SOLANO COUNTY ZONING ADMINISTRATOR
Resource Management Staff Report

Application No. MU-14-03 | **Meeting of February 19, 2015**
Project Planner: Eric Wilberg, Associate Planner | **Agenda Item No. 3**

Applicant:	**Property Owner:**
Verizon Wireless NSA Wireless, Pamela Nobel 2010 Crow Canyon Place Suite 355 San Ramon, CA 94583	Jean Brazelton 3628 Gates Canyon Road Vacaville, CA 95688

Action Requested: Minor Use Permit application to permit the co-location of a wireless communication facility atop an existing 97.9 foot tall PG&E tower.

Site Information:

Size: 165 acres (total six parcels)	Location: near Gates Canyon and Pleasants Valley Roads
APN: 0121-150-10 (project site)	
Zoning: Exclusive Agriculture 'A-40'	Land Use: Agriculture, cattle grazing
General Plan: Agriculture	Ag. Contract: 565
Utilities: N/A	Access: Gates Canyon Road

Adjacent General Plan Designations, Zoning and Existing Land Uses

	General Plan	Zoning	Land Use
North	Agriculture	Exclusive Agriculture 'A-40'	Alfalfa
South	Agriculture	Exclusive Agriculture 'A-40'	Fruit Trees
East	Agriculture	Exclusive Agriculture 'A-40'	Fruit Trees
West	Agriculture	Exclusive Agriculture 'A-40'	Fruit Trees

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.

Motion to Approve

The Zoning Administrator does hereby **ADOPT** the attached draft resolution and **APPROVE** Minor Use Permit No. MU-14-03 subject to the recommended conditions of approval.

ENVIRONMENTAL SETTING

The subject parcel is 42.18 acres in size and is part of a larger, 165.06 acre legal lot reconfigured through Lot Line Adjustment LLA-11-02 and Certificate of Compliance CC-11-03. The project is

located approximately one mile west of the City of Vacaville, near the intersection of Pleasants Valley and Gates Canyon Roads, on Assessor's Parcel Number 0121-150-100

The topography is characterized by rolling hills, with a majority of the site exhibiting slopes between 16 – 24%. The site is generally open grass land with oak and walnut trees being the predominant vegetation. The property is primarily utilized for cattle grazing and is undeveloped with the exception of two 97.9 foot tall PG&E transmission towers and overhead utility lines which traverse the property in a north-south direction.

Surrounding properties within Pleasants Valley consist primarily of open grazing land and orchard crop production interspersed with rural home sites.

PROJECT DESCRIPTION

The proposed project consists of co-locating an unmanned wireless telecommunications facility to be mounted on an existing PG&E transmission tower. The Verizon Wireless facility would be comprised of six, six foot tall, panel antennas mounted on a 12 foot tall 'top hat' atop the existing 97.9 foot tall transmission tower. Various equipment cabinets, remote radio units, cable boxes, and a stand-by diesel generator would be installed on a raised steel platform within the base of the lattice tower. Six foot tall redwood fencing would enclose the approximate 570 square foot equipment area.

A new 20 foot wide gravel roadway and encroachment at Gates Canyon Road would be constructed to afford access to the site. Two 5 foot wide underground utility routes would connect the site to a power poles along Pleasants Valley Road and at a location just north of the existing towers.

LAND USE CONSISTENCY

Zoning Regulations

Section 28.81(E)(1)(a)(4) of the County Zoning Regulations states that co-located wireless communication facilities, regardless of zoning district, may be conditionally approved by the Zoning Administrator, provided the facility complies with the general requirements delineated in subsection (D) of 28.81, Wireless Communication Facilities.

The applicant has retained the firm of Hammett & Edison, Inc. Consulting Engineers to evaluate the project's potential radio frequency (RF) electromagnetic field exposure. The report (Attachment D) concludes that the proposed project would comply with the FCC standards for human exposure to RF.

Section 28.81(J)(10) of the Zoning Regulations requires that all wireless communication facilities be designed to minimize noise. The applicant has therefore submitted the results of a noise study conducted by Hammett & Edison, Inc. (Attachment E). The report concludes that the facility, including the occasional use of the stand-by diesel generator, would remain under the Zoning Regulations threshold of 65 dBA L_{dn} at the property line.

As proposed, the project meets County Zoning Regulation requirements, including the Wireless Communications Facilities Ordinance for co-located facilities, as well as Exclusive Agriculture 'A-40' minimum development standards for land use setbacks to property lines.

General Plan

The project is located within ¾ mile of Pleasants Valley Road, a scenic roadway identified on Figure RS-5 of the Solano County General Plan. The proposed six foot tall panel antennas would be mounted on an existing 97.9 foot tall PG&E lattice transmission tower. Views of the antennas from Pleasants Valley Road would be insignificant due to the existing built environment and the shear mass of the lattice towers.

All of the proposed equipment and cabinets would be located at the base of tower and would not be visible from the roadway due to existing oak and walnut trees obstructing this line of sight. Attachment F provides before and after photo simulations of the project.

Williamson Act

Per the Solano County Uniform Rules and Procedures Governing Agricultural Preserves and Land Conservation Contracts, wireless telecommunication facilities are identified as a compatible use on properties under an active Williamson Act Contract and Agricultural Preserve.

RECOMMENDATION

Staff recommends that the Zoning Administrator **ADOPT** the mandatory and suggested findings, and **APPROVE** Minor Use Permit No. MU-14-03, subject to the recommended conditions of approval.

MINOR USE PERMIT MANDATORY FINDINGS

1. **That the establishment, maintenance or operation of the use applied for is in conformity to the General Plan for the County with regard to traffic circulation, population densities and distribution, and other aspects of the General Plan considered by the Zoning Administrator.**

   The co-location of a wireless communications facility is consistent with the goals, objectives and policies of the Solano County Zoning Ordinance and Solano County General Plan. The project as proposed by the applicant, along with the recommended conditions of approval will be consistent with the General Plan.

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

   The project involves constructing an encroachment to Gates Canyon Road and 20 foot wide private roadway to access the site. The facility would be unmanned and does not require domestic water and/or private septic system.

3. **The subject use will not, under the circumstances of this 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.**

The Solano County Development Review Committee has reviewed the project permit and determined that the project will not present a detrimental or injurious impact on surrounding properties and has recommended conditions of approval to be implemented on the project to support this finding.

ADDITIONAL FINDINGS

4. The proposed facility complies will all applicable sub-sections of Wireless Communications Facilities, 28.81.

5. The RF Environmental Evaluation Report for the project shows that the cumulative radio-frequency energy emitted by the facility and any near-by facilities is consistent with FCC regulations.

6. The facility blends in with the 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.

CONDITIONS OF APPROVAL

1. The wireless communication facility shall be established and operated in accord with the application materials submitted with MU-14-03, and with the development plans entitled Verizon Wireless, Pleasants Valley, 3628 Gates Canyon Road, submitted November 13, 2014, and as approved by the Solano County Zoning Administrator.

2. All requirements of the Federal Communications Commission shall be met prior to the issuance of a building permit and during operation of the subject facility. Ground level radiation shall not exceed standards adopted by the Federal Communications Commission and U.S. Environmental Protection Administration.

3. 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.

4. Upon termination or expiration of the subject use permit, the proposed wireless communication infrastructure shall be removed from the site. All obsolete or unused facilities, including concrete pads, shall be removed within 12 months of cessation of operations at the site and the area returned to natural conditions.

5. Any expansion or change in the use may require a new or modified use permit and further environmental review.

6. No additional uses (including outdoor storage), new or expanded buildings shall be established or constructed beyond those identified on the approved plot plan without prior approval of new permits or minor revisions to the permits.

7. The permittee shall obtain approval from the Building and Safety Division prior to construction, erection, enlargement, altering, repairing, moving, improving, removing, converting, demolishing any building or structure, fence or retaining wall regulated by the Solano County Building laws. Submit four (4) sets of plans to the Building and Safety Division for plan review and permits prior to beginning any improvements.

8. The premises shall be maintained in a neat and orderly manner and kept free of accumulated debris and junk.

9. Antennas shall be painted or of a color and material to match the existing PG&E lattice transmission tower.

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 the Solano County Department of Resource Management Hazardous Materials Section.

11. The permittee shall apply for, secure and abide by the conditions of an Encroachment Permit for the proposed connection to Gates Canyon Road. Application shall be made with the Solano County Department of Resource Management Public Works Engineering Division.

12. The permittee shall take measures to avoid tracking loose gravel and material onto the County Roadway. Should loose material be tracked onto the roadway, the permittee shall take measures to sweep the roadway on a regular basis.

13. The permittee shall apply for, secure and abide by the conditions of a grading permit for the new access road proposed for the site. The grading permit application shall include details related to how the road will be constructed, such as: retaining walls, daylight of grading, road section, etc. Grading permit application shall also address site drainage and storm water protection during roadway construction. Application shall be made with the Solano County Department of Resource Management Public Works Engineering Division.

14. The subject minor use permit shall be valid for a fixed term of ten (10) years; with an expiration date of February 19, 2025. Issuance of a new land use entitlement is required should the facility continue to operate on-site past the permit expiration date of February 19, 2025.

Attachments

A – Draft Resolution
B – Assessor's Parcel Map
C – Development Plans
D – Radio Frequency Evaluation
E – Noise Analysis Report
F – Photo Simulations

SOLANO COUNTY ZONING ADMINISTRATOR RESOLUTION NO. XX

WHEREAS, the Solano County Zoning Administrator has considered Minor Use Permit Application No. MU-14-03 of **Verizon Wireless (c/o NSA Wireless)** to construct a wireless communication facility atop an existing 97.9 foot tall PG&E lattice tower. The Verizon site would consist of six panel antenna mounted on a 12 foot tall "top hat" tower extension. Equipment cabinets would be located within the base of the existing tower on a raised steel platform with redwood enclosure fencing. The project is located at Gates Canyon and Vaca Valley Roads, Vacaville, in an "A-40" Exclusive Agricultural Zoning District, APN: 0121-150-100, and;

WHEREAS, said Zoning Administrator 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 February 19, 2015, and;

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

1. **That the establishment, maintenance or operation of the use applied for is in conformity to the General Plan for the County with regard to traffic circulation, population densities and distribution, and other aspects of the General Plan considered by the Zoning Administrator.**

   The co-location of a wireless communications facility is consistent with the goals, objectives and policies of the Solano County Zoning Ordinance and Solano County General Plan. The project as proposed by the applicant, along with the recommended conditions of approval will be consistent with the General Plan.

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

   The project involves constructing an encroachment to Gates Canyon Road and 20 foot wide private roadway to access the site. The facility would be unmanned and does not require domestic water and/or private septic system.

3. **The subject use will not, under the circumstances of this 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.**

   The Solano County Development Review Committee has reviewed the project permit and determined that the project will not present a detrimental or injurious impact on surrounding properties and has recommended conditions of approval to be implemented on the project to support this finding.

Exhibit A

ADDITIONAL FINDINGS

4. The proposed facility complies will all applicable sub-sections of Wireless Communications Facilities, 28.81.

5. The RF Environmental Evaluation Report for the project shows that the cumulative radio-frequency energy emitted by the facility and any near-by facilities is consistent with FCC regulations.

6. The facility blends in with the 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.

BE IT THEREFORE RESOLVED, that the Zoning Administrator has approved Minor Use Permit Application No. MU-14-03 subject to the following recommended conditions of approval:

1. The wireless communication facility shall be established and operated in accord with the application materials submitted with MU-14-03, and with the development plans entitled Verizon Wireless, Pleasants Valley, 3628 Gates Canyon Road, submitted November 13, 2014, and as approved by the Solano County Zoning Administrator.

2. All requirements of the Federal Communications Commission shall be met prior to the issuance of a building permit and during operation of the subject facility. Ground level radiation shall not exceed standards adopted by the Federal Communications Commission and U.S. Environmental Protection Administration.

3. 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.

4. Upon termination or expiration of the subject use permit, the proposed wireless communication infrastructure shall be removed from the site. All obsolete or unused facilities, including concrete pads, shall be removed within 12 months of cessation of operations at the site and the area returned to natural conditions.

5. Any expansion or change in the use may require a new or modified use permit and further environmental review.

6. No additional uses (including outdoor storage), new or expanded buildings shall be established or constructed beyond those identified on the approved plot plan without prior approval of new permits or minor revisions to the permits.

7. The permittee shall obtain approval from the Building and Safety Division prior to construction, erection, enlargement, altering, repairing, moving, improving, removing, converting, demolishing any building or structure, fence or retaining wall regulated by the

Solano County Building laws. Submit four (4) sets of plans to the Building and Safety Division for plan review and permits prior to beginning any improvements.

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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 the Solano County Department of Resource Management Hazardous Materials Section.

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12. The permittee shall take measures to avoid tracking loose gravel and material onto the County Roadway. Should loose material be tracked onto the roadway, the permittee shall take measures to sweep the roadway on a regular basis.

13. The permittee shall apply for, secure and abide by the conditions of a grading permit for the new access road proposed for the site. The grading permit application shall include details related to how the road will be constructed, such as: retaining walls, daylight of grading, road section, etc. Grading permit application shall also address site drainage and storm water protection during roadway construction. Application shall be made with the Solano County Department of Resource Management Public Works Engineering Division.

14. The subject minor use permit shall be valid for a fixed term of ten (10) years; with an expiration date of February 19, 2025. Issuance of a new land use entitlement is required should the facility continue to operate on-site past the permit expiration date of February 19, 2025.

****

I hereby certify that the foregoing resolution was adopted at the regular meeting of the Solano County Zoning Administrator on February 19, 2015.

