CODE COMPLIANCE

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. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

OREGON BUILDING CODES AND STANDARDS:

1. 2019 OREGON STRUCTURAL SPECIALTY CODE (2018 IBC)
2. 2019 OREGON MECHANICAL SPECIALTY CODE (2018 IBC)
3. 2017 OREGON RESIDENTIAL SPECIALTY CODE (2015 IRC)
4. 2017 OREGON ELECTRICAL SPECIALTY CODE (2017 NFPA 70)
5. ANSI/EIA-TIA-222-H

PROJECT TEAM

ENGINEER:

J5 INFRASTRUCTURE PARTNERS
CONTACT: JAMES CHUNG
EMAIL: jchung@J5IP.com
PHONE: (949) 247-7767 x 111

AT&T CONSTRUCTION MANAGER:

CONTACT: CHARLIE PITT
EMAIL: cp1261@att.com
PH: 971-295-6924

AT&T RF ENGINEER:

CONTACT: CHRIS OSGOOD
EMAIL: co3884@att.com

AT&T PROJECT MANAGER:

CONTACT: WENDY LONG
PH: (206) 321-1116

SITE ACQUISITION:

J5 INFRASTRUCTURE PARTNERS
CONTACT: NATALIE ERLUND
EMAIL: nerlund@J5IP.com
PH: (503) 539-9247

CONSTRUCTION MANAGER:

J5 INFRASTRUCTURE PARTNERS
CONTACT: DEVIN TAYLOR
PH: (503) 309-1380

A&E MANAGER:

J5 INFRASTRUCTURE PARTNERS
CONTACT: JOSH MALBERG
EMAIL: jmalberg@j5ip.com
PH: (208) 316-1897

PROJECT MANAGER:

J5 INFRASTRUCTURE PARTNERS
CONTACT: SARA MITCHELL
EMAIL: samitchell@J5IP.com
PH: (901) 281-1422

SITE INFORMATION

PROPERTY OWNER:
ROIC OREGON, LLC
16144 SE HAPPY VALLEY TOWN CENTER DR
HAPPY VALLEY, OR
97086

JURISDICTION:	CITY OF WEST LINN
A.P.N.:	00391819
CURRENT ZONING:	COMMERCIAL
EXISTING USE:	MULTIUSE, COMMUNICATIONS FACILITY
PROPOSED USE:	MULTIUSE, COMMUNICATIONS FACILITY
LATITUDE (NAD 83):	45.43640500 45° 21' 50.58" N
LONGITUDE (NAD 83):	-122.6467500 122° 38' 48.3" W

ACCESSIBILITY REQUIREMENTS: FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. ACCESSIBILITY IS NOT REQUIRED PER CBC2019, SECTION 11B-203.4 (LIMITED ACCESS SPACE)

POWER AGENCY:
PG&E
PH: (800) 743-5000

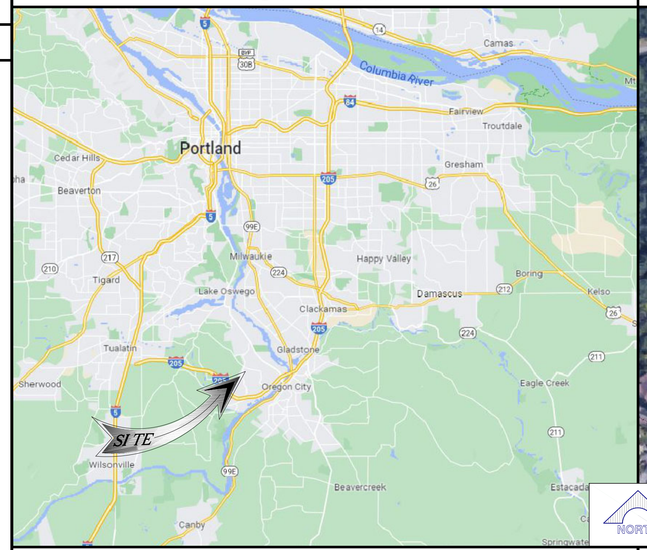
TELEPHONE AGENCY:
AT&T

RFDS VERSION: 1
DATE: 2/1/21
DATE UPDATED: 12/13/21

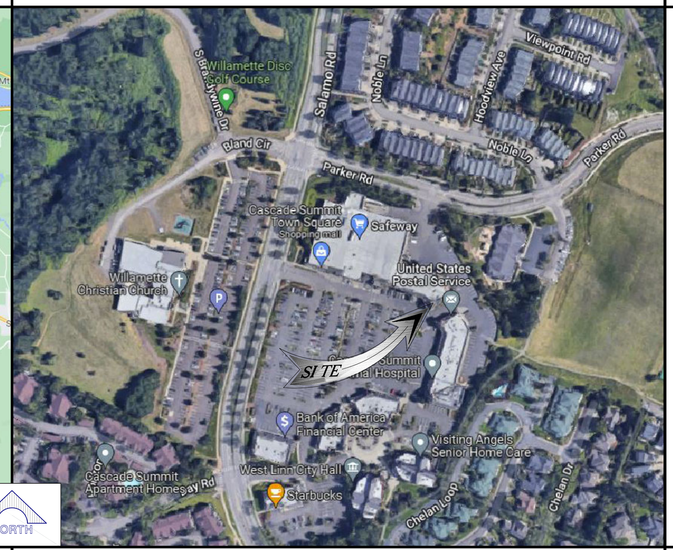
AT&T

SITE NUMBER: PX30
SITE NAME: CASCADE SUMMIT
SITE TYPE: ROOFTOP CUPOLA
ADDRESS: 21400 SOUTH SALAMO ROAD
WEST LINN, OR 97068
INSTALLATION TYPE: CBAND 5G

VICINITY MAP



LOCAL MAP



PROJECT DESCRIPTION

MODIFICATION TO AN UNMANNED TELECOMMUNICATIONS FACILITY, CONSISTING OF THE FOLLOWING:

- REMOVE (1) EXISTING 6'-4" CUPOLA

- RETAIN (6) NNHH-65A-R4 PANEL ANTENNAS
- RETAIN (9) RRH'S AT EQUIPMENT LEVEL
- RETAIN (3) DUAL MODE FIBER JUMPER FIBER TRUNKS
- RETAIN (3) DC JUMPER POWER TRUNKS
- RETAIN (1) DC12-48-60-RM SURGE SUPPRESSOR AT EQUIPMENT LEVEL

- INSTALL (3) PROPOSED NOKIA AEQK PANEL ANTENNAS
- INSTALL (3) PROPOSED NOKIA AEQU PANEL ANTENNAS
- INSTALL (1) PROPOSED DC6-48-60-0-1B-01 SURGE SUPPRESSOR AT ANTENNA LEVEL
- INSTALL (3) PROPOSED PWRT-208-S POWER TRUNKS
- INSTALL (1) PROPOSED RFFT-24SM-001-50M FIBER TRUNKS
- INSTALL (1) 5'-3" SQ (O.D.) x 12'-4" FRP CUPOLA ENCLOSURE

GENERAL CONTRACTOR NOTES

DO NOT SCALE DRAWINGS

THESE PLANS ARE FORMATTED TO BE FULL SIZE AT 24" X 36". CONTRACTORS SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR MATERIAL ORDERS OR BE RESPONSIBLE FOR THE SAME.

GENERAL NOTES

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

STATEMENTS

STRUCTURAL ANALYSIS IS NOT WITHIN THE SCOPE OF WORK CONTAINED IN THIS DRAWINGS SET. FOR ANALYSIS OF EXISTING AND/OR PROPOSED COMPONENTS, REFER TO STRUCTURAL ANALYSIS PROVIDED UNDER SEPARATE COVER.

ANTENNA MOUNT ANALYSIS IS NOT WITHIN THE SCOPE OF WORK CONTAINED IN THIS DRAWING SET. FOR ANALYSIS OF MOUNT TO SUPPORT EXISTING AND/OR PROPOSED COMPONENTS, REFER TO ANTENNA MOUNT STRUCTURAL ANALYSIS PROVIDED UNDER SEPARATE COVER.

DRIVING DIRECTIONS

DIRECTIONS FROM PDX AIRPORT

1. HEAD NORTHWEST ON NE AIRPORT WAY
2. TURN LEFT
3. SLIGHT LEFT ONTO NE AIRPORT WAY
4. USE THE RIGHT 2 LANES TO TURN SLIGHTLY RIGHT TO MERGE ONTO I-205 S TOWARD I-84/PORTLAND/SALEM
5. FOLLOW I-205 S TO WILLAMETTE DR IN WEST LINN. TAKE EXIT 8 FROM I-205 S
6. MERGE ONTO I-205 S
7. TAKE EXIT 8 FOR STATE ROUTE 43 TOWARD W LINN/LAKE OSWEGO
8. TAKE WILLAMETTE FALLS DR, SUNSET AVE AND PARKER RD TO YOUR DESTINATION
9. TURN LEFT ONTO WILLAMETTE DR
10. TURN RIGHT ONTO WILLAMETTE FALLS DR
11. SLIGHT RIGHT ONTO SUNSET AVE
12. TURN RIGHT ONTO CORNWALL ST
13. TURN LEFT AT THE 2ND CROSS STREET ONTO LANCASTER ST
14. TURN RIGHT ONTO PARKER RD
15. TURN LEFT TO STAY ON PARKER RD
16. TURN LEFT
17. TURN RIGHT (DESTINATION WILL BE ON THE RIGHT)

DIGALERT
800-227-2600
Call 2 Full Working Days In Advance

PROJECT INFORMATION

USID #	82052
FA #	10092270
PACE PARENT #	MRWOR053614
PACE CHILD #	MRWOR057963

SHEET INDEX

PREPARED FOR

AT&T

16331 NE 72ND AVE. STE. 2100
PORTLAND, OR 97201

Vendor:

J5 INFRASTRUCTURE PARTNERS

23 MAUCHLY #110
IRVINE, CA 92618

J5 PROJECT ID: P-071612

AT&T Site ID:

PX30

REV	DATE	DESCRIPTION	INT.
1	08/04/22	100% CD	RWB
0	04/21/22	100% CD	MLDV

Licensor:

Issued For:

PX30

CASCADE SUMMIT
21400 SOUTH SALAMO ROAD
WEST LINN, OR 97068

Sheet Title:

TITLE SHEET

Sheet Number:

T-1

GENERAL CONSTRUCTION NOTES:

1. PLANS ARE INTENDED TO BE DIAGRAMMATIC OUTLINE ONLY, UNLESS NOTED OTHERWISE. THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
2. THE CONTRACTOR SHALL OBTAIN, IN WRITING, AUTHORIZATION TO PROCEED BEFORE STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED OR IDENTIFIED BY THE CONTRACT DOCUMENTS.
3. CONTRACTOR SHALL CONTACT USA (UNDERGROUND SERVICE ALERT) AT (800) 227-2600, FOR UTILITY LOCATIONS, 48 HOURS BEFORE PROCEEDING WITH ANY EXCAVATION, SITE WORK OR CONSTRUCTION.
4. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY INDICATED OTHERWISE, OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.
5. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CBC / UBC'S REQUIREMENTS REGARDING EARTHQUAKE RESISTANCE, FOR, BUT NOT LIMITED TO, PIPING, LIGHT FIXTURES, CEILING GRID, INTERIOR PARTITIONS, AND MECHANICAL EQUIPMENT. ALL WORK MUST COMPLY WITH LOCAL EARTHQUAKE CODES AND REGULATIONS.
6. REPRESENTATIONS OF TRUE NORTH, OTHER THAN THOSE FOUND ON THE PLOT OF SURVEY DRAWINGS, SHALL NOT BE USED TO IDENTIFY OR ESTABLISH BEARING OF TRUE NORTH AT THE SITE. THE CONTRACTOR SHALL RELY SOLELY ON THE PLOT OF SURVEY DRAWING AND ANY SURVEYOR'S MARKINGS AT THE SITE FOR THE ESTABLISHMENT OF TRUE NORTH, AND SHALL NOTIFY THE ARCHITECT / ENGINEER PRIOR TO PROCEEDING WITH THE WORK IF ANY DISCREPANCY IS FOUND BETWEEN THE VARIOUS ELEMENTS OF THE WORKING DRAWINGS AND THE TRUE NORTH ORIENTATION AS DEPICTED ON THE CIVIL SURVEY. THE CONTRACTOR SHALL ASSUME SOLE LIABILITY FOR ANY FAILURE TO NOTIFY THE ARCHITECT / ENGINEER.
7. THE BUILDING DEPARTMENT ISSUING THE PERMITS SHALL BE NOTIFIED AT LEAST TWO WORKING DAYS PRIOR TO THE COMMENCEMENT OF WORK, OR AS OTHERWISE STIPULATED BY THE CODE ENFORCEMENT OFFICIAL HAVING JURISDICTION.
8. DO NOT EXCAVATE OR DISTURB BEYOND THE PROPERTY LINES OR LEASE LINES, UNLESS OTHERWISE NOTED.
9. ALL EXISTING UTILITIES, FACILITIES, CONDITIONS, AND THEIR DIMENSIONS SHOWN ON THE PLAN HAVE BEEN PLOTTED FROM AVAILABLE RECORDS. THE ARCHITECT / ENGINEER AND THE OWNER ASSUME NO RESPONSIBILITY WHATSOEVER AS TO THE SUFFICIENCY OR THE ACCURACY OF THE INFORMATION SHOWN ON THE PLANS, OR THE MANNER OF THEIR REMOVAL OR ADJUSTMENT. CONTRACTORS SHALL BE RESPONSIBLE FOR DETERMINING EXACT LOCATION OF ALL EXISTING UTILITIES AND FACILITIES PRIOR TO START OF CONSTRUCTION. CONTRACTORS SHALL ALSO OBTAIN FROM EACH UTILITY COMPANY DETAILED INFORMATION RELATIVE TO WORKING SCHEDULES AND METHODS OF REMOVING OR ADJUSTING EXISTING UTILITIES.
10. CONTRACTOR SHALL VERIFY ALL EXISTING UTILITIES, BOTH HORIZONTAL AND VERTICALLY, PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES OR DOUBTS AS TO THE INTERPRETATION OF PLANS SHOULD BE IMMEDIATELY REPORTED TO THE ARCHITECT / ENGINEER FOR RESOLUTION AND INSTRUCTION, AND NO FURTHER WORK SHALL BE PERFORMED UNTIL THE DISCREPANCY IS CHECKED AND CORRECTED BY THE ARCHITECT / ENGINEER. FAILURE TO SECURE SUCH INSTRUCTION MEANS CONTRACTOR WILL HAVE WORKED AT HIS/HER OWN RISK AND EXPENSE.
11. ALL NEW AND EXISTING UTILITY STRUCTURES ON SITE AND IN AREAS TO BE DISTURBED BY CONSTRUCTION SHALL BE ADJUSTED TO FINISH ELEVATIONS PRIOR TO FINAL INSPECTION OF WORK.
12. ANY DRAIN AND/OR FIELD TILE ENCOUNTERED / DISTURBED DURING CONSTRUCTION SHALL BE RETURNED TO IT'S ORIGINAL CONDITION PRIOR TO COMPLETION OF WORK. SIZE, LOCATION AND TYPE OF ANY UNDERGROUND UTILITIES OR IMPROVEMENTS SHALL BE ACCURATELY NOTED AND PLACED ON "AS-BUILT" DRAWINGS BY GENERAL CONTRACTOR, AND ISSUED TO THE ARCHITECT / ENGINEER AT COMPLETION OF PROJECT.
13. ALL TEMPORARY EXCAVATIONS FOR THE INSTALLATION OF FOUNDATIONS, UTILITIES, ETC., SHALL BE PROPERLY LAID BACK OR BRACED IN ACCORDANCE WITH CORRECT OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) REQUIREMENTS.
14. INCLUDE MISC. ITEMS PER AT&T SPECIFICATIONS

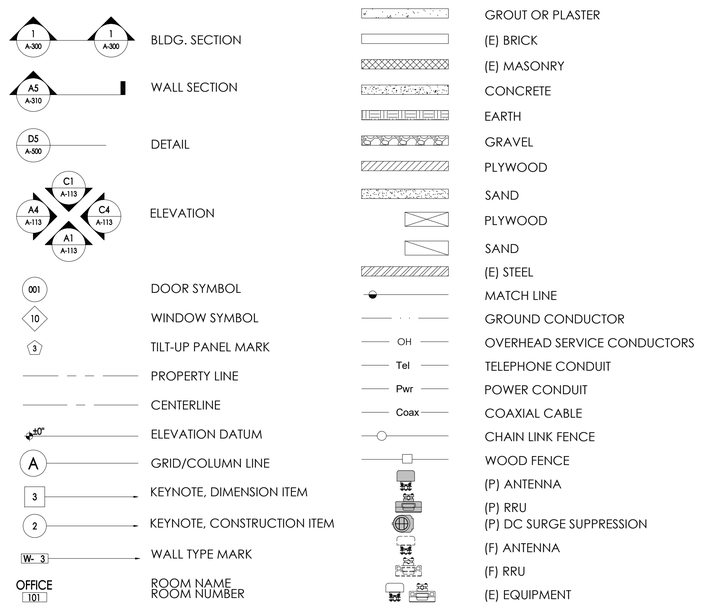
APPLICABLE CODES, REGULATIONS AND STANDARDS:

1. SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION.
2. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
3. SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:
   - 3.1. AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
   - 3.2. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, ASD, FIFTEENTH EDITION
   - 3.3. TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-H, STRUCTURAL STANDARD FOR STRUCTURAL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES
   - 3.4. INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVITY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRICAL EQUIPMENT.
   - 3.5. IEEE C62.41, RECOMMENDED PRACTICES ON SURGE VOLTAGES IN LOW VOLTAGE AC POWER CIRCUITS (FOR LOCATION CATEGORY "C3" AND "HIGH SYSTEM EXPOSURE")
   - 3.6. TIA 607 COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS TELCORDIA GR-63 NETWORK
   - 3.7. EQUIPMENT-BUILDING SYSTEM (NEBS): PHYSICAL PROTECTION
   - 3.8. TELCORDIA GR-347 CENTRAL OFFICE POWER WIRING
   - 3.9. TELCORDIA GR-1275 GENERAL INSTALLATION REQUIREMENTS
   - 3.10. TELCORDIA GR-1503 COAXIAL CABLE CONNECTIONS
   - 3.11. ANY AND ALL OTHER LOCAL & STATE LAWS AND REGULATIONS
   - 3.12. FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

ABBREVIATIONS:

A.B.	ANCHOR BOLT	FDN.	FOUNDATION	SCH.	SCHEDULE
ABV.	ABOVE	F.O.C.	FACE OF CONCRETE	SHT.	SHEET
ACCA	ANTENNA CABLE COVER ASSEMBLY	F.O.M.	FACE OF MASONRY	SIM.	SIMILAR
ADD'L	ADDITIONAL	F.O.S.	FACE OF STUD	SPEC.	SPECIFICATIONS
A.F.F.	ABOVE FINISHED FLOOR	F.O.W.	FACE OF WALL	SQ.	SQUARE
A.F.G.	ABOVE FINISHED GRADE	F.S.	FINISH SURFACE	S.S.	STAINLESS STEEL
ALUM.	ALUMINUM	FT.(')	FOOT (FEET)	STD.	STANDARD
ALT.	ALTERNATE	FTG.	FOOTING	STL.	STEEL
ANT.	ANTENNA	G.	GROWTH (CABINET)	STRUC.	STRUCTURAL
APPRX.	APPROXIMATE(LY)	GA.	GAUGE	TEMP.	TEMPORARY
ARCH.	ARCHITECT(URAL)	GI.	GALVANIZE(D)	THK.	THICK(NESS)
AWG.	AMERICAN WIRE GAUGE	G.F.I.	GROUND FAULT CIRCUIT INTERRUPTER	T.N.	TOE NAIL
BLDG.	BUILDING	GLB. (GLU-LAM)	GLUE LAMINATED BEAM	T.O.A.	TOP OF ANTENNA
BLK.	BLOCK	GPS	GLOBAL POSITIONING SYSTEM	T.O.C.	TOP OF CURB
BLKG.	BLOCKING	GRND.	GROUND	T.O.F.	TOP OF FOUNDATION
BM.	BEAM	HDR.	HEADER	T.O.P.	TOP OF PLATE (PARAPET)
B.N.	BOUNDARY NAILING	HGR.	HANGER	T.O.S.	TOP OF STEEL
BTCW.	BARE TINNED COPPER WIRE	HT.	HEIGHT	T.O.W.	TOP OF WALL
B.O.F.	BOTTOM OF FOOTING	ICGB.	ISOLATED COPPER GROUND BUS	TYP.	TYPICAL
B/U	BACK-UP CABINET	IN. (")	INCH(ES)	U.G.	UNDER GROUND
CAB.	CABINET	INT.	INTERIOR	U.L.	UNDERWRITERS LABORATORY
CANT.	CANTILEVER(ED)	LB.(#)	POUND(S)	U.N.O.	UNLESS NOTED OTHERWISE
C.I.P.	CAST IN PLACE	L.B.	LAG BOLTS	V.I.F.	VERIFY IN FIELD
CLG.	CEILING	L.F.	LINEAR FEET (FOOT)	W	WIDE (WIDTH)
CLR.	CLEAR	L.	LONG(ITUDINAL)	w/	WITH
COL.	COLUMN	MAS.	MASONRY	WD.	WOOD
CONC.	CONCRETE	MAX.	MAXIMUM	W.P.	WEATHERPROOF
CONN.	CONNECTION(OR)	M.B.	MACHINE BOLT	WT.	WEIGHT
CONST.	CONSTRUCTION	MECH.	MECHANICAL	℄	CENTERLINE
CONT.	CONTINUOUS	MFR.	MANUFACTURER	ℙ	PLATE, PROPERTY LINE
d	PENNY (NAILS)	MIN.	MINIMUM		
DBL.	DOUBLE	MISC.	MISCELLANEOUS		
DEPT.	DEPARTMENT	MTL.	METAL		
D.F.	DOUGLAS FIR	(N)	NEW		
DIA.	DIAMETER	NO.(#)	NUMBER		
DIAG.	DIAGONAL	N.T.S.	NOT TO SCALE		
DIM.	DIMENSION	O.C.	ON CENTER		
DWG.	DRAWING(S)	OPNG.	OPENING		
DWL.	DOWEL(S)	P/C	PRECAST CONCRETE		
EA.	EACH	PCS	PERSONAL COMMUNICATION SERVICES		
EL.	ELEVATION	PLY.	PLYWOOD		
ELEC.	ELECTRICAL	PPC	POWER PROTECTION CABINET		
ELEV.	ELEVATOR	PRC	PRIMARY RADIO CABINET		
EMT.	ELECTRICAL METALLIC TUBING	P.S.F.	POUNDS PER SQUARE FOOT		
E.N.	EDGE NAIL	P.S.I.	POUNDS PER SQUARE INCH		
ENG.	ENGINEER	P.T.	PRESSURE TREATED		
EQ.	EQUAL	PWR.	POWER (CABINET)		
EXP.	EXPANSION	QTY.	QUANTITY		
EXST.(E)	EXISTING	RAD.(R)	RADIUS		
EXT.	EXTERIOR	REF.	REFERENCE		
FAB.	FABRICATION(OR)	REINF.	REINFORCEMENT(ING)		
F.F.	FINISH FLOOR	REQ'D/	REQUIRED		
F.G.	FINISH GRADE	RGS.	RIGID GALVANIZED STEEL		
FIN.	FINISH(ED)				
FLR.	FLOOR				

SYMBOLS LEGEND:



PREPARED FOR

AT&T

16331 NE 72ND AVE. STE. 2100
PORTLAND, OR 97201

Vendor:

J5 INFRASTRUCTURE PARTNERS

23 MAUCHLY #110
IRVINE, CA 92618

J5 PROJECT ID: P-071612

AT&T Site ID:

PX30

REV	DATE	DESCRIPTION	INT.
1	08/04/22	100% CD	RWB
0	04/21/22	100% CD	MLDV

Licensor:

Issued For:

PX30

CASCADE SUMMIT
21400 SOUTH SALAMO ROAD
WEST LINN, OR 97068

Sheet Title:

GENERAL NOTES

Sheet Number:

GN-1

AT&T

This Site Operated by:

AT&T MOBILITY

16331 NE 72ND AVE. STE. 2100
PORTLAND, OR 97201
IN CASE OF FIRE AND THE NEED FOR SHUTDOWN
TO DEACTIVATE ANTENNAS CALL THE
FOLLOWING NUMBER:
For 24 Hour Emergency Contact and Access Please Call:
(800)832-6662

Reference Site#: PX30

Site Address: 21400 SOUTH SALAMO ROAD WEST LINN, OR 97068

10 FENCED COMPOUND SIGNAGE
N.T.S.

DANGER

NO TRESPASSING

INFORMATION

Federal Communications Communication
Tower Registration Number

1 2 3 4 5 6 7

Posted in accordance with federal Communications Commission rules and antenna tower registration 47CFR 17.4(g).

