

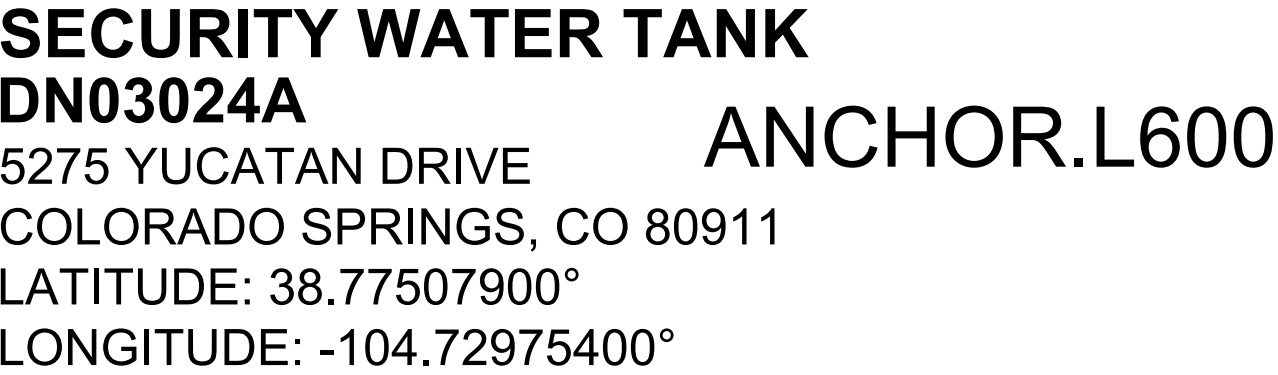


DN03024A

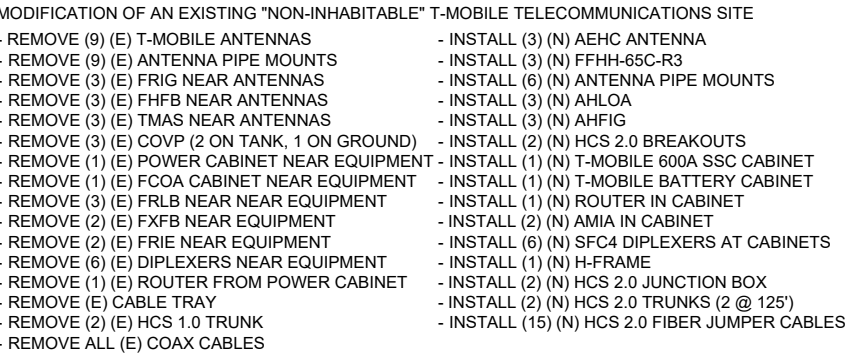
APPROVAL SIGNATURE BLOCK

The following parties have reviewed these documents.
All documents are subject to review by the local zoning/building departments and may impose changes or modifications.

<div><div></div><div>Project Manager (Print)</div></div>	<div><div></div><div>Project Manager</div></div>	<div><div><input type="checkbox"/> Approved</div><div><input type="checkbox"/> Rejected</div></div>	<div><div></div><div>Date</div></div>
<div><div></div><div>RF Engineer (Print)</div></div>	<div><div></div><div>RF Engineer</div></div>	<div><div><input type="checkbox"/> Approved</div><div><input type="checkbox"/> Rejected</div></div>	<div><div></div><div>Date</div></div>
<div><div></div><div>Site Acquisition (Print)</div></div>	<div><div></div><div>Site Acquisition</div></div>	<div><div><input type="checkbox"/> Approved</div><div><input type="checkbox"/> Rejected</div></div>	<div><div></div><div>Date</div></div>
<div><div></div><div>Construction Manager (Print)</div></div>	<div><div></div><div>Construction Manager</div></div>	<div><div><input type="checkbox"/> Approved</div><div><input type="checkbox"/> Rejected</div></div>	<div><div></div><div>Date</div></div>
<div><div></div><div>TMO Quality Assurance (Print)</div></div>	<div><div></div><div>TMO Quality Assurance</div></div>	<div><div><input type="checkbox"/> Approved</div><div><input type="checkbox"/> Rejected</div></div>	<div><div></div><div>Date</div></div>



SCOPE OF WORK



SITE INFORMATION

SITE TYPE: WATER TANK
SITE NAME: SECURITY WATER TANK
SITE NUMBER: DN03024A
SITE ADDRESS: 5275 YUCATAN DR
COLORADO SPRINGS, CO 80911

JURISDICTION: EL PASO COUNTY

PARCEL #: 6501200004

A.D.A. COMPLIANCE: NOT REQUIRED PER IBC 1103.2.9.

RFDS DATE: 09/28/2020

CODE COMPLIANCE

ALL WORK SHALL BE PERFORMED AND MATERIALS 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.

GOVERNING CODES, AS APPLICABLE:
2015 PPRBC, 2015 IBC, 2015 IFC, 2015 IMC,
2015 IECC, 2017 NEC

GENERAL CONSTRUCTION NOTES

1. THE FACILITY IS AN UNOCCUPIED WIRELESS FACILITY.
2. PLANS ARE NOT TO BE SCALED AND ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY, UNLESS NOTED OTHERWISE. THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
3. PRIOR TO THE SUBMISSION OF BIDS, THE CONTRACTORS SHALL VISIT THE JOB SITE AND BE RESPONSIBLE FOR ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS, AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES ARE TO BE BROUGHT TO THE ATTENTION OF THE IMPLEMENTATION ENGINEER AND ARCHITECT/ENGINEER PRIOR TO PROCEEDING WITH THE WORK.
4. THE CONTRACTOR SHALL RECEIVE, IN WRITING, AUTHORIZATION TO PROCEED BEFORE STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED OR IDENTIFIED BY THE CONTRACT DOCUMENTS.
5. CONTRACTOR SHALL CONTACT LOCAL DIGGERS HOTLINE 48 HOURS PRIOR TO PROCEEDING WITH ANY EXCAVATION, SITE WORK OR CONSTRUCTION.
6. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY INDICATED OTHERWISE OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.
7. ALL WORK PERFORMED AND MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. MECHANICAL AND ELECTRICAL SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

PROJECT CONTACTS

PROPERTY OWNER:
SECURITY WATER DEPARTMENT
231 SECURITY BLVD.
EL PASO, CO 80811

APPLICANT:
T-MOBILE WEST LLC
18400 EAST 22ND AVENUE
AURORA, CO 80011
303.313.6923

T-MOBILE PROJECT MANAGEMENT
 18400 EAST 22ND AVENUE
 AURORA, CO 80011
 ALINA BESOIU
 925.628.1880

T-MOBILE CONSTRUCTION MANAGER
18400 EAST 22ND AVENUE
AURORA, CO 80011
JOE IACOVETTA
720.434.9943

SITE ACQUISITION:
WYCO LAND SERVICES
6335 DOWNING STREET
DENVER, CO 80216
ANNIE MACKIEWICZ
303.601.7241

A&E PROJECT MANAGER
WYCO ENGINEERING SERVICES
6335 DOWNING STREET
DENVER, CO 80216
BRANDON SAENZ
315.375.3535

ENGINEER ON RECORD
WYCO ENGINEERING SERVICES
6335 DOWNING STREET
DENVER, CO 80216
PARTHA RAMAKRISHNAN, PE
303.253.4468

DRAWING INDEX

[illegible]

FROM 18400 EAST 22ND AVENUE AURORA, CO 80011:
HEAD EAST ON E 22ND AVE TOWARD TOWER RD, TURN LEFT ONTO TOWER RD, TURN LEFT ONTO I-70
WEST, MERGE ONTO I-70 WEST, EXIT 282 TO MERGE ONTO I-225 SOUTH TOWARDS COLORADO
SPRINGS, TAKE EXIT 1A FOR I-25 SOUTH TOWARD COLO SPRINGS, MERGE ONTO I-25 SOUTH, TAKE EXIT
135 TOWARD AIRPORT, TURN LEFT ONTO S ACADEMY BLVD., TAKE THE MILTON E. PROBY PARKWAY
EXIT TOWARD AIR PORT, CONTINUE ONTO MILTON E PROBY PKWY, TURN RIGHT ONTO HANCOCK EXPY,
TURN LEFT ONTO YUCATAN DR., DESTINATION WILL BE ON THE LEFT



PROJECT INFORMATION:

SITE NAME:
SECURITY WATER TANK

SITE ID:
DN03024A

5275 YUCATAN DR
COLORADO SPRINGS, CO 80911
EL PASO COUNTY

Rev: Date: Description: By:

[illegible]

PLANS PREPARED BY:



LICENSURE NO:

ALL SCALES ARE SET FOR 24"x36" SHEET

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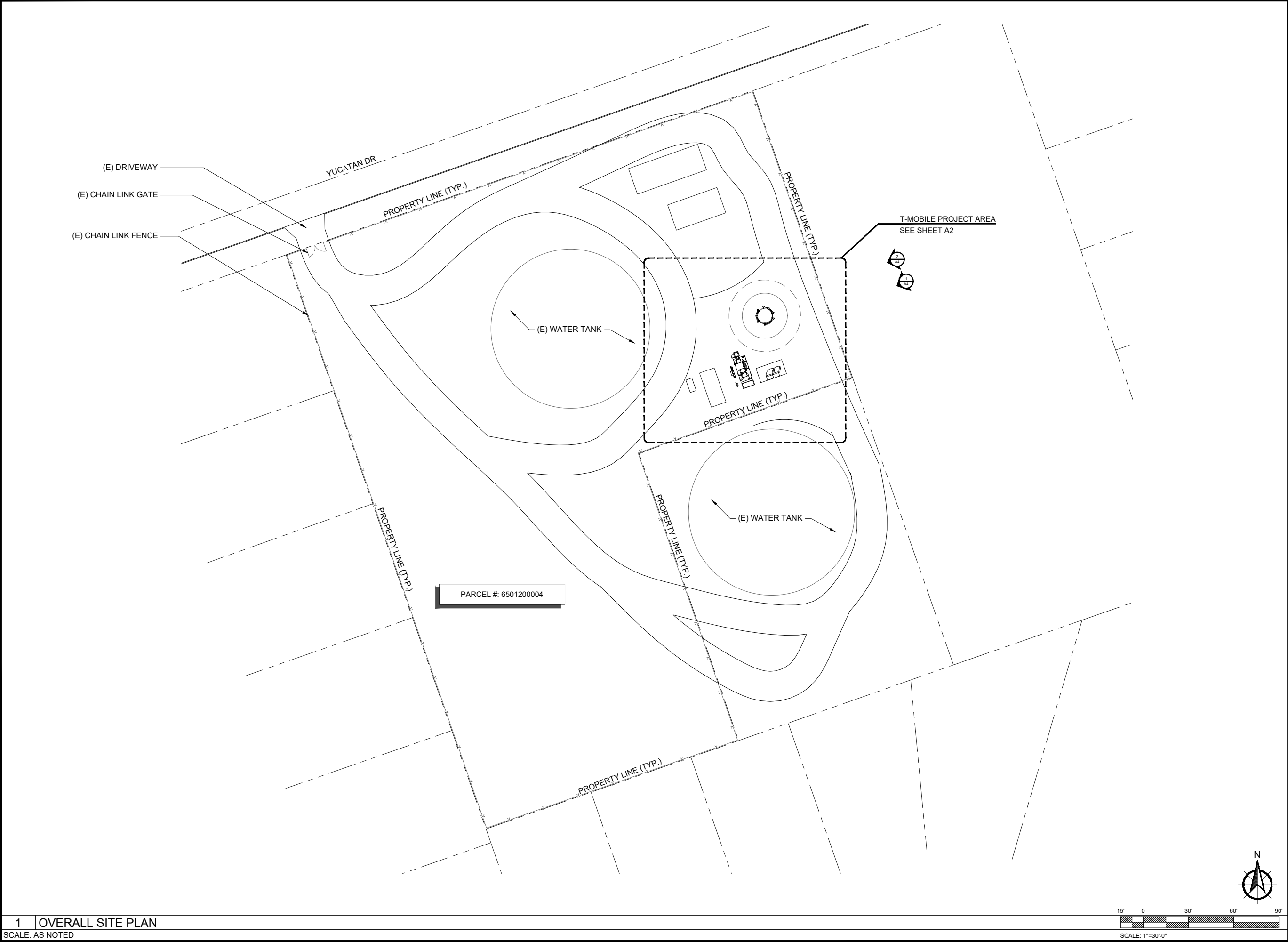
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Sheet Title:

TITLE SHEET

Sheet Number:

T1



18400 EAST 22ND AVE. AURORA, CO 80011



5808 SOUTH RAPP ST., STE.150 LITTLETON, CO 80011

PROJECT INFORMATION:

SITE NAME:
SECURITY WATER TANK
SITE ID:
DN03024A

5275 YUCATAN DR
COLORADO SPRINGS, CO 80911
EL PASO COUNTY

Rev: Date: Description: By:

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PLANS PREPARED BY:



