

P:\2007\0218508-KLUTE, INC-FINAL MILLIGAN 3 SUBSTATION REDESIGN AND DETAILING\01 - FINAL PROJECT FOLDERS\07 DRAWINGS\01 - NOTES\M3-S001.DWG - James Gerstburger 9 July 2019 9:38:59 AM

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ABBREVIATIONS

AB	ANCHOR BOLTS
ADD'L	ADDITIONAL
AL	ALUMINUM
ALT	ALTERNATE
B/	BOTTOM OF
BC	BOLT CIRCLE
BLDG	BUILDING
BM	BEAM
BRG	BEARING
BOS	BOTTOM OF STEEL
BOT	BOTTOM
BS	BOTH SIDES
BTWN	BETWEEN
CA	CROSSARM
CJ	CONSTRUCTION/ CONTROL JOINT
CIP	CAST-IN-PLACE
CL	CENTER LINE
CLR	CLEAR
CONC	CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS
CT	CURRENT TRANSFORMER
DTL	DETAIL
DIM	DIMENSION
DWG	DRAWING
EA	EACH
EJ	EXPANSION JOINT
EL	ELEVATION
ENCL	ENCLOSURE
EOC	EDGE OF CONCRETE
EQ	EQUAL
EW	EACH WAY
EXIST	EXISTING
EXP	EXPANSION
FDN	FOUNDATION
FDR	FEEDER
FS	FAR SIDE
FTG	FOOTING
GALV	GALVANIZE
GEN	GENERAL
HORIZ	HORIZONTAL
HP	HIGH POINT ELEVATION
LEN	LENGTH
LAT	LATERAL
LLH	LONG LEG HORIZ
LLO	LONG LEG OUT
LLV	LONG LEG VERT
LONG	LONGITUDINAL
LP	LAP DISTANCE
MAX	MAXIMUM
MFR	MANUFACTURER
MIN	MINIMUM
MNT	MOUNT
NOM	NOMINAL
NS	NEAR SIDE
NTS	NOT TO SCALE
OC	ON CENTER
OSL	OUT STANDING LEG
OTO	OUT TO OUT DISTANCE
PL	PLATE
PT	POTENTIAL TRANSFORMER
RE	REFERENCE
REINF	REINFORCEMENT
REQ'D	REQUIRED
RET	RETAINING
SA	SURGE ARRESTER
SCH	SCHEDULE
SEC	SECTION
SHT	SHEET
SIM	SIMILAR
SLO	SHORT LEG OUT
SOG	SLAB ON GRADE
SPA	SPACING
SS	STAINLESS STEEL
STL	STEEL
SUPPL	SUPPLIER
T&B	TOP AND BOTTOM
T/	TOP OF
T/L	TRANSMISSION LINE
THK	THICK, THICKNESS
TOC	TOP OF CONCRETE
TOS	TOP OF STEEL
TRAN	TRANSVERSE
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VERT	VERTICAL
WT	WEIGHT

STRUCTURE INVENTORY

SHEET NO.	TYPE	STRUCTURE	NO.
M3-S100	115AFDE	115kV A-FRAME DEADEND	1
M3-S150	SM	STATIC MAST (55')	2
M3-S260	115V01	115kV CCVT STRUCTURE	1
M3-S290	115D1	115kV SWITCH STRUCTURE	1
MS-S350	34NGR	34.5kV NGR STRUCTURE	1
M3-S360	34D1	34.5kV HIGH BUS/ V-BREAK SWITCH STR	1
M3-S380	34CB	34.5kV DISTRIBUTION STR w/ TRUSS	1 LOT
M3-S390	34RS	34.5kV RISER STRUCTURE	3
M3-S400	AB-2	1" DIA x 3'-8" ANCHOR BOLTS	72
M3-S400	AB-4	1 1/2" DIA x 4'-6" ANCHOR BOLTS	8
M3-S400	AB-5	14J REBAR x 5'-10" ANCHOR BOLTS	16
M3-S402	OP1	SWITCH OPERATOR PLATFORM - 3'x6'	7

GENERAL STRUCTURAL NOTES

- ALL STEEL ASTM A36 (PLATES, BARS, ANGLES, CHANNELS, STRUCTURAL TEES, MISCELLANEOUS STEEL, ETC) UNO.
- USE ASTM A500 GRADE B FOR ROUND, SQUARE AND RECTANGULAR HSS, UNO.
- USE ASTM A53 GRADE B FOR PIPE, UNO.
- USE ASTM A992 FOR ROLLED AND W SECTIONS, UNO.
- USE ASTM F1554 GRADE 55 FOR ALL CAST-IN-PLACE ANCHOR BOLTS, UNO. GALVANIZE PER ASTM A153.
- ALL STRUCTURAL STEEL SHALL BE GALVANIZED PER ASTM A123 AND ALL HARDWARE PER ASTM A153.
- START AND STOP WELDS AT CENTER-LINE OF TUBES.
- ALL WELDS $\frac{1}{4}$ " FILLET WELDS ALL AROUND, UNO.
- ASSEMBLY BOLTS SHALL BE $\frac{5}{8}$ " DIAMETER ASTM A325 WITH HEAVY HEX NUTS AND MF LOCKNUTS, UNO. BOLT HOLES SHALL BE OVERSIZED $\frac{1}{16}$ " UNO.
- THE OPEN END OF TUBULAR SECTIONS NOT COVERED BY A CONNECTION PLATE SHALL BE FINISHED WITH TACK-WELDED EXPANDED STEEL MESH.

RELEASE FOR
FABRICATION

9-Jul-18

KLUTE, INC.
YORK, NE

MILLIGAN 3 SUBSTATION
GENERAL STRUCTURAL NOTES

No	Date	Drawn	Designed	Checked	Revisions		
					Proj. No.	218-429	218-508
0	06/23/2017	JEG	JEG	KLUTE	ORIGINAL RELEASE		
1	05/31/2018	JEG	JEG	KLUTE	REVISED FOR UPDATED CLIENT DRAWINGS		
2	07/09/2018	JEG	JEG	KLUTE	REVISED FOR AFW COMMENTS, REMOVED NOTE 11.		
3							
4							
5							
6							
7							

APPROVED BY:

DKD

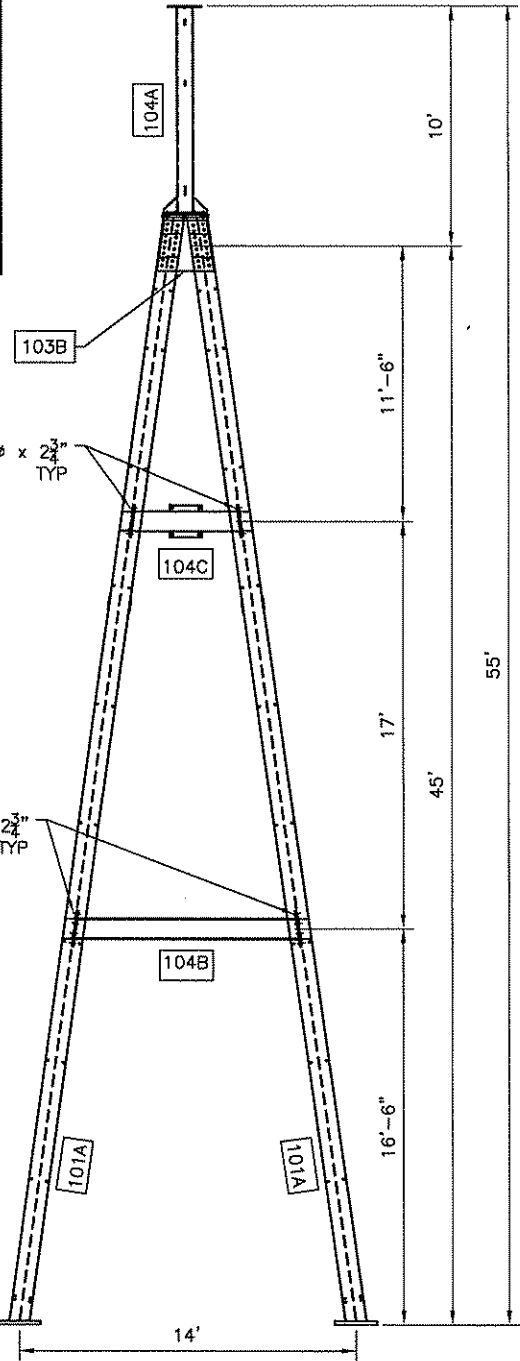


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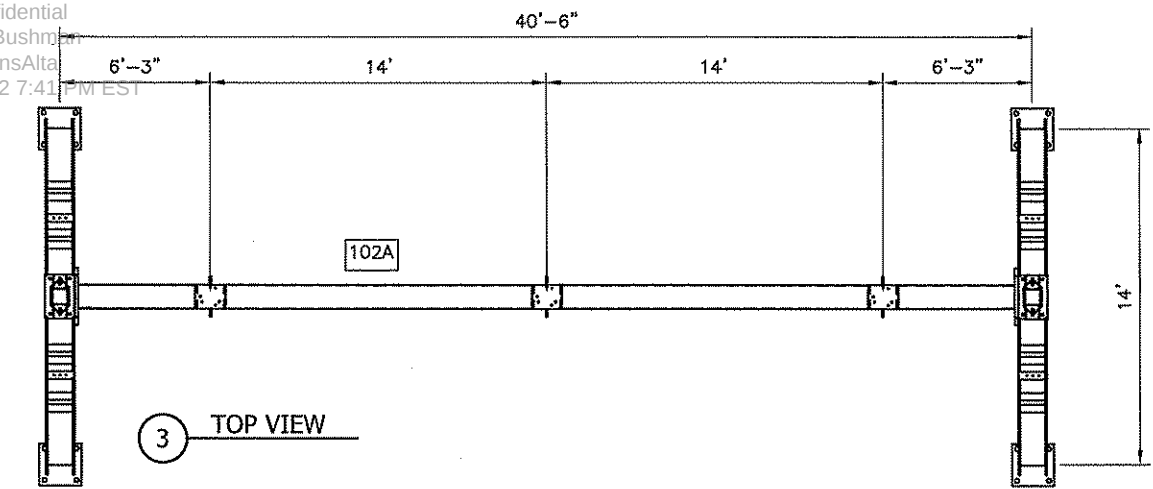
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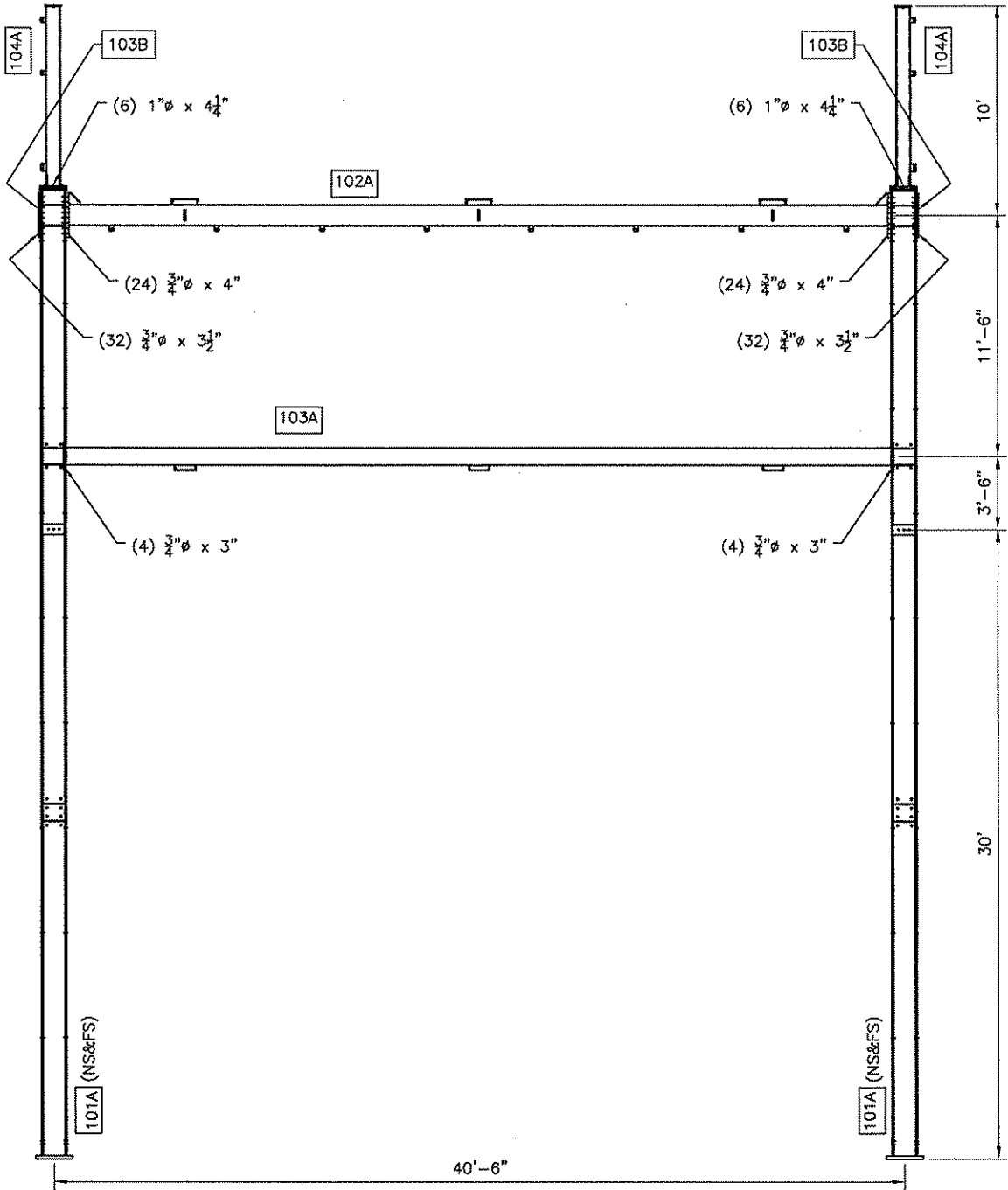
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QTY	ITEM	DESCRIPTION	LENGTH		MATERIAL	WEIGHT EA	EXT WEIGHT
			FT	IN		LBS	LBS
4	101A	LEG				3796.1	15184.4
1	102A	BEAM				2733.6	2733.6
1	103A	BEAM				1436.5	1436.5
2	103B	PLATE				210.5	421.1
2	104A	COLUMN				482.8	965.6
2	104B	BRACE				326.7	653.5
2	104C	BRACE				276.6	553.3
		STEEL SUBTOTAL					21948
48	HARDWARE	3/4"-10	0	2-3/4	A325	0.69	33.1
8		3/4"-10	0	3	A325	0.72	5.8
64		3/4"-10	0	3-1/2	A325	0.78	49.9
48		3/4"-10	0	4	A325	0.84	
168		3/4"-10 HEX NUT			HVY		
168		3/4" CIRCULAR WASHERS			HARDENED		
168		3/4"-10 LOCK NUT			MF		
12		1"-8	0	4-1/4	A325	1.69	20.3
12		1"-8 HEX NUT			HVY		
12		1" CIRCULAR WASHERS			HARDENED		
12		1"-8 LOCK NUT			MF		
		HARDWARE SUBTOTAL					109.1
		TOTAL BLACK WEIGHT					22058
		+3.5% GALVANIZING					772.0
		UNIT TOTAL					22831
		TOTAL ONE (1) REQ'D					22831



2 END VIEW



3 TOP VIEW



1 FRONT VIEW

115kV A-FRAME DEADEND STRUCTURE (115AFDE)

- GENERAL NOTES:
- FOR DETAIL DRAWINGS SEE SHEETS S101-S104.
 - ALL STEEL ASTM A36 (PLATES, BARS, ANGLES, CHANNELS, STRUCTURAL TEES, MISCELLANEOUS STEEL, ETC), UNO.
 - USE ASTM A500 GRADE B FOR ROUND, SQUARE AND RECTANGULAR HSS, UNO.
 - USE ASTM A53 GRADE B FOR PIPE, UNO.
 - USE ASTM A992 FOR ROLLED AND W SECTIONS, UNO.
 - ALL STRUCTURAL STEEL SHALL BE GALVANIZED PER ASTM A123 AND ALL HARDWARE PER ASTM A153.
 - START AND STOP WELDS AT CENTER-LINE OF TUBES.
 - ALL WELDS 1/4" FILLET WELDS ALL AROUND, UNO.
 - ASSEMBLY BOLTS SHALL BE 3/8" DIAMETER ASTM A325 WITH HEAVY HEX NUTS AND MF LOCKNUTS, UNO.
 - BOLT HOLES SHALL BE OVERSIZED 1/16" UNO.
 - THE OPEN END OF TUBULAR SECTIONS NOT COVERED BY A CONNECTION PLATE SHALL BE FINISHED WITH TACK-WELDED EXPANDED STEEL MESH.

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10-Jul-18

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YORK, NE

MILLIGAN 3 SUBSTATION
115KV A-FRAME DEADEND STRUCTURE (115AFDE)

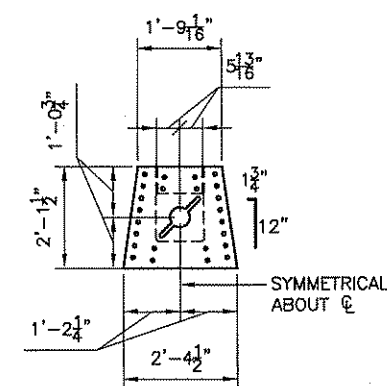
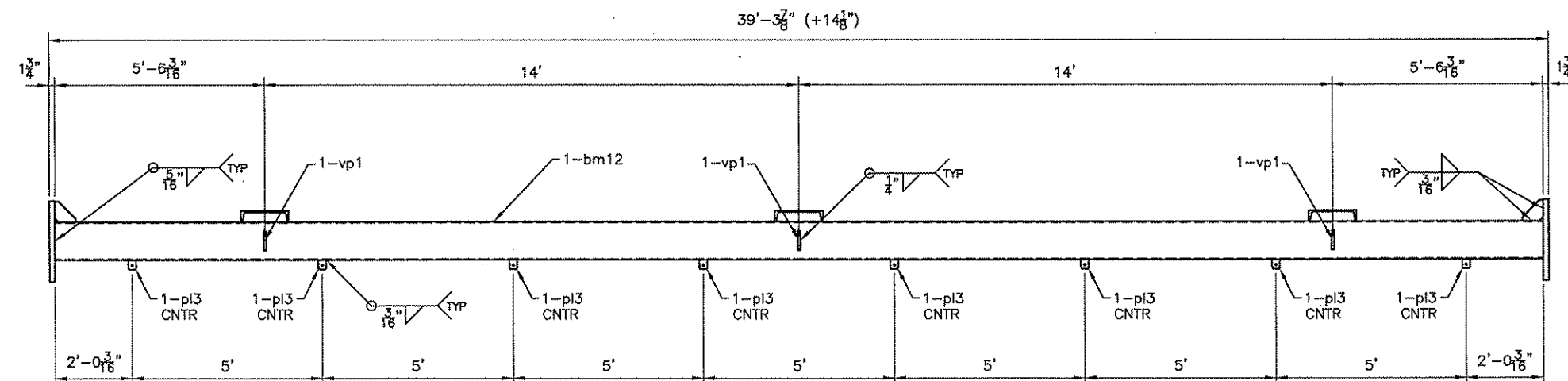
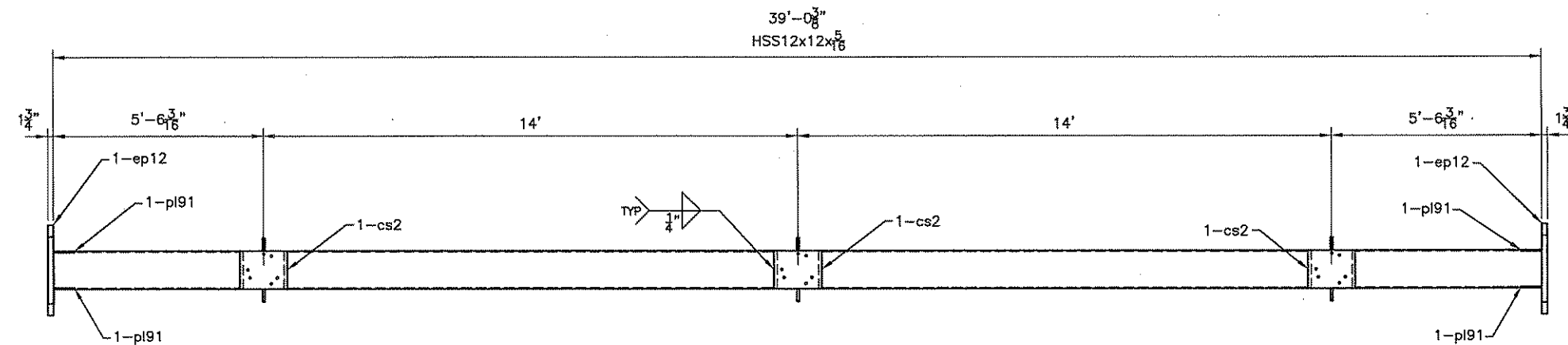
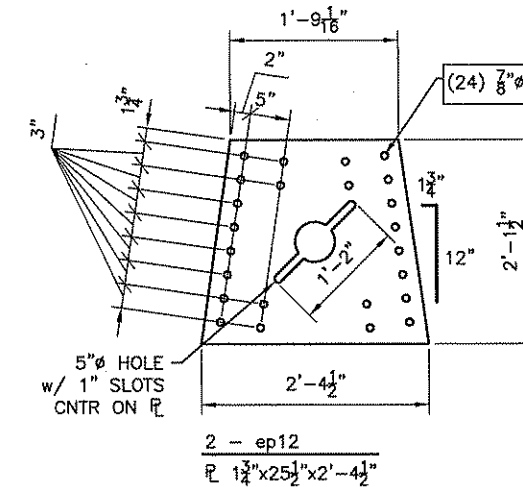
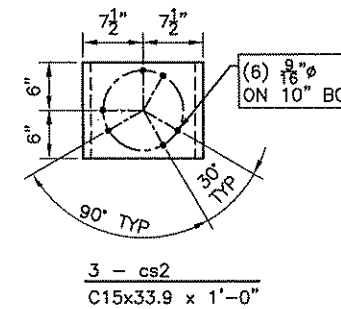
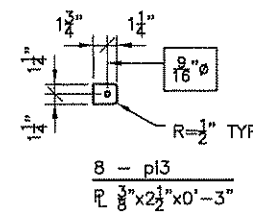
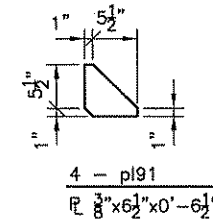
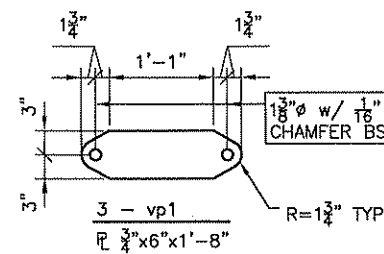
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M3-S100

BILL OF MATERIALS						
ITEM	QTY	DESCRIPTION	LENGTH		MATERIAL	WEIGHT LBS
			FT	IN		
102A		BEAM				
bm12	1	HSS12x12x5/16	39	3/8	A500 GR B	1907.1
ep12	2	PL 1-3/4"x25-1/2"	2	4-1/2	A572 GR 50	627.2
cs2	3	C15x33.9	1	0	A36	101.7
vp1	3	PL 3/4"x6"	1	8	A36	76.6
pl3	8	PL 3/8"x2-1/2"	0	3	A36	6.4
pl91	4	PL 3/8"x6-1/2"	0	6-1/2	A36	14.8
		SUBTOTAL				2733.6
MAKE 1 TIME						

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A BEAM 102A

GENERAL NOTES:
1. SEE ERECTION DRAWING, BOM SUMMARY
AND GENERAL NOTES SHEET S100.

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RELEASE FOR
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9-Jul-18

KLUTE, INC.
YORK, NE

MILLIGAN 3 SUBSTATION
115kV A-FRAME DEADEND STRUCTURE (115AFDE)

No	Date	Drawn	Designed	Checked	Revisions	Proj. No.
0	08/01/2017	JEG	DKD	KLUTE	ORIGINAL RELEASE	216-429
1			<i>356</i>			
2						
3						
4						
5						
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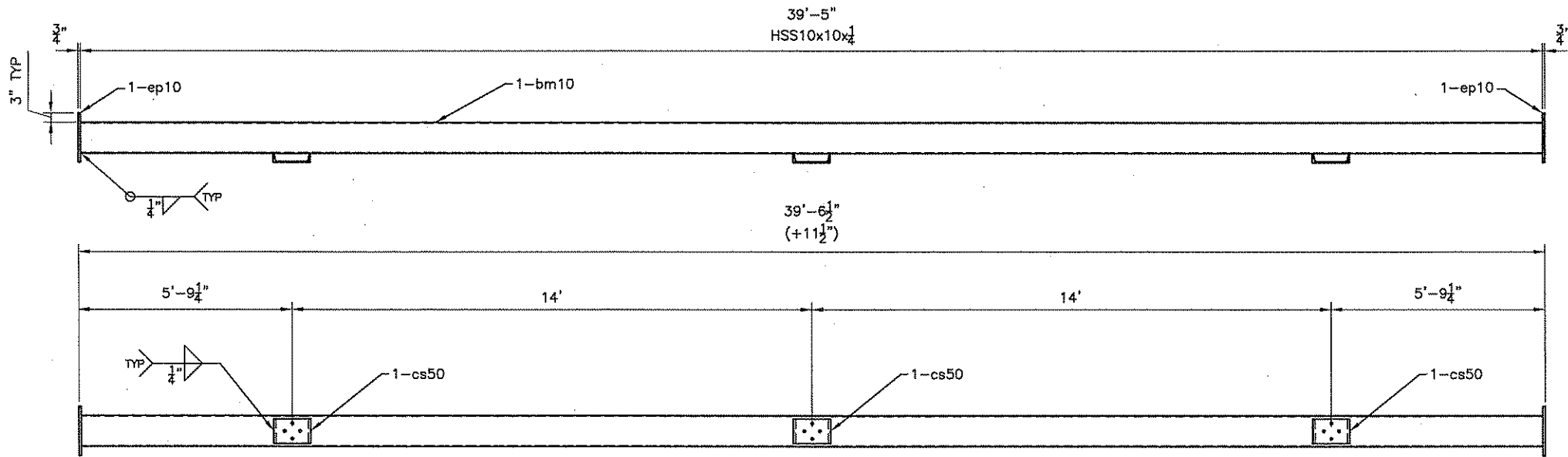
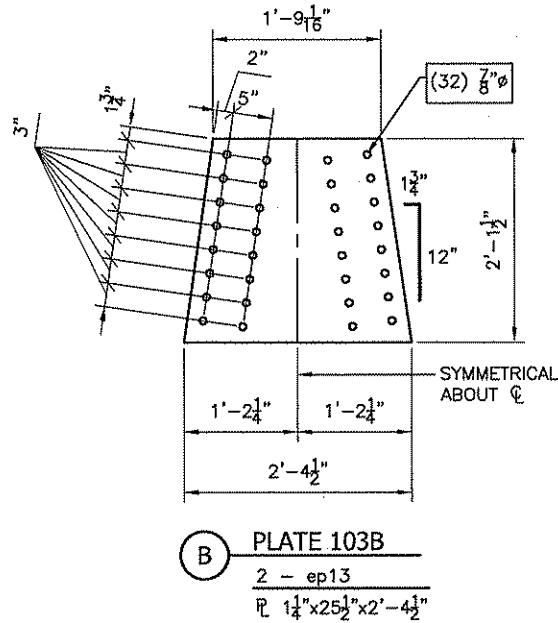
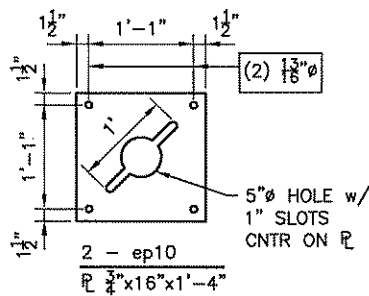
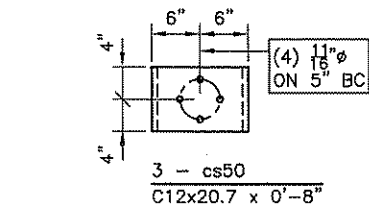
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M3-S102

BILL OF MATERIALS						
ITEM	QTY	DESCRIPTION	LENGTH		MATERIAL	WEIGHT LBS
			FT	IN		
103A	1	BEAM				
bm10	1	HSS10x10x1/4	39	5	A500 GR B	1286.2
ep10	2	PL 3/4"x16"	1	4	A36	108.9
cs50	3	C12x20.7	0	8	A36	41.4
		SUBTOTAL				1436.5
103B	2	PL 1-1/4"x25-1/2"	2	4-1/2	A572 GR 50	421.1
MAKE 1 TIME						

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A BEAM 103A

GENERAL NOTES:
1. SEE ERECTION DRAWING, BOM SUMMARY
AND GENERAL NOTES SHEET S100.

