<u>**APPENDIX A**</u>

Y-170 & 386A
COCHECO RIVER
ROCHESTER, NH

1. The location of the Y170 and 386A crossings are shown on the attached location maps marked as Exhibits 1 and 2.

2. The design and proposed construction of this crossing is shown on the two attached PSNH Transmission Drawings entitled "Y-170 LINE (115 KV), BETWEEN STRUCTURES 11 AND 12, COCHECO RIVER WATER CROSSING, ROCHESTER", NEW HAMPSHIRE" (Drawing No. D-10237-600) marked as Exhibit 3 and "386A LINE (34.5Kv), BETWEEN STRUCTURES 13 AND 14, COCHECO RIVER WATER CROSSING, ROCHESTER", NEW HAMSHIRE" (Drawing No. D-7649-410) marked as Exhibit 4.

3. Line Y170 and 386A will cross the Cocheco River on a single pole, 110 foot, steel dead end structure (eastern side) and on a single pole, 110 foot, wood tangent suspension structure (western side). Details of these structures are provided with this Appendix as Figures 1 and 2. As shown on Figure 1, the phase wires between the Y170 line and 386A have an approximate separation at the structure of 12 feet vertically and 15 feet horizontally. The phase to phase clearance between the Y170 and 386A phases is 12 feet vertically and one foot, six inches horizontally. The static wire is carried on the structure by a support bracket approximately 9 inches down from the top of the structure. The neutral conductor is carried by a support bracket 52 feet from the top of the pole. This will result in a clearance of 7 feet horizontally and 10 feet, 6 inches vertically from the phase conductors. As shown on Figure 2, the phase wires between the 386A and Y170 lines have an approximate separation at the structure of 11 feet vertically and 14 feet horizontally. The phase to phase clearance between the Y170 and 386A phases is 11 feet vertically. The static wire is carried on the structure by a support bracket approximately 9 inches down from the top of the structure. The neutral conductor is carried by a support bracket 53 feet, six inches from the top of the pole. This will result in a clearance of 6 feet, 6 inches horizontally and 4 feet, 8 inches vertically from the phase conductors. Minimum distance to ground for truck traffic for 115kV is 20.1'and has been met as 49.6'of clearance is provided. A minimum ground clearance of 24' has been kept throughout the new line installment. Minimum distance to ground for truck traffic for 750V to 22kV phase-to-ground is 18.5'and has been met as 46.2'of clearance is provided. A minimum ground clearance of 22' has been kept throughout the new line installment. Minimum distance to ground for truck traffic for neutral conductors meeting NESC Rule 230 E1 is 15.5'and has been met as 46.2'of clearance is provided. A minimum ground clearance of 20' has been kept throughout the new line installment.

4. Flood water elevations for the Cocheco River were based on information contained in flood insurance rate map number 33017C0203D, Panel 203 of 405, Effective May 17, 2005 obtained from FEMA. The 100-year flood elevation for this portion of the

river is approximately 225 feet. No information was available for the 10-year flood elevation for this portion of the river. However, it should be noted that the 100-year elevation, which these lines were designed to safely exceed, would be well above the 10-year flood elevation. The area of the crossing, as required by the NESC (Section 232), is approximately 60.6 acres ((500' x 5,280')/43,560sf/ac= 60.6 ac. As stated in paragraph 9 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 100-year flood event for this crossing are as follows;

- PSNH investigated a multitude of weather and loading conditions for its design. The conditions investigated include NESC C2-2012 Heavy Load Conditions, minus 20 degrees F and 30 degrees F ambient temperature for the static wires, OPGW cable and phase conductors, 120 degrees F ambient temperature for the static wires and OPGW cable, 285 degrees F for the 386A phase conductors and 356 degrees F for the Y170 phase conductors. Loading conditions considered both ice and no ice conditions for ambient temperatures below 32 degrees F. PSNH used these design conditions and combinations thereof to determine the minimum clearance of all conductors to the water and land surfaces, and between the phase conductors, OPGW cable and neutral conductor. PSNH has determined that the weather cases and combinations listed below and shown in the profile of Exhibits 3 and 4 of this Appendix result in the minimum clearances 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.

- Y170 (115 kV): NESC Heavy Loading - The maximum conductor sag for this weather case will be 10.5 feet with a clearance to the water surface of 52.1 feet.

- Y170 (115 kV): 356 degrees F – Max operating temperature (Phase wires) based on PSNH transmission standards - The maximum conductor sag for this weather case will be 19.1 feet with a clearance to the water surface of 35.2 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 30.1 feet by 5.1 feet under temporary emergency conditions during a 100-yr storm event.

- Y170 (115 kV): Minimum phase to OPGW cable clearance – The weather case that would produce the minimum clearance between the phase wires and the OPGW cable in the shield wire position occurs at the attachment points on Structure 12, as shown on Figure 2. At this location the clearance would be 16.08’ vertically and 7.5’ horizontally from the static wire. The closest midspan clearance 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 also be at 30 deg. F and would still be iced with 1/2” of radial ice. Under these conditions the clearance would be 18.9 feet vertically and 7.5 feet horizontally from the shield wires to the closest phase wire. Based on Section 235.C.2.a.1 and Table 235-6 section 2.a of the NESC, the minimum clearance required is 57.4 inches (4.8 feet) [29” + (121 kV-50 kV)x 0.4”].

- Y170 (115kV): Minimum phase to neutral clearance – The weather case that would produce the minimum clearance between the phase wires and the neutral wire would be on Structure 12 of the Y170 Line. At this location as described previously the clearance from the Y170 line would be 6.5 feet horizontally from the neutral wire to the closest phase wire. Based on Section 235.C.2.a.1 and Table 235-6 section 2.a of the NESC, the minimum clearance required is 57.4 inches (4.8 feet) [29” + (121 kV-50 kV)x 0.4”].

- 386A (34.5 kV): NESC Heavy Loading - The maximum conductor sag for this weather case will be 10.8 feet with a clearance to the water surface of 52.0 feet.

- 386A (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 15.3 feet with a clearance to the water surface of 42.2 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 13.7 feet under temporary emergency conditions during a 100-yr storm event.

- 386A (34.5 kV): Minimum phase to OPGW cable clearance – The weather case that would produce the minimum clearance between the phase wires and the OPGW cable in the shield wire position occurs at the attachment points on Structure 14, as shown on Figure 2. At this location the clearance would be 16.08’ vertically and 6.5’ horizontally from the static wire. The closest midspan clearance 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 also be at 30 deg. F and would still be iced with 1/2" of radial ice. Under these conditions the clearance would be 13.3' vertically and 6.5' horizontally from the shield wires to the closest phase wire. Based on Section 235.C.2.a.1 and Table 235-6 section 2.a of the NESC, the minimum clearance required is 23 inches (1.92 feet) [12" + (34.5kV-8.7 kV)x 0.4"].

- 386A (Neutral): NESC Heavy Loading - The maximum conductor sag for this weather case will be 21.69 feet with a clearance to the water surface of 36.2 feet.

- 386A (Neutral): 120 degrees F – Max operating temperature (Phase wires) based on PSNH transmission standards - The maximum conductor sag for this weather case will be 22.7 feet with a clearance to the water surface of 31.4 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 28.5 feet by 2.9 feet under temporary emergency conditions during a 100-yr storm event.

- 386A (Neutral): Minimum phase to neutral clearance – The weather case that would produce the minimum clearance between the phase wires and the neutral wire would be on Structure 14 of the 386A Line. At this location as described previously the clearance from the 386A line would be 6.5 feet horizontally from the neutral wire to the closest phase wire. Based on Section 235.C.2.a.1 and Table 235-6 section 2.a of the NESC, the minimum clearance required is 23 inches (1.92 feet) [12" + (34.5kV-8.7 kV)x 0.4"].

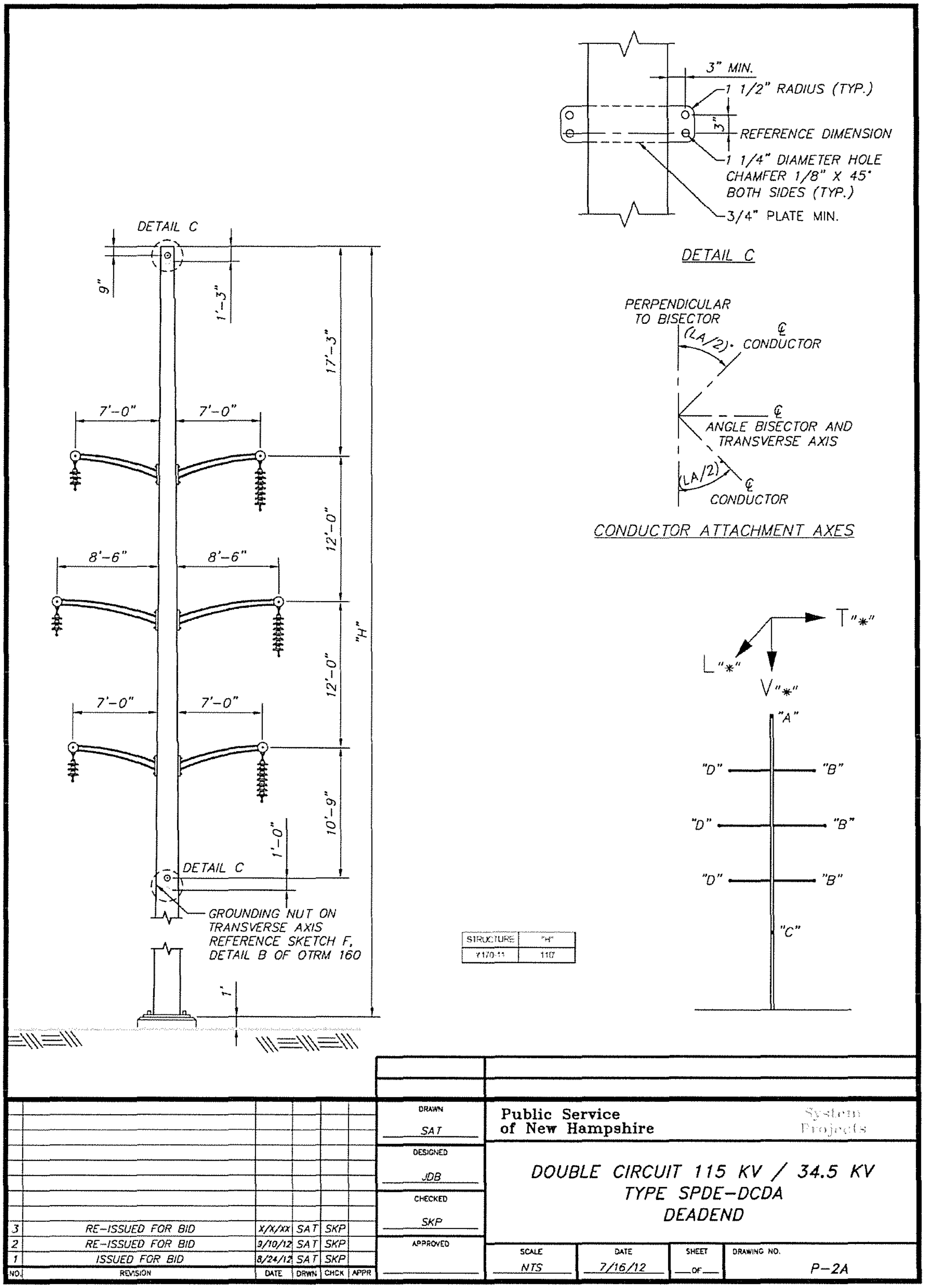

Figure 1 – Y170-11 / 386A-13

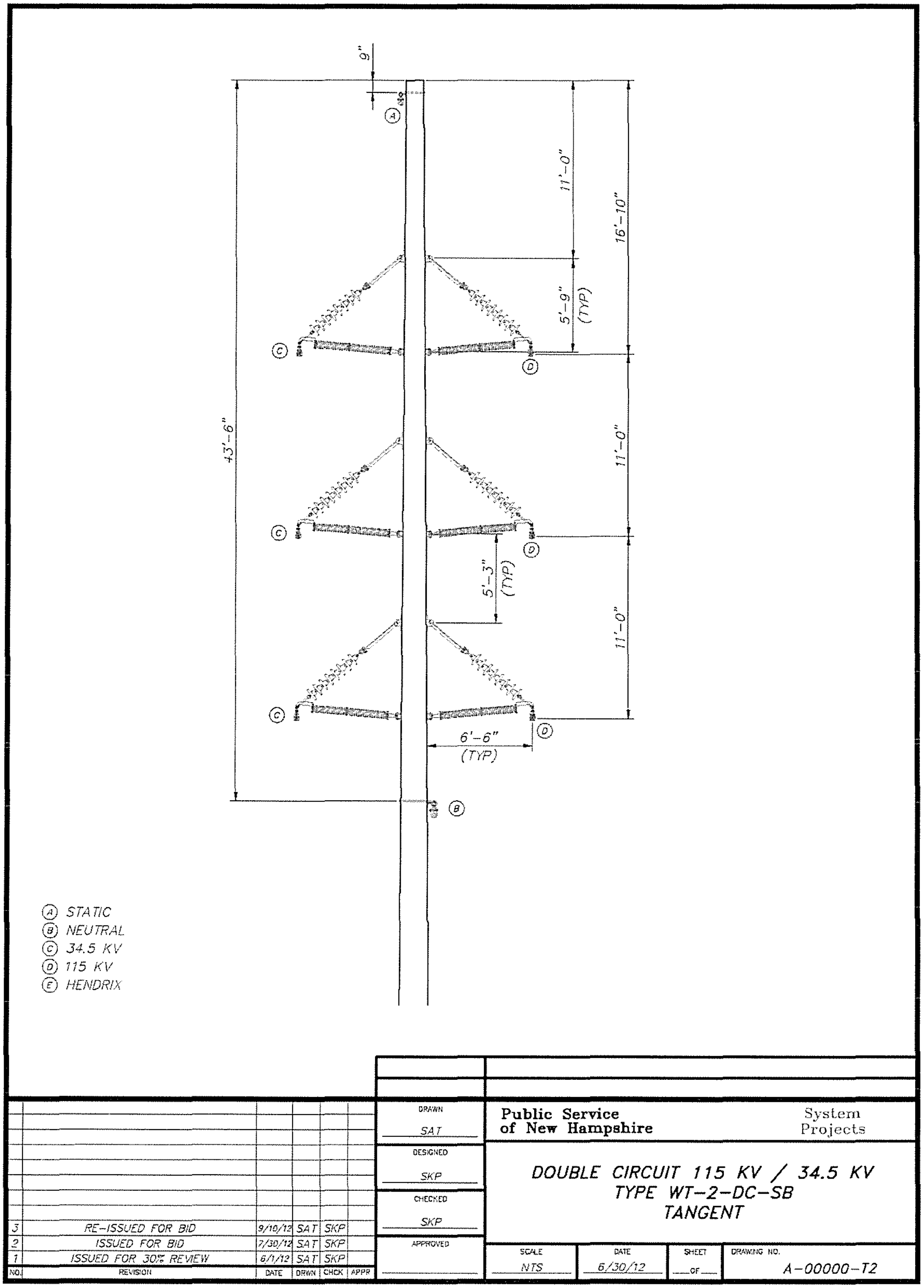

Figure 2 – Y170-12 / 386A-14

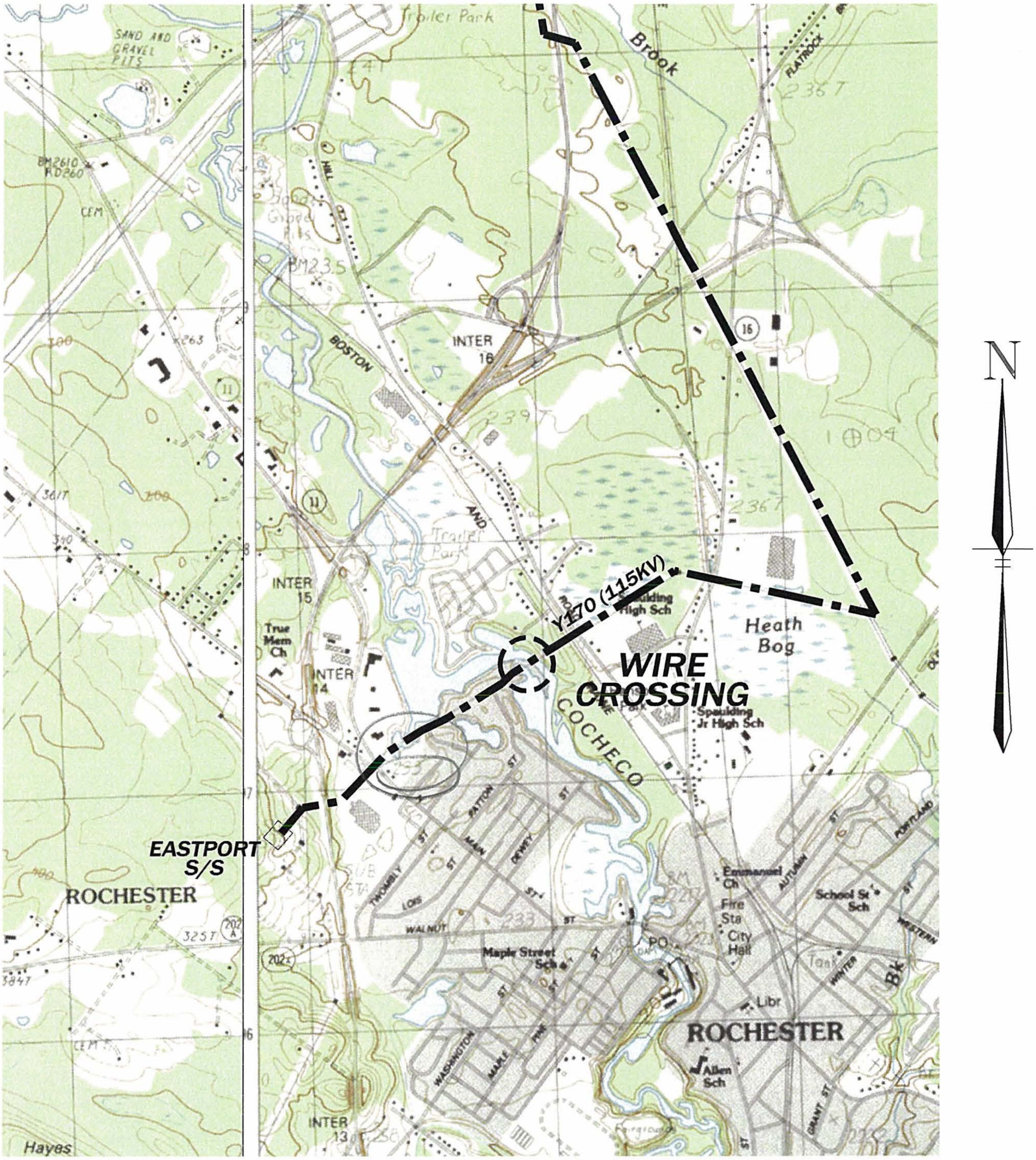

EXHIBIT 1

NO.	REVISION	DATE	DRWN	CHCK	APPR
1	RE-ISSUED FOR PERMITTING	10/2/12	SAT	PEC	
0	ISSUED FOR PERMITTING	9/27/12	SAT	PEC	

DRAWN: SAT	Public Service of New Hampshire — System Projects
DESIGNED: PEC	**LOCATION PLAN**
	Y170 LINE (115 KV)
CHECKED: NPA	**COCHECO RIVER CROSSING**
	ROCHESTER, NEW HAMPSHIRE
APPROVED:	SCALE: 1"=2000' · DATE: 9/20/12 · SHEET ___ OF ___ · DRAWING NO. D-10237-600A

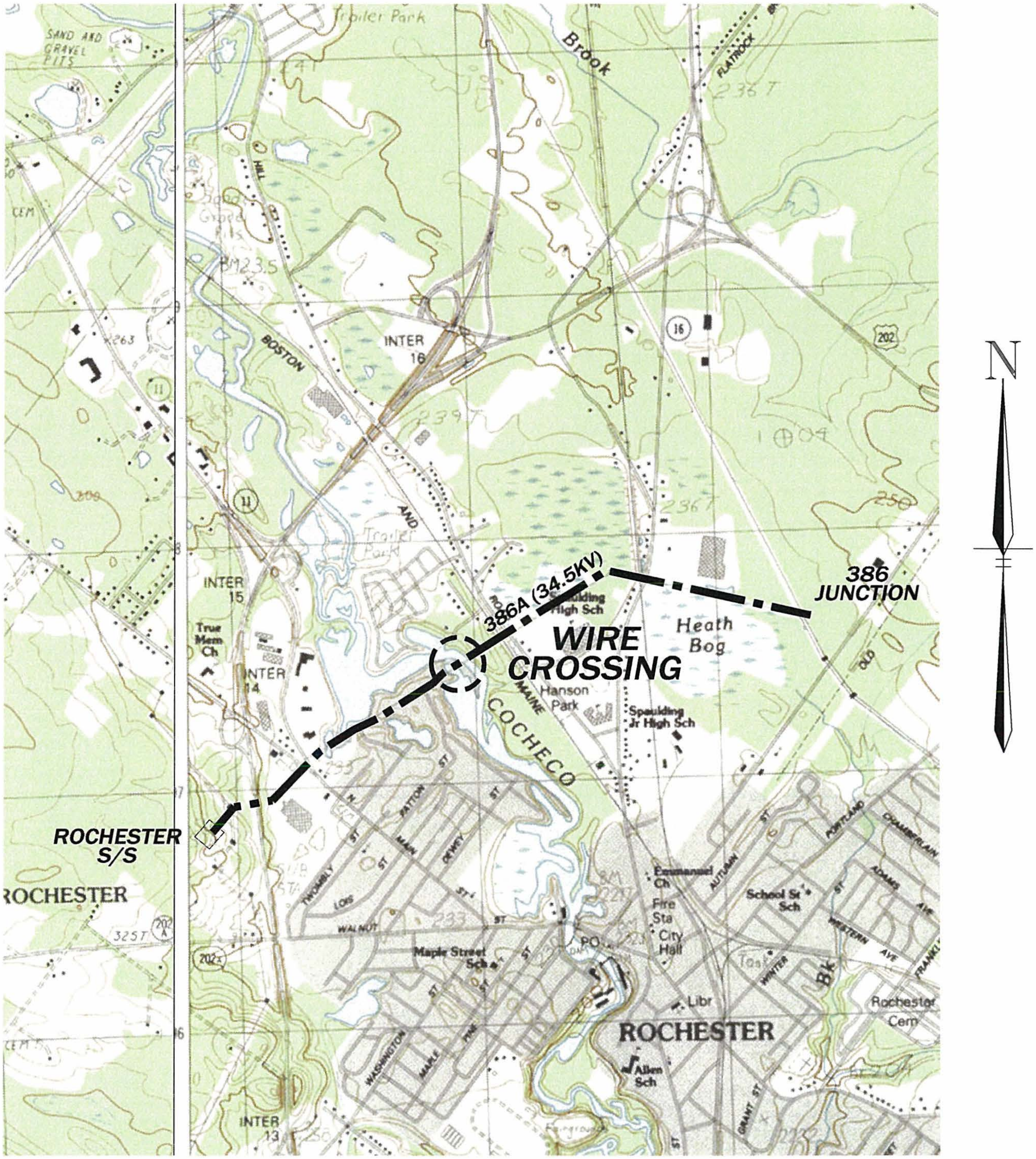

EXHIBIT 2

NO.	REVISION	DATE	DRWN	CHCK	APPR
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0	ISSUED FOR PERMITTING	9/27/12	SAT	PEC	

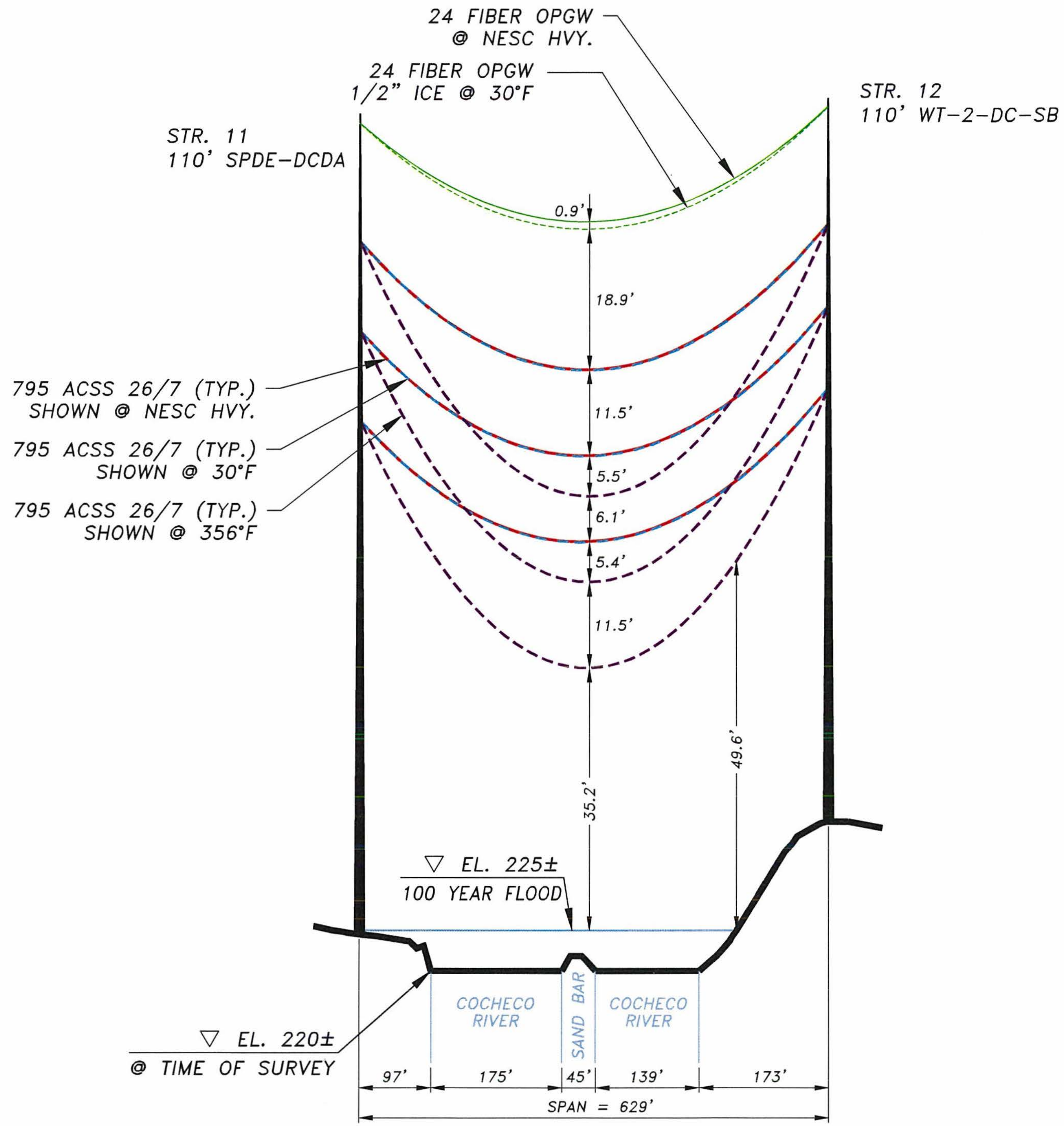
DRAWN: SAT
DESIGNED: PEC
CHECKED: NPA
APPROVED:

Public Service of New Hampshire — System Projects

LOCATION PLAN
386A LINE (34.5 KV)
COCHECO RIVER CROSSING
ROCHESTER, NEW HAMPSHIRE

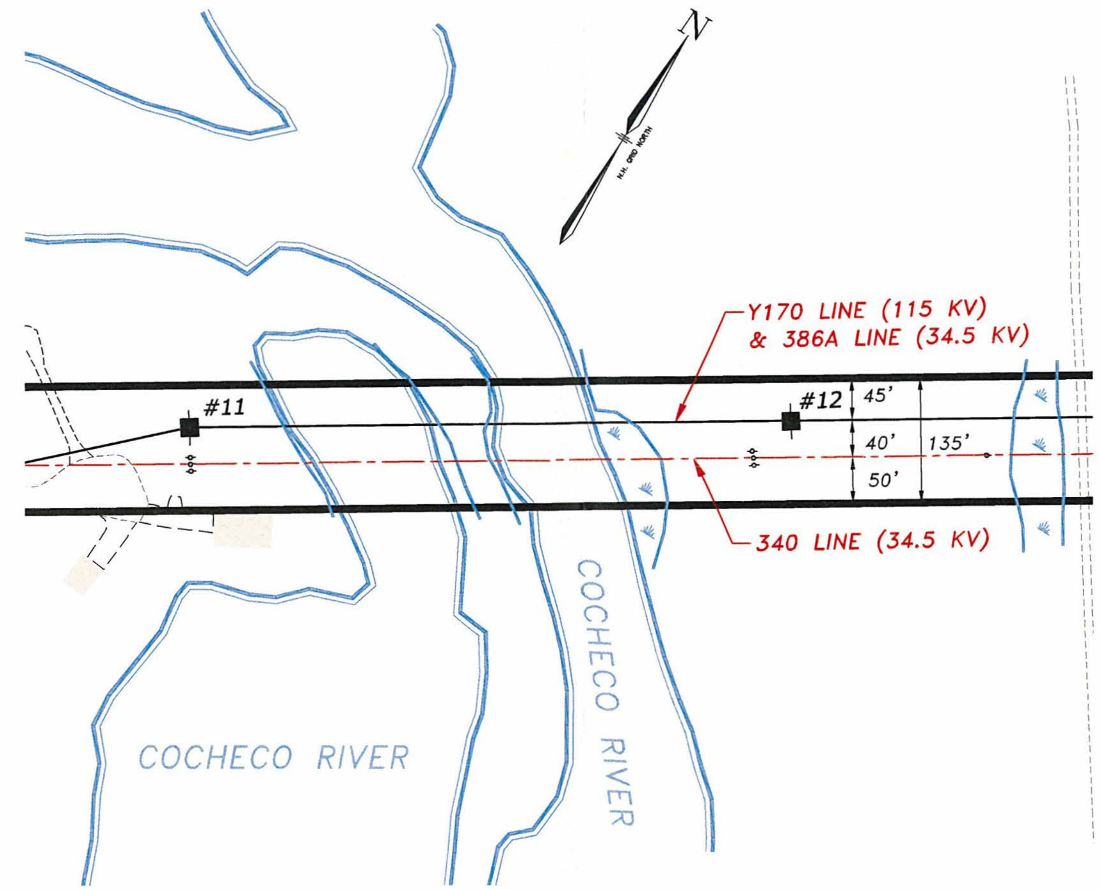
SCALE	DATE	SHEET	DRAWING NO.
1"=2000'	9/20/12	__OF__	D-7649-410A

THIS PLAN IS FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE



PROFILE

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



PLAN VIEW

SCALE: 1"=200'

200 100 0 200 400 600

GRAPHIC SCALE
1" = 200'

EXHIBIT 3

Public Service of New Hampshire — Transmission Business

NO.	REVISION	DATE	DRWN	CHCK	APPR
4	RE-ISSUED FOR PERMITTING	11/28/12	SAT	NPA	
3	RE-ISSUED FOR PERMITTING	11/21/12	SAT	NPA	
2	RE-ISSUED FOR PERMITTING	10/4/12	SAT	NPA	
1	RE-ISSUED FOR PERMITTING	10/2/12	SAT	NPA	
0	ISSUED FOR PERMITTING	9/27/12	SAT	NPA	

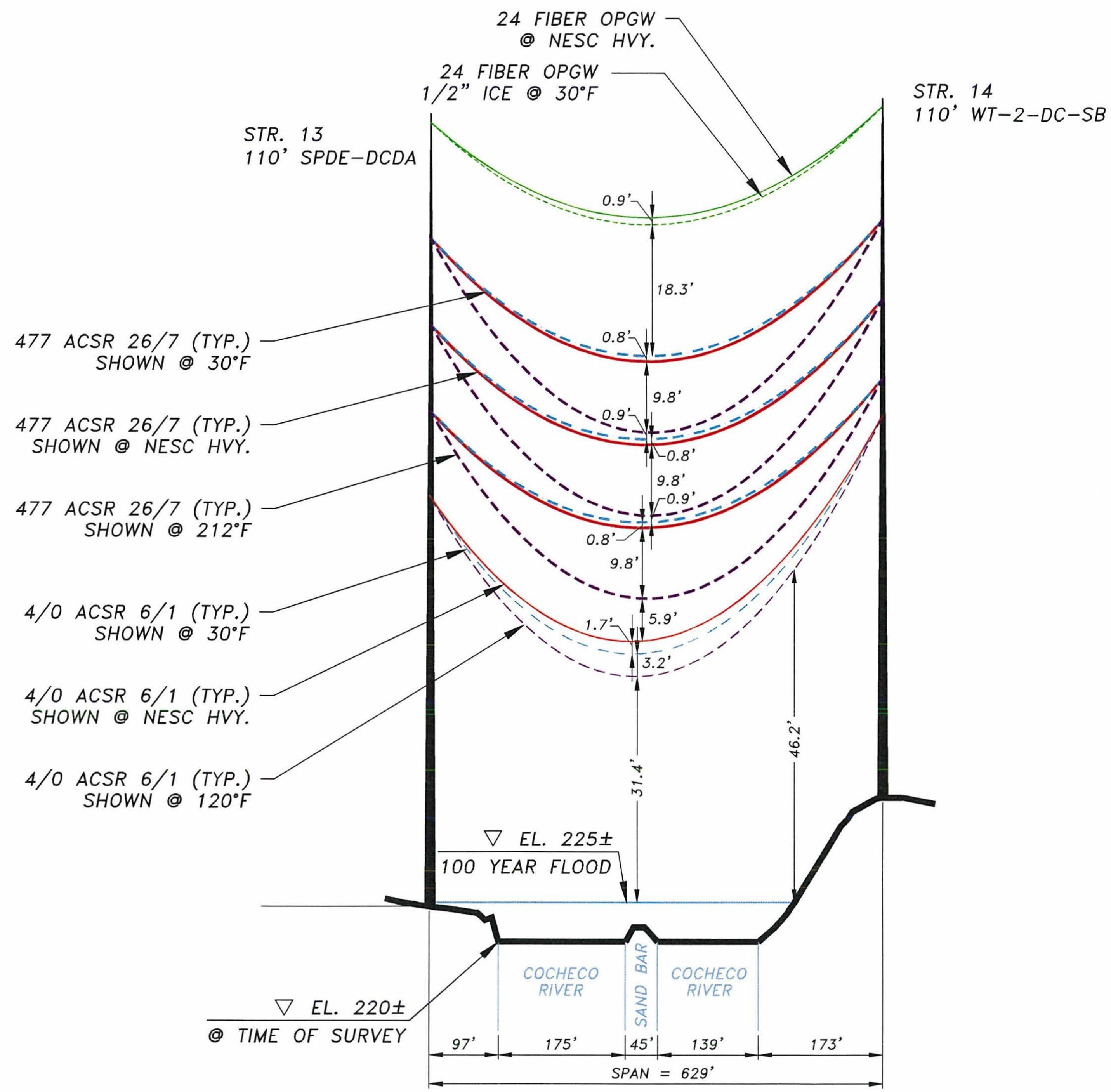
DRAWN: SAT
DESIGNED: PEC
CHECKED: NPA
APPROVED: .

Y-170 LINE (115 KV)
BETWEEN STRUCTURES 11 AND 12
COCHECO RIVER WATER CROSSING
ROCHESTER, NEW HAMPSHIRE

SCALE	DATE	SHEET	DRAWING NO.
AS NOTED	8/20/12	1 OF 1	D-10237-600

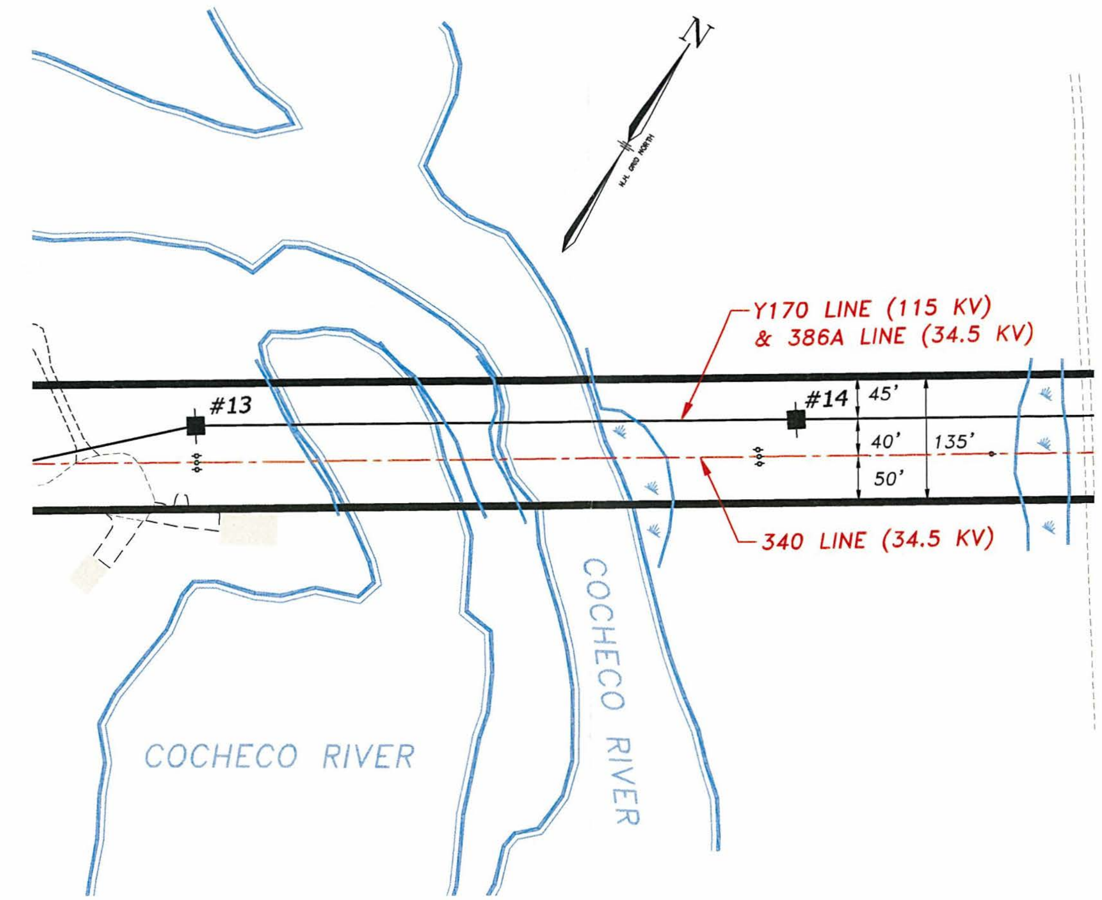
24 FIBER OPGW INSTALLED @ 5300 LBS. NESC HVY. INITIAL
795 ACSS 26/7 INSTALLED @ 7000 LBS. NESC HVY. INITIAL

THIS PLAN IS FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE



PROFILE

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



PLAN VIEW

SCALE: 1"=200'

200 100 0 200 400 600

GRAPHIC SCALE
1" = 200'

24 FIBER OPGW INSTALLED @ 5300 LBS. NESC HVY. INITIAL
477 ACSR 26/7 INSTALLED @ 5000 LBS. NESC HVY. INITIAL
4/0 ACSR 6/1 INSTALLED @ 2500 LBS. NESC HVY. INITIAL

EXHIBIT 4

NO.	REVISION	DATE	DRWN	CHCK	APPR
2	RE-ISSUED FOR PERMITTING	11/21/12	SAT	NPA	
1	RE-ISSUED FOR PERMITTING	10/2/12	SAT	NPA	
0	ISSUED FOR PERMITTING	9/27/12	SAT	NPA	

Public Service of New Hampshire — Transmission Business

DRAWN: SAT
DESIGNED: PEC
CHECKED: NPA
APPROVED:

386A LINE (34.5 KV)
BETWEEN STRUCTURES 13 AND 14
COCHECO RIVER WATER CROSSING
ROCHESTER, NEW HAMPSHIRE

SCALE	DATE	SHEET	DRAWING NO.
AS NOTED	8/20/12	1 OF 1	D-7649-410