SCHEDULE "H"

Town of Cardston

Licensed Occupant: Small Connected Devices

Electrical Distribution System Operational Documents

Version 1.023

Contents

This document is the property of the Town of Cardston for authorized use only.

1. Scope

- This document details the requirements and instructions in approving the attachment and servicing small connected devices on Cardston Electric Utility Poles.
- The application for Licensed Occupant request is provided in the New Electrical Connections (Licensed Occupant) Service Request Form. This can be found at (https://www.cardston.ca/government/municipal-services/electrical)

2. Purpose

- To provide details and requirements for the safe installation and operation of small connected device attachments on Cardston Electric Utility Poles and to meet applicable codes and regulations.

3. Normative References

- Workers shall be competent in Cardston Electric Utility standards:
  - Town of Cardston Licensed Occupant: Small Connected Devices attachment process.
  - Town of Cardston Licensed Occupant: Process Guide.

4. Glossary

- Poles: Certain electric distribution poles owned by Cardston Electric Utility which are located in the area within which Cardston Electric Utility operates its electric distribution system as prescribed by the Alberta Utilities Commission under the Hydro and Electric Energy Act (Alberta), as amended.
- Small Connected Devices: Small sized equipment that may include cabinets, security cameras, wireless devices, antennae, microcell (small cell), 5G devices, dual LED obstruction light antenna, and control boxes. Small connected devices usually have loads of up to 200W, 1phase, 120/240V.

5. Legislations

Alberta Electrical Utility Code (AEUC) (See Annex A)

- The Alberta Electrical Utility Code (AEUC), provides the minimum safe limits of approach for persons and equipment performing activities near overhead power lines and definitions of utility worker and qualified utility worker.
- A person must notify Cardston Electric Utility (by calling 403-653-5672) before any activities are undertaken or equipment is operated within 7.0 meters of Cardston Electric Utility's electric distribution system, to:
  - Determine the voltage of the power line; and
  - Establish the same limit of approach distance as listed in section 2-014 and table 1.

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- Section 2-014 and Table 1, safe limits of approach
  - 0 – 750 V insulated, or polyethylene covered conductors .....0.3 m
  - 0 – 750 V bare, uninsulated .....1.0 m
  - Above 750 V insulated conductors .....1.0 m
  - 0.75 kV – 40 kV.....3.0 m
- The required safe limits of approach do not apply to movement of persons, equipment, buildings, vehicles, or objects under Cardston Electric Utility's overhead power lines.

Occupational Health and Safety Code

- Occupational Health and Safety Code – Alberta Regulation 191/2021 and Explanation Guide provides further guidance on the safe limit of approach distances as specified in the AEUC.
- Section 225 (2), An employer must notify the operator of an energized overhead power line before work is done or equipment is operated in the vicinity of the power line at distances less than the safe limits of approach as specified below and obtain the operator's assistance in protecting workers involved.
  - 0 – 750V insulated or polyethylene covered conductors .....0.3 m
  - 0 – 750V bare, uninsulated .....1.0 m
  - Above 750V insulated conductors .....1.0 m
  - 0.75V – 40kV .....3.0 m

CSA C22.3 No. 1-15, Overhead Systems

- CSA C22.3 No. 1-15, Overhead Systems, specifies the Minimum Vertical Separations at a Licensed Occupant structure (6) and working space to allow workers to have access to equipment and conductors and to allow for the installation of the equipment on the structure. Cardston Electric Utility's interpretation is that these separations do not include the minimum approach distance required by AEUC.
  - 0 – 750V supply conductors and Communication line plant.....1.0m
  - > 0.75kV up to and less than 22kV supply conductors 1.2m
  - Luminaires span wires or brackets and communication line plant
    - Not effectively grounded 1.0m
    - Effectively grounded 0.1m

Safety Code 6: Health Canada's Radiofrequency Exposure Guidelines

- Safety Code 6 [B9] provides technical information for guiding individuals or groups in their understanding of Health Canada's radiofrequency (RF) exposure guidelines.

