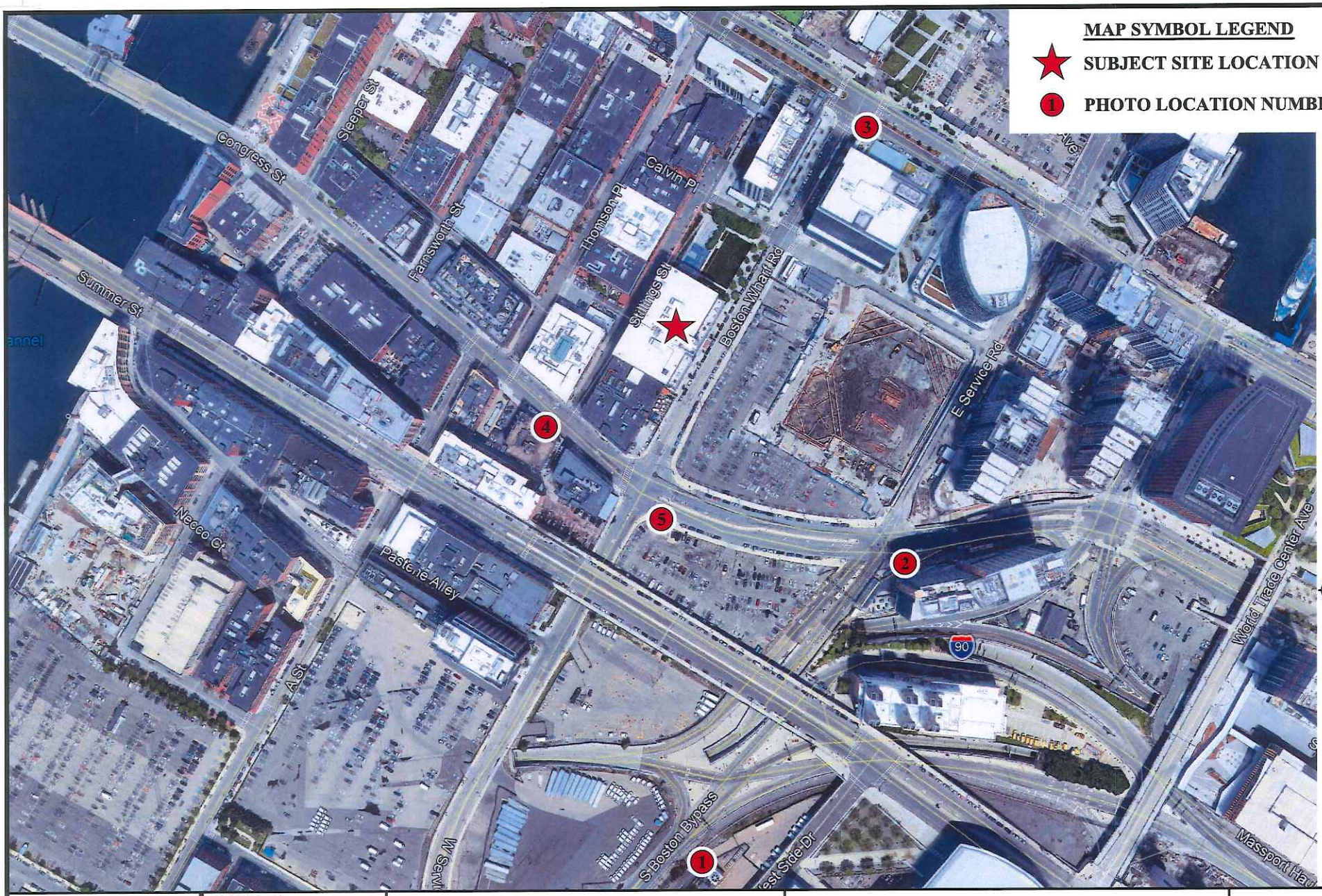
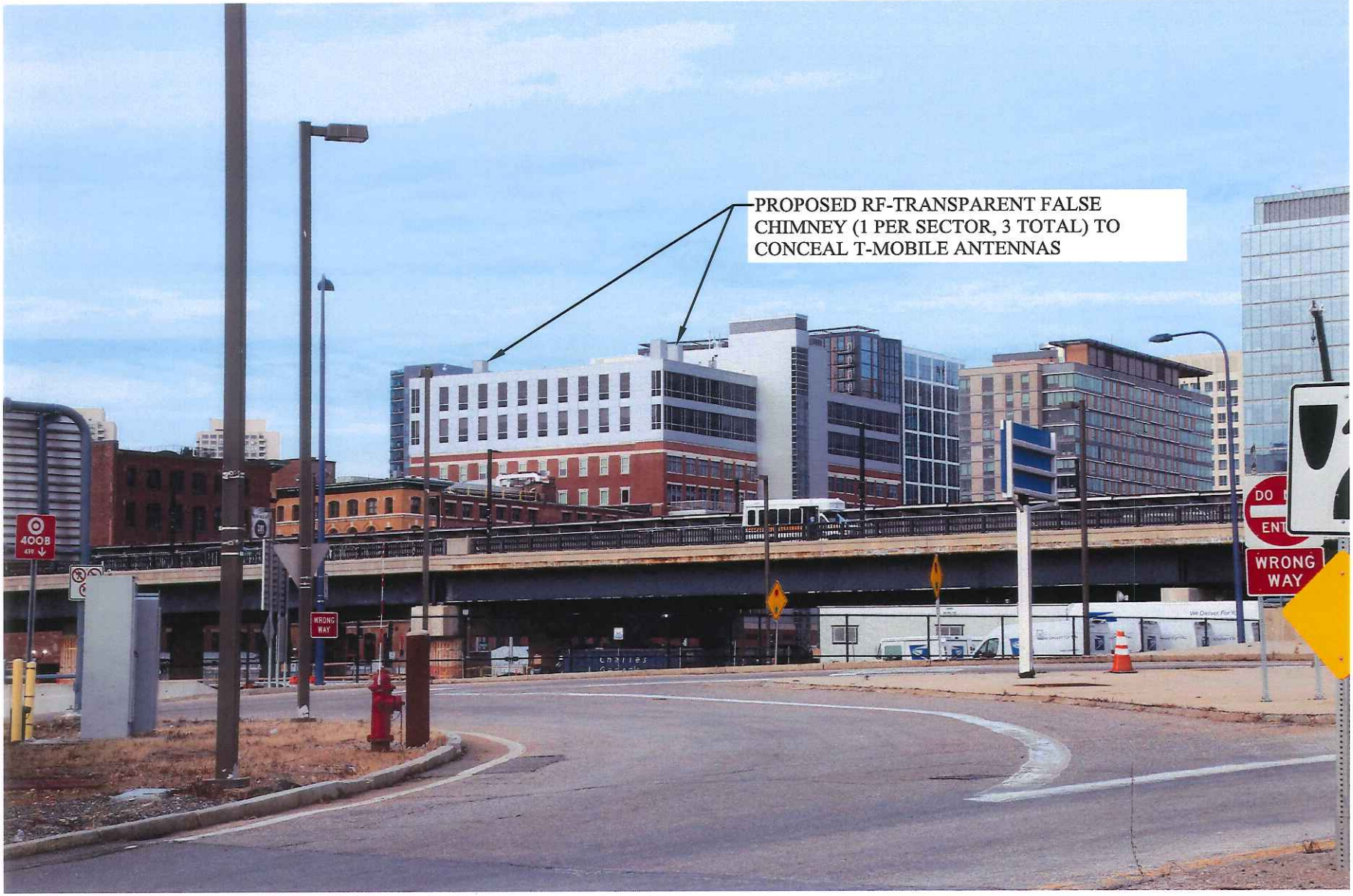


PREPARED FOR: T-MOBILE NORTHEAST, LLC 15 COMMERCE WAY, SUITE B NORTON, MA 02766 OFFICE: (508) 286-2700 FAX: (508) 286-2893	PREPARED BY: ADVANCED ENGINEERING GROUP, P.C. Civil Engineering - Site Development Surveying - Telecommunications 500 NORTH BROADWAY EAST PROVIDENCE, 02914 PH: (401) 354-2403 FAX: (401) 633-6354	SITE NO: 4BN0012B SITE NAME: 22 BOSTON WHARF ROAD ADDRESS: 22 BOSTON WHARF ROAD BOSTON, MA 02210	KEY MAP OF PHOTOS	PAGE: MAP-1 DATE: 12/17/2020 DRAWN BY: MR REVISION: 0

PREPARED FOR: T-MOBILE NORTHEAST, LLC 15 COMMERCE WAY, SUITE B NORTON, MA 02766 OFFICE: (508) 286-2700 FAX: (508) 286-2893	PREPARED BY: EG ADVANCED ENGINEERING GROUP, P.C. Civil Engineering - Site Development Surveying - Telecommunications 500 NORTH BROADWAY EAST PROVIDENCE, 02914 PH: (401) 354-2403 FAX: (401) 633-6354	SITE NO: 4BN0012B SITE NAME: 22 BOSTON WHARF ROAD ADDRESS: 22 BOSTON WHARF ROAD BOSTON, MA 02210	**VIEW #1** EXISTING VIEW FROM THE SOUTH, ON SOUTH BOSTON BYPASS	PAGE: V-1E DATE: 12/17/2020 DRAWN BY: MR REVISION: 0



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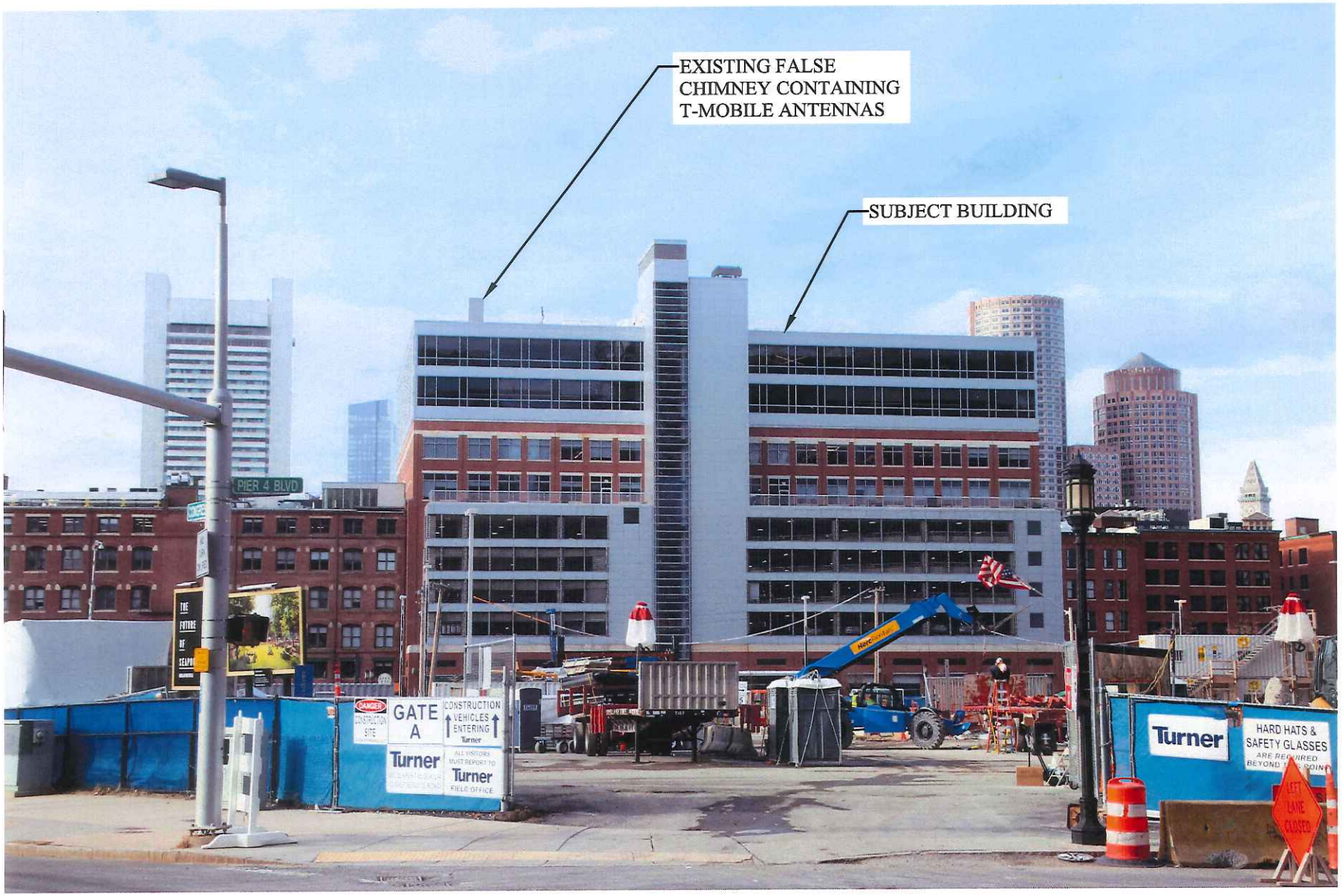


PREPARED FOR: T–MOBILE NORTHEAST, LLC 15 COMMERCE WAY, SUITE B NORTON, MA 02766 OFFICE: (508) 286–2700 FAX: (508) 286–2893	PREPARED BY: EG ADVANCED ENGINEERING GROUP, P.C. Civil Engineering - Site Development Surveying - Telecommunications 500 NORTH BROADWAY EAST PROVIDENCE, 02914 PH: (401) 354–2403 FAX: (401) 633–6364	SITE NO: 4BN0012B SITE NAME: 22 BOSTON WHARF ROAD ADDRESS: 22 BOSTON WHARF ROAD BOSTON, MA 02210	**VIEW #2** EXISTING VIEW FROM THE SOUTHEAST, AT THE INTERSECTION OF CONGRESS STREET AND EAST SERVICE ROAD	PAGE: V–2E DATE: 12/17/2020 DRAWN BY: MR REVISION: 0

PREPARED FOR: T–MOBILE NORTHEAST, LLC 15 COMMERCE WAY, SUITE B NORTON, MA 02766 OFFICE: (508) 286–2700 FAX: (508) 286–2893	PREPARED BY: EG ADVANCED ENGINEERING GROUP, P.C. Civil Engineering - Site Development Surveying - Telecommunications 500 NORTH BROADWAY EAST PROVIDENCE, 02914 PH: (401) 354–2403 FAX: (401) 633–6354	SITE NO: 4BN0012B SITE NAME: 22 BOSTON WHARF ROAD ADDRESS: 22 BOSTON WHARF ROAD BOSTON, MA 02210	**VIEW #2** PROPOSED VIEW FROM THE SOUTHEAST, AT THE INTERSECTION OF CONGRESS STREET AND EAST SERVICE ROAD	PAGE: V–2P DATE: 12/17/2020 DRAWN BY: MR REVISION: 0

PROPOSED RF-TRANSPARENT FALSE CHIMNEYS WILL NOT BE VISIBLE FROM THIS VIEWPOINT

PREPARED FOR: T–MOBILE NORTHEAST, LLC 15 COMMERCE WAY, SUITE B NORTON, MA 02766 OFFICE: (508) 286–2700 FAX: (508) 286–2893	PREPARED BY: EG ADVANCED ENGINEERING GROUP, P.C. Civil Engineering - Site Development Surveying - Telecommunications 500 NORTH BROADWAY EAST PROVIDENCE, 02914 PH: (401) 354-2403 FAX: (401) 633-6354	SITE NO: 4BN0012B SITE NAME: 22 BOSTON WHARF ROAD ADDRESS: 22 BOSTON WHARF ROAD BOSTON, MA 02210	**VIEW #3** EXISTING VIEW FROM THE NORTHEAST, AT THE INTERSECTION OF SEAPORT BOULEVARD AND BOSTON WHARF ROAD	PAGE: V–3E DATE: 12/17/2020 DRAWN BY: MR REVISION: 0

PROPOSED RF-TRANSPARENT FALSE CHIMNEYS WILL NOT BE VISIBLE FROM THIS VIEWPOINT

PREPARED FOR: T–MOBILE NORTHEAST, LLC 15 COMMERCE WAY, SUITE B NORTON, MA 02766 OFFICE: (508) 286–2700 FAX: (508) 286–2893	PREPARED BY: ADVANCED ENGINEERING GROUP, P.C. Civil Engineering - Site Development Surveying - Telecommunications 500 NORTH BROADWAY EAST PROVIDENCE, 02914 PH: (401) 354–2403 FAX: (401) 633–6354	SITE NO: 4BN0012B SITE NAME: 22 BOSTON WHARF ROAD ADDRESS: 22 BOSTON WHARF ROAD BOSTON, MA 02210	**VIEW #4** EXISTING VIEW FROM THE SOUTHWEST, AT THE INTERSECTION OF STILLINGS STREET AND BOSTON WHARF ROAD	PAGE: V–4E DATE: 12/17/2020 DRAWN BY: MR REVISION: 0

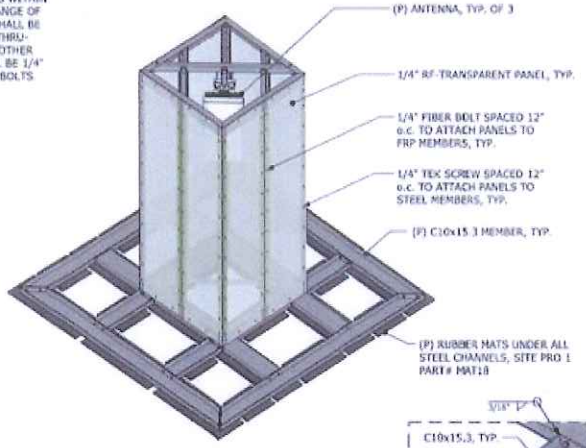
PROPOSED RF-TRANSPARENT FALSE CHIMNEYS WILL NOT BE VISIBLE FROM THIS VIEWPOINT

PREPARED FOR: T–MOBILE NORTHEAST, LLC 15 COMMERCE WAY, SUITE B NORTON, MA 02766 OFFICE: (508) 286–2700 FAX: (508) 286–2893	PREPARED BY: EG ADVANCED ENGINEERING GROUP, P.C. Civil Engineering - Site Development Surveying - Telecommunications 500 NORTH BROADWAY EAST PROVIDENCE, 02914 PH: (401) 354–2403 FAX: (401) 633–6354	SITE NO: 4BN0012B SITE NAME: 22 BOSTON WHARF ROAD ADDRESS: 22 BOSTON WHARF ROAD BOSTON, MA 02210	**VIEW #5** EXISTING VIEW FROM THE SOUTH, AT THE INTERSECTION OF CONGRESS STREET AND BOSTON WHARF ROAD	PAGE: V–5E DATE: 12/17/2020 DRAWN BY: MR REVISION: 0

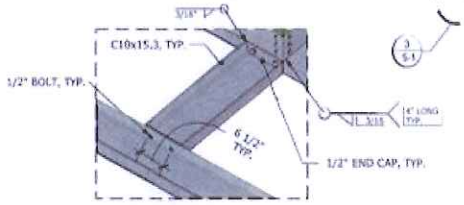
Specs: AIR6449 2.5GHz (Band 41)

AIR 6449 – L or L+5G NR*	
Max Output Power	300W
EIRP	~79 dBm
Radio	64T64R
Spectrum Bands	B41 Active
Bandwidth	Full IBW (194 MHz BW) sup
Dimensions (HxWxD in) w/o protruding Weight (lbs)	33.1 x 20.5 x 8.3 inches 103 lbs
Minimum SW needed/availability	LTE: Q3'20
Data Ports	4 x 25 Gbps eCPRI

NOTES:
1. RF-TRANSPARENT PANELS ARE TO BE COUNTER-SUNK AT LOCATIONS OF STRUCTURAL BOLTS.
2. ALL BOLTS WITHIN THE BEAM RANGE OF ANTENNAS SHALL BE 1/4" NYLON THRU-BOLTS. ALL OTHER BOLTS SHALL BE 1/4" STEEL THRU-BOLTS.

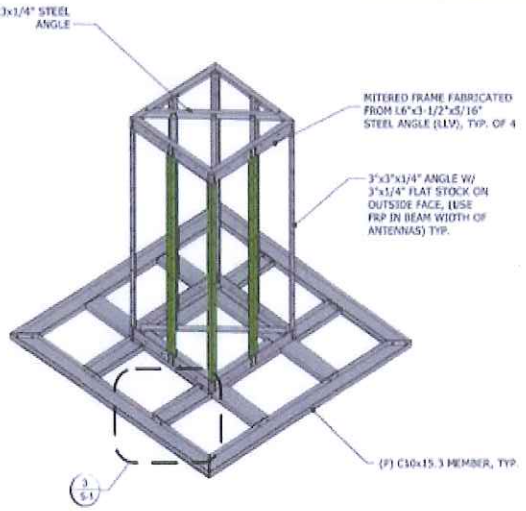


1 S-1 ISOMETRIC
Scale: NTS



3 S-1 DETAIL
Scale: N.T.S.

**LENGTH AND ORIENTATION OF ANTENNA SUPPORT TO BE FIELD-CUT TO ACHIEVE DESIRED AZIMUTH



2 S-1 FRAMING ISOMETRIC
Scale: NTS

SCOTT N. ADAMS CIVIL No. 46020 REGISTERED PROFESSIONAL ENGINEER

ADVANCED | CENTERLINE

SITE NUMBER: 4BN0012B
SITE NAME: 22 BOSTON WHARF ROAD

T-MOBILE NORTHEAST LLC
15 COMMERCE WAY, SUITE B

NO.	DATE	REVISIONS	BY	CHK
0	01/06/20	ISSUED FOR REVIEW	GPR	SMA
1	05/31/20	ISSUED FOR CONSTRUCTION	GPR	SMA

ANTENNA ENCLOSURE ISOMETRICS

PRODUCT DESCRIPTION

Spectrum Bands	B25 / B66A
Technology	GSM, WCDMA and LTE on B25 WCMDA and LTE on B66A
5G NR Support	YES
Max Output Power	4x40W
Instantaneous BW	B25: 40 MHz if L+W/G MSMM or 60 MHz if LTE only B66A: 70 MHz
RF Connector	4.3-10
Data Ports	2 x 10.1Gb/s CPRI
DC Feed	-48 V DC power connector
Fuse Rating	20A
Max Power Consumption	660W
Dimensions (H x W x D)	14.9" x 13.2" x 5.4"
Weight	46.3 lb

WARRANTY: 2 Years

SPARES: 2% of install base. Additional units can be requested as per need.

