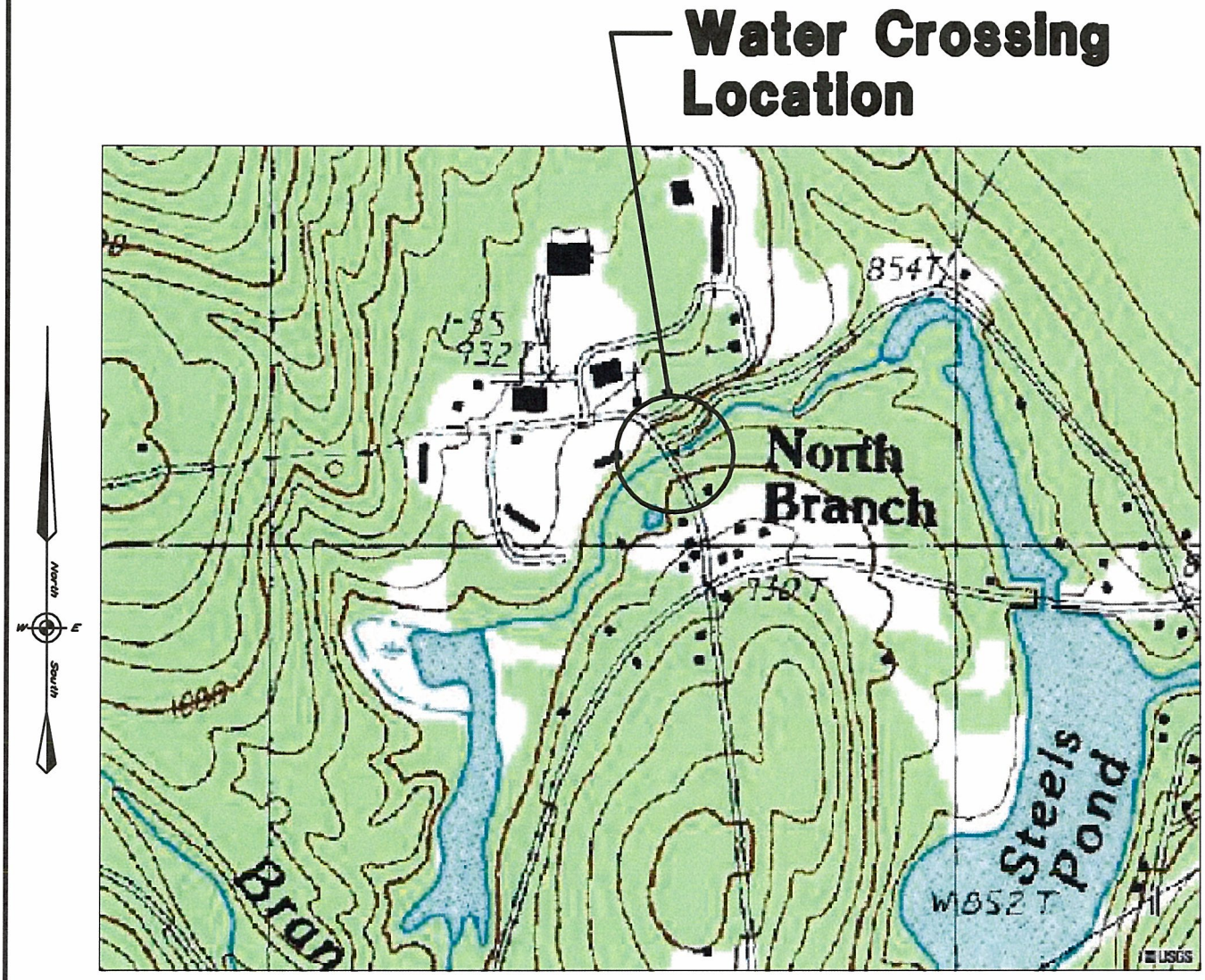
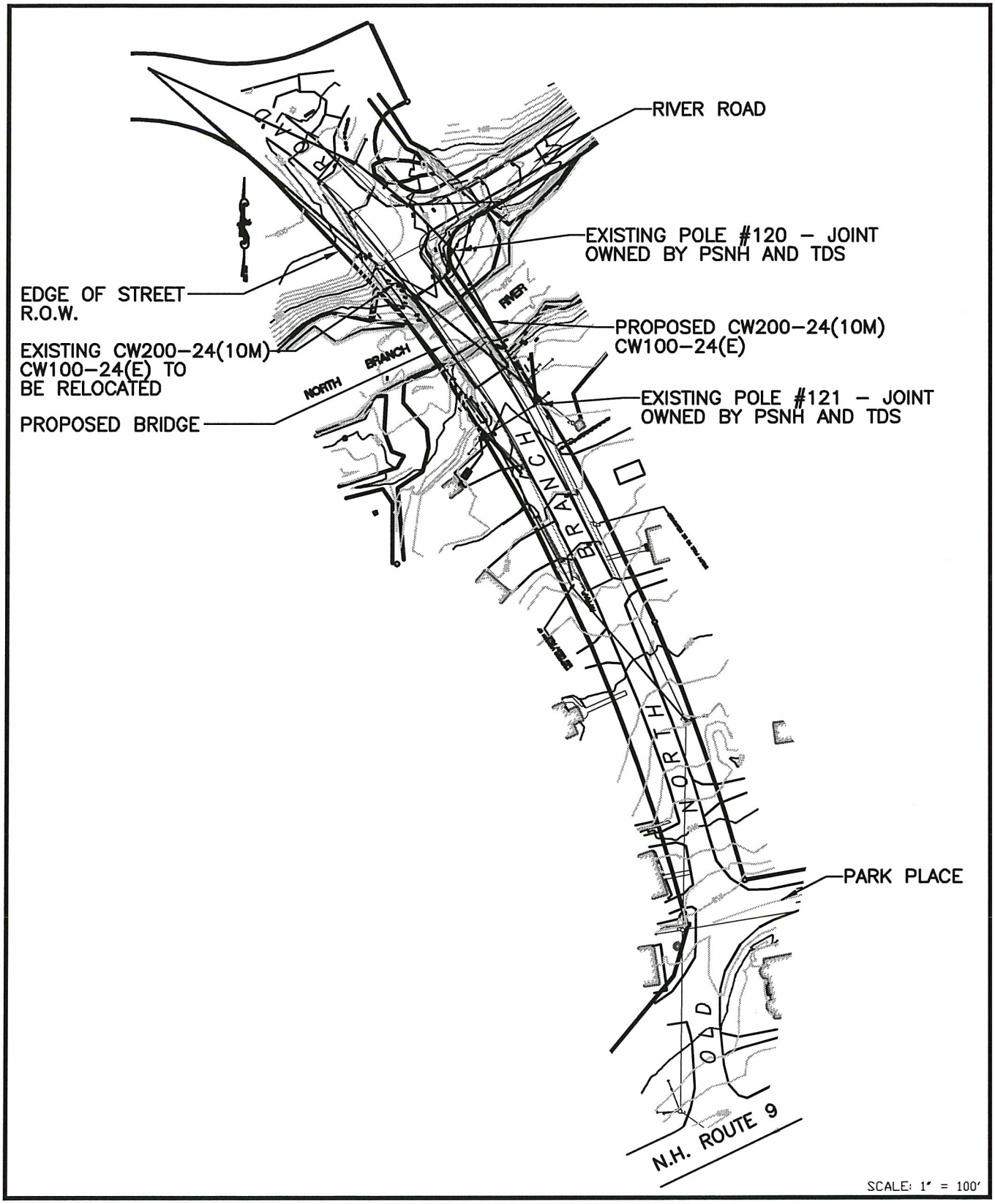