8"

12"

9 FENCED COMPOUND SIGNAGE
N.T.S.

6 FCC ASR SIGNAGE
N.T.S.

NOTICE

AUTHORIZED PERSONNEL ONLY

8 DOOR / EQUIPMENT SIGN
N.T.S.

Property of AT&T

Authorized Personnel Only

No Trespassing
Violators will be Prosecuted

In case of emergency, or prior to performing maintenance on this site, call _____
and reference cell site number _____

5 GATE SIGNAGE
N.T.S.

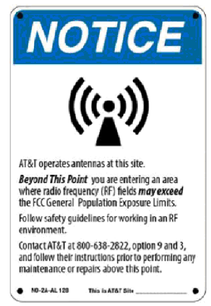
7 NFPA HAZARD SIGN - TYPICAL
N.T.S.

Property of AT&T

Authorized Personnel Only

In case of emergency, or prior to performing maintenance on this site, call _____
and reference cell site number _____

4 SHELTER / CABINET DOORS SIGNAGE
N.T.S.



Notice Sign 2
(8" x 12")

Caution Sign 2
(8" x 12")

Trilingual Notice Sign

Caution Sign 2A
(8" x 12")
Use only if instructed by RF Safety

Caution Sign 2B Tower
(8" x 12")
Use for Towers only

Caution Sign 2C Parapet
(5" x 7")

Warning Sign #WA-**1B**-AL-128

Warning Sign #WA-**2A**-AL-128

Note: Both signs have the same 8" x 12" dimensions

Shall be used when barriers are present or will be deployed around AT&T antennas – **Warning 1B**

Shall be used in lieu of barriers along with striping when barriers are not allowed– **Warning 2A**

REQUIRE HQ / MRFSE APPROVAL

1. CONTRACTOR SHALL INSTALL ALL INFORMATION SIGNAGE IN ACCORDANCE w/ AT&T WIRELESS DOCUMENT #03-0074, RF EXPOSURE POLICY AND RF SAFETY COMPLIANCE PROGRAM, LATEST EDITION.

2. FABRICATION:

*SIGN I-1: ENTRANCE DOOR, SEE DETAIL 1A, THIS SHEET

SIGN 1 IS TO BE MADE ON THE 50 MIL ALUMINUM SHEETING (SIZE 8 INCHES BY 12 INCHES) w/ FOUR (4) $\frac{1}{4}$ INCH MOUNTING HOLES, ONE EACH CORNER OF THE SIGN FOR MOUNTING w/ HARDWARE w/ TIE WRAPS. THE MAIN BACKGROUND COLOR IS TO BE WHITE FRONT & BACK w/ BLACK LETTERING.

THE INFORMATION BAND SHALL BE 1.2 INCH SOLID GREEN BAND w. 0.5 INCH HIGH BLACK LETTERING. THE BODY TEXT SHALL BE IN BLACK LETTERING w/0.2 INCH HIGH LETTERS. THE REF LINE SHALL BE IN $\frac{1}{8}$ INCH LETTERS.

THE PLACEMENT OF TEXT SHALL BE DONE IN A MANNER THAT WILL PERMIT EASY READING FROM A DISTANCE OF APPROXIMATELY 6 FEET IN FRONT OF THE SIGN.

ALL PAINT WILL BE BAKED w/ENAMEL w/ UV PROTECTIVE COATING OVER THE FACE OF THE SIGN.

*SIGN 1-2: POLE, SEE DETAIL 1B, THIS SHEET

SIGN 2 MUST BE A NON METALLIC LABEL w/ AN ADHESIVE BACKING, THE LABEL SHALL BE MADE USING VINYL OR SIMILAR WEATHERPROOF MATERIAL. THE LABEL SHALL BE APPROXIMATELY 5X7 INCHES w/ A WHITE BACKGROUND AND BLACK LETTERING. THE GREEN BAND SHALL BE 1.375 INCH IN HEIGHT & THE LETTERING SHALL BE BLACK w/ 0.75 INCH HIGH LETTERS. THE TEXT LETTERING SHALL BE BLACK w/ $\frac{1}{8}$ INCH HIGH LETTERS. UV PROTECTION SHALL BE PLACED OVER THE FRONT OF THE LABEL.

*SIGN 1-3: BACK OF ANTENNAS, SEE DETAIL 1C & 3, THIS SHEET

*SIGN 3 IS A 1 INCH X 2 INCH PANEL THAT CAN BE APPLIED TO THE BACK OR SIDE OF AN ANTENNA TO IDENTIFY IT AS AN AT&T ANTENNA.

*SIGN 1-4: SIDE OF ANTENNAS, SEE DETAIL 1D & 3, THIS SHEET

SIGN 4 IS MADE FROM TRANSPARENT MATERIAL 1-1/2 INCHES WIDE & 24 INCHES LONG. THE LETTERING IS TO BE BLACK w $\frac{1}{2}$ INCH LETTERING IN A VERTICAL COLUMN. THE SPACING BETWEEN WORDS MUST BE SUCH THAT IT IS EASILY READ & FILLS THE LENGTH OF THE SIGN.

2 ALERTING & INFORMATION SIGNAGE
N.T.S.

SIGNAGE AND STRIPING INFORMATION

1. THE FOLLOWING INFORMATION IS A GUIDELINE w/ RESPECT TO PREVAILING STANDARDS LIMITING HUMAN EXPOSURE TO RADIO FREQUENCY ENERGY AND SHOULD BE USED AS SUCH. IF THE SITE'S EMF REPORT OR ANY LOCAL, STATE OR FEDERAL GUIDELINES OR REGULATIONS SHOULD BE IN CONFLICT w/ ANY PART OF THESE NOTES OR PLANS, THE MORE RESTRICTIVE GUIDELINE OR REGULATION SHALL BE FOLLOWED AND OVERRIDE THE LESSER.
2. IF THE PUBLIC LIMIT OF RF EXPOSURE ON THE SITE IS EXCEEDED AND THE AREA IS PUBLICLY ACCESSIBLE (e.g. ROOF ACCESS DOOR THAT CANNOT BE LOCKED, OR FIRE EGRESS) THEN BOTH BARRICADES AND STRIPING SHALL BE PLACED AROUND THE ANTENNAS. THE EXACT EXTENT OF THE BARRICADES AND STRIPING SHALL BE DETERMINED BY THE EMF REPORT. USE THE PLANS AS A GUIDELINE FOR PLACEMENT OF SUCH BARRICADES AND STRIPING.
3. ALL TRANSMIT ANTENNAS REQUIRE A THREE LANGUAGE WARNING SIGN WRITTEN IN ENGLISH, SPANISH, AND CHINESE. THIS SIGN SHALL BE PROVIDED TO THE CONTRACTOR AND THE AT&T CONSTRUCTION PROJECT MANAGER AT THE TIME OF CONSTRUCTION. THE LARGER SIGN SHALL BE PLACED IN PLAIN SIGHT AT ALL ROOF ACCESS LOCATIONS AND ON ALL BARRICADES. THE SMALLER SIGN SHALL BE PLACED ON THE ANTENNA ENCLOSURES IN A MANNER THAT IS EASILY SEEN BY ANY PERSON ON THE ROOF. WARNING SIGNS SHALL COMPLY w/ ANSI C95.2 COLOR, SYMBOL, AND CONTENT CONVENTIONS. ALL SIGNS SHALL HAVE AT&T'S NAME AND THE COMPANY CONTACT INFORMATION (e.g. TELEPHONE NUMBER) TO ARRANGE FOR ACCESS TO THE RESTRICTED AREAS. THIS TELEPHONE NUMBER SHALL BE PROVIDED TO THE CONTRACTOR BY THE AT&T CONSTRUCTION PROJECT MANAGER AT THE TIME OF CONSTRUCTION.
4. PHOTOS OF ALL STRIPING, BARRICADES & SIGNAGE SHALL BE PART OF THE CONTRACTORS CLOSE OUT PACKAGE & SHALL BE TURNED INTO THE AT&T CONSTRUCTION PACKAGE & SHALL BE TURNED INTO THE AT&T CONSTRUCTION PROJECT MANAGER AT THE END OF CONSTRUCTION.
5. STRIPING SHALL BE DONE w/ FADE RESISTANT YELLOW SAFETY PAINT IN A CROSS-HATCH PATTERN AS DETAILED BY THE CONSTRUCTION DRAWINGS. ALL BARRICADES SHALL BE MADE OF AN RF FRIENDLY MATERIAL SO AS NOT TO BLOCK OR INTERFERE w/ THE OPERATION OF THE ANTENNAS. BARRICADES SHALL BE PAINTED w/ FADE RESTRAINT YELLOW SAFETY PAINT. THE CONTRACTOR SHALL PROVIDE ALL RF FRIENDLY BARRICADES NEEDED, & SHALL PROVIDE THE AT&T CONSTRUCTION PROJECT MANAGER w/ A DETAILED SHOP DRAWING OF EACH BARRICADE UPON CONSTRUCTION COMPLETION.

1 GENERAL NOTES
N.T.S.

PREPARED FOR

AT&T

16331 NE 72ND AVE. STE. 2100
PORTLAND, OR 97201

Vendor:

JS INFRASTRUCTURE PARTNERS

23 MAUCHLY #110
IRVINE, CA 92618

J5 PROJECT ID: P-071612

AT&T Site ID:

PX30

REV	DATE	DESCRIPTION	INT.
1	08/04/22	100% CD	RWB
0	04/21/22	100% CD	MLDV

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Sheet Title:

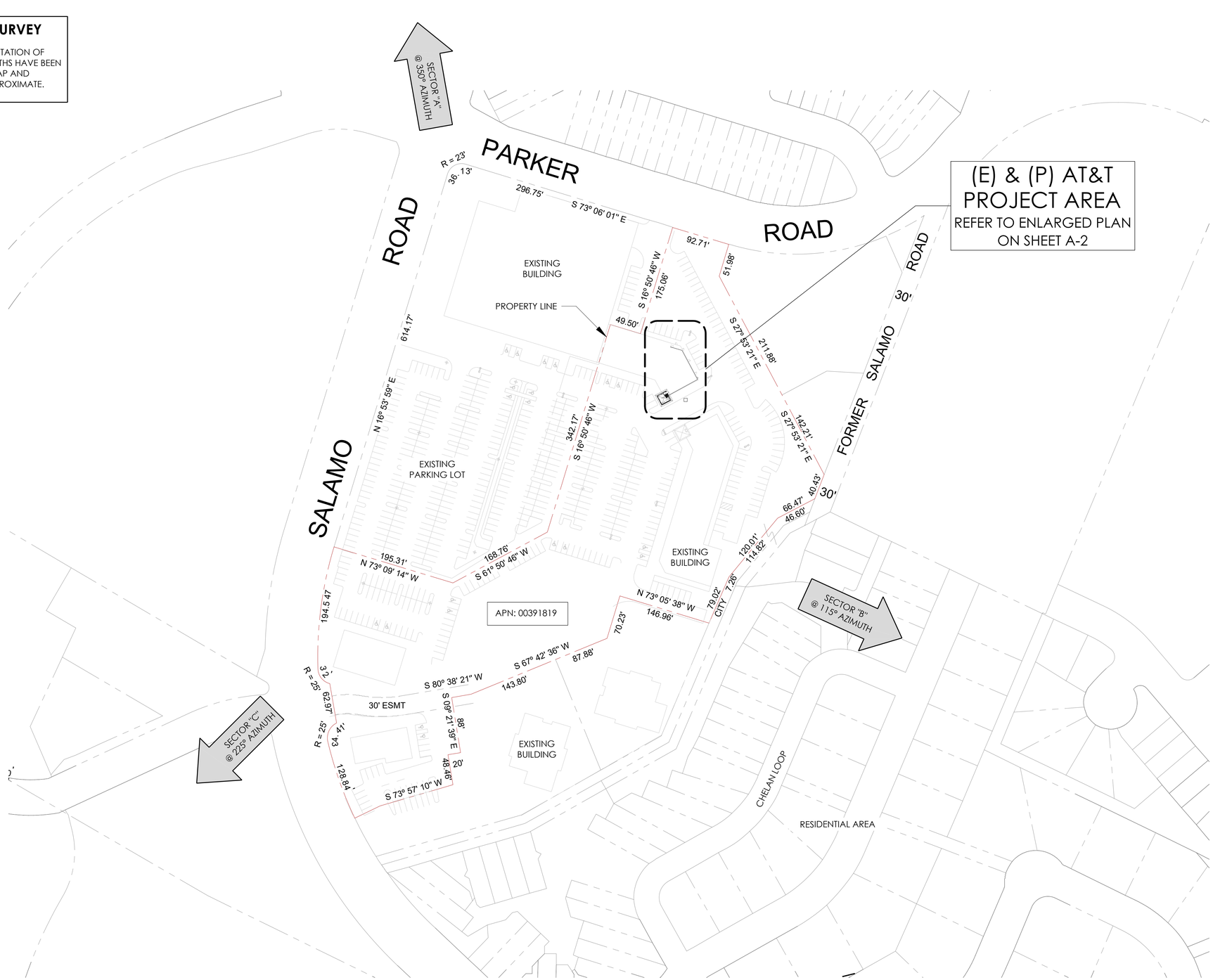
SITE SIGNAGE

Sheet Number:

GN-2

THIS IS NOT A SITE SURVEY

ALL PROPERTY BOUNDARIES, ORIENTATION OF TRUE NORTH AND STREET HALF-WIDTHS HAVE BEEN OBTAINED FROM A TAX PARCEL MAP AND EXISTING DRAWINGS AND ARE APPROXIMATE.



1 OVERALL SITE PLAN

24"x36" SCALE: 1" = 300'-0"
11"x17" SCALE: 1" = 600'-0"
300' 150' 0" 300'

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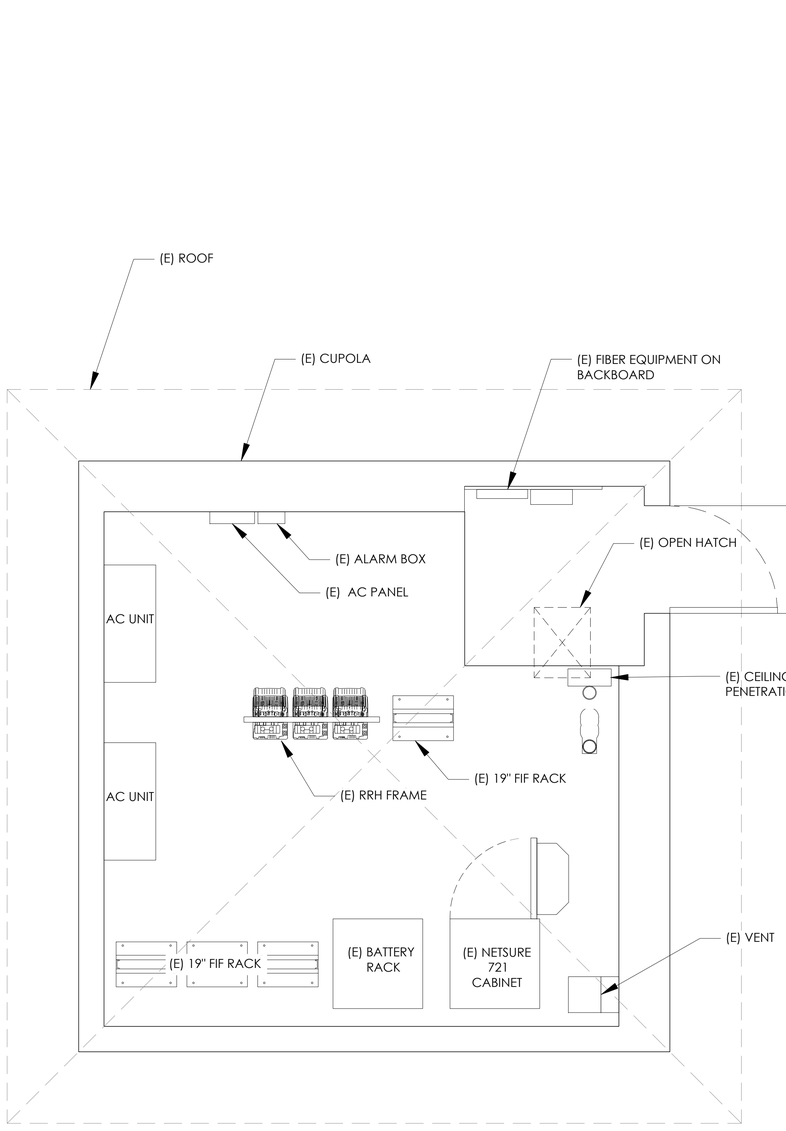
WEST LINN, OR 97068

Sheet Title:

OVERALL SITE PLAN

Sheet Number:

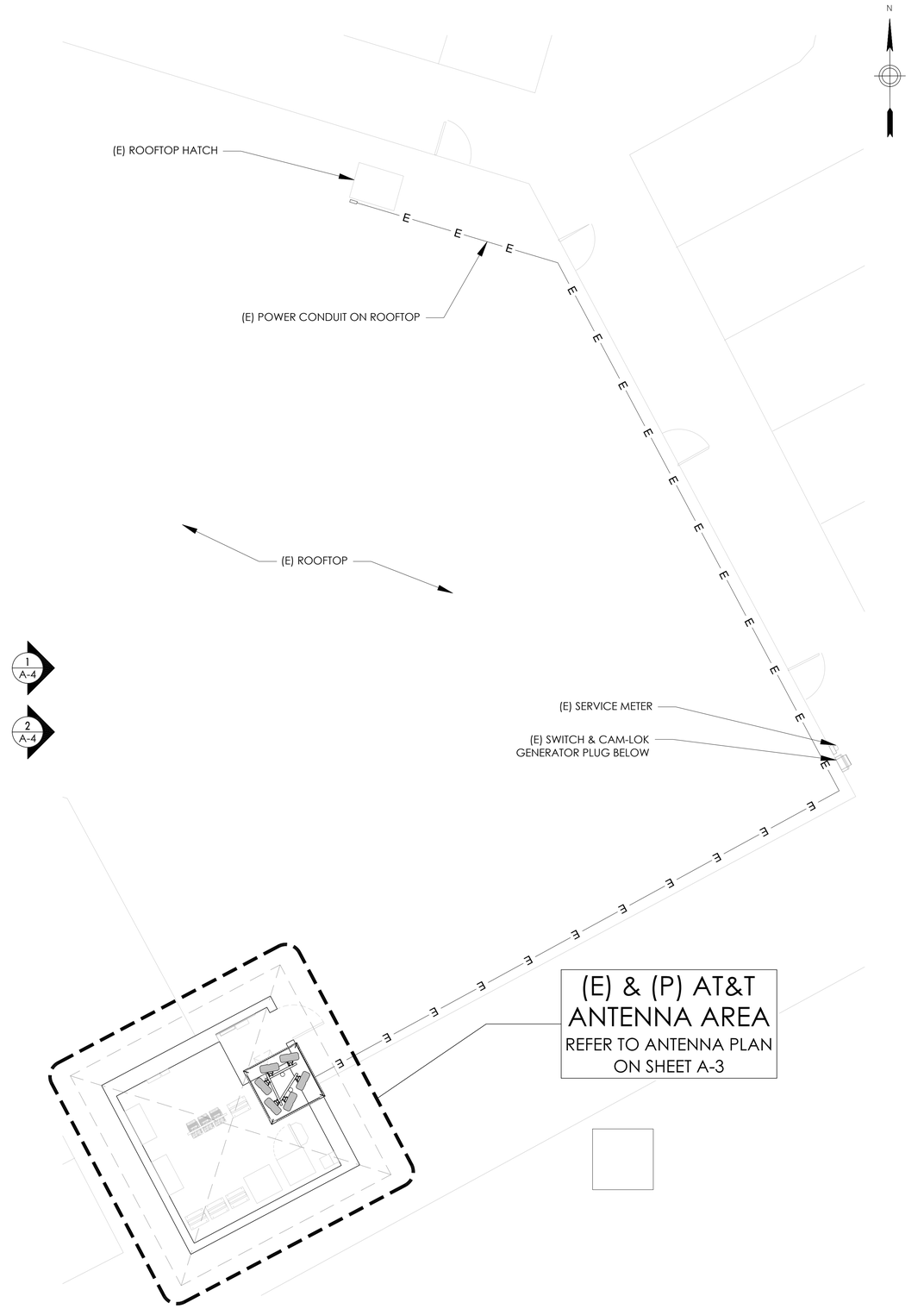
A-1



2 EQUIPMENT PLAN

24"x36" SCALE: 1/2" = 1'-0"
11"x17" SCALE: 1/4" = 1'-0"

2' 1' 0" 2'



1 ENLARGED SITE PLAN

24"x36" SCALE: 3/32" = 1'-0"
11"x17" SCALE: 3/64" = 1'-0"

8' 4' 0" 8'

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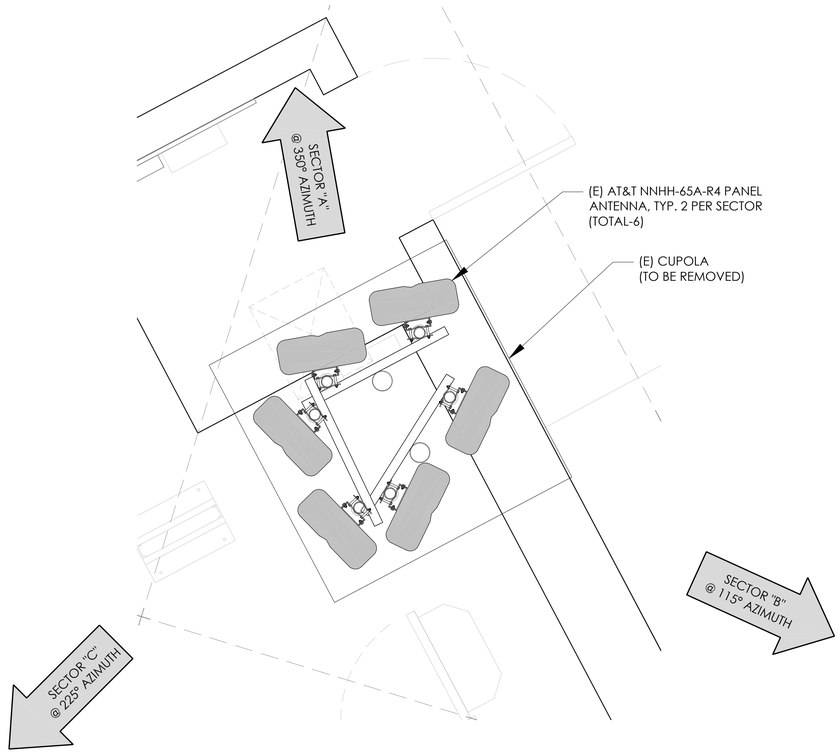
Sheet Title:

