

NH PUC Docket DE 16-441:

Petition of PSNH d/b/a Eversource Energy to Construct and Maintain
Electric Lines, Neutral Wire and Fiber Optic Cable Over/Across the
Public Waters of the Oyster River and Little Bay in the Town of Durham,
Pickering Brook and Little Bay in the Town of Newington

SUMMARY
Revisions between Originally Submitted Petition
And Revised Engineering Design

PETITION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE D/B/A EVERSOURCE ENERGY FOR LICENSES TO CONSTRUCT AND MAINTAIN ELECTRIC LINES, NEUTRAL WIRE AND FIBER OPTIC CABLE OVER AND ACROSS THE PUBLIC WATERS OF THE OYSTER RIVER AND LITTLE BAY IN THE TOWN OF DURHAM, NEW HAMPSHIRE AND PICKERING BROOK AND LITTLE BAY IN THE TOWN OF NEWINGTON, NEW HAMPSHIRE.

Reasons for revision

The original petition of Public Service Company of New Hampshire D/B/A Eversource Energy for licenses to construct and maintain electric lines, neutral wire and fiber optic cable over and across the public waters of the Oyster River and Little Bay in the Town of Durham, New Hampshire and Pickering Brooke and Little Bay in the Town of Newington, New Hampshire was originally submitted on April 12, 2016 as part of the Application for Certificate of Site and Facility for the Seacoast Reliability Project. Following that submittal, several engineering design changes have occurred to accommodate concerns of abutters to the project corridor as well as refine the design to align with Eversource standard structure configurations. This results in minor changes to the engineering crossing drawings and petition appendices as originally submitted, as listed below. The crossings still meet or exceed all NESC requirements.

Changes to Original Petition

There are no changes to the Petition filed.

Changes to Appendix A

1. Paragraph #1- Revised Drawing number F10740901 (Exhibit 1) has been supplied. There are no changes to the location plan labeled as Drawing number F10740902 (Exhibit 2).
2. Paragraph #1- **Change** “PSNH” to “Eversource Energy”
3. Paragraph #3- **Change** “As shown on Exhibit 1...approximate separation at the structure of 7 - 15 feet vertically ... neutral wire is carried... approximately seven feet down below the 34.5kV phase wires.” to “As shown on Exhibit 1...approximate separation at the structure of 6 - 13 feet vertically...neutral wire is carried... approximately 12 feet down below the 34.5kV phase wires.”
4. Paragraph #5 Bullet 3- **Change** “...a clearance to the water surface of 57.1 feet. ... exceed the minimum clearance requirement of 30.1 feet by 27 feet under temporary emergency conditions during a 10-yr storm event.” to “...a clearance to the water surface of 58.4 feet. ... exceed the minimum clearance

- requirement of 30.1 feet by 28.3 feet under temporary emergency conditions during a 10-yr storm event.”
5. Paragraph #5 Bullet 4- **Change** “... the clearance would be 12 feet vertically ...” **to** “... the clearance would be 12.5 feet vertically ...”
 6. Paragraph #5 Bullet 5- **Change** “...clearance would be 8.7 feet vertically and 1 foot horizontally from the shield wires to the closest phase wire...exceed the vertical requirement by 5.8 feet under worst case conditions.” **to** “...clearance would be 13.3 feet vertically and 1 foot horizontally from the shield wires to the closest phase wire...exceed the vertical requirement by 9.9 feet under worst case conditions.”
 7. Paragraph #5 Bullet 6- **Change** “...clearance to the water surface of 36.7feet ... exceed the minimum clearance requirement of 28.5 feet by 8 feet under temporary emergency conditions during a 10-yr storm event.” **to** “...clearance to the water surface of 37.2 feet ... exceed the minimum clearance requirement of 28.5 feet by 8.7 feet under temporary emergency conditions during a 10-yr storm event.”
 8. Paragraph #5 Bullet 7- **Change** “...clearance to the water surface of 30.3 feet. ...exceed the minimum clearance requirement of 25.5 feet by 4.8 feet under temporary emergency conditions during a 10-yr storm event.” **to** “...clearance to the water surface of 31.1 feet. ...exceed the minimum clearance requirement of 25.5 feet by 5.6 feet under temporary emergency conditions during a 10-yr storm event.”
 9. Paragraph #5 Bullet 8- **Change** “...clearance of the closest 34.5kV line would be 1.5 feet vertically and 0 feet horizontally ... exceed the vertical requirement by 0.2 feet under worst case conditions.” **to** “...clearance of the closest 34.5kV line would be 2.5 feet vertically and 0 feet horizontally ... exceed the vertical requirement by 1.2 feet under worst case conditions.”

Changes to Appendix B

1. Paragraph #1- Revised Drawing numbers F10740903 (Exhibit 3) and 385040901 (Exhibit 5) have been supplied. There are no changes to the location plans labeled as Drawing numbers F10740904 (Exhibit 4) and 385040902 (Exhibit 6).
2. Paragraph #1- **Change** “PSNH” **to** “Eversource Energy”
3. Paragraph #3- **Change** “As shown on Exhibit 3...separation at the structure of 8 -15 feet vertically” **to** “As shown on Exhibit 3...separation at the structure of 6 -12.5 feet vertically”
4. Paragraph #3- **Change** “A clearance of 26.2 feet...NESC required clearance of 20.1 feet by 6.1 feet.” **to** “A clearance of 27.2 feet...NESC required clearance of 20.1 feet by 7.1feet.”
5. Paragraph #4- **Change** “...1-pole, direct embed, 60 foot pole (eight feet embedded), wood deadend structure (western side)...” **to** “...1-pole, direct embed, 65 foot pole (8.5 feet embedded), wood deadend structure (western side)...”

6. Paragraph #4- **Change** "...separation at the structure of five feet vertically and 0-9 feet horizontally in a horizontal configuration." **to** "...separation at the structure of five feet vertically and 0 feet horizontally in a vertical configuration."
7. Paragraph #4- **Change** "for Structure 5...approximately five feet..." **to** "for Structure 5...approximately seven feet..."
8. Paragraph #4- **Change** "A clearance of 21 feet between...NESC required clearance of 15.5 feet by 5.5 feet." **to** "A clearance of 19.2 feet between...NESC required clearance of 15.5 feet by 3.7 feet."
9. Paragraph #6, Bullet 3- **Change** "...a clearance to the water surface of 34.1 feet.... exceed the minimum clearance requirement of 22.1 feet by 12 feet under temporary emergency conditions during a 10-yr storm event." **to** "...a clearance to the water surface of 34.6 feet.... exceed the minimum clearance requirement of 22.1 feet by 12.5 feet under temporary emergency conditions during a 10-yr storm event."
10. Paragraph #6, Bullet 4- **Change** "Under these conditions the clearance would be 13.5 feet vertically..." **to** "Under these conditions the clearance would be 12.5 feet vertically..."
11. Paragraph #6, Bullet 5- **Change** "...a clearance to the water surface of 31.9 feet. ...exceed the minimum clearance requirement of 20.5 feet by 11.4 feet under temporary emergency conditions..." **to** "...a clearance to the water surface of 29.2 feet. ...exceed the minimum clearance requirement of 20.5 feet by 8.7feet under temporary emergency conditions..."
12. Paragraph #6, Bullet 6- **Change** "...a clearance to the water surface of 23.5 feet. ... exceed the minimum clearance requirement of 17.5 feet by 6 feet under temporary emergency conditions during a 10-yr storm event." **to** "...a clearance to the water surface of 21.8 feet. exceed the minimum clearance requirement of 17.5 feet by 4.3 feet under temporary emergency conditions during a 10-yr storm event."
13. Paragraph #6, Bullet 7- **Change** "...clearance of the closest 34.5kV line would be 2.4 feet vertically and 0 feet horizontally from the neutral wire ... will exceed the vertical requirement by 1.1 feet under worst case conditions." **to** "...clearance of the closest 34.5kV line would be 4.4 feet vertically and 0 feet horizontally from the neutral wire ... will exceed the vertical requirement by 3.1 feet under worst case conditions."

Changes to Appendix C

1. Paragraph #1- Revised Drawing number F10740905 (Exhibit 7) has been supplied.
2. Paragraph #1- **Change** "PSNH" **to** "Eversource Energy"
3. Paragraph #3- **Change** "80 feet" **to** "70 feet"
4. Paragraph #3- **Change** "6 to 12 feet" **to** "7.5 to 15 feet"
5. Paragraph #3- **Clarification**- Davit arms on steel structure are approximately 10 feet long.

REVISED
APPENDIX A

F107 & 380 Lines
OYSTER RIVER
DURHAM, NH

1. The design and proposed construction of this crossing is shown on the attached Eversource Energy Transmission Business Drawing entitled "DOUBLE CKT F107 & 380 BETWEEN STR. 28 & 29 OYSTER RIVER, DURHAM, NEW HAMPSHIRE" (Drawing No. F10740901) marked as Exhibit 1.
2. The location of the double circuit F107 and 380 crossing is shown on the attached Location Plan marked as Exhibit 2.
3. Line F107 and 380 will cross the Oyster River on a 1-pole, direct embed, 110 foot pole (16.5 feet embedded), steel tangent suspension structure (northern side) and on a 1-pole, 100 foot, steel deadend strain structure on concrete foundation (southern side). Details of these structures are shown on Exhibit 1. As shown on Exhibit 1, for Structure 28 the 115kV phase wires have an approximate separation at the structure of 6-13 feet vertically and 0-13 feet horizontally in a delta configuration. The static wire is carried on the structure by a support bracket approximately nine inches down from the top of the structure. The 34.5kV phase wires are arranged horizontally approximately 15 feet below the lowest 115kV conductor and have an approximate separation at the structure of 0-5 feet vertically and 3-6 feet horizontally. The neutral wire is carried on the structure by a support bracket approximately 12 feet down below the 34.5kV phase wires. As shown on Exhibit 1, for Structure 29 the 115kV phase wires have an approximate separation at the structure of 7 -15 feet vertically and 3-20 feet horizontally in a delta configuration. The static wire is carried on the structure by a support bracket approximately six inches down from the top of the structure. The 34.5kV phase wires are arranged horizontally approximately 16 feet below the lowest 115kV conductor and have an approximate separation at the structure of zero feet vertically and five feet horizontally. The neutral wire is carried on the structure by a support bracket approximately seven feet down below the 34.5kV phase wires. All NESC clearances at the structure, as described in paragraph 11 of the petition, have been met by exceeding the horizontal and/or vertical clearances required. Land along the shoreline between the structures of this crossing and the river is not traversable by vehicles. However, minimum distances to ground per the NESC have been met. A clearance of 24 feet between the neutral and the closest ground point has been provided. This exceeds the NESC required clearance of 15.5 feet by 8.5 feet. As all other phase wires are above this elevation they will always exceed the NESC required clearance.
4. Flood water elevations for the Oyster River were based on information contained in flood insurance rate maps provided by FEMA. Flood elevations are based on FEMA FIRM Map 33017C0314D Panel 314 or 405 dated May 17, 2005 and FEMA FIS Study 33015CV001A Dated May 17, 2005. The 10-year flood elevation for this portion

of the river is approximately 33.3 feet. The area of the crossing, as required by the NESC (Section 232), is approximately 38.1 acres (314ft x5280ft/43560sf/acre). As stated in paragraph 10 of the petition, the minimum required 115 kV conductor clearance for water surface areas between 20-200 acres is 30.1 feet for 115 kV and 28.5 feet for 34.5 kV.

5. The sags and clearances to the water surface during a 10-year flood event for this crossing are as follows;

- PSNH has investigated a multitude of weather and loading conditions for its design. PSNH used these design conditions and combinations thereof to determine the minimum clearance of all conductors to the water and land surfaces, between the phase conductors and OPGW cable and neutral conductors. PSNH has determined that the weather cases and combinations listed below results in the minimum clearance and control over all other weather conditions and combinations.
- Shield wires – Due to the fact that the OPGW wire is located above the phase wires, its clearance to the water surface will always exceed the minimum required NESC distance.
- F107 (115 kV): 285 degrees F – Max operating temperature (Phase wires) based on PSNH transmission standards - The maximum conductor sag for this weather case will be 22 feet with a clearance to the water surface of 58.4 feet. This condition produces the greatest sag in the phase wires and therefore the minimum clearance to the water surface. This design will exceed the minimum clearance requirement of 30.1 feet by 28.3 feet under temporary emergency conditions during a 10-yr storm event.
- F107 (115 kV): Minimum phase to shield wire(s) clearance – The weather case that would produce the minimum clearance between the phase wires and the shield wires would be a combination of winter weather factors. First, the phase wires would have to be at 30 deg. F just after an ice storm and would have just dropped their ice. The shield wires would be at 32 deg. F and would still be iced with 1/2” of radial ice. Under these conditions the clearance would be 12.5 feet vertically and 6 feet horizontally from the shield wires to the closest phase wire. As described in Paragraph 11 of the petition, 64.7 inches (5.4 feet) of horizontal and/or 32.3 inches (2.7 feet) of vertical clearance is required between 115kV and 0kV conductors. The line would exceed both clearance requirements.
- F107 and 380 (115kV and 34.5kV): Minimum 115kV phase conductor to 34.5kV phase conductor clearance – The weather case that would produce the minimum clearance between the 115kV phase wires and the 34.5 kV phase wires would occur when the 34.5kV

conductor is at 30 deg. F with no ice and the 115kV phase wires are at their maximum operating temperatures of 285 degrees F. Under these conditions the clearance would be 8.7 feet vertically and 1 foot horizontally from the shield wires to the closest phase wire. As described in Paragraph 11 of the petition, 70.7 inches (5.9 feet) of horizontal and/or 40.7 inches (3.4 feet) of vertical clearance is required between 115kV and 34.5kV conductors. The line design will meet these requirements as the conductors will exceed the vertical requirement by 5.8 feet under worst case conditions.

- 380 (34.5 kV): 212 degrees F – Max operating temperature (Phase wires) based on PSNH distribution standards - The maximum conductor sag for this weather case will be 24 feet with a clearance to the water surface of 37.2 feet. This condition produces the greatest sag in the phase wires and therefore the minimum clearance to the water surface. This design will exceed the minimum clearance requirement of 28.5 feet by 8.7 feet under temporary emergency conditions during a 10-yr storm event.
- 380 (Neutral): 120 degrees F – Max operating temperature (Phase wires) based on PSNH distribution standards - The maximum conductor sag for this weather case will be 21 feet with a clearance to the water surface of 31.1 feet. This condition produces the greatest sag in the phase wires and therefore the minimum clearance to the water surface. This design will exceed the minimum clearance requirement of 25.5 feet by 5.6 feet under temporary emergency conditions during a 10-yr storm event.
- 380 (Neutral): Minimum phase to neutral clearance – Due to the fact that the 115kV phase conductors are located above the 34.5kV phase wires, its clearance to the neutral conductor will always exceed the minimum required NESC distance. The weather case that would produce the minimum clearance between the 34.5kV phase wires and the neutral wire would be a condition where the neutral conductor is at 80 deg. F and the 34.5kV conductors are at their maximum operating temperatures of 212 degrees F. Under these conditions the clearance of the closest 34.5kV line would be 2.5 feet vertically and 0 feet horizontally from the neutral wire to the closest phase wire. As described in Paragraph 11 of the petition, 59.8 inches (4.15 feet) of horizontal and/or 15.7 inches (1.3 feet) of vertical clearance is required between 34.5kV and 0kV conductors. The line design will meet these requirements as the conductors will exceed the vertical requirement by 1.2 feet under worst case conditions.

REVISED
APPENDIX B

F107 & 3850 Lines
PICKERING BROOK
NEWINGTON, NH

1. The design and proposed construction of these crossings is shown on the attached Eversource Energy Transmission Business Drawings entitled "SINGLE CKT F107 BETWEEN STR. 119 & 120 PICKERING BROOK, NEWINGTON, NEW HAMPSHIRE" (Drawing No. F10740903) marked as Exhibit 3 and "SINGLE CKT 3850 BETWEEN STR. 5 & 6 PICKERING BROOK, NEWINGTON, NEW HAMPSHIRE" (Drawing No. 385040901) marked as Exhibit 5.

2. The location of the single circuit F107 crossing is shown on the attached Location Plan marked as Exhibit 4. The location of the single circuit 3850 crossing is shown on the attached Location Plan marked as Exhibit 6.

3. Line F107 will cross the Pickering Brook on a 1-pole, direct embed, 100 foot pole (16 feet embedded), steel tangent suspension structure (eastern side) and on a 1-pole, 75 foot, steel deadend strain structure on concrete foundation (western side). Details of these structures are shown on Exhibit 3. As shown on Exhibit 3, for Structure 120 the 115kV phase wires have an approximate separation at the structure of 6-12.5 feet vertically and 0-13 feet horizontally (6.5 foot post insulators) in a delta configuration. The static wire is carried on the structure by a support bracket approximately nine inches down from the top of the structure. As shown on Exhibit 3, for Structure 119 the 115kV phase wires have an approximate separation at the structure of 7 -15 feet vertically and 2.5-20 feet horizontally in a delta configuration. The static wire is carried on the structure by a support bracket approximately six inches down from the top of the structure. Land along the shoreline between the structures of this crossing and the river is not traversable by vehicles. However, minimum distances to ground per the NESC have been met. A clearance of 27.2 feet between the phase wire and the closest ground point has been provided. This exceeds the NESC required clearance of 20.1 feet by 7.1 feet. As all other phase wires are above this elevation they will always exceed the NESC required clearance.