Uncontrolled and controlled environments

- Controlled environments are defined as those that meets the following conditions:
  - The RF field intensities were characterized by means of measurements, calculations, or modelling,
  - The person exposed is aware of the potential for RF exposure and are cognizant of the intensities of the RF field in their environment, and

- The person exposed is aware of the potential health risks associated with RF field exposures and can control their risk using mitigation strategies.

Situations that do not meet the above conditions are considered uncontrolled environments.

Safety signs for RF protection

- Areas. Signs should be used to label areas where RF exposure levels may exceed exposure limits for controlled and uncontrolled areas.
- Devices. A Caution sign may be used to identify RF energy emitting devices that can produce exposures that can lead to injury from misuse. A Danger sign may be applied to any device, if it produces exposure levels that pose a risk of immediate and severe injury.

6. General Considerations

- The safety, accessibility, maintainability, security, and reliability of electricity infrastructure are to be paramount.
- Wireless Licensed Occupant Attachments must meet CSA C22.3 Part 1 (Overhead Systems), Health Canada Safety Code 6, the Power Utility Standards, and the telecommunication standards. In cases where requirements overlap, whichever requirement is more stringent shall apply.
- Wireless attachments and consumer service shall meet the AEUC, Canadian Electrical Code C22.1, and provision of service shall be as per Cardston Electric Utility's Service and Metering Guide.
- Application for Licensed Occupant attachments shall be on a first permit submission – first served basis. Cardston Electric Utility will not grant the attacher exclusive use, vested rights, or franchise Licensed Occupant of its facilities to 3rd party attachers. The attacher is required to share the poles with the Power Utility or other 3rd party attachers.

7. Rates, Riders, and Options

- All small load requirements that are predictable will be billed under CRD 200 Small commercial rate. If the loads change over time or if the loads are no longer predictable, Cardston Electric Utility may meter the service at the customer's cost and bill accordingly at Cardston Electric Utility's discretion.
- Types of Service eligible under this option include security cameras, Wi-Fi transmitters, and cellular devices.

8. General Requirements

- The Licensed Occupant party proposing to attach small connected devices, intended for commercial applications (i.e., antennae, small cell, Wi-Fi, etc.), shall maintain a Licensed Occupant Agreement with Cardston Electric Utility.

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- The Licensed Occupant party shall be responsible to utilize competent workers, as per Occupational Health and Safety Code – Alberta Regulation 191/2021 and other applicable requirements. The Licensed Occupant party shall install their small connected devices within the space as approved by Cardston Electric Utility while respecting the applicable electrical safe limits of approach.
- Electrical services associated with the installation of small connected devices on Cardston Electric Utility structures shall meet Cardston Electric Utility and all applicable provisions of Alberta Electrical Utility Code (AEUC) [B3] and Canadian Electrical Code C22.1.
- Cardston Electric Utility is required to meet the requirements of the Alberta Electrical Utility Code (AEUC). Therefore, the customer proposing to attach on Cardston Electric Utility's facilities must also follow and meet the requirements of the Alberta Electrical Utility Code (AEUC).
- The Licensed Occupant party shall secure all necessary permits and provide a copy to Cardston Electric Utility representative. This includes but is not limited to municipal approvals, electrical permit or inspection certificate, land use, and environmental permits.

NOTE: In the absence of an electrical permit or inspection certificate (where the permitting authority does not provide permit or inspect electrical service installations on Poles), the Licensed Occupant party shall sign a Connection Authorization Form indicating that the Licensed Occupant party installation is okay to be connected to the electric distribution system.

- The Licensed Occupant party shall obtain an approval from Cardston Electric Utility to attach on Poles. The Licensed Occupant party shall not attach or perform any work on the Pole without an approval by Cardston Electric Utility.
- The Licensed Occupant attacher shall provide details, of any potential hazards or risks to a worker working on the pole, of the device proposed to be attached on the Pole.
- The customer will be responsible for any applicable fees including application fees, device review fees, interconnection fees, and pole attachment fees. Application and device review fees are billed at time of application. Interconnection fees will form part of the project costs quotation and billed after customer project acceptance. Pole attachment fees are annual attachment fees billed monthly.

