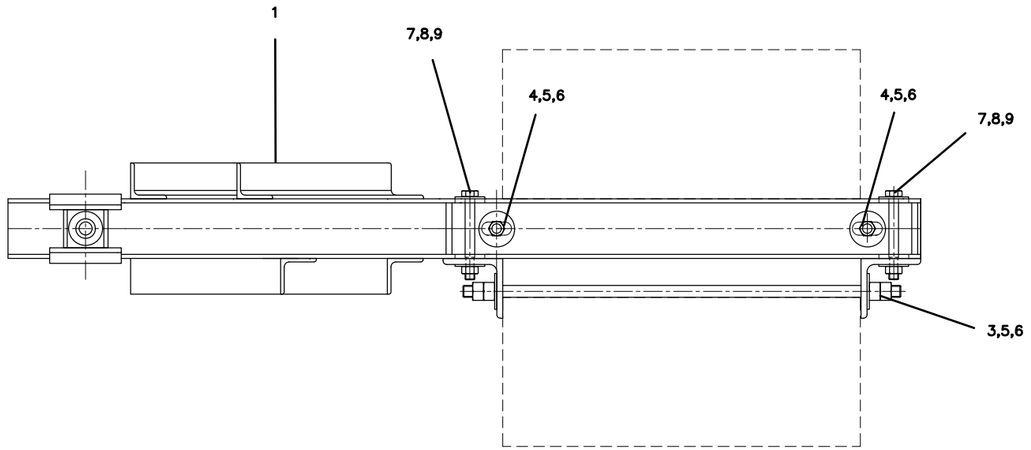
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
ALLOCATION OF JUMPER FOR FEEDER ANCHOR TO CROSS FEEDER AT POLE AT RECTANGULAR MAST

CADD FILE NAME: W6332

REV: | EDITION: 01012024

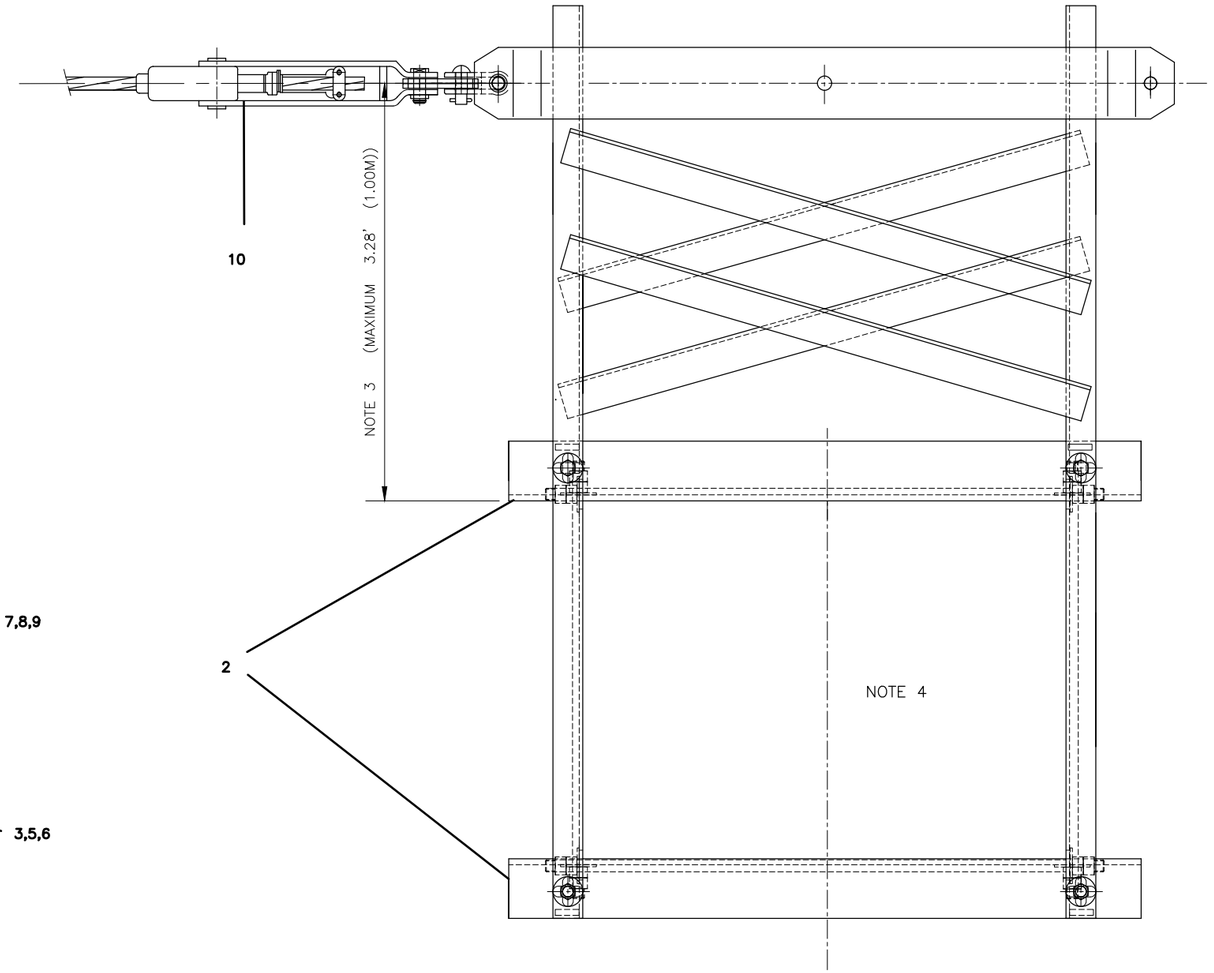
STANDARD DRAWING NO.: **W6332**



SINGLE STATIC WIRE TERMINATION TRAVERSE

ELEVATION

NTS



SINGLE STATIC WIRE TERMINATION TRAVERSE

PLAN

NTS

NOTES:

1. LENGTH ACCORDING TO MASTSIZE
2. HOT DIP GALVANIZED ACCORDING TO DIN EN ISO 10684 tZn–o
3. VARIABLE LENGTH (DEPENDS ON DETAIL DESIGN) ; MAXIMUM 3.28' (1.00M)
4. MASTSIZE MUST BE CONSIDERED
5. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

	A						
	1	STATIC WIRE TERMINATION		10			
	4	HEXAGON HEAD SCREW M16x140	5.6 NOTE2	9	DIN EN ISO 4014		
	4	HEXAGON NUT M16	6 NOTE2	8	DIN EN ISO 4032		
	8	WASHER FOR M16	200HV NOTE2	7	DIN EN ISO 7093		
	8	WASHER FOR M20	200HV NOTE2	6	DIN EN ISO 7093		
	16	HEXAGON NUT M20	6 NOTE2	5	DIN EN ISO 4032		
	2	STUD BOLT M20	5.6 NOTE2	4	DIN 976–1		NOTE 1
	2	STUD BOLT M20	5.6 NOTE2	3	DIN 976–1		NOTE 1
	2	SUPPORTING ANGLE		2			NOTE 1
	1	TERMINATION TRAVERSE		1			NOTE 1 NOTE 3
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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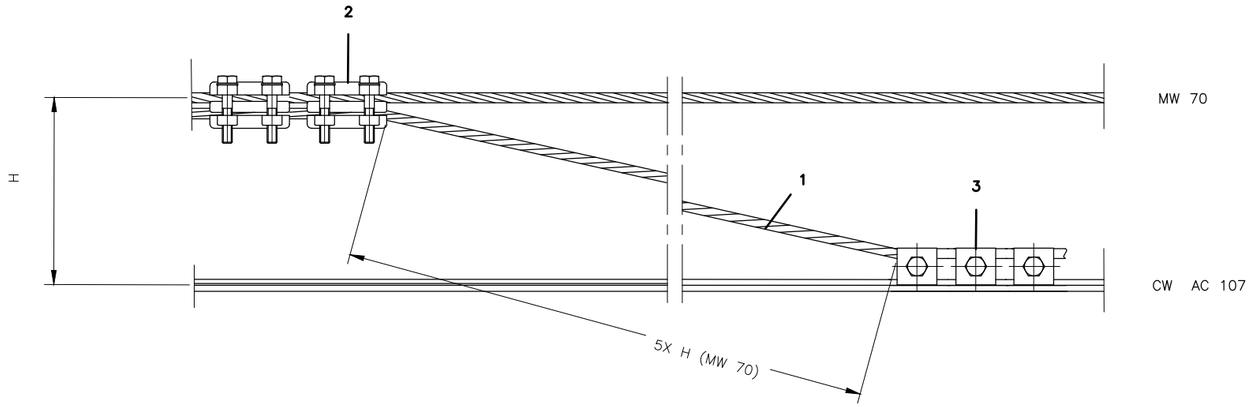
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
SINGLE TERMINATION TRAVERSE
FOR STATIC WIRE

CADD FILE NAME: W6333

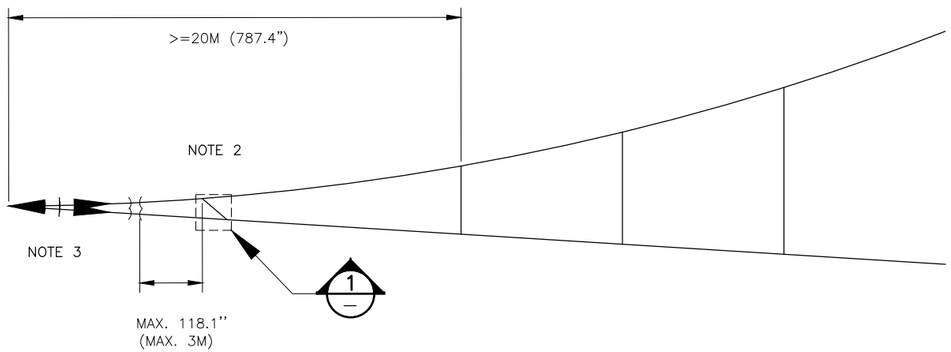
REV: | EDITION: 01012024

STANDARD DRAWING NO.: W6333



SAFETY CATCH

1 DETAIL
NTS



CATENARY END SECTION

ELEVATION
NTS

NOTES:
1. LENGTH AS NEEDED
2. AREA OF SAFETY CATCH
3. TENSION WHEEL TERMINATION OR FIXED TERMINATION
4. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

	A						
	3	CONNECTION CLAMP Z TO CW WIRE		3			
	2	CONNECTION CLAMP Z TO MW WIRE		2			
	1	MW BZ II 70		1			NOTE 1
PIECES		DESCRIPTION	MATERIAL	PART	DWG-NO/STANDARD	KG/PC.	REMARKS/ID-NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:
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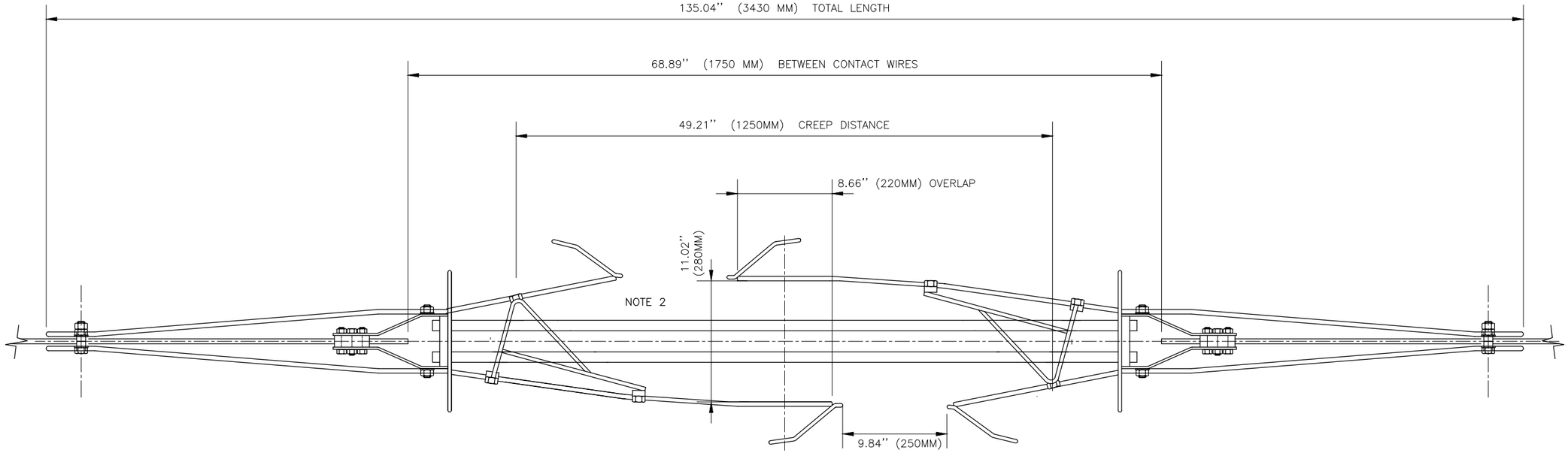
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
SAFETY CATCH
ASSEMBLY / ARRANGEMENT
SC-01

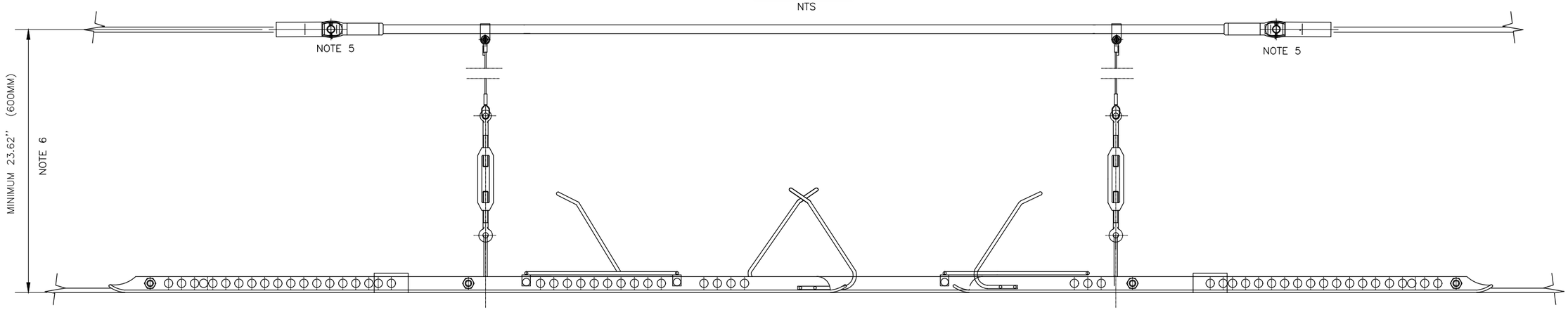
CADD FILE NAME: W6334
REV:
EDITION: 01012024
STANDARD DRAWING NO.: W6334



SECTION INSULATOR 25 kV

PLAN

NTS



NOTE:

1. SECTION INSULATOR TO BE IN ACCORDANCE WITH MANUFACTURERS SPECIFICATION
2. INSULATOR CREEPAGE PATH = 1250mm NOMINAL.
3. COMPONENT TO BE PURCHASED AS A PROPRIETARY PRODUCT FROM ARTHUR FLURY AG. OR APPROVED EQUAL
4. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS SHOWN OTHERWISE.
5. MESSENGER WIRE CLAMP ACCORDING TO FLURY
6. MINIMUM SYSTEM HEIGHT 23.62'' (600MM)

SECTION INSULATOR 25 kV WITH SUSPENSION FOR 200 KM/H

ELEVATION

NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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STANDARD DRAWINGS

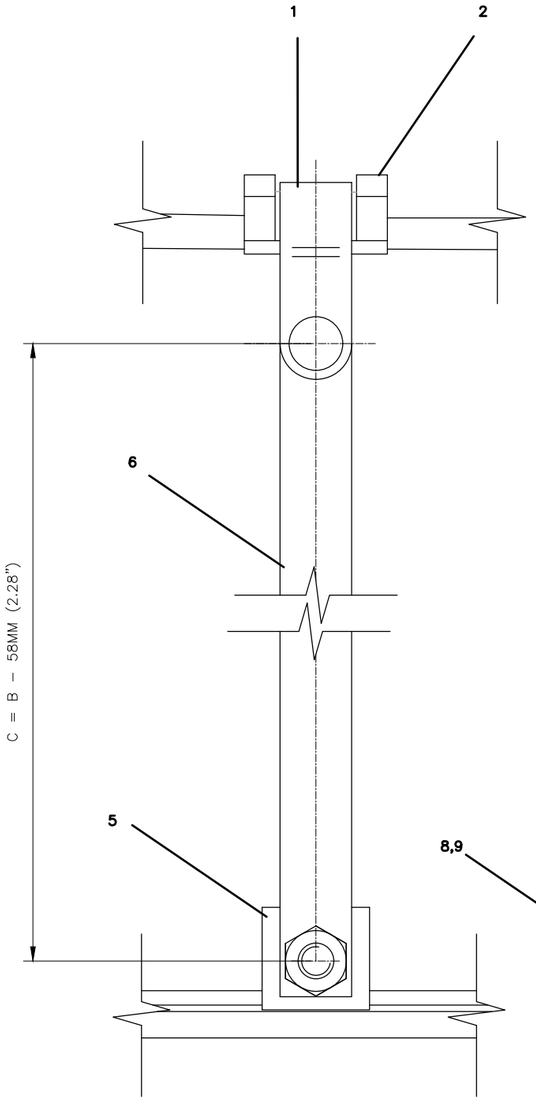
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
SECTION INSULATOR 25 kV WITH SUSPENSION FOR 200 KM/H
SI-04

CADD FILE NAME: W6338

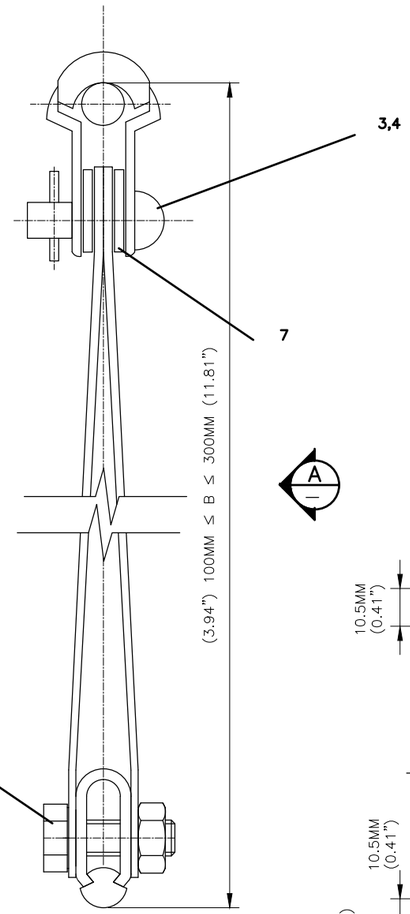
REV:

EDITION: 01012024

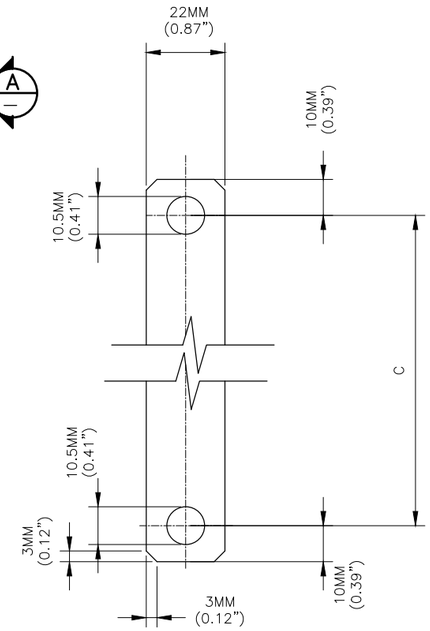
STANDARD DRAWING NO.: **W6338**



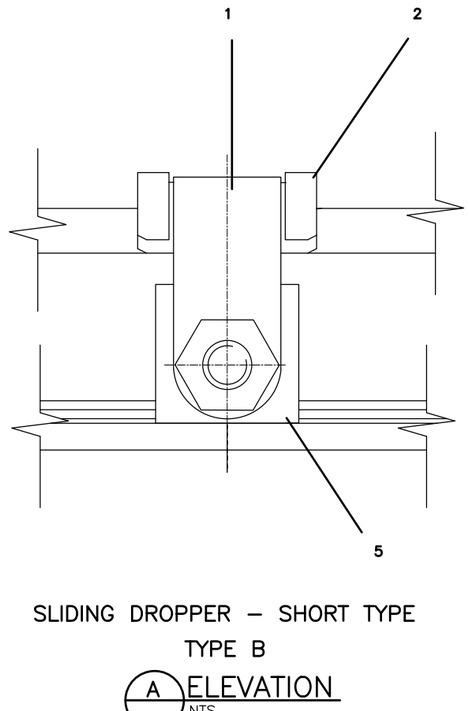
SLIDING DROPPER
TYPE A
A – ELEVATION
NTS



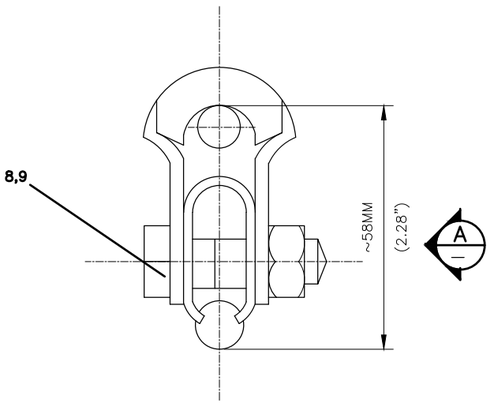
SLIDING DROPPER
TYPE A
ELEVATION
NTS



PART 6 – CLEVIS LINK 22MMX2MM
ELEVATION
NTS



SLIDING DROPPER – SHORT TYPE
TYPE B
A – ELEVATION
NTS



SLIDING DROPPER – SHORT TYPE
TYPE B
ELEVATION
NTS

NOTES:
1. DROPPER LENGTH TO BE DEFINED IN DETAILED DESIGN
2. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS).