4. Line 3850 will cross the Pickering Brook on a 1-pole, direct embed, 65 foot pole (8.5 feet embedded), wood deadend structure (western side) and on a 1-pole, direct embed 60 foot (eight feet embedded), wood tangent structure (eastern side). As shown on Exhibit 5, for Structure 5 the 34.5kV phase wires have an approximate separation at the structure of five feet vertically and 0 feet horizontally in a vertical configuration. The neutral wire is carried on the structure by a support bracket approximately seven feet down below the 34.5kV phase wires. As shown on Exhibit 5, for Structure 6 the 34.5kV phase wires have an approximate separation at the structure of four feet eight inches horizontally in a horizontal configuration. The neutral wire is carried on the structure by a support bracket approximately five feet down below the 34.5kV phase wires. All NESC clearances at the structure as described in paragraph 11 of the petition have been met by exceeding the horizontal and/or vertical clearances required. Land along the shoreline between the structures of this crossing and the river is not traversable by

vehicles. However, minimum distances to ground per the NESC have been met. A clearance of 19.2 feet between the neutral and the closest ground point has been provided. This exceeds the NESC required clearance of 15.5 feet by 3.7 feet. As all other phase wires are above this elevation they will always exceed the NESC required clearance.

5. Flood water elevations for the Pickering Brook were based on information contained in flood insurance rate maps provided by FEMA. There was no flood elevation provided on the FEMA Maps as this portion of Pickering Brook is in the Zone X section of Map 33015C0255E, dated May 17, 2005. Zone X locations indicate that under a 100 year flood event the flood depth would be less than 1 foot. For conservative design it was assumed that the water level would not exceed the top of bank during a 10 year flood. The 10-year flood elevation for this portion of the river was designed at approximately 27.7 feet. This far exceeds the 1 foot depth prescribed on the FEMA flood map. The area of the crossing, as required by the NESC (Section 232), is approximately 9.9 acres (82 feet x 5280 feet/43560sf/acre). As stated in paragraph 10 of the petition, the minimum required 115 kV conductor clearance for water surface areas between under 20 acres is 22.1 feet for 115 kV and 20.5 feet for 34.5 kV.

6. The sags and clearances to the water surface during a 10-year flood event for this crossing are as follows;

- PSNH has investigated a multitude of weather and loading conditions for its design. PSNH used these design conditions and combinations thereof to determine the minimum clearance of all conductors to the water and land surfaces, between the phase conductors and OPGW cable and neutral conductors. PSNH has determined that the weather cases and combinations listed below results in the minimum clearance and control over all other weather conditions and combinations.
- Shield wires – Due to the fact that the OPGW wire is located above the phase wires, its clearance to the water surface will always exceed the minimum required NESC distance.
- F107 (115 kV): 285 degrees F – Max operating temperature (Phase wires) based on PSNH transmission standards - The maximum conductor sag for this weather case will be 18.4 feet with a clearance to the water surface of 34.6 feet. This condition produces the greatest sag in the phase wires and therefore the minimum clearance to the water surface. This design will exceed the minimum clearance requirement of 22.1 feet by 12.5 feet under temporary emergency conditions during a 10-yr storm event.
- F107 (115 kV): Minimum phase to shield wire(s) clearance – The weather case that would produce the minimum clearance between the phase wires and the shield wires would be a combination of winter weather factors. First, the phase wires would have to be at 30 deg. F just after an ice storm and would have just dropped their ice. The shield wires would be at 32 deg. F and would still be iced with 1/2” of radial ice. Under these conditions the

clearance would be 12.5 feet vertically and 6 feet horizontally from the shield wires to the closest phase wire. As described in Paragraph 11 of the petition 64.7 inches (5.4 feet) of horizontal and/or 32.3 inches (2.7 feet) of vertical clearance is required between 115kV and 0kV conductors. The line would exceed both clearance requirements.

- 380 (34.5 kV): 212 degrees F – Max operating temperature (Phase wires) based on PSNH distribution standards - The maximum conductor sag for this weather case will be 22.1 feet with a clearance to the water surface of 29.2 feet. This condition produces the greatest sag in the phase wires and therefore the minimum clearance to the water surface. This design will exceed the minimum clearance requirement of 20.5 feet by 8.7 feet under temporary emergency conditions during a 10-yr storm event.
- 380 (Neutral): 120 degrees F – Max operating temperature (Phase wires) based on PSNH distribution standards - The maximum conductor sag for this weather case will be 19 feet with a clearance to the water surface of 21.8 feet. This condition produces the greatest sag in the phase wires and therefore the minimum clearance to the water surface. This design will exceed the minimum clearance requirement of 17.5 feet by 4.3 feet under temporary emergency conditions during a 10-yr storm event.
- 380 (Neutral): Minimum phase to neutral clearance – The weather case that would produce the minimum clearance between the 34.5kV phase wires and the neutral wire would be a condition where the neutral conductor is at 80 deg. F and the 34.5kV conductors are at their maximum operating temperatures of 212 degrees F. Under these conditions the clearance of the closest 34.5kV line would be 4.4 feet vertically and 0 feet horizontally from the neutral wire to the closest phase wire. As described in Paragraph 11 of the petition, 49.8 inches (4.15 feet) of horizontal and/or 15.7 inches (1.3 feet) of vertical clearance is required between 34.5kV and 0kV conductors. The line design will meet these requirements as the conductors will exceed the vertical requirement by 3.1 feet under worst case conditions.

REVISED
APPENDIX C

F107 Line
Little Bay
Durham, NH and Newington, NH

1. The design and proposed construction of this crossing is shown on the attached Eversource Energy Transmission Business Drawing entitled "F107 LINE CROSSING, LITTLE BAY DURHAM AND NEWINGTON, NEW HAMPSHIRE" (Drawing No. F10740905) marked as Exhibit 7.
2. The location of the F107 crossing of Little Bay is also shown on Exhibit 7.
3. Line F107 will cross Little Bay using three underground submarine cables. The three cables will be buried using a water jet plow, driver hand jetting or mechanical trenching. The submarine cable will begin at F107 Structure 101 on the West shore of Little Bay. This structure will be a single pole, 70 foot, steel deadend strain structure on concrete foundation. The cable will then run underwater to an underground manhole on the East shore of Little Bay. Details of Structure 101 are provided with the petition on Exhibit 7. As shown on Exhibit 7, for Structure 101 the overhead 115kV phase wires have an approximate separation at the structure of 7.5 to 15 feet vertically and 0 to 20 feet horizontally with 10 feet long davit arms in a delta configuration. The static wire is carried on the structure by a support bracket approximately 9 inches down from the top of the structure on the left and right poles. The submarine cable will run down the pole at Structure 101 and be buried to a depth of 42 inches heading east for approximately 367 feet by open trenching or diver burial, one phase per pole, from the overhead conductor elevation. The cables will then proceed 1835 feet at 42 inch burial using a water jet plow. At that point the depth will be increased to 8 feet depth in the main channel for approximately 2431 feet. Continuing the Eastern path, the depth will decrease to 42 inches for the last 770 feet where the cable will come on shore and enter an underground splice vault. From that point the submarine cable will be spliced to a land based underground cable to connect to the above ground portion of the line at Structure 102. Details of the splice vault have been included on Exhibit 7. As shown on Exhibit 7 the cables will be installed 42 inches below finished grade and will be spaced a minimum of 18 inches apart vertically attached to the side of the manhole. All NESC clearances at the structure, as described in paragraph 11 of the petition, have been met by exceeding the horizontal and/or vertical clearances required. This crossing will be entirely underground or underwater so all overhead clearances described will not be applicable to this crossing.
4. The underwater crossing will consist of three 115kV rated, 1400 mm² XLPE submarine cables. The cable will have a copper wire core surrounded by extruded XLPE insulation. A layer of copper armoring will be installed on the outside of the cable to provide mechanical protection. The overall cable diameter will be approximately 140.2 mm. The cables will be installed with a separation of approximately 30 feet in the main channel of Little Bay. As they approach land they will converge to within 5 feet

separation. Two ADSS fiber optic cables will be strapped to two separate cable (one ADSS cable per conductor cable) to continue the fiber optic path for the F107 line. These cables will follow the same route as the 115kV conductors. There are four existing cables in the corridor that have been abandoned. Some of these cables may be raised to the surface, cut, capped and reset on the bottom to move them out of the way of the new cable installation.