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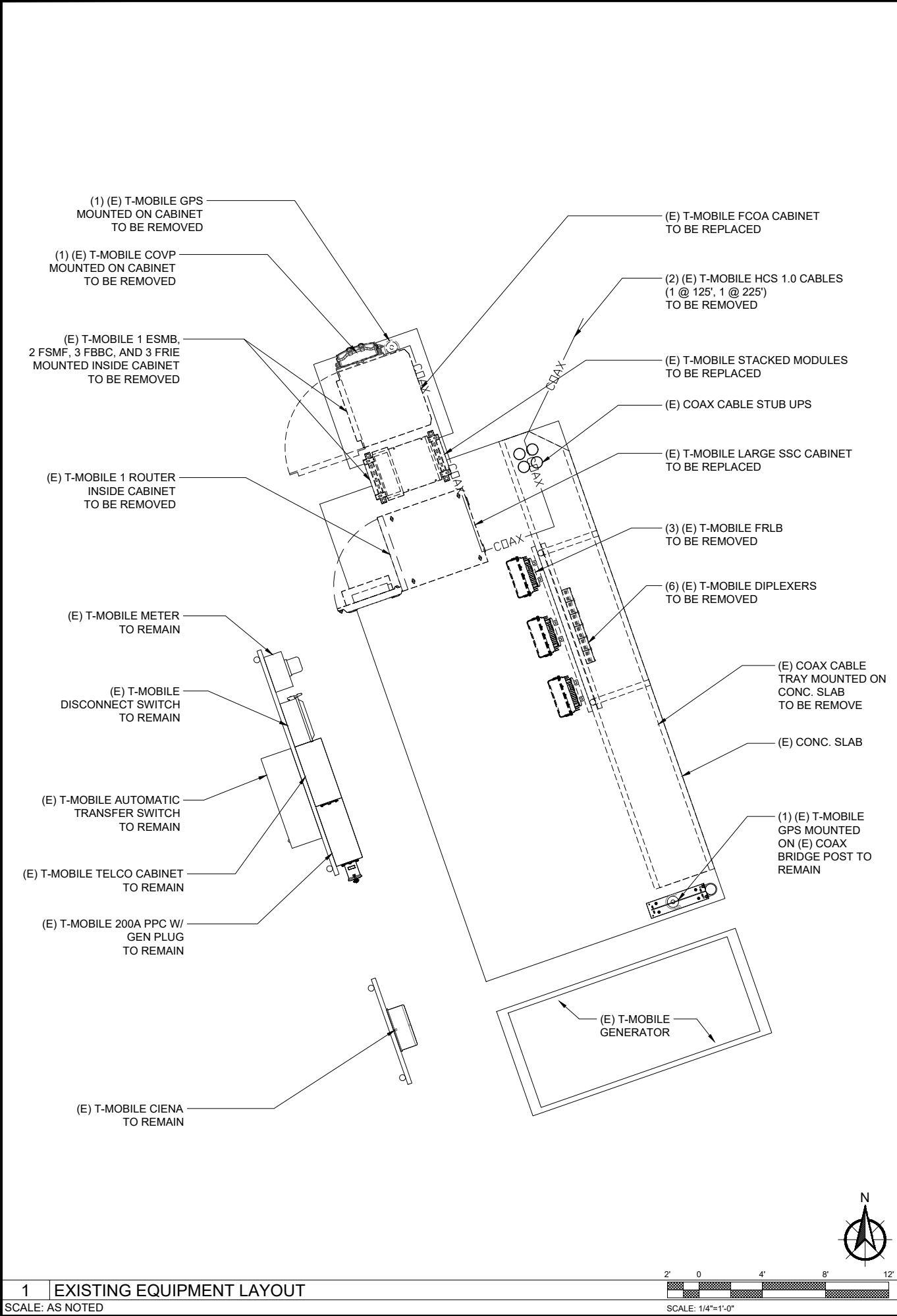
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OVERALL
SITE
PLAN

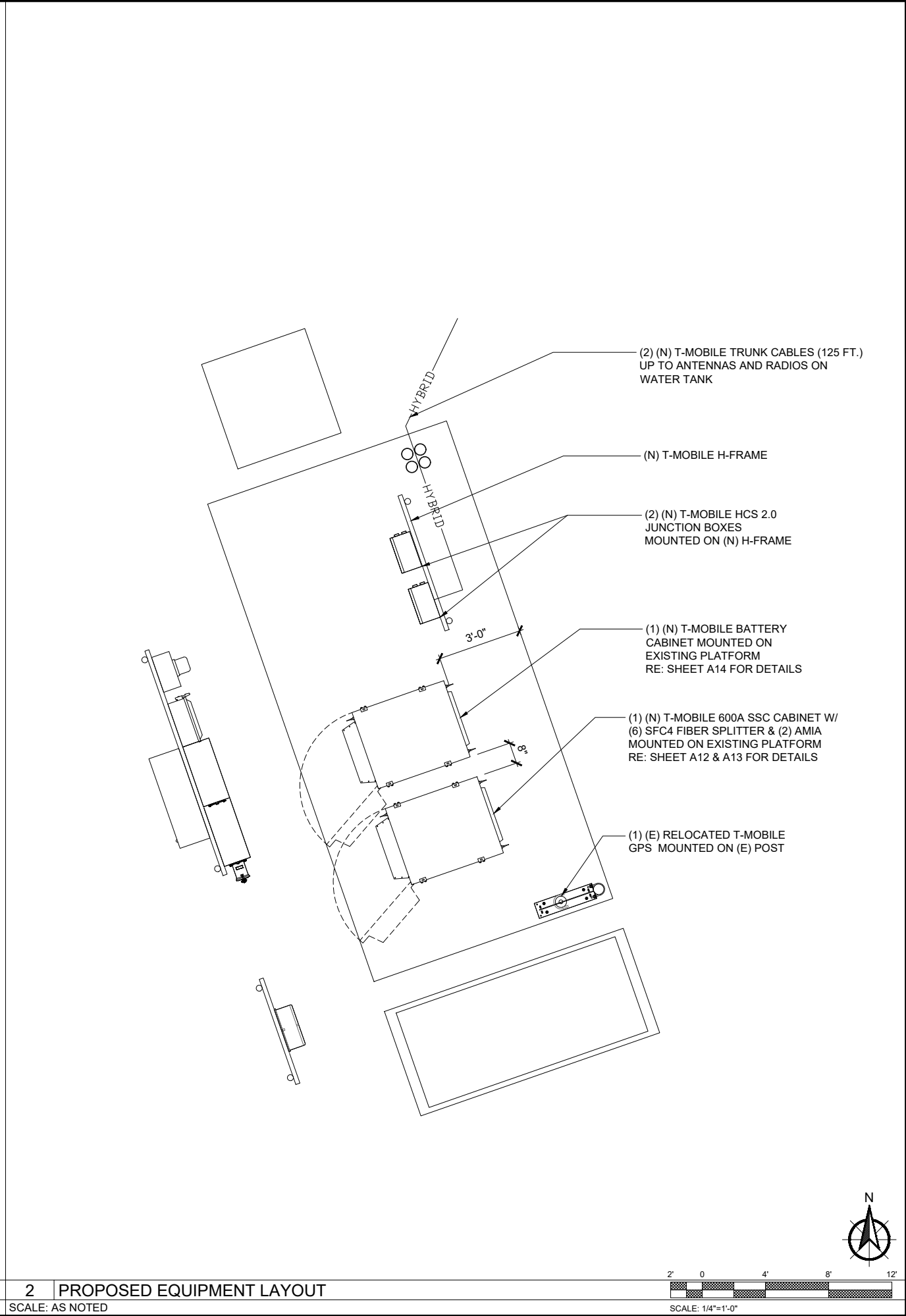
Sheet Number:

A1

A2



1 EXISTING EQUIPMENT LAYOUT
SCALE: AS NOTED



2 PROPOSED EQUIPMENT LAYOUT
SCALE: AS NOTED



PROJECT INFORMATION:

SITE NAME:
SECURITY WATER TANK

SITE ID:
DN03024A

5275 YUCATAN DR
COLORADO SPRINGS, CO 80911
EL PASO COUNTY

Rev:	Date:	Description:	By:
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PLANS PREPARED BY:

WYCO
FIELD SERVICES
where quality still counts.

6335 DOWNING ST
DENVER, CO 80216
WYCOFS.COM

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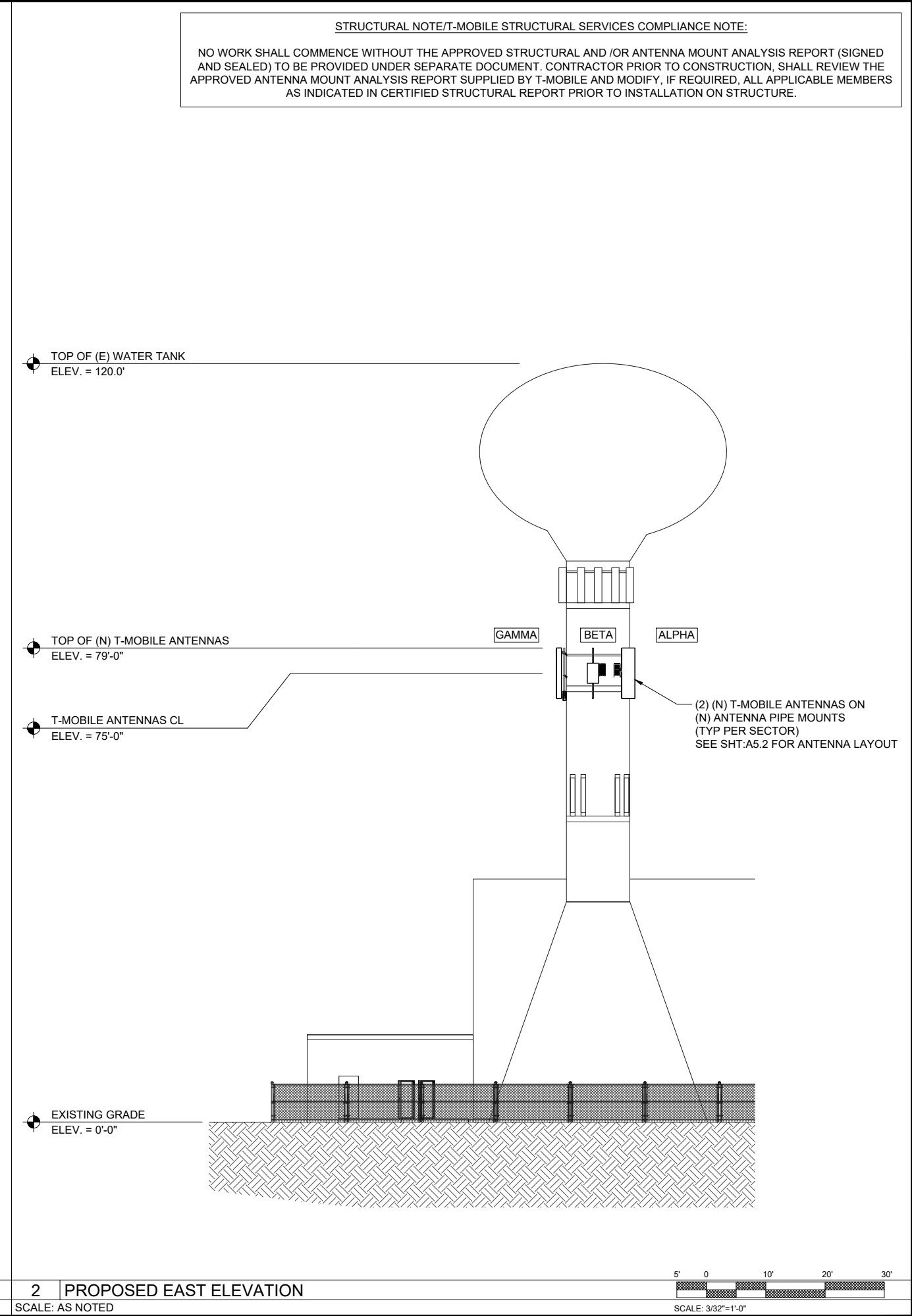
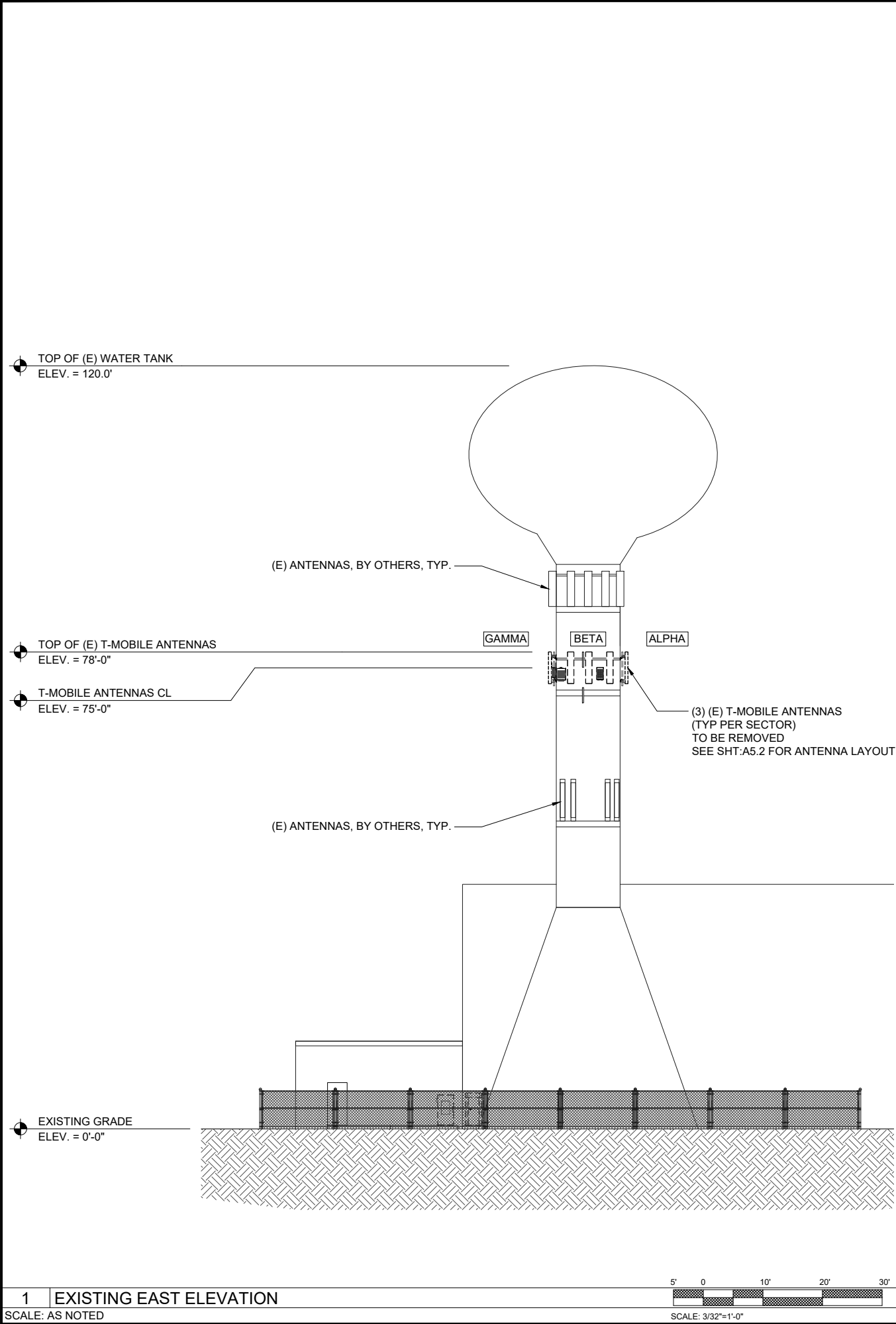
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Sheet Title:

