

Solano County

*675 Texas Street
Fairfield, California 94533
www.solanocounty.com*



Agenda - Final

Thursday, April 7, 2016

7:00 PM

Board of Supervisors Chambers

Planning Commission

Any person wishing to address any item listed on the Agenda may do so by submitting a Speaker Card to the Clerk before the Commission considers the specific item. Cards are available at the entrance to the meeting chambers. Please limit your comments to five (5) minutes. For items not listed on the Agenda, please see "Items From the Public".

All actions of the Solano County Planning Commission can be appealed to the Board of Supervisors in writing within 10 days of the decision to be appealed. The fee for appeal is \$150.

Any person wishing to review the application(s) and accompanying information may do so at the Solano County Department of Resource Management, Planning Division, 675 Texas Street, Suite 5500, Fairfield, CA. Non-confidential materials related to an item on this Agenda submitted to the Commission after distribution of the agenda packet are available for public inspection during normal business hours and on our website at www.solanocounty.com under Departments, Resource Management, Boards and Commissions.

The County of Solano does not discriminate against persons with disabilities and is an accessible facility. If you wish to attend this meeting and you will require assistance in order to participate, please contact Kristine Letterman, Department of Resource Management at (707) 784-6765 at least 24 hours in advance of the event to make reasonable arrangements to ensure accessibility to this meeting.

AGENDA

CALL TO ORDER

SALUTE TO THE FLAG

ROLL CALL

APPROVAL OF AGENDA

APPROVAL OF THE MINUTES

[PC 16-012](#) Minutes of March 17, 2016

Attachments: [minutes](#)

ITEMS FROM THE PUBLIC:

This is your opportunity to address the Commission on a matter not heard on the Agenda, but it must be within the subject matter jurisdiction of the Commission. Please submit a Speaker Card before the first speaker is called and limit your comments to five

minutes. Items from the public will be taken under consideration without discussion by the Commission and may be referred to staff.

REGULAR CALENDAR

[PC 16-013](#)

Public Hearing to consider Minor Use Permit Application No. MU-15-08 of Verizon Wireless to co-locate a wireless communications facility on an existing PG&E utility tower located at 5210 Hawkins Road, approximately 1 mile east of the City of Vacaville within the Exclusive Agriculture "A-40" Zoning District; APN 0134-300-020. (Project Planner: Eric Wilberg)

Attachments: [A - PC Resolution](#)
[B - Assessor Map](#)
[C - Development Plans](#)
[D - Site Photos Simulations](#)
[E - Radio-frequency Study](#)

ANNOUNCEMENTS AND REPORTS

ADJOURN

To the Planning Commission meeting of April 21, 2016 at 7:00 P.M., Board Chambers, 675 Texas Street, Fairfield, CA



Solano County

675 Texas Street
Fairfield, California 94533
www.solanocounty.com

Agenda Submittal

Agenda #: **Status:** PC Minutes
Type: PC-Document **Department:** Planning Commission
File #: PC 16-012 **Contact:** Kristine Letterman
Agenda date: 4/7/2016 **Final action:**
Title: Minutes of March 17, 2016

Governing body: Planning Commission

District:

Attachments: [minutes](#)

Date	Ver.	Action By	Action	Result
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MINUTES OF THE SOLANO COUNTY PLANNING COMMISSION

Meeting of March 17, 2016

The regular meeting of the Solano County Planning Commission was held in the Solano County Administration Center, Board of Supervisors' Chambers (1st floor), 675 Texas Street, Fairfield, California.

PRESENT: Commissioners Rhoads-Poston, Walker, Hollingsworth, and Chairperson Cayler

EXCUSED: Commissioner Castellblanch

STAFF PRESENT: Matt Walsh, Principal Planner; Karen Avery, Senior Planner; Jim Laughlin, Deputy County Counsel; and Kristine Letterman, Planning Commission Clerk

Chairperson Cayler called the meeting to order at 7:00 p.m. with a salute to the flag. Roll call was taken and a quorum was present.

Approval of the Agenda

The Agenda was approved with no additions or deletions.

Approval of the Minutes

The minutes of the regular meeting of February 4, 2016 were approved as written.

Items from the Public

There was no one from the public wishing to speak.

Regular Calendar

Item No. 1.

PUBLIC HEARING to consider Use Permit Application No. U-15-06 of **Verizon Wireless** for a new wireless telecommunications facility consisting of a 103' monopine (faux tree) with supporting ground equipment located within a 50' x 50' fenced compound. The project is located at 5093 Midway Road, Vacaville, in an "RR-5" Rural Residential Zoning District, APN: 0106-220-560. The Planning Commission will also be considering a Mitigated Negative Declaration as recommended by the Solano County Department of Resource Management. (Project Planner: Karen Avery)

Karen Avery gave a brief presentation of staff's written report. The project site is located on a 5.03 acre parcel in a rural residential area. The parcel is developed with a single family dwelling. There is a small animal shelter located behind the house within a fenced enclosure. There is a row of mature trees located along the frontage of the property bordering Midway

Road. The remainder of the parcel is vegetated with annual grasses and it appears that the majority of the property has been used for animal grazing. A Mitigated Negative Declaration was prepared and circulated for the project which found no significant impacts. Ms. Avery noted that staff amended the conditions of approval, specifically Condition No. 2, to eliminate the language referencing the use of a chain link fence. With that, staff recommended approval of the project.

The applicant's representative, Jenny Blocker, spoke in favor of the project. She stated that this facility is needed for both coverage and capacity for Verizon's network. She said there are two facilities within the vicinity that are currently overloaded and so this site will not only provide coverage to residents, businesses and travelers on Highways 80 and 505, but will also offload those existing facilities so that they operate better.

Chairperson Cayler opened the public hearing. Since there was no one from the public wishing to speak, the public hearing was closed.

A motion was made by Commissioner Walker and seconded by Commissioner Hollingsworth to adopt the Mitigated Negative Declaration and the mandatory and additional findings, and to approve Use Permit Application No. U-15-06 subject to the recommended conditions of approval as amended. The motion passed unanimously. (Resolution No. 4636)

ANNOUNCEMENTS and REPORTS

There were no announcements or reports.

Since there was no further business, the meeting was **adjourned**.



Agenda Submittal

Agenda #: **Status:** PC-Regular

Type: PC-Document **Department:** Planning Commission

File #: PC 16-013 **Contact:**

Agenda date: **Final action:**

Title: Public Hearing to consider Minor Use Permit Application No. MU-15-08 of Verizon Wireless to co-locate a wireless communications facility on an existing PG&E utility tower located at 5210 Hawkins Road, approximately 1 mile east of the City of Vacaville within the Exclusive Agriculture "A-40" Zoning District; APN 0134-300-020. (Project Planner: Eric Wilberg)

Governing body:

District:

- Attachments:**
- [A - PC Resolution](#)
 - [B - Assessor Map](#)
 - [C - Development Plans](#)
 - [D - Site Photos Simulations](#)
 - [E - Radio-frequency Study](#)

Date	Ver.	Action By	Action	Result
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Published Notice Required? Yes X No

Public Hearing Required? Yes X No

RECOMMENDATION:

The Planning Commission ADOPT the attached resolution and APPROVE Minor Use Permit No. MU-15-08 based on the enumerated findings and subject to the recommended conditions of approval.

EXECUTIVE SUMMARY:

Verizon Wireless is requesting permit approval to construct a wireless telecommunication facility atop an existing 113 foot tall PG&E lattice utility tower. The tower is developed with an existing Sprint facility, established pursuant to Use Permit U-00-07. The Verizon equipment would be co-located atop the tower, as well as within the lease area at the base of the tower.

ENVIRONMENTAL ANALYSIS:

The project qualifies for a Categorical Exemption from the California Environmental Quality Act pursuant to CEQA Guidelines Section 15303, New Construction of Small Structures. Class 3 consists of construction and location of limited numbers of new, small facilities or structures. The Guidelines indicate that land uses which do not involve the use of significant amounts of hazardous substances, and do not exceed 2,500 square feet in floor area qualify for this exemption. The project meets these guideline standards.

BACKGROUND:

On April 20, 2000 the Zoning Administrator granted Land Use Permit U-00-07 to Sprint for the construction and operation of wireless communication facility mounted on a 113' tall PG&E tower. On February 9, 2012 a

revision was granted to allow modifications to the Sprint antennas and equipment.

PROPERTY INFORMATION:

A. Applicant/Owner:

Applicant/ Lessee Verizon Wireless
c/o Aaron Salars
465 1st St. W. Ste 101
Sonoma, CA 95476

Land Owner: G&W Holdings LLC
3660 Wilshire Blvd, Ste 612
Los Angeles, CA 90010

B. General Plan Land Use Designation/Zoning:

General Plan: Agriculture
Zoning: Exclusive Agriculture "A-40"

C. Existing Use: Agriculture, Wireless Communication Facility

D. Adjacent Zoning and Uses:

North: Exclusive Agriculture "A-40"/ agriculture
South: Exclusive Agriculture "A-40"/ agriculture
East: Exclusive Agriculture "A-40"/ agriculture
West: Exclusive Agriculture "A-40"/ agriculture

ANALYSIS:

A. Environmental Setting

The project is located within unincorporated Solano County, one mile east of the City of Vacaville, at 5215 Hawkins Road. The rectangular shaped parcel is 24.62 acres in size and is primarily utilized for agricultural field crop production. The entire site is relatively flat exhibiting slopes of less than six percent. Aside from a pair of overhead utility lines traversing the property in a north - south direction, the parcel is undeveloped. A Sprint wireless communication facility has been previously constructed on one of the four PG&E transmission towers on-site. This tower is set back 500 feet from Hawkins Road, near the western property line. The tower is also the site of the Verizon proposed co-location. Surrounding properties exhibit characteristics similar to that of the project site, utilized for agricultural field crop production. Agricultural home sites are interspersed throughout the area.

B. Project Description

In order to provide clear, consistent mobile communications service to the area of eastern Vacaville, Verizon Wireless is requesting use permit approval to construct a co-located telecommunication facility on an existing PG&E transmission tower. The facility consists of installing six (6) panel type antennas, six (6) remote radio units (RRU's) and two (2) surge protectors on a six (6) foot tall top hat extension above the existing Sprint antennas. The project would increase the overall height of the tower to 125'3".