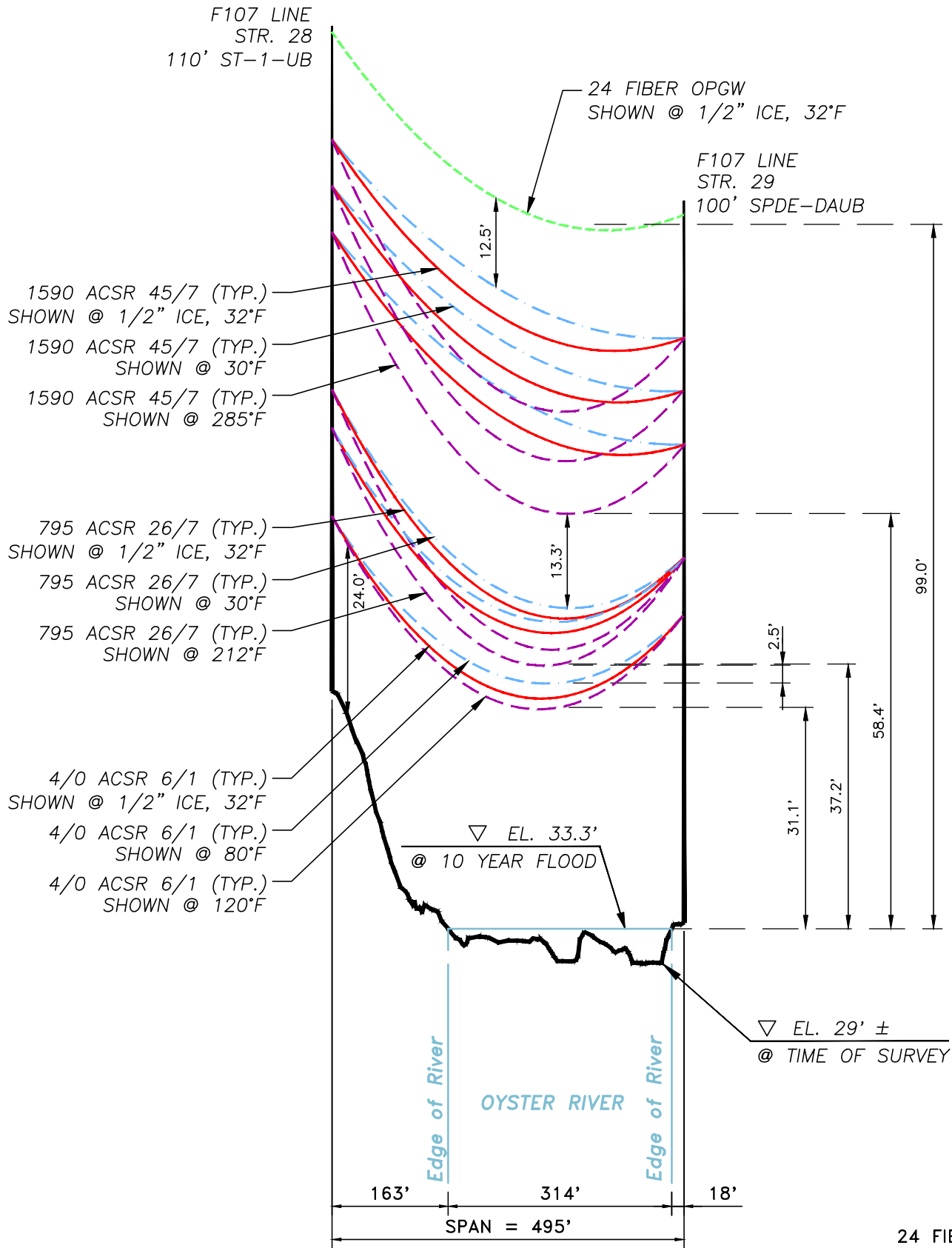
5. The submarine cable will be buried between 42 inches and 96 inches depending on the location within the Little Bay. This will meet or exceed the NESC clearance of 42 inches based on Table 352-1 of the NESC for underground direct bury cable over 50kV. Section 351.C.5 of the NESC also states that "Submarine crossings should be routed, installed, or both, so they will be protected from erosion by tidal action or currents. They should not be located where ships normally anchor." All three cables will be located in an existing cable crossing location as shown on the NOAA Navigational Chart for Little Bay and Great Bay attached to this petition as Exhibit 8. Per the NOAA Nautical Chart User's Manual dated 1997 this designation includes restrictions on anchoring in the cable area. This satisfies the requirement of the NESC. The cables will also be buried to protect them from tidal action as well as any inadvertent boat anchors.

6. The underground vault will comply with all requirements of the NESC. As described in NESC Section 323.A the underground vault will be designed for an HS-20 vehicle loading. Per NESC Section 323.B the underground vault will have a vertical dimension not less than 6 feet and a minimum of 3 feet of working space and shall be accessible by two manholes with a minimum diameter of 26 inches.

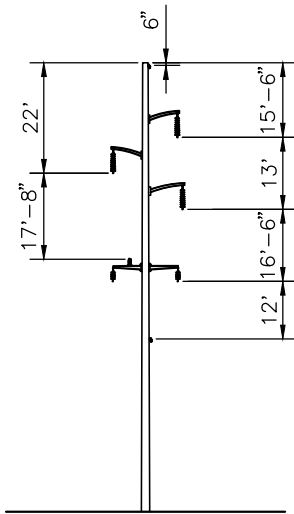
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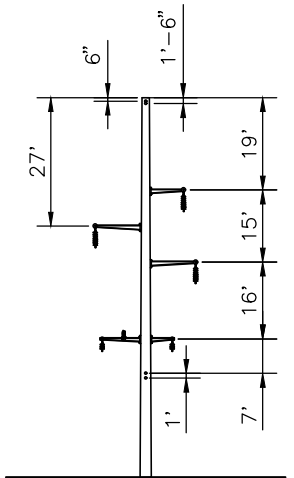
THIS PLAN FOR REFERENCE ONLY.
NO REPRESENTATION OR WARRANTY IS
MADE AS TO LOCATION OF
BOUNDARIES OR OTHER POINTS OF
REFERENCE. RIGHT OF WAY LOCATION
HAS BEEN SURVEYED AND PROVIDED
BY DOUCET SURVEY INC.



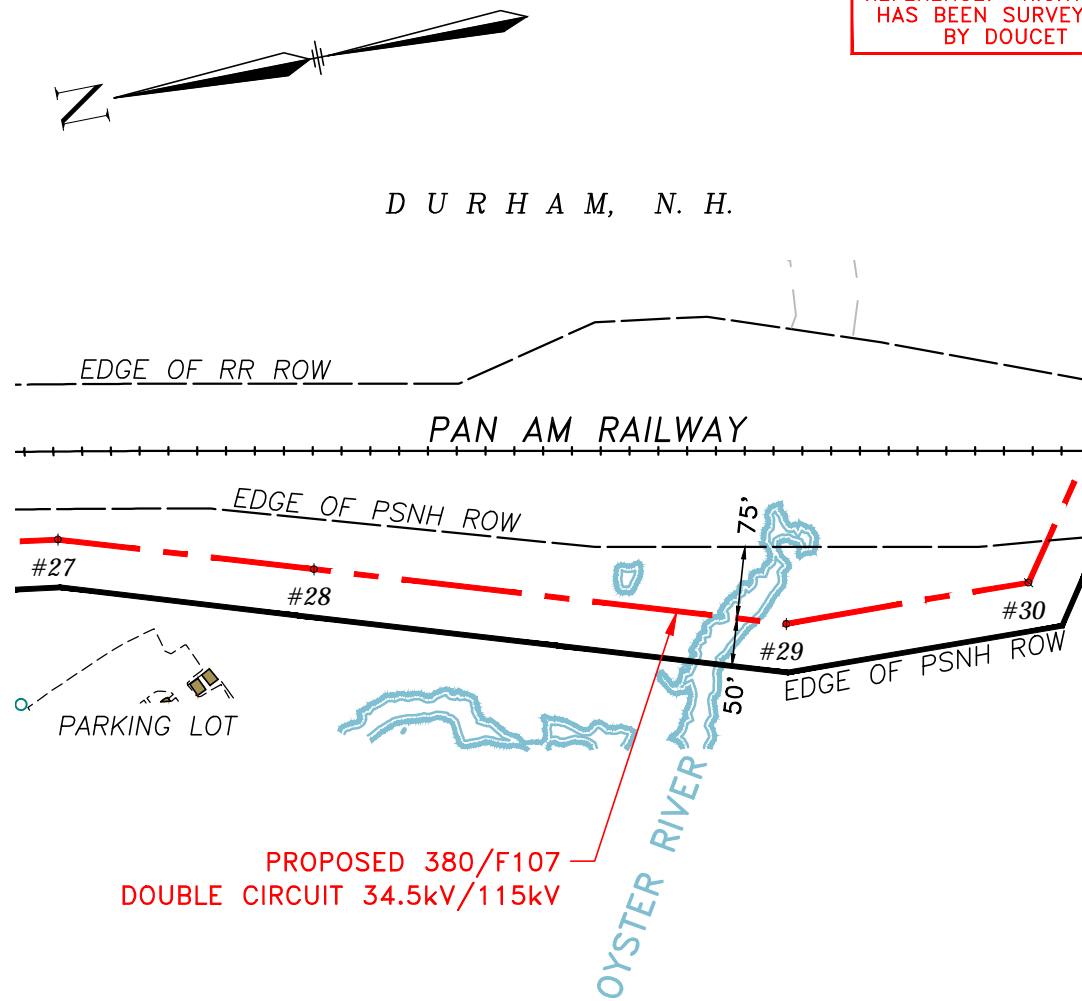
PROFILE
SCALE: 1"=200' HORIZ.
20' VERT.