B	A							
1	1	HEXAGON NUT M10	A2	9				
1	1	HEXAGON HEAD BOLT M10X30	A2–70	8				
–	2	WASHER 10	A2	7				
–	2	CLEVIS LINK 22MMX2MM	A2	6	NOTE 1			
1	1	DROPPER CLIP FOR CW	A2	5				
–	1	BOLT 10X26	CU	4				
–	1	SPLINT 5X29	A2	3				
1	1	PLASTIC SLIDING INSERT	PA	2				
1	1	SLIDING DROPPER CLIP	A2	1				
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD		KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:
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San Carlos, CA 94070

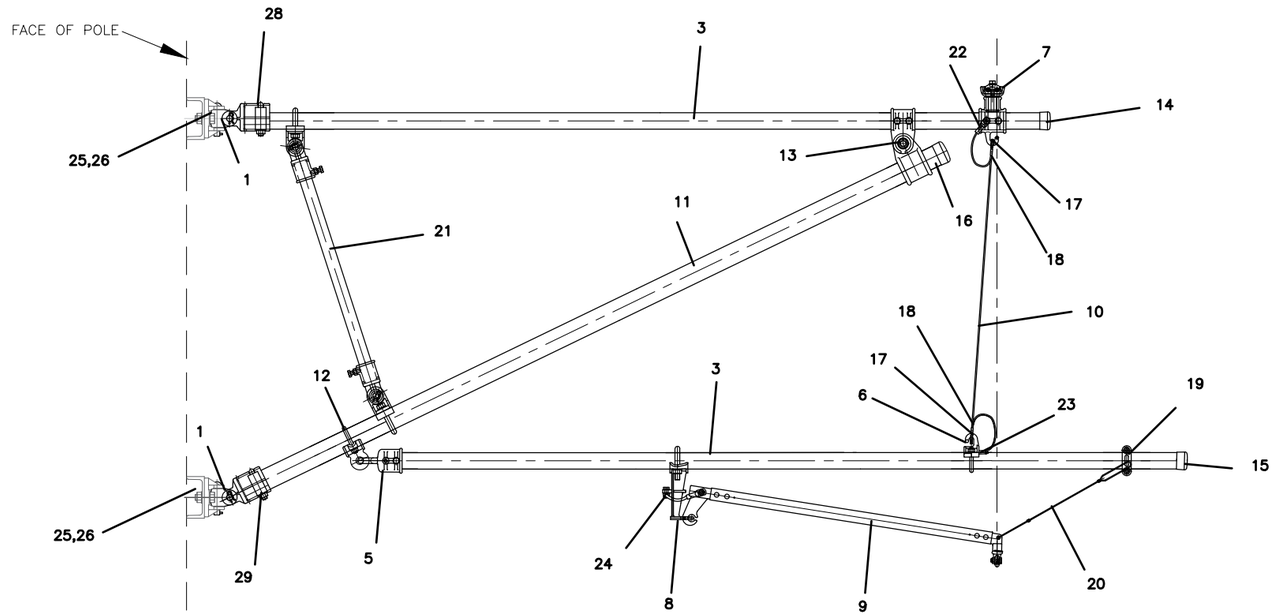
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
SLIDING DROPPER – LOW HEIGHT
RIGID TYPE
HA–04

CADD FILE NAME: W6343
REV: | EDITION: 01012024
STANDARD DRAWING NO.: **W6343**

NOTES:

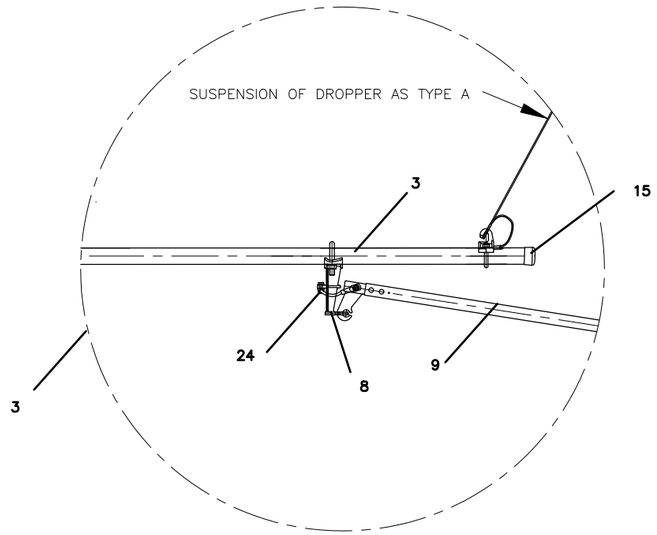
1. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)



TYPE A – CANTILEVER PULL OFF WITHOUT INSULATION

ELEVATION

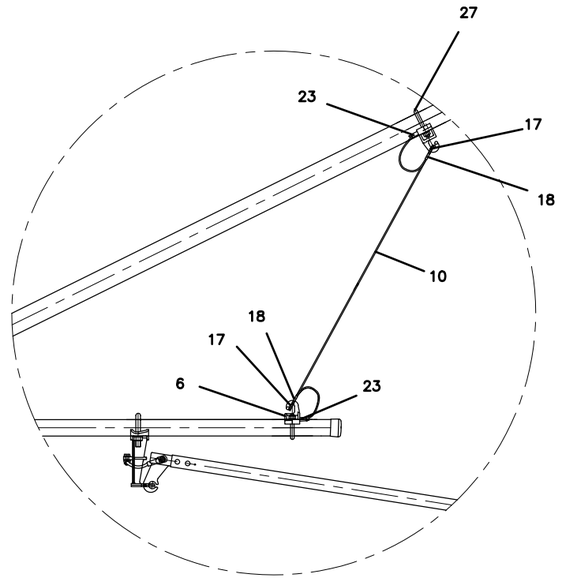
NTS



TYPE B – CANTILEVER PULL OFF WITHOUT INSULATION

ELEVATION

NTS



TYPE C – CANTILEVER PULL OFF WITHOUT INSULATION

ELEVATION

NTS

PIECES C	PIECES B	PIECES A	DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.
								WITHOUT WINDSTAY, DROPPER AT HOOK CLAMP
								WITHOUT WINDSTAY, DROPPER AT MW–CLAMP
								WITH WINDSTAY, DROPPER AT MW–CLAMP
1	1	1	CLEVIS FOR TUBE ø70		29			
1	1	1	CLEVIS FOR TUBE ø55		28			
1	–	–	HOOK CLAMP FOR TUBE ø70		27			
2	2	2	BETA–SPLINT PIN	1.4462	26			
2	2	2	PIN 19X100	A2	25			
1	1	1	ELECTRICAL CONNECTION		24			
2	1	1	CABLE LUG 10–25 S	CU TIN–PLATED	23			
–	1	1	CABLE LUG 12–25 S	CU TIN–PLATED	22			
1	1	1	DIAGONAL TUBE ø42		21			
–	–	1	WIND STAY FOR STEADY ARM		20			
–	–	1	EYE CLAMP FOR WIND STAY ø55		19			
2	2	2	COMPRESS. SLEEVE B16	A2	18			
2	2	2	THIMBLE 35	A2	17			
1	1	1	TUBE CAP ø70	PVC	16			
1	1	1	TUBE CAP ø55	PVC	15			
1	1	1	TUBE CAP ø55	PVC	14			
1	1	1	TUBE CONNECTING BRACKET ø55/70		13			
1	1	1	EYE CLAMP FOR TUBE ø70		12			
1	1	1	TUBE ø70X6 LENGTH AS NEEDED	ALMGSI1F31	11			
1	1	1	WIRE 6–SE–BK 1570 SZ	STAINLESS STEEL	10			
1	1	1	STEADY ARM LENGTH AS NEEDED		9			
1	1	1	DROP BRACKET FOR ø55		8			
1	1	1	CATENARY SWIVEL CLAMP TUBE ø55		7			
1	1	1	HOOK CLAMP FOR TUBE ø55		6			
1	1	1	HOOK END FITTING FOR TUBE ø55		5			
–	–	–	–		4			
2	2	2	TUBE ø55X6 LENGTH AS NEEDED	ALMGSI1F31	3			
–	–	–	–		2			
2	2	2	SWIVEL JOINT		1			

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CANTILEVER PULL OFF
WITHOUT INSULATION
CA–31

CADD FILE NAME: W6344

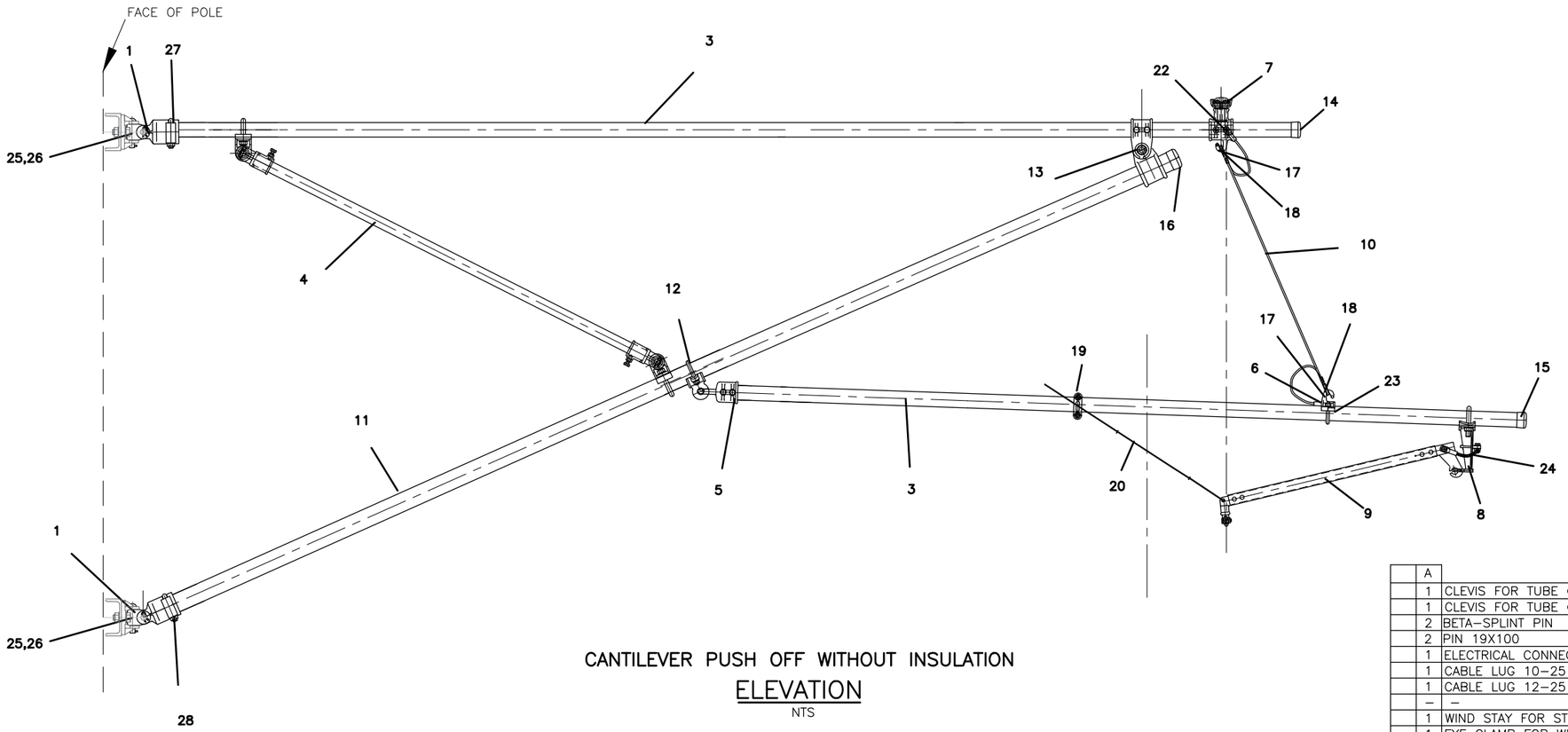
REV:

EDITION: 01012024

STANDARD DRAWING NO.: **W6344**

NOTES:

1. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)



CANTILEVER PUSH OFF WITHOUT INSULATION

ELEVATION

NTS

	A						
	1	CLEVIS FOR TUBE ø70		28			
	1	CLEVIS FOR TUBE ø55		27			
	2	BETA–SPLINT PIN	1.4462	26			
	2	PIN 19X100	A2	25			
	1	ELECTRICAL CONNECTION		24			
	1	CABLE LUG 10–25 S	CU TIN–PLATED	23			
	1	CABLE LUG 12–25 S	CU TIN–PLATED	22			
	–	–		21			
	1	WIND STAY FOR STEADY ARM		20			
	1	EYE CLAMP FOR WIND STAY ø55		19			
	2	COMPRESS. SLEEVE B16	A2	18			
	2	THIMBLE 35	A2	17			
	1	TUBE CAP ø70	PVC	16			
	1	TUBE CAP ø55	PVC	15			
	1	TUBE CAP ø55	PVC	14			
	1	TUBE CONNECTING BRACKET ø55/70		13			
	1	EYE CLAMP FOR TUBE ø70		12			
	1	TUBE ø70X6 LENGTH AS NEEDED	ALMGSI1F31	11			
	1	WIRE 6–SE–BK 1570 SZ	STAINLESS STEEL	10			
	1	STEADY ARM LENGTH AS NEEDED		9			
	1	DROP BRACKET FOR ø55		8			
	1	CATENARY SWIVEL CLAMP TUBE ø55		7			
	1	HOOK CLAMP FOR TUBE ø55		6			
	1	HOOK END FITTING FOR TUBE ø55		5			
	1	DIAGONAL TUBE ø42		4			
	2	TUBE ø55X6 LENGTH AS NEEDED	ALMGSI1F31	3			
	–	–		2			
	2	SWIVEL JOINT		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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San Carlos, CA 94070

STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CANTILEVER PUSH OFF
WITHOUT INSULATION
CA–32

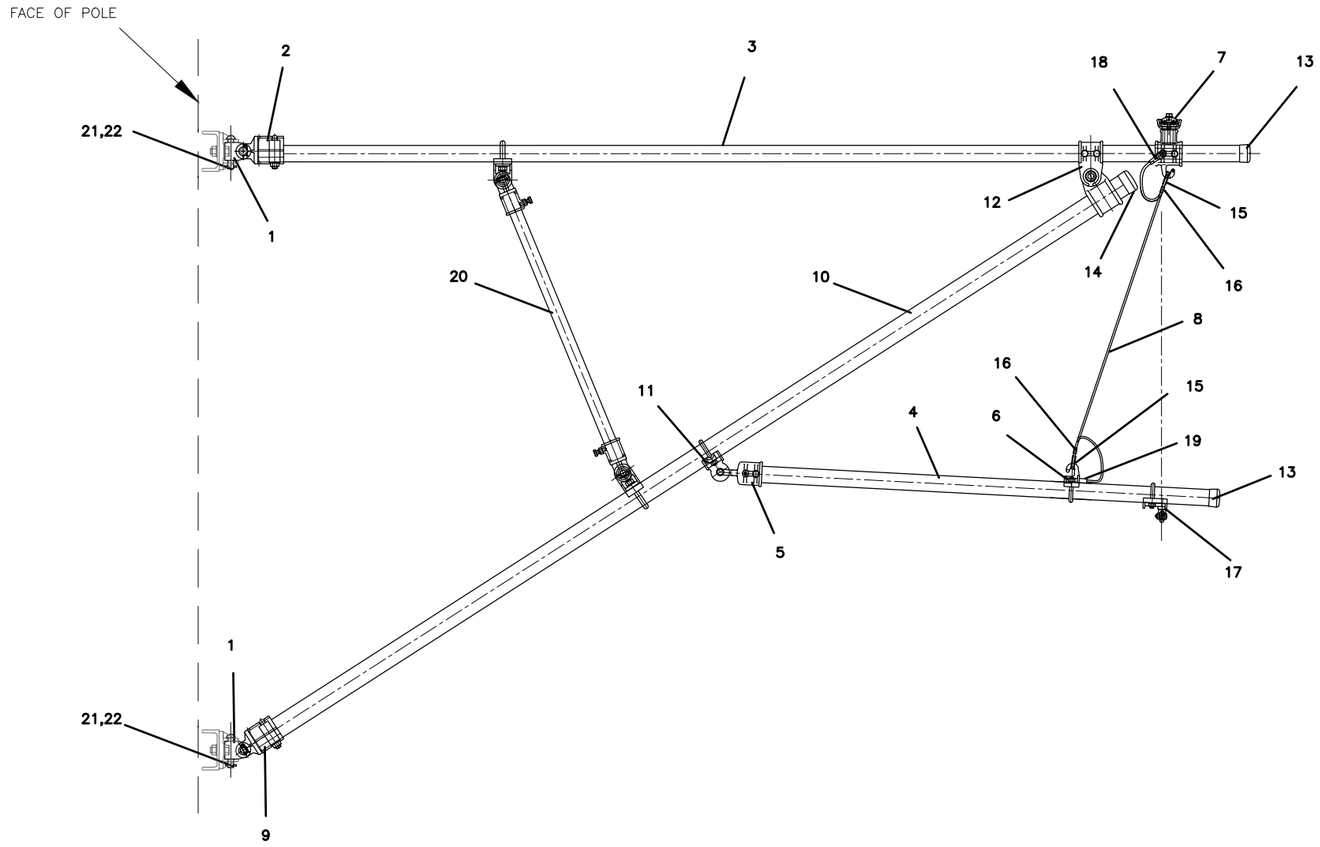
CADD FILE NAME: W6345

REV: | EDITION: 01012024

STANDARD DRAWING NO.: W6345

NOTES:

1. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)



CANTILEVER OUT OF RUNNING – WITHOUT INSULATION

ELEVATION

NTS

CANTILEVER WITH DIAGONAL TUBE

PIECES	DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.
A						
2	BETA–SPLINT PIN	1.4462	22			
2	PIN 19X100	A2	21			
1	DIAGONAL TUBE ø42		20			
1	CABLE LUG 10–25 S	CU TIN–PLATED	19	shape DIN 46235		
1	CABLE LUG 12–25 S	CU TIN–PLATED	18	shape DIN 46235		
1	CW–HOLDER FOR TUBE ø 55	G–Al	17			
2	COMPRESS. SLEEVE B16	A2	16			
2	THIMBLE 35	A2	15	DIN 43154		
1	TUBE CAP ø70	PVC	14			
2	TUBE CAP ø55	PVC	13			
1	TUBE CONNECTING BRACKET ø55/ø70	G–Al	12			
1	EYE CLAMP FOR TUBE ø70	G–Al	11			
1	TUBE ø70 X 6 LENGTH AS NEEDED	ALMGSI1F31	10			
1	CLEVIS FOR TUBE ø70		9			
1	WIRE 6–SE–BK 1570 SZ	STAINLESS STEEL	8			
1	CATENARY SWIVEL CLAMP FOR TUBE ø55	G–Al	7			
1	HOOK CLAMP FOR TUBE ø55	G–Al	6			
1	HOOK END FITTING FOR TUBE ø55	G–Al	5			
1	TUBE ø55 X 6 LENGTH AS NEEDED	ALMGSI1F31	4			
1	TUBE ø55 X 6 LENGTH AS NEEDED	ALMGSI1F31	3			
1	CLEVIS FOR TUBE ø55		2			
2	SWIVEL JOINT	ALSI7MG0,3	1			