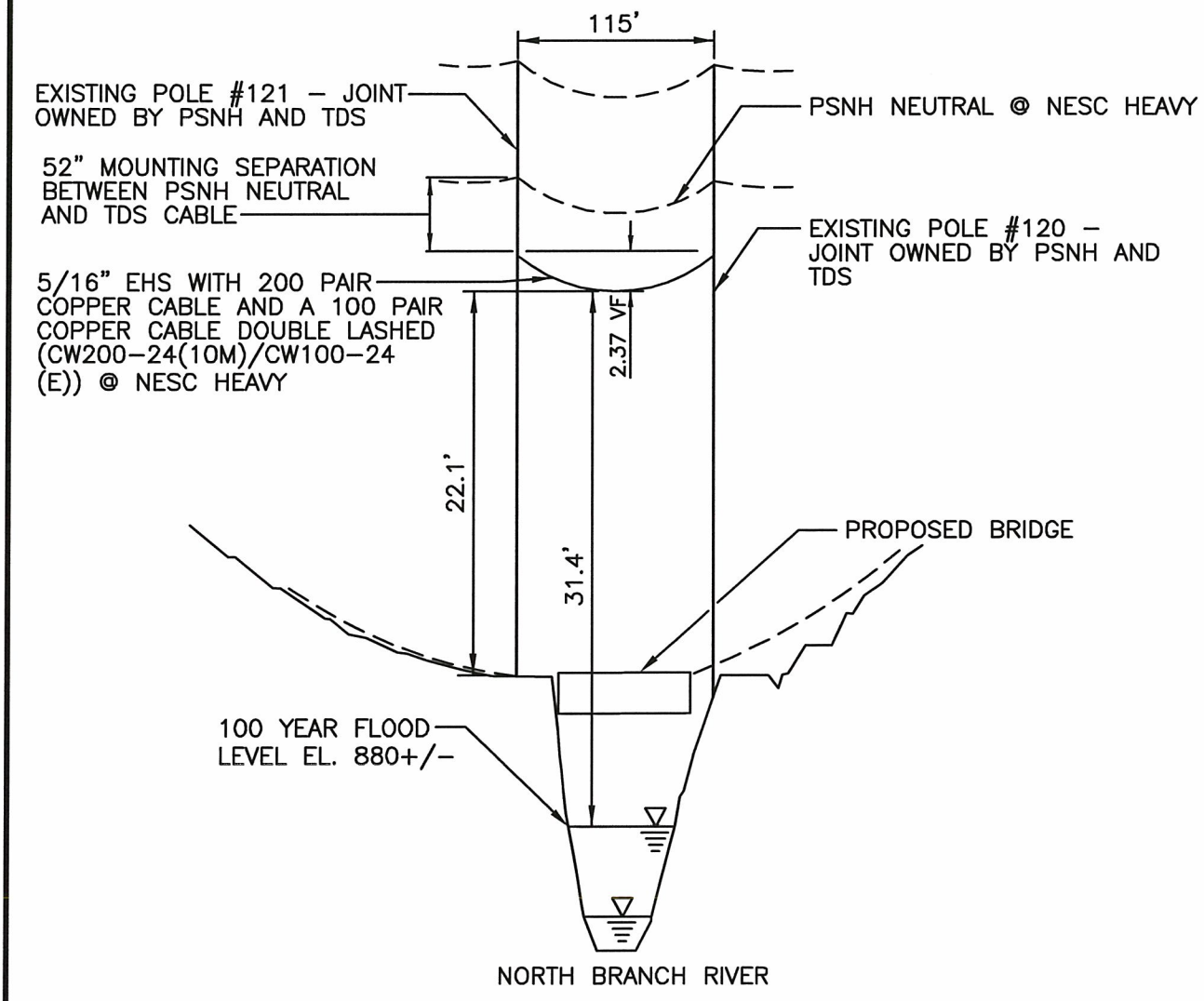