9. Supply of Licensed Occupant Pole

- If a new Licensed Occupant pole is required for the Licensed Occupant party proposing to attach small connected devices, a request can be made to have Cardston Electric Utility supply and install it.
- The Licensed Occupant Customer shall be responsible to pay for the associated costs of the installation of the new pole in the form of customer contribution.
- This installation is subject to applicable laws, approvals, land rights and engineering requirements.
- Locations are generally restricted to acceptable locations within government road allowances and utility right of ways as determined by Cardston Electric Utility. Cardston Electric Utility will

not supply a Licensed Occupant pole on private property; in a location that requires regular land access costs; or one that has accessibility concerns.

- The addition of a Licensed Occupant pole may affect the adjacent structures, such as with uplift issues or additional loading. As such, the Licensed Occupant Customer shall pay the required changes in the system in accommodating this new Licensed Occupant pole.

10. Customer Responsibilities

- When proposing to attach small connected device and taking service on Poles, the customer must make an application for Licensed Occupant and electric service to Cardston Electric Utility.
- The Customer should provide the following information at time of application:
  - Map showing proposed Pole locations of small connected devices.
  - Devices and Equipment Details:
    - Mass (kg)
    - Dimensions (mm) (height, width, depth)
    - Proposed Height of Attachments (top of box) (mm)
    - Device Specifications (CSA Approved)
    - Attachment material details (clamps, straps, stand-off brackets)
    - Power requirements
      - Maximum Wattage (i.e., 200W)
      - Number of phase (i.e., single phase)
      - Number of wire (i.e., 3Wire)
  - Antennae and wireless devices
    The following information are required for new designs, expansion or additions, and new wireless devices.
    - Network Design
    - Location of fiber optic cables
    - Location of wireless devices
    - Coverage (footprint) of wireless devices: GIS spatial data (shapefile or file geodatabase)
    - Specification sheets for wireless devices
    - Operating frequency bands and bandwidth for wireless devices
    - Safety Code 6 – Controlled and Uncontrolled environment exposure limits
  - The Customer should arrange to meet and to collaborate with Cardston Electric Utility Design representative in verifying proposed poles for Licensed Occupant in the field, prior to finalizing plans of Licensed Occupant attachments.
- Upon receipt of Acceptance and approval to attach, the Licensed Occupant party shall call 403-653-5672 to arrange for an overhead orientation and pre-construction meeting with the Cardston Electric Utility.
- The customer shall be responsible for the installation of their Licensed Occupant facilities on the Poles.
- The Licensed Occupant devices are to be attached based on approved heights of attachments on each pole, proposed for Licensed Occupant.

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- Connect the Licensed Occupant device conductors (Line, Neutral, Ground wires) at the load side of the breaker, neutral, and ground terminals, respectively. Ensure the breaker is in the "OFF" position before making any connections.
- Request for inspections of completed Licensed Occupant installations. Correct any deficiency or deficiencies of Licensed Occupant attachments, as identified by the Cardston Electric Utility representative.
- Turn the breaker (inside the load center) to the "ON" position to energize the Licensed Occupant device on the pole.

11. Cardston Electric Utility Responsibilities

- Cardston Electric Utility will perform, but not limited to, the following tasks:
  - Cardston Electric Utility will review completeness of customer information.
  - Collaborate with Customer in identifying poles which are available and not available for Licensed Occupant. Offer cost effective solutions in providing electric service to the customer's Licensed Occupant devices on the Pole.
  - Review structure integrity and separations required for proposed Licensed Occupant attachments.
  - Provide maximum and minimum heights of attachment of Licensed Occupant devices on each pole proposed for Licensed Occupant.
  - Accept and provide design approval to attach, as appropriate.
  - Attend pre-construction site meetings and provide overhead orientations.
  - Install Load Center on the pole. Energize line side of the breaker by connecting the line side conductors of the load center to the distribution system. Keep the breaker in the "OFF" position.
  - Inspect customer attachments. Identify any deficiencies with the Licensed Occupant installations and have the Licensed Occupant party correct deficiencies, as applicable.
  - Complete as-built drawings - redline heights of Licensed Occupant attachments on the as-built construction print.

