UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
UKIAH FIELD OFFICE
Walker Ridge

AREA REFERENCE MAP

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
5	INTERSTATE HIGHWAY	★	STATE CAPITOL
20	U.S. HIGHWAY	◆	BLM FIELD OFFICE
78	STATE HIGHWAY	●	FACILITY LOCATION

Preliminary Design

FACILITY IMAGE

SHEET INDEX

SHEET NO.	TITLE	DWG. NO.	Revision Date
1	Title Sheet	T1	11/20/2015
2	Shelter Layout (To Be Provided by Contractor)	A1	11/20/2015
3	Shelter Foundation (To be Provided by Contractor)	A2	11/20/2015
4	Shelter Elevation Details (To be Provided by Contractor)	A3	11/20/2015
5	Existing Site Layout	C2	11/20/2015
6	Proposed Site Layout	C2-1	11/20/2015
7	Shelter Layout	C3	11/20/2015
8	Electrical One-Line (To be provided by Contractor)	E2	11/20/2015
9	External Grounding	E3	11/20/2015
10	Internal Grounding	E4	11/20/2015
11	Tower Structural Design (To be provided by Contractor)	S1	11/20/2015
12	Tower Foundation Design (To be provided by Contractor)	S2	11/20/2015
13	Tower Assembly (To be provided by Contractor)	S3	11/20/2015
14	Key Notes	Keynotes	11/20/2015
15	Grounding Typicals	G1	11/20/2015
16	Installation Typicals	G2	11/20/2015

VICINITY MAP

Directions to Walker Ridge
From Clear Lake Oaks, CA

1. Head northeast on CA-20 East toward Lake Street go 15.4 mi
2. Turn left on Walker Ridge Road go 5.3 mi
3. Slight right go 0.4 mi
4. Turn left toward Bartlett Springs Road go 125 ft.
5. Turn left toward Bartlett Springs Road go 102 ft.
6. Turn right toward Bartlett Springs Road go 233 ft.
7. Turn left onto Bartlett Springs Road go 2.6 mi to facility
8. Facility will be on the right

Lat: 39° 5'54.90"N
Long: 122°29'18.30"W
Elevation: 3,527 ft. AMSL

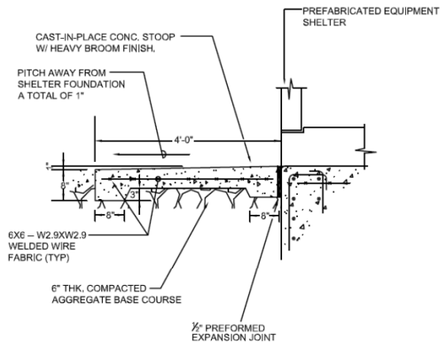
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
WALKER RIDGE
DISTRICT Ukiah Field Office
STATE California

MARK	DATE	DESCRIPTION	APPROVED

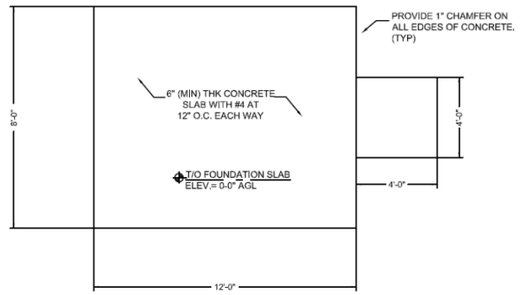
PROJECT NO: Call 0052 - California Construction Specifications
DESIGN OFFICE: Contractor
DESIGNED BY: Technical Evaluation and Development Services, LLC
DRAWN BY: Ted Sumners
CHK'D BY:
APPROVED BY:
DATE: 11/20/2015

T1
SHEET 1 OF 16

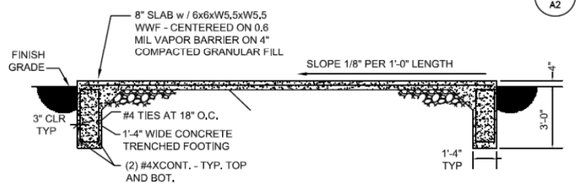
Shelter Foundation Details
(To Be Provided By Contractor)



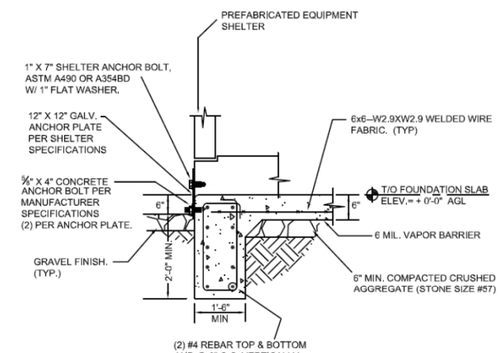
2/A2 CONCRETE STOOP DETAIL



1/A2 SHELTER FOUNDATION PLAN



3/A2 FOUNDATION SECTION



4/A2 SECTION AT FOUNDATION WALL

SEE SECTION 133423

FOUNDATION PREPARATION

A SUBSURFACE SOIL INVESTIGATION (GEOTECHNICAL) SHALL BE BEEN MADE AT THE PROJECT SITE. LOCATIONS OF EACH EXPLORATION AND INFORMATION OBTAINED WILL BE PROVIDED TO THE GOVERNMENT ASSIGNED CONSTRUCTION/PROJECT MANAGER. INFORMATION OBTAINED WILL BE USED IN PREPARING THE FOUNDATION DESIGN; HOWEVER, IT WILL ALSO BE MADE AVAILABLE FOR GENERAL INFORMATION TO BIDDERS. BIDDERS ARE EXPECTED TO EXAMINE THE SITE AND RECORD OF INVESTIGATIONS AND THEN DECIDE FOR THEMSELVES THE CHARACTER OF MATERIALS TO BE ENCOUNTERED. THE GOVERNMENT DOES NOT GUARANTEE THAT MATERIALS OTHER THAN THOSE DISCLOSED BY THE BORINGS WILL NOT BE ENCOUNTERED OR THAT THE PROPORTIONS AND CHARACTER OF THE VARIOUS MATERIALS WILL NOT VARY FROM THOSE INDICATED ON THE BORING LOGS.

WORK REQUIRED CONSISTS OF ALL STRIPPING, SURFACE COMPACTION, EXCAVATING, COMPACTING, BACKFILLING, FILLING AND RELATED ITEMS NECESSARY TO COMPLETE WORK INDICATED ON DRAWINGS AND DESCRIBED IN THESE SPECIFICATIONS.

PRIOR TO ANY BACKFILLING OR FILLING OPERATIONS, REPRESENTATIVE SAMPLES OF EACH PROPOSED FILL MATERIAL SHALL BE COLLECTED AND TESTED BY A QUALIFIED TESTING LABORATORY EMPLOYED BY THE OWNER. ALL BACKFILL AND FILL MATERIAL USED IN THIS PROJECT SHALL BE APPROVED BY THE TESTING LABORATORY.

FIELD DENSITY CONTROL TESTS SHALL BE MADE AS DIRECTED BY THE OWNER. DENSITY TESTS SHALL BE MADE FOR THE COMPACTED SUBGRADE AND FOR EACH LAYER OF FILL. TESTS SHALL BE PERFORMED BY A QUALIFIED TESTING LABORATORY EMPLOYED BY THE OWNER.

THE CONTRACTOR SHALL MAINTAIN SITE OF WORK AND ADJACENT GROUNDS IN WELL DRAINED CONDITION.

THE ENTIRE BUILDING CONSTRUCTION AREA EXTENDING TO AT LEAST FIVE FEET OUTSIDE CONSTRUCTION LINES SHALL BE STRIPPED TO A DEPTH NECESSARY TO REMOVE ALL TOPSOIL, VEGETATION, ORGANIC SOIL, DEBRIS OR OTHER DELETERIOUS MATERIAL.

FOLLOWING STRIPPING OPERATIONS, THE ENTIRE SURFACE WITHIN THE BUILDING AREAS SHALL BE COMPACTED WITH A SELF–PROPELLED VIBRATORY COMPACTOR. SIZE OF COMPACTOR SHALL BE APPROVED BY THE TESTING LABORATORY. SUFFICIENT PASSES OF THE COMPACTION EQUIPMENT SHALL BE MADE TO PRODUCE A DENSITY OF AT LEAST 95% OF THE MODIFIED PROCTOR MAXIMUM DENSITY TO A DEPTH OF 12 INCHES BELOW THE STRIPPED SURFACE.

ALL BACKFILL AND FILL MATERIAL SHALL BE A RELATIVELY CLEAN SAND CONTAINING LESS THAN 10%, BY WEIGHT, OF SILT OR CLAY–SIZED MATERIAL PASSING THE #200 SIEVE AND WHICH HAS BEEN APPROVED BY THE TESTING LABORATORY.

BACKFILL AND FILL MATERIAL SHALL BE PLACED IN UNIFORM LOOSE LAYERS NOT EXCEEDING 8 INCHES IN THICKNESS AND COMPACTED WITH THE VIBRATORY COMPACTOR SPECIFIED ABOVE. ALL BACKFILL AND FILL MATERIAL SHALL BE COMPACTED TO A DENSITY OF 95% OF THE MAXIMUM MODIFIED PROCTOR DENSITY.

WHERE THE SUBGRADE OR THE LAYERS OF SOIL MATERIAL MUST BE MOISTURE CONDITIONED BEFORE COMPACTION, UNIFORMLY APPLY WATER TO SURFACE OF THE SUBGRADE OR LAYERS OF SOIL MATERIAL TO PREVENT FREE WATER FROM APPEARING ON THE SURFACE DURING OR SUBSEQUENT TO COMPACTION OPERATIONS.

EXCAVATIONS SHALL NOT EXTEND BELOW THE EXACT LINES OF FOOTINGS AND FLOOR SLABS. SHOULD THE EXCAVATION BE CARRIED BELOW SUCH LINES, THE CONTRACTOR SHALL FILL IN THE RESULTING EXCESS EXCAVATION WITH CONCRETE UNDER FOOTINGS, AND WITH APPROVED GRANULAR MATERIAL UNDER SLABS AT NO COST TO THE OWNER.

ALL EXCAVATIONS SHALL BE KEPT FREE OF STANDING WATER UNTIL CONCRETE FOUNDATIONS ARE PLACED. WHERE PRACTICAL, CONCRETE SHALL BE PLACED IMMEDIATELY AFTER FOUNDATION EXCAVATIONS, FORMWORK AND REINFORCING HAVE BEEN REVIEWED BY THE OWNER.

EXCAVATIONS FOR FOOTINGS AND TRENCHES MAY BE CUT TO ACCURATE SIZES AND SIDE FORMS OMITTED, IF CONCRETE IS PLACED IN CLEAN CUT TRENCHES WITHOUT CAVE–INS.

ALL BACKFILL AROUND FOUNDATION EXCAVATIONS AND IN PLUMBING AND ELECTRICAL TRENCHES BENEATH SLABS ON GRADE MUST BE PROPERLY BACKFILLED AND COMPACTED. DENSIFICATION OF BACKFILL IN THESE RESTRICTED WORKING AREAS SHALL BE ACCOMPLISHED BY USE OF MANUALLY OPERATED VIBRATORY COMPACTION EQUIPMENT. LIFTS OF FILL SHALL NOT EXCEED A MAXIMUM OF 4 INCHES IN THICKNESS AND ALL SUCH FILL SHALL BE COMPACTED TO PREVIOUSLY SPECIFIED DENSITY.

NOTES

1) MATERIALS
   A) CONCRETE – REGULAR WT. AGGREGATES – f'_c = 3000 PSI @ 28 DAYS
   B) REINFORCING STEEL – ASTM A–615, GRADE 60
2) SEE CIVIL DRAWINGS FOR LOCATION OF EQUIPMENT BUILDING ON THE SITE.
3) SEE SPECIFICATIONS "FOUNDATION PREPARATION" FOR PREPARATION OF SUBGRADE BELOW EQUIPMENT BUILDING.
4) DESIGN SOIL BEARING PRESSURE ---------- 2000 PSF
5) SLAB TOLERANCE IS ± 1/4".
6) * = 24" MINIMUM, BUT MAY VARY AS REQUIRED PER: LOCAL CODE, AND/OR SOIL BEARING CAPACITY.
7) ALL REBAR TO BE GRADE 40 MINIMUM UNLESS OTHERWISE SPECIFIED.
8) W6.5 AS SPECIFIED FOR THE WWF HAS 0.288" DIAMETER.
9) WWF IS 60 KSI MINIMUM.
10) OVERLAP SPLICES ARE ALLOWED FOR REINFORCING BAR, USE 18" MINIMUM LAP.
11) ALL REQUIRED TIE DOWN PLATES, SHIMS, BOLTS, AND ANCHORS SHALL BE PLACED INSIDE SHELTER PRIOR TO SHIPMENT FROM MANUFACTURER.
12) SHELTER FOUNDATION HAS BEEN DESIGNED IN ACCORDANCE WITH LOCAL BUILDING CODES AND BASIC WIND SPEEDS OF 130 mph.

U.S. DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

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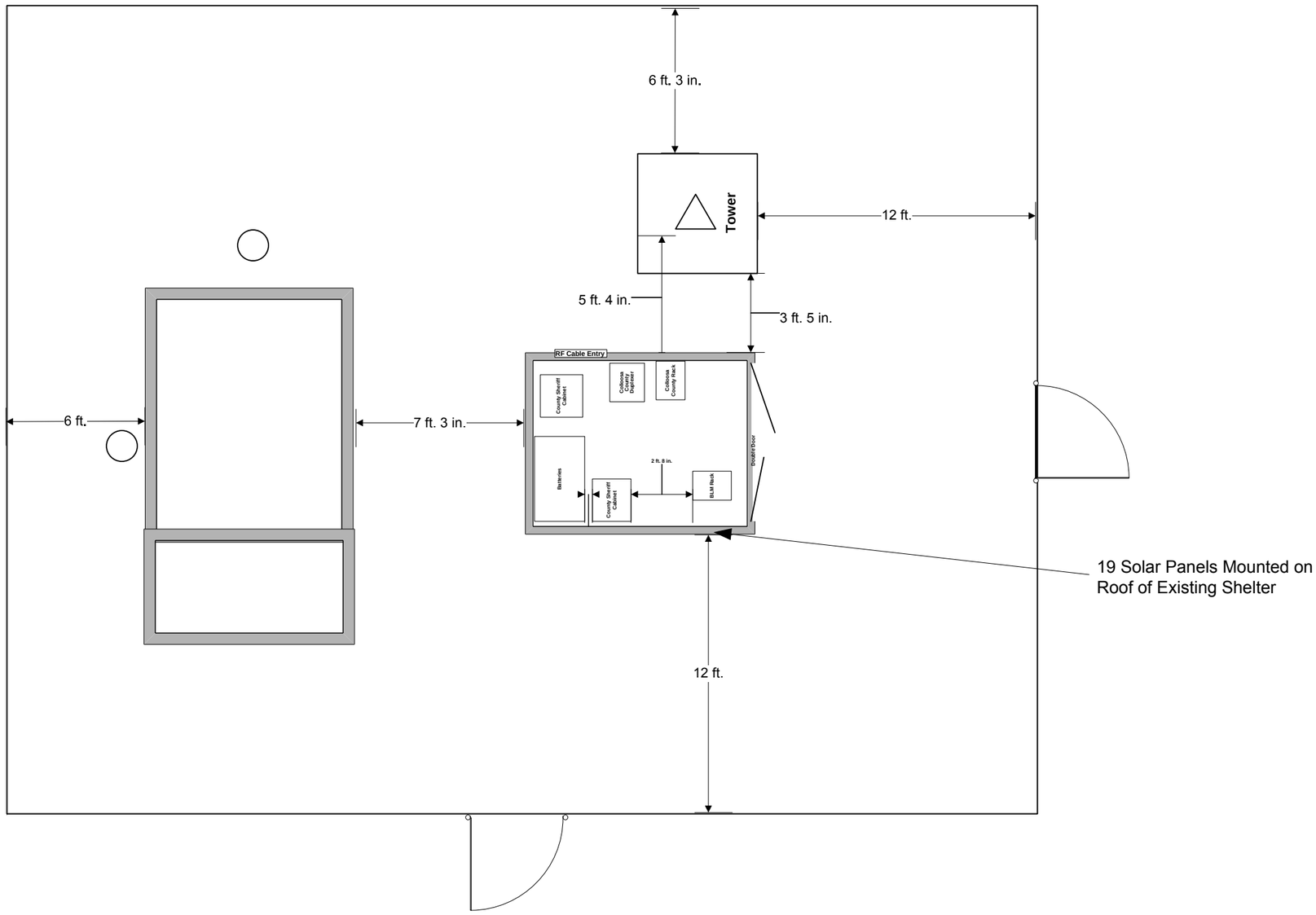
WALKER RIDGE
ORGANIZATION — Ukiah Field Office — STATE — California

MARK	DESCRIPTION	DATE	APPROVED

PROJECT NO:
DESIGN OFFICE:
DESIGNED BY:
DRAWN BY:
CHK'D BY:
APPROVED BY:
DATE:

A2
SHEET 3 OF 16

Existing Site Layout



0 3 5 10

3/16" = 1'

N

Preliminary Design

UNITED STATES DEPARTMENT OF THE INTERIOR
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ORG UNIT Ukiah Field Office STATE California

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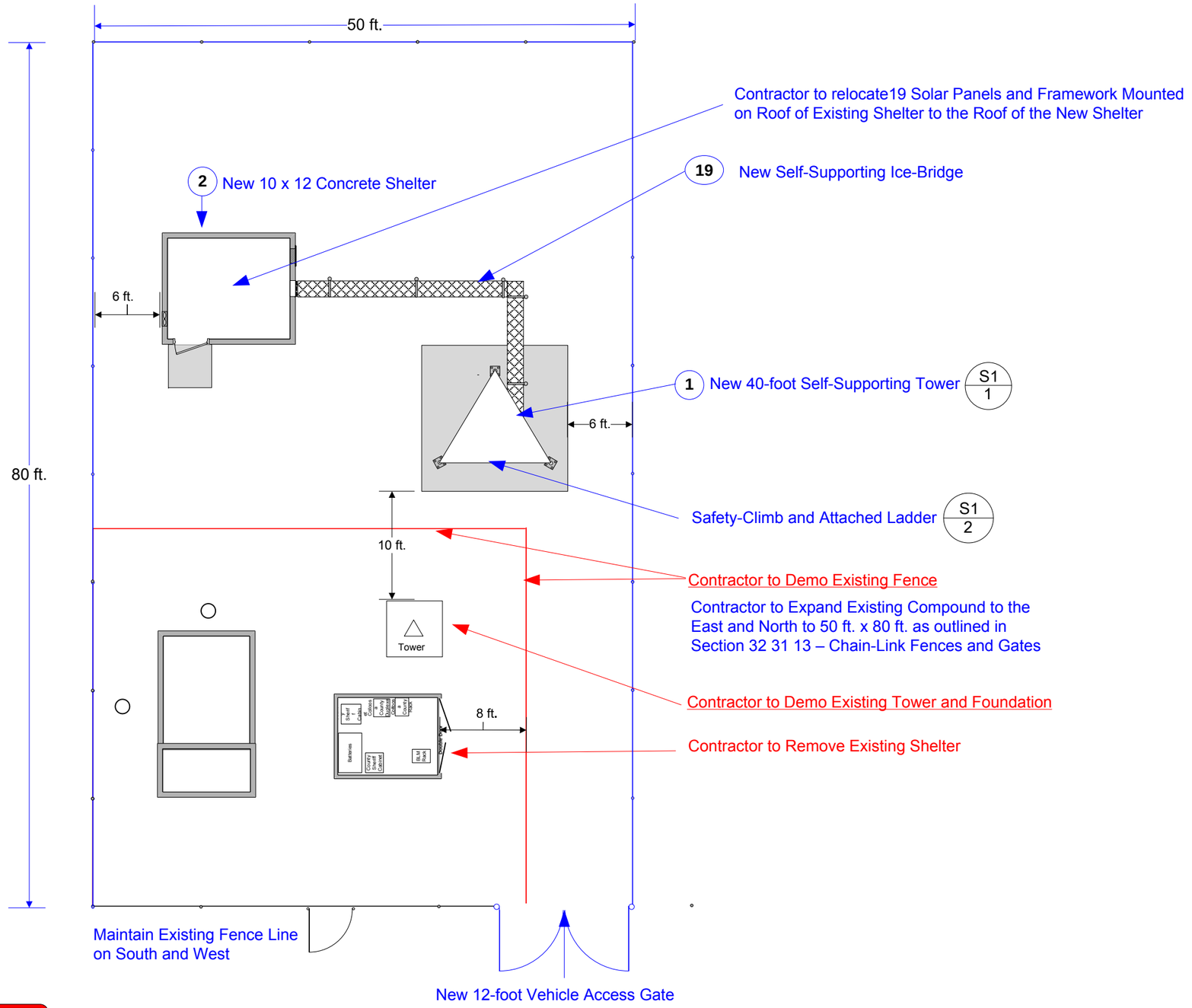
C2

SHEET 5 OF 16

Proposed Site Layout



0 6 10 20

3/32” = 1'

Preliminary Design

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STATE California

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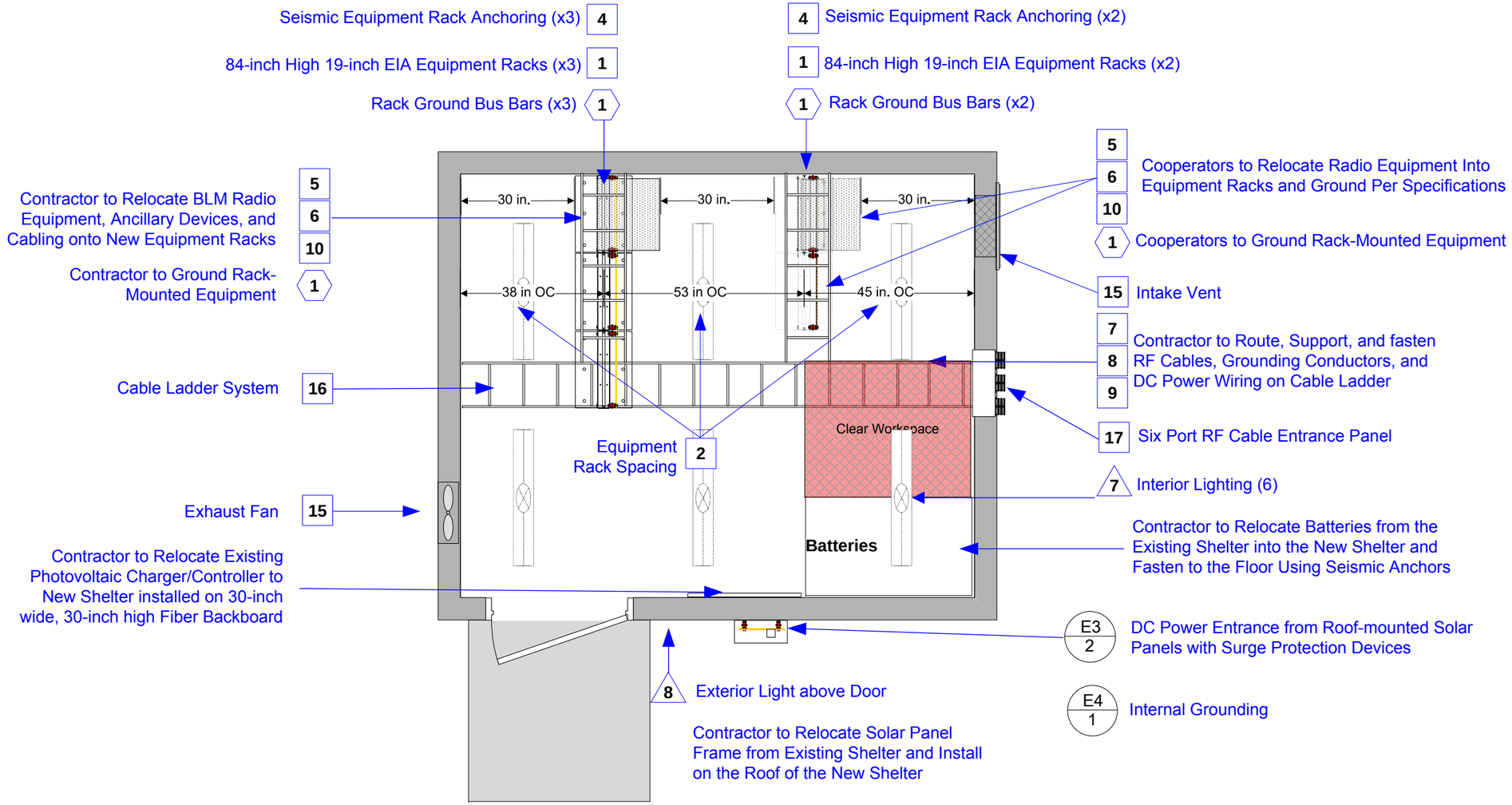
C2-1

SHEET 6 OF 16

Shelter Layout



C3 1 **Proposed Shelter Configuration**

0 3 5 10

3/8” = 1'

N

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BUREAU OF LAND MANAGEMENT

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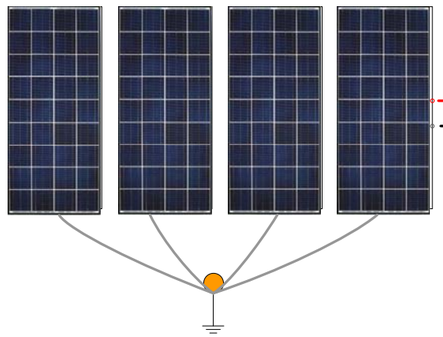
C3
SHEET 7 OF 16

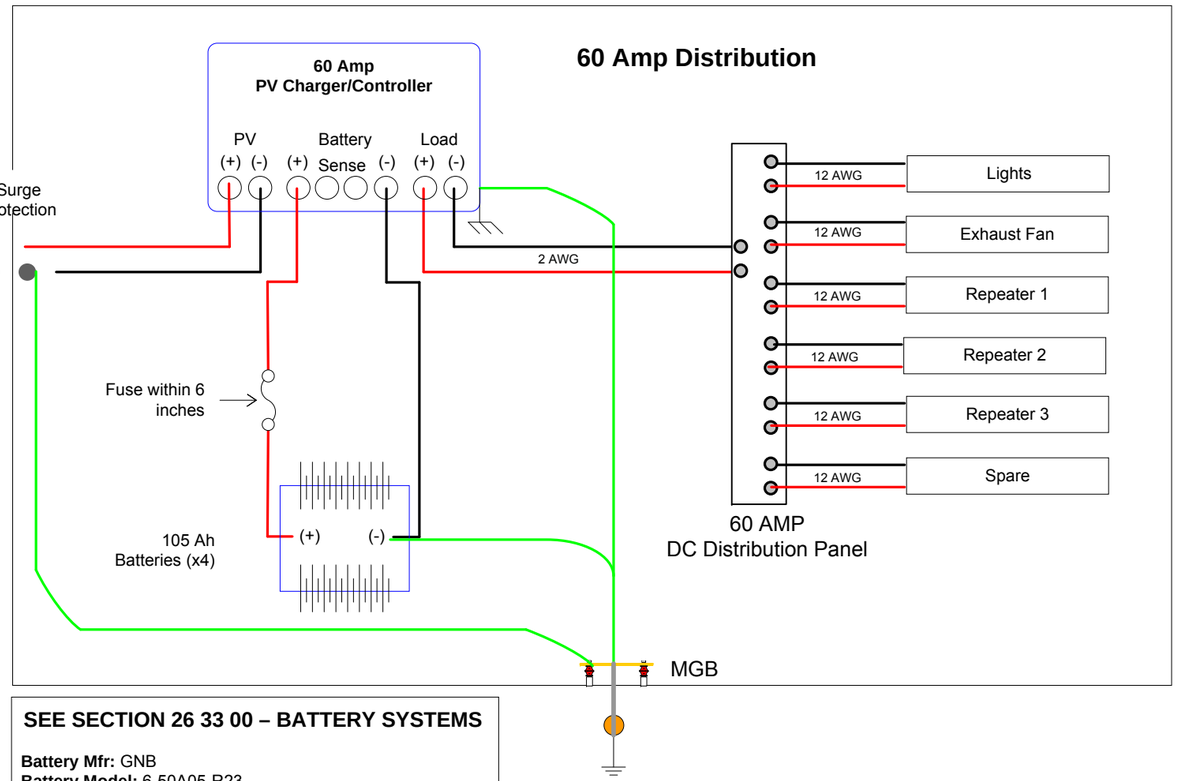
Electrical One-Line
(To Be Provided By Contractor)

TYPICAL NOT FOR CONSTRUCTION

SEE SECTION 26 31 00 – PHOTOVOLTAIC COLLECTOR SYSTEM

Photovoltaic Panel Mfr.:
Model:
Qty:
Watts:





SEE SECTION 26 33 00 – BATTERY SYSTEMS

Battery Mfr: GNB
Battery Model: 6-50A05-R23
Qty: 4
Amp-Hours: 105

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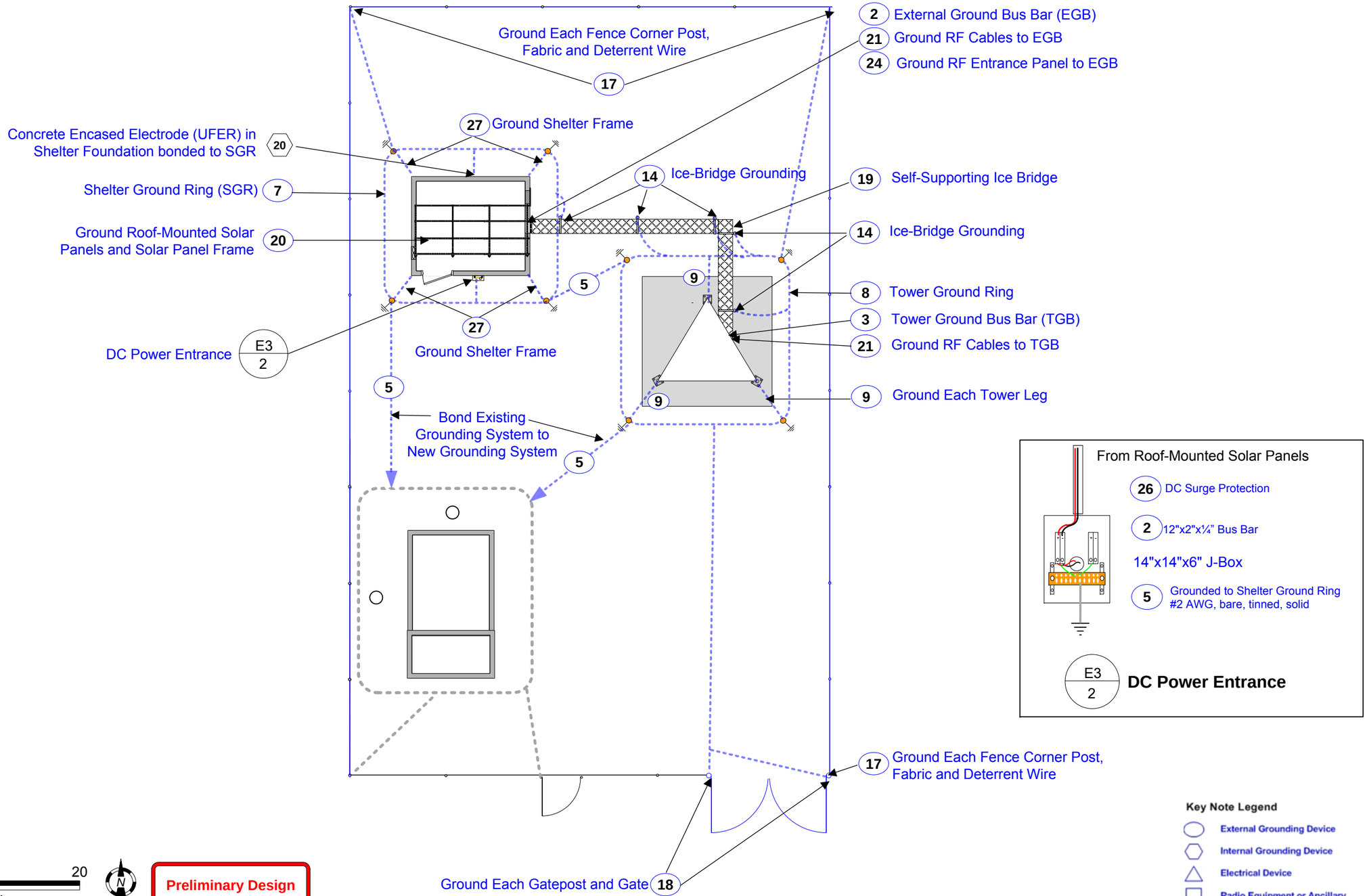
E2
SHEET 8 OF 16

External Grounding



0 6 10 20
3/32" = 1'

N

Preliminary Design

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

WALKER RIDGE

ORG UNIT Ukiah Field Office
STATE California

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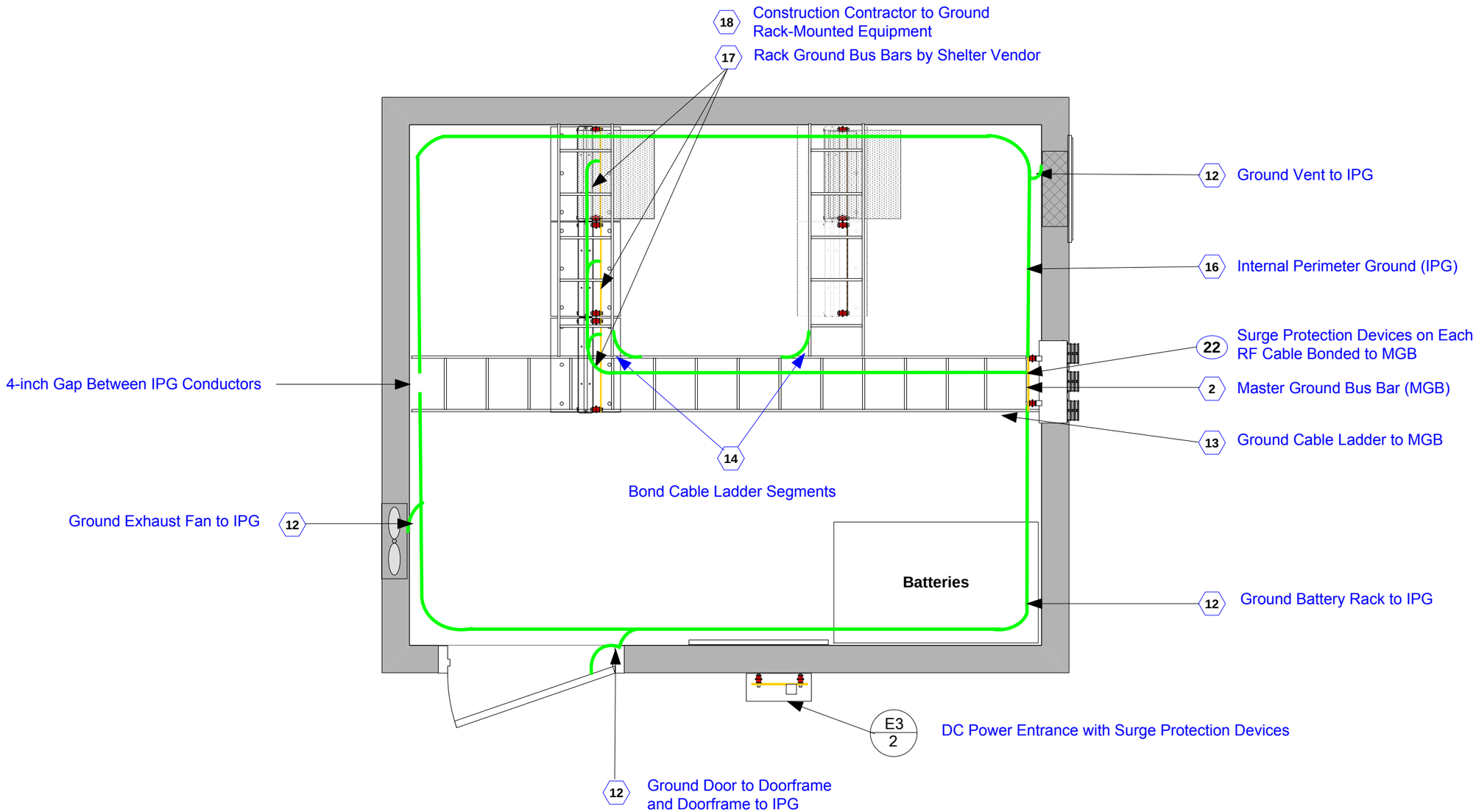
CHK'D BY:	
APPROVED BY:	
DATE:	11/20/2015

MARK	DESCRIPTION	DATE	APPROVED

E3

Internal Grounding



0 1.2 2 4

1/2" = 1'

N

Preliminary Design

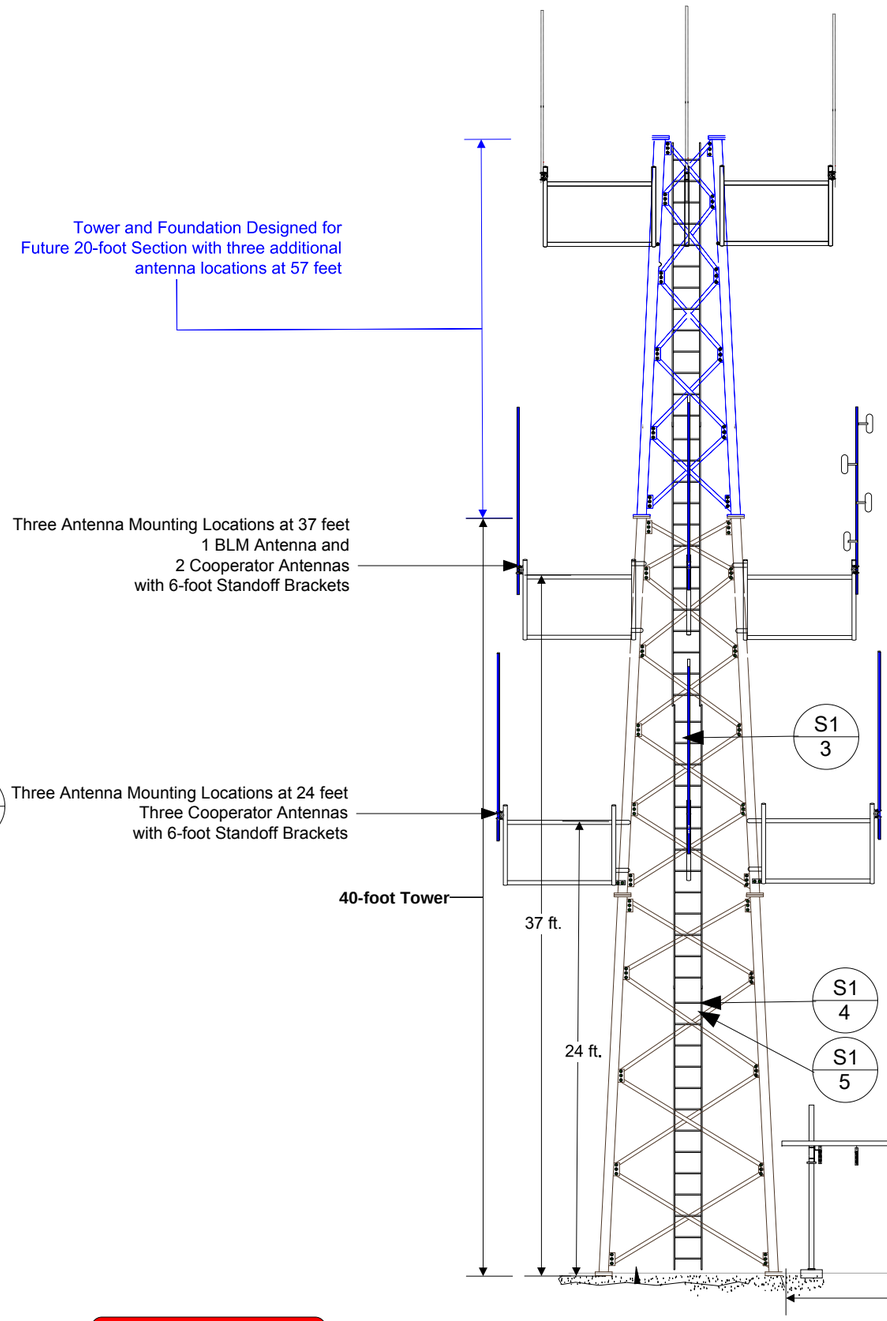
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
WALKER RIDGE
Ukiah Field Office STATE California
Organization

MARK	DESCRIPTION	DATE	APPROVED
DATE:	11/20/2015		
APPROVED BY:			
CHK'D BY:			
DRAWN BY:	Ted Sumners		
DESIGNED BY:	Technical Evaluation and Development Services, LLC		
DESIGN OFFICE:	Contractor		
PROJECT NO:	Call 0052 - California Construction Specifications		

E4

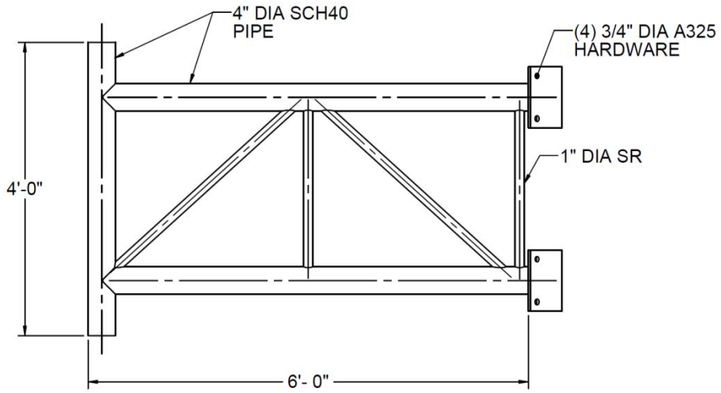
SHEET 10 OF 16

Tower Structural Design – Typical Not For Construction
(To Be Provided By Contractor)

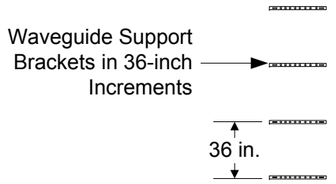


S1 / 1 — 40-Foot Self-Supporting Lattice Tower

S1 / 3 — Attached Climbing Ladder and Safety-Climb



S1 / 2 — 6-Foot Antenna Standoff Bracket



S1 / 4 — Attached Or Integrated RF Cable Support

Stainless Steel RF Cable Anchors

Preliminary Design

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

WALKER RIDGE

STATE California

ORGANIZATION Ukiah Field Office

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PROJECT NO:
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DRAWN BY:
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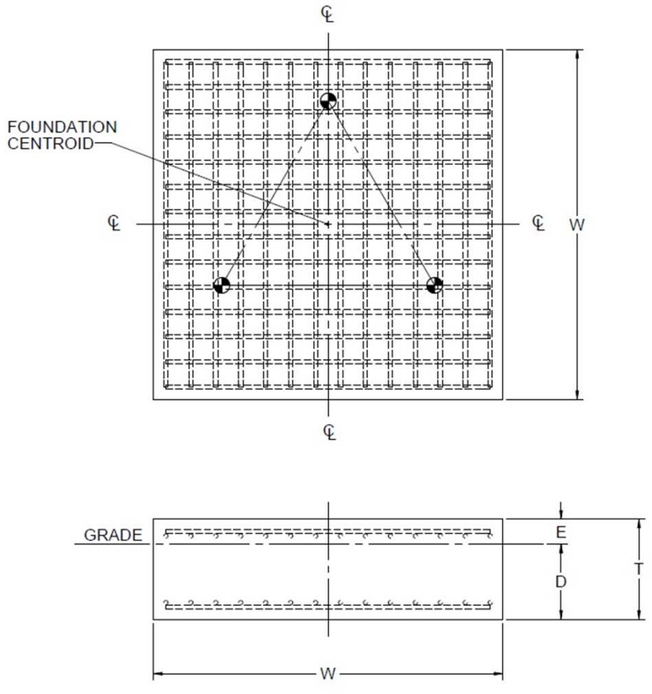
DATE:

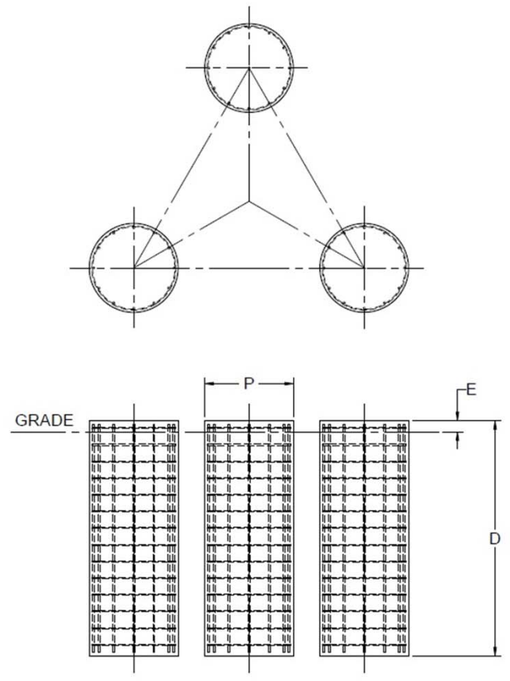
S1

SHEET 11 OF 16

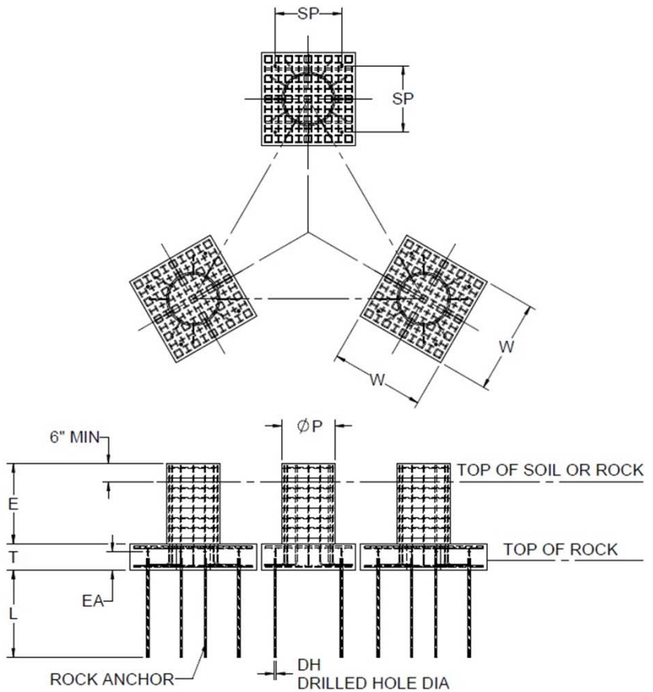
Tower Foundation Design – Typical Not For Construction
(To Be Provided By Contractor)



SELF SUPPORT TOWER MAT FOUNDATION



SELF SUPPORT TOWER DRILLED PIER FOUNDATION



SELF SUPPORT TOWER PAD W/ ROCK ANCHOR FOUNDATION

SELF-SUPPORTING LATTICE TOWER FOUNDATIONS

TOWER DESIGN	SOIL COND.	ANCHOR ROD ASSY.	MAT FOUNDATION						DRILLED PIER FOUNDATION					INDIVIDUAL PAD WITH ROCK ANCHORS													
			W	D	T	E	HOR. BARS (PER DIR. PER LAYER)	CONC. VOL.	D	E	P	VERT. BARS (PER FND.)	CONC. VOL. (3 FND.)	W	T	D	P	E	ROCK ANCHOR	ANCHOR PROOF LOAD	ANCHOR LOCKOFF LOAD	DH	SP	EA	L	HOR. BARS (PER DIR., PER LAYER, PER FND.)	VERT. BARS (PER FND.)	CONC. VOL. (3 FND.)
S1-40	SAND	A	13' - 6"	5'	5' - 6"	6"	17 #7	37.1 CU YD	19'	6"	2' - 6"	9 #8	10.6 CU YD	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S1-40	CLAY	A	13' - 6"	5'	5' - 6"	6"	17 #7	37.1 CU YD	19'	6"	2' - 6"	9 #8	10.6 CU YD	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S1-40	ROCK	A	---	---	---	---	---	---	---	---	---	---	---	6'	3'	6" MIN	3'	2' MIN/5' MAX	4 #6 (3/4" ϕ) x 12'-9"	16 KIP	14 KIP	3"	3' - 6"	2' - 5"	10'	6 #7	14 #8	15.9 CU YD
S1-60	SAND	A	18' - 6"	5'	5' - 6"	6"	22 #7	69.7 CU YD	30'	6"	3' - 6"	18 #8	32.6 CU YD	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S1-60	CLAY	A	18' - 6"	5'	5' - 6"	6"	22 #7	69.7 CU YD	30'	6"	3' - 6"	18 #8	32.6 CU YD	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S1-60	ROCK	A	---	---	---	---	---	---	---	---	---	---	---	6'	3'	6" MIN	3'	2' MIN/5' MAX	4 #7 (7/8" ϕ) x 14'-9"	38 KIP	32 KIP	3 1/2"	3' - 6"	2' - 5"	12'	6 #7	14 #8	15.9 CU YD
S2-60	SAND	B	19' - 6"	5'	5' - 6"	6"	24 #7	77.5 CU YD	31'	6"	3' - 6"	18 #8	33.7 CU YD	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S2-60	CLAY	B	19' - 6"	5'	5' - 6"	6"	24 #7	77.5 CU YD	31'	6"	3' - 6"	18 #8	33.7 CU YD	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S2-60	ROCK	B	---	---	---	---	---	---	---	---	---	---	---	6'	3'	6" MIN	3'	2' MIN/5' MAX	4 #7 (7/8" ϕ) x 14'-9"	39 KIP	32 KIP	3 1/2"	3' - 6"	2' - 5"	12'	6 #7	14 #8	15.9 CU YD
S2-80	SAND	B	24'	5'	5' - 6"	6"	29 #7	117.3 CU YD	48'	6"	4'	23 #8	67.7 CU YD	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S2-80	CLAY	B	24'	5'	5' - 6"	6"	29 #7	117.3 CU YD	48'	6"	4'	23 #8	67.7 CU YD	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S2-80	ROCK	B	---	---	---	---	---	---	---	---	---	---	---	6'	3'	6" MIN	3'	2' MIN/5' MAX	4 #11 (1-3/8" ϕ) x 18'-9"	70 KIP	58 KIP	4"	3' - 6"	2' - 5"	16'	6 #7	14 #8	15.9 CU YD

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

UNITED STATES DEPARTMENT OF THE INTERIOR
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ORGANIZATION Ukiah Field Office STATE California

MARK | DESCRIPTION | DATE | APPROVED

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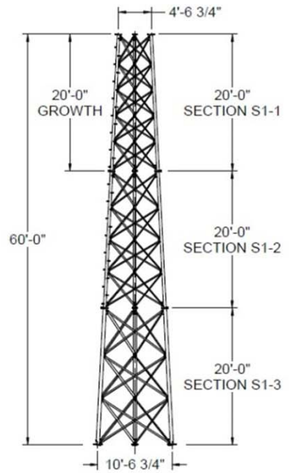
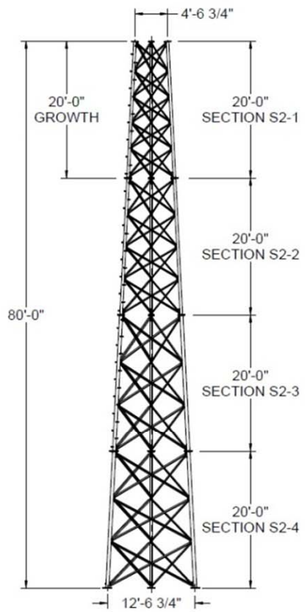
S2

Tower Assembly – Typical Not For Construction
(To Be Provided By Contractor)



40FT SELF SUPPORT TOWER
EXPANDED TO 60FT



60FT SELF SUPPORT TOWER
EXPANDED TO 80FT

SELF-SUPPORTING LATTICE TOWER ASSEMBLIES

TOWER NUMBER	TOWER HEIGHT	BASE SECTION	TOWER WIDTH		NO ICE			WITH SOLID ICE			WITH RIME ICE
			TOP	BOTTOM	MOMENT (FT-KIP)	SHEAR (KIP)	WEIGHT (KIP)	MOMENT (FT-KIP)	SHEAR (KIP)	WEIGHT (KIP)	WEIGHT (KIP)
S1-40	40'	S1-3	6'-6 3/4"	10'-6 3/4"	494	21.8	5.6	170	7.3	30.6	561
S1-60	60'	S1-3	4'-6 3/4"	10'-6 3/4"	1175	35.5	7.9	412	12.1	47.2	900
S2-60	60'	S2-4	6'-6 3/4"	12'-6 3/4"	1423	44.6	11.5	477	14.7	59.1	1018
S2-80	80'	S2-4	4'-6 3/4"	12'-6 3/4"	2561	64.4	14.2	910	22.3	82.6	1477

SELF-SUPPORTING LATTICE TOWER SECTIONS

SECTION NUMBER	TOP WIDTH	BOTTOM WIDTH	LEG	PANELS	DIAGONAL	HORIZONTAL	FLANGE PLATE		FLANGE BOLTS	BRACE BOLTS	WEIGHT		
							TOP	BOTTOM			LEGS	BRACING	TOTAL
S1-1	4'-6 3/4"	6'-6 3/4"	P 2.375" OD x 0.154"	5	L 1 1/2" x 1 1/2" x 3/16"	L 2" x 2" x 3/16"	3/4" x 6 1/2" SQ.	3/4" x 6 1/2" SQ.	(12) 3/4" A325N	(75) 1/2" A325X	384 #	356 #	740 #
S1-2	6'-6 3/4"	8'-6 3/4"	P 3.500" OD x 0.216"	4	L 2 1/2" x 2 1/2" x 3/16"	L 2" x 2" x 3/16"	1" x 6 1/2" SQ.	1 1/4" x 11 1/4" DIA.	(12) 3/4" A325N	(60) 5/8" A325X	594 #	655 #	1249 #
S1-3	8'-6 3/4"	10'-6 3/4"	P 5.563" OD x 0.258"	3	L 2 1/2" x 2 1/2" x 3/16"	---	1 1/4" x 11 1/4" DIA.	1 1/4" x 11 1/4" DIA.	(24) 3/4" A325N	(45) 5/8" A325X	1133 #	1086 #	2219 #
S2-1	4'-6 3/4"	6'-6 3/4"	P 2.375" OD x 0.154"	5	L 1 1/2" x 1 1/2" x 3/16"	L 2" x 2" x 3/16"	3/4" x 6 1/2" SQ.	3/4" x 6 1/2" SQ.	(12) 3/4" A325N	(75) 1/2" A325X	384 #	356 #	740 #
S2-2	6'-6 3/4"	8'-6 3/4"	P 3.500" OD x 0.216"	4	L 2 1/2" x 2 1/2" x 3/16"	L 2" x 2" x 3/16"	1" x 6 1/2" SQ.	1 1/4" x 11 1/4" DIA.	(12) 3/4" A325N	(60) 5/8" A325X	594 #	655 #	1249 #
S2-3	8'-6 3/4"	10'-6 3/4"	P 5.563" OD x 0.258"	3	L 3 1/2" x 3 1/2" x 1/4"	---	1 1/4" x 11 1/4" DIA.	1 1/4" x 11 1/4" DIA.	(24) 3/4" A325N	(45) 5/8" A325X	1133 #	1086 #	2219 #
S2-4	10'-6 3/4"	12'-6 3/4"	P 6.625" OD x 0.375"	3	L 3 1/2" x 3 1/2" x 1/4"	---	1 1/4" x 11 1/4" DIA.	1 1/4" x 11 1/4" DIA.	(24) 3/4" A325N	(45) 3/4" A325X	1775 #	1262 #	3037 #

SELF-SUPPORTING LATTICE TOWER ANTENNA LOADING

TOWER	ANTENNA			MOUNT			LINE	
	ELEV. *	QTY.	DESCRIPTION	ELEV.*	QTY.	DESCRIPTION	QTY.	DESCRIPTION
S1-40	30'	3	ANDREW DB224-C	28'-9"	3	6' STANDOFF MOUNT (120 DEG. SEPARATION BETWEEN MOUNTS)	3	7/8" COAX
	25'	1	2 M SOLID DISH WITH RADOME	25'	1	2' STANDOFF MOUNT ON 7' FACE MOUNTED CROSS ARMS	1	7/8" COAX
S1-60	55'	1	2 M SOLID DISH WITH RADOME	55'	1	2' STANDOFF MOUNT ON 7' FACE MOUNTED CROSS ARMS	1	7/8" COAX
	47'	3	ANDREW DB224-C	45'-9"	3	3' STANDOFF MOUNT (120 DEG. SEPARATION BETWEEN MOUNTS)	3	7/8" COAX
	30'	3	ANDREW DB224-C	28'-9"	3	6' STANDOFF MOUNT (120 DEG. SEPARATION BETWEEN MOUNTS)	3	7/8" COAX
	25'	1	2 M SOLID DISH WITH RADOME	25'	1	2' STANDOFF MOUNT ON 7' FACE MOUNTED CROSS ARMS	1	7/8" COAX
S2-60	55'	1	2 M SOLID DISH WITH RADOME	55'	1	2' STANDOFF MOUNT ON 7' FACE MOUNTED CROSS ARMS	1	7/8" COAX
	47'	3	ANDREW DB224-C	45'-9"	3	3' STANDOFF MOUNT (120 DEG. SEPARATION BETWEEN MOUNTS)	3	7/8" COAX
	30'	3	ANDREW DB224-C	28'-9"	3	6' STANDOFF MOUNT (120 DEG. SEPARATION BETWEEN MOUNTS)	3	7/8" COAX
	25'	1	2 M SOLID DISH WITH RADOME	25'	1	2' STANDOFF MOUNT ON 7' FACE MOUNTED CROSS ARMS	1	7/8" COAX
S2-80	75'	1	2 M SOLID DISH WITH RADOME	75'	1	2' STANDOFF MOUNT ON 7' FACE MOUNTED CROSS ARMS	1	7/8" COAX
	67'	3	ANDREW DB224-C	65'-9"	3	3' STANDOFF MOUNT (120 DEG. SEPARATION BETWEEN MOUNTS)	3	7/8" COAX
	55'	1	2 M SOLID DISH WITH RADOME	55'	1	2' STANDOFF MOUNT ON 7' FACE MOUNTED CROSS ARMS	1	7/8" COAX
	47'	3	ANDREW DB224-C	45'-9"	3	3' STANDOFF MOUNT (120 DEG. SEPARATION BETWEEN MOUNTS)	3	7/8" COAX
	30'	3	ANDREW DB224-C	28'-9"	3	6' STANDOFF MOUNT (120 DEG. SEPARATION BETWEEN MOUNTS)	3	7/8" COAX
	25'	1	2 M SOLID DISH WITH RADOME	25'	1	2' STANDOFF MOUNT ON 7' FACE MOUNTED CROSS ARMS	1	7/8" COAX

* ELEVATIONS LISTED FOR BOTTOM OF OMNI/DIPOLE ANTENNAS AND CENTERLINES OF ALL OTHER ANTENNAS AND MOUNTS.

PRELIMINARY DRAWING NOT FOR CONSTRUCTION

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
WALKER RIDGE
ORGANIZATION Ukiah Field Office STATE California

APPROVED
DATE
DESCRIPTION
MARK

PROJECT NO:
DESIGN OFFICE:
DESIGNED BY:
DRAWN BY:
CHK'D BY:
APPROVED BY:
DATE:

S3
SHEET 13 OF 16

KEY NOTES – Remote Facilities

KEY NOTES: RADIO FACILITY INFRASTRUCTURE

1	New Communications Tower shall be provided and installed as specified in Section 33 81 13 – Communications Transmission Towers
2	New Prefabricated Communications Equipment Shelter shall be provided and installed as specified in Section 13 34 18 – Prefabricated Communications Shelter
3	New Pepro Communications Equipment Shelter shall be provided and installed as specified in Section 13 34 18.13 – Alum Shelter with Articulating Mast
4	New Outdoor Equipment Cabinet shall be provided and installed as specified in Section 13 34 18.33 – Outdoor Equipment Cabinet

KEY NOTES: EXTERNAL GROUNDING (Remote Facility)

25Ω	Ground Resistance shall be 25 Ohms or Less. Ground resistance testing shall be as specified in *Section 33 79 83.53 – Grounding Electrode System Resistance*
1	Ground Rod: 5/8" diameter, 8-foot long, *Paragraph 2.2 and 3.1, Section 33 79 83.13 – Grounding Electrodes*
2	External Ground Bus Bar (EGB): *Paragraph 3.2, Section 33 79 86 – Ground Bus Bars at Remote Facility* (4"x12"x¼")
3	Tower Ground Bus Bar (TGB): *Paragraph 3.3, Section 33 79 86 – Ground Bus Bars at Remote Facility* (4"x12"x¼")
4	External Grounding Conductor: # 6 AWG, bare, solid, tinned copper, *Paragraph 2.1, Section 33 79 83 – External Grounding Conductors*
5	External Grounding Conductor: # 2 AWG, bare, solid, tinned, copper, *Paragraph 2.1, Section 33 79 83 – External Grounding Conductors*
6	External Grounding Conductor: # 1/0 AWG, bare, solid, tinned, copper, *Paragraph 2.1, Section 33 79 83 – External Grounding Conductors*
7	Shelter Ground Ring: *Section 33 79 15 – Communications Shelter Grounding*
8	Tower Ground Ring: *Paragraph 3.2, Section 33 79 16 – Tower Grounding*
9	Self-Supporting Tower Leg Grounding: *Paragraph 3.3, Section 33 79 16 – Tower Grounding*
10	Monopole Tower Grounding: *Paragraph 3.4, Section 33 79 16 – Tower Grounding*
11	Guyed Tower Leg Grounding: *Paragraph 3.5, Section 33 79 16 – Tower Grounding*
12	Guy Anchor and Guy Wire Grounding: *Paragraph 3.6, Section 33 79 16 – Tower Grounding*
13	Ground External Ancillary Device: *Paragraphs 3.1 and 3.2, Section 33 79 20 – Bonding Ancillary Devices to the External Grounding System*
14	Self-Supporting Ice Bridge Grounding: *Paragraph 3.4, Section 33 79 20 – Bonding Ancillary Devices to the External Grounding System*
15	Non-Self-Supporting Ice Bridge Grounding: *Paragraph 3.5, Section 33 79 20 – Bonding Ancillary Devices to the External Grounding System*
16	Non-Self-Supporting Ice Bridge Isolators: *Paragraph 3.5, Section 33 79 20 – Bonding Ancillary Devices to the External Grounding System*
17	Ground Fence Corner Posts, Fabric and Deterrent Wiring: Paragraphs 3.2 and 3.3, *Section 33 79 20 – Bonding Ancillary Devices to the External Grounding System*
18	Ground Gate and Gate Posts: *Paragraph 3.2 and 3.3, Section 33 79 20 – Bonding Ancillary Devices to the External Grounding System*
19	Install New Self-Supporting Ice Bridge: *Section 33 82 33.23 – RF Cable Ice-Bridge*
20	Ground Solar Panels and Support Framework: *Paragraphs 3.2 and 3.6*, *Section 33 79 20 – Bonding Ancillary Devices to the External Grounding System*
21	RF Cable Grounding: *Paragraph 3.12, Section 27 05 10 – Cable and Wire Installation.*
22	RF Cable Surge Protection: *Paragraph 3.13, Section 27 05 10 – Cable and Wire Installation.*
23	Spare/Unused RF Cable Termination: *Paragraph 3.14, Section 27 05 10 – Cable and Wire Installation.*
24	RF Cable Entrance Panel Grounding: *Paragraph 3.15 E, Section 27 05 10 – Cable and Wire Installation.*
25	Ground Radial Conductor: *Section 33 79 83.20 – Supplemental Grounding Electrodes.*
26	DC Power Surge Protection: *Paragraph 3.3G, Section 26 31 00 – Photovoltaic Collector System*
27	Shelter Frame Grounding: *Paragraph 3.3 A Section,* 33 79 15 – Communications Shelter Grounding
28	Shelter Siding Grounding: *Paragraph 3.3 B Section,* 33 79 15 – Communications Shelter Grounding

KEY NOTES: INTERNAL GROUNDING (Remote Facility)

1	Common Building Grounding System: *Paragraph 3.1, Section 33 79 86 – Ground Bus Bars at Remote Facilities*
2	Master Ground Bus Bar (MGB): *Paragraph 3.4, Section 33 79 86 – Ground Bus Bars at Remote Facilities* (4"x12"x¼")
3	Not Applicable
4	Subsystem Ground Bus Bar at RF Entrance (SSGB): *Paragraph 3.5, Section 33 79 86 – Ground Bus Bars at Remote Facilities* (4"x12"x¼")
5	Not Applicable
6	Not Applicable
7	Internal Grounding Conductor: #6 AWG, green-jacketed, stranded, copper, *Paragraph 3.1, Section 33 79 84 – Internal Grounding and Bonding Conductors*
8	Internal Grounding Conductor: #2 AWG, green-jacketed, stranded, copper, *Paragraph 3.1, Section 33 79 84 – Internal Grounding and Bonding Conductors*
9	Internal Grounding Conductor: #1/0 AWG, green-jacketed, stranded, copper, *Paragraph 3.1, Section 33 79 84 – Internal Grounding and Bonding Conductors*
10	Internal Grounding Conductor: # 2/0 AWG, green-jacketed, stranded, copper, *Paragraph 3.1, Section 33 79 84 – Internal Grounding and Bonding Conductors*
11	Internal Grounding Conductor: # 3/0 AWG, green-jacketed, stranded, copper, *Paragraph 3.1, Section 33 79 84 – Internal Grounding and Bonding Conductors*
12	Ground Internal Ancillary Device: *Paragraph 3.1 to 3.2, Section 33 79 84.13 – Bonding Equipment to the Internal Grounding System*
13	Ground Cable Runway: *Paragraph 3.4, Section 33 79 84.13 – Bonding Equipment to the Internal Grounding System*
14	Bond Cable Runway Segments: *Paragraph 3.4, Section 33 79 84.13 – Bonding Equipment to the Internal Grounding System*
15	Bonding Connection: *Paragraph 2.2 and 3.3, Section 33 79 84 – Internal Grounding and Bonding Conductors*
16	Internal Perimeter Ground: *Paragraph 3.2, Section 33 79 84 – Internal Grounding and Bonding Conductors*
17	Rack Ground Bus Bar (RGB): *Section 33 79 84.16 – Rack Ground Bus Bars*
18	Ground Rack-Mounted Equipment: *Paragraph 3.5, Section 27 11 16.20 – Equipment Installation in Racks and Cabinets*
19	Ground Telephone Service Entrance: *Paragraph 3.4, Section 33 79 86.13 – Ground Bus Bars at Occupied Facility*
20	Concrete Encased Electrode (Ufer): *Paragraph 3.2 C, Section 33 79 86.13 – Ground Bus Bars at Occupied Facility*

Symbols

- Existing Below Grade Grounding Conductor
- New Below Grade Grounding Conductor
- Existing Above Grade Grounding Conductor
- New Above Grade Grounding Conductor
- Bus Bar
- Ground Rod (typical 5/8" diameter x 8' long)
- Vertical Structural Steel
- RF Surge Protection Device
- Existing Indoor Grounding Conductor
- New Indoor Grounding/Bonding Conductor
- New Dedicated 20-Ampere Circuit
- Electrical Meter
- Electrical Service-Disconnect
- Electrical Distribution Panel
- Equiipment Rack

KEY NOTES: ELECTRICAL (Remote Facility)

1	New Electrical Service Disconnect Panel as specified in Paragraphs 2.2 and 3.2, Section 26 27 13 – Electricity Metering
2	Electrical Service-Entrance Grounding - Neutral-to-ground bond at service-entrance: *Paragraph 3.3,* Section 26 27 13 – Electricity Metering
3	New Primary Surge Protection Device at service-entrance as specified in Section 26 43 13 – Surge Protection Devices
4	New Electrical Panel Board: Section 26 24 16 – Panel Boards (100-Ampere)
4A	Electrical Panel Board Grounding: Paragraphs 2.5 and 3.3, Section 26 24 16 – Panel Boards
5A	Belowground Electrical Service: Paragraph 3.2, Section 26 21 13 – Low-Voltage Electrical Service-Entrance (100-Ampere minimum) (Trench Paragraph 3.2F)
5B	Aboveground Electrical Service: Paragraph 3.2, Section 26 21 13 – Low-Voltage Electrical Service-Entrance (100-Ampere minimum) (Clearance Paragraph 3.2 E)
6	Dedicated 20-Ampere Circuit for Radio Equipment: *Paragraph 3.3, Section 27 11 16.23 – Equipment Installation in Racks and Cabinets*
7	Interior Lighting: Paragraph 2.1 to 2.7, Section 26 50 00 – Lighting
8	Exterior Lighting: Paragraph 3.3, Section 26 50 00 – Lighting
9	Facility Lightning Protection System: Section 26 41 00 – Facility Lightning Protection

KEY NOTES: RADIO EQUIPMENT (Remote Facility)

1	New Equipment Rack: *Section 27 11 16 – Equipment Rack*
2	Equipment Rack Spacing Requirements: *Paragraph 3.2, Section 27 11 16.13 – Equipment Rack/Cabinet Installation*
3	Equipment Rack Anchoring (Standard): *Paragraphs 3.3 and 3.4, Section 27 11 16.13 – Equipment Rack/Cabinet Installation*
4	Equipment Rack Anchoring (Seismic): *Paragraph 3.1, Section 27 11 16.13 – Equipment Rack/Cabinet Installation*
5	Radio Equipment Installation in Racks and Cabinets: *Paragraph 3.1, Section 27 11 16.23 – Equipment Installation in Racks and Cabinets*
6	Ancillary Equipment Installation in Racks and Cabinets: *Paragraph 3.2, Section 27 11 16.23 – Equipment Installation in Racks and Cabinets*
7	Cable Separation and Grouping: Paragraphs 3.4 *Section 27 05 10 – Cable and Wire Installation.*
8	Cable Installation in Trays and Ladders: Paragraphs 3.5 *Section 27 05 10 – Cable and Wire Installation.*
9	Securing Cables within Trays and Ladders: Paragraphs 3.6 *Section 27 05 10 – Cable and Wire Installation.*
10	Cable Installation in Racks and Cabinets: *Paragraphs 3.7 to 3.11, Section 27 05 10 – Cable and Wire Installation.*
11	Securing Cables to Walls and Pipe-Masts: Paragraph 3.12, *Section 27 05 10 – Cable and Wire Installation.*
12	Antenna Pipe-Masts: Shall be designed and installed in accordance with *ANSI TIA/ EIA-222-G – Steel Antenna Towers and Antenna Supporting Structures*
13	RF Cable Routing and Support Below Ice Bridge: *Paragraph 3.4, Section 33 82 33.23 – RF Cable Ice Bridge*
14	RF Cable Routing and Support on Tower: *Paragraph 3.8, Section 33 81 13 – Communications Transmission Towers*
15	Exhaust Fan: *Paragraph 2.7, Section 13 34 18 – Prefabricated Communications Shelters*
16	New Cable Ladder: *Paragraph 2.10, Section 13 34 18-54 – Prefabricated Communications Shelters*
17	RF Cable Entrance: *Paragraph 3.15, Section 27 05 10 – Cable and Wire Installation.*

Active Key Notes Highlighted

- Infrastructure
- External Grounding Device
- Internal Grounding Device
- Electrical Device
- Radio Equipment or Ancillary

NOTE: Use only those Key Notes specifically referenced on the drawings and/or specifications. Active Key Notes have been highlighted on this Key Note reference sheet.

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STATE

DISTRICT

PROJECT NO:	Call 0052 California Construction Specifications	APPROVED	
DESIGN OFFICE:	Contractor	DATE	
DESIGNED BY:	Technical Evaluation & Development Services, LLC	DESCRIPTION	
DRAWN BY:	Ted Sumners	MARK	
CHK'D BY:			
APPROVED BY:			
DATE:	08/14/2015		

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SHEET 14 OF 16