



# IN CITY COUNCIL

Marlborough, Mass., SEPTEMBER 9, 2024

ORDERED:

**IN CITY COUNCIL  
NOTICE OF DECISION  
GRANT OF SPECIAL PERMIT**

Special Permit Application of:  
Dish Wireless, LLC  
5701 South Santa Fe Drive  
Littleton, CO 80120  
Order No. 24-1009195B

Locus:  
157 Union Street  
Marlborough, MA 01752  
Assessors Map 43, Parcel(s) 56

## DECISION

The City Council of the City of Marlborough hereby **GRANTS** the Application for a Special Permit to Dish Wireless L.L.C., with a principal office located at 5701 South Santa Fe Drive, Littleton, CO 80120 c/o Network Building & Consulting, LLC, 300 Unicorn Park, Suite 501, Woburn, MA 01801, as provided in the DECISION and subject to the Findings of Fact and Conditions therein.

Decision date: September 9, 2024.

The Decision of the City Council was filed in the Office of the City Clerk of Marlborough on the 10<sup>th</sup> day of September 2024.

This is to certify that twenty (20) days have passed since the filing of the within decision and no appeal has been filed with this office.

Given at Marlborough this 1<sup>st</sup> day of October 2024.

Given under Chapter 40A Section 17 of the General Laws.

A TRUE COPY  
ATTEST:

City Clerk



# IN CITY COUNCIL

Marlborough, Mass., ~~SEPTEMBER 9, 2024~~

ORDERED:

## IN CITY COUNCIL

### NOTICE OF DECISION GRANT OF SPECIAL PERMIT

Special Permit Application of:  
Dish Wireless, LLC  
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Decision date: September 9, 2024.

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### APPEALS

Appeals, if any, shall be made pursuant to Massachusetts General Laws Chapter 40A, § 17, and shall be filed within twenty (20) days after the date of the filing of this Notice of Decision in the Office of the City Clerk of the City of Marlborough, Massachusetts.

A TRUE COPY  
ATTEST:



City Clerk



# IN CITY COUNCIL

Marlborough, Mass., SEPTEMBER 9, 2024

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ORDERED:

## IN CITY COUNCIL

### DECISION ON A SPECIAL PERMIT DISH WIRELESS, LLC

#### ORDER NO. 24-1009195B

The City Council of the City of Marlborough hereby **GRANTS** the Application for a Special Permit to Dish Wireless (the "Applicant") to allow for the co-location of a new Wireless Communications Facility (3 antennas and associated equipment) on an existing rooftop pursuant to the submitted plans, as provided in the DECISION and subject to the Findings of Fact and Conditions therein.

#### FINDINGS OF FACT

1. The Applicant is a duly organized and existing corporation and FCC Licensee having a business address of 5701 South Santa Fe Drive, Littleton, CO 80120 c/o Network Building & Consulting, LLC, 300 Unicorn Park, Suite 501, Woburn, MA 01801.
2. The Applicant is a lessee of a portion of the property located at 157 Union Street, Marlborough, MA (Assessor's Map 43, Parcel 56), Marlborough, Massachusetts (the "Site").
3. On May 21, 2024, the Applicant filed with the City Clerk of the City of Marlborough an application (hereinafter referred to as the "Application") for a Special Permit under Chapter 650 (Zoning) of the Code of the City of Marlborough (hereinafter referred to as the "Zoning Ordinance"), Section 650-25 entitled Wireless Communications Facilities.
4. In accordance with Article V, Section 650-18(A)(20) and Section 650-25 of the Zoning Ordinance, the Applicant proposes the co-location of a new Wireless Communications Facility (3 antennas and associated equipment) (the "Use") at the Site, as shown in the plans submitted with the Application and referenced in paragraph 5 below.
5. In connection with the Application, the Applicant submitted a certified list of abutters, filing fees, and plans by NB&C Engineering Services, LLC, with the last revision date of December 12, 2023, (collectively the "Plans"), attached hereto as "**Attachment A.**"
6. Pursuant to the Application, the Applicant is licensed by the FCC to provide personal wireless services in the City of Marlborough and surrounding areas and currently has a problem with significant gaps in coverage and capacity issues with coverage that could be alleviated by installing the Use on the subject location as shown on the Plans.



# IN CITY COUNCIL

Marlborough, Mass., SEPTEMBER 9, 2024

PAGE 2

## ORDERED:

7. The Site is located in the Residence A-3 (A-3) Zoning District which allows a Special Permit to be issued for a Wireless Communication Facility (“WCF”).
8. Pursuant to the Rules and Regulations of the City Council of the City of Marlborough and applicable statutes of the Commonwealth of Massachusetts, the City Council established a date for a public hearing on the Application, and the City Clerk for the City of Marlborough caused notice of the same to be advertised and determined that notice of the same was provided to abutters and the planning boards of all surrounding towns entitled thereto in accordance with applicable regulations and law.
9. The Marlborough City Council, pursuant to Massachusetts General Laws Chapter 40A, opened a public hearing on the Application on July 22, 2024. The public hearing was held in the City Council Chamber, at the Marlborough City Hall, 140 Main Street. The public hearing was closed on July 22, 2024.
10. The Applicant presented oral testimony and demonstrative evidence at the public hearing, demonstrating that the Use meets all the applicable Special Permit criteria of Article VI, Section 650-25 and Article VIII, Section 650-59.
11. At the Public Hearing, there were no members of the public speaking in opposition to the Use.
12. The Council, in reviewing the Application, considered the Review Standard and Development Requirements, as enumerated in Article VI, Section 650-25 and Article VII, Section 650-59 of the City of Marlborough Zoning Ordinance, applicable to the Use.

### **BASED ON THE ABOVE, THE CITY COUNCIL MAKES THE FOLLOWING FINDINGS AND TAKES THE FOLLOWING ACTIONS:**

- A. The Applicant has complied with the Rules and Regulations promulgated by the Marlborough City Council as they pertain to special permit applications.
- B. The City Council finds the proposed Use of the Site is in harmony with the intent and general purpose of the Zoning Ordinance of the City of Marlborough when subject to appropriate terms and conditions as provided in this Decision. The City Council makes these findings subject to the completion and adherence by the Applicant, its successors and/or assigns to the conditions more fully set forth herein.
- C. The City Council finds that the proposed Use is consistent with the purposes of Section 650-25 governing WCFs in the City.
- D. The proposed WCF and location are consistent with both the applicable review standards in Section 650-25(D) and the development requirements in Section 650-25(E).



# IN CITY COUNCIL

Marlborough, Mass., SEPTEMBER 9, 2024

PAGE 3

## ORDERED:

- E. The City Council recognizes the Applicant is a federal licensee afforded certain protection under federal telecommunications law, to the extent provided by law.
- F. The City Council confirms the Applicant has demonstrated the need to construct the proposed facility to solve certain wireless coverage and capacity issues that currently exist in its network in the vicinity.
- G. The City Council finds that the proposed Use, which will enhance wireless telecommunications, is good for business and good for the public safety and convenience where much of the population now owns and relies on wireless connectivity and a majority of 911 calls are now made on wireless telephones.
- H. The City Council finds that there are adequate, ample parking spaces on the host parcel.
- I. The City Council finds the proposed Use, which consists of an unmanned and unoccupied facility, will have no impact on traffic and pedestrian safety in the area.
- J. The City Council finds the proposed Use will not be contrary to the public health, safety, convenience and welfare and will not be offensive or detrimental.
- K. The City Council, pursuant to its authority under MGL Chapter 40A and the City of Marlborough Zoning Ordinance **GRANTS** to the Applicant a Special Permit for construction of the Use, a wireless communications facility on the existing rooftop **SUBJECT TO THE FOLLOWING CONDITIONS**, which conditions shall be binding on the Applicant, its successors and/or assigns:
  8. Construction in Accordance with Applicable Laws. Construction of all structures on the Site is to be in accordance with all applicable Building Codes and Zoning Regulations in effect in the City of Marlborough and the Commonwealth of Massachusetts and shall be built according to the Plans as may be amended during Site Plan Review.
  9. Site Plan Review. The issuance of the Special Permit is further subject to detailed Site Plan Review by the Site Plan Review Committee, in accordance with the City of Marlborough Site Plan Review Ordinance prior to the issuance of the building permit. Any additional changes, alterations, modifications, or amendments, as required during the process of Site Plan Review, shall be further conditions attached to the building permit. Subsequent Site Plan Review shall be consistent with the conditions of this Special Permit and the Plans submitted, reviewed, and approved by the City Council as the Special Permit Granting Authority.



# IN CITY COUNCIL

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PAGE 4

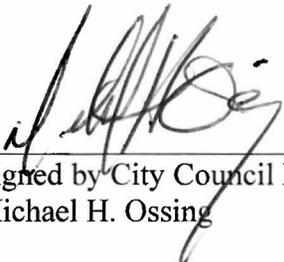
## ORDERED:

10. Incorporation of Submissions. All plans, photo renderings, site evaluations, briefs and other documentation provided by the Applicant as part of the Application, and as amended or revised during the application/hearing process before the City Council and/or the City Council's Public Services Committee, are herein incorporated into and become a part of this Special Permit and become conditions and requirements of the same, unless otherwise altered by the City Council.
11. Compliance with Applicable Laws. The Applicant, its successors and/or assigns agrees to comply with all municipal, state, and federal rules, regulations, and ordinances as they may apply to the construction, maintenance, and operation of the Use.
12. All work performed on the Site shall comply with this Decision. No other building or construction or activity (including but not limited to any other communications device, WCF, tower, etc.) shall occur without further modification of this Special Permit. This condition shall be interpreted consistent with federal law governing WCF's.
13. The Applicant shall comply with all applicable conditions for WCFs on private property as set forth in Section 650-25(F), each of which shall constitute conditions of this special permit.
14. In accordance with the provisions of Massachusetts General Laws Chapter 40A, Section 11, the Applicant, its successors and/or assigns, at its expense shall record this Special Permit in the Middlesex South Registry of Deeds after the City Clerk has certified that the twenty-day period for appealing this Special Permit has elapsed with no appeal having been filed, and before the Applicant has applied to the Building Commissioner for a building permit. Upon recording, the Applicant shall forthwith provide a copy of the recorded Special Permit to the City Council Office, the Building Department and the City Solicitor's Office.

**Yea: 10 – Nay: 0 – Abstain: 1**

**Yea: Vital, Doucette, Preciado, Brown, Irish, Fuccillo, Landers, Navin, Oram & Ossing.**

**Abstain: Robey.**

  
\_\_\_\_\_  
Signed by City Council President  
Michael H. Ossing

ADOPTED  
In City Council  
24-1009195B

# ATTACHMENT

# A



DISH Wireless L.L.C. SITE ID:  
**BOBOS01101B**

DISH Wireless L.L.C. SITE ADDRESS:  
**157 UNION STREET  
MARLBOROUGH, MA 01752**

**MASSACHUSETTS 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:

CODE TYPE	CODE
BUILDING	MA STATE BUILDING CODE, 9TH EDITION (780 CMR)/2015 IBC W/ AMENDMENTS
MECHANICAL	MECHANICAL CODE 2015 OF MASSACHUSETTS/2015 IMC W/ AMENDMENTS
ELECTRICAL	MA ELECTRICAL CODE/2023 NEC W/ AMENDMENTS

**SHEET INDEX**

SHEET NO.	SHEET TITLE
T-1	TITLE SHEET
A-1	BUILDING PLAN
A-2	ANTENNA PLAN, ELEVATION AND SCHEDULE
A-3	BUILDING ELEVATION
A-4	EQUIPMENT PLATFORM AND H-FRAME DETAILS
A-5	EQUIPMENT DETAILS
A-6	EQUIPMENT DETAILS
E-1	ELECTRICAL/FIBER ROUTE PLAN AND NOTES
E-2	ELECTRICAL DETAILS
E-3	ELECTRICAL ONE-LINE & PANEL SCHEDULE
C-1	GROUNDING PLANS AND NOTES
C-2	GROUNDING DETAILS
C-3	GROUNDING DETAILS
RF-1	RF CABLE COLOR CODE
GN-1	LEGEND AND ABBREVIATIONS
GN-2	RF SIGNAGE
GN-3	GENERAL NOTES
GN-4	GENERAL NOTES
GN-5	GENERAL NOTES

**SCOPE OF WORK**

THIS IS NOT AN ALL INCLUSIVE LIST. CONTRACTOR SHALL UTILIZE SPECIFIED EQUIPMENT PART OR ENGINEER APPROVED EQUIVALENT. CONTRACTOR SHALL VERIFY ALL NEEDED EQUIPMENT TO PROVIDE A FUNCTIONAL SITE. THE PROJECT GENERALLY CONSISTS OF THE FOLLOWING:

- SECTOR SCOPE OF WORK:**
- INSTALL (3) PROPOSED PANEL ANTENNAS (1 PER SECTOR)
  - INSTALL (2) PROPOSED ANTENNA MOUNTS
  - UTILIZE (1) EXISTING ABANDONED ANTENNA MOUNT
  - INSTALL PROPOSED JUMPERS
  - INSTALL (6) PROPOSED RRU's (2 PER SECTOR)
  - INSTALL (3) PROPOSED OVER VOLTAGE PROTECTION DEVICE (OVP) (1 PER SECTOR)
  - INSTALL (3) PROPOSED DC POWER CABLES (1 PER SECTOR)
  - INSTALL (3) PROPOSED FIBER TRUNKS (1 PER SECTOR)
  - INSTALL PROPOSED CABLE TRAY
- ROOFTOP SCOPE OF WORK:**
- INSTALL (1) PROPOSED H-FRAME
  - INSTALL PROPOSED CABLE TRAY
  - INSTALL (1) PROPOSED BRU IN CABINET
  - INSTALL (1) PROPOSED EQUIPMENT CABINET
  - INSTALL (1) PROPOSED POWER PROTECTION CABINET (PPC)
  - INSTALL (1) PROPOSED NEMA 3 TELCO-FIBER BOX
  - INSTALL (1) PROPOSED ZAVD SURT, IF REQUIRED
  - INSTALL (1) PROPOSED GPS UNIT
  - INSTALL (1) PROPOSED DISCONNECT

**SITE PHOTO**



UNDERGROUND SERVICE ALERT - 811 DIG SAFE  
UTILITY NOTIFICATION CENTER OF MASSACHUSETTS  
(888) 344-7233  
WWW.DIGSAFE.COM



CALL 811 WORKING DAYS UTILITY NOTIFICATION PRIOR TO CONSTRUCTION

**GENERAL NOTES**

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE, NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

11"x17" PLOT WILL BE HALF SCALE UNLESS OTHERWISE NOTED

CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON THE JOB SITE, AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK.

**SITE INFORMATION**

PROPERTY OWNER: MARLBOROUGH HOSPITAL  
ADDRESS: 157 UNION STREET  
MARLBOROUGH, MA 01752

TOWER TYPE: ROOFTOP

TOWER CO SITE ID: N/A

TOWER APP NUMBER: N/A

COUNTY: MIDDLESEX

LATITUDE (NAD 83): 42° 21' 18.804" N  
42.355168 N

LONGITUDE (NAD 83): 71° 33' 17.225" W  
-71.554785 W

ZONING JURISDICTION: MARLBOROUGH

ZONING DISTRICT: RESIDENTIAL A-3

PARCEL NUMBER: 43-56

OCCUPANCY GROUP: U

CONSTRUCTION TYPE: I-B

POWER COMPANY: NATIONAL GRID

TELEPHONE COMPANY: COMCAST

**PROJECT DIRECTORY**

APPLICANT: DISH Wireless L.L.C.  
5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120

STRUCTURE MANAGER: MARLBOROUGH HOSPITAL  
157 UNION STREET  
MARLBOROUGH, MA 01752

SITE DESIGNER: NB+C ENGINEERING SERVICES, LLC  
100 APOLLO DRIVE, SUITE 303  
CHELMSFORD, MA 01824  
(978) 856-8308

SITE ACQUISITION: KRISTEN LEDUC  
KLEDUC@NB+C.COM

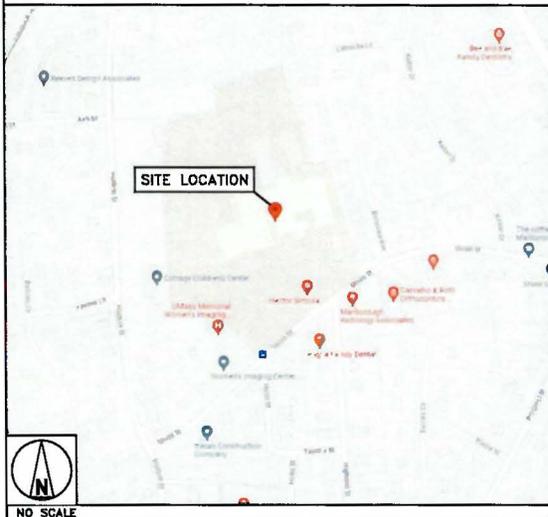
CONSTRUCTION MANAGER: CHAD WILCOX  
CHAD.WILCOX@DISH.COM

RF ENGINEER: IRMA SEBASTIAN  
IRMA.SEBASTIAN@DISH.COM

**DIRECTIONS**

DIRECTIONS FROM BOSTON, LOGAN AIRPORT:  
HEAD SOUTHEAST ON AIRPORT RD. KEEP RIGHT TOWARD DEPARTURES/ECONOMY PARKING/CELL PHONE LOT/GEN. AVIATION. KEEP LEFT TOWARD TERMINAL E C B/TERMINAL B PARKING. KEEP LEFT TOWARD TERMINALS A/B/D/CENTRAL PARKING/AIRPORT EXIT/CELL PHONE LOT/GEN. AVIATION/ECONOMY LOT/VEH. FOOD/HOTELS/RENTAL CARS. KEEP LEFT TOWARD TERMINALS A/B/C/E/CENTRAL PARKING/BOSTON/90 W/1-93 S/WILLIAMS TUNNEL/MASS PIKE. TAKE RAMP ONTO I-90 W TOWARD BOSTON/1-93 S/WILLIAMS TUNNEL/MASS PIKE. TAKE EXIT 111 TOWARD SOUTHBORO ON RT-9 W. KEEP LEFT ONTO PLEASANT ST. CONTINUE TOWARD WATER/RT-9 E/RT-30/SOUTHBORO. CONTINUE ON FRANK AVE. CONTINUE ON BOSTON RD. CONTINUE ON FRAMMINGHAM RD. CONTINUE ON MARLBORO RD. CONTINUE ON MAPLE ST. CONTINUE ON S BOLTON ST. CONTINUE ON S BOLTON ST. TURN LEFT ONTO UNION ST. TURN RIGHT. 157 UNION ST. MARLBOROUGH, MA 01752.

**VICINITY MAP**



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



NB+C ENGINEERING SERVICES, LLC.

100 APOLLO DRIVE  
SUITE 303  
CHELMSFORD, MA 01824  
(978) 856-8308



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

DRAWN BY:	CHECKED BY:	APPROVED BY:
CCM	NSB	DRG
RFDS REV #:		0

**CONSTRUCTION DOCUMENTS**

SUBMITTALS		
REV	DATE	DESCRIPTION
0	12/12/2023	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER  
**100753**

DISH Wireless L.L.C.  
PROJECT INFORMATION  
**BOBOS01101B**

157 UNION STREET  
MARLBOROUGH, MA 01752

SHEET TITLE  
**TITLE SHEET**

SHEET NUMBER  
**T-1**



**NOTES**

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. CONTRACTOR SHALL MAINTAIN A 10'-0" MINIMUM SEPARATION BETWEEN THE PROPOSED GPS UNITS, TRANSMITTING ANTENNAS AND EXISTING GPS UNITS.
3. UTILITY RUBBER MAT TO BE INSTALLED UNDER ALL DISH Wireless L.L.C. EQUIPMENT THAT IS RESTING ON OR ADJACENT TO ROOF MEMBRANE.
4. CONTRACTOR SHALL PAINT ALL DISH Wireless L.L.C. ANTENNAS AND RELATED APPURTENANCES TO MATCH EXISTING SURROUNDINGS.



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



NB+C ENGINEERING SERVICES, LLC.  
100 APOLLO DRIVE  
SUITE 303  
CHELMSFORD, MA 01824  
(978) 856-8308



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DRAWN BY: CHECKED BY: APPROVED BY:  
CCM NSB DRG  
RFDS REV #:

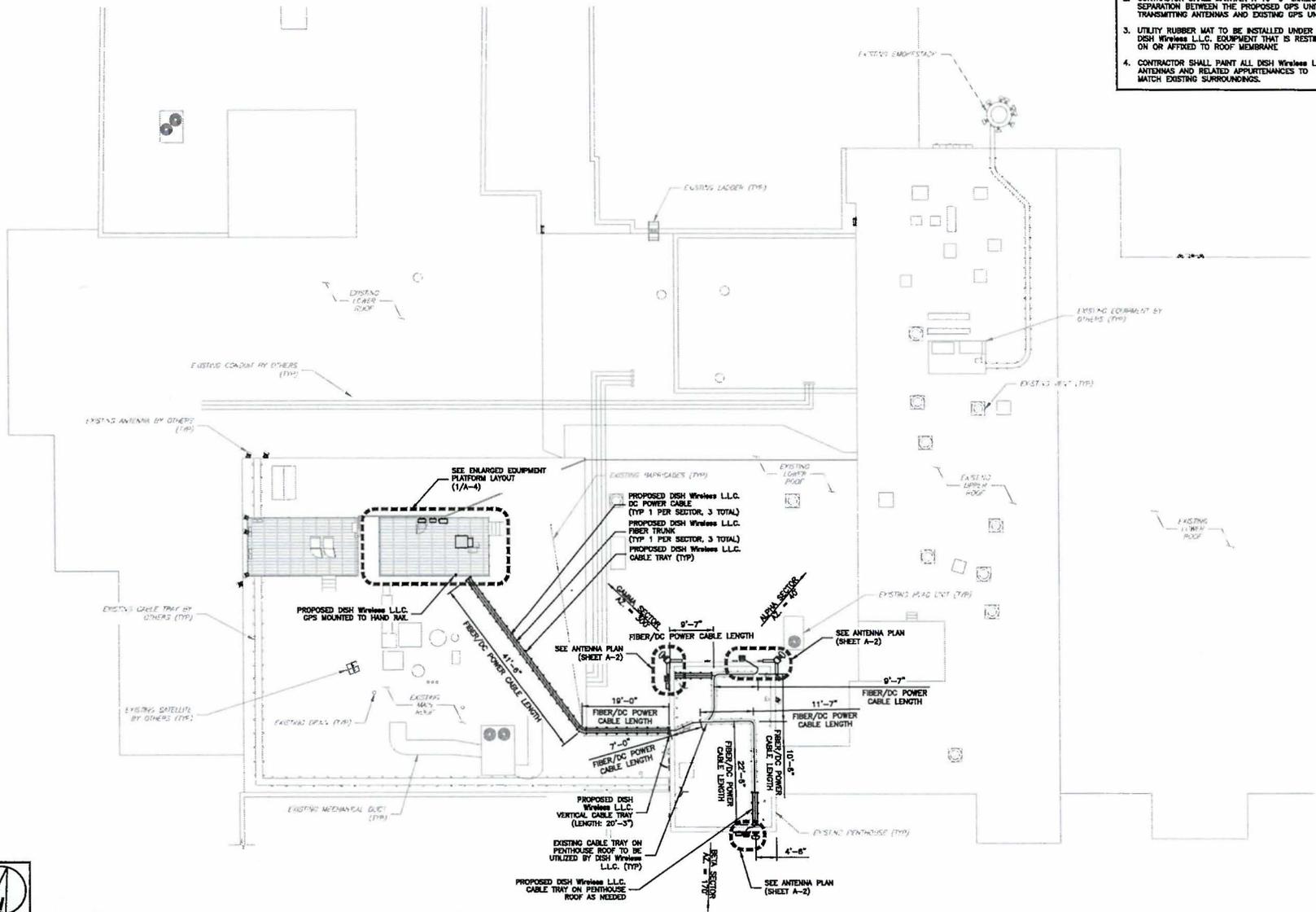
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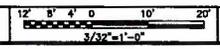
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MARLBOROUGH, MA 01752

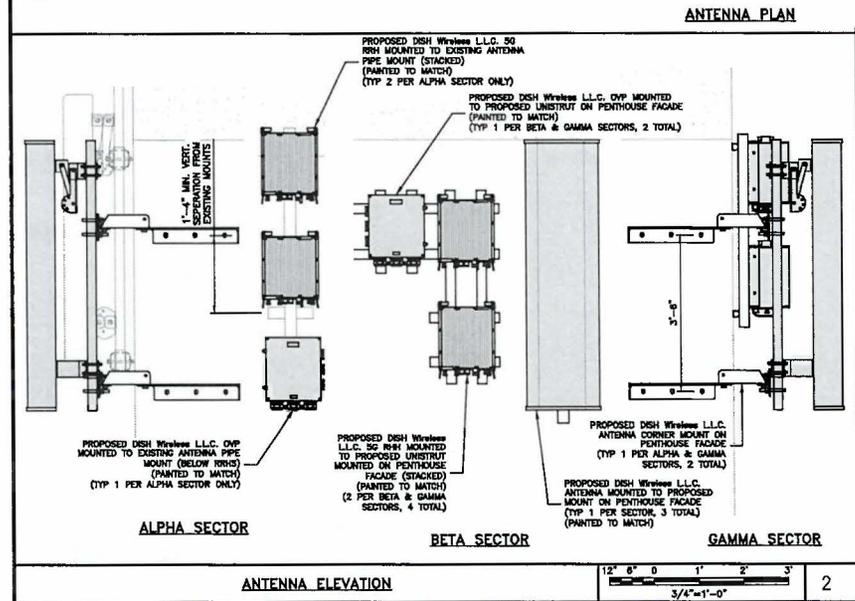
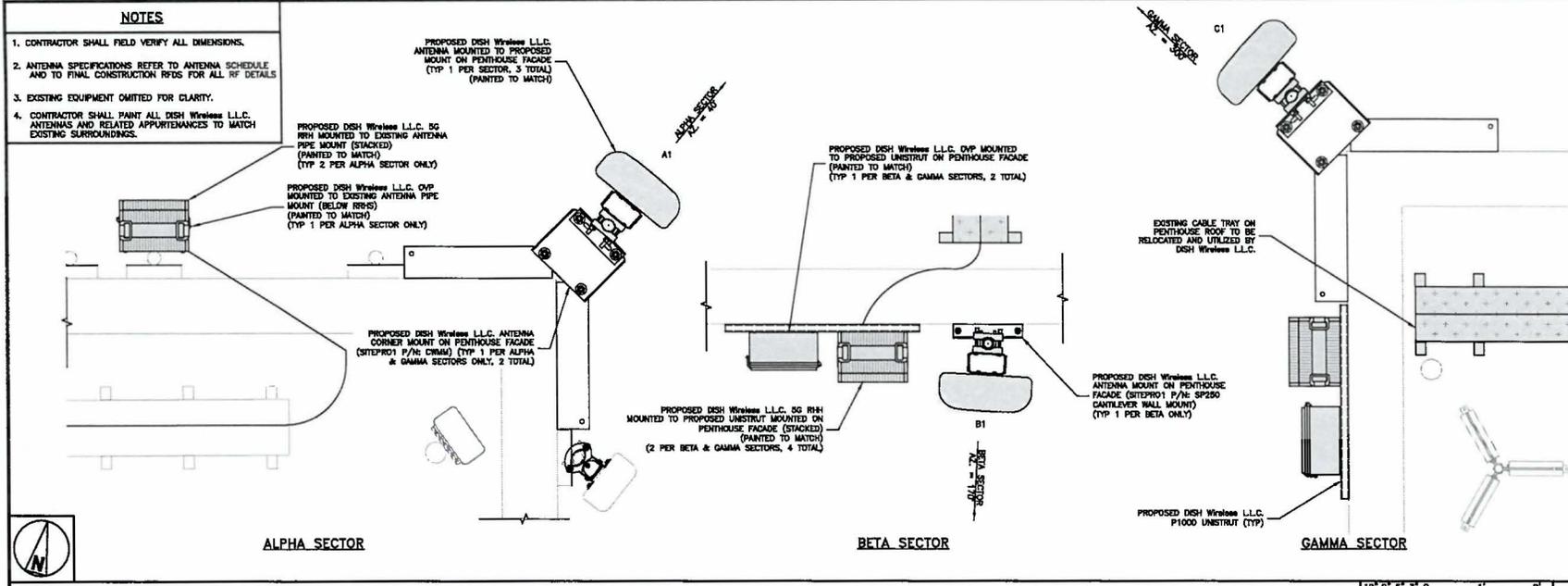
SHEET TITLE  
**BUILDING PLAN**

SHEET NUMBER  
**A-1**



**BUILDING PLAN**





**ANTENNA SCHEDULE**

SECTOR POS.	ANTENNA					TRANSMISSION CABLE	RRH			OVP
	EXISTING OR PROPOSED	MANUFACTURER - MODEL NUMBER	TECH	AZMUTH	RAD CENTER		MANUFACTURER - MODEL NUMBER	TECH	POS.	
A1	PROPOSED	JMA - MX08FR0685-21	5G	40°	89°-9°	(1) 5AWG DC POWER CABLE (121'± LONG)	SAMSUNG - MID BAND SFG-ARR3K01D/RP4450T-70A	5G	A1	RAYCAP
A2	---	---	---	---	---	(1) FIBER TRUNK (137'± LONG)	SAMSUNG - LOW BAND SFG-ARR3J01D/RP4450T-71A	5G	A1	RDIC-3045-PF-48
A3	---	---	---	---	---	---	---	---	---	---
B1	PROPOSED	JMA - MX08FR0685-21	5G	170°	89°-9°	(1) 5AWG DC POWER CABLE (130'± LONG)	SAMSUNG - MID BAND SFG-ARR3K01D/RP4450T-70A	5G	B1	RAYCAP
B2	---	---	---	---	---	(1) FIBER TRUNK (130'± LONG)	SAMSUNG - LOW BAND SFG-ARR3J01D/RP4450T-71A	5G	B1	RDIC-3045-PF-48
B3	---	---	---	---	---	---	---	---	---	---
C1	PROPOSED	JMA - MX08FR0685-21	5G	300°	89°-9°	(1) 5AWG DC POWER CABLE (135'± LONG)	SAMSUNG - MID BAND SFG-ARR3K01D/RP4450T-70A	5G	C1	RAYCAP
C2	---	---	---	---	---	(1) FIBER TRUNK (135'± LONG)	SAMSUNG - LOW BAND SFG-ARR3J01D/RP4450T-71A	5G	C1	RDIC-3045-PF-48
C3	---	---	---	---	---	---	---	---	---	---

**NOTES**

- CONTRACTOR TO REFER TO FINAL CONSTRUCTION RFDs FOR ALL RF DETAILS.
- ANTENNA AND RRH MODELS MAY CHANGE DUE TO EQUIPMENT AVAILABILITY. ALL EQUIPMENT CHANGES MUST BE APPROVED AND REMAIN IN COMPLIANCE WITH THE PROPOSED DESIGN AND STRUCTURAL ANALYSES.
- RAYCAP POWERPLUS POWER BOOSTER TO BE INSTALLED WITHIN PROPOSED EQUIPMENT CABINET.

**dish wireless.**

5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120

**NB+C**  
TOTALLY COMMITTED.

NB+C ENGINEERING SERVICES, LLC.  
100 APOLLO DRIVE SUITE 303  
CHELMSFORD, MA 01824  
(978) 856-8308

REGISTERED PROFESSIONAL ENGINEER

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DRAWN BY: CHECKED BY: APPROVED BY:

CCM    NSB    DRG

RFDs REV #:

**CONSTRUCTION DOCUMENTS**

SUBMITTALS

REV	DATE	DESCRIPTION
0	12/12/2023	BUILD FOR CONSTRUCTION

A&E PROJECT NUMBER  
100753

DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBOS01101B

157 UNION STREET  
MARLBOROUGH, MA 01752

SHEET TITLE  
ANTENNA PLAN,  
ELEVATION AND SCHEDULE

SHEET NUMBER  
A-2

**NOTES**

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3. CONTRACTOR SHALL MAINTAIN A 10'-0" MINIMUM SEPARATION BETWEEN THE PROPOSED GPS UNIT, TRANSMITTING ANTENNAS AND EXISTING GPS UNITS.
4. CONTRACTOR SHALL PAINT ALL DISH Wireless L.L.C. ANTENNAS AND RELATED APPLURANCES TO MATCH EXISTING SURROUNDINGS.



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



NB+C ENGINEERING SERVICES, LLC.

100 APOLLO DRIVE  
SUITE 303  
CHELMSFORD, MA 01824  
(978) 856-8306



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DRAWN BY: CHECKED BY: APPROVED BY:

CCM NSB DRG

RFDS REV #: 0

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REV	DATE	DESCRIPTION
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A&E PROJECT NUMBER  
100753

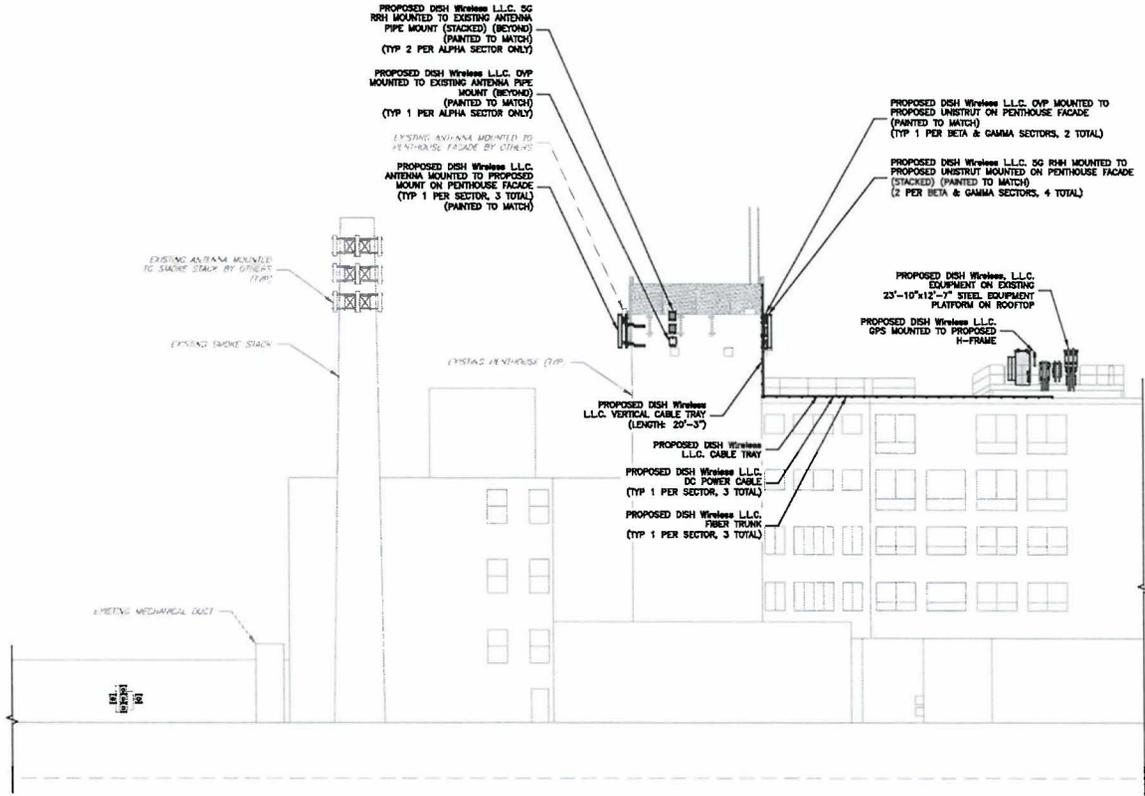
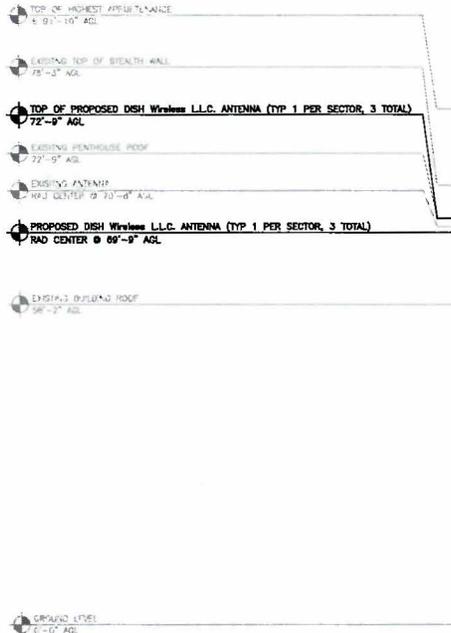
DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBOS01101B

157 UNION STREET  
MARLBOROUGH, MA 01752

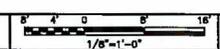
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BUILDING  
ELEVATION

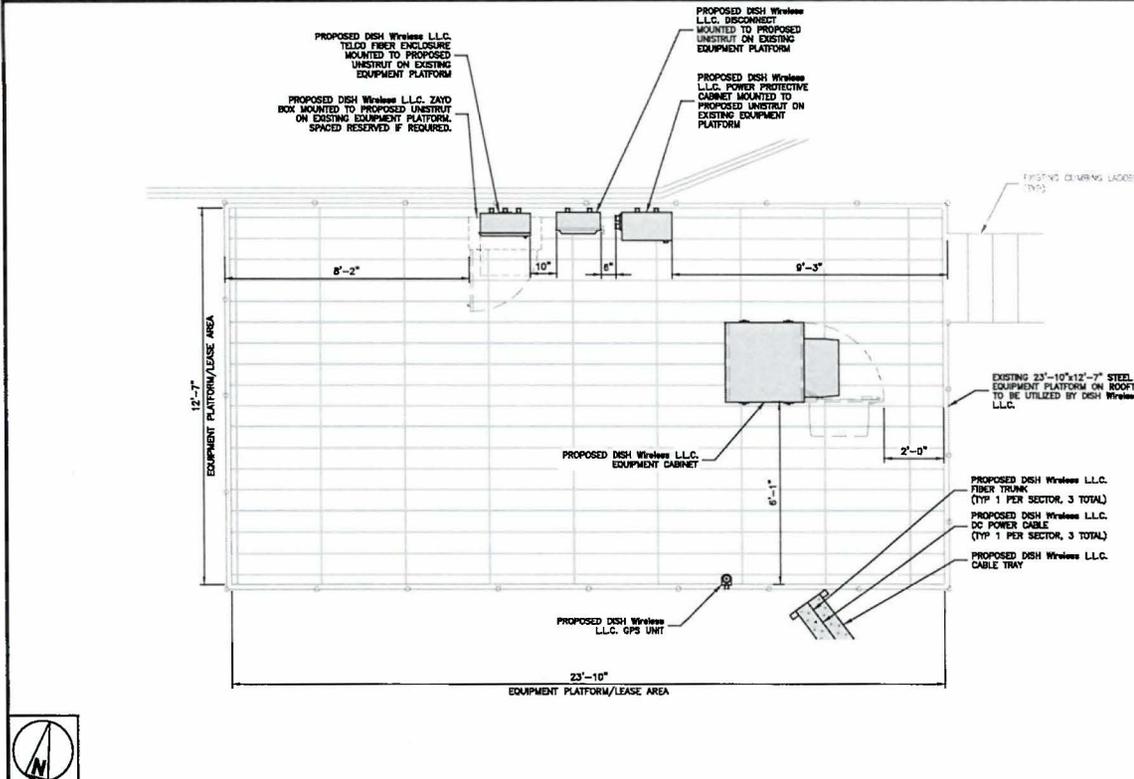
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**A-3**

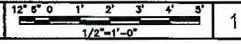


**BUILDING ELEVATION**





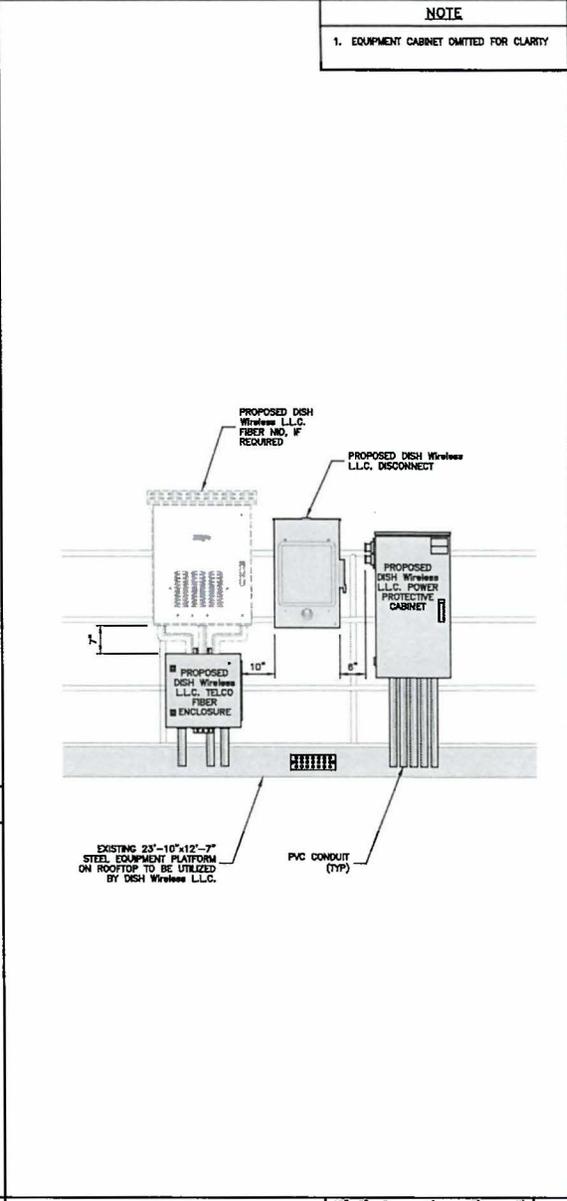
PLATFORM EQUIPMENT PLAN



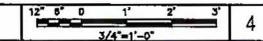
NOT USED	NO SCALE	2
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NOT USED	NO SCALE	3
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**NOTE**  
1. EQUIPMENT CABINET OMITTED FOR CLARITY



H-FRAME EQUIPMENT ELEVATION



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120

**TOTALLY COMMITTED.**

NB+C ENGINEERING SERVICES, L.L.C.

100 APOLLO DRIVE  
SUITE 303  
CHELMSFORD, MA 01824  
(978) 856-8308

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CCM	NSB	DRG			
RFDS REV #:				0	

**CONSTRUCTION DOCUMENTS**

SUBMITTALS		
REV	DATE	DESCRIPTION
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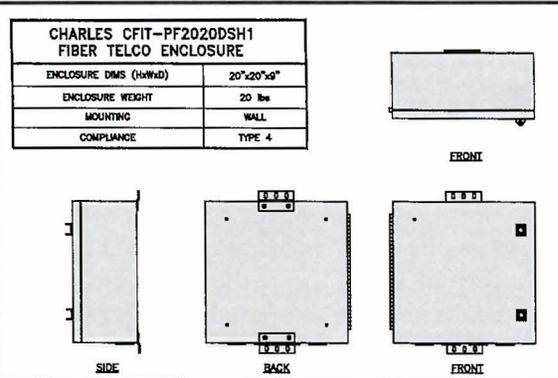
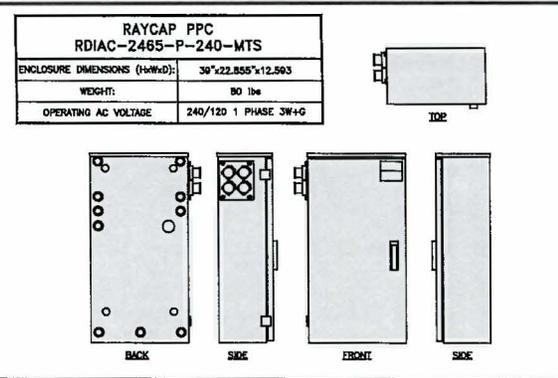
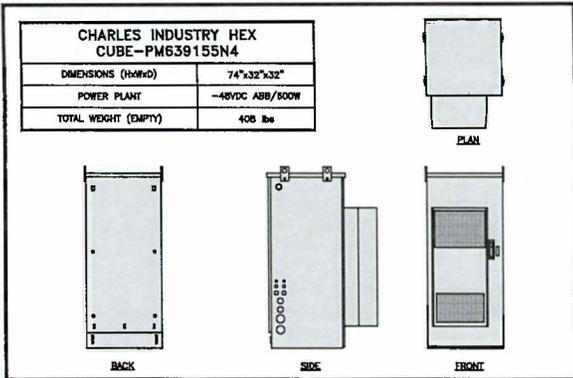
ARE PROJECT NUMBER  
**100753**

DISH Wireless L.L.C.  
PROJECT INFORMATION  
**BOBOS01101B**

157 UNION STREET  
MARLBOROUGH, MA 01752

SHEET TITLE  
**EQUIPMENT PLATFORM AND H-FRAME DETAILS**

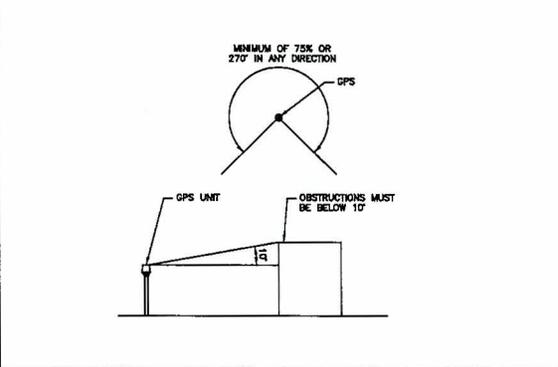
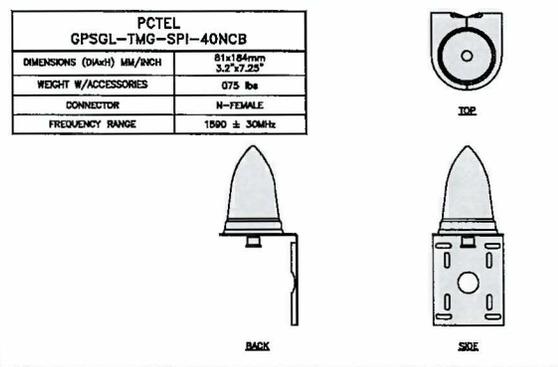
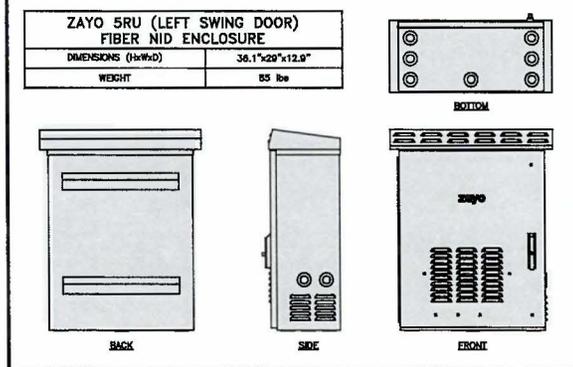
SHEET NUMBER  
**A-4**



CABINET DETAIL NO SCALE 1

POWER PROTECTION CABINET (PPC) DETAIL NO SCALE 2

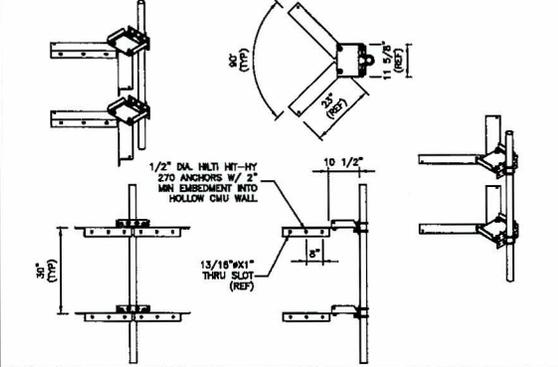
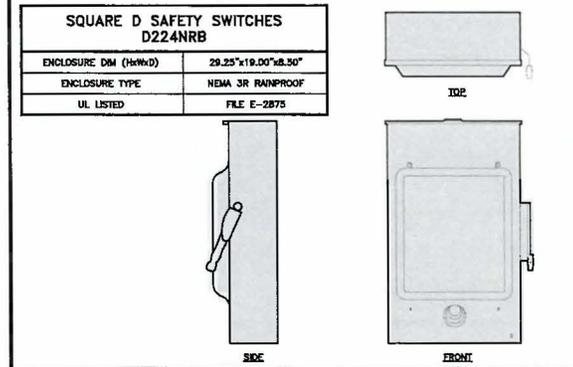
FIBER TELCO ENCLOSURE DETAIL NO SCALE 3



FIBER NID ENCLOSURE DETAIL NO SCALE 4

GPS DETAIL NO SCALE 5

GPS MINIMUM SKY VIEW REQUIREMENTS NO SCALE 6



SAFETY SWITCH DETAIL NO SCALE 7

SITEPRO1 (CWMM) SLIDER BRACKET CORNER MOUNT NO SCALE 8

NOT USED NO SCALE 9



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



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100 APOLLO DRIVE  
SUITE 303  
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RFD5 REV #: 0

CONSTRUCTION DOCUMENTS

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100753

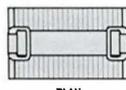
DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBOS01101B

157 UNION STREET  
MARLBOROUGH, MA 01752

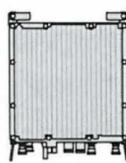
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EQUIPMENT DETAILS

SHEET NUMBER  
A-5

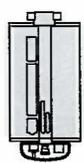
<b>SAMSUNG - MID BAND</b> SFG-ARR3KMO1DI/RF4451D-70A	
DIMENSIONS (HxWxD)	15"x15"x8.9"
WEIGHT	61.3 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR -48VDC
INPUT VOLTAGE	(-36 to 58 VDC)



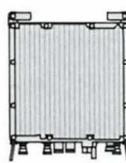
PLAN



BACK



SIDE

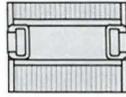


FRONT

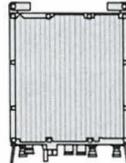
RRH DETAIL

NO SCALE 1

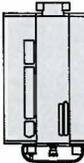
<b>SAMSUNG - LOW BAND</b> SFG-ARR3J601DI/RF4450T-71A	
DIMENSIONS (HxWxD)	15"x16.5"x11"
WEIGHT	94.8 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR -48VDC
INPUT VOLTAGE	(-36 to 58 VDC)



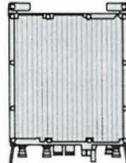
PLAN



BACK



SIDE

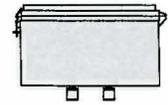


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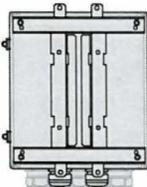
RRH DETAIL

NO SCALE 2

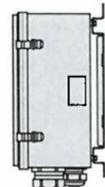
<b>RAYCAP RDIDC-3045-PF-48</b> SURGE PROTECTION DEVICE (OVP)	
DIMENSIONS (HxWxD)	19.00"x18.21"x9.84"
WEIGHT	21 lbs



PLAN



BACK



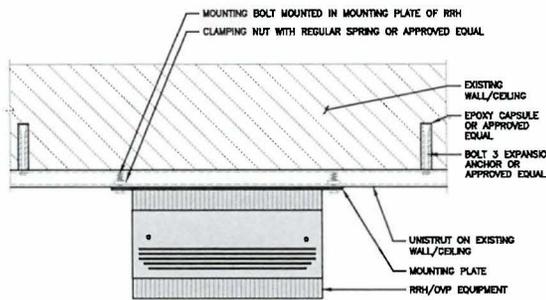
SIDE



FRONT

SURGE PROTECTION DEVICE DETAIL (OVP)

NO SCALE 3



NOTE:  
OR DISH Wireless L.L.C.  
APPROVED EQUIVALENT

RRH UNISTRUT WALL/CEILING MOUNT DETAIL

NO SCALE 4

<b>JMA</b> MX08FRO665-21	
DIMENSIONS (HxWxD)	72.8"x20.0"x8.0"
RF PORTS, CONNECTOR TYPE	8 x 4.3-10 FEMALE
WEIGHT	64.5 lbs
WEIGHT WITH BRACKETS	82.5 lbs



PLAN



SIDE



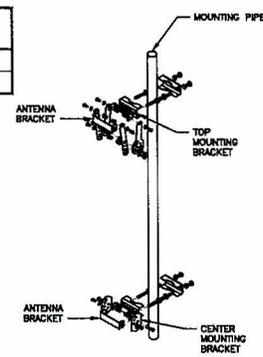
FRONT

ANTENNA DETAIL

NO SCALE 5

<b>JMA ANTENNA MOUNT BRACKET</b> #9190031B	
TOTAL WEIGHT (WITH BRACKETS)	18 lbs (8.18 Kg)
POLE DIAMETER RANGE	2.5" to 4.5"

NOTE:  
KIT #9190031B: TOP AND BOTTOM BRACKETS  
FOR 4-, 5-, AND 8-FOOT ANTENNAS  
ANTENNA BRACKET NOT PART OF KIT



NOTE:  
OR DISH Wireless L.L.C.  
APPROVED EQUIVALENT

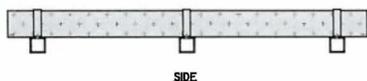
ANTENNA BRACKET DETAIL

NO SCALE 6

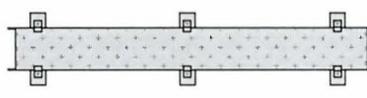
<b>COMMSCOPE RT-CB4D</b> ROOFTOP COVER KIT		<b>MOUNTING</b>	NON-PENETRATING
		<b>INCLUDED PRODUCTS:</b>	RTCB4D.01 CHANNEL (1) MT-F1996 SLEEPERS (3) RTCUH HARDWARE RTHC.D1 HOLD-DOWN CLAMPS (6)
DIMENSIONS (HxWxL)	7"x 11.25" x 96"		
WEIGHT/ VOLUME	85.98 LBS		
CABLE RUN (QTY)	4		



END



SIDE

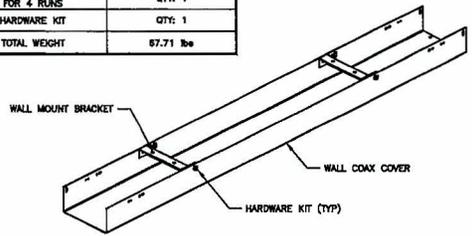


PLAN

ROOFTOP CABLE TRAY DETAIL

NO SCALE 7

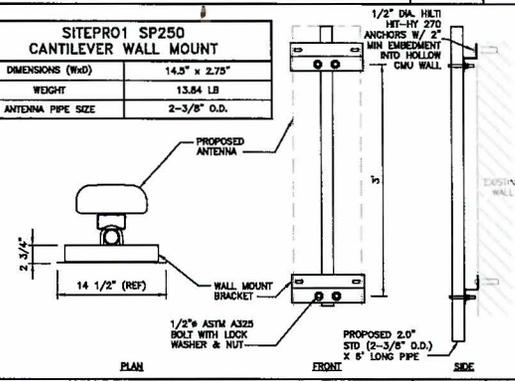
<b>COMMSCOPE COAX WALL</b> SUPPORT MT-F1589	
WALL MOUNT BRACKET (4 RUNS OF COAX)	QTY: 2
WALL COAX COVER FOR 4 RUNS	QTY: 1
HARDWARE KIT	QTY: 1
TOTAL WEIGHT	67.71 lbs



WALL MOUNTED CABLE TRAY DETAIL

NO SCALE 8

<b>SITEPRO1 SP250</b> CANTILEVER WALL MOUNT	
DIMENSIONS (WxD)	14.5" x 2.75"
WEIGHT	13.84 LB
ANTENNA PIPE SIZE	2-3/8" O.D.



ANTENNA WALL MOUNT DETAIL

NO SCALE 9



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



NB+C ENGINEERING SERVICES, L.L.C.  
100 APOLLO DRIVE SUITE 300  
CHELMSFORD, MA 01924  
(878) 558-8306



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RFDS REV #: 0

**CONSTRUCTION DOCUMENTS**

**SUBMITTALS**

REV	DATE	DESCRIPTION
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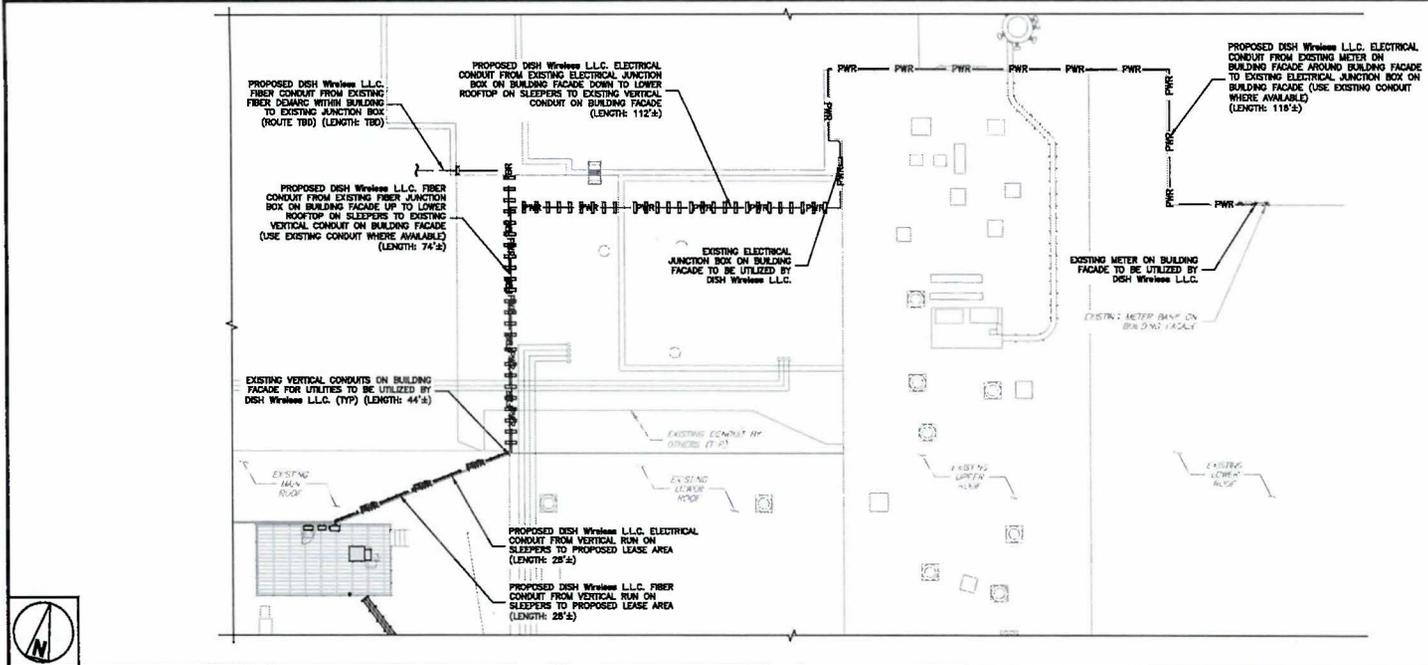
A&E PROJECT NUMBER  
100753

DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBOS01101B

157 UNION STREET  
MARLBOROUGH, MA 01752

SHEET TITLE  
EQUIPMENT DETAILS

SHEET NUMBER  
A-6



- NOTES**
1. UTILIZE EXISTING ABANDONED SPRINT CONDUITS WHERE AVAILABLE. REPLACE/INSTALL NEW CONDUIT SECTIONS AS NEEDED.
  2. CONTRACTOR TO VERIFY WITH DISH Wireless L.L.C. C.M. THE LOCATION OF THE POWER AND FIBER SOURCE PRIOR TO CONSTRUCTION.
  3. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



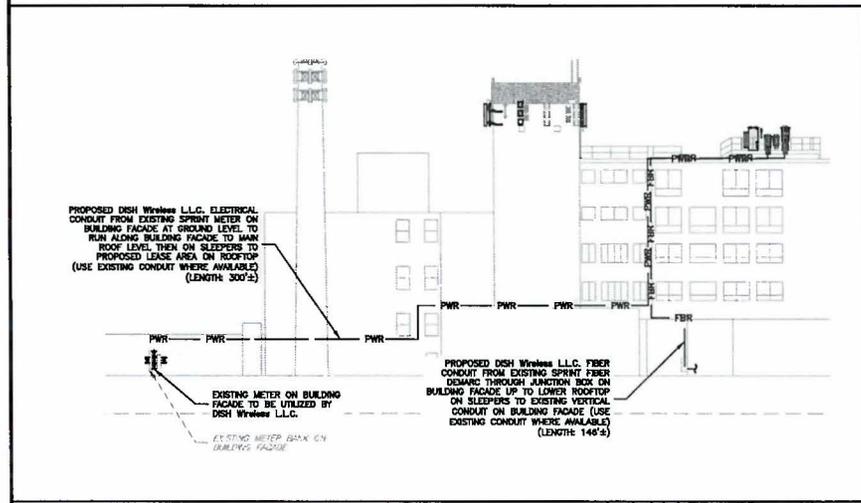
NB+C ENGINEERING SERVICES, LLC.  
100 APOLLO DRIVE  
SUITE 303  
CHELSEA, MA 01824  
(978) 858-8306



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UTILITY ROUTE PLAN

18' 12' 8' 4' 0" 18' 32'  
1/16"=1'-0" 1



UTILITY ROUTE ELEVATION

18' 12' 8' 4' 0" 18' 32'  
1/16"=1'-0" 2

NOT USED

NO SCALE 3

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**CONSTRUCTION DOCUMENTS**

SUBMITTALS		
REV	DATE	DESCRIPTION
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ARE PROJECT NUMBER  
100753

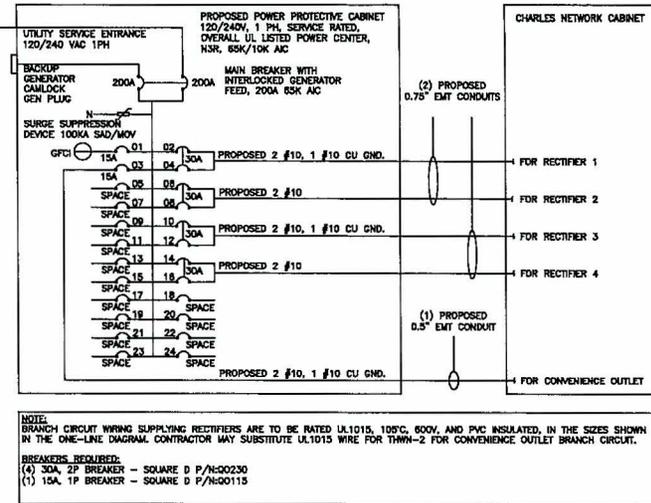
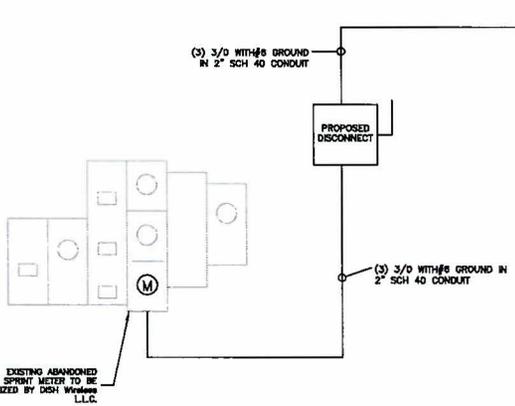
DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBOS01101B

157 UNION STREET  
MARLBOROUGH, MA 01752

SHEET TITLE  
ELECTRICAL/FIBER ROUTE  
PLAN AND NOTES

SHEET NUMBER  
E-1





**NOTE:**  
BRANCH CIRCUIT WIRING SUPPLYING RECTIFIERS ARE TO BE RATED UL1015, 105°C, 600V, AND PVC INSULATED, IN THE SIZES SHOWN IN THE ONE-LINE DIAGRAM. CONTRACTOR MAY SUBSTITUTE UL1015 WIRE FOR THWN-2 FOR CONVENIENCE OUTLET BRANCH CIRCUIT.

**BREAKERS REQUIRED:**  
(4) 30A, 2P BREAKER - SQUARE D P/N: Q0230  
(1) 15A, 1P BREAKER - SQUARE D P/N: G0115

**NOTES**

THE ENGINEER OF RECORD HAS PERFORMED ALL REQUIRED SHORT CIRCUIT CALCULATIONS AND THE AIC RATINGS FOR EACH DEVICE IS ADEQUATE TO PROTECT THE EQUIPMENT AND THE ELECTRICAL SYSTEM.

THE ENGINEER OF RECORD HAS PERFORMED ALL REQUIRED VOLTAGE DROP CALCULATIONS AND ALL BRANCH CIRCUIT AND FEEDERS COMPLY WITH THE NEC (LISTED ON T-1) ARTICLE 210.19(A)(1) FPN NO. 4.

THE (2) CONDUITS WITH (4) CURRENT CARRYING CONDUCTORS EACH, SHALL APPLY THE ADJUSTMENT FACTOR OF 80% PER 2014/17 NEC TABLE 310.15(B)(3)(a) OR 2020 NEC TABLE 310.15(C)(1) FOR UL1015 WIRE.

#12 FOR 15A-20A/1P BREAKER: 0.8 x 30A = 24.0A  
#10 FOR 25A-30A/2P BREAKER: 0.8 x 40A = 32.0A  
#8 FOR 35A-40A/2P BREAKER: 0.8 x 55A = 44.0A  
#6 FOR 45A-60A/2P BREAKER: 0.8 x 75A = 60.0A

**CONDUIT SIZING:** AT 40% FILL PER NEC CHAPTER 9, TABLE 4, ARTICLE 358.  
0.5" CONDUIT - 0.122 SQ. IN AREA  
0.75" CONDUIT - 0.213 SQ. IN AREA  
2.0" CONDUIT - 1.318 SQ. IN AREA  
3.0" CONDUIT - 2.907 SQ. IN AREA

**CABINET CONVENIENCE OUTLET CONDUCTORS (1 CONDUIT):** USING THWN-2, CU.  
#10 - 0.0211 SQ. IN X 2 = 0.0422 SQ. IN  
#10 - 0.0211 SQ. IN X 1 = 0.0211 SQ. IN <GROUND  
**TOTAL = 0.0633 SQ. IN**

0.5" EMT CONDUIT IS ADEQUATE TO HANDLE THE TOTAL OF (3) WIRES, INCLUDING GROUND WIRE, AS INDICATED ABOVE.

**RECTIFIER CONDUCTORS (2 CONDUITS):** USING UL1015, CU.  
#10 - 0.0288 SQ. IN X 4 = 0.1152 SQ. IN  
#10 - 0.0082 SQ. IN X 1 = 0.0082 SQ. IN <BARE GROUND  
**TOTAL = 0.1234 SQ. IN**

0.75" EMT CONDUIT IS ADEQUATE TO HANDLE THE TOTAL OF (5) WIRES, INCLUDING GROUND WIRE, AS INDICATED ABOVE.

**PPC FEED CONDUCTORS (1 CONDUIT):** USING THWN, CU.  
3/0 - 0.2679 SQ. IN X 3 = 0.8037 SQ. IN  
#6 - 0.0507 SQ. IN X 1 = 0.0507 SQ. IN <GROUND  
**TOTAL = 0.8544 SQ. IN**

3.0" SCH 40 PVC CONDUIT IS ADEQUATE TO HANDLE THE TOTAL OF (4) WIRES, INCLUDING GROUND WIRE, AS INDICATED ABOVE.



**PPC ONE-LINE DIAGRAM**

NO SCALE 1

PROPOSED CHARLES PANEL SCHEDULE											
LOAD SERVED	VOLT AMPS (WATTS)		TRIP #	Ckt #	PHASE	TRIP #	VOLT AMPS (WATTS)		LOAD SERVED	TRIP #	Ckt #
	L1	L2					L1	L2			
PPC GFCI OUTLET	180	180	15A	1	A	2	30A	2880	2880		
CHARLES GFCI OUTLET	180	180	15A	3	B	4	30A	2880	2880		
-SPACE-				5	A	6	30A	2880	2880		
-SPACE-				7	A	8	30A	2880	2880		
-SPACE-				9	A	10	30A	2880	2880		
-SPACE-				11	A	12	30A	2880	2880		
-SPACE-				13	A	14	30A	2880	2880		
-SPACE-				15	B	16					
-SPACE-				17	A	18					
-SPACE-				19	B	20					
-SPACE-				21	A	22					
-SPACE-				23	B	24					
VOLTAGE AMPS	180	180						11520	11520		
200A MCB, 1A, 24 SPACE, 120/240V				L1	L2			VOLTAGE AMPS			
MB RATING: 85,000 AIC				11700	11700			AMPS			
				58	58			MAX AMPS			
				95	95			MAX 125%			
				125	125						

**PANEL SCHEDULE**

NO SCALE 2

**NOT USED**

NO SCALE 3

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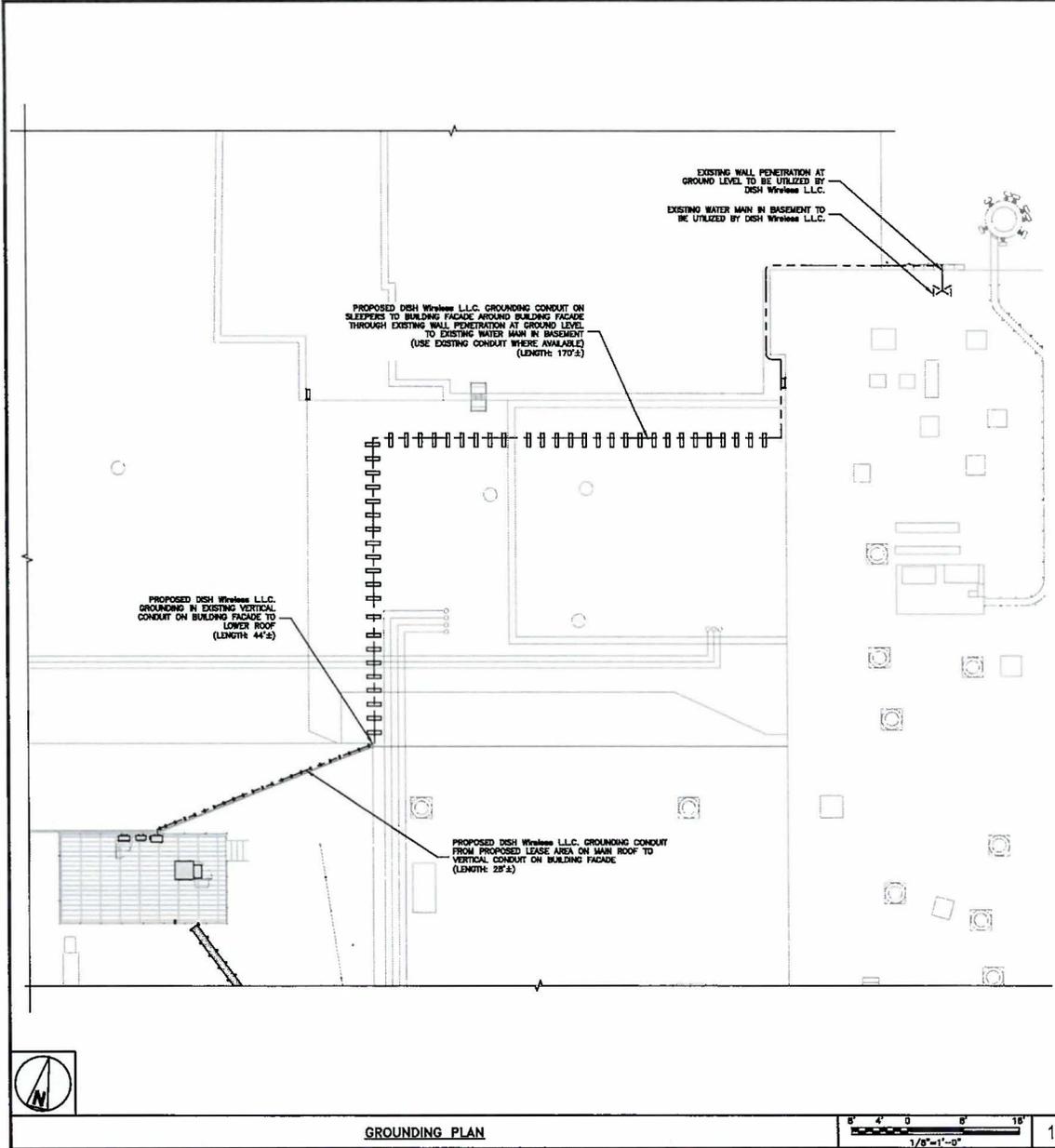
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DISH Wireless LLC  
PROJECT INFORMATION  
BOBOS01101B

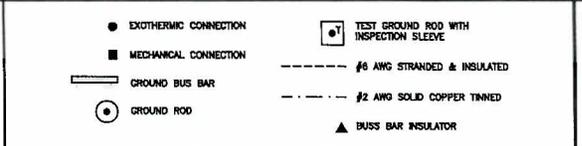
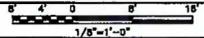
157 UNION STREET  
MARLBOROUGH, MA 01752

SHEET TITLE  
ELECTRICAL ONE-LINE, FAULT  
CALCS & PANEL SCHEDULE

SHEET NUMBER  
E-3



GROUNDING PLAN



**GROUNDING LEGEND**

- GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.
- CONTRACTOR SHALL GROUND ALL EQUIPMENT AS A COMPLETE SYSTEM. GROUNDING SHALL BE IN COMPLIANCE WITH NEC SECTION 250 AND DISH Wireless L.L.C. GROUNDING AND BONDING REQUIREMENTS AND MANUFACTURER'S SPECIFICATIONS.
- ALL GROUND CONDUCTORS SHALL BE COPPER; NO ALUMINUM CONDUCTORS SHALL BE USED.
- NO EXOTHERMIC WELDING ON ROOFTOP

**GROUNDING ROOFTOP KEY NOTES**

- (A) EXTERIOR GROUND RING: #2 AWG SOLID COPPER, BURIED AT A DEPTH OF AT LEAST 30 INCHES BELOW GRADE, OR 6 INCHES BELOW THE FROST LINE AND APPROXIMATELY 24 INCHES FROM THE EXTERIOR WALL OR FOOTING.
- (B) ROOFTOP GROUND SYSTEM: THE GROUND SYSTEM USING MINIMUM #2 AWG SOLID COPPER CONDUCTORS.
- (C) INTERIOR GROUND RING: #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTOR EXTENDED AROUND THE PERIMETER OF THE EQUIPMENT AREA. ALL NON-TELECOMMUNICATIONS RELATED METALLIC OBJECTS FOUND WITHIN A SITE SHALL BE GROUND TO THE INTERIOR GROUND RING WITH #6 AWG STRANDED GREEN INSULATED CONDUCTOR.
- (D) BOND TO INTERIOR GROUND RING: #2 AWG SOLID TINNED COPPER WIRE PRIMARY BONDS SHALL BE PROVIDED AT LEAST AT FOUR POINTS ON THE INTERIOR GROUND RING, LOCATED AT THE CORNERS OF THE BUILDING OR ROOM.
- (E) GROUND ROD: UL LISTED COPPER CLAD STEEL. MINIMUM 1/2" DIAMETER BY EIGHT FEET LONG. GROUND RODS SHALL BE INSTALLED WITH INSPECTION SLEEVES. GROUND RODS SHALL BE DRIVEN TO THE DEPTH OF GROUND RING CONDUCTOR.
- (F) CELL REFERENCE GROUND BAR (CRGB): POINT OF GROUND REFERENCE FOR ALL COMMUNICATIONS EQUIPMENT FRAMES. ALL BONDS ARE MADE WITH #2 AWG UNLESS NOTED OTHERWISE STRANDED GREEN INSULATED COPPER CONDUCTORS. BOND TO COMMON BUILDING GROUND SYSTEM WITH (2) #2 SOLID TINNED COPPER CONDUCTORS.
- (G) HATCH PLATE GROUND BAR: BOND TO THE COMMON BUILDING GROUND SYSTEM WITH TWO #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTORS. WHEN A HATCH-PLATE AND A CELL REFERENCE GROUND BAR ARE BOTH PRESENT, THE CRGB MUST BE CONNECTED TO THE HATCH-PLATE AND TO THE INTERIOR GROUND RING USING (2) TWO #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTORS EACH.
- (H) EXTERIOR CABLE ENTRY PORT GROUND BARS: LOCATED AT THE ENTRANCE TO THE CELL SITE ROOM. BOND TO GROUND RING WITH A #2 AWG SOLID TINNED COPPER CONDUCTORS WITH MECHANICAL CONNECTIONS.
- (J) TELCO GROUND BAR: BOND TO BOTH CELL REFERENCE GROUND BAR OR EXTERIOR GROUND RING.
- (K) FRAME BONDING: THE BONDING POINT FOR TELECOM EQUIPMENT FRAMES SHALL BE THE GROUND BUS THAT IS NOT ISOLATED FROM THE EQUIPMENT METAL FRAMEWORK.
- (L) INTERIOR UNIT BONDS: METAL FRAMES, CABINETS AND INDIVIDUAL METALLIC UNITS LOCATED WITH THE AREA OF THE INTERIOR GROUND RING REQUIRE A #6 AWG STRANDED GREEN INSULATED COPPER BOND TO THE INTERIOR GROUND RING.
- (M) FENCE AND GATE GROUNDING: METAL FENCES SHALL BE BONDED TO THE COMMON BUILDING GROUND SYSTEM WITH A #2 AWG SOLID TINNED COPPER CONDUCTOR AT AN INTERVAL NOT EXCEEDING 25 FEET. BONDS SHALL BE MADE AT EACH GATE POST AND ACROSS GATE OPENINGS.
- (N) EXTERIOR UNIT BONDS: METALLIC OBJECTS, EXTERNAL TO OR MOUNTED TO THE BUILDING, SHALL BE BONDED TO THE COMMON BUILDING GROUND SYSTEM USING #2 TINNED SOLID COPPER WIRE.
- (P) ICE BRIDGE SUPPORTS: EACH ICE BRIDGE LEG SHALL BE BONDED TO THE GROUND RING WITH #2 AWG BARE TINNED COPPER CONDUCTOR. PROVIDE EXOTHERMIC WELDS AT BOTH THE ICE BRIDGE LEG AND BURIED GROUND RING.
- (Q) DURING ALL DC POWER SYSTEM CHANGES INCLUDING DC SYSTEM CHANGE OUTFITS, RECTIFIER REPLACEMENTS OR ADDITIONS, BREAKER DISTRIBUTION CHANGES, BATTERY ADDITIONS, BATTERY REPLACEMENTS AND INSTALLATIONS OR CHANGES TO DC CONVERTER SYSTEMS IT SHALL BE REQUIRED THAT SERVICE CONTRACTORS VERIFY ALL DC POWER SYSTEMS ARE EQUIPPED WITH A MASTER DC SYSTEM RETURN GROUND CONDUCTOR FROM THE DC POWER SYSTEM COMMON RETURN BUS DIRECTLY CONNECTED TO THE CELL SITE REFERENCE GROUND BAR.
- (R) ROOFTOP COLLECTOR BUSS BAR IS TO BE MECHANICALLY BONDED TO COMMON BUILDING GROUND SYSTEM. REFER TO DISH Wireless L.L.C. GROUNDING NOTES.

GROUNDING KEY NOTES

NO SCALE 2



5701 SOUTH SANTA FE DRIVE  
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RFD5 REV #: 0

**CONSTRUCTION DOCUMENTS**

SUBMITTALS		
REV	DATE	DESCRIPTION
0	12/12/2023	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER  
100753

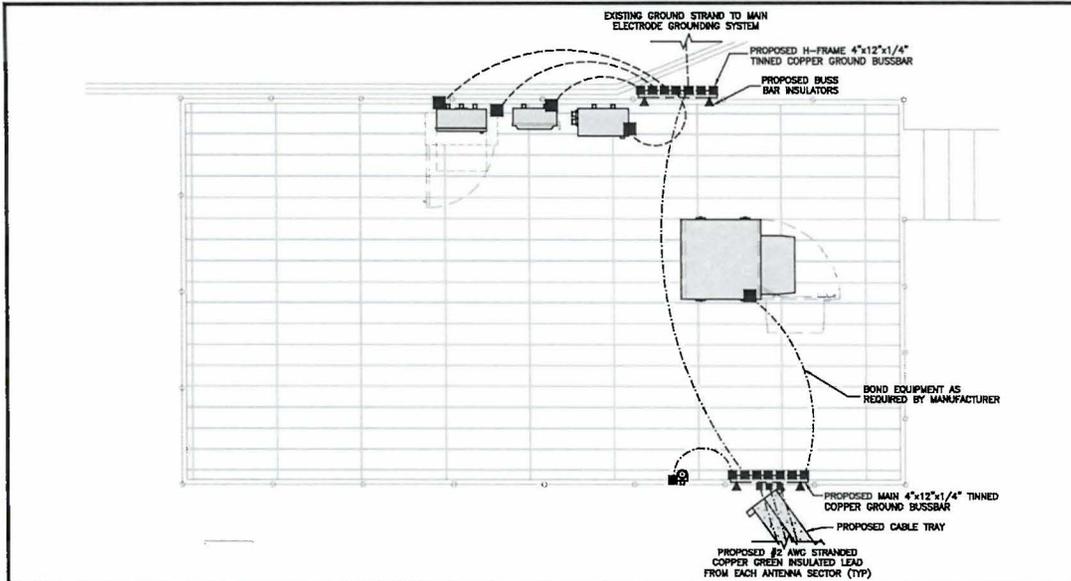
DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBOS01101B

157 UNION STREET  
MARLBOROUGH, MA 01752

SHEET TITLE  
GROUNDING PLANS  
AND NOTES

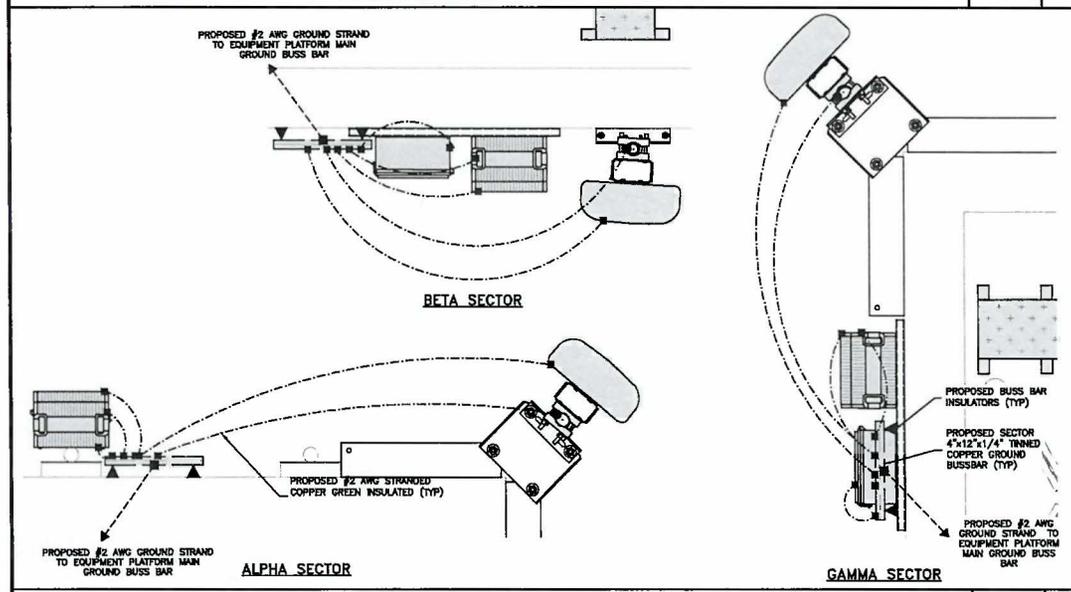
SHEET NUMBER

G-1



TYPICAL ROOFTOP EQUIPMENT GROUNDING PLAN

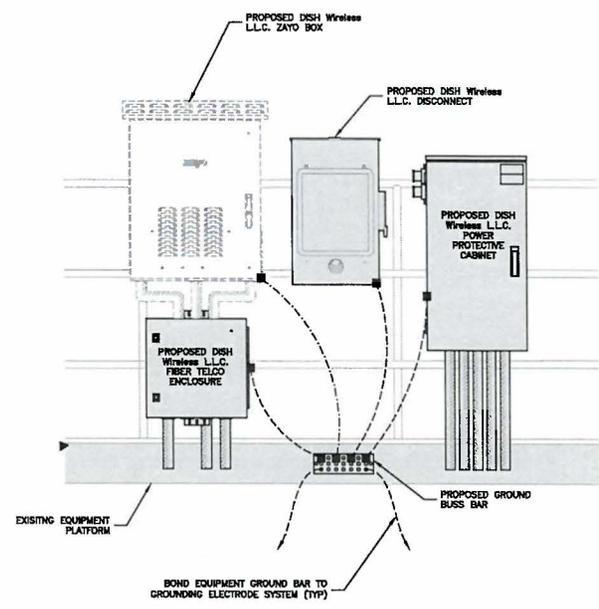
NO SCALE 1



TYPICAL ROOFTOP ANTENNA GROUNDING PLAN

NO SCALE 2

NOTE  
EQUIPMENT CABINET OMITTED FOR CLARITY



H-FRAME GROUNDING DETAIL

NO SCALE 3



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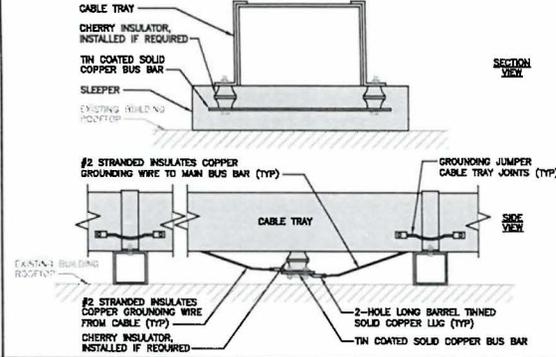
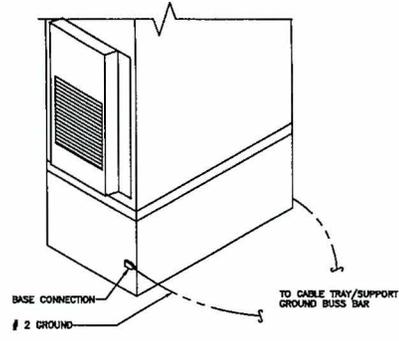
DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBOS01101B

157 UNION STREET  
MARLBOROUGH, MA 01752

SHEET TITLE  
GROUNDING DETAILS

SHEET NUMBER  
G-2

1. EXOTHERMIC WELD (2) TWO, #2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUND BAR. ROUTE CONDUCTORS TO BURIED GROUND RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
2. ALL EXTERIOR GROUNDING HARDWARE SHALL BE STAINLESS STEEL 3/8" DIAMETER OR LARGER. ALL HARDWARE 18-8 STAINLESS STEEL, INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
3. FOR GROUND BOND TO STEEL ONLY: COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
4. DO NOT INSTALL CABLE GROUNDING KIT AT A BEND AND ALWAYS DIRECT GROUND CONDUCTOR DOWN TO GROUNDING BUS.
5. NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUND BAR AND BOLTED ON THE BACK SIDE.
6. ALL GROUNDING PARTS AND EQUIPMENT TO BE SUPPLIED AND INSTALLED BY CONTRACTOR.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUND BAR AS REQUIRED.
8. ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINNERS).



TYPICAL GROUNDING NOTES

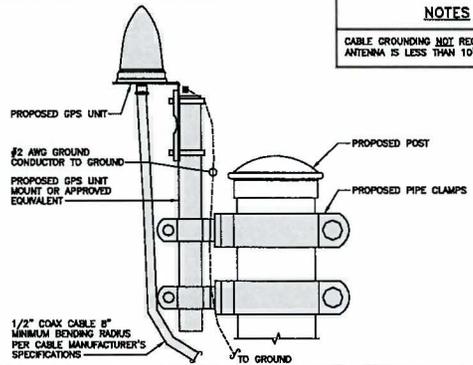
NO SCALE 1

OUTDOOR CABINET GROUNDING

NO SCALE 2

TYPICAL CABLE TRAY GROUND BUSS BAR

NO SCALE 3

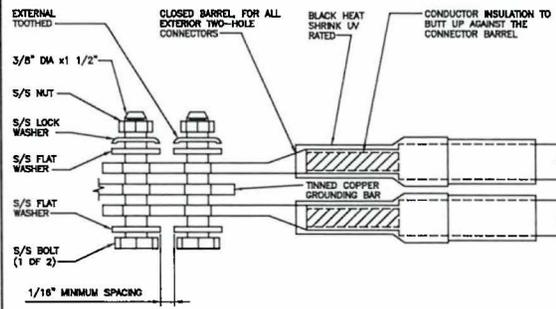


NOTES

CABLE GROUNDING NOT REQUIRED WHEN ANTENNA IS LESS THAN 10' FROM CABINET

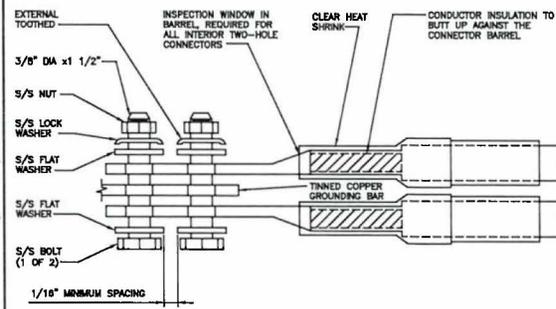
TYPICAL GPS UNIT GROUNDING

NO SCALE 4



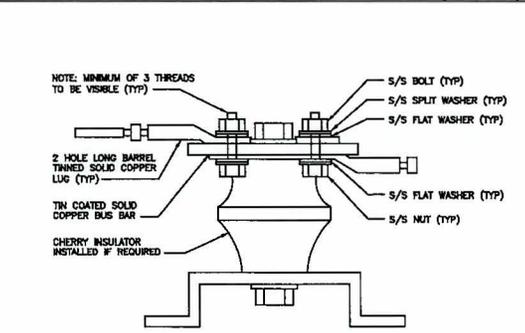
TYPICAL EXTERIOR TWO HOLE LUG

NO SCALE 5



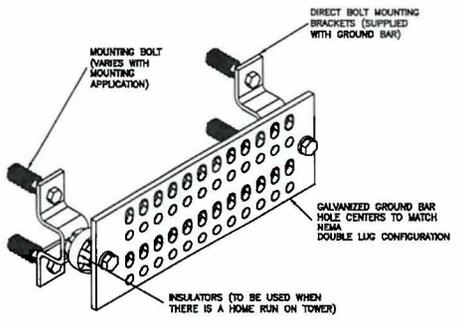
TYPICAL INTERIOR TWO HOLE LUG

NO SCALE 6



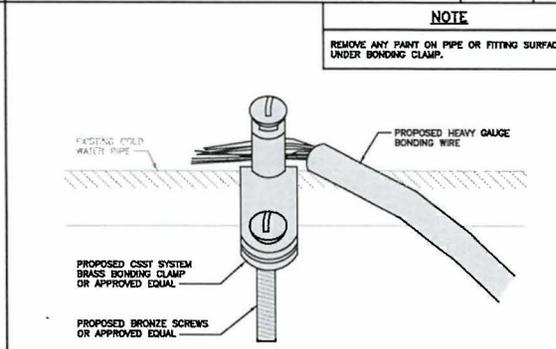
LUG DETAIL

NO SCALE 7



GROUND BAR DETAIL

NO SCALE 8



TYPICAL COLD WATER CONDUIT GROUNDING DETAIL

NO SCALE 9



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100753

DISH Wireless LLC  
PROJECT INFORMATION  
BOBOS01101B

157 UNION STREET  
MARLBOROUGH, MA 01752

SHEET TITLE  
GROUNDING DETAILS

SHEET NUMBER  
G-3

HYBRID/DISCREET CABLES		3/4" TAPE WIDTHS WITH 3/4" SPACING											
<p>LOW-BAND RRH (N70-N71 BASEBAND) + (N72-N76 RAYS) + (N77-N78 RAYS) = ORIGINAL PER MARKET</p> <p>ADD FREQUENCY COLOR TO SECTOR BAND (CABLES WILL USE YELLOW RAYS)</p>	ALPHA RRH				BETA RRH				GAMMA RRH				
	PORT 1 + SLANT	PORT 2 - SLANT	PORT 3 + SLANT	PORT 4 - SLANT	PORT 1 + SLANT	PORT 2 - SLANT	PORT 3 + SLANT	PORT 4 - SLANT	PORT 1 + SLANT	PORT 2 - SLANT	PORT 3 + SLANT	PORT 4 - SLANT	
<p>MID-BAND RRH (N85 BANDS N86-N79)</p> <p>ADD FREQUENCY COLOR TO SECTOR BAND (CABLES WILL USE YELLOW RAYS)</p>	RED	RED	RED	RED	BLUE	BLUE	BLUE	BLUE	GREEN	GREEN	GREEN	GREEN	
<p>HYBRID/DISCREET CABLES</p> <p>INCLUDE SECTOR BANDS USING SUPPLEMENTAL ALPHA RAY + FREQUENCY BANDS.</p> <p>EXAMPLE 1 - HYBRID, OR DISCREET, SUPPORTS ALL SECTORS, BOTH LOW-BANDS AND MID-BANDS.</p> <p>EXAMPLE 2 - HYBRID, OR DISCREET, SUPPORTS CABLES ONLY, ALL SECTORS.</p> <p>EXAMPLE 3 - MAIN COAX WITH GROUND ISOLATED RAYS.</p>	EXAMPLE 1	EXAMPLE 2	EXAMPLE 3	CHASSIS COAX #1 (ALPHA)	CHASSIS COAX #2 (ALPHA)								
<p>FIBER JUMPERS TO RRHs</p> <p>LOW-BAND RRH FIBER CABLES HAVE SECTOR STRIPES ONLY.</p>	LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH							
<p>POWER CABLES TO RRHs</p> <p>LOW-BAND RRH POWER CABLES HAVE SECTOR STRIPES ONLY.</p>	LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH							
<p>RET MOTORS AT ANTENNAS</p> <p>RET CONTROL IS HANDLED BY THE MAIN-BAND RAYS WHEN USE SET OF RET POINTS EAST OF ANTENNA.</p> <p>SEPARATE RET CABLES ARE USED WHEN ANTENNA POINTS PROVIDE INPUTS FOR BOTH LOW AND MID BANDS.</p>	ANTENNA 1 MID BAND	ANTENNA 1 LOW BAND	ANTENNA 1 MID BAND	ANTENNA 1 LOW BAND	ANTENNA 1 MID BAND	ANTENNA 1 LOW BAND							
<p>MICROWAVE RADIO LINKS</p> <p>LINKS WILL HAVE A 1.5-2 INCH WHITE WRAP WITH THE AZIMUTH COLOR OVERLAPPING IN THE MIDDLE.</p> <p>ADD ADDITIONAL SECTOR COLOR BANDS FOR EACH ADDITIONAL TWR RADIO.</p> <p>MICROWAVE CABLES WILL REQUIRE P-TOUCH LABELS INSIDE THE CABINET TO IDENTIFY THE COLOR AND REMOTE SITE ID'S.</p>	FORWARD AZIMUTH OF 0-120 DEGREES		FORWARD AZIMUTH OF 120-240 DEGREES		FORWARD AZIMUTH OF 240-360 DEGREES								
	PRIMARY	SECONDARY	PRIMARY	SECONDARY	PRIMARY	SECONDARY							

RF CABLE COLOR CODES

NO SCALE

1

LOW BANDS (N71+N28)  
OPTIONAL - (N29)

ORANGE

AWS  
(N88+N70+H-BLDCX)

PURPLE

OBRS TECH  
(3 GHz)

YELLOW

NEGATIVE SLANT PORT  
ON ANT/RRH

WHITE

ALPHA SECTOR

RED

BETA SECTOR

BLUE

GAMMA SECTOR

GREEN

COLOR IDENTIFIER

NO SCALE

2

NOT USED

NO SCALE

3

RF CABLE COLOR CODES

NO SCALE

1

NOT USED

NO SCALE

4

**dish**  
wireless.

5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120

**NB+C**  
TOTALLY COMMITTED.

NB+C ENGINEERING SERVICES, LLC.

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RFDS REV #:

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CONSTRUCTION  
DOCUMENTS

SUBMITTALS

REV DATE DESCRIPTION

0 12/12/2023 ISSUED FOR CONSTRUCTION

AME PROJECT NUMBER

100753

DISH Wireless LLC  
PROJECT INFORMATION

BOBOS01101B

157 UNION STREET  
MARLBOROUGH, MA 01752

SHEET TITLE

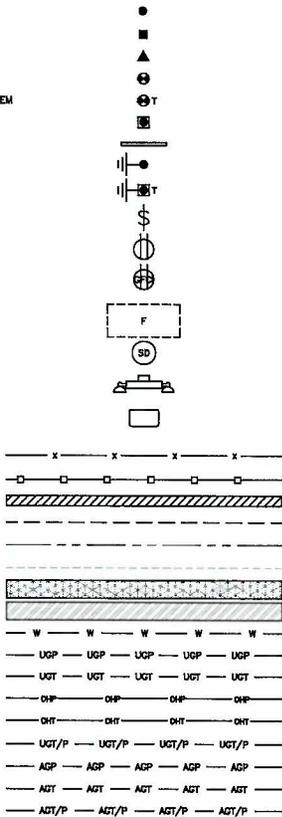
RF

CABLE COLOR CODE

SHEET NUMBER

RF-1

EXOTHERMIC CONNECTION  
 MECHANICAL CONNECTION  
 BUSS BAR INSULATOR  
 CHEMICAL ELECTROLYTIC GROUNDING SYSTEM  
 TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM  
 EXOTHERMIC WITH INSPECTION SLEEVE  
 GROUNDING BAR  
 GROUND ROD  
 TEST GROUND ROD WITH INSPECTION SLEEVE  
 SINGLE POLE SWITCH  
 DUPLEX RECEPTACLE  
 DUPLEX GFCI RECEPTACLE  
 FLUORESCENT LIGHTING FIXTURE  
 (2) TWO LAMPS 48-TB  
 SMOKE DETECTION (DC)  
 EMERGENCY LIGHTING (DC)  
 SECURITY LIGHT W/PHOTOCELL LITHONIA ALXW  
 Q234N 4296A(21)SR K-SR4-120-PE-009TXD  
 WOOD/WROUGHT IRON FENCE  
 WALL STRUCTURE  
 LEASE AREA  
 PROPERTY LINE (PL)  
 SETBACKS  
 ICE BRIDGE  
 CABLE TRAY  
 WATER LINE  
 UNDERGROUND POWER  
 UNDERGROUND TELCO  
 OVERHEAD POWER  
 OVERHEAD TELCO  
 UNDERGROUND TELCO/POWER  
 ABOVE GROUND POWER  
 ABOVE GROUND TELCO  
 ABOVE GROUND TELCO/POWER  
 WORKPOINT



LEGEND

AB ANCHOR BOLT  
 ABV ABOVE  
 AC ALTERNATING CURRENT  
 ADDL ADDITIONAL  
 AFF ABOVE FINISHED FLOOR  
 AFG ABOVE FINISHED GRADE  
 AGL ABOVE GROUND LEVEL  
 AIC AMPERAGE INTERRUPTION CAPACITY  
 ALUM ALUMINUM  
 ALT ALTERNATE  
 ANT ANTENNA  
 APPROX APPROXIMATE  
 ARCH ARCHITECTURAL  
 ATS AUTOMATIC TRANSFER SWITCH  
 AWG AMERICAN WIRE GAUGE  
 BATT BATTERY  
 BLDG BUILDING  
 BLK BLOCK  
 BLKG BLOCKING  
 BM BEAM  
 BTC BARE TINNED COPPER CONDUCTOR  
 BOF BOTTOM OF FOOTING  
 CAB CABINET  
 CANT CANTILEVERED  
 CHG CHARGING  
 CLG CEILING  
 CLR CLEAR  
 COL COLUMN  
 COMM COMMON  
 CONC CONCRETE  
 CONSTR CONSTRUCTION  
 DBL DOUBLE  
 DC DIRECT CURRENT  
 DEPT DEPARTMENT  
 DF DOUGLAS FIR  
 DIA DIAMETER  
 DIAG DIAGONAL  
 DIM DIMENSION  
 DWG DRAWING  
 DWL DOWEL  
 EA EACH  
 EC ELECTRICAL CONDUCTOR  
 EL ELEVATION  
 ELEC ELECTRICAL  
 EMT ELECTRICAL METALLIC TUBING  
 ENG ENGINEER  
 EQ EQUAL  
 EXP EXPANSION  
 EXT EXTERIOR  
 EW EACH WAY  
 FAB FABRICATION  
 FF FINISH FLOOR  
 FG FINISH GRADE  
 FIF FACILITY INTERFACE FRAME  
 FIN FINISH(ED)  
 FLR FLOOR  
 FDN FOUNDATION  
 FOC FACE OF CONCRETE  
 FOM FACE OF MASONRY  
 FOS FACE OF STUO  
 FOW FACE OF WALL  
 FS FINISH SURFACE  
 FT FOOT  
 FTG FOOTING  
 GA GAUGE  
 GEN GENERATOR  
 GFCI GROUND FAULT CIRCUIT INTERRUPTER  
 GLB GLUE LAMINATED BEAM  
 GLV GALVANIZED  
 GPS GLOBAL POSITIONING SYSTEM  
 GND GROUND  
 GSM GLOBAL SYSTEM FOR MOBILE  
 HDG HOT DIPPED GALVANIZED  
 HDR HEADER  
 HGR HANGER  
 HVAC HEAT/VENTILATION/AIR CONDITIONING  
 HT HEIGHT  
 ICR INTERIOR GROUND RING  
 IN INCH  
 INT INTERIOR  
 LB(S) POUND(S)  
 LF LINEAR FEET  
 LTE LONG TERM EVOLUTION  
 MAS MASONRY  
 MAX MAXIMUM  
 MB MACHINE BOLT  
 MECH MECHANICAL  
 MFR MANUFACTURER  
 MGB MASTER GROUND BAR  
 MIN MINIMUM  
 MISC MISCELLANEOUS  
 MTL METAL  
 MTS MANUAL TRANSFER SWITCH  
 MW MICROWAVE  
 NEC NATIONAL ELECTRIC CODE  
 NM NEWTON METERS  
 NO. NUMBER  
 # NUMBER  
 NTS NOT TO SCALE  
 OC ON-CENTER  
 OSHA OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION  
 OPNG OPENING  
 P/C PRECAST CONCRETE  
 PCS PERSONAL COMMUNICATION SERVICES  
 PCU PRIMARY CONTROL UNIT  
 PRC PRIMARY RADIO CABINET  
 PP POLARIZING PRESERVING  
 PSF POUNDS PER SQUARE FOOT  
 PSI POUNDS PER SQUARE INCH  
 PT PRESSURE TREATED  
 PWR POWER CABINET  
 QTY QUANTITY  
 RAD RADIUS  
 RECT RECTIFIER  
 REF REFERENCE  
 REINF REINFORCEMENT  
 REIN'D REINFORCED  
 RET REMOTE ELECTRIC TILT  
 RF RADIO FREQUENCY  
 RMC RIGID METALLIC CONDUIT  
 RRUH REMOTE RADIO HEAD  
 RRU REMOTE RADIO UNIT  
 RWY RACEWAY  
 SCH SCHEDULE  
 SHT SHEET  
 SIAD SMART INTEGRATED ACCESS DEVICE  
 SM SIMILAR  
 SPEC SPECIFICATION  
 SQ SQUARE  
 SS STAINLESS STEEL  
 STD STANDARD  
 STL STEEL  
 TEMP TEMPORARY  
 THK THICKNESS  
 TMA TOWER MOUNTED AMPLIFIER  
 TN TIE NAIL  
 TGA TOP OF ANTEHNA  
 TOC TOP OF CURB  
 TOF TOP OF FOUNDATION  
 TOP TOP OF PLATE (PARAPET)  
 TOS TOP OF STEEL  
 TOW TOP OF WALL  
 TVSS TRANSIENT VOLTAGE SURGE SUPPRESSION  
 TYP TYPICAL  
 UG UNDERGROUND  
 UL UNDERWRITERS LABORATORY  
 UNO UNLESS NOTED OTHERWISE  
 UMS UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM  
 UPS UNINTERRUPTIBLE POWER SYSTEM (DC POWER PLANT)  
 VIF VERIFIED IN FIELD  
 W WIDE  
 W/ WITH  
 WD WOOD  
 WP WEATHERPROOF  
 WT WEIGHT

ABBREVIATIONS



5701 SOUTH SANTA FE DRIVE  
 LITTLETON, CO 80120



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 100 APOLO DRIVE SUITE 300  
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RFDS REV #:		0

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DISH Wireless L.L.C.  
 PROJECT INFORMATION  
 BOBOS01101B

157 UNION STREET  
 MARLBOROUGH, MA 01752

SHEET TITLE  
 LEGEND AND ABBREVIATIONS

SHEET NUMBER

GN-1

SIGN TYPES		
TYPE	COLOR	COLOR CODE PURPOSE
INFORMATION	GREEN	"INFORMATIONAL SIGN" TO NOTIFY OTHERS OF SITE OWNERSHIP & CONTACT NUMBER AND POTENTIAL RF EXPOSURE.
NOTICE	BLUE	"NOTICE BEYOND THIS POINT" RF FIELDS BEYOND THIS POINT MAY EXCEED THE FCC GENERAL PUBLIC EXPOSURE LIMIT. OBEY ALL POSTED SIGNS AND SITE GUIDELINES FOR WORKING IN RF ENVIRONMENTS. IN ACCORDANCE WITH FEDERAL COMMUNICATIONS COMMISSION RULES ON RADIO FREQUENCY EMISSIONS 47 CFR-1.1307(b).
CAUTION	YELLOW	"CAUTION BEYOND THIS POINT" RF FIELDS BEYOND THIS POINT MAY EXCEED THE FCC GENERAL PUBLIC EXPOSURE LIMIT. OBEY ALL POSTED SIGNS AND SITE GUIDELINES FOR WORKING IN RF ENVIRONMENTS. IN ACCORDANCE WITH FEDERAL COMMUNICATIONS COMMISSION RULES ON RADIO FREQUENCY EMISSIONS 47 CFR-1.1307(b).
WARNING	ORANGE/RED	"WARNING BEYOND THIS POINT" RF FIELDS AT THIS SITE EXCEED FCC RULES FOR HUMAN EXPOSURE. FAILURE TO OBEY ALL POSTED SIGNS AND SITE GUIDELINES FOR WORKING IN RF ENVIRONMENTS COULD RESULT IN SERIOUS INJURY. IN ACCORDANCE WITH FEDERAL COMMUNICATIONS COMMISSION RULES ON RADIO FREQUENCY EMISSIONS 47 CFR-1.1307(b).

**SIGN PLACEMENT:**

- RF SIGNAGE PLACEMENT SHALL FOLLOW THE RECOMMENDATIONS OF AN EXISTING EME REPORT, CREATED BY A THIRD PARTY PREVIOUSLY AUTHORIZED BY DISH Wireless L.L.C.
- INFORMATION SIGN (GREEN) SHALL BE LOCATED ON EXISTING DISH Wireless L.L.C. EQUIPMENT.
  - A) IF THE INFORMATION SIGN IS A STICKER, IT SHALL BE PLACED ON EXISTING DISH Wireless L.L.C. EQUIPMENT CABINET.
  - B) IF THE INFORMATION SIGN IS A METAL SIGN IT SHALL BE PLACED ON EXISTING DISH Wireless L.L.C. H-FRAME WITH A SECURE ATTACH METHOD.
- IF EME REPORT IS NOT AVAILABLE AT THE TIME OF CREATION OF CONSTRUCTION DOCUMENTS, PLEASE CONTACT DISH Wireless L.L.C. CONSTRUCTION MANAGER FOR FURTHER INSTRUCTION ON HOW TO PROCEED.

**NOTES:**

1. FOR DISH Wireless L.L.C. LOGO, SEE DISH Wireless L.L.C. DESIGN SPECIFICATIONS (PROVIDED BY DISH Wireless L.L.C.)
2. SITE ID SHALL BE APPLIED TO SIGNS USING "LASER ENGRAVING" OR ANY OTHER WEATHER RESISTANT METHOD (DISH Wireless L.L.C. APPROVAL REQUIRED)
3. TEXT FOR SIGNAGE SHALL INDICATE CORRECT SITE NAME AND NUMBER AS PER DISH Wireless L.L.C. CONSTRUCTION MANAGER RECOMMENDATIONS.
4. CABINET/SHELTER MOUNTING APPLICATION REQUIRES ANOTHER PLATE APPLIED TO THE FACE OF THE CABINET WITH WATER PROOF POLYURETHANE ADHESIVE.
5. ALL SIGNS WILL BE SECURED WITH EITHER STAINLESS STEEL ZIP TIES OR STAINLESS STEEL TECH SCREWS
6. ALL SIGNS TO BE 8.5"x11" AND MADE WITH 0.04" ALUMINUM MATERIAL.

# INFORMATION

This is an access point to an area with transmitting antennas.

Obey all signs and barriers beyond this point.  
Call the DISH Wireless L.L.C. NOC at 1-866-624-6874

Site ID: \_\_\_\_\_



THIS SIGN IS FOR REFERENCE PURPOSES ONLY.

NOTICE

Transmitting Antenna(s)

Radio frequency fields beyond this point MAY EXCEED the FCC Occupational exposure limit.

Obey all posted signs and site guidelines for working in radio frequency environments.

Call the DISH Wireless L.L.C. NOC at 1-866-624-6874 prior to working beyond this point.

Site ID: \_\_\_\_\_

dish

THIS SIGN IS FOR REFERENCE PURPOSES ONLY

CAUTION

Transmitting Antenna(s)

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Site ID: \_\_\_\_\_

dish

THIS SIGN IS FOR REFERENCE PURPOSES ONLY

WARNING

Transmitting Antenna(s)

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Call the DISH Wireless L.L.C. NOC at 1-866-624-6874 prior to working beyond this point.

Site ID: \_\_\_\_\_

dish

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RF SIGNAGE



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



NB+C ENGINEERING SERVICES, L.L.C.

100 APOLLO DRIVE  
SUITE 303  
CHELMSFORD, MA 01824  
(978) 856-6306



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DRAWN BY: CHECKED BY: APPROVED BY:

CCM NSB DRG

RFDS REV #: 0

**CONSTRUCTION DOCUMENTS**

**SUBMITTALS**

REV	DATE	DESCRIPTION
0	12/12/2023	ISSUED FOR CONSTRUCTION

A/E PROJECT NUMBER  
100753

DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBOS01101B

157 UNION STREET  
MARLBOROUGH, MA 01752

SHEET TITLE  
RF SIGNAGE

SHEET NUMBER  
GN-2

**SITE ACTIVITY REQUIREMENTS:**

1. NOTICE TO PROCEED – NO WORK SHALL COMMENCE PRIOR TO CONTRACTOR RECEIVING A WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE DISH Wireless L.L.C. AND TOWER OWNER NOC & THE DISH Wireless L.L.C. AND TOWER OWNER CONSTRUCTION MANAGER.
2. "LOOK UP" – DISH Wireless L.L.C. AND TOWER OWNER SAFETY CLIMB REQUIREMENT:  
THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR DISH Wireless L.L.C. AND DISH Wireless L.L.C. AND TOWER OWNER POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND DISH Wireless L.L.C. AND TOWER OWNER STANDARDS, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA-322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH DISH Wireless L.L.C. AND TOWER OWNER INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON DISH Wireless L.L.C. AND TOWER OWNER TOWER SITE AND LATEST VERSION OF ANSI/TIA-1019-A-2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY DISH Wireless L.L.C. AND TOWER OWNER PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES INCLUDING PRIVATE LOCATES SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. ALL EXISTING 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 CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND DISH PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. ALL EXISTING 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 DISH Wireless L.L.C. AND TOWER OWNER, AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS AND RADIOS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

**GENERAL NOTES:**

- 1.FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:  
CONTRACTOR:GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION  
CARRIER:DISH Wireless L.L.C.  
TOWER OWNER:TOWER OWNER
2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.
5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.
6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CARRIER POC AND TOWER OWNER.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND TOWER OWNER PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION, BEFORE SUBMITTING BIDS, TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.
12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF DISH Wireless L.L.C. AND TOWER OWNER
13. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.



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DRAWN BY: CHECKED BY: APPROVED BY:

CCM	NSB	DRG
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RFDS REV #: 0

**CONSTRUCTION DOCUMENTS**

**SUBMITTALS**

REV	DATE	DESCRIPTION
0	12/12/2023	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER  
100753

DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBOS01101B

157 UNION STREET  
MARLBOROUGH, MA 01752

SHEET TITLE  
GENERAL NOTES

SHEET NUMBER

**GN-3**

**CONCRETE FOUNDATIONS AND REINFORCING STEEL:**

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.
2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH ( $f'_c$ ) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°F AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE-THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER-TO-CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH ( $F_y$ ) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:  
 #4 BARS AND SMALLER 40 ksi  
 #5 BARS AND LARGER 60 ksi
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
  - CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3"
  - CONCRETE EXPOSED TO EARTH OR WEATHER:
  - #6 BARS AND LARGER 2"
  - #5 BARS AND SMALLER 1-1/2"
  - CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
  - SLAB AND WALLS 3/4"
  - BEAMS AND COLUMNS 1-1/2"
7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

**ELECTRICAL INSTALLATION NOTES:**

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
- 4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
- 4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. TIE WRAPS ARE NOT ALLOWED.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI-CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.

16. ELECTRICAL METALLIC TUBING (EMT) OR METAL-CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90° AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOULD SPECIMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER-ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3 (OR BETTER) FOR EXTERIOR LOCATIONS.
25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR DISH Wireless L.L.C. AND TOWER OWNER BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "DISH Wireless L.L.C."
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.



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DRAWN BY: CHECKED BY: APPROVED BY:

CCM	NSB	DRG
RFDS REV #:		0

**CONSTRUCTION DOCUMENTS**

SUBMITTALS		
REV	DATE	DESCRIPTION
0	12/12/2023	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER  
100753

DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBOS01101B

157 UNION STREET  
MARLBOROUGH, MA 01752

SHEET TITLE  
GENERAL NOTES

SHEET NUMBER  
GN-4

**GROUNDING NOTES:**

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL-OFF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 FT OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON-METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD-WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING 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). DO NOT ATTACH GROUNDING TO FIRE SPRINKLER SYSTEM PIPES.



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