

Chebeague Island Broadband

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Underground Installation



Underground Installation

This document serves to guide homeowners who may require a new underground (UG) utility path to allow Axiom to bring fiber-optic service to their property. Please consider the following factors as you evaluate your options:

§ Do your existing utilities (typically power and telephone) come to your home underground rather than aerially from the nearest utility pole?

§ Do you have a pre-existing viable conduit available to run the fiber cable in (more below on defining “viable”)?

§ Installing a new UG cable path to your property likely has associated expenses, which will be borne solely by the homeowner. The UG cable path needs to be in place by the time Axiom’s outside plant contractor begins to build fiber drops in your neighborhood.

Determining if your existing conduit path is “viable”

Many homeowners have underground utilities for aesthetic reasons or because the nearest utility pole makes it impractical to service the home by bringing service overhead to the side of the house. If you do not know how electrical service comes to your home, it’s pretty easy to determine if aerial wires are coming to the corner of your home overhead. If not, then you may want to

locate the electrical service on the side of the house and see if it is coming out of the ground, typically protected by some hard conduit. If your service appears to be underground, it is likely that you will want fiber service to come the same way; in fact, for many properties with existing underground utilities, there is no reasonable option to install the fiber cable overhead (aerially).

Let's discuss a "viable conduit path" for a moment. If you have an existing conduit that we can safely pull a new cable into without damaging the new or existing conduits, that may be all you need. But, how does one determine this? A usable ("viable") conduit must meet the following conditions:

§ Customer-owned (we cannot pull through conduit owned by a utility or other 3rd party)

§ Undamaged (meaning not broken or blocked by mud, ice, debris, rodent nests, etc.), and continuous from one end to the other

§ Does not contain electrical cables. By code our fiber cable can share a conduit with low-voltage communications cables (phone, alarm, etc.), but cannot be placed in a conduit with electrical wires.

§ Is large enough, meaning specifically:

- o An absolute minimum size of 3/4" conduit is required. This size works only for a new, empty conduit with minimal bends and is not advised unless it cannot be avoided (e.g., this size conduit was previously placed as a spare, and remains clear and undamaged).

- o 1-1/4" conduit or larger is preferred, allows up to 360* of total bends in the system, and is very likely to be compatible with at least one pre-existing communication cable

- o Installing the largest conduit that fits your budget is advised. 2" conduits make our installers very happy and provide ample space to pull additional cables in the future as your needs evolve. While the conduit itself is not cheap, a lot of the cost of a new conduit system is in the opening of the ground, so there is a case to be made for oversizing any newly installed conduit.

Please note the critical difference between underground utilities that are "direct buried" vs. being installed in a continuous conduit from end-to-end (typically, from the pole to the house). It is unfortunately common to find that your current utilities come to your house directly buried in the ground rather than in conduit. This very often appears to be a continuous conduit run, as short stubs of conduit known as "riser guards" are often installed on the pole and the home; however, these riser guards, unlike a continuous conduit run, terminate a few feet or less after entering the ground. Even if it has riser guards, a directly buried cable is not a "viable conduit path" that our installers can use to bring

fiber to your house.

If there is any concern about the viability of a conduit path on your property, we recommend you or your agent verify the conduit well in advance of the anticipated fiber installation date to minimize delays and unexpected expenses during the fiber construction period. If the conduit is short enough, this can be as simple as the homeowner pushing a “wire fish” (a/k/a: fish tape) through the conduit to ensure that it is clear. For longer runs, a shop vacuum may be used to suck or blow a wad of cotton balls on a string through the conduit, or an electrician may be hired to place a “pull string” in the conduit to ensure an unobstructed cable path.

Next steps if you do not have an available conduit

If you have determined that you don't have an available conduit, you now have three choices.

§ Hire a local contractor to dig a trench and install a conduit before we install the service.

§ Dig a trench and install a conduit yourself.

§ Have us put the cable on top of the ground and sign a waiver accepting responsibility if the cable becomes damaged for some reason.

Any one of these three options may make sense, depending on your circumstances.

Hire a local contractor

We have identified an on-island contractor who can help you dig a trench and install a conduit. This is the easiest solution if you can line up these resources early in the season. After Memorial Day, it gets much more busy and harder to get contractors to do this work, given the demands on their time. We encourage you to schedule early to ensure your installation goes smoothly and is not delayed. This is not the least expensive option; all costs would be negotiated between the contractor and homeowner directly.

Contact:

“Bo” Beaupre- (207)570-8042- Please note that preferred communication is via text.

Do it yourself

If you are handy in the yard and want to save costs, homeowners can dig their own trench and install their own conduit.

Preferred conduit: 1-1/2” minimum diameter electrical PVC conduit, glued joints,

and long-radius sweep connections. System requirements: no more than 360 degrees of total system bends, 150' max between pull boxes, free of obstructions and other wiring, and with a pull string installed.

On the ground

This option allows fiber to be brought to the house without cost to the homeowner, but it comes with some risks. On-the-ground solutions have been deployed on other islands, and Axiom is familiar with these types of installations.

On-the-ground installations typically perform well because the cable we use is quite sturdy and is rated for direct burial in the earth. While the cable is sturdy and safe to touch (it is 100% glass and plastic and does not conduct electricity), leaving it exposed on the ground does mean it is more likely to be damaged over time when compared to a fiber cable buried in a conduit. Lawnmowers, chainsaws, a fallen tree, or heavy equipment driving over the cable can all cause damage requiring repair.

Because of this risk, we require that the homeowner sign a waiver memorializing their responsibility if the on-the-ground cable becomes damaged. We also encourage homeowners to consider this type of installation to be temporary and to bury the cable a few inches (or more) under the ground as soon as possible to protect the cable from being snagged, pulled, or otherwise damaged. After-the-fact direct burial must be done carefully to avoid tensioning the cable and pulling the glass fibers out of the gray plastic box where the fiber cable terminates on the side of the house or in the basement.

The last word

Axiom encourages homeowners to determine their installation choices as soon as possible and procure resources well before a final install is made to the side of the home. This work should be done in the spring as soon as the ground thaws, allowing easy digging. The contractor mentioned is aware of installation guidelines, and we encourage anyone with questions to contact Axiom at 255-0679 to discuss their situation.

Axiom Fiber Optic Conduit Specifications

1. Conduit depth: We recommend burying the conduit 18 inches below grade. Minimum depths not subject to vehicular traffic (please see item 12 below if subjected to vehicular traffic):
 - a. 12 inches on private property.
 - b. 24 inches on City and County Right of Way.

c. 36 inches on State Highways.

2. Trench should have a flat surface and be deep enough to obtain minimum cover first 6 inches of backfill must be soft earth or sand and free of rocks. Fill must be able to pass through 1/2 inch screen.
3. Conduit with runs of 150 feet and multiples thereof shall have an intermediate pull box installed. If it's impractical to place a pull box at 150 feet and the entire length is greater than 225 feet, a larger size conduit must be used.
4. Duct bends: The minimum radius bend should be 6 times the diameter for conduits 2 inches or less, and 10 times the diameter for conduits greater than 2 inches.
5. The service entrance should be located outside of the dwelling and must be accessible at all times. The entry location must conform to current National Electrical Code (NEC) code requirements. The conduit at the home should rise no more than 5 feet and not less than 2 feet above grade.
6. We recommend that the riser conduit on a service pole extend 8 feet above the grade. This is to protect the conductors. All conduits should be capped to prevent water and debris from entering. When telephone and electric service conduits terminate on the same service pole, it's preferable to place the two conduits opposite each other on the service pole. It's permissible to place conduits with less separation, but not less than $\frac{1}{4}$ of the circumference of the pole (climbing space must be maintained). Riser conduit must be properly strapped to pole.
7. Poly pull string or equivalent with a minimum 200 lb. rating should be installed in all conduits.
8. Minimum conduit sizes:
 - a. 1 $\frac{1}{2}$ inches for single residence. 1 inch is allowed if the stub out from the pull box is 2 inches and you're placing the 1 inch inside the 2 inch stub out.
 - b. 2 inches for service up to 4 residences.
9. Customer retains ownership and maintenance responsibility for conduit system on private property.
10. Customer should ensure conduit and pillboxes on their premises are free from obstruction prior to installation of service drops or cable.
11. Clearance from power conduits and wires must be maintained. Ensure the following separations are maintained between power and telecom conduits as applicable:

- a. 3 inches when encased in concrete.
 - b. 4 inches when separated with brick or mason.
 - c. 12 inches of well tamped earth when only earth.
 - d. 6 inches when crossing foreign objects, i.e. water, sewer etc.
12. The minimum protection requirements for buried facilities subjected to vehicular traffic should be: 24 inches of well tamped earth if direct buried. 12 – 18 inches if concrete encased.
13. Please attempt to place conduit systems well away from trees or shrubs