ENLARGED SITE PLAN & EQUIPMENT PLANS

Sheet Number:

A-2



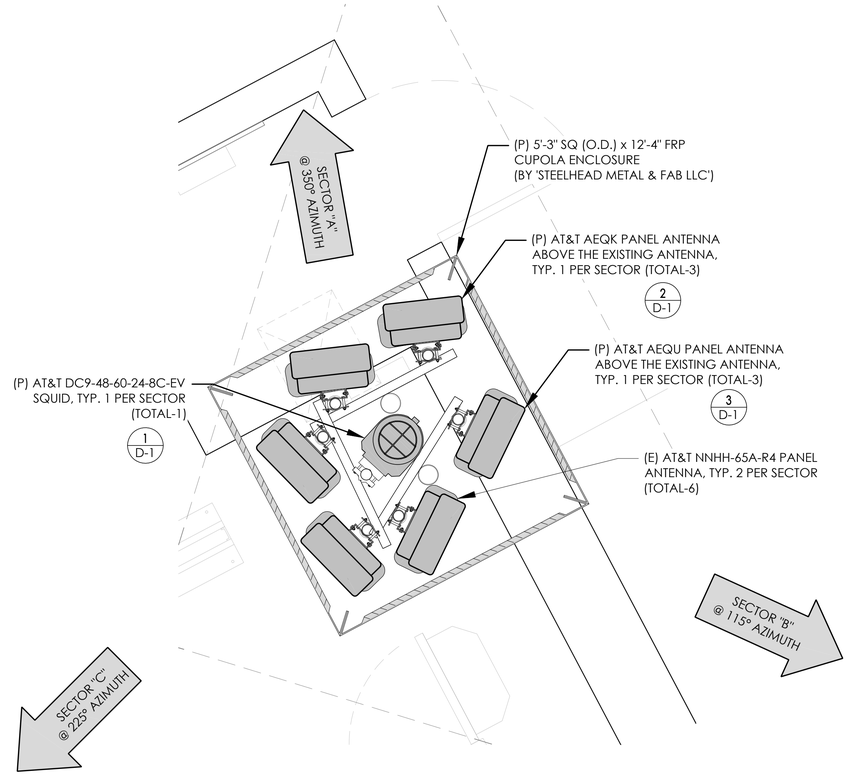
AT 37' RAD CENTER

1 EXISTING ANTENNA PLAN

24"x36" SCALE: 3/32" = 1'-0"
11"x17" SCALE: 3/64" = 1'-0"

8' 4' 0" 8'

NOTE:
1. AN ANTENNA MOUNT ANALYSIS MUST BE PERFORMED AND DETERMINED ADEQUATE FOR THE PROPOSED LOADING PRIOR TO INSTALLING ANY NEW EQUIPMENT ON THE TOWER.



AT 37' AND 43.55' RAD CENTER

2 PROPOSED ANTENNA PLAN

24"x36" SCALE: 3/32" = 1'-0"
11"x17" SCALE: 3/64" = 1'-0"

8' 4' 0" 8'

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23 MAUCHLY #110
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J5 PROJECT ID: P-071612

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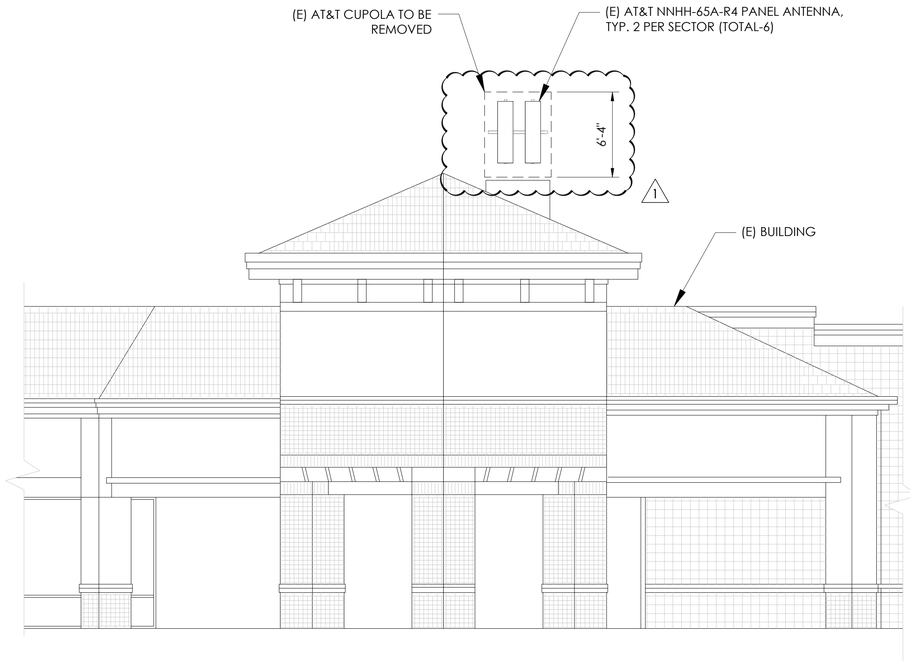
Sheet Title:

EXISTING AND PROPOSED ANTENNA PLANS

Sheet Number:

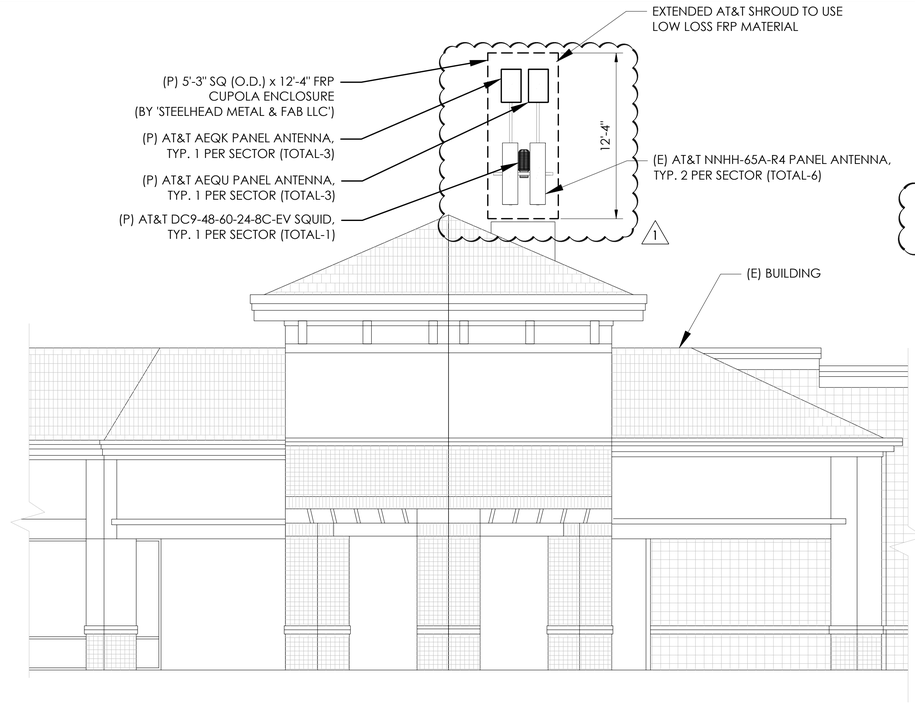
A-3



NOTE:
1. ALL (P) ANTENNAS AND EQUIPMENT MOUNTED TO THE (E) POLE SHALL BE PAINTED TO MATCH (E).
2. RRUS & SURGE ARRESTORS ARE NOT SHOWN FOR CLARITY.
3. (E) 6'-4" CUPOLA SHALL BE REMOVED AND DISPOSED OF IN A LEGAL MANOR.

1 EXISTING SOUTHWEST ELEVATION

24"x36" SCALE: 3/16" = 1'-0"
11"x17" SCALE: 3/32" = 1'-0"
4' 2' 0" 4'



NOTE:
1. ALL INFORMATION PERTAINING TO THIS EXISTING CUPOLA AND ALL ASSOCIATED COMPONENTS INCLUDING BUT NOT LIMITED TO ANTENNA MOUNTS, ANTENNAS, UPGRADES, AND EXTENSIONS ARE FOR DEPICTION PURPOSES ONLY. THIS SET OF CONSTRUCTION DRAWINGS DOES NOT CONSTITUTE A STRUCTURAL ANALYSIS FOR THE AFOREMENTIONED STRUCTURE.

2 PROPOSED SOUTHWEST ELEVATION

24"x36" SCALE: 3/16" = 1'-0"
11"x17" SCALE: 3/32" = 1'-0"
4' 2' 0" 4'

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J5 INFRASTRUCTURE PARTNERS

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IRVINE, CA 92618

J5 PROJECT ID: P-071612

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Sheet Title:

SOUTHWEST ELEVATIONS

Sheet Number:

A-4

RFDS VERSION: 1
DATE UPDATED: 12/16/2021, 4:39:21 PM

(E) ANTENNA SCHEDULE

	POS	AZIMUTH	RAD CENTER	MECHANICAL DOWNTILT	ANTENNA MAKE	ANTENNA MODEL	RRH MODEL	SURGE SUPPRESSOR	FEEDER TYPE
SECTOR "A"	A1	350°	37-0"	0	COMMSCOPE	NNHH-65A-R4			(1) DUAL MODE FIBER JUMPER (3) DC JUMPER
	A2	350°	37-0"	0	COMMSCOPE	NNHH-65A-R4			
SECTOR "B"	B1	115°	37-0"	0	COMMSCOPE	NNHH-65A-R4			
	B2	115°	37-0"	0	COMMSCOPE	NNHH-65A-R4			
SECTOR "C"	C1	225°	37-0"	0	COMMSCOPE	NNHH-65A-R4			
	C2	225°	37-0"	0	COMMSCOPE	NNHH-65A-R4			

1 EXISTING ANTENNA SCHEDULE
N.T.S.

RFDS VERSION: 1
DATE UPDATED: 12/16/2021, 4:39:21 PM

(P) ANTENNA SCHEDULE

	POS	AZIMUTH	RAD CENTER	MECHANICAL DOWNTILT	ANTENNA MAKE	ANTENNA MODEL	RRH MODEL	SURGE SUPPRESSOR	FEEDER TYPE
SECTOR "A"	A1	350°	37-0"	0	COMMSCOPE	NNHH-65A-R4		(1) DC9-48-60-24-8C-EV	(1) DUAL MODE FIBER JUMPER (1) RFFT-24SM-001-50M (3) DC JUMPER (3) PWRT-208-S
	A1	350°	43.55'	0	NOKIA	AEQK			
	A2	350°	37-0"	0	COMMSCOPE	NNHH-65A-R4			
	A2	350°	43.55'	0	NOKIA	AEQU			
SECTOR "B"	B1	115°	37-0"	0	COMMSCOPE	NNHH-65A-R4			
	B1	115°	43.55'	0	NOKIA	AEQK			
	B2	115°	37-0"	0	COMMSCOPE	NNHH-65A-R4			
	B2	115°	43.55'	0	NOKIA	AEQU			
SECTOR "C"	C1	225°	37-0"	0	COMMSCOPE	NNHH-65A-R4			
	C1	225°	43.55'	0	NOKIA	AEQK			
	C2	225°	37-0"	0	COMMSCOPE	NNHH-65A-R4			
	C2	225°	43.55'	0	NOKIA	AEQU			

1 PROPOSED ANTENNA SCHEDULE
N.T.S.

NOTE:
(E) ANTENNA AZIMUTHS ARE ESTIMATED AND ARE TO BE VERIFIED BY RF.

NOTES TO CONTRACTOR:
1. CONTRACTOR IS TO REFER TO AT&T'S MOST CURRENT RADIO FREQUENCY DATA SHEET (RFDS) PRIOR TO CONSTRUCTION.
2. CABLE LENGTHS WERE DETERMINED BASED ON VISUAL INSPECTION DURING SITE-WALK. CONTRACTOR TO VERIFY ACTUAL LENGTH DURING PRE-CONSTRUCTION WALK.
3. CONTRACTOR TO VERIFY PORTS HAVE SUFFICIENT ROOM.

PREPARED FOR
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PORTLAND, OR 97201

Vendor:
J5 INFRASTRUCTURE PARTNERS
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IRVINE, CA 92618
J5 PROJECT ID: P-071612

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Sheet Title:
EXISTING AND PROPOSED ANTENNA SCHEDULES

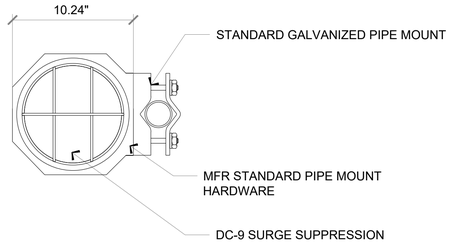
Sheet Number:
A-5

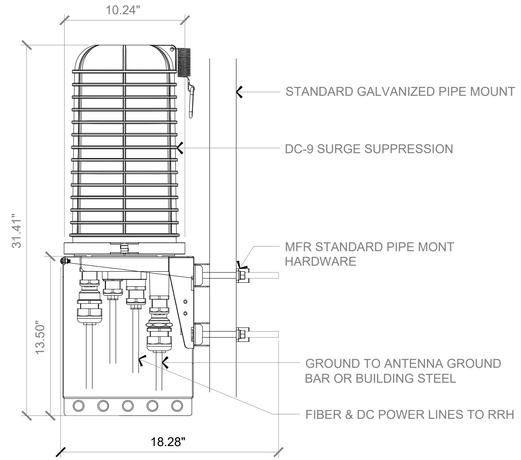
RAYCAP DC9-48-60-24-8C-EV SURGE SUPPRESSION

COLOR: BLACK/SILVER

DIMENSIONS: 10.24" DIA X 31.41" TALL W/ 13.50" BASE

WEIGHT:A: +/- 27.8 LBS. (INCLUDING MOUNTING HARDWARE)





1 DC SURGE SUPPRESSION
N.T.S.

AirScale High Power MAA benefits

- 5G Adaptive Antenna System for optimized capacity and coverage
- Digital beamforming for multi-user MIMO
- Connectivity with AirScale BBU (via eCPRI)
- Beamforming capable 64T64R with total 200W output power
- 32TRX + 32TRX split mode support

AEQK 475589A NOKIA

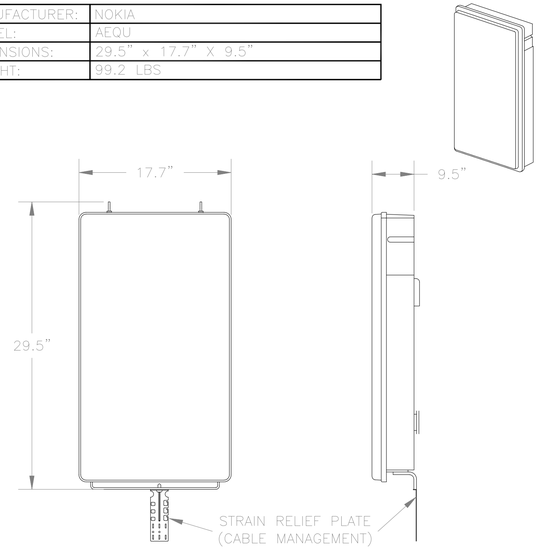
AEQK AirScale MAA 64T64R 192AE n77 200W

Technical datasheet

Product Specifications	
Standard	3GPP/FCC NR compliant, TDD
Band / Frequency range	3700~3980MHz
Supported RAT	5G
Max. supported modulation	256QAM
Number of TX/RX paths	64T / 64R
MIMO streams	16
Instantaneous bandwidth IBW	200MHz
Occupied bandwidth OBW	100MHz+100MHz for 32TRX + 32TRX split mode
Total average EIRP	77dBm
Max. output power per TRX	3.125 W / TRX (200 W total) - SW settable up to 13 dB down
Dimensions / Volume	750 x 450 x 240 mm (H x W x D)
Weight	45kg w/o bracket
Supply voltage / Connector type	DC -40.5 V... -57V / 2 pole connector
Power consumption	727 W (75% DL duty cycle, ETSI Average)
Optical ports	2xSFP28, 10/25GE eCPRI
Other interfaces / Connector type	LMI / HDMI, RF monitor port / SMA, Control AISG, External Alarms / MDR26, status LEDs
Operational temperature range	-40degC to +55C
Cooling	Natural convection cooling
Installation options / mechanical tilt	Pole, wall, with vertical adjustment of ±15° (thermally limited)
Ingress / Surge protection	IP65/Class II 20KA

2 NOKIA AEQK ANTENNA SPECIFICATIONS
N.T.S.

MANUFACTURER:	NOKIA
MODEL:	AEQU
DIMENSIONS:	29.5" x 17.7" X 9.5"
WEIGHT:	99.2 LBS



3 NOKIA AEQU ANTENNA SPECIFICATIONS
N.T.S.

FOR INFORMATION ONLY

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16331 NE 72ND AVE. STE. 2100
PORTLAND, OR 97201

Vendor:

J5 INFRASTRUCTURE PARTNERS

23 MAUCHLY #110
IRVINE, CA 92618

J5 PROJECT ID: P-071612

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WEST LINN, OR 97068

Sheet Title:

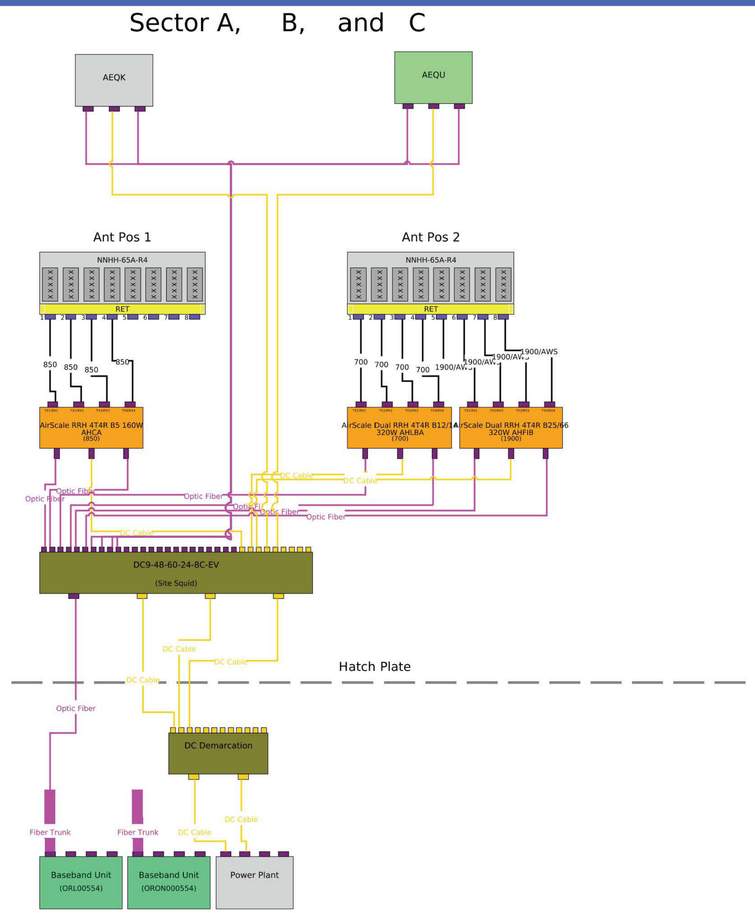
DETAILS

Sheet Number:

D-1

NOTES TO CONTRACTOR:
1. CONTRACTOR IS TO REFER TO AT&T'S MOST CURRENT RADIO FREQUENCY DATA SHEET (RFDS) PRIOR TO CONSTRUCTION.

Diagram - Sector	A	Diagram File Name - WAT4335758_SectorABandC.png					
Atoll Site Name -	PX30 CBand	Location Name -	CASCADE SUMMIT	Market -	OREGON	Market Cluster -	SEATTLE/OREGON/NO. ID
Comments:							



1 PLUMBING DIAGRAM (SECTOR "A", "B" AND "C")
N.T.S.

PREPARED FOR

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PORTLAND, OR 97201

Vendor:

J5 INFRASTRUCTURE PARTNERS

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WEST LINN, OR 97068

Sheet Title:

PLUMBING DIAGRAM

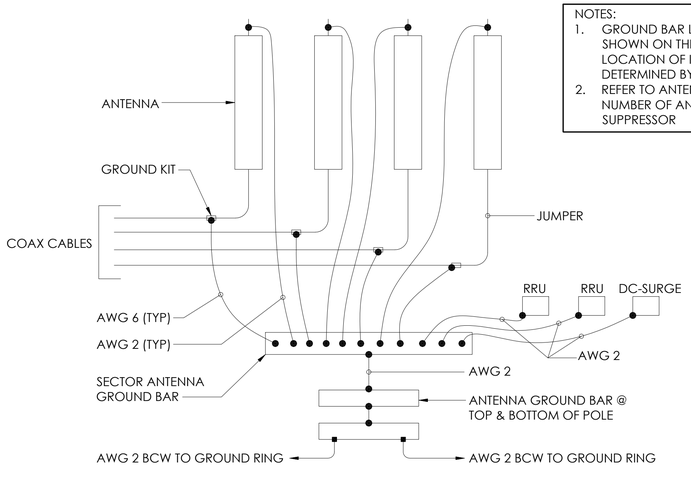
Sheet Number:

RF-1

GROUNDING NOTES:

1. ALL DETAILS ARE SHOWN IN GENERAL TERMS. ACTUAL GROUNDING INSTALLATION REQUIREMENTS AND CONSTRUCTION ACCORDING TO SITE CONDITIONS.
2. ALL GROUNDING CONDUCTORS: #2 AWG SOLID BARE TINNED COPPER WIRE UNLESS OTHERWISE NOTED.
3. GROUND BAR LOCATED IN BASE OF EQUIPMENT WILL BE PROVIDED, FURNISHED AND INSTALLED BY THE VENDOR.
4. ALL BELOW GRADE CONNECTIONS: EXOTHERMIC WELD TYPE, ABOVE GRADE CONNECTIONS: EXOTHERMIC WELD TYPE.
5. GROUND RING SHALL BE LOCATED A MINIMUM OF 24" BELOW GRADE OR 6" MINIMUM BELOW THE FROST LINE.
6. INSTALL GROUND CONDUCTORS AND GROUND ROD MINIMUM OF 1'-0" FROM EQUIPMENT CONCRETE SLAB, SPREAD FOOTING, OR FENCE.
7. EXOTHERMIC WELD GROUND CONNECTION TO FENCE POST: TREAT WITH A COLD GALVANIZED SPRAY.
8. GROUND BARS:
   A) EQUIPMENT GROUND BUS BAR (EGB) LOCATED AT THE BOTTOM OF ANTENNA POLE/MAST FOR MAKING GROUNDING JUMPER CONNECTIONS TO COAX FEEDER CABLES SHALL BE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR. JUMPERS (FURNISHED BY OWNERS) SHALL BE INSTALLED AND CONNECTED BY ELECTRICAL CONTRACTOR.
9. ALL GROUNDING INSTALLATIONS AND CONNECTIONS SHALL BE MADE BY ELECTRICAL CONTRACTOR.
10. OBSERVE N.E.C. AND LOCAL UTILITY REQUIREMENTS FOR ELECTRICAL SERVICE GROUNDING.
11. GROUNDING ATTACHMENT TO TOWER SHALL BE AS PER MANUFACTURER'S RECOMMENDATIONS OR AT GROUNDING POINTS PROVIDED (2 MINIMUM).
12. IF EQUIPMENT IS IN A C.L. FENCE ENCLOSURE, GROUND ONLY CORNER POSTS AND SUPPORT POSTS OF GATE. IF CHAIN LINK LID IS USED, THEN GROUND LID ALSO.
13. GROUNDING AT PPC CABINET SHALL BE VERTICALLY INSTALLED.
14. ALL GROUNDING FOR ANTENNAS SHALL BE CONNECTED SO THAT IT WILL BY-PASS MAIN BUSS BAR.
15. ALL EMT RUNS SHALL BE GROUNDED AND HAVE A BUSHING, NO PVC ABOVE GROUND.
16. USE SEPARATE HOLES FOR GROUNDING AT BUSS BAR. NO "DOUBLE-UP" OF LUGS.
17. POWER AND TELCO CABINETS SHALL BE GROUNDED (BONDED) TOGETHER.
18. NO LB'S ALLOWED ON GROUNDING.
19. PROVIDE STAINLESS STEEL CLAMP AND BRASS TAGS ON COAX AT ANTENNAS AND DOGHOUSE.
20. ALL ELECTRICAL AND GROUNDING AT THE CELL SITE SHALL COMPLY WITH THE NATIONAL ELECTRICAL CODE (NEC), NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 780 (LATEST EDITION), AND MANUFACTURER SPECIFICATION.
21. IF THE AC PANEL IN THE POWER CABINET IS WIRED AS SERVICE ENTRANCE, THE AC SERVICE GROUND CONDUCTOR SHALL BE CONNECTED TO GROUND ELECTRODE SYSTEM. WHEN THE AC PANEL IN THE POWER CABINET IS CONSIDERED A SUB-PANEL, THE GROUND WIRE SHALL BE INSTALLED IN THE AC POWER CONDUIT. THE INSTALLATION SHALL BE PER LOCAL AND NATIONAL ELECTRIC CODE (NFPA-70).
22. EXOTHERMIC WELDING IS RECOMMENDED FOR GROUNDING CONNECTION WHERE PRACTICAL. OTHERWISE, THE CONNECTION SHALL BE MADE USING COMPRESSION TYPE-2 HOLES. LONG BARREL LUGS OR DOUBLE CRIMP CLAMP "C" CLAMP. THE COPPER CABLES SHALL BE COATED WITH ANTIOXIDANT (COPPER SHIELD) BEFORE MAKING THE CONNECTIONS. THE MANUFACTURER'S TORQUING RECOMMENDATIONS ON THE BOLT ASSEMBLY TO SECURE CONNECTIONS SHALL BE FOLLOWED.
23. THE ANTENNA CABLES SHALL BE GROUNDED AT THE TOP AND BOTTOM OF THE VERTICAL RUN FOR LIGHTING PROTECTION. THE ANTENNA CABLE SHIELD SHALL BE BONDED TO A COPPER GROUND BUSS AT THE LOWER MOST POINT OF A VERTICAL RUN JUST BEFORE IT BEGINS TO BEND TOWARD THE HORIZONTAL PLANE. WIRE RUNS TO GROUND SHALL BE KEPT AS STRAIGHT AND SHORT AS POSSIBLE. ANTENNA CABLE SHIELD SHALL BE GROUNDED JUST BEFORE ENTERING THE CELL CABINET. ANY ANTENNA CABLES OVER 200 FEET IN LENGTH SHALL ALSO BE EQUIPPED WITH ADDITIONAL GROUNDING AT MID-POINT.
24. ALL GROUNDING CONDUCTORS INSIDE THE BUILDING SHALL BE RUN IN CONDUIT RACEWAY SYSTEM, AND SHALL BE INSTALLED AS STRAIGHT AS PRACTICAL WITH MINOR BENDS TO AVOID OBSTRUCTIONS. THE BENDING RADIUS OF ANY #2 GROUNDING CONDUCTOR IS 8". PVC RACEWAY MAY BE FLEXIBLE OR RIGID PER THE FIELD CONDITIONS. GROUNDING CONDUCTORS SHALL NOT MAKE CONTACT WITH ANY METALLIC CONDUITS, SURFACES OR EQUIPMENT.
25. PROVIDE PVC SLEEVES WHERE GROUNDING CONDUCTORS PASS THROUGH THE BUILDING WALLS AND /OR CEILINGS.
26. INSTALL GROUND BUSHINGS ON ALL METALLIC CONDUITS AND BOND TO THE EQUIPMENT GROUND BUSS IN THE PANEL BOARD.
27. GROUND ANTENNA BASES, FRAMES, CABLE RACKS AND OTHER METALLIC COMPONENTS WITH #2 GROUNDING CONDUCTORS AND CONNECT TO INSULATED SURFACE MOUNTED GROUND BARS. CONNECTION DETAILS SHALL FOLLOW MANUFACTURER'S SPECIFICATIONS FOR GROUNDING.
28. ALL PROPOSED GROUNDING CONDUCTORS SHALL BE ROUTED AND CONNECTED TO THE MAIN GROUND BAR OR EXISTING GROUND RING.

4 GROUNDING NOTES
N.T.S.



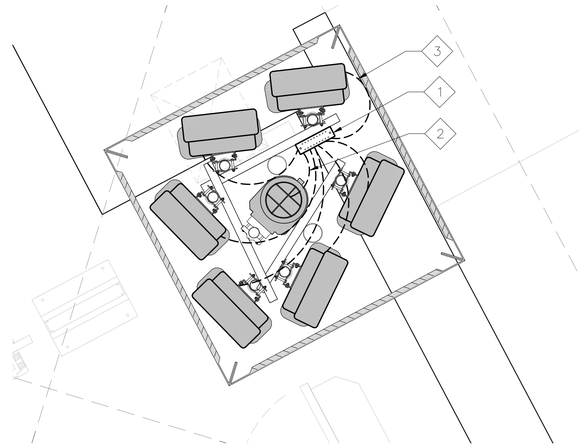
NOTES:
1. GROUND BAR LOCATION IS SCHEMATIC AS SHOWN ON THIS SHEET AND ACTUAL LOCATION OF INSTALLATION WILL BE DETERMINED BY THE INSTALLER.
2. REFER TO ANTENNA PLAN FOR EXACT NUMBER OF ANTENNA, RRU AND DC SURGE SUPPRESSOR

3 TYP. ANTENNA GROUNDING DIAGRAM
N.T.S.

KEY NOTES:

1. (E) ANTENNA GROUND BAR TO BE VERIFIED @ FIELD
2. AWG 2 INSULATED COPPER GROUND WIRE FROM (N) RRUS AND DC6 TO (E) ANTENNA GROUND BAR
3. AWG 6 INSULATED COPPER GROUND WIRE FROM NEW ANTENNA GROUND KIT TO (E) ANTENNA GROUND BAR

NOTES:
1. REFER TO TYP. ANTENNA GROUNDING DIAGRAM
2. (E) GROUND WIRES ARE NOT SHOWN FOR CLARITY



2 ANTENNA GROUNDING PLAN
N.T.S

1 NOT USED
N.T.S

PREPARED FOR

AT&T

16331 NE 72ND AVE. STE. 2100
PORTLAND, OR 97201

Vendor:

J5 INFRASTRUCTURE PARTNERS

23 MAUCHLY #110
IRVINE, CA 92618

J5 PROJECT ID: P-071612

AT&T Site ID:

PX30

REV	DATE	DESCRIPTION	INT.
1	08/04/22	100% CD	RWB
0	04/21/22	100% CD	MLDV

Licensor:

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21400 SOUTH SALAMO ROAD
WEST LINN, OR 97068

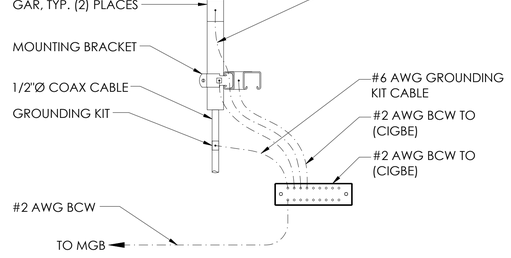
Sheet Title:

GROUNDING PLANS & NOTES

Sheet Number:

G-1

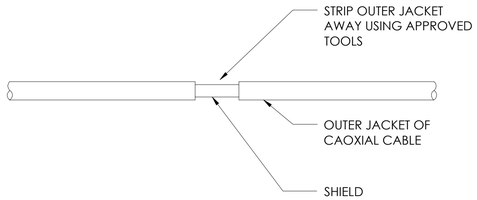
10 NOT USED
N.T.S.

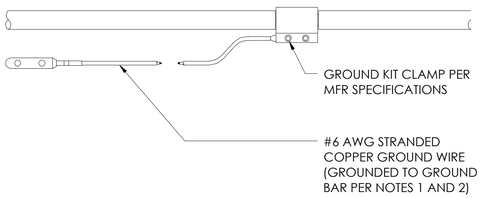


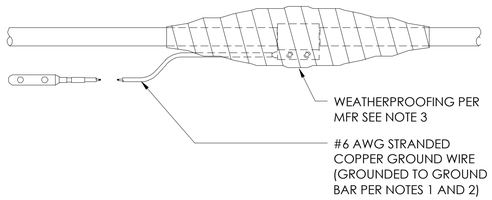
9 GPS ANTENNA GROUNDING
N.T.S.

NOTES:

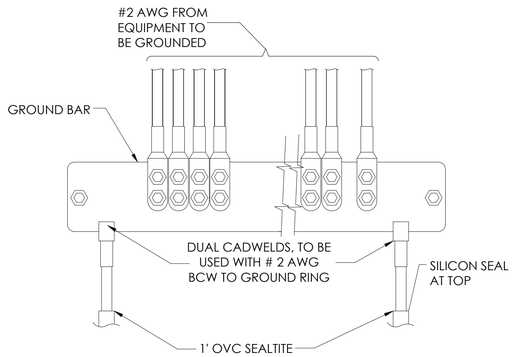
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MFR
3. WEATHER PROOFING SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY THE CABLE MFR





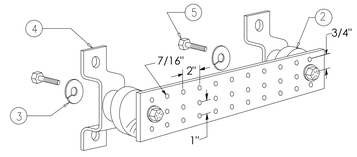


7 GROUND KIT
N.T.S.



NOTE:
1. CONTRACTOR TO UTILIZE KOPR-SHIELD (THANS & BETTS) ON ALL LUG CONNECTIONS OR APPROVED EQUAL
2. ALL LUGS TO BE DUAL HOLE LONG BARREL AND CRIMPED TWICE WITH MFR'S RECOMMENDED TOOL

5 GROUND BAR CONNECTION
N.T.S.



LEGEND

1- COPPER GROUND BAR, "X 1/4"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

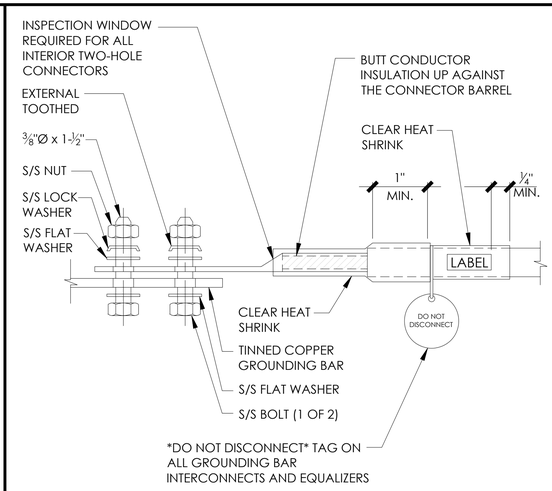
4- WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056 OR EQUAL

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

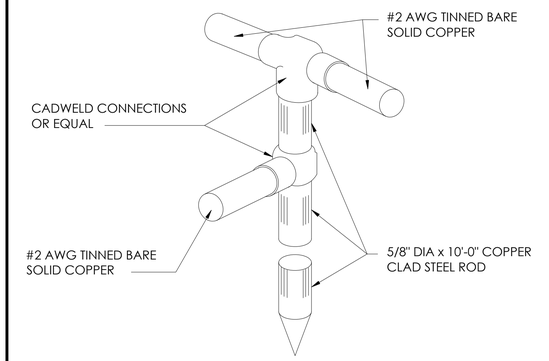
6- INSULATORS SHALL BE ELIMINATED WHEN BONDING DIRECTLY TO TOWER/MONOPOLE STRUCTURE. CONNECTION TO TOWER/MONOPOLE STRUCTURE SHALL BE PER MANUFACTURERS RECOMMENDATIONS.

NOTE: ALL HARDWARE SHALL BE STAINLESS STEEL

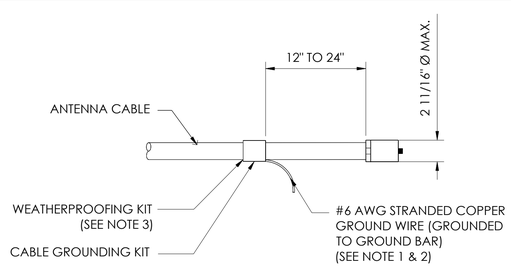
4 GROUND BAR DETAIL
N.T.S.



3 LUG TO BUSS BAR DETAIL
N.T.S.



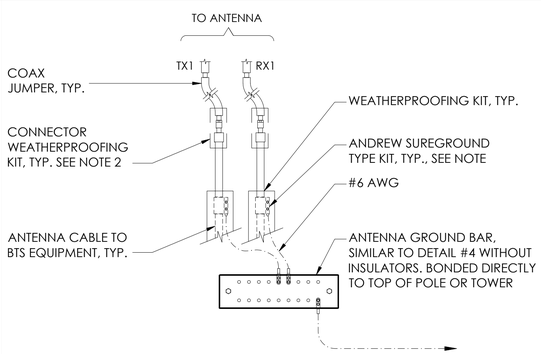
2 GROUND ROD DETAIL
N.T.S.



NOTE:

1 DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE (TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.)

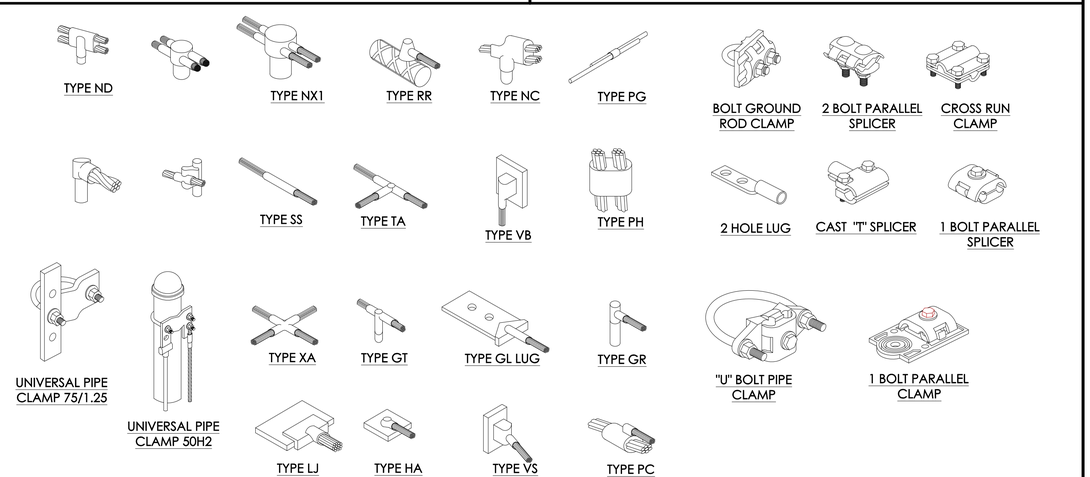
8 CONNECTION OF GROUND KIT TO ANTENNA CABLE
N.T.S.



NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE ANDREW TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED

6 GROUND CONNECTION TO GROUND BAR
N.T.S.



1 TYPICAL MECHANICAL CONNECTIONS
N.T.S.

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Vendor:

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CASCADE SUMMIT
21400 SOUTH SALAMO ROAD
WEST LINN, OR 97068

Sheet Title:

GROUNDING DETAILS

Sheet Number:

G-2

VECTOR ENGINEERS
651 W. Galena Park Blvd., Suite 101
Draper, UT 84020
(801) 990-1775
www.vectorse.com

STEELHEAD METAL & FAB, LLC
P.O. Box 3850 Salem OR, 97302
Ph: (503) 763-0114
Toll Free: 1-877-900-6789
Fax (503) 763-6280
www.steelheadmetals.com

DATE: 8/19/22	DESIGNED: CNM	DRAFTER: CNM

REVISIONS

REV	DATE	DESCRIPTION

AT&T

CASCADE SUMMIT

SITE #: PX30
ROOFTOP CUPOLA

LOCATION:

21400 SALAMO ROAD
WEST LINN, OR 97068
CLACKAMAS COUNTY

DRAWING INDEX

NOTE: FOR ORDERING CONTACT
PAUL MARY – PROJECT MANAGER/ SENIOR ESTIMATOR
STEELHEAD METAL & FAB
O – (971) 915-2843
C – (503) 735-5456
PAULM@STEELHEADMETALS.COM

TITLE SHEET

CASCADE SUMMIT
SITE #: PX30
ROOFTOP CUPOLA
21400 SALAMO ROAD
WEST LINN, OR 97068
CLACKAMAS COUNTY

STRUCTURAL
REGISTERED PROFESSIONAL ENGINEER
93806PE
OREGON
JULY 10, 2018
WELLS LIND HOLMES

EXPIRES: 6/30/2023

08/19/2022

U1133.524.221

T1

REV 0

DESIGN CRITERIA

STRUCTURAL DESIGN IS BASED ON THE OREGON STRUCTURAL SPECIALTY CODE, 2019 EDITION (2018 IBC) AND THE ASCE 7-16 STANDARD

DESIGN LOADS:

WIND: WIND SPEED = 98 MPH (3-SEC GUST) PER THE ASCE 7-16 STANDARD
RISK CATEGORY: II
EXPOSURE: C
ELEVATION: 640 FT ABOVE SEA LEVEL

SEISMIC:
IMPORTANCE FACTOR: 1.00
RISK CATEGORY: II
MAPPED SPECTRAL RESPONSE ACCELERATIONS:
S_S = 0.844g, S_1 = 0.379g
SITE CLASS: D
SPECTRAL RESPONSE COEFFICIENTS:
S_{DS} = 0.675g, S_{D1} = 0.485g
SEISMIC DESIGN CATEGORY: D

STRUCTURAL STEEL

1. ALL STEEL PIPE SHALL CONFORM w/ ASTM A53 GR. B (35 KSI), U.N.O.
2. ALL OTHER STEEL SHAPES & PLATES SHALL CONFORM w/ ASTM A36, U.N.O.
3. ALL BOLTS FOR STEEL-TO-STEEL CONNECTIONS SHALL CONFORM w/ ASTM F3125 GR. A325, U.N.O.
4. ALL WELDING SHALL BE PERFORMED IN ACCORDANCE WITH THE SPECIFICATIONS AND PROCEDURES OF THE AMERICAN WELDING SOCIETY (AWS) BY CERTIFIED WELDERS PER AWS D1.1. WELDS SHALL BE PERFORMED WITH MINIMUM E70XX LOW-HYDROGEN ELECTRODE EXCEPT WHERE HIGHER STRENGTH ELECTRODE IS REQUIRED BY AWS D1.1.
5. ALL STEEL SURFACES SHALL BE GALVANIZED IN ACCORDANCE w/ ASTM A123 AND ASTM F2329 STANDARDS.
6. ALL STRUCTURAL BOLTS SHALL BE TIGHTENED PER AN APPROVED PRETENSIONING METHOD AS DEFINED BY AISC. FOR EASE OF INSPECTION, THE "TURN-OF-NUT" METHOD AS DEFINED BY AISC WITH MATCH-MARKING TECHNIQUES IS RECOMMENDED.
7. ALL BOLT HOLES SHALL BE STANDARD SIZE PER TABLE J3.3 OF AISC U.N.O. WASHERS ARE REQUIRED FOR ANY CONNECTION THAT HAS LARGER THAN STANDARD SIZED BOLT HOLES.
8. ALL HEAVY HEX NUTS SHALL BE ASTM A563 GR. C OR DH OR EQUIVALENT.
9. ALL HARDENED WASHERS SHALL BE ASTM F436 OR EQUIVALENT.

FRP

1. FRP STRUCTURAL SHAPES SHALL BE STRONGWELL EXTREN SERIES 500/525 MANUFACTURED USING THE PULTRUSION PROCESS.
2. ALL FIELD CUT OR DRILLED EDGES OF FRP STRUCTURAL MEMBERS TO BE COATED BY OTHERS WITH RESIN OR ACRYLIC SEALER COMPATIBLE WITH THE RESIN MATRIX USED IN THE STRUCTURAL SHAPE.
3. IF PREFABRICATED MEMBERS DO NOT ASSEMBLE PER PLAN, CONTACT STEELHEAD METAL & FAB LLC BEFORE CUTTING OR ALTERING FABRICATED MEMBERS.
4. FRP STRUCTURAL MEMBERS SHALL BE FABRICATED AND ASSEMBLED AS INDICATED ON THE DRAWINGS.
5. THE CONTRACTOR SHALL PROTECT THE FRP STRUCTURAL MEMBERS FROM ABUSE TO PREVENT BREAKAGE, NICKS, GOUGES, ETC. DURING FABRICATION, HANDLING, AND INSTALLATION.
6. FRP BOLTS SHOULD BE TIGHTENED AND LOCKED WITH EPOXY.
8. FRP OR STEEL BOLTS THROUGH FRP MEMBERS SHALL MEET THE FOLLOWING SPACING AND EDGE DISTANCE REQUIREMENTS, MEASURED FROM BOLT CENTERS:
   MIN. BOLT SPACING = 4 TIMES BOLT DIA.
   MIN. EDGE DIST = 3 TIMES BOLT DIA. IN DIRECTION OF PULTRUSION
   MIN. EDGE DIST = 2 TIMES BOLT DIA. PERPENDICULAR TO DIRECTION OF PULTRUSION

GENERAL NOTES

1. CONTRACTOR SHALL FIELD VERIFY SITE OR LAYOUT RESTRICTIONS, SITE CONDITIONS, DIMENSIONS, AND ELEVATIONS BEFORE START OF CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF STEELHEAD, INC. PRIOR TO BEGINNING PROJECT. ALL WORK SHALL BE PERFORMED USING ACCEPTED CONSTRUCTION PRACTICES. CONTRACTOR TO VERIFY MATERIALS PROVIDED BY STEELHEAD PRIOR TO INSTALLATION.
2. ALL ENGINEERING PLANS, DRAWINGS, DESIGNS, CALCULATIONS AND SPECIFICATIONS (COLLECTIVELY, "PLANS") ARE DESIGNED TO THE PROPRIETARY MANUFACTURING SPECIFICATIONS OF STEELHEAD METAL AND FAB., LLC ("STEELHEAD") INTENDED AND AUTHORIZED SOLELY FOR USE WITH PRODUCT PRODUCED BY STEELHEAD. UNAUTHORIZED USE IS STRICTLY PROHIBITED. CUSTOMER AGREES TO DEFEND, INDEMNIFY AND HOLD STEELHEAD HARMLESS FROM AND AGAINST ANY AND ALL DEMANDS, CLAIMS, SUITS, PROCEEDINGS, LOSSES, LIABILITIES, DAMAGES, FEES, COSTS AND EXPENSES (INCLUDING, WITHOUT LIMITATION, REASONABLE ATTORNEYS' FEES AND COSTS) ARISING FROM OR RELATING TO ANY UNAUTHORIZED USE OF STEELHEAD'S PLANS BY CUSTOMER.
3. NO FIELD MODIFICATIONS MAY BE MADE TO RFTRANSPARENT PANELS WITHOUT THE EXPRESS WRITTEN CONSENT FROM THE ENGINEER OF RECORD. STEELHEAD, INC. AND ENGINEER OF RECORD ASSUME NO RESPONSIBILITY FOR THE STRUCTURE IF ALTERATIONS AND/OR ADDITIONS ARE MADE TO THE DESIGN AS SHOWN IN THESE DRAWINGS.
4. THE CONTRACTOR AND ALL SUBCONTRACTORS SHALL COMPLY WITH ALL LOCAL CODES, REGULATIONS, AND ORDINANCES AS WELL AS STATE DEPARTMENT OF INDUSTRIAL REGULATIONS AND DIVISION OF INDUSTRIAL SAFETY (OSHA) REQUIREMENTS.
5. THE CONTRACTOR SHALL SUPERVISE AND DIRECT ALL WORK TO THE BEST OF HIS/HER ABILITY AND SKILL. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, PROCEDURES, AND SEQUENCES, AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
6. THE CONTRACTOR SHALL VERIFY, COORDINATE, AND PROVIDE ALL NECESSARY BLOCKING, BACKING, FRAMING, HANGERS, OR OTHER SUPPORTS FOR ALL ITEMS REQUIRING SAME, WHETHER SHOWN OR NOT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY BRACING, SHORING, FORMWORK, ETC., AND SHALL CONFORM TO ALL NATIONAL, STATE, AND LOCAL ORDINANCES AND CODES, IN ORDER TO SAFELY EXECUTE ALL STAGES OF WORK TO COMPLETE THIS PROJECT.
7. IT IS THE INTENT OF THESE DRAWINGS TO SHOW THE COMPLETED INSTALLATION OF THE STRUCTURE SHOWN.
8. CONTRACTOR ASSUMES RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING THE SAFETY OF ALL PERSONS AND PROPERTY IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES. THIS REQUIREMENT APPLIES CONTINUOUSLY, AND IS NOT LIMITED TO NORMAL WORKING HOURS.
9. CONTRACTOR TO HOLD ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT.
10. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL EXISTING UTILITIES, SHOWN OR NOT SHOWN. THE CONTRACTOR IS FINANCIALLY RESPONSIBLE FOR REPAIR OR REPLACEMENT OF UTILITIES OR OTHER PROPERTY DAMAGED IN CONJUNCTION WITH THE EXECUTION OF WORK ON THIS PROJECT.
11. WEATHER PROOFING AND/OR FLASHING TO BE PROVIDED BY CONTRACTOR AS REQUIRED.
12. ALL FRP MEMBERS TO BE FIELD-CUT BY OTHERS.
13. ALL FRP MEMBERS AND PANELS TO BE SUPPLIED BY STEELHEAD. ALL STEEL MEMBERS TO BE SUPPLIED BY CONTRACTOR.

DESIGN REACTIONS

R = 2,375 lb (1.0D+0.7E)
V = 1,850 lb (0.6W)
M = 9,725 ft-lb (0.6W)

APPROXIMATE WEIGHT OF EACH STRUCTURE: 4,325 lb (INCLUDES WEIGHT OF ANTENNAS, EQUIPMENT, & MOUNTS)

THE DESIGN REACTIONS LISTED ABOVE ARE TYPICAL AT EA. NEW TO EXISTING PIPE CONNECTION. REACTIONS V & M SHALL BE CONSIDERED TO ACT IN ANY HORIZONTAL DIRECTION. IT IS THE RESPONSIBILITY OF OTHERS TO DETERMINE THE ADEQUACY OF THE EXISTING MAST PIPES AND EXISTING BUILDING TO SUPPORT THE RFTRANSPARENT™ CUPOLA FOR THE DESIGN REACTIONS LISTED ABOVE.

SPECIAL INSPECTIONS

1. STEEL FABRICATION SHALL BE DONE ON THE PREMISES OF A FABRICATOR REGISTERED AND APPROVED AS REQUIRED BY THE BUILDING OFFICIAL TO PERFORM SUCH WORK WITHOUT SPECIAL INSPECTION. ALTERNATIVELY, SPECIAL INSPECTION OF MATERIALS, WELDING, AND FABRICATION PROCEDURES SHALL BE REQUIRED FOR FABRICATION BY AN UNAPPROVED FABRICATOR.
2. NO FIELD WELDING SHALL BE PERMITTED
3. THE FOLLOWING SPECIAL INSPECTIONS SHALL BE REQUIRED PER CHAPTER 17 OF THE BUILDING CODE:

- SPECIAL INSPECTION OF HIGH-STRENGTH BOLTING (WHEN APPLICABLE):
  - PERIODIC SPECIAL INSPECTION IF BOLTS ARE PRETENSIONED WITH MATCH-MARKING TECHNIQUES
  - CONTINUOUS SPECIAL INSPECTION OF ALL OTHER HIGH-STRENGTH BOLTING

4. SPECIAL INSPECTION IS NOT REQUIRED FOR WORK OF A MINOR NATURE OR AS WARRANTED BY CONDITIONS IN THE JURISDICTION AS APPROVED BY THE BUILDING OFFICIAL. THUS, SPECIAL INSPECTION ITEMS ABOVE MAY BE WAIVED AS DEEMED APPROPRIATE BY THE BUILDING OFFICIAL.

STRUCTURAL OBSERVATION

NO STRUCTURAL OBSERVATION IS REQUIRED.

DISCLAIMERS

1. ALL STRUCTURAL COMPONENTS TO BE CONNECTED TOGETHER SHALL BE COMPLETELY FIT UP ON THE GROUND OR OTHERWISE VERIFIED FOR COMPATIBILITY PRIOR TO LIFTING ANY COMPONENT INTO PLACE. REPAIRS REQUIRED DUE TO FIT-UP OR CONNECTION COMPATIBILITY PROBLEMS AFTER PARTIAL ERECTION ARE THE FINANCIAL RESPONSIBILITY OF THE CONTRACTOR.
2. SOME TELECOMMUNICATION STRUCTURES ARE SUSCEPTIBLE TO WIND-INDUCED OSCILLATIONS. OSCILLATIONS MAY OCCUR AT LOW OR MODERATE WIND SPEEDS AND MAY CAUSE STRUCTURAL DAMAGE. TIA PROVIDES NO PRACTICAL ANALYTICAL METHOD TO PREDICT AND PREVENT WIND-INDUCED STRUCTURAL OSCILLATIONS. VECTOR STRUCTURAL ENGINEERING RECOMMENDS FREQUENT MONITORING TO IDENTIFY WIND-INDUCED OSCILLATION AND REGULAR CONDITION ASSESSMENTS TO IDENTIFY FATIGUE CRACKING, LOOSE OR MISSING BOLTS, AND ANY OTHER STRUCTURAL DEFECTS. ANY OSCILLATION OR DEFECTS OBSERVED SHALL BE IMMEDIATELY REPORTED TO VECTOR STRUCTURAL ENGINEERING FOR FURTHER EVALUATION AND POSSIBLE REPAIRS OR MODIFICATIONS WHICH MAY BE REQUIRED AT THE OWNER'S EXPENSE.

VECTOR ENGINEERS
651 W. Galena Park Blvd., Suite 101
Draper, UT 84020
(801) 990-1775
www.vectorse.com

STEELHEAD METAL & FAB, LLC
P.O. Box 3850 Salem OR, 97302
Ph: (503) 763-0114
Toll Free: 1-877-900-6789
Fax (503) 763-6280
www.steelheadmetals.com

DATE: 8/19/22	DESIGNED: CNM	DRAFTER: CNM

REVISIONS

REV	DATE	DESCRIPTION

AT&T

NOTES & SPECIFICATIONS

CASCADE SUMMIT
SITE #: PX30
ROOFTOP CUPOLA
21400 SALAMO ROAD
WEST LINN, OR 97068
CLACKAMAS COUNTY

STRUCTURAL
REGISTERED PROFESSIONAL ENGINEER
93806PE
OREGON
JULY 10, 2018
WELLS LIND HOLMES

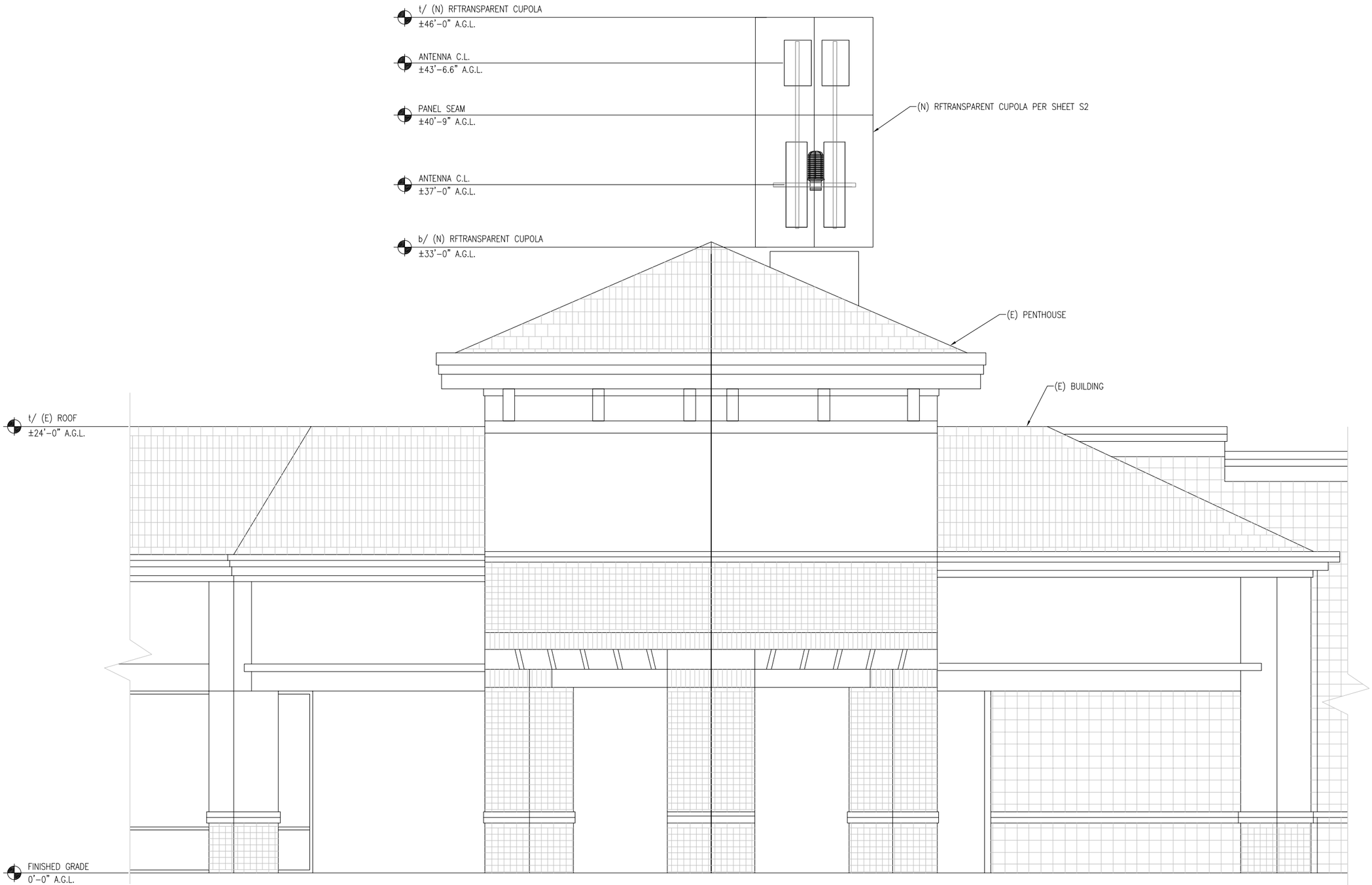
EXPIRES: 6/30/2023

08/19/2022

U1133.524.221

N1

REV 0



BUILDING ELEVATION VIEW (1)
N.T.S.

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BUILDING ELEVATION VIEW

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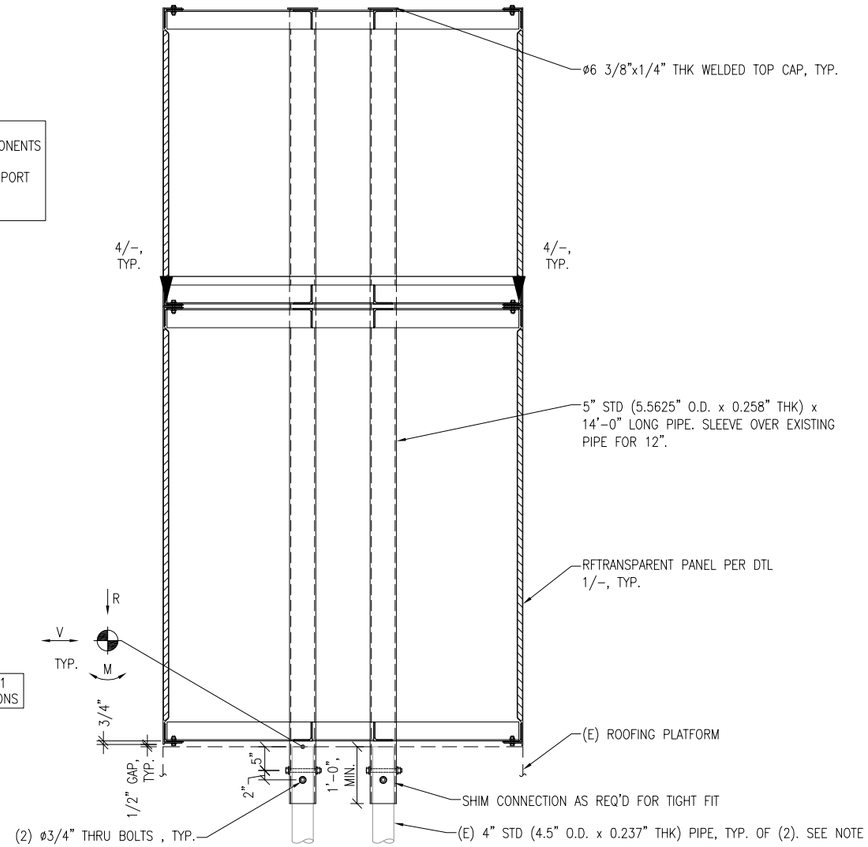
08/19/2022

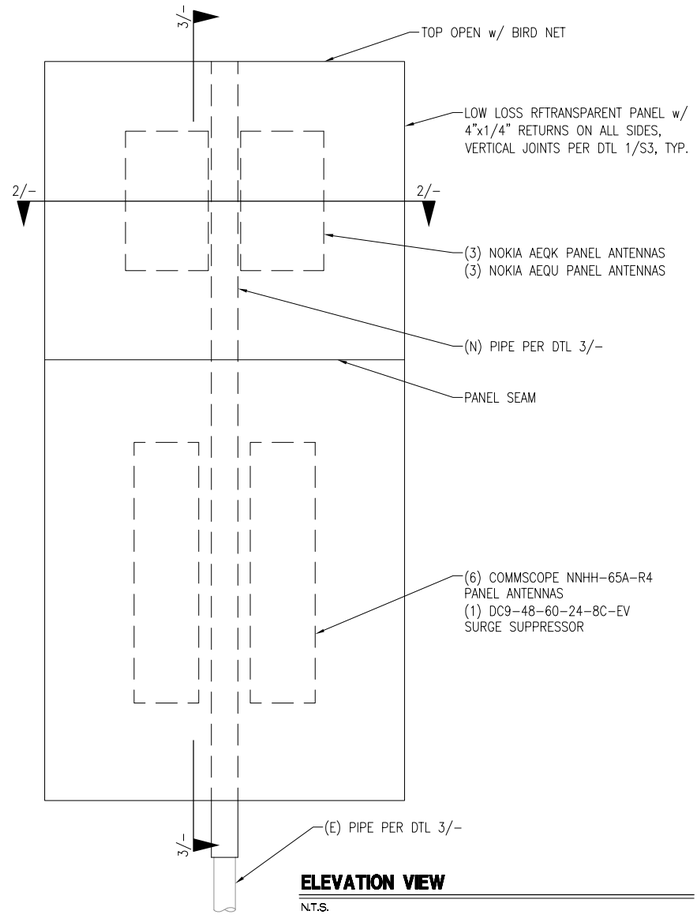
U1133.524.221

S1 REV 0

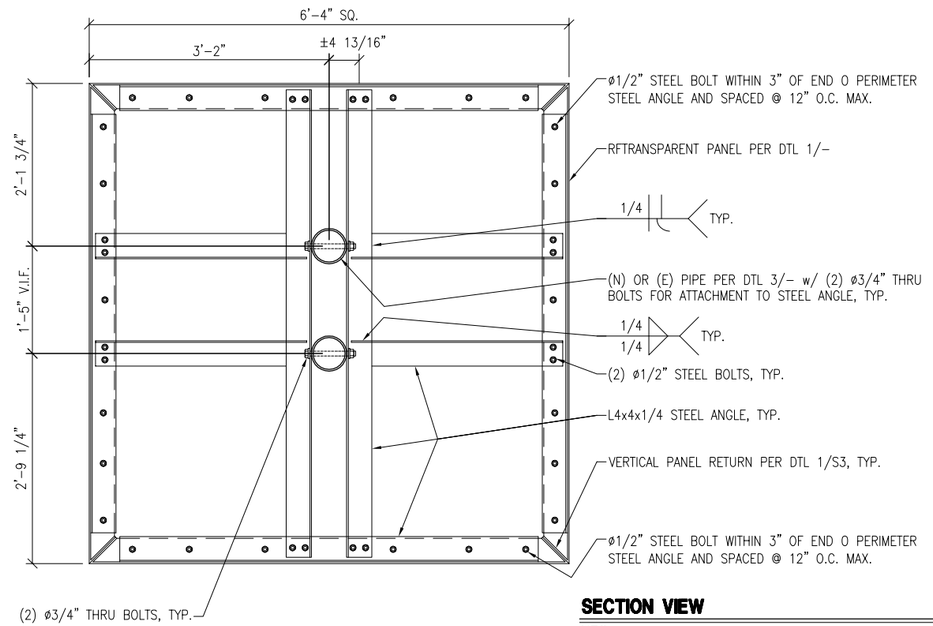
NOTES:
1. COMPATIBILITY OF NEW AND EXISTING COMPONENTS TO BE VERIFIED PRIOR TO FABRICATION.
2. ADEQUACY OF EXISTING STRUCTURE TO SUPPORT THE DESIGN REACTIONS PER SHEET N1 TO BE DETERMINED BY OTHERS.



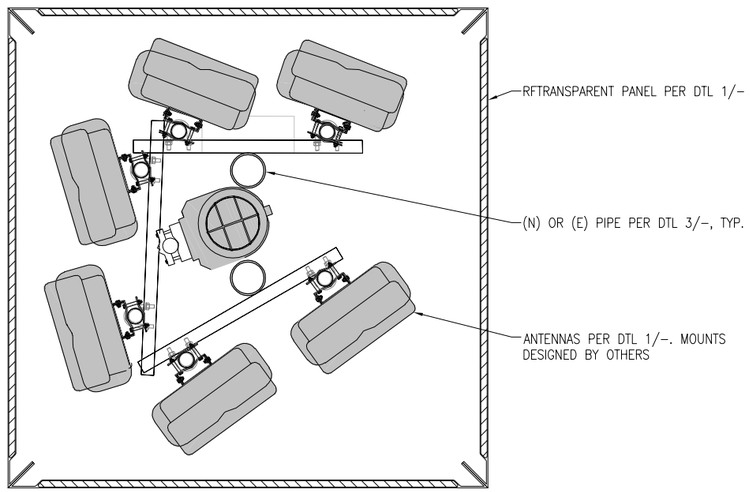
SECTION VIEW 3
N.T.S.



ELEVATION VIEW 1
N.T.S.



SECTION VIEW 4
N.T.S.



SECTION VIEW 2
N.T.S.

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651 W. Galena Park Blvd., Suite 101
Draper, UT 84020
(801) 990-1775
www.vectorse.com

STEELHEAD METAL & FAB, LLC
P.O. Box 3850 Salem OR, 97302
Ph: (503) 763-0114
Toll Free: 1-877-900-6789
Fax (503) 763-6280
www.steelheadmetals.com

DATE: 8/19/22	DESIGNED: CNM	DRAFTER: CNM

REVISIONS

REV	DATE	DESCRIPTION

AT&T

CUPOLA VIEWS

CASCADE SUMMIT
SITE #: PX30
ROOFTOP CUPOLA
21400 SALAMO ROAD
WEST LINN, OR 97068
CLACKAMAS COUNTY

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER
93806PE
OREGON
JULY 10, 2018
WELLS LIND HOLMES

EXPIRES: 6/30/2023

08/19/2022

U1133.524.221

S2 REV 0

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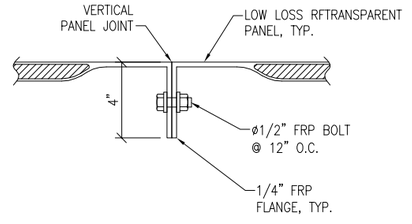
REVISIONS

REV	DATE	DESCRIPTION

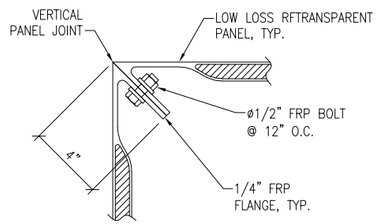
AT&T

DETAILS

CASCADE SUMMIT
SITE #: PX30
ROOFTOP CUPOLA
21400 SALAMO ROAD
WEST LINN, OR 97068
CLACKAMAS COUNTY



MID SPAN JOINT
(WHERE OCCURS)



CORNER JOINT

STRUCTURAL
REGISTERED PROFESSIONAL ENGINEER
93806PE
OREGON
JULY 10, 2018
WELLS LIND HOLMES

EXPIRES: 6/30/2023

08/19/2022

U1133.524.221

S3

REV 0

PANEL JOINTS
N.T.S.

1

STRUCTURAL CALCULATIONS
for
CASCADE SUMMIT (SITE # PX30)
ROOFTOP CUPOLA
at
21400 SALAMO ROAD
WEST LINN, OR 97068
for
AT&T
&
STEELHEAD METAL & FAB LLC

BY: **WELLS HOLMES, S.E.**
PROJECT ENGINEER

PROJECT #: **U1133.524.221**

DATE: **August 19, 2022**

DESIGNED BY CNM; CHECKED BY TPH

NOTE:
The calculations presented in this package are intended for a single use at the location indicated above, for the client listed above. These calculations shall not be reproduced, reused, "card filed", sold to a third party, or altered in any way without the written authorization of Vector Structural Engineering, LLC and Steelhead Metal & Fab LLC.

JOB NO.: U1133.524.221

PROJECT: CASCADE SUMMIT

Design Criteria:

Code: Structural design is based on the Oregon Structural Specialty Code, 2019 Edition (2018 IBC) and the ASCE 7-16 standard.

Wind: Basic wind speed = 98 mph (3-second gust) per the ASCE 7-16 standard
Risk Category: II
Wind exposure: C

Seismic: Seismic importance factor, I = 1
Risk Category: II
Mapped spectral response accelerations: S_S = 0.844g 0.379g
Site class: D
Spectral response coefficients: S_{DS} = 0.675g S_{D1} = 0.485g
Seismic design category: D

General Notes:

1 The contractor shall verify dimensions, conditions and elevations before starting work. The engineer shall be notified immediately if any discrepancies are found.
2 The typical notes and details shall apply in all cases unless specifically detailed elsewhere. Where no detail is shown, the construction shall be as shown for other similar work and as required by the building code.
3 These calculations are limited to the structural members shown in these calculations only. The connection of the members shown in these calculations to the existing structure shall be by others, with the exception of those explicitly shown on the drawings.
4 The contractor shall be responsible for compliance with local construction safety orders. Approval of shop drawings by the architect or structural engineer shall not be construed as accepting this responsibility.
5 All structural framing members shall be adequately shored and braced during erection and until full lateral and vertical support is provided by adjoining members.

Structural Steel:

1 All structural steel code checks based on the AISC, 15th Edition per the ASCE 7 standard
2 All steel pipe to be per ASTM A53 GR. B (35 KSI), U.N.O.
3 All other structural steel shapes & plates shall be per ASTM A36, U.N.O.
4 All bolts for steel-to-steel connections shall be per ASTM F3125 GR. A325 U.N.O.
5 All bolted connections shall be tightened per the "turn-of-nut" method as defined by AISC.
6 All welding shall be performed by certified welders in accordance with the latest edition of the American Welding Society (AWS) D1.1
7 All steel surfaces shall be galvanized in accordance with ASTM A123 and ASTM F2329 standards, thoroughly coated with a zinc-rich primer, or otherwise protected as noted on the structural drawings.

JOB NO.: U1133.524.221

PROJECT: CASCADE SUMMIT

Fiberglass Reinforced Plastic (FRP):

1 All structural shapes shall be Strongwell Extren Series 500/525 produced using the pultrusion process.
2 All cut edges and holes shall be sealed with a resin compatible with the resin matrix used in the structural shape.
3 The fabricator and contractor shall exercise precautions necessary to protect the fiberglass pultruded structural shapes from abuse to prevent breakage, nicks, gouges, etc. during fabrication, handling, and installation.
4 Structural shapes shall be fabricated and assembled as indicated on the design drawings.
5 FRP threaded rods and nuts shall be tightened to snug tight and turned an additional 1/2 turn and locked with epoxy.

JOB NO.: U1133.524.221

PROJECT: CASCADE SUMMIT

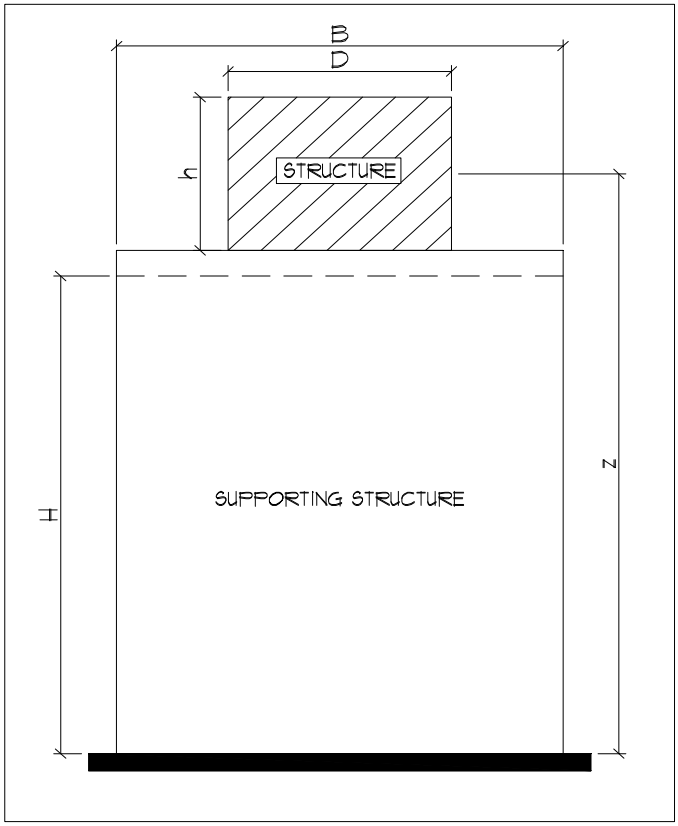
DESIGN WIND LOADS ON OTHER STRUCTURES:

(Chimneys, Tanks, Rooftop Equipment, & Similar Structures)

Label: Rooftop Cupola

INPUT DATA:

Basic Wind Speed, V [mph]:	98
Exposure Category:	C
Elevation Above Sea Level [ft]:	640
Structure:	
Cross-Section:	Square
Height, h [ft]:	13.0
Width, D [ft]:	6.3
Length, L_1 [ft]:	6.3
Average Elevation, z [ft]:	39.5
For Non-Rooftop, Flexible Structures, (if n_1 < 1 Hz):	
Depth, L [ft]:	
Natural Frequency, n_1 [Hz]:	
Damping Ratio, β:	0.005
Rooftop Structure?	Yes
Supporting Structure (of Rooftop Structure):	
Height, H [ft]:	28.0
Width, B [ft]:	50.0
Length, L_2 [ft]:	50.0
For Flexible Supporting Structures, (if n_1 < 1 Hz):	
Depth, L [ft]:	
Natural Frequency, n_1 [Hz]:	
Damping Ratio, β:	0.005



DESIGN SUMMARY:

Full Wind Pressure, 1.0W [psf]:	**42.8**
Design Wind Pressure, 0.6W [psf]:	**25.7**
Design Diagonal Pressure, 0.6W [psf]:	**25.7**
Design Uplift Pressure (if applicable), 0.6W [psf]:	**20.3**

JOB NO.: U1133.524.221

PROJECT: CASCADE SUMMIT

DESIGN WIND LOADS ON OTHER STRUCTURES

Label: Rooftop Cupola

WIND ANALYSIS:		ASCE 7-16 References:
Full Wind Pressure, 1.0W [psf]:	**42.8**	(Section 29.4.1)
Design Wind Pressure, 0.6W [psf]:	**25.7**	(Section 2.4.1)
Design Diagonal Pressure, 0.6W [psf]:	**25.7**	(Section 2.4.1)
Design Uplift Pressure (if applicable), 0.6W [psf]:	**20.3**	(Section 29.4.1)

Design Wind Pressure:

Velocity Pressure, qz [psf]:	22.5	(Equation 26.10-1)
Initial GCf:	1.90	(Section 29.4.1)
Area Ratio:	0.06	(Section 29.4.1)
Final GCf:	**1.9**	(Section 29.4.1)

Design Uplift Pressure:		(Equation 29.4-3)
Velocity Pressure, qz [psf]:	**22.5**	(Equation 26.10-1)
Initial GCf:	**1.5**	
Area Ratio:	**0.0**	
Final GCf:	**1.5**	

Velocity Pressure, $q_z = 0.00256K_zK_{zt}K_dK_eV^2$

Velocity Pressure Exposure Coefficient, Kz:	1.04	(Table 29.10-1)
Topographic Factor, Kzt:	1.0	(Section 26.8.2)
Wind Directionality Factor, Kd:	0.90	(Table 26.6-1)
Ground Elevation Factor, Ke:	0.98	(Table 26.9-1)

Velocity Pressure Exposure Coefficient, $K_z = 2.01(z/z_g)^{(2/\alpha)}$ (Table 26.10-1)

Force Coefficient, Cf:	900	(Table 26.11.1)
3-sec Gust-Speed Power Law Exponent, α:	9.5	(Table 26.11.1)

JOB NO.: U1133.524.221

PROJECT: CASCADE SUMMIT

LOADS SUMMARY

Label: Rooftop Cupola FRP: Strongwell

Dead Load, D:

Component:	Weight							
SCI FiberCell Panel:	3.00	psf	Area =	329.16	ft^2	Total =	987	lb
L4x4x1/4 Steel Angle	6.60	plf	Length =	202.56	ft	Total =	1337	lb
5" STD Steel Pipe:	14.62	plf	Length =	28.0	ft	Total =	409	lb
Generic Panel Antenna:	82.50	lb	Number =	12		Total =	990	lb
Generic Surge Supressor:	30.00	lb	Number =	1		Total =	30	lb
2" STD Steel Pipe:	3.66	plf	Length =	48	ft	Total =	176	lb
Misc:	396	lb	Number =	1		Total =	396	lb
						W_p =	4325	lb

Wind Load, W:

p =	25.7	psf	(ASD diag. pressure - see wind calcs)			
Height, h:	14.6	ft	(accounting for 1.6 ft of wind on back face due to open top)			
Max. Horiz. Dim.:	9.0	ft, diag.	V_{trans}:	3353	lb	**Controls**

Seismic Load, E: Consider Seismic: Yes

Architectural Component: Cantilever element unbraced or braced below center of mass

Risk Category:	II	F_a =	1.2	
Seismic Design Category:	D	F_v =	1.9	
I_p =	1.0	S_{MS} =	1.013	
Site Class:	D	S_{M1} =	0.728	
R_p =	2.5	S_{DS} =	0.675	
S_s =	0.844	S_{D1} =	0.485	
S_1 =	0.379			

a_p =	2.5		0.7 * $F_{p,min}$ =	613	lb
z =	46.0	ft	0.7 * $F_{p,max}$ =	3271	lb
h =	46.0	ft			
z/h =	1.0		0.7 * $F_{p,trans}$ =	2453	lb
			0.7 * $F_{p,vert}$ =	409	lb

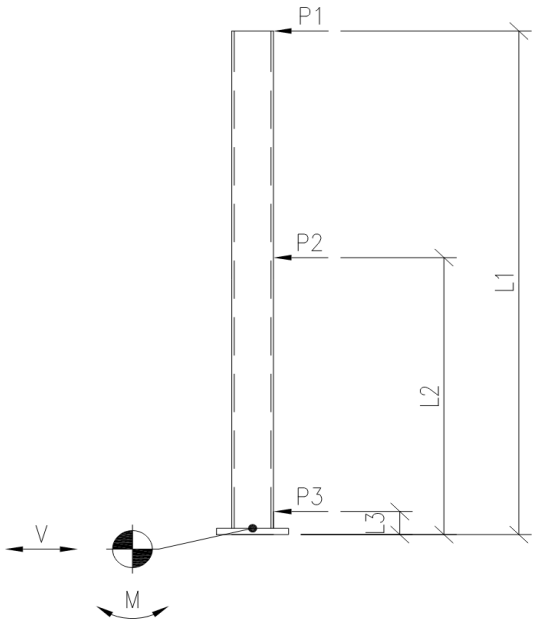
JOB NO.: U1133.524.221

PROJECT: Cascade Summit

DESIGN APPROACH: ASD

PIPE REACTIONS Location: Mast Pipes (Wind)

Normal Wind		
Wind Pressure:	25.7	psf (0.6 W)
Trib Width of (1) Mast Pipe:	3.165	ft
L1:	13	ft
L2:	7.75	ft
L3:	0.27	ft
P1:	214	lb
P2:	518	lb
P3:	326	lb
Base Shear, V:	1057	lb
Overturning Moment, M:	6876	lb-ft
Diagonal Wind		
Wind Pressure:	25.7	psf (0.6 W)
Trib Width of (1) Mast Pipe:	4.5	ft
L1:	13	ft
L2:	7.75	ft
L3:	0.27	ft
P1:	302	lb
P2:	732	lb
P3:	461	lb
Base Shear, V:	1495	lb
Overturning Moment, M:	9724	lb-ft



Note: Reactions are typical of ea. of the (2) mast pipes. There will be an additional shear load at the base of the mount pipes due to the cupola being off center (1500 lb*3.75"/17"=331 lb).

JOB NO.: U1133.524.221

PROJECT: Cascade Summit

PIPE REACTIONS Location: Mast Pipes (Seismic)

	Horizontal Load	
0.7*Fp for ea. pipe:	1227	lb
L1:	13	ft
L2:	7.75	ft
L3:	0.27	ft
P1:	248	lb
P2:	601	lb
P3:	378	lb
Base Shear, V:	1227	lb
Overturning Moment, M:	7976	lb-ft

Note: Reactions are typical of ea. of the (2) mast pipes.

JOB NO.: U1133.524.221

PROJECT: Cascade Summit

PIPE IN BENDING Location: Mast Pipes (Max. Reactions)

Steel Shape:	5" STD.	
Diameter, D:	5.5625	in
Thickness, t:	0.258	in
Design Thickness, t_{des}:	0.24	
D/t:	23.2	
Mod. of Elasticity, E:	29000	ksi
Yield Stress, F_y:	35	ksi
Compact D/t ratio, λ_p:	58	
Noncompact D/t ratio, λ_r:	257	
Column compactness:	compact	
Inner diameter, ID:	5.1	in
Plastic Section Modulus, Z:	7	in^3
Moment of Inertia, I:	14	in^4
Elastic Section Modulus, S:	5	in^3
Slender Section Critical Stress, F_{cr}:	413	ksi
Nominal Moment Capacity, M_n:	238	k-in
Moment Capacity:	12	k-ft
Maximum Moment:	9.7	k-ft
Check Member:	81.9%	
Result:	**Selected member size is adequate.**	
Note:		

JOB NO.: U1133.524.221

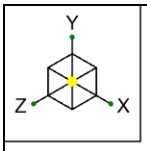
PROJECT: Cascade Summit

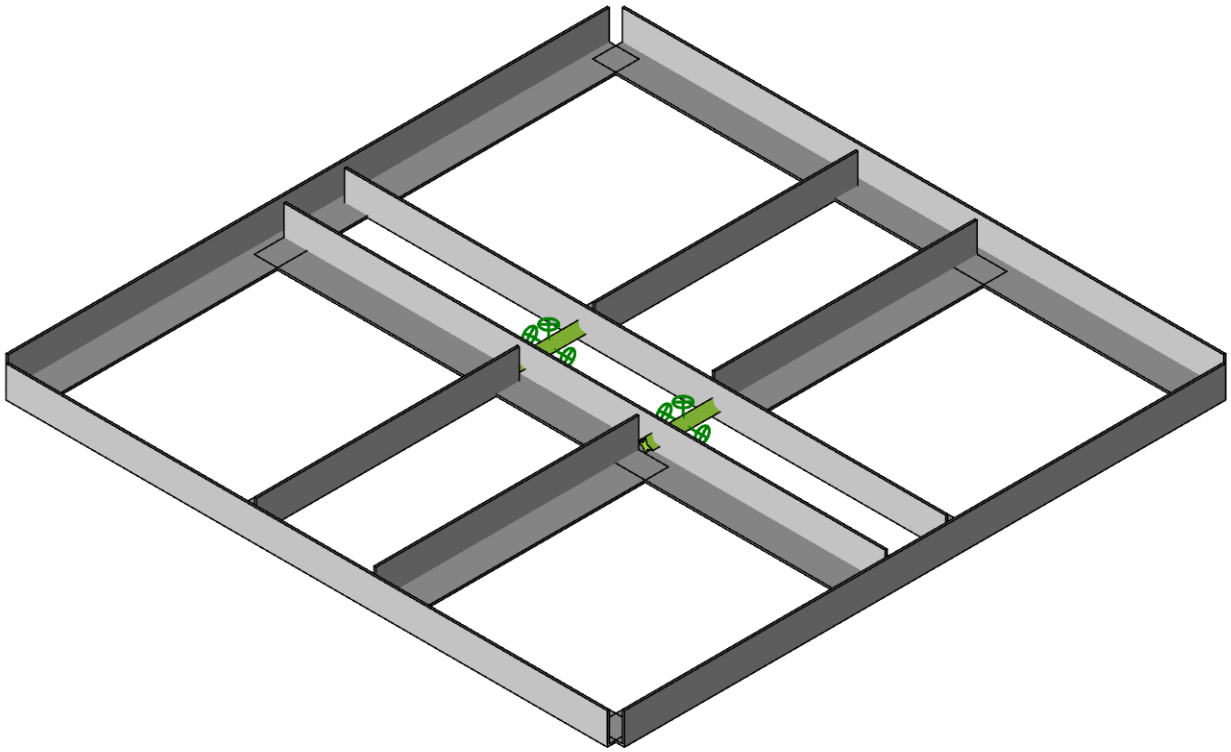
GIRT LOADS

Location: Linear loads on girts in Risa 3d

Cupola Width:	6.33	ft
P1 (1.0W):	80	plf (trib load on girt / cupola width)
P2 (1.0W):	193	plf
P3 (1.0W):	121	plf
Panel DL:	12	plf

Note: P1 = P1 from wind calc on mast pipe above / 0.6 Wind Factor / 6.33 ft. Panel DL = 3 psf *(7.75/2+.27ft).





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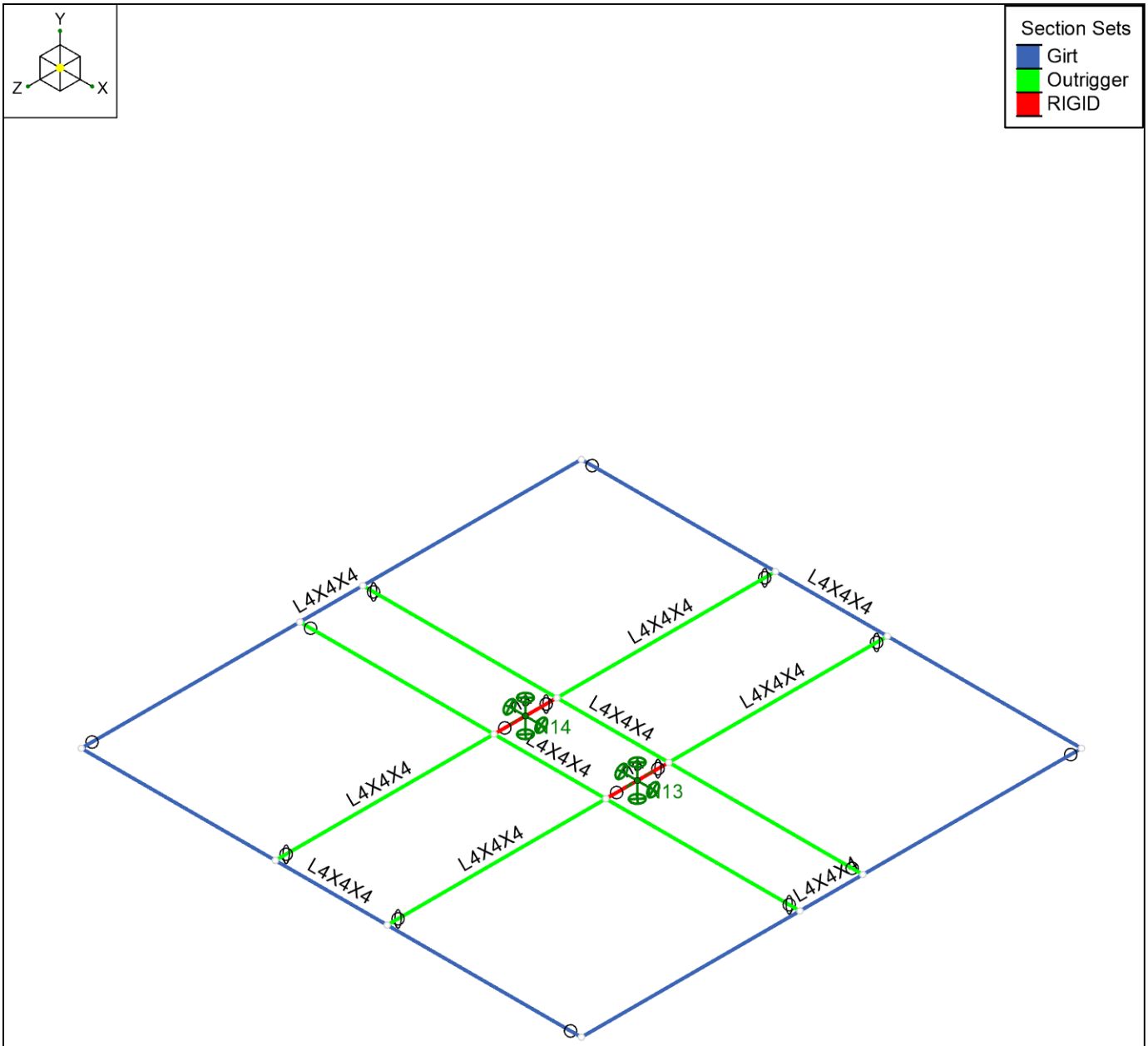
cmillard		Aug 19, 2022
U1133.524.221		Cascade Summit.r3d



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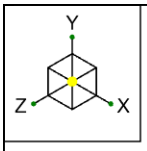

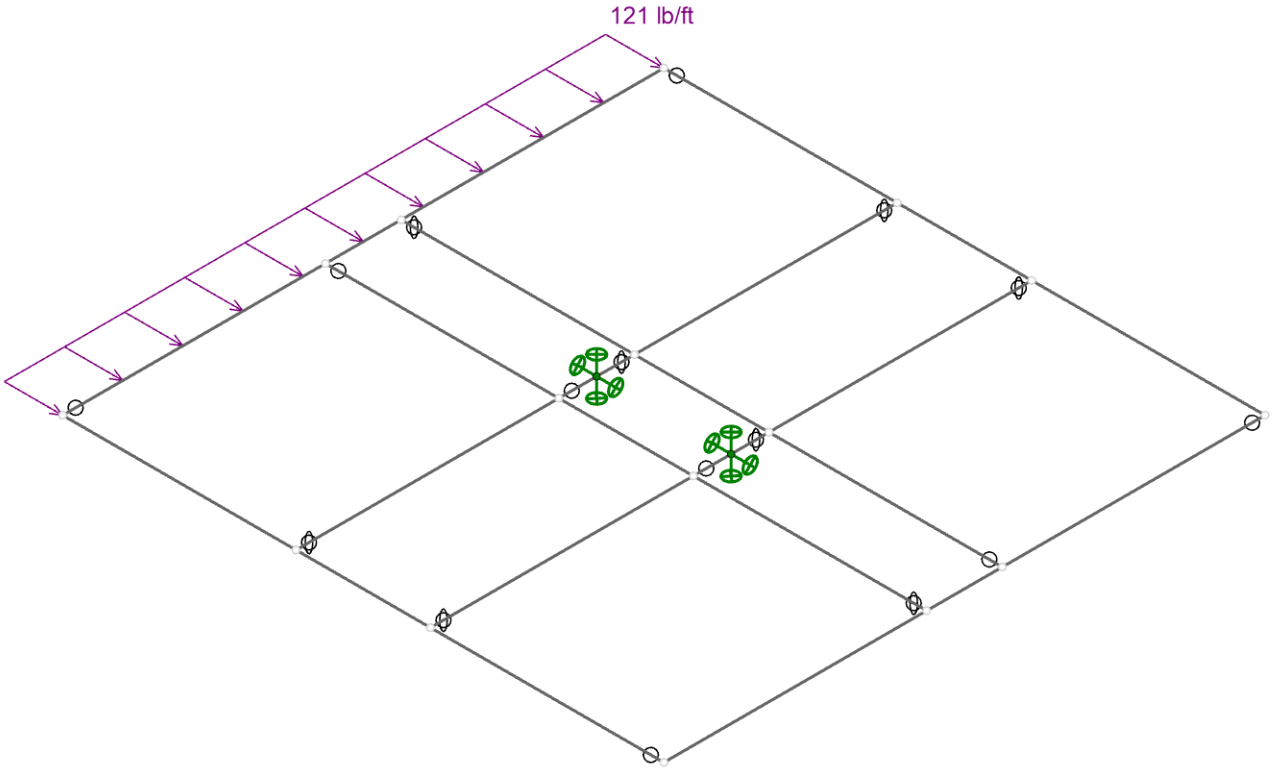

Loads: BLC 2, WLX

Vector Structural Engineering	Cascade Summit	SK-3
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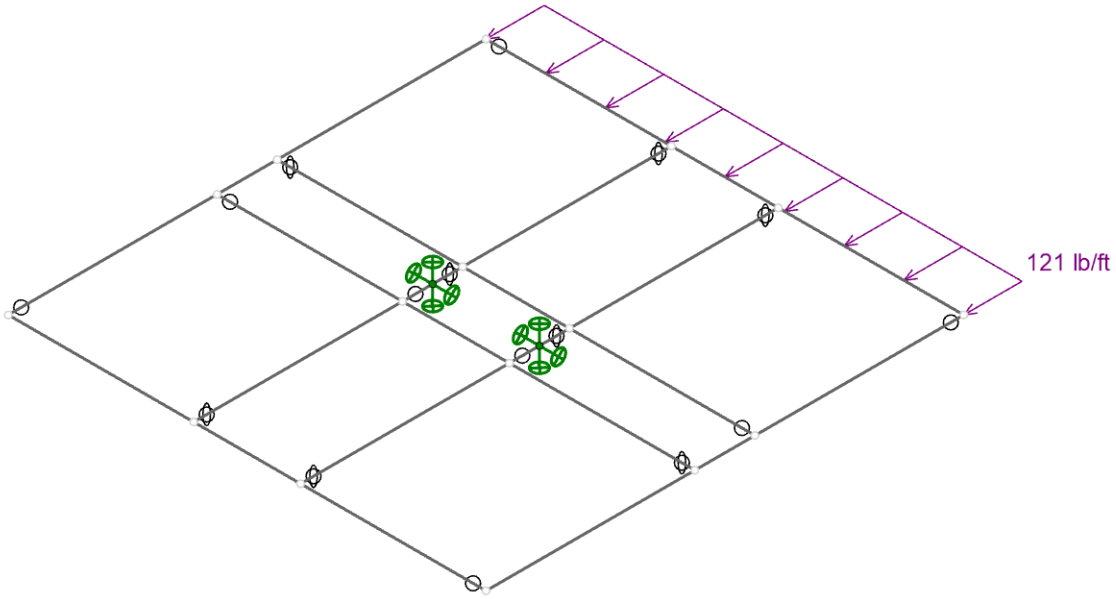
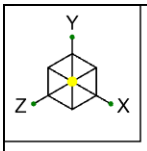
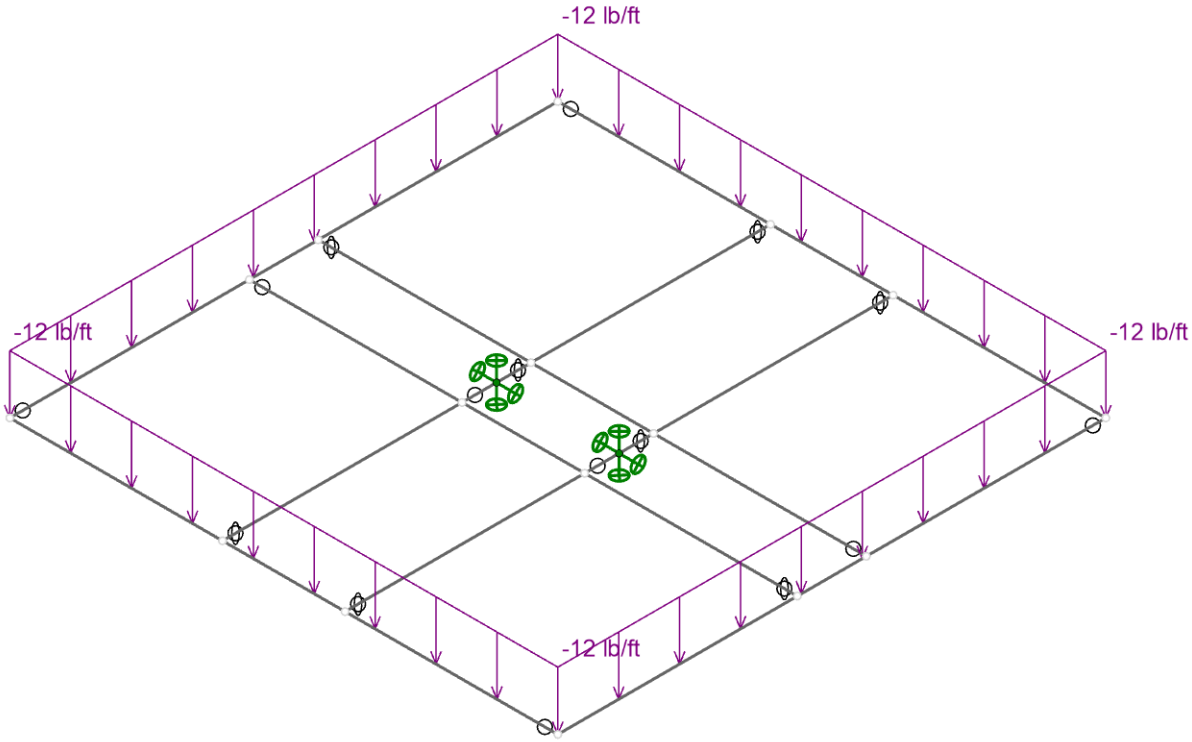


Loads: BLC 3, WLZ

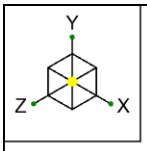
Vector Structural Engineering	Cascade Summit	SK-4
cmillard		Aug 19, 2022
U1133.524.221		Cascade Summit.r3d

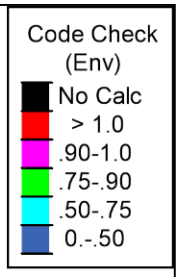


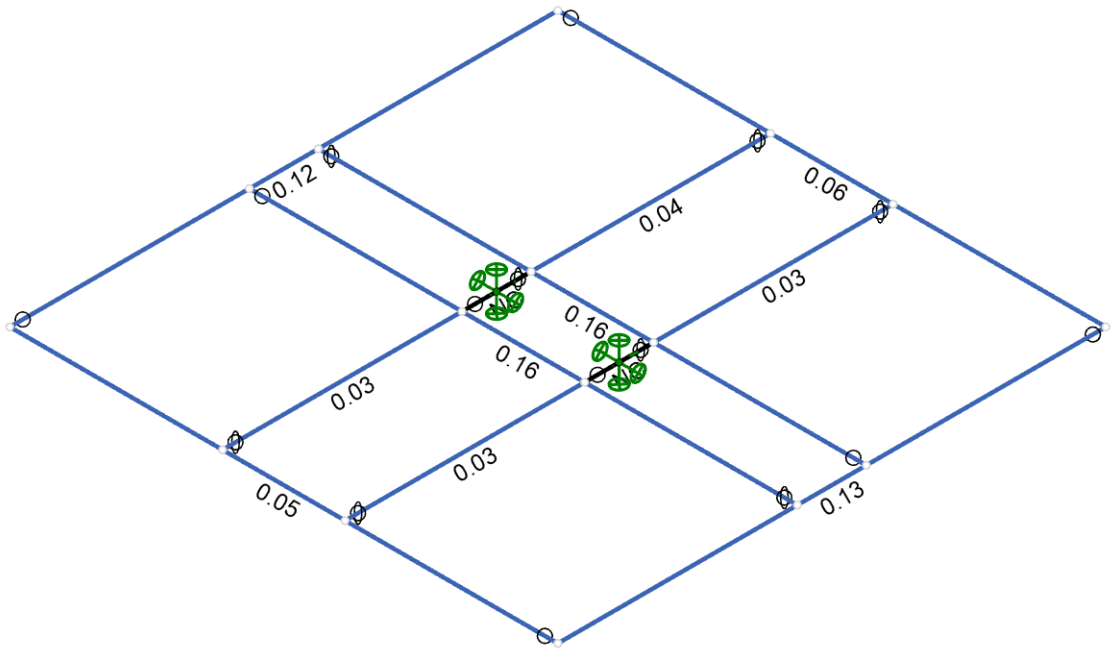


Loads: BLC 4, Panels

Vector Structural Engineering	Cascade Summit	SK-5
cmillard		Aug 19, 2022
U1133.524.221		Cascade Summit.r3d

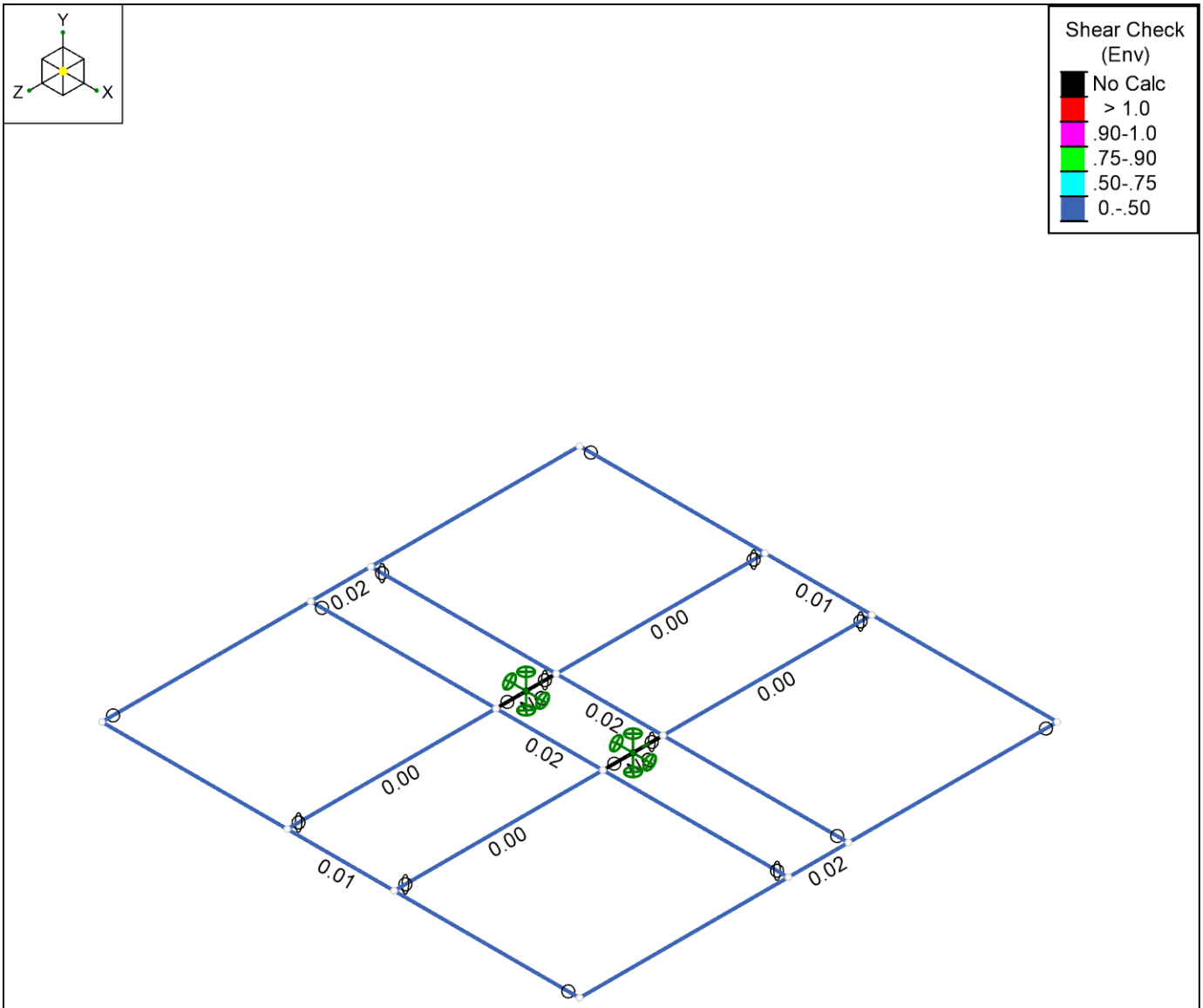






Member Code Checks Displayed (Enveloped)

Vector Structural Engineering	Cascade Summit	SK-6
cmillard		Aug 19, 2022
U1133.524.221		Cascade Summit.r3d



Member Shear Checks Displayed (Enveloped)

Vector Structural Engineering	Cascade Summit	SK-7
cmillard		Aug 19, 2022
U1133.524.221		Cascade Summit.r3d

Model Settings

Solution
Members

Number of Reported Sections	5
Number of Internal Sections	100
Member Area Load Mesh Size (in^2)	144
Consider Shear Deformation	Yes
Consider Torsional Warping	Yes

Wall Panels

Approximate Mesh Size (in)	24
Transfer Forces Between Intersecting Wood Walls	Yes
Increase Wood Wall Nailing Capacity for Wind Loads	Yes
Include P-Delta for Walls	Yes
Optimize Masonry and Wood Walls	Yes
Maximum Number of Iterations	3

Processor Core Utilization

Single	No
Multiple (Optimum)	Yes
Maximum	No

Axis
Vertical Global Axis

Global Axis corresponding to vertical direction	Y
Convert Existing Data	Yes

Default Member Orientation

Default Global Plane for z-axis	XZ

Plate Axis

Plate Local Axis Orientation	Global

Codes

Hot Rolled Steel	AISC 15th (360-16): ASD
Stiffness Adjustment	Yes (Iterative)
Notional Annex	None
Connections	AISC 14th (360-10): ASD
Cold Formed Steel	AISI S100-16: ASD
Stiffness Adjustment	Yes (Iterative)
Wood	AWC NDS-18: ASD
Temperature	< 100F
Concrete	ACI 318-14
Masonry	TMS 402-16: ASD
Aluminum	AA ADM1-15: ASD
Structure Type	Building
Stiffness Adjustment	Yes (Iterative)
Stainless	AISC 14th (360-10): ASD
Stiffness Adjustment	Yes (Iterative)

Concrete
Column Design

Analysis Methodology	Exact Integration Method
Parme Beta Factor	0.65

Model Settings (Continued)

Compression Stress Block	Rectangular Stress Block
Analyze using Cracked Sections	Yes
Leave room for horizontal rebar splices (2*d bar spacing)	Yes
List forces which were ignored for design in the Detail Report	Yes

Rebar

Column Min Steel	1
Column Max Steel	8
Rebar Material Spec	ASTM A615
Warn if beam-column framing arrangement is not understood	No

Shear Reinforcement

Number of Shear Regions	4
Region 2 & 3 Spacing Increase Increment (in)	4

Seismic

RISA-3D Seismic Load Options

Code	ASCE 7-16
Risk Category	I or II
Drift Cat	Other
Base Elevation (ft)	
Include the weight of the structure in base shear calcs	Yes

Site Parameters

S_1 (g)	1
SD_1 (g)	1
SD_S (g)	1
T_L (sec)	5

Structure Characteristics

T Z (sec)	
T X (sec)	
C_tZ	0.02
C_tX	0.02
C_tExp. Z	0.75
C_tExp. X	0.75
R Z	3
R X	3
Ω_0Z	1
Ω_0X	1
C_dZ	4
C_dX	4
ρ Z	1

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot [k-ft/rad]	Y Rot [k-ft/rad]
1	N14	Reaction	Reaction	Reaction	Reaction	Reaction
2	N13	Reaction	Reaction	Reaction	Reaction	Reaction

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	0.3	0.65	0.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
7	A1085	29000	11154	0.3	0.65	0.49	50	1.25	65	1.15
8	A913 Gr.65	29000	11154	0.3	0.65	0.49	65	1.1	80	1.1

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	Girt	L4X4X4	Beam	Single Angle	A36 Gr.36	Typical	1.93	3	3	0.044
2	Outrigger	L4X4X4	Beam	Single Angle	A36 Gr.36	Typical	1.93	3	3	0.044

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	M4	N3	N4	270	Girt	Beam	Single Angle	A36 Gr.36	Typical
2	M6	N1	N2	270	Girt	Beam	Single Angle	A36 Gr.36	Typical
3	M7	N2	N3	270	Girt	Beam	Single Angle	A36 Gr.36	Typical
4	M9	N5	N6		Outrigger	Beam	Single Angle	A36 Gr.36	Typical
5	M10	N7	N8		Outrigger	Beam	Single Angle	A36 Gr.36	Typical
6	M11	N9	N10	270	Outrigger	Beam	Single Angle	A36 Gr.36	Typical
7	M12	N11	N12		Outrigger	Beam	Single Angle	A36 Gr.36	Typical
8	M13	N4	N1	270	Girt	Beam	Single Angle	A36 Gr.36	Typical
9	M14	N19	N21		Outrigger	Beam	Single Angle	A36 Gr.36	Typical
10	M15	N23	N17	270	Outrigger	Beam	Single Angle	A36 Gr.36	Typical
11	M16	N11	N21		RIGID	None	None	RIGID	Typical
12	M17	N9	N17		RIGID	None	None	RIGID	Typical

Member Advanced Data

	Label	I Release	J Release	Physical	Deflection Ratio Options	Seismic DR
1	M4		BenPIN	Yes	Default	None
2	M6		BenPIN	Yes	Default	None
3	M7		BenPIN	Yes	Default	None
4	M9	OOOOXO	OOOXXO	Yes	Default	None
5	M10	OOOOXO	OOOXXO	Yes	Default	None
6	M11		OOOXXO	Yes	Default	None
7	M12		OOOXXO	Yes	Default	None
8	M13		BenPIN	Yes	Default	None
9	M14	OOOXXO		Yes	Default	None
10	M15	OOOXXO		Yes	Default	None
11	M16	BenPIN	AllPIN	Yes	** NA **	None
12	M17	BenPIN	AllPIN	Yes	** NA **	None

Hot Rolled Steel Design Parameters

	Label	Shape	Length [in]	Lcomp top [in]	Channel Conn.	a [in]	Function
1	M4	Girt	76	Lbyy	N/A	N/A	Lateral
2	M6	Girt	76	Lbyy	N/A	N/A	Lateral
3	M7	Girt	76	Lbyy	N/A	N/A	Lateral
4	M9	Outrigger	76	Lbyy	N/A	N/A	Lateral
5	M10	Outrigger	76	Lbyy	N/A	N/A	Lateral
6	M11	Outrigger	33.219	Lbyy	N/A	N/A	Lateral
7	M12	Outrigger	33.219	Lbyy	N/A	N/A	Lateral
8	M13	Girt	76	Lbyy	N/A	N/A	Lateral
9	M14	Outrigger	33.218	Lbyy	N/A	N/A	Lateral
10	M15	Outrigger	33.218	Lbyy	N/A	N/A	Lateral

Basic Load Cases

	BLC Description	Category	Y Gravity	Distributed
1	Member Weight	DL	-1.1	
2	WLX	WLX		1
3	WLZ	WLZ		1
4	Panels	DL		4

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor
1	D+0.6W(X)	Yes	Y	DL	1	WLX	0.6		
2	D+0.6W(Z)	Yes	Y	DL	1	WLZ	0.6		
3	D+0.6W(diag.)	Yes	Y	DL	1	WLX	0.474	WLZ	0.474

Envelope Node Reactions

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N14	max	-109.87	2	330.32	1	2.24	1	-7.13	2	6.25	2	0	3
2		min	-486.43	1	329.27	2	-227.96	2	-10.51	1	-2.03	1	0	1
3	N13	max	109.87	2	329.24	2	-2.24	1	13.6	2	-1.12	1	0	3
4		min	26.63	1	328.19	1	-231.84	2	10.51	1	-8.99	2	0	1
5	Totals:	max	0	2	658.51	2	0	1						
6		min	-459.8	1	658.51	1	-459.8	2						

Envelope Maximum Member Section Forces

	Member		Axial[lb]	Loc[in]	LC	y Shear[lb]	Loc[in]	LC	z Shear[lb]	Loc[in]	LC	Torque[lb-ft]	Loc[in]	LC	y-y Moment[lb-ft]	Loc[in]	LC	z-z Moment[lb-ft]	Loc[in]	LC
1	M4	max	152.88	42.75	2	54.44	31.67	2	123.36	43.54	2	2.21	76	2	0	76	3	0	76	3
2		min	28.86	43.54	1	-54.69	52.25	2	-121.87	32.46	2	-0.12	33.25	1	-118.06	42.75	1	-304.5	42.75	2
3	M6	max	153.11	42.75	2	187.85	32.46	1	122.54	43.54	3	2.13	76	1	0	76	3	0	76	3
4		min	29.25	43.54	1	-187.72	43.54	1	-122.79	32.46	2	-0.7	33.25	2	-80	33.25	2	-375.59	42.75	1
5	M7	max	8.66	29.29	1	49.1	52.25	2	70.55	0	3	1.81	76	1	33.28	35.63	1	165.84	41.96	2
6		min	-55.16	0	2	-47.27	1.58	2	-69.88	76	2	-1.27	30.08	1	-4.63	46.71	2	-1.51	0	1
7	M9	max	218.85	76	1	151.4	46.71	2	90.99	27.71	1	0.83	45.92	1	0	76	3	414.23	45.92	1
8		min	0	30.08	2	-157.85	29.29	2	-76.3	49.87	1	-2.74	0	3	-144.74	29.29	2	-5.7	0	1
9	M10	max	223.75	29.29	1	146.28	46.71	1	104.73	27.71	2	0.12	45.92	2	0	76	3	427.75	30.08	3
10		min	0	30.08	2	-153.5	29.29	1	-103.33	51.46	3	-2.28	0	1	-123.18	45.92	1	-6.43	0	2
11	M11	max	-34.84	33.22	1	-7.1	28.03	2	10.06	0	1	0	33.22	3	45.48	0	3	1.09	33.22	1
12		min	-54.65	0	2	-23.07	1.38	3	-10.8	33.22	2	0	0	1	0	33.22	1	-44.41	0	3
13	M12	max	-25.63	33.22	1	12.07	0	2	23.25	18.69	1	0	33.22	3	12.12	6.92	2	15.95	0	2
14		min	-41.75	0	2	-8.58	33.22	1	-7.81	2.42	2	0	0	1	-48.3	0	1	-44.21	0	1

Envelope Maximum Member Section Forces (Continued)