RELEASE FOR
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9-Jul-18

KLUTE, INC. YORK, NE		MILLIGAN 3 SUBSTATION 115KV A-FRAME DEADEND STRUCTURE (115AFDE)		Proj. No.	
				216-429	
				Revisions	
				ORIGINAL RELEASE	
No.	Date	Drawn	Designed	Checked	
0	08/01/2017	JEG	DKD	KLUTE	
1					
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DKD *[Signature]*

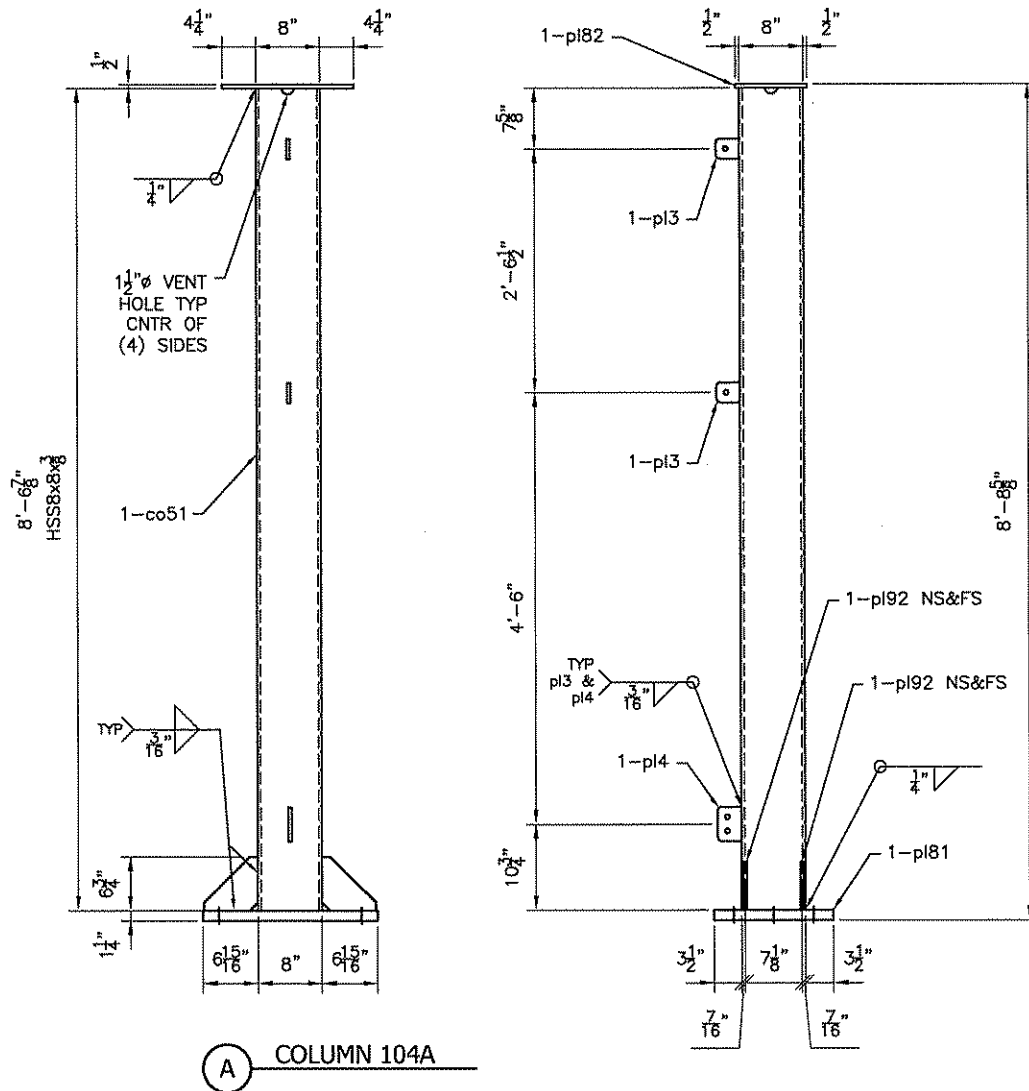
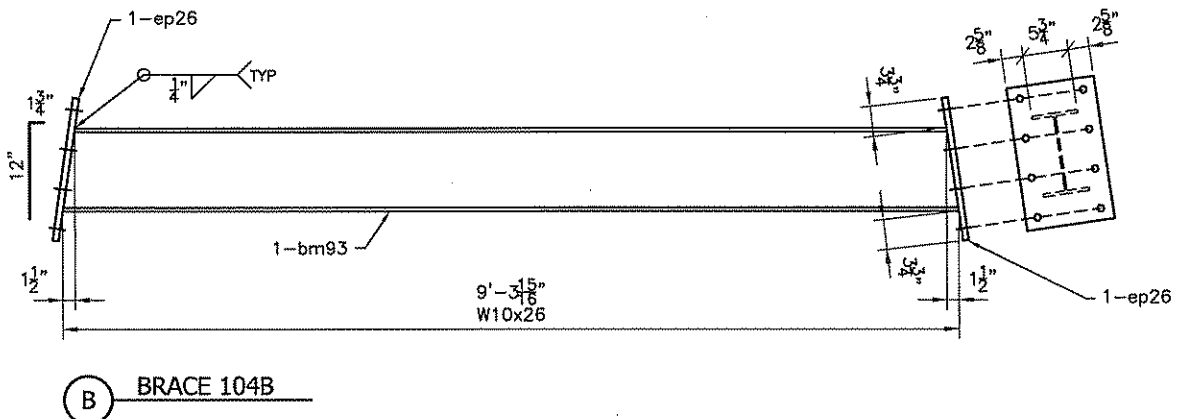
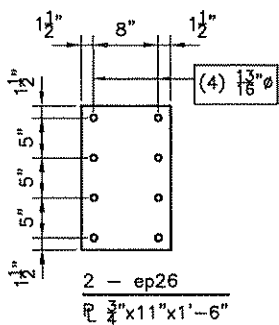
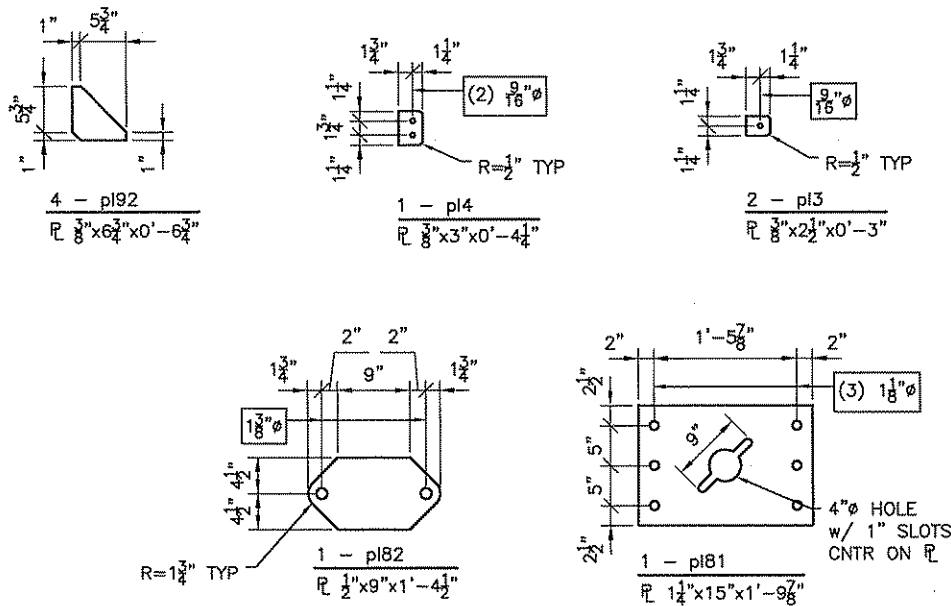
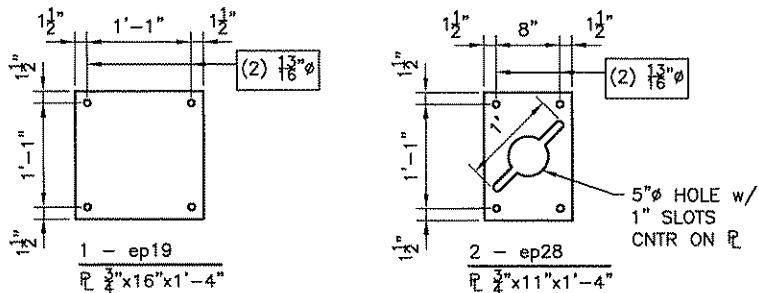
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M3-S103

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BILL OF MATERIALS						
ITEM	QTY	DESCRIPTION	LENGTH		MATERIAL	WEIGHT LBS
			FT	IN		
104A		COLUMN				
co51	1	HSS8x8x3/8	8	6-7/8	A500 GR B	323.1
pl81	1	PL 1-1/4"x15"	1	9-7/8	A572 GR 50	116.3
pl82	1	PL 1/2"x9"	1	4-1/2	A36	21.1
pl92	4	PL 3/8"x6-3/4"	0	6-3/4	A36	19.4
pl3	2	PL 3/8"x2-1/2"	0	3	A36	1.6
pl4	1	PL 3/8"x3"	0	4-1/4	A36	1.4
		SUBTOTAL				482.8
104B		BRACE				
bm93	1	W10x26	9	3-15/16	A992	242.5
ep26	2	PL 3/4"x11"	1	6	A36	84.2
		SUBTOTAL				326.7
104C		BRACE				
bm14	1	HSS10x10x1/4	4	6-3/16	A500 GR B	147.3
ep28	2	PL 3/4"x11"	1	4	A36	74.9
ep19	1	PL 3/4"x16"	1	4	A36	54.4
		SUBTOTAL				276.6
MAKE 2 TIMES						

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GENERAL NOTES:
1. SEE ERECTION DRAWING, BOM SUMMARY
AND GENERAL NOTES SHEET S100.

RELEASE FOR
FABRICATION
10-Jul-18

KLUTE, INC. YORK, NE	MILLIGAN 3 SUBSTATION 115KV A-FRAME DEADEND STRUCTURE (115AFDE)	Proj. No.		Revisions	
		216-429		ORIGINAL RELEASE	
No	Date	Drawn	Designed	Checked	Revised
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APPROVED BY:
DKD

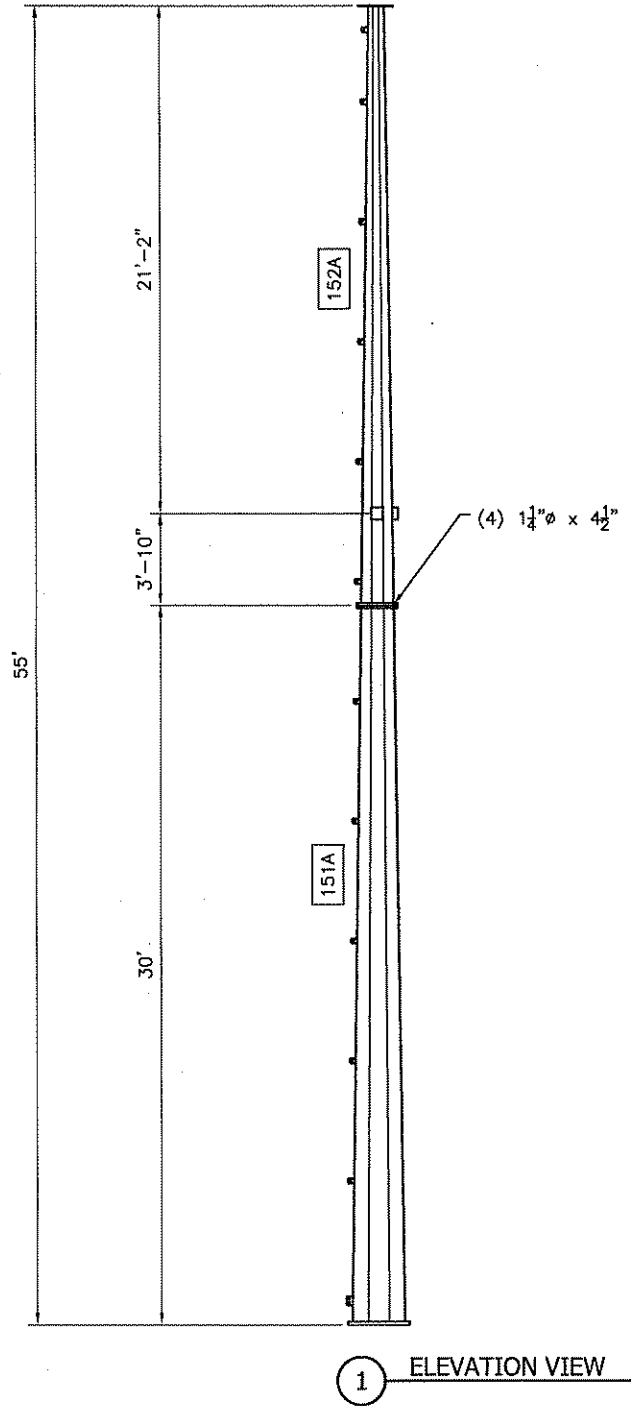
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BILL OF MATERIALS SUMMARY							
QTY	ITEM	DESCRIPTION	LENGTH		MATERIAL	WEIGHT EA	EXT WEIGHT
			FT	IN		LBS	LBS
2	151A	SECTION				1810.3	3620.6
2	152A	SECTION				808.5	1617.1
		STEEL SUBTOTAL					5238
8	HARDWARE	1-1/4" - 6	0	4-1/2	A325	3.10	24.8
8		1-1/4" - 6 HEX NUT			HVY		
8		1-1/4" CIRCULAR WASHERS			HARDENED		
8		1-1/4" - 6 LOCK NUT			MF		
		HARDWARE SUBTOTAL					24.8
		TOTAL BLACK WEIGHT					5263
		+3.5% GALVANIZING					184.2
UNIT TOTAL							2724
TOTAL TWO (2) REQ'D							5448



- GENERAL NOTES:
- FOR DETAIL DRAWINGS SEE SHEETS S151-S152.
 - ALL STEEL ASTM A36 (PLATES, BARS, ANGLES, CHANNELS, STRUCTURAL TEES, MISCELLANEOUS STEEL, ETC), UNO.
 - USE ASTM A500 GRADE B FOR ROUND, SQUARE AND RECTANGULAR HSS, UNO.
 - USE ASTM A53 GRADE B FOR PIPE, UNO.
 - USE ASTM A992 FOR ROLLED AND W SECTIONS, UNO.
 - USE ASTM A572 GRADE 50 FOR BENT PLATE STRUCTURES.
 - ALL STRUCTURAL STEEL SHALL BE GALVANIZED PER ASTM A123 AND ALL HARDWARE PER ASTM A153.
 - START AND STOP WELDS AT CENTER-LINE OF TUBES.
 - ALL WELDS 1/4" FILLET WELDS ALL AROUND, UNO.
 - ASSEMBLY BOLTS SHALL BE 3/8" DIAMETER ASTM A325 WITH HEAVY HEX NUTS AND MF LOCKNUTS, UNO.
 - BOLT HOLES SHALL BE OVERSIZED 1/16" UNO.

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STATIC MAST STRUCTURE (SM)
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RELEASE FOR
FABRICATION
9-Jul-18

KLUTE, INC.
YORK, NE

MILLIGAN 3 SUBSTATION
STATIC MAST STRUCTURE (SM)

No	Date	Drawn	Designed	Checked	Revisions	
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0	06/23/2017	JEG	JEG	KLUTE	218-429	ORIGINAL RELEASE
1						
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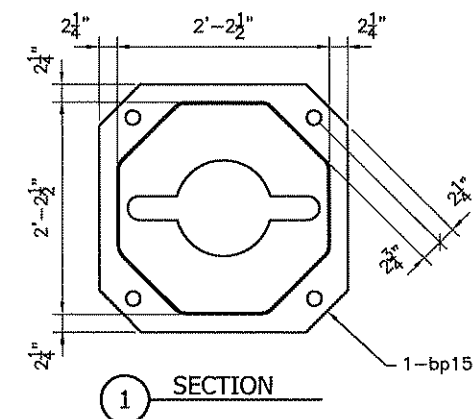
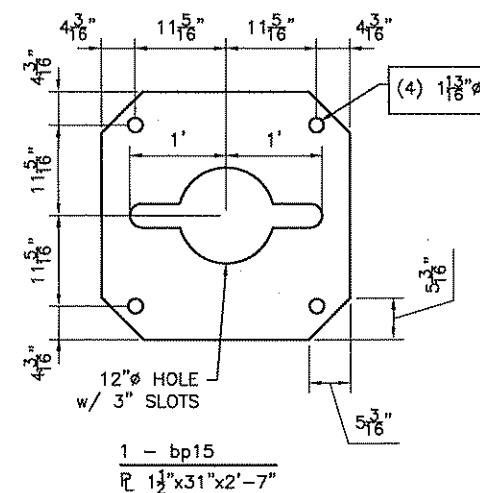
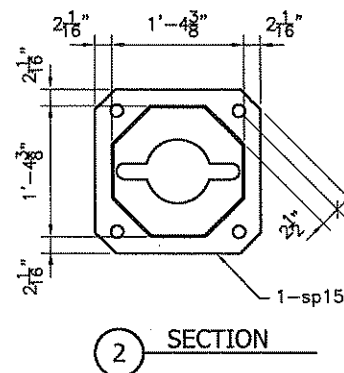
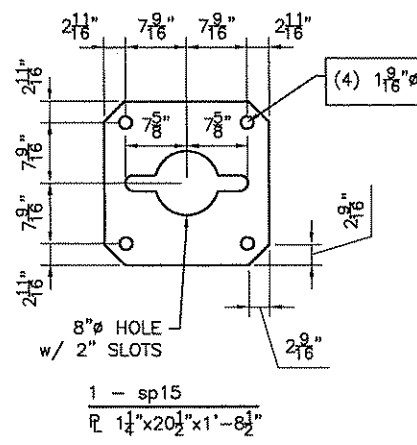
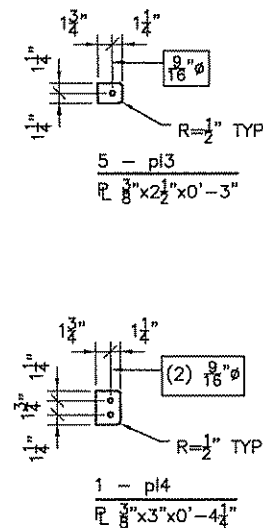
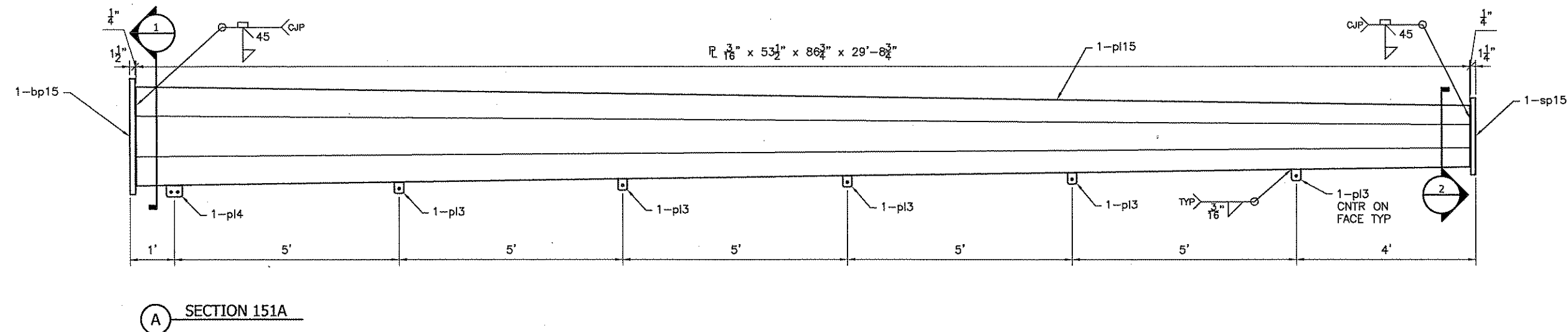
M3-S150

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BILL OF MATERIALS						
ITEM	QTY	DESCRIPTION	LENGTH		MATERIAL	WEIGHT LBS
			FT	IN		
151A		SECTION				
pl15	1	PL 3/16" x 53-1/2" x 86-3/4"	29	8-3/4	A572 GR 50	1330.1
bp15	1	PL 1-1/2"x31"	2	7	A572 GR 50	347.5
sp15	1	PL 1-1/4"x20-1/2"	1	8-1/2	A572 GR 50	127.3
pl4	1	PL 3/8"x3"	0	4-1/4	A36	1.4
pl3	5	PL 3/8"x2-1/2"	0	3	A36	4.0
		SUBTOTAL				1810.3
MAKE 2 TIMES						

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Troy Bushman
TransAlta
Feb 01, 2022 7:41 PM EST

RELEASE FOR
FABRICATION
9-Jul-18



SHEET NOTES:
1. SEE ERECTION DRAWING,
BOM SUMMARY AND GENERAL
NOTES SHEET S150.

Revisions		Proj. No.
1	ORIGINAL RELEASE	216-429
2		
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KLUTE, INC.
YORK, NE

MILLIGAN 3 SUBSTATION
STATIC MAST STRUCTURE (SM)

APPROVED BY:
DKD

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Engineering
FORT COLLINS COLORADO
(970) 224-9100 ESC@THINKESC.COM

M3-S151

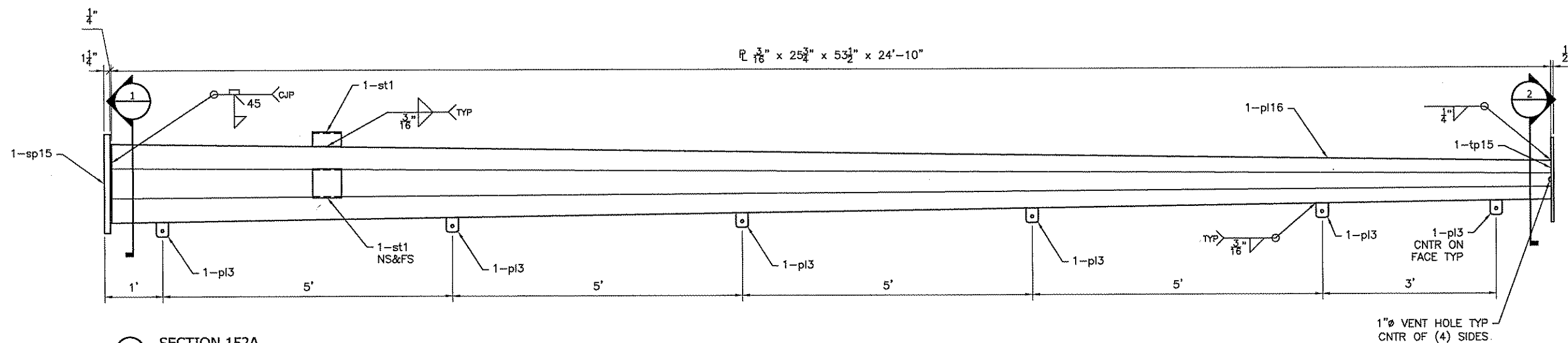
confidential
Troy Bushman
TransAlta
Feb 01, 2022 7:41 PM EST

P:\2007\51218\608-KLUTE, INC-FINAL MILLIGAN 3 SUBSTATION REDESIGN AND DETAILING\01 - FINAL PROJECT FOLDERS\07 DRAWINGS\160 - SM\3-S152.DWG James Gerslberger 9 July 2018 9:35:36 AM

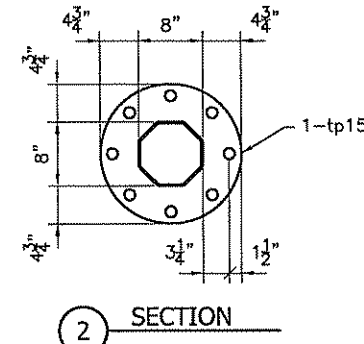
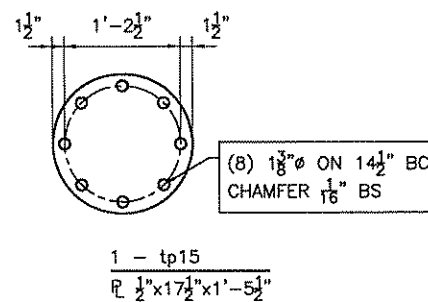
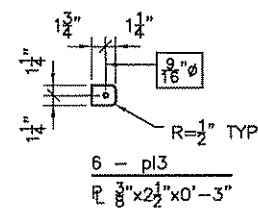
BILL OF MATERIALS						
ITEM	QTY	DESCRIPTION	LENGTH		MATERIAL	WEIGHT LBS
			FT	IN		
152A		SECTION				
pl16	1	PL 3/16" x 25-3/4" x 53-1/2"	24	10	A572 GR 50	627.8
sp15	1	PL 1-1/4"x20-1/2"	1	8-1/2	A572 GR 50	127.3
tp15	1	PL 1/2"x17-1/2"	1	5-1/2	A36	34.3
st1	3	HSS6x6x1/4	0	6	A500 GR B	14.3
pl3	6	PL 3/8"x2-1/2"	0	3	A36	4.8
		SUBTOTAL				808.5
MAKE 2 TIMES						

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TransAlta
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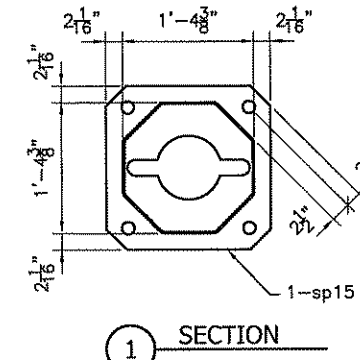
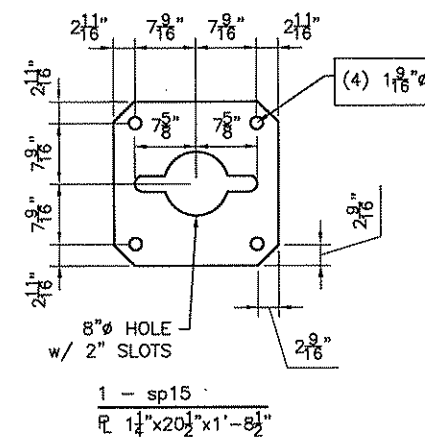
RELEASE FOR
FABRICATION
9-Jul-18



A SECTION 152A



2 SECTION



1 SECTION

SHEET NOTES:
1. SEE ERECTION DRAWING,
BOM SUMMARY AND GENERAL
NOTES SHEET S150.