NOT TO SCALE

TDS TELECOM	CW200-24(10M)/ CW100-24(E) NORTH BRANCH WATER CROSSING ANTRIM, NH	LOCUS MAP	FIGURE: **EXHIBIT 1**
		REF. SHEET: N/A	DATE: 04/07/11



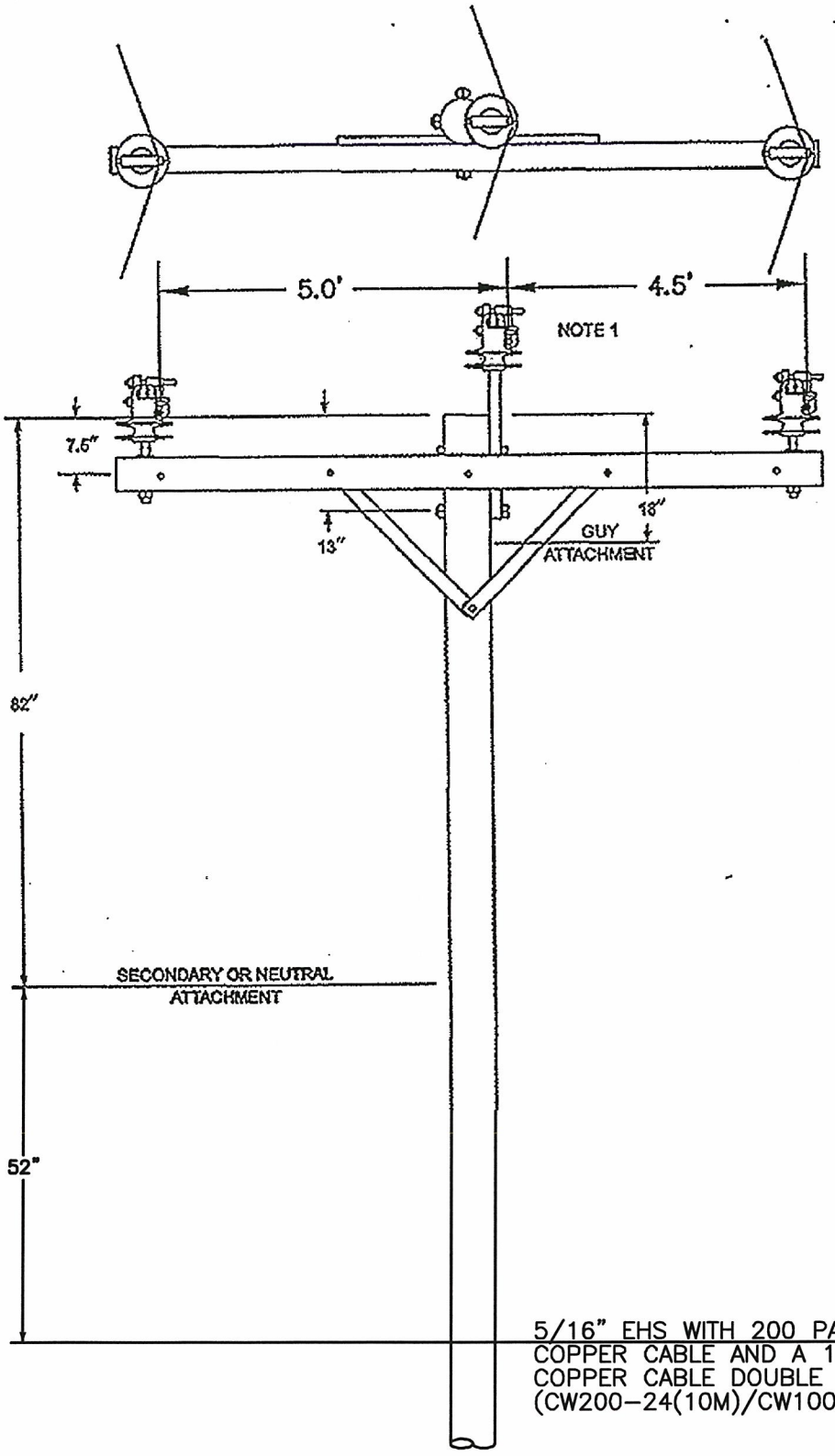
TDS TELECOM	CW200–24(10M)/ CW100–24(E) NORTH BRANCH WATER CROSSING ANTRIM, NH	PLAN	FIGURE: **EXHIBIT 2**
		REF. SHEET: N/A	DATE: 04/07/11



