Technical and Aesthetic Standards for Small Cell Siting

Littleton Electric Light and Water Departments

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Glossary of Definitions and Acronyms

ADA Requirements – (Americans with Disabilities Act) Technical requirements for accessibility to sites, facilities, buildings and elements by individuals with disabilities.

Antenna – The interface between radio waves propagating through space and electric currents moving in metal conductors, used with a transmitter or receiver.

Applicable Standards – means all applicable engineering, safety, and other standards governing the placement, installation, maintenance, and operation of Wireless Communication Facilities and the performance of all work in or around Utility Facilities and includes the most current versions of National Electric Safety Code ("NESC"), the National Electrical Code ("NEC"), the American Public Power Association (APPA) Safety Manual, and the regulations of the Occupational Safety and Health Administration ("OSHA").

Application – A request made to Utility to attach Wireless Communication Facilities upon Utility's Poles, consistent with Article 6 of this agreement.

Attaching Entities – Wireless carriers, infrastructure companies, or others applying to attach to Littleton Electric Light and Water Departments owned equipment.

Bonding - The permanent joining of metal parts together to form an electrically conductive path that has the capacity to conduct safely any fault current likely to be imposed on it.

Cabinet – The housing of small cell equipment.

Conduit - A tube or trough for protecting electric wiring.

FCC – Federal Communications Commission.

FCC Order – "In the Matter of Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment," Declaratory Ruling and Third Report and Order, WT Docket No. 17-79, WC Docket No. 17-84, 2018 WL 4678555, (rel. September 27, 2018) ("Order")

Fiber Backhaul – The portion of the network that is comprised of intermediate links between the core network, or backbone network, and the small subnetworks at the edge of the network.

Grounding - The conductor that connects equipment to the earth via a grounding electrode.

Licensed Frequencies – Devices that operate within the portion of the radio spectrum designated by the FCC to be reserved for organizations that have been granted licenses.

Light Pole – A utility owned pole that is a raised source of light.

Littleton Electric Light and Water Departments – (LELWD) A municipality providing electricity to the towns of Littleton and Boxborough and water to the town of Littleton.

Make-Ready or Make-Ready Work - All work Utility reasonably determines to be required to accommodate Licensee's Wireless Communication Facilities and/or to comply with all Applicable Standards. Such work includes, but is not limited to, field survey work, rearrangement and/or transfer of Utility Facilities or existing Attachments, inspections, engineering work, permitting work, tree trimming (other than tree trimming performed for normal maintenance purposes), and pole replacement and construction, but does not include Licensee's routine maintenance.

Master Agreement – An agreement between the attaching entity and the Littleton electric Light and Water Departments regarding the attachment of small cell infrastructure.

Micro-Cell or Micro Wireless Facility –A wireless facility suspended on cables owned by an entity that has authorized Licensee's use strung between existing Poles that meets the following qualifications: (i) is not larger in dimension than 24 inches in length, 15 inches in width, and 12 inches in height; and (ii) any exterior antenna is no longer than 11 inches.

Mid-Span - The point on a flexural member that is equidistant from the two end supports.

NESC – The National Electric Safety Code.

Pedestals/Vaults/Enclosures/Surface Mounted Cabinets - Above- or below-ground housings that are not attached to Poles but are used to enclose a cable/wire splice, power supplies, amplifiers, passive devices, and/or to provide a service connection point.

Pole - A pole owned or controlled by Utility, including a Jointly Owned pole, used for the distribution of electricity and/or Communication Service that is capable of supporting Attachments for Wireless Communication Facilities.

Pole Attachment Agreement – An agreement made between the Littleton Electric Light and Water Department and an attaching entity that allows an attaching entity to attach to LELWD owned poles.

Pole Loading Analysis – Identifies the forces acting on a pole and analyzes its structural integrity.

Pole-mounted Cabinet – A cabinet that is mounted to a utility or light pole and is used for small cell applications.

Pole-mounted Equipment –Equipment that is mounted to a utility or light pole and is used for small cell applications.

Power Disconnect – A switch that isolates all a service from the source of power.

Power Meter – An electric device that measures energy consumption.

Public Right-of-Way - The Town public right of ways have been established and are maintained primarily for the purposes of transportation movement of vehicles and pedestrians. It is also desirable to grant individuals and utility company's access to utilize Town right of ways for purposes other than transportation.

Restriction Zone – A zone or area that has been designated by the Littleton Electric Light and Water Department as an area with different aesthetical standards. This area is described as…

RF Exposure – Exposure to radiofrequency.

Riser Cable – A cable that travels up or down a utility pole or light pole for the purpose of small cell applications.

Small Cell Equipment - Small cells are low-powered cellular radio access nodes that operate in licensed and unlicensed spectrum that have a range of 10 meters to a few kilometers.

Stand-off Brackets – Brackets that attach to the utility pole that are used to support conduit. Stand-off brackets and straps are to be purchased through LELWD.

Transition Conduit - Conduit transitions to from below ground to above ground.

Wireless Backhaul - The use of wireless communications systems to get data from an end user to a node in a major network such as the Internet or the proprietary network of a large business, academic institution or government agency.

Wireless Facility or Wireless Communication Facility - a facility or facilities owned and/or controlled by Licensee and defined as Small Wireless Facilities by the Federal Communications Commission. Small Wireless Facilities include those facilities intended to be used for the provision of personal wireless service as defined at 47 U.S.C. § 332(c)(7)(C), including, but not limited to, antennas, remote radio heads, transmitters, transceivers, and related Equipment. For the removal of doubt, wireline facilities used for backhaul are not Wireless Communication Facilities.

1 Introduction

The Littleton Electric Light and Water Departments (LELWD) has established these technical and aesthetic standards (Standards) to govern access to and use of LELWD poles by wireless carriers, infrastructure companies, or others (collectively referred to as "Attaching Entities" or "Applicants") for installation of small Wireless Facilities, as defined by the U.S. Federal Communications Commission. These facilities are commonly called "small cells." The small cells and all associated equipment are referred to in these standards as "Wireless Facilities."

These standards are intended to protect the primary purposes of utility poles, light poles, and other fixtures (that is, to support utility cables and equipment and to provide illumination) and to ensure public safety and utility employee safety. The technical standards describe in detail whether and how a particular structure can be used for Wireless Facilities attachment. After a proposed placement is determined to be acceptable according to the technical standards, the aesthetic standards then ensure that the technically feasible options are also aesthetically acceptable.

These Standards are part of an evolving process that considers the ongoing development of communications technologies as well as a recent FCC order entitled "Accelerating Wireline Broadband Deployment by Removing Barriers to Infrastructure Investment" (the Order).[1] The Standards may be amended to accommodate future technological and regulatory changes as well as the needs of LELWD.

All Attaching Entities must follow the most current version of the National Electrical Safety Code (NESC) and all other applicable engineering standards, FCC standards, and other federal, state and local standards and codes. These LELWD Standards use national safety standards and federal rules as a foundation, but LELWD's unique operational requirements, as well as local aesthetic requirements, also inform these Standards.

[1] "In the Matter of Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment," Declaratory Ruling and Third Report and Order, WT Docket No. 17-79, WC Docket No. 17-84, 2018 WL 4678555, (rel. September 27, 2018) ("Order") (available online: https://docs.fcc.gov/public/attachments/FCC-18-133A1.pdf).

2 Pre-Application Requirements

LELWD has created an application form that accompanies these Standards. The form may be downloaded at www.lelwd.com. Before LELWD will accept an application, Attaching Entities must complete the following steps.

2.1 Execute Master Agreement

Attaching Entities must execute a master agreement with LELWD prior to making an application to install equipment on LELWD poles. Attaching entities must contact LELWD at (978) 540 - 2222 to obtain the forms and procedures. The master agreement contains the terms and conditions for Wireless Facilities attachment on LELWD poles. All associated fees defined in the master agreement.

2.2 Submit a Complete Application

Applications must be fully completed before they will be considered by LELWD. Applications may be submitted to Nick Lawler, General Manager at nlawler@lelwd.com via the online application form.

3 Review, Approval, and Construction Process

LELWD will review the application and the design proposed by the Applicant. If the application does not comply with these Standards, LELWD will reject it and send it back. Terms, conditions, and procedures on make-ready, pole replacement, installation, and maintenance work are outlined in the master agreement. Pole replacement and structural analysis requirements are described in Section 4.3 of these Standards.

Once LELWD approves the application, LELWD will perform any required make-ready (in the power space on utility poles, or on LELWD-owned streetlights), will notify Attaching Entities consistent with existing LELWD policy, and will replace utility poles and streetlights as necessary. Payments must be made in advance for this work.

If LELWD determines that the pole needs to be replaced to provide space and clearance or other reasons, the Applicant shall pay for the cost of pole replacement and all other make-ready. If new poles are needed, LELWD shall install and own the new poles. Payment must be made in advance for this work.

The Applicant shall provide on-site training of LELWD personnel to safely install and maintain the Wireless Facilities equipment, as well as RF occupational training related to working in close proximity to this equipment. The Applicant shall hold training annually to ensure continued compliance with updated versions of the NESC, FCC, federal, state, and other applicable standards and codes.

LELWD shall perform all work in the utility pole power space, including installation and maintenance. Once the make-ready is done, LELWD will authorize the Attaching Entity to do the approved work below the power space on utility poles and on light poles.

Technical drawings identifying all electrical specifications and requirements for the Wireless Facilities attachment shall be provided to LELWD and should accompany every application.

LELWD shall consider complete applications received from multiple Attaching Entities to attach to the same Pole on a “first-come, first-served,” non-discriminatory basis.

- If LELWD receives a subsequent application for the same pole from a second prospective Attaching Entity following acceptance of a complete application and prior to completing make-ready electrical construction or issuing a Notice to Proceed on said first application, LELWD shall reject the second application and any subsequent applications for the same pole, if there was no consideration of the proposed attachments from the application which was first in time.

- LELWD will reconsider the rejected application if it is revised and resubmitted to eliminate the conflict with the first in time application previously approved.
- In the event the Attaching Entity fails to pay for make-ready construction within the timeline in the agreement, LELWD will reject the application and accept other applications for that pole.

4 Small Cell Equipment Standards

This section describes LELWD's technical and aesthetic requirements for small cells.

The FCC report and order defined small cell antennas as three cubic feet or less and associated equipment as twenty-eight cubic feet or less. Height criteria for small cell structures include: (1) fifty (50) feet in height or less; (2) or structures that are no more than ten (10) percent higher than that of adjacent structures; or (3) does not extend existing structures upon which the equipment is located to a height of more than 50 feet or by more than 10% whichever is greater.

4.1 Pole-Mounted Equipment

As of the date of this version of the Standards, typical pole-mounted small cell equipment comprises:

1. Antennas on the top of pole.
2. Radios, fiber terminations, and other equipment located in enclosures or cabinets.
3. A power meter and power disconnect switch, usually located in two separate, smaller enclosures.
4. Power disconnect with lockout provisions must be mounted outside areas that exceed RF exposure limits (per FCC and Commonwealth of Massachusetts regulations).

Figures 1 through 3 are conceptual drawings intended to demonstrate the basic elements of a small cell attachment and how they typically fit together; the drawings are not to scale or representative of actual structures.

Figure 1 is an example of a small cell on a utility pole. Figure 2 illustrates a small cell on a light pole. Figure 3 shows a small cell on a customized light pole designed to conceal the cabinet. Detailed drawings are provided in Appendix A.