12. Load Center and Standard Servicing

- The load center must be rated for outdoors, single phase, 3Wire, 15A, 120/240V AC system.
- The standard service voltage for small connected devices is 120V, 1-Phase, 3Wire.

Figure 2: Load Center: showing the Line, Neutral, and Ground (3Wire) connections in the load center

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13. Recommended and Restricted Poles for Licensed Occupant Attachments

Recommended poles for Licensed Occupant attachments

- Streetlight poles – for the intent of this document, streetlight poles shall refer to underground fed steel streetlight poles. Generally, streetlight poles are available for Licensed Occupant unless identified as restricted in the following sections. Streetlight poles are to be inspected, evaluated for structure loading, and appropriateness before giving approvals to attach.

NOTE: Streetlight poles are not to be used for Licensed Occupant wireline attachments (such as telecommunication cables) as these streetlight structures are basically not intended to support these wireline attachments.

- Tangent wood poles (simple framing for supporting conductors without guying or dead ends) usually provide better clearances and space for Licensed Occupant attachments. These may include single phase transformer on tangent pole. Due to operational reasons, two thirds of the pole typically must be free for climbing, which restricts some pole types. Wood poles are to be inspected, evaluated for structure loading and appropriateness before giving approvals to attach.

Restricted poles for Licensed Occupant attachments

- Streetlight poles with existing Licensed Occupant attachments (including previously approved attachments) will require a re-evaluation of the integrity of the structure and a new approval from Cardston Electric Utility.

NOTES: Streetlight pole structure analysis are usually completed by Cardston Electric Utility's streetlight pole manufacturer. Thus, details of new and existing Licensed Occupant attachments on the streetlight pole shall be obtained and gathered for evaluation. Any additional cost of evaluations will be attributed to the customer.

- Streetlight poles with visible signs of rusts and dents. Rusts and dents affect the integrity of streetlight poles. Streetlight poles with rusts and dents, as verified in the field, shall be replaced when required for Licensed Occupant attachments.

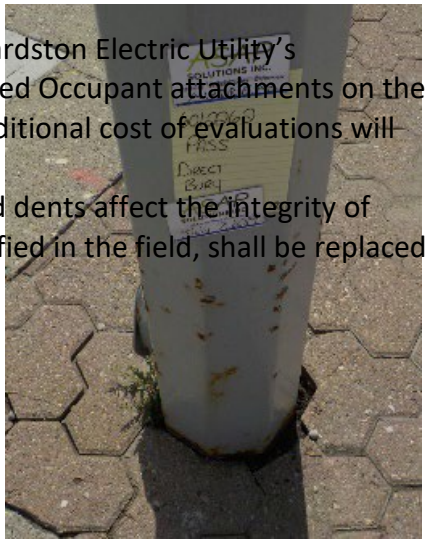

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Figure 3 – Existing attachments (Left), Breakaway Pole (Center), Direct buried (Right)

- Streetlight poles on breakaway bases - Licensed Occupant attachments are not allowed. Streetlight poles on breakaway bases are intended to improve traffic safety and are not meant to handle the additional structure loading of a Licensed Occupant attachment. Breakaway bases are not to be replaced with standard bases, for the purpose of allowing Licensed Occupant attachments, due to its intended purpose and use (which is for lighting and traffic safety).
- Direct buried streetlight poles – Licensed Occupant attachments are not allowed unless replaced. Direct buried streetlight poles are old standard structures and will have to be replaced when required for Licensed Occupant attachments. The actual condition of the portion of streetlight pole buried underground is unknown unless verified and tested. Thus, additional loading on the structure may cause the structure to fail.
- Wood poles with multiple guys, equipment, or switching devices (corner poles, primary underground risers, secondary underground risers, three phase banked transformer poles, no attachments are allowed. The Licensed Occupant attachment will generally restrict maintenance and operations work on these normally accessed structures.

- **14. Small Connected Devices**
- Small connected devices may include cabinets, security cameras, wireless devices, antennae, microcell (small cell), 5G devices, and dual LED obstruction light.

