

**Pole Attachments, Small Cell Antenna and
Distributed Antenna System (DAS) Below Distribution Conductors**



1. Scope

This standard covers the information necessary to install a small cell antenna or Distributed Antenna System (DAS) on Seattle City Light (SCL) wood distribution poles below the distribution conductor.

2. Application

This standard is used by SCL engineers, crews, customers, and approved contractors for the installation of a small cell antenna or DAS on a wood distribution pole below the distribution conductor.

Refer to SCL 0093.12 for additional requirements regarding identification and labeling of pole attachments.

Refer to SCL 0095.20 for pole top installation of cellular antennas, including small cell antennas.

3. Requirements

3.1 Codes, Permits, and Approvals

All necessary permits shall be obtained by the wireless unit owner.

Only one small cell antenna or DAS installation shall be allowed per pole location.

Installation shall not be allowed on poles where no adequate clearance is available. This includes poles with transformers, capacitors, primary cable terminations, primary switches, or primary metering equipment.

As a rule, installation shall not be allowed on primary corner poles. However, these poles may be allowed on a case-by-case basis with approval by Joint Use Engineering.

Permits and applications for all proposed work, which includes installations, modifications, or relocations shall be reviewed and approved by SCL Joint Use Engineering.

All installations shall meet or exceed all applicable structural and clearance requirements of the latest revision of the National Electrical Safety Code (NESC), as well as SCL construction standards. In case of conflict, the most stringent requirement will prevail. This may result in a pole replacement to accommodate the installation of the added antenna and its associated equipment.

All electrical service to provide power to the small cell antenna and DAS shall meet all applicable National Electrical Code (NEC).

A Non-Ionizing Electromagnetic Radiation (NIER) report shall be submitted to the pole owner(s) and retained on file for each equipment type/model. The NIER report shall be endorsed by a Radio Frequency (RF) Professional Engineer (PE) who is licensed in Washington state. The NIER report shall specify minimum approach distances to the general public as well as to the electrical and communication workers that are not trained for working in an RF environment (uncontrolled) when accessing the pole directly by climbing or aerial lift.

3.2 Service Voltage and Connection

A single phase 120/240 V service voltage will be provided to the small cell and DAS. In some cases, only a single phase 120 V service may be available.

A triplex service wire shall be used, with one wire serving as the messenger. The messenger shall be grounded per Section 3.3.

All service connections shall be made using a parallel connector clamp.

An external disconnect switch shall be required (FCC OET Bulletin 65; WAC 296-62-09005) to allow the antenna to be de-energized before work can be performed within the area designated by the RF caution signs described in Section 3.6. The service disconnect switch shall isolate all electric services including any battery backups. The service disconnect switch shall be either mounted to the communication equipment enclosure or just below it, per Section 3.6.

SCL will make every reasonable effort to notify the antenna owner of outages 24 hours in advance when possible. However, SCL reserves the right to disconnect power to the installation without prior notice when necessary.

3.3 Grounding and Bonding

All conductive parts of the antenna installation on the pole shall be bonded together and grounded to the pole ground or system neutral. See NESC 092C3a and b.

All messengers shall be bonded together and grounded to the pole ground or system neutral.

A copper ground wire, #4 AWG minimum size, shall be installed from the base of the antenna bracket to a ground rod(s) at the base of the pole. The ground wire shall be permanently connected to the ground rod.

If no ground rod exists, one shall be installed. This installation shall meet or exceed the requirements of SCL 0451.01 and Seattle Electrical Code (SEC) 250.53 or the Authority Having Jurisdiction.

If SCL and communication ground rods exist, all ground rods shall be bonded together using #4 AWG copper wire.

3.4 Conduit Risers

Risers at the base of the pole shall be constructed per SCL 0224.34.

Riser extensions up the pole shall be constructed per SCL 0126.04.

All conduits larger than 2 inches in diameter shall be installed on standoff brackets.