EQUIPMENT LAYOUT

Sheet Number:

A3



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PROJECT INFORMATION:

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SECURITY WATER TANK

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DN03024A

5275 YUCATAN DR
COLORADO SPRINGS, CO 80911
EL PASO COUNTY

Rev:

Date:

Description:

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1

09/14/2020

PRELIM. CONST.

EL

2

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Sheet Title:

EAST
ELEVATION

Sheet Number:

A4

ANTENNA NOTES:

1. ANTENNA CONTRACTOR SHALL INSURE THAT ALL ANTENNA MOUNTING PIPES ARE PLUMB.

2. FEEDLINE LENGTHS INDICATED ARE APPROXIMATE.

3. ANTENNA COAXIAL FEEDERS & ANTENNA JUMPERS SHALL BE COLOR CODED PER T-MOBILE REQUIREMENTS.

4. IN ADDITION TO THE COLOR CODE, THE FOLLOWING ANTENNA SECTOR COLOR STRIPE SHALL BE ADDED TO EACH ANTENNA SECTOR FEEDLINE & JUMPER.

5. SEE SHEET A_ FOR DETAILS

ALPHA - RED STRIPE
BETA - BLUE STRIPE
GAMMA - WHITE STRIPE
DELTA - GREEN STRIPE
EPSILON - GRAY STRIPE
ZETA - BROWN STRIPE
HYBRID - GRAY STRIPE

6. MULTI PORT ANTENNAS: TERMINATE UNUSED ANTENNA PORTS WITH CONNECTOR CAP & WEATHERPROOF THOROUGHLY. JUMPERS FROM TMA_s MUST TERMINATE TO OPPOSITE POLARIZATIONS IN EACH SECTOR.

7. CONTRACTOR MUST FOLLOW ALL MANUFACTURERS' RECOMMENDATIONS REGARDING THE INSTALLATION OF FEEDLINES, CONNECTORS, AND ANTENNAS.

8. MINIMUM BEND RADIUS:

LDF4-50A (1/2" HARD LINE) = 5"
FSJ4-50B (1/2" SUPER FLEX) = 1 1/4"
AVA5-50A (7/8" HARD LINE) = 10"
AVA7-50A (1-5/8" HARD LINE) = 15"
LDF7-50A (1-5/8" HARD LINE) = 20"

9. CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE INFORMATION TO T-MOBILE.

10. WEATHERPROOF ALL ANTENNA CONNECTORS WITH SELF AMALGAMATING TAPE.

11. ANTENNA CONTRACTOR SHALL PERFORM A "TAPE DROP" MEASUREMENT TO CONFIRM/ VALIDATE ANTENNA CENTERLINE (ACL) HEIGHT. CONTRACTOR SHALL SUBMIT A COMPLETED HEIGHT VERIFICATION FORM TO THE CONSTRUCTION MANAGER.

12. ALL FIBER RUNS CONTAINED IN ONE COMMSCOPE HYBRID DC-FIBER CABLE (MODEL# HCS 2.0 TRUNK CABLE 12#6AWG24 SM FIBER PR) FROM LOWER JUNCTION BOX TO UPPER JUNCTION BOX, HYBRID CABLE SHALL BE COLOR CODED PER T-MOBILE REQUIREMENTS.

1 | ANTENNA NOTES

SCALE: N.T.S.

NOTES:

- INFORMATION PER RFDS DATED: 09/28/2020
CONTRACTOR TO REFER TO MOST RECENT RFDS BY T-MOBILE PRIOR TO COMMENCING WORK.
- REFER TO SHEETS A9.1 & A9.2 FOR ANTENNA SPECIFICATIONS.

ANTENNA KEY

STATUS	ANTENNA NUMBER	BEAM WIDTH	ANTENNA VENDOR	MODEL #	AZIMUTH	ELEC. DOWNTILT	MECH. DOWNTILT	ANTENNA CENTERLINE AGL	TECH.	HYBRID FEEDER	
										(QTY) SIZE	COLOR CODE
NEW	A1	0°	COMMSCOPE	FFHH-65C-R3	30°	TBD	0°	75'-0"	L700 L600 N600 U2100 G1900 L1900 L2100	TRUNK #1 FEEDS ALL AEHC ANTENNAS GRAY 1 B2 & C2 SHARED WITH ALPHA TRUNK #1 (HCS 2.0 TRUNK) TRUNK #2 FEEDS AHLOA AND AHFIG RADIOS GRAY 2 B1 AND C1 SHARED WITH ALPHA TRUNK #2 (HCS 2.0 TRUNK)	GRAY 1
NEW	A2	0°	NOKIA	AEHC	30°	TBD	0°	75'-0"	L2500 N2500		GRAY 2
NEW	B1	0°	COMMSCOPE	FFHH-65C-R3	150°	TBD	0°	75'-0"	L700 L600 N600 U2100 G1900 L1900 L2100		
NEW	B2	0°	NOKIA	AEHC	150°	TBD	0°	75'-0"	L2500 N2500		
NEW	C1	0°	COMMSCOPE	FFHH-65C-R3	270°	TBD	0°	75'-0"	L700 L600 N600 U2100 G1900 L1900 L2100		GRAY 3
NEW	C2	0°	NOKIA	AEHC	270°	TBD	0°	75'-0"	L2500 N2500		

EQUIPMENT PLATFORM / EQUIPMENT KEY

LOCATION	VENDOR	EQUIPMENT	MODEL NUMBER	TECH.	QTY.	STATUS
CABINET	NOKIA	SYSTEM MODULE	ASIK	N2500 N600	2	(N)
CABINET	NOKIA	SYSTEM MODULE	ASIB	L2500L2100 L1900L700 L600	2	(N)
CABINET	NOKIA	SYSTEM MODULE	FSMF	U2100G1900	1	(E)
CABINET	NOKIA	SYSTEM MODULE	ABIA	L1900L2100 L1900L700 L600	3	(N)
CABINET	NOKIA	SYSTEM MODULE	ABIL	N2500N600	4	(N)
CABINET	NOKIA	SYSTEM MODULE	ABIC	L2500	3	(N)
CABINET	NOKIA	SYSTEM MODULE	AMIA	-	2	(N)
H-FRAME	NOKIA	FIBER J-BOX	HCS 2.0 TOWER J-BOX	-	2	(N)
CABINET	NOKIA	TRANSPORT SYSTEM	CSR IXRe	-	1	(N)
CABINET	NOKIA	DIPLEXER	SFC4	-	6	(N)

EQUIPMENT FEEDLINE KEY

LOCATION	VENDOR	EQUIPMENT	MODEL NUMBER	TECH	QTY	STATUS
ALL SECTORS	COMMSCOPE	HYBRID	125 FT. HCS 2.0 TRUNK	-	2	(N)
ALPHA	COMMSCOPE	HYBRID	±30 FT. HCS 2.0 JUMPER CABLES 10AWG-2-PR-AIRSCALE	-	5	(N)
BETA	COMMSCOPE	HYBRID	±30 FT. HCS 2.0 JUMPER CABLES 10AWG-2-PR-AIRSCALE	-	5	(N)
GAMMA	COMMSCOPE	HYBRID	±30 FT. HCS 2.0 JUMPER CABLES 10AWG-2-PR-AIRSCALE	-	5	(N)

ROOFTOP EQUIPMENT KEY

LOCATION	VENDOR	EQUIPMENT	MODEL NUMBER	TECH.	QTY.	STATUS
1 PER SECTOR	NOKIA	RRU	AHLOA	N600(DARK) LTE600 LTE700	3	(N)
1 PER SECTOR	NOKIA	RRU	AHFIG	U2100 G1900 L1900 L2100	3	(N)
ALL SECTORS	NOKIA	BREAKOUT FEATURE	PENDANT	-	1	(N)

2 | NOT USED

SCALE: N.T.S.

3 | ANTENNA & EQUIPMENT KEYS

SCALE: N.T.S.

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5808 SOUTH RAPP ST., STE.150 LITTLETON, CO 80011

PROJECT INFORMATION:

SITE NAME:

SECURITY WATER TANK

SITE ID:

DN03024A

5275 YUCATAN DR
COLORADO SPRINGS, CO 80911
EL PASO COUNTY

Rev: Date: Description: By:

1	09/14/2020	PRELIM. CONST.	EL
2	09/28/2020	REV 1	ML

PLANS PREPARED BY:

