



CONSTRUCTION DRAWING

IF USING 11"x17" PLOT, DRAWINGS WILL BE HALF SCALE

APPLICABLE CODES

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES.

- CALIFORNIA ADMINISTRATIVE CODE (INCL TITLE 24 & 25)
- 2019 CALIFORNIA BUILDING CODE
- CITY/COUNTY ORDINANCES
- BUILDING OFFICIALS & CODE ADMINISTRATORS (BOCA)
- 2019 MECHANICAL CALIFORNIA CODE
- ANSI/EIA-222-F LIFE SAFETY CODE NFPA-101
- 2019 CALIFORNIA PLUMBING CODE
- 2019 CALIFORNIA ELECTRICAL CODE
- LOCAL BUILDING CODE

GENERAL NOTES

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. HANDICAPPED ACCESS REQUIREMENTS ARE NOT REQUIRED IN ACCORDANCE WITH THE 2019 CALIFORNIA BUILDING CODE. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE; NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

SITE INFORMATION

PROPERTY OWNER: SASAKI GO SR TRUSTEE & ET AL & SASAKI KAY K TRUSTEE
PO BOX 536
LOS ALTOS, CA 94023

APPLICANT: DISH WIRELESS
ADDRESS: 5701 S SANTA FE DR
LITTLE TOWN, CO 80120

LATITUDE: 37.401083'

LONGITUDE: -122.131833'

LAT/LONG TYPE: NAD-83

GROUND ELEVATION: ±90' AMSL

ZONING JURISDICTION: CITY OF PALO ALTO

CURRENT ZONING: RM40 - HIGH DENSITY MULTIPLE FAMILY RESIDENCE DISTRICT

ASSESSOR'S PARCEL NO.: 137-29-017

PROPOSED USE: UNMANNED TELECOMMUNICATIONS FACILITY

TYPE OF CONSTRUCTION: TYPE V

OCCUPANCY GROUP: R-2

EQUIPMENT LEASE AREA (SF): ±164 S.F.

PROJECT TEAM

APPLICANT:
DISH WIRELESS
5701 S SANTA FE DR
LITTLE TOWN, CO 80120

ENGINEER:
M SQUARED WIRELESS
1387 CALLE AVANZADO
SAN CLEMENTE, CA 92673
CONTACT: MICHAEL MONTELLA
PH: (949) 391-6824

SITE ACQUISITION:
QUALTEK WIRELESS
1200 DEL PASO RD, STE 150
SACRAMENTO, CA 95843
EMAIL: NCA_DISH@QUALTEKWIRELESS.COM

RF ENGINEER:
DISH WIRELESS
5701 S SANTA FE DR
LITTLE TOWN, CO 80120
CONTACT: POOJA SHAH

CONSTRUCTION MANAGER:
QUALTEK WIRELESS
1200 DEL PASO RD, STE 150
SACRAMENTO, CA 95843
CONTACT: JOSHUA ROBERSON
PH: (949) 505-4225-6433
EMAIL: JROBERSON@QUALTEKWIRELESS.COM

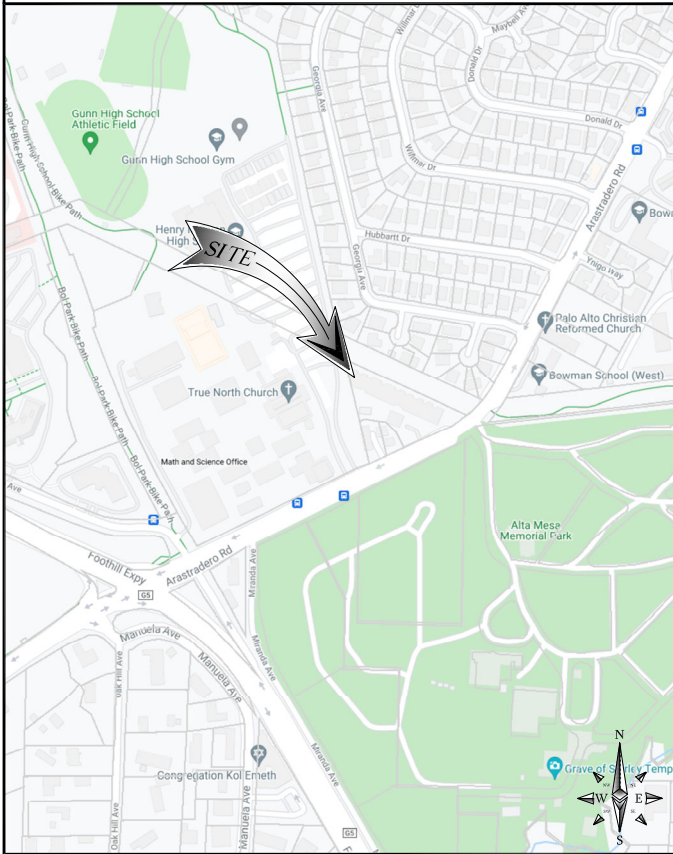
DISH WIRELESS SITE ID: SFSFO00398A

DISH WIRELESS SITE ADDRESS:

724 ARASTRADERO RD
PALO ALTO, CA 94304

INSTALLATION OF TELECOMMUNICATION SITE

VICINITY MAP



SITE PHOTO



DRIVING DIRECTIONS

DIRECTIONS FROM SAN FRANCISCO INTERNATIONAL AIRPORT:

- HEAD SOUTH
- KEEP LEFT, FOLLOW SIGNS FOR US-101 S/SAN JOSE AND MERGE ONTO US-101 S
- TAKE EXIT 400C TO MERGE ONTO SAN ANTONIO RD
- MERGE ONTO SAN ANTONIO RD
- TURN RIGHT ONTO E CHARLESTON RD
- CONTINUE ONTO ARASTRADERO RD
- CONTINUE STRAIGHT TO STAY ON ARASTRADERO RD
- TURN RIGHT
- DESTINATION WILL BE ON THE RIGHT

PROJECT DESCRIPTION

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 (1) NEW ANTENNA MOUNT
- INSTALL (3) NEW PANEL ANTENNAS (1 PER SECTOR)
- INSTALL (3) FUTURE PANEL ANTENNAS (1 PER SECTOR)
- INSTALL (3) NEW DUAL STANDOFF ARM MOUNTS (1 PER SECTOR)
- INSTALL (6) NEW RRUS (2 PER SECTOR)
- INSTALL (6) FUTURE RRUS (2 PER SECTOR)
- INSTALL (1) NEW SURGE SUPPRESSION DEVICE
- INSTALL (1) NEW HYBRID CABLE (±60')
- INSTALL PROPOSED JUMPERS

OUTDOOR SCOPE OF WORK:

- INSTALL (1) NEW CABINET
- INSTALL (1) NEW NEMA 3 TELCO-FIBER BOX
- INSTALL (1) NEW GPS ANTENNA
- INSTALL (3) NEW 2" FIBER CONDUITS

REFERENCE RFDS REVISION 1, DATED 02/08/2022

DRAWING INDEX

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A-2	ANTENNA LAYOUT AND SCHEDULE
A-3	EQUIPMENT LAYOUT
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A-5	NORTHWEST ELEVATION
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E-1	ELECTRICAL PLAN AND NOTES
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APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS & AUTHORIZE THE SUBCONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT & MAY IMPOSE CHANGES OR MODIFICATIONS.

DISH WIRELESS RF ENGINEER: _____ DATE: _____

DISH WIRELESS OPERATIONS: _____ DATE: _____

SITE ACQUISITION: _____ DATE: _____

CONSTRUCTION MANAGER: _____ DATE: _____

PROPERTY OWNER: _____ DATE: _____

ZONING: _____ DATE: _____

PROJECT MANAGER: _____ DATE: _____

DO NOT SCALE DRAWINGS

SUBCONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS & FIELD CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.



USA NORTH

Know what's below.
Call before you dig.

Call Two Working Days Before You Dig!

811 / 800-227-2600
usanorth.org

dish
wireless.

5701 S SANTA FE DR
LITTLE TOWN, CO 80120

QUALTEK
WIRELESS

1200 DEL PASO RD, STE 150
SACRAMENTO, CA 95843

M SQUARED
WIRELESS

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

DRAWN BY: CP

CHECKED BY: MM

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A	02/09/2022	90% CD'S FOR REVIEW



DATE SIGNED: 11/17/2022

Loyall A. Wharton, P.E.
Professional Engineer License: #C50547
Expiration Date: 06-30-2023

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.

SFSFO00398A
724 ARASTRADERO RD
PALO ALTO, CA 94304
ROOFTOP

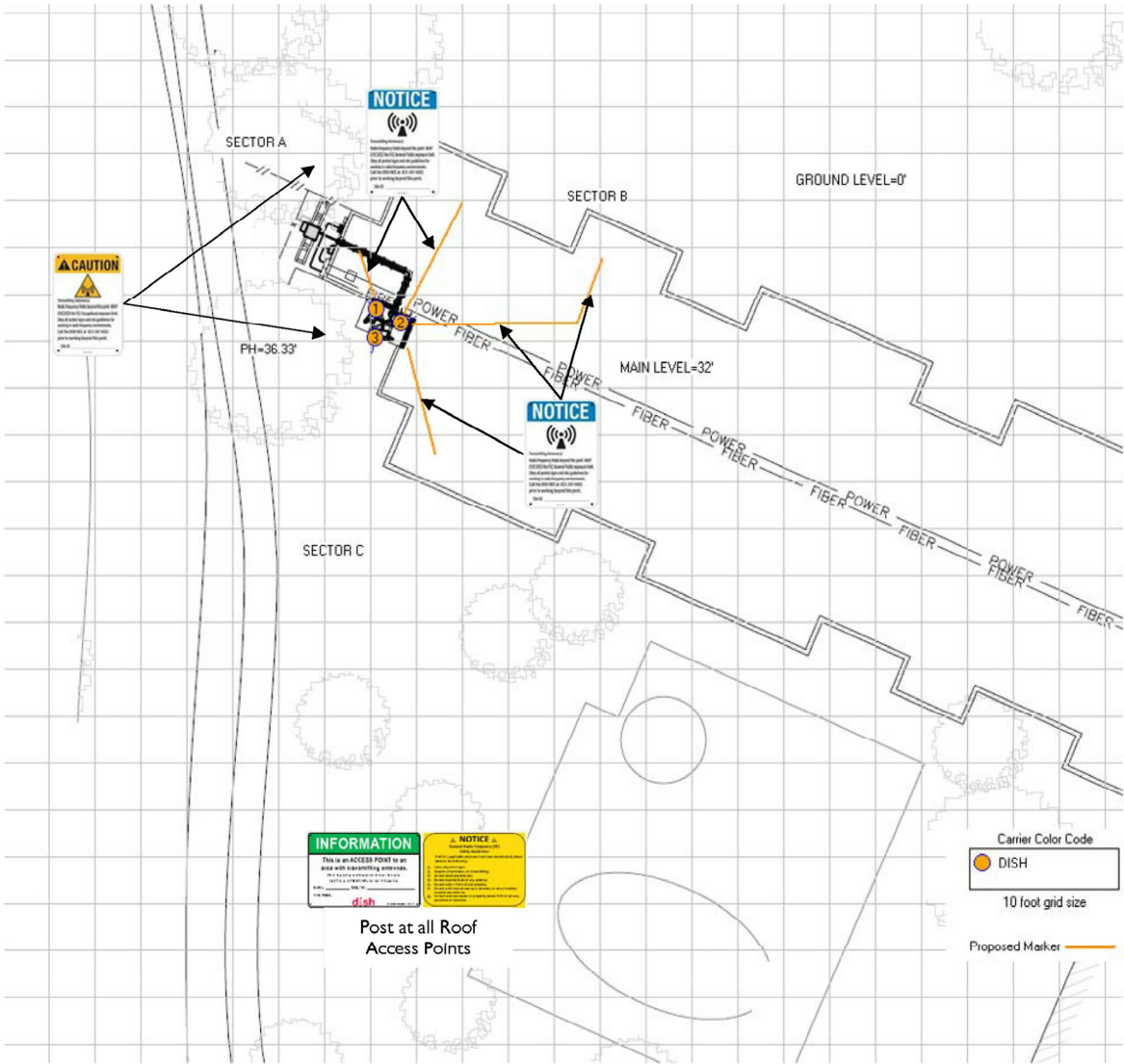
SHEET TITLE

TITLE SHEET

SHEET NUMBER

T-1

Dish Wireless Safety (Signage) Plan



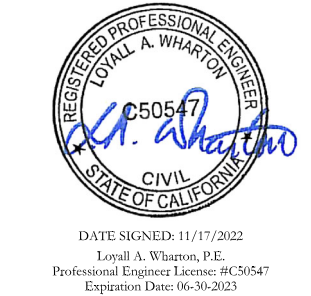
Final Compliance Configuration							
	GUIDELINES	NOTICE	CAUTION	WARNING	NOC INFO	BARRIER/MARKER	
Access Point(s)	1+	0	0	0	1+	N/A	
Alpha	0	2	1+	0	0	11'	11'
Beta	0	10	0	0	0	79'	27' & 16'x36'
Gamma	0	3	1+	0	0	24'	24'

Sign	Posting Instructions	Required Signage / Mitigation
	NOC Information Information signs are used to provide contact information for any questions or concerns for personnel accessing the site.	Securely post at the main rooftop access door and every point of access to the site in a manner conspicuous to all individuals entering thereon as indicated in the signage plan.
	Guidelines Informational sign used to notify workers that there are active antennas installed and provide guidelines for working in RF environments.	Securely post at the main rooftop access door and every point of access to the site in a manner conspicuous to all individuals entering thereon as indicated in the signage plan.
	Notice Used to notify individuals they are entering an area where the power density emitted from transmitting antennas may exceed the FCC's MPE limit for the general public or occupational exposures.	Securely post every 8 feet on the painted barriers on the main roof level in front of the Dish Wireless antennas.
	Caution Used to notify individuals that they are entering a hot spot where either the general public or occupational FCC's MPE limit is or could be exceeded.	Securely post at the trees adjacent to the Dish Wireless antennas where there are areas that exceed the FCC standards for general public and occupational exposure.
	Warning Used to notify individuals that they are entering a hot zone where the occupational FCC's MPE limit has been exceeded by 10x.	Signage not required.



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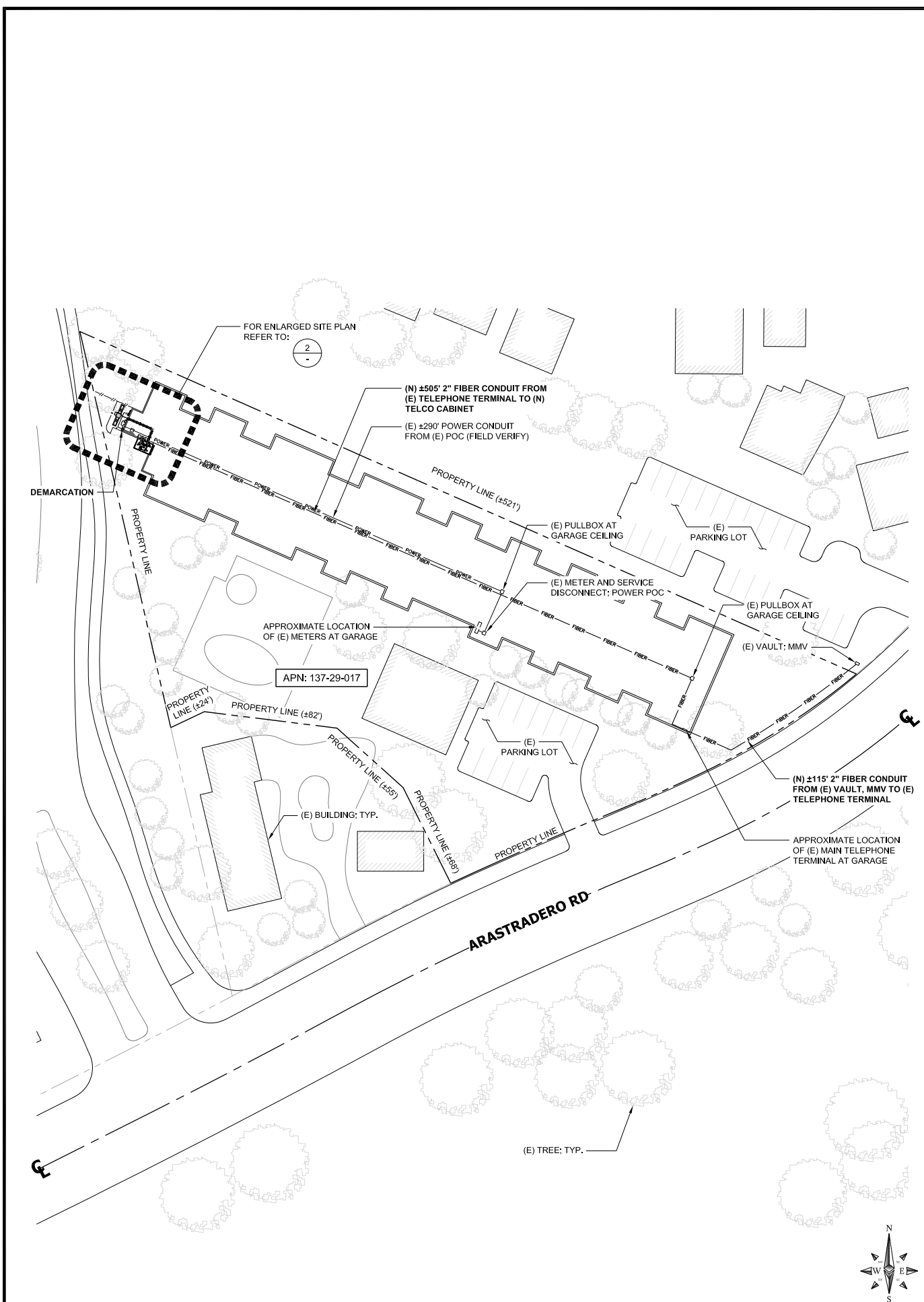


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PALO ALTO, CA 94304
ROOFTOP

SHEET TITLE
RF-EME
COMPLIANCE REPORT

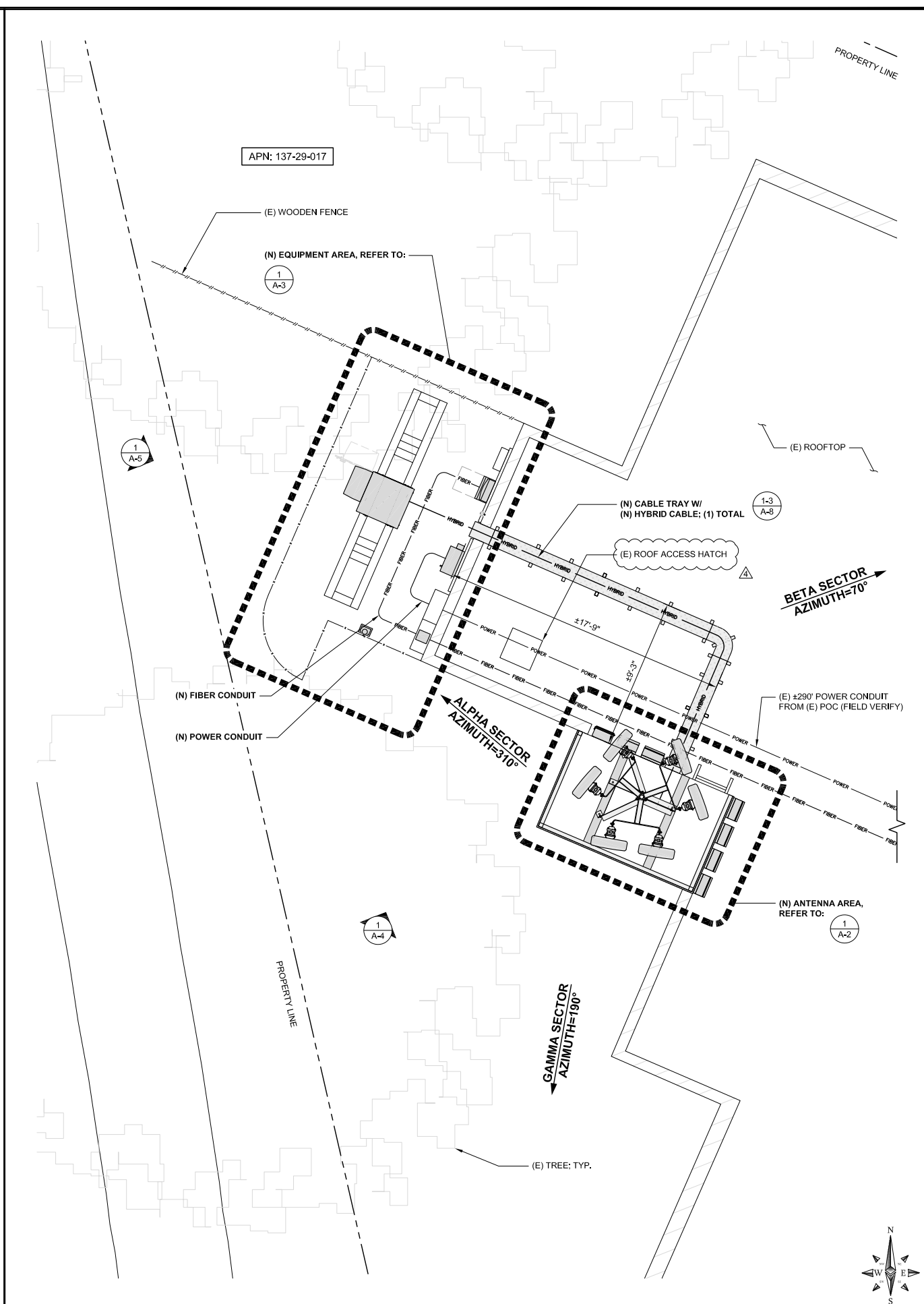
SHEET NUMBER
T-2



OVERALL SITE PLAN

24"x36" SCALE: 1" = 40'-0"
11"x17" SCALE: 1" = 80'-0"

1



ENLARGED SITE PLAN

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

2

dish
wireless.

5701 S SANTA FE DR
LITTLETON, CO 80120

QUALTEK
WIRELESS

1200 DEL PASO RD, STE 150
SACRAMENTO, CA 95843

M SQUARE
WIRELESS

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

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REGISTERED PROFESSIONAL ENGINEER
LOYALL A. WHARTON
C50547
CIVIL
STATE OF CALIFORNIA

DATE SIGNED: 11/17/2022
Loyall A. Wharton, P.E.
Professional Engineer License: #C50547
Expiration Date: 06-30-2023

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724 ARASTRADERO RD
PALO ALTO, CA 94304
ROOFTOP

SHEET TITLE
**OVERALL AND
ENLARGED SITE PLAN**

SHEET NUMBER
A-1

SECTOR	POSITION	ANTENNA						TRANSMISSION CABLE	
		EXISTING OR PROPOSED	MANUFACTURER – MODEL NUMBER	TECHNOLOGY	SIZE (HxW)	AZIMUTH	RAD CENTER	FEED LINE TYPE AND LENGTH	
ALPHA	A1	PROPOSED	CELLMAX CX12044x	5G	72.4" x 26.7"	310°	42'-0"	(1) HIGH-CAPACITY HYBRID CABLE (±60' LONG)	
	A2	FUTURE	CELLMAX CX12044x	TBD	72.4" x 26.7"	310°	42'-0"		
BETA	B1	PROPOSED	CELLMAX CX12044x	5G	72.4" x 26.7"	70°	42'-0"		
	B2	FUTURE	CELLMAX CX12044x	TBD	72.4" x 26.7"	70°	42'-0"		
GAMMA	C1	PROPOSED	CELLMAX CX12044x	5G	72.4" x 26.7"	190°	42'-0"		
	C2	FUTURE	CELLMAX CX12044x	TBD	72.4" x 26.7"	190°	42'-0"		

SECTOR	POSITION	RRH	
		MANUFACTURER – MODEL NUMBER	TECHNOLOGY
ALPHA	A1/A2	FUJITSU TA08025-B604	N71
	A1/A2	FUJITSU TA08025-B605	N70/N66
BETA	B1/B2	FUJITSU TA08025-B604	N71
	B1/B2	FUJITSU TA08025-B605	N70/N66
GAMMA	C1/C2	FUJITSU TA08025-B604	N71
	C1/C2	FUJITSU TA08025-B605	N70/N66

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.

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

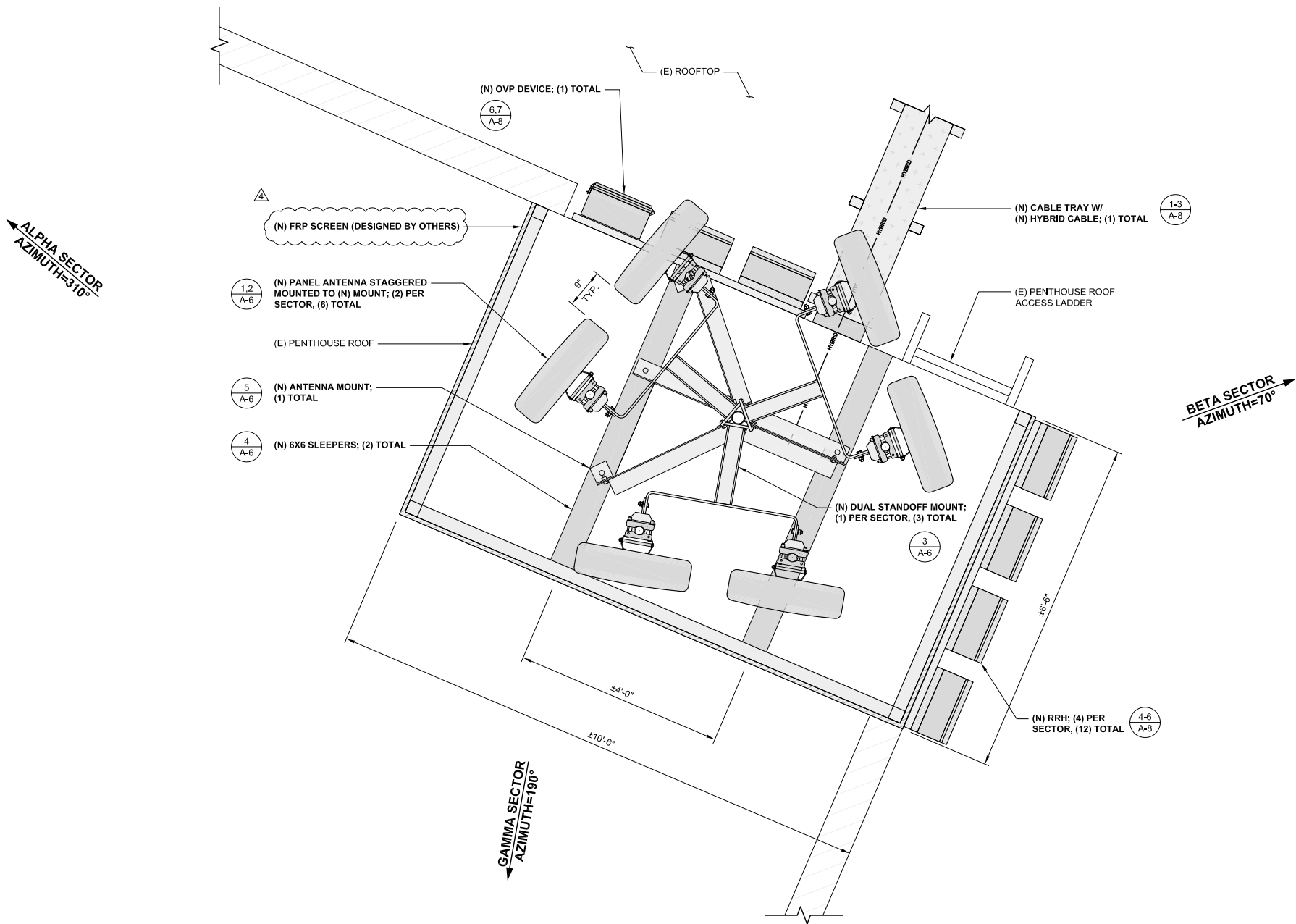
NOTES TO CONTRACTOR:

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

NOTES:

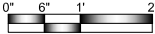
- ANTENNA AZIMUTHS ARE ESTIMATED AND ARE TO BE VERIFIED BY RF.
- ANTENNA BY OTHERS NOT SHOWN FOR CLARITY.
- PRIOR TO ORDERING ANTENNAS VERIFY CORRECT MODEL NUMBER WITH LATEST RFDS AND NOTIFY ENGINEER OF RECORD IMMEDIATELY IF DISCREPANCY IS FOUND.

ANTENNA & EQUIPMENT SCHEDULE



PROPOSED ANTENNA LAYOUT

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



1



5701 S SANTA FE DR
LITTLETON, CO 80120



1200 DEL PASO RD, STE 150
SACRAMENTO, CA 95843



1387 CALLE AVANZADO
SAN CLEMENTE CA 92673 (949) 391-8824

DRAWN BY: CP
CHECKED BY: MM

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DATE SIGNED: 11/17/2022
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Professional Engineer License: #C50547
Expiration Date: 06-30-2023

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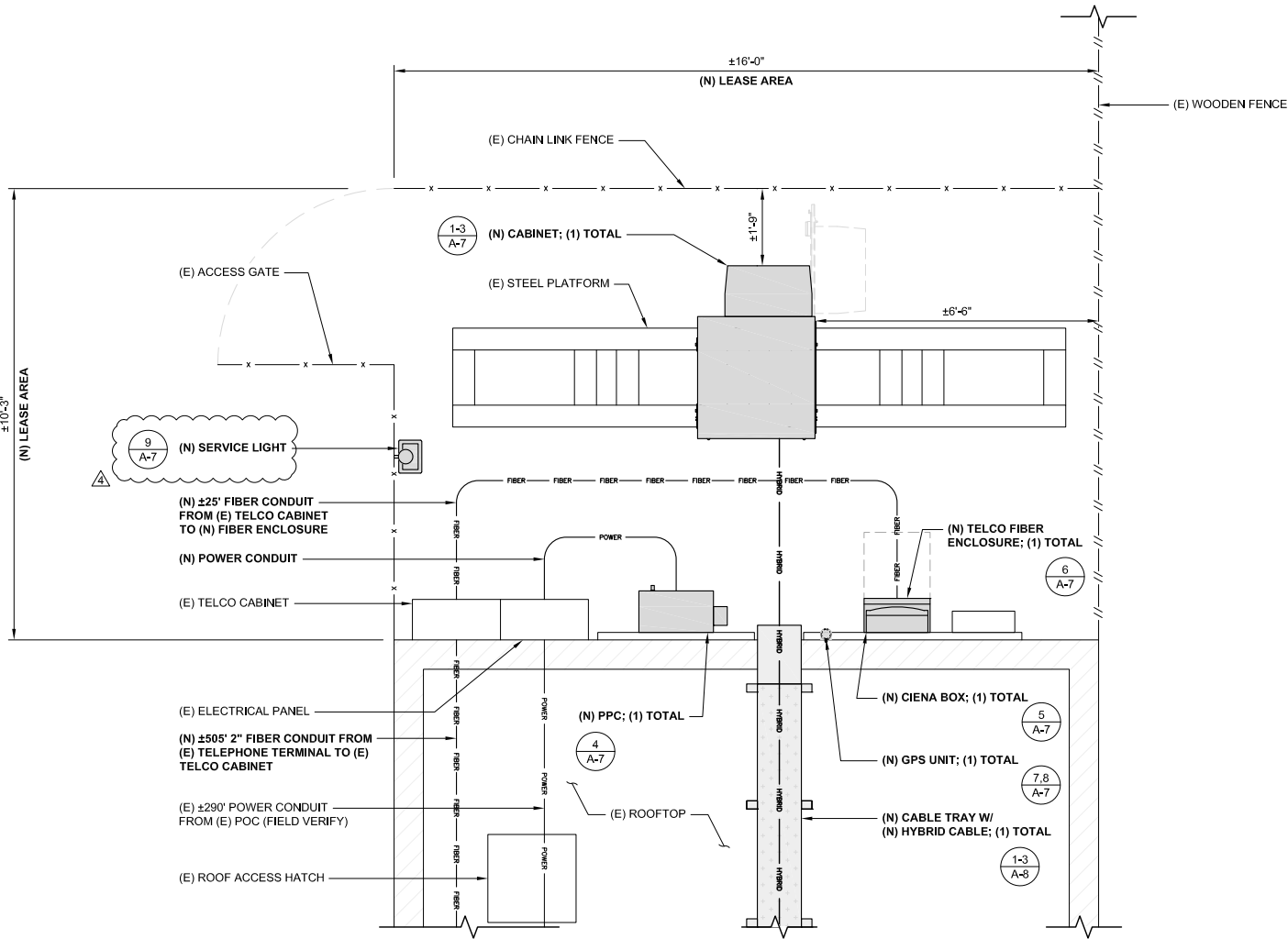
SFSFO00398A
724 ARASTRADERO RD
PALO ALTO, CA 94304
ROOFTOP

SHEET TITLE
ANTENNA LAYOUT
AND SCHEDULE

SHEET NUMBER

A-2

NOTES:
1. ROOFTOP NOT SHOWN FOR CLARITY.
2. ANTENNAS NOT SHOWN FOR CLARITY.



dish
wireless.