No	Date	Drawn	Designed	Checked	Revisions	
					Proj. No.	218-429
1	06/23/2017	JEG	JEG	KLUTE	ORIGINAL RELEASE	
2						
3						
4						
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APPROVED BY:
DKD

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engineering
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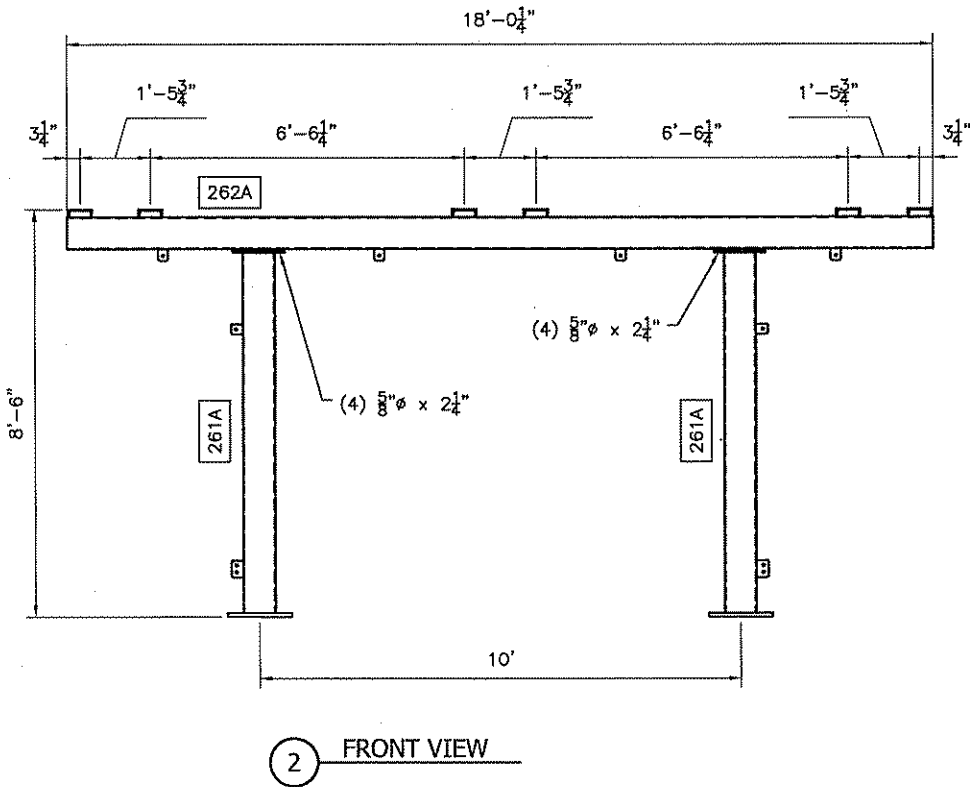
M3-S152

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Troy Bushman
TransAlta
Feb 01, 2022 7:41 PM EST

BILL OF MATERIALS SUMMARY							
QTY	ITEM	DESCRIPTION	LENGTH		MATERIAL	WEIGHT EA	EXT WEIGHT
			FT	IN		LBS	LBS
2	261A	COLUMN				291.9	583.8
1	262A	BEAM				601.1	601.1
		STEEL SUBTOTAL					1185
8	HARDWARE	5/8"-11	0	2-1/4	A325	0.41	3.3
8		5/8"-11 HEX NUT			HVY		
8		5/8" CIRCULAR WASHERS			HARDENED		
8		5/8"-11 LOCK NUT			MF		
		HARDWARE SUBTOTAL					3.3
		TOTAL BLACK WEIGHT					1189
		+3.5% GALVANIZING					41.6
UNIT TOTAL							1231
TOTAL ONE (1) REQ'D							1231

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RELEASE FOR
FABRICATION
9-Jul-18



- GENERAL NOTES:
- FOR DETAIL DRAWINGS SEE SHEETS S261-S262.
 - ALL STEEL ASTM A36 (PLATES, BARS, ANGLES, CHANNELS, STRUCTURAL TEES, MISCELLANEOUS STEEL, ETC), UNO.
 - USE ASTM A500 GRADE B FOR ROUND, SQUARE AND RECTANGULAR HSS, UNO.
 - USE ASTM A53 GRADE B FOR PIPE, UNO.
 - USE ASTM A992 FOR ROLLED AND W SECTIONS, UNO.
 - ALL STRUCTURAL STEEL SHALL BE GALVANIZED PER ASTM A123 AND ALL HARDWARE PER ASTM A153.
 - START AND STOP WELDS AT CENTER-LINE OF TUBES.
 - ALL WELDS 1/4" FILLET WELDS ALL AROUND, UNO.
 - ASSEMBLY BOLTS SHALL BE 5/8" DIAMETER ASTM A325 WITH HEAVY HEX NUTS AND MF LOCKNUTS, UNO.
 - BOLT HOLES SHALL BE OVERSIZED 1/16" UNO.
 - THE OPEN END OF TUBULAR SECTIONS NOT COVERED BY A CONNECTION PLATE SHALL BE FINISHED WITH TACK-WELDED EXPANDED STEEL MESH.

No	Date	Drawn	Designed	Checked	Revisions		Proj. No.
					ORIGINAL RELEASE		
0	06/23/2017	JEG	DKD	KLUTE			216-429
1							
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DKD



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M3-S260

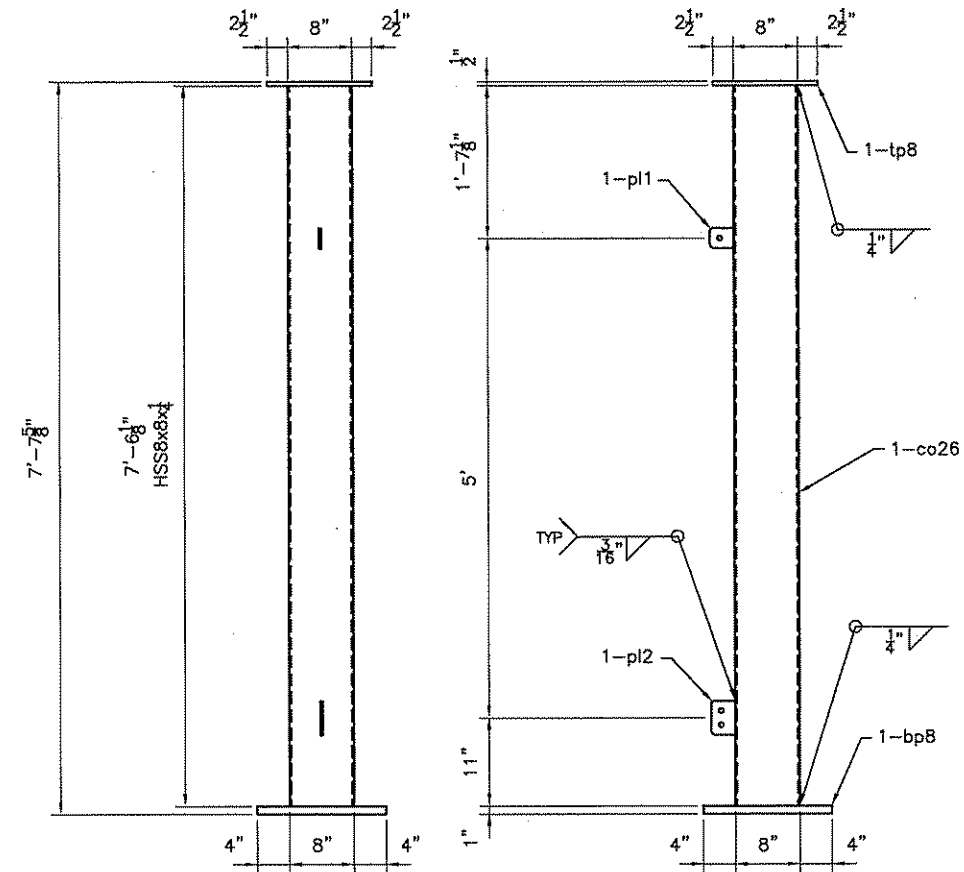
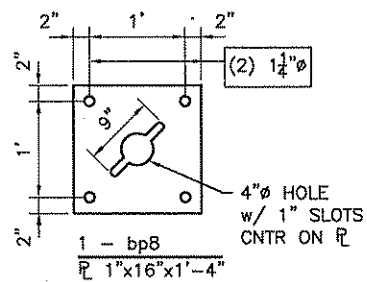
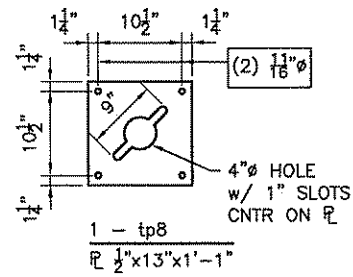
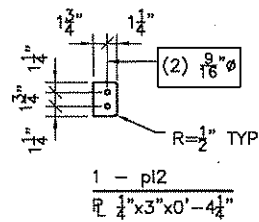
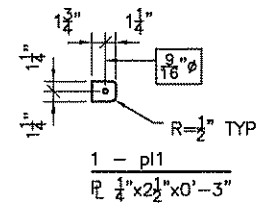
confidential
Troy Bushman
TransAlta
Feb 01, 2022 7:41 PM EST

P:\200\S218508-KLUTE, INC-FINAL MILLIGAN 3 SUBSTATION REDESIGN AND DETAILING\01 - FINAL PROJECT FOLDERS\07 DRAWINGS\S260 - 115KV\115V01\115V01-S261.DWG - James Gerslberger 9 July 2018 9:42:48 AM

BILL OF MATERIALS						
ITEM	QTY	DESCRIPTION	LENGTH		MATERIAL	WEIGHT LBS
			FT	IN		
261A		COLUMN				
co26	1	HSS8x8x1/4	7	6-1/8	A500 GR B	193.9
bp8	1	PL 1"x16"	1	4	A572 GR 50	72.6
tp8	1	PL 1/2"x13"	1	1	A36	24.0
pl1	1	PL 1/4"x2-1/2"	0	3	A36	0.5
pl2	1	PL 1/4"x3"	0	4-1/4	A36	0.9
		SUBTOTAL				291.9
MAKE 2 TIMES						

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RELEASE FOR
FABRICATION
9-Jul-18



A COLUMN 261A

SHEET NOTES:
1. SEE ERECTION DRAWING,
BOM SUMMARY AND GENERAL
NOTES SHEET S260.

Revisions		Proj. No.
1	ORIGINAL RELEASE	218-229
2		
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APPROVED BY:
DKD

ESC
engineering
FORT COLLINS COLORADO
(970) 224-8100 ESC@THINKESC.COM

M3-S261

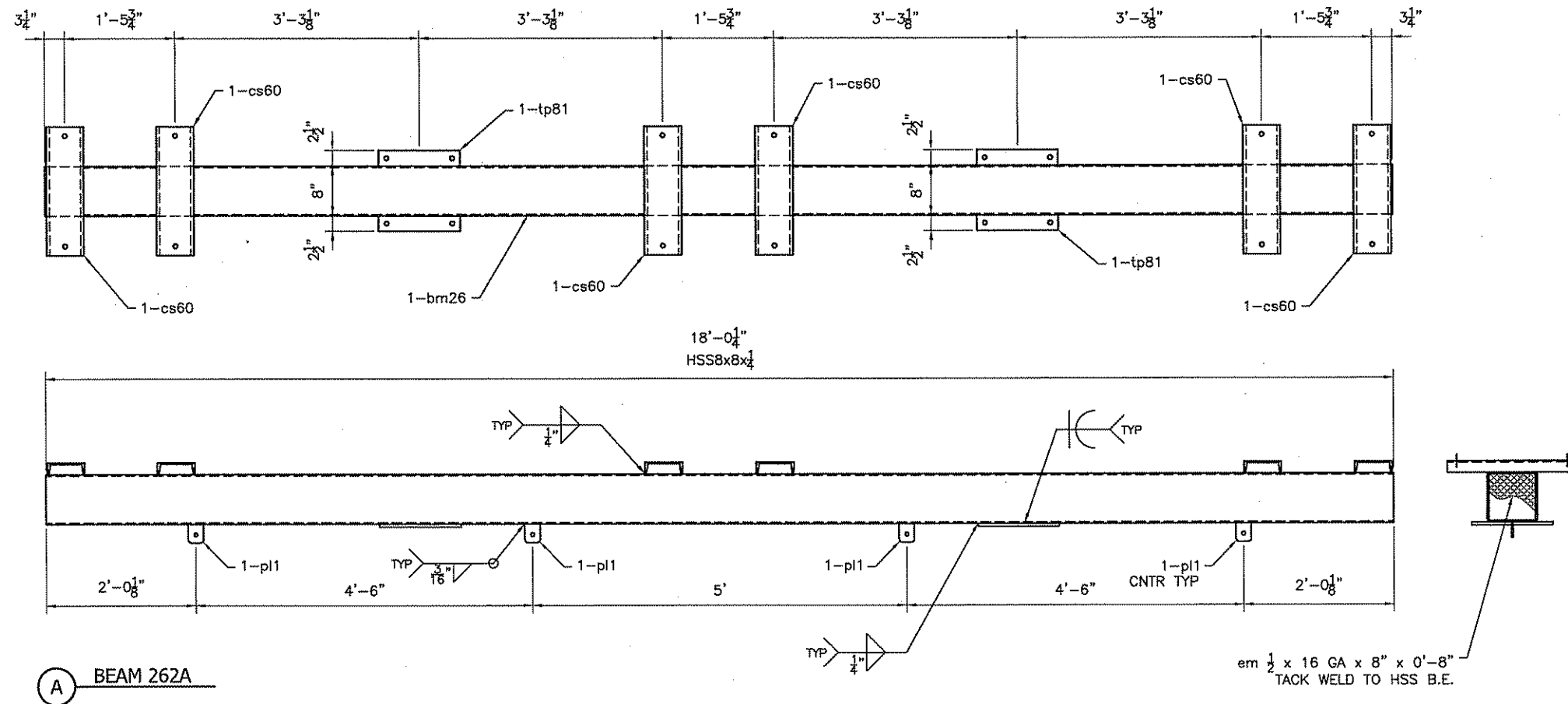
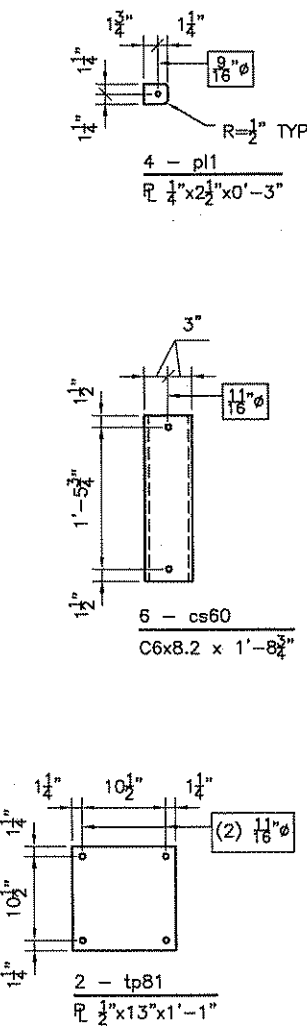
confidential
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Feb 01, 2022 7:41 PM EST

P:\2005\218698-KLUTE, INC-FINAL MILLIGAN 3 SUBSTATION REDESIGN AND DETAILING\01 - FINAL PROJECT FOLDERS\07 DRAWINGS\S260 - 115V01\M3-S262.DWG James Gerschberger 9 July 2018 9:42:54 AM

BILL OF MATERIALS						
ITEM	QTY	DESCRIPTION	LENGTH		MATERIAL	WEIGHT LBS
			FT	IN		
262A		BEAM				
bm26	1	HSS8x8x1/4	18	1/4	A500 GR B	465.3
tp81	2	PL 1/2"x13"	1	1	A36	47.9
cs60	6	C6x8.2	1	8-3/4	A36	85.1
pl1	4	PL 1/4"x2-1/2"	0	3	A36	2.1
em	2	1/2 x 16 GA x 8"	0	8	EXP MTL	0.66
		SUBTOTAL				601.1
MAKE 1 TIME						

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RELEASE FOR
FABRICATION
9-Jul-18



A BEAM 262A

SHEET NOTES:
1. SEE ERECTION DRAWING,
BOM SUMMARY AND GENERAL
NOTES SHEET S260.

Revisions		Proj. No.
No.	Date	218-429
0	06/23/2017	JEG
1		
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APPROVED BY:
DKD *att*

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(970) 224-9100 ESC@THINKESCO.COM

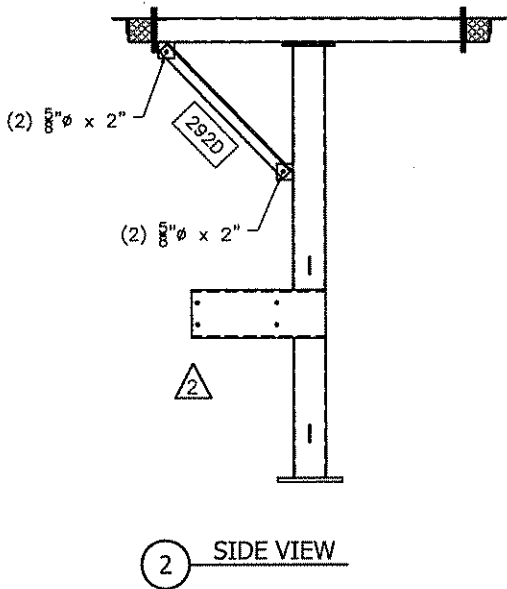
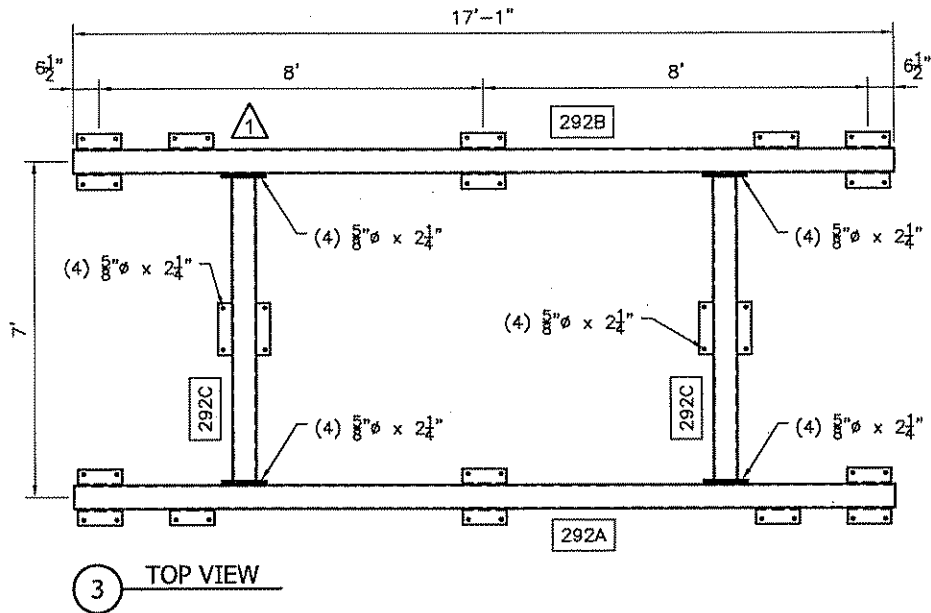
M3-S262

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Troy Bushman
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Feb 01, 2022 7:41 PM EST

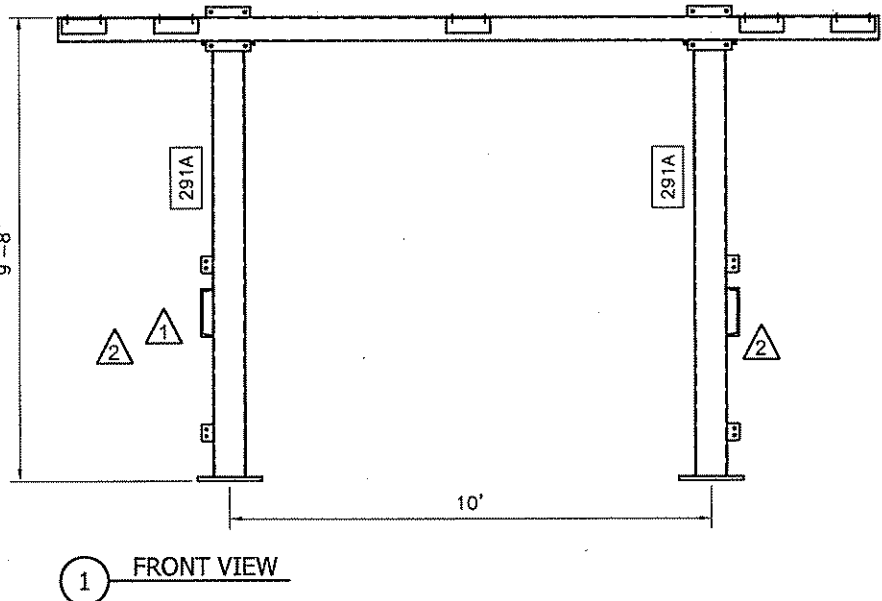
BILL OF MATERIALS SUMMARY						
QTY	ITEM	DESCRIPTION	LENGTH		MATERIAL	WEIGHT EA LBS
			FT	IN		
1	291A	COLUMN				390.0
1	292A	BEAM				431.5
1	292B	BEAM				431.5
2	292C	BEAM				181.0
2	292D	BRACE				22.5
		STEEL SUBTOTAL				1660
4	HARDWARE	5/8"-11	0	2	A325	0.38
24		5/8"-11	0	2-1/4	A325	0.40
28		5/8"-11 HEX NUT			HVY	
28		5/8" CIRCULAR WASHERS			HARDENED	
28		5/8"-11 LOCK NUT			MF	
		HARDWARE SUBTOTAL				11.1
		TOTAL BLACK WEIGHT				1672
		+3.5% GALVANIZING				58.5
		UNIT TOTAL				1731
		TOTAL ONE (1) REQ'D				1731

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Feb 01, 2022 7:41 PM EST

RELEASE FOR
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9-Jul-18



- GENERAL NOTES:
1. FOR DETAIL DRAWINGS SEE SHEETS S291-S292.
 2. ALL STEEL ASTM A36 (PLATES, BARS, ANGLES, CHANNELS, STRUCTURAL TEES, MISCELLANEOUS STEEL, ETC), UNO.
 3. USE ASTM A500 GRADE B FOR ROUND, SQUARE AND RECTANGULAR HSS, UNO.
 4. USE ASTM A53 GRADE B FOR PIPE, UNO.
 5. USE ASTM A992 FOR ROLLED AND W SECTIONS, UNO.
 6. ALL STRUCTURAL STEEL SHALL BE GALVANIZED PER ASTM A123 AND ALL HARDWARE PER ASTM A153.
 7. START AND STOP WELDS AT CENTER-LINE OF TUBES.
 8. ALL WELDS 1/4" FILLET WELDS ALL AROUND, UNO.
 9. ASSEMBLY BOLTS SHALL BE 5/8" DIAMETER ASTM A325 WITH HEAVY HEX NUTS AND MF LOCKNUTS, UNO.
 10. BOLT HOLES SHALL BE OVERSIZED 1/8" UNO.
 11. THE OPEN END OF TUBULAR SECTIONS NOT COVERED BY A CONNECTION PLATE SHALL BE FINISHED WITH TACK-WELDED EXPANDED STEEL MESH.