Figure 1: Conceptual Drawing of a Small Cell on a Utility Pole

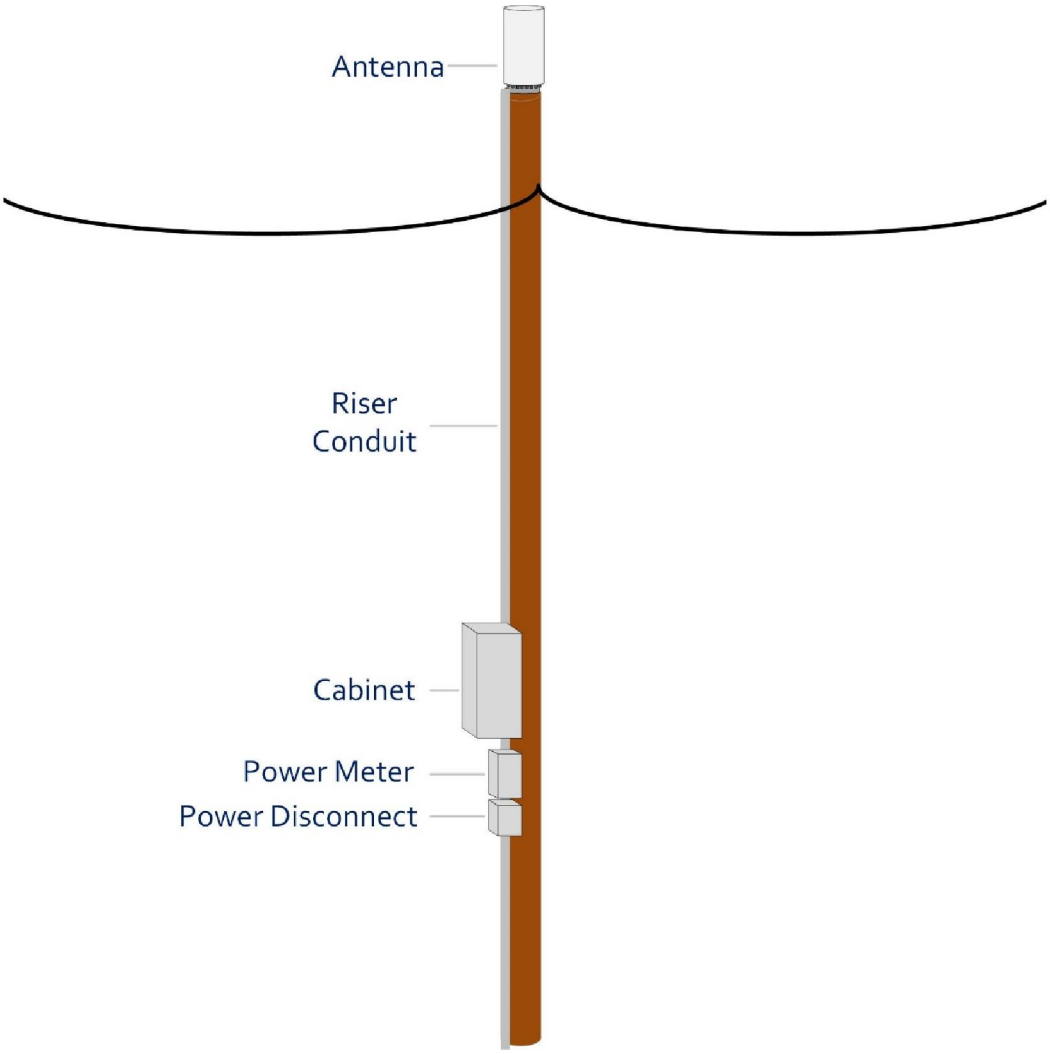

Figure 2: Conceptual Drawing of a Small Cell on a Light Pole

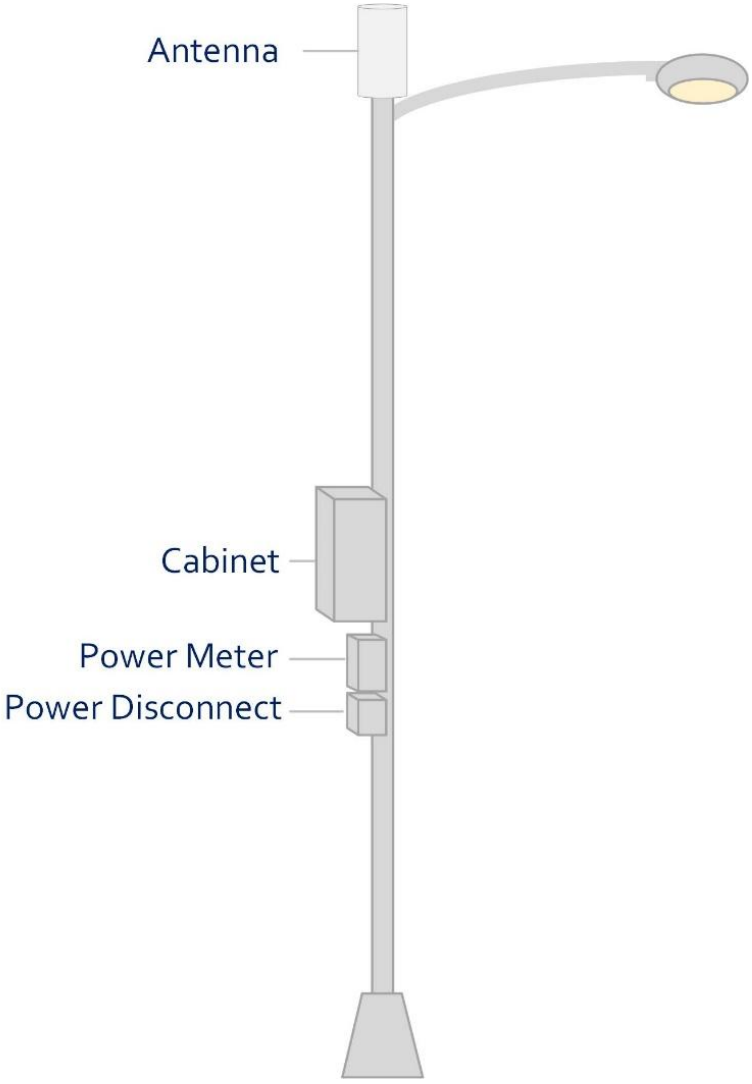

Figure 3: Conceptual Drawing of a Small Cell on a Light Pole with Concealed Cabinet

In all cases, the placement of small cells shall be consistent with existing structures and aesthetics, in harmony with the surroundings, and as unobtrusive as possible.

For example, in areas with decorative light poles, small cells on light poles must be consistent with the existing decorative light poles, calling for a design that is comparable in scale and incorporates the design characteristics of those poles.

In the event an Applicant seeks to place a small cell in a manner that does not comply with the aesthetic standards, it must request a waiver from LELWD.

4.2 Order of Preference – Location

The order of preference for the location of small cell installations in the Town located upon Town right-of-way adjacent to certain zoning districts, from most preferred to least preferred is:

1. Road right-of-way areas (except those adjacent to municipal parks, residential areas or the town common area)
2. Commercial Zone (General commercial zoning adjacent, retail and commercial areas)
3. Mixed Commercial and Residential Zone (Town common, the historic center of town, etc.)
4. Residential Zone (Town Residential, other residential areas, etc.)
5. Parks (on right-of-way adjacent to parks)

4.3 Use of Wooden Utility Poles

LELWD's order of preference for siting Wireless Facilities on wooden utility poles is contained in the following list. If no such poles are available, Attaching Entities should submit an application for making attachments on poles they find suitable and LELWD will review the application and consider moving existing attachments at the Attaching Entity's cost. LELWD maintains sole discretion over the suitability of the pole.

1. Stub poles
2. Poles with no primary that are at an intersection
3. Poles with no primary that are near a property line
4. Non-decorative streetlights, if replaced by a streetlight meeting these standards
5. Other poles without primary if the Applicant can show there is no other viable option
6. Decorative streetlight poles replaced with a pole that is aesthetically in keeping with the replaced pole

Wireless Facilities shall not be installed on:

- Poles containing controls such as fire alarm, police signal, or traffic signals;
- Poles with capacitor controls, regulator controls, recloser controls, air switch operating handles, or an existing three-phase overhead transformer bank;
- Poles with single-phase transformers that are not accessible to mechanized equipment (i.e., a bucket truck);
- Poles with underground electric or communication riser conduits; poles not accessible to mechanized equipment (i.e., a bucket truck); or
- Double-circuit poles.
- Poles with cable nodes, power supplies, line amplifiers or fiber cabinets.

- Poles with Advanced Meter Infrastructure (AMI) such as CGR's, Mesh Nodes or other equipment required to operate the LELD AMI system.

Risers must be the same color as the pole and mounted on back side of the pole. Messenger strand shall be bonded.

Risers feeding ground mounted cabinets shall be installed using standoff brackets which must be purchased from LELWD.

4.4 Utility Pole Replacement or Structural Analysis Requirement

The standard and default approach for attaching to utility poles will be for the pole to be replaced by LELWD at the Attaching Entity's cost to accommodate a new wireless facility attachment. Any poles in poor condition (per the judgment of LELWD) or that are 10 or more years old shall be replaced with Class 2 pole (at a minimum) with adequate height to accommodate equipment. Pole top extensions shall not be used. If additional height is needed a new pole shall be installed. New or replacement pole height shall not exceed 55' unless authorized by LELWD. Antenna height must not exceed 55' above grade.

If the Attaching Entity believes the pole may provide space and structural support for all existing attachments, plus the proposed Wireless Facilities attachment, the Attaching Entity shall provide an engineering design and Pole Loading Analysis (PLA) calculations to justify the use of the existing pole.

Each PLA must be undertaken by a Registered Professional Structural Engineer licensed in the Commonwealth of Massachusetts (Engineer) to undertake and complete the engineering design, the physical testing of pole integrity, and PLA calculations. LELWD reserves the right to approve the contractor and/or consultant selected to perform this work; such approval shall not be unreasonably withheld.

Acceptable software for PLA calculations shall be a commercially available product with general industry acceptance. Should the Applicant or its contractor use a commercially available software application that LELWD does not possess, the Applicant shall make available to LELWD at least one software license. The Applicant will gather the physical and technical information required to conduct a PLA.

4.5 Use of Light Poles

A utility light pole that is replaced with a new pole must be replaced with a new pole at the same location that is designed primarily to serve the purpose of the original pole (i.e., lighting) while also serving as a supporting structure for the Wireless Facilities attachment.

The standard approach will be for a light pole to be replaced with a light pole designed to accommodate the small cell. In the event the Applicant believes the existing pole can support the structure and fulfill all other aesthetic and technical standards, the Applicant shall provide an industry-standard PLA certified by the Engineer indicating that the specific pole will safely support the load.

Replacement poles shall resemble existing poles (To be provided by LELWD at the cost of the customer unless otherwise specified):

- 15’ Fiberglass Town & Country Poles
- 27’ Aluminum Poles

4.6 Mid-Span Microcell Installations

Microcell wireless equipment can be attached to existing or proposed wireline installations. All mid-span installations shall be no closer than 15 inches and no further than 72 inches from an LELWD pole, including any attached external antenna. Midspan wireless installations cannot exceed 18 inches in length, 15 inches in height, and 12 inches in depth. The Attaching Entity shall provide engineering design and pole loading analysis (PLA) calculations to justify the use both adjacent poles. Power disconnect is typically located on one of the strand-mounted components, on the outside.

5 General Technical and Aesthetic Requirements and Guidelines

- Subject to further discussions, Wireless Facilities shall be installed with a minimum 30-foot setback from residential buildings and a minimum 20-foot setback from commercial buildings.
- LELWD prefers the use of poles at intersections and lot lines.
- No new poles should be installed where poles do not currently exist, unless the Applicant can demonstrate to LELWD's satisfaction that there is no other option to provide service.
- If new poles are to be installed in the public right-of-way, the Applicant shall be solely responsible for obtaining all permits and approvals required under state law and/or local regulation.
- Wireless Facilities by a single provider should be installed with a minimum spacing of 500 feet in residential areas.
- LELWD prefers the use of stealth design elements, such as shapes and colors that match surrounding infrastructure and minimize adverse visual impacts.
- LELWD prefers the use of tapered shapes that smoothly integrate into structures (avoiding, for example, new rectangular boxes).
- The Applicant shall minimize the size and aesthetic difference between a replacement structure and the original pole or structure. (Size requirements defined in section 4)
- In designated areas, Wireless Facilities should use banners and coloring to match surrounding light poles and fixtures.
- No facilities shall be installed in a park or in a right-of-way within 250 feet of a park without prior permission of the Parks Commission.