Ancillary equipment is proposed within a 17' x 20' lease area located underneath the tower legs. Equipment includes a total of three (3) battery and radio cabinets, two (2) surge protectors, one (1) PG&E power meter, one (1) intersect box (transfers normal power to back-up power, one (1) Telco box, and one (1) standby 30 kW back-up diesel generator. The generator is intended to operate in emergency situations and for a twenty (20) minute test period once per week. PG&E electrical service and AT&T high capacity fiber service located at the

joint pole on Hawkins road would be connected to the lease area via underground conduits. The lease area would be enclosed by a 6 foot tall wood fence.

The proposed facility will be unmanned and does not require the installation of utilities such as a domestic drinking water well or private septic system. After construction is complete, the site will be visited one to two times per month for routine maintenance. The facility would be monitored remotely 24 hours per day. In case of emergency, the site will be signed identifying a 1-800 number (manned by Verizon employees).

The project involves construction of a gravel roadway (12 feet wide, approximately 500 linear feet) to provide access to the facility from Hawkins Road. Construction of the road involves relocating an existing irrigation ditch near the eastern property line of the parcel. Conduits for power and fiber would be installed underneath the proposed roadway, with the access easement.

D. General Plan and Zoning Consistency

The 2008 General Plan Land Use designation for the site is Agriculture. General Plan policies support the need for public facilities and services throughout the County. The proposed modification to the wireless communication facility does not conflict with adopted policies.

The project is located within the Exclusive Agriculture 'A-40' Zoning District. The agricultural Zoning allows for wireless communications facilities with an approved conditional use permit.

E. Alternatives Analysis

Verizon chose to co-locate at this site in order to minimize impacts while providing the least intrusive means to fix a gap in their network.

Section 28.81(F) of the Wireless Ordinance requires an Alternatives Analysis to be prepared for Use Permits considered before the Planning Commission. Zoning Regulations identify co-located equipment and mounting on existing non-residential structures as preferred methods for siting wireless communication facilities. Verizon has proposed a co-location with an existing Sprint facility on an existing PG&E tower; therefore an alternatives analysis, as is required for new facilities, has not been prepared for this project.

G. Visual Analysis

Section 28.81(G) of the Wireless Ordinance requires a Visual Analysis for a facility considered before the Planning Commission and located within $\frac{3}{4}$ mile of a designated scenic roadway. Figure RS-5 of the General Plan identifies Interstate 80, 2.5 miles north of the project site, as the nearest scenic roadway. A Visual Analysis is not required for this project.

F. Radio-Frequency Exposure Review

Section 28.81(H) of the Wireless Ordinance requires the preparation of a radio-frequency (RF) exposure review for the project. Verizon Wireless has submitted the results of a radio frequency (RF) study prepared by Hammett & Edison, Inc. (Attachment E). The study evaluated the RF exposure level of the wireless facility with proposed Verizon antennas and equipment configuration. The study concluded that the site will comply with FCC guidelines limiting public exposure to RF energy.

FINDINGS:

- 1. The establishment, maintenance, or operation of the proposed use is in conformity with the County General Plan with regard to traffic circulations, population densities and distribution, and other aspects of the General Plan.**

The operation and maintenance of a wireless communication facility is consistent with the goals, objectives, and policies of the Solano County General Plan, including but not limited to the Land Use, Resources, and Public Facilities and Service Chapters.

2. Adequate utilities, access roads, drainage and other necessary facilities have been or are being provided.

Vehicular access to the site will be via Hawkins Road with internal access via a proposed driveway. The site has existing electrical power and the building plans will be reviewed and approved by the Solano County Building and Safety Division before a permit is issued. The facility will be unmanned and does not require a source for domestic drinking water or private septic system.

3. The subject use will not, under the circumstances of the particular case, constitute a nuisance or be detrimental to the health, safety, peace, morals, comfort or general welfare of persons residing or working in or passing through the neighborhood of such proposed use, or be detrimental or injurious to property and improvements in the neighborhood or to the general welfare of the County.

From an aesthetic viewpoint, the project consists of installing six panel antennas atop a 113 foot tall utility tower. The tower is developed with an existing Sprint facility at the ~119 foot tower elevation. Proposed equipment would be located within the base of the tower and surrounded by 6 foot tall wooden fencing. There are numerous PG&E lattice towers located in the general vicinity. The project will blend with and be compatible with the existing environment.

ADDITIONAL FINDINGS:

4. The proposed facility complies with applicable sub-sections of Wireless Communications Facilities, Sec. 28.81 of the Zoning Regulations.
5. The RF Environmental Evaluation Report for the facility shows that the cumulative radio-frequency energy emitted by the facility and any near-by facilities will be consistent with FCC regulations.
6. The facility blends in with its existing environment and will not have significant visual impacts.
7. The project qualifies for a Categorical Exemption from the California Environmental Quality Act pursuant to CEQA Guidelines Section 15303, New Construction of Small Structures. Class 3 consists of construction and location of limited numbers of new, small facilities or structures. The Guidelines indicate that land uses which do not involve the use of significant amounts of hazardous substances, and do not exceed 2,500 square feet in floor area qualify for this exemption. The project meets these guideline standards.

CONDITIONS OF APPROVAL:

General

1. Approval is hereby granted to Verizon Wireless to establish a co-located wireless communication facility in accord with the application materials and development plans submitted with Minor Use Permit Application MU-15-08 and as approved by the Solano County Planning Commission.
2. Pursuant to Section 28.81(J) of the Wireless Ordinance, the subject minor use permit shall be granted for a fixed term of ten (10) years and shall expire April 7, 2026. Consideration of a new land use permit is required should the need for the wireless communication facility remain upon permit expiration.
3. No additional uses (including outdoor storage), new or expanded buildings shall be established or

constructed beyond those identified on the approved development plans without prior approval of a new, revised, or amended use permit.

4. All requirements of the Federal Communications Commission including RF signage shall be met prior to building permit issuance and operation of the subject facility.
5. The permittee shall take such measures as may be necessary or as may be required by the County to prevent offensive noise, lighting, dust or other impacts which constitute a hazard or nuisance to surrounding properties.
6. The premises shall be maintained in a neat and orderly manner and kept free of accumulated debris and junk
7. Upon termination or expiration of the subject use permit, the proposed wireless communication infrastructure shall be removed from the site. All equipment, including concrete pads, shall be removed within 90 days of discontinuation of the use and the site shall be restored to its original pre-construction condition. The County shall have access across the subject property to effect such removal.
8. As proposed, all on-site utility lines leading to and connecting the leased areas and equipment shelters shall be located underground.

Building & Safety Division

9. Prior to any construction or improvements taking place, a Building Permit Application shall be submitted as per Section 105 of the 2010 California Building Code, or the latest edition enforced at the time of building permit application. "Any owner or authorized agent who intends to construct, enlarge, alter, repair, move, demolish, or change the occupancy of a building or structure, or to erect, install, enlarge, alter, repair, remove, convert, or replace any electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be done, shall first make application to the building official and obtain the required permit."

Environmental Health Division

10. The maximum potential volume of hazardous materials stored at the facility shall be calculated, and if required, the facility shall submit a hazardous materials business plan to Solano county Hazardous Materials Section.

Public Works Engineering

11. The permittee shall apply for, secure and abide by the terms and conditions of an encroachment permit for work within the right of way of Hawkins Road.
12. The permittee shall apply for, secure and abide by the conditions of a grading permit for the proposed access road and communications facility improvements. Grading Plans shall be prepared by a Civil Engineer, licensed in the State of California.

Solano Irrigation District

13. The District owns in fee title a strip of land 45 feet wide and adjacent to the easterly property line of the subject parcel. No permanent facilities shall be constructed within the District's right-of-way.
14. Approval by the District shall be required for the requisite grading permit and building permit.

15. Under no circumstances shall the District's fee title right-of-way be used to access the site.

ATTACHMENTS:

A - Draft Resolution

B - Assessor Map

C - Development Plans (revised 01/13/16)

D - Site Photo Simulations

E - Radio-frequency Study

SOLANO COUNTY PLANNING COMMISSION

RESOLUTION NO. XX

WHEREAS, the Solano County Planning Commission has considered Minor Use Permit Application No. MU-15-08 of **Verizon Wireless** to co-locate a wireless communication facility on an existing PG&E utility tower located at 5210 Hawkins Road, 3.5 miles east of the City of Vacaville in an “A-40” Exclusive Agricultural Zoning District, APN: 0134-300-020, and;

WHEREAS, the Commission has reviewed the report of the Department of Resource Management and heard testimony relative to the subject application at the duly noticed public hearing held on April 7, 2016, and;

WHEREAS, after due consideration, the Planning Commission has made the following findings in regard to said proposal:

1. **The establishment, maintenance, or operation of the proposed use is in conformity with the County General Plan with regard to traffic circulations, population densities and distribution, and other aspects of the General Plan.**

The operation and maintenance of a wireless communication facility is consistent with the goals, objectives, and policies of the Solano County General Plan, including but not limited to the Land Use, Resources, and Public Facilities and Service Chapters.

2. **Adequate utilities, access roads, drainage and other necessary facilities have been or are being provided.**

Vehicular access to the site will be via Hawkins Road with internal access via a proposed driveway. The site has existing electrical power and the building plans will be reviewed and approved by the Solano County Building and Safety Division before a permit is issued. The facility will be unmanned and does not require a source for domestic drinking water or private septic system.

3. **The subject use will not, under the circumstances of the particular case, constitute a nuisance or be detrimental to the health, safety, peace, morals, comfort or general welfare of persons residing or working in or passing through the neighborhood of such proposed use, or be detrimental or injurious to property and improvements in the neighborhood or to the general welfare of the County.**

From an aesthetic viewpoint, the project consists of installing six panel antennas atop a 113 foot tall utility tower. The tower is developed with an existing Sprint facility at the ~119 foot tower elevation. Proposed equipment would be located within the base of the tower and surrounded by 6 foot tall wooden fencing. There are numerous PG&E lattice towers located in the general vicinity. The project will blend with and be compatible with the existing environment.

4. The proposed facility complies with applicable sub-sections of Wireless Communications Facilities, Sec. 28.81 of the Zoning Regulations.
5. The RF Environmental Evaluation Report for the facility shows that the cumulative radio-frequency energy emitted by the facility and any near-by facilities will be consistent with FCC regulations.