Figure 4 – Wi-fi Device (Left), Security Cameras (Center) and Telecommunication Micro Cell (Right)

- Licensed Occupant equipment and devices shall be installed in accordance with all applicable codes and regulations.
- Equipment and devices shall only be attached below the Licensed Occupant zone of a wood pole. They are not to be attached between the primary and secondary space of the Licensed Occupant wood pole. Refer to Figure 5.
- Pole straps must be used when attaching equipment and devices on streetlight poles. Drilling screws or making holes on streetlight poles is not allowed. Drilling on streetlight poles would normally cause rusting.
- 3rd party equipment and devices shall be attached on stand-off brackets (using pole straps or screws/bolts) on wood poles to allow access (be able to climb the pole to access supply facilities). As a general guideline, 2/3 of the wood pole must be free for climbing.
- The maximum number of small connected device attacher on a pole is 1.
- The minimum height of attachment of small connected devices on the Pole shall be 4 meters.

NOTE: The minimum height of attachment of the load center on the pole is 3 meters from ground.

- Prudent avoidance (Safety Code 6 exception limits) should be applied to specific existing facilities in close proximity (e.g., < 5m to sensitive or high occupancy facilities such as schools, childcare centers, long term care facilities, hospitals, and residential buildings).

15. Licensed Occupant Poles and Vertical Separations at the Pole

- The typical Space Allocation for services on Cardston Electric Utility Wood Structures.
- The required separations between the lowest primary supply facilities and the highest small connected device facility shall be 3.6m.
- The required separations between the lowest secondary supply facilities and the highest small connected device shall be 1.6m

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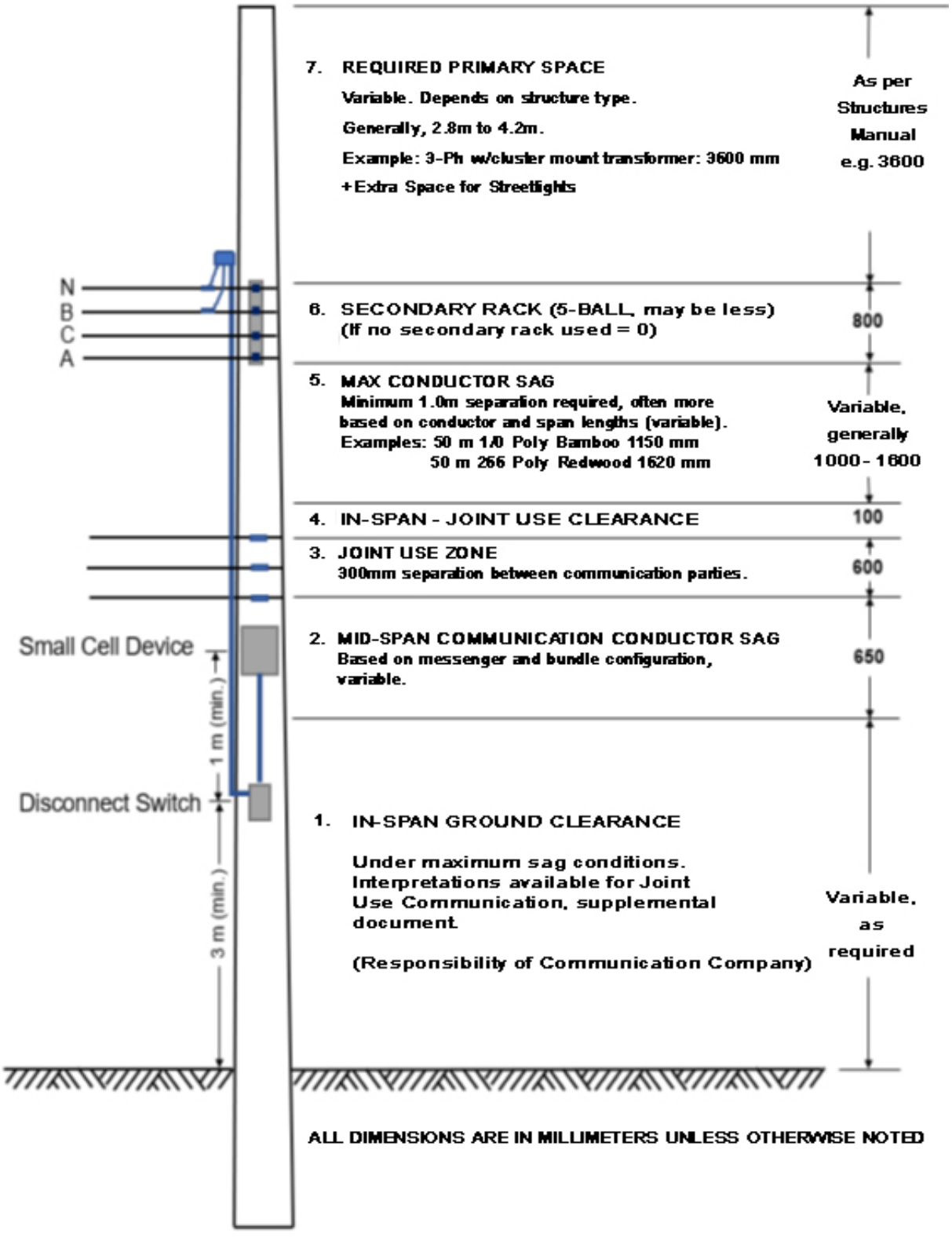

