

**PROJECT:** DO MACRO UPGRADE

**SITE NAME:** USWW MANITOU WATER

**SITE CASCADE:** DN14XC247

**ADDRESS:** 7353 W. HWY 24  
CASCADE, CO 80809  
EL PASO COUNTY

**LATITUDE:** 38.88689° N / 38° 53' 12.8" N

**LONGITUDE:** 104.95846° W / 104° 57' 30.5" W

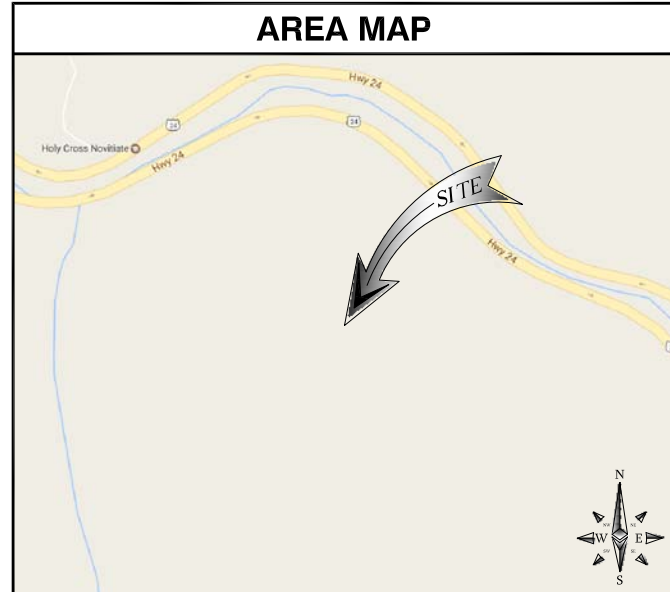
**SITE TYPE:** MONOPOLE



1387 CALLE AVANZADO  
SAN CLEMENTE CA 92673 (949) 391-6824

DRAWN BY: MB  
CHECKED BY: MM

SITE INFORMATION	
PROPERTY OWNER:	GEORGE VAHSOLTZ 7225 WEST HIGHWAY 24 MANITOU SPRINGS, CO 80829 GEORGE VAHSOLTZ
APPLICANT:	SPRINT
GROUND ELEVATION:	±7460'
LAT/LONG TYPE:	NAD-83
LATITUDE:	38.88689° N / 38° 53' 12.8" N
LONGITUDE:	104.95846° W / 104° 57' 30.5" W
ZONING JURISDICTION:	EL PASO COUNTY
ZONING CLASSIFICATION:	RESIDENTIAL - TOPOGRAPHIC (R-T)
CURRENT USE:	UNMANNED TELECOMMUNICATIONS FACILITY
ASSESSOR'S PARCEL NO.:	83264-00-018
PROPOSED USE:	UNMANNED TELECOMMUNICATIONS FACILITY
TYPE OF CONSTRUCTION:	V-B
OCCUPANCY GROUP:	U-2



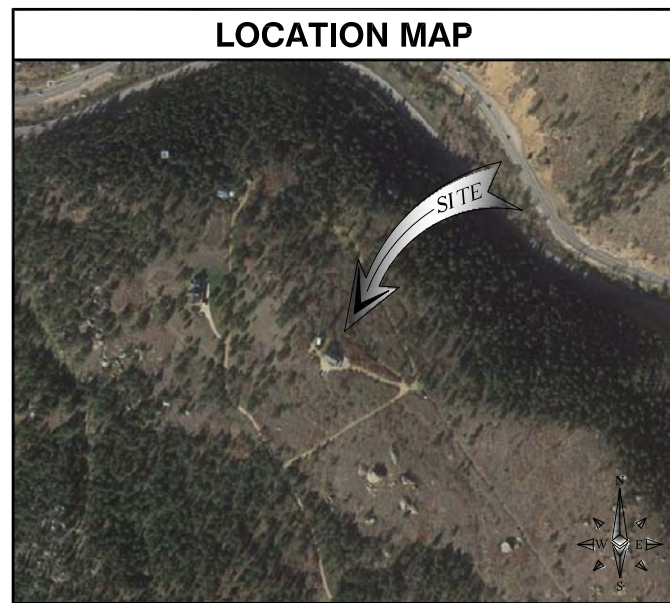
PROJECT DESCRIPTION	
SPRINT PROPOSES TO MODIFY AN EXISTING WIRELESS INSTALLATION. THE SCOPE WILL CONSIST OF THE FOLLOWING:	
• REMOVE	(2) EXISTING SPRINT PANEL ANTENNAS
• RELOCATE	(2) EXISTING SPRINT 1900 RRU'S TO ANTENNA LEVEL
• INSTALL	(1) NEW SPRINT MONOPOLE MOUNT
• INSTALL	(2) NEW SPRINT PANEL ANTENNAS
• INSTALL	(4) NEW SPRINT RRU @ ANTENNA LEVEL
• INSTALL	(2) NEW SPRINT HYBRID CABLE
• INSTALL	(2) NEW SPRINT POWER JUNCTION CYLINDERS
• INSTALL	(2) NEW SPRINT FIBER JUNCTION CYLINDERS
• INSTALL	(4) NEW SPRINT BATTERIES IN EXISTING BBU CABINET
• INSTALL	(1) NEW SPRINT 2.5GHZ BASEBAND UNIT IN EXISTING MMBS CABINET
• INSTALL	(2) NEW SPRINT QUADPLEXERS

\* NO NEW AC ELECTRICAL WORK IS INCLUDED IN THE SCOPE OF THIS PROJECT

DRAWING INDEX	
SHEET NO:	SHEET TITLE
T-1	TITLE SHEET
GN-1	GENERAL NOTES
GN-2	GENERAL NOTES
A-1	SITE PLAN
A-2	EQUIPMENT LAYOUT
A-3	ANTENNA LAYOUT
A-4	ELEVATIONS
A-5	COLOR CODING
D-1	EQUIPMENT DETAILS
D-2	EQUIPMENT DETAILS
D-3	EQUIPMENT DETAILS
E-1	GENERAL ELECTRICAL NOTES
E-2	ONE-LINE DIAGRAM
E-3	PANEL SCHEDULE
E-4	ANTENNA GROUNDING PLAN AND DIAGRAM
E-5	GROUNDING DETAILS
RF-1	RADIO FREQUENCY DATA SHEET

REV	DATE	DESCRIPTION
△	01/10/2019	100% CD - JX COMMENTS
0	12/11/2017	100% CD - BP SUBMITTAL
B	11/30/2017	90% CD'S - REVISED
A	11/2/2017	90% CD'S FOR REVIEW

PROJECT TEAM	
<b>REAL ESTATE MANAGER:</b> CONTACT: CHRISTINE POULIGNOT REAL ESTATE MANAGER - COLORADO SPRINT NEXTEL CORPORATION C/O CHRISTINE POULIGNOT MAILSTOP: COENGJ0201 333 INVERNESS DRIVE SOUTH ENGLEWOOD, CA 80112 PH: (720) 329-7993 EMAIL: christine.poullignot@sprint.com	<b>ENGINEER:</b> M SQUARED WIRELESS 1387 CALLE AVANZADO SAN CLEMENTE, CA 92673 CONTACT: MICHAEL MONTELLO EMAIL: michael@msquaredwireless.com
<b>SITE ACQUISITION</b> M SQUARED WIRELESS CONTACT: MATTHEW BABB 1387 CALLE AVANZADO SAN CLEMENTE, CA 92673 PH: (619) 992-5561 EMAIL: matthewbabb61@gmail.com	<b>RF ENGINEER:</b> CONTACT: NEERAJ BERI PH: (440) 222-8729 EMAIL: neeraj.beri@sprint.com
	<b>CONSTRUCTION MANAGER:</b> CONTACT: BRANDON WHINERY PH: (303) 505-5750 EMAIL: brandon.whinery@sprint.com



APPLICABLE CODES	
ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:	
•	2015 INTERNATIONAL BUILDING CODE
•	2014 NATIONAL ELECTRICAL CODE
•	LOCAL BUILDING CODES
•	CITY/COUNTY ORDINANCES

APPROVALS	
THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS & AUTHORIZE THE SUBCONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT & MAY IMPOSE CHANGES OR MODIFICATIONS.	
SPRINT RF ENGINEER: _____	DATE: _____
SPRINT OPERATIONS: _____	DATE: _____
SITE ACQUISITION: _____	DATE: _____
CONSTRUCTION MANAGER: _____	DATE: _____
PROPERTY OWNER: _____	DATE: _____
ZONING: _____	DATE: _____
PROJECT MANAGER: _____	DATE: _____



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

USWW MANITOU WATER  
DN14XC247  
7353 W. HWY 24  
CASCADE, CO 80809  
MONOPOLE

GENERAL NOTES	
THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. HANDICAPPED ACCESS REQUIREMENTS ARE NOT REQUIRED IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE; NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS NEW.	

DO NOT SCALE DRAWINGS	
SUBCONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS & FIELD CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.	

SHEET TITLE  
**TITLE SHEET**

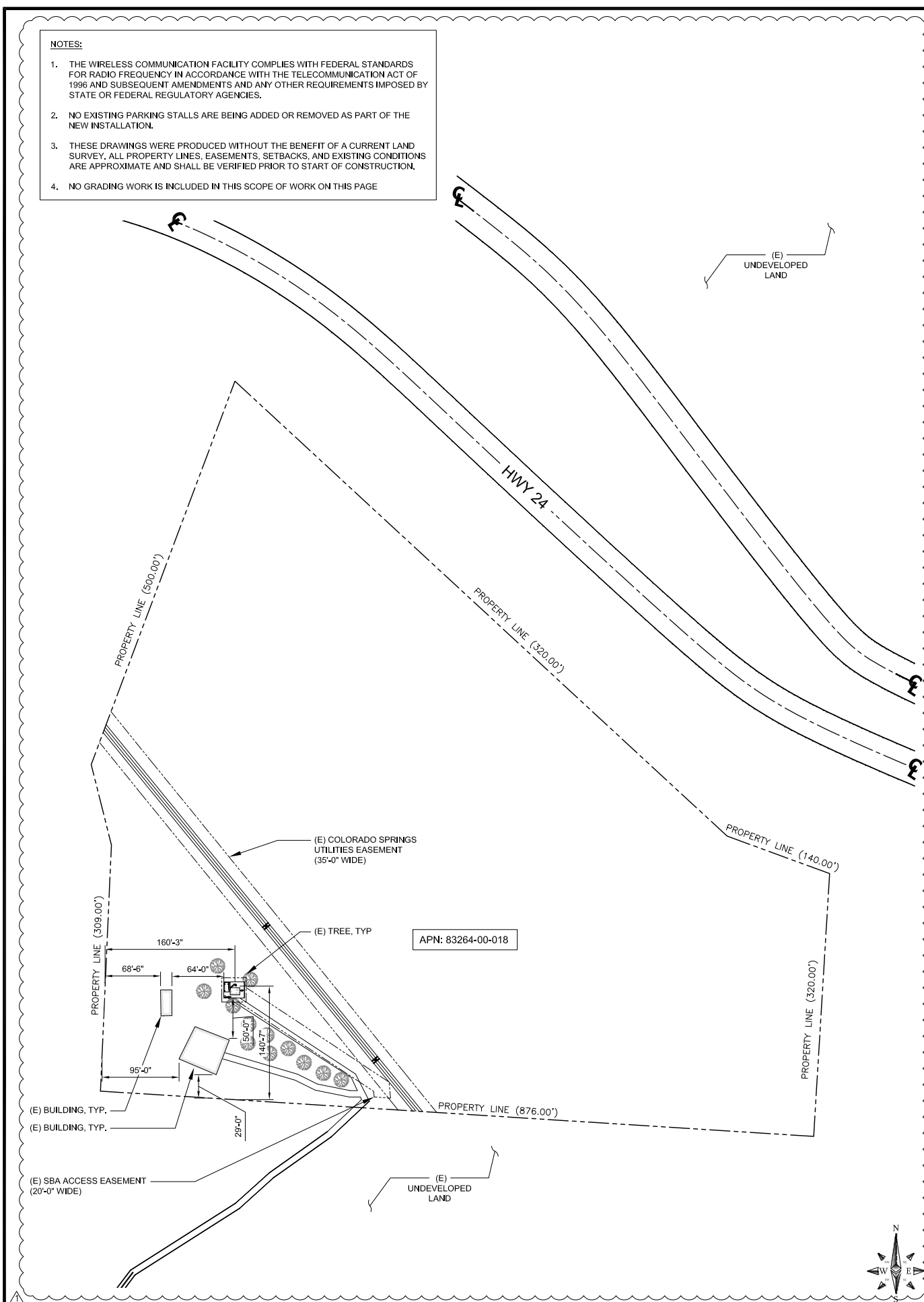
SHEET NUMBER  
**T-1**





**NOTES:**

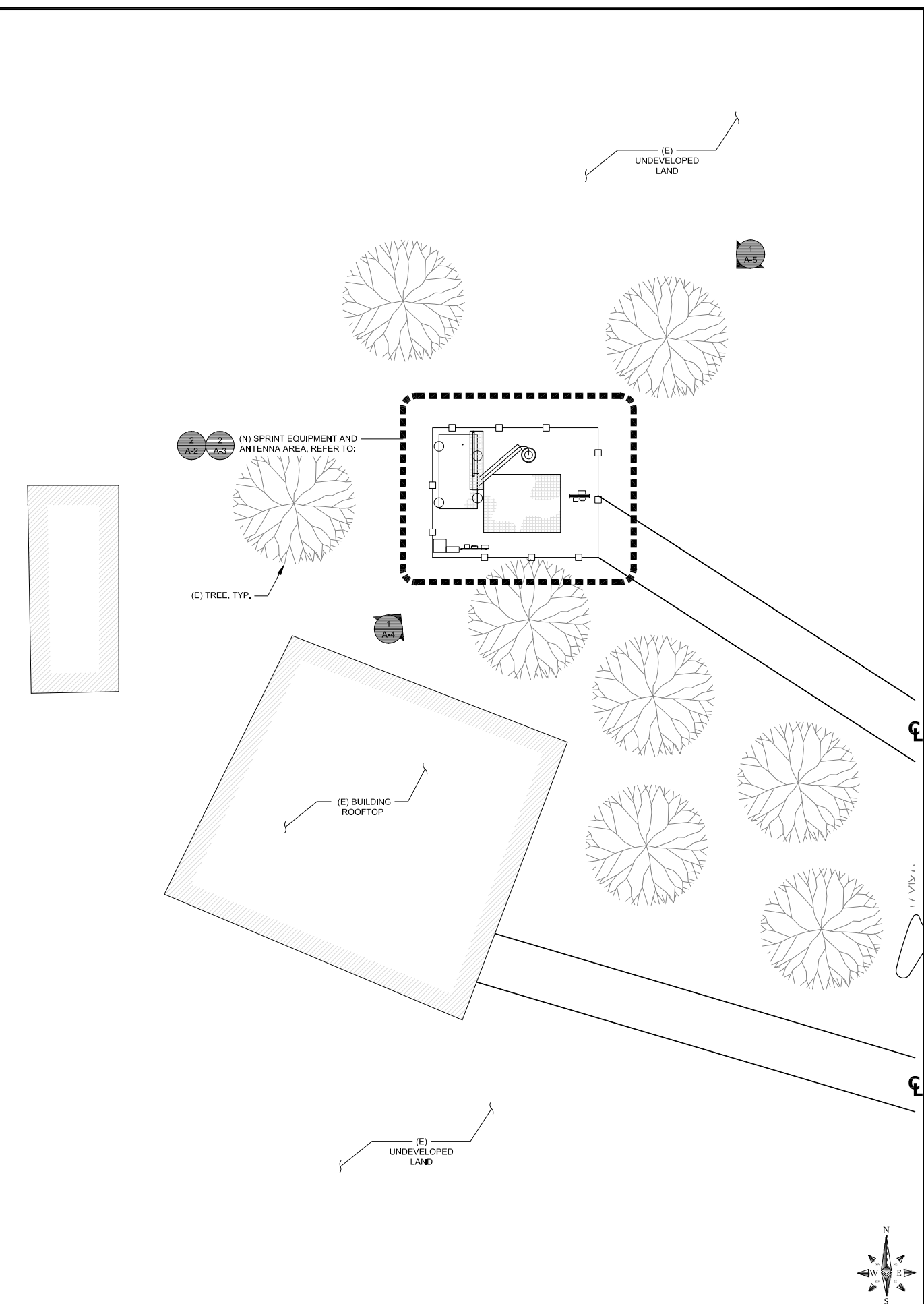
1. THE WIRELESS COMMUNICATION FACILITY COMPLIES WITH FEDERAL STANDARDS FOR RADIO FREQUENCY IN ACCORDANCE WITH THE TELECOMMUNICATION ACT OF 1996 AND SUBSEQUENT AMENDMENTS AND ANY OTHER REQUIREMENTS IMPOSED BY STATE OR FEDERAL REGULATORY AGENCIES.
2. NO EXISTING PARKING STALLS ARE BEING ADDED OR REMOVED AS PART OF THE NEW INSTALLATION.
3. THESE DRAWINGS WERE PRODUCED WITHOUT THE BENEFIT OF A CURRENT LAND SURVEY. ALL PROPERTY LINES, EASEMENTS, SETBACKS, AND EXISTING CONDITIONS ARE APPROXIMATE AND SHALL BE VERIFIED PRIOR TO START OF CONSTRUCTION.
4. NO GRADING WORK IS INCLUDED IN THIS SCOPE OF WORK ON THIS PAGE.