Standoff brackets shall be Stock No. 686796 or preapproved equivalent. See SCL 6867.50.

All conduit running from the equipment enclosure box to the small cell antennas or DAS shall be on the face of the pole or match existing conduit risers.

The maximum number of conduits allowed for each antenna installation shall be four (4) conduits total, one (1) for service power and three (3) for the coaxial cables and fiber. The maximum conduit size allowed shall be 4 inches in diameter.

The minimum space between the pole and the closest part of the conduit shall be 4-1/2 inches (for climbing).

3.5 Equipment Mounting

Small cell antennas and DAS equipment shall be installed in the electrical supply space between primary conductor and the common neutral. See clearance requirements in Section 3.9.

In cases where the space between the primary conductor and the common neutral is unavailable or otherwise presents obstacles to proper installation, a guy stub pole can be used. On these poles, the antenna or DAS shall be installed above the secondary service providing power to the antenna. See clearance requirements in Section 3.9.

All work in the electrical supply space shall be performed by SCL crews or its approved contractors.

Only one pole-mounted communication equipment enclosure shall be allowed per pole. The maximum dimensions and weight of the enclosure shall comply with SCL 0094.01.

All communication equipment shall be mounted in a configuration that preserves the climbing space on the pole.

Enclosures shall be located on the street side of the pole unless approved otherwise by an SCL Engineer. See Section 3.9 for clearance requirements.

The power disconnect switch shall be mounted on the same side as the equipment enclosure. It may be mounted directly to the enclosure or below the enclosure. See Section 3.9 for clearance requirements.

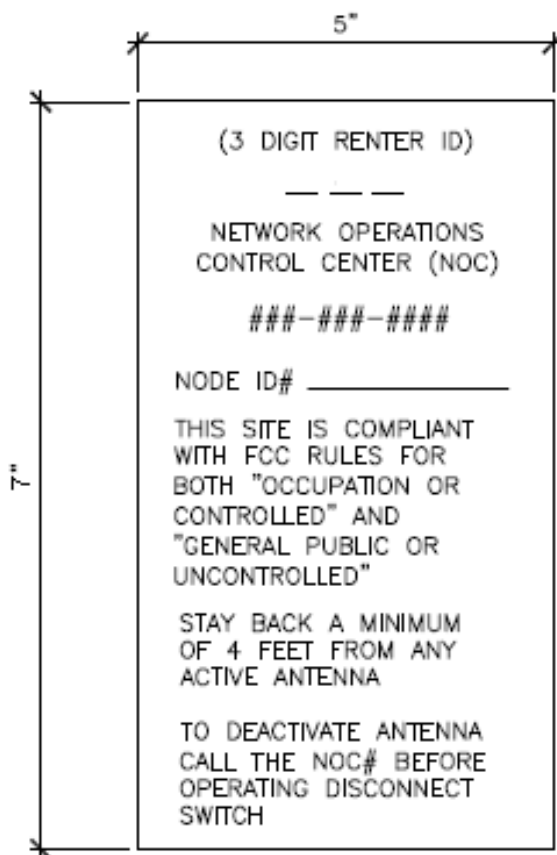
The communication enclosure may be pad mounted, provided no equipment is located closer than 10 ft from the pole.

3.6 Labeling and Caution Tags

The following tags shall be employed for each small cell antenna or DAS installation:

- **Antenna owner identification (ID) and RF notification tags** shall be installed on all equipment enclosures and be clearly visible from the ground. Tags shall contain a unique company equipment ID number and site name as approved by SCL Joint Use Engineering, working clearance, and a 24-hour contact phone number for deactivation notification. See Figure 3.6a.
- **RF caution tags** shall be applied on the equipment enclosure. These shall be clearly marked and visible from the ground and approved by SCL Joint Use Engineering prior to application. See Figure 3.6b.

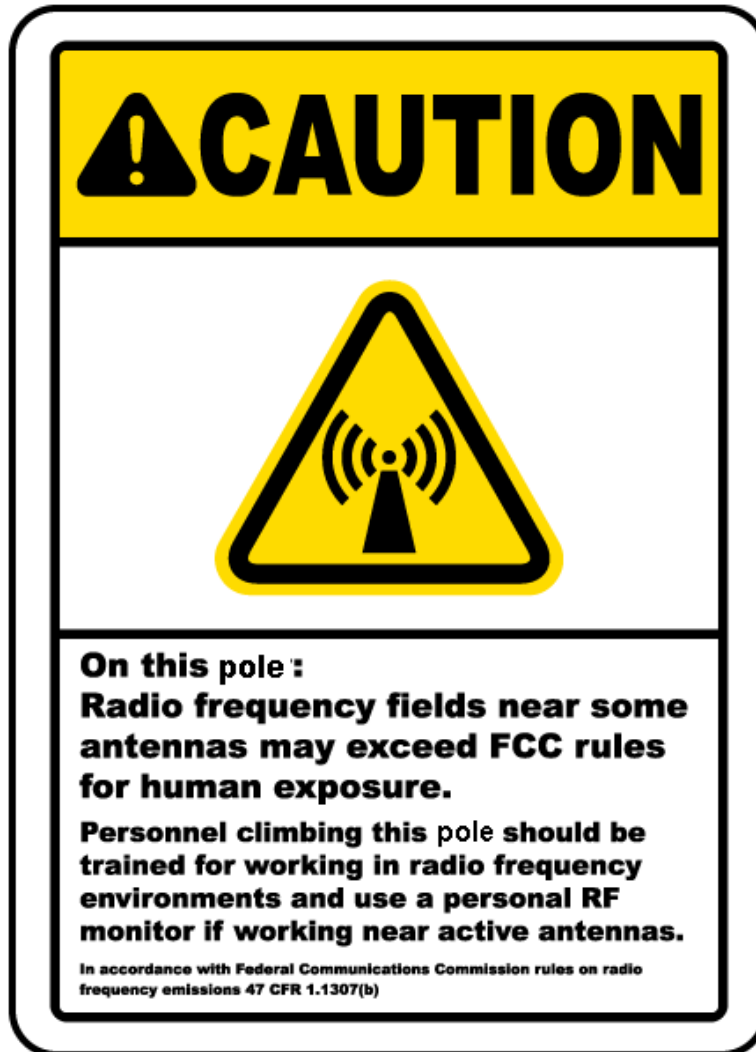
Figure 3.6a. Example of RF Notification Tag for Small Cell or DAS



Notes:

1. 5" x 7" aluminum (yellow with black lettering)
2. Located on side of equipment cabinet
3. Made of weather and corrosive resistant material

Figure 3.6b. Example of RF Caution Tag for Small Cell or DAS



Notes:

1. 5" x 7" aluminum (yellow with black lettering)
2. Located on side of equipment cabinet
3. Made of weather and corrosive resistant material

3.7 Aesthetics and Inspection

Antennas and DAS equipment shall be installed in a manner that allows for maintenance and climbing of the pole by all parties.

Antenna cables shall be installed in a manner that minimizes excess cabling.

The antenna and conduits shall be painted Sherwin Williams Fairfax Brown SW2856.

3.8 Community Notification and Disputes

All required community notifications shall be the responsibility of the antenna owner.

All questions and inquiries resulting from the antenna installation shall be resolved by the antenna owner.

The antenna owner shall provide the SCL Joint Use Engineering with a current phone number for referral of citizen inquiries.

3.9 Clearances

Clearances shall be maintained as shown in Table 3.9 and Figures 3.9a and 3.9b.

Minimum horizontal clearance from the surface of the pole to the antenna panels and pole-mounted equipment shall be 4-1/2 inches.

Table 3.9. Clearances

Description	Clearances
Street-side pole mounted equipment	<ul style="list-style-type: none"> ▪ Equipment enclosure shall be a minimum of 15'-6" above ground. ▪ Power disconnect switch shall be a minimum of 13'-6" above ground, or mounted to the enclosure.
Field-side pole mounted equipment	<ul style="list-style-type: none"> ▪ Equipment enclosure shall be a minimum of 14'-0" above ground. ▪ Power disconnect switch shall be a minimum of 12'-0" above ground, or mounted to the enclosure.
Primary distribution poles	<ul style="list-style-type: none"> ▪ A minimum vertical clearance of 36 inches shall be maintained between the top of the antenna panels and the primary conductor above. ▪ A minimum vertical clearance of 12 inches shall be maintained between the bottom of the antenna panels and the neutral or secondary service conductor below. ▪ The minimum horizontal and/or slant clearance of 36 inches shall be maintained between all conductors energized at primary voltage and all parts of the antenna.
Guy stub poles	<ul style="list-style-type: none"> ▪ A minimum vertical clearance of 12 inches shall be maintained between the top of the antenna panels and the lowest span guy bracket attachment. ▪ A minimum vertical clearance of 12 inches shall be maintained between the bottom of the antenna panels and the secondary service conductor below. ▪ The antenna panels shall be oriented, positioned, or offset to optimize clearance to the down guys.

Figure 3.9a. Small Cell or DAS on Primary Distribution Pole

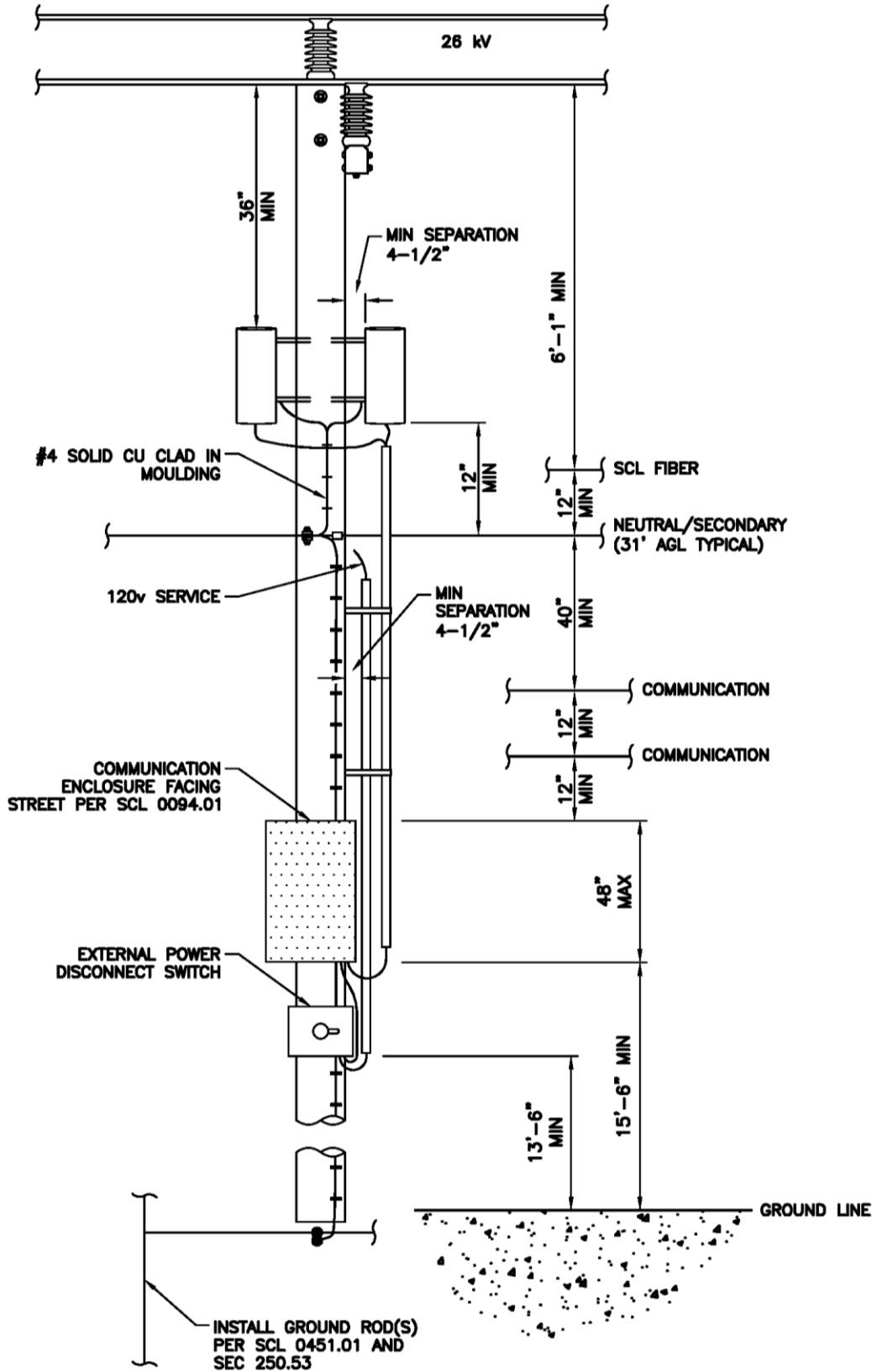
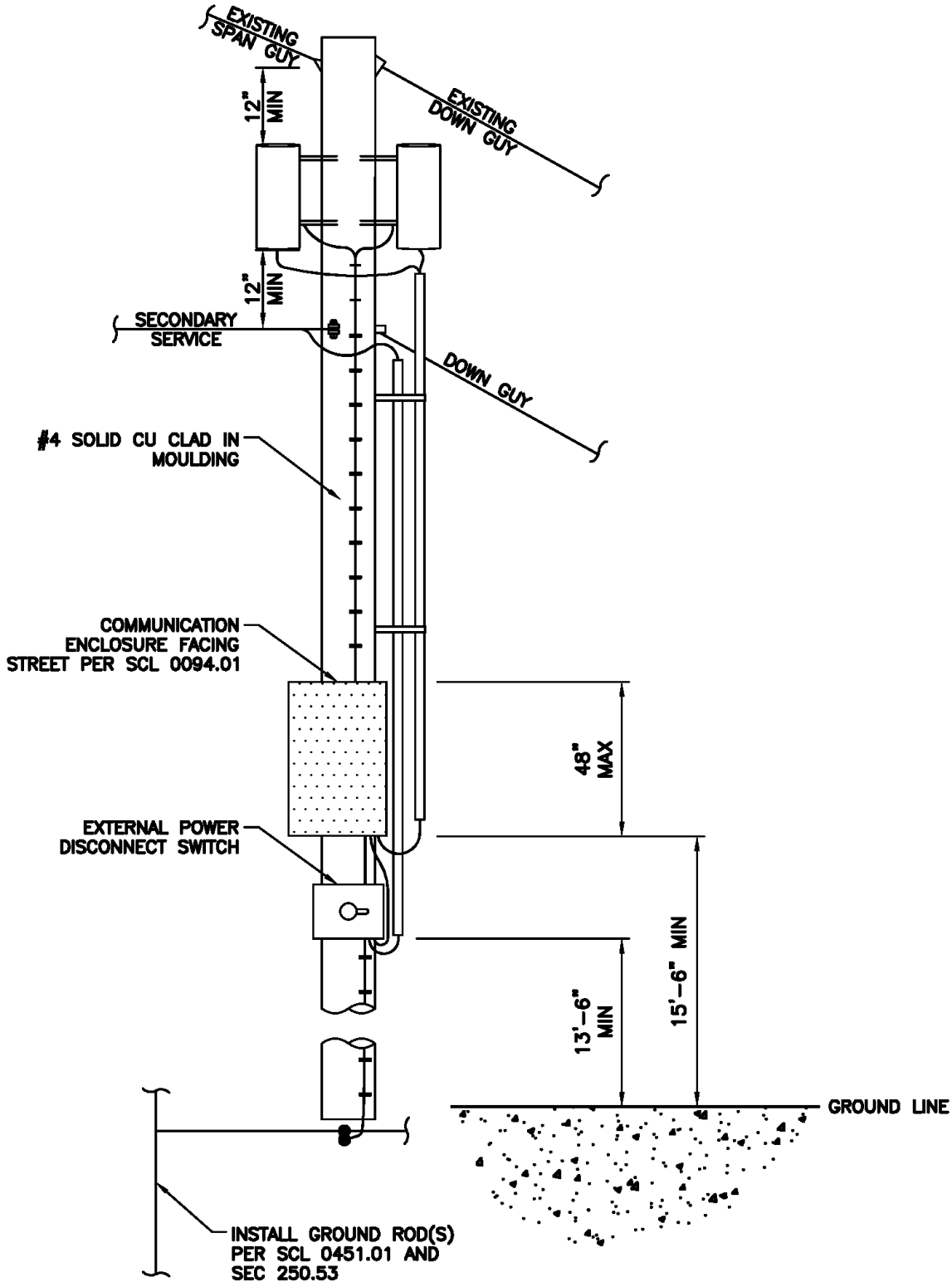