Material SAP #	Material Description
33623	Radio 4415 B25
33624	Radio 4415 B66A

Radio mounting: The multi-ERS bracket will be a default mounting. Note the mounting kit for Radio 4415 is the same as the one for Radio 2217/4478.

Material SAP #	Material Description
33480 (default)	2217/4478 Install Kit Multi-ERS bracket

ERICSSON

Enclosure 6160 AC

The Enclosure 6160 is a multi-purpose site cabinet designed to support a multitude of equipment such as ERS Baseband, Transport, Li-Ion battery and 3PP vendor equipment. It also provides a highly capable power system and battery back-up - all in a streamlined design and minimized footprint to support cost efficient expansion of mobile broadband.

Being an all-in-one enclosure, the Enclosure 6160 is a very fitting choice for all types of sites where the capacity need is large or room for future expansion is needed. It is ideally used for modernizing existing sites or in greenfield scenarios to match both current and future needs.

With a robust design, IP65 compliance and a sealed Heat Exchanger (HEX) climate system the Enclosure 6160 ensures optimal environmental protection of the active equipment - enabling them for a long-lasting service. The complete system is also integrated and verified for the entire Ericsson Radio System and ensures best-in-class service.

The power system offers 31,5kW of power in total and provides 24kW of -48V DC power for both internal and external consumers.

The equipment space allows 19U of rack space ensuring well enough capacity for existing need and future expansion.

One of the main advantages of the Enclosure 6160 is its default integration with ENM - allowing for advanced remote monitoring and control such a fault management (alarms), inventory management and performance measurements. The cabinet also provides an open O&M interface for integration to 3PP O&M systems.

Preliminary technical specification for Enclosure 6160 AC

CAPACITY	
Rack space user equipment	19U (19" rack)
Hardware capabilities	Power and CPRI support for multi-standard remote radios (RRU or AIR)
	ERS Baseband and Transport units
	Li-Ion batteries
	3PP equipment
	Additional power feed available as option
MECHANICAL SPECIFICATION	
Weight	145 kg (excluding active equipment) 320 lbs (excluding active equipment)
Dimension (H x W x D)	1600 x 650 x 650 mm (incl. Base frame) 63 x 26 x 26 in. (incl. Base frame)
Base frame height	150 mm 6 in.
Mounting position	Ground
Enclosure material	Aluminum
Color	Power paint NCS 2002-B
Door	Front access
Rack type	19" (IEC 60297-3-100)
Locking type	Pad lock or Cylinder
POWER SYSTEM	
Input voltage	3P+N+PE: 346/200-415/240 VAC 2P+N+PE: 208/120-220/127 VAC 1P+N+PE: 200-250 VAC
Input power	<33kW
Output load (-48VDC)	24kW
Total capacity (-48VDC)	31.5kW
AC SPD	Class 2/Type 2
DC SPD	Class 2/Type 2
PSU Slots	9x
Service outlet	Optional
Priority load	8x Circuit Breaker
LLVD 1	6x Circuit Breaker
LLVD 2	6x Circuit Breaker
CB ratings	3A / 5A / 10A / 15A / 20A / 25A / 30A / 40A / 50A / 60A / 80A / 100A
Battery Interface	2x Circuit Breaker
Battery Circuit Breaker rating	125A 2pol (200A)

PSU efficiency	96%
PSU output voltage (nominal)	-48VDC
PSU rated current	73A
PSU power factor	≥0.99
PSU emissions	EN 55022 Class B
Ingress protection power system	IP20
DC/DC Voltage booster	PSU 48 13 - 3x -58V ports PDU 02 03 - 3x -58V ports/4x -48V ports Both units are optional

ENVIRONMENTAL SPECIFICATION

Ingress protection	IP65
Environment	Class 1.2 (Storage) Class 2.3 (Transport) Class 4.1 (Operation) ETSI EN 300 019-1-1
Relative humidity	15-100%

CLIMATE SYSTEM

Type	Heat Exchanger
Temperature range	-33°C to +50°C*
Cooling capacity	2700W
Heater	Optional

STANDARDS COMPLIANCE

UL 62368-1

UL 60950-22

UL 50E

Telcordia GR-63-CORE

Telcordia GR-487-CORE

Telcordia GR-1089-CORE

CABLE I/O

Entry point	Bottom
Plinth cable access	Rear and side access
AC In	1x Ø16-35mm
DC Out (shielded)	32x Ø10-18mm
DC In (battery feed)	6x Ø19mm
Signal Cable Outlet	10x Ø10mm
Signal Cable Inlet	8x Ø6mm
Optical	32x Ø6mm
Conduits knock-out plates	6x Ø2"
Punched holes	3x Ø26mm

REMOTE MANAGEMENT

External Alarms	32x
Fault Management	Following alarms are sent to ENM: - Battery temp sensors missing/faulty - AC Mains failure per rectifier - Rectifier over temperature alarm - Battery CB trip - Load CB trip - Rectifier failure

	- External alarms - LLVD/BLVD disconnect Alarms can be set for all Performance Data parameters
Performance Management	Following data is sent to ENM: - System Voltage - System Current - System Power - Total Delivered Energy - Battery Temperature - Battery Voltage - Battery Current - Battery State of Charge - Rectifier Output Voltage - Rectifier Output Current - Rectifier Input Voltage - Rectifier run time
Configuration Management	Following parameters can be set remotely from ENM: - Float Charge Voltage - Elevated Charge Voltage - Battery Disconnect Voltage - Load Disconnect Voltage - Temperature Compensation - Battery Capacity - Alarm limits for all analogue values - Rectifier Current Limit - Battery temperature sensors - State of health test - Compensation factor - Charging algorithm, float, temperature compensation, boost and equalization
Inventory Management	The inventory record from production is stored in Cabinet controller and can be fetched remotely. Inventory record can be updated in case of HW replacement Inventory record covers: - Cabinet Controller - Power Controller - Rectifiers - Cabinet - Battery Test Record

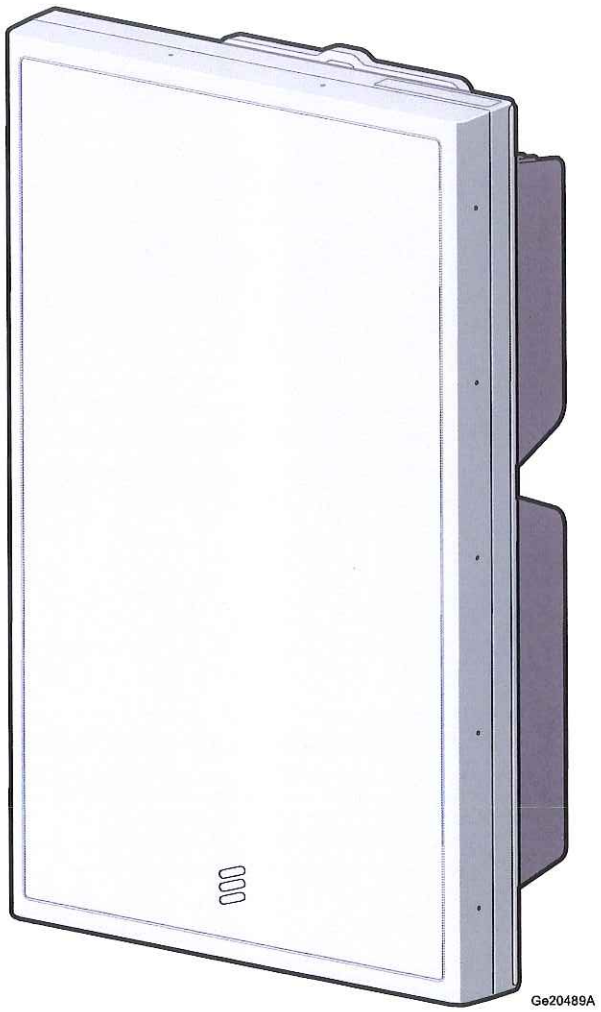
*Configuration dependent – please refer to CPI

ERICSSON

Antenna Integrated Radio Unit Description

AIR 6449

Description



Contents

1 Introduction

This document describes the AIR 6449 unit.

1.1 Warranty Seal

The product is equipped with a warranty seal sticker.

Note: Seals that have been implemented by Ericsson must not be broken or removed, as it otherwise voids warranty.

2 Product Overview

AIR 6449 is a 64TR TDD AAS for LTE and NR, operating as standalone or as mixed mode.

The AIR unit has beamforming and MU-MIMO technology, capable to fully utilize radio resources in both azimuth and elevation.

The main benefits compared to previous macro solutions are improvements in:

— Enhanced coverage - High gain adaptive beamforming

— Enhanced capacity - High-order spatial multiplexing and multi-user MIMO

— Advanced RAN features - Vertical and horizontal beamforming

— Improved network performance - Low inter-cell interference

The AIR unit is designed for outdoor installations, intended for pole, wall, tower, or mast mounting.

HWACs are required for this product.

A typical installation alternative is shown in Figure 1.

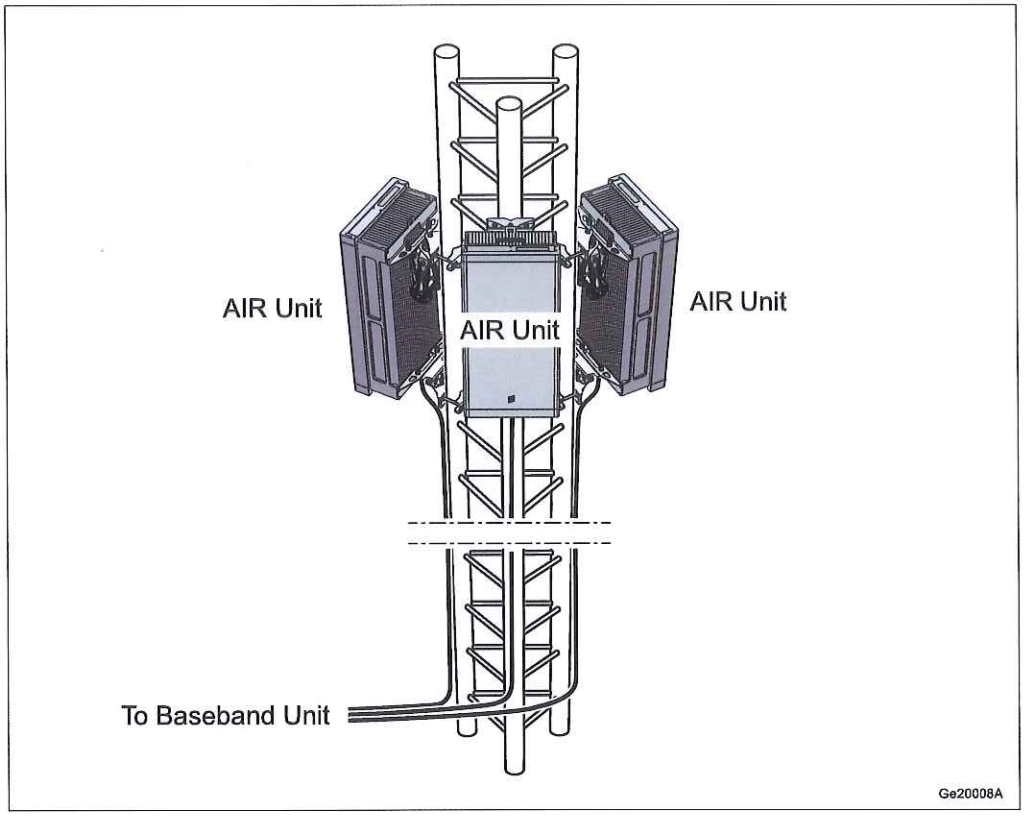


Figure 1 Three AIR Units Pointing at Three Different Directions

2.1 Main Features

- DC-I (3-wire) or DC-C (2-wire) power connection
- LTE and NR TDD
- Multistandard mixed-mode
- 64 transmitter/receiver (64TX/64RX) branches
- eCPRI
- Complies with 3GPP base station class Wide Area. For a list of relevant standards, see Radio Standards Compliance on page 28.

2.2 Required Installation Equipment

Table 1

Mounting Kit	Product Name	Product Number
Swivel mounting kit	AIR Medium, wall and pole mount bracket no tilt with azimuth	SXK 109 2064/1
Tilt and swivel mounting kit	AIR Medium, wall and pole mount bracket with tilt and azimuth	SXK 109 2065/1

For more information, see Site Installation Products Overview.

3 Technical Data

Table 2 Technical Data

Description	Value
Maximum nominal output power[1] [2]	B41 and B41K: 320 W (License key is required for total output power over 20 W.)
Number of carriers	LTE[3]: Up to three NR: Up to two Mixed mode: Up to six
Frequency[4]	B41 for NR 2496–2690 MHz
	B41K for NR 2515–2675 MHz

(1) For detailed information about licenses and HWACs, see Manage Licenses and Hardware Activation Codes in the Radio Node libraries.
(2) For detailed information about output power, see Hardware-Related Capabilities.
(3) LTE in mixed mode only.
(4) For information about IBW, see RBS Configurations.

3.1 EIRP Data

3.1.1 Traffic Beams

This section describes the EIRP of traffic beams for the AIR unit.

Table 3 AIR Unit Typical EIRP Performance Data for Traffic Beams

Uniform Traffic Beams[1]	Direction		
Parameter	H0V6 deg	H55V6 deg	H0V18 deg
Vertical Beamwidth	7°	7°	7.5°
Horizontal Beamwidth	12.5°	21°	13°
Peak EIRP (Typical) [2][3]	2 × 75 dBm	2 × 70 dBm	2 × 72.5 dBm

(1) The traffic beamforming of this product is not limited to the uniform beamshapes and directions given in the table. The beams are dynamically optimized.
(2) The peak EIRP (typical) in the table is calculated for two simultaneous orthogonal beams.
(3) This value can be limited by the activation of certain features.

3.1.2 Broadcast Beams

This section describes performance data for broadcast beams in three different scenarios.

Table 4 AIR Unit Typical Antenna Performance Data for Broadcast Beams in Macro Scenario

Scenario: Macro	**Beam LTE**	**Beam NR**
Parameter	**BrM1(1), BrM2(2)**	**BrM1(1)**
Vertical Beamwidth	7.5±1°	7.5±1°
Horizontal Beamwidth	65±5°	65±5°
Digital Downtilt	−3° to 11°	−3° to 11°
Vertical Beam Pointing Error	≤ 1°	≤ 1°
Horizontal Beam Pointing Direction	0±5°	0±5°
EIRP (Typical)	2 × 67 dBm	1 × 70 dBm
Vertical Side Lobe Suppression	15 dB	15 dB
Front to Back Ratio	25 dB	25 dB
Beam Parallelity	≤ −10 dB	N/A

(1) Broadcast Beam Macro 1
(2) Broadcast Beam Macro 2

Table 5 AIR Unit Typical Antenna Performance Data for Broadcast Beams in Hotspot Scenario

Scenario: Hotspot	**Beam LTE**	**Beam NR**
Parameter	**BrHS1(1), BrHS2(2)**	**BrHS1(1)**
Vertical Beamwidth	30±3°	30±3°
Horizontal Beamwidth	65±5°	65±5°
Digital Downtilt	Fixed 6°	Fixed 6°
Vertical Beam Pointing Error	≤ 3°	≤ 3°

Scenario: Hotspot	Beam LTE	Beam NR
Parameter	**BrHS1(1), BrHS2(2)**	**BrHS1(1)**
Horizontal Beam Pointing Direction	0±5°	0±5°
EIRP (Typical)	2 × 61.5 dBm	1 × 64.5 dBm
Vertical Side Lobe Suppression	12 dB	12 dB
Front to Back Ratio	-	-
Beam Parallelity	≤ −10 dB	N/A

(1) Broadcast Beam Hotspot 1

(2) Broadcast Beam Hotspot 2

Table 6 AIR Unit Typical Antenna Performance Data for Broadcast Beams in Highrise Scenario

Scenario: Highrise	Beam LTE	Beam NR
Parameter	**BrHR1(1), BrHR2(2)**	**BrHR1(1)**
Vertical Beamwidth	30±3°	30±3°
Horizontal Beamwidth	20±2°	20±2°
Digital Downtilt	Fixed 6°	Fixed 6°
Vertical Beam Pointing Error	≤ 1°	≤ 1°
Horizontal Beam Pointing Direction	0±5°	0±5°
EIRP (Typical)	2 × 66 dBm	1 × 69 dBm
Vertical Side Lobe Suppression	12 dB	12 dB
Front to Back Ratio	-	-
Beam Parallelity	≤ −10 dB	N/A

(1) Broadcast Beam Highrise 1

(2) Broadcast Beam Highrise 2

3.2 Physical Characteristics

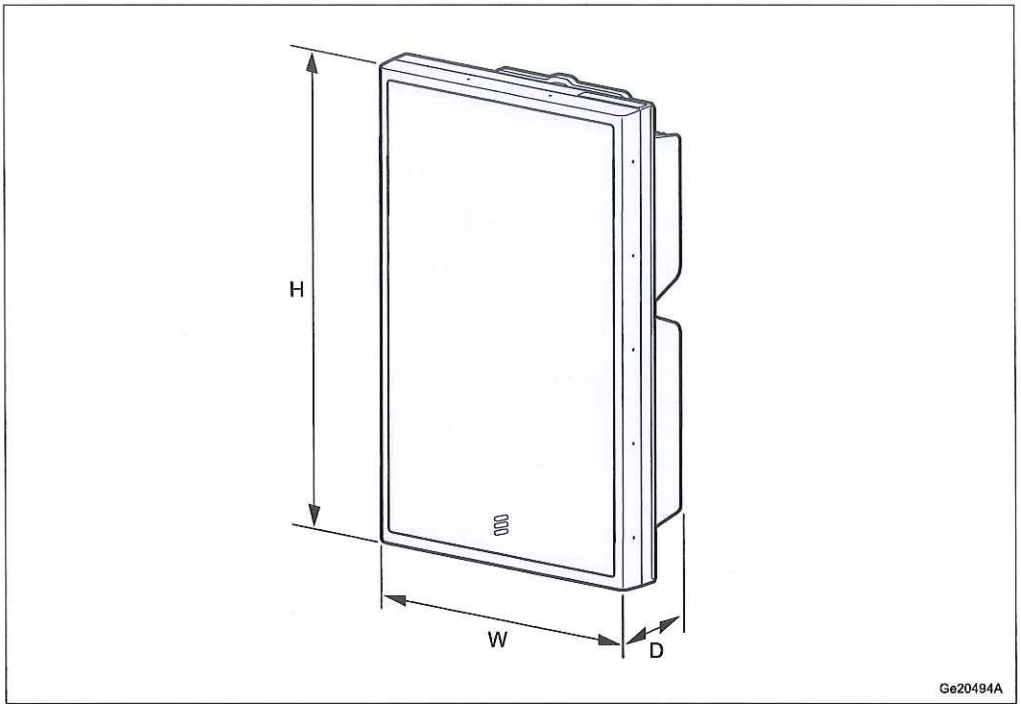


Figure 2 AIR Unit Dimensions

Table 7 AIR Unit Dimensions

AIR Unit Type	Height (H) × Width (W) × Depth (D)
AIR 6449 B41	841 × 521 × 217 mm
AIR 6449 B41K	841 × 521 × 217 mm

Table 8 AIR Unit Weight

AIR Unit Type	Unit Weight	Mounting Kit Weight	
		SXK 109 2064/1	SXK 109 2065/1
AIR 6449 B41	46.1 kg ±5%	4.4 kg	5.9 kg
AIR 6449 B41K	45.7 kg ±5%	4.4 kg	5.9 kg

The heat-sink of the AIR unit is gray (color code NCS S 4502-B).

The radome and covers of the AIR unit are white (color code NCS S 1002-B).

3.3 Installation Requirements

This section describes the installation requirements for installing the AIR unit. For a complete installation description, see Install Antenna Integrated Radio Units.

The AIR unit is designed for outdoor use, and it can be installed either on a pole, on a wall, on a mast, or on a tower.

Adhere to the following for safety and operation reasons: The mechanical design of the AIR unit is based on environmental conditions that are equal to or exceeding class 4.1 as specified in EN 300 019-1-4 and GR-3178-CORE and thereby respects the static mechanical load imposed on an AIR unit by wind at maximum velocity. Wind loads in this document are calculated with reference to wind pressure. For more accurate results, the specific terrain information for relevant sites and geographical area where the AIR unit will be installed must be carefully analyzed, considered, and calculated according to EN 1991-1-4.

Pole clamps, brackets, mounting accessories and other installation material or equipment specified by Ericsson in the AIR unit product information documentation must be used and Ericsson installation instructions be complied with. In addition, it must be observed that specific environmental conditions that the AIR unit becomes exposed to, such as icing, heat, dust, dynamic stress (for example, strain caused by oscillating support structures) or other environmental conditions that exceed or otherwise deviate from the Environmental Characteristics on page 14, can result in the breakage of an AIR unit or its mounting accessories and even cause the AIR unit to fall to the ground.

These facts, information, and circumstances must be considered and properly taken into account during the site planning process and adhered to for installation and operation of the AIR unit. Ericsson expressly disclaims any responsibility or liability arising out of failures in this regard.