**SITE PLAN**

24"x36" SCALE: 1" = 80'-0"  
11"x17" SCALE: 1" = 160'-0"

**ENLARGED SITE PLAN**



24"x36" SCALE: 1" = 10'-0"  
11"x17" SCALE: 1" = 20'-0"



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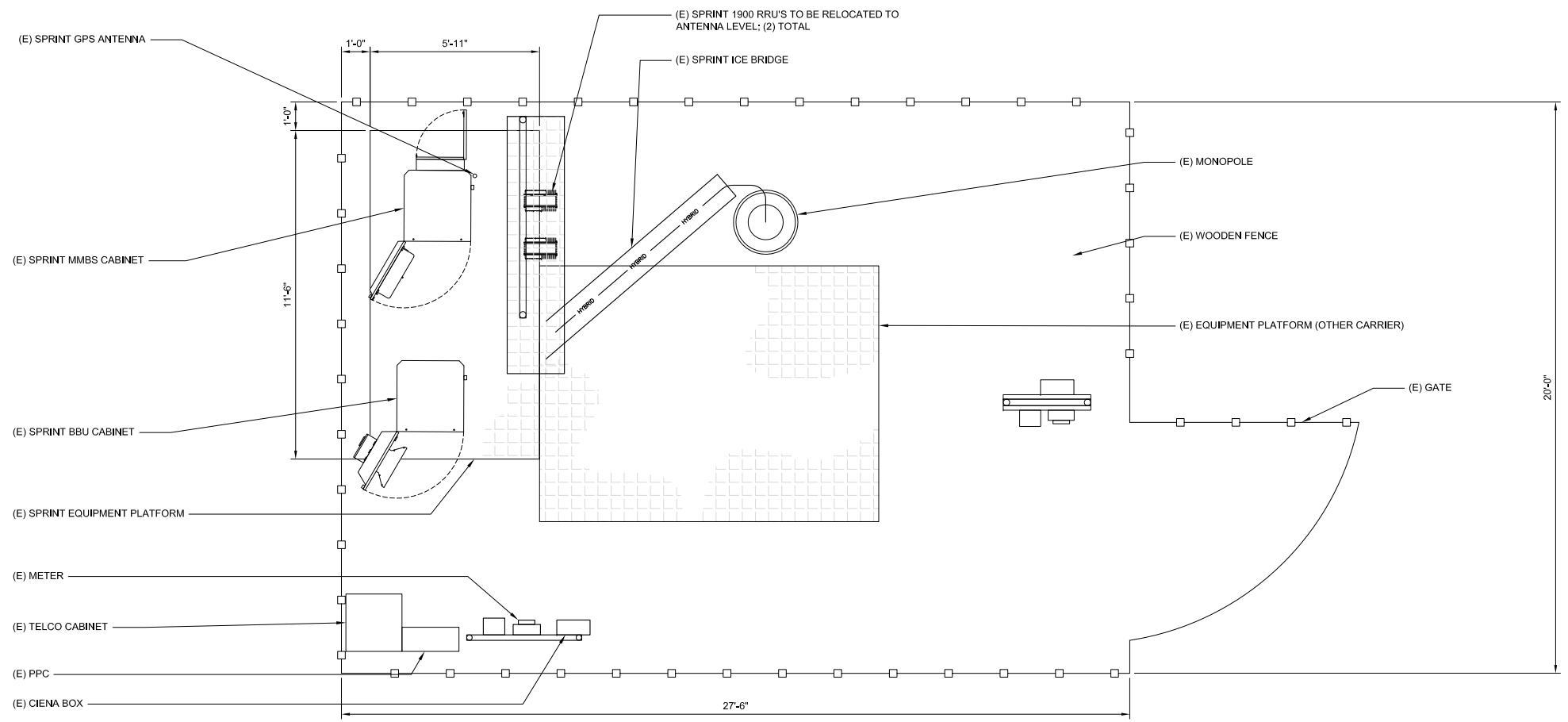
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SHEET TITLE  
**SITE PLAN**

SHEET NUMBER  
**A-1**

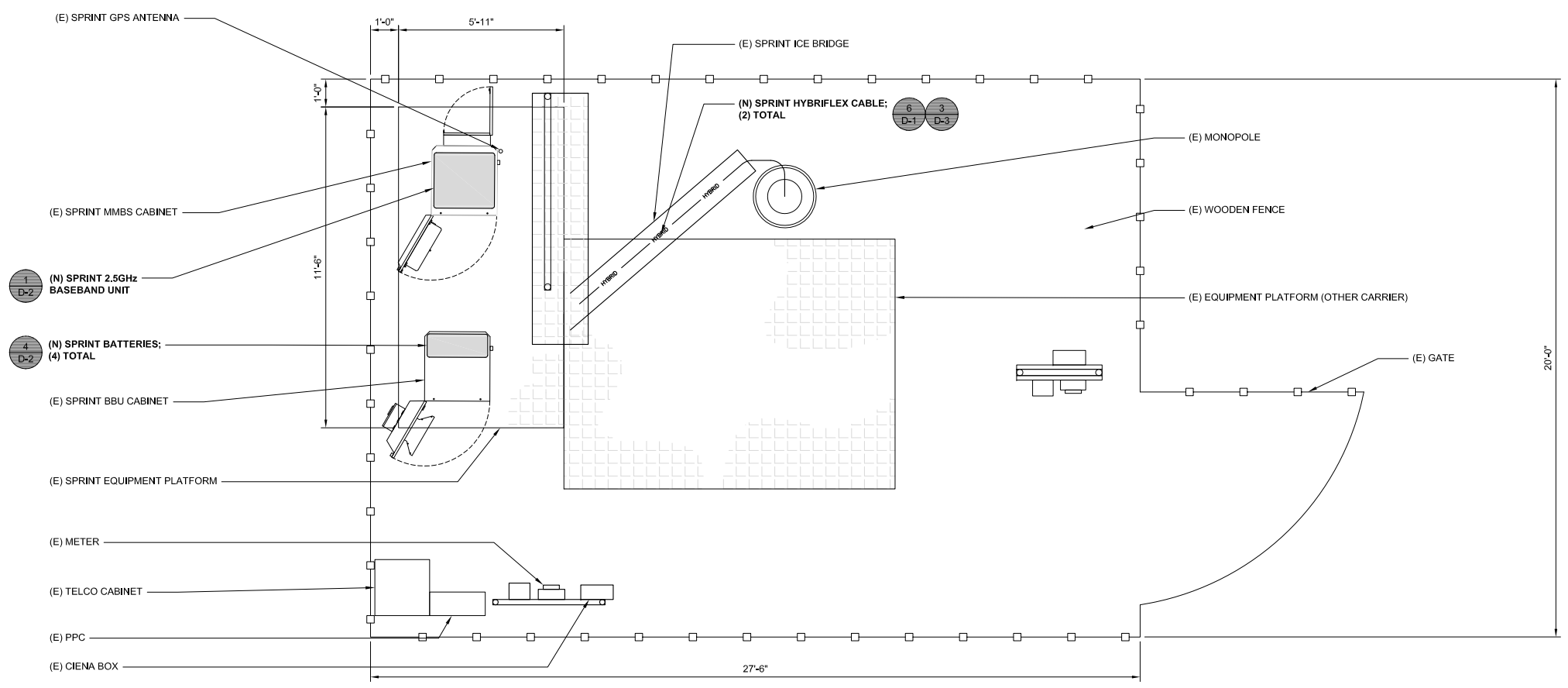
NOTE:  
ANTENNAS NOT SHOWN FOR CLARITY.



**EXISTING EQUIPMENT LAYOUT**

24"x36" SCALE: 3/8" = 1'-0"  
11"x17" SCALE: 3/4" = 1'-0" 0' 1' 2' 4' 1

NOTE:  
ANTENNAS NOT SHOWN FOR CLARITY.



**PROPOSED EQUIPMENT LAYOUT**

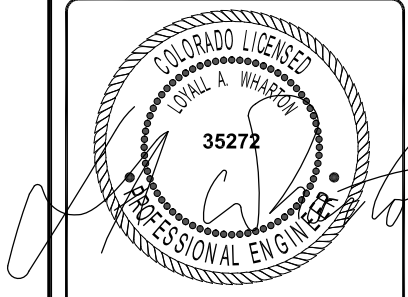
24"x36" SCALE: 3/8" = 1'-0"  
11"x17" SCALE: 3/4" = 1'-0" 0' 1' 2' 4' 2



**M SQUARE WIRELESS**  
1387 CALLE AVANZADO  
SAN CLEMENTE CA 92673 (949) 391-6824

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SHEET TITLE  
**EQUIPMENT LAYOUT**

SHEET NUMBER  
**A-2**

**NOTE:**

- M. SQUARED ENGINEERS ACCEPTS NO LIABILITY FOR THE STRUCTURAL CAPACITY OF THE TOWER STRUCTURE, MOUNTS, ANTENNAS, CABLES OR ANY OTHER APPURTENANCE ON THE TOWER. THE CONTRACTOR AND SUBCONTRACTOR SHALL COORDINATE WITH AND COMPLY WITH THE PROVISIONS OF THE STRUCTURAL ANALYSIS PREPARED FOR THIS SITE AND PROJECT PRIOR TO THE INSTALLATION OF ANTENNAS AND CABLE ON THE TOWER, IMMEDIATELY REPORT ANY DISCREPANCIES BETWEEN THE CONSTRUCTION DRAWINGS AND THE STRUCTURAL ANALYSIS TO SPRINT. REFER TO THE STRUCTURAL ANALYSIS AND/OR STRUCTURAL LETTER FOR THE APPROVAL OF ALL MODIFICATIONS TO AND ADDING EQUIPMENT OF NEW TOWER APPURTENANCES.
- REFER TO ADDITIONAL DRAWINGS SPECIFIC TO TOWER REINFORCEMENT FOR THIS SITE SHOULD THERE BE A REQUIREMENT FOR ANY TOWER REINFORCEMENT.
- REFER TO STRUCTURAL ANALYSIS FOR COAXIAL AND OTHER CABLE SUPPORT AND CONFIGURATION DETAIL.
- REFER TO STRUCTURAL ANALYSIS FOR ALL CARRIERS APPURTENANCES AS THEY MAY NOT BE SHOWN IN ELEVATION DETAIL.

ANTENNA POSITION	REMOTE RADIO UNITS		DC CABLES	
	RRUS MAKE AND MODEL	RRUS COUNT	LENGTH	AWG
1	(N) 2500MHz RRU	1	±75'	--
2	(N) 800MHz RRU	1	±75'	--
3	(E)1900MHz RRU	1	±75'	--
4	--	--	--	--
1	(N) 2500MHz RRU	1	±75'	--
2	(N) 800MHz RRU	1	±75'	--
3	(E)1900MHz RRU	1	±75'	--
4	--	--	--	--

ANTENNA POSITION	NEW OPTIMAL ANTENNA REQUIREMENTS (VERIFY WITH CURRENT RFDS)		ANTENNA MAKE AND MODEL		RAD CENTER		AZIMUTH		TRANSMISSION LINE		
	TECHNOLOGY	ANTENNA COUNT	EXISTING	NEW	EXISTING	NEW	EXISTING	NEW	CABLE LENGTH	CABLE QTY.	FEEDER TYPE
	1	800/1900MHz 2500MHz	1	GENERIC SPRINT ANTENNA	HPA65R-KE4A-K	58'-0"	58'-0"	320'	325'	±10'	10
2	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--
1	800/1900MHz 2500MHz	1	GENERIC SPRINT ANTENNA	HPA65R-KE4A-K	58'-0"	58'-0"	120'	125'	±10'	10	JUMPERS
2	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--

**NOTES TO CONTRACTOR:**

- CONTRACTOR IS TO REFER TO SPRINT'S MOST CURRENT RADIO FREQUENCY DATA SHEET (RFDS) PRIOR TO CONSTRUCTION
- CABLE LENGTHS WERE DETERMINED BASED ON VISUAL INSPECTION DURING SITE-WALK. CONTRACTOR TO VERIFY ACTUAL LENGTH DURING PRE-CONSTRUCTION WALK
- CONTRACTOR TO VERIFY PORTS HAVE SUFFICIENT ROOM

**NOTE:**

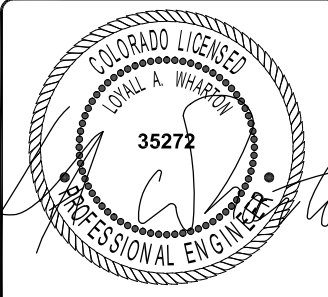
- (E) ANTENNA AZIMUTHS ARE ESTIMATED AND ARE TO BE VERIFIED BY RF.
- ALL NEW FIBER/CABLE RUNS TO UTILIZE (E) CONDUIT PATHS PREVIOUSLY ESTABLISHED WITHIN A PRE-APPROVED ACCESS/UTILITY ROUTE.



**M SQUARED WIRELESS**  
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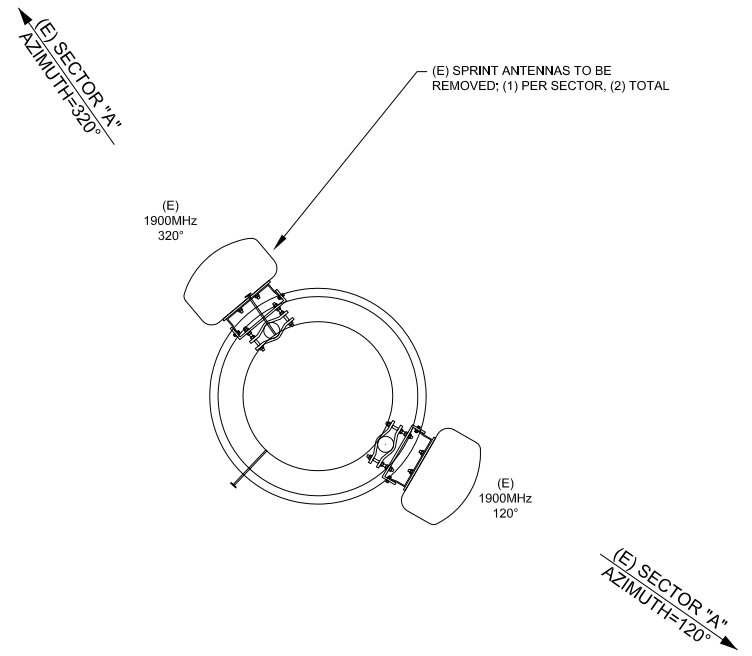
USWW MANITOU WATER  
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SHEET TITLE  
**ANTENNA LAYOUT**

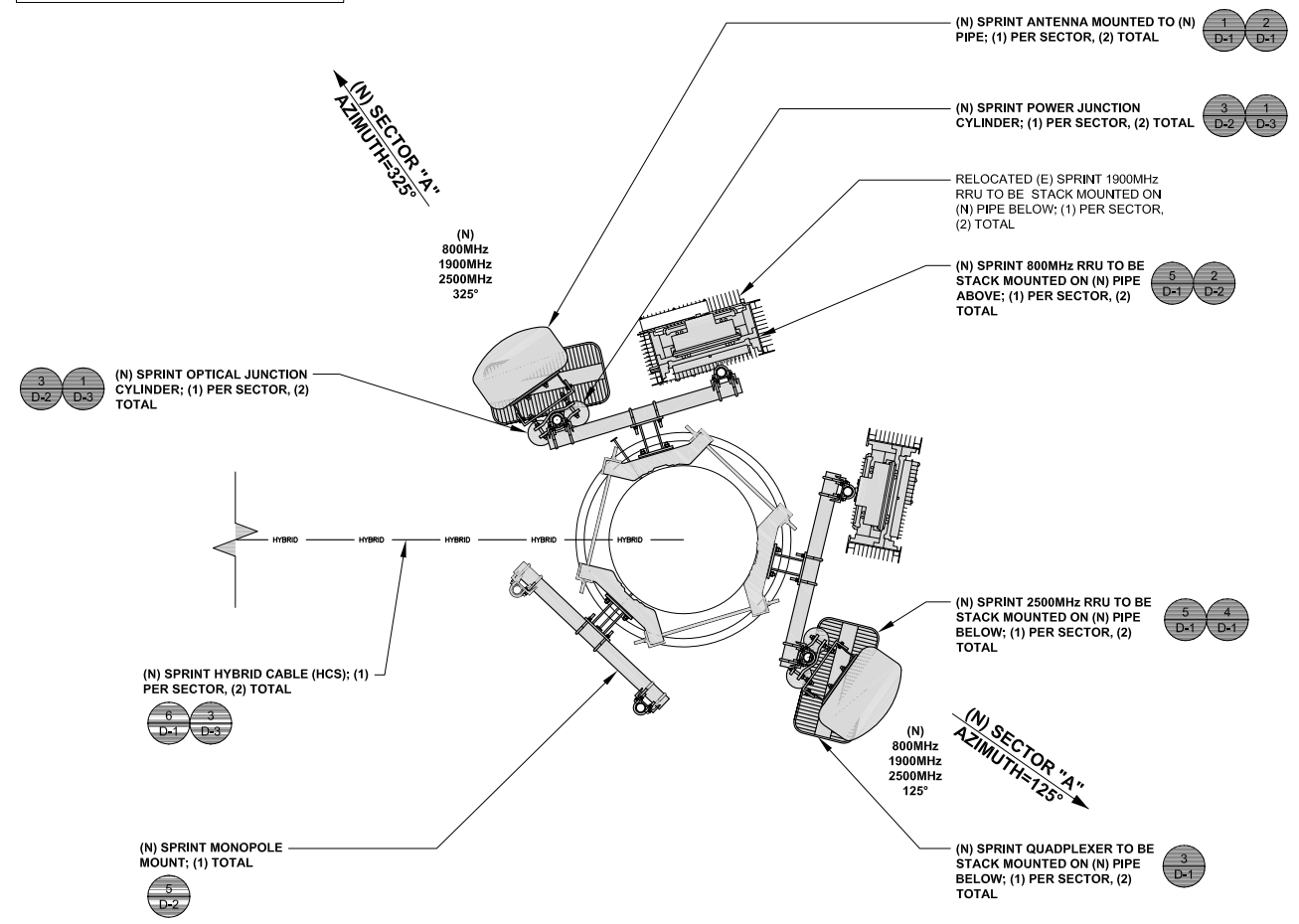
SHEET NUMBER  
**A-3**

**NOTES**

**NOTE:**  
 GROUND EQUIPMENT NOT SHOWN FOR CLARITY.



**NOTE:**  
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**EXISTING ANTENNA LAYOUT**

24"x36" SCALE: 1" = 1'-0"  
 11"x17" SCALE: 2" = 1'-0"