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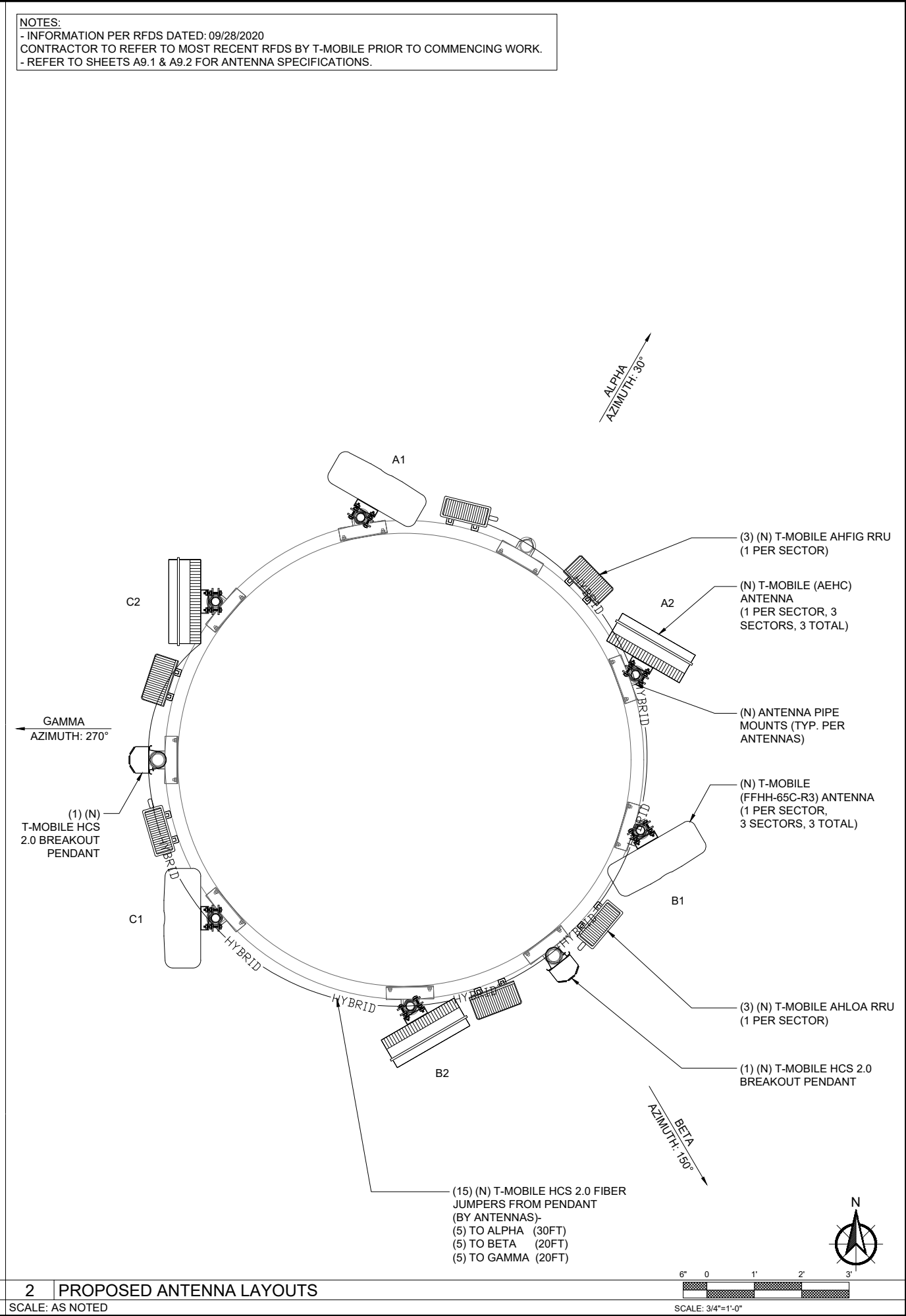
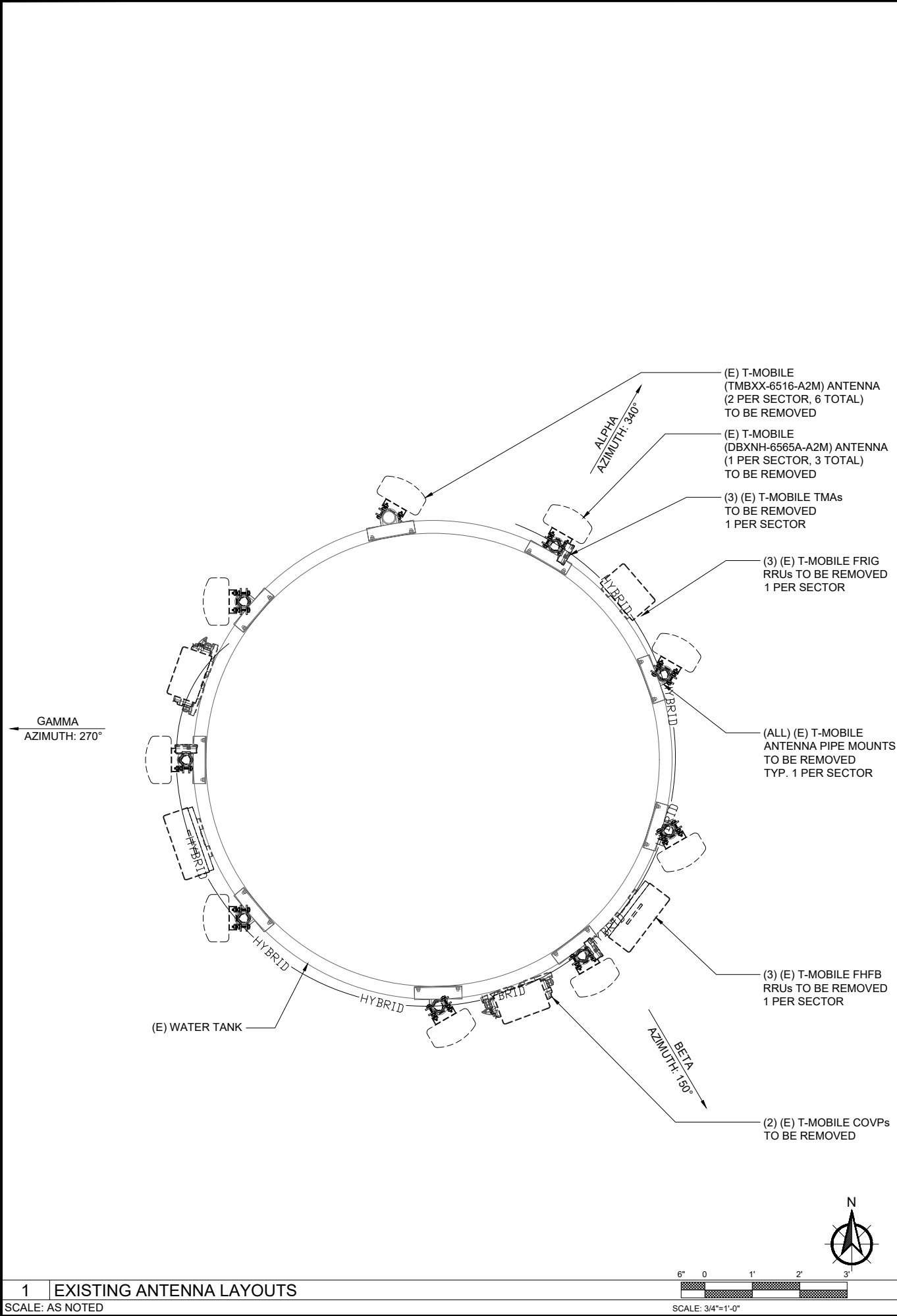
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Sheet Title:

ANTENNA & EQUIPMENT KEYS

Sheet Number:

A5.1





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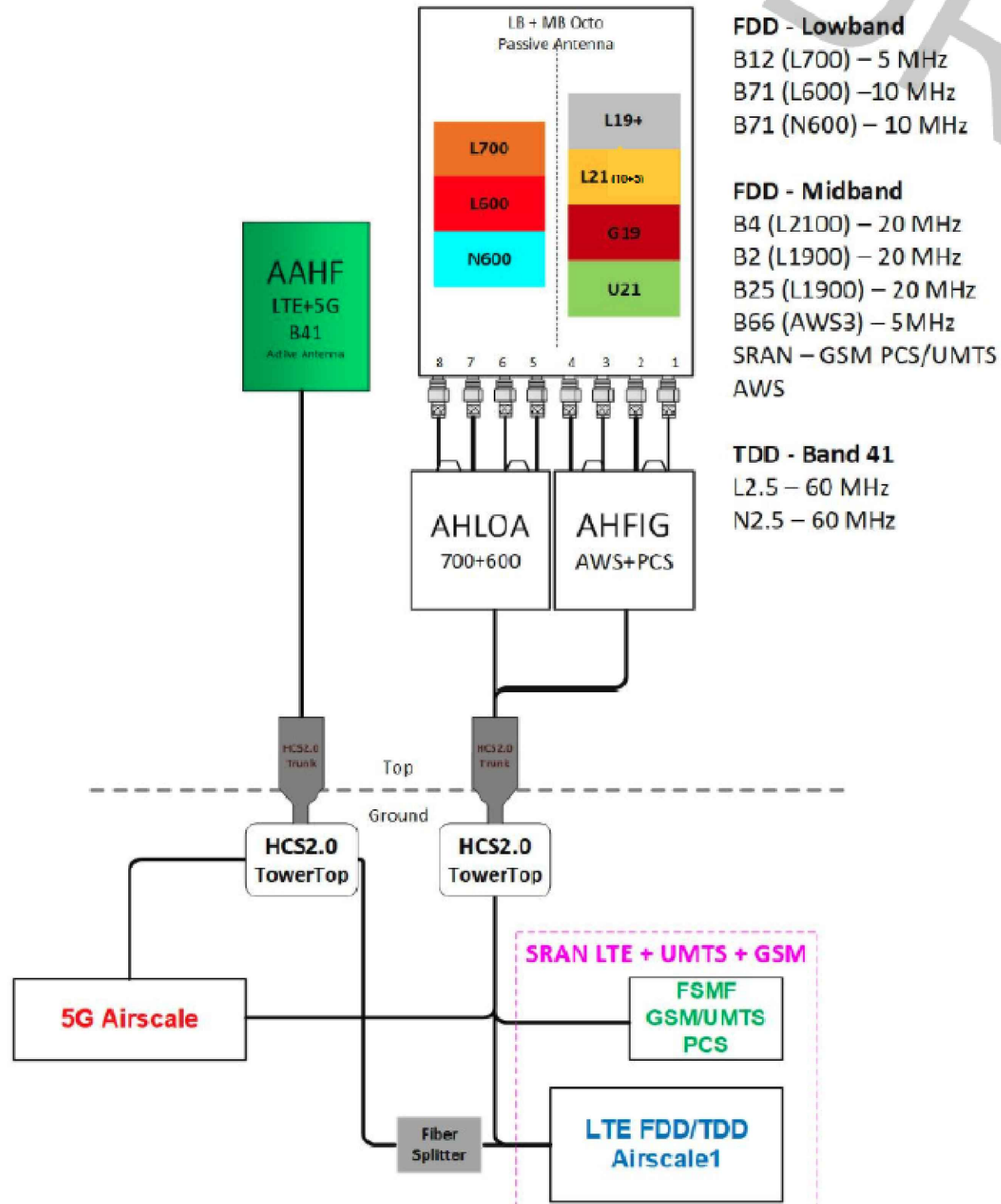
ANTENNA LAYOUT

Sheet Number:

A5.2

Configuration 56791X_SR

* For 5G and LTE Airscale BB dimensioning refer to Fiber Port matrices.
(Alpha, Beta & Gamma)



FDD - Lowband
B12 (L700) – 5 MHz
B71 (L600) – 10 MHz
B71 (N600) – 10 MHz

FDD - Midband
B4 (L2100) – 20 MHz
B2 (L1900) – 20 MHz
B66 (AWS3) – 5MHz
SRAN – GSM PCS/UMTS
AWS

TDD - Band 41
L2.5 – 60 MHz
N2.5 – 60 MHz

Notes:



18400 EAST 22ND AVE. AURORA, CO 80011



5808 SOUTH RAPP ST., STE.150 LITTLETON, CO 80011

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Sheet Title:

RFDS

Sheet Number:

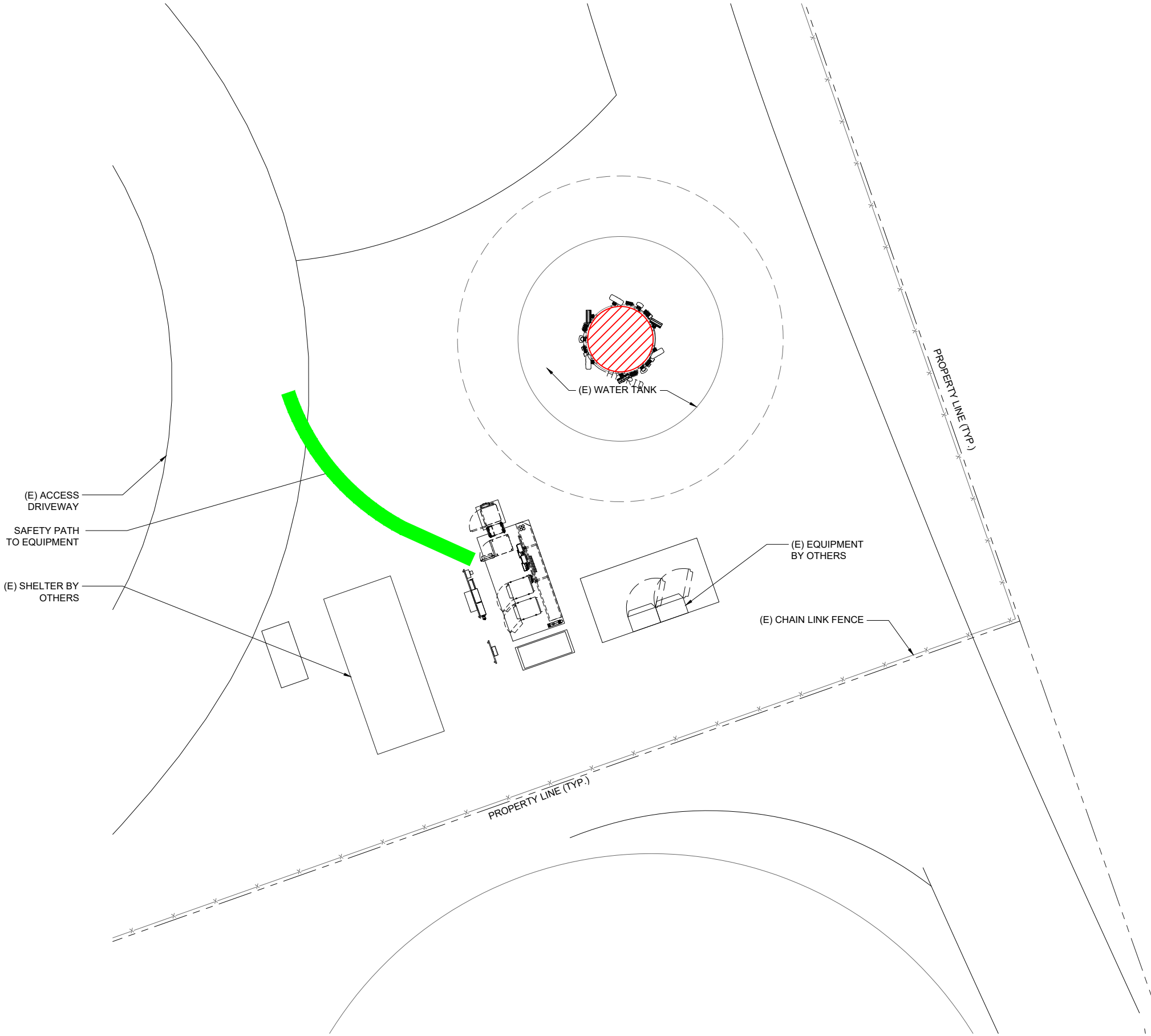
A6

NOTE:
THIS SITE MEETS OSHA COMPLIANCE FOR FIELD
OPERATIONS TO ACCESS BTS EQUIPMENT ON THE GROUND.
ALL ANTENNAS AND RADIOS ARE TOWER CREW ONLY.