6. The facility blends in with its existing environment and will not have significant visual impacts.
7. The project qualifies for a Categorical Exemption from the California Environmental Quality Act pursuant to CEQA Guidelines Section 15303, New Construction of Small Structures. Class 3 consists of construction and location of limited numbers of new, small facilities or structures. The Guidelines indicate that land uses which do not involve the use of significant amounts of hazardous substances, and do not exceed 2,500 square feet in floor area qualify for this exemption. The project meets these guideline standards.

BE IT, THEREFORE, RESOLVED, that the Planning Commission of the County of Solano does hereby approve Minor Use Permit No. MU-15-08 based on the findings and subject to the following recommended conditions of approval:

General

1. Approval is hereby granted to Verizon Wireless to establish a co-located wireless communication facility in accord with the application materials and development plans submitted with Minor Use Permit Application MU-15-08 and as approved by the Solano County Planning Commission.
2. Pursuant to Section 28.81(J) of the Wireless Ordinance, the subject minor use permit shall be granted for a fixed term of ten (10) years and shall expire April 7, 2026. Consideration of a new land use permit is required should the need for the wireless communication facility remain upon permit expiration.
3. No additional uses (including outdoor storage), new or expanded buildings shall be established or constructed beyond those identified on the approved development plans without prior approval of a new, revised, or amended use permit.
4. All requirements of the Federal Communications Commission including RF signage shall be met prior to building permit issuance and operation of the subject facility.
5. The permittee shall take such measures as may be necessary or as may be required by the County to prevent offensive noise, lighting, dust or other impacts which constitute a hazard or nuisance to surrounding properties.
6. The premises shall be maintained in a neat and orderly manner and kept free of accumulated debris and junk
7. Upon termination or expiration of the subject use permit, the proposed wireless communication infrastructure shall be removed from the site. All equipment, including concrete pads, shall be removed within 90 days of discontinuation of the use and the site shall be restored to its original pre-construction condition. The County shall have access across the subject property to effect such removal.
8. As proposed, all on-site utility lines leading to and connecting the leased areas and equipment shelters shall be located underground.

Building & Safety Division

9. Prior to any construction or improvements taking place, a Building Permit Application shall be submitted as per Section 105 of the 2010 California Building Code, or the latest edition enforced at the time of building permit application. "Any owner or authorized agent who intends to construct, enlarge, alter, repair, move, demolish, or change the occupancy of a building or structure, or to erect, install, enlarge, alter, repair, remove, convert, or replace any electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be done, shall first make application to the building official and obtain the required permit."

Environmental Health Division

10. The maximum potential volume of hazardous materials stored at the facility shall be calculated, and if required, the facility shall submit a hazardous materials business plan to Solano county Hazardous Materials Section.

Public Works Engineering

11. The permittee shall apply for, secure and abide by the terms and conditions of an encroachment permit for work within the right of way of Hawkins Road.
12. The permittee shall apply for, secure and abide by the conditions of a grading permit for the proposed access road and communications facility improvements. Grading Plans shall be prepared by a Civil Engineer, licensed in the State of California.

Solano Irrigation District

13. The District owns in fee title a strip of land 45 feet wide and adjacent to the easterly property line of the subject parcel. No permanent facilities shall be constructed within the District's right-of-way.
14. Approval by the District shall be required for the requisite grading permit and building permit.
15. Under no circumstances shall the District's fee title right-of-way be used to access the site.

I hereby certify that the foregoing resolution was adopted at the regular meeting of the Solano County Planning Commission on April 7, 2016 by the following vote:

AYES:	Commissioners	_____

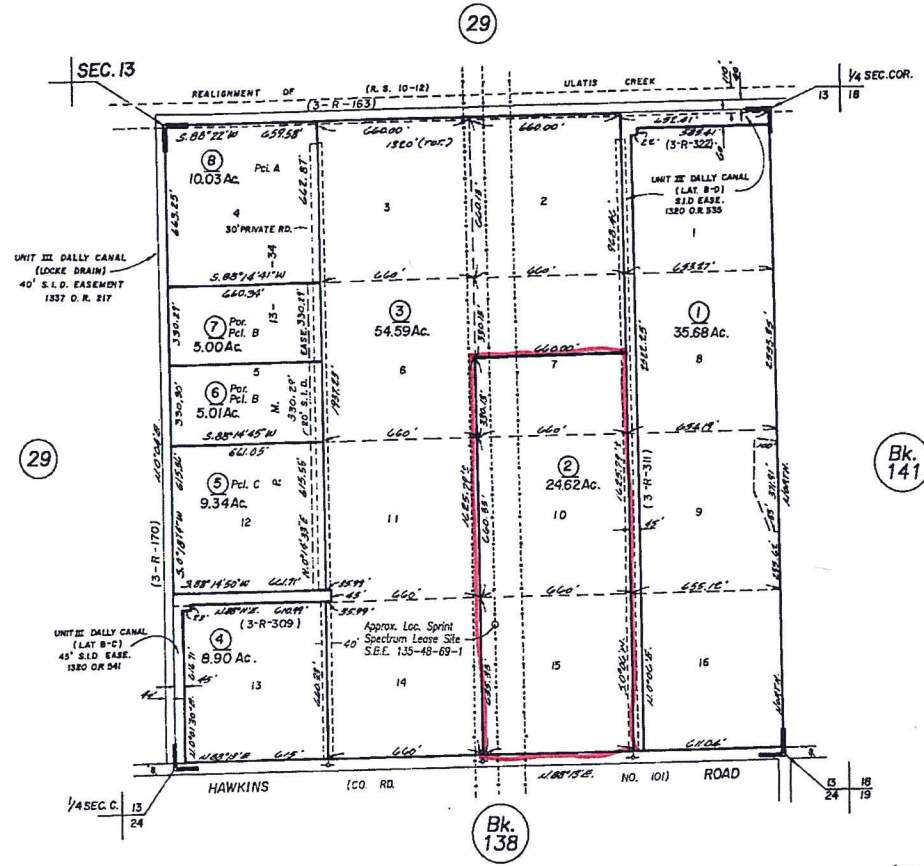
NOES:	Commissioners	_____
EXCUSED:	Commissioners	_____

By: _____
Bill Emlen, Secretary

S.E. 1/4 SEC. 13, T.6N., R.1W., M.D.B.& M.

Tax Area Code
91021

134-30



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Allison Subdivision, R.M. Bk.1 Pg 28
Assessor's Block Numbers Shown in Ellipses, Assessor's Parcel Numbers Shown in Circles

Ad: Bk.138 (Remap) 7-19-13	Cr
SSE PU (300-02) 3-25-01	FG
300-054254c Corr. 7-21-77	MR
REVISION	DATE BY

NOTE: This map is for assessment purposes only. It is not intended to define legal boundary rights or imply compliance with land division laws.

Assessor's Map Bk. 134 Pg. 30
County of Solano, Calif.

14-15

FILE COPY

MU-15-08

LEISURE TOWN

285362
5210 HAWKINS RD
VACAVILLE, CA 95687

verizon wireless

278 MITCHELL DRIVE BLDG 9
WALNUT CREEK, CA 94598



LEISURE TOWN

5210 HAWKINS RD, VACAVILLE, CA 95687
LOCATION NUMBER: 285362

VERIZON WIRELESS EQUIPMENT ENGINEER:		VERIZON WIRELESS REAL ESTATE:	
SIGNATURE _____	DATE _____	SIGNATURE _____	DATE _____
VERIZON WIRELESS CONSTRUCTION:		VERIZON WIRELESS RF ENGINEER:	
SIGNATURE _____	DATE _____	SIGNATURE _____	DATE _____
PROPERTY OWNER:		ON AIR, LLC - LEASING:	
SIGNATURE _____	DATE _____	SIGNATURE _____	DATE _____
ON AIR, LLC - CONSTRUCTION:		ON AIR, LLC - ZONING:	
SIGNATURE _____	DATE _____	SIGNATURE _____	DATE _____

PROJECT DESCRIPTION

- A (P) VERIZON WIRELESS UNMANNED TELECOMMUNICATION FACILITY CONSISTING OF INSTALLING:
- (P) 12' TOWER EXTENSION
 - (S) (P) VERIZON WIRELESS ANTENNAS
 - (S) (P) RRUS-12 UNITS W/ (S) (P) AC MODULES
 - (S) (P) BAYCAP 3315 UNITS (1) @ ANTENNA & (1) @ EQUIPMENT
 - (P) 30KW DIESEL GENERATOR W/ 12000S FUEL TANK
 - (P) VERIZON WIRELESS (319 SO F1) LICENSE AREA BELOW AN (S) PG&E TOWER
 - (P) (P) GPS ANTENNAS
 - (1) (P) HYBRID CABLE
 - (12) (P) RUNS OF COAX CABLES

PROJECT INFORMATION

SITE NAME:	LEISURE TOWN	SITE #:	285362
COUNTY:	SOLANO	JURISDICTION:	SOLANO COUNTY
APN:	134-330-020	POWER:	PG&E
SITE ADDRESS:	5210 HAWKINS RD VACAVILLE, CA 95687	TELEPHONE:	AT&T
CURRENT ZONING:	-		
CONSTRUCTION TYPE:	V-B		
OCCUPANCY TYPE:	U, UNMANNED COMMUNICATIONS FACILITY		
PROPERTY OWNER:	658 HOLDENS LLC 3550 WILSHIRE BLVD #512 LOS ANGELES, CA 90010		
APPLICANT:	VERIZON WIRELESS 2785 MITCHELL DRIVE, BLDG 9 WALNUT CREEK, CA 94598		
LEASING CONTACT:	ATN: AARON SALARS (707) 933-9533		
ZONING CONTACT:	ATN: AARON SALARS (707) 933-9533		
CONSTRUCTION CONTACT:	ATN: OLIVER FONTANA (915) 255-5545		

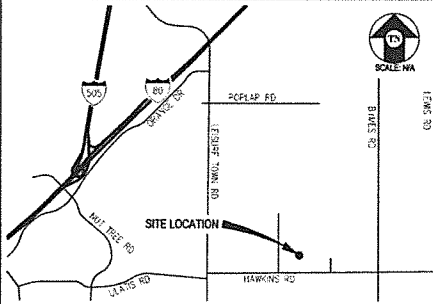
PG&E INFORMATION

TOWER INFO:
TOWER SUFF: 40862076
TOWER#: 602/019
LINE NAME: VACA-LAMBIE SW STA 230 X17
PROJECT#: 2015-09 NEW

PG&E CONTACT INFO:

PROJECT MANAGER: STEVEN MILLER
MOBILE: (925) 222-0630
E-MAIL: SMILLER@PG&E.COM
ADDRESS: 245 MARKET ST
MAIL CODE N102
SAN FRANCISCO, CA 94105

VICINITY MAP



DRIVING DIRECTIONS

FROM: 2785 MITCHELL DRIVE, BLDG 9, WALNUT CREEK, CA 94598
TO: 5210 HAWKINS RD, VACAVILLE, CA 95687

1. HEAD NORTHEAST ON MITCHELL DR TOWARD OAK GROVE RD
2. TURN LEFT ONTO OAK GROVE RD
3. TURN LEFT ONTO TREAT BLVD
4. TURN RIGHT ONTO REPARK AVE
5. TAKE THE INTERSTATE RAMP ON RAMP ON THE LEFT
6. MERGE ONTO I-680 N (PARTIAL FULL ROAD)
7. KEEP LEFT AT THE FORK TO CONTINUE ON I-680 (PARTIAL FULL ROAD)
8. TAKE EXIT 714 TOWARD I-80 E/SACRAMENTO
9. MERGE ONTO I-80 E
10. TAKE EXIT 55 FOR ALLISON GRAVE TREE PKWY TOWARD MONTE VISTA AVE
11. TURN RIGHT ONTO ALLISON DR
12. TURN LEFT ONTO CLATS DR
13. TURN LEFT ONTO LEISURE TOWN RD
14. TURN RIGHT ONTO HAWKINS RD
15. TURN LEFT

END AT: 5210 HAWKINS RD, VACAVILLE, CA 95687

ESTIMATED TIME: 45 MINUTES ESTIMATED DISTANCE: 42.6 MILES

CODE COMPLIANCE

ALL WORK & MATERIALS SHALL BE PERFORMED & INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

- 2013 CALIFORNIA ADMINISTRATIVE CODE, PART 1, TITLE 24 C.C.R.
- 2013 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 C.C.R.
- (2012 INTERNATIONAL BUILDING CODE VOLUMES 1-2 AND 2013 CALIFORNIA AMENDMENTS)
- 2013 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 C.C.R.
- (2011 NATIONAL ELECTRICAL CODE AND 2013 CALIFORNIA AMENDMENTS)
- 2013 CALIFORNIA MECHANICAL CODE (CMC) PART 4, TITLE 24 C.C.R.
- (2012 UNIFORM MECHANICAL CODE AND 2013 CALIFORNIA AMENDMENTS)
- 2013 CALIFORNIA PLUMBING CODE (CPC), PART 1, TITLE 24 C.C.R.
- (2012 UNIFORM PLUMBING CODE AND 2013 CALIFORNIA AMENDMENTS)
- 2013 CALIFORNIA ENERGY CODE (CEC), PART 5, TITLE 24 C.C.R.
- 2013 CALIFORNIA FIRE CODE, PART 9, TITLE 24 C.C.R.
- (2012 INTERNATIONAL FIRE CODE AND 2013 CALIFORNIA AMENDMENTS)
- 2013 CALIFORNIA GREEN BUILDING STANDARDS CODE, PART 11, TITLE 24 C.C.R.
- 2013 CALIFORNIA REFERENCED STANDARDS, PART 12, TITLE 24 C.C.R.
- ANSI/ISA-18.2-2005-C

ALONG WITH ANY OTHER APPLICABLE LOCAL & STATE LAWS AND REGULATIONS

DISABLED ACCESS REQUIREMENTS

THIS FACILITY IS UNMANNED & NOT FOR HUMAN HABITATION. DISABLED ACCESS & REQUIREMENTS ARE NOT REQUIRED IN ACCORDANCE WITH CALIFORNIA STATE BUILDING CODE, TITLE 24 PART 2, SECTION 110-255.4

SHEET INDEX

SHEET	DESCRIPTION	REV
I-1	TITLE SHEET	-
C-1	TOPOGRAPHIC SURVEY	-
C-2	TOPOGRAPHIC SURVEY	-
A-1	OVERALL SITE PLAN	-
A-2	ACCESS ROAD PLANS	-
A-3	SITE PLAN	-
A-4	EQUIPMENT PLAN & DETAILS	-
A-5	ANTENNA PLAN & DETAILS	-
A-6	ELEVATIONS	-

**PRELIMINARY:
NOT FOR
CONSTRUCTION**

KEVIN A. SPENNER
31469

ISSUE STATUS

DATE	DESCRIPTION	REV
02/05/15	2D LOGS	DIG
09/17/16	CLIENT REV	0.0
10/06/16	CLIENT REV	0.5
10/09/16	CLIENT REV	0.5
10/14/16	CLIENT REV	0.5
10/13/16	CLIENT REV	1.0

DRAWN BY: C. CODY

CHECKED BY: L. HOUGHTBY

APPROVED BY: -

DATE: 01/13/16

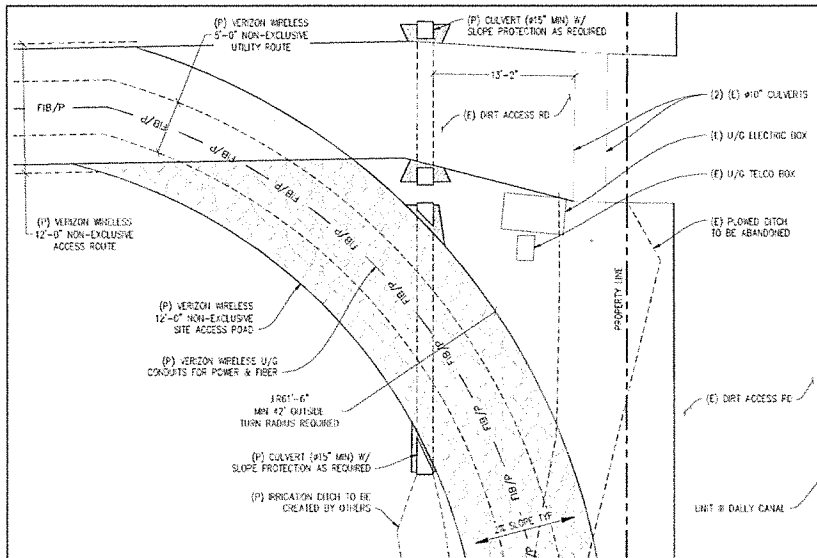
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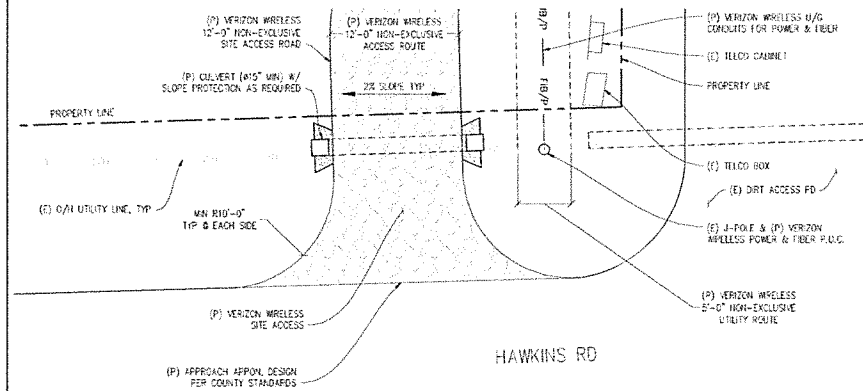
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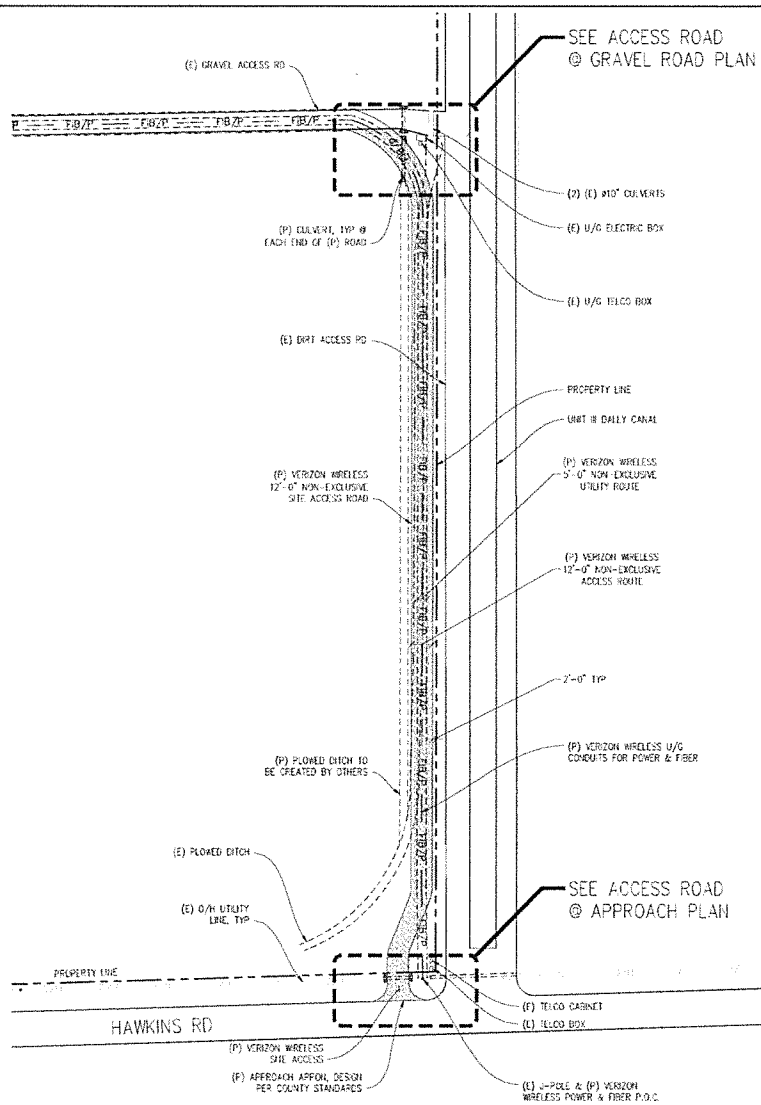
Streamline Engineering
6445 Sierra College Blvd., Suite E Granite Bay, CA 95961
Contact: Larry Houghtby Phone: 916-676-9441
E-Mail: larry@streamlineeng.com
www.streamlineeng.com
We are an Equal Opportunity Employer. Minorities and women are encouraged to apply.



ACCESS ROAD @ GRAVEL ROAD PLAN
1"=4'-0"



ACCESS ROAD @ APPROACH PLAN
1"=4'-0"



ACCESS ROAD PLAN
1"=30'-0"



LEISURE TOWN

285362
5210 HAWKINS RD
VACAVILLE, CA 95687

verizon wireless

2785 MITCHELL DRIVE, BLDG 9
WALNUT CREEK, CA 94598

Streamline Engineering

4445 Sierra College Blvd, Suite 6 Granite Bay, CA 95961
Contact: Larry Haughey Phone: 916-274-4100
E-Mail: lhaughey@streamlineeng.com

**PRELIMINARY:
NOT FOR
CONSTRUCTION**

KEVIN R. SORENDEN
34469

DATE	DESCRIPTION	REV.
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11/06/15	CLIENT REV	0-0-2
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11/23/15	CLIENT REV	0-0-4
10/13/16	CLIENT REV	0-0-5

DRAWN BY: C. COBY

CHECKED BY: L. HAUGHEY

APPROVED BY:

DATE: 01/13/16

SHEET TITLE:

ACCESS ROAD PLANS

SHEET NUMBER:

A-2

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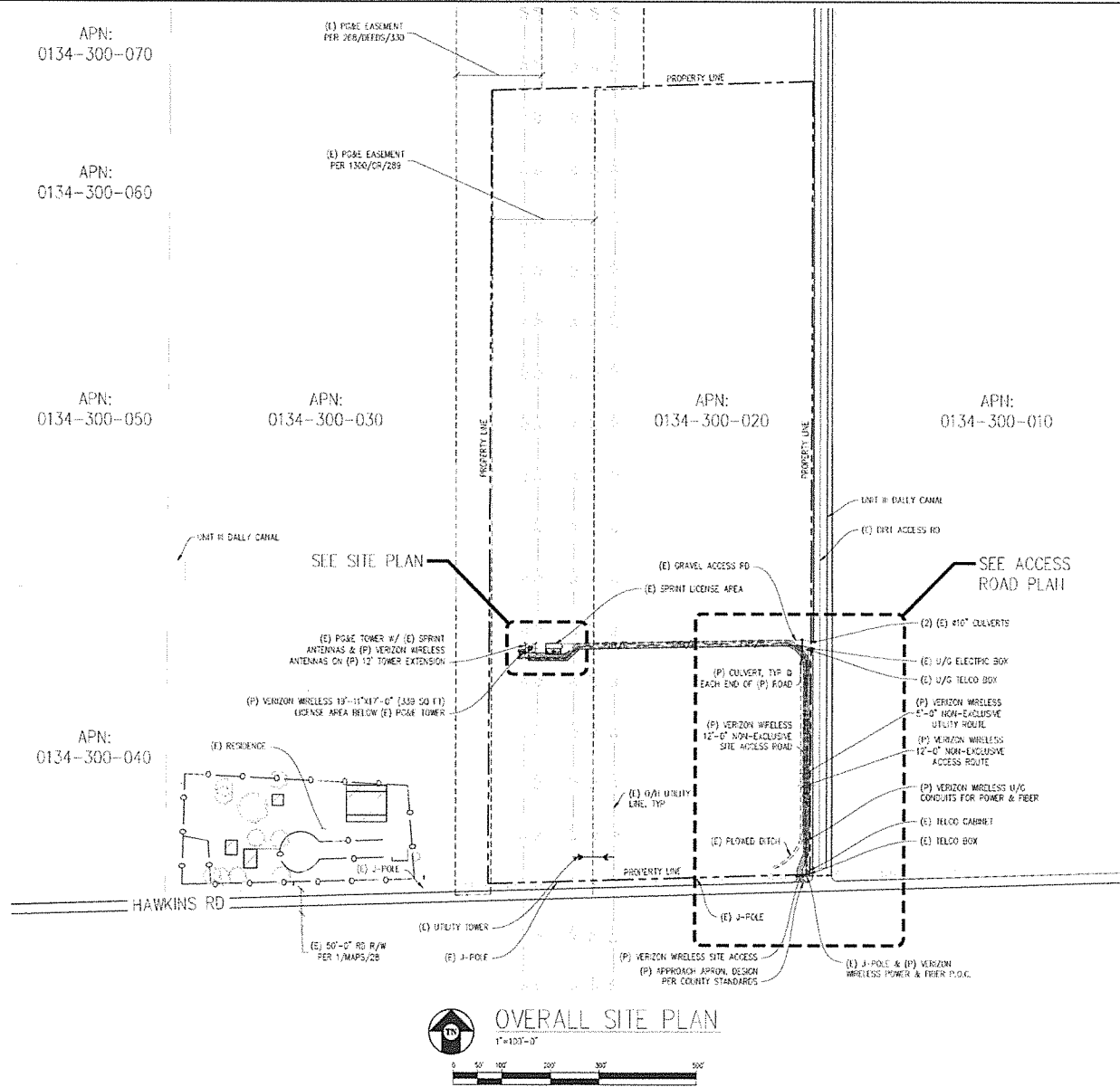
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0134-300-050

APN:
0134-300-030

APN:
0134-300-020

APN:
0134-300-010



OVERALL SITE PLAN
1"=100'-0"

LEISURE TOWN

285362
5210 HAWKINS RD
WACAVILLE, CA 95687

verizon wireless

2785 MITCHELL DRIVE BLDG 8
WALNUT CREEK, CA 94598

Streamline Engineering
CONSULTING INC.
8445 Sierra College Blvd, Suite E Granite Bay, CA 95881
Tel: 916-471-1941
Fax: 916-471-1941

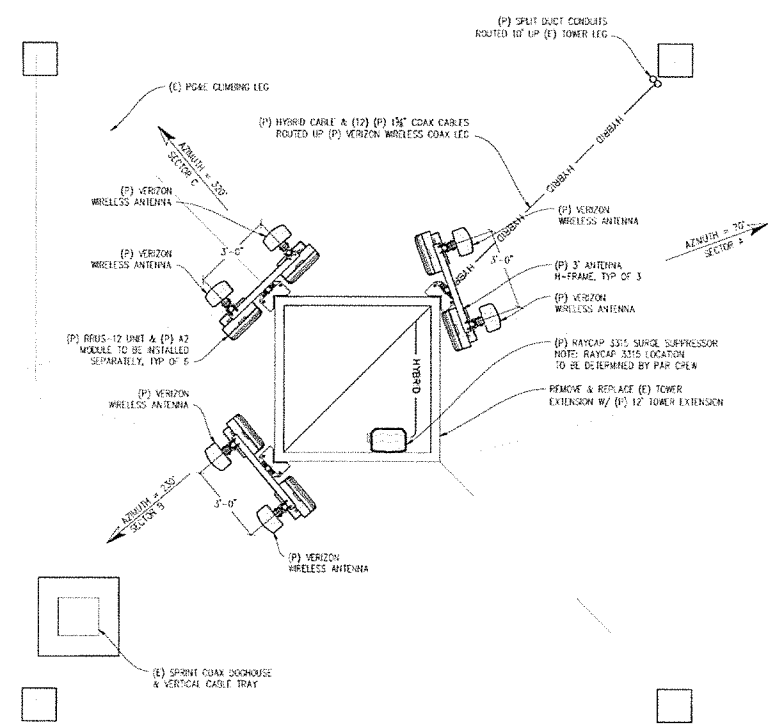
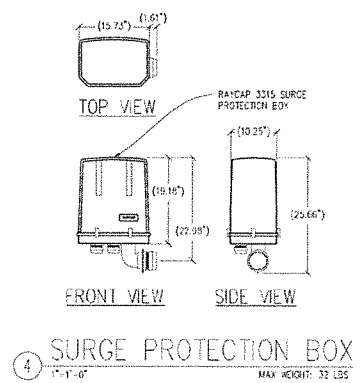
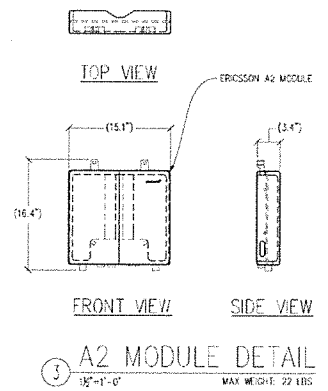
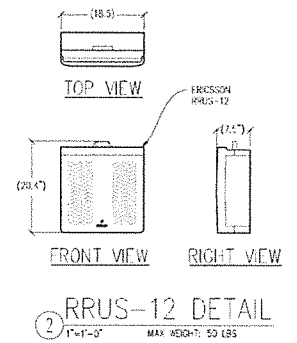
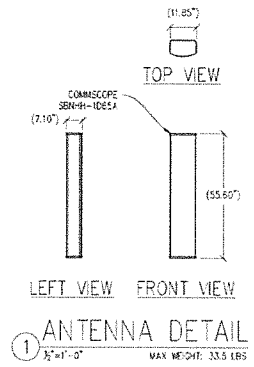
PRELIMINARY;
NOT FOR
CONSTRUCTION

KEVIN W. STEVENSON
01469

ISSUE STATUS		
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	10/06/14	CLIENT REV U.S.
	10/09/14	CLIENT REV U.S.
	01/26/16	CLIENT REV U.S.
	01/13/16	CLIENT REV U.S.

DRAWN BY: C. COBY
CHECKED BY: L. HOOKHEDY
APPROVED BY: -
DATE: 01/13/16

SHEET TITLE:
OVERALL
SITE PLAN
SHEET NUMBER:
A-1



ANTENNA PLAN
3/2"-1'-0"

NOTE:
1. (E) SPRINT ANTENNAS NOT SHOWN FOR CLARITY.
2. RELOCATE (E) SPRINT ANTENNAS TO (P) 12\"/>

LEISURE TOWN
285362
5310 HARKNESS RD
VACAVILLE, CA 95687

verizon wireless
2785 MITCHELL DRIVE, BLDG 9
WALNUT CREEK, CA 94598

Streamline Engineering
8445 Sierra College Blvd., Suite E, Grizzly Bay, CA 95681
Contact: Larry Houghby Phone: 916-274-1100
E-Mail: larry@streamlineeng.com Fax: 916-265-1941

PRELIMINARY:
NOT FOR CONSTRUCTION
KEVIN R. SCHEIDEN
04493

ISSUE STATUS		
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	01/13/16	CLIENT REV 10.C
DRAWN BY: C. CODY		
CHECKED BY: L. HOUGHBY		
APPROVED BY: -		
DATE: 01/13/16		

SHEET TITLE:
ANTENNA PLAN & DETAILS
SHEET NUMBER:
A-5

LEISURE TOWN

285362
520 HAWKINS RD
VACAVILLE, CA 95987

verizon wireless

2785 MITCHELL DRIVE, BLDG 8
WALNUT CREEK, CA 94598

Streamline Engineering

8445 Sierra College Blvd., Suite E Granite Bay, CA 95961
Contact: Larry Houghrey Phone: 916-776-4100
E-mail: larry@streamline-engineering.com

PRELIMINARY:
NOT FOR
CONSTRUCTION

KEVIN R. SPRINGEN
0469

ISSUE STATUS

Δ	DATE	DESCRIPTION	REV.
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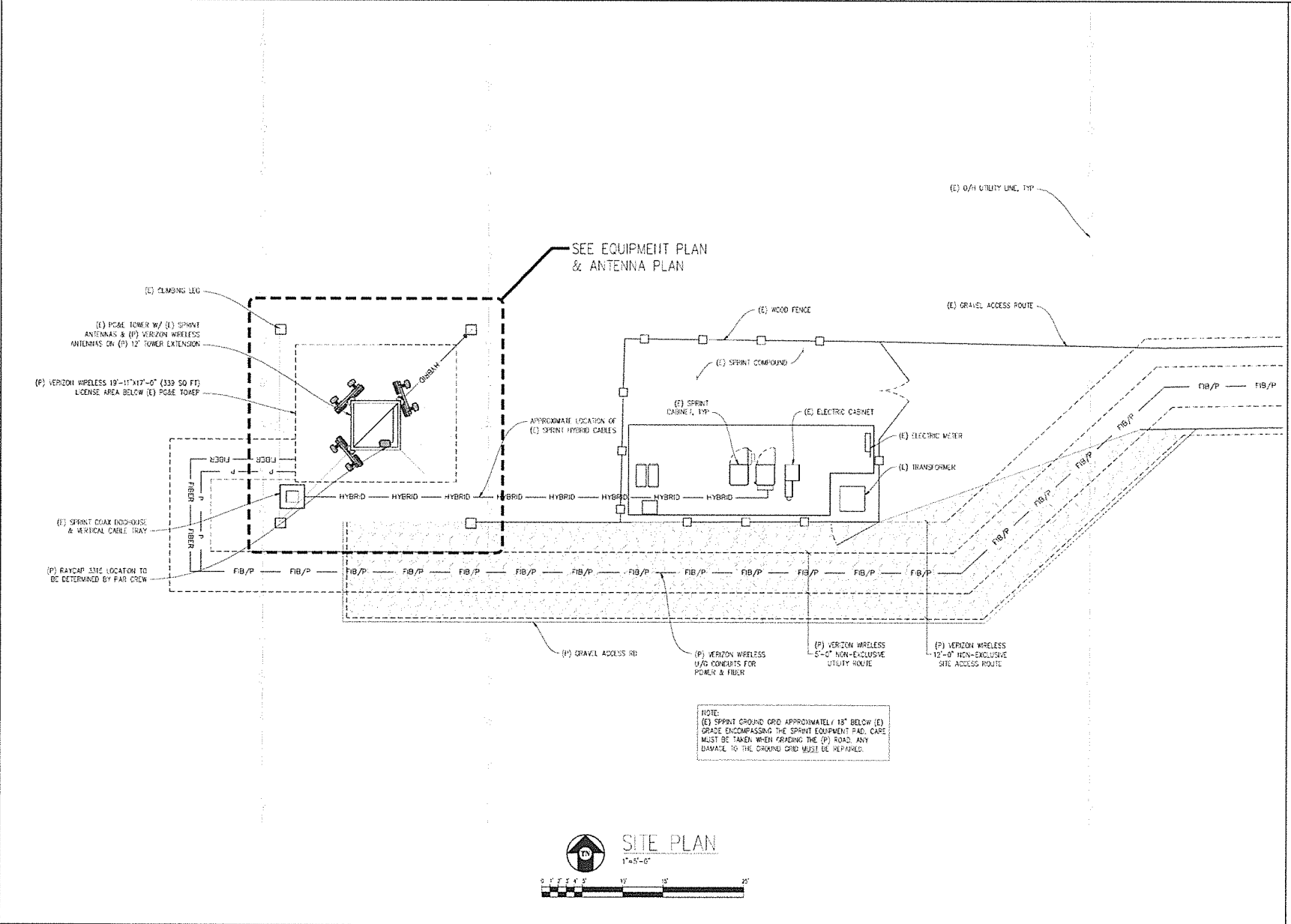
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CHECKED BY: L. HOUGHREY
APPROVED BY: -
DATE: 01/13/16

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SITE PLAN

SHEET NUMBER:

A-3



LEISURE TOWN

285362
 5210 LAWRENCE RD
 VACAVILLE, CA 94987



2785 MITCHELL DRIVE, BLDG 8
 WALNUT CREEK, CA 94598

Streamline Engineering
 CONSULTING INC.

8445 Sierra College Blvd, Suite E Granite Bay, CA 95961
 Phone: 916-464-1941
 Fax: 916-464-1941
 E-Mail: info@streamlineeng.com

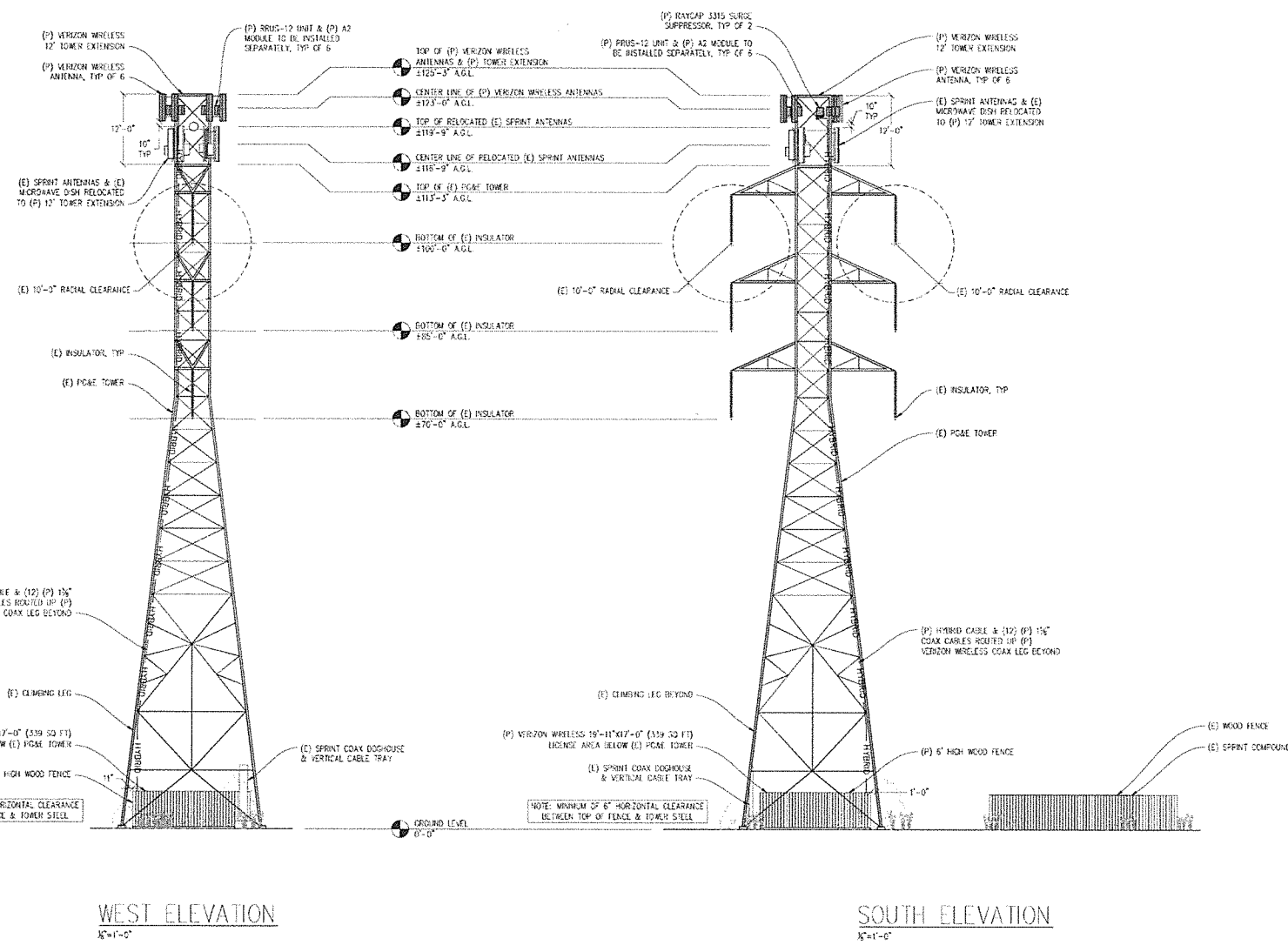
PRELIMINARY:
 NOT FOR
 CONSTRUCTION

KEVIN W. SPENGLER
 51462

ISSUE STATUS		
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5	01/13/16	CLIENT REV / 0.5
6	01/13/16	CLIENT REV / 0.6

DRAWN BY: C. COBY
 CHECKED BY: L. HOUGHBY
 APPROVED BY: -
 DATE: 01/13/16

SHEET TITLE:
 ELEVATIONS
 SHEET NUMBER:
A-6



LEISURE TOWN

285362
5200 HANCOCK RD
VACAVILLE, CA 94987



Streamline Engineering
COMMUNICATIONS
8445 Santa Coloma Blvd., Suite E, Granite Bay, CA 95861
Contact: Larry Houghby, Phone: 916-276-1180
E-Mail: larry@streamlineeng.com Fax: 916-260-1841
www.streamlineeng.com
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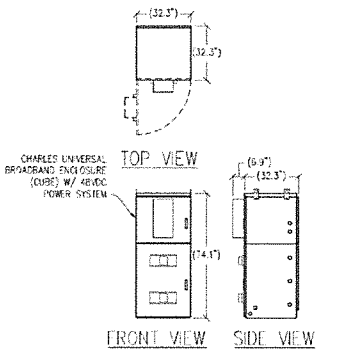
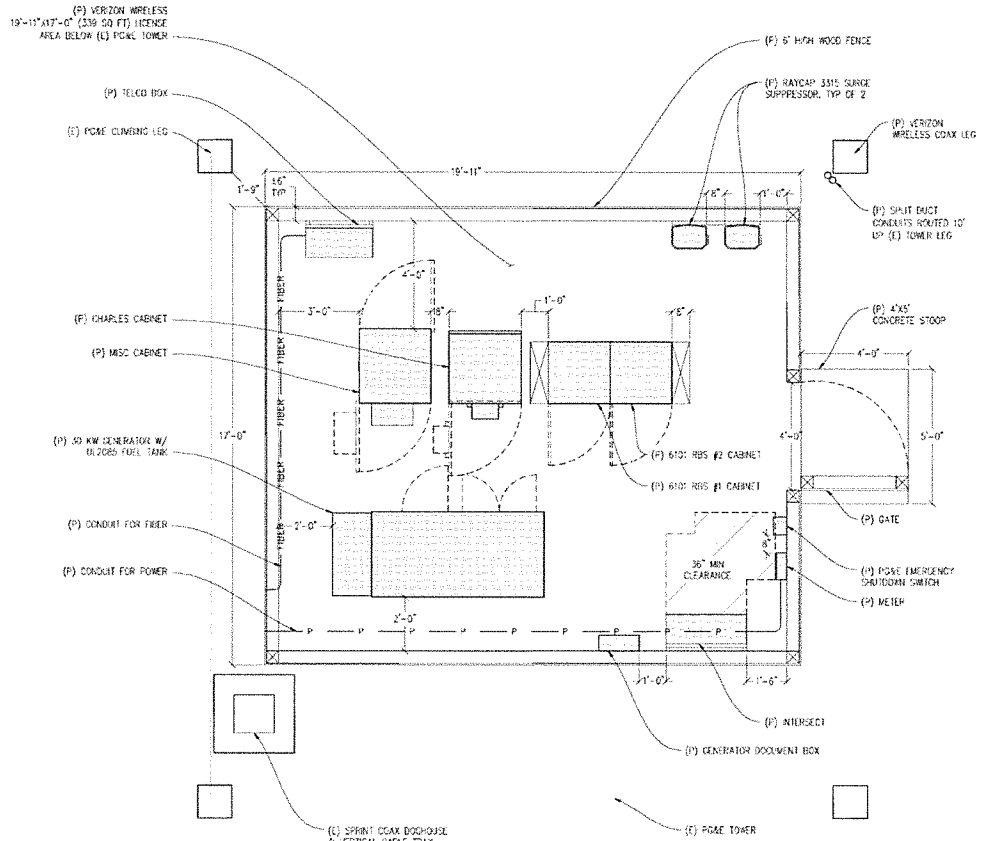
PRELIMINARY:
NOT FOR
CONSTRUCTION
MWM & SPPINDEN
54499

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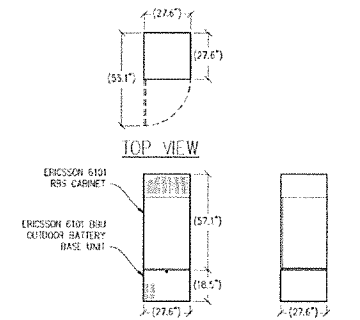
DRAWN BY: C. CODY
CHECKED BY: L. HOUGHBY
APPROVED BY: _____
DATE: 01/13/16

SHEET TITLE:
EQUIPMENT PLAN
& DETAILS
SHEET NUMBER:

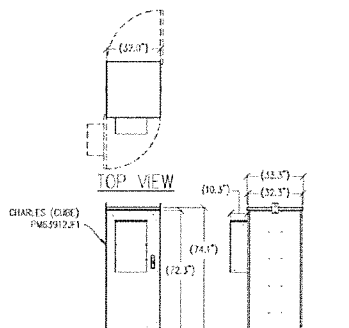
A-4



① POWER CABINET DETAIL
3/8\"/>



② 6101 CABINET DETAIL
3/8\"/>



③ MISC CABINET DETAIL
3/8\"/>



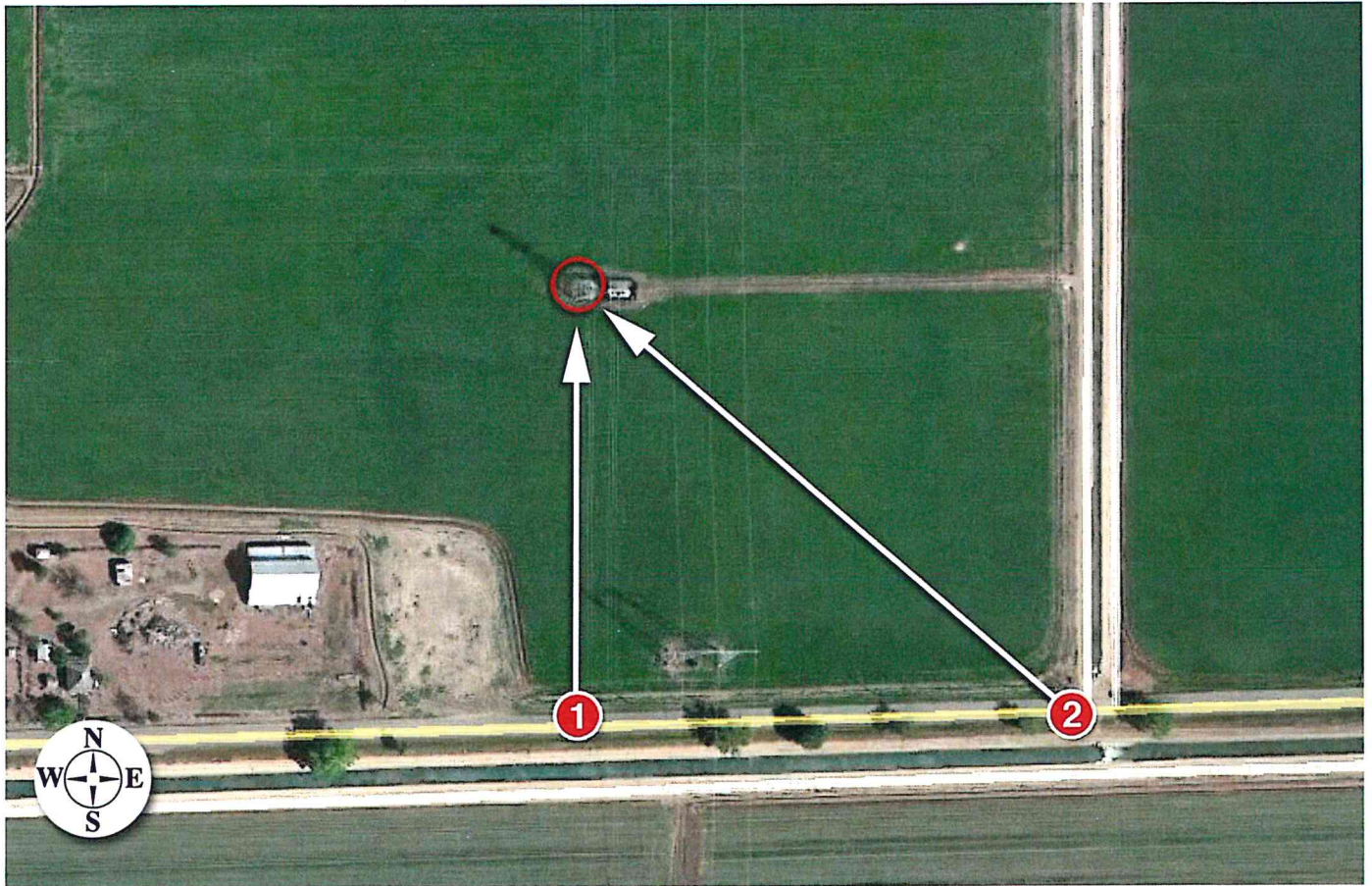


Leisure Town

Site Photo Simulations

Includes:

- 1 Shot Location Map
- 2 Simulated Views



Leisure Town

Site # 285362

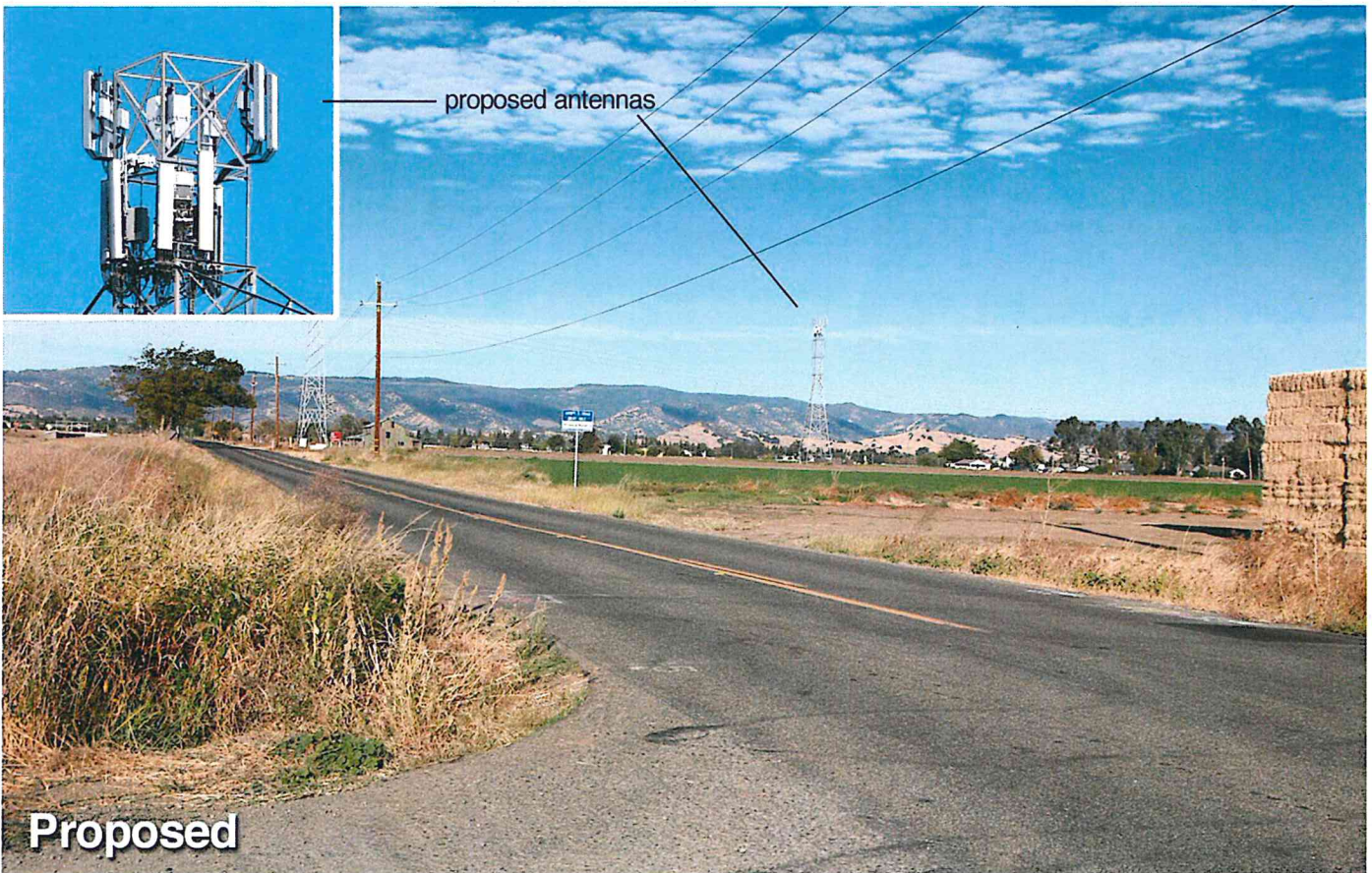
Aerial Map

9/28/15

5210 Hawkins Road
Vacaville, CA

Applied Imagination 510 914-0500





**Verizon Wireless • Proposed Base Station (Site No. 285362 “Leisure Town”)
5210 Hawkins Road • Vacaville, 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 personal wireless telecommunications carrier, to evaluate the base station (Site No. 285362 “Leisure Town”) proposed to be located at 5210 Hawkins Road in Vacaville, California, for compliance with appropriate guidelines limiting human exposure to radio frequency (“RF”) electromagnetic fields.

Executive Summary

Verizon proposes to install directional panel antennas on the tall PG&E lattice tower sited on Hawkins Road near Vacaville, east of Leisure Town Road. The proposed operation will, together with the existing base station at the site, 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 FCC limit for exposures of unlimited duration to radio frequency energy for several personal wireless services are as follows:

Wireless Service	Frequency Band	Occupational Limit	Public Limit
Microwave (Point-to-Point)	5–80 GHz	5.00 mW/cm ²	1.00 mW/cm ²
WiFi (and unlicensed uses)	2–6	5.00	1.00
BRS (Broadband Radio)	2,600 MHz	5.00	1.00
WCS (Wireless Communication)	2,300	5.00	1.00
AWS (Advanced Wireless)	2,100	5.00	1.00
PCS (Personal Communication)	1,950	5.00	1.00
Cellular	870	2.90	0.58
SMR (Specialized Mobile Radio)	855	2.85	0.57
700 MHz	700	2.40	0.48
[most restrictive frequency range]	30–300	1.00	0.20

Power line frequencies (60 Hz) are well below the applicable range of these standards, and there is considered to be no compounding effect from simultaneous exposure to power line and radio frequency fields.

**Verizon Wireless • Proposed Base Station (Site No. 285362 “Leisure Town”)
5210 Hawkins Road • Vacaville, California**

General Facility Requirements

Base stations 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 transceivers are often located at ground level and are connected to the antennas by coaxial cables. A small antenna for reception of GPS signals is also required, mounted with a clear view of the sky. 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”). The conservative nature of this method for evaluating exposure conditions has been verified by numerous field tests.

Site and Facility Description

Based upon information provided by Verizon, including zoning drawings by Streamline Engineering and Design, Inc., dated September 17, 2015, it is proposed to install six Andrew Model SBNHH-1D65A directional panel antennas on a 12-foot extension to be added on top of the existing 113-foot PG&E lattice tower sited on the rural property located at 5210 Hawkins Road* in unincorporated Solano County near Vacaville, about 3/4 miles east of Leisure Town Road. The antennas would employ up to 4° downtilt, would be mounted at an effective height of about 123 feet above ground, and would be oriented in pairs toward 70°T, 230°T, and 320°T. The maximum effective radiated power in any direction would be 6,900 watts, representing simultaneous operation at 3,010 watts for AWS, 3,080 watts for PCS, and 810 watts for 700 MHz service; no operation on cellular frequencies is presently proposed from this site.

* This address is reportedly preferred by County staff.



**Verizon Wireless • Proposed Base Station (Site No. 285362 “Leisure Town”)
5210 Hawkins Road • Vacaville, California**

Presently located on the side of the tower are similar antennas for use by Sprint, as well as a microwave “dish” antenna, for interconnection of this site with others in the Sprint network. Those antennas are to be relocated to the new tower extension, and those facilities are assumed for the limited purpose of this study to be as follows:

<u>Service</u>	<u>Maximum ERP</u>	<u>Antenna Model</u>	<u>Downtilt</u>	<u>Height</u>
BRS	1,500 watts	KMW ET-X-WM-18-65-8P	8°	116½ ft
PCS	7,000	KMW ET-X-TS-70-15-62-18	8	116½
SMR	500	KMW ET-X-TS-70-15-62-18	8	116½

Study Results

For a person anywhere at ground, the maximum RF exposure level due to the proposed Verizon operation by itself is calculated to be 0.0026 mW/cm², which is 0.29% of the applicable public exposure limit. The maximum calculated cumulative level at ground, for the simultaneous operation of both carriers, is 0.74% of the public exposure limit. The maximum calculated cumulative level at any nearby building[†] is 0.88% of the public limit. It should be noted that these results include several “worst-case” assumptions and therefore are expected to overstate actual power density levels.

No Recommended Mitigation Measures

Due to their mounting locations and height, the Verizon antennas would not be accessible to unauthorized persons, and so no mitigation measures are necessary to comply with the FCC public exposure guidelines. It is presumed that PG&E already takes adequate precautions to ensure that there is no unauthorized access to its tower and that all personnel receive appropriate training to prevent exposures in excess of the occupational limit.

Conclusion

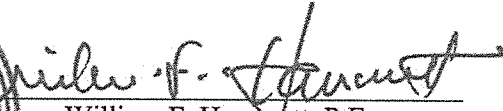
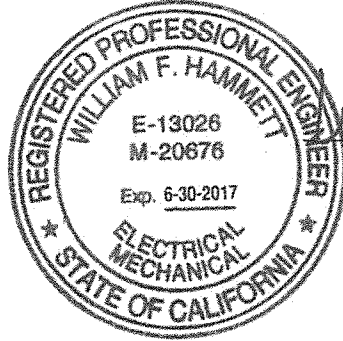
Based on the information and analysis above, it is the undersigned’s professional opinion that operation of the base station proposed by Verizon Wireless at 5210 Hawkins Road in Vacaville, California, will comply with the prevailing standards for limiting public exposure to radio frequency energy and, 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 base stations.

[†] Located at least 420 feet away, based on photographs from Google Maps.

Verizon Wireless • Proposed Base Station (Site No. 285362 "Leisure Town")
5210 Hawkins Road • Vacaville, California

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, 2017. 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.



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

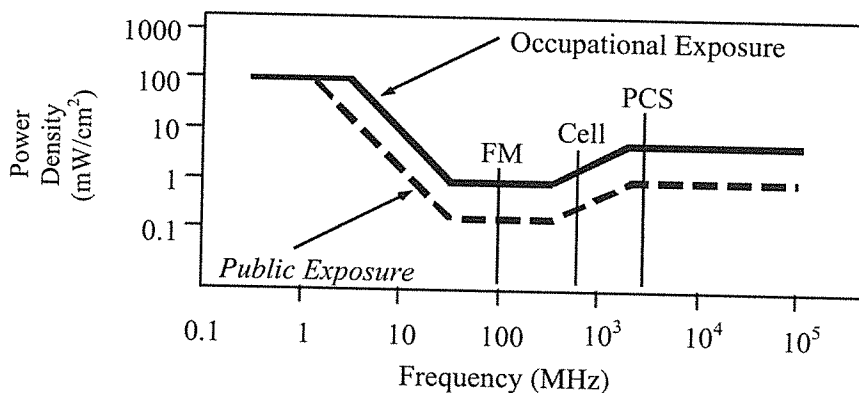
October 7, 2015

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 (<i>f</i> 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	<i>614</i>	1.63	<i>1.63</i>	100	<i>100</i>
1.34 – 3.0	614	<i>823.8/f</i>	1.63	<i>2.19/f</i>	100	<i>180/f²</i>
3.0 – 30	1842/ <i>f</i>	<i>823.8/f</i>	4.89/ <i>f</i>	<i>2.19/f</i>	900/ <i>f²</i>	<i>180/f²</i>
30 – 300	61.4	<i>27.5</i>	0.163	<i>0.0729</i>	1.0	<i>0.2</i>
300 – 1,500	3.54√ <i>f</i>	<i>1.59√f</i>	√ <i>f</i> /106	<i>√f/238</i>	<i>f/300</i>	<i>f/1500</i>
1,500 – 100,000	137	<i>61.4</i>	0.364	<i>0.163</i>	5.0	<i>1.0</i>



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 built those formulas into a proprietary program that calculates, at each location on an arbitrary rectangular grid, the total expected power density from any number of individual radio sources. The program allows for the description of buildings and uneven terrain, if required to obtain more accurate projections.



HAMMETT & EDISON, INC.
CONSULTING ENGINEERS
SAN FRANCISCO

FCC Guidelines
Figure 1

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/cm²,

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/cm²,

where θ_{BW} = half-power beamwidth of the antenna, in degrees, and

P_{net} = net power input to the antenna, in watts,

D = distance from antenna, in meters,

h = aperture height of the 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/cm²,

where ERP = total ERP (all polarizations), in kilowatts,

RFF = relative field factor at the direction to the actual point of calculation, and

D = distance from the center of radiation to the 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 has been built into a proprietary program that calculates, at each location on an arbitrary rectangular grid, the total expected power density from any number of individual radiation sources. The program also allows for the description of uneven terrain in the vicinity, to obtain more accurate projections.

