

Case File Number: PLN15-006**May 6, 2015**

Location:	960 Arlington Avenue. (See map on reverse)
A.P.N. :	(015-1296-001-02)
Description:	Installation of a Wireless Telecommunications facility involving eight (8) new antennas (located inside two new penthouse screening enclosures), and a generator located on the roof a of two-story commercial/industrial building. The associated mechanical equipment cabinet will be located within the building.
Applicant:	Complete Wireless, for Verizon Wireless.
Contact Person	Maria Kim
Phone Number:	(916) 247-6087
Owner:	Thomas Mcelroy
Planning Permits Required:	Major Conditional Use Permit and Regular Design Review to install new roof-top antennas and associated equipment (Macro Telecommunications Facility) located in a Housing Business Mix Commercial Zone.
General Plan:	Housing Business Mix Commercial.
Zoning:	HBX-1 Housing Business Mix Commercial Zone.
Environmental Determination:	Exempt, Section 15301 and 15303 of the State CEQA Guidelines: minor alterations to existing facilities and small structures; Section 15183 of the State CEQA Guidelines: projects consistent with a Community Plan, General Plan or Zoning.
Historic Status:	Not a Potential Designated Historic Property; Survey Rating: N/A
Service Delivery District:	2
City Council District:	1
Status:	Pending
Finality of Decision:	Appealable to City Council within 10 days
For Further Information:	Contact case planner Jason Madani at (510) 238-4790 or jmadani@oaklandnet.com

SUMMARY

The proposed project is to install a wireless Telecommunications Macro Facility (involving eight (8) new rooftop antennas and associated equipment) on an existing two-story commercial building. The associated mechanical equipment cabinet will be located within the existing building. The site is located within the Housing Business Mix General Plan designation and the HBX-1 Housing Business Mix Commercial zone. A Major Conditional Use Permit and Design Review are required to install a Macro Telecommunications Facility located in a Housing Business Mix Commercial zone. The proposal will provide enhanced Telecommunications service to support the residential, commercial and civic uses in the neighborhood. The original design has been revised to meet all applicable findings for approval (see findings sections). Therefore, staff recommends approval of the project subject to the attached conditions of approval.

CITY OF OAKLAND PLANNING COMMISSION



0 125 250 500 750 1,000 Feet



Case File: PLN15006

Applicant: Complete Wireless Consulting for Verizon Wireless

Address: 960 Arlington Avenue

Zone: HBX-1

PROJECT DESCRIPTION

The applicant, Complete Wireless for Verizon Wireless is proposing to install eight (8) new antennas located inside two (2) 10' x 10' and 12' x 12' penthouse screening enclosures, and a generator located on the roof of an existing two-story commercial building. The proposed telecommunication facility will occupy approximately 284 s.f. area on the roof and approximately 204 s.f. within a building area for associated mechanical equipment cabinets (see attachment A).

PROPERTY DESCRIPTION

The subject property is an approximately .38 acre parcel with a two-story commercial building. The subject property is located on Arlington Avenue at Lowell Street, and is bounded by an industrial building on the north side and a residential property on the west side.

BACKGROUND

Limitations on Local Government Zoning Authority under the Telecommunications Act of 1996 Section 704 of the Telecommunications Act of 1996 (TCA) provides federal standards for the siting of "Personal Wireless Services Facilities." "Personal Wireless Services" include all commercial mobile services (including personal communications services (PCS), cellular radio mobile services, and paging); unlicensed wireless services; and common carrier wireless exchange access services. Under Section 704, local zoning authority over personal wireless services is preserved such that the FCC is prevented from preempting local land use decisions; however, local government zoning decisions are still restricted by several provisions of federal law. Under Section 253 of the TCA, no state or local regulation or other legal requirement can prohibit or have the effect of prohibiting the ability of any entity to provide any interstate or intrastate telecommunications service. Further, Section 704 of the TCA imposes limitations on what local and state governments can do. Section 704 prohibits any state and local government action which unreasonably discriminates among personal wireless providers. Local governments must ensure that its wireless ordinance does not contain requirements in the form of regulatory terms or fees which may have the "effect" of prohibiting the placement, construction, or modification of personal wireless services. Section 704 also preempts any local zoning regulation purporting to regulate the placement, construction and modification of personal wireless service facilities on the basis, either directly or indirectly, on the environmental effects of radio frequency emissions (RF) of such facilities, which otherwise comply with FCC standards in this regard. See, 47 U.S.C. 332(c) (7) (B) (iv) (1996). This means that local authorities may not regulate the siting or construction of personal wireless facilities based on RF standards that are more stringent than those promulgated by the FCC. Section 704 mandates that local governments act upon personal wireless service facility siting applications to place, construct, or modify a facility within a reasonable time. 47 U.S.C.332(c) (7) (B) (ii). See FCC Shot Clock ruling setting forth "reasonable time" standards for applications deemed complete. Section 704 also mandates that the FCC provide technical support to local governments in order to encourage them to make

property, rights-of-way, and easements under their jurisdiction available for the placement of new spectrum-based telecommunications services. This proceeding is currently at the comment stage. For more information on the FCC's jurisdiction in this area, contact Steve Markendorff, Chief of the Broadband Branch, Commercial Wireless Division, Wireless Telecommunications Bureau, at (202) 418-0640 or e-mail "smarkend@fcc.gov".

GENERAL PLAN ANALYSIS

The subject property is located within the Housing Business Mix General Plan Designation. The Housing Business Mix land use classification is intended to guide a transition from heavy industry to low impact light industrial and other businesses that can co-exist compatibly with residential development. The proposed unmanned wireless telecommunication facility will not adversely affect and detract from the characteristics of the neighborhood. The proposal will preserve a convenient and functional commercial building and will not likely affect the general quality and character of the neighborhood. The proposed project is not expected to have any significant visual impacts on the existing structure and surrounding area.

ZONING ANALYSIS

The subject property is located in the HBX-1 Housing Business Mix Commercial Zone. The HBX-1 zone is intended to provide development standards that provide for the compatible coexistence of industrial and heavy commercial activities and medium density residential development. This zone recognizes the equal importance of housing and business. The project requires a Major Conditional Use Permit, and Design Review. Staff finds that the proposed application meets the applicable HBX-1 Zoning and City of Oakland Telecommunications Regulations as discussed under "Key Issues" and "Findings" of this report.

ENVIRONMENTAL DETERMINATION

The California Environmental Quality Act (CEQA) Guidelines lists the projects that qualify as categorical exemptions from environmental review. The proposed project is categorically exempt from the environmental review requirements pursuant to Section 15301, 15303 for additions and alterations to existing facilities, and small structures. In addition, the project is also exempt per Section 15183, for projects consistent with a community plan, general plan or zoning.

KEY ISSUES AND IMPACTS

A community meeting was held on April 1st 2015. Many community member believe that a telecommunication installation should not be within close proximity to homes. Staff believes that the new telecommunication facility located on the roof of existing commercial/industrial building that is fully screened and with appropriate conditions of approval will not have significant visual impacts on the operating characteristic of the existing commercial/industrial building. It will provide an essential telecommunication services to the community and the City of Oakland at large. It will also be available to emergency services such as Police, Fire and Health response teams. The submitted RF analysis indicates compliance with FCC limitations regarding RF emissions.

1. Conditional Use Permit, Design Review

Section 17.65.030 of the City of Oakland Planning Code requires a Conditional Use Permit and Design Review to install a Macro Telecommunication Facility in the HBX-1 Housing Business Mix Commercial Zone. Furthermore, pursuant to Section 17.134.020 (A) (3) (i) and 17.136.050B of the Oakland Planning Code, a Major Conditional Use Permit and Design Review is required for any telecommunication facility in the HBX-1 zone or within one hundred (100) feet of the boundary of any residential zone. The required findings for a major conditional use permit and design review are listed and included in staff's evaluation as part of this report.

2. Project Site

Section 17.128.110 of Oakland's Telecommunication Regulations indicate that new wireless facilities shall generally be located on designated properties or facilities in the following order of preference:

- A. Co-located on an existing structure or facility with existing wireless antennas.
- B. City owned properties or other public or quasi-public facilities.
- C. Existing commercial or industrial structures in non-residential zones (excluding all HBX Zones and the D-CE3 and D-C-4 Zones).
- D. Existing commercial or industrial structures in residential zones, HBX Zones, or the D-CE-3 or D-CE-4 Zones.
- E. Other non-residential uses in residential zones, HBX Zones, or the D-CE-3 or D-CE-4 Zones.
- F. Residential uses in non-residential zones. (excluding all HBX Zones and the D-CE-3 and D-CE-4 Zones).
- G. Residential uses in residential zones, HBX Zones, or the D-CE-3 or D-CE-4 Zones.

*Facilities locating on an A, B or C ranked preference do not require a site alternatives analysis. Facilities proposing to locate on a D through G ranked preference, inclusive, must submit a site alternatives analysis as part of the required application materials.

Since the proposed project involves installation new antennas on an existing commercial/industrial structure within an HBX-1 zone, the proposed project meets (D) and hence a site alternatives analysis is required.

City of Oakland Planning staff has reviewed the applicant's written evidence of alternative sites analysis (see attachment A) and determined that the site selected conforms to the telecommunication regulation requirements. In addition, and agree that no other sites are more suitable. The project has met design criteria (A) and (B) since, the proposed eight (8) new antennas (located inside two new penthouse screening enclosures), and (a generator location further away from the residential property) to be located on the roof a of two-story commercial/industrial building.

3. Project Design

Section 17.128.120 of the City of Oakland Telecommunications Regulations indicates that new wireless facilities shall generally be designed in the following order of preference:

- A. Building or structure mounted antennas completely concealed from view.
- B. Building or structure mounted antennas set back from roof edge, not visible from public right-of way.
- C. Building or structure mounted antennas below roof line (facade mount, pole mount) visible from public right-of-way, painted to match existing structure.
- D. Building or structure mounted antennas above roof line visible from public right of-way.
- E. Monopoles.
- F. Towers.

* Facilities designed to meet an A or B ranked preference do not require a site design alternatives analysis. Facilities designed to meet C through F ranked preference, inclusive, must submit a site design alternatives analysis as part of the required application materials. A site design alternatives analysis shall, at a minimum, consist of:

Written evidence must indicate why each higher preference design alternative can not be used. Such evidence shall be in sufficient detail that independent verification could be obtained if required by the City of Oakland Zoning Manager. Evidence should indicate if the reason an alternative was rejected was technical (e.g. incorrect height, interference from existing RF sources, inability to cover required area) or for other concerns (e.g. inability to provide utilities, construction or structural impediments).

The original design has been revised to meet design criteria (A) and (B) since the eight (8) new antennas will be located within two penthouse enclosures located on the roof of the existing two-story commercial/industrial building within HBX-1 zone.

Planning staff has reviewed the applicant's written evidence of alternative sites analysis (see attachment A) and determined that the site selected conforms to the telecommunication regulation requirements.

4. Project Radio Frequency Emissions Standards

Section 17.128.130 of the City of Oakland Telecommunication Regulations require that the applicant submit the following verifications including requests for modifications to existing facilities:

- a.* The Telecommunications regulations require that the applicant submit written documentation demonstrating that the emission from the proposed project are within the limits set by the Federal Communications Commission. In the document (attachment B) prepared by HAMMETT & EDISON, INC, Consulting Engineers, the proposed project was evaluated for compliance with appropriate guidelines limiting human exposure to radio frequency electromagnetic fields. According to the report on the proposal, the project will comply with the prevailing standards for limiting public exposure to radio frequency energy and, therefore, the proposed site will operate within the current acceptable thresholds as established by the Federal Government or any such agency that may be subsequently authorized to establish such standards.

b. Prior to final building permit sign off, an RF emissions report indicating that the site is actually operating within the acceptable thresholds as established by the Federal government or any such agency who may be subsequently authorized to establish such standards.

The information submitted with the initial application was an RF emissions report, prepared by HAMMETT & EDISON, INC, Consulting Engineers (Attachment B). The report states that the proposed project will comply with the prevailing standards for limiting public exposure to radio frequency energy and, therefore, will not cause a significant impact on the environment. Additionally, staff recommends that prior to the final building permit sign off; the applicant submits certified RF emissions report stating that the facility is operating within acceptable thresholds established by the regulatory federal agency.

CONCLUSION

Staff believes that the new telecommunication facility with appropriate conditions of approval (including relocation of the generator location further away from the residential property) will not have significant visual impacts on the operating characteristic of the existing commercial/industrial building. It will provide an essential telecommunication services to the community and the City of Oakland at large. It will also be available to emergency services such as Police, Fire and Health response teams. Staff believes that the findings for approval can be made to support the Conditional Use Permit, Design Review.

RECOMMENDATIONS:

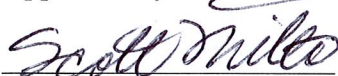
1. Affirm staff's Environmental Determination
2. Approve the Conditional Use Permit, and Design Review application (PLN15-006) subject to the attached Findings and Conditions of Approval

Prepared by:



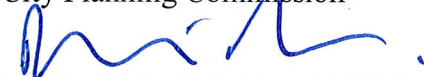
Jason Madani
Planner II

Approved by:



Scott Miller,
Zoning Manager

Approved for forwarding to the
City Planning Commission



Darin Ranelletti Deputy Director
Bureau of Planning

ATTACHMENTS:

- A. Project Plans & Photo simulations & Alternative sites analysis
- B. Hammett & Edison, Inc. Consulting Engineer RF Emissions Report

FINDINGS FOR APPROVAL

This proposal meets the required findings under Sections 17.134.050 (General Use Permit criteria); and 17.136.050 (B) (Non-Residential Design Review criteria); and, 17.128.060(B) (Telecommunications Macro Facilities 17.128.060 (C), as set forth below. Required findings are shown in **bold** type; reasons proposal satisfies them are shown in normal type.

SECTION 17.134.050 – GENERAL USE PERMIT FINDINGS:

A. That the location, size, design, and operating characteristics of the proposed development will be compatible with, and will not adversely affect, the livability or appropriate development of abutting properties and the surrounding neighborhood, with consideration to be given to harmony in scale, bulk, coverage, and density; to the availability of civic facilities and utilities; to harmful effect, if any upon desirable neighborhood character; to the generation of traffic and the capacity of surrounding streets; and to any other relevant impact of the development.

The purpose of the project is to enhance wireless telecommunications service in the area. The installation of new antennas will not adversely affect the operating characteristics or livability of the existing area because the proposed antennas will be inside two penthouse screening enclosures located on the roof of the existing commercial/industrial building. The facility will be unmanned and will not create additional vehicular traffic in the area. The 10 foot height of the screening enclosures is proportional to the overall scale of the building.

B. That the location, design, and site planning of the proposed development will provide a convenient and functional living, working, shopping, or civic environment, and will be as attractive as the nature of the use and its location and setting warrant.

The location, design and site planning of the proposed development will provide enhanced telecommunication service for the area. It will maintain the use of the commercial/industrial building. The proposal will preserve the use of the existing commercial/industrial building. With appropriate conditions of approval, the proposal will not have significant impacts on the operating characteristic of the existing residential and commercial buildings and surrounding neighborhood.

C. That the proposed development will enhance the successful operation of the surrounding area in its basic community functions, or will provide an essential service to the community or region.

The proposed development will enhance the successful operation of the surrounding area in its basic community function and will provide an essential service to the community or region. This will be achieved by improving the functional use of the site by providing a regional Telecommunications facility for the community and will be available to the Police, Fire Services, and the public safety organizations and the general public.

D. That the proposal conforms to all applicable design review criteria set forth in the DESIGN REVIEW PROCEDURE of Chapter 17.136 of the Oakland Planning Code.

The proposal conforms with all significant aspects of the Design Review criteria set forth in Chapter 17.136 of the Oakland Planning Code, as outlined below.

E. That the proposal conforms in all significant respects with the Oakland General Plan and with any other applicable plan or development control map which has been adopted by the City Council.

The subject property is located within the Housing Business Mix General Plan Designation. The Housing Business Mix land use classification is intended to guide a transition from heavy industry to low impact light industrial and other businesses that can co-exist compatibly with residential development. The proposed unmanned wireless telecommunication facility will not adversely affect and detract from the Housing Business Mix characteristics of the neighborhood. The proposal will preserve a convenient and functional commercial building and will not likely affect the general quality and character of the neighborhood. The proposed project will have minimal effect on the existing structure and surrounding area. It will rather provide wireless services in support of the residential, commercial and civic activities encouraged by the General Plan.

17.136.050(B) – NONRESIDENTIAL DESIGN REVIEW CRITERIA:

1. That the proposal will help achieve or maintain a group of facilities which are well related to one another and which, when taken together, will result in a well-composed design, with consideration given to site, landscape, bulk, height, arrangement, texture, materials, colors, and appurtenances; the relation of these factors to other facilities in the vicinity; and the relation of the proposal to the total setting as seen from key points in the surrounding area. Only elements of design which have some significant relationship to outside appearance shall be considered, except as otherwise provided in Section 17.136.060;

The proposed eight (8) new antennas are located inside two penthouse enclosures. The generator equipment will be camouflaged to blend in with the existing HVAC equipment located on the roof of commercial building. Photo simulations submitted for the project show the view of the proposed antennas and screen, as seen from the street, with minimum visual impacts. Therefore, the proposal will not have significant impacts on the operating characteristic of the existing residential building and surrounding neighborhood.

2. That the proposed design will be of a quality and character which harmonizes with, and serves to protect the value of, private and public investments in the area;

See above #1 findings

3. That the proposed design conforms in all significant respects with the Oakland General Plan and with any applicable design review guidelines or criteria, district plan,

or development control map which have been adopted by the Planning Commission or City Council.

See above #E

17.128.070(B) DESIGN REVIEW CRITERIA FOR MACRO FACILITIES

1. Antennas should be painted and/or textured to match the existing structure:

The proposed screening enclosures are compatible with the existing building material, and blends in with the architectural style of the commercial building.

2. Antennas mounted on architecturally significant structures or significant architectural details of the building should be covered by appropriate casings which are manufactured to match existing architectural features found on the building:

The proposed antennas are located inside two penthouse enclosures and will be camouflaged to blend in with the existing building appearance.

3. Where feasible, antennas can be placed directly above, below or incorporated with vertical design elements of a building to help in camouflaging:

See findings above.

4. Equipment shelters or cabinets shall be screened from the public view by using landscaping, or materials and colors consistent with surrounding backdrop:

The proposed screening enclosures will be compatible with the existing building materials, and will blend in with the architectural style of the building.

5. Equipment shelters or cabinets shall be consistent with the general character of the area.

See above findings.

6. For antennas attached to the roof, maintain a 1:1 ratio for equipment setback; screen the antennas to match existing air conditioning units, stairs, or elevator towers; avoid placing roof mounted antennas in direct line with significant view corridors.

The placement of the antennas within the rooftop penthouse structures located on the roof of the commercial building and meets the 1:1 ratio for equipment height setback from the edge of building roof line.

7. That all reasonable means of reducing public access to the antennas and equipment has been made, including, but not limited to, placement in or on buildings or structures, fencing, anti-climbing measures and anti-tampering devices.

The proposed panel antennas will be mounted on the roof of the building and will not be accessible to the public due to its location. The associated equipment cabinets located within the building and are fully concealed from public access.

Section 17.128.070(C) CONDITIONAL USE PERMIT (CUP) FINDINGS FOR MACRO FACILITIES

1. The project must meet the special design review criteria listed in subsection B of this section (17.128.070B):

The proposed project meets the special design review criteria listed in section 17.128.070B. (see above).

2. The proposed project must not disrupt the overall community character:

The proposed Telecommunications facility is fully screened from public view and, therefore the proposal will not disrupt the overall community character surrounding the subject site.

CONDITIONS OF APPROVAL
PLN15-006

STANDARD CONDITIONS:

1. Approved Use

Ongoing

a) The project shall be constructed and operated in accordance with the authorized use as described in the application materials, **PLN15-006**, and the plans dated **February 11, 2015** and submitted on **February 13th, 2015** and as amended by the following conditions. Any additional uses or facilities other than those approved with this permit, as described in the project description and the approved plans, will require a separate application and approval. Any deviation from the approved drawings, Conditions of Approval or use shall required prior written approval from the Director of City Planning or designee.

b) This action by the City Planning Commission (“this Approval”) includes the approvals set forth below. This Approval includes: **Installation of a Wireless Telecommunications facility involving eight (8) new antennas (located inside two new penthouse screening enclosures), and a generator located on the roof a of two-story commercial/industrial building. The associated mechanical equipment cabinet will be located within the building.**

2. Effective Date, Expiration, Extensions and Extinguishment

Ongoing

Unless a different termination date is prescribed, this Approval shall expire **two calendar years** from the approval date, unless within such period all necessary permits for construction or alteration have been issued, or the authorized activities have commenced in the case of a permit not involving construction or alteration. Upon written request and payment of appropriate fees submitted no later than the expiration date of this permit, the Director of City Planning or designee may grant a one-year extension of this date, with additional extensions subject to approval by the approving body. Expiration of any necessary building permit for this project may invalidate this Approval if the said extension period has also expired.

3. Scope of This Approval; Major and Minor Changes

Ongoing

The project is approved pursuant to the **Oakland Planning Code** only. Minor changes to approved plans may be approved administratively by the Director of City Planning or designee. Major changes to the approved plans shall be reviewed by the Director of City Planning or designee to determine whether such changes require submittal and approval of a revision to the approved project by the approving body or a new, completely independent permit.

4. Conformance with other Requirements

Prior to issuance of a demolition, grading, P-job, or other construction related permit

- a) The project applicant shall comply with all other applicable federal, state, regional and/or local codes, requirements, regulations, and guidelines, including but not limited to those imposed by the City’s Building Services Division, the City’s Fire Marshal, and the City’s Public Works Agency.

- b) The applicant shall submit approved building plans for project-specific needs related to fire protection to the Fire Services Division for review and approval, including, but not
- c) limited to automatic extinguishing systems, water supply improvements and hydrants, fire department access, and vegetation management for preventing fires and soil erosion.

5. Conformance to Approved Plans; Modification of Conditions or Revocation***Ongoing***

- a) Site shall be kept in a blight/nuisance-free condition. Any existing blight or nuisance shall be abated within 60-90 days of approval, unless an earlier date is specified elsewhere.
- b) The City of Oakland reserves the right at any time during construction to require certification by a licensed professional that the as-built project conforms to all applicable zoning requirements, including but not limited to approved maximum heights and minimum setbacks. Failure to construct the project in accordance with approved plans may result in remedial reconstruction, permit revocation, permit modification, stop work, permit suspension or other corrective action.
- c) Violation of any term, conditions or project description relating to the Approvals is unlawful, prohibited, and a violation of the Oakland Municipal Code. The City of Oakland reserves the right to initiate civil and/or criminal enforcement and/or abatement proceedings, or after notice and public hearing, to revoke the Approvals or alter these conditions if it is found that there is violation of any of the conditions or the provisions of the Planning Code or Municipal Code, or the project operates as or causes a public nuisance. This provision is not intended to, nor does it; limit in any manner whatsoever the ability of the City to take appropriate enforcement actions.

6. Signed Copy of the Conditions***With submittal of a demolition, grading, and building permit***

A copy of the approval letter and conditions shall be signed by the property owner, notarized, and submitted with each set of permit plans to the appropriate City agency for this project.

7. Indemnification***Ongoing***

- i. To the maximum extent permitted by law, the applicant shall defend (with counsel acceptable to the City), indemnify, and hold harmless the City of Oakland, the Oakland City Council, the City of Oakland Redevelopment Agency, the Oakland City Planning Commission and its respective agents, officers, and employees (hereafter collectively called City) from any liability, damages, claim, judgment, loss (direct or indirect) action, causes of action, or proceeding (including legal costs, attorneys' fees, expert witness or consultant fees, City Attorney or staff time, expenses or costs) (collectively called "Action") against the City to attack, set aside, void or annul, (1) an approval by the City relating to a development-related application or subdivision or (2)

implementation of an approved development-related project. The City may elect, in its sole discretion, to participate in the defense of said Action and the applicant shall reimburse the City for its reasonable legal costs and attorneys' fees.

- ii. Within ten (10) calendar days of the filing of any Action as specified in subsection A above, the applicant shall execute a Letter of Agreement with the City, acceptable to the Office of the City Attorney, which memorializes the above obligations. These obligations and the Letter of Agreement shall survive termination, extinguishment or invalidation of the approval. Failure to timely execute the Letter of Agreement does not relieve the applicant of any of the obligations contained in this condition or other requirements or Conditions of Approval that may be imposed by the City.

8. Compliance with Conditions of Approval

Ongoing

The project applicant shall be responsible for compliance with the recommendations in any submitted and approved technical report and all the Conditions of Approval set forth below at its sole cost and expense, and subject to review and approval of the City of Oakland.

9. Severability

Ongoing

Approval of the project would not have been granted but for the applicability and validity of each and every one of the specified conditions, and if any one or more of such conditions is found to be invalid by a court of competent jurisdiction this Approval would not have been granted without requiring other valid conditions consistent with achieving the same purpose and intent of such Approval.

10. Job Site Plans

Ongoing throughout demolition, grading, and/or construction

At least one (1) copy of the stamped approved plans, along with the Approval Letter and Conditions of Approval, shall be available for review at the job site at all times.

11. Special Inspector/Inspections, Independent Technical Review, Project Coordination and Management

Prior to issuance of a demolition, grading, and/or construction permit

The project applicant may be required to pay for on-call special inspector(s)/inspections as needed during the times of extensive or specialized plan check review, or construction. The project applicant may also be required to cover the full costs of independent technical and other types of peer review, monitoring and inspection, including without limitation, third party plan check fees, including inspections of violations of Conditions of Approval. The project applicant shall establish a deposit with the Building Services Division, as directed by the Building Official, Director of City Planning or designee.

12. Days/Hours of Construction Operation

Ongoing throughout demolition, grading, and/or construction

The project applicant shall require construction contractors to limit standard construction activities as follows:

- a) Construction activities are limited to between 7:00 AM and 7:00 PM Monday through Friday, except that pile driving and/or other extreme noise generating activities greater than 90 dBA shall be limited to between 8:00 a.m. and 4:00 p.m. Monday through Friday.
- b) Any construction activity proposed to occur outside of the standard hours of 7:00 am to 7:00 pm Monday through Friday for special activities (such as concrete pouring which may require more continuous amounts of time) shall be evaluated on a case by case basis, with criteria including the proximity of residential uses and a consideration of resident's preferences for whether the activity is acceptable if the overall duration of construction is shortened and such construction activities shall only be allowed with the prior written authorization of the Building Services Division.
- c) Construction activity shall not occur on Saturdays, with the following possible exceptions:
 - i. Prior to the building being enclosed, requests for Saturday construction for special activities (such as concrete pouring which may require more continuous amounts of time), shall be evaluated on a case by case basis, with criteria including the proximity of residential uses and a consideration of resident's preferences for whether the activity is acceptable if the overall duration of construction is shortened. Such construction activities shall only be allowed on Saturdays with the prior written authorization of the Building Services Division.
 - ii. After the building is enclosed, requests for Saturday construction activities shall only be allowed on Saturdays with the prior written authorization of the Building Services Division, and only then within the interior of the building with the doors and windows closed.
- d) No extreme noise generating activities (greater than 90 dBA) shall be allowed on Saturdays, with no exceptions.
- e) No construction activity shall take place on Sundays or Federal holidays.
- f) Construction activities include but are not limited to: truck idling, moving equipment (including trucks, elevators, etc) or materials, deliveries, and construction meetings held on-site in a non-enclosed area.

PROJECT SPECIFIC CONDITIONS:**13. Radio Frequency Emissions*****Prior to the final building permit sign off.***

The applicant shall submit a certified RF emissions report stating the facility is operating within the acceptable standards established by the regulatory Federal Communications Commission.

14. Operational***Ongoing.***

Noise levels from the activity, property, or any mechanical equipment on site shall comply with the performance standards of Section 17.120 of the Oakland Planning Code and Section 8.18 of the Oakland Municipal Code. If noise levels exceed these standards, the activity causing the noise shall be abated until appropriate noise reduction measures have been installed and compliance verified by the Planning and Zoning Division and Building Services.

15. Compliance with Title 24***Prior to issuance of certificate of occupancy.***

The applicant shall implement acoustical techniques in compliance with Title 24 to ensure that noise levels in interior spaces remain at or below 45 CNEL with all doors and windows closed.

16. Generator location***Prior to issuance of a Building Permit***


The applicant shall submit revised site plan showing the generator enclosure to be located within the building, or alternatively, shall be at least 75' away from the west building wall if located on the roof.

17. Height Limitation***Ongoing.***

The maximum height of the screening enclosure shall be 10 feet. Any height beyond 10 feet would compromise the appropriate scale and proportionality with the existing building mass.

ZD DRAWING SIGN-OFF

DATE:	TIME:	%	ONE-PLEASE RETURN BY:
SIGNATURE		DATE	
SITE ACQUISITION			
PLANNING			
CONSTRUCTION			
MANAGEMENT			

		SIGNATURE	DATE
CONSTRUCTION:			
REAL ESTATE:			
RF ENGINEER:			
EQUIPMENT ENGINEER:			
W/ ENG./TRANSPORT:			

OTHER (IF APPLICABLE)	SIGNATURE	DATE

DIRECTIONS

1. HEAD TOWARD N. WIGET LN ON MITCHELL DR.
2. TURN LEFT ONTO N. WIGET LN
3. TURN LEFT ONTO 5TH ST. (PORTIONS MAY BE TEMPORARILY FORBIDDEN)
4. TURN RIGHT AND TAKE RAMP ONTO GROVE SHAFER FWY (CA-24 W) TOWARD OAKLAND
5. KEEP RIGHT ONTO CALDECOTT TUNEL
6. TURN LEFT ONTO TELEGRAPH AVE
7. TURN RIGHT ONTO MARTIN LUTHER KING JR. WAY
8. TURN RIGHT ONTO 5TH ST. (PORTIONS MAY BE TEMPORARILY FORBIDDEN)
9. TURN LEFT ONTO ARLINGTON AVE. DESTINATION IS ON THE RIGHT
10. TURN LEFT ONTO ARLINGTON AVE. DESTINATION IS ON THE RIGHT

INDEX OF DRAWINGS

1. T1.1 TITLE SHEET, LOCATION PLAN, PROJECT DATA
2. C1.1 OVERALL EXTERIOR SITE PLAN
3. A1.1 OVERALL EXTERIOR SITE PLAN
4. A2.1 OVERALL EXTERIOR SITE PLAN, EQUIPMENT ROOM PLAN
5. A2.1 OVERALL EXTERIOR SITE PLAN, EQUIPMENT ROOM PLAN
6. A3.1 PROJECT ELEVATIONS

ATTACHMENT A

verizon WIRELESS

2785 Mitchell Drive, Walnut Creek, CA 94598

PARADISE PARK

960 ARLINGTON AVENUE
OAKLAND, CA 94608
APN: 15-1296-001-02
LOCATION #: 29118



LOCATION PLAN

PROJECT DIRECTORY

APPLICANT:
VERIZON WIRELESS
1550 RIVER PARK DRIVE
WALNUT CREEK, CA 94598

PROJECT OWNER:
THOMAS D. MCELROY
1550 RIVER PARK DRIVE
WALNUT CREEK, CA 94598

ARCHITECT:
MST ARCHITECTS
1550 RIVER PARK DRIVE
WALNUT CREEK, CA 94598
916-587-7950
mstarchitects.com

CONSTRUCTION MANAGER:
COMPLETE WIRELESS CONSULTING, INC.
2008 V STREET
EMERYVILLE, CA 94608
916-587-7950
mcs@completewireless.net

PROJECT SUMMARY

ASSESSOR'S PARCEL NUMBER: 015-1296-001-02

JURISDICTION: CITY OF OAKLAND

OCCUPANCY: S-2 (UNMANNED TELECOMMUNICATIONS FACILITY) U (TOWER)

TYPE OF CONSTRUCTION: V-B

ZONING: HBX-1

CODE COMPLIANCE

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

1. 2013 CALIFORNIA ADMINISTRATIVE CODE (CAC) (INCL. TITLE 24 & 25)
2. 2013 CALIFORNIA BUILDING CODE (CBC)
3. 2013 CALIFORNIA ELECTRICAL CODE (CEC)
4. 2013 CALIFORNIA FIRE CODE (FC)
5. 2013 CALIFORNIA PLUMBING CODE (CPC)
6. 2013 CALIFORNIA ENERGY CODE (CEC)
7. 2013 CALIFORNIA FIRE CODE (FC)
8. 2013 CALIFORNIA FIRE CODE (FC)
9. 2013 CALIFORNIA FIRE CODE (FC)
10. LOCAL COUNTY OR CITY ORDINANCES

ACCESSIBILITY REQUIREMENTS: THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. ACCESSIBILITY NOT REQUIRED IN ACCORDANCE WITH THE 2013 CBC 11B-203.5, AND 11B-202.4 EXCEPTION 7.

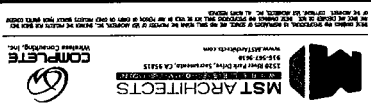
PROJECT DESCRIPTION

PROPOSED VERIZON WIRELESS UNMANNED TELECOMMUNICATIONS FACILITY, INCLUDING:

- A 10'-4"x19'-6" INTERIOR EQUIPMENT ROOM LEASE AREA.
- A 10'-0"x10'-0" & A 12'-0"x12'-0" ANTENNA LEASE AREA.
- A 5'-0"x8'-0" GENERATOR LEASE AREA.
- POWER, TELCO, & GAS UTILITIES BROUGHT TO FACILITY.
- AN INTERIOR EQUIPMENT ROOM W/INDOOR EQUIPMENT CABINETS & ASSOCIATED EQUIPMENT.
- A STAGNOY GENERATOR.
- (8) ANTENNAS W/ASSOCIATED EQUIPMENT CONCEALED WITHIN (2) NEW RF TRANSPARENT ROOFTOP ENCLOSURES.

PROJECT MILESTONES

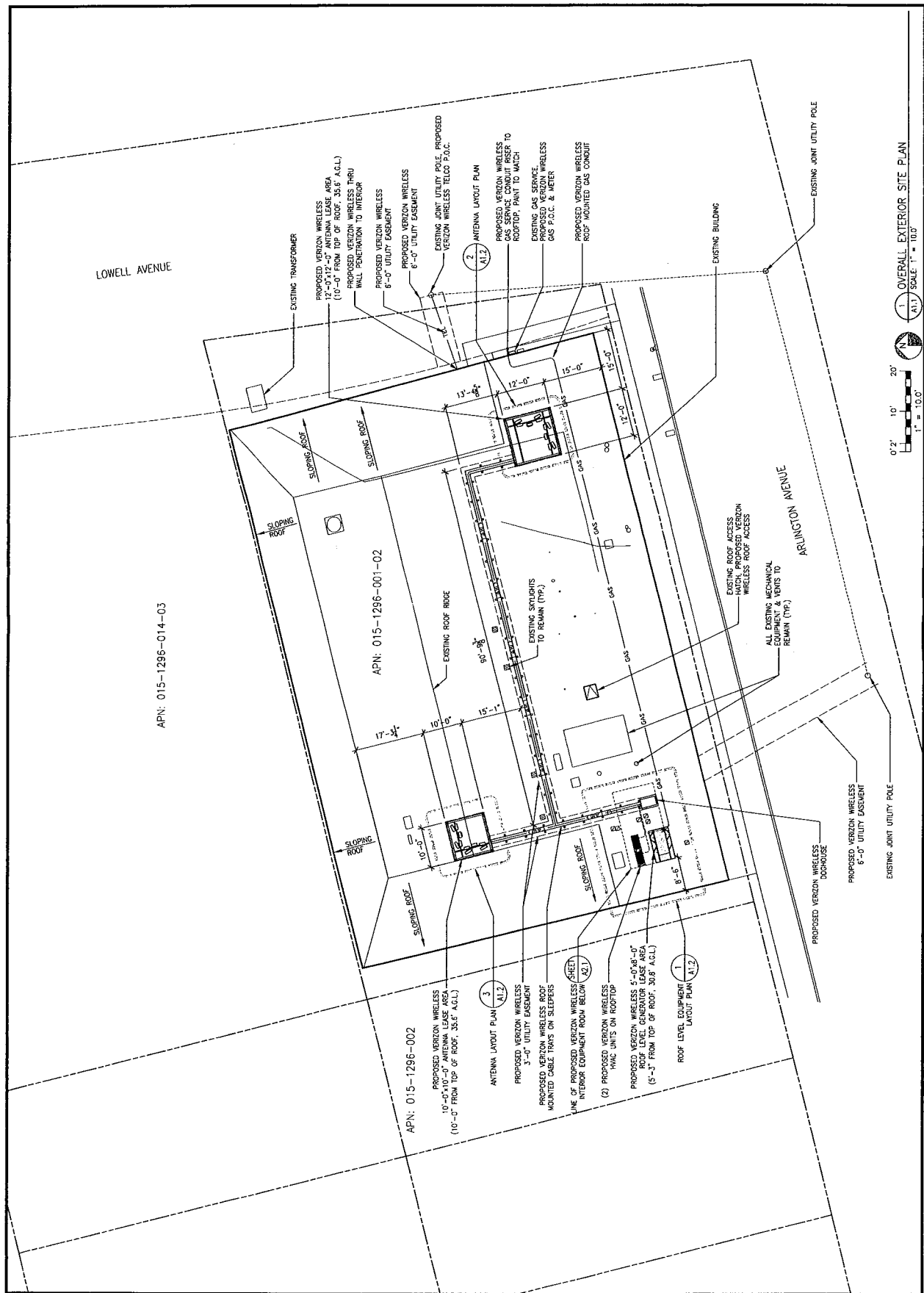
10/05/2014 90% ZONING DOCUMENTS
11/11/2014 100% ZONING DOCUMENTS
02/11/2015 100% ZONING DOCUMENTS REVISION 1
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XX/XX/XXXX 100% CONSTRUCTION DOCUMENTS

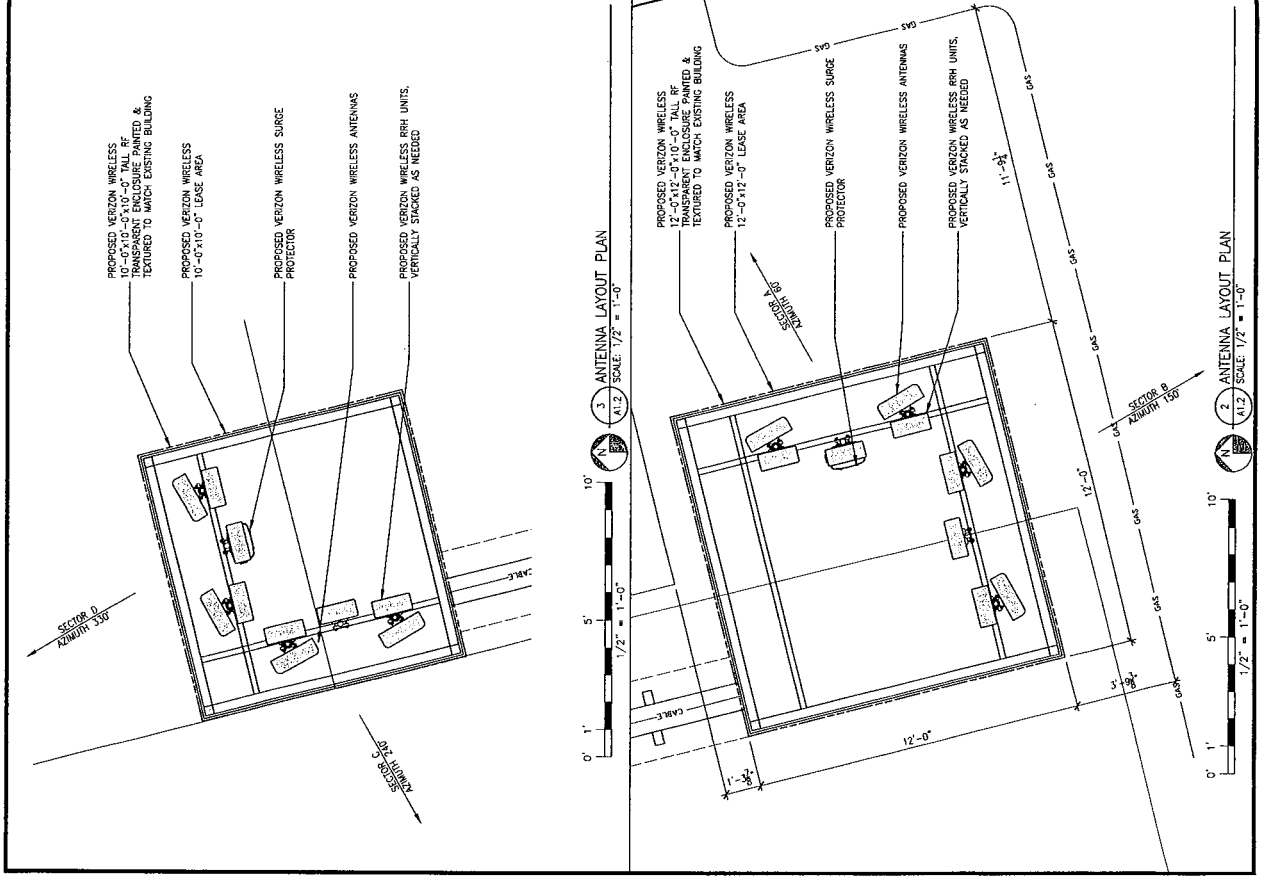


verizon WIRELESS
PARADISE PARK
960 ARLINGTON AVENUE
OAKLAND, CA 94608

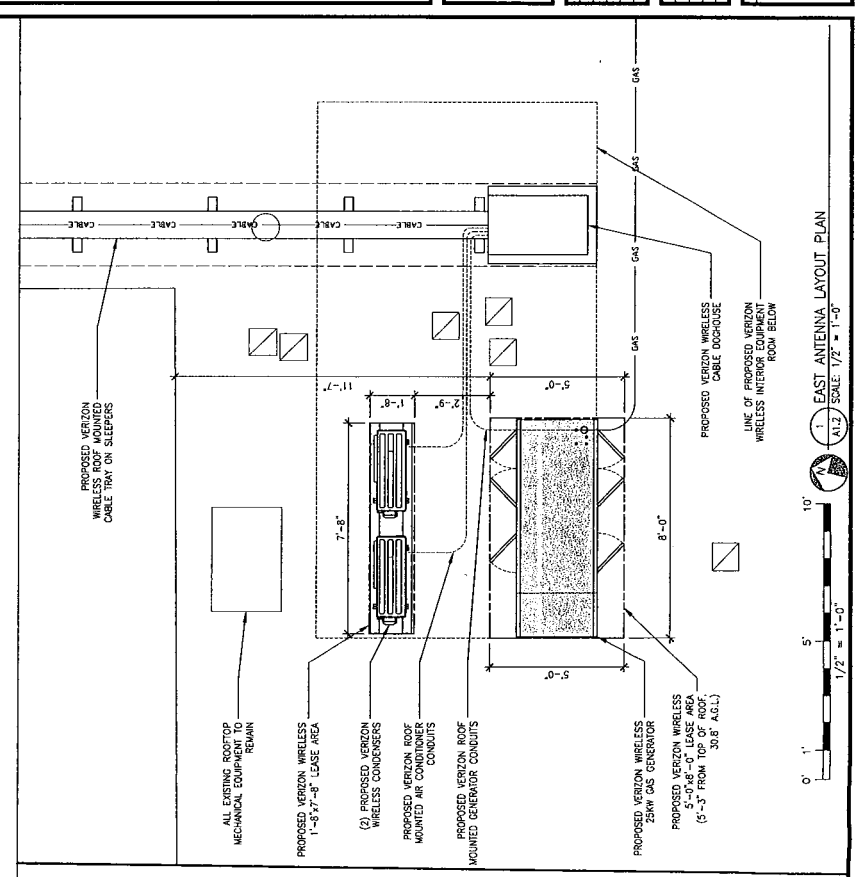
SHEET TITLE:
TITLE SHEET, LOCATION PLAN, PROJECT DATA

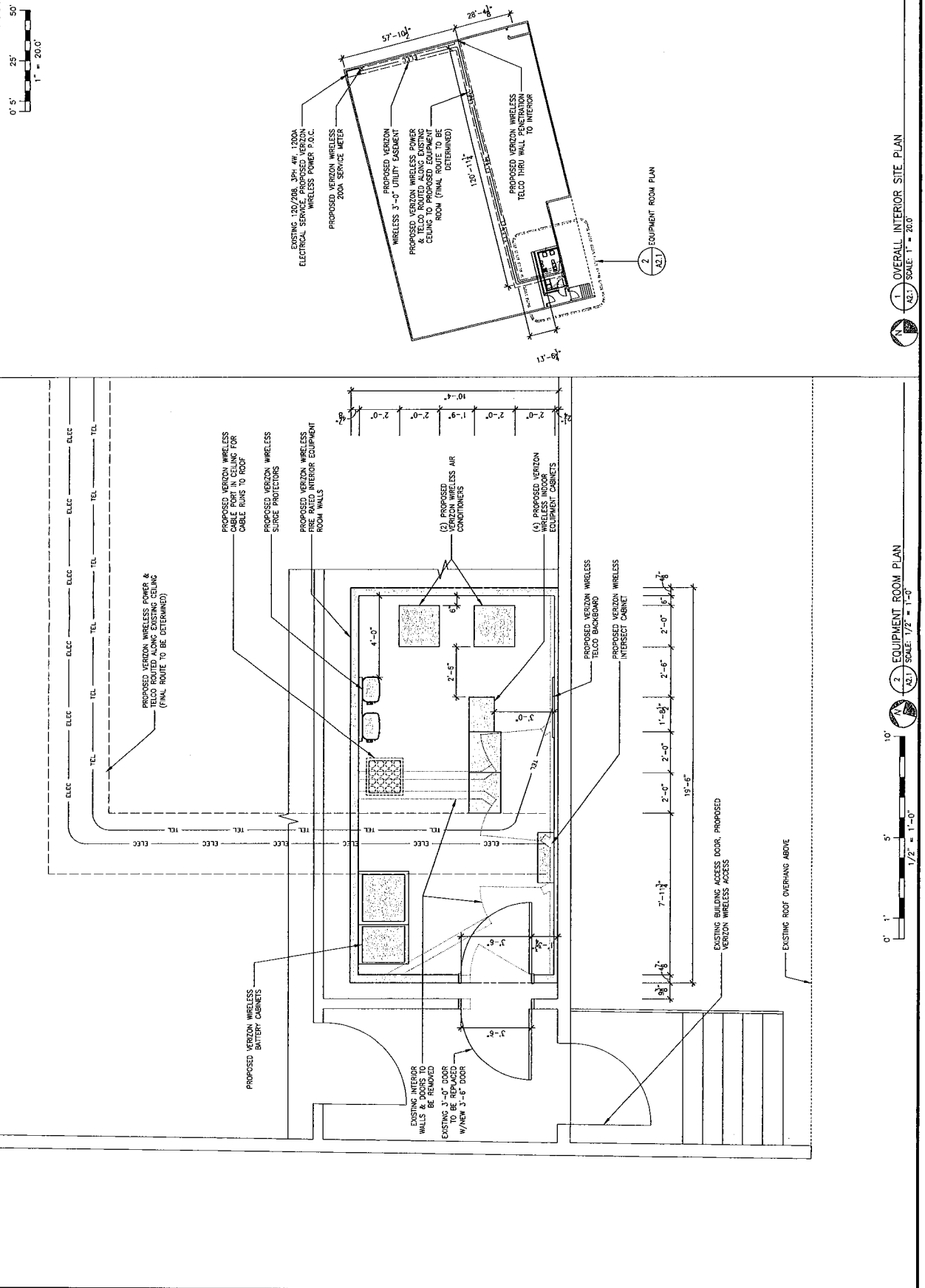
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EQUIPMENT	DESCRIPTION	QUANTITY						TOTAL
		SECTOR A	SECTOR B	SECTOR C	SECTOR D	SECTOR E	SECTOR F	
ANTENNA	HYDRA 1720R000	2	2	2	2	2	2	12
RH	PRU12	3	3	3	3	3	3	18
TRIA OR DIRECTIONAL	N/A	0	0	0	0	0	0	0
SURGE PROTECTOR/HYBRID	HYBRID TRUNK CABLE	2	2	2	2	2	2	12
COAXIAL CABLE	N/A	0	0	0	0	0	0	0
RET CABLE	N/A	0	0	0	0	0	0	0








MST ARCHITECTS
 155 BAYVIEW BOULEVARD, SUITE 200
 OAKLAND, CA 94612
 TEL: 415.778.8800
 WWW.MSTARCHITECTS.COM



COMPLETE
 155 BAYVIEW BOULEVARD, SUITE 200
 OAKLAND, CA 94612
 TEL: 415.778.8800
 WWW.COMPLETEARCHITECTS.COM

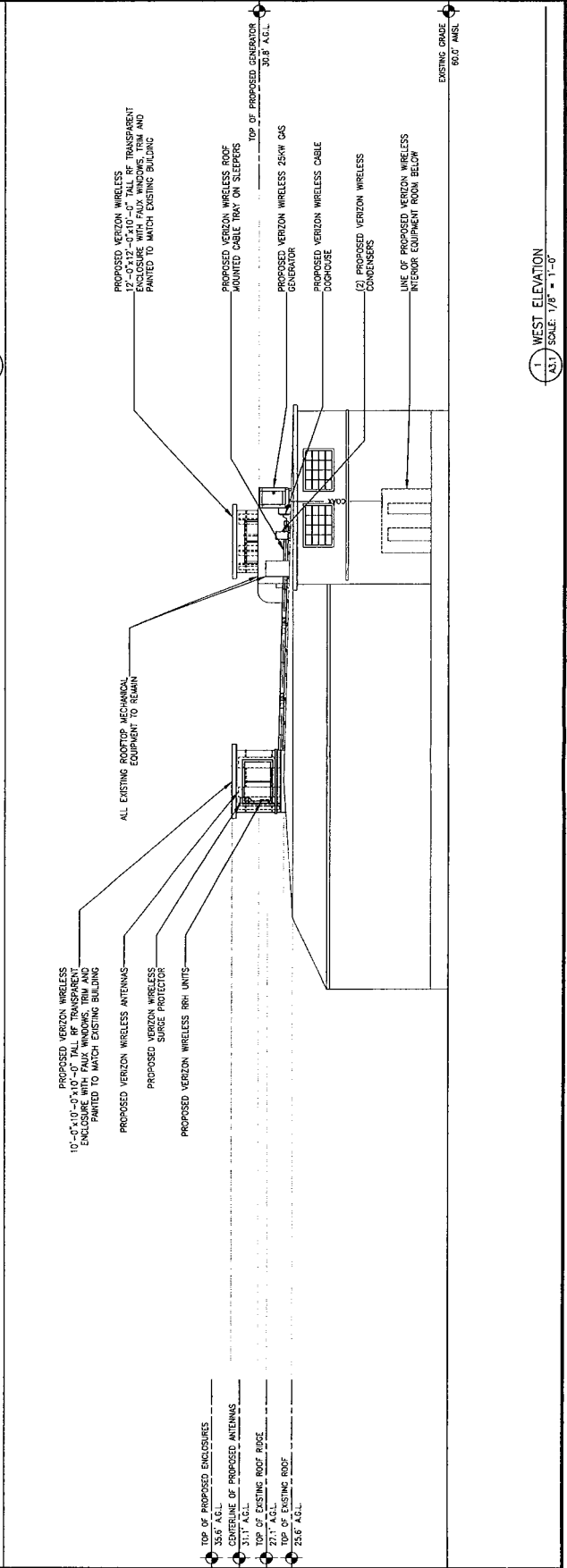
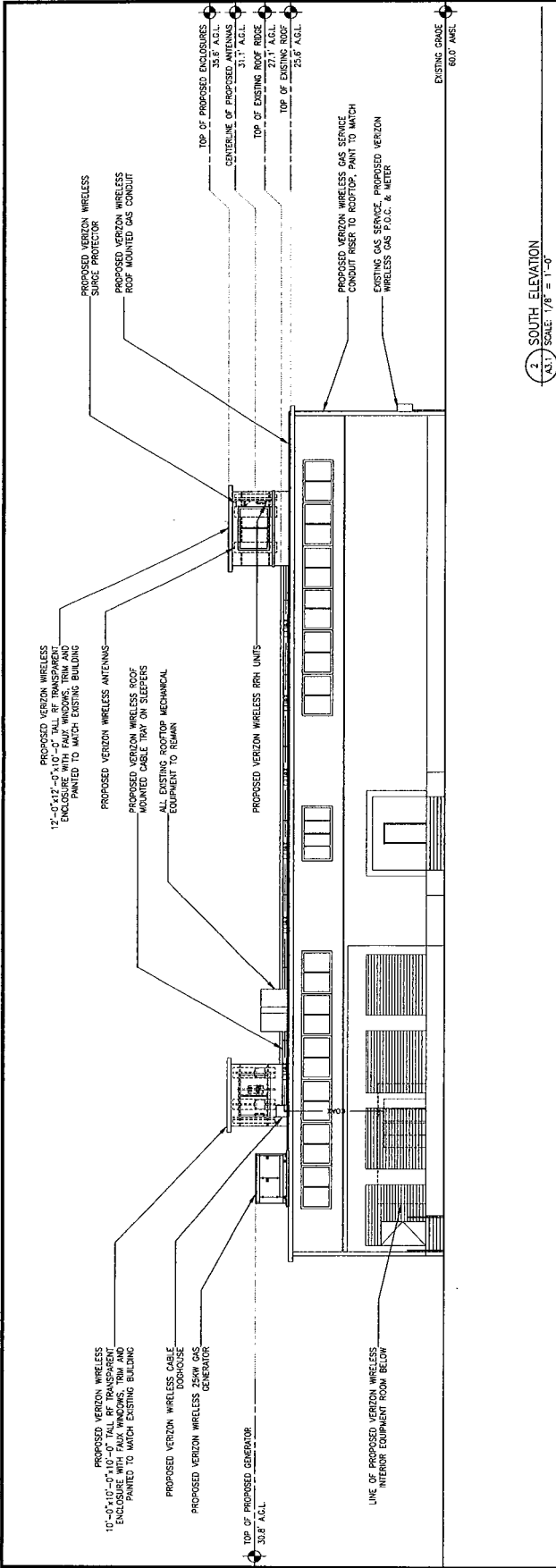


Verizon
 960 ARLINGTON AVENUE
 OAKLAND, CA 94608
 PROJECT ELEVATIONS

SHEET TITLE

1. WEST ELEVATION
 A3.1 SCALE 1/8" = 1'-0"

2. SOUTH ELEVATION
 A3.1 SCALE 1/8" = 1'-0"



Paradise Park

980 Arlington Ave
Oakland CA 94608

verizonwireless

Aerial photograph showing the viewpoints for the photosimulations and neighborhood photos.

ATTACHMENT A





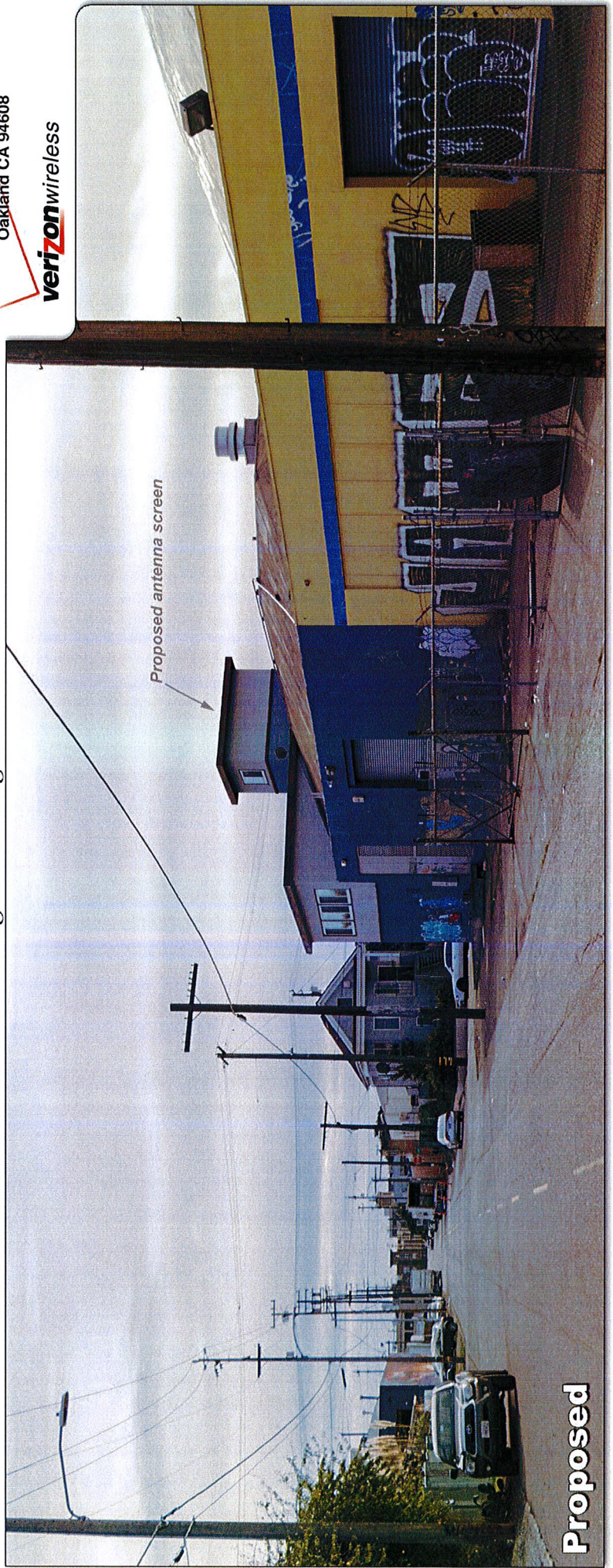
Existing

Photosimulation of the view looking south along Lowell Street.

Paradise Park

980 Arlington Ave
Oakland CA 94608

verizonwireless



Proposed

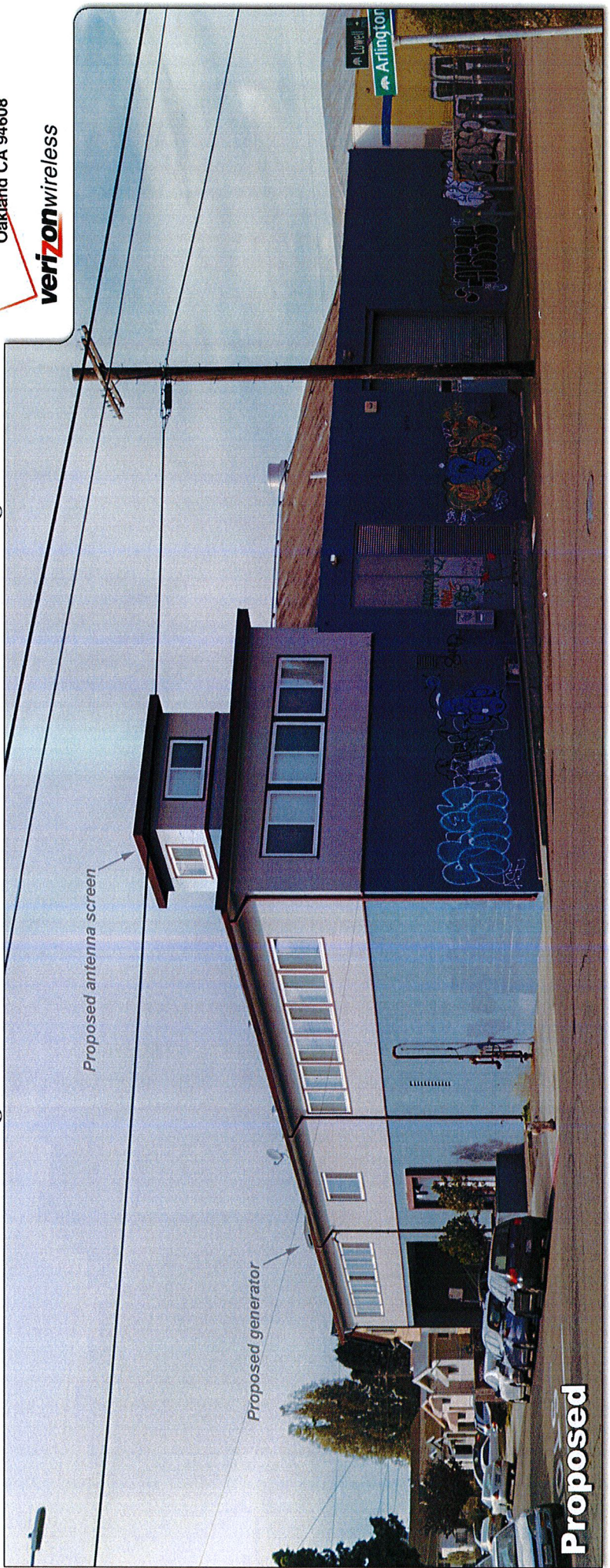


Photosimulation of the view looking west from across the corner of Lowell St. and Arlington Ave.

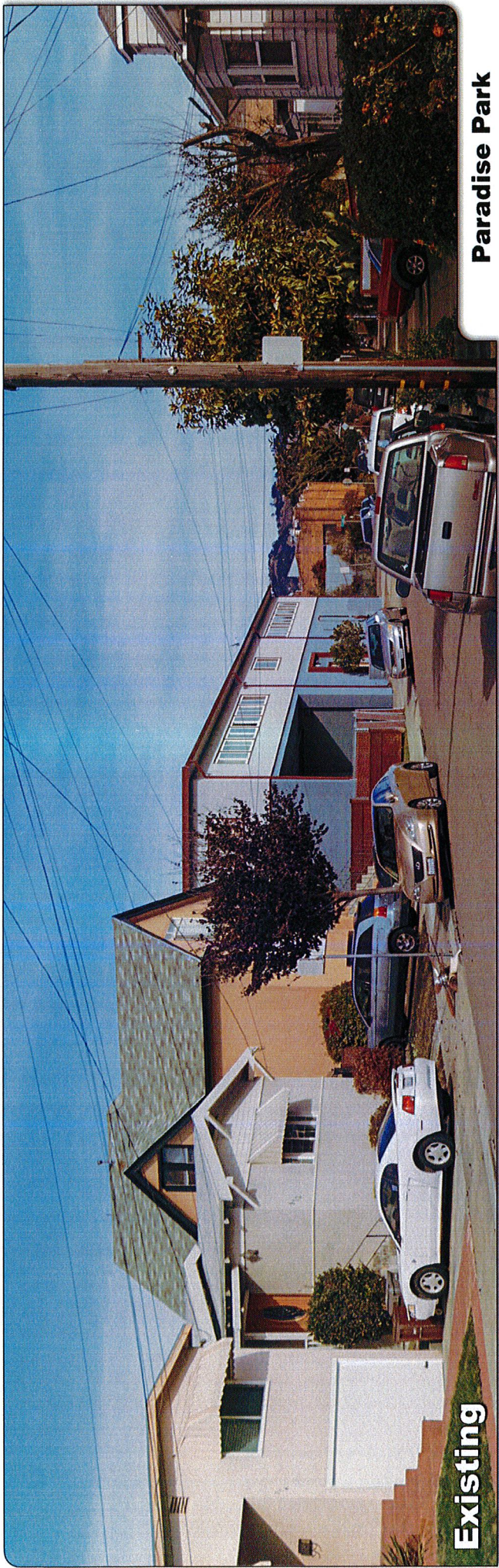
Paradise Park

980 Arlington Ave
Oakland CA 94608

verizonwireless



Proposed



Existing

Photosimulation of the view looking northeast along Arlington Ave.

Paradise Park

980 Arlington Ave
Oakland CA 94608



Proposed

ALTERNATIVE SITES ANALYSIS VERIZON WIRELESS

Site Name: Paradise Park
Location: 960 Arlington Avenue, Oakland, CA 94608
APN: 15-1296-001-02

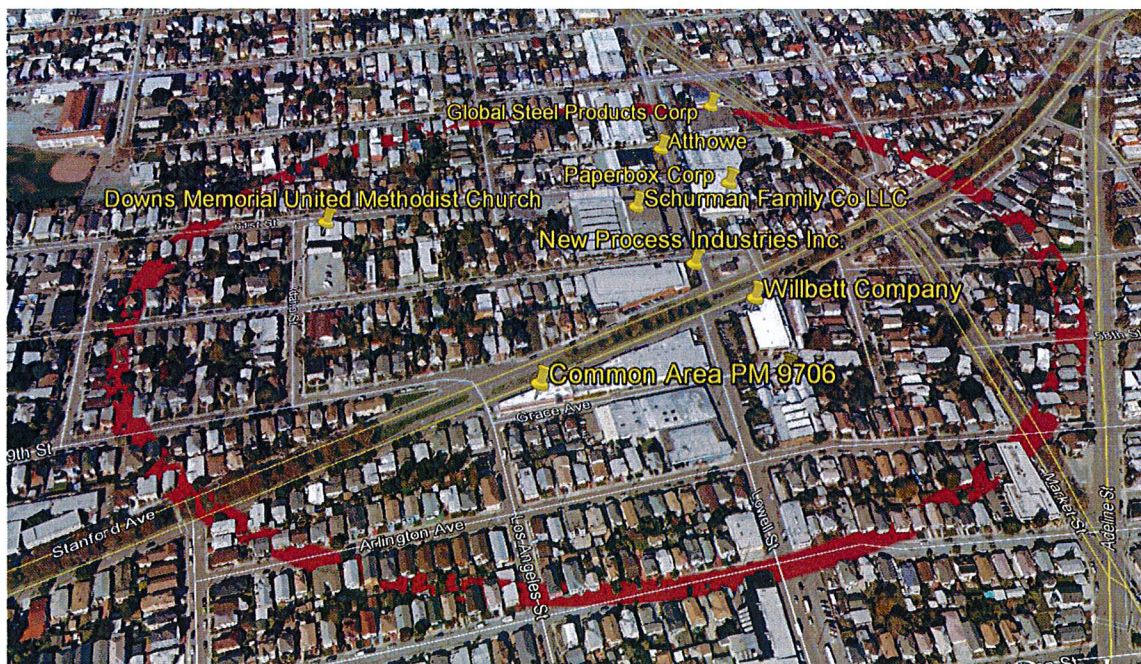
Section 17.128.110 identifies the most preferred site locations and designs as set forth by the City of Oakland. Verizon begins its process by identifying a search area and a required centerline height. Verizon then looks to local codes and general plans to identify the values significant to the local community for the siting and locating of wireless facilities.

In addition to the abovementioned location and height attributes, each proposed site must meet certain minimum requirements, such as the following:

- A willing landlord,
- Feasible construction,
- Road access,
- Available telephone and electrical utilities,
- Satisfaction of coverage objectives, and
- Compliance with local zoning requirements.

a. Co-located on an existing structure or facility with existing wireless antennas.

During the candidate review process, Verizon first looked for collocation opportunities within the Search Ring. This particular search ring does not provide a feasible collocation opportunities to fulfill Verizon's coverage objectives because the buildings are all two story buildings or shorter.



b. City-owned properties or other public or quasi-public facilities.

The search ring is located in an area that has HBX-1 zone in the center of residentially zoned areas. This particular service area does not have public or quasi-public facilities needed to meet Verizon’s coverage objectives.

c. Existing commercial or industrial structures in non-residential zones (excluding all HBX Zones and the D-CE-3 and D-CE-4 Zones).

Capacity and coverage demands grow as more and more consumers rely on only their smartphones and move away from landlines, making search rings more difficult to place in areas that would be strictly for non-residential or commercial uses. As stated above, the search ring is located in an area that has an HBX-1 zone in the center of residential zones.

d. Existing commercial or industrial structures in residential zones, HBX Zones or the D-CE-3 or D-CE-4 Zones).

Lastly, Verizon looked for feasible façade-mount and roof-mount opportunities. This particular area is dense with buildings and provides many roof-mounting prospects. However, because the area is zoned HBX-1, the search was narrowed to businesses or commercial structures. The following business structures were contacted:

Other rooftop facilities that were investigated:

- Schurman Family Co LLC, 954 60th Street, Oakland, CA—This location was a rooftop opportunity in the HBX-1 zone. However, Verizon requested a facility located south of Stanford Avenue.
- Global Steel Products, 938 61st Street, Oakland, CA—This location was a rooftop opportunity in the HBX-1 zone. However, Verizon requested a facility located south of Stanford Avenue and this site is located further north than the above candidate.

Other candidates investigated but not presented:

- Lowell Street, Oakland, CA (APN: 015-1345-013-04)—This candidate is zoned HBX-1. It is less desirable because it would require the construction of a new structure and abutted residential zones to the east and south. However, the landlord was not available for contact via physical visit or interest letter.
- Common Area, 967 Stanford Avenue, Oakland, CA—This property is zoned HBX-1 and landlord was uninterested in leasing space for wireless facilities.
- Downs Memorial United Methodist Church, 6026 Idaho Street, Oakland, CA—No response from inquiries regarding a wireless project.
- New Process Industries Inc., No Address, Lowell St., Oakland, CA—This location was less desirable because it would require the construction of a new structure. Additionally, the manager of the facility was unavailable during two separate physical visits to this building.
- 940 Arlington Avenue, Oakland, CA—This building seemed to be vacant. No contact was successfully made.
- Paperbox Corp., 933 60th Street, Oakland, CA—This site manager did not want a wireless facility on site.
- Willbett Company, 935 Stanford Avenue, Oakland, CA—This building seemed to be vacant. No contact was successfully made.

- Johnson Burners, 925 Stanford Avenue, Oakland, CA—Multiple physical visits yielded no contact for this site. No contact was successfully made.
- Hunza Graphics, 919 Stanford Avenue, Oakland, CA— Multiple physical visits yielded no contact for this site. No contact was successfully made.

The Proposed Facility location and design represents a thorough and responsible investigation of alternative sites and co-location possibilities performed over the last few months. After an exhaustive review of the available properties and the applicable zoning law, Verizon has determined that the proposed site is the best available location for a wireless telecommunications facility to meet the coverage objective.

**Verizon Wireless • Proposed Base Station (Site No. 291118 “Paradise Park”)
960 Arlington Avenue • Oakland, 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. 291118 “Paradise Park”) proposed to be located at 960 Arlington Avenue in Oakland, California, for compliance with appropriate guidelines limiting human exposure to radio frequency (“RF”) electromagnetic fields.

Executive Summary

Verizon proposes to install directional panel antennas above the roof of the two-story building located at 960 Arlington Avenue in Oakland. 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

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



**Verizon Wireless • Proposed Base Station (Site No. 291118 “Paradise Park”)
960 Arlington Avenue • Oakland, California**

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 attached 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 MST Architects, Inc., dated October 2, 2014, it is proposed to install eight Amphenol Model HTXCW451720R000 directional panel antennas within two new view screen enclosures to be installed above the roof of the two-story building located at 960 Arlington Avenue in Oakland. The antennas would be mounted with no downtilt at an effective height of about 35 feet above ground, 9½ feet above the roof, and would be oriented in pairs toward 60°T, 150°T, 240°T, and 330°T, to provide service in all directions. The maximum effective radiated power in any direction would be 13,900 watts, representing simultaneous operation at 5,480 watts for AWS, 5,480 watts for PCS, and 2,940 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 0.035 mW/cm², which is 4.7% of the applicable public exposure limit. The maximum calculated level at the top-floor elevation of any nearby building* is 15% 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. Levels are calculated to exceed the applicable public exposure limit on the roof of the subject building, in front of the antennas.

* Including the residences located at least 40 feet away, based on photographs from Google Maps.



**Verizon Wireless • Proposed Base Station (Site No. 291118 "Paradise Park")
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Recommended Mitigation Measures

It is recommended that the roof access hatch be kept locked,[†] so that the Verizon antennas are not accessible to unauthorized persons. To prevent occupational exposures in excess of the FCC guidelines, it is recommended that appropriate RF safety training be provided to all authorized personnel who have access to the roof, including employees and contractors of Verizon as well as roofers, HVAC workers, and building maintenance staff. No access within 18 feet directly in front of the antennas themselves, such as might occur during maintenance work on the roof, should be allowed while the base station is in operation, unless other measures can be demonstrated to ensure that occupational protection requirements are met. Marking blue demarcation boundaries on the roof of the building, as shown in Figure 3, and posting explanatory signs[‡] at the roof access hatch, at the demarcation boundaries, and on the enclosures in front of the antennas would be sufficient to meet FCC-adopted guidelines.

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 960 Arlington Avenue in Oakland, California, can comply with the prevailing standards for limiting human exposure to radio frequency energy and, therefore, need 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. Locking the roof access hatch is recommended to establish compliance with public exposure limits; training authorized personnel, marking demarcation boundaries, and posting explanatory signs is recommended to establish compliance with occupational exposure limits.

[†] If the roof access door cannot be locked, it is recommended that barricades be installed instead of and at the same locations as the blue demarcation lines shown in Figure 3.

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



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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.

November 21, 2014



Andrea L. Bright

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



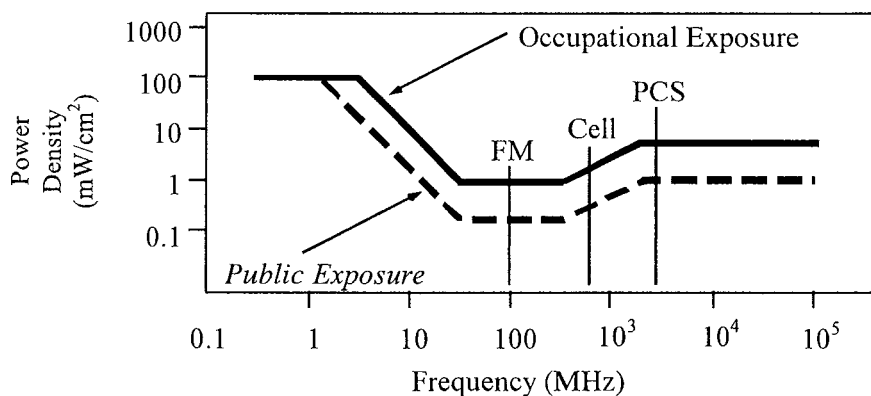
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FCC Radio Frequency Protection Guide

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/f	<i>823.8/f</i>	4.89/f	<i>2.19/f</i>	900/f ²	<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.



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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

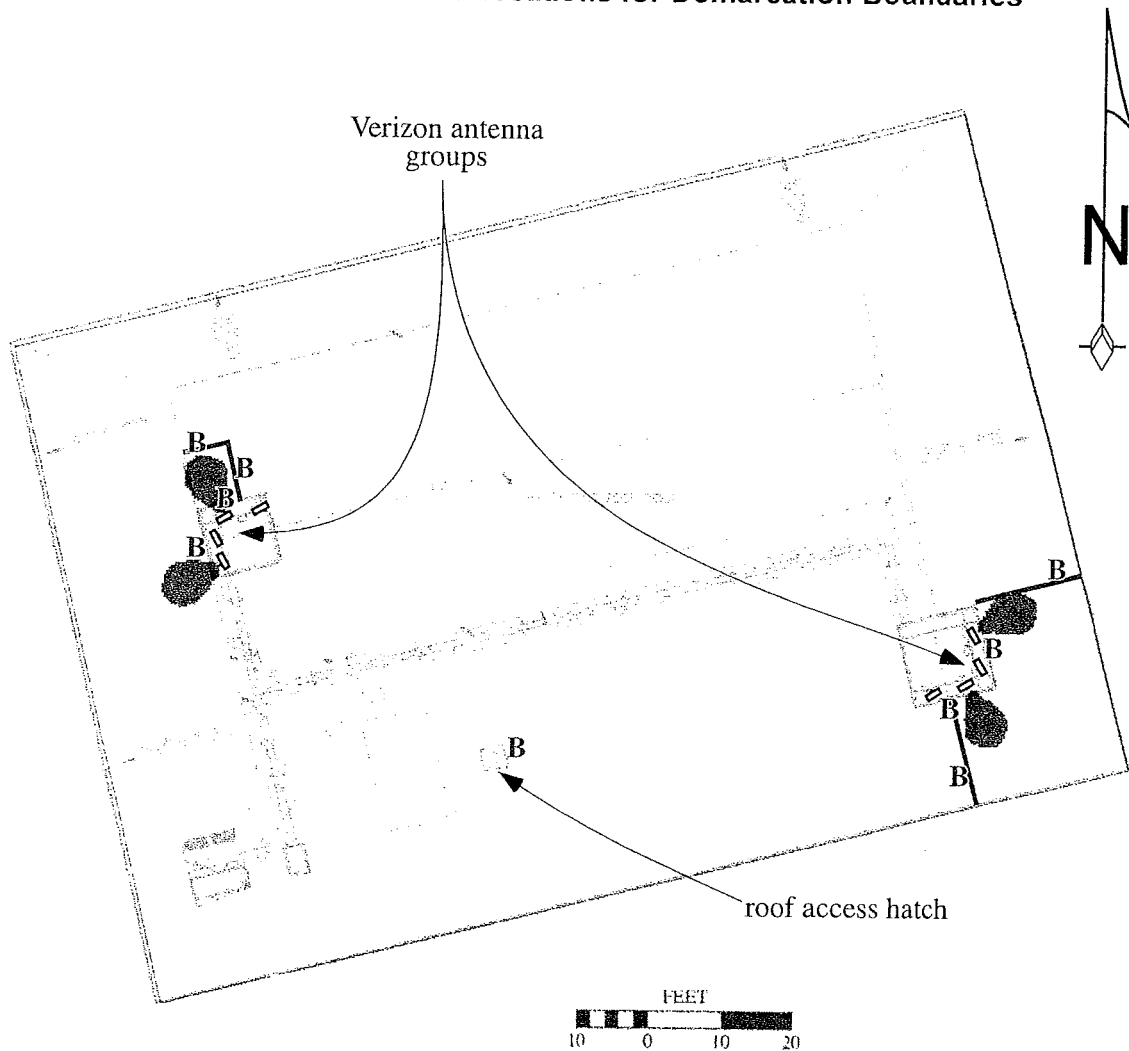
D = distance from the center of radiation to the point of calculation, in meters.

The factor of 2.56 accounts for the increase in power density due to ground reflection, assuming a reflection coefficient of 1.6 ($1.6 \times 1.6 = 2.56$). 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.



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Calculated Maximum Exposure Levels on Roof
Exceeding Public Limit (light blue shading), with
Recommended Minimum Locations for Demarcation Boundaries



Calculations performed according to OET Bulletin No. 65, August 1997.
Colors shown represent percent of applicable FCC public limit.

Signage Legend:

B



[blank] <100%

■ >100%

□ >500%

Notes:

Base drawing from MST Architects, Inc., dated October 2, 2014.
Explanatory signs should be posted as shown above, readily visible
to authorized workers needing access. See text.



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Figure 3