5.1 RF Exposure

Attaching Entities shall comply with all provisions and guidelines of the FCC OET Bulletin 65, as may be amended from time to time, and shall submit a report certifying FCC OET 65 compliance for each Wireless Facilities installation. The following elements, at a minimum, must be contained within the report:

- A statement of compliance (or non-compliance) per FCC and Commonwealth of Massachusetts regulations;
- Date of the report;

- Date of statement of compliance;
- Pole number proposed for the Wireless Facilities installation;
- Attaching Entity's site or identification number for the Wireless Facilities installation;
- GPS coordinates of the proposed pole;
- Calculation of RF power at the radios or other electronics;
- Calculation of RF power at the antennas; and
- Location of the applicable signage with above ground level height listed.
- Upon installation, the Applicant shall perform RF field tests while the Wireless Facility is in operation, supervised by LELWD to demonstrate compliance with FCC OET 65. LELWD may request more texts if deemed necessary by LELWD.
- Any change in antenna configuration or RF parameters shall require an RF field test to be performed again.
- Photographic simulation with three different line of sight viewpoints.

5.2 RF Signage Requirements:

Approved signage compliant with FCC OET Bulletin 65 shall be posted at each Pole or Streetlight Pole hosting a Wireless Facilities installation, and/or at multiple locations on such pole structure as required by FCC OET 65.

The RF signage shall comply with the appropriate and predetermined exposure level applicable to: "General Public", "Occupational Worker", and "Specialized Worker" as shown in Figure 4 below. All signage shall be low visibility; signs should be no larger than 8" x 12" and made of weather, corrosion, and Ultra-Violet (UV) resistant materials.

Figure 4: RF Signage

5.3 Emergency RF/ Power Shut-Off

Each approved Wireless Facilities installation shall have a clearly marked disconnect switch adjacent to the electronics cabinet and located outside areas that exceed RF exposure limits. The disconnect switch must have provisions for a pad lock to be installed for the workers safety. Once the shut-off switch is placed in the open position, the electronics equipment related to the installation shall not be energized. Additionally, no RF transmissions shall be emitted by any antenna related to the installation.

5.4 Riser Cable

Riser cables to connect antennas and antenna accessory equipment, backhaul services, and power lines shall be in u-guard or conduit on the back side of wooden utility poles with top side weatherheads. Power cables transporting AC power shall be in separate u-guard or conduit from DC power or telecommunications cable.

5.5 Conduit Requirements

All conduit affixed to poles shall be Schedule 40 PVC. No conduit shall pass through the power space. The conduit should be painted to match the pole color. These conduits shall not exceed a diameter of two inches (2”). Only the minimum number of conduits necessary for the attachment shall be placed. No exposed riser cable slack shall be stored externally. All slack shall be stored in junction boxes or equipment cabinets or on snowshoes on the aerial cable. On light poles, no cables shall be visible on the exterior of the pole.

5.6 Transition conduit

Conduit transitions to above ground shall be in schedule 40 RGS conduit bonded to ground with galvanized finish. All coupling points shall be threaded mechanical or solvent-welded and watertight. All transition conduit shall be installed using stand-off bracket hardware supplied by LELWD.

5.7 Licensed Frequencies

Antennas shall only transmit or receive frequencies that are licensed by the FCC to the Applicant or to the carrier the Applicant represents. In the event the Applicant wishes to add another carrier or change the carrier network using the Wireless Facilities, the Applicant shall notify LELWD in writing of the change in carrier and frequencies.

Frequency bands listed by the FCC to be unlicensed and available for open use, may be transmitted or received, as long as they do not cause interference with another Attaching Entity, FCC-licensed entity, LELWD, or the Littleton or Boxborough Fire, Police and Highway Departments.

If LELWD, the Town of Littleton or the Town of Boxborough experiences interference, the Attaching Entity or its successor shall pay for an expert third-party review and remediate the interference. LELWD reserves the right to remove the equipment if the interference is not corrected within two weeks of discovery. If an entity if working toward a solution, LELWD has an option to grant an extension beyond the two week time-frame.

5.8 Attachment Position and Defined Space

In no circumstance shall an antenna clearance be less than specified by the NESC. Radio equipment shall be housed in the wireless equipment cabinet. Non-antenna equipment shall not be mounted within the antenna area or pole top space.

5.9 Point of Demarcation

The Backhaul Network Interface Device and point of demarcation are to be clearly identified on the submitted engineering drawings, as required in the Application, with the provider of backhaul services clearly identified.

5.10 Fiber Backhaul

The method for connecting backhaul to wireless facilities shall be connection of LELWD-provided dark fiber to the Wireless Facilities at the point of demarcation. LELWD has right to first refusal regarding any new fiber backhaul. The preferred approach shall be for LELWD to construct dark fiber from its network-to-network interconnection point in XXX to the Wireless Facilities and provide a connectorized pair of fibers and slack cable at the point of demarcation.

If LELWD does not have any available fiber backhaul, then they may refuse to provide dark fiber to the attaching entity.

If the point of demarcation is on a utility pole, LELWD shall construct the fiber to the cabinet with 20 feet of cable slack.

If the point of demarcation is in a slab-mounted cabinet, with the antenna on a utility pole, LELWD shall construct the fiber to the pole with sufficient additional slack to enable the Applicant to pull the fiber to the cabinet and connect through its own conduit to the point of demarcation.

If the antenna is on a streetlight pole, with the point of demarcation in a cabinet on or in the pole, LELWD shall construct the fiber in underground conduit to a meet-me handhole near the base of the pole, with 50 feet of slack.

If the antenna is on a streetlight pole, with the point of demarcation in a cabinet on a slab, LELWD shall construct the fiber in underground conduit to a meet-me handhole near the slab, with 50 feet of slack.

Fiber provided by LELWD shall comply with the G.652D standard. Typical LELWD fiber construction uses ADSS cable installed aerially in the communications or power space or in underground conduit, depending on the local conditions.

Fiber shall be tested end-to-end by LELWD before handoff to the Applicant. Testing shall be deemed successfully completed if: (1) maximum fiber losses meet manufacturer specifications, with an allowance for splices and connectors; (2) individual splice losses do not exceed 0.1 dB; and (3) maximum mated connector losses do not exceed manufacturer specifications. Testing will be performed by LELWD personnel and may be observed by designated representatives of the applicant.

LELWD shall be responsible for maintenance of the fiber according to the terms of the master license agreement.

An alternative method of connecting backhaul to wireless facilities is for the applicant to construct its own fiber, or for the applicant to contract with a third party to construct the fiber. If it seeks to attach the fiber to LELWD utility poles, the applicant or the third party constructing the fiber must have a separate pole attachment agreement, and the fiber installation must comply with all policies and procedures for third-party wireline pole attachment.

5.11 Wireless Backhaul

The Wireless Installation can be connected via wireless backhaul services. The volume and height of any antenna used for wireless backhaul services is counted towards the total antenna size in Section 5.15.

5.12 Backup Power

Battery backup power devices shall be installed with a transfer switch to prevent back-feeding into the electrical system. No other types of backup power shall be permitted.

5.13 LELWD Work on a Pole

LELWD shall open the Service Disconnect Switch prior to performing any work on an LELWD pole in order to de-energize the Antenna. Any backup power shall also be disconnected when the Service Disconnect Switch is operated. LELWD shall de-energize Wireless Facilities prior to performing any work on a pole structure after providing twenty-four (24) hours' advance notice to the Applicant. Such advance notice may be provided by telephone or email. In an emergency, LELWD may de-energize the equipment without prior notice.

5.14 Signage

Attaching Entities shall install 8" x 12" signs or decals made of weather, corrosion, and UV resistant materials easily visible from the ground level. At a minimum, each sign or decal shall indicate the Attaching Entity's name, emergency 24-hour contact number, and unique identifier for that site.

5.15 Pole-Mounted Antennas

The following requirements apply to pole-mounted antennas:

- Any Antenna in the Pole Top Space must have 60 inches clearance from the closest electrical conductor. U-Guard must cover the cables which run from a pole top antenna to the wireless equipment cabinet and must be installed opposite of "B" phase on the pole structure.
- The total volume of pole-mounted antennas must not exceed 3 cubic feet on a single pole.
- Pole-mounted antennas must be no taller than 48" (4 feet).
- Pole-mounted antennas must have a smooth cylindrical shape (ideally, a single canister, or multiple separate antennas placed inside sheeting that is flush with the pole, or a form factor in which multiple antennas merge into a single smooth shape). No separately mounted antennas will be allowed on a single installation (for example, physically separate panel antennas for each sector).

- Pole-mounted antennas must be flush-mounted or placed in line with the pole.
- Antennas on light poles must be same color as the pole. Antennas on wooden utility poles mush be a neutral, unobtrusive color (e.g., black, brown, dark green).

5.16 Cabinets

5.16.1 Pole-Mounted Cabinets

- Cabinets are allowed on the sidewalk side of wooden utility poles.
- Cabinets are allowed on the sidewalk side of light poles except in designated areas.
- An acceptable alternative to external cabinets on a light pole would be equipment placed inside the pole, such as in the base of the pole in a way that integrates with the design of the pole.
- Cabinets mounted on poles must have at least a 12-foot clearance from the ground, or the minimum clearance required by the latest edition of the National Electrical Safety Code (NESC), whichever is greater.
- Cabinets must be flush-mounted to poles.
- Rectangular cabinets on poles are limited to 48" (height) by 24" (width) by 18" (depth); cabinets that are non-rectangular in shape must be comparable or less in volume and visual impact.
- LELWD prefers placing pole-mounted equipment in enclosures with tapered shapes, which are less obtrusive than rectangular cabinets.
- The power meter and power disconnect switch must be located below the cabinet or (in the case of a light pole) inside the pole.
- Cabinets on light poles must be same color as the pole. Cabinets on wooden utility poles must be a neutral, unobtrusive color (e.g., black, brown, dark green).

5.16.2 Surface-Mounted Cabinets

- Surface-mounted cabinets must be on a concrete slab, and where possible must be placed next to existing pedestals and cabinets (for example, near traffic signal controllers, transformers or other utility pedestals).
- Surface-mounted cabinets must be the same color as other nearby pedestals or cabinets. Where there are no other nearby pedestals or cabinets, the cabinets should be the same color as the pole housing the antenna.

- Surface-mounted cabinets must be no larger than 10 cubic feet in volume, and with height, width, and depth each not exceeding 3.5 feet.
- All equipment located within the right-of-way shall be located such that it meets ADA requirements and does not obstruct, impede or hinder usual pedestrian or vehicle traffic.

5.17 Lighting and Noise

- No lighting is allowed on Wireless Facilities attachments; if there are lights on the supplied equipment, they must be covered, removed, or deactivated.
- Wireless Facilities attachments may not create noise in excess of state and local limitations prescribed by laws and regulations.
- Attaching entities are required to incorporate noise suppression measures or place equipment in locations less likely to impact adjacent residences or businesses to ensure compliance with all applicable noise regulations. Where applicable, remediation including relocation of equipment must be implemented by the Attaching Entities.