LEGEND

3' SAFETY PATH TO EQUIPMENT

TOWER CREW ONLY



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SAFETY PLAN

Sheet Number:

A8

Product Specifications



FFHH-65C-R3
8-port sector antenna, 4x 617-806 and 4x 1695-2360 MHz, 65° HPBW, 3x RET, 600 MHz-Ready Antenna Technology

Electrical Specifications

Frequency Band, MHz	617-698	698-806	1695-1880	1850-1990	1920-2200	2300-2360
Gain, dBi	15.3	15.5	17.8	18.2	18.9	19.6
Beamwidth, Horizontal, degrees	67	63	65	66	64	55
Beamwidth, Vertical, degrees	10.2	9.1	5.7	5.3	4.9	4.4
Beam Tilt, degrees	2-13	2-13	2-12	2-12	2-12	2-12
USLS (First Lobe), dB	19	17	20	19	19	21
Front-to-Back Ratio at 180°, dB	32	29	35	40	40	41
Isolation, dB	28	28	28	28	28	28
Isolation, Intersystem, dB	28	28	28	28	28	28
VSWR Return Loss, dB	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0
PIM, 3rd Order, 2 x 20 W, dBc		-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	300	300	300	300	300	250
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	617-698	698-806	1695-1880	1850-1990	1920-2200	2300-2360
Gain by all Beam Tilts, average, dBi	15.0	15.2	17.4	17.9	18.5	19.3
Gain by all Beam Tilts Tolerance, dB	±0.6	±0.5	±0.4	±0.5	±0.6	±0.5
Gain by Beam Tilt, average, dBi	2 ° 14.8	2 ° 15.0	2 ° 17.2	2 ° 17.6	2 ° 18.1	2 ° 18.8
	8 ° 15.1	8 ° 15.3	7 ° 17.5	7 ° 18.0	7 ° 18.6	7 ° 19.4
	13 ° 15.0	13 ° 15.1	12 ° 17.4	12 ° 17.8	12 ° 18.4	12 ° 19.2
Beamwidth, Horizontal Tolerance, degrees	±2.7	±4.8	±5.5	±5.2	±4.9	±6.4
Beamwidth, Vertical Tolerance, degrees	±0.6	±0.7	±0.4	±0.3	±0.4	±0.1
USLS, beampeak to 20° above beampeak, dB	17	12	15	16	16	18
Front-to-Back Total Power at 180° ± 30°, dB	23	21	29	31	31	31
CPR at Boresight, dB	24	23	21	20	21	22
CPR at Sector, dB	6	10	9	9	9	8

* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, [download the whitepaper Time to Raise the Bar on BSAs.](#)

Array Layout

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page 1 of 5
January 11, 2018

Product Specifications



FFHH-65C-R3

RF Connector Quantity, high band	4
RF Connector Interface	4.3-10 Female
Color	Light gray
Grounding Type	RF connector inner conductor and body grounded to reflector and mounting bracket
Radiator Material	Aluminum Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Location	Bottom
Wind Loading, frontal	1925.0 N @ 150 km/h 432.8 lbf @ 150 km/h
Wind Loading, lateral	351.0 N @ 150 km/h 78.9 lbf @ 150 km/h
Wind Loading, rear	1945.0 N @ 150 km/h 437.3 lbf @ 150 km/h
Wind Speed, maximum	241 km/h 150 mph

Dimensions

Length	2437.0 mm 95.9 in
Width	640.0 mm 25.2 in
Depth	235.0 mm 9.3 in
Net Weight, without mounting kit	57.9 kg 127.6 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10-30 Vdc
Internal RET	High band (2) Low band (1)
Power Consumption, idle state, maximum	1 W
Power Consumption, normal conditions, maximum	10 W
Protocol	3GPP/AISG 2.0 (Single RET)
RET Interface	8-pin DIN Female 8-pin DIN Male
RET Interface, quantity	1 female 1 male

Packed Dimensions

Length	2590.0 mm 102.0 in
Width	752.0 mm 29.6 in
Depth	380.0 mm 15.0 in
Shipping Weight	84.4 kg 186.1 lb

Regulatory Compliance/Certifications

Agency RoHS 2011/65/EU China RoHS SJ/T 11364-2006 ISO 9001:2008	Classification Compliant by Exemption Above Maximum Concentration Value (MCV) Designed, manufactured and/or distributed under this quality management system
---	--



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page 3 of 5
January 11, 2018



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5808 SOUTH RAPP ST., STE. 150 LITTLETON, CO 80011

PROJECT INFORMATION:

SITE NAME:
SECURITY WATER TANK
SITE ID:
DN03024A

5275 YUCATAN DR
COLORADO SPRINGS, CO 80911
EL PASO COUNTY

Rev:	Date:	Description:	By:
1	09/14/2020	PRELIM. CONST.	EL
2	09/28/2020	REV 1	ML

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Sheet Title:

ANTENNA
SPECIFICATIONS

Sheet Number:

A9.1

AEHC AirScale MAA 64T64R 192AE B41 320W
Preliminary technical data

Specification	Details
Standard	3GPP NR and LTE compliant, TDD, FCC compliant
Band / Frequency range	2496 - 2690 MHz 3GPP B41
Max. supported modulation	256 QAM
Number of TX/RX paths	64T / 64R
MIMO streams	16
Instantaneous bandwidth IBW	194 MHz
Occupied bandwidth OBW	190 MHz
Total average EIRP	79 dBm
Max. output power per TRX	5 W / TRX (320 W total)
Dimensions	970 mm (H) x 540 mm (W) x 205 mm (D)
Volume	94 l
Weight	47 kg (without mounting brackets)
Supply voltage / Connector type	DC -36 V ... -60 V / 2 pole connector
Power consumption	≤1280 W typical (75% DL duty cycle, 30% RF load) ≤1690 W max (75% DL duty cycle, 100% RF load)
Optical ports	4 x SFP28, 10/25GE eCPRI (Octis)
Other interfaces / Connector type	RF monitor port / SMA, Control AISG, External Alarms / MDR26, status LED
Operational temperature range	-40 °C ... +55 °C
Cooling	Natural convection cooling
Installation options	Pole / Wall, ± 15° vertical
Ingress / Surge protection	IP65, Class II 20 kA
Supported RAT	5G, TD-LTE

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AirScale High Power
Wide Band MAA benefits

- 5G Adaptive Antenna System for optimized capacity and coverage
- Beamforming capable 64T64R with total 320W output power
- Full band operation for B41



AEHC 475124A
NOKIA

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ANTENNA
SPECIFICATIONS

A9.2

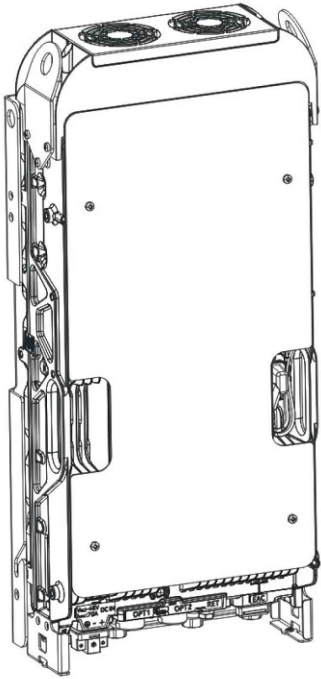
AirScale Dual RRH 4T4R B12/71 240W AHLOA



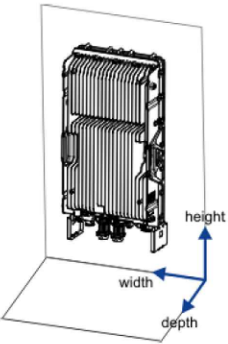
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Product Code: 474331A	
Supported Frequency bands	3GPP Band 12/71
Frequencies	Band 12 adjusted: UL 698 – 716 MHz, DL 728 – 746 MHz Band 71: UL 663 MHz – 698 MHz, DL 617 MHz – 652 MHz
Number of TX/RX paths/pipes	4 pipes; 2T2R, 2T4R, 4T4R for both bands
Instantaneous Bandwidth IBW	17 MHz for B12 and 35MHz for B71 1 MHz below B12 NB IoT future use
Occupied Bandwidth OBW	UL 53MHz contiguous DL B12 17MHz + 1 MHz NB IoT future use. B71 35MHz
Output Power	60W per TX shared between bands
Supply Voltage / Range	DC-48 V / -36 V to -60 V
Typical Power Consumption	640W [ETSI Busy Hour Load at 4TX@60W 450W [ETSI Busy Hour Load at 4TX@20W
Antenna Ports	4 ports, 4.3-10+
Optical Ports	2 x CPRI 9.8 Gbps
ALD Control Interfaces	AISG3.0 and RET (DC on ANT1 & ANT3)
Other Interfaces	External Alarm MDR-26 (4 inputs, 1 Output) DC Circular Power Connector
Physical	560 mm x 308 mm x 189 mm Approximately 38kg with no covers or brackets
Operating Temperature Range	-40°C to 55°C (with no solar load)
Surge Protection	Class II 5A
Installation Options	Pole, Wall, Book Mount

NOKIA



Property	Value
Height	Core RRH: 695 mm (27.36 in.) With upper and lower mounting brackets: 730 mm (28.74 in.)
Width	Core RRH: 308 mm (12.13 in.) With mounting cover: 327 mm (12.87 in.)
Depth	Core RRH: 131 mm (5.15 in.) With mounting cover: 142 mm (5.59 in.)
Weight	Core RRH: 32 kg (70.55 lb)
Volume	Core RRH: 31 l



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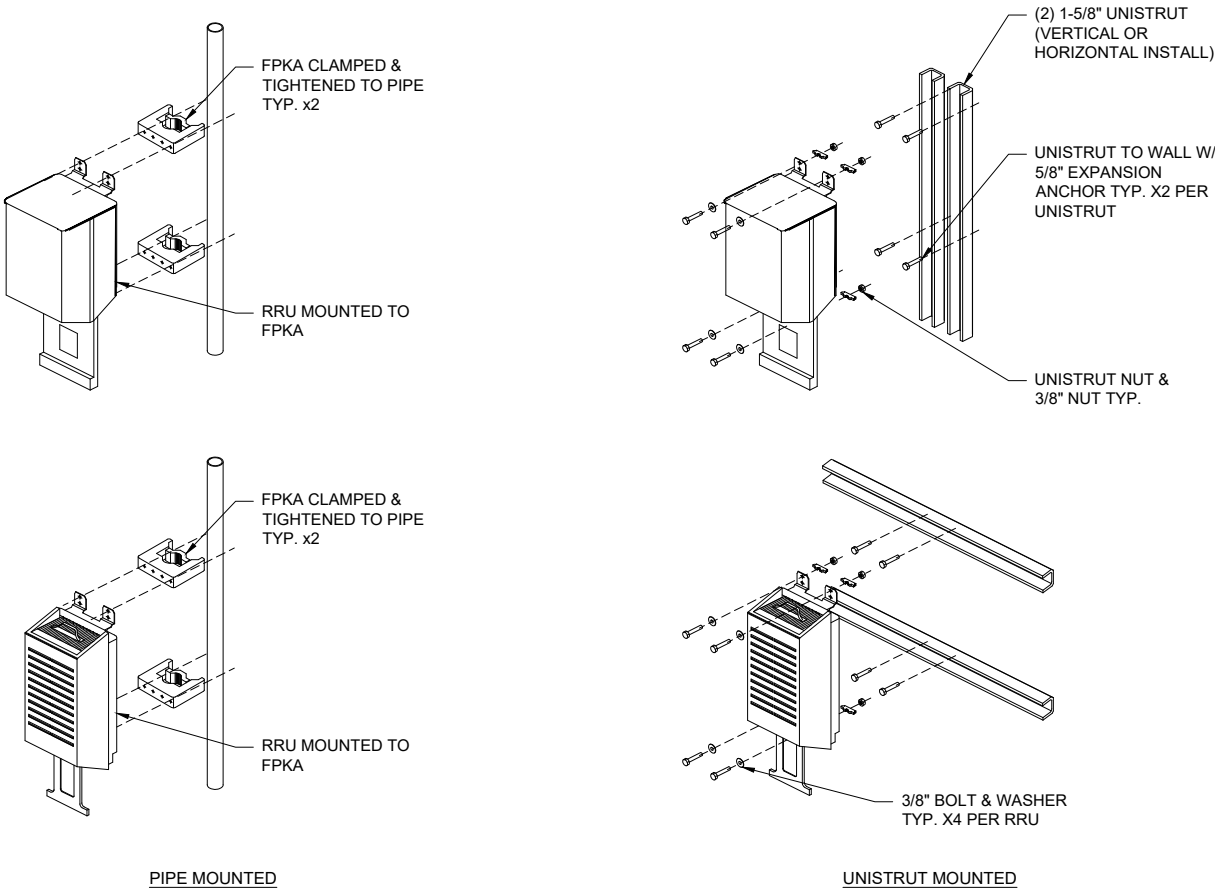
**EQUIPMENT
DETAILS**

Sheet Number:

A10

1 RRU SPECIFICATIONS (AHLOA)

SCALE: N.T.S.



3 RRU MOUNTING DETAIL

SCALE: N.T.S.