PROFILE

SCALE: 1"=100' HORIZ. 1"=10' VERT.

TDS TELECOM	CW200–24(10M)/ CW100–24(E) NORTH BRANCH WATER CROSSING ANTRIM, NH	PROFILE	FIGURE: **EXHIBIT 3**
		REF. SHEET: N/A	DATE: 04/07/11



TDS TELECOM	CW200-24(10M)/ CW100-24(E) NORTH BRANCH WATER CROSSING ANTRIM, NH	Pole Detail	FIGURE: **EXHIBIT 4**
		REF. SHEET: N/A	DATE: 04/07/11

EXHIBIT 5

QUANTUM CONSTRUCTION CONSULTANTS, LLC

PROJECT ONB TDS
PROJECT NO. 0296
CALCULATED BY JAB DATE 4/1/11
CHECKED BY DATE
SHEET NO. 1 OF 8

SUBJECT TDS COMM. LINES OVER NO. BRANCH RIVER

TASK: DETERMINE CLEARANCES FROM LAND & RIVER FOR TDS RELOCATED COMM. LINES TO SUPPORT PETITION TO NH P.U.C.

DATA:
- VERTICAL CLEARANCES REQ'D PER NESC TABLE 232-1:
  - 2. ROADS, STREETS = 15.5 VF
  - 7.b. RIVERS 20-200 AC = 25.5 VF
- (FROM PSNH) L = 115 LF BETWEEN POLES H120 & H121
- (FROM TDS) SUPPORT CABLE = 5/16" 7 STRAND STEEL EHS
- (FROM TDS ⟨) 100 PAIR CABLE: 0.98"ø ω = 0.55 LB/FT
  200 PAIR CABLE = 1.32"ø ω = 1.02 LB/FT
- (FROM TDS) INSTALLED TENSION @ 60°F = 2000 LB/FT (LOADED)
- (FROM TDS) MOUNTING ATTACHMENT = 52" BELOW PSNH NEUTRAL
- (FROM PSNH) PSNH CLEARANCES FOR NEUTRAL SAGGED @ NESC HEAVY = 26.7' ROAD & 36.0' RIVER (FROM PSNH)

QUANTUM CONSTRUCTION CONSULTANTS, LLC

PROJECT ONB TDS
PROJECT NO. Q246
CALCULATED BY JAB DATE 9/1/11
CHECKED BY DATE
SHEET NO. 2 OF 8

SUBJECT TDS Comm. Lines over No. Branch River

DATA (CONT'D):

- PSNH NEUTRAL SAG @ NESC HEAVY = 2.13 VF (FROM PSNH)

ANALYSIS: • UTILIZE SOUTHWIRE SAG 10™ PC BASED PROGRAM FOR SAG-TENSION CALCULATIONS:

- ANALYZE FOR NESC HEAVY - 0°F; WIND = 4 PSF; ½" RADIAL ICE
- ANALYZE FOR 120°F; 30°F - NO ICE, NO WIