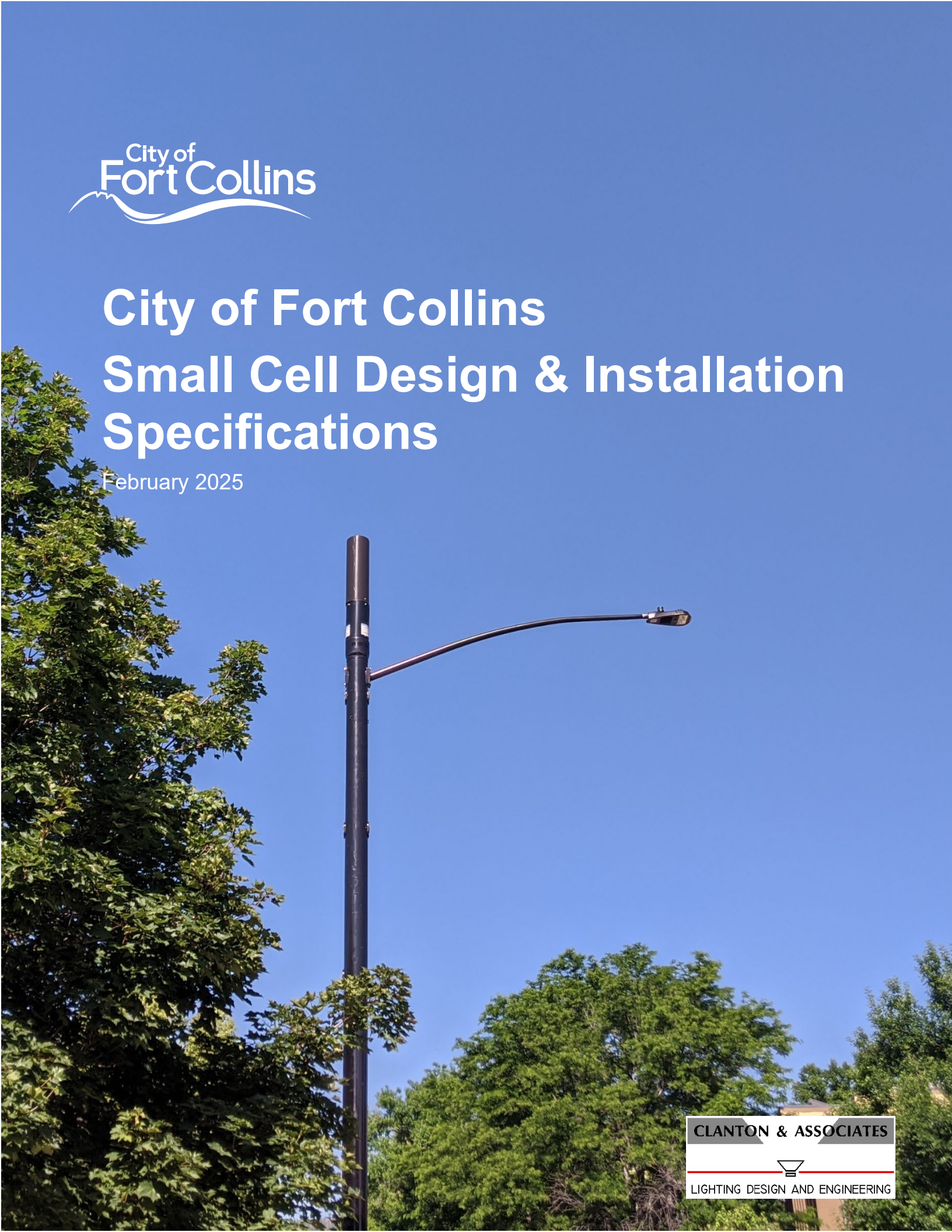
City of Fort Collins
Small Cell Design & Installation Specifications

February 2025



CLANTON & ASSOCIATES

LIGHTING DESIGN AND ENGINEERING

This Document

This document was created to provide a centralized resource for the City of Fort Collins standards and specifications that relate to small cell deployment in the public right-of-way.

The City of Fort Collins intends this manual to provide a forum for common understanding of the standards and the reasons behind them. It is an open invitation: The City welcomes suggestions, comments, questions, and concerns on these matters, and expects to update and change the manual as appropriate. To share your thoughts, start by contacting the Engineering Service Department at smallcell@fcgov.com.

Important Contacts

Building Services

- Address: 281 N. College Ave., Fort Collins, CO 80524
- Phone: 970-416-2740

Colorado 811

- Address: 16361 Table Mountain Pkwy., Golden, CO 80403
- Phone: 303-232-1991

Engineering

- Address: 281 N. College Ave., Fort Collins, CO 80524
- Phone: 970-221-6605

Light & Power

- Address: 222 Laporte Ave., Fort Collins, CO 80524
- Emergency Contact: 970-221-6710

Planning Services

- Address: 281 N. College., Fort Collins, CO 80524
- Phone: 970-221-6760

Water, Wastewater, Stormwater Emergency Contact

- Phone: 970-221-6700

Important Documents

Below are important documents referred to in this specification. Please refer to Appendix A for links to find the most up to date documents.

City of Fort Collins Documents
Contractor License Application
Electric Service Worksheet
Larimer County Urban Area Street Standards
Municipal Code Chapter 23
Electric Service Standards
Schedule of Rates, Charges, and Fees
Small Cell Permit

Table of Contents

Section 1. Introduction 3
Section 2. Definitions 4
Section 3. Notice Requirements 8
Section 4. Small Cell Placement Criteria 10
Section 4.1. Small Cell Facility Location Hierarchy 10
Section 4.2. Placement Within the Public Right-of-Way 10
Section 4.3. Poles near Historic Buildings or in Historic Districts 14
Section 5. Utility Clearances 16
Section 5.1. City of Fort Collins Utility Location Requirements 16
Section 5.2. Water Utilities 17
Section 5.3. Street Tree and Canopy Cover Protection 19
Section 5.4. Small Cell Facility Undergrounding 20
Section 5.5. Small Cell Facility Conduit 21
Section 6. Design Requirements 22
Section 6.1. Pre-application Checklist 22
Section 6.2. Site Electric Standards 22
Section 6.3. Electric Metering 23
Section 7. Radio Frequency Compliance Report 25
Section 8. Small Cell Assembly Aesthetic Requirements 26
Section 8.1. Standard Small Cell Requirements 26
Section 8.2. Collocated Small Cell Aesthetics 27
Section 8.3. Third Party Pole Attachments 28
Section 8.4. Traffic Signal Mounted Small Cells 29
Section 8.5. Freestanding Small Cell Pole 31
Appendix A. Links A-1
Appendix B. Variance Document B-1
Appendix C. General Notes C-1
Appendix D. Details SC-01

Section 1. Introduction

All small cell ("wireless") facilities, as defined by U.S.C 332(c)(7) and 1455 and the *Colorado Revised Statutes Title 29 and* within the City of Fort Collins public rights-of-way, shall meet or exceed the following standards and specifications:

All City of Fort Collins department-specific specifications; as defined within this document or as published by the City of Fort Collins or Larimer County;

- City Charter;
- City of Fort Collins Municipal Code, Chapter 23, Article 7; and
- City of Fort Collins Small Cell Master License Agreement.

The City of Fort Collins reserves the right to approve deviations of standards on a case-by-case basis. A deviation of standard will be processed in accordance with the procedures and policies established by the City and/or each respective department.

The purpose and intent of these standards is to establish a cohesive aesthetic small cell facility ("small cell") appearance, while protecting the community's visual quality, and public health, safety and general welfare, particularly in and near residences.

Section 2. Definitions

AASHTO — Shall mean the American Association of State Highway and Transportation Officials.

Antenna — Communication equipment that transmits or receives electromagnetic radio frequency signals used to provide wireless service.

Applicant — Or permittee shall mean a natural person or persons, partnership, company, corporation, or other legal entity who files an application for and/or receives a small cell wireless facility permit.

Base Flood — Referred to as the one-hundred year flood shall mean the flood having a one-percent chance of being equaled or exceeded in any given year, whether designated as such by FEMA or by the Utilities Executive Director in the manner provided City of Fort Collins Municipal Code Chapter 10.

Base Flood Elevation (BFE) — Shall refer to the elevation for which there is a one-percent chance in any given year that flood levels will equal or exceed it.

Cantenna — Refers to the antenna and all necessary equipment contained within a cylindrical shroud mounted on the small cell wireless facility infrastructure.

City — Refers to the City of Fort Collins.

Clear Zone — The total roadside border area, starting at the edge of the traveled way, available for safe use by errant vehicles. This area may consist of a shoulder, a recoverable slope, a non-recoverable slope, and/or a clear run-out area. The desired minimum width is dependent upon traffic volumes and speeds and on the roadside geometry. Simply stated, it is an unobstructed, relatively flat area beyond the edge of the traveled way that allows a driver to stop safely or regain control of a vehicle that leaves the traveled way.

Cold Sequence Disconnect — A meter disconnect that is installed on the utility side of the electric meter.

Collocated	—	Refers to joined use of any existing or new structure for small cell facility and any other use, e.g., streetlight pole or traffic signal mast arm.
Conceal/Concealment	—	Refers to design techniques and standards described in City of Fort Collins Municipal Code Sec. 23-176(C).
Critical Root Zone (CRZ)	—	Refers to trees; it is the distance from the trunk that equals one foot for every inch of the tree's diameter.
Dripline	—	Refers to trees; it is the area defined by the outer edge (circumference) of the tree canopy.
FCC	—	The Federal Communications Commission.
FCU Engineer	—	Fort Collins Utilities Engineer.
Hardscape Area	—	Generally, refers to areas that are constructed of brick, stone, concrete, wood, and metal.
High Pressure Gas Line	—	A part of the gas line operating system which operates at a higher pressure, 200 pounds to 1,500 pounds per square inch, than the standard service pressure delivered to the customer; thus, a pressure regulator is required on each service to control pressure delivered to the customer.
Historic Resource	—	A building, site, structure, or object that is located on a lot, lots, or area of property and is (1) designated as a Fort Collins landmark or is contributing to a Fort Collins landmark district; (2) designated on the Colorado State Register of Historic Properties, either individually or contributing to a district, or the National Register of Historic Places, either individually or contributing to a district; or (3) determined to be eligible for designation as a Fort Collins landmark either through a binding or non-binding determination pursuant to Land Use Code Section 5.8.1(D).

Landscaping — Any combination of living plants such as trees, shrubs, plants, vegetative ground cover or turf grasses, and may include structural features such as walkways, fences, benches, works of art, reflective pools, fountains or the like. Landscaping shall also include irrigation systems, mulches, topsoil use, soil preparation, revegetation or the preservation, protection and replacement of existing trees.

Low Pressure Gas Line — A line in which gas pressure in the mains and service lines is substantially the same as that delivered to the customers' appliances and can range from ¼ pound to 200 pounds of pressure; ordinarily a pressure regulator is not required on individual service lines.

Master License Agreement (MLA) — A written agreement between the City and an applicant in which is set forth specific terms and conditions for the use of City-owned infrastructure in connection with the operation of a wireless network.

NEMA — Refers to the National Electrical Manufacturers Association.

Planting Site — A location identified by City Forestry to be reserved for a future street tree.

Point of Delivery — the Point of Delivery, also referred to as 'Point of Connection', is a point beyond which the customer is responsible for installation, maintenance and field locating of electrical equipment. For commercial and industrial service applications, the point of connection is the secondary lugs or spades of the distribution transformer, or, if existing, it is the nearest junction box/vault installed by Utilities serving the load at issue.

Provider — Refers to the entity that wishes to provide service from the small cell wireless infrastructure.

Public Right-of-Way (ROW) — The surface of and the space above and below the public roads, streets and alley right-of-way, and public utility easements or other public ways of any type whatsoever, now or hereafter located and existing within the city limits of Fort Collins, Colorado, and as otherwise defined at§ 38-5.5-102, C.R.S.

Public Highway — A main road or thoroughfare, such as a street, boulevard, or parkway, available to the public for use for travel or transportation.

Small Cell Wireless Facility — A compact wireless communication facility where each antenna, including exposed elements, is located inside an area of no more than three (3) cubic feet in volume, irrespective of whether enclosed; and primary equipment enclosures are not larger than seventeen (17) cubic feet in volume. The following associated equipment may be located outside the primary equipment enclosure and, if so located, is not included in the calculation of equipment volume: electric meter, concealment, telecommunications demarcation box, ground-based enclosure, back-up power systems, grounding equipment, power transfer switch and cut-off switch. All associated equipment, even if located outside the primary equipment enclosure, shall be included within the definition of small cell facility.

Standalone (Freestanding) Pole — A small-cell facility that is not joined with a streetlight pole. Also commonly referred to as a freestanding pole.

Softscape Area — Generally, refers to areas that are constructed of soil and landscaping.

Test hole — Also referred to as potholes, test holes are excavations with hand tools or non-destructive tools (such as hydro excavation) and are intended to confirm the exact position and depth of underground pipes, cables, or other structures.

Section 3. Notice Requirements

Adjacent Property Owner Notices

The applicant must provide advance notice to all property owners adjacent to construction work in public rights-of-way. "Construction work" includes excavation, boring, assembly, rehabilitation, renovation, remodeling or improvement of any structure or facility in the Public Highway or adjacent to a sidewalk beside the Public Highway, including associated landscaping, parking, equipment, or furnishings for such work.

- At least fifteen (15) calendar days before commencement of any work in the Public Highway, within 175 linear feet of the small cell facility.
- If private trees are located within 40 feet of the pole location, the applicant shall notify adjacent property owners of potential impact at least fifteen calendar days before commencement of any work in the Public Highway.
- Provide notice to Transfort at least fifteen (15) calendar days before commencement of any work that will impact Transfort Bus Stops to allow appropriate detour planning, if necessary.
- At least seventy-two (72) hours before commencement of any work in the Public Highway the owner and use permittee must:
    - Deliver a notice to each address in the area of the activity and within 175 linear feet of the small cell facility.

Information Required for Notice

The notices required shall include the name, telephone number, and address of the owner and use permittee, a description of the work to be performed, the duration of the work, and the name, address, and telephone number of a person who will provide information to and receive comments from any member of the public concerning the work.

Posted Sign

Posted notice located at the beginning and end points of construction activity are required at least seventy-two (72) hours before any work takes place and must be in the following format and size:

- 12 square foot ground-mounted sign that can be secured or anchored to the ground in which it stands.
- The sign must include 25 copies of the mailed notice (example below) or substantially similar flyer that provides the name, telephone number, and address of the owner and use permittee, a description of the work to be performed, the duration of the work, and the name, address, and telephone number of a person who will provide information to and receive comments from any member of the public concerning the work.

Figure 1: Example of required posted signage

Section 4. Small Cell Placement Criteria

Section 4.1. Small Cell Facility Location Hierarchy

Locations shall be selected per City of Fort Collins Municipal Code, Section 23-174 *Location Standards.* The City has the following tiered preferences when evaluating small cell facility locations, with '1' being the most preferable. Please note that a small cell permit will be rejected if a preferred, higher tier location is available within two hundred (200) feet radially of the proposed location.

Tier 1: Replace an existing streetlight pole and install a new collocated streetlight and small cell pole.

Tier 2: Replace an existing third-party pole and install a new combination pole that includes both the small cell and third-party equipment. This may include, but is not limited to, privately controlled cable or telecommunication company facilities.

Tier 3: Replace an existing traffic signal pole with a new small cell mounted on the new traffic signal pole.

Tier 4: Install a new freestanding small cell pole.

To the maximum extent feasible, small cell facilities must be located on main corridors and arterials, and not on local streets. If proposed on residential street, an application must include a propagation map to ensure the location is needed for network operations. Refer to the Master Street Plan for the roadway classifications.

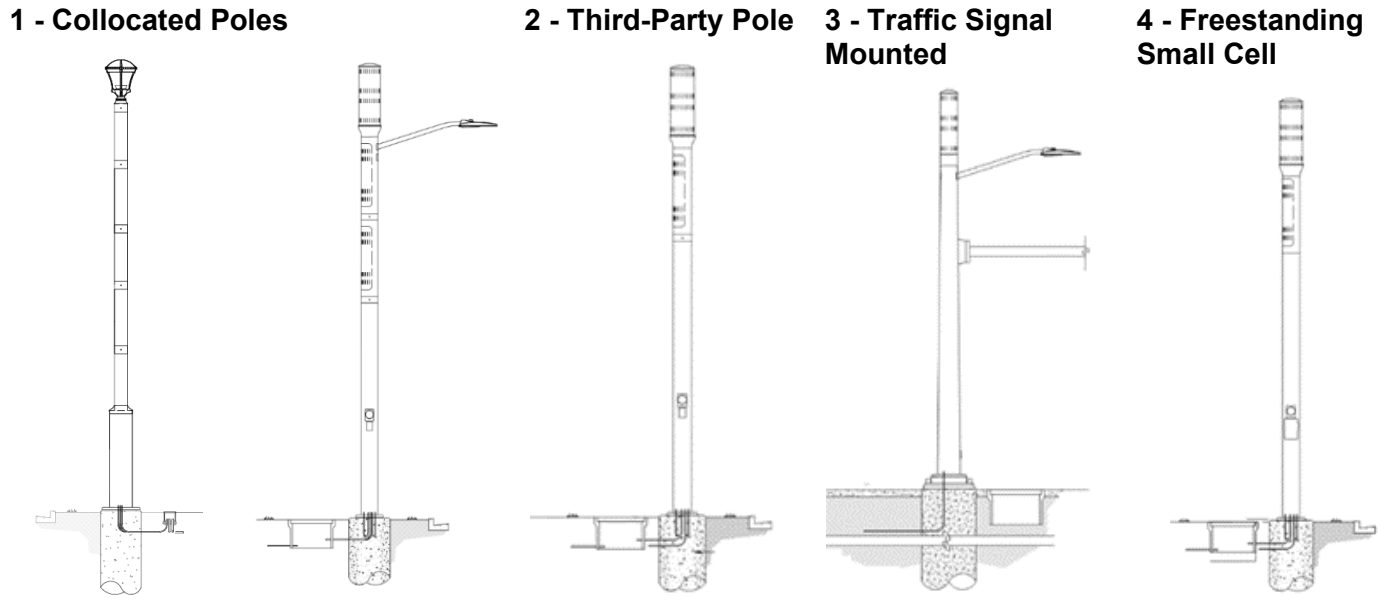


Figure 2: From left to right: SC-08, SC-03, SC-04, SC-05, and SC-06. See Appendix D for details.

Section 4.2. Placement Within the Public Right-of-Way

All small cell equipment located within the public right-of-way shall be accepted by the City of Fort Collins prior to the permit application for installation. All small cell poles and other underground equipment shall be located per the following:

- Equipment installations demonstrate compliance with all requirements of the Americans with Disabilities Act (ADA), specifically, that the equipment shall not impede, obstruct, or hinder the usual pedestrian or vehicular travel within the public rights-of-way.
- Any new freestanding facilities shall be located outside of the "clear zone" as defined by the current edition of *AASHTO Roadside Design Guide*. Equipment located behind a curb shall be installed no closer than two feet behind the back edge of curb. Equipment located adjacent to a roadway without curb shall be located outside of any clear zone or 10 feet away from the edge of travel way, whichever is the furthest.
- Any new freestanding small cell facilities must demonstrate compliance with sight triangles per AASHTO and the Larimer County Urban Area Street Standards.

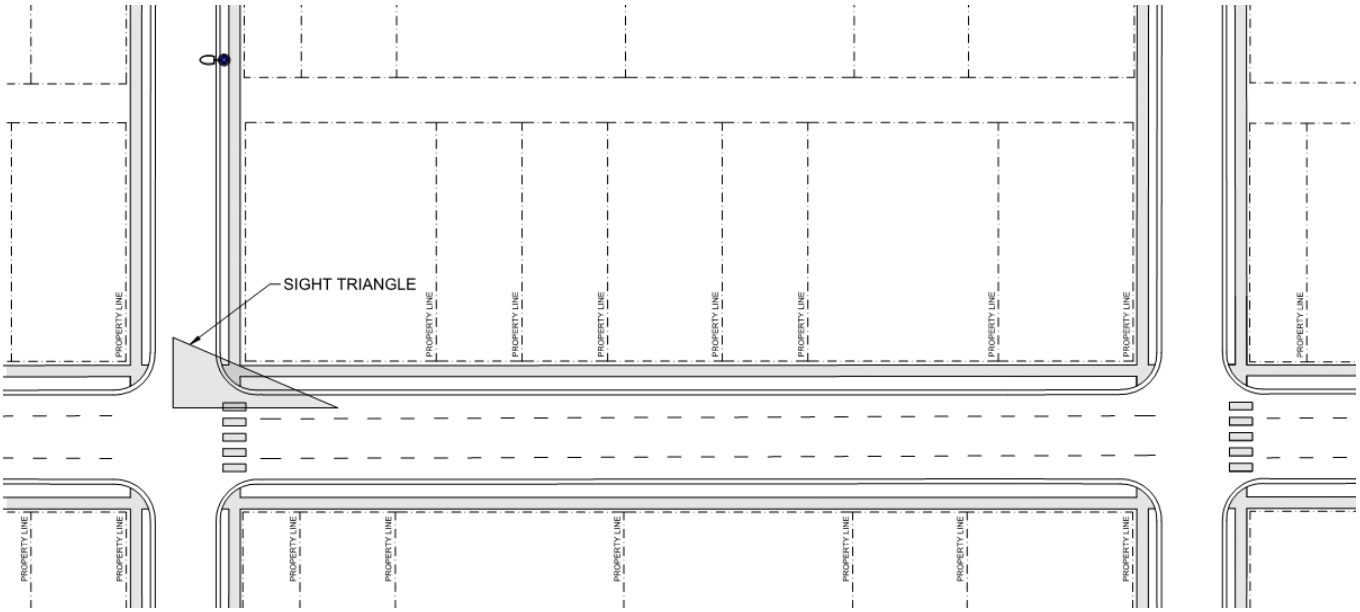


Figure 3: Example sight triangle

- Installations shall not impact any existing structural equipment such as, but not limited to, bridges, retaining walls, underpasses, or pedestrian tunnels.
- To the maximum extent feasible, small cell facilities must be in alignment with the existing trees, utilities, streetlights, and other streetscape equipment within the parkway/amenity zone. Small cell facilities must not impede access to or line of sight vision of bus stops.
- Small cell facilities shall be in alignment with property lines unless the new small cell equipment is replacing an existing pole.
- Small cell installations shall not be closer than 150 radial feet to an approved or existing freestanding small cell location. Refer to the City of Fort Collins Small Cell Locate Site for existing and approved freestanding small cell locations.

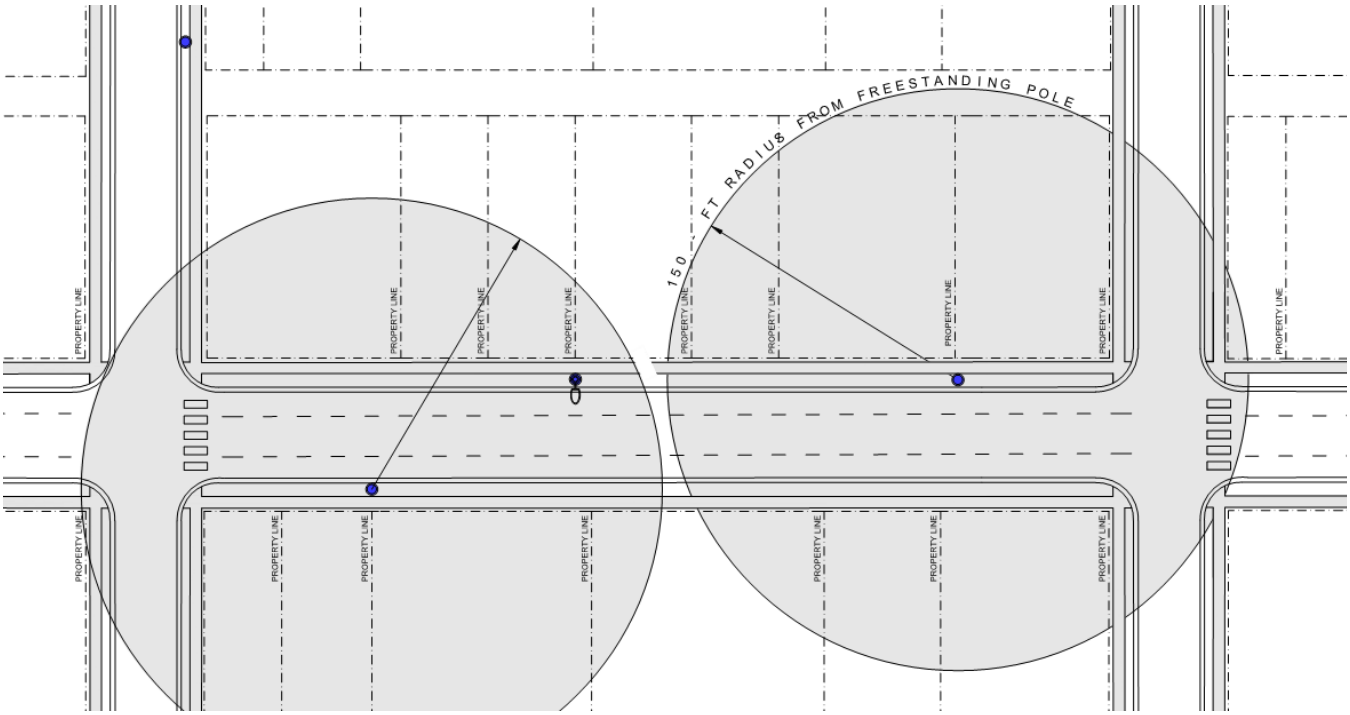


Figure 4: Radius of freestanding small cells aligned with property line

- Freestanding Small Cell Facilities (Tier 4): If proposing a freestanding facility, there must be no other facilities within 600 feet of the proposed location. Refer to the City of Fort Collins Small Cell Locate Site for existing and approved freestanding small cell locations.
- If within a floodplain, small cell equipment shall be elevated above Base Flood Elevation (BFE) or floodproofed (NEMA Enclosure). Refer to the City of Fort Collins Floodplain Map for more information.
- Floodplain linework should be shown on site plans as applicable. Base Flood Elevations for poles within the floodplain/floodway should be shown on plan profile.
- New poles within a City or FEMA floodplain must comply with the safety regulations of Chapter 10 of the City Municipal Code. The applicant shall obtain a Floodplain Use permit from the City of Fort Collins and pay all applicable floodplain use permit fees prior to commencing any construction activity.
- New poles within a FEMA regulatory floodway or any work impacting ground surface in a City regulatory floodway must be preceded by a No-Rise Certification, which must be prepared by a professional engineer licensed in the State of Colorado.
- Outdoor storage associated with nonresidential use, whether temporary or permanent, is prohibited in City and/or FEMA floodways.
- Base Flood Elevation (BFE), floodplain boundaries, and the following note must be on plans: “Small cell equipment shall be elevated above Base Flood Elevation (BFE) or floodproofed via a NEMA enclosure.”
- Consider corridor plans and subarea plans in cases where future improvements would require the relocation of small cell infrastructure.

- Streetlight poles often have traffic or street signs and other infrastructure attached to them. It is expected that a structural analysis submitted for all sites take into account a worst-case set of attachments into account. The worst-case attachment in Fort Collins' system includes:

  - Stop sign - 36" x 36"
  - Street name signs - 2 @ 12" x 58"
  - No outlet sign - 8" x 36"
  - All-way sign - 6" x 12"
  - Luminaire – 1 @ 12" x 24" x 4"
  - Mast Arm – 1 mast arm only
  - Metering System attachments
    - Gatekeeper
    - Media converter
    - Tropos mesh network radio

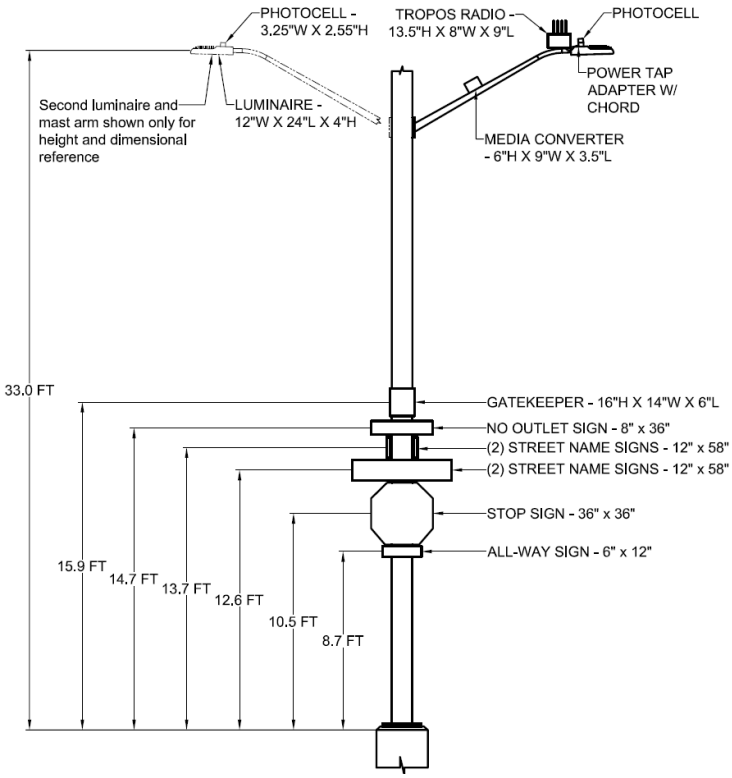


Figure 5.

