UTILITY UNDERGROUNDING HOW-TO GUIDE

June 2022

City of Boulder

Preface

The City of Boulder (city) prepared this guide as a resource for residents and businesses seeking to underground their utility services. It was prepared based on input from community members and is intended to help those seeking to underground be better informed about the undergrounding process at the onset of their undergrounding projects.

Except where city permitting is discussed, the city is not responsible for any of the processes or requirements outlined in this guide. The State of Colorado's Public Utilities Commission (PUC) serves the public interest by effectively regulating utilities and facilities so that the people of Colorado receive safe, reliable, and reasonably-priced services consistent with the economic, environmental and social values of the state. The PUC provides the regulatory oversight for utility service providers in the city, including Xcel Energy, who provides all electrical services in the city, and telecommunications providers, to include Comcast and Century Link. When it comes to projects such as undergrounding of overhead utility lines, the utility providers follow the rules set by the PUC. This includes the processes that must be followed and the costs that must be passed on to individual customers.

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HOW TO USE THIS DOCUMENT

This guide is intended to assist those considering privately initiated undergrounding to help evaluate the viability of their project and to provide some helpful tips and guidance to streamline the process and make it more efficient.

What is a Distribution System?

The distribution system is a grid of infrastructure that delivers power (electricity) and service to the community. This typically consists of poles and wires for an overhead system, and underground wires, and above-ground equipment (transformers and pedestals) for an underground system.

It is helpful to understand that many of the poles in the Boulder community house infrastructure of multiple utilities including Xcel Energy and telecommunication such as, CenturyLink, Comcast, etc. (See appendix for helpful info on identifying lines). Removing poles requires the undergrounding of each of the utilities that currently use the poles. Burying all electric and telecommunication utilities requires extensive planning and coordination. Typically, there is a separate cost associated with undergrounding each utility.

OVERVIEW AND CONSIDERATIONS

Planning the overhead to underground conversion of dry utilities requires many companies and neighbors to come together and align on scope and cost. A typical conversion will require the undergrounding of the distribution system as well as the individual service to each home.

It is important to determine the goals and extent of a project early on so that this can be articulated to all utility companies. Some may find it helpful to hire a qualified electrical contractor who is familiar with undergrounding power and communication lines, as well as the service needs of each property.

Because undergrounding impacts all properties that are served by and/or that abut the services to be undergrounded, it is best to start by determining individual interest and financial ability of a group of neighbors to participate. This should be assessed prior to engaging the utilities to minimize modification of designs, increasing the efficiency and timeliness of the effort.

PROCESS OVERVIEW: NEIGHBORHOOD-SCALE

Scope the Project

1. Determine the extent of desired lines to be undergrounded with the community and impacted stakeholders.
    - Identify which properties also connect to the section of overhead lines you wish to underground
    - Contact neighbors and property owners to determine their interest in participating in a project to underground your area's utilities; Be clear that undergrounding will come at the expense of property owners.
    - Collect information from neighbors who would like to learn more about the process and are interested in exploring undergrounding utilities in your area.
    - Determine whether you are ready to move forward with scoping the project with the utilities.
    - If you decide to move forward, develop a project scope to bring to the utilities. Include the line you wish to underground, interest from neighboring properties and preferred timeline.

Contact Utilities that Use the Poles

Please note, not all poles are owned by Xcel Energy and therefore pole ownership and removal should be disused with all utility companies during the planning phase of the project.

1. Apply to Xcel Energy to discuss your project scope, timelines and needs for each community member.
    - Xcel can help you identify which other utilities currently use the poles.
2. Contact communication companies such as Comcast and CenturyLink to discuss your project scope, timelines and needs for each community member (please see contact section below).
3. Schedule a site visit with all utilities to determine the placement of new underground equipment as well as any clearance and land rights that may be required.