3.3.1 Outdoor Installation Environments to Avoid

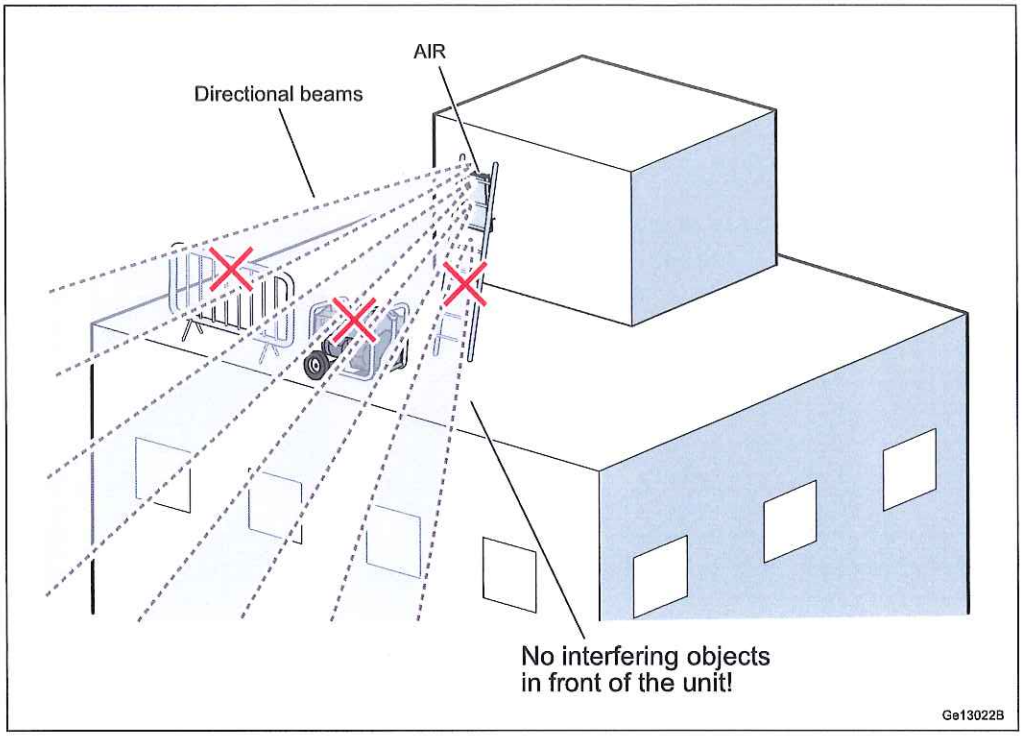
The AIR unit is designed for outdoor use but to ensure optimal operation, avoid the following:

- Hot microclimates caused by, for example, heat radiated or reflected from dark or metallic walls or floors
- Chimney mouths or ventilation system outlets
- Large glass or concrete surfaces

Avoid radio interference by keeping the area directly in front of the antenna clear of the following:

- Metal surfaces or objects such as railings, ladders, or chains
- Equipment generating electromagnetic fields, for example, electric motors in air conditioners or diesel generators

— RBS equipment



3.3.2 Painting Disclaimer

Ericsson recommends to not paint the product as it can affect performance of the product.

Ericsson applies limitations to the warranty and service contract if the product is painted.

If the product is painted, the following commercial limitations apply:

— Failure modes directly related to overheating because of painting are not valid for repair within the scope of the warranty or standard service contract.

— Product failures related to paint contamination of components of the unit are not valid for repair within the scope of warranty or standard service contract.

— When a painted unit is repaired, it might be restored to the standard color before being returned to the market. It is not possible to guarantee that the same unit is sent back to the same place. This is also valid for units repaired under a service contract.

— For repairs within the warranty period or a standard service contract, the customer is charged the additional costs for replacing all painted parts of the unit or the complete unit.

If adaptations are required, contact Ericsson for information.

3.4 Installation Alternatives

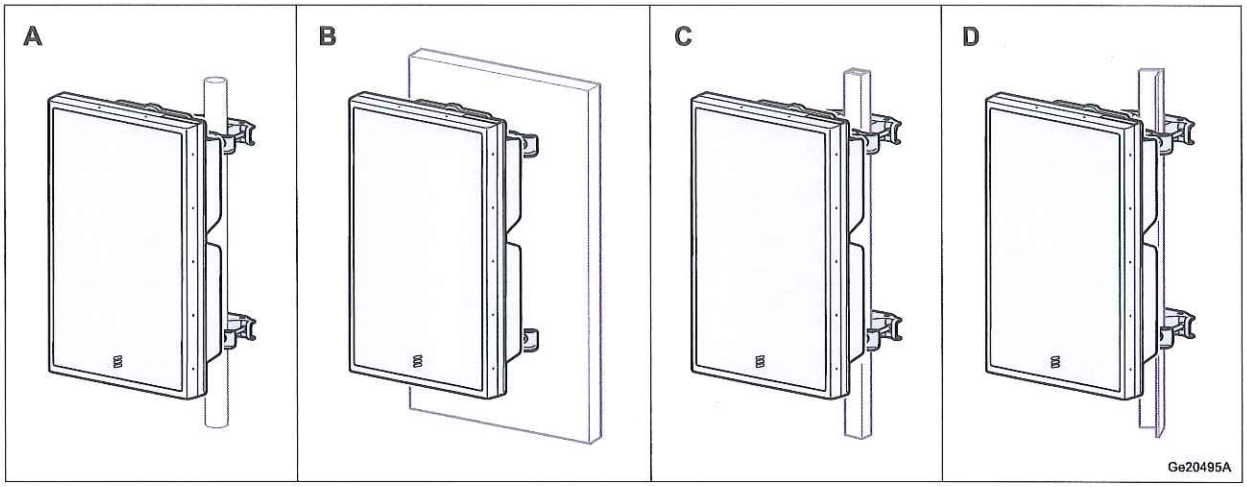


Figure 3 Installation Method Alternatives

Table 9 Installation Alternatives

Installation Method	Description
A	Pole installation (pole with circular cross section)
B	Wall installation
C	Pole installation (pole with square cross section)
D	Pole installation (pole with 90° angle cross section)

Table 10 Pole Mounting Range

Pole	Circular	Square	90° Angle
Minimum outer dimension	Ø76 mm	50 × 50 mm	50 × 50 mm
Maximum outer dimension	Ø114 mm	80 × 80 mm	80 × 80 mm

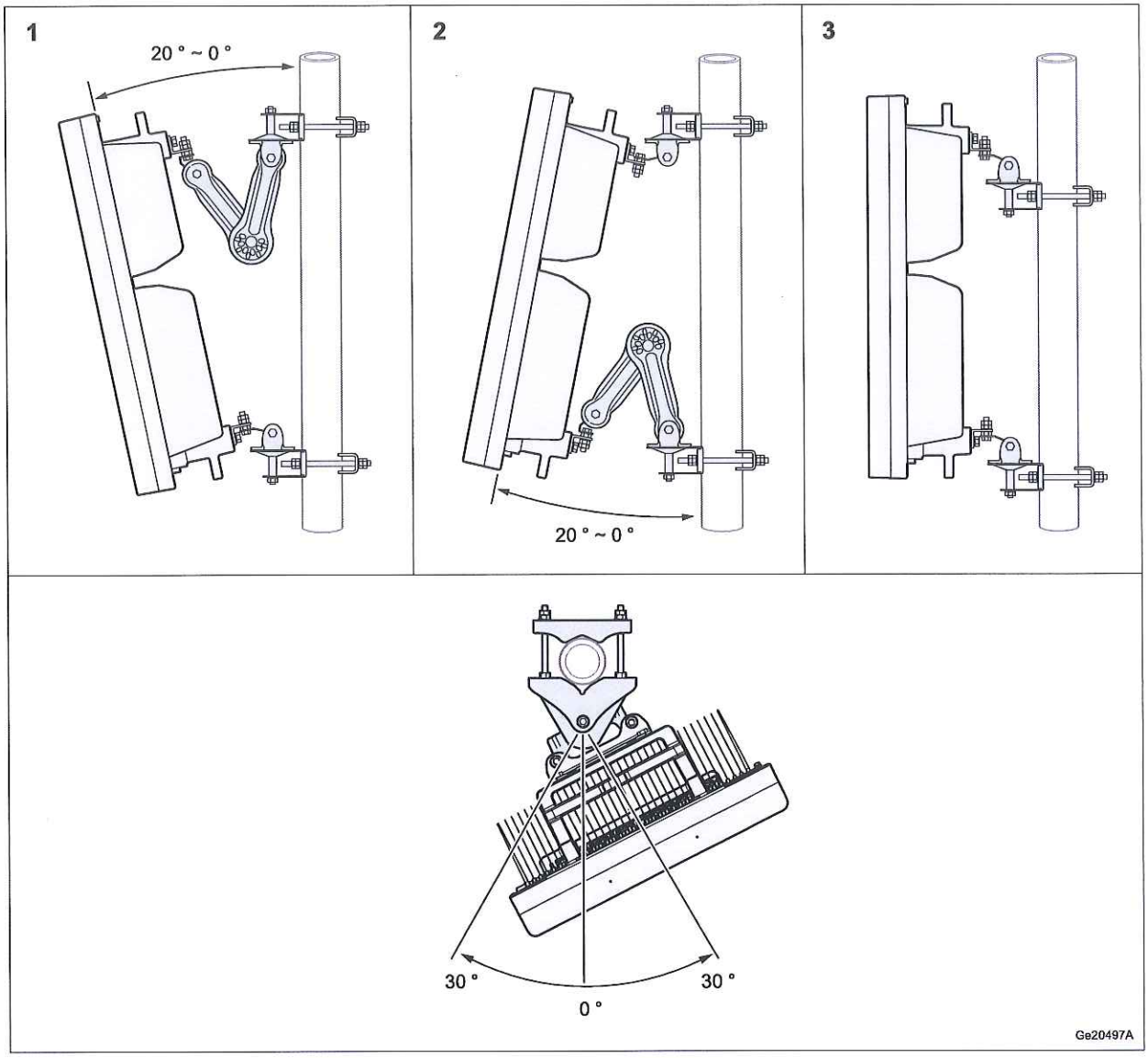


Figure 4 Tilt and Swivel Angle

Note: Mounting kit SXK 109 2064/1 supports swivel angle, and SXK 109 2065/1 supports both swivel and tilt angle.

3.5 Space Requirements

The AIR unit is installed with the cable connections facing down. Allow enough free space below the AIR unit to ensure sufficient working space.

Table 11 Space Requirements Between AIR Units or AIR Unit and Antenna Installed Side by Side

Required Free Horizontal Space
0.1 m

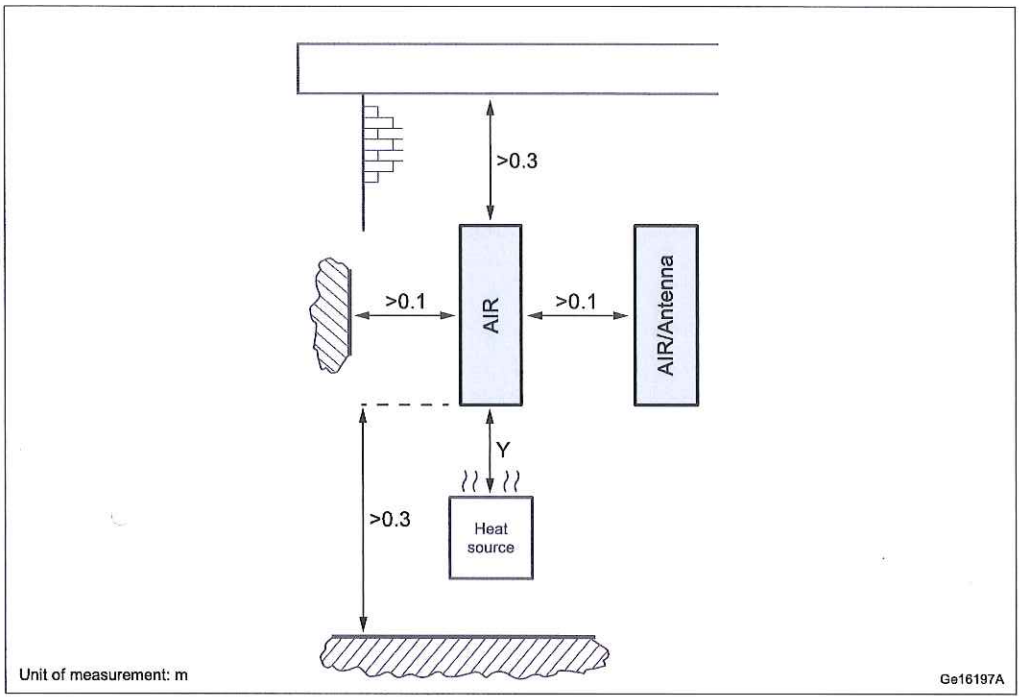


Figure 5 Space Requirements for AIR Unit

Distance Y depends on the heat dissipation from the source below the AIR as well as the surrounding temperature. The distance must be big enough so that the maximum operating temperature limit is not exceeded.

Table 12 Temperature Increase Due to Heat Source Below AIR at Different Distances [degrees Celsius]

Distance	Heat Dissipation from Source Below AIR			
	350 W	500 W	950 W	1200 W
0.2 m	1°C	3°C	5°C	6°C
0.3 m	0°C	1°C	3°C	4°C
0.5 m	0°C	0°C	2°C	3°C

Note: To ensure adequate airflow, do not enclose the AIR unit in a box-like environment.

3.6 Acoustic Noise

The AIR unit does not have active cooling components. It can emit low levels of acoustic noise when operating on low capacity.

The sound pressure level when operating on low capacity in NR is lower than 28 dBA at 1-meter distance and hemispherical distribution, and 25 dBA for spherical distribution.

3.7 Environmental Characteristics

This section contains operating environment data for the AIR unit.

3.7.1 Operating Environment

The following are the values for the normal operating environment of the AIR:

Temperature	−40 to +55°C
Solar radiation	≤ 1,120 W/m^2
Relative humidity	2% to 100%
Absolute humidity	0.26 to 40 g/m^3
Maximum wind load at 42 m/s (Pole installed AIR unit)	B41: 1665 N (front), 395 N (side) B41K: 1665 N (front), 395 N (side)

3.7.2 Heat Dissipation

The AIR is convection cooled and designed for outdoor installation.

Table 13 AIR Heat Dissipation

Unit	Output Power (W)	Maximum Heat Dissipation (kW)
AIR 6449 B41	320	1.0
AIR 6449 B41K	320	1.0

3.7.3 Vibration

This section describes how the AIR unit tolerates vibrations. The AIR unit operates reliably during seismic activity as specified by test method IEC 60068-2-57 Ff.

Maximum level of RRS	50 m/s^2 within 2–5 Hz for DR=2%
Frequency range	1–35 Hz

Time history signal	Verteq II from earthquake standard ATIS 0600329.2014

The AIR unit operates reliably during random vibration as specified by test method IEC 60068-2-64.

Random vibration, normal operation:

ASD-level	0.3 m^2/s^3 on horizontal axes X and Y
	0.2 m^2/s^3 on vertical axis Z
Frequency range	2–200 Hz
Time per test direction	30 minutes

3.7.4 Materials

All Ericsson products fulfill the legal, market, and Ericsson requirements regarding the following:

- Material declaration
- Materials' fire resistance, components, wires, and cables
- Recycling
- Restricted and banned material use

3.8 Power Supply Characteristics

This section describes the power supply requirements, power consumption, and fuse and circuit breaker recommendations for the AIR unit.

3.8.1 DC Power Supply Characteristics

The AIR unit is designed for DC-I (3-wire) power connections used on DC-I (3-wire) sites. For DC-C (2-wire) power solutions, a DC-C (2-wire) connector is used.

The following is a list of the power supply requirements:

Nominal Voltage	−48 V DC
Operating Voltage Range	−36.0 to −58.5 V DC
Non-destructive Range	0 to −60 V DC

Fuse and Circuit Breaker Recommendations

The recommendations given in this section are based on peak power consumption, and they give no information on power consumption during normal operation.

The recommended melting fuse type is am-gL-gG, according to IEC 60269-1. Circuit breakers must comply with at least Curve 3 tripping characteristics, according to IEC 60947-2.

The AIR unit has a built-in Class 1 (Type 1) SPD to protect the equipment in case of lightning and network transients. The recommended fuse or circuit breaker rating is therefore dimensioned to not trip the fuse or circuit breaker in case of SPD operation.

Table 14 AIR Unit Fuse and Circuit Breaker Recommendations

Unit (DC Powered)	Output Power	Maximum Load Current at -36 V DC	Maximum Allowed Fuse Rating(1)
AIR 6449 B41	320 W	45 A	50 A
AIR 6449 B41K	320 W	45 A	50 A

(1) The maximum allowed fuse rating must (with a certain safety margin 10-20%) be larger than the maximum load current for reliable operation. However, it must not be larger than the next or nearest higher fuse or circuit breaker standard value in order to minimize the cable cross-section area and at the same time fully comply with relevant safety standards.

3.8.2 Power Consumption

For information on power consumption, see Power Consumption Calculations.

3.9 System Characteristics

This section describes the system characteristics of the AIR.

3.9.1 RF Electromagnetic Field Exposure

For general information on RF EMF exposure, see Radio Frequency Electromagnetic Fields.

3.9.2 Software

For information on software dependencies, see Radio Software Support.

3.9.3 Radio Configurations

For information about available radio configurations, see RBS Configurations.

4 Hardware Architecture

This section describes the AIR unit hardware structure regardless of configuration or frequency. For a description of the currently available radio configurations, see RBS Configurations.

4.1 AIR Unit Parts

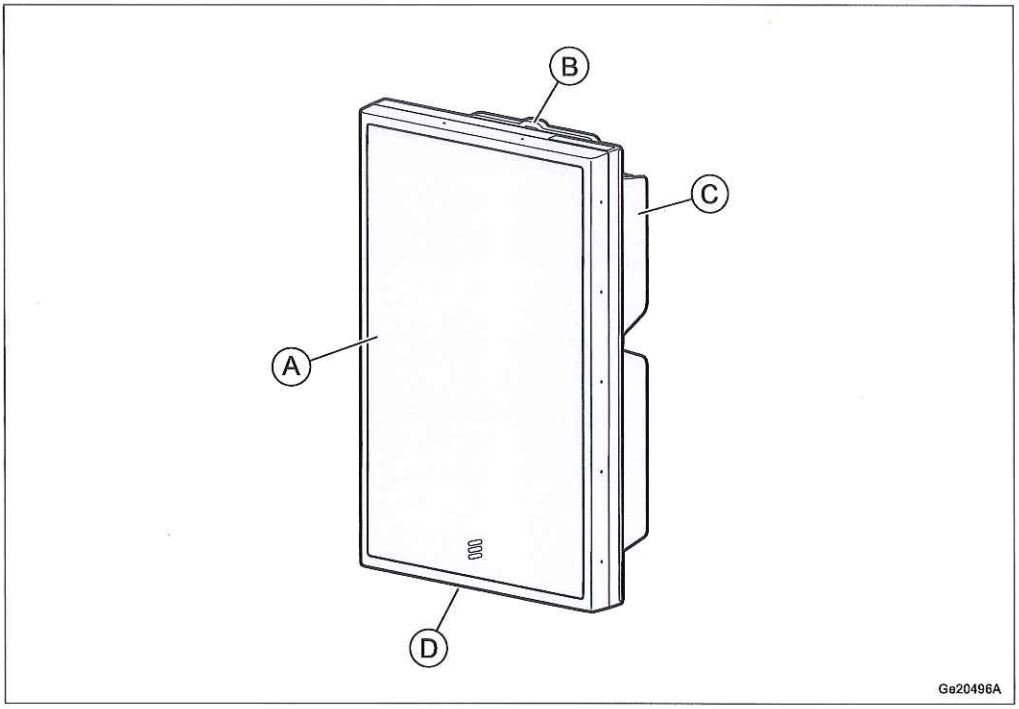


Figure 6 AIR Unit Parts

Table 15 AIR Unit Parts

Position	Component
A	Radome
B	Upper lifting eye
C	Cooling fins
D	Connection interfaces

4.2 Optical Indicators and Button

The AIR unit is equipped with optical indicators that show the system status and a loop back test button.

For detailed information about the optical indicators, see Indicators, Buttons, and Switches.

Note: The AIR unit has no maintenance button.

