GUIDELINES

FOR WORKING IN PROXIMITY TO CITY OF MEDICINE HAT POWER LINES

You don't have to touch a buried or overhead line to be electrocuted….

Medicine Hat

UTILITY SAFETY PARTNERS

Where's the LINE?

Revised: 05/19/2026
EO-DOC-OPS-003.03

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INTRODUCTION

Message from the Operations Manager

Every day in Alberta, two to three people come into contact with an overhead or underground power line. When that happens, the risk of serious injury or death is extremely high. Electrical safety cannot be assumed.

Work of all types—including construction, landscaping, maintenance, and recreation—is carried out in proximity to power lines every day. Because electrical infrastructure blends into the background of our communities, many people don't consciously notice it, even though it is always present.

Many electrical incidents occur because people are unaware of safe limits of approach, bring equipment or tools too close, or make assumptions about voltage or the level of hazard. Ladders, machinery, augers, and even recreational items such as kites can create dangerous situations in an instant.

Electricity cannot be seen, heard, or smelled. For that reason, all electrical lines and equipment must always be treated as energized and dangerous. Most incidents are preventable through awareness, education, and respect for the electrical infrastructure that supports our daily lives.

This document provides guidance for workers and contractors on safe practices when exposing or working in proximity to buried and overhead electric facilities within the City of Medicine Hat Electric Operations service area. This service area includes the City of Medicine Hat, Redcliff, Dunmore, Desert Blume, and portions of Cypress County, as shown on Map 1 on page 7.

This document is evergreen and will be updated as required. It is provided for information purposes only and does not supersede legislation. Employers and workers are responsible for independently assessing their work activities and implementing appropriate safe work procedures that comply with this guideline and all applicable legislative and regulatory requirements. These guidelines are intended to support the development of safe work procedures when working near energized low-, medium-, and high-voltage electrical infrastructure and to assist in meeting the requirements of the Alberta Electrical Utility Code, the Alberta Occupational Health and Safety Act, Regulation, and Code, the City of Medicine Hat Electric Customer Connection Guide, CSA C22 No. 7-10 for Underground Systems, CSA C22 No. 1-15 for Overhead Systems, the Canadian Electrical Code Part I, CAN/ULC-S801, and the Canadian Common Ground Alliance.

When planning work within the scope of this document, please note that Electric Operations business hours are 8:00 a.m. to 4:00 p.m., with a request cutoff time of 2:00 p.m. Requests outside these hours may be accommodated at overtime rates. Qualified Utility Employees are available during regular business hours, at no cost, for job planning discussions, agreements, meetings, reclosure blocks, and related coordination. Early engagement helps ensure everyone has the information needed to work safely and confidently around electrical infrastructure.

Everyone has a role to play—by staying informed, planning ahead, and respecting electrical hazards; we can ensure that every job is completed safely, and everyone goes home unharmed.

Jeff Sandford
Manager Electric Distribution Operations

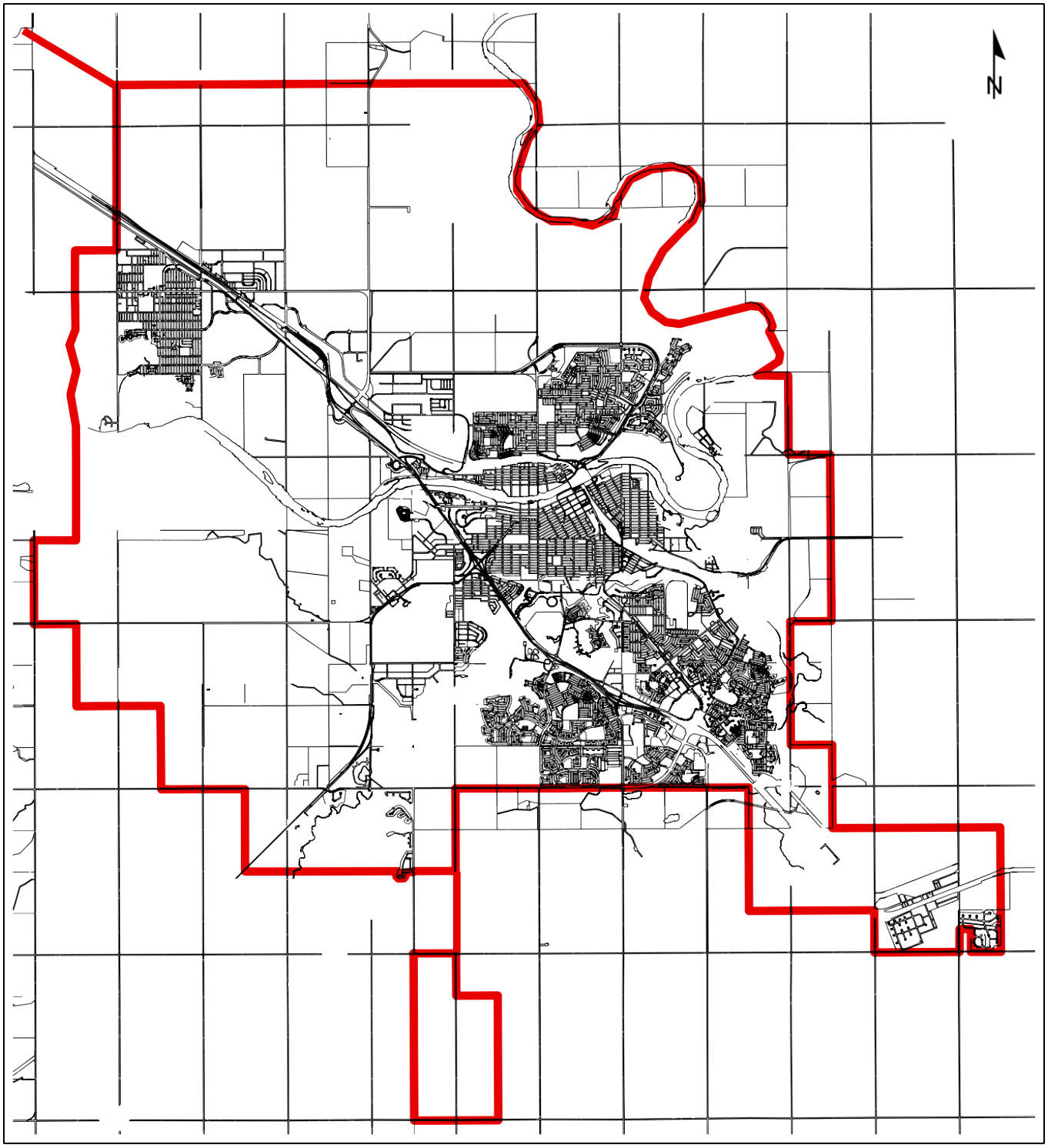
DEFINITIONS (refer to the following definitions for this document)

AESO……	The Alberta Electric System Operator is responsible for the safe and reliable operation of the Alberta Interconnected Electric System (AIES).
AEUC……..	The Alberta Electric Utility Code.
Contractor…….	Anyone disturbing the ground (including homeowners).
CMH……	City Of Medicine Hat
City of Medicine Hat QUE….	Qualified Utility Employee deemed competent by the CMH Electric Utility.
City of Medicine Hat SCO….	Qualified Safety Codes Officer recognized by the Alberta Safety Codes Council with designation of powers by the CMH Electric Utility.
City of Medicine Hat ESCO….	ESCO, A certified professional employed by accredited municipalities or agencies to enforce the Safety Codes Act, ensuring electrical installations comply with the Canadian Electrical Code (Part1) and provincial regulations.
City of Medicine Hat USCO….	USCO, A certified professional who inspects the construction, operation, and maintenance of electrical utility systems to ensure compliance with the Safety Codes Act and the Alberta Electrical Utility Code. (sometimes referred to as an EDI (Electric Distribution Inspector). They represent the authority having jurisdiction to ensure safety against shock and fire hazards.
De-Energized (Dead)…….	At a potential equal to or not significantly different from that of ground at the worksite. No cable or device is considered de-energized unless it is grounded.
Energized (Live)…….	At a potential significantly different from that of ground (earth) at the worksite and which presents an electrical hazard. **NOTE:** A part is energized when it is electrically connected to a source of electric energy. It can also be energized when it is electrically charged under the influence of an electric or magnetic field. Apparatus must be considered energized unless confirmed isolated and grounded.
Grounded…….	Electrically connected to earth through a grounding electrode or through an extended conducting body.
Hand Dig……	No mechanical excavation work. The only tool allowed is a clean, non-conductive shovel until all buried facilities have been found or hydrovac (See Part 32 –- Section 448-1 of AB OH&S Explanation Guide).
Hand Expose Zone…….	Distance from outside of locator marks that must be exposed by hand dig or non-destructive hydrovac methods (see 2.1).
High Voltage (HV)……	CMH Electric's transmission system uses high voltages—typically 69,000 Volts and 138,000 Volts —which are above the 50,000 Volt definition for high voltage.

Insulated……	Having sufficient insulating covering, dielectric separation, and/or airspace to prevent a significant flow of current (i.e. current that can cause personal injury or harm to equipment) between objects at different potentials.
Limit of Approach……..	See minimum approach distance.
Minimum Approach Distance (MAD)……	Also referred to as "Minimum Working Distance". The minimum distance in air to be maintained between any part of the body of a worker, including any object being handled directly, and any part(s) at different potential(s). This distance will be referenced for contractors and non-electric personnel in the Electric Proximity Safety Plan.
Mechanical Excavation…….	Boring or open cut excavation by means of mechanical excavating equipment such as powered excavators, earth movers, earth piercing equipment including handheld augers and other mechanical equipment.
Medium Voltage (MV)…….	CMH Electric's distribution primary system operates at medium voltage levels (8 kV and 13.8 kV), consistent with the 1,001 V to 50,000 V range defined by CAN/ULC-S801.
Near……	Close to, or in such proximity so as to give rise to the possibility of encroaching on the Limits of Approach.
Non-destructive…….	See hand dig definition and Figure 1.
Locate……	Identification on the ground of the position of the utility line(s) and related underground infrastructure based on records or electronic locating equipment and includes provision of necessary documentation such as a locate sheet.
Low Voltage (LV)…….	Voltages equal to or less than 1,000 Volts. Or simply stated CMH Electric distribution secondary voltages (120/240V, 122/208V, 277/480V, 347/600V).
Portable Bond Mat…….	A mat that creates an equipotential zone for the worker to stand during various energized and de-energized work practices.
Proximity……..	For the purposes of electrical operations, distance at which there is a possibility of exposure to an adverse effect (i.e., Arc flash hazard, radio frequencies, electromagnetic frequencies).
Step Potential……	The difference in voltage level from one foot of a person to the opposite foot. This can be felt when a person steps across an energized path of earth. The worker forms a parallel path to the earth and current flows through the worker as well as the earth. This can result in harmful current levels in some situations.
Touch Potential……..	The difference in voltage level between energized electric lines or equipment and the earth. This may be felt by a person standing on the ground when they contact the electric lines or equipment and complete a parallel path to earth. The voltage may be supplied by a power system element such as a portable generator, or by unintentional energization, or by induction. Touch potential can vary greatly, as it depends on the distance from where the worker is standing to the location of the source voltage.

CITY OF MEDICINE HAT ELECTRIC SERVICE AREA MAP

Figure 1. CMH Electric Service Area Map



PART 2

GROUND DISTURBANCE IN PROXIMITY TO BURIED ELECTRIC FACILITIES

2.0 LOCATING BURIED ELECTRIC FACILITIES

Over 25% of direct power line contacts in Alberta involve excavators. The majority of incidents involving overhead power lines occur while the equipment is being operated or transported. Even if the equipment does not make direct contact, electricity can arc or "jump" from the power line to any conductive object. The chances of arcing increase with the voltage.

Failing to locate buried utilities prior to disturbing the ground and inexperience working around marked lines are two (2) reasons why underground power line contacts are so common. Request a CMH Electric locate before you dig by contacting Utility Safety Partners on-line or at 1-800-242-3447.

Prior to disturbing the ground, the ground disturber must ensure that underground utility locations for all buried facilities have been completed through Utility Safety Partners. **The locate process will indicate if a CMH Electric Proximity Safety Plan is required.** All location documentation must be current and on site with the person doing the excavation. The CMH Electric Operations locators will use different types of marks to assist in identifying what steps are required.

Locates will not be performed on privately owned underground powerlines, as they are outside CMH Electric Distribution jurisdiction.

A chevron with a closed top, or diamond shape, indicates transmission or high voltages (pictured below). These are rare in the service area, but they do exist. If there is a buried transmission, both an Electric Proximity Safety Plan and Regulatory approval are required. See 2.4 for details.

A chevron indicated primary voltages, can be either single or 3 phase (pictured below). If there is buried primary, an Electric Proximity Safety Plan is required. See 2.4 for details.

Dashed lines indicate secondary voltage. An Electric Proximity Safety Plan is not required at this time. Excavators shall comply with all legislation in relation to excavating in proximity to buried electric lines utilizing safe work practices.

NOTE: ***ALL*** *electric cables are to be treated as* ***ENERGIZED*** *during the excavating and back filling procedures.*
For overhead electrical lines, see part(s) 2.5 and 3.0-3.5 of this document.

Figure 2. Legend for CMH Electric Locate Marks

2.1 PROTECTION OF CABLES AND EQUIPMENT IN OPEN EXCAVATIONS

The contractor and site personnel will ensure exposed energized equipment and cables are secured from public contact while they are unattended. During periods of inactivity, all open excavations will be covered, barricaded, and adequately fenced off with approved fencing to minimize access to the exposed facilities.

2.2 DAMAGE

If damage has occurred while exposing CMH Electric facilities:

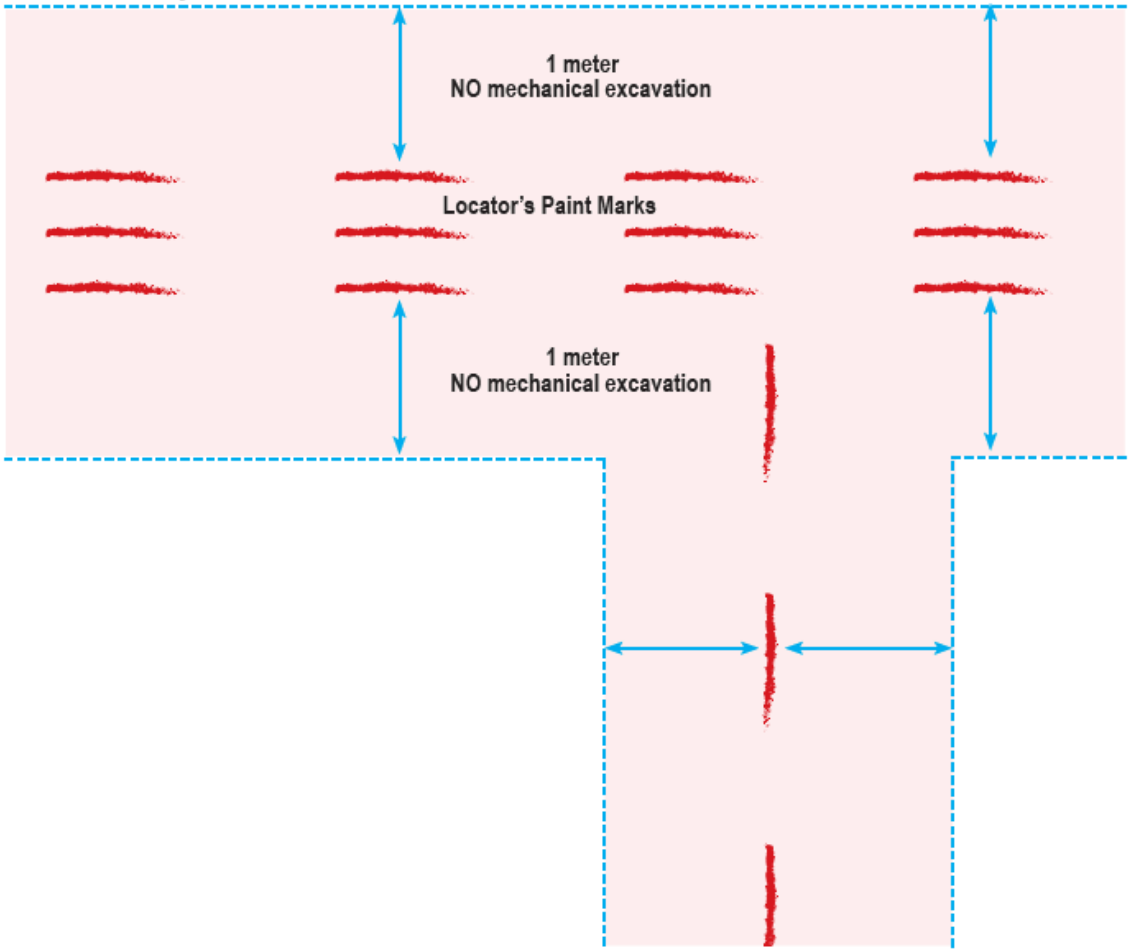
1. **STOP WORK** and do not move or touch anything.
   Be conscious and know the hazards of step and touch potential.
2. Keep those outside the dig back ten (10) meters and, if possible, secure the site.
3. Contact **9-1-1** if an injury has occurred.
   Notify CMH Electric Operations (403-529-8260).
   Do not re-enter the excavation until clearance has been given, and repairs have been completed by a CMHE qualified electric employee.
4. In the event of a line contact, all CMH Electric work permissions will be suspended until an investigation is complete and submitted to the CMH Electric USCO. Only a CMHE USCO may re-instate work permissions.

2.3 CLEARANCE STANDARDS NON-MECHANICAL EXPOSE ZONE

Underground Secondary Cables (Low Voltage: Less than 1000 volts line to line).

No mechanical excavation work is to be undertaken in any circumstances within the no mechanical excavation zone; 1.0 meter on either side of the locate markers placed by Utility Safety Partners. Only a non-destructive means of excavating is permitted within the one-meter buffer zone (hand-expose or hydrovac). See 2.12 for asphalt challenges.

Figure 3. Secondary Buffer Zone

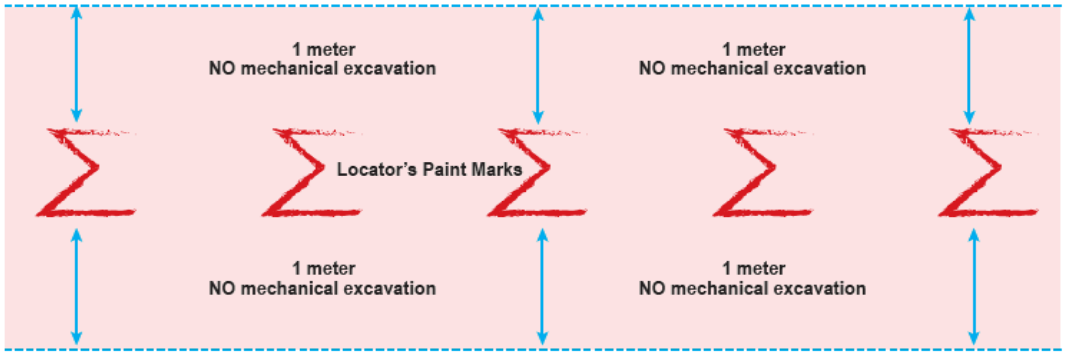


Underground Primary Cables

(Medium Voltage: 8,000 or 13,800 volts)

When there is a "CONFLICT" indication from CMH Electric on the locate slip, or marks on the ground indicating buried primary cables, then no mechanical excavation work is to be undertaken, under any circumstances, within one (1) meter on either side of the location markers. Excavations outside this buffer zone may proceed, but should work be required within this zone, an Electric Proximity Safety Plan is required. Contact the CMH Electric Operations at 403-529-8257. A CMH QUE shall meet on-site and provide formal guidance before excavation will be allowed within this area.

Figure 4. Primary Buffer Zone



Underground Transmission Cables

(High Voltage: 69,000 or 138,000 volts)

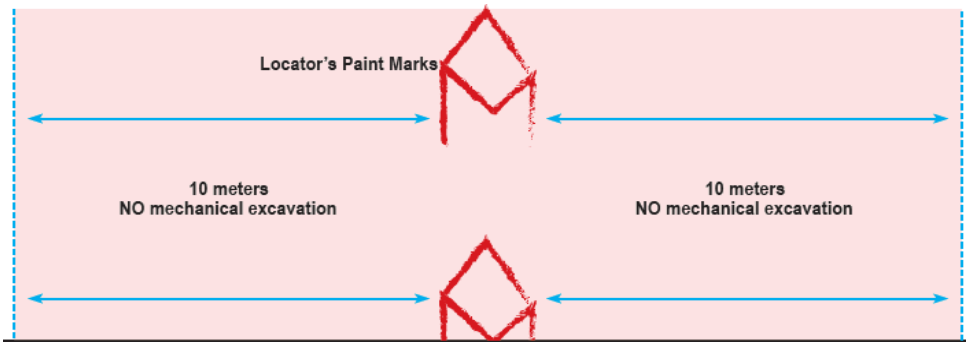
When a "CONFLICT – Transmission" is indicated on a CMH Electric locate slip, or when ground markings identify buried transmission cables, mechanical excavation is strictly prohibited within 10 meters on either side of the marked location under all circumstances.

If excavation is required within 10 meters of buried transmission cable(s), CMH Electric Operations (403-529-8260) must be contacted prior to any work. Under no circumstances shall the cables remain energized during excavation within this zone as per CAN/ULC-S801 (OH&S enforced).

De-energization of transmission facilities requires provincial approval by the AESO in accordance with ISO Rule 306.4. Requests must be submitted through CMH Electric System Control Operators a minimum of 45 days in advance. Approval is not guaranteed, as system reliability considerations—including time of year, system loading, and overall grid stability—will factor into the decision.

A CMH QUE must be on-site during excavation, and they will provide excavators with both an Electric Proximity Safety Plan and a G.O.I. (Guarantee of Isolation).

Figure 5. Transmission Buffer Zone



2.4 CLEARANCE STANDARDS NON-MECHANICAL EXPOSE ZONE (AROUND EQUIPMENT)

No mechanical excavation will be permitted that may result in damage to the protective ground grids associated with CMH Electric Transformers, Switchgears, or Enclosures. An Electric Proximity Safety Plan will be issued and only approved. Non-destructive hydrovacing or hand exposing will be permitted within one (1) meter of the ground grid. See also 3.7 and 3.8.

CAUTION: System ground wires and ground rods are not locatable and are typically buried below the final grade and encompass an engineered area around or adjacent to CMH Electric Facilities. Contacting the ground system may cause damage to the adjacent structures or equipment and/or personal injury or death. No mechanical excavation work is to be undertaken in any circumstances when disturbing the ground within one (1) meter of the locate marks that will be painted at a measured distance from the equipment. No one should handle, disturb, move, or modify a ground grid. Placing oneself in series with an open ground can be fatal.

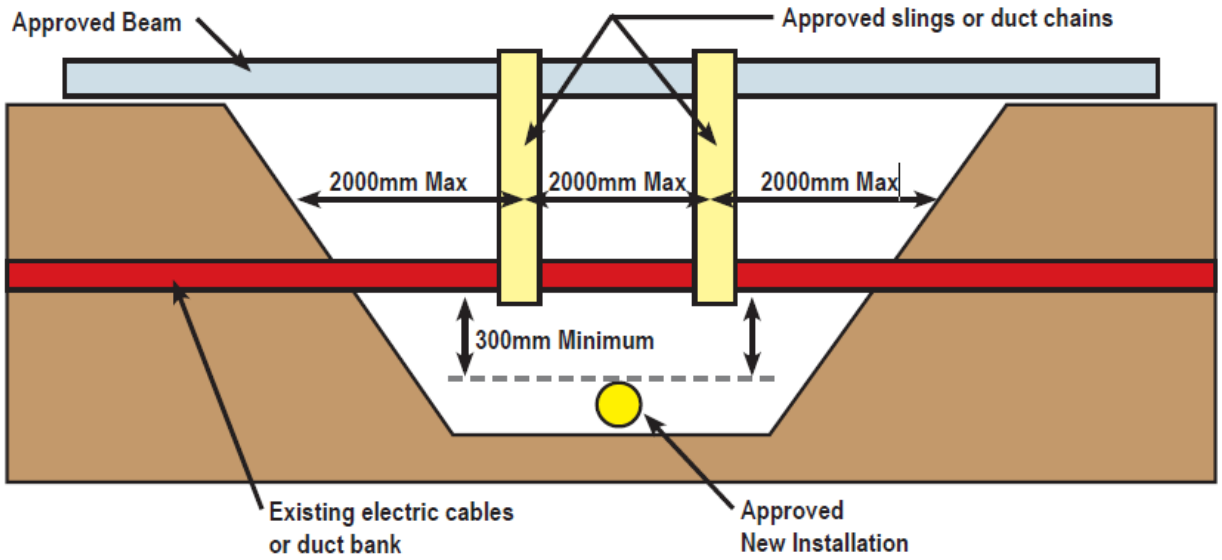
2.5 STRUCTURE SUPPORT

Buried Systems: The CMH Electric equipment, cables, ducts, and concrete duct banks that may be undermined, shall be supported. The Contractor must call City of Medicine Hat Electric Operations at 403-529-8260 prior to excavating near City of Medicine Hat Electric equipment, ducts, cables, or concrete duct banks.

