



March 20, 2017

Invitation to Bid 17056 Control Enclosure for Robert Douglas Substation
Addendum 1

The Bid due date is **changed to 2:00 p.m. March 30, 2017.**

Addendum 1 is issued to modify Appendix B, Scope and Drawings/Specifications, provide clarification, as well as provide answers to questions received.

1. Appendix A, Terms and Conditions, Section 20, Warranty: At a minimum, the Contractor shall include a warranty for all labor, parts and equipment supplied by this Contract for one (1) year.
2. Appendix B, Section 1.5, Assembly; The following is added in the first paragraph, after the 3rd sentence:

The Contractor shall be responsible for lifting the relay enclosure from the trailer or trailers and placing it on the prepared foundation. This includes but is not limited to providing the crane, all rigging, cribbing and labor to lift and place the relay enclosure in its final location on the prepared foundation.
3. Appendix B-1, Scope and Drawings/Specifications are changed as specified in the attached drawings. Changes are marked by revision clouds.

Question / Answers:

Clarifications:

Under this solicitation, the contractor is only responsible for crane, rigging and labor for placing the Control Enclosure on the prepared foundation. The successful bidder will negotiate separately with Matanuska Electric Association for the services and cost for the reassembly of the control enclosure after it is placed on the foundation. Services may include joining and weather proofing any shipping splits, installation of ridge caps, eaves, and fascia, which may have been removed for shipping.

Q1.) For lead time calculations, what is the anticipated award date for this project?

A1.) Anticipated award date is estimated to be April 26, 2017. This is an estimate and the Authority makes no guarantees as to the actual award date.

Q2.) Bid documents state that we are to provide warranty in accordance with the specifications. After multiple reviews of the specification documents, there is no specific

reference to warranty requirements. Can you please confer with the customer and advise what is required with regard to the Warranty?

A2.) See Item #1 above.

As a reminder, all addendum must be acknowledged on the bid schedule.

Thank you,

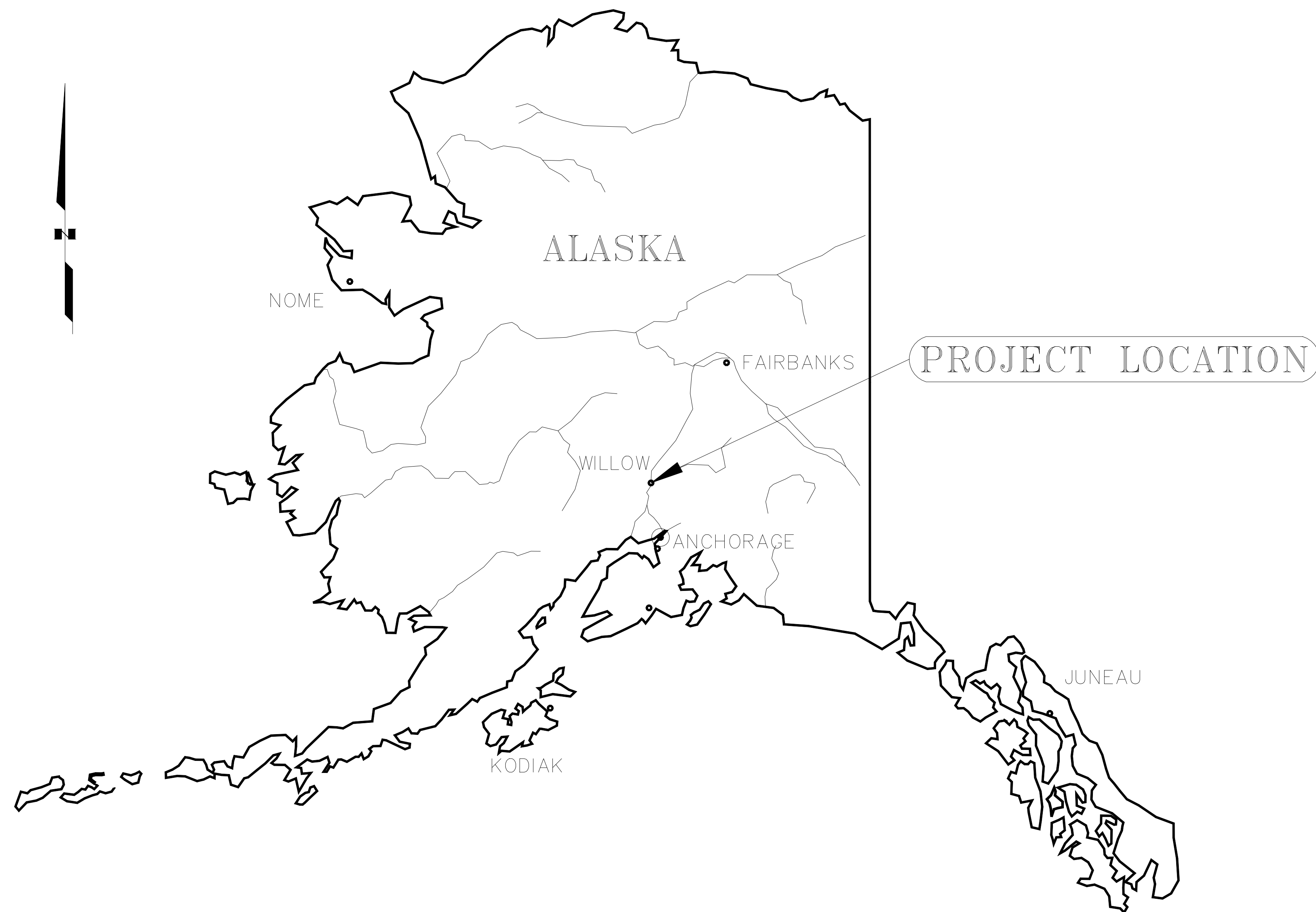
A handwritten signature in blue ink, appearing to read "A. Morton".

Andrew Morton
Contracting Officer
amorton@aidea.org

MATANUSKA ELECTRIC ASSOCIATION, INC.
 ROBERT DOUGLAS SUBSTATION
 24060 WEST WILLOW FISHHOOK ROAD, WILLOW, ALASKA
 WORK ORDER NO. EN16-3.2



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 STATEWIDE..... 800-478-3121
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 ALYESKA CABLE TV (GIRDWOOD)..... 783-2982
 MILITARY PETROLEUM FUEL LINES..... 592-2334
 OR 552-5342
 STATE STORM DRAINS & STREET LIGHTS..... 333-2411



DRAWING INDEX				
TITLE	DRAWING NUMBER	SHEET	REVISION	NOTES
CONTROL ENCLOSURE AND RELAY PANELS TITLE & DRAWING INDEX	DGSS-PR-0000	1	B	
CONTROL ENCLOSURE AND RELAY PANELS TITLE & DRAWING INDEX	DGSS-PR-0000	2	B	
CONTROL ENCLOSURE PLAN	DGSS-SS-2009	1	C	
CONTROL ENCLOSURE NORTH AND SOUTH EXTERIOR ELEVATIONS	DGSS-SS-2009	2	B	
CONTROL ENCLOSURE EAST AND WEST EXTERIOR ELEVATIONS	DGSS-SS-2009	3	B	
CONTROL ENCLOSURE NORTH AND SOUTH INTERIOR ELEVATIONS	DGSS-SS-2009	4	C	
CONTROL ENCLOSURE EAST AND WEST INTERIOR ELEVATIONS	DGSS-SS-2009	5	B	
CONTROL ENCLOSURE CABLE TRAY PLAN	DGSS-SS-2009	6	B	
CONTROL ENCLOSURE LIGHTING PLAN	DGSS-SS-2009	7	C	
CONTROL ENCLOSURE NAMEPLATES	DGSS-SS-2009	8	C	
CONTROL ENCLOSURE BILL OF MATERIAL	DGSS-SS-2009	9	C	
ELECTRICAL GENERAL INFORMATION	DGSS-EL-0000	1	A	
ELECTRICAL CABLE & WIRE STANDARD	DGSS-EL-0000	2	A	
138 kV ONE-LINE DIAGRAM	DGSS-EL-0010	1	A	
24.9 kV ONE-LINE DIAGRAM	DGSS-EL-0011	1	A	
STATION SERVICE ONE-LINE DIAGRAM	DGSS-EL-0012	1	B	
125 VDC ONE LINE DIAGRAM	DGSS-EL-0013	1	A	
SCADA NETWORK TOPOLOGY	DGSS-EL-0014	1	B	
SCADA NETWORK TOPOLOGY	DGSS-EL-0014	2	A	
SCADA NETWORK TOPOLOGY	DGSS-EL-0014	3	A	
SCADA NETWORK TOPOLOGY	DGSS-EL-0014	4	B	
SCADA NETWORK TOPOLOGY	DGSS-EL-0014	5	B	
SCADA NETWORK TOPOLOGY	DGSS-EL-0014	6	A	
SCADA NETWORK TOPOLOGY	DGSS-EL-0014	7	B	
TIME SYNCHRONIZATION NETWORK TOPOLOGY	DGSS-EL-0015	1	A	
138 kV BREAKER B1 THREE-LINE DIAGRAM	DGSS-EL-0100	1	A	PROVIDED AFTER BID AWARD
138 kV SYNC CVT THREE-LINE DIAGRAM	DGSS-EL-0101	1	A	PROVIDED AFTER BID AWARD
138 kV BUS PT THREE-LINE DIAGRAM	DGSS-EL-0102	1	A	PROVIDED AFTER BID AWARD
138/24.9 kV TRANSFORMER T1 THREE-LINE DIAGRAM	DGSS-EL-0103	1	A	PROVIDED AFTER BID AWARD
24.9 kV MAIN PT THREE-LINE DIAGRAM	DGSS-EL-0104	1	A	PROVIDED AFTER BID AWARD
STATION SERVICE THREE-LINE DIAGRAM	DGSS-EL-0105	1	A	PROVIDED AFTER BID AWARD
24.9 kV RECLOSER TD415 THREE-LINE DIAGRAM	DGSS-EL-0106	1	A	PROVIDED AFTER BID AWARD
24.9 kV RECLOSER TD425 THREE-LINE DIAGRAM	DGSS-EL-0107	1	A	PROVIDED AFTER BID AWARD
24.9 kV RECLOSER TD435 THREE-LINE DIAGRAM	DGSS-EL-0108	1	A	PROVIDED AFTER BID AWARD
125 VDC DC PANEL #1 SCHEMATIC & SCHEDULE	DGSS-EL-2000	1	A	PROVIDED AFTER BID AWARD
125 VDC DC PANEL #2 SCHEMATIC & SCHEDULE	DGSS-EL-2000	2	A	PROVIDED AFTER BID AWARD
240 VAC AC PANEL #1 SCHEMATIC & SCHEDULE	DGSS-EL-2001	1	A	PROVIDED AFTER BID AWARD
240 VAC AC PANEL #2 SCHEMATIC & SCHEDULE	DGSS-EL-2001	2	A	PROVIDED AFTER BID AWARD
2488A, 2620A, 2730MA & 2730MB DC SCHEMATIC	DGSS-EL-2002	1	A	PROVIDED AFTER BID AWARD
735-HLY1 DC SCHEMATIC	DGSS-EL-2003	1	A	PROVIDED AFTER BID AWARD
735-HLY2 DC SCHEMATIC	DGSS-EL-2004	1	A	PROVIDED AFTER BID AWARD
3530A DC SCHEMATIC	DGSS-EL-2005	1	A	PROVIDED AFTER BID AWARD
2240A DC SCHEMATIC	DGSS-EL-2006	1	A	PROVIDED AFTER BID AWARD
2411A DC SCHEMATIC	DGSS-EL-2007	1	A	PROVIDED AFTER BID AWARD
421-HLY DC SCHEMATIC	DGSS-EL-2008	1	A	PROVIDED AFTER BID AWARD
311L-HLY DC SCHEMATIC	DGSS-EL-2009	1	A	PROVIDED AFTER BID AWARD
DFR1 DC SCHEMATIC	DGSS-EL-2010	1	A	PROVIDED AFTER BID AWARD
421-TLND DC SCHEMATIC	DGSS-EL-2011	1	A	PROVIDED AFTER BID AWARD
311L-TLND DC SCHEMATIC	DGSS-EL-2012	1	A	PROVIDED AFTER BID AWARD
487E-T1 DC SCHEMATIC	DGSS-EL-2013	1	A	PROVIDED AFTER BID AWARD
86T1 DC SCHEMATIC	DGSS-EL-2014	1	A	PROVIDED AFTER BID AWARD
735-T1-1 DC SCHEMATIC	DGSS-EL-2015	1	A	PROVIDED AFTER BID AWARD
735-T1-2 DC SCHEMATIC	DGSS-EL-2016	1	A	PROVIDED AFTER BID AWARD
451-TD325 DC SCHEMATIC	DGSS-EL-2017	1	A	PROVIDED AFTER BID AWARD
451-TD415 DC SCHEMATIC	DGSS-EL-2018	1	A	PROVIDED AFTER BID AWARD
451-TD425 DC SCHEMATIC	DGSS-EL-2019	1	A	PROVIDED AFTER BID AWARD
451-TD435 DC SCHEMATIC	DGSS-EL-2020	1	A	PROVIDED AFTER BID AWARD
2730MC & 2725A DC SCHEMATIC	DGSS-EL-2021	1	A	PROVIDED AFTER BID AWARD
3530B DC SCHEMATIC	DGSS-EL-2022	1	A	PROVIDED AFTER BID AWARD
2240B DC SCHEMATIC	DGSS-EL-2023	1	A	PROVIDED AFTER BID AWARD
2523A DC SCHEMATIC	DGSS-EL-2024	1	A	PROVIDED AFTER BID AWARD
125 VDC BATTERY CHARGER AC & DC SCHEMATIC	DGSS-EL-2025	1	A	PROVIDED AFTER BID AWARD
MS2000A AC & DC SCHEMATIC	DGSS-EL-2026	1	A	PROVIDED AFTER BID AWARD
HYDROGEN DETECTION AC SYSTEM SCHEMATIC	DGSS-EL-2027	1	A	PROVIDED AFTER BID AWARD
FIRE DETECTION SYSTEM AC SCHEMATIC	DGSS-EL-2028	1	A	PROVIDED AFTER BID AWARD
HVAC SYSTEM SCHEMATIC	DGSS-EL-2029	1	A	PROVIDED AFTER BID AWARD
HVAC SYSTEM SCHEMATIC	DGSS-EL-2029	2	A	PROVIDED AFTER BID AWARD
INTERIOR LIGHT & RECEPTACLE AC SCHEMATIC	DGSS-EL-2030	1	A	PROVIDED AFTER BID AWARD
EXTERIOR LIGHT & RECEPTACLE AC SCHEMATIC	DGSS-EL-2031	1	A	PROVIDED AFTER BID AWARD
RELAY PANELS LIGHT & RECEPTACLE AC SCHEMATIC	DGSS-EL-2032	1	A	PROVIDED AFTER BID AWARD
MAINTENANCE LIGHTING AC SCHEMATIC	DGSS-EL-2500	1	A	PROVIDED AFTER BID AWARD
138 kV BREAKER B1 AC & DC SCHEMATIC	DGSS-EL-2501	1	A	PROVIDED AFTER BID AWARD
138 kV MOTOR OPERATED SWITCH DG-138-2S3 AC & DC SCHEMATIC	DGSS-EL-2502	1	A	PROVIDED AFTER BID AWARD
138 kV CIRCUIT SWITCHER TD200 AC & DC SCHEMATIC	DGSS-EL-2503	1	A	PROVIDED AFTER BID AWARD
138 kV TRANSFORMER T1 AC & DC SCHEMATIC	DGSS-EL-2504	1	A	PROVIDED AFTER BID AWARD

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS		JOB #: MEA W.O. EN16-3.2	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	KER/09-19-2016	TCC/09-19-2016
B	ISSUED FOR BID	KER/03-15-2017	TCC/03-15-2017

ENG. STAMP

Matanuska Electric Association

163 East Industrial Way
Palmer, AK 99645
(907) 761-9300
WWW.MEA.COOP

NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION

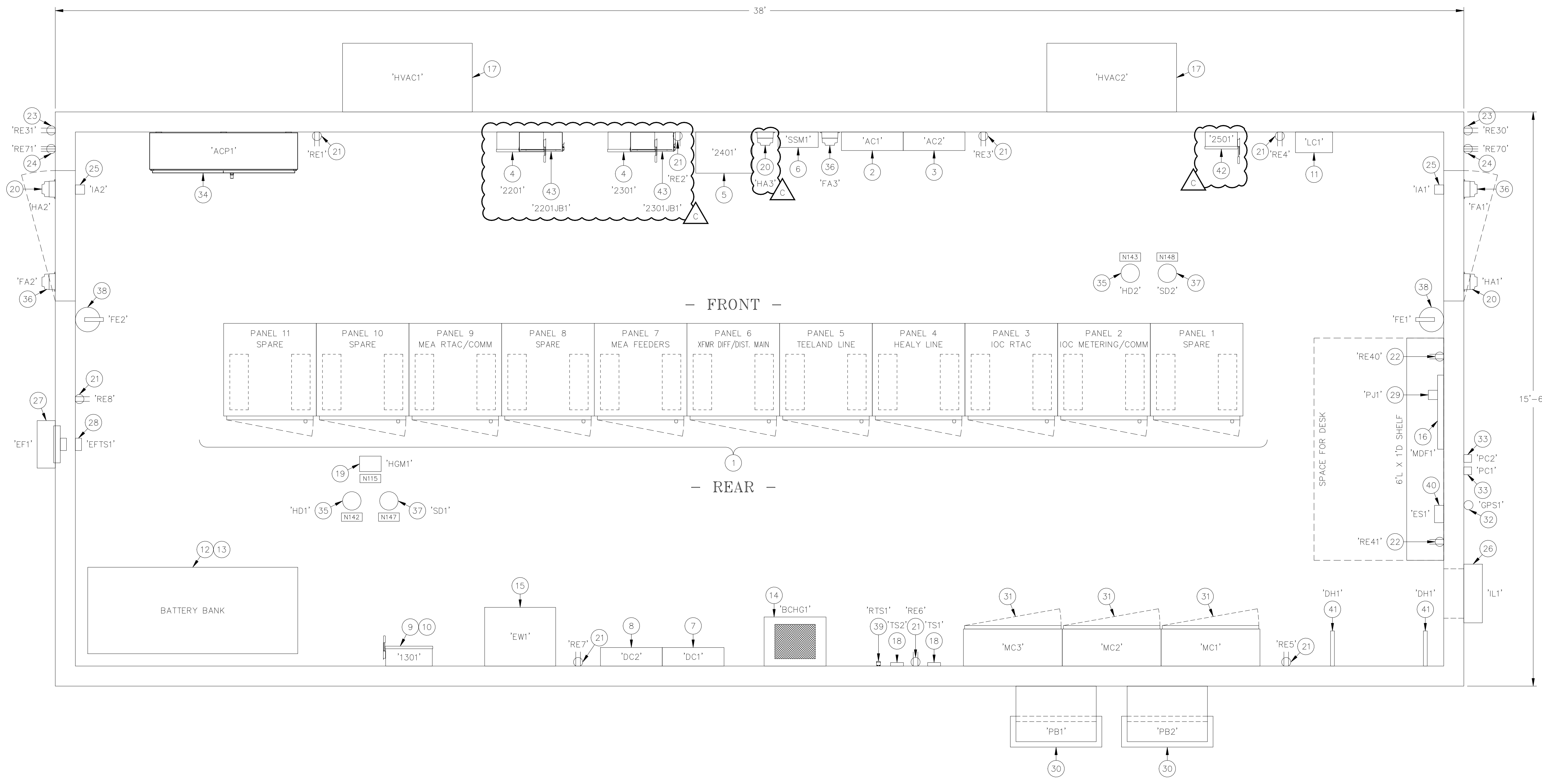
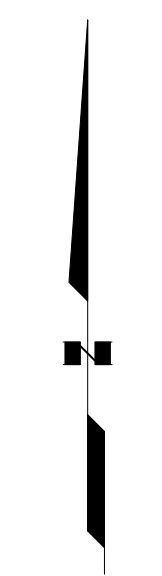
DRAWING NAME:
**DOUGLAS SUBSTATION
 CONTROL ENCLOSURE AND RELAY PANELS
 TITLE & DRAWING INDEX**

dgss-pr-0000_1.dwg

REF. DWG(S):

DRAWING NO.: **DGSS-PR-0000**

SHEET **1** OF **2**



NOTES:
 ① SEE DRAWING REFERENCE 1 FOR BILL OF MATERIAL.
 ② SEE DRAWING REFERENCE 2 FOR NAMEPLATES (INXXX).



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A	ISSUED FOR DESIGN CONCEPT REVIEW	KER/07-01-2016
B	ISSUED FOR BID REVIEW	KER/09-19-2016
C	ISSUED FOR BID	KER/03-15-2017

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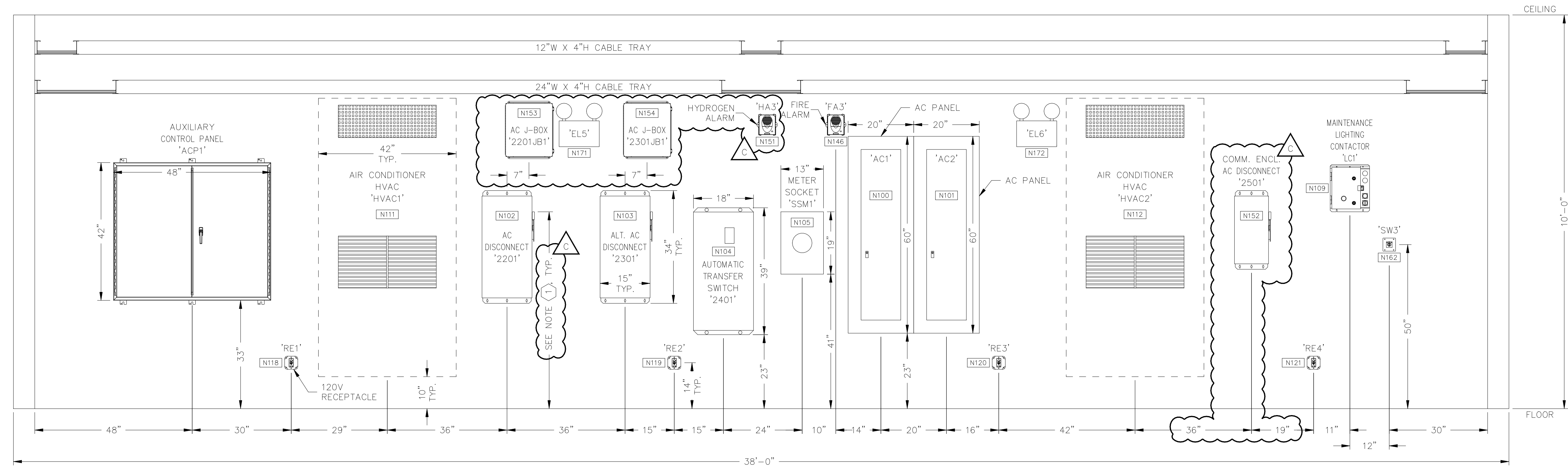
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1	DGSS-SS-2009/9	CONTROL ENCLOSURE BILL OF MATERIAL
2	DGSS-SS-2009/8	CONTROL ENCLOSURE NAMEPLATES

DRAWING NAME: DOUGLAS SUBSTATION CONTROL ENCLOSURE PLAN

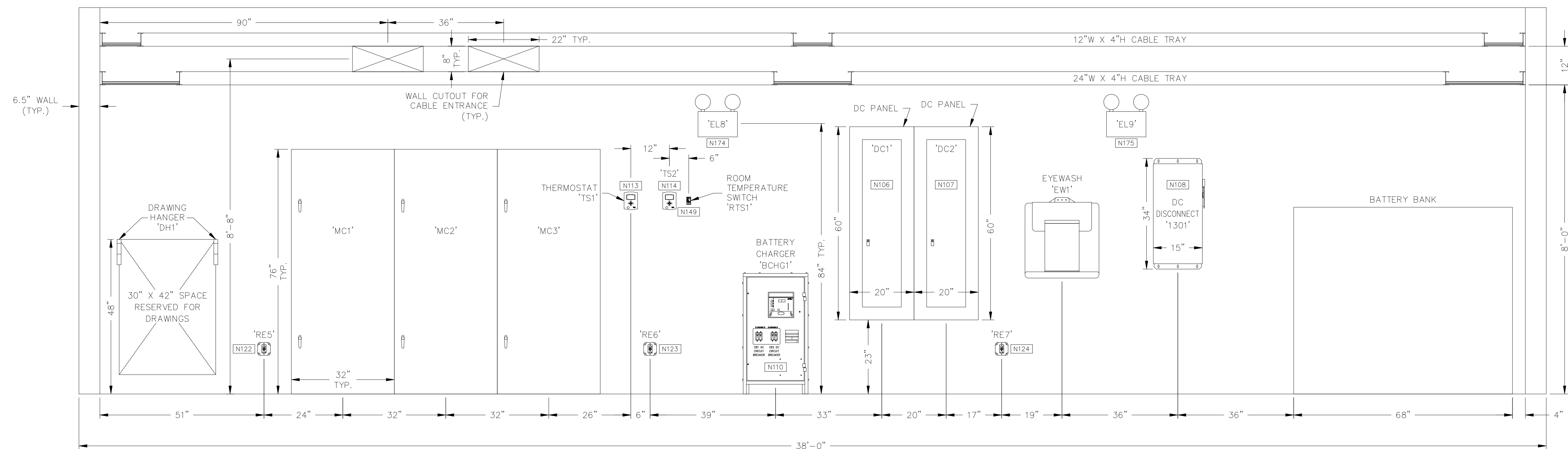
REF. DWG(S):

DRAWING NO.: DGSS-SS-2009

SHEET 1 OF 9

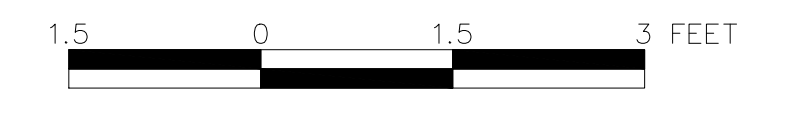


1 NORTH ELEVATION



2 SOUTH ELEVATION

- NOTES:
- 1 MAXIMUM HEIGHT OF 6' FROM FLOOR TO THE TOP OF OPERATING HANDLE WHEN IN THE UP POSITION.
 - 2 SEE DRAWING REFERENCE 3 FOR NAMEPLATES (XXXX).
 - 3 SEE DRAWING REFERENCE 4 FOR BILL OF MATERIAL.



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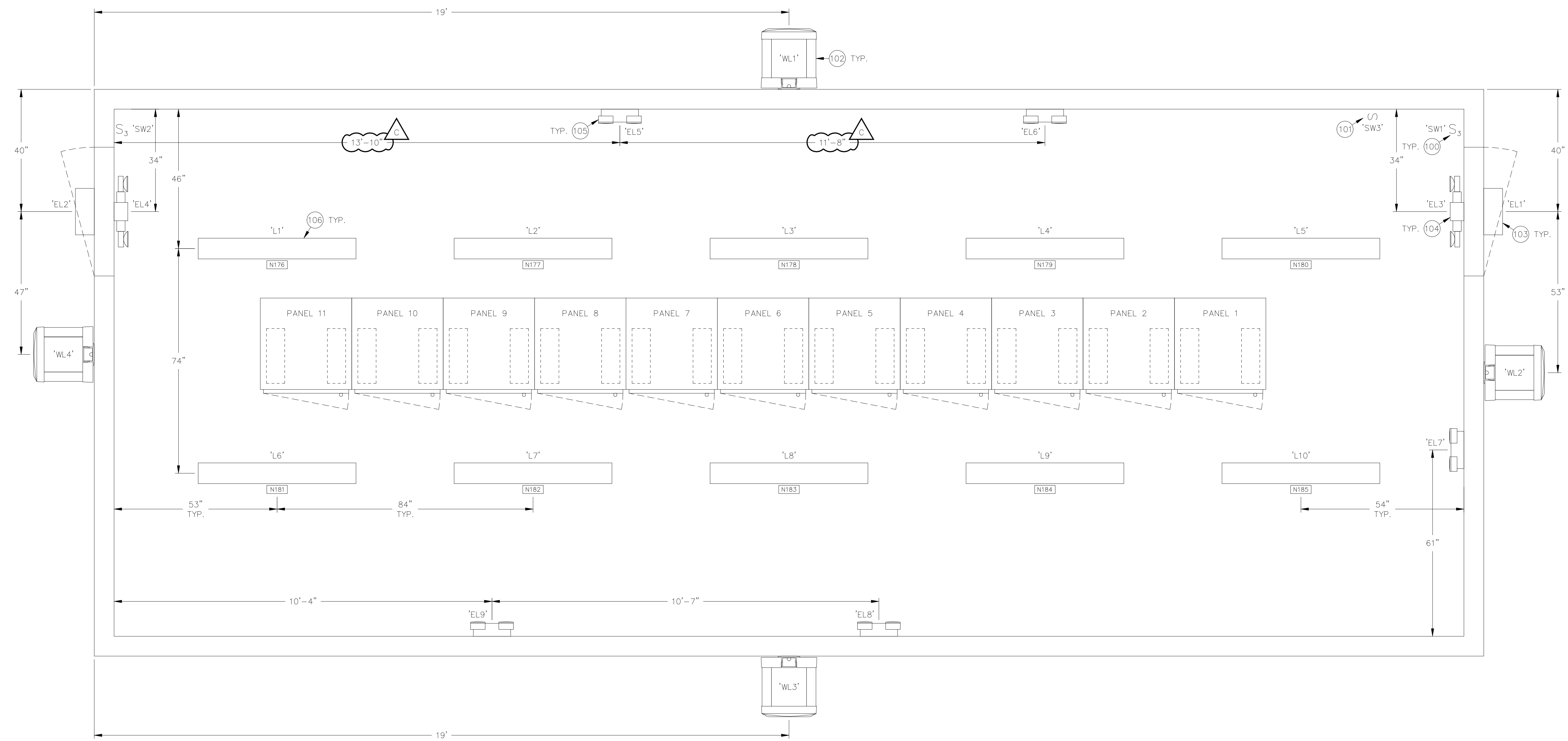
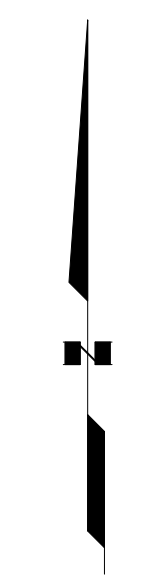
NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION
1	-	NORTH ELEVATION
2	-	SOUTH ELEVATION
3	DGSS-SS-2009/8	CONTROL ENCLOSURE NAMEPLATES
4	DGSS-SS-2009/9	CONTROL ENCLOSURE BILL OF MATERIAL

DRAWING NAME: DOUGLAS SUBSTATION CONTROL ENCLOSURE NORTH AND SOUTH INTERIOR ELEVATIONS

REF. DWG(S):

DRAWING NO.: DGSS-SS-2009

SHEET 4 OF 9



NOTES:

- ① SEE DRAWING REFERENCE 1 FOR BILL OF MATERIAL.
- ② SEE DRAWING REFERENCE 2 FOR NAMEPLATES (XXXX).



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B	ISSUED FOR BID REVIEW	KER/09-19-2016	TCC/09-19-2016
C	ISSUED FOR BID	KER/03-15-2017	TCC/03-15-2017

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Matanuska Electric Association

MEAA
MATANUSKA ELECTRIC ASSOCIATION

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NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION
1	DGSS-SS-2009/9	CONTROL ENCLOSURE BILL OF MATERIAL
2	DGSS-SS-2009/8	CONTROL ENCLOSURE NAMEPLATES

DRAWING NAME: DOUGLAS SUBSTATION CONTROL ENCLOSURE LIGHTING PLAN

REF. DWG(S):

DRAWING NO.: DGSS-SS-2009

SHEET 7 OF 9

dgss-ss-2009_7.dwg

NAMEPLATE NUMBER	QTY	LINE 1 TEXT	LINE 2 TEXT	LINE 3 TEXT	NAMEPLATE SIZE HEIGHT x WIDTH (IN)	TEXT HEIGHT (IN)
N100	1	AC PANEL	AC1		1 x 3	1/4
N101	1	AC PANEL	AC2		1 x 3	1/4
N102	1	AC DISCONNECT	2201		1 x 4	1/4
N103	1	AC DISCONNECT	2301		1 x 4	1/4
N104	1	AUTO TRANSFER	SWITCH 2401		1 x 4	1/4
N105	1	STATION SERVICE	METER 1		1 x 4	1/4
N106	1	DC PANEL	DC1		1 x 3	1/4
N107	1	DC PANEL	DC2		1 x 3	1/4
N108	1	DC FUSED DISCONNECT	1301		1 x 5	1/4
N109	1	MAINTENANCE LIGHTING	CONTACTOR	LC1	1-1/2 x 5	1/4
N110	1	BATTERY CHARGER	BCHG1		1 x 4	1/4
N111	1	HVAC UNIT	HVAC1		1 x 3	1/4
N112	1	HVAC UNIT	HVAC2		1 x 3	1/4
N113	1	HVAC1 THERMOSTAT	TS1		1 x 4	1/4
N114	1	HVAC2 THERMOSTAT	TS2		1 x 4	1/4
N115	1	H2 GAS MON.	HGM1		1 x 3	1/4
N116	1	HYDROGEN ALARM	HA1		1 x 4	1/4
N117	1	HYDROGEN ALARM	HA2		1 x 4	1/4
N118	1	120 VAC	RECEPTACLE	RE1	1-1/2 x 3	1/4
N119	1	120 VAC	RECEPTACLE	RE2	1-1/2 x 3	1/4
N120	1	120 VAC	RECEPTACLE	RE3	1-1/2 x 3	1/4
N121	1	120 VAC	RECEPTACLE	RE4	1-1/2 x 3	1/4
N122	1	120 VAC	RECEPTACLE	RE5	1-1/2 x 3	1/4
N123	1	120 VAC	RECEPTACLE	RE6	1-1/2 x 3	1/4
N124	1	120 VAC	RECEPTACLE	RE7	1-1/2 x 3	1/4
N125	1	120 VAC	RECEPTACLE	RE8	1-1/2 x 3	1/4
N126	1	120 VAC	RECEPTACLE	RE40	1-1/2 x 3	1/4
N127	1	120 VAC	RECEPTACLE	RE41	1-1/2 x 3	1/4
N128	1	120 VAC	RECEPTACLE	RE30	1-1/2 x 3	1/4
N129	1	120 VAC	RECEPTACLE	RE31	1-1/2 x 3	1/4
N130	1	240 VAC	RECEPTACLE	RE70	1-1/2 x 3	1/4
N131	1	240 VAC	RECEPTACLE	RE71	1-1/2 x 3	1/4
N132	1	INTRUSION ALM	IA1		1 x 4	1/4
N133	1	INTRUSION ALM	IA2		1 x 4	1/4
N134	1	INTAKE LOUVER	IL1		1 x 4	1/4
N135	1	EXHAUST FAN	EF1		1 x 4	1/4
N136	1	EXHAUST SYSTEM	THERMOSTAT	EFTS1	1-1/2 x 4	1/4
N137	1	TELEPHONE JACK	PJ1		1 x 4	1/4
N138	1	PULL BOX 1	PB1		1 x 4	1/4
N139	1	PULL BOX 2	PB2		1 x 4	1/4
N140	1	PHOTO CONTROL	PC1		1 x 4	1/4
N141	1	PHOTO CONTROL	PC2		1 x 4	1/4
N142	1	HEAT DETECTOR	HD1		1 x 4	1/4
N143	1	HEAT DETECTOR	HD2		1 x 4	1/4

NAMEPLATE NUMBER	QTY	LINE 1 TEXT	LINE 2 TEXT	LINE 3 TEXT	NAMEPLATE SIZE HEIGHT x WIDTH (IN)	TEXT HEIGHT (IN)
N144	1	FIRE ALARM	FA1		1 x 3	1/4
N145	1	FIRE ALARM	FA2		1 x 3	1/4
N146	1	FIRE ALARM	FA3		1 x 3	1/4
N147	1	SMOKE DETECTOR	SD1		1 x 4	1/4
N148	1	SMOKE DETECTOR	SD2		1 x 4	1/4
N149	1	ROOM TEMPERATURE	SWITCH	RTS1	1-1/2 x 5	1/4
N150	1	ES1	ETHERNET SWITCH	SEL-2725	1 x 3	1/8
N151	1	HYDROGEN ALARM	HA3		1 x 4	1/4
N152	1	COMM ENCLOSURE	AC DISCONNECT	2501	1-1/2 x 4	1/4
N153	1	AC JUNCTION BOX	2201JB1		1-1/2 x 5	1/4
N154	1	AC JUNCTION BOX	2301JB1		1-1/2 x 5	1/4
N155						
N156						
N157						
N158						
N159						
N160	1	INTERIOR LIGHT SW	SW1		1 x 4	1/4
N161	1	INTERIOR LIGHT SW	SW2		1 x 4	1/4
N162	1	EXTERIOR LIGHT SW	SW3		1 x 4	1/4
N163	1	WALLPACK LIGHT	WL1		1 x 4	1/4
N164	1	WALLPACK LIGHT	WL2		1 x 4	1/4
N165	1	WALLPACK LIGHT	WL3		1 x 4	1/4
N166	1	WALLPACK LIGHT	WL4		1 x 4	1/4
N167	1	EMERGENCY LIGHT	EL1		1 x 4	1/4
N168	1	EMERGENCY LIGHT	EL2		1 x 4	1/4
N169	1	EMERGENCY EXIT LIGHT	EL3		1 x 5	1/4
N170	1	EMERGENCY EXIT LIGHT	EL4		1 x 5	1/4
N171	1	EMERGENCY LIGHT	EL5		1 x 4	1/4
N172	1	EMERGENCY LIGHT	EL6		1 x 4	1/4
N173	1	EMERGENCY LIGHT	EL7		1 x 4	1/4
N174	1	EMERGENCY LIGHT	EL8		1 x 4	1/4
N175	1	EMERGENCY LIGHT	EL9		1 x 4	1/4
N176	1	CEILING LIGHT	L1		1 x 3	1/4
N177	1	CEILING LIGHT	L2		1 x 3	1/4
N178	1	CEILING LIGHT	L3		1 x 3	1/4
N179	1	CEILING LIGHT	L4		1 x 3	1/4
N180	1	CEILING LIGHT	L5		1 x 3	1/4
N181	1	CEILING LIGHT	L6		1 x 3	1/4
N182	1	CEILING LIGHT	L7		1 x 3	1/4
N183	1	CEILING LIGHT	L8		1 x 3	1/4
N184	1	CEILING LIGHT	L9		1 x 3	1/4
N185	1	CEILING LIGHT	L10		1 x 3	1/4
N186						
N187						

NOTES:

- ① ALL NAMEPLATES SHALL BE 1/16" THICK MINIMUM PLASTIC.
- ② ALL NAMEPLATES SHALL HAVE EXTERIOR RATED HIGH-TACK ADHESIVE.
- ③ ALL NAMEPLATES SHALL BE BLACK SURFACE WITH WHITE TEXT.
- ④ ALL TEXT SHALL BE "ARIAL BOLD" FONT.
- ⑤ EACH LINE OF TEXT SHALL BE CENTERED ON THE NAMEPLATE.
- ⑥ ALL TEXT SHALL BE UPPER CASE.
- ⑦ ALL DIMENSIONS SHOWN IN INCHES.

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS		JOB #: MEA W.O. EN16-3.2	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
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C	ISSUED FOR BID	KER/03-15-2017	TCC/03-15-2017

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NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION

DRAWING NAME:		DOUGLAS SUBSTATION CONTROL ENCLOSURE NAMEPLATES	
REF. DWG(S):			
DRAWING NO.:		DGSS-SS-2009	
		SHEET 8 OF 9	

dgss-ss-2009_8.dwg

BILL OF MATERIAL table with columns: REF. NO., UNIT, ESTIMATED QUANTITY, DESCRIPTION, MANUFACTURER/CATALOG NUMBER, FURNISHED BY. Includes items 1-20 such as relay panels, AC panels, disconnects, switches, and HVAC units.

BILL OF MATERIAL table with columns: REF. NO., UNIT, ESTIMATED QUANTITY, DESCRIPTION, MANUFACTURER/CATALOG NUMBER, FURNISHED BY. Includes items 21-50 such as interior and exterior receptacles, intrusion alarms, dampers, fans, and control panels.

BILL OF MATERIAL table with columns: REF. NO., UNIT, ESTIMATED QUANTITY, DESCRIPTION, MANUFACTURER/CATALOG NUMBER, FURNISHED BY. Includes items 100-106 such as light switches, LED wall pack lights, and emergency lights.

BILL OF MATERIAL table with columns: REF. NO., UNIT, ESTIMATED QUANTITY, DESCRIPTION, MANUFACTURER/CATALOG NUMBER, FURNISHED BY. Includes items 120-138 such as cable trays, horizontal tees, bends, and support kits.

- NOTES:
1. BILL OF MATERIAL QUANTITIES ARE ESTIMATED. ACTUAL QUANTITIES SHALL BE VERIFIED BY THE CONTRACTOR.
2. SWITCHGEAR MANUFACTURER TO CERTIFY HEATING & COOLING CAPACITY.

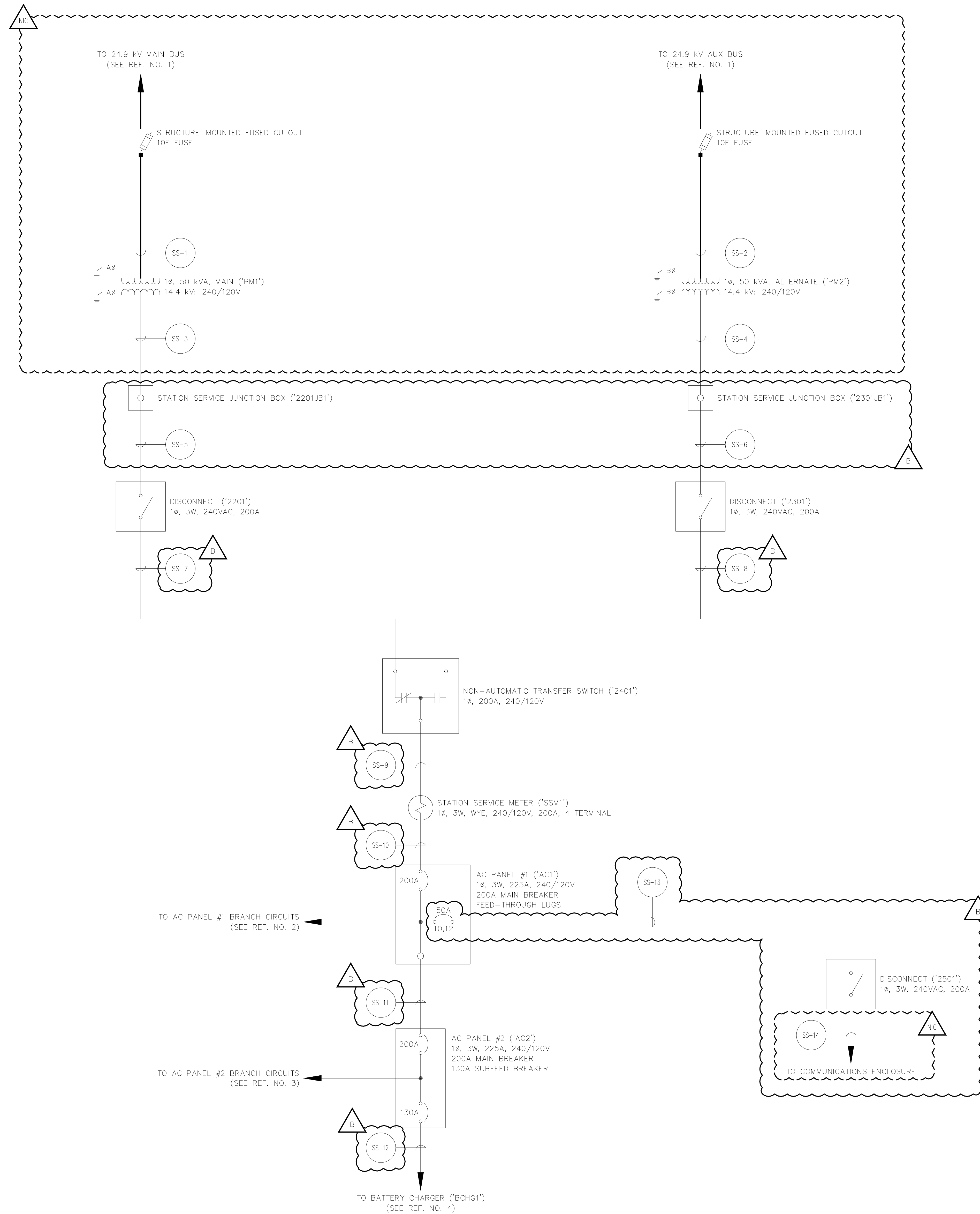
PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT. DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS. JOB #: MEA W.O. EN16-3.2. Includes revision table with columns: NO., DESIGN/CONSTRUCTION/ASBUILT REVISION, DWN BY/DATE, REVIEWED BY/DATE.

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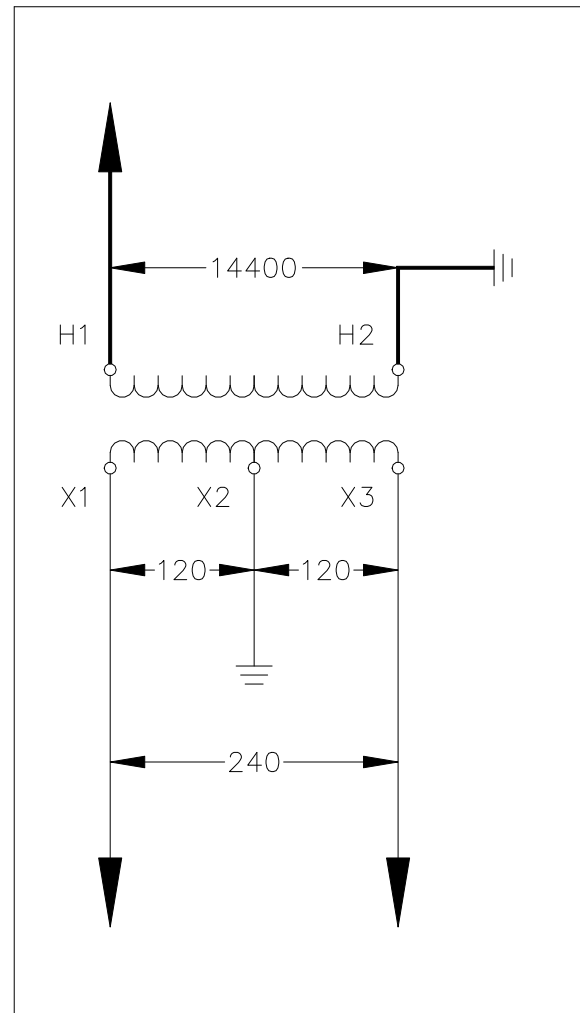


Table with columns: NO., DRAWING NO./SHEET, REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION. Includes entries for DGSS-EL-4500, DGSS-EL-4512 THRU 4514, and DGSS-EL-4515.

DRAWING NAME: DOUGLAS SUBSTATION CONTROL ENCLOSURE BILL OF MATERIAL. Drawing No.: DGSS-SS-2009. SHEET 9 OF 9.



TRANSFORMER CONNECTION DIAGRAM



PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS		JOB #: MEA W.O. EN16-3.2	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016
B	ISSUED FOR BID	MSG/03-15-2017	TCC/03-15-2017

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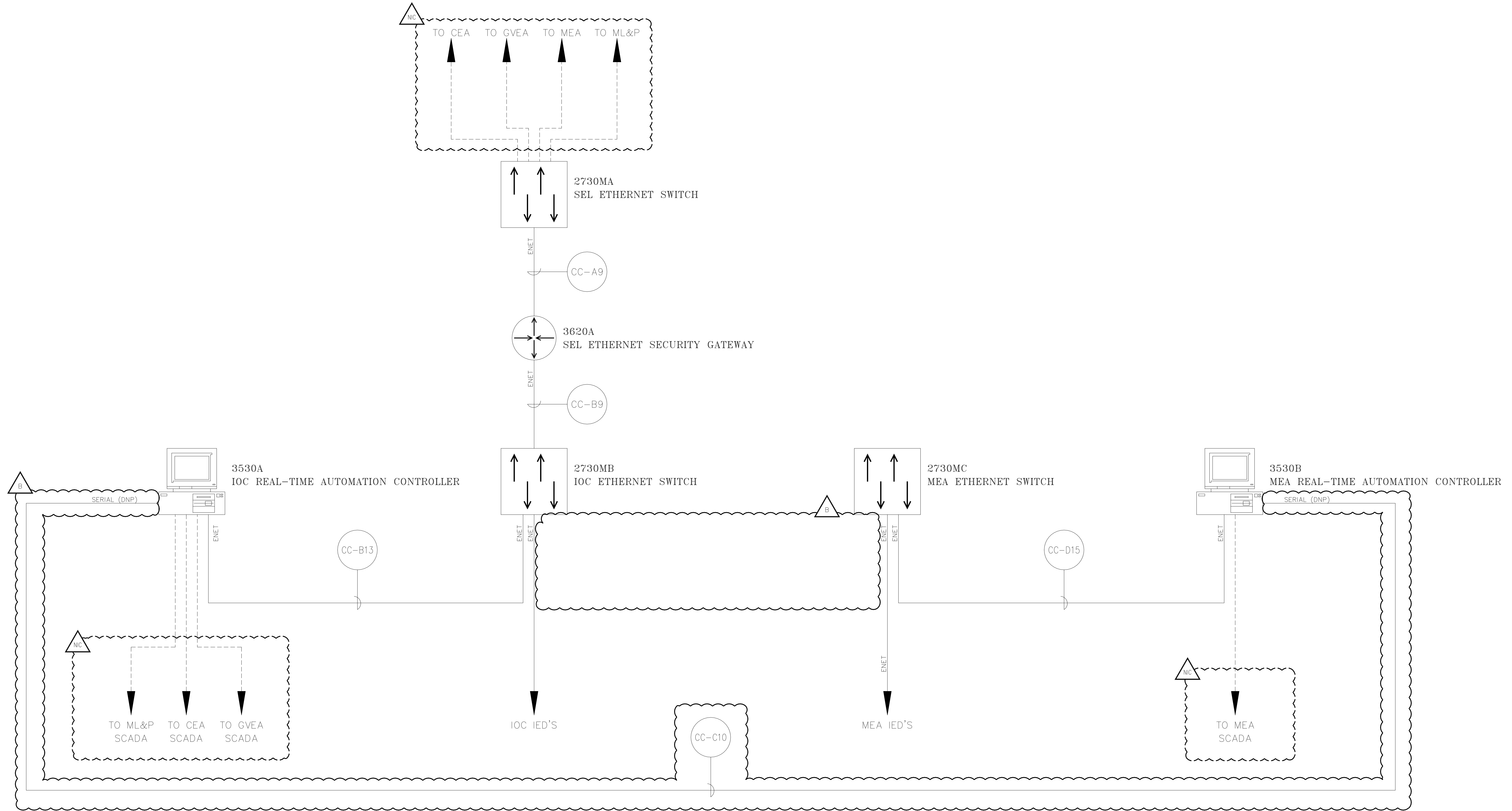
NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION
1	DGSS-EL-0011/1	24.9 kV ONE-LINE DIAGRAM
2	DGSS-EL-2001/1	240 VAC AC PANEL #1 SCHEMATIC & SCHEDULE
3	DGSS-EL-2001/2	240 VAC AC PANEL #2 SCHEMATIC & SCHEDULE
4	DGSS-EL-0013/1	125 VDC ONE-LINE DIAGRAM

DRAWING NAME: DOUGLAS SUBSTATION STATION SERVICE ONE-LINE DIAGRAM

REF. DWG(S):

DRAWING NO.: DGSS-EL-0012

SHEET 1 OF 1



LEGEND:

- ADDR COMMUNICATION ADDRESS
- ASCII AMERICAN STANDARD CODE FOR INFORMATION INTERCHANGE
- BNC BAYONNET NELL-CONCELMAN CONNECTOR
- DEMOD DEMODULATED IRIG-B (SAME AS UNMOD)
- DNP3 DISTRIBUTED NETWORK PROTOCOL
- EIA ELECTRONICS INDUSTRY ASSOCIATION
- ENET 10BASE-T/100BASE-TX ETHERNET (802.3/802.3u)
- FB SEL FAST BINARY PROTOCOL
- FNET 10BASE-FX/100BASE-FX ETHERNET (802.3z)
- GPS GLOBAL POSITIONING SYSTEM
- IDLC ISDN DATA LINK CONTROL PROTOCOL
- IGN POWERLOGIC ION PROTOCOL
- INTERNET PROTOCOL
- IRIG-B INTER-RANGE INSTRUMENTATION GROUP MOD B
- ISDN INTEGRATED SERVICE DIGITAL NETWORK
- MB SEL MIRRORED BITS PROTOCOL
- MOD MODULATED IRIG-B
- NTP NETWORK TIME PROTOCOL
- P# PORT NUMBER
- PPS PULSE PER SECOND
- RC RADIO GUIDE
- RXID RECEIVE IDENTIFIER
- SEL SCHWEITZER ENGINEERING LABORATORIES
- TCP TRANSMISSION CONTROL PROTOCOL
- TXID TRANSMIT IDENTIFIER
- UNMOD UNMODULATED IRIG-B (SAME AS DEMOD)

- FIBER-TO-COPPER CONVERTER
- ETHERNET-TO-SERIAL CONVERTER

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS		JOB #: MEA W.O. EN16-3.2	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016
B	ISSUED FOR BID	MSG/03-15-2017	TCC/03-15-2017

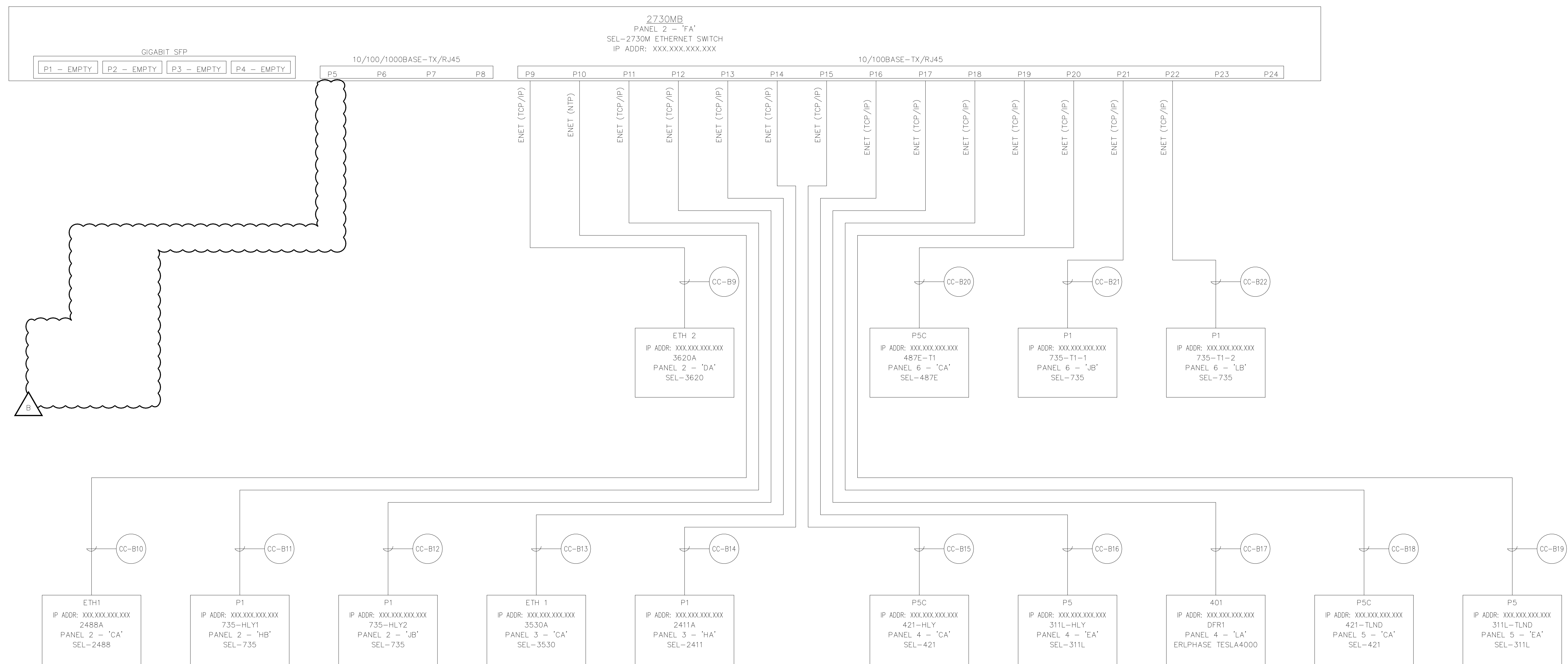
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NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION


DRAWING NAME: DOUGLAS SUBSTATION SCADA NETWORK TOPOLOGY	
REF. DWG(S):	
DRAWING NO.:	DGSS-EL-0014
SHEET 1 OF 7	



- LEGEND:**
- ADDR COMMUNICATION ADDRESS
 - ASCII AMERICAN STANDARD CODE FOR INFORMATION INTERCHANGE
 - BNC BAYONNET NELL-CONCELMAN CONNECTOR
 - DEMOD DEMODULATED IRIG-B (SAME AS UNMOD)
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 - IGN POWERLOGIC IGN PROTOCOL
 - INTERNET PROTOCOL
 - IRIG-B INTER-RANGE INSTRUMENTATION GROUP MOD B
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PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS		JOB #: MEA W.O. EN16-3.2	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016
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NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION

DRAWING NAME: **DOUGLAS SUBSTATION SCADA NETWORK TOPOLOGY**



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REF. DWG(S):

DRAWING NO.: **DGSS-EL-0014**

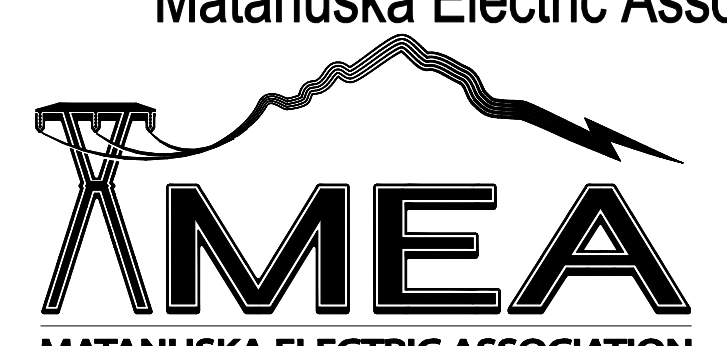
SHEET **4** OF **7**



- LEGEND:**
- ADDR COMMUNICATION ADDRESS
 - ASCII AMERICAN STANDARD CODE FOR INFORMATION INTERCHANGE
 - BNC BAYONET NELL-CONCELMAN CONNECTOR
 - DEMOD DEMODULATED IRIG-B (SAME AS UNMOD)
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 - INTERNET PROTOCOL
 - IRIG-B INTER-RANGE INSTRUMENTATION GROUP MOD B
 - ISDN INTEGRATED SERVICE DIGITAL NETWORK
 - MB SEL MIRRORED BITS PROTOCOL
 - MOD MODULATED IRIG-B
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 - TXID TRANSMIT IDENTIFIER
 - UNMOD UNMODULATED IRIG-B (SAME AS DEMOD)
 -  FIBER-TO-COPPER CONVERTER
 -  ETHERNET-TO-SERIAL CONVERTER

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS		JOB #: MEA W.O. EN16-3.2	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016
B	ISSUED FOR BID	MSG/03-15-2017	TCC/03-15-2017

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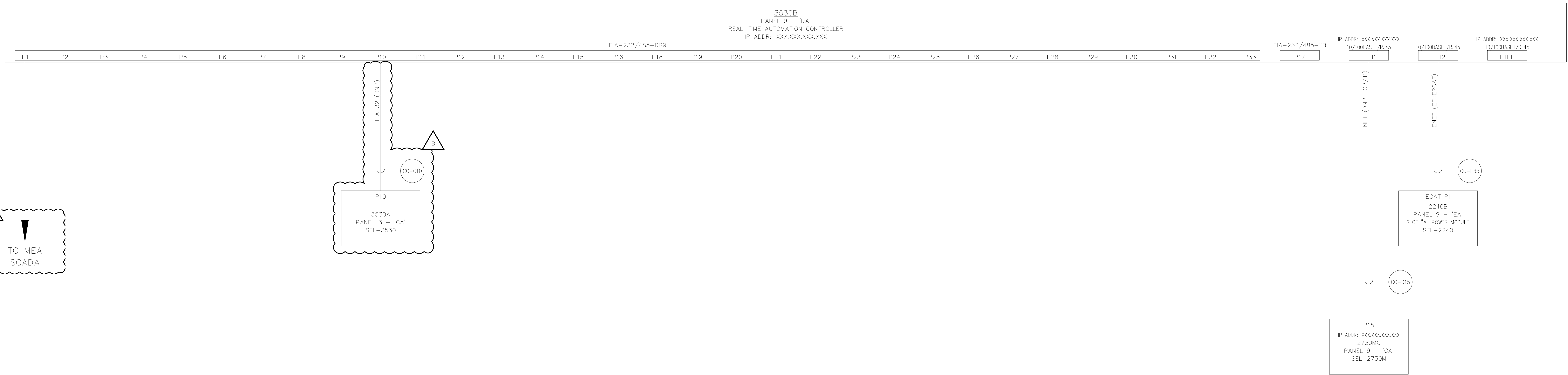
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DRAWING NAME: **DOUGLAS SUBSTATION SCADA NETWORK TOPOLOGY**

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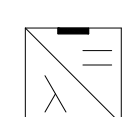
DRAWING NO.: **DGSS-EL-0014**

SHEET **5** OF **7**



LEGEND:

- ADDR COMMUNICATION ADDRESS
- ASCII AMERICAN STANDARD CODE FOR INFORMATION INTERCHANGE
- BNC BAYONNET NELL-CONELMAN CONNECTOR
- DEMOD DEMODULATED IRIG-B (SAME AS UNMOD)
- DNP3 DISTRIBUTED NETWORK PROTOCOL
- EIA ELECTRONICS INDUSTRY ASSOCIATION
- ENET 10BASE-T/100BASE-TX ETHERNET (802.3/802.3u)
- FB SEL FAST BINARY PROTOCOL
- FNET 10BASE-FX/100BASE-FX ETHERNET (802.3z)
- GPS GLOBAL POSITIONING SYSTEM
- IDLC ISDN DATA LINK CONTROL PROTOCOL
- IGN POWERLOGIC IGN PROTOCOL
- INTERNET PROTOCOL
- IRIG-B INTER-RANGE INSTRUMENTATION GROUP MOD B
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- MB SEL MIRRORED BITS PROTOCOL
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- TXID TRANSMIT IDENTIFIER
- UNMOD UNMODULATED IRIG-B (SAME AS DEMOD)

-  FIBER-TO-COPPER CONVERTER
-  ETHERNET-TO-SERIAL CONVERTER

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS		JOB #: MEA W.O. EN16-3.2	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016
B	ISSUED FOR BID	MSG/03-15-2017	TCC/03-15-2017

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NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION

DRAWING NAME: **DOUGLAS SUBSTATION SCADA NETWORK TOPOLOGY**

dass-el-0014_7.dwg

REF. DWG(S):

DRAWING NO.: **DGSS-EL-0014**

SHEET **7** OF **7**

CABLE OR WIRE NO.	CATALOG NUMBER	ESTIMATED LENGTH (FT)	FROM	TO	FUNCTION	VIA	DRAWING NUMBER	FURNISHED BY
SS-1	TBD	TBD	24.9 kV MAIN BUS, FUSED CUTOUT	STATION SERVICE XFMR, 'PM1'	24.9 kV STATION SVC CIRCUIT	CONDUIT TBD	DGSS-EL-0012	NIC
SS-2	TBD	TBD	24.9 kV AUX BUS, FUSED CUTOUT	STATION SERVICE XFMR, 'PM2'	24.9 kV STATION SVC CIRCUIT	CONDUIT TBD	DGSS-EL-0012	NIC
SS-3	HW174 4004G	TBD	STATION SERVICE XFMR, 'PM1'	JUNCTION BOX, '2201JB1'	NORMAL STATION SVC CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY CONDUIT TBD	DGSS-EL-0012	NIC
SS-4	HW174 4004G	TBD	STATION SERVICE XFMR, 'PM2'	JUNCTION BOX, '2301JB1'	ALTERNATE STATION SVC CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY CONDUIT TBD	DGSS-EL-0012	NIC
SS-5	3 X HW010 40101 & 1 X HW010 10101 GREEN	10	JUNCTION BOX, '2201JB1'	DISCONNECT, '2201'	STATION SVC CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0012	C
SS-6	3 X HW010 40101 & 1 X HW010 10101 GREEN	10	JUNCTION BOX, '2301JB1'	DISCONNECT, '2301'	STATION SVC CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0012	C
SS-7	3 X HW010 40101 & 1 X HW010 10101 GREEN	30	DISCONNECT, '2201'	TRANSFER SWITCH, '2401'	STATION SVC CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0012	C
SS-8	3 X HW010 40101 & 1 X HW010 10101 GREEN	30	DISCONNECT, '2301'	TRANSFER SWITCH, '2401'	STATION SVC CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0012	C
SS-9	3 X HW010 40101 & 1 X HW010 10101 GREEN	30	TRANSFER SWITCH, '2401'	STATION SERVICE METER, 'SSM1'	STATION SVC CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0012	C
SS-10	3 X HW010 40101 & 1 X HW010 10101 GREEN	30	STATION SERVICE METER, 'SSM1'	AC PANEL 1, 'AC1'	STATION SVC CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0012	C
SS-11	3 X HW010 40101 & 1 X HW010 10101 GREEN	20	AC PANEL 1, 'AC1'	AC PANEL 2, 'AC2'	STATION SVC CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0012	C
SS-12	HW172 0203G	40	AC PANEL 2, 'AC2'	BATTERY CHARGER, 'BCHG1'	BATTERY CHARGER CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0012	C
SS-13	HW172 0203G	30	AC PANEL 1, 'AC1'	DISCONNECT, '2501'	STATION SVC CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0012	C
SS-14	HW174 00204	TBD	DISCONNECT, '2501'	COMMUNICATIONS ENCLOSURE	STATION SVC CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY CONDUIT TBD	DGSS-EL-0012	NIC
AC1-HT1A	HW172 0603G	40	AC PANEL 1, 'AC1'	HVAC UNIT 1, 'HVAC1'	AC PANEL 1 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC1-HT1B	HW173 01004	40	AC PANEL 1, 'AC1'	HVAC UNIT 1, 'HVAC1'	AC PANEL 1 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC1-HT2A	HW172 0603G	30	AC PANEL 1, 'AC1'	HVAC UNIT 2, 'HVAC2'	AC PANEL 1 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC1-HT2B	HW173 01004	30	AC PANEL 1, 'AC1'	HVAC UNIT 2, 'HVAC2'	AC PANEL 1 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC1-HT3	HW173 01204	40	AC PANEL 1, 'AC1'	AUXILIARY CONTROL PANEL 1, 'ACP1'	AC PANEL 1 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC1-RE1	HW173 01004	100	AC PANEL 1, 'AC1'	EXTERIOR RECEPTACLES	AC PANEL 1 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC1-RE2	HW173 01204	100	AC PANEL 1, 'AC1'	EXTERIOR RECEPTACLES	AC PANEL 1 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC1-RE3	HW173 01204	270	AC PANEL 1, 'AC1'	INTERIOR RECEPTACLES	AC PANEL 1 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC1-RE4	HW173 01204	50	AC PANEL 1, 'AC1'	RELAY PANEL 1	AC PANEL 1 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC1-LT1	HW173 01204	160	AC PANEL 1, 'AC1'	EXTERIOR LIGHTING	AC PANEL 1 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC1-LT2	HW173 01204	200	AC PANEL 1, 'AC1'	INTERIOR EMERGENCY LIGHTING	AC PANEL 1 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC1-LT3	HW173 01204	160	AC PANEL 1, 'AC1'	INTERIOR LIGHTING	AC PANEL 1 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC1-LT4	HW173 01204	40	AC PANEL 1, 'AC1'	LIGHTING CONTACTOR, 'LC1'	AC PANEL 1 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC1-LT5	HW172 0803G	40	AC PANEL 1, 'AC1'	LIGHTING CONTACTOR, 'LC1'	AC PANEL 1 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC1-LT6	HW172 0803G	40	AC PANEL 1, 'AC1'	LIGHTING CONTACTOR, 'LC1'	AC PANEL 1 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC1-HD1	HW173 01204	40	AC PANEL 1, 'AC1'	AUXILIARY CONTROL PANEL 1, 'ACP1'	AC PANEL 1 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC1-FD1	HW173 01204	40	AC PANEL 1, 'AC1'	AUXILIARY CONTROL PANEL 1, 'ACP1'	AC PANEL 1 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC1-MS2000A	HW173 01004	40	AC PANEL 1, 'AC1'	RELAY PANEL 7 INVERTER	AC PANEL 1 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC-RE40	HW173 01204	60	PANEL 7	RECEPTACLES RE40 & RE41	UPS RECEPTACLE CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2026	C
AC2-B1-1	HW172 0803G	60	AC PANEL 2, 'AC2'	MARSHALLING CABINET 1, 'MC1'	AC PANEL 2 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC2-B1-2	HW172 0803G	60	AC PANEL 2, 'AC2'	MARSHALLING CABINET 1, 'MC1'	AC PANEL 2 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC2-TD200-1	HW173 01004	60	AC PANEL 2, 'AC2'	MARSHALLING CABINET 1, 'MC1'	AC PANEL 2 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC2-2S3-1	HW173 01004	60	AC PANEL 2, 'AC2'	MARSHALLING CABINET 1, 'MC1'	AC PANEL 2 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C
AC2-T1-1	HW172 0603G	60	AC PANEL 2, 'AC2'	MARSHALLING CABINET 2, 'MC2'	AC PANEL 2 BRANCH CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-2001	C

C = CONTRACTOR, O = OWNER, NIC = NOT IN CONTRACT.

NOTES:

① ALL CABLE AND WIRE SHALL BE BY HOUSTON WIRE & CABLE UNLESS NOTED OTHERWISE.

② CABLES LENGTHS ARE ESTIMATED.

CABLE OR WIRE NO.	CATALOG NUMBER	ESTIMATED LENGTH (FT)	FROM	TO	FUNCTION	VIA	DRAWING NUMBER	FURNISHED BY
CT-B1-1A	HW173 01004	50	MARSHALLING CABINET 1, 'MC1'	RELAY PANEL 2	CT CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0101	C
CT-B1-2A	HW173 01004	50	MARSHALLING CABINET 1, 'MC1'	RELAY PANEL 5	CT CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0101	C
CT-B1-3A	HW173 01004	50	MARSHALLING CABINET 1, 'MC1'	RELAY PANEL 4	CT CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0101	C
CT-B1-4A	HW173 01004	50	MARSHALLING CABINET 1, 'MC1'	RELAY PANEL 4	CT CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0101	C
CT-T1-1A	HW173 01004	40	MARSHALLING CABINET 3, 'MC3'	RELAY PANEL 6	CT CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0100	C
CT-T1-3A	HW173 01004	40	MARSHALLING CABINET 3, 'MC3'	RELAY PANEL 6	CT CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0100	C
CT-T1-4A	HW173 01004	40	MARSHALLING CABINET 3, 'MC3'	RELAY PANEL 6	CT CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0100	C
CT-T1-4B	HW173 01004	30	RELAY PANEL 6	RELAY PANEL 7	CT CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0100	C
CT-T1-5A	HW173 01004	30	MARSHALLING CABINET 3, 'MC3'	RELAY PANEL 6	CT CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0100	C
PT-1-3	HW173 01204	50	MARSHALLING CABINET 3, 'MC3'	RELAY PANEL 4	138 kV BUS PT CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0101	C
PT-1-4	HW173 01204	50	MARSHALLING CABINET 3, 'MC3'	RELAY PANEL 4	138 kV BUS PT CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0101	C
PT-2-2	HW173 01204	50	MARSHALLING CABINET 3, 'MC3'	RELAY PANEL 4	138 kV SYNC CVT CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0101	C
PT-3-2	HW173 01204	50	MARSHALLING CABINET 3, 'MC3'	RELAY PANEL 7	24.9 kV MAIN PT CIRCUIT	LOWER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0101	C
AC2-B1-3	HW174 00804	TBD	MARSHALLING CABINET 1, 'MC1'	GCB B1 INTERFACE CABINET	AC POWER (B1 - 240 VAC)	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
AC2-B1-4	HW174 00804	TBD	MARSHALLING CABINET 1, 'MC1'	GCB B1 CONTROL CABINET	AC POWER (B1 - 120 VAC)	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
AC2-TD200-2	HW173 01004	TBD	MARSHALLING CABINET 1, 'MC1'	CIRCUIT SWITCHER TD-200	AC POWER TD-200 120V	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
AC2-2S3-2	HW173 01004	TBD	MARSHALLING CABINET 1, 'MC1'	MOAS 2S3	AC POWER 2S3 - 120VAC	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
AC2-T1-2	HW174 00604	TBD	MARSHALLING CABINET 2, 'MC2'	POWER TRANSFORMER 'T1'	AC POWER (T1 - 240 VAC)	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
CT-B1-1	HW173 01004	TBD	MARSHALLING CABINET 1, 'MC1'	GCB B1 INTERFACE CABINET	B1 CURRENT	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
CT-B1-2	HW173 01004	TBD	MARSHALLING CABINET 1, 'MC1'	GCB B1 INTERFACE CABINET	B1 CURRENT	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
CT-B1-3	HW173 01004	TBD	MARSHALLING CABINET 1, 'MC1'	GCB B1 INTERFACE CABINET	B1 CURRENT	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
CT-B1-4	HW173 01004	TBD	MARSHALLING CABINET 1, 'MC1'	GCB B1 INTERFACE CABINET	B1 CURRENT	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
CT-T1-1	HW173 01004	TBD	MARSHALLING CABINET 3, 'MC3'	POWER TRANSFORMER 'T1'	T1 CURRENT	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
CT-T1-2	HW173 01004	TBD	MARSHALLING CABINET 3, 'MC3'	POWER TRANSFORMER 'T1'	T1 CURRENT	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
CT-T1-3	HW173 01004	TBD	MARSHALLING CABINET 3, 'MC3'	POWER TRANSFORMER 'T1'	T1 CURRENT	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
CT-T1-4	HW173 01004	TBD	MARSHALLING CABINET 3, 'MC3'	POWER TRANSFORMER 'T1'	T1 CURRENT	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
CT-T1-5	HW173 01004	TBD	MARSHALLING CABINET 3, 'MC3'	POWER TRANSFORMER 'T1'	T1 CURRENT	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
CT-25KV-1	HW173 01004	TBD	MARSHALLING CABINET 2, 'MC2'	24.9KV CT / PT J-BOX	25KV BUS CURRENT	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
CT-415-1	HW173 01004	TBD	MARSHALLING CABINET 2, 'MC2'	RECLOSER TD-415	METERING CURRENTS	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
CT-425-1	HW173 01004	TBD	MARSHALLING CABINET 2, 'MC2'	RECLOSER TD-425	METERING CURRENTS	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
CT-435-1	HW173 01004	TBD	MARSHALLING CABINET 2, 'MC2'	RECLOSER TD-435	METERING CURRENTS	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
PT-1-1	HW173 01212	TBD	MARSHALLING CABINET 3, 'MC3'	138 kV POTENTIAL J-BOX	138KV POTENTIALS	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
PT-2-1	HW173 01204	TBD	MARSHALLING CABINET 3, 'MC3'	138 kV B PHASE CVT J-BOX	138KV SYNC POTENTIAL	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
PT-3-1	HW173 01204	TBD	MARSHALLING CABINET 3, 'MC3'	24.9KV CT / PT J-BOX	25KV POTENTIALS	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC
PT-3-3	HW173 01204	TBD	MARSHALLING CABINET 3, 'MC3'	POWER TRANSFORMER 'T1'	25KV POTENTIALS	LOWER TIER OF OVERHEAD CABLE TRAY TRENCH, CONDUIT TBD	TBD	NIC

dgss-el-4000_1.dwg

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			JOB #: MEA W.O. EN16-3.2		
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS			ENG. STAMP		
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE		
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016		
B	ISSUED FOR BID	MSG/03-15-2017	TCC/03-15-2017		

Matanuska Electric Association



163 East Industrial Way
Palmer, AK 99645
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NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION

DRAWING NAME: DOUGLAS SUBSTATION AC CABLE & WIRE SCHEDULE

REF. DWG(S):

DRAWING NO.: DGSS-EL-4000

SHEET 1 OF 2

CABLE OR WIRE NO.	CATALOG NUMBER	ESTIMATED LENGTH (FT)	FROM	TO	FUNCTION	VIA	DRAWING NUMBER	FURNISHED BY
CC-A9	SEL C627	6	RELAY PANEL 2, DEVICE 'EA'	RELAY PANEL 2, DEVICE 'DA'	SCADA DATA CIRCUIT	INTRA-PANEL	DGSS-EL-0014	C
CABLE REMOVED								
CC-B9	SEL C627	6	RELAY PANEL 2, DEVICE 'FA'	RELAY PANEL 2, DEVICE 'DA'	SCADA DATA CIRCUIT	INTRA-PANEL	DGSS-EL-0014	C
CC-B10	SEL C627	6	RELAY PANEL 2, DEVICE 'FA'	RELAY PANEL 2, DEVICE 'CA'	SCADA DATA CIRCUIT	INTRA-PANEL	DGSS-EL-0014	C
CC-B11	SEL C627	10	RELAY PANEL 2, DEVICE 'FA'	RELAY PANEL 2, DEVICE 'HB'	SCADA DATA CIRCUIT	INTRA-PANEL	DGSS-EL-0014	C
CC-B12	SEL C627	10	RELAY PANEL 2, DEVICE 'FA'	RELAY PANEL 2, DEVICE 'JB'	SCADA DATA CIRCUIT	INTRA-PANEL	DGSS-EL-0014	C
CC-B13	SEL C627	30	RELAY PANEL 2, DEVICE 'FA'	RELAY PANEL 3, DEVICE 'CA'	SCADA DATA CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0014	C
CC-B14	SEL C627	30	RELAY PANEL 2, DEVICE 'FA'	RELAY PANEL 3, DEVICE 'HA'	SCADA DATA CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0014	C
CC-B15	SEL C627	30	RELAY PANEL 2, DEVICE 'FA'	RELAY PANEL 4, DEVICE 'CA'	SCADA DATA CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0014	C
CC-B16	SEL C627	30	RELAY PANEL 2, DEVICE 'FA'	RELAY PANEL 4, DEVICE 'EA'	SCADA DATA CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0014	C
CC-B17	SEL C627	30	RELAY PANEL 2, DEVICE 'FA'	RELAY PANEL 4, DEVICE 'LA'	SCADA DATA CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0014	C
CC-B18	SEL C627	40	RELAY PANEL 2, DEVICE 'FA'	RELAY PANEL 5, DEVICE 'CA'	SCADA DATA CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0014	C
CC-B19	SEL C627	40	RELAY PANEL 2, DEVICE 'FA'	RELAY PANEL 5, DEVICE 'EA'	SCADA DATA CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0014	C
CC-B20	SEL C627	40	RELAY PANEL 2, DEVICE 'FA'	RELAY PANEL 6, DEVICE 'CA'	SCADA DATA CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0014	C
CC-B21	SEL C627	40	RELAY PANEL 2, DEVICE 'FA'	RELAY PANEL 6, DEVICE 'JB'	SCADA DATA CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0014	C
CC-B22	SEL C627	40	RELAY PANEL 2, DEVICE 'FA'	RELAY PANEL 6, DEVICE 'LB'	SCADA DATA CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0014	C
CABLE REMOVED								
CC-C10	SEL 272A	40	RELAY PANEL 3, DEVICE 'CA'	RELAY PANEL 9, DEVICE 'DA'	SCADA DATA CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0014	C
CC-C35	SEL 627F	6	RELAY PANEL 3, DEVICE 'CA'	RELAY PANEL 3, DEVICE 'EA'	SCADA DATA CIRCUIT	INTRA-PANEL	DGSS-EL-0014	C
CC-D9	SEL C627	50	RELAY PANEL 9, DEVICE 'CA'	RELAY PANEL 2, DEVICE 'CA'	SCADA DATA CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0014	C
CC-D10	SEL C627	30	RELAY PANEL 9, DEVICE 'CA'	RELAY PANEL 7, DEVICE 'CA'	SCADA DATA CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0014	C
CC-D11	SEL C627	30	RELAY PANEL 9, DEVICE 'CA'	RELAY PANEL 7, DEVICE 'FA'	SCADA DATA CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0014	C
CC-D12	SEL C627	30	RELAY PANEL 9, DEVICE 'CA'	RELAY PANEL 8, DEVICE 'CA'	SCADA DATA CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0014	C
CC-D13	SEL C627	30	RELAY PANEL 9, DEVICE 'CA'	RELAY PANEL 8, DEVICE 'FA'	SCADA DATA CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0014	C
CC-D14	SEL C627	30	RELAY PANEL 9, DEVICE 'CA'	RELAY PANEL 7, DEVICE 'NA'	SCADA DATA CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0014	C
CC-D15	SEL C627	6	RELAY PANEL 9, DEVICE 'CA'	RELAY PANEL 9, DEVICE 'DA'	SCADA DATA CIRCUIT	INTRA-PANEL	DGSS-EL-0014	C
CC-D16	SEL C627	10	RELAY PANEL 9, DEVICE 'CA'	RELAY PANEL 9, DEVICE 'GA'	SCADA DATA CIRCUIT	INTRA-PANEL	DGSS-EL-0014	C
CC-D24	SEL C627	70	RELAY PANEL 9, DEVICE 'CA'	ETHERNET SWITCH, 'ESI'	SCADA DATA CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0014	C
CC-E35	SEL 627F	6	RELAY PANEL 9, DEVICE 'DA'	RELAY PANEL 9, DEVICE 'EA'	SCADA DATA CIRCUIT	INTRA-PANEL	DGSS-EL-0014	C

C = CONTRACTOR, O = OWNER, NIC = NOT IN CONTRACT.

NOTES:

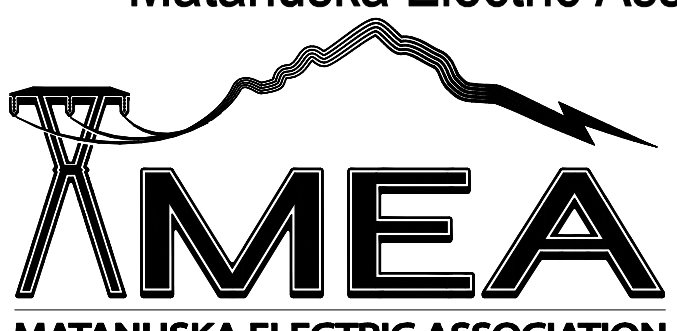
- (1) ALL CABLE AND WIRE SHALL BE BY SCHWEITZER ENGINEERING LABORATORIES UNLESS NOTED OTHERWISE.
- (2) CABLE LENGTHS ARE ESTIMATED.

CABLE OR WIRE NO.	CATALOG NUMBER	ESTIMATED LENGTH (FT)	FROM	TO	FUNCTION	VIA	DRAWING NUMBER	FURNISHED BY
TS-10	SEL C953	6	PANEL 2, DEVICE 'CA'	PANEL 2, DEVICE 'DA'	TIME SYNCHRONIZATION CIRCUIT	INTRA-PANEL	DGSS-EL-0015	C
TS-11	SEL C962	10	PANEL 2, DEVICE 'DA'	PANEL 2, DEVICE 'HB'	TIME SYNCHRONIZATION CIRCUIT	INTRA-PANEL	DGSS-EL-0015	C
TS-12	SEL C963	6	PANEL 2, DEVICE 'HB'	PANEL 2, DEVICE 'JB'	TIME SYNCHRONIZATION CIRCUIT	INTRA-PANEL	DGSS-EL-0015	C
TS-13	SEL C962	30	PANEL 2, DEVICE 'JB'	PANEL 3, DEVICE 'CA'	TIME SYNCHRONIZATION CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0015	C
TS-14	SEL C962	10	PANEL 3, DEVICE 'CA'	PANEL 3, DEVICE 'HA'	TIME SYNCHRONIZATION CIRCUIT	INTRA-PANEL	DGSS-EL-0015	C
TS-20	SEL C953	30	PANEL 2, DEVICE 'CA'	PANEL 4, DEVICE 'CA'	TIME SYNCHRONIZATION CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0015	C
TS-21	SEL C953	30	PANEL 4, DEVICE 'CA'	PANEL 5, DEVICE 'CA'	TIME SYNCHRONIZATION CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0015	C
TS-22	SEL C953	30	PANEL 5, DEVICE 'CA'	PANEL 6, DEVICE 'CA'	TIME SYNCHRONIZATION CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0015	C
TS-23	SEL C962	10	PANEL 6, DEVICE 'CA'	PANEL 6, DEVICE 'JB'	TIME SYNCHRONIZATION CIRCUIT	INTRA-PANEL	DGSS-EL-0015	C
TS-24	SEL C963	6	PANEL 6, DEVICE 'JB'	PANEL 6, DEVICE 'LB'	TIME SYNCHRONIZATION CIRCUIT	INTRA-PANEL	DGSS-EL-0015	C
TS-30	SEL C962	30	PANEL 2, DEVICE 'CA'	PANEL 4, DEVICE 'EA'	TIME SYNCHRONIZATION CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0015	C
TS-31	SEL C962	10	PANEL 4, DEVICE 'EA'	PANEL 4, DEVICE 'LA'	TIME SYNCHRONIZATION CIRCUIT	INTRA-PANEL	DGSS-EL-0015	C
TS-32	SEL C962	30	PANEL 4, DEVICE 'LA'	PANEL 5, DEVICE 'EA'	TIME SYNCHRONIZATION CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0015	C
TS-40	SEL C953	40	PANEL 2, DEVICE 'CA'	PANEL 7, DEVICE 'CA'	TIME SYNCHRONIZATION CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0015	C
TS-41	SEL C953	10	PANEL 7, DEVICE 'CA'	PANEL 7, DEVICE 'FA'	TIME SYNCHRONIZATION CIRCUIT	INTRA-PANEL	DGSS-EL-0015	C
TS-42	SEL C953	30	PANEL 7, DEVICE 'FA'	PANEL 8, DEVICE 'CA'	TIME SYNCHRONIZATION CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0015	C
TS-43	SEL C953	10	PANEL 8, DEVICE 'CA'	PANEL 8, DEVICE 'FA'	TIME SYNCHRONIZATION CIRCUIT	INTRA-PANEL	DGSS-EL-0015	C
TS-44	SEL C953	30	PANEL 8, DEVICE 'FA'	PANEL 9, DEVICE 'DA'	TIME SYNCHRONIZATION CIRCUIT	UPPER TIER OF OVERHEAD CABLE TRAY	DGSS-EL-0015	C
TS-45	SEL C962	10	PANEL 9, DEVICE 'DA'	PANEL 9, DEVICE 'CA'	TIME SYNCHRONIZATION CIRCUIT	INTRA-PANEL	DGSS-EL-0015	C

dgss-el-4002_1.dwg

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			JOB #: MEA W.O. EN16-3.2		
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS			ENG. STAMP		
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE		
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016		
B	ISSUED FOR BID	MSG/03-15-2017	TCC/03-15-2017		

Matanuska Electric Association



163 East Industrial Way
Palmer, AK 99645
(907) 761-9300
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NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION

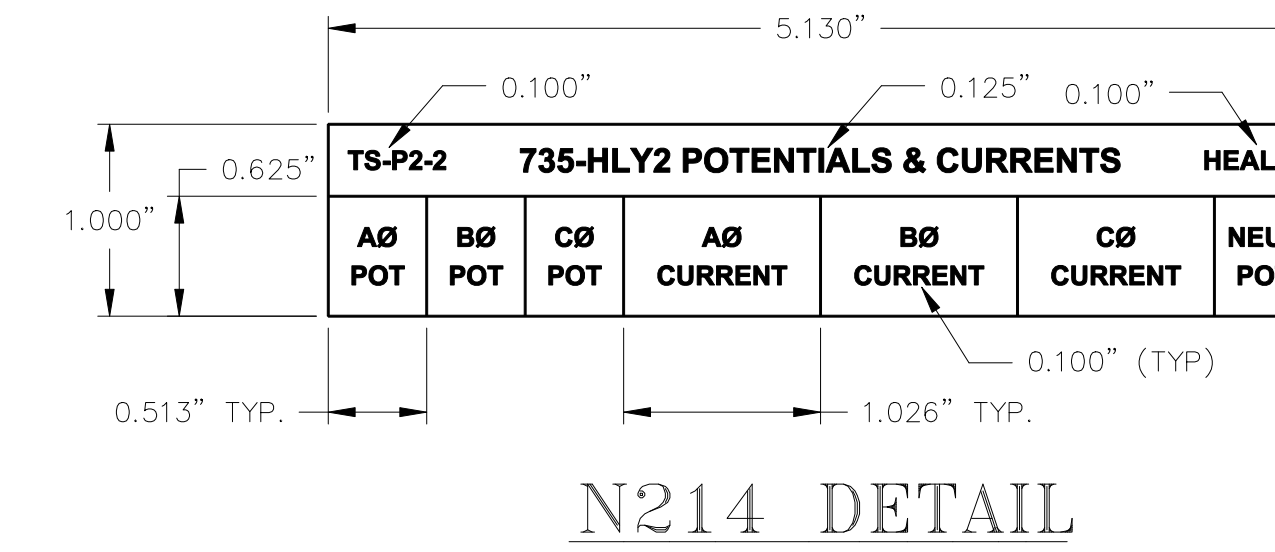
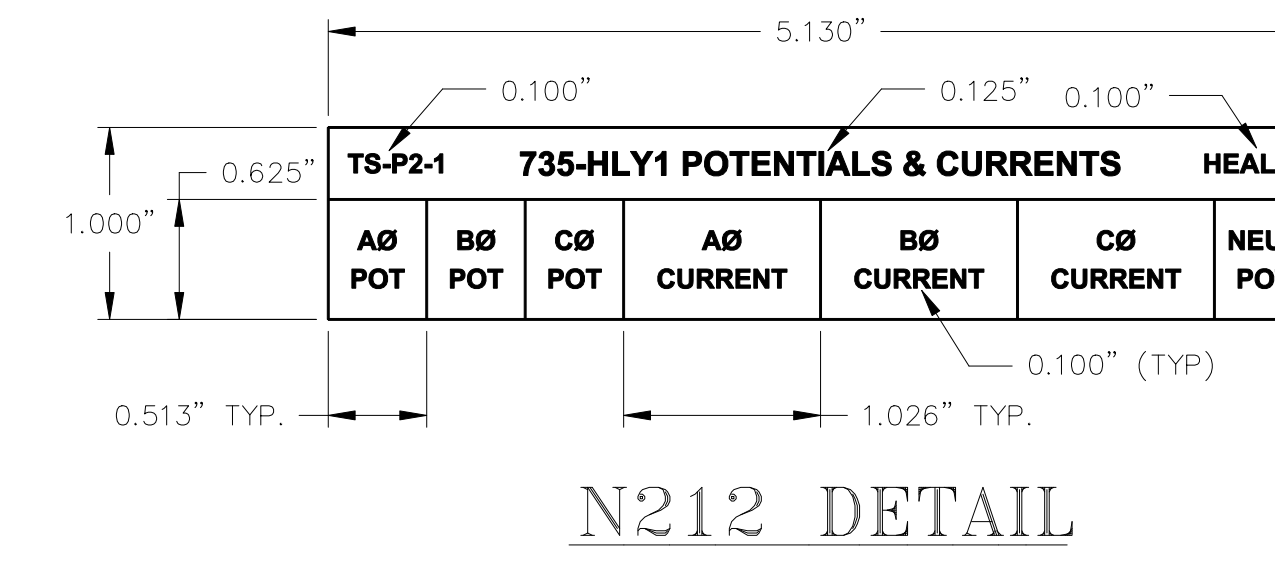
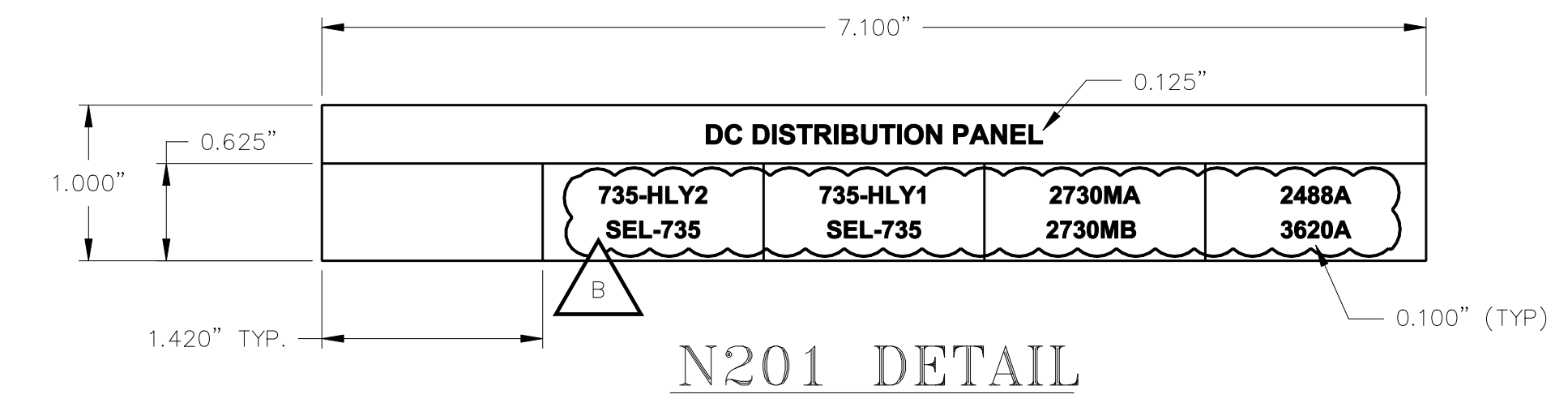
**DOUGLAS SUBSTATION
COMMUNICATION
CABLE & WIRE SCHEDULE**

REF. DWG(S):

DRAWING NO.: DGSS-EL-4002

SHEET 1 OF 1

NAMEPLATE NUMBER	QTY	LINE 1 TEXT	LINE 2 TEXT	LINE 3 TEXT	NAMEPLATE SIZE HEIGHT x WIDTH (IN)	TEXT HEIGHT (IN)
N200	2	PANEL 2	IOC METERING/COMM		1-1/2 x 5	1/4
N201	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N202	2	AA			1/2 x 3/4	1/4
N203	2	AB			1/2 x 3/4	1/4
N204	2	AC			1/2 x 3/4	1/4
N205	2	AD			1/2 x 3/4	1/4
N206	2	AE			1/2 x 3/4	1/4
N207	1	2488A	SATELLITE CLOCK	SEL-2488	1 x 3	1/8
N208	1	3620A	ETHERNET GATEWAY	SEL-3620	1 x 3	1/8
N209	1	2730MA	ETHERNET SWITCH	SEL-2730M	1 x 3	1/8
N210	1	2730MB	ETHERNET SWITCH	SEL-2730M	1 x 3	1/8
N211	1	735-HLY1	INTERTIE METER	SEL-735	1 x 3	1/8
N212	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N213	1	735-HLY2	INTERTIE METER (BACKUP)	SEL-735	1 x 3	1/8
N214	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N215	1	A			1/2 x 3/4	1/4
N216	1	B			1/2 x 3/4	1/4
N217	1	CA	2488A	SEL-2488	1 x 1-1/2	1/8
N218	1	DA	3620A	SEL-3620	1 x 1-1/2	1/8
N219	1	EA	2730MA	SEL-2730M	1 x 1-1/2	1/8
N220	1	FA	2730MB	SEL-2730M	1 x 1-1/2	1/8
N221	1	HA	TS-P2-1	735 TEST SW	1 x 1-1/2	1/8
N222	1	HB	735-HLY1	SEL-735	1 x 1-1/2	1/8
N223	1	JA	TS-P2-2	735 TEST SW	1 x 1-1/2	1/8
N224	1	JB	735-HLY2	SEL-735	1 x 1-1/2	1/8
N225	1	GB	GROUND BUS		1 x 1-1/2	1/8
N226	1	WORK LIGHT			1 x 1-1/2	1/8



- NOTES:
- ALL NAMEPLATES SHALL BE 1/16" THICK MINIMUM PLASTIC.
 - ALL NAMEPLATES SHALL HAVE EXTERIOR RATED HIGH-TACK ADHESIVE.
 - ALL NAMEPLATES SHALL BE BLACK SURFACE WITH WHITE TEXT.
 - ALL TEXT SHALL BE "ARIAL BOLD" FONT.
 - EACH LINE OF TEXT SHALL BE CENTERED ON THE NAMEPLATE.
 - ALL TEXT SHALL BE UPPER CASE.
 - ALL DIMENSIONS SHOWN IN INCHES.

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT		JOB #: MEA W.O. EN16-3.2	
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS		ENG. STAMP	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016
B	ISSUED FOR BID	MSG/03-15-2017	TCC/03-15-2017

Matanuska Electric Association

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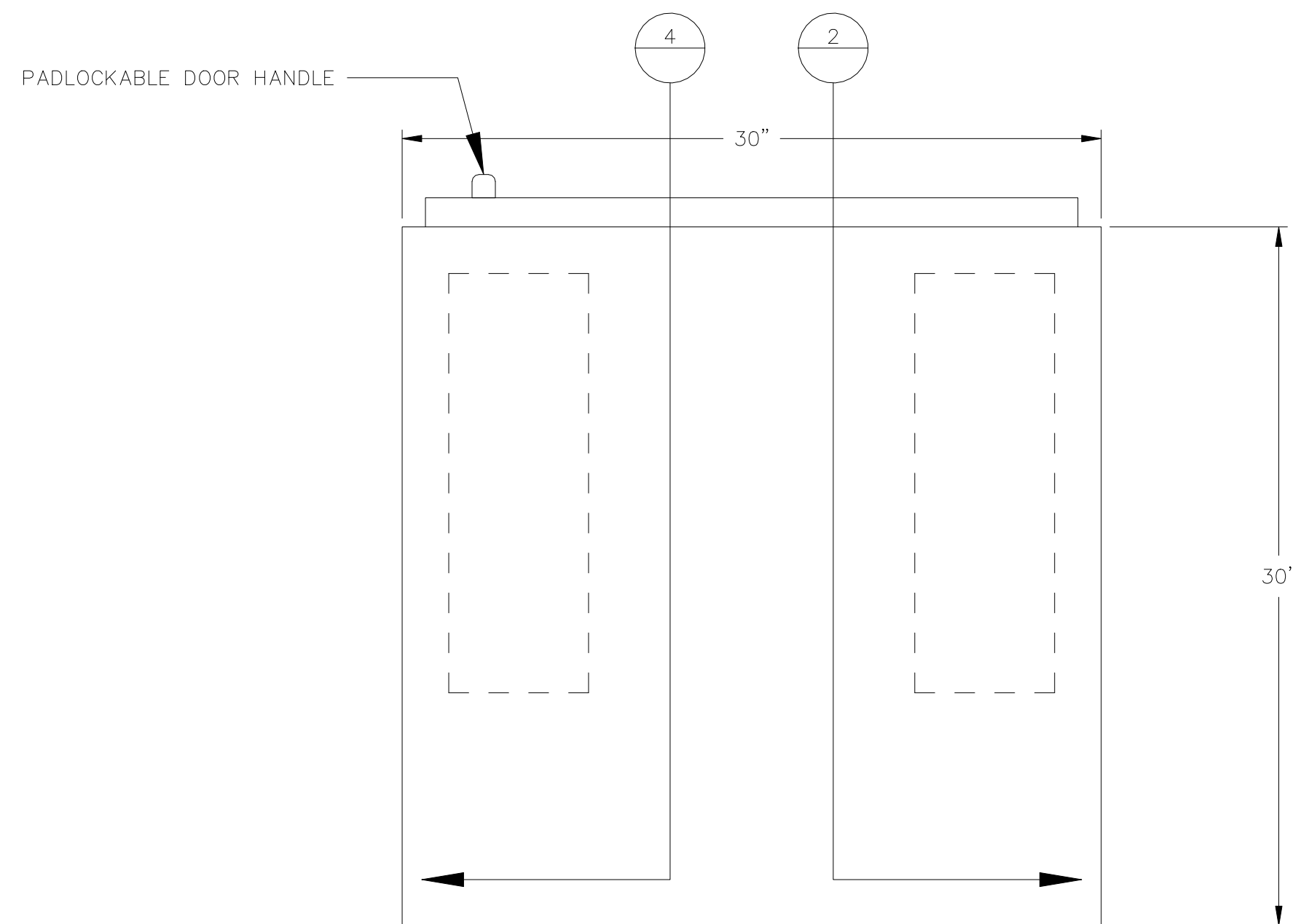
NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION

DRAWING NAME: DOUGLAS SUBSTATION PANEL 2 NAMEPLATES

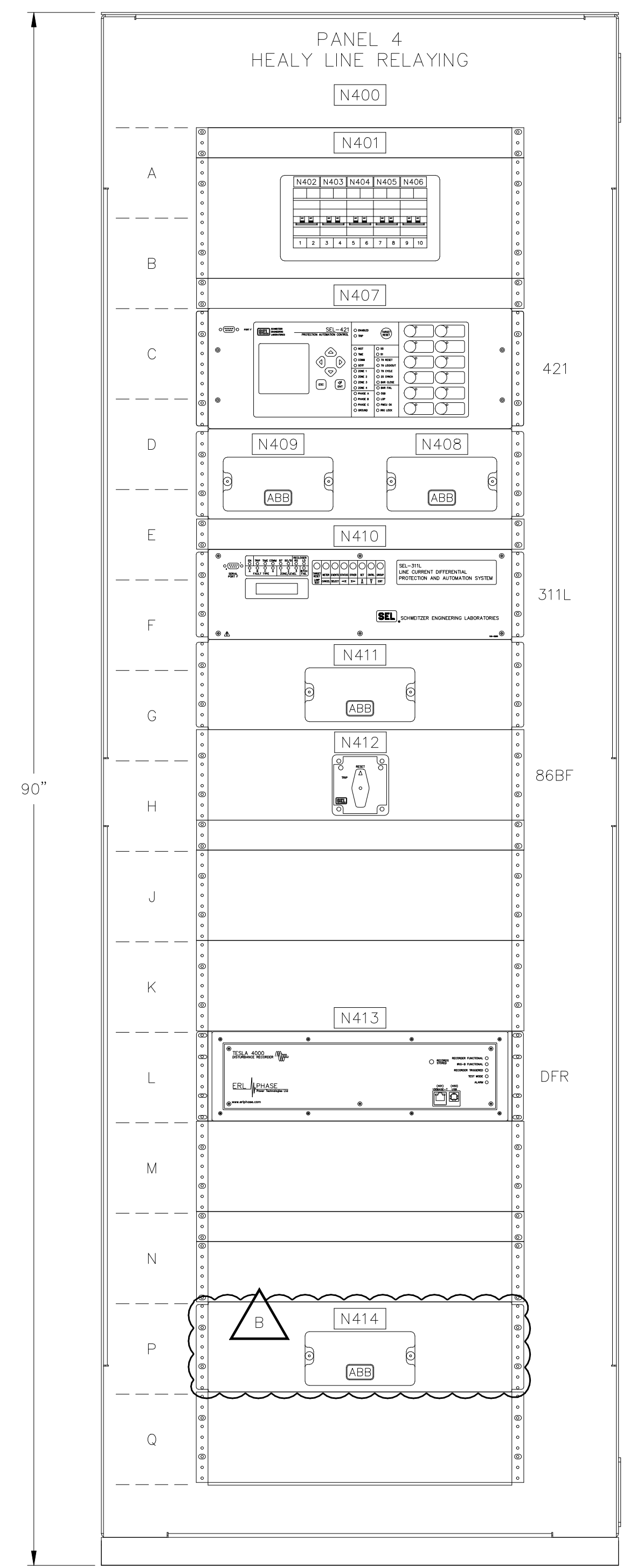
REF. DWG(S):

DRAWING NO.: DGSS-EL-4502

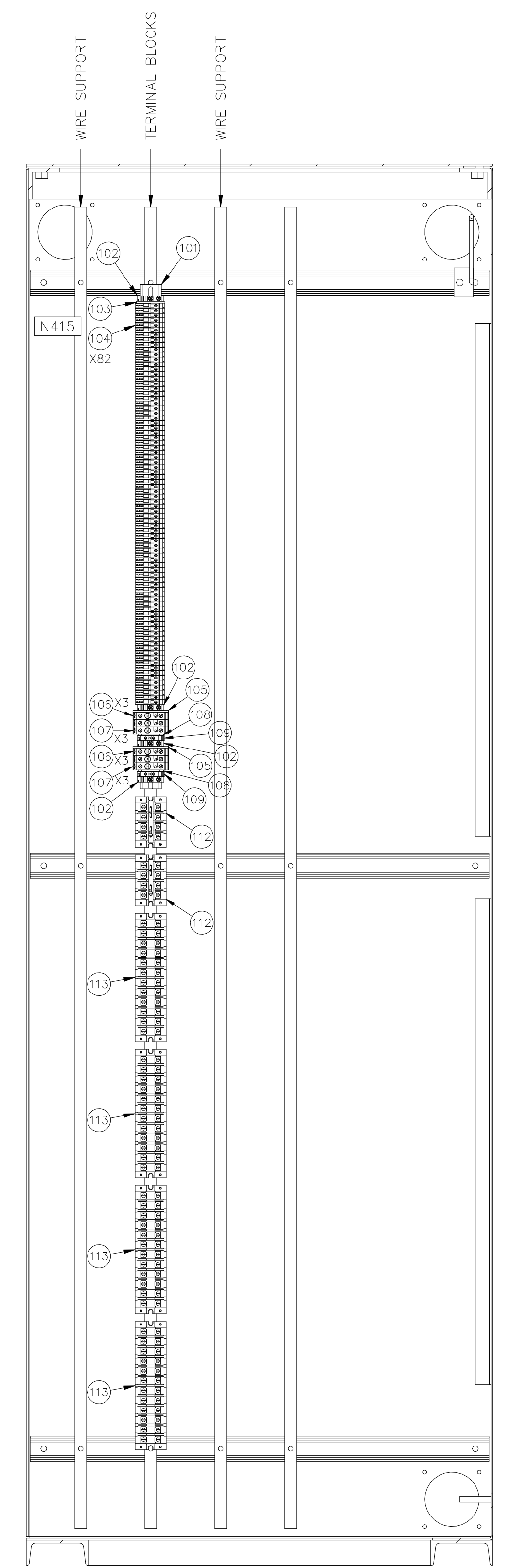
SHEET 2 OF 3



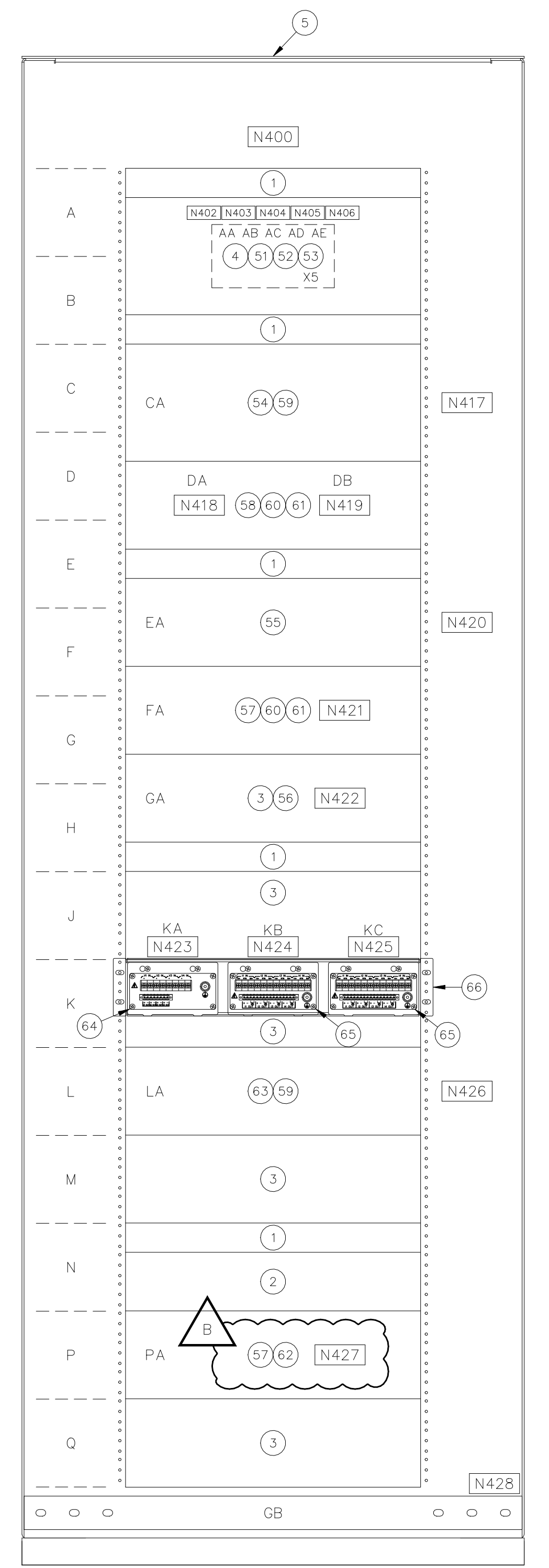
5 PANEL 4 (TOP)
N.T.S.



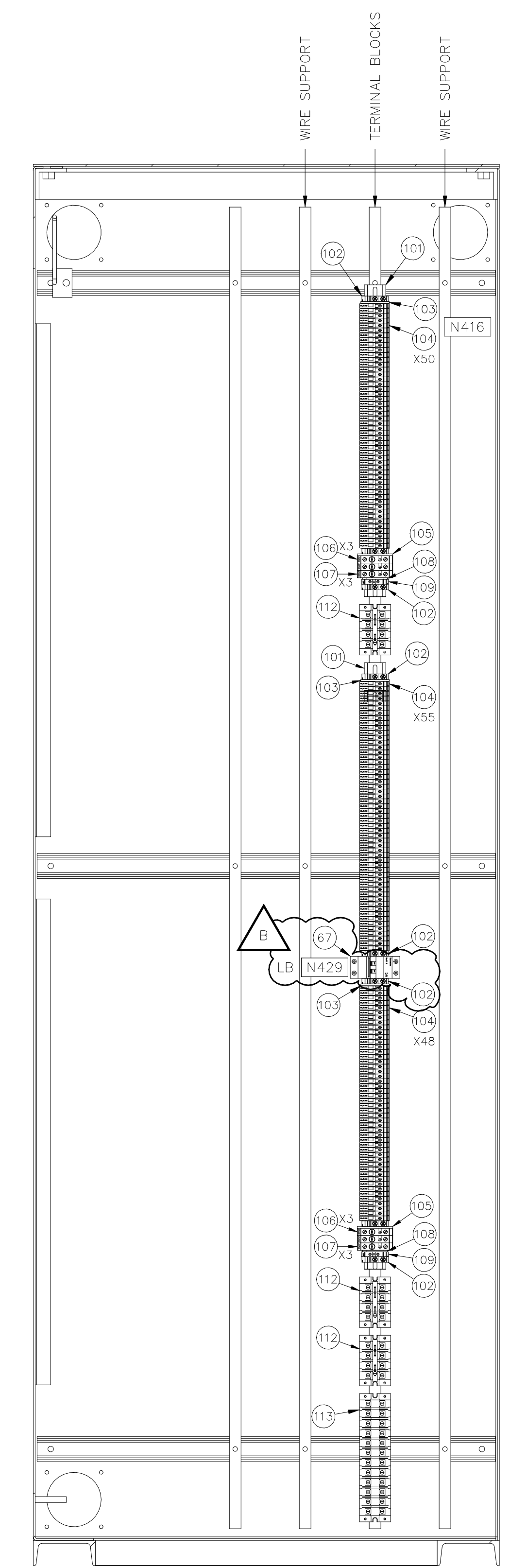
1 PANEL 4 (FRONT)
N.T.S.



2 PANEL 4 (A-SIDE)
N.T.S.



3 PANEL 4 (REAR)
N.T.S.



4 PANEL 4 (B-SIDE)
N.T.S.

- NOTES:
- 1 SEE REFERENCE 6 FOR NAMEPLATES (NXXX)
 - 2 SEE REFERENCE 7 FOR BILL OF MATERIAL.
 - 3 ALL DIMENSIONS SHOWN IN INCHES.

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS			
JOB #: MEA W.O. EN16-3.2		ENG. STAMP	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016
B	ISSUED FOR BID	MSG/03-15-2017	TCC/03-15-2017

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163 East Industrial Way
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(907) 761-9300
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NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION
1	-	PANEL 4 (FRONT)
2	-	PANEL 4 (A-SIDE)
3	-	PANEL 4 (REAR)
4	-	PANEL 4 (B-SIDE)
5	-	PANEL 4 (TOP)
6	DGSS-EL-4504/2	PANEL 4 NAMEPLATES
7	DGSS-EL-4504/3	PANEL 4 BILL OF MATERIAL

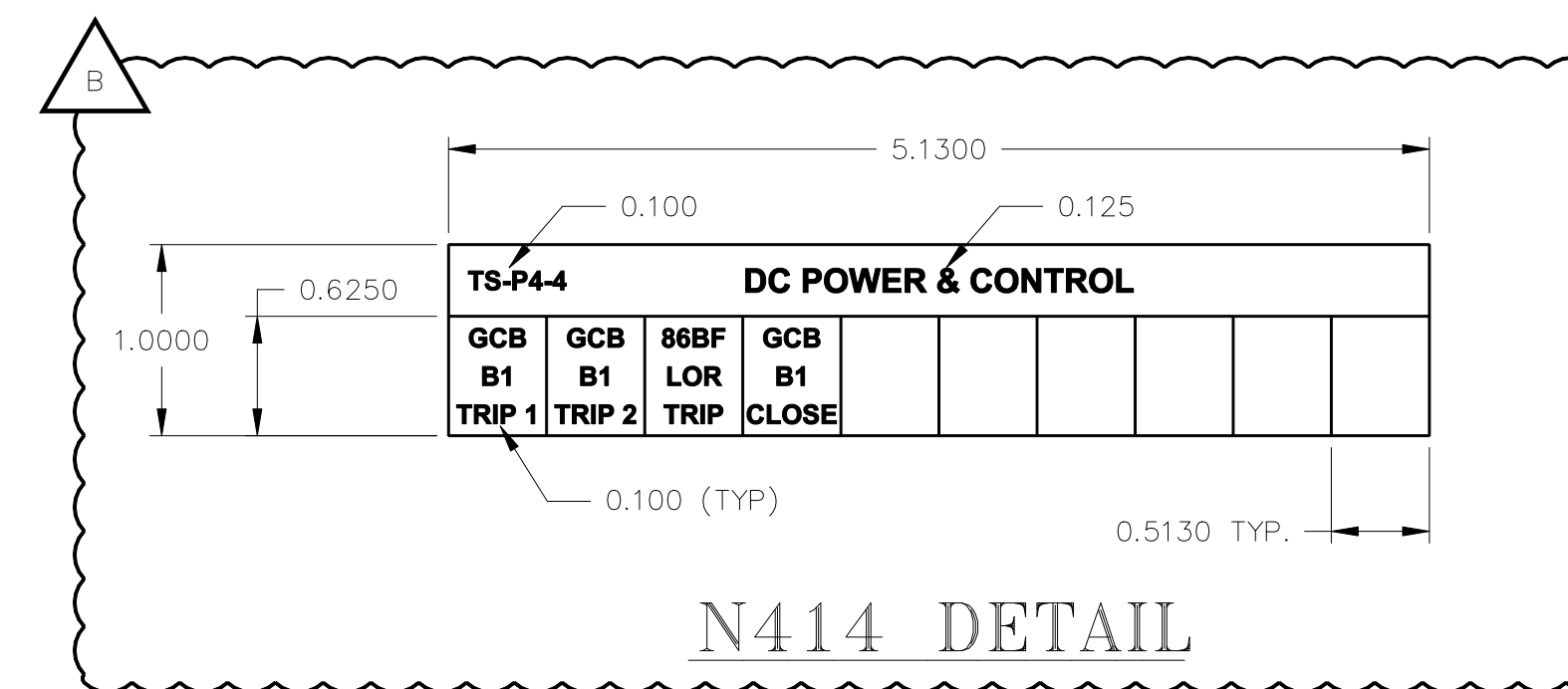
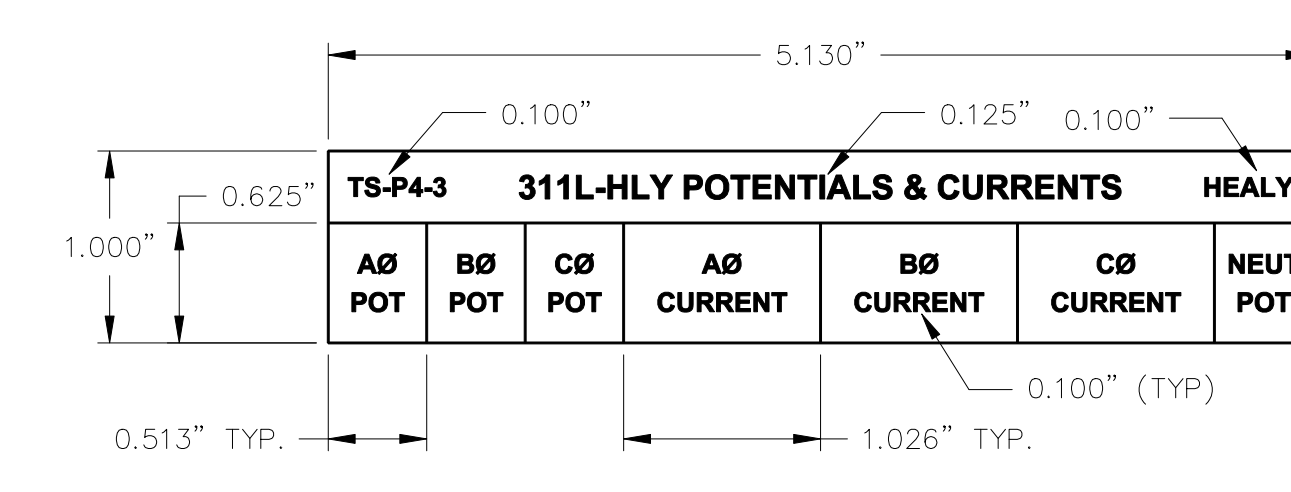
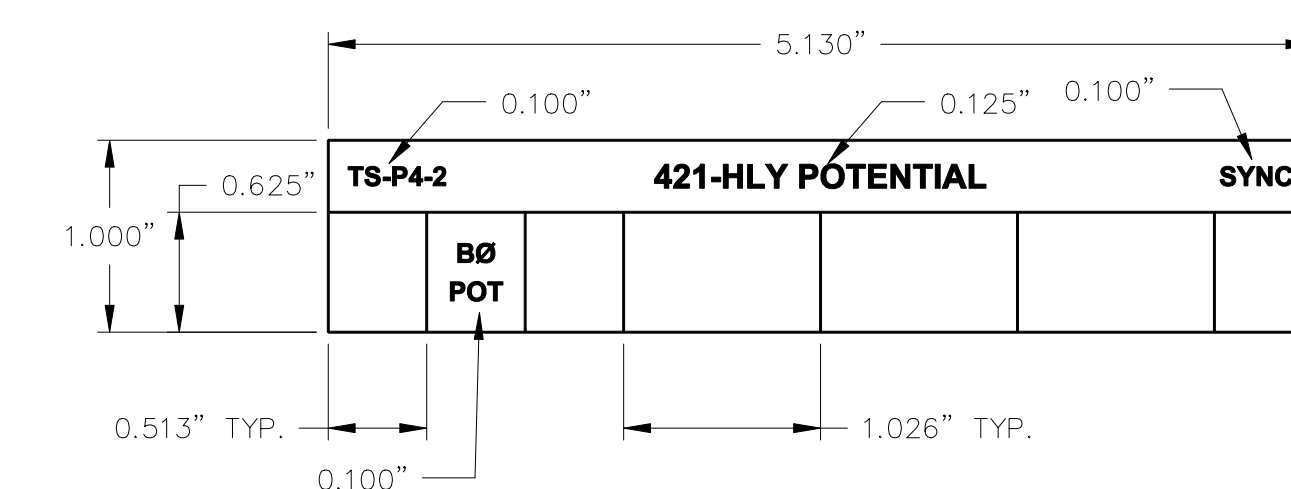
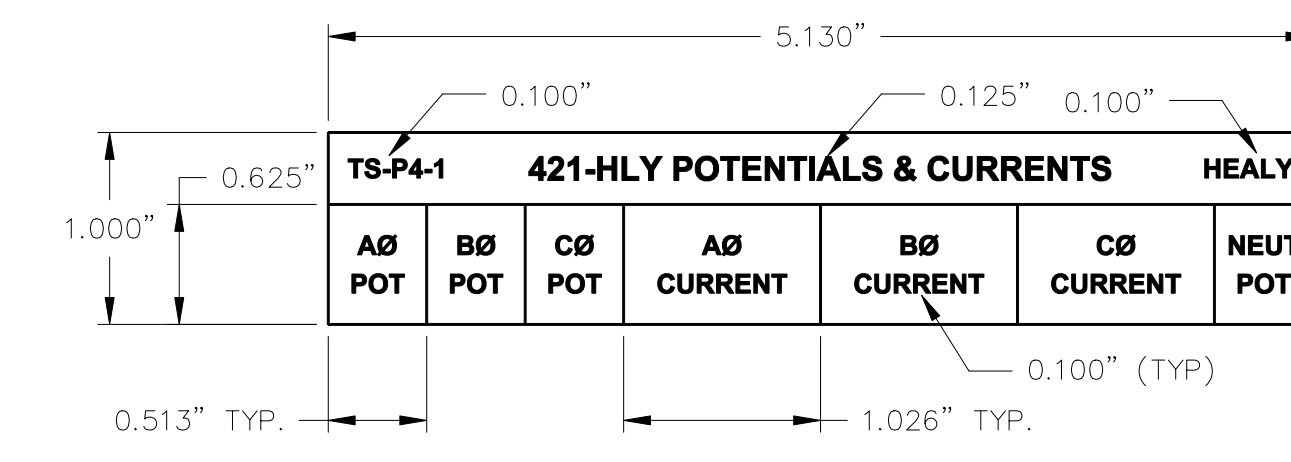
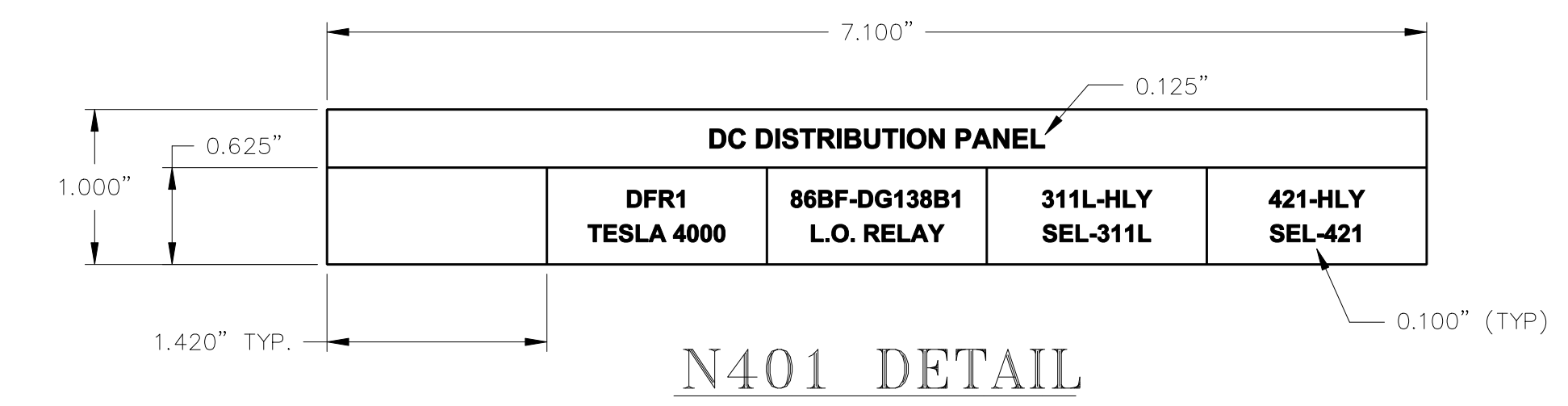
DRAWING NAME: DOUGLAS SUBSTATION
PANEL 4
ELEVATION

REF. DWG(S):

DRAWING NO.: DGSS-EL-4504

SHEET 1 OF 3

NAMEPLATE NUMBER	QTY	LINE 1 TEXT	LINE 2 TEXT	LINE 3 TEXT	NAMEPLATE SIZE HEIGHT x WIDTH (IN)	TEXT HEIGHT (IN)
N400	2	PANEL 4	HEALY LINE RELAYING		1-1/2 x 5	1/4
N401	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N402	2	AA			1/2 x 3/4	1/4
N403	2	AB			1/2 x 3/4	1/4
N404	2	AC			1/2 x 3/4	1/4
N405	2	AD			1/2 x 3/4	1/4
N406	2	AE			1/2 x 3/4	1/4
N407	1	421-HLY	HEALY LINE RELAY	SEL-421	1 x 3	1/8
N408	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N409	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N410	1	311L-HLY	HEALY LINE RELAY	SEL-311L	1 x 3	1/8
N411	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N412	1	86BF-DG138B1	BKR FAIL LOCK-OUT RELAY	GCB DG-138-B1	1 x 3	1/8
N413	1	DFR1	POWER SYSTEM RECORDER	TESLA 4000	1 x 3	1/8
N414	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N415	1	A			1/2 x 3/4	1/4
N416	1	B			1/2 x 3/4	1/4
N417	1	CA	421-HLY	SEL-421	1 x 1-1/2	1/8
N418	1	DA	TS-P4-1	421 TEST SW	1 x 1-1/2	1/8
N419	1	DB	TS-P4-2	421 TEST SW	1 x 1-1/2	1/8
N420	1	EA	311L-HLY	SEL-311L	1 x 1-1/2	1/8
N421	1	FA	TS-P4-3	311L TEST SW	1 x 1-1/2	1/8
N422	1	GA	86BF-DG138B1	BF LO RELAY	1 x 1-1/2	1/8
N423	1	KA	DFR1-PT1	138 kV VT	1 x 1-1/2	1/8
N424	1	KB	DFR1-CT1	138 kV BKR CT	1 x 1-1/2	1/8
N425	1	KC	DFR1-CT2	138 kV XFMR CT	1 x 1-1/2	1/8
N426	1	LA	DFR1	TESLA 4000	1 x 1-1/2	1/8
N427	1	PA	TS-P4-4	TEST SW	1 x 1-1/2	1/8
N428	1	GB	GROUND BUS		1 x 1-1/2	1/8
N429	1	LB			1/2 x 3/4	1/4
N430	1	WORK LIGHT			1 x 1-1/2	1/8



- NOTES:
- ALL NAMEPLATES SHALL BE 1/16" THICK MINIMUM PLASTIC.
 - ALL NAMEPLATES SHALL HAVE EXTERIOR RATED HIGH-TACK ADHESIVE.
 - ALL NAMEPLATES SHALL BE BLACK SURFACE WITH WHITE TEXT.
 - ALL TEXT SHALL BE "ARIAL BOLD" FONT.
 - EACH LINE OF TEXT SHALL BE CENTERED ON THE NAMEPLATE.
 - ALL TEXT SHALL BE UPPER CASE.
 - ALL DIMENSIONS SHOWN IN INCHES.

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS		JOB #: MEA W.O. EN16-3.2	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016
B	ISSUED FOR BID	MSG/03-15-2017	TCC/03-15-2017

ENG. STAMP

Matanuska Electric Association

163 East Industrial Way
Palmer, AK 99645
(907) 761-9300
WWW.MEA.COOP

NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION

DRAWING NAME: DOUGLAS SUBSTATION PANEL 4 NAMEPLATES

REF. DWG(S):

DRAWING NO.: DGSS-EL-4504

SHEET 2 OF 3

BILL OF MATERIAL					
REF. NO.	UNIT	ESTIMATED QUANTITY	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
1	EA	5	BLANK FILLER PANEL, METALLIC GREY, 1U	BUD/PA-1101-MG (OAE)	C
2	EA	1	BLANK FILLER PANEL, METALLIC GREY, 2U	BUD/PA-1102-MG (OAE)	C
3	EA	5	BLANK FILLER PANEL, METALLIC GREY, 3U	BUD/PA-1103-MG (OAE)	C
4	EA	1	BLANK FILLER PANEL, METALLIC GREY, 4U	BUD/PA-1104-MG (OAE)	C
5	EA	1	RELAY CABINET WITH DOOR AND COPPER GROUND BUS	TBD	C
6	LOT	1 1 1	LED ENCLOSURE LIGHT LIGHT CABLE ASSEMBLY, 120 VAC	HOFFMAN: HOFFMAN/LEDA1S35 HOFFMAN/LEDA20C	C
7	LOT	1 1 1	LIGHT SWITCH, SINGLE POLE SWITCH BOX COVER	HUBBELL: KELLEMS/HBL12211 (OAE) RACO/239 (OAE) RACO/800C (OAE)	C
8			NOT USED		
9			NOT USED		
10			NOT USED		
11			NOT USED		
12			NOT USED		
13			NOT USED		
14			NOT USED		
15			NOT USED		
16			NOT USED		
17			NOT USED		
18			NOT USED		
19			NOT USED		
20			NOT USED		
21			NOT USED		
22			NOT USED		
23			NOT USED		
24			NOT USED		
25			NOT USED		
26			NOT USED		
27			NOT USED		
28			NOT USED		

C = CONTRACTOR, O = OWNER, NIC = NOT IN CONTRACT.

BILL OF MATERIAL					
REF. NO.	UNIT	ESTIMATED QUANTITY	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
51	EA	5	CIRCUIT BREAKER, 15 AMP	SCHNEIDER ELECTRIC/MG17436	C
52	EA	1	MULTI-POLE BREAKER FRONT MOUNTING KIT	SCHNEIDER ELECTRIC/14210	C
53	EA	1	DIN RAIL WITH SUPPORT	SCHNEIDER ELECTRIC/14211	C
54	EA	1	PROTECTIVE RELAY (421-HLY)	SCHWEITZER/04214415XC0X4H384XXX	C
55	EA	1	PROTECTIVE RELAY (311L-HLY)	SCHWEITZER/0311L7HCC3254X4XX	C
56	EA	1	LOCKOUT RELAY (86BF-DG138B1)	SCHWEITZER/RS86=DKB9	C
57	EA	2	19" RACK BEZEL, FT-1 STYLE, SINGLE CUTOUT	SCHWEITZER/915900178	C
58	EA	1	19" RACK BEZEL, FT-1 STYLE, DUAL CUTOUT	SCHWEITZER/915900179	C
59	EA	2	BNC TEE, F/M/F	SCHWEITZER/240-1799	C
60	EA	3	TEST SWITCH, FT-1 STYLE, (6-C, 4-P) (TS-P4-1, TS-P4-2, TS-P4-3)	ABB/C7148325G32	C
61	EA	9	SWITCH HANDLE INTERLOCKING BAR, 2-POSITION	ABB/1270547	C
62	EA	1	TEST SWITCH, FT-1 STYLE, (10-P) (TS-P4-4)	ABB/9676A93G01	C
63	EA	1	POWER SYSTEM RECORDER (DFR1)	ERLPHASE/109312-TESLA4000-18-16P-0-2-60	C
64	EA	1	AC VOLTAGE INPUT MODULE, TESLA 4000 (DFR1-PT1)	ERLPHASE/114258	C
65	EA	2	AC CURRENT INPUT MODULE, TESLA 4000 (DFR1-CT1, DFR-CT2)	ERLPHASE/114260	C
66	EA	1	MODULE RACK MOUNT PLATE, TESLA 4000	ERLPHASE/114248	C
67	EA	1	CIRCUIT BREAKER, 5 AMP	SCHNEIDER ELECTRIC/MG17434	C
68			NOT USED		
69			NOT USED		
70			NOT USED		
71			NOT USED		
72			NOT USED		
73			NOT USED		
74			NOT USED		
75			NOT USED		
76			NOT USED		
77			NOT USED		
78			NOT USED		
79			NOT USED		
80			NOT USED		

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BILL OF MATERIAL					
REF. NO.	UNIT	ESTIMATED QUANTITY	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
101	EA	2	MOUNTING RAIL, PR30	ABB/1SNA 173 220 R0500	C
102	EA	2	END STOP, BAM2	ABB/1SNA 206 351 R1600	C
103	EA	4	END SECTION, FEM8	ABB/1SNA 113 373 R2600	C
104	EA	235	TERMINAL, SWITCH BLOCK, TYPE M6/8.SNB	ABB/1SNA 115 688 R2500	C
105	EA	4	END SECTION, FEM12S	ABB/1SNA 117 628 R2200	C
106	EA	12	TERMINAL, FUSE BLOCK, TYPE MB10/12.SF	ABB/1SNA 111 033 R0300	C
107	EA	12	FUSE, FU520, 3.15A	ABB/1SNA 008 289 R1600	C
108	EA	4	END SECTION, FEM6	ABB/1SNA 118 368 R1600	C
109	EA	4	TERMINAL BLOCK, FEED THRU, TYPE M6/8	ABB/1SNA 115 118 R1100	C
110	EA	2	TERMINAL MARKERS, VERTICAL, RC810, 1-100	ABB/1SNA 234 060 R0500	C
111	EA	1	TERMINAL MARKERS, VERTICAL, RC810, 101-200	ABB/1SNA 234 061 R2200	C
112	EA	5	TERMINAL BLOCK, 4 POLE, 30 AMP, SHORTING	MARATHON/1504 SC 01C WITH CC 1504	C
113	EA	5	TERMINAL BLOCK, 12 POLE, 30 AMP, STANDARD	MARATHON/1512 STD 01C	C
114			NOT USED		
115			NOT USED		
116			NOT USED		
117			NOT USED		
118			NOT USED		
119			NOT USED		
120			NOT USED		
121			NOT USED		
122			NOT USED		
123			NOT USED		
124			NOT USED		
125			NOT USED		
126			NOT USED		
127			NOT USED		
128			NOT USED		
129			NOT USED		
130			NOT USED		

C = CONTRACTOR, O = OWNER, NIC = NOT IN CONTRACT.

NOTES:

- 1 BILL OF MATERIAL QUANTITIES ARE ESTIMATED. ACTUAL QUANTITIES SHALL BE VERIFIED BY THE CONTRACTOR.

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS		JOB #: MEA W.O. EN16-3.2	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
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ENG. STAMP

Matanuska Electric Association



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NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION

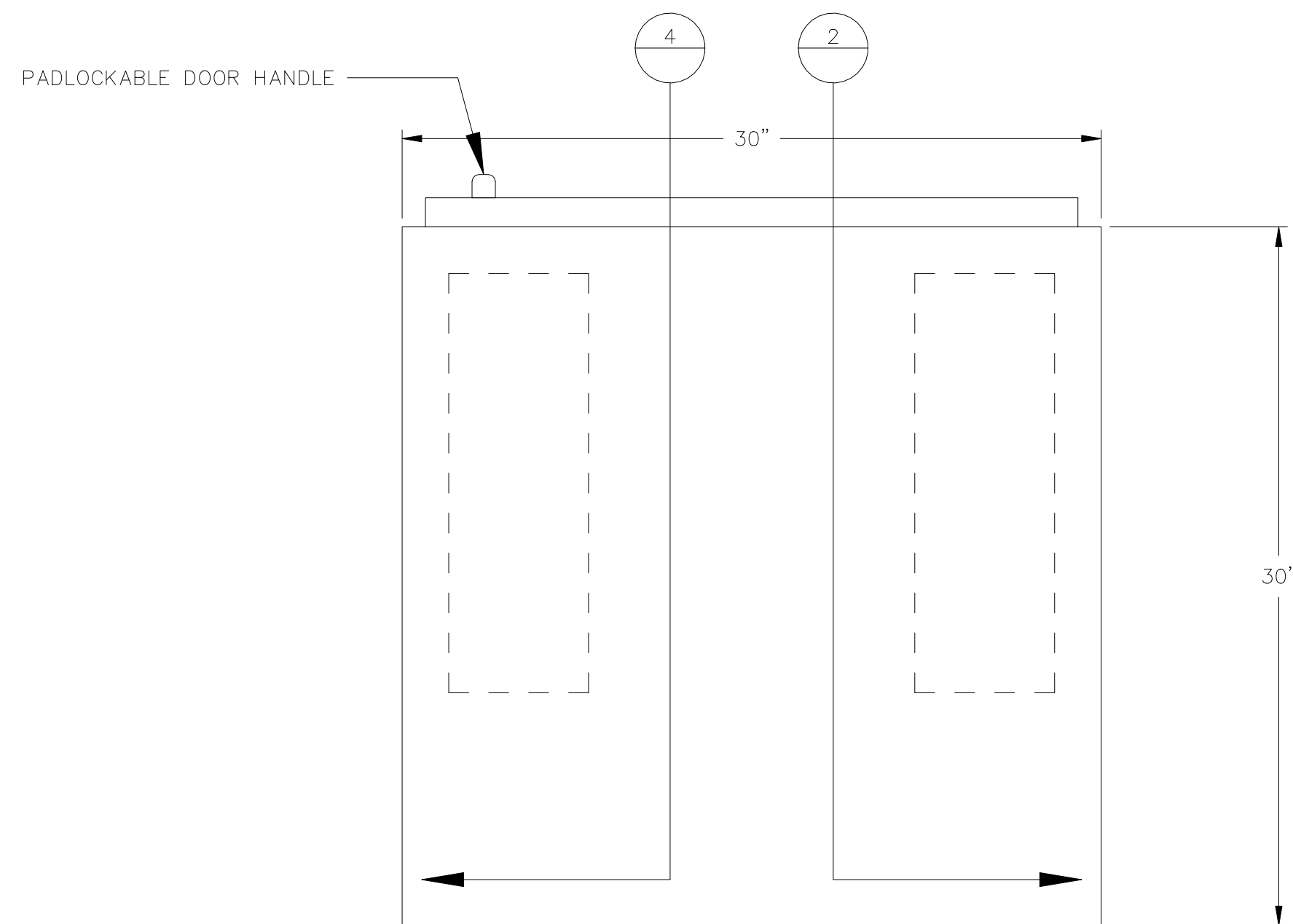
DRAWING NAME: DOUGLAS SUBSTATION
PANEL 4
BILL OF MATERIAL

REF. DWG(S):

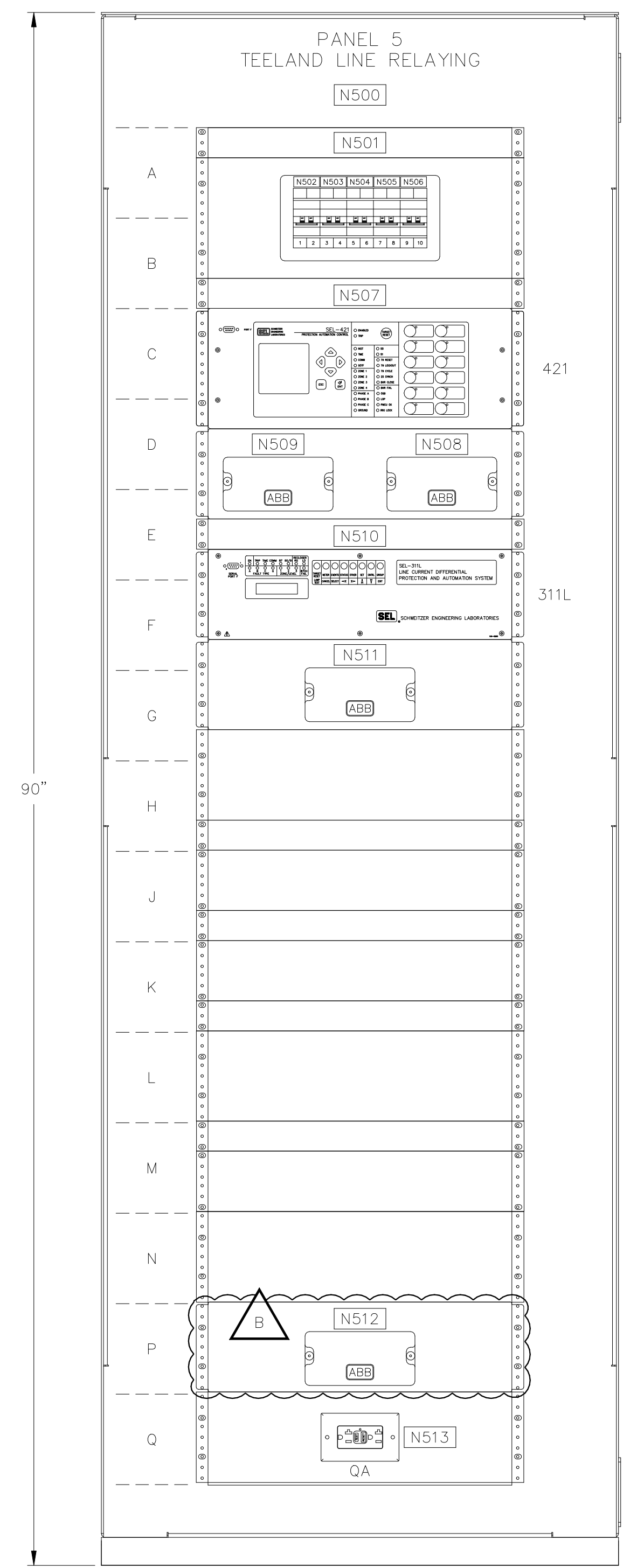
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dass-el-4504_3.dwg

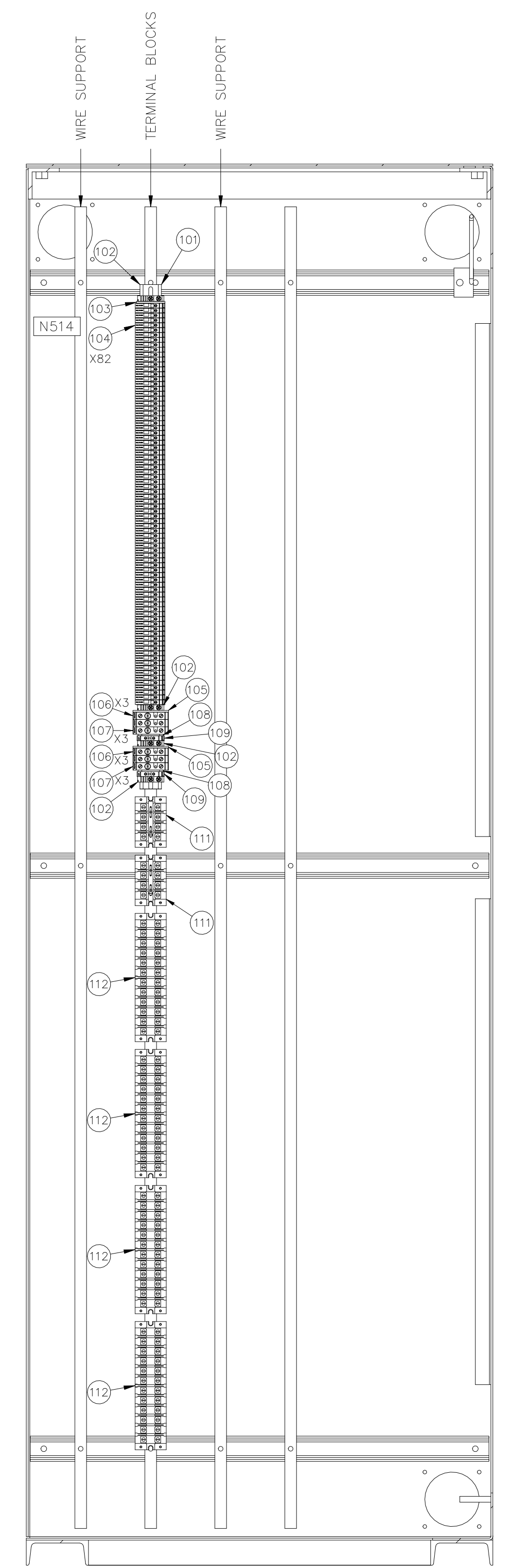
SHEET 3 OF 3



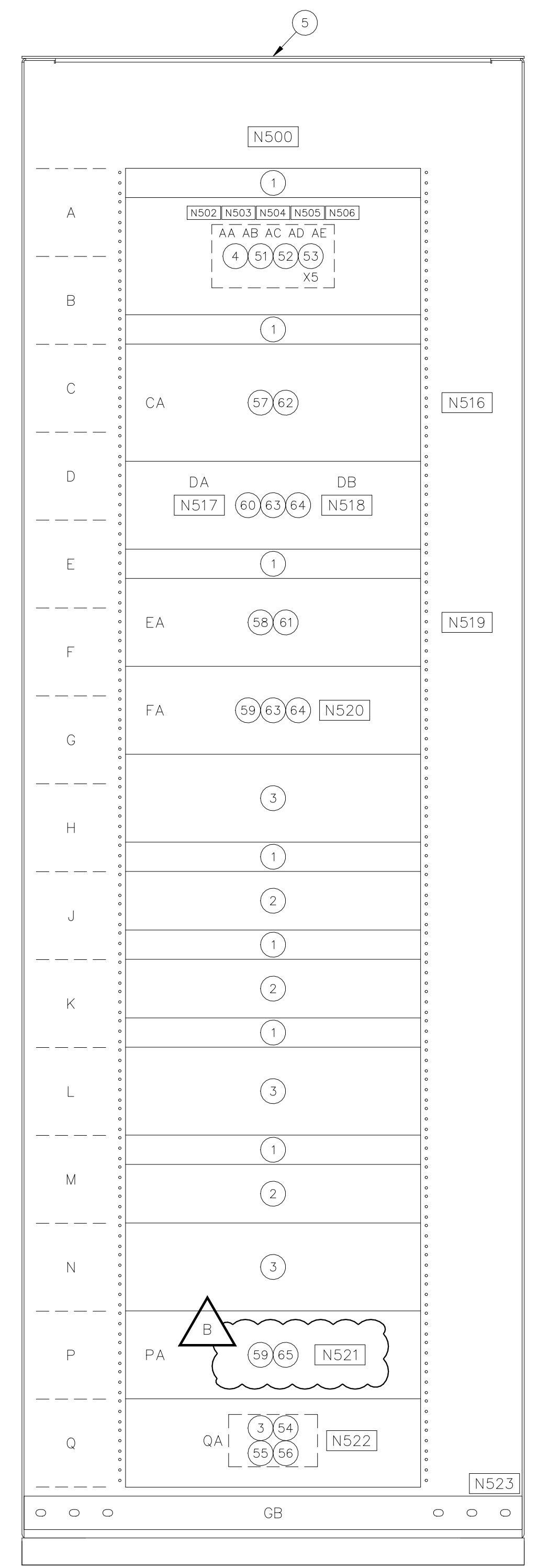
5 PANEL 5 (TOP)
N.T.S.



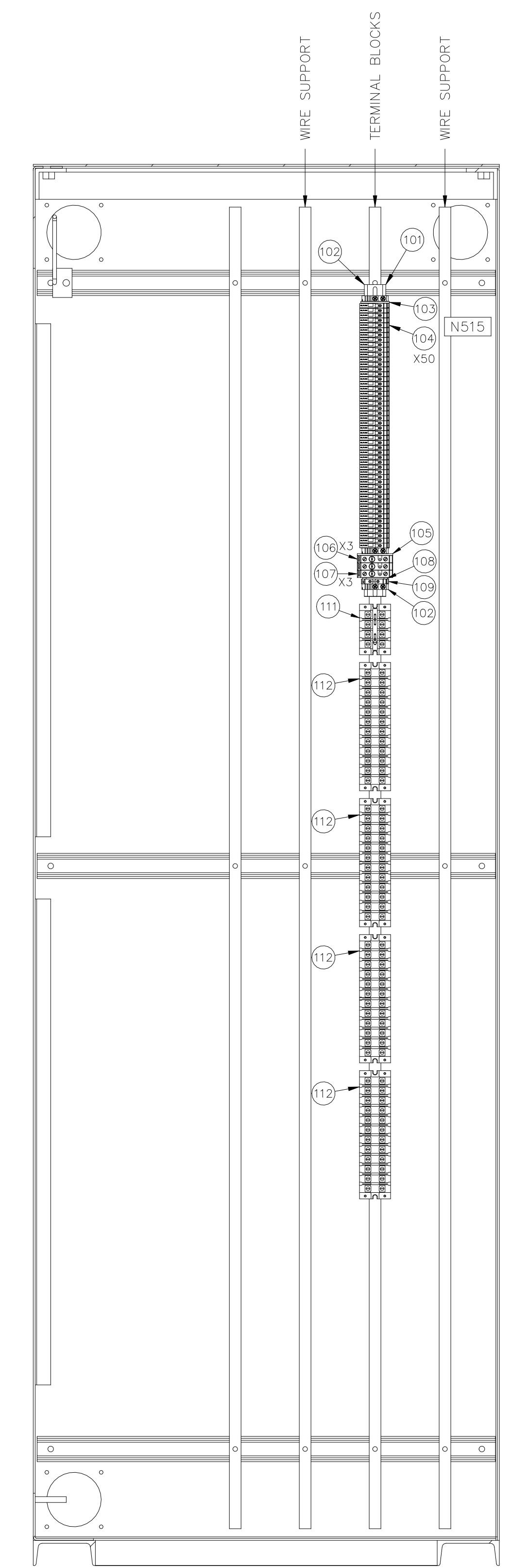
1 PANEL 5 (FRONT)
N.T.S.



2 PANEL 5 (A-SIDE)
N.T.S.



3 PANEL 5 (REAR)
N.T.S.



4 PANEL 5 (B-SIDE)
N.T.S.

- NOTES:
- 1 SEE REFERENCE 6 FOR NAMEPLATES (NXXX)
 - 2 SEE REFERENCE 7 FOR BILL OF MATERIAL.
 - 3 ALL DIMENSIONS SHOWN IN INCHES.

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS			
JOB #: MEA W.O. EN16-3.2		ENG. STAMP	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016
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NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION
1	-	PANEL 5 (FRONT)
2	-	PANEL 5 (A-SIDE)
3	-	PANEL 5 (REAR)
4	-	PANEL 5 (B-SIDE)
5	-	PANEL 5 (TOP)
6	DGSS-EL-4505/2	PANEL 5 NAMEPLATES
7	DGSS-EL-4505/3	PANEL 5 BILL OF MATERIAL

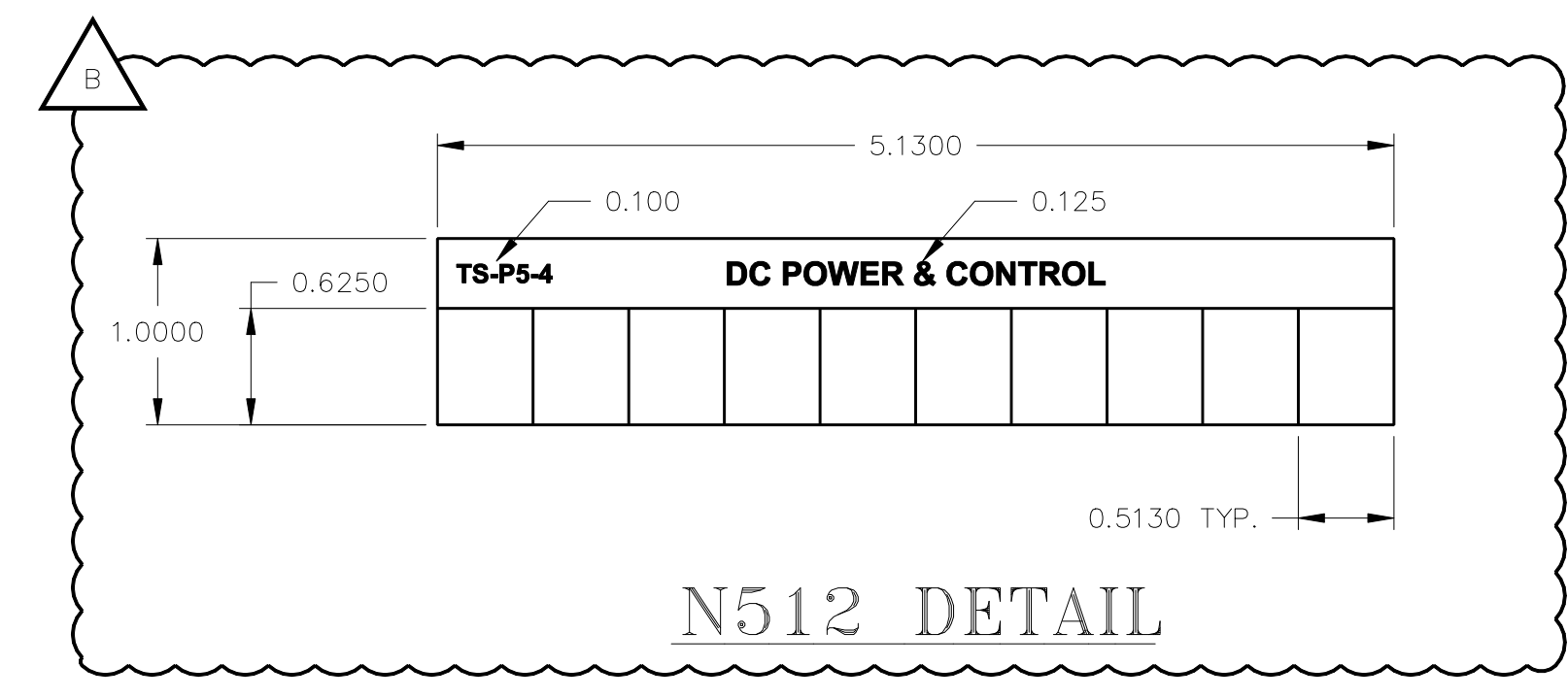
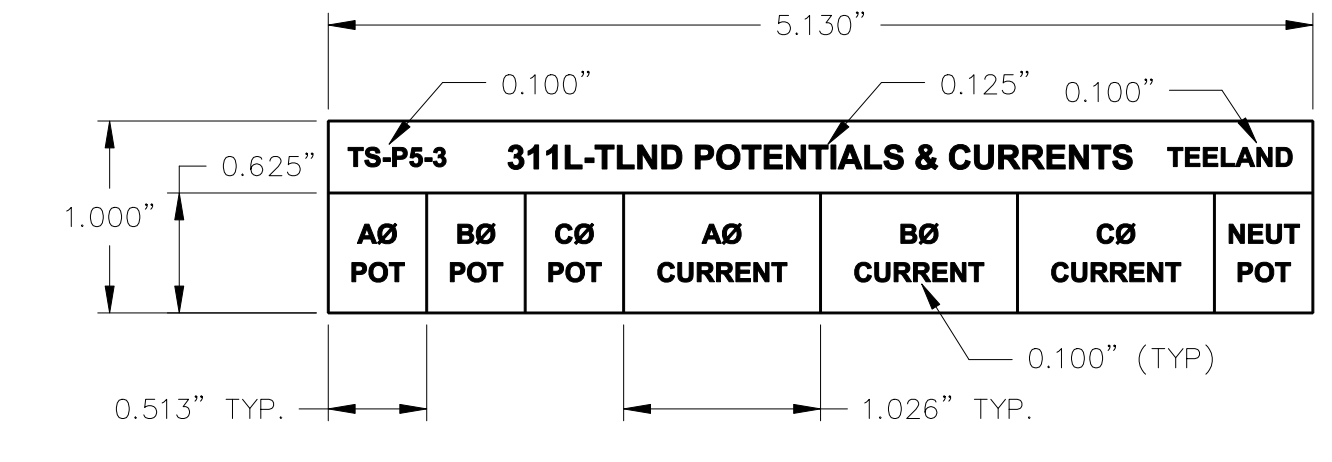
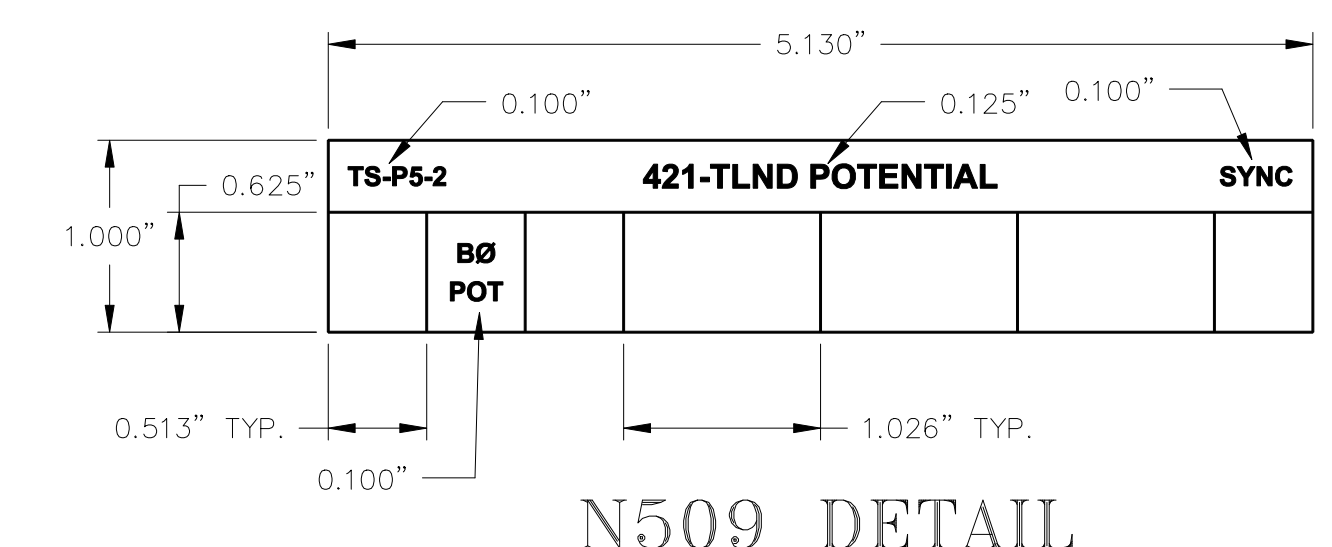
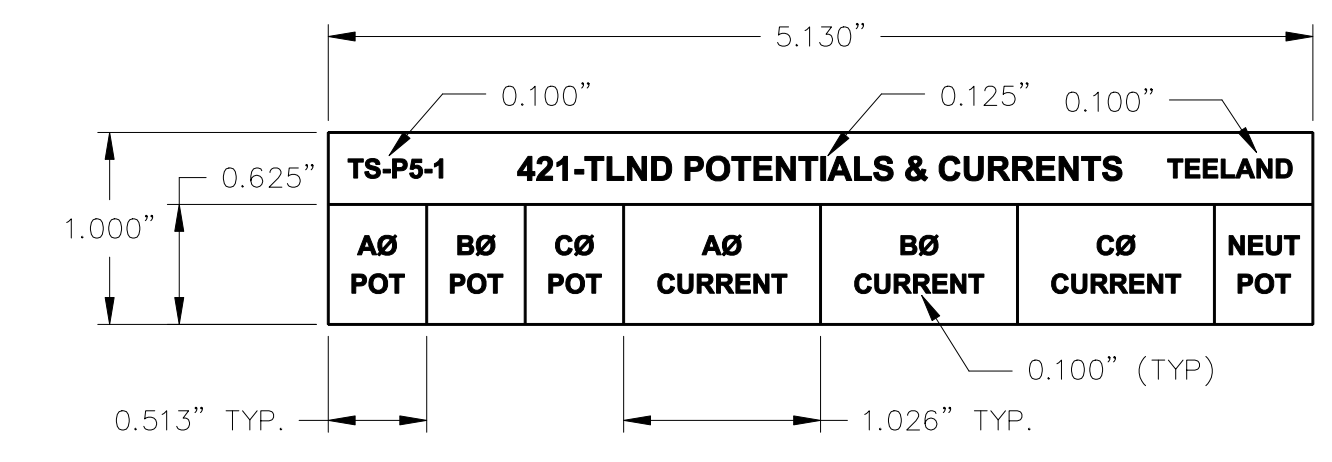
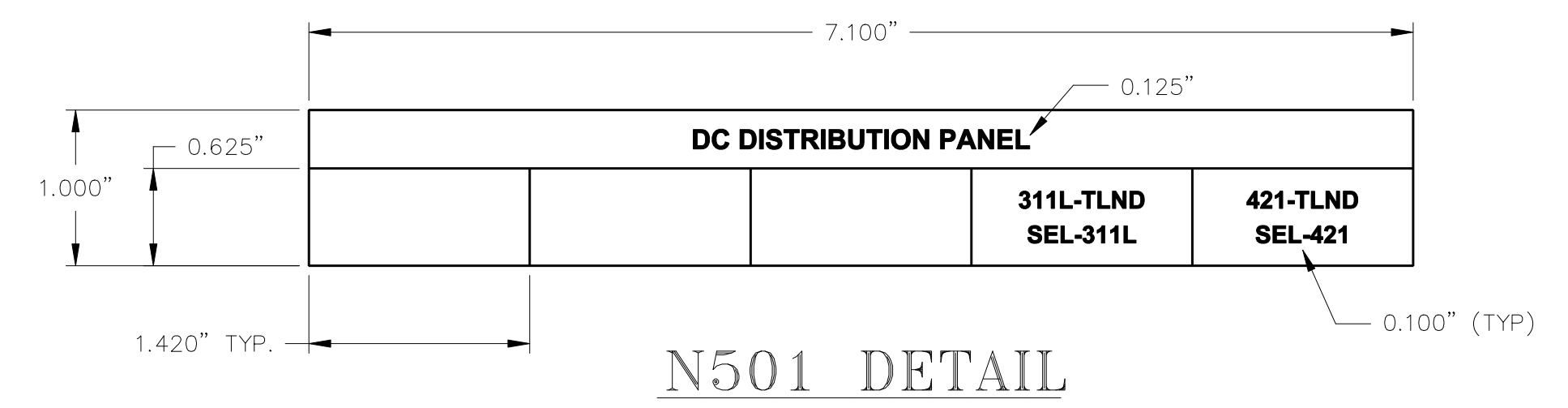
DOUGLAS SUBSTATION
PANEL 5
ELEVATION

dass-el-4505_1.dwg

DRAWING NO.: DGSS-EL-4505

SHEET 1 OF 3

NAMEPLATE NUMBER	QTY	LINE 1 TEXT	LINE 2 TEXT	LINE 3 TEXT	NAMEPLATE SIZE HEIGHT x WIDTH (IN)	TEXT HEIGHT (IN)
N500	2	PANEL 5	TEELAND LINE RELAYING		1-1/2 x 5	1/4
N501	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N502	2	AA			1/2 x 3/4	1/4
N503	2	AB			1/2 x 3/4	1/4
N504	2	AC			1/2 x 3/4	1/4
N505	2	AD			1/2 x 3/4	1/4
N506	2	AE			1/2 x 3/4	1/4
N507	1	421-TLND	TEELAND LINE RELAY	SEL-421	1 x 3	1/8
N508	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N509	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N510	1	311L-TLND	TEELAND LINE RELAY	SEL-311L	1 x 3	1/8
N511	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N512	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N513	1	RE23	120 VAC	RECEPTACLE	1 x 3	1/8
N514	1	A			1/2 x 3/4	1/4
N515	1	B			1/2 x 3/4	1/4
N516	1	CA	421-TLND	SEL-421	1 x 1-1/2	1/8
N517	1	DA	TS-P5-1	421 TEST SW	1 x 1-1/2	1/8
N518	1	DB	TS-P5-2	421 TEST SW	1 x 1-1/2	1/8
N519	1	EA	311L-TLND	SEL-311L	1 x 1-1/2	1/8
N520	1	FA	TS-P5-3	311L TEST SW	1 x 1-1/2	1/8
N521	1	PA	TS-P5-4	TEST SW	1 x 1-1/2	1/8
N522	1	QA	RE23	RECEPTACLE	1 x 1-1/2	1/8
N523	1	GB	GROUND BUS		1 x 1-1/2	1/8
N524	1	WORK LIGHT			1 x 1-1/2	1/8



- NOTES:
- ALL NAMEPLATES SHALL BE 1/16" THICK MINIMUM PLASTIC.
 - ALL NAMEPLATES SHALL HAVE EXTERIOR RATED HIGH-TACK ADHESIVE.
 - ALL NAMEPLATES SHALL BE BLACK SURFACE WITH WHITE TEXT.
 - ALL TEXT SHALL BE "ARIAL BOLD" FONT.
 - EACH LINE OF TEXT SHALL BE CENTERED ON THE NAMEPLATE.
 - ALL TEXT SHALL BE UPPER CASE.
 - ALL DIMENSIONS SHOWN IN INCHES.

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT		JOB #: MEA W.O. EN16-3.2	
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS		ENG. STAMP	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016
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NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION

DRAWING NAME: DOUGLAS SUBSTATION PANEL 5 NAMEPLATES

REF. DWG(S):

DRAWING NO.: DGSS-EL-4505

SHEET 2 OF 3

BILL OF MATERIAL					
REF. NO.	UNIT	ESTIMATED QUANTITY	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
1	EA	7	BLANK FILLER PANEL, METALLIC GREY, 1U	BUD/PA-1101-MG (OAE)	C
2	EA	3	BLANK FILLER PANEL, METALLIC GREY, 2U	BUD/PA-1102-MG (OAE)	C
3	EA	4	BLANK FILLER PANEL, METALLIC GREY, 3U	BUD/PA-1103-MG (OAE)	C
4	EA	1	BLANK FILLER PANEL, METALLIC GREY, 4U	BUD/PA-1104-MG (OAE)	C
5	EA	1	RELAY CABINET WITH DOOR AND COPPER GROUND BUS	TBD	C
6	LOT	1 1 1	LED ENCLOSURE LIGHT LIGHT CABLE ASSEMBLY, 120 VAC	HOFFMAN: HOFFMAN/LEDA1S35 HOFFMAN/LEDA20C	C
7	LOT	1 1 1	LIGHT SWITCH, SINGLE POLE SWITCH BOX COVER	HUBBELL: KELLEMS/HBL12211 (OAE) RACO/239 (OAE) RACO/800C (OAE)	C
8			NOT USED		
9			NOT USED		
10			NOT USED		
11			NOT USED		
12			NOT USED		
13			NOT USED		
14			NOT USED		
15			NOT USED		
16			NOT USED		
17			NOT USED		
18			NOT USED		
19			NOT USED		
20			NOT USED		
21			NOT USED		
22			NOT USED		
23			NOT USED		
24			NOT USED		
25			NOT USED		
26			NOT USED		
27			NOT USED		
28			NOT USED		

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BILL OF MATERIAL					
REF. NO.	UNIT	ESTIMATED QUANTITY	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
51	EA	5	CIRCUIT BREAKER, 15 AMP	SCHNEIDER ELECTRIC/MG17436	C
52	EA	1	MULTI-POLE BREAKER FRONT MOUNTING KIT	SCHNEIDER ELECTRIC/14210	C
53	EA	1	DIN RAIL WITH SUPPORT	SCHNEIDER ELECTRIC/14211	C
54	EA	1	RECEPTACLE, 125V, 20A, DUPLEX, GFI (RE23)	HUBBELL-KELLEMS/GFR53625GI	C
55	EA	1	COVER PLATE, 1-GANG, STAINLESS STEEL	HUBBELL-KELLEMS/SS26 (OAE)	C
56	EA	1	SINGLE GANG BOX, ALUMINUM	HUBBELL-RACO/5386-0 (OAE)	C
57	EA	1	PROTECTIVE RELAY (421-TLND)	SCHWEITZER/04214415XC0X4H384XXXX	C
58	EA	1	PROTECTIVE RELAY (311L-TLND)	SCHWEITZER/0311L7HCC3254X4XX	C
59	EA	2	19" RACK BEZEL, FT-1 STYLE, SINGLE CUTOUT	SCHWEITZER/915900178	C
60	EA	1	19" RACK BEZEL, FT-1 STYLE, DUAL CUTOUT	SCHWEITZER/915900179	C
61	EA	1	WIRE LEAD TERMINATOR, 50 OHM	SCHWEITZER/915900036	C
62	EA	1	BNC TEE, F/M/F	SCHWEITZER/240-1799	C
63	EA	3	TEST SWITCH, FT-1 STYLE, (6-C, 4-P) (TS-P5-1, TS-P5-2, TS-P5-3)	ABB/C714B325G32	C
64	EA	9	SWITCH HANDLE INTERLOCKING BAR, 2-POSITION	ABB/1270547	C
65	EA	1	TEST SWITCH, FT-1 STYLE, (10-P) (TS-P5-4)	ABB/9676A93G01	C
66			NOT USED		
67			NOT USED		
68			NOT USED		
69			NOT USED		
70			NOT USED		
71			NOT USED		
72			NOT USED		
73			NOT USED		
74			NOT USED		
75			NOT USED		
76			NOT USED		
77			NOT USED		
78			NOT USED		
79			NOT USED		
80			NOT USED		

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BILL OF MATERIAL					
REF. NO.	UNIT	ESTIMATED QUANTITY	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
101	EA	2	MOUNTING RAIL, PR30	ABB/1SNA 173 220 R0500	C
102	EA	7	END STOP, BAM2	ABB/1SNA 206 351 R1600	C
103	EA	2	END SECTION, FEM8	ABB/1SNA 113 373 R2600	C
104	EA	132	TERMINAL, SWITCH BLOCK, TYPE M6/8.SNB	ABB/1SNA 115 688 R2500	C
105	EA	3	END SECTION, FEM12S	ABB/1SNA 117 628 R2200	C
106	EA	9	TERMINAL, FUSE BLOCK, TYPE MB10/12.SF	ABB/1SNA 111 033 R0300	C
107	EA	9	FUSE, FU520, 3.15A	ABB/1SNA 008 289 R1600	C
108	EA	3	END SECTION, FEM6	ABB/1SNA 118 368 R1600	C
109	EA	3	TERMINAL BLOCK, FEED THRU, TYPE M6/8	ABB/1SNA 115 118 R1100	C
110	EA	2	TERMINAL MARKERS, VERTICAL, RCB10, 1-100	ABB/1SNA 234 060 R0500	C
111	EA	3	TERMINAL BLOCK, 4 POLE, 30 AMP, SHORTING	MARATHON/1504 SC 01C WITH CC 1504	C
112	EA	8	TERMINAL BLOCK, 12 POLE, 30 AMP, STANDARD	MARATHON/1512 STD 01C	C
113			NOT USED		
114			NOT USED		
115			NOT USED		
116			NOT USED		
117			NOT USED		
118			NOT USED		
119			NOT USED		
120			NOT USED		
121			NOT USED		
122			NOT USED		
123			NOT USED		
124			NOT USED		
125			NOT USED		
126			NOT USED		
127			NOT USED		
128			NOT USED		
129			NOT USED		
130			NOT USED		

C = CONTRACTOR, O = OWNER, NIC = NOT IN CONTRACT.

NOTES:

- 1 BILL OF MATERIAL QUANTITIES ARE ESTIMATED. ACTUAL QUANTITIES SHALL BE VERIFIED BY THE CONTRACTOR.

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS		JOB #: MEA W.O. EN16-3.2	
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163 East Industrial Way
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(907) 761-9300
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NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION

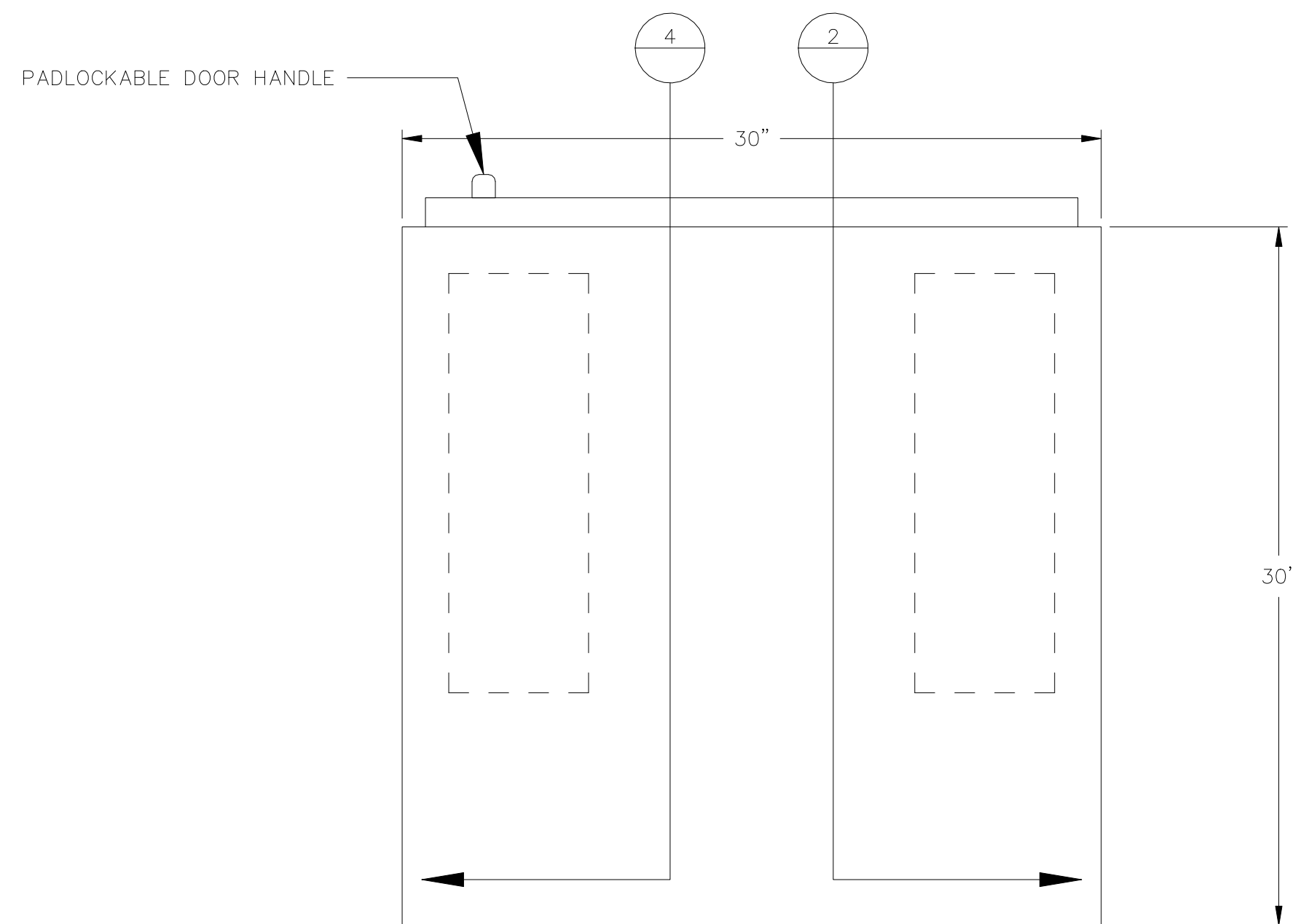
DRAWING NAME: DOUGLAS SUBSTATION
PANEL 5
BILL OF MATERIAL

REF. DWG(S):

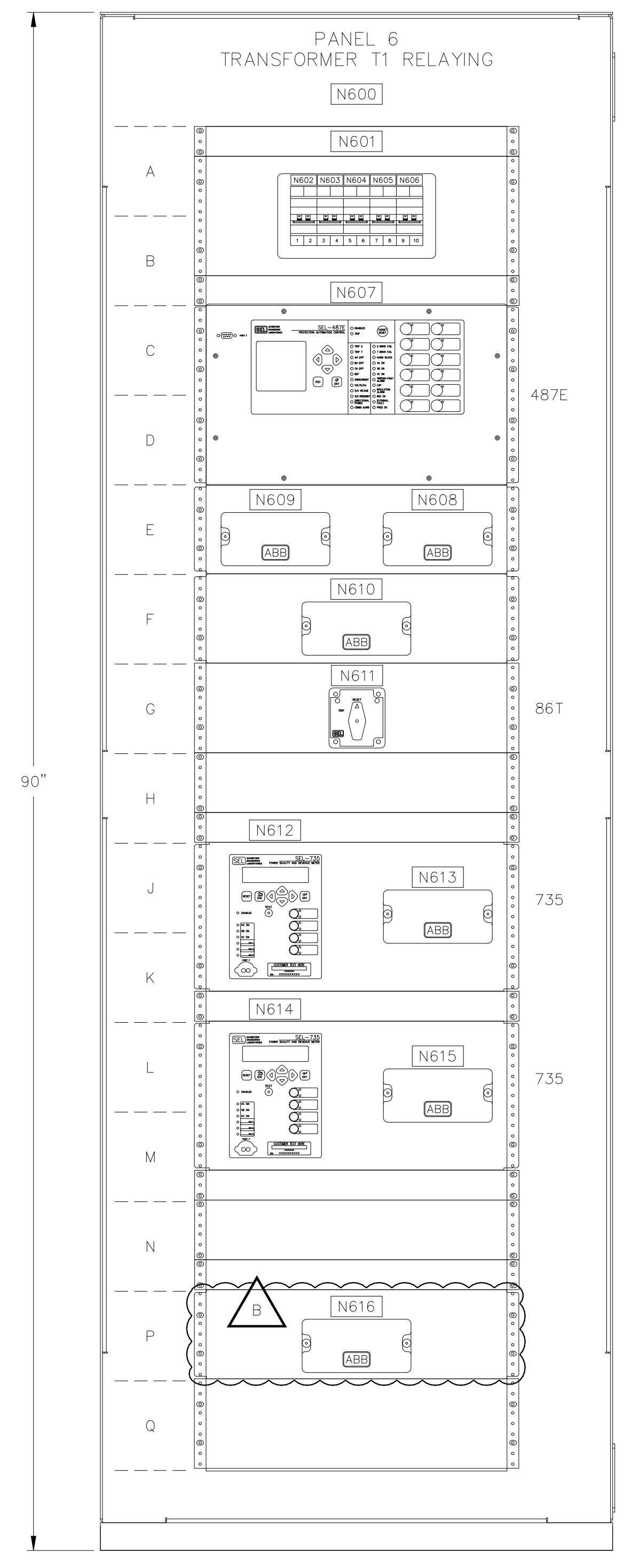
DRAWING NO.: DGSS-EL-4505

dass-el-4505_3.dwg

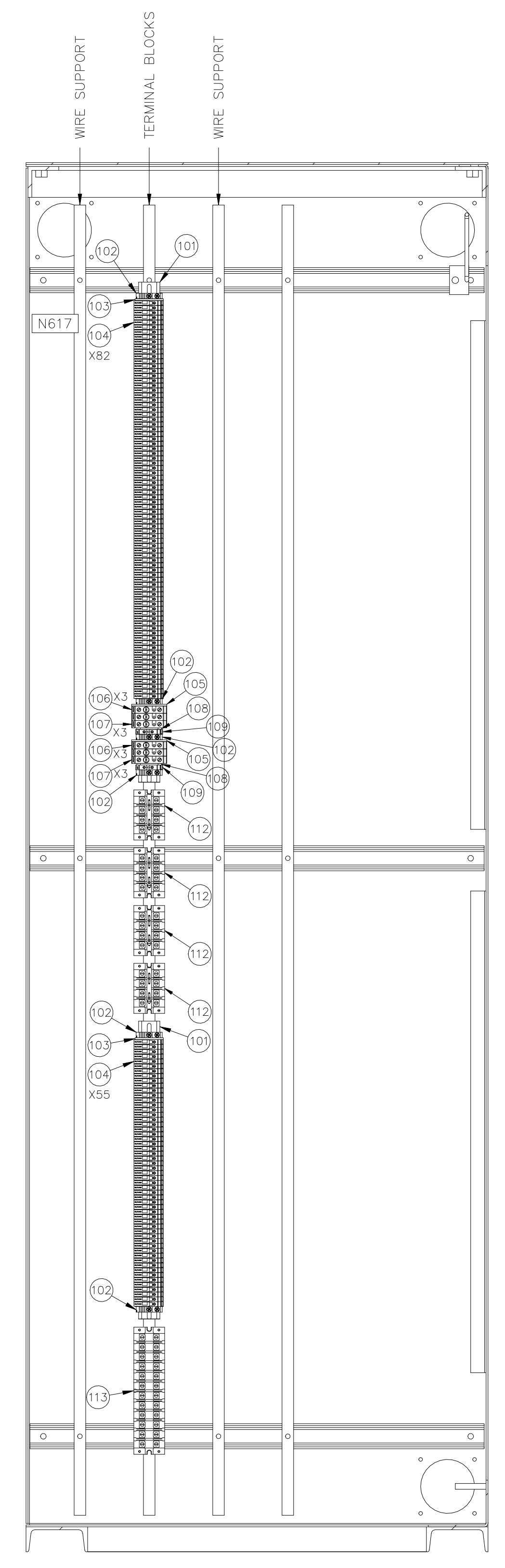
SHEET 3 OF 3



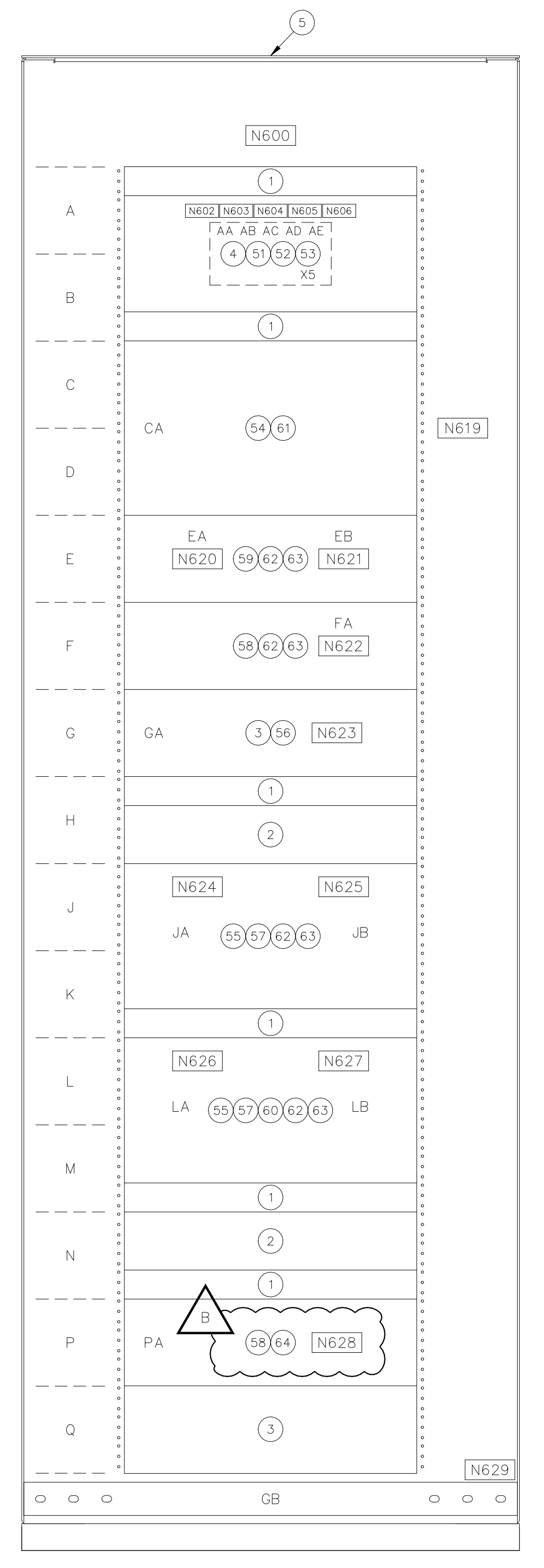
5 PANEL 6 (TOP)
N.T.S.



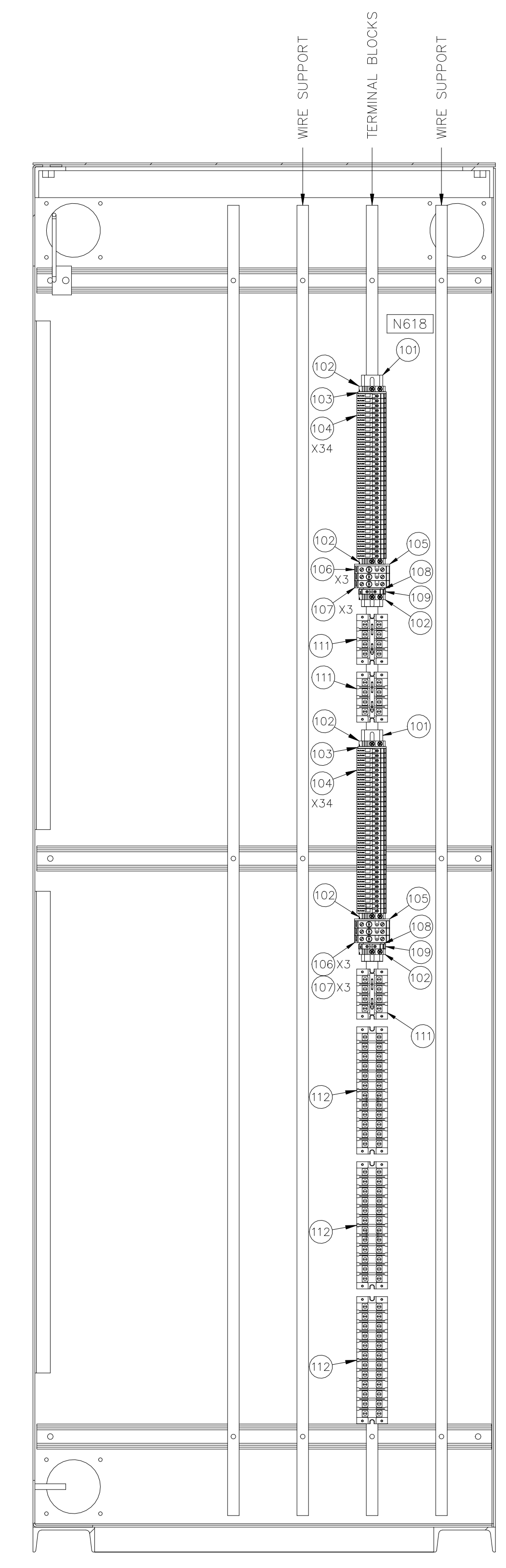
1 PANEL 6 (FRONT)
N.T.S.



2 PANEL 6 (A-SIDE)
N.T.S.



3 PANEL 6 (REAR)
N.T.S.



4 PANEL 6 (B-SIDE)
N.T.S.

NOTES:

1 SEE REFERENCE 6 FOR NAMEPLATES (NXXX)

2 SEE REFERENCE 7 FOR BILL OF MATERIAL.

3 ALL DIMENSIONS SHOWN IN INCHES.

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS

NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016
B	ISSUED FOR BID	MSG/03-15-2017	TCC/03-15-2017

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NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION
1	-	PANEL 6 (FRONT)
2	-	PANEL 6 (A-SIDE)
3	-	PANEL 6 (REAR)
4	-	PANEL 6 (B-SIDE)
5	-	PANEL 6 (TOP)
6	DGSS-EL-4506/2	PANEL 6 NAMEPLATES
7	DGSS-EL-4506/3	PANEL 6 BILL OF MATERIAL

DRAWING NAME: DOUGLAS SUBSTATION
PANEL 6
ELEVATION

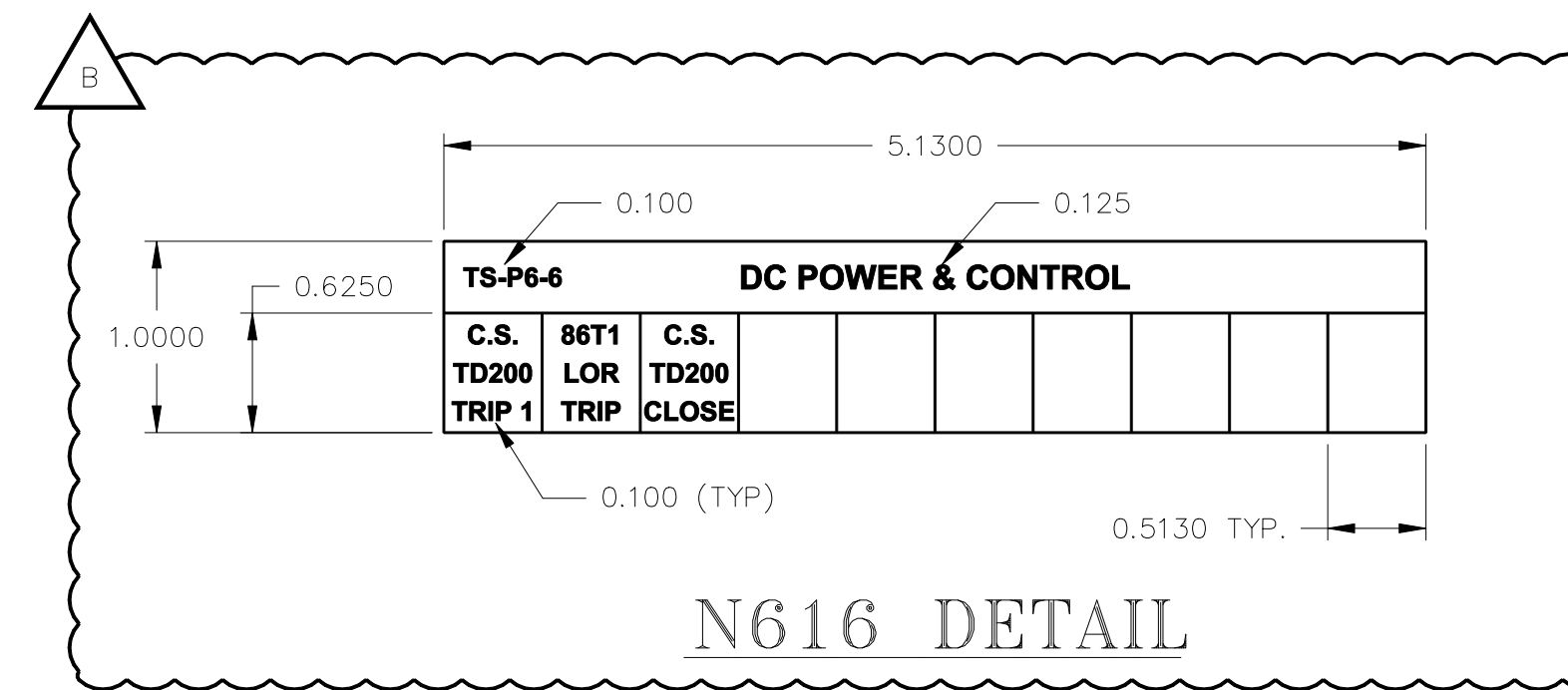
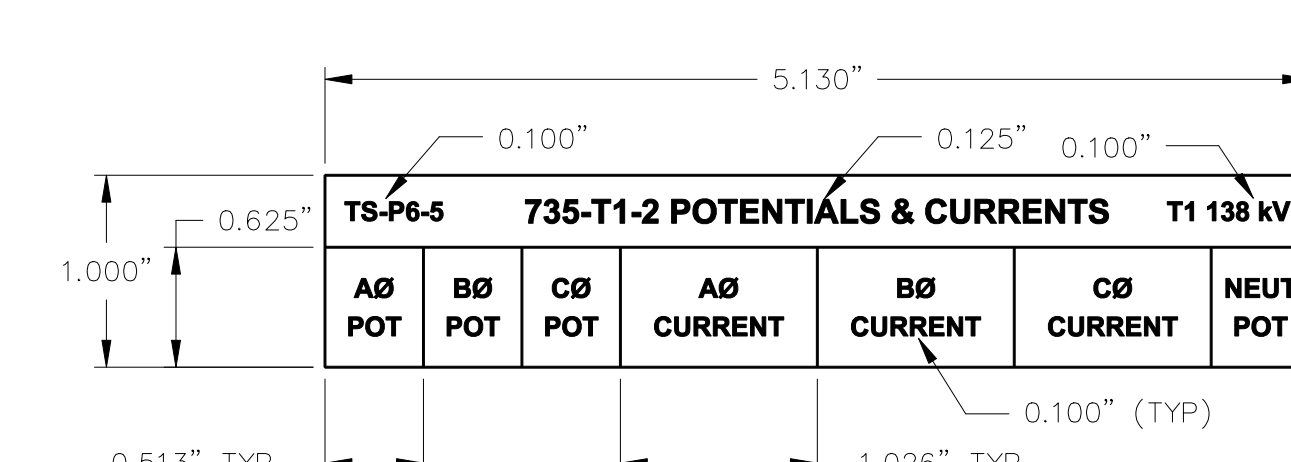
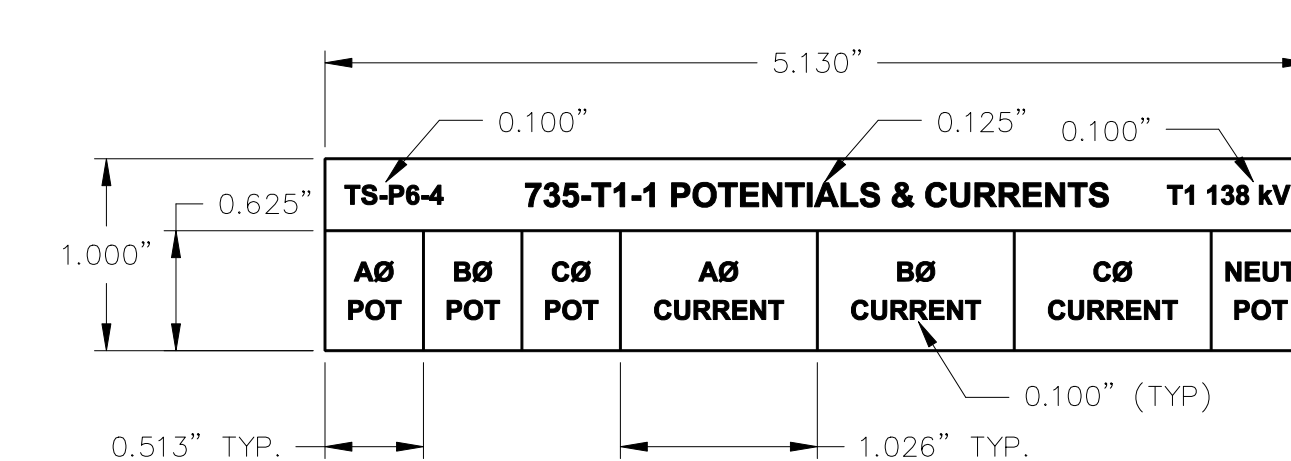
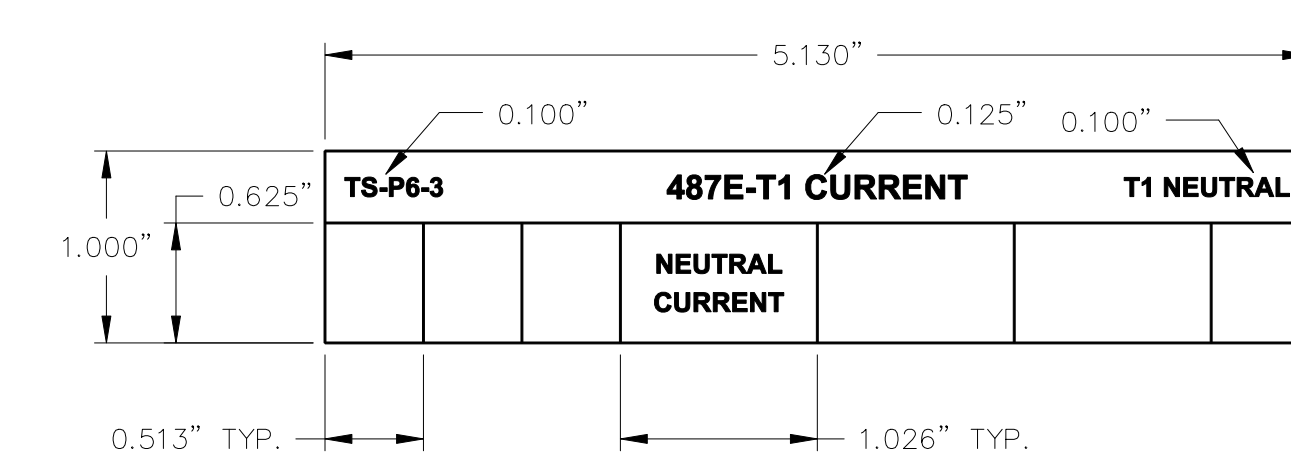
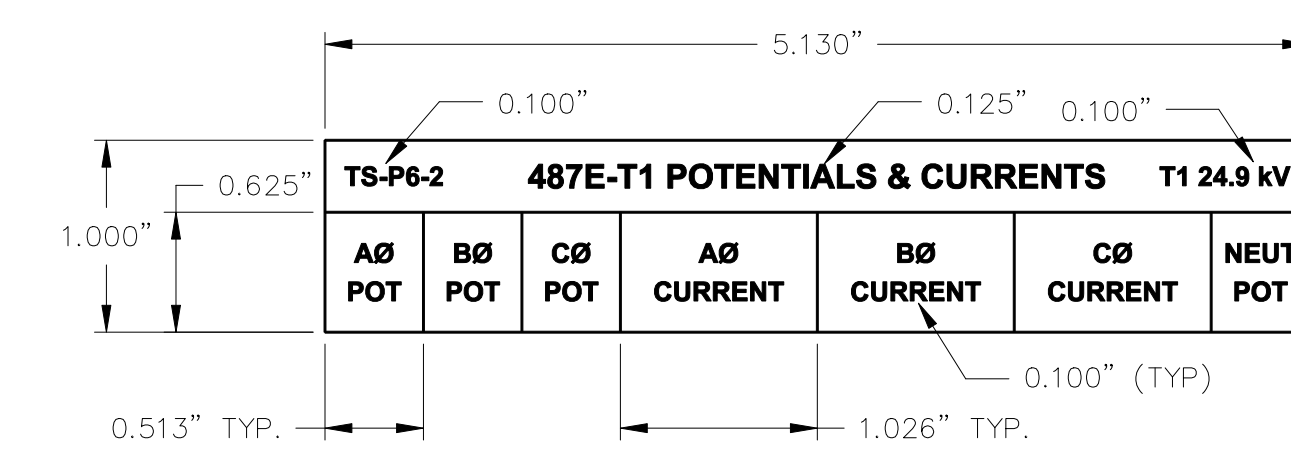
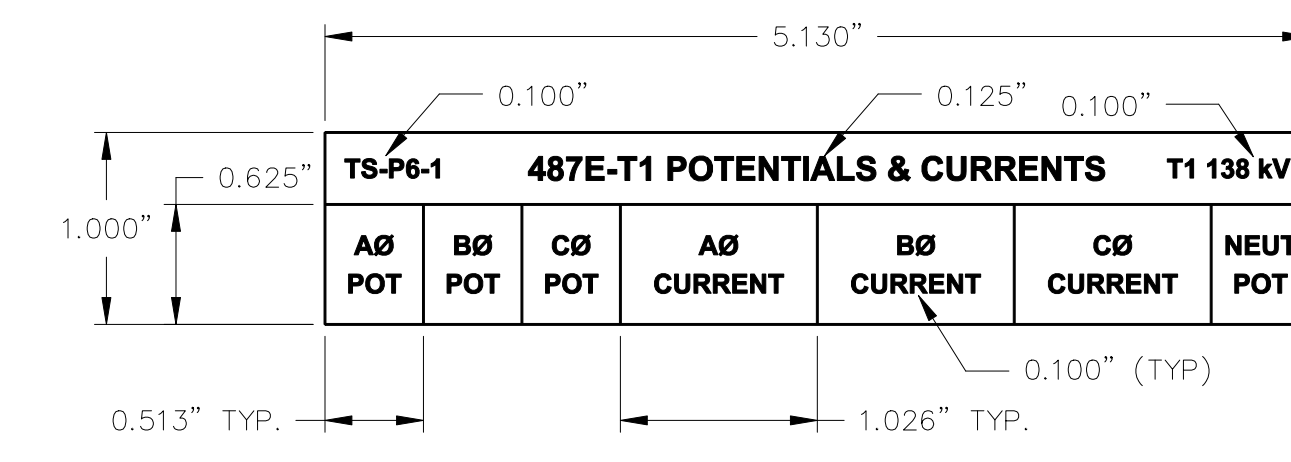
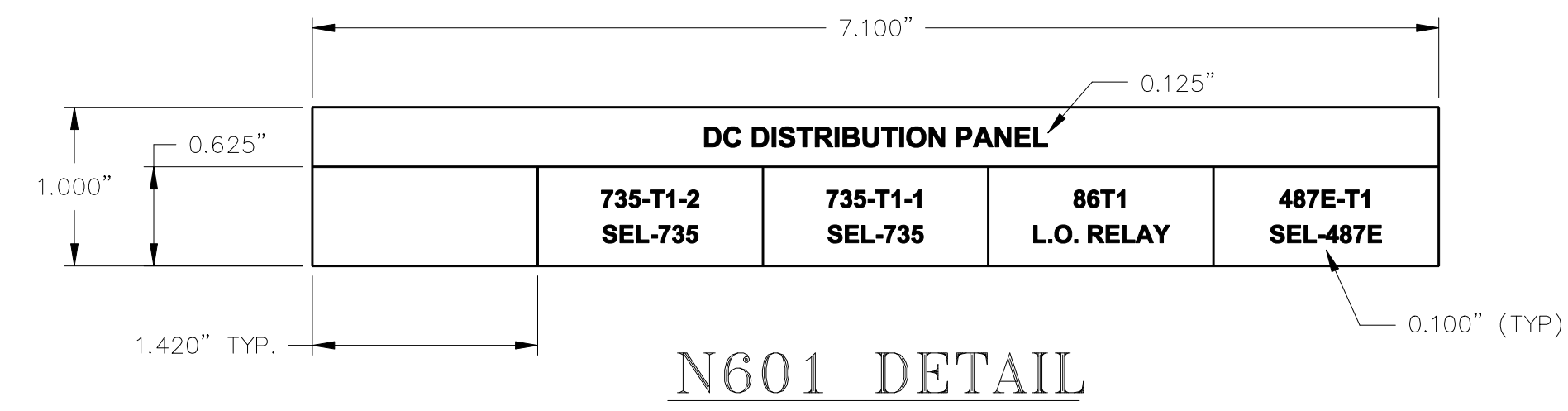
REF. DWG(S):

DRAWING NO.: DGSS-EL-4506

dass-el-4506_1.dwg

SHEET 1 OF 3

NAMEPLATE NUMBER	QTY	LINE 1 TEXT	LINE 2 TEXT	LINE 3 TEXT	NAMEPLATE SIZE HEIGHT x WIDTH (IN)	TEXT HEIGHT (IN)
N600	2	PANEL 6	TRANSFORMER T1 RELAYING	TRANSFORMER T1 METERING	1-1/2 x 5	1/4
N601	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N602	2	AA			1/2 x 3/4	1/4
N603	2	AB			1/2 x 3/4	1/4
N604	2	AC			1/2 x 3/4	1/4
N605	2	AD			1/2 x 3/4	1/4
N606	2	AE			1/2 x 3/4	1/4
N607	1	487E-T1	TRANSFORMER T1 RELAY	SEL-487E	1 x 3	1/8
N608	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N609	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N610	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N611	1	86T1	XFMR LOCK-OUT RELAY	TRANSFORMER T1	1 x 3	1/8
N612	1	735-T1-1	XFMR T1 METER	SEL-735	1 x 3	1/8
N613	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N614	1	735-T1-2	XFMR T1 METER (BACKUP)	SEL-735	1 x 3	1/8
N615	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N616	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N617	1	A			1/2 x 3/4	1/4
N618	1	B			1/2 x 3/4	1/4
N619	1	CA	487E-T1	SEL-487E	1 x 1-1/2	1/8
N620	1	EA	TS-P6-1	487E TEST SW	1 x 1-1/2	1/8
N621	1	EB	TS-P6-2	487E TEST SW	1 x 1-1/2	1/8
N622	1	FA	TS-P6-3	487E TEST SW	1 x 1-1/2	1/8
N623	1	GA	86T1	XFMR LO RELAY	1 x 1-1/2	1/8
N624	1	JA	TS-P6-4	735 TEST SW	1 x 1-1/2	1/8
N625	1	JB	735-T1-1	SEL-735	1 x 1-1/2	1/8
N626	1	LA	TS-P6-5	735 TEST SW	1 x 1-1/2	1/8
N627	1	LB	735-T1-2	SEL-735	1 x 1-1/2	1/8
N628	1	PA	TS-P6-6	TEST SW	1 x 1-1/2	1/8
N628	1	GB	GROUND BUS		1 x 1-1/2	1/8
N629	1	WORK LIGHT			1 x 1-1/2	1/8



- NOTES:
- ALL NAMEPLATES SHALL BE 1/16" THICK MINIMUM PLASTIC.
 - ALL NAMEPLATES SHALL HAVE EXTERIOR RATED HIGH-TACK ADHESIVE.
 - ALL NAMEPLATES SHALL BE BLACK SURFACE WITH WHITE TEXT.
 - ALL TEXT SHALL BE "ARIAL BOLD" FONT.
 - EACH LINE OF TEXT SHALL BE CENTERED ON THE NAMEPLATE.
 - ALL TEXT SHALL BE UPPER CASE.
 - ALL DIMENSIONS SHOWN IN INCHES.

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS		JOB #: MEA W.O. EN16-3.2	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016
B	ISSUED FOR BID	MSG/03-15-2017	TCC/03-15-2017

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NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION

DRAWING NAME: DOUGLAS SUBSTATION PANEL 6 NAMEPLATES

REF. DWG(S):

DRAWING NO.: DGSS-EL-4506

SHEET 2 OF 3

BILL OF MATERIAL					
REF. NO.	UNIT	ESTIMATED QUANTITY	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
1	EA	6	BLANK FILLER PANEL, METALLIC GREY, 1U	BUD/PA-1101-MG (OAE)	C
2	EA	2	BLANK FILLER PANEL, METALLIC GREY, 2U	BUD/PA-1102-MG (OAE)	C
3	EA	2	BLANK FILLER PANEL, METALLIC GREY, 3U	BUD/PA-1103-MG (OAE)	C
4	EA	1	BLANK FILLER PANEL, METALLIC GREY, 4U	BUD/PA-1104-MG (OAE)	C
5	EA	1	RELAY CABINET WITH DOOR AND COPPER GROUND BUS	TBD	C
6	LOT	1 1 1	LED ENCLOSURE LIGHT LIGHT CABLE ASSEMBLY, 120 VAC	HOFFMAN: HOFFMAN/LEDA1S35 HOFFMAN/LEDA20C	C
7	LOT	1 1 1	LIGHT SWITCH, SINGLE POLE SWITCH BOX COVER	HUBBELL: KELLEMS/HBL12211 (OAE) RACO/239 (OAE) RACO/800C (OAE)	C
8			NOT USED		
9			NOT USED		
10			NOT USED		
11			NOT USED		
12			NOT USED		
13			NOT USED		
14			NOT USED		
15			NOT USED		
16			NOT USED		
17			NOT USED		
18			NOT USED		
19			NOT USED		
20			NOT USED		
21			NOT USED		
22			NOT USED		
23			NOT USED		
24			NOT USED		
25			NOT USED		
26			NOT USED		
27			NOT USED		
28			NOT USED		

C = CONTRACTOR, O = OWNER, NIC = NOT IN CONTRACT.

BILL OF MATERIAL					
REF. NO.	UNIT	ESTIMATED QUANTITY	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
51	EA	5	CIRCUIT BREAKER, 15 AMP	SCHNEIDER ELECTRIC/MG17436	C
52	EA	1	MULTI-POLE BREAKER FRONT MOUNTING KIT	SCHNEIDER ELECTRIC/14210	C
53	EA	1	DIN RAIL WITH SUPPORT	SCHNEIDER ELECTRIC/14211	C
54	EA	1	PROTECTIVE RELAY (487E-T1)	SCHWEITZER/0487E3X411XXCOX4H684XXX	C
55	EA	2	REVENUE METER (735-T1-1, 735-T1-2)	SCHWEITZER/0735VX20944CXXA4X16101XX	C
56	EA	1	LOCKOUT RELAY (86T1)	SCHWEITZER/RS86=DKB9	C
57	EA	2	RACK BEZEL, VERTICAL 735 & FT-1 TEST SWITCH	SCHWEITZER/915900216	C
58	EA	2	19" RACK BEZEL, FT-1 STYLE, SINGLE CUTOUT	SCHWEITZER/915900178	C
59	EA	1	19" RACK BEZEL, FT-1 STYLE, DUAL CUTOUT	SCHWEITZER/915900179	C
60	EA	1	WIRE LEAD TERMINATOR, 50 OHM	SCHWEITZER/915900036	C
61	EA	1	BNC TEE, F/M/F	SCHWEITZER/240-1799	C
62	EA	5	TEST SWITCH, FT-1 STYLE, (6-C, 4-P) (TS-P6-1, TS-P6-2, TS-P6-3, TS-P6-4, TS-P6-5)	ABB/C714B325G32	C
63	EA	15	SWITCH HANDLE INTERLOCKING BAR, 2-POSITION	ABB/1270547	C
64	EA	1	TEST SWITCH, FT-1 STYLE, (10-P) (TS-P6-6)	ABB/9676A93G01	C
65			NOT USED		
66			NOT USED		
67			NOT USED		
68			NOT USED		
69			NOT USED		
70			NOT USED		
71			NOT USED		
72			NOT USED		
73			NOT USED		
74			NOT USED		
75			NOT USED		
76			NOT USED		
77			NOT USED		
78			NOT USED		
79			NOT USED		
80			NOT USED		

C = CONTRACTOR, O = OWNER, NIC = NOT IN CONTRACT.

BILL OF MATERIAL					
REF. NO.	UNIT	ESTIMATED QUANTITY	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
101	EA	2	MOUNTING RAIL, PR30	ABB/1SNA 173 220 R0500	C
102	EA	12	END STOP, BAM2	ABB/1SNA 206 351 R1600	C
103	EA	4	END SECTION, FEM8	ABB/1SNA 113 373 R2600	C
104	EA	205	TERMINAL, SWITCH BLOCK, TYPE M6/8.SNB	ABB/1SNA 115 688 R2500	C
105	EA	4	END SECTION, FEM12S	ABB/1SNA 117 628 R2200	C
106	EA	12	TERMINAL, FUSE BLOCK, TYPE MB10/12.SF	ABB/1SNA 111 033 R0300	C
107	EA	12	FUSE, FU520, 3.15A	ABB/1SNA 008 289 R1600	C
108	EA	4	END SECTION, FEM6	ABB/1SNA 118 368 R1600	C
109	EA	4	TERMINAL BLOCK, FEED THRU, TYPE M6/8	ABB/1SNA 115 118 R1100	C
110	EA	2	TERMINAL MARKERS, VERTICAL, RC810, 1-100	ABB/1SNA 234 060 R0500	C
111	EA	2	TERMINAL MARKERS, VERTICAL, RC810, 101-200	ABB/1SNA 234 061 R2200	C
112	EA	7	TERMINAL BLOCK, 4 POLE, 30 AMP, SHORTING	MARATHON/1504 SC 01C WITH CC 1504	C
113	EA	4	TERMINAL BLOCK, 12 POLE, 30 AMP, STANDARD	MARATHON/1512 STD 01C	C
114			NOT USED		
115			NOT USED		
116			NOT USED		
117			NOT USED		
118			NOT USED		
119			NOT USED		
120			NOT USED		
121			NOT USED		
122			NOT USED		
123			NOT USED		
124			NOT USED		
125			NOT USED		
126			NOT USED		
127			NOT USED		
128			NOT USED		
129			NOT USED		
130			NOT USED		

C = CONTRACTOR, O = OWNER, NIC = NOT IN CONTRACT.

NOTES:

- 1 BILL OF MATERIAL QUANTITIES ARE ESTIMATED. ACTUAL QUANTITIES SHALL BE VERIFIED BY THE CONTRACTOR.

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS		JOB #: MEA W.O. EN16-3.2	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016
B	ISSUED FOR BID	MSG/03-15-2017	TCC/03-15-2017

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NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION

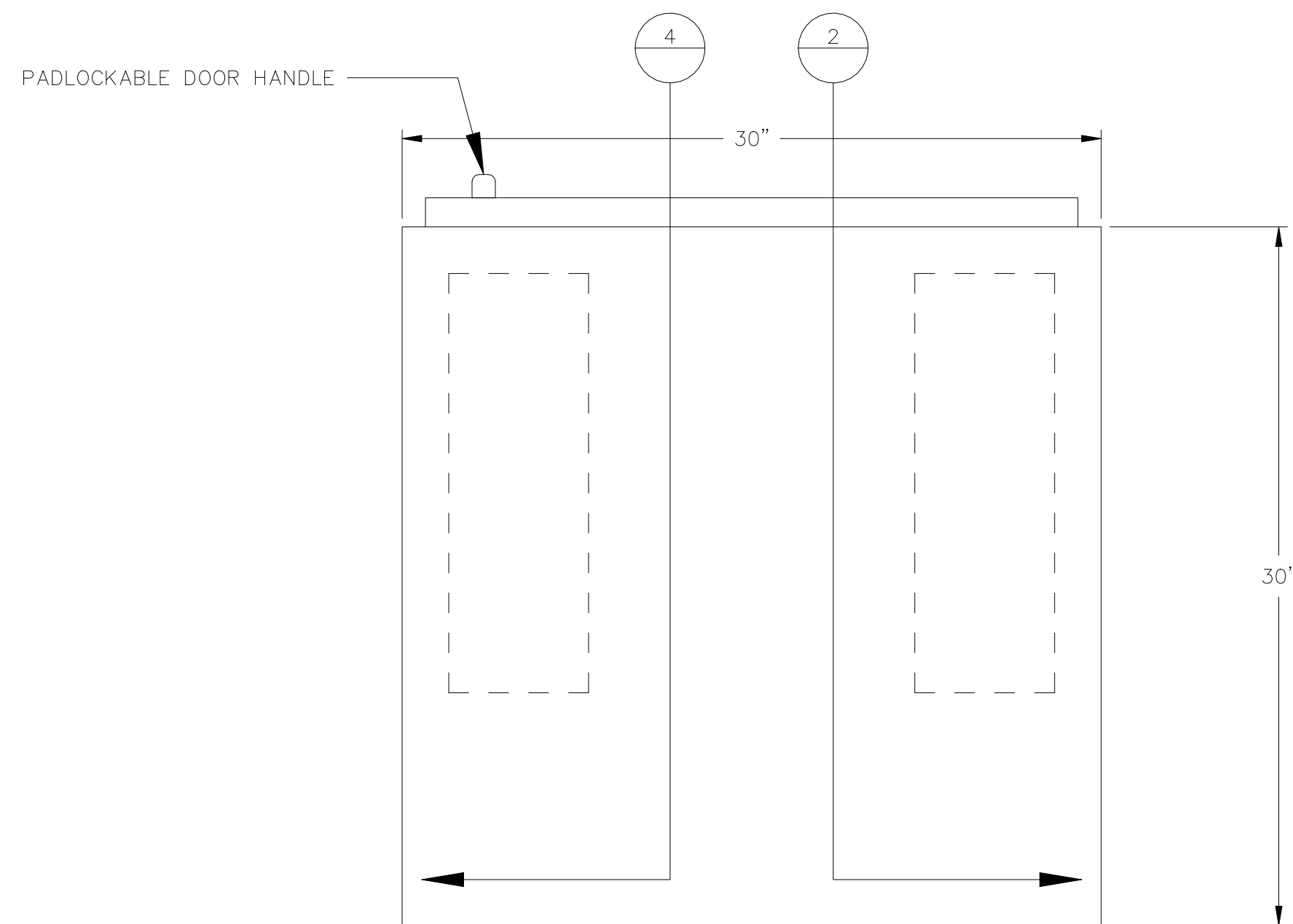
DRAWING NAME: DOUGLAS SUBSTATION PANEL 6 BILL OF MATERIAL

REF. DWG(S):

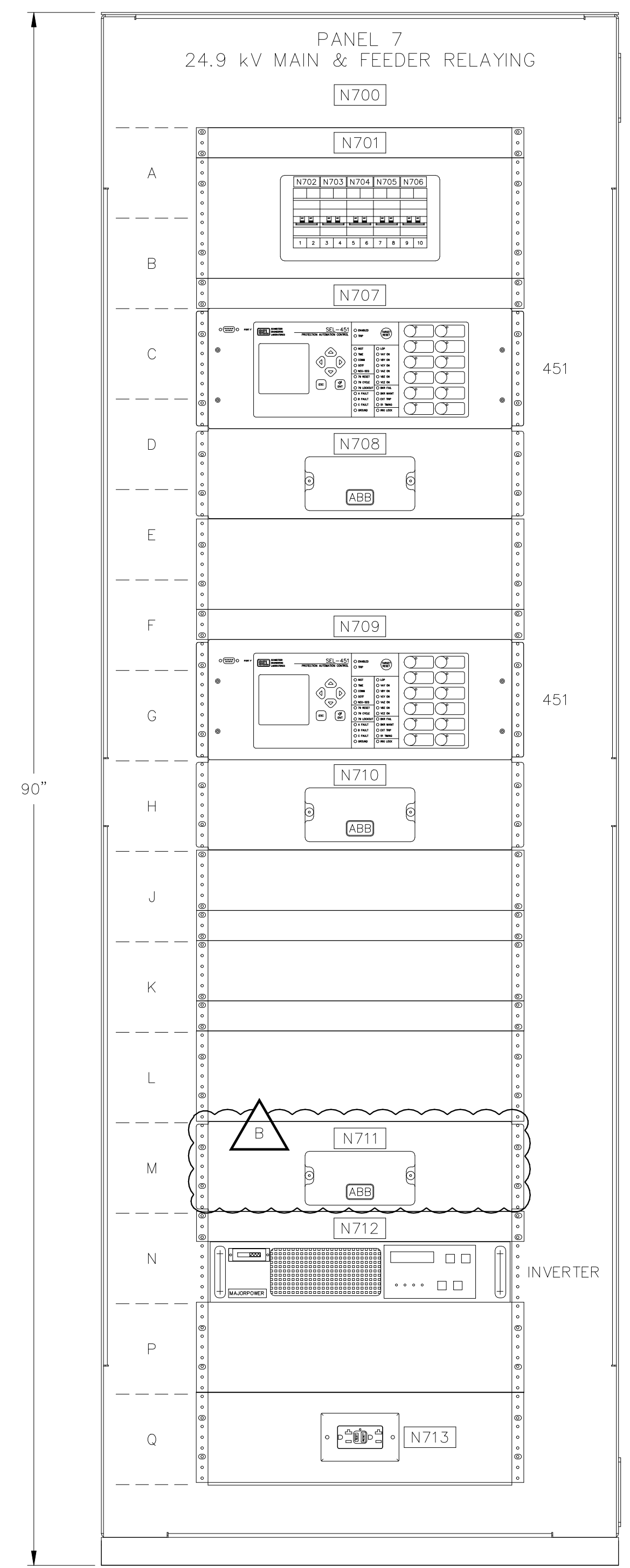
DRAWING NO.: DGSS-EL-4506

3 OF 3

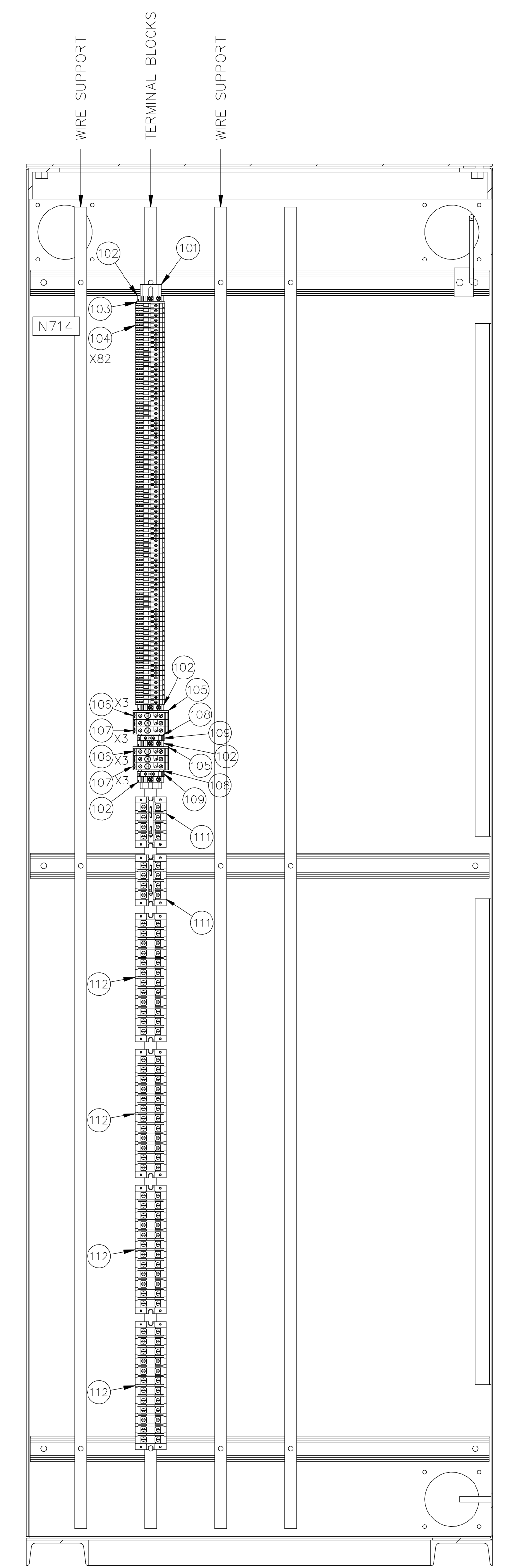
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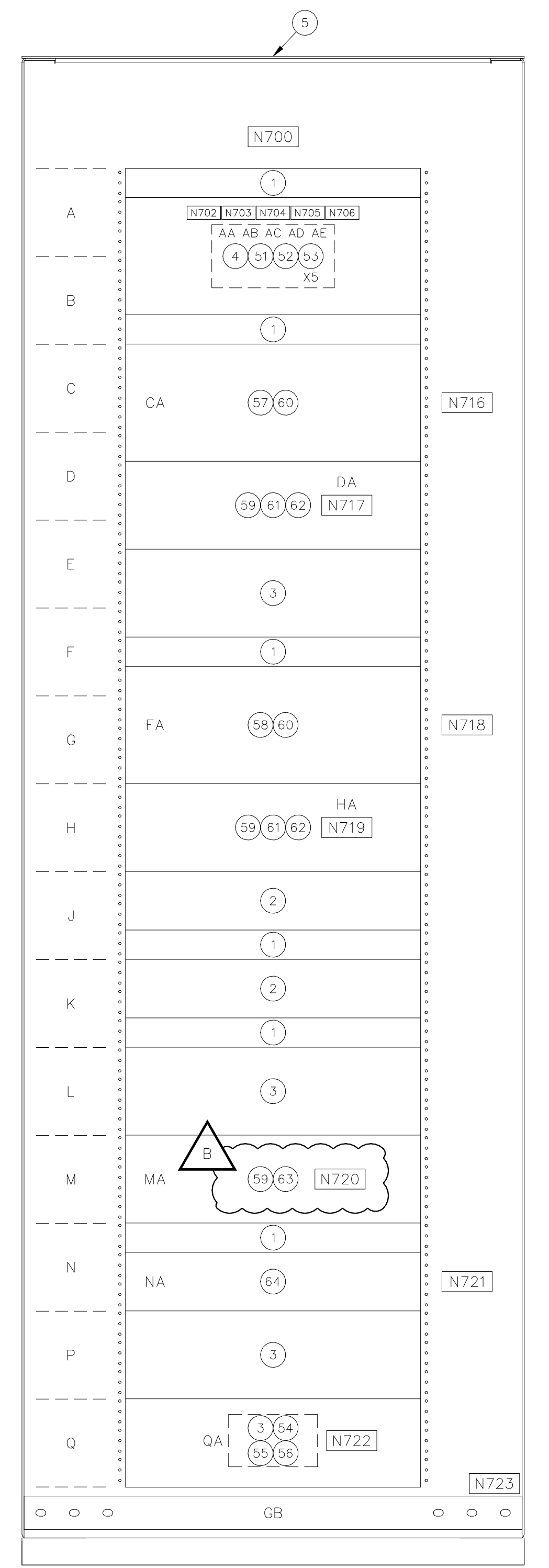
5 PANEL 7 (TOP)
N.T.S.



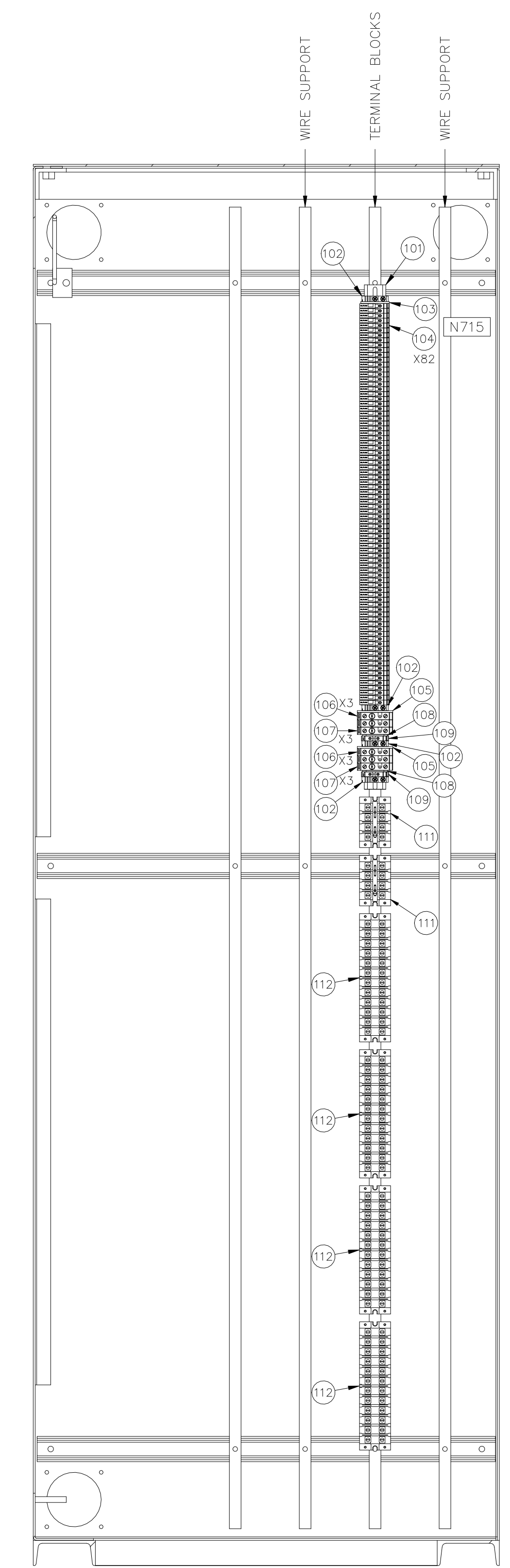
1 PANEL 7 (FRONT)
N.T.S.



2 PANEL 7 (A-SIDE)
N.T.S.



3 PANEL 7 (REAR)
N.T.S.



4 PANEL 7 (B-SIDE)
N.T.S.

- NOTES:
- 1 SEE REFERENCE 6 FOR NAMEPLATES (NXXX)
 - 2 SEE REFERENCE 7 FOR BILL OF MATERIAL.
 - 3 ALL DIMENSIONS SHOWN IN INCHES.

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS		JOB #: MEA W.O. EN16-3.2	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
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NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION
1	-	PANEL 7 (FRONT)
2	-	PANEL 7 (A-SIDE)
3	-	PANEL 7 (REAR)
4	-	PANEL 7 (B-SIDE)
5	-	PANEL 7 (TOP)
6	DGSS-EL-4507/2	PANEL 7 NAMEPLATES
7	DGSS-EL-4507/3	PANEL 7 BILL OF MATERIAL

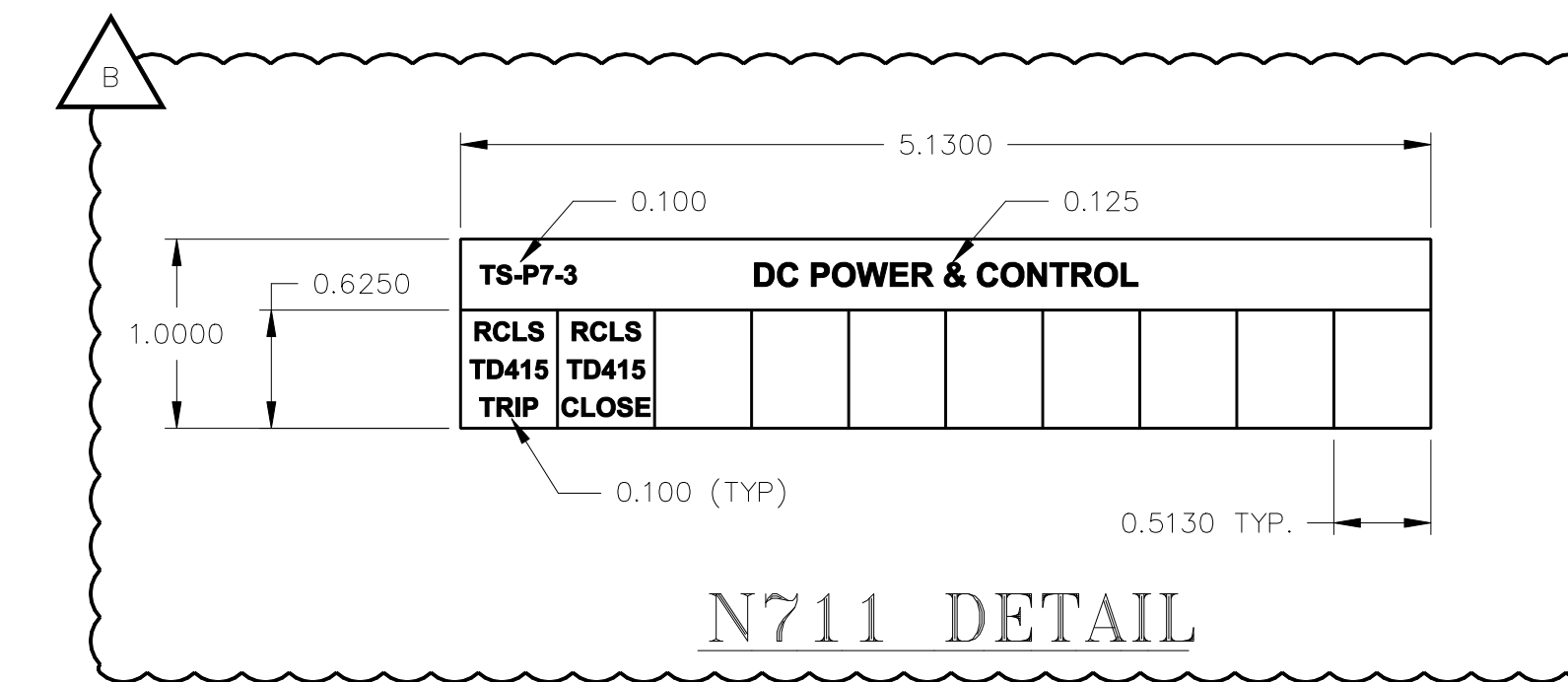
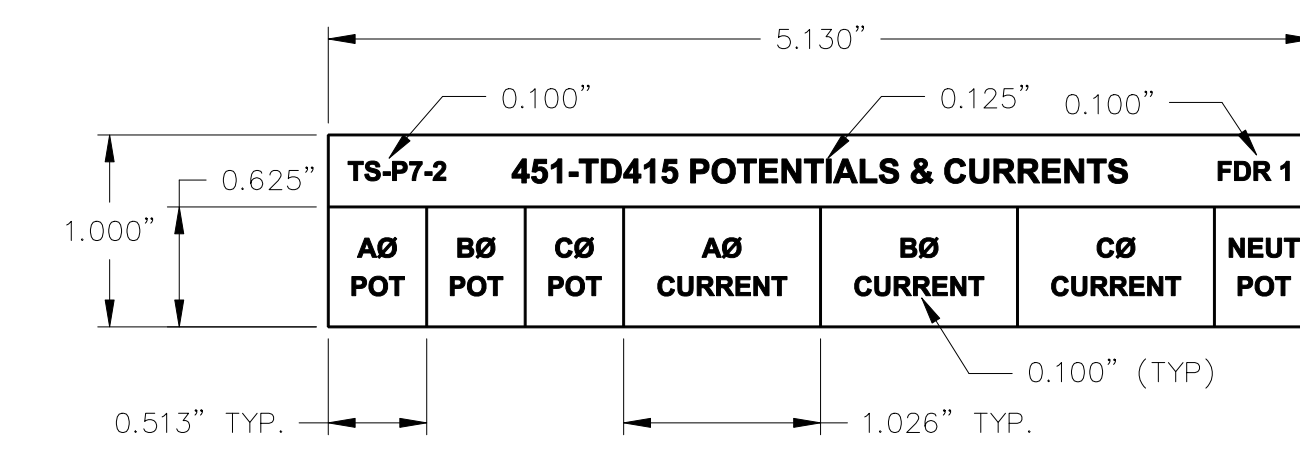
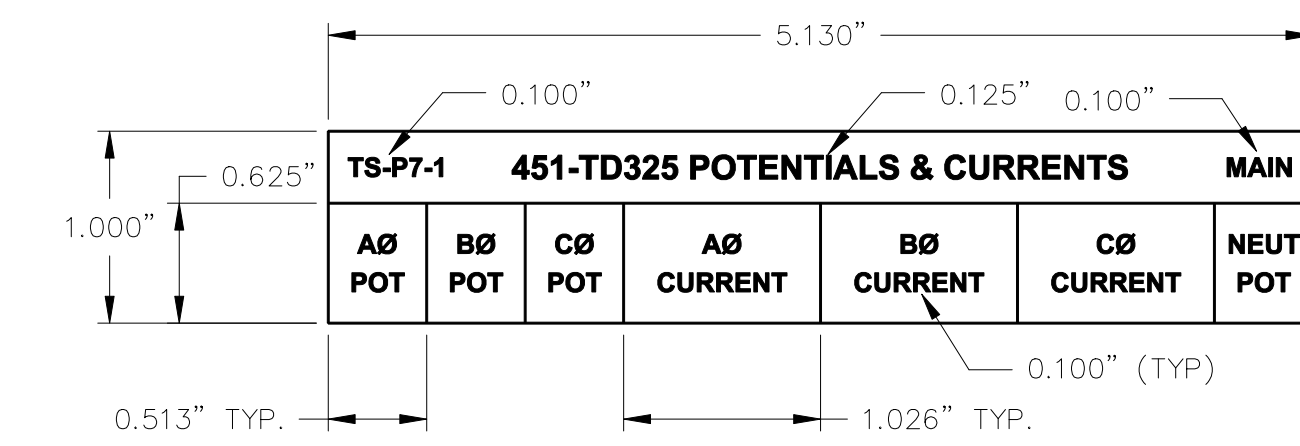
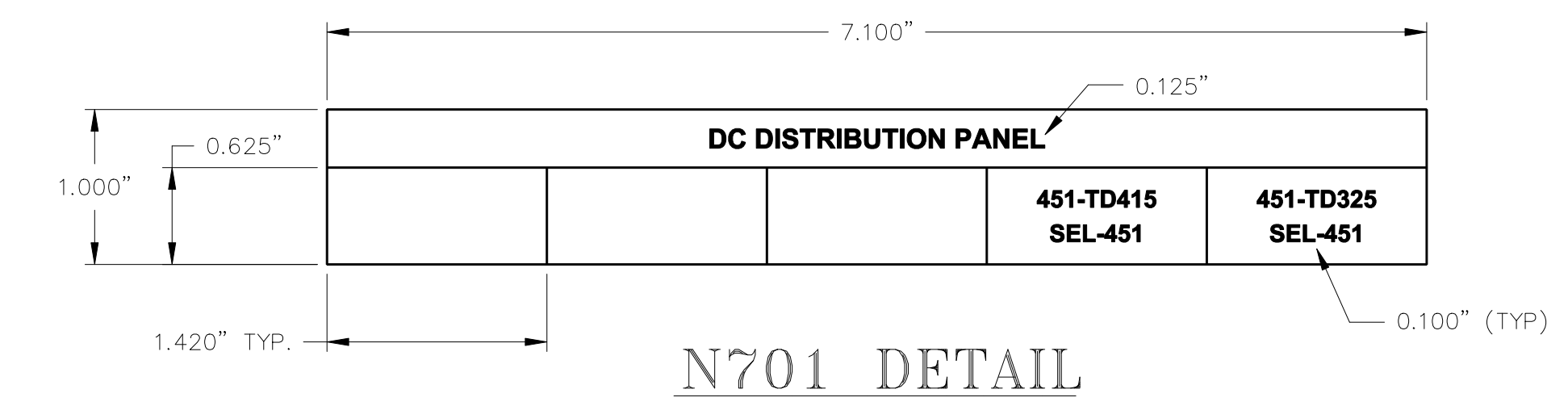
DRAWING NAME: DOUGLAS SUBSTATION
PANEL 7
ELEVATION

REF. DWG(S):

DRAWING NO.: DGSS-EL-4507

SHEET 1 OF 3

NAMEPLATE NUMBER	QTY	LINE 1 TEXT	LINE 2 TEXT	LINE 3 TEXT	NAMEPLATE SIZE HEIGHT x WIDTH (IN)	TEXT HEIGHT (IN)
N700	2	PANEL 7	24.9 kV MAIN BUS RELAYING	24.9 kV FEEDER 3 RELAYING	1-1/2 x 5	1/4
N701	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N702	2	AA			1/2 x 3/4	1/4
N703	2	AB			1/2 x 3/4	1/4
N704	2	AC			1/2 x 3/4	1/4
N705	2	AD			1/2 x 3/4	1/4
N706	2	AE			1/2 x 3/4	1/4
N707	1	451-TD325	24.9 kV MAIN BUS RELAY	SEL-451	1 x 3	1/8
N708	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N709	1	451-TD415	FEEDER NO. 1 RELAY	SEL-451	1 x 3	1/8
N710	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N711	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N712	1	MS2000A	125 VDC/120 VAC INVERTER	MAJORPOWER MS2000	1 x 3	1/8
N713	1	RE24	120 VAC	RECEPTACLE	1 x 3	1/8
N714	1	A			1/2 x 3/4	1/4
N715	1	B			1/2 x 3/4	1/4
N716	1	CA	451-TD325	SEL-451	1 x 1-1/2	1/8
N717	1	DA	TS-P7-1	451 TEST SW	1 x 1-1/2	1/8
N718	1	FA	451-TD415	SEL-451	1 x 1-1/2	1/8
N719	1	HA	TS-P7-2	451 TEST SW	1 x 1-1/2	1/8
N720	1	MA	TS-P7-3	TEST SW	1 x 1-1/2	1/8
N721	1	NA	MS2000A	INVERTER	1 x 1-1/2	1/8
N722	1	QA	RE24	RECEPTACLE	1 x 1-1/2	1/8
N723	1	GB	GROUND BUS		1 x 1-1/2	1/8
N724	1	WORK LIGHT			1 x 1-1/2	1/8



- NOTES:
- ALL NAMEPLATES SHALL BE 1/16" THICK MINIMUM PLASTIC.
 - ALL NAMEPLATES SHALL HAVE EXTERIOR RATED HIGH-TACK ADHESIVE.
 - ALL NAMEPLATES SHALL BE BLACK SURFACE WITH WHITE TEXT.
 - ALL TEXT SHALL BE "ARIAL BOLD" FONT.
 - EACH LINE OF TEXT SHALL BE CENTERED ON THE NAMEPLATE.
 - ALL TEXT SHALL BE UPPER CASE.
 - ALL DIMENSIONS SHOWN IN INCHES.

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT		JOB #: MEA W.O. EN16-3.2	
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS		ENG. STAMP	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016
B	ISSUED FOR BID	MSG/03-15-2017	TCC/03-15-2017

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NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION

DRAWING NAME: DOUGLAS SUBSTATION PANEL 7 NAMEPLATES

REF. DWG(S):

DRAWING NO.: DGSS-EL-4507

SHEET 2 OF 3

BILL OF MATERIAL					
REF. NO.	UNIT	ESTIMATED QUANTITY	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
1	EA	5	BLANK FILLER PANEL, METALLIC GREY, 1U	BUD/PA-1101-MG (OAE)	C
2	EA	2	BLANK FILLER PANEL, METALLIC GREY, 2U	BUD/PA-1102-MG (OAE)	C
3	EA	5	BLANK FILLER PANEL, METALLIC GREY, 3U	BUD/PA-1103-MG (OAE)	C
4	EA	1	BLANK FILLER PANEL, METALLIC GREY, 4U	BUD/PA-1104-MG (OAE)	C
5	EA	1	RELAY CABINET WITH DOOR AND COPPER GROUND BUS	TBD	C
6	LOT	1 1 1	LED ENCLOSURE LIGHT LIGHT CABLE ASSEMBLY, 120 VAC	HOFFMAN: HOFFMAN/LEDA1S35 HOFFMAN/LEDA20C	C
7	LOT	1 1 1	LIGHT SWITCH, SINGLE POLE SWITCH BOX COVER	HUBBELL: KELLEMS/HBL12211 (OAE) RACO/239 (OAE) RACO/800C (OAE)	C
8			NOT USED		
9			NOT USED		
10			NOT USED		
11			NOT USED		
12			NOT USED		
13			NOT USED		
14			NOT USED		
15			NOT USED		
16			NOT USED		
17			NOT USED		
18			NOT USED		
19			NOT USED		
20			NOT USED		
21			NOT USED		
22			NOT USED		
23			NOT USED		
24			NOT USED		
25			NOT USED		
26			NOT USED		
27			NOT USED		
28			NOT USED		

C = CONTRACTOR, O = OWNER, NIC = NOT IN CONTRACT.

BILL OF MATERIAL					
REF. NO.	UNIT	ESTIMATED QUANTITY	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
51	EA	5	CIRCUIT BREAKER, 15 AMP	SCHNEIDER ELECTRIC/MG17436	C
52	EA	1	MULTI-POLE BREAKER FRONT MOUNTING KIT	SCHNEIDER ELECTRIC/14210	C
53	EA	1	DIN RAIL WITH SUPPORT	SCHNEIDER ELECTRIC/14211	C
54	EA	1	RECEPTACLE, 125V, 20A, DUPLEX, GFI (RE23)	HUBBELL-KELLEMS/GFR53625GI	C
55	EA	1	COVER PLATE, 1-GANG, STAINLESS STEEL	HUBBELL-KELLEMS/SS26 (OAE)	C
56	EA	1	SINGLE GANG BOX, ALUMINUM	HUBBELL-RACO/5386-0 (OAE)	C
57	EA	1	PROTECTIVE RELAY (451-TD325)	SCHWEITZER/0451541EXCOX4H384XXXX	C
58	EA	1	PROTECTIVE RELAY (451-TD415)	SCHWEITZER/0451541DXCOX4H384XXXX	C
59	EA	3	19" RACK BEZEL, FT-1 STYLE, SINGLE CUTOUT	SCHWEITZER/915900178	C
60	EA	2	BNC TEE, F/M/F	SCHWEITZER/240-1799	C
61	EA	2	TEST SWITCH, FT-1 STYLE, (6-C, 4-P) (TS-P7-1, TS-P7-2)	ABB/C714B325G32	C
62	EA	6	SWITCH HANDLE INTERLOCKING BAR, 2-POSITION	ABB/1270547	C
63	EA	1	TEST SWITCH, FT-1 STYLE, (10-F) (TS-P7-3)	ABB/9676A93G01	C
64	EA	1	POWER INVERTER, 125 VDC/120 VAC/2 KVA (MS2000A)	MAJORPOWER/MAJORSINE2000-125-2U WITH SNMP	C
65			NOT USED		
66			NOT USED		
67			NOT USED		
68			NOT USED		
69			NOT USED		
70			NOT USED		
71			NOT USED		
72			NOT USED		
73			NOT USED		
74			NOT USED		
75			NOT USED		
76			NOT USED		
77			NOT USED		
78			NOT USED		
79			NOT USED		
80			NOT USED		

C = CONTRACTOR, O = OWNER, NIC = NOT IN CONTRACT.

BILL OF MATERIAL					
REF. NO.	UNIT	ESTIMATED QUANTITY	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
101	EA	2	MOUNTING RAIL, PR30	ABB/1SNA 173 220 R0500	C
102	EA	8	END STOP, BAM2	ABB/1SNA 206 351 R1600	C
103	EA	2	END SECTION, FEM8	ABB/1SNA 113 373 R2600	C
104	EA	164	TERMINAL, SWITCH BLOCK, TYPE M6/8.SNB	ABB/1SNA 115 688 R2500	C
105	EA	4	END SECTION, FEM12S	ABB/1SNA 117 628 R2200	C
106	EA	12	TERMINAL, FUSE BLOCK, TYPE MB10/12.SF	ABB/1SNA 111 033 R0300	C
107	EA	12	FUSE, FU520, 3.15A	ABB/1SNA 008 289 R1600	C
108	EA	4	END SECTION, FEM6	ABB/1SNA 118 368 R1600	C
109	EA	4	TERMINAL BLOCK, FEED THRU, TYPE M6/8	ABB/1SNA 115 118 R1100	C
110	EA	2	TERMINAL MARKERS, VERTICAL, RCB10, 1-100	ABB/1SNA 234 060 R0500	C
111	EA	4	TERMINAL BLOCK, 4 POLE, 30 AMP, SHORTING	MARATHON/1504 SC 01C WITH CC 1504	C
112	EA	8	TERMINAL BLOCK, 12 POLE, 30 AMP, STANDARD	MARATHON/1512 STD 01C	C
113			NOT USED		
114			NOT USED		
115			NOT USED		
116			NOT USED		
117			NOT USED		
118			NOT USED		
119			NOT USED		
120			NOT USED		
121			NOT USED		
122			NOT USED		
123			NOT USED		
124			NOT USED		
125			NOT USED		
126			NOT USED		
127			NOT USED		
128			NOT USED		
129			NOT USED		
130			NOT USED		

C = CONTRACTOR, O = OWNER, NIC = NOT IN CONTRACT.


NOTES:

- 1 BILL OF MATERIAL QUANTITIES ARE ESTIMATED. ACTUAL QUANTITIES SHALL BE VERIFIED BY THE CONTRACTOR.

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS		JOB #: MEA W.O. EN16-3.2	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016
B	ISSUED FOR BID	MSG/03-15-2017	TCC/03-15-2017

ENG. STAMP

Matanuska Electric Association



163 East Industrial Way
Palmer, AK 99645
(907) 761-9300
WWW.MEA.COOP

NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION

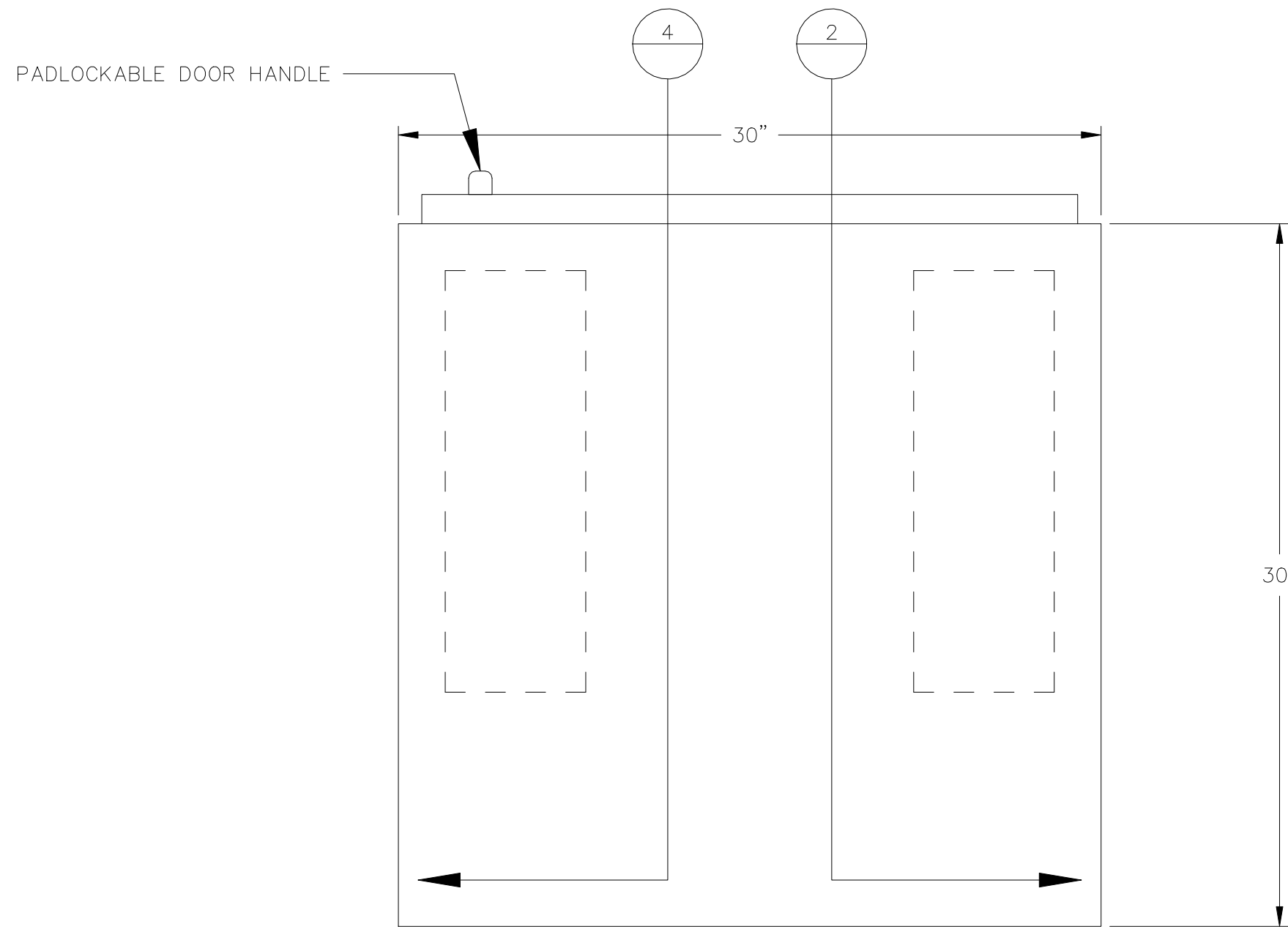
DRAWING NAME: DOUGLAS SUBSTATION
PANEL 7
BILL OF MATERIAL

REF. DWG(S):

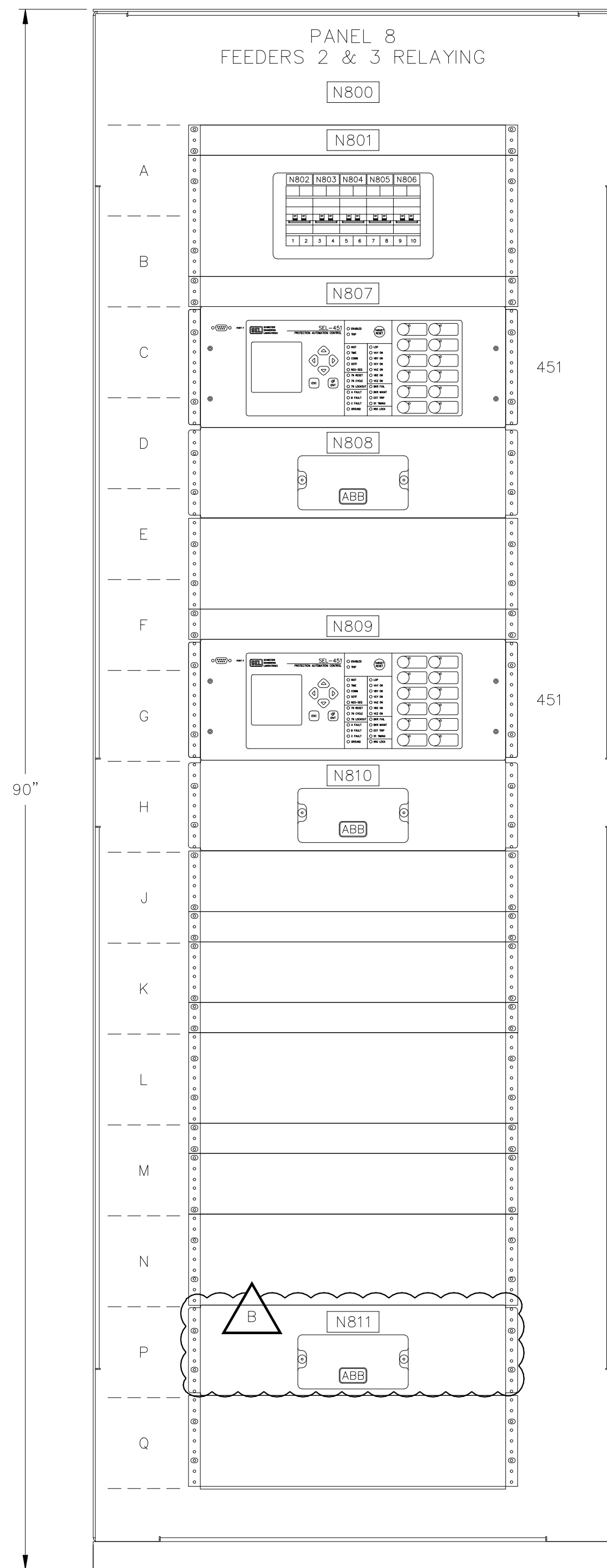
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dass-el-4507_3.dwg

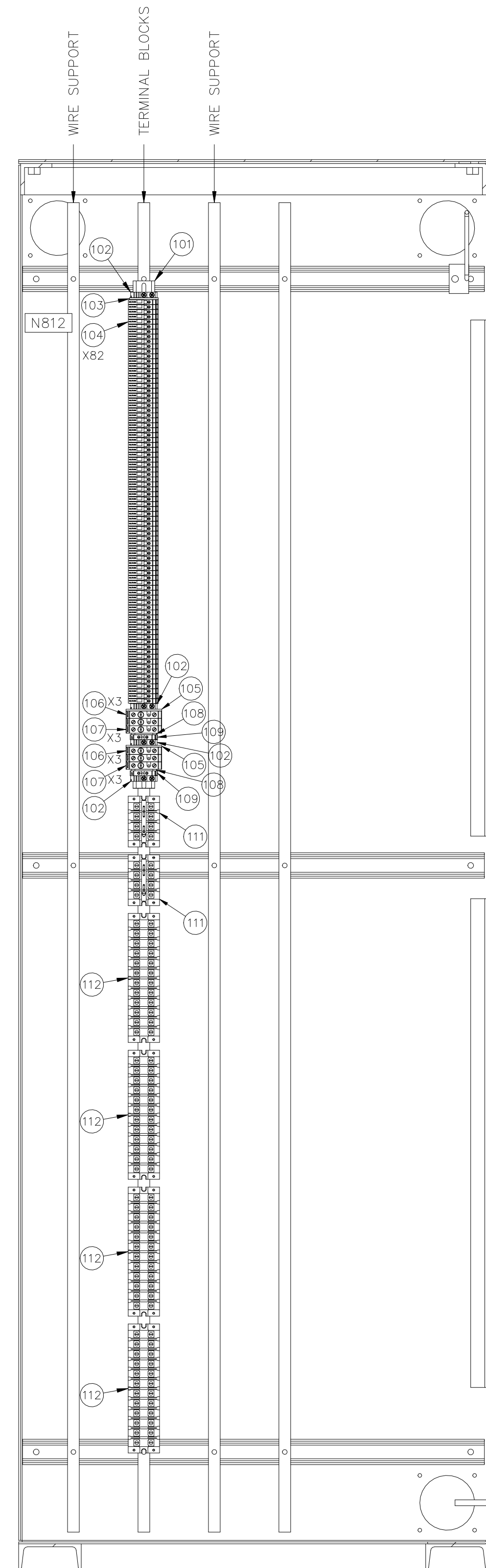
SHEET 3 OF 3



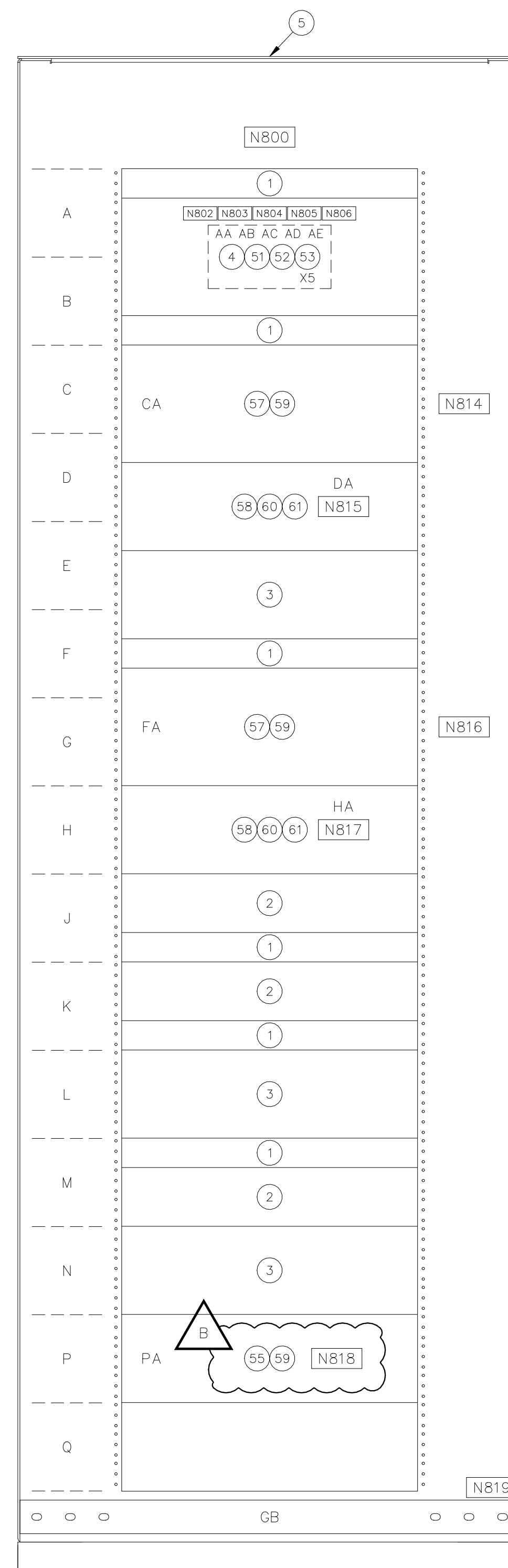
5 PANEL 8 (TOP)
N.T.S.



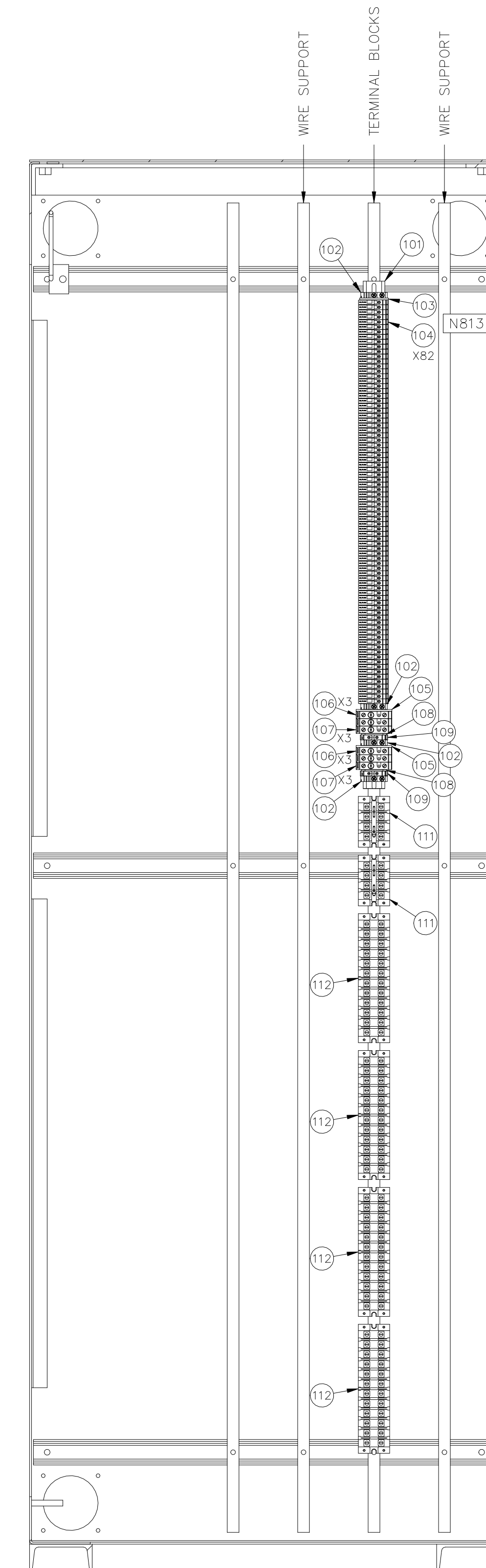
1 PANEL 8 (FRONT)
N.T.S.



2 PANEL 8 (A-SIDE)
N.T.S.



3 PANEL 8 (REAR)
N.T.S.



4 PANEL 8 (B-SIDE)
N.T.S.

NOTES:

1 SEE REFERENCE 6 FOR NAMEPLATES (NXXX)

2 SEE REFERENCE 7 FOR BILL OF MATERIAL.

3 ALL DIMENSIONS SHOWN IN INCHES.

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS			
JOB #: MEA W.O. EN16-3.2		ENG. STAMP	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016
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(907) 761-9300
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NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION
1	-	PANEL 8 (FRONT)
2	-	PANEL 8 (A-SIDE)
3	-	PANEL 8 (REAR)
4	-	PANEL 8 (B-SIDE)
5	-	PANEL 8 (TOP)
6	DGSS-EL-4508/2	PANEL 8 NAMEPLATES
7	DGSS-EL-4508/3	PANEL 8 BILL OF MATERIAL

DRAWING NAME: DOUGLAS SUBSTATION
PANEL 8
ELEVATION

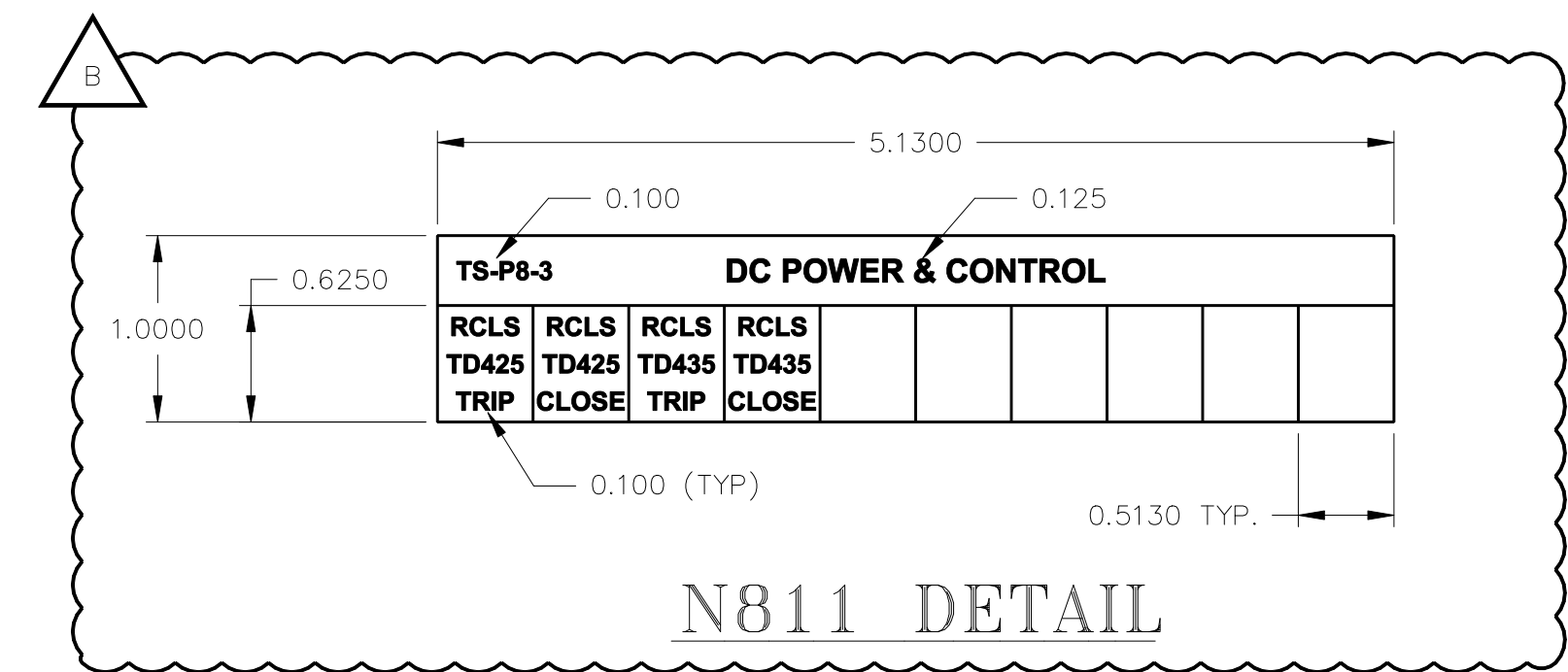
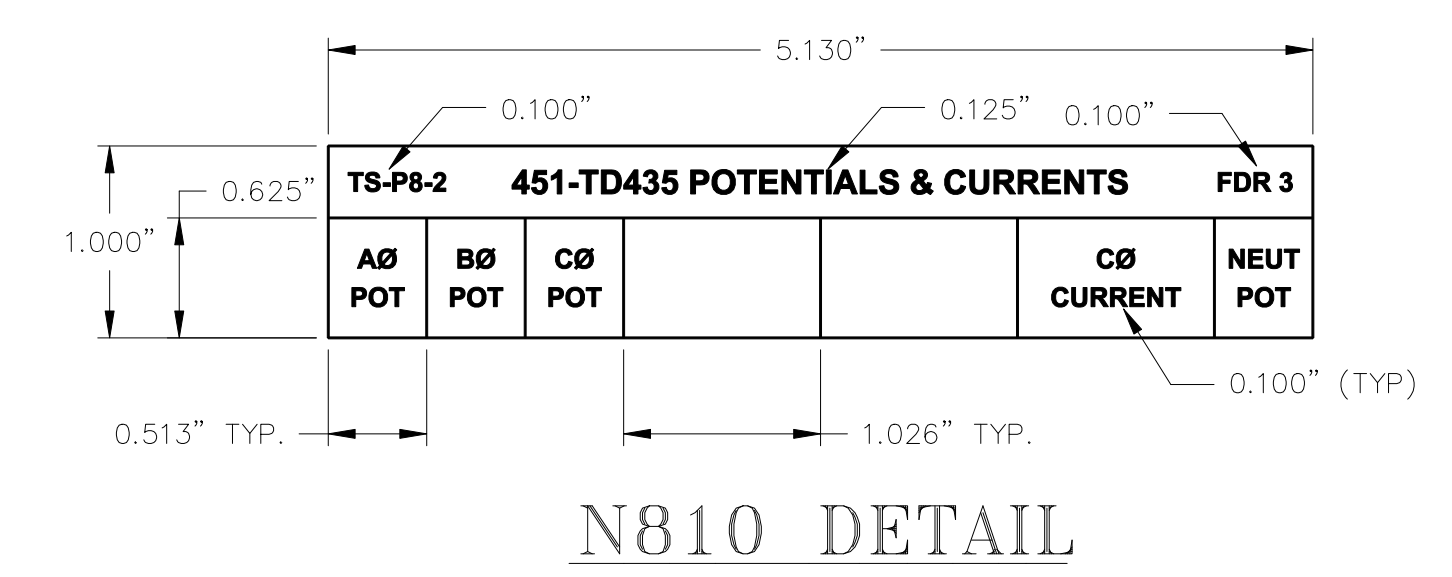
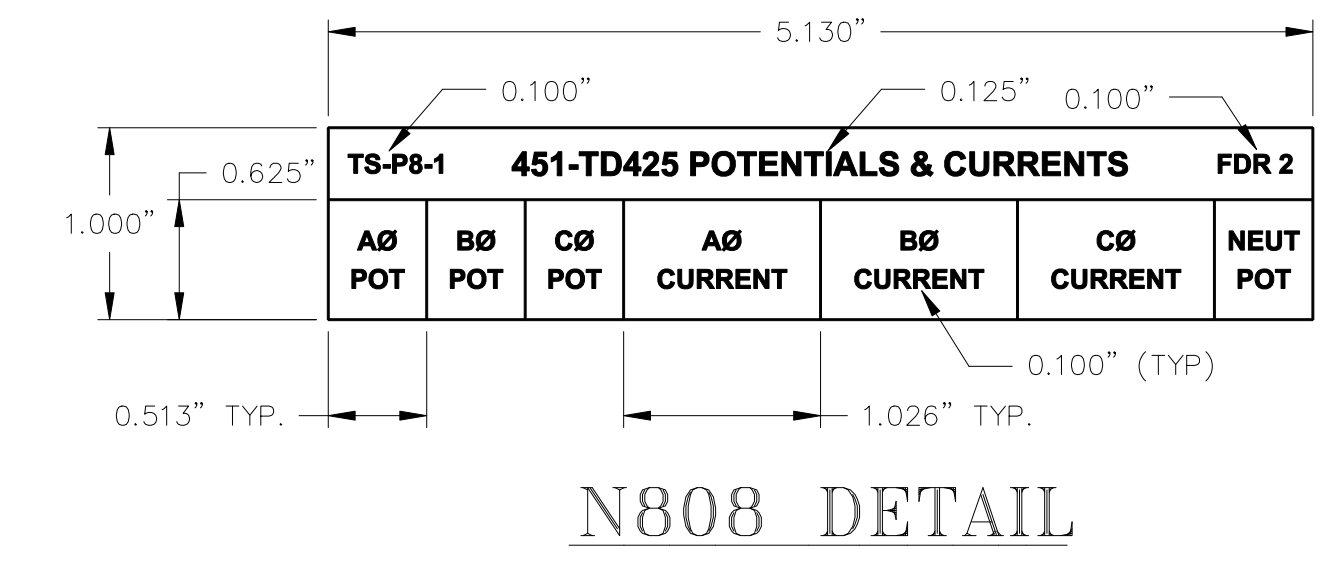
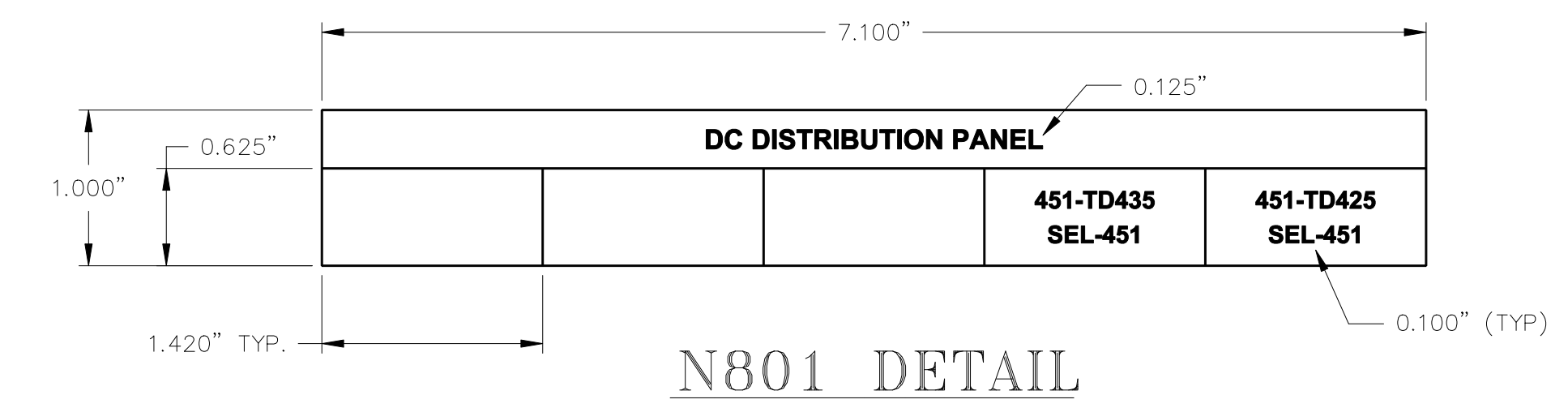
REF. DWG(S):

DRAWING NO.: DGSS-EL-4508

SHEET 1 OF 3

dass-el-4508_1.dwg

NAMEPLATE NUMBER	QTY	LINE 1 TEXT	LINE 2 TEXT	LINE 3 TEXT	NAMEPLATE SIZE HEIGHT x WIDTH (IN)	TEXT HEIGHT (IN)
N800	2	PANEL 8	24.9 kV FEEDERS 2 & 3 RELAYING		1-1/2 x 5	1/4
N801	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N802	2	AA			1/2 x 3/4	1/4
N803	2	AB			1/2 x 3/4	1/4
N804	2	AC			1/2 x 3/4	1/4
N805	2	AD			1/2 x 3/4	1/4
N806	2	AE			1/2 x 3/4	1/4
N807	1	451-TD425	FEEDER NO. 2 RELAY	SEL-451	1 x 3	1/8
N808	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N809	1	451-TD435	FEEDER NO. 3 RELAY	SEL-451	1 x 3	1/8
N810	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N811	1	SEE NAMEPLATE DETAIL ON THIS SHEET				
N812	1	A			1/2 x 3/4	1/4
N813	1	B			1/2 x 3/4	1/4
N814	1	CA	451-TD425	SEL-451	1 x 1-1/2	1/8
N815	1	DA	TS-P8-1	451 TEST SW	1 x 1-1/2	1/8
N816	1	FA	451-TD435	SEL-451	1 x 1-1/2	1/8
N817	1	HA	TS-P8-2	451 TEST SW	1 x 1-1/2	1/8
N818	1	PA	TS-P8-3	TEST SW	1 x 1-1/2	1/8
N819	1	GB	GROUND BUS		1 x 1-1/2	1/8
N820	1	WORK LIGHT			1 x 1-1/2	1/8



- NOTES:
- 1) ALL NAMEPLATES SHALL BE 1/16" THICK MINIMUM PLASTIC.
 - 2) ALL NAMEPLATES SHALL HAVE EXTERIOR RATED HIGH-TACK ADHESIVE.
 - 3) ALL NAMEPLATES SHALL BE BLACK SURFACE WITH WHITE TEXT.
 - 4) ALL TEXT SHALL BE "ARIAL BOLD" FONT.
 - 5) EACH LINE OF TEXT SHALL BE CENTERED ON THE NAMEPLATE.
 - 6) ALL TEXT SHALL BE UPPER CASE.
 - 7) ALL DIMENSIONS SHOWN IN INCHES.

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT		JOB #: MEA W.O. EN16-3.2	
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS		ENG. STAMP	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016
B	ISSUED FOR BID	MSG/03-15-2017	TCC/03-15-2017

Matanuska Electric Association

MEEA
MATANUSKA ELECTRIC ASSOCIATION

163 East Industrial Way
Palmer, AK 99645
(907) 761-9300
WWW.MEA.COOP

NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION

DRAWING NAME: DOUGLAS SUBSTATION
PANEL 8
NAMEPLATES

doss-el-4508_2.dwg

DRAWING NO.: DGSS-EL-4508

SHEET 2 OF 3

BILL OF MATERIAL					
REF. NO.	UNIT	ESTIMATED QUANTITY	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
1	EA	6	BLANK FILLER PANEL, METALLIC GREY, 1U	BUD/PA-1101-MG (OAE)	C
2	EA	3	BLANK FILLER PANEL, METALLIC GREY, 2U	BUD/PA-1102-MG (OAE)	C
3	EA	4	BLANK FILLER PANEL, METALLIC GREY, 3U	BUD/PA-1103-MG (OAE)	C
4	EA	1	BLANK FILLER PANEL, METALLIC GREY, 4U	BUD/PA-1104-MG (OAE)	C
5	EA	1	RELAY CABINET WITH DOOR AND COPPER GROUND BUS	TBD	C
6	LOT	1 1 1	LED ENCLOSURE LIGHT LIGHT CABLE ASSEMBLY, 120 VAC	HOFFMAN: HOFFMAN/LEDA1S35 HOFFMAN/LEDA20C	C
7	LOT	1 1 1	LIGHT SWITCH, SINGLE POLE SWITCH BOX COVER	HUBBELL: KELLEMS/HBL12211 (OAE) RACO/239 (OAE) RACO/800C (OAE)	C
8			NOT USED		
9			NOT USED		
10			NOT USED		
11			NOT USED		
12			NOT USED		
13			NOT USED		
14			NOT USED		
15			NOT USED		
16			NOT USED		
17			NOT USED		
18			NOT USED		
19			NOT USED		
20			NOT USED		
21			NOT USED		
22			NOT USED		
23			NOT USED		
24			NOT USED		
25			NOT USED		
26			NOT USED		
27			NOT USED		
28			NOT USED		

C = CONTRACTOR, O = OWNER, NIC = NOT IN CONTRACT.

BILL OF MATERIAL					
REF. NO.	UNIT	ESTIMATED QUANTITY	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
51	EA	5	CIRCUIT BREAKER, 15 AMP	SCHNEIDER ELECTRIC/MG17436	C
52	EA	1	MULTI-POLE BREAKER FRONT MOUNTING KIT	SCHNEIDER ELECTRIC/14210	C
53	EA	1	DIN RAIL WITH SUPPORT	SCHNEIDER ELECTRIC/14211	C
54	EA	2	PROTECTIVE RELAY (451-TD425, 451-TD435)	SCHWEITZER/0451541DXC0X4H384XXXX	C
55	EA	3	19" RACK BEZEL, FT-1 STYLE, SINGLE CUTOFF	SCHWEITZER/915900178	C
56	EA	2	BNC TEE, F/M/F	SCHWEITZER/240-1799	C
57	EA	2	TEST SWITCH, FT-1 STYLE, (6-C, 4-P) (TS-P8-1, TS-P8-2)	ABB/C714B325G32	C
58	EA	6	SWITCH HANDLE INTERLOCKING BAR, 2-POSITION	ABB/1270547	C
59	EA	1	TEST SWITCH, FT-1 STYLE, (10-P) (TS-P8-3)	ABB/9676A93G01	C
60			NOT USED		
61			NOT USED		
62			NOT USED		
63			NOT USED		
64			NOT USED		
65			NOT USED		
66			NOT USED		
67			NOT USED		
68			NOT USED		
69			NOT USED		
70			NOT USED		
71			NOT USED		
72			NOT USED		
73			NOT USED		
74			NOT USED		
75			NOT USED		
76			NOT USED		
77			NOT USED		
78			NOT USED		
79			NOT USED		
80			NOT USED		

C = CONTRACTOR, O = OWNER, NIC = NOT IN CONTRACT.

BILL OF MATERIAL					
REF. NO.	UNIT	ESTIMATED QUANTITY	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
101	EA	2	MOUNTING RAIL, PR30	ABB/1SNA 173 220 R0500	C
102	EA	8	END STOP, BAM2	ABB/1SNA 206 351 R1600	C
103	EA	2	END SECTION, FEM8	ABB/1SNA 113 373 R2600	C
104	EA	164	TERMINAL, SWITCH BLOCK, TYPE M6/8.SNB	ABB/1SNA 115 688 R2500	C
105	EA	4	END SECTION, FEM12S	ABB/1SNA 117 628 R2200	C
106	EA	12	TERMINAL, FUSE BLOCK, TYPE MB10/12.SF	ABB/1SNA 111 033 R0300	C
107	EA	12	FUSE, FU520, 3.15A	ABB/1SNA 008 289 R1600	C
108	EA	4	END SECTION, FEM6	ABB/1SNA 118 368 R1600	C
109	EA	4	TERMINAL BLOCK, FEED THRU, TYPE M6/8	ABB/1SNA 115 118 R1100	C
110	EA	2	TERMINAL MARKERS, VERTICAL, RCB10, 1-100	ABB/1SNA 234 060 R0500	C
111	EA	4	TERMINAL BLOCK, 4 POLE, 30 AMP, SHORTING	MARATHON/1504 SC 01C WITH CC 1504	C
112	EA	8	TERMINAL BLOCK, 12 POLE, 30 AMP, STANDARD	MARATHON/1512 STD 01C	C
113			NOT USED		
114			NOT USED		
115			NOT USED		
116			NOT USED		
117			NOT USED		
118			NOT USED		
119			NOT USED		
120			NOT USED		
121			NOT USED		
122			NOT USED		
123			NOT USED		
124			NOT USED		
125			NOT USED		
126			NOT USED		
127			NOT USED		
128			NOT USED		
129			NOT USED		
130			NOT USED		

C = CONTRACTOR, O = OWNER, NIC = NOT IN CONTRACT.

NOTES:

- 1 BILL OF MATERIAL QUANTITIES ARE ESTIMATED. ACTUAL QUANTITIES SHALL BE VERIFIED BY THE CONTRACTOR.

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT			
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS		JOB #: MEA W.O. EN16-3.2	
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016
B	ISSUED FOR BID	MSG/03-15-2017	TCC/03-15-2017

ENG. STAMP

Matanuska Electric Association



163 East Industrial Way
Palmer, AK 99645
(907) 761-9300
WWW.MEA.COOP

NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION

DRAWING NAME: DOUGLAS SUBSTATION
PANEL 8
BILL OF MATERIAL

REF. DWG(S):

DRAWING NO.: DGSS-EL-4508

dass-el-4508_3.dwg

SHEET 3 OF 3

BILL OF MATERIAL					
REF. NO.	UNIT	ESTIMATED QUANTITY	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
1	EA	8	BLANK FILLER PANEL, METALLIC GREY, 1U	BUD/PA-1101-MG (OAE)	C
2	EA	2	BLANK FILLER PANEL, METALLIC GREY, 2U	BUD/PA-1102-MG (OAE)	C
3	EA	5	BLANK FILLER PANEL, METALLIC GREY, 3U	BUD/PA-1103-MG (OAE)	C
4	EA	1	BLANK FILLER PANEL, METALLIC GREY, 4U	BUD/PA-1104-MG (OAE)	C
5	EA	1	RELAY CABINET WITH DOOR AND COPPER GROUND BUS	TBD	C
6	LOT	1 1 1	LED ENCLOSURE LIGHT LIGHT CABLE ASSEMBLY, 120 VAC	HOFFMAN: HOFFMAN/LEDA1S35 HOFFMAN/LEDA20C	C
7	LOT	1 1 1	LIGHT SWITCH, SINGLE POLE SWITCH BOX COVER	HUBBELL: KELLEMS/HBL12211 (OAE) RACO/239 (OAE) RACO/800C (OAE)	C
8			NOT USED		
9			NOT USED		
10			NOT USED		
11			NOT USED		
12			NOT USED		
13			NOT USED		
14			NOT USED		
15			NOT USED		
16			NOT USED		
17			NOT USED		
18			NOT USED		
19			NOT USED		
20			NOT USED		
21			NOT USED		
22			NOT USED		
23			NOT USED		
24			NOT USED		
25			NOT USED		
26			NOT USED		
27			NOT USED		
28			NOT USED		

C = CONTRACTOR, O = OWNER, NIC = NOT IN CONTRACT.

BILL OF MATERIAL					
REF. NO.	UNIT	ESTIMATED QUANTITY	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
51	EA	5	CIRCUIT BREAKER, 15 AMP	SCHNEIDER ELECTRIC/MG17436	C
52	EA	1	MULTI-POLE BREAKER FRONT MOUNTING KIT	SCHNEIDER ELECTRIC/14210	C
53	EA	1	DIN RAIL WITH SUPPORT	SCHNEIDER ELECTRIC/14211	C
54	EA	1	CIRCUIT BREAKER, 5 AMP	SCHNEIDER ELECTRIC/MG17434	C
55	EA	1	RECEPTACLE, 125V, 20A, DUPLEX, GFI (RE25)	HUBBELL-KELLEMS/GFR5362SGI	C
56	EA	1	COVER PLATE, 1-GANG, STAINLESS STEEL	HUBBELL-KELLEMS/SS26 (OAE)	C
57	EA	1	SINGLE GANG BOX, ALUMINUM	HUBBELL-RACO/5386-0 (OAE)	C
58	EA	1	ETHERNET SWITCH (2730MC)	SCHWEITZER/2730M0ARA1111AAAAAX0	C
59	EA	1	REAL TIME AUTOMATION CONTROLLER (3530A)	SCHWEITZER/3530HB0DX211A0XXXXXX	C
60	LOT	1 1 2 2 2 4 1	AXION PLATFORM, SEL-2240 (2240B) AXION CHASSIS, SEL-2242 POWER COUPLER, SEL-2243 (SLOTS: A, B) I/O MODULE, 10 OUTPUTS, SEL-2244 (SLOTS: C, D) I/O MODULE, 16 OUTPUTS, SEL-2244 (SLOTS: E, F) I/O MODULE, 24 INPUTS, SEL-2244 (SLOTS: G, H, I, J) WETTING VOLTAGE JUMPER KIT, 24 JUMPERS, 4-PRONG	SCHWEITZER: SCHWEITZER/2242R1X0 SCHWEITZER/224311X0 SCHWEITZER/22443131X0 SCHWEITZER/22445151X0 SCHWEITZER/22442424X0 SCHWEITZER/915900240	C
61	EA	1	ANNUNCIATOR (2523A)	SCHWEITZER/252301H13A0A0XX	C
62	EA	1	WIRE LEAD TERMINATOR, 50 OHM	SCHWEITZER/915900036	C
63	EA	1	ETHERNET TRANSCEIVER	SCHWEITZER/2890M1X	C
64			NOT USED		
65			NOT USED		
66			NOT USED		
67			NOT USED		
68			NOT USED		
69			NOT USED		
70			NOT USED		
71			NOT USED		
72			NOT USED		
73			NOT USED		
74			NOT USED		
75			NOT USED		
76			NOT USED		
77			NOT USED		
78			NOT USED		

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BILL OF MATERIAL					
REF. NO.	UNIT	ESTIMATED QUANTITY	DESCRIPTION	MANUFACTURER/CATALOG NUMBER	FURNISHED BY
101	EA	2	MOUNTING RAIL, PR30	ABB/1SNA 173 220 R0500	C
102	EA	16	END STOP, BAM2	ABB/1SNA 206 351 R1600	C
103	EA	13	END SECTION, FEM8	ABB/1SNA 113 373 R2600	C
104	EA	494	TERMINAL, SWITCH BLOCK, TYPE M6/8.SNB	ABB/1SNA 115 688 R2500	C
105	EA	2	TERMINAL MARKERS, VERTICAL, RC810, 1-100	ABB/1SNA 234 060 R0500	C
106	EA	2	TERMINAL MARKERS, VERTICAL, RC810, 101-200	ABB/1SNA 234 061 R2200	C
107	EA	8	TERMINAL BLOCK, 12 POLE, 30 AMP, STANDARD	MARATHON/1512 STD 01C	C
108	EA	1	TERMINAL MARKERS, VERTICAL, RC810, 201-300	ABB/1SNA 234 062 R2300	C B
109			NOT USED		
110			NOT USED		
111			NOT USED		
112			NOT USED		
113			NOT USED		
114			NOT USED		
115			NOT USED		
116			NOT USED		
117			NOT USED		
118			NOT USED		
119			NOT USED		
120			NOT USED		
121			NOT USED		
122			NOT USED		
123			NOT USED		
124			NOT USED		
125			NOT USED		
126			NOT USED		
127			NOT USED		
128			NOT USED		
129			NOT USED		
130			NOT USED		

C = CONTRACTOR, O = OWNER, NIC = NOT IN CONTRACT.

NOTES:

- 1 BILL OF MATERIAL QUANTITIES ARE ESTIMATED. ACTUAL QUANTITIES SHALL BE VERIFIED BY THE CONTRACTOR.

PROJECT: DOUGLAS CONTROL ENCLOSURE REPLACEMENT		JOB #: MEA W.O. EN16-3.2	
DESIGNER/PROJECT ENGINEER: TIM CONRAD/EPS			
NO.	DESIGN/CONSTRUCTION/ASBUILT REVISION	DWN BY/DATE	REVIEWED BY/DATE
A	ISSUED FOR BID REVIEW	MSG/09-19-2016	TCC/09-19-2016
B	ISSUED FOR BID	MSG/03-15-2017	TCC/03-15-2017

ENG. STAMP

Matanuska Electric Association



163 East Industrial Way
Palmer, AK 99645
(907) 761-9300
WWW.MEA.COOP

NO.	DRAWING NO./SHEET	REFERENCE DRAWING/DETAIL/PLAN/SECTION DESCRIPTION

DRAWING NAME: DOUGLAS SUBSTATION
PANEL 9
BILL OF MATERIAL

doss-el-4509_3.dwg

REF. DWG(S):

DRAWING NO.: DGSS-EL-4509

SHEET 3 OF 3