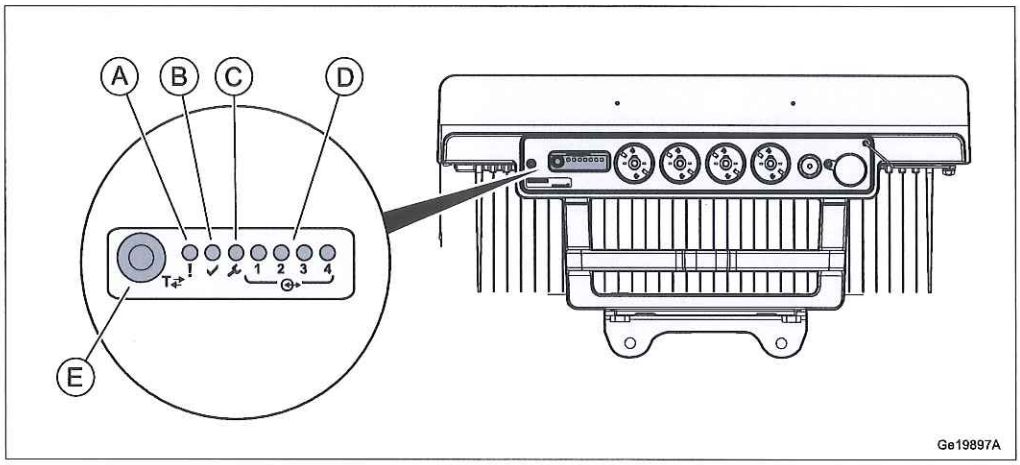


Figure 7 Optical Indicators and Button

Table 16 Optical Indicators

Position	Marking	Indicator	Color	Mode	Interpretation
A	!	Fault	red	Off	No fault detected in unit
				On	Fault detected in unit
B	✔	Operational	Green	Off	No power
				On	Operational
				Flashing Slowly (0.5 Hz)	Missing dependent resource
				Flickering (16 Hz)	Transitory activity

Position	Marking	Indicator	Color	Mode	Interpretation
				Double flashing Off	Loading in progress No ongoing traffic
				Double flashing On	Loading in progress Traffic is ongoing
C		Maintenance	Blue	Off	No ongoing maintenance activity Traffic is ongoing
				On	Maintenance mode All traffic and alarms are suppressed
				Flashing Slowly (0.5 Hz)	Maintenance mode is initiated When traffic and alarms are removed, the indicator switches to **On**
D	1, 2, 3, 4	Interface	Green	Off	Disconnected
				On	Connected

Table 17 Button

Position	Name	Marking
E	Loop back test	T2

5 Connection Interfaces

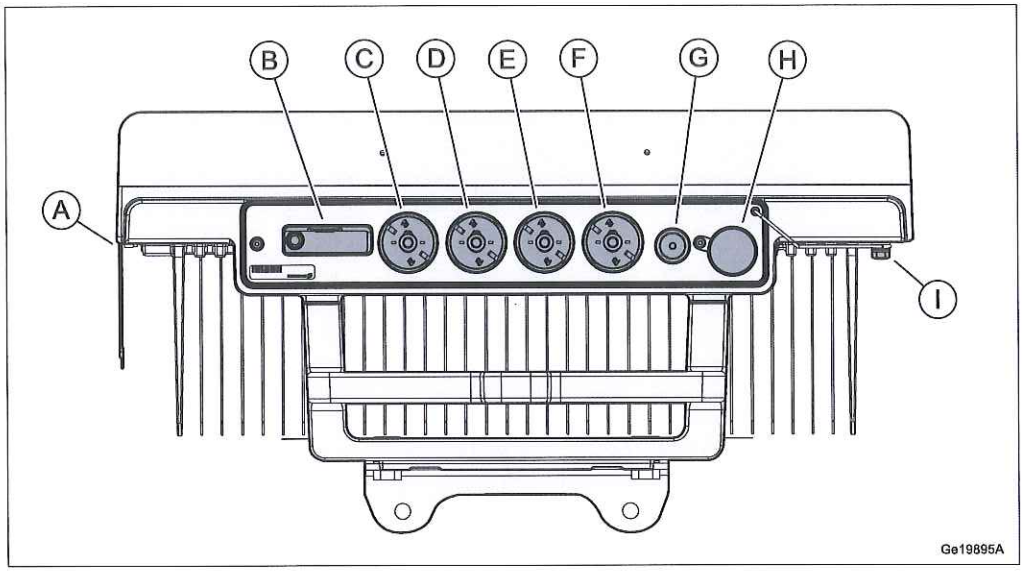
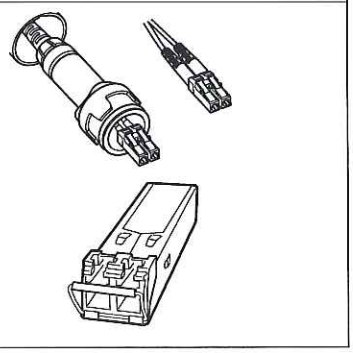
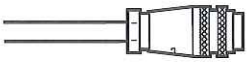
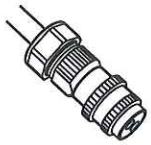
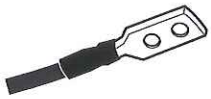


Figure 8 AIR 6449 Connection Interfaces

Table 18 AIR 6449 Connection Interfaces

Position	Description	Marking	Connector Types	Cable Illustration
A	TX Monitor		SMA female connector	
B	Optical indicators	! , , 1, 2, 3, 4	–	–
C[1]	eCPRI 1	1	LC (On SFP28) with support for FullAXS	
D[1]	eCPRI 2	2		
E[1]	eCPRI 3	3		
F[1]	eCPRI 4	4		

Position	Description	Marking	Connector Types	Cable Illustration
G	Following functions supported: — RAE — EC-light — External alarms Note: If using more than one function, a Y-cable must be connected to the DIN 14 connector for each added function.		DIN 14 female connector	
H	−48 V DC power supply	−48 V	Power connector	
I	Grounding point		2 × 6 mm dual lug	

(1) See AIR 6449 Connection to Baseband per RAT on page 21.

AIR 6449 Connection to Baseband per RAT

Figure 9 shows the early phase alternatives for connection to Baseband.

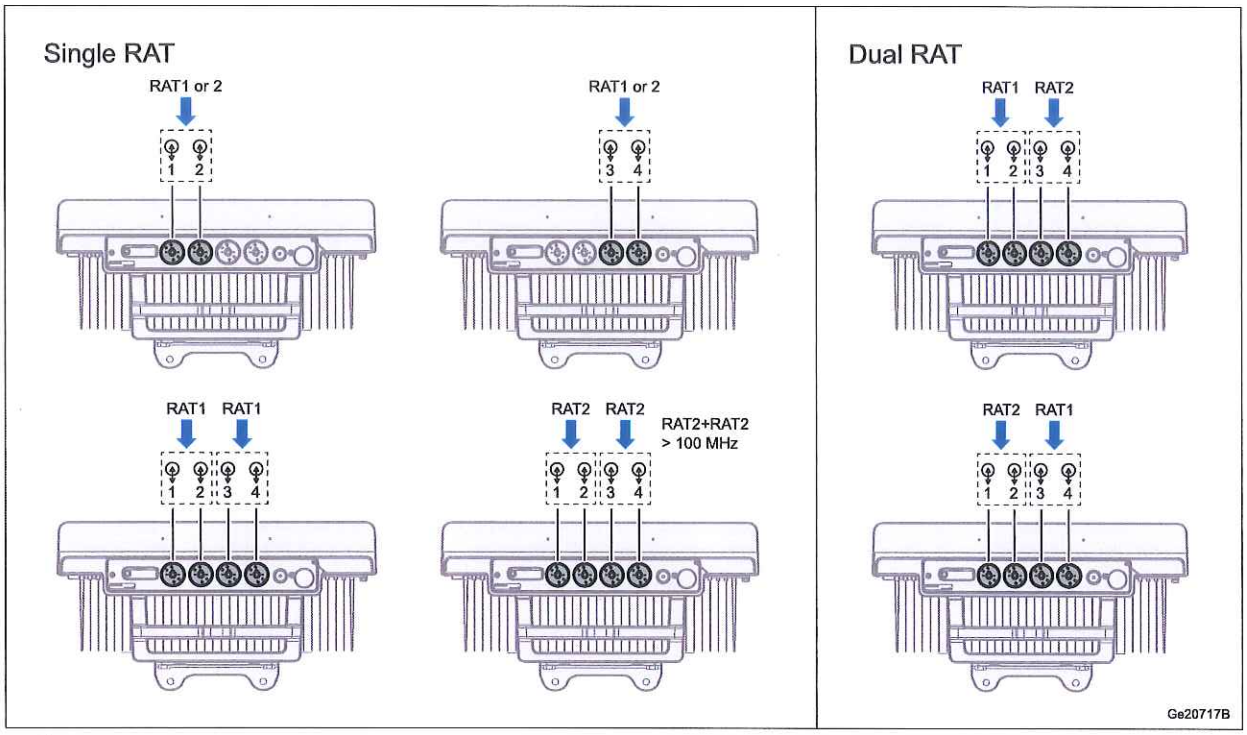


Figure 9 Connections to Baseband

The ports can be used for connection to Baseband in the following ways:

— Ports are grouped in pairs:

  • Data port 1 and 2 is a pair.

  • Data port 3 and 4 is a pair.

— Connection to LTE Baseband must be connected as a pair if two ports are used.

— Connection to NR Baseband must be connected as a pair if two ports are used.

— Mixed mode within a pair is not supported.

Each pair is limited to 100 MHz BW for the assigned carriers, using one or two ports.

5.1 Grounding Interface

The AIR unit must be grounded to protect it from overvoltage and lightning strikes. The grounding interface on the AIR unit accepts a 2 × 6 mm dual lug on a coated cable.

For more information about grounding principles, see Grounding Guidelines for RBS Sites.

5.2 −48 V DC Power Supply Interface

The −48 V DC power connection is made through a connector with a 3-wire (DC-I) connection or a connector with a 2-wire (DC-C) connection.

For power cable dimensioning, see Site Installation Products Overview.

For determining which connector or junction box to use, see Table 19.

Table 19 −48 V DC Power Supply Connector or Junction Box

Cross-Sectional Area of Each Conductor (mm^2)	Connector or Junction Box
10–16	Used with connector RNT 447 36/01 (3-wire (DC-I)) or RNT 447 37/01 (2-wire (DC-C))
25	Used with junction box NTB 101 75/1

The power cable conductor has a wire for both the 0 V conductor and a wire for the −48 V DC conductor.

All cables must be shielded. The shielding must be properly connected both to the power connector and to the grounding in the power supply equipment; otherwise, the AIR unit over voltage and lightning protection does not function properly.

5.3 Optical Cable Interface

The optical cable interfaces provide connections to optical cables for traffic and timing signals between the AIR and a Baseband unit. A Small Form-factor Pluggable (SFP) is used to connect the optical cable to the AIR.

Note: The AIR uses SFP28 modules for optical transmission and optical radio interfaces on the data ports.

Use the same SFP type on both the AIR and Baseband.

Only use SFP28 modules approved and supplied by Ericsson. These modules fulfill the following:

— Compliance with Class 1 laser product safety requirements defined in standard IEC 60825-1.

— Certification according to general safety requirements defined in standard IEC 62368-1.

— Functional and performance verified to comply with RBS specifications.

Recommended SFP28 modules are obtained from the product packages for the RBS and the Main Remote Installation products. For more information, see Spare Parts Catalog, Site Installation Products Overview, and SFP Module Selector Guide.

eCPRI Interface

The AIR unit sets up connection with Baseband via eCPRI interface, a 25 Gbps Ethernet port.

5.4 RAE Interface

Remote eAntenna Extension (RAE) is used to determine if the AAS unit has moved during a thunder storm, earthquake, or similar.

The RAE unit is mounted on top of the AAS and measures four different properties:

— Position

— Antenna Azimuth

— Mechanical Tilt

— Antenna Mounting Height

For the measurements, except for altitude measurement, satellite positioning systems are used. It means that the unit is dependent of free line of sight to several satellites to be able to work.

5.5 Loop Back Test Button

The loop back test button initialize test mode for mainly data (SFPs) loop back test.

5.6 Optical Indicators

Optical indicators show the system status. For more information about the optical indicators, see Indicators, Buttons, and Switches.

5.7 TX Monitor Interface

The TX monitor interface provides monitoring of output power and performance.

The TX monitor output is the sum of coupled signals from all 64 branches. Compared to the output signals the TX monitor signal is attenuated 20 dB to 53 dB depending on the number of active branches and the amplitude and phase relations between them.

If only one branch is active, the attenuation is 53 dB.

6 Standards and Regulations

This section presents a brief overview of standards, regulatory product approval, and declaration of conformity for the radio.

Declaration of Conformity

"Hereby, Ericsson AB, declares that this product is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU and 2011/65/EU."

FCC Compliance Statement

"This device complies with Part 15 of the FCC CFR 47 rules. Operation is subject to the following two conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation."

6.1 Regulatory Approval

The product complies with the following market requirements:

- European Community (EC) market requirements, Radio Equipment Directive 2014/53/EU and Directive 2011/65/EU.
- The apparatus may include Radio Transceivers with support for frequency bands not allowed or not harmonized within the EC.
- Products containing radio Equipment outside North America and in countries not recognizing the CE-mark may be labeled according to national requirements or standards.

6.1.1 Environmental Standards Compliance

The product complies with the following environmental standard:

Europe

- Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive (2011/65/EU)

6.1.2 Safety Standards Compliance

In accordance with market requirements, the product complies with the following product safety standards and directives:

International

— IEC 62368-1

Europe

— EN 50385

— EN 62368-1

North America

— FCC CFR 47 Part 1.1310

— UL 62 368-1

— CSA-C22.2 No. 62 368-1

— Health Canada Safety Code 6

6.1.2.1 Outdoor Specific Requirements

The product complies with the following outdoor specific requirements:

International

— IEC 60529 (IP65)

— IEC 60950-22

Europe

— EN 60529 (IP65)

— EN 60950-22

North America

— UL 50E

— UL 60950-22

— CAN/CSA-C22.2 No. 60950-22

6.1.3 EMC Standards Compliance

The product complies with the following Electromagnetic Compatibility (EMC) standards:

International

— 3GPP TS38.113

Europe

— ETSI EN 301 489-1

— ETSI EN 301 489-50

North America

— FCC CFR 47 Part 15 B

— IC ICES-003 B

6.1.4 Radio Standards Compliance

The product complies with the following radio standards:

International

— 3GPP TS38.141-1

— 3GPP TS38.141-2

Europe

— ETSI EN 301 908-1

— ETSI EN 301 908-18

North America

— FCC CFR 47 Part 27

— FCC CFR 47 Part 2

— FCC CFR 47 Part 96

— IC RSS-Gen

— IC RSS-192

6.1.5 Marking

To show compliance with legal requirements, the product is marked with the following labels:

Europe

— CE mark

North America

— FCC CFR 47 Part 15 Statement

— IC ICES-003 Statement

— usETL/cETL

— FCC ID Number

— IC ID Number

6.2 Other Standards and Regulations

The standards and regulations in this section are not regulatory approved.

6.2.1 Spare Parts

The product adheres to the Ericsson Serviceability and Spare Part Strategy.

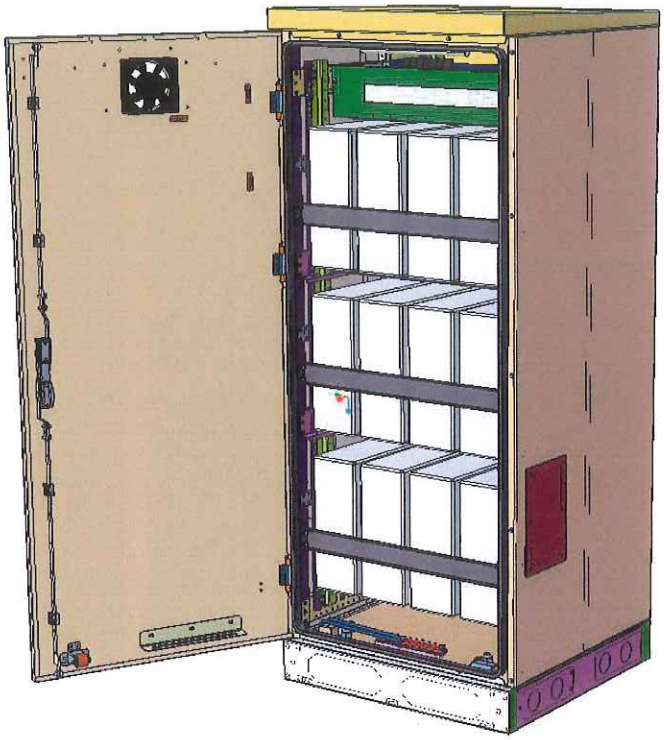
6.2.2 Surface Quality

The surface quality of the AIR unit is according to Ericsson standard class A5 for the radome, top, front, and side covers, and A6 for the heat-sink.

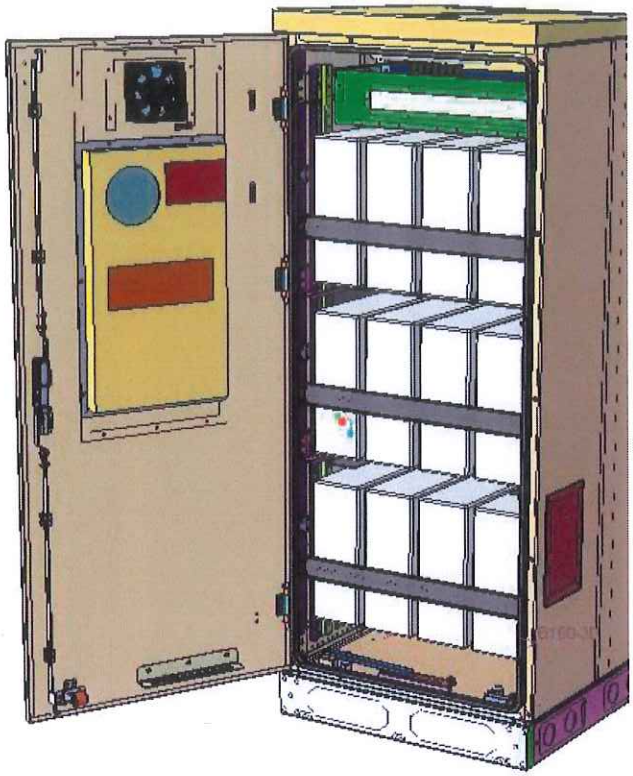
6.2.3 Vandal Resistance

Unauthorized access is not possible without damaging the tamper proof warranty seal.

Enclosure B160



Enclosure B160
AirCon + VRLA



Enclosure B160
AirCon + Li-Ion

Enclosure B160

Capacity

- VRLA 12V: 100Ah / 150Ah / 170Ah / 190Ah / 210Ah
- Li-Ion: 24U 19" / 23"
- Sodium-Nickel: 3x FIAMM

Electrical specification

- DC Output: -48VDC/200A
- Battery breakers: 2x 125/2p
- Alarms: Door open, Climate failure, MCB Connection

Mechanical specification

- Weight: 134kg
- Dimensions: 63 x 26 x 26 in. (incl. Base frame)
- Base frame height: 6 in.
- Material: Galvanized steel (180g/m^2)
- Color: Powder paint NCS 2002-B
- Door: Front access
- Locking type: Pad lock / cylinder

Environmental s

- Ingress pro

- Relative hu

Climate system

- Air Conditic
  - Fan ty
  - Coolin
- Convection
  - Emerg

PROJECT INFORMATION

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY MODIFICATIONS
SITE ADDRESS:	22 BOSTON WHARF ROAD BOSTON, MA 02210
LATITUDE: LONGITUDE:	42.350304° N 71.047206° W
JURISDICTION:	NATIONAL, STATE & LOCAL CODES OR ORDINANCES
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
DESIGN GUIDELINE:	67D5993DB HYBRID

DRAWING INDEX

		REV
T-1	TITLE SHEET	4
GN-1	GENERAL NOTES	4
A-1	ROOF & EQUIPMENT PLANS	4
A-2	EXISTING ELEVATION	4
A-3	PROPOSED ELEVATION	4
A-4	EXISTING ELEVATION	4
A-5	PROPOSED ELEVATION	4

GENERAL NOTES

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

2. THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.

3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE LESEE/LICENSEE REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK. IN THE EVENT OF DISCREPANCIES THE CONTRACTOR SHALL PRICE THE MORE COSTLY OR EXTENSIVE WORK, UNLESS DIRECTED IN WRITING OTHERWISE.

4. THE SCOPE OF WORK SHALL INCLUDE FURNISHING ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.

5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

6. THE CONTRACTOR SHALL OBTAIN AUTHORIZATION TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DRAWINGS / CONTRACT DOCUMENTS.

7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S / VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.

8. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDUMS OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.

9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. 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.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL NECESSARY CONSTRUCTION CONTROL SURVEYS, ESTABLISHING AND MAINTAINING ALL LINES AND GRADES REQUIRED TO CONSTRUCT ALL IMPROVEMENTS AS SHOWN HEREIN.

11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY OR LOCAL GOVERNMENT AUTHORITY.

12. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC. DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.

13. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.

14. THE CONTRACTOR SHALL COMPLY WITH ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJECT.

15. THE CONTRACTOR SHALL NOTIFY THE LESEE/LICENSEE REPRESENTATIVE WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE LESEE/LICENSEE REPRESENTATIVE.

16. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC. ON THE JOB.

17. ALL UNDERGROUND UTILITY INFORMATION WAS DETERMINED FROM SURFACE INVESTIGATIONS AND EXISTING PLANS OF RECORD. THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES IN THE FIELD PRIOR TO ANY SITE WORK. CALL THE FOLLOWING FOR ALL PRE-CONSTRUCTION NOTIFICATION 72-HOURS PRIOR TO ANY EXCAVATION ACTIVITY: DIG SAFE SYSTEM (MA, ME, NH, RI, VT): 1-888-344-7233 CALL BEFORE YOU DIG (CT): 1-800-922-4455

18. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY CONSTRUCTION CONTROL SURVEYS AND MAINTAINING ALL LINES AND GRADES REQUIRED TO CONSTRUCT ALL IMPROVEMENTS SHOWN HEREIN.

19. ALL DIMENSIONS SHOWN THUS ± ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS WHICH EFFECT THE CONTRACTORS WORK. CONTRACTOR TO VERIFY ALL DIMENSIONS WITH PROJECT OWNER PRIOR TO CONSTRUCTION.

20. NORTH ARROW SHOWN ON PLANS REFERS TO APPROXIMATE TRUE NORTH. PRIOR TO THE START OF CONSTRUCTION, ORDERING OR FABRICATING OF ANTENNA MOUNTS, CONTRACTOR SHALL CONSULT WITH PROJECT OWNER'S RF ENGINEER AND FIELD VERIFY ALL ANTENNA SECTOR LOCATIONS AND ANTENNA AZIMUTHS.

21. THE CONTRACTOR AND OR HIS SUB CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY OR LOCAL GOVERNMENT AUTHORITY.

22. ANTENNA INSTALLATION SHALL BE CONDUCTED BY FIELD CREWS EXPERIENCED IN THE ASSEMBLY AND ERECTION OF RADIO ANTENNAS, TRANSMISSION LINES AND SUPPORT STRUCTURES.

23. COAXIAL CABLE CONNECTORS AND TRANSMITTER EQUIPMENT SHALL BE PROVIDED BY THE PROJECT OWNER AND IS NOT INCLUDED IN THESE CONSTRUCTION DOCUMENTS. A SCHEDULE OF PROJECT OWNER SUPPLIED MATERIALS IS ATTACHED TO THE BID DOCUMENTS (SEE EXHIBIT 3). ALL OTHER HARDWARE TO BE PROVIDED BY THE CONTRACTOR. CONNECTION HARDWARE SHALL BE STAINLESS STEEL.

24. WHEN "PAINT TO MATCH" IS SPECIFIED FOR ANTENNA CONCEALMENT, PAINT PRODUCT FOR ANTENNA RADOME SHALL BE SHERWIN WILLIAMS COROTHANE II. SURFACE PREPARATION AND APPLICATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND PROJECT OWNER'S GUIDELINE'S.

25. COORDINATION, LAYOUT, AND FURNISHING OF CONDUIT, CABLE AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

26. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.

27. ALL (E)ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY ENGINEERS. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR PIER DRILLING AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW.