Review Design and Cost Estimates

1. Each company will create a design and cost estimate for the work. This may include material, labor, permits and restoration requirements. Please note, costs are subject to change based on weather and ground conditions.
2. Signed contracts and payment may be required prior to the scheduling and start of construction. Work with each company to determine requirements for implementation.

PROCESS OVERVIEW: INDIVIDUAL PROPERTIES

When planning an overhead to underground service conversion, each property will have requirements specific to the needs of the property. This may be determined by service size and energy consumption, meter panel sizing and upgrades, electric codes, and internal wiring, as well as clearance and installation requirements. All these factors may influence scope and cost to each property owner.

Contact and/or Hire an Electrician

Working with a certified electrician will allow each homeowner a clear understanding of what is required to install a new underground meter, including panel, code, and internal wiring requirements, as well as costs and timing.

1. Identify whether upgrades will be required: If for some reason the homeowner's existing breaker panel poses potential safety hazards (such as most models of Federal Pacific Panels that are no longer permitted), this could trigger the need to replace such panels in addition to the meter panel and would come with an associated additional cost.
2. Talk with your electrician about future electrical needs such as Solar Panels, EV Charging, etc.
3. The electrician will be required to pull a permit and meet all inspection requirements with the City of Boulder Building Permits and Inspection

Apply to Xcel Energy for an Overhead Underground Service Conversion

1. Each property owner is required to apply to Xcel requesting the service conversion. A designer will provide the scope and cost for each property.
2. Ensure your electrician has a copy of the Xcel Energy Electric Standards and Use Manual and is following installation and meter requirements.

3. An inspection from the City of Boulder will be released to Xcel Energy prior to the new meter being installed.

Contact Communication Companies

1. Each property owner is required to request the service conversion from their communication provider(s).
2. Each company will provide the scope and cost estimate for their respective work efforts.

FREQUENTLY ASKED QUESTIONS

Distribution FAQs

What equipment is required when the distribution system is undergrounded? How does this impact me?
Switch cabinets, pad-mount transformers, pedestals, and underground wires are just some of the items that may be required when a system is undergrounded. Each utility will provide a design and system requirements that are specific to the project. See pictures in the Appendix for reference.

New equipment and wires will need to be placed in a utility easement, so that all companies can safely access and maintain the system. Each property owner will need to provide adequate spacing for the utility equipment of which should be free of vegetation and structures.

Please visit Xcel Energy's website to learn more about vegetation management.

What ground clearances and land rights do I need to plan for?
It is important that all utilities can safely maintain and operate the equipment for the lifetime of the equipment. Proper clearance of structures to include patios, play structures, vegetation, etc. will be required.

Your utility will confirm the specific needs for the project; however, we have listed standard requirements for your reference:

- Electrical distribution easements in rear lots are a minimum of 8' wide
- Please reference drawings CR-40, CR-50 and CR060 the Xcel Energy Electric Standards Manual to see transformer clearances

Who pays for the undergrounding of the main distribution lines and what does it cost?
The requesting parties, property owner and/or builder is responsible for paying for each utility design, electrician and all other fees associated with the project. Typical utility designs may include material, labor, permitting and restoration requirements for the project. Costs are based off the specific requirements of the system and costs are subject to change pending weather conditions and ground construction difficulty, such a rock, shale, etc.

Can the city's undergrounding fund pay for my project?
Under their franchise agreement with the city, Xcel Energy will invest up to 1% of the annual revenues it collects from the community to underground overhead lines within city right of ways. The city is able to direct this investment based on identified priorities. The funds available through this program have been historically prioritized towards undergrounding in conjunction with city transportation or water utility projects, for example to allow for the addition or expansion of a multi-use path or to support stormwater

management. Due to the limited amount of funds available and the focus on city right of ways, this program would not be available to support individual or neighborhood undergrounding.

Why am I responsible for the costs to underground?
Currently, there isn't a regulatory mechanism to underground power lines and spread these costs across all ratepayers so customers who desire infrastructure that is currently overhead to be buried will likely have to bear these costs.