A support beam (or beams) for cables and duct banks shall be employed. The actual sizing and supply of the support beams, slings, and/or chains will be determined by the contractor and approved by CMH UDS. The support system must be sufficient to prevent sag, bending, and deflection of duct, cables, and/or duct banks. The support beam must be in the form of a steel "I" beam or wood pole set across the excavation running parallel with the undermined facility, and it must have sufficient span length to reach a minimum of three (3) meters (on each side) beyond the edge of the excavation so that the supporting structure will not slough into the excavation due to unstable soil conditions.

CMH Electric facilities not encased in concrete (direct buried cable or ducts) must be supported by nylon slings. Cable or plastic duct chains may be used to support concrete encased duct banks. The maximum distance between supports or slings is two (2) meters.

Figure 6. Cable, Duct and Duct Bank Support



Overhead Systems: Do not dig within seven (7) meters of a CMH Electric power pole without an Electric Proximity Safety Plan. Depending on the details of the excavation, you may need additional support to prevent poles collapsing. The safety plan process will determine the safest way to do the work and if the pole will need to be held. Depending on the specific circumstances, including pole construction and soil conditions unique to each excavation, the Electrical Engineering Supervisor may be required to review the plan. A CMH Electric USCO or QUE will make the determination at the site meeting if required. These types of excavations require more involved and advanced planning.

Poles and anchors that may be impacted by excavations shall be supported to safeguard the electric system, workers, and the public. The contractor must call CMH Electric Operations (403-529-8260) and work with the utility to create a safe work plan. Where required, The Utility can provide temporary pole support services at the ground disturber's expense. For current pricing and scheduling, contact CMH Electric directly. Pole support installation and removal is performed between 8:00 a.m. and 2:00 p.m., provided work can be completed within this time window.
All removal requests must be submitted by 2:00 p.m. at least one full working day in advance.

2.6 SPLICES

Use extreme caution when working within one (1) meter of any cable splice. No one shall move, walk on, or disturb cable splices while exposing or working around electric cables. Contact CMH Electric Operations (403-529-8260) for inspection prior to backfilling any splice.

2.7 BACKFILL REQUIREMENTS

Upon completion of the work near CMH Electric facilities, all exposed direct buried primary cables and ducts must be padded with bedding sand at a depth of 300mm. See Figure 6.

Bedding sand shall be well graded and free of ice, frozen material, loam, organic material, and stones larger than 5mm. The remaining common fill must be compacted to CMH compaction specifications.

The Contractor shall be prepared to provide compaction test results if requested by CMH Electric Operations USCO. Common fill may be the material removed from excavation but must be free of snow, ice, loam, organic material, and boulders larger than 200mm. If compaction cannot be obtained to allow proper support, CMH Electric may require fill Crete under CMH Electric facilities.

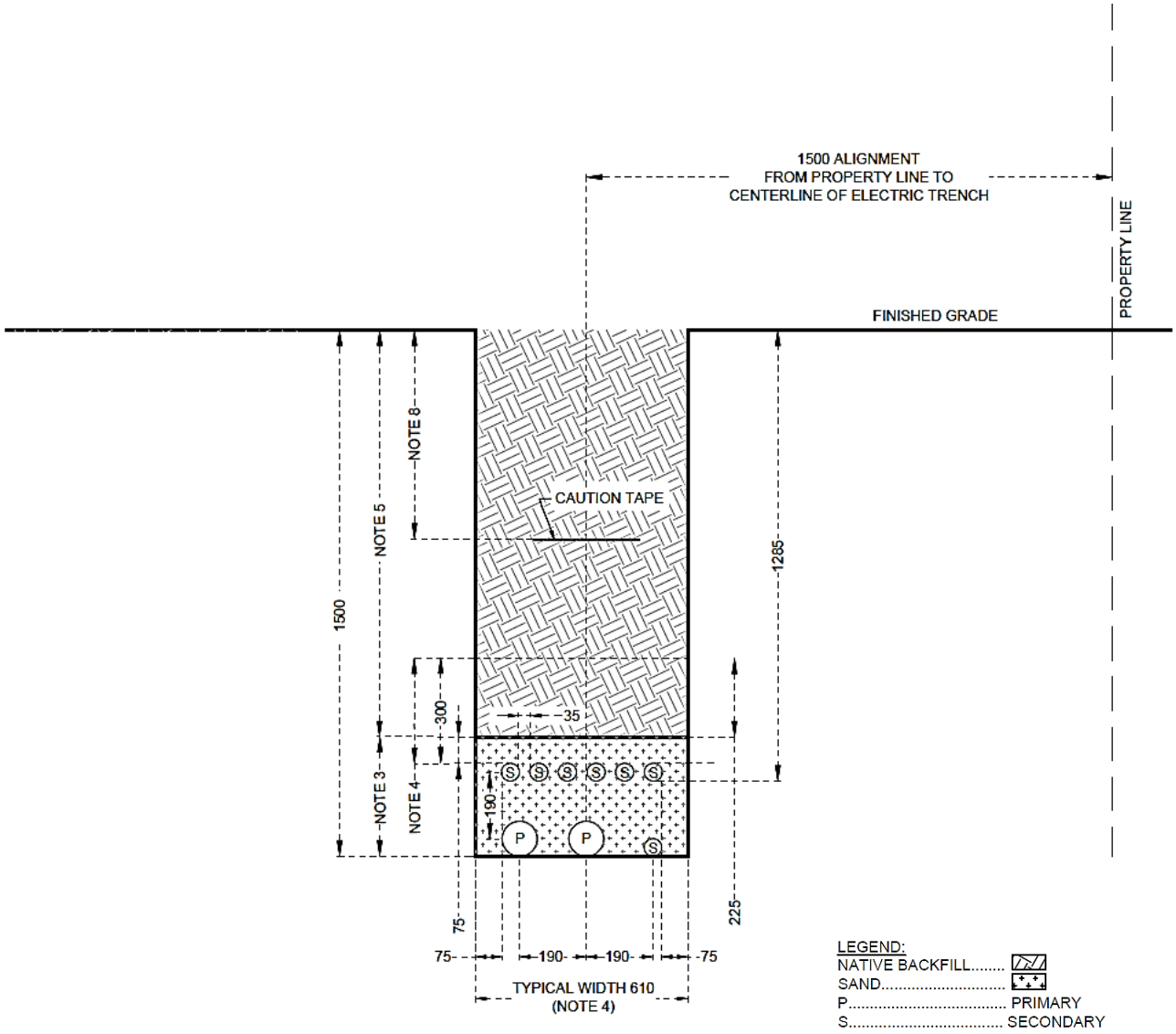
Final grade shall be restored to a level that ensures the burial depth of CMH Electric cables has not changed. If there is a rise or fall in the final grade, CMH Electric must be contacted prior to backfill so the new grade can be recorded.

Tramsmission circuits require specific instruction from CMH Electric for backfill requirements.

Notify CMH Electric Operations at 403-529-8260 prior to any back filling.

NOTE*: ALL POWER CABLES ARE TO BE CONSIDERED ENERGIZED DURING THE EXCAVATION AND BACKFILL PROCEDURES*.

Figure 7. Backfill Requirements for Cables and Ducts



NOTES:

1. ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED.
2. ALL BACK DISTRIBUTION TRENCH TO BE 1.5m OUTSIDE PROPERTY LINE UNLESS NOTED OTHERWISE.
3. AT A MINIMUM 75mm OF SAND IS REQUIRED TO BE INSTALLED AT THE SIDES OF THE TRENCH, AS WELL TO COVER THE TOP OF THE CONDUIT. IF THE BOTTOM OF TRENCH IS ROCKY, 75mm OF SAND IS REQUIRED.
4. 3rd PARTY CONDUITS OR CONDUCTORS MUST BE A MINIMUM OF 300mm FROM THE TOP OF CITY ELECTRIC CONDUIT, AND MUST MAINTAIN A 300mm HORIZONTAL DISTANCE AS WELL.
5. NATIVE BACKFILL WITH DEBRIS & ROCKS THAT IS LESS THAN 30mm IN SIZE SHALL BE USED FOR REMAINING BACKFILL, OTHERWISE SUBSTITUTE WITH 3/4" ROAD CRUSH.
6. COMPACTION TO BE EXECUTED ONCE CONDUCTORS & CONDUITS ARE COVERED WITH 300mm OF BACKFILL.
7. CONDUCTOR/CONDUIT SPACING:
   - PRIMARY → PRIMARY = 190mm (CENTRE TO CENTRE)
   - PRIMARY → SECONDARY = 190mm (CENTRE TO CENTRE)
   - SECONDARY → SECONDARY = 35mm (OUTSIDE OF CABLE TO OUTSIDE OF CABLE)
8. 6" - "CAUTION BURIED ELECTRIC LINE BELOW" TAPE - INSTALLED IN TRENCH ABOVE CABLE, 600mm FROM FINISHED GRADE.
9. ALL PRIMARY & SECONDARY CABLES TO BE IN CONDUIT, SEE DETAILED DESIGN FOR MORE INFORMATION.
10. INSTALLATION MUST BE INSPECTED PRIOR TO BACKFILLING BY UTILITY SAFETY CODES OFFICER.
11. CABLE MUST BE PROTECTED FROM MECHANICAL DAMAGE AT ALL TIMES.