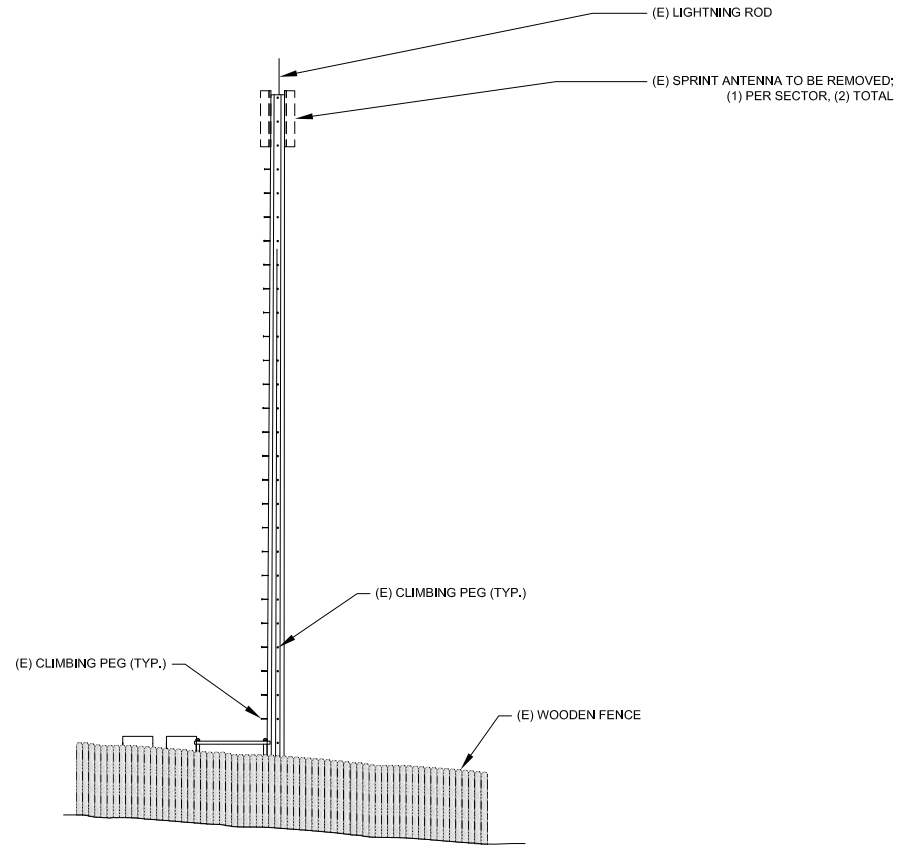
**PROPOSED ANTENNA LAYOUT**

24"x36" SCALE: 1/4" = 1'-0"  
 11"x17" SCALE: 1/2" = 1'-0"



TOP OF (E) SPRINT PANEL ANTENNAS  
 ELEV. 60'-4" AGL  
 TOP OF (E) MONOPOLE  
 ELEV. 60'-0" AGL  
 RAD CENTER OF (E) SPRINT PANEL ANTENNAS  
 ELEV. 58'-0" AGL

(E) EQUIPMENT PLATFORM LEVEL  
 ELEV. ±1'-6" AGL  
 GROUND LEVEL  
 ELEV. 0'-0" AGL

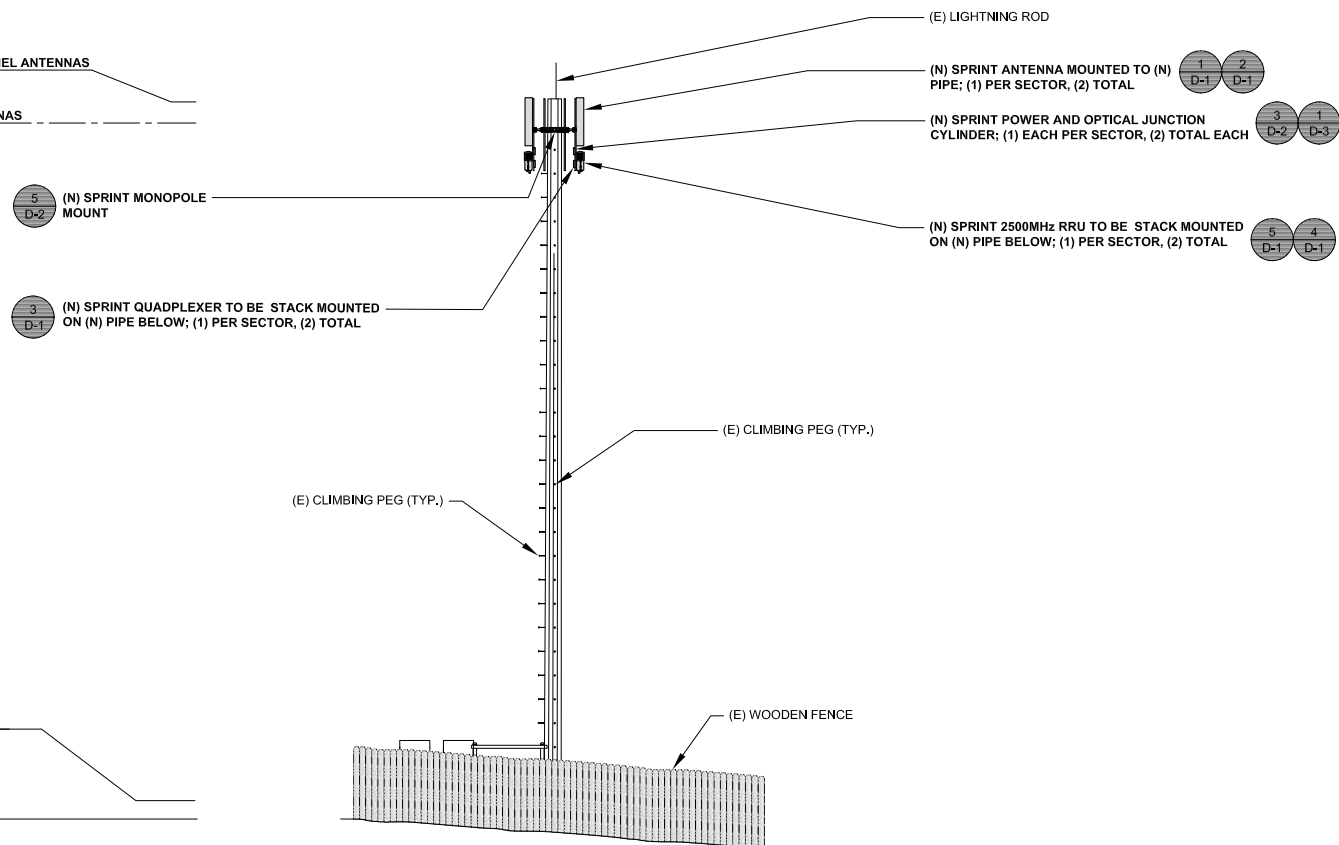


**EXISTING SOUTHWEST ELEVATION**

24"x36" SCALE: 1/8" = 1'-0"  
 11"x17" SCALE: 1/4" = 1'-0"

TOP OF (E) MONOPOLE AND (N) SPRINT PANEL ANTENNAS  
 ELEV. 60'-0" AGL  
 RAD CENTER OF (N) SPRINT PANEL ANTENNAS  
 ELEV. 58'-0" AGL

(E) EQUIPMENT PLATFORM LEVEL  
 ELEV. ±1'-6" AGL  
 GROUND LEVEL  
 ELEV. 0'-0" AGL



**PROPOSED SOUTHWEST ELEVATION**

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SHEET TITLE  
**ELEVATIONS**

SHEET NUMBER  
**A-4**

Frequency / Radio	Indicator	ID
800 #1	Yellow	Green
1900 #1	Yellow	Red
1900 #2	Yellow	Brown
1900 #3	Yellow	Blue
1900 #4	Yellow	Grey
800 #2	Yellow	Orange
2500 #1	Yellow	White
2500 #2	Yellow	Purple

**TECHNOLOGY COLOR CODING**

24"x36" SCALE: NTS  
11"x17" SCALE: NTS **1**

2500MHz #1 Cal Cable - Sector	Cable	First Ring	Second Ring	Third Ring	Forth Ring	Fifth Ring	Sixth Ring
1 Alpha	1	Yellow		Yellow	White		
2 Beta	2	Yellow	Yellow		Yellow	White	
3 Gamma	3	Yellow	Yellow	Yellow		Yellow	White

2500MHz #2 Cal Cable - Sector	Cable	First Ring	Second Ring	Third Ring	Forth Ring	Fifth Ring	Sixth Ring
1 Alpha	1	Yellow		Yellow	Purple		
2 Beta	2	Yellow	Yellow		Yellow	Purple	
3 Gamma	3	Yellow	Yellow	Yellow		Yellow	Purple

**2500 MHz RADIO CALIBRATION CABLE COLOR CODING**

24"x36" SCALE: NTS  
11"x17" SCALE: NTS **2**

Sector	Cable	First Ring	Second Ring	Third Ring
1 Alpha	1	Green	No Tape	No Tape
1	2	Blue	No Tape	No Tape
1	3	Brown	No Tape	No Tape
1	4	White	No Tape	No Tape
1	5	Red	No Tape	No Tape
1	6	Grey	No Tape	No Tape
1	7	Purple	No Tape	No Tape
1	8	Orange	No Tape	No Tape
2 Beta	1	Green	Green	No Tape
2	2	Blue	Blue	No Tape
2	3	Brown	Brown	No Tape
2	4	White	White	No Tape
2	5	Red	Red	No Tape
2	6	Grey	Grey	No Tape
2	7	Purple	Purple	No Tape
2	8	Orange	Orange	No Tape
3 Gamma	1	Green	Green	Green
3	2	Blue	Blue	Blue
3	3	Brown	Brown	Brown
3	4	White	White	White
3	5	Red	Red	Red
3	6	Grey	Grey	Grey
3	7	Purple	Purple	Purple
3	8	Orange	Orange	Orange

**HYBRID CABLE COLOR CODING**

24"x36" SCALE: NTS  
11"x17" SCALE: NTS **3**



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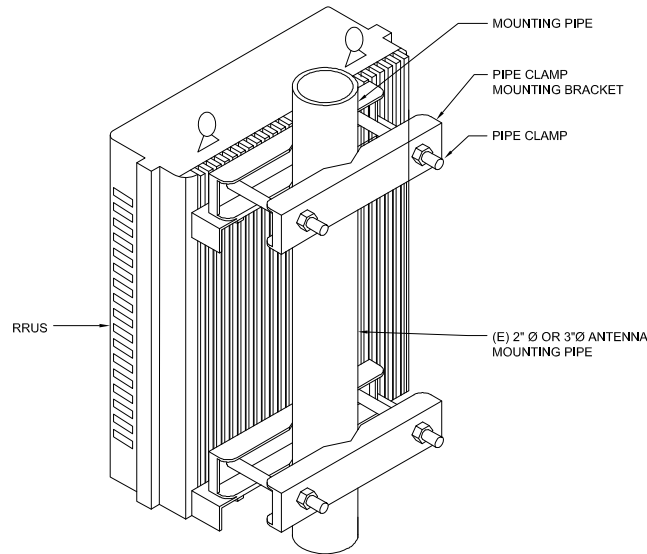
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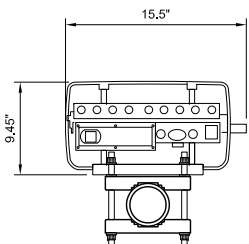
SHEET TITLE  
**COLOR CODING**

SHEET NUMBER  
**A-5**

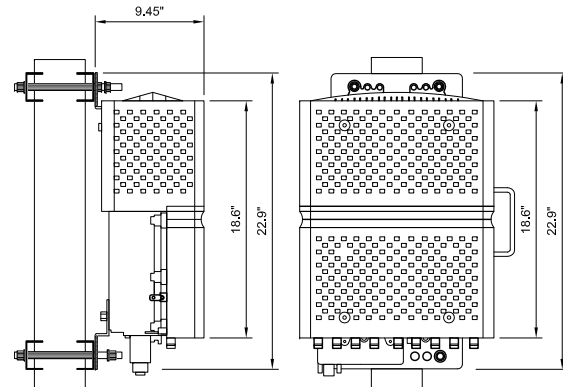




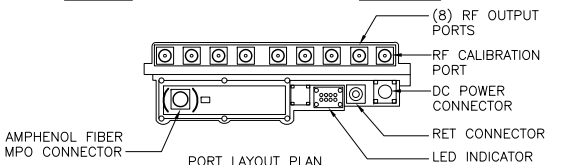
**SAMSUNG 2.5 GHz RRH**  
 MANUFACTURER: SAMSUNG  
 DIMENSIONS, HxWxD: 18.6"x15.5"x9.45"  
 WEIGHT: 59.5lbs.  
 WEIGHT W/ BRACKET: 71.8 LBS.



BOTTOM VIEW



FRONT VIEW



PORT LAYOUT PLAN

**NOTES:**  
 COMPLY WITH MANUFACTURER'S INSTRUCTIONS TO ENSURE THAT ALL RRH'S RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING. DO NOT OPEN RRH PACKAGES IN THE RAIN.

**(N) AND (E) RRUS MOUNTING DETAIL**

24"x36" SCALE: NTS  
 11"x17" SCALE: NTS

5

**(N) 2500 MHZ RRU**

24"x36" SCALE: NTS  
 11"x17" SCALE: NTS

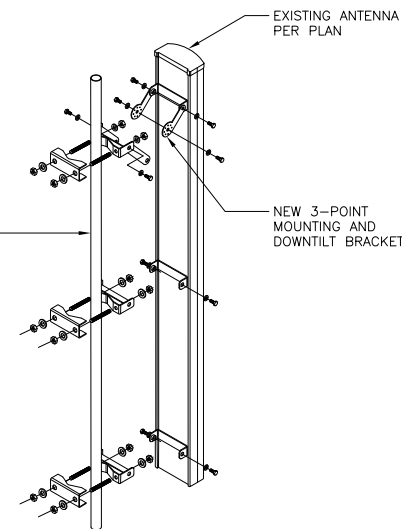
4

**(N) ANTENNA MOUNTING**

24"x36" SCALE: NTS  
 11"x17" SCALE: NTS

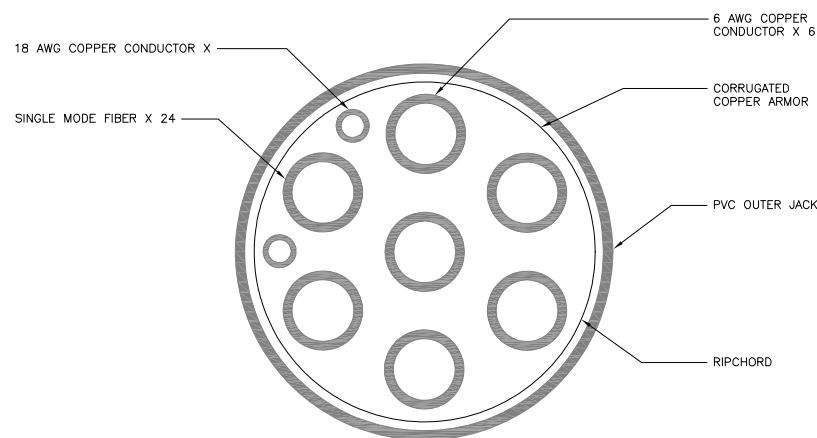
1

3"-4 1/2" ANTENNA PIPE MAST PER PLAN  
 EXISTING ANTENNA PER PLAN  
 NEW 3-POINT MOUNTING AND DOWNTILT BRACKET



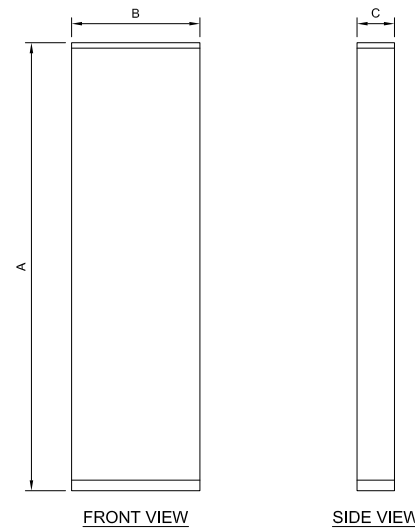
**NOTE:**  
 TOP BRACKET MAY BE VALMONT MODEL DB380  
 ALSO IF NO DOWNTILT OF ANTENNA IS REQUIRED.

CABLE TYPE	NUMBER, SIZE (AWG)	6/C #6 + 2/C #18
VOLTAGE		600
OUTER JACKET		PVC
SHIELDING		CORRUGATED COPPER
MAX SHIELDING RESISTANCE (OHM/FT @ 20 C)		0.0035
DRAIN		N/A
RIPCHORD		KEVLAR
DC CONDUCTOR MATERIAL		COPPER
DC CONDUCTOR SIZE (AWG)		6
MAX DC RESISTANCE (OHM/1000FT)		0.411 @ 20° C
COLOR CODE		BLACK/RED
ALARM CONDUCTOR MATERIAL		COPPER
ALARM CONDUCTOR SIZE (AWG)		18
MAX DC RESISTANCE (OHM/1000FT)		6.7
COLOR CODE		TBD
FIBER CABLES		SM
OUTER DIAMETER (IN) - NOMINAL		1.24
WEIGHT (LB/FT)		1.05
MINIMUM BEND RADIUS (IN)		15
BEND MOMENT (LB/IN)		TBD
TENSIL STRENGTH (LB)		325
CRUST RESISTANCE, FOTP-41 (N/MM)		22
STRENGTH MEMBER		NO
OPERATING TEMPERATURE RANGE (LOW)		-40° C
OPERATING TEMPERATURE RANGE (HIGH)		+80° C
FIBER TYPE		LOW WATER PEAK SINGLE MODE LOOSE TUBE
FIBER STRAND COMPLIANCE		ITU-T REC. G.652.D, G657.A2
FIBER COATING DIAMETER (UM)		.242 +/- 0.007MM 0.9 +/- 0.005MM
FIBER COUNT		24
NUMBER OF FIBER SUBUNITS		.1
FIBER COUNT EACH UNITS		24
FIBER COUNT JACKETS		FR JACKET
MAX ATTENUATION, 1310 NM (DB/KM)		LESS THAN EQUA 0.5
MAX ATTENUATION, 1550 NM (DB/KM)		LESS THAN EQUA 0.5



NOTE: CABLE CROSS-SECTION NOT DRAWN TO SCALE

MANUFACTURER:		CCI	
MODEL NO.:		HPA65R-KE4A-K	
DIMENSIONS:		CONNECTOR TYPE:	TOTAL WEIGHT :
A	48"	(6) 7/16" DIN (FEMALE)	28.7 LBS
B	11.7"	CONNECTOR LOCATION:	
C	7.6"	BOTTOM	



TOP VIEW

FRONT VIEW

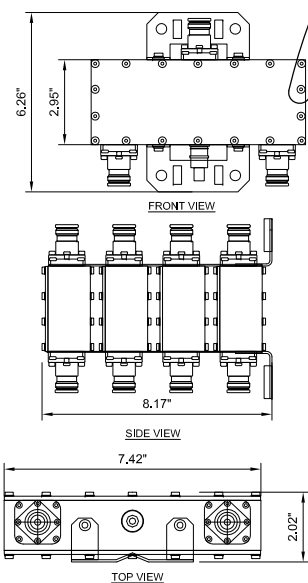
SIDE VIEW

**(N) PANEL ANTENNA**

24"x36" SCALE: NTS  
 11"x17" SCALE: NTS

2

MECHANICAL			
MODULARITY	QUAD		
WEIGHT W/ BRACKETS	14.4 LBS (6.6KG)		
	6.26X7.42X8.17 in. (159X188.5X207.4mm)		
ELECTRICAL			
RF PARAMETERS	PORTS	FREQUENCY(MHz)	SPECIFICATION
RETURN LOSS	COMMON	1695 - 2180	18 dB min, 20 dB typ
	PCS/AWS	1695 - 2180	18 dB min, 20 dB typ
	BRS	2496 - 2690	18 dB min, 20 dB typ
INSERTION LOSS	COMMON TO PCS/AWS	1695 - 2180	0.2 dB typ, 0.25dBmax
	COMMON TO BRS	2496 - 2690	0.2 dB typ, 0.25dBmax
REJECTION	COMMON TO PCS/AWS	2496 - 2690	50 dB mini
	COMMON TO BRS	1695 - 2180	50 dB mini
ISOLATION	PCS/AWS TO BRS	1695 - 2180	50 dB mini
	BRS TO PCS/AWS	2496 - 2690	50 dB mini
GENERAL CHARACTERISTICS			
General Impedance	50 ohms		
Cont. Average PWR	250 W max (input ports), 500 W maximum (Common port)		
Peak Envelope PWR	1 kW max (input ports), 3 kW maximum (Common port)		
Intermodulation	<-117 dBm (-160 dBc) at 2 x +43 dBm tones all bands		



TOP VIEW

**(N) HYBRID CABLE SPECIFICATIONS**

24"x36" SCALE: NTS  
 11"x17" SCALE: NTS

6

**(N) QUADPLEXER DPO-7126Y-0X1**

24"x36" SCALE: NTS  
 11"x17" SCALE: NTS

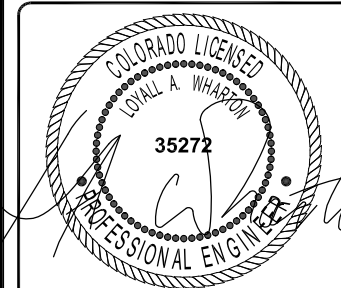
3



1387 CALLE AVANZADO  
 SAN CLEMENTE CA 92673 (949) 391-6624

DRAWN BY: MB  
 CHECKED BY: MM

REV	DATE	DESCRIPTION
0	01/10/2019	100% CD - JX COMMENTS
0	12/11/2017	100% CD - BP SUBMITTAL
B	11/30/2017	90% CD'S - REVISED
A	11/2/2017	90% CD'S FOR REVIEW



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

USWW MANITOU WATER  
 DN14XC247  
 7353 W. HWY 24  
 CASCADE, CO 80809  
 MONOPOLE

SHEET TITLE  
**EQUIPMENT DETAILS**

SHEET NUMBER  
**D-1**

DRAWN BY: MB  
CHECKED BY: MM

REV	DATE	DESCRIPTION
Δ	01/10/2019	100% CD - JX COMMENTS
0	12/11/2017	100% CD - BP SUBMITTAL
B	11/30/2017	90% CD'S - REVISED
A	11/2/2017	90% CD'S FOR REVIEW

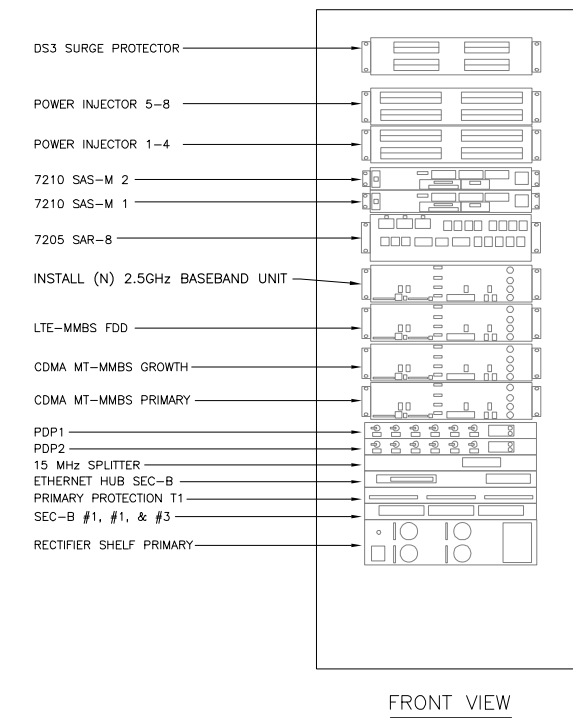
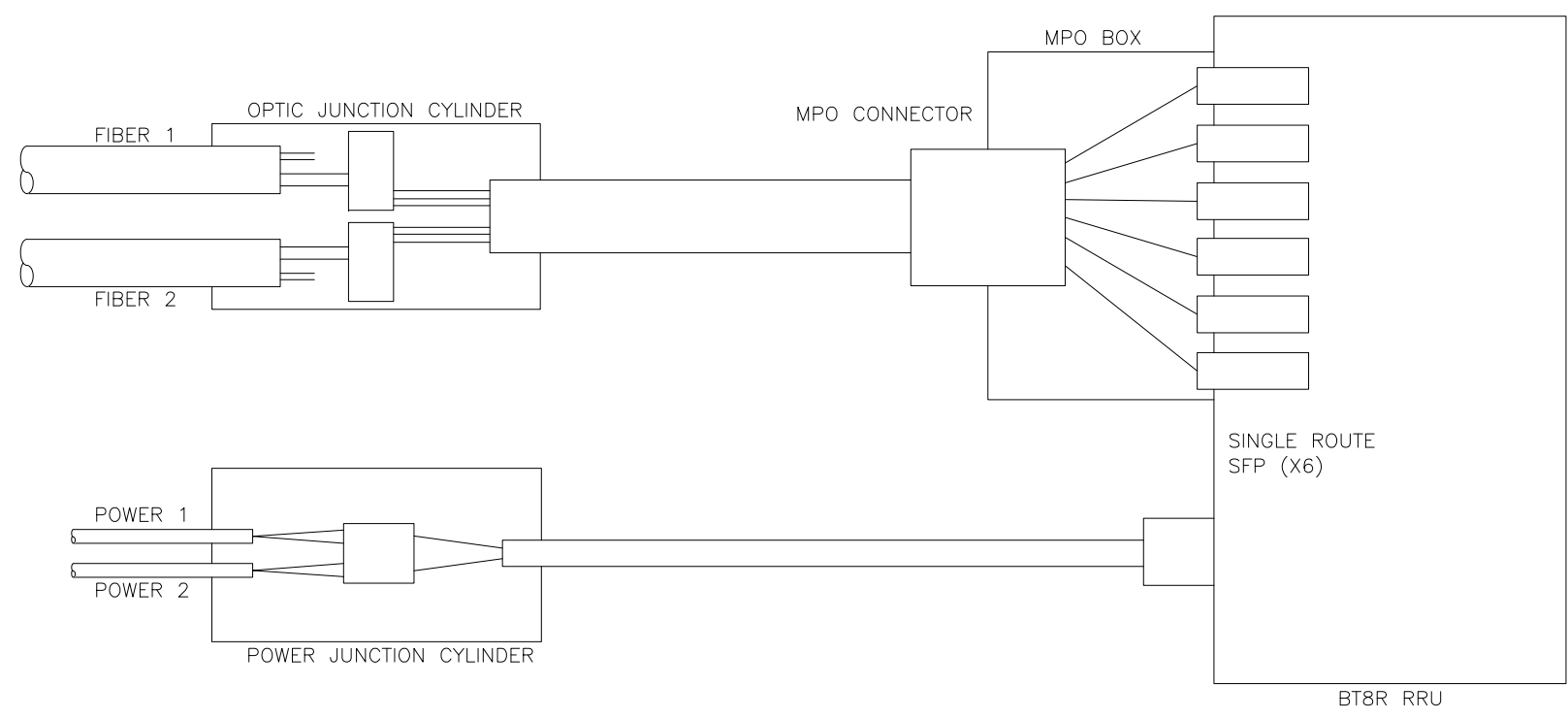


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USWW MANITOU WATER  
DN14XC247  
7353 W. HWY 24  
CASCADE, CO 80809  
MONOPOLE

SHEET TITLE  
**DETAILS**

SHEET NUMBER  
**D-2**



**(N) POWER & OPTIC CYLINDER SCHEMATIC DETAIL**

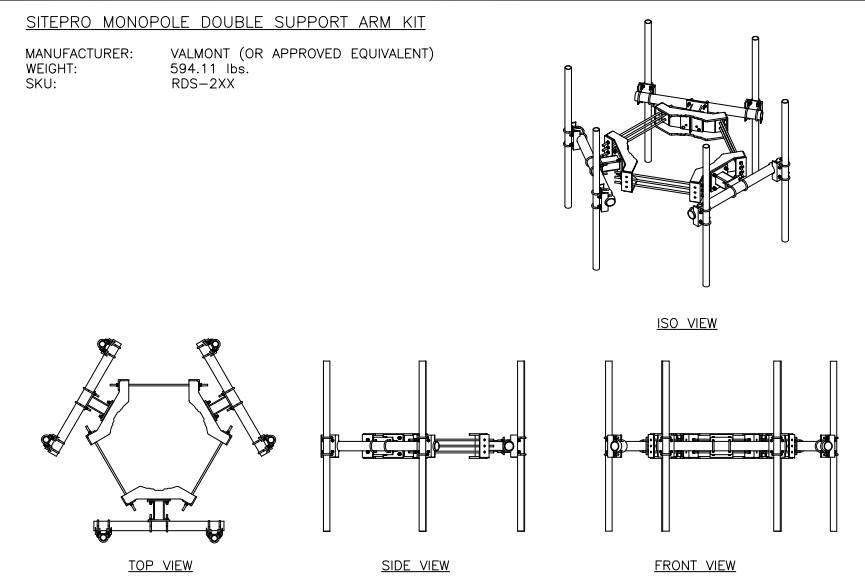
24"x36" SCALE: NTS  
11"x17" SCALE: NTS

**3**

**(E) MMBS CABINET**

24"x36" SCALE: NTS  
11"x17" SCALE: NTS

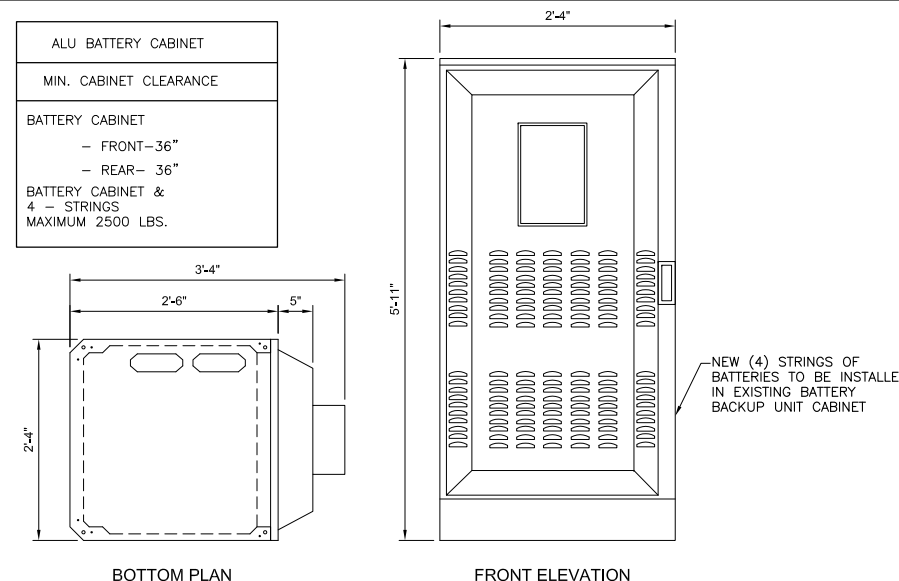
**1**



**(N) MONOPOLE MOUNT**

24"x36" SCALE: NTS  
11"x17" SCALE: NTS

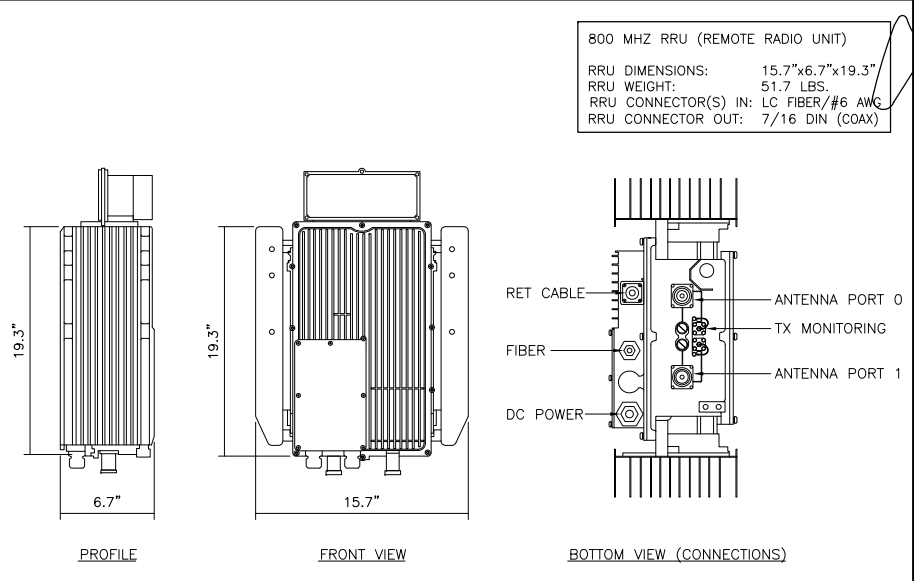
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**(E) BATTERY BACKUP UNIT CABINET**

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11"x17" SCALE: NTS

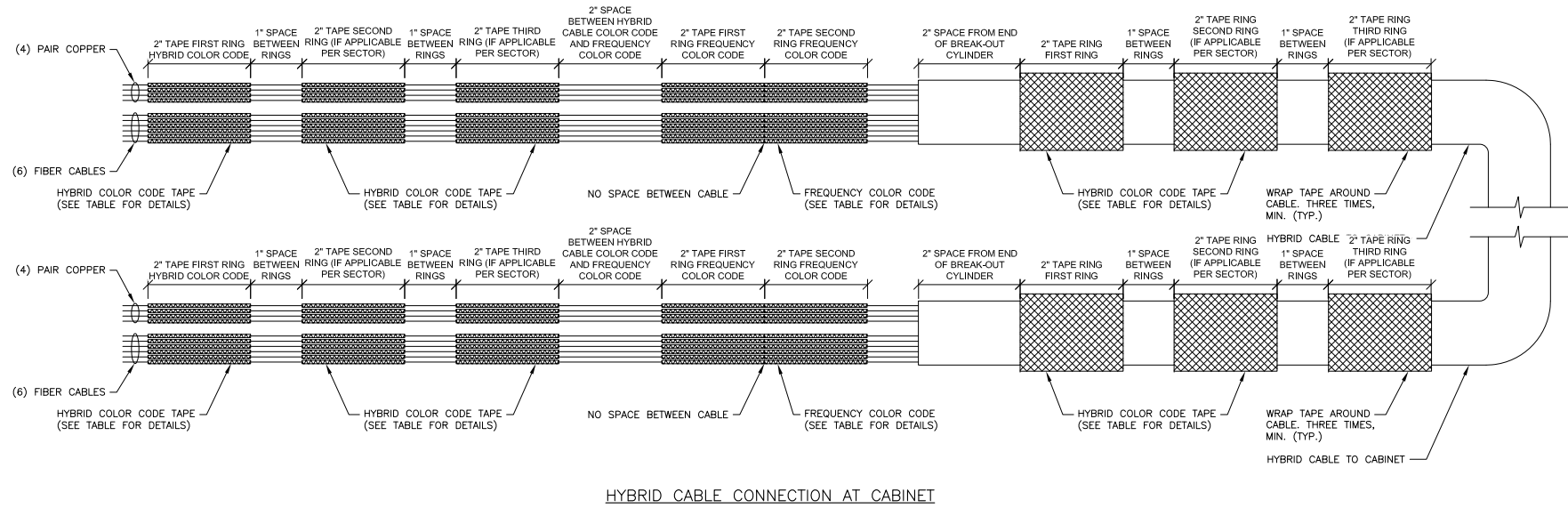
**4**



**(N) 800MHz RRU**

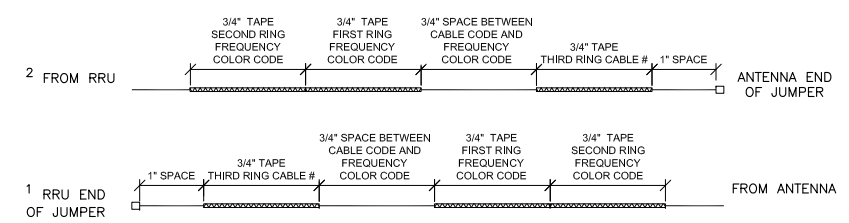
24"x36" SCALE: NTS  
11"x17" SCALE: NTS

**2**

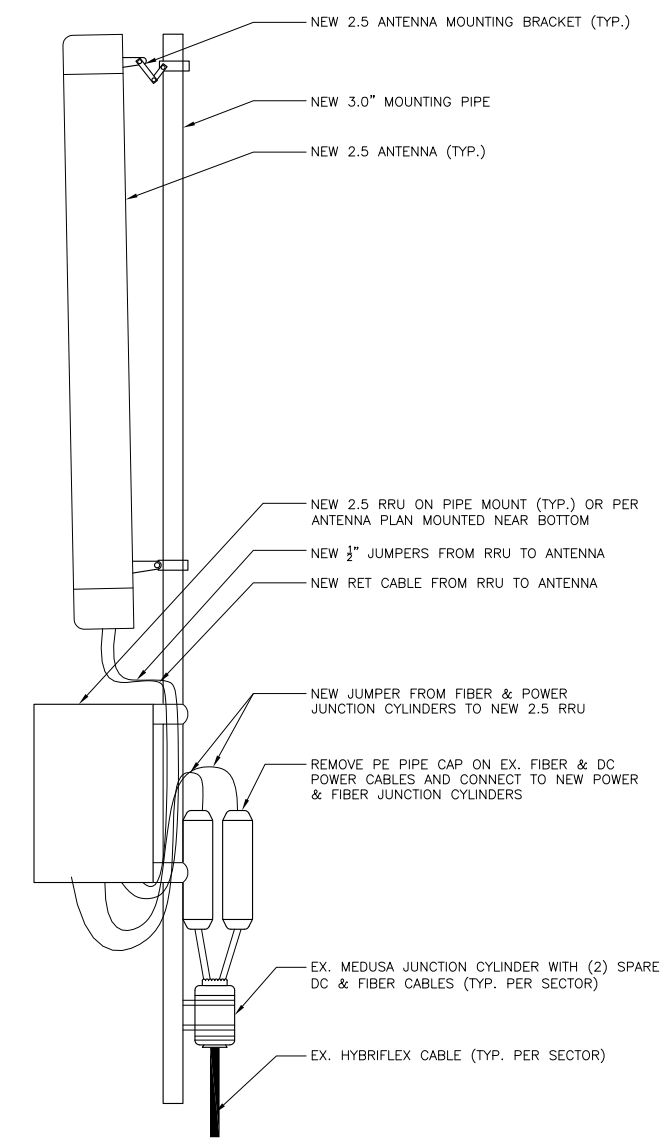


HYBRID CABLE CONNECTION AT CABINET

- NOTES:**
1. ALL CABLES SHALL BE MARKED AT THE TOP AND BOTTOM WITH 2" COLORED TAPE OR STENCIL TAG. COLOR TAPE SHALL BE OBTAINED FROM GRAYBAR ELECTRIC.
  2. THE FIRST RING SHALL BE CLOSEST TO THE END OF THE CABLE AND SPACED APPROXIMATELY 2" FROM AN END CONNECTOR, WEATHERPROOFING, OR BREAK-OUT CYLINDER, WITH 1" SPACE BETWEEN EACH RING.
  3. THE HYBRID CABLE COLOR SHALL BE APPLIED IN ACCORDANCE WITH THE "TYPICAL HYBRID CABLE COLOR CODE" TABLE BELOW FOR THE RESPECTIVE SECTOR.
  4. INDIVIDUAL POWER PAIRS AND FIBER CABLES SHALL BE LABELED WITH BOTH THE HYBRID CABLE COLOR FOR THE RESPECTIVE SECTOR AND A FREQUENCY COLOR CODE IN ACCORDANCE WITH THE "FREQUENCY COLOR CODE FOR PAIRS AND FIBER CABLES OF HYBRID CABLE" TABLE.
  5. A 2" GAP SHALL SEPARATE THE HYBRID CABLE COLOR CODE FROM THE FREQUENCY COLOR CODE.
  6. THE 2" COLOR RINGS FOR THE FREQUENCY CODE SHALL BE PLACED NEXT TO EACH OTHER WITH NO SPACES.
  7. THE 2" COLORED TAPE(S) SHALL EACH BE WRAPPED A MINIMUM OF 3 TIMES AROUND THE HYBRID CABLE OR INDIVIDUAL CABLES, AND THE TAPE SHALL BE KEPT IN THE SAME LOCATION AS MUCH AS POSSIBLE.
  8. COLOR BAND ON JUMPERS SHALL BE 2" WIDE WITH A 2" SPACE.



JUMPER CABLE CONNECTION AT RRU AND ANTENNA



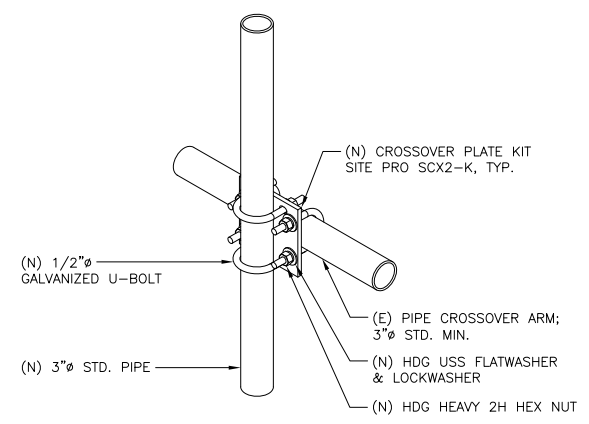
**(N) HYBRID CABLE COLOR SCHEME DETAIL**

	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6	TYPE 7
TOTAL LENGTH	~35 M (114.8')	~55 M (180.4')	~65 M (213.3')	~80 M (262.5')	~100 M (328.1')	~120 M (393.7')	~160 M (524.9')
HYBRID POWER CABLE CONFIGURATION	AWG 10 1 PAIR, AWG 12 3 PAIR	AWG 8 1 PAIR, AWG 10 3 PAIR	AWG 6 1 PAIR, AWG 8 1 PAIR, AWG 10 2 PAIR	AWG 6 PAIR, AWG 8 3 PAIR	AWG 4 1 PAIR, AWG 6 1 PAIR, AWG 8 2 PAIR	AWG 6 1 PAIR, AWG 8 3 PAIR	AWG 2 1 PAIR, AWG 4 3 PAIR
CABLE Ø	25MM (0.98")	27MM (1.06")	30MM (1.18")	30/32MM (1.18"/1.25")	39.2MM (1.25")	39.2MM (1.56")	43.5MM (1.69")
BEND RADIUS	11.81"	12.99"	15.35"	17.71"	17.71"	18.00"/30.00"	21.00"/35.00"
OPTIC CABLE	LC/PC-TO-LC/PC, SINGLE MODE						
DU CABINET (POWER CABLE TERMINAL MAX SIZE AWG 4)	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE						
RRU POWER CABLE SPEC	AWG 8, 14.7~15.4MM (0.57"-0.60") / AWG 10, 11.5~12.4MM (0.45"-0.48")					8 AWG CABLES 4 PAIRS	
NON-USE POWER AND OPTIC CABLE PROTECTION	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE
SAMSUNG FIBER	0.5LBS/LF	0.6LBS/LF	0.8LBS/LF	0.9LBS/LF	1.1LBS/LF	N/A	N/A
ASIA TAI	0.7LBS/LF	0.7LBS/LF	0.7LBS/LF	0.7LBS/LF	0.7LBS/LF	N/A	N/A
TESCO	N/A	N/A	N/A	N/A	N/A	1.6LBS/LF	2.2LBS/LF

**(N) HYBRID CABLE TYPE**

24"x36" SCALE: NTS  
11"x17" SCALE: NTS

**CROSSOVER MOUNTING KIT**



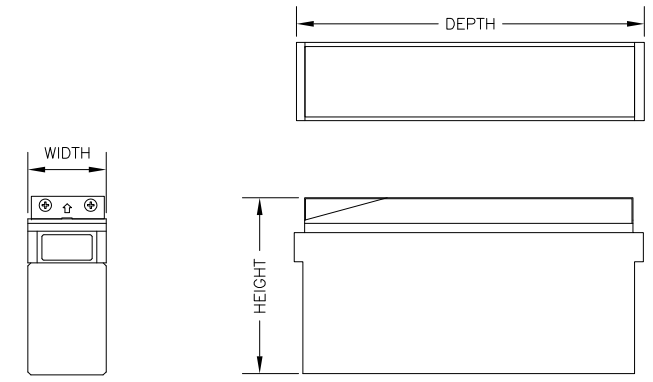
MOUNTING - ISOMETRIC

24"x36" SCALE: NTS  
11"x17" SCALE: NTS

**2.5 ANTENNA/RRU CONNECTIONS, TYP.**

MANUFACTURER: ACME  
MODEL NO: 12NDT190  
HEIGHT: 12.45"  
WIDTH: 4.93"  
DEPTH: 21.99"  
WEIGHT: 42.2LBS  
VOLTAGE: 9.6V  
10 HR TO 1.8 VPC @ 25° C

ELECTROLYTE CONTENT: 2.58 GAL PER BATTERY CELL  
EXISTING ELECTROLYTE CONTENT: 30.96 GAL  
NEW ELECTROLYTE CONTENT: 10.32 GAL  
TOTAL ELECTROLYTE CONTENT PER PLAN: 41.28 GAL



**BATTERY DETAIL**

24"x36" SCALE: NTS  
11"x17" SCALE: NTS



DRAWN BY: MB  
CHECKED BY: MM

REV	DATE	DESCRIPTION
0	01/10/2019	100% CD - JX COMMENTS
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USWW MANITOU WATER  
DN14XC247  
7353 W. HWY 24  
CASCADE, CO 80809  
MONOPOLE

SHEET TITLE  
**DETAILS**

SHEET NUMBER  
**D-3**

# GENERAL ELECTRICAL NOTES


1. SUBMITTAL OF BIO INDICATES CONTRACTOR IS COGNIZANT OF ALL JOB SITE CONDITIONS AND WORK TO BE PREFORMED UNDER THIS CONTRACT.
2. CONTRACTOR SHALL PERFORM ALL FIELD VERIFICATION AND EXAMINATION WORK PRIOR TO THE ORDERING OF THE ELECTRICAL EQUIPMENT AND THE ACTUAL CONSTRUCTION. CONTRACTOR SHALL ISSUE A WRITTEN NOTICE OF ALL FINDINGS TO THE ENGINEER AND OWNER LISTING ALL MALFUNCTIONS, FAULTY, EQUIPMENT, AND DISCREPANCIES.
3. THESE PLANS ARE SCHEMATIC ONLY; CONTRACTOR SHALL FOLLOW AS CLOSELY AS POSSIBLE.
4. ANTENNA MOUNTING HEIGHTS AND AZIMUTHS SHALL BE VERIFIED WITH OWNER PRIOR TO INSTALLATION.
5. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION, CONSTRUCTION TOOLS, TRANSPORTATION, ETC., FOR A COMPLETE AND PROPERLY OPERATIVE SYSTEM ENERGIZED THROUGHOUT AND AS INDICATED ON DRAWINGS, AS SPECIFIED HEREIN AND/OR AS OTHERWISE INDICATED. NOTE THAT CONTRACTOR SHALL SECURE ALL NECESSARY ELECTRICAL PERMITS, AND PAY ALL REQUIRED FEES.
6. IF REQUIRED, CONTRACTOR SHALL COORDINATE WITH LOCAL UTILITY COMPANY FOR CONNECTION OF TEMPORARY AND PERMANENT POWER TO THE SITE. THE TEMPORARY POWER AND ALL HOOK-UP COSTS SHALL BE PAID BY THE CONTRACTOR.
7. ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND IN PERFECT CONDITION WHEN INSTALLED AND SHALL BE OF THE BEST GRADE AND OF THE SAME MANUFACTURER THROUGHOUT FOR EACH CLASS OR GROUP OF EQUIPMENT. EXCEPTIONS TO THIS MAY BE PERMITTED IF NEW REPLACEMENT BREAKERS OR SWITCHES ARE NOT AVAILABLE FOR ORIGINAL ELECTRICAL DISTRIBUTION EQUIPMENT – ON THAT CASE, RECONDITIONED EQUIPMENT MAY BE PERMISSIBLE IF IT CARRIES ONE (1) YEAR WARRANTY. MATERIALS SHALL BE LISTED AND APPROVED BY UNDERWRITER'S LABORATORY AND SHALL BEAR THE INSPECTION LABEL "J" WHERE SUBJECT TO SUCK APPROVAL. Materials SHALL MEET WITH APPROVAL OF THE DIVISION OF INDUSTRIAL SAFETY AND ALL GOVERNING BODIES HAVING JURISDICTION. MATERIALS SHALL BE MANUFACTURED IN ACCORDANCE WITH APPLICABLE STANDARDS ESTABLISHED BY ANSI, NEMA, AND NBFU.
8. IF CONTRACTOR IS PROPOSING ALTERNATE MATERIALS OR CONSTRUCTION METHODS FROM WHAT IS SPECIFIED IN THE PLANS, CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND/OR CATALOG CUT-SHEETS TO OWNER FOR APPROVAL PRIOR TO COMMENCEMENT OF THE WORK.
9. ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH CURRENT NATIONAL CODES AND ALL LOCAL AND STATE CODES, LAWS, AND ORDINANCES. PROVIDE ALL COMPONENTS AND WIRING SIZES AS REQUIRED TO MEET NEC.
10. EACH CONDUCTOR OF EVERY SYSTEM SHALL BE PERMANENTLY TAGGED IN EACH PANELBOARD, PULLBOX, J-BOX, SWITCH BOX, ETC., IN COMPLIANCE WITH OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (O.S.H.A.) REQUIREMENTS.
11. COMPLETE JOB SHALL BE GUARANTEED FOR A PERIOD OF ONE (1) YEAR AFTER THE DATE OF JOB ACCEPTANCE BY OWNER. ANY WORK, MATERIAL OR EQUIPMENT FOUND TO BE FAULTY DURING THAT PERIOD SHALL BE CORRECTED AT ONCE, UPON WRITTEN NOTIFICATION, AT THE EXPENSE OF THE CONTRACTOR.
12. CLEAN WORK SITE DAILY, AND REMOVE ALL DEBRIS RESULTING FROM CONSTRUCTION. LEAVE JOB SITE IN A TIDY AND UNDAMAGED CONDITION.
13. UPON COMPLETION OF WORK, PERFORM CONTINUITY, SHORT CIRCUIT, AND GROUNDING TEST. GROUNDING SYSTEM SHALL BE TESTED BY INDEPENDENT TESTING AGENCY, WITH WRITTEN REPORT SUBMITTED TO THE OWNER FOR REVIEW AND APPROVAL. AFTER APPROVAL, FURNISH ONE COPY OF REPORT TO ENGINEER.
14. PROVIDE OWNER WITH ONE SET OF COMPLETE ELECTRICAL "AS BUILT" DRAWINGS AT THE COMPLETION OF THE JOB, SHOWING ACTUAL EQUIPMENT LOCATIONS, CONDUIT/CABLE ROUTING, PANEL SCHEDULE, AND OTHER DETAILS WITHIN 10 DAYS OF PROJECT COMPLETION. DATE OF JOB COMPLETION SHALL BE THE DATE ON THE CONTRACTOR'S "NOTICE OF COMPLETION" SUBMITTED TO THE OWNER, AFTER SITE INSPECTION AND SIGNOFF BY OWNER.
15. ALL BROCHURES, OPERATING MANUAL, CATALOGS, SHOP DRAWINGS, ETC. SHALL BE TURNED OVER TO OWNER AT JOB COMPLETION.
16. ALL CIRCUIT BREAKERS, FUSES AND ELECTRICAL EQUIPMENT SHALL HAVE AN INTERRUPTING RATING NOT LESS THAN THE MAXIMUM SHORT CIRCUIT CURRENT TO WHICH THEY MAY BE SUBJECTED, AND A MINIMUM OF 10,000 A.I.C.
17. PATCH, REPAIR AND PAINT ANY AREA THAT HAS BEEN DAMAGED IN THE COURSE OF THE ELECTRICAL WORK.