STRUCTURE 28
SINGLE POLE
TYPE ST-1-UB



STRUCTURE 29
SINGLE POLE
TYPE SPDE-DAUB



GRAPHIC SCALE
1" = 200'

EXHIBIT 1

24 FIBER OPGW INSTALLED @ 4,500 LBS. NESC HVY. INITIAL
1590 ACSR 45/7 INSTALLED @ 11,400 LBS. NESC HVY. INITIAL
795 ACSR 26/7 INSTALLED @ 4,500 LBS. NESC HVY. INITIAL
4/0 ACSR 6/1 INSTALLED @ 2,500 LBS. NESC HVY. INITIAL

4	UPDATED SAGS	8/16	SCF	APJ	-
3	UPDATED F107 STRUCTURE NUMBERS	11/15	SCF	APJ	-
NO.	REVISION	DATE	DRWN	CHKD	APPR

EVERSOURCE
ENERGY

TRANSMISSION
BUSINESS

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DOUBLE CKT F107 & 380
BETWEEN STR. 28 & 29
OYSTER RIVER, DURHAM, NEW HAMPSHIRE

DRAWN
SCF

ENGINEER
KMS

CHECKED
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APPROVED
-

SCALE
AS NOTED

DATE
12/8/14

SHEET
1 OF 1

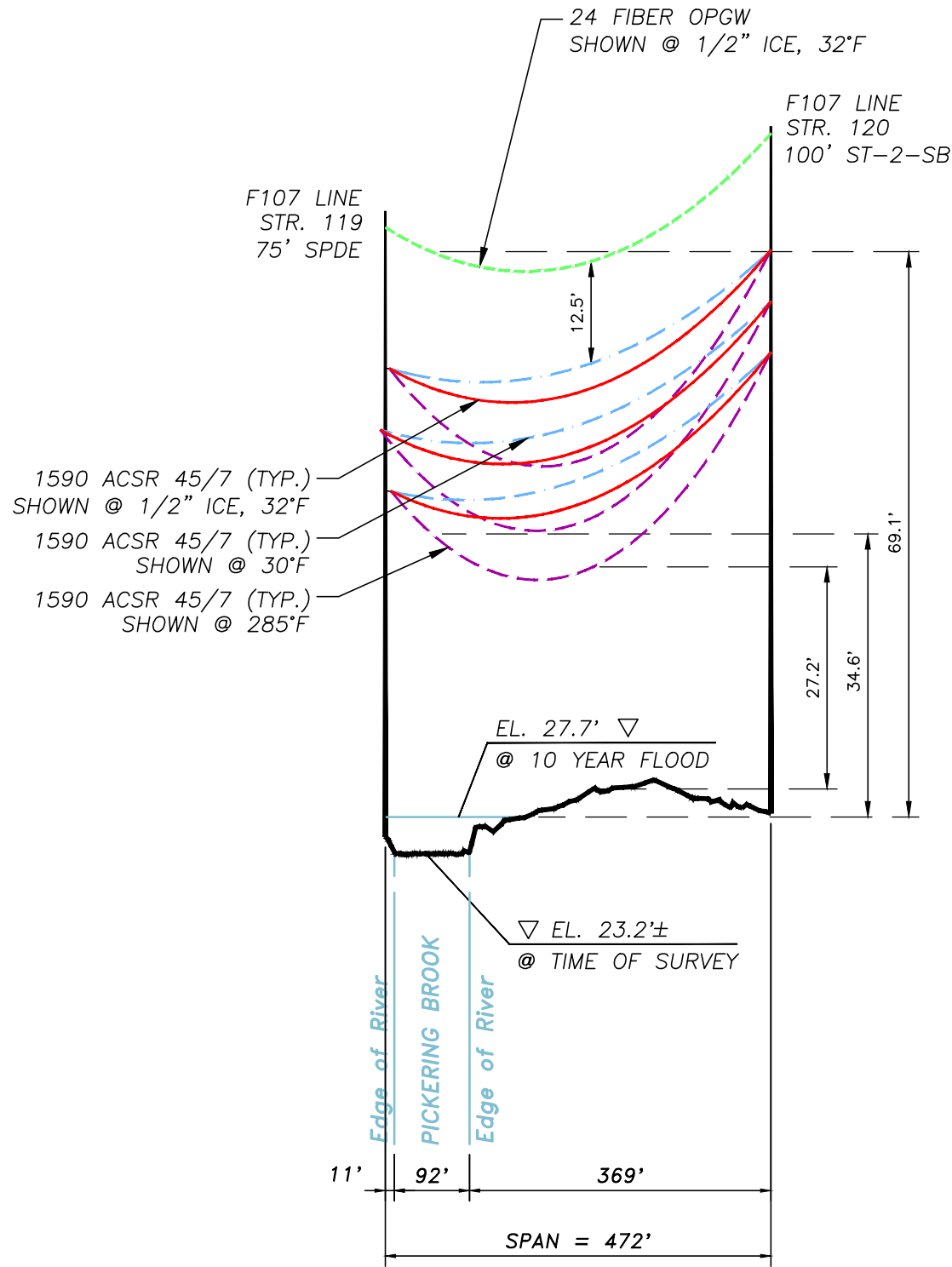
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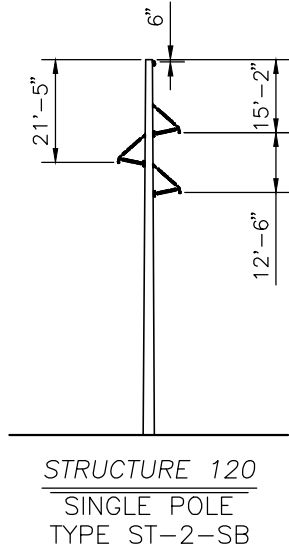
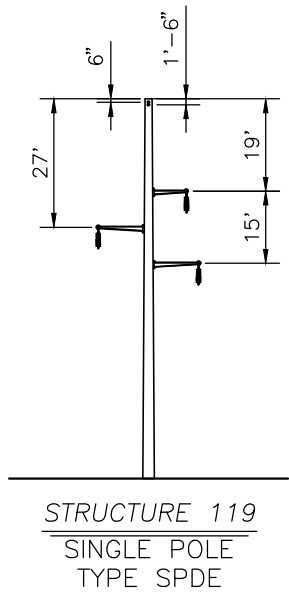
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BY DOUCET SURVEY INC.

NEWINGTON, N. H.



PROFILE
SCALE: 1"=200' HORIZ.
20' VERT.



24 FIBER OPGW INSTALLED @ 4,500 LBS. NESC HVY. INITIAL
1590 ACSR 45/7 INSTALLED @ 11,400 LBS. NESC HVY. INITIAL

5	UPDATED SAGS	8/16	SCF	APJ	-
4	UPDATED F107 STRUCTURE NUMBERS	12/15	SCF	APJ	-
NO.	REVISION	DATE	DRWN	CHKD	APPR

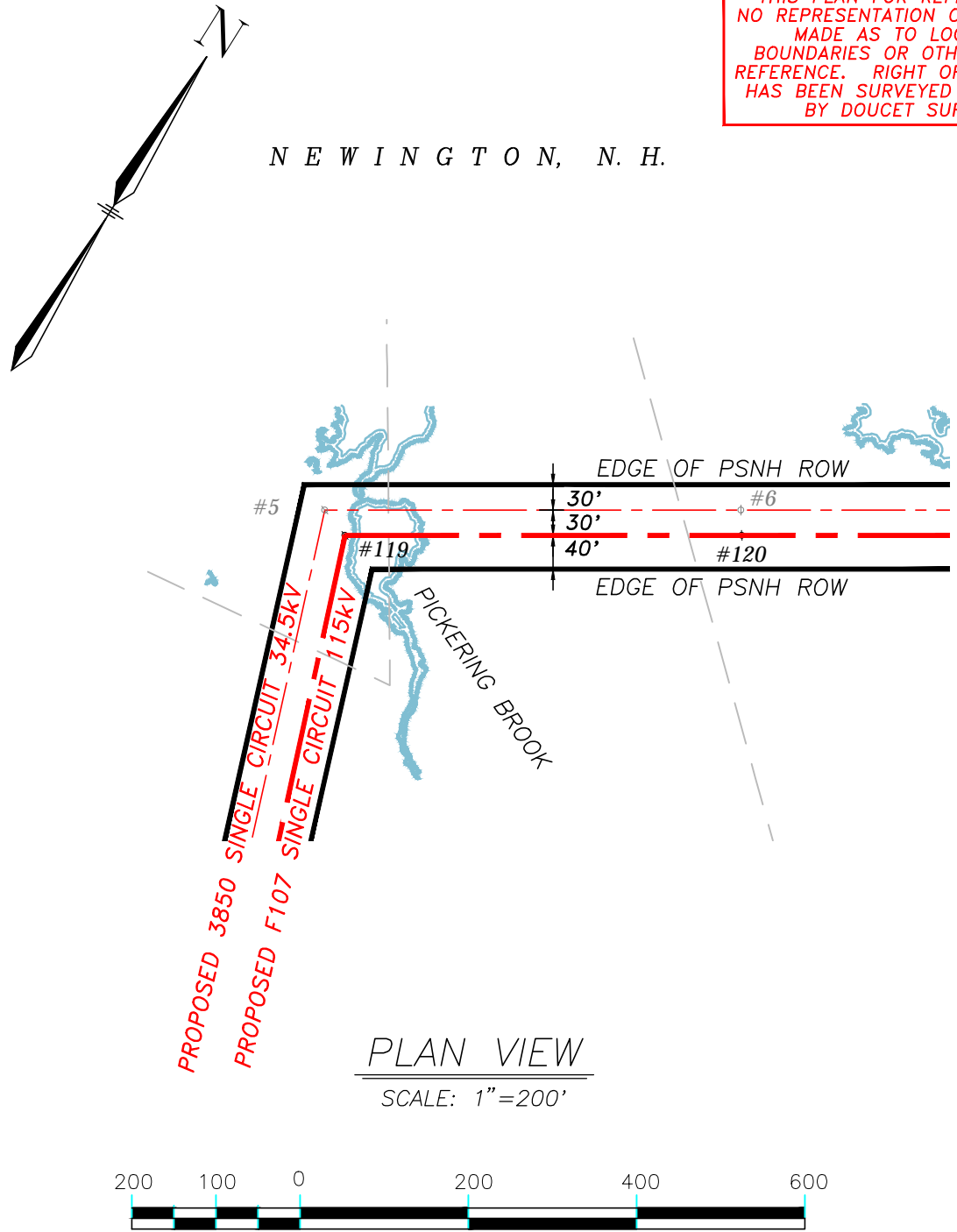


EXHIBIT 3

EVERSOURCE
ENERGY

TRANSMISSION
BUSINESS

5
T

SINGLE CKT F107
BETWEEN STR. 119 & 120
PICKERING BROOK, NEWINGTON, NEW HAMPSHIRE

DRAWN
SCF

ENGINEER
KMS

CHECKED
APJ

APPROVED
-

SCALE
AS NOTED

DATE
3/17/15

SHEET
1 OF 1

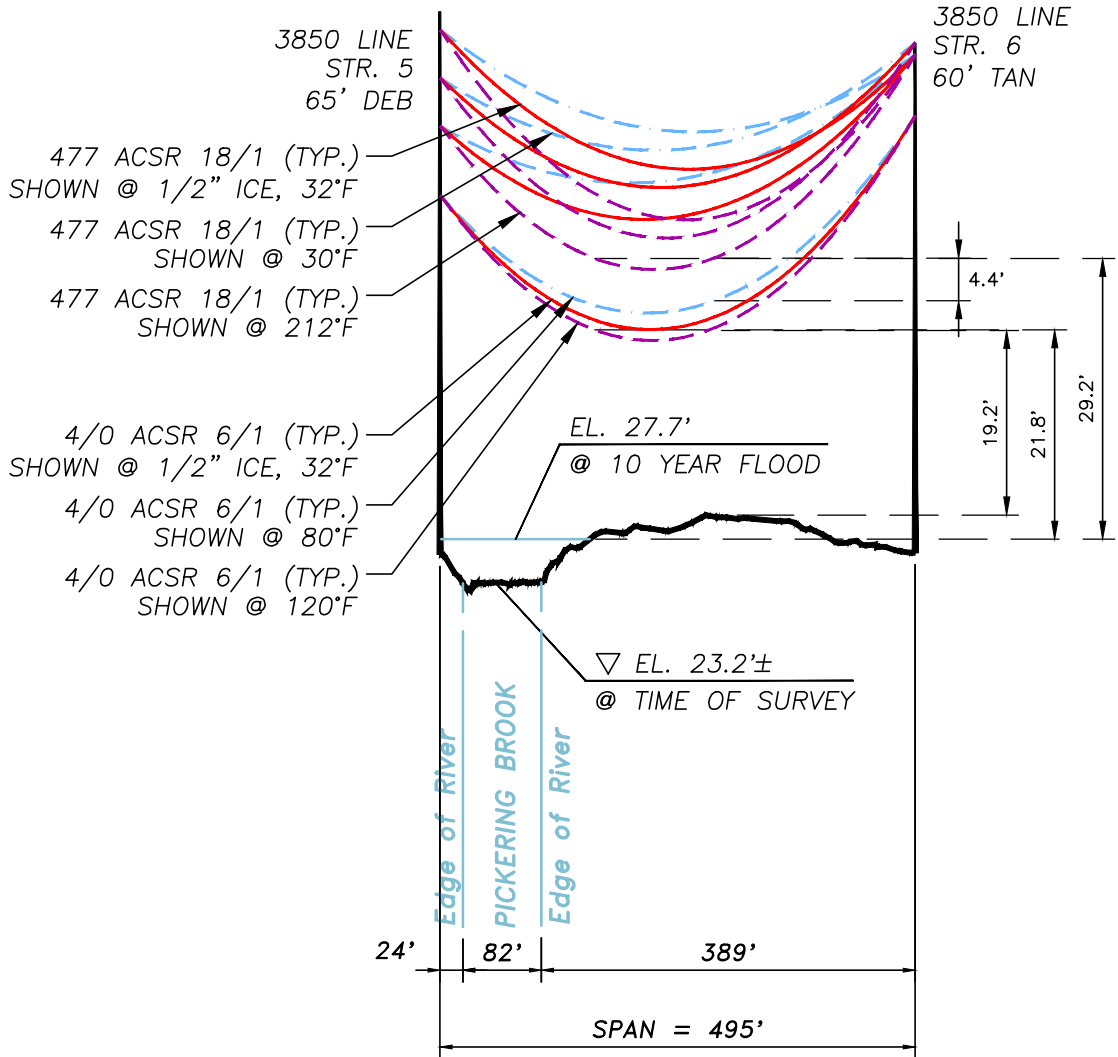
DRAWING NO.
F10740903

08/2012

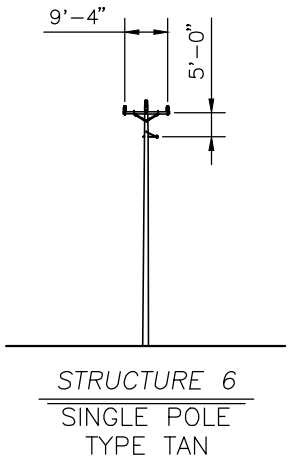
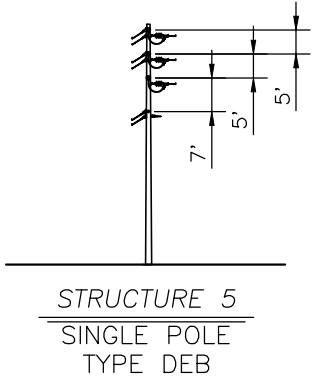
1/6/2017 11:40 AM - SFISHER - 385040901.DWG - 385040901

THIS PLAN FOR REFERENCE ONLY.
NO REPRESENTATION OR WARRANTY IS
MADE AS TO LOCATION OF
BOUNDARIES OR OTHER POINTS OF
REFERENCE. RIGHT OF WAY LOCATION
HAS BEEN SURVEYED AND PROVIDED
BY DOUCET SURVEY INC.

NEWINGTON, N. H.



PROFILE
SCALE: 1"=200' HORIZ.
20' VERT.