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CANTILEVER WITHOUT INSULATION
OUT OF RUNNING
CA–33

CADD FILE NAME: W6346

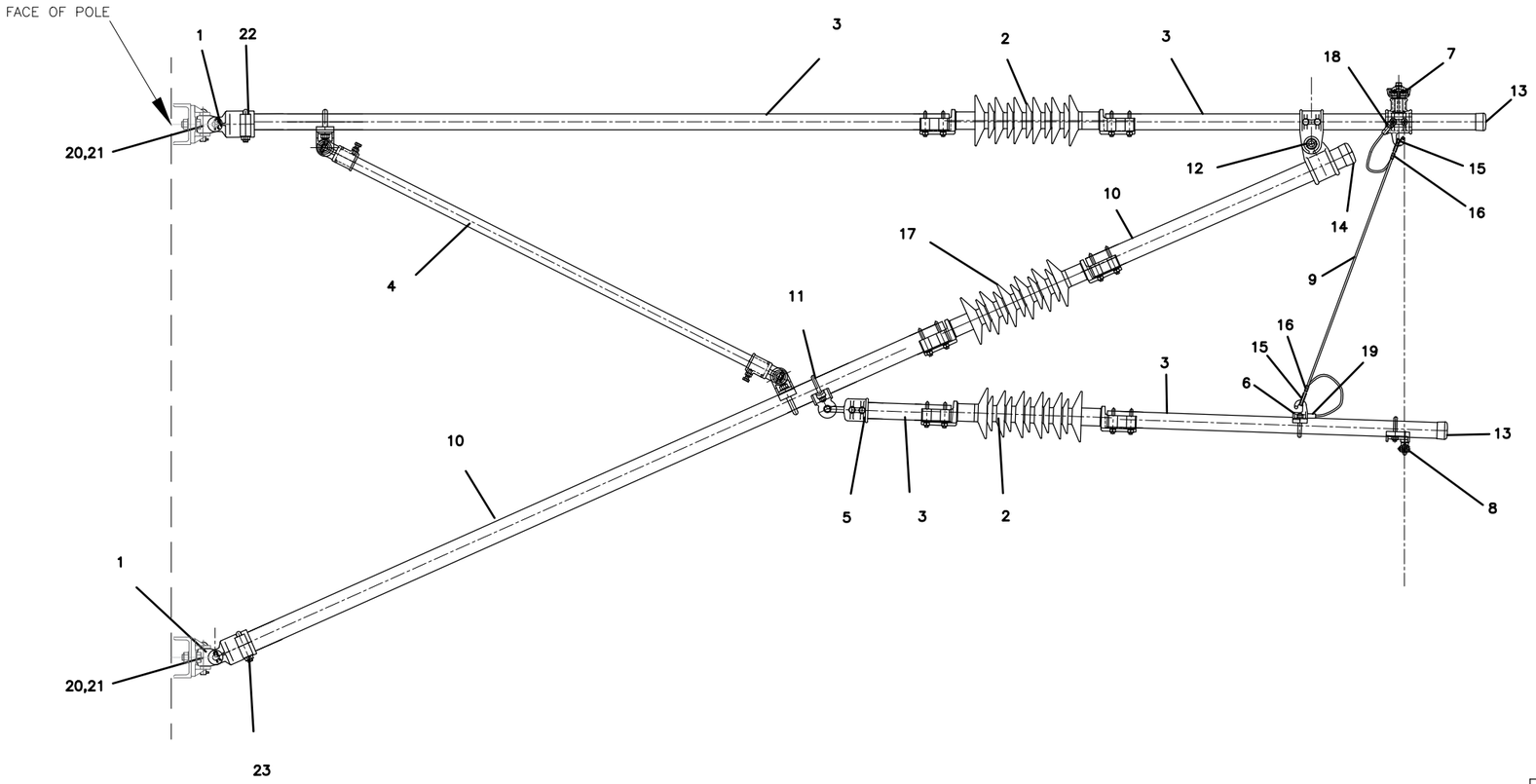
REV:

EDITION: 01012024

STANDARD DRAWING NO.: **W6346**

NOTES:

1. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)



CANTILEVER RUNNING OUT WITH OFFSET INSULATION

ELEVATION

NTS

	A							
	1	CLEVIS FOR TUBE ø70		23			
	1	CLEVIS FOR TUBE ø55		22			
	2	BETA–SPLINT PIN	1.4462	21			
	2	PIN 19X100	A2	20			
	1	CABLE LUG 10–25 S	CU TIN–PLATED	19			
	1	CABLE LUG 12–25 S	CU TIN–PLATED	18			
	1	COMPOSITE INSULATOR CAP/CAP ø70		17			
	2	COMPRESS. SLEEVE B16	A2	16			
	2	THIMBLE 35	A2	15			
	1	TUBE CAP ø70	PVC	14			
	2	TUBE CAP ø55	PVC	13			
	1	TUBE CONNECTING BRACKET ø55/70		12			
	1	EYE CLAMP FOR TUBE ø70		11			
	2	TUBE ø70X6 LENGTH AS NEEDED	ALMGSI1F31	10			
	1	WIRE 6–SE–BK 1570 SZ	STAINLESS STEEL	9			
	1	CW–HOLDER FOR TUBE ø55		8			
	1	CATENARY SWIVEL CLAMP TUBE ø55		7			
	1	HOOK CLAMP FOR TUBE ø55		6			
	1	HOOK END FITTING FOR TUBE ø55		5			
	1	DIAGONAL TUBE ø42		4			
	4	TUBE ø55X6 LENGTH AS NEEDED	ALMGSI1F31	3			
	2	COMPOSITE INSULATOR CAP/CAP ø55		2			
	2	SWIVEL JOINT		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

Bin Zhang

DEPUTY DIRECTOR, ENGINEERING

Caltrain

1250 San Carlos Avenue
San Carlos, CA 94070

STANDARD DRAWINGS

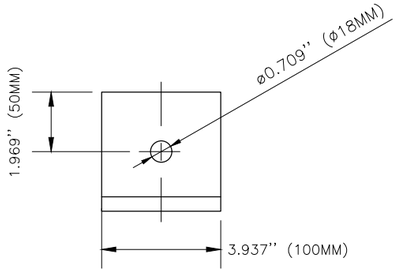
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
CANTILEVER RUNNING OUT
WITH OFFSET INSULATION
CA–34

CADD FILE NAME: W6347

REV:

EDITION: 01012024

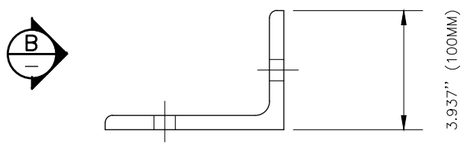
STANDARD DRAWING NO.: **W6347**



PART 4

B – ELEVATION

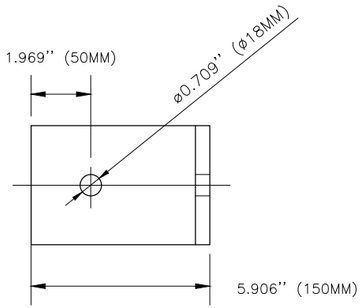
NTS



PART 4

ELEVATION

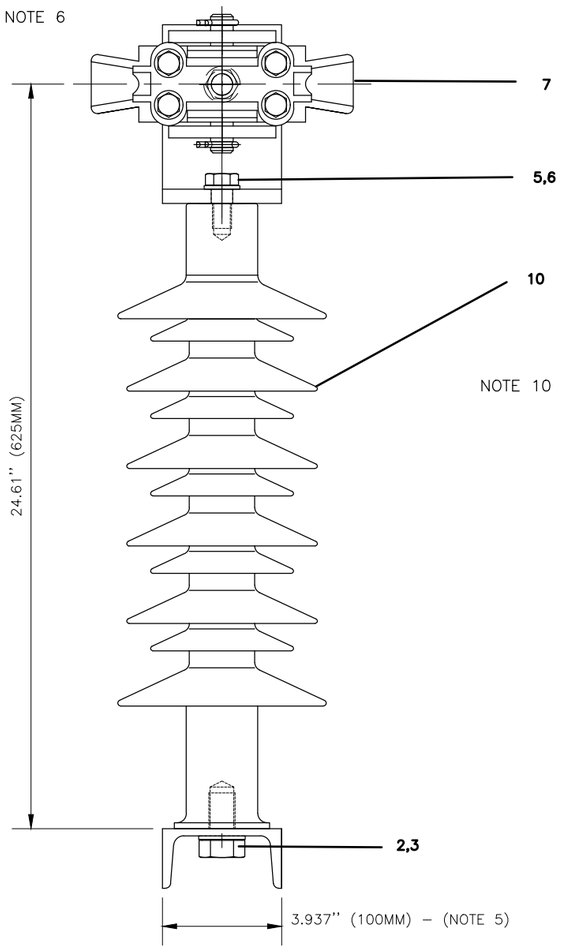
NTS



PART 4

PLAN

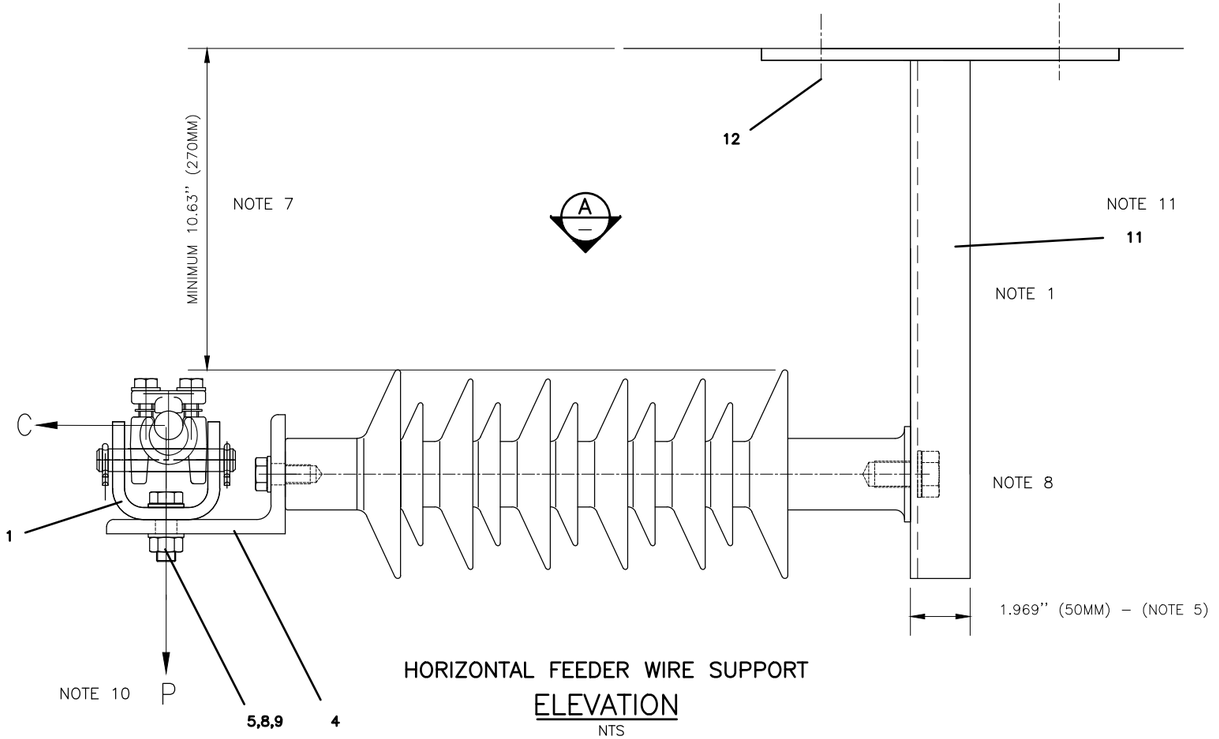
NTS



HORIZONTAL FEEDER WIRE SUPPORT

A – PLAN

NTS



HORIZONTAL FEEDER WIRE SUPPORT

ELEVATION

NTS

NOTES:

1. LENGTH OF DROP TUBE DEPENDS ON SITE CONDITIONS
2. COATING ACC. TO DIN EN ISO 10684–TZN–O
3. ANGLE 3.937''x5.906''x0.472''
4. HOT DIP GALVANIZED ACC. TO DIN EN ISO 1461 (MIN. THICKNESS: 85 µm) AFTER DRILLING
5. FINAL DIMENSIONING OF THE DROP TUBE BY THE CONTRACTOR
6. TURN CLAMP IN CORRECT POSITION
7. NORMAL RECOMMENDED DISTANCE IN AIR – W6006
8. BOREHOLE ø0.945'' (24MM)
9. M16x50: M0.629''x1.969''
   M16x35: M0.629''x1.378''
   M22x35: M0.866''x1.378''
10. FORCE C+P SHALL NOT OVERSTEPPED (562 LBF) 2.5 KN UNDER USE
11. PROVISION FOR EARTHING TO BE CONSIDERED AT DROP TUBE
12. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

B	A							
–	4	ANCHOR BOLTS		12			
–	1	DROP TUBE	NOTE 4	11			NOTE 1,5,11
–	1	INSULATOR		10			
–	1	NUT M16	8 NOTE2	9	DIN EN ISO 4032		
–	1	HEXAGON HEAD SCREW M16x50	8.8 NOTE2	8	DIN EN ISO 4017		NOTE 9
–	1	FEEDER WIRE CLAMP	G–AL	7			
–	1	HEXAGON HEAD SCREW M16x35	8.8 NOTE2	6	DIN EN ISO 4017		NOTE 9
–	3	WASHER M16	200HV NO.2	5	DIN EN ISO 7089		
–	1	SUPPORT ANGLE 100x150x12	NOTE 4	4	DIN EN 10056–1		NOTE 3
–	1	HEXAGON HEAD SCREW M22x35	8.8 NOTE2	3	DIN EN ISO 4017		NOTE 9
–	1	WASHER FOR M22	200HV NO.2	2	DIN EN ISO 7089		
–	1	BRACKET FOR FEEDER WIRE CLAMP		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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1250 San Carlos Avenue
San Carlos, CA 94070

STANDARD DRAWINGS

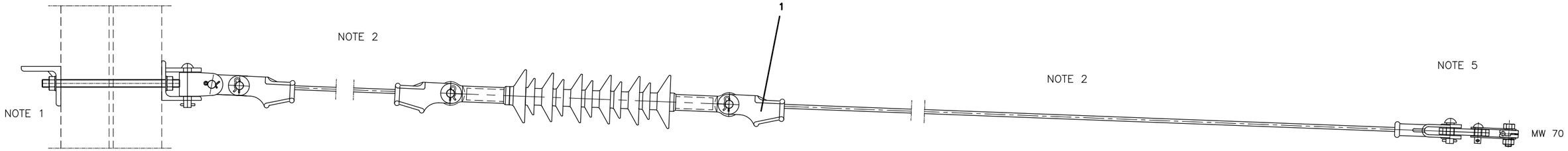
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
HORIZONTAL FEEDER WIRE SUPPORT
UNDER STRUCTURE
AT U–PROFILE DROP TUBE

CADD FILE NAME: W6353

REV:

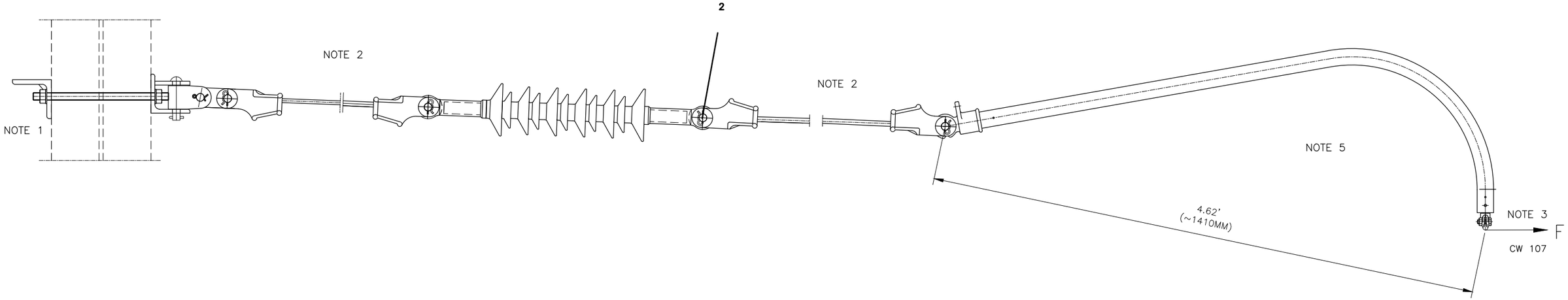
EDITION: 01012024

STANDARD DRAWING NO.: **W6353**



NOTE 4

NOTE 5



PULL OFF TERMINATION FOR CATENARY
WITH BENT STEADY ARM FOR CONTACT WIRE

ELEVATION

NTS

NOTES:

1. CHOICE OF BRACKET DEPENDS ON THE TYPE OF POLE
2. LENGTH AS NEEDED
3. MAXIMUM WORKING LOAD: F = 404.65 LBF (1.8 kN)
4. POLE ORIENTATION ACCORDING TO LAYOUT PLANS
5. INCLINATION TO BE CACULATED IN DETAIL DESIGN – DEPENDING ON RADIAL FORCE AND DROPPER DISTANCE
6. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS).

	A						
	1	PULL OFF TERMINATION FOR CW		2			
	1	PULL OFF TERMINATION FOR MW		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG-NO/STANDARD	KG/PC.	REMARKS/ID-NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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San Carlos, CA 94070

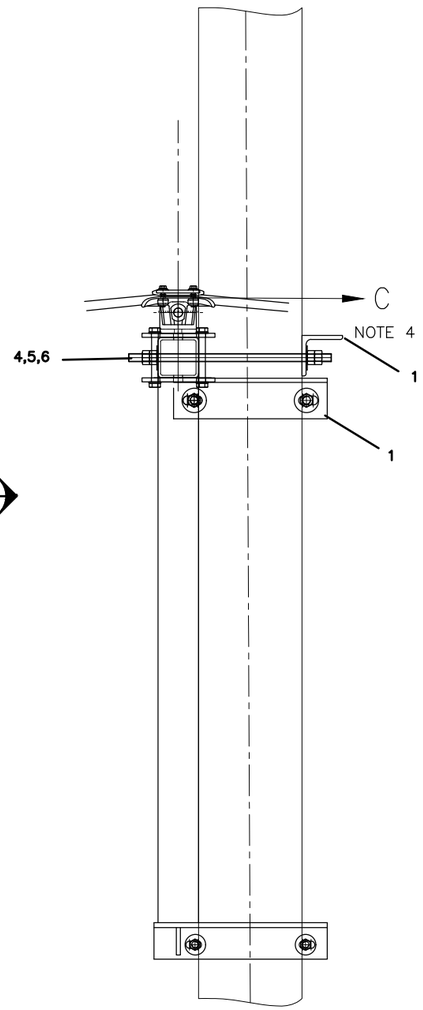
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
PULL OFF TERMINATION
FOR CATENARY WITH
BENT STEADY ARM PO-05

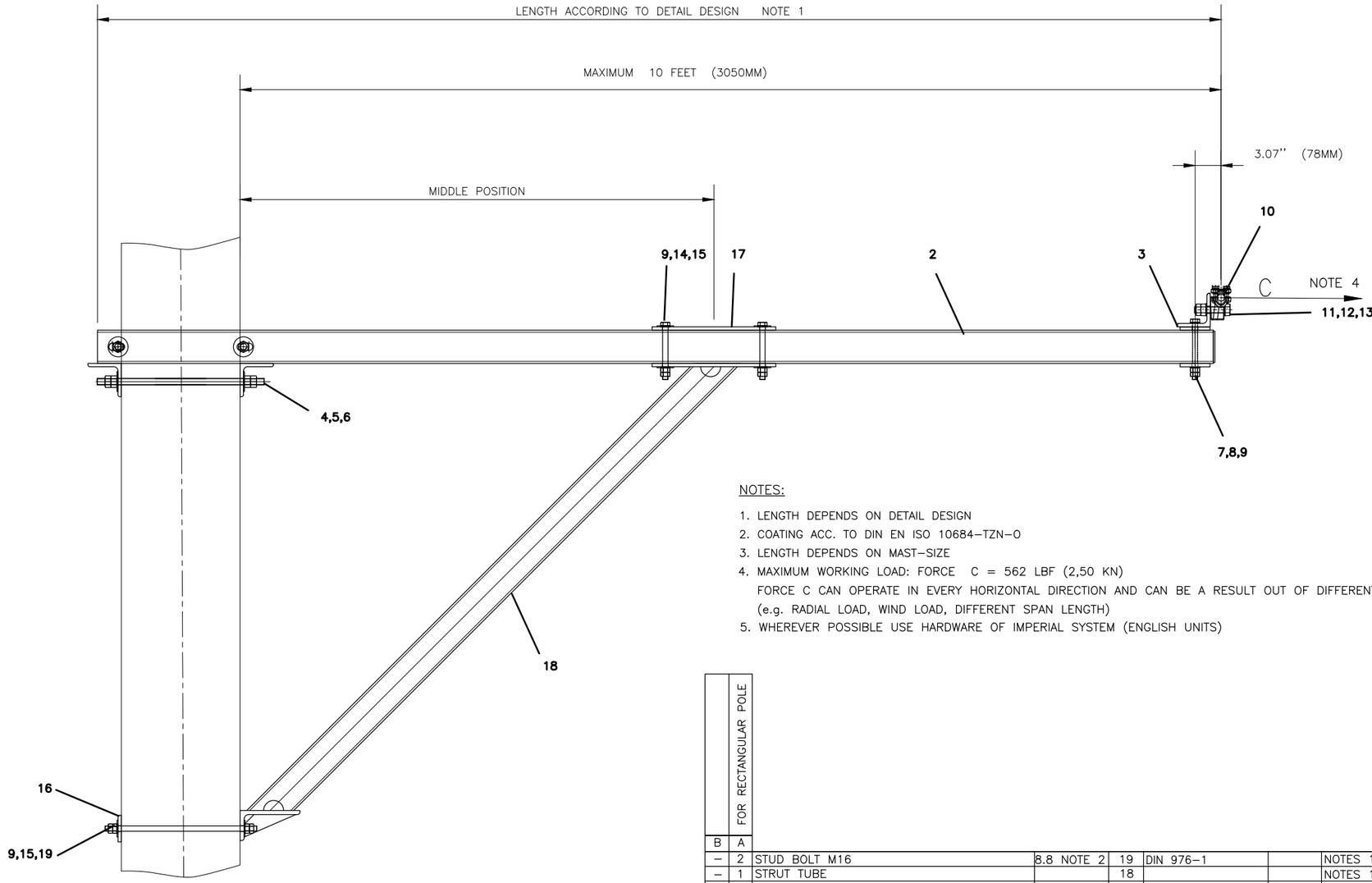
CADD FILE NAME: W6363

REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6363**



STATIC WIRE SUPPORT WITH STRUT TUBE
AT RECTANGULAR POLE
ELEVATION
NTS



STATIC WIRE SUPPORT WITH STRUT TUBE
AT RECTANGULAR POLE
A
–
ELEVATION
NTS

NOTES:

1. LENGTH DEPENDS ON DETAIL DESIGN
2. COATING ACC. TO DIN EN ISO 10684–TZN–O
3. LENGTH DEPENDS ON MAST–SIZE
4. MAXIMUM WORKING LOAD: FORCE C = 562 LBF (2,50 KN)
   FORCE C CAN OPERATE IN EVERY HORIZONTAL DIRECTION AND CAN BE A RESULT OUT OF DIFFERENT FORCES (e.g. RADIAL LOAD, WIND LOAD, DIFFERENT SPAN LENGTH)
5. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

FOR RECTANGULAR POLE							
B	A						
–	2	STUD BOLT M16	8.8 NOTE 2	19	DIN 976–1		NOTES 1 AND 3
–	1	STRUT TUBE		18			NOTES 1 AND 3
–	1	FASTENING PLATE		17			
–	1	BACK PLATE		16			NOTES 1 AND 3
–	12	WASHER M16	200HV NOTE 2	15	DIN EN ISO 7093		
–	4	HEXAGON HEAD SCREW M16x160	8.8 NOTE 2	14	DIN EN ISO 4017		
–	3	WASHER FOR M20	200HV NO.2	13	DIN EN ISO 7089		
–	2	NUT M20	8 NOTE2	12	DIN EN ISO 4032		
–	1	HEX. HEAD SCREW M20x100	8.8 NOTE2	11	ISO 4017		
–	1	STATIC WIRE CLAMP		10			
–	18	HEXAGON HEAD NUT M16	8 NOTE 2	9	DIN EN ISO 4032		
–	2	WASHER M16	200HV NOTE 2	8	DIN EN ISO 7089		
–	1	HEXAGON HEAD SCREW M16x180	8.8 NOTE 2	7	DIN EN ISO 4017		
–	4	STUD BOLT M20	8.8 NOTE 2	6	DIN 976–1		NOTES 1 AND 3
–	16	NUT M20	8 NOTE 2	5	DIN EN ISO 4032		
–	8	WASHER FOR M20	200HV NOTE 2	4	DIN EN ISO 7093		
–	1	ANGLE FOR STATIC WIRE SUPPORT		3			
–	1	SUPPORTING STRUCTURE FOR STATIC WIRE		2			NOTES 1 AND 3
–	3	CLAMPING ANGLE		1			NOTES 1 AND 3
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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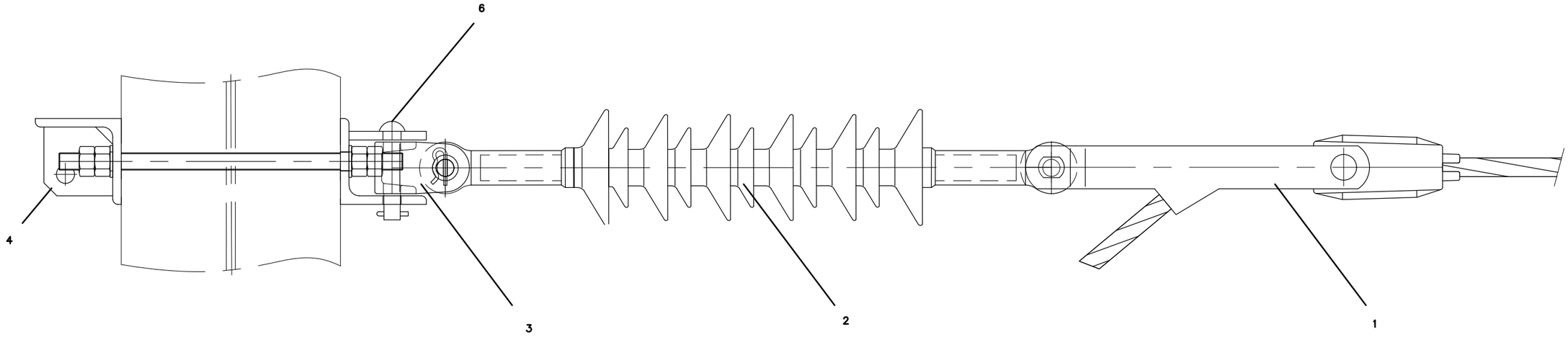
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
STATIC WIRE SUPPORT
WITH STRUT TUBE
AT RECTANGULAR MAST

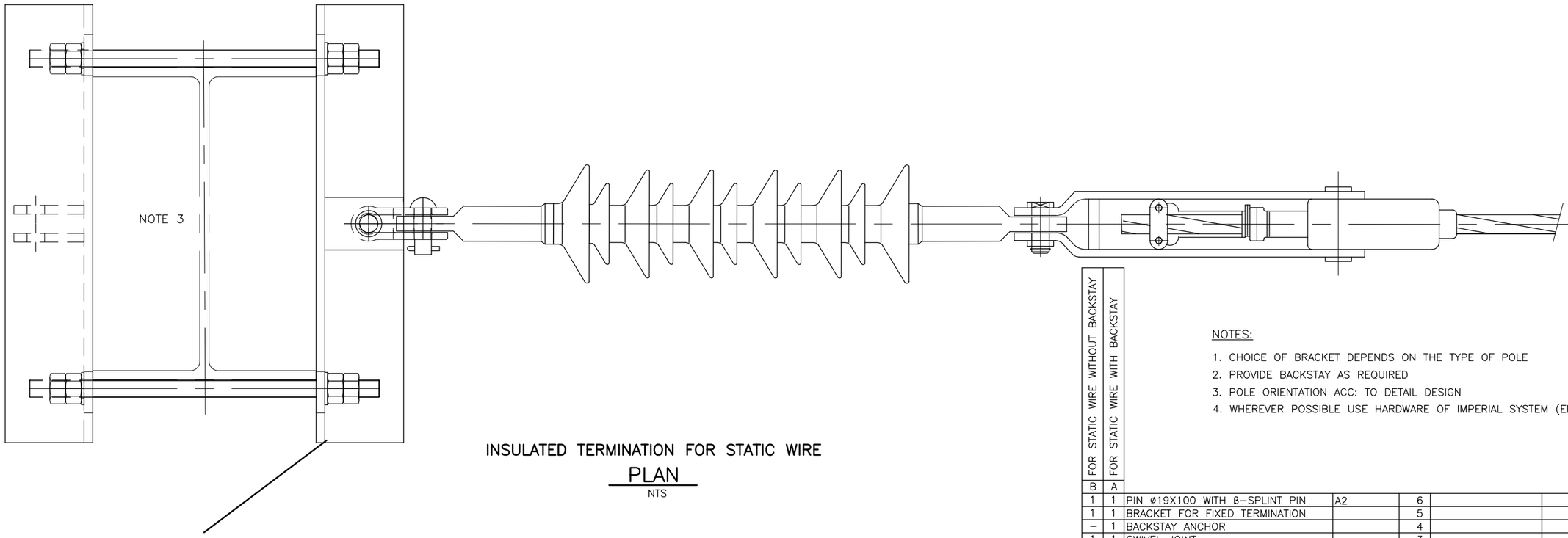
CADD FILE NAME: W6365
REV:
EDITION: 01012024
STANDARD DRAWING NO.: **W6365**



INSULATED TERMINATION FOR STATIC WIRE

ELEVATION

NTS



INSULATED TERMINATION FOR STATIC WIRE

PLAN

NTS

NOTES:

1. CHOICE OF BRACKET DEPENDS ON THE TYPE OF POLE
2. PROVIDE BACKSTAY AS REQUIRED
3. POLE ORIENTATION ACC: TO DETAIL DESIGN
4. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

FOR STATIC WIRE WITHOUT BACKSTAY	FOR STATIC WIRE WITH BACKSTAY	DESCRIPTION	MATERIAL	PART	DWG-NO/STANDARD	KG/PC.	REMARKS/ID-NO.
B	A						
1	1	PIN ø19X100 WITH 8-SPLINT PIN	A2	6			
1	1	BRACKET FOR FIXED TERMINATION		5			NOTE 1
–	1	BACKSTAY ANCHOR		4			NOTE 2
1	1	SWIVEL JOINT		3			
1	1	COMPOSITE INSULATOR TYPE 3		2			
1	1	TERMINATION CLAMP FOR STATIC WIRE		1			
PIECES							

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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San Carlos, CA 94070

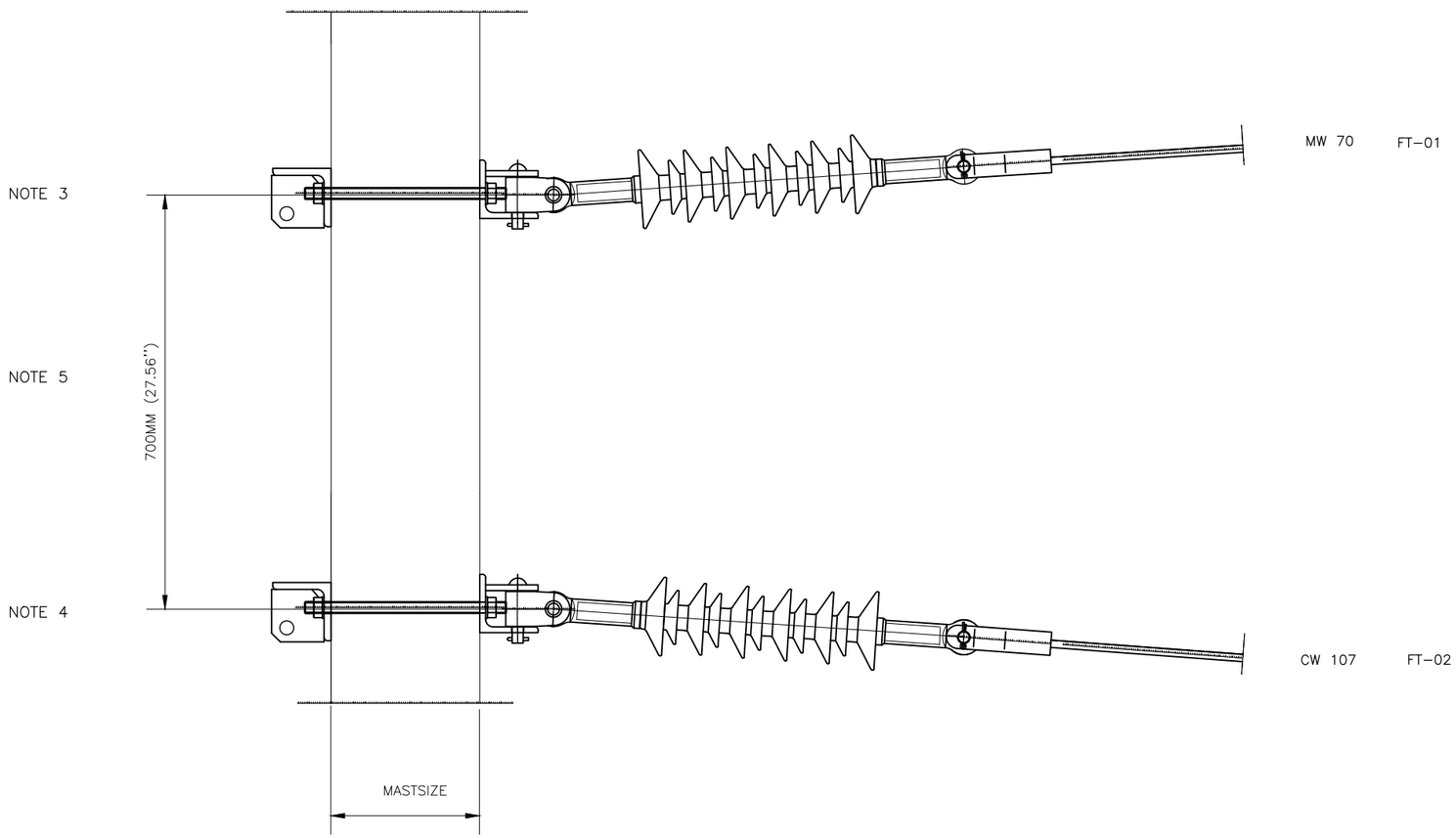
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
INSULATED TERMINATION
FOR STATIC WIRE
FT-07

CADD FILE NAME: W6368

REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6368**



NOTES:

1. DIFFERENT HEIGHT WILL BE POINTED OUT IN DETAIL DESIGN
2. ALSO USEABLE FOR SINGLE CONTACT WIRE SYSTEM (ONLY FT-02)
3. HEIGHT: CONTACT WIRE HEIGHT + 1200MM (HEIGHT: CONTACT WIRE HEIGHT + 47.24")
4. HEIGHT: CONTACT WIRE HEIGHT + 500MM (HEIGHT: CONTACT WIRE HEIGHT + 19.69")
5. BACKSTAY ACCORDING TO DETAIL DESIGN
6. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

FIXED TERMINATION FOR CW AND MW

ELEVATION

NTS

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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San Carlos, CA 94070

STANDARD DRAWINGS

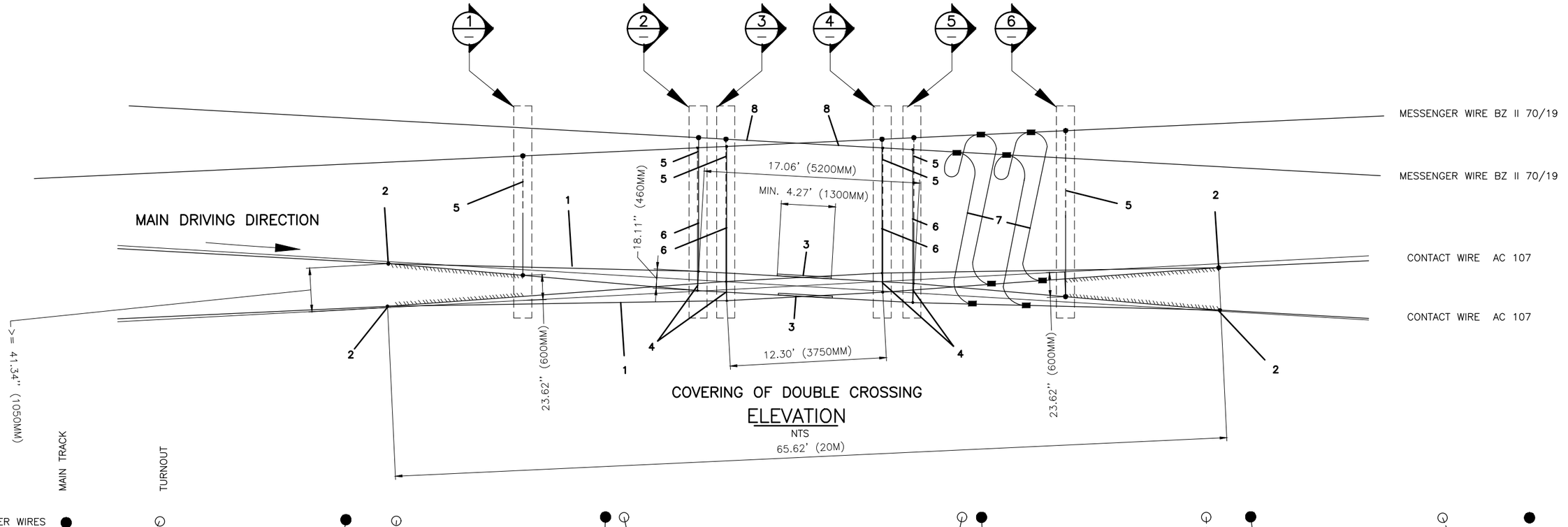
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
STANDARD HEIGHT FOR
FIXED TERMINATION OF CONTACT
AND MESSENGER WIRE

CADD FILE NAME: W6369

REV:

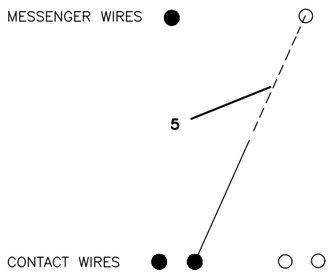
EDITION: 01012024

STANDARD DRAWING NO.: **W6369**

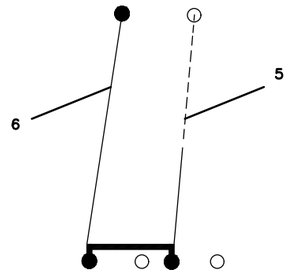


COVERING OF DOUBLE CROSSING
ELEVATION
NTS

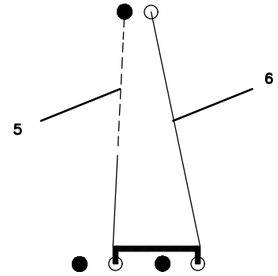
MESSENGER WIRES
CONTACT WIRES



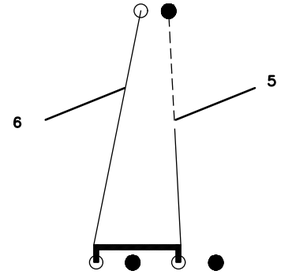
ELEVATION
DROPPER SITUATION
1 DETAIL
NTS