Who owns the poles?
Typically, Xcel Energy or CenturyLink owns the poles. It will be important to clarify this during the planning process as this will influence who is responsible for the final removal of the poles once wires are removed.

How should I restore my landscaping and who can help with that?
Restoration of the site can be included as part of the work performed by the utility. If this is desired the property owners should inform the utility so that it can be included in the scope of the work. If the property owner would like to take ownership of the restoration work, utilities can remove this from their cost estimates. In this case, the property owner would be responsible for any erosion control measures required until restoration is complete and associated permits. Standard installation requirements do require 95% compaction of the trench and/or bore pits to prevent ground settling.

Who is responsible for securing the necessary permits?
There are two types of permits that are considered for a full underground project, to include distribution and service.

The utility is responsible for requesting permits associated with the distribution construction work and costs will be included in the utility design.

Individual property owners are responsible for securing the necessary permits for setting the new electrical meter and the necessary respective electrical wiring and improvements. A licensed electrician can assist with these steps. Communications companies will typically bundle all of the service work together with the distribution work and do not typically require an additional permit for conversion of the service.

Each home needs its own permit for conversion of overhead to underground service that will have an associated cost (this has historically been less than $50 but you would be advised to check with the building permit department at the City of Boulder). This does not necessarily mean each homeowner must submit a permit with the City of Boulder, as a single electrical contractor could pull permits for multiple homes.

What happens if someone does not want to underground the Distribution lines or Service?
If a property owner does not want to participate or cannot do so at the time of the project, an overhead pole and wires may remain in place to serve the customer. This may require additional equipment, such as down guys / guy wires (a wire used to stabilize the pole and ensure the pole line is in safe working condition). Consult with your utility design professional on the options and design impact.

Service FAQs

How much does it cost to underground my service?
The cost of undergrounding service at each property will vary based off energy consumption, equipment needs and utility design, building code requirements as well as permitting and restoration requirements.

Each utility provider will provide the property owner a cost estimate to bring the service from the distribution system to the new meter panel. It is recommended that the property owner consult and/or hire a licensed electrician to determine the cost and electrical needs for the new meter panel to ensure current code requirements are met.

How many homes are served from the current overhead system?
The number of homes fed from the system varies based on the development and grid design of the region. Please work with each utility to determine the number of homes that may be impacted as a part of the project.

If there are multiple homes being served from an overhead pole, then all services must be undergrounded to remove the pole. If all services are undergrounded, the cost to remove the pole should be planned with the owning party as part of the overall distribution project plan.

For homes that wish to retain the overhead service from the existing system, what will that require?
For customers who wish to remain fed from an overhead service, a service pole and wire/set of wires will remain. Additional equipment, such as a down guy / guy wire, may be required to stabilize the pole.

What are the meter and breaker requirements for a new underground service?
Each property owner undergrounding their respective electric service will need to convert the overhead panel to an underground meter panel. A licensed contractor should be hired and will ensure permit and code requirements are met. Refer to the Illustrations Section, Drawings SC-30, SC-140, SC-150, and SC-170 in the Xcel Energy Standards of Electric installation and use Manual. Phone loops, cable TV conductors, grounding clamps, etc. shall not be attached to the service riser or meter housing.

Replacing the breaker box may be required if the applicable breakers do not meet current code. We recommend having a licensed electrician review this with all homeowners before undertaking the project.

What does the building inspection entail and are there any pertinent details I need to understand?
The building inspection will cover the electrical inspection at a given home. New work will be conducted to the newest iteration of applicable code. This applies directly to work being conducted as part of the project. A typical standard is that the work effort cannot make the homeowner's electrical system less safe. Work on the meter only may avoid downstream work on the panel or home.

Access to the premises will need to be provided for inspection crews. It is likely that they will not need to enter homes, but that won't always be the case.

It is best to designate a single point of contact (such as a neighborhood champion) to call in and contact the City with questions and issues.