115kV SWITCH STRUCTURE (115D1)

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Feb 01, 2022 7:41 PM EST

KLUTE, INC.
YORK, NE

MILLIGAN 3 SUBSTATION
115kV SWITCH STRUCTURE (115D1)

APPROVED BY:
DKD

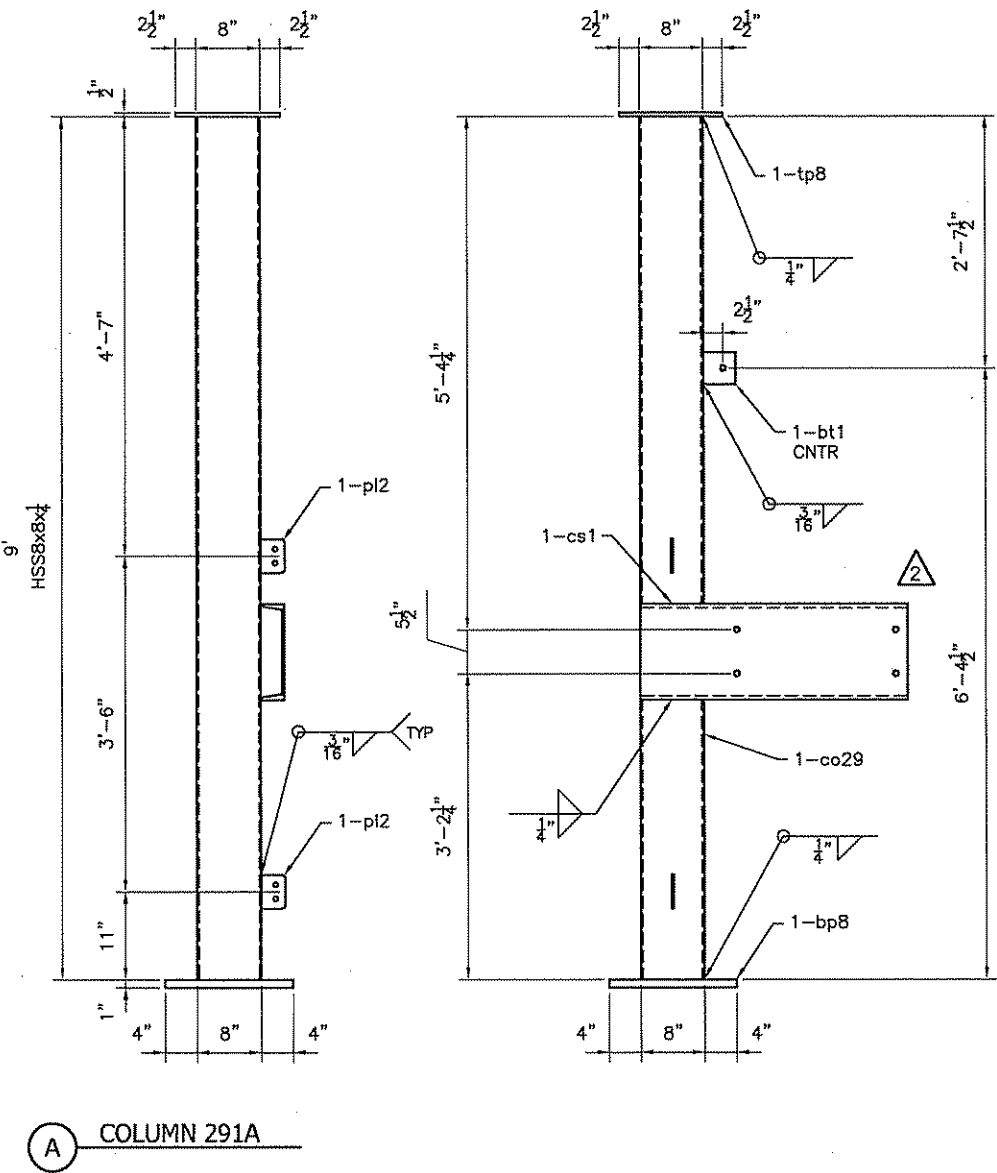
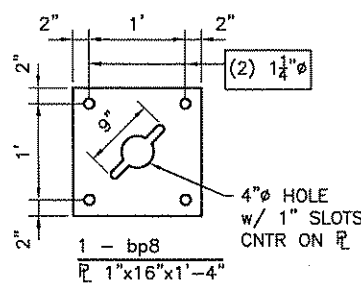
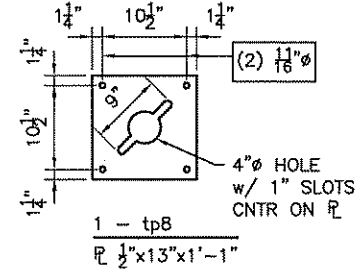
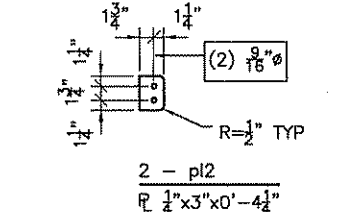
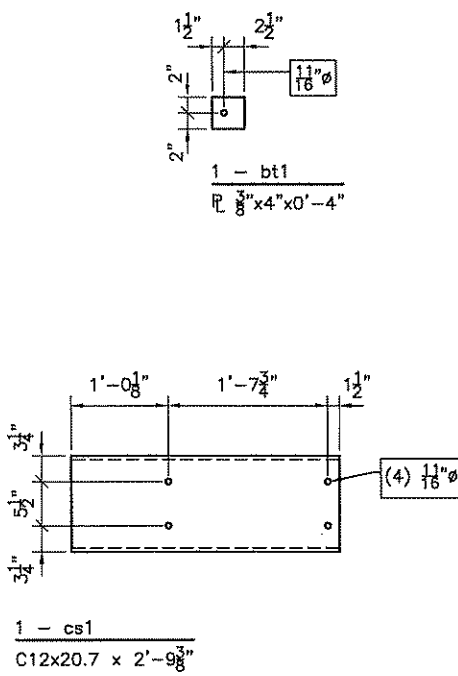
ESC
engineering
FORT COLLINS COLORADO
(970) 224-9100 ESC@THINKESC.COM

M3-S290

BILL OF MATERIALS						
ITEM	QTY	DESCRIPTION	LENGTH		MATERIAL	WEIGHT LBS
			FT	IN		
291A		COLUMN				
co29	1	HSS8x8x1/4	9	0	A500 GR B	232.4
bp8	1	PL 1"x16"	1	4	A572 GR 50	72.6
tp8	1	PL 1/2"x13"	1	1	A36	24.0
pl2	2	PL 1/4"x3"	0	4-1/4	A36	1.8
bt1	1	PL 3/8"x4"	0	4	A36	1.7
cs1	1	C12x20.7	2	9-3/8	A36	57.6
		SUBTOTAL				390.0
MAKE 2 TIMES						

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Feb 01, 2022 7:41 PM EST

RELEASE FOR
FABRICATION
9-Jul-18



SHEET NOTES:
1. SEE ERECTION DRAWING,
BOM SUMMARY AND GENERAL
NOTES SHEET S290.

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Feb 01, 2022 7:41 PM EST

Revisions		Proj. No.
0	ORIGINAL RELEASE	218-429
1	REVISED FOR UPDATED CLIENT DRAWINGS	218-508
2	REVISED FOR AEW COMMENTS, UPDATED SW. OP. MNT.	218-508
3		
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KLUTE, INC.
YORK, NE

MILLIGAN 3 SUBSTATION
115KV SWITCH STRUCTURE (115D1)

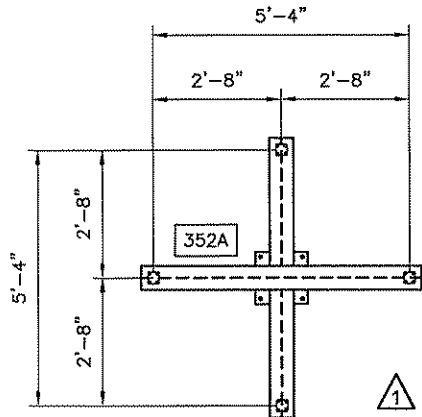
APPROVED BY:
DKD

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engineering
FORT COLLINS COLORADO
(970) 224-9100 ESC@THINKESC.COM

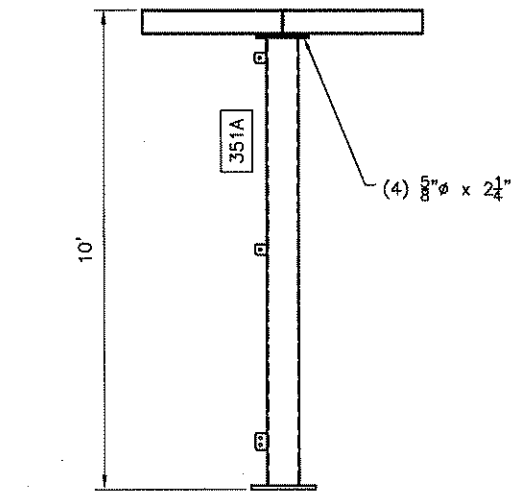
M3-S291

P:\200\S\218508-KLUTE, INC-FINAL MILLIGAN 3 SUBSTATION REDESIGN AND DETAILING\01 - FINAL PROJECT FOLDERS\07 DRAWINGS\S350 - 34NGR\M3-S350.DWG James Gersbarger 10 July 2018 9:25:48 AM

BILL OF MATERIALS SUMMARY							
QTY	ITEM	DESCRIPTION	LENGTH		MATERIAL	WEIGHT EA	EXT WEIGHT
			FT	IN		LBS	LBS
1	351A	COLUMN				339.5	339.5
1	352A	BEAM				198.6	198.6
		STEEL SUBTOTAL					538
4	HARDWARE	5/8"-11	0	2-1/4	A325	0.40	1.6
4		5/8"-11 HEX NUT			HVY		
4		5/8" CIRCULAR WASHERS			HARDENED		
4		5/8"-11 LOCK NUT			MF		
		HARDWARE SUBTOTAL					1.6
		TOTAL BLACK WEIGHT					540
		+3.5% GALVANIZING					18.9
UNIT TOTAL							559
TOTAL ONE (1) REQ'D							559



2 TOP VIEW



1 FRONT VIEW

34.5kV NGR STRUCTURE (34NGR)

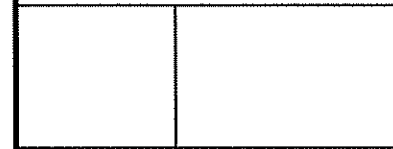
confidential
Troy Bushman
TransAlta
Feb 01, 2022 7:41 PM EST

- GENERAL NOTES:
- FOR DETAIL DRAWINGS SEE SHEETS S351-S352.
 - ALL STEEL ASTM A36 (PLATES, BARS, ANGLES, CHANNELS, STRUCTURAL TEES, MISCELLANEOUS STEEL, ETC), UNO.
 - USE ASTM A500 GRADE B FOR ROUND, SQUARE AND RECTANGULAR HSS, UNO.
 - USE ASTM A53 GRADE B FOR PIPE, UNO.
 - USE ASTM A992 FOR ROLLED AND W SECTIONS, UNO.
 - ALL STRUCTURAL STEEL SHALL BE GALVANIZED PER ASTM A123 AND ALL HARDWARE PER ASTM A153.
 - START AND STOP WELDS AT CENTER-LINE OF TUBES.
 - ALL WELDS 1/4" FILLET WELDS ALL AROUND, UNO.
 - ASSEMBLY BOLTS SHALL BE 5/8" DIAMETER ASTM A325 WITH HEAVY HEX NUTS AND MF LOCKNUTS, UNO.
 - BOLT HOLES SHALL BE OVERSIZED 1/16" UNO.
 - THE OPEN END OF TUBULAR SECTIONS NOT COVERED BY A CONNECTION PLATE SHALL BE FINISHED WITH TACK-WELDED EXPANDED STEEL MESH.

RELEASE FOR
FABRICATION
10-Jul-18

No	Date	Drawn	Designed	Checked	Revisions	
					Proj. No.	
0	06/04/2018	JEG	JEG	KLUTE	218-508	ORIGINAL RELEASE
1	07/09/2018	JEG	JEG	KLUTE	218-508	REVISED FOR AFW COMMENTS
2						
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APPROVED BY:
DKD



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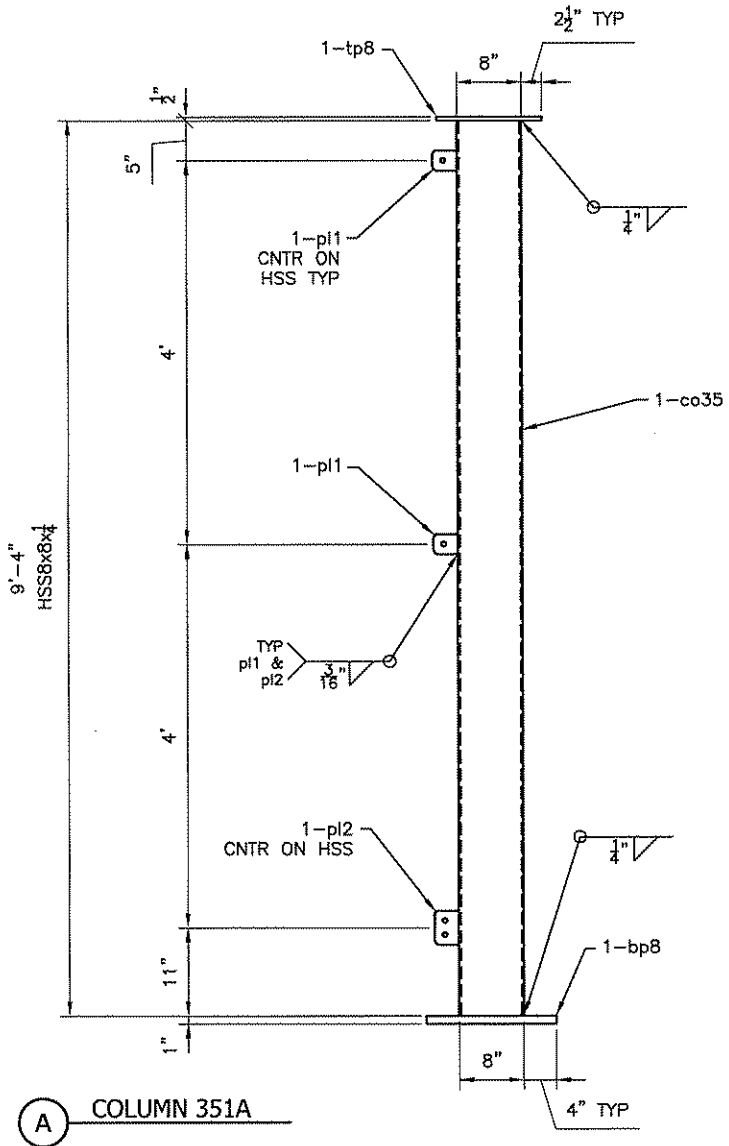
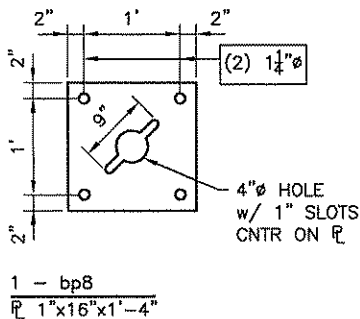
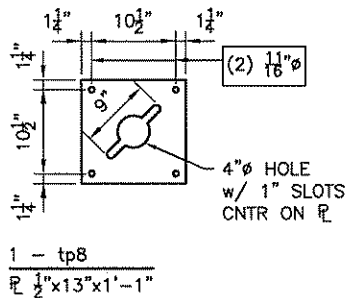
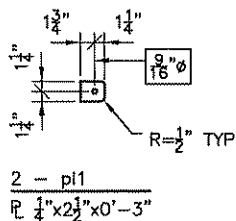
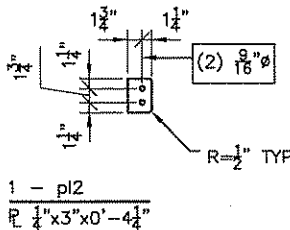
M3-S350

P:\200\S21808-KLUTE, INC-FINAL MILLIGAN 3 SUBSTATION REDESIGN AND DETAILING01 - FINAL PROJECT FOLDERS\07 DRAWINGS\350 - 34NGRM3-S351.DWG - James Gersberger 10 July 2018 9:25:54 AM

BILL OF MATERIALS						
ITEM	QTY	DESCRIPTION	LENGTH		MATERIAL	WEIGHT LBS
			FT	IN		
351A		COLUMN				
co35	1	HSS8x8x1/4	9	4	A500 GR B	241.0
bp8	1	PL 1"x16"	1	4	A572 GR 50	72.6
tp8	1	PL 1/2"x13"	1	1	A36	24.0
pl1	2	PL 1/4"x2-1/2"	0	3	A36	1.1
pl2	1	PL 1/4"x3"	0	4-1/4	A36	0.9
		SUBTOTAL				339.5
MAKE 1 TIME						

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Feb 01, 2022 7:41 PM EST

RELEASE FOR
FABRICATION
9-Jul-18



SHEET NOTES:
1. SEE ERECTION DRAWING,
BOM SUMMARY AND GENERAL
NOTES SHEET S350.

Revisions		Proj. No.
1	ORIGINAL RELEASE	218-508
2		
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APPROVED BY:
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(970) 224-9100 ESC@THINKESC.COM

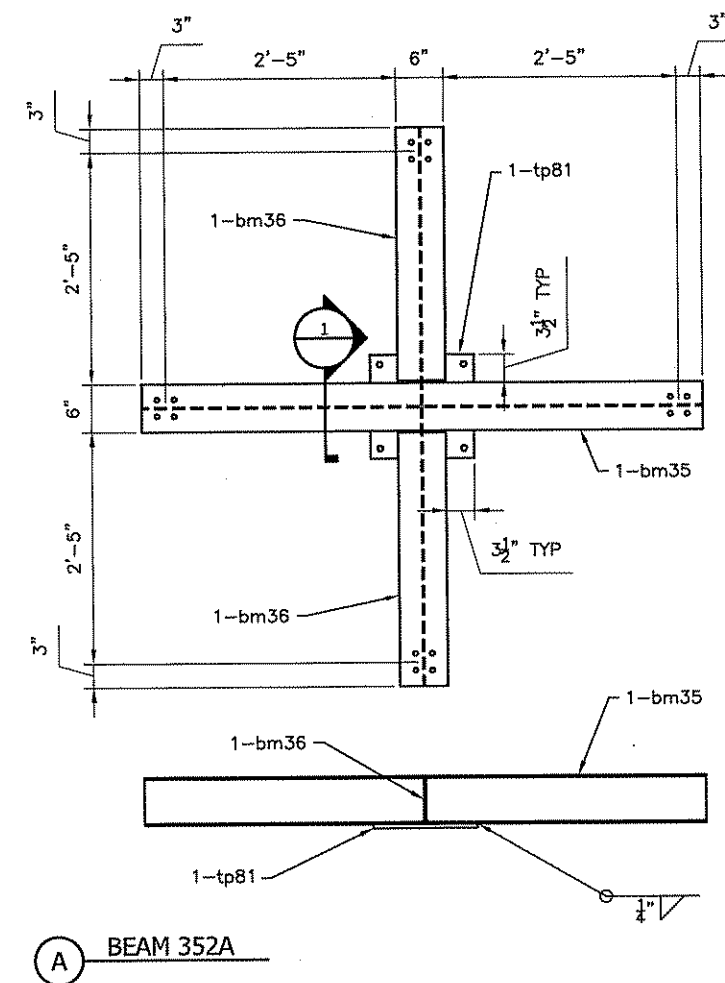
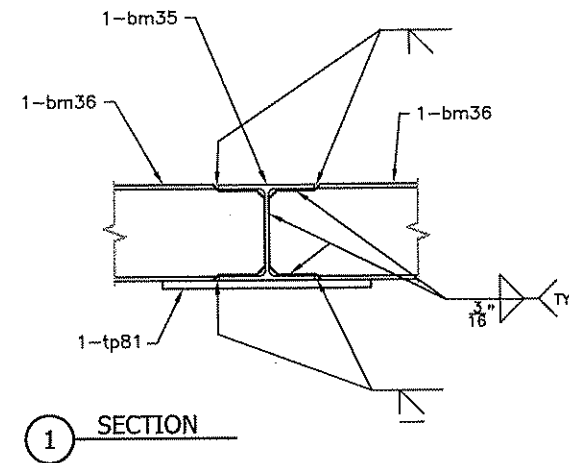
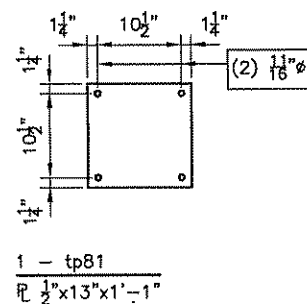
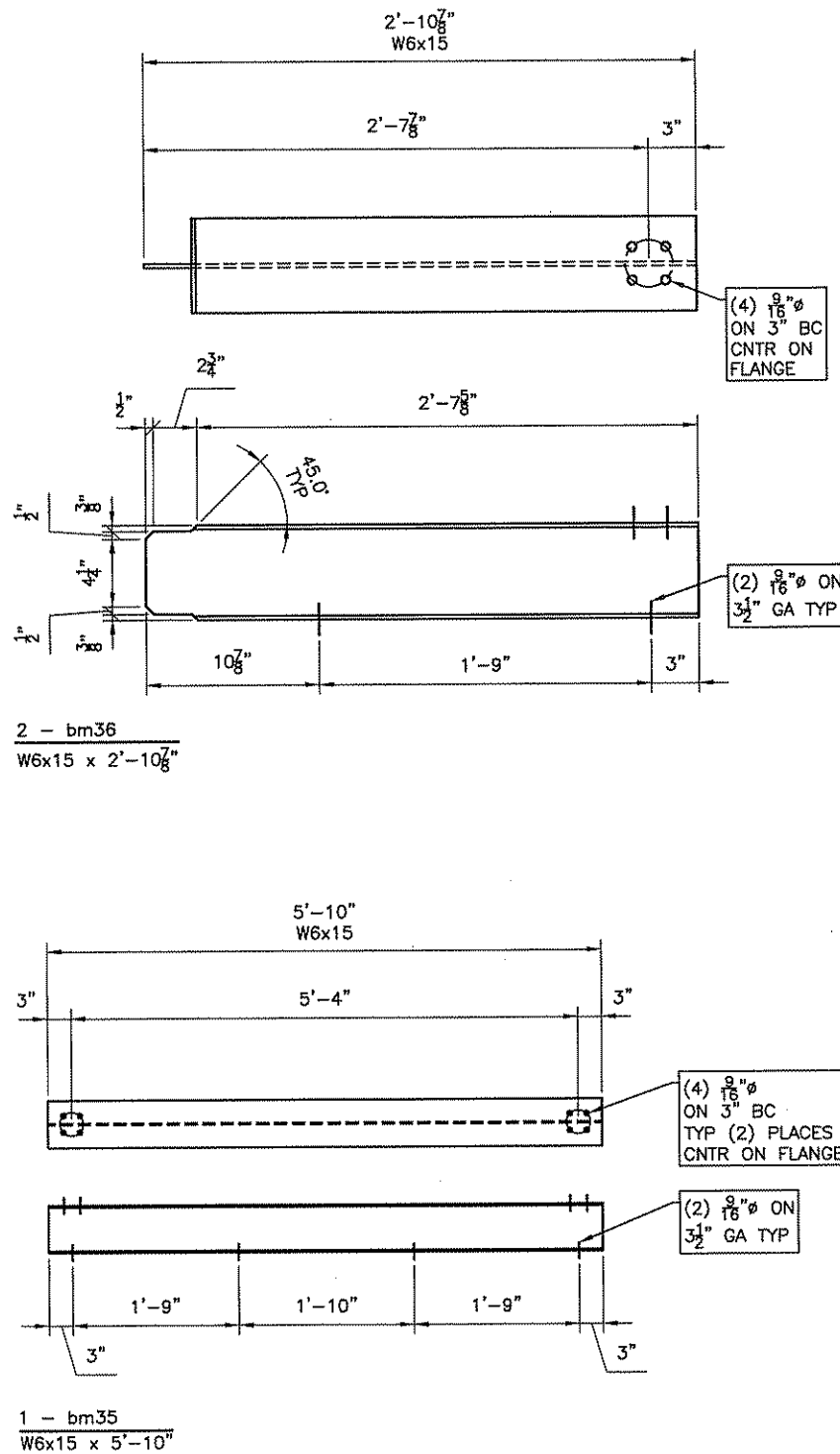
M3-S351

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Troy Bushman
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Feb 01, 2022 7:41 PM EST

P:\2020\218508-KLUTE, INC-FINAL MILLIGAN 3 SUBSTATION REDESIGN AND DETAILING\01 - FINAL PROJECT FOLDERS\07 DRAWINGS\350 - 34NGRM3-S352.DWG James Gensberger 13 July 2018 7:16:13 AM

BILL OF MATERIALS						
ITEM	QTY	DESCRIPTION	LENGTH		MATERIAL	WEIGHT LBS
			FT	IN		
352A		BEAM				
bm35	1	W6x15	5	10	A992	87.5
bm36	2	W6x15	2	10-7/8	A992	87.2
tp81	1	PL 1/2"x13"	1	1	A36	24.0
		SUBTOTAL				198.6
MAKE 1 TIME						

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Feb 01, 2022 7:41 PM EST



SHEET NOTES:
1. SEE ERECTION DRAWING,
BOM SUMMARY AND GENERAL
NOTES SHEET S350.

RELEASE FOR
FABRICATION
13-Jul-18

KLUTE, INC.
YORK, NE

MILLIGAN 3 SUBSTATION
34.5kV NGR STRUCTURE (34NGR)

APPROVED BY:
DKD

ESC
engineering

FORT COLLINS COLORADO
(970) 224-9100 ESC@THINKESC.COM

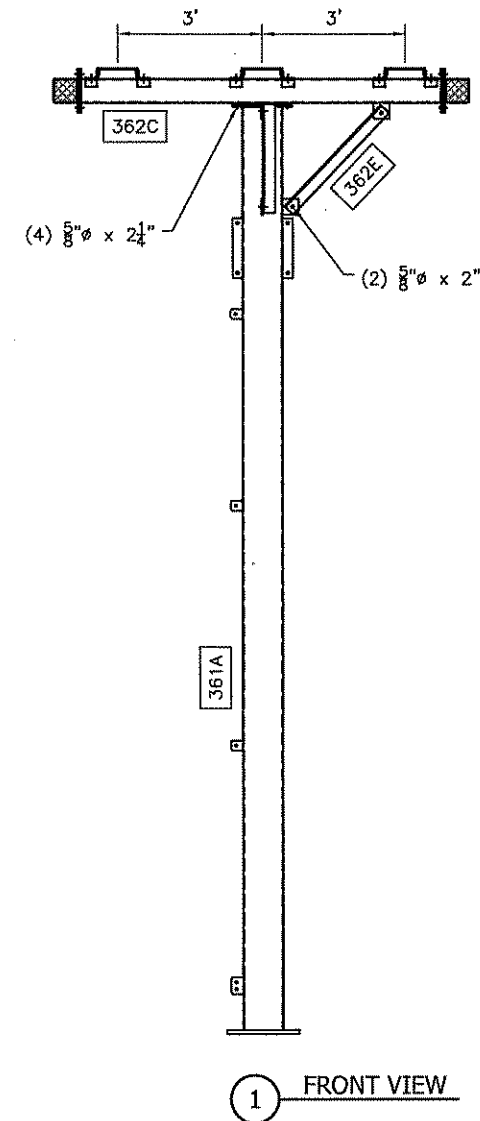
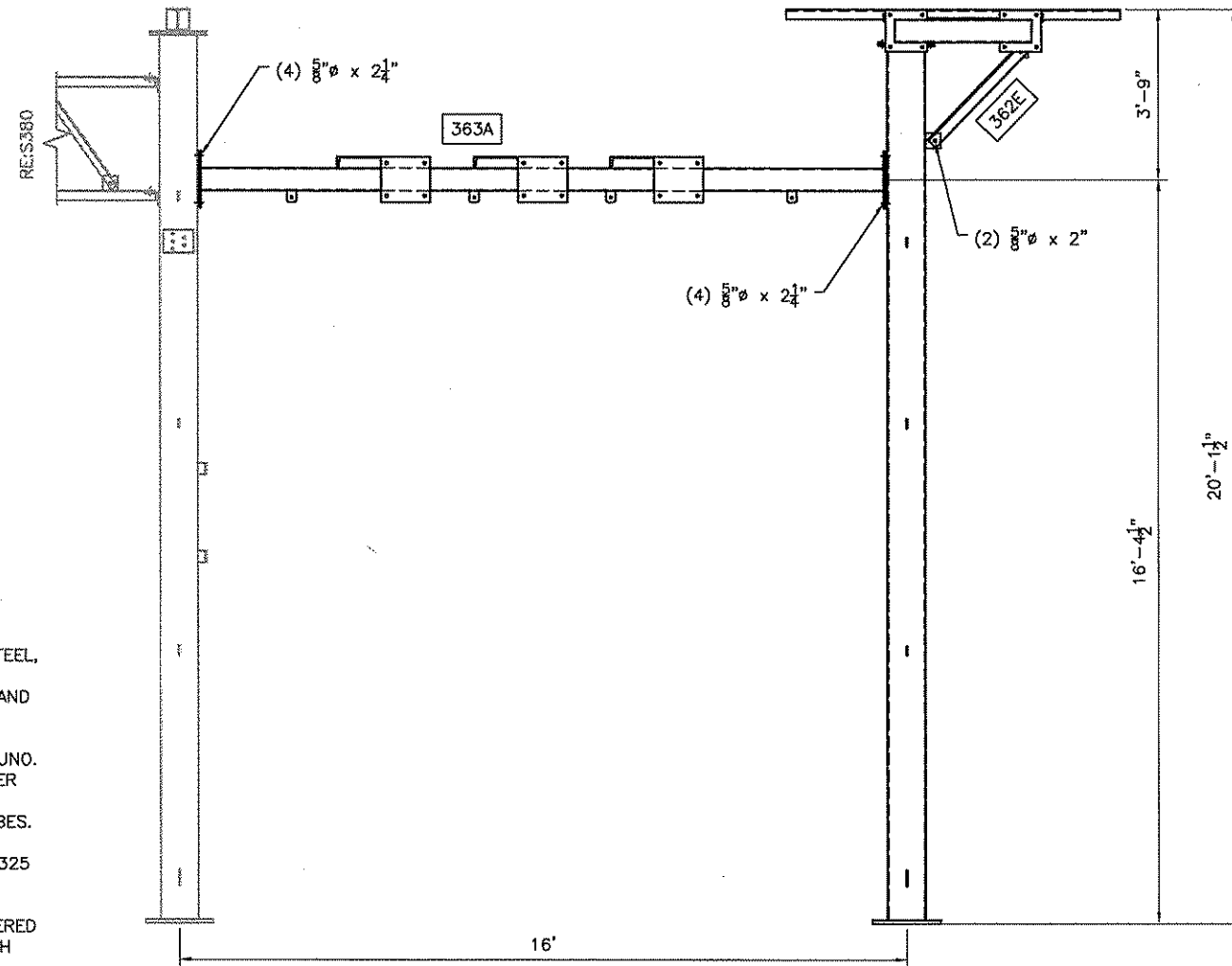
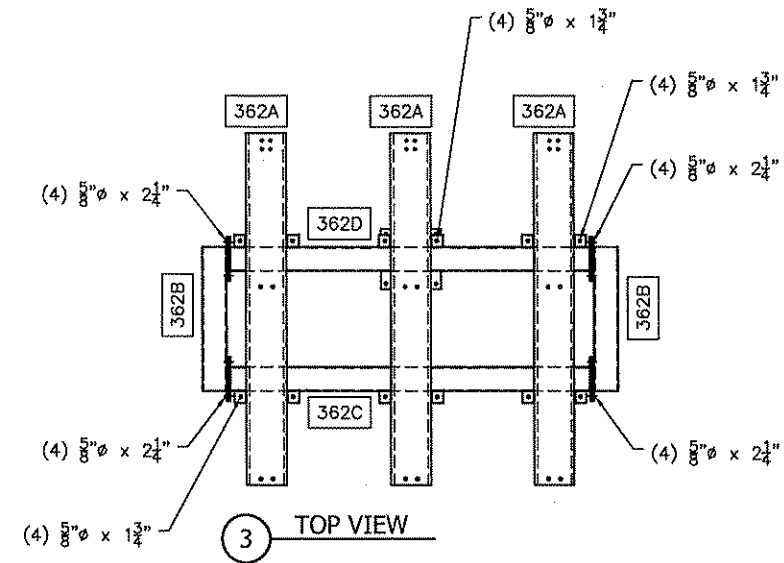
M3-S352

confidential
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P:\2020\3621\8608-KLUTE, INC-FINAL MILLIGAN 3 SUBSTATION REDESIGN AND DETAILING\01 - FINAL PROJECT FOLDERS\07 DRAWINGS\360 - 3401M3-S360.DWG James Gerstberger 9 July 2018 3:08:43 PM

BILL OF MATERIALS SUMMARY							
QTY	ITEM	DESCRIPTION	LENGTH		MATERIAL	WEIGHT EA	EXT WEIGHT
			FT	IN		LBS	LBS
1	361A	COLUMN				789.4	789.4
3	362A	ITEM				116.3	348.9
2	362B	ITEM				91.7	183.5
1	362C	ITEM				184.8	184.8
1	362D	ITEM				216.7	216.7
2	362E	BRACE				17.8	35.6
1	363A	BEAM				432.0	432.0
		STEEL SUBTOTAL					2191
12	HARDWARE	5/8"-11	0	1-3/4	A325	0.36	4.3
4		5/8"-11	0	2	A325	0.38	1.5
28		5/8"-11	0	2-1/4	A325	0.41	11.5
44		5/8"-11 HEX NUT			HVY		
44		5/8" CIRCULAR WASHERS			HARDENED		
44		5/8"-11 LOCK NUT			MF		
		HARDWARE SUBTOTAL					17.3
		TOTAL BLACK WEIGHT					2209
		+3.5% GALVANIZING					77.3
		UNIT TOTAL					2287
		TOTAL ONE (1) REQ'D					2287

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Feb 01, 2022 7:41 PM EST



GENERAL NOTES:

1. FOR DETAIL DRAWINGS SEE SHEETS S361-S363.
2. ALL STEEL ASTM A36 (PLATES, BARS, ANGLES, CHANNELS, STRUCTURAL TEES, MISCELLANEOUS STEEL, ETC), UNO.
3. USE ASTM A500 GRADE B FOR ROUND, SQUARE AND RECTANGULAR HSS, UNO.
4. USE ASTM A53 GRADE B FOR PIPE, UNO.
5. USE ASTM A992 FOR ROLLED AND W SECTIONS, UNO.
6. ALL STRUCTURAL STEEL SHALL BE GALVANIZED PER ASTM A123 AND ALL HARDWARE PER ASTM A153.
7. START AND STOP WELDS AT CENTER-LINE OF TUBES.
8. ALL WELDS 1/4" FILLET WELDS ALL AROUND, UNO.
9. ASSEMBLY BOLTS SHALL BE 5/8" DIAMETER ASTM A325 WITH HEAVY HEX NUTS AND MF LOCKNUTS, UNO.
10. BOLT HOLES SHALL BE OVERSIZED 1/16" UNO.
11. THE OPEN END OF TUBULAR SECTIONS NOT COVERED BY A CONNECTION PLATE SHALL BE FINISHED WITH TACK-WELDED EXPANDED STEEL MESH.

34.5kV HIGH BUS/ SWITCH STRUCTURE (34D1)

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Feb 01, 2022 7:41 PM EST

RELEASE FOR
FABRICATION
9-Jul-18

KLUTE, INC.
YORK, NE

MILLIGAN 3 SUBSTATION
34.5kV HIGH BUS/ SWITCH STRUCTURE (34D1)

No	Date	Drawn	Designed	Checked	Revisions		Proj. No.
0	06/23/2017	JEG	DKD	KLUTE	ORIGINAL RELEASE		216-429
1							
2							
3							
4							
5							
6							
7							

APPROVED BY:

DKD

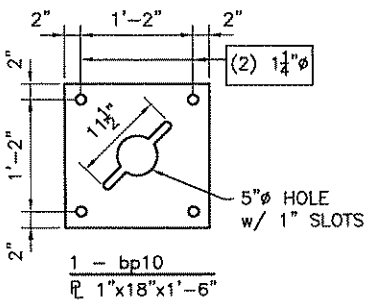
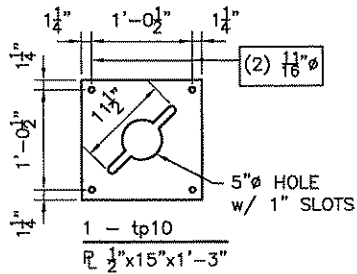
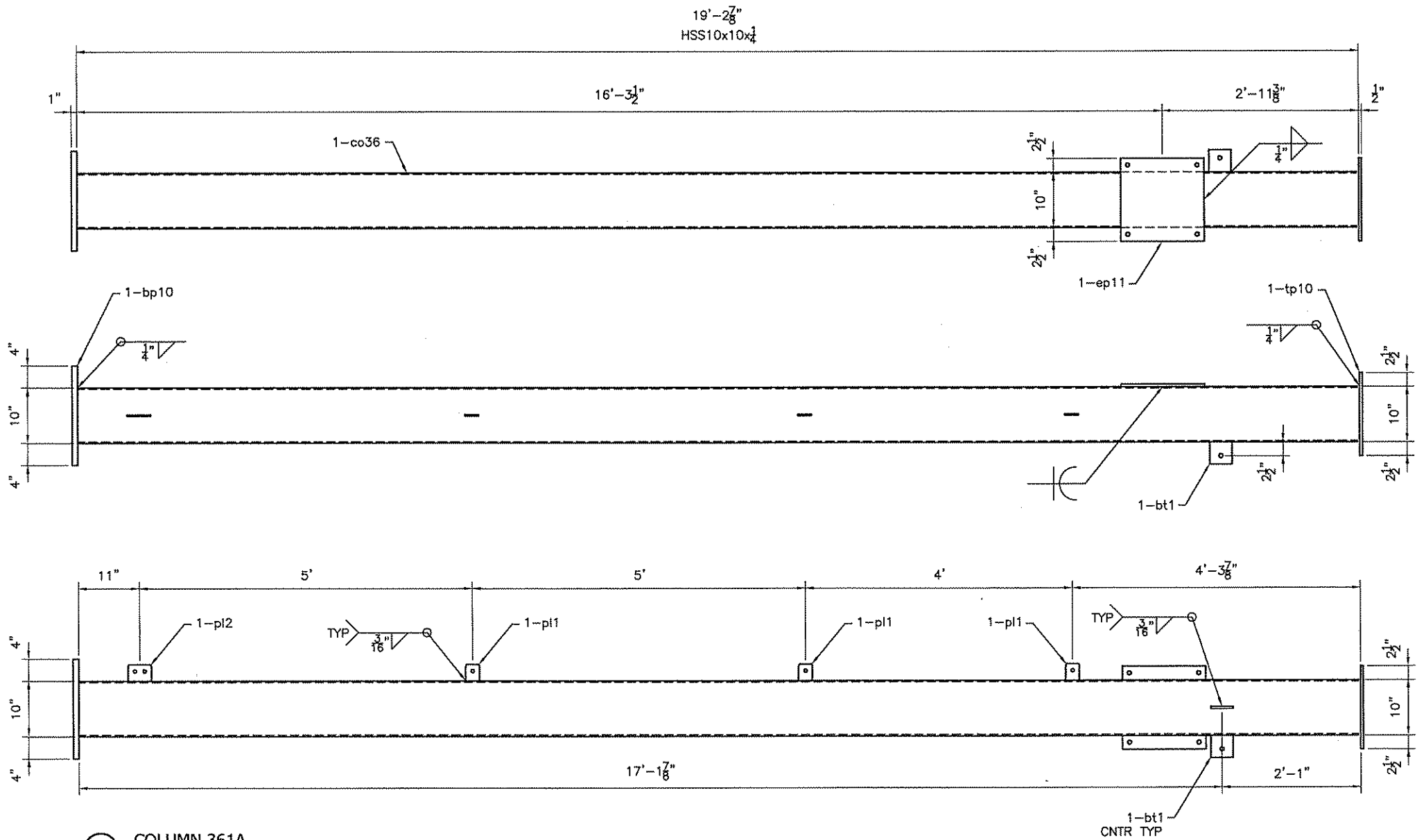
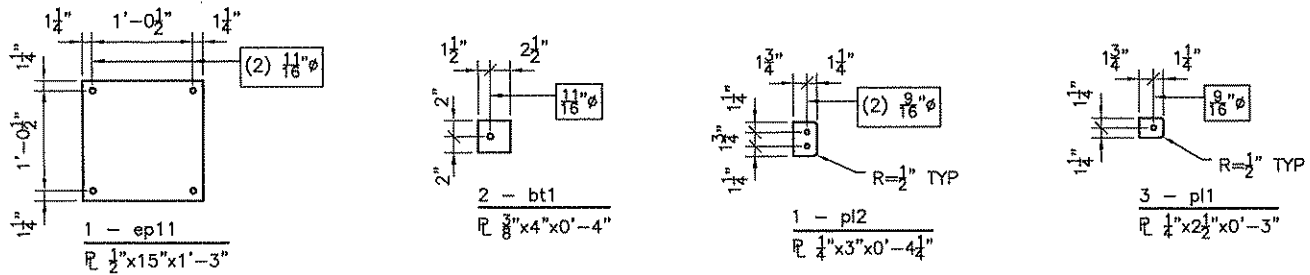


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M3-S360

BILL OF MATERIALS						
ITEM	QTY	DESCRIPTION	LENGTH		MATERIAL	WEIGHT LBS
			FT	IN		
361A		COLUMN				
co36	1	HSS10x10x1/4	19	2-7/8	A500 GR B	627.8
bp10	1	PL 1"x18"	1	6	A572 GR 50	91.9
tp10	1	PL 1/2"x15"	1	3	A36	31.9
pl1	3	PL 1/4"x2-1/2"	0	3	A36	1.6
pl2	1	PL 1/4"x3"	0	4-1/4	A36	0.9
bt1	2	PL 3/8"x4"	0	4	A36	3.4
ep11	1	PL 1/2"x15"	1	3	A36	31.9
		SUBTOTAL				789.4
MAKE 1 TIME						

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A COLUMN 361A

SHEET NOTES:
1. SEE ERECTION DRAWING,
BOM SUMMARY & GENERAL
NOTES SHEET S360.

RELEASE FOR
FABRICATION
9-Jul-18

KLUTE, INC. YORK, NE	MILLIGAN 3 SUBSTATION 34.5kV HIGH BUS/ SWITCH STRUCTURE (34D1)	Proj. No.	
		216-29	
Checked	KLUTE	Revisions	
		ORIGINAL RELEASE	
Designed	DKD		
Drawn	JEG		
Date	06/23/2017		
No	1		
	2		
	3		
	4		
	5		
	6		
	7		

APPROVED BY:
DKD

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engineering
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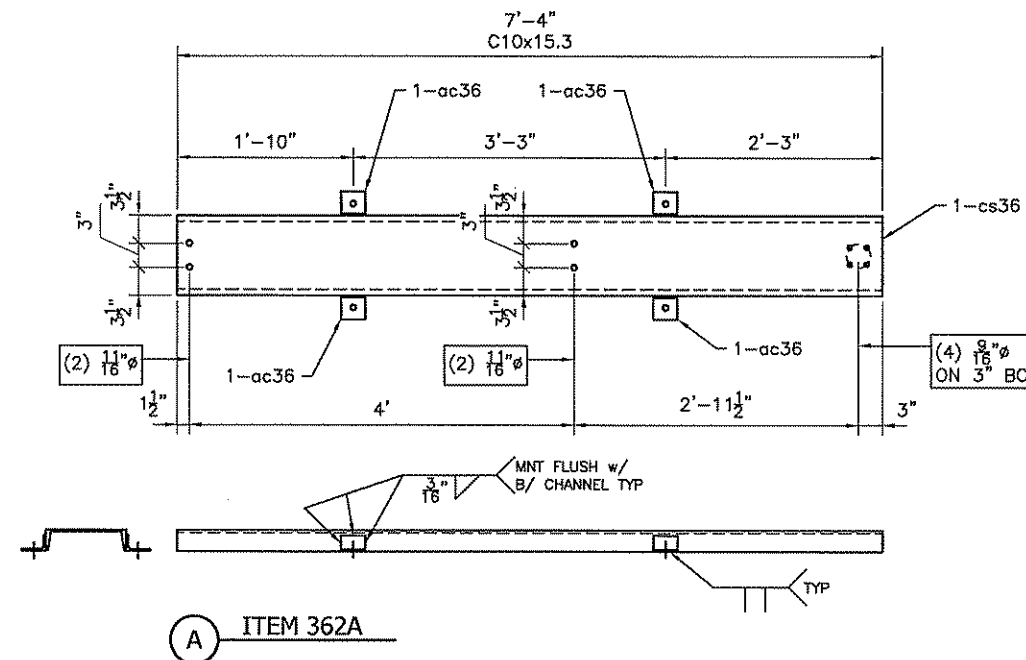
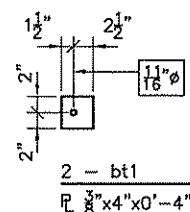
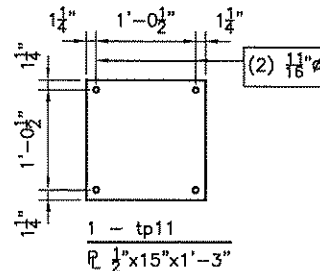
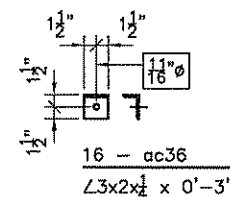
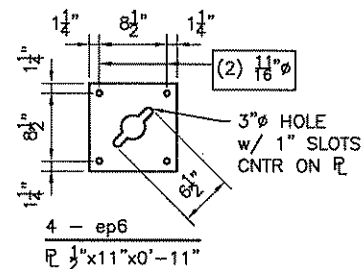
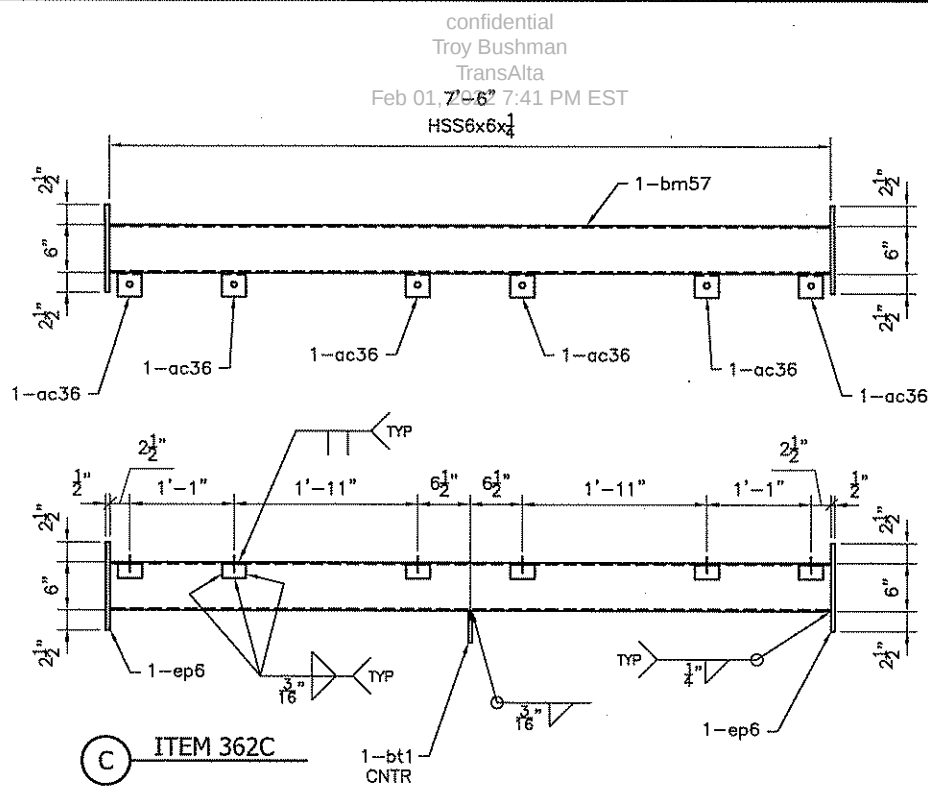
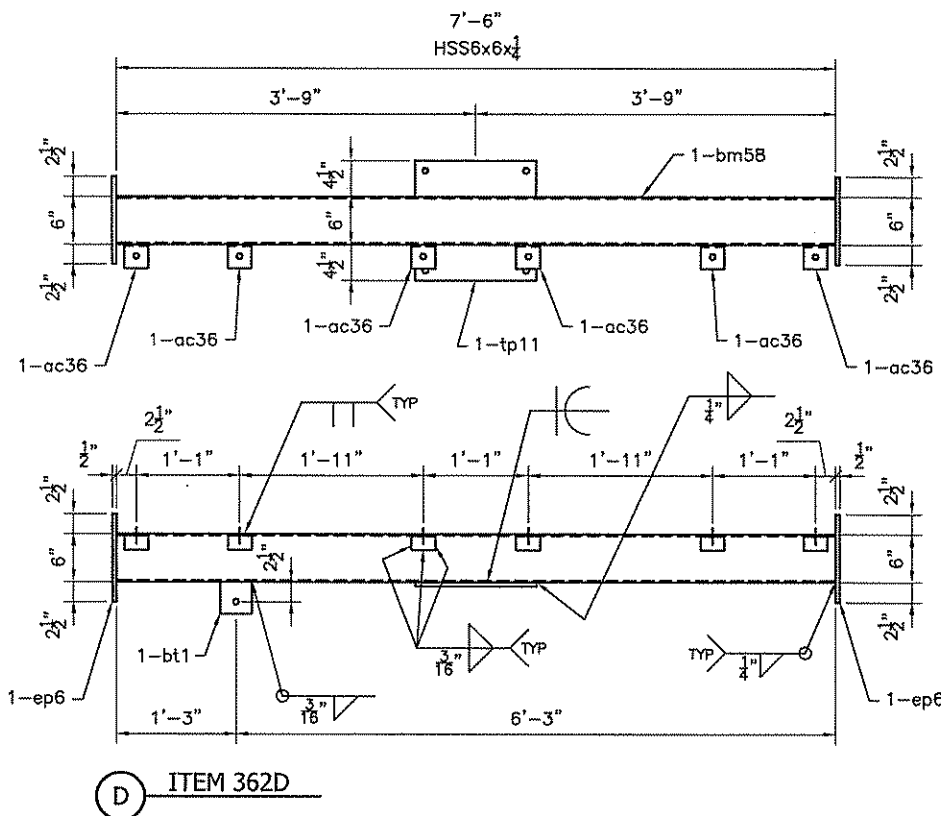
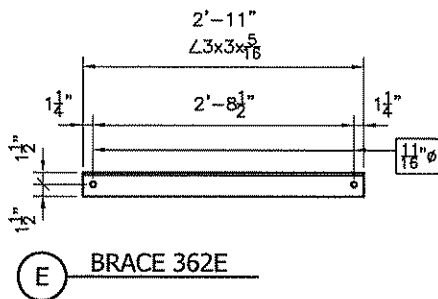
M3-S361

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BILL OF MATERIALS						
ITEM	QTY	DESCRIPTION	LENGTH		MATERIAL	WEIGHT LBS
			FT	IN		
362A	3	ITEM				
cs36	1	C10x15.3	7	4	A36	112.2
ac36	4	L3x2x1/4	0	3	A36	4.1
		SUBTOTAL				116.3
362B	2	ITEM				
bm17	1	HSS6x6x1/4	3	0	A500 GR B	57.1
ep61	2	PL 1/2"x11"	0	11	A36	34.3
em	2	1/2 x 16 GA x 6"	0	6	EXP MTL	0.37
		SUBTOTAL				91.7
362C	1	ITEM				
bm57	1	HSS6x6x1/4	7	6	A500 GR B	142.7
ep6	2	PL 1/2"x11"	0	11	A36	34.3
bt1	1	PL 3/8"x4"	0	4	A36	1.7
ac36	6	L3x2x1/4	0	3	A36	6.2
		SUBTOTAL				184.8
362D	1	ITEM				
bm58	1	HSS6x6x1/4	7	6	A500 GR B	142.7
tp11	1	PL 1/2"x15"	1	3	A36	31.9
ep6	2	PL 1/2"x11"	0	11	A36	34.3
bt1	1	PL 3/8"x4"	0	4	A36	1.7
ac36	6	L3x2x1/4	0	3	A36	6.2
		SUBTOTAL				216.7
362E	2	L3x3x5/16	2	11	A36	35.6

MAKE 1 TIME



SHEET NOTES:
1. SEE ERECTION DRAWING,
BOM SUMMARY & GENERAL
NOTES SHEET S360.

RELEASE FOR
FABRICATION

9-Jul-18

KLUTE, INC.
YORK, NE

MILLIGAN 3 SUBSTATION
34.5kV HIGH BUS/ SWITCH STRUCTURE (34D1)

APPROVED BY:

DKD

ESC
Engineering

FORT COLLINS COLORADO
(970) 224-9100 ESC@THINKESC.COM

M3-S362

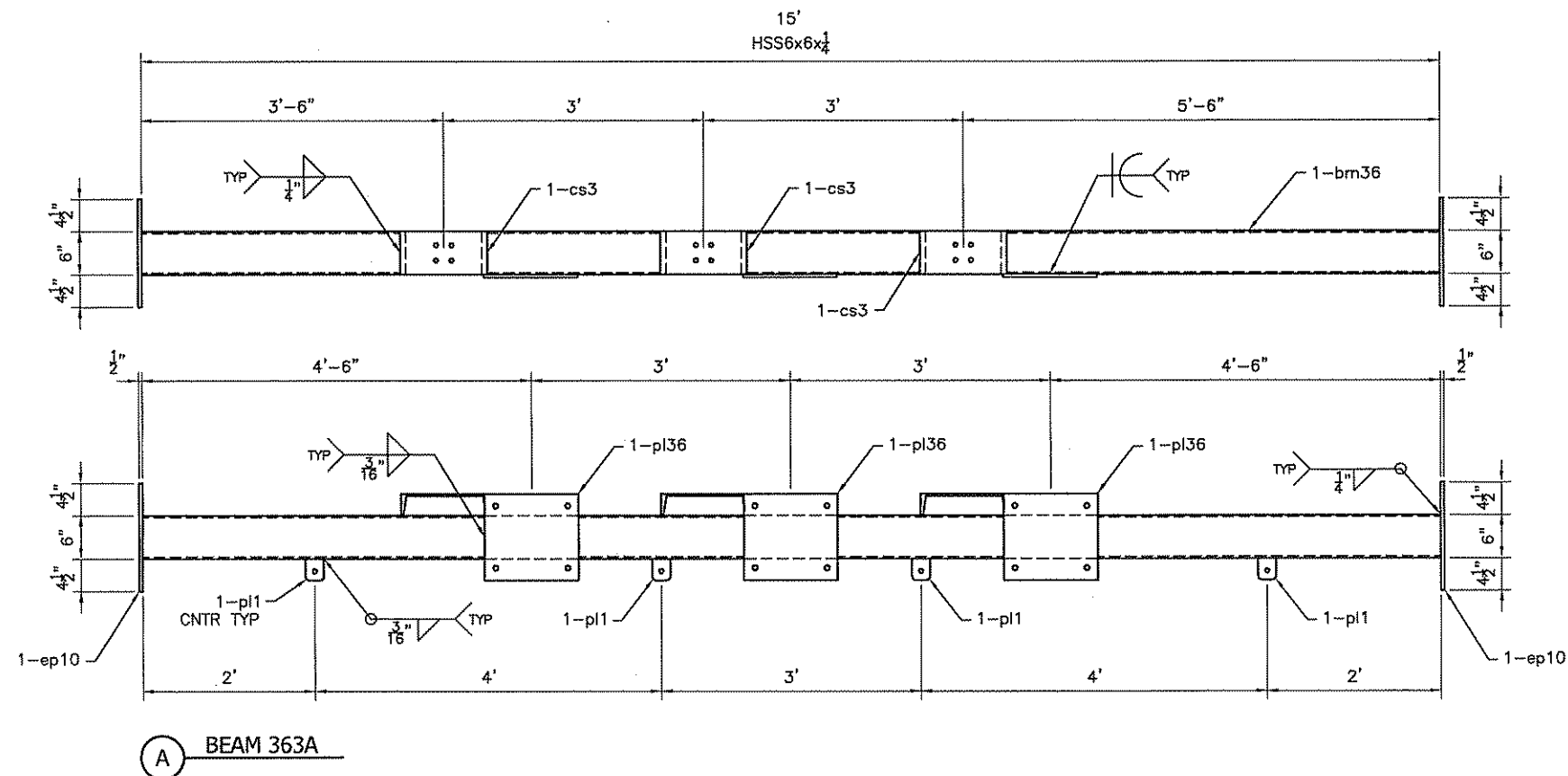
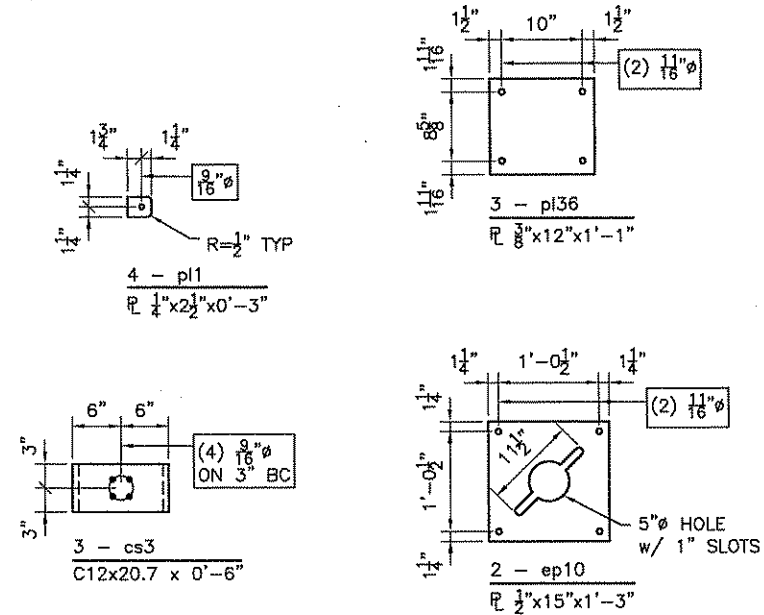
confidential
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Feb 01, 2022 7:41 PM EST

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Feb 01, 2022 7:41 PM EST

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BILL OF MATERIALS						
ITEM	QTY	DESCRIPTION	LENGTH		MATERIAL	WEIGHT LBS
			FT	IN		
363A		BEAM				
bm36	1	HSS6x6x1/4	15	0	A500 GR B	285.3
ep10	2	PL 1/2"x15"	1	3	A36	63.8
pl1	4	PL 1/4"x2-1/2"	0	3	A36	2.1
pl36	3	PL 3/8"x12"	1	1	A36	49.8
cs3	3	C12x20.7	0	6	A36	31.1
		SUBTOTAL				432.0
MAKE 1 TIME						

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RELEASE FOR
FABRICATION
9-Jul-18

KLUTE, INC.
YORK, NE

MILLIGAN 3 SUBSTATION
34.5kV HIGH BUS/ SWITCH STRUCTURE (34D1)

No	Date	Drawn	Designed	Checked	Revisions	
					Proj. No.	
0	06/23/2017	JEG	DKD	KLUTE	218-429	
1					ORIGINAL RELEASE	
2						
3						
4						
5						
6						
7						

APPROVED BY:
DKD

ESC
engineering
FORT COLLINS COLORADO
(970) 224-8100 ESC@THINKESC.COM

M3-S363

SHEET NOTES:
1. SEE ERECTION DRAWING,
BOM SUMMARY & GENERAL
NOTES SHEET S360.

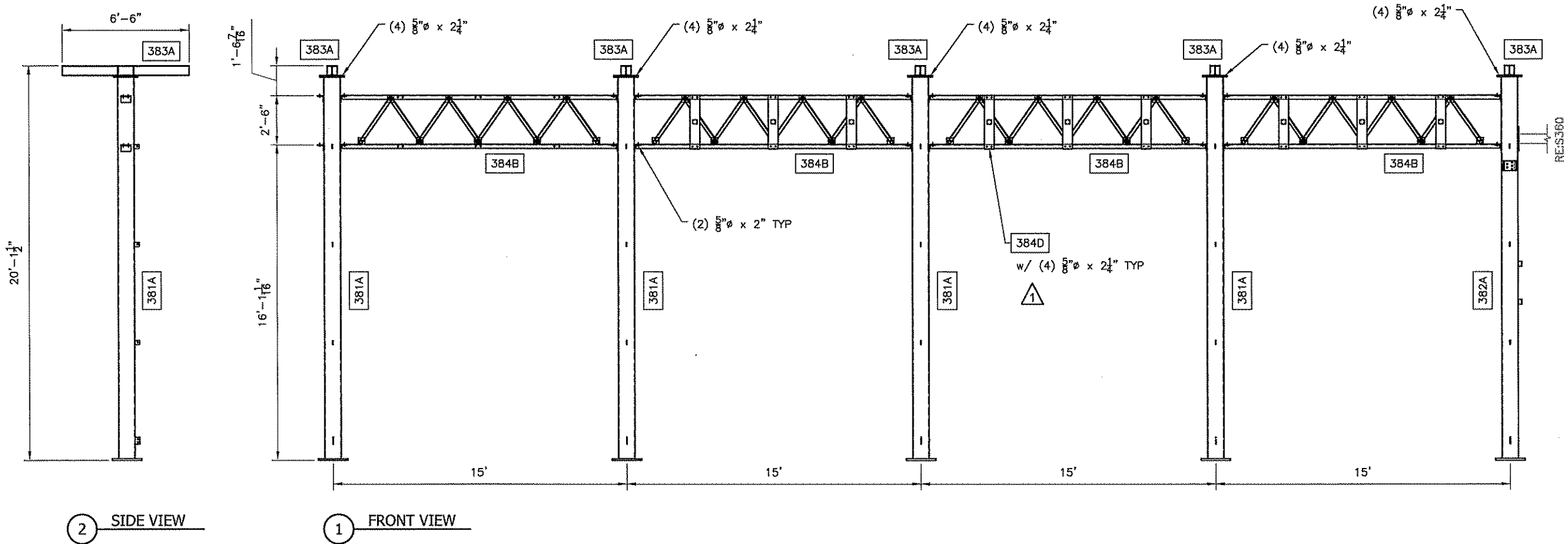
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BILL OF MATERIALS SUMMARY							
QTY	ITEM	DESCRIPTION	LENGTH		MATERIAL	WEIGHT EA	EXT WEIGHT
			FT	IN		LBS	LBS
4	381A	COLUMN				780.8	3123.2
1	382A	COLUMN				814.4	814.4
5	383A	BEAM				136.0	679.9
4	384A	TRUSS BEAM				508.4	2033.7
9	384D	PLATE				21.0	188.8
		STEEL SUBTOTAL					6840
68	HARDWARE	5/8"-11	0	2	A325T	0.38	25.8
56		5/8"-11	0	2-1/4	A325	0.41	23.0
124		5/8"-11 HEX NUT			HVY		
124		5/8" CIRCULAR WASHERS			HARDENED		
124		5/8"-11 LOCK NUT			MF		
		HARDWARE SUBTOTAL					48.8
		TOTAL BLACK WEIGHT					6889
		+3.5% GALVANIZING					241.1
UNIT TOTAL							7131
TOTAL ONE (1) REQ'D							7131

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TransAlta
Feb 01, 2022 7:41 PM EST

- GENERAL NOTES:
- FOR DETAIL DRAWINGS SEE SHEETS S381-S384.
 - ALL STEEL ASTM A36 (PLATES, BARS, ANGLES, CHANNELS, STRUCTURAL TEES, MISCELLANEOUS STEEL, ETC), UNO.
 - USE ASTM A500 GRADE B FOR ROUND, SQUARE AND RECTANGULAR HSS, UNO.
 - USE ASTM A53 GRADE B FOR PIPE, UNO.
 - USE ASTM A992 FOR ROLLED AND W SECTIONS, UNO.
 - ALL STRUCTURAL STEEL SHALL BE GALVANIZED PER ASTM A123 AND ALL HARDWARE PER ASTM A153.
 - START AND STOP WELDS AT CENTER-LINE OF TUBES.
 - ALL WELDS 1/4" FILLET WELDS ALL AROUND, UNO.
 - ASSEMBLY BOLTS SHALL BE 5/8" DIAMETER ASTM A325 WITH HEAVY HEX NUTS AND MF LOCKNUTS, UNO.
 - BOLT HOLES SHALL BE OVERSIZED 1/8" UNO.
 - THE OPEN END OF TUBULAR SECTIONS NOT COVERED BY A CONNECTION PLATE SHALL BE FINISHED WITH TACK-WELDED EXPANDED STEEL MESH.



34.5kV DISTRIBUTION STRUCTURE w/ TRUSS (34CB)

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Feb 01, 2022 7:41 PM EST

RELEASE FOR
FABRICATION
10-Jul-18

KLUTE, INC.
YORK, NE

MILLIGAN 3 SUBSTATION
34.5kV DISTRIBUTION STRUCTURE w/ TRUSS (34CB)

No	Date	Drawn	Designed	Checked	Revisions	Proj. No.
0	06/23/2017	JEG	JEG	KLUTE	ORIGINAL RELEASE	218-429
1	07/09/2018	JEG	JEG	KLUTE	REVISED FOR AFW COMMENTS. ADDED INSULATOR PL.	218-508
2						
3						
4						
5						
6						
7						

APPROVED BY:

DKD



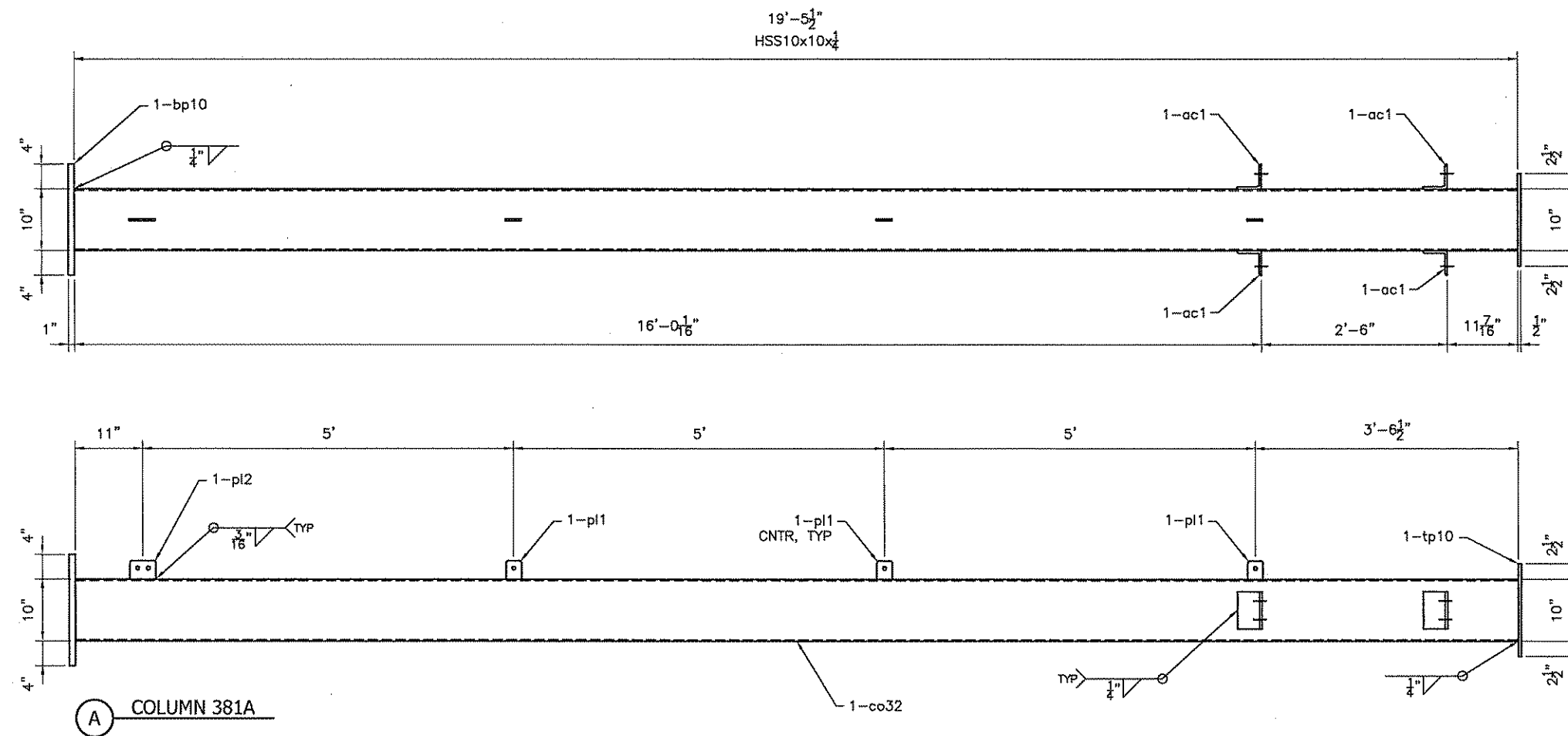
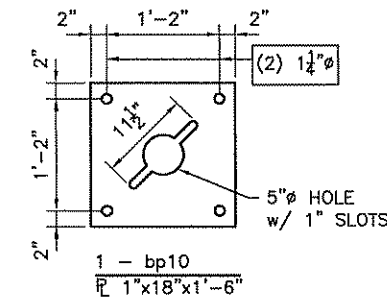
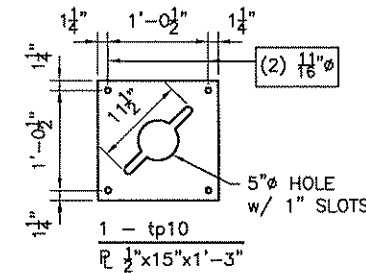
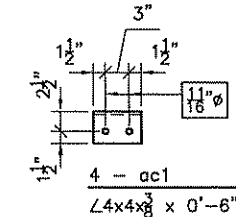
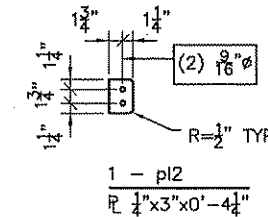
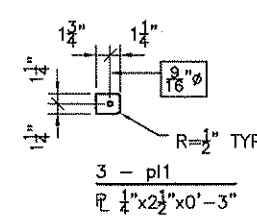
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(970) 224-9100 ESC@THINKESC.COM

M3-S380

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BILL OF MATERIALS					
ITEM	QTY	DESCRIPTION	LENGTH		WEIGHT
			FT	IN	
381A		COLUMN			
co32	1	HSS10x10x1/4	19	5-1/2	A500 GR B 634.9
bp10	1	PL 1"x18"	1	6	A572 GR 50 91.9
tp10	1	PL 1/2"x15"	1	3	A36 31.9
ac1	4	L4x4x3/8	0	6	A36 19.6
pl1	3	PL 1/4"x2-1/2"	0	3	A36 1.6
pl2	1	PL 1/4"x3"	0	4-1/4	A36 0.9
		SUBTOTAL			780.8
MAKE 4 TIMES					

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Troy Bushman
TransAlta
Feb 01, 2022 7:41 PM EST



SHEET NOTES:
1. SEE ERECTION DRAWING,
BOM SUMMARY AND GENERAL
NOTES SHEET S380.

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Troy Bushman
TransAlta
Feb 01, 2022 7:41 PM EST

RELEASE FOR
FABRICATION
9-Jul-18

KLUTE, INC.
YORK, NE

MILLIGAN 3 SUBSTATION
34.5KV DISTRIBUTION STRUCTURE W/ TRUSS (34CB)

APPROVED BY:
DKD

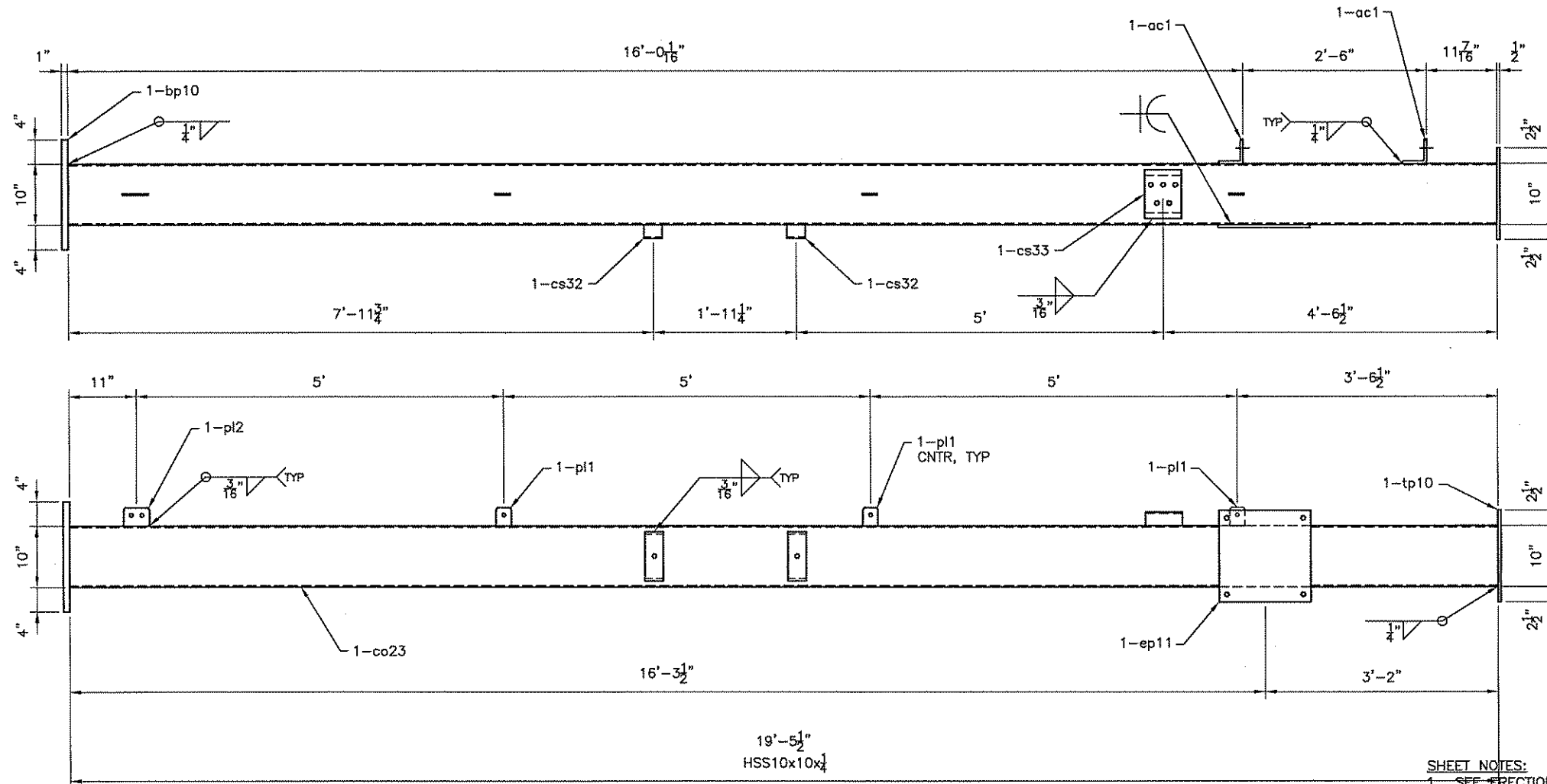
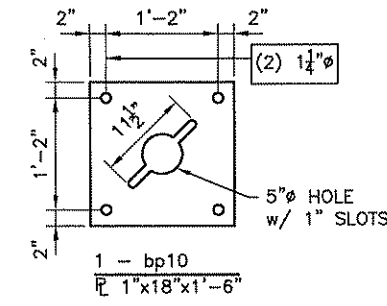
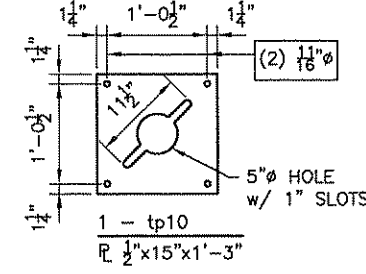
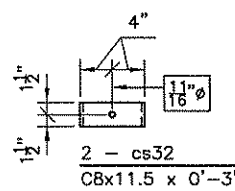
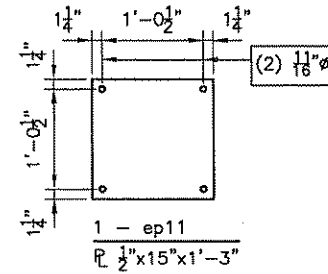
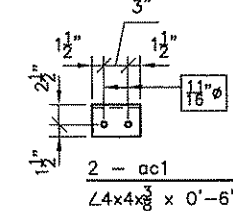
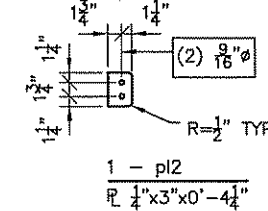
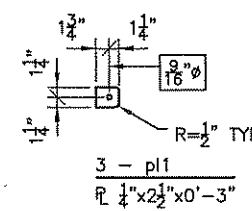
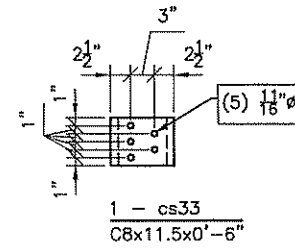
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M3-S381

P:\000\52186008-KLUTE, INC-FINAL MILLIGAN 3 SUBSTATION REDESIGN AND DETAILING\001 - FINAL PROJECT FOLDERS\007 DRAWINGS\380 - 34CBM3-S382.DWG James Gerabarger 9 July 2018 12:57:43 PM

BILL OF MATERIALS					
ITEM	QTY	DESCRIPTION	LENGTH		WEIGHT LBS
			FT	IN	
382A		COLUMN			
co23	1	HSS10x10x1/4	19	5-1/2	A500 GR B 634.9
bp10	1	PL 1"x18"	1	6	A572 GR 50 91.9
tp10	1	PL 1/2"x15"	1	3	A36 31.9
ac1	2	L4x4x3/8	0	6	A36 9.8
cs32	2	C8x11.5	0	3	A36 5.8
cs33	1	C8x11.5	0	6	A36 5.8
ep11	1	PL 1/2"x15"	1	3	A36 31.9
pl1	3	PL 1/4"x2-1/2"	0	3	A36 1.6
pl2	1	PL 1/4"x3"	0	4-1/4	A36 0.9
		SUBTOTAL			814.4
MAKE 1 TIME					

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SHEET NOTES:
1. SEE ERECTION DRAWING,
BOM SUMMARY AND GENERAL
NOTES SHEET S380.

