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Petition No. 1605
The Connecticut Light and Power Company d/b/a Eversource Energy
Hartford Underground Cable Replacement Project
Hartford

Staff Report
May 31, 2024

Introduction

On December 29, 2023, the Connecticut Siting Council (Council) received a petition from The Connecticut Light and Power Company d/b/a Eversource Energy (Eversource) for a declaratory ruling pursuant to Connecticut General Statutes (CGS) §4-176 and §16-50k, for the Hartford Underground Cable Replacement Project (Petition or Project) within existing and new right-of-way (ROW) in the City of Hartford (City).

The Project consists of the replacement and partial relocation of existing underground 115-kilovolt (kV) electric transmission high pressure fluid filled (HPFF) cables on the 1722 and 1704 Lines with cross linked polyethylene (XLPE) cables in the City along approximately 6.7 miles of existing and new ROW between Northwest Hartford Substation, Southwest Hartford Substation, and South Meadow Substation; the retirement of two transmission line taps at Capital District Energy Center Cogeneration Associates (CDECCA) and O'Brien Energy Systems, Inc. (OES) cogeneration facilities in the City; and related electric transmission cable and substation improvements.

On December 29, 2023, in compliance with Regulations of Connecticut State Agencies (RCSA) §16-50j-40, Eversource provided notice of the proposed Project to the City and abutting property owners.

On January 2, 2024, the Council sent correspondence to the City stating that the Council has received the Petition and invited the City to contact the Council with any questions or comments by January 28, 2024. No comments were received from the City.

Under CGS §16-50x, the Council retains exclusive jurisdiction over the existing electric transmission line and substation facility sites. Under RCSA §16-50j-2a(29), "site" means a contiguous parcel of property with specified boundaries, including, but not limited to, the leased area, right-of-way, access and easements on which a facility and associated equipment is located, shall be located or is proposed to be located. The Council cannot delegate its statutory authority to any other entity.[1]

Pursuant to CGS §4-176(e) of the Uniform Administrative Procedure Act, an administrative agency is required to take action on a petition for a declaratory ruling within 60 days of receipt. During a regular meeting held on February 15, 2024, pursuant to CGS §4-176(e), the Council voted to set the date by which to render a decision on the Petition as no later than June 26, 2024, which is the 180-day statutory deadline for a final decision under CGS §4-176(i).

The Council issued interrogatories to Eversource on March 8, and April 22, 2024. Eversource submitted responses to the Council's interrogatories on March 27 and May 17, 2024, respectively.

The purpose of the proposed Project is to improve system reliability on the 1722 and 1704 Lines by replacing existing HPFF electric transmission cables with XLPE cables as part of Eversource's long-term plan to modernize its aging underground cable systems. Over 60 percent of Eversource's existing HPFF lines are over

[1] *Corcoran v. Connecticut Siting Council*, 284 Conn. 455 (2007)

40 years old. The existing HPFF cable systems require ancillary equipment such as fluid pressurizing plants and backup generators to maintain the temperature and pressure of the dielectric fluid (mineral oil) that surrounds the HPFF cables. The presence of insulating fluids also includes the risk of release. Additionally, there is only one global supplier left that produces HPFF cables. Thus, Eversource proposes to replace the 1722 and 1704 Lines with XLPE technology that does not require a dielectric fluid and has fewer components subject to operations and maintenance.

Notice and Community Outreach

Eversource initiated outreach to the City in April 2022 by providing an initial overview of the Project. As the Project route was being finalized, between April 2022 and December 2023, Eversource met with City officials including, but not limited to, the Mayor's Office, City Council, Department of Public Works, Fire Department, and the Colt Park Foundation. Eversource is also working with the City to finalize permanent easements on three City-owned parcels for underground utility rights and the Traffic Management Plan (TMP).

Eversource also reached out to several Neighborhood Revitalization Zone Groups (NRZGs) representing the areas of Hartford that would be affected by the proposed Project. Two of the NRZGs, Coalition to Strengthen the Sheldon/Charter Oak Neighborhood and Frog Hollow, accepted Eversource's offer to present the Project at one of their monthly meetings. The Parkville and West End groups opted to review Project information independently. Topics related to traffic control, work hours, construction and Project need were discussed during meetings with the NRZGs. Eversource would continue to communicate with the NRZGs throughout the duration of the Project.

Eversource initiated outreach to abutting property owners along the Project route in June 2023. All abutting property owners were notified of the Project and provided instructions on how to obtain additional information, as well as how to submit comments to the Council. Eversource is working closely with several abutting property owners such as Hartford Hospital, Trinity College, and other businesses regarding site-specific concerns. For example, Eversource received feedback from these institutions and/or businesses on the location of the vaults and duct banks and adjusted these where feasible. Eversource also received feedback from Hartford Hospital and Trinity College on the preferred hours for work to be performed in the vicinity of the hospital and college. Additionally, some business owners along the Project route requested an update on the TMP, work hours and scheduling. Eversource did not receive additional comments from abutters or the City since the filing of the Petition with the Council.

During the construction phase of the Project, Eversource would maintain contact with the City and abutting property owners to inform them of construction activities. Eversource would also coordinate with abutters and the City regarding Project restoration work.

Existing Facility Site

The existing road ROW that contains the 1722 Line varies in width from 40 feet to 200 feet and extends in an approximately north-south direction for approximately 2.9 miles through a dense urban area with commercial and residential uses and the Park River (North Branch) between Northwest Hartford Substation at Albany Avenue (Route 44) and Southwest Hartford Substation at New Park Avenue.

The existing underground 115-kV HPFF 1722 Line utilizes 3,000 kcmil aluminum cables with one conductor per phase and was installed in 1974. The 1722 Line is primarily located within City streets and Eversource-owned substation properties.

Beginning at Northwest Hartford Substation, the existing 1722 Line route runs in a northwesterly direction to Albany Avenue and continues across the North Branch of the Park River on the underside of a Connecticut Department of Transportation (CDOT) Bridge to Scarborough Street and then continues in a southerly

direction along Scarborough Street, Whitney Street and South Whitney Street to Park Street. At Park Street, the route turns west to the intersection with Madison Avenue and continues on Madison Avenue in a southerly direction to Kane Street. The route then crosses Kane Street to reach Southwest Hartford Substation.

The existing ROW for the 1704 Line varies in width from 50 feet to 100 feet and extends in an approximately east-west direction for approximately 3.8 miles through a dense urban area with residential and commercial uses; recreational uses such as Colt Park; Park River (South Branch), institutional uses such as Hartford Hospital and Trinity College; and transportation corridors such as the AMTRAK rail line and the CT*fastrak* Busway. This existing ROW extends from Southwest Hartford Substation at New Park Avenue to South Meadow Substation at Reserve Road.

The existing underground 115-kV HPFF 1704 Line utilizes 3,000 kcmil aluminum cables with one conductor per phase and was installed in 1974. The 1704 Line is primarily located within City streets and Eversource-owned substation properties or City-owned property.

Beginning at Southwest Hartford Substation, the existing underground 1704 Line route runs in a northerly direction along New Park Avenue to Hamilton Street. The route continues to the east under Hamilton Street, crosses under the CT*fastrak* Busway and the AMTRAK rail line to the Hamilton Street Bridge across the South Branch of the Park River via attachment to the south side of the City's Hamilton Street Bridge. The route continues along Hamilton Street to the intersection with Summit Street and Zion Street and turns south along Summit Street to Vernon Street and continues easterly along Vernon Street to Retreat Avenue. The route continues along Retreat Avenue and to Wyllys Street to the Charter Oak Place intersection. The route turns south onto Groton Street to Stonington Street and runs east-west along the northern edge of Colt Park. East of the intersection with Ramon Quiros Boulevard, the route enters Colt Park and runs southeasterly through the park and re-enters the street at the intersection of Hendrixsen Avenue and Curcombe Street. The route continues southeasterly along Hendrixen Avenue to Wawarme Avenue and then to Reserve Road. On Reserve Road, the route crosses beneath the Interstate 91 and Wilbur Cross Highway overpass to reach South Meadow Substation.

The existing 1722 Line Tap extends in an approximately east-west direction for approximately 0.96 mile between the 1722 Line and the CDECCA facility, which is located between Interstate 84 and Capitol Avenue in Hartford.

The existing 1704 Line Tap extends in an approximately north-south direction for approximately 0.6 mile between the 1704 Line and the OES facility located near the Hartford Convention Center.

The existing Northwest Hartford Substation is located at 1557 Albany Avenue and connects to the underground 1722 Line. Northwest Hartford Substation also connects to the overhead 115-kV 1756 and 1751 Lines, which connect to Bloomfield Substation in Bloomfield, Rood Avenue Substation in Windsor and North Bloomfield Substation in Bloomfield.

The existing Southwest Hartford Substation is located at 271 New Park Avenue and connects to the underground 1722 and 1704 Lines. Southwest Hartford Substation also connects to the overhead/underground 1346 Line which terminates at Newington Substation in Newington.

The existing South Meadow Substation is located at 140 Reserve Road and connects to the underground 1704 Line. South Meadow Substation also connects to the overhead 1873 Line which terminates at Rood Avenue Substation in Windsor; the 1786 Line which terminates at East Hartford Substation in East Hartford; and the 1775 which terminates at Riverside Substation in East Hartford.

See attached Figure 1 – Project Location.

Project Development

The replacement cables cannot be installed in exactly the same locations as the existing cables because the existing cables must remain in service until the replacement cables are installed and energized. Notwithstanding, the replacement of the 1722 and 1704 cables would generally follow the existing HPFF cable routes with the exception of three minor route deviations: Bulkeley Avenue; Hamilton Street Bridge; and Colt Park. The total lengths of the deviations are about 15 percent of the total project length, and the total length of the proposed route is about 3 percent longer than the length of the existing lines. The proposed route, including the proposed deviations, was selected for the following reasons:

a) Less construction constraints, requires fewer bends, and reduces the need for utility relocations;
b) Limits impacts to residential, commercial and public properties to the extent practicable; and
c) Follows the existing route alignment to the extent feasible.

The three route deviations are listed below.

Bulkeley Avenue Route Deviation – 1722 Line

This proposed route would deviate from the existing route beginning at the intersection of Park Street and Madison Avenue. Rather than turn south onto Madison Avenue, the proposed route would continue to the west on Park Street approximately 500 feet to Bulkeley Avenue and then would follow Bulkeley Avenue and continue south across Eversource-owned property at 226 Prospect Avenue and an easement across abutting private property to Kane Street and would rejoin the existing route just north of Southwest Hartford Substation. This proposed route deviation is about 2,600 feet long or about 800 feet longer than the route of the existing 1722 Line in this area. This deviation has an incremental cost of approximately $3.8M.

This route deviation is required because Madison Avenue is highly congested with multiple underground utilities, and there is insufficient space for the installation of a replacement line. Additionally, after the existing cable was installed beneath Madison Avenue, the road was abandoned at its south end and redeveloped with a church and car wash facility. Thus, Eversource no longer has the franchise rights of a street ROW to install the replacement cable along the route of the existing cable and has been unable to secure the necessary additional rights from the two landowners to utilize the existing route in this area.

Hamilton Street Bridge Deviation – 1704 Line

This proposed route would deviate from the existing route to cross the South Branch of the Park River. As a result of discussions between Eversource and the City Public Works Department, it was determined that, in lieu of utilizing the Hamilton Street Bridge for the replacement cable, a preferred solution is to install the replacement cable by horizontal boring technology (micro-tunnelling) underneath the South Branch of the Park River, approximately 50 feet north of the Hamilton Street Bridge, on City-owned property. This proposed route deviation is about 500 feet long or about 150 feet longer than the existing route. The micro-tunneling for this deviation has an incremental cost of approximately $2.3M.

This route deviation is required because certain constraints prohibit the attachment of the cable to the bridge due the following:

a) The replacement cable cannot be attached to the south side of the bridge because that space is currently occupied by the existing 1704 HPFF cable, and that cable cannot be removed or relocated during construction because it must remain in service until the replacement cable is energized;
b) The replacement cable cannot be attached to the north side of the bridge because that space is occupied by an existing natural gas main; and

c) The replacement cable cannot be attached to the underside of the bridge because the bridge does not have horizontal support structures that would allow the cables to be installed in bays between the supports.

Colt Park Deviation – 1704 Line

This proposed route would deviate from the existing route where a section of the 1704 Line is located under the northern portion of Colt Park. Based on Eversource's discussions with the City Public Works Department, the City prefers to have this portion of the route relocated to the perimeter of the Park. This proposed route deviation is approximately 2,000 feet long or about 150 feet longer than the existing route. This deviation has an incremental cost of approximately $410k.

Cost

The total estimated cost of the Project is approximately $315.8M. The cost breakdown by various categories is provided below.

		Rounded ($s in Millions)		
Item	**Description**	**Total**	**Line 1722**	**Line 1704**
A	Engineering and Indirect	$32.80	$11.86	$20.94
B	Cable installation	$50.19	$21.09	$29.11
C	Duct bank installation	$153.14	$65.98	$87.17
D	Micro-tunneling	$4.69	$-	$4.69
E	Jack and Bore	$16.22	$-	$16.22
F	Substation work	$18.92	$10.10	$8.81
G	Commissioning	$3.19	$1.59	$1.60
H	Land Rights	$8.94	$8.57	$0.37
I	Environmental	$1.48	$1.04	$0.44
J	AFUDC	$13.94	$12.22	$1.72
K	Contingency	$12.29	$5.35	$6.94
Total		$315.80	$137.79	$178.01

Of this $315.8M total, approximately $314.4M would be eligible for regional cost allocation as it is associated with Pool Transmission Facilities (PTF).[2] Approximately $1.4M is associated with non-PTF.[3] Pending a final determination from the Independent System Operator of New England, Inc. (ISO-NE), total costs are expected to be allocated[4] as follows:

Eversource Connecticut ratepayers[5] 19.5% ($61.58M)
Other Connecticut ratepayers[6] 6.0% ($18.95M)

[2] ISO-NE defines Pool Transmission Facilities as facilities rated 69-kV or above owned by the participating transmission owners over which ISO-NE has operating authority in accordance with the terms set forth in the Transmission Operating Agreements.
[3] Non-PTF costs are associated with the decommissioning and in-place retirement of CDECCA tap.
[4] These allocations are estimates based on 2022 actual loads.
[5] Electrical service customers of Eversource and located within Connecticut.
[6] Electrical service customers located within Connecticut but outside of Eversource's service territory.