Figure 5 – Typical Space Allocation for Services on Cardston Electric Utility Wood Structures

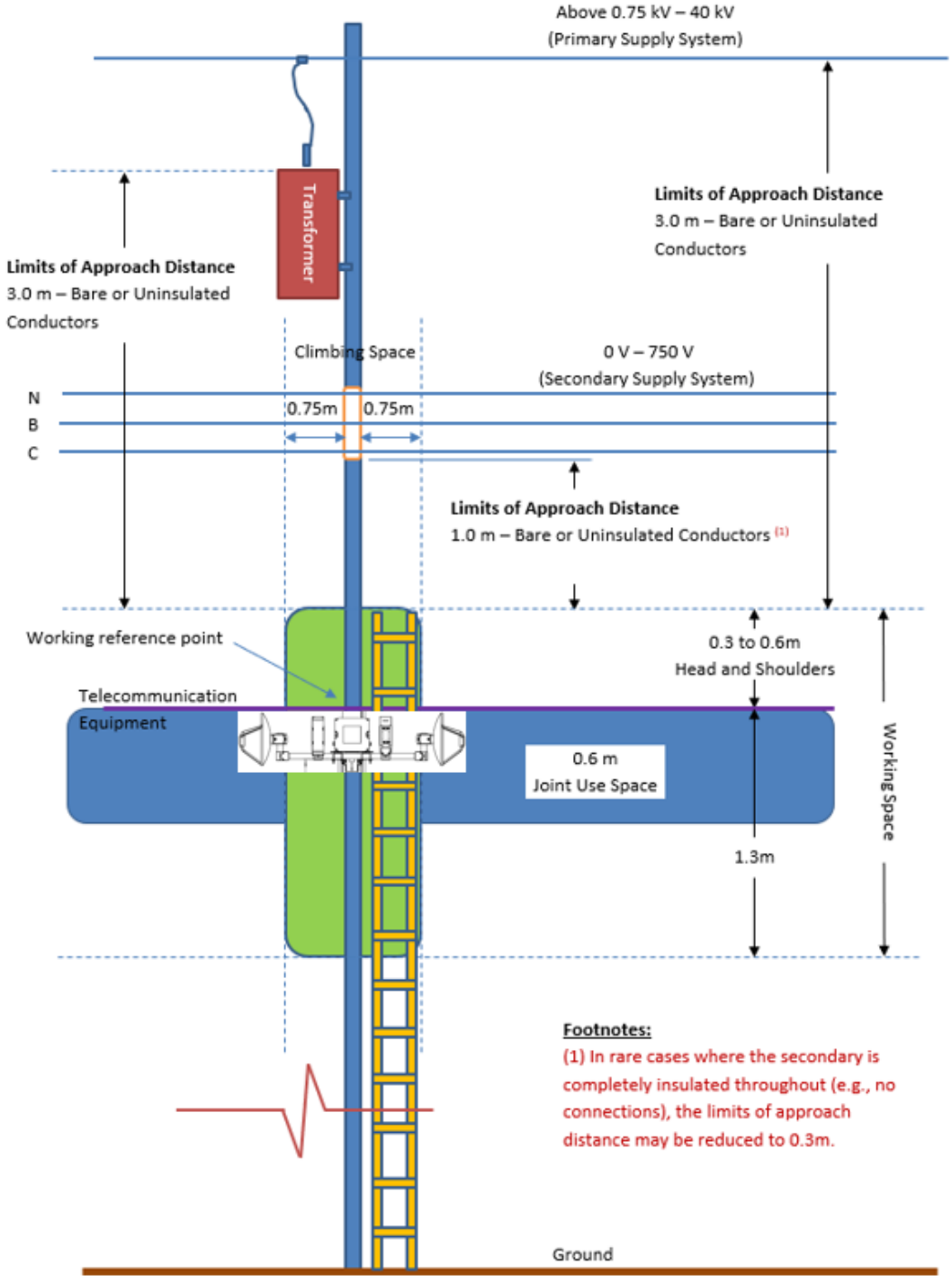

Figure 6: Diagram showing telecommunication equipment and a 3.6m safe limits of approach (includes minimum 3.0m limits of approach distance + 0.6m head and shoulders).

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- The required vertical separations will help ensure the minimum limits of approach to the nearest primary and secondary supply facilities are maintained by the Telecommunication worker on the pole.

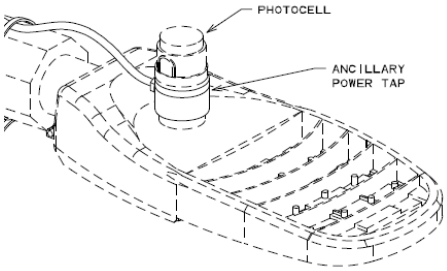
16. Connections, Shutdown, and Notifications for Equipment & Devices

Electric Service Connections

- Licensed Occupant requests for equipment and devices generally require an electric service. Electric service requests for Licensed Occupant equipment and devices will generally be processed as a commercial service and not metered.
- Electric supply connections may be completed as follows:
  - Load Center. Cardston Electric Utility will supply and install the load center on a wood or streetlight pole (with existing nipple).

Figure 4 – Wi-fi Device (Left), Security Cameras (Center) and Telecommunication Micro Cell (Right)

  - In cases where the streetlight pole does not have a nipple, Cardston Electric Utility will supply and install an ancillary power tap (item# 641-0405) in addition to the load center on streetlight poles.



- Local authority inspection certificate and Site IDs are required for each point of service prior to connection of any Licensed Occupant device and equipment to the Cardston Electric Utility's electric distribution system.

Servicing and Demarcation Points

- Cardston Electric Utility will supply and install the load center on the pole, complete with service cables (#12 AWG) in liquid tight flexible conduits. The costs of these installations will be attributed to the customer through the interconnection fees.
- The demarcation point of electric service will be at the load side of the load center.
- The customer shall be responsible to supply and connect the load side service conductors at the load side of the disconnect switch.
- On wood and streetlight poles, the load side service conductors shall be installed in PVC or liquid tight flexible conduits (i.e., mechanical protection), strapped directly on the pole, and shall be continuous from the load center up to the customer's device.
- The distribution system shall be designed and built to meet cable ampacity and voltage drop requirements. Where these requirements are not met, modifications or upgrades may be needed before connecting these loads in the system. All needed upgrades will be attributed to the customer.

Shutdown Procedures on equipment and devices

- A power line technician or any worker performing work on the pole, must first turn the breaker in the load center to the "OFF" position
- After work on the pole is complete, the power line technician or any worker performing work on the pole, must turn the disconnect switch of the Licensed Occupant equipment or device back to the "ON" position.