1 RRU SPECIFICATIONS (AHFIG)

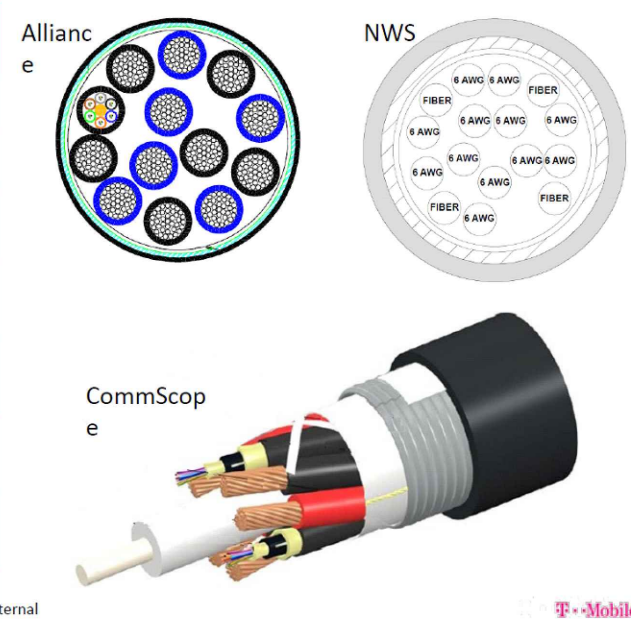
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4 NOT USED

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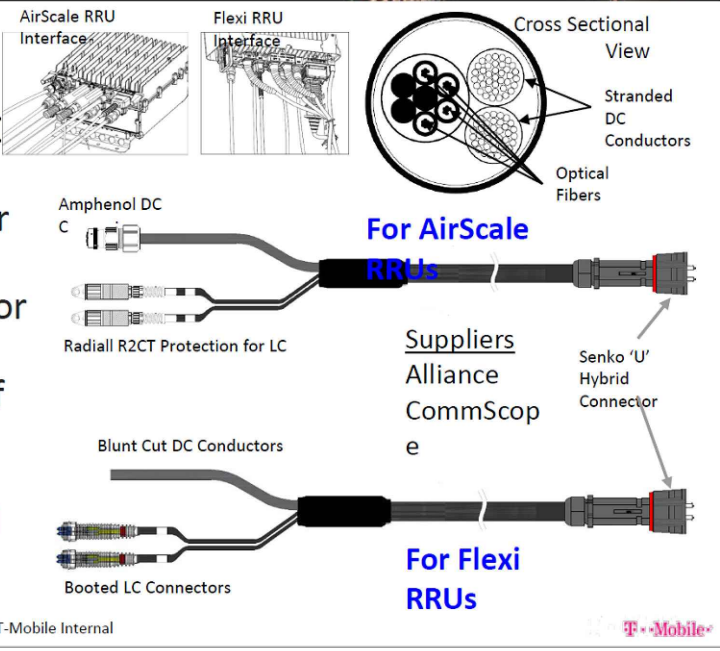
Trunk Cable General Specifications

Characteristic	Alliance	CommScope	NWS
Outer Diam.	1.46"	1.55"	1.48"
Weight	1.61 lb/ft	1.71 lb/ft	1.61 lb/ft
Min. Bend Rad	14.6"	18.6"	21.5"
DC Conductors	12 x 6AWG	12 x 6AWG	12 x 6AWG
Armor	Corrugated Cu	Corrugated Al	Cu tape, PVC
Conductor Termination	None	None	None
Single-Mode Fibers	48	48	48
Fiber Termination	LC pair	LC pair	LC pair



Hybrid Jumper Cable General Specifications

- Outer diameter: 0.72"
- Weight: 0.34 lb/ft
- Operating Temp: -40 °C to +75 °C
- Connectorized for mating with tower top trunk cable breakout or roof top box
- DC and fiber interfaces versions for Nokia Airscale and Flexi RRUs
- Short (tower top 15') & long (roof top 20' - 250') AirScale versions available
- Also available with legacy booted LC connectors and blunt cut DC conductors for Flexi RRU applications



1 HCS 2.0 TRUNK CABLE SPECIFICATIONS

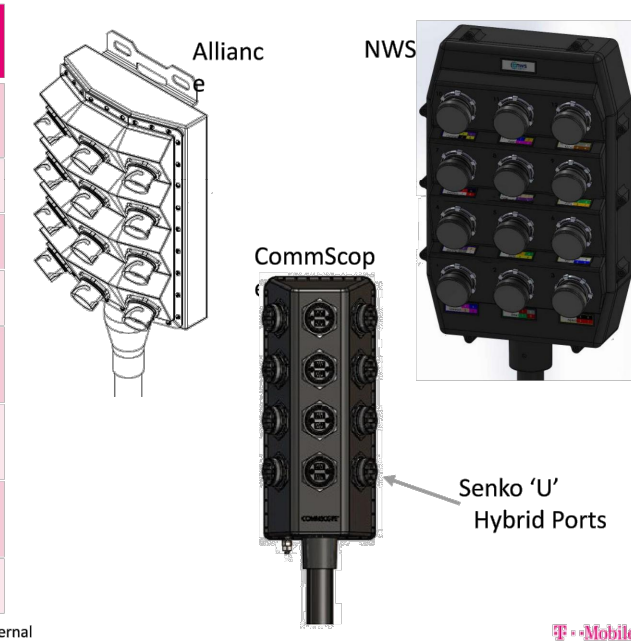
SCALE: N.T.S.

2 HCS 2.0 HYBRID JUMPER CABLE SPECIFICATIONS

SCALE: N.T.S.

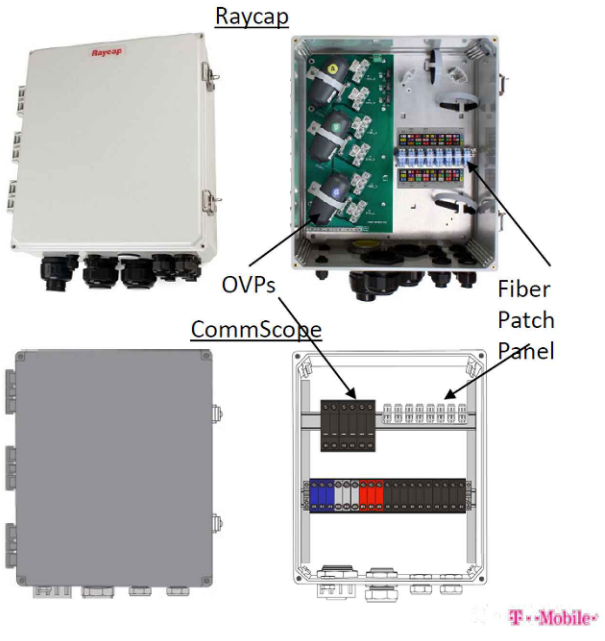
Breakout Feature General Specifications

Characteristic	Alliance	CommScope	NWS
Dimensions, in.	9.3x14.9x5.8	6.7x16.9x4.7	10.2x16.0x3.2
Weight	1.61 lb/ft	0.970 lb/ft	1.61 lb/ft
Port Interface	Senko U	Senko U	Senko U
Hybrid Ports	12	12	12
Conductor Termination	None	None	None
Single Mode Fibers	48	48	48
Fiber Termination	LC pair	LC pair	LC pair
Max RRU	12	12	12



Bottom Junction Box General Specifications

Characteristics	CommScope	Raycap
Dimensions	14"x16"x8"	14"x16"x8"
Weight	23.5 lb	21.9 lb
OVP, IEC 61643-1	24"	Class I SPD (3)
UL Rating		1449, 4 th Ed.
OVP Monitoring	Dry contact	Dry contact
Fiber Patch Panel	24 LC pairs	24 LC pairs
Environmental Rating	IP67	IP66
Operating Temperature	-40 °C to +75 °C	-40 °C to +80 °C



3 HCS 2.0 BREAKOUT FEATURE (PENDANT)

SCALE: N.T.S.

4 HCS 2.0 BOTTOM JUNCTION BOX SPECIFICATIONS

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A11

Figure: AMIA AirScale Subrack (factory default)

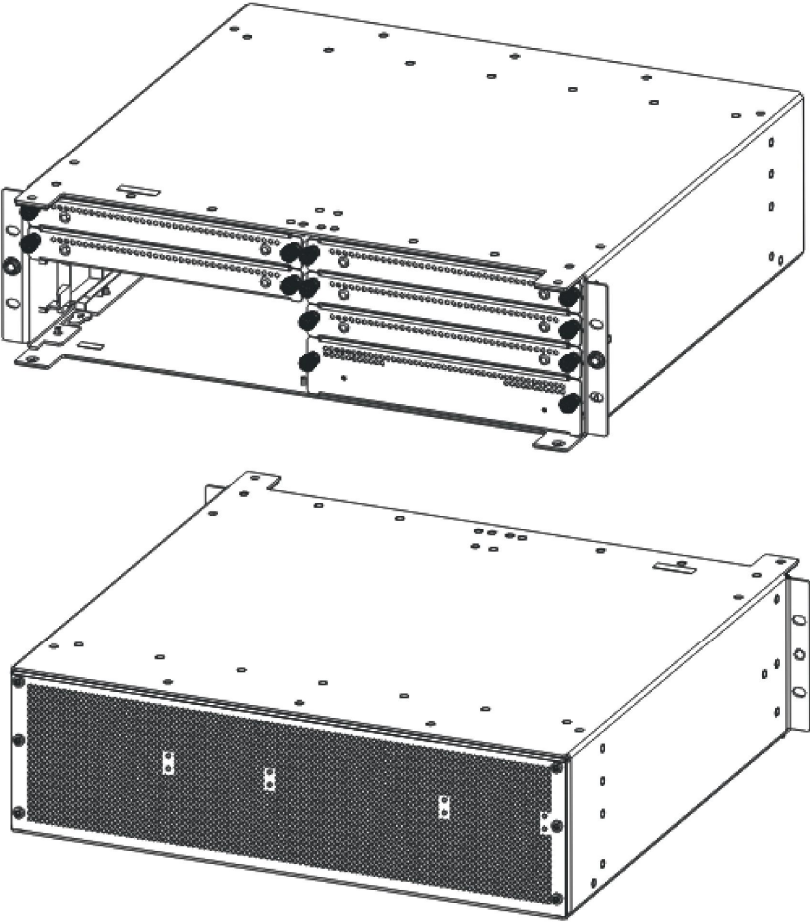
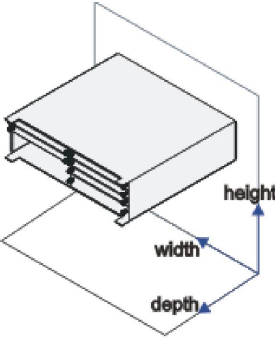


Table: AMIA dimensions and weight

Property	Value	Dimensions orientation
Height	128.5 mm (5.1 in.)	
Depth	400 mm (15.7 in.)	
Width	447 mm (17.6 in.)	

Property	Value	Dimensions orientation
Weight	Empty: 5.1 kg (11.2 lb)	
	With dummy panels: 6.8 kg (15 lb)	
	With all units: 23.9 kg (52.7 lb)	

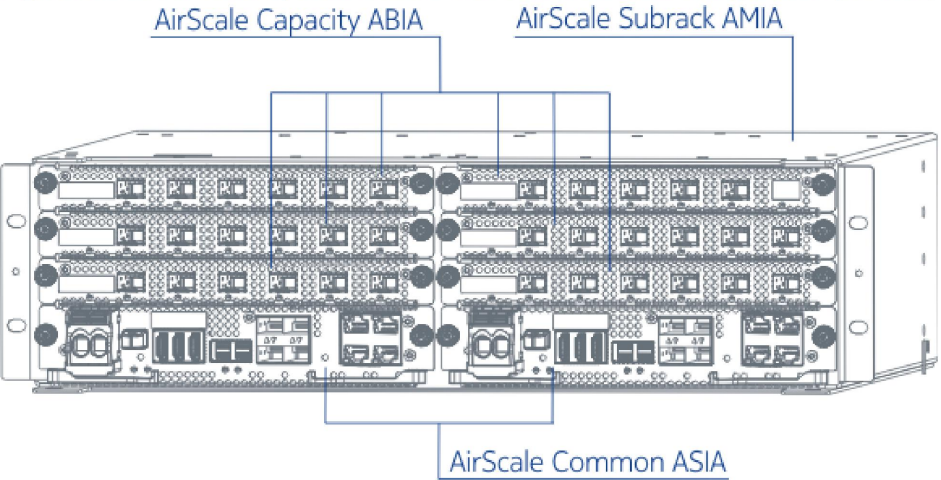
For more information, see the *Nokia AirScale Base Station Product Description* document.

