

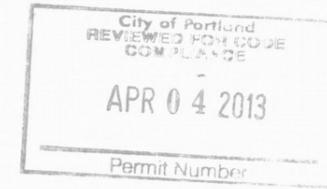
T-Mobile®



POWELL BUTTE OR2
 12646 SE DIVISION STREET
 PORTLAND, OR 97236
 MULTNOMAH COUNTY
82782

LATITUDE 45° 30' 13.0" N LONGITUDE 122° 31' 54.0" W

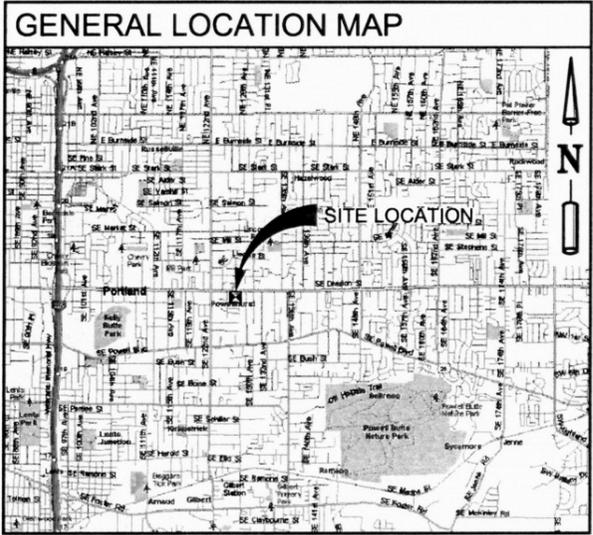
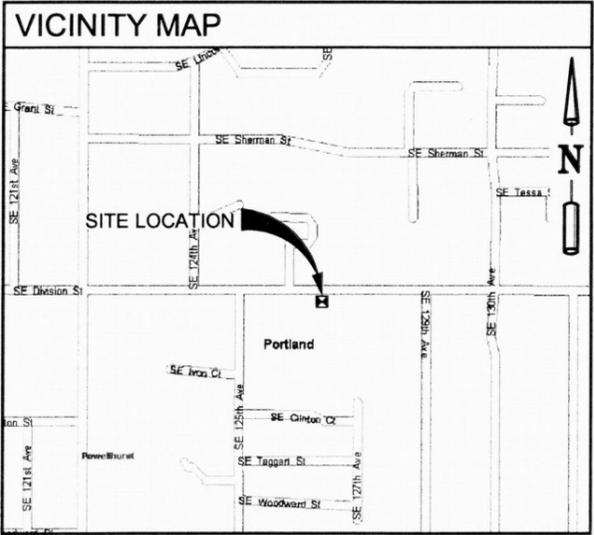
T-MOBILE SITE: DIVISION 122ND - PO01917A



PROJECT CONSULTANTS:
LYNX
 PLANS PREPARED BY:
CORNERSTONE ENGINEERING, INC.
 16928 WOODINVILLE-REDMOND RD NE, SUITE 210
 WOODINVILLE, WA 98072
 PHONE: 425.487.1732 FAX: 425.487.1734
 EMAIL: cei@cornerstone-engr.com
 WWW.CORNERSTONE-ENGR.COM

PROPRIETARY INFORMATION
 THE INFORMATION CONTAINED IN THIS SET OF CONSTRUCTION DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO T-MOBILE WIRELESS, LLC. SERVICES IS STRICTLY PROHIBITED.

PROJECT INFO:
82782
POWELL BUTTE OR2
 12646 SE DIVISION STREET
 PORTLAND, OR 97236
 MULTNOMAH COUNTY



PROJECT TEAM

APPLICANT:
 T-MOBILE
 8960 NE ALDERWOOD RD
 PORTLAND, OR 97220

PROGRAM MANAGER:
 JULEI HINTY
 (206) 388-7611
jhinty@lynxconsulting.org

CONSULTING ENGINEER:
 CORNERSTONE ENGINEERING, INC.
 16928 WOODINVILLE REDMOND ROAD NE SUITE 210
 WOODINVILLE, WA 98072
 MARK W OLSON, P.E.
 PH: (425) 487-1732
 FAX: (425) 487-1734

SITE ACQUISITION:
 JULEI HINTY
 (206) 388-7611
jhinty@lynxconsulting.org

ZONING:
 AILEEN ZAVALAS
 (206) 972-1368
azavales@lynxconsulting.org

RF ENGINEER:
 T-MOBILE
 DARRYL SALK
 (425) 770-0006

PROJECT CONSULTANT:
 LYNX CONSULTING
 17311 135th AVE NE, SUITE A-100,
 WOODINVILLE, WA 98072
 FAX: (425) 345-3277

PROPERTY OWNER:
 CHARLES NAKVASIL
 6341 SE 34TH AVE
 PORTLAND, OR 97202

TOWER OWNER:
 AMERICAN TOWER CORP.
 116 HUNTINGTON AVE, 11TH FLOOR
 BOSTON, MA 02116
 (617) 375-7500

DRAWING INDEX

DWG	DESCRIPTION
T-1	TITLE SHEET
G-1	GENERAL NOTES
A-1	SITE PLAN
A-1.1	ENLARGED SITE PLAN
A-1.2	EXISTING & PROPOSED ANTENNA PLANS
A-2	SOUTH ELEVATION
A-3	DETAIL SHEET
A-3.1	DETAIL SHEET
E-1	SCHEMATIC GROUNDING PLAN & DETAILS
RF-1	RF DETAILS
RF-2	RF DETAILS
RF-3	RF DETAILS

LEGAL DESCRIPTION
 SECTION 11 1S 2E, TL 100

DRIVING DIRECTIONS
 FROM T-MOBILE PORTLAND OFFICE
 HEAD TOWARD NE CLARK ST ON NE ALDERWOOD RD.
 BEAR LEFT ONTO NE CLARK ST.
 TURN RIGHT ONTO NE HOLMAN ST.
 CONTINUE ON NE 105TH AVE.
 TURN RIGHT ONTO NE SANDY BLVD (US-30-BYP).
 TURN LEFT AND TAKE RAMP ONTO VETERANS MEMORIAL HWY (I-205 S)
 TOWARD I-84/SALEM.
 TAKE EXIT #19/US-26/DIVISION ST./POWELL BLVD. TOWARD US-26
 E/DIVISION ST./GRESHAM/MT. HOOD.
 TURN LEFT ONTO SE DIVISION ST.
 THE SITE IS ON THE RIGHT BEHIND BUILDING.

PROJECT INFORMATION

CODE INFORMATION:
 ZONING CLASSIFICATION: CN2
 BUILDING CODE: IBC 2009
 CONSTRUCTION TYPE: II-B
 JURISDICTION: CITY OF PORTLAND, OR
 PROPOSED BUILDING USE: TELECOMM

TAXLOT:
 PROP ID: R334050
 MAP TAX LOT: 1S2E11BB 100

AREA OF PARCEL:
 25,552 SQ. FT. (0.54 ACRES)

GENERAL INFORMATION:
 1. PARKING REQUIREMENTS ARE UNCHANGED. (NON ASSIGNED TECH PARKING)
 2. TRAFFIC IS UNAFFECTED.
 3. NO SIGNAGE IS PROPOSED.

PROJECT INFORMATION

THIS IS UNSTAFFED AND RESTRICTED EQUIPMENT AND WILL BE USED FOR THE TRANSMISSION OF RADIO SIGNALS FOR THE PURPOSE OF PROVIDING PUBLIC CELLULAR SERVICE. T-MOBILE CERTIFIES THAT THIS TELEPHONE EQUIPMENT FACILITY WILL BE SERVICED ONLY BY T-MOBILE EMPLOYEES AND THE WORK ASSOCIATED WITH ANY EQUIPMENT CANNOT BE PERFORMED BY HANDICAPPED PERSONS. THIS FACILITY WILL BE FREQUENTED ONLY BY SERVICE PERSONNEL FOR REPAIR PURPOSES. PURSUANT TO THE AMERICANS WITH DISABILITIES ACT (ADA), APPENDIX B SECTION 4.11. (5) (B), THIS FACILITY IS EXEMPT FROM THAT ACT.

NO POTABLE WATER SUPPLY TO BE PROVIDED AT THIS LOCATION

NO WASTE WATER OR SOLID WASTE WILL BE GENERATED AT THIS LOCATION.

T-MOBILE MAINTENANCE CREW (ONE PERSON) WILL MAKE AN AVERAGE OF ONE TRIP PER MONTH AT ONE HOUR PER TRIP.

APPROVAL/SIGN OFF OF DRAWINGS

CONSULTANT GROUP SIGN OFF	DATE	INITIAL AND PRINT NAME
LANDLORD'S REPRESENTATIVE		
CONSTRUCTION COORDINATOR		
PROGRAM MANAGER		
SITE ACQUISITION		
ZONING		
RF ENGINEER		

REVIEWERS SHALL CLEARLY PLACE INITIALS ADJACENT TO EACH REDLINE NOTE AS DRAWINGS ARE BEING REVIEWED

PROJECT DESCRIPTION

THIS PROPOSAL IS FOR THE MODIFICATION OF AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY, CONSISTING OF THE REMOVAL / REPLACEMENT OF (8) EXISTING PANEL ANTENNAS WITH (6) NEW TMBXX-6516-R2M AND (3) NEW TMBX-6516-R2M ANTENNAS, (6) EXISTING TMA'S WITH (3) NEW AWS TMA'S; THE ADDITION OF (3) FRIA UNITS (@ EQUIPMENT), (2) FXFB UNITS AND (3) FRIG UNITS TO AN EXISTING MONOPOLE; ALSO THE ADDITION OF (1) HYBRID CABLE AND (2) COVP UNITS (1 NEAR ANTENNAS AND 1 NEAR THE SITE SUPPORT EQUIPMENT) ON AN EXISTING CONCRETE SLAB WITHIN A FENCED COMPOUND.

ISSUED FOR: **CONSTRUCTION**

REV. DATE: ISSUED FOR:

REV.	DATE	ISSUED FOR	BY
0	02-27-13	CONSTRUCTION	DRA
A	02-13-13	CLIENT REVIEW	DMO

DRAWN BY: CHK.: APV:

DMO	JRF	MWO
-----	-----	-----

CURRENT ISSUE DATE: **02-27-13**



DRAWING INFORMATION:
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DRAWING TITLE: **TITLE SHEET**

DRAWING NUMBER: **T-1 0**

CEI JOB NUMBER: 13-19009

CALL TWO WORKING DAYS BEFORE YOU DIG!

811

NATIONAL UTILITIES UNDERGROUND LOCATE

SAFETY PRECAUTION SHALL BE IMPLEMENTED BY CONTRACTORS AT ALL TRENCHING IN ACCORDANCE WITH CURRENT OSHA STANDARDS

ELECTRIC - RED
 SEWER - GREEN
 GAS/OIL - YELLOW
 SURVEY - PINK

TELECOM - ORANGE
 PROPOSED - WHITE
 WATER - BLUE

THIS IS NOT A SURVEY

ALL INFORMATION AND TRUE NORTH HAVE BEEN OBTAINED FROM EXISTING DRAWINGS AND ARE APPROXIMATE.