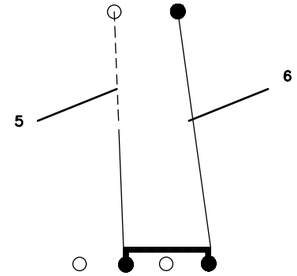
ELEVATION
DROPPER SITUATION
2 DETAIL
NTS



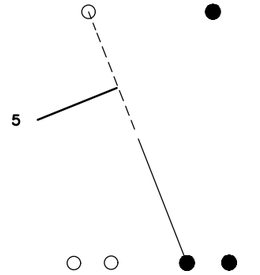
ELEVATION
DROPPER SITUATION
3 DETAIL
NTS



ELEVATION
DROPPER SITUATION
4 DETAIL
NTS



ELEVATION
DROPPER SITUATION
5 DETAIL
NTS



ELEVATION
DROPPER SITUATION
6 DETAIL
NTS

NOTES:

1. THE IN RUNNING CONTACT WIRE OF EITHER TRACK IN THE CROSSING IS THE LOWER ONE
2. THE SHADED AREA (\\\\\\\\), RAMP AREA OF PANTOGRAPH, NO CLAMPS ARE ALLOWED TO BE MOUNTED
3. ● MESSENGER WIRE AND CONTACT WIRE OF MAIN TRACK
4. ○ MESSENGER WIRE AND CONTACT WIRE OF TURNOUT
5. SPREADER
6. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.
–	2	SHRINKING HOSE FOR MESSEN. WIRE 70/19	POLYOLEFIN	8	FTMM 28/9–A/U		
–	1	ELECTRICAL CONNECTION		7			EC–02
–	4	DROPPER		6			
–	6	SLIDING DROPPER		5			
–	4	SPREADER FOR TWO CONTACT WIRES		4			
–	2	CROSSING OF 2 CONTACT WIRES		3			
–	8	ADDITIONAL CLAMP FOR 2 CONTACT WIRE		2			
–	2	CONTACT WIRE AC 107		1			

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:
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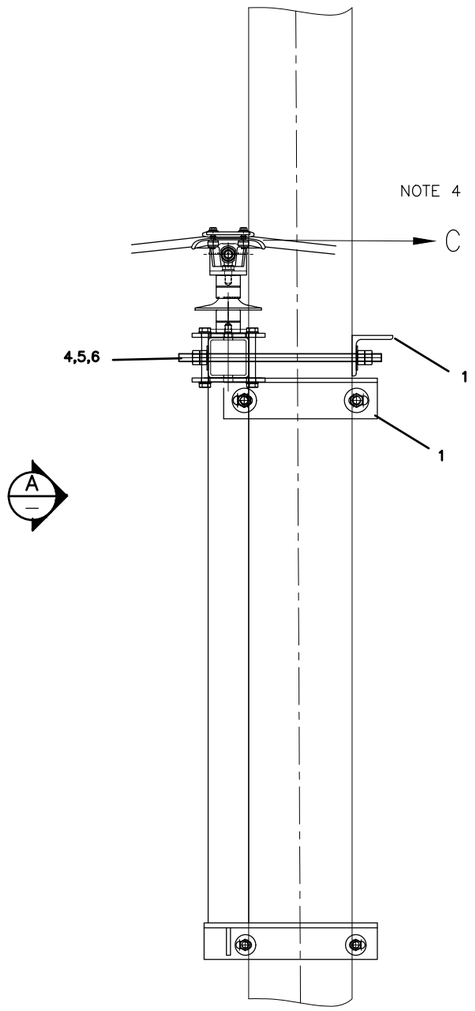
1250 San Carlos Avenue
San Carlos, CA 94070

STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
ARRANGEMENT AT
DOUBLE SLIP

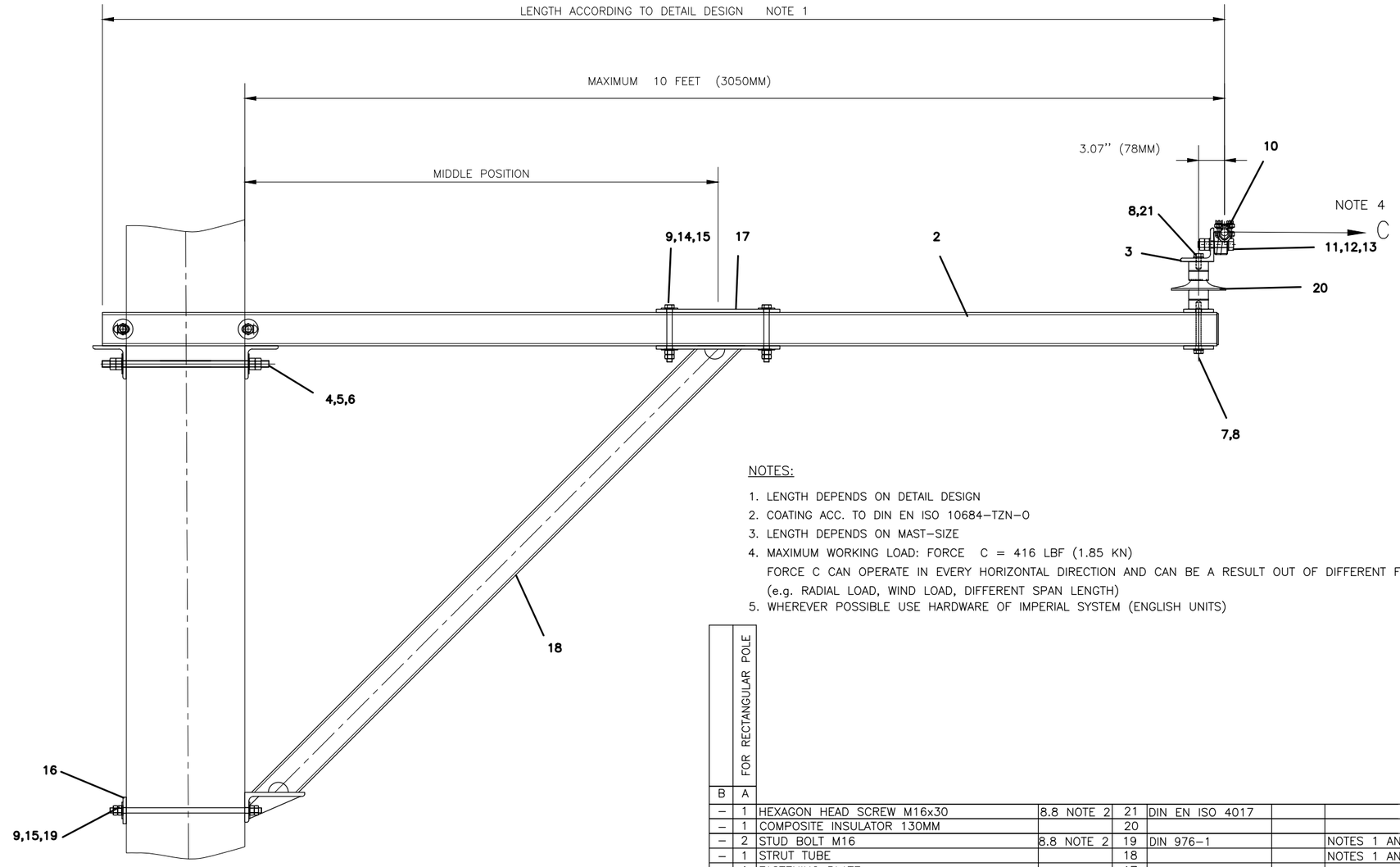
CADD FILE NAME: W6371
REV:
EDITION: 01012024
STANDARD DRAWING NO.: W6371



INSULATED STATIC WIRE
SUPPORT WITH STRUT TUBE
AT RECTANGULAR POLE

ELEVATION

NTS



INSULATED STATIC WIRE
SUPPORT WITH STRUT TUBE
AT RECTANGULAR POLE

A — ELEVATION

NTS

NOTES:

1. LENGTH DEPENDS ON DETAIL DESIGN
2. COATING ACC. TO DIN EN ISO 10684–TZN–O
3. LENGTH DEPENDS ON MAST–SIZE
4. MAXIMUM WORKING LOAD: FORCE C = 416 LBF (1.85 KN)
   FORCE C CAN OPERATE IN EVERY HORIZONTAL DIRECTION AND CAN BE A RESULT OUT OF DIFFERENT FORCES (e.g. RADIAL LOAD, WIND LOAD, DIFFERENT SPAN LENGTH)
5. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

	FOR RECTANGULAR POLE						
B	A						
–	1	HEXAGON HEAD SCREW M16x30	8.8 NOTE 2	21	DIN EN ISO 4017		
–	1	COMPOSITE INSULATOR 130MM		20			
–	2	STUD BOLT M16	8.8 NOTE 2	19	DIN 976–1		NOTES 1 AND 3
–	1	STRUT TUBE		18			NOTES 1 AND 3
–	1	FASTENING PLATE		17			
–	1	BACK PLATE		16			NOTES 1 AND 3
–	12	WASHER M16	200HV NOTE 2	15	DIN EN ISO 7093		
–	4	HEXAGON HEAD SCREW M16x160	8.8 NOTE 2	14	DIN EN ISO 4017		
–	3	WASHER FOR M20	200HV NO.2	13	DIN EN ISO 7089		
–	2	NUT M20	8 NOTE2	12	DIN EN ISO 4032		
–	1	HEX. HEAD SCREW M20x100	8.8 NOTE2	11	ISO 4017		
–	1	STATIC WIRE CLAMP		10			
–	16	HEXAGON HEAD NUT M16	8 NOTE 2	9	DIN EN ISO 4032		
–	2	WASHER M16	200HV NOTE 2	8	DIN EN ISO 7089		
–	1	HEXAGON HEAD SCREW M16x140	8.8 NOTE 2	7	DIN EN ISO 4017		
–	4	STUD BOLT M20	8.8 NOTE 2	6	DIN 976–1		NOTES 1 AND 3
–	16	NUT M20	8 NOTE 2	5	DIN EN ISO 4032		
–	8	WASHER FOR M20	200HV NOTE 2	4	DIN EN ISO 7093		
–	1	ANGLE FOR STATIC WIRE SUPPORT		3			
–	1	SUPPORTING STRUCTURE FOR STATIC WIRE		2			NOTES 1 AND 3
–	3	CLAMPING ANGLE		1			NOTES 1 AND 3
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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San Carlos, CA 94070

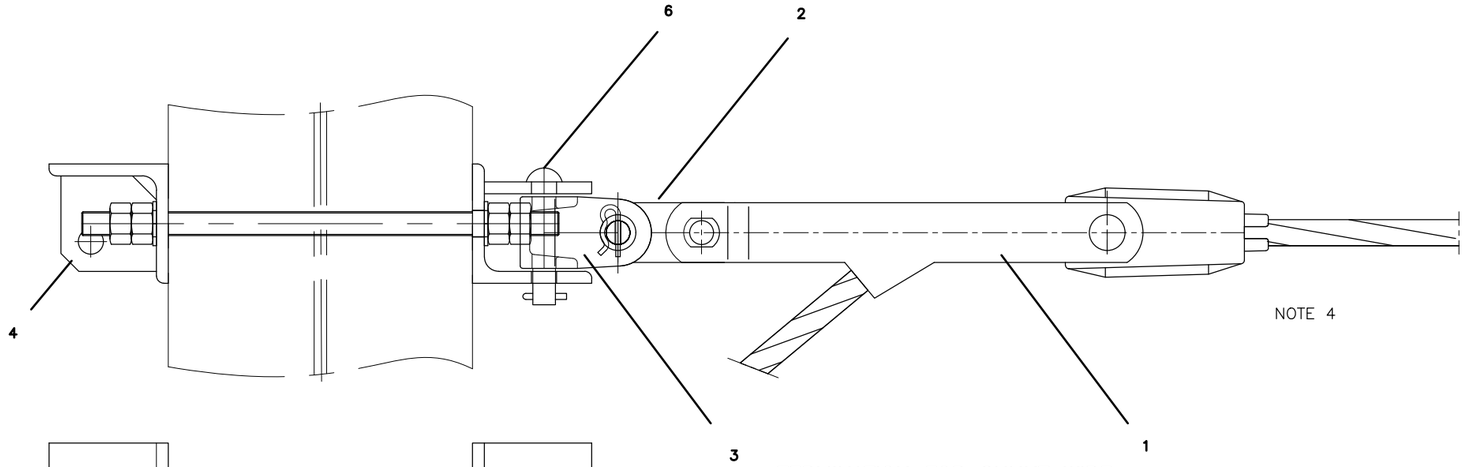
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
INSULATED STATIC WIRE SUPPORT
WITH STRUT TUBE
AT RECTANGULAR MAST

CADD FILE NAME: W6374

REV: | EDITION: 01012024

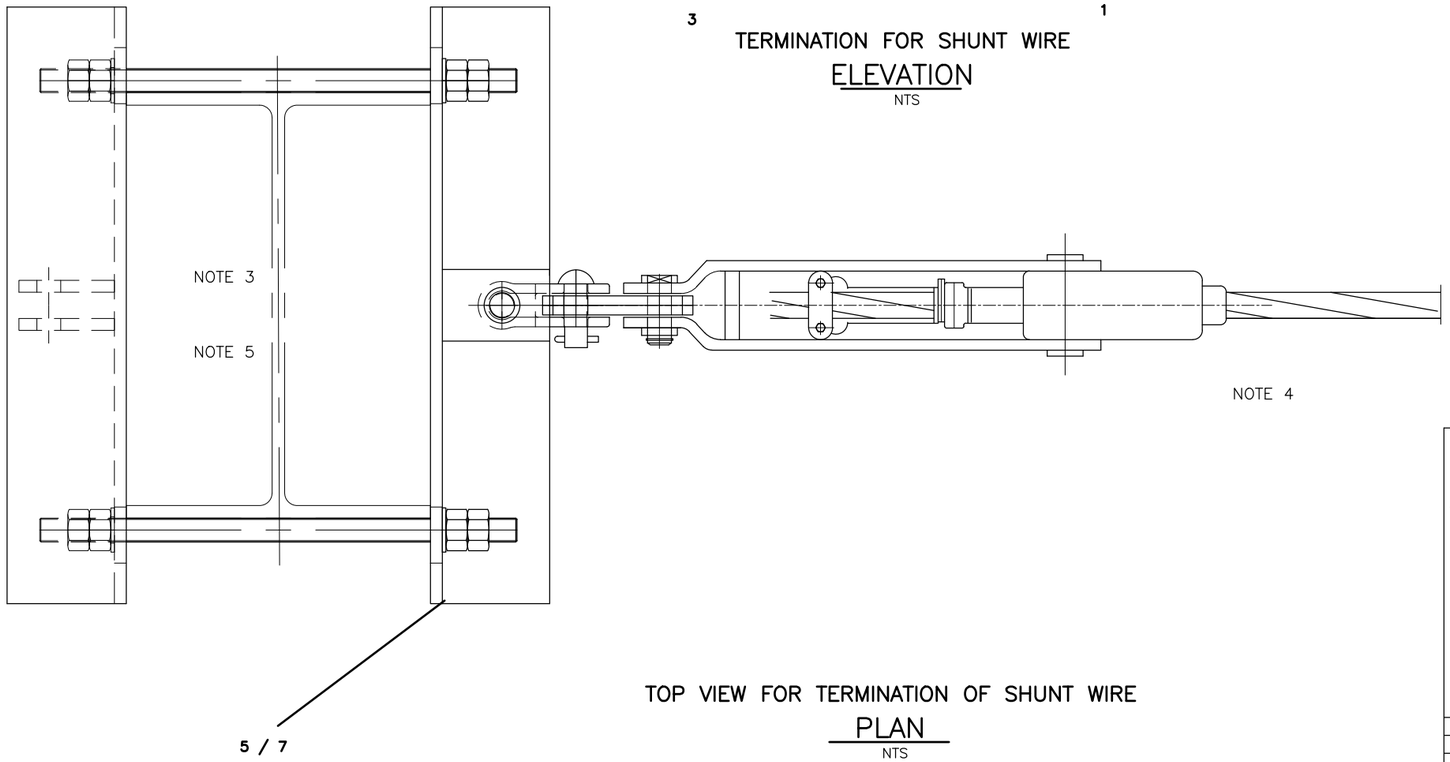
STANDARD DRAWING NO.: **W6374**



TERMINATION FOR SHUNT WIRE

ELEVATION

NTS



TOP VIEW FOR TERMINATION OF SHUNT WIRE

PLAN

NTS

NOTE 6

FOR SHUNT WIRE WITHOUT BACKSTAY / ROUND POLE	FOR SHUNT WIRE WITHOUT BACKSTAY	FOR SHUNT WIRE WITH BACKSTAY							
C	B	A							
1	–	–	BRACKET FOR TERMINATION AT ROUND POLE		7				
1	1	1	PIN ø19X100 WITH 8–SPLINT PIN	A2	6				
–	1	1	BRACKET FOR FIXED TERMINATION		5				NOTE 1
–	–	1	BACKSTAY ANCHOR		4				NOTE 2
1	1	1	SWIVEL JOINT		3				
2	2	2	LINK PLATE		2				
1	1	1	TERMINATION CLAMP FOR SHUNT WIRE		1				
PIECES			DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD		KG/PC.	REMARKS/ID–NO.

NOTES:

1. CHOICE OF BRACKET DEPENDS ON THE TYPE OF POLE
2. PROVIDE BACKSTAY AS REQUIRED
3. POLE ORIENTATION ACC: TO DETAIL DESIGN
4. GROUNDING OF SHUNT WIRE SIMILAR TO DRAWING W5240
5. ARRANGEMENT FOR ROUND POLE NOT SHOWN
6. TYPE A AND B FOR RECTANGULAR POLE; TYPE C FOR ROUND POLE
7. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

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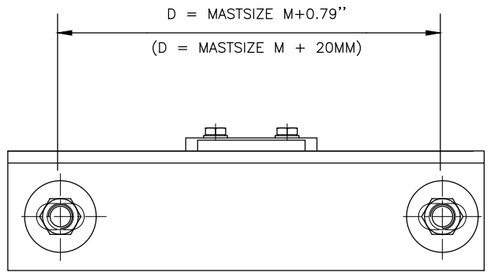
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
TERMINATION FOR SHUNT WIRE
AT RECTANGULAR / ROUND POLE
FT–08

CADD FILE NAME: W6383

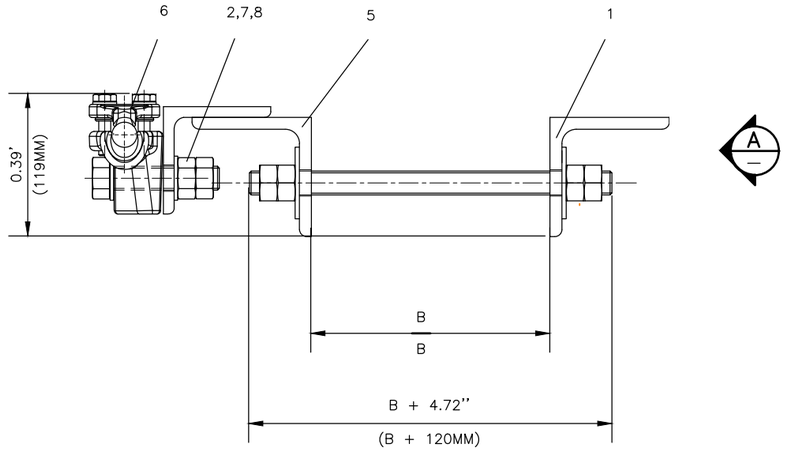
REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6383**



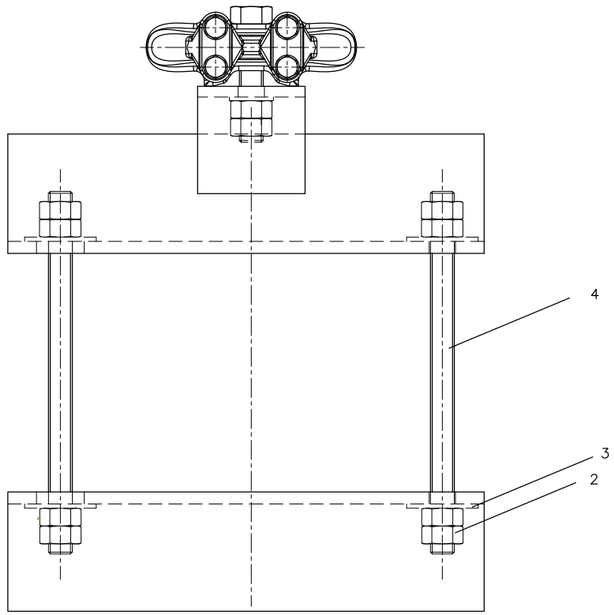
BRACKET WITH EARTHING CLAMP AT RECTANGULAR MAST
OR RECTANGULAR DROP TUBE