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SHEET TITLE
EQUIPMENT LAYOUT

SHEET NUMBER
A-3



NOTE:
1. PROPOSED EQUIPMENT TO BE PAINTED TO MATCH EXISTING STRUCTURE.

RAD CENTER OF NEW PANEL ANTENNAS
ELEV. 42'-0" A.G.L.

TOP OF EXISTING PENTHOUSE
ELEV. ±36'-4" A.G.L.

TOP OF EXISTING ROOF
ELEV. ±32'-0" A.G.L.

GROUND LEVEL
ELEV. 0'-0" A.G.L.

(N) PANEL ANTENNA STAGGERED
MOUNTED TO (N) MOUNT; (2) PER
SECTOR, (6) TOTAL

(N) FRP SCREEN (DESIGNED BY OTHERS)

(N) RRH; (4) PER SECTOR,
(12) TOTAL

(N) GPS UNIT; (1) TOTAL

(N) CABLE TRAY W/
(N) HYBRID CABLE; (1) TOTAL

(N) CABINET; (1) TOTAL

(E) ACCESS GATE

(E) WOODEN FENCE

(N) SERVICE LIGHT

(E) CHAIN LINK FENCE

(N) PPC; (1) TOTAL

(E) TELCO CABINET

46'-0"

PROPOSED SOUTHWEST ELEVATION

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

0' 1' 2' 4'

1

dish
wireless.

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SOUTHWEST ELEVATIONS

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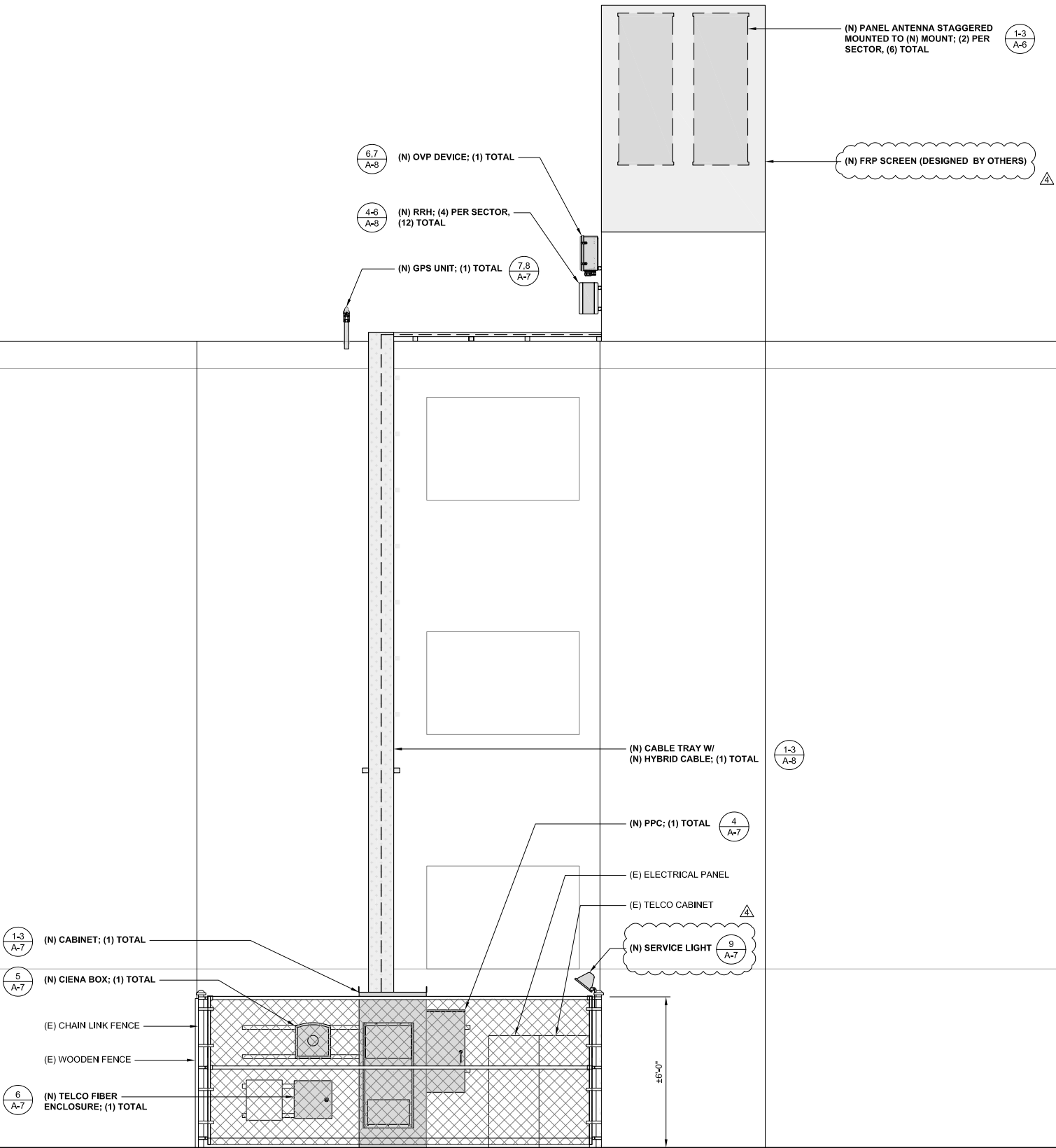
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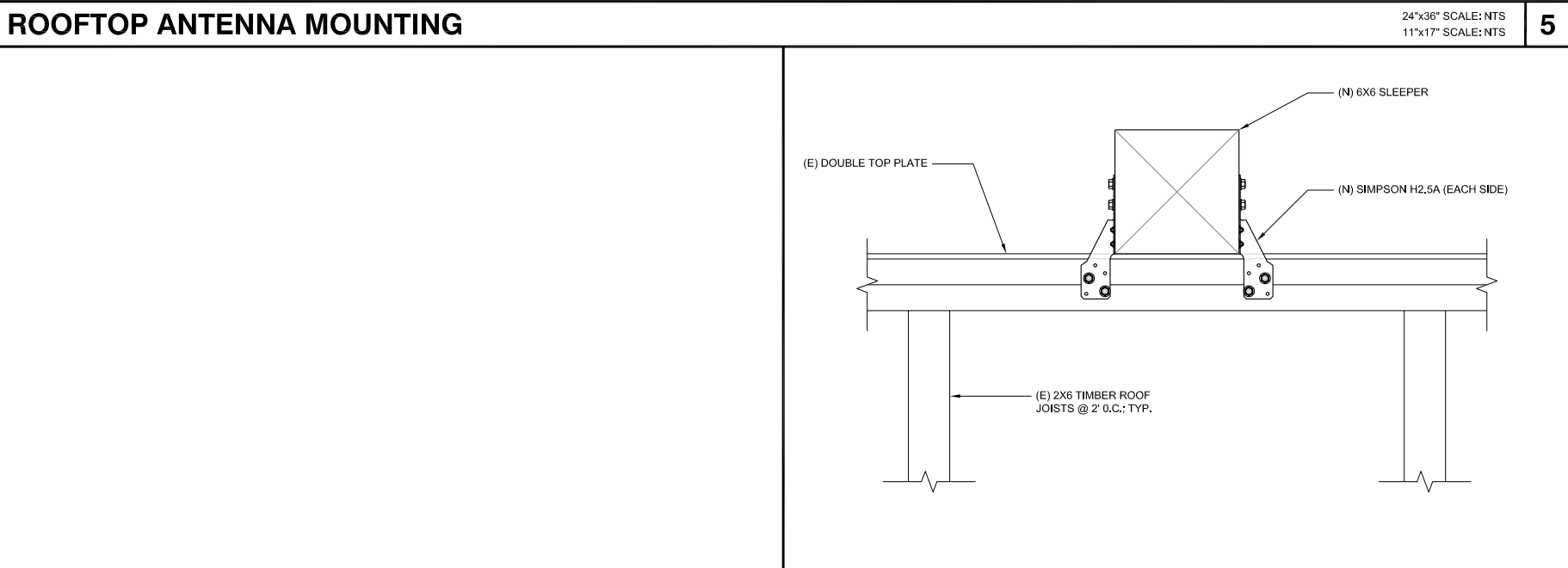
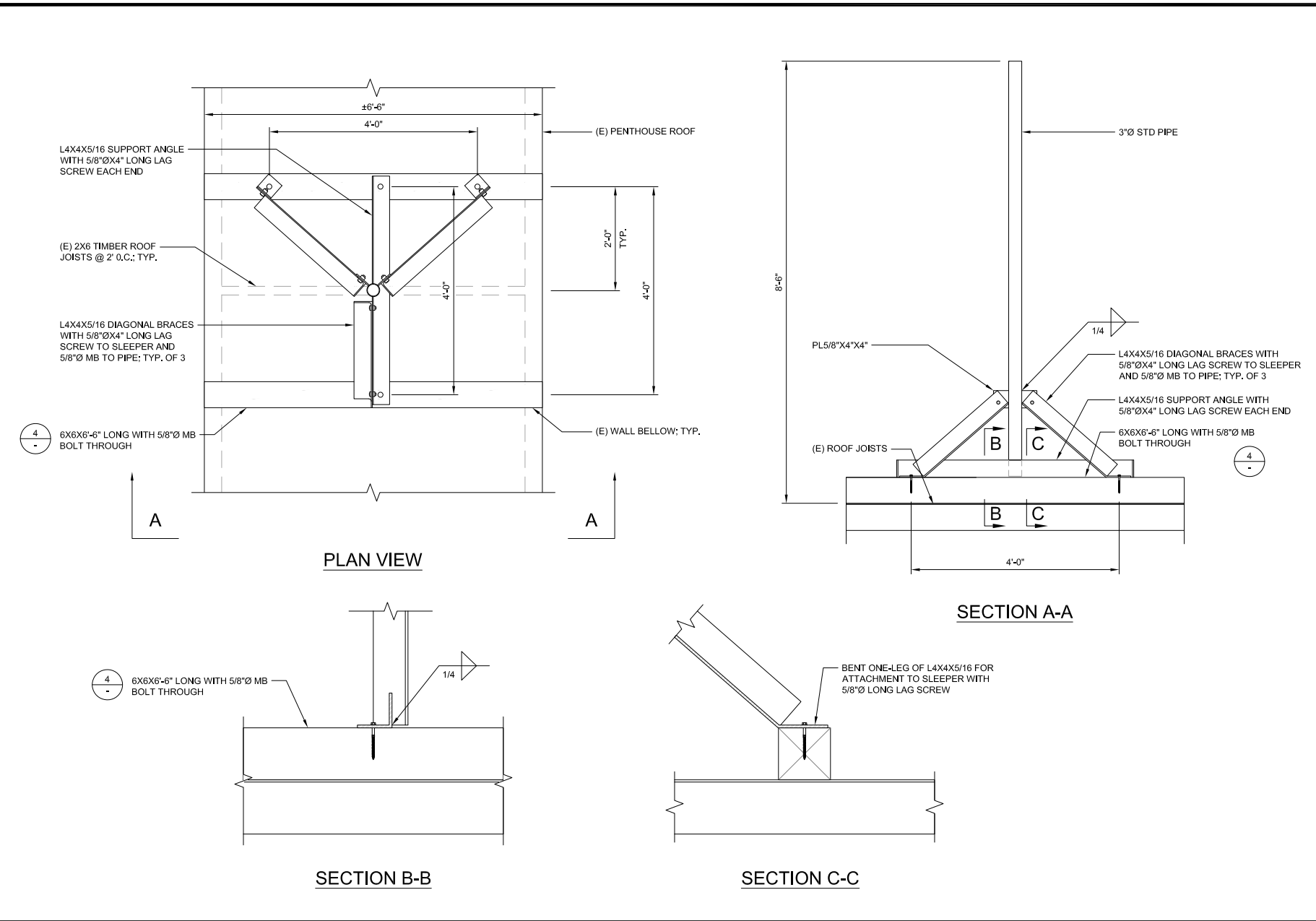
SFSFO00398A
724 ARASTRADERO RD
PALO ALTO, CA 94304
ROOFTOP

SHEET TITLE
NORTHWEST ELEVATIONS

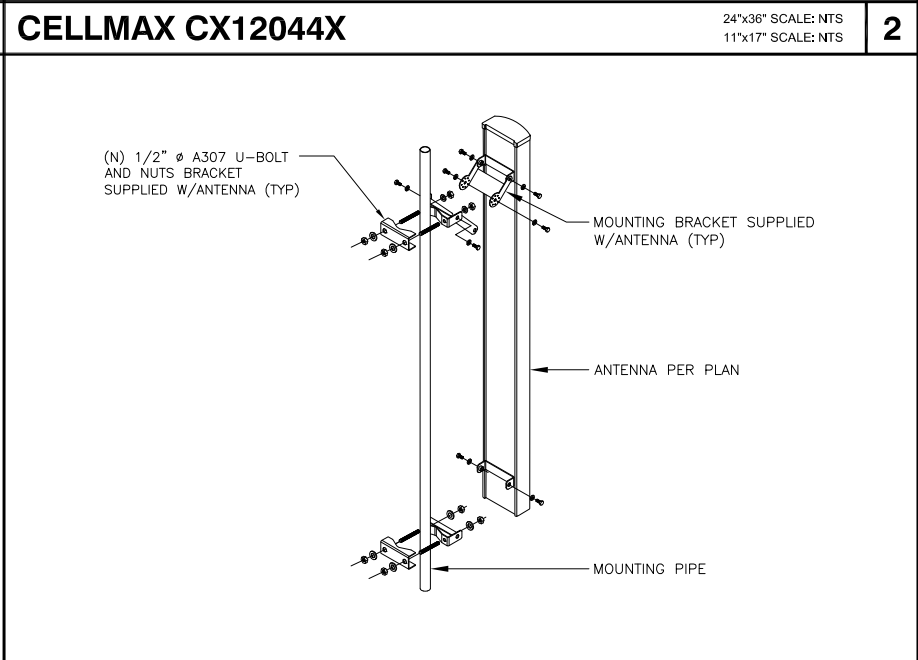
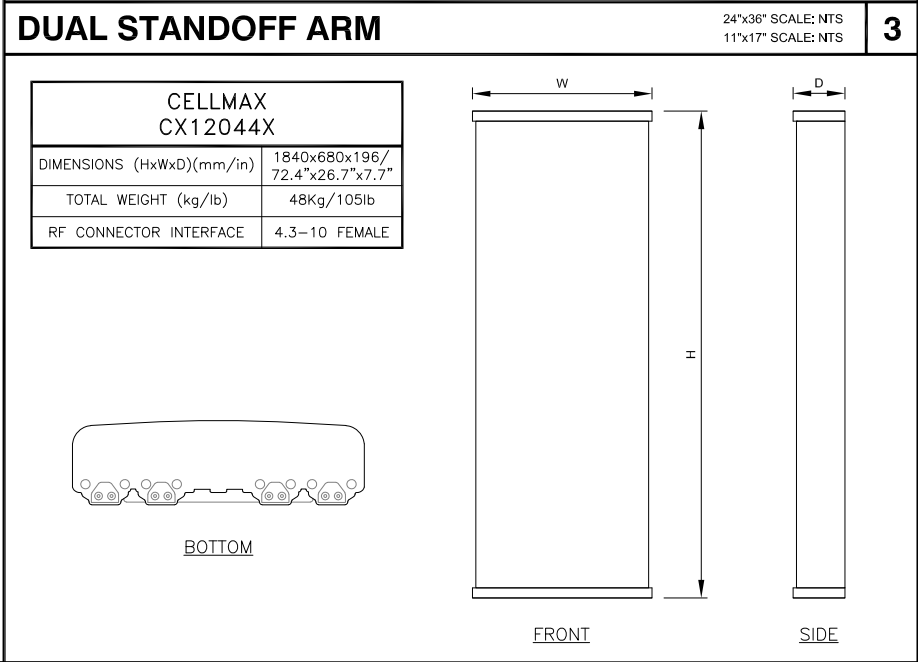
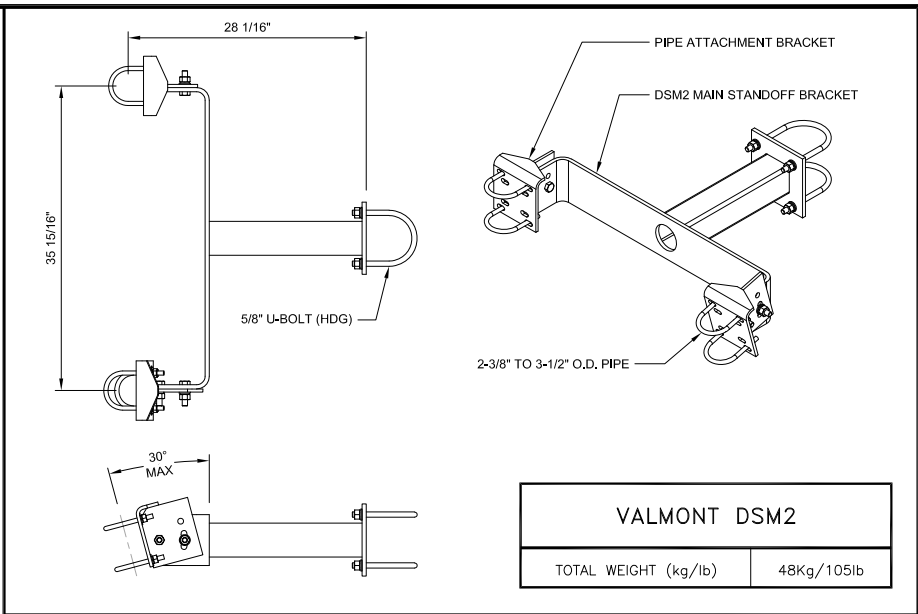
SHEET NUMBER
A-5