Please Contact Electric Standards Engineering (standardsengineering@fcgov.com) for more information on these attachments.

If structural analysis determines that the additional infrastructure exceeds the allowable amount, the traffic signs can be moved to a standalone signpost. The placement must meet current LCUASS/MUTCD standards.

Placement of small cell facilities is also subject to the requirements contained in the remaining sections of this standards and specifications document, and all requirements of the Fort Collins City Code and Land Use Code.

Section 4.3. Poles near Historic Buildings or in Historic Districts

Collocated Poles: For proposed installations that replace existing streetlight poles or other existing municipally owned structures, or that collocate with new streetlight poles or other municipally owned structures, historic preservation review will be limited to direct effects, usually archaeological, as a result of excavating the new tower and equipment box. Indirect effects from visual intrusion of the tower will be considered mitigated through the co-location of the facility on municipal infrastructure.

New freestanding poles (Tier 4):

New freestanding poles shall be subject to restrictions in a Master License Agreement and, to the maximum extent feasible, as defined in the City's Land Use Code.

1. For any new freestanding pole, Historic Preservation staff will identify if any property/building over fifty years of age requires historic survey, or is an Historic Resource (officially designated by City, state, and/or federal programs(s), or officially determined eligible for such designation(s)). If new historic survey is required, this will be coordinated by Preservation staff at the applicant's expense. Typically, historic survey will only be required where a new freestanding pole may obstruct important views to an Historic Resource.
2. If Preservation staff identifies an Historic Resource within 200 feet of the proposed installation for which the installation may pose an adverse effect (such as blocking or obscuring important views into the historic property, or obstruction of important features), the applicant must provide a review of at least one alternative location that resolves the adverse effect.
3. Applicants can assess if there are any known Historic Resources within 200 feet of a proposed new freestanding pole site by using the Historic Resources Planning Map. This map application includes a buffering tool, and it can be found online here. To use the buffering tool on the Historic Resources Planning Map, select the point icon in the menu on the left side of the screen, and make sure the buffer distance is set to 200 feet. Navigate on the map to the location of the proposed new freestanding pole site, then click on the map to place a point at the proposed location. The buffer will appear. In the left menu, select the down-pointing arrow icon next to the result labeled "Fort Collins Historic Resource Survey" to highlight all applicable properties within the buffer. In the same result area, click the up-pointing arrow icon to download a spreadsheet of all the applicable properties in the buffer. Both properties that are designated as historic and properties that are eligible for designation are considered Historic Resources. If there is not valid survey data available for a property for which a proposed installation may pose an adverse effect, historic survey may be required.

Figure 6: Historic property map example. The red arrows indicate features of the buffering tool, including the point selection icon, the download results icon, and the expand/highlight results icon.

Archaeology:

When excavating footings for collocated or new poles, any discoveries of subsurface historic/prehistoric resources will be reported to the City's Historic Preservation staff immediately (preservation@fcgov.com; 970-224-6078), and all construction activity on the site shall cease immediately. At the applicant's expense, a professional archeologist shall determine the importance of the findings, and if determined to be significant, shall monitor the excavation. Professional archaeological monitoring with modified excavation (i.e., not using hydrovac) may be required in cases where locations/collocations are in proximity to known areas of archaeological interest, such as certain downtown areas, and sites within 200 feet of waterways due to subsurface soil behavior.

Historic Survey & Records:

Historic Preservation staff will provide applicants with access to existing records, including GIS and archival survey records, upon request. Where a new pole is proposed and historic survey has been required by City staff, as provided for in Land Use Code Section 5.8.1, the cost of such survey will be subject to the City's existing historic survey fees and will be paid by the applicant. City Preservation staff are responsible for assigning the historic survey to a third-party specialist, certifying the results, and transmitting those results to the applicant. Per Article II, Section 14-23 of the Municipal Code, any determination made by staff regarding eligibility may be appealed to the Historic Preservation Commission by the applicant, any resident of the City, or owner of property in the City. Such appeal shall be set forth in writing and filed with the Director within fourteen (14) days of the date of the staff's determination.

Section 5. Utility Clearances

All new small cell equipment necessary for a complete, working installation shall meet the minimum depth and distance requirements from subsurface utilities established in National Electric Safety Code (NESC), the Larimer County Urban Area Street Standards, and the Fort Collins Utilities Light and Power Electrical Service Standards. Examples of standard clearances can be found in Table 1: Standard Utility Clearances, below.

Table 1: Standard Utility Clearances

	Sanitary Sewage and Storm Sewer Facilities	Gas Regulation Stations	High Pressure Gas Lines	Intermediate Pressure Gas Lines	Local Gas Utility*
Horizontal Clearance	10 Feet	20 Feet	10 Feet	5 Feet	5 Feet
Vertical Clearance	All boring crossings shall have a clearance of 18 inches above and 24 inches below pipe.				5 Feet

* Local gas utility requirements shall be subject to changes by the utility company and must be confirmed by the applicant prior to construction.

Section 5.1. City of Fort Collins Utility Location Requirements

Before construction of any dry utilities within the boundary of the City of Fort Collins, all utilities infrastructure including electric, water, wastewater and stormwater must be located. Figure 7 shows an example of the existing wet and dry utilities that may be located within the cross section of a single intersection or block. The exposure and restoration of test holes and other excavation must observe the following general and utility specific requirements.

Figure 7: Example of existing dry and wet utilities within an intersection

General Test Hole / Excavation Restoration Requirements

Hardscape Areas: generally, refers to areas that are constructed of brick, stone, concrete, wood, and metal.

When test holing the exposed Utility should be covered with a minimum of 12 inches to a maximum of 18 inches of bedding material, flow filled shall be installed from the previous elevation to the top of hardscape subgrade, capped with asphalt or concrete, and sealed to be watertight per Engineering Right of Way Excavation permit standards.

Softscape Areas: generally, refers to areas that are constructed of soil and landscaping.

The exposed Utility shall be covered with a minimum of 12 inches to a maximum of 18 inches of bedding material, and then native soil. Some softscape areas may require the same restoration as hardscape areas dependent on their location and relationship to nearby to hardscape areas.

Separation from Other Utilities

Horizontal: Dry utilities including natural gas, electric, cable television, telephone, communication, etc. running parallel to public water, wastewater, stormwater mains or related appurtenance shall be no closer than 10 feet.

Vertical: All crossings shall be clearly identified and dimensioned on the utility plans in both plan and profile views. All crossings must have a minimum of 18 inches vertical clearance above and 24 inches vertical clearance below the wet Utility system while maintaining the minimum depth of cover required by current Fort Collins Design and Construction standards for the bored Utility.

Crossings: All crossings, to the extent reasonably feasible, shall be made perpendicular (90-degree angle) to all wet utility mains, laterals, and services. No long horizontal angle crossings are allowed.

Section 5.2. Water Utilities

Water System

- STANDBY IS REQUIRED ON 16 INCHES AND LARGER WATER MAINS. All standbys are required to be scheduled 48 hours in advance of work by contacting the City of Fort Collins Utility Services. For a quick reference guide or more information about Utility standards visit www.fcgov.com/development-forms.
- TEST HOLE REQUIRED ON ALL WATER MAINS AND SERVICES unless exempted. Measuring the depth of a water valve does not constitute an actual test hole of the Utility.
- Dry utilities in the vicinity of Water Utility curb stops require a six-foot separation in all directions from the dry utility to the center of curb stop.
- A bituminous (rubberized) coating is required on all metallic water mains that have been located and exposed due to test holing efforts. Located and exposed mains must be covered with a minimum of 12 inches to a maximum of 18 inches of 3/8 angular bedding.

Wastewater System

- STANDBY IS REQUIRED ON 18 INCHES AND LARGER SEWER MAINS. All standbys are required to be scheduled 48 hours in advance of work by contacting the City of Fort Collins Utility Services. For a quick reference guide or more information about Utility standards visit www.fcgov.com/development-forms.

- TEST HOLE REQUIRED ON ALL WASTEWATER MAINS AND SERVICES unless exempted. Measuring the depth of a manhole does not constitute an actual test hole of the Utility.
- Exposed wastewater mains must be covered with a minimum of 12 inches to a maximum of 18 inches of 3/4 angular bedding.

Stormwater System

- STANDBY IS REQUIRED ON 24 INCHES AND LARGER STORM WATER MAINS. All standbys are required to be scheduled 48 hours in advance of work by contacting the City of Fort Collins Utility Services. For a quick reference guide or more information about Utility standards visit www.fcgov.com/development-forms.
- TEST HOLE REQUIRED ON ALL STORMWATER MAINS AND SERVICES unless exempted. Measuring the depth of a manhole, inlet structure, etc. does not constitute an actual test hole of the Utility.
- Exposed stormwater infrastructure must be covered with a minimum of 12 inches to a maximum of 18 inches of 3/4 angular bedding.

Water Utility Exceptions

In certain situations, there may be some flexibility to these requirements; however, this is an exception to the normal requirement and will only be allowed with the approval of the City of Fort Collins Utilities - Water Utilities Engineer (FCU Engineer) and the corresponding engineering official for any non-City owned community utility facilities, e.g., Fort Collins-Loveland Water District or South Fort Collins Wastewater District.

If a conflict between mains and services, other utilities, and other departments within the City is identified during construction, the Contractor shall contact the FCU Engineer to interpret these specifications or to determine if the standards of other utilities or departments apply.

Field changes from the approved plans shall not be permitted without prior written permission from the FCU Engineer, at smallcell@fcgov.com.

Water Emergencies

For all water emergencies call 970-221-6700, 24-hours a day. Call to report flooding, water main breaks, sewer line problems, water taste or odor, blocked storm drains, spills or dumping down storm drains. Call 911 to report illegal dumping or spills that are potentially life threatening or hazardous to the environment.

Section 5.3. Street Tree and Canopy Cover Protection

Tree protection shall be followed as listed in the City of Fort Collins Land Use Code, Division 5.10.1, the municipal code and the standards and specifications within this section. Where the standards conflict, the stricter of the standards shall prevail in relation to street tree and tree canopy protection:

- It shall be unlawful for any person to plant, cut, trim, prune, remove, or destroy any tree within the public right-of-way of any street or sidewalk, or upon other City-owned property within the City of Fort Collins Municipal Code, Section 27-31.
- Small cell foundations and poles shall not be located within 40 feet or within the Critical Root Zone (CRZ) of an existing tree or planting site. The greater of the two shall apply. The CRZ is defined in Figure 8:

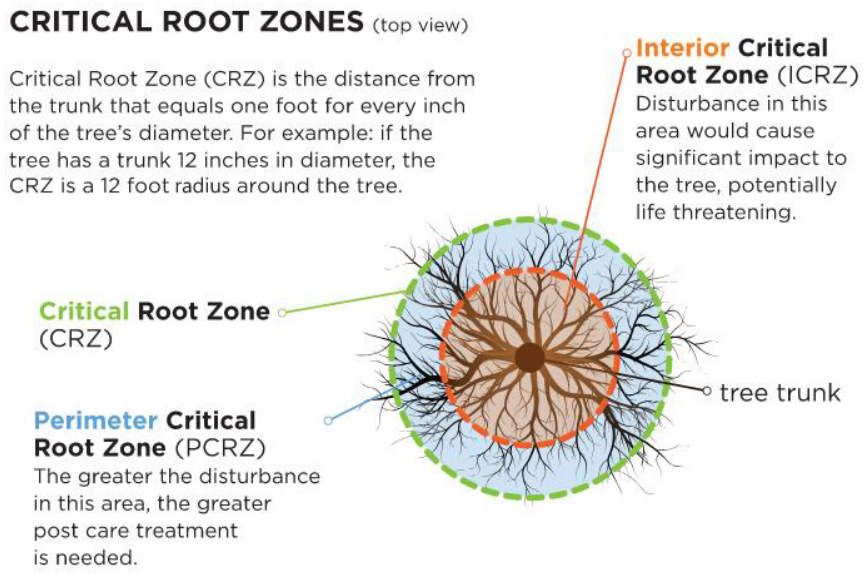


Figure 8: Critical Root Zone

- There shall be no storage or movement of equipment, material, debris or fill within the CRZ of any tree. During the construction stage, the applicant shall prevent the cleaning of equipment or material or the storage and disposal of waste material such as paints, solvents, asphalt, concrete, motor oil or any other material harmful to the life of the tree, within the dripline or CRZ of any tree or group of trees.
- The applicant shall notify adjacent property owners when any private tree(s) are located within the 40-foot separation requirement and address any identified or potential tree health impacts. Refer to Section 3 for more information.

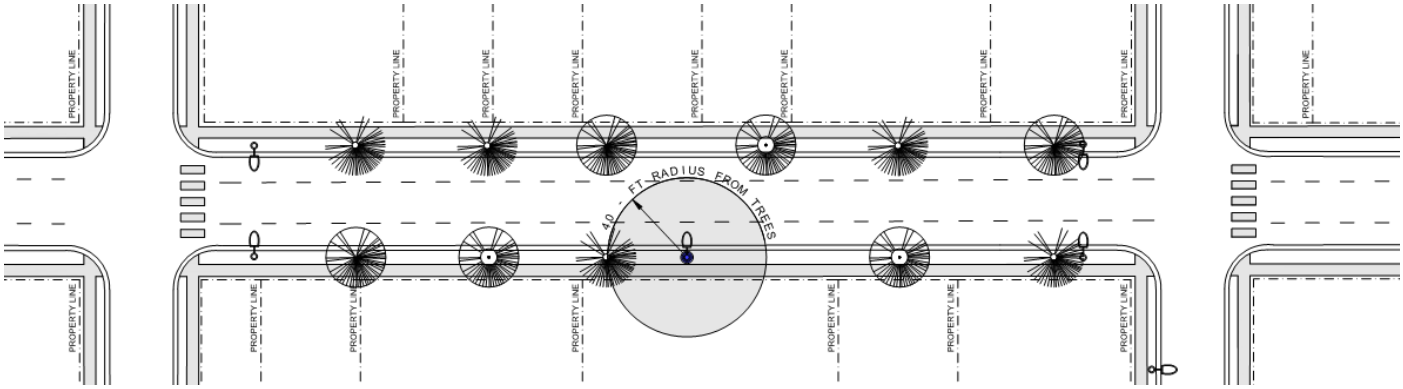


Figure 9: 40-foot radius from the Critical Root Zone

Excavation Adjacent to Street Tree and Canopy Cover

- Within the drip line of any protected existing tree, there shall be no cut or fill over a four-inch depth unless a qualified arborist or forester has evaluated and approved the disturbance, and the written evaluation of such professional has been submitted with applicable application materials.
- The installation of small cell foundations and poles, vaults, utilities or any underground elements requiring excavation deeper than six inches shall be accomplished by boring under the root system of any protected existing tree at a minimum depth of 24 inches and shall not pass under any existing tree trunk. The auger or boring entry point distance is established from the face of the tree (outer bark) and is scaled from tree diameter at breast height as described in Table 2 below. BORING SHALL NOT OCCUR DIRECTLY UNDER THE TREE TRUNK AND SHALL BE SHIFTED TO ONE SIDE OF THE PARKWAY.
- Low pressure hydro excavation, air spading or hand digging are additional tools and practices that will help reduce impact to the tree(s) root system when excavating at depths of 24 inches or less. Refer to Figure 8 for root protection guidelines. The CRZ shall be incorporated into and shown on small cell permit plans for all existing trees within 40 feet of the proposed location.

Table 2: Tree Diameter to Auger / Bore Pit Distance

Tree Diameter at Breast Height (inches)	0″ to 9″	10″ to 14″	15″ to 19″	Over 19″
Auger / Boring Pit Distance from Face of Tree* (feet)	5′	10′	12′	15′
*The boring pit distance shall be measured from the edge of disturbance to the face of the tree.				

If a variance is requested, the City of Fort Collins Forestry Division requires the following prior to submitting a permit application:

1. A written statement regarding all details of the requested variance.
2. An on-site visit with the Forestry Division to determine whether the proposed variance is deemed acceptable.
3. An alternative location analysis with written report by a qualified arborist or forester attesting to the proposed location's compliance with Forestry Division standards.

Section 5.4. Small Cell Facility Undergrounding

- All equipment that is not located within the small cell pole or the antenna enclosure shall be installed below grade per the City of Fort Collins Municipal Code Chapter 23 and the *Fort Collins Charter* Article XI Section 9.
- Equipment base cabinets or externally mounted equipment are prohibited.
- All conduit, cabling, wires, and grounding electrodes shall enter/exit the pole through conduit sweeps within the pole foundation.

Section 5.5. Small Cell Facility Conduit

New conduit from the electrical secondary box to the location of power supply shall be installed at a minimum depth of 36 inches from top of the pipe to finish grade, or 24 inches from the top of pipe to the top of subgrade within hardscape areas, whichever is greater.

New conduit from the small cell pole to the electrical secondary box shall be installed at a depth of 20 to 24 inches. All conduit shall be schedule 80 PVC when installed underneath roadway or parking surfaces. PVC conduit installed underneath softscape, including pedestrian paving, may be reduced to schedule 40 PVC.

Section 6. Design Requirements

All equipment shall be located internal to the equipment vault, pole, and cantenna. No external mounted equipment shall be permitted, unless noted in the sections below. No equipment base cabinets or base shrouds shall be permitted.

All proposed small cell locations shall be considered for installation according to the hierarchy contained in Section 3, and shall meet the requirements listed in the sections below:

Section 6.1. Pre-application Checklist

A map displaying the proposed small cell facility equipment location in relation to documented resources, including but not limited to:

- Historic resources (designed and evaluated). Historic Preservation Services staff can provide access to archival and geo-referenced information, as available;
- Small cell wireless facilities within 200 radial feet; and
- Trees in the public right-of-way within 40 feet of the proposed small cell facility, and
- Distance to the nearest residential building.

Section 6.2. Site Electric Standards

Each small cell project location shall provide a quality level B professional engineering subsurface utility locate per Colorado SB18-167, and a surveyed, scaled map showing all existing utilities within a 20-foot radius of the proposed area of work. Further investigation may be required, at the discretion of the Fort Collins Utility Engineer, for any wet or dry utility within five feet of the limits of disturbance required for the project.

Point of Deliver (POD), facility location, existing utilities and surface structures for each individual site shall be illustrated on reproducible plan sheet measuring at least 24-inch by 36-inch per the Larimer County Urban Area Street Standards. Additional clarity and detail may be required at the discretion of the Fort Collins Utility Engineer. At minimum, each plan sheet shall provide:

- A scale;
- Vicinity map;
- North arrow;
- All adjacent street names and surrounding addresses adjacent the project location;
- Small cell details including: foundation, conduit pull boxes, small cell pole type and details; and
- City of Fort Collins general notes are listed in Appendix C and shall be included in the plan set. These general notes shall include, but are not limited to clearing and grubbing, forestry, planning, Light & Power, and engineering utilities.
- A detail that shows the simulation of the pole installed in the proposed location.

A final design showing the proposed small cell location, electrical connection, routing and general construction practices shall be in conformance with all current standards and regulations set forth in the *City of Fort Collins Municipal Code, City of Fort Collins Light and Power Service Standards* and *Larimer County Urban Area Street Standards* (LCUASS) as amended, as well as any superseding standards regulated by the State of Colorado or United States Federal Government.

Each small cell project site is subject to current Commercial Capacity Fees with a base service rate or a 100-amp service. Additional Capacity charges will apply to all sites exceeding a 100-amp service. Any modifications to existing electrical system, which include, but are not limited to, system upgrades, relocations, site disturbance and engineering efforts, will be at the sole cost of the applicant.

The applicant is responsible for the installation of all private electrical and fiber services associated with the design of the specific small cell system. The applicant is also responsible for providing additional conduit for a dedicated conductor to the streetlight luminaire. All service installation from the POC shall be installed with applicable insulated #12 AWG tracer wire and shall include bedding material as approved by Light & Power Engineering.

Triplex conductor sized #1/0 AWG is required from the power source to the small cell facility. It is at the discretion of the FCU Engineer if enhanced service requirements are required to supply adequate service to the small cell site and surrounding facilities. All replacements and/or upgrades to the existing electric system to achieve the minimum service requirements are at the expense of the applicant.

Upon final acceptance of the Small Cell Construction Plans and Application, the applicant shall contact City of Fort Collins Light and Power to schedule the construction of any upgrades required for the installation of the small cell facilities. Schedule will be based upon availability of personnel and workload, and the project will be assigned in the order in which it is received.

Section 6.3. Electric Metering

- All small cell facilities' electric service shall be metered with one of two options and shall include a disconnect:
    - Accommodations for non-socket-based electric meters in the cabinet shall support mounting provisions for a 120VAC,100A meter measuring five inches by two inches by seven inches (5"x2"x7") per the *Fort Collins Utilities* requirements shown in Figure 10 below.

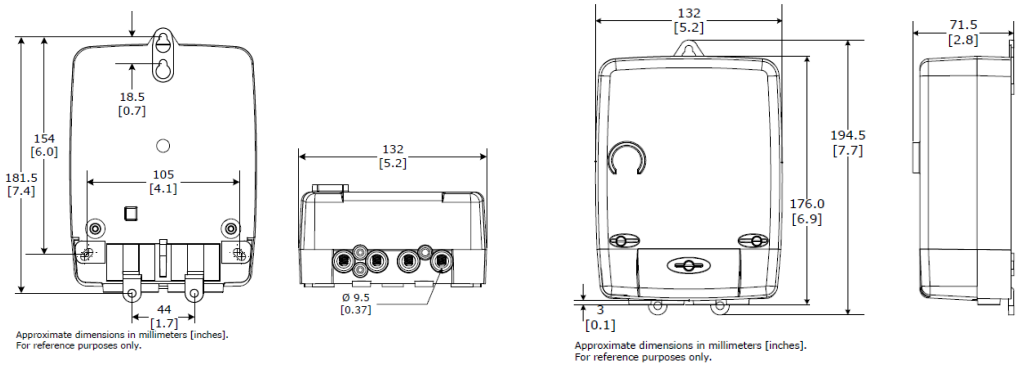


Figure 10: GREX Meter Elevation

    - Socket-based metering designed to accommodate a Form 2S electric meter is also acceptable. Meter socket enclosure shall incorporate a disconnect and a lever bypass.

  - In either case, Fort Collins Light & Power shall furnish the electric meter, and the applicant shall furnish the provisions for mounting the meter.

- The electric meter with disconnect shall be incorporated into the small cell pole.
  - The meter shall be fully or partially recessed into a radio frequency (RF) transparent pole between four feet and six feet above final grade.
  - When the meter is not fully recessed inside a RF transparent pole section only the meter face shall be exposed. A small opening shall be provided in the pole section, between four feet and six feet above final grade, to allow the meter face to be exposed while still allowing the meter housing to be partially recessed in the pole.
- Disconnect shall be located on the customer's side of the meter and shall be internal to the pole such that no seams, lines, housing, or disconnect is visible from the outside of the pole. When the meter cannot be located internal to the pole, the meter housing and disconnect shall be recessed into the pole, within a NEMA 3 enclosure, such that it sits flush with the pole. Given that the expected load and service characteristics of the small cell installations are less than 60 amps, the applicant may use a fused pullout disconnect for this function. Note also, that though this is considered a commercial service, the load and service size generally will not require a cold sequence disconnect.
- Utility access to all meter equipment, mounting provisions, meter disconnect, conduit, fuses, and utility electrical equipment shall be provided by a single door with a cylinder lock.
- Utility meters that are partially recessed shall be located within the pole such that the exposed part of the meter faces in the direction of or the opposing direction of the flow of traffic.

Section 7. Radio Frequency Compliance Report

Radio frequency (RF) exposure shall meet the uncontrolled environment limits specified in the Federal Communications Commission *FCC 96-326*. An RF emissions compliance report shall be signed and sealed by a licensed professional RF engineer and submitted at the time of application for each construction permit listing:

- All equipment and equipment frequencies;
- Maximum equipment power density for both controlled and uncontrolled exposure for each frequency, percent of maximum permissible exposure (MPE), watts of effective radiated power (W ERP), antenna height, antenna orientation, and vertical and horizontal distance of reported MPE from structure(s);
- Maximum power density at ground level and at the height of the antenna;
- Highest percentage of MPE; and
- Exhibits that document the location and orientation of the antennas with color coded areas of RF exposures within the controlled and uncontrolled population limit. The exhibits shall show both an elevation of the structure and a plan view at the elevation of the antennas. The exhibits shall be scaled and show the dimensions and reach of the exposure of the radio frequency from the antenna.

Figure 11: Maximum Permissible Exposure

The applicant will be required by the City to show compliance with the submitted RF emissions compliance report after the small cell equipment has been installed.

Section 8. Small Cell Assembly Aesthetic Requirements

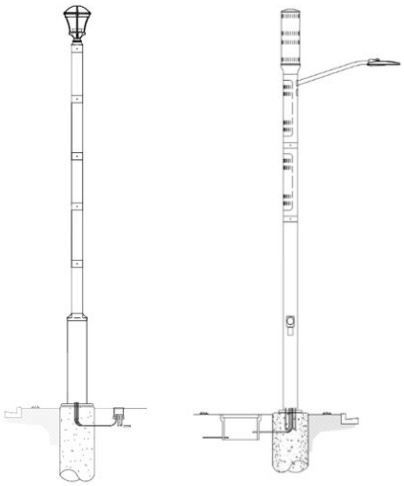
Section 8.1. Standard Small Cell Requirements

All small cell equipment shall meet the following standards, and those specified this this standard for the specific small cell installation type/

Table 3: Foundation Requirements

Ventilation	Equipment vaults and poles shall be rated for passive cooling.
Noise Level	Small cell equipment shall not emit noise greater than 50 dBA at the nearest property line.
Pole Color	Equipment shall be painted Benjamin Moore – Ironclad Bronzetone #163-60 **or** Sherwin Williams "Fed Park Service Brown" DNS4-40011.
Pole Finishing Coat	Sherwin Williams – Polane HS pigmented polyurethane finish capable of withstanding exposure to ultraviolet, chemicals, and extreme weather conditions.
Surface Coat	The surface coating shall be uniformly applied to prevent craze-lines, bumps, and pinholes. The surface coating shall have a minimum dry film thickness of 1.5 mils.
Steel Equipment	Shall be galvanized steel with epoxy paint.
Foundation Size	No greater than 3 feet diameter and 8.5 feet in depth without prior approval by the City.
Foundation Conduit Stub Outs	Minimum of four (4), two-inch PVC conduit stub outs located between 20-inches and 24-inches below grade.
Foundation Stamp	Foundation plans shall be stamped by a Colorado licensed professional engineer.
Radio Frequency Warning Labels	RF warning labels shall list the distance from the pole of the Maximum Permissible Exposure for the uncontrolled general population for a minimum of 30-minutes. RF warning labels shall be mounted external to the Provider's equipment at such locations as necessary on the poles. RF warning

All permitted small cells shall meet the aesthetic requirements listed in the sections below.



Section 8.2. Collocated Small Cell Aesthetics

The applicant shall be responsible for bringing the collocated streetlight assemblies up to the Fort Collins Light and Power's current luminaire specifications for any selected location. Existing streetlight equipment (pole, mast arm, and luminaire) shall be removed and returned to the City at no cost to the City. The applicant shall fully remove the existing streetlight foundation and replace such foundation with a foundation approved by Fort Collins Engineering.

All small cell equipment, except for the antenna and meter, shall be undergrounded or housed within the pole. All antennas, UE relays, coax cables, antenna mounts, and other equipment necessary for a complete installation shall be mounted internal to the cantenna.

The applicant's point of delivery will be at the existing or upgraded junction box next to the existing streetlight.

Figure 12: SC-08 & SC-03. See Appendix D for details.

Table 4: Collocated Small Cell Standards

Pole	Maximum of 12-inch straight, round diameter.
Mast Arm	*City of Fort Collins Utilities* Specification No: 373-104.
Luminaire	Shall be approved by Fort Collins Utilities prior to installation.
Luminaire Hand Hole	A hand hole shall be located above the mast arm for luminaire electrical service.
Separation of Service	Streetlight electrical service shall be separated with a metal divider.
RF Transparent Section(s)	Internally mounted small cell equipment may be installed within the pole.
Cantenna Diameter	Maximum of 16-inches outer diameter. Application proposed for future collocation ability is allowed a maximum of 18-inches.
Cantenna Height	Maximum of 6-feet and 7-inches including tapered transition.
Collocated	***Collector and Arterial Streets:*** Small cell shall not exceed 36-feet and 7-inches in between the top of the cantenna and the top of the foundation. ***Local Streets:*** Small cell shall not exceed 18-feet in between the top of the cantenna and the top of the foundation.
Transition	An enclosed, tapered transition between the pole and the cantenna.

Section 8.3. Third Party Pole Attachments

Small cell attachments collocated on third-party owned poles shall meet the standard requirements of the owner, in addition to all right of way safety standards applied to facilities located in City public highways.

All small cell equipment, except for the antenna, meter, and disconnect shall be undergrounded or housed within the pole. All antennas, UE relays, coax cables, and antenna mount shall be mounted internal to the cantenna or within an equipment shroud.

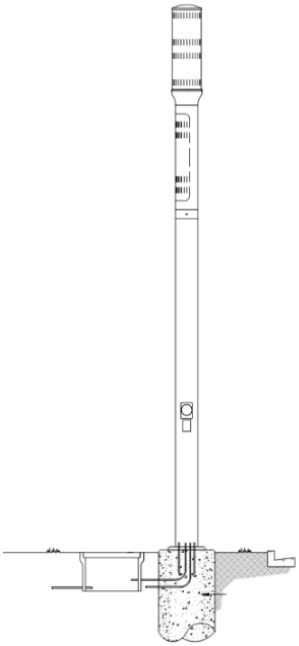


Figure 13: SC-04. See Appendix D for detail.

Table 5: Third Party Pole Attachment

Pole	Maximum of 12-inch straight, round diameter.
Separation of Service	Small cell service shall be separated from utility equipment per the Utility standards.
RF Transparent Section(s)	Internally mounted small cell equipment may be installed within a metal pole per the Utility standards.
Cantenna Diameter	Maximum of 16-inches outer diameter.
Cantenna Height	Maximum of 6-feet and 7-inches including tapered transition.
Assembly height	Pole assembly with small cell shall not exceed 36-feet and 7-inches in between the top of the cantenna and the top of the foundation.
Transition	An enclosed, tapered transition between the pole and the cantenna.

Section 8.4. Traffic Signal Mounted Small Cells

All new collocated traffic signal poles shall meet the traffic signal requirements established by the Traffic Engineer and/or the Electric Project Engineer. All small cell equipment, except for the antenna and meter, shall be undergrounded. The meter may be installed in a separate meter power pedestal approved by Fort Collins Utilities and shall meet the requirements established in Section 6.3.

Applicant shall consider sight triangles at the intersection and submit plans that certify existing visibility levels are protected in each of applicant's small cell permit applications. All equipment greater than nine inches in diameter shall be installed two feet behind the back edge of the sidewalk.

Traffic signal pole and caisson shall be designed to accommodate installation of a Colorado Department of Transportation standard S-614-40 or S-614-40A mast arm and luminaire arm.

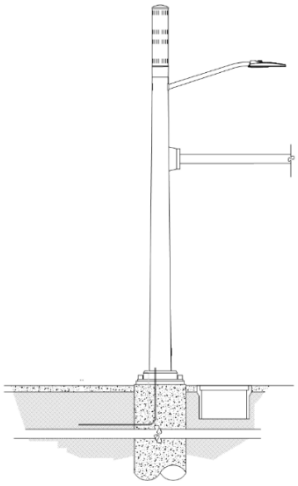


Figure 14: SC-05. See Appendix D for detail.

Concealment and Shrouding

All facilities, new or replacement, should conceal all related wireless equipment within the pole, or must be buried below grade in vaults. Panel or prismatic antennas whose proper function prevents them from being fully enclosed within an enclosure shall be considered enclosed if their installation is substantially within the pole boundary. No above-ground ancillary facilities such as pedestals and cabinets separate from the pole will be allowed. No secondary attachments unrelated to Fort Collins Light & Power metering and meter disconnect are allowed.

Table 6: Traffic Signal Mounted Small Cell

Traffic Signal Pole	Per the Larimer County Urban Area Street Standards (LCUASS) and per the current edition of the *Colorado Department of Transportation (CDOT) Standards S-614-40, S-614-40A* and CDOT Traffic Signal Construction Standards.
Signal Mast Arm	Per the *Colorado Department of Transportation (CDOT) Standards S-614-40, S-614-40A* and CDOT Traffic Signal Construction Standards.
Luminaire Mast Arm	Per Fort Collins Light & Power requirements.
Luminaire	Shall be approved by Fort Collins Utilities prior to installation.
Separation of Service	Small cell conduit shall not be strapped to the exterior of the traffic signal pole. A separate channel shall be included within the pole.
Cantenna Diameter	Up to 16-inches in diameter.
Cantenna Height	Shall be mounted to the top of the traffic signal pole. The cantenna shall not extend more than 6-feet and 7-inches, including tapered transition, above the top of the traffic signal pole
Transition	An enclosed, tapered transition between the pole and the cantenna.

Figure 15: Example traffic signal mounted small cell

Section 8.5. Freestanding Small Cell Pole

All small cell equipment, except for the antenna and meter, shall be undergrounded or housed within the pole. All antennas, UE relays, coax cables, and antenna mount shall be mounted internal to the cantenna.

An electrical service lateral shall be installed between each freestanding small cell pole and the power source (transformer). The applicant shall own the electrical service from the power source, the service lateral, and the electrical service into the small cell pole.

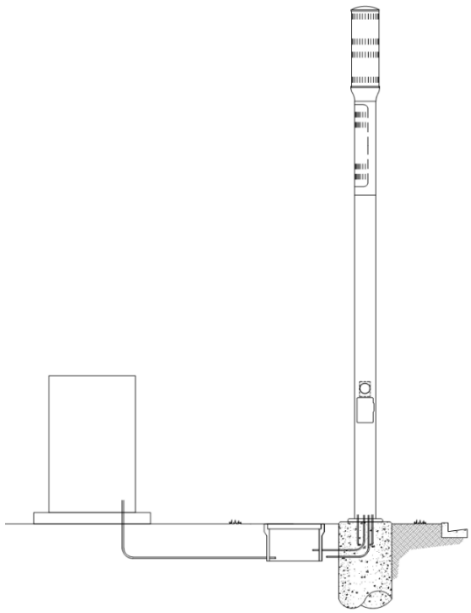


Figure 16: SC-06. See Appendix D for detail.

Table 7: Freestanding Small Cell Pole

Pole	Maximum of 12-inch straight, round diameter.
Pole Height	Top of the cantenna shall be no more than 30 feet above the top of the foundation.
RF Transparent Section(s)	Internally mounted small cell equipment may be installed within the pole.
Cantenna Diameter	Maximum of 16-inches outer diameter.
Cantenna Height	Maximum of 6-feet and 7-inches including tapered transition.
Transition	An enclosed, tapered transition between the pole and the cantenna.

Appendix A. Links

Below are common links that applicants should refer to when requesting a small cell permit.

Contractor License Application

General Contractor Application Packet

Right of Way Contractor Packet

Larimer County Urban Area Street Standards

City of Fort Collins Master Street Plan Map

City of Fort Collins Floodplain Map

City of Fort Collins Development Forms

City of Fort Collins Land Use Code

City of Fort Collins Municipal Code Chapter 23

City of Fort Collins Utilities Light and Power Electrical Service Standards

City of Fort Collins Electric Service Standards

City of Fort Collins Electric Service Rules and Regulations

City of Fort Collins Schedule of Electrical Rates, Charges, and Fees

City of Fort Collins Small Cell Encroachment Permit

Colorado Revised Statutes Title 29

Colorado Department of Transportation (CDOT) Construction Standards

Appendix B. Variances

The following variances are documented in the standards and specifications and moved to this Appendix for applicants to easily determine the procedures for each department when requesting a variance. The City of Fort Collins reserves the right to approve variances from the standards and specifications if the variance meets the intent of these standards and specifications and the Master License Agreement.

Forestry Variance:

If a variance is requested, the City of Fort Collins Forestry Division requires the following prior to submitting a permit application:

1. A statement regarding all details of the requested variance.
2. An on-site visit with the Forestry Division to determine whether the proposed variance is deemed acceptable.

- An alternative location analysis with required professional arborist or forester analysis of site compliance with Forestry Division requirements and all standards set forth in Appendix C to these Guidelines.

Appendix C. General Notes

Refer to Larimer County Urban Area Street Standards Appendix E for detailed notes for inclusion on all small cell plans. The following General Notes are provided as a guideline for inclusion on plan sheets.

GENERAL NOTES

1. PROJECT BENCHMARK: (ADD BENCHMARK DATA). ALL ELEVATIONS SHOWN ON THESE PLANS ARE REFERENCED TO THE PROJECT BENCHMARK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAFEGUARDING THE PROJECT BENCHMARK AND OTHER SURVEY MONUMENTS. DAMAGED MONUMENTS SHALL BE RE-ESTABLISHED AND REPLACED BY THE LICENSED LAND SURVEYOR AT THE EXPENSE OF THE PARTY RESPONSIBLE FOR THE DAMAGE.
2. THE CONTRACTOR SHALL PERFORM WORK IN ACCORDANCE WITH THE GEOTECHNICAL RECOMMENDATIONS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROMPTLY NOTIFYING THE ENGINEER OF ANY PROBLEMS OR POTENTIAL PROBLEMS IN CONFORMING TO THE DESIGN LINE AND GRADE FOR ANY ELEMENT OF THE CONSTRUCTION. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROMPTLY NOTIFYING THE ENGINEER OF SITE CONDITIONS THAT DIFFER FROM THOSE SHOWN ON THE APPROVED PLANS.
4. IN THE EVENT THE CONTRACTOR ALLOWS, AUTHORIZES, APPROVES OR CONSTRUCTS ITEMS THAT DIFFER FROM THE APPROVED PLANS, SPECIFICATIONS OR OTHER CONTRACT DOCUMENTS, WITHOUT WRITTEN APPROVAL BY THE ENGINEER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY LIABILITY ARISING FROM SUCH CHANGES.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, AND ANY OTHER NEEDED ACTION TO PROTECT THE LIFE, HEALTH AND SAFETY OF THE PUBLIC AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACTOR.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING SAFE, PASSABLE ACCESS TO PRIVATE PROPERTIES ADJACENT TO THE WORK THROUGHOUT THE PERIOD OF CONSTRUCTION.
7. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO FOR LOCATION OF UNDERGROUND GAS, ELECTRIC AND COMMUNICATION UTILITIES AT LEAST 48 HOURS PRIOR TO CONSTRUCTION (1-800-922-1987). THE CONTRACTOR SHALL NOTIFY OTHER APPLICABLE UTILITY COMPANIES AS WELL TO OBTAIN FIELD LOCATES OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
8. LOCATIONS OF UNDERGROUND UTILITIES AS SHOWN ON THE PLANS WERE TAKEN FROM THE RECORDS OF THE CONTROLLING AGENCIES OR FROM AGENCY MARKINGS IN THE FIELD. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THEIR COMPLETENESS OR ACCURACY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE EXISTENCE AND/OR LOCATION OF ALL UNDERGROUND UTILITIES AND PARTICIPATE IN THE RESOLUTION OF AND CONFLICTS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF ALL NECESSARY UTILITY RELOCATIONS WITH THE APPROPRIATE UTILITY COMPANY.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE JOB SITE CONDITIONS THROUGHOUT THE DURATION OF CONSTRUCTION, INCLUDING SAFETY OF ALL PERSONS AND PROTECTION OF PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED ONLY TO WORKING HOURS. THE CONTRACTOR SHALL DEFEND INDEMNIFY AND HOLD THE OWNER, THE ENGINEER AND THE GOVERNING JURISDICTION HARMLESS FOR

ANY AND ALL LIABILITY, IN CONNECTION WITH THE PERFORMANCE OF WORK, EXCEPT FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER, THE ENGINEER OR THE GOVERNING JURISDICTION.

11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING NEARBY PUBLIC OR PRIVATE STREETS OF MUD AND DEBRIS, DUE TO CONSTRUCTION ACTIVITIES, ON A DAILY BASIS OR AS DIRECTED BY GOVERNING JURISDICTION PERSONNEL.
12. THE CONTRACTOR SHALL HAVE IN HIS POSSESSION AT ALL TIMES THE APPROPRIATE EDITION OF THE GOVERNING JURISDICTION DESIGN AND CONSTRUCTION STANDARDS, ONE SET OF APPROVED CONSTRUCTION PLANS, THE STORM WATER MANAGEMENT PLAN, AND ALL REQUIRED PERMITS.
13. ALL (SANITARY SEWER, STORM SEWER, WATER LINE OR STREET) CONSTRUCTION SHALL CONFORM TO THE APPROPRIATE EDITION OF THE GOVERNING JURISDICTION STANDARDS AND SPECIFICATION.
14. ALL CONSTRUCTION SHALL CONFORM TO THE APPROPRIATE EDITION OF THE LARIMER COUNTY URBAN AREA STREET STANDARDS AND THE STANDARDS AND SPECIFICATIONS OF THE COLORADO DEPARTMENT OF TRANSPORTATION, THE URBAN DRAINAGE AND FLOOD CONTROL DISTRICT, AND INDUSTRY STANDARDS AS APPLICABLE TO ELEMENTS OF WORK NOT COVERED BY LOCAL AGENCY STANDARDS AND SPECIFICATIONS. REQUIREMENTS OF THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, THE ENVIRONMENTAL PROTECTION AGENCY AND THE U.S. ARMY CORPS OF ENGINEERS, SHALL ALSO BE FOLLOWED AS THEY RELATE TO THE WORK.
15. SANITARY SEWER AND STORM SEWER LENGTHS ARE FROM CENTER OF MANHOLE TO CENTER OF MANHOLE. SANITARY SEWER AND STORM SEWER MANHOLES ARE 4-FOOT DIAMETER UNLESS OTHERWISE NOTED.
16. TFI INDICATES TOP FRONT OF INLET ELEVATION. TFI ELEVATIONS SHOWN ON INLETS IN PROFILE VIEW ARE AT MID-POINT OF INLET. REFER TO SPECIFIC INLET DETAILS FOR TFI ELEVATIONS ON INLET CORNERS IF APPLICABLE

TREE PROTECTION STANDARDS

1. ALL EXISTING TREES WITHIN THE LIMITS OF DEVELOPMENT SHALL REMAIN AND BE PROTECTED.
2. THERE SHALL BE NO CUT OR FILL WITHIN THE DRIPLINE OF ANY PROTECTED EXISTING TREE.
3. PER CITY OF FORT COLLINS MUNICIPAL CODE, SECTION 27-31, IT SHALL BE UNLAWFUL FOR ANY PERSON TO PLANT, TRIM, PRUNE, REMOVE, OR DESTROY ANY TREE WITHIN THE PUBLIC RIGHT-OF-WAY OF ANY STREET OR SIDEWALK, OR UPON OTHER CITY OWNED PROPERTY.
4. PRIOR TO AND DURING CONSTRUCTION, BARRIERS SHALL BE ERECTED AROUND ALL PROTECTED EXISTING TREES WITH SUCH BARRIERS TO BE OF ORANGE FENCING A MINIMUM OF FOUR (4) FEET IN HEIGHT, SECURED WITH METAL T- POSTS, NO CLOSER THAN SIX (6) FEET FROM THE TRUNK OR ONE-HALF (½) OF THE DRIP LINE, WHICHEVER IS GREATER. THERE SHALL BE NO STORAGE OR MOVEMENT OF EQUIPMENT, MATERIAL, DEBRIS OR FILL WITHIN THE FENCED TREE PROTECTION ZONE. CHAINLINK FENCING MAY BE REQUIRED DEPENDING ON THE EXTENT OF WORK.

5. DURING THE CONSTRUCTION STAGE OF DEVELOPMENT, THE APPLICANT SHALL PREVENT THE CLEANING OF EQUIPMENT OR MATERIAL OR THE STORAGE AND DISPOSAL OF WASTE MATERIAL SUCH AS PAINTS, OILS, SOLVENTS, ASPHALT, CONCRETE, MOTOR OIL OR ANY OTHER MATERIAL HARMFUL TO THE LIFE OF A TREE WITHIN THE DRIP LINE OF ANY PROTECTED TREE OR GROUP OF TREES.
6. SIGNS, PERMITS, WIRES OR ANY OTHER DAMAGING ATTACHMENTS SHALL NOT BE FASTENED TO ANY TREE.
7. THE INSTALLATION OF VAULTS, UTILITIES OR ANY UNDERGROUND ELEMENTS REQUIRING EXCAVATION DEEPER THAN SIX INCHES SHALL BE ACCOMPLISHED BY BORING UNDER THE ROOT SYSTEM OF ANY EXISTING TREE AT A MINIMUM DEPTH OF 24 INCHES.
8. THE AUGER OR BORING ENTRY POINT DISTANCE IS ESTABLISHED FROM THE FACE OF THE TREE (OUTER BARK) AND IS SCALED FROM TREE DIAMETER AT BREAST HEIGHT AS DESCRIBED IN THE CHART BELOW. BORING SHALL NOT OCCUR DIRECTLY UNDER THE TREE TRUNK AND SHALL BE SHIFTED TO ONE SIDE OF THE PARKWAY.

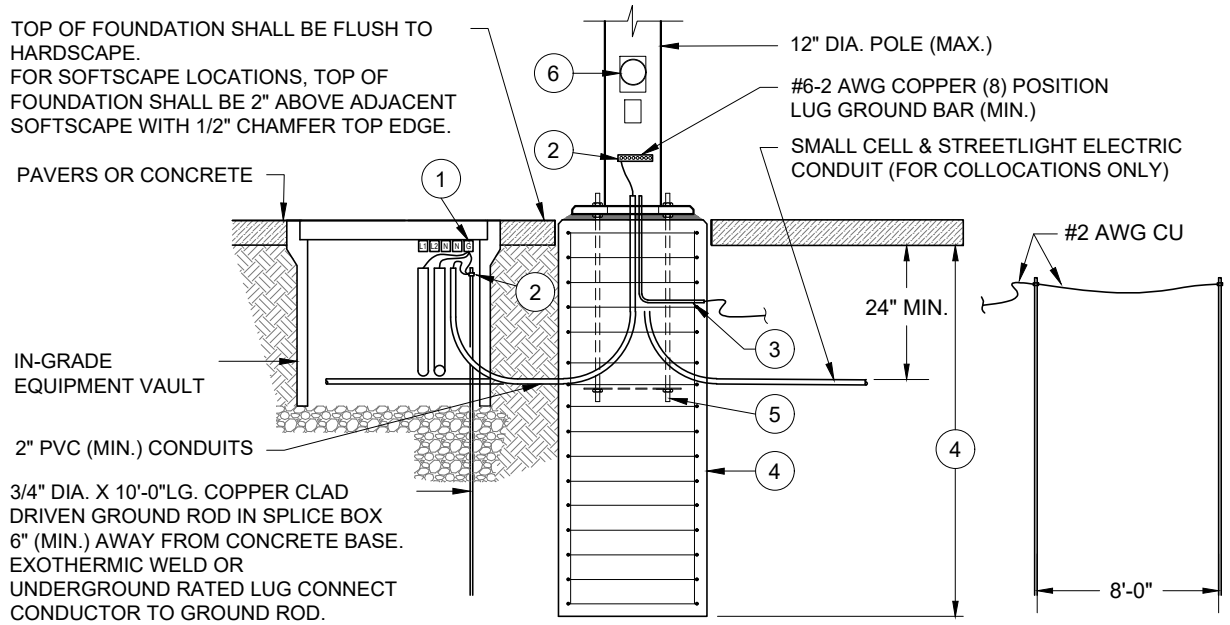
Tree Diameter to Auger / Bore Pit Distance (Source: Table 2 Fort Collins Small Cell standards and Specifications)

Tree Diameter at Breast Height (inches)	0" to 9"	10" to 14"	15" to 19"	Over 19"
Auger / Boring Pit Distance from Face of Tree* (feet)	5'	10'	12'	15'
*The boring pit distance shall be measured from the edge of disturbance to the face of the tree.				

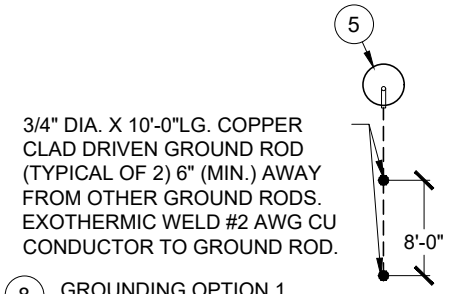
9. THE USE OF LOW-PRESSURE HYDRO EXCAVATION, AIR SPADING OR HAND DIGGING TOOLS AND PRACTICES MAY BE REQUIRED TO HELP REDUCE IMPACT TO THE TREE(S) ROOT SYSTEM WHEN EXCAVATING AT DEPTHS OF 24 INCHES OR LESS. PLEASE REFER TO THE CRITICAL ROOT ZONE (CRZ) DIAGRAM FOR ROOT PROTECTION GUIDELINES.
10. NO VAULTS OR HANDHOLES SHALL BE PLACED WITHIN 10' OF AN EXISTING TREE.
11. IF ROOTS LARGER THAN 2" IN DIAMETER ARE ENCOUNTERED IN THE PROCESS OF EXCAVATION, CITY OF FORT COLLINS FORESTRY DIVISION MUST BE NOTIFIED.
12. IF A VARIANCE IS PERMITTED, THE CITY OF FORT COLLINS FORESTRY DIVISION MAY REQUIRE A PRECONSTRUCTION COORDINATION MEETING TO REVIEW TREE PROTECTION STANDARDS, UTILITY INSTALLATION AND ADDITIONAL SITE WORK.

Appendix D. Details

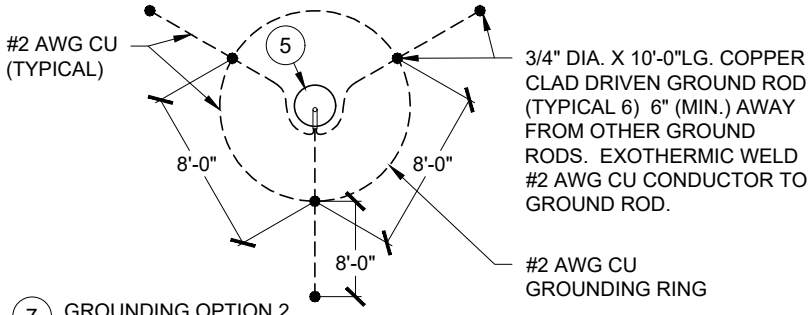
The following pages include typical small cell details for installation and small cell components installed within the City of Fort Collins.



ELEVATION SECTION VIEW



8 GROUNDING OPTION 1
LINEAR GROUNDING



7 GROUNDING OPTION 2
RADIAL GROUNDING WITH INNER RING

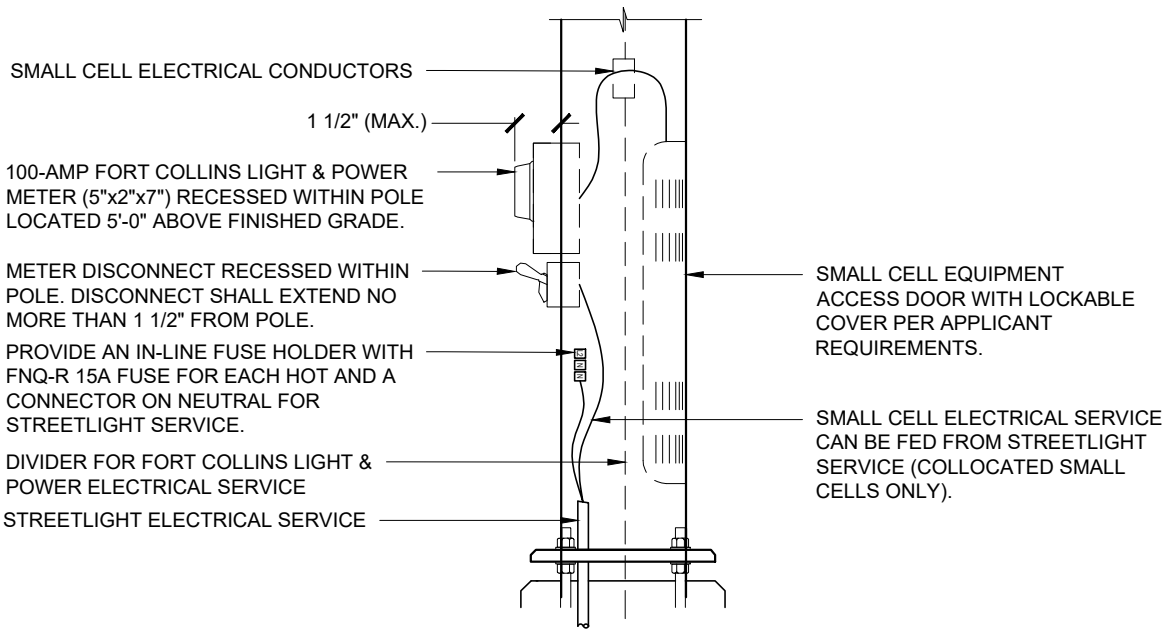
FOUNDATION DETAIL NOTES

1. BOND RACEWAY GROUND TO GROUND ROD IN IN-GRADE VAULT.
2. BOND (1#4 SOFT DRAWN BARE CU) TO GROUND ROD(S) AND GROUNDING LUG IN EQUIPMENT CABINET HAND HOLE.
3. PROVIDE 3/4" GRC SLEEVE IN FOUNDATION FOR GROUNDING CONDUCTORS.
4. COLLOCATION SMALL CELL AND FREE STANDING SMALL CELL FOUNDATION EMBEDMENT DEPTH, DIMENSIONS AND REINFORCEMENT SHALL BE DESIGNED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF COLORADO.
5. ANCHOR BOLT CIRCLE SHALL BE CENTERED ON FOUNDATION WITH AN ANCHOR BOLT TEMPLATE.
6. CITY OF FORT COLLINS UTILITIES METER SHALL BE PROPERLY GROUNDED PER N.E.S.C. CURRENT ADDITION.
7. RADIAL GROUNDING OPTION: BOND (1 #2 SOFT DRAWN BARE CU) TO GROUND ROD RING WITH (6) 3/4" x 10'-0" GROUND RODS IN RADIAL DESIGN WITH LOOP RING ON INSIDE (3) RODS. EXOTHERMIC WELD CONDUCTOR TO EACH ROD.
8. LINEAR GROUNDING OPTION: BOND (1#2 SOFT DRAWN BARE CU) TO (2) 3/4" x 10'-0 GROUND RODS IN LINEAR ARRANGEMENT . EXOTHERMIC WELD CONDUCTOR TO EACH ROD.