28. ALL (E)INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF UTILITY COMPANY ENGINEERING. THE AREAS OF THE PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE EQUIPMENT, DRIVEWAY OR

29. GRAVEL, SHALL BE GRADED TO A UNIFORM SLOPE, FERTILIZED, SEEDED AND COVERED WITH MULCH UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL ESTABLISH AND MAINTAIN SOIL EROSION AND SEDIMENTATION CONTROLS AT ALL TIMES

30. DURING CONSTRUCTION. PER FCC MANDATE, ENHANCED EMERGENCY (E911) SERVICE IS REQUIRED TO MEET NATIONWIDE STANDARDS

31. FOR WIRELESS COMMUNICATIONS SYSTEMS. PROJECT OWNER'S IMPLEMENTATION REQUIRES DEPLOYMENT OF EQUIPMENT AND ANTENNAS GENERALLY DEPICTED ON THIS PLAN, ATTACHED TO OR MOUNTED IN CLOSE PROXIMITY TO THE BTS RADIO CABINETS. PROJECT OWNER RESERVES THE RIGHT TO MAKE REASONABLE MODIFICATIONS TO E911 EQUIPMENT AND LOCATION AS TECHNOLOGY EVOLVES TO MEET REQUIRED SPECIFICATIONS.

32. SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

MANUAL OF STEEL CONSTRUCTION, ASD, NINTH EDITION;

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-G, STRUCTURAL STANDARDS FOR STEEL

ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

APPLICABLE BUILDING CODES:
SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

BUILDING CODE:

MASSACHUSETTS STATE BUILDING CODE 780 CMR, 9TH EDITION
ELECTRICAL CODE: MASSACHUSETTS 527 CMR 12.00 (NEC 2020)
NFPA 780, 2017

ELECTRICAL AND GROUNDING NOTES

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.

2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.

3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATION INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.

4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.

5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.

6. BURIED CONDUIT SHALL BE SCHEDULE 40 PVC.

7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THHN INSULATION.

8. RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE PPC AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.

9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE AND GREENLEE CONDUIT MEASURING TAPE IN EACH INSTALLED TELCO CONDUIT.

10. WHERE CONDUIT BETWEEN BTS AND PROJECT OWNER CELL SITE PPC AND BETWEEN BTS AND PROJECT OWNER CELL SITE TELCO SERVICE CABINET ARE UNDERGROUND USE PVC, SCHEDULE 40 CONDUIT. ABOVE THE GROUND PORTION OF THESE CONDUITS SHALL BE PVC CONDUIT.

11. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.

12. PPC SUPPLIED BY PROJECT OWNER.

13. GROUNDING SHALL COMPLY WITH NEC ART. 250.

14. GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.

ADDITIONAL NOTE:
GROUNDING, BONDING AND LIGHTNING PROTECTION SHALL BE DONE IN ACCORDANCE WITH "T-MOBILE BTS SITE GROUNDING STANDARDS".

15. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.

16. ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.

17. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 6 FEET OF PROJECT OWNER EQUIPMENT OR CABINET TO MASTER GROUND BAR OR GROUNDING RING.

18. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.

19. BOND ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.

20. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.

21. CONTRACTOR SHALL PROVIDE AND INSTALL OMNI DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALLS OVER EACH GROUND ROD AND BONDING POINT BETWEEN EXISTING TOWER/ (E) MONOPOLE GROUNDING RING AND EQUIPMENT GROUNDING RING.

22. CONTRACTOR SHALL TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION. 5 OHMS MAXIMUM RESISTANCE REQUIRED.

23.CONTRACTOR SHALL CONDUCT ANTENNA, COAX, AND LNA RETURN-LOSS AND DISTANCE- TO-FAULT MEASUREMENTS (SWEEP TESTS) AND RECORD RESULTS FOR PROJECT CLOSE OUT.

COMMONWEALTH OF MASSACHUSETTS
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REGISTERED PROFESSIONAL ENGINEER

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	G.C.	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
AWG	AMERICAN WIRE GAUGE	MGB	MASTER GROUND BUS		
BCW	BARE COPPER WIRE	MIN	MINIMUM	TBD	TO BE DETERMINED
BTS	BASE TRANSCEIVER STATION	(P)	PROPOSED/NEW	TBR	TO BE REMOVED
(E)	EXISTING	N.T.S.	NOT TO SCALE	TBRR	TO BE REMOVED AND REPLACED
EG	EQUIPMENT GROUND	REF	REFERENCE		
EGR	EQUIPMENT GROUND RING	REQ	REQUIRED	TYP	TYPICAL
(F)	FUTURE				

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NO.	DATE	REVISIONS	BY	CHK
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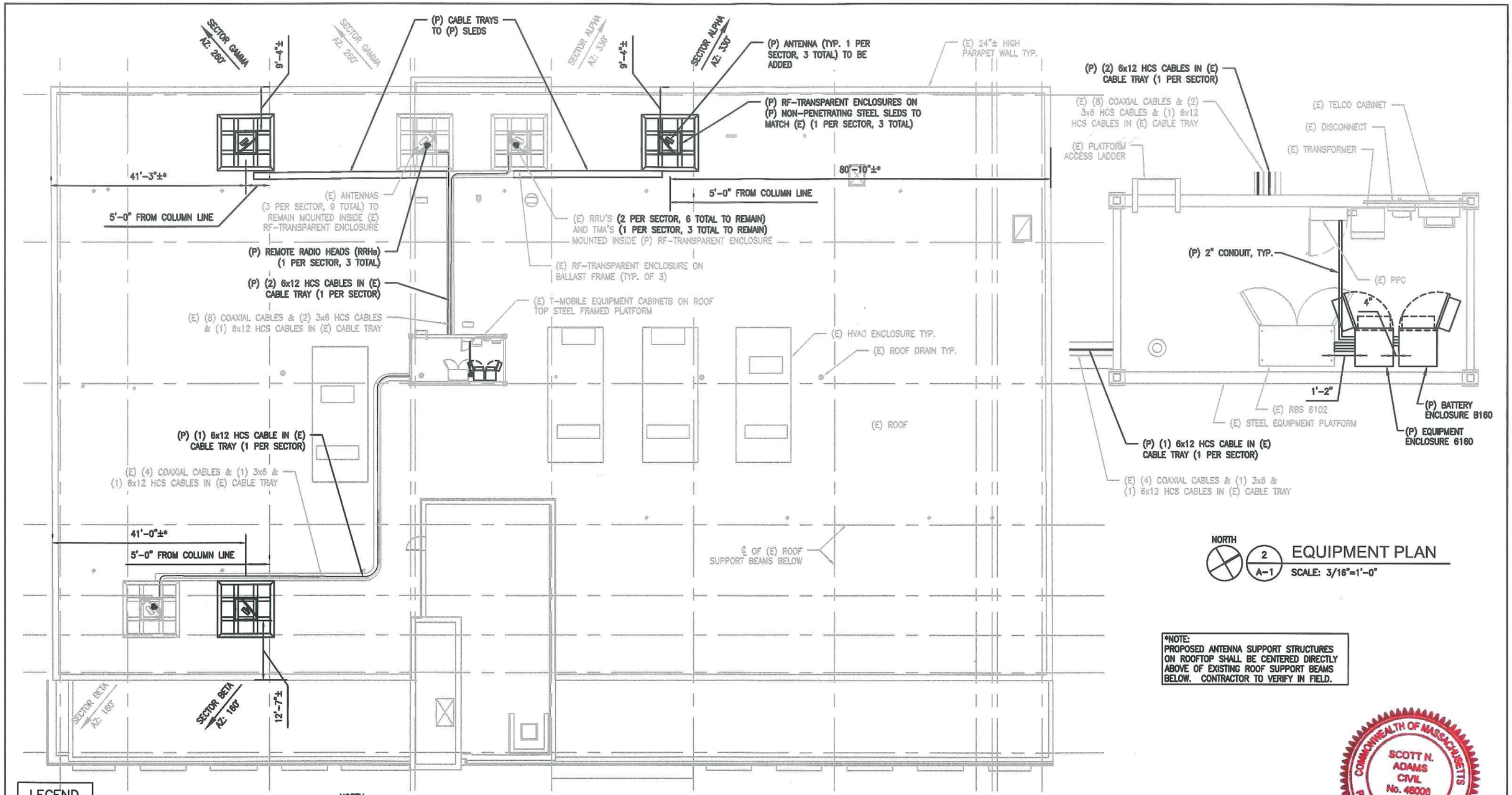
2	09/10/20	UPDATES	MER	SNA
3	10/29/20	UPDATES	MER	MRC
4	12/20/20	UPDATES	JWH	SNA

GENERAL NOTES

SHEET NO. GN-1



LEGEND

(E) = FUTURE
(E) = EXISTING
(P) = PROPOSED
(AGL) = ABOVE GROUND LEVEL

*NOTE:
PROPOSED ANTENNA SUPPORT STRUCTURES ON ROOFTOP SHALL BE CENTERED DIRECTLY ABOVE OF EXISTING ROOF SUPPORT BEAMS BELOW. CONTRACTOR TO VERIFY IN FIELD.

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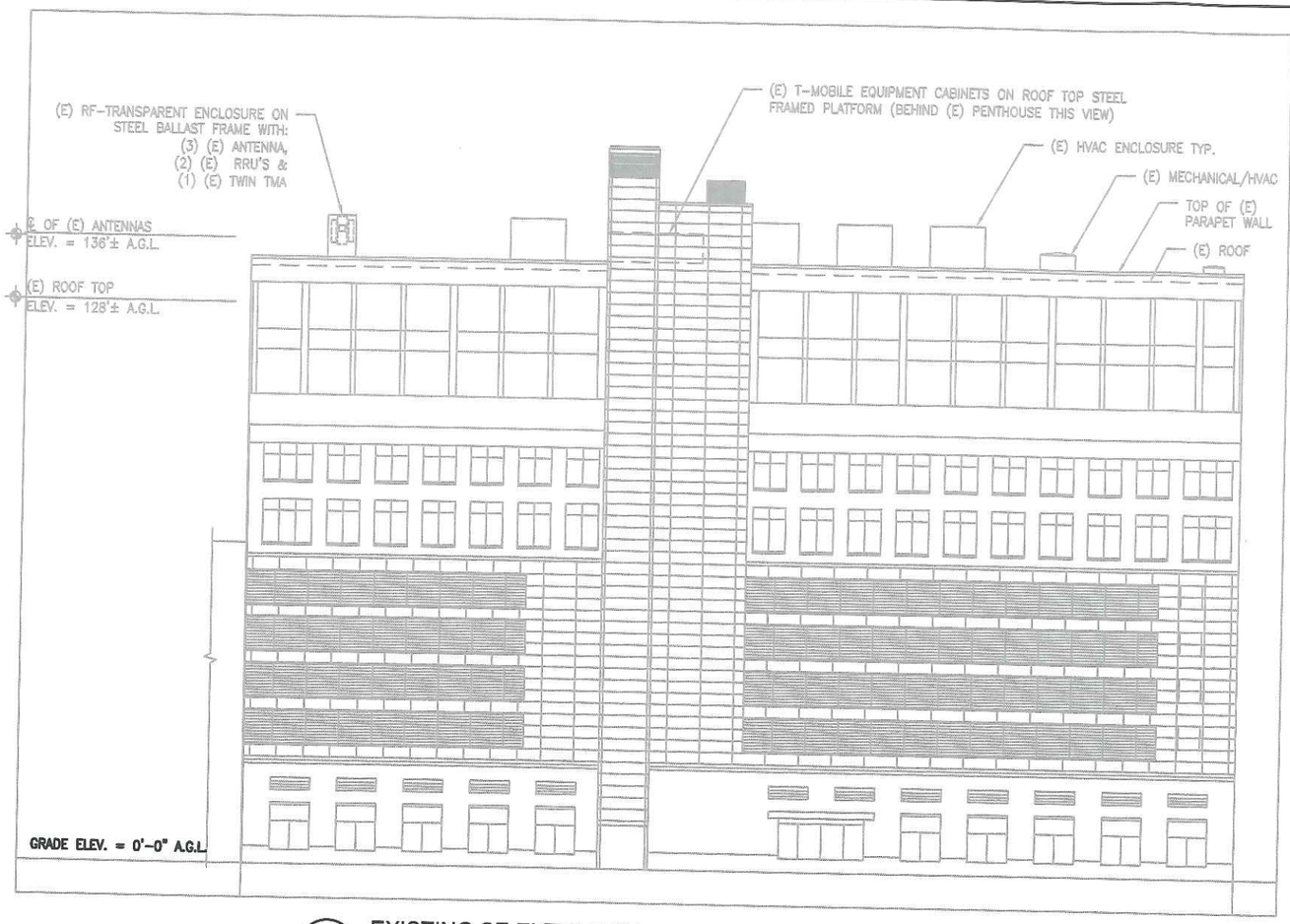
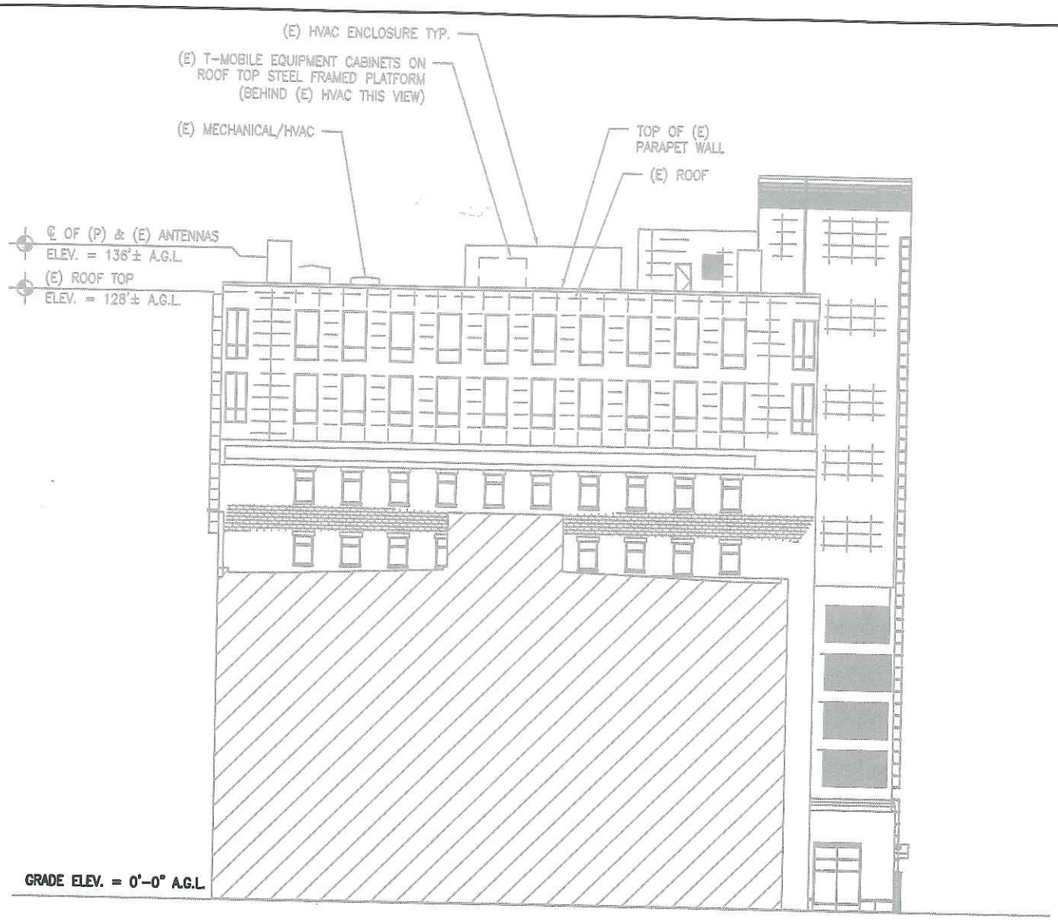
ROOF & EQUIPMENT PLANS

SHEET NO. A-1



1 / A-2 EXISTING SE ELEVATION

SCALE: 1/32"=1'-0"



2 / A-2 EXISTING SW ELEVATION

SCALE: 1/32"=1'-0"

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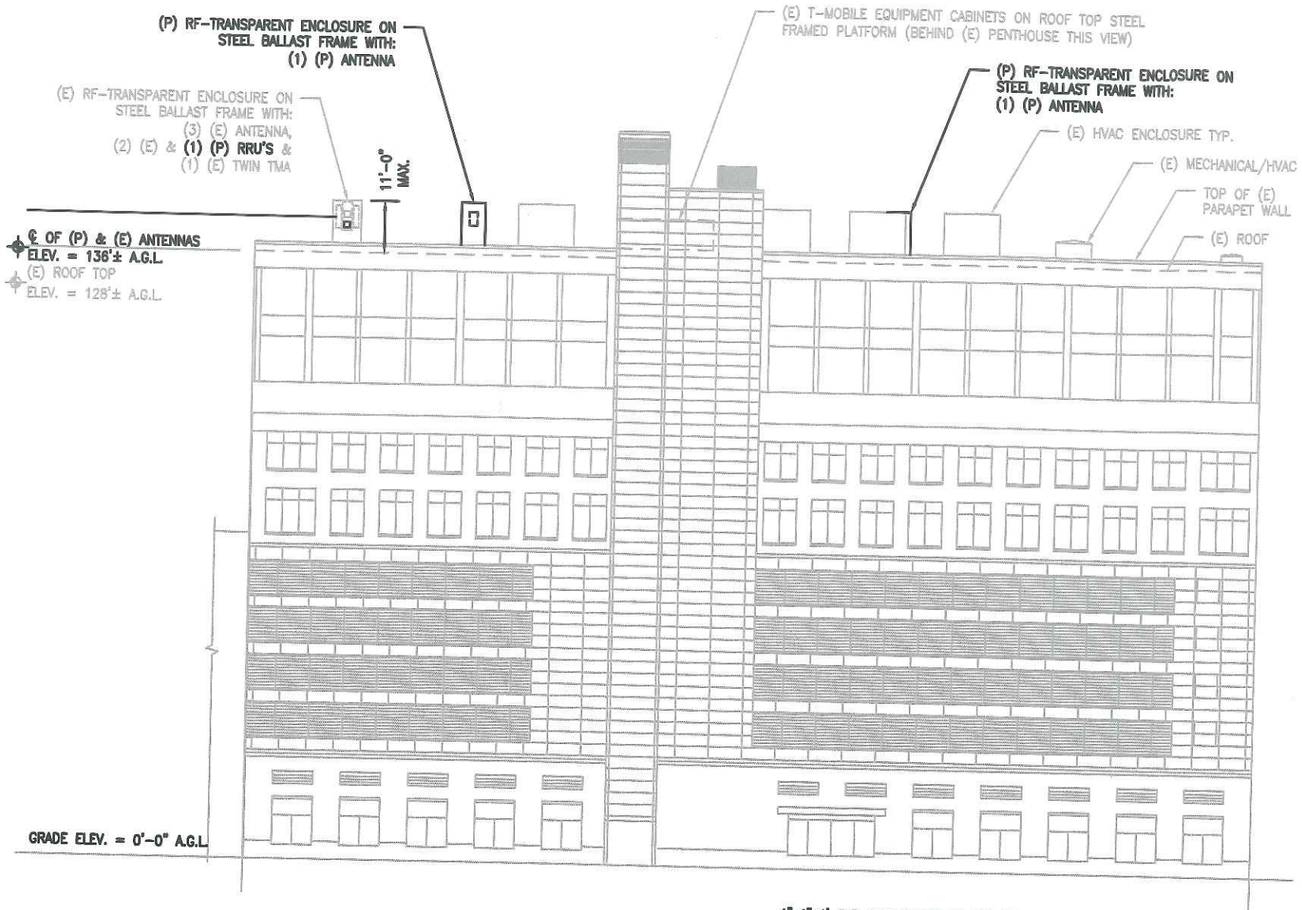
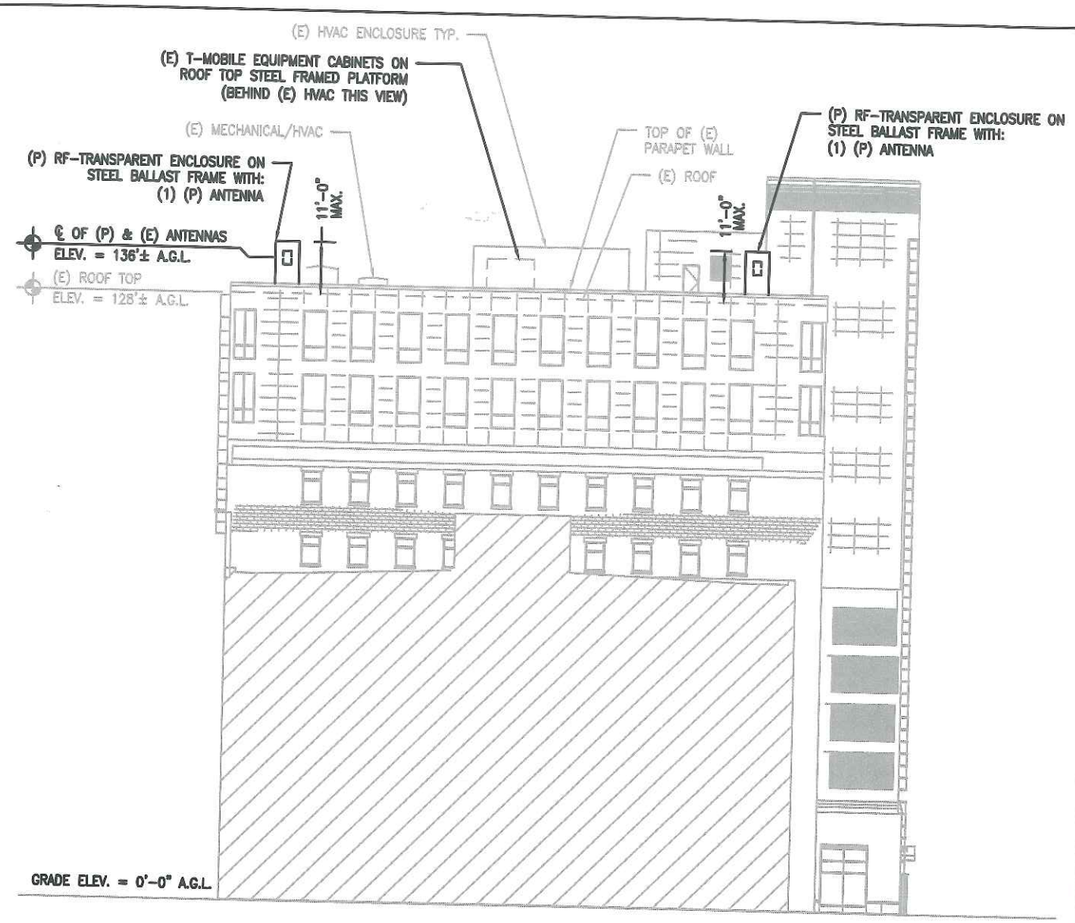
EXISTING ELEVATIONS

SHEET NO. A-2



1 A-3 PROPOSED SE ELEVATION

SCALE: 1/32"=1'-0"



2 A-3 PROPOSED SW ELEVATION

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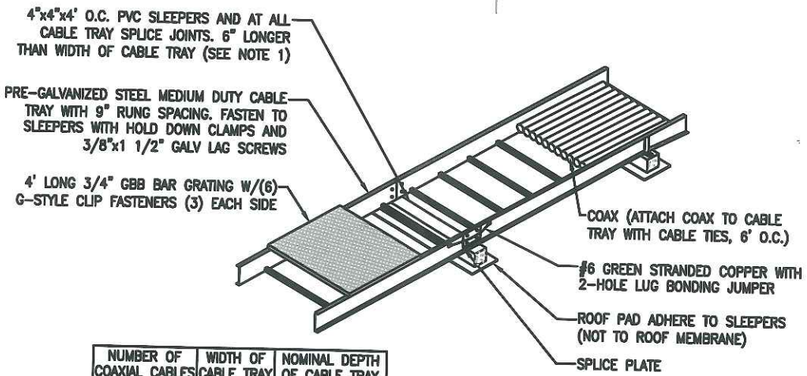

NUMBER OF COAXIAL CABLES	WIDTH OF CABLE TRAY	NOMINAL DEPTH OF CABLE TRAY
18	24"	4"
12	18"	4"
8	12"	4"

NOTE:
1. PVC SLEEPERS FILLED WITH CONCRETE EVERY 10'-0".