Nokia AirScale System Module Indoor

Nokia AirScale System Module Indoor consists of the following items:

- One Nokia AirScale Subrack (AMIA), including backplane for high bandwidth connectivity between processing plug-in units
- One or two Nokia AirScale Common (ASIA) plug-in units for transport interfacing and for centralized processing
- Up to six Nokia AirScale Capacity (ABIA) plug-in units for baseband processing and for optical interfaces with radio units

Figure: Nokia AirScale System Module Indoor in maximum configuration (2xASIA, 6xABIA)



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**EQUIPMENT
DETAILS**

Sheet Number:

A12



HP-Large 3 Power Cabinet

Product Features

Compact design for equipment & power:

- 30RU supports 3 radios and transport equipment
- 600A @ -48V power system
- Slimline high efficiency rectifier
- ORION Touch screen Controller
- Rear Access Hatch

Direct air-cooling solution, 6000W capacity, 5°C delta T

Easy slide-in filter replacement

Connects with:

- SB3, 2-string battery cabinet
- LB3, 4-string battery cabinet
- V2, Expansion equipment and battery cabinet

Designed to GR-487 specifications

www.deltaww.com



Specifications

Model	HPL3 (HP-Large 3 Power Cabinet)	
1. General		
Construction	Aluminum enclosure	
Dimensions (W x H x D)	30 x 72 x 34.6 in. (762 x 1829x 879mm), Depth with Door/Hatch: 44.7 in. (1136mm)	
Weight	~595 lbs (~270kg) (without customer equipment or batteries)	
Internal rack dimension	Total Equipment space 30RU:	
	Horizontal rack:	19" x 27RU
	Vertical rack:	19" x 3RU
	Power System space:	23" x 12RU
Mounting options	Pad-mount, plinth option	
Finish	Polyester Power Paint (Tan)	
Safety	UL Listed , IEC / EN 60950	
2. Environment		
Operating temperature	-40°C to +50°C (-40°F to +122°F) with solar load. IP 55	
Protection class	designed to GR-487	
Acoustics	65dBA @5000W heat load , 70dBA @ 6000W	
Humidity (relative)	95%, non-condensing (Max.)	
3. Thermal Management		
Cooling Equipment:	Direct Air Cooling, 6000W capacity, 5°C delta T	
Heating Equipment:	Forced air heating (2) 1000W AC heaters	
4. Equipment		
Cable entry	Knock-out plate on each upper side wall / Additional knockouts on sides (1) 3" conduit hole with hole plug	
Door latch	3 point latching, 5/16 nut driver tool, pad-locking capability	
Primary ground	10 double-hole ¼"-20 threaded holes on 5/8" center ground bar	
Lifting Ears	4 Lifting Tabs	
Plinth	Optional 6" plinth available	
Standard equipment	AC Load Center:	
	240V split phase, dual feed / (1) 200A + (1)100A	
	208V 3-phase, single feed / (1) 200A	
	AC Surge Protection for each breaker feed	
	GFCI Receptacle 120V	
	Temp Probes	
	(6 form-C) Alarm Termination block	
	605A/ 54V (336kW) redundant Power System with DIN rail distribution:	
	12 rectifier positions (3x55A DPR3000 rectifiers included)	
	48 poles for load (2x10A, 3x50A, and 6x100A load breakers included)	
Front Door:	16 poles for battery	
	(2) SB350 / (2) SB175 Battery connections	
	(3) SB350 Generator connections	
	(6) DC powered centrifugal fans with (3) MERV-13 filters, (GORE option)	
	Clogged Filter alarm pressure switch	
	Door intrusion alarm	
	(2) 1000W AC powered heaters	
	LED interior cabinet light	
	Exhaust vent with (3) MERV-13 filters, (GORE option)	
5. Ordering information		
Cabinet	ESOA600-HCU01	HP-Large 3 600A Power / Equipment Cabinet
Rectifier	ESR-48/60A A-T	48V / 56A 3000W, 96.4%, CAN communication
Controller (Spare)	TPS1020028AU17	Orion TOUCH Controller
Plinth, 6"	37993318816900-S	Plinth for V1/V2, HPL2, HPL3, LB2 and LB3

*All specifications are subject to change without prior notice

Delta Group Website:
www.deltaww.com

Product Website:
www.deltapowersolutions.com

United States of America & Canada:
Delta Electronics (USA) Inc.
2925 E. Plano Parkway
Plano, TX (Texas) 75074

Sales and Orders:
DEUSTPS.Sales@deltaww.com
DEUSTPS.Orders@deltaww.com

Field Support:
1-877-DELTA-08 option 3
(877-335-8208 option 3)
DEUSTPS.Support@deltaww.com

Installation Services:
DEUSTPS.Services@deltaww.com

RMA:
DEUSTPS.RMA@deltaww.com



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A13



Compact design for battery strings:

- Direct air cooling solution
- Supports four strings of -48V VRLA batteries up to 210Ah
- 600A rated bus bar with 200A breaker per string
- Bulk Input / Output with ability to daisy chain cabinets
- Front to Front Air Flow
- Corrosion resistant aluminum construction
- Powder coated high gloss finish
- Designed to meet GR-487



Specifications

Model		LB3 (Large Battery 3 Cabinet)
1. General		
Construction	Aluminium enclosure	
Dimensions (W x H x D)	30 x 72 x 35 in. (381 x 1829x 889mm), Depth with Door: 41.2 in. (1047mm)	
Weight	~540 lbs (~245kg) (without batteries)	
Internal rack dimension	4 battery trays to support up to 4 strings 210Ah batteries	
Mounting options	Pad-mount, plinth option	
Finish	Polyester Power Paint (Tan)	
Safety	UL Listed , IEC / EN 60950	
2. Environment		
Operating temperature	-40°C to +50°C (-40°F to +122°F) with solar load	
Protection class	IP55 designed to GR-487	
Acoustics	65dBA	
Humidity (relative)	95%, non-condensing (Max.)	
3. Thermal Management		
Cooling Equipment:	Direct Air Cooling	
Heating Equipment:	Forced air heating (1) 1000W AC heaters	
4. Equipment		
Cable entry	Knock-out plate on each upper side wall Additional knockouts each side	
Door latch	3 point latching, 5/16 nut driver tool, pad-locking capability	
Primary ground	10 double-hole ¼"-20 threaded holes on 5/8" center ground bar	
Lifting Ears	4 Lifting Tabs	
Plinth	Optional 6" plinth available	
Standard equipment	AC Load Center: 30A heater breaker Left or Right side AC entry options	
	AC Surge Protection (option)	
	DC Load Center: 600A bulk feed bus bar (4) 200A bolt in battery breakers	
	(4) 2-hole lug landings,(2 output/2 input from second battery cabinet)	
	Temp Probes	
	Battery Trays: (4) battery trays (4) -48V battery strings (210Ah max each)	
	Connection kit: (1) DC 10A Breaker supplied (install onto HPL3 Power Cabinet)	
	LED interior cabinet light	
	(2) DC powered Axial fans with (1) F5 Filters	
	Front Door:	Door intrusion alarm (1) 1000W AC powered heaters
5. Ordering information		
Cabinet	ESOF015-ECV04	Large Battery 3 (LB3) Cabinet
Plinth, 6"	37993318816900-S	Plinth for V1/V2, HPL2, HPL3, LB2 and LB3

*All specifications are subject to change without prior notice.

RMA:
DEUSTPS.RMA@deltaww.com



GENERAL CONSTRUCTION NOTES:

1.

THE FACILITY IS AN UNOCCUPIED WIRELESS FACILITY.

2.

PLANS ARE NOT TO BE SCALED AND ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY, UNLESS NOTED OTHERWISE. THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

3.

PRIOR TO THE SUBMISSION OF BIDS, THE CONTRACTORS SHALL VISIT THE JOB SITE AND BE RESPONSIBLE FOR ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS, AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES ARE TO BE BROUGHT TO THE ATTENTION OF THE IMPLEMENTATION ENGINEER AND ARCHITECT/ENGINEER PRIOR TO PROCEEDING WITH THE WORK.

4.

THE CONTRACTOR SHALL RECEIVE, IN WRITING, AUTHORIZATION TO PROCEED BEFORE STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED OR IDENTIFIED BY THE CONTRACT DOCUMENTS.

5.

CONTRACTOR SHALL CONTACT LOCAL DIGGERS HOTLINE 48 HOURS PRIOR TO PROCEEDING WITH ANY EXCAVATION, SITE WORK OR CONSTRUCTION.

6.

THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURERs RECOMMENDATIONS UNLESS SPECIFICALLY INDICATED OTHERWISE OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.

7.

ALL WORK PERFORMED AND MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. MECHANICAL AND ELECTRICAL SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

8.

THE GENERAL CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK, USING THE BEST SKILLS AND ATTENTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT INCLUDING CONTACT AND COORDINATION WITH THE CONSTRUCTION FIELD ENGINEER AND WITH THE LANDLORDs AUTHORIZED REPRESENTATIVE.

9.

DETAILS ARE INTENDED TO SHOW END RESULT OF DESIGN. MINOR MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.

10.

REPRESENTATIONS OF TRUE NORTH, OTHER THAN THOSE FOUND ON THE PLOT OF SURVEY DRAWING, SHALL NOT BE USED TO IDENTIFY OR ESTABLISH THE BEARING OF TRUE NORTH AT THE SITE. THE CONTRACTOR SHALL RELY SOLELY ON THE PLOT OF SURVEY DRAWING AND ANY SURVEYORs MARKINGS AT THE SITE FOR THE ESTABLISHMENT OF TRUE NORTH, AND SHALL NOTIFY THE ARCHITECT/ENGINEER PRIOR TO PROCEEDING WITH THE WORK IF ANY DISCREPANCY IS FOUND BETWEEN THE VARIOUS ELEMENTS OF THE WORKING DRAWINGS AND THE TRUE NORTH ORIENTATION AS DEPICTED ON THE PLAT OF SURVEY. THE CONTRACTOR SHALL ASSUME SOLE LIABILITY FOR ANY FAILURE TO NOTIFY THE ARCHITECT/ENGINEER.

STRUCTURAL NOTES:

1.0

GENERAL CONDITIONS

1.1

DESIGN AND CONSTRUCTION OF ALL WORK SHALL CONFORM TO THE APPROVED EDITION OF THE IBC EDITION AND ALL OTHER APPLICABLE STATE CODES, ORDINANCES, AND REGULATIONS. IN CASE OF CONFLICT BETWEEN THE CODES, STANDARDS, AND REGULATIONS, SPECIFICATIONS, GENERAL NOTES AND/OR MANUFACTURERs REQUIREMENTS. USE THE MOST STRINGENT PROVISION.

1.2

IT IS THE EXPRESS INTENT OF THE PARTIES INVOLVED IN THIS PROJECT THAT THE CONTRACTOR OR SUBCONTRACTOR OR INDEPENDENT CONTRACTOR OR THEIR RESPECTIVE EMPLOYEES SHALL EXCULPATE THE ARCHITECT, THE ENGINEER, THE CONSTRUCTION MANAGER, THE OWNER, AND THEIR AGENTS, FROM ANY LIABILITY WHATSOEVER AND HOLD THEM HARMLESS AGAINST LOSS, DAMAGES, LIABILITY OR ANY EXPENSE ARISING IN ANY MATTER FROM THE WRONGFUL OR NEGLIGENT ACT, OR FAILURE TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, OR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES OR FAILURE TO CONFORM TO THE STATE SCAFFOLDING ACT IN CONNECTION WITH THE WORK.

1.3

DO NOT SCALE DRAWINGS.

1.4

VERIFY ALL EQUIPMENT MOUNTING DIMENSIONS PER MANUFACTURER DRAWINGS.

1.5

SUBMIT ONE SEPIA AND TWO PRINTS OF ALL STRUCTURAL SHOP DRAWINGS. MARKED UP SEPIA SHALL BE RETURNED.

STRUCTURAL STEEL NOTES:

1.

CHANNELS, ANGLES AND PLATES SHALL BE ASTM A36 MATERIAL, UNLESS NOTED OTHERWISE.

2.

SQUARE AND RECTANGULAR TUBE STEEL HSS SECTIONS SHALL BE ASTM A500, GRADE B (Fy = 46 ksi) MATERIAL.

3.

ROUND PIPE SECTIONS SHALL BE ASTM A53, GRADE B (Fy =35 ksi) MATERIAL.

4.

DESIGN, FABRICATION, AND ERECTION SHALL BE IN ACCORDANCE WITH THE "AISC SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS", WITH COMMENTARY AND THE "CODE OF STANDARD PRACTICE".

5.

ALL STEEL SHALL HAVE ONE COAT OF SHOP PRIMER. DO NOT PAINT AREAS WITHIN 3" OF BOLTS, WELDS OR HEADED STUDS.

6.

BOLTS SHALL BE HIGH STRENGTH BOLTS, A325, CONFORMING TO ASTM SPECIFICATIONS. ALL CONNECTIONS SHALL HAVE A MINIMUM OF 2 BOLTS.

7.

WELDING SHALL BE CONDUCTED BY CERTIFIED WELDERS AND SHALL CONFORM TO THE AWS CODES FOR ARC AND GAS WELDING IN BUILDING CONSTRUCTION.

8.

WELDS SHALL BE MADE USING E70XX ELECTRODES AND SHALL BE 3/16" MINIMUM UNLESS OTHERWISE NOTED.

9.

WELDING SHALL BE PERFORMED IN ACCORDANCE WITH A WELDED PROCEDURE SPECIFICATION (WPS) AS PER AWS D1.1 , D1.3 AND D1.4.

10.

ONLY PRE-QUALIFIED WELDING PROCEDURES SHALL BE USED.

11.

UNLESS SPECIFICALLY ADDRESSED IN THE SPECIFICATIONS OR THE DETAILS, ALL STEEL ITEMS PERMANENTLY EXPOSED TO EARTH OR WEATHER SHALL BE CORROSION-RESISTANT BY GALVANIZING OR BY THE USE OF STAINLESS STEEL.