Customer Notification of Outage

- Pre-planned Outages (PPO) and Non-Emergency work

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- During a pre-planned outage, the customer will receive an automated e-mail from Cardston Electric Utility's two days before the planned interruption date.
- The automated e-mail will contain the following information:
  - Address of the service
  - Outage date and time
  - Reasons for outage

Emergency (power down)

- Cardston Electric Utility will not notify the customer in a power down condition.
- Power loss due to a power down will typically be reported to Cardston Electric Utility through customer calls.

Back-up power devices

- Customer devices and equipment attached on Poles are not allowed to have back-up power (e.g., battery).

Note: A downed pole may not stop a device with back up power from operating, of which may cause hazards to utility workers and public.

Annex A

Alberta Electrical Utility Code (AEUC), 5th Edition

This annex contains some applicable code clauses. Refer to the full AEUC for more details.

2-012 Interference with Systems

1) No person shall interfere with, tamper with, or willfully damage electrical utility systems covered by this Code.

2) Electrical utility system poles and structures shall be kept free of all materials and equipment not required for the system, unless permitted by the operator of the utility system.

3) No person shall make attachments to electrical utility system poles and structures unless authorization has been received from the operator of the utility system.

4) No person shall climb electrical utility system poles or structures or make connections or disconnections to electrical utility system equipment unless the person has been authorized to do so by the operator of the utility system.

5) No person shall enter an electrical utility system generating station, substation, subsurface chamber, equipment room, or similar location unless that person is authorized to enter by the operator of the utility system.

2-014 Activities near Overhead Power Lines (See Appendix B.)

1) This Rule applies to activities near overhead powerlines and not the movement of persons, equipment, buildings, vehicles, or objects under overhead powerlines.

2) A person must contact the operator of the utility system before activities other than those in Subrule (1) are undertaken or equipment is operated within 7.0 meters of an energized overhead line to:

(a) determine the voltage of the power line; and

(b) establish the appropriate safe limit of approach distance listed in Table 1.

3) Except as provided for in Subrule (4), a person must ensure that the safe limit of approach distance, as established in Subrule (2), is maintained and that no activities are undertaken and no equipment is operated at distances less than the established safe limit of approach distance.

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4) A person must notify the operator of the utility system before activities are undertaken or equipment is operated in the vicinity of the power line at distances less than the safe limit of approach distances listed in Table 1 and obtain the operator's assistance in protecting persons involved.

5) Notwithstanding Subrules (1) through (4), Table 1 does not apply to OH&S Part 40 Utility Workers – Electrical.

6) A person must ensure that earth or other materials are not placed under or beside an overhead power line if doing so reduces the safe clearance to less than the Minimum Vertical Design Clearances above Ground or Rails as defined in Table 5 of this Code and the safe limit of approach distances listed in Table 1.

7) A person must follow the direction of the operator of the utility system in maintaining the appropriate safe clearance when conducting activities near an overhead power line.

8) If an activity is being carried out near the safe limits of approach distances specified in Table 1, the person completing the activity shall assign a person to act as an observer to ensure that the safe limit of approach distances will be maintained.

9) A person shall not excavate or perform similar operations in the vicinity of an overhead power line if it reduces the electrical and structural integrity of the power line including associated grounding equipment.

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Annex B

Transformer and Voltage Drop Calculations

- Applications of small connected devices connecting in Cardston Electric Utility's existing distribution system and meeting the criteria below, will not require an evaluation of transformer loading or voltage drop calculations:
  - Total additional load of up to 1% of the transformer's rating added to the existing secondary distribution system.
  - For example: Existing 1-ph transformer is 10 kVA, the maximum allowable load that can be added without the need to check for transformer loading and voltage drop is 90W.

    10 kVA * 1% = 0.1 kVA
    kVA * 0.9 (power factor) = 0.09kW or 90W

- Where an existing secondary distribution system (includes secondary cables and transformer) are found to be overloaded, these projects should be discussed with Cardston Electric Utility representative for evaluation prior to any additional loads to the system

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