RELEASE FOR
FABRICATION
9-Jul-18

KLUTE, INC.
YORK, NE

MILLIGAN 3 SUBSTATION
34.5kV DISTRIBUTION STRUCTURE W/ TRUSS (34CB)

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DKD

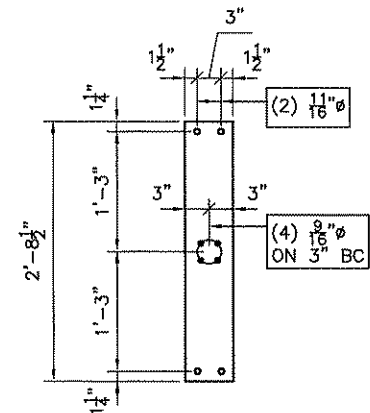
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M3-S382

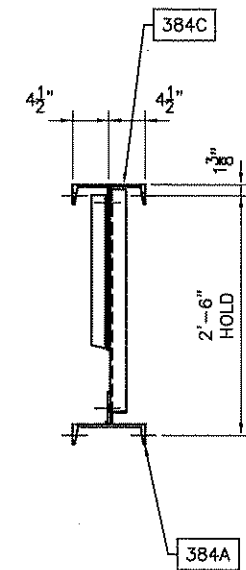
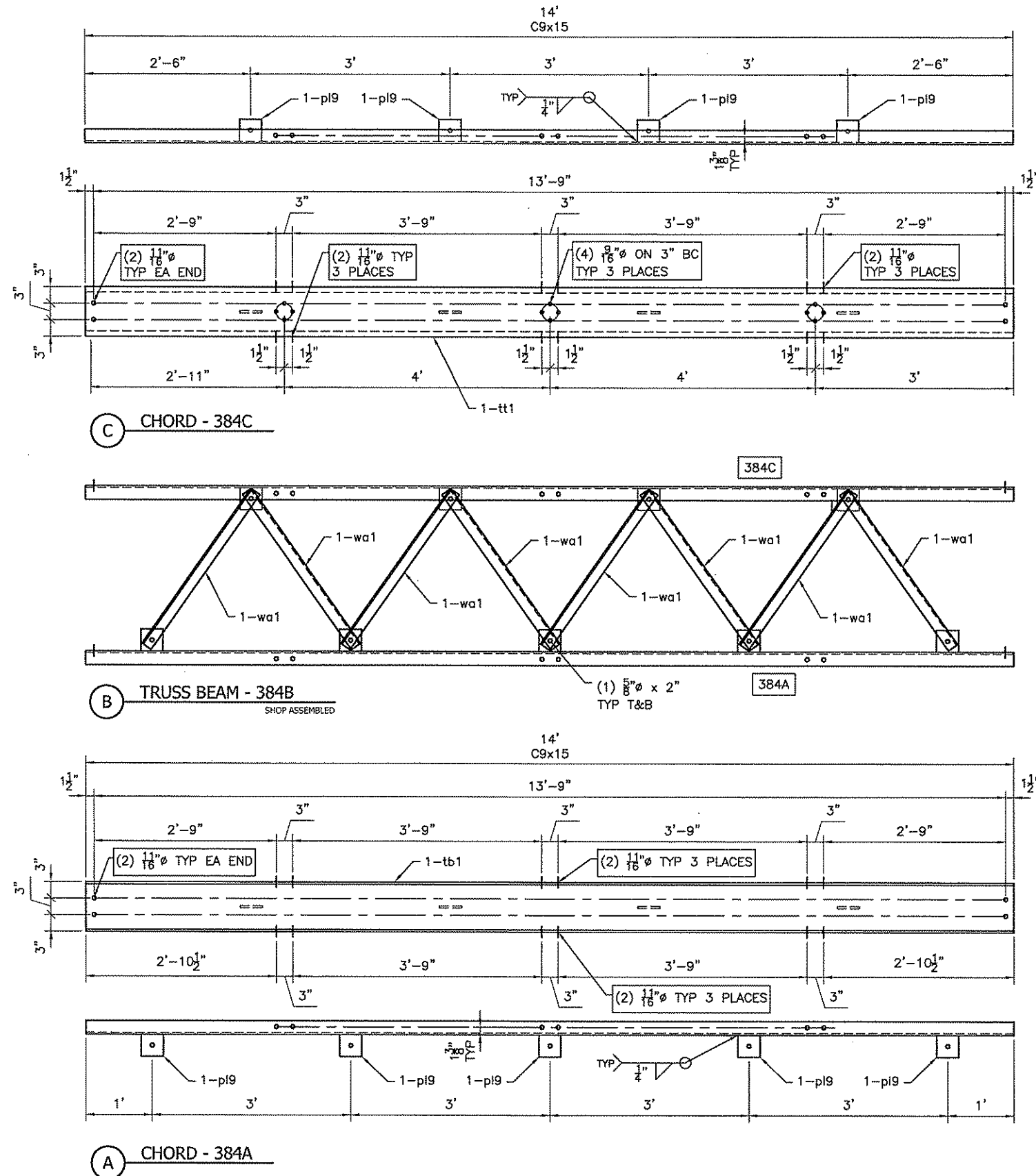
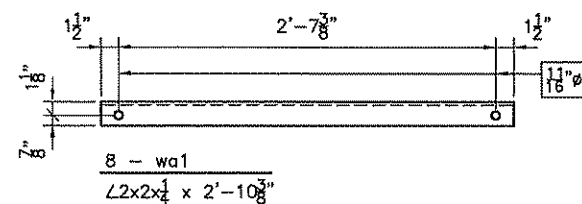
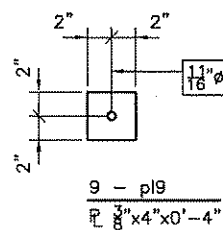
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P:\200\S32\18508-KLUTE, INC-FINAL MILLIGAN 3 SUBSTATION REDESIGN AND DETAILING\01 - FINAL PROJECT FOLDERS\07 DRAWINGS\380 - 34CBM3-S384.DWG James Gerstberger 9 July 2018 1:10:30 PM

BILL OF MATERIALS						
ITEM	QTY	DESCRIPTION	LENGTH		MATERIAL	WEIGHT LBS
			FT	IN		
384A	4	TRUSS BEAM				
tt1	1	C9x15	14	0	A36	210.0
tb1	1	C9x15	14	0	A36	210.0
wa1	8	L2x2x1/4	2	10-3/8	A36	73.1
pl9	9	PL 3/8"x4"	0	4	A36	15.3
		SUBTOTAL				508.4
384D	9	PLATE	2	8-7/8	A36	188.8
MAKE 1 TIME						



D PLATE 384D
PL 3/8"x6"x2'-8 1/2"



SHEET NOTES:
1. SEE ERECTION DRAWING,
BOM SUMMARY AND GENERAL
NOTES SHEET S380.

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RELEASE FOR
FABRICATION
9-Jul-18

Revisions		Proj. No.
No.	Date	218-423
0	06/23/2017	218-423
1	07/09/2018	218-508
2		
3		
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Revisions		Proj. No.
No.	Date	218-423
0	06/23/2017	218-423
1	07/09/2018	218-508
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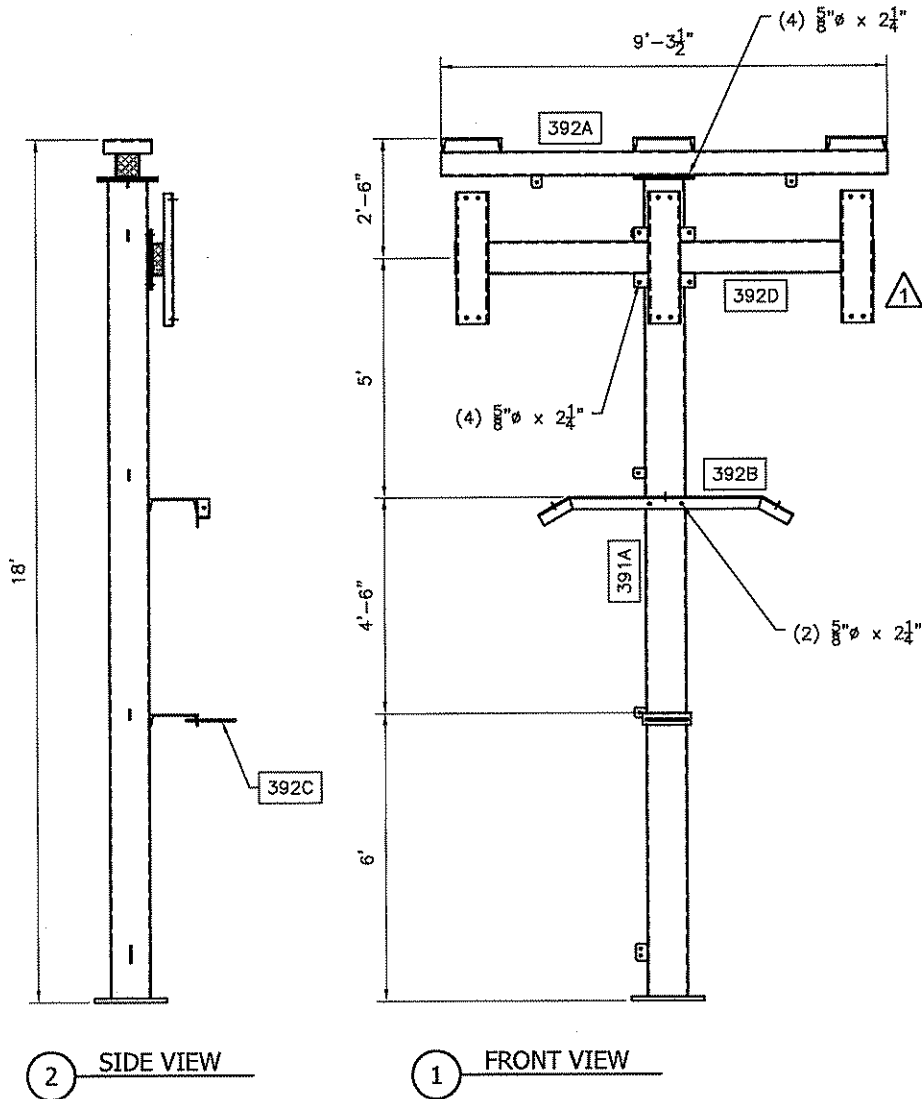
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M3-S384

P:\200\S2\180508-KLUTE, INC-FINAL MILLIGAN 3 SUBSTATION REDESIGN AND DETAILING\01 - FINAL PROJECT FOLDERS\07 DRAWINGS\S390 - 34RS\W3-S390.DWG - James Gansberger 13 July 2018 7:16:20 AM

BILL OF MATERIALS SUMMARY							
QTY	ITEM	DESCRIPTION	LENGTH		MATERIAL	WEIGHT EA	EXT WEIGHT
			FT	IN		LBS	LBS
3	391A	COLUMN				745.6	2236.9
3	392A	BEAM				311.8	935.3
3	392B	BEAM				27.0	80.9
3	392C	U-BOLT				1.6	4.8
3	392D	BEAM				277.9	833.6
		STEEL SUBTOTAL					4091
30	HARDWARE	5/8"-11	0	2-1/4	A325T	0.41	12.3
30		5/8"-11 HEX NUT			HVY		
30		5/8" CIRCULAR WASHERS			HARDENED		
30		5/8"-11 LOCK NUT			MF		
		HARDWARE SUBTOTAL					12.3
		TOTAL BLACK WEIGHT					4104
		+3.5% GALVANIZING					143.6
		UNIT TOTAL					1416
		TOTAL THREE (3) REQ'D					4248

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- GENERAL NOTES:
1. FOR DETAIL DRAWINGS SEE SHEETS S391-S392.
 2. ALL STEEL ASTM A36 (PLATES, BARS, ANGLES, CHANNELS, STRUCTURAL TEES, MISCELLANEOUS STEEL, ETC), UNO.
 3. USE ASTM A500 GRADE B FOR ROUND, SQUARE AND RECTANGULAR HSS, UNO.
 4. USE ASTM A53 GRADE B FOR PIPE, UNO.
 5. USE ASTM A992 FOR ROLLED AND W SECTIONS, UNO.
 6. ALL STRUCTURAL STEEL SHALL BE GALVANIZED PER ASTM A123 AND ALL HARDWARE PER ASTM A153.
 7. START AND STOP WELDS AT CENTER-LINE OF TUBES.
 8. ALL WELDS 1/4" FILLET WELDS ALL AROUND, UNO.
 9. ASSEMBLY BOLTS SHALL BE 5/8" DIAMETER ASTM A325 WITH HEAVY HEX NUTS AND MF LOCKNUTS, UNO.
 10. BOLT HOLES SHALL BE OVERSIZED 1/16" UNO.
 11. THE OPEN END OF TUBULAR SECTIONS NOT COVERED BY A CONNECTION PLATE SHALL BE FINISHED WITH TACK-WELDED EXPANDED STEEL MESH.

RELEASE FOR
FABRICATION

13-Jul-18

KLUTE, INC.
YORK, NE

MILLIGAN 3 SUBSTATION
34.5KV RISER STRUCTURE (34RS)

No	Date	Drawn	Designed	Checked	Revisions		Proj. No.
					ORIGINAL RELEASE	REVISED FOR UPDATED CLIENT DRAWINGS	
0	06/23/2017	JEG	DKD	KLUTE	KLUTE	218-423	218-508
1	05/31/2018	JEG	JEG	KLUTE			
2							
3							
4							
5							
6							
7							

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DKD



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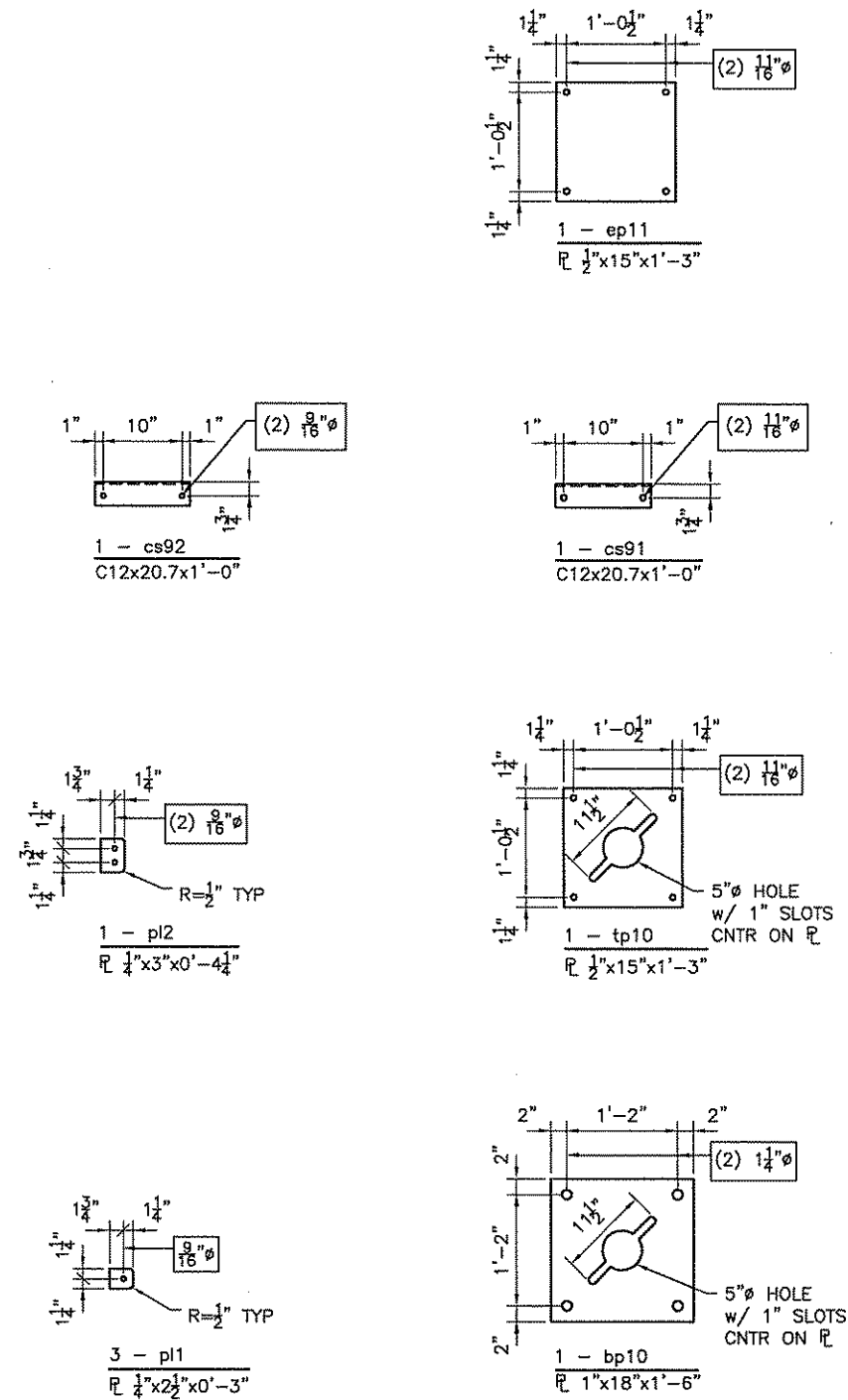
M3-S390

34.5kV RISER STRUCTURE (34RS)

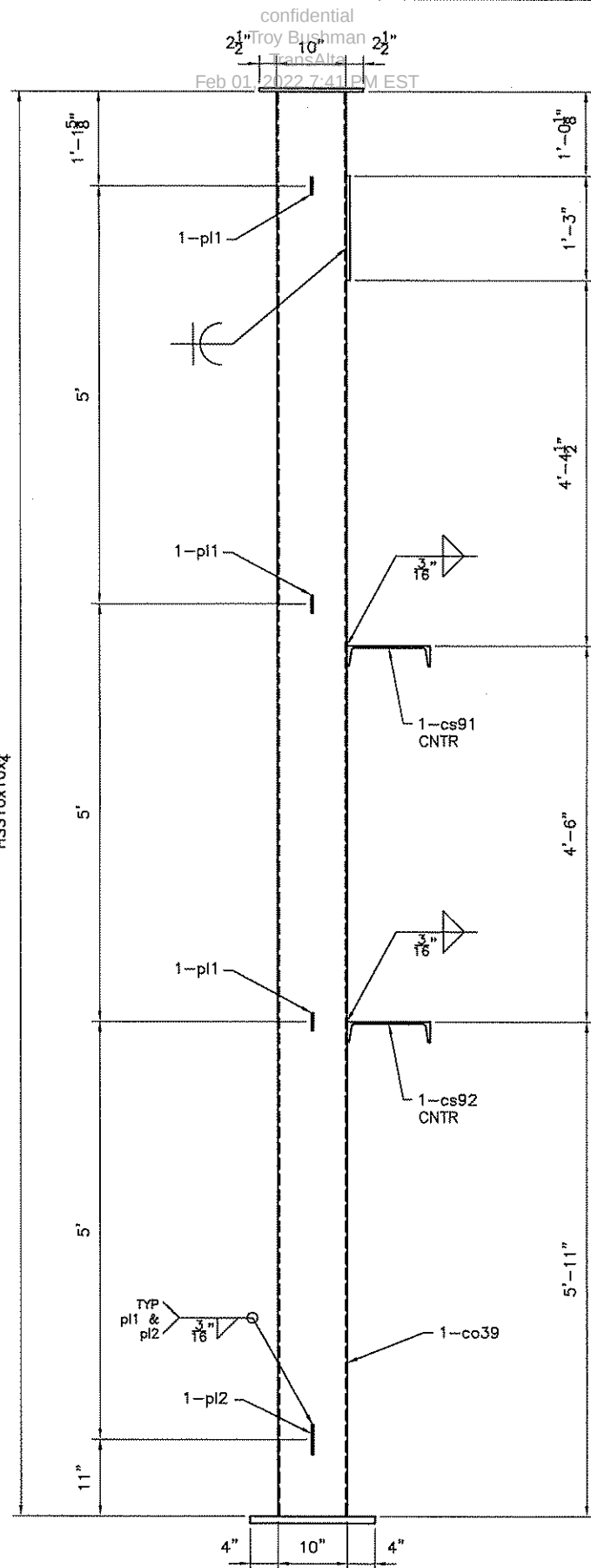
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BILL OF MATERIALS					
ITEM	QTY	DESCRIPTION	LENGTH		WEIGHT LBS
			FT	IN	
391A		COLUMN			
co39	1	HSS10x10x1/4	17	5/8	A500 GR B 556.4
bp10	1	PL 1"x18"	1	6	A572 GR 50 91.9
tp10	1	PL 1/2"x15"	1	3	A36 31.9
ep11	1	PL 1/2"x15"	1	3	A36 31.9
pl1	3	PL 1/4"x2-1/2"	0	3	A36 1.6
pl2	1	PL 1/4"x3"	0	4-1/4	A36 0.9
cs91	1	C12x20.7	1	0	A36 20.7
cs92	1	C12x20.7	1	0	A36 10.4
		SUBTOTAL			745.6
MAKE 3 TIMES					



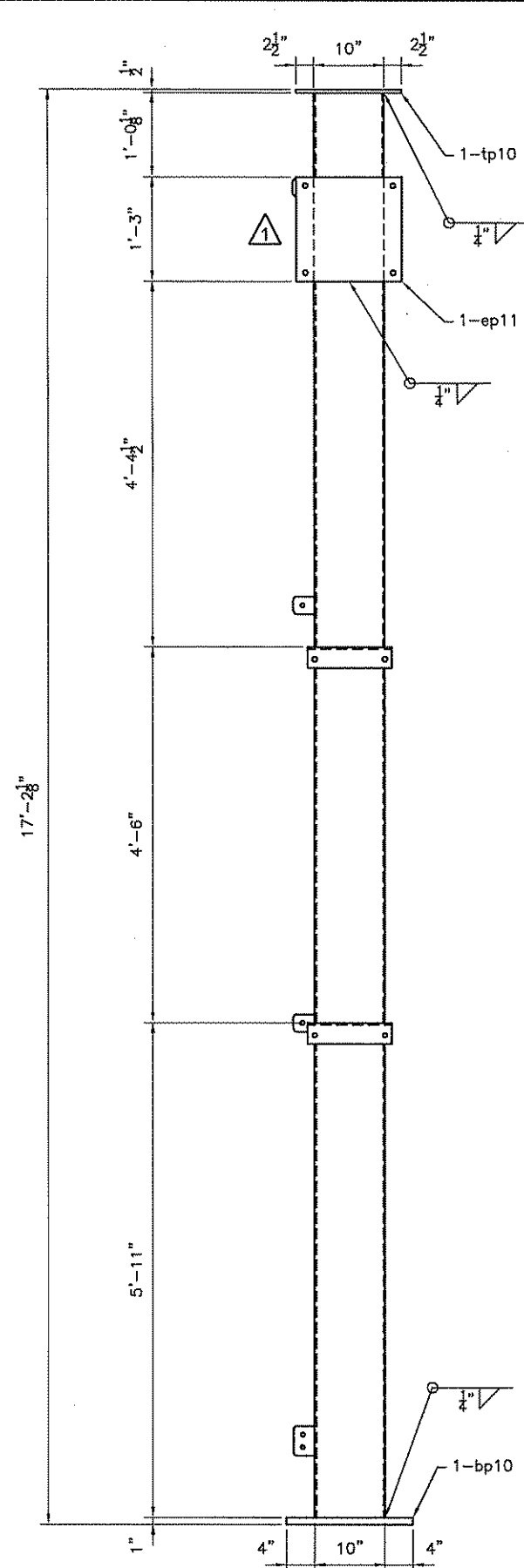
17'-0 5/8"
HSS10x10x1/4



A COLUMN 391A

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SHEET NOTES:
1. SEE ERECTION DRAWING,
BOM SUMMARY AND GENERAL
NOTES SHEET S390.

RELEASE FOR
FABRICATION
9-Jul-18

KLUTE, INC.
YORK, NE

MILLIGAN 3 SUBSTATION
34.5KV RISER STRUCTURE (34RS)

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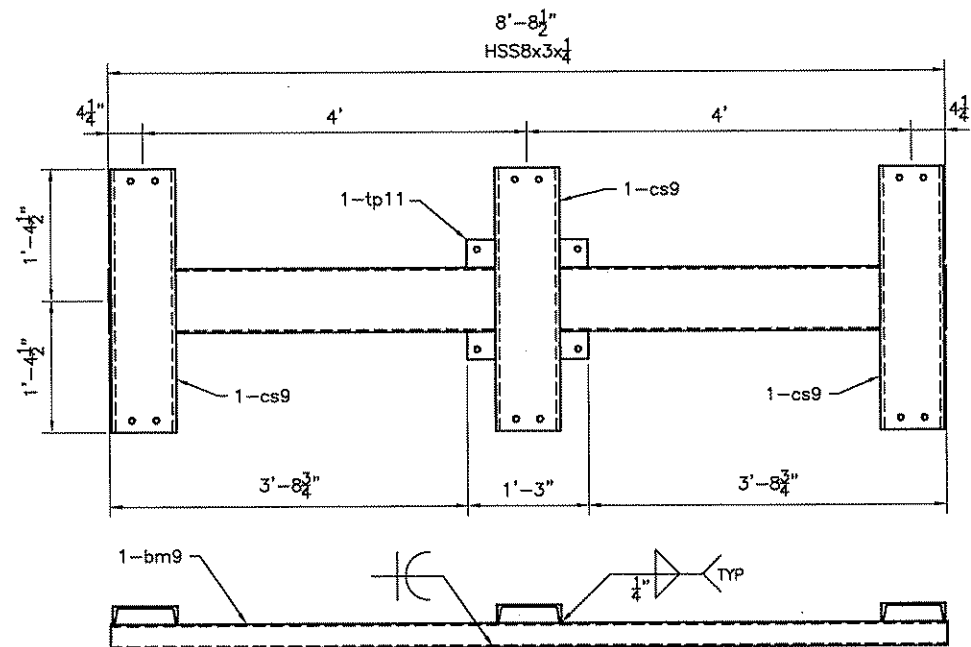


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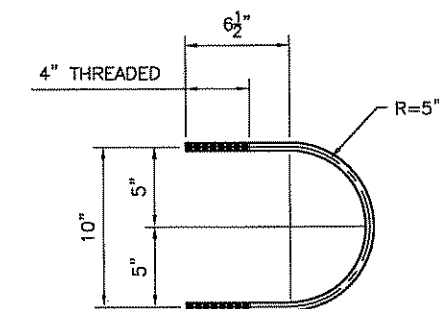
M3-S391

P:\200\S\18008-KLUTE, INC-FINAL MILLIGAN 3 SUBSTATION REDESIGN AND DETAILING\01 - FINAL PROJECT FOLDER\07 DRAWINGS\0390 - 34RSV3-S392.DWG James Garsberger 13 July 2018 8:18:43 AM

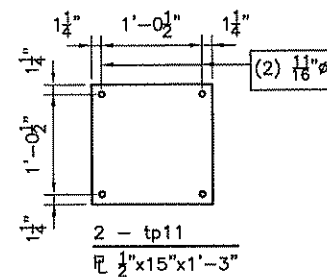
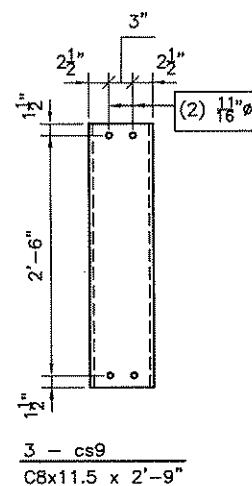
BILL OF MATERIALS						
ITEM	QTY	DESCRIPTION	LENGTH		MATERIAL	WEIGHT LBS
			FT	IN		
392A	1	BEAM				
bm39	1	HSS6x6x1/4	9	3-1/2	A500 GR B	176.7
tp11	1	PL 1/2"x15"	1	3	A36	31.9
pl1	2	PL 1/4"x2-1/2"	0	3	A36	1.1
cs2	3	C15x33.9	1	0	A36	101.7
em	2	1/2 x 16 GA x 6"	0	6	EXP MTL	0.4
		SUBTOTAL				311.8
392B	1	L3x3x1/4	5	6	A36	27.0
392C	1	1/2"-13 x 10" U-BOLT	2	4-3/4	A307	1.6
HARDWARE	4	1/2"-13 HEX NUT				
	2	1/2" CIRCULAR WASHERS				
392D	1	BEAM				
bm9	1	HSS8x3x1/4	8	8-1/2	A500 GR B	150.8
tp11	1	PL 1/2"x15"	1	3	A36	31.9
cs9	3	C8x11.5	2	9	A36	94.9
em	2	1/2 x 16 GA x 3"	0	8	EXP MTL	0.3
		SUBTOTAL				277.9
MAKE 3 TIMES						



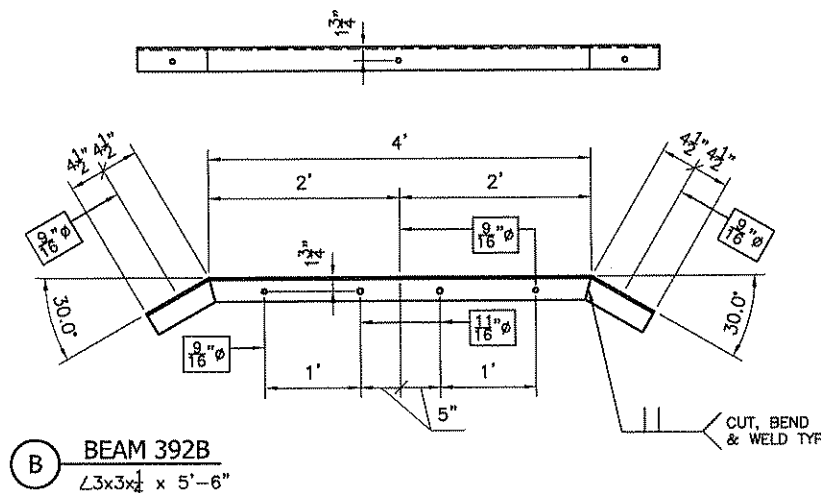
D BEAM 392D



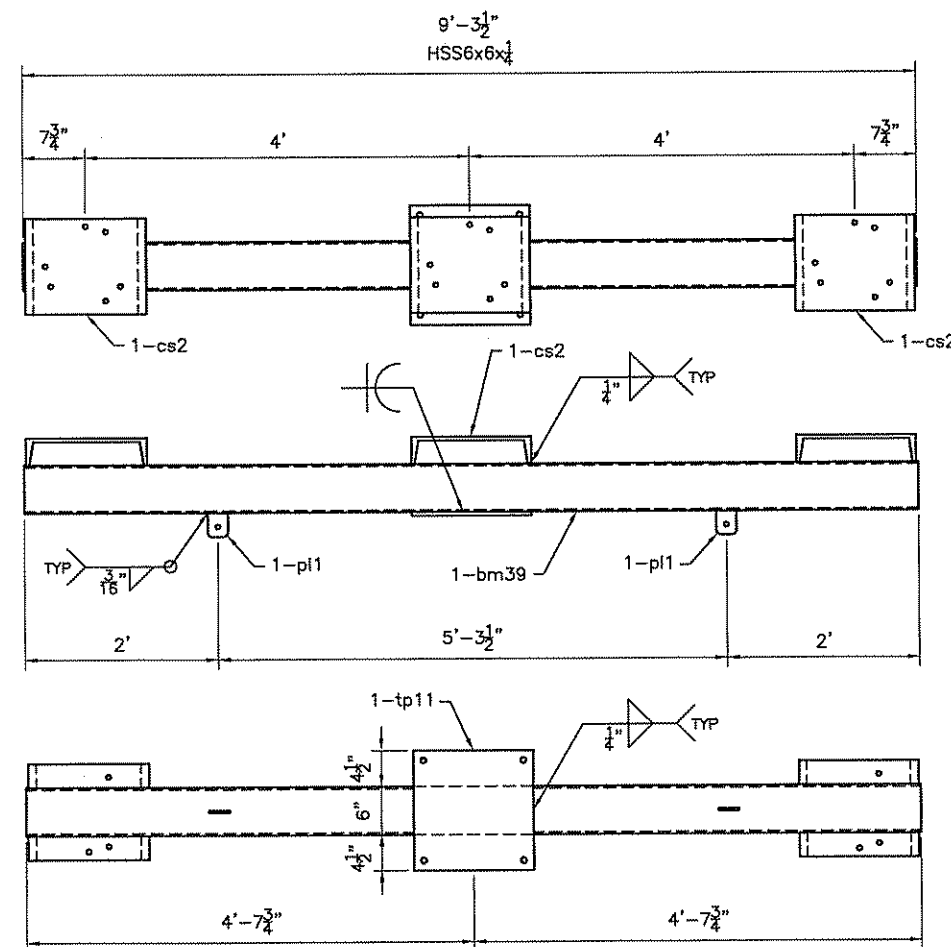
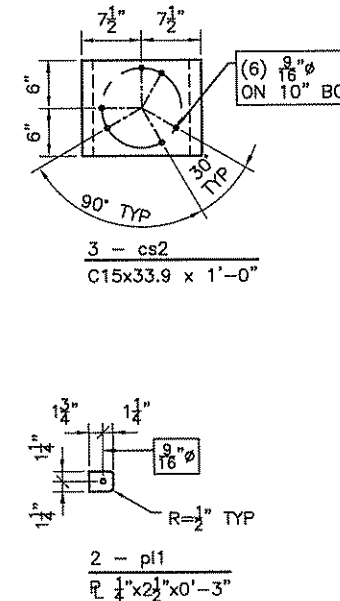
C ITEM 392C
1/2" x 10" U-BOLT
1/2"-13 BOLT x 2'-4 3/4" (+/-)



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B BEAM 392B
L3x3x1/4 x 5'-6"



A BEAM 392A

SHEET NOTES:
1. SEE ERECTION DRAWING,
BOM SUMMARY AND GENERAL
NOTES SHEET S390.

RELEASE FOR
FABRICATION
13-Jul-18

KLUTE, INC.
YORK, NE

MILLIGAN 3 SUBSTATION
34.5kV RISER STRUCTURE (34RS)

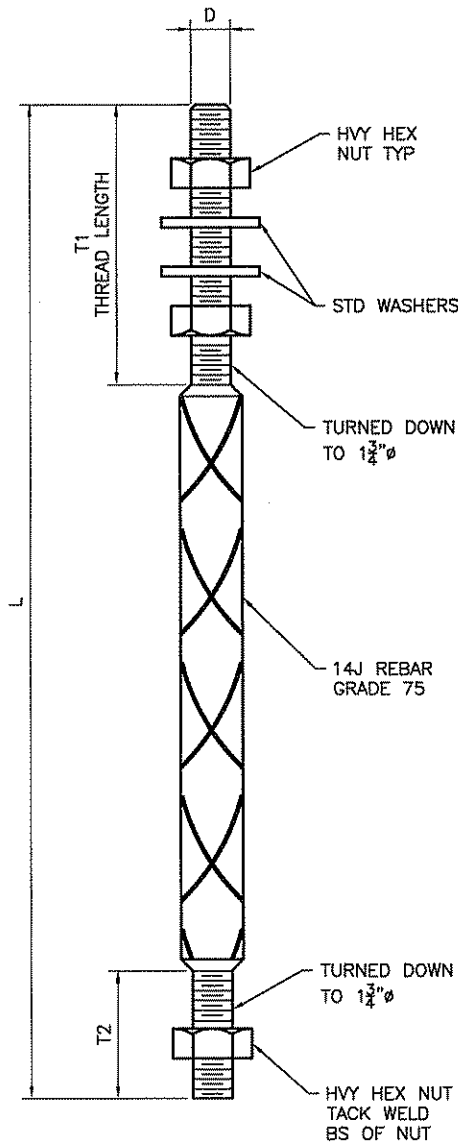
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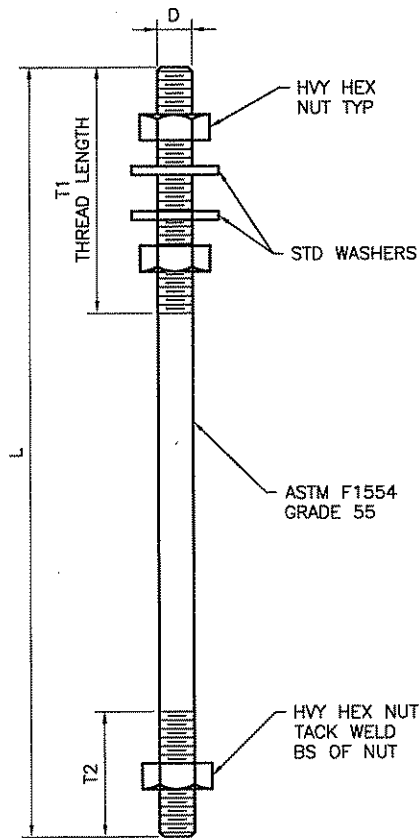
M3-S392

ANCHOR BOLT BILL OF MATERIALS							
NUMBER REQUIRED	MARK	DESCRIPTION	D	L	T1	T2	UNIT WEIGHT (LBS)
72	AB-2	ANCHOR BOLT TYPE A	1"	3'-8"	5"	1-1/2"	10.3
0	AB-3	ANCHOR BOLT TYPE A	1-1/4"	3'-9"	5-1/2"	2"	16.4
8	AB-4	ANCHOR BOLT TYPE A	1-1/2"	4'-6"	6"	2-1/2"	30.1
16	AB-5	ANCHOR BOLT TYPE B	1-3/4"	5'-10"	7"	3"	52.5
TOTAL BLACK WEIGHT							1821.6
+3.5% GALVANIZING							63.8
TOTAL GALVANIZED WEIGHT							1886

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ANCHOR BOLT
TYPE B



ANCHOR BOLT
TYPE A

- SHEET NOTES:
1. ALL ROD ASTM F1554 GRADE 55 UNO.
 2. GALVANIZE PER ASTM A123.
 3. ALL ANCHOR BOLTS TO INCLUDE STD WASHERS AND HEAVY HEX NUTS AS NOTED.
 4. PROJECTION EQUALS THREAD LENGTH UNO.

RELEASE FOR
FABRICATION
13-Jul-18

Revisions		Proj. No.
0	ORIGINAL RELEASE	218-423
1	REVISED FOR UPDATED CLIENT DRAWINGS	218-508
2	REVISED FOR AFW COMMENTS. UPDATE AB LENGTH.	218-508
3		
4		
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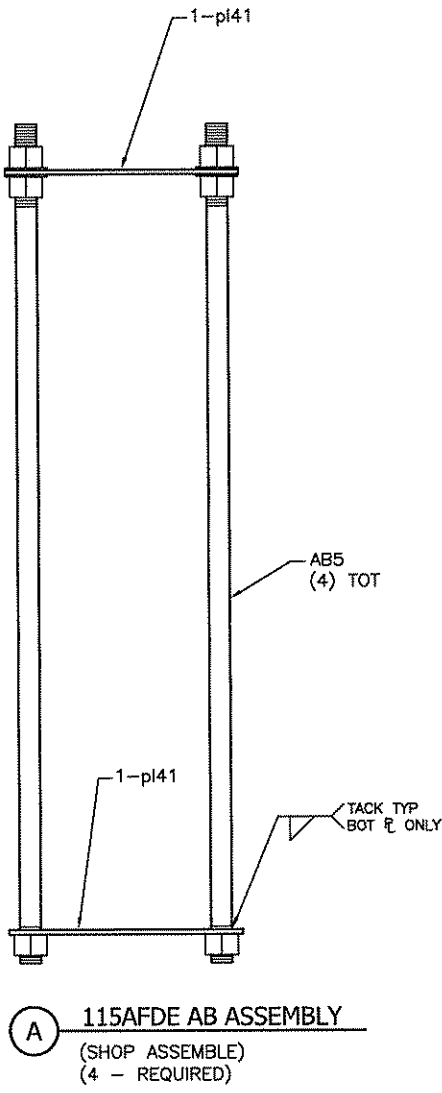
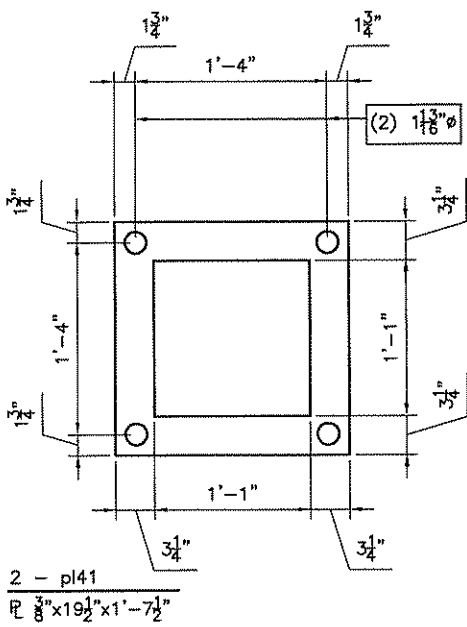
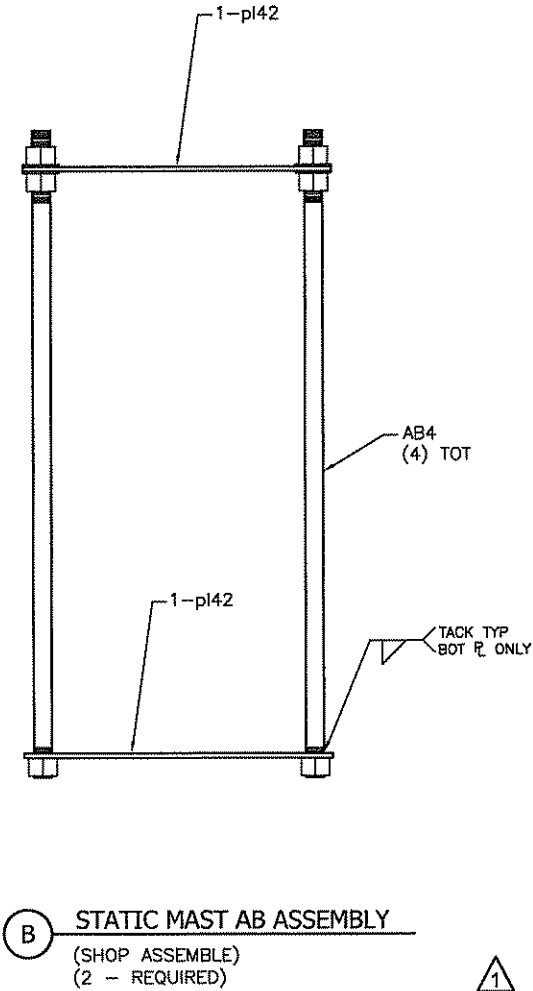
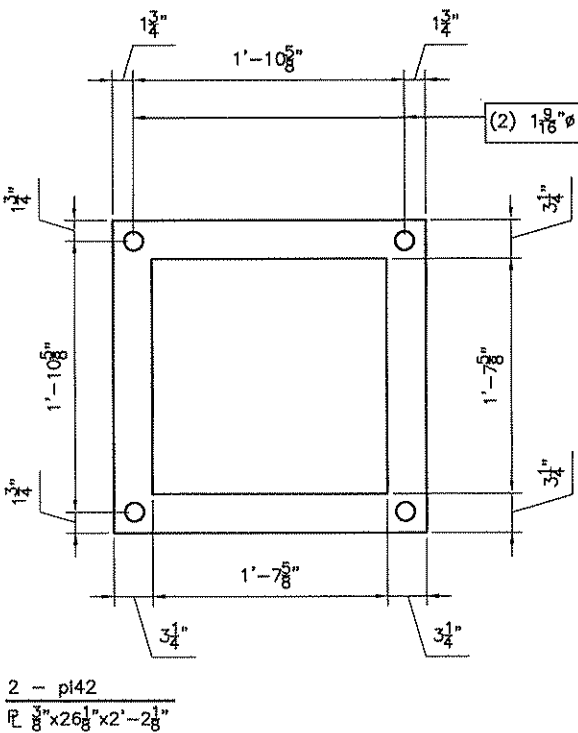
M3-S400

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BILL OF MATERIALS						
ITEM	QTY	DESCRIPTION	LENGTH		MATERIAL	WEIGHT LBS
			FT	IN		
401A	4	115AFDE AB ASSEMBLY				
pl41	2	PL 3/8"x19-1/2"	1	7-1/2	A36	44.9
		SUBTOTAL				44.9
		+3.5% GALVANIZING				1.6
		UNIT TOTAL				46.5
		TOTAL (4) REQ'D				186.0
401B	2	STATIC MAST AB ASSEMBLY				
pl42	2	PL 3/8"x26-1/8"	2	2-1/8	A36	63.2
		SUBTOTAL				63.2
		+3.5% GALVANIZING				2.2
		UNIT TOTAL				65.5
		TOTAL (2) REQ'D				130.9

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RELEASE FOR
FABRICATION
13-Jul-18



A 115AFDE AB ASSEMBLY
(SHOP ASSEMBLE)
(4 - REQUIRED)

B STATIC MAST AB ASSEMBLY
(SHOP ASSEMBLE)
(2 - REQUIRED)

- SHEET NOTES:**
1. ALL STEEL ASTM A36 UNO (E.G. PLATES, BARS, ANGLES, CHANNELS, STRUCTURAL TEES, MISCELLANEOUS STEEL, ETC).
 2. DO NOT GALVANIZE TEMPLAT PLATES.

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No	Date	Drawn	Designed	Checked	Revisions	
					Proj. No.	
0	06/23/2017	JEG	DKD	KLUTE	218-423	ORIGINAL RELEASE
1	07/09/2018	JEG	JEG	KLUTE	218-508	REVISED FOR AFW COMMENTS, ADDED TEMPLATES.
2						
3						
4						
5						
6						
7						

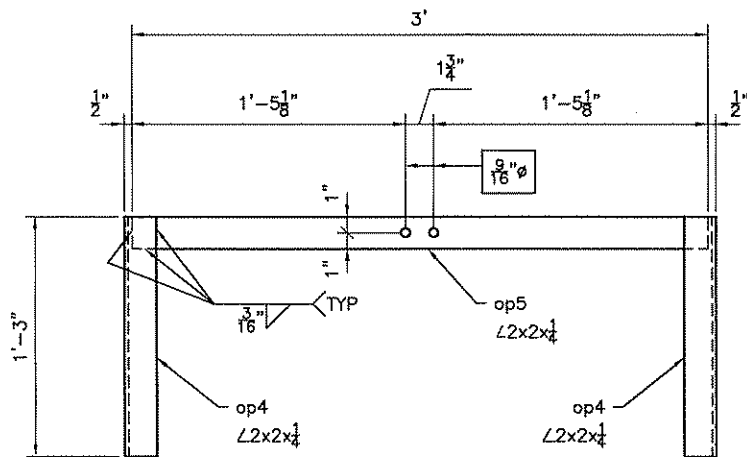
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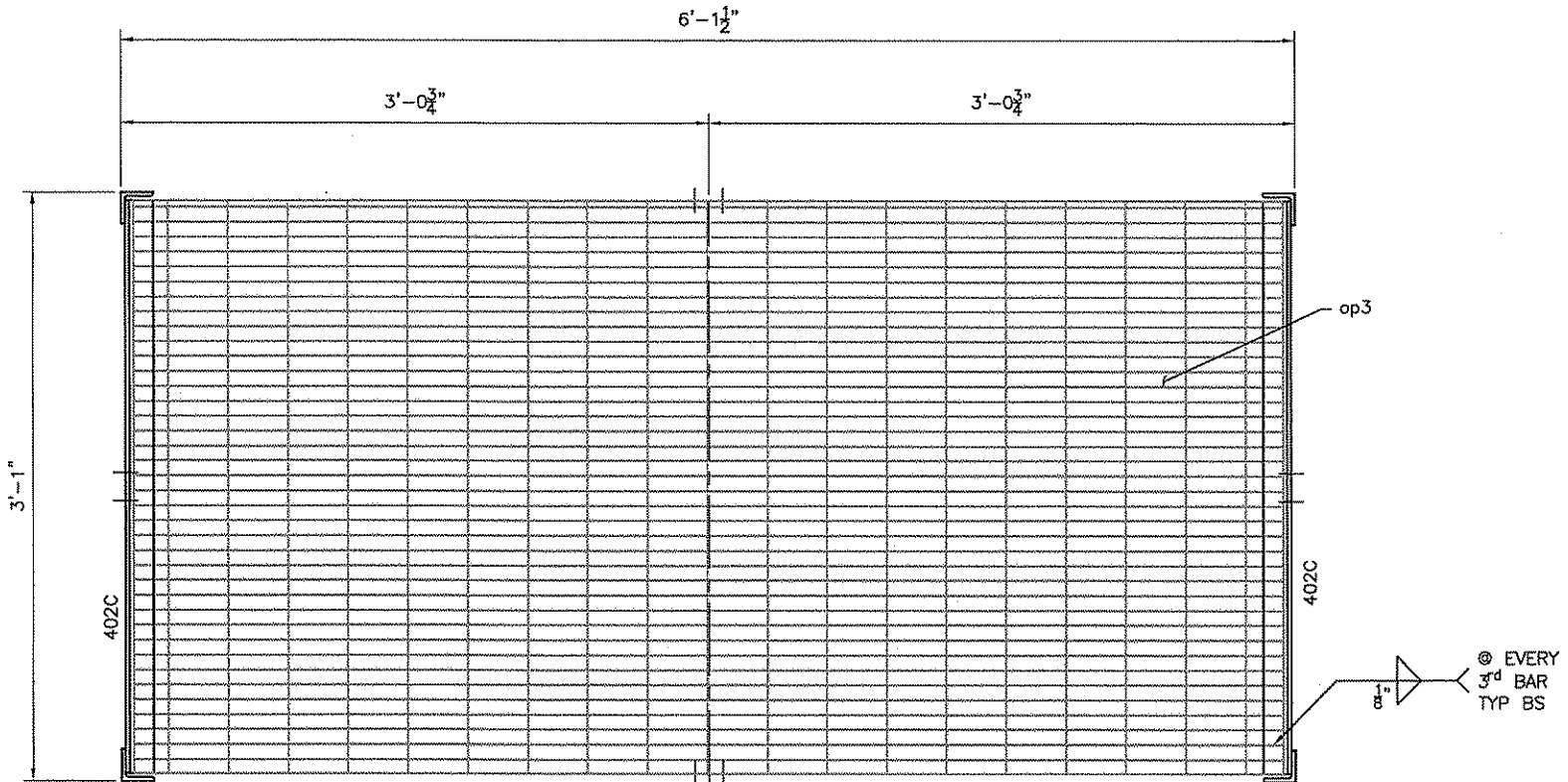
M3-S401

BILL OF MATERIALS						
ITEM	QTY	DESCRIPTION	LENGTH		MATERIAL	WEIGHT LBS
			FT	IN		
402A		WELDMENT				
op3	1	SERRATED GRATING - 3'-0" - 3/16"x1-3/4" BEARING BARS SPACED 1-3/16" OC - CROSS BARS 4" OC	6	0	GALVANIZED A36	225.0
op4	4	L2x2x1/4	1	3	A36	16.0
op5	2	L2x2x1/4	3	0	A36	19.1
		TOTAL BLACK WEIGHT				260.1
		+3.5% GALVANIZING				9.1
UNIT TOTAL						269.2
TOTAL (7) SEVEN REQ'D						1885

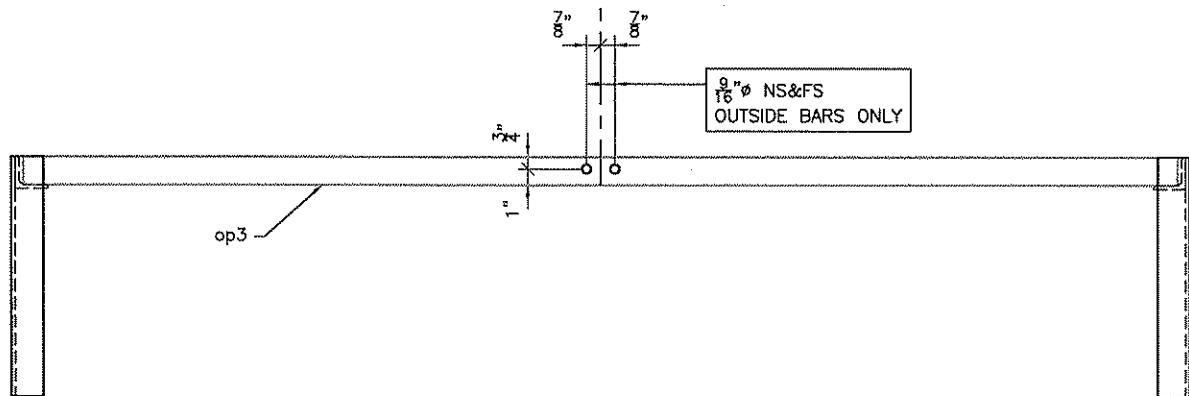
1



C 2 - WELDMENT 402C



A WELDMENT 402A



B SIDE VIEW

SHEET NOTES:

1. ALL STEEL ASTM A36 UNO (E.G. PLATES, BARS, ANGLES, CHANNELS, STRUCTURAL TEES, MISCELLANEOUS STEEL, ETC).
2. GALVANIZE ALL STRUCTURAL STEEL AFTER FABRICATION PER ASTM A123.

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RELEASE FOR
FABRICATION
9-Jul-18

KLUTE, INC.
YORK, NE

MILLIGAN 3 SUBSTATION
SWITCH OPERATOR PLATFORM (OP1)

APPROVED BY:
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M3-S402

