



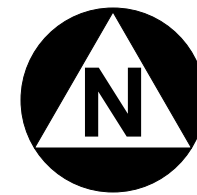
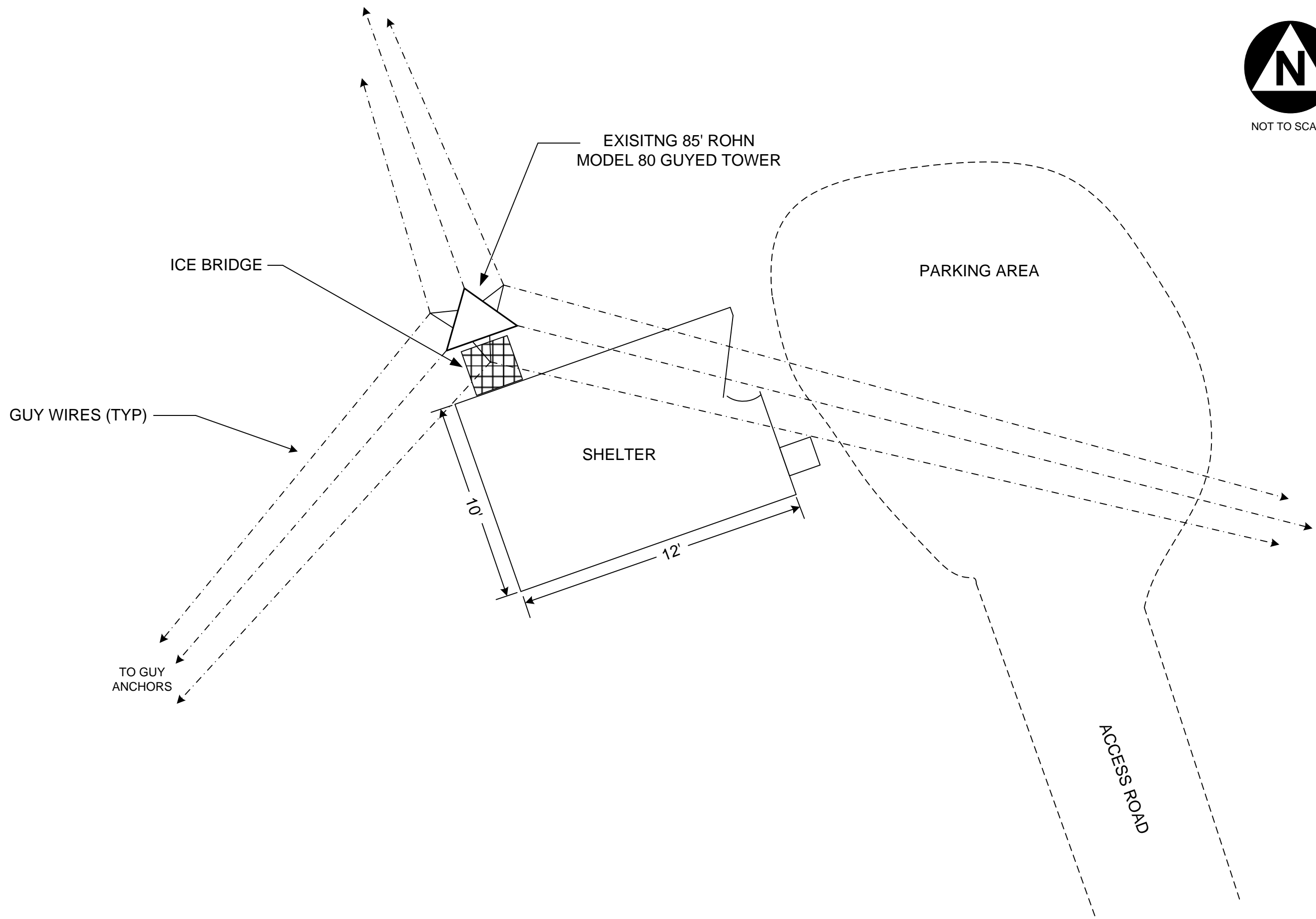
Alaska Railroad Corporation

APPENDIX A

SITE DRAWINGS

PATH DATASHEETS

PATH CALCULATIONS



NOT TO SCALE



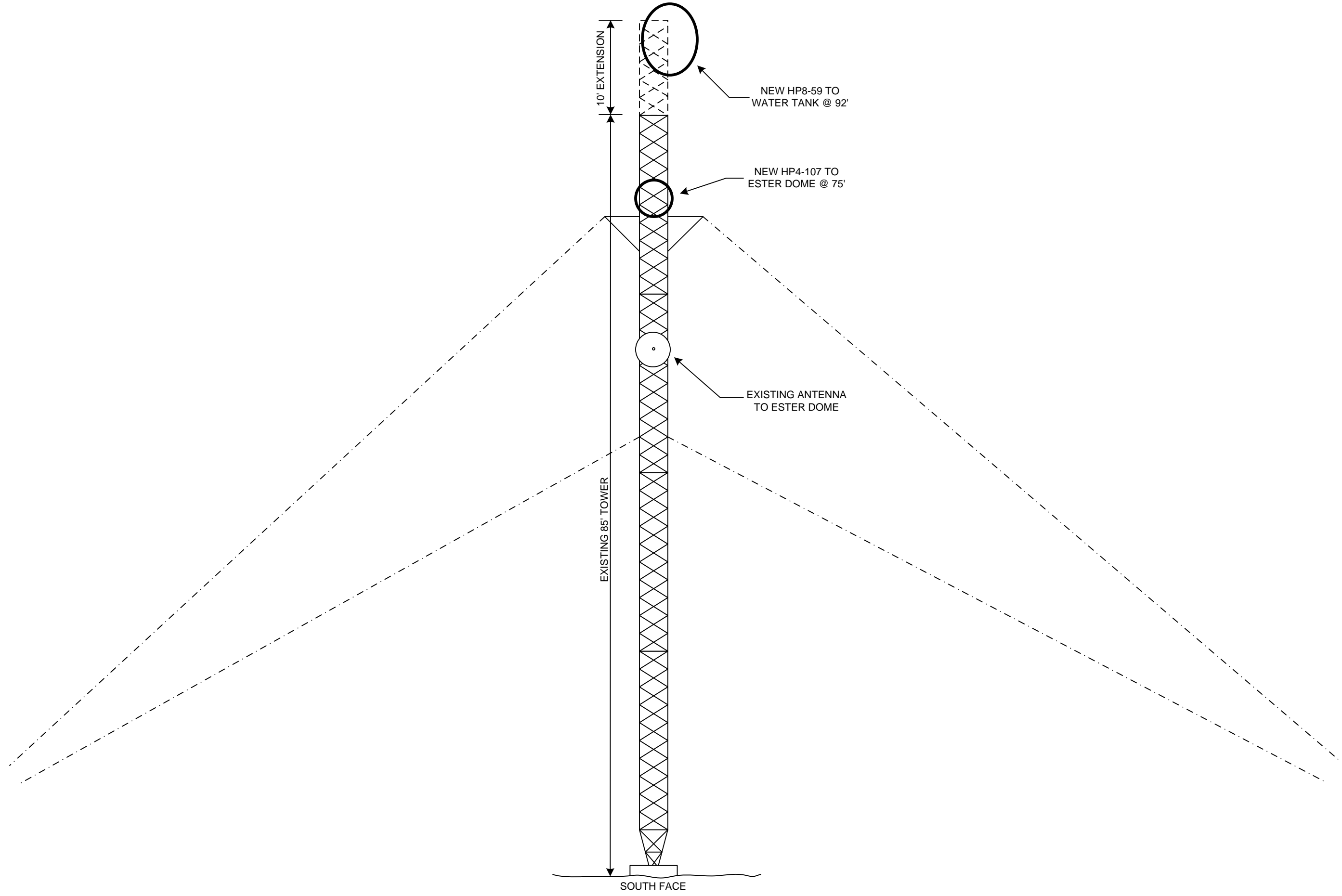
REV.	DATE	REVISION DESCRIPTION	DRAWN	ENGR.
0	4/30/18		SUMMIT	SUMMIT
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DWG REV: 0

SHEET: 1 of 1

**MURPHY DOME
Site Layout**



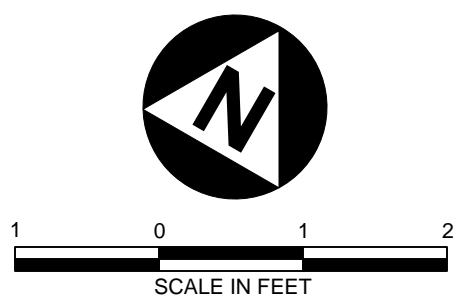
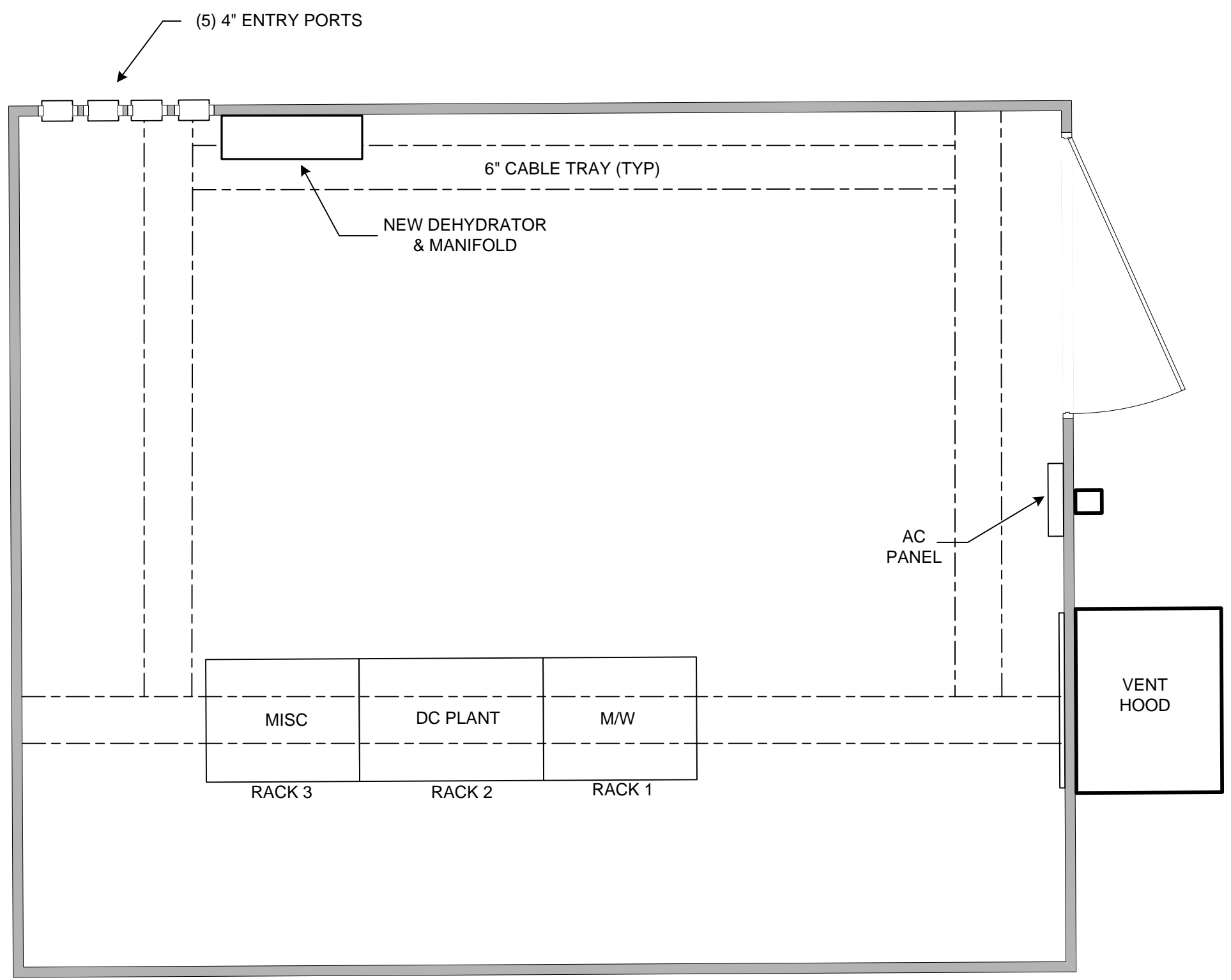


REV.	DATE	REVISION DESCRIPTION	DRAWN	ENGR.
0	4/30/18		SUMMIT	SUMMIT
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DWG REV: 0
 SHEET: 1 of 1

**MURPHY DOME
 Tower Profile**

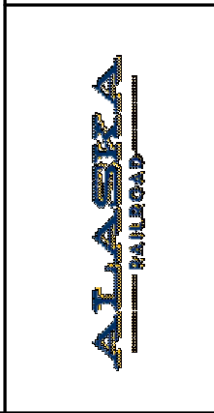


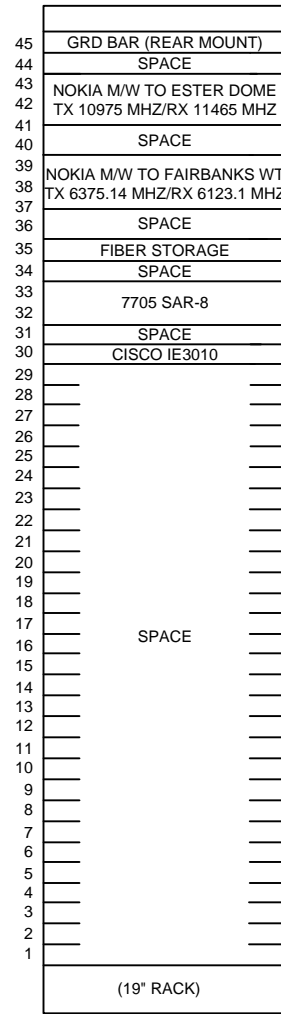


REV.	DATE	REVISION DESCRIPTION	DRAWN	ENGR.
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DWG REV: 0
 SHEET: 1 of 1