A — ELEVATION
NTS



BRACKET WITH EARTHING CLAMP
AT RECTANGULAR MAST
OR RECTANGULAR DROP TUBE

ELEVATION
NTS



BRACKET WITH EARTHING CLAMP
AT RECTANGULAR MAST
OR RECTANGULAR DROP TUBE

PLAN
NTS

NOTES:

1. COATING ACC. TO DIN EN ISO 10684–tZN–o
2. POLE ORIENTATION ACCORDING TO LAYOUT PLANS
3. DIMENSION: FEET (MM) (UNLESS SHOWN OTHERWISE)
4. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

B	A							
–	3	WASHER FOR M20	200HV NO.1	8	DIN EN ISO 7089		
–	1	HEX. HEAD SCREW M20x100	8.8 NO.1	7	ISO 4017		
–	1	ELECTRICAL CLAMP FOR STATIC WIRE		6	B681011AX		
–	1	BACK ANGLE WITH EARTHING ANGLE		5			
–	2	STUD BOLT M20	8.8 NO.1	4	DIN 976–1		LENGTH AS REQUIRED
–	4	WASHER FOR M20	200HV NO.1	3	DIN EN ISO 7093		
–	10	NUT M20	8 NO.1	2	DIN EN ISO 4032		
–	1	BACK BRACKET		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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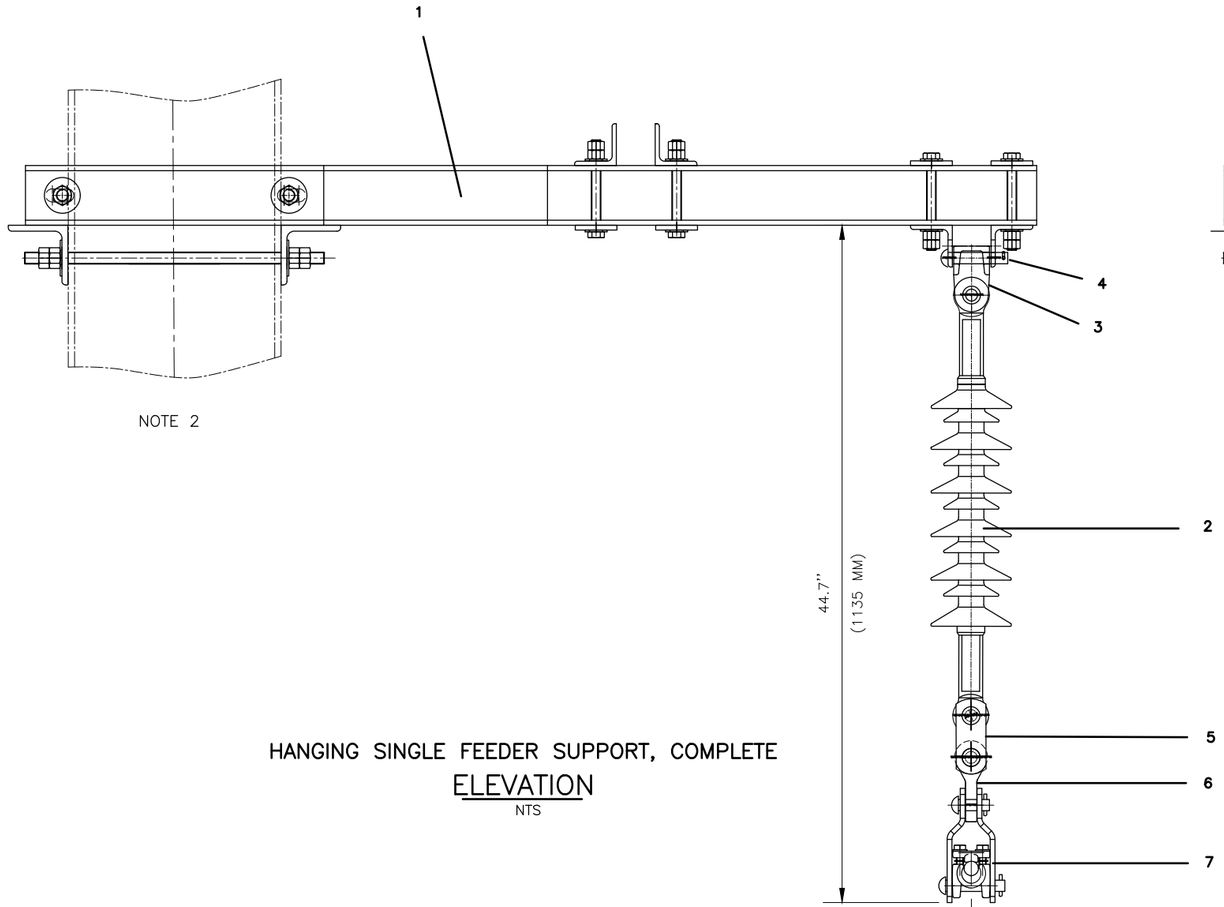
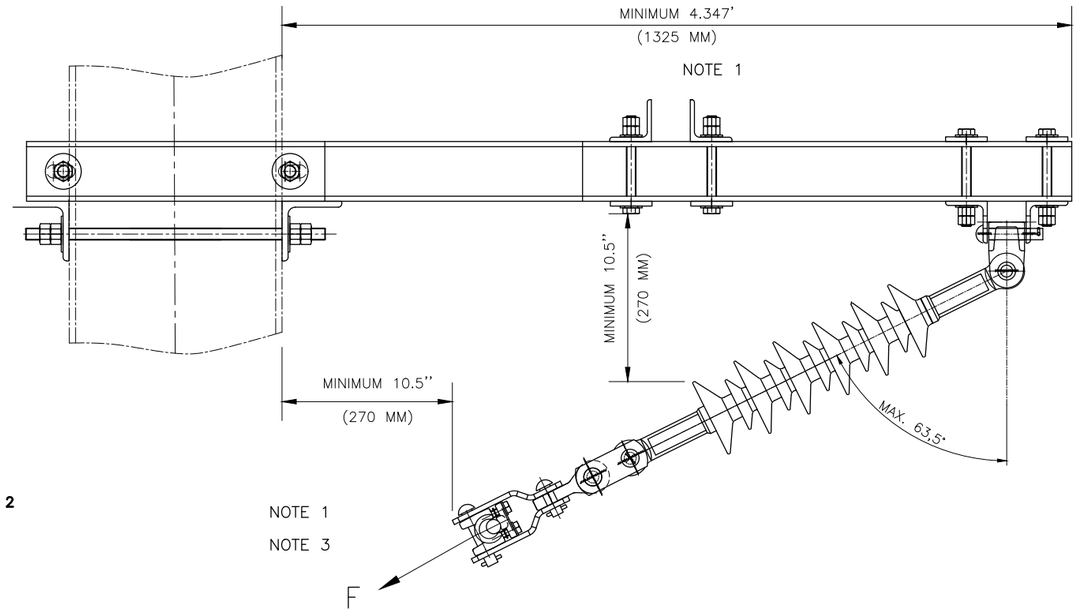
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
BRACKET WITH EARTHING CLAMP
AT RECTANGULAR MAST
OR RECTANGULAR DROP TUBE

CADD FILE NAME: W6385
REV:
EDITION: 01012024
STANDARD DRAWING NO.: **W6385**

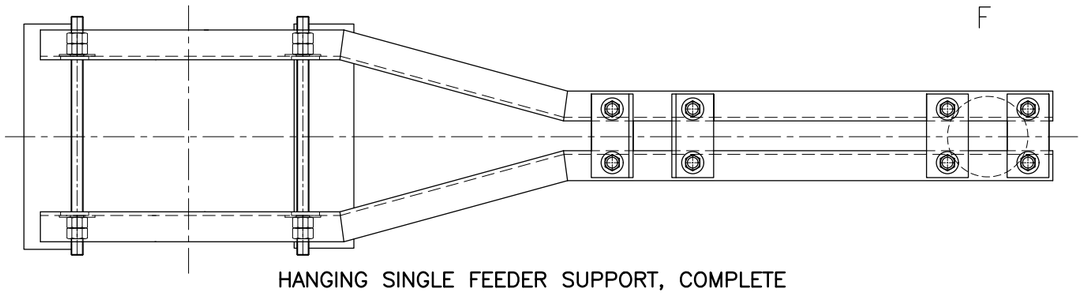


HANGING SINGLE FEEDER SUPPORT, COMPLETE
ELEVATION
NTS



HANGING SINGLE FEEDER SUPPORT, COMPLETE
SWIVELED OUT POSITION
ELEVATION
NTS

NOTE 1
NOTE 3



HANGING SINGLE FEEDER SUPPORT, COMPLETE
PLAN
NTS

NOTES:

1. LENGTH DEPENDS ON MAST SIZE AND NECESSARY DISTANCE
2. POLE ORIENTATION ACCORDING TO LAYOUT PLANS
3. ELECTRICAL CLEARANCE ACCORDING TO W6006 IS > 10.5 INCHES (270 MM)
4. TO BE USED IN SPANS WITHOUT OBSTACLES ONLY. OTHERWISE USE V–FEEDER W6109
5. MAXIMUM F = 2248 LBF (10 KN)
6. FOR F > 1124 LBF (5 KN) STEEL STRUCTURE TO BE CHECKED BY STATIC CALCULATION
7. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

FOR RECTANGULAR MAST

B	A							
–	1	FEEDER WIRE CLAMP, COMPLETE	G–AL	7				
–	1	TWISTED EYE–EYE CONNECTOR		6				
–	1	LINK PLATE WITH BOLTS		5				
–	1	BOLT ø19x100 WITH ß–SPLINT		4				
–	1	SWIVEL JOINT		3				
–	1	COMPOSITE INSULATOR		2				
–	1	SUPPORTING STRUCTURE FOR V–FEEDER SUPPORT		1				NOTE 1
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD		KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:
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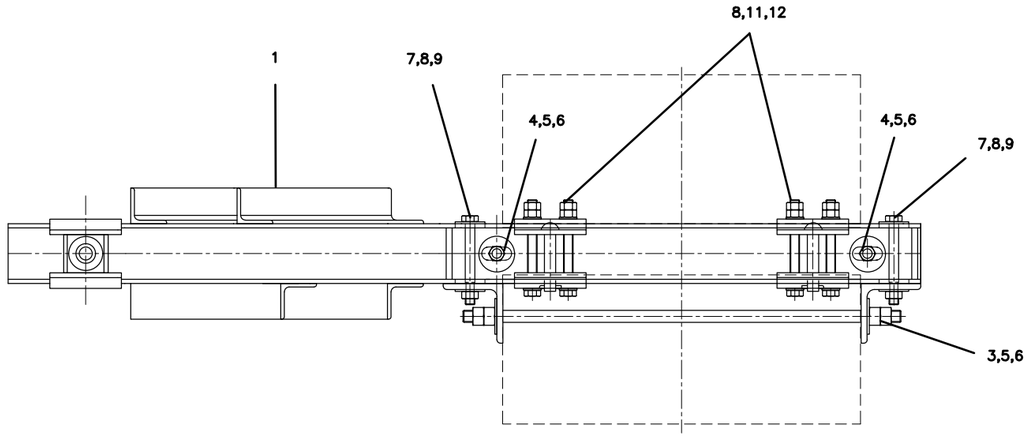
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
HANGING SINGLE FEEDER
SUPPORT, COMPLETE

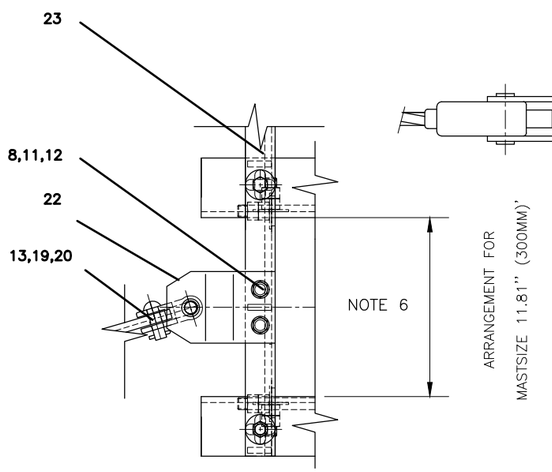
CADD FILE NAME: W6387
REV:
EDITION: 01012024
STANDARD DRAWING NO.: W6387



TYPE A – SINGLE STATIC WIRE TERMINATION TRAVERSE WITH ADDITIONAL FW V–MIDDLE TERMINATION

ELEVATION

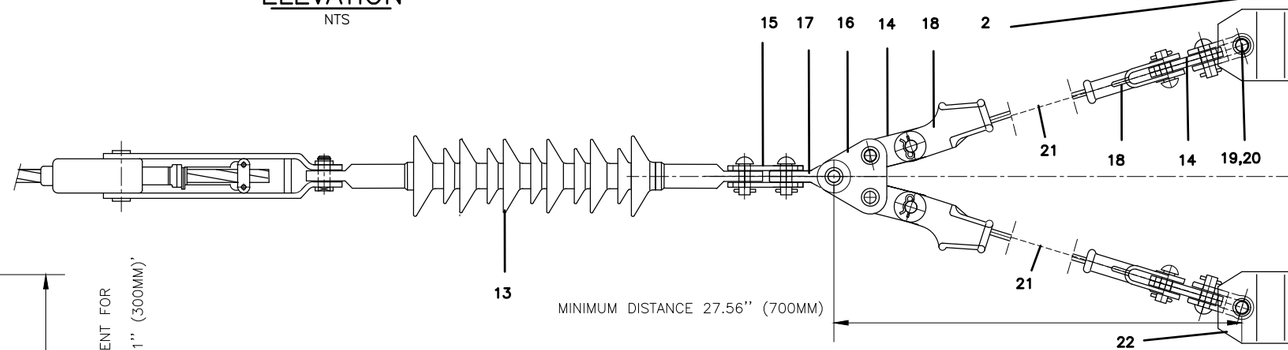
NTS



TYPE B – SINGLE STATIC WIRE TERMINATION TRAVERSE WITH ADDITIONAL FW MIDDLE TERMINATION MASTSIZE < 11.81" (300MM)

PLAN

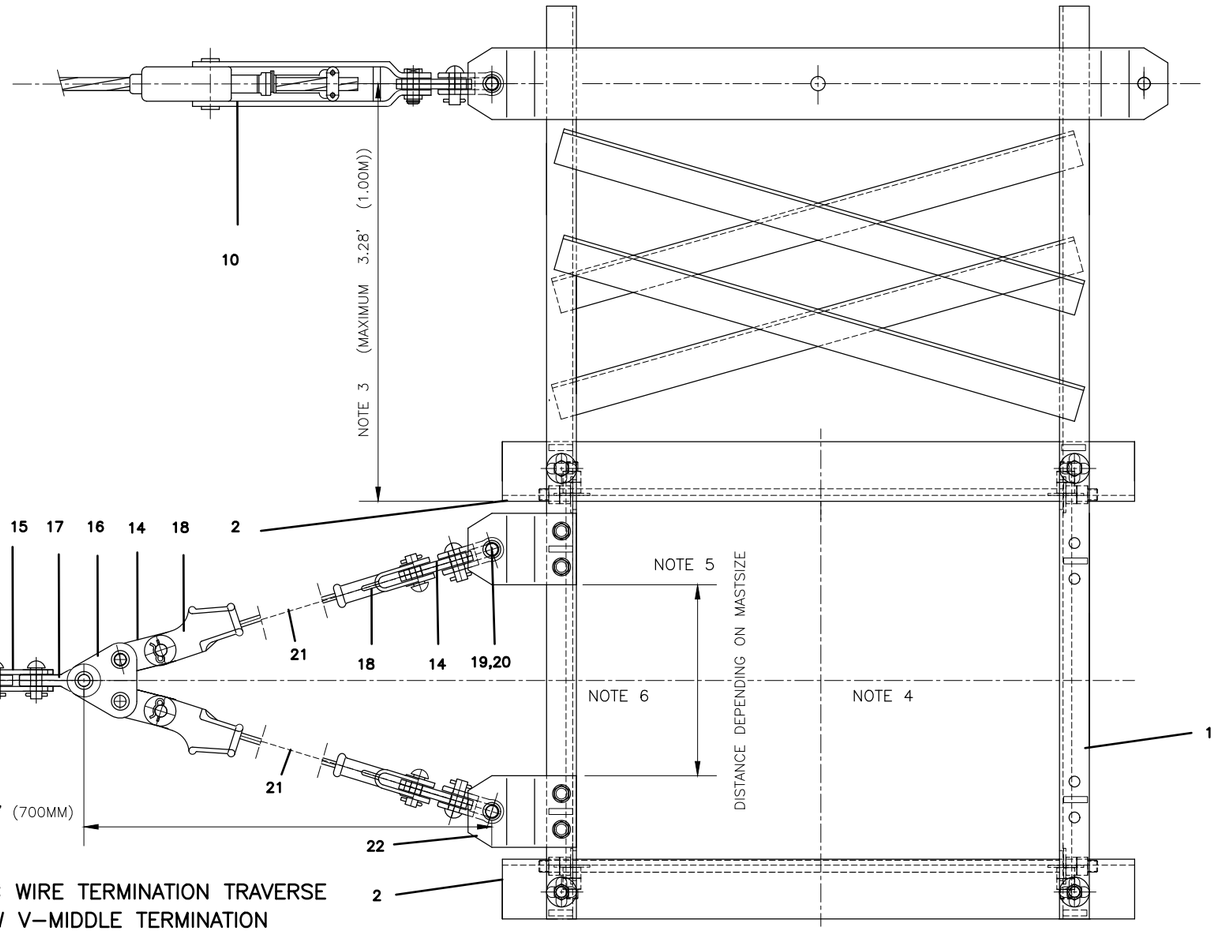
NTS



TYPE A – SINGLE STATIC WIRE TERMINATION TRAVERSE WITH ADDITIONAL FW V–MIDDLE TERMINATION MASTSIZE >= 11.81" (300MM)

PLAN

NTS



NOTES:

1. LENGTH ACCORDING TO MASTSIZE
2. HOT DIP GALVANIZED ACCORDING TO DIN EN ISO 10684 tZn–o
3. VARIABLE LENGTH (DEPENDS ON DETAIL DESIGN) ; MAXIMUM 3.28' (1.00M)
4. MASTSIZE MUST BE CONSIDERED
5. MASTSIZE MUST BE CONSIDERED – MINIMUM MASTSIZE FOR V–TERMINATION 11.81" (300MM)
6. FOR MASTSIZE < 11.81" (300 MM) ONLY ONE TERMINATION MUST BE CONSIDERED IN THE MIDDLE OF THE U–PROFILE
7. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