How does a homeowner effectuate a new meter conversion?
Once the new underground electric meter housing is approved by the City of Boulder inspector, the city will release the approved inspection notice to Xcel Energy. Xcel will then schedule the installation of the new meter.

Does my new underground service require an easement?
A property's underground service does not typically require an easement and is considered a 'right by invitation'.

If a new service is required, do other items need to be inspected or are there other requirements?
Yes, the grounding and bonding system would need to be inspected and verified to ensure that it meets current standards. If you have questions regarding these requirements, please speak to a licensed electrician.

Communication Utilities FAQs

How do I find out which utilities currently use the poles?
Each company will have to be contacted to determine their presence on a given set of poles. During an initial site visit with all utilities who indicate they have utility presence it is advised to confirm that each and every utility is accounted for. Typically, the communications parties are CenturyLink and Comcast, but it is possible that there are other joint use parties.

What is the first step to exploring undergrounding communications facilities?
Scheduling a site visit with all of the known utilities would be the first step in exploring any undergrounding project. Each utility will be able to provide information regarding their presence and project details.

How does the process move forward after the initial site visit?
Providing the communications parties with an Xcel Energy undergrounding design will help them to develop their respective designs based on which poles are intended to be removed.

Are services included in the communications parties' designs?
Yes, unlike Xcel Energy, communications parties include the cost of the service in with their distribution line undergrounding. This means that the cost estimates provided for communications will represent a bundled cost, including all of the service laterals to the homes.

Do communications companies also require easements?
Yes, sometimes they may be able to leverage the same easements that Xcel Energy will utilize, but in certain instances may require specific property rights for a necessary set of equipment.

Is there a different timeline for Comcast and CenturyLink's removal of overhead facilities and the respective poles?
Yes, communications parties usually bury their facilities and then return when all of the power undergrounding work has been completed to remove their overhead infrastructure and the associated poles and connect to their new underground infrastructure. This is typically the final and last step of any undergrounding project.

ADDITIONAL INFORMATION

Financing Options and Alternatives

Typically projects of this nature are paid for up-front, prior to work commencing, in a lump sum fashion. There are options to seek formation of a general or special improvement district for your neighborhood if interested. See information below:

Title 8, Chapter 4 of the Boulder Revised Code addresses the requirements for formation of General Improvement Districts (GIDs) – go to: General Improvement Districts.

GIDs may be an approach to neighborhood level undergrounding since it provides a mechanism to secure the financial support of all benefitting parties and allowing payment of the costs over a period of time through property tax assessments.

CONTACT INFORMATION

City of Boulder

- **Permit Consultations**
  https://energovcss.bouldercolorado.gov/EnerGov_Prod/selfservice/BoulderCO_Prod#/login?redirectUrl=%2Fhome
- **Process Information**
  https://bouldercolorado.gov/services/building-permits-and-inspections#section-13377
- **City of Boulder Q&A**
  https://bouldercolorado.gov/services/building-permits-and-inspections#section-13377
- **Distribution System Planning**
  Lex Telischak, Electrical Engineer
  TelischakL@Bouldercolorado.gov
  303-441-3442

Xcel Energy

- **Consultation and concept planning**
  BDRCO@Xcelenergy.com
- **Request Service**
  https://my.xcelenergy.com/BuildingRemodeling/XE_Login
- **Builders Call Line**
  bclco@xclenergy.com
  800-628-2121

Comcast

- **Kevin Young**
  Kevin_Young@cable.comcast.com
  720-281-8666

CenturyLink

- **Renee Hester**
  Renee.Hester@lumen.com
  720-738-2778

Appendix

Photos:

Distribution System – Ownership:

Above the red line: primary electrical

Above the orange line and below the red line: secondary electrical

Below the orange line: communications (typ. CenturyLink and Comcast)

Pedestals:

Padmount Transformer (50kVA typ.):

Typical Switch Cabinet: