Know what's below. Call before you dig.

COLORADO 811 — KNOW WHAT'S BELOW. CALL BEFORE YOU DIG.

Approved
By:Gabe Sevigny
Date:11/01/2017
El Paso County Planning & Community Development

EL PASO COUNTY, COLORADO — EST. 1861

Sprint

PROJECT: DO MACRO UPGRADE

SITE CASCADE: DN72XC019

ADDRESS: 6761 SHOUP ROAD
COLORADO SPRINGS, CO 80908
EL PASO COUNTY

LATITUDE: 39.01178° N / 39° 0' 42.408"N
LONGITUDE: 104.70175° W / 104° 42' 6.3"W

SITE TYPE: MONOPINE

SITE INFORMATION

TOWER OWNER:	SBA
APPLICANT:	SPRINT
LAT/LONG TYPE:	NAD-83
LATITUDE:	39.01178° N / 39° 0' 42.408"N
LONGITUDE:	104.70175° W / 104° 42' 6.3"W
ZONING JURISDICTION:	EL PASO COUNTY
ZONING CLASSIFICATION:	STATE ASSESSED
CURRENT USE:	UNMANNED TELECOMMUNICATIONS FACILITY
ASSESSOR'S PARCEL NO.:	5218-002-001
PROPOSED USE:	UNMANNED TELECOMMUNICATIONS FACILITY
TYPE OF CONSTRUCTION:	V-B
OCCUPANCY GROUP:	U-2

AREA MAP

PROJECT DESCRIPTION

SPRINT WIRELESS PROPOSES TO MODIFY AN EXISTING WIRELESS INSTALLATION, THE SCOPE WILL CONSIST OF THE FOLLOWING:

• REMOVE	(3)	EXISTING SPRINT PANEL ANTENNAS
• RELOCATE	(3)	EXISTING SPRINT 1900MHz RRU'S TO ANTENNA LEVEL
• INSTALL	(3)	NEW SPRINT 2500MHz PANEL ANTENNAS
• INSTALL	(3)	NEW SPRINT 2500MHz RRUS @ ANTENNA LEVEL
• INSTALL	(3)	NEW SPRINT 800MHz PANEL ANTENNA
• INSTALL	(3)	NEW SPRINT 800MHz RRUS @ ANTENNA LEVEL
• INSTALL	(4)	NEW SPRINT BATTERIES IN EXISTING BBU CABINET
• INSTALL	(3)	NEW SPRINT POWER JUNCTION CYLINDERS
• INSTALL	(3)	NEW SPRINT FIBER JUNCTION CYLINDERS
• INSTALL	(1)	NEW SPRINT 2500MHz BASEBAND UNIT IN EXISTING MMBS CABINET
• INSTALL	(3)	NEW SPRINT HYBRIFLEX CABLE (HFC)

DRAWING INDEX

SHEET NO:	SHEET TITLE
T-1	TITLE SHEET
GN-1	GENERAL NOTES
GN-2	GENERAL NOTES
A-1	KEYMAP, SITE PLAN, ENLARGED 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

PROJECT TEAM

REAL ESTATE MANAGER:
CONTACT: CHRISTINE POULIGNOT
REAL ESTATE MANAGER - COLORADO
SPRINT NEXTEL CORPORATION
C/O CHRISTINE POULIGNOT
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ENGLEWOOD, CA 80112
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EMAIL:christine.poulignot@sprint.com

SITE ACQUISITION
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SAN CLEMENTE, CA 92673
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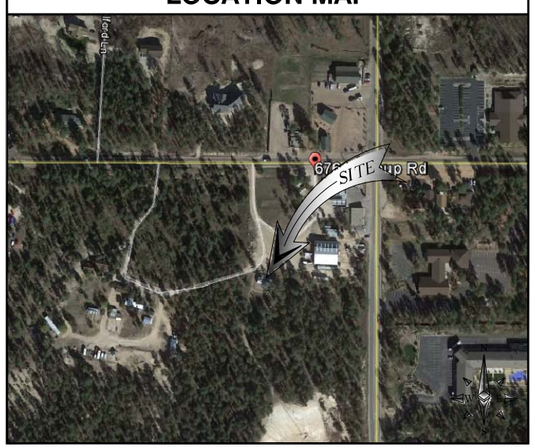
EMAIL: matthewbabb61@gmail.com

ENGINEER:
M.SQUARED ENGINEERS
1387 CALLE AVANZADO
SAN CLEMENTE, CA 92673
CONTACT: MICHAEL MONTELLO
EMAIL: michael@m2-eng.com

RF ENGINEER:
CONTACT: NEERAJ BERI
PH: (440) 222-8729
EMAIL: neeraj.beri@sprint.com

CONSTRUCTION MANAGER:
CONTACT: BRANDON WHINERY
PH: (303) 505-5750
EMAIL: brandon.whinery@sprint.com

LOCATION MAP



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

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.

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: _____

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.

Sprint

m.squared ENGINEERS
1387 CALLE AVANZADO
SAN CLEMENTE, CA 92673
(619) 997-4012

DRAWN BY:	PC
CHECKED BY:	MM

REV	DATE	DESCRIPTION
A	07/24/2017	90% CD'S FOR REVIEW

DN72XC019
6761 SHOUP ROAD
COLORADO SPRINGS, CO 80908
MONOPINE

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

THESE OUTLINE SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT STANDARD CONSTRUCTION SPECIFICATIONS, INCLUDING CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

SECTION 01 100 - SCOPE OF WORK:

THE WORK:
SHALL COMPLY WITH APPLICABLE NATIONAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF.

PRECEDENCE:
SHOULD CONFLICTS OCCUR BETWEEN THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AND THE CONSTRUCTION DRAWINGS, INFORMATION ON THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE.

SITE FAMILIARITY:
CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS PRIOR TO PROCEEDING WITH CONSTRUCTION.

ON-SITE SUPERVISION:
THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE:
THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.

A. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. PROVIDE ALL MATERIALS AND LABOR AS REQUIRED TO PROVIDE A COMPLETE AND FUNCTIONING SYSTEM. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK .

B. CONTRACTOR SHALL NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY VARIATIONS PRIOR TO PROCEEDING WITH THE WORK. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.

C. MARK THE FIELD SET OF DRAWINGS IN RED, DOCUMENTING ANY CHANGES FROM THE CONSTRUCTION DOCUMENTS.

METHODS OF PROCEDURE (MOPS) FOR CONSTRUCTION:
CONTRACTOR SHALL PERFORM WORK AS DESCRIBED IN THE FOLLOWING INSTALLATION AND COMMISSIONING MOPS.

A. TOP HAT
B. HOW TO INSTALL A NEW CABINET
C. BASE BAND UNIT IN EXISTING UNIT
D. INSTALLATION OF BATTERIES
E. INSTALLATION OF HYBRID CABLE
F. INSTALLATION OF RRU'S
G. CABLING
H. TS-0200 REV 4 - ANTENNA LINE ACCEPTANCE STANDARDS
I. SPRINT CELL SITE ENGINEERING NOTICE - EN 2012-001, REV 1.
J. COMMISSIONING MOPS
K. GROUNDING NE-312-201
L. SPRINT INTEGRATED CONSTRUCTION STANDARDS VERSION 4.0

SECTION 01 200 - COMPANY FURNISHED MATERIAL AND EQUIPMENT

COMPANY FURNISHED MATERIAL AND EQUIPMENT IS IDENTIFIED ON THE RF DATA SHEET IN THE CONSTRUCTION DRAWINGS.

CONTRACTOR IS RESPONSIBLE FOR SPRINT PROVIDED MATERIAL AND EQUIPMENT TO ENSURE IT IS PROTECTED AND HANDLED PROPERLY THROUGHOUT THE CONSTRUCTION DURATION.

CONTRACTOR IS RESPONSIBLE FOR RECEIPT OF SPRINT FURNISHED EQUIPMENT AT CELL SITE OR CONTRACTORS LOCATION. CONTRACTOR TO COMPLETE SHIPPING AND RECEIPT DOCUMENTATION IN ACCORDANCE WITH COMPANY PRACTICE.

SECTION 01 300 - CELL SITE CONSTRUCTION

NOTICE TO PROCEED:
NO WORK SHALL COMPLETE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF WORK ORDER.

SITE CLEANLINESS:
CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.

SECTION 01 400 - SUBMITTALS & TESTS

ALTERNATES:
AT THE COMPANY'S REQUEST, ANY ALTERNATIVES TO THE MATERIALS OR METHODS SPECIFIED SHALL BE SUBMITTED TO SPRINTS CONSTRUCTION MANAGER FOR APPROVAL. SPRINT WILL REVIEW AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING. NO VERBAL APPROVALS WILL BE CONSIDERED.

TESTS AND INSPECTIONS:

A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTION AND PROJECT DOCUMENTATION.

B. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

1. COAX SWEEPS AND FIBER TESTS PER TS-0200 REV 4 ANTENNA LINE ACCEPTANCE STANDARDS.

2. AGL, AZIMUTH AND DOWNTILT PROVIDE AN AUTOMATED REPORT UPLOADED TO SITERRA USING A COMMERCIAL MADE-FOR THE PURPOSE ELECTRONIC ANTENNA ALIGNMENT TOOL (AAT). INSTALLED AZIMUTH, CENTERLINE AND DOWNTILT MUST CONFORM WITH RF CONFIGURATION DATA.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.

4. ALL TESTING REQUIRED BY APPLICABLE INSTALLATION MOPS.

C. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:

1. AZIMUTH, DOWNTILT, AGL FROM SUNSIGHT INSTRUMENTS - ANTENNA ALIGNMENT TOOL (ATT)

2. SEEP AND FIBER TESTS

3. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT

4. ALL AVAILABLE JURISDICTIONAL INFORMATION

5. PDF SCAN REDLINES PRODUCED IN FIELD

6. A PDF SCAN OF RELINE MARK-UPS SUITABLE FOR USE IN ELECTRONIC AS-BUILT DRAWING PRODUCTION

7. LIEN WAIVERS

8. FINAL PAYMENT APPLICATION

9. REQUIRED FINAL CONSTRUCTION PHOTOS

10. CONSTRUCTION AND COMMISSIONING CHECKLIST COMPLETE WITH NO DEFICIENT ITEMS

11. ALL POST NTP TASKS INCLUDING DOCUMENT UPLOADS COMPLETED IN SITERRA (SPRINTS DOCUMENT REPOSITORY OF RECORD.

12. CLOSEOUT PHOTOGRAPHS:

a. PROVIDE PHOTOGRAPHS OF FINAL PROJECT PER THE FOLLOWING LIST. ADDITIONAL PHOTOGRAPHS MAY BE REQUIRED TO SUPPORT ACCEPTANCE PROCESSES

(I) MAIN HYBRID CABLE ROUTE (MINIMUM TWO PHOTOS)
(I) PHOTOS OF EACH ANTENNA AND RRU
(III) MANUFACTURERS NAME TAG FOR ALL SERIALIZED EQUIPMENT
(IV) PULL AND DISTRIBUTION BOXES INTERMEDIATE BETWEEN RRU'S AND MMBS (DOOR OPEN)
(V) MMBS CABINET WITH DOOR OPEN SHOWING MODIFICATIONS
(VI) POWER CABINET, DOORS OPEN, BATTERIES INSTALLED
(VII) BREAK OUT CYLINDERS
(VIII) ASR SIGNAGE FOR SPRINT OWNED TOWERS
(IX) RADIATION EXPOSURE WARNING SIGNS
(X) PHOTOGRAPH FROM EACH SECTOR FROM APPROXIMATELY RAD CENTER OF ANY NEW ANTENNA AT HORIZON.

b. LOAD PHOTOS TO SITERRA PROJECT LIBRARY I5. IN I5 CREATE NEW CATEGORY: 2.5 DEPLOYMENT AND SECTION: PERMANENT CONSTRUCTION. LABEL PHOTOS WITH SITE CASCADE AND VIEW BEING DEPICTED. CAMERAS USED TO TAKE PHOTOGRAPHS SHALL GPS ENABLED SUCH THAT THE GPS COORDINATED ARE INCLUDED IN THE PHOTO MEDIA-FILE INFORMATION.

COMMISSIONING:
PERFORM ALL COMMISSIONING AS REQUIRED BY APPLICABLE MOPS

INTEGRATION:
PERFORM ALL INTEGRATION ACTIVITIES AS REQUIRED BY APPLICABLE MOPS

SECTION 07 500 - ROOF CUTTING, PATCHING AND REPAIR

SUMMARY:
THIS SECTION SPECIFIES CUTTING AND PATCHING EXISTING ROOFING SYSTEMS WHERE CONDUIT OR CABLES EXIT THE BUILDING-MOUNTED ANTENNAS, AND AS REQUIRED FOR WATERTIGHT PERFORMANCE. ROOFTOP ENTRY OPENINGS IN MEMBRANE ROOFTOPS SHALL BE CONSTRUCTED TO COMPLY WITH LANDLORD, ANY EXISTING WARRANTY, AND LOCAL JURISDICTIONAL STANDARDS.

1.4 SUBMITTALS:

A. PRE-CONSTRUCTION ROOF PHOTOS: COMPLETE A ROOF INSPECTION PRIOR TO THE INSTALLATION OF SPRINT EQUIPMENT ON ANY ROOFTOP BUILD. AT A MINIMUM INSPECT AND PHOTOGRAPH (MINIMUM 3 EA.) ALL AREAS IMPACTED BY THE ADDITION OF THE SPRINT EQUIPMENT.

B. PROVIDE SIMILAR PHOTOGRAPHS SHOWING ROOF CONDITIONS AFTER CONSTRUCTION (MINIMUM 3 EA.)

C. ROOF INSPECTION PHOTOGRAPHS SHOULD BE UPLOADED WITH CLOSEOUT PHOTOGRAPHS.

SECTION 09 900 - PAINTING

QUALITY ASSURANCE:

A. COMPLY WITH COVERING CODES AND REGULATIONS, PROVIDE PRODUCTS OF ACCEPTABLE MANUFACTURERS WHICH HAVE BEEN IN SATISFACTORY USE IN SIMILAR SERVICE FOR THREE YEARS. USE EXPERIENCED INSTALLERS. DELIVER, HANDLE, AND STORE MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

B. COMPLY WITH ALL ENVIRONMENTAL REGULATIONS FOR VOLATILE ORGANIC COMPOUNDS.

MATERIALS:

A. MANUFACTURERS: BENJAMIN MOORE, ICI DEVOE COATINGS, PPG, SHERWIN WILLIAMS OR APPROVED EQUAL, PROVIDE PREMIUM GRADE, PROFESSIONAL - QUALITY PRODUCTS FOR COATING SYSTEMS.

PAINT SCHEDULE:

A. EXTERIOR ANTENNAS AND ANTENNA MOUNTING HARDWARE: ONE COAT OF PRIMER AND TWO FINISH COATS. PAINT FOR ANTENNAS SHALL BE NON-METALLIC BASED AND CONTAIN NO METALLIC PARTICLES. PROVIDE COLORS AND PATTERNS AS REQUIRED TO MASK APPEARANCE OF ANTENNAS. ON ADJACENT BUILDING SURFACES AND AS ACCEPTABLE TO THE OWNER, REFER TO ANTENNA MANUFACTURER'S INSTRUCTIONS WHENEVER POSSIBLE.

B. ROOF TOP CONSTRUCTION: TOUCH UP - PREPARE SURFACES TO BE REPAIRED, FOLLOW INDUSTRY STANDARDS AND REQUIREMENTS OF OWNER TO MATCH EXISTING COATING AND FINISH.

PAINTING APPLICATION:

1. INSPECT SURFACES, REPORT UNSATISFACTORY CONDITIONS IN WRITING; BEGINNING WORK MEANS ACCEPTANCE OF SUBSTRATE.

2. COMPLY WITH MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS FOR PREPARATION, PRIMING AND COATING WORK. COORDINATE WITH WORK OF OTHER SECTIONS.

3. MATCH APPROVED MOCK-UPS FOR COLOR, TEXTURE, AND PATTERN. RE-COAT OR REMOVE AND REPLACE WORK WHICH DOES NOT MATCH OR SHOWS LOSS OF ADHESION.

4. CLEAN UP, TOUGH UP AND PROTECT WORK.

TOUCHUP PAINTING:

1. GALVANIZING DAMAGE AND ALL BOLTS AND NUTS SHALL BE TOUCHED UP AFTER TOWER ERECTION WITH "GALVANOX", "DRY GALY", OR "ZINC-IT".

2. FIELD TOUCHUP PAINT SHALL BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.

3. ALL METAL COMPONENTS SHALL BE HANDLED WITH CARE TO PREVENT DAMAGE TO THE COMPONENTS, THEIR PRESERVATIVE TREATMENT, OR THEIR PROTECTIVE COATINGS.

SECTION 11 700 - ANTENNA ASSEMBLY, REMOTE RADIO UNITS AND CABLE INSTALLATION

SUMMARY:
THIS SECTION SPECIFIES INSTALLATION OF ANTENNAS, RRU'S, AND CABLE EQUIPMENT, INSTALLATION, AND TESTING OF COAXIAL FIBER CABLE.

ANTENNAS AND RRU'S:
THE NUMBER AND TYPE OF ANTENNAS AND RRU'S TO BE INSTALLED IS DETAILED ON THE CONSTRUCTION DRAWINGS.

HYBRID CABLE:
HYBRID CABLE WILL BE DC/FIBER AND FURNISHED FOR INSTALLATION AT EACH SITE. CABLE SHALL BE INSTALLED PER THE CONSTRUCTION DRAWINGS AND THE APPLICABLE MANUFACTURER'S REQUIREMENTS.

JUMPERS AND CONNECTORS:
FURNISH AND INSTALL 1/2" COAX JUMPER CABLES BETWEEN THE RRU'S AND ANTENNAS. JUMPERS SHALL BE TYPE LDF 4, FLC 12-50, CR 540, OR FXL 540, SUPER-FLEX CABLES ARE NOT ACCEPTABLE. JUMPERS BETWEEN THE RRU'S AND ANTENNAS OR TOWER TOP AMPLIFIERS SHALL CONSIST OF 1/2 INCH FOAM DIELECTRIC, OUTDOOR RATED COAXIAL CABLE. DO NOT USE SUPER-FLEX OUTDOORS. MAXIMUM OF 4 FEET EXCESS PER JUMPER AND HAVE CONNECTORS AT EACH END, MANUFACTURED BY SUPPLIER. IF JUMPERS ARE FIELD FABRICATED, FOLLOW MANUFACTURER'S REQUIREMENTS FOR INSTALLATION OF CONNECTORS.

REMOTE ELECTRICAL TILT (RET) CABLES:

MISCELLANEOUS:
INSTALL SPLITTERS, COMBINERS, FILTERS PER RF DATA SHEET, FURNISHED BY SPRINT.

ANTENNA INSTALLATION:
THE CONTRACTOR SHALL ASSEMBLE ALL ANTENNAS ONSITE IN ACCORDANCE WITH THE INSTRUCTIONS SUPPLIED BY THE MANUFACTURER, ANTENNA HEIGHT, AZIMUTH, AND FEED ORIENTATION INFORMATION SHALL BE A DESIGNATED ON THE CONSTRUCTION DRAWINGS.

A. THE CONTRACTOR SHALL POSITION THE ANTENNA ON TOWER PIPE MOUNTS SO THAT THE BOTTOM STRUT IS LEVEL. THE PIPE MOUNTS SHALL BE PLUMB TO WITHIN 1 DEGREE.

B. ANTENNA MOUNTING REQUIREMENTS: PROVIDE ANTENNA MOUNTING HARDWARE AS INDICATED ON THE DRAWINGS.

HYBRID CABLE INSTALLATION:

A. THE CONTRACTOR SHALL ROUTE, TEST, AND INSTALL ALL CABLES AS INDICATED ON THE CONSTRUCTION DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. THE INSTALLED RADIUS OF THE CABLES SHALL NOT BE LESS THAN THE MANUFACTURER'S SPECIFICATIONS FOR BENDING RADII.

C. EXTREME CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE CABLES DURING HANDLING AND INSTALLATION.

1. FASTENING MAIN HYBRID CABLES: ALL CABLES SHALL BE PERMANENTLY FASTENED TO THE COAX LADDER AT 4'-0" OC USING NON-MAGNETIC STAINLESS STEEL CLIPS.

2. FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA), WITHIN THE MMBS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES:

a. FIBER: SUPPORT FIBER BUNDLES USING 1/2" VELCRO STRAPS OF THE REQUIRED LENGTH O 18" OC. STRAPS SHALL BE UV, OIL AND WATER RESISTANT AND SUITABLE FOR INDUSTRIAL INSTALLATIONS AS MANUFACTURED BY TEXTOL OR APPROVED EQUAL

b. DC: SUPPORT DC BUNDLES WITH ZIP TIES OF THE ADEQUATE LENGTH, ZIP TIES TO BE UV STABILIZED, BLACK NYLON, WITH TENSILE STRENGTH AT 12,000 PSI AS MANUFACTURED BY NELCO PRODUCTS OR EQUAL.

3. FASTENING JUMPERS: SECURE JUMPERS TO THE SIDE ARMS OR HEAD FRAMES USING STAINLESS STEEL TIE WRAPS OR STAINLESS STEEL BUTTERFLY CLIPS.

4. CABLE INSTALLATION:

a. INSPECT CABLE PRIOR TO USE FOR SHIPPING DAMAGE, NOTIFY THE CONSTRUCTION MANAGER.

b. CABLE ROUTING: CABLE INSTALLATION SHALL BE PLANNED TO ENSURE THAT THE LINES WILL BE PROPERLY ROUTED IN THE CABLE ENVELOP AS INDICATED ON THE DRAWINGS.

c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURERS RECOMMENDED MAXIMUM BEND RADIUS.

5. GROUNDING OF TRANSMISSION LINES: ALL TRANSMISSION LINES SHALL BE GROUNDED AS INDICATED ON DRAWINGS.

6. HYBRID CABLE COLOR CODING: ALL COLOR CODING SHALL BE AS REQUIRED IN TS 0200 REV 4.

7. HYBRID CABLE LABELING: INDIVIDUAL HYBRID AND DC BUNDLES SHALL BE LABELED ALPHA-NUMERICALLY ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE - EN 2012-001 REV 4.

WATERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:

A. ALL FIBER & COAX CONNECTORS AND GROUND KITS SHALL BE WATERPROOFED.

B. WEATHERPROOFED USING ONE OF THE FOLLOWING METHODS. ALL INSTALLATIONS MUST BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY BEST PRACTICES.

1. COLD SHRINK: ENCOMPASS CONNECTOR IN COLD SHRINK TUBING AND PROVIDE A DOUBLE WRAP OF 2" ELECTRICAL TAPE EXTENDING 2" BEYOND TUBING, PROVIDE 3M COLD SHRINK CXS SERIES OR EQUAL.

2. SELF-AMALGAMATING TAPE: CLEAN SURFACES. APPLY A DOUBLE WRAP OF SELF-AMALGAMATING TAPE 2" BEYOND CONNECTOR. APPLY A SECOND WRAP OF SELF-AMALGAMATING TAPE IN OPPOSITE DIRECTION. APPLY DOUBLE WRAP OF 2" WIDE ELECTRICAL TAPE EXTENDING 2" BEYOND THE SELF-AMALGAMATING TAPE.

3. 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.

4. OPEN FLAME ON JOB SITE IS NOT ACCEPTABLE

SECTION 11 800 - INSTALLATION OF MULTIMODAL BASE STATIONS (MMBS) AND RELATED EQUIPMENT

SUMMARY:

A. THIS SECTION SPECIFIES MMBS CABINETS, AND INTERNAL EQUIPMENT INCLUDING BY NOT LIMITED TO RECTIFIERS, POWER DISTRIBUTION UNITS, BASE AND UNITS, SURGE ARRESTORS, BATTERIES, AND SIMILAR EQUIPMENT FURNISHED BY THE COMPANY FOR INSTALLATION BY THE CONTRACTOR (OFCI).

B. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MISCELLANEOUS MATERIALS AND PROVIDE ALL LABOR REQUIRED FOR INSTALLATION EQUIPMENT IN EXISTING CABINET OR NEW CABINET AS SHOWN ON DRAWINGS AND AS REQUIRE BY THE APPLICABLE INSTALLATION MOPS.

C. COMPLY WITH MANUFACTURERS INSTALLATION AND START-UP REQUIREMENTS.

DC CIRCUIT BREAKER LABELING

A. LABEL CIRCUIT BREAKERS ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE - EN 2012-001, REV 1.

SECTION 11 800 - INSTALLATION OF MULTIMODAL BASE STATIONS (MMBS) AND RELATED EQUIPMENT

SUMMARY:

A. THIS SECTION SPECIFIES MMBS CABINETS, POWER CABINETS, AND INTERNAL EQUIPMENT INCLUDING BY NOT LIMITED TO RECTIFIERS, POWER DISTRIBUTION UNITS, BASE BAND UNITS, SURGE ARRESTORS, BATTERIES, AND SIMILAR EQUIPMENT F FURNISHED BY THE COMPANY FOR INSTALLATION BY THE CONTRACTOR (OFCI).

B. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MISCELLANEOUS MATERIALS AND PROVIDE ALL LABOR REQUIRED FOR INSTALLATION EQUIPMENT IN EXISTING CABINET OR NEW CABINET AS SHOWN ON DRAWINGS AND AS REQUIRE BY THE APPLICABLE INSTALLATION MOPS.

C. COMPLY WITH MANUFACTURERS INSTALLATION AND START-UP REQUIREMENTS.

SUPPORTING DEVICES:

A. MANUFACTURED STRUCTURAL SUPPORT MATERIALS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY THE FOLLOWING:

1. ALLIED TUBE AND CONDUIT

2. B-LINE SYSTEM

3. SUNISTRUT DIVERSIFIED PRODUCTS

4. THOMAS & BETTS

B. FASTENERS: TYPES, MATERIALS, AND CONSTRUCTION FEATURES AS FOLLOWS:

1. EXPANSION ANCHORS: CARBON STEEL WEDGE OR SLEEVE TYPE.

2. POWER-DRIVEN THREADED STUDS: HEAT-TREATED STEEL, DESIGNED SPECIFICALLY FOR THE INTENDED SERVICE.

3. FASTEN BY MEANS OF WOOD SCREWS ON WOOD.

4. TOGGLE BOLTS ON HOLLOW MASONRY UNITS.

5. CONCRETE INSERTS OF EXPANSION BOLTS ON CONCRETE OR SOLID MASONRY.

6. MACHINE SCREWS, WELDED THREADED STUDS, OR SPRING-TENSION CLAMPS ON STEEL.

7. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE SHALL NOT BE PERMITTED.

8. DO NOT WELD CONDUIT, PIPE STRAPS, OR ITEMS OTHER THAN THREADED STUDS TO STEEL STRUCTURES.

9. IN PARTITIONS OF LIGHT STEEL CONSTRUCTION, USE SHEET METAL SCREWS.

SUPPORTING DEVICES:

A. INSTALL SUPPORTING DEVICES TO FASTEN ELECTRICAL COMPONENTS SECURELY AND PERMANENTLY IN ACCORDANCE WITH NEC.
B. COORDINATE WITH THE BUILDING STRUCTURAL SYSTEM AND WITH OTHER TRADES.
C. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, FASTEN ELECTRICAL ITEMS AND THEIR SUPPORTING HARDWARE SECURELY TO THE STRUCTURE IN ACCORDANCE WITH THE FOLLOWING:
D. ENSURE THAT THE LOAD APPLIED BY ANY FASTENER DOES NOT EXCEED 25 PERCENT OF THE PROOF TEST LOAD.
E. USE VIBRATION AND SHOCK-RESISTANT FASTENERS FOR ATTACHMENTS TO CONCRETE SLABS.

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REV	DATE	DESCRIPTION
A	07/24/2017	90% CD'S FOR REVIEW

DN72XC019
6761 SHOUP ROAD
COLORADO SPRINGS, CO 80908
MONOPINE

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN-1

ELECTRICAL IDENTIFICATION:

A. UPDATE AND PROVIDE TYPED CIRCUIT BREAKER SCHEDULES IN THE MOUNTING BRACKET, INSIDE DOORS OF AC PANEL BOARDS WITH ANY CHANGES MADE TO THE AC SYSTEM.

B. BRANCH CIRCUITS FEEDING AVIATION OBSTRUCTION LIGHTING EQUIPMENT SHALL BE CLEARLY IDENTIFIED AS SUCH AT THE BRANCH CIRCUIT PANELBOARD.

SECTION 26 200 - ELECTRICAL MATERIALS AND EQUIPMENT

CONDUIT:

A. RIGID GALVANIZED STEEL (RGS) CONDUIT SHALL BE USED FOR EXTERIOR LOCATIONS ABOVE GROUND AND IN UNFURNISHED INTERIOR LOCATIONS AND FOR ENCASED RUNS IN CONCRETE. RIGID CONDUIT AND FITTINGS SHALL BE STEEL, COATED WITH ZINC EXTERIOR AND INTERIOR BY THE HOT DIP GALVANIZING PROCESS. CONDUIT SHALL BE PRODUCED TO ANSI SPECIFICATIONS C80.1. FEDERAL SPECIFICATION WW-C-581 AND SHALL BE LISTED WITH THE UNDERWRITERS' LABORATORIES. FITTING WILL NOT BE ACCEPTABLE. RGS CONDUITS SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND.

B. UNDERGROUND CONDUIT IN CONCRETE SHALL BE POLYVINYLCHLORIDE (PVC) SUITABLE FOR DIRECT BURIAL AS APPLICABLE. JOINTS SHALL BE BELLED, AND FLUSH SOLVENT WELDED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. CONDUIT SHALL BE CARLON ELECTRICAL PRODUCTS OR APPROVED EQUAL.

C. TRANSITIONS BETWEEN PVC AND RIGID (RGS) SHALL BE MADE WITH PVC COATED METALLIC LONG SWEEP RADIUS ELBOWS.

D. EMT OR RIGID GALVANIZED STEEL CONDUIT MAY BE USED FINISHED SPACES CONCEALED IN WALLS AND CEILINGS. EMT SHALL BE MILD STEEL, ELECTRICALLY WELDED, ELECTRO-GALVANIZED OR HOT-DIPPED GALVANIZED AND PRODUCED TO ANSI SPECIFICATION C80.3, FEDERAL SPECIFICATION WW-C-563, AND SHALL BE UL LISTED. EMT SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND, OR APPROVED EQUAL. FITTING SHALL BE METALLIC COMPRESSION. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE.

E. LIQUID TIGHT FLEXIBLE METALLIC CONDUIT SHALL BE USED FINAL CONNECTION TO EQUIPMENT. FITTINGS SHALL BE METALLIC GLAND TYPE COMPRESSION FITTINGS, MAINTAINING THE INTEGRITY OF CONDUIT SYSTEM. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE. MAXIMUM LENGTH OF FLEXIBLE CONDUIT SHALL NOT EXCEED 6-FEET. LFMC SHALL BE PROTECTED AND SUPPORTED AS REQUIRE BY NEC. MANUFACTURERS OF FLEXIBLE CONDUITS SHALL BE CAROL, ANACONDA METAL. HOSE OR UNIVERSAL METAL HOSE, OR APPROVED EQUAL.

F. MINIMUM SIZE CONDUIT SHALL BE 3/4 INCH (21 MM).

HUBS AND BOXES:

A. AT ENTRANCES TO CABINETS OR OTHER EQUIPMENT NOT HAVING INTEGRAL THREADED HUBS PROVIDE METALLIC THREADED HUBS OF THE SIZE AND CONFIGURATION REQUIRED, HUB SHALL INCLUDE LOCKNUT AND NEOPRENE O-RING SEAL. PROVIDE IMPACT RESISTANT 105 DEGREE C PLASTIC BUSHINGS TO PROTECT CABLE INSULATION.

B. CABLE TERMINATION FITTINGS FOR CONDUIT

1. CABLE TERMINATORS FOR RGS CONDUIT SHALL BE TYPE CRC BY O-Z/GEDNEY OR EQUAL.

2. CABLE TERMINATORS FOR LFMC SHALL BE ETCO - CL2075; OR MADE FOR THE PURPOSE PRODUCTS BY ROXTEC.

C. EXTERIOR PULL BOXES AND PULL BOXES IN INTERIOR INDUSTRIAL AREAS SHALL BE PLATED CAST ALLOY, HEAVY DUTY, WEATHERPROOF, DUST PROOF, WITH GASKET, PLATED IRON ALLOY COVER AND STAINLESS STEEL COVER SCREWS, CROUSE-HINDS WAB SERIES OR EQUAL.

D. CONDUIT OUTLET BODIES SHALL BE PLATED CAST ALLOY WITH SIMILAR GASKET COVERS. OUTLET BODIES SHALL BE OF THE CONFIGURATION AND SIZE SUITABLE FOR THE APPLICATION. PROVIDE CROUSE-HINDS FORM 8 OR EQUAL.

E. MANUFACTURER FOR BOXES AND COVERS SHALL BE HOFFMAN, SQUARE "D", CROUSE-HIND, COOPER, ADALET, APPLETON, O-Z GEDNEY, RACO, OR APPROVED EQUAL.

SUPPLEMENTAL GROUNDING SYSTEM

A. FURNISH AND INSTALL A SUPPLEMENTAL GROUNDING SYSTEM AS INDICATED ON THE DRAWINGS. SUPPORT SYSTEM WITH NON-MAGNETIC STAINLESS STEEL CLIPS WITH RUBBER GROMMETS. GROUNDING CONNECTORS SHALL BE TINNED COPPER WIRE, SIZES AS INDICATED ON THE DRAWINGS. PROVIDE STRANDED OR SOLID BARE OR INSULATED CONDUCTORS AS INDICATED.

B. SUPPLEMENTAL GROUNDING SYSTEM: ALL CONNECTIONS TO BE MADE WITH CAD WELDS, EXCEPT AT EQUIPMENT USE LUGS OR OTHER AVAILABLE GROUNDING MEANS AS REQUIRED BY MANUFACTURER; AT GROUND BARS USE TWO HOLE SPADES WITH NO OX.

C. STOLEN GROUND-BARS: IN THE EVENT OF STOLEN GROUND BARS, CONTACT SPRINT CM FOR REPLACEMENT INSTRUCTION USING THREADED ROD KITS.

EXISTING STRUCTURE:

A. EXISTING EXPOSED WIRING AND ALL EXPOSED OUTLETS, RECEPTACLES, SWITCHES, DEVICES, BOXES, AND OTHER EQUIPMENT THAT ARE NOT TO BE UTILIZED IN THE COMPLETED PROJECT SHALL BE REMOVED OR DE-ENERGIZED AND CAPPED IN THE WALL, CEILING, OR FLOOR SO THAT THEY ARE CONCEALED AND SAFE, WALL, CEILING, OR FLOOR SHALL BE PATCHED TO MATCH THE ADJACENT CONSTRUCTION.

CONDUIT AND CONDUCTOR INSTALLATION:

A. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE. MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLETS OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FINISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUIT SHALL BE TEMPORARILY CAPPED TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.

B. CONDUCTORS SHALL BE PULLED IN ACCORDANCE WITH ACCEPTED GOOD PRACTICE.

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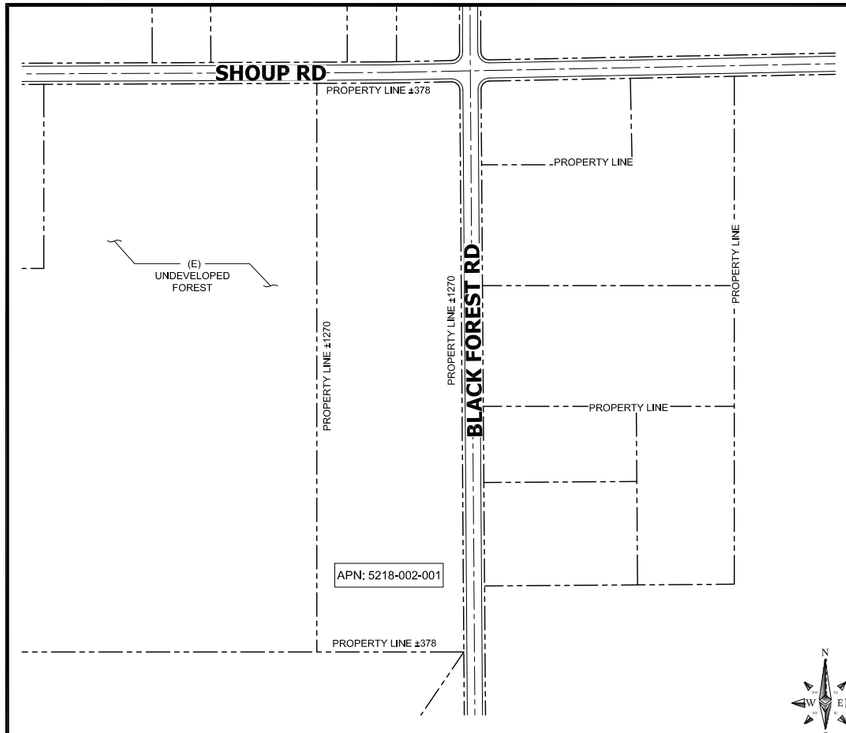
DN72XC019
6761 SHOUP ROAD
COLORADO SPRINGS, CO 80908
MONOPINE

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

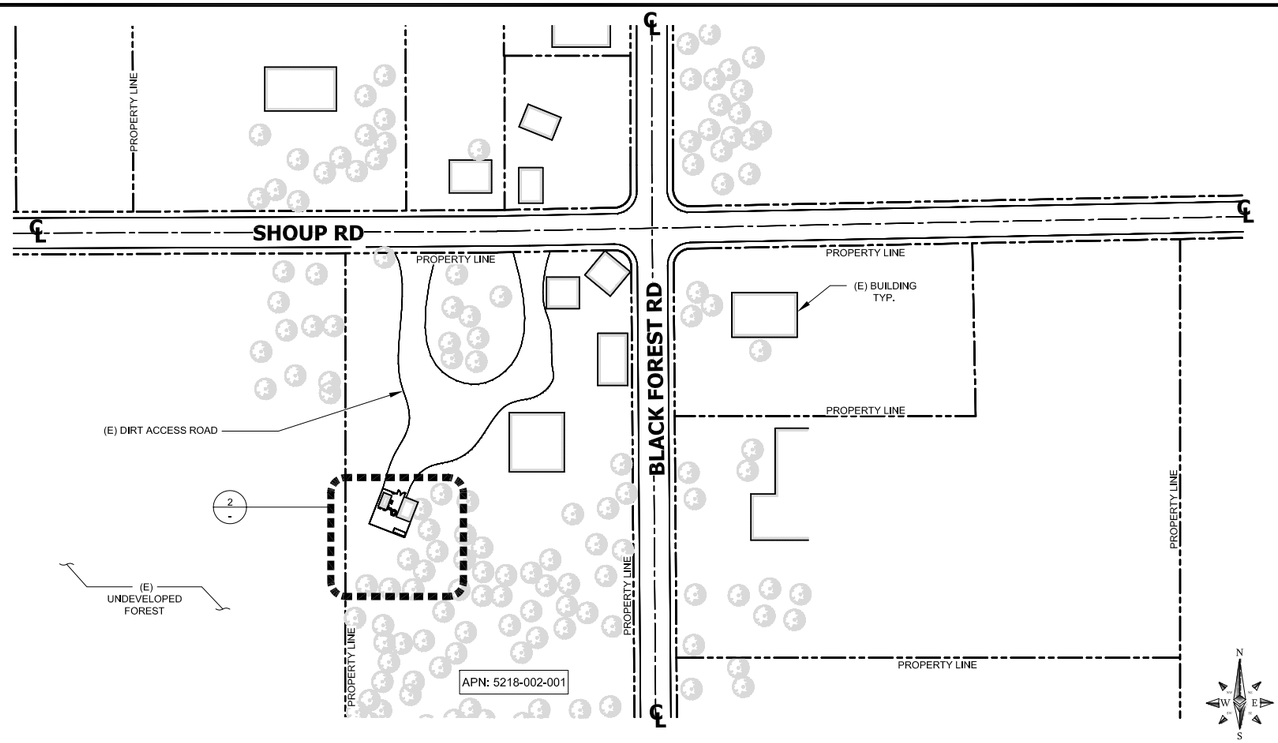
GN-2



KEYMAP

24"x36" SCALE: 1" = 200'-0"
11"x17" SCALE: 1" = 400'-0"
0" 100' 200' 400'

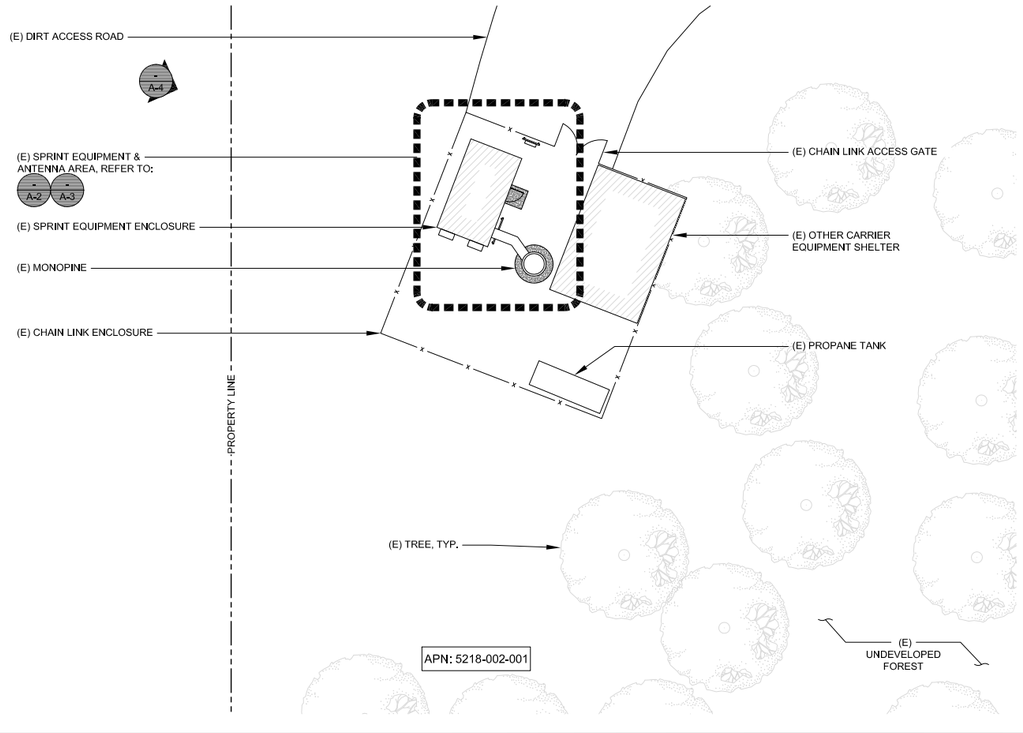
1



SITE PLAN

24"x36" SCALE: 1" = 100'-0"
11"x17" SCALE: 1" = 200'-0"
0" 50' 100' 200'

2



ENLARGED SITE PLAN

24"x36" SCALE: 1/16" = 1'-0"
11"x17" SCALE: 1/32" = 1'-0"
0" 8' 16' 32'

3

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

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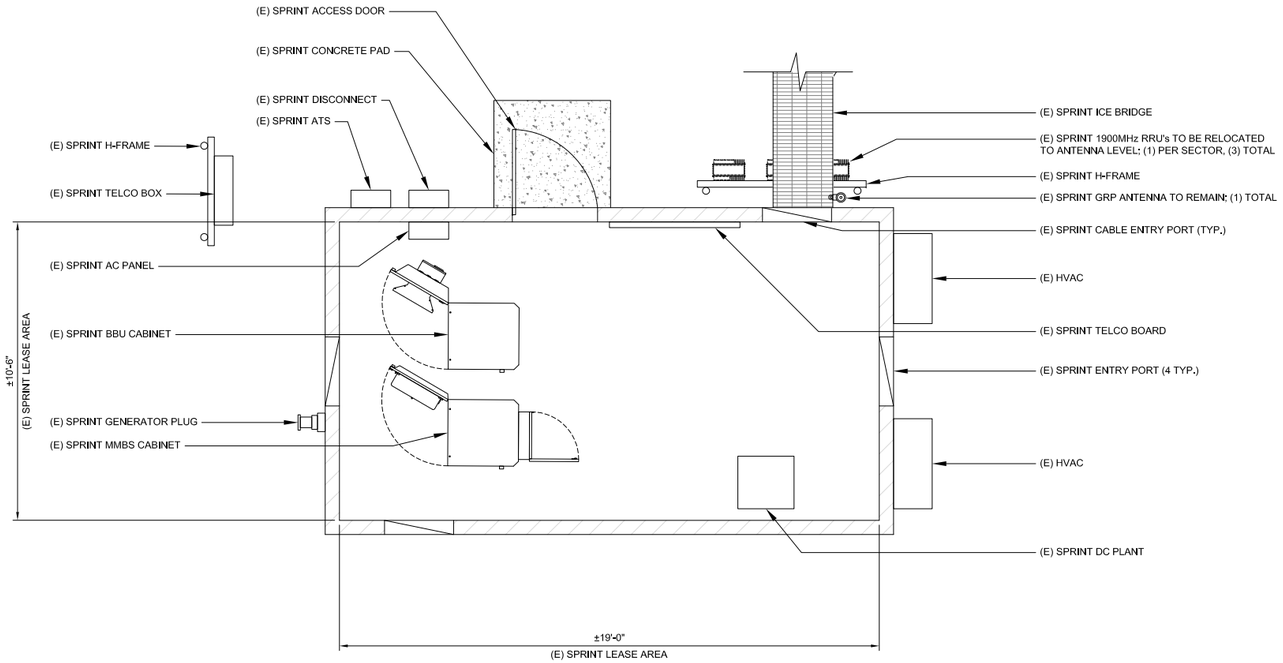
6761 SHOUP ROAD
COLORADO SPRINGS, CO 80908
MONOPINE

SHEET TITLE
KEY MAP, SITE PLAN, ENLARGED SITE PLAN

SHEET NUMBER
A-1

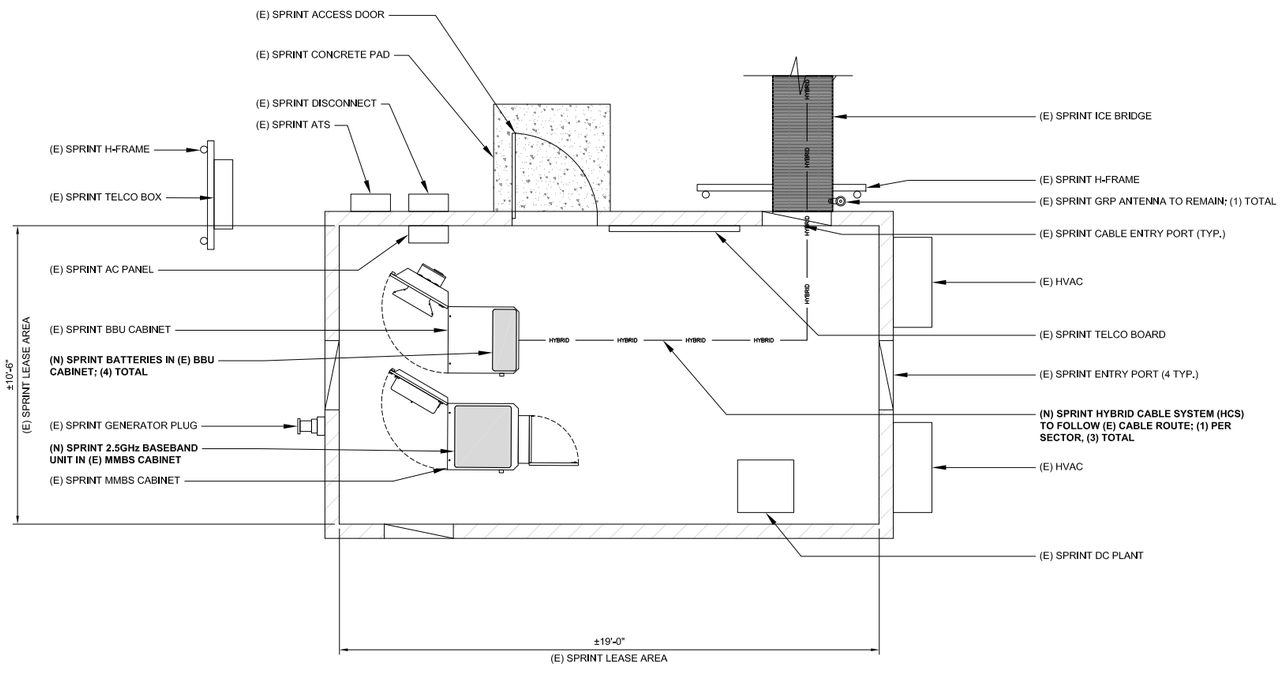


EXISTING EQUIPMENT LAYOUT

24"x36" SCALE: 3/8" = 1'-0"
11"x17" SCALE: 3/16" = 1'-0"

0" 1' 2' 4'

1



PROPOSED EQUIPMENT LAYOUT

24"x36" SCALE: 3/8" = 1'-0"
11"x17" SCALE: 3/16" = 1'-0"

0" 1' 2' 4'

2

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COLORADO SPRINGS, CO 80908
MONOPINE

SHEET TITLE

EQUIPMENT LAYOUT

SHEET NUMBER

A-2

NOTE:

1. 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.
2. REFER TO THE STRUCTURAL ANALYSIS AND/OR STRUCTURAL LETTER FOR THE APPROVAL OF ALL MODIFICATIONS TO AND ADDING EQUIPMENT OF NEW TOWER APPURTENANCES.
3. REFER TO ADDITIONAL DRAWINGS SPECIFIC TO TOWER REINFORCEMENT FOR THIS SITE SHOULD THERE BE A REQUIREMENT FOR ANY TOWER REINFORCEMENT.
4. REFER TO STRUCTURAL ANALYSIS FOR COAXIAL AND OTHER CABLE SUPPORT AND CONFIGURATION DETAIL.
5. REFER TO STRUCTURAL ANALYSIS FOR ALL CARRIERS APPURTENANCES AS THEY MAY NOT BE SHOWN IN ELEVATION DETAIL.

NOTES TO CONTRACTOR:

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

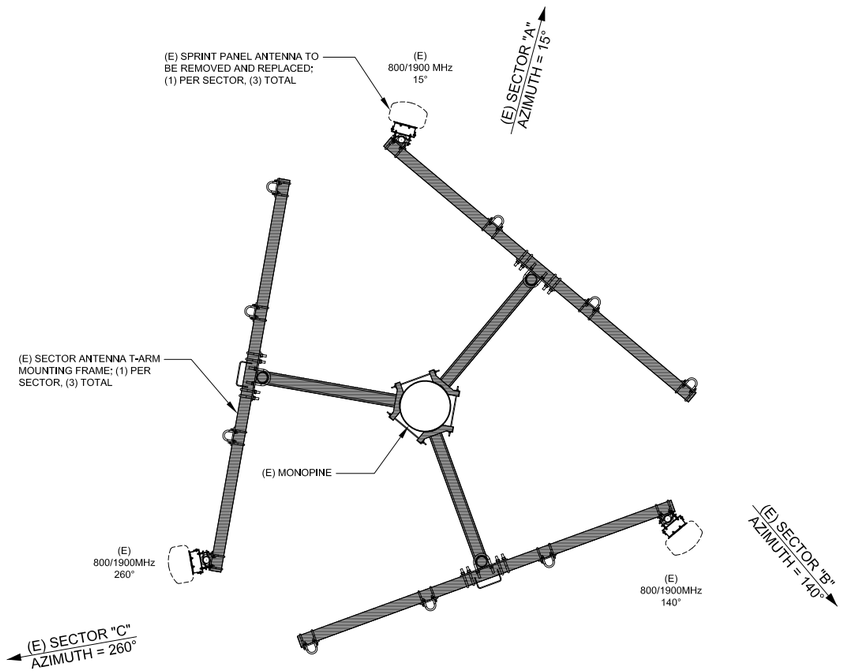
NOTE:

1. (E) ANTENNA AZIMUTHS ARE ESTIMATED AND ARE TO BE VERIFIED BY RF.
2. ALL NEW FIBER/CABLE RUNS TO UTILIZE (E) CONDUIT PATHS PREVIOUSLY ESTABLISHED WITHIN A PRE-APPROVED ACCESS/UTILITY ROUTE.
3. MONOPINE FRONDS NOT SHOWN FOR CLARITY

		REMOTE RADIO UNITS		DC CABLES	
	ANTENNA POSITION	RRUS MAKE AND MODEL	RRUS COUNT	LENGTH	AWG
SECTOR A	1	(E)1900MHz RRU	1	115'	–
	2	(N) 800MHz RRU	1	115'	–
	3	(N) 2500MHz RRU	1	115'	–
	4	–	–	–	–
SECTOR B	1	(E)1900MHz RRU	1	115'	–
	2	(N) 800MHz RRU	1	115'	–
	3	(N) 2500MHz RRU	1	115'	–
	4	–	–	–	–
SECTOR C	1	(E)1900MHz RRU	1	115'	–
	2	(N) 800MHz RRU	1	115'	–
	3	(N) 2500MHz RRU	1	115'	–
	4	–	–	–	–

	NEW OPTIMAL ANTENNA REQUIREMENTS (VERIFY WITH CURRENT RFDS)		ANTENNA MAKE AND MODEL		RAD CENTER		AZIMUTH		TRANSMISSION LINE		
	ANTENNA POSITION	TECHNOLOGY	ANTENNA COUNT	EXISTING	NEW	EXISTING	NEW	EXISTING	NEW	CABLE LENGTH	CABLE QTY.	FEEDER TYPE
SECTOR A	1	800,1900MHz	1	GENERIC SPRINT ANTENNA	KMW ET-X-TS-70-16-62-18-IR-RD	86'-0"	86'-0"	15°	55°	±10'	6/1	(N) JUMPER/RET
	2	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–
	4	2500MHz	1	–	KMW ET-X-WM-18-65-8P	–	86'-0"	–	325°	±10'	9/1	(N) JUMPER/RET
SECTOR B	1	800,1900MHz	1	GENERIC SPRINT ANTENNA	KMW ET-X-TS-70-16-62-18-IR-RD		86'-0"	140°	170°	±10'	6/1	(N) JUMPER/RET
	2	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–
	4	2500MHz	1	–	KMW ET-X-WM-18-65-8P	–	86'-0"	–	325°	±10'	9/1	(N) JUMPER/RET
SECTOR C	1	800,1900MHz	1	GENERIC SPRINT ANTENNA	KMW ET-X-TS-70-16-62-18-IR-RD	86'-0"	86'-0"	260°	325°	±10'	6/1	(N) JUMPER/RET
	2	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–
	4	2500MHz	1	–	KMW ET-X-WM-18-65-8P	–	86'-0"	–	325°	±10'	9/1	(N) JUMPER/RET

NOTES

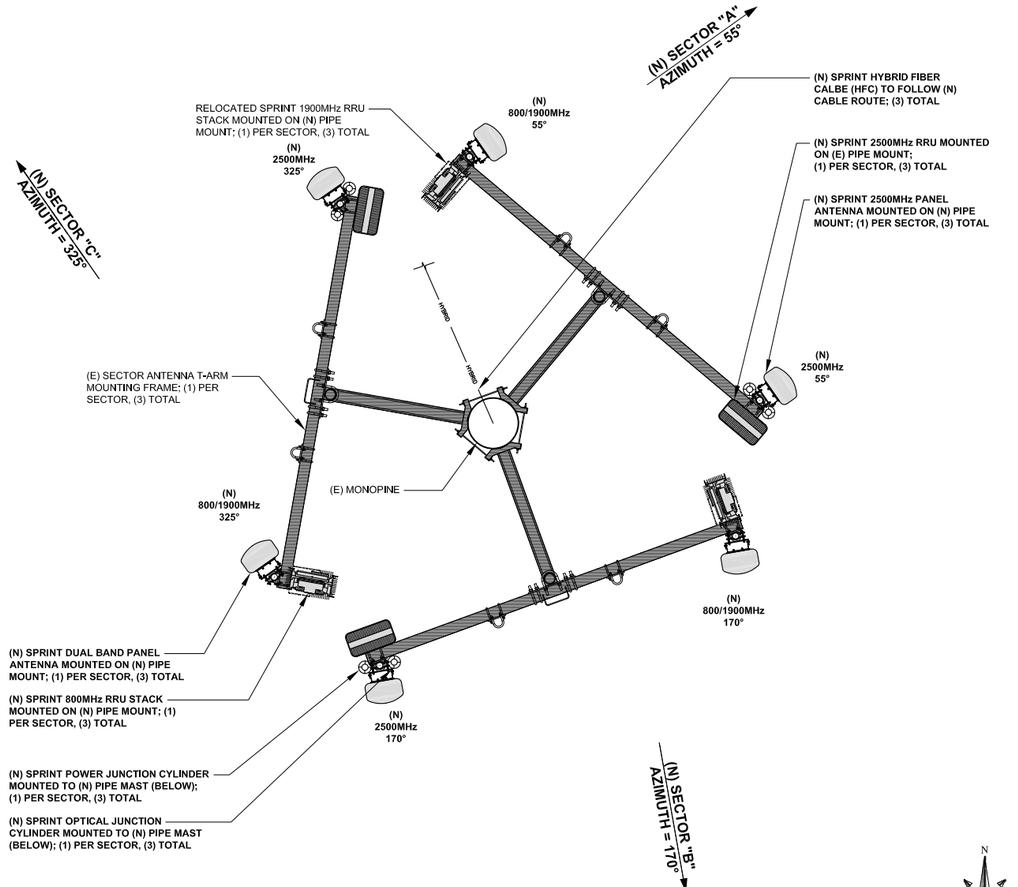


EXISTING ANTENNA LAYOUT

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

0" 1' 2' 4'

1



PROPOSED ANTENNA LAYOUT

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

0" 1' 2' 4'

2

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6761 SHOUP ROAD
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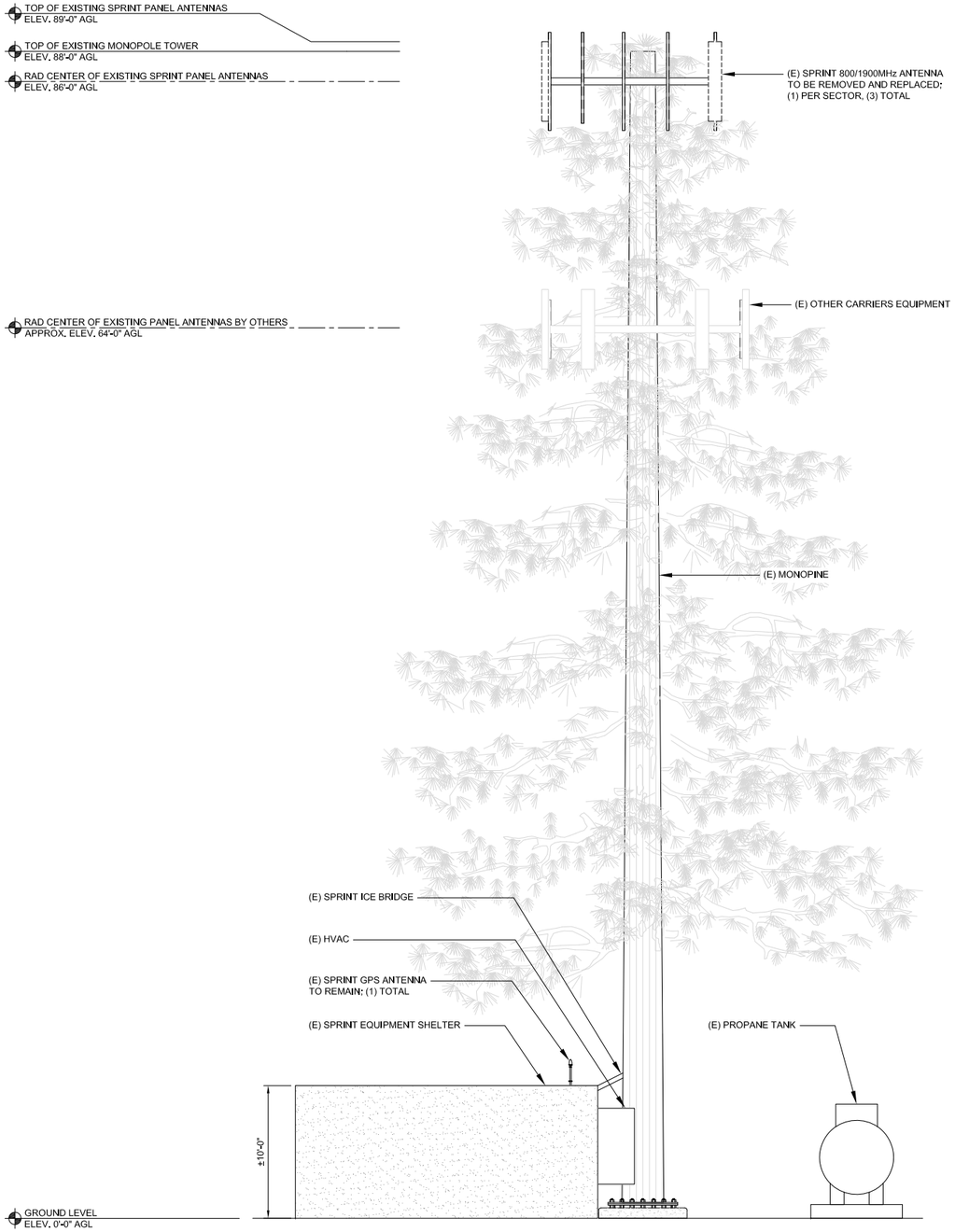
MONOPINE

SHEET TITLE
ANTENNA LAYOUT

SHEET NUMBER
A-3

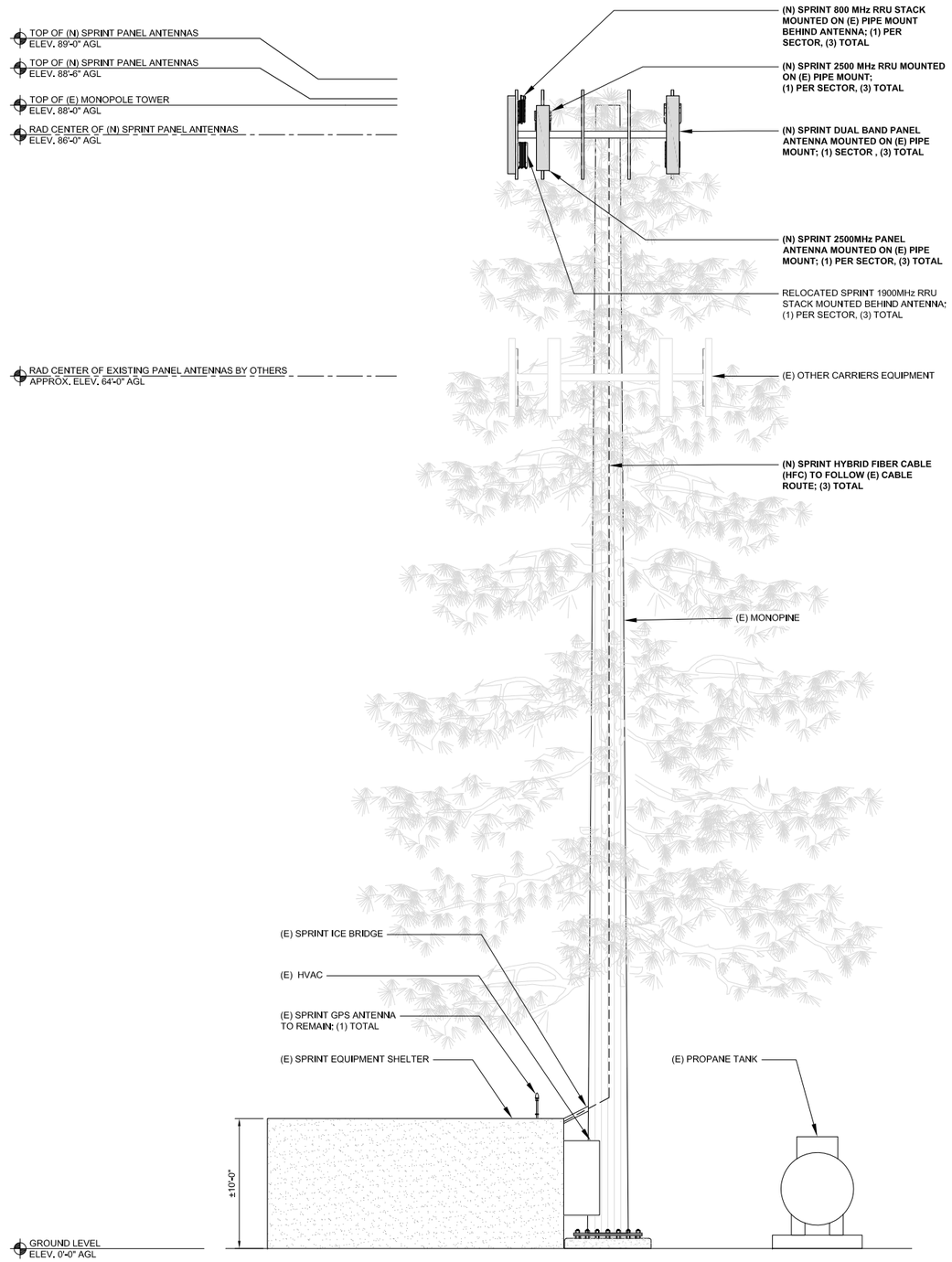


EXISTING NORTHWEST ELEVATION

24"x36" SCALE: 3/16" = 1'-0"
11"x17" SCALE: 3/32" = 1'-0"

0" 2' 4' 8'

1



PROPOSED NORTHWEST ELEVATION

24"x36" SCALE: 3/16" = 1'-0"
11"x17" SCALE: 3/32" = 1'-0"

0" 2' 4' 8'

2

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MONOPINE

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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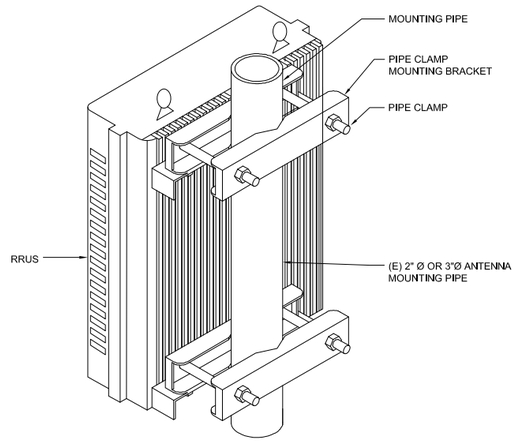
MONOPINE

SHEET TITLE
COLOR CODING

SHEET NUMBER
A-5



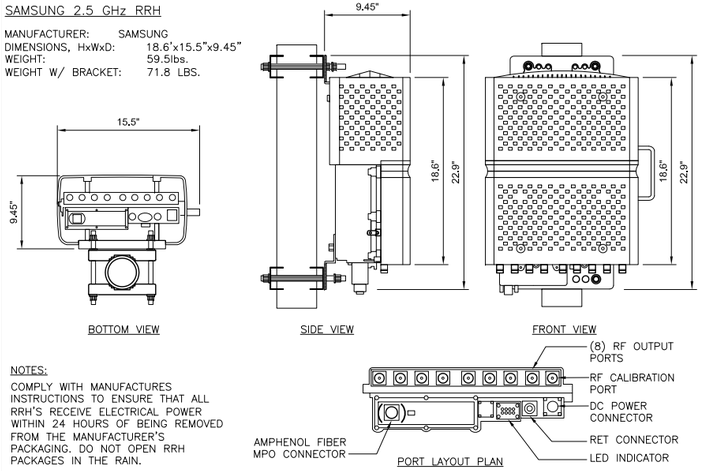
(N) AND (E) RRUS MOUNTING DETAIL

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

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.



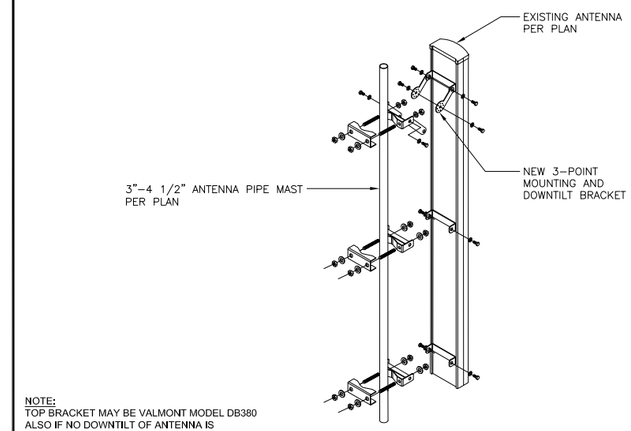
NOTES:

COMPLY WITH MANUFACTURES 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.

2500 MHZ RRU

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

4



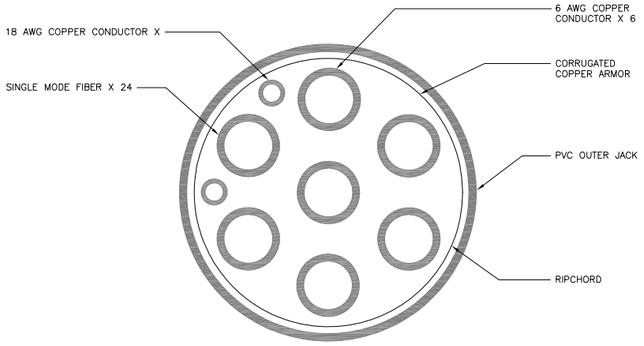
NOTE:
TOP BRACKET MAY BE VALMONT MODEL DB380 ALSO IF NO DOWNTILT OF ANTENNA IS REQUIRED.

ANTENNA MOUNTING

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

1

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 (LOW)	+80° C
FIBER TYPE		LOW WATER PEAK SINGLE MODE LOOSE TUBE
FIBER STRAND COMPLIANCE		ITU-T REC. G.652.D, G657.A2
		IEC 60793-2-50 TYPE B.1.3 & TYPE B.6 A&B
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



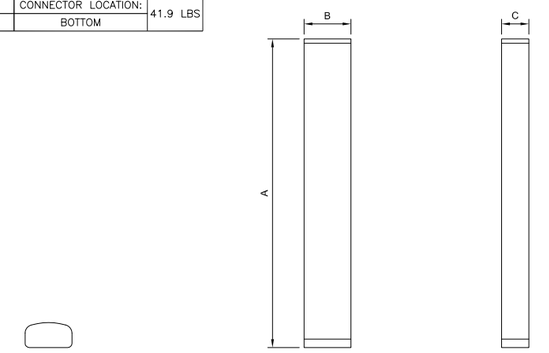
NOTE: CABLE CROSS-SECTION NOT DRAWN TO SCALE

(N) HYBRID CABLE SPECIFICATIONS

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

6

MANUFACTURER:		KMW	
MODEL NO.:		ET-X-TS-70-16-62-18-IR-RD	
DIMENSIONS:		CONNECTOR TYPE:	TOTAL WEIGHT :
A	73.8"	(8) 7/16" DIN (FEMALE)	
B	11.8"	CONNECTOR LOCATION:	41.9 LBS
C	5.9"	BOTTOM	

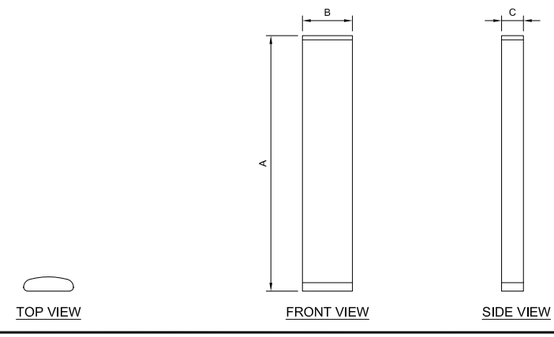


(N) KMW PANEL ANTENNA 800 BAND

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

2

MANUFACTURER:		KMW	
MODEL NO.:		ET-X-WM-18-65-8P	
DIMENSIONS:		CONNECTOR TYPE:	TOTAL WEIGHT :
A	61"	(8) 7/16" DIN (FEMALE)	
B	12"	CONNECTOR LOCATION:	36.4 LBS
C	4.3"	BOTTOM	



(N) KMW PANEL ANTENNA 2500 BAND

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

3

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(619) 997-4012

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REV	DATE	DESCRIPTION
A	07/24/2017	90% CD'S FOR REVIEW

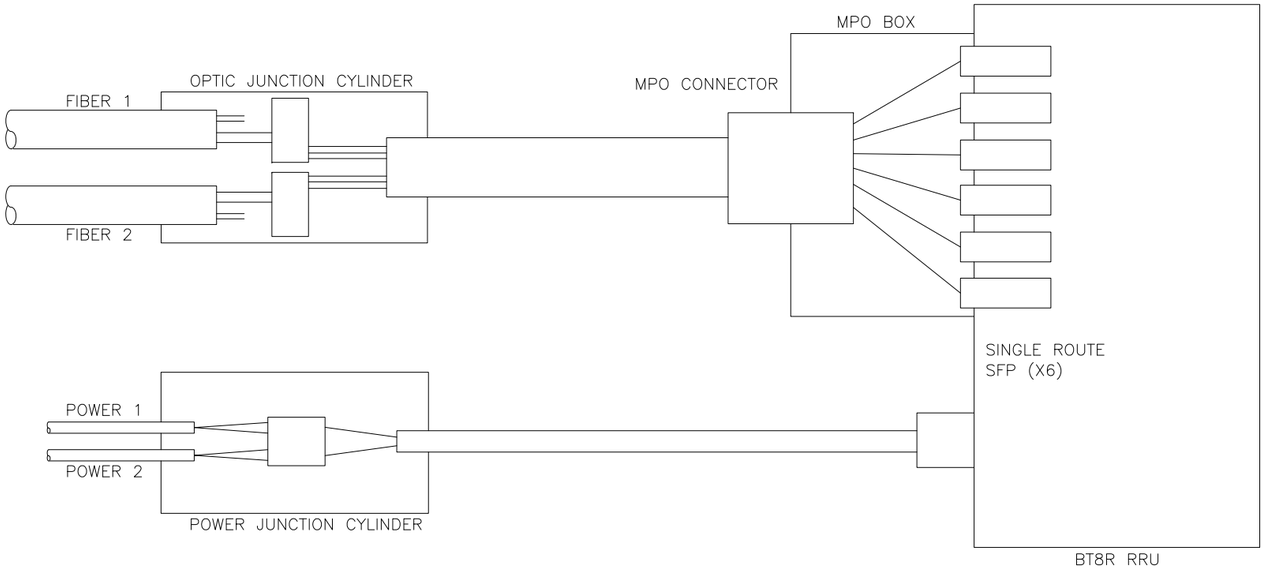
DN72XC019
6761 SHOUP ROAD
COLORADO SPRINGS, CO 80908
MONOPINE

SHEET TITLE

EQUIPMENT DETAILS

SHEET NUMBER

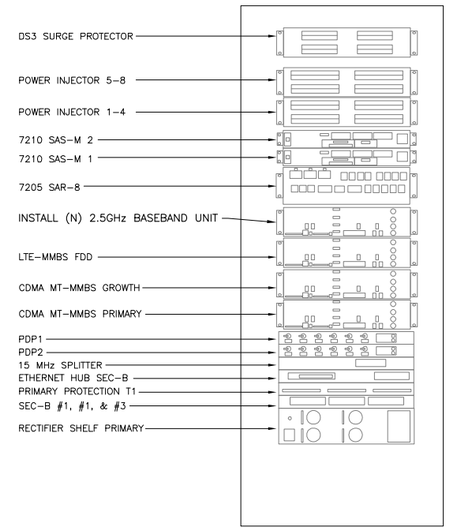
D-1



POWER & OPTIC CYLINDER SCHEMATIC DETAIL

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

3



FRONT VIEW

(E) MMBS CABINET

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

1

NOT USED

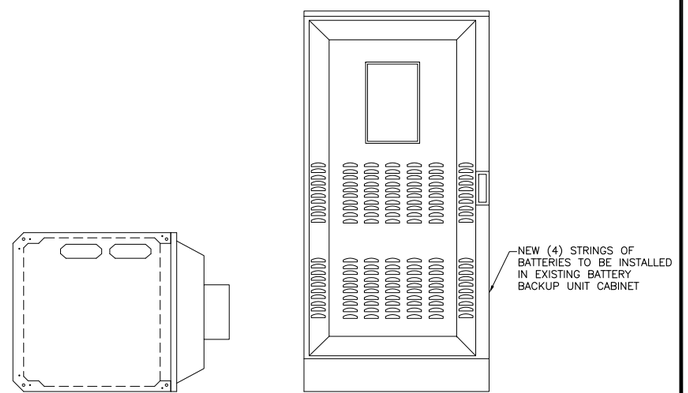
24"x36" SCALE: NTS
11"x17" SCALE: NTS

5

NOT USED

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

4



BOTTOM PLAN

FRONT ELEVATION

(E) BATTERY BACKUP UNIT CABINET

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

2

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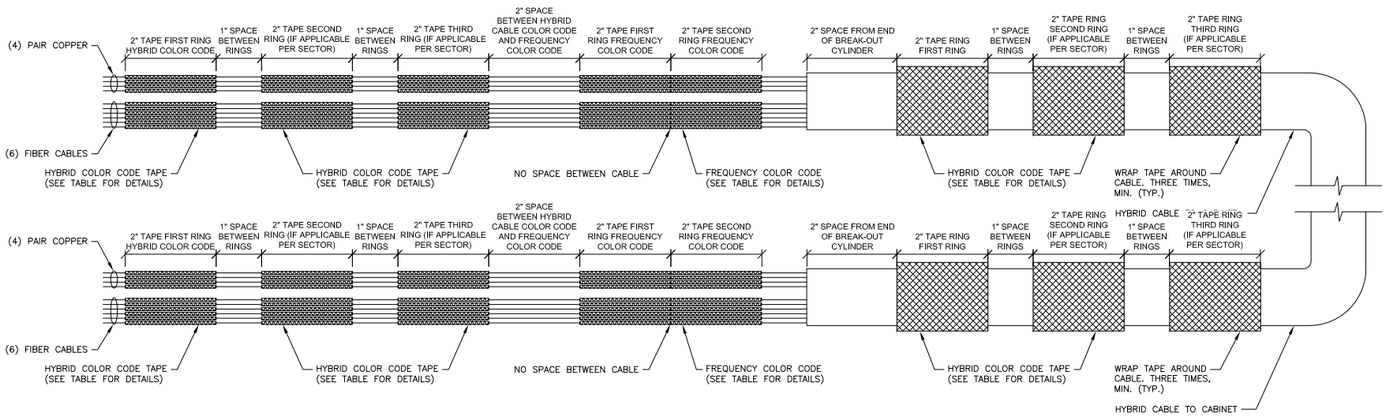
SHEET TITLE

DETAILS

SHEET NUMBER

D-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 ABOVE FOR THE RESPECTIVE SECTOR.

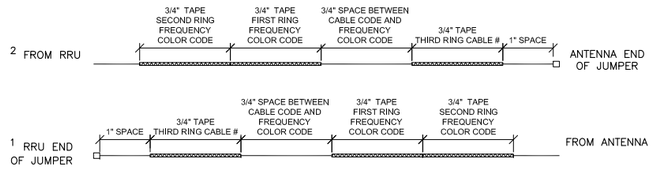
4. INDIVIDUAL POWER PAIRS AND FIBER CABLES SHALL BE LABELED WITH BOTH THE HYBRID CABLE COLOR FOR THE RESPECTIVE SECTOR AND A FREQUENCY COLOR CODE IN ACCORDANCE WITH THE "FREQUENCY COLOR CODE FOR PAIRS AND FIBER CABLES OF HYBRID CABLE" TABLE ABOVE.

5. A 2" GAP SHALL SEPARATE THE HYBRID CABLE COLOR CODE FROM THE FREQUENCY COLOR CODE.

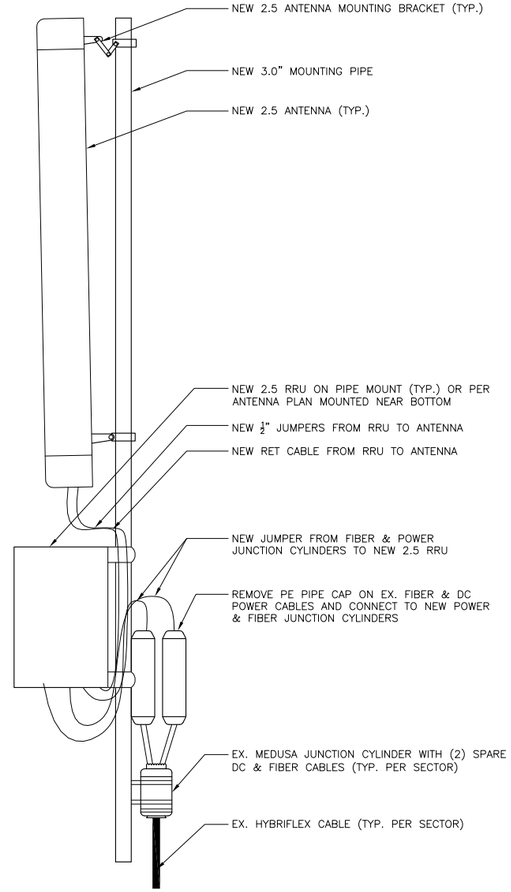
6. THE 2" COLOR RINGS FOR THE FREQUENCY CODE SHALL BE PLACED NEXT TO EACH OTHER WITH NO SPACES.

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



	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6	TYPE 7
TOTAL LENGTH	~35 M (114.8')	~55 M (114.8')	~65 M (213.3')	~80 M (262.5')	~100 M (328.1')	~120 M (420.0')	~160 M (550.0')
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	AWWG 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, SIGNLE 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
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

HYBRID CABLE COLOR SCHEME DETAIL

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

3

2.5 ANTENNA/RRU CONNECTIONS, TYP.

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

1

NOT USED

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

5

NOT USED

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

4

HYBRID CABLE TYPE

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

2

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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 SATE 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 THORUGH 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
- — OE — OE — OE — EXISTING O/H ELECTRICAL
- — AGP — AGP — AGP — EXISTING A/G ELECTRICAL
- — UGT — UGT — UGT — EXISTING U/G TELEPHONE
- — FO — FO — EXISTING FIBER OPTIC
- - HFLEX — HFLEX — HFLEX – EXISTING HYBRIFLEX CABLE
- — UGP — UGP — UGP — NEW U/G ELECTRIC
- — OE — OE — OE — NEW O/H ELECTRIC
- — AGP — AGP — AGP — NEW A/G ELECTRIC
- — UGT — UGT — UGT — NEW U/G TELEPHONE
- — FO — FO — NEW FIBER OPTIC
- - HFLEX — HFLEX — HFLEX – NEW HYBRIFLEX CABLE

- — X — X — X — EXISTING CHAINLINK FENCE
- — X — X — X — NEW CHAINLINK FENCE
- EXISTING WOOD FENCE
- NEW WOOD FENCE

ELEVATION/SECTION REFERENCE. TOP NUMBER IS THE DETAIL; BOTTOM NUMBER IS THE SHEET NO.

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A	07/24/2017	90% CD'S FOR REVIEW

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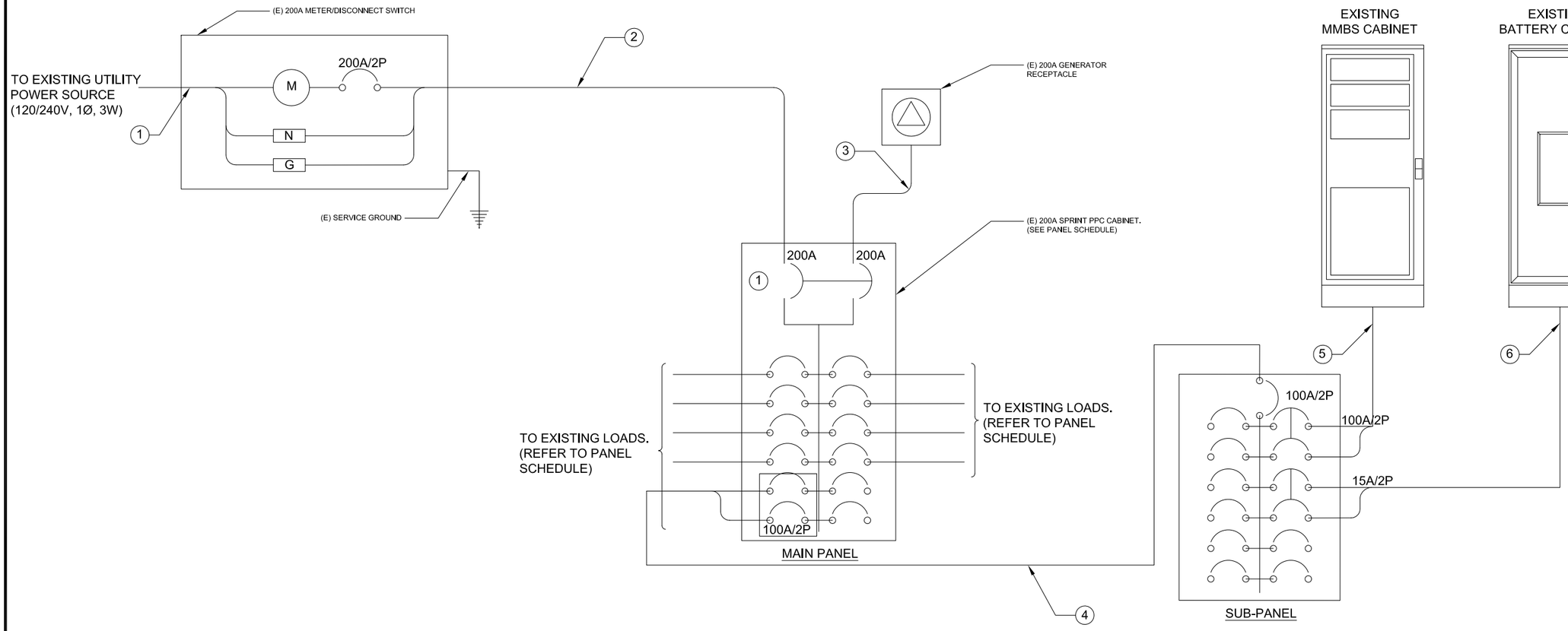
6761 SHOUP ROAD
COLORADO SPRINGS, CO 80908
MONOPINE

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

SHEET NUMBER
E-1



CIRCUIT SCHEDULE

NO	FROM	TO	CONFIGURATION
1	UTILITY SOURCE	METER/ DISCONNECT	EXISTING
2	METER/ DISCONNECT	TRANSFER & LOAD CENTER	EXISTING
3	TRANSFER & LOAD CENTER	GENERATOR RECEPTACLE	EXISTING
4	TRANSFER & LOAD CENTER	SUB-PANEL	EXISTING
5	SUB PANEL	EXISTING MMBS CABINET	EXISTING
6	SUB PANEL	EXISTING BATTERY CABINET	EXISTING

NOTES:

1. MECHANICALLY INTERLOCKED TO PREVENT SIMULTANEOUS FEED FROM UTILITY AND GENERATOR, "BREAK-BEFORE-MAKE."

TYPICAL ONE-LINE DIAGRAM

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

1

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m.squared
ENGINEERS
1387 CALLE AVANZADO
SAN CLEMENTE, CA 92673
(619) 997-4012

DRAWN BY: PC
CHECKED BY: MM

REV	DATE	DESCRIPTION
A	07/24/2017	90% CD'S FOR REVIEW

DN72XC019
6761 SHOUP ROAD
COLORADO SPRINGS, CO 80908
MONOPINE

SHEET TITLE
ONE-LINE DIAGRAM

SHEET NUMBER
E-2

MAIN PANEL

SITE NUMBER:	DN72XC019	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 AMPS	CKT BKR P	CKT BKR STAT	SERV LD VA	USE FAC	DESCRIPTION	PHASE A VA	PHASE B VA	DESCRIPTION	USE FAC	SERV LD VA	CKT BKR STAT	CKT BKR P	CKT BKR AMPS	CKT NO
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
							12118	11638		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:	DN72XC019	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 AMPS	CKT BKR P	CKT BKR STAT	SERV LD VA	USE FAC	DESCRIPTION	PHASE A VA	PHASE B VA	DESCRIPTION	USE FAC	SERV LD VA	CKT BKR STAT	CKT BKR P	CKT BKR AMPS	CKT NO
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
							9150	9150		TOTAL KVA:			18.30		
										AMPS			76.25		

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.

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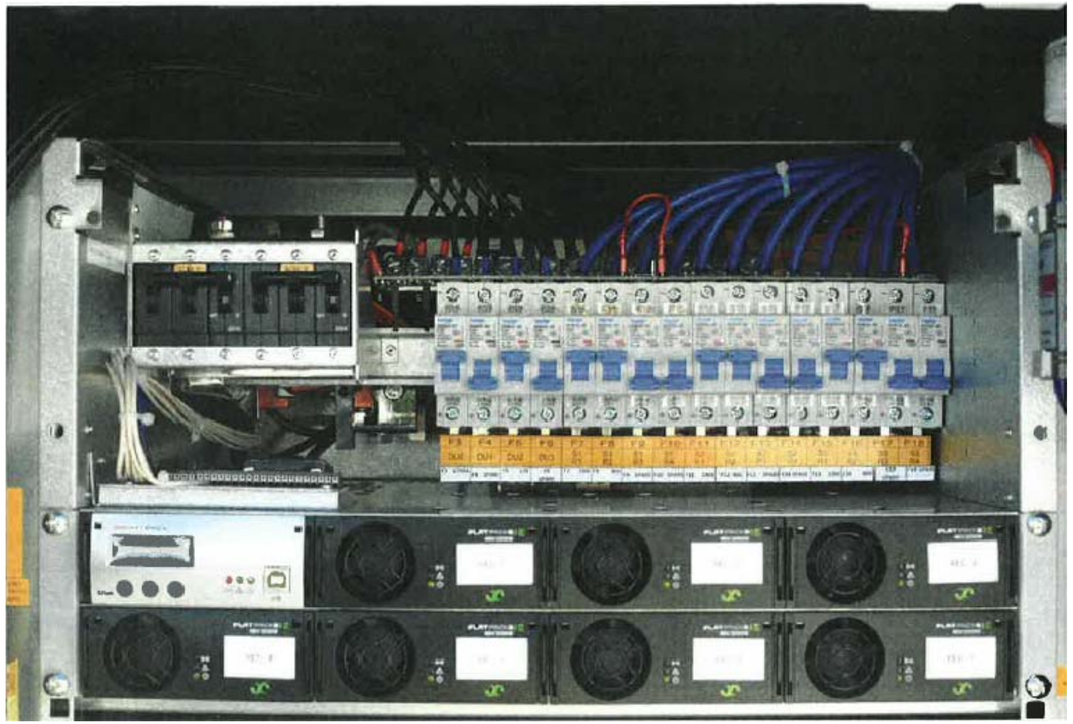
REV	DATE	DESCRIPTION
A	07/24/2017	90% CD'S FOR REVIEW

DN72XC019
6761 SHOUP ROAD
COLORADO SPRINGS, CO 80908
MONOPINE

SHEET TITLE
PANEL SCHEDULE

SHEET NUMBER
E-3

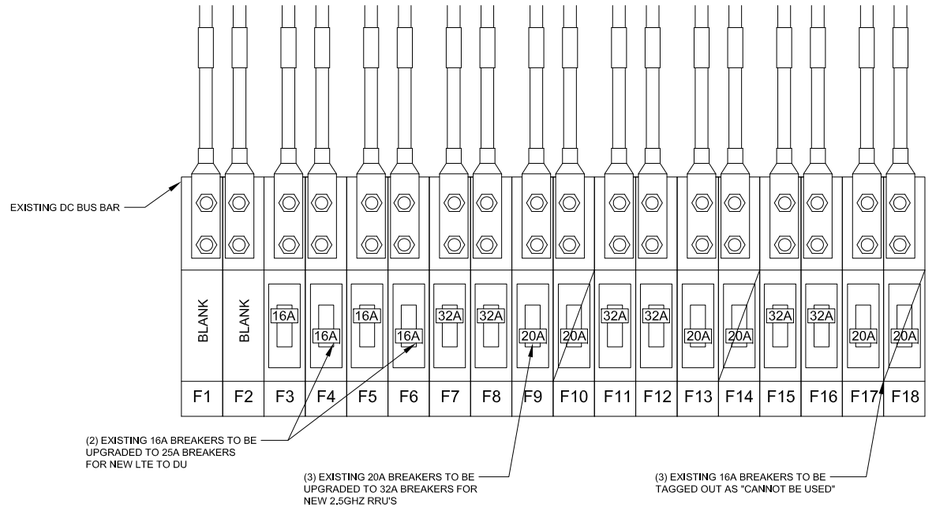


EXISTING DC POWER DISTRIBUTION

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

1

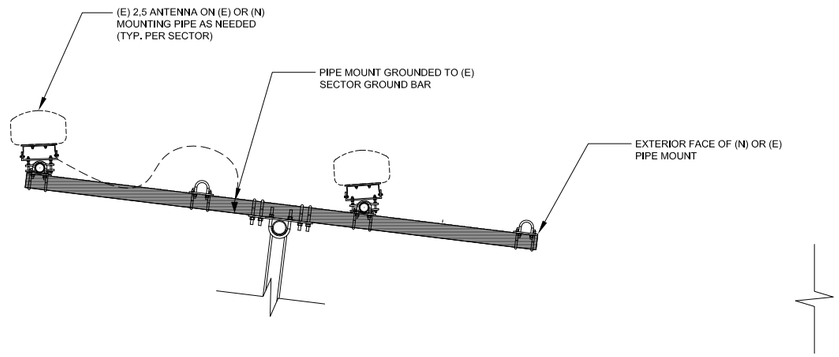
NOTES:
1. (2) DU BREAKERS TO BE UPGRADED FROM 16A TO 25A.
2. (3) RRU BREAKERS TO BE UPGRADED FROM 20A TO 32A.
3. REMAINING/UNUSED RRH BREAKERS TO BE TAGGED OUT AS "CANNOT BE USED"



TYPICAL DC POWER DISTRIBUTION

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

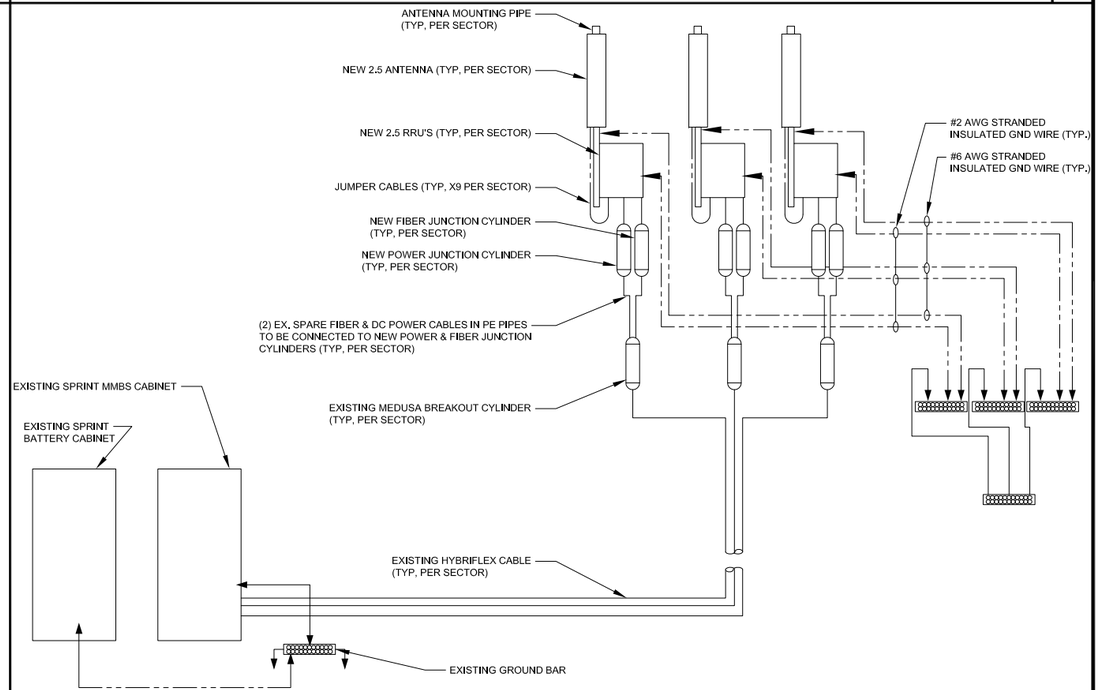
2



TYPICAL ANTENNA GROUNDING PLAN

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

3



TYPICAL GROUNDING RISER DIAGRAM

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

4

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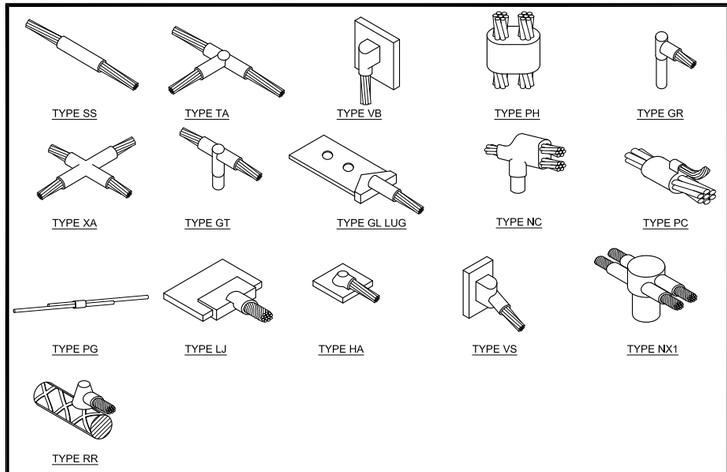
REV	DATE	DESCRIPTION
A	07/24/2017	90% CD'S FOR REVIEW

DN72XC019
6761 SHOUP ROAD
COLORADO SPRINGS, CO 80908
MONOPINE

SHEET TITLE
DC DISTRIBUTION AND ANTENNA GROUNDING PLAN AND DIAGRAM

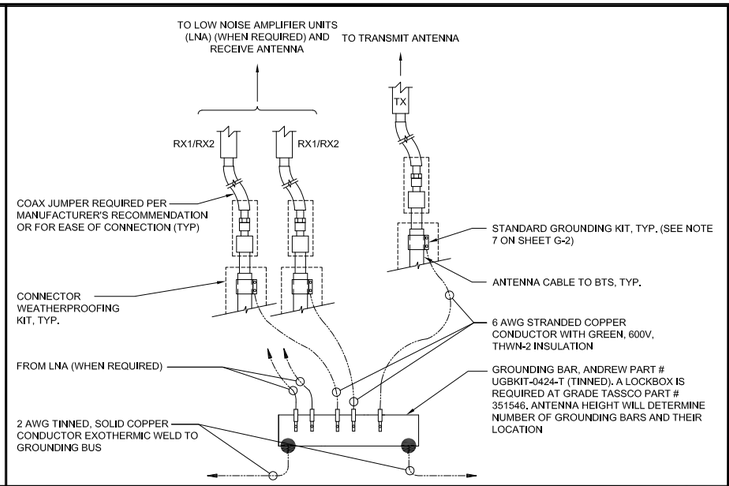
SHEET NUMBER
E-4



TYPICAL CADWELD TYPES

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

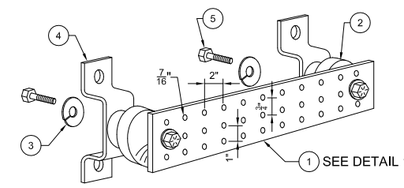
7



GROUNDING BAR CONNECTION

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

4



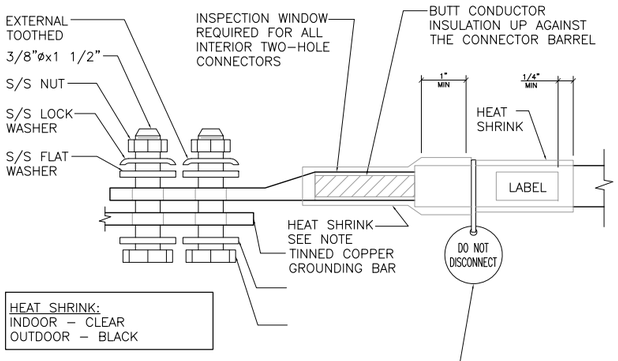
LEGEND:

1. COPPER GROUND BAR, 1/4"X 4"X 20", NEWTON INSTRUMENT CO. CAT. NO. B-6142 OR EQUAL. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION. (ACTUAL GROUND BAR SIZE WILL VARY BASED ON NUMBER OF GROUND CONNECTIONS)
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4 OR EQUAL
3. 5/8" LOCKWASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8 OR EQUAL WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056 OR EQUAL
4. 5/8-11 X 1" HHCS BOLTS, NEWTON INSTRUMENT CO. CAT NO. 3012-1 OR EQUAL
5. INSULATORS SHALL BE ELIMINATED WHEN BONDING DIRECTLY TO TOWER/MONOPOLE STRUCTURE. CONNECTION TO TOWER/MONOPOLE STRUCTURE SHALL BE PER MANUFACTURERS RECOMMENDATIONS

GROUNDING BAR DETAIL

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

1



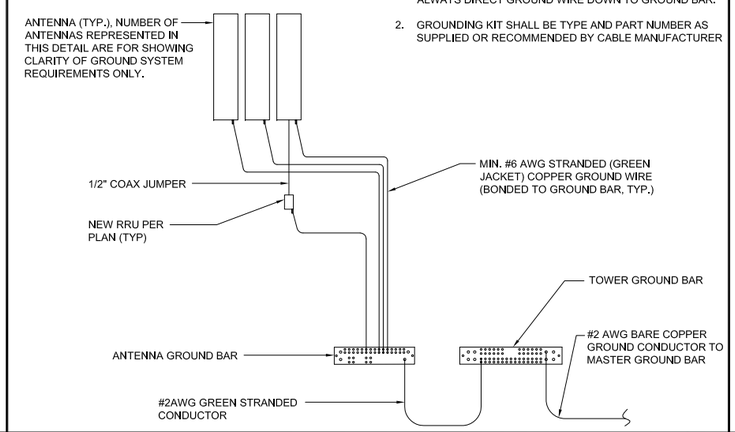
GROUND LUG TO BUS BAR

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

8

NOTES:

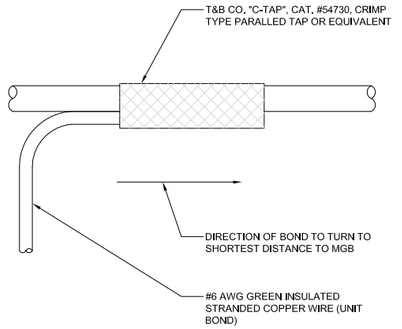
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER



ANTENNA GROUNDING PLAN

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

5

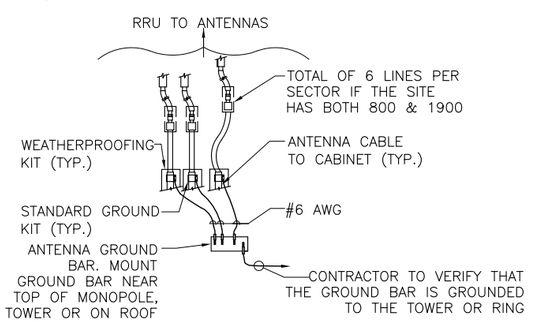


GROUNDING WIRE CONNECTION

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

2

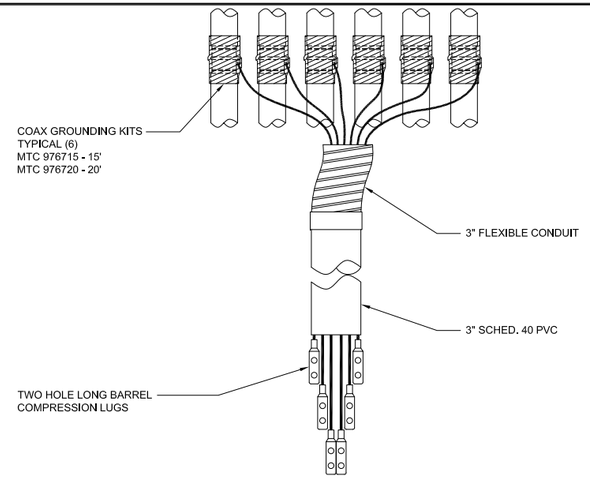
NOTES:
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE ANDREWS. (TYPE & PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.)



TYPICAL COAX GROUNDING

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

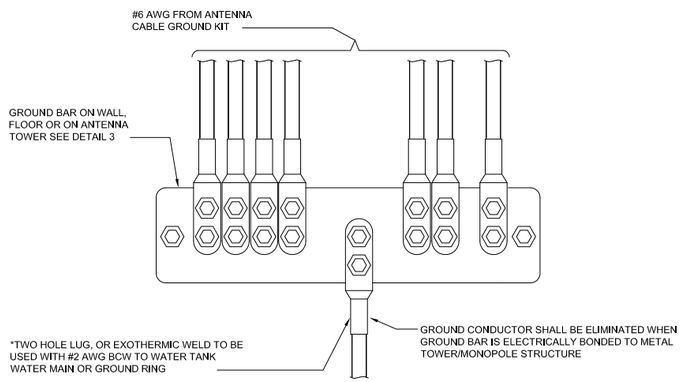
9



COAX GROUND KIT

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

6



* __ GROUND BARS AT THE BOTTOM OF TOWERS/MONOPOLES SHALL ONLY USE EXOTHERMIC WELDS.

WIRE TO GROUND BAR CONNECTION

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

3

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A	07/24/2017	90% CD'S FOR REVIEW

DN72XC019
6761 SHOUP ROAD
COLORADO SPRINGS, CO 80908
MONOPINE

SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER
E-5

Site Identification	
Cascade	[illegible]
SMS Schedule ID	[illegible]
SMS Schedule Name	[illegible]
PID	[illegible]
RRU OEM	[illegible]
Switch OEM	[illegible]
RFDS Issue Date	[illegible]
RFDS Revision Date	
RFDS Revision	[illegible]

Filter Analysis Complete	[illegible]
RFDS - Issue Date	[illegible]
Design Status	[illegible]
Bander Analysis Complete	[illegible]
Project Description	[illegible]

Ancillary Cabinet1 Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	

Battery Backup Cabinet Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	

Junction Box Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Junction Boxes needed at site	

BTS #2 Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Needed at site	

Contact Information	
Engineer Email	[illegible]
Sprint Badged RF Engineer	
RF Engineer Email	[illegible]
RF Engineer Phone	
RF Manager	
RF Manager Email	[illegible]
RF Manager Phone	

Carrier Count	
2500 LTE	[illegible]
1900 LTE	
1900 EVDO	
1900 Voice	
800 LTE	[illegible]
800 Voice	[illegible]

UE Relay Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
UE Relay Azimuth	
Manufacturer	
UE Relay CL Height (meters)	

Ancillary Cabinet2 Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	

AAU Top Hat Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Top Hat Quantity	

Power Protection Cabinet Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Power Protection Cabinet	

Location Details	
Latitude	[illegible]
Longitude	[illegible]
Market	[illegible]
Region	[illegible]
City	[illegible]
State	[illegible]
Zip Code	[illegible]
County	[illegible]

2500 MHz	[illegible]
1900 MHz	
800 MHz	[illegible]

GPS Antenna Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
GPS Antenna needed at site	

Repeater Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	

Growth Cabinet Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	

BTS #1 Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Number of BTS #1	

A&E Drawing Requirements

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	RRH-B8	RRH-B8	RRH-B8	N/A	N/A	N/A
Weight (lbs)	59.75	59.75	59.75	N/A	N/A	N/A
Dimensions	21.26 x 15.03 x 8.03	21.26 x 15.03 x 8.03	21.26 x 15.03 x 8.03	N/A	N/A	N/A
Manufacturer	STA	STA	STA	N/A	N/A	N/A
Number of RRUs needed	1	1	1	0	0	0
RRU to Filter Jumper Make/Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
RRU to Filter Jumper Qty	0	0	0	0	0	0
RRU to Splitter/Triplexor Jumper Make/Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A		N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
RRU to Splitter/Triplexor Jumper Qty	0	0	0	0	0	0
Filter Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 2						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A		N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 3						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A

Band: 800	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	N/A	RRH-C2A	RRH-C2A	N/A	N/A	N/A
Weight (lbs)	N/A	55.16	55.16	N/A	N/A	N/A
Dimensions	N/A	23.7 x 15.75 x 6.73	23.7 x 15.75 x 6.73	N/A	N/A	N/A
Manufacturer	N/A	STA	STA	N/A	N/A	N/A
Number of RRUs needed	0	1	1	0	0	0
RRU to Filter Jumper Make/Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
RRU to Filter Jumper Qty	0	0	0	0	0	0
RRU to Splitter/Triplexor Jumper Make/Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A		N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
RRU to Splitter/Triplexor Jumper Qty	0	0	0	0	0	0
Filter Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 2						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A		N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 3						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1						
Model Number	1900 Hybrid_STA	1900 Hybrid_STA	1900 Hybrid_STA	N/A	N/A	N/A
Weight (Lbs.)	2.2	2.2	2.2	N/A	N/A	N/A
Dimensions (In.)	1.76	1.76	1.76	N/A	N/A	N/A
Manufacturer	STA	STA	STA	N/A	N/A	N/A

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Trunk Cable 1 Qty						
Trunk Cable 2						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Trunk Cable 2 Qty						
Trunk Cable 3						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Trunk Cable 3 Qty						
Bottom Jumper Make/Model						
Model Number	N/A					
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Jumper Qty	0	0	0	0	0	0
Main line Coax Make/Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Main line Coax Qty	0	0	0	0	0	0
Power Junction Cylinder Model						
Model Number	EP96-04223A	EP96-04223A	EP96-04223A	N/A	N/A	N/A
Weight (Lbs.)	4.58	4.58	4.58	N/A	N/A	N/A
Dimensions (In.)	15.35 High x 3.15 dia	15.35 High x 3.15 dia	15.35 High x 3.15 dia	N/A	N/A	N/A
Manufacturer	STA	STA	STA	N/A	N/A	N/A
Power Junction Cylinder Qty	1	1	1	0	0	0
Optical Junction Cylinder Qty needed						
Model Number	EP96-04225A	EP96-04225A	EP96-04225A	N/A	N/A	N/A
Weight (Lbs.)	4.04	4.04	4.04	N/A	N/A	N/A
Dimensions (In.)	11.22 High x 3.15 dia	11.22 High x 3.15 dia	11.22 High x 3.15 dia	N/A	N/A	N/A
Manufacturer	STA	STA	STA	N/A	N/A	N/A
Optical Junction Cylinder Qty needed						

Band: 2500	Alpha		Beta		Gamma		Delta		Epsilon		Zeta	
Antenna1												
Model Number	ET-X-WM-18-65-8P		ET-X-WM-18-65-8P		ET-X-WM-18-65-8P							
Weight (lbs)	36.4		36.4		36.4		N/A		N/A		N/A	
Dimensions	61 x 12 x 4.3		61 x 12 x 4.3		61 x 12 x 4.3		N/A		N/A		N/A	
Manufacturer	KMW		KMW		KMW		N/A		N/A		N/A	
Ant1 Top Jumper Make/Mode/Qty	2.5 Jumper	8	2.5 Jumper	8	2.5 Jumper	8	N/A	0	N/A	0	N/A	0
Ant 1 RF requested Diameter	1/2"		1/2"		1/2"		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	55		170		325		N/A		N/A		N/A	
Antenna 1 Mechanical DT	0		0		0		N/A		N/A		N/A	
Antenna 1 Center Line (ft)	86		86		86		N/A		N/A		N/A	
Antenna 1 Electrical DT	0		0		0		N/A		N/A		N/A	
Antenna 1 Electrical DT 2	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 1 Electrical DT 3	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 1 Twist	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna2												
Model Number												
Weight (lbs)	N/A		N/A		N/A		N/A		N/A		N/A	
Dimensions	N/A		N/A		N/A		N/A		N/A		N/A	
Manufacturer	N/A		N/A		N/A		N/A		N/A		N/A	
Ant2 Top Jumper Make/Mode/Qty	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0
Ant 2 RF Top Jumper Diameter	N/A		N/A		N/A		N/A		N/A		N/A	
Ant 2 RF Top Jumper Length(ft)	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Azimuth	0		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Mechanical DT	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Center Line (ft)	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Electrical DT	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Electrical DT 2	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Electrical DT 3	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Twist	N/A		N/A		N/A		N/A		N/A		N/A	

Band: 800	Alpha		Beta		Gamma		Delta		Epsilon		Zeta	
Antenna1												
Model Number			ET-X-TS-70-16-62-18-IR-RD		ET-X-TS-70-16-62-18-IR-RD							
Weight (lbs)	N/A		41.9		41.9		N/A		N/A		N/A	
Dimensions	N/A		73.8 x 11.8 x 5.9		73.8 x 11.8 x 5.9		N/A		N/A		N/A	
Manufacturer	N/A		KMW		KMW		N/A		N/A		N/A	
Ant1 Top Jumper Make/Mode/Qty	N/A	0	800/1900 Jumper	6	800/1900 Jumper	6	N/A	0	N/A	0	N/A	0
Ant 1 RF requested Diameter	1/2"		1/2"		1/2"		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	N/A		170		325		N/A		N/A		N/A	
Antenna 1 Mechanical DT	N/A		0		0		N/A		N/A		N/A	
Antenna 1 Center Line (ft)	N/A		86		86		N/A		N/A		N/A	
Antenna 1 Electrical DT	N/A		0		0		N/A		N/A		N/A	
Antenna 1 Electrical DT 2	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 1 Electrical DT 3	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 1 Twist	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna2												
Model Number												
Weight (lbs)	N/A		N/A		N/A		N/A		N/A		N/A	
Dimensions	N/A		N/A		N/A		N/A		N/A		N/A	
Manufacturer	N/A		N/A		N/A		N/A		N/A			
Ant2 Top Jumper Make/Mode/Qty	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	
Ant 2 RF Top Jumper Diameter	N/A		N/A		N/A		N/A		N/A		N/A	
Ant 2 RF Top Jumper Length(ft)	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Azimuth	N/A		0		N/A		N/A		N/A		N/A	
Antenna 2 Mechanical DT	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Center Line (ft)	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Electrical DT	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Electrical DT 2	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Electrical DT 3	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Twist	N/A		N/A		N/A		N/A		N/A		N/A	

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