5.18 Bonding and Grounding

Per the guidelines stated in the NESC, it is the policy and practice of LELWD to ground all Pole structures installed as part of LELWD's distribution system and streetlight service. Attaching entities shall ground their equipment to the multi-ground neutral vertical provided by LELWD. All of the following defined Wireless Facilities components, or pole appurtenance listed, must be bonded:

- Antenna(s)
- Antenna brackets (if applicable)
- Riser conduit(s)
- Radios and other electronics
- Cable messenger strand

Appendix A: Pole-Mounted Wireless Facilities Typical Drawings

Figure 5: Pole with Secondary Power and Antenna on Top Space with Slab-Mounted Equipment Cabinet

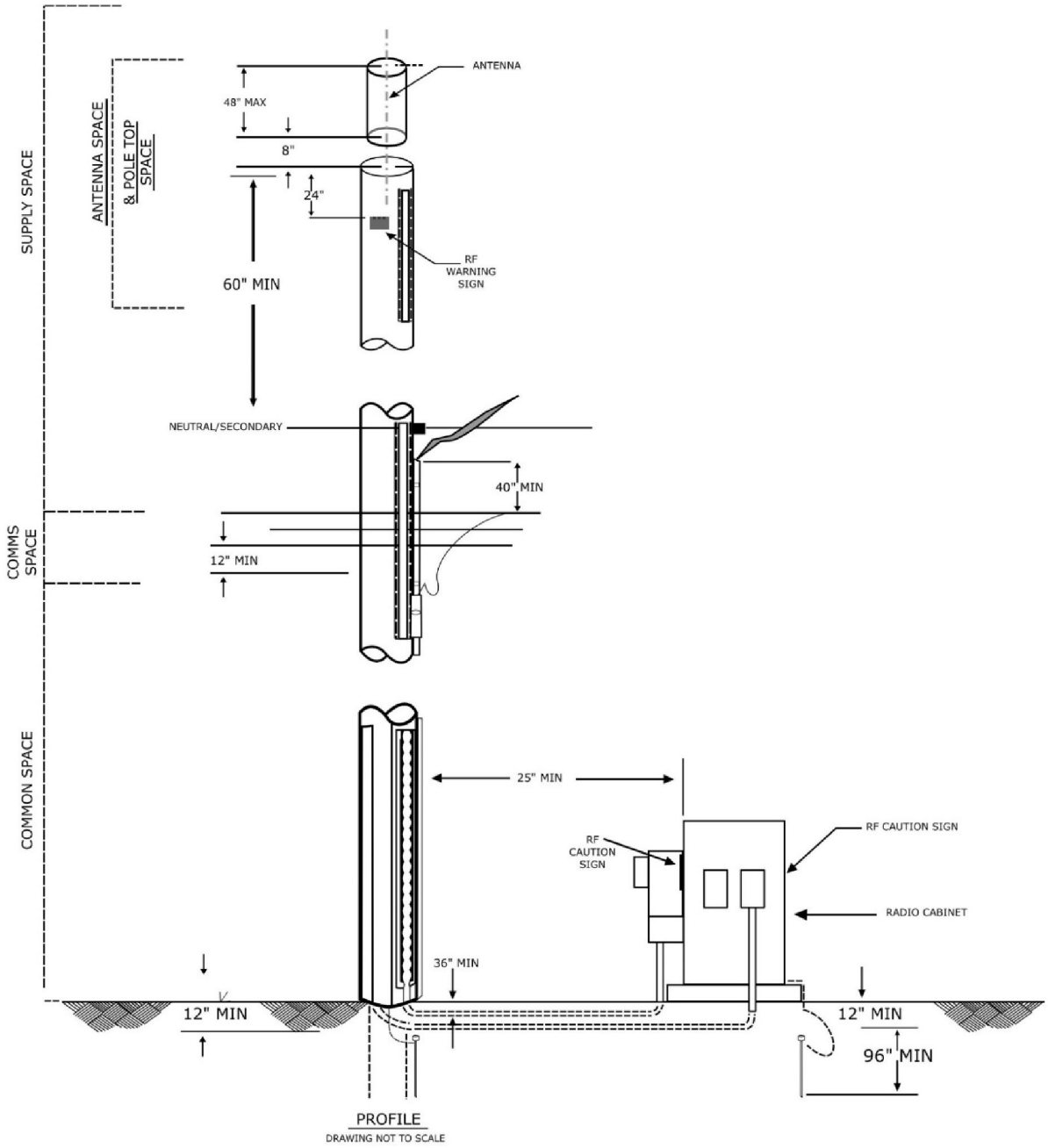

Figure 6: Pole with Secondary Power and Antenna on Top Space with Pole-Mounted Equipment Cabinet

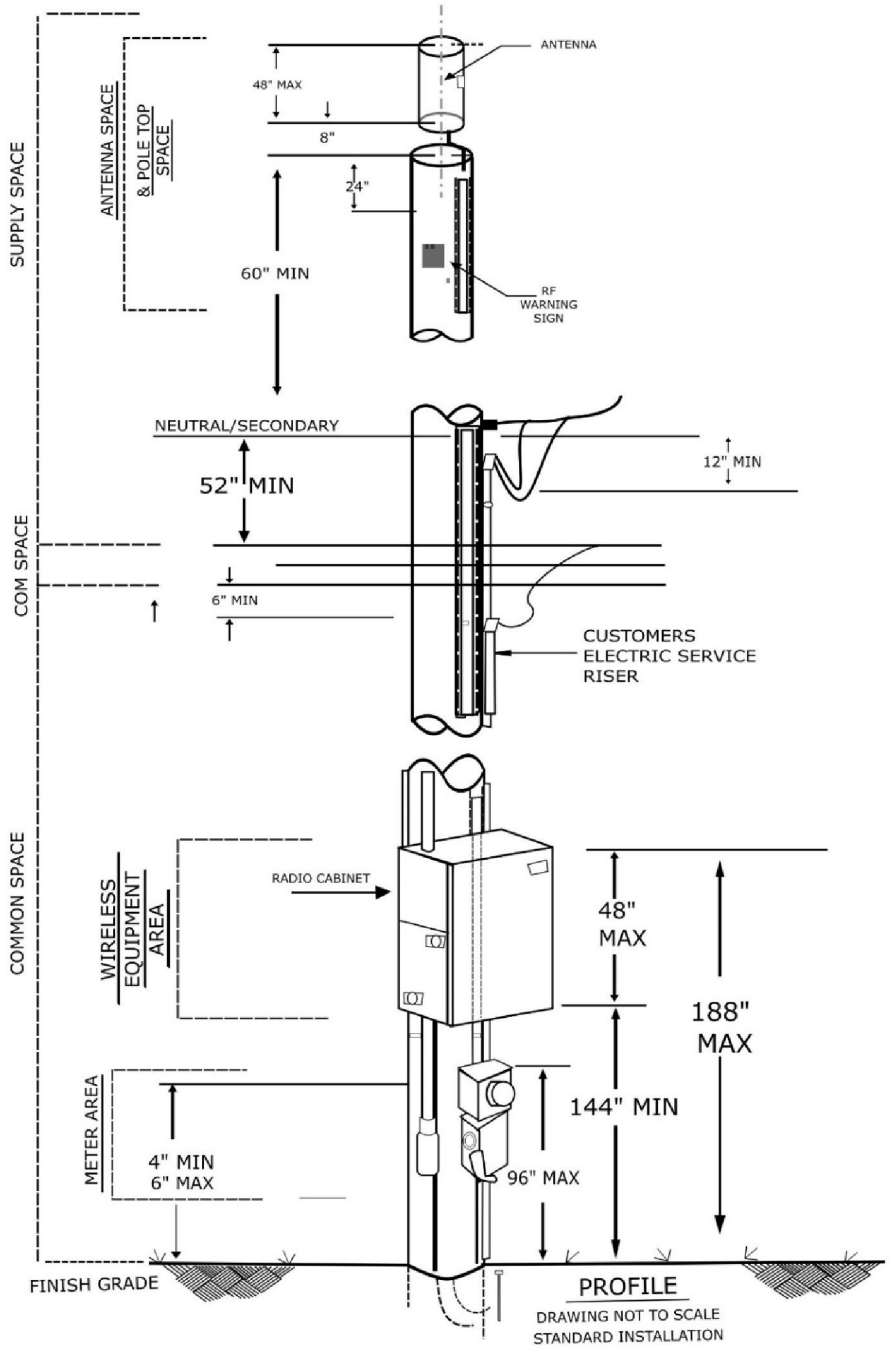

Figure 7: Pole with Secondary Power and Antenna on Top Space with Overhead-Fed Streetlight and Slab-Mounted Equipment Cabinet

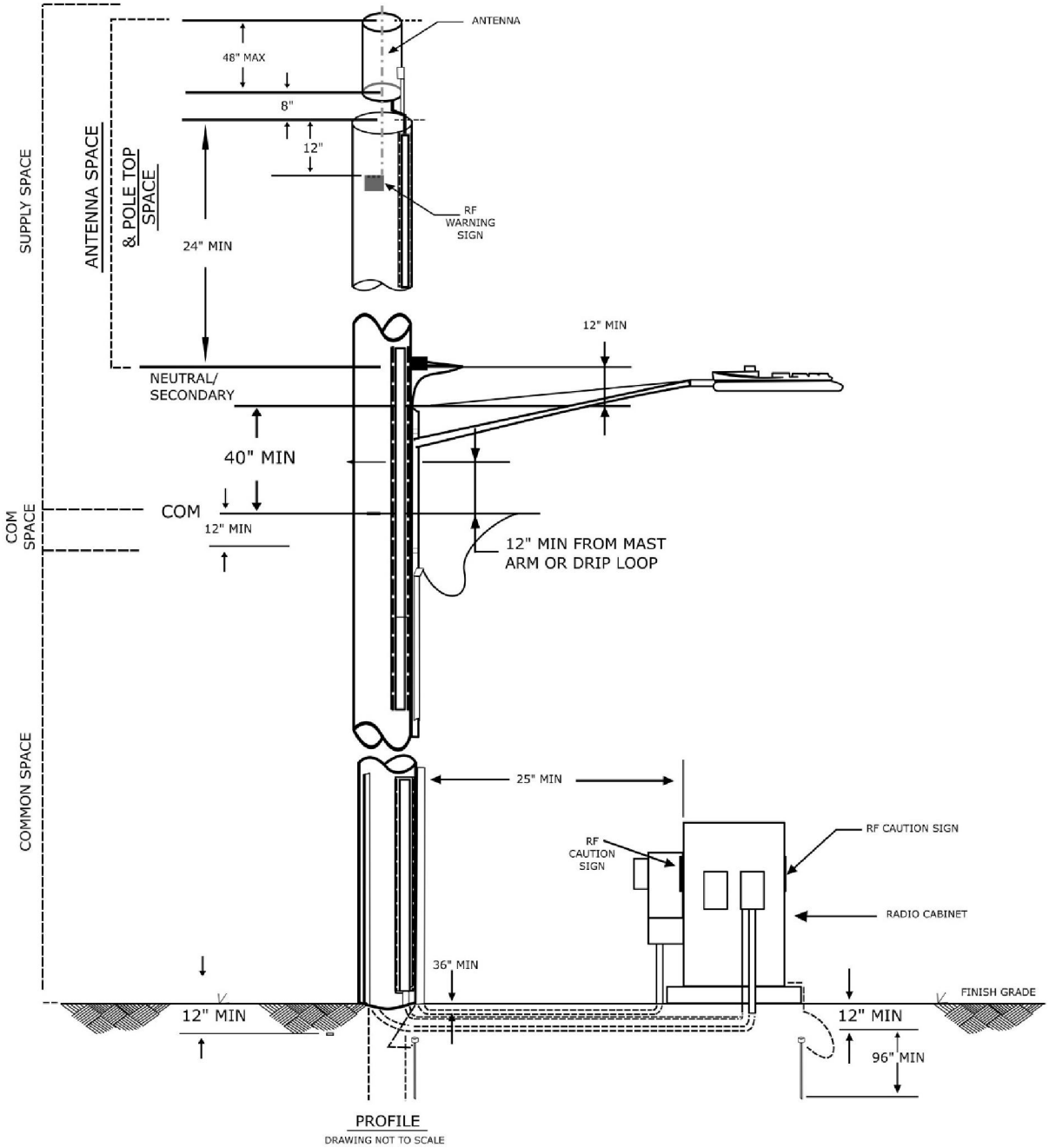

Figure 8: Pole with Secondary Power and Antenna on Top Space and Overhead-Fed Streetlight Pole with Mid-Pole Wireless Backhaul Antenna and Slab-Mounted Equipment Cabinet

