

Clearances to Overhead Electrical Infrastructure

Communication between all parties involved in the design, construction, renovation, for the use and maintenance of buildings near overhead (OH) electrical infrastructure is key. Planners, architects, developers / contractors, and property owners must be informed and work together to ensure all laws, regulations and local requirements are met for the safety of workers and occupants.

New Buildings or Additions to Buildings

It is essential that Alectra Utilities is notified on proposed projects early in the design phase to review and provide feedback. Site plan applications should be provided, including the drawings, to capture any conflicts before any permit is issued by the municipality. Ideally, Alectra Utilities will be asked to provide pre-design input.

For any new building or additions to existing buildings, there are a number of codes and regulations that govern the proximity to overhead electrical infrastructure that must be adhered to by all stakeholders. The Ontario Building Code (OBC), Ontario Electrical Safety Code (OESC), Ontario Occupational Health and Safety Act (OHSA), and Ontario Regulation 22/04 all have the same requirements regarding clearances. **These clearances take into account the conductor swing as per the OBC and apply to the outermost part of the building, which includes the balconies, fire escapes, flat roofs, or other projections beyond the face of the building as shown in Figure 1.**

The OBC regulates the design and construction of all new buildings and for additions, alterations and change of use of existing buildings. Applying Article 3.1.19.1, Above Ground Electrical Conductors; Clearances to Buildings, **minimum horizontal clearances to OH electrical infrastructure are as follows:**

Clearance from the OH Power Line	<750V	>750V
Radial to conductor	3 m (10 ft)	5 m (16 ft)
Along the OH pole line (from a vertical line drawn from power line to ground level)	2 m (6.5 ft)	2 m (6.5 ft)

All stakeholders should contact Alectra Utilities to determine the requirements for the specific design scenario.

According to CSA C22.3 No. 1, permanent or temporary structures / buildings or their extensions, should not be over or underneath overhead electrical infrastructure.

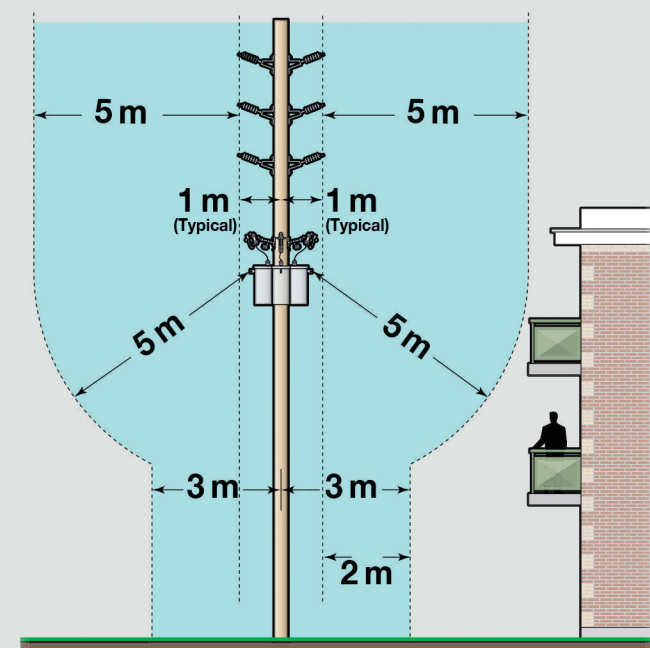
Examples of instances when these clearances become necessary for workers and occupants:

- **Workers-** using scaffolding during construction, putting up signs and lighting, or other equipment to maintain the building, i.e. resurfacing, window washing or use of cranes.
- **Occupants** - using clothes lines, business signs, flags, or general reach from a balcony

Alectra Utilities should be contacted prior to any activity within 3 m of the OH electrical infrastructure, such as tree trimming or working on the sides of a building. According to the Ministry of Labour's Occupational Health and Safety Act and the Electrical Safety Code, only Alectra Utilities' employees or approved contractors can work in proximity to these lines.