B	A						
1	–	TERMINATION TRAVERSE – SINGLE		23			NOTE 1, 3 AND 6
2	4	TERMINATION PLATE		22			
–	2	MESSENGER WIRE BZ II 70/19		21			
1	2	SWIVEL JOINT		20			
1	2	PIN 19x100 WITH B–SPLINT PIN		19			
–	4	WEDGE TYPE DEAD END CLAMP		18			
–	1	TWISTED EYE EYE CONNECTOR		17			
–	1	TRIANGULAR CLEVIS LINK		16			
–	1	LINK PLATES WITH PINS		15			
–	8	LINK PLATES		14			
1	1	FEEDER WIRE TERMINATION		13			
4	8	WASHER FOR M16	200HV NOTE2	12	DIN EN ISO 7089		
2	4	HEXAGON HEAD SCREW M16x150	5.6 NOTE2	11	DIN EN ISO 4014		
1	1	STATIC WIRE TERMINATION		10			
4	4	HEXAGON HEAD SCREW M16x140	5.6 NOTE2	9	DIN EN ISO 4014		
8	12	HEXAGON NUT M16	6 NOTE2	8	DIN EN ISO 4032		
8	8	WASHER FOR M16	200HV NOTE2	7	DIN EN ISO 7093		
8	8	WASHER FOR M20	200HV NOTE2	6	DIN EN ISO 7093		
16	16	HEXAGON NUT M20	6 NOTE2	5	DIN EN ISO 4032		
2	2	STUD BOLT M20	5.6 NOTE2	4	DIN 976–1		NOTE 1
2	2	STUD BOLT M20	5.6 NOTE2	3	DIN 976–1		NOTE 1
2	2	SUPPORTING ANGLE		2			NOTE 1
–	1	TERMINATION TRAVERSE – V		1			NOTE 1, 3 AND 5
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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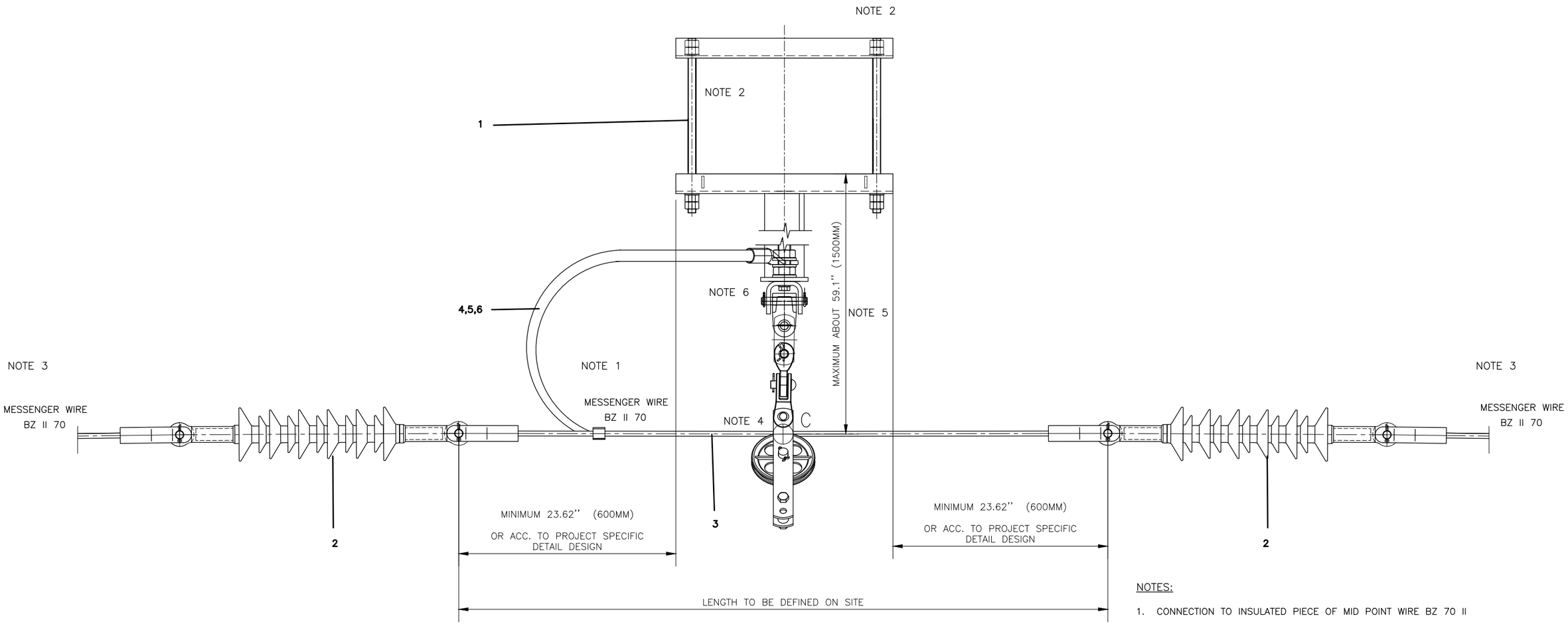
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
SINGLE SW TERMINATION TRAVERSE
WITH ADDITIONAL FW
MIDDLE TERMINATION

CADD FILE NAME: W6389

REV: | EDITION: 01012024

STANDARD DRAWING NO.: **W6389**



INSULATION ARRANGEMENT OF OFFSET
MID POINT ANCHOR WIRE WITH PULLEY SUPPORT

ELEVATION

NTS

NOTES:

1. CONNECTION TO INSULATED PIECE OF MID POINT WIRE BZ 70 II
2. PORTAL SIZE ACC. TO PROJECT SPECIFIC DETAIL DESIGN – LENGTH / DIMENSIONS ACC. TO PORTAL SIZE
3. CONTINUING CONNECTION ACC. TO PROJECT SPECIFIC DETAIL DESIGN
4. MAXIMUM WORKING LOAD: FORCE C = 449.6 LBF (2000N) – LOOK AT W6391 (e.g. RADIAL LOAD, WIND LOAD)
5. LENGTH ACC. TO PROJECT SPECIFIC DETAIL DESIGN
6. TURN CLAMP INTO NECESSARY POSITION
7. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

	A						
	1	CABLE LUG 16–120	CU	6	DIN 46235		
	1	JUMPER WIRE 95x259 (LENGTH AS NEEDED)	E–CU	5	.		
	1	ELECTRICAL CLAMP	.	4	.		
	1	MESSENGER WIRE BZ II 70/19		3	DIN 48201		NOTE 1
	2	CUT IN INSULATION FOR MW		2			
	1	MID POINT ANCHOR WIRE OFFSET SUPPORT WITH PULLEY		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

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STANDARD DRAWINGS

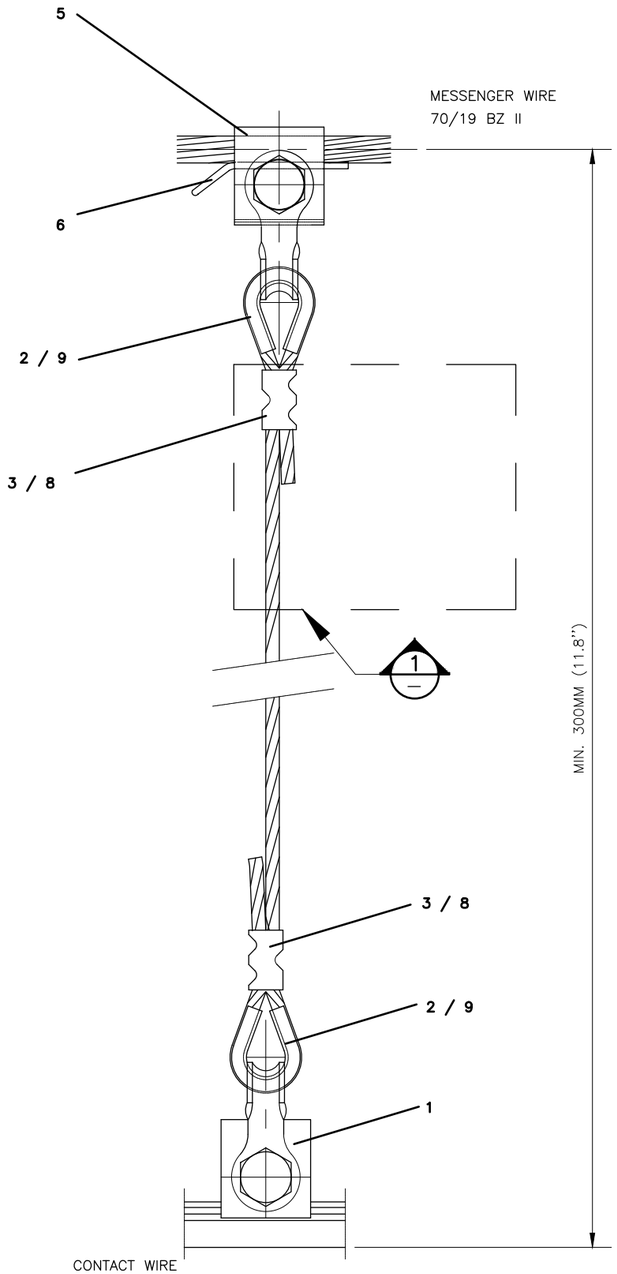
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
INSULATION ARRANGEMENT OF MPA
WIRE WITH PULLEY SUPPORT
OFFSET

CADD FILE NAME: W6390

REV:

EDITION: 01012024

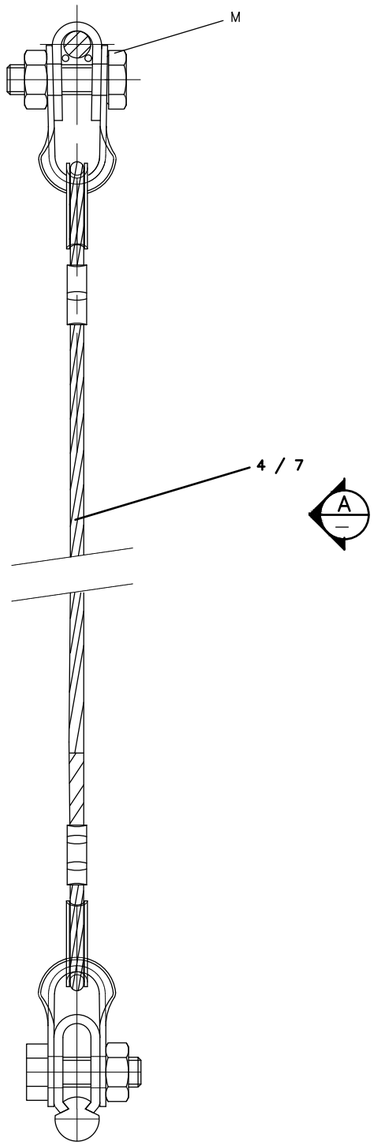
STANDARD DRAWING NO.: **W6390**



DROPPER

A — ELEVATION

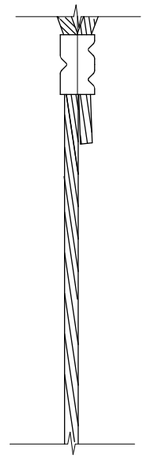
NTS



DROPPER

ELEVATION

NTS



END SECTION OF DROPPER

1 — DETAIL

NTS

NOTE 3

NOTES:

1. STANDARD DROPPER WIRE BZ II 10X49 (CUMG 0.4)
2. FLEXIBLE STAINLESS STEEL WIRE
3. USE FOR DRAWING W6005 – BOTH DROPPER SOLUTIONS WILL BE FUNCTIONAL
4. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

STAINLESS STEEL DROPPER	BZ II 10X49 DROPPER	DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.
B	A	PIECES					
2	–	THIMBLE F. STAINLESS STEEL ROPE		9			
2	–	COMPRESSION SPLICE F. STAINLESS STEEL ROPE		8			
1	–	ROPE STAINLESS STEEL (LENGTH AS NEEDED)	A4	7			NOTE 2
1	1	CLIP FOR 70MM²	BZ II	6	DIN 48300		
1	1	DROPPER CLAMP FOR MW 70MM²	A2	5			
–	1	WIRE BZ II 10X49 (LENGTH AS NEEDED)	CUMG 0.4	4	DIN 43138		NOTE 1
–	2	COMPRESSION SPLICE F. WIRE 10MM² (D=4.5MM)	E–CUF20	3			
–	2	THIMBLE FOR WIRE 10X49	A2	2	DIN 43154		
1	1	DROPPER CLAMP FOR CW	A2	1			

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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STANDARD DRAWINGS

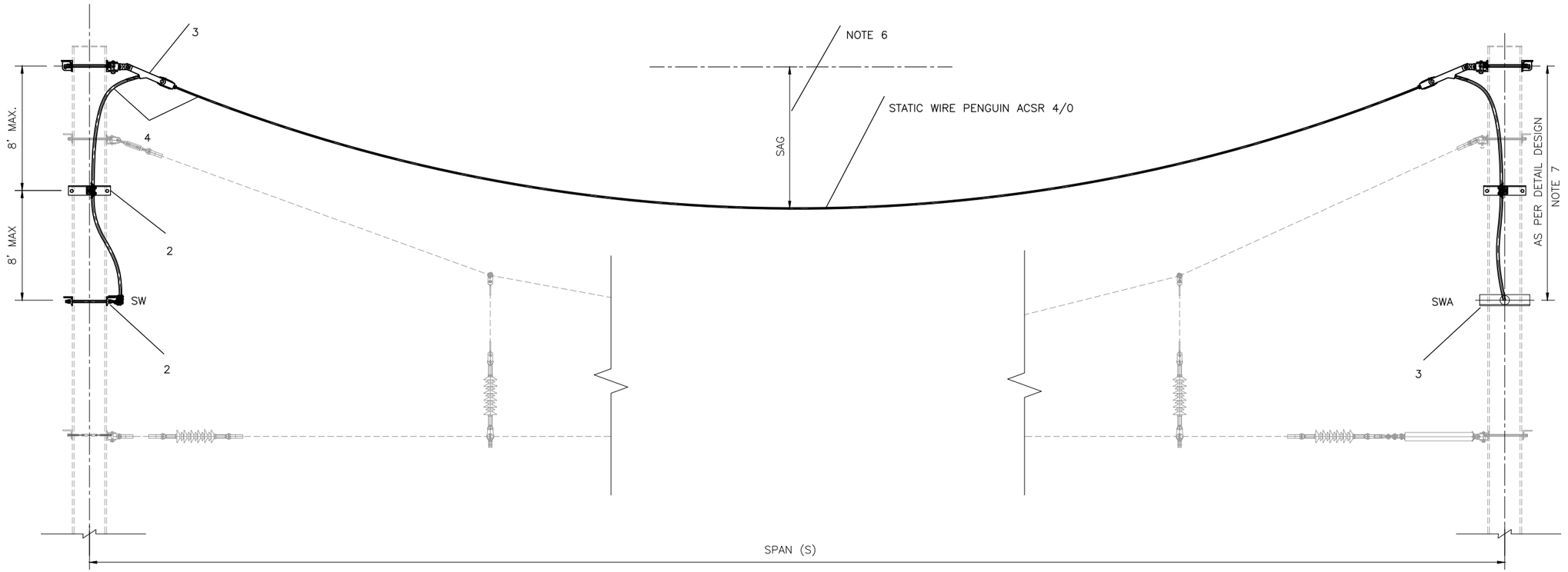
ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
DROPPER
USE FOR PUBLIC AREA SPAN LENGTH
HA–05

CADD FILE NAME: W6844

REV: | EDITION: 01012024

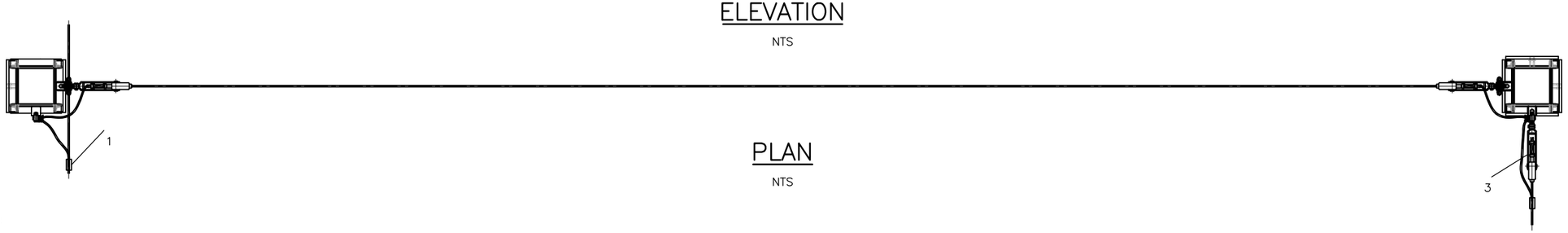
STANDARD DRAWING NO.: **W6844**

JUMPER AND CROSS TRACK ARRANGEMENT FOR THROUGH STATIC WIRE TO STATIC WIRE TERMINATION.



ELEVATION

NTS



PLAN

NTS

NOTES:

1. ALL DIMENSIONS ARE IN FEET, UNLESS SHOWN OTHERWISE.
2. DOWN GUY NOT SHOWN FOR CLARITY, REFER TO OCS BASIC DESIGN POLES AND STRUCTURES FOR DOWN GUY DETAILS.
3. FOR MAST TYPE, REFER TO PROJECT SPECIFIC DETAIL DESIGN.
4. LENGTH TO BE DEFINED AT SITE.
5. SIMILAR ARRANGEMENT CAN BE USED FOR SINGLE TRACK CATENARY POLES.
6. NECESSARY ELECTRICAL CLEARANCES FROM ANY 25 KV LIVE PARTS SHALL BE MAINTAINED IN ACCORDANCE TO BASIC DESIGN DRAWING W6006.
7. IF DISTANCE IS GREATER THAN 16', ADDITIONAL SUPPORTS SHALL BE INSTALLED AT SITE.
8. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

	A						
	1	PENGUIN ACSR 4/0 (LENGTH AS NEEDED)		4	NOTE 4		
	3	TERMINATION ARRANGEMNT FOR STATIC WIRE FT-05		3			
	3	SINGLE SUPPORT FOR STATIC WIRE		2			
	2	TAP CONNECTOR FOR STATIC WIRE 4/0 TO 4/0		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG-NO/STANDARD	KG/PC.	REMARKS/ID-NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
JUMPER & CROSS TRACK ARRANGEMENT
SW TO SWA (SW-09B)

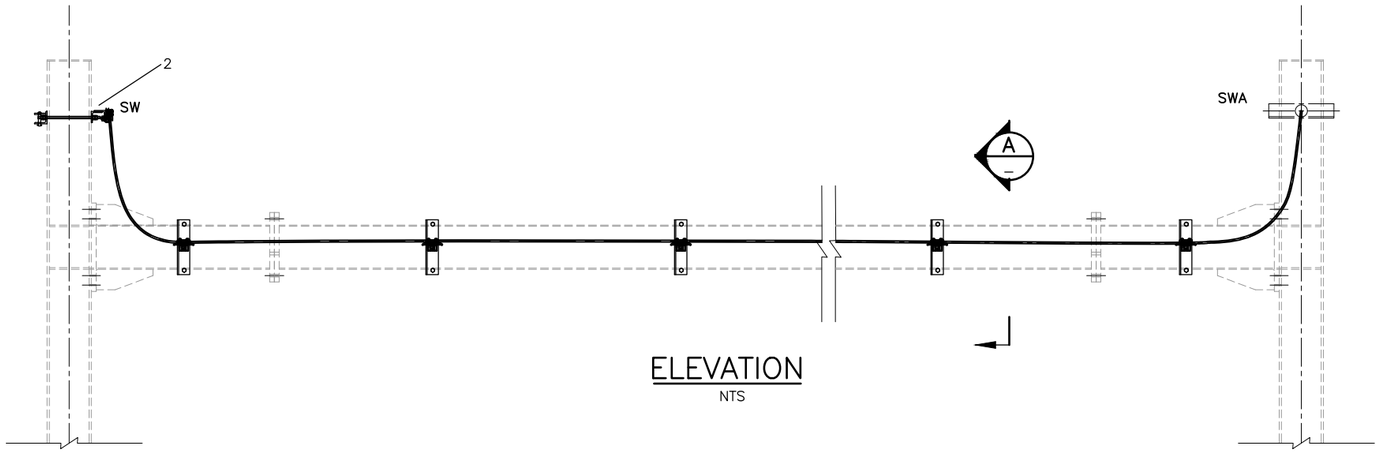
CADD FILE NAME: W6858

REV:

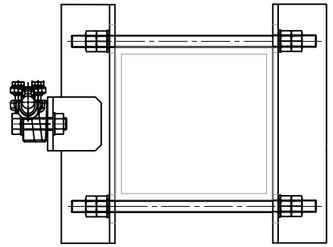
EDITION: 01012024

STANDARD DRAWING NO.: W6858

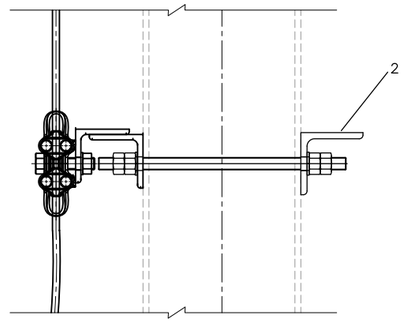
JUMPER AND CROSS TRACK ARRANGEMENT ON PORTAL FOR TROUGH STATIC WIRE TO STATIC WIRE TERMINATION.