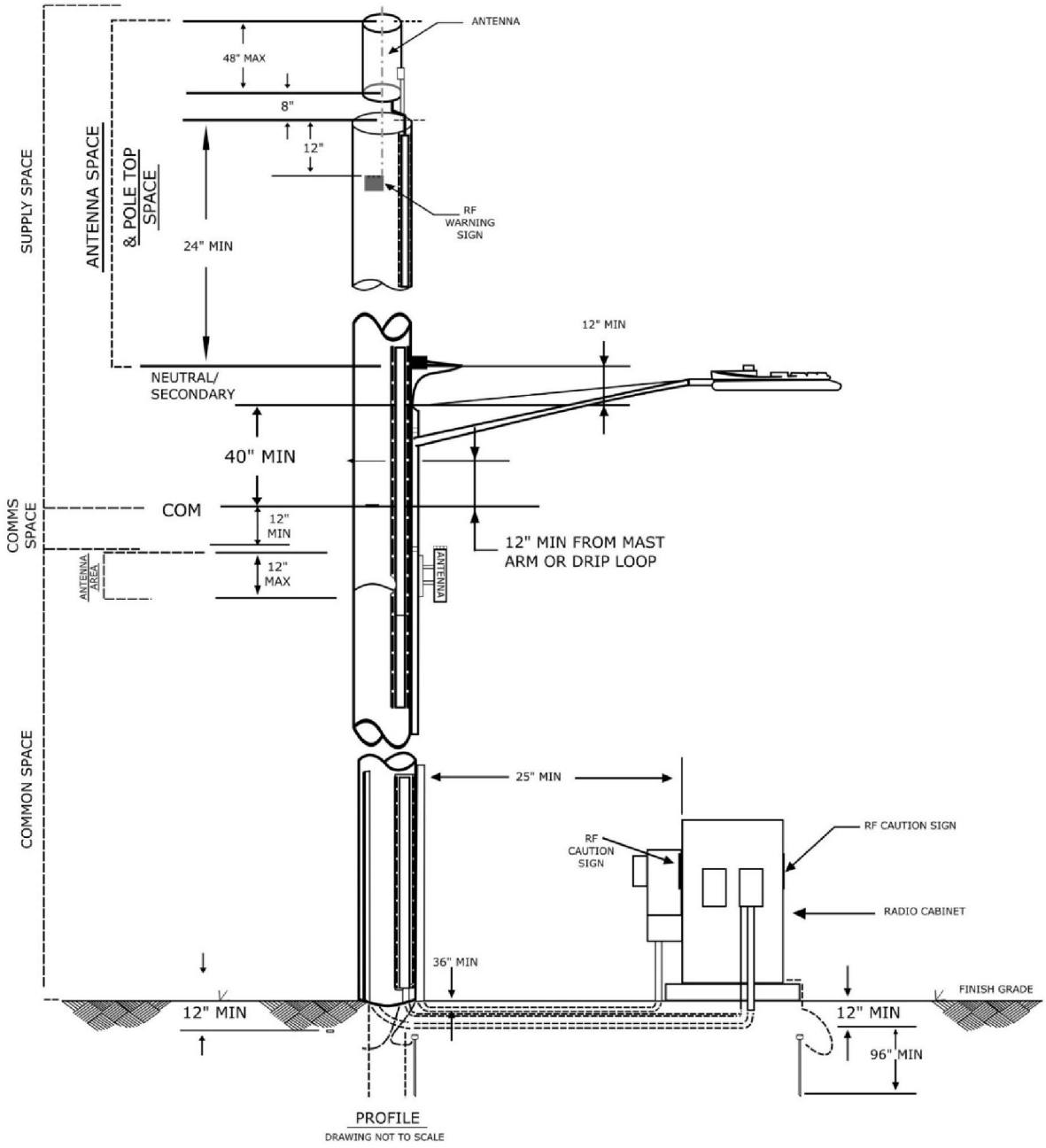

Figure 9: Pole with Secondary Power and Overhead-Fed Streetlight with Pole-Mounted Equipment Cabinet

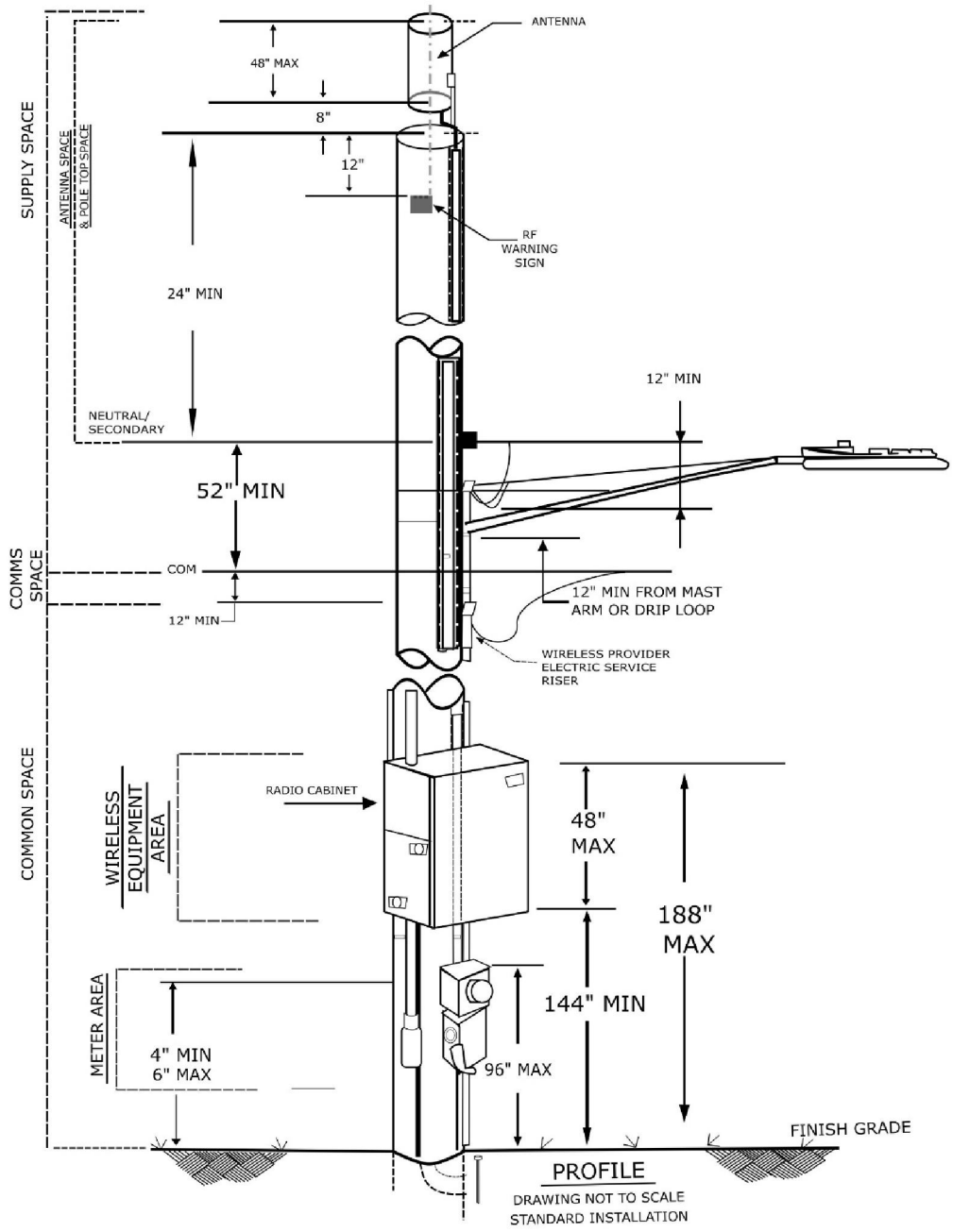

Figure 10: Pole with Secondary Power and Overhead-Fed Streetlight with Mid-Pole Wireless Backhaul Antenna and Pole-Mounted Equipment Cabinet

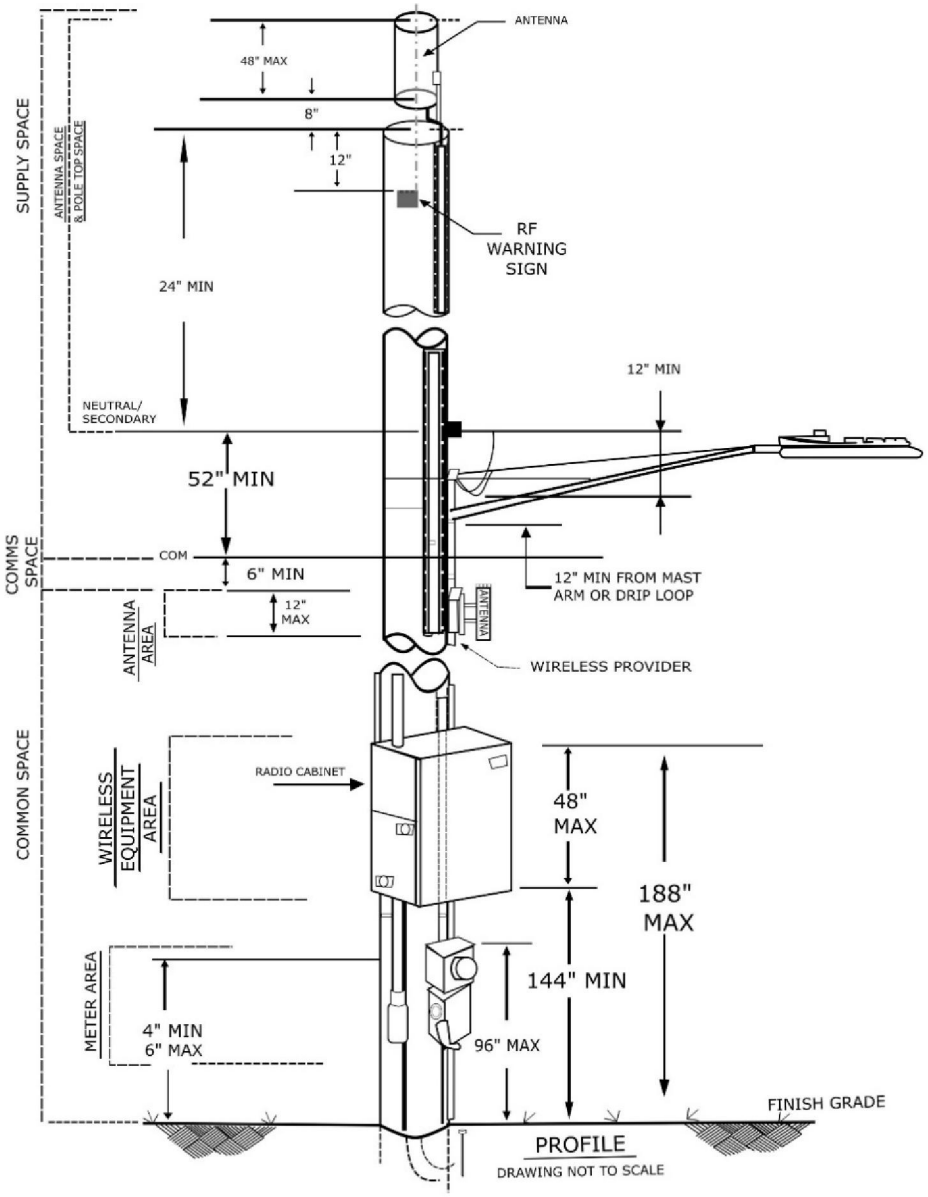

Figure 11: Pole with Primary Power and Strand-Mounted Antenna with Slab-Mounted Equipment Cabinet