Other New England ratepayers[7]	74.5%	($235.27M)
Cost Total	100%	($315.8M)

Eversource also performed a Life Cycle Cost (LCC) Analysis for the Project. Per the Council's *2022 Life-Cycle Cost Analysis of Overhead and Underground Electric Transmission Lines* (2022 Life Cycle Report), the LCC for a transmission project is the sum of the net present values (NPV) of three components over the study period: first costs, operations and maintenance (O&M) costs and electrical loss costs.[8] As a comparison to total Project cost, the first costs or costs to design, permit and construct a line will be used.[9]

The 1704 Line and the 1722 Line have estimated first costs of approximately $42.78M and $47.52M per linear mile, respectively. The Project involves line segments for the 1704 and 1722 Lines of approximately 3.84 and 2.95 linear miles each, respectively. This results in a total Project first cost of approximately $304.5M or within less than four percent of the Project total $315.8M. The total cost of $315.8M has an accuracy band of +/- 25 percent.

Annual O&M costs are estimated at about $8,560 per mile for both the 1704 and 1722 Lines or about $58,122 based on about 6.79 circuit-miles total. Utilizing an annual O&M escalation rate of 2 percent, discount rate of 8 percent and a 40-year study period from the 2022 Life Cycle Report[10], the NPV of O&M would be approximately $888k. Utilizing the same study period and discount rate along with Eversource's projected load growth and energy cost data[11], the NPV of the electrical loss costs would be approximately $736k. Thus, the total life cycle cost would be approximately $306M or still within the accuracy band of total Project cost because first costs are the dominant component. The NPV contributions of O&M and electrical loss costs to LCC are very small relative to the total Project cost.

Proposed Project

The Project is proposed to address identified asset condition deficiencies by replacement of aging HPFF transmission cables with new XLPE cables to improve long-term reliability, meet load growth needs, and reduce the risk of dielectric fluid releases to the environment. Approximately 6.7 linear miles of single-circuit cable would be replaced between Northwest Hartford Substation and South Meadow Substation. Specifically, the Project entails the replacement 3,000 kcmil aluminum HPFF with 5,000 kcmil copper XLPE for both the 1722 and 1704 Lines.

The New England region's clean energy goals and expected significant load growth associated with electrification (such as heating and electric vehicles) results in a higher load-carrying capacity necessary to address the ongoing energy transition. Eversource notes a compound annual load growth rate of approximately 2.1 percent based on recent 10-year forecast information by ISO-NE. Thus, the proposed replacement cables would have additional capacity relative to the existing cables to be replaced. A table of cable capacities is included below.

Cable	Normal Rating (MVA)	Long-term Energy Rating (MVA)	Short-term Emergency Rating (MVA)
Existing 1704 Line	**245**	**277**	**409**

[7] Electrical service customers located within New England but outside of Connecticut.
[8] 2022 Life Cycle Report, p. 21
[9] O&M costs and electrical loss costs components are not related to the Project cost total.
[10] 2022 Life Cycle Report, p. 21
[11] The projected load growth rate is 2.1 percent. Energy cost is $100/MWh with a 4.1 percent annual escalation rate.

Existing 1722 Line	**245**	**277**	**409**
Replacement 1704 Line	**264**	**432**	**1,020**
Replacement 1722 Line	**307**	**432**	**1,018**

The duct bank would contain three 8-inch diameter polyvinyl chloride (PVC) conduits or one conduit per phase. Most of the duct bank would utilize a triangular (i.e. delta) phase arrangement. In areas where adequate clearances from other utilities cannot be attained via the triangular configuration, a vertical or horizontal configuration would be used. Also, Eversource anticipates that a portion of the 1704 Line would have a horizontal arrangement for approximately 50 feet on New Park Avenue.

See attached Figures 2 through 4 – Duct Bank Configurations.

In addition, two 4-inch diameter conduits would be located within the duct bank to carry two fiber optic cables per circuit: one fiber optic cable for remote protection and one fiber optic cable for monitoring cable operating temperatures.

Approximately 7 splice vaults are proposed for the 1722 Line, and 11 splice vaults are proposed for the 1704 Line. Splice vaults would typically be spaced approximately 2,000 feet to 3,500 feet apart, depending on the cable system alignment. A typical splice vault would have dimensions of approximately 22 feet long, by 7 feet wide by 7 feet tall.[12] For each circuit, a ground continuity conductor would be installed in 2-inch diameter PVC conduit to ground the cable sheaths and equipment within the proposed vaults.

See attached Figure 5 – Splice Vault Configuration.

Eversource would utilize a combination of open trench construction and two forms of trenchless construction: jack-and-bore and micro-tunneling to install the XLPE. See section titled "Project Construction."

Northwest Hartford Substation

Modifications necessary to facilitate this Project within the fenced substation include, but are not limited to, the following:

a) Install a new approximately 16-foot 6-inch tall termination structure for the 1722 Line with three XLPE potheads and cable supports;
b) Replace the existing coupling-capacitor voltage transformers (CCVTs) with three new line potential transformers (PTs) on three new pedestals that would be less than 20 feet high;
c) Retrofit the existing 1722 Line ground disconnect switch with a new motor operator;
d) Replace the existing HPFF 1722 Line relays and meters in the existing control house with new line relays and meters;
e) Install two new fiber patch panels and associated supervisory control and data acquisition (SCADA) and telecommunications equipment in the existing control house; and
f) Remove existing HPFF potheads.

The height of the proposed termination structure would be shorter than the height of the tallest existing structure of 44 feet.

[12] The two splice vault "chimneys" add approximately three additional feet to the height to the splice vault.

Southwest Hartford Substation

Modifications necessary to facilitate this Project within the fenced substation related to the 1722 Line include, but are not limited to, the following:

a) Install a new approximately 27-foot 4-inch tall termination structure for the 1722 Line with three XLPE potheads and cable supports;
b) Replace the existing CCVTs with three new line PTs on new structures;
c) Retrofit the existing 1722 Line ground disconnect switch with a new motor operator;
d) Replace the existing HPFF 1722 Line relays and meter in the existing control house with new line relays and meters; and
e) Remove existing HPFF potheads.

Modifications necessary to facilitate this Project within the fenced substation related to the 1704 Line include, but are not limited to, the following:

a) Install a new approximately 20-foot tall termination structure for the 1704 Line with three XLPE potheads and cable supports;
b) Modify the existing HPFF termination structure for the new configuration;
c) Install new motor-operated disconnect switch and ground switch;
d) Relocate existing PTs to an existing structure;
e) Replace the existing HPFF 1704 Line relays and meters in the existing control house with new line relays and meters;
f) Install two new fiber patch panels and associated SCADA and telecommunications equipment in the existing control house; and
g) Remove existing HPFF potheads.