PROJECT CONSULTANTS:



PLANS PREPARED BY:



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PROJECT INFO:

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POWELL BUTTE OR2

12646 SE DIVISION STREET
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MULTNOMAH COUNTY

ISSUED FOR:

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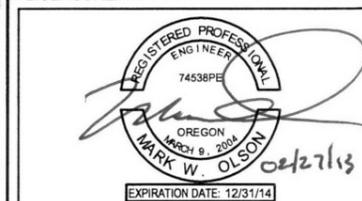
DRAWN BY: CHK.: APV.:

DMO JRF MWO

CURRENT ISSUE DATE:

02-27-13

LICENSURE:



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DRAWING TITLE:

SITE PLAN

DRAWING NUMBER:

A-1 0

CEI JOB NUMBER: 13-19009

City of Portland
Bureau of
Development Services
By SJS Date 3/18/13
Approved by
Planning and Zoning Review

SE DIVISION STREET

SE DIVISION STREET

SITE ACCESS

TL:500

TL:400

TL:1S2E11BB 100
25,552 SQ FT
0.54 ACRES

TL:11400

TL:11300

TL:501

TL:402

A-2

(E) ±80'-0" STEEL MONOPOLE
W/ PROPOSED MODIFICATION
TMBXX-6516-R2M & TMBX-6516-R2M ANTENNAS

A-1.1



SITE PLAN

22x34 SCALE: 1" = 20'-0"

11x17 SCALE: 1" = 40'-0"

NOTES:

1. CONTRACTOR TO PROVIDE ALL HANGERS & HARDWARE (STAINLESS STEEL &/OR GALVANIZED ONLY) TO SUPPORT CABLES & JUMPERS EVERY 3'-0".
2. RETURN USED LNA'S & MCPA'S TO T-MOBILE WAREHOUSE.
3. PROPOSED 100AMP BREAKER IN VALARE POWER SHELF W/ (2) #2 THHN STRANDED IN EMT OR LT FLEX FROM BREAKER TO COVP.
4. CONTRACTOR TO REMOVE EXISTING RET HOME RUN COAX AND UNUSED GPS ANTENNA WITH CABLE.
5. THE FRIG RRU IS TO ONLY BE MOUNTED VERTICALLY.
6. THE COVP IS TO ONLY BE MOUNTED VERTICALLY.
7. CONTRACTOR TO MAINTAIN CLEARANCE FOR EXISTING CLIMBING PEGS WHEN INSTALLING RRU'S & NEW UNIVERSAL RING MOUNT.
8. OTHER CARRIER ANTENNA ARRAYS NOT SHOWN FOR CLARITY.

City of Portland
Bureau of
Development Services
By SJS Date 3/18/13
Approved by
Planning and Zoning Review



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PLANS PREPARED BY:
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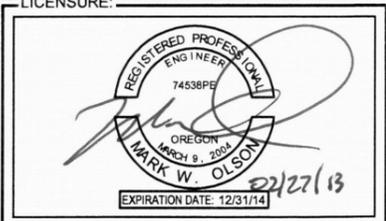
ISSUED FOR:
CONSTRUCTION

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A	02-13-13	CLIENT REVIEW	DMO

DRAWN BY: DMO CHK: JRF APV: MWO

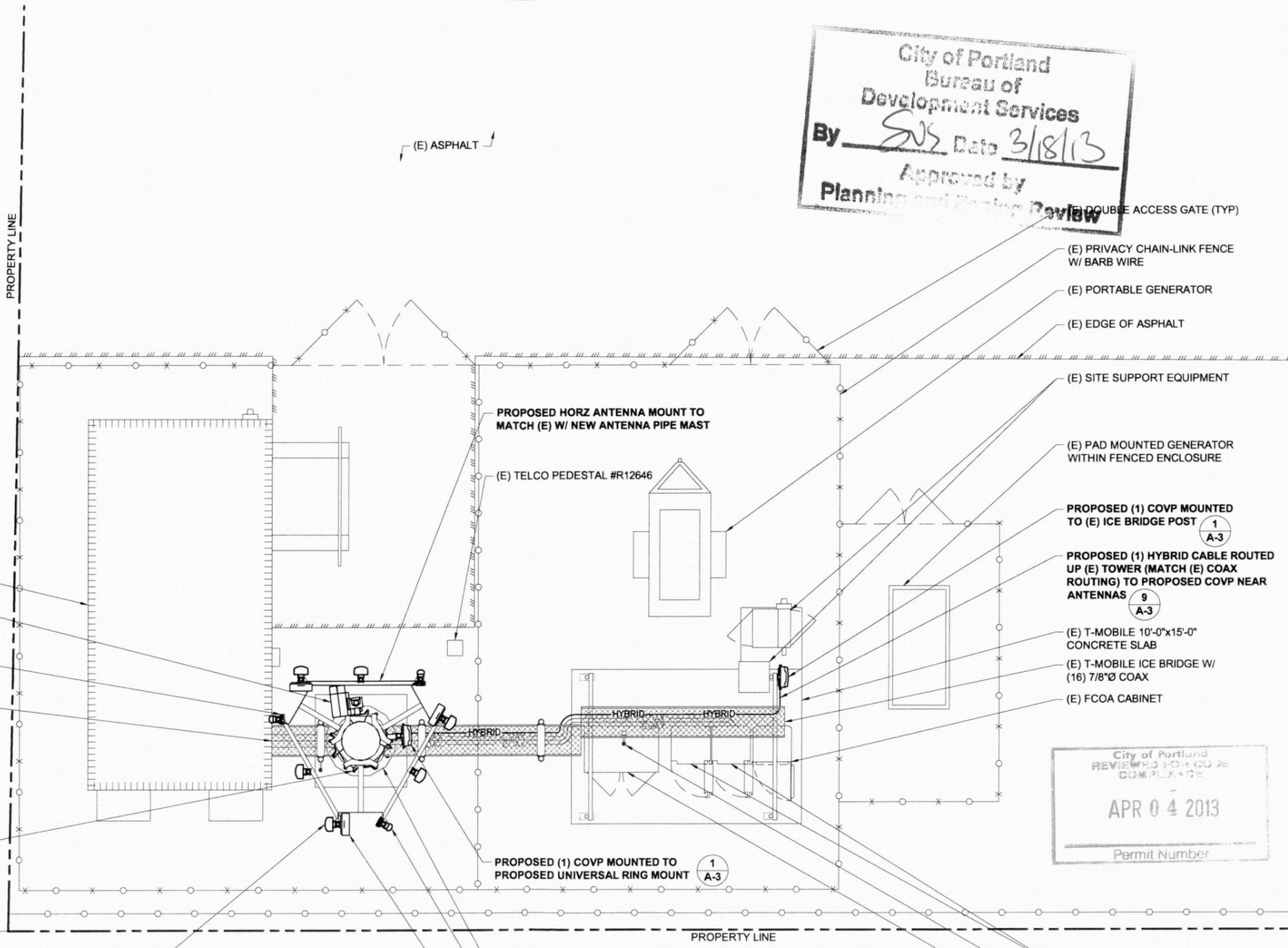
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DRAWING TITLE:
ENLARGED SITE PLAN

DRAWING NUMBER:
A-1.1 0
CEI JOB NUMBER: 13-19009



City of Portland
REVIEWED FOR CODE COMPLIANCE
APR 04 2013
Permit Number



ENLARGED SITE PLAN

22x34 SCALE: 1/4" = 1'-0" 11x17 SCALE: 1/8" = 1'-0"



PROJECT CONSULTANTS:



PLANS PREPARED BY:



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DRAWN BY: CHK.: APV.:

DMO JRF MWO

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DRAWING TITLE:

EXISTING & PROPOSED ANTENNA PLANS

DRAWING NUMBER:

A-1.2 0

CEI JOB NUMBER: 13-19009

City of Portland
Bureau of
Development Services
By SJS Date 3/18/13
Approved by
Planning and Review Review