BILL EMLEN, DIRECTOR
RESOURCE MANAGEMENT

_____

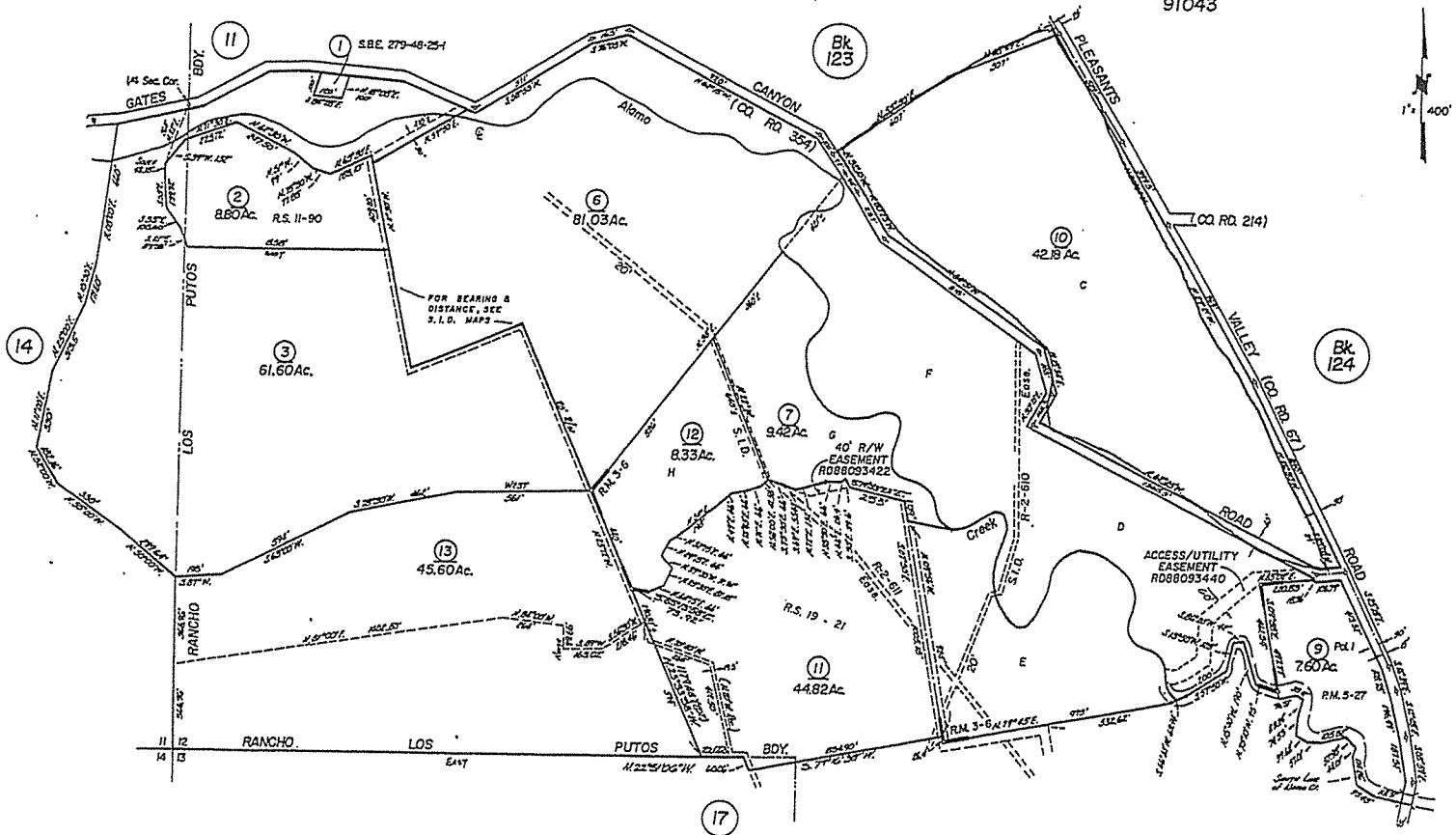
Michael Yankovich
Planning Program Manager

Exhibit B

POR. LOT 37, RANCHO LOS PUTOS
POR. SEC. 11 & 12, T. 6N., R.2W., M.D.B.&M. EXT.

Tax Area Code
91020
91043

121-15



J.W. Gates Estate Sub. – R.M. Bk. 3, Pg. 6

REVISION	DATE	BY

NOTE: This map is for assessment purposes only and is not for the intent of interpreting legal boundary rights, zoning regulations and/or legality of land division laws.

NOTE – Assessor's Block Numbers Shown in Ellipses
Assessor's Parcel Numbers Shown in Circles

Assessor's Map Bk. 121, Pg. 15
County of Solano, Calif.

9596

FILE COPY
MU-14-03

verizon wireless

SITE NAME: PLEASANTS VALLEY

PSL NUMBER: 249895

SITE ADDRESS: 3628 GATES CANYON ROAD
VACAVILLE, CA 95688

TOWER INFORMATION: VZN-249895B
TWR. #07/40
VACA-PARKWAY 230kV LINE
SAP# 40596434

SITE ADDRESS:
3628 GATES CANYON ROAD
VACAVILLE, CA 95688

PROPERTY OWNER:
JEAN BRAZELTON, THE EUGENE BRAZELTON ESE1
3628 GATES CANYON ROAD
VACAVILLE, CA 95688
(707)-448-2238

STRUCTURE OWNER:
PG&E
245 MARKET ST MAIL CODE N10D
CONTACT: MIKE SULLIVAN
PHONE (925) 323-9664

PROJECT ARCHITECT:
DIAMOND ENGINEERING SERVICES, INC
4255 PARK ROAD
BENICIA, CA 94510
CONTACT: BRUCE LYON, ARCHITECT

PROJECT ENGINEER:
DIAMOND ENGINEERING SERVICES, INC
4255 PARK ROAD
BENICIA, CA 94510
CONTACT: ERIC UHRENHOLT, PE

CONSTRUCTION MANAGER:
NSA WIRELESS, INC.
2010 CROW CANYON PL., STE. #355
SAN RAMON, CA 94583
CONTACT: SCOTT COWAN
(707) 689-4144

ZONING/LEASING AGENT:
NSA WIRELESS, INC.
2010 CROW CANYON PL., STE. #355
SAN RAMON, CA 94583
CONTACT: PAMELA NOBEL
(707)-486-7232

JURISDICTION:
SOLANO COUNTY

COUNTY:
SOLANO COUNTY

APN NUMBER
SOL: 0121-150-100

ELEVATION (NAVD88):
378.3'± AMSL, GROUND ELEVATION AT CENTER TOWER
TOP OF TOWER 97.9'± AGL

APPLICANT:
verizon wireless
2785 MITCHELL DRIVE
WALNUT CREEK, CA 94598

SITE INFORMATION

ZONING:	A-40
ZONING CLASSIFICATION:	EXCLUSIVE AGRICULTURE
BUILDING TYPE:	V-B
OCCUPANCY:	S-2, UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY
FIRE SPRINKLES:	AN AUTOMATED FIRE SUPPRESSION SYSTEM (FIRE SPRINKLERS) IS NOT REQUIRED.
EQUIPMENT LEASE AREA:	430.25 SQ. FT. ±

BUILDING DATA

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

1. 2013 CALIFORNIA BUILDING CODE (CBC)

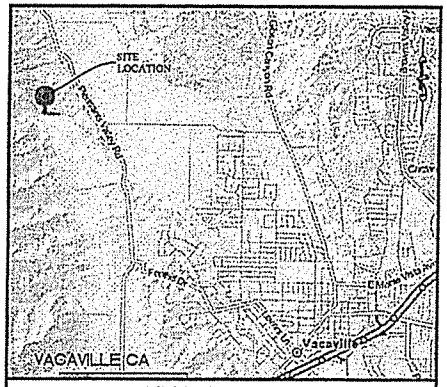
WORK PERFORMED SHALL COMPLY WITH THE FOLLOWING:

CALIFORNIA FIRE CODE	2013 EDITION UFC
CALIFORNIA BUILDING CODE	2013 EDITION CBC
CALIFORNIA MECHANICAL CODE	2013 EDITION UPMC
CALIFORNIA PLUMBING CODE	2013 EDITION UPMC
CALIFORNIA ELECTRICAL CODE	2013 EDITION 2012 NEC
CAL GREEN CODE	2013 EDITION CGC

CALIFORNIA ENERGY EFFICIENCY STANDARDS CODE (CEES) 2013 EDITION REVISED JULY 2013, AND ALL APPLICABLE LOCAL & STATE ORDINANCES, CODES AND REGULATIONS AND 2013 CALIFORNIA STATE STANDARDS CODE AMENDMENTS.

2. LOCAL BUILDING CODE
3. CITY/COUNTY ORDINANCES
4. NFPA 76

BUILDING CODES



VICINITY MAP

FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. HANDICAPPED ACCESS REQUIREMENTS ARE NOT REQUIRED IN ACCORDANCE WITH THE 2013 CALIFORNIA BUILDING CODE.

ADA COMPLIANCE

SIGNATURES

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:	AGENT - LEASING:
SIGNATURE: DATE:	SIGNATURE: DATE:
AGENT - CONSTRUCTION:	AGENT - ZONING:
SIGNATURE: DATE:	SIGNATURE: DATE:

SIGNATURE OF APPROVAL

1. INSTALL NEW VERIZON WIRELESS OUTDOOR EQUIPMENT ON A NEW RAISED STEEL PLATFORM W/ A NEW 19'-6" X 19'-6" REDWOOD FENCE COMPOUND/ LICENSE AREA.
2. INSTALL NEW VERIZON WIRELESS 30kW DIESEL GENERATOR W/ UL 2085 LISTED 132 GAL. TANK ON NEW EQUIPMENT PLATFORM WITHIN THE NEW REDWOOD FENCE COMPOUND.
3. INSTALL NEW 12'-0" HIGH TOP HAT EXTENSION ON (E) 97.9'± AGL P.G.&E. LATTICE TOWER.
4. INSTALL (2) NEW VERIZON WIRELESS ANTENNAS PER SECTOR, (6) ANTENNAS TOTAL WITH (12) 2"Ø CO-AX, ON THE NEW TOP HAT EXTENSION ON THE (E) P.G.&E. LATTICE TOWER.
5. INSTALL (6) NEW VERIZON WIRELESS RRUS ON A NEW H-FRAME WITHIN THE NEW REDWOOD FENCE COMPOUND.
6. INSTALL (3) NEW VERIZON WIRELESS TMA'S & (3) NEW DIPLEXERS ON THE NEW TOP HAT EXTENSION ON THE (E) P.G.&E. LATTICE TOWER, (1) TMA & (1) DIPLEXER PER SECTOR.
7. INSTALL (2) NEW RAYCAPS & (3) NEW DIPLEXERS ON A NEW H-FRAME WITHIN THE NEW REDWOOD EQUIPMENT COMPOUND FENCE.
8. INSTALL (2) NEW GPS ANTENNAS ON THE (E) P.G.&E. LATTICE TOWER.

PROJECT DESCRIPTION

verizon wireless
2785 MITCHELL DRIVE
WALNUT CREEK, CA 94598
TEL: (925) 904-3533
FAX: (925) 904-3513

NSA Wireless, Inc.
2010 CROW CANYON PL., STE. #355
SAN RAMON, CA 94583
(925) 244-1890

DIAMOND ENGINEERING SERVICES

PROJECT TEAM

SHEET NO	DESCRIPTION
T1	PROJECT INFORMATION & SHEET INDEX
C-1	TOPOGRAPHIC SURVEY EXISTING CONDITIONS
A1	SITE PLAN
A2	EQUIPMENT PLAN
A3	ANTENNA PLAN
A4	NORTHWEST & NORTHEAST ELEVATIONS
A5	SOUTHEAST & SOUTHWEST ELEVATIONS
A6	EQUIPMENT LAYOUT, LEGEND & NOTES
AD1	ANTENNA, RRU, RAYCAP, TMA & DIPLEXER DETAILS
AD2	ANTENNA COLOR CODES

SHEET INDEX

DIAMOND ENGINEERING SERVICES
4255 PARK ROAD
BENICIA, CA 94510
TEL: 707-304-3351

verizon wireless
2785 MITCHELL DRIVE
WALNUT CREEK, CA
TEL: (925) 904-3533
FAX: (925) 904-3513

VERIZON WIRELESS
PLEASANTS VALLEY PS#249895
3628 GATES CANYON ROAD
VACAVILLE, CA 95688

PROJECT INFORMATION & SHEET INDEX

REVISIONS

No.	DESCRIPTION	DATE
F	FOR REVIEW	05-12-2014
G	FOR REVIEW	06-07-2014
H	EQPM LAYOUT REV	06-09-2014
I	PG&E COMMENTS	06-16-2014
K	PG&E COMMENTS	06-23-2014
L	DRIVEWAY	06-25-2014

Job No.: N14030
Draw/Check By: BLL / EKU

T1

-10-

Exhibit C

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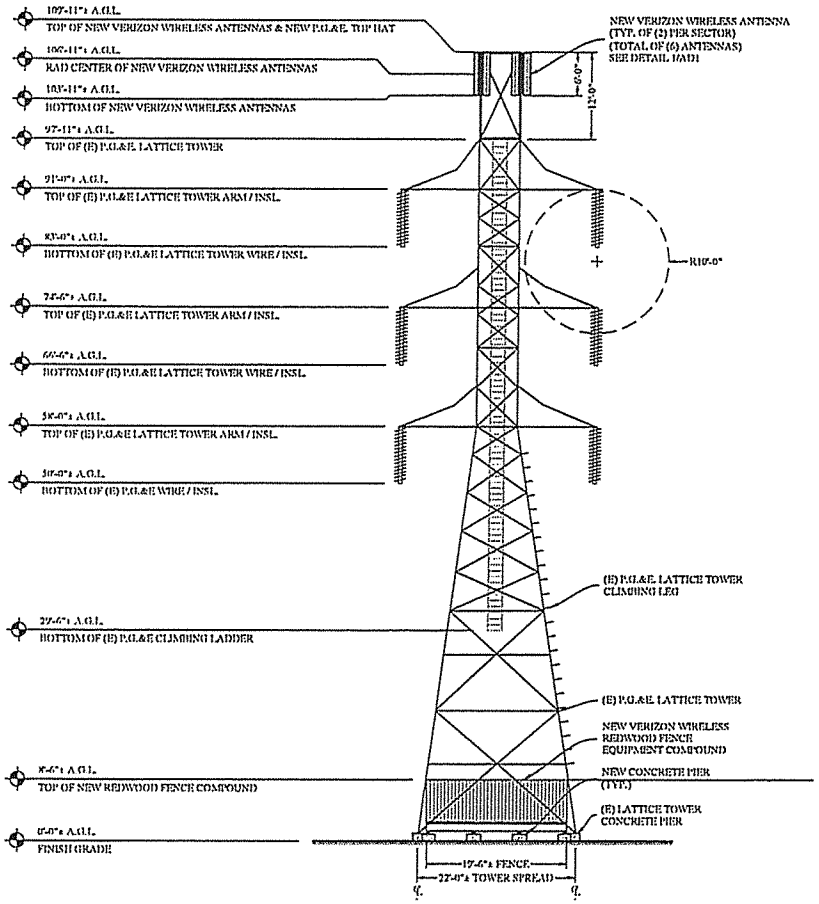
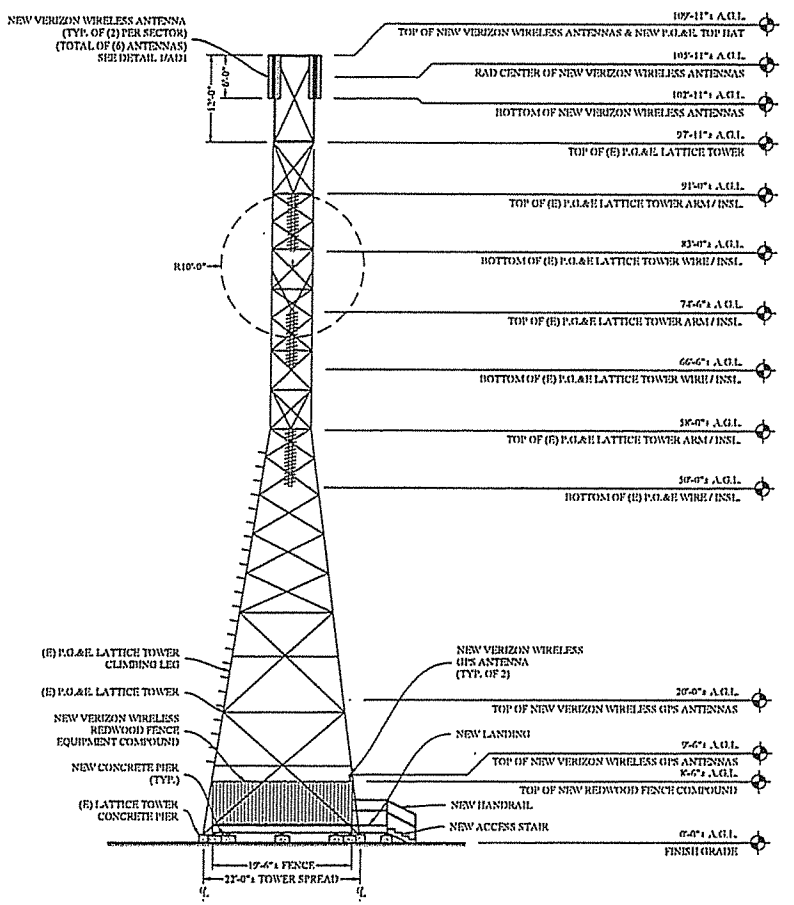


2 NORTHEAST ELEVATION

SCALE: 1/8"=1'-0"



1 NORTHWEST ELEVATION

SCALE: 1/8"=1'-0"

DIAMOND ENGINEERING SERVICES
4255 PARK ROAD
BENICIA, CA 94510
TEL: 707-304-3151

verizon wireless
MITCHELL DRIVE
WALNUT CREEK, CA
TEL: (925) 904-3533
FAX: (925) 904-3513

VERIZON WIRELESS
PLEASANTS VALLEY PS#249895
3628 GATES CANYON ROAD
VACAVILLE, CA 95688

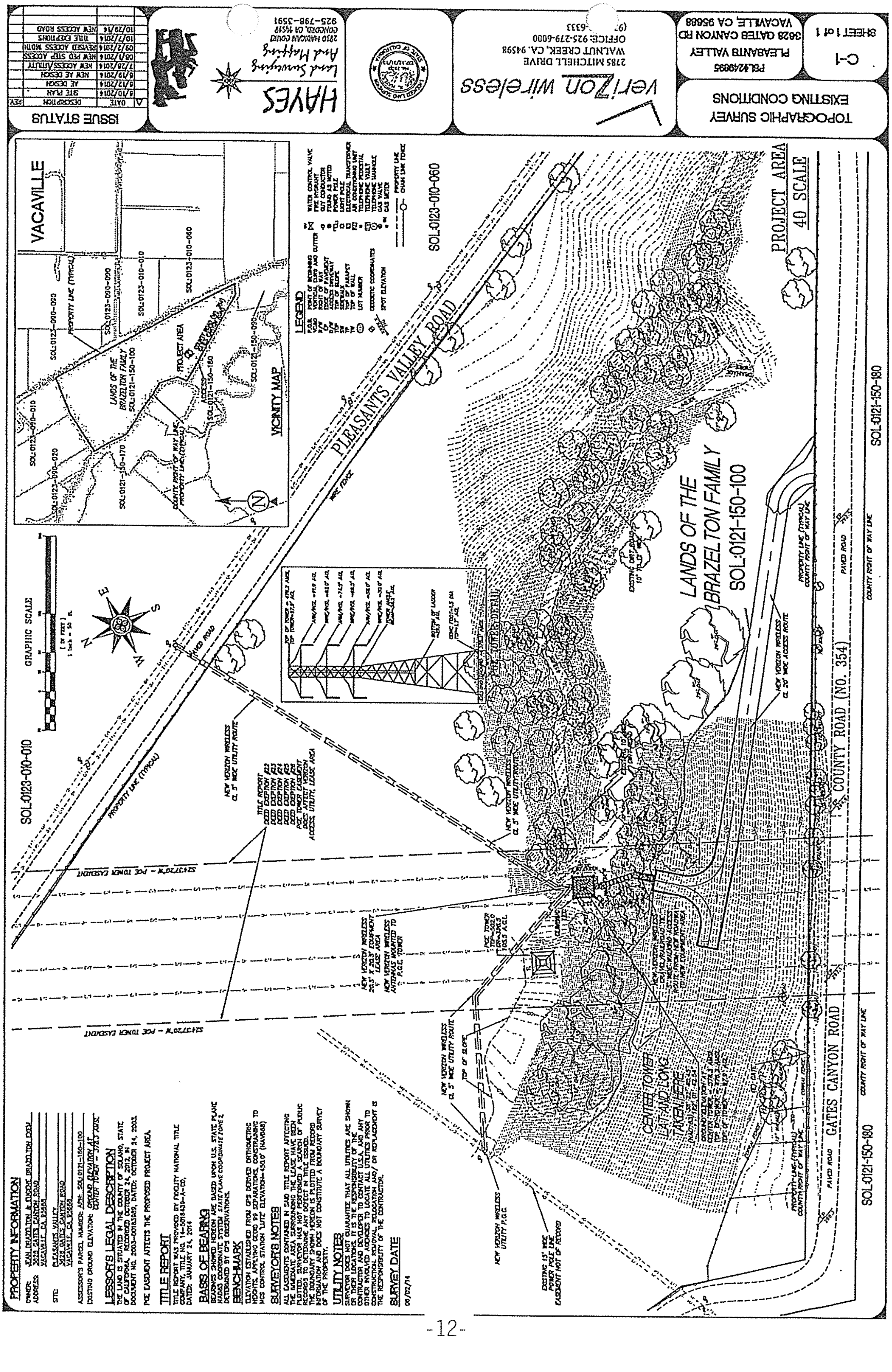
SOUTHWEST ELEVATION

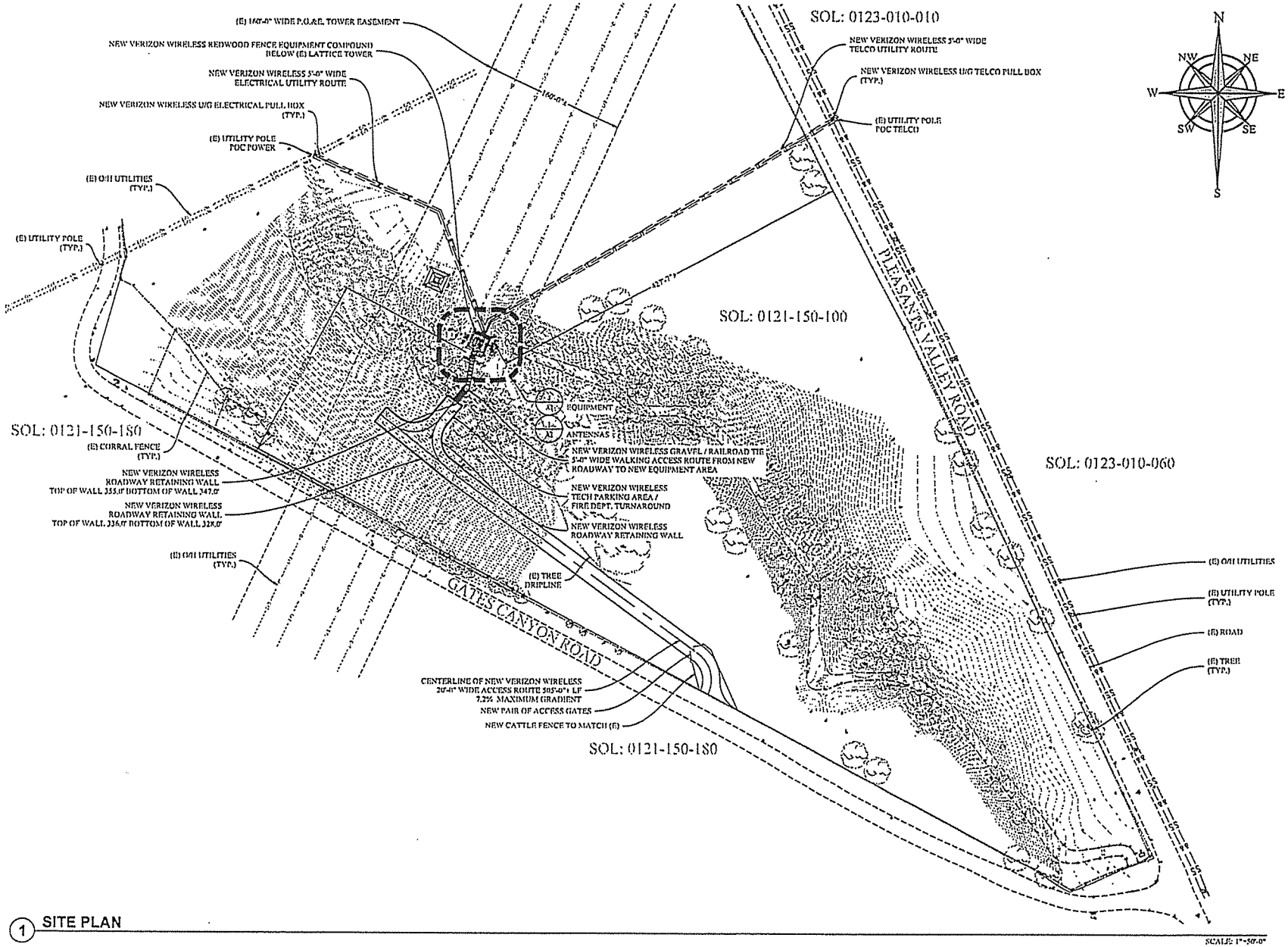
REVISIONS

No.	DESCRIPTION	DATE
F	FOR REVIEW	03-12-2014
G	FOR REVIEW	10-07-2014
H	EQPMT LAYOUT REV	10-09-2014
I	PG&E COMMENTS	10-10-2014
K	PG&E COMMENTS	10-23-2014
L	DRIVEWAY	10-28-2014

Job No.: N14030
Draw/Check By: BLL / EKU

A4


TOPOGRAPHIC SURVEY
EXISTING CONDITIONS
C-1
SHEET 1 of 1
PSL#249695
PLEASANTS VALLEY
3628 GATES CANYON RD
VACAVILLE, CA 95688
verizon wireless
2785 MITCHELL DRIVE
WALNUT CREEK, CA. 94598
OFFICE: 925-279-6000
HAYES
Land Surveying And Mapping
2310 HARCUM COURT
CONCORD, CA 94518
925-798-3591
ISSUE STATUS
PROPERTY INFORMATION
LESSOR'S LEGAL DESCRIPTION
TITLE REPORT
BASIS OF BEARING
BENCHMARK
SURVEYOR'S NOTES
UTILITY NOTES
SURVEY DATE
VACAVILLE
VICINITY MAP
LEGEND
GRAPHIC SCALE
PLEASANTS VALLEY ROAD
LANDS OF THE
BRAZELTON FAMILY
SOL:0121-150-100
SOL-0123-010-010
SOL-0123-010-060
SOL-0121-150-180
PROJECT AREA
40 SCALE
COUNTY ROAD (NO. 354)
GATES CANYON ROAD
CENTER TOWER
LAT AND LONG
TAKEN HERE
PROPERTY LINE (TYPICAL)
NEW VERIZON WIRELESS
CL 20' WIDE ACCESS ROUTE
NEW VERIZON WIRELESS
CL 5' WIDE UTILITY ROUTE
PG&E TOWER DETAIL



1 SITE PLAN

SCALE: 1"=50'-0"

DIAMOND ENGINEERING SERVICES
4255 PARK ROAD
BENICIA, CA 94510
TEL: 707-304-3351

verizon Wireless
MITCHELL DRIVE
LT CREEK, CA
TEL: (925) 904-3533
FAX: (925) 904-3513

VERIZON WIRELESS
PLEASANTS VALLEY PS#249895
3628 GATES CANYON ROAD
VACAVILLE, CA 95688

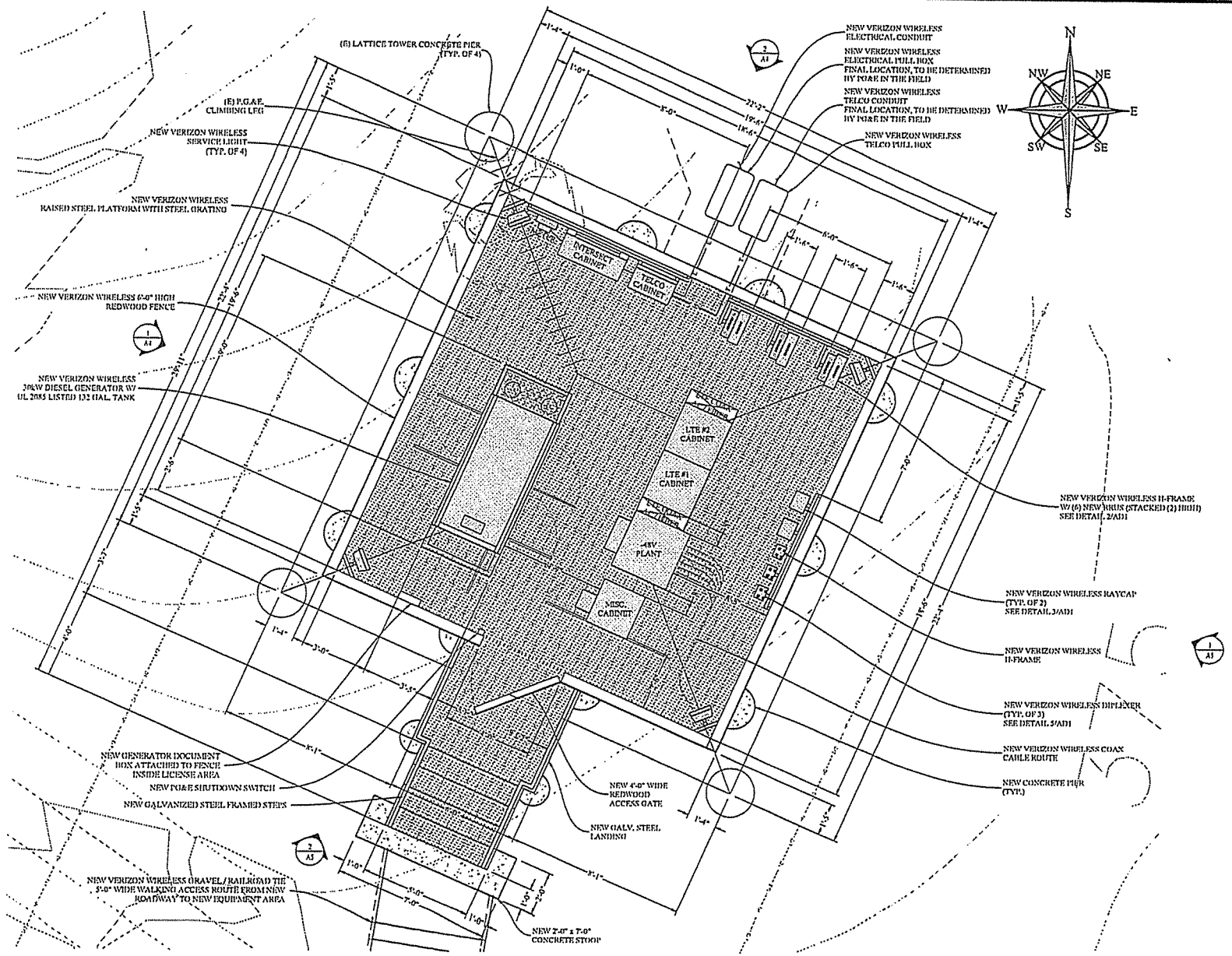
SITE PLAN

REVISIONS

No.	DESCRIPTION	DATE
F	FOR REVIEW	09-12-2014
G	FOR REVIEW	10-07-2014
H	EQUIP LAYOUT REV	10-09-2014
I	PG&E COMMENTS	10-10-2014
K	PG&E COMMENTS	10-22-2014
L	DRIVEWAY	10-28-2014

Job No.: N14030
Draw/Check By: BLL / EKU

A1



1 EQUIPMENT PLAN

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

DIAMOND ENGINEERING SERVICES
4255 PARK ROAD
BENICIA, CA 94510
TEL: 707-304-3551

verizon Wireless
MITCHELL DRIVE
WALNUT CREEK, CA
TEL: (925) 904-3533
FAX: (925) 904-3513

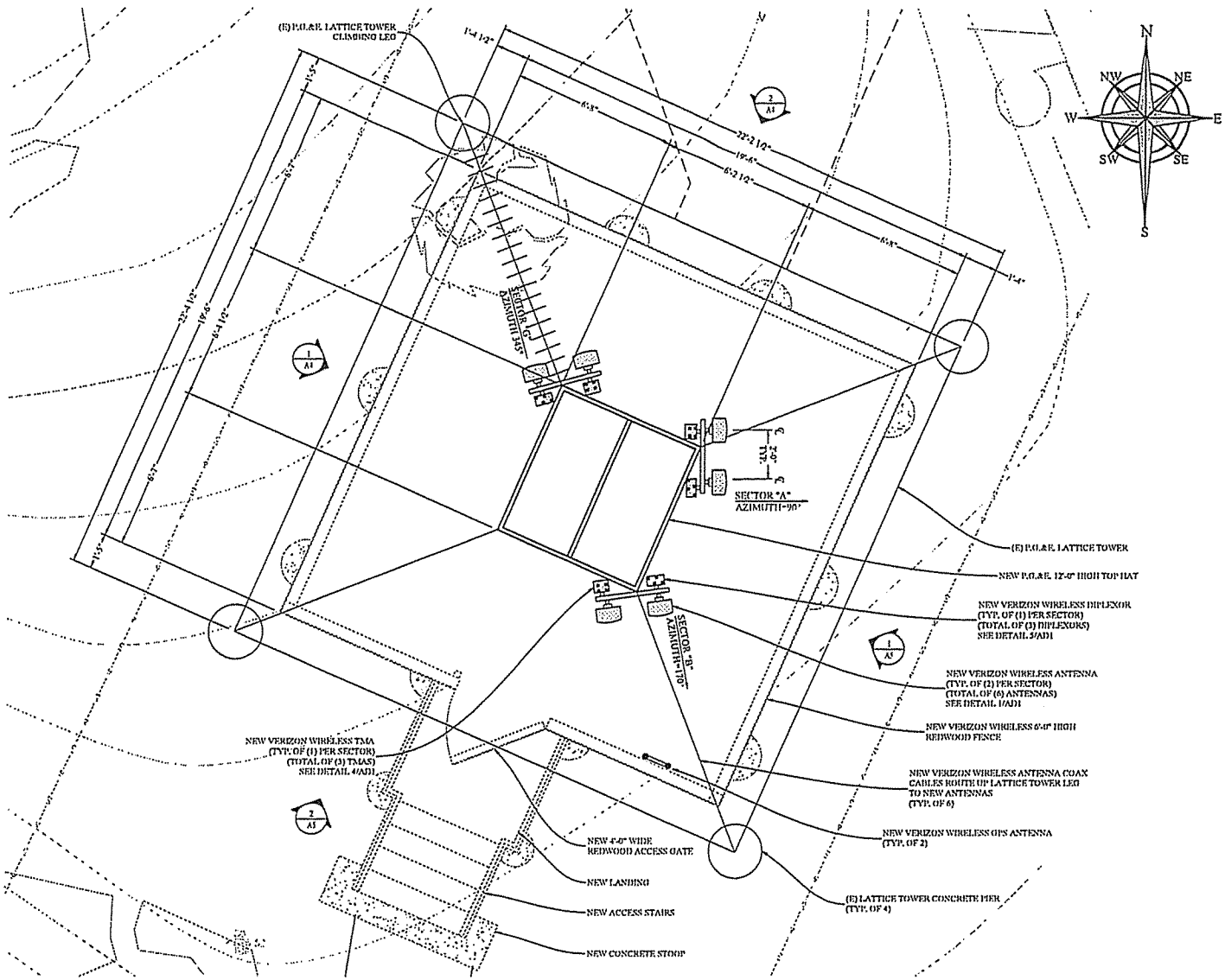
VERIZON WIRELESS
PLEASANTS VALLEY PS#249895
3628 GATES CANYON ROAD
VACAVILLE, CA 95688

EQUIPMENT PLAN

REVISIONS		
No.	DESCRIPTION	DATE
F	FOR REVIEW	09-12-2014
G	FOR REVIEW	10-07-2014
H	EQPM LAYOUT REV	10-09-2014
I	PG&E COMMENTS	10-10-2014
K	PG&E COMMENTS	10-22-2014
L	DRIVEWAY	10-28-2014

Job No.: N14030
Draw/Check By: BLL / EKU

A2



1 ANTENNA PLAN

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

DIAMOND ENGINEERING SERVICES
4255 PARK ROAD
BENICIA, CA 94510
TEL: 707-304-3351

verizon Wireless
MITCHELL DRIVE
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TEL: (925) 904-3533
FAX: (925) 904-3513

VERIZON WIRELESS
PLEASANTS VALLEY PS#249895
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VACAVILLE, CA 95688

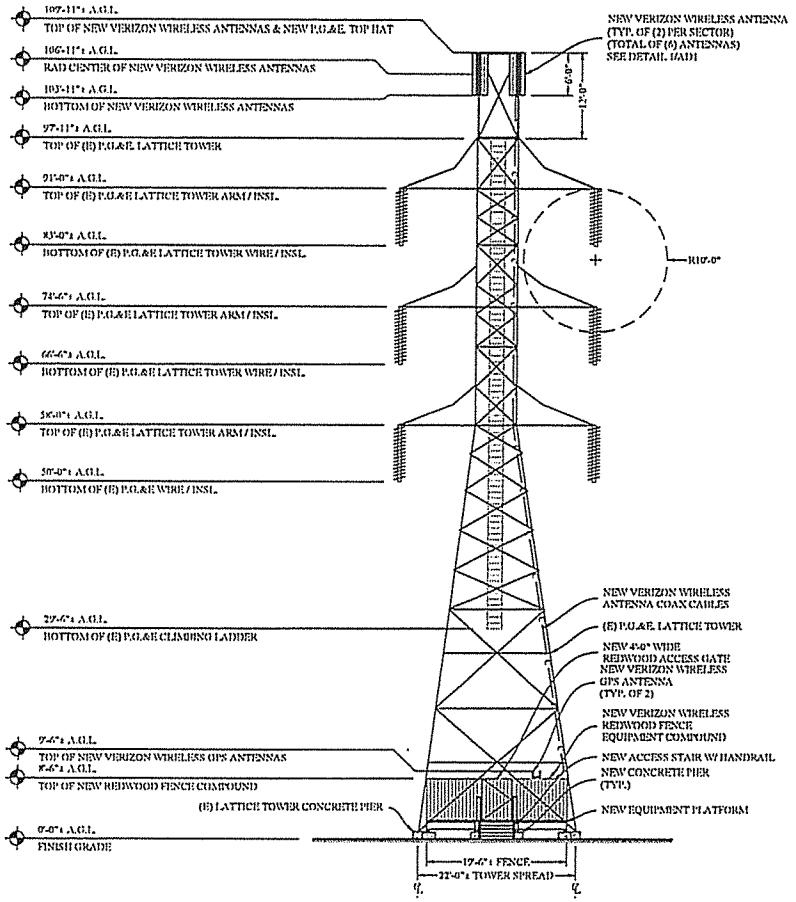
ANTENNA PLAN

REVISIONS

No.	DESCRIPTION	DATE
F	FOR REVIEW	09-12-2014
G	FOR REVIEW	10-07-2014
H	EQM LAYOUT REV	10-09-2014
I	PG&E COMMENTS	10-10-2014
K	PG&E COMMENTS	10-23-2014
L	DRIVEWAY	10-31-2014

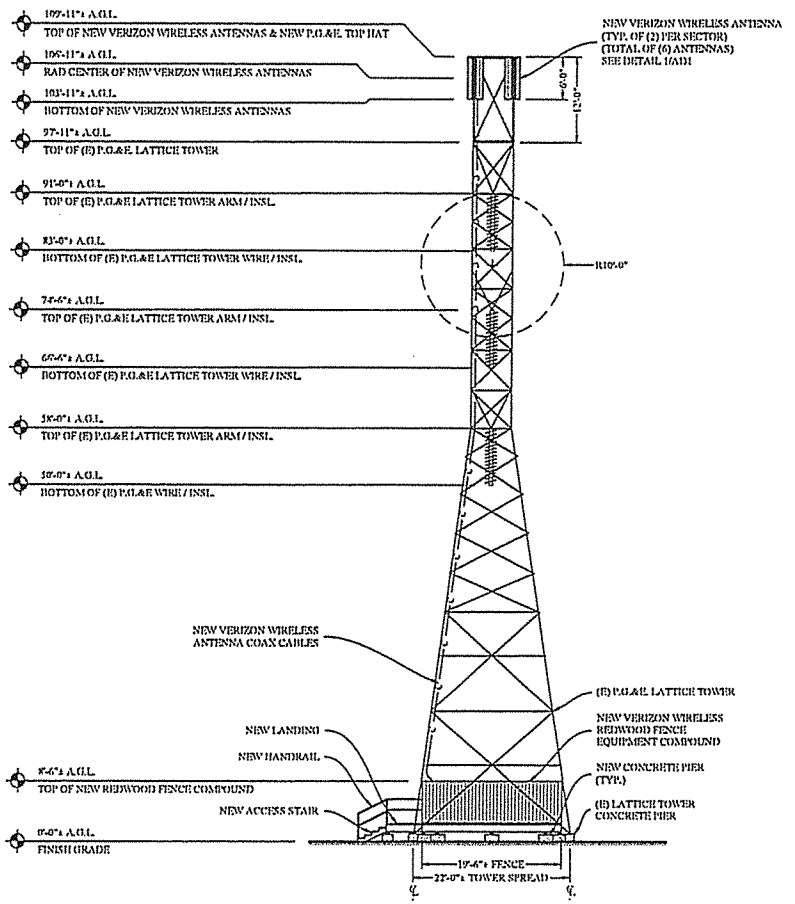
Job No.: N14030
Draw/Check By: JLL / EKU

A3



2 SOUTHWEST ELEVATION

SCALE: 1/8"=1'-0"



1 SOUTHEAST ELEVATION

SCALE: 1/8"=1'-0"

DIAMOND ENGINEERING SERVICES
4255 PARK ROAD
BENICIA, CA 94510
TEL: 707-304-3351

verizon wireless
MITCHELL DRIVE
WALNUT CREEK, CA
TEL: (925) 904-3533
FAX: (925) 904-3513

VERIZON WIRELESS
PLEASANTS VALLEY PS#249895
3628 GATES CANYON ROAD
VACAVILLE, CA 95688

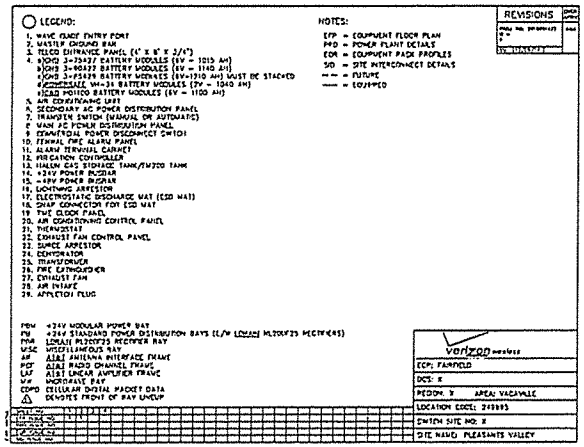
SOUTHEAST & SOUTHWEST ELEVATIONS

REVISIONS

No.	DESCRIPTION	DATE
F	FOR REVIEW	05-12-2014
G	FOR REVIEW	10-07-2014
H	EQPM LAYOUT REV	10-09-2014
I	PG&E COMMENTS	10-10-2014
K	PG&E COMMENTS	10-22-2014
L	DRIVEWAY	10-28-2014

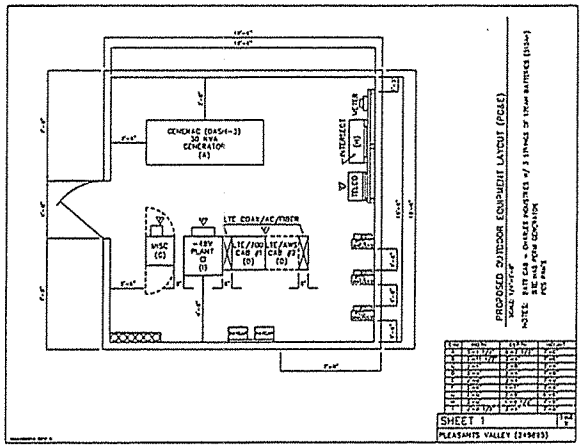
Job No.: N14030
Draw/Check By: BLL / EKU

A5



2 LEGEND & NOTES

SCALE: NONE



1 EQUIPMENT LAYOUT

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

DIAMOND ENGINEERING SERVICES
4255 PARK ROAD
BENICIA, CA 94510
TEL: 707-304-3351

verizon wireless
MITCHELL DRIVE
NUT CREEK, CA
TEL: (925) 904-3533
FAX: (925) 904-3513

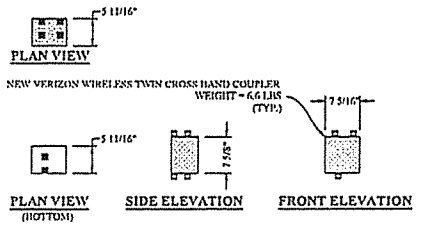
VERIZON WIRELESS
PLEASANTS VALLEY PS#249895
3628 GATES CANYON ROAD
VACAVILLE, CA 95688

EQUIPMENT LAYOUT,
LEGEND & NOTES

REVISIONS		
No.	DESCRIPTION	DATE
F	FOR REVIEW	05-12-2014
G	FOR REVIEW	10-07-2014
H	EQPM LAYOUT REV	10-09-2014
I	PG&E COMMENTS	10-10-2014
K	PG&E COMMENTS	10-23-2014
L	DRIVEWAY	10-28-2014

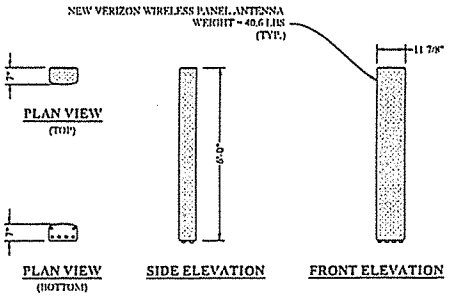
Job No.: N14030
Drawn/Check By: BLL / EKU

A6



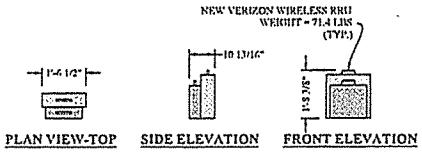
5 DIPLEXER DETAIL

SCALE: 1"=1'-0"



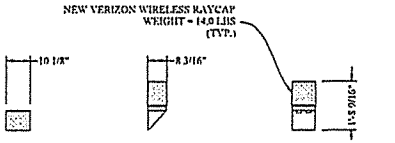
1 ANTENNA DETAIL

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



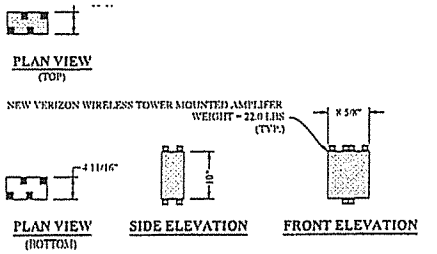
2 RRU DETAIL

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



3 RAYCAP DETAIL

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



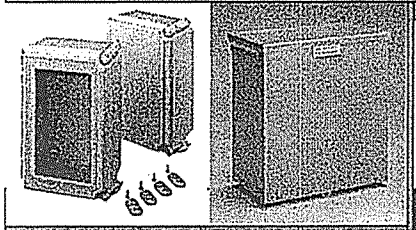
4 TMA DETAIL

SCALE: 1"=1'-0"

PG&E Material and Hardware

RF Disconnects / Document Boxes / Access Gate Lock Set-up

Field Notes: (#1) Approved RF Disconnects are designed by the Carrier and tested/confirmed by PG&E. (#2) PG&E locks (ONLY) installed on RF Disconnect and Document boxes. (#2) Access Gate Lock Configurations as noted - multiple locks to be inserted/daisy chained inside the "eye-bolts".

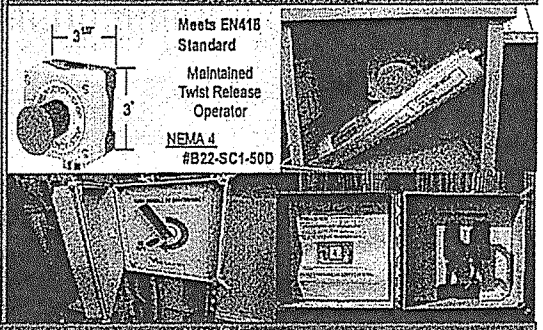


Optimal RF Disconnect and Generator Documents Box

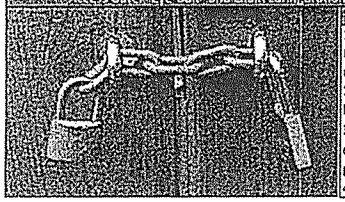
Model # A14120CHQRFGW - Fiberglass, Quick Release Latch with Standard Cover (Generator Documents BOX)

Model # A8RBG - NEMA Type 3R Enclosure, Screw Cover

RFD Disconnect Options / Models



Access Gate Eyebolt and chain configuration



Notes/References

1) This arrangement is for wood gates and fences. For other types of enclosures (CMU, fiberglass, or metal) use appropriate eyebolt type.
2) If additional locks are required, daisy-chain them between eyebolts.
3) HB IVES Lag thread eyebolt: 3/8" dia., 4-1/2" overall length, 2" thread length, 1-1/8" ID eye, zinc plated steel - or equal.
4) 5/16" Grade 40 chain.

CX.20052.131106

6 PG&E EQUIPMENT

SCALE: NONE

DAVIDSON ENGINEERING SERVICES
4255 PARK ROAD
BENICIA, CA 94510
TEL: 707-304-3351

verizon Wireless
[illegible] MITCHELL DRIVE
WALNUT CREEK, CA
TEL: (925) 934-3533
FAX: (925) 934-3513

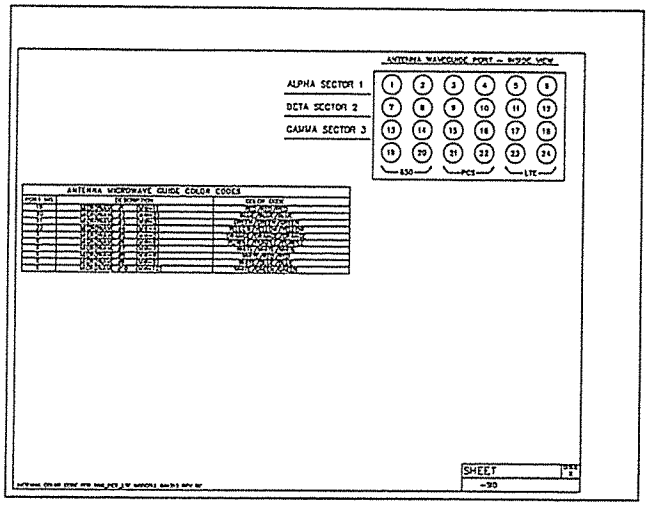
VERIZON WIRELESS
PLEASANTS VALLEY PS#249895
3628 GATES CANYON ROAD
VACAVILLE, CA 95688

ANTENNA, RRU, RAYCAP, TMA & DIPLEXER DETAILS

REVISIONS			
No.	DESCRIPTION	DATE
F	FOR REVIEW	09-12-2014
G	FOR REVIEW	10-07-2014
H	EQM LAYOUT REV	10-07-2014
I	PG&E COMMENTS	10-10-2014
K	PG&E COMMENTS	10-22-2014
L	DRIVEWAY	10-24-2014

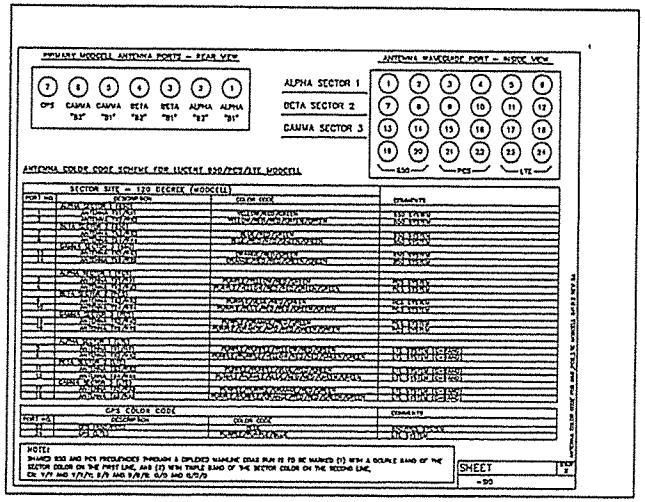
Job No.: N14030
Draw/Check By: BLL / EKU

AD1



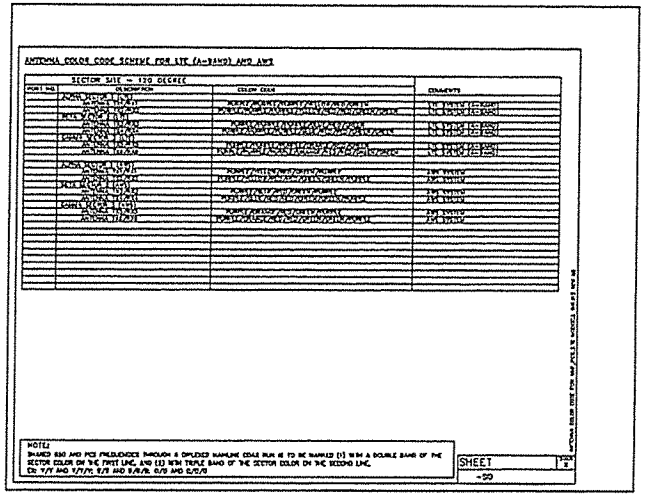
3 ANTENNA COLOR CODES (CONT.)

SCALE: NONE



1 ANTENNA COLOR CODES

SCALE: NONE



2 ANTENNA COLOR CODES (CONT.)

SCALE: NONE

DIAMOND ENGINEERING SERVICES
4255 PARK ROAD
BENICIA, CA 94510
TEL: 707-304-3351

verizon Wireless
MITCHELL DRIVE
LUT CREEK, CA
TEL: (925) 904-3533
FAX: (925) 904-3513

VERIZON WIRELESS
PLEASANTS VALLEY PS#249895
3628 GATES CANYON ROAD
VACAVILLE, CA 95688

ANTENNA COLOR CODES

REVISIONS

No.	DESCRIPTION	DATE
F	FOR REVIEW	03-12-2014
G	FOR REVIEW	10-07-2014
H	EQUIP LAYOUT REV	10-09-2014
I	RD&E COMMENTS	10-16-2014
K	RD&E COMMENTS	10-22-2014
L	DRIVEWAY	10-28-2014

Job No.: N14030
Draw/Check By: BLL / EKU

AD2

Verizon Wireless • Proposed Base Station (Site No. 249895 "Pleasants Valley")
3628 Gates Canyon 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. 249895 "Pleasants Valley") proposed to be located near 3628 Gates Canyon 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 a tall PG&E lattice tower to be located along Gates Canyon Road, near its intersection with Pleasants Valley Road, in Vacaville. 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 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)	5,000–80,000 MHz	5.00 mW/cm^2	1.00 mW/cm^2
BRS (Broadband Radio)	2,600	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.

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 Diamond Engineering Services, Inc., dated August 12, 2014, it is proposed to install six Andrew Model SBNHH-1D65B directional panel antennas on top of a 98-foot PG&E lattice tower located along Gates Canyon Road, northwest of its intersection with Pleasants Valley Road, in Vacaville. The antennas would be mounted with up to 7° downtilt at an effective height of about 107 feet above ground and would be oriented in pairs toward 90°T, 170°T, and 345°T. The maximum effective radiated power in any direction would be 11,150 watts, representing simultaneous operation at 3,840 watts for AWS, 3,580 watts for PCS, 2,090 watts for cellular, and 1,640 watts for 700 MHz 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 0.0088 mW/cm^2, which is 1.2% of the applicable public exposure limit.

The maximum calculated level at the second-floor elevation of any nearby building would be 1.5% of the public exposure limit. The maximum calculated level at the second-floor elevation of any nearby residence* is 1.1% 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.

No Recommended Mitigation Measures

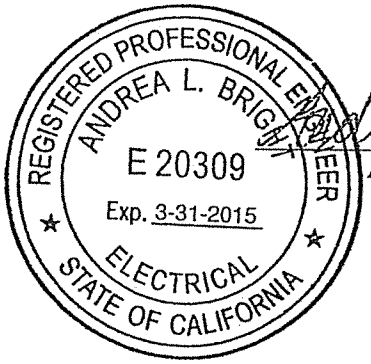
Due to their mounting locations, the Verizon antennas would not be accessible to the general public, and so no mitigation measures are necessary to comply with the FCC public exposure guidelines. It is presumed that PG&E already takes adequate precautions to ensure that there is no unauthorized access to its tower and that all authorized 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 near 3628 Gates Canyon 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.

Authorship

The undersigned author of this statement is a qualified Professional Engineer, holding California Registration No. E-20309, which expires on March 31, 2015. This work has been carried out under her direction, and all statements are true and correct of her own knowledge except, where noted, when data has been supplied by others, which data she believes to be correct.



Andrea L. Bright, P.E.
707/996-5200

October 20, 2014

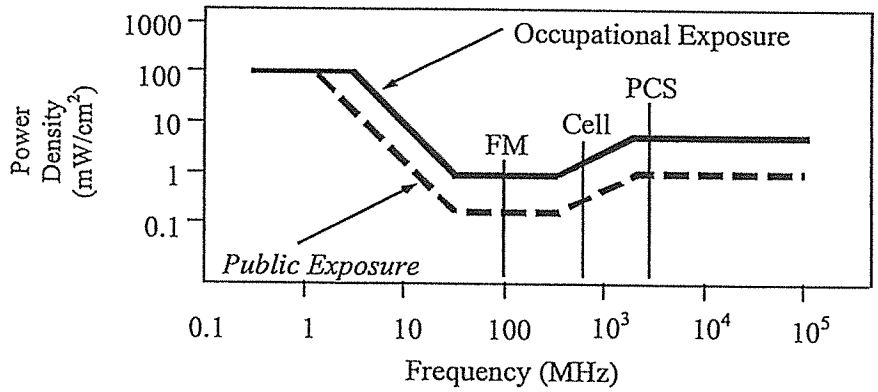
* Located at at least 690 feet away, based on photographs from Google Maps.

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	Electromagnetic Fields (f is frequency of emission in MHz)					
Applicable Range (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 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.

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 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:

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

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.

Verizon Wireless • Proposed Base Station (Site No. 249895 "Pleasants Valley")
3628 Gates Canyon 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 telecommunications carrier, to evaluate its base station (Site No. 249895 "Pleasants Valley") proposed to be located at 3628 Gates Canyon Road in Vacaville, California, for compliance with appropriate guidelines limiting sound levels from the installation.

Executive Summary

Verizon proposes to install a new base station at 3628 Gates Canyon Road in Vacaville, California, to include outdoor equipment cabinets and a stand-by diesel generator within a fenced enclosure under a PG&E tower. Noise levels from the operation will be below the allowed municipal limit.

Prevailing Standard

The County of Solano sets forth limits on sound levels in its County Code, in which Section 28.81 "Wireless Telecommunications Facilities," Item J-10, requires that:

> All wireless communication facilities shall be designed to minimize noise. If a facility is located in or within 100 feet of a residential district, noise attenuation measures shall be included to reduce noise levels to a maximum exterior noise level of 50 L_{dn} at the facility site's property lines.

For wireless facilities not in or within 100 feet of a residential district, Section 28.70.10B.1.b. prohibits noise "that exceeds 65 dBA L_{dn} at any property line."

The composite "day-night" average L_{dn} is referenced for this evaluation incorporates a 10 dBA penalty during nighttime hours (10 p.m. to 7 a.m.) to reflect typical residential conditions, where noise is more readily heard at night. By definition, L_{dn} is 6.4 dBA higher than the continuous equivalent noise level L_{eq}.

Figure 1 attached describes the calculation methodology used to determine applicable noise levels for evaluation against the prevailing standard.

General Facility Requirements

Wireless telecommunications facilities ("cell sites") typically consist of two distinct parts: the electronic base transceiver stations ("BTS" or "cabinets") that are connected to traditional wired telephone lines, and the antennas that send wireless signals created by the BTS out to be received by individual subscriber units. The BTS are often located outdoors at ground level and are connected to the antennas by coaxial cables. The BTS typically require environmental units to cool the electronics

inside. Such cooling is often integrated into the BTS, although external air conditioning may be installed, especially when the BTS are housed within a larger enclosure.

Most cell sites have back-up battery power available, to run the site for some number of hours in the event of a power outage. Many sites have back-up power generators installed, to run the site during an extended power outage.

Site & Facility Description

Based upon information provided by Verizon, including zoning drawings by Diamond Engineering Services, dated August 12, 2014, that carrier proposes to install a number of equipment cabinets within a fenced enclosure to be constructed under a tall PG&E lattice tower next to 3628 Gates Canyon Road in Vacaville, California. Four of the cabinets have small fans built in to cool the electronics inside. The nearest property line is to the south, about 275 feet from the near edge of Verizon's proposed enclosure. Proposed to be located on the PG&E tower are directional panel antennas for Verizon's base station operation; this portion of the facility does not generate acoustic noise.

A Generac Model SD030 back-up diesel power generator with Level 2A sound enclosure is to be installed within the enclosure for emergency use, in the event of an extended commercial power outage. Such generators typically operate for a 15-minute test period once a week during normal business hours on a weekday, in order to ensure their readiness.

Study Results

The several manufacturers provide the following maximum noise levels in any direction from their equipment:

Cabinet Model	Quantity	Maximum L_{eq} Noise Level	Reference Distance
CommScope RBA-72	one	58.7 dBA	5 feet
Purcell FLX16WS	two	64.7	1 meter
Unspecified*	one	64.0	5 feet
Generac SD030	one	63.0	23 feet

For the combined operation of all fans in all four AT&T cabinets, the maximum calculated noise level at the nearest property line is 39.2 dBA L_{dn}. If the generator were in operation, too, the maximum calculated noise level at the nearest property line would be 48.2 dBA L_{dn}. Even before consideration of the attenuating effects of the perimeter fence, cabinet orientation, and intervening terrain or vegetation, these results are below the applicable Solano County limit of 65 dBA, as well as below the County's most restrictive limit of 50 dBA L_{dn}.

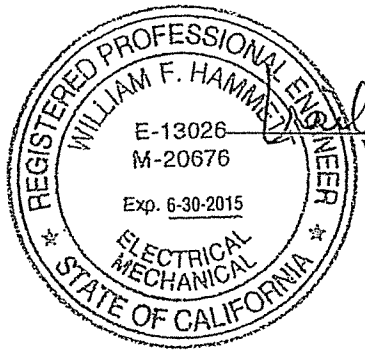
* Assumed to be cooled by McLean T-20 units.

Conclusion

Based on the information and analysis above, it is the undersigned's professional opinion that the operation of the Verizon Wireless base station proposed to be located at 3628 Gates Canyon Road in Vacaville, California, will comply with the Solano County 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, 2015. 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.

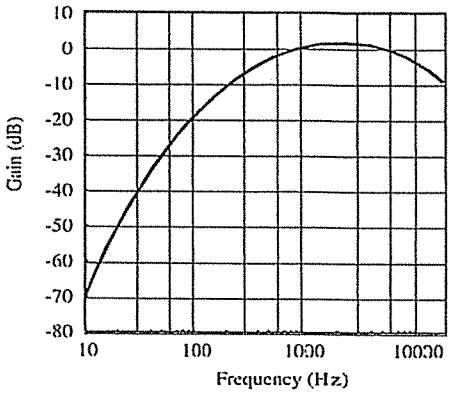


William F. Hammett, P.E.
707/996-5200

November 13, 2014

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:

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

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

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.

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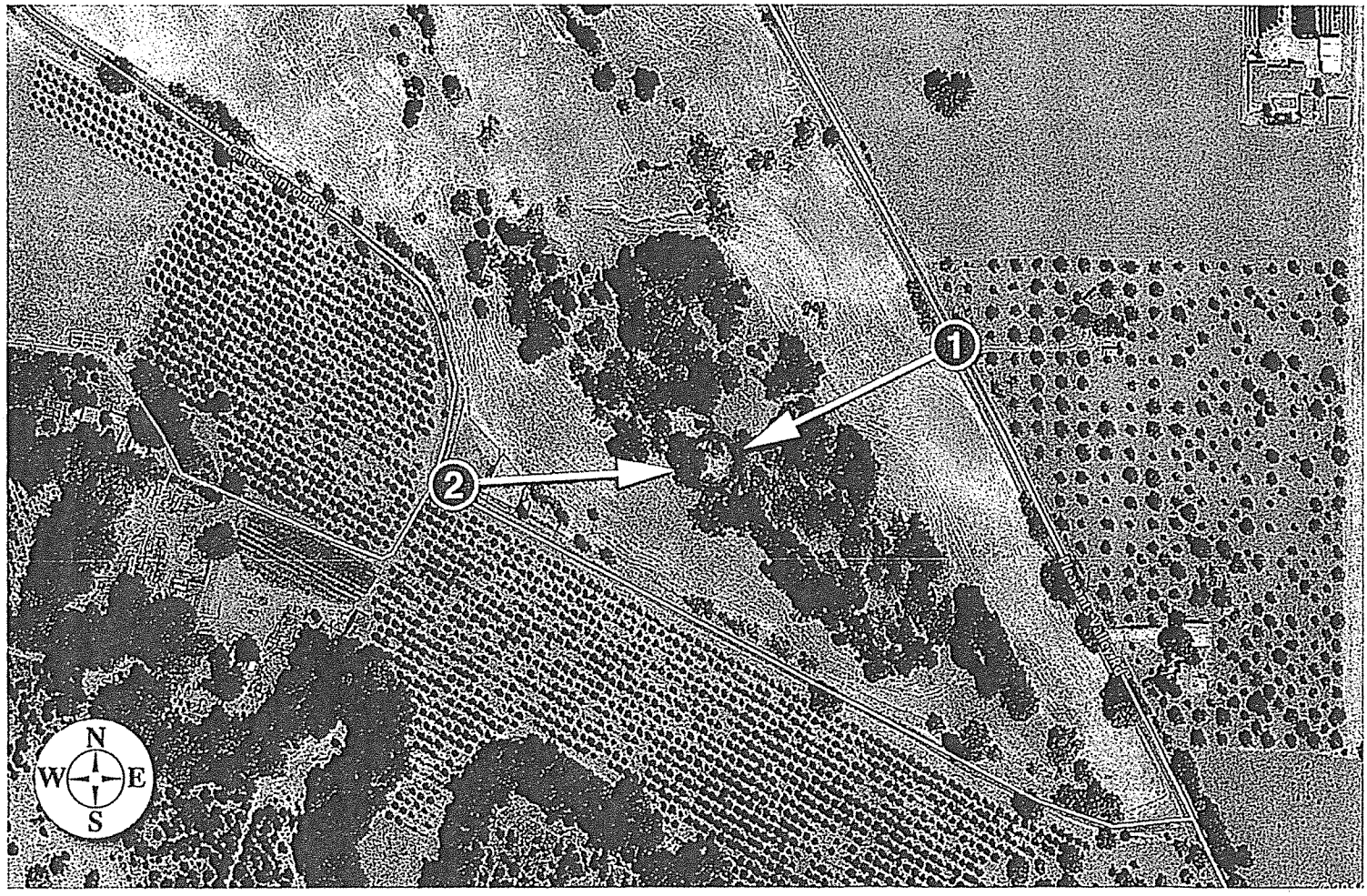
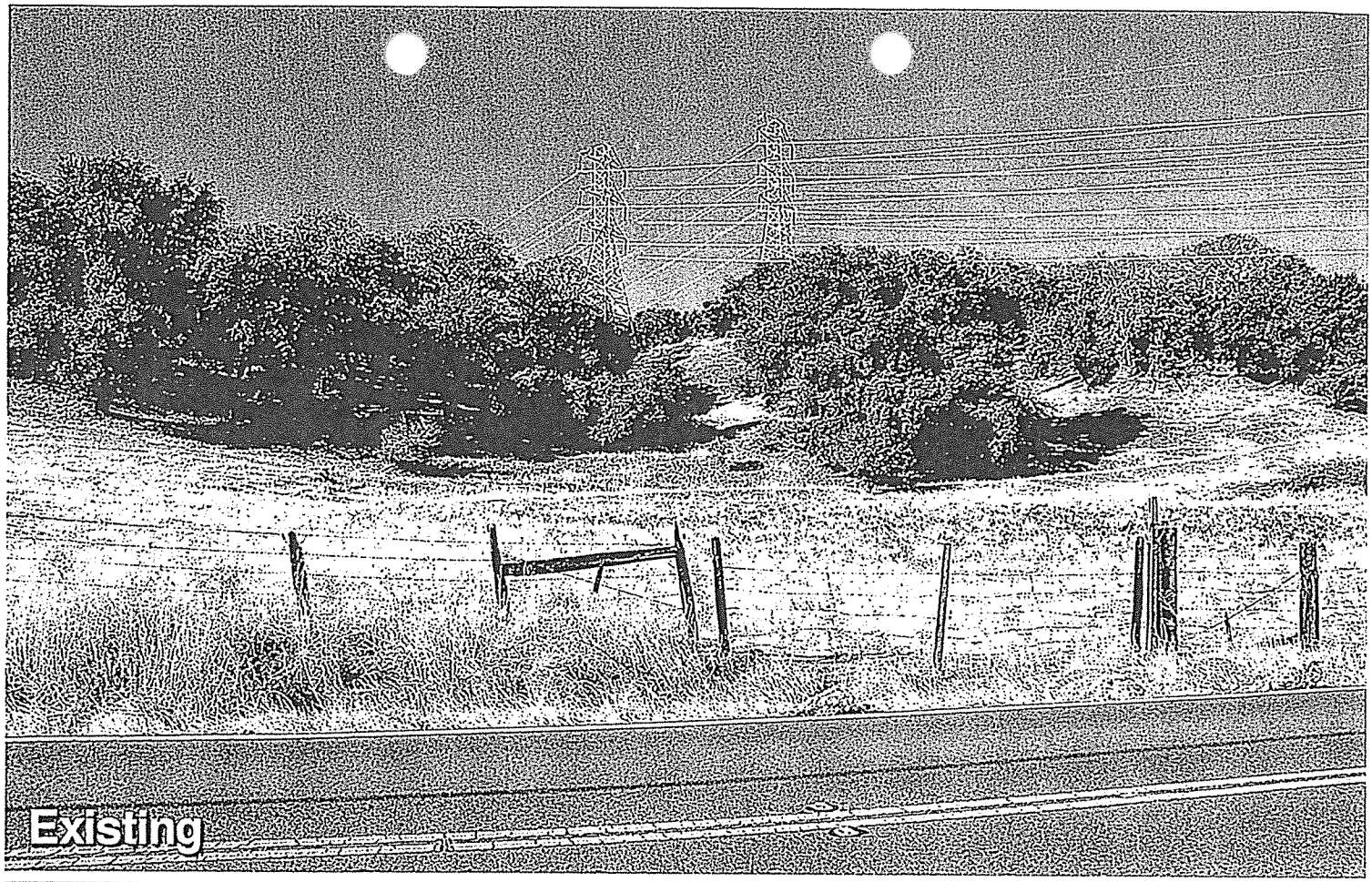
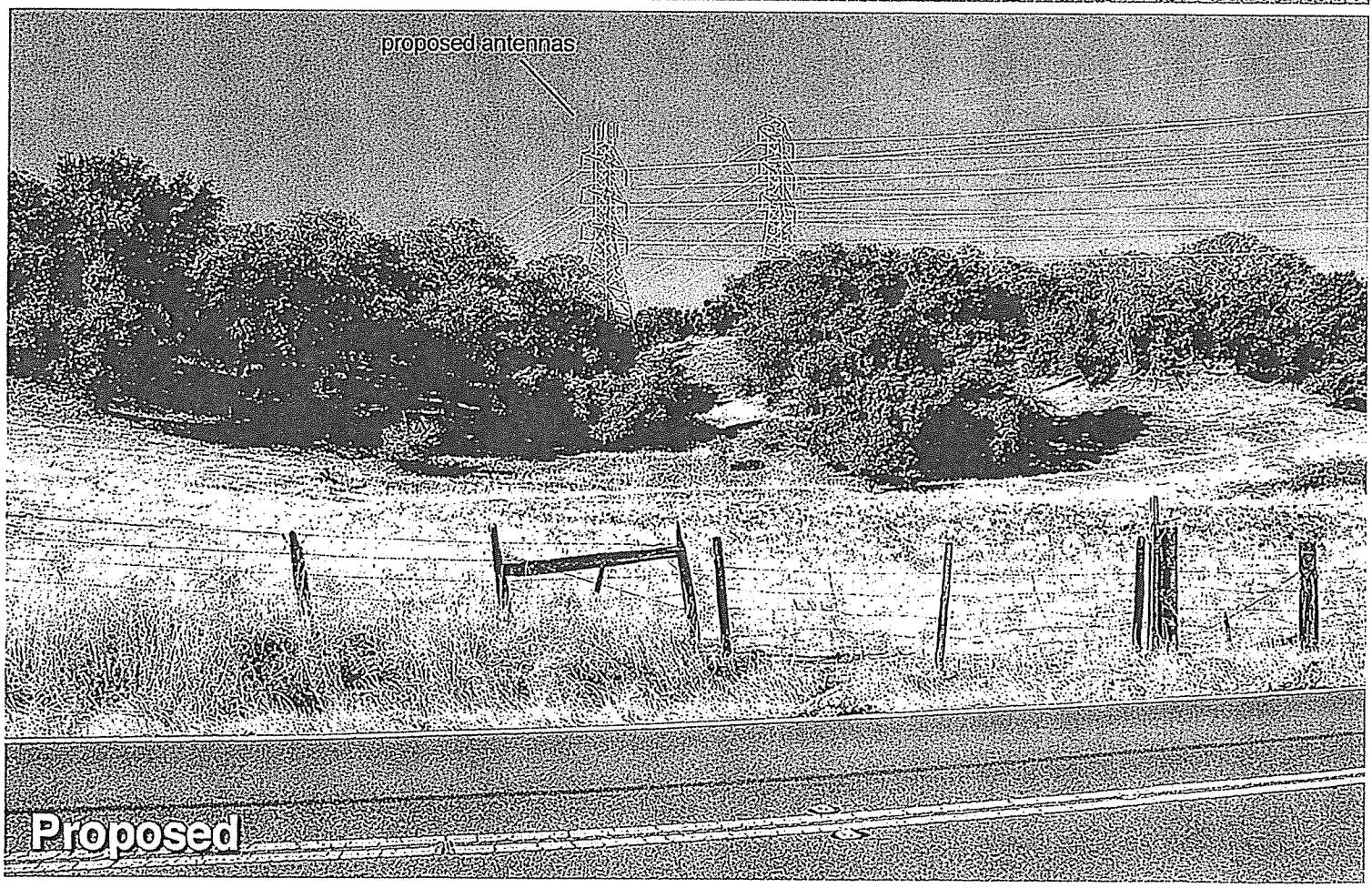






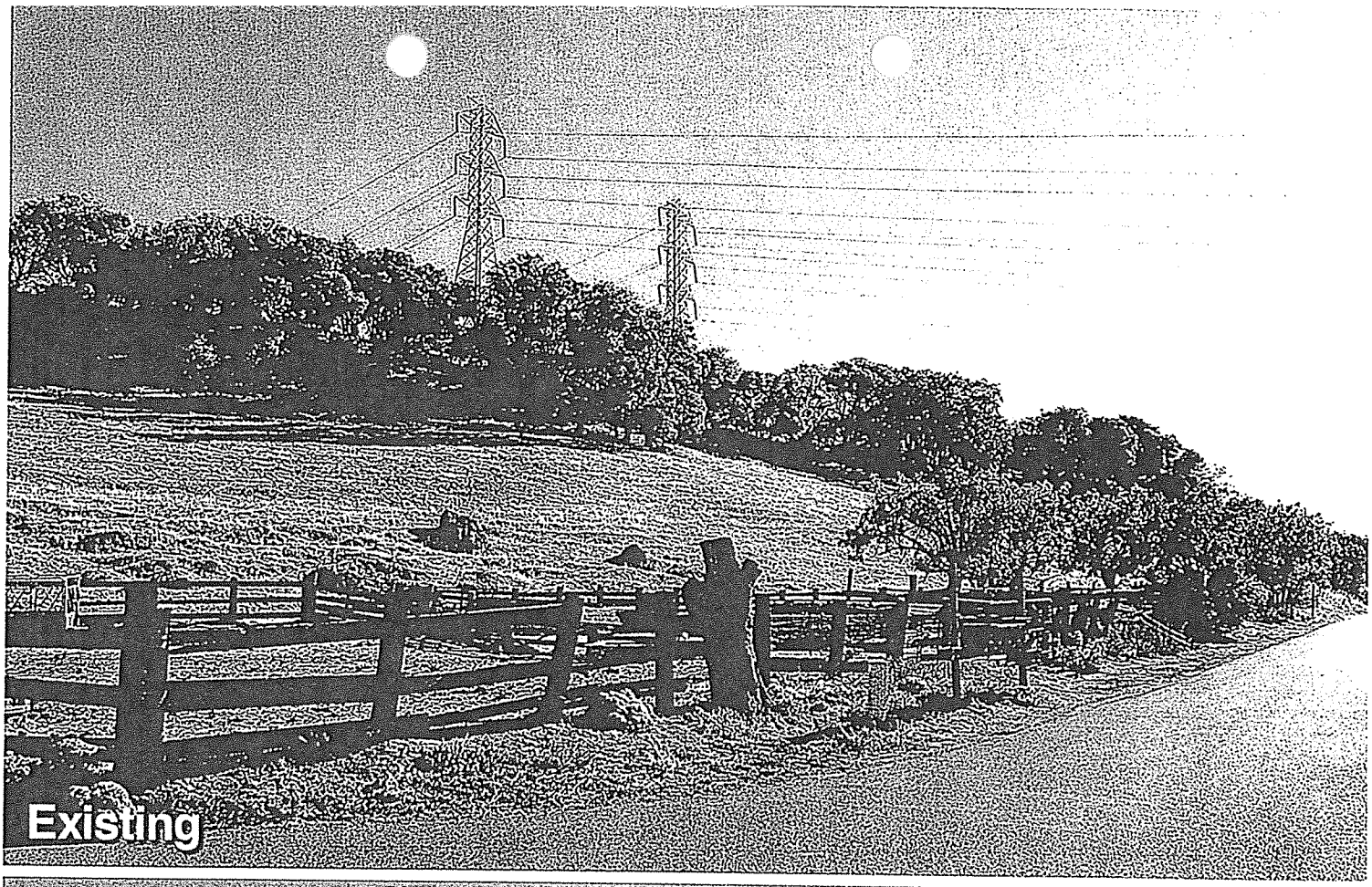
verizon wireless | Pleasants Valley | Site # 249895 | -30- | Looking Southwest from Pleasants Valley Road

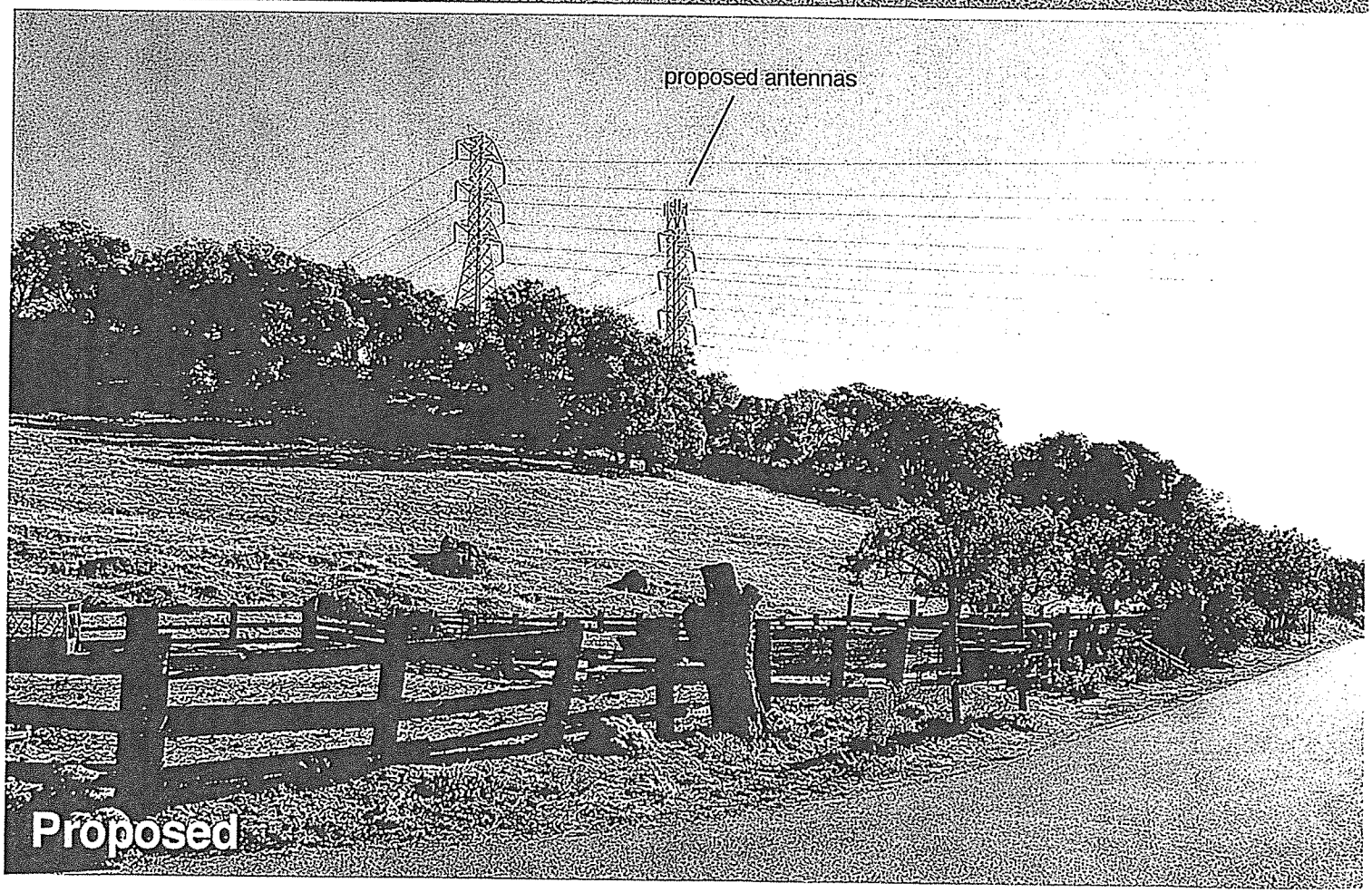
3628 Gates Canyon Drive
Vacaville, CA 95688

10/20/14

View #1

Applied Imagination 510 914-0500

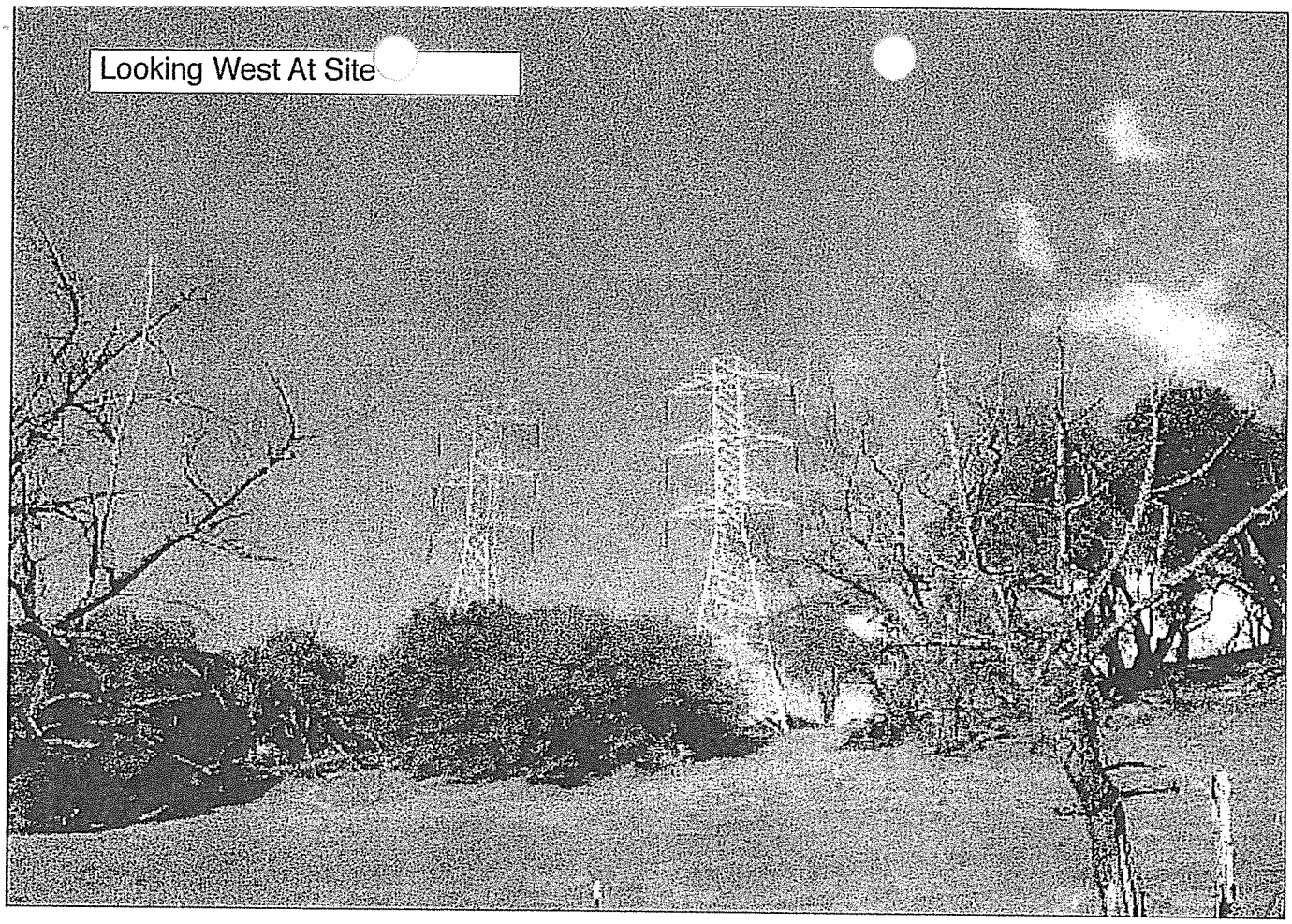


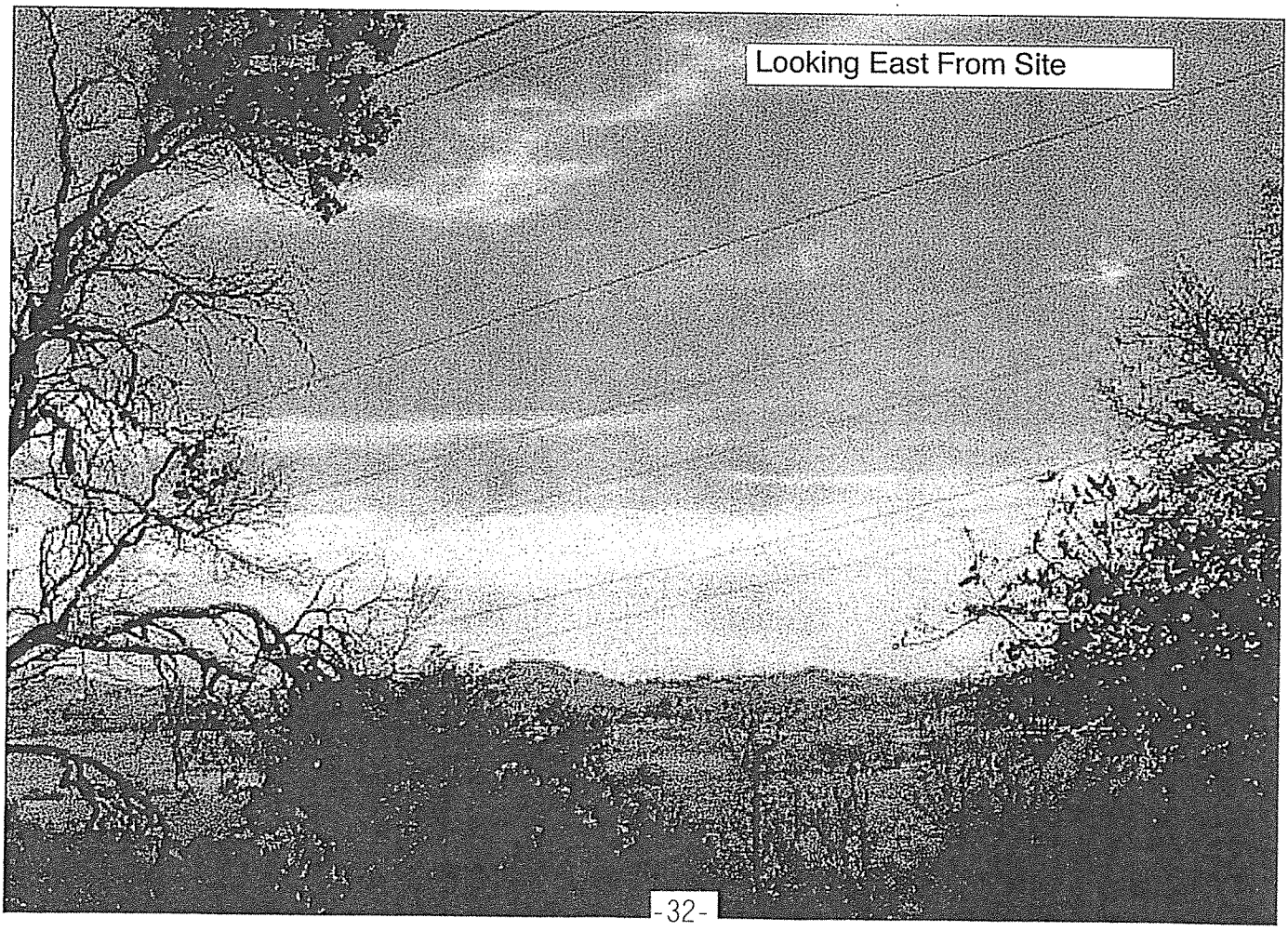


verizonwireless Pleasants Valley Site # 249895 -31- Looking East from Gates Canyon Road

10/20/14 3628 Gates Canyon Drive Vacaville, CA 95688 View #2

Applied Imagination 510 914-0500


Looking West At Site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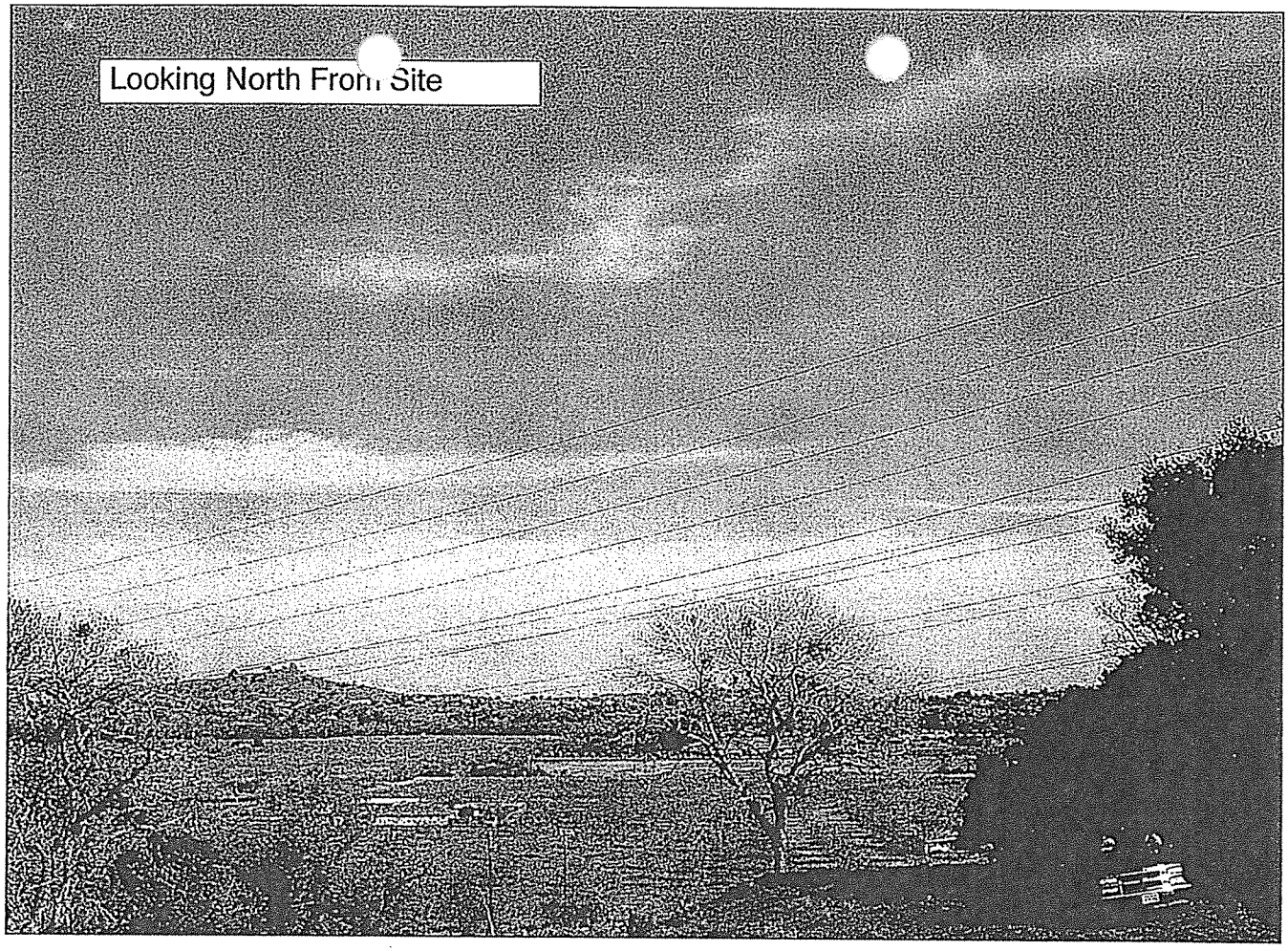
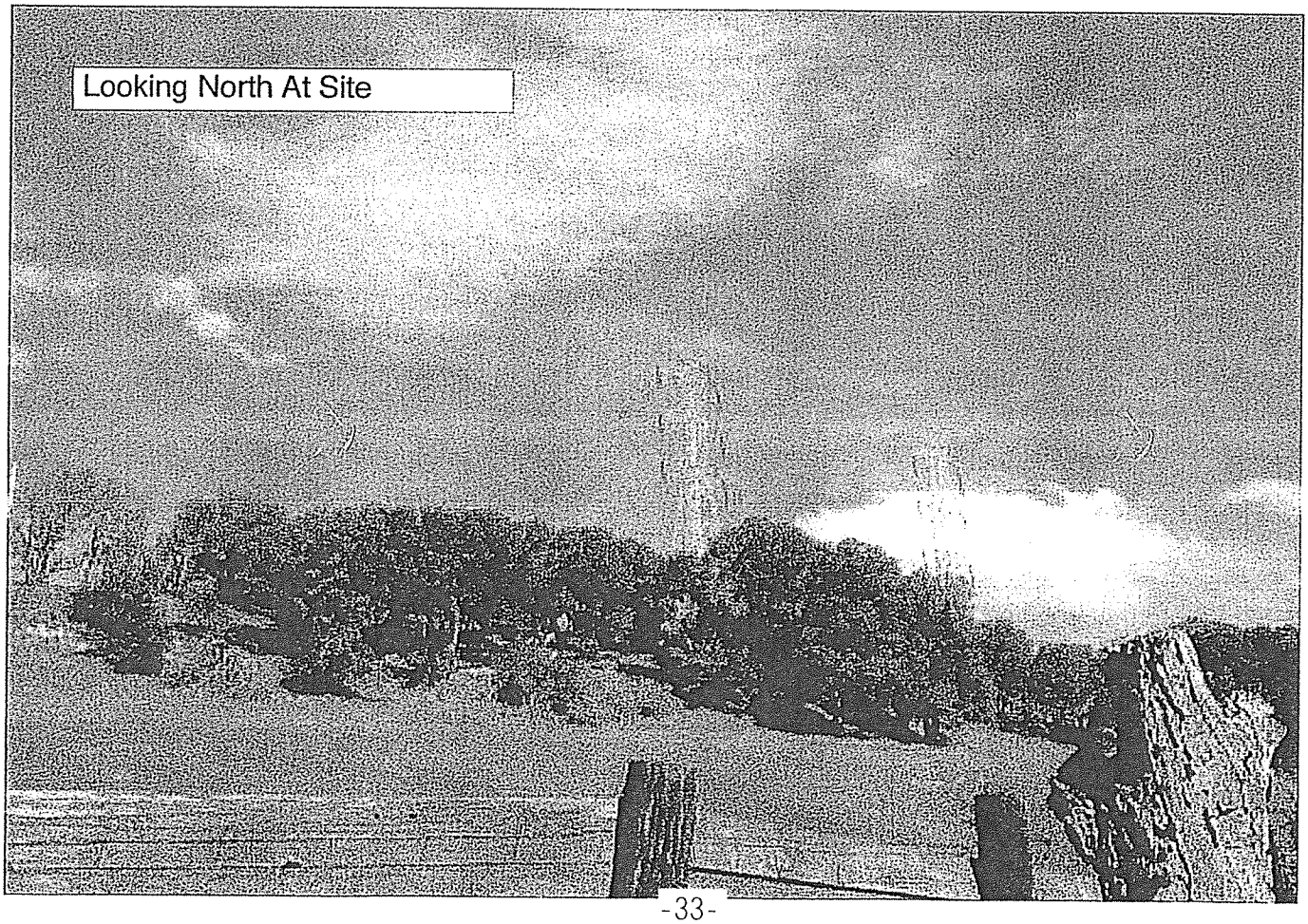

Looking North From Site


Looking North At Site