

Transmission line construction process

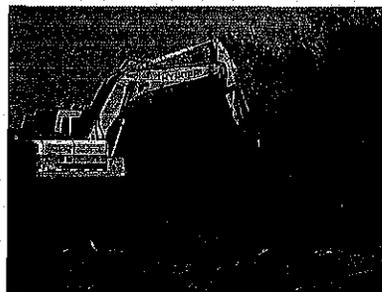
There are several steps needed prior to poles being installed. The process can vary depending on the size of the line, soil conditions, terrain and other variables.

1. Soil surveys and property staking:

Before acquisition begins, field survey and soil information must be obtained to finalize design. A soil boring is drilled at structure locations to determine the mechanical properties of the soil. Right-of-way agents request access to the property and coordinate between the soil boring contractor and the property owner. The soil boring locations are staked and existing underground utilities are located prior to borings. Once final pole locations are determined, they are staked in the field with tree clearing limits, right-of-way boundaries and other property features mapped as needed. Landowners are able to view structure locations prior to easement acquisition. Typically, a 150-foot wide easement will be required for 345 kV lines and an 80-foot easement for 161 kV lines.

2. Construction access and tree clearing:

Before construction starts, crews will identify access routes to the easement area. The access is typically 25 to 30 feet wide and is needed so large equipment including a drill rig, concrete trucks and a crane can be delivered to the site. Tree clearing and other vegetation removal will take place on the identified access route and the area within the easement. Matting is sometimes put down in wet or soft areas to prevent compaction, minimize soil disturbance and improve site safety.

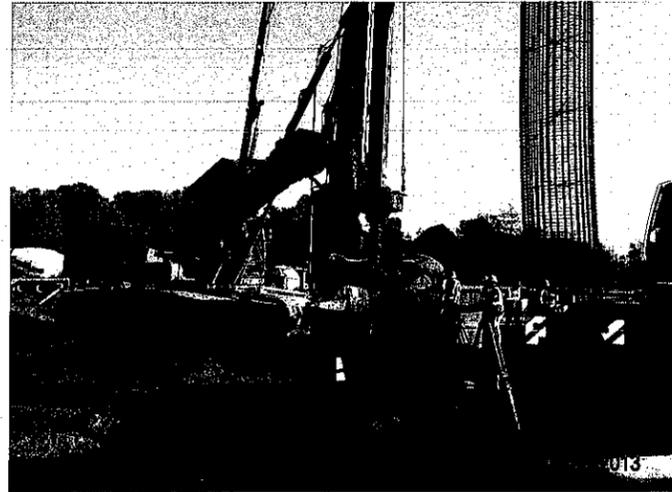


3. Equipment mobilization and material delivery:

A crane, drill rig, concrete truck, boom trucks, trailers, structures, steel casing and rebar cages are some of the equipment and materials that will be moved into the site for construction.

4. Foundation construction:

Construction crews will begin drilling for the structure foundation. A typical 345 kV drilled pier foundation is eight to 11 feet in diameter and drilled 30 to 60 feet deep. Lower voltage lines use smaller structures which require smaller foundations. Once the drilling is complete, reinforcing steel is placed in the hole and concrete is poured. A drilled pier foundation typically takes one to two days to construct but can take longer if rock is encountered. A specialty foundation may be required in rocky or poor soil areas.



5. Erection of the structure:

High voltage transmission structures are usually steel poles. The poles are assembled at the foundation site and set in place with the use of cranes and other heavy equipment. A pole can be assembled and set in place in one day.



6. Stringing conductor:

After all structures are erected in an area, the next step is to install conductor (wire). Conductor is pulled from one structure to the next through a pulley system temporarily placed on the structures. After a section of conductor is pulled through a series of structures, the conductor is attached to insulators, which are attached to the structure and the pulleys are removed. Trucks, heavy equipment and sometimes helicopters are used in this process. In some cases, conductor is connected using implosive connectors that create a flash and loud boom. Other equipment including bird diverters, spacers and galloping devices are also installed.



7. Land restoration:

Following construction, the right-of-way is cleaned up and restored. This work may include tile and fence repair, rut removal, decompaction, tilling, seeding and possible wetland restoration. If damage occurred to crops or other non-restorable property during construction, CapX2020 will fairly reimburse the landowner for those damages.