18. IN DRILLING HOLES INTO CONCRETE WHETHER FOR FASTENING OR ANCHORING PURPOSED THOROUGH THE FLOOR OR WALLS FOR CONDUIT RUNS, PIPE RUNS, ETC., IT MUST CLEARLY UNDERSTOOD THAT TENDONS AND/OR REINFORCING STEEL WILL NOT BE DRILLED INTO, CUT, OR DAMAGED UNDER ANY CIRCUMSTANCES.
19. EXACT LOCATION OF TENDONS AND/OR REINFORCING STEEL ARE NOT KNOWN AND THEREFORE MUST BE SEARCHED FOR BY APPROPRIATE METHODS, SUCH AS X-RAY EQUIPMENT OR OTHER DEVICES THAT CAN ACCURATELY LOCATE THE REINFORCING AND/OR STEEL TENDONS.
20. ALL EXTERIOR WALL PENETRATIONS SHALL BE SEALED WITH SUITABLE WEATHERPROOF SEALANT. PENETRATIONS IN FIRE RATED WALLS SHALL BE FIRE STOPPED IN ACCORDANCE WITH CURRENT LOCAL BUILDING CODES USING U.L. RATED MATERIALS.
21. ALL CONDUCTORS SHALL BE COPPER, #12 AWG MINIMUM. UNLESS NOTED OTHERWISE, INSULATION SHALL BE 90°C RATED, AND DUAL RATED THHN/THWN-2. NO BX OR ROMEX CABLE IS PERMITTED UNLESS SPECIFICALLY NOTED OTHERWISE ON DRAWINGS.
22. ALL CONDUIT ONLY (C.O.) RUNS SHALL HAVE A PULL WIRE OR ROPE, AND TRUE TAPE.
23. GROUND THE ENTIRE ELECTRICAL SYSTEM IN ACCORDANCE WITH THE NEC AND DRAWINGS. BELOW GRADE GROUND CONDUCTORS SHALL BE #2 AWG SOLID BARE TINTED COPPER. ABOVE GRADE, ALL CONDUCTORS SHALL BE STRANDED GREEN INSULATED COOPER, SEIZED #2 AWG OR AS SHOWN IN THE DRAWINGS. GROUND CONDUCTOR SHALL HAVE A MINIMUM 24" BENDING RADIUS. GROUND RODS SHALL BE COPPER CLAD STEEL, 5/8" ROUND AND 8' LONG. GROUNDING HARDWARE SHALL BE ERICO, STORM COPPER COMPONENTS, FUSHI COPPERWELD OR APPROVED EQUAL.
24. GROUND ALL ANTENNA BASES, ENCLOSURES, FRAMES, CABLE RUNS, AND OTHER METALLIC COMPONENTS USING GROUND WIRES AND CONNECT TO THE BUS BARS. FOLLOW EQUIPMENT MANUFACTURER'S RECOMMENDATIONS FOR GROUNDING. GROUND COAX SHIELD AT BOTH ENDS USING CABLE MANUFACTURER'S RECOMMENDATIONS.
25. THE NUMBER OF GROUNDING BARS MAY VARY DEPENDING UPON THE SITE LAYOUT, ANTENNA LOCATION, AND OTHER FACTORS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING SUFFICIENT GROUNDING BARS AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.
26. EXOTHERMIC WELDS SHALL INCLUDE ALL CABLE TO CABLE, SPLICES, CABLE TO GROUND RODS, GROUND ROD SPLICES AND OTHER SYSTEMS AS INDICATED. ALL MATERIALS USED (MOLDS, WELDING, METAL, ETC.) SHALL BE INSTALLED PER MANUFACTURERS' RECOMMENDATIONS AND PROCEDURES. ALL EXOTHERMIC WELD CONNECTIONS ON GALVANIZED SURFACES SHALL BE CLEANED THOROUGHLY AND COLORED TO MATCH SURFACE WITH (2) TWO COATS OF GALVITE (WHITE) PAINT OR SILVERBRITE (ALUMINUM).
27. ALL STRANDED COPPER WITH GREEN INSULATION TO BE ATTACHED WITH CRIMPED DOUBLE LUG, ATTACHED WITH NUTS, BOLTS AND STAR WASHERS TYPICAL. ALL MECHANICAL CONNECTIONS SHALL HAVE ANTI-OXIDANT GREASE (E.G. NO-OX) APPLIED BETWEEN LUG AND BUS BAR.
28. ALL EXPOSED TINNED COPPER GROUNDS SHALL BE PROTECTED BY 1/2" PVC CONDUIT AND SECURED. WHERE SUBJECT TO MECHANICAL DAMAGE, OTHER GROUND LEADS SHALL ALSO BE ENCLOSED IN 1/2" OR 3/4" LTFC.
29. COMPRESSION FITNESS TO BE USED ON ALL CONDUITS (NO SETSCREWS).
30. PVC CONDUIT INSTALLED IN OUTDOOR LOCATIONS SUBJECT TO SUNLIGHT EXPOSURE SHALL BE UV RESISTANT. SURFACE-MOUNTED CONDUIT INSTALLED IN LOCATIONS SUBJECT TO FOOT TRAFFIC OR OTHER WEAR AND TEAR, SHALL BE PVC SCHEDULE 80, IMC, OR GRC. CONDUIT RUNS ALONG WALLS OR FLOORS SHALL BE SURFACE MOUNTED UNLESS SPECIFICALLY NOTED OTHERWISE ON THE PLANS. OTHER CONDUIT REQUIREMENTS:
  - 30.a. INTERMEDIATE METALLIC CONDUIT (IMC) SHALL HAVE U.L. LABEL. FITTINGS SHALL BE WATERTIGHT COMPRESSION TYPE. IMC SHALL BE USED FOR OUTDOOR RUNS, IMC IN CONTACT WITH EARTH SHALL BE 1/2 LAPPED WRAPPED WITH HUNTS WRAP PROCESS NO. 3
  - 30.b. ELECTRICAL METALLIC TUBING (EMT) SHALL HAVE U.L. LABEL. FITTINGS SHALL BE GLAND RING COMPRESSION TYPE. EMT SHALL BE USED ONLY FOR INTERIOR RUNS.
  - 30.c. FLEXIBLE METALLIC CONDUIT SHALL HAVE U.L. LISTED LABEL AND MAY BE USED WHERE PERMITTED BY CODE. FITTINGS SHALL BE "JAKE" OR "SQUEEZE" TYPE. LENGTH SHALL HAVE FULL SIZE GROUND WIRE.
  - 30.d. ALL UNDERGROUND CONDUIT SHALL BE PVC SCHEDULE 40 (UNLESS NOTED OTHERWISE) AT A MINIMUM DEPTH OF 24" BELOW GRADE.
31. ALL NEW ELECTRICAL ENCLOSURES (EXCEPT FOR JUNCTION OR SPLICE BOXES) SUCH AS PANELBOARDS AND DISCONNECT SWITCHES SHALL BE LABELED WITH PERMANENT ENGRAVED PHENOLIC NAMEPLATES, BLACK WITH WHITE LETTERING, AND ATTACHED WITH RIVETS.

## ABBREVIATIONS

AAV	ALTERNATE ACCESS VENDOR	GR	GROWTH (CABINET)	UADU	UNIVERSAL TYPE A DIGITAL UNIT
ACCA	ANTENNA CABLE ASSEMBLY	GRC	GALVANIZED RIGID (STEEL) CONDUIT	U/G	UNDERGROUND
AFF	ABOVE FINISHED FLOOR	IGB	INTERNAL GROUND BAR	WP	WEATHERPROOF
AFG	ABOVE FINISHED GRADE	IGR	INTERIOR GROUND RING	WW	WIREWAY
AWS	ADVANCED WIRELESS SERVICES	IMC	INTERMEDIATE METALLIC CONDUIT	XFMR	TRANSFORMER
A/G	ABOVE GROUND	ISCW	INSULATED STRANDED COPPER WIRE		
AGB	ANTENNA GROUND BAR	LTE	LONG TERM EVOLUTION		
ATS	AUTOMATIC TRANSFER SWITCH	LTFC	LIQUID TIGHT FLEXIBLE CONDUIT		
AWG	AMERICAN WIRE GAUGE	MGB	MAIN (OR MASTER) GROUND BAR		
BBU	BASEBAND UNIT	MMBS	MULTI-MODE BASE STATION		
BCW	BARE COPPER WIRE	MTS	MANUAL TRANSFER SWITCH		
BSCW	BARE STRANDED COPPER WIRE	NEC	NATIONAL ELECTRIC CODE		
BTCW	BARE TINNED COPPER WIRE	NID	NETWORK INTERFACE DEVICE		
C	CONDUIT	NV	NETWORK VISION		
CAB	CABINET	O/H	OVERHEAD		
CE	CONCRETE ENCASED	PCS	PERSONAL COMMUNICATION SERVIICES		
CGB	COLLECTOR GROUND BAR	PPC	POWER PROTECTION CABINET		
CKT	CIRCUIT	PRC	PRIMARY RADIO CABINET		
COVP	CAPACITOR OVERVOLTAGE PROTECTION	PVC	POLYVINYL CHLORIDE		
DB	DIRECT BURIED	PWR	POWER		
DEI	DIGITAL EXPANSION INTERFACE	RGS	RIGID GALVANIZED STEEL		
DISC	DISCONNECT	RRH	REMOTE RADIO HEAD		
EMT	ELECTRICAL METALLIC TUBING	RRU	REMOTE RADIO UNIT		
GFCI	GROUND FAULT CURRENT INTERRUPTER	SPD	SURGE PROTECTIVE DEVICE		
G	GROUND	S/S	STAINLESS STEEL		
GND	GROUND	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR		
GPS	GLOBAL POSITIONING SYSTEM	TYP	TYPICAL		

## ELECTRICAL LEGEND

— UGP — UGP — UGP —	EXISTING U/G ELECTRICAL	— X — X — X —	EXISTING CHAINLINK FENCE
— OE — OE — OE —	EXISTING O/H ELECTRICAL	— X — X — X —	NEW CHAINLINK FENCE
— AGP — AGP — AGP —	EXISTING A/G ELECTRICAL	— □ — □ — □ —	EXISTING WOOD FENCE
— UGT — UGT — UGT —	EXISTING U/G TELEPHONE	— □ — □ — □ —	NEW WOOD FENCE
— FO — FO — FO —	EXISTING FIBER OPTIC		
— HFLEX — HFLEX — HFLEX —	EXISTING HYBRIFLEX CABLE		
— UGP — UGP — UGP —	NEW U/G ELECTRIC		ELEVATION/SECTION REFERENCE. TOP NUMBER IS THE DETAIL; BOTTOM NUMBER IS THE SHEET NO.
— OE — OE — OE —	NEW O/H ELECTRIC		
— AGP — AGP — AGP —	NEW A/G ELECTRIC		
— UGT — UGT — UGT —	NEW U/G TELEPHONE		
— FO — FO — FO —	NEW FIBER OPTIC		
— HFLEX — HFLEX — HFLEX —	NEW HYBRIFLEX CABLE		

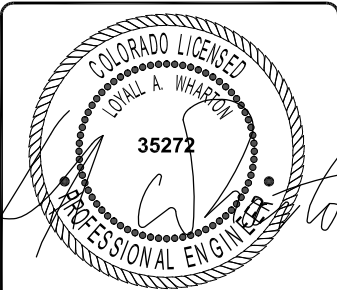


1387 CALLE AVANZADO  
SAN CLEMENTE CA 92673 (949) 391-6824

DRAWN BY: MB

CHECKED BY: MM

REV	DATE	DESCRIPTION
Δ	01/10/2019	100% CD - JX COMMENTS
0	12/11/2017	100% CD - BP SUBMITTAL
B	11/30/2017	90% CD'S - REVISED
A	11/2/2017	90% CD'S FOR REVIEW



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USWW MANITOU WATER  
DN14XC247  
7353 W. HWY 24  
CASCADE, CO 80809  
MONOPOLE

SHEET TITLE  
**GENERAL ELECTRICAL  
NOTES, ABBREVIATIONS,  
AND ELEC. LEGEND**

SHEET NUMBER  
**E-1**





MAIN PANEL

SITE NUMBER:	DN14XC247	ENCLOSURE TYPE:	NEMA 3R	BUSS RATING:	200 AMPS	INTERNAL TVSS:	YES
VOLTAGE:	240V/120	PANEL STATUS:	EXISTING	NEUTRAL RATING:	YES	WIRE:	3
MAIN BREAKER:	200 AMP	MODEL NUMBER:	TBD	NEUTRAL BUS:	YES	AIC:	22,000
MOUNT:	SURFACE	PHASE:	1	N to GROUND BOND:	YES	GROUND BAR:	YES

CKT NO	CKT BKR			SERV LD VA	USE FAC	DESCRIPTION	PHASE A VA	PHASE B VA	DESCRIPTION	USE FAC	SERV LD VA	CKT BKR			CKT NO
	AMPS	P	STAT									STAT	P	AMPS	
1	200	2	----	0	0.00	GENERATOR MAIN	0		TVSS	1.00	0	----	----	----	2
3	----	----	----	0	0.00	—		0		1.00	0	----	----	----	4
5	----	----	----	0	0.00	SPACE	500		SPACE	0.00	0	----	----	----	6
7	----	----	----	0	0.00	SPACE		0	LIGHT	1.00	500	ON	1	20	8
9	100	2	ON	9150	1.25	SUB PANEL	11618		FAN	1.00	200	ON	1	10	10
11	----	----	----	9150	1.25			11637.5	TELCO GFI	1.00	180	ON	1	20	12
										TOTAL KVA:		23.76			
										AMPS		98.98			

NOTE: CL = LONG CONTINUOUS LOAD  
 LML = LARGEST MOTOR LOAD  
 UM = UTILITY MAIN CIRCUIT BREAKER  
 GM = GENERATOR MAIN CIRCUIT BREAKER

SEE SINGLE LINE DIAGRAM FOR WIRING DIAGRAM  
 \*THIS IS A TYPICAL PANEL SCHEDULE SUBJECT TO CHANGE AND TO BE FIELD VERIFIED.

SUB-PANEL

SITE NUMBER:	DN14XC247	ENCLOSURE TYPE:	NEMA 3R	BUSS RATING:	125 AMPS	INTERNAL TVSS:	YES
VOLTAGE:	240V/120	PANEL STATUS:	EXISTING	NEUTRAL RATING:	YES	WIRE:	3
MAIN BREAKER:	100 AMP	MODEL NUMBER:	TBD	NEUTRAL BUS:	YES	AIC:	22,000
MOUNT:	SURFACE	PHASE:	1	N to GROUND BOND:	YES	GROUND BAR:	YES

CKT NO	CKT BKR			SERV LD VA	USE FAC	DESCRIPTION	PHASE A VA	PHASE B VA	DESCRIPTION	USE FAC	SERV LD VA	CKT BKR			CKT NO
	AMPS	P	STAT									STAT	P	AMPS	
1	----	----	----			SPACE	8750		SAMSUNG MMBS CABINET	1.00	0	ON	2	100	2
3	----	----	----			SPACE		8750		1.00	0	----	----	----	4
5	----	----	----			SPACE	400		SAMSUNG BATTERY	0.00	0	ON	2	15	6
7	----	----	----			SPACE		400		1.00	500	----	----	----	8
9	----	----	----			SPACE	0		SPACE	1.00	200	----	----	----	10
11	----	----	----			SPACE		0	SPACE	1.00	180	----	----	----	12
										TOTAL KVA:		18.30			
										AMPS		76.25			

NOTE: CL = LONG CONTINUOUS LOAD  
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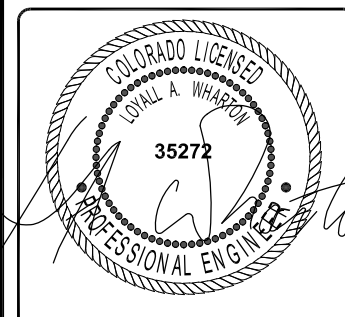
SEE SINGLE LINE DIAGRAM FOR WIRING DIAGRAM  
 \*THIS IS A TYPICAL PANEL SCHEDULE SUBJECT TO CHANGE AND TO BE FIELD VERIFIED.



1387 CALLE AVANZADO  
 SAN CLEMENTE CA 92673 (949) 391-6824

DRAWN BY: MB  
 CHECKED BY: MM

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0	12/11/2017	100% CD - BP SUBMITTAL
B	11/30/2017	90% CD'S - REVISED
A	11/2/2017	90% CD'S FOR REVIEW

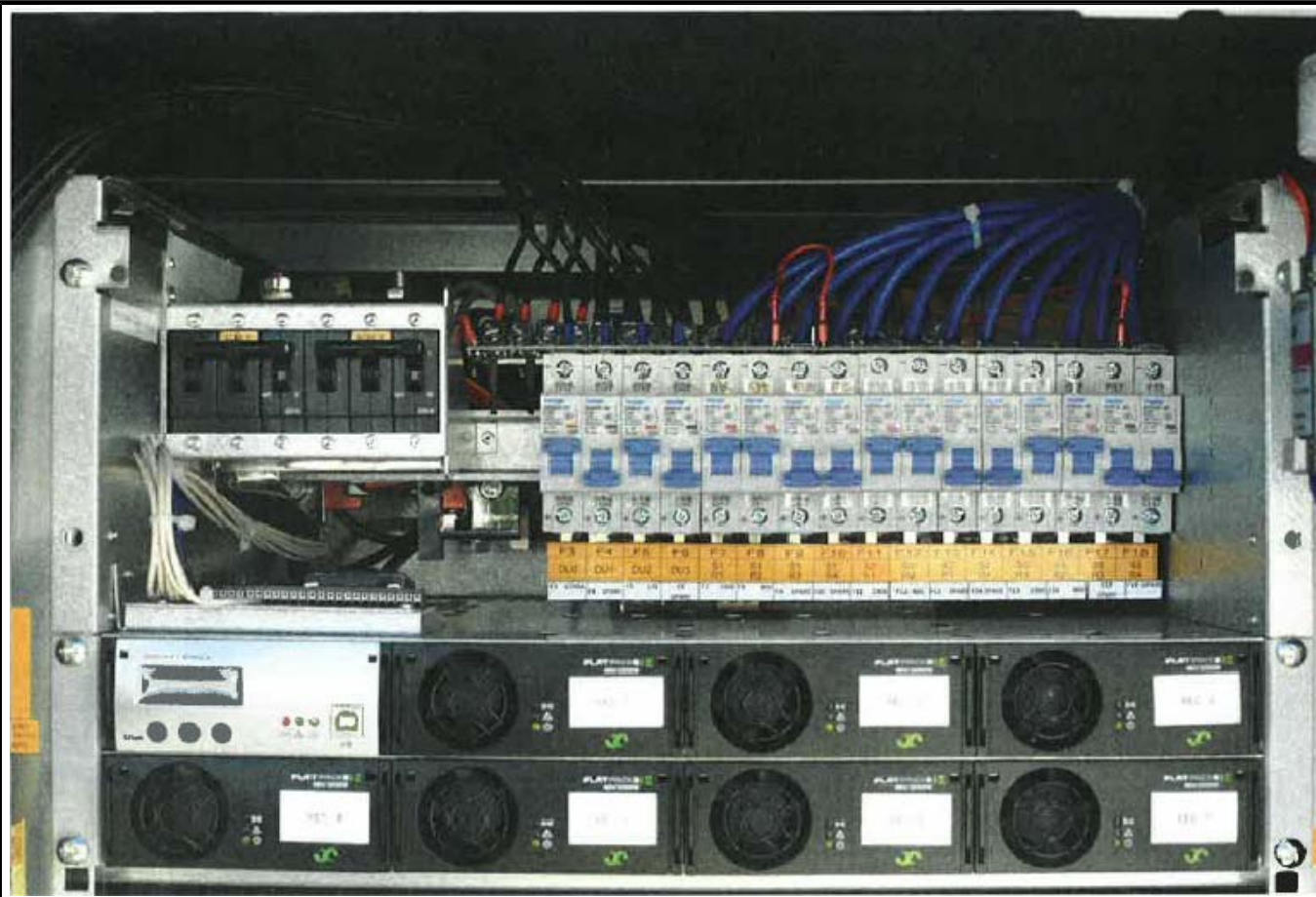


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USWW MANITOU WATER  
 DN14XC247  
 7353 W. HWY 24  
 CASCADE, CO 80809  
 MONOPOLE

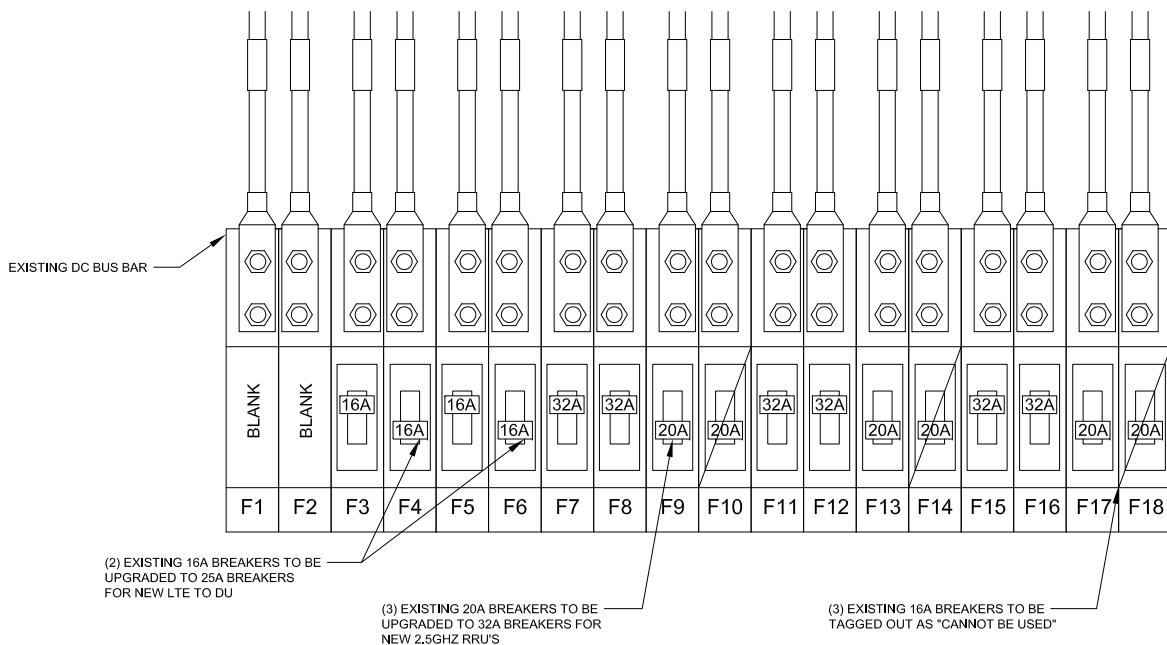
SHEET TITLE  
**PANEL SCHEDULE**

SHEET NUMBER  
**E-3**

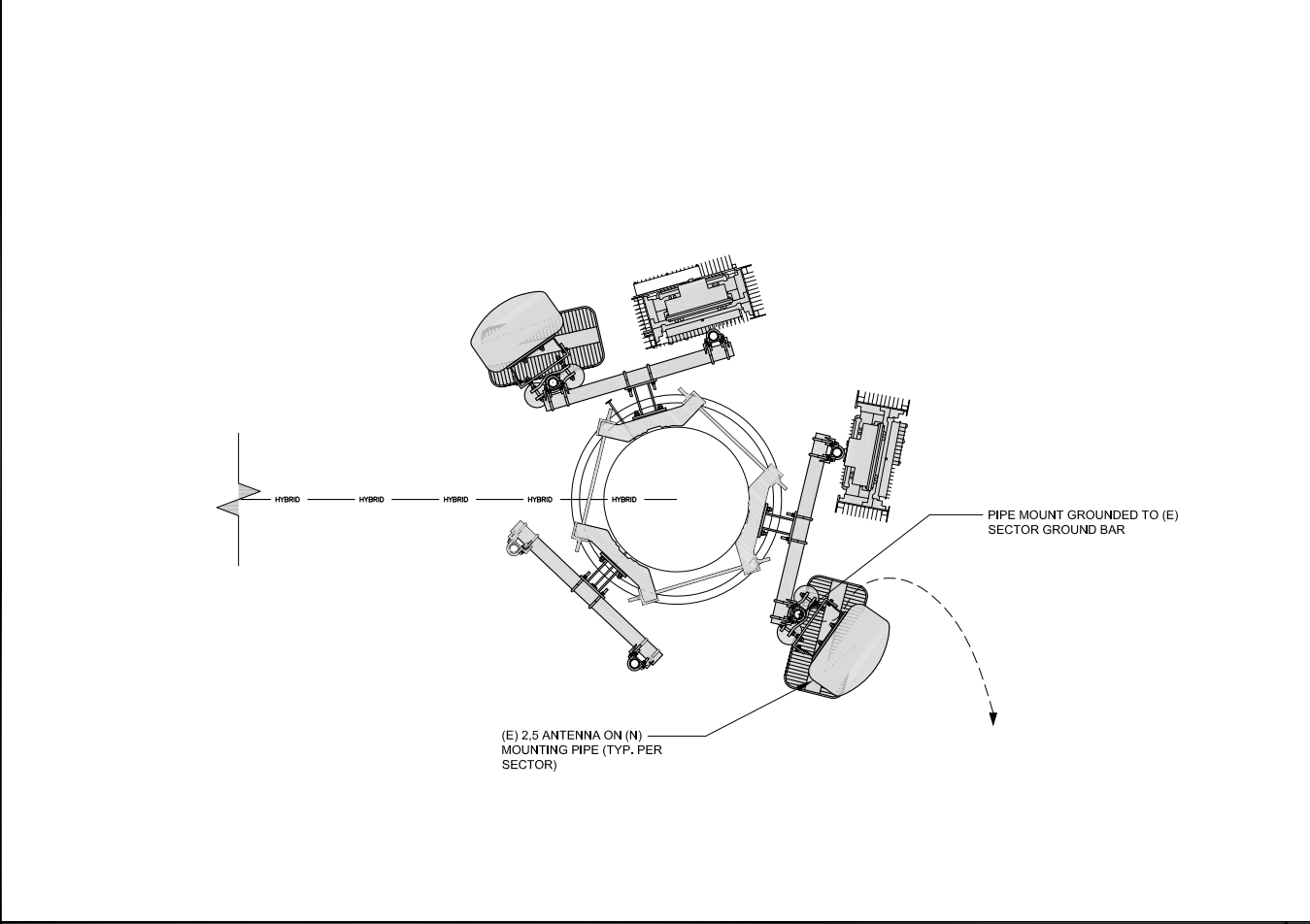


EXISTING DC POWER DISTRIBUTION

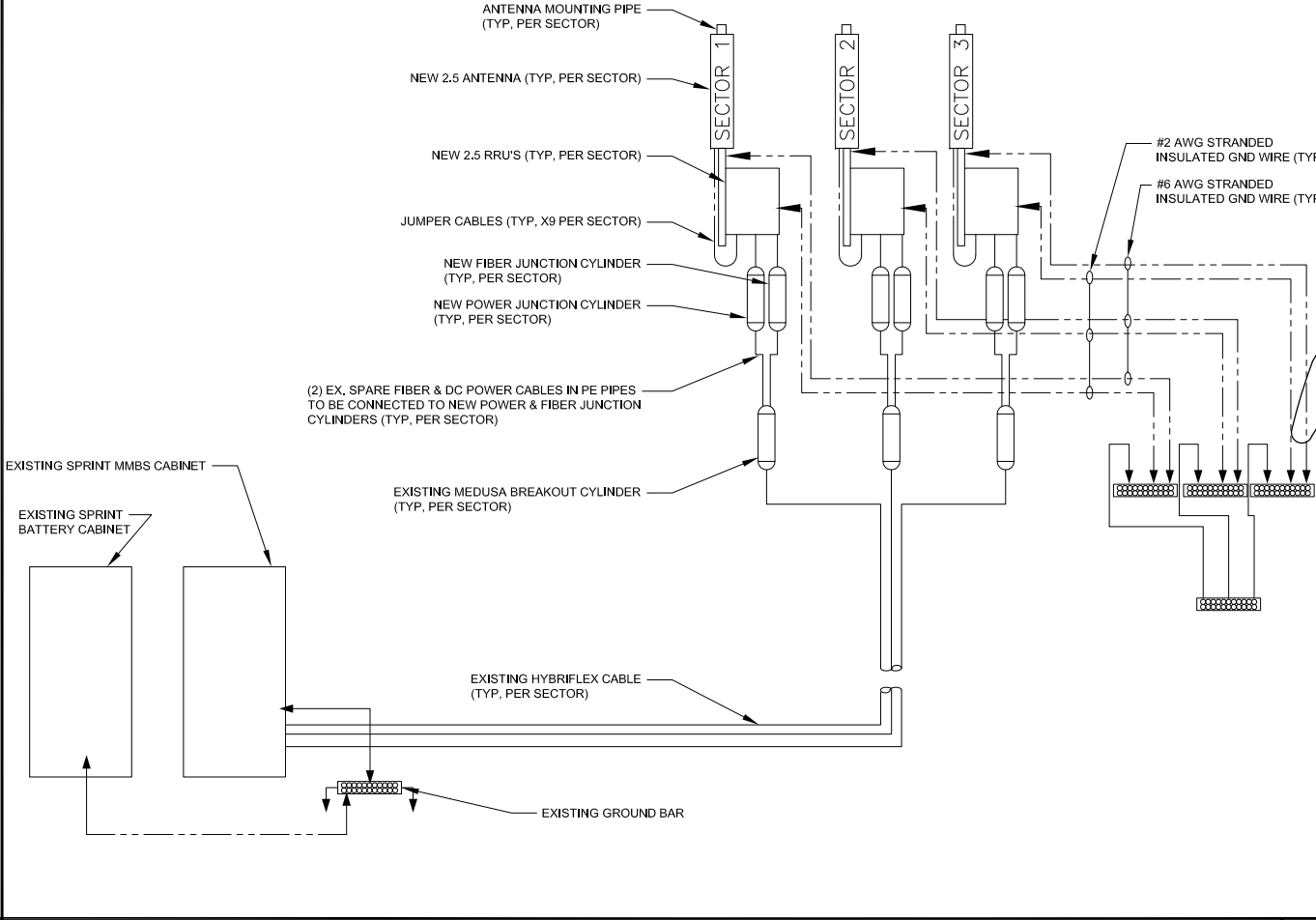
- NOTES:  
 1. (2) DU BREAKERS TO BE UPGRADED FROM 16A TO 25A.  
 2. (3) RRU BREAKERS TO BE UPGRADED FROM 20A TO 32A.  
 3. REMAINING/UNUSED RRH BREAKERS TO BE TAGGED OUT AS "CANNOT BE USED"



TYPICAL DC POWER DISTRIBUTION



TYPICAL ANTENNA GROUNDING PLAN



TYPICAL GROUNDING RISER DIAGRAM



1397 CALLE AVANZADO  
 SAN CLEMENTE CA 92673 (949) 391-6824

DRAWN BY: MB  
 CHECKED BY: MM

REV	DATE	DESCRIPTION
A	11/2/2017	90% CD'S FOR REVIEW
B	11/30/2017	90% CD'S - REVISED
0	12/11/2017	100% CD - BP SUBMITTAL
Δ	01/10/2019	100% CD - JX COMMENTS

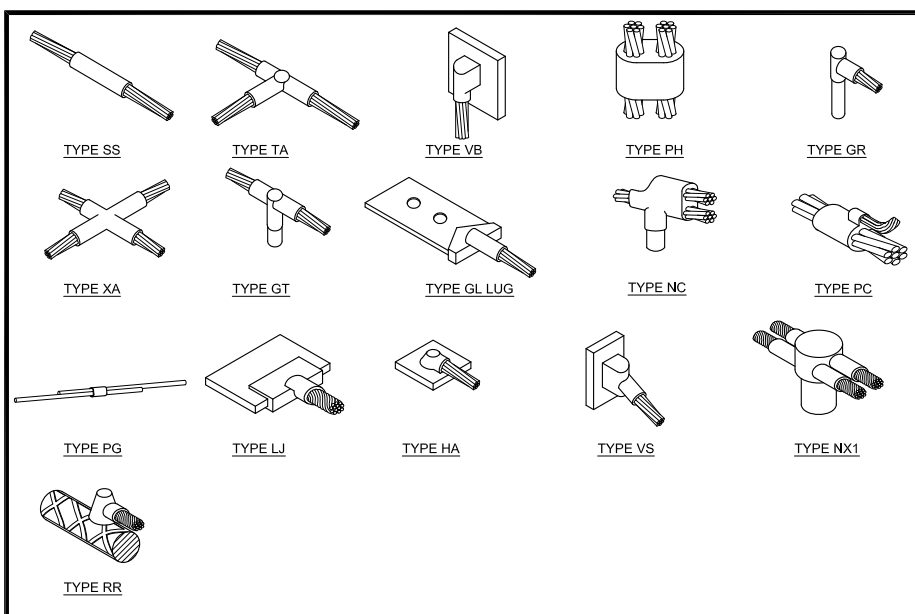


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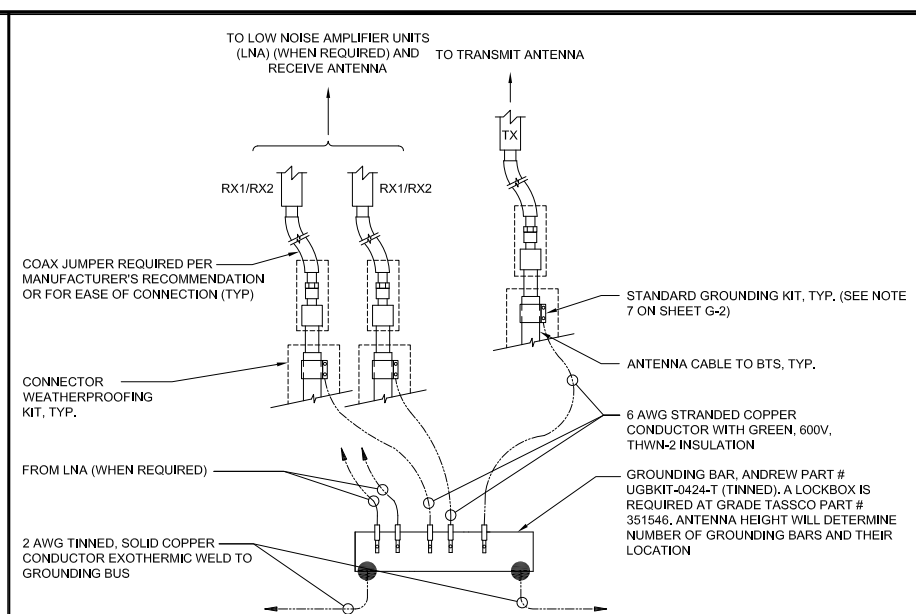
USWW MANITOU WATER  
 DN14XC247  
 7353 W. HWY 24  
 CASCADE, CO 80809  
 MONOPOLE

SHEET TITLE  
**DC DISTRIBUTION AND ANTENNA GROUNDING PLAN AND DIAGRAM**

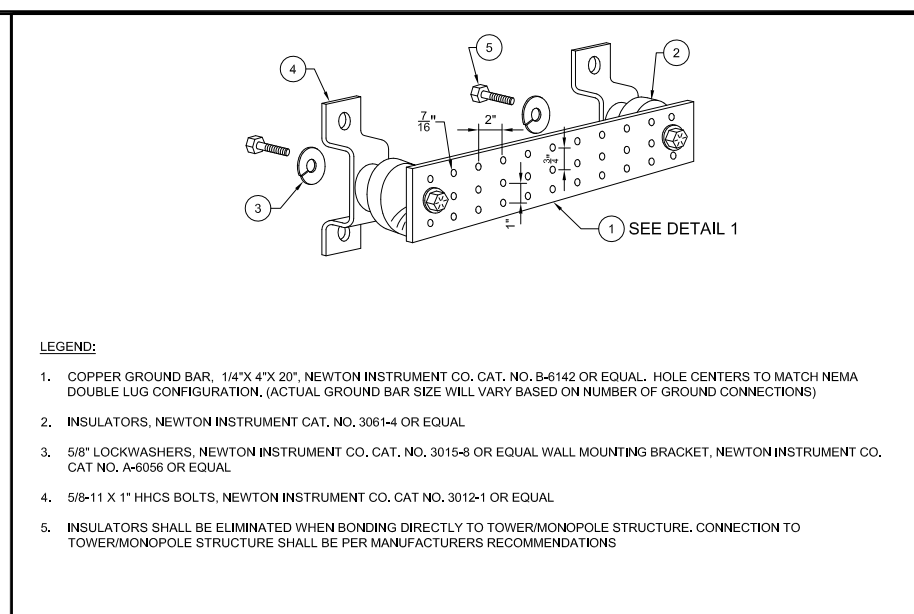
SHEET NUMBER  
**E-4**



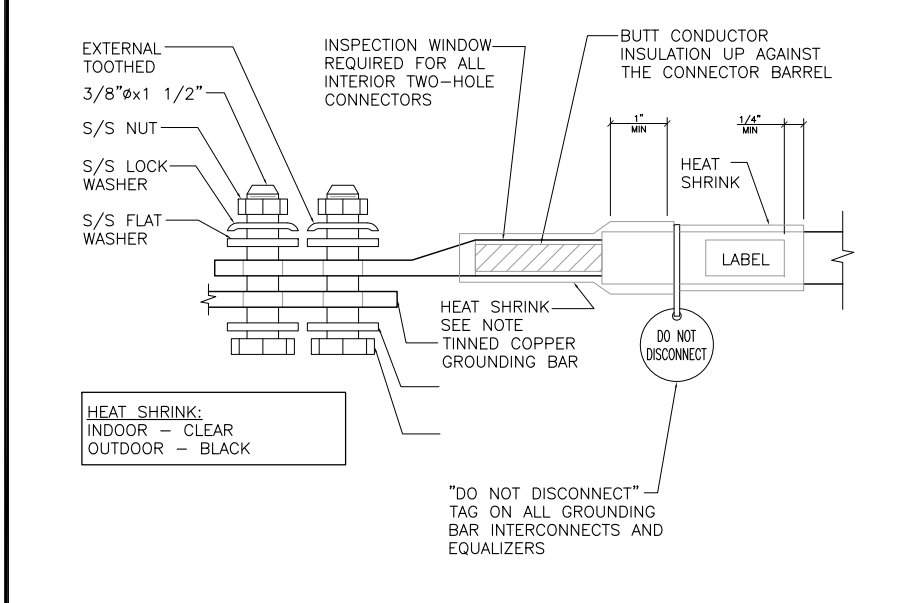
**TYPICAL CADWELD TYPES** 24"x36" SCALE: NTS 11"x17" SCALE: NTS **7**