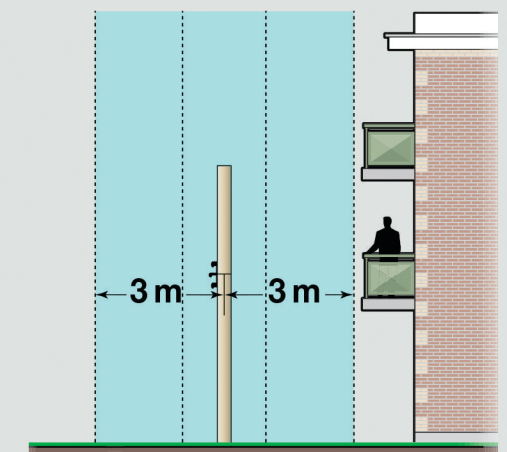


Figure 1: Ontario Building Code Clearance Requirements



Clearance from Medium Voltage (>750V)

Maximum swing: The greatest horizontal displacement of any point on a power line, from its position at rest. In other words, the maximum swing is the distance a wire strung on a pole can potentially swing in any direction.



Clearance from Low Voltage (<750V)



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Clearances for Swimming Pools

Electrical safety around swimming pools, hot tubs, and water features is critical, as the combination of water and electricity can create dangerous and unintended paths of electric current. Installations of in-ground and above ground swimming pools typically require a permit from the city. The city permitting department, pool and spa contractors, and property owners must be informed and work together to ensure all laws, regulations and local requirements are met.

The clearance requirements specified in the Ontario Electrical Safety Code (OESC) Section 68, Pools, tubs, and spas are harmonized with Canadian Standards Association (CSA) Standard C22.3 No. 1 Overhead systems and CSA Standard C22.3 No. 7 Underground systems. Alectra Utilities references these CSA Standards as part of their electrical safety distribution regulation.



Overhead

Swimming pools, hot tubs, and water features shall not be located under or adjacent to overhead electrical infrastructure, or within 5 m (16 ft) horizontal distance of the pool area. It is important to factor in not only the pool, but any pool accessories (see Figures 1 & 2 and Table 1) and includes:

- Un-fixed equipment such as hand-held vacuums and pole skimmers, removable ladders
- Fixed equipment such as slides, diving boards, swings, lights, or platforms
- Structures such as shed, decks, or fences.

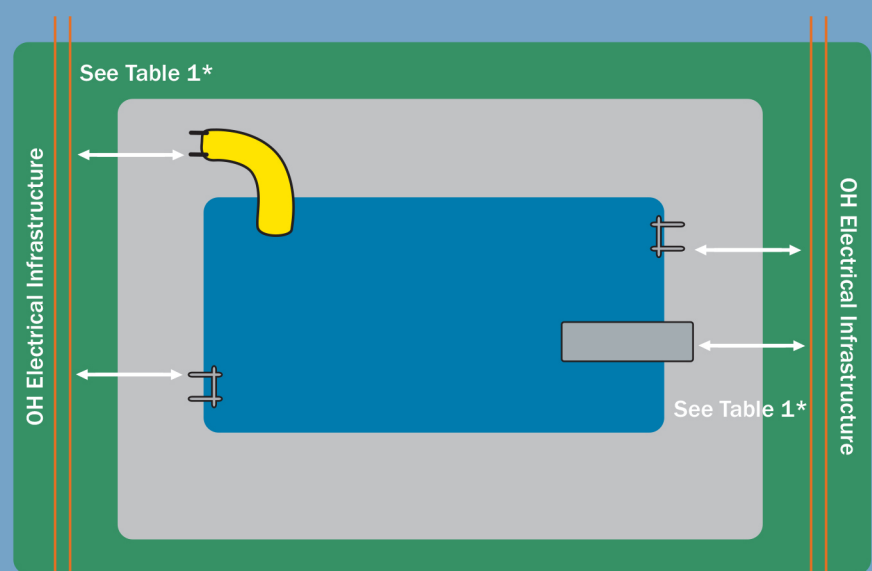
Underground

Electrical infrastructure and other utilities that is underground pose a risk of tingling or shock or to bathers. Alectra Utilities should be contacted to ensure the required clearances are met based on the type of buried infrastructure, see Figure 2 and Table 2.

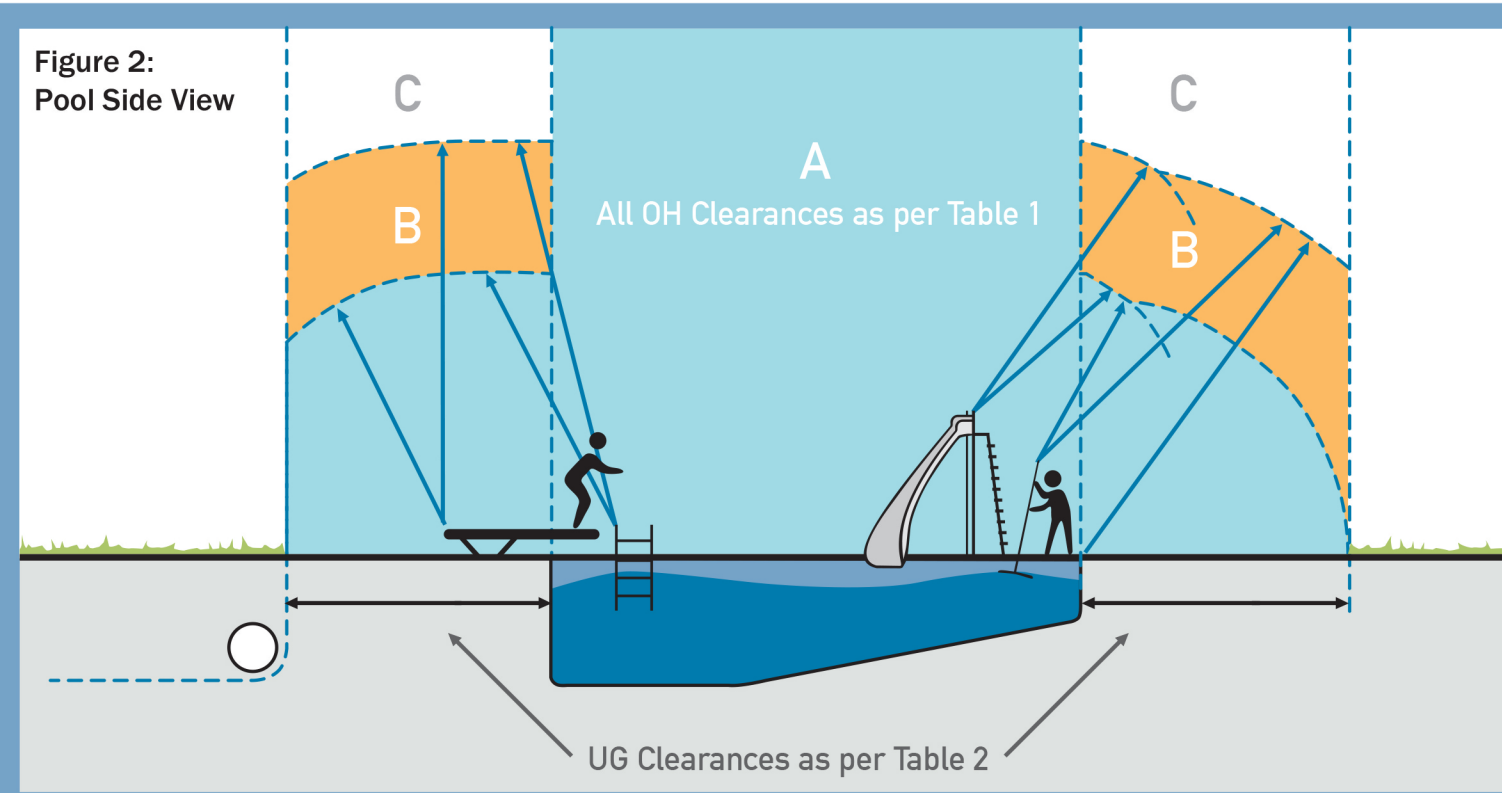
Electrical Infrastructure Voltage Level	Minimum Clearances from Inside Walls of Pool and the Outer Edge of Pool Accessories
A	NOT PERMITTED
B 0 - 750V	5 m (16 ft)
C 750V - 46kV	7.5 m (25 ft)

Electrical Infrastructure Voltage Level	Minimum Clearances from Inside Walls of Pool
A	NOT PERMITTED
0 - 750V	1.5 m (5 ft)
750V - 15kV	3 m (10 ft)
15kV - 28kV	6 m (20 ft)

Figure 1: Pool Top View



* From closest point from the electrical equipment to the edge of the pool and pool accessories or unfixed equipment, e.g. diving board, hand rail, slide