City of Portland
REVIEWED FOR CODE
COMPLIANCE
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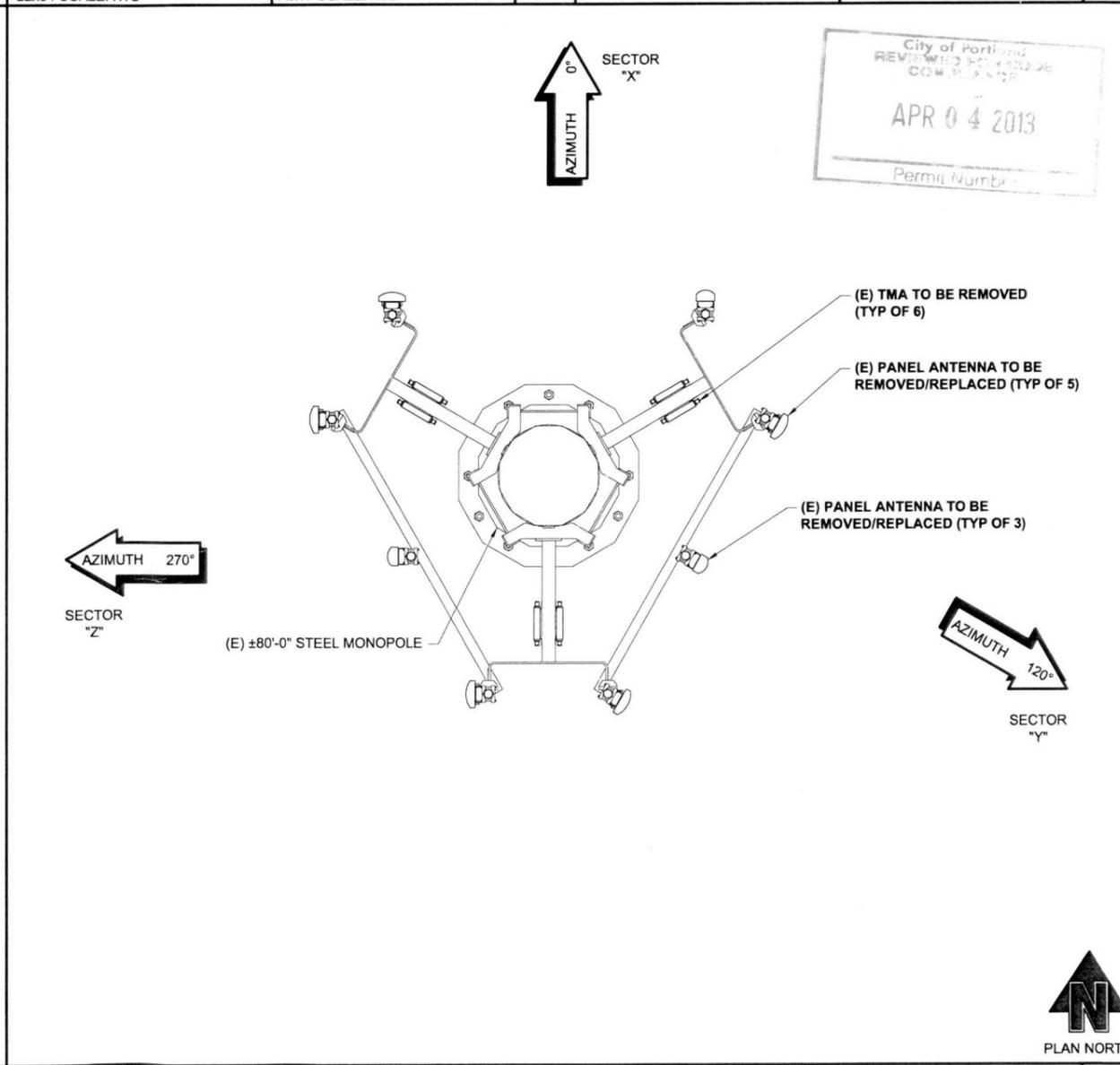
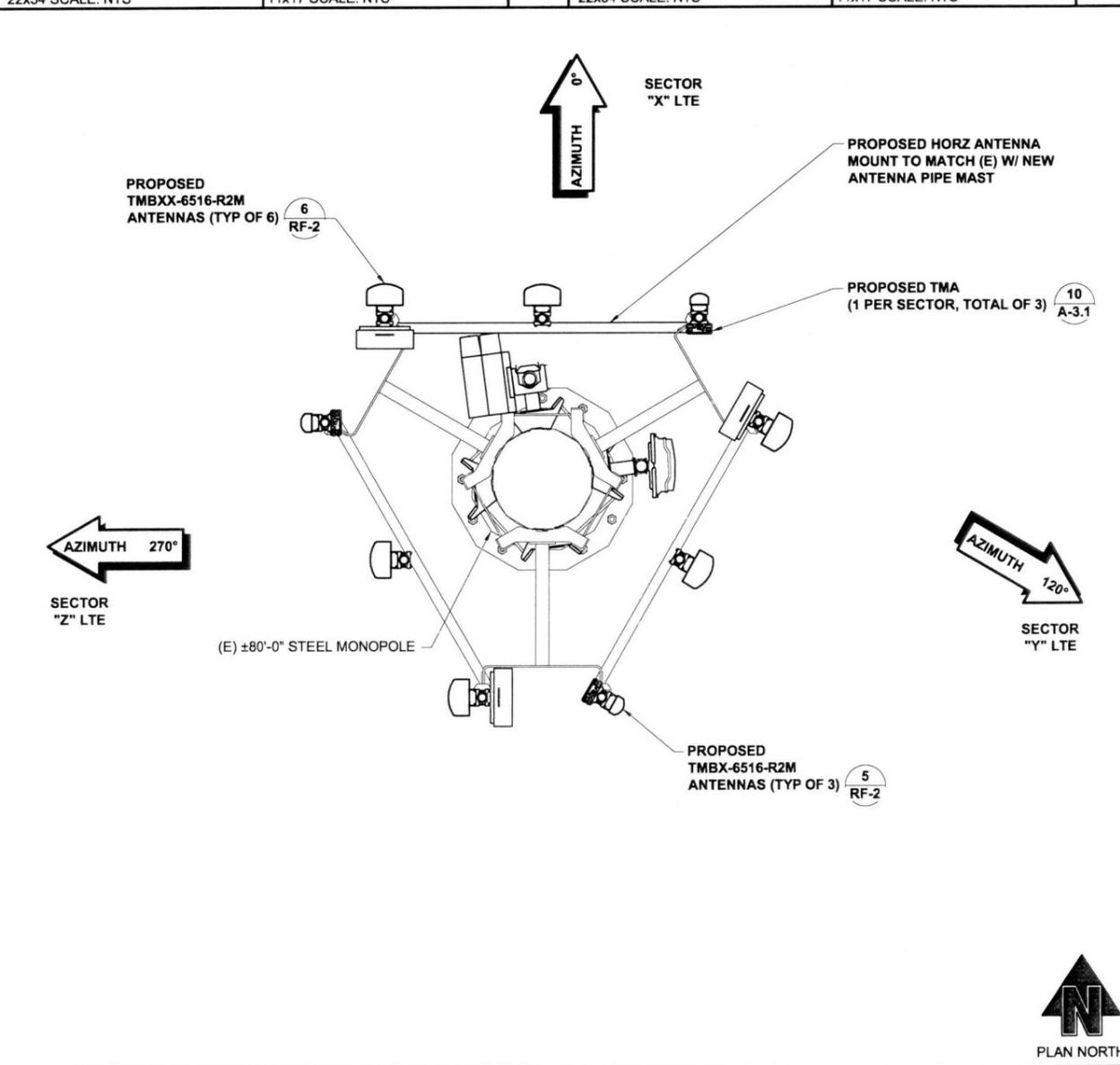
NOT USED
22x34 SCALE: NTS
11x17 SCALE: NTS

12 NOT USED
22x34 SCALE: NTS
11x17 SCALE: NTS

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22x34 SCALE: NTS
11x17 SCALE: NTS

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11x17 SCALE: NTS

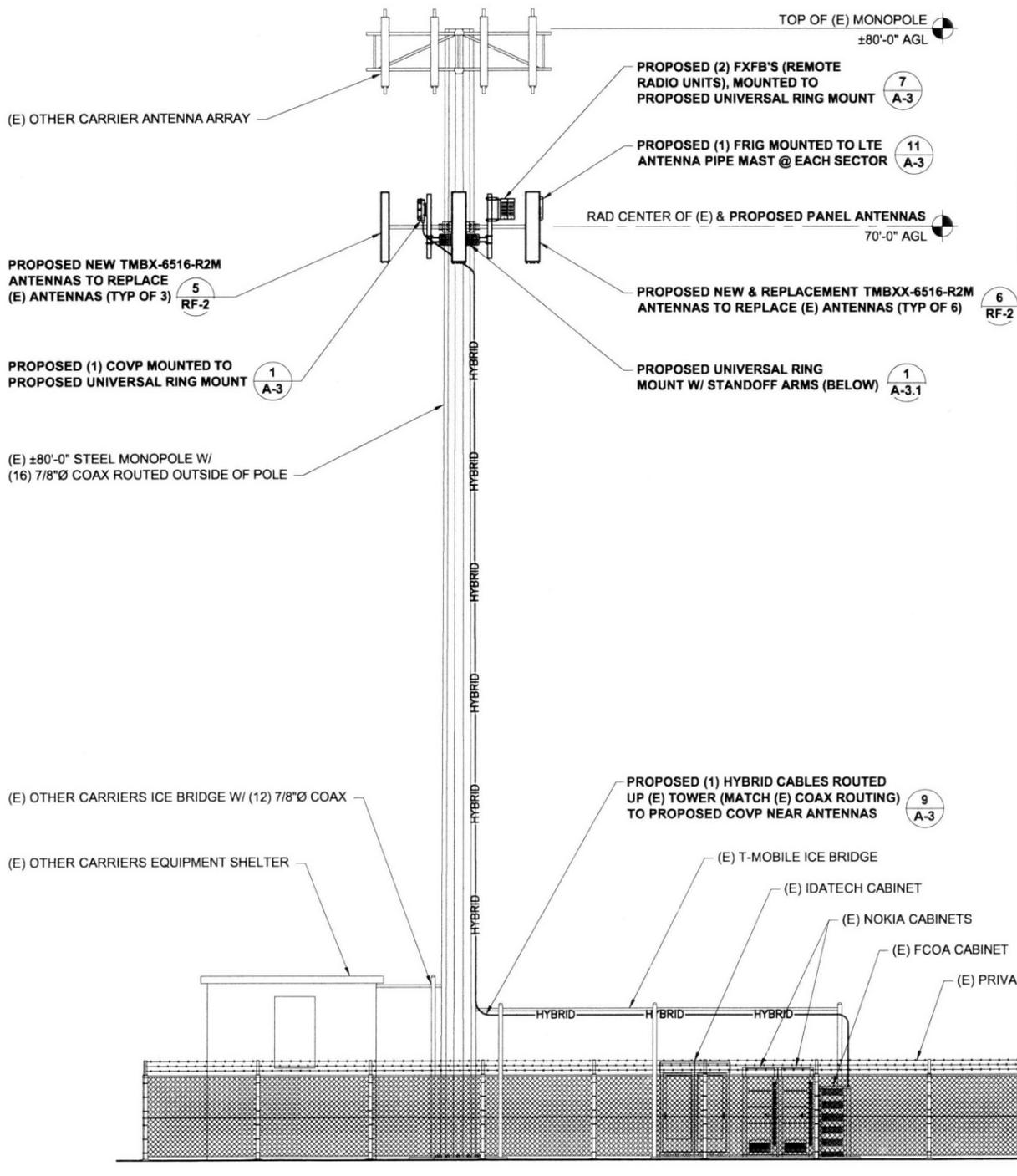


2 PROPOSED ANTENNA PLAN
22x34 SCALE: 1/2" = 1'-0"
11x17 SCALE: 1/4" = 1'-0"

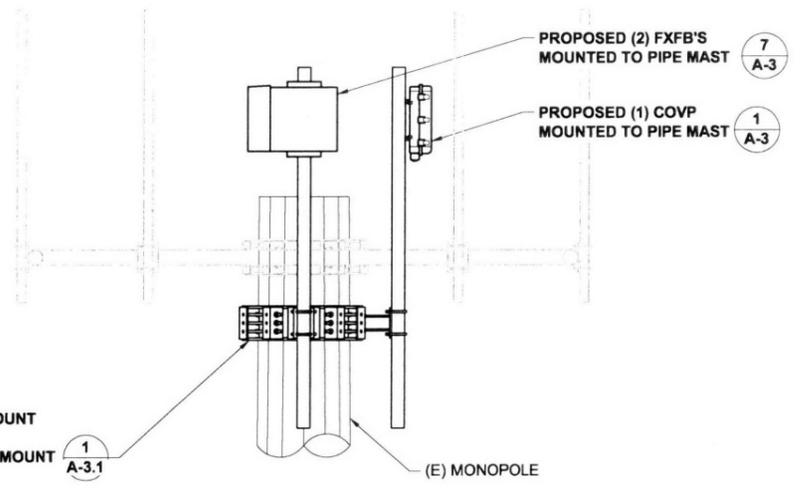
1 EXISTING ANTENNA PLAN
22x34 SCALE: 1/2" = 1'-0"
11x17 SCALE: 1/4" = 1'-0"

CEI JOB NUMBER: 13-19009

PAINT NOTE:
ALL PROPOSED ANTENNAS/EQUIPMENT & ATTACHMENTS SHALL BE PAINTED TO MATCH EXISTING ON-SITE CONDITIONS.



NOTE:
CONTRACTOR TO MAINTAIN CLEARANCE FOR EXISTING CLIMBING PEGS WHEN INSTALLING RRU'S & NEW UNIVERSAL RING MOUNT



ENLARGED RRU MOUNTING DETAIL
22x34 SCALE: 1/2" = 1'-0" | 11x17 SCALE: 1/4" = 1'-0"

City of Portland
Bureau of
Development Services
By SOS Date 3/18/13
Approved by
Planning and Zoning Review

City of Portland
REVIEWED FOR PERMIT
COMPLETION
APR 04 2013
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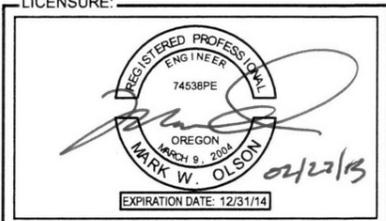
ISSUED FOR: **CONSTRUCTION**

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A	02-13-13	CLIENT REVIEW	DMO

DRAWN BY: DMO | CHK: JRF | APV: MWO

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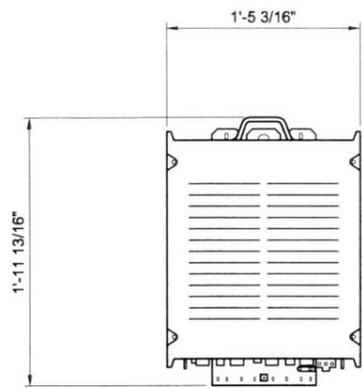


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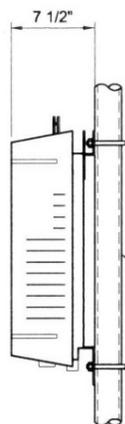
DRAWING TITLE:
SOUTH ELEVATION

DRAWING NUMBER:
A-2 0

SOUTH ELEVATION
22x34 SCALE: 3/16" = 1'-0" | 11x17 SCALE: 3/32" = 1'-0"



FRONT

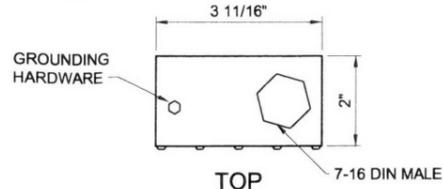


RIGHT SIDE

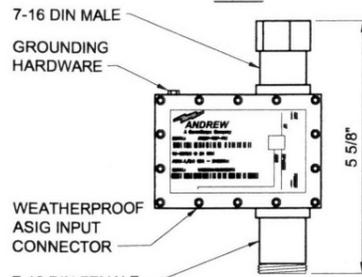
DIMENSIONS (WxHxD) W/ SOLAR COVER & MOUNTING	17.2" x 23.8" x 7.5"
FRIG UNIT WEIGHT	24.0 kg / 52.9 lbs
SOLAR SHIELD WEIGHT	1.2 kg / 2.6 lbs
MOUNTING BRACKET WEIGHT	0.7 kg / 1.5 lbs
TOTAL WEIGHT	25.9 kg / 57 lbs

PIPE MAST
3/8"Ø U-BOLT OR BANDING

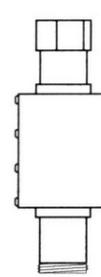
NOTE:
FRIG TO BE MOUNTED VERTICALLY ONLY



TOP

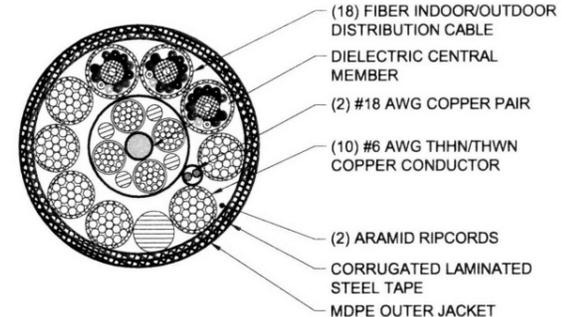


FRONT



SIDE

GROUNDING HARDWARE
7-16 DIN MALE
GROUNDING HARDWARE
WEATHERPROOF ASIG INPUT CONNECTOR
7-16 DIN FEMALE



HYBRID CABLE

22x34 SCALE: NTS 11x17 SCALE: NTS

NOKIA FRIG RRU

22x34 SCALE: 1 1/2" = 1'-0" 11x17 SCALE: 3/4" = 1'-0"

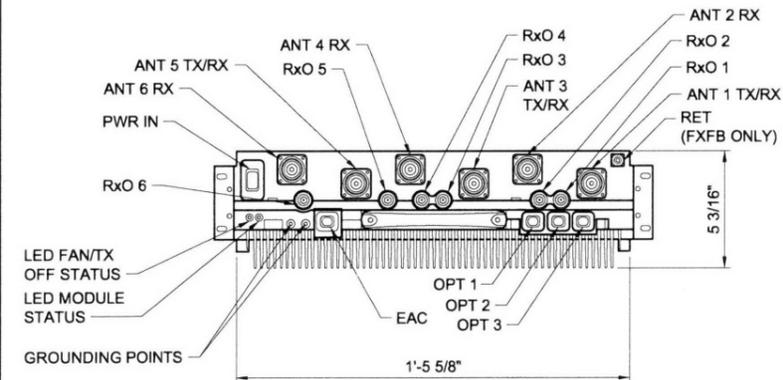
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BIAS TEE

22x34 SCALE: 6" = 1'-0" 11x17 SCALE: 3" = 1'-0"

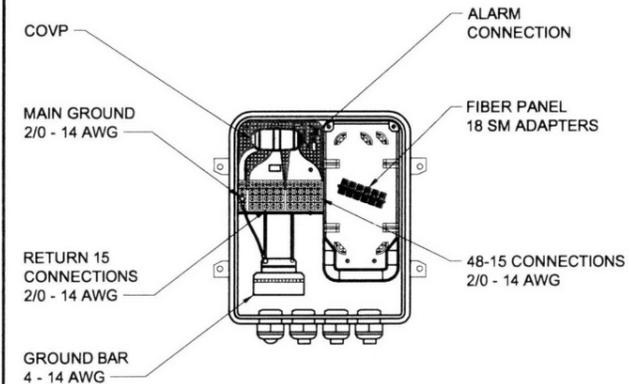
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9



PROPERTY	VALUE
HEIGHT	133 mm/3U (5.2 in)
WIDTH (WITH COVERS)	447 mm (17.6 in) 490 mm (19.3 in)
DEPTH (FOR RACK ASSEMBLIES) DEPTH (WITH COVERS)	395 mm (15.6 in) 560 mm (22 in)
WEIGHT (INCLUDING THE CORE, FANS AND CASING)	MAX. 25 kg (55.1 lb)

NOTE:
FOR MOUNTING SEE DETAIL 2/A-3.1



COVP INTERIOR

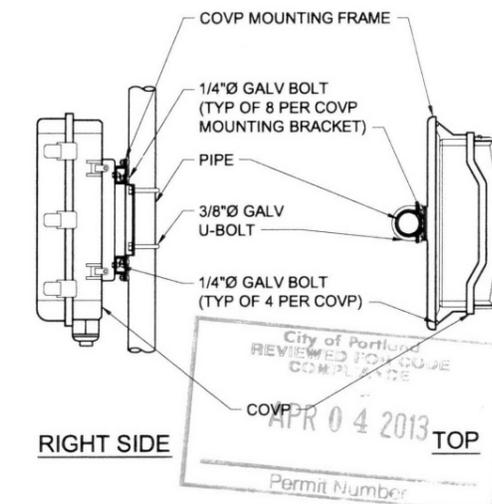
22x34 SCALE: 1 1/2" = 1'-0" 11x17 SCALE: 3/4" = 1'-0"

6

COVP MOUNT

22x34 SCALE: 1 1/2" = 1'-0" 11x17 SCALE: 3/4" = 1'-0"

5

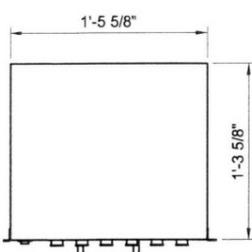


RIGHT SIDE

NOKIA FXFB RRU

22x34 SCALE: 3" = 1'-0" 11x17 SCALE: 1 1/2" = 1'-0"

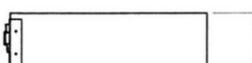
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TOP



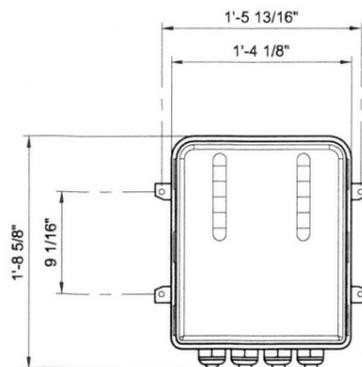
FRONT



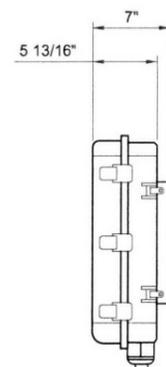
RIGHT SIDE

PROPERTY	3-SECTOR RF MODULE	DUAL RF MODULE	SINGLE RF MODULE
HEIGHT	133 mm/3U (5.2 in)	133 mm/3U (5.2 in)	133 mm/3U (5.2 in)
WIDTH (WITH COVERS)	447 mm (17.6 in) 490 mm (19.3 in)	447 mm (17.6 in) 490 mm (19.3 in)	447 mm (17.6 in) 490 mm (19.3 in)
DEPTH (FOR RACK ASSEMBLIES) DEPTH (WITH COVERS)	395 mm (15.6 in) 560 mm (22 in)	395 mm (15.6 in) 560 mm (22 in)	395 mm (15.6 in) 560 mm (22 in)
WEIGHT (INCLUDING THE CORE, FANS AND CASING)	25 kg (55.1 lb)	21.8 kg (48.1 lb)	18.7 kg (41.2 lb)

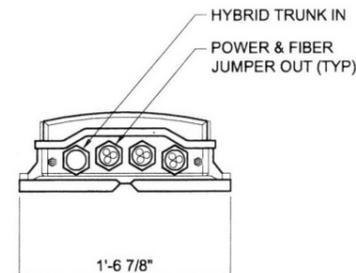
NOTES:
1. FOR MOUNTING SEE DETAIL 5/A-3
2. COVP TO BE MOUNTED VERTICALLY ONLY



FRONT



RIGHT SIDE



BOTTOM

NOKIA FRIA RRU

22x34 SCALE: 1 1/2" = 1'-0" 11x17 SCALE: 3/4" = 1'-0"

3

RAYCAP COVP (RCMDC-4010-PF-48)

22x34 SCALE: 1 1/2" = 1'-0" 11x17 SCALE: 3/4" = 1'-0"

1



PROJECT CONSULTANTS:



PLANS PREPARED BY:



16928 WOODINVILLE-REDMOND RD NE, SUITE 210
WOODINVILLE, WA 98072
PHONE: 425.487.1732 FAX: 425.487.1734
EMAIL: ce@cornerstone-engr.com
WWW.CORNERSTONE-ENGR.COM

PROJECT INFO:

82782

POWELL BUTTE OR2

12646 SE DIVISION STREET
PORTLAND, OR 97236
MULTNOMAH COUNTY

ISSUED FOR:

CONSTRUCTION

REV: DATE: ISSUED FOR: BY:

REV	DATE	ISSUED FOR	BY
0	02-27-13	CONSTRUCTION	DRA
A	02-13-13	CLIENT REVIEW	DMO

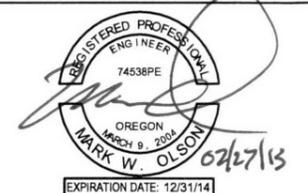
DRAWN BY: CHK.: APV.:

DMO JRF MWO

CURRENT ISSUE DATE:

02-27-13

LICENSE:



DRAWING INFORMATION:

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DRAWING TITLE:

DETAIL SHEET

DRAWING NUMBER:

A-3

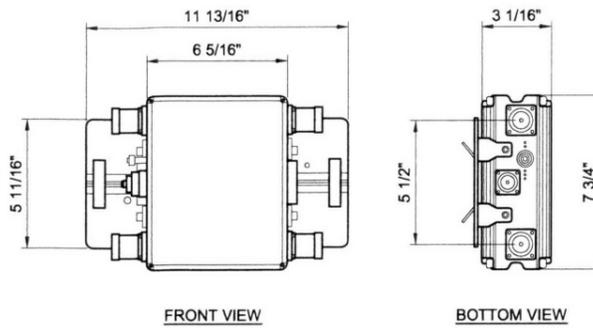
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CEI JOB NUMBER:

13-19009

PARTS LIST			
ITEM #	QUANTITY	PART NUMBER	DESCRIPTION
1	2	601257	ANGLE ARM
2	2	601256	MOUNTING CLAMP
3	2	601235-1	BRACKET
4	2	601235-2	BRACKET
5	1	601258	LABEL, ANGLE
6	4	600679-3	SPACER TUBE
7	14	100525-24	ME FLAT WASHER (STAINLESS STEEL)
8	2	600419-8	M8x1.25x25mm LARGE CARRIAGE BOLT (STAINLESS STEEL)
9	6	6/17395	M8 LOCK WASHER (STAINLESS STEEL)
10	4	600419-10	M8x1.25x110mm LARGE HEX HEAD SCREW (STAINLESS STEEL)
11	6	204001-15	M8x1.25 HEX NUT (STAINLESS STEEL)
12	2	225244	CLAMP PLATE
13	8	600419-24	LARGE LOCK WASHER (STAINLESS STEEL)
14	8	204001-21	M12x1.75 HEX NUT (STAINLESS STEEL)
15	4	600419-12	M12x1.75x150mm LARGE CARRIAGE BOLT (STAINLESS STEEL)
17	1	601584	MOLYBDENUM DISULFIDE GREASE

TOWER MOUNTED AMPLIFIER	
MANUFACTURER	ANDREW
MODEL	ETW200VS12UB
WEIGHT	11.0 lb



TMA DETAIL

22x34 SCALE: 3" = 1'-0"

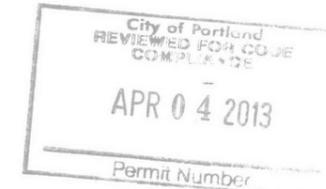
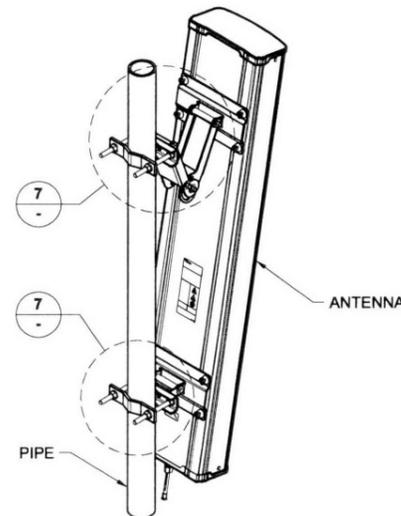
11x17 SCALE: 1 1/2" = 1'-0"

10 NOT USED

22x34 SCALE: NTS

11x17 SCALE: NTS

9



PROJECT CONSULTANTS:
 PLANS PREPARED BY:
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 16928 WOODINVILLE-REDMOND RD NE, SUITE 210
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 PHONE: 425.487.1732 FAX: 425.487.1734
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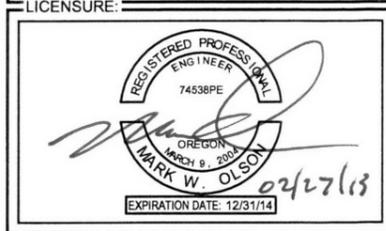
PROJECT INFO:
 82782
 POWELL BUTTE OR2
 12646 SE DIVISION STREET
 PORTLAND, OR 97236
 MULTNOMAH COUNTY

ISSUED FOR:
CONSTRUCTION

REV.	DATE	ISSUED FOR	BY
0	02-27-13	CONSTRUCTION	DRA
A	02-13-13	CLIENT REVIEW	DMO

DRAWN BY: CHK.: APV.:
 DMO JRF MWO

CURRENT ISSUE DATE:
 02-27-13

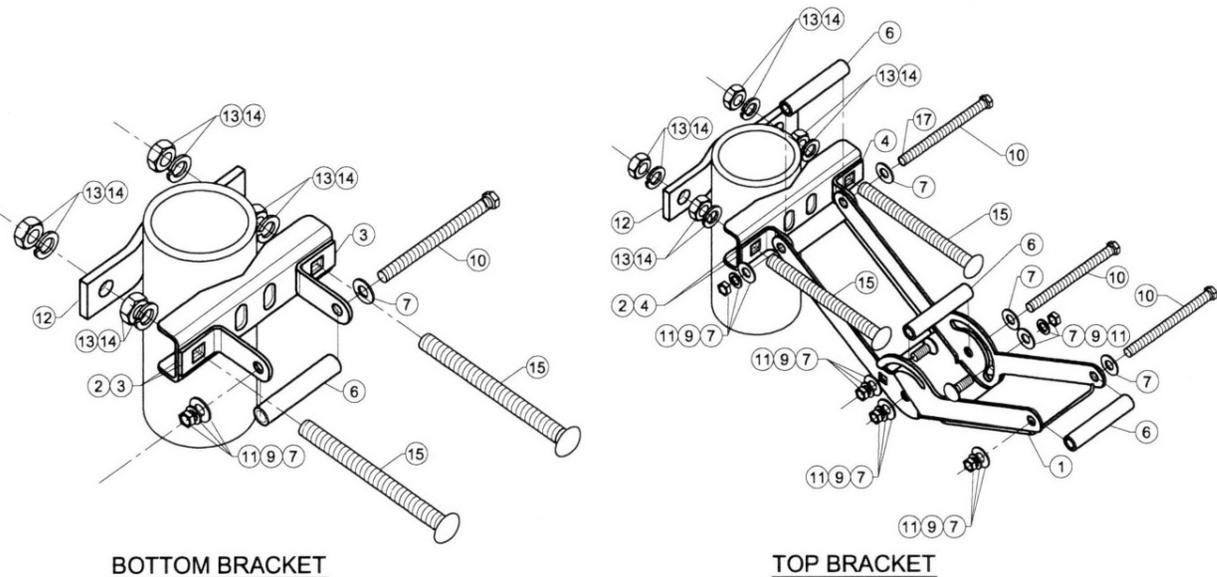


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DRAWING TITLE:
DETAIL SHEET

DRAWING NUMBER:
A-3.1 0

CEI JOB NUMBER: 13-19009



BOTTOM BRACKET

TOP BRACKET

ANTENNA BRACKET ATTACHMENT

22x34 SCALE: NTS 11x17 SCALE: NTS

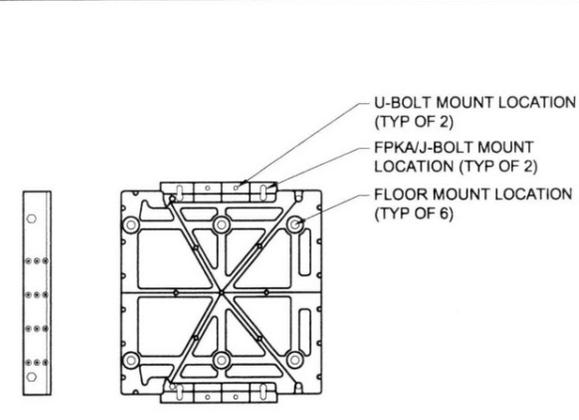
ANTENNA ATTACHMENT

22x34 SCALE: NTS 11x17 SCALE: NTS

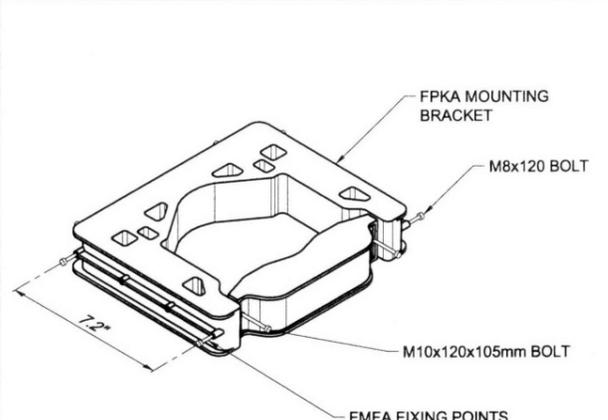
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22x34 SCALE: NTS 11x17 SCALE: NTS

5

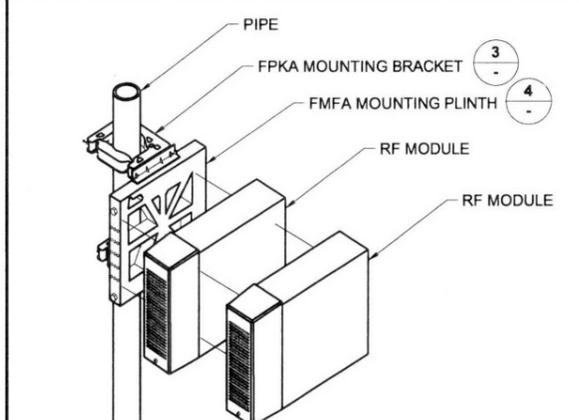


FRONT RIGHT SIDE



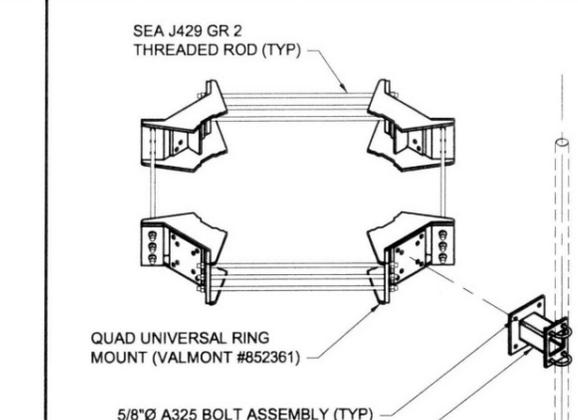
MOUNTING BRACKET (FPKA)

22x34 SCALE: NTS 11x17 SCALE: NTS



RRU MOUNTING

22x34 SCALE: NTS 11x17 SCALE: NTS



UNIVERSAL RING MOUNT

22x34 SCALE: NTS 11x17 SCALE: NTS

1

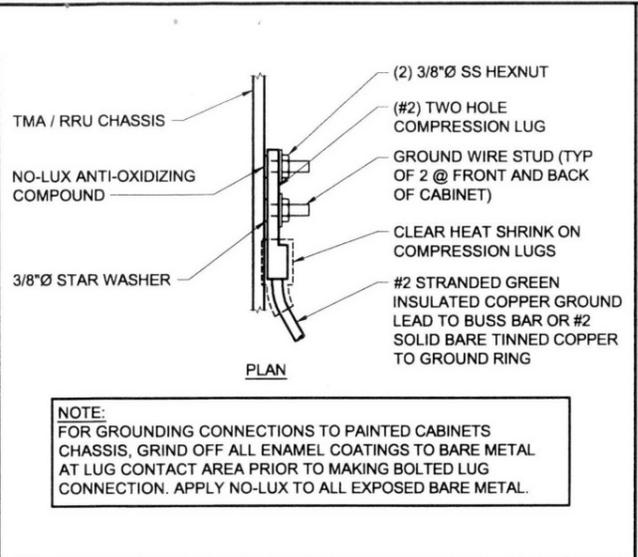
MOUNTING PLINTH (FMFA)

22x34 SCALE: 1 1/2" = 1'-0" 11x17 SCALE: 3/4" = 1'-0"

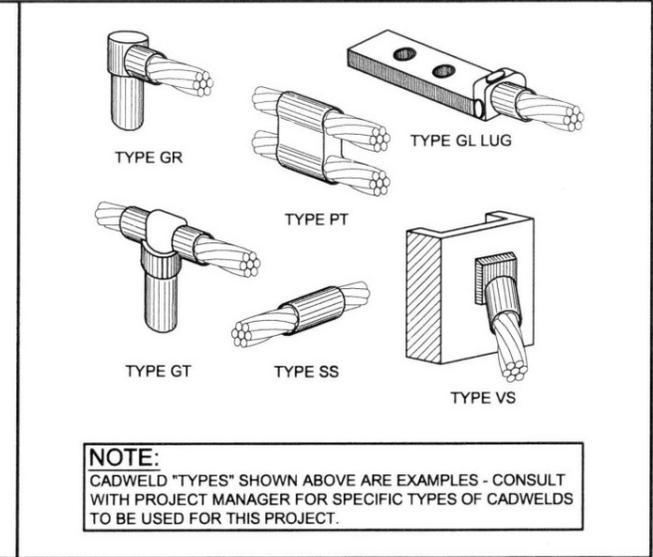
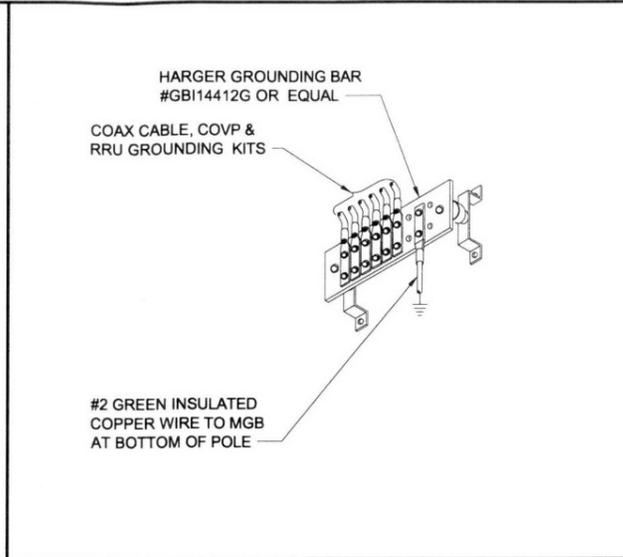
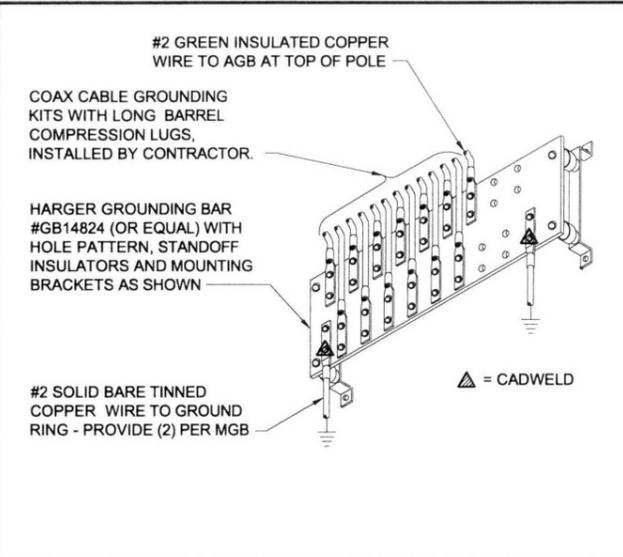
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3

2



NOTE:
FOR GROUNDING CONNECTIONS TO PAINTED CABINETS CHASSIS, GRIND OFF ALL ENAMEL COATINGS TO BARE METAL AT LUG CONTACT AREA PRIOR TO MAKING BOLTED LUG CONNECTION. APPLY NO-LUX TO ALL EXPOSED BARE METAL.



NOTE:
CADWELD "TYPES" SHOWN ABOVE ARE EXAMPLES - CONSULT WITH PROJECT MANAGER FOR SPECIFIC TYPES OF CADWELDS TO BE USED FOR THIS PROJECT.



PROJECT CONSULTANTS:
LYNX

PLANS PREPARED BY:
CORNERSTONE ENGINEERING, INC.
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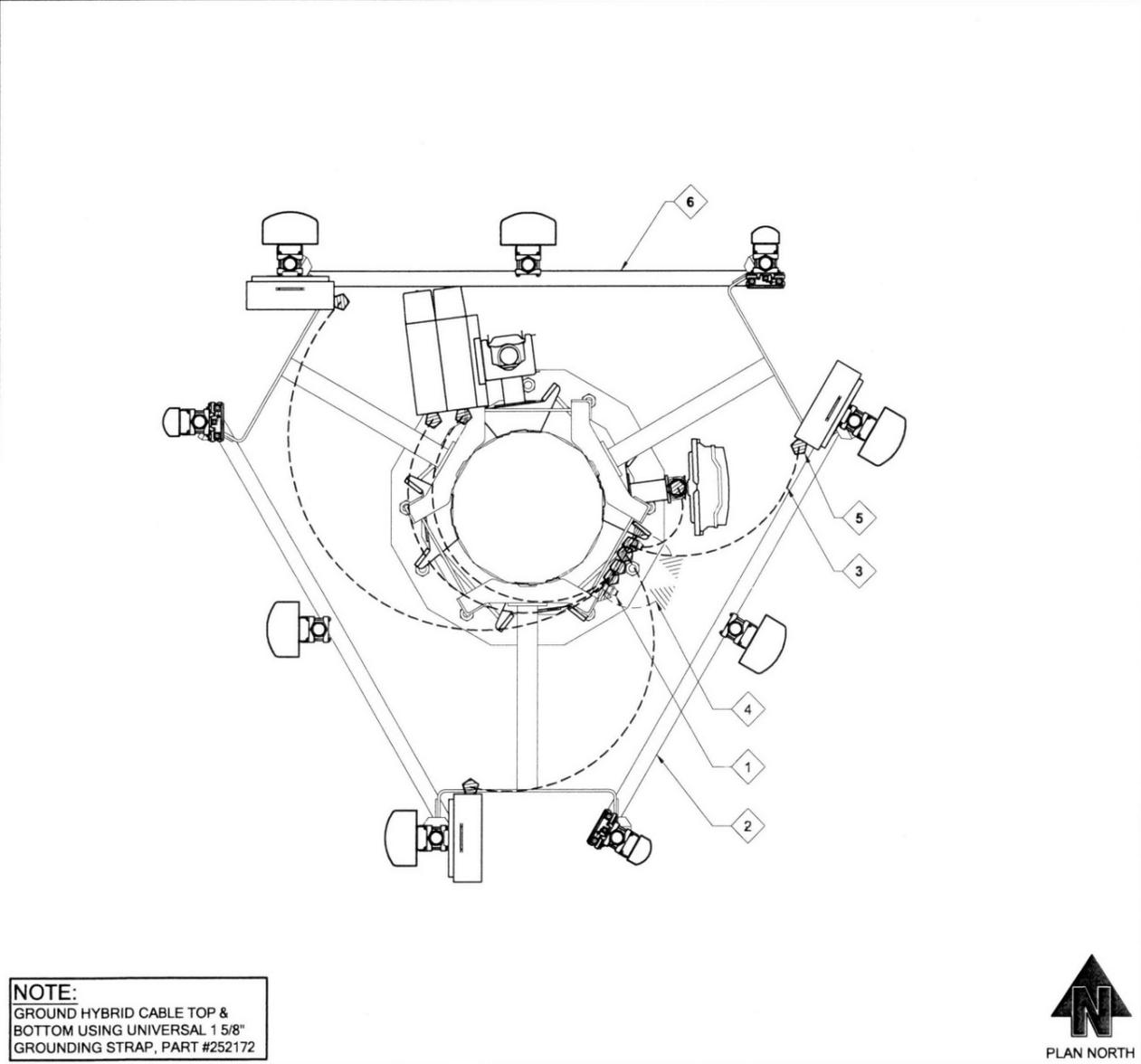
GROUND ATTACHMENT
22x34 SCALE: NTS | 11x17 SCALE: NTS

12 TYPICAL MASTER GROUND BAR
22x34 SCALE: NTS | 11x17 SCALE: NTS

11 ACCESSORY GROUND BUSS BAR
22x34 SCALE: NTS | 11x17 SCALE: NTS

10 CADWELD CONNECTIONS
22x34 SCALE: NTS | 11x17 SCALE: NTS

PROJECT INFO:
82782
POWELL BUTTE OR2
12646 SE DIVISION STREET
PORTLAND, OR 97236
MULTNOMAH COUNTY



- 1 (E) GROUND ACCESSORY BUSS BAR, TYP.
- 2 (E) ANTENNA MOUNT STRUCTURE.
- 3 **PROPOSED #2 STRANDED GREEN INSULATED COPPER GROUND LEAD, TYP.**
- 4 (E) #2 STRANDED GREEN INSULATED COPPER GROUND LEAD, TYP. (V.I.F.)
- 5 **PROPOSED GROUND CONNECTION TO RRU. SEE 12/E-1.**
- 6 **PROPOSED ANTENNA MOUNT STRUCTURE.**

1. GROUNDING SHALL COMPLY WITH LATEST EDITION OF THE NATIONAL ELECTRICAL CODE.
2. MINIMUM BENDING RADIUS FOR GROUND CONDUCTOR IS 8".
3. NO SPLICES PERMITTED IN GROUND CONDUCTORS.
4. ALL GROUNDING CONNECTORS TO BE CLEAN AND FREE OF PAINT AT THEIR MATING SURFACES AND INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. USE PENETROX OR EQUIVALENT ANTIOXIDANT GREASE.
5. ALL GROUND BAR CONNECTIONS ARE TO BE 2 HOLE LUG COMPRESSION TYPE. STACKED CONNECTIONS ARE NOT ACCEPTABLE. BACK TO BACK CONNECTIONS ON OPPOSITE SIDES OF THE GROUND BAR WILL BE PERMITTED.
6. ENSURE ALL MECHANICAL CONNECTORS ARE TORQUED TO THE MANUFACTURER'S SPECIFIED VALUES.
7. MULTIPLE BONDS ON GROUND RODS TO BE SEPARATED BY AT LEAST 6".
8. MAXIMUM RESISTANCE OF THE COMPLETED GROUND SYSTEM SHALL NOT EXCEED A RESISTANCE OF 5 OHMS TO EARTH.
9. GROUND WIRES SHALL NOT BE INSTALLED THROUGH HOLES IN ANY METAL OBJECTS OR SUPPORTS; TO PRECLUDE ESTABLISHING A "CHOKE" POINT.
10. GROUND BARS SHALL NOT BE FIELD MODIFIED.
11. GROUND RING BURIAL DEPTH SHALL BE 30".
12. A CERTIFIED CONTRACTOR WILL MAKE ALL MEASUREMENTS REQUIRED TO TEST THE GROUNDING SYSTEM USING A MEGGER OR EQUIVALENT. THE ACCEPTABLE RESISTANCE MEASURED FOR THE GROUNDING SYSTEM WILL NOT EXCEED 5 OHMS RESISTANCE. THREE DISTANCES SHALL BE USED: 1 AT 100 FEET, 1 AT 70 FEET, AND 1 AT 35 FEET. THESE DISTANCES ARE SUBJECT TO A SITE BY SITE BASIS. T-MOBILE-WTS SHALL BE GIVEN 24 HOURS NOTICE. ALL COSTS ASSOCIATED WITH GROUND TESTING WILL BE AT THE EXPENSE OF THE CONTRACTOR.

ISSUED FOR: **CONSTRUCTION**

REV. DATE ISSUED FOR BY:

0	02-27-13	CONSTRUCTION	DRA
A	02-13-13	CLIENT REVIEW	DMO

DRAWN BY: CHK. APV.:

DMO	JRF	MWO
-----	-----	-----

CURRENT ISSUE DATE: **02-27-13**

KEYED NOTES
22x34 SCALE: NTS | 11x17 SCALE: NTS

SYMBOL	DESCRIPTION
	MASTER GROUND BAR 1/4"x4"x24" COPPER
	ACCESSORY GROUND BAR 1/4"x4"x12" OR 1/4"x4"x20" COPPER
	GROUND INSPECTION WELL
	5/8"x8'-0" COPPER CLAD STEEL GROUND ROD
	COMPRESSION LUG/MECHANICAL CONNECTION
	CADWELD CONNECTION
	SIDE SPLICE CADWELD
	FIELD VERIFY & TIE INTO EXISTING GROUNDING

6

City of Portland
REVIEWED FOR CODE COMPLIANCE
APR 04 2013
Permit Number

LICENSE:

SCHEMATIC GROUNDING PLAN
22x34 SCALE: 3/4" = 1'-0" | 11x17 SCALE: 3/8" = 1'-0"

3 LEGEND
22x34 SCALE: NTS | 11x17 SCALE: NTS

2 GROUNDING NOTES
22x34 SCALE: NTS | 11x17 SCALE: NTS

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DRAWING TITLE:
SCHEMATIC GROUNDING PLAN & DETAILS

DRAWING NUMBER:
E-1 0
CEI JOB NUMBER: 13-19009

RF DATA SHEET									
SECTOR	COLOR	# OF ANTENNAS	ANTENNA VENDOR	ANTENNA MODEL	AZIMUTH (TN)	MECHANICAL DOWNTILT	ELECTRICAL DOWNTILT	RAD CENTER	HYBRID CABLE LENGTH
ALPHA (S-1)	RED	2 (NEW)	ANDREW	TMBXX-6516-R2M	0°	TBD	TBD	66'-0" AGL	100'
ALPHA (S-1)	RED	1 (NEW)	ANDREW	TMBX-6516-R2M	0°	TBD	TBD		
BETA (S-2)	GREEN	2 (NEW)	ANDREW	TMBXX-6516-R2M	120°	TBD	TBD		
BETA (S-2)	GREEN	1 (NEW)	ANDREW	TMBX-6516-R2M	120°	TBD	TBD		
GAMMA (S-3)	BLUE	2 (NEW)	ANDREW	TMBXX-6516-R2M	270°	TBD	TBD		
GAMMA (S-3)	BLUE	1 (NEW)	ANDREW	TMBX-6516-R2M	270°	TBD	TBD		

COAX CABLE			
SECTOR	# OF COAX	SIZE	LENGTH
ALPHA (S-1)	6 (E)	7/8"Ø	100'
BETA (S-2)	6 (E)	7/8"Ø	
GAMMA (S-3)	4 (E)	7/8"Ø	

UL & DL FREQUENCIES:
 SEATTLE MARKET:
 PCS:
 UL: 1885 - 1895 Mhz, 1900 - 1905 Mhz
 DL: 1965 - 1975 Mhz, 1980 - 1985 Mhz
 AWS:
 UL: 1745 - 1755 Mhz, 1730 - 1735 Mhz
 DL: 2145 - 2155 Mhz, 2130 - 2135 Mhz

ALL SECTORS
 - (6) TMBXX-6516-R2M QUAD ANTENNAS
 - (3) TMBX-6516-R2M DUAL ANTENNAS
 - (8) MODULES (2 FXFB + 3 FRIA + (3) FRIG) FRIA LOCATED @ BTS EQUIPMENT
 - (1) HYBRID CABLE & (2) COVPS
 - REMOVE ALL EXISTING TMA'S
 - ADD (3) ETW200VS12UB AWS TMA'S
 - ADD (1) HORIZONTAL ANTENNA MOUNT (ALPHA SECTOR)
 - KEEP ALL EXISTING TMBX-6516-R2M ANTENNAS
 - KEEP ALL EXISTING COAX



PROJECT CONSULTANTS:
 PLANS PREPARED BY:
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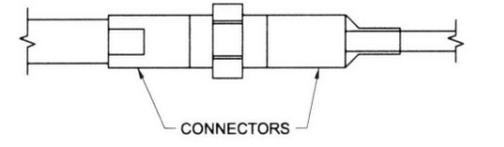
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11 NOT USED
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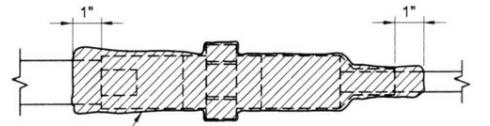
10 PROJECT SUMMARY
 22x34 SCALE: NTS | 11x17 SCALE: NTS

PROJECT INFO:
 82782
POWELL BUTTE OR2
 12646 SE DIVISION STREET
 PORTLAND, OR 97236
 MULTNOMAH COUNTY

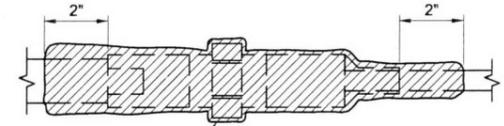
- COAXIAL CABLE NOTES:**
- ALL COAXIAL CABLE CONNECTIONS TO BE WEATHERPROOFED.
 - CONTRACTOR TO PROVIDE DRIP LOOPS IN CABLES AND JUMPERS WHERE NECESSARY.
 - TAGGING:**
 - ALL COAXIAL CABLES TO BE MARKED WITH COLOR CODED TAPE TO INDICATE THE ANTENNA SECTOR.
 - COLORS TO BE MARKED WITH COLOR CODED TAPE AND EACH END OF JUMPERS AS CLOSE TO EACH END AS POSSIBLE. (NOT TO INTERFERE WITH WEATHERPROOFING).
 - COAXIAL CABLE SPECIFICATIONS REQUIRE CABLE SUPPORT EVERY 3'-0" ON CENTER. CONTRACTOR SHALL SUPPLY SUPPORTS AS REQUIRED TO MEET THIS REQUIREMENT.



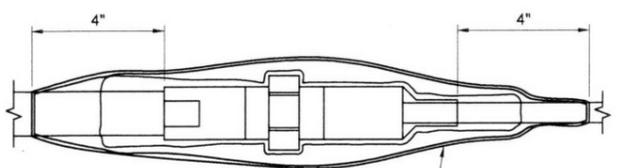
STEP 1



STEP 2



STEP 3



STEP 4

ELECTRICAL TAPE: 3 LAYERS WITH 2" TAPE AND 3 LAYERS IN 3/4" TAPE (ALL WITH MINIMUM 50% OVERLAP). ALL TAPE ENDS SHALL BE CUT (DO NOT COAT WITH 3M SCOTCH COTE SPRAY SEALER).

NOTE:
 VERTICAL CONNECTIONS SHALL BE TAPED FROM THE BOTTOM UP SO OVERLAP MOVES WATER AWAY FROM CONNECTION, TYP.
 PROVIDE HEAT SHRINK IN PLACE OF TAPE FOR QUAD POLES AND LNA'S (TYP.)

- ALL ANTENNA AND COAXIAL ANTENNA CABLE TO BE FURNISHED BY T-MOBILE AND INSTALLED BY CONTRACTOR.
- COAX COLOR CODING: ANTENNAS TO BE NUMBERED IN A CLOCKWISE MANNER FROM TRUE NORTH AND COLOR CODED TO ESTABLISHED T-MOBILE STANDARDS.
- COAX COLOR CODING APPLIES TO SECTORIZED SITES. FOR OMNI SITES, USE THE ATO, BTO & GTO COLOR CODES ONLY.
- COAX SHALL BE TAGGED WITH COLOR CODING AT (2) PLACES USING 1" WIDE WEATHER PROOF COLORED VINYL TAPE AT THE FOLLOWING LOCATIONS:
 #1 - AT ANTENNA CONNECTION
 #2 - AT ENTRY TO EQUIPMENT CABINET
- RUN COAXIAL CABLE WITH MINIMUM 12" SLACK @ 12" FROM EDGE OF EQUIPMENT CABINETS. ACROSS WAVE GUIDE BRIDGE (IF APPLICABLE), UP TO TOWER LEG (IF APPLICABLE), & DISTRIBUTE TO EACH ANTENNA DEVICE. FURNISH AND INSTALL A MINIMUM OF (3) GROUND KITS PER COAXIAL CABLE ACCORDING TO ELECTRICAL DRAWINGS. VERIFY NUMBER OF ANTENNAS, CABLE & CABLE DIAMETER WITH PROJECT MANAGER.

NOT USED
 22x34 SCALE: NTS | 11x17 SCALE: NTS

6 ANTENNA & COAX GENERAL NOTES
 22x34 SCALE: NTS | 11x17 SCALE: NTS

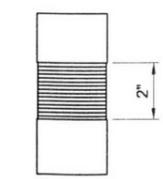


FIGURE 1

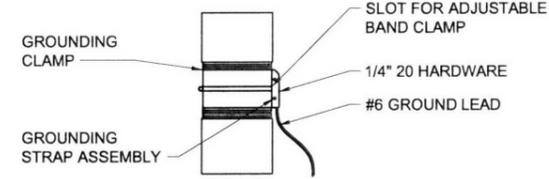


FIGURE 2

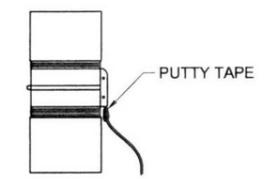


FIGURE 3

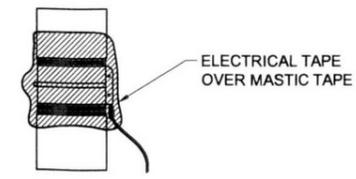


FIGURE 4

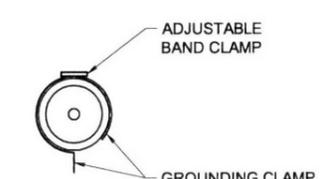


FIGURE 5

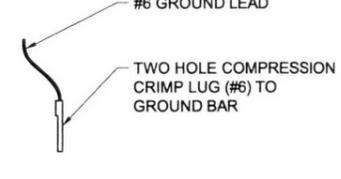


FIGURE 6

COAXIAL CABLE WEATHERPROOFING
 22x34 SCALE: NTS | 11x17 SCALE: NTS

3 COAXIAL CABLE GROUNDING
 22x34 SCALE: NTS | 11x17 SCALE: NTS

ISSUED FOR: **CONSTRUCTION**

REV: DATE: ISSUED FOR: BY:

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A	02-13-13	CLIENT REVIEW	DMO

DRAWN BY: CHK.: APV.:
 DMO JRF MWO

CURRENT ISSUE DATE: 02-27-13

LICENSE: 74538PE

REG. REGISTERED PROFESSIONAL ENGINEER
 74538PE
 OREGON
 MARCH 9, 2004
 J. MARK W. OLSON
 EXPIRATION DATE: 12/31/14

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DRAWING TITLE: **RF DETAILS**

DRAWING NUMBER: **RF-1 0**

CEI JOB NUMBER: 13-19009



PROJECT CONSULTANTS:



PLANS PREPARED BY:



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12646 SE DIVISION STREET
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MULTNOMAH COUNTY

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DMO JRF MWO

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LICENSURE:



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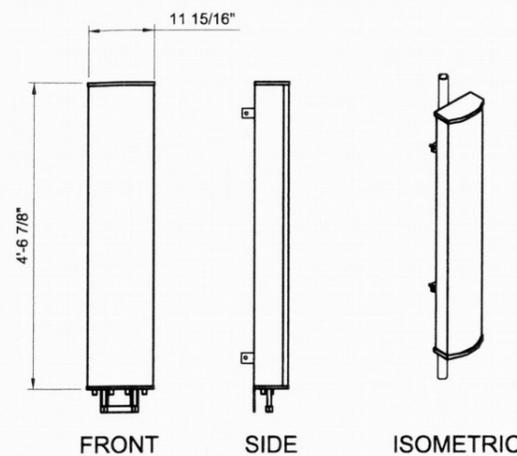
DRAWING TITLE:

RF DETAILS

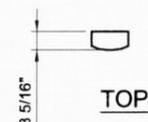
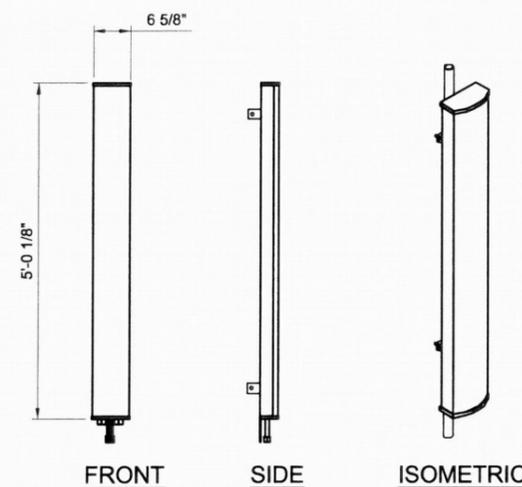
DRAWING NUMBER:

RF-2 0

CEI JOB NUMBER: 13-19009



ANDREW TMBXX-6516-R2M ANTENNA				
MECHANICAL SPECIFICATIONS				
PART NUMBER	HEIGHT	WIDTH	DEPTH	WEIGHT
TMBXX-6516-R2M	59 in (with actuator)	11.9 in	6.3 in	34.6 lbs
CONNECTORS	STANDARD MOUNTING HARDWARE			
(4) 7-16 DIN	INCLUDED			
ELECTRICAL SPECIFICATIONS				
FREQUENCY	POLARIZATION	GAIN	AZIMUTH B.W.	ELEVATION B.W.
1710-2155 MHz	±45°	17.5° ± 0.8	64.5° ± 8	7.2° ± 1.2
VSWR	MAX INPUT POWER			
1.35:1 / 16.5	250 WATTS			



ANDREW TMBX-6516-R2M ANTENNA				
MECHANICAL SPECIFICATIONS				
PART NUMBER	HEIGHT	WIDTH	DEPTH	WEIGHT
TMBX6516-R2M	60.1 in (with actuator)	6.6 in	3.3 in	11.2 lbs
CONNECTORS	STANDARD MOUNTING HARDWARE			
(2) 7-16 DIN	INCLUDED			
ELECTRICAL SPECIFICATIONS				
FREQUENCY	POLARIZATION	GAIN	AZIMUTH B.W.	ELEVATION B.W.
1710-2155 MHz	±45°	17.5° ± 0.7	66° ± 6	7.2° ± 1.1
VSWR	MAX INPUT POWER			
1.35:1 / 16.5	250 WATTS			

NOT USED
22x34 SCALE: NTS

12 NOT USED
22x34 SCALE: NTS

11 NOT USED
11x17 SCALE: NTS

NOT USED
22x34 SCALE: NTS

8 NOT USED
22x34 SCALE: NTS

7 ANTENNA DETAIL
22x34 SCALE: NTS

6 ANTENNA DETAIL
22x34 SCALE: NTS

5 ANTENNA DETAIL
11x17 SCALE: NTS

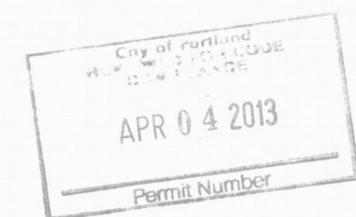
NOT USED
22x34 SCALE: NTS

4 NOT USED
22x34 SCALE: NTS

3 NOT USED
22x34 SCALE: NTS

2 NOT USED
22x34 SCALE: NTS

1 NOT USED
11x17 SCALE: NTS





PROJECT CONSULTANTS:



PLANS PREPARED BY:



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EMAIL: ce@cornerstone-engr.com
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PROJECT INFO:

82782
POWELL BUTTE OR2
12646 SE DIVISION STREET
PORTLAND, OR 97236
MULTNOMAH COUNTY

ISSUED FOR:

CONSTRUCTION

REV: DATE: ISSUED FOR: BY:

0	02-27-13	CONSTRUCTION	DRA
A	02-13-13	CLIENT REVIEW	DMO

DRAWN BY: CHK: APV:

DMO JRF MWO

CURRENT ISSUE DATE:

02-27-13

LICENSURE:



DRAWING INFORMATION:

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DRAWING TITLE:

RF DETAILS

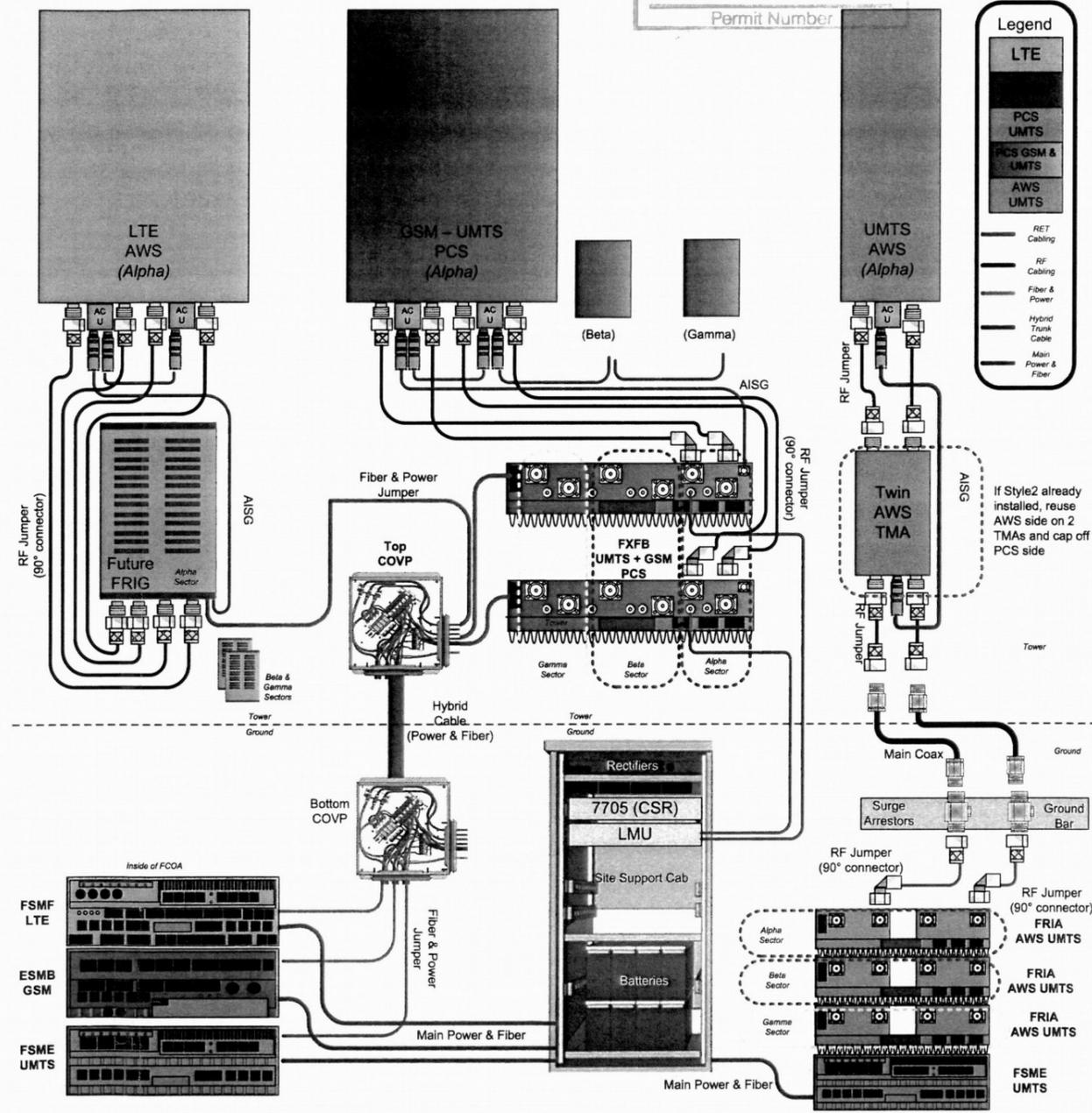
DRAWING NUMBER:

RF-3 0

CEI JOB NUMBER: 13-19009

NSN
Configuration 1A - 2013
Tower-Top RRU for Contiguous Spectrum Markets
(1 Sector of cabling shown for clarity)

City of Portland
REVIEWED FOR PERMIT
COMPLIANCE
APR 04 2013
Permit Number



NOT USED

22x34 SCALE: NTS

11x17 SCALE: NTS

2 ALL SECTORS

22x34 SCALE: NTS

11x17 SCALE: NTS

1