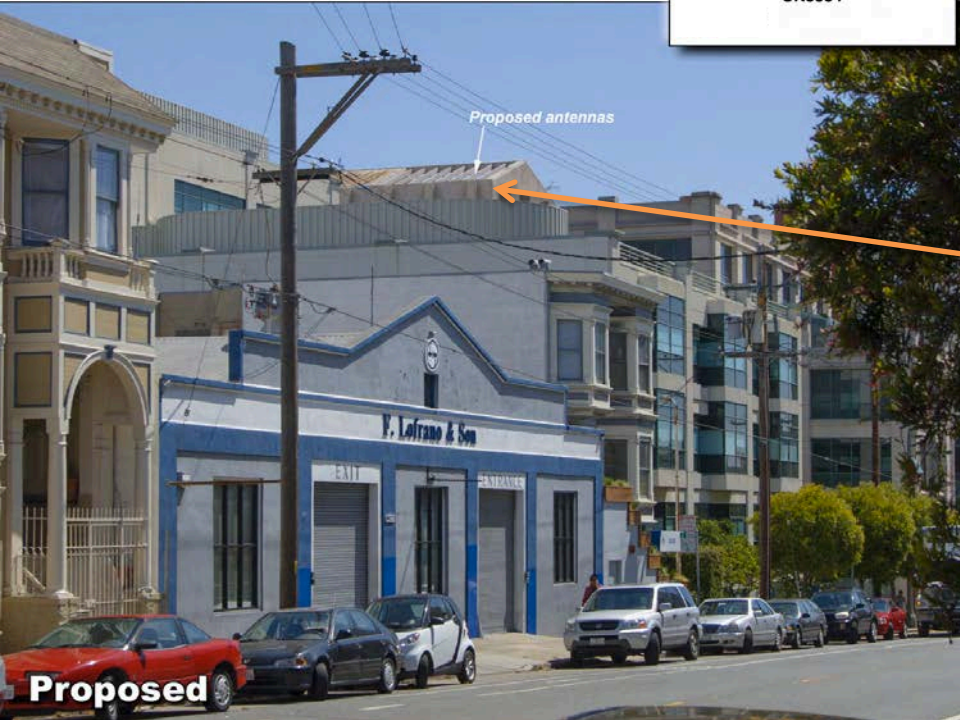


## Example Macro WTS Facility



Partially screened panel antennas attached to the face of an existing rooftop-penthouse, on a medical office building

Cable trays used to minimize visibility of cabling



## Example Macro WTS Facility Non-Screened Monopole

Multiple panel antennas for two wireless carriers +  
microwave dish

*Disfavored Design Built 1997  
Would no longer be recommend for approval for new  
facilities*



Existing



Example Macro  
WTS Facility

Screened Rooftop-Mounted  
Facility

Proposed



3 panel antennas in fake  
rooftop-mounted vent pipes,  
and equipment on roof (low-  
profile screen boxes) and in  
rear yard



## Example Macro WTS Facility (equipment area examples)

Equipment areas associated with a typical Macro (rooftop or monopole).

Cabinets feature computers and batteries (to power the facility in case of a power outage)

Equipment areas for Macro sites range in size from equivalent of 2 office cubicles to size of a shipping container.

Equipment areas placed on either rooftops, basements, inside buildings, or some rear yard areas.



Cable tray (power and communication cables)

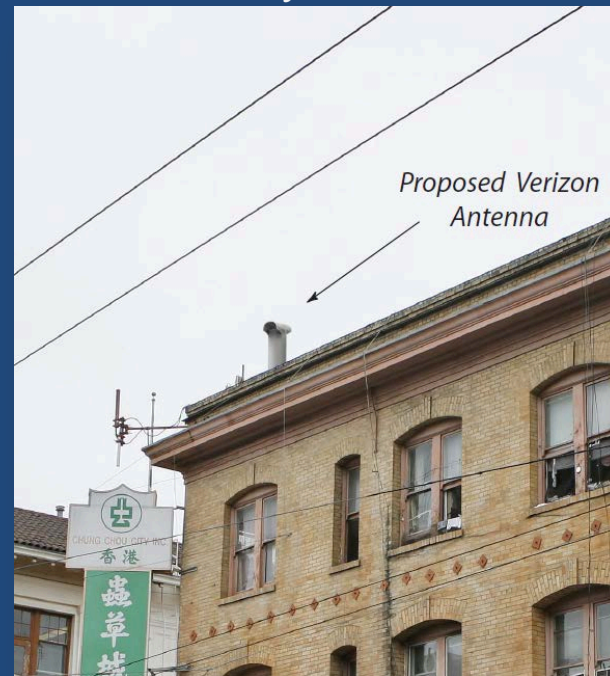


Existing



## Example Micro WTS Facility

Proposed Verizon Antenna



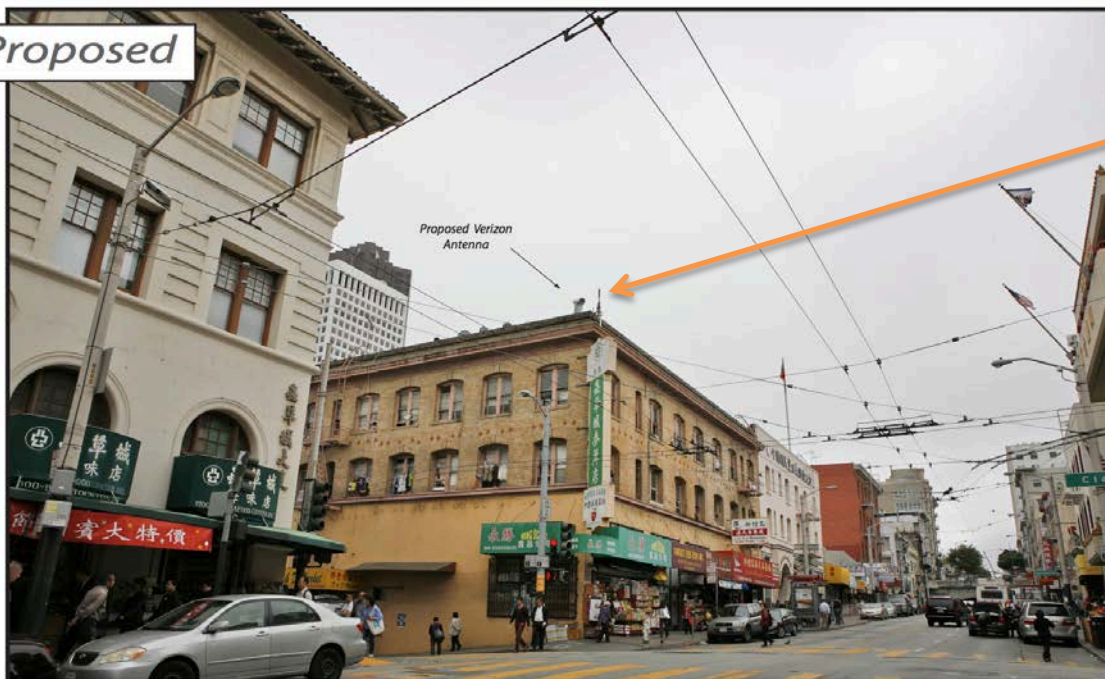
Single antenna in faux vent pipe on roof

Smaller equipment on roof and rear yard (equivalent to four suitcases and a dormitory-sized refrigerator), than the equipment used for a typical Macro WTS facility

Examples of Wireless Facilities Deployed by Commercial Carriers

Proposed

Proposed Verizon Antenna





## Example Micro WTS Facility

Dual Whip Antennas on facade  
(and equipment inside building)

Building located in the Pacific  
Avenue Neighborhood Commercial  
District (NCD)

*Disfavored Legacy Design –  
Would no longer be approved for  
new facilities, due to use of  
unscreened antennas on primary  
facades of buildings considered  
Potential or Known Historic  
Resources*



## Example Personal Wireless Services Facility

Three panel antennas, and large, noise-generating equipment (internal cooling fans) attached to an existing wooden utility pole (not owned by City)

### Disfavored Design (initial design)

State law partially limits City's review of wireless facilities on wooden poles (State Public Utilities Code 7901). Wooden poles are not owned by the City. [Information link](#).

A larger overall number of wireless facilities on multiple wooden poles are needed to provide similar coverage as a single rooftop-mounted Macro WTS facility

Wireless Facilities on Poles subject to [Article 25 of Public Works Code](#)



proposed antennas



## Example Personal Wireless Services Facility

Two panel antennas and equipment attached to an existing wooden utility pole (not owned by City)

### Disfavored Design

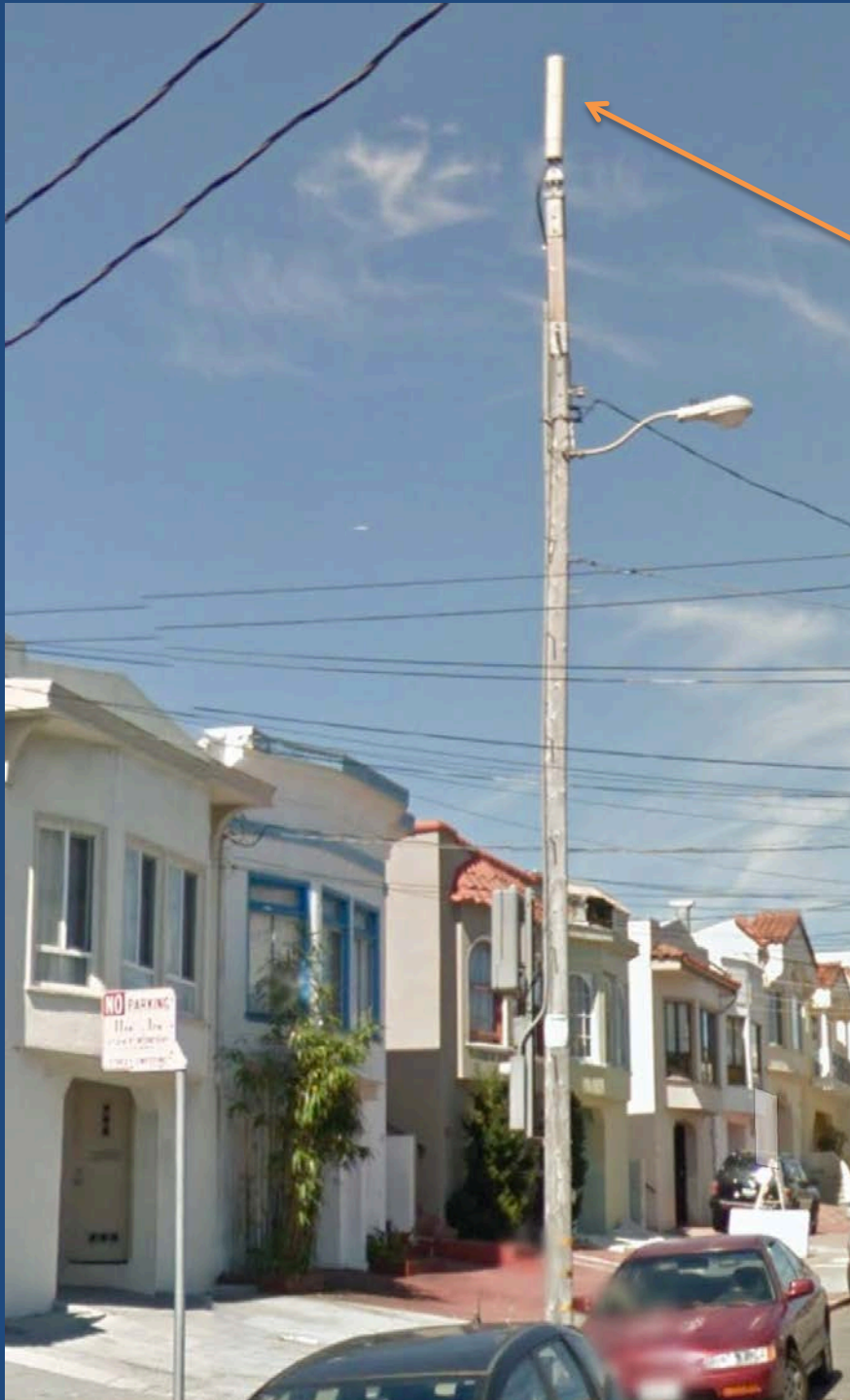
*(would not be recommended for approval for similar new facilities)*

*State law partially limits City's review of wireless facilities on wooden poles (State Public Utilities Code)*

*A larger overall number of wireless facilities on (multiple) poles are typically needed to provide similar coverage as a single rooftop-mounted Macro WTS facility.*

Wireless carriers often refer to these facilities as outdoor Distributed Antenna Systems or the acronym "oDAS"





## Example Personal Wireless Services Facility

Single radome antenna and equipment attached to an existing wooden utility pole (not owned by City)

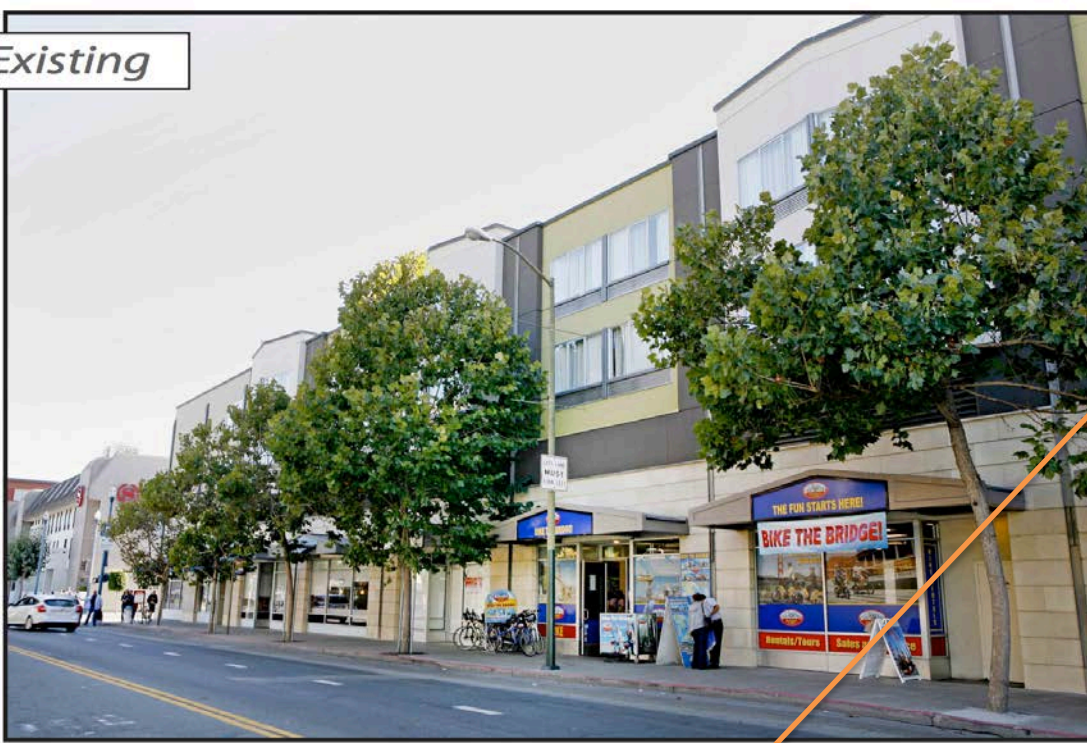
### Disfavored Design

*(though less intrusive than many other wireless facilities mounted on wooden poles)*

*State law partially limits City's review of wireless facilities on wooden poles (State Public Utilities Code)*

*Larger overall number of wireless facilities on multiple poles are typically needed to provide similar coverage as a single rooftop-mounted Macro WTS facility*

Existing



## Example Personal Wireless Services Facility

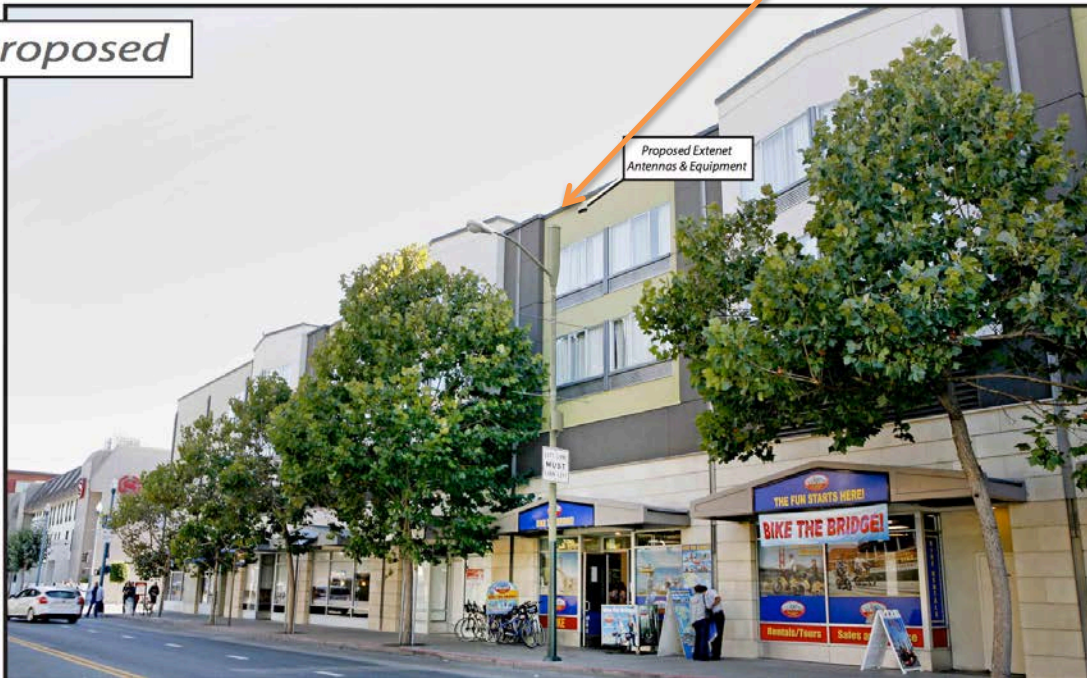
Single radome antenna, and equipment attached to an existing City owned steel light pole (*one of two equipment enclosures placed behind street signage*)

*Preferred Design - Considered less-intrusive compared to other facilities often proposed on poles along streets.*

*Equipment contains no cooling fans and do not generate noise*

*These proposed facilities use relatively low power antennas for high speed data coverage in areas such as North Beach, Downtown and SOMA*

Proposed





Existing



Proposed



## Example Personal Wireless Services Facility

Single radome antenna, and equipment attached to an existing City owned steel light pole (*one of two equipment enclosures placed behind street signage*)

*Preferred Design - Considered less-intrusive compared to other facilities often proposed on poles along streets.*

*Equipment contains no cooling fans and do not generate noise*

*These proposed facilities use relatively low power antennas for high speed data coverage in areas such as North Beach, Downtown and SOMA*

## Example Personal Wireless Services Facility



*Existing transit pole on the left and a proposed Small Cell (on Columbus Avenue) on the right. The Italian flag tri-colors painted on the existing pole (below sign) would be retained.*

Single radome antenna, and equipment attached to an existing City-owned steel transit (MUNI) pole (*one of two equipment enclosures placed behind street signage*)

*Preferred Design - Considered less-intrusive compared to other facilities often proposed on wood poles along streets.*

*Equipment contains no cooling fans and do not generate noise*

*These proposed facilities use relatively low power antennas for high speed data coverage in areas such as North Beach, Downtown and SOMA*

Additional examples (for steel light & transit poles) available at [sf-planning.org/wireless](http://sf-planning.org/wireless)





*Small (palm-sized) antenna attached to office ceiling*

*Interior-mounted iDAS antennas are not typically subject to Planning review; however the rooftop-mounted antennas connecting these facilities is subject to Planning review. Interior iDAS antennas may require review in certain historic buildings.*

*Some iDAS systems also extend public safety radio coverage into buildings and parking structures. This allows handheld police and fire radios to function more effectively inside, since building walls or parking structures may block signals.*

## Example **Internal Distributed Antenna Systems (iDAS)**

Typically a single rooftop-mounted antenna (or *underground fiber-optic connection to building*) connected to a large number of small antennas (photo example) on the ceilings of each floor of a high-rise office, hotel, or convention center.

Many new buildings feature energy efficient glass (“low-e”) which degrades/blocks wireless signals from outside wireless facilities.

iDAS is often used to address indoor mobile data capacity for a large numbers of mobile device users

Existing

Existing Sprint  
Installation

## Example Modification (antenna swap and screening change) to a Macro WTS Facility

Smaller antennas within a single radome on the roof replaced with 3 larger antennas inside a faux (fake) stairwell penthouse

*A separate building in background features unscreened panel antennas for another wireless carrier*

The faux stairwell penthouse is made of fibre-reinforced plastic (FRP) which is textured and painted to match elements such as wood, metal, or stucco.

Proposed

Proposed Sprint  
Installation

FRP material allows radio signals to transmit through, but without blocking the radio signal.





*There are over 1,033 existing commercial Micro, Macro, and Personal Wireless Services (also known as “oDAS” or Small Cell) facilities in San Francisco*

*For a detailed map visit the [Planning Department Map Library](#), then choose “Wireless Telecommunications Services Facilities”*