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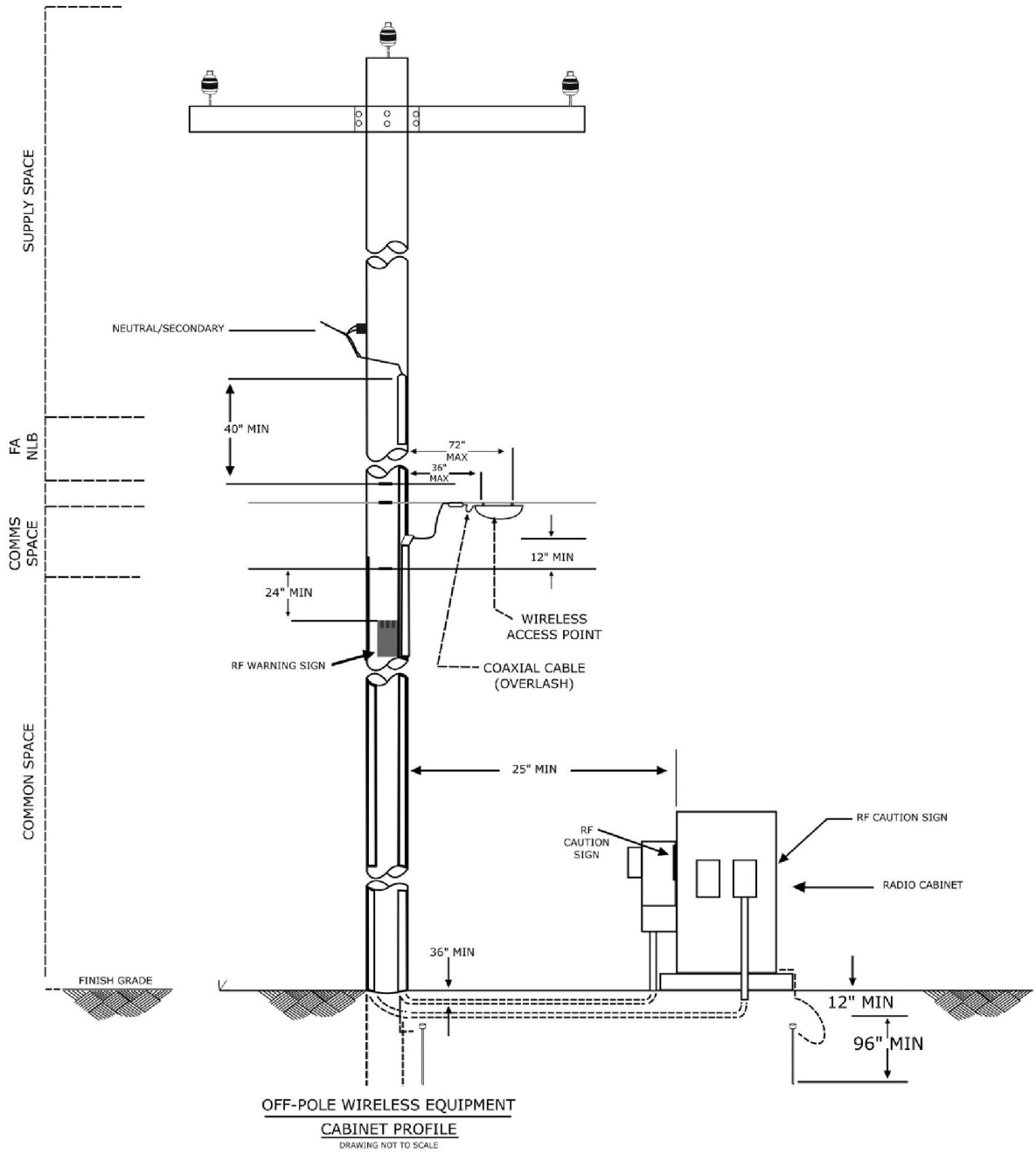

Figure 12: Pole with Primary Power and Antenna on Top Space with Slab-Mounted Equipment Cabinet

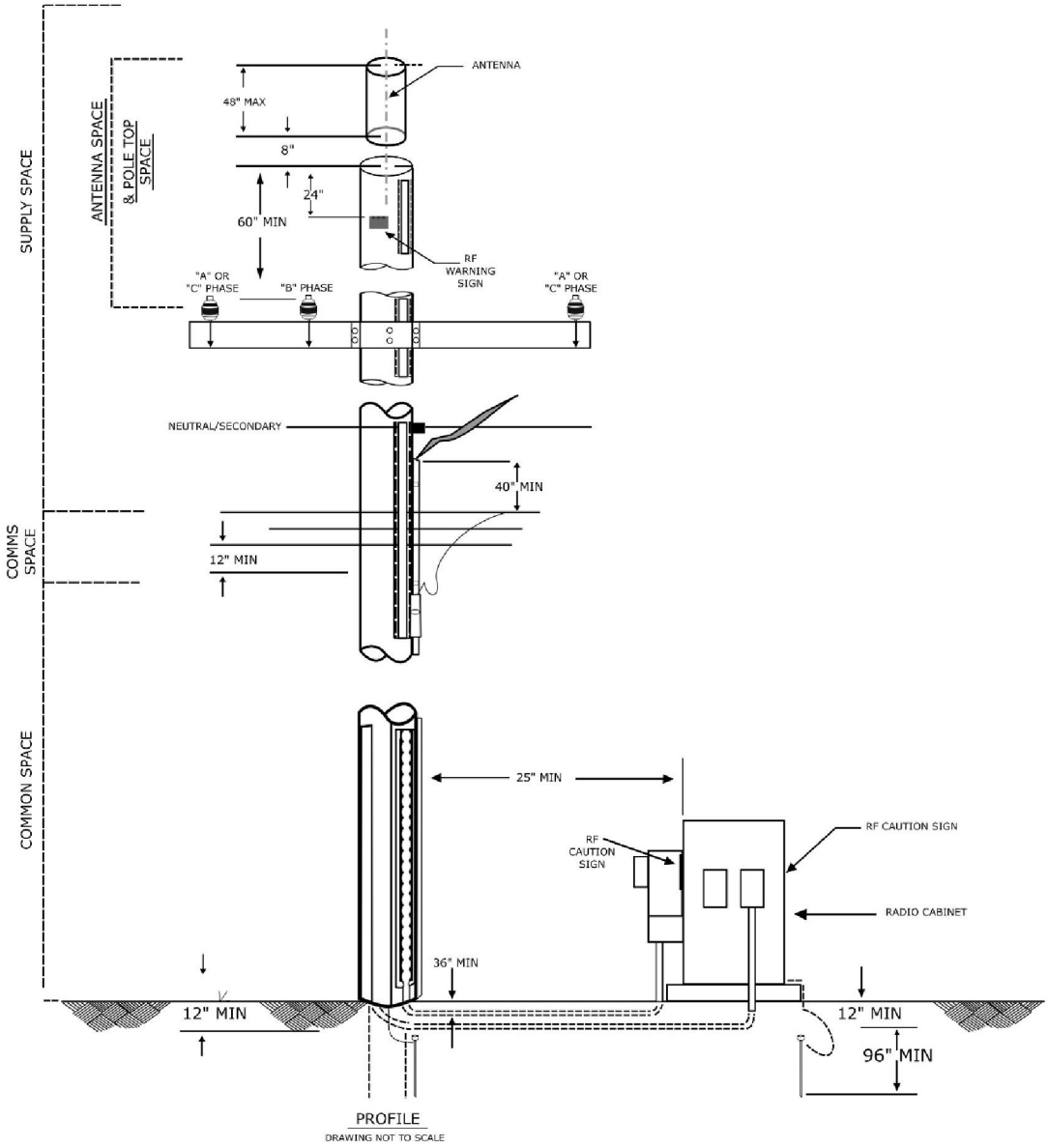

Figure 13: Pole with Primary Power and Antenna on Top Space with Mid-Pole Wireless Backhaul Antenna, and Slab-Mounted Equipment Cabinet

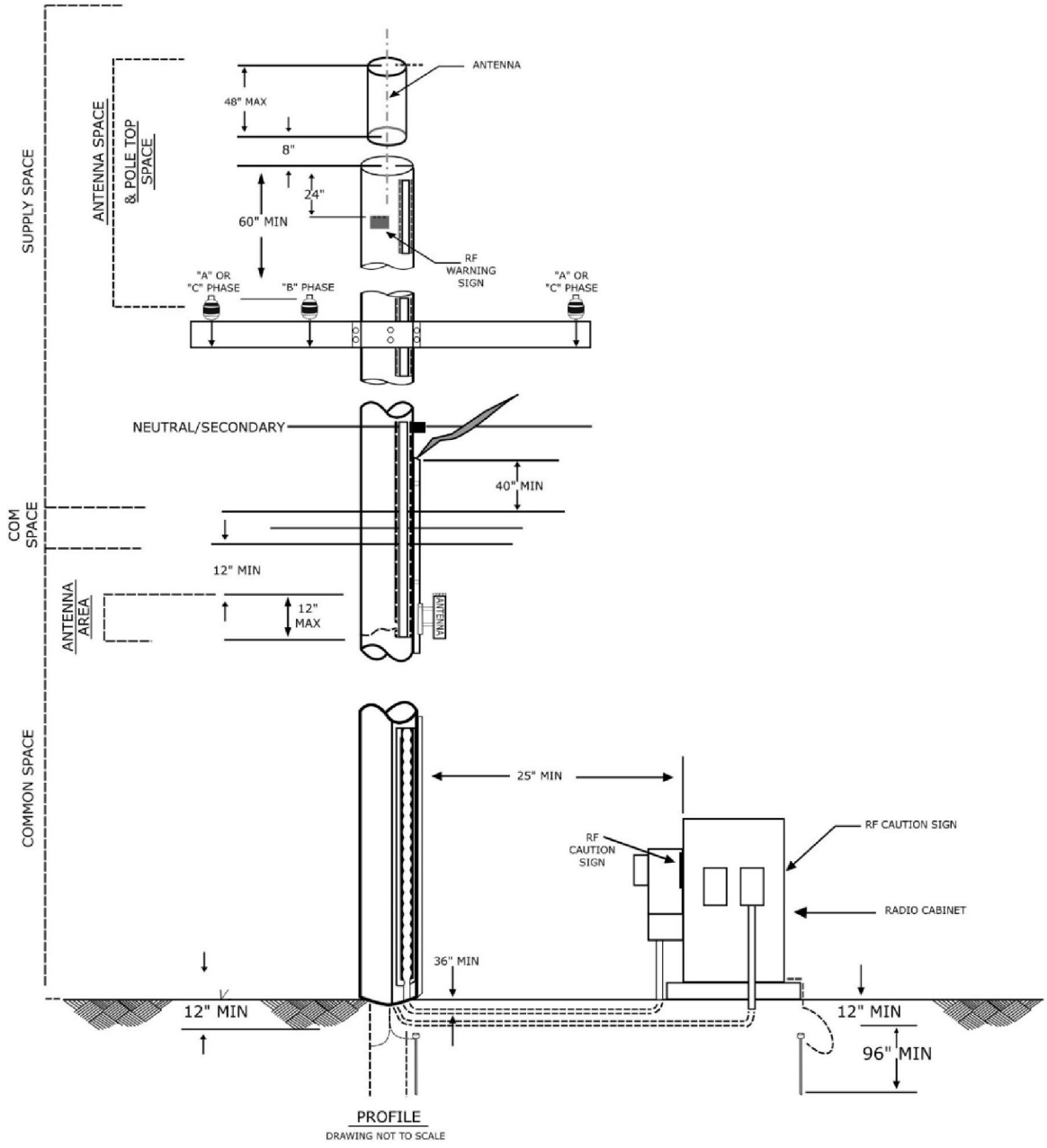

Figure 14: Pole with Primary Power and Mid-Pole Wireless Backhaul Only (no Antenna) with Pole-Mounted Equipment Cabinet