2.8 Exposing Underground Electric Facilities

Requirements for exposing energized underground distribution cables shall be documented in written procedures. The procedures include, but are not limited to, the following directives:

1. Where reasonably practicable, underground distribution cables shall be isolated and grounded before exposure. Cables energized at voltages above 25 kV shall be de-energized and grounded prior to excavation;
2. Automatic circuit reclosing should be blocked before excavation or exposure;
3. Mechanical excavation methods are not allowed within 1 m of the outside extremity of any electric cable or cable in duct unless it is positively identified as isolated and grounded or the electrical cable or cable in duct has been exposed to sight (daylighted) by the following methods:

   A) By hand-digging where the shovel handle is non-conductive; or
   B) By another non-destructive technique

   Note: *Pointed probes or tools capable of piercing the cable shall not be used during excavation.*

4. All workers shall wear appropriate personal protective equipment (PPE) during any hand digging or removal of loose soil within 300 mm of an energized cable, in accordance with Alberta Occupational Health and Safety (OHS) requirements and their organization's procedures.

   Third-party Contractors must contact CMH Electric Operations (403-529-8257) prior to excavating within the hand exposure buffer zone to obtain an Electrical Proximity Safety Plan.

   The City of Medicine Hat is not responsible for the work methods or practices of third parties working in proximity to electrical infrastructure. The third party is solely responsible for ensuring compliance with all applicable legislation, regulations, and codes, including but not limited to PPE requirements and worker competency.

   When exposing CMH Electric infrastructure, Contractors must have a functioning cell phone or other approved means of communication to contact 9-1-1 and CMH Electric Operations (403-529-8260).

2.9 HYDROVAC GUIDELINES FOR EXPOSING ELECTRIC FACILITIES

The Contractor must call the City of Medicine Hat Electric Operations (403-529-8257) for an Electric Proximity Safety Plan prior to excavating near City of Medicine Hat Electric equipment, ducts, cables, or concrete duct banks.

Contractors must ensure that all personnel involved in hydrovacing procedures are competent or are under the direct supervision of a competent employee and are equipped and wearing personal protective equipment (PPE), as per part 18 of the Alberta Occupational Health & Safety Code, at all times during and while exposing any City of Medicine Hat Electric plant or equipment.

When a Contractor is exposing energized or isolated cables, Electric Operations recommends that:

- The job site and the truck must have signage in accordance with the Contractor's procedures and must be supervised to warn staff or the public of site-related hazards and against entering the job site.
- Signs indicating "Danger" must be located a minimum of three (3) meters from the truck to reduce the risk of injury from step and/or touch potential.

NOTE: *All water pressure and/or vacuum systems (hydrovacing) that use a combination of water temperature and pressure have the potential to damage underground cables and facilities. Cable damage may occur by too much water pressure and will appear as a slice into the cable sheath of an unknown depth or as though the outer sheath has been torn and pulled outward. If damage is suspected, exit the excavation immediately and secure the site. Notify City of Medicine Hat Electric Operations (403-529-8260). Do not re-enter the excavation until clearance has been given, and repairs have been completed by a CMH Electric QUE.*

Hydro excavation equipment may be used to expose underground cables, subject to the following conditions:

- Only cables identified by the utility as suitable for hydro excavation, in accordance with its procedures, shall be exposed using hydro excavation equipment.
- Hydro vac operators exposing underground electric cables must have successfully completed the DETAC Equal Potential Bonding Guide for Hydrovac Operators, or another utility-approved equivalent course. Proof of completion may be requested by CMH Electric personnel on site.
- Operators shall stand on a portable bonding mat and ensure the mat is properly connected to the conductive components of the pressure wand and vacuum tube. All manufacturer instructions for bonding and equipment use must be followed.
- Effective warning barriers (e.g., barricades, cones, caution tape) shall be installed around the immediate excavation area where buried facilities are being exposed. Barriers are not required around the entire hydrovac unit unless specified by the bonding mat manufacturer.
- Workers and members of the public must be kept at least 2 meters away from the excavation area.
- If adequate warning barriers cannot be established, a designated spotter shall be assigned to control access and warn workers or the public to remain clear of the work area.

The hydo excavation crew shall ensure that:

- The water pressure and temperature settings do not exceed:
  - 1500 psi and 38 °C while exposing buried facilities, and
  - 2500 psi and 93 °C while hydro excavating large volumes of soil that have been confirmed as not containing any buried facilities.
- An oscillating head is used at all times to limit the possibility of damaging buried facilities.
- The end of the water wand has a urethane or equivalent cover to prevent mechanical damage to buried facilities, and
- The end of the vacuum tube has a urethane or equivalent cover to prevent mechanical damage to buried facilities

The following safe work methods must be followed:

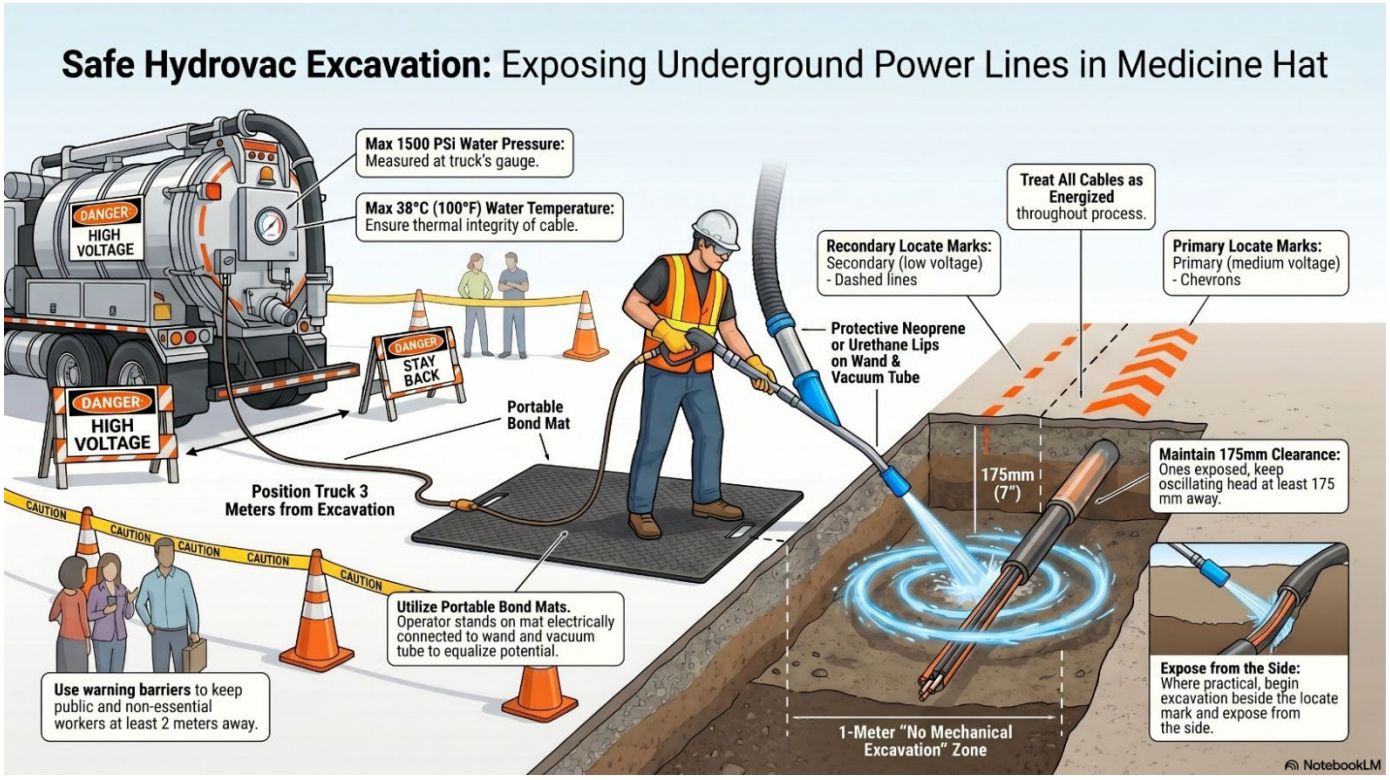
- The water wand shall be in constant circular motion, avoiding moving the wand parallel to the buried facility. Jabbing motions are to be avoided because they can damage buried facilities;
- The water wand shall never be left unattended with the pressure on and water flowing;
- Where practical, buried facilities shall be exposed from the side and not directly from above. The excavation should begin beside the locate mark(s) and go to a depth below the expected depth of the buried facility. At that point, soil covering the buried facility can be removed;

- Once the buried facility has been exposed, a distance of at least 175 mm (7 inches) should be maintained between it and the oscillating head of the water wand; and
- Avoid positioning the vacuum tube directly over exposed facilities

In some cases, an excavation is very large, and a significant volume of soil must be removed. In such cases, the hydro excavation operator may increase the water pressure and temperature above the normal limit of 1500 psi and 38 °C. to as much as 2500 psi and 93 °C, subject to the following conditions:

- All buried facilities within the excavation shall be fully exposed along their entire length before the pressure and temperature are increased; and
- Before the pressure and temperature are increased, additional slot trenches shall be cut once the expected buried facilities have been exposed. These additional slot trenches help confirm that no unmarked buried facilities are present in the large volume of soil that will be hydro excavated. The hydro excavation operator is responsible for determining the location and number of slot trenches required.
- The slot trenches:
    - Should be at approximately right angles to the exposed facilities
    - Shall go outwards from the exposed buried facilities to the full width of excavation, and
    - Shall be cut down to the full depth of the exposed buried facilities.

If a splice is encountered while hydro excavating, precautions shall be taken to ensure that the splice is not damaged. Work is allowed to continue if the water wand remains at least 1 m away from the discovered splice.



2.10 DIRECTIONAL BORING GUIDELINES

The Contractor must call the CMH Electric Operations (403-529-8257) for an Electric Proximity Safety Plan prior to excavating near CMH Electric equipment, ducts, cables, or concrete duct bank(s).

Safety Precautions: When a Contractor is doing directional boring, CMH Electric makes the following recommendations:

- The job site and equipment must have signage in accordance with the Contractor's procedures and must be supervised to warn staff or public of site related hazards and against entering the job site.
- Signs indicating "Danger" must be located a minimum of three (3) meters from the equipment to reduce the risk of injury from step and/or touch potential. No person should touch the truck/equipment while the excavation is in progress to avoid touch potential.

All directional boring machines have the potential to damage underground CMH Electric cables and facilities. Extreme caution must be used when working near energized cables. At the time of permit issue, the CMH Electric QUE will determine if a QUE is required to supervise the site.

Before boring begins, all located CMH Electric cables and facilities in conflict must be exposed to sight (daylighted). If coring or boring parallel to the cable, the cable must be exposed at roughly five (5) meter intervals to make sure the drill head will not impact the cable. The CMH Electric QUE will confirm based on work at time of permit issuance.

The machine operator will not allow any persons within three (3) meters of the machine while the boring operation is in progress. This is to prevent touch potential if the drill head contacts an energized cable.

The drill operator will remain on the machine if an energized cable is contacted until he has been given clearance from a CMH Electric QUE.

2.11 MANAGING SECONDARY POWER AND EXCAVATION CONFLICTS UNDER CEMENT

There are several buried power conductors within the CMH Service Area that cannot be exposed using non-destructive means. Commonly street lighting cables can be found under sidewalks and asphalt. Street light cables in mature areas of the city were often installed directly under the sidewalk.

A photocell **SHALL NOT** be used as an isolation. Also, the streetlights may be on a live circuit with the photocell on individual luminaries leaving the cables energized during the day. There is also the potential of pilot wires that would also always remain energized. As these cables cannot be exposed through the cement, the circuit needs to be isolated before tearing out the concrete or asphalt.

Should the Alberta One-Call locate indicate there is street light cables directly under a sidewalk that need to be excavated, permission to isolate the circuit and turn a section of lights off must be obtained by the facility owner (the owner of the road) first. Once permission is obtained, they will contact CMH Electric Operations Customer Service a minimum of two (2) working days prior to starting work and crews will isolate the line. Temporary light plants or other strategies may be required at the discretion of the road owner. Once the work is complete and all men and equipment are clear, then contact CMH Electric Operations Customer Service to reconnect the light and/or circuit.

PART 3
WORKING IN PROXIMITY TO OVERHEAD POWER LINES

O/H WORK STANDARDS AND PLANNING CONSIDERATIONS

3.0 OVERHEAD CONTACTS

Overhead power lines or conductors have been a part of the Alberta skyline for more than a century now and carry thousands of volts of electricity to our homes and businesses and at first glance, look harmless.

Electricity is often overlooked as it cannot be seen, and it cannot often be heard, regardless of how it is portrayed on television. Assuming that the hazard is minimal has proven to be a dangerous assumption. Coming into contact with, or even in proximity to, live electrical parts can be fatal.

The majority of incidents involving overhead power lines occur while equipment is being operated or transported. Even if the equipment does not make direct contact, electricity can arc or "jump" from the power line to any conductive object. The chances of arcing increase with the voltage of the line and the closer equipment gets.

When equipment makes contact with a power line, it puts both the operator and the workers standing in the surrounding area at risk. An electrical current may flow through the equipment and into the ground. The voltage will be highest close to the equipment and "ripples" outward, energizing anything touching it.

Carefully planning how equipment is used in proximity to power lines is key. Always keep your equipment at least seven (7) meters away from overhead lines.

Every day, two to three Albertans will come in contact with power lines. The potential for injury and even death is extremely high. Some of the most common activities that caused these incidents are:

- During the loading and unloading of dump trucks
- Cement trucks and garbage trucks
- Roofing and other exterior building work
- Cranes, boom trucks
- Road work
- Tree Trimming.

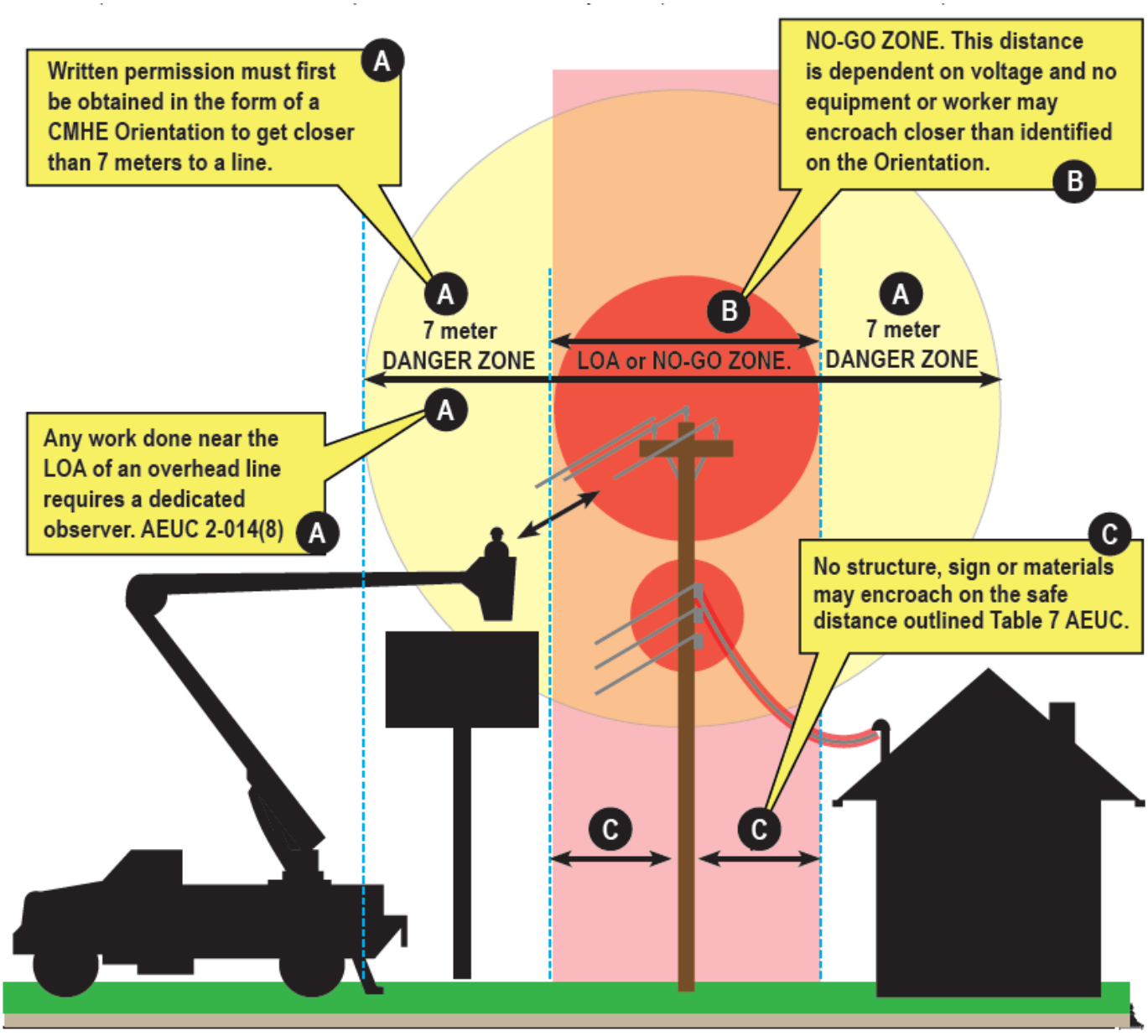
3.1 EQUIPMENT IN PROXIMITY TO OVERHEAD POWER LINES

The limits of approach distances for overhead power lines are intended to prevent power line contacts resulting in injuries and fatalities. Limits of approach are the safe distances that people or equipment must maintain from exposed energized power lines, or equipment, which vary depending on the system voltage and the training and experience of the individual.

If work is planned near energized high-voltage electrical conductors, Alberta OHS Code (Part 17, Overhead Power Lines) specifies the safe limits of approach that must be maintained by any worker, machine, equipment, or material. If work is done or equipment is operated within seven (7) meters of an overhead power line within the City of Medicine Hat Service Area, the CMH Electric Operations must be contacted.

The CMH Electric QUE will indicate the voltage of the power line, the safe working distance, and outline any special safety requirements. The CMH Electric Operations Group manages this communication with an Electric Proximity Safety Plan. This process ensures that all workers within seven (7) meters of an overhead line are aware of the hazards and expectations to work safety are understood by all workers.

Figure 8. Minimum Requirement for Unqualified Workers and/or Equipment Operating Near Overhead Power lines (As outlined in Alberta Occupational Health and Safety Code (Part 17, Overhead Power lines)



When working in proximity to power lines, workers and equipment should adhere to the following guidelines:

- Know the voltages and safe limits of approach for equipment and workers.
  Reference the utilities look up and live mapping system for information regarding the overhead lines in proximity to your work zone. medicinehat.ca/lookupandlive
- Know the normal operating circuit or feeder identification name/number, in case of emergency. Understand that electricity distribution is dynamic, and these may change to facilitate system needs.
- Mark the location of all overhead power lines and/or exposed underground cables on work plans.
- If your project might result in workers or equipment encroaching on minimum distances, you must contact CMH Electric Operations before beginning any work.
- Call CMH Electric Operations (403-529-8257) for an Electric Proximity Safety Plan and clearance requirements specific to your area and the job, if required, to be within seven (7) meters of a line.
- As per the Electric Proximity Safety Plan, a dedicated spotter will be required when equipment is within seven (7) meters of a line.

Figure 9. Limits of Approach for Non-QUE within CMH Electric Operations Service Area if the Voltage has been Confirmed. *(Taken from AB Electric Utility Code, Table 1. Ref.: Rule 2-014)*

Type	Voltage	L.O.A.
Secondary	0 - 750 Volts	1 m
Primary	8,000 or 13,800 Volts	3 m
Transmission	69,000 Volts	3.5 m
Transmission	138,000 Volts	4 m

Situations may arise in which work must be done, or equipment operated near a power line at distances less than the safe limit of approach distance for that particular voltage. In such cases, the CMH Electric QUE and/or Utility Safety Codes Officer(s) will provide assistance to protect workers.

This could involve de-energizing the power line, relocating it, or performing some other equally effective action. This work is more involved, can have a monetary cost, and will require planning. The CMH Electric Operations Group **will not** install dielectric protective cover up on power lines for third parties.

Any work plan involving reducing the limits of approach must be approved in writing in conjunction with an Electric Proximity Safety Plan. A site visit with a CMH Electric USCO or QUE is required prior to issuing a safety plan.

3.2 HIGH LOADS

Alberta Transportation has designated several high-load corridors in Alberta. These corridors allow for loads up to nine meters tall and are the recommended route for high loads in the province. Outside these corridors, the CMH has power lines with a variety of voltages and varying clearance heights where roads and highways are crossed. Also, there may be third party communications, such as TELUS, Rogers, Bell, etc., on the poles with reduced clearances that may be within the CMH Electric service area.

No high loads (>4.15 meters) shall be moved under the overhead power line(s) without assistance from the Operator of the Utility System as per the Alberta Electric Utility Code. If a load higher than 4.15 meters is required to be moved under the power line(s) within CMH Electric supply area, please contact the CMH Electric Operations Customer Service Department (403-529-8257) as soon as possible for scheduling prior to crossing under a line.

Please be aware that we typically require at least 10 business days' notice to schedule a high load move, and the move will need to be coordinated with other stakeholders such as communications, police, or RCMP. In addition, if your move requires a transmission line outage, ninety days' notice may be required as per the Alberta Electric System Operator.

3.3 GRADES AND EXCAVATION NEAR OVERHEAD POWER LINES

Should any work involve adding or removing the surface under a power line, the finished grade at any power line crossing shall maintain the original "As-Found" clearance to the overhead power line(s) and shall meet or exceed the minimum clearance (Table 5, AEUC) of:

- 5.7 meters for 0-750 V circuits
- 6.0 meters for 13.8kV circuits
- 6.4 meters for 69 kV circuits
- 6.7 meters for 138 kV circuits.

During and/or after construction, the safe limits of approach cannot be reduced in any way No spill piles, materials or equipment may be stored underneath or adjacent to a power line as it will reduce the distance to the conductors and could become an uncontrolled hazard to workers or the public. Keep spill piles and materials well outside the limits of approach from the line. This distance will be outlined in the Electric Proximity Safety Plan.

3.4 SHEDS, SIGNS, AND BUILDINGS

Any shed or building greater than 107 square feet requires a building permit. No structure shall encroach into the utility right of way, add a hazard to workers or prevent the safe operation of electrical devices.

No person shall construct or place buildings, signs, or other objects within the minimum clearances from overhead power lines unless authorized in writing by a CMH Electric Operations Utility Safety Codes Officer in accordance with the tables located in the Alberta Electric Utility Code.

3.5 SYSTEM INTERFERENCE

Electrical utility system poles and structures shall be kept free of all materials and equipment not required for the system. No person shall make permanent or temporary attachments to electrical utility poles unless authorization has been received from the operator of the utility system.

No person shall climb CMH electric system poles or make connections or disconnections to electrical utility system equipment unless the person has been authorized to do so by an authorized CMH Electric Operations representative and in constant communication with the System Control Room.

No person shall enter an electrical utility system generating station, substation, subsurface chamber, equipment room, or similar location without an authorized and qualified escort unless that person is authorized to enter by an authorized CMH Electric Operations representative.

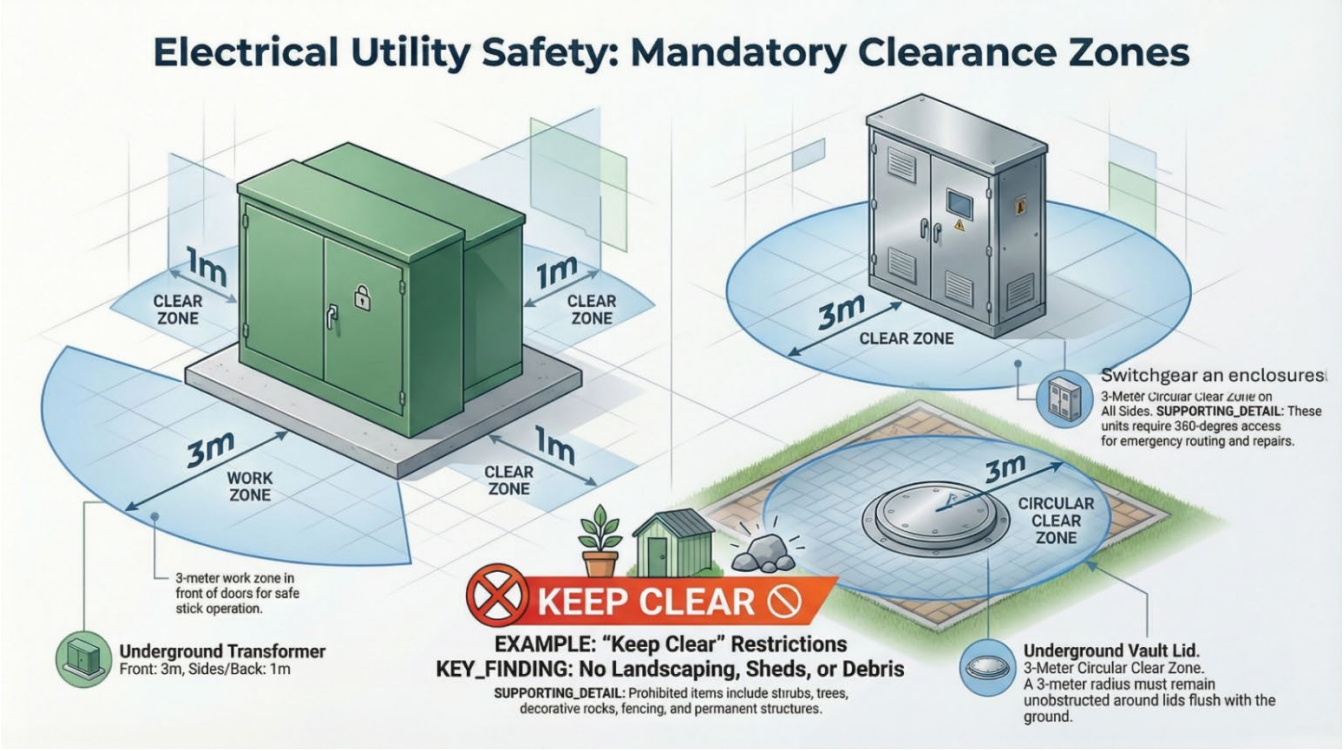
3.6 PAD-MOUNT TRANSFORMERS AND ENCLOSURES

Transformers are the green or gray boxes that are often found in front of homes or businesses next to the sidewalk. Transformers change primary voltage power into the secondary voltage power used in homes and businesses. Underground primary voltage cables feed into the transformer, and smaller secondary voltage cables run to each home or business power meter.

Crews need room around the transformers so they can inspect and maintain them and make any necessary repairs. Pad-mounted transformers shall not be blocked or obstructed by spill piles, construction fencing, stored materials, equipment, decorative rocks, shrubs, or any other obstruction or tripping hazard. A three (3) meter work zone shall remain clear in front (lock side) of any pad-mounted transformer at all times. The sides and back of such equipment shall be kept clear one (1) meter.

An enclosure is green, brown, gray, or stainless cabinet. Enclosures help to route power between neighborhoods. Underground primary voltage cables feed into and out of the enclosure allowing circuits to loop to minimize outage times and provide a more robust system.

The same as transformers, crews need room around the enclosures so they can inspect, maintain, and make any necessary repairs. Enclosures shall not be blocked or obstructed by spill piles, construction fencing, stored materials, equipment, decorative rocks, shrubs or any other obstruction or tripping hazard. A three (3) meter work zone shall remain clear in front (lock side) of any enclosure at all times. The sides and back of such equipment shall be kept clear one (1) meter.



3.7 SWITCHING CUBICLES

These can look similar to transformers. They help to route power between neighborhoods and also help protect the system using switches that turn off in the case of a fault and protect the rest of the system.

When crews are doing maintenance work or emergency repairs during an outage, switching cubicles allow them to bypass the area where they are working. Once the location of a problem is identified, switching cubicles are usually the first-place crews will go to restore as many customers as possible, and make the worksite safe so crews can complete repairs or maintenance.

Similar to transformers and enclosures, crews need room around the switching cubicle so they can inspect and maintain them and make any necessary repairs. Switch cubicles shall not be blocked or obstructed by spill piles, construction fencing, stored materials, equipment, decorative rocks, shrubs, or any other obstruction or tripping hazard. There are access points on all four (4) sides; a three (3) meter work zone shall remain clear on all sides at all times.

3.8 LOCKS

Only an authorized CMH Electric QUE may remove an access lock from any CMH Electric device. If an unattended device is open or unlocked, please contact Electric Operations at 403-529-8260.

In the event CMH Electric is required to isolate a circuit, a GOI (Guarantee of Isolation) will be provided with a GIS drawing or single line outlining the isolation and responsibilities. The recipient of the GOI will be required to participate in the lockout practice. These details will be addressed with the GOI.

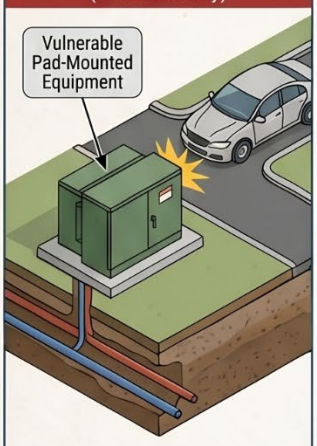
PROTECTING UTILITY ASSETS:
A GUIDE FOR PROPERTY OWNERS & DEVELOPERS

THE "RULE OF THE LAST PERSON" PRINCIPLE OF RESPONSIBILITY

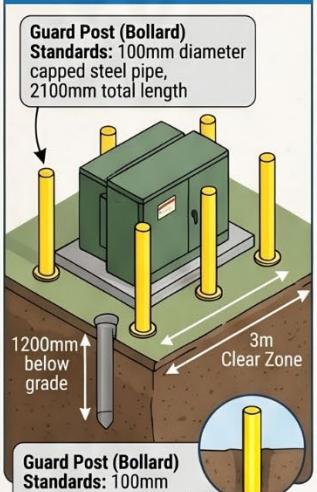
If a new structure or change on private property creates a safety hazard or code violation for existing utility equipment, the property owner is responsible for correcting it. The entity that introduced the change is financially responsible for all modifications required to bring the site back into safety compliance.

SCENARIO 1: NEW TRAFFIC & VEHICULAR RISK

PROBLEM
(New Driveway)



SOLUTION
(Bollard Protection)

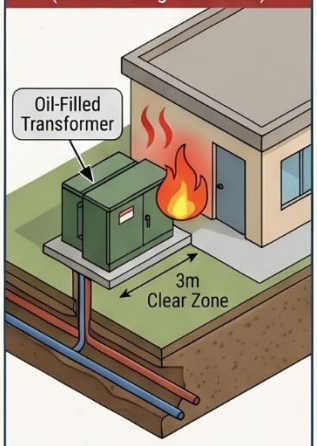


Guard Post (Bollard) Standards: 100mm diameter capped steel pipe, 2100mm total length

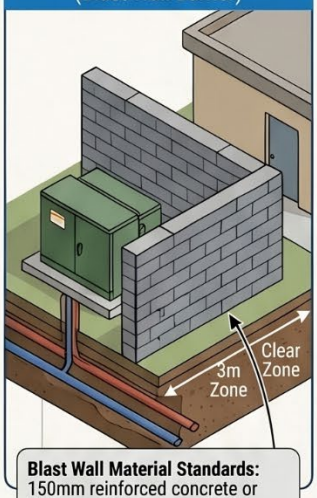
Finish: Hot-dip galvanized or rust-resistant paint

SCENARIO 2: BUILDING EXTENSIONS & BLAST WALLS

PROBLEM
(Encroaching Extension)



SOLUTION
(Blast Wall Barrier)



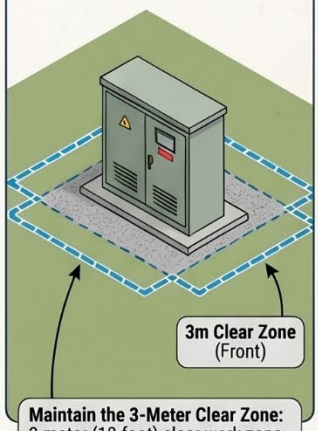
Blast Wall Material Standards: 150mm reinforced concrete or 200mm solid masonry blocks

Mandatory Segregation: Heavy, non-combustible barrier to isolate potential fire/explosion hazards

SCENARIO 3: ENCROACHING OBSTRUCTIONS IN WORK ZONES

PROBLEM
(Prohibited Obstructions)

SOLUTION
(Maintain Clear Work Zone)



Maintain the 3-Meter Clear Zone: 3-meter (10-foot) clear work zone required on all four sides for safe stick operation (Switching Cubicle requirement)

RESPONSIBILITY & COMPLIANCE NOTE

Owner's Financial Liability: All costs associated with meeting minimum code clearances for worker safety or physical protection are the sole responsibility of the property owner.

Utility Right of Removal: The utility sub-department reserves the express right to remove any obstructions that interfere with the safe operation of the electrical system at the owner's expense.

3.9 CMHE ASSETS, PHOTO REFERENCE TO COMMON DEVICES

Vault


URD Box

3 Phase Transformer

Single Phase Transformer


Padmount Switchgear


Padmount Switchgear


Enclosure


Enclosure

REVISION LIST

- January 2020
- May 2026

UTILITY DISTRIBUTION SYSTEMS | ELECTRIC OPERATIONS | 403-529-8260