verizon

PALO ALTO SMALL CELL CLUSTER 6

PROJECT TEAM

APPLICANT:
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EMAIL:Katherine@andersonstreecare.com

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 CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

2019 TITLE 24, CALIFORNIA CODE OF REGULATIONS:
2019 CALIFORNIA BUILDING CODE
2019 CALIFORNIA ELECTRICAL CODE
2019 CALIFORNIA MECHANICAL CODE
2019 GREEN BUILDING CODE
2019 CALIFORNIA ENERGY CODE

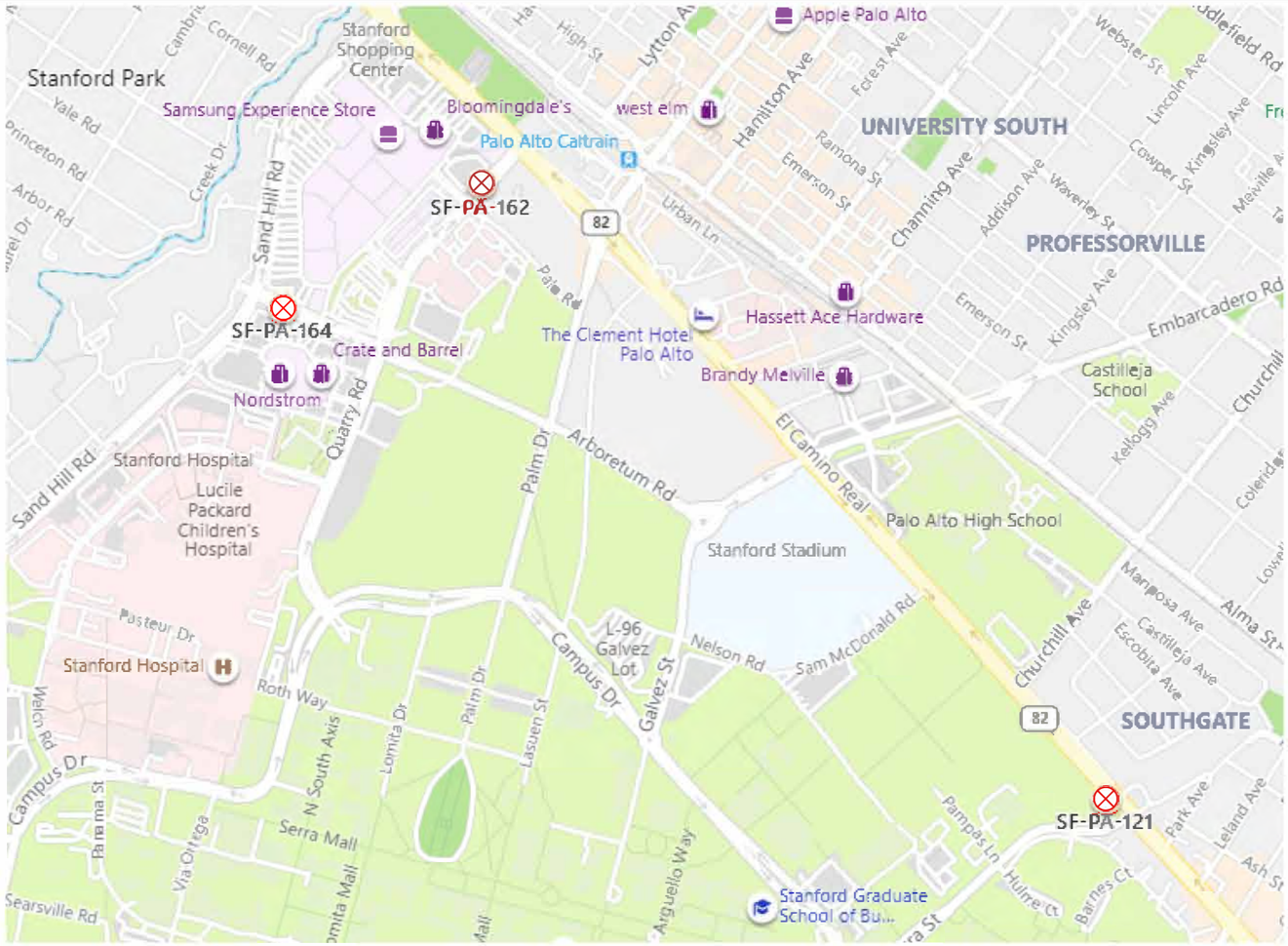
*AS AMENDED BY CITY OF PALO ALTO *(10/24/16)* AND MADE EFFECTIVE JANUARY 1ST, 2017 AS PER CITY OF PALO ALTO MUNICIPAL CODE ORDINANCE NUMBERS 5389, 5390, 5391, 5392, 5393, 5394, 5395, 5396, AND 5397.

GENERAL ORDER 95 (MAY 2018 EDITION)

SIGNATURE BLOCK

TITLE	SIGNATURE	DATE
CONSTRUCTION MANAGER		
RF ENGINEER		
REAL ESTATE		
SITE AQUISITION		
PROPERTY OWNER		
POLE OWNER		

VICINITY MAP



DRAWING INDEX

SHEET NO:	SHEET TITLE
CT-1	CLUSTER TITLE SHEET

NODE:	ADJACENT ADDRESS	TYPE
121	1691 EL CAMINO REAL	METAL STREET LIGHT
162	158 QUARRY ROAD	METAL STREET LIGHT
164	ARBORETUM ROAD	METAL STREET LIGHT

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23675 BIRTCHER DRIVE
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REGISTERED PROFESSIONAL ENGINEER
OSAM ZALZALI
71655
CIVIL
STATE OF CALIFORNIA

CLUSTER TITLE SHEET

CT-1

verizon

SITE ID:	SF PALO ALTO 121
PROJECT NAME:	VZW PALO ALTO SMALL CELL
POLE#:	0157
LOCATION CODE:	425225
ADJACENT APN:	ACROSS FROM 124-25-044
SITE ADDRESS:	1691 EL CAMINO REAL PALO ALTO, 94306
COUNTY:	SANTA CLARA
SITE TYPE:	STREET LIGHT POLE
ROADWAY TYPE:	ARTERIAL & SPECIAL SETBACK FRONTAGES
HISTORIC STATUS OR DISTRICT:	N/A

PROJECT DESCRIPTION

VERIZON WIRELESS PROPOSES TO INSTALL A NEW WIRELESS COMMUNICATION SITE ON A NEW/REPLACEMENT STREET LIGHT POLE. THE SCOPE WILL CONSIST OF THE FOLLOWING:

- ☐ REMOVE (1) EXISTING STREET LIGHT/POLE #167 IN THE CA-82 PUBLIC R.O.W.
- ☐ INSTALL (1) NEW 'EL CAMINO REAL' ROADWAY LIGHT POLE W/ LED LAMP IN
- ☐ PLACE OF REMOVED LIGHT POLE #167, PER LIGHTING STYLE PLACEMENT GUIDE
- ☐ RE-CONNECT CPA STREET LIGHT POWER TO NEW/REPLACEMENT STREET LIGHT
- ☐ INSTALL NEW POLE FOUNDATION

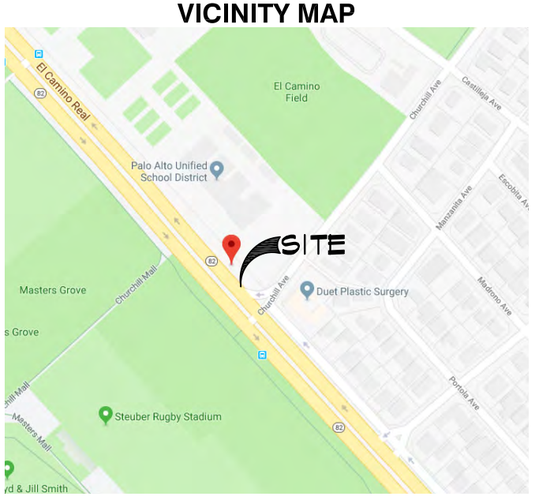
- ☐ INSTALL (3) NEW ERICSSON SM-6701 RADIO/ANTENNAS ATOP NEW POLE
- ☐ INSTALL (1) NEW NEMA 6P AC DISCONNECT WITHIN NEW U.G. POWER HANDHOLE
- ☐ INSTALL (1) NEW 5/8"ø x10'L. GROUND ROD WITHIN NEW U.G. POWER HANDHOLE
- ☐ INSTALL NEW AC POWER CABLES FROM POC, TO DISCONNECT, TO RADIOS
- ☐ INSTALL NEW GROUND CABLES FROM DISCONNECT/RADIOS/POLE TO GROUND ROD
- ☐ INSTALL NEW FIBER CABLES FROM POC, TO DEMARC, TO RADIOS
- ☐ INSTALL NEW RF NOTICE AND EMERGENCY SHUT-DOWN SIGNAGE AS REQUIRED
- ☐ INSTALL NEW U.G. PATH FROM POWER POC TO NEW U.G. POWER HANDHOLE

** METAL SURFACES REQUIRING PAINT SHALL BE PAINTED WITH A KELLY MOORE PAINT COLOR AND CODE YET TO BE DETERMINED, BUT SHALL BE IN ACCORDANCE WITH CITY OF PALO ALTO CODE.

ADMINISTRATIVE REQUIREMENTS

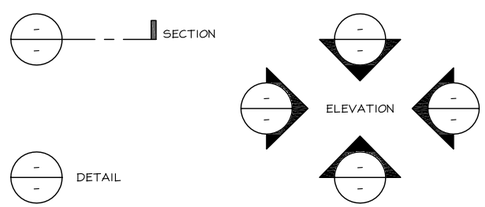
SUBCONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS & FIELD CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

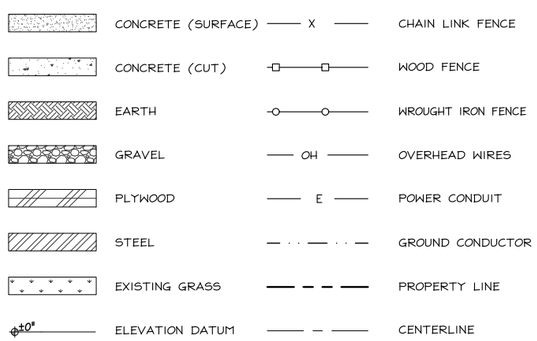
VICINITY MAP



SYMBOLS/ABBREVIATIONS LEGEND

ADD'L	ADDITIONAL	L.	LONG(ITUDINAL)
A.F.G.	ABOVE FINISHED GRADE	MAX.	MAXIMUM
ANT.	ANTENNA	MFR.	MANUFACTURER
ASS'Y.	ASSEMBLY	MIN.	MINIMUM
AWG.	AMERICAN WIRE GAUGE	(N)	NEW
BLDG.	BUILDING	NTS	NOT TO SCALE
BTCW.	BARE TINNED COPPER WIRE	O.C.	ON CENTER
CLR.	CLEAR	P.T.	PRESSURE TREATED
CONC.	CONCRETE	RAD.(R)	RADIUS
CONN.	CONNECTION(OR)	REQ'D	REQUIRED
CONST.	CONSTRUCTION	RGS.	RIGID GALVANIZED STEEL
CONT.	CONTINUOUS	SCH.	SCHEDULE
DBL.	DOUBLE	SIM.	SIMILAR
D.F.	DOUGLAS FIR	SQ.	SQUARE
DIA.	DIAMETER	S.S.	STAINLESS STEEL
DIM.	DIMENSION	STD.	STANDARD
EA.	EACH	TEMP.	TEMPORARY
ELEV	ELEVATION	THK.	THICK(NESS)
EMT.	ELECTRICAL METALLIC TUBING	TYP.	TYPICAL
(E)	EXISTING	U.G.	UNDER GROUND
F.G.	FINISH GRADE	U.L.	UNDERWRITERS LABORATORY
FT.(')	FOOT (FEET)	U.N.O.	UNLESS NOTED OTHERWISE
GA.	GAUGE	V.I.F.	VERIFY IN FIELD
HT.	HEIGHT	W	WIDE (WIDTH)
IN.(")	INCH(ES)	w/	WITH
LB.(#)	POUND(S)	WD.	WOOD
L.F.	LINEAR FEET (FOOT)	W.P.	WEATHERPROOF





PROJECT TEAM

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PHONE: (408) 590-5976
EMAIL:Katherine@andersonstreecare.com

SITE INFORMATION

LATITUDE:
N 37° 25' 49.39"(37.430385)

LONGITUDE:
W 122° 9' 9.06"(-122.152517)

ELEVATION:
+53.24' AMSL

ZONING:
N/A

EXISTING OCCUPANCY:
N/A

OCCUPANCY CLASSIFICATION:
N/A

JURISDICTION:
CITY OF PALO ALTO

ASSESSORS PARCEL NUMBER:
ACROSS FROM 124-25-044

PROPERTY LEGAL DESCRIPTION:
N/A PUBLIC RIGHT OF WAY

ADA COMPLIANCE:
N/A

DIG ALERT

811 USA North
Know what's below. Call before you dig.
California and Nevada
Call Two Working Days Before You Dig!
811 / 800-227-2600

DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY ALL PLANS & (E) DIMENSIONS & CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME IF USING 11"X17" PLOT, DRAWINGS WILL BE HALF SCALE.

DRAWING INDEX

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T-2.1	PHOTOSIMS WITHOUT SHROUD
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T-4	EME REPORT
LS-1	SITE SURVEY
A-1	SITE PLAN
A-1.1	EXISTING UTILITY SITE PLAN
A-1.2	UTILITY PLAN (FOR REFERENCE)
A-1.3	LOCATION MAP
A-1.4	BORING/UNDERGROUND UTILITY PLAN
A-1.5	CITY STANDARDS & DETAILS
A-1.6	CITY STANDARDS & DETAILS
A-1.7	R.O.W SECTION
A-2	ENLARGED SITE PLAN
A-3	ELEVATIONS W/ SHROUD
A-3A	ELEVATIONS WITHOUT SHROUD
A-3.1	ELEVATIONS W/ SHROUD
A-3.1A	ELEVATIONS WITHOUT SHROUD
D-1	DETAILS W/ SHROUD
D-1.1	DETAILS WITHOUT SHROUD
D-3	NOISE STUDY,FOUNDATION DETAILS, POLE DRAWING
D-4	LUMINAIRE DETAILS
E-1	ELECTRICAL/GROUNDING DIAGRAMS, NOTES, & PANEL SCHEDULE
TCP-1	TRAFFIC CONTROL PLAN (BY OTHERS)
C-1	CALCS W/ SHROUD
C-2	CALCS W/ SHROUD
C-3	CALCS W/ SHROUD
C-4	CALCS W/ SHROUD
C-5	CALCS WITHOUT SHROUD
C-6	CALCS WITHOUT SHROUD
C-7	CALCS WITHOUT SHROUD
C-8	CALCS WITHOUT SHROUD
GN-1	GENERAL NOTES
GN-2	GENERAL NOTES
TPR-1	TREE PROTECTION REPORT
L-1	PALO ALTO TREE PROTECTION
L-2	PALO ALTO POLLUTION PREVENTION CHECKLIST
L-3	PALO ALTO EROSION CONTROL AND CONDUIT LOCATION DETAILS & NOTES
L-4	PALO ALTO TRENCHING & SIDEWALK STANDARD DRAWINGS

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#AS AMENDED BY CITY OF PALO ALTO AND MADE EFFECTIVE JANUARY IST, 2020 AS PER CURRENT CITY OF PALO ALTO MUNICIPAL CODE ORDINANCES GENERAL ORDER 95 (v.2018)

verizon
2785 MITCHELL DRIVE, SUITE 9
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ALLSTATES ENGINEERING & SURVEYING
23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
DRAWN BY:	LS
CHECKED BY:	DW

REV	DATE	DESCRIPTION	
1	01/19/2021	100% CD'S FOR SUBMITTAL	MG
0	10/08/2020	100% CD'S FOR REVIEW	MG
B	06/04/2020	95% CD'S FOR REDLINE	RF
A	04/10/2020	90% CD'S FOR REDLINE	NC

REGISTERED PROFESSIONAL ENGINEER
HASSAM ZALZALI
71655
CIVIL
STATE OF CALIFORNIA

SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

verizon

12/24/20

SF Palo Alto 121

Adjacent to 1664 El Camino Real
Palo Alto, CA

Looking Northwest from El Camino Real

View #1

Applied Imagination 510 914-0500

verizon

12/24/20

SF Palo Alto 121

Adjacent to 1664 El Camino Real
Palo Alto, CA

Looking South from El Camino Real

View #2

Applied Imagination 510 914-0500

verizon
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REGISTERED PROFESSIONAL ENGINEER
ISSAM ZALZALI
71655
CIVIL
STATE OF CALIFORNIA

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SHEET TITLE
PHOTOSIMS W/ SHROUD

SHEET NUMBER
T-2

verizon

12/24/20

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SF PALO ALTO 121
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PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE
PHOTOSIMS
WITHOUT SHROUD

SHEET NUMBER
T-2.1

Statement of Hammett & Edison, Inc., Consulting Engineers

The firm of Hammett & Edison, Inc., Consulting Engineers, has been retained on behalf of Verizon Wireless, a personal wireless telecommunications carrier, to evaluate its small cell (No. 425225 "SF Palo Alto 121") proposed to be sited in Palo Alto, California, for compliance with appropriate guidelines limiting human exposure to radio frequency ("RF") electromagnetic fields.

Executive Summary

Verizon proposes to install three small antennas on the municipal light pole sited in the public right-of-way near 1600 El Camino Real in Palo Alto. The proposed operation will comply with the FCC guidelines limiting public exposure to RF energy.

Prevailing Exposure Standards

The U.S. Congress requires that the Federal Communications Commission ("FCC") evaluate its actions for possible significant impact on the environment. A summary of the FCC's exposure limits is shown in Figure 1. These limits apply for continuous exposures and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health. The most restrictive limit for exposures of unlimited duration at several wireless service bands are as follows:

Wireless Service Band	Transmit Frequency	"Uncontrolled" Public Limit	Occupational Limit (5 times Public)
Microwave (point-to-point)	1–80 GHz	1.0 mW/cm^2	5.0 mW/cm^2
Millimeter-wave	24–47	1.0	5.0
Part 15 (WiFi & other unlicensed)	2–6	1.0	5.0
CBRS (Citizens Broadband Radio)	3,550 MHz	1.0	5.0
BRS (Broadband Radio)	2,490	1.0	5.0
WCS (Wireless Communication)	2,305	1.0	5.0
AWS (Advanced Wireless)	2,110	1.0	5.0
PCS (Personal Communication)	1,930	1.0	5.0
Cellular	869	0.58	2.9
SMR (Specialized Mobile Radio)	854	0.57	2.85
700 MHz	716	0.48	2.4
600 MHz	617	0.41	2.05
[most restrictive frequency range]	30–300	0.20	1.0

General Facility Requirements

Small cells typically consist of two distinct parts: the electronic transceivers (also called "radios" or "channels") that are connected to the traditional wired telephone lines, and the passive antennas that send the wireless signals created by the radios out to be received by individual subscriber units. The radios are typically mounted on the support pole or placed in a cabinet at ground level, and they are

connected to the antennas by coaxial cables. Because of the short wavelength of the frequencies assigned by the FCC for wireless services, the antennas require line-of-sight paths for their signals to propagate well and so are installed at some height above ground. The antennas are designed to concentrate their energy toward the horizon, with very little energy wasted toward the sky or the ground. This means that it is generally not possible for exposure conditions to approach the maximum permissible exposure limits without being physically very near the antennas.

Computer Modeling Method

The FCC provides direction for determining compliance in its Office of Engineering and Technology Bulletin No. 65, "Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radio Frequency Radiation," dated August 1997. Figure 2 describes the calculation methodologies, reflecting the facts that a directional antenna's radiation pattern is not fully formed at locations very close by (the "near-field" effect) and that at greater distances the power level from an energy source decreases with the square of the distance from it (the "inverse square law"). This methodology is an industry standard for evaluating RF exposure conditions and has been demonstrated through numerous field tests to be a conservative prediction of exposure levels.

Site and Facility Description

Based upon information provided by Verizon, it is proposed to install three 2-foot-tall Ericsson Model 6701 directional panels with integrated radios on a new light pole to replace the existing pole sited in the public right-of-way on the southwest side of El Camino Real in Palo Alto, about 200 feet northwest of its intersection with Serra Street. The antennas would be mounted around the pole at an effective height of about 32½ feet above ground and would be oriented toward 0°T, 120°T, and 240°T, together forming an omnidirectional pattern. The maximum effective radiated power proposed in any direction is 193 watts for 28 GHz service. There are reported no other wireless telecommunications base stations at the site or nearby.

Study Results

For a person anywhere at ground, the maximum RF exposure level due to the proposed Verizon operation is calculated to be 0.0037 mW/cm^2, which is 0.37% of the applicable public exposure limit. The maximum calculated level at any nearby building[*] is 0.28% of the public exposure limit. It should be noted that these results include several "worst-case" assumptions and therefore are expected to overstate actual power density levels from the proposed operation.

[*] Located at least 150 feet away, based on the drawings

Recommended Mitigation Measures

Due to their mounting location and height, the antennas would not be accessible to unauthorized persons, and so no measures are necessary to comply with the FCC public exposure guidelines. To prevent occupational exposures in excess of the FCC guidelines, it is recommended that appropriate RF safety training be provided to all workers who have access within 8 feet outward from the antennas. No access within 2 feet directly in front of the antennas should be allowed while they are in operation, unless other measures can be demonstrated to ensure that occupational protection requirements are met. It is recommended that explanatory signs[†] be posted at the antennas and/or on the pole below the antennas, readily visible from any angle of approach.

Conclusion

Based on the information and analysis above, it is the undersigned's professional opinion that operation of the small cell proposed by Verizon Wireless near 1600 El Camino Real in Palo Alto, will comply with the prevailing standards for limiting public exposure to radio frequency energy and, therefore, will not for this reason cause a significant impact on the environment. The highest calculated level in publicly accessible areas is much less than the prevailing standards allow for exposures of unlimited duration. This finding is consistent with measurements of actual exposure conditions taken at other operating small cells. Training authorized personnel and posting explanatory signs are recommended to establish compliance with FCC guidelines.

Authorship

The undersigned author of this statement is a qualified Professional Engineer, holding California Registration No. E-21306, which expires on September 30, 2021. This work has been carried out under his direction, and all statements are true and correct of his own knowledge except, where noted, when data has been supplied by others, which data he believes to be correct.

REGISTERED PROFESSIONAL ENGINEER · NEIL J. OLIJ · No. E-21306 · Exp. 9-30-2021 · ELECTRICAL · STATE OF CALIFORNIA

Neil J. Olij, P.E.
707/996-5200

February 1, 2021

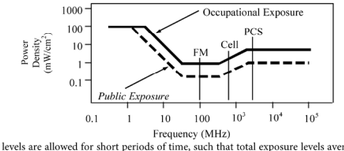
[†] Signs should comply with OET-65 color, symbol, and content recommendations. Contact information should be provided (e.g., a telephone number) to arrange for access to restricted areas. The selection of language(s) is not an engineering matter, and guidelines from the landlord, local zoning or health authority, or appropriate professionals may be required.

FCC Radio Frequency Protection Guide

The U.S. Congress required (1996 Telecom Act) the Federal Communications Commission ("FCC") to adopt a nationwide human exposure standard to ensure that its licensees do not, cumulatively, have a significant impact on the environment. The FCC adopted the limits from Report No. 86, "Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," published in 1986 by the Congressionally chartered National Council on Radiation Protection and Measurements ("NCRP"). Separate limits apply for occupational and public exposure conditions, with the latter limits generally five times more restrictive. The more recent standard, developed by the Institute of Electrical and Electronics Engineers and approved as American National Standard ANSI/IEEE C95.1-2006, "Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," includes similar limits. These limits apply for continuous exposures from all sources and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health.

As shown in the table and chart below, separate limits apply for occupational and public exposure conditions, with the latter limits (in *italics* and/or dashed) up to five times more restrictive:

Frequency Applicable Range (MHz)	Electromagnetic Fields (f is frequency of emission in MHz) Electric Field Strength (V/m)		Magnetic Field Strength (A/m)		Equivalent Far-Field Power Density (mW/cm^2)	
0.3 – 1.34	614	*614*	1.63	*1.63*	100	*100*
1.34 – 3.0	614	*823.8/f*	1.63	*2.19/f*	100	*180/f^2*
3.0 – 30	1842/f	*823.8/f*	4.89/f	*2.19/f*	900/f^2	*180/f^2*
30 – 300	61.4	*27.5*	0.163	*0.0729*	1.0	*0.2*
300 – 1,500	3.54$\sqrt{f}$	*1.59$\sqrt{f}$*	$\sqrt{f}$/106	$\sqrt{f}$/*238*	f/300	*f/1500*
1,500 – 100,000	137	*61.4*	0.364	*0.163*	5.0	*1.0*



Higher levels are allowed for short periods of time, such that total exposure levels averaged over six or thirty minutes, for occupational or public settings, respectively, do not exceed the limits, and higher levels also are allowed for exposures to small areas, such that the spatially averaged levels do not exceed the limits. However, neither of these allowances is incorporated in the conservative calculation formulas in the FCC Office of Engineering and Technology Bulletin No. 65 (August 1997) for projecting field levels. Hammett & Edison has incorporated those formulas in a computer program capable of calculating, at thousands of locations on an arbitrary grid, the total expected power density from any number of individual radio frequency sources. The program allows for the inclusion of uneven terrain in the vicinity, as well as any number of nearby buildings of varying heights, to obtain more accurate projections.

RFR.CALC™ Calculation Methodology

Assessment by Calculation of Compliance with FCC Exposure Guidelines

The U.S. Congress required (1996 Telecom Act) the Federal Communications Commission ("FCC") to adopt a nationwide human exposure standard to ensure that its licensees do not, cumulatively, have a significant impact on the environment. The maximum permissible exposure limits adopted by the FCC (see Figure 1) apply for continuous exposures from all sources and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health. Higher levels are allowed for short periods of time, such that total exposure levels averaged over six or thirty minutes, for occupational or public settings, respectively, do not exceed the limits.

Near Field.
Prediction methods have been developed for the near field zone of panel (directional) and whip (omnidirectional) antennas, typical at wireless telecommunications base stations, as well as dish (aperture) antennas, typically used for microwave links. The antenna patterns are not fully formed in the near field at these antennas, and the FCC Office of Engineering and Technology Bulletin No. 65 (August 1997) gives suitable formulas for calculating power density within such zones.

For a panel or whip antenna, power density $S = \frac{180}{\theta_{BW}} \times \frac{0.1 \times P_{net}}{\pi \times D \times h}$, in mW/cm^2,

and for an aperture antenna, maximum power density $S_{max} = \frac{0.1 \times 16 \times \eta \times P_{net}}{\pi \times h^2}$, in mW/cm^2,

where θ_{BW} = half-power beamwidth of antenna, in degrees,
P_{net} = net power input to antenna, in watts,
D = distance from antenna, in meters,
h = aperture height of antenna, in meters, and
η = aperture efficiency (unitless, typically 0.5-0.8).

The factor of 0.1 in the numerators converts to the desired units of power density.

Far Field.
OET-65 gives this formula for calculating power density in the far field of an individual RF source:

power density $S = \frac{2.56 \times 1.64 \times 100 \times RFF^2 \times ERP}{4 \times \pi \times D^2}$, in mW/cm^2,

where ERP = total ERP (all polarizations), in kilowatts,
RFF = three-dimensional relative field factor toward point of calculation, and
D = distance from antenna effective height to point of calculation, in meters.