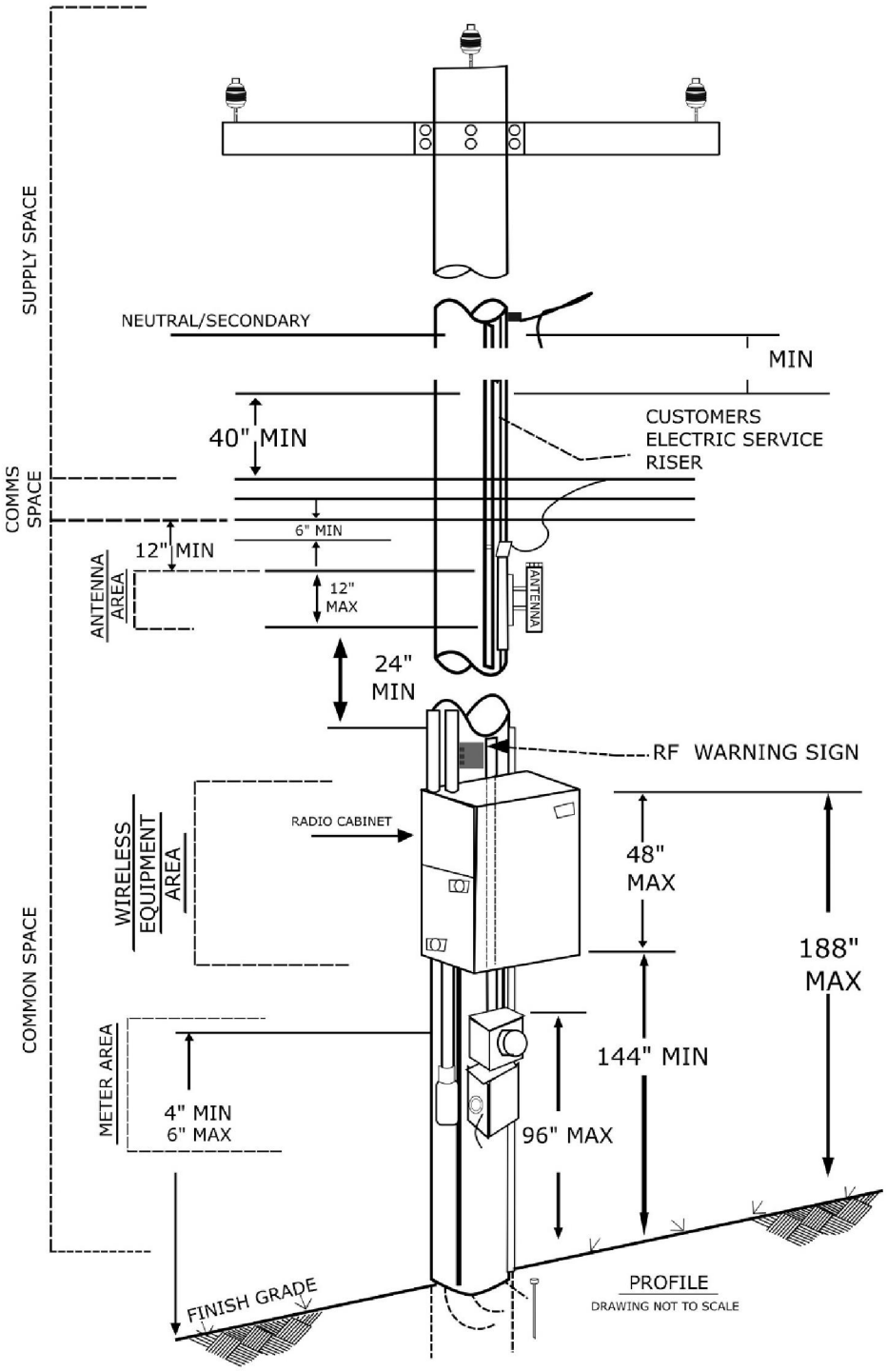

Figure 15: Pole with Primary Power and Antenna on Top Space with Pole-Mounted Equipment Cabinet

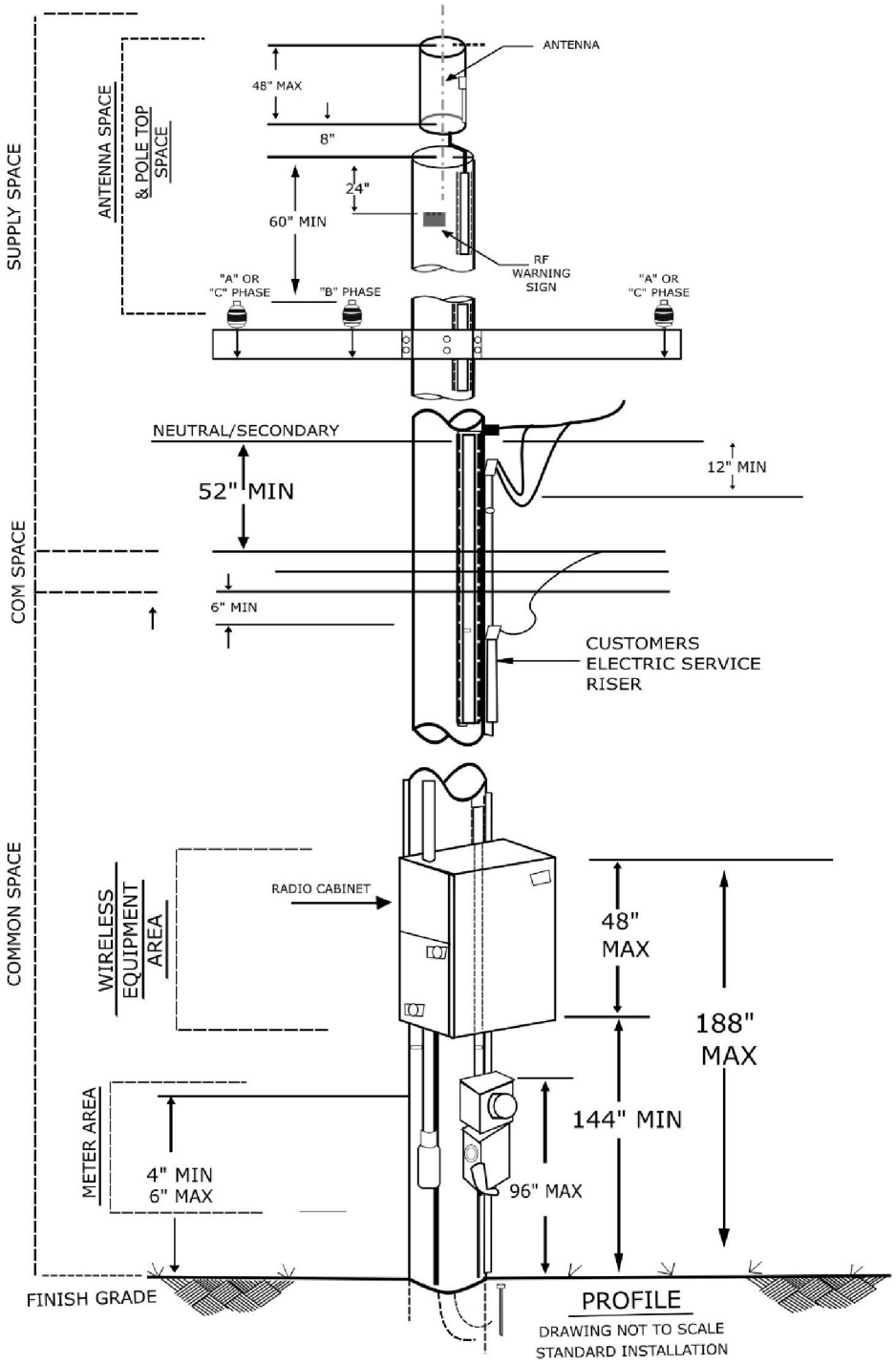

Figure 16: Pole with Primary Power and Antenna on Top Space with Mid-Pole Wireless Backhaul Antenna and Pole-Mounted Equipment Cabinet

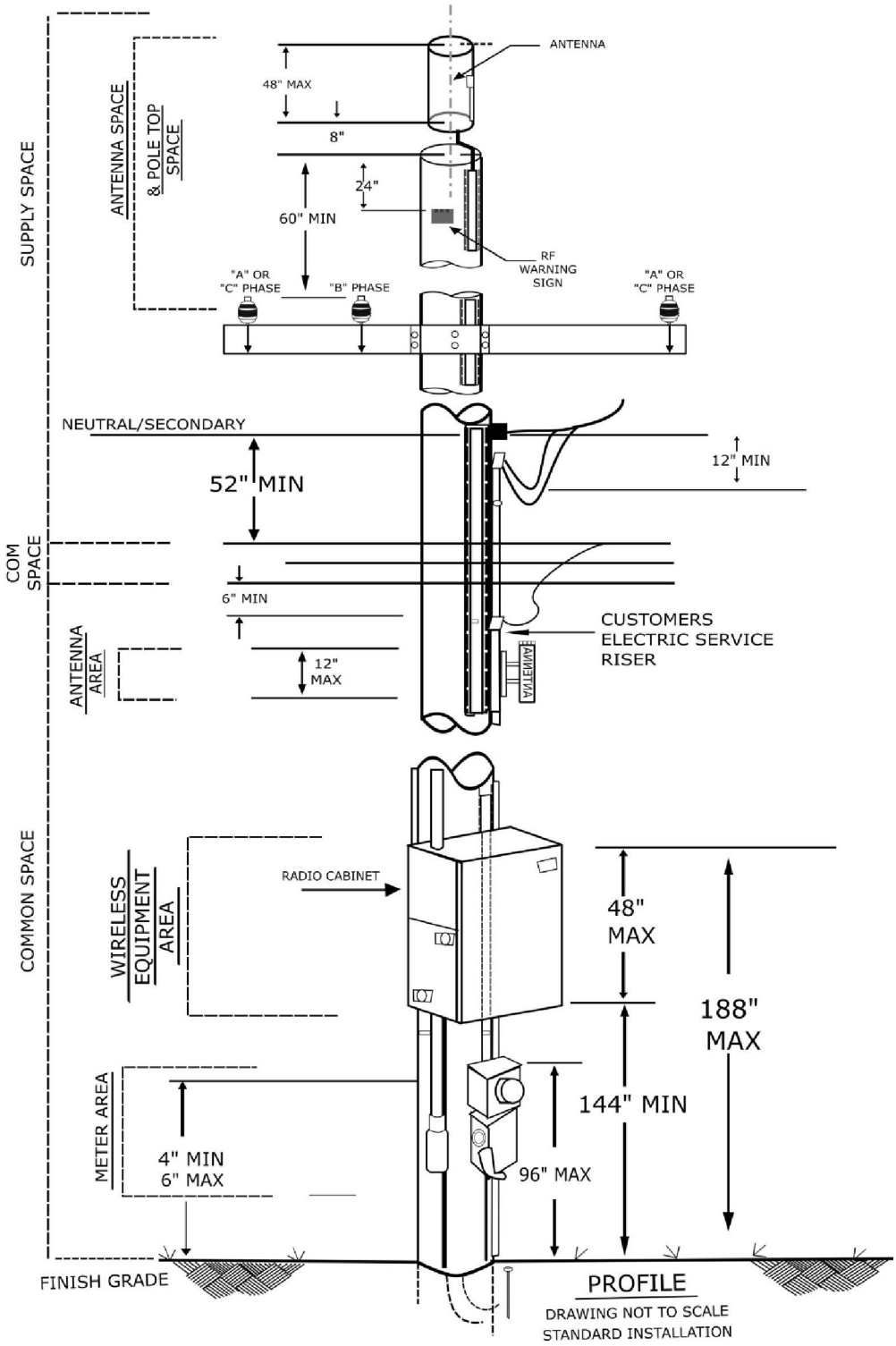

Figure 17: Pole with Hendrix Primary Power and Overhead-Fed Streetlight with Mid-Pole Wireless Backhaul Antenna and Pole-Mounted Equipment Cabinet