	Member		Axial[lb]	Loc[in]	LC	y Shear[lb]	Loc[in]	LC	z Shear[lb]	Loc[in]	LC	Torque[lb-ft]	Loc[in]	LC	y-y Moment[lb-ft]	Loc[in]	LC	z-z Moment[lb-ft]	Loc[in]	LC
15	M13	max	8.53	76	1	90.63	29.29	2	71.07	0	2	1.79	76	2	84.51	45.92	2	134.82	46.71	1
16		min	-63.78	30.08	2	-87.94	46.71	2	-70.5	76	2	0	0	1	-3.14	3.17	2	-1.56	0	2
17	M14	max	140.17	33.22	2	9.12	0	1	-8.92	29.76	2	0	33.22	3	0	0	3	-2.98	0	1
18		min	-34.35	0	1	-11.75	33.22	2	-25.03	0	3	0	0	1	-51.13	33.22	3	-50.47	33.22	3
19	M15	max	143.8	33.22	2	20.77	28.72	1	10.13	0	2	0	33.22	3	39.61	33.22	1	17.55	33.22	2
20		min	-26.1	0	1	-10.33	20.07	2	-10.53	33.22	1	0	0	1	-19.97	33.22	2	-42.7	33.22	1
21	M16	max	77.43	9.56	2	155.69	9.56	2	245.77	4.78	1	0	9.56	3	97.93	4.78	1	71.06	4.78	1
22		min	-190.47	0	3	-178.34	0	1	-240.66	4.88	1	0	0	1	0	0	1	0	0	1
23	M17	max	84.17	9.56	3	181.69	9.56	2	66.21	9.56	2	0	9.56	3	0	9.56	3	72.4	4.78	2
24		min	-155.46	0	2	-150.91	0	1	-43.66	0	2	0	0	1	-26.38	4.78	2	0	0	1

Envelope AISC 15TH (360-16): ASD Member Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	Pnc/om [lb]	Pnt/om [lb]	Mnyy/om [lb-ft]	Mnzz/om [lb-ft]	Cb	Eqn
1	M4	L4X4X4	0.13	42.75	3	0.02	43.54	z	2	25336.46	41604.79	2087.56	3951.99	1.31	H2-1
2	M6	L4X4X4	0.12	33.25	2	0.02	43.54	y	1	25336.46	41604.79	2087.56	3942.61	1.3	H2-1
3	M7	L4X4X4	0.05	37.21	1	0.01	76	z	1	25336.46	41604.79	2087.56	3834.94	1.17	H2-1
4	M9	L4X4X4	0.16	29.29	2	0.02	29.29	y	3	25336.46	41604.79	2087.56	3906.11	1.25	H2-1
5	M10	L4X4X4	0.16	29.29	1	0.02	29.29	y	1	25336.46	41604.79	2087.56	3946.36	1.3	H2-1
6	M11	L4X4X4	0.03	0	3	0	33.22	y	3	32150.33	41604.79	2087.56	4467.66	1.5	H2-1
7	M12	L4X4X4	0.03	0	1	0	33.22	z	1	32150.33	41604.79	2087.56	4467.66	1.45	H2-1
8	M13	L4X4X4	0.06	45.92	2	0.01	76	y	2	25336.46	41604.79	2087.56	3707.18	1.03	H2-1
9	M14	L4X4X4	0.04	33.22	3	0	33.22	z	3	32150.38	41604.79	2087.56	4467.66	1.44	H2-1
10	M15	L4X4X4	0.03	33.22	1	0	33.22	y	1	32150.38	41604.79	2087.56	4467.66	1.5	H2-1

JOB NO.: U1133.524.221

PROJECT: Cascade Summit

BOLTED SHEAR CONNECTION Location: Thru bolt

Bolt Grade:	ASTM A325		
Bolt Diameter:	0.75	in	
Number of Bolts:	1		
Double Shear?	Yes		
Bolt Capacity:	23856	lbs	(AISC Equation J3-1)
Shear Load:	2375	lbs	
Check Bolt:	10.0%		
Result:	**Select (1) 0.75 in. dia. ASTM A325 bolt.**		
Note:	Load = vertical reaction @ connection to (E) pipe.		

JOB NO.: U1133.524.221

PROJECT: CASCADE SUMMIT

ENCLOSURE CALCULATIONS

FRP Shear Connection w/ Steel Bolts:

Label: FRP girt to steel girt connection — Bearing stress of FRP member controls.

INPUT:

Design Force, P [lb]:	121
Steel Bolt Diameter, d_b [in]:	1/2
# Bolts, n_b:	(1)
FRP Web Thickness, t_w [in]:	1/4
Double Shear:	No
Bearing Stress:	Crosswise
Factor of Safety, FS:	4

Notes:
Load = P3 from Girt load calc since bolts are at 12" O.C.

OUTPUT:

f_{brg} [psi]:	972	<	F_{brg} [psi]:	3,750	**OK**

Select (1) 1/2" diameter steel bolt

See attached FRP material and section properties.

SERIES 500/525/625 STRUCTURAL SHAPES ULTIMATE COUPON PROPERTIES

Below are the test results for the **minimum** ultimate **coupon** properties of **EXTREN®** structural shapes as per the referenced ASTM procedures. The properties of plate as well as thermal cure rod and bar are found elsewhere in this section. Designers should refer to Section 8 — **FLEXURAL MEMBERS** and Section 9 — **COMPRESSION MEMBERS** for the recommended design equations for **EXTREN®.** The actual geometry and application of the structural shape will determine its ultimate usability. Additionally, WF / I-Beam ASTM properties may vary due to location in the part but the modulus of elasticity will not be affected.

PROPERTY	ASTM TEST	UNITS	SERIES 500/525	SERIES 625
MECHANICAL				
Tensile Stress, LW	D638	psi	30,000	30,000
Tensile Stress, CW	D638	psi	7,000	7,000
Tensile Modulus, LW	D638	10^6 psi	2.5	2.6
Tensile Modulus, CW	D638	10^6 psi	0.8	0.8
Compressive Stress, LW①	D695	psi	30,000	30,000
Compressive Stress, CW	D695	psi	15,000	16,000
Compressive Modulus, LW	D695	10^6 psi	2.5	2.6
Compressive Modulus CW	D695	10^6 psi	0.8	0.8
Flexural Stress, LW②	D790	psi	30,000	30,000
Flexural Stress, CW	D790	psi	10,000	10,000
Flexural Modulus, LW⑨	D790	10^6 psi	1.6	1.6
Flexural Modulus, CW	D790	10^6 psi	0.8	0.8
Modulus of Elasticity ③	full section	10^6 psi	2.6	2.8
Modulus of Elasticity > 4" ③	full section	10^6 psi	2.5	2.5
Shear Modulus, LW ④⑧	—	10^6 psi	0.425	0.425
Short Beam Shear, LW ⑦⑧	D2344	psi	4,500	4,500
Ultimate Bearing Stress, LW	D953	psi	30,000	30,000
Poisson's Ratio, LW⑧	D3039	in/in	0.33	0.33
Notched Izod Impact, LW	D256	ft-lbs/in	25	25
Notched Izod Impact, CW	D256	ft-lbs/in	4	4
PHYSICAL				
Barcol Hardness⑤	D2583	—	45	45
24 hr Water Absorption⑥	D570	% Max	0.6	0.6
Density	D792	lbs/in^3	.062-.070	.062-.070
Coefficient of Thermal Expansion, LW ⑧	D696	10^{-6} in/in/°F	7	7
Thermal Conductivity ⑧	C177	BTU-in/ft^2/hr/°F	4	4
ELECTRICAL				
Arc Resistance, LW ⑧	D495	seconds	120	120
Dielectric Strength, LW ⑧	D149	KV/in	35	35
Dielectric Strength, PF ⑨	D149	volts/mil	200	200

PROPERTY	TEST	VALUE
FLAMMABILITY (Only Series 525 and 625)		
Flammability Classification (1/8")	UL 94	VO
Tunnel Test	ASTM E84	25 Max
NBS Smoke Chamber	ASTM E662	650-700 (Typical)
Flammability	ASTM D635	Self Extinguishing
UL Thermal Index	Generic	130°C
British Fire Test	BS 476-7	Class 1

LW — lengthwise
CW — crosswise
PF — perpendicular to laminate face

NOTES:

① Refer to Section 9 — **COMPRESSION MEMBERS** for the recommended allowable stresses for **EXTREN®** columns.

② Refer to Section 8 — **FLEXURAL MEMBERS** for the recommended allowable stresses for **EXTREN®** beams. LW results are for the flange only.

③ This value is determined from full section simple beam bending of **EXTREN®** structural shapes and will be used in Sections 8 and 9 for design.

④ The Shear Modulus value has been determined from tests with full sections of **EXTREN®** structural shapes. Less precise values are occasionally estimated for pultrusion by using an equation for isotropic materials, $G=E/2(1+\nu)$. For example, if **EXTREN®** pultrusions are assumed to be isotropic with a Poisson's Ratio (ν) of 0.33 and a Modulus of Elasticity of 2.6×10^6 psi, then G = 977,000 psi, which exceeds the listed tested value. **EXTREN®** shapes are mat/roving composites and anisotropic.

⑤ Strongwell incorporates a synthetic surfacing veil routinely on the surface of all **EXTREN®** structural shapes. This has the effect of lowering the measured Barcol Hardness and does not reflect an absence of cure. Other additives incorporated into the composite for corrosion protection and surface improvements may also reduce Barcol Hardness to a typical value of 45. A surface unprotected by a surfacing veil without additives would have a minimum value of 50.

⑥ Measured as a percentage maximum by weight.

⑦ Span to depth ratio of 3:1; **EXTREN®** angles will have a minimum value of 4000 psi and the I/W shapes are tested in the web.

⑧ Typical values because these are shape, composite and orientation dependent tests.

⑨ This is a typical value which varies with composite thickness.

SYMBOLS FOR ELEMENTS OF SECTIONS

A Cross-sectional area (in^2)

A_w Cross-sectional area of web or webs (in^2)

D Outside diameter of round tube (in)
Diameter of round rod (in)
Diameter of round hole in square tube (in)

I Moment of Inertia (in^4)

J Torsional constant (in^4)

R Radius (in)

R_f Flange toe radius (in)

R_i Radius of inside corner (in)

R_o Radius of outside corner (in)

S Section modulus (in^3)

S_b Section modulus from the bottom of an unsymmetrical section (in^3)

S_t Section modulus from the top of an unsymmetrical section (in^3)

Wt Weight of section (lbs)

b Width of section (in)
Outside dimension of square tube or bar (in)

b_f Width of flange (in)

b_1 Width between flange section in strut (in)
Top width of hat section (in)

d Full depth of section (in)

d_1 Outer depth of shape in F section (in)

r Radius of gyration (in)

s Spacing between back to back channels or angles (in)

t Thickness of section (in)
Wall thickness of tubes (in)

t_b Thickness of width dimension (in)

t_d Thickness of depth dimension (in)

t_f Thickness of flange (in)

t_w Thickness of web (in)

x Distance from the outside of the web to the minor (Y-Y) axis of a channel section or other similar unsymmetrical sections (in)

y Distance from neutral X-X axis to the outer-most fibers of a cross section (in)
Distance from the back of the flange to the major (X-X) axis of a tee section or other similar unsymmetrical sections (in)

SAFETY FACTORS

Safety factors are defined as the ratio of the ultimate stress to the working or allowable stress.

$$\text{SAFETY FACTOR (S.F.)} = \frac{\text{ULTIMATE STRESS (U.S.)}}{\text{ALLOWABLE STRESS (A.S.)}}$$

$$\text{therefore, A.S.} = \frac{\text{U.S.}}{\text{S.F.}}$$

Safety factors compensate for:

- allowable tolerances of the part
- uncertainty of the anticipated loading (magnitude, type or placement)
- assumptions in methods of analysis
- fabrication tolerances (squareness of cuts, normal tolerances, etc.)

In Section 3 - **PROPERTIES OF EXTREN®**, Strongwell lists the **minimum** ultimate values for stresses obtained from coupon or full section testing. Typical property values are generally 20% -25% higher than those listed. Even though these are minimum ultimate stresses, these values **should not** be utilized for design purposes before dividing them by the appropriate safety factor.

The safety factors used in the various design tables were chosen to prevent first deformation of the part. First deformation is defined as the first visible deformation including local flange or web buckling, twisting, crushing, etc. The recommended safety factors used for design are:

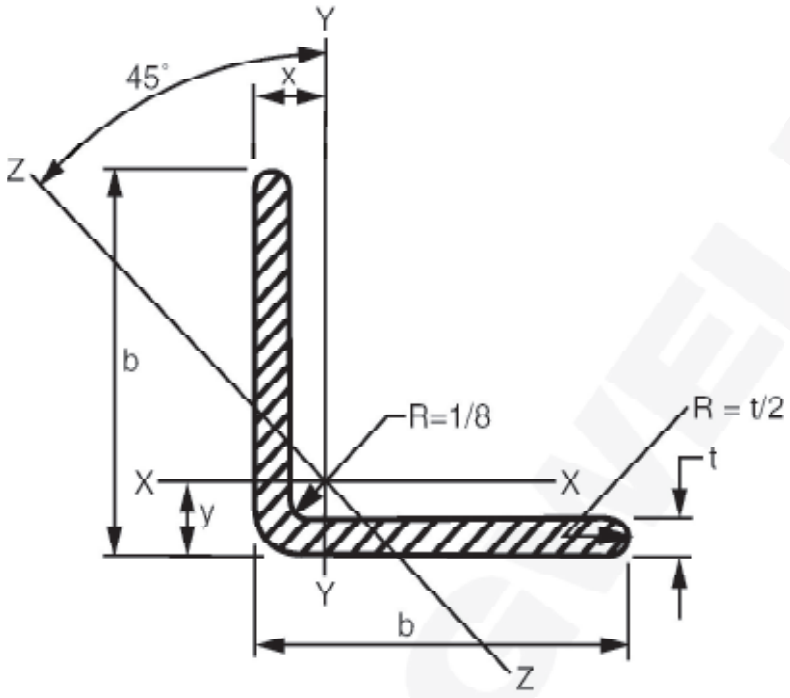
	RECOMMENDED SAFETY FACTORS ①
Flexural members, beams	2.5 ②
Compression members, columns	3.0 ②
Shear	3.0
Connections	4.0
Modulus of Elasticity	1.0 ③
Shear Modulus	1.0 ③

NOTES:

① The safety factors given are for **static load conditions only**. Safety factors for impact loads and dynamic loads are typically **two times** the static load safety factor, see *Mechanics of Materials*, Reference 7. Long term service loads which result in creep deformations will require higher safety factors to insure satisfactory performance. For creep effects, see *Structural Plastics Design Manual,* Reference 2.

② Strongwell has developed empirical equations which calculate the allowable stresses for **EXTREN®** when used as compression members (columns) and as flexural members (beams). These equations, used to generate the allowable load tables found in this design manual, are the result of full section testing. This testing more accurately reflects the performance of the column or beam and should be used instead of coupon properties. The designer should use the allowable load found in the appropriate table, which includes a safety factor of 3.0 for columns and 2.5 for beams.

It must be noted that these equations are applicable only for **EXTREN®** and are a function of the proprietary resins and glass placement in the **EXTREN®** composite plus the size and shape of the part. The use of these empirical equations for pultruded products other than **EXTREN®** is not recommended and could result in a structural failure.



EXTREN® EQUAL LEG ANGLES

PHYSICAL PROPERTIES				SECTION PROPERTIES						DESIGN PROPERTIES	
SIZE		A	NOM. Wt/ft	AXIS X—X or Y—Y				AXIS Z–Z		b/t	J
b	t			I	S	r	x or y	I	r		
in	in	in^2	lbs	in^4	in^3	in	in	in^4	in		in^4
1	1/8	0.22	0.17	0.02	0.03	0.30	0.29	0.01	0.19	8.00	0.001
1-1/4	1/8	0.29	0.22	0.04	0.05	0.37	0.35	0.02	0.24	10.00	0.002
1-1/4	3/16	0.42	0.35	0.06	0.07	0.37	0.37	0.03	0.24	6.67	0.005
1-1/2	1/8	0.35	0.28	0.07	0.07	0.45	0.41	0.03	0.29	12.00	0.002
1-1/2	3/16	0.51	0.41	0.11	0.10	0.45	0.44	0.04	0.29	8.00	0.006
1-1/2	1/4	0.67	0.50	0.13	0.13	0.44	0.46	0.06	0.29	6.00	0.007
2	1/8	0.48	0.37	0.19	0.13	0.63	0.55	0.08	0.46	16.00	0.002
2	3/16	0.70	0.56	0.27	0.19	0.61	0.56	0.11	0.39	10.67	0.008
2	1/4	0.92	0.73	0.34	0.24	0.60	0.58	0.14	0.39	8.00	0.020
3	1/4	1.42	1.13	1.18	0.54	0.91	0.82	0.49	0.58	12.00	0.030
3	3/8	2.09	1.66	1.70	0.80	0.90	0.87	0.70	0.58	8.00	0.090
4	1/4	1.92	1.54	2.94	1.00	1.23	1.07	1.21	0.79	16.00	0.040
4	3/8	2.84	2.31	4.26	1.48	1.22	1.12	1.75	0.78	10.67	0.134
4	1/2	3.75	2.86	5.56	1.97	1.22	1.18	2.29	0.78	8.00	0.312
5	1/2	4.71	3.68	11.34	3.35	1.55	1.61	4.87	1.02	10.00	0.390
6	1/4	2.94	2.35	10.70	2.43	1.91	1.59	4.36	1.22	24.00	0.061
6	3/8	4.34	3.44	14.85	3.38	1.85	1.60	6.07	1.18	16.00	0.204
6	1/2	5.72	4.64	19.38	4.46	1.84	1.66	7.92	1.17	12.00	0.480

SYMBOLS FOR FLEXURAL MEMBERS (BEAMS)

A_w	Cross-sectional area of web or webs (in^2)
B	Derived constant for use in Eq. B-5
C_1	Lateral buckling coefficient from Table B-1
E	Modulus of Elasticity about X-X or Y-Y axis (psi)
F_b	Allowable flexural stress (psi)
F_b'	Allowable flexural stess-laterally unsupported beams (psi)
F_u	Ultimate flexural stress-laterally supported beams (psi)
F_u'	Ultimate flexural stress-laterally unsupported beams (psi)
F_v	Allowable shear stress (psi)
G	Shear modulus (psi)
I_x I_y	Moment of inertia about X-X or Y-Y axis (in^4)
J	Torsional constant (in^4)
K_x K_y	Effective length factor for buckling about X-X or Y-Y axis
K_b	Coefficient for flexural deflection
K_v	Coefficient for shear deflection
L	Length of beam (center to center of supports) (ft)
L_u	Unbraced length of beam (center to center of lateral braces) (ft)
M	Bending moment from applied loads (lb-in)
N	Derived constant for use in Eq. B-5
P	Concentrated load on beam (lbs)
S_x	Section Modulus about X-X axis (in^3)
V	Shear from applied load (lbs)
W	Uniform beam load (lbs/ft)
Wt	Weight of section (lbs)
b	Outside dimension of square tube (in)
b_f	Width of flange (in)
d	Full depth of section (in)
f_b	Flexural stress from applied loads (psi)
f_v	Shear stress from applied loads (psi)
l	Length of beam (center to center of supports) (in)
l_u	Unbraced length of beam (center to center of lateral braces) (in)
t	Thickness of section (in) Wall thickness of tubes (in)
t_f	Thickness of flange (in)
w	Uniform beam load (lb/in)
Δ	Deflection (in)

BEAM EQUATIONS FOR LOADS APPLIED IN THE PLANE OF THE WEB

STRESSES FROM APPLIED LOADS

Flexural stress:

$$f_b = \frac{M}{S_x} \qquad \text{(B-1)}$$

Shear stress:

$$f_v = \frac{V}{A_w} \qquad \text{(B-2)}$$

ULTIMATE AND ALLOWABLE FLEXURAL STRESSES

Laterally Supported EXTREN® W & I Shapes

Ultimate:

$$F_u = \frac{.5E}{(b_f / t_f)^{1.5}} \leq \begin{cases} 30{,}000 \text{ psi (}\textbf{EXTREN}^{®}\text{ 500/525)} \\ 30{,}000 \text{ psi (}\textbf{EXTREN}^{®}\text{ 625} > 4\text{")} \\ 33{,}000 \text{ psi (}\textbf{EXTREN}^{®}\text{ 625} \leq 4\text{")} \end{cases} \qquad \text{(B-3)}$$

Allowable:

$$F_b = \frac{F_u}{2.5} \qquad \text{(B-4)}$$

Laterally Unsupported EXTREN® W & I Shapes

Ultimate:

$$F_u' = \frac{C_1}{S_x}\sqrt{N^2 + \frac{d^2 B^2}{4}} \leq F_u \qquad \text{(B-5)}$$

Where:

$$N = \frac{\pi}{K_y l_u}\sqrt{E\, I_y G J}$$

And:

$$B = \frac{\pi^2 E\, I_y}{(K_y l_u)^2}$$

Allowable:

$$F_b' = \frac{F_u'}{2.5} \qquad \text{(B-6)}$$

K_y and C_1 are taken from Table B-1 and reflect the beam end conditions in the Y-Y Axis and loading on the beam.

Laterally Supported or Laterally Unsupported EXTREN® Square and Rectangular Tubing:

Ultimate:

$$F_u = \frac{E}{16(b/t)^{0.85}} \leq \begin{cases} 30{,}000 \text{ psi (}\textbf{EXTREN}^{®}\text{ 500/525)} \\ 33{,}000 \text{ psi (}\textbf{EXTREN}^{®}\text{ 625)} \end{cases} \qquad \text{(B-7)}$$

Allowable:

$$F_b = \frac{F_u}{2.5} \qquad \text{(B-8)}$$

BEAM EQUATIONS FOR LOADS APPLIED IN THE PLANE OF THE WEB

Laterally Supported EXTREN® Channels

$$\text{Ultimate: } F_u = \leq \frac{E}{27(b_f / t_f)^{.95}} \begin{cases} 30{,}000 \text{ psi (EXTREN® 500 \& 525)} \\ 33{,}000 \text{ psi (EXTREN® 625)} \end{cases} \quad \text{(B-9)}$$

$$\text{Allowable: } F_b = \frac{F_u}{2.5} \quad \text{(B-10)}$$

It must be stressed that a non-symmetrical shape such as a channel should only be used when the flanges are adequately laterally supported. Current industry experience has shown that satisfactory performance from channels has been achieved when the compression flange was laterally supported with connecting members at the following spacings:

— 24" maximum for 3" and 4" channels
— 36" maximum for 5" and 6" channels
— 48" maximum for 8" channels and larger

ALLOWABLE SHEAR STRESSES

EXTREN® structural shapes:

$$F_v = \frac{4500}{3.0} = 1500 \text{ psi} \quad \text{(B-11)}$$

EXTREN® large rectangular shapes:

$$F_v = \frac{4000}{3.0} = 1333 \text{ psi} \quad \text{(B-12)}$$

DEFLECTIONS

EXTREN® structural shapes with uniform loads, w:

$$\Delta = K_b \frac{w l^4}{E I_x} + K_v \frac{w l^2}{A_w G} \quad \text{(B-13)}$$

EXTREN® structural shapes with concentrated loads, P:

$$\Delta = K_b \frac{P l^3}{E I_x} + K_v \frac{P l}{A_w G} \quad \text{(B-14)}$$

K_b is taken from Table B-2 and reflects the beam end conditions.

K_v = 0.35. This value actually varies slightly depending on load distribution, end constraints and Poisson's Ratio, but the given value will be adequate for most cases with supports at both ends of the beam.

K_v = 1.2 for cantilever beams.

For additional information, see Mechanics of Materials by Timoshenko & Gere.