

WIRELESS COMMUNICATION FACILITIES DESIGN GUIDELINES

Planning, Building, and Transportation Department and Public Works
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PURPOSE AND APPLICABILITY

The purpose of these Wireless Communication Facilities (WCF) Design Guidelines are to assist applicants with preparing design plans for the deployment of WCF in the City of Alameda. The guidelines govern all WCF deployment on private property and in the public right-of-way. These guidelines will be used to evaluate permit applications for all WCF, and these guidelines may be updated periodically by the Planning, Building, and Transportation Department and the Public Works Department to address the needs with fast-evolving technology.

GOALS

The City of Alameda seeks to balance the importance of providing good and reliable wireless coverage and capacity with installations that do not significantly impact neighborhood character or detract from Alameda's unique and historic streetscapes. The design guidelines support the following goals:

1. Facilitate the buildout of a wireless telecommunications network that provides high speed telecommunications service to the entire Alameda community.
2. Ensure wireless facilities be aesthetically compatible with its immediate surroundings by concealing all components in existing structures, or otherwise apply stealth, camouflage, and screening techniques to hide or blend them into the environment.
3. Avoid wireless facility installations that would materially impair the character of historic/architecturally significant buildings or otherwise would substantially obstruct significant views (e.g., locations that have clear views of local landmarks or the San Francisco Bay.)

LOCATION PREFERENCES

The City of Alameda has established the following location preferences for WCF site selection in order to mitigate against adverse visual, noise and aesthetic impacts. These parameters are listed in the order of preference and divided into two categories – preferences for siting on private property and preferences for siting within the public rights-of-way:

1. Private Property.
 - a. Co-location on existing towers, facilities and sites.

- b. Property owned by the City of Alameda.
 - c. Non-residential areas.
 - d. Residential areas - Siting within residential areas is discouraged unless supported by clear and convincing evidence documenting that no more-preferred location is technically feasible and potentially available. . New macro tower facilities are strongly discouraged in residential areas.
2. Public Rights-of-Way.
- i. Industrial or commercial areas;
 - ii. Other non-residential areas;
 - iii. Residential areas – siting within residential areas is discouraged; however, applications in such areas may be approved so long as the applicant demonstrates by clear and convincing evidence in the written record that either (1) no more preferred locations exist within 300 feet from the proposed site; or (2) any more preferred locations within 300 feet from the proposed site would be technically infeasible.

UNIVERSAL DESIGN GUIDELINES FOR ALL WCF

1. *Minimize all Visual Impacts.* Design all wireless facilities with the goal of minimizing its visual impact to the surrounding environment. At the earliest stages of site selection and equipment planning, think about the most appropriate design that would allow for the optimal integration of the new installation with existing environment, with specific attention to architecture and landscape nearby that could be used to screen or hide new equipment. Wireless facility installations should avoid having the effect of materially impairing the character-defining features of the City's historic monuments, and historic resources that are listed or eligible for inclusion on the National Register of Historic Places.
2. *Use of Landscaping.* When facilities are located in areas with substantial existing vegetation, place wireless equipment where it can maximize usage of the existing landscape for visual screening. When new landscaping is incorporated into the design, the landscaping must appear as natural features found in the immediate area so as to be unnoticeable (camouflaged facilities). Any new landscaping, including irrigation, shall be installed and maintained by the applicant, as long as the permit is in effect.
3. *Paint and Finish.* All equipment, antennas, poles, cables, hardware, and towers shall have a non- reflective finish and shall be painted or otherwise treated to minimize

visual and aesthetic impacts.

4. *Security.* All wireless communications facilities shall provide sufficient security measures and anti-climbing measures in the design of the facility to reduce the potential for damage, theft, trespass, and injury.
5. *Interference.* All WCF shall be designed, located and operated to avoid interference with the quiet enjoyment of the surrounding area or neighborhood, including interference from adverse visual, noise and aesthetic impacts, and at a minimum shall be subject to the City-adopted noise standards contained in AMC Section 4-10. *Noise Regulations.*
6. *Signage and Decals.* No advertising or signs, other than necessary provider identification signs and warning signs, shall be allowed on or at the location of a wireless communications facility. Radio-frequency (RF) warning labels, Node ID stickers, and other required identification labels shall be the smallest allowable under applicable regulations. Consider placing these labels on the underside of the equipment enclosure, for example, so it is only visible to the person standing up close. Remove or paint over colored equipment manufacturer decals and logos not required by government regulation.
7. *Noise from Ventilation.* Where cooling and ventilation is needed, use a passive cooling system in locations close to residences or windows. In the event that a fan is needed, consider using enclosures with sufficient space to allow for additional airflow and cooling fans with a low noise profile.
8. *Detailed Plans.* Ensure plans and photo simulations submitted for City plan review accurately show smaller equipment items such as duplexers, ground buss bars, PBX or J-Boxes. Hide these elements in locations such as behind equipment enclosures, or in mounting arms which feature recessed areas.

A. GUIDELINES FOR FACILITIES LOCATED ON PRIVATE PROPERTY

1. BUILDING-MOUNTED EQUIPMENT:

In addition to the Universal Guidelines above, WCF mounted on or attached to existing or proposed buildings should adhere to the following:

- a. Plan and design building-mounted antennas and any ancillary equipment to be in scale and architecturally integrated with the building design and architectural features. Screening may include designs such as locating the facility within attics, steeples, towers, behind and below parapets, or concealed within a new architectural addition to a building that is consistent with the building's architectural style. When new architectural additions are proposed, the addition must adhere to the City's Design Review Manual and are subject to the Design

Review process under AMC Section 30-37.

- b. Avoid placing equipment on the primary or public-facing façade of the building.
- c. New architectural features such as columns, pilasters, corbels, or other ornamentation that conceal antennas may be used only if such features are native to the architectural style of the existing building.
- d. Façade mounted antennas attached to existing structures must consider the scale, symmetry, and design of the structure and minimize the addition of bulk and clutter to a building. Do not interrupt the architectural lines or decorative patterns of the building.
- e. Paint or otherwise treat/texture antennas or other equipment that are mounted directly against a building wall to match the adjacent building surfaces.
- f. Place all roof-mounted equipment and antennas a minimum of five-feet (5') from the edge of the building.
- g. Do not allow exposed cabling or exposed mounting apparatus on a building façade without the associated antennas.

2. GUIDELINES FOR ALL VERTICAL INSTALLATIONS:

In addition to the Universal Guidelines above, this section addresses vertical installations including pole-mounted facilities such as faux trees and athletic field lights.

a. General Standards.

- i. Consider the use of equipment enclosures that are nearly the same width as the pole, even if they need to be slightly longer as a result. Narrow enclosures are less likely to impair views of buildings and scenic resources or to detract from streetscapes. Utilize equipment mounting base plates that are no wider than the pole.
- ii. Typically, the wide variation in enclosure surface materials and sizes on a single pole can draw more attention (clutter compared to mass) to the facility than a system of enclosures that is comparatively larger, but more uniform in profile and longer instead of wider or deeper.
- iii. Design new vertical structures and poles to the minimum height necessary.
- iv. Antennas mounted on such structures as light standards should be placed on the structure in a way to minimize visibility, and be painted to blend into the structure.
- v. For new poles, incorporate any cabling and conduits into the pole itself. On

existing poles, use shrouds, risers or conduit, to reduce the appearance of cluttered or tangled cabling. In some instances, installation practices such as using equipment enclosures with specific port locations, or crossing wires below a down-facing port on an equipment enclosure, can reduce the likelihood that cabling will appear cluttered or bend outward from the pole and further away from the enclosure.

Athletic Field Lights (AFL):

- i. Mount antennas as close as possible to the pole without obstructing the light source and within a radome no more than thirty-six (36") inches in diameter. Provide covers on the underside of the radome enclosure.
- ii. For existing AFL with exposed antennas, route all cables directly into port holes no more than 12 inches of exposed conduit (evaluated on a case by case basis).
- iii. Apply chin covers to conceal any excess cables that hang above or below the antennas. Chin covers shall match the exact antennas dimensions and profile, and be painted and textured to match the antenna's exterior finish.
- iv. Paint antennas and mounting apparatus the same color as the pole.
- v. All cables and conduit to and from the light standard are expected to be routed from underneath the caisson up into the pole. Where that is not feasible on an existing pole, cable coverings may be allowed on the exterior where they are painted to match and minimally visible (evaluated on a case-by-case basis).

Faux Trees:

- i. Only use faux trees in an existing landscape setting with trees of a similar height and species.
- ii. If the site is void of tall trees or landscape, create a landscape setting that integrates the faux tree with additional live planting of a similar tree species and varying heights.
- iii. Faux trees in non-urban settings should be species regionally appropriate to the San Francisco Bay Area that blends with established plant communities.
- iv. Utilize faux trees that replicate the shape, structure, and color of live trees. Provide detailed specifications of the branch and leaf design on plans submitted for plan review.
- v. Ensure that the top of the faux tree does not exceed allowed height on approved plans.

- vi. All cables must be routed directly from the ground up through the pole. Avoid the use of exterior cable coverings that may defeat the tree design.
- vii. Faux tree structures shall include three dimensional bark cladding from the base to the top of the 'trunk' and along all portions of each branch.
- viii. Design faux trees with a minimum of 3-branches per foot for full density coverage with limited spacing between the branches so that the structure appears as natural as possible. The majority of branches should be 8-foot or longer. Branches should extend beyond the length of the antenna by a minimum of 24-inches. Trees should be designed to mimic the natural appearance of their species. Branch coverage shall be dense and natural, and no portion of any antennas shall protrude beyond the branches. There should be no gaps in branch coverage.
- ix. Socks are mandatory for all antennas and associated components located on a faux tree. Sock design shall replicate the same visual appearance as the rest of the tree.

B. GUIDELINES FOR FACILITIES LOCATED WITHIN THE PUBLIC RIGHTS-OF-WAY

1. General Standards for Small Cells or Distributed Antenna Systems (DAS).

- a. All replacement or new poles must comply with all applicable City regulations and policies. The new or replacement poles must match design, height, color and material of the original or adjacent poles.
- b. All disturbed landscape shall be replaced in-kind and areas of bare or disturbed soil must be revegetated in accordance with City landscape requirements.
- c. All Attachments on utility poles must meet requirements in California Public Utilities General Order 95.
- d. Certain decorative light poles in Alameda are City-designated historic monuments and must be avoided. Traffic signal poles must also be avoided. These poles do not show as available poles in the online map view.
- e. Minimum height clearance regulations shall be observed by all components of the installation.
- f. Small cells and any associated antennas, accessory equipment or improvements shall not be located in any place or manner that would physically interfere with or impede access to any: (i) worker access to any above-ground or underground infrastructure for traffic control, streetlight or public transportation, including without limitation any curb control sign, parking meter, vehicular traffic sign, pedestrian traffic sign, barricade reflectors; (ii) access to any public transportation

vehicles, shelters, street furniture or other improvements at any public transportation stop; (iii) worker access to above-ground or underground infrastructure owned or operated by any public or private utility agency; (iv) fire hydrant or water valve; (v) access to any doors, gates, sidewalk doors, passage doors, stoops or other ingress and egress points to any building appurtenant to the rights-of-way; or (vi) access to any fire escape.

2. Additional Placement Requirements. In addition to all other applicable requirements, facilities within the public rights-of-way must:

- a. Be placed as close as possible to the property line between two parcels that abuts the public rights-of-way and, in residential zones, not be placed along residential frontage to the extent feasible.
- b. Not be placed within any sight distance triangles at any intersections;
- c. Not be placed in any location that obstructs view lines for traveling vehicles, bicycles and pedestrian;
- d. Not be placed in any location that obstructs views of any traffic signs or signals;
- e. Not be placed in any location that obstructs illumination patterns for existing streetlights;
- f. Be placed at least five feet away from any driveway or established pedestrian pathway between a residential structure and the public rights-of-way;
- g. Be placed at least 25 feet away from any driveways for police/sheriff's stations, fire stations or other emergency responder facilities.

3. Antennas.

- a. *Volume.* Each individual antenna associated with a single small cell shall not exceed three cubic feet.
- b. *Mounting Configuration.* Limit installation to one radome antenna at the top of the light standard with one equipment cabinet mounted directly on the pole. All antennas shall be concealed inside the radome with a diameter similar to the pole itself, but in no case should the radome be more than eighteen (18") inches in diameter. Notwithstanding the foregoing, antennas operating on high frequency bands may be flush-mounted to the pole and all mounting hardware and cabling must be concealed within a shroud.
- c. *Overall Height.* When mounted on street lights, the antennas/radome enclosures should be mounted above the light source, but the antenna/radome should extend

no higher than five (5) feet above the height of the existing pole.

- d. *Utility Pole Configuration.* On jointly owned public utility poles, the installation should occur in the communications space below the section of pole supporting Alameda Municipal Power overhead electric lines. Side-arm antennas must be shrouded and the shroud must cover the cross arm and any cables, jumpers, wires or other connectors between the vertical riser and the antenna.
- e. *Cabling.* All cabling between the antenna and the pole shall be concealed within a sleeve or shroud between the bottom of the antenna and the mounting bracket.

4. Accessory Equipment.

- a. *Volume.* The cumulative volume for all accessory equipment for a single small wireless facility or other infrastructure deployment shall not exceed: (A) nine cubic feet in residential areas, or (B) 17 cubic feet in nonresidential areas. The volume limits in this subsection do not apply to any undergrounded accessory equipment.
- b. *Installation Preferences.* Applicants are encouraged to install accessory equipment in accordance with the following preferences (i) internally within the pole or caisson to minimize external pole-mounted equipment (ii) in an underground vault; or (iii) in a single pole mounted equipment shroud.
- c. *Underground Equipment.* If installing the equipment internally within the pole or caisson is not feasible, equipment shall be placed underground when proposed in any (i) underground utility district; (ii) location where the utilities are primarily located underground or (iii) any location where the City finds substantial evidence that the additional above-ground accessory equipment would incommode the public's uses in the public rights-of-way. Notwithstanding the preceding sentence, the Director may grant an exception when the applicant demonstrates by clear and convincing evidence that compliance with this section would be technically infeasible.
- d. *Vaults.* All undergrounded accessory equipment must be installed in an environmentally controlled vault that is load-rated to meet the City's standards and specifications. Underground vaults located beneath a sidewalk must be constructed with a slip-resistant cover and properly secured to prevent unauthorized access. Vents for airflow shall be flush-to-grade when placed within the sidewalk and may not exceed two feet above grade when placed off the sidewalk. Vault lids shall not exhibit logos or commercial advertisements.
- e. *Ground-Mounted Equipment.* Above-ground cabinets not attached to a pole are prohibited, unless the applicant demonstrates by clear and convincing evidence that no other more preferred configuration as described in these guidelines would

be technically feasible. On collector roads and local roads, the City prefers ground-mounted accessory equipment to be concealed as follows: (i) within a landscaped parkway, median or similar location, behind or among new/existing landscape features and painted or wrapped in flat natural colors to blend with the landscape features; and (ii) if landscaping concealment is not technically feasible, disguised as other street furniture adjacent to the support structure, such as, for example, mailboxes, benches, trash cans and information kiosks. On arterial roads outside underground utility districts, proposed ground-mounted accessory equipment should be completely shrouded or placed in a cabinet substantially similar in appearance to existing ground-mounted accessory equipment cabinets.

- f. *Orientation.* Mount equipment cabinets directly behind any road signs located on a pole, if possible. Unless placed behind a street sign or some other concealment that dictates the equipment orientation on the pole, all pole-mounted accessory equipment should be oriented away from prominent views. In general, the proper orientation will likely be toward the street to reduce the overall profile when viewed from the nearest abutting properties. If orientation toward the street is not feasible, then the proper orientation will most likely be away from oncoming traffic. If more than one orientation would be technically feasible, the Director may select the most appropriate orientation.
- g. *Pole-Mounted Accessory Equipment.* Pole-mounted accessory equipment shall be mounted in a single cabinet or shroud and on the same side of the pole. If a long rectangular disconnect switch is used, rotate the enclosure so the elements can be stacked closer together on the pole. Utilize brackets that allow equipment to be mounted no more than 4" from the pole except for utility poles which must comply with California Public Utilities General Order 95 (2' from pole).
- h. *Horizontal Projection.* Pole-mounted accessory equipment shall not project: (i) more than 18 inches from the pole surface; (ii) over any roadway for vehicular travel; or (iii) over any abutting private property. All pole-mounted accessory equipment shall be mounted flush to the pole surface. If applicable laws preclude flush-mounted equipment, the separation gap between the pole and the accessory equipment shall be no greater than required for compliance with such laws and concealed by opaque material (such as cabinet "flaps" or "wings").

5. Utilities.

- a. *Electrical Service.* Electrical power must be arranged through a service agreement with the City's electric utility service provider Alameda Municipal Power. Service through AMP will be non-metered service.
- b. *Overhead Lines.* All utilities must be installed underground in underground utility districts or where utilities are primarily underground. In areas with existing

overhead lines, new communication lines shall be “overlashed” with existing communication lines to the extent feasible.

- c. *Vertical Cable Risers.* All cables, wires and other connectors must be routed through conduits within the pole or other support structure, and all conduit attachments, cables, wires and other connectors must be concealed from public view. All cables and conduit to and from a light standard must be routed from underneath the caisson. To the extent that cables, wires and other connectors cannot be routed through the pole, such as with wood utility poles, applicants shall route them through a single external conduit or shroud that has been finished to match the underlying pole.
- d. *Spools and Coils.* To reduce clutter and deter vandalism, excess fiber optic or coaxial cables shall not be spooled, coiled or otherwise stored on the pole outside equipment cabinets or shrouds.
- e. *Existing Conduit or Circuits.* To reduce unnecessary wear and tear on the public rights-of-way, applicants are encouraged to use existing conduits and/or electric circuits whenever available and technically feasible. Access to any conduit and/or circuits owned by the City or Alameda Municipal Power shall be subject to the owner’s prior written approval.