Figure 3.9b. Small Cell or DAS Unit on Guy Stub Pole



4. Construction Notes

Secure (with nylon zip ties) all loose wires and jumpers to minimize flapping and entanglement.

If available, see the manufacturer installation and user's guide for each type of installation for more information.

5. Materials

All materials shall be provided by the antenna owner.

These materials shall meet or exceed SCL specifications where SCL specifications exist. If needed, specialized tools, and training for those tools, shall be provided to SCL as required to assist with antenna installation.

6. References

Federal Communication Commission Office of Engineering and Technology (FCC OET); "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields"; OET Bulletin 65 Edition 97-01, August 1997

National Electrical Safety Code (NESC) C2-2017 Edition; Institute of Electrical and Electronics Engineers (IEEE), 2017

NFPA-70, National Electric Code (NEC); 2011 Edition, National Fire Protection Association, Quincy, MA, 2010

SCL Construction Standard 0093.12; " Pole Attachments, Identification and Tagging"

SCL Construction Standard 0094.01; "Communication Enclosures on SCL Wood Poles"

SCL Construction Standard 0126.04; "Riser Extensions"

SCL Construction Standard 0224.34; "Steel Conduit Risers"

SCL Construction Standard 0451.01; "Grounding Electrodes for Distribution Poles"

SCL Material Standard 6867.50; "Bracket, For Pole Riser Conduit"

SCL 0095.20; "Pole Attachments, Pole Top Cellular Antennas"

SEC 250.53; "Grounding Electrode System Installation"

WAC 296-62-09005; "Nonionizing Radiation"

7. Sources

Federal Communication Commission; FCC Order 11-50

Haberman, Douglas; SCL Joint Use Strategic Advisor; subject matter expert for 0095.15 (douglas.haberman@seattle.gov)

Neuansourinh, Ponet; SCL Standards Engineer and originator for 0095.15 (ponet.neuansourinh@seattle.gov)

RCW 80.36.375; "Personal Wireless Services – Siting Microcells, Minor Facilities, or a Small Cell Network – Definitions"

SCL 0095.05 (canceled); "Pole Attachments, Automated Meter Reading and Cellular Phone Antennas"

SEC 230.43; "Wiring Methods for 1000 Volts, Nominal, or Less"