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Tree Planting and Trimming Near Overhead Electrical Infrastructure

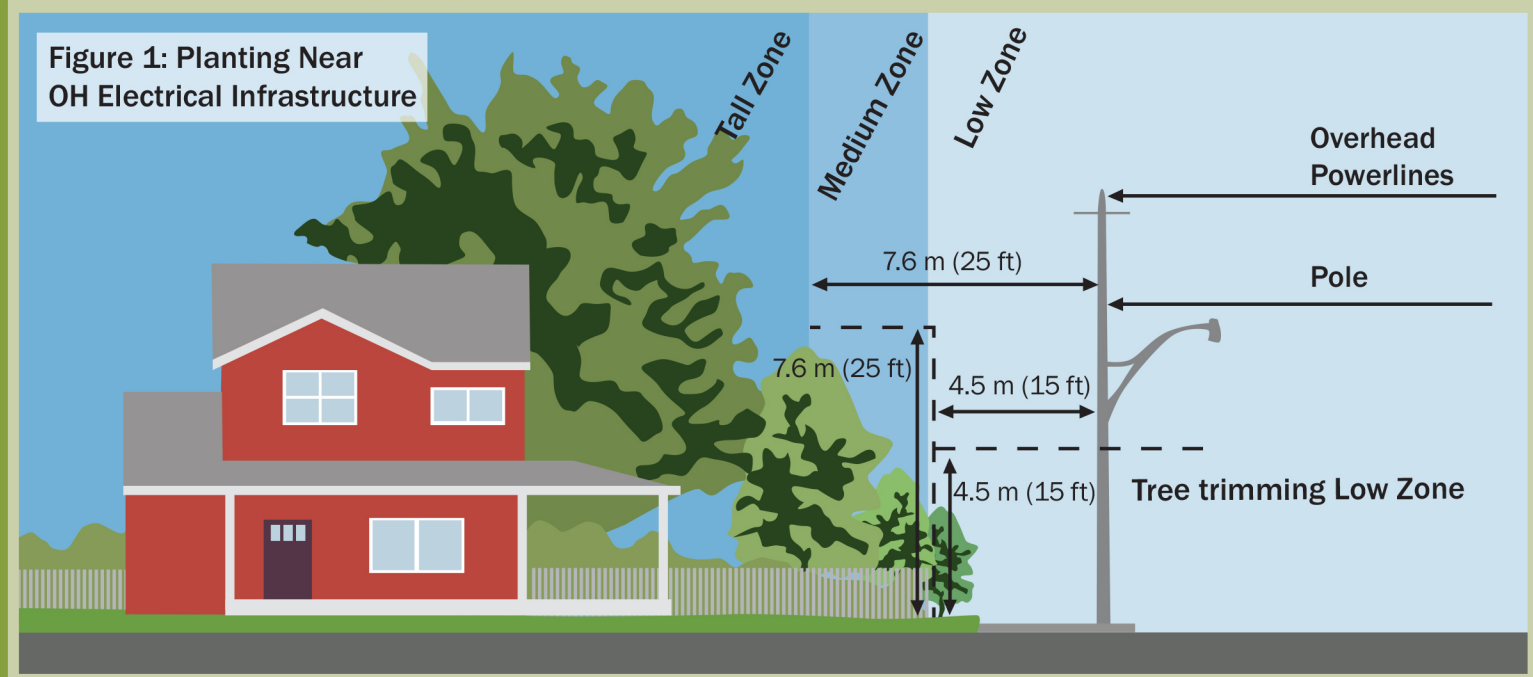
When trees, shrubs or vines are too close to the Overhead (OH) electrical infrastructure, there are potential hazards from branches and limbs such as fires, power outages, or direct contact when playing in or working around hidden lines.

Trees, shrubs, and vines should not be placed closer than 3 m (10 ft) from the base of an electrical pole, and as per **Figure 1**.

When selecting trees for planting, it is important to consider that different varieties grow at different rates and those that grow faster will need to be trimmed more often, or be planted farther from OH electrical infrastructure.

As shown in **Figure 1**, the following tree planting zones apply:

Low Zone	Trees and shrubs planted under the electrical lines should have a maximum mature height and spread of 4.5 m (15 ft).
Medium Zone	The maximum mature height and spread of trees planted from the outer edge of the Low Zone in all directions, measuring 7.6 m (25 ft) from OH lines.
Tall Zone	Extends from the outer edge of the Medium Zone, and measures 7.6 m (25 ft) from the OH lines. At maturity, trees planted in this zone should not encroach on the Medium Zone.



Tree Trimming

A tree that grows too close to the OH electrical lines will need to maintain a safe clearance of 3 m (10 ft). Tree trimming near power infrastructure must be completed by qualified utility arborists.

Should any property owner need to do work near the OH electrical infrastructure and these distances cannot be met, they should contact Alectra Utilities to discuss solutions.

Underground Clearance

When planting in the vicinity of Underground (UG) electrical infrastructure, the minimum clearance required from the edge of the root ball to the edge of the UG cables is 1 m (3 ft). This protects the electrical infrastructure, and reduces damage to the roots of the trees should Alectra Utilities need to access its equipment. If the minimum distance cannot be achieved, Alectra Utilities may require the installation of a root deflector against the root ball.

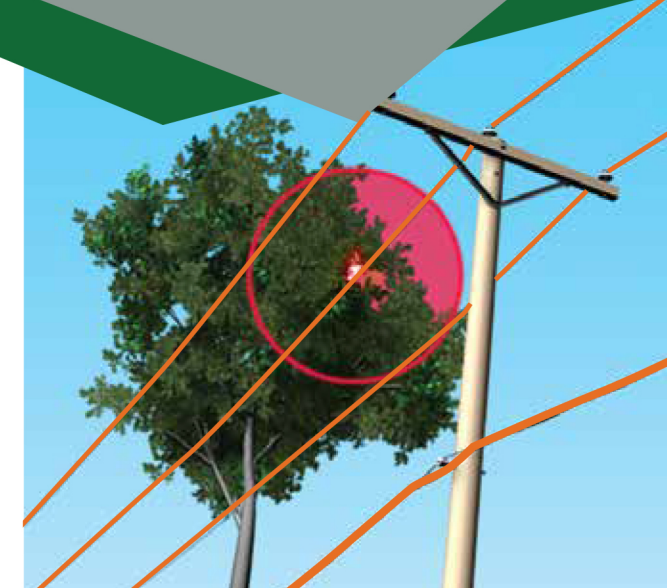
Locates

UG electrical infrastructure may be buried and can be at different depths. When planting a tree, a locate must be requested before digging.

Request a locate
Ontario One Call
1-800-400-2255
www.ontarioonecall.ca

Excavation

Tree planting and removal can involve deep excavation that has the potential to cause damage. The excavation method must protect the UG electrical infrastructure if within 1m (3 ft), i.e. hand, vacuum, or pneumatic tools, as approved by Alectra Utilities.



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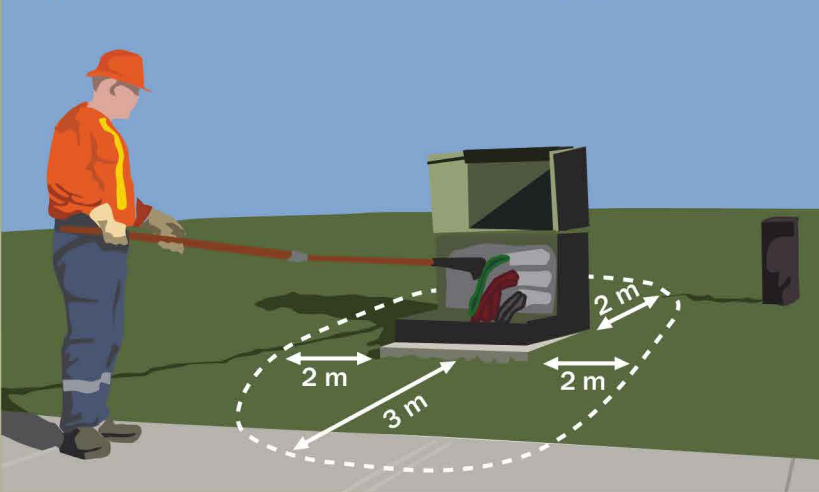
Figure 2: Pad Mount Clearance Concerns

Clearances to Underground Electrical Infrastructure

Clearances around underground (UG) electrical infrastructure as per Alectra Utilities' specifications and standards must be met by planners, architects, developers / contractors, municipalities, and property owners.