GENERAL NOTE

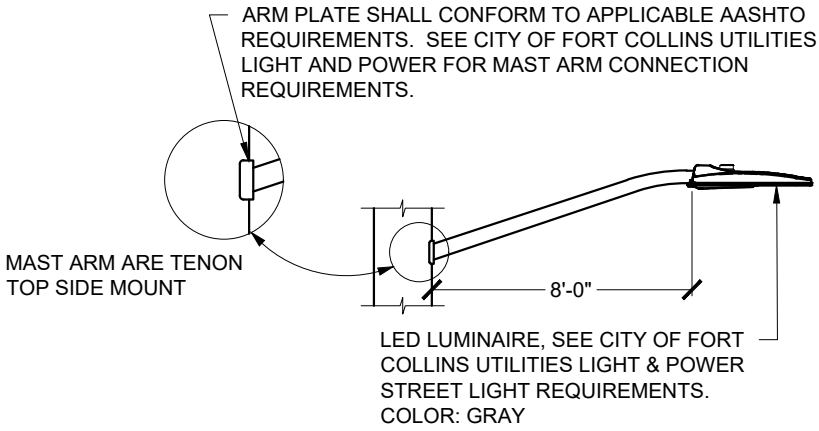
1. FOUNDATION DETAILS ARE INCLUDED ONLY TO SHOW ELECTRICAL COMPONENTS. REFER TO CITY OF FORT COLLINS UTILITIES LIGHT & POWER STANDARDS STREETLIGHT OR TRAFFIC SIGNAL REQUIREMENTS.
2. FREESTANDING SMALL CELL REQUIRES AN ADDITIONAL SERVICE LATERAL TO AN ADJACENT TRANSFORMER.

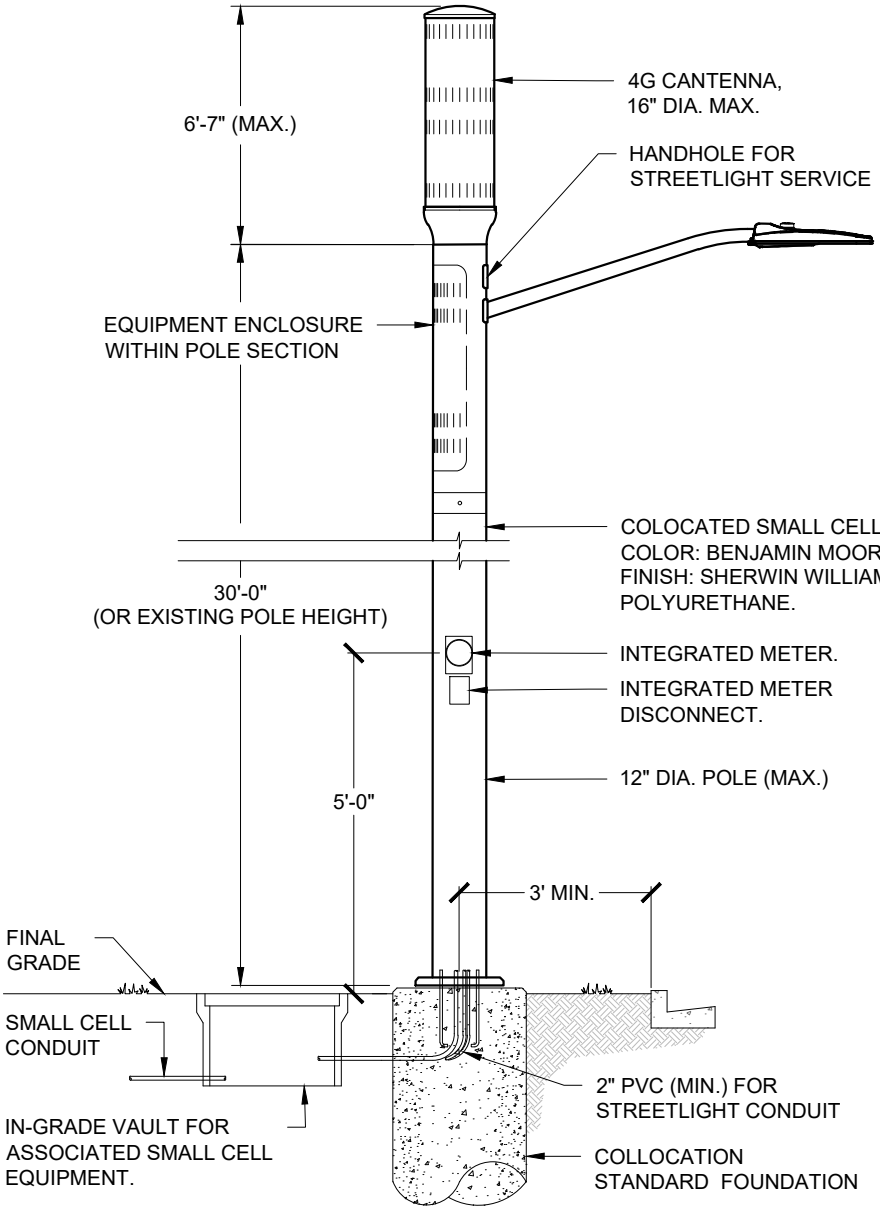
City of Fort Collins	City of Fort Collins Utilities Light & Power	Date: JUNE 2020
	SMALL CELL ELECTRICAL DETAIL	Std. Dwg. No. SC–01

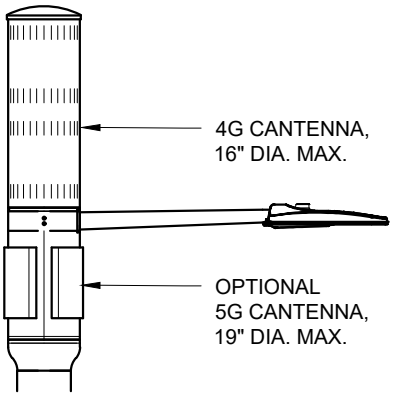


COLLOCATION POLE BASE DETAIL

City of Fort Collins	City of Fort Collins Utilities Light & Power	Date: JUNE 2020
	SMALL CELL POLE BASE DETAIL	Std. Dwg. No. SC–02





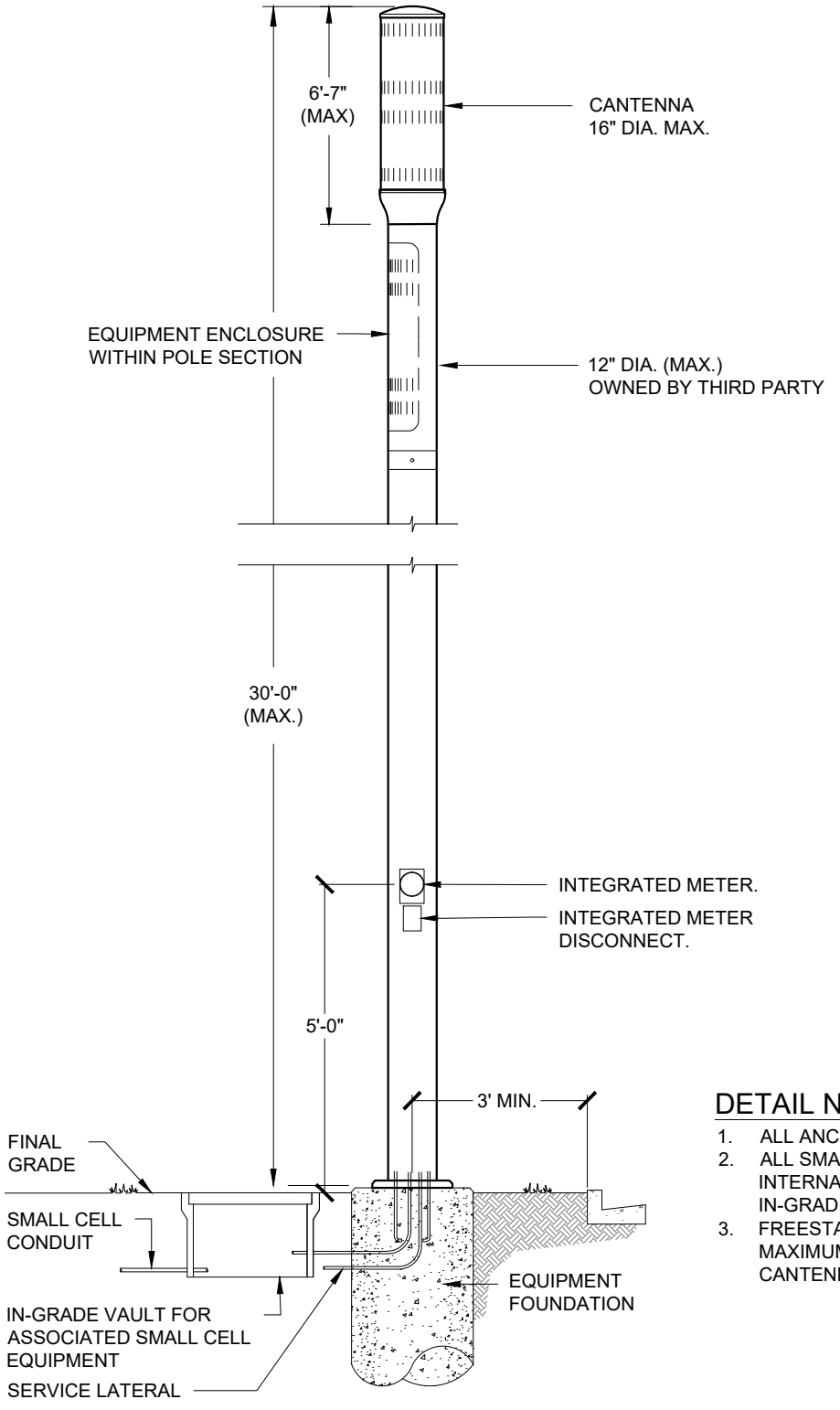


ALTERNATIVE MAST ARM MOUNTING LOCATION & STYLE

DETAIL NOTES

1. LUMINAIRE SHALL BE MOUNTED AT 30 FEET OR AS REQUIRED BY THE CITY OF FORT COLLINS UTILITIES LIGHT & POWER.
2. ALL STREETLIGHT ELECTRICAL SHALL BE SEPARATED FROM SMALL CELL EQUIPMENT BY A DIVIDER.
2. ALL ANCHOR BOLT HARDWARE SHALL BE CONCEALED.
3. ALL SMALL CELL EQUIPMENT SHALL BE HOUSED INTERNAL TO THE POLE, WITHIN THE EQUIPMENT VAULT, OR HIDDEN BEHIND THE CANTENNA.
4. COMBINATION SMALL CELL POLE SHALL BE 36'-0" MAXIMUM FROM TOP OF FOUNDATION TO TOP OF CANTENNA.

City of Fort Collins	City of Fort Collins Utilities Light & Power	Date: JUNE 2020
	COLLOCATED SMALL CELL POLE DETAIL	Std. Dwg. No. SC–03

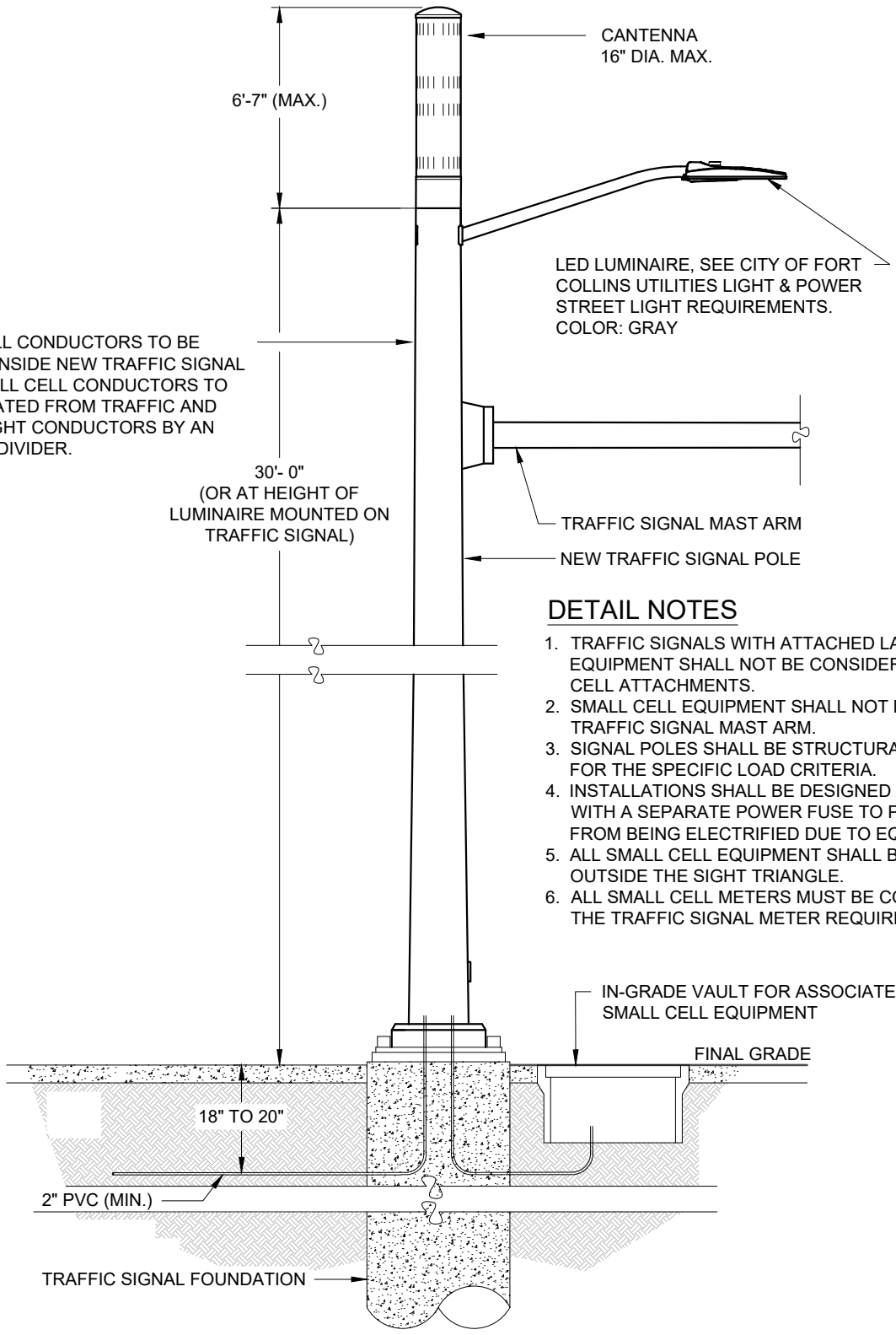


3RD PARTY POLE

DETAIL NOTES

1. ALL ANCHOR BOLT HARDWARE SHALL BE CONCEALED.
2. ALL SMALL CELL EQUIPMENT SHALL BE HOUSED INTERNAL TO THE FREESTANDING POLE, IN THE IN-GRADE VAULT, OR HIDDEN BEHIND THE CANTENNA.
3. FREESTANDING SMALL CELL POLE SHALL BE 30'-0" MAXIMUM FROM TOP OF FOUNDATION TO TOP OF CANTENNA.

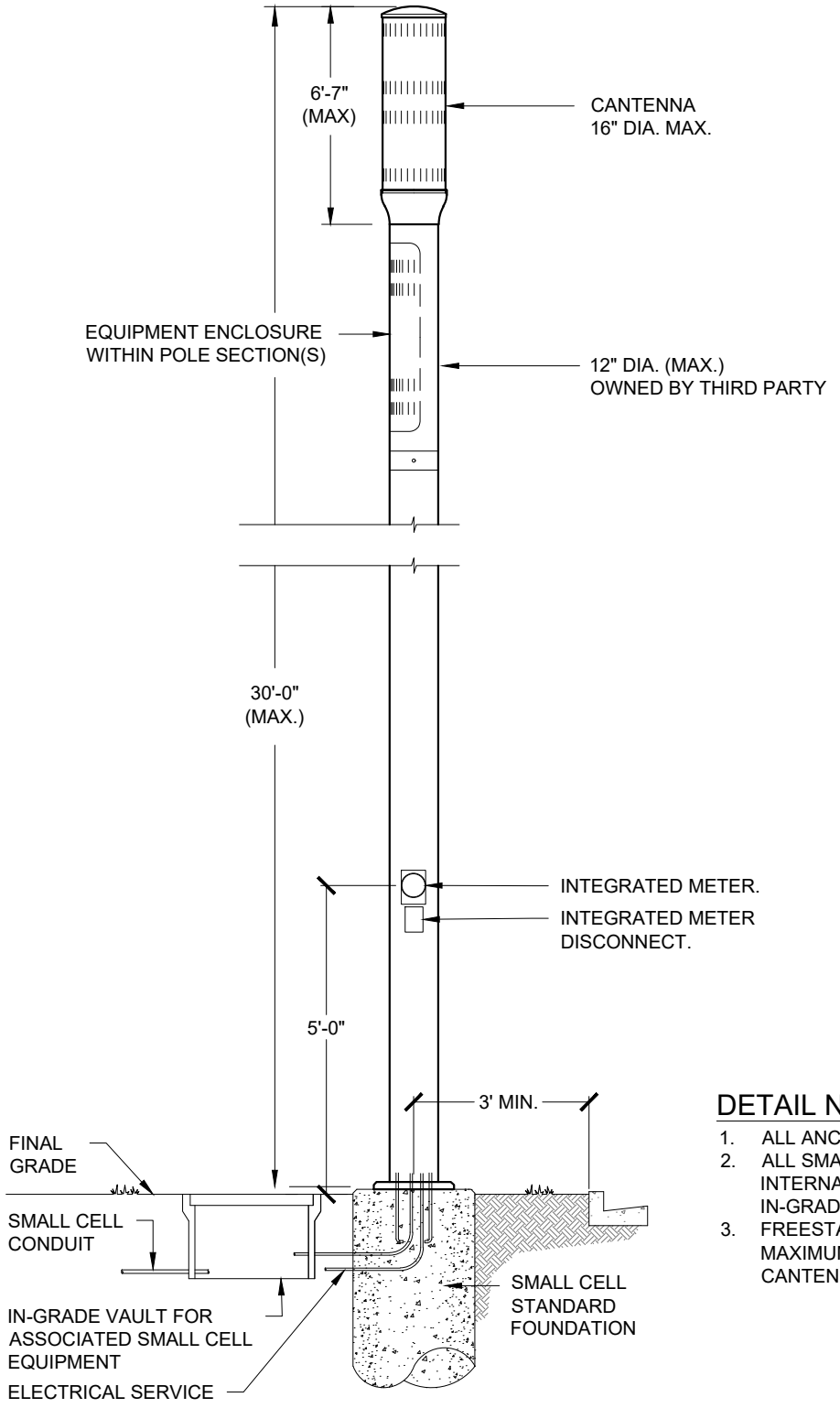
City of Fort Collins	City of Fort Collins Utilities Light & Power	Date: JUNE 2020
	THIRD PARTY POLE WITH SMALL CELL	Std. Dwg. No. SC–04



DETAIL NOTES

1. TRAFFIC SIGNALS WITH ATTACHED LAW ENFORCEMENT EQUIPMENT SHALL NOT BE CONSIDERED FOR SMALL CELL ATTACHMENTS.
2. SMALL CELL EQUIPMENT SHALL NOT BE LOCATED ON TRAFFIC SIGNAL MAST ARM.
3. SIGNAL POLES SHALL BE STRUCTURALLY ENGINEERED FOR THE SPECIFIC LOAD CRITERIA.
4. INSTALLATIONS SHALL BE DESIGNED AND INSTALLED WITH A SEPARATE POWER FUSE TO PREVENT POLE FROM BEING ELECTRIFIED DUE TO EQUIPMENT FAILURE.
5. ALL SMALL CELL EQUIPMENT SHALL BE LOCATED OUTSIDE THE SIGHT TRIANGLE.
6. ALL SMALL CELL METERS MUST BE CONSISTENT WITH THE TRAFFIC SIGNAL METER REQUIREMENTS.

City of Fort Collins	City of Fort Collins Utilities Light & Power	Date: JUNE 2020
	TRAFFIC SIGNAL POLE WITH SMALL CELL DETAIL	Std. Dwg. No. SC–05

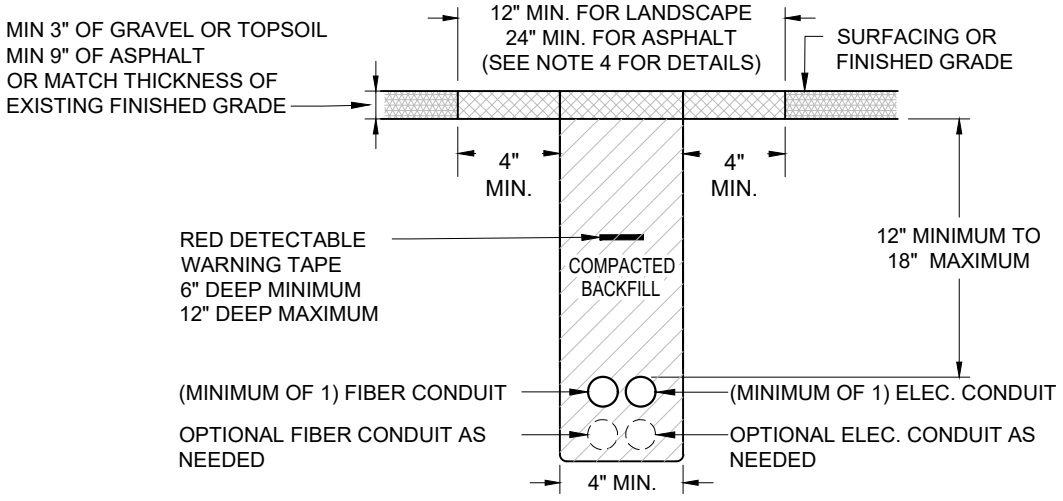


30 FT. STANDARD

DETAIL NOTES

1. ALL ANCHOR BOLT HARDWARE SHALL BE CONCEALED.
2. ALL SMALL CELL EQUIPMENT SHALL BE HOUSED INTERNAL TO THE FREESTANDING POLE, IN THE IN-GRADE VAULT, OR HIDDEN BEHIND THE CANTENNA.
3. FREESTANDING SMALL CELL POLE SHALL BE 30'-0" MAXIMUM FROM TOP OF FOUNDATION TO TOP OF CANTENNA.

City of Fort Collins	City of Fort Collins Utilities Light & Power	Date: JUNE 2020
	FREESTANDING SMALL CELL POLE	Std. Dwg. No. SC–06



TRENCHING DETAIL NOTES

1. CONTRACTOR SHALL COORDINATE BORING, DRIVING, OR TRENCHING WITH OTHER UNDERGROUND UTILITIES. CONTRACTOR SHALL USE COMMON TRENCHES WHEREVER POSSIBLE.

2. WHENEVER POSSIBLE, CONDUIT OR CABLE SHALL BE INSTALLED BY BORING, DRIVING, OR ANY OTHER ACCEPTABLE MEANS UNDER CONCRETE UNITS. OPEN CUTTING SHALL BE USED ONLY UNDER SPECIAL CIRCUMSTANCES AND ONLY WITH APPROVAL OF CITY OF FORT COLLINS UTILITIES LIGHT & POWER.

3. MINIMUM WIDTH AND TYPE OF RESTORATION TO BE DETERMINED BY CITY OF FORT COLLINS UTILITIES LIGHT & POWER INSPECTOR, BASED ON CONTRACTOR'S PRE-ACTIVITY PHOTOS, TO MATCH PRE-EXISTING CONDITIONS.

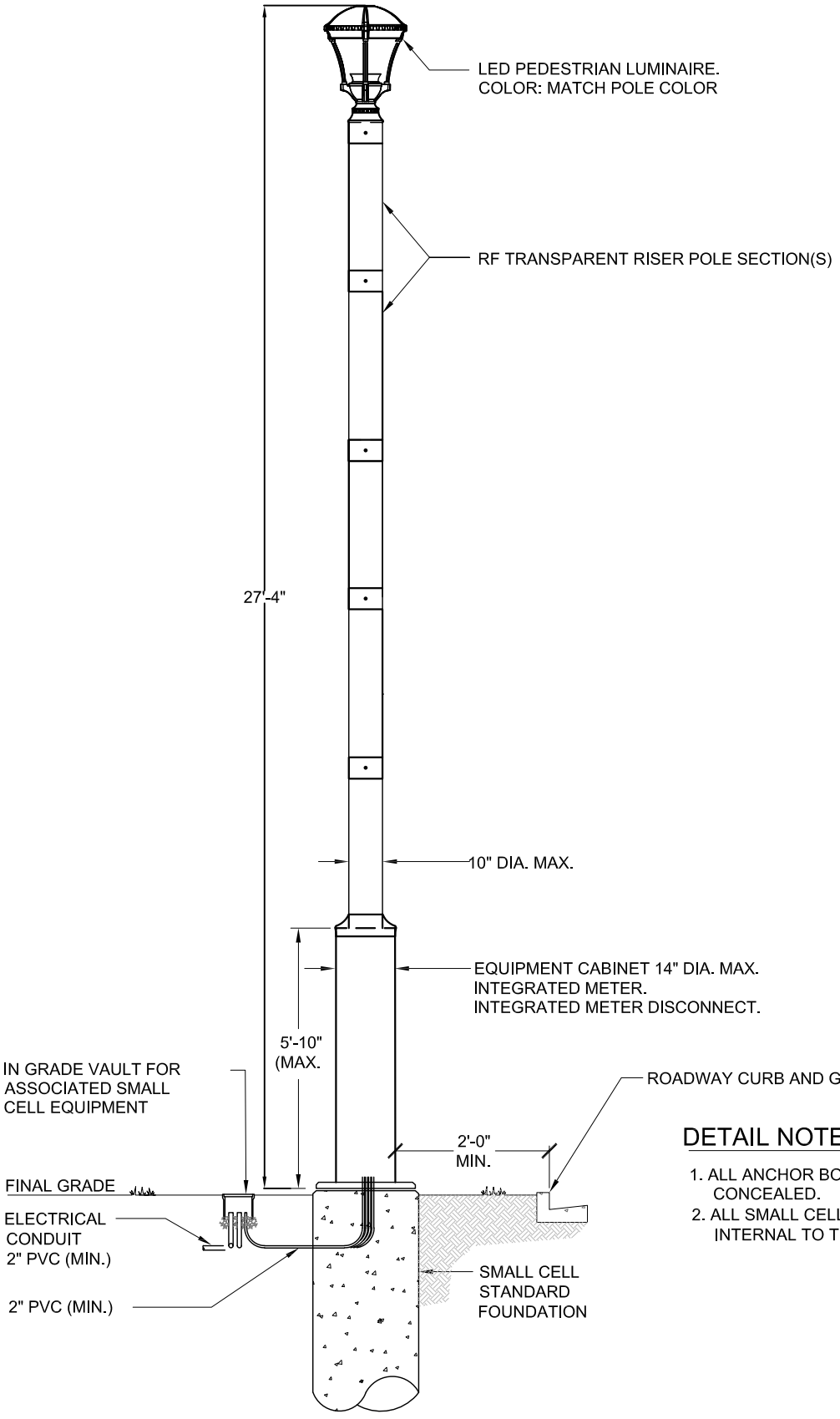
4. SOD REPLACEMENT SHALL BE 12" (MIN.) AND 18" (MAX.) IN WIDTH. ASPHALT REPLACEMENT SHALL BE A MINIMUM OF 24" IN WIDTH. ANY HARDSCAPE (CONCRETE OR PAVERS) SHALL BE REPLACED IN FULL PANELS OR PAVERS OF THE SAME TYPE, COLOR, AND SIZE AS BEFORE. ALL CONDUIT, LANDSCAPE RESTORATION, ASPHALT RESTORATION, AND CONCRETE RESTORATION MUST BE INSTALLED IN ACCORDANCE WITH THE CITY OF FORT COLLINS TRANSPORTATION STANDARD DETAILS.

5. 1-#12 AWG LOCATE WIRE SHALL BE LOCATED IN ALL EMPTY CONDUITS.

6. COLLOCATED SMALL CELLS MAY BE FED FROM THE STREETLIGHT SERVICE.

7. FREESTANDING SMALL CELLS REQUIRE AN INDIVIDUAL SERVICE LATERAL BE INSTALLED AND CONNECTED TO AN ADJACENT TRANSFORMER.

City of Fort Collins	City of Fort Collins Utilities Light & Power	Date: JUNE 2020
	TRENCHING DETAIL	Std. Dwg. No. SC–07



DETAIL NOTES

1. ALL ANCHOR BOLT HARDWARE SHALL BE CONCEALED.
2. ALL SMALL CELL EQUIPMENT SHALL BE HOUSED INTERNAL TO THE POLE.

City of Fort Collins Light & Power	City of Fort Collins Utilities Light & Power	Date: MARCH 2023
	RESIDENTIAL COLLOCATED SMALL CELL POLE DETAIL	Std. Dwg. No. SC-08