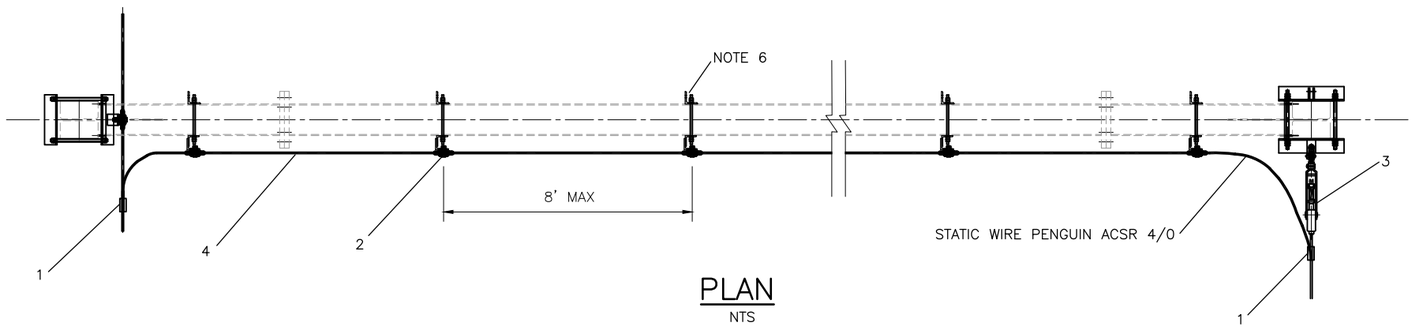
ELEVATION
NTS



A SECTION
NTS



PLAN
NTS



PLAN
NTS

NOTES:

1. ALL DIMENSIONS ARE IN FEET, UNLESS SHOWN OTHERWISE.
2. DOWN GUY NOT SHOWN FOR CLARITY, REFER TO OCS BASIC DESIGN POLES AND STRUCTURES FOR DOWN GUY DETAILS.
3. FOR MAST TYPE, REFER TO PROJECT SPECIFIC DETAIL DESIGN.
4. LENGTH TO BE DEFINED AT SITE.
5. MAXIMUM SPACING BETWEEN SW SUPPORT CLAMP SHOULD NOT EXCEED 8'.
6. FINAL NUMBER AND ORIENTATION OF SW SUPPORT ON PORTAL BEAM SHALL BE DECIDED AT SITE.
7. NECESSARY ELECTRICAL CLEARANCES FROM ANY 25 KV LIVE PARTS SHALL BE MAINTAINED IN ACCORDANCE TO BASIC DESIGN DRAWING W6006.
8. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

	A						
	1	PENGUIN ACSR 4/0 (LENGTH AS NEEDED)		4	NOTE 4		
	1	TERMINATION ARRANGEMENT FOR STATIC WIRE FT-05		3			
NOTE 7		STATIC WIRE SUPPORT ON PORTAL BEAM		2			
	2	TAP CONNECTOR FOR STATIC WIRE 4/0 to 4/0		1			
PIECES		DESCRIPTION	MATERIAL	PART	DWG-NO/STANDARD	KG/PC.	REMARKS/ID-NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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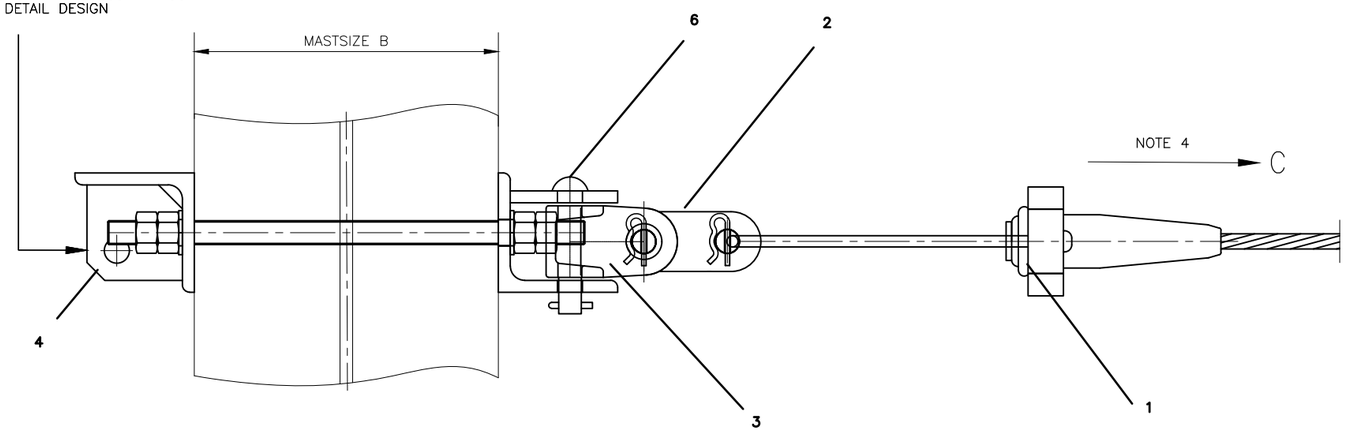
STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
JUMPER & CROSS TRACK ARRANGEMENT
SW TO SWA ON PORTAL (SW-10B)

CADD FILE NAME: W6862
REV:
EDITION: 01012024
STANDARD DRAWING NO.: W6862

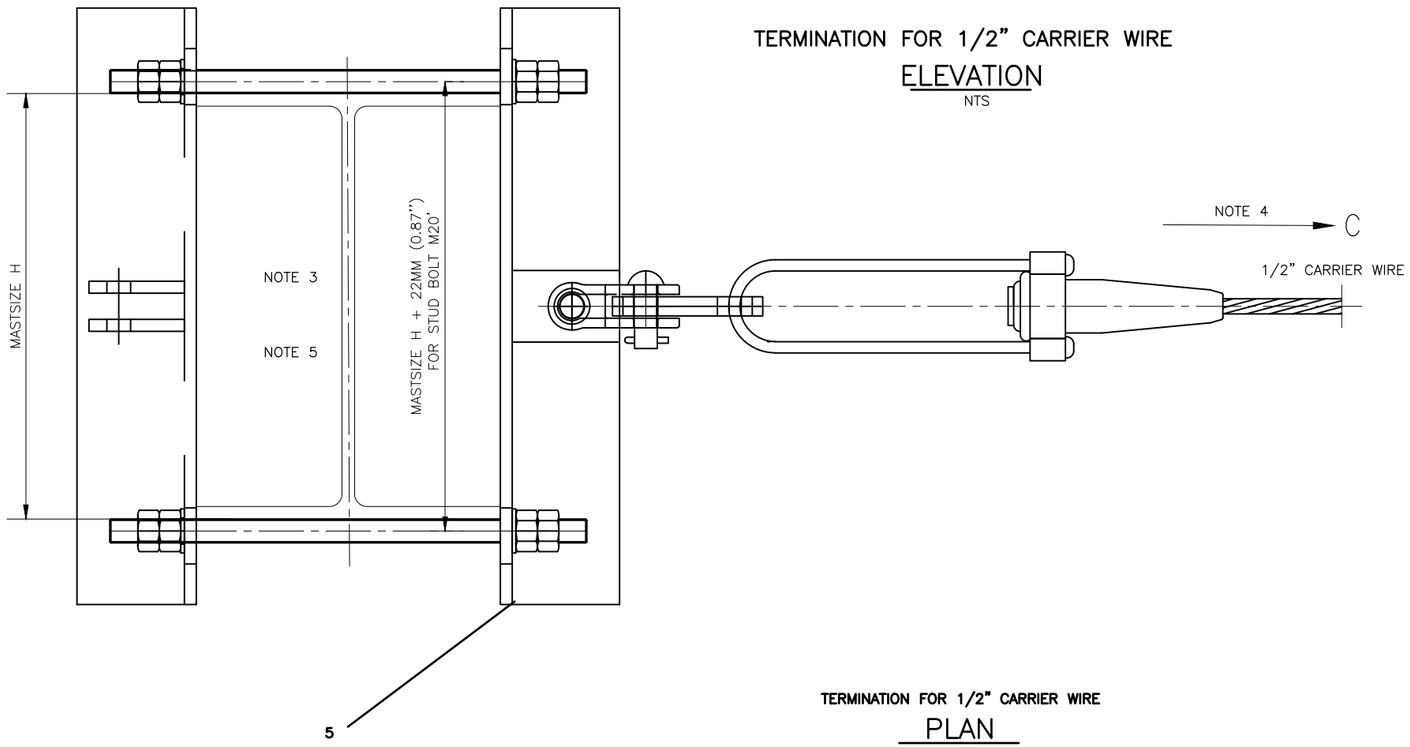
CONNECTION FOR BACKSTAY ANCHOR, IF NECESSARY ACC. TO DETAIL DESIGN



TERMINATION FOR 1/2" CARRIER WIRE

ELEVATION

NTS



TERMINATION FOR 1/2" CARRIER WIRE

PLAN

NTS

LENGTH OF PARTS ACC. TO MASTSIZE

NOTE 2
NOTE 6

C	B	A	PIECES	DESCRIPTION	MATERIAL	PART	DWG-NO/STANDARD	KG/PC.	REMARKS/ID-NO.
1	1	1	1	PIN ø19X100 WITH 8-SPLINT PIN	A2	6			
1	1	1	1	BRACKET FOR FIXED TERMINATION		5			NOTE 1
–	–	1	–	BACKSTAY ANCHOR		4			NOTE 2
1	1	1	1	SWIVEL JOINT		3			
2	2	2	2	LINK PLATE		2			
1	1	1	1	TERMINATION CLAMP FOR 1/2" WIRE		1			NOTE 7

WITHOUT BACKSTAY / ROUND POLE
WITHOUT BACKSTAY / RECTANGULAR MAST
WITH BACKSTAY / RECTANGULAR MAST

NOTES:

1. CHOICE OF BRACKET DEPENDS ON THE TYPE OF POLE
2. CHOICE OF BACKSTAY DEPENDS ON DETAIL DESIGN, IF NECESSARY
3. POLE ORIENTATION ACC: TO DETAIL DESIGN
4. MAXIMUM WORKING LOAD: FORCE C = 7048 LBF (31.35 KN)
5. ARRANGEMENT FOR ROUND POLE NOT SHOWN
6. TYPE A AND B FOR RECTANGULAR POLE; TYPE C FOR ROUND POLE
7. UNIVERSAL STRANDVISE TO CATALOG NUMBER 5204 FROM MACLEAN POWER SYSTEM. OR APPROVED EQUAL.
8. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

REV	DATE	BY	CHK	APP	DESCRIPTION
					01012024 EDITION

REV	DATE	BY	CHK	APP

PENINSULA CORRIDOR JOINT POWERS BOARD

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STANDARD DRAWINGS

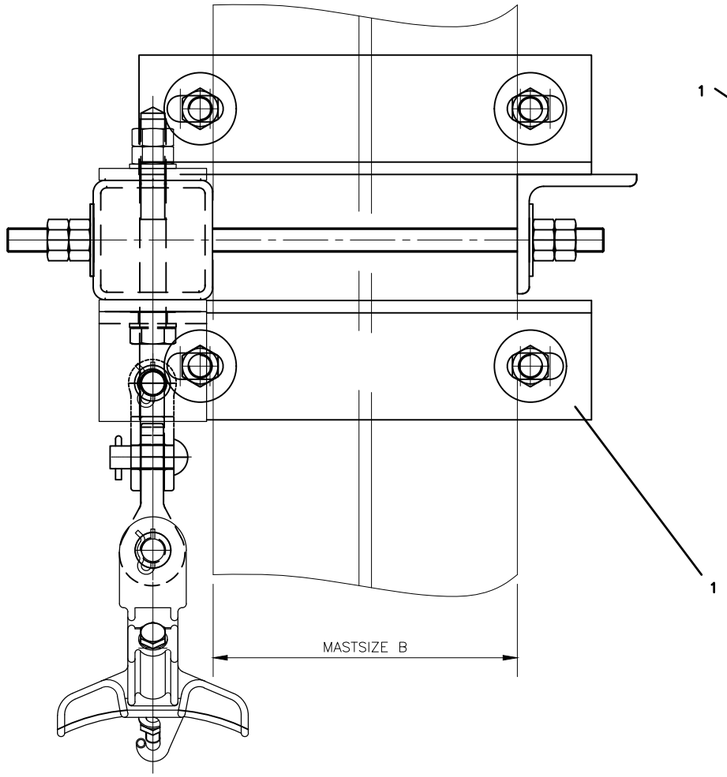
ELECTRIFICATION PROJECT OVERHEAD CONTACT SYSTEM TERMINATION FOR 1/2" CARRIER WIRE AT RECTANGULAR / ROUND POLE FOR INSULATED FEEDER CABLE FT-09

CADD FILE NAME: W6932

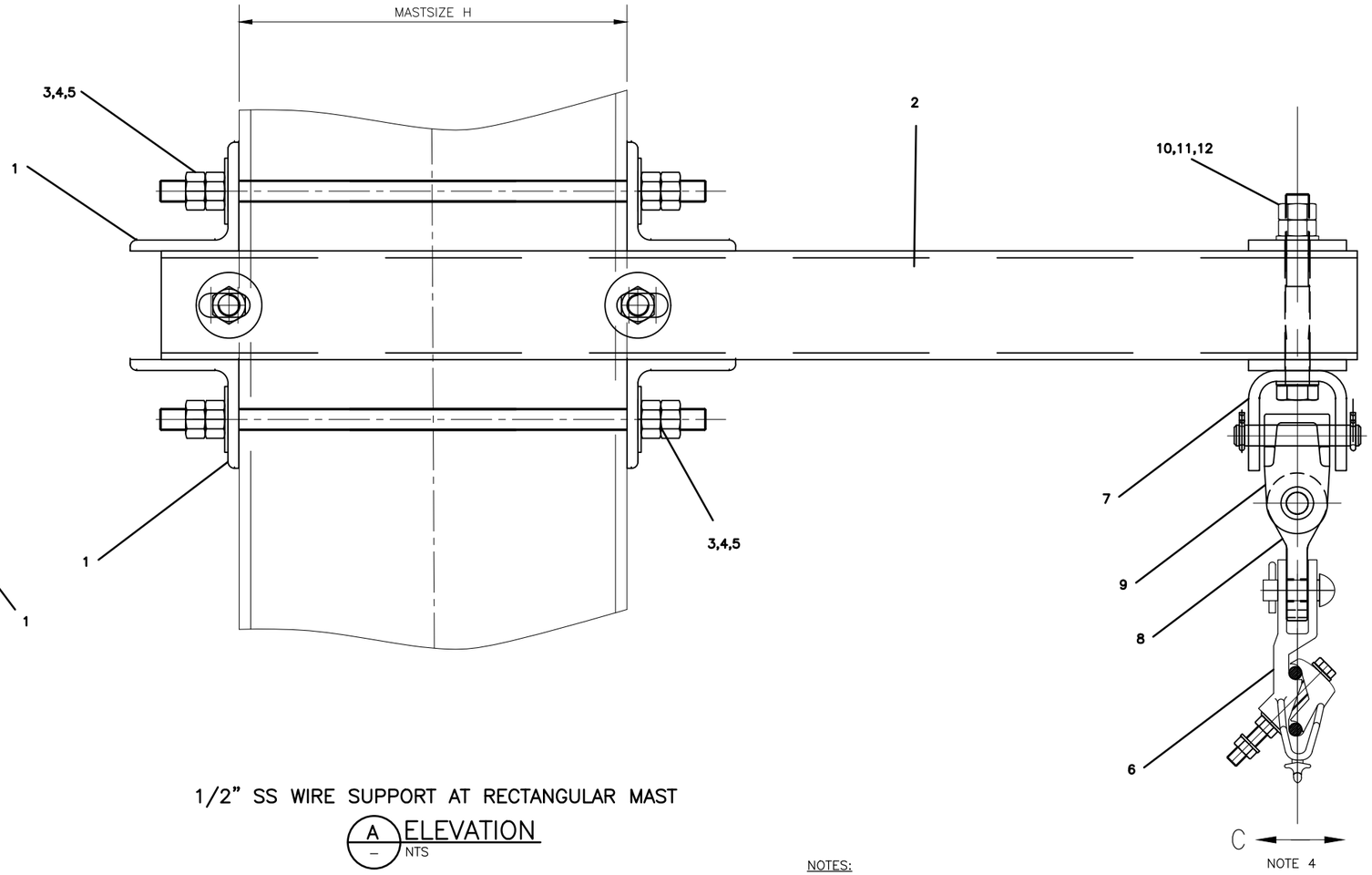
REV:

EDITION: 01012024

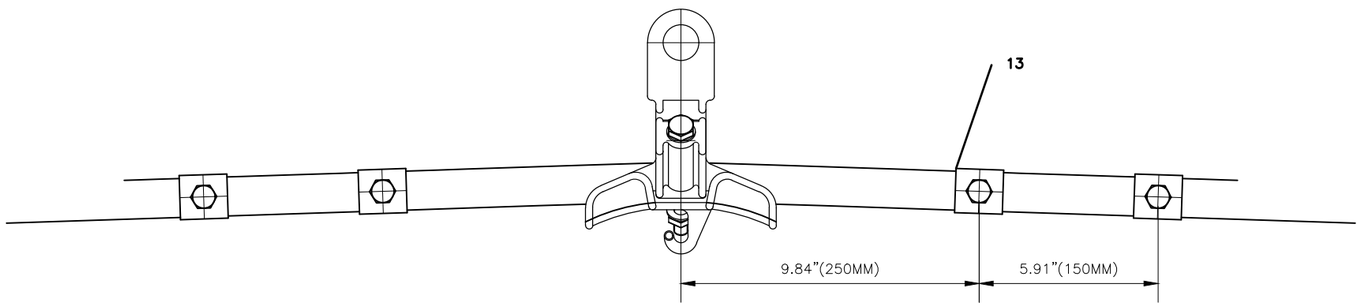
STANDARD DRAWING NO.: **W6932**



1/2" SS WIRE SUPPORT AT RECTANGULAR MAST
ELEVATION
NTS



1/2" SS WIRE SUPPORT AT RECTANGULAR MAST
A – ELEVATION
NTS



CLAMPING ARRANGEMENT OF 1/2" SS WIRE
ELEVATION
NTS

NOTES:

1. LENGTH DEPENDS ON MASTSIZE
2. COATING ACC. TO DIN EN ISO 10684–TZN–O
3. POLE ORIENTATION ACCORDING TO LAYOUT PLANS
4. MAXIMUM WORKING LOAD: FORCE C = 1,574 LBF (7.0 KN)
   FORCE C CAN OPERATE IN EVERY HORIZONTAL DIRECTION AND CAN BE A RESULT OUT OF DIFFERENT FORCES (e.g. RADIAL LOAD, WIND LOAD)
5. THE MAXIMUM FW OFFSET LIMIT WITHOUT STRUT TUBE IS 6.5' OFFSET
6. WHEREVER POSSIBLE USE HARDWARE OF IMPERIAL SYSTEM (ENGLISH UNITS)

FOR RECTANGULAR POLE							
B	A						
–	4	PARALLEL GROOVE CLAMP		13			
–	2	WASHER M22	200HV NOTE 2	12	DIN EN ISO 7089		
–	2	NUT M22	8 NOTE 2	11	DIN EN ISO 4032		
–	1	HEXAGON HEAD SCREW M22x175	8.8 NOTE 2	10	DIN EN ISO 4017		
–	1	SWIVEL JOINT		9			
–	1	TWISTED EYE–EYE CONNECTOR		8			
–	1	BRACKET FOR WIRE CLAMP		7			
–	1	SUPPORT CABLE CLAMP	G–AL	6			
–	6	STUD BOLT M20	8.8 NOTE 2	5	DIN 976–1		NOTE 1
–	24	NUT M20	8 NOTE 2	4	DIN EN ISO 4032		
–	12	WASHER FOR M20	200HV NOTE 2	3	DIN EN ISO 7093		
–	1	SUPPORTING STRUCTURE FOR POSTINSULATOR		2			NOTE 1
–	5	BACK ANGLE WITHOUT EARTHING		1			NOTE 1
PIECES		DESCRIPTION	MATERIAL	PART	DWG–NO/STANDARD	KG/PC.	REMARKS/ID–NO.

REV	DATE	BY	CHK	APP	DESCRIPTION
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REV	DATE	BY	CHK	APP

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STANDARD DRAWINGS

ELECTRIFICATION PROJECT
OVERHEAD CONTACT SYSTEM
1/2" CARRIER WIRE SUPPORT
TO SUPPORT INSULATED FEEDER CABLE
AT RECTANGLE MAST

CADD FILE NAME: W6933
REV: | EDITION: 01012024
STANDARD DRAWING NO.: **W6933**