Electrical workers must be able to safely access equipment to operate, maintain or replace it, see **Figure 1**. The property owner will be responsible for any costs related to removing an obstruction, or if power restoration is delayed due to the obstruction.

Figure 1: Clearances to Pad Mounted Equipment



The following clearances around pad mounted electrical equipment mitigate all risks associated with working space and hazards related to the ground grid. This area must remain free of any structures, obstructions, or plantings:

- 3 m (10 ft) in front of all doors**
- 2 m (6.5 ft) all sides without doors**



Figure 3: Pad Mount Clearance Concerns

Other UG Utilities

Alectra Utilities and all other UG utility stakeholder infrastructure including communications, water, wastewater, and gas facilities must **meet the clearances to UG electrical infrastructure as per CSA C22.3 No.7 Underground Systems**.

In order to meet these requirements, coordination of all facilities within proximity of other UG equipment is essential.

Municipalities & Property Owners

Above ground obstructions or hiding the electrical equipment is not permitted, see **Figures 2 and 3**. Municipalities and property owners must be aware of the clearances for the safety of its assets in proximity to UG electrical infrastructure, including but not limited to:

Municipalities: bus shelters, traffic signs

Property Owners: decks or patio blocks, retaining walls, pool equipment, hot tubs, storage sheds, metallic objects like mail-boxes, flag posts, outdoor patio seating (temporary and permanent)

Locates

It is important to know where UG electrical infrastructure and other utilities are located before work begins, regardless of the project size. Examples include but are not limited to:

Contractors: excavating for an addition, new building, sidewalks, or repairing buried infrastructure

Property Owners: planting a tree, landscaping, installing a fence, deck, driveway, or repairing buried infrastructure (pools, heated driveways, irrigation and sprinkler systems)

To protect the project from unnecessary damage, injuries, and financial penalties, contractors and property owners involved in the above activities must contact Ontario One Call at:

Request a locate
Ontario One Call or 1-800-400-2255
www.ontarioonecall.ca

The various utilities will mark the location of buried UG infrastructure so the dig can be done safely.

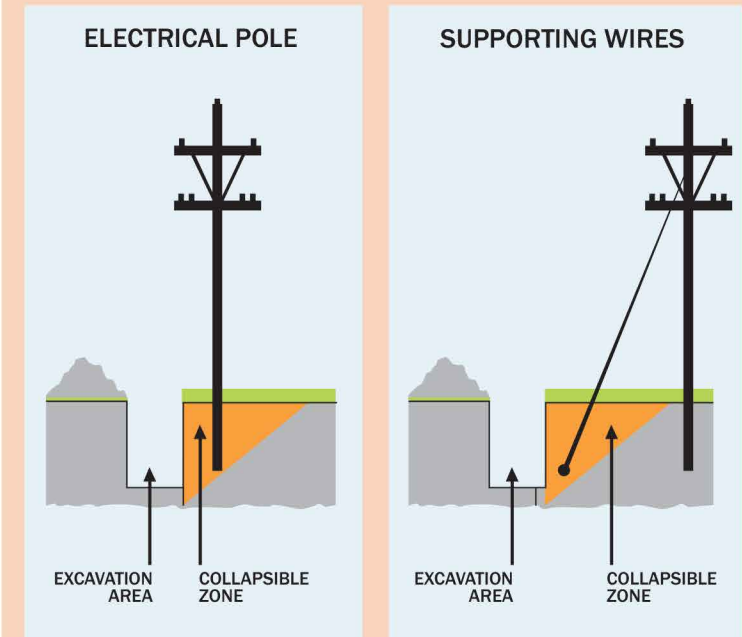


Figure 4: Excavation Near Electrical Equipment

Excavating & Digging

Extreme caution should be used when digging near the marked UG infrastructure or electrical pole (including guy wires, ground grid) see **Figures 4 and 5**. **Contact with a sharp shovel or excavation equipment could easily damage electrical infrastructure and could result in harmful electrical current.**

See ESA's "Guideline for Excavating in the Proximity of UG Distribution Lines" www.esasafe.com and contact Alectra Utilities for guidance before excavation in the proximity of electrical infrastructure.

Figure 5: Contractor Excavation Near Electrical Equipment