The height of the proposed termination structures would be shorter than the height of the tallest existing structure of 65 feet.

South Meadow Substation

Modifications necessary to facilitate this Project within the fenced substation related to the 1704 Line include, but are not limited to, the following:

a) Install a new, free-standing pothead/lightning arrestor structure (approximately 20 feet tall);
b) Install a new line disconnect switch structure (approximately 20 feet tall);
c) Relocate certain existing subsurface infrastructure;
d) Replace the existing 1704 Line relays and meters in the existing control house with new line relays and meters;
e) Install two new fiber patch panels and associated SCADA and telecommunications equipment in the existing control house; and
f) Remove existing HPFF potheads.

The height of the proposed structures would be shorter than the height of the tallest existing structure of 68 feet.

Transmission Line Taps

The tap between the 1722 Line and the CDECCA facility is still energized but is no longer needed to serve the CDECCA facility, and it does not require replacement. It would be retired in place as modifications to the distribution system would meet the needs of the CDECCA facility.

The tap between the 1704 Line and the OES facility is no longer needed to serve the facility and has been de-energized.

Project Construction

Eversource would utilize the following staging/laydown areas: Eversource-owned property at 226-244 Prospect Avenue and Eversource-owned property at 200 Maxim Road.

Eversource would utilize City streets or parking lots for access. No new access is expected to be necessary. Access to work areas would be in accordance with the TMP.

Eversource would obtain a CDOT Encroachment Permit to cross State Route 44 and the CT*fastrak* corridor within the Project route area. Eversource would also obtain railroad encroachment permits for AMTRAK, CDOT rail line and DOAg.[13]

Construction areas would be isolated by establishing erosion and sedimentation (E&S) controls in accordance with the applicable version of the *Connecticut Guidelines for Soil Erosion and Sediment Control* and Eversource's April 2022 Best Management Practices Manual for Massachusetts and Connecticut (BMPs).[14] Temporary E&S control measures would be left in place until the areas disturbed by construction activities are permanently stabilized. Permanent stabilization would consist of the application of pavement for areas within existing road ROWs or otherwise currently paved areas. For areas without existing pavement, a grass vegetative cover would generally be used. After final stabilization is achieved, all temporary E&S controls would be removed.

A Project-specific Stormwater Pollution Control Plan (SWPCP) would be developed for registration under a Department of Energy and Environmental Protection (DEEP) Stormwater Permit. The Stormwater Permit requires the designing qualified professional to conduct the SWPCP Implementation Inspection that confirms compliance with the Stormwater Permit and the initial implementation of all SWPCP control measures for the initial phase of construction. The SWPCP also requires a qualified inspector to inspect the work areas at least once per week and within 24-hours after a rain event that meets certain permit criteria.

The Project is eligible for certification through the U.S. Army Corps of Engineers (USACE)/DEEP Self-Verification Notification process in regard to wetland impact. The self-verification notification forms would be submitted to the USACE - New England District and DEEP prior to the start of project construction, as required by the SWPCP.

The general construction sequence is as follows:

a) Perform pre-construction activities including, but not limited to, marking out existing utilities, setting up traffic control, and installing E&S controls;
b) Saw-cut pavement;
c) Prepare temporary work areas;
d) Relocate existing utilities where necessary;
e) Excavate for duct banks and vaults;

[13] Eversource would jack-and-bore under a DOAg-owned rail spur which serves the Connecticut Regional Market.
[14] 2022 Eversource Best Management Practices MA_CT

f) Install PVC casing pipe and internal conduits;
g) Backfill excavations; and
h) Restore work areas.

Open trench construction would be utilized for the majority of the Project. Mechanical excavation would remove the concrete or asphalt surface, topsoil and sub-grade material. Removed material would be relocated to an appropriate off-site location for disposal or temporarily stockpiled and reused as clean backfill.

After a trench has been opened and shoring has been installed, conduits are assembled and supported in the trench. The area around the conduits is then filled with concrete. After the concrete has set, the trench is backfilled with thermal backfill.

Jack-and-bore construction is a trenchless installation method that would be used to cross beneath the CT*fastrak* Busway and the following rail lines: AMTRAK, CDOT and DOAg spur. This method utilizes a jacking pit where hydraulic jacking equipment pushes a casing pipe of roughly 38 inches outside diameter to a receiving pit. As the pipe advances, the soils and solids are removed from the pipe.

After the jack-and-bore casing pipe is installed, the conduits for the cables, communication lines, grounding line and spare are placed inside the pipe with spacers to hold their alignment. The remaining space in the casing pipe is filled with a flowable grout material (to serve as thermal backfill).

Micro-tunneling is a trenchless installation method that would be used to cross beneath the South Branch of the Park River. A micro-tunnel boring machine will drill an approximately 4-foot diameter bore horizontally from the sending pit towards the receiving pit. This creates a path to push the pipe through the bore via pipe jacking system. Pumps would remove the slurry and send it to equipment for slurry material separation. The conduits for the cables, communication lines, grounding line and spare are placed inside the pipe with spacers to hold their alignment. The remaining space in the casing pipe is filled with a flowable grout material (to serve as thermal backfill).

XLPE cables would be pulled into the duct bank casing pipes via truck or trailer mounted winch and special handling equipment between adjacent vaults. A single cable would be pulled into place within each conduit. XLPE splicing is a precise and complex procedure that would take approximately five to seven days to complete the splices in each vault.

After completion and energization of the replacement XLPE cables, the existing HPFF lines would be de-energized and prepared for in-place retirement. The dielectric fluid would be pumped out of the pipes and transferred to a tank truck for proper recycling or disposal. HPFF cables would be separated at splice vaults, pulled from pipes, cut into sections and removed for recycling. Substation cable terminations would be removed or modified. Mineral oil pumphouses and other HPFF-related equipment would be removed. Pipes would be cleaned, capped and pressurized with low pressure nitrogen gas.

After areas of disturbance have been stabilized, E&S controls would be removed and restoration would commence. This includes re-paving areas that were originally paved. Restoration may also include reseeding, sodding, turf, replanting and landscaping where necessary. Final restoration would be subject to applicable permitting and/or property owner agreements.

Project-related traffic would be expected to be temporary and limited to the construction area. Due to the proposed open-trenching, Eversource anticipates that road shoulder closures or single lane closures using one lane alternating traffic with police details would be required during construction. The TMP is being developed in consultation with the City and CDOT permits. Eversource would communicate with local businesses to avoid interruptions to critical product deliveries and would also notify municipal officials and the public as part of its outreach plan.

Environmental Effects and Mitigation Measures

The Project crosses an unnamed watercourse of the South Branch of the Park River immediately north of Southwest Hartford Substation and south of Kane Street. To minimize impacts to this watercourse, the duct banks for both lines would be installed at the same time. Approximately 0.6 acre of tree and brush clearing would be required. Tree removal would be necessary to install the duct banks for both lines and to prevent roots from intruding upon the duct banks in the future.

A temporary dam would be installed to divert approximately 123 feet of the watercourse during construction. Temporary matting would be utilized for access. Temporary coffer dams would be constructed upstream and downstream of the work area, and a pipe would be installed to temporarily divert the watercourse around the construction zone while maintaining stream flow. All work would be performed in accordance with Eversource BMPs and the SWPCP.

Overall, minimal vegetation removal would be required due to the largely urban nature of the site. Selective vegetation and tree removal would also be necessary in the area between Albany Avenue and Northwest Hartford Substation at the North Branch of the Park River crossing. Eversource would minimize vegetation removal activities to the extent practicable, and vegetation removal activities would be performed in accordance with Eversource BMPs.

A wetland is located west and northwest of Northwest Hartford Substation. The Project would result in approximately 160 square feet of permanent wetland impacts associated with the transmission line duct passing through the narrowest portion of the wetland. Temporary impacts to wetlands would be approximately 352 square feet due to a matted access road to be constructed above and adjacent to the proposed route alignment.

No vernal pools are located proximate to the site.

Portions of the replacement transmission lines would be located within the 100-year and 500-year Federal Emergency Management Agency-designated flood zones. Additionally, there are City Flood Storage Areas associated with the North and South Branches of the Park River. The proposed Project would be entirely underground in flood zone areas and would not result in any significant or permanent effects on these flood zones. No vaults are proposed to be installed within flood zones. Temporary construction equipment would be stored outside of the 100-year flood zone when not in use. Some temporary stockpiling of soil material may be necessary within the 500-year flood zone or Flood Storage Area, but this would be temporary in nature and stabilized per Eversource BMPs. Eversource is developing a final Flood Contingency Plan per input from USACE and the City.

The Project is not within a DEEP-designated Aquifer Protection Area. Notwithstanding, Eversource would conduct work in accordance with its BMPs which include provisions for the proper storage, secondary containment, and handling of diesel fuel, motor oil, grease and other lubricants, to protect subsurface water quality.

The DEEP-approved SWPCP would contain details regarding the E&S control measures that would be implemented to protect wetlands and vernal pools. E&S controls would also be inspected weekly by a qualified inspector, as required by the SWPCP. The Project would comply with the SWPCP, USACE self-verification procedures, and Eversource's BMPs.

Invasive species mitigation measures would be conducted in accordance with Eversource's BMPs. Measures include the cleaning of temporary mats to prevent the introduction of invasive species into wetlands, the cleaning of vehicles, equipment, materials, gear, footwear or clothing of all visible soil and plant material on site known to contain invasives or as near as practical to the invasive area, prior to leaving the Project site.
The facility site is not located within a DEEP Natural Diversity Database (NDDB) buffer area.

Eversource also consulted with the U.S. Fish & Wildlife Service's (USFWS) Information, Planning and Consultation (IPaC) service regarding federally-listed species that may be present within the Project area. The IPaC report identified the northern long-eared bat (NLEB), a federally-listed and state-listed Endangered Species. Tree clearing would not occur during the inactive season of the NLEB when NLEBs may roost in trees. There are no known NLEB maternity roost trees within 150 feet of the Project area, and the nearest known NLEB hibernaculum is located over 5 miles to the north in the Town of East Granby. The USFWS response letter indicated that the Project would have no effect on NLEB.

A Phase 1A Cultural Resources Assessment (Phase 1A) of the Project area determined that 14 Historic Districts and 8 individual properties listed on the National Register of Historic Places (NRHP) are located within 500 feet of the Project. Additionally, 8 individual properties listed on the State Register of Historic Places (SRHP) are located within 500 feet of the Project. The Phase 1A results indicated that there are no recorded archaeological sites within 500 feet of the Project. The pedestrian survey determined that it is unlikely that significant archaeological deposits would be encountered during construction. Notwithstanding, Eversource would implement an Unanticipated Discoveries Plan (UDP) for its workers and contractors to follow in the event archaeological deposits are found during construction. By letter dated February 1, 2024, SHPO indicated that the proposed Project would have no adverse effect on historic properties.

The nearest publicly-accessible recreational resource is Colt Park. The 1704 line currently passes diagonally under the northern portion of the park between Stonington Street and Hendricxsen Avenue. The proposed Colt Park Deviation would relocate the 1704 Line towards the perimeter of the park rather directly under the northern portion of the park. This route deviation would be under a paved parking area and not the open lawn area. While construction would temporarily impact the parking area, the Project is not expected to impact the recreational value of Colt Park.

The Project would include the replacement of underground transmission which would not be expected to have visual impacts on the surrounding area. Substation modifications would be above-ground, but such modifications would be located within the existing fenced substations and would not be taller than the tallest existing structures at such substations.

Public Safety

The NESC is the authoritative code for ensuring the continued practical safeguarding of persons and utility facilities during the installation, operation and maintenance of electric power and communications utility systems, including substations, overhead lines and underground lines. The Project would comply with the 2023 NESC, which became effective February 1, 2023.

There would be no permanent changes to existing sound levels after completion of the Project. Noise associated with construction activities is exempt from DEEP Noise Control Regulations. Notwithstanding, any construction-related noise would be short-term and localized in the vicinity of work sites. Eversource would construct during daylight hours where feasible. However, night work is expected to be necessary to avoid impacting areas of high traffic congestion during the day, accommodate a schedule outage, complete certain cable replacement work tasks, or complete the testing and commission process. Trenchless construction would require continuous 24-hour work after it begins. Noise sources from that process would be primarily from a generator and tunneling equipment.

Eversource utilized the Federal Aviation Administration (FAA) Notice Criteria Tool (NCT) and determined that the proposed substation termination structures at Northwest Substation and Southwest Substation would not require notice to the FAA, and no marking or lighting would be required. The NCT results indicated that the proposed terminal structure at South Meadow Substation exceeds the Notice Criteria and requires notice to the FAA to determine whether marking or lighting would be required. Eversource notes that this structure is not the tallest structure at the substation, so it is not anticipated that marking or lighting will be necessary.

Electric fields (EF) are produced whenever voltage is applied to electrical conductors and equipment. Electric fields are typically measured in units of kilovolts/meter (kV/m). As the weight of scientific evidence indicates that exposure to electric fields, beyond levels traditionally established for safety, does not cause adverse health effects, and as safety concerns for electric fields are sufficiently addressed by adherence to the NESC, as amended, health concerns regarding Electric and Magnetic Fields (EMF) focus on MF rather than EF. The International Commission on Non-Ionizing Radiation Protection (ICNIRP) has established a guideline of 4.2 kV/m.

The Project route contains an existing transmission line that emits magnetic fields (MF). In the United States, no state or federal exposure standards for 60-Hertz MF based on demonstrated health effects have been established, nor are there any such standards established worldwide. However, the ICNIRP has established a level of 2,000 milliGauss (mG), based on extrapolation from scientific experimentation, and the International Committee on Electromagnetic Safety (ICES) has calculated a guideline of 9,040 mG for exposure to workers and the general public, and recognized in the Council's *Electric and Magnetic Field Best Management Practices for the Construction of Electric Transmission Lines in Connecticut.*

Eversource reviewed MF levels associated with the Project. Pre- and post-construction MF levels[15] are presented in the table below:

Summary of Fields	Magnetic Field Calculations (mG)	
	25 Feet Offset	Maximum
Trench	8.35	116.10
Vault	18.10	116.14
Trenchless Crossing	11.57	87.56

All MF values would be below the ICNIRP exposure guidelines of 2,000 mG.

The cables would not be a source of EF due to the shielding effects of the cable shield wires being grounded, and thus, the entire electric field is self-contained.

The Project would replace conductors rather than add new lines at the substations, and the spacing of the phases would remain approximately the same. Thus, the Project would result in negligible changes to MF levels at the property boundaries of the three substations.

Construction Schedule

Construction is expected to begin in mid-2024 with a projected in-service date of December 2026. Complete decommissioning and restoration of affected areas is anticipated to be completed by year-end 2027. Normal work hours would be Monday through Saturday from 7:00 a.m.[16] to 7:00 p.m. Occasional Sunday work hours are anticipated.

[15] MF levels are based on peak forecasted steady state load conditions which is more conservative than utilizing average annual load conditions.
[16] During the winter, snow plowing and de-icing may be necessary prior to the 7:00 a.m. start of the work day.

Certain work activities would be performed during non-typical hours and, in some cases, on a continuous 24-hour basis. Non-typical hours might also be necessary due to circumstances including, but not limited to, cable installations; cable splicing; performing work during a Connecticut Valley Electric Exchange or AMTRAK approved outage; and switching, testing, and commissioning. Additionally, non-typical hours may be necessary in certain locations to mitigate impacts to business operations or residential properties.

Conclusion

If approved, staff recommends the following conditions:

1. Approval of any project changes be delegated to Council staff;
2. Identification of provisions for erosion and sedimentation (E&S) controls, if necessary, at the staging area locations prior to the commencement of construction;
3. Submit a copy of the DEEP Stormwater Permit prior to commencement of construction;
4. Submit a copy of the final Flood Contingency Plan; and
5. Submit a copy of the final Traffic Management Plan.

Figure 1 – Project Location

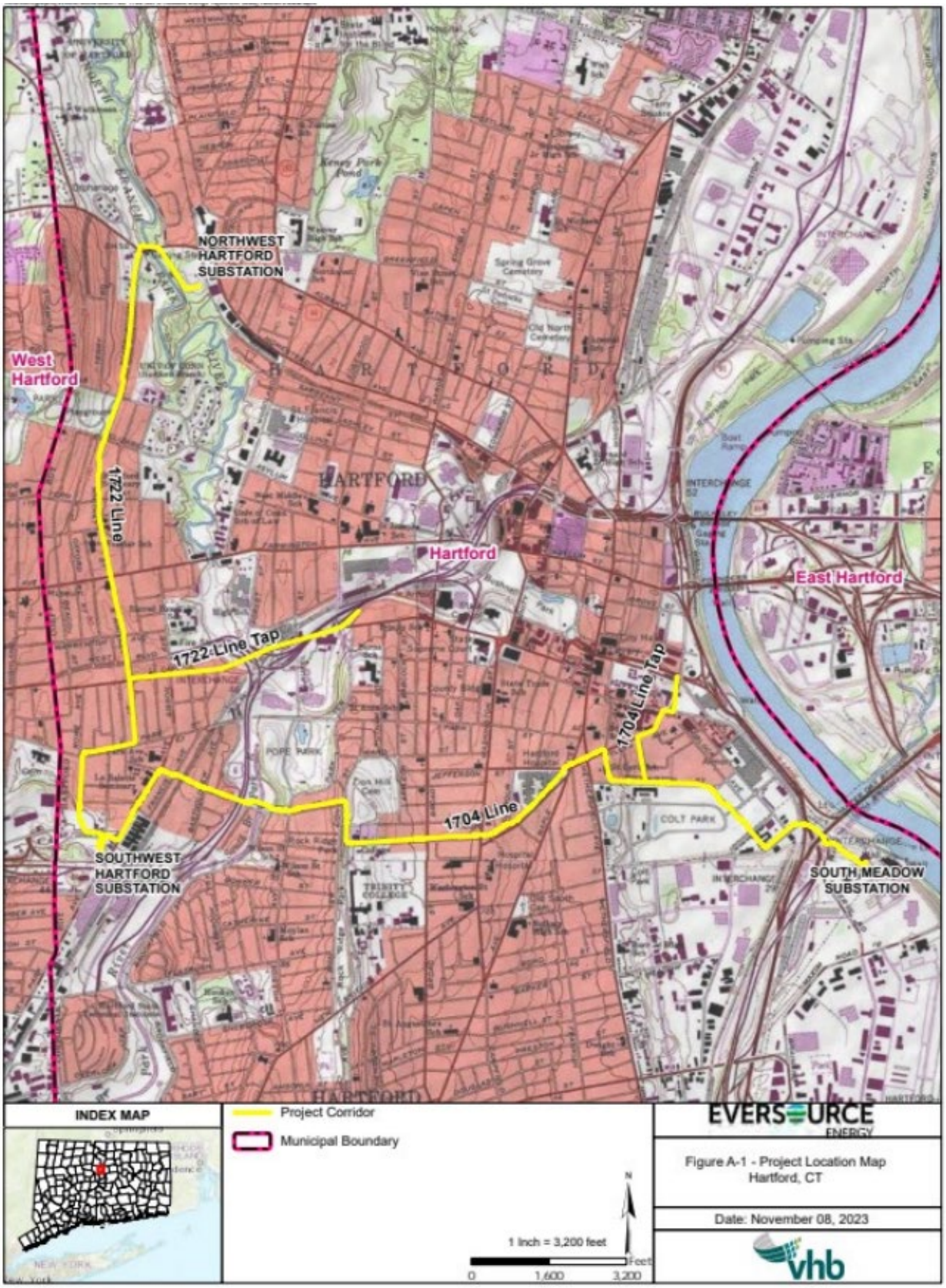


Figure 2 – Duct Bank Configuration – Triangle/Delta

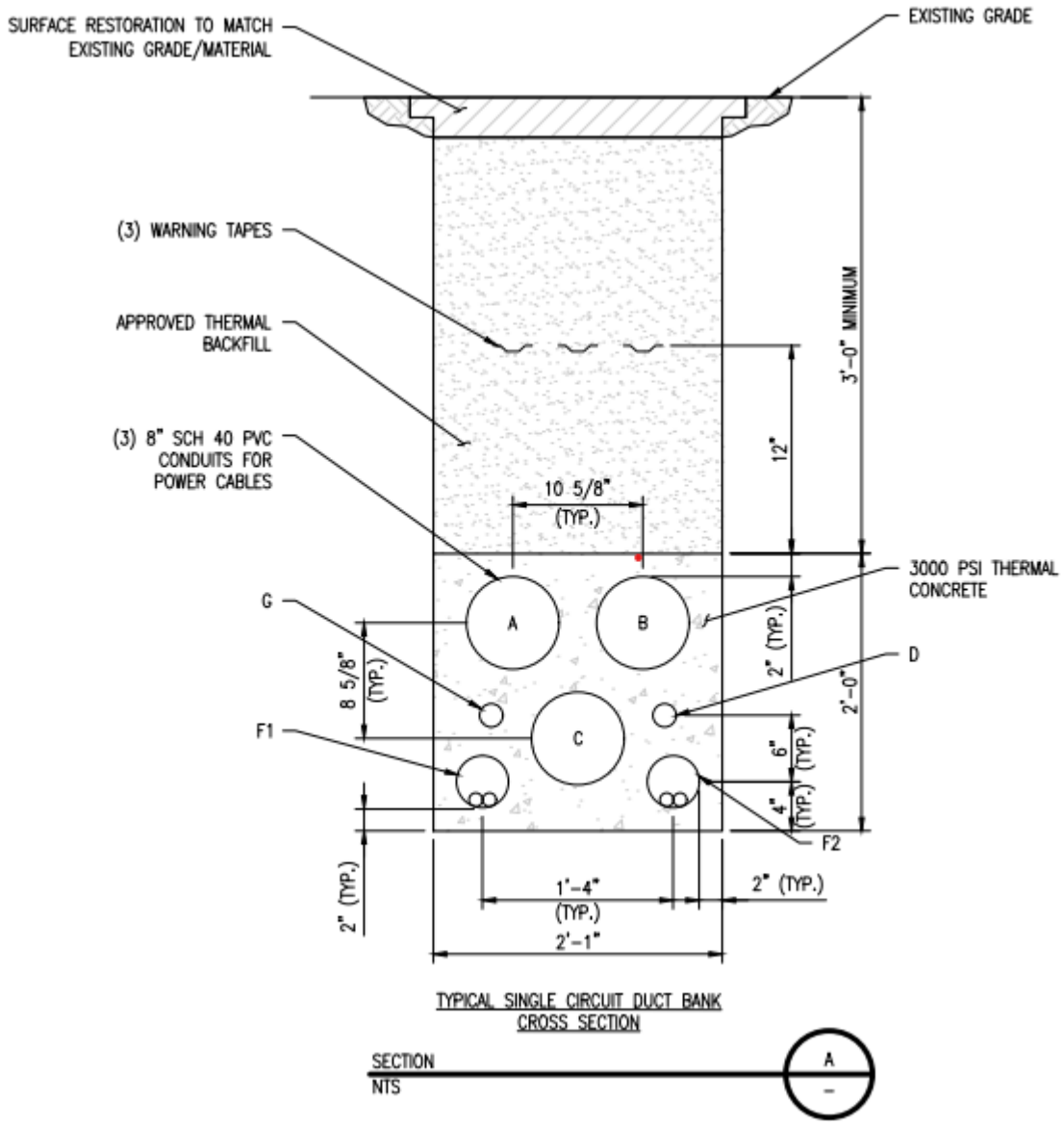


Figure 3 – Duct Bank Configuration – Vertical

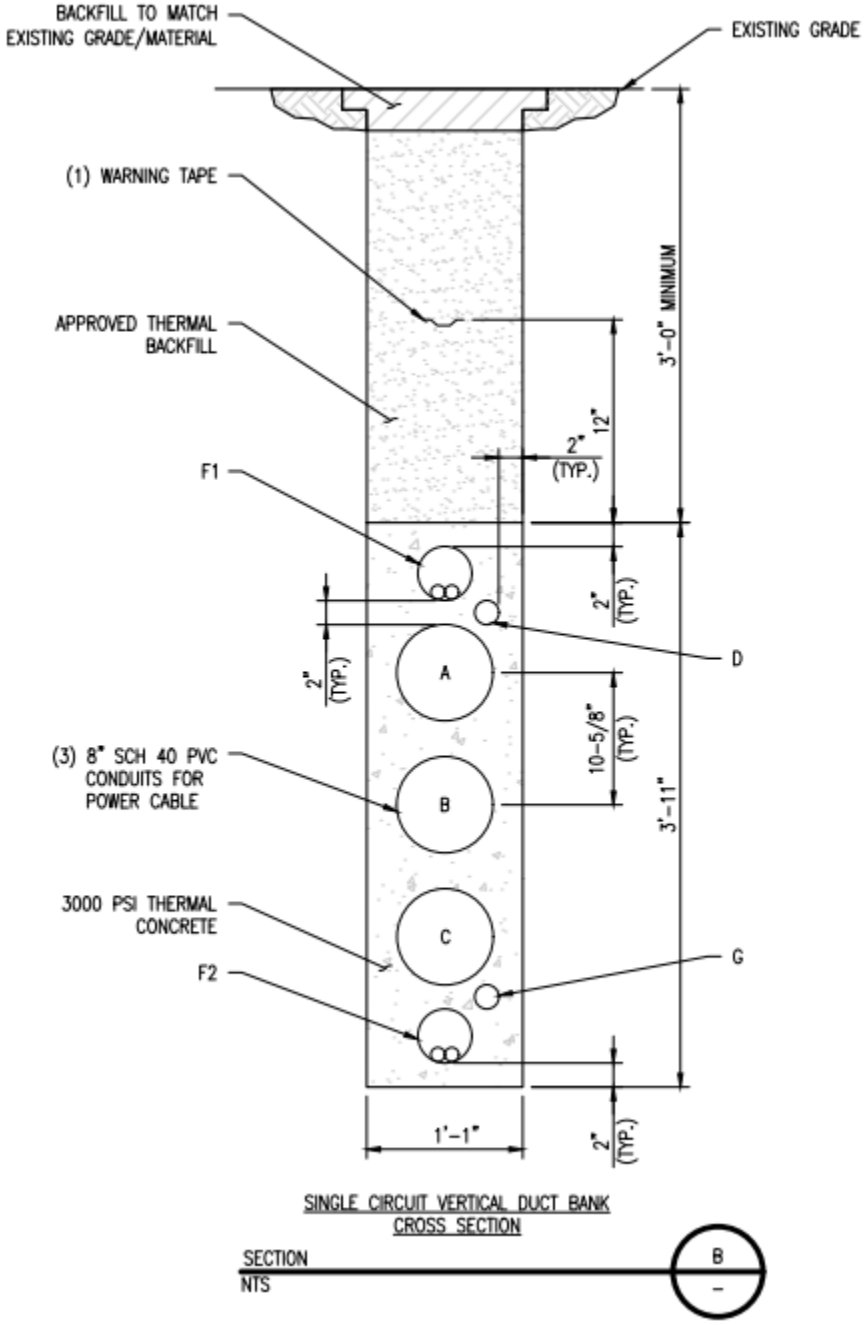


Figure 4 – Duct Bank Configuration – Horizontal

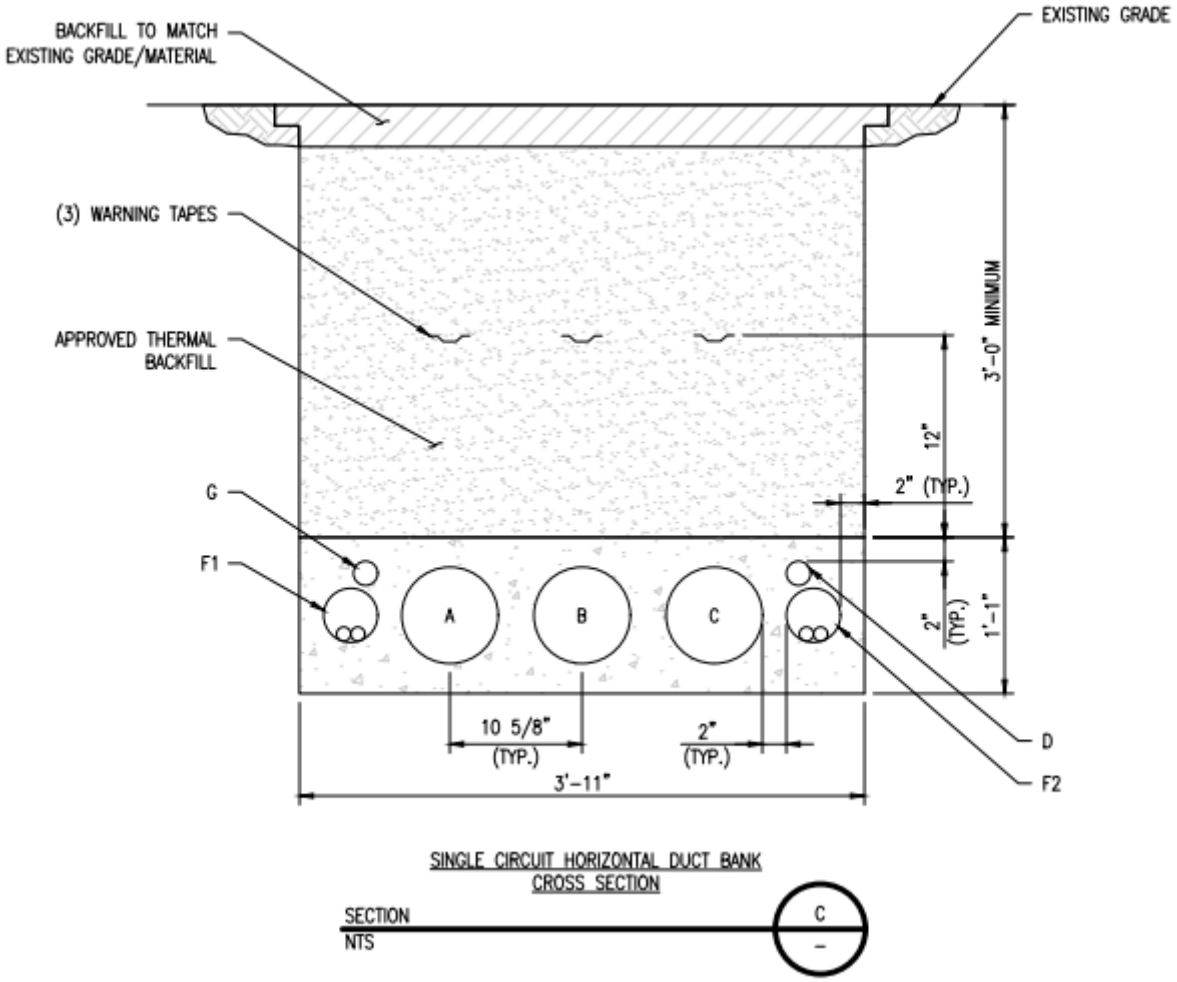
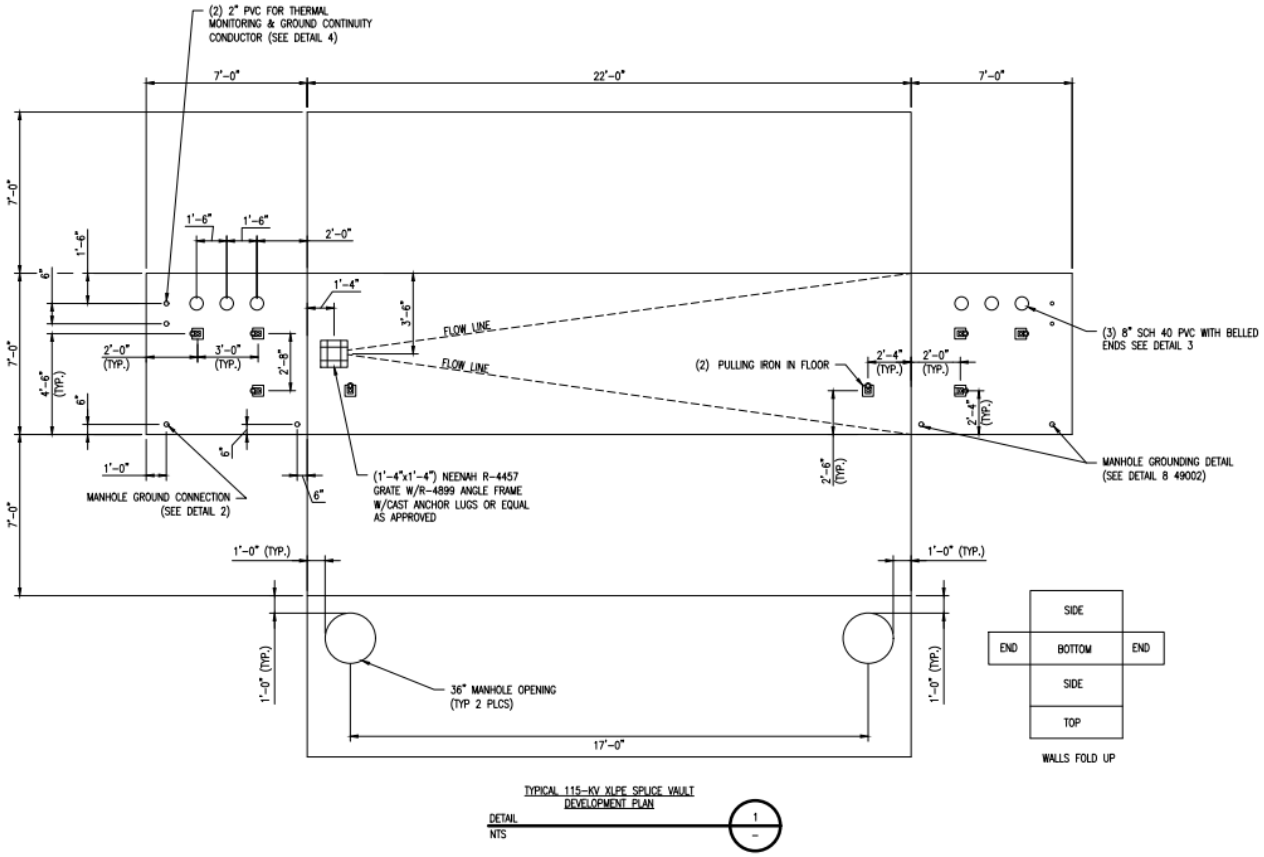


Figure 5 – Splice Vault Configuration



TYPICAL 115-KV XLPE SPLICE VAULT DEVELOPMENT PLAN

DETAIL 1 / NTS