PROPOSED NORTHWEST ELEVATION

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



NOT USED 6 SLEEPER TO WALL CONNECTION 24"x36" SCALE: NTS 11"x17" SCALE: NTS

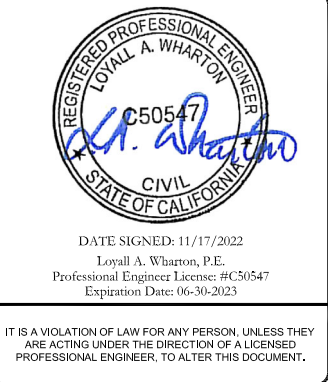


CELLMAX CX12044X 24"x36" SCALE: NTS 11"x17" SCALE: NTS



DRAWN BY:	CP
CHECKED BY:	MM

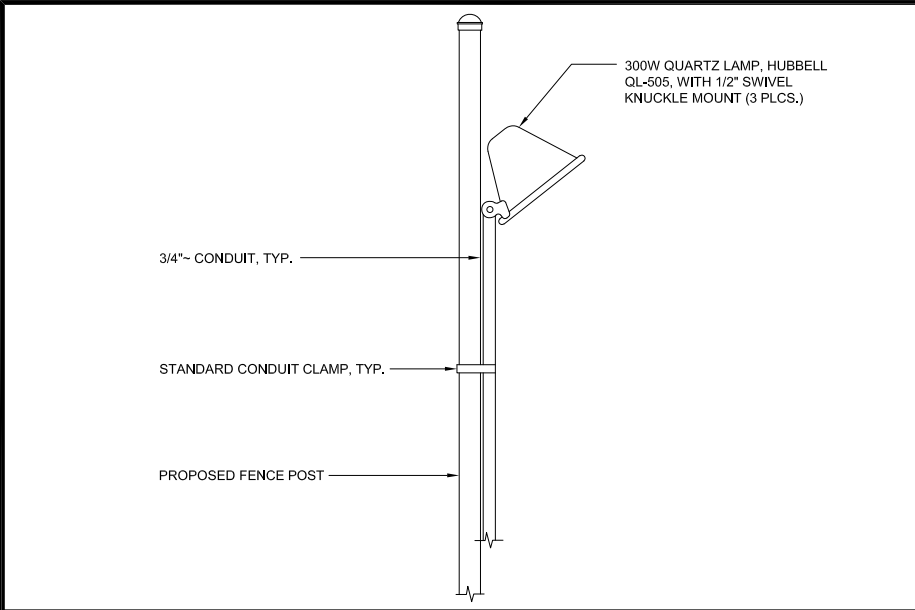
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2	10/03/2022	100% CD'S FOR SUBMITTAL
1	09/23/2022	100% CD'S FOR SUBMITTAL
0	03/24/2022	100% CD'S FOR SUBMITTAL
B	02/18/2022	100% CD'S FOR REVIEW
A	02/09/2022	90% CD'S FOR REVIEW



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ROOFTOP

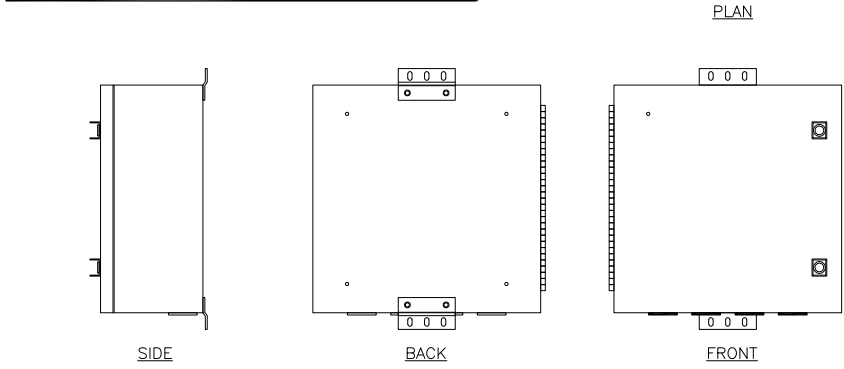
SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-6



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

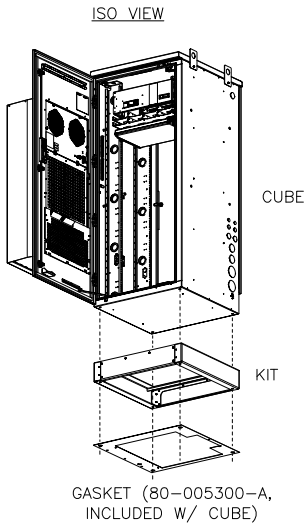
CHARLES CFIT-PF2020DSH1 FIBER TELCO ENCLOSURE	
ENCLOSURE DIMS (HxWxD)	20"x20"x9"
ENCLOSURE WEIGHT	20 lbs
MOUNTING	WALL
COMPLIANCE	TYPE 4



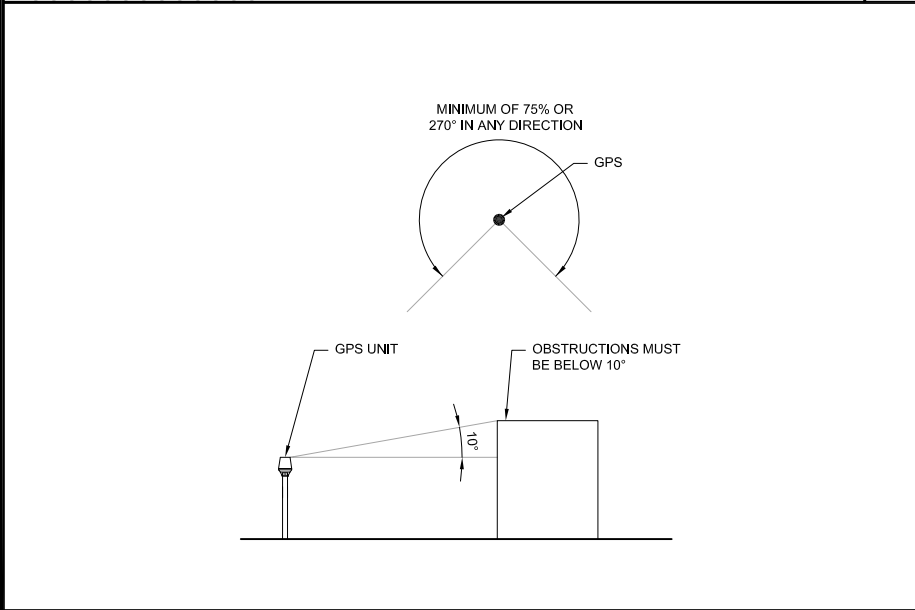
FIBER TELCO ENCLOSURE 24"x36" SCALE: NTS
11"x17" SCALE: NTS

CHARLES 6" PLINTH FOR PM639155N4 SERIES	
MATERIAL	STEEL
TOTAL WEIGHT AS SHIPPED	71 LBS

- KIT INSTALLATION:**
1. LOCATE THE GASKET THAT SHIPS WITH THE CUBE.
 2. FOLLOW THE INSTALLATION INSTRUCTIONS THAT SHIP WITH THE CUBE FOR PREPARING THE CONCRETE PAD.
 3. PLACE THE GASKET ON THE CONCRETE PAD. PLACE THE PLINTH ON THE GASKET. ENSURE THAT ALL MOUNTING HOLES ARE PROPERLY ALIGNED.
 4. SECURE THE PLINTH TO THE PAD USING FOUR CUSTOMER SUPPLIED, CORROSION RESISTANT, 1/2"-13 HEX HEAD BOLTS WITH ANCHORS. SEE THE INSTRUCTIONS THAT SHIP WITH THE CUBE.
 5. LOWER THE CUBE ONTO THE PLINTH, ENSURING THAT THE MOUNTING HOLES ON THE CUBE ARE ALIGNED WITH THE HOLES ON TOP OF THE PLINTH.
 6. SECURE THE CUBE TO THE PLINTH USING HARDWARE THAT SHIPS WITH THE PLINTH.

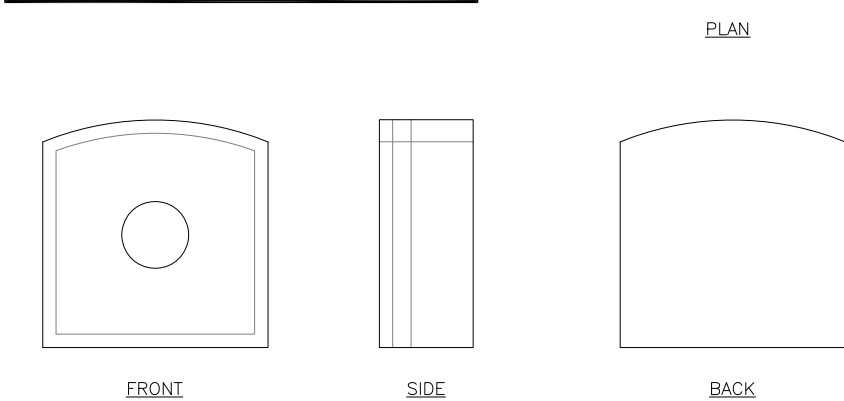


6" CABINET PLINTH 24"x36" SCALE: NTS
11"x17" SCALE: NTS



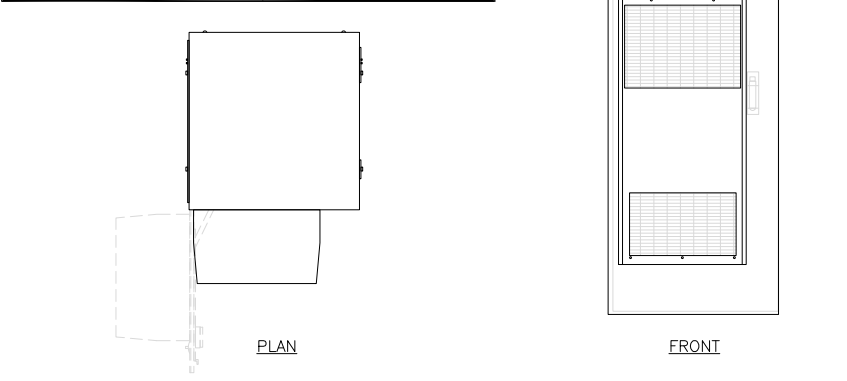
GPS MINIMUM SKY VIEW REQUIREMENTS 24"x36" SCALE: NTS
11"x17" SCALE: NTS

CIENA 3931 SERVICE DELIVERY SWITCH	
DIMENSIONS (HxWxD)	17.0"x16.8"x7.0"
WEIGHT	28.6 lbs
POWER INPUT	60W MAX

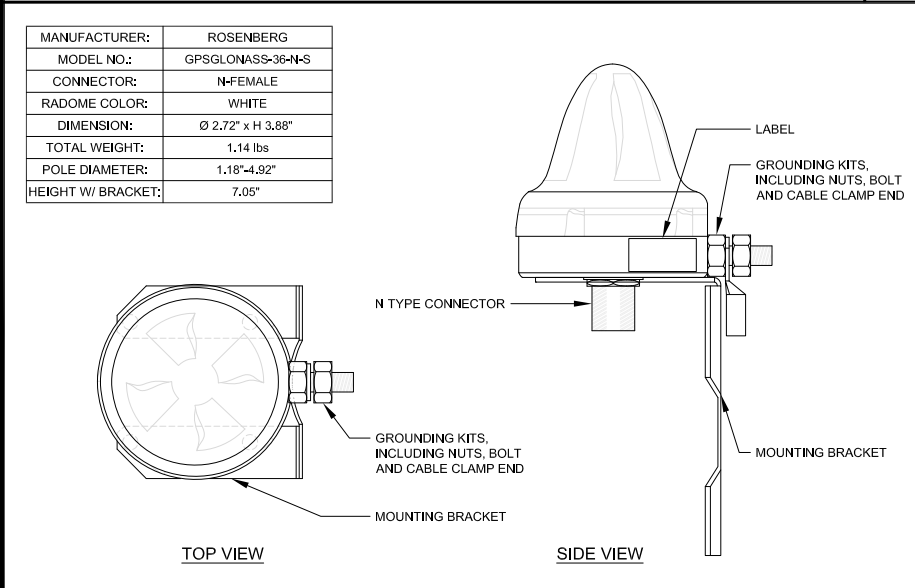


CIENA BOX 24"x36" SCALE: NTS
11"x17" SCALE: NTS

EQUIPMENT CABINET CHARLES CUBE PM639155N4	
ENCLOSURE DIM (HxWxD)	74.1"x32.0"x32.0"
TOTAL WEIGHT W/ NO BATTERIES	559.14 LBS
TOTAL WEIGHT W/ 4 BATTERIES	1067.14 LBS

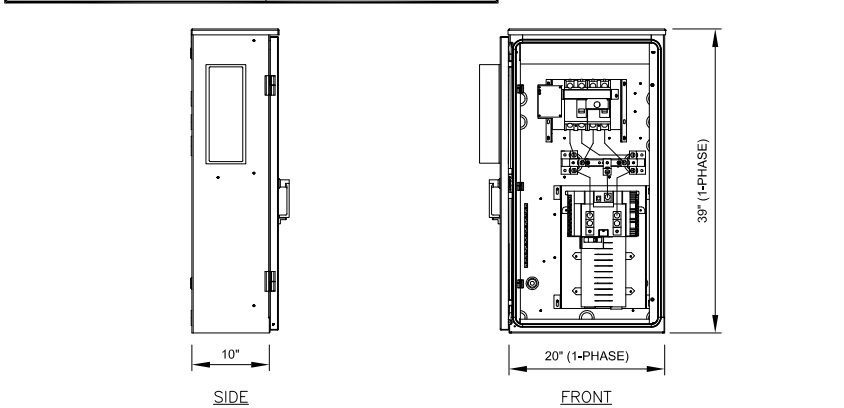


EQUIPMENT CABINET 24"x36" SCALE: NTS
11"x17" SCALE: NTS

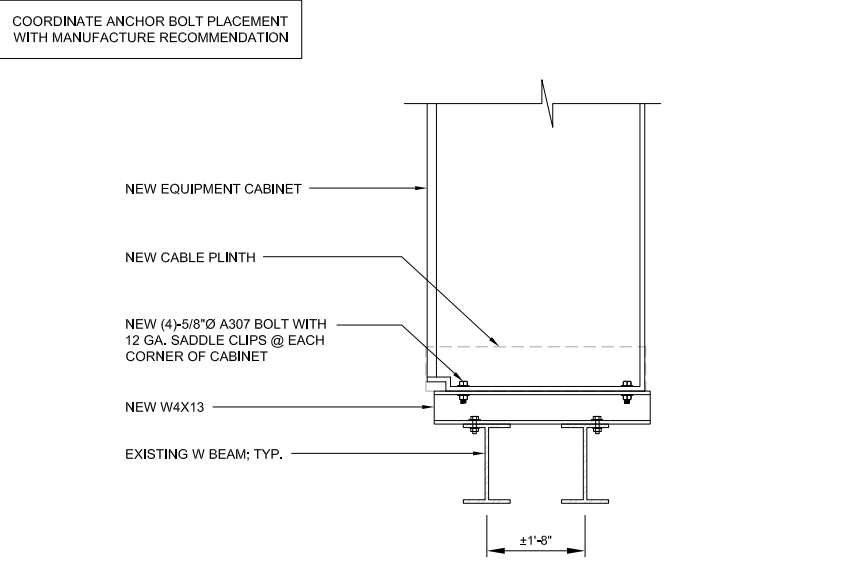


GPS ANTENNA 24"x36" SCALE: NTS
11"x17" SCALE: NTS

RAYCAP RDIAC-6152-P-240-MTS AC POWER PROTECTION CABINET	
TOTAL WEIGHT	124 LBS
DIMENSIONS	40" X 20" X 10"



RAYCAP PPC RDIAC-6512-P-240-MTS 24"x36" SCALE: NTS
11"x17" SCALE: NTS



CABINET MOUNTING DETAIL 24"x36" SCALE: NTS
11"x17" SCALE: NTS

dish
wireless.
5701 S SANTA FE DR
LITTLETON, CO 80120

QUALTEK
WIRELESS
1200 DEL PASO RD, STE 150
SACRAMENTO, CA 95843

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

DRAWN BY:	CP
CHECKED BY:	MM

REV	DATE	DESCRIPTION
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B	02/18/2022	100% CD'S FOR REVIEW
A	02/09/2022	90% CD'S FOR REVIEW

REGISTERED PROFESSIONAL ENGINEER
LOYAL A. WHARTON
C50547
CIVIL
STATE OF CALIFORNIA
DATE SIGNED: 11/17/2022
Loyall A. Wharton, P.E.
Professional Engineer License: #C50547
Expiration Date: 06-30-2023
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PALO ALTO, CA 94304
ROOFTOP

SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-7

NOTES:

1. CONTRACTOR SHALL FIELD VERIFY ALL PROPOSED UNDERGROUND UTILITY CONDUIT ROUTE.
2. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.