477 ACSR 18/1 INSTALLED @ 4,500 LBS. NESC HVY. INITIAL
4/0 ACSR 6/1 INSTALLED @ 2,500 LBS. NESC HVY. INITIAL

5	ISSUED FOR SEC AMENDMENT	1/17	SCF	APJ	-
4	REVISED 30 PERCENT DESIGN	9/16	SCF	APJ	-
NO.	REVISION	DATE	DRWN	CHKD	APPR

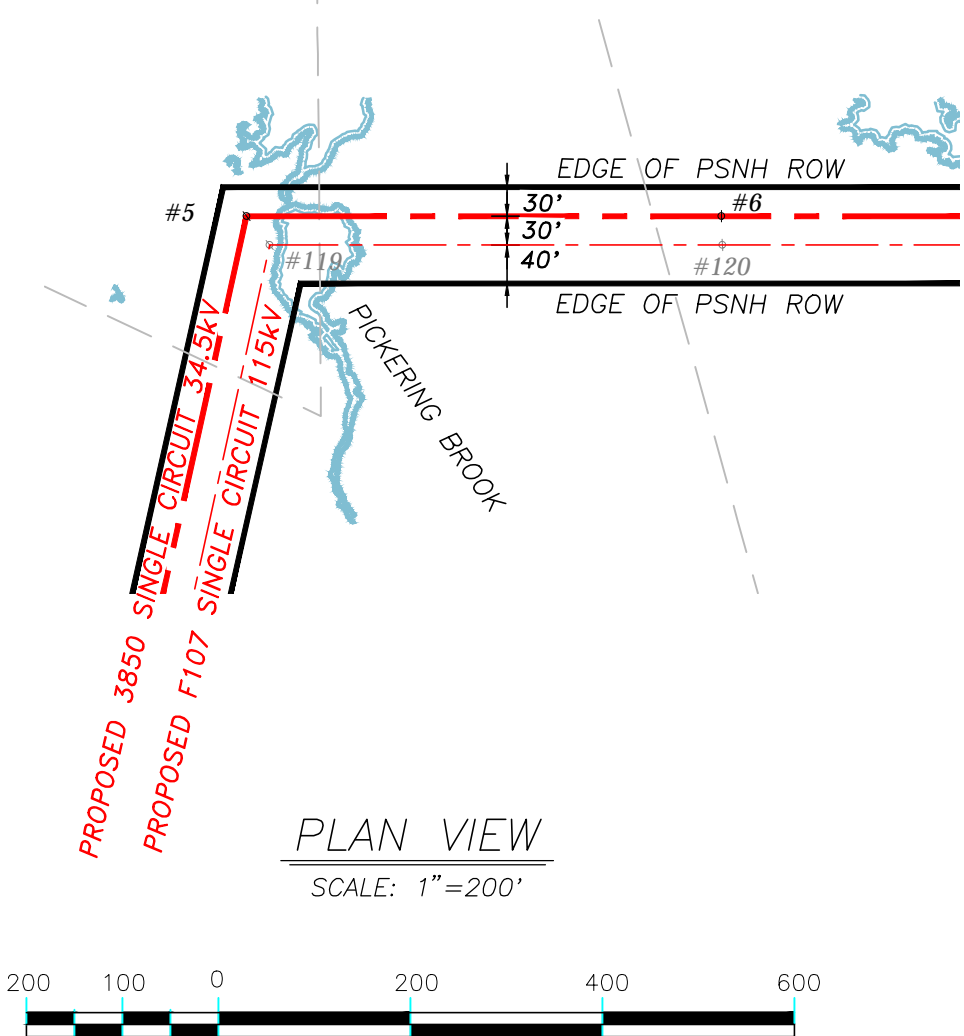


EXHIBIT 5

EVERSOURCE
ENERGY

TRANSMISSION
BUSINESS

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T

SINGLE CKT 3850
BETWEEN STR. 5 & 6
PICKERING BROOK, NEWINGTON, NEW HAMPSHIRE

DRAWN SCF
ENGINEER KMS
CHECKED APJ
APPROVED -

SCALE AS NOTED	DATE 8/4/15	SHEET 1 OF 1	DRAWING NO. 385040901
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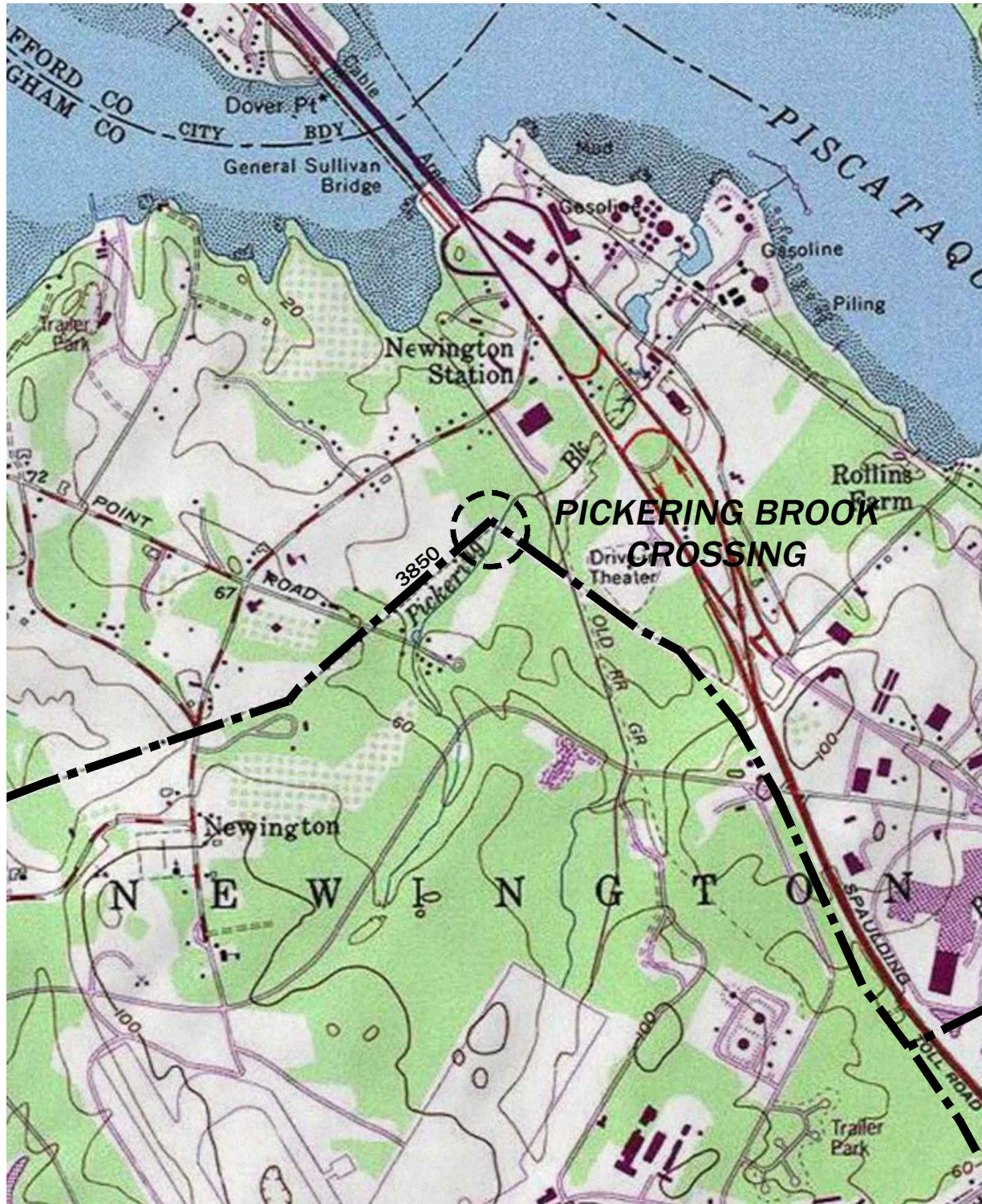
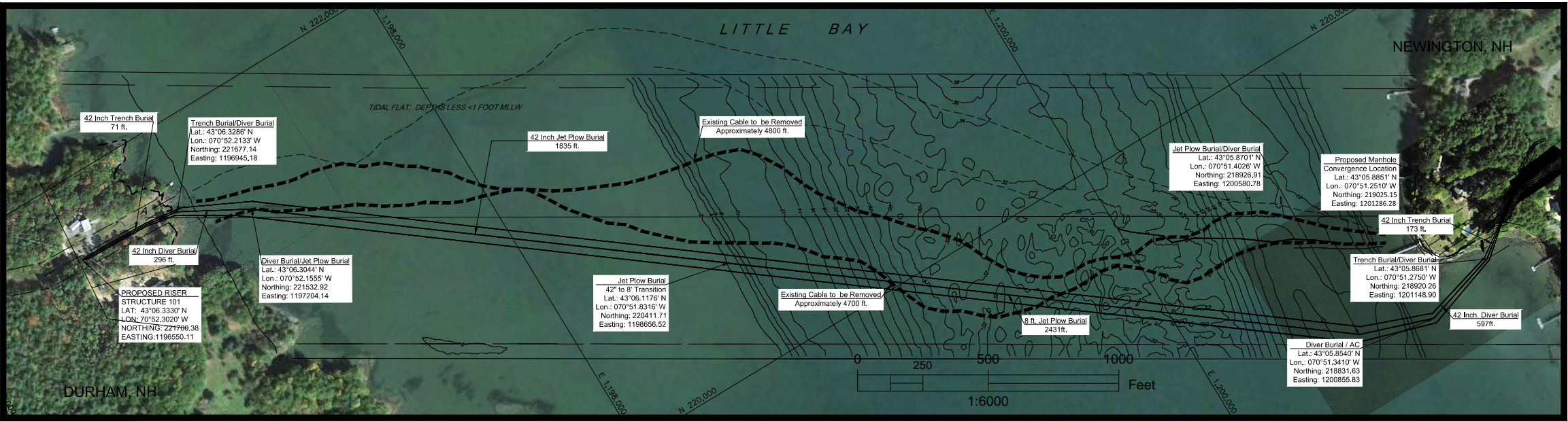


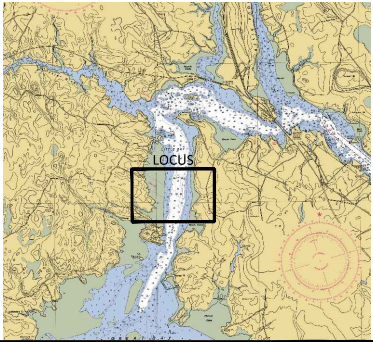
EXHIBIT 6

				DRAWN		System	
				SCF		Projects	
				DESIGNED		LOCATION PLAN SINGLE CIRCUIT 3850 LINE CROSSING PICKERING BROOK NEWINGTON, NEW HAMPSHIRE	
				KMS			
				CHECKED			
				APJ			
				APPROVED		SCALE	
						DATE	
						SHEET	
						DRAWING NO.	
ISSUED FOR PERMITTING				8/7/15		385040902	
REVISION				DATE		1"=1500'	
NO.				DRWN		CHK	
				APPR			

PLAN VIEW



THIS PLAN FOR REFERENCE ONLY.
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BOUNDARIES OR OTHER POINTS OF
REFERENCE. RIGHT OF WAY LOCATION
HAS BEEN SURVEYED AND PROVIDED
BY DOUCET SURVEY INC.



Coordinate System
State Plane, NAD 83
2800 - New Hampshire, U.S. Feet
Vertical Datum: MLLW

PROFILE VIEW

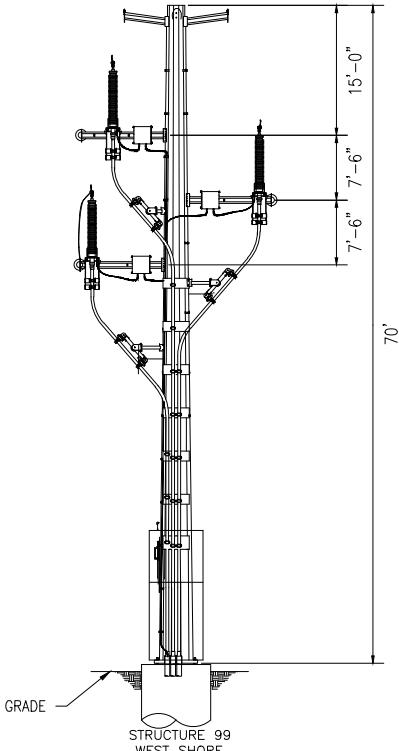
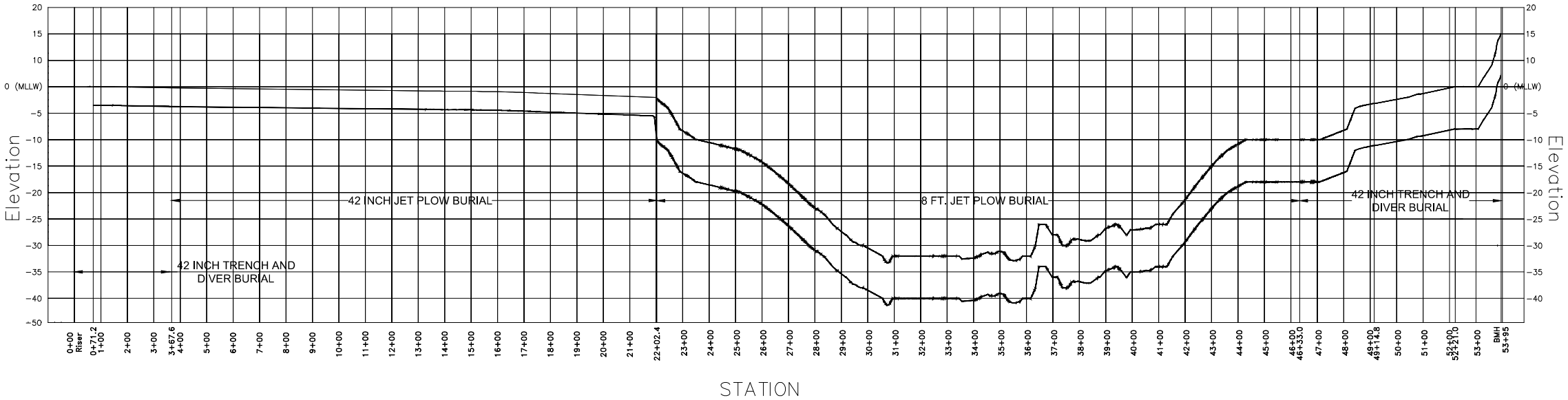
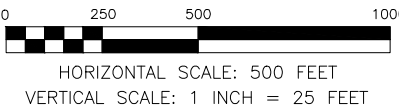
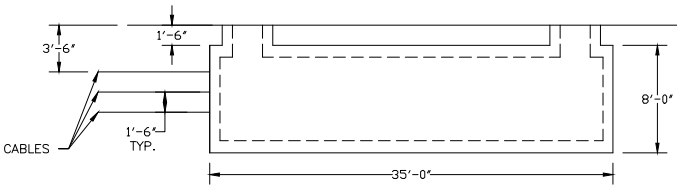
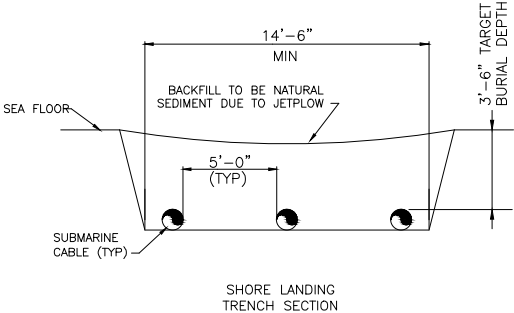
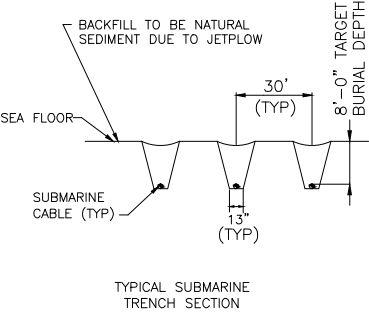


EXHIBIT 7



General Notes	
PROPOSED RE-ROUTE	
Magnetometer Hit	▲
Route Centerline:	---
Trench Burial:	---
Diver Burial:	---
8' Jet Plow Burial:	---
3' Jet Plow Burial:	---
OOS Cable:	---
OOS Cable To Be Removed:	---
Cable Area:	---
Easement Area:	---
Mean High Water	---



Caldwell
Marine International, LLC.

1433 Highway 34 South
Building B
Farmingdale, NJ 07727
732.557.6100

NO.	REVISION	DATE	DRWN	CHKD	APPR
9	Revised: Border, Riser Structure & Manhole Dimensions	1/17	-	-	-
8	Rev. 08/Issue 01	1/16	-	-	-

EVERSOURCE
ENERGY

TRANSMISSION
BUSINESS

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F107 LINE CROSSING
LITTLE BAY

DURHAM AND NEWINGTON, NEW HAMPSHIRE

DRAWN	ENGINEER	CHECKED	APPROVED	SCALE	DATE	SHEET	DRAWING NO.
-	-	-	-	AS NOTED	4/15/15	1 OF 1	F10740905

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