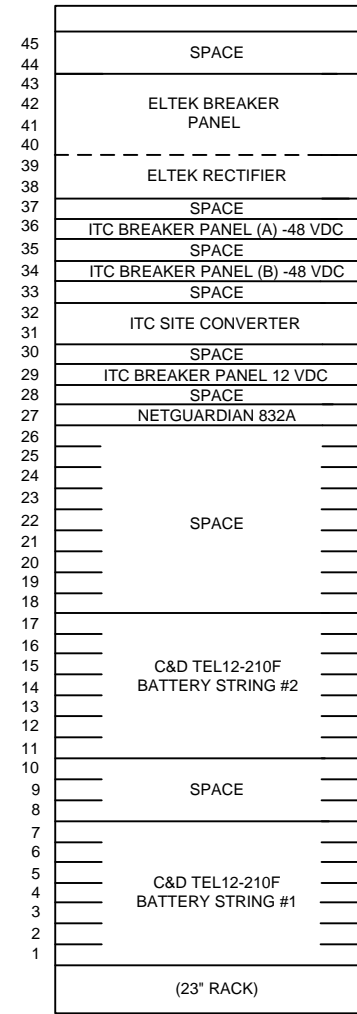
MURPHY DOME
Building Layout





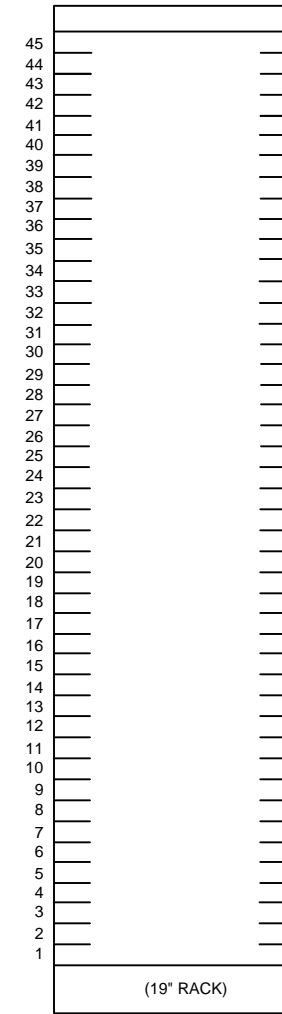
(19" RACK)

RACK #1



(23" RACK)

RACK #2



(19" RACK)

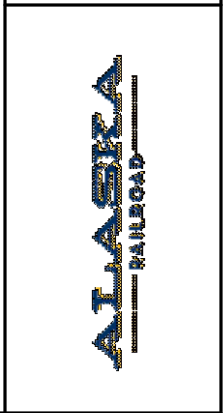
RACK #3



REV.	DATE	REVISION DESCRIPTION	DRAWN	ENGR.
0	4/30/18		SUMMIT	SUMMIT

DWG REV: 0
SHEET: 1 of 1

MURPHY DOME Rack Profiles

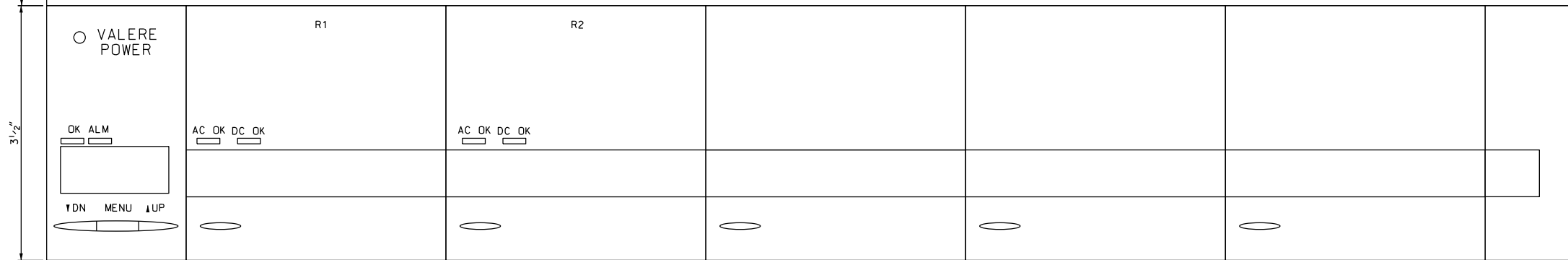
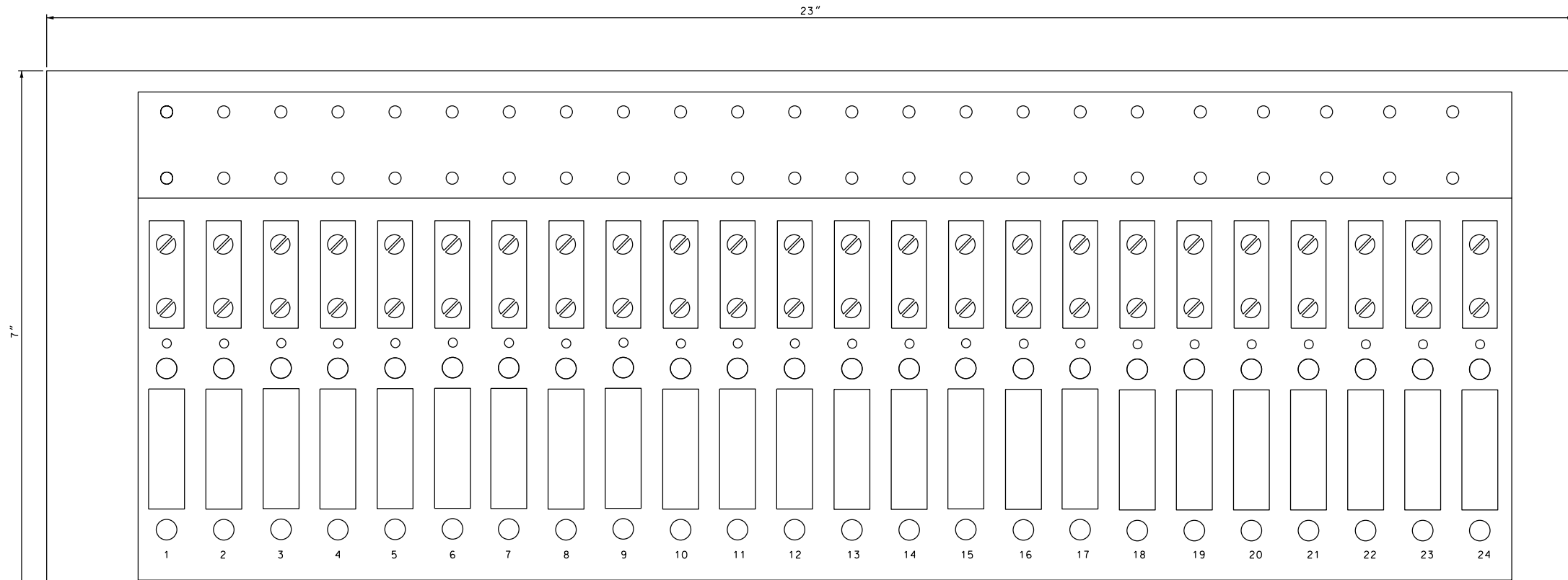


CIRCUIT BREAKER LOADS

POS	AMPS	DESTINATION	DESCRIPTION
1	- +	100	BATTERY CONNECTIONS
2	- +	100	
3	- +		BATTERY CONNECTIONS
4	- +		
1	- +	30 RACK #2 - POS 36	ITC -48V BREAKER PANEL A - BUS A
2	- +	30 RACK #2 - POS 24	ITC -48V BREAKER PANEL B - BUS A
3	- +	100 RACK #2 - POS 31	ITC 12V - 48V SITE CONVERTER
4	- +		
5	- +		
6	- +		
7	- +		
8	- +		
9	- +		
10	- +		
11	- +		
12	- +		
13	- +		
14	- +		
15	- +		
16	- +		
17	- +		
18	- +		
19	- +		
20	- +		

REV.	DATE	REVISION DESCRIPTION	DRAWN	ENGR.
0	4/30/18		SUMMIT	SUMMIT

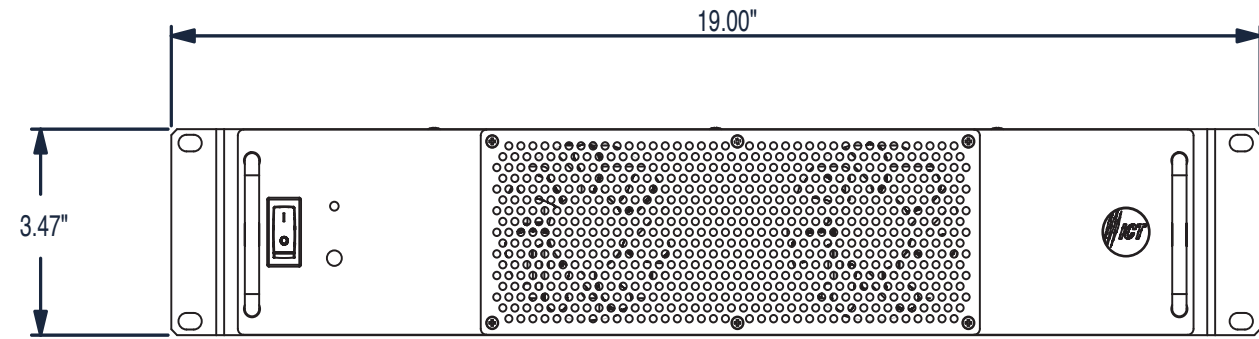
DWG REV: 0
SHEET: 1 of 1



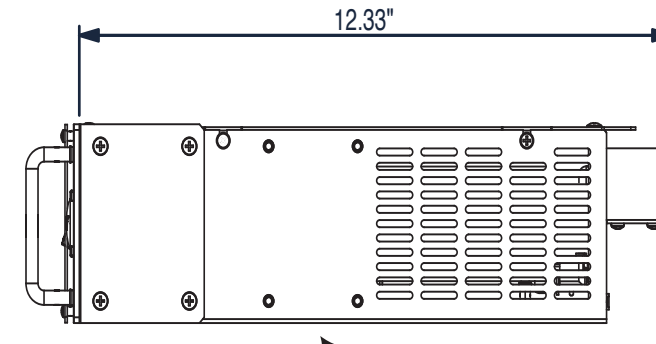
FRONT VIEW

MURPHY DOME
 Eltek 23" Int. Power System
 (Rack #2 - POS 40)

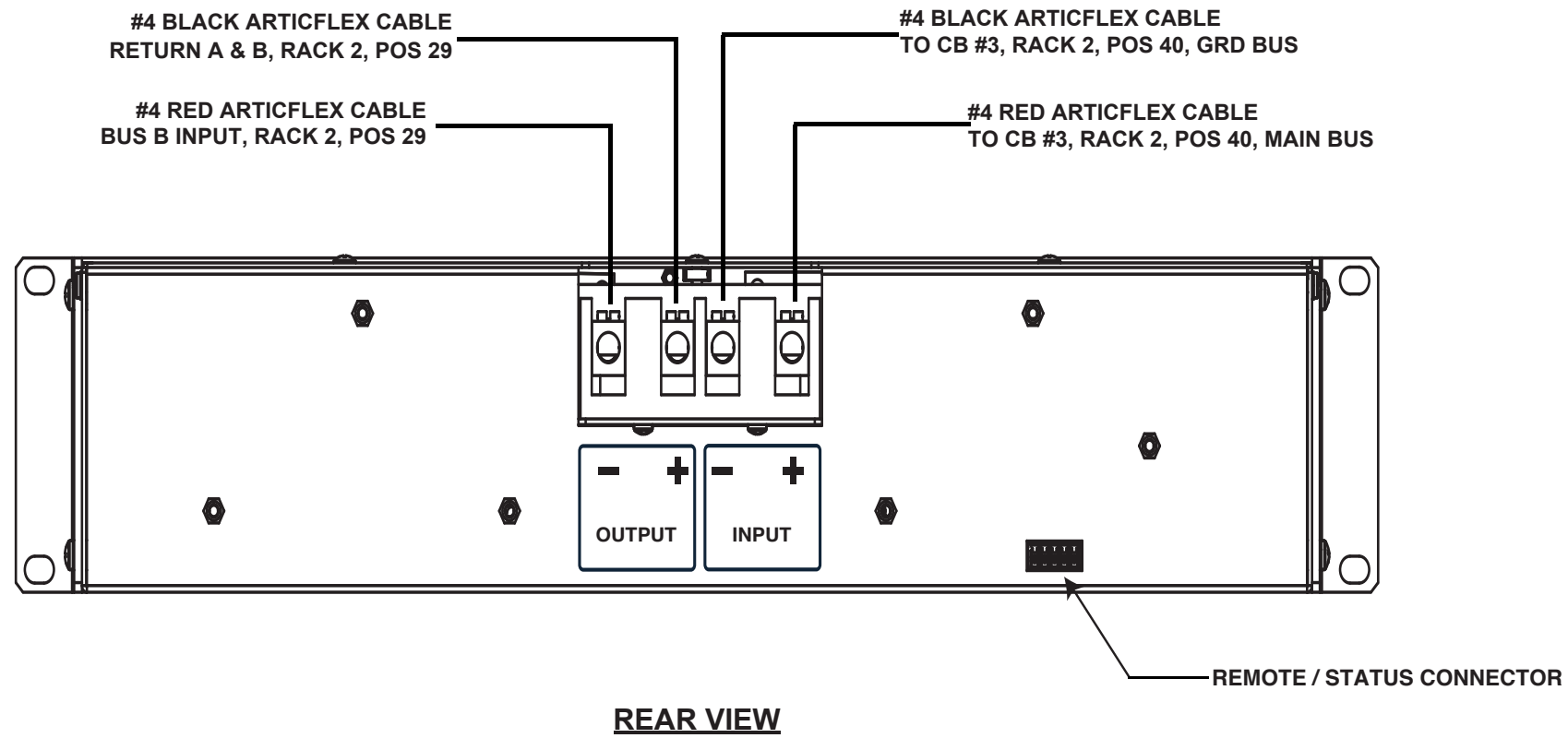
FRONT VIEW



SIDE VIEW



ALTERNATE RACK EAR POSITION



REV.	DATE	REVISION DESCRIPTION	DRAWN	ENGR.
0	4/30/18		SUMMIT	SUMMIT
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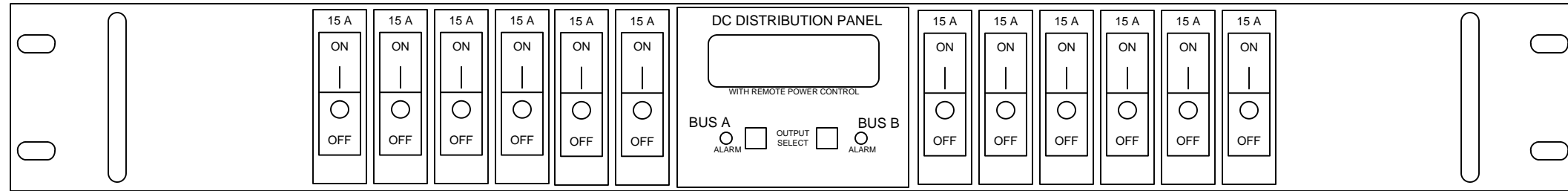
DWG REV: 0

SHEET: 1 of 1

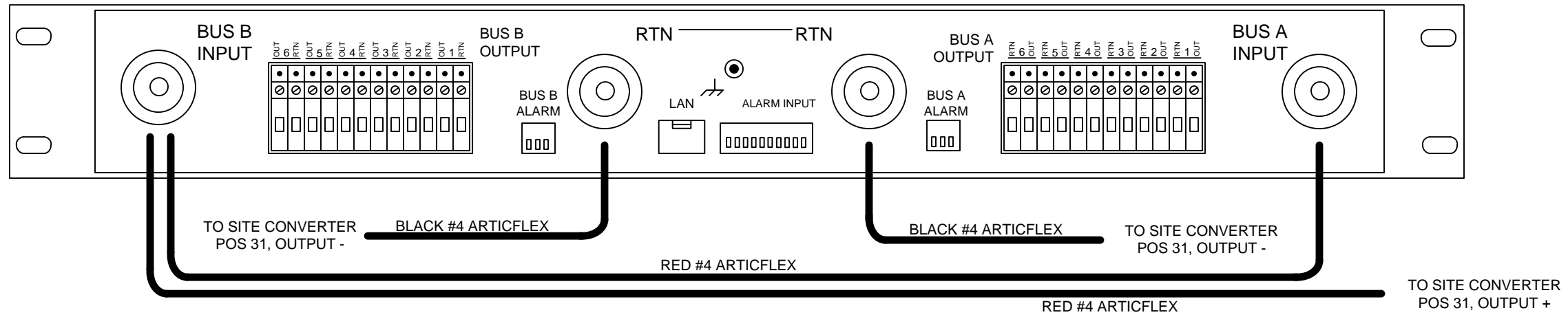
**MURPHY DOME
ICT Site Converter
WIRING DIAGRAM
(RACK 2-POS 31)**



FRONT VIEW



REAR VIEW



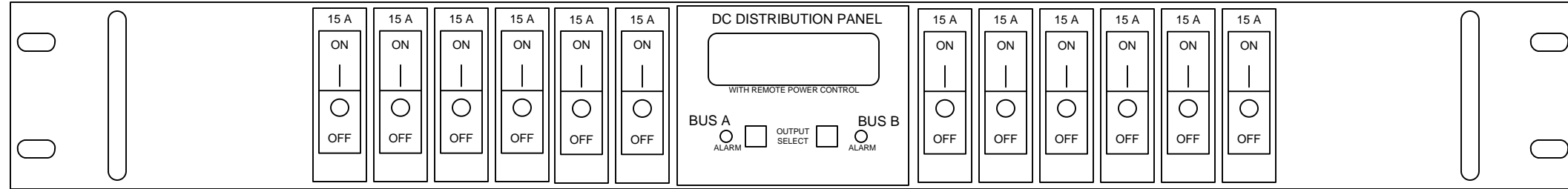
TERMINAL	AMPS	DESTINATION	TERMINAL	AMPS	DESTINATION
A1	+ -		B1	+ -	
A2	+ -		B2	+ -	
A3	+ -		B3	+ -	
A4	+ -		B4	+ -	
A5	+ -		B5	+ -	
A6	+ -		B6	+ -	

REV.	DATE	REVISION DESCRIPTION	DRAWN	ENGR.
0	4/30/18		SUMMIT	SUMMIT
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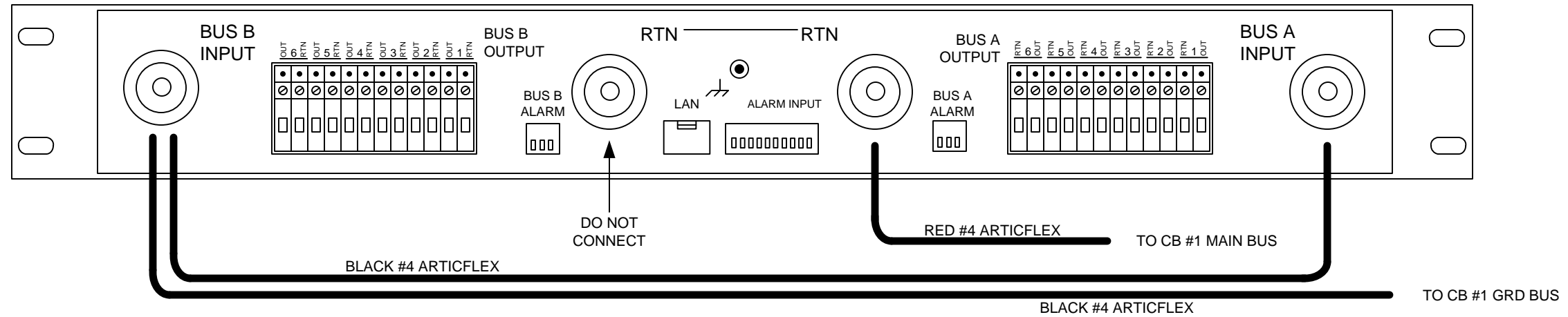
DWG REV: 0
SHEET: 1 of 1

MURPHY DOME
12 VDC BREAKER PANEL
WIRING DIAGRAM
(RACK 2-POS 29)

FRONT VIEW



REAR VIEW



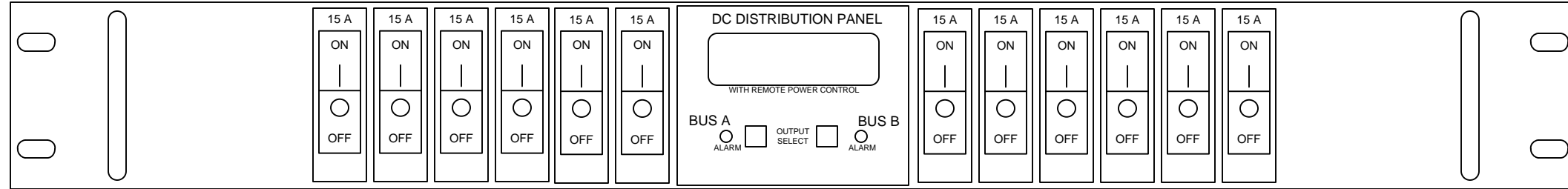
TERMINAL	AMPS	DESTINATION	TERMINAL	AMPS	DESTINATION
A1	5	NETGUARDIAN - TBB	B1	10	ESTER M/W – MAIN
A2	5	CISCO IE3010 – PSU 1	B2	10	FAIRBANKS M/W – MAIN
A3			B3	10	7705 – MAIN
A4			B4		
A5			B5		
A6			B6		

REV.	DATE	REVISION DESCRIPTION	DRAWN	ENGR.
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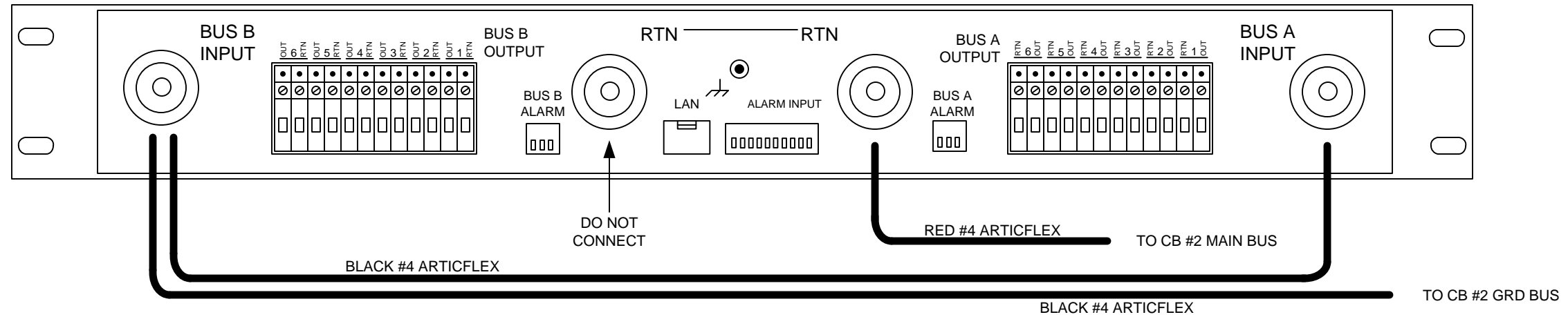
DWG REV: 0
SHEET: 1 of 1

MURPHY DOME
-48 VDC BREAKER PANEL A
WIRING DIAGRAM
(RACK 2-POS 36)

FRONT VIEW



REAR VIEW

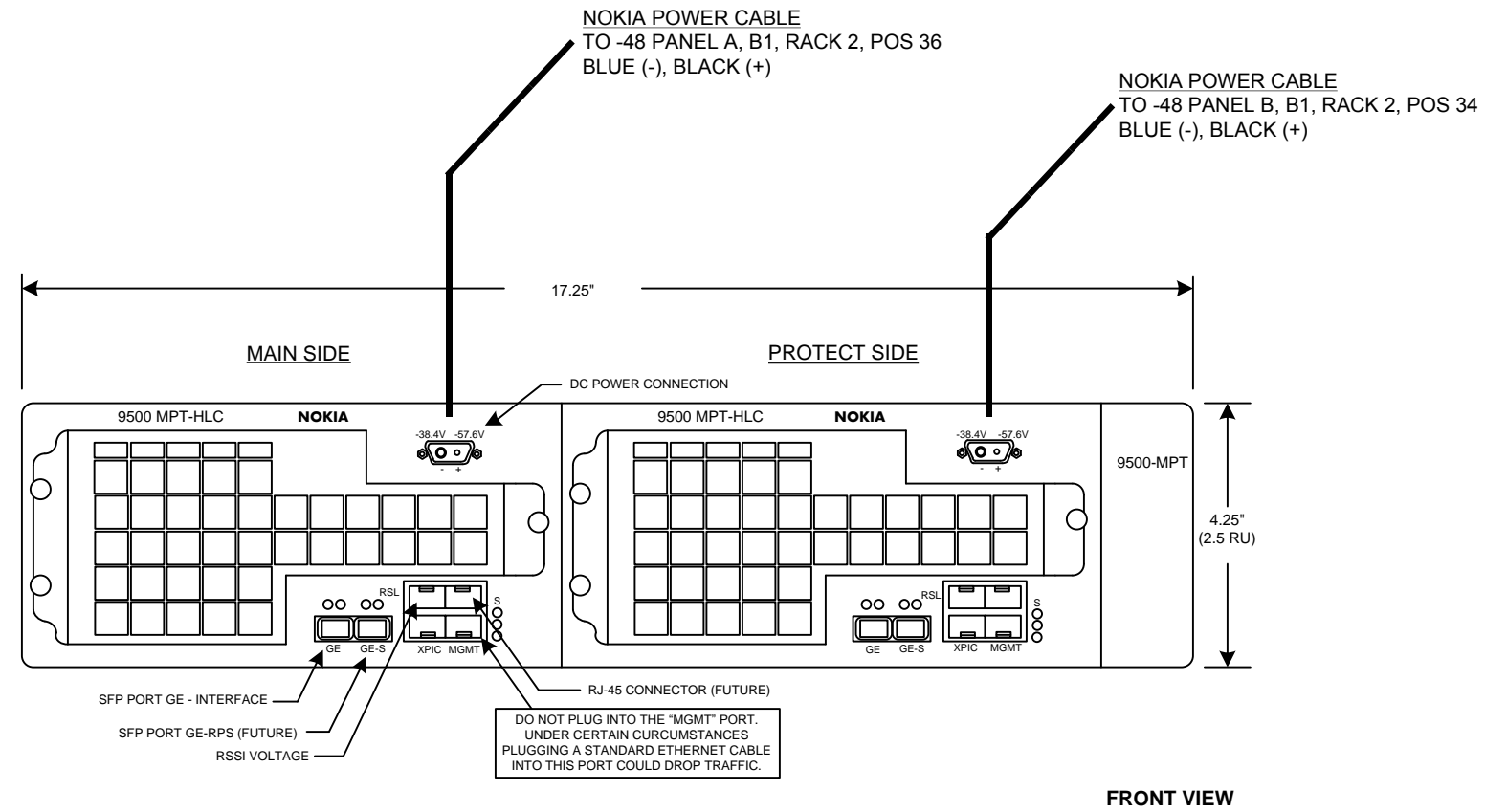


TERMINAL	AMPS	DESTINATION	TERMINAL	AMPS	DESTINATION
A1	5	NETGUARDIAN - TBA	B1	10	ESTER M/W – PROTECT
A2	5	CISCO IE3010 – PSU 2	B2	10	FAIRBANKS M/W– PROTECT
A3			B3	10	7705 – PROTECT
A4			B4		
A5			B5		
A6			B6		

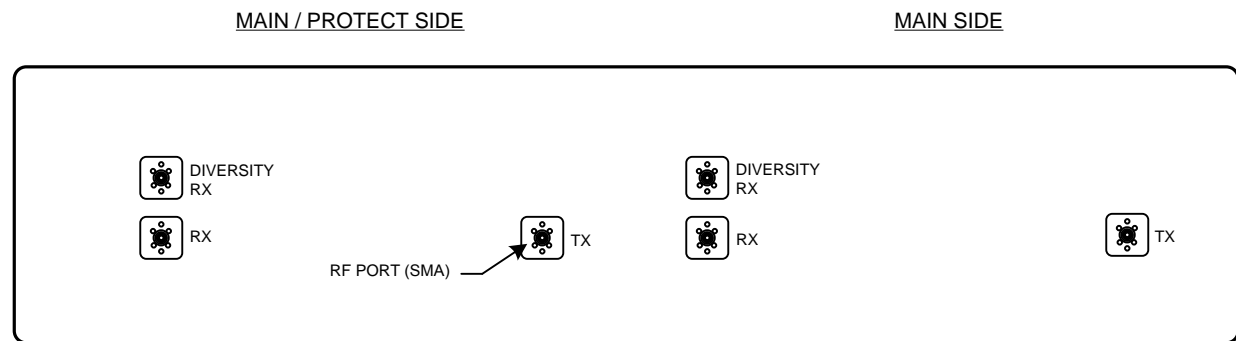
REV.	DATE	REVISION DESCRIPTION	DRAWN	ENGR.
0	4/30/18		SUMMIT	SUMMIT

DWG REV: 0
SHEET: 1 of 1

MURPHY DOME
-48 VDC BREAKER PANEL B
WIRING DIAGRAM
(RACK 2-POS 34)



FRONT VIEW



REAR VIEW

RADIO MODEL
WVCE11-L2-1024F40S-294-30-HS

FREQUENCIES
TX: 10975 MHZ / RX: 11465 MHZ

TABLE #1
WIRING FOR MPT-HLC POWER CABLE

FUSE PANEL	WIRE COLOR
BATTERY +	BLACK
BATTERY -	BLUE
SHIELD GND	GRN/YEL

TABLE #2
WIRING FOR MPT-HLC RSL CABLE

SIGNAL	RJ-45 PIN	WIRE CLR
RX POWER MAIN	6	RED
GND	7	BLACK
RX POWER DIVERSITY	8	BLUE

PROVIDES RJ-45 TO BANANA PLUG

TABLE #3
RSL / RSSI USING MPT-HLC RSL CONNECTOR

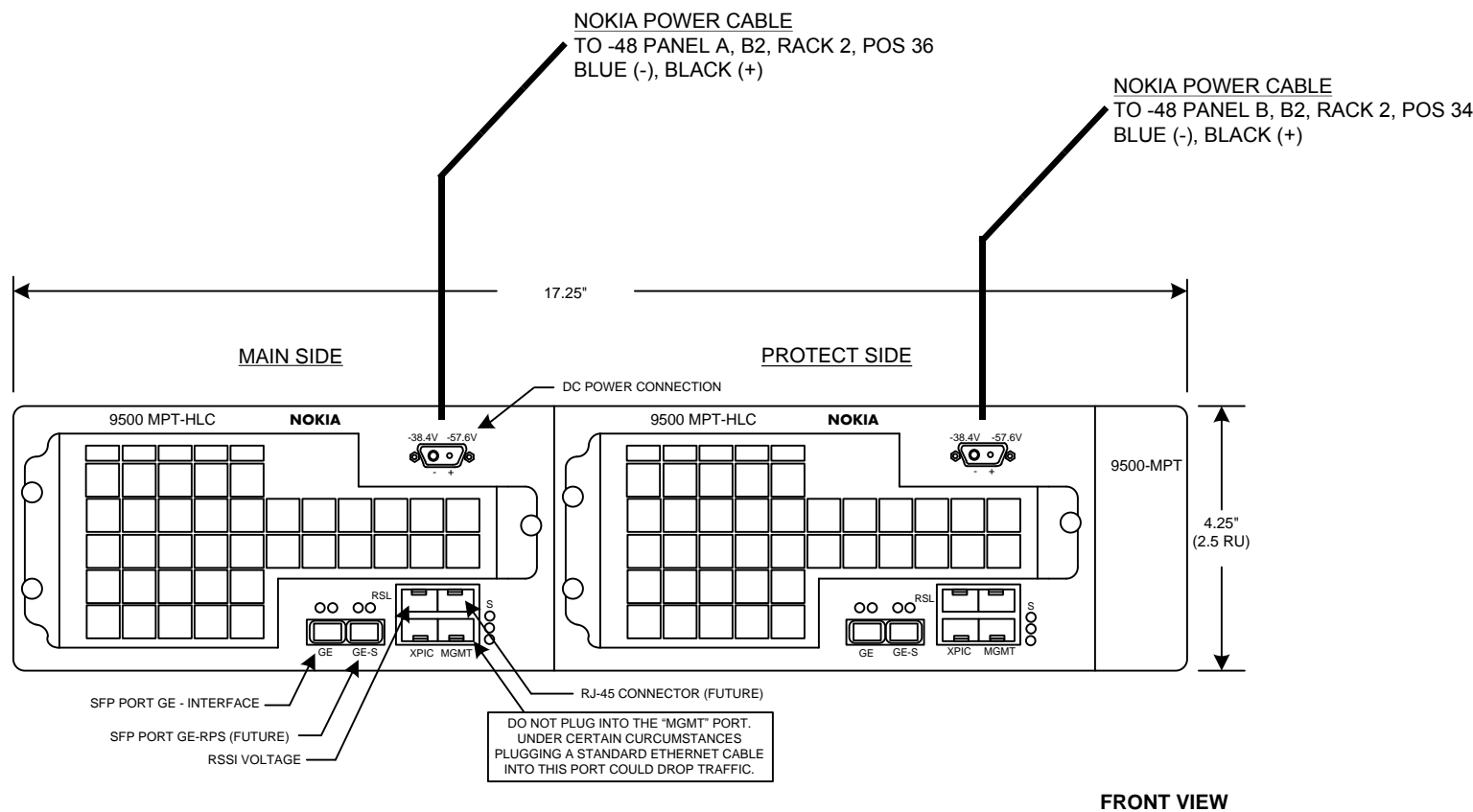
RSSI VOLTAGE (Vdc)	4.94	4.31	3.72	3.10	2.46	1.86	1.25	0.62	0.26
RSL (dBm)	-20	-30	-40	-50	-60	-70	-80	-90	-100

A HIGHER RSSI EQUALS A HIGHER RSL

REV.	DATE	REVISION DESCRIPTION	DRAWN	ENGR.
0	4/30/18		SUMMIT	SUMMIT

DWG REV: 0
SHEET: 1 of 1

MURPHY DOME
Nokia 9500 MPT-HLC (Rack 1)
RADIO TO ESTER DOME



RADIO MODEL
WVCE61-L1-512F30S-205-31.5-HS

FREQUENCIES
TX: 6375.14 MHZ / RX: 6123.1 MHZ

TABLE #1
WIRING FOR MPT-HLC POWER CABLE

FUSE PANEL	WIRE COLOR
BATTERY +	BLACK
BATTERY -	BLUE
SHIELD GND	GRN/YEL

TABLE #2
WIRING FOR MPT-HLC RSL CABLE

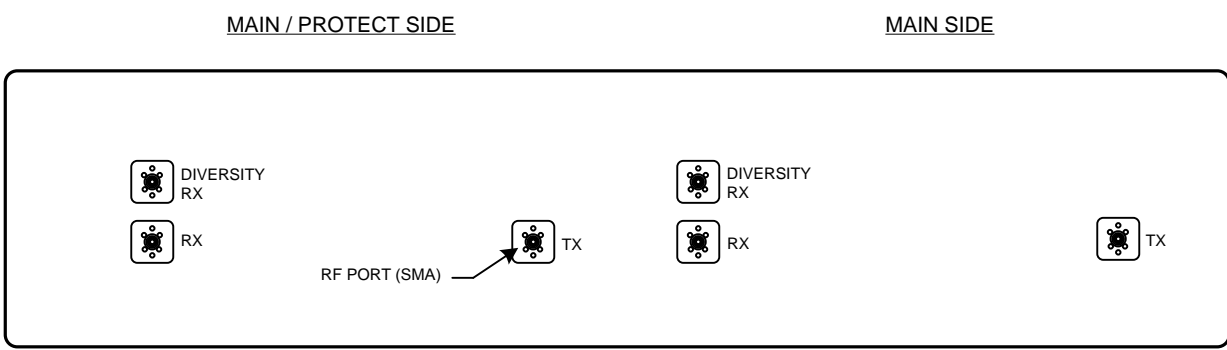
SIGNAL	RJ-45 PIN	WIRE CLR
RX POWER MAIN	6	RED
GND	7	BLACK
RX POWER DIVERSITY	8	BLUE

PROVIDES RJ-45 TO BANANA PLUG

TABLE #3
RSL / RSSI USING MPT-HLC RSL CONNECTOR

RSSI VOLTAGE (Vdc)	4.94	4.31	3.72	3.10	2.46	1.86	1.25	0.62	0.26
RSL (dBm)	-20	-30	-40	-50	-60	-70	-80	-90	-100

A HIGHER RSSI EQUALS A HIGHER RSL

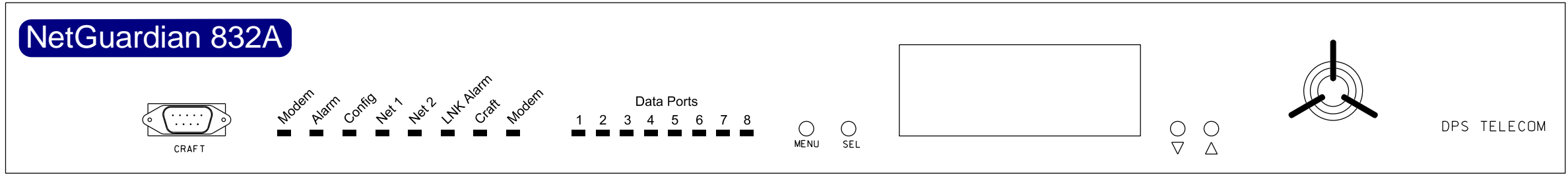


ENGR.	DATE	REVISION DESCRIPTION	DRAWN
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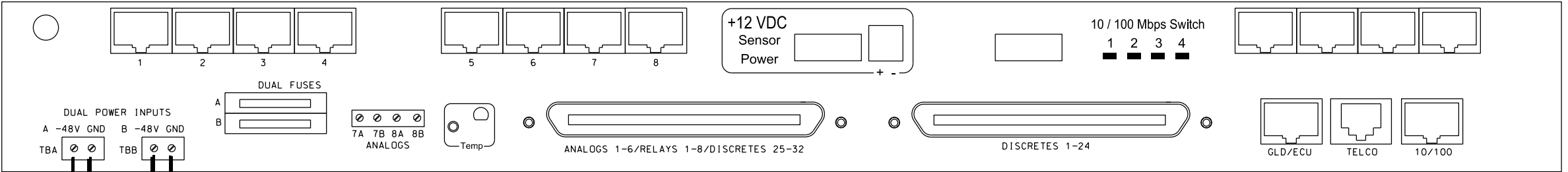
DWG REV: 0
SHEET: 1 of 1

MURPHY DOME
Nokia 9500 MPT-HLC (Rack 1)
RADIO TO FAIRBANKS

NetGuardian 832A



FRONT VIEW



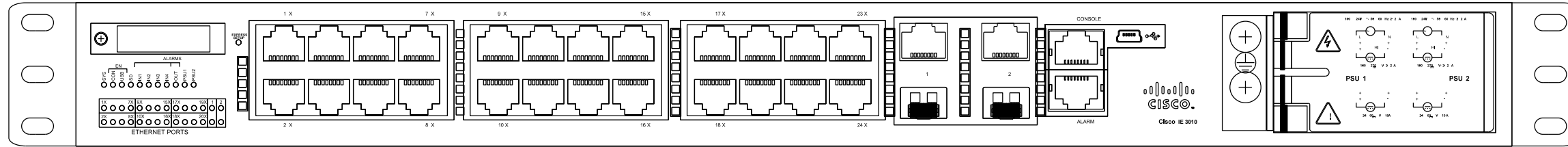
REAR VIEW

- #14 RED ARTICFLEX TO RACK 2, POS 34, BUS OUTPUT A1 (RTN)
- #14 BLACK ARTICFLEX TO RACK 2, POS 36, BUS OUTPUT A1 (OUT)
- #14 BLACK ARTICFLEX TO RACK 2, POS 34, BUS OUTPUT A1 (OUT)
- #14 RED ARTICFLEX TO RACK 2, POS 36, BUS OUTPUT A1 (RTN)

REV.	DATE	REVISION DESCRIPTION	DRAWN	ENGR.
0	4/30/18		SUMMIT	SUMMIT
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DWG REV: 0
SHEET: 1 of 1

MURPHY DOME NetGuardian 832A (Rack 2) WIRING DIAGRAM



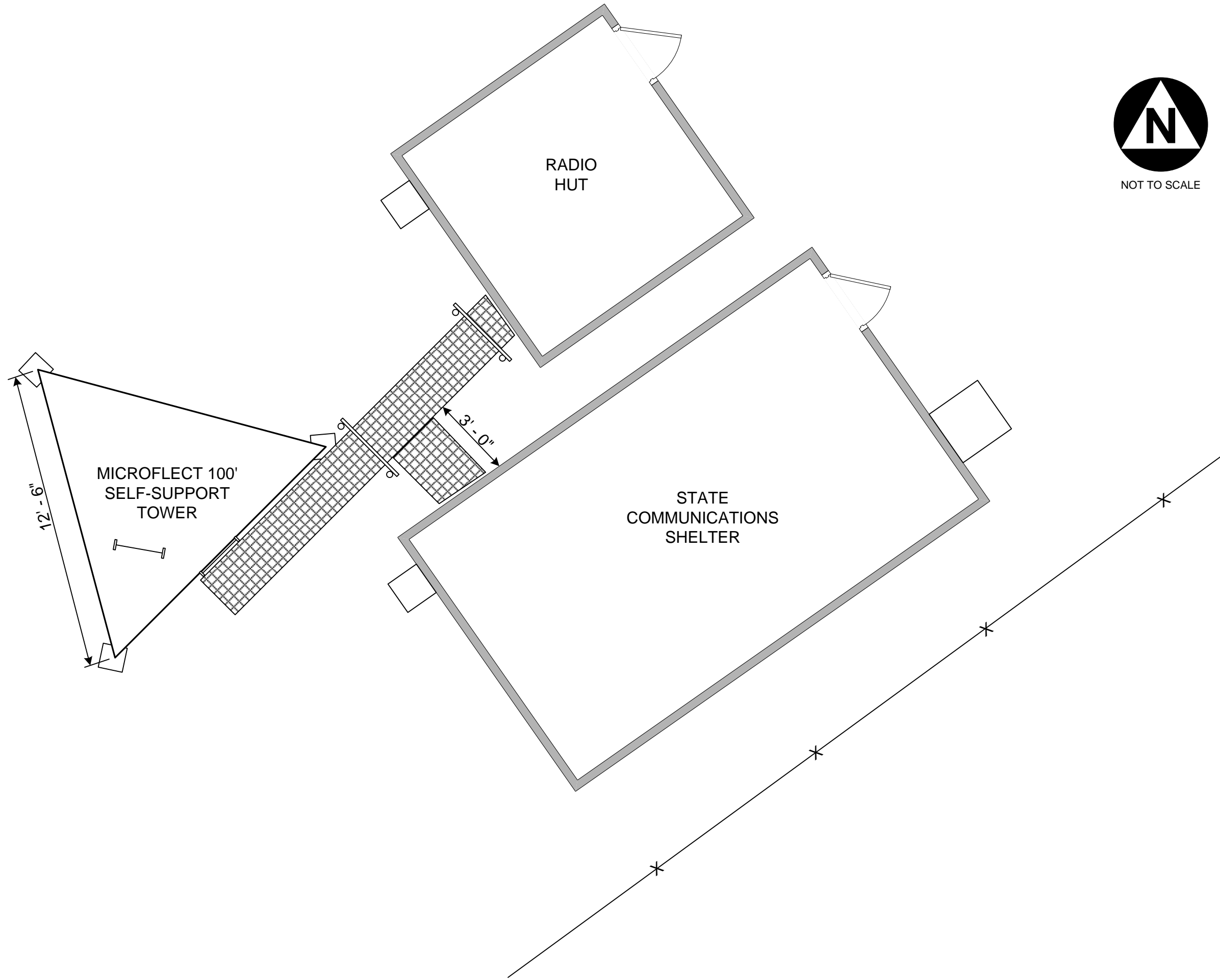
DC POWER	
PIN	DESTINATION
PSU 1 (-)	RACK 2, POS 36, A2 RTN
PSU 1 (+)	RACK 2, POS 36, A2 OUT
PSU 2 (-)	RACK 2, POS 34, A2 RTN
PSU 2 (+)	RACK 2, POS 34, A2 OUT

REV.	DATE	REVISION DESCRIPTION	DRAWN	ENGR.
0	4/30/18		SUMMIT	SUMMIT

DWG REV: 0
 SHEET: 1 of 1

MURPHY DOME
Cisco IE 3010 Switch
RACK #1 - POS 30



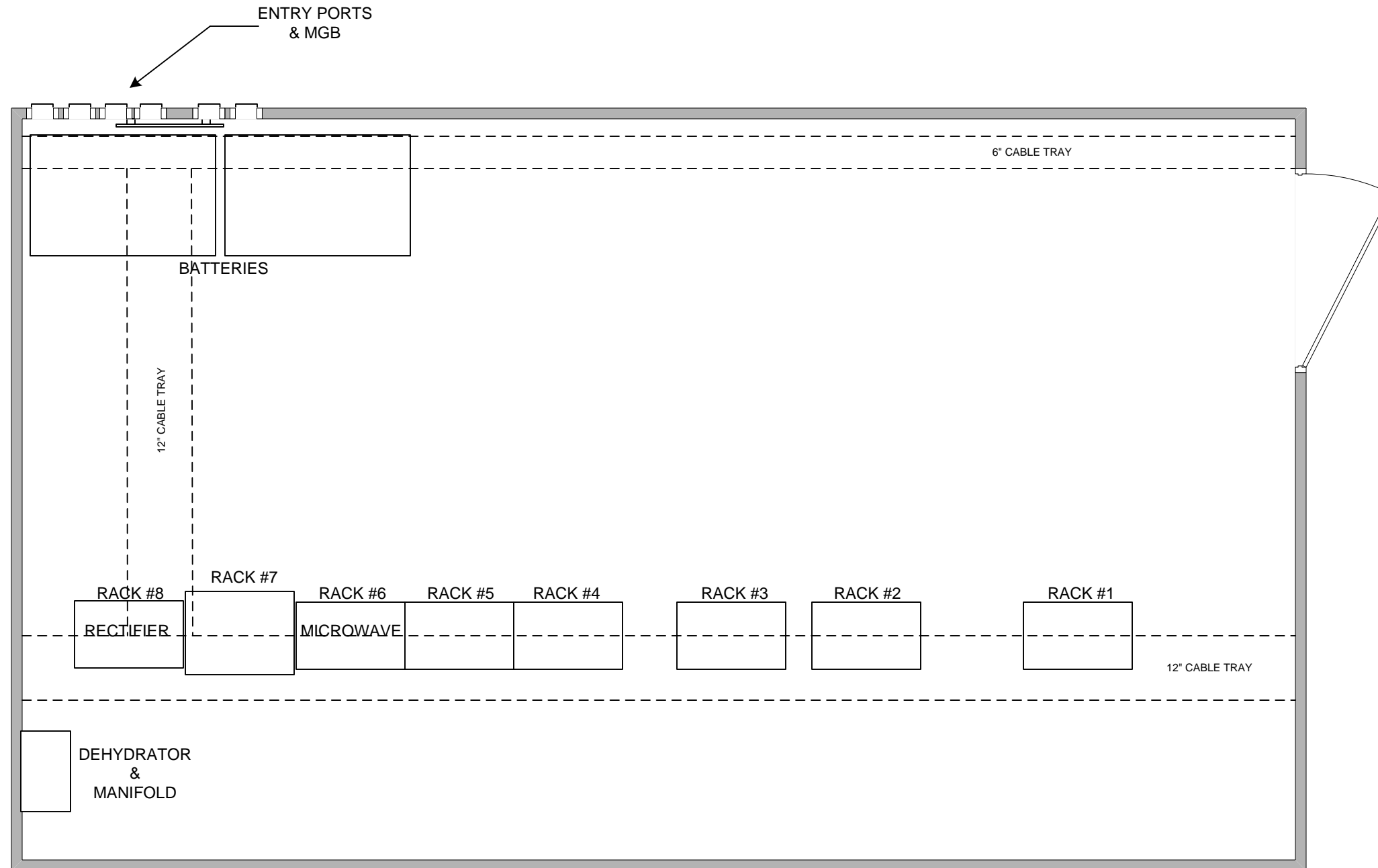
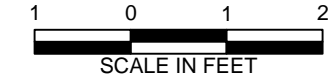
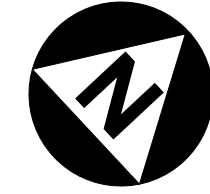


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DWG REV: 0
 SHEET: 1 of 1

**ESTER DOME
 Site Layout**

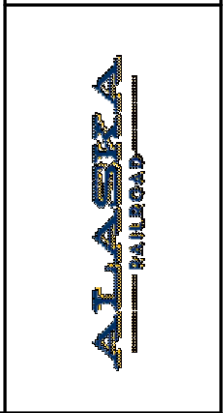


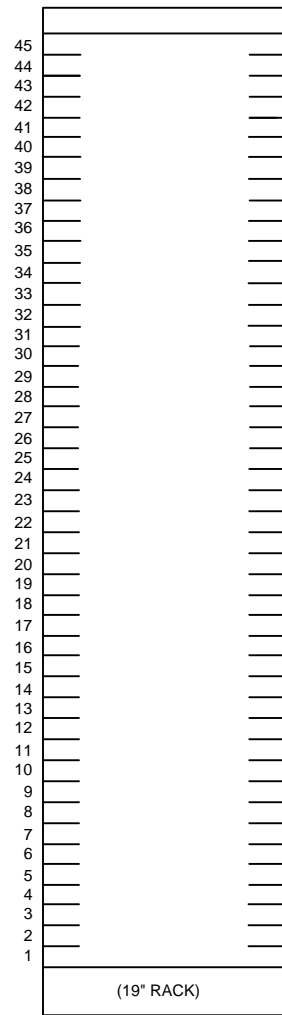


REV.	DATE	REVISION DESCRIPTION	DRAWN	ENGR.
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DWG REV: 0
 SHEET: 1 of 1

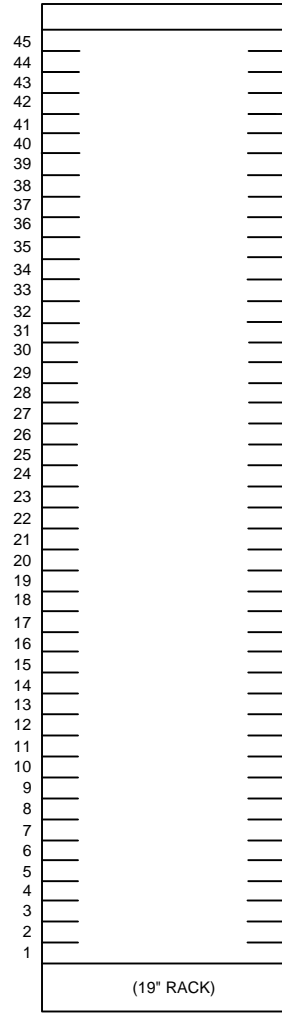
ESTER DOME
Building Layout





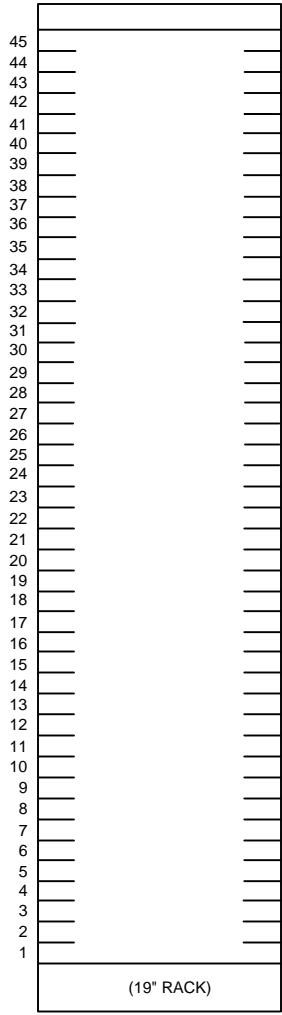
(19" RACK)

RACK #1



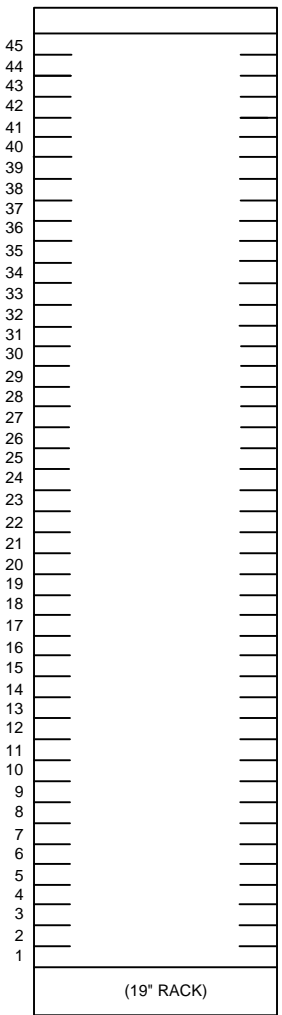
(19" RACK)

RACK #2



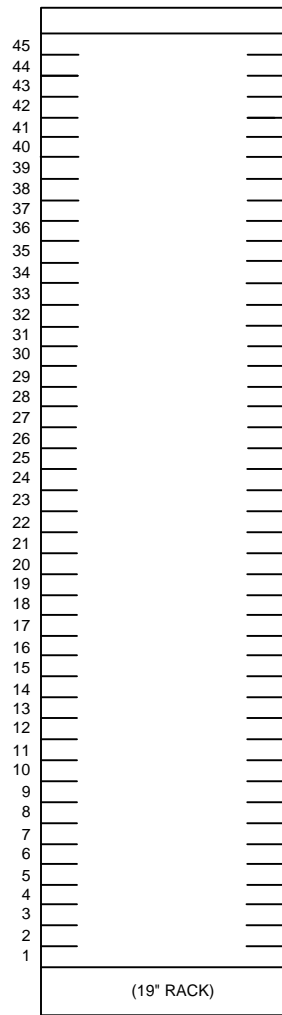
(19" RACK)

RACK #3



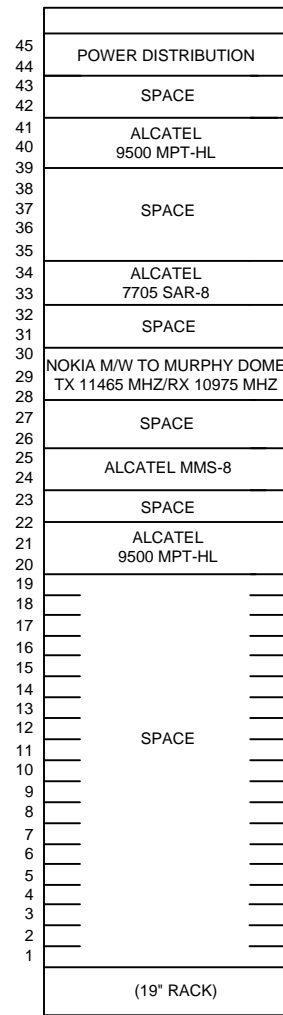
(19" RACK)

RACK #4



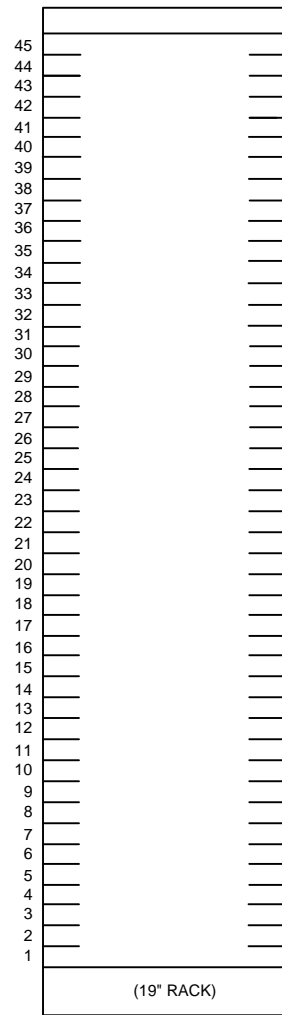
(19" RACK)

RACK #5



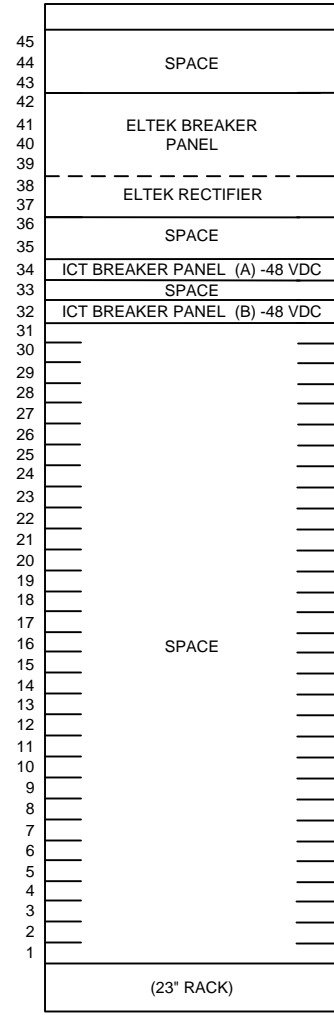
(19" RACK)

RACK #6



(19" RACK)

RACK #7



(23" RACK)

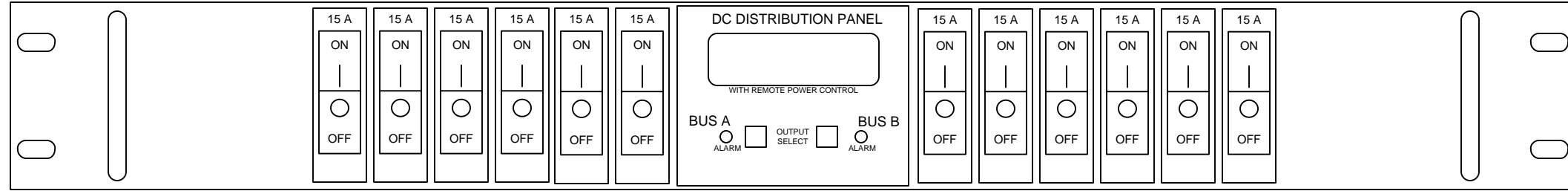
RACK #8

ENGR:		---	---	---	---
DRAWN:		SUMMIT	---	---	---
REVISION DESCRIPTION					
REV.	DATE				
0	4/30/18	---	---	---	---
DWG REV:		0			
SHEET:		1 of 1			

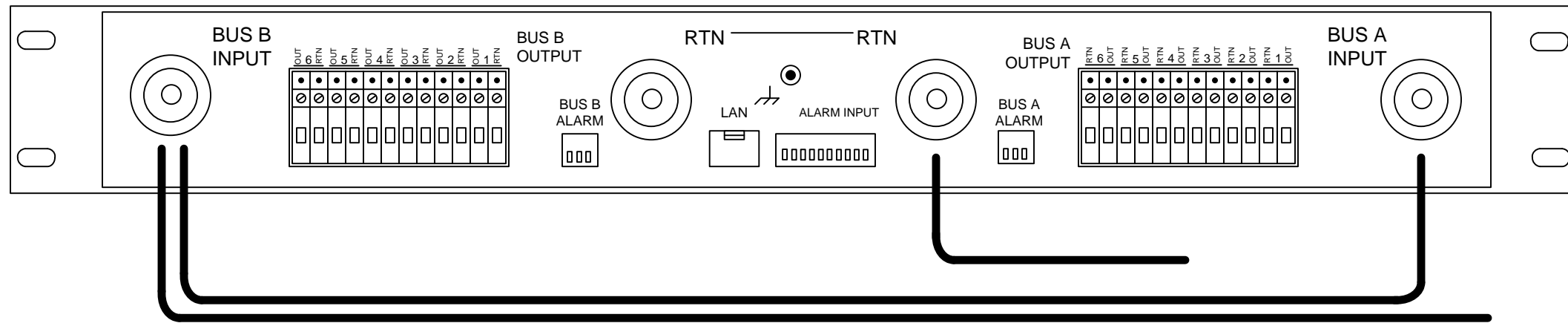
**ESTER DOME
Rack Profiles**



FRONT VIEW



REAR VIEW



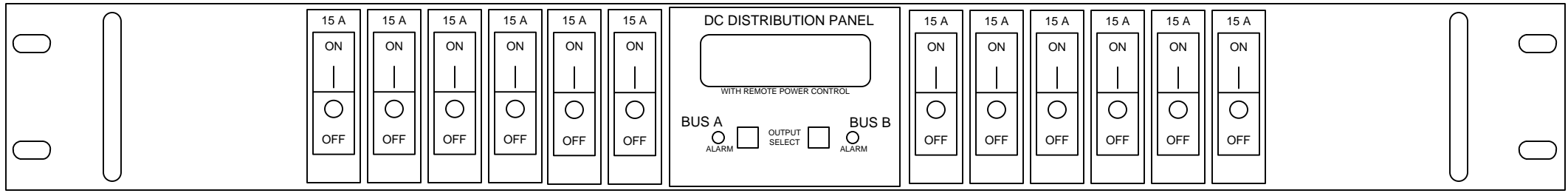
TERMINAL	AMPS	DESTINATION	TERMINAL	AMPS	DESTINATION
A1	+ -	15	B1	+ -	NOKIA M/W – MAIN
A2	+ -	15	B2	+ -	
A3	+ -		B3	+ -	
A4	+ -		B4	+ -	
A5	+ -		B5	+ -	
A6	+ -		B6	+ -	

REV.	DATE	REVISION DESCRIPTION	DRAWN	ENGR.
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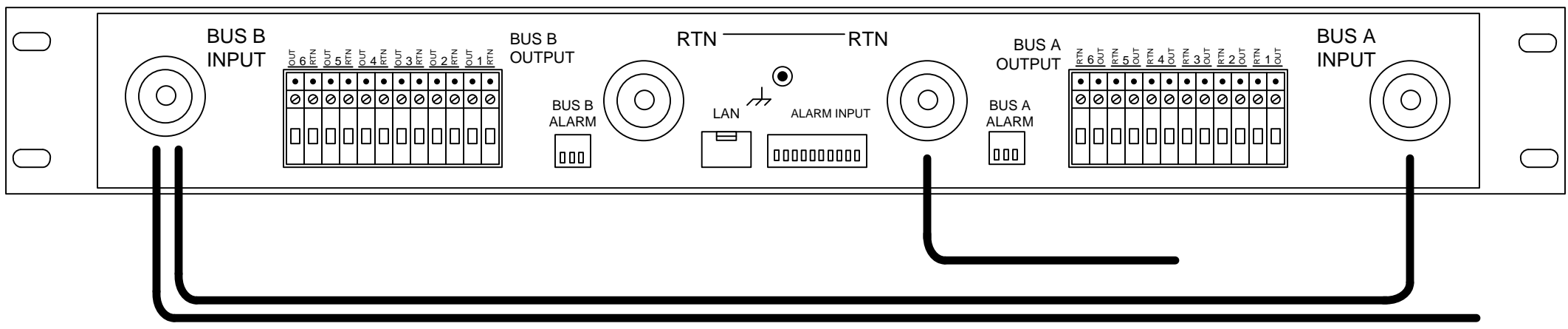
DWG REV: 0
SHEET: 1 of 1

ESTER DOME
-48 VDC BREAKER PANEL A
WIRING DIAGRAM
(RACK 8-POS 34)

FRONT VIEW



REAR VIEW

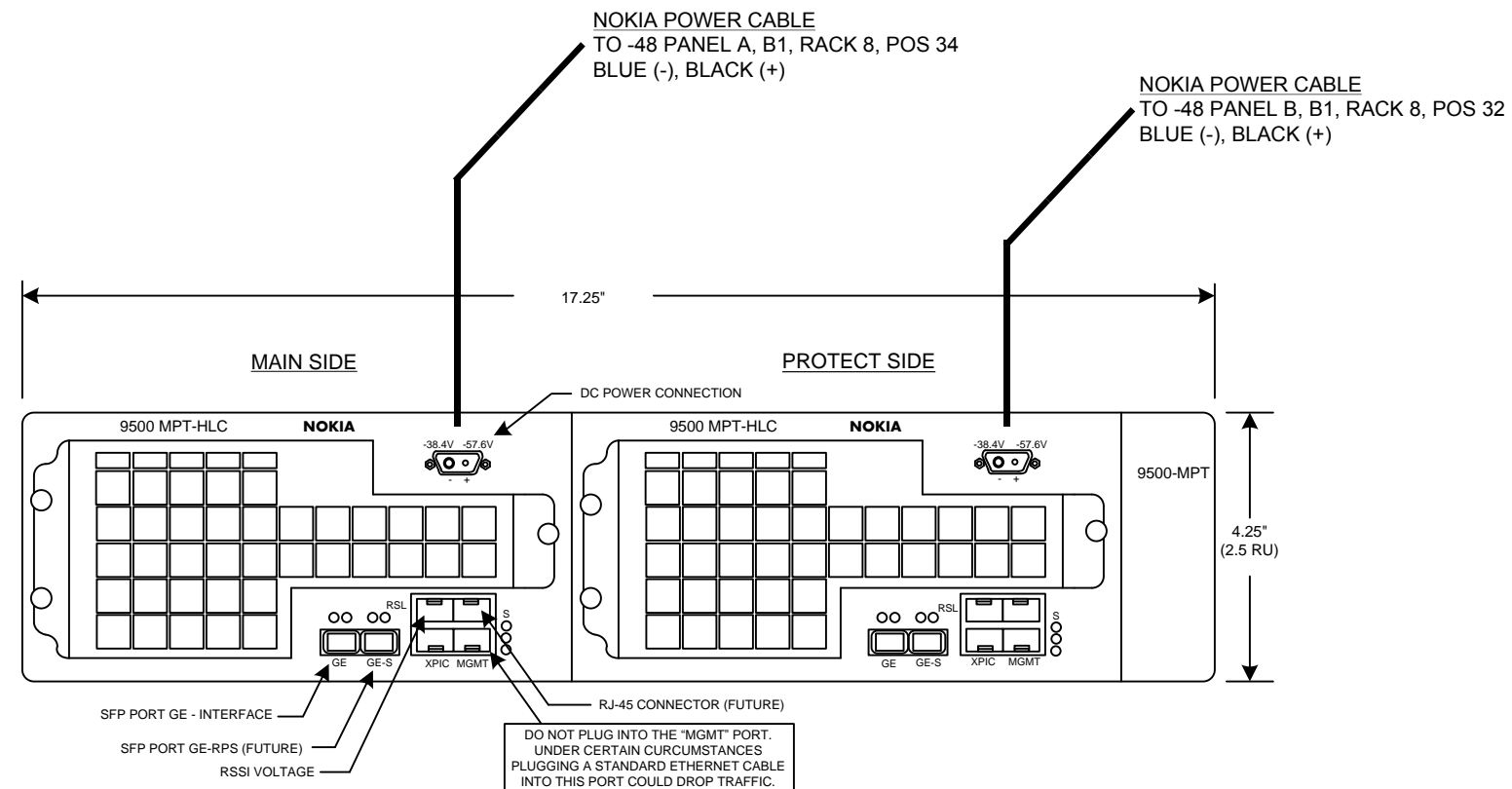


TERMINAL	AMPS	DESTINATION	TERMINAL	AMPS	DESTINATION
A1	+ -	15	B1	+ -	NOKIA M/W – PROTECT
A2	+ -	15	B2	+ -	
A3	+ -		B3	+ -	
A4	+ -		B4	+ -	
A5	+ -		B5	+ -	
A6	+ -		B6	+ -	

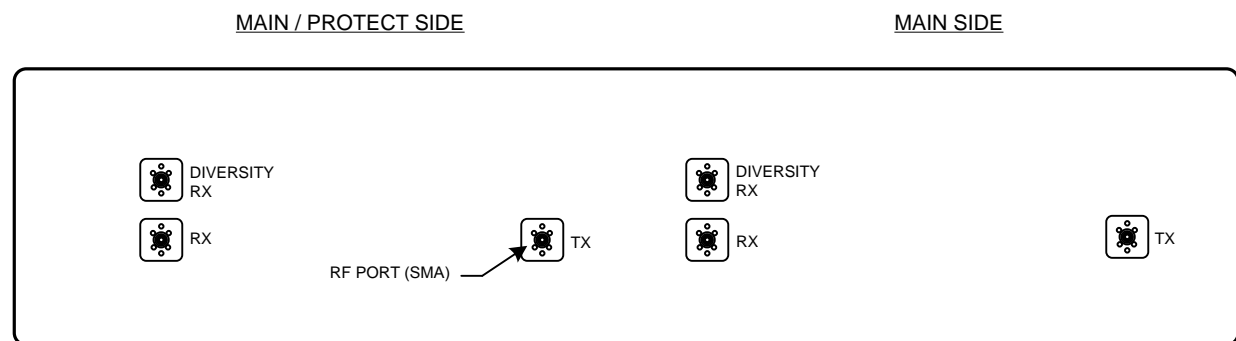
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DWG REV: 0
SHEET: 1 of 1

ESTER DOME
-48 VDC BREAKER PANEL B
WIRING DIAGRAM
(RACK 8-POS 32)



FRONT VIEW



REAR VIEW

RADIO MODEL
WVCE11-L2-1024F40S-294-30-HS

FREQUENCIES
TX: 11465 MHZ / RX: 10975 MHZ

TABLE #1
WIRING FOR MPT-HLC POWER CABLE

FUSE PANEL	WIRE COLOR
BATTERY +	BLACK
BATTERY -	BLUE
SHIELD GND	GRN/YEL

TABLE #2
WIRING FOR MPT-HLC RSL CABLE

SIGNAL	RJ-45 PIN	WIRE CLR
RX POWER MAIN	6	RED
GND	7	BLACK
RX POWER DIVERSITY	8	BLUE

PROVIDES RJ-45 TO BANANA PLUG

TABLE #3
RSL / RSSI USING MPT-HLC RSL CONNECTOR

RSSI VOLTAGE (Vdc)	4.94	4.31	3.72	3.10	2.46	1.86	1.25	0.62	0.26
RSL (dBm)	-20	-30	-40	-50	-60	-70	-80	-90	-100

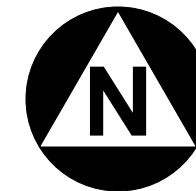
A HIGHER RSSI EQUALS A HIGHER RSL

ENGR.	DRAWN	REVISION DESCRIPTION	DATE
SUMMIT	SUMMIT		4/30/18
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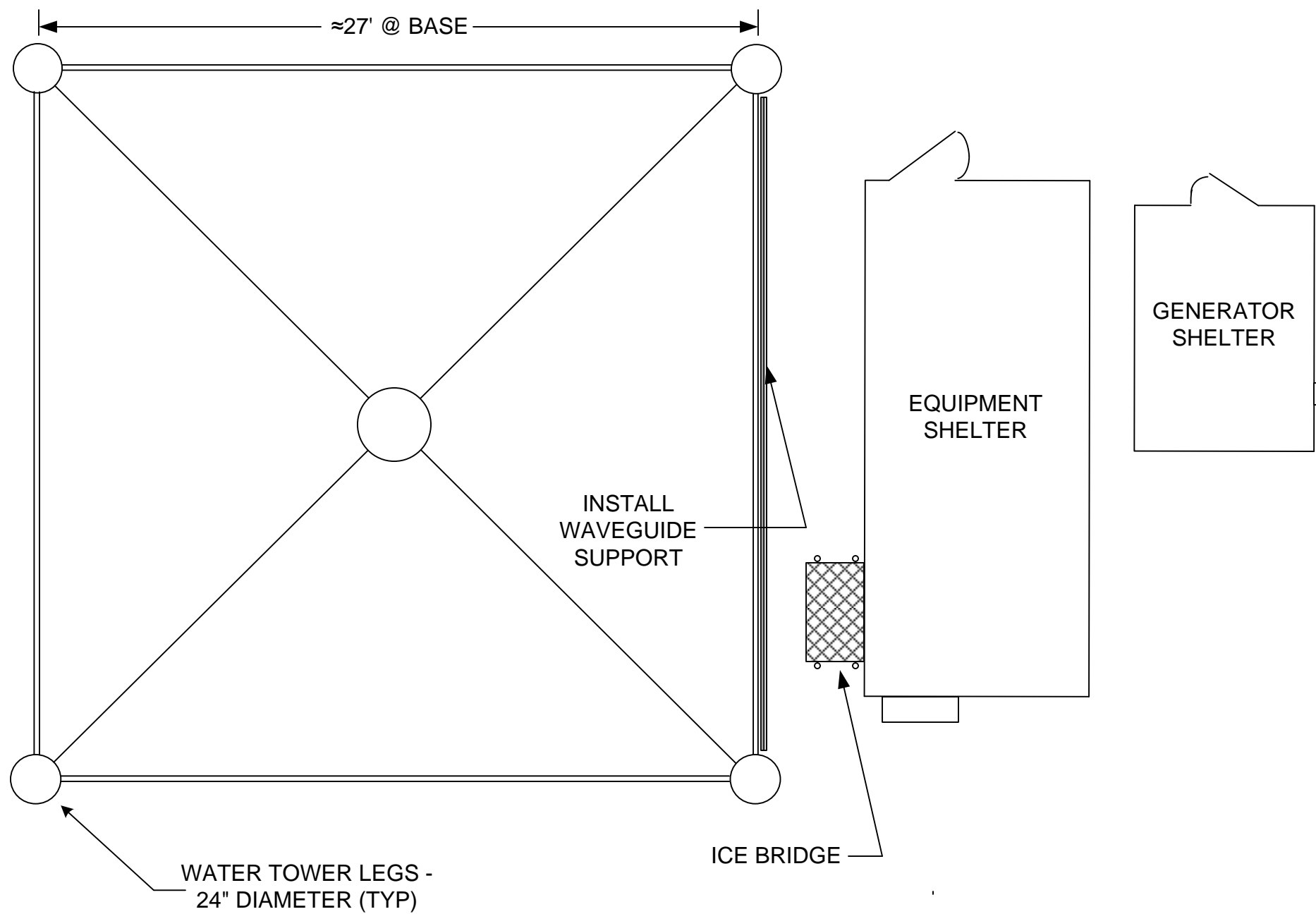
DWG REV: 0

SHEET: 1 of 1

ESTER DOME
Nokia 9500 MPT-HLC (Rack 6)
RADIO TO MURPHY DOME



NOT TO SCALE

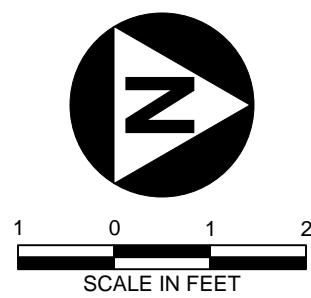
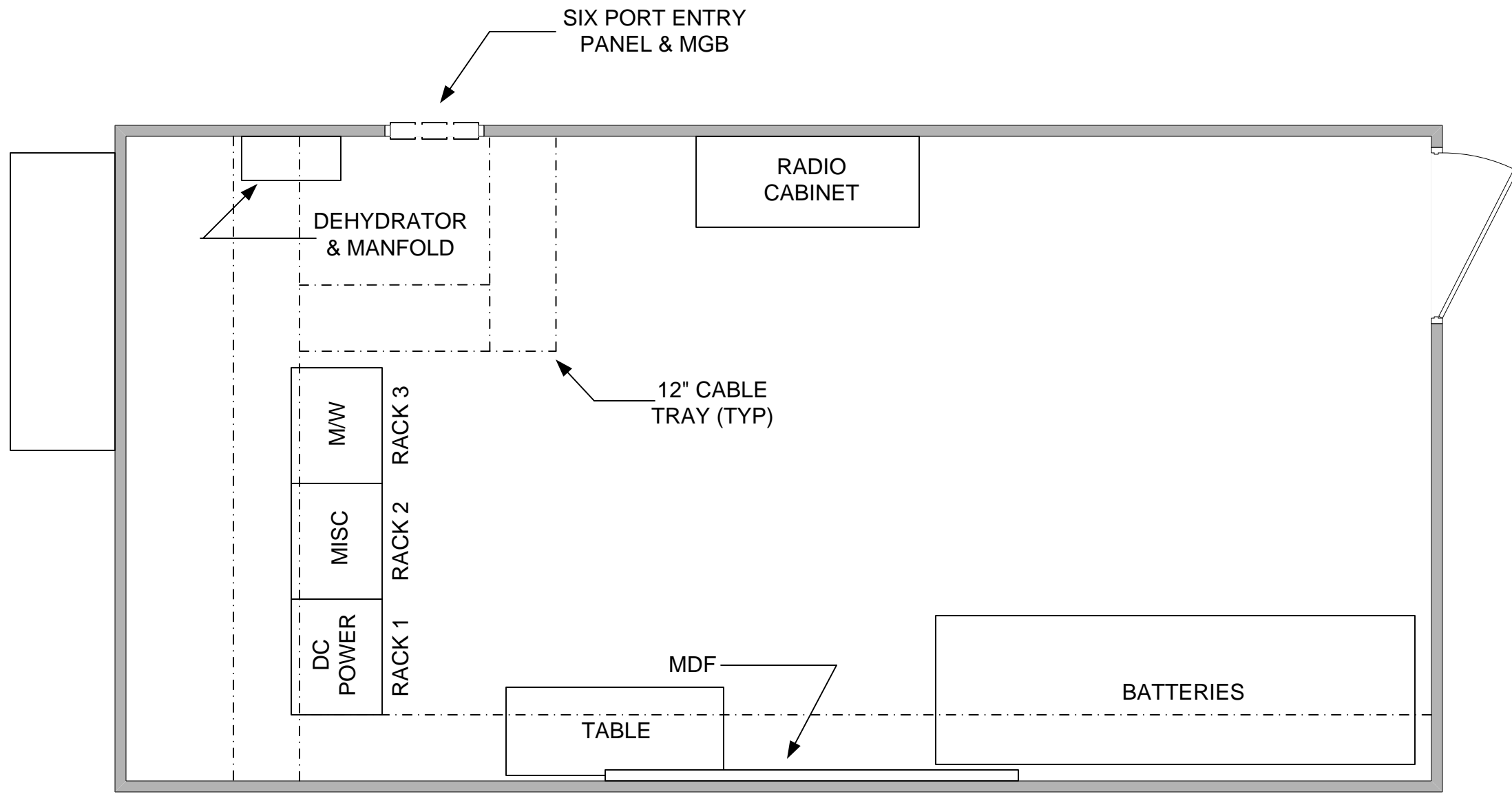


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DWG REV: 0
 SHEET: 1 of 1

**FAIRBANKS
 WATER TOWER
 Site Layout**



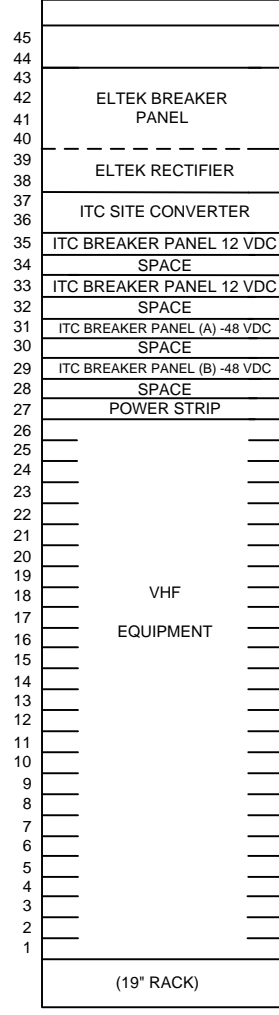


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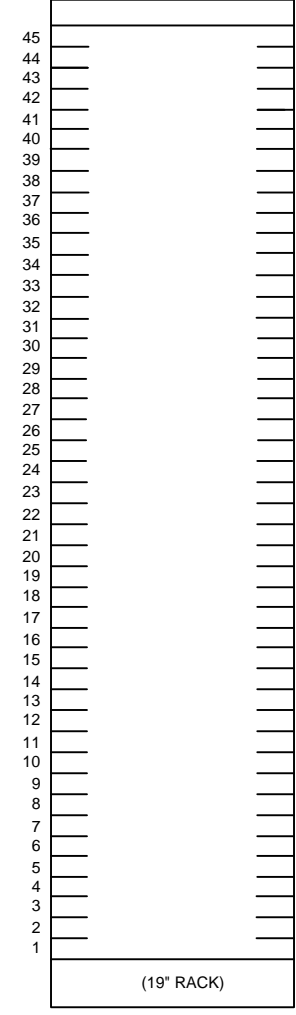
DWG REV: 0
 SHEET: 1 of 1

**FAIRBANKS
 WATER TOWER
 Building Layout**

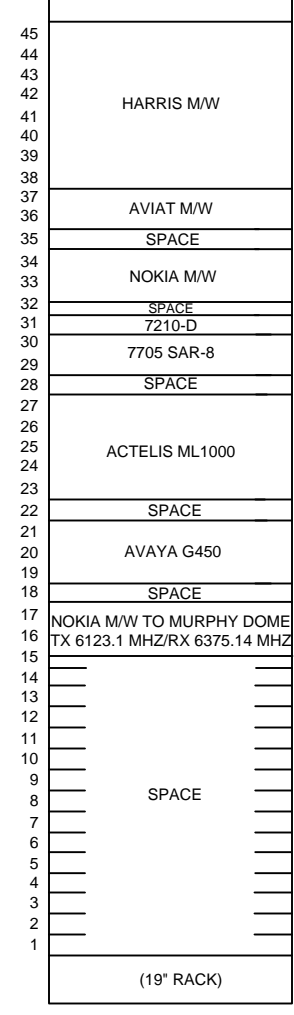




RACK #1



RACK #2



RACK #3

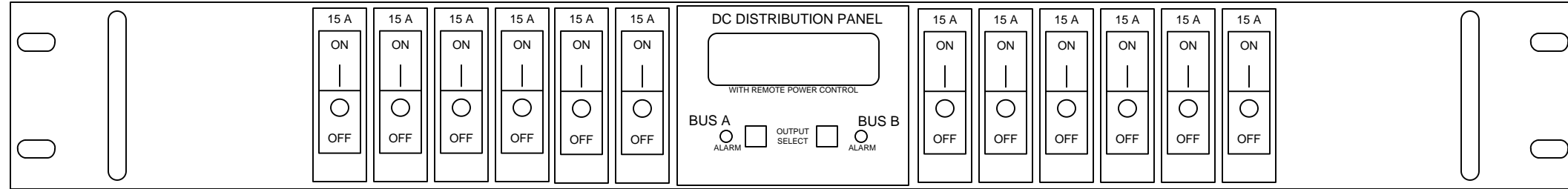
**FAIRBANKS
WATER TANK
Rack Profiles**

DWG REV: 0
SHEET: 1 of 1

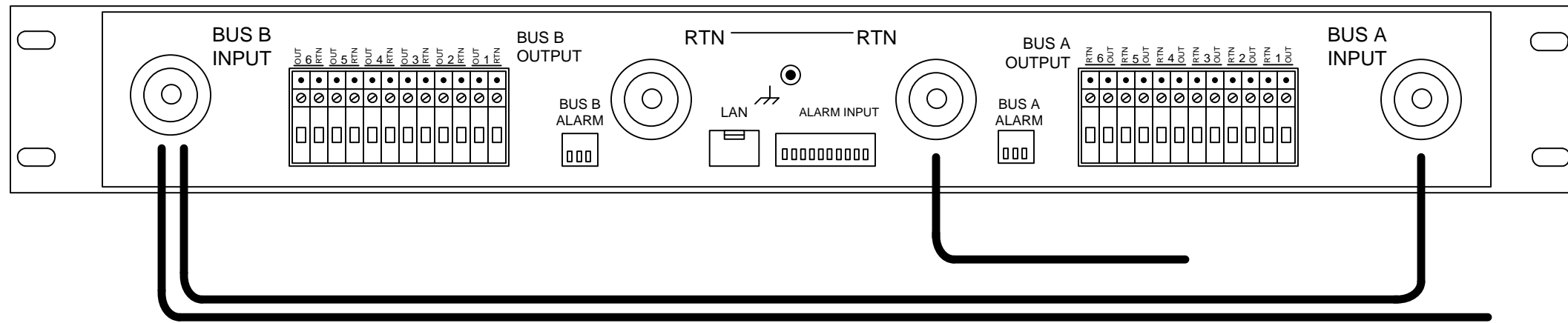
REV.	DATE	REVISION DESCRIPTION	DRAWN	ENGR.
0	4/30/18		SUMMIT	SUMMIT



FRONT VIEW



REAR VIEW



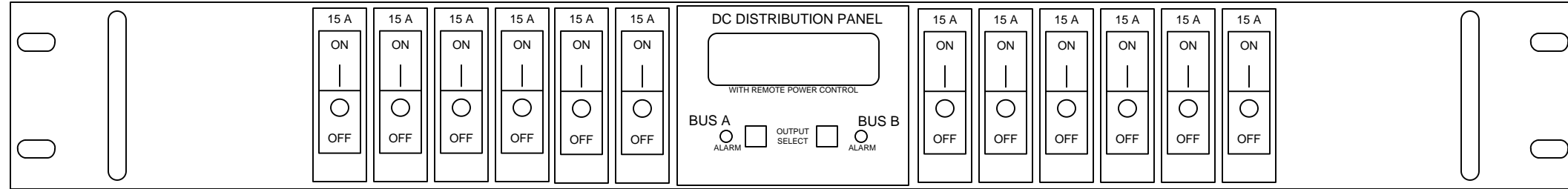
TERMINAL	AMPS	DESTINATION	TERMINAL	AMPS	DESTINATION
A1	+ -	15	B1	+ -	15
A2	+ -	5	B2	+ -	NOKIA M/W – MAIN
A3	+ -	15	B3	+ -	
A4	+ -	5	B4	+ -	
A5	+ -	5	B5	+ -	
A6	+ -	15	B6	+ -	

REV.	DATE	REVISION DESCRIPTION	DRAWN	ENGR.
0	4/30/18		SUMMIT	SUMMIT
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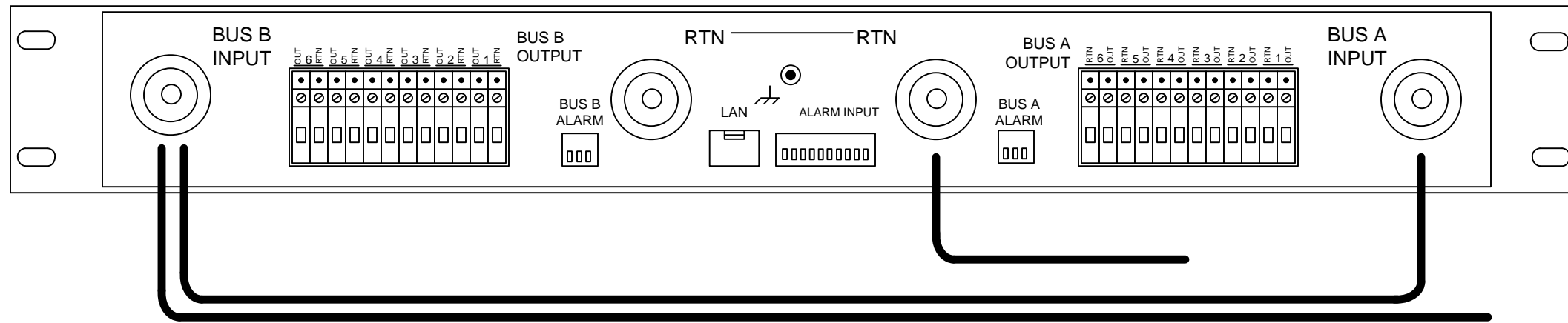
DWG REV: 0
SHEET: 1 of 1

**FAIRBANKS
-48 VDC BREAKER PANEL A
WIRING DIAGRAM
(RACK 1-POS 31)**

FRONT VIEW



REAR VIEW

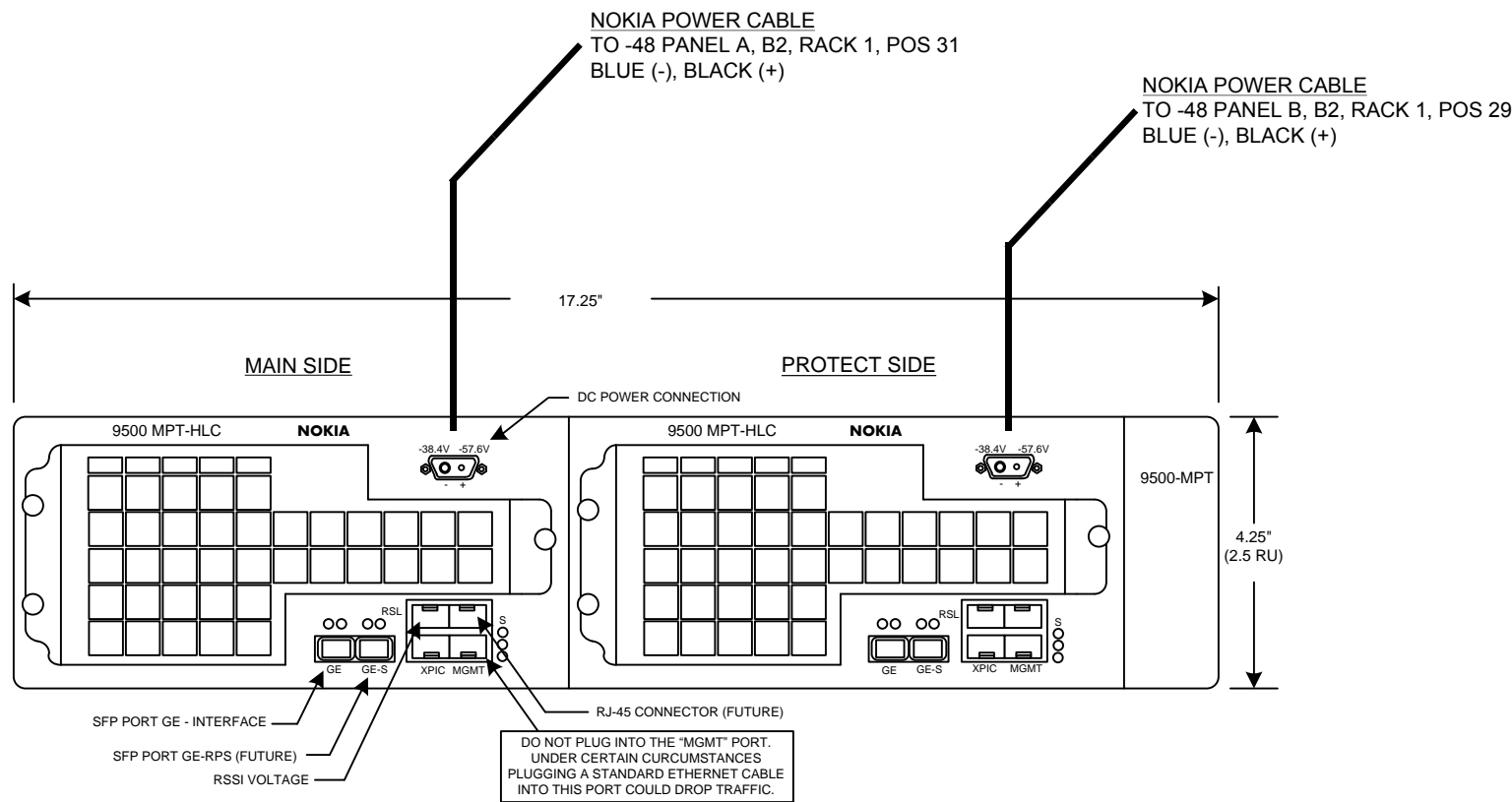


TERMINAL	AMPS	DESTINATION	TERMINAL	AMPS	DESTINATION
A1	+ -	15	B1	+ -	15
A2	+ -	5	B2	+ -	NOKIA M/W – PROTECT
A3	+ -	15	B3	+ -	
A4	+ -		B4	+ -	
A5	+ -		B5	+ -	
A6	+ -		B6	+ -	

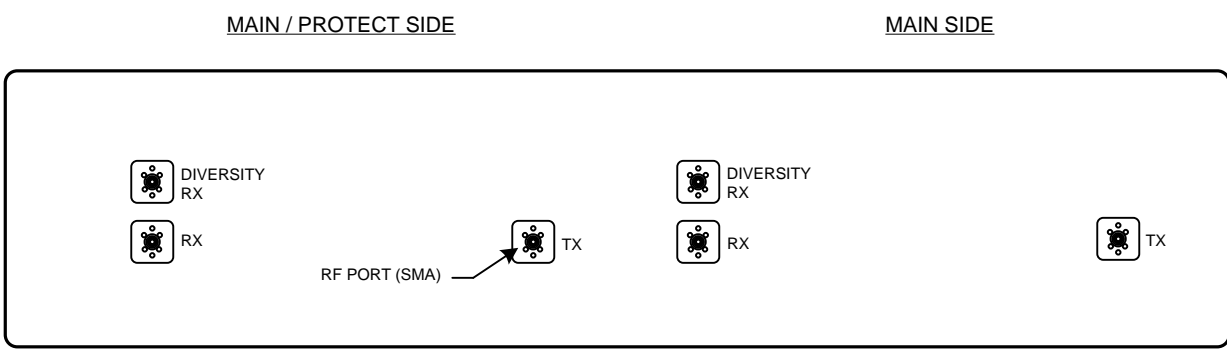
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0	4/30/18		SUMMIT	SUMMIT
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DWG REV: 0
SHEET: 1 of 1

**FAIRBANKS
-48 VDC BREAKER PANEL B
WIRING DIAGRAM
(RACK 1-POS 29)**



FRONT VIEW



REAR VIEW

RADIO MODEL
WVCE61-L1-512F30S-205-31.5-HS

FREQUENCIES
TX: 6123.1 MHZ / RX: 6375.14 MHZ

TABLE #1
WIRING FOR MPT-HLC POWER CABLE

FUSE PANEL	WIRE COLOR
BATTERY +	BLACK
BATTERY -	BLUE
SHIELD GND	GRN/YEL

TABLE #2
WIRING FOR MPT-HLC RSL CABLE

SIGNAL	RJ-45 PIN	WIRE CLR
RX POWER MAIN	6	RED
GND	7	BLACK
RX POWER DIVERSITY	8	BLUE

PROVIDES RJ-45 TO BANANA PLUG

TABLE #3
RSL / RSSI USING MPT-HLC RSL CONNECTOR

RSSI VOLTAGE (Vdc)	4.94	4.31	3.72	3.10	2.46	1.86	1.25	0.62	0.26
RSL (dBm)	-20	-30	-40	-50	-60	-70	-80	-90	-100

A HIGHER RSSI EQUALS A HIGHER RSL

REV.	DATE	REVISION DESCRIPTION	DRAWN	ENGR.
0	4/30/18		SUMMIT	SUMMIT

DWG REV: 0
SHEET: 1 of 1

FAIRBANKS
Nokia 9500 MPT-HLC (Rack 3)
RADIO TO MURPHY DOME



Path Data Sheet

812 Lexington Dr
Plano, Texas 75075
www.micronetcom.com

Phone: 972-422-7200
Fax: 972-422-1900
epcn@micronetcom.com

File: M1811330 - 1

Updated PCN Major - Date: May 30, 2018

Site Name, State		Ester Dome, AK	Murphy Dome, AK
Call Sign / Status		/ License	/ License
Company Name(s):		Alaska Railroad Corporation	Alaska Railroad Corporation
FRN / Radio Service		0001573419 / MG	0001573419 / MG
City / County		Fairbanks / Fairbanks North	FAIRBANKS / Fairbanks North
Latitude	N(NAD 83)	64 52 30.4	64 57 35.8
Longitude	W(NAD 83)	148 03 57.8	148 13 53.4
Azimuth	(degrees)	320.5	140.3
Elevation	AMSL(ft/m)	<u>2364.5 / 720.7</u>	<u>2065.9 / 629.7</u>
ASR#			
Distance	(miles/km)	7.63 / 12.28	

Transmit Receive Antenna		COMMSCOPE	COMMSCOPE
Antenna Model		HP4-107B	HP4-107B
Gain / Beamwidth	(dBi/deg)	40.4 / 1.6	40.4 / 1.6
Antenna Height	AGL(ft/m)	35.0 / 10.7	73.0 / 22.3
Tilt	(degrees)	-0.412	0.329

Equipment		NOKIA	NOKIA
Equipment Model		WVCE11-L(2)-1024F40S-294 HP	WVCE11-L(2)-1024F40S-294 HP
Stability	(%)	0.001	0.001
ATPC / Trigger Level	(dBm)	No	No
Fixed Losses Cm,Tx,Rx	(dB)	7.3,0.0,0.0	7.8,0.0,0.0

Transmit Frequencies (MHz)			11465V			10975V				
Emissions			Ester Dome, AK			Murphy Dome, AK				
Mod/Lvl	Designator	Traffic (kbps)	Tx Power (dBm)			EIRP (dBm)	Rx Lvl (dBm)	Tx Power (dBm)		
			nom	crd	max			nom	crd	max
QAM/1024	40M0D7W	294000	29.0			62.1	-40.5	29.0	61.6	-40.5



Path Data Sheet

812 Lexington Dr
Plano, Texas 75075
www.micronetcom.com

Phone: 972-422-7200
Fax: 972-422-1900
epcn@micronetcom.com

File: W1811330 - 1

Updated PCN Major - Date: May 30, 2018

Site Name, State		AKRR Fairbanks WT, AK	Murphy Dome, AK
Call Sign / Status		WQHN788 / License	/ License
Company Name(s):		Alaska Railroad Corporation	Alaska Railroad Corporation
FRN / Radio Service		0001573419 / MG	0001573419 / MG
City / County		Fairbanks / Fairbanks North	FAIRBANKS / Fairbanks North
Latitude	N(NAD 83)	64 50 53.9	64 57 35.8
Longitude	W(NAD 83)	147 44 38.3	148 13 53.4
Azimuth	(degrees)	298.6	118.1
Elevation	AMSL(ft/m)	433.1 / 132.0	<u>2065.9 / 629.7</u>
ASR#			
Distance	(miles/km)	16.3 / 26.23	

Transmit Receive Antenna		COMMSCOPE	COMMSCOPE
Antenna Model		HP6-59WC	HP8-59WA
Gain / Beamwidth	(dBi/deg)	39.4 / 1.8	41.9 / 1.4
Antenna Height	AGL(ft/m)	105.0 / 32.0	92.0 / 28.0
Tilt	(degrees)	0.99	-1.167

Equipment		NOKIA	NOKIA
Equipment Model		WVCE61-L(1)-512A30S-206 SP	WVCE61-L(1)-512A30S-206 SP
Stability	(%)	0.001	0.001
ATPC / Trigger Level	(dBm)	No	No
Fixed Losses Cm,Tx,Rx	(dB)	6.5,0.0,0.0	5.8,0.0,0.0

Transmit Frequencies (MHz)		6123.1V	6375.14V							
Emissions			AKRR Fairbanks WT, AK	Murphy Dome, AK						
Mod/Lvl	Designator	Traffic (kbps)	Tx Power (dBm)			Tx Power (dBm)			EIRP (dBm)	Rx Lvl (dBm)
			nom	crd	max	nom	crd	max		
QAM/512	30M0D7W	206000	30.5	63.4	-37.2	30.5	66.6	-37.2		

PATH CALCULATIONS - Appendix A

Utilizing diplexer filters



	Ester Dome	Murphy Dome
Latitude	64 52 33.10 N	64 57 35.70 N
Longitude	148 04 04.40 W	148 13 53.20 W
True azimuth (°)	320.52	140.37
Vertical angle (°)	-0.41	0.33
Elevation (ft)	2363.00	2065.00
Antenna model	HP4-107 (TR)	HP4-107 (TR)
Antenna gain (dBi)	40.40	40.40
Antenna height (ft)	35.00	73.00
TX line model	EW90	EW90
TX line unit loss (dB/100 ft)	3.08	3.08
TX line length (ft)	80.00	95.00
TX line loss (dB)	2.46	2.93
Connector loss (dB)	0.50	0.50
TX filter loss (dB)	2.10	2.10
RX filter loss (dB)	2.20	2.20
Frequency (MHz)	11200.00	
Polarization	Vertical	
Path length (mi)	7.55	
Free space loss (dB)	135.15	
Atmospheric absorption loss (dB)	0.19	
Net path loss (dB)	65.23	65.23
Configuration	MHSB	MHSB
Radio model	WVCE11-L2-1024F40S-294-30-HS	WVCE11-L2-1024F40S-294-30-HS
TX power (dBm)	29.00	29.00
Emission designator	40M0D7W	40M0D7W
EIRP (dBm)	64.34	63.87
RX threshold criteria	1E-6 BER	1E-6 BER
RX threshold level (dBm)	-61.50	-61.50
Receive signal (dBm)	-36.23	-36.23
Thermal fade margin (dB)	25.27	25.27
Dispersive fade margin (dB)	47.00	47.00
Dispersive fade occurrence factor	1.00	
Effective fade margin (dB)	25.24	25.24
Climatic factor	1.00	
Terrain roughness (ft)	140.00	
C factor	0.26	
Average annual temperature (°F)	28.87	

PATH CALCULATIONS - Appendix A

Utilizing diplexer filters



	Ester Dome	Murphy Dome
Fade occurrence factor (Po)	3.164E-003	
Worst month multipath availability (%)	99.99905	99.99905
Worst month multipath unavailability (%)	0.00095	0.00095
Worst month multipath unavailability (sec)	24.87	24.87
Annual multipath availability (%)	99.99983	99.99983
Annual multipath unavailability (%)	0.00017	0.00017
Annual multipath unavailability (sec)	52.22	52.22
Annual 2 way multipath availability (%)	99.99967	
Annual 2 way multipath unavailability (%)	0.00033	
Annual 2 way multipath unavailability (sec)	104.45	
Polarization	Vertical	
Rain region	Fairbanks, Alaska	
Rain rate (mm/hr)	104.34	
Flat fade margin - rain (dB)	25.27	
Rain attenuation (dB)	25.24	
Annual rain availability (%)	99.99999	
Annual rain unavailability (min)	0.07	
Annual rain + multipath availability (%)	99.99966	
Annual rain + multipath unavailability (min)	1.81	

Multipath fading method - Vigants - Barnett

Rain fading method - Crane

PATH CALCULATIONS - Appendix A

Utilizing diplexer filters



	Fairbanks Water Tank	Murphy Dome
Latitude	64 50 54.30 N	64 57 35.70 N
Longitude	147 44 38.80 W	148 13 53.20 W
True azimuth (°)	298.54	118.09
Vertical angle (°)	0.99	-1.16
Elevation (ft)	439.00	2065.00
Antenna model	HP6-59 (TR)	HP8-59 (TR)
Antenna gain (dBi)	38.60	41.50
Antenna height (ft)	105.00	92.00
TX line model	EW63	EW63
TX line unit loss (dB/100 ft)	1.43	1.43
TX line length (ft)	180.00	115.00
TX line loss (dB)	2.57	1.64
Connector loss (dB)	0.50	0.50
TX filter loss (dB)	1.80	1.80
RX filter loss (dB)	2.10	2.10
Frequency (MHz)	6175.00	
Polarization	Vertical	
Path length (mi)	16.29	
Free space loss (dB)	136.65	
Atmospheric absorption loss (dB)	0.23	
Net path loss (dB)	65.90	65.90
Configuration	MHSB	MHSB
Radio model	WVCE61-L1-512F30S-206-31.5-HS	WVCE61-L1-512F30S-206-31.5-HS
TX power (dBm)	30.50	30.50
Emission designator	30M0D7W	30M0D7W
EIRP (dBm)	64.23	68.06
RX threshold criteria	1E-6 BER	1E-6 BER
RX threshold level (dBm)	-67.00	-67.00
Receive signal (dBm)	-35.40	-35.40
Thermal fade margin (dB)	31.60	31.60
Dispersive fade margin (dB)	52.00	52.00
Dispersive fade occurrence factor	1.00	
Effective fade margin (dB)	31.56	31.56
Climatic factor	1.00	
Terrain roughness (ft)	140.00	
C factor	0.26	
Average annual temperature (°F)	28.73	

PATH CALCULATIONS - Appendix A

Utilizing diplexer filters



	Fairbanks Water Tank	Murphy Dome
Fade occurrence factor (Po)	1.750E-002	
Worst month multipath availability (%)	99.99878	99.99878
Worst month multipath unavailability (%)	0.00122	0.00122
Worst month multipath unavailability (sec)	32.07	32.07
Annual multipath availability (%)	99.99979	99.99979
Annual multipath unavailability (%)	0.00021	0.00021
Annual multipath unavailability (sec)	67.35	67.35
Annual 2 way multipath availability (%)	99.99957	
Annual 2 way multipath unavailability (%)	0.00043	
Annual 2 way multipath unavailability (sec)	134.70	

Multipath fading method - Vigants - Barnett