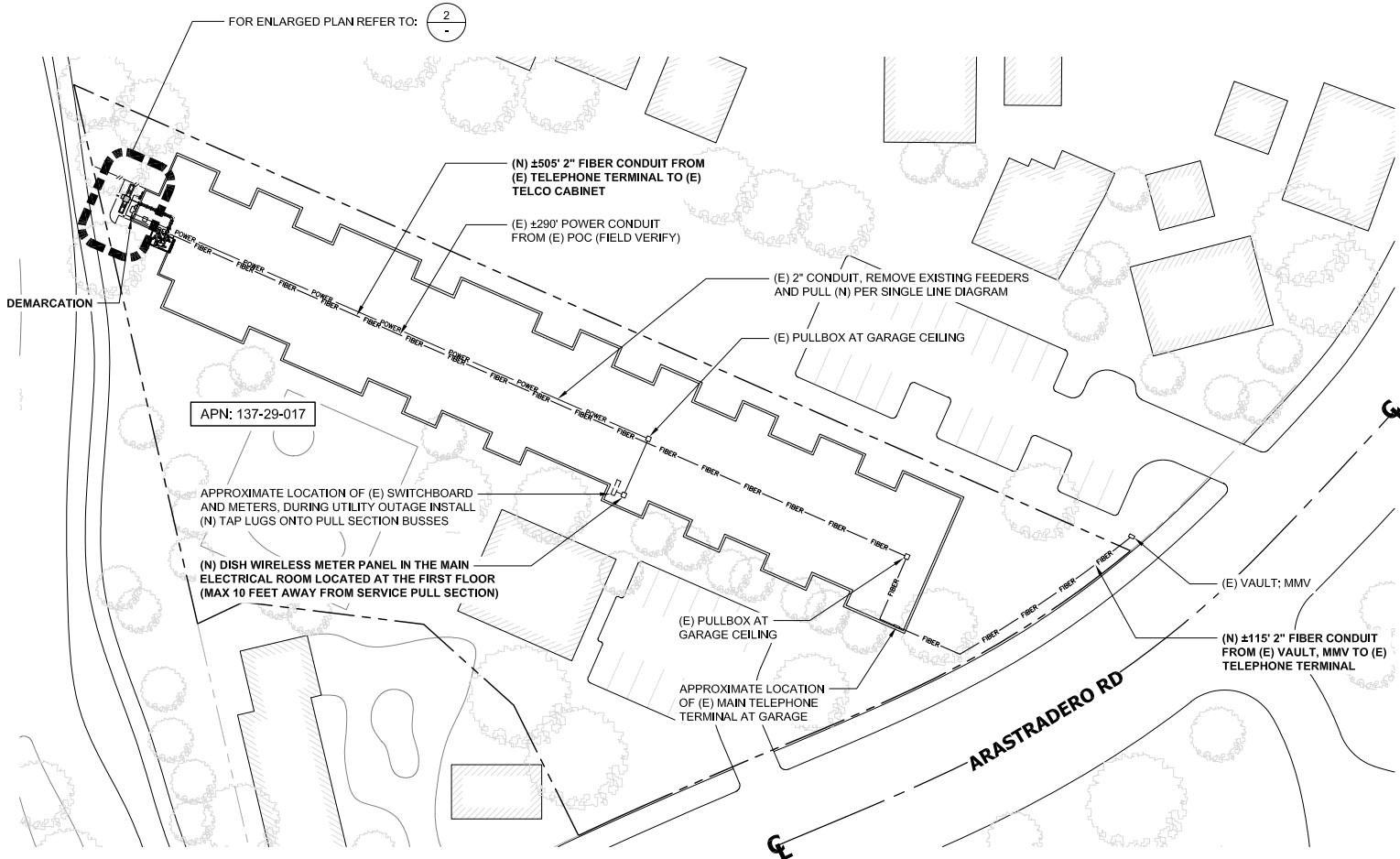
DC POWER WIRING SHALL BE COLOR CODED AT EACH END FOR IDENTIFYING +24V AND -48 CONDUCTORS. RED MARKINGS SHALL IDENTIFY +24V AND BLUE MARKINGS SHALL IDENTIFY -48V.

1. CONTRACTOR SHALL INSPECT THE EXISTING CONDITIONS PRIOR TO SUBMITTING A BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO THE CONSTRUCTOR'S FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, NOT AFTER THE CONTRACT HAS BEEN AWARDED.
2. ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH CURRENT NATIONAL ELECTRICAL CODES AND ALL STATE AND LOCAL CODES, LAWS, AND ORDINANCES. PROVIDE ALL COMPONENTS AND WIRING SIZED AS REQUIRED TO MEET NEC STANDARDS.
3. LOCATION OF EQUIPMENT, CONDUIT AND DEVICES SHOWN ON THE DRAWINGS ARE APPROXIMATE AND SHALL BE COORDINATED WITH FIELD CONDITIONS PRIOR TO CONSTRUCTION.
4. CONDUIT ROUGH-IN SHALL BE COORDINATED WITH THE MECHANICAL EQUIPMENT TO AVOID LOCATION CONFLICTS. VERIFY WITH THE MECHANICAL EQUIPMENT CONTRACTOR AND COMPLY AS REQUIRED.
5. CONTRACTOR SHALL PROVIDE ALL BREAKERS, CONDUITS AND CIRCUITS AS REQUIRED FOR A COMPLETE SYSTEM.
6. CONTRACTOR SHALL PROVIDE PULL BOXES AND JUNCTION BOXES AS REQUIRED BY THE NEC ARTICLE 314.
7. CONTRACTOR SHALL PROVIDE ALL STRAIN RELIEF AND CABLE ASSEMBLES. INSTALLATION SHALL BE IN ACCORDANCE WIT MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
8. ALL DISCONNECTS AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED PHENOLIC NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS INSTALLED ON, AND PANEL FIELD LOCATIONS FED FROM.
9. INSTALL AND EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS PER THE SPECIFICATIONS AND NEC 250. THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT ALL JUNCTION BOXES, PULL BOXES, AND ALL DISCONNECT SWITCHES, AND EQUIPMENT CABINETS.
10. ALL NEW MATERIAL SHALL HAVE A U.L. LABEL.
11. PANEL SCHEDULE LOADING AND CIRCUIT ARRANGEMENTS REFLECT POST-CONSTRUCTION EQUIPMENT.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR AS-BUILT PANEL SCHEDULE AND SITE DRAWINGS.
13. ALL TRENCHES IN COMPOUND TO BE HAND DUG.

ELECTRICAL NOTES

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

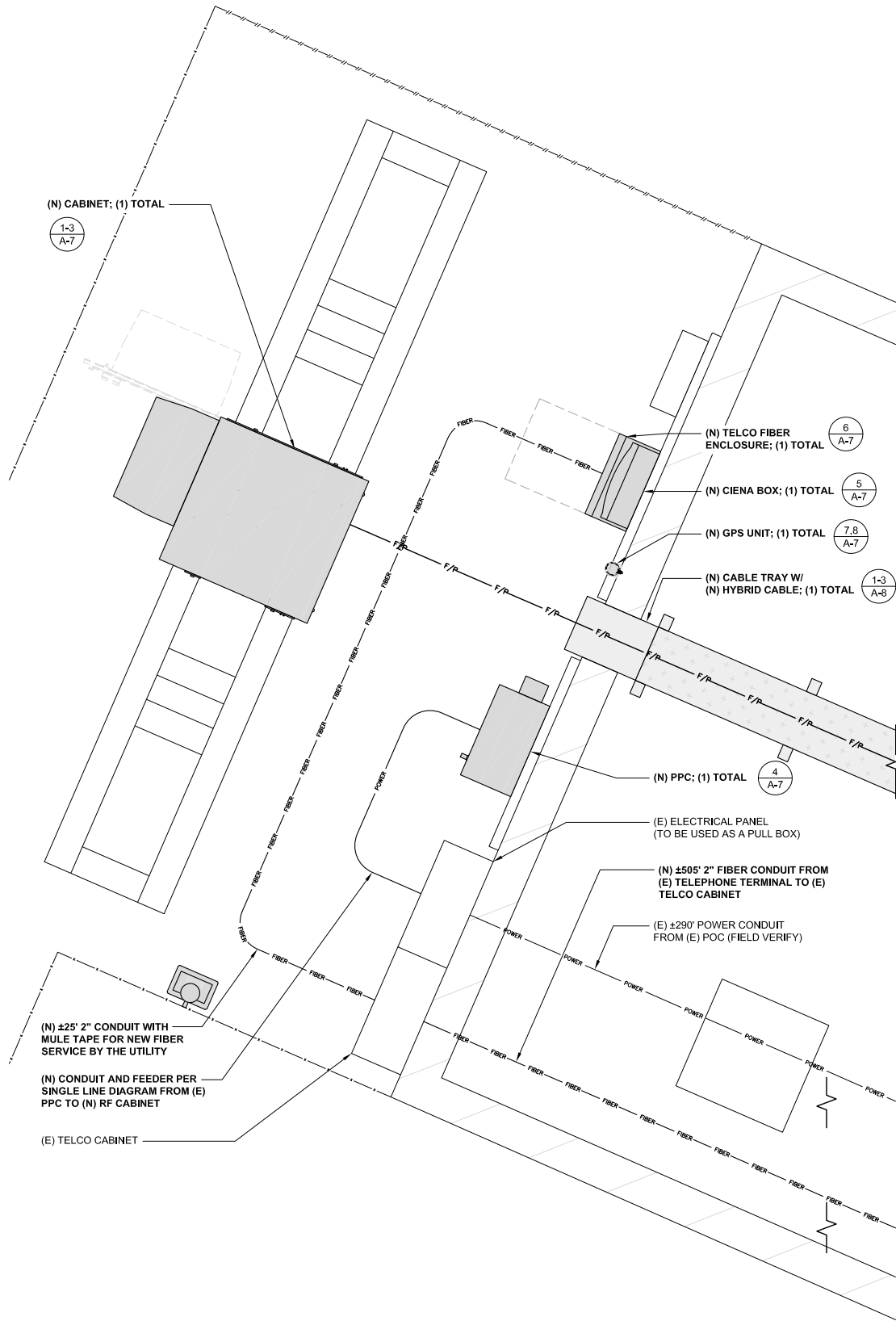
3



ELECTRICAL PLAN

24"x36" SCALE: 1" = 40'-0"
11"x17" SCALE: 1" = 80'-0"

1



ENLARGED ELECTRICAL PLAN

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

2



5701 S SANTA FE DR
LITTLETON, CO 80120



1200 DEL PASO RD, STE 150
SACRAMENTO, CA 95843



1387 CALLE AVANZADO
SAN CLEMENTE CA 92873 (949) 391-8824

DRAWN BY: CP
CHECKED BY: MM

REV	DATE	DESCRIPTION
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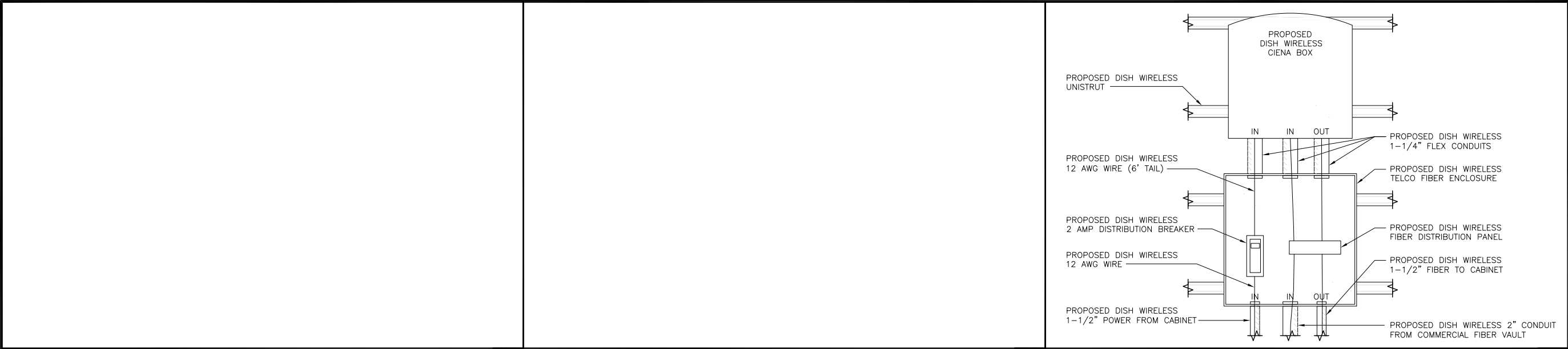
DATE SIGNED: 11/17/2022
Loyall A. Wharton, P.E.
Professional Engineer License: #C50547
Expiration Date: 06-30-2023