The factor of 2.56 accounts for the increase in power density due to ground reflection, assuming a reflection coefficient of 1.6 (1.6 x 1.6 = 2.56). The factor of 1.64 is the gain of a half-wave dipole relative to an isotropic radiator. The factor of 100 in the numerator converts to the desired units of power density. This formula is used in a computer program capable of calculating, at thousands of locations on an arbitrary grid, the total expected power density from any number of individual radio frequency sources. The program also allows for the inclusion of uneven terrain in the vicinity, as well as any number of nearby buildings of varying heights, to obtain more accurate projections.

verizon
2785 MITCHELL DRIVE, SUITE 9
WALNUT CREEK, CA 94598

Vinculums
575 LENNON LANE #125
WALNUT CREEK, CA 94598
OFFICE: (925) 482-8500

ALLSTATES ENGINEERING & SURVEYING
23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
DRAWN BY:	LS
CHECKED BY:	DW

REV	DATE	DESCRIPTION	
1	01/19/2021	100% CD'S FOR SUBMITTAL	MG
0	10/08/2020	100% CD'S FOR REVIEW	MG
B	06/04/2020	95% CD'S FOR REDLINE	RF
A	04/10/2020	90% CD'S FOR REDLINE	NC

REGISTERED PROFESSIONAL ENGINEER · WISSAM ZALZALI · 71655 · CIVIL · STATE OF CALIFORNIA

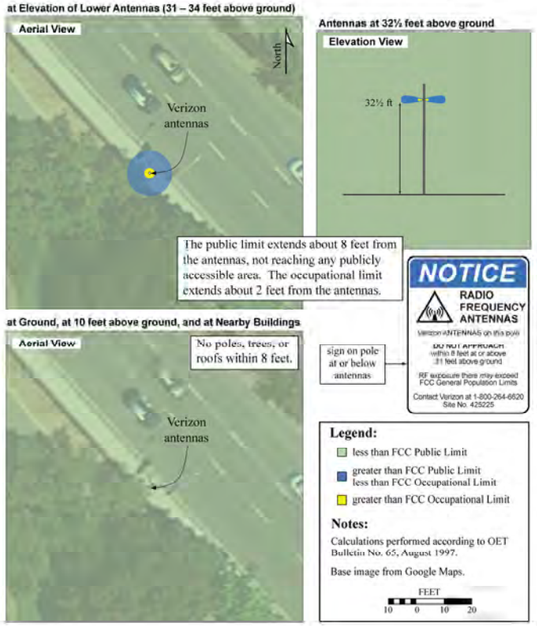
SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE
EME REPORT

SHEET NUMBER
T-3

Verizon Wireless • Proposed Small Cell (No. 425225 "SF Palo Alto 121")
1600 El Camino Real • Palo Alto, California

Calculated RF Exposure Levels



HAMMETT & EDISON, INC.
CONSULTING ENGINEERS
SAN FRANCISCO

(February 1, 2021) V1-YBSU.1
Supplemental Figure

verizon
2785 MITCHELL DRIVE, SUITE 9
WALNUT CREEK, CA 94598

Vinculums
575 LENNON LANE #125
WALNUT CREEK, CA 94598
OFFICE: (925) 482-8500

ALLSTATES ENGINEERING & SURVEYING
23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
DRAWN BY:	LS
CHECKED BY:	DW

REV	DATE	DESCRIPTION	
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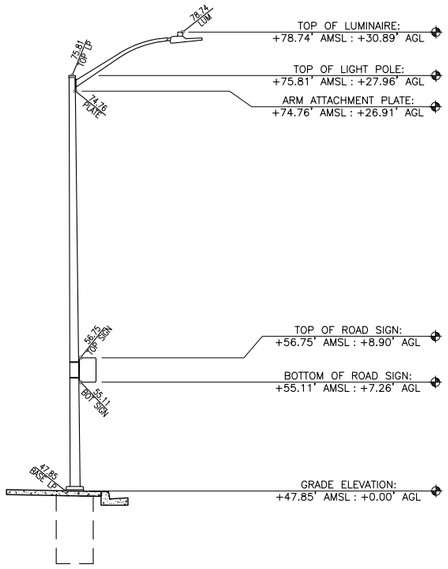
0	10/08/2020	100% CD'S FOR REVIEW	MG
B	06/04/2020	95% CD'S FOR REDLINE	RF
A	04/10/2020	90% CD'S FOR REDLINE	NC

REGISTERED PROFESSIONAL ENGINEER
NISSAM ZAZZALI
71655
CIVIL
STATE OF CALIFORNIA

SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE
EME REPORT

SHEET NUMBER
T-4



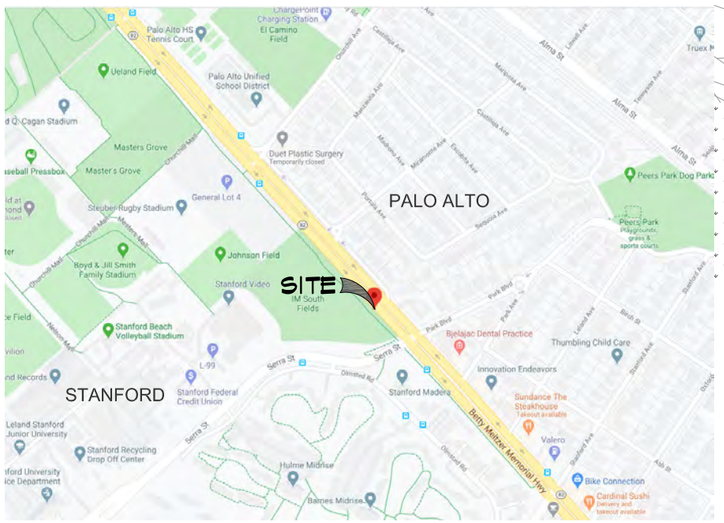
2 LIGHT POLE ELEVATION

1 inch = 5ft.

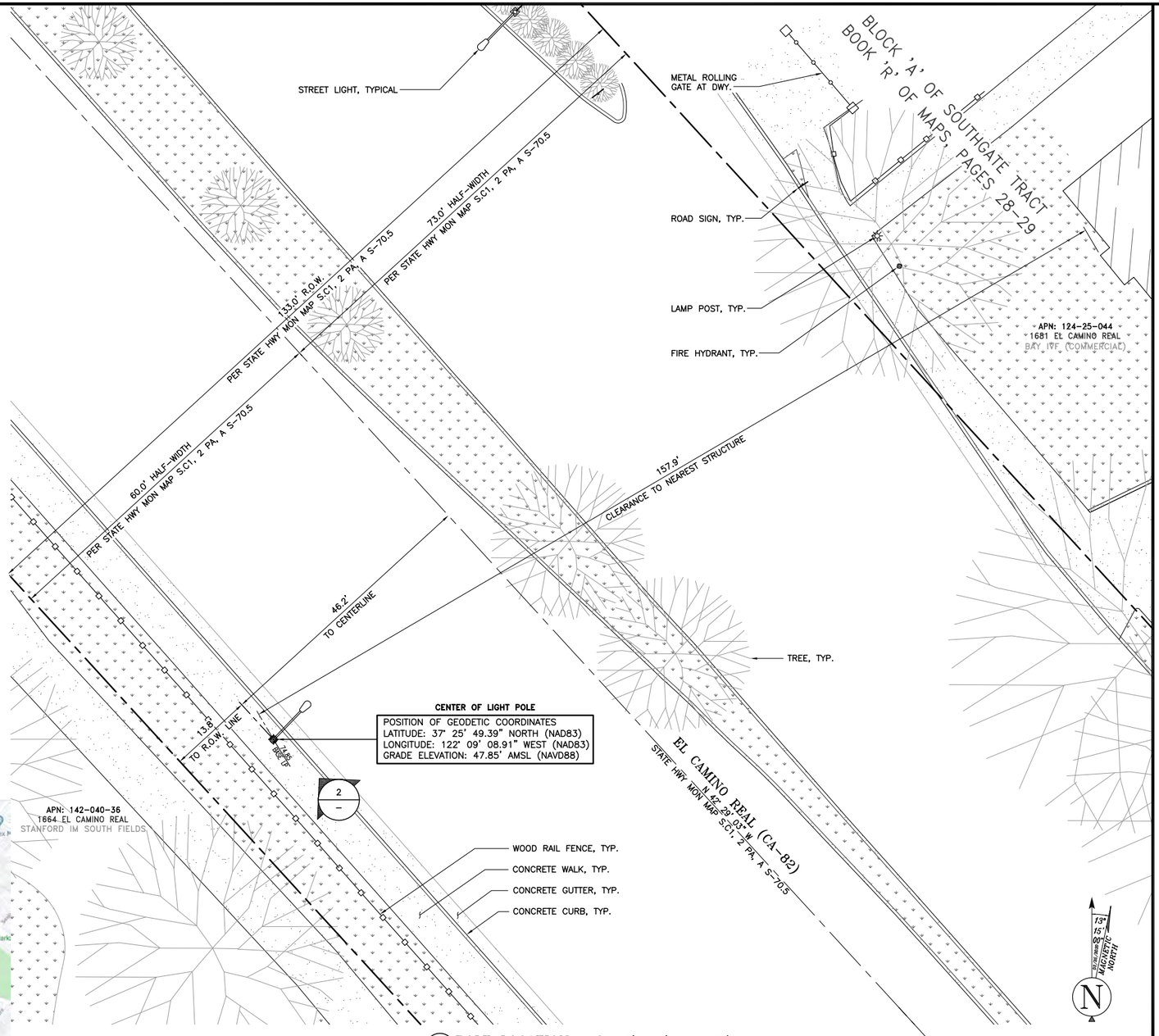
0 2.5' 5' 10'

LEGEND

●	TREE	▭	U.G. UTILITY VAULT
-o-	UTILITY POLE	◎	FOUND MONUMENT
XXXX.X NG	SPOT ELEVATION	◆	GEODETIC MARKER
Ⓦ	WATER VALVE	▬▬	MASONRY WALL
BOL	BOLLARD	FL	FLOW LINE
TOP _	TOP OF ITEM	FC	FACE OF CURB
BOT _	BOTTOM OF ITEM	R.O.W.	RIGHT OF WAY
BLDG	TOP OF BUILDING	AP	ASPHALT
LP	LIGHT POLE	SW	SIDEWALK
———	LIMITS OF PROPERTY	—O/H—	OVERHEAD LINE
— x —	CHAIN LINK FENCE	———o———	METAL FENCE
———□———	WOOD FENCE	——·—·——	GRADE BREAK



VICINITY MAP



1 POLE LOCATION

1 inch = 10ft.

0 5' 10' 20'

TITLE REPORT

NOT APPLICABLE (RIGHT-OF-WAY)

LEGAL DESCRIPTION

NOT APPLICABLE (RIGHT-OF-WAY)

ASSESSOR'S PARCEL NO.

NOT APPLICABLE (RIGHT-OF-WAY)

UTILITY NOTE:

SURVEYOR DOES NOT GUARANTEE THAT ALL UTILITIES ARE SHOWN OR THEIR LOCATIONS ARE DEFINITE. IT IS THE RESPONSIBILITY OF THE CONTRACTOR AND DEVELOPER TO CONTACT BLUE STAKE AND ANY OTHER INVOLVED AGENCIES TO LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION. REMOVAL, RELOCATION AND/ OR REPLACEMENT IS THE RESPONSIBILITY OF THE CONTRACTOR.

NOTES:

1. THIS IS NOT A BOUNDARY SURVEY. THIS IS A SPECIALIZED RIGHT OF WAY MAP. THE PROPERTY LINES AND EASEMENTS SHOWN HEREON ARE FROM RECORD INFORMATION AS NOTED HEREON. ALL STATES ENGINEERING & SURVEYING/ZALZALI & ASSOCIATES, INC. TRANSLATED THE TOPOGRAPHIC SURVEY TO RECORD INFORMATION USING MONUMENT(S)/LANDMARK(S) SHOWN HEREON. NO TITLE RESEARCH WAS PERFORMED BY ALL STATES ENGINEERING & SURVEYING/ZALZALI & ASSOCIATES, INC.

2. ANY CHANGES MADE TO THE INFORMATION ON THIS PLAN, WITHOUT THE WRITTEN CONSENT OF ALL STATES ENGINEERING & SURVEYING / ZALZALI & ASSOCIATES, INC. RELIEVES ALL STATES ENGINEERING & SURVEYING/ ZALZALI & ASSOCIATES, INC. OF ANY AND ALL LIABILITY.

3. THESE DRAWINGS & SPECIFICATIONS ARE THE PROPERTY & COPYRIGHT OF ALL STATES ENGINEERING & SURVEYING / ZALZALI & ASSOCIATES, INC. & SHALL NOT BE USED ON ANY OTHER WORK EXCEPT BY AGREEMENT WITH THE SURVEYOR. WRITTEN DIMENSIONS SHALL TAKE PREFERENCE OVER SCALED & SHALL BE VERIFIED ON THE JOB SITE. ANY DISCREPANCY SHALL BE BROUGHT TO THE NOTICE OF THE SURVEYOR PRIOR TO COMMENCEMENT OF ANY WORK.

4. THIS SITE IS PROPOSED TO BE DEVELOPED ON A STREET LIGHT POLE LOCATED OUTSIDE OF THE PUBLIC RIGHT OF WAY.

SURVEY DATE

03/25/2020

BASIS OF BEARING

BEARINGS SHOWN HEREON ARE BASED UPON U.S. STATE PLANE NAD83 COORDINATE SYSTEM CALIFORNIA STATE PLANE COORDINATE ZONE THREE, DETERMINED BY GPS OBSERVATIONS.

BENCHMARK

RTCM-REF 3270
NORTHING: 1970498.865
EASTING: 6082238.002
+248.11' (A.M.S.L.)

REFERENCE MAPS

- 633-M-50/51
- STATE HIGHWAY MONUNMENTS MAP S.C1, 2 PA, A S-70.5

verizon

2785 MITCHELL DRIVE, SUITE 9
WALNUT CREEK, CA 94598

Vinculums

575 LENNON LANE #125
WALNUT CREEK, CA 94598
OFFICE: (925) 482-8500

ALLSTATES ENGINEERING & SURVEYING

23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-102830
DRAWN BY:	NC
CHECKED BY:	BC/DW

REV	DATE	DESCRIPTION	
0	05/18/2020	FINAL SURVEY	NC
A	05/15/2020	PRELIMINARY DRAWING	NC

PROFESSIONAL LAND SURVEYOR
BRUCE T. CRAMTON
No. 8039
STATE OF CALIFORNIA

SF PALO ALTO 121

PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL
PALO ALTO, 94306
LOCATION CODE: 425267

SHEET TITLE

SITE SURVEY

SHEET NUMBER

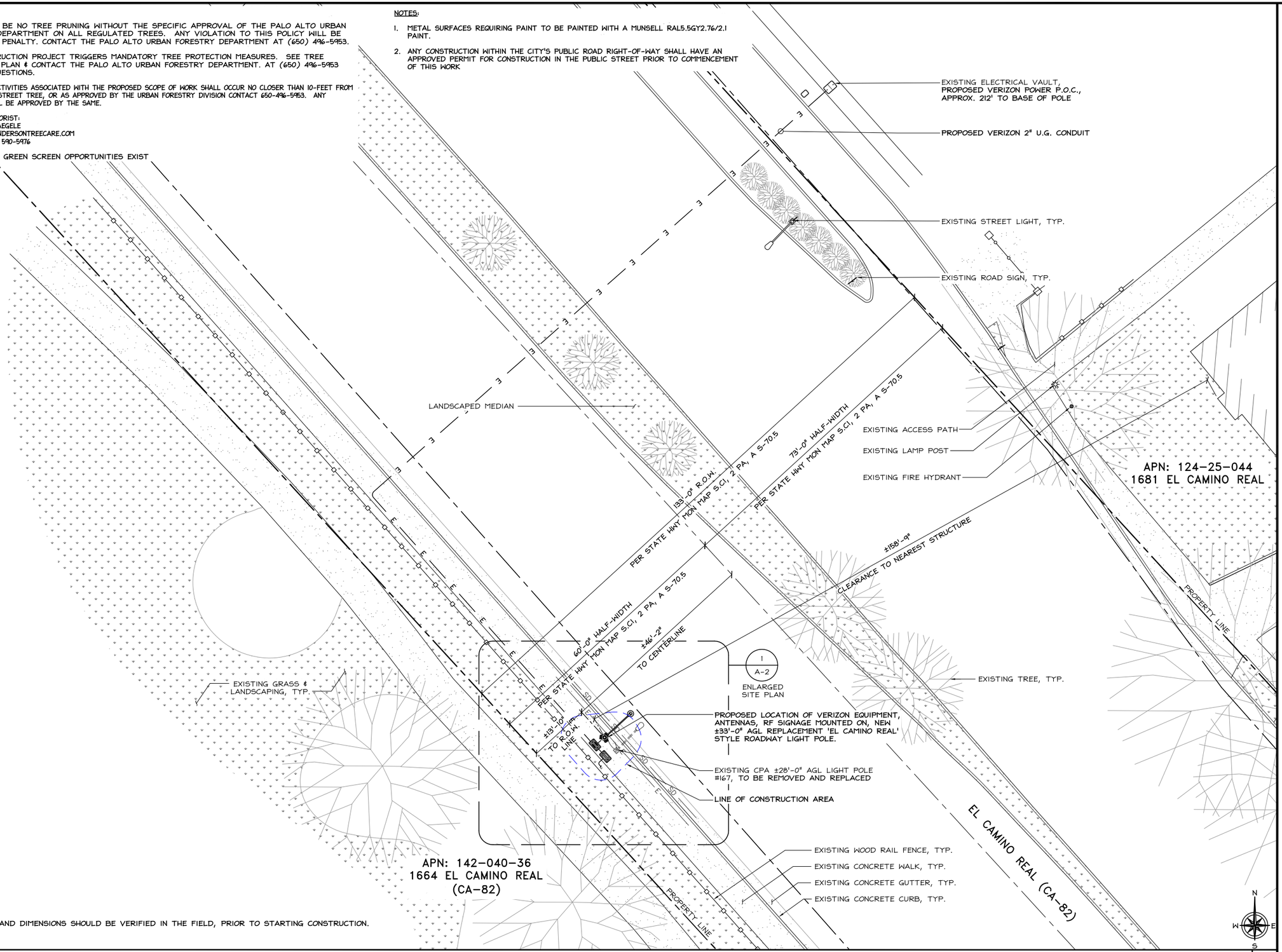
C-1

TREE NOTES:

1. THERE WILL BE NO TREE PRUNING WITHOUT THE SPECIFIC APPROVAL OF THE PALO ALTO URBAN FORESTRY DEPARTMENT ON ALL REGULATED TREES. ANY VIOLATION TO THIS POLICY WILL BE SUBJECT TO PENALTY. CONTACT THE PALO ALTO URBAN FORESTRY DEPARTMENT AT (650) 496-5953.
2. THIS CONSTRUCTION PROJECT TRIGGERS MANDATORY TREE PROTECTION MEASURES. SEE TREE PROTECTION PLAN & CONTACT THE PALO ALTO URBAN FORESTRY DEPARTMENT. AT (650) 496-5953 WITH ANY QUESTIONS.
3. EXCAVATION ACTIVITIES ASSOCIATED WITH THE PROPOSED SCOPE OF WORK SHALL OCCUR NO CLOSER THAN 10-FEET FROM THE EXISTING STREET TREE, OR AS APPROVED BY THE URBAN FORESTRY DIVISION CONTACT 650-496-5953. ANY CHANGES SHALL BE APPROVED BY THE SAME.
4. PROJECT ARBORIST:
   KATHERINE NAEGELE
   KATHERINE@ANDERSONTREECARE.COM1
   PHONE: (408) 590-5976
5. NO FEASIBLE GREEN SCREEN OPPORTUNITIES EXIST

NOTES:

1. METAL SURFACES REQUIRING PAINT TO BE PAINTED WITH A MUNSELL RAL5.5GY2.76/2.1 PAINT.
2. ANY CONSTRUCTION WITHIN THE CITY'S PUBLIC ROAD RIGHT-OF-WAY SHALL HAVE AN APPROVED PERMIT FOR CONSTRUCTION IN THE PUBLIC STREET PRIOR TO COMMENCEMENT OF THIS WORK



NOTE:

ALL ITEMS AND DIMENSIONS SHOULD BE VERIFIED IN THE FIELD, PRIOR TO STARTING CONSTRUCTION.

SITE PLAN

24"x36" SCALE: 3/32" = 1'-0"
11"x17" SCALE: 3/64" = 1'-0"
8' 4' 0" 8'

1

verizon
2785 MITCHELL DRIVE, SUITE 9
WALNUT CREEK, CA 94598

Vinculums
575 LENNON LANE #125
WALNUT CREEK, CA 94598
OFFICE: (925) 482-8500

ALLSTATES ENGINEERING & SURVEYING
23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
DRAWN BY:	LS
CHECKED BY:	DW

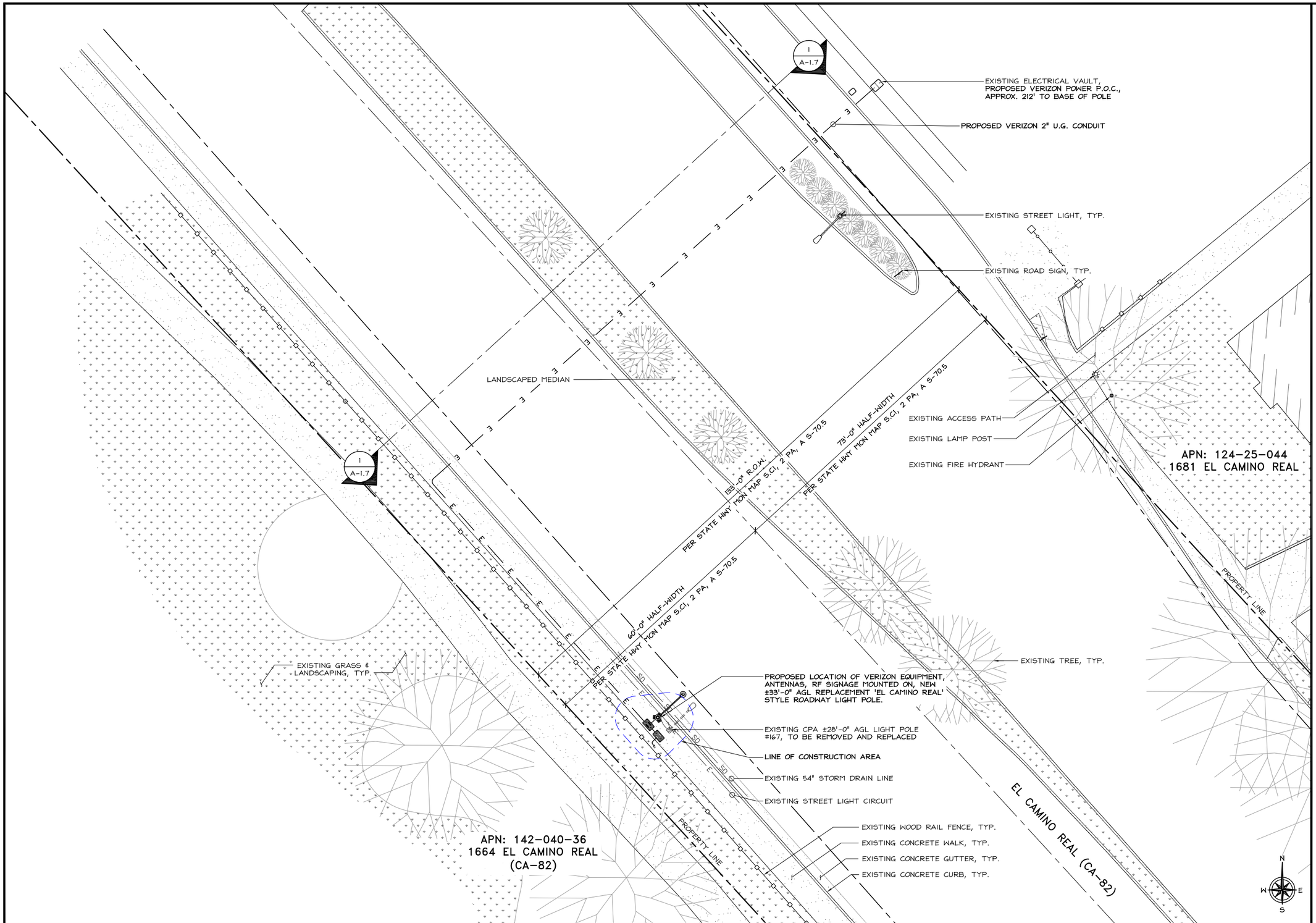
REV	DATE	DESCRIPTION	
1	01/19/2021	100% CD'S FOR SUBMITTAL	MG
0	10/08/2020	100% CD'S FOR REVIEW	MG
B	06/04/2020	95% CD'S FOR REDLINE	RF
A	04/10/2020	90% CD'S FOR REDLINE	NC

REGISTERED PROFESSIONAL ENGINEER
WISSAM ZALZALI
71655
CIVIL
STATE OF CALIFORNIA

SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE
SITE PLAN

SHEET NUMBER
A-1



EXISTING UTILITY SITE PLAN

24"x36" SCALE: 3/32" = 1'-0"
11"x17" SCALE: 3/64" = 1'-0"
8' 4' 0" 8'

1

verizon

2785 MITCHELL DRIVE, SUITE 9
WALNUT CREEK, CA 94598

Vinculums

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ALLSTATES ENGINEERING & SURVEYING

23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
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CHECKED BY:	DW

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REGISTERED PROFESSIONAL ENGINEER
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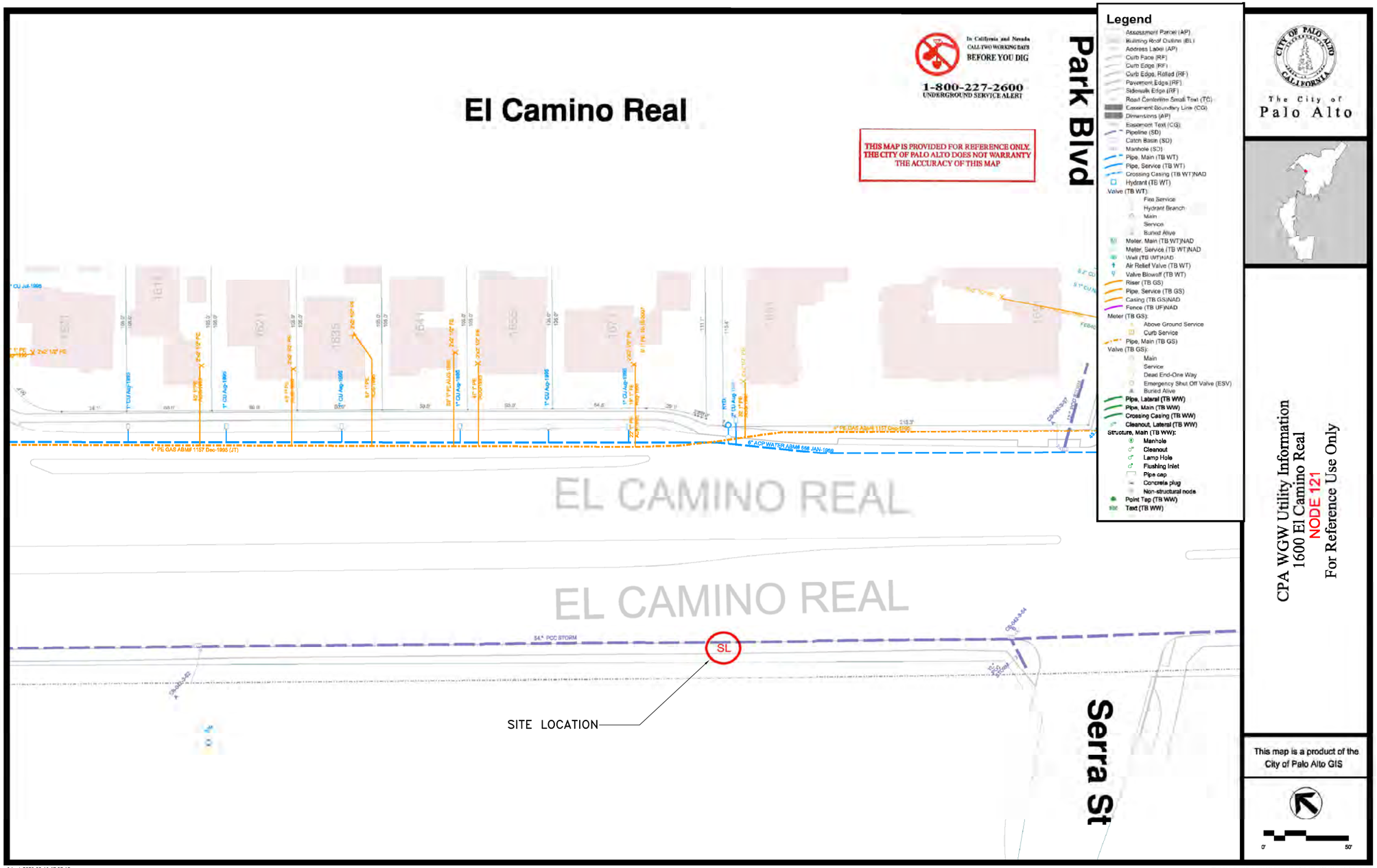
STATE OF CALIFORNIA

SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE
EXISTING UTILITY SITE PLAN

SHEET NUMBER
A-1.1



verizon
2785 MITCHELL DRIVE, SUITE 9
WALNUT CREEK, CA 94598

Vinculums
575 LENNON LANE #125
WALNUT CREEK, CA 94598
OFFICE: (925) 482-8500

ALLSTATES ENGINEERING & SURVEYING
23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
DRAWN BY:	LS
CHECKED BY:	DW

REV	DATE	DESCRIPTION	
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0	10/08/2020	100% CD'S FOR REVIEW	MG
B	06/04/2020	95% CD'S FOR REDLINE	RF
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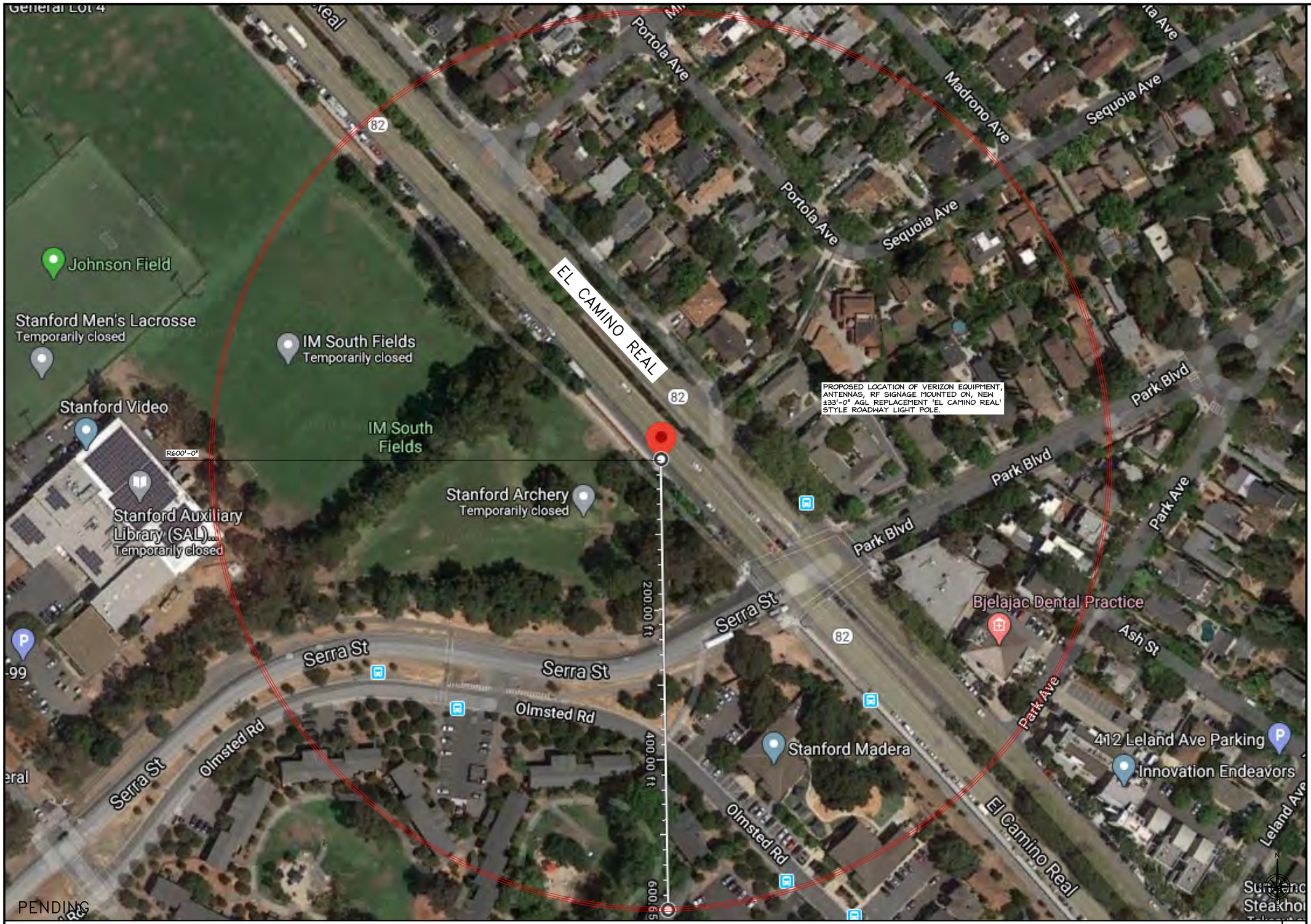
REGISTERED PROFESSIONAL ENGINEER
WISSAM ZALZALI
71655
CIVIL
STATE OF CALIFORNIA

SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE
UTILITY PLAN
(FOR REFERENCE)

SHEET NUMBER
A-1.2



EXISTING UTILITY SITE PLAN

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

1

verizon
2785 MITCHELL DRIVE, SUITE 9
WALNUT CREEK, CA 94598

Vinculums
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WALNUT CREEK, CA 94598
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REGISTERED PROFESSIONAL ENGINEER
ISSAM ZALZALI
71655
CIVIL
STATE OF CALIFORNIA

SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE
LOCATION MAP

SHEET NUMBER
A-1.3

- ALL WORK SHALL COMPLY WITH THE CITY OF PALO ALTO 2018 STANDARD DRAWINGS AND SPECIFICATIONS BORING, TRENCHING, POTHOLING AND DEWATERING, SECTION 17
- THE LOCATION OF EXISTING UTILITY MAINS AND LATERAL LINES INCLUDING STORM DRAIN, SANITARY SEWER, WATER, GAS, UNDERGROUND ELECTRICAL AND COMMUNICATION CONDUITS CROSSING THE TRENCH EXCAVATION SHALL BE VERIFIED BY THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING UNDERGROUND SERVICES ALERT (USA) AT 811 OR 800-642-2444 AT LEAST FIVE (5) WORKING DAYS PRIOR TO BEGINNING UNDERGROUND WORK SO THAT EXISTING UTILITIES CAN BE MARKED IN THE FIELD, UNLESS OTHERWISE STATED BY CITY CONTRACT.
- EXCAVATION SHALL BE SUPPORTED AND EXCAVATION OPERATIONS CONDUCTED IN ACCORDANCE WITH THE RULES OF THE CALIFORNIA OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA). IF IN THE OPINION OF THE ENGINEER, THERE EXISTS A SITUATION OF IMMINENT DANGER TO THE WORKERS, THE ENGINEER MAY ORDER THE WORK STOPPED AND THE CONTRACTOR SHALL COMPLY WITH RULES OF THE CALIFORNIA OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA).
- BACKFILL SHALL BE SAND OR GRANULAR MATERIAL FALLING WITHIN THE LIMITS DESCRIBED IN THE STANDARD DRAWING 401. AGGREGATE BASE, ASPHALT CONCRETE, PORTLAND CEMENT CONCRETE SHALL CONFORM TO THE REQUIREMENTS WITHIN THESE SPECIFICATIONS.
- THE CONTRACTOR SHALL INSTALL THE CONDUIT IN ACCORDANCE WITH THE APPROVED STREET WORK PERMIT. ALL CONDUITS SHALL BE INSTALLED UNDERGROUND USING DIRECTIONAL BORING METHOD. MICRO-TUNNELING OR OTHER METHODS SHALL BE APPROVED BY THE PUBLIC WORKS ENGINEERING DIVISION. THE CONDUITS SHALL BE INSTALLED WITH TRACER WIRE APPROVED BY THE ENGINEER PER CITY OF PALO ALTO UTILITIES DEPARTMENT WATER, GAS AND WASTEWATER UTILITY STANDARDS. REFER TO STANDARD DRAWING 402.
- TRENCHES SHALL NOT BE LEFT OPEN AT THE END OF THE DAY. ADEQUATE PROVISIONS SHALL BE MADE FOR THE PLACING OF TEMPORARY STEEL PLATES IN ADDITION TO BARRICADES, SIGNING AND LIGHTING. STOCKPILING OF EXCAVATED MATERIAL WITHIN THE PUBLIC RIGHT-OF-WAY SHALL NOT BE ALLOWED. A MAXIMUM OF THREE-HUNDRED (300) FEET OR ONE (1) CITY BLOCK OF TRENCH, WHICHEVER IS GREATER, MAY BE OPENED AT ONE TIME. FOR TEMPORARY PATCHING, A MINIMUM THICKNESS OF TWO (2) INCHES OF CUTBACK WILL BE USED.
- PRIOR TO EXCAVATION OF TRENCHING, POTHOLING OR SENDING/RECEIVING PITS, THE ASPHALT CONCRETE OR PORTLAND CEMENT CONCRETE SHALL BE CUT OR MILL TO A NEAT LINE FULL DEPTH WITH A SAW-CUTTING OR MILLING DEVICE APPROVED BY THE ENGINEER.
- BACKFILL MATERIAL SHALL BE COMPACTED TO 90 PERCENT MINIMUM RELATIVE COMPACTION EXCEPT THE TOP TWENTY-FOUR (24) INCHES, WHICH SHALL BE MECHANICALLY COMPACTED TO 95 PERCENT MINIMUM RELATIVE COMPACTION. MECHANICALLY COMPACTED LIFTS USING ALTERNATIVE EQUIPMENT, COMPLYING WITH MANUFACTURE'S SPECIFICATION, WILL REQUIRE THE APPROVAL OF THE ENGINEER. USE OF ALTERNATIVE COMPACTION EQUIPMENT SHALL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR ANY DAMAGE TO THE CONDUIT, SURROUNDING GROUND, OR EXISTING AND NEW IMPROVEMENTS.

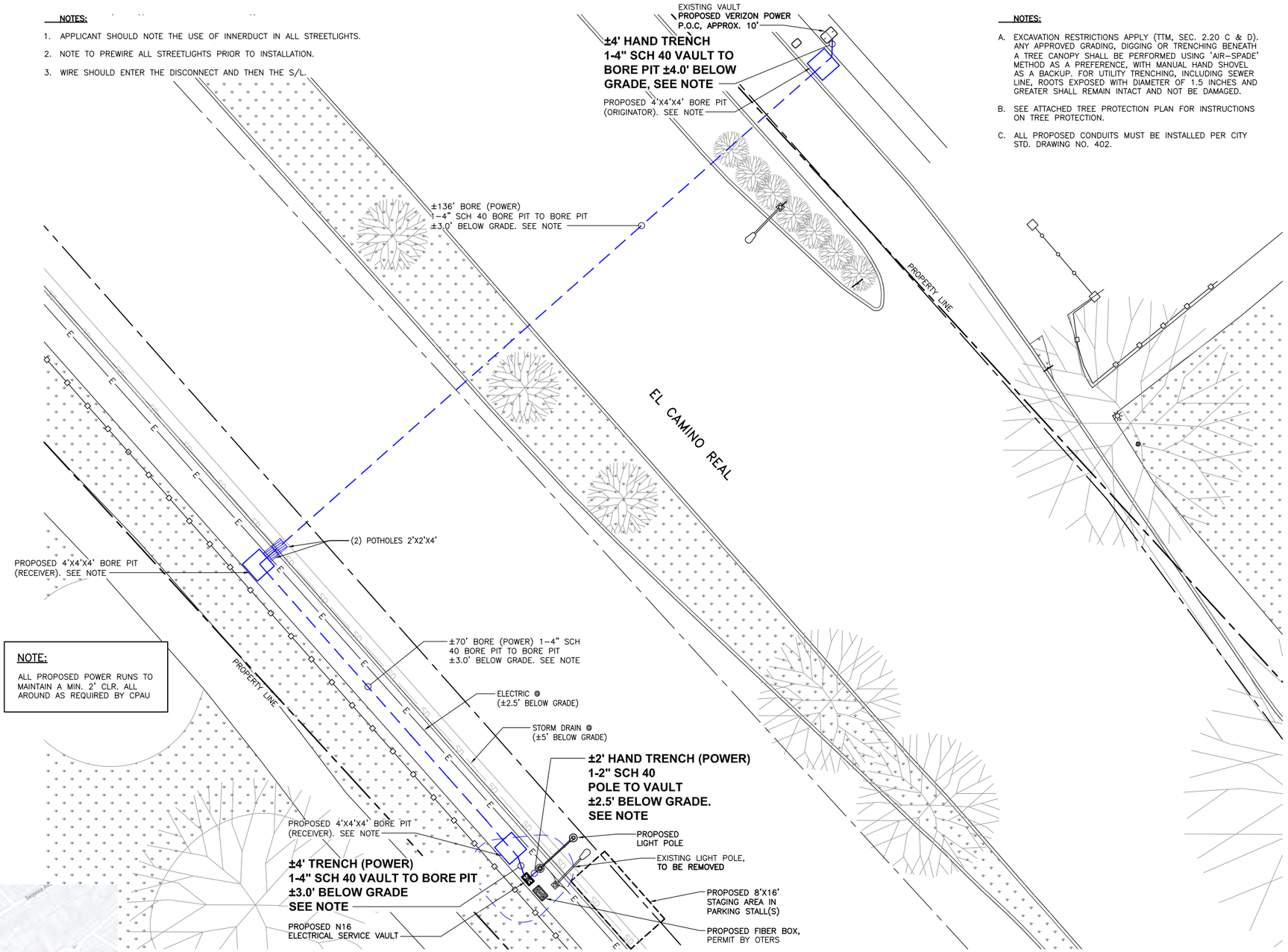
② NOTES

Sawcutting & Asphalt/Concrete Removal

- ☐ Protect storm drain inlets during saw cutting.
- ☐ If saw cut slurry enters a catch basin, clean it up immediately.
- ☐ Shovel or vacuum saw cut slurry deposits and remove from the site. When making saw cuts, use as little water as possible. Sweep up, and properly dispose of all residues.

NOTES:

1. APPLICANT SHOULD NOTE THE USE OF INNERDUCT IN ALL STREETLIGHTS.
2. NOTE TO PREWIRE ALL STREETLIGHTS PRIOR TO INSTALLATION.
3. WIRE SHOULD ENTER THE DISCONNECT AND THEN THE S/L.



NOTE:

ALL PROPOSED POWER RUNS TO MAINTAIN A MIN. 2' CLR. ALL AROUND AS REQUIRED BY CPAU

NOTES:

A. EXCAVATION RESTRICTIONS APPLY (TTM, SEC. 2.20 C & D). ANY APPROVED GRADING, DIGGING OR TRENCHING BENEATH A TREE CANOPY SHALL BE PERFORMED USING 'AIR-SPADE' METHOD AS A PREFERENCE, WITH MANUAL HAND SHOVEL AS A BACKUP. FOR UTILITY TRENCHING, INCLUDING SEWER LINE, ROOTS EXPOSED WITH DIAMETER OF 1.5 INCHES AND GREATER SHALL REMAIN INTACT AND NOT BE DAMAGED.

B. SEE ATTACHED TREE PROTECTION PLAN FOR INSTRUCTIONS ON TREE PROTECTION.

C. ALL PROPOSED CONDUITS MUST BE INSTALLED PER CITY STD. DRAWING NO. 402.

① LIGHT POLE

1 inch = 10ft.

2' 1' 0" 2'

VICINITY MAP

PROJECT SPECIFIC PERMIT INFORMATION		
DESCRIPTION	QTY	UNIT
PLACE (1) 4" SCH 40 CONDUIT	214	LF
PLACE (1) 2" SCH 40 CONDUIT	2	LF
REMOVE AND RESTORE SOIL	224	FT³

811 USA North
Know what's below. Call before you dig.
California and Nevada
Call Two Working Days Before You Dig!
811 / 800-227-2600

N W E S

LEGEND

U.G. UTILITY VAULT	BOL	BOLLARD	FL	FLOW LINE	W WATER
MH MANHOLE	TOP _	TOP OF ITEM	EOP	EDGE OF PAVEMENT	SS SANITARY SEWER
UTILITY POLE	BOT _	BOTTOM OF ITEM	R.O.W.	RIGHT OF WAY	SD STORM DRAIN
XXXX.X SPOT ELEVATION	BLDG	TOP OF BUILDING	AP	ASPHALT	G GAS
W WATER VALVE	LP	LIGHT POLE	SW	SIDEWALK	C COMMUNICATION
FOUND MONUMENT	LIMITS OF PROPERTY		O/H OVERHEAD LINE		E ELECTRIC
GEODETIC MARKER	x CHAIN LINK FENCE		METAL FENCE		U UNKNOWN UTILITY
MASONRY WALL	WOOD FENCE		GRADE BREAK		IRR IRRIGATION

verizon
2785 MITCHELL DRIVE, SUITE 9
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Vinculums
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WALNUT CREEK, CA 94598
OFFICE: (925) 482-8500

ALLSTATES ENGINEERING & SURVEYING
23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
DRAWN BY:	NC
CHECKED BY:	DW

REV	DATE	DESCRIPTION	
0	01/19/2021	FINAL BORING PLAN	MG
A	10/12/2020	PRELIMINARY BORING PLAN	SS

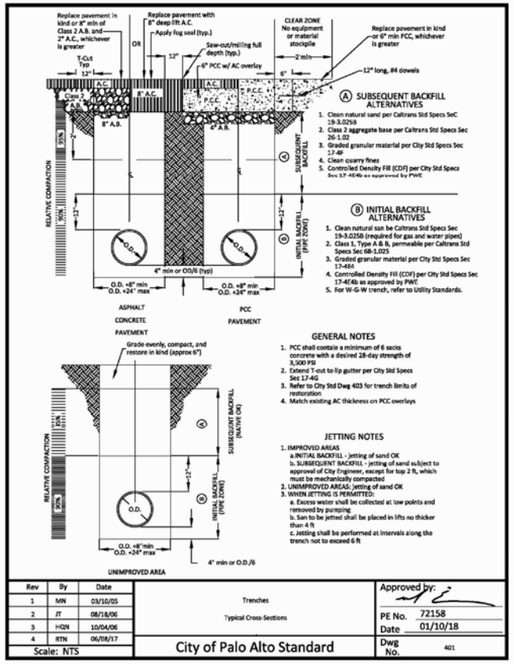
REGISTERED PROFESSIONAL ENGINEER
M ISSAM ZALZALI
71655
CIVIL
STATE OF CALIFORNIA

SF PALO ALTO 121

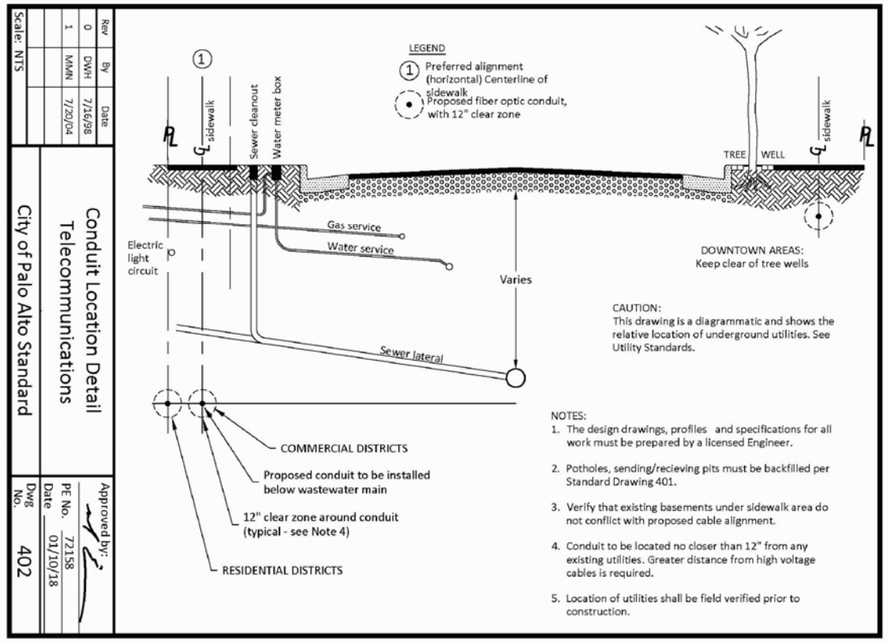
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, CA 94306
LOCATION CODE: 425225

SHEET TITLE
BORING SITE PLAN

SHEET NUMBER
A-1.4



5 CITY STANDARD DWG 401
N.T.S.



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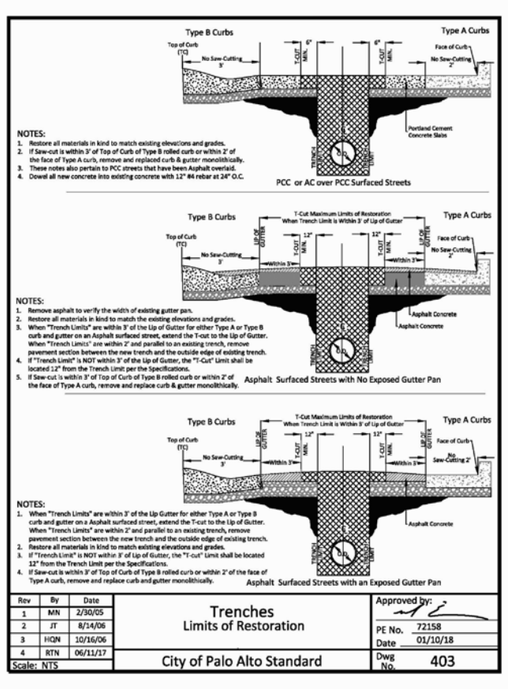

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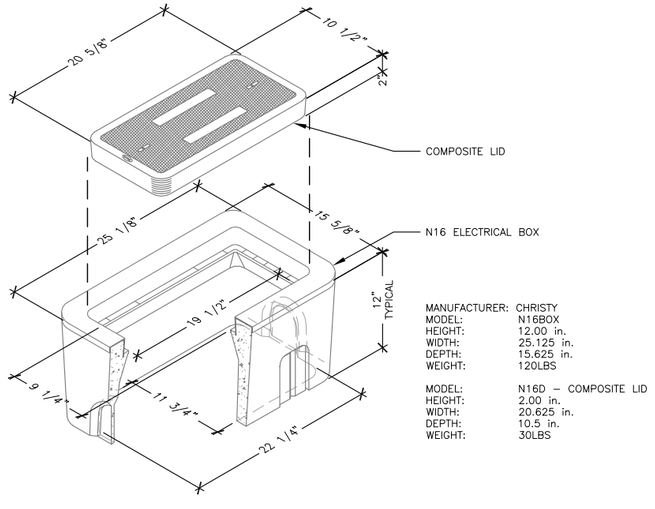

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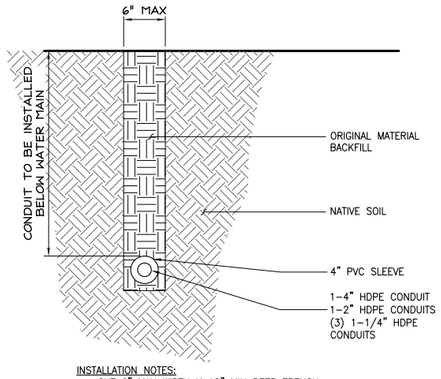

1 IN DIRT – PRIVATE
N.T.S.

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Vinculums
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OFFICE: (925) 482–8500

ALLSTATES ENGINEERING & SURVEYING
23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P–334899
DRAWN BY:	NC
CHECKED BY:	DW

REV	DATE	DESCRIPTION	
0	01/19/2021	FINAL BORING PLAN	MG
A	10/12/2020	PRELIMINARY BORING PLAN	SS

REGISTERED PROFESSIONAL ENGINEER
WISAM ZALZALI
71655
CIVIL
STATE OF CALIFORNIA

SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA–82)
PALO ALTO, CA 94306
LOCATION CODE: 425225

SHEET TITLE
CITY STANDARDS & DETAILS

SHEET NUMBER
A-1.5

- Grade fills over 6-inches or impervious overlay shall incorporate an approved permanent aeration system, permeable material or other approved mitigation.
- Grade cuts exceeding 4-inches shall incorporate retaining walls or an appropriate transition equivalent.

notes:

Required Practices

C. Trenching, Excavation and Equipment Use

Trenching, excavation or boring activity within the TPZ is restricted to the following activities, conditions and requirements if approved by the *City Arborist*. *(See Restriction Zones for Excavation, Trenching or Boring Near Regulated Trees, Image 2.20-1 through 2.20-3)*. Mitigating measures shall include prior notification to and direct supervision by the *project arborist*.

1. Notification. Contractor shall notify the *project arborist* a minimum of 24 hours in advance of the activity in the TPZ.
2. Root Severance. Roots that are encountered shall be cut to sound wood and repaired (*see Root Injury, Section 2.25 A-1*). Roots 2-inches and greater must remain injury free.
3. Excavation. Any approved excavation, demolition or extraction of material shall be performed with equipment sitting outside the TPZ. Methods permitted are by hand digging, hydraulic or pneumatic air excavation technology. Avoid excavation within the TPZ during hot, dry weather.
   - If excavation or *trenching* for drainage, utilities, irrigation lines, etc., it is the duty of the contractor to tunnel under any roots 2-inches in diameter and greater.
   - Prior to excavation for foundation/footings/walls, grading or *trenching* within the TPZ, roots shall first be severed cleanly 1-foot outside the TPZ and to the depth of the future excavation. The trench must then be hand dug and roots pruned with a saw, sawzall, narrow trencher with sharp blades or other approved root pruning equipment.
4. Heavy Equipment. Use of backhoes, steel tread tractors or any heavy vehicles within the TPZ is prohibited unless approved by the *City Arborist*. If allowed, a protective *root buffer* (*see Root Buffer and Damage to Trees, Section 2.25.A-1*) is required. The protective buffer shall consist of a base course of tree chips spread over the root area to a minimum of 6-inch depth, layered by 3/4-inch quarry gravel to stabilize 3/4-inch plywood on top. This buffer within the TPZ shall be maintained throughout the entire construction process.
   - Structural design. If injurious activity or interference with roots greater than 2-inches will occur within the TPZ, plans shall specify a design of special foundation, footing, walls, concrete slab or pavement designs subject to *City Arborist* approval. Discontinuous foundations such as concrete pier and structural grade beam must maintain natural grade (not to exceed a 4-inch cut), to minimize root loss and allow the tree to use the existing soil.

- Basement excavations shall be designed outside the TPZ of all *protected* and *designated trees* (*see Excavation, Section 2.20-3*) and shall not be harmful to other mature or neighboring property trees.

notes:

Required Practices

D. Tunneling & Directional Drilling

If *trenching* or pipe installation has been approved within the TPZ, then the trench shall be either cut by hand, air-spade, hydraulic vac-on excavation or, by mechanically boring the tunnel under the roots with a horizontal directional drill and hydraulic or pneumatic air excavation technology. In all cases, install the utility pipe immediately, backfill with soil and soak within the same day. Installation of private utility improvements shall be tunnel bored beneath the tree and roots per *Trenching Tunneling & Distance Matrix* In Table 2-1.

TABLE 2-1
Trenching & Tunneling Distance

TRENCHING DISTANCE

When the Tree Diameter At 4.5 Ft Is:	Trenching will be Replaced with Boring at this Minimum Distance (10x tree dia.) from the Face of the Tree in any Direction:
6-9" Measured At 6" à	6-9'
10-14" Measured At 54" à	10-14'
15-19" Measured At 54" à	15-19'
Over 19" Measured At 54" à	20' +

DEPTH OF TUNNELING

Tree Diameter	Depth of Tunneling
9" Or Less Measured At 6" à	2.5'
10-14" Measured At 54" à	3.0'
15-19" Measured At 54" à	3.5'
More Than 19" Measured At 54" Depth of Tunnel à	4.0'

Bore Pits Shall Be Located At A Minimum Distance As Specified By The Trenching Distance Table Above.

1. Public Utilities
   Underground public utility improvements or repairs shall be performed in accordance with the *Utility Standards for Excavation, Trenching or Boring, Section 02200.309*; and per *Restriction Zones Near Regulated Trees (see Images 2.20-1 through 2.20-3)*.
2. Street Trees
   Exclusions for *street trees* in the publicly owned right-of-way (ROW).
   - *Street Trees* that are in conflict with utility infrastructure where the conflict cannot be resolved may be removed if approved by Public Works Operations (e.g., a tree planted directly on top of a damaged sewer lateral.)

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ALLSTATES ENGINEERING & SURVEYING
23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
DRAWN BY:	NC
CHECKED BY:	DW

REV	DATE	DESCRIPTION	
0	01/19/2021	FINAL BORING PLAN	MG
A	10/12/2020	PRELIMINARY BORING PLAN	SS

REGISTERED PROFESSIONAL ENGINEER
WISSAM ZALZALI
71655
CIVIL
STATE OF CALIFORNIA

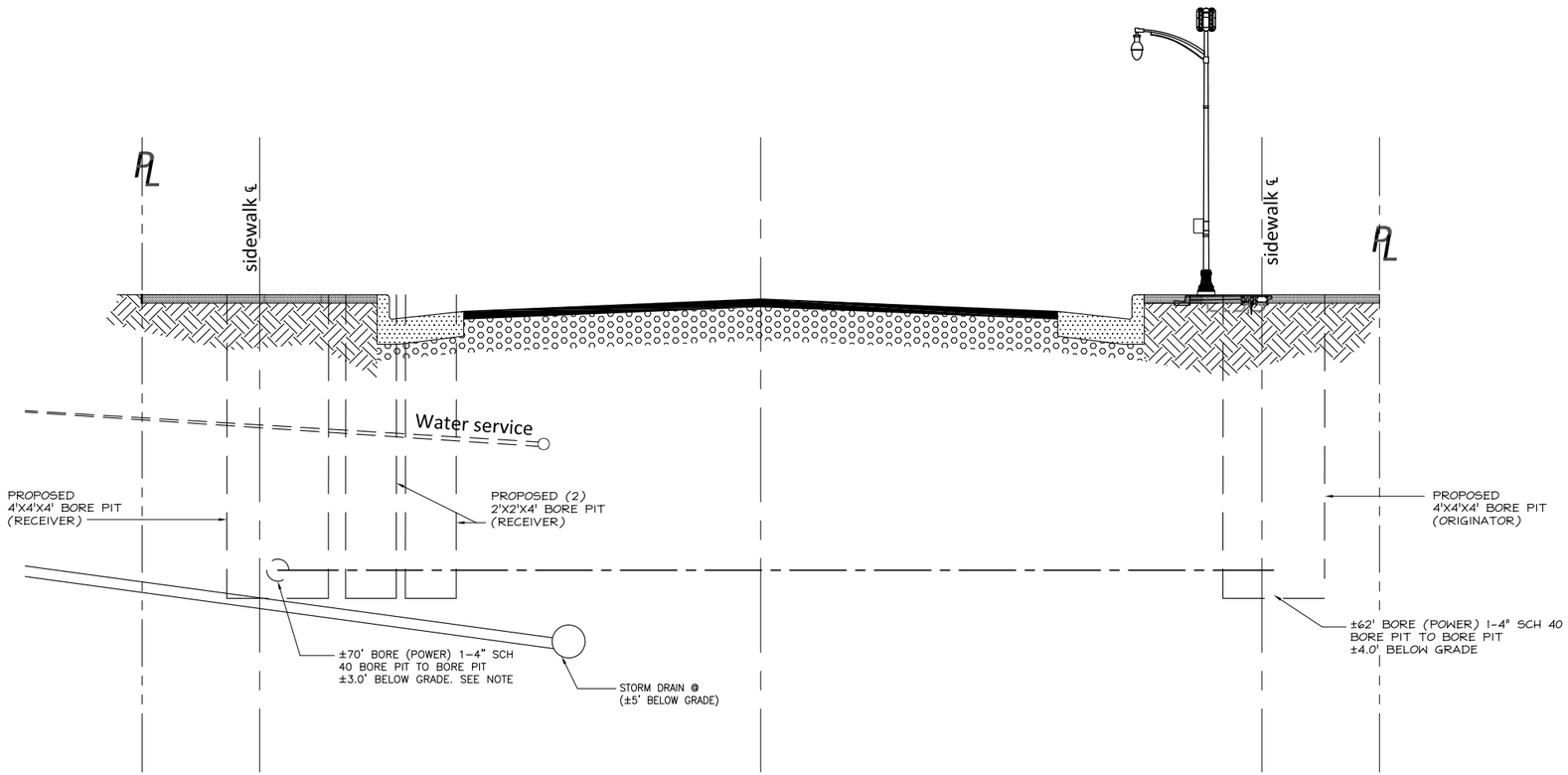
SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, CA 94306
LOCATION CODE: 425225

SHEET TITLE
CITY STANDARDS & DETAILS

SHEET NUMBER
A-1.6

1. ALL WORK SHALL COMPLY WITH THE CITY OF PALO ALTO 2018 STANDARD DRAWINGS AND SPECIFICATIONS BORING, TRENCHING, POTHOLING AND DEWATERING, SECTION 17
2. THE LOCATION OF EXISTING UTILITY MAINS AND LATERAL LINES INCLUDING STORM DRAIN, SANITARY SEWER, WATER, GAS, UNDERGROUND ELECTRICAL AND COMMUNICATION CONDUITS CROSSING THE TRENCH EXCAVATION SHALL BE VERIFIED BY THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING UNDERGROUND SERVICES ALERT (USA) AT 811 OR 800-642-2444 AT LEAST FIVE (5) WORKING DAYS PRIOR TO BEGINNING UNDERGROUND WORK SO THAT EXISTING UTILITIES CAN BE MARKED IN THE FIELD, UNLESS OTHERWISE STATED BY CITY CONTRACT.
3. EXCAVATION SHALL BE SUPPORTED AND EXCAVATION OPERATIONS CONDUCTED IN ACCORDANCE WITH THE RULES OF THE CALIFORNIA OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA). IF IN THE OPINION OF THE ENGINEER, THERE EXISTS A SITUATION OF IMMINENT DANGER TO THE WORKERS, THE ENGINEER MAY ORDER THE WORK STOPPED AND THE CONTRACTOR SHALL COMPLY WITH RULES OF THE CALIFORNIA OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA).
4. BACKFILL SHALL BE SAND OR GRANULAR MATERIAL FALLING WITHIN THE LIMITS DESCRIBED IN THE STANDARD DRAWING 401. AGGREGATE BASE, ASPHALT CONCRETE, PORTLAND CEMENT CONCRETE SHALL CONFORM TO THE REQUIREMENTS WITHIN THESE SPECIFICATIONS.
5. THE CONTRACTOR SHALL INSTALL THE CONDUIT IN ACCORDANCE WITH THE APPROVED STREET WORK PERMIT. ALL CONDUITS SHALL BE INSTALLED UNDERGROUND USING DIRECTIONAL BORING METHOD. MICRO-TUNNELING OR OTHER METHODS SHALL BE APPROVED BY THE PUBLIC WORKS ENGINEERING DIVISION. THE CONDUITS SHALL BE INSTALLED WITH TRACER WIRE APPROVED BY THE ENGINEER PER CITY OF PALO ALTO UTILITIES DEPARTMENT WATER, GAS AND WASTEWATER UTILITY STANDARDS. REFER TO STANDARD DRAWING 402.
6. TRENCHES SHALL NOT BE LEFT OPEN AT THE END OF THE DAY. ADEQUATE PROVISIONS SHALL BE MADE FOR THE PLACING OF TEMPORARY STEEL PLATES IN ADDITION TO BARRICADES, SIGNING AND LIGHTING. STOCKPILING OF EXCAVATED MATERIAL WITHIN THE PUBLIC RIGHT-OF-WAY SHALL NOT BE ALLOWED. A MAXIMUM OF THREE-HUNDRED (300) FEET OR ONE (1) CITY BLOCK OF TRENCH, WHICHEVER IS GREATER, MAY BE OPENED AT ONE TIME. FOR TEMPORARY PATCHING, A MINIMUM THICKNESS OF TWO (2) INCHES OF CUTBACK WILL BE USED.
7. PRIOR TO EXCAVATION OF TRENCHING, POTHOLING OR SENDING/RECEIVING PITS, THE ASPHALT CONCRETE OR PORTLAND CEMENT CONCRETE SHALL BE CUT OR MILL TO A NEAT LINE FULL DEPTH WITH A SAW-CUTTING OR MILLING DEVICE APPROVED BY THE ENGINEER.
8. BACKFILL MATERIAL SHALL BE COMPACTED TO 90 PERCENT MINIMUM RELATIVE COMPACTION EXCEPT THE TOP TWENTY-FOUR (24) INCHES, WHICH SHALL BE MECHANICALLY COMPACTED TO 95 PERCENT MINIMUM RELATIVE COMPACTION. MECHANICALLY COMPACTED LIFTS USING ALTERNATIVE EQUIPMENT, COMPLYING WITH MANUFACTURE'S SPECIFICATION, WILL REQUIRE THE APPROVAL OF THE ENGINEER. USE OF ALTERNATIVE COMPACTION EQUIPMENT SHALL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR ANY DAMAGE TO THE CONDUIT, SURROUNDING GROUND, OR EXISTING AND NEW IMPROVEMENTS.

(2) NOTES



(1) R.O.W SECTION
NTS

Sawcutting & Asphalt/Concrete Removal

- ☐ Protect storm drain inlets during saw cutting.
- ☐ If saw cut slurry enters a catch basin, clean it up immediately.
- ☐ Shovel or vacuum saw cut slurry deposits and remove from the site. When making saw cuts, use as little water as possible. Sweep up, and properly dispose of all residues.

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WALNUT CREEK, CA 94598
OFFICE: (925) 482-8500

ALLSTATES ENGINEERING & SURVEYING
23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
DRAWN BY:	LS
CHECKED BY:	DW

REV	DATE	DESCRIPTION	
1	01/19/2021	100% CD'S FOR SUBMITTAL	MG
0	10/08/2020	100% CD'S FOR REVIEW	MG
B	06/04/2020	95% CD'S FOR REDLINE	RF
A	04/10/2020	90% CD'S FOR REDLINE	NC

REGISTERED PROFESSIONAL ENGINEER
WISSAM ZAZZALI
71655
CIVIL
STATE OF CALIFORNIA

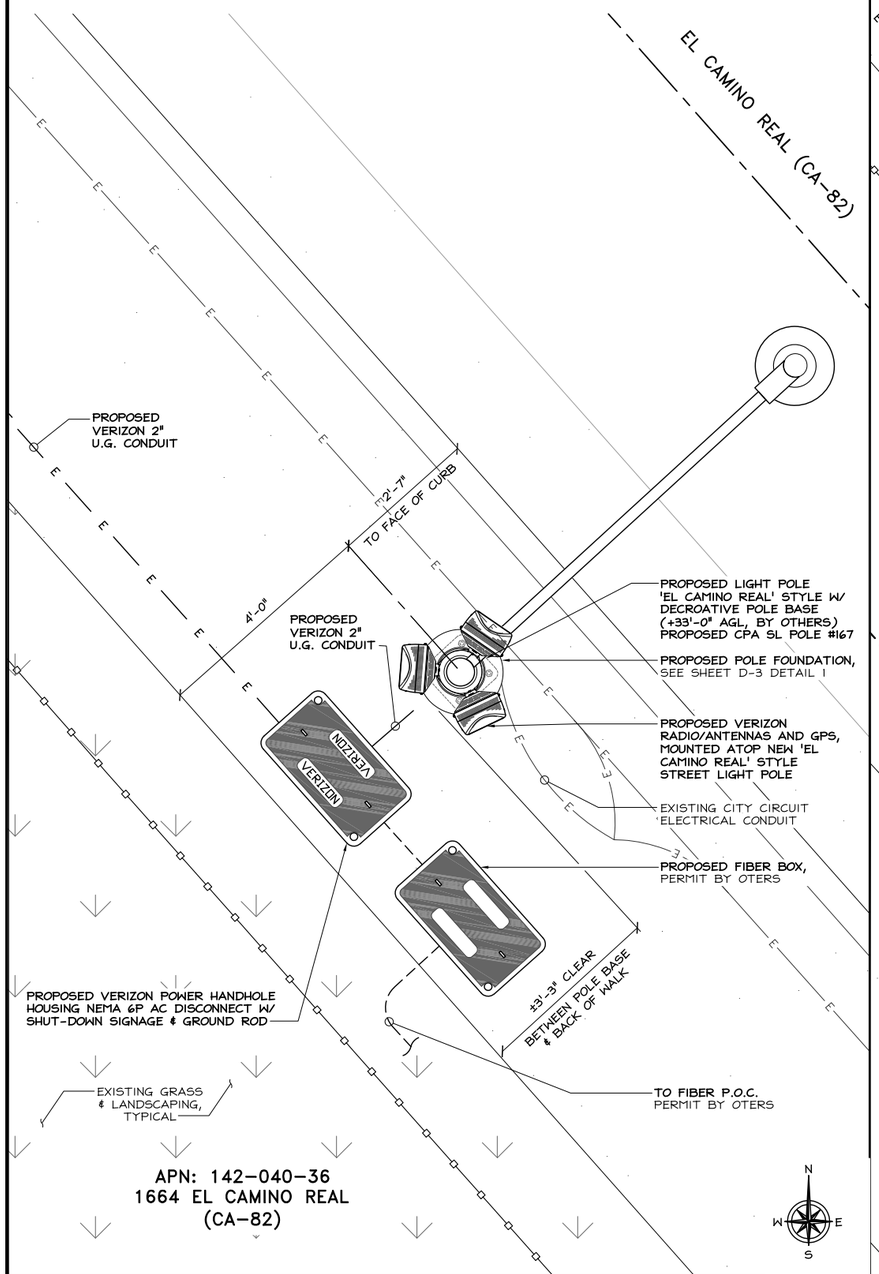
SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE
R.O.W. SECTION

SHEET NUMBER
A-1.7

NOTES:

1. METAL SURFACES REQUIRING PAINT TO BE PAINTED MUNSELL RAL5.5GY2.76/2.1.
2. THE CONTRACTOR MAY BE REQUIRED TO SUBMIT A LOGISTICS PLAN TO THE PUBLIC WORKS DEPARTMENT PRIOR TO COMMENCING WORK THAT ADDRESSES ALL IMPACTS TO THE CITY'S RIGHT-OF-WAY, INCLUDING, BUT NOT LIMITED TO: PEDESTRIAN CONTROL, TRAFFIC CONTROL, TRUCK ROUTES, MATERIAL DELIVERIES, CONTRACTOR'S PARKING, CONCRETE POURS, CRANE LIFTS, WORK HOURS, NOISE CONTROL, DUST CONTROL, STORM WATER POLLUTION PREVENTION, CONTRACTOR'S CONTACT, NOTICING OF AFFECTED SURROUNDING PROPERTIES , AND SCHEDULE OF WORK. THE REQUIREMENT TO SUBMIT A LOGISTICS PLAN WILL BE DEPENDENT ON THE NUMBER OF APPLICATIONS PUBLIC WORKS ENGINEERING RECEIVES WITHIN CLOSE PROXIMITY TO HELP MITIGATE AND CONTROL THE IMPACT TO THE PUBLIC-RIGHT-OF-WAY. IF NECESSARY, PUBLIC WORKS MAY REQUIRE A LOGISTICS PLAN DURING CONSTRUCTION.
3. TREES MAY NOT BE PLANTED WITHIN 10 FEET OF EXISTING WATER, GAS OR WASTEWATER MAINS/SERVICES OR METERS; LESSER DISTANCES REQUIRE A PERMANENT IMPERMEABLE ROOT-BARRIER A MINIMUM OF 3' HORIZONTAL FROM WATER, GAS AND WASTEWATER SERVICES/MAINS/METERS.



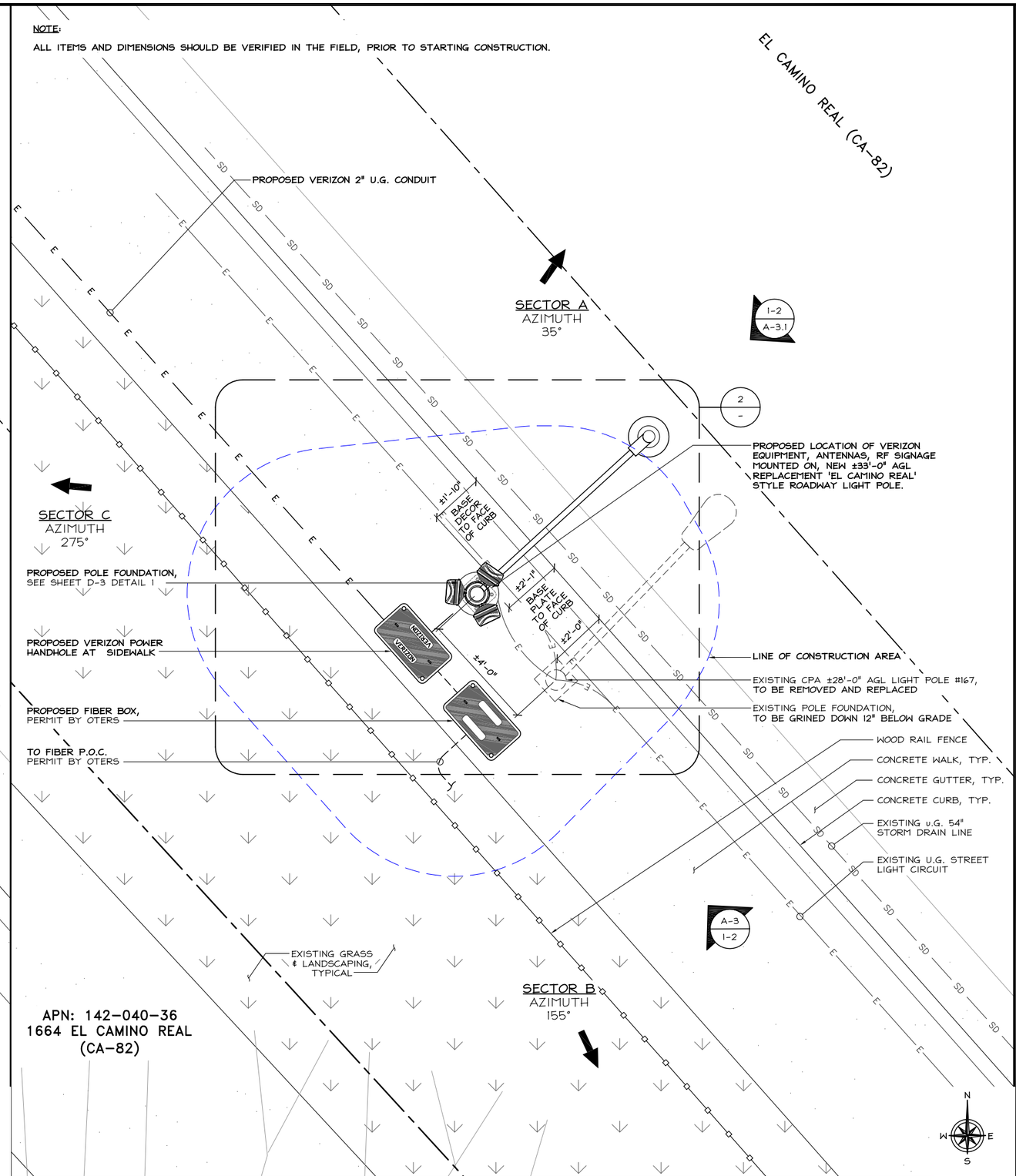
ENLARGED SITE PLAN

24"x36" SCALE: 3/4" = 1'-0"
11"x17" SCALE: 3/8" = 1'-0"
1' 6" 0" 1'

2

NOTE:

ALL ITEMS AND DIMENSIONS SHOULD BE VERIFIED IN THE FIELD, PRIOR TO STARTING CONSTRUCTION.



ENLARGED SITE PLAN

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

1

verizon

2785 MITCHELL DRIVE, SUITE 9
WALNUT CREEK, CA 94598

Vinculums

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OFFICE: (925) 482-8500

ALLSTATES ENGINEERING & SURVEYING

23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
DRAWN BY:	LS
CHECKED BY:	DW

REV	DATE	DESCRIPTION	
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0	10/08/2020	100% CD'S FOR REVIEW	MG
B	06/04/2020	95% CD'S FOR REDLINE	RF
A	04/10/2020	90% CD'S FOR REDLINE	NC

REGISTERED PROFESSIONAL ENGINEER
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CIVIL
STATE OF CALIFORNIA

SF PALO ALTO 121

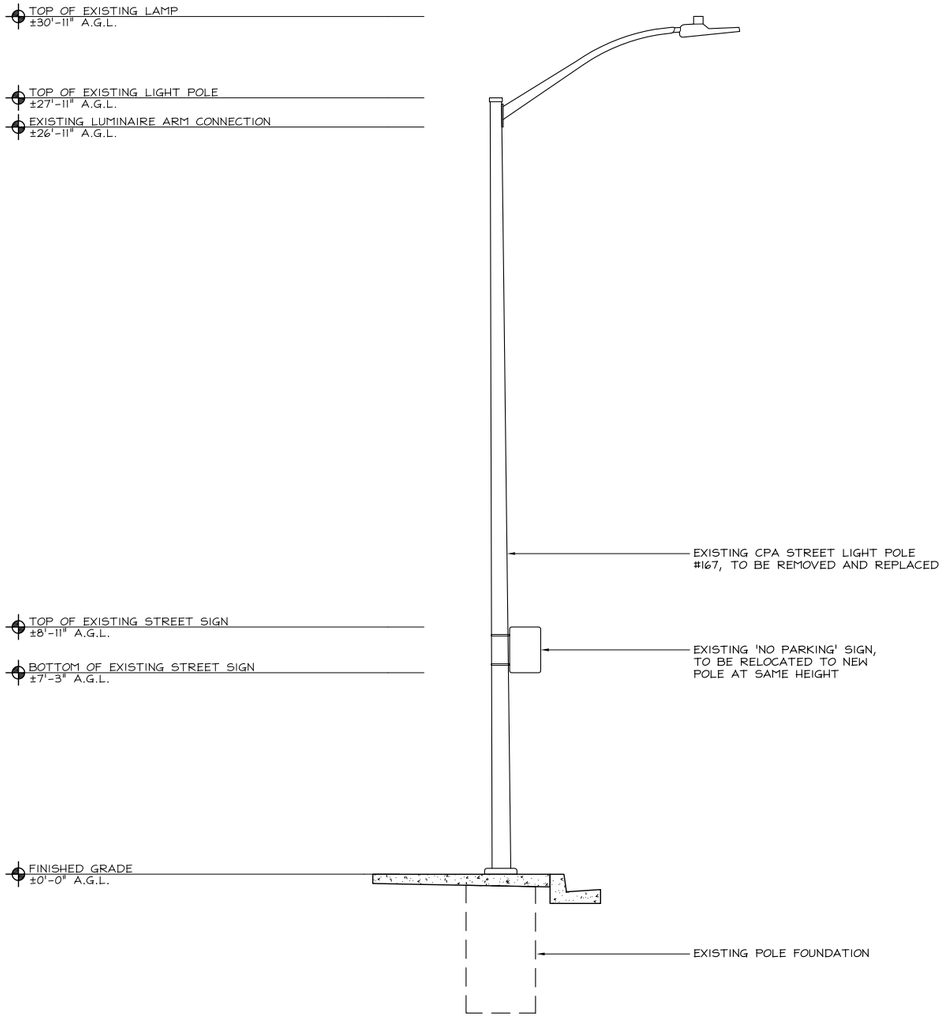
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE

ENLARGED SITE PLAN

SHEET NUMBER

A-2



EXISTING NORTHEAST ELEVATION

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

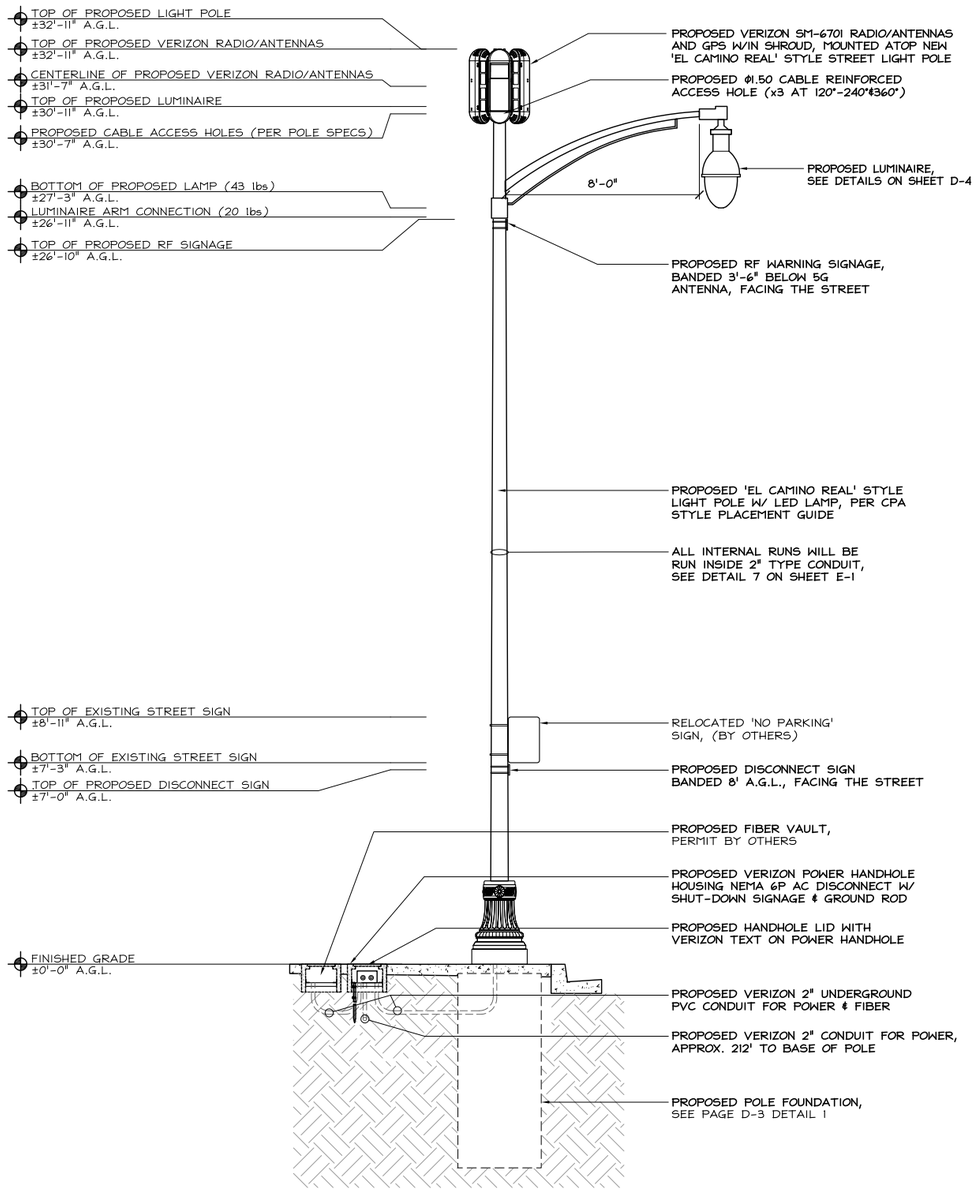
2' 1' 0" 2'

2

NOTES:

1. NEW GALVANIZED LIGHT POLE TO BE PAINTED WITH MUNSELL RAL5.5GY2.76/2.1 PAINT.
2. NEW RADIOS AND HARDWARE TO BE PAINTED MUNSELL RAL5.5GY2.76/2.1 OR WRAPPED AS ALLOWED BY THE MANUFACTURER.
3. ALL CABLE/WIRE BETWEEN THE POLE ACCESS HOLE AND THE SHROUD GROMMET HOLE WILL RUN TROUGH 1.5" CONDUIT PAINTED/COLORED TO MATCH POLE COLOR.

TOTAL ANETNNA/SHROUD VOLUME (CU. FT.)		
MODEL	TOTAL	TOTAL VOLUME (CU. FT.)
COMPTEK	3	±3.3



PROPOSED NORTHEAST ELEVATION

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

2' 1' 0" 2'

1

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ALLSTATES ENGINEERING & SURVEYING
23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
DRAWN BY:	LS
CHECKED BY:	DW

REV	DATE	DESCRIPTION	
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0	10/08/2020	100% CD'S FOR REVIEW	MG
B	06/04/2020	95% CD'S FOR REDLINE	RF
A	04/10/2020	90% CD'S FOR REDLINE	NC

REGISTERED PROFESSIONAL ENGINEER
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C.WIL

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PUBLIC R.O.W. ADJACENT TO:
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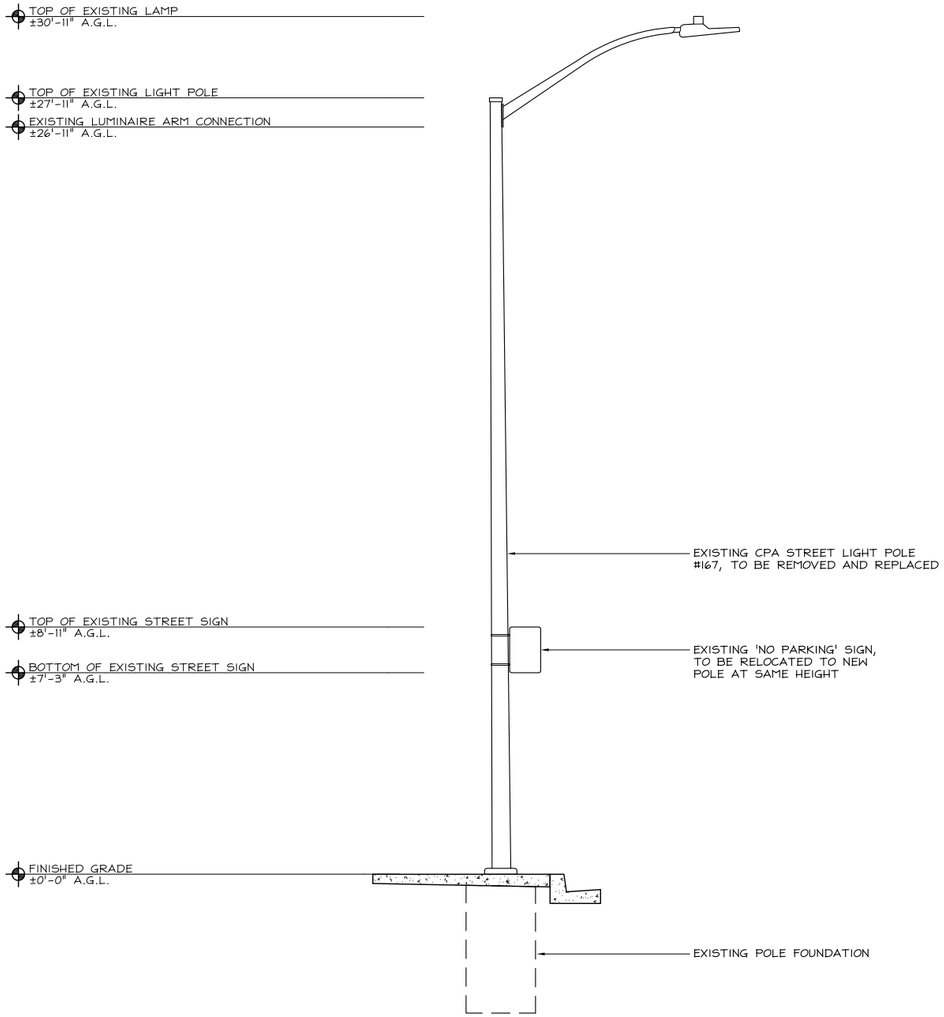
PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE
ELEVATIONS W/
SHROUD

SHEET NUMBER
A-3



EXISTING NORTHEAST ELEVATION

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

2' 1' 0" 2'

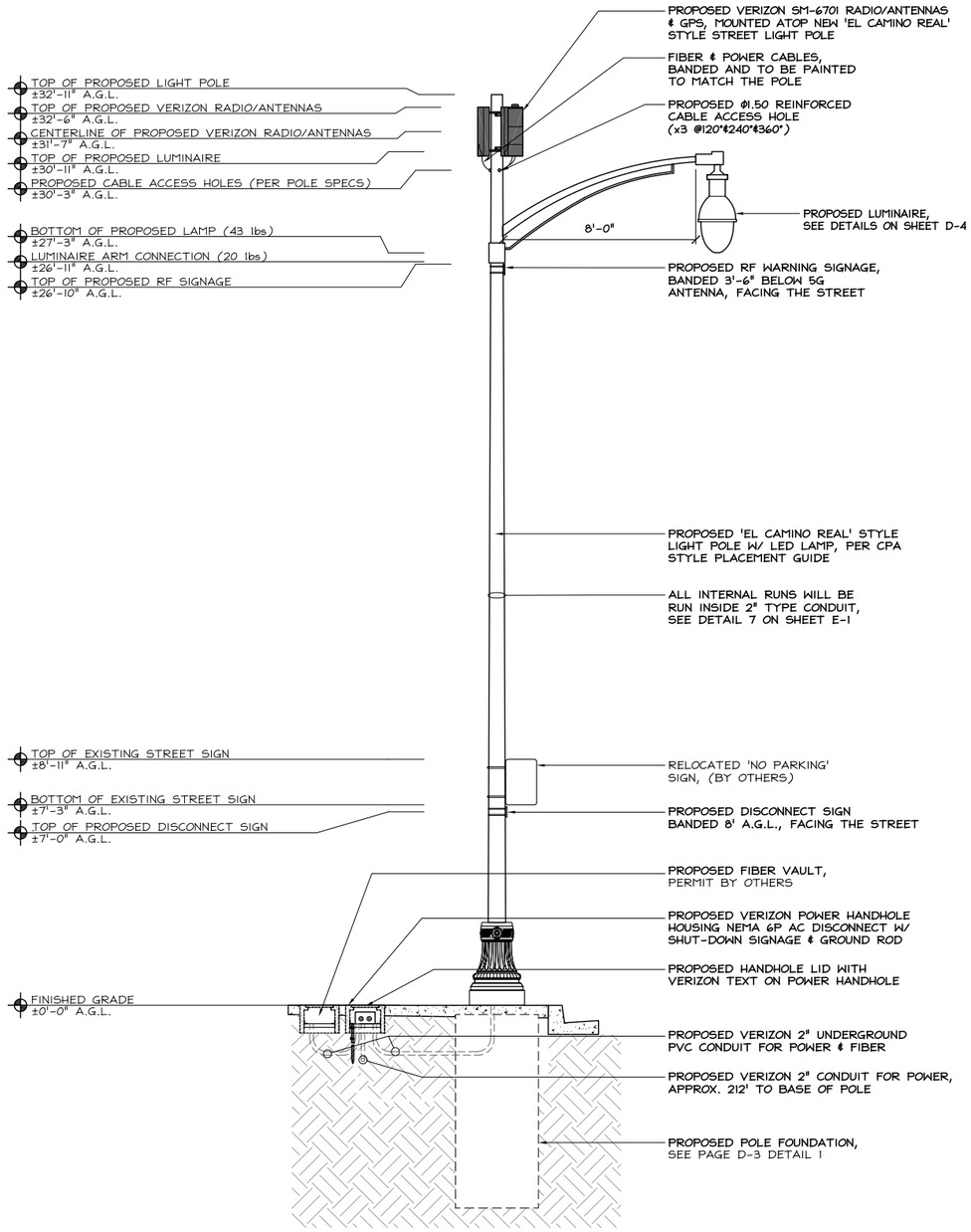
2

NOTES:

1. NEW GALVANIZED LIGHT POLE TO BE PAINTED WITH MUNSELL RAL5.5GY2.76/2.1 PAINT.
2. NEW RADIOS AND HARDWARE TO BE PAINTED MUNSELL RAL5.5GY2.76/2.1 OR WRAPPED AS ALLOWED BY THE MANUFACTURER.
3. ALL CABLE/WIRE BETWEEN THE POLE ACCESS HOLE AND THE ANTENNA PAINTED/COLORED TO MATCH POLE COLOR.

TOTAL ANETNNA/RADIO VOLUME (CU. FT.)

MODEL	TOTAL	TOTAL VOLUME (CU. FT.)
SM6701	3	±1.53



PROPOSED NORTHEAST ELEVATION

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

2' 1' 0" 2'

1

verizon
2785 MITCHELL DRIVE, SUITE 9
WALNUT CREEK, CA 94598

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OFFICE: (925) 482-8500

ALLSTATES ENGINEERING & SURVEYING
23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
DRAWN BY:	LS
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A	04/10/2020	90% CD'S FOR REDLINE	NC

REGISTERED PROFESSIONAL ENGINEER
WASAM ZALZALI
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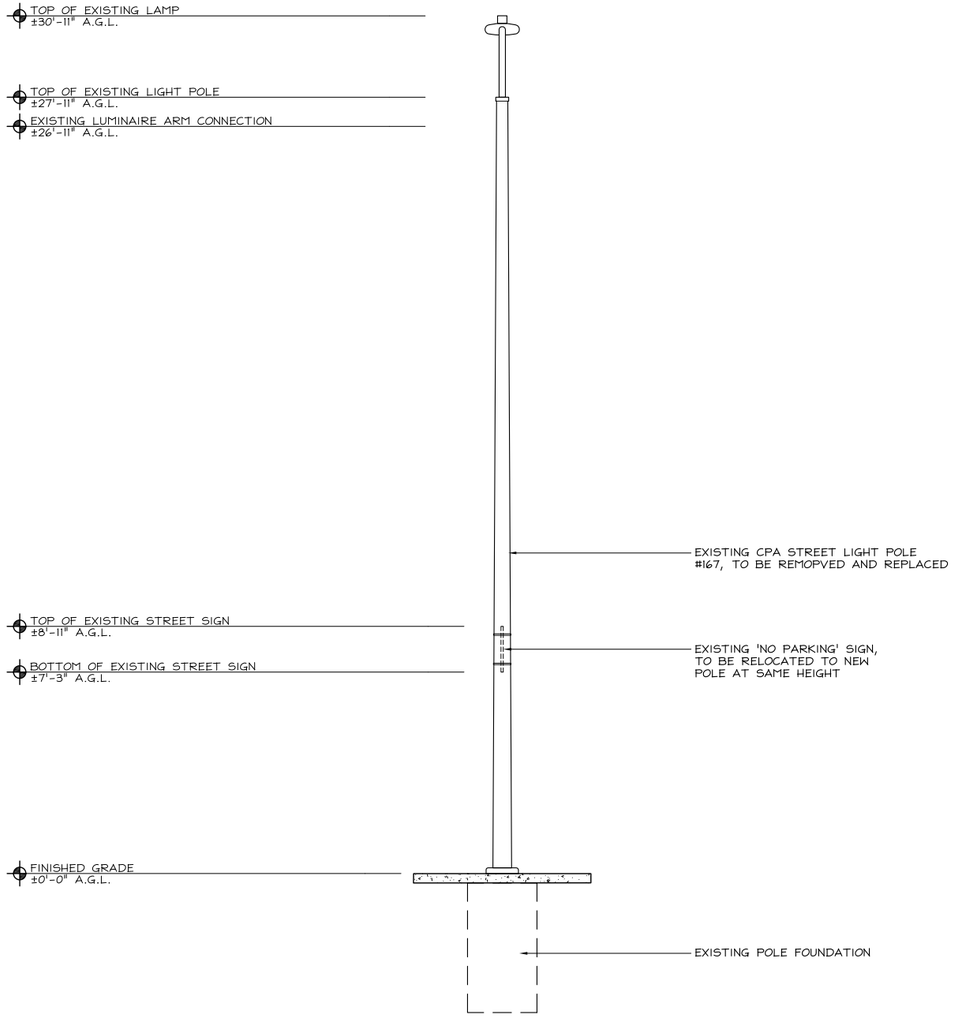
SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE
ELEVATIONS
WITHOUT SHROUD

SHEET NUMBER
A-3A



EXISTING SOUTHEAST ELEVATION

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

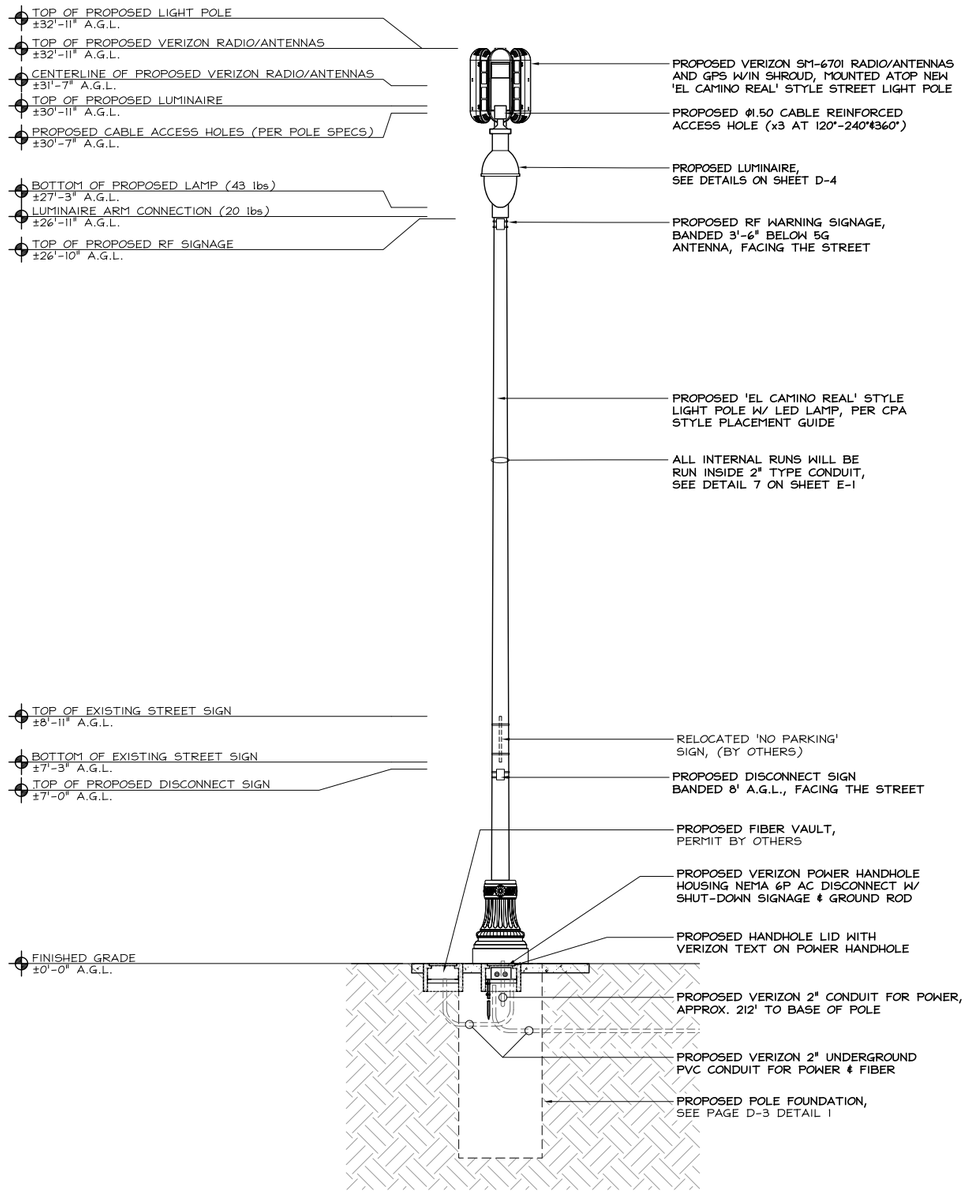
2' 1' 0" 2'

2

NOTES:

1. NEW GALVANIZED LIGHT POLE TO BE PAINTED WITH MUNSELL RAL5.5GY2.76/2.1 PAINT.
2. NEW RADIOS AND HARDWARE TO BE PAINTED MUNSELL RAL5.5GY2.76/2.1 OR WRAPPED AS ALLOWED BY THE MANUFACTURER.
3. ALL CABLE/WIRE BETWEEN THE POLE ACCESS HOLE AND THE SHROUD GROMMET HOLE WILL RUN TROUGH 1.5" CONDUIT PAINTED/COLORED TO MATCH POLE COLOR.

TOTAL ANETNNA/SHROUD VOLUME (CU. FT.)		
MODEL	TOTAL	TOTAL VOLUME (CU. FT.)
COMPTEK	3	±3.3



PROPOSED SOUTHEAST ELEVATION

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

2' 1' 0" 2'

1

verizon
2785 MITCHELL DRIVE, SUITE 9
WALNUT CREEK, CA 94598

Vinculums
575 LENNON LANE #125
WALNUT CREEK, CA 94598
OFFICE: (925) 482-8500

ALLSTATES ENGINEERING & SURVEYING
23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
DRAWN BY:	LS
CHECKED BY:	DW

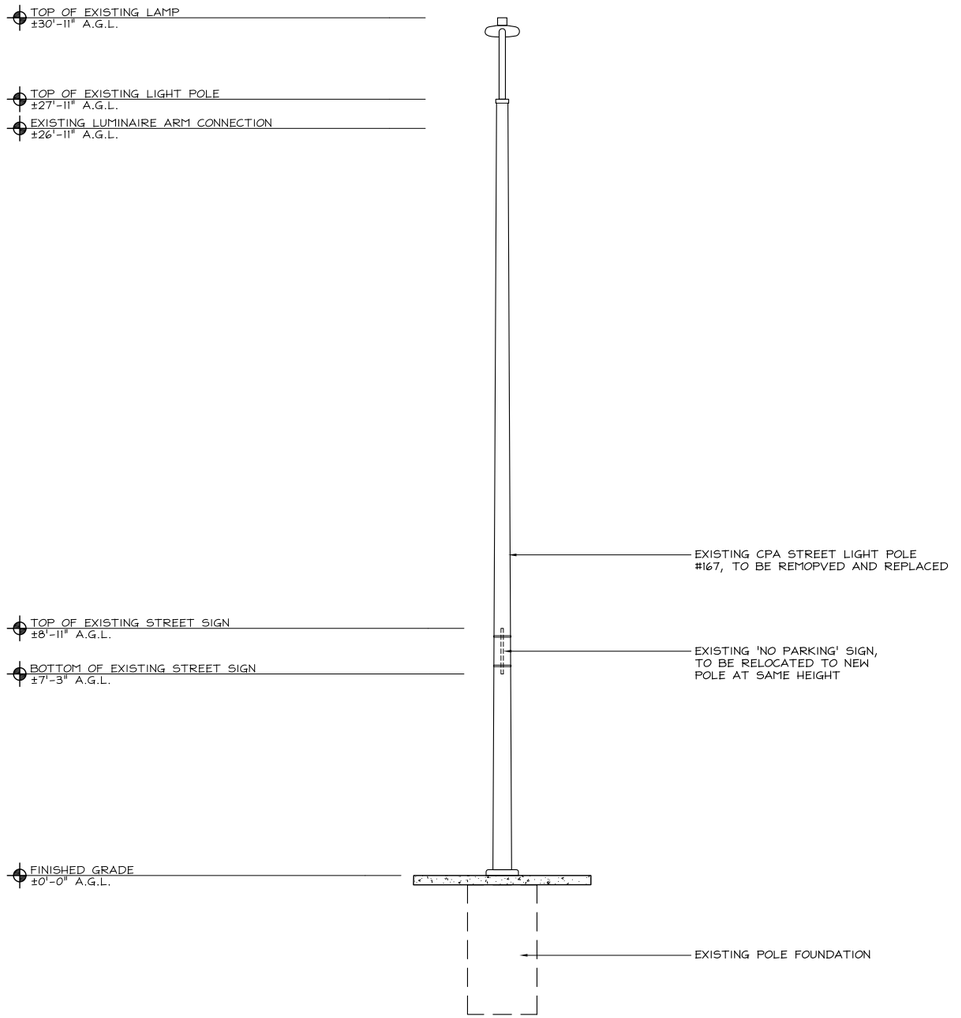
REV	DATE	DESCRIPTION	
1	01/19/2021	100% CD'S FOR SUBMITTAL	MG
0	10/08/2020	100% CD'S FOR REVIEW	MG
B	06/04/2020	95% CD'S FOR REDLINE	RF
A	04/10/2020	90% CD'S FOR REDLINE	NC

REGISTERED PROFESSIONAL ENGINEER
WISSAM ZALZALI
71655
CIVIL
STATE OF CALIFORNIA

SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE
ELEVATIONS W/
SHROUD

SHEET NUMBER
A-3.1



EXISTING SOUTHEAST ELEVATION

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

2' 1' 0" 2'

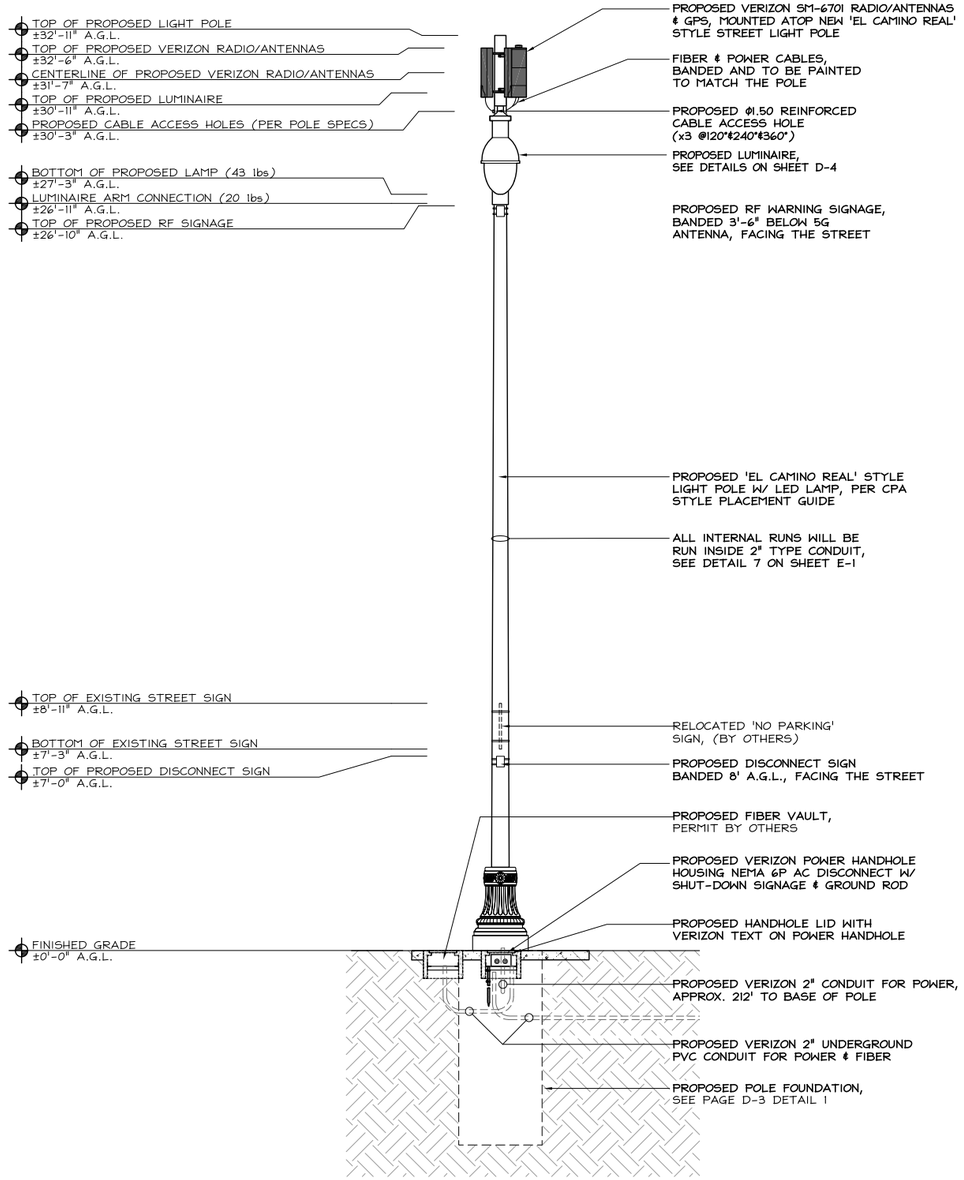
2

NOTES:

1. NEW GALVANIZED LIGHT POLE TO BE PAINTED WITH MUNSELL RAL5.5GY2.76/2.1 PAINT.
2. NEW RADIOS AND HARDWARE TO BE PAINTED MUNSELL RAL5.5GY2.76/2.1 OR WRAPPED AS ALLOWED BY THE MANUFACTURER.
3. ALL CABLE/WIRE BETWEEN THE POLE ACCESS HOLE AND THE ANTENNA PAINTED/COLORED TO MATCH POLE COLOR.

TOTAL ANETNNA/RADIO VOLUME (CU. FT.)

MODEL	TOTAL	TOTAL VOLUME (CU. FT.)
SM6701	3	±1.53



PROPOSED SOUTHEAST ELEVATION

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

2' 1' 0" 2'

1

verizon
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ALLSTATES ENGINEERING & SURVEYING
23675 BIRTCHER DRIVE
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PROJECT ID:	P-334899
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REGISTERED PROFESSIONAL ENGINEER
WISSAM ZALZALI
71655
CIVIL
STATE OF CALIFORNIA

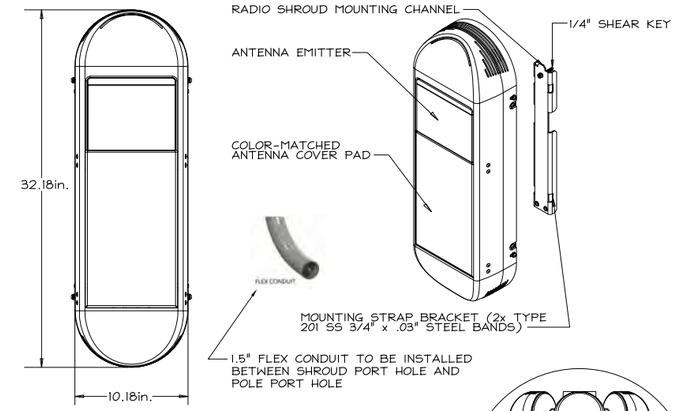
SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE
ELEVATIONS
WITHOUT SHROUD

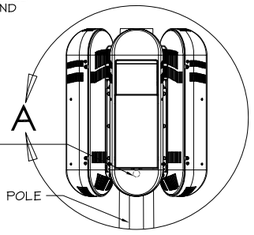
SHEET NUMBER
A-3.1A

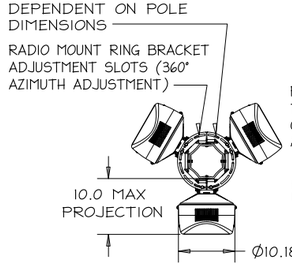
ERICSSON 6701 POLE ATTACHMENT SHROUD
PART NO. 30311
(OR APPROVED EQUAL)

NOTES:
1. FULL SHROUD PAINTABLE TO MATCH COLOR OF EXISTING STRUCTURE.
2. COLOR-MATCHED 3M FILM TO BE APPLIED TO ANTENNA EMITTER FACE.
3. SHROUD DRY WEIGHT = 18 LBS.
4. TOTAL WEIGHT INCLUDING ANTENNA = 49LBS.
5. ANTENNA/SHROUD VOLUME = 1.1 CU.FT. (EACH)

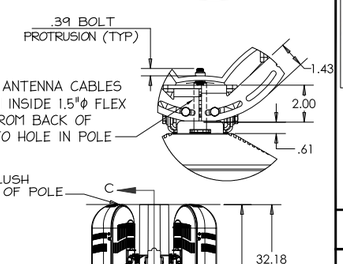


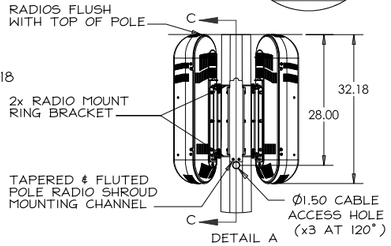
DETAIL A (SECTOR 1 RADIO HIDDEN FOR CLARITY)



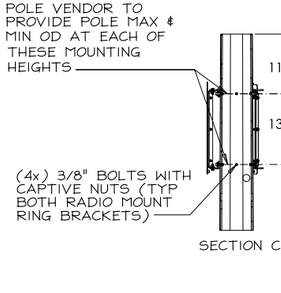


DETAIL B

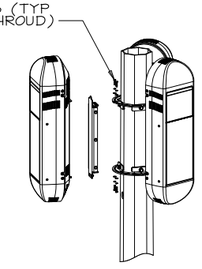




DETAIL A



SECTION C-C

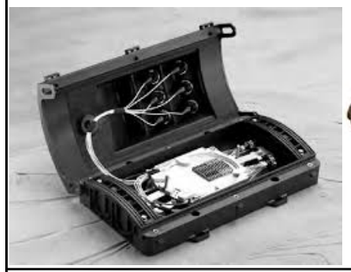


SM6701 SHROUD & MOUNTING DETAILS
24"x36" SCALE: NTS
11"x17" SCALE: NTS
7

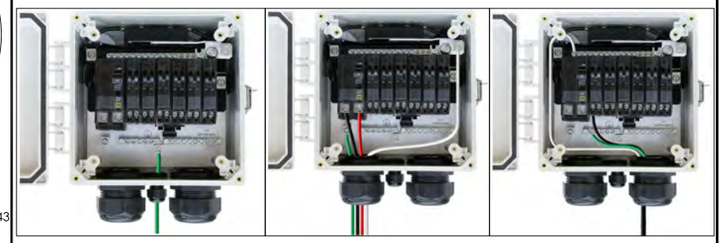
PREFORMED LINE PRODUCTS
COYOTE TERMINAL CLOSURE (FIBER DEMARCATION UNIT)

- DIMENSIONS: 18.76"L x 9.70"W x 5.13"D
- WEIGHT: N/A

OR VERIZON APPROVED EQUAL

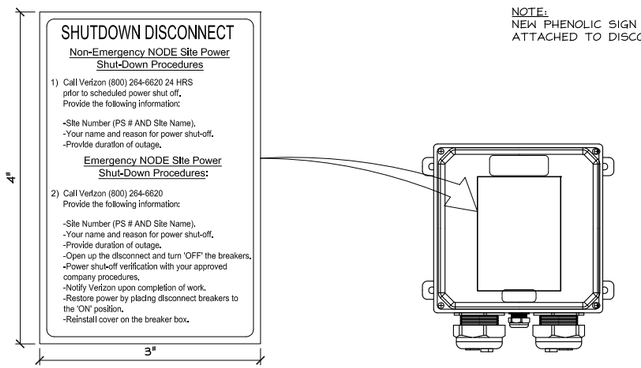


FIBER DEMARCATION UNIT
24"x36" SCALE: NTS
11"x17" SCALE: NTS
6



GROUND | AC POWER "IN" | AC POWER "OUT"

AC POWER DISCONNECT WIRE DIAGRAM
5

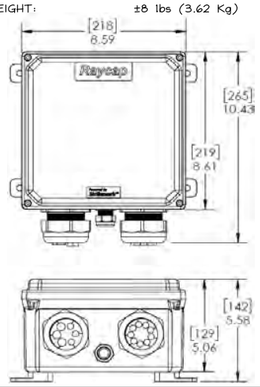


NOTE:
NEW PHENOLIC SIGN TO BE ATTACHED TO DISCONNECT

SHUTDOWN SIGN ON DISCONNECT
24"x36" SCALE: NTS
11"x17" SCALE: NTS
4

Raycap
RSCAC-1333-PH-240 AC POWER DISCONNECT
(OR APPROVED EQUAL)

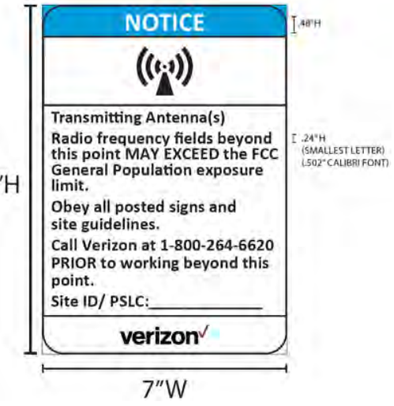
- DIMENSIONS: 10.43"L x 8.59"W x 5.06"D
- WEIGHT: ±8 lbs (3.62 Kg)



RSCAC-1333-PH-240

NEMA 6P AC POWER DISCONNECT
24"x36" SCALE: NTS
11"x17" SCALE: NTS
3

CONTRACTOR NOTE:
- SITE ID WILL BE SWITCH #, SITE # AND SITE NAME.
- NODE NUMBER WILL BE MARKET#-NODE.B#-SMALL CELL NAME.



NOTE:
INSTALL EME NOTICE SIGN 3' BELOW STREET MACRO UNITS.

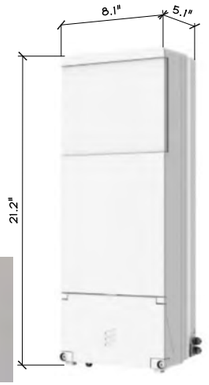
GO95 RF SIGNAGE
24"x36" SCALE: NTS
11"x17" SCALE: NTS
2

ERICSSON
STREET MACRO 6701

- DIMENSION W/ PROTRUDING ITEMS INCL GPS ANT: 21.2"H x 8.1"W x 5.1"D
- TOTAL RADIO AREA (CU. IN.): 875.77 CU. IN.
- WEIGHT: ±31 lbs

RADIO AREA (CU. FT.)			
RADIO MODEL	TOTAL RADIO(S)	TOTAL RADIO AREA (CU. IN.)	TOTAL RADIO AREA (CU. FT.)
MACRO 6701	1	875.77 CU. IN.	0.51 CU. FT.

NEW GPS ATTACHED ON TOP OF SM 6701 (PRE INSTALLED BY MANUFACTURER) (1) TOTAL (MAX. MEASUREMENTS WILL NOT EXCEED)



STREET MACRO 6701
24"x36" SCALE: NTS
11"x17" SCALE: NTS
1

verizon
2785 MITCHELL DRIVE, SUITE 9
WALNUT CREEK, CA 94598

Vinculums
575 LENNON LANE #125
WALNUT CREEK, CA 94598
OFFICE: (925) 482-8500

ALLSTATES ENGINEERING & SURVEYING
23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
DRAWN BY:	LS
CHECKED BY:	DW

REV	DATE	DESCRIPTION	
1	01/19/2021	100% CD'S FOR SUBMITTAL	MG
0	10/08/2020	100% CD'S FOR REVIEW	MG
B	06/04/2020	95% CD'S FOR REDLINE	RF
A	04/10/2020	90% CD'S FOR REDLINE	NC

REGISTERED PROFESSIONAL ENGINEER
WISSAM ZALZALI
71655
CIVIL
STATE OF CALIFORNIA

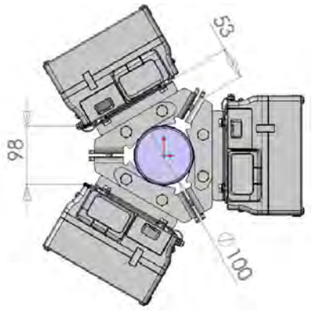
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

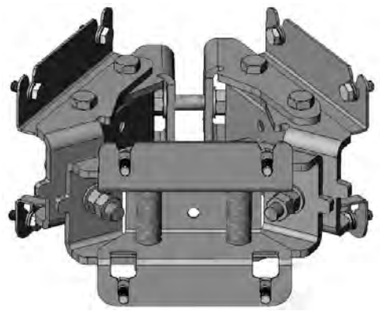
SHEET TITLE
DETAILS W/ SHROUD

SHEET NUMBER
D-1

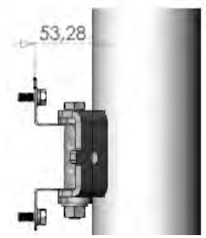
TRIPLE BRACKET PHOTOS - WITH AZIMUTH/TILT BRACKET (OPTIONAL / AS NEEDED)



TRIPLE BRACKET - PLAN VIEW

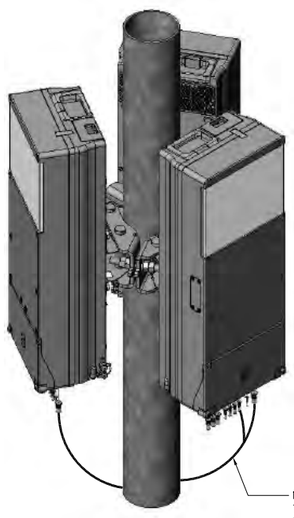


TRIPLE BRACKET - (ISO) VIEW WITHOUT RADIOS



SINGLE BRACKET - SIDE VIEW

TRIPLE BRACKET - SXK 109 2157/5



TRIPLE BRACKET - (ISO) VIEW RADIOS

SM 6701 TRIPLE- BRACKET

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

7

PREFORMED LINE PRODUCTS

COYOTE TERMINAL CLOSURE (FIBER DEMARCATION UNIT)

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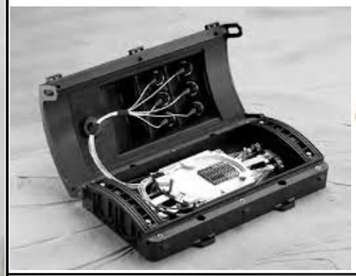
- WEIGHT: N/A

OR VERIZON APPROVED EQUAL



FIBER DEMARCATION UNIT

24"x36" SCALE: NTS
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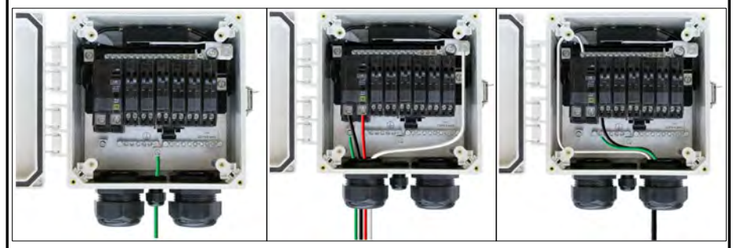
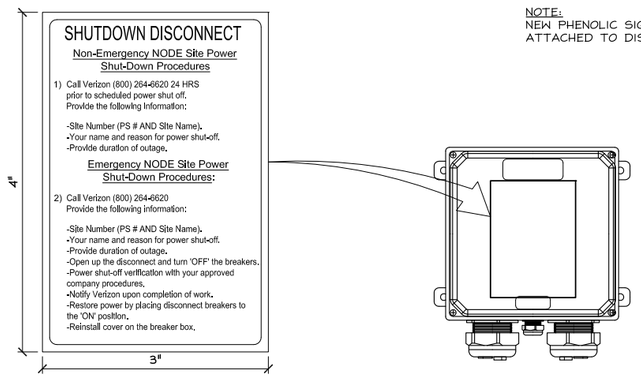
6



GROUND | AC POWER "IN" | AC POWER "OUT"

AC POWER DISCONNECT WIRE DIAGRAM

5



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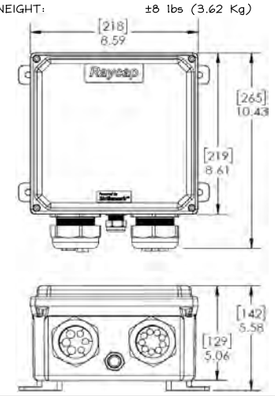

RSCAC-1333-PH-240

NEMA 6P AC POWER DISCONNECT

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3

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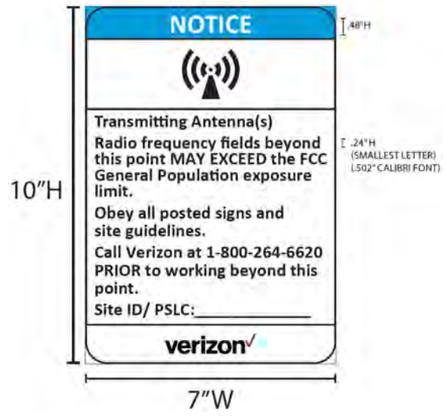

NOTE:
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11"x17" SCALE: NTS

2

STREET MACRO 6701

ERICSSON

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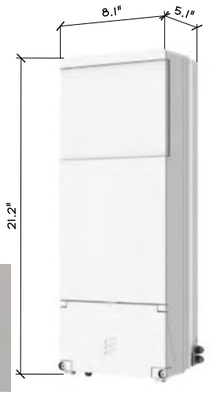

STREET MACRO 6701

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

1

verizon

2785 MITCHELL DRIVE, SUITE 9
WALNUT CREEK, CA 94598

Vinculums

575 LENNON LANE #125
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ALLSTATES ENGINEERING & SURVEYING

23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
DRAWN BY:	LS
CHECKED BY:	DW

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REGISTERED PROFESSIONAL ENGINEER
WISAM ZAZALI
71655
CIVIL
STATE OF CALIFORNIA

SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE
DETAILS WITHOUT SHROUD

SHEET NUMBER
D-1.1

Verizon Wireless • Proposed Small Cells
Three Pole Locations • Palo Alto, California

Statement of Hammett & Edison, Inc., Consulting Engineers

The firm of Hammett & Edison, Inc., Consulting Engineers, has been retained on behalf of Verizon Wireless, a wireless telecommunications carrier, to evaluate three small cells proposed to be sited in Palo Alto, California, for compliance with municipal limits on sound levels from the installations.

Executive Summary

Verizon proposes to install antennas and equipment on three light poles sited in the public right-of-way in Palo Alto. Noise from the proposed operations will comply with the City's pertinent noise limits.

Prevailing Standard

Palo Alto adopted Resolution No. 9825 (April 15, 2019) "Resolution of the Council of the City of Palo Alto Adopting Objective Aesthetic, Noise, and Related Standards for Wireless Communication Facilities in the Public Rights of Way," which sets limits on noise at residential areas for wireless facilities installed in public rights-of-way. Noise at the nearest residential property line is limited to an increase of 5 dB over existing ambient levels, if the ambient noise level would remain below 60 dBA L_{dn}, or to an increase of 3 dB, otherwise. The composite "day-night" average L_{dn} incorporates a 10 dB penalty during nighttime hours (10 pm to 7 am), to reflect typical residential conditions, where noise is more readily heard at night. By definition, sound from a continuous noise source will be 6.4 dB higher when expressed in L_{dn}.

It is noted that the amended language also references Chapter 9.10 of the Code, which had set a more relaxed increase of 15 dB increase for such WCF sitings, assessed at 25 feet from the pole. It is assumed for this study that the minimum reference ambient level is 40 dBA, as defined in Chapter 9.10.

A summary of noise assessment and calculation methodologies is shown in Figure 1.

General Facility Requirements

Small cells typically consist of two distinct parts: the electronic transceivers (also called "radios"), that are connected to traditional wired telephone lines, and the antennas that send wireless signals created by the radios out to be received by individual subscriber units. The radios are typically mounted on the support pole or placed in a cabinet at the base of the pole, and are connected to the antennas by cables. Some radios require fans to cool the electronics inside. Some radios are integrated with the antennas as a single unit.

Verizon Wireless • Proposed Small Cells
Three Pole Locations • Palo Alto, California

Site & Facility Description

According to information provided by Verizon, that carrier proposes to install a cylindrical antenna and two Ericsson Model 4402 radio units within a shroud on top of the light pole in the public right-of-way at each of the three locations listed in Table 1, and three Ericsson Model 6701 antennas, with integrated radios, within shrouds below the light arm on the pole.

Study Results

Ericsson reports that the maximum noise level from any one Model 4402 radio is 40.9 dBA,* and that the maximum noise level from three Model 6701 units is 39.6 dBA,* both at a reference distance of 5 feet. The cylindrical antenna is passively cooled, generating no noise.

At a distance of 6¼ feet, the calculated noise level from the simultaneous operation of this combined equipment would result in an increase not exceeding 5 dB above the minimum allowed ambient level of 40 dBA; the increase above the ambient would be less than 5 dB for any siting of the equipment beyond this distance. If the existing ambient were determined to be above 40 dBA statutory minimum, then the calculated increase due to the Verizon operation would, by definition, decrease. **All of the proposed small cells in Table 1 meet this distance requirement.**

Conclusion

Based on the information and analysis above, it is the undersigned's professional opinion that operation of these Verizon Wireless small cells proposed in Palo Alto will, under the conditions noted above, comply with the municipal standards limiting acoustic noise emission levels.

Authorship

The undersigned author of this statement is a qualified Professional Engineer, holding California Registration Nos. E-13026 and M-20676, which expire on June 30, 2021. This work has been carried out under his direction, and all statements are true and correct of his own knowledge except, where noted, when data has been supplied by others, which data he believes to be correct.

REGISTERED PROFESSIONAL ENGINEER WILLIAM F. HAMMETT E-13026 M-20676 Exp. 6-30-2021 ELECTRICAL MECHANICAL STATE OF CALIFORNIA

December 16, 2020

William F. Hammett, P.E.
707/996-5200

* Adjusted value based on manufacturer data, to reflect record high temperature of 107°F in Palo Alto.

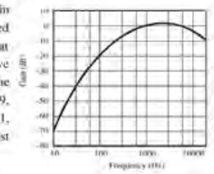
Verizon Wireless • Proposed Small Cells
Three Pole Locations • Palo Alto, California

Small Cell No.	Approximate Address	Nearest Residential Property
425225 "SF Palo Alto 121"	1600 El Camino Real (CA-82)	120 feet
425266 "SF Palo Alto 162"	158-164 Quarry Road	1,130 feet
425268 "SF Palo Alto 164"	Arboretum Road	200 feet

Table 1. Proposed Verizon small cells

Noise Level Calculation Methodology

Most municipalities and other agencies specify noise limits in units of dBA, which is intended to mimic the reduced receptivity of the human ear to Sound Pressure ("L_P") at particularly low or high frequencies. This frequency-sensitive filter shape, shown in the graph to the right as defined in the International Electrotechnical Commission Standard No. 179, the American National Standards Institute Standard No. 5.1, and various other standards, is also incorporated into most calibrated field test equipment for measuring noise levels.



30 dBA	library
40 dBA	rural background
50 dBA	office space
60 dBA	conversation
70 dBA	car radio
80 dBA	traffic corner
90 dBA	lawnmower

The dBA units of measure are referenced to a pressure of 20 μPa (micropascals), which is the threshold of normal hearing. Although noise levels vary greatly by location and noise source, representative levels are shown in the box to the left.

Manufacturers of many types of equipment, such as air conditioners, generators, and telecommunications devices, often test their products in various configurations to determine the acoustical emissions at certain distances. This data, normally expressed in dBA at a known reference distance, can be used to determine the corresponding sound pressure level at any particular distance, such as at a nearby building or property line. The sound pressure drops as the square of the increase in distance, according to the formula:

$$L_P = L_K + 20 \log(D_K/D_P),$$

where L_P is the sound pressure level at distance D_P and L_K is the known sound pressure level at distance D_K.

Individual sound pressure levels at a particular point from several different noise sources cannot be combined directly in units of dBA. Rather, the units need to be converted to scalar sound intensity units in order to be added together, then converted back to decibel units, according to the formula:

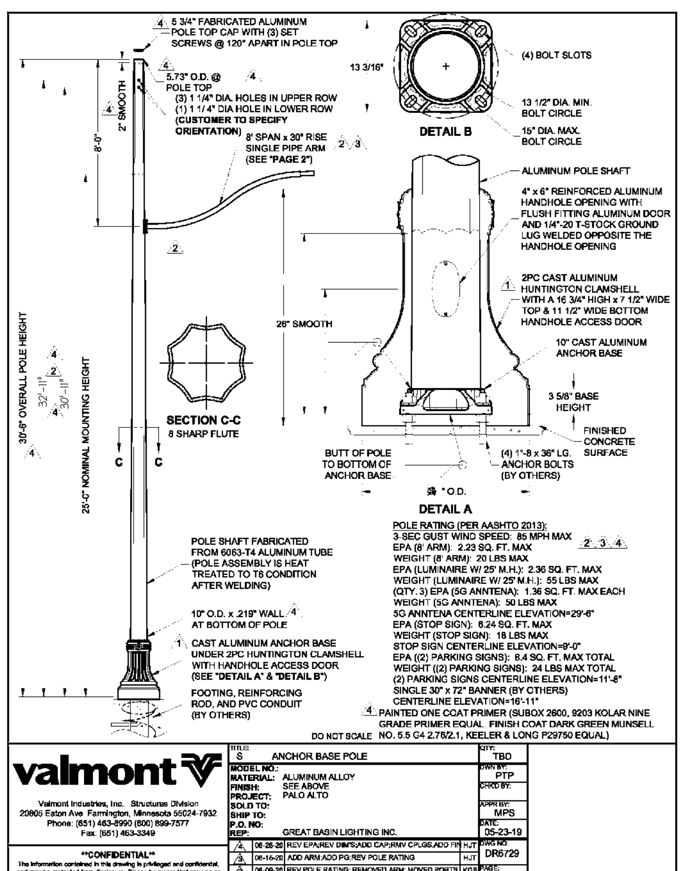
$$L_T = 10 \log \left(10^{L_1/10} + 10^{L_2/10} + \ldots\right),$$

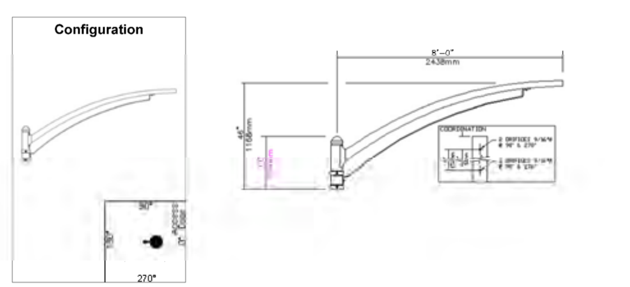
where L_T is the total sound pressure level and L_1, L_2, etc are individual sound pressure levels.

Certain equipment installations may include the placement of barriers and/or absorptive materials to reduce transmission of noise beyond the site. Noise Reduction Coefficients ("NRC") are published for many different materials, expressed as unitless power factors, with 0 being perfect reflection and 1 being perfect absorption. Unpainted concrete block, for instance, can have an NRC as high as 0.35. However, a barrier's effectiveness depends on its specific configuration, as well as the materials used and their surface treatment.

NOISE STUDY

24"x36" SCALE: NTS
11"x17" SCALE: NTS
2





Qty	3	Bracket	AC8-1A-R5-CAP1-SCRAL7022TX

Description of Components:

Arm: Shall be made from spun and tapered aluminum 6063-T4, tempered to T6 after welding. The tapered arm is formed into a vertically oriented ellipse of 4" (102mm) by 2 7/8" (73mm) welded onto a plate and mechanically assembled to central adaptor. The bracket end is of 2 3/8" (60mm) O.D.

Decorative Element: Flat made of bent aluminum, 2" (51mm) wide, 0.375" (10mm) thick, mechanically assembled.

Central Adaptor: Made of cast 356 aluminum, complete with a top decorative cap. Slip-fits 9" (229mm) over a 4" (102mm) outside diameter pole or tenon. Mechanically fastened to the pole or tenon.

Bracket Options: (CAP1),Optional Pole Cap

Note: The AC8 bracket meets the AASHTO 2001 standard specifications for structural support for luminaires.

Bracket Properties (Weight and EPA): 32 lbs (14.5 kg), 3.87 ft²

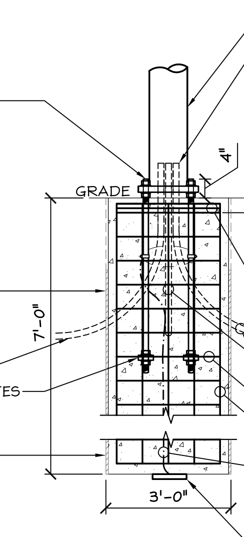
Lumec
08-01-2018 Page 3 / 6

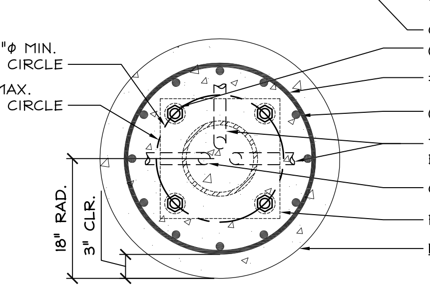
PHILIPS LUMEC

POLE SPECS

24"x36" SCALE: NTS
11"x17" SCALE: NTS
3

NOTE:
THIS INFORMATION MAY NOT CONTAIN ALL DETAILS REQUIRED FOR CONSTRUCTION. APPROPRIATE MODIFICATION MAY BE REQUIRED TO ENSURE SUITABILITY OF THESE DRAWINGS FOR THE SPECIFIC APPLICATION. IT IS THE USER'S RESPONSIBILITY TO ENSURE INSTALLATION OF THE EQUIPMENT/SYSTEM IS IN ACCORDANCE WITH BUILDING/PROJECT SPECIFICATIONS, APPLICABLE CODES AND STANDARDS.





FOUNDATION DETAIL

24"x36" SCALE: NTS
11"x17" SCALE: NTS
1

verizon
2785 MITCHELL DRIVE, SUITE 9
WALNUT CREEK, CA 94598

Vinculums
575 LENNON LANE #125
WALNUT CREEK, CA 94598
OFFICE: (925) 482-8500

ALLSTATES ENGINEERING & SURVEYING
23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
DRAWN BY:	LS
CHECKED BY:	DW

REV	DATE	DESCRIPTION	
1	01/19/2021	100% CD'S FOR SUBMITTAL	MG
0	10/08/2020	100% CD'S FOR REVIEW	MG
B	06/04/2020	95% CD'S FOR REDLINE	RF
A	04/10/2020	90% CD'S FOR REDLINE	NC

REGISTERED PROFESSIONAL ENGINEER WISSAM ZALZAL 71655 CIVIL STATE OF CALIFORNIA

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

SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE
NOISE STUDY, FOUNDATION DETAILS, POLE DRAWINGS

SHEET NUMBER
D-3

Submittal Cover Letter

Date: June 12, 2018
Contractor name: Phoenix Electric
Project name: City of Palo- Downtown Improvements
Customer PO# 767-02
JAM SO# 54798

Please see the enclosed set of submittals for the materials to be supplied on the above-mentioned project; these are for APPROVAL. The material will remain ON HOLD pending the receipt of signed approved submittals. Please note standard factory lead times will apply upon release.

Submittal page#	Item Description	Spec Section	Check if Deviation	Request for information
2-5	LED Luminaires	N/A		

*Per the factory, there is a smaller scale version. However, this version maxes out at 55 watts, and the specified version is 135w. Please advise.

If you have any questions please let me know.

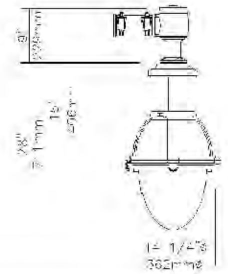
Thank you,
Samantha Douglas
Project Administration
JAM Services, Inc.

958 E. AIRWAY BLVD • LIVERMORE, CALIFORNIA • 94551
PHONE: (925) 455-5267 • FAX: (925) 455-5271

RNS20 (Reference=L23638-3)

QTY [19]

LEDGINE



EPA: 2.03 sqft / weight: 43 lb (19.5 kg)
Note: 3D image may not represent color or option selected.
Logos above include link, click to access.

Qty 1 Luminaire **RNS20-55W32LED4K-T-ACDR-LE3-120-DMG-SMB-RC-BKTX**

Description of Components:

Hood: Cast 356.1 aluminum dome, mechanically assembled on the housing, c/w a watertight grommet, mechanically assembled to the bracket with four bolts 3/8-16 UNC. This suspension system permits for a full rotation of the luminaire in 90 degree increments.

Housing: In a round shape, this housing is made of 356.1 aluminum, complete with a weatherproof door giving a tool-free access to the ballast, mechanically assembled. This suspension system permits for a full rotation of the luminaire in 90 degree increments.

Access-Mechanism: A gravity die cast 356 aluminum frame with latch and hinge. The mechanism shall offer tool-free access to the inside of the luminaire. An embedded memory-retentive gasket shall ensure weatherproofing.

Light Engine: LEDgine composed of 4 main components: **Heat Sink / LED Module / Optical System / Driver**
Electrical components are RoHS compliant.

Heat Sink: Made of cast aluminum optimising the LEDs efficiency and life. Product does not use any cooling device with moving parts (only passive cooling device).

Globe: (ACDR), Made of one-piece seamless injection-molded impact-resistant (DR) acrylic having an inner prismatic surface. Complete with a semi-prismatic house side shield and external glare softening prisms. The globe is mechanically assembled and sealed onto the lower part of the heat sink.

LED Module: LED type Philips Lumileds LUXEON T. Composed of 32 high-performance white LEDs. Color temperature as per ANSI/NEMA bin Neutral White, 4000 Kelvin nominal (3985K +/- 275K or 3710K to 4260K), CRI 70 Min. 75 Typical.

RNS20 (Reference=L23638-3)

Optical System: (LE3), IES type III (asymmetrical). Composed of high-performance optical grade PMMA acrylic refractor lenses to achieve desired distribution optimized to get maximum spacing, target lumens and a superior lighting uniformity. Optical system is rated IP66. Performance shall be tested per LM-63, LM-79 and TM-15 (IESNA) certifying its photometric performance. Street side indicated.

Driver: High power factor of 90% minimum. Electronic driver, operating range 50/60 Hz. **Auto-adjusting universal voltage input from 120 to 277 VAC rated for both application line to line or line to neutral, Class I**, THD of 20% max. Maximum ambient operating temperature from -40F(-40C) to 130F(55C) degrees. **Driver comes with dimming compatible 0-10 volts.**

The current supplying the LEDs will be reduced by the driver if the driver experiences internal overheating as a protection to the LEDs and the electrical components. Output is protected from short circuits, voltage overload and current overload. Automatic recovery after correction. Standard built-in driver surge protection of 2.5kV (min).

Driver Options: (DMG), Dimming compatible 0-10 volts. For applicable warranty, certification and operation guide see *"Philips Lumec dimmable luminaire specification document for unapproved device installed by other"*. To get document, click on this link: Specification document or go on web site on this address: http://www.lumec.com/Lumec3DV2/PdfWebLink/Philips Lumec dimmable luminaire specification document for unapproved device installed by other.pdf

Surge Protector: Surge protector tested in accordance with ANSI/IEEE C62.45 per ANSI/IEEE C62.41.2 Scenario I Category C High Exposure 10kV/10kA waveforms for Line-Ground, Line-Neutral and Neutral-Ground, and in accordance with U.S. DOE (Department of Energy) MSSLC (Municipal Solid-State Street Lighting Consortium) model specification for LED roadway luminaires electrical immunity requirements for High Test Level 10kV / 10kA.

Adaptor: (SMB), Made of cast 356 aluminum, complete with a block connector, mechanically assembled to the bracket. Can be mounted on a 1.66"(42mm) to 2.38"(60mm) outside diameter bracket arm tubing that slip fits 6.5" (165mm) long inside the adaptor, permits an adjustment of ± 5°.

Luminaire Options: (RC), Receptacle for a twist-lock photoelectric cell or a shorting cap. Use of photocell or shorting cap is required to ensure proper illumination.

RNS20 (Reference=L23638-3)

Miscellaneous

Description of Components:

Wiring: Gauge (#14) TEW/AWM 1015 or 1230 wires, 6" (152mm) minimum exceeding from luminaire.

Hardware: All exposed screws shall be complete with Ceramic primer-seal basecoat to reduce seizing of the parts and offers a high resistance to corrosion. All seals and sealing devices are made and/or lined with EPDM and/or silicone and/or rubber.

Finish: Color to be **black textured RAL9005TX (BKTX)** and in accordance with the AAMA 2603 standard. Application of polyester powder coat paint (4 mils/100 microns) with ± 1 mils/24 microns of tolerance. The Thermosetting resins provides a discoloration resistant finish in accordance with the ASTM D2244 standard, as well as luster retention in keeping with the ASTM D523 standard and humidity proof in accordance with the ASTM D2247 standard.

The surface treatment achieves a minimum of 2000 hours for salt spray resistant finish in accordance with testing performed and per ASTM B117 standard.

LED products manufacturing standard: The electronic components sensitive to electrostatic discharge (ESD) such as light emitting diodes (LEDs) are assembled in compliance with IEC61340-5-1 and ANSI/ESD S20.20 standards so as to eliminate ESD events that could decrease the useful life of the product.

Quality Control: The manufacturer must provide a written confirmation of its ISO 9001-2008 and ISO 14001-2004 International Quality Standards Certification.

Certification: The manufacturer will have to supply a copy of approval products certificate, CSA or UL.

Vibration Resistance: The RNS20 meets the **ANSI C136.31-2001**, American National Standard for Roadway Luminaire Vibration specifications for normal applications. (Tested for 1.5G over 100 000 cycles)

Web site information details: Click on any specific information details you need:

Paint finish / Warranties / ISO 9001-2008 Certification / ISO 14001-2004 Certification

RNS20 (Reference=L23638-3)

LED light engine technical information for RNS20-30
LED = Philips Lumileds Luxeon T, CRI = 70, CCT = 4000K (3985K +/- 275K or 3710K to 4260K)
System (LED + driver) rated life = 100,000 hrs [1]

LED Module	Typical delivered lumens	Typical system wattage[2] (W)	Typical current @ 120 V (A)	Typical current @ 208 V (A)	Typical current @ 240 V (A)	Typical current @ 277 V (A)	LED current (mA)	HID Replacement[3]	Luminaire Efficacy Rating (Lm/W)	BUG rating
24W16LED4K-T-LE2	3040	28	0.25	0.15	0.13	0.12	530	70-100	107	B1-U2-G1
24W16LED4K-T-LE3	3017	28	0.25	0.15	0.13	0.12	530	70-100	106	B1-U2-G1
24W16LED4K-T-LE4	3032	28	0.25	0.15	0.13	0.12	530	70-100	107	B1-U2-G1
24W16LED4K-T-LE5	3050	28	0.25	0.15	0.13	0.12	530	70-100	107	B2-U2-G2
30W16LED4K-T-LE2	3825	37	0.32	0.19	0.17	0.15	700	70-100	103	B1-U2-G1
30W16LED4K-T-LE3	3796	37	0.32	0.19	0.17	0.15	700	70-100	103	B1-U2-G1
30W16LED4K-T-LE4	3815	37	0.32	0.19	0.17	0.15	700	70-100	103	B1-U2-G1
30W16LED4K-T-LE5	3837	37	0.32	0.19	0.17	0.15	700	70-100	104	B3-U3-G3
35W32LED4K-T-LE2	4236	36	0.31	0.19	0.17	0.15	350	70-100	118	B1-U3-G1
35W32LED4K-T-LE3	4175	36	0.31	0.19	0.17	0.15	350	70-100	116	B1-U2-G1
35W32LED4K-T-LE4	4225	36	0.31	0.19	0.17	0.15	350	70-100	117	B1-U2-G1
35W32LED4K-T-LE5	4249	36	0.31	0.19	0.17	0.15	350	70-100	118	B3-U3-G3
55W32LED4K-T-LE2	5945	53	0.47	0.27	0.24	0.22	530	100-150	111	B1-U3-G1
55W32LED4K-T-LE3	5900	53	0.47	0.27	0.24	0.22	530	100-150	110	B1-U3-G2
55W32LED4K-T-LE4	5930	53	0.47	0.27	0.24	0.22	530	100-150	112	B1-U3-G2
55W32LED4K-T-LE5	5994	53	0.47	0.27	0.24	0.22	530	100-150	113	B3-U3-G3

1 L70 = 100,000 hrs (at ambient temperature = 25°C)
2 System wattage or total luminaire wattage includes the LED module and the LED driver.
3 Note: These guidelines show typical replacements for the HID wattage ranges shown. Replacements should always be confirmed with a photometric layout.
Note: Due to rapid and continuous advances in LED technology, LED luminaire data is subject to change without notice and at the discretion of Philips.

verizon
2785 MITCHELL DRIVE, SUITE 9
WALNUT CREEK, CA 94598

Vinculums
575 LENNON LANE #125
WALNUT CREEK, CA 94598
OFFICE: (925) 482-8500

ALLSTATES ENGINEERING & SURVEYING
23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
DRAWN BY:	LS
CHECKED BY:	DW

REV	DATE	DESCRIPTION	
1	01/19/2021	100% CD'S FOR SUBMITTAL	MG
0	10/08/2020	100% CD'S FOR REVIEW	MG
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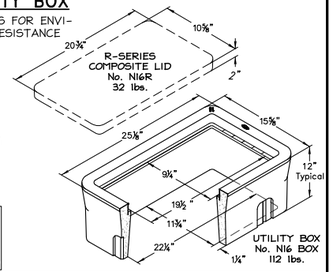
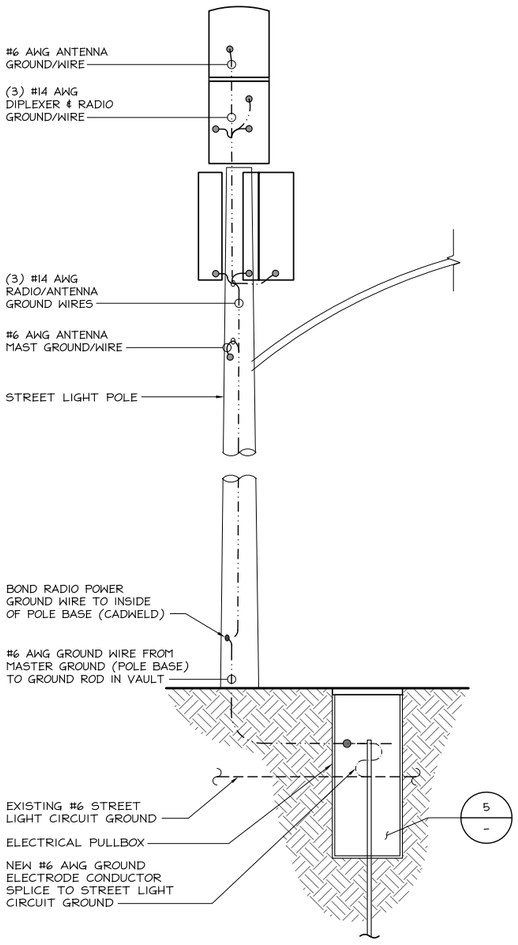
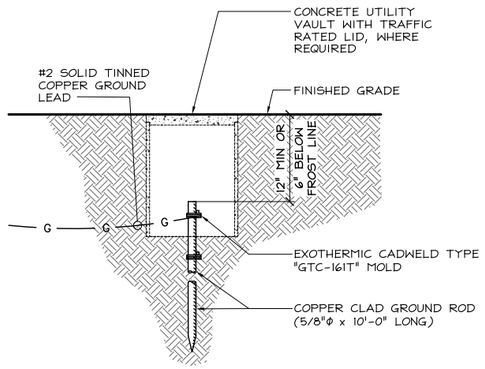
SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

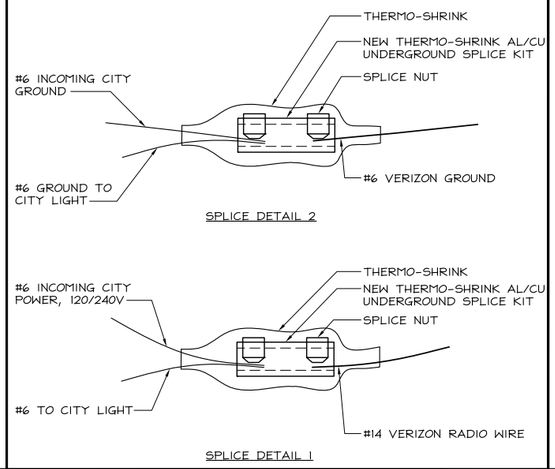
SHEET TITLE
LUMINAIRE DETAILS

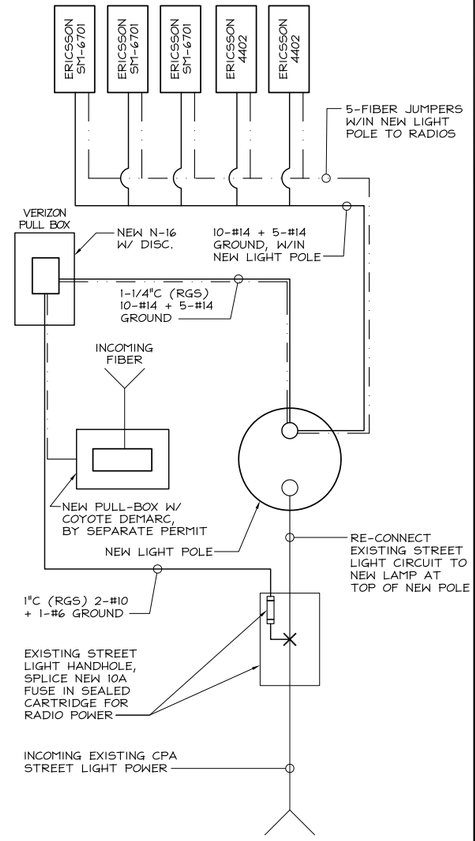
SHEET NUMBER
D-4











- CARLON HAL-FREE RISER-GARD, HJ4X4C-2000:

Technical Info:

UL Listed to 2024	Test Method	Maximum Value
Maximum Flame Propagation	UL 2024	3'6"
Maximum Air Temperature	UL 2024	387°F

- Storage and Handling -4°F to 150°F
- No UV protection (not suitable for outdoor use)
- Do NOT store outside

	Color	Part No.	Nom. I.D.	Nom. O.D.	Pull Tape	Reel Size	Reel Type	Reel Length (feet)	Reel Weight (lbs.)	Wt. per 100 ft. (lbs.)
2"	White	HJ4X4C-2000	2.000	2.425	900 lb.	82" x 41"	W	2000	375	20.8

W = Wood

CARLON RISER-GARD 7

OLDCASTLE N16 UTILITY BOX

- EXCEEDS ASTM-D1693 STANDARDS FOR ENVIRONMENTAL STRESS CRACKING RESISTANCE
- ETCHED POLYPROPYLENE FACE
- FACE ANCHORED IN CONCRETE
- ULTRA-VIOLET INHIBITOR

A HIGH DENSITY REINFORCED CONCRETE BOX WITH NON-SETTING SHOULDERS POSITIONED TO MAINTAIN GRADE AND FACILITATE BACK FILLING. APPROXIMATE DIMENSIONS AND WEIGHT SHOWN.

NOTE:
SPECIFICATION OF THIS VAULT MANUFACTURER AND MODEL ARE SUBJECT TO REPLACEMENT WITH APPROVED EQUIVALENT VAULT/LID

OLDCASTLE ORDER CODE	ITEM	APPROXIMATE SHIP'G. WEIGHT	DESCRIPTION
N16BOX	BOX	112 lbs.	N16 ELECTRICAL BOX (11-3/4"x22-1/4") - 20 PER PALLET
N16R	LID	32 lbs.	R-SERIES COMPOSITE LID WITH POLYPROPYLENE RING (ORDER N90 BOLT DOWN KIT SEPARATELY)
FL16T	LID	13 lbs.	FIBRELYTE LID, NON-CONCRETE BOLT DOWN (ORDER N90 BOLT-DOWN KIT SEPARATELY)
N16J	LID	36 lbs.	CAST IRON LID BOLT DOWN (ORDER N90 BOLT-DOWN KIT SEPARATELY)
B16-61D	COVER	28 lbs.	STEEL CHECKER PLATE COVER
N16-61J	COVER	28 lbs.	STEEL CHECKER PLATE COVER (ORDER N90 BOLT-DOWN KIT SEPARATELY)
B16X12	EXTENSION	113 lbs.	12" REINFORCED CONCRETE BOX EXTENSION - 20 PER PALLET
B30SL	SLAB	52 lbs.	REINFORCED CONCRETE SLAB (16"x28")

N16 U.G. UTILITY BOX 6

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

PANEL 'A'

SITE NAME:
P-64 - SF **PALO ALTO 121**

PANEL DESIGNATION:
AC PANEL 'A'

VOLTAGE: 120/240 V
PHASE: 1
WIRE: 3
MAIN BREAKER: 60 AMP
BUSS RATING: 60 AMP
LOCATION: UG VAULT

CKT	LOAD DESCRIPTION	BREAKER AMPS	BREAKER POLES	BREAKER STATUS	SERVICE LOAD VA	USAGE FACTOR	PHASE A VA	PHASE B VA	PHASE A VA	PHASE B VA	USAGE FACTOR	SERVICE LOAD VA	BREAKER STATUS	BREAKER POLES	BREAKER AMPS	LOAD DESCRIPTION	CKT
1	MAIN	60	2	**ON**			0		250		1.25	200	**ON**	2	15	ERICSSON SM-6701 #3	2
3								0		250	1.25	200					4
5	ERICSSON SM-6701 #1	15	2	**ON**	200	1.25	250		313		1.25	250	**ON**	2	15	ERICSSON 4402 #1	6
7					200	1.25		250		313	1.25	250					8
9	**ERICSSON SM-6701 #2**	15	2	**ON**	200	1.25	250		313		1.25	250	**ON**	2	15	ERICSSON 4402 #2	10
11					200	1.25		250		313	1.25	250					12

CONTRACTOR SHALL LABEL PANEL WITH CARRIER I.D., SERVICE RATING, AND FEED SOURCE

PHASE A TOTAL VA	1375
PHASE B TOTAL VA	1375
TOTAL KVA	2.75
TOTAL AMPS	11.46

NOTES:
1. ALL LOADS CALCED AS LCL/MCL LOADS (OK TO DESIGN TO 100% CAPACITY)
2. UNUSED BREAKER POSITIONS SHALL REMAIN COVERED W/ MFR. COVER
3. ALL EQUIPMENT/BREAKERS SHALL BEAR A LABEL FOR I.D. & RATING

PANEL SCHEDULE 2

GROUND RISER DIAGRAM 7

GROUND WELL/ROD 5

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

SPLICE DETAIL 2

SPLICE DETAIL 1

NOT USED 4

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

ELECTRICAL NOTE:

1. ALL WORK SHALL COMP;Y TO THE CURRENT EDITION OF THE CALIFORNIA ELECTRICAL CODE, CALIFORNIA BUILDING CODE, NATIONAL ELECTRICAL CODE, ALL APPLICABLE REGULATIONS GOVERNING NON-JPA UTILITY POLES (G.O. 95), AND ALL APPLICABLE LOCAL CODES.
2. ALL WORK SHALL COMPLY WITH VERIZON CARRIER CONSTRUCTION STANDARDS FOR SMALL CELL INSTALLATION.
3. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND ALL APPLICABLE LOCAL CODES.
4. AC PANEL SHALL HAVE A 'MAIN' BREAKER AFFIXED TO BOTH POLES OF THE MAIN LUG BUSS AND FED THROUGH LOAD SIDE TO PROVIDE SINGLE SHUT-OFF SWITCH FOR ALL SMALL CELL POWER ON AC PANEL.
5. POWER, CONTROL AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT. SHALL BE SINGLE CONDUCTOR (#14 AWG AND LARGER), 600V, OIL RESISTANT. THWN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90°C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED.
6. REFER TO PANEL SCHEDULE (2/-) AND ONE-LINE DIAGRAM (1/-) FOR CIRCUIT ARRANGEMENT & WIRING CONNECTION.
7. SUBCONTRACTOR SHALL COORDINATE WITH UTILITY COMPANY BEFORE THE START OF CONSTRUCTION. POWER AND TELEPHONE CONDUIT SHALL BE PROVIDED AND INSTALLED PER UTILITY REQUIREMENTS.
8. SUBCONTRACTOR SHALL PROVIDE 20 AMP, SINGLE PHASE, 120/240 (OR 120/208) VAC, 60HZ SERVICE FOR VERIZON SITE.

ELECTRICAL NOTES 3

ONE-LINE DIAGRAM 1

verizon
2785 MITCHELL DRIVE, SUITE 9
WALNUT CREEK, CA 94598

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ALLSTATES
ENGINEERING & SURVEYING
23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
DRAWN BY:	LS
CHECKED BY:	DW

REV	DATE	DESCRIPTION	
1	01/19/2021	100% CD'S FOR SUBMITTAL	MG
0	10/08/2020	100% CD'S FOR REVIEW	MG
B	06/04/2020	95% CD'S FOR REDLINE	RF
A	04/10/2020	90% CD'S FOR REDLINE	NC

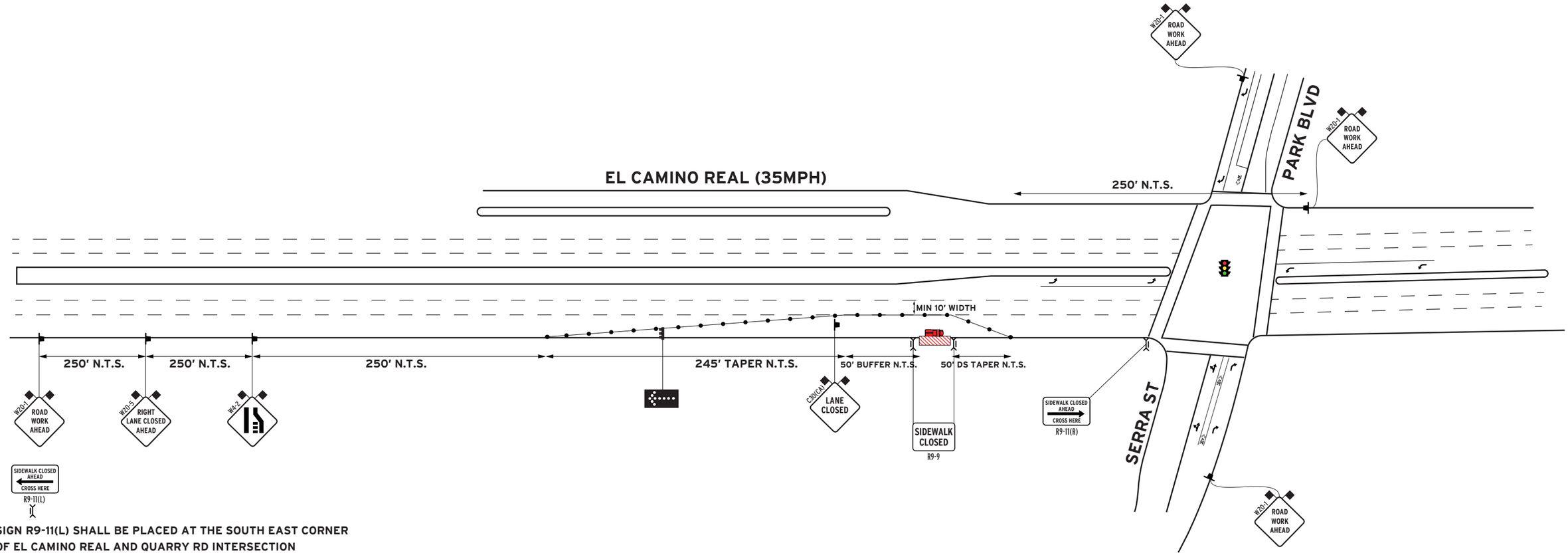
WISSAM ZALZALI
71655

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

SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE
ELECTRICAL/GROUNDING DIAGRAMS, NOTES, & PANEL SCHEDULE

SHEET NUMBER
E-1



SIGN R9-11(L) SHALL BE PLACED AT THE SOUTH EAST CORNER OF EL CAMINO REAL AND QUARRY RD INTERSECTION

LEGEND:

- CHANNELIZING DEVICE WITH CLIP-ON SIGN
- CHANNELIZING DEVICE
- SIGN
- WORK ZONE
- DIRECTION OF TRAFFIC
- TYPE 1 BARRICADE
- TYPE 1 BARRICADE W/SIGN
- TYPE 3 BARRICADE
- TYPE 3 BARRICADE W/SIGN
- K-RAIL/WATER FILLED BARRIERS
- TEMP RAISED MARKERS
- ARROW BOARD MARKER
- PEDESTRIAN BARRICADES
- CERTIFIED FLAGGER
- CRASH BARRELS
- MESSAGE BOARD (PCMS)
- FLASHING ARROWBOARD
- CRASH ATTENUATORS
- FLASHING BEACON/BARRICADE LIGHT

PLAN 1
TEMP TRAFFIC CONTROL PLAN

NOTES

- Traffic control shall conform with the most current CAMUTCD part 6 and/or Caltrans Standards
- One lane of traffic in each direction and all high volume turning lanes shall be maintained at all times on all streets at a minimum lane width of 10 feet.
- Contractor shall notify local authorities once signs are posted.
- All advanced warning signs shall be equipped with 2 (18" orange flags)
- Certified Traffic Control Workers shall have Type II vests, work shoes, and hard hats.
- Temporary no parking signs shall be placed a min of 72 hrs prior of work.
- Driveways shall be monitored and maintained at all times during work hours.
- Distance between sign and work area will be determined on speed limit.
- Roadway shall not be opened until safe for public use. All open trenches must be plated or - backfilled prior to public usage.
- All Devices shall be removed when no longer required.

MEANING OF LETTER CODES ON TYPICAL APPLICATION DIAGRAMS MUTCD TABLE 6C-1

ROAD TYPE	DISTANCE BETWEEN SIGNS		
	A	B	C
Urban (Low Speed) - 25 mph or less	100 ft	100 ft	100 ft
Urban (Low Speed) + 25 to 40 mph	250 ft	250 ft	250 ft
Urban (High Speed) + 40 mph	350 ft	350 ft	350 ft
Rural	500 ft	500 ft	500 ft
Expressway / Freeway	1,000 ft	1,500 ft	2,640 ft

COMPASS:

SCALE: NOT TO SCALE

DATE REQSTD: 5/4/20

DATE COMPLTD: 5/7/20

PROJECT LOCATION: 1600 EL CAMINO REAL, PALO ALTO, CA

PO# SF PALO ALTO 121

PAGE# 1/1

REQUEST BY:
YVONNE WASHINGTON
VINCULUMS
925-999-5523
YWASHINGTON@VINCULUMS.COM

AFTER HOURS EMERGENCY 510-299-5666

Drawn By:
DREW PATEL
CSLB# 917034
Office: 510-657-2543
Fax: 510-657-2544

44800 Industrial Drive Fremont, CA 94538
WWW.BATSTRAFFICSOLUTIONS.COM

B.A.T.S. TRAFFIC SOLUTIONS

Vinculums

575 Lennon Lane #125
Walnut Creek, CA 94598
(925) 482-8500

ALLSTATES

23675 Birtcher Dr.
Lake Forest, CA
(949) 273-0996

VERIZON
PALO ALTO_121

All States Engineering & Surveying
Project No: 64 – CLUSTER-6 | PALO ALTO_121

Structural Analysis Report

ROW Adjacent to 1664 El Camino Real (CA-82), Palo Alto, 94306
Proposed 29'-6" AGL 'Downtown' Style Aluminum Light Pole & Foundation

REGISTERED PROFESSIONAL ENGINEER WISSAM ZAZALI C 71655 CIVIL STATE OF CALIFORNIA

Rev. #	Reason for Revision	Total # of Sheets	Prepared By	Checked By	Approved /Accepted	Date
1	Updated Pole Specs	22	LeT	LeT	WZ	12/4/2020

	Quantity/Type /Shape	Strength (min.)	Dimensions	Thickness /Depth	Capacity Utilization	
Pole Shaft	Aluminum / 8-sided tapered	25 ksi*	5.65"Φ at top 10.0"Φ at bottom	0.219"	41.4 %	PASS
Anchor Bolts	4	36 ksi	1" Φ	-	41.0 %	PASS
Base Plate	1	36 ksi	13.6" Cast Base	-	ADEQUATE	
Foundation	Circular Caisson	3.25 ksi	36"Dia.	7'-0"**	ADEQUATE	

* Pole grade is 6063-T6 per provided specs.
** Required depth of caisson (**Unrestrained** at G/L) – This analysis was performed without a soil report, and minimum soil properties from IBC 18 were used. Required pole foundation embedment depth may change with a soil report from the proposed pole location.

Professional Engineering Firm
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www.allstatesengineering.com

Steel Decorated Pole
Palo Alto
PALO ALTO_121

ALLSTATES

Project Description:
All States Engineering & Surveying (ASES) is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the metal pole.
The purpose of the analysis is to determine acceptability of the pole stress level. Based on our analysis we have determined the metal pole stress level for the structure and anchorage, under the following load case:

LC: Proposed Pole + Proposed Equipment with Shroud
(Please see page 5 for details)

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

Structural Analysis Parameters:
This analysis has been performed in accordance with AASHTO 2013 guidelines.

- Wind Speed: ***85 mph per AASHTO 2013***
- Exposure Category: ***C***
- Risk Category: ***II***
- Topographical: ***1***
- Crest Height = ***0***
- Ice Thickness = ***0 in***
- Min. Soil Lateral Bearing = ***100 psf/ft*2 = 200 psf/ft per CBC & IBC 1806.3.4***
- Min. Soil Bearing = ***1500 psf***

We at *All States Engineering & Surveying* appreciate the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or any other projects, please give us a call.

ATC Hazards by Location

Search Information

Address:	1664 El Camino Real, Palo Alto, CA 94306, USA
Coordinates:	37.430475, -122.1524438
Elevation:	49 ft
Timestamp:	2020-12-04T19:10:34.720Z
Hazard Type:	Seismic
Reference Document:	ASCE7-16
Risk Category:	II
Site Class:	D-default

Basic Parameters

Name	Value	Description
S_S	1.775	MCE_R ground motion (period=0.2s)
S_1	0.637	MCE_R ground motion (period=1.0s)
S_{MS}	2.13	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	1.42	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1.2	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.915	Coefficient of risk (0.2s)
CR_1	0.9	Coefficient of risk (1.0s)
PGA	0.73	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.877	Site modified peak ground acceleration

T_L	12	Long-period transition period (s)
SsRT	2.057	Probabilistic risk-targeted ground motion (0.2s)
SsUH	2.248	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.775	Factored deterministic acceleration value (0.2s)
S1RT	0.82	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.912	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.637	Factored deterministic acceleration value (1.0s)
PGAd	0.73	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

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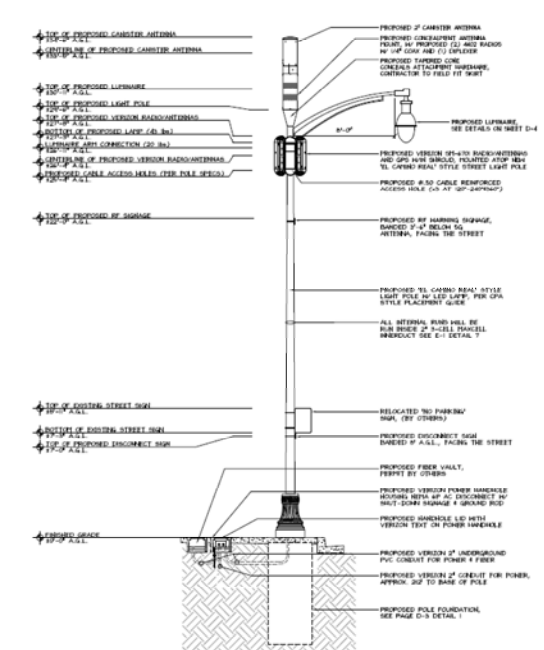
ALLSTATES
PROJECT: PALO ALTO_121
CLIENT: 102 - Sequoia VZW Bakersfield
DESIGN BY:
REVIEW BY: LeT
DATE: 12/4/2020

Pole Wind & Seismic Analysis Based on AASHTO 2013 | **Proposed Elevation**

NOTES:
1. NEW GALVANIZED LIGHT POLE TO BE PAINTED WITH MUNSELL RAL8.5GY2.74/2.1 PAINT.
2. NEW RADIOS AND HARDWARE TO BE PAINTED MUNSELL RAL8.5GY2.74/2.1 OR WRAPPED AS ALLOWED BY THE MANUFACTURER.
3. ALL CABLE/WIRE BETWEEN THE POLE ACCESS HOLE AND THE SHROUD GROMMET HOLE WILL RUN TROUGH 1.5" CONDUIT PAINTED/COLORED TO MATCH POLE COLOR.

TOTAL ANETNNA/RADIO VOLUME (CU. FT.)		
MODEL	TOTAL	TOTAL VOLUME (CU. FT.)
SM6701	3	±5.5
4G CANISTER + CONE	1	±4.4



ALLSTATES
PROJECT: PALO ALTO_121
CLIENT: 102 - Sequoia VZW Bakersfield
DESIGN BY:
REVIEW BY: LeT
DATE: 12/4/2020

Pole Wind & Seismic Analysis Based on AASHTO 2013 | **Loading**

PROPOSED COMPONENTS

Rad Center	Component Type	QUANTITY	MOUNT TYPE
32'-0"	(N) Canister Antenna w/ Shroud	1	Top Mounted Pole
26'-4"	(N) Ericsson SM6701 Antennas	3	Pole Mounted
17'-6"	Reserved 30" x 72" Banner	1	
9'-0"	(E) Street Sign	1	
-	(N) RF Signage	1	
-	(N) & (E) Conduit, Wire, & In-line Fuse	-	Inside Pole

WIND PRESSURE DERIVATION (AASHTO 2013)

Height of Pole	h =	29.5	ft	
Wind Speed	V =	85	mph	(AASHTO 2013)
Wind Exposure (B, C or D)		C		
Wind Directionality (Pole)	K_d =	0.95		(AASHTO 2013, Table 3.8.5-1)
Gust Effect Factor	G =	1.14		(AASHTO 2013, Sec. 3.8.6)
3-sec Gust Exponent	α =	9.50		(ASCE 7-16, Table 26.11-1)
Atmospheric Height	Z_g =	900	ft	(ASCE 7-16, Table 26.11-1)
Vel. Pressure Coeff. (Min)	$K_{z,min}$ =	0.84		(ASCE 7-16, Table 29.10-1)
Velocity Pressure Coeff	$K_z = 2.0(z/Z_g)^{2/\alpha}$ =	0.97		(AASHTO 2013, Equation 3.8.4-1)
Wind Force @ Pole top	$F_d = 0.00256K_zK_dGV^2(C_dA)$ =	19.5	psf *C_dA	(Wind Pressure Input For O-Calc Analysis)
Total Applied Shear	V_u =	977	lbs	(From TNX Report)
Total Applied Moment	M_u =	15728	lb-ft	(From TNX Report)

CALCULATION OF WIND DRAG COEFFICIENTS (Cd) FROM AASTHO 2013, TABLE 3.8.7-1 — C_v = 1.00 For V≤105 mph

Appurtenance	Height (in)	Width (in)	Depth (in)	d (ft)	C_vVd	C_d
(N) Canister Antenna w/ Shroud	65.0	12.0	-	1.00	85	0.45
(N) Ericsson SM6701 Antennas	32.2	10.2	7.3	1.05	-	1.70
(E) Round Luminaire	2.9	88.0	-	0.24	20	0.50
(E) Round Pole	354	7.85	-	0.65	56	0.69

SEISMIC LOAD ANALYSIS (ASCE 7-16)

Total Pole Weight	$W = P_s$ =	752	lbs	(Approximate Wt. Including Pole With (N) Components)
Spectral Response (Short)	S_{DS} =	1.775		(ATC Hazards Design Maps Summary)
Spectral Response (1 sec.)	S_1 =	0.637		(ATC Hazards Design Maps Summary)
Importance Factor	I_e =	1.0		(ASCE 7-16, Section 15.4.1.1)
Response Factor	R =	1.5		(ASCE 7-16, Table 15.4-2)
Seismic Response Coeff	$C_s = 0.044S_{DS}I$ =	0.078		(ASCE 7-16, Section 15.4-1)
Seismic Response Coeff	$C_s = 0.8S_1/(R/I_e)$ =	0.340		(ASCE 7-16, Section 15.4-2)
Seismic Response Coeff	$C_s = S_{DS}/(R/I_e)$ =	1.183		(ASCE 7-16, Section 12.8-2)
Lateral Seismic Force	$V_s = MAX(C_s)W$ =	1.183	*W	
Total Applied Shear	V_s =	890	lbs	
Total Applied Moment	$M_s = V_s(2/3h)$ =	17501	lb-ft	

(Seismic Loads Governing For Pole Shaft Capacity Check)

verizon✓

2785 MITCHELL DRIVE, SUITE 9
WALNUT CREEK, CA 94598

Vinculums

575 LENNON LANE #125
WALNUT CREEK, CA 94598
OFFICE: (925) 482-8500

ALLSTATES
ENGINEERING & SURVEYING

23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
DRAWN BY:	LS
CHECKED BY:	DW

REV	DATE	DESCRIPTION	
1	01/19/2021	100% CD'S FOR SUBMITTAL	MG
0	10/08/2020	100% CD'S FOR REVIEW	MG
B	06/04/2020	95% CD'S FOR REDLINE	RF
A	04/10/2020	90% CD'S FOR REDLINE	NC

REGISTERED PROFESSIONAL ENGINEER WISSAM ZAZALI 71655 CIVIL STATE OF CALIFORNIA

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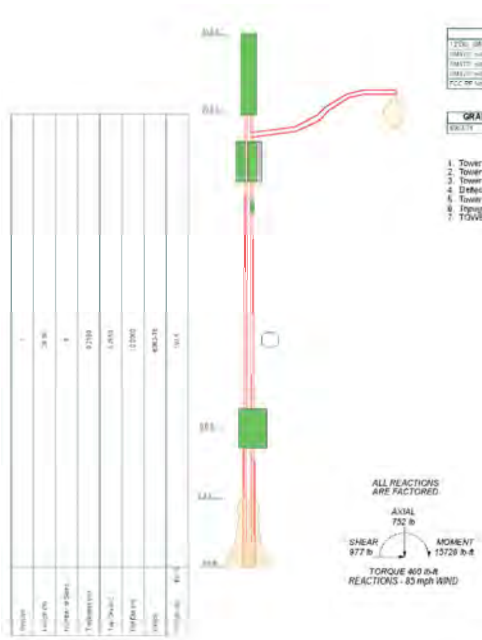
SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE
CALCS W/ SHROUD

SHEET NUMBER
C-1

07



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
[illegible]	[illegible]	[illegible]	[illegible]

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
[illegible]	[illegible]	[illegible]			

TOWER DESIGN NOTES

1. Tower is located in Santa Clara County, California.
2. Tower designed for Exposure C to the AASHTO 2013 Standard.
3. Tower designed for a 85 mph basic wind in accordance with the AASHTO 2013 Standard.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 41.4%

All States Engineering & Surveying
23675 Birtcher Drive
Lake Forest, CA 92630
Phone: (949) 273-0998
FAX: (949) 606-7222

Palo Alto_Light Pole
PALO ALTO_121
64 - Vinculums_VZW
AASHTO 2013 | 12/04/20 | NTS | E-1

08

Steel Decorated Pole
Palo Alto
PALO ALTO_121

Tower Input Data

The tower is a monopole.
This tower is designed using the ASSHTO 2013 standard. The following design criteria apply:

- Tower is located in Santa Clara County, California.
- Basic wind speed of 85 mph.
- Structure Class II.
- Exposure Category C.
- Topographic Category 1.
- Crest Height 0.00 ft.
- Deflections calculated using a wind speed of 60 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	29.50-0.00	29.50		8	5.7650	10.0000	0.2190	0.8760	6063-T6 (25 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	6.0596	4.0324	16.3628	2.0187	3.1189	5.2464	33.5169	1.9653	1.4801	6.758
	10.6435	7.1116	89.7569	3.5603	5.4100	16.5909	183.8543	3.4661	3.2333	14.764

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 29.50-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
Existing Cable Inside Pole	C	No	Yes	CaAa (Out Of Face)	0.50 - 0.00	1	No Ice	0.06	0.15

09

Steel Decorated Pole
Palo Alto
PALO ALTO_121

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	29.50-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.032	0.07
		D	0.000	0.000	0.000	0.000	0.00

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Light Luminarie	A	From Leg	6.50 0.00 0.00	0.0000	22.50	No Ice	2.36	2.36	55.00
8' x 2.875" O.D. Light Pole Arm	A	From Leg	4.00 0.00 1.75	0.0000	22.50	No Ice	1.92	0.06	65.00
FCC RF Notice Signage	C	From Leg	0.00 0.00 0.00	0.0000	23.50	No Ice	0.33	0.01	0.20
* SM6701 with Shroud	C	From Leg	0.25 0.25 0.00	0.0000	26.33	No Ice	2.80	2.08	49.00
SM6701 with Shroud	B	From Leg	0.25 0.25 0.00	0.0000	26.33	No Ice	2.80	2.08	49.00
SM6701 with Shroud	D	From Leg	0.25 0.25 0.00	0.0000	26.33	No Ice	2.80	2.08	49.00
* 30"x30" Street Sign	C	From Leg	0.00 0.00 0.00	0.0000	9.00	No Ice	7.50	0.05	5.00
* 2PC Cast Alum. Huntington Clamshell	C	None		0.0000	1.42	No Ice	2.01	2.01	50.00
* 12"Dia. x65" Shroud w/ Antenna	C	None		0.0000	32.00	No Ice	3.06	3.06	107.10

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Steel Decorated Pole
Palo Alto
PALO ALTO_121

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 45 deg - No Ice
5	0.9 Dead+1.6 Wind 45 deg - No Ice
6	1.2 Dead+1.6 Wind 90 deg - No Ice
7	0.9 Dead+1.6 Wind 90 deg - No Ice
8	Dead+Wind 0 deg - Service
9	Dead+Wind 45 deg - Service
10	Dead+Wind 90 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	29.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	4	-750.83	-9109.43	10215.91
			Max. Mx	7	-562.50	-14557.27	-976.05
			Max. My	2	-750.42	1948.62	15606.77
			Max. Vy	6	972.13	-14499.56	-842.39
			Max. Vx	2	-972.26	1948.62	15606.77
			Max. Torque	5			460.85

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	4	752.22	-612.05	612.05
	Max. H_x	3	564.16	105.32	970.86
	Max. H_z	2	752.22	105.32	970.89
	Max. M_x	2	15606.79	105.32	970.89
	Max. M_z	7	14557.26	-970.87	-105.32
	Max. Torsion	5	459.78	-612.03	612.03
	Min. Vert	3	564.16	105.32	970.86
	Min. H_x	7	564.16	-970.87	-105.32
	Min. H_z	6	752.22	-970.85	-105.32
	Min. M_x	7	-976.25	-970.87	-105.32
	Min. M_z	2	-1948.42	105.32	970.89
	Min. Torsion	1	0.02	-0.16	-0.16

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	626.85	0.16	0.16	-445.72	463.59	-0.02
1.2 Dead+1.6 Wind 0 deg - No Ice	752.22	-105.32	-970.89	-15606.79	1948.42	-323.36
0.9 Dead+1.6 Wind 0 deg - No Ice	564.16	-105.32	-970.86	-15377.55	1796.31	-324.40

11

Steel Decorated Pole
Palo Alto
PALO ALTO_121

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
1.2 Dead+1.6 Wind 45 deg - No Ice	752.22	612.05	-612.05	-10215.74	-9109.62	-458.34
0.9 Dead+1.6 Wind 45 deg - No Ice	564.16	612.03	-612.03	-10017.19	-9196.90	-459.78
1.2 Dead+1.6 Wind 90 deg - No Ice	752.22	970.85	105.32	842.58	-14499.55	-324.68
0.9 Dead+1.6 Wind 90 deg - No Ice	564.16	970.87	105.32	976.25	-14557.26	-325.67
Dead+Wind 0 deg - Service	626.85	-29.32	-270.43	-4629.12	851.45	-90.62
Dead+Wind 45 deg - Service	626.85	170.51	-170.47	-3132.85	-2217.08	-128.19
Dead+Wind 90 deg - Service	626.85	270.39	29.37	-63.99	-3711.64	-90.69

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
L1	29.5 - 0 (1)	TP10x5.765x0.219	29.50	29.50	99.4	7.1116	-750.42	126745.00	0.006

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	29.5 - 0 (1)	TP10x5.765x0.219	15727.92	38573.92	0.408	0.00	38573.92	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u lb-ft	ϕT_n lb-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	29.5 - 0 (1)	TP10x5.765x0.219	977.97	99206.40	0.010	323.35	80323.58	0.004

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	29.5 - 0 (1)	0.006	0.408	0.000	0.010	0.004	0.414 ✓	1.000	[illegible] ✓

12

Steel Decorated Pole
Palo Alto
PALO ALTO_121

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
L1	29.5 - 0	Pole	TP10x5.765x0.219	1	-750.42	126745.00	41.4	Pass
							Summary	
						Pole (L1)	41.4	Pass
						RATING =	**41.4**	**Pass**

verizon✓
2785 MITCHELL DRIVE, SUITE 9
WALNUT CREEK, CA 94598

Vinculums
575 LENNON LANE #125
WALNUT CREEK, CA 94598
OFFICE: (925) 482-8500

ALLSTATES ENGINEERING & SURVEYING
23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
DRAWN BY:	LS
CHECKED BY:	DW

REV	DATE	DESCRIPTION	
1	01/19/2021	100% CD'S FOR SUBMITTAL	MG
0	10/08/2020	100% CD'S FOR REVIEW	MG
B	06/04/2020	95% CD'S FOR REDLINE	RF
A	04/10/2020	90% CD'S FOR REDLINE	NC

REGISTERED PROFESSIONAL ENGINEER
WISSAM ZALZALI
71655
CIVIL
STATE OF CALIFORNIA

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

SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE
CALCS W/ SHROUD

SHEET NUMBER
C-2

Hilti PROFIS Engineering 3.0.65

www.hilti.com

Company:	All State Eng. & Surveying	Page:	1
Address:	23675 Birtcher Dr. Lake Forest, CA 92630	Specifier:	
Phone I Fax:	9492730996 |	E-Mail:	
Design:	Concrete - Sep 9, 2020 (1)	Date:	12/4/2020
Fastening point:			

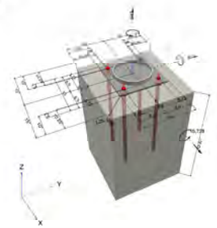
Specifier's comments:

1 Input data

Anchor type and diameter:	Heavy Hex Head ASTM F 1554 GR. 36 1
Item number:	not available
Effective embedment depth:	h_{ef} = 25.000 in.
Material:	ASTM F 1554
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ACI 318-08 / CIP
Stand-off installation:	without clamping (anchor); restraint level (anchor plate): 1.00; e_b = 1.250 in.; t = 0.500 in.
Anchor plate[1]:	l, x l, x t = 13.000 in. x 13.000 in. x 0.500 in.; (Recommended plate thickness: not calculated)
Profile:	Round HSS (AISC); HSS10X.188; (L x W x T) = 10.000 in. x 10.000 in. x 0.188 in.
Base material:	cracked concrete, 3000, f'c = 3,000 psi; h = 84.000 in.
Reinforcement:	tension: condition A, shear: condition B; anchor reinforcement: tension edge reinforcement: > No. 4 bar with stirrups
Seismic loads (cat. C, D, E, or F)	no

[1] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, ft-lb]



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Phone I Fax:	9492730996 |	E-Mail:	
Design:	Concrete - Sep 9, 2020 (1)	Date:	12/4/2020
Fastening point:			

1.1 Design results

Case	Description	Forces [lb] / Moments [ft-lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 642; V_y = 0; V_z = 977; M_x = 15,726.000; M_y = 0.000; M_z = 0.000;	no	41

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Fastening point:			

2 Proof I Utilization (Governing Cases)

		Design values [lb]		Utilization	
Loading	Proof	Load	Capacity	β_N / β_V [%]	Status
Tension	Pullout Strength	10,094	25,217	41 / -	OK
Shear	Steel failure (with lever arm)	244	886	- / 28	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	0.400	0.276	5/3	34	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

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Design:	Concrete - Sep 9, 2020 (1)	Date:	12/4/2020
Fastening point:			

4 Remarks; Your Cooperation Duties

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All States Engineering & Surveying
Zalzali & Associates, Inc.
23675 Birtcher Drive
Lake Forest
CA
92630

Project Title: Lighht Pole Caisson Embedment Depth
Engineer:
Project ID: Palo Alto Light Pole
Project Descr:

File: Caisson Depth.ecd
Software copyright ENERCALC, INC. 1983-2020, Build:12.20.8.27
Lic. # : KW-06009156
Zalzali & Associates Inc.

Pole Footing Embedded in Soil

DESCRIPTION: Proposed Caisson embedment (soil values From IBC Table 1806.2 with lateral bearing load increase from IBC 1806.3.4)

Code References

Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Pole Footing Shape: Circular
Pole Footing Diameter: 36.0 in
Calculate Min. Depth for Allowable Pressures
No Lateral Restraint at Ground Surface
Allow Passive: 200.0 pcf
Max Passive: 1,500.0 psf

Controlling Values

Governing Load Combination : +D+W
Lateral Load: 0.9770 k
Moment: 15.728 k-ft
NO Ground Surface Restraint
Pressures at 1/3 Depth
Actual: 433.356 psf
Allowable: 433.550 psf

Minimum Required Depth: 6.625 ft

Footing Base Area: 7.069 ft^2
Maximum Soil Pressure: 0.618.62 ksf

Applied Loads

Lateral Concentrated Load (k)		Lateral Distributed Loads (k/ft)		Vertical Load (k)
D : Dead Load	k	k/ft		0.6420 k
Lr : Roof Live	k	k/ft		k
L : Live	k	k/ft		k
S : Snow	k	k/ft		k
W : Wind	0.9770 k	k/ft		k
E : Earthquake	k	k/ft		k
H : Lateral Earth	k	k/ft		k
Load distance above ground surface	16.708 ft	TOP of Load above ground surface	ft	
		BOTTOM of Load above ground surface	ft	

Load Combination Results

	Forces @ Ground Surface		Required	Pressure at 1/3 Depth		Soil Increase
Load Combination	Loads - (k)	Moments - (ft-k)	Depth - (ft)	Actual - (psf)	Allow - (psf)	Factor
+D+W	0.977	15.728	6.63	433.4	433.5	1.000

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Zalzali & Associates Inc.

Concrete Caisson

DESCRIPTION: Design Concrete Caisson

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

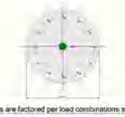
General Information

f'c : Concrete 28 day strength = 3.250 ksi
E = 3,122.0 ksi
Density = 150.0 pcf
= 0.850
fy - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits: ASTM A615 Bars Used
Min. Reinf. = 0.250 %
Max. Reinf. = 8.0 %

Overall Caisson Height: 7.0 ft
End Fixity: Top Free, Bottom Fixed
Brace condition for deflection (buckling) along Caisson :
X-X (width) axis :
Fully braced against buckling ABOUT Y-Y Axis
Y-Y (depth) axis
Fully braced against buckling ABOUT X-X Axis

Caisson Cross Section

Column Dimensions: 36 0in Diameter, Caisson Edge to Rebar Edge Cover = 3.0in
Column Reinforcing: 12 - #5 bars



Entered loads are factored per load combinations specified by user.

Applied Loads

Caisson self weight included: 7,422.01 lbs * Dead Load Factor
AXIAL LOADS...
Reaction from Pole: Axial Load at 7.0 ft above base, D = 0.7320 k
BENDING LOADS...
Reaction from Pole: Lat. Point Load at 7.0 ft creating Mx-x, W = 1,628 ft-k
Reaction from Pole: Moment acting about X-X axis at 7.0 ft, W = 26,213 k-ft

DESIGN SUMMARY

Load Combination: +0.90D+W+1.60H
Location of max above base: 6.953 ft
Maximum Stress Ratio: 0.672 : 1
Ratio = (Pu^2+Mu^2)^.5 / (PhiPn^2+PhiMn^2)^.5
Pu = 7.357 k, φ * Pn = 98.643 k
Mu-x = 26.137 k-ft, φ * Mn x = -369.236 k-ft
Mu-y = 0.0 k-ft, φ * Mn-y = 0.0 k-ft
Mu Angle = 0.0 deg
Mu at Angle = 26.137 k-ft, φMn at Angle = 363.063 k-ft
Pn & Mn values located at Pu-Mu vector intersection with capacity curve

Caisson Capacities . . .

Pmax : Nominal Max. Compressive Axial Capacity: 3,024.81 k
Pmin : Nominal Min. Tension Axial Capacity: k
φ Pn, max : Usable Compressive Axial Capacity: 1,799.78 k
φ Pn, min : Usable Tension Axial Capacity: k

Maximum SERVICE Load Reactions . .

Top along Y-Y: 0.0 k, Bottom along Y-Y: 0.0 k
Top along X-X: 0.0 k, Bottom along X-X: 0.9770 k

Maximum SERVICE Load Deflections . . .

Along Y-Y: 0.000339 in @ 7.0 ft above base for load combination : W Only
Along X-X: 0.0 in @ 0.0 ft above base for load combination :

General Section Information . φ = 0.76, β = 0.650, ρ = 0.865
ρ % Reinforcing: 0.3655 %, Rebar % Ok
Reinforcing Area: 3.720 in^2
Concrete Area: 1,017.88 in^2

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Concrete Caisson

DESCRIPTION: Design Concrete Caisson

Governing Load Combination Results

Governing Factored Load Combination	Moment X-X	Moment Y-Y	Dist. from base ft	Axial Load Pu k	Bending Analysis k-ft φ * Pn	Δ+	Δ+ * Mnx	Δ-	Δ- * Mny	Alpha (deg)	Mu	φ Mn	Utilization Ratio
+1.40D+1.60H			6.93	11.44	1,799.78					0.000			0.006
+1.20D+0.50Lr+L+W+1.60H	Actual		6.93	9.81	150.99	1.000	26.14			0.000	26.14	429.10	0.062
+0.90D+W+1.60H	Actual		6.93	7.36	98.64	1.000	26.14			0.000	26.14	383.04	0.072

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction k @ Base	@ Top	Axial Reaction k @ Base	Mx - End Moments k-ft @ Base	@ Top	My - End Moments k-ft @ Base	@ Top
+D+H					4.174				
+D+0.60W+H			0.977		5.174	6.889			
+0.60D+0.60W+0.60H			0.977		4.004	6.889			

Maximum Moment Reactions

Note: Only non-zero reactions are listed.

Load Combination	Moment About X-X Axis @ Base	@ Top	Moment About Y-Y Axis @ Base	@ Top
+D+H				
+D+0.60W+H	6.889 k-ft			
+0.60D+0.60W+0.60H	6.889 k-ft			

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ALLSTATES ENGINEERING & SURVEYING
23675 BIRTCHER DRIVE
LAKE FOREST, CA 92630

PROJECT ID:	P-334899
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REV	DATE	DESCRIPTION	
1	01/19/2021	100% CD'S FOR SUBMITTAL	MG
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B	06/04/2020	95% CD'S FOR REDLINE	RF
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REGISTERED PROFESSIONAL ENGINEER
WASAM ZALZALI
71655
CIVIL
STATE OF CALIFORNIA

SF PALO ALTO 121
PUBLIC R.O.W. ADJACENT TO:
1664 EL CAMINO REAL (CA-82)
PALO ALTO, 94306
LOCATION CODE: 425225

SHEET TITLE
CALCS W/ SHROUD

SHEET NUMBER
C-3