12.

ALL FIELD WELDS ON GALVANIZED MATERIAL SHALL BE BRUSH-COATED WITH A ZINC-RICH PAINT.

FRP NOTES:

1.

ALL FRP MATERIAL SHALL BE EXTREN SERIES 500 OR EQUIVALENT, PRODUCED BY THE PULTRUSION METHOD.

2.

ALL ADHESIVE RESIN SHALL BE PLEXUS METHACRYLATE OR AN EQUIVALENT ADHESIVE RESIN THAT IS COMPATIBLE WITH THE RESIN MATRIX USED IN THE STRUCTURAL SHAPES.

3.

ALL FRP CONNECTIONS SHALL BE FULLY-BONDED AT EACH SIDE WITH A 1/4" PLATE AND A MINIMUM OF (2) 3/8" DIAMETER FLATHEAD FRP SCREWS PER MEMBER.

4.

ISOPLAST NUTS AND BOLTS SHALL BE TIGHTENED TO A SNUG-TIGHT FIT PLUS AN ADDITIONAL 1/2 TURN, PRIOR TO BEING LOCKED WITH EPOXY.

5.

ALL PANELS / SHEATHING SHALL BE FULLY BONDED WITH 3/8" FLATHEAD FRP SCREWS AT 12" O.C.

6.

ALL FIELD CUT AND DRILLED EDGES, HOLES AND ABRASIONS SHALL BE SEALED WITH A CATALYZED EPOXY RESIN COMPATIBLE WITH THE MANUFACTURERs ORIGINAL RESIN.

CONCRETE NOTES:

3.0

STANDARDS FOR ALL CONCRETE WORK:

3.1

ALL CONCRETE WORK SHALL CONFORM WITH ACI. 318 OR LATEST. DETAIL REINFORCING IN CONFORMANCE WITH ACI. SP66 LATEST.

3.2

NO SPLICES OF REINFORCEMENT SHALL BE MADE EXCEPT AS DETAILED OR AUTHORIZED BY THE STRUCTURAL ENGINEER. LAP SPLICES WHERE PERMITTED SHALL BE A MINIMUM OF 30 BAR DIAMETERS.

3.3

PROVIDE ALL ACCESSORIES NECESSARY TO SUPPORT REINFORCING AT POSITIONS SHOW ON DRAWINGS.

3.4

WIRE FABRIC REINFORCEMENT MUST LAP ONE FULL MESH AT SIDE AND END LAPS SHALL BE TIED TOGETHER.

3.5

CURE AFTER FINISHING CONCRETE. KEEP MOIST FOR 7 DAYS AFTER POURING.

3.6

COMPACT STRUCTURAL FILL 95% PROCTOR DENSITY PRIOR TO PLACING CONCRETE UNDER SLABS.

3.7

1/4" CHAMFER ON ALL CORNERS AND EDGES.

3.8

ALL CONCRETE SHALL BE PORTLAND, TYPE 1 CEMENT WITH A MINIMUM OF 28 DAY STRENGTH OF 3000 PSI., 4" SLUMP AND A MINIMUM AIR ENTRAPMENT OF 4%.

3.9

ALL REINFORCING STEEL SHALL BE GRADE 60. ALL REINFORCING MESH SHALL CONFORM TO ASTM A 185.

ELECTRICAL NOTES:

1.

SUBMITTAL OF BID INDICATES CONTRACTOR IS COGNIZANT OF ALL JOB SITE CONDITIONS AND WORK TO BE PERFORMED UNDER THIS CONTRACT. CONTRACTOR IS RESPONSIBLE FOR ALL FIELD VERIFICATION.

2.

THESE PLANS ARE DIAGRAMMATIC ONLY, AND NOT TO BE SCALED.

3.

ELECTRICAL 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 REQUIRED.

4.

ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND IN PERFECT CONDITION WHEN INSTALLED AND SHALL BE OF THE BEST GRADE OR GROUP OF EQUIPMENT. MATERIALS SHALL BE LISTED AND APPROVED BY UNDER-WRITERs LABORATORY AND SHALL BEAR THE INSPECTION LABEL "J" WHERE SUBJECT TO SUCH 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.

5.

ALL CONDUIT INSTALLED SHALL BE SURFACE MOUNTED UNLESS OTHERWISE NOTED.

6.

ELECTRICAL CONTRACTOR SHALL CARRY OUT HIS WORK WITH ACCORDANCE WITH ALL GOVERNING STATE, COUNTY, LOCAL CODES AND O.S.H.A.

7.

ELECTRICAL CONTRACTOR SHALL SECURE ALL NECESSARY ELECTRICAL PERMITS, AND PAY ALL REQUIRED FEES.

8.

COMPLETE JOB SHALL BE GUARANTEED FOR A PERIOD OF NO LESS THAN ONE YEAR AFTER THE DATE OF JOB COMPLETION. 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 ELECTRICAL CONTRACTOR.

9.

ALL CONDUIT ONLY (C.O.) SHALL HAVE A PULL WIRE OR ROPE, AND TRUE TAPE.

10.

PROVIDE THE OWNER WITH ONE SET OF COMPLETE DIMENSIONS AND CIRCUITS, WITHIN 10 WORKING DAYS OF PROJECT COMPLETION. ELECTRICAL "AS BUILT" DRAWINGS, SHOWING ACTUAL LOCATION OF CONDUITS.

11.

ALL BROCHURES, OPERATING MANUALS, CATALOGS, SHOP DRAWINGS, ETC. SHALL BE TURNED OVER TO PROJECT MANAGER AT JOB COMPLETION.

12.

USE T-TAP CONNECTIONS ON ALL MULTI-CIRCUITS WITH COMMON NEUTRAL CONDUCTOR FOR LIGHTING FIXTURE. ALL CONDUCTORS SHALL BE COPPER.

13.

THE EXTERIOR GROUND RING SHALL BE TESTED PER CCI SPECIFICATIONS AND SHALL HAVE A RESISTANCE TO EARTH OF 5 OHMS OR LESS. IF NOT NOTIFY ENGINEER.

14.

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.

15.

THE ENTIRE ELECTRICAL INSTALLATION SHALL BE GROUNDED AS REQUIRED BY ALL APPLICABLE CODES.

16.

PATCH, REPAIR, AND PAINT ANY AREA THAT HAS BEEN DAMAGED IN THE COURSE OF THE ELECTRICAL WORK.

17.

IN DRILLING HOLES INTO CONCRETE (WHETHER FOR FASTENING OR ANCHORING PURPOSES OR PENETRATIONS THROUGH THE FLOOR FOR CONDUIT RUNS, PIPE RUNS, ETC.) IT MUST BE CLEARLY UNDERSTOOD THAT TENDONS AND RE-BARS WILL NOT BE DRILLED INTO, CUT, OR DAMAGED UNDER ANY CIRCUMSTANCES.

18.

LOCATION OF TENDONS AN RE-BARS ARE NOT DEFINITELY KNOWN AND THEREFORE MUST BE SEARCHED FOR BY APPROPRIATE METHODS AND EQUIPMENT VIA X-RAY, OR OTHER DEVICES THAT CAN ACCURATELY LOCATE THE REINFORCING STEEL TENDONS.

19.

PENETRATIONS IN FIRE RATED WALLS SHALL BE FIRE STOPPED IN ACCORDANCE WITH APPLICABLE LOCAL BUILDING CODES. USING U.L. RATED MATERIALS.

20.

ELECTRICAL CONTRACTOR IS TO COORDINATE WITH 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.

21.

ELECTRICAL CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND/OR CATALOG CUT-SHEETS ON ALL NON-SPECIFIED ORIGINAL MATERIALS AND EQUIPMENT, TO PROJECT MANAGER PRIOR TO COMMENCEMENT OF THE WORK.

22.

UPON COMPLETION OF WORK, CONDUCT CONTINUITY AND SHORT CIRCUIT, AS WELL AS, GROUNDING TEST. GROUNDING TEST SHALL BE PERFORMED BY INDEPENDENT TESTING AGENCY, WITH WRITTEN REPORT SUBMITTED TO THE PROJECT MANAGER FOR REVIEW AND APPROVAL.

23.

CLEAN PREMISES DAILY OF ALL DEBRIS RESULTING FROM WORK AND LEAVE WORK PREMISES IN A COMPLETE AND UNDAMAGED CONDITION.

24.

ALL EXTERIOR WALL PENETRATIONS SHALL BE SEALED WITH POLYSEAM SEALANT.

25.

ALL #2 TINNED BARE COPPER DOWNLEADS TO BE PROTECTED BY 1/2" P.V.C. PIPE AND SECURED.

26.

COMPRESSION FITTINGS TO BE USED ON ALL CONDUITS (NO SET SCREWS).

27.

ALL #6 STRANDED COPPER WITH GREEN INSULATION TO BE ATTACHED WITH CRIMPED DOUBLE LUG, ATTACHED WITH NUTS, BOLTS AND STAR WASHERS TYPICAL AND NO-OX GREASE BETWEEN LUG AND BUS BAR.

28.

ALL ABOVE GROUND CONDUIT SHALL BE RIGID GALVANIZED CONDUIT WITH WEATHERPROOF FITTINGS.

GROUNDING:

1.

ALL METALLIC PARTS OF ELECTRICAL EQUIPMENT WHICH DO NOT CARRY CURRENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING MANUFACTURER, T-MOBILE GROUNDING AND BONDING STANDARDS, AND THE NATIONAL ELECTRICAL CODE.

2.

PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEM INDICATED WITH ASSEMBLY OF MATERIALS, INCLUDING GROUNDING ELECTRODES, BONDING JUMPERS AND ADDITIONAL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.

3.

ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUNDING CONDUCTORS SHALL NOT BE LOOPED OR SHARPLY BENT. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND IN THE SHORTEST AND STRAIGHTEST PATHS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES.

4.

GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUND RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN #2 AWG COPPER. ROOFTOP GROUND RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).

5.

TIGHTEN GROUNDING AND BONDING CONNECTORS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH MANUFACTURERs PUBLISHED TORQUE TIGHTENING VALUES FOR CONNECTORS AND BOLTS. WHERE MANUFACTURERs TORQUING REQUIREMENTS ARE NOT AVAILABLE, TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUE VALUES SPECIFIED IN UL TO ASSURE PERMANENT AND EFFECTIVE GROUNDING. CONTRACTOR SHALL VERIFY THE LOCATIONS OF GROUNDING TIE-IN-POINTS TO THE EXISTING GROUNDING SYSTEM.

6.

ALL UNDERGROUND GROUNDING CONNECTIONS SHALL BE MADE BY THE GROUNDING SYSTEM. EXOTHERMIC WELD PROCESS AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURERs INSTRUCTIONS.

7.

ALL GROUNDING CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS. EXOTHERMIC WELDED CONNECTIONS SHALL BE APPROVED BY THE INSPECTOR HAVING JURISDICTION BEFORE BEING PERMANENTLY CONCEALED.

8.

APPLY CORROSION-RESISTANCE FINISH TO FIELD CONNECTIONS AND PLACES WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DESTROYED.

9.

A SEPARATE, CONTINUOUS, INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUITS.

10.

BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE 6 AWG GROUNDING CONDUCTOR TO A GROUND BUS.

11.

DIRECT BURIED GROUNDING CONDUCTORS SHALL BE INSTALLED AT A NOMINAL DEPTH OF 36" MINIMUM BELOW GRADE, OR 6" BELOW THE FROST LINE, USE THE GREATER OF THE TWO DISTANCES.

12.

ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSTALLED IN SCHEDULE 40 PVC CONDUIT.

13.

THE INSTALLATION OF CHEMICAL ELECTROLYTIC GROUNDING SYSTEM IN STRICT ACCORDANCE WITH MANUFACTURERs INSTRUCTIONS. REMOVE SEALING TAPE FROM LEACHING AND BREATHER HOLES. INSTALL PROTECTIVE BOX FLUSH WITH GRADE.

14.

DRIVE GROUND RODS UNTIL TOPS ARE A MINIMUM DISTANCE OF 36" DEPTH OR 6" BELOW FROST LINE, USING THE GREATER OF THE TWO DISTANCES.

15.

IF COAX ON THE ICE BRIDGE IS MORE THAN 6 FT. FROM THE GROUND BAR AT THE BASE OF THE TOWER, A SECOND GROUND BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE, TO GROUND THE COAX CABLE GROUNDING KITS AND IN-LINE ARRESTORS.

16.

CONTRACTOR SHALL REPAIR, AND/OR REPLACE, EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.

T-Mobile

18400 EAST 22ND AVE. AURORA, CO 80011

tellusconnect

5808 SOUTH RAPP ST., STE.150 LITTLETON, CO 80011

PROJECT INFORMATION:

SITE NAME:

SECURITY WATER TANK

SITE ID:

DN03024A

5275 YUCATAN DR

COLORADO SPRINGS, CO 80911

EL PASO COUNTY

Rev:

Date:

Description:

By:

1

09/14/2020

PRELIM. CONST.

EL

2

09/28/2020

REV 1

ML

PLANS PREPARED BY:

WYCO

FIELD SERVICES

where quality still counts.

6335 DOWNING ST

DENVER, CO 80216

WYCOFS.COM

LICENSURE NO:

DRAWN BY:

CHK BY:

APV BY:

EL

BS

PR

Sheet Title:

GENERAL

NOTES

Sheet Number:

GN1