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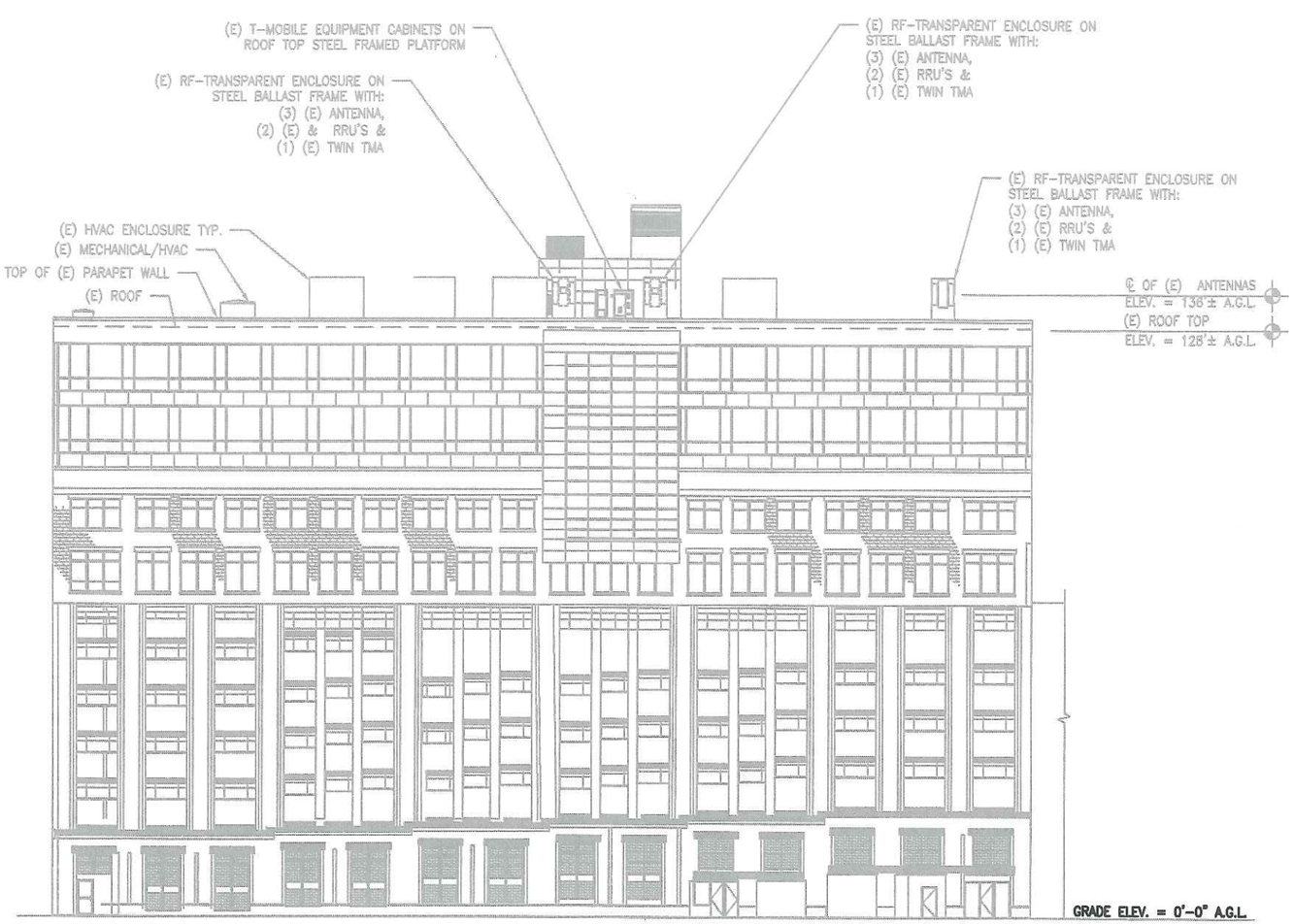
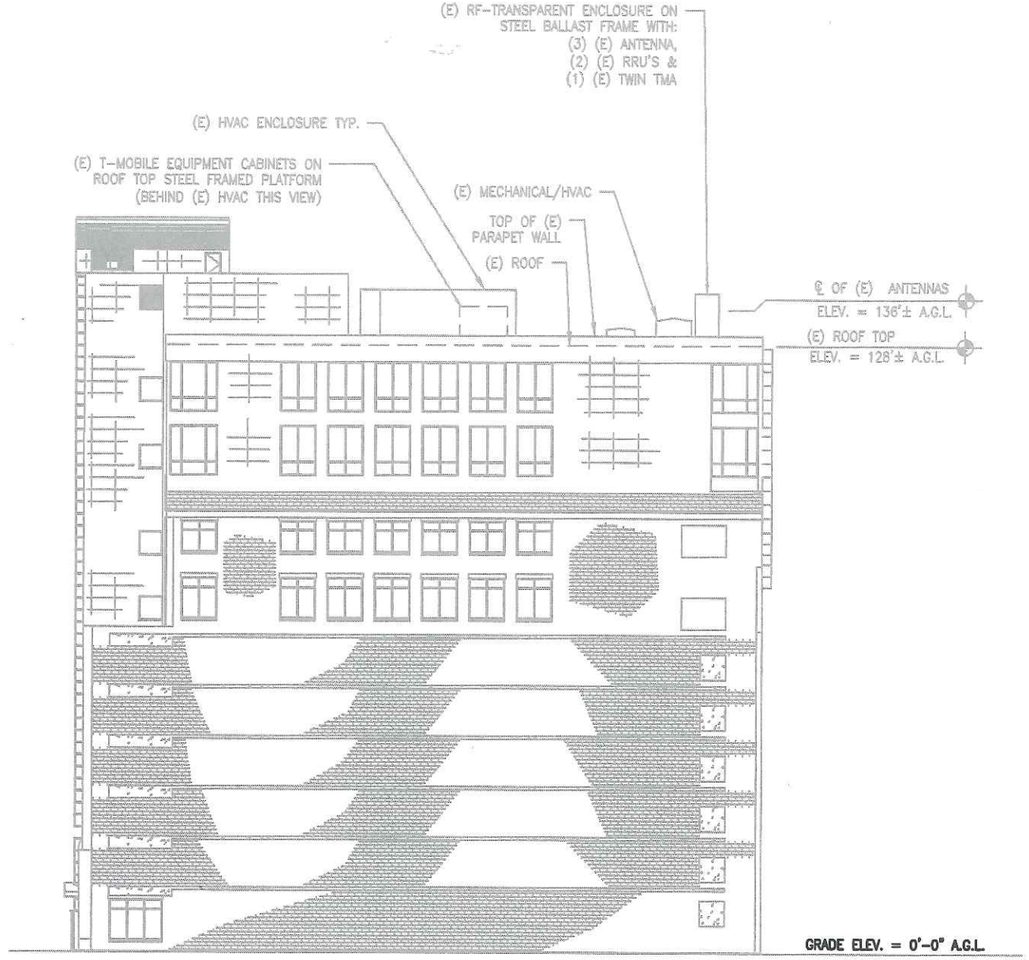
PROPOSED ELEVATIONS

SHEET NO. A-3



1 A-4 EXISTING NW ELEVATION

SCALE: 1/32"=1'-0"



2 A-4 EXISTING NE ELEVATION

SCALE: 1/32"=1'-0"

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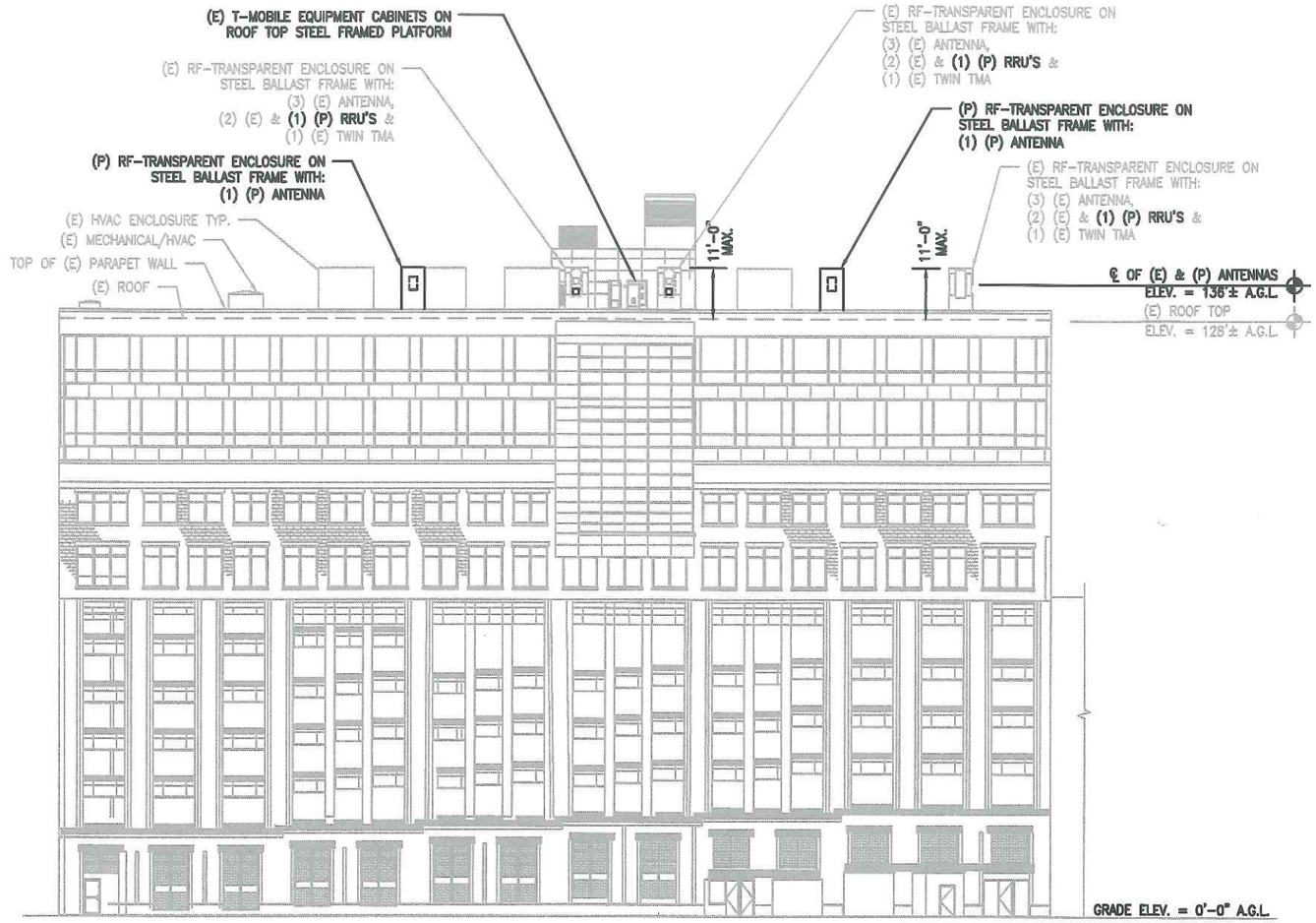
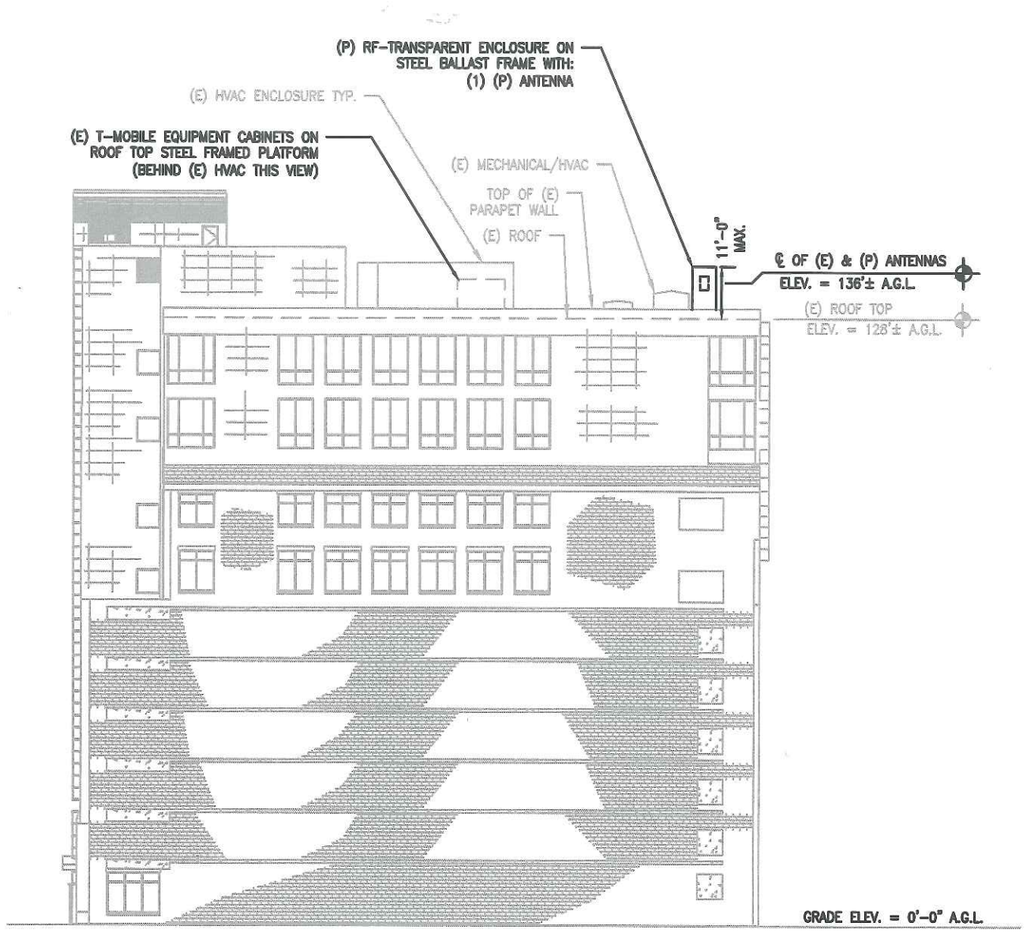
ELEVATIONS

SHEET NO. A-4



1 A-5 PROPOSED NW ELEVATION

SCALE: 1/32"=1'-0"



2 A-5 PROPOSED NE ELEVATION

SCALE: 1/32"=1'-0"

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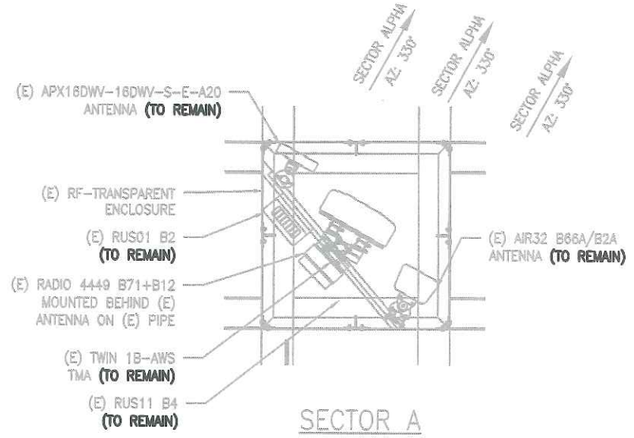
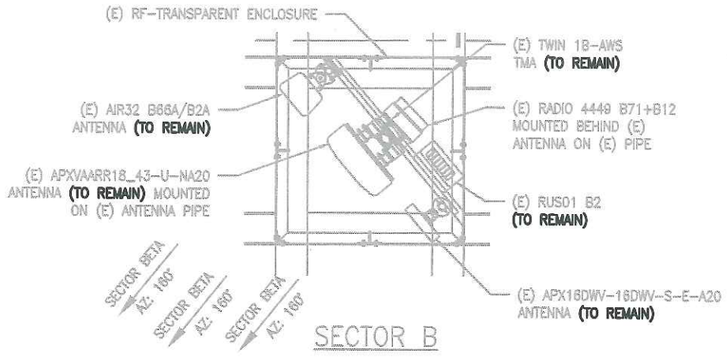
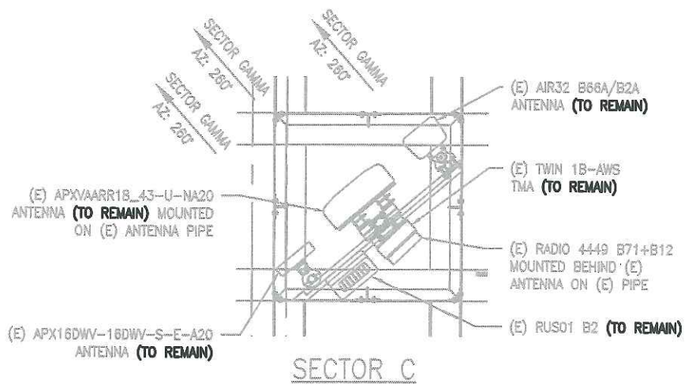
PROPOSED ELEVATIONS

SHEET NO. A-5





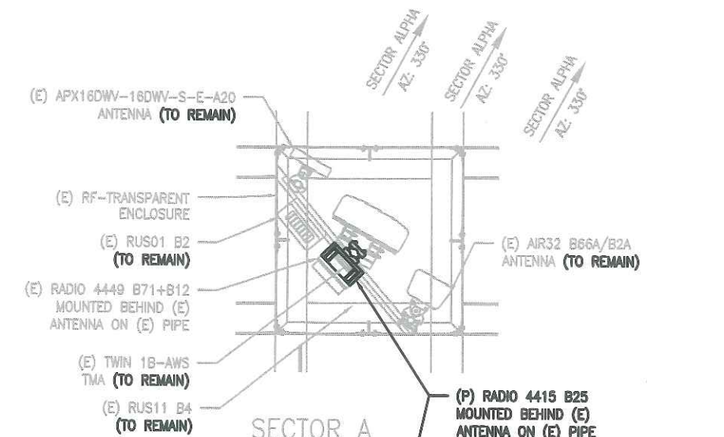


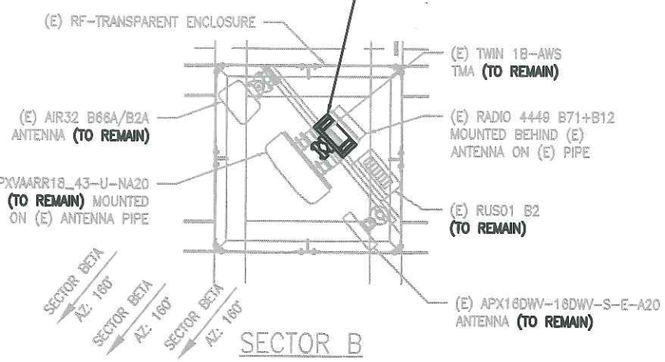
NORTH

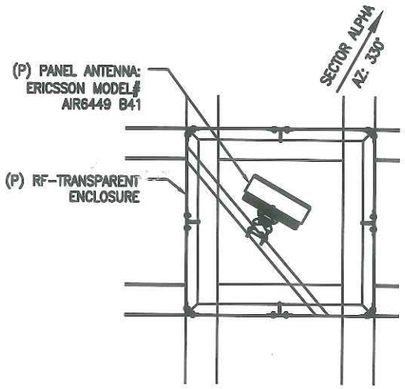
1 A-6

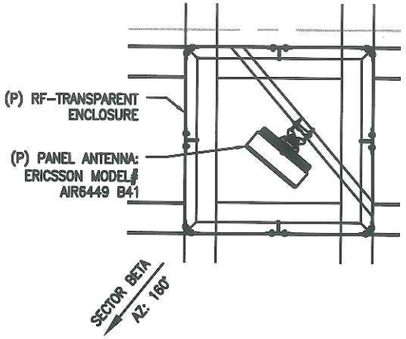
EXISTING ANTENNA PLANS

SCALE: 1/4"=1'-0"

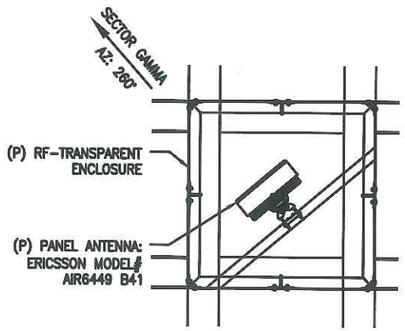


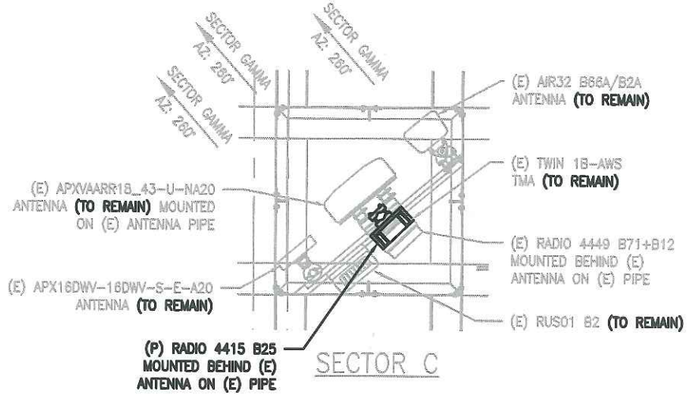






*NOTE:
PROPOSED ANTENNA SUPPORT STRUCTURES ON ROOFTOP SHALL BE CENTERED DIRECTLY ABOVE OF EXISTING ROOF SUPPORT BEAMS BELOW. CONTRACTOR TO VERIFY IN FIELD.





NOTES:

1) CONTRACTOR TO VERIFY ALL DIMENSIONS AND ELEVATIONS WHICH EFFECT THE CONTRACTORS WORK IN FIELD

2) IF EXISTING (E) CONDITIONS FOUND DIFFER THAN SHOWN ENGINEER MUST BE INFORMED OF ACTUAL FIELD CONDITIONS

3) VERIFY CURRENT RFDS FOR REQUIRED ANTENNAS AND EQUIPMENT

COMMONWEALTH OF MASSACHUSETTS
SCOTT N. ADAMS
CIVIL
No. 46006
REGISTERED PROFESSIONAL ENGINEER

NORTH

2 A-6

PROPOSED ANTENNA PLANS

SCALE: 1/4"=1'-0"

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CENTERLINE COMMUNICATIONS
CENTERLINE COMMUNICATIONS
95 RYAN DRIVE, SUITE 1
RAYNHAM, MA 02767

SITE NUMBER: 4BN0012B

SITE NAME: 22 BOSTON WHARF ROAD

22 BOSTON WHARF ROAD
BOSTON, MA 02210
SUFFOLK COUNTY

T-MOBILE NORTHEAST LLC
15 COMMERCE WAY, SUITE B
NORTON, MA 02766
OFFICE: (508) 286-2700
FAX: (508) 286-2893

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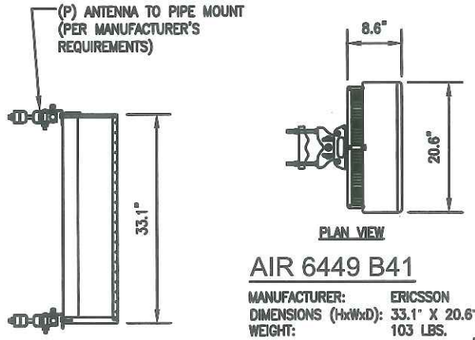
3	10/29/20	UPDATES	MER	MRC
4	12/20/20	UPDATES	JWH	SNA

ENLARGED SITE PLAN DETAILS & ANTENNA PLANS

SHEET NO. A-6

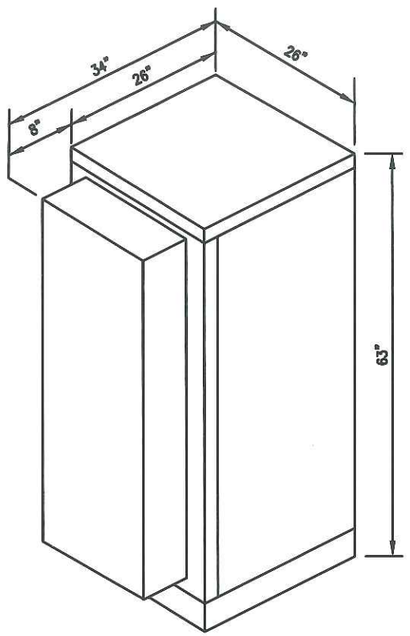


AIR 6449 B41

MANUFACTURER: ERICSSON
DIMENSIONS (HxWxD): 33.1" X 20.6" X 8.6"
WEIGHT: 103 LBS.

1 / A-7 ANTENNA DETAIL
SCALE: N.T.S.

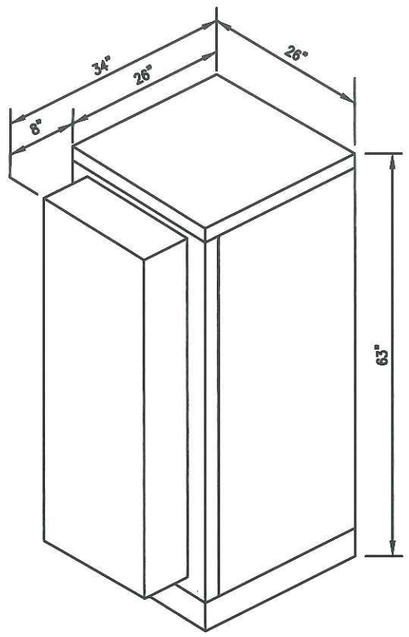
STRUCTURAL LIMITATION:
STRUCTURAL ANALYSIS WAS CONDUCTED UTILIZING THE T-MOBILE DESIGN STANDARD OF TWO BATTERY STRINGS (TOTAL BATTERY WEIGHT MAX OF 1,353 LBS). THE GENERAL CONTRACTOR AND/OR T-MOBILE SHALL NOTIFY THE ENGINEER OF RECORD PRIOR TO CONSTRUCTION IF ADDITIONAL BATTERIES ARE TO BE INSTALLED AS STRUCTURAL DESIGN MODIFICATIONS MAY BE REQUIRED.



ENCLOSURE 6160 AC

*PRELIMINARY SPECIFICATIONS
MANUFACTURER: ERICSSON
DIMENSIONS: 32"x26"x63"
WEIGHT W/O EQUIPMENT: 320 LBS.
WEIGHT W/ EQUIPMENT: 605 LBS.

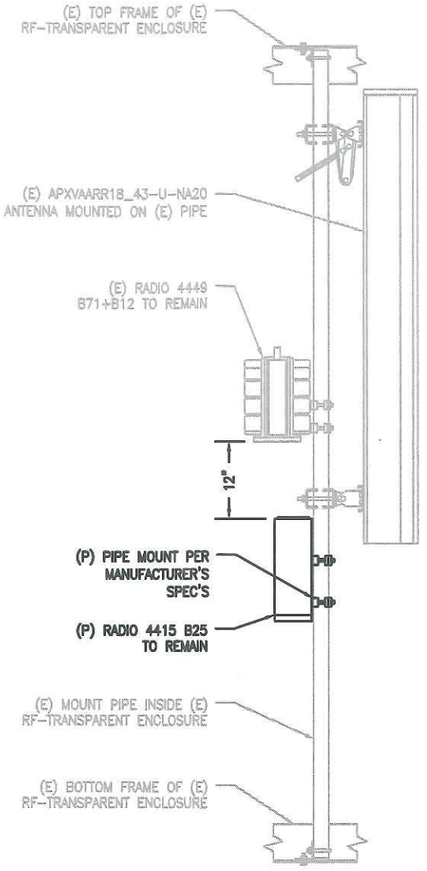
2 / A-7 EQUIP. CABINET DETAIL
SCALE: N.T.S.



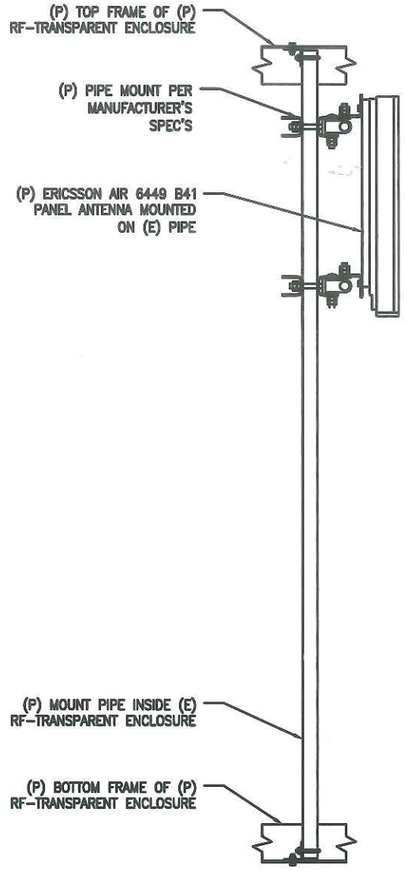
ENCLOSURE B160

*PRELIMINARY SPECIFICATIONS
MANUFACTURER: ERICSSON
DIMENSIONS: 32"x26"x63"
WEIGHT W/O BATTERIES: 295 LBS.
WEIGHT W/ BATTERIES: 1,353 LBS.
ONLY TWO (2) STRINGS OF BATTERIES ALLOWED

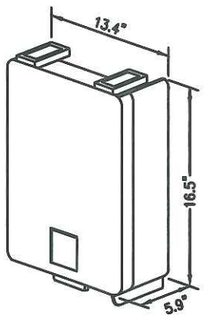
3 / A-7 BATTERY CABINET DETAIL
SCALE: N.T.S.



4 / A-7 RRH MOUNT DETAIL
SCALE: 1/2"=1'-0"



5 / A-7 ANTENNA MOUNT DETAIL
SCALE: 1/2"=1'-0"



RRUS-4415 B25

MANUFACTURER: ERICSSON
DIMENSIONS (HxWxD): 16.5"x13.4"x5.9"
WEIGHT: 46 LBS

6 / A-7 RRH DETAILS
SCALE: N.T.S.

EQUIPMENT SCHEDULE

CURRENT EQUIPMENT

QUANTITY	DESCRIPTION
3	RFS APX16DWV-16DWV-S-E-A20 PANEL ANTENNAS
3	RFS APXVAARR18_43-U-NA20 PANEL ANTENNAS
3	ERICSSON AIR32 B66A/B2A PANEL ANTENNAS
3	ERICSSON RADIO RUS01 B2
3	ERICSSON RADIO 4449 B71+B12
3	GENERIC STYLE 1B TWIN AWS TMAs
6	1 5/8"ø COAXIAL CABLES (ACTIVE)
6	1 5/8"ø COAXIAL CABLES (UNCONNECTED)
3	3x6 HCS HYBRID CABLES
3	6x12 HCS HYBRID CABLES
1	RBS 6102 EQUIPMENT CABINET

EQUIPMENT TO BE REMOVED
NONE

EQUIPMENT TO BE ADDED

3	ERICSSON AIR6449 B41 PANEL ANTENNAS (ANCHOR)
3	ERICSSON RADIO 4415 B25
3	6X12 HCS HYBRID CABLES
1	ERICSSON 6160 EQUIPMENT CABINET
1	ERICSSON B160 EQUIPMENT CABINET

FINAL EQUIPMENT CONFIGURATION

3	RFS APX16DWV-16DWV-S-E-A20 PANEL ANTENNAS
3	RFS APXVAARR18_43-U-NA20 PANEL ANTENNAS (L700)
3	ERICSSON AIR6449 B41 PANEL ANTENNAS (ANCHOR)
3	ERICSSON AIR32 B66A/B2A PANEL ANTENNAS
3	ERICSSON RADIO RUS01 B2
3	ERICSSON RADIO 4449 B71+B12
3	ERICSSON RADIO 4415 B25
3	GENERIC STYLE 1B TWIN AWS TMAS
6	1 5/8"ø COAXIAL CABLES (ACTIVE)
6	1 5/8"ø COAXIAL CABLES (UNCONNECTED)
3	3X6 HCS HYBRID CABLES
6	6X12 HCS HYBRID CABLES
1	RBS 6102 EQUIPMENT CABINET
1	ERICSSON 6160 EQUIPMENT CABINET
1	ERICSSON B160 EQUIPMENT CABINET

RF CONFIGURATION: 67D5993DB HYBRID

SCOPE OF WORK

1. INSTALL (3) RF-TRANSPARENT ANTENNA ENCLOSURE
2. INSTALL (3) NEW PANEL ANTENNAS, (1) PER SECTOR
3. INSTALL (3) NEW REMOTE RADIO HEADS, (1) PER SECTOR
4. INSTALL (3) NEW HCS CABLES, (1) PER SECTOR
5. INSTALL NEW CABLE TRAYS
6. INSTALL (1) NEW 6160 EQUIPMENT CABINET
7. INSTALL (1) NEW B160 BATTERY CABINET

LEGEND

(E) = FUTURE
(E) = EXISTING
(P) = PROPOSED
(AGL) = ABOVE GROUND LEVEL

COMMONWEALTH OF MASSACHUSETTS
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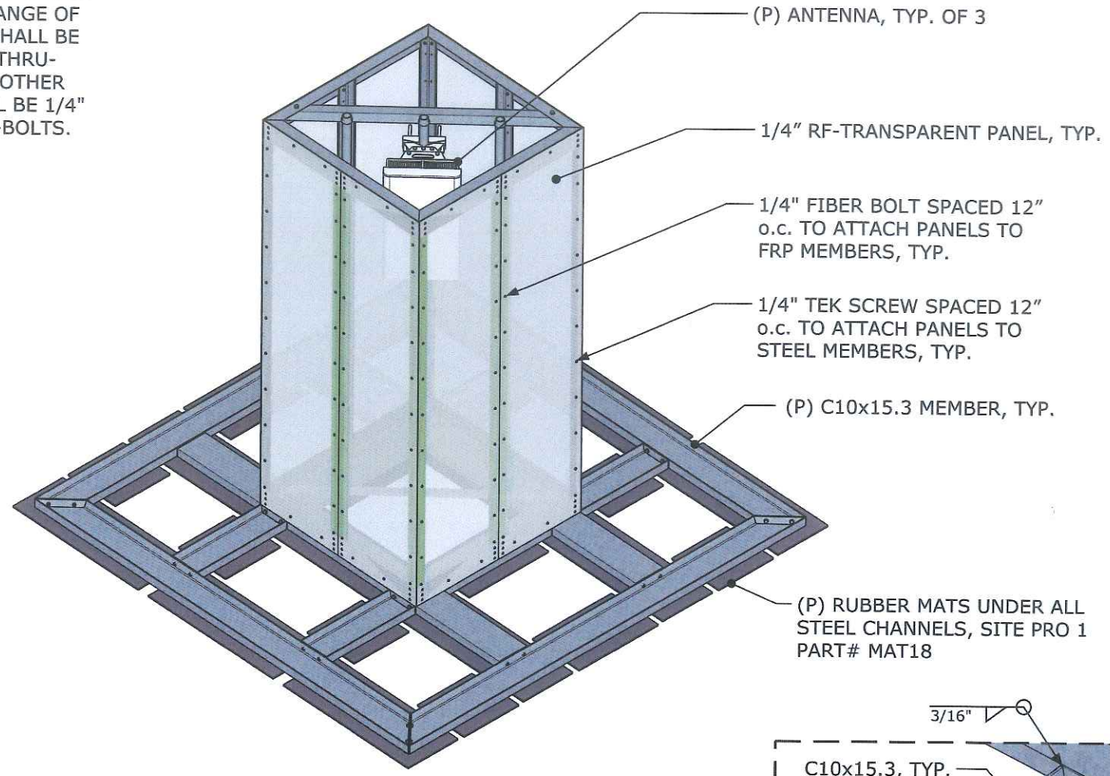
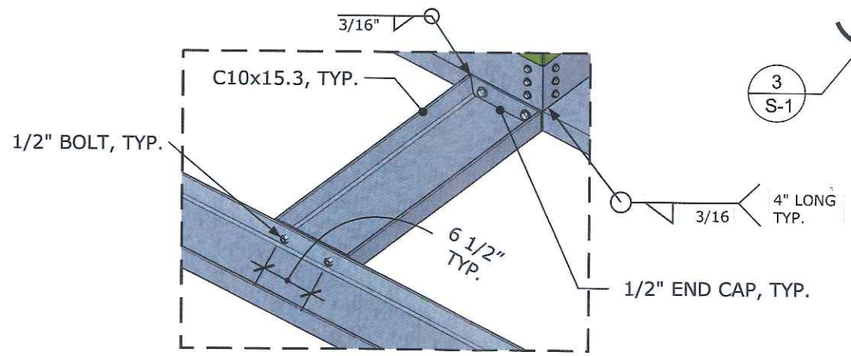
EQUIPMENT DETAILS & EQUIPMENT SCHEDULE

SHEET NO. A-7

NOTES:
1. RF-TRANSPARENT PANELS ARE TO BE COUNTER-SUNK AT LOCATIONS OF STRUCTURAL BOLTS.
2. ALL BOLTS WITHIN THE BEAM RANGE OF ANTENNAS SHALL BE 1/4" NYLON THRU-BOLTS. ALL OTHER BOLTS SHALL BE 1/4" STEEL THRU-BOLTS.

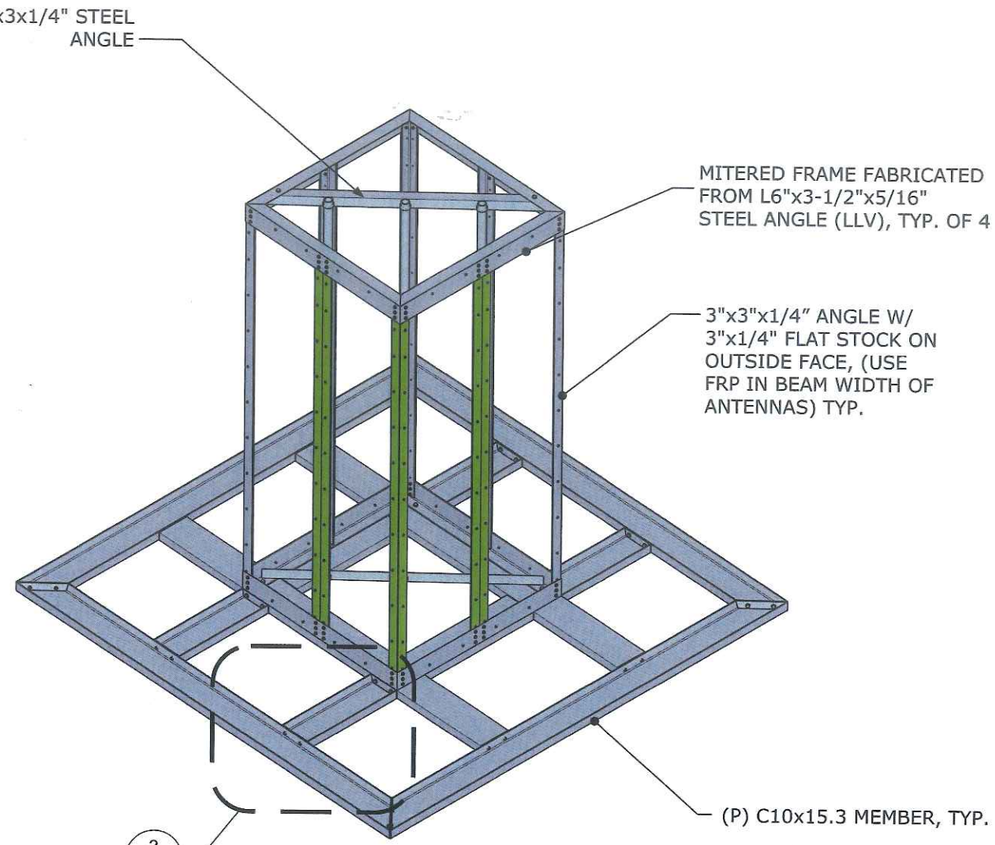


1 / S-1 ISOMETRIC
Scale: NTS



3 / S-1 DETAIL
Scale: N.T.S.