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PALO ALTO, CA 94304
ROOFTOP

SHEET TITLE
ELECTRICAL PLAN
AND NOTES

SHEET NUMBER
E-1



NOT USED

9

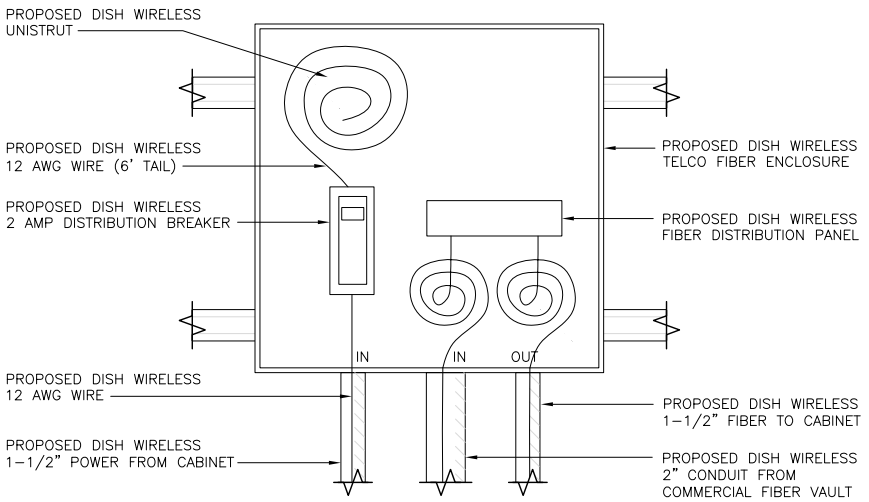
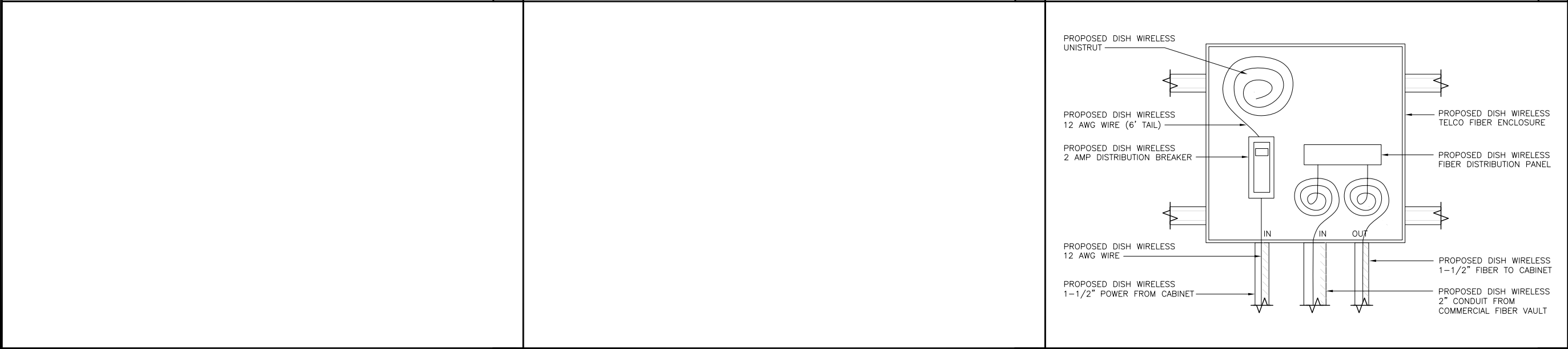
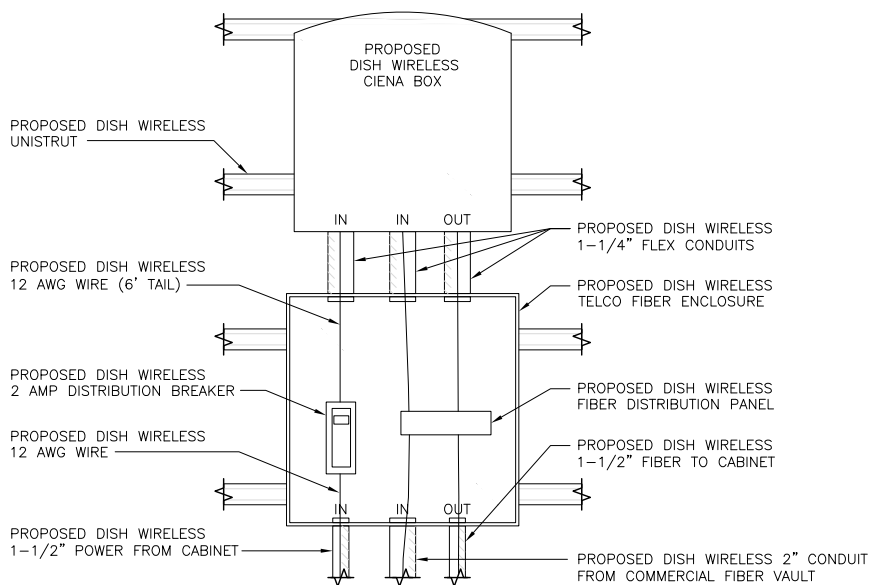
NOT USED

6

LIT TELCO BOX WIRING LAYOUT

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

3



NOT USED

8

NOT USED

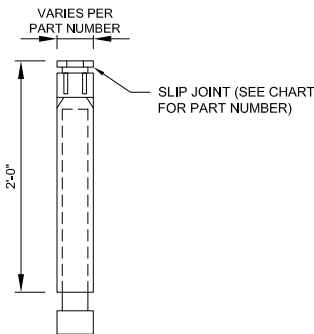
5

DARK TELCO BOX WIRING LAYOUT

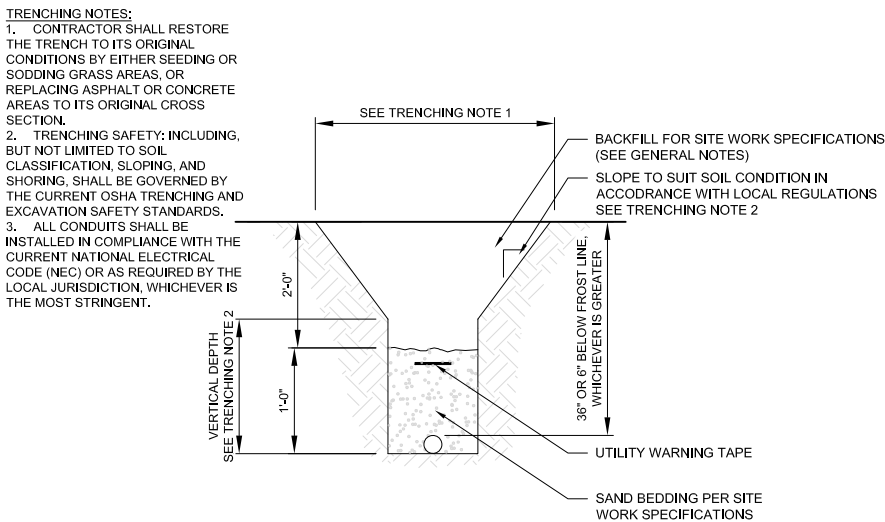
24"x36" SCALE: NTS
11"x17" SCALE: NTS

2

CARLON EXPANSION FITTINGS				
COUPLING END PART#	MALE TERMINAL ADAPTER END PART #	SIZE	STD CTN QTY.	TRAVEL LENGTH
E945D	E945DX	1/2"	20	4"
E945E	E945EX	3/4"	15	4"
E945F	E945FX	1"	10	4"
E945G	E945GX	1 1/4"	5	4"
E945H	E945HX	1 1/2"	5	4"
E945J	E945JX	2"	15	8"
E945K	E945KX	2 1/2"	10	8"
E945L	E945LX	3"	10	8"
E945M	E945MX	3 1/2"	5	8"
E945N	E945NX	4"	5	8"
E945P	E945PX	5"	1	8"
E945R	E945RX	6"	1	8"



NOTE:
CONTRACTOR TO INSTALL EXPANSION
FITTING SLIP JOINT AT METER CENTER
CONDUIT TERMINATION, AS PER
LOCAL UTILITY POLICY, ORDINANCE
AND/OR SPECIFIED REQUIREMENT.



NOT USED

7

EXPANSION JOINT DETAIL

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

4

TYP. UNDERGROUND TRENCH DETAIL

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

1

5701 S SANTA FE DR
LITTLETON, CO 80120

1200 DEL PASO RD, STE 150
SACRAMENTO, CA 95843

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

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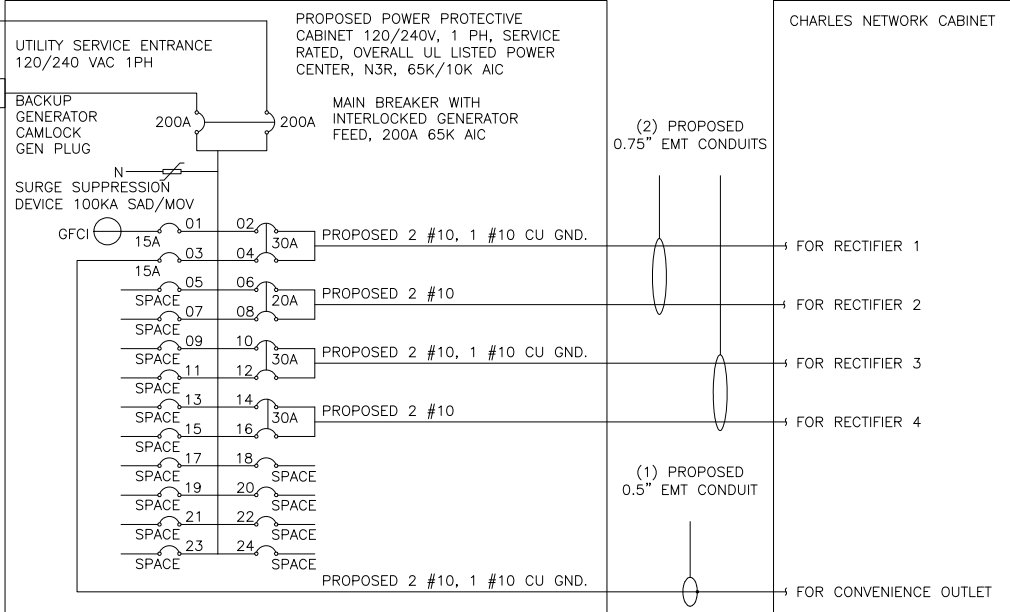
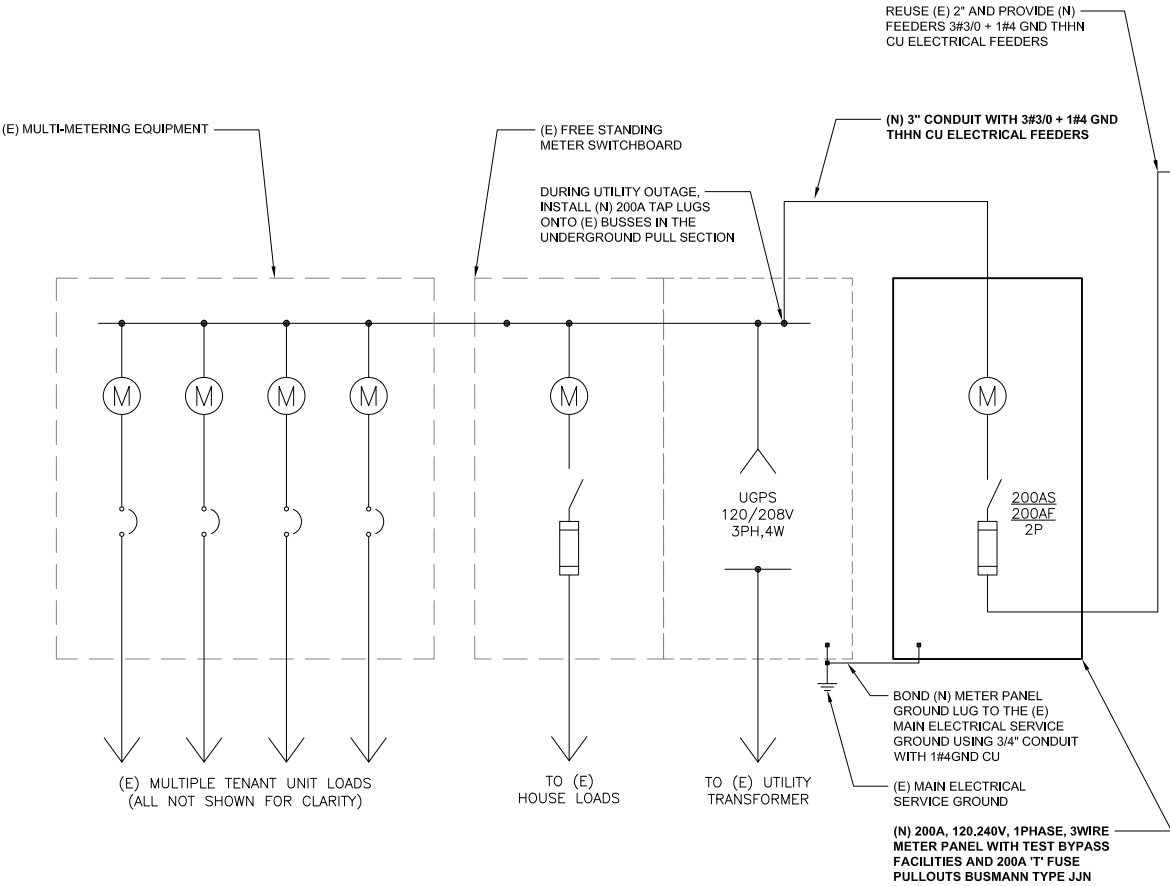
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PALO ALTO, CA 94304
ROOFTOP

SHEET TITLE

ELECTRICAL DETAILS

SHEET NUMBER

E-2



NOTE:
BRANCH CIRCUIT WIRING SUPPLYING RECTIFIERS ARE TO BE RATED UL015, 105C, 600V AND PVC INSTALLED, 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
(2) 15A, 1P BREAKER - SQUARE D P/N:Q0115

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)(a) OR 2020 NEC TABLE 310.15(C)(1) FOR UL1015 WIRE.

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

CONDUIT SIZING: AT 40% FILL PER NEC CHAPTER 9, TABLE A, ARTICLE 358.
0.5" CONDUIT - 0.122 SQ. IN AREA
0.75" CONDUIT - 0.213 SQ. IN AREA
2.0" CONDUIT - 1.316 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 $\times 2 = 0.0422$ SQ. IN
#10 - 0.0211 SQ. IN $\times 1 = 0.0211$ 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 (1 CONDUIT): USING UL1015, CU.

#10 - 0.0266 SQ. IN $\times 4 = 0.1064$ SQ. IN
#10 - 0.0082 SQ. IN $\times 1 = 0.0082$ SQ. IN <BARE GROUND
TOTAL = 0.1146 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.

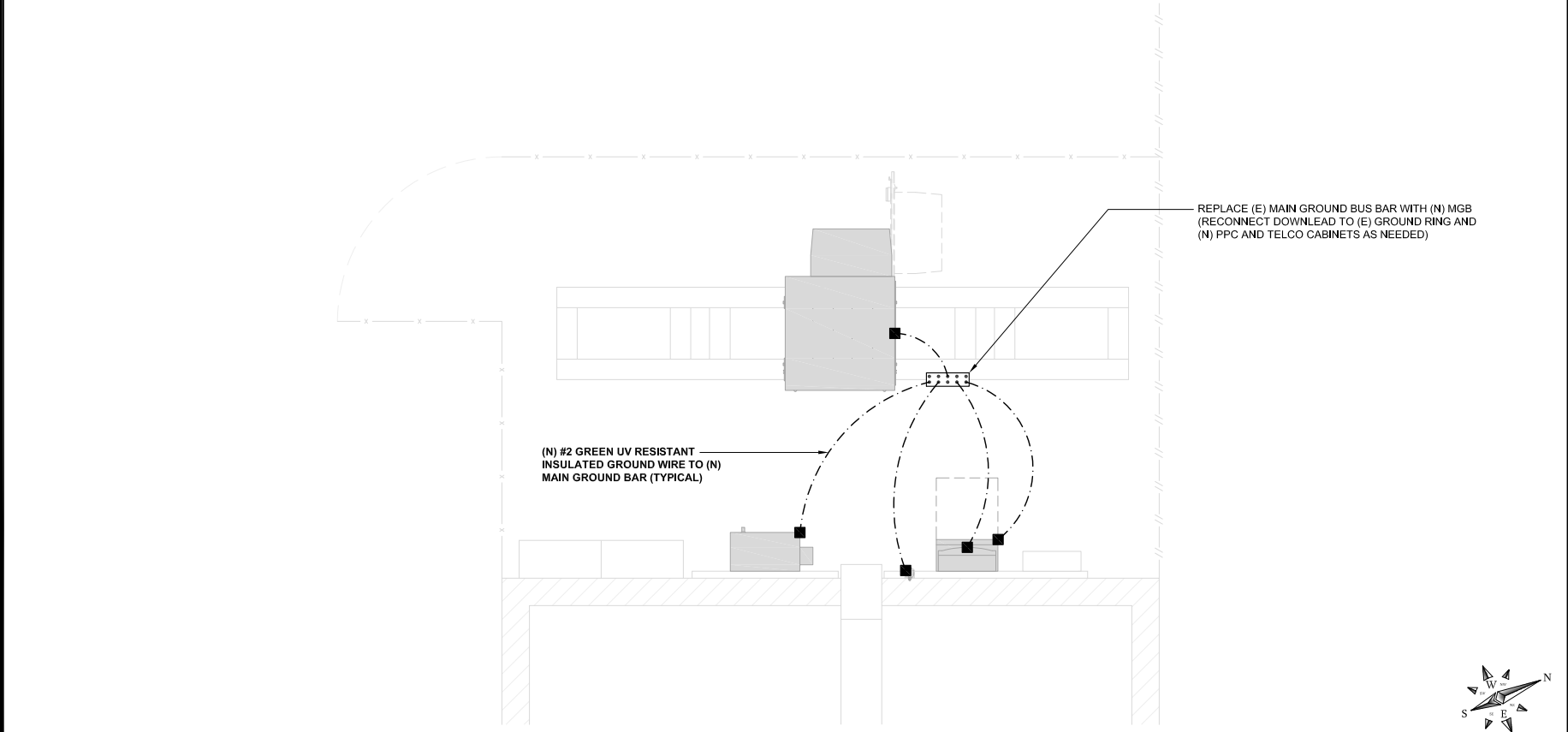
3/0 - 0.2679 SQ. IN $\times 3 = 0.8037$ SQ. IN
#6 - 0.0507 SQ. IN $\times 1 = 0.0507$ SQ. IN <GROUND
TOTAL = 0.8544 SQ. IN

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

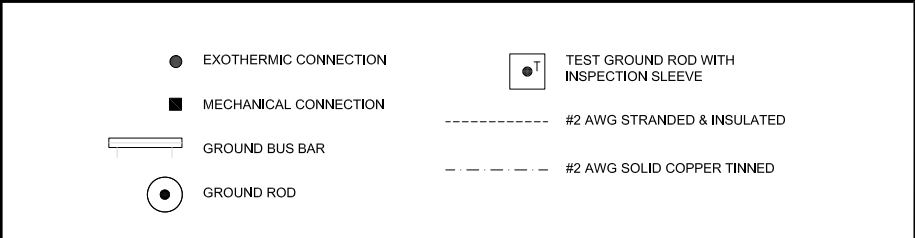
PROPOSED CHARLES PANEL SCHEDULE

LOAD SERVED	VOLT AMPS (WATTS)		TRIP	CKT #	PHASE		CKT #	TRIP	VOLT AMPS (WATTS)		LOAD SERVED
	L1	L2			L1	L2					
PPC GFCI OUTLET	180		15A	1	A	2		30A	2880		ABB/GE INFINITY RECTIFIER 1
CHARLES GFCI OUTLET		180	15A	3	B	4				2880	
—SPACE—				5	A	6		30A	2880		ABB/GE INFINITY RECTIFIER 2
—SPACE—				7	B	9				2880	
—SPACE—				9	A	11		30A	2880		ABB/GE INFINITY RECTIFIER 3
—SPACE—				11	B	13				2880	
—SPACE—				13	A	15		30A	2880		ABB/GE INFINITY RECTIFIER 4
—SPACE—				15	B	17				2880	
—SPACE—				17	A	19					—SPACE—
—SPACE—				19	B	21					—SPACE—
—SPACE—				21	A	23					—SPACE—
—SPACE—				23	B	25					—SPACE—
VOLTAGE AMPS		180	180						11520	11520	
200A MCB, 1Ø, 24 SPACE, 120/240V		L1	L2								
MB RATING: 65,000 AIC		11700	11700					VOLTAGE AMPS			
		98	98					AMPS			
		98						MAX AMPS			
		121.9						MAX 125%			
		</									

ANTENNA GROUNDING PLAN



EQUIPMENT 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 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) TOWER GROUND RING: THE GROUND RING SYSTEM SHALL BE INSTALLED AROUND AN ANTENNA TOWER'S LEGS, AND/OR GUY ANCHORS. WHERE SEPARATE SYSTEMS HAVE BEEN PROVIDED FOR THE TOWER AND THE BUILDING, AT LEAST TWO BONDS SHALL BE MADE BETWEEN THE TOWER RING GROUND SYSTEM AND THE BUILDING RING 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 GROUNDED 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.
- (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: 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 GROUND RING WITH (2) #2 SOLID TINNED COPPER CONDUCTORS.
- (G) HATCH PLATE GROUND BAR: BOND TO THE INTERIOR GROUND RING 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 BUILDING. BOND TO GROUND RING WITH A #2 AWG SOLID TINNED COPPER CONDUCTORS WITH AN EXOTHERMIC WELD AND INSPECTION SLEEVE.
- (J) TELCO GROUND BAR: BOND TO BOTH CELL REFERENCE GROUND BAR AND EXTERIOR GROUND RING.
- (K) FRAME BONDING: THE BONDING POINT FOR TELECOM EQUIPMENT FRAMES SHALL BE THE GROUND BUS THAT IS NOT ISOLATED FROM THE EQUIPMENTS METAL FRAMEWORK. BOND THE FRAME GROUND TO THE "I" SECTION OF THE CELL REFERENCE GROUND BAR OR SUPPLEMENTARY CONDUCTOR. (SHEET G3 DETAIL 1)
- (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 WITHIN 7 FEET OF THE EXTERIOR GROUND RING OR OBJECTS BONDED TO THE EXTERIOR GROUND RING SHALL BE BONDED TO THE GROUND RING 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 EXTERIOR GROUND RING. 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 OUTS, 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) TOWER TOP COLLECTOR BUSS BAR IS TO BE MECHANICALLY BONDED TO PROPOSED ANTENNA MOUNT.

REFER TO DISH WIRELESS GROUNDING NOTES.

GROUNDING KEY NOTES

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wireless.

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REGISTERED PROFESSIONAL ENGINEER
LOYALL A. WHARTON
C50547
CIVIL
STATE OF CALIFORNIA

DATE SIGNED: 11/17/2022
Loyall A. Wharton, P.E.
Professional Engineer License: #C50547
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ROOFTOP

SHEET TITLE
**GROUNDING PLANS
AND NOTES**

SHEET NUMBER
G-1

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 SHINERS).

TO ANTENNAS

TO ANTENNAS

COAX JUMPER REQUIRED PER MANUFACTURER'S RECOMMENDATION OR FOR EASE OF CONNECTION (TYP)

CONNECTOR WEATHERPROOFING KIT, TYP.

FROM RRU

#2 GREEN UV RESISTANT INSULATED GROUND WIRE TO MAIN GROUND BAR

STANDARD GROUNDING KIT, TYP. (SEE NOTE 7 ON SHEET G-2)

ANTENNA CABLE TO BTS, TYP.

6 AWG STRANDED COPPER CONDUCTOR WITH GREEN, 600V, THWN-2 INSULATION

GROUNDING BAR, ANDREW PART # UGBKIT-0424-T (TINNED). A LOCKBOX IS REQUIRED AT GRADE TASSCO PART # 351546. ANTENNA HEIGHT WILL DETERMINE NUMBER OF GROUNDING BARS AND THEIR LOCATION

4

5

3

2

1

7/16"

1"

SEE DETAIL 1

LEGEND:

1. COPPER GROUND BAR, 1/4"x 4"x 20", NEWTON INSTRUMENT CO. CAT. NO. B-6142 OR EQUAL. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION. (ACTUAL GROUND BAR SIZE WILL VARY BASED ON NUMBER OF GROUND CONNECTIONS)

2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4 OR EQUAL

3. 5/8" LOCKWASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8 OR EQUAL WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056 OR EQUAL

4. 5/8-11 X 1" HHCS BOLTS, NEWTON INSTRUMENT CO. CAT NO. 3012-1 OR EQUAL

5. INSULATORS SHALL BE ELIMINATED WHEN BONDING DIRECTLY TO TOWER/MONOPOLE STRUCTURE. CONNECTION TO TOWER/MONOPOLE STRUCTURE SHALL BE PER MANUFACTURERS RECOMMENDATIONS

TYPICAL GROUNDING NOTES

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

9

GROUNDING BAR CONNECTION

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

6

GROUNDING BAR DETAIL

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

3

BASE CONNECTION

TO CABLE TRAY/SUPPORT GROUND BUSS BAR

2 GROUND

ANTENNA (TYP.), NUMBER OF ANTENNAS REPRESENTED IN THIS DETAIL ARE FOR SHOWING CLARITY OF GROUND SYSTEM REQUIREMENTS ONLY.

1/2" COAX JUMPER

NEW RRU PER PLAN (TYP)

MIN. #6 AWG STRANDED (GREEN JACKET) COPPER GROUND WIRE (BONDED TO GROUND BAR, TYP.)

MAIN GROUND BAR

#2AWG GREEN STRANDED CONDUCTOR

ANTENNA GROUND BAR

#2 AWG BARE COPPER GROUND CONDUCTOR TO BUILDING STEEL OR GROUNDING SYSTEM

NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER

T&B CO. "C-TAP", CAT. #54730, CRIMP TYPE PARALLEL TAP OR EQUIVALENT

DIRECTION OF BOND TO TURN TO SHORTEST DISTANCE TO MGB

#6 AWG GREEN INSULATED STRANDED COPPER WIRE (UNIT BOND)

OUTDOOR CABINET GROUNDING

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

8

ANTENNA GROUNDING PLAN

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

5

GROUNDING WIRE CONNECTION

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

2

CABLE TRAY

CHERRY INSULATOR, INSTALLED IF REQUIRED

TIN COATED SOLID COPPER BUS BAR

SLEEPER

EXISTING BUILDING ROOFTOP

SECTION VIEW

#2 STRANDED INSULATES COPPER GROUNDING WIRE TO MAIN BUS BAR (TYP)

#2 UV RESISTANT GREEN INSULATED GROUNDING JUMPER BETWEEN CABLE TRAY SECTIONS, USE DOUBLE LUG CONNECTORS (TYP)

CABLE TRAY

EXISTING BUILDING ROOFTOP

#6 STRANDED INSULATES COPPER GROUNDING WIRE FROM CABLE (TYP)

CHERRY INSULATOR, INSTALLED IF REQUIRED

2-HOLE LONG BARREL TINNED SOLID COPPER LUG (TYP)

TIN COATED SOLID COPPER BUS BAR

SIDE VIEW

PROPOSED GPS UNIT

#6 AWG GROUND CONDUCTOR TO GROUND

PROPOSED GPS UNIT MOUNT OR APPROVED EQUIVALENT

1/2" COAX CABLE 8" MINIMUM BENDING RADIUS PER CABLE MANUFACTURER'S SPECIFICATIONS

PROPOSED POST

PROPOSED PIPE CLAMPS

TO CLOSEST ANTENNA OR MAIN GROUND BAR

#6 AWG FROM ANTENNA CABLE GROUND KIT

GROUND BAR ON WALL, FLOOR OR ON ANTENNA TOWER SEE DETAIL 3

*TWO HOLE LUG, OR EXOTHERMIC WELD TO BE USED WITH #2 AWG BCW TO MAIN GROUND BAR

CABLE TRAY GROUND BUSS BAR

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

7

GPS UNIT GROUNDING

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

4

WIRE TO GROUND BAR CONNECTION

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

1

dish

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M SQUARE

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CP

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REGISTERED PROFESSIONAL ENGINEER

LOYAL A. WHARTON

C50547

CIVIL

STATE OF CALIFORNIA

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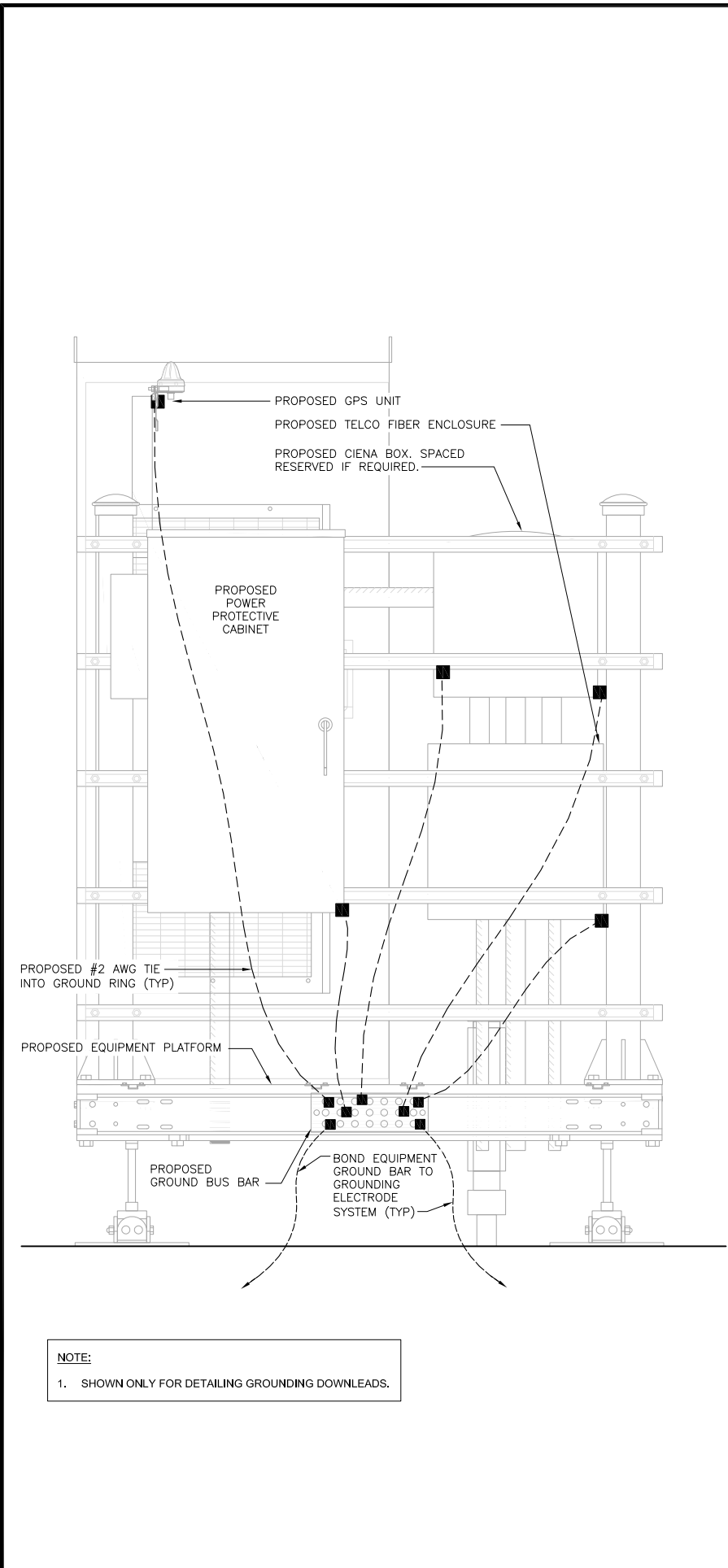
ROOFTOP

SHEET TITLE

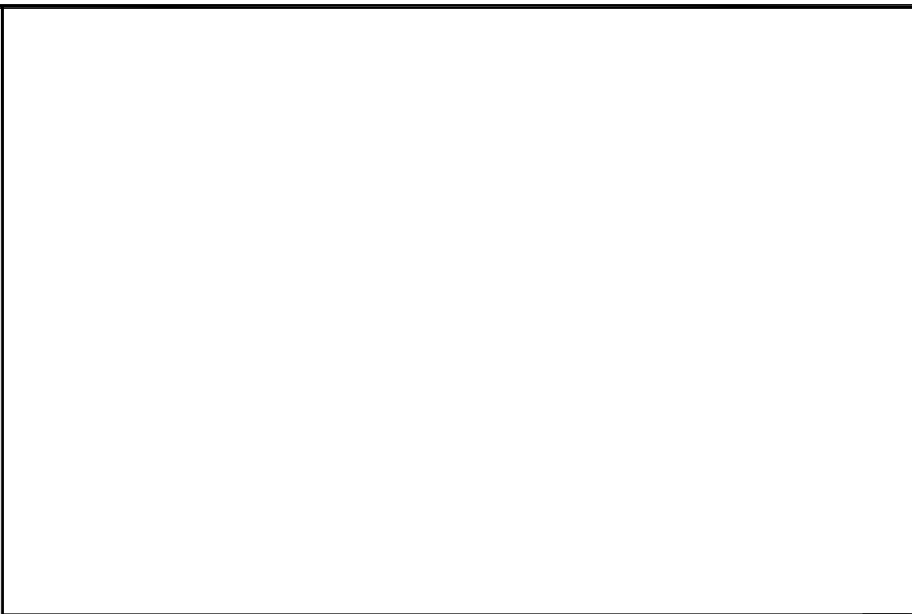
GROUNDING DETAILS

SHEET NUMBER

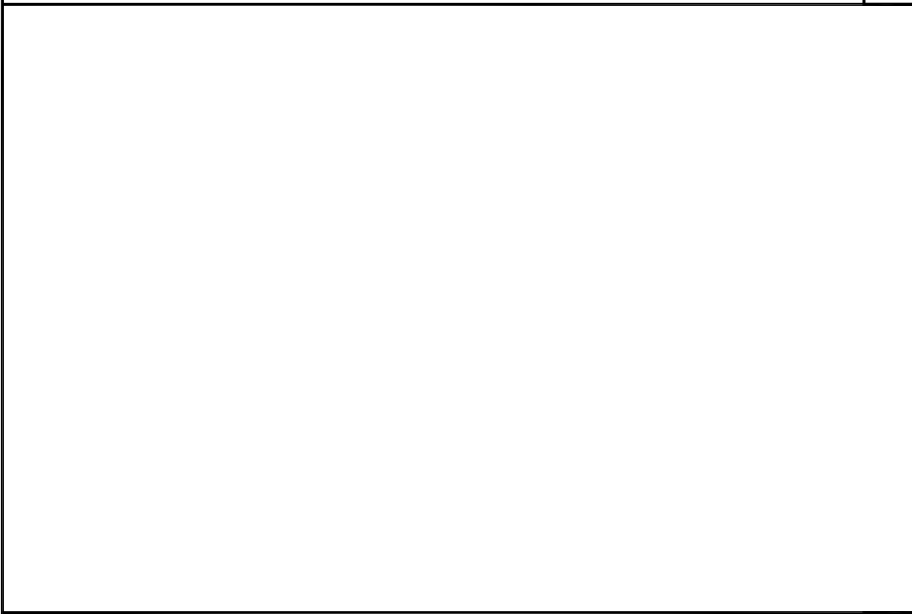
G-2



GROUNDING AT EQUIPMENT CABINETS 24"x36" SCALE: NTS 11"x17" SCALE: NTS **7**



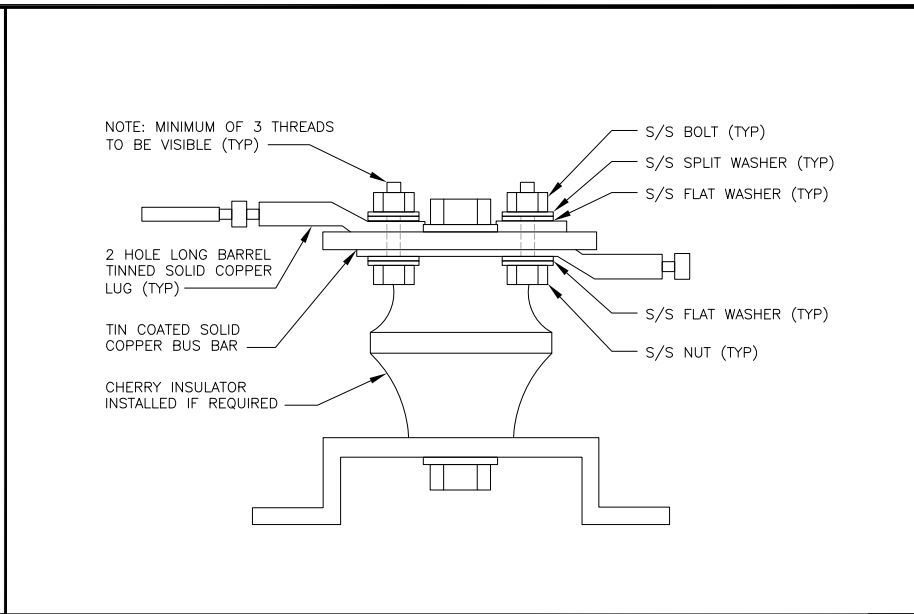
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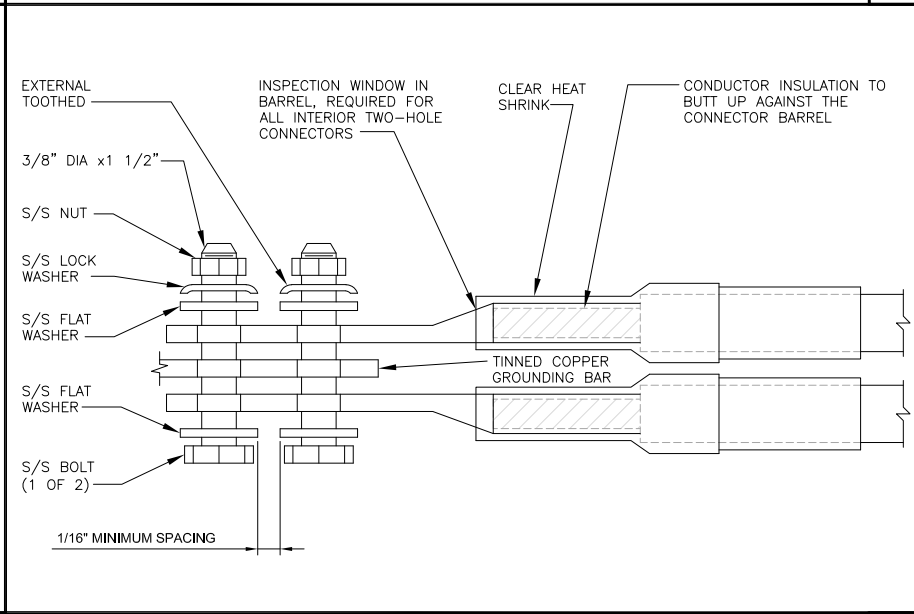
NOT USED **5**



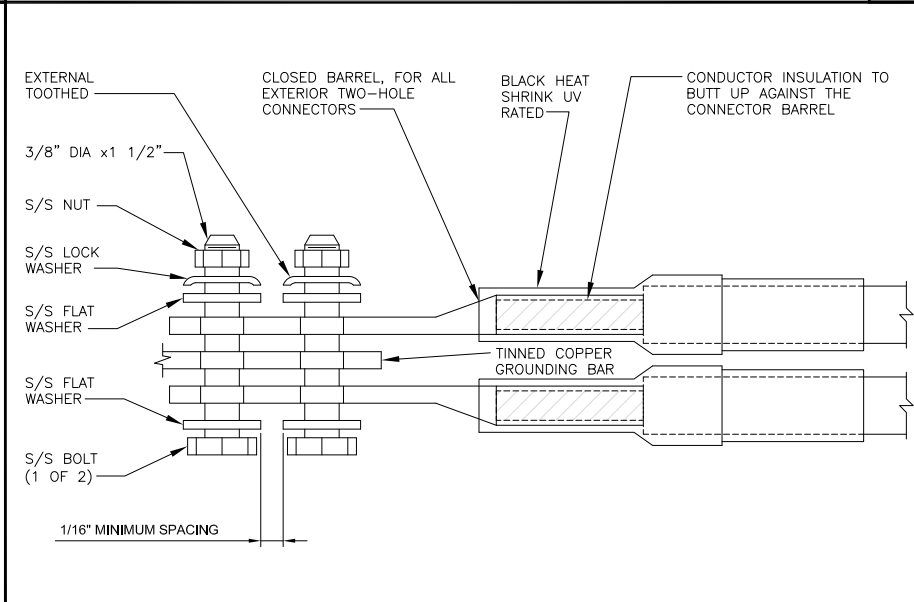
NOT USED **4**



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



INTERIOR TWO HOLE LUG 24"x36" SCALE: NTS 11"x17" SCALE: NTS **2**



EXTERIOR TWO HOLE LUG 24"x36" SCALE: NTS 11"x17" SCALE: NTS **1**

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PALO ALTO, CA 94304
ROOFTOP

SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER
G-3

NOTE:

1. REFER TO LATEST COLOR CODE BEFORE CONSTRUCTION START.

RF COLOR CODING

RF Cable Color Codes	Low Bands (N71-N26) Optional - (N29)	AWS (N66+N70+H-block)	CBRS Tech (3 GHz)	Negative Slant Port on Ant/RRH
	ORANGE	PURPLE	YELLOW	WHITE
RF Jumper Color Coding				
3/4" tape widths with 3/4" spacing				
Low-Band RRH - (600MHz N71 baseband) + (850MHz N26 band) + (700MHz N29 band) - optional per market	ALPHA RRH			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	RED	RED	RED	RED
Add Frequency Color to Sector Band (CBRS will use Yellow bands)	BETA RRH			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	BLUE	BLUE	BLUE	BLUE
	GAMMA RRH			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	GREEN	GREEN	GREEN	GREEN
	Negative Slant Port on Ant/RRH			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	WHITE	WHITE	WHITE	WHITE
Mid-band RRH - (AWS bands N66+N70)	ALPHA RRH			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	RED	RED	RED	RED
Add Frequency Color to Sector Band (CBRS will use Yellow bands)	BETA RRH			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	BLUE	BLUE	BLUE	BLUE
	GAMMA RRH			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	GREEN	GREEN	GREEN	GREEN
	Negative Slant Port on Ant/RRH			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	WHITE	WHITE	WHITE	WHITE
Hybrid/Discreet Cables	Example 1			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	RED	RED	RED	RED
Include sector bands being supported along with frequency bands	Example 2			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	RED	RED	RED	RED
Example 1 - Hybrid, or discreet, supports all sectors, both low-bands and mid-bands	Example 3			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	RED	RED	RED	RED
Example 2 - Hybrid, or discreet, supports CBRS only, all sectors	Example 3 (canister)			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	RED	RED	RED	RED
Example 3 - Main Coax with ground mounted RRUs	Example 3 (canister)			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	RED	RED	RED	RED
Fiber Jumpers to RRHs	Low Band RRH			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	RED	RED	RED	RED
Low Band RRH fiber cables have sector stripe only	Mid Band RRH			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	RED	RED	RED	RED
Power Cables to RRHs	Low Band RRH			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	RED	RED	RED	RED
Low Band RRH power cables have sector stripe only	Mid Band RRH			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	RED	RED	RED	RED
RET motors at Antennas	Antenna 1			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	RED	RED	RED	RED
RET control is handled by the MID-band RRU when one set of RET ports exist on antenna.	Antenna 1			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	RED	RED	RED	RED
Separate RET cables are used when antenna ports provide inputs for both LOW and MID bands.	Antenna 1			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	RED	RED	RED	RED
Microwave Radio Links	Forward azimuth of 0-120 degrees			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	RED	RED	RED	RED
Links will have a 1.5-2 inch white wrap with the azimuth color overlapping in the middle. Add additional sector color bands for each additional MW radio.	Forward azimuth of 120-240 degrees			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	RED	RED	RED	RED
Microwave cables will require P-touch labels inside the cabinet to identify the local and remote Site ID's.	Forward azimuth of 240-359 degrees			
	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
	RED	RED	RED	RED



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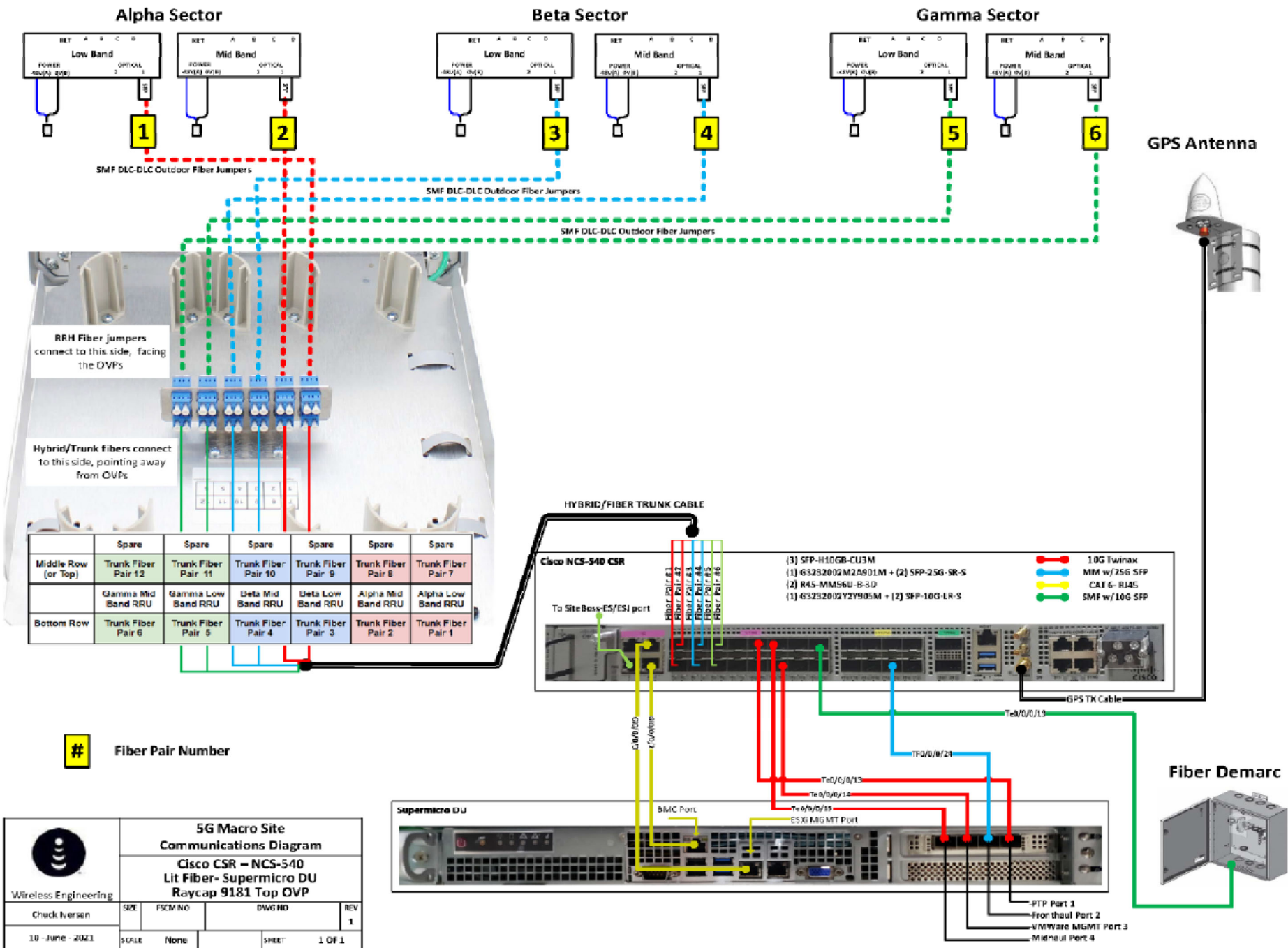
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ROOFTOP

SHEET TITLE
RF CABLE COLOR CODE

SHEET NUMBER

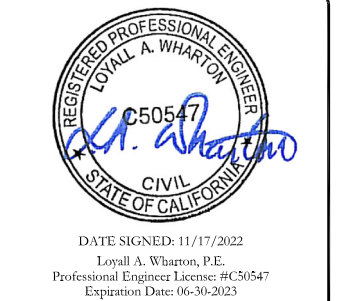
RF-1

NOTE:
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ROOFTOP

SHEET TITLE
PLUMBING DIAGRAM

SHEET NUMBER
RF-2

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

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 AND TOWER OWNER NOC & THE DISH WIRELESS AND TOWER OWNER CONSTRUCTION MANAGER.
- "LOOK UP" - DISH WIRELESS 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 AND DISH WIRELESS 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 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 AND TOWER OWNER INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON DISH WIRELESS 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 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 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

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 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.



5701 S SANTA FE DR
LITTLETON, CO 80120





1200 DEL PASO RD, STE 150
SACRAMENTO, CA 95843



1387 CALLE AVANZADO
SAN CLEMENTE CA 92673 (949) 391-8824

DRAWN BY:	CP
CHECKED BY:	MM

	02/02/2023	100% CD'S PER JX COMMENTS
3	11/17/2022	100% CD'S FOR SUBMITTAL
2	10/03/2022	100% CD'S FOR SUBMITTAL
1	09/23/2022	100% CD'S FOR SUBMITTAL
0	03/24/2022	100% CD'S FOR SUBMITTAL
B	02/18/2022	100% CD'S FOR REVIEW
A	02/09/2022	90% CD'S FOR REVIEW
REV	DATE	DESCRIPTION



DATE SIGNED: 11/17/2022
Loyall A. Wharton, P.E.
Professional Engineer License: #C50547
Expiration Date: 06-30-2023

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.

SFSFO00398A
724 ARASTRADERO RD
PALO ALTO, CA 94304
ROOFTOP

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN-2

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/90s 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 (WIREMOLD SPECMATE 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 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".

30.

ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

dish

wireless.

5701 S SANTA FE DR
LITTLETON, CO 80120

QUALTEK

WIRELESS

1200 DEL PASO RD, STE 150
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M SQUARE

WIRELESS

1387 CALLE AVANZADO
SAN CLEMENTE CA 92673 (949) 391-8824

DRAWN BY:	CP
CHECKED BY:	MM

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1	09/23/2022	100% CD'S FOR SUBMITTAL
0	03/24/2022	100% CD'S FOR SUBMITTAL
B	02/18/2022	100% CD'S FOR REVIEW
A	02/09/2022	90% CD'S FOR REVIEW
REV	DATE	DESCRIPTION

REGISTERED PROFESSIONAL ENGINEER

LOYALL A. WHARTON

C50547

STATE OF CALIFORNIA

CIVIL

DATE SIGNED: 11/17/2022
Loyall A. Wharton, P.E.
Professional Engineer License: #C50547
Expiration Date: 06-30-2023

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.

SFSFO00398A
724 ARASTRADERO RD
PALO ALTO, CA 94304
ROOFTOP

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-3

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-OF-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.

dish

wireless.

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LITTLETON, CO 80120

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DRAWN BY:	CP
CHECKED BY:	MM

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