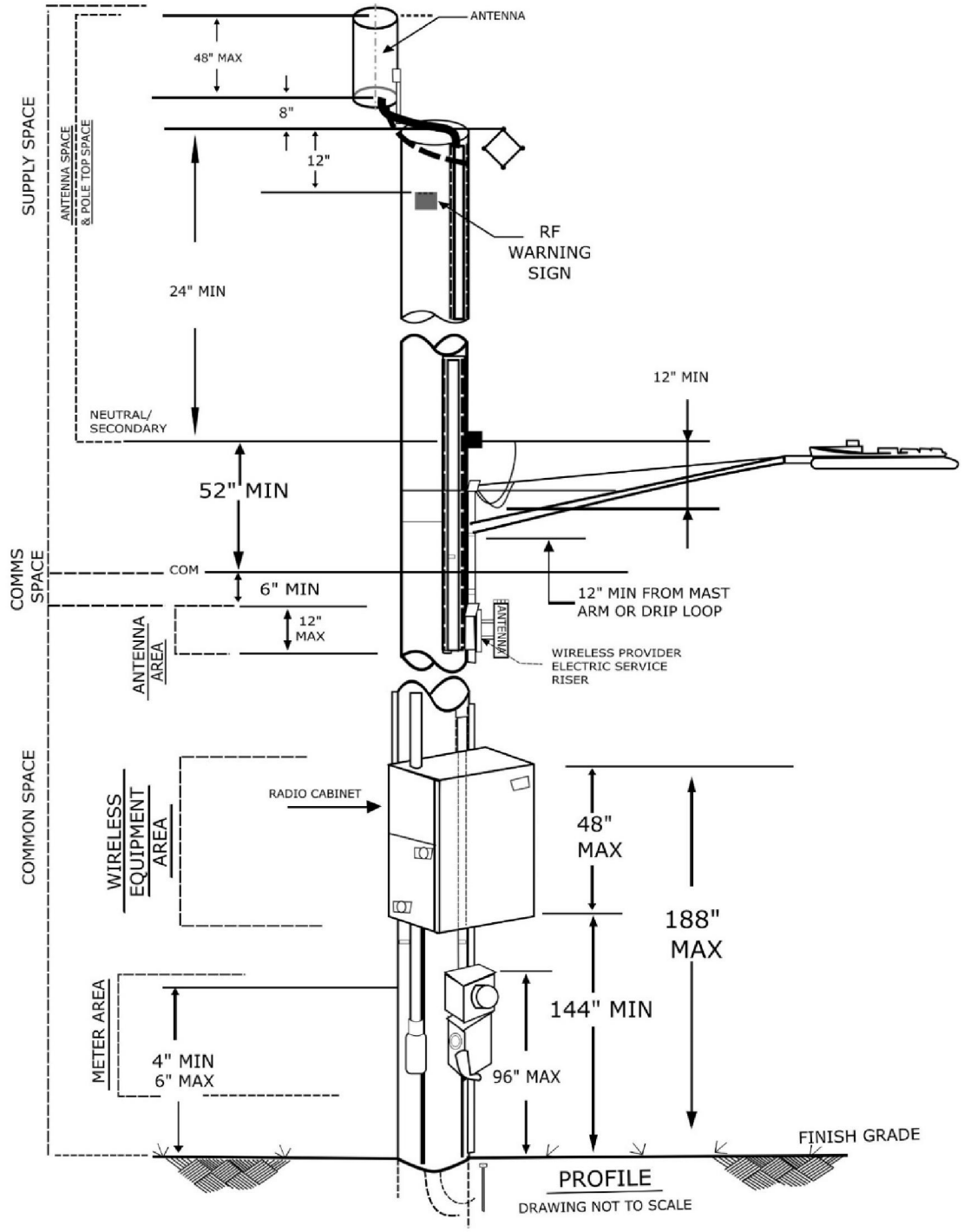

Figure 18: Pole with Hendrix Primary Power and Overhead-Fed Streetlight with Slab-Mounted Equipment Cabinet

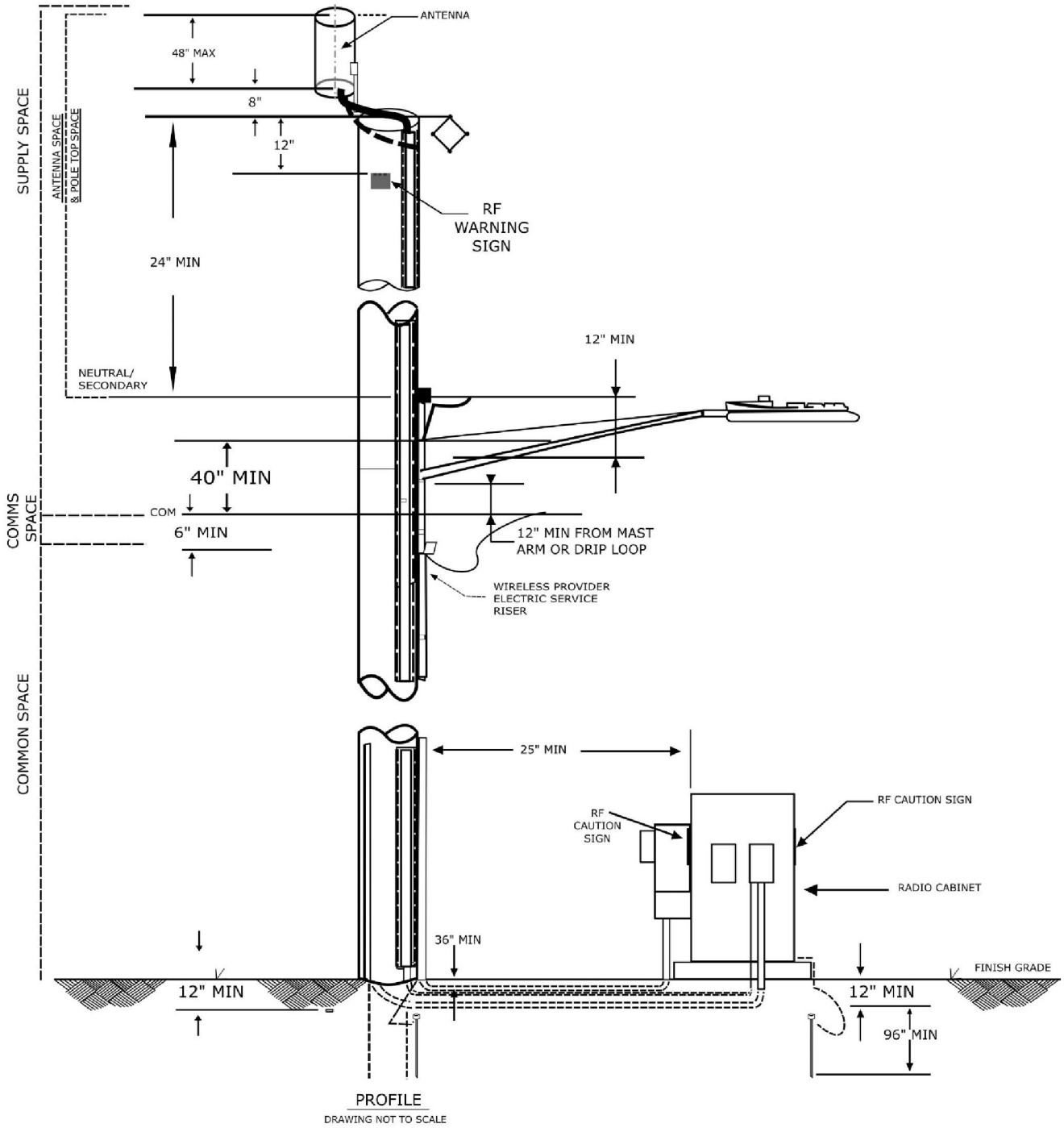

Figure 19: 30-foot or 40-foot Streetlight Pole with Antenna on Top and Single Cobra Head and Slab-Mounted Equipment Cabinet

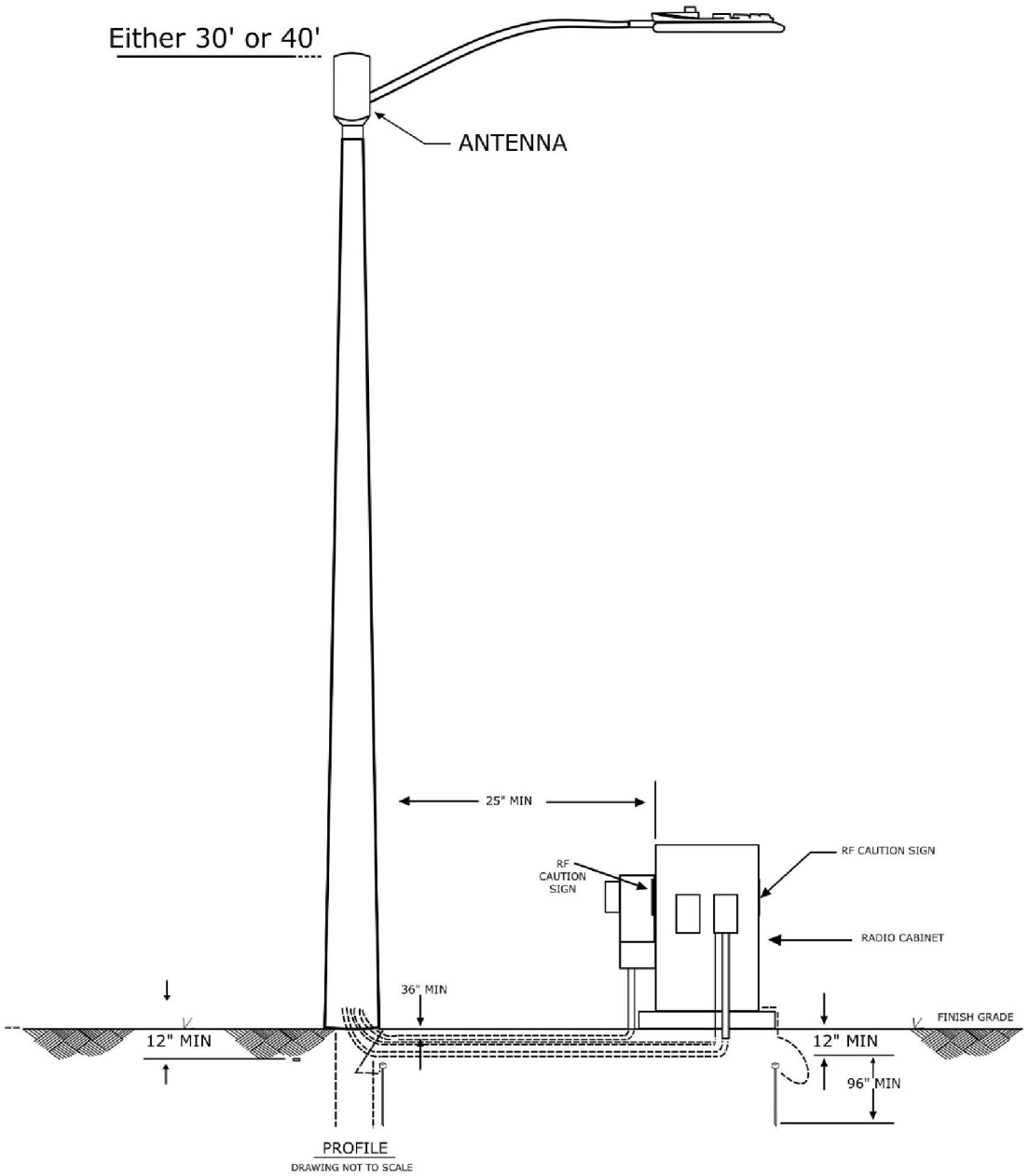

Figure 20: 30-foot or 40-foot Streetlight Pole with Antenna on Top and Dual Cobra Head and Slab-Mounted Equipment Cabinet