**LENGTH AND ORIENTATION OF ANTENNA SUPPORT TO BE FIELD-CUT TO ACHIEVE DESIRED AZIMUTH



2 / S-1 FRAMING ISOMETRIC
Scale: NTS

COMMONWEALTH OF MASSACHUSETTS
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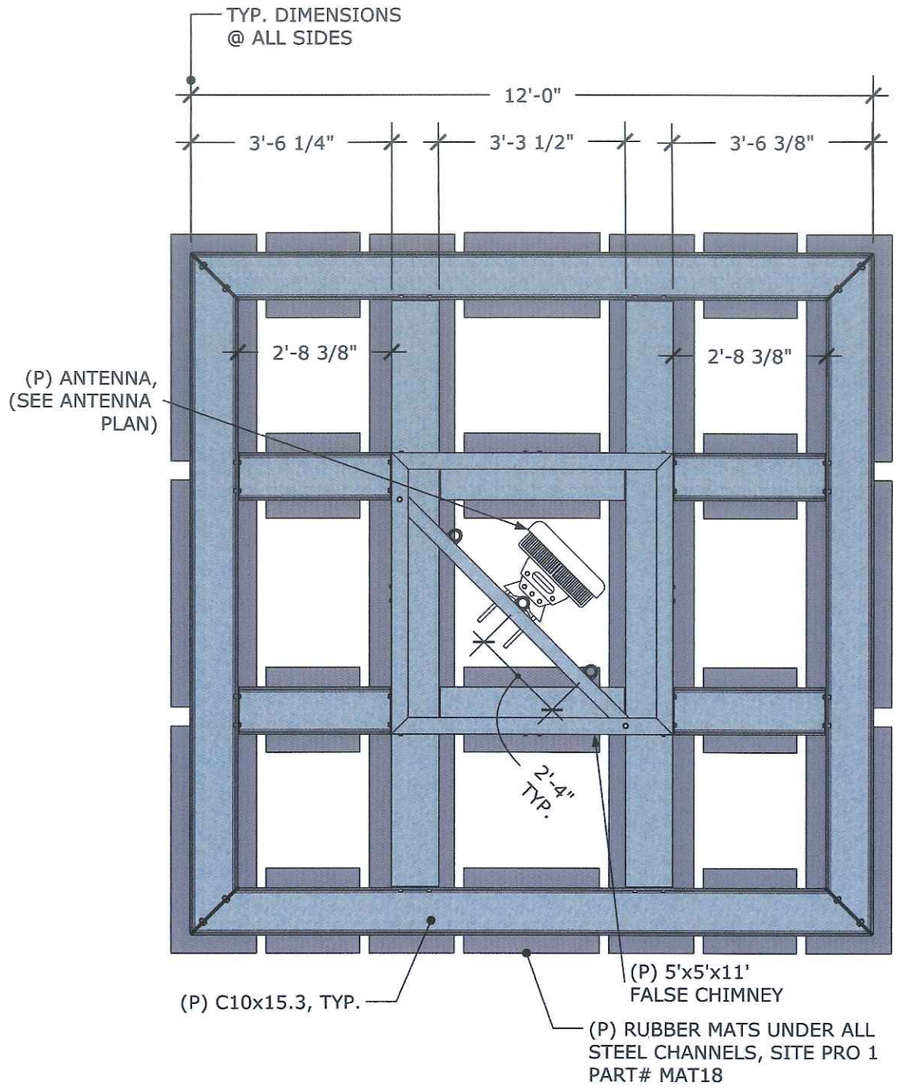
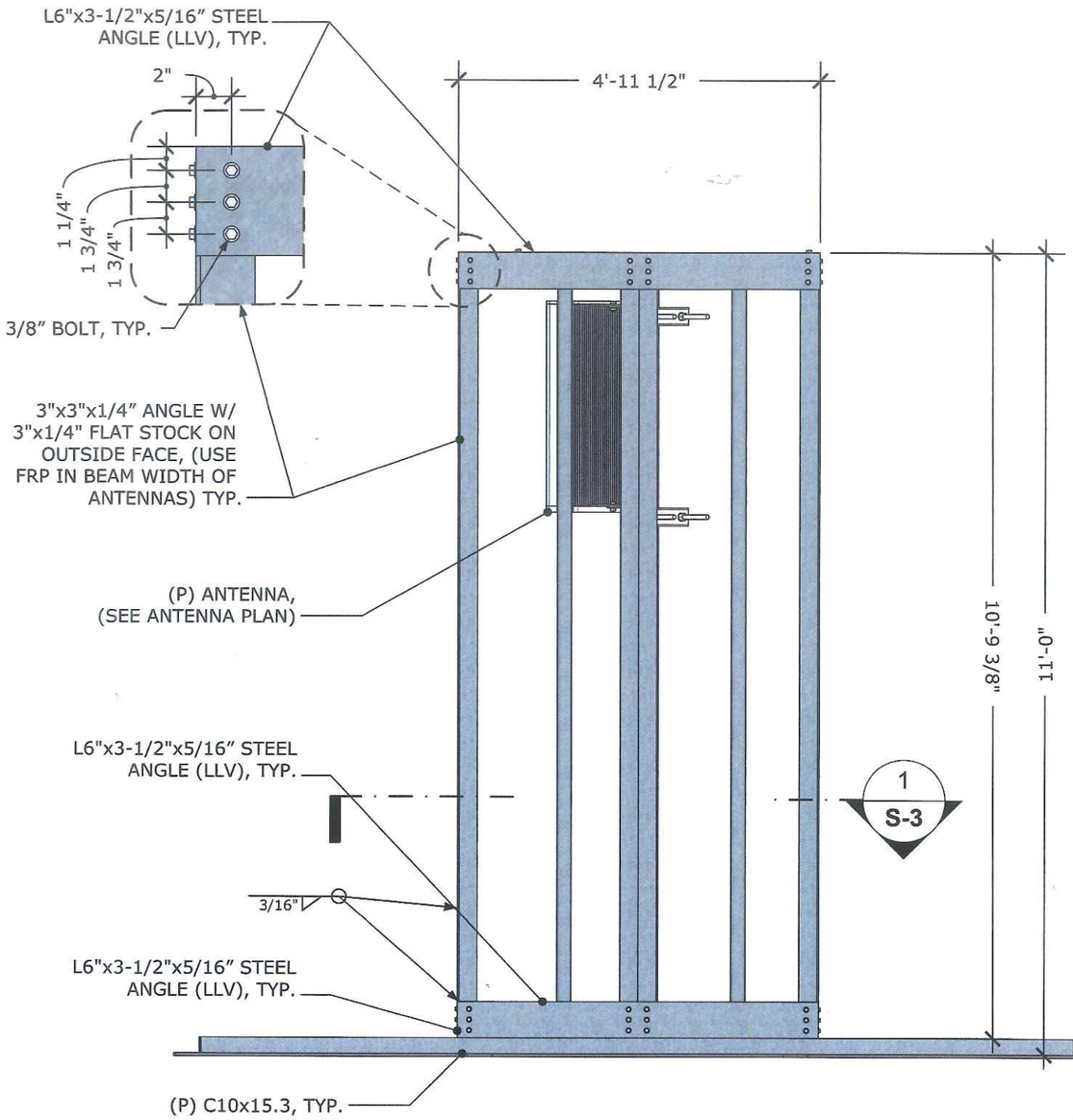
ANTENNA ENCLOSURE ISOMETRICS

SHEET NO. S-1



1 S-2 PLAN

Scale: 3/8"=1'-0"



2 S-2 ELEVATION

Scale: 1/2"=1'-0"

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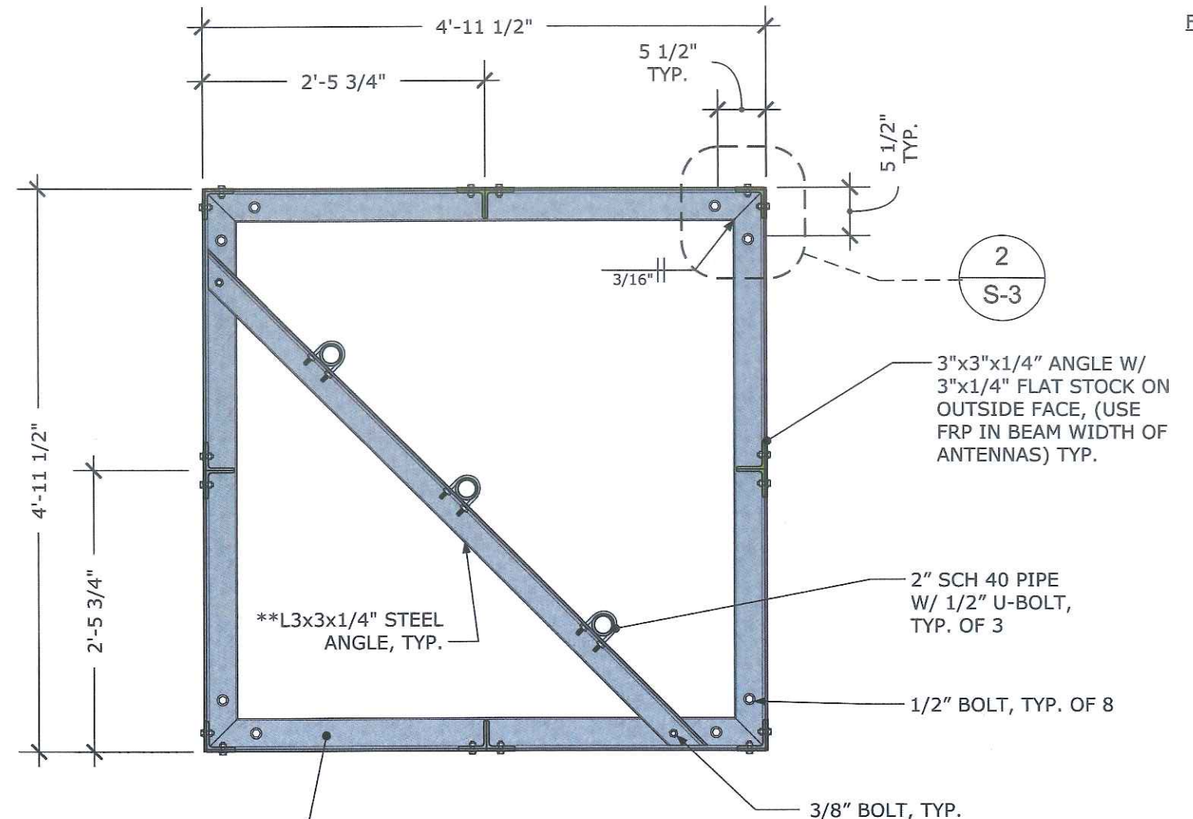
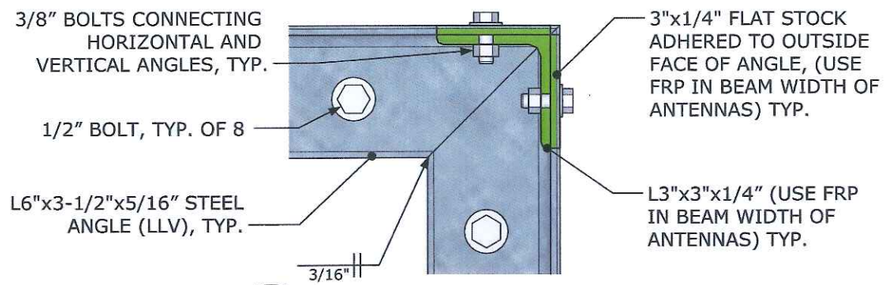
ANTENNA ENCLOSURE PLAN AND ELEVATION

SHEET NO. S-2



1 S-3 SECTION

Scale: 3/4"=1'-0"



2 S-3 DETAIL

Scale: 3"=1'-0"

FRP

1. All structural shapes are to be manufactured by the pultrusion process with a glass content minimum of 45%, maximum of 55% by weight. The structural shapes shall be composed of fiberglass reinforcement and resin in qualities, quantities, properties, arrangements and dimensions as necessary to meet the design requirements and dimensions as specified in the Contract Documents.
2. Fiberglass reinforcement shall be a combination of continuous roving, continuous strand mat, and surfacing veil in sufficient quantities as needed by the application and/or physical properties required.
3. Resins shall be non-fire retardant isophthalic polyester or ISO, non-fire retardant isophthalic polyester used to produce NSF Standard 61 certified shapes; ISOFR, fire retardant isophthalic polyester; VE, non-fire retardant vinyl ester used to produce NSF Standard 61 certified shapes or VEFR, fire retardant vinyl ester, (choose one)}
   with chemical formulation necessary to provide the corrosion resistance, strength and other physical properties as required.
4. All finished surfaces of FRP items and fabrications shall be smooth, resin-rich, free of voids and without dry spots, cracks, crazes or unreinforced areas. All glass fibers shall be well covered with resin to protect against their exposure due to wear or weathering.
5. All pultruded structural shapes shall be further protected from ultraviolet (UV) attack with 1) integral UV inhibitors in the resin and 2) a synthetic surfacing veil to produce a resin rich surface.
6. Tensile strength shall be a minimum of 30ksi
7. Flexural strength shall be a minimum of 30ksi

STRUCTURAL

1. All structural steel work shall conform to the requirements of the American Institute of Steel Construction (AISC) and all applicable building codes.
2. Structural steel angles to be ASTM A36 steel.
3. All bolts shall be ASTM Grade A325, hot-dip galvanized per ASTM D153. All bolts shall be 1/2" diameter unless otherwise noted.
4. All bolts shall have galvanized lock washer or pal nut
5. Tighten bolts using the "turn of the nut" method as specified by AISC.
6. Hot-dip galvanize angles per ASTM D123 after fabrication.
7. Apply a minimum of two coats of cold galvanizing to any field cut or drilled surfaces.
8. Structural connection bolts shall be high strength bolts (bearing type) and conform to ASTM A325 "High Strength Bolts for Structural Joints, Including suitable nuts and plain hardened washers".
9. all bolts anchors and miscellaneous hardware shall be galvanize in accordance with ASTM A153 "Zinc-Coating (Hot-Dip) on Iron and Steel Hardware", unless otherwise noted.
10. Steel pipe shall conform to ASTM A500 "cold-formed welded & seamless carbon steel structural tubing", grade A, or ASTM A53 pipe steel black and hot-dipped zinc-coated welded and seamless type E or S, grade B. Pipe sizes indicated are nominal. Actual outside diameter is larger.
11. Expansion bolts shall conform to federal specification FF-S-325, group II, type 4, class 1, Hilti kwik bolt II or approved equal. Installation shall be in accordance with the manufacturer's recommendations. minimum embedment shall be three and one half (3 1/2) inches.
12. Epoxy anchor assembly shall consist of 1/2" diameter stainless steel anchor rod with nuts & washers, an internally threaded insert, a screen tube and an epoxy adhesive. The anchoring system shall be the Hilti-HIT HY-20 and or HY-150 systems (as specified in dwg.) or engineers approved equal with 4-1/4" min. embedment depth.
13. Field welds, drill holes, saw cuts and all damaged galvanized surfaces shall be repaired with an organic zinc repair paint complying with requirements of ASTM A780. Galvanizing repair paint shall have 86 percent zinc by weight, zirp by duncan galvanizing, galva bright premium by crown or equal. thickness of applied galvanizing repair paint shall be not less than 4 coats (allow time to dry between coats) with a resulting coating thickness required by ASTM A123 or A153 as applicable.
14. Contractor shall comply with AWS code for procedures, appearance and quality of welds, and for methods used in correcting welding. All welders and welding processes shall be qualified in accordance with AWS "Standard Qualification Procedures". All wedding shall be done using E70XX electrodes and welding shall conform to AISC and D1.1. Where fill weld sizes are not shown, provide the minimum size per table J2.4 in the AISC "Manual of Steel Construction", 9th Edition.

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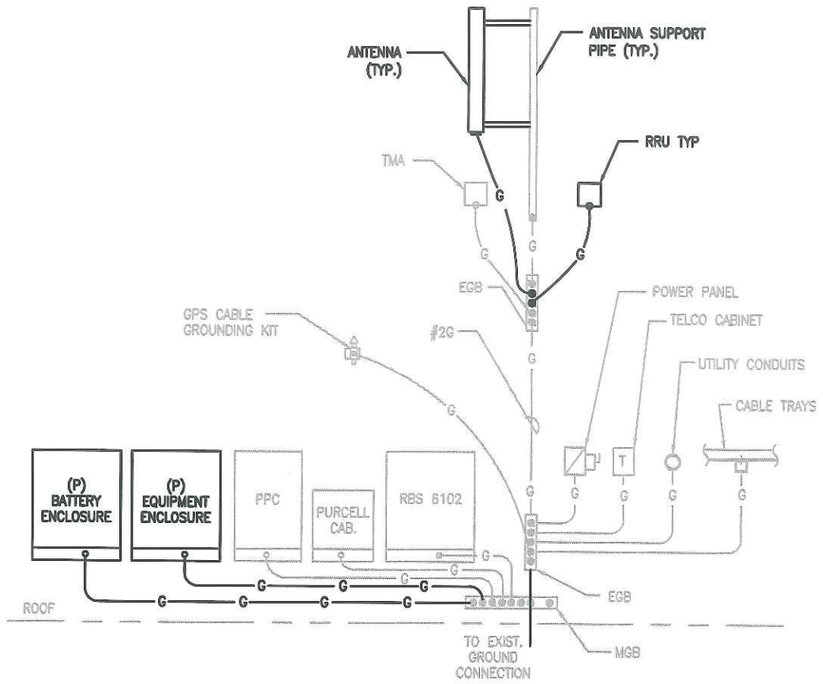
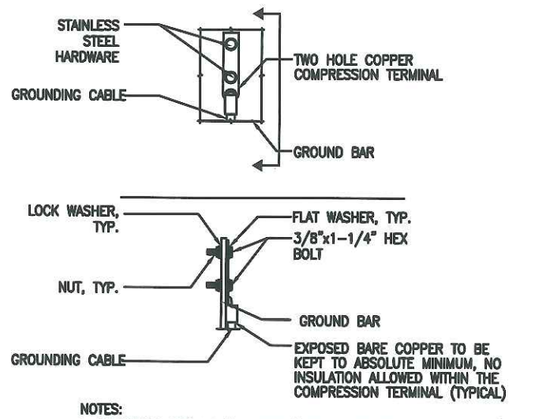
ANTENNA ENCLOSURE DETAILS & NOTES

SHEET NO. S-3



1 G-1 TYP. GROUNDING RISER DIAGRAM

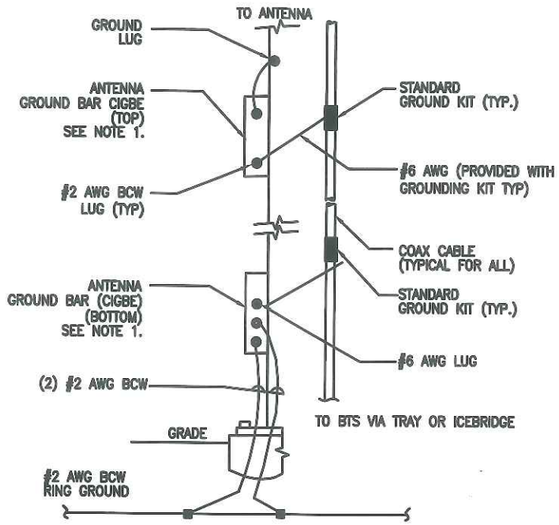
SCALE: N.T.S.



NOTES:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.
4. ALL GROUND LUGS MUST BE HEAT SHRUNK AT WIRE/LUG CONNECTION

2 G-1 TYP. GROUND BAR CONNECTION DETAIL

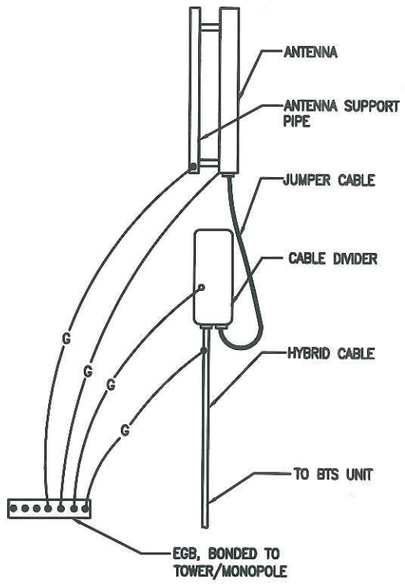
SCALE: N.T.S.



NOTE:
1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER. ANTENNA LOCATION AND CONNECTION ANTENNA LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED.

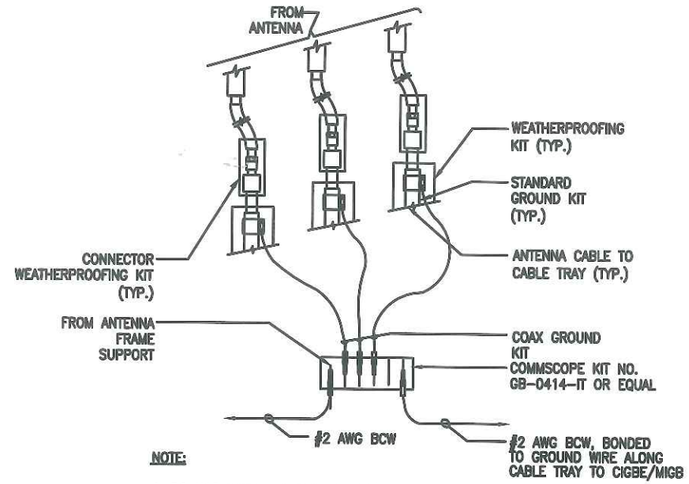
3 G-1 ANTENNA CABLE GROUNDING

SCALE: N.T.S.



6 G-1 HYBRID CABLE CONNECTION & GROUNDING DETAIL

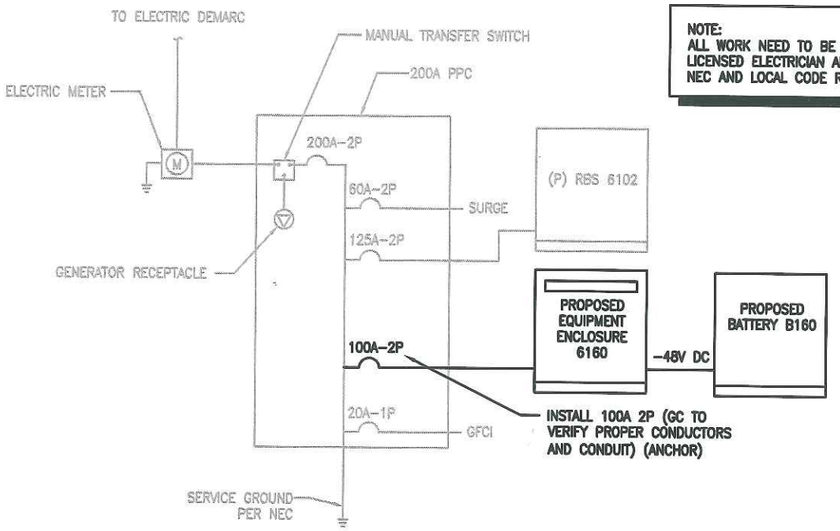
SCALE: N.T.S.



NOTE:
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.
2. ALL PROPOSED COAXIAL CABLING TO BE GROUNDED IN (3) LOCATIONS; BELOW JUMPER/HARDLINE CONNECTION, AT BASE OF TOWER & PRIOR TO BUILDING/CABINET ENTRY.

4 G-1 GROUND WIRE TO GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



NOTE:
ALL WORK NEED TO BE PERFORMED BY LICENSED ELECTRICIAN ADHERING TO THE NEC AND LOCAL CODE REQUIREMENTS.

5 G-1 ONE LINE POWER DIAGRAM

SCALE: N.T.S.

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REGISTERED PROFESSIONAL ENGINEER

ADVANCED ENGINEERING GROUP, P.C.
Civil Engineering - Site Development - Surveying - Telecommunications
500 North Broadway, East Providence, RI 02914
Phone: (401) 354-2403
Fax: (401) 633-6354

CENTERLINE COMMUNICATIONS
CENTERLINE COMMUNICATIONS
95 RYAN DRIVE, SUITE 1
RAYNHAM, MA 02767

SITE NUMBER: 4BN0012B
SITE NAME: 22 BOSTON WHARF ROAD
22 BOSTON WHARF ROAD
BOSTON, MA 02210
SUFFOLK COUNTY

T-MOBILE NORTHEAST LLC
15 COMMERCE WAY, SUITE B
NORTON, MA 02766
OFFICE: (508) 286-2700
FAX: (508) 286-2893

NO.	DATE	REVISIONS	BY	CHK
0	07/24/20	ISSUED FOR REVIEW	MER	SNA
1	08/31/20	ISSUED FOR CONSTRUCTION	MER	SNA
2	09/10/20	UPDATES	MER	SNA
3	10/29/20	UPDATES	MER	MRC
4	12/20/20	UPDATES	JWH	SNA

GROUNDING, ONE LINE DIAGRAM & DETAILS

SHEET NO. G-1