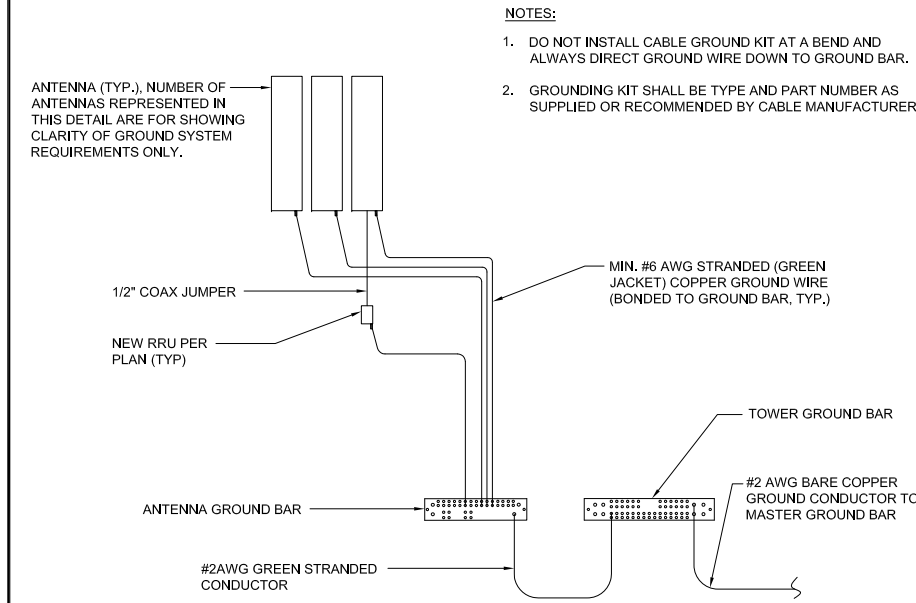
**GROUNDING BAR CONNECTION** 24"x36" SCALE: NTS 11"x17" SCALE: NTS **4**



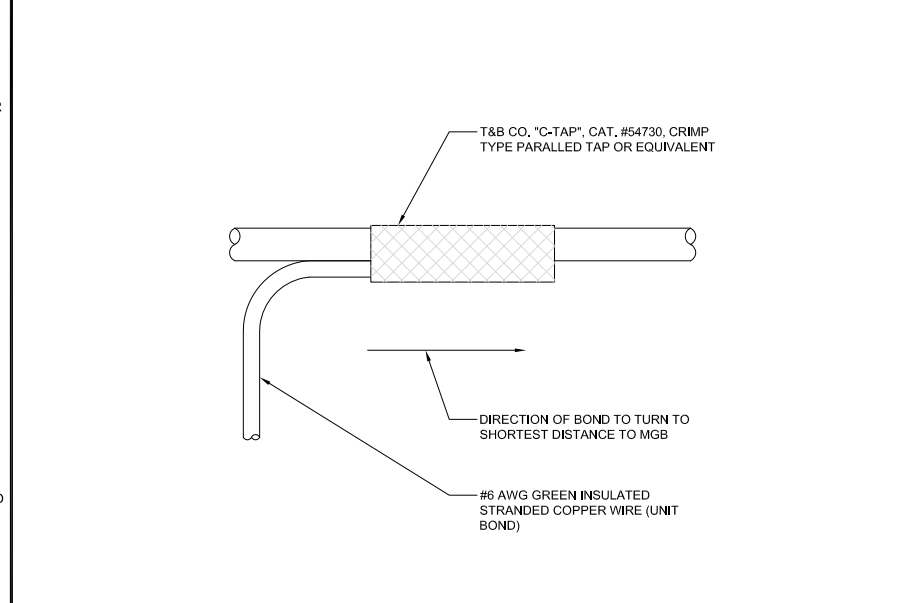
**GROUNDING BAR DETAIL** 24"x36" SCALE: NTS 11"x17" SCALE: NTS **1**



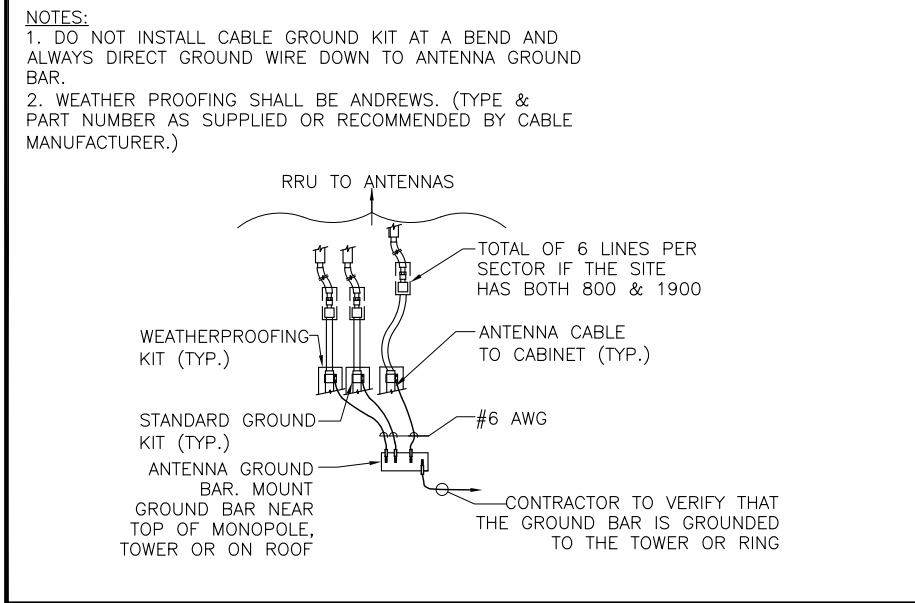
**GROUND LUG TO BUS BAR** 24"x36" SCALE: NTS 11"x17" SCALE: NTS **8**



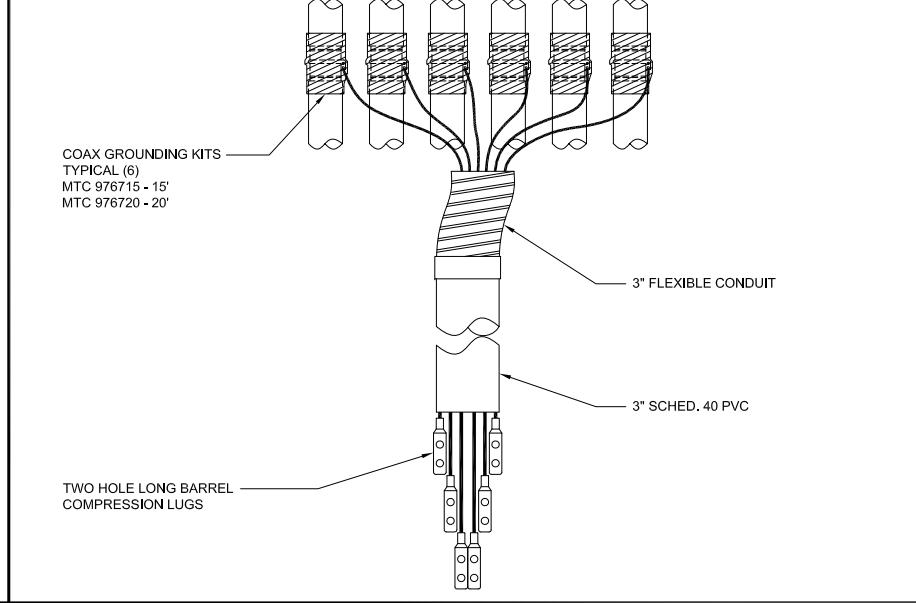
**ANTENNA GROUNDING PLAN** 24"x36" SCALE: NTS 11"x17" SCALE: NTS **5**



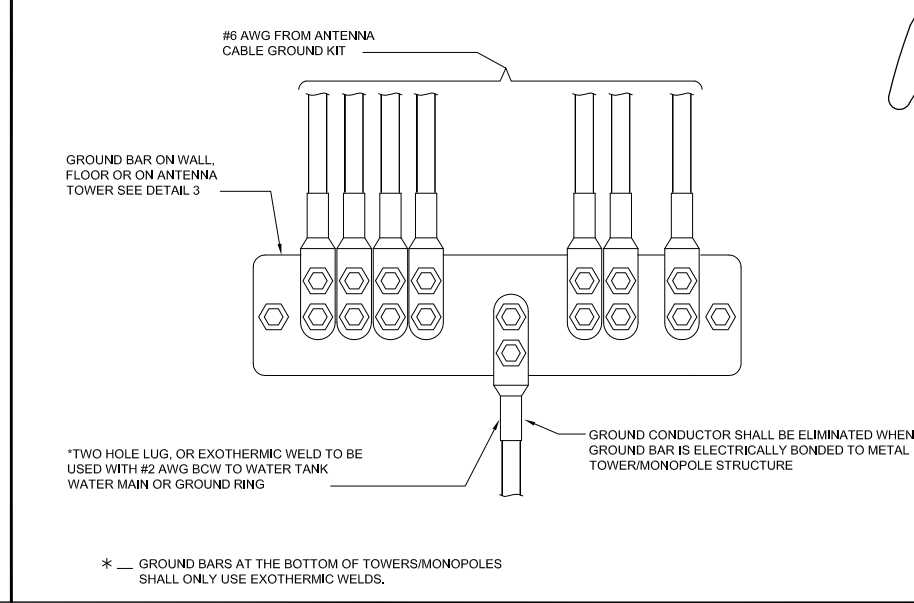
**GROUNDING WIRE CONNECTION** 24"x36" SCALE: NTS 11"x17" SCALE: NTS **2**



**TYPICAL COAX GROUNDING** 24"x36" SCALE: NTS 11"x17" SCALE: NTS **9**



**COAX GROUND KIT** 24"x36" SCALE: NTS 11"x17" SCALE: NTS **6**

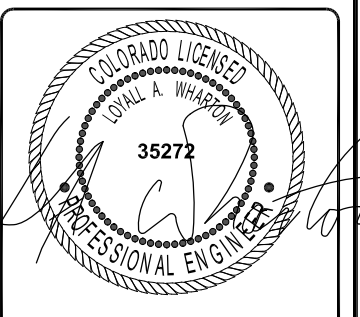


**WIRE TO GROUND BAR CONNECTION** 24"x36" SCALE: NTS 11"x17" SCALE: NTS **3**



DRAWN BY:	MB
CHECKED BY:	MM

REV	DATE	DESCRIPTION
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USWW MANITOU WATER  
DN14XC247  
7353 W. HWY 24  
CASCADE, CO 80809  
MONOPOLE

SHEET TITLE  
**GROUNDING DETAILS**

SHEET NUMBER  
**E-5**



**SprintVision** **RF Design Sheet**

Site Identification		Contact Information		Location Details	
Cascade	DN14XC247	Engineer Email	gprina.2.1@msw@sprint.com	Latitude	38.80664
SMS Schedule ID	124494	Sprint Badged RF Engineer	Geneta Team	Longitude	-104.86842
SMS Schedule Name	CO Micro Upgrade	RF Engineer Email	gprina.2.1@msw@sprint.com	Market	Colorado
RFID		RF Engineer Phone	224-346-9619	Region	West
RRU OEM	Samung	RF Manager	Dejananda.Rou@sprint.com	City	Monte Vista
Switch OEM	39A	RF Manager Email	Dejananda.Rou@sprint.com	State	CO
RFDS Issue Date	2017-04-12 00:00:00	RF Manager Phone	949-214-5811	Zip Code	CO80809
RFDS Revision	3			County	El Paso
Filter Analysis Complete		Carrier Count		Sector Count	
Filter Analysis Complete	YES	2500 LTE	3	2500MHz	2
RFDS - Issue Date		1900 LTE		1900MHz	
Design Status	Complete	1900 EVDO		1900MHz	
Border Analysis Complete	YES	1900 Voice	1	800MHz	2
Project Description	488 800 3G/4G and 2500 4G On each sector, replace existing antenna with (1) 4' 6-port triband antenna. Diplex 1900 & 2500 bands. Relocate 1900 RRUs to lower top.	800 LTE	1		
		800 Voice	1		

**Additional RF Notes**  
Add 800 3G/4G and 2500 4G. On each sector, replace existing antenna with (1) 4' 6-port triband antenna. Diplex 1900 & 2500 bands. Relocate 1900 RRUs to lower top.

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
<b>Radio Model</b>						
Model Number	RRH-B8	RRH-B8	N/A	N/A	N/A	N/A
Weight (lbs)	59.75	59.75	N/A	N/A	N/A	N/A
Dimensions	21.26 x 15.03 x 8.03	21.26 x 15.03 x 8.03	N/A	N/A	N/A	N/A
Manufacturer	STA	STA	N/A	N/A	N/A	N/A
Number of RRUs needed	1	1	0	0	0	0

Band: 800	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
<b>Radio Model</b>						
Model Number	RRH-C2A	RRH-C2A	N/A	N/A	N/A	N/A
Weight (lbs)	55.16	55.16	N/A	N/A	N/A	N/A
Dimensions	23.7 x 15.75 x 6.73	23.7 x 15.75 x 6.73	N/A	N/A	N/A	N/A
Manufacturer	STA	STA	N/A	N/A	N/A	N/A
Number of RRUs needed	1	1	0	0	0	0

Trunk Cable 1	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Model Number	1900 Hybrid_STA	1900 Hybrid_STA	N/A	N/A	N/A	N/A
Weight (lbs)	2.2	2.2	N/A	N/A	N/A	N/A
Dimensions (in)	1.76	1.76	N/A	N/A	N/A	N/A
Manufacturer	STA	STA	N/A	N/A	N/A	N/A

Power Junction Cylinder Model	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Model Number	EP96-04223A	EP96-04223A	N/A	N/A	N/A	N/A
Weight (lbs)	4.58	4.58	N/A	N/A	N/A	N/A
Dimensions (in)	15.35 High x 3.15 dia	15.35 High x 3.15 dia	N/A	N/A	N/A	N/A
Manufacturer	STA	STA	N/A	N/A	N/A	N/A
Power Junction Cylinder Qty	1	1	0	0	0	0

Optical Junction Cylinder Qty needed	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Model Number	EP96-04225A	EP96-04225A	N/A	N/A	N/A	N/A
Weight (lbs)	4.04	4.04	N/A	N/A	N/A	N/A
Dimensions (in)	11.22 High x 3.15 dia	11.22 High x 3.15 dia	N/A	N/A	N/A	N/A
Manufacturer	STA	STA	N/A	N/A	N/A	N/A
Optical Junction Cylinder Qty needed						

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
<b>Antenna1</b>						
Model Number	Antenna assigned on a different band	Antenna assigned on a different band				
Weight (lbs)	0	0	N/A	N/A	N/A	N/A
Dimensions	0 x 0 x 0	0 x 0 x 0	N/A	N/A	N/A	N/A
Manufacturer	-	-	N/A	N/A	N/A	N/A
Ant 1 Top Jumper Make/Mode/Qty	2.5 Jumper   4	2.5 Jumper   4	N/A	0	N/A	0
Ant 1 RF requested Diameter	N/A	N/A	N/A	N/A	N/A	N/A
Ant 1 RF requested Top Jumper Length(ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Azimuth	325	125	N/A	N/A	N/A	N/A
Antenna 1 Mechanical DT	0	0	N/A	N/A	N/A	N/A
Antenna 1 Center Line (ft)	58	58	N/A	N/A	N/A	N/A
Antenna 1 Electrical DT	2	N/A	N/A	N/A	N/A	N/A
Antenna 1 Electrical DT 2	N/A	2	N/A	N/A	N/A	N/A

Band: 800	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
<b>Antenna1</b>						
Model Number	HPA65R-KE4AA-K	HPA65R-KE4AA-K				
Weight (lbs)	28.7	28.7	N/A	N/A	N/A	N/A
Dimensions	48 x 11.7 x 7.6	48 x 11.7 x 7.6	N/A	N/A	N/A	N/A
Manufacturer	CCI	CCI	N/A	N/A	N/A	N/A
Ant 1 Top Jumper Make/Mode/Qty	800/1900 Jumper   1	800/1900 Jumper   2	N/A	0	N/A	0
Ant 1 RF requested Diameter	N/A	N/A	N/A	N/A	N/A	N/A
Ant 1 RF requested Top Jumper Length(ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Azimuth	325	125	N/A	N/A	N/A	N/A
Antenna 1 Mechanical DT	0	0	N/A	N/A	N/A	N/A
Antenna 1 Center Line (ft)	58	58	N/A	N/A	N/A	N/A
Antenna 1 Electrical DT	3	3	N/A	N/A	N/A	N/A



**M SQUARE**  
WIRELESS  
1387 CALLE AVANZADO  
SAN CLEMENTE CA 92673 (949) 391-6824

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7353 W. HWY 24  
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MONOPOLE

SHEET TITLE  
**RADIO FREQUENCY  
DATA SHEET**

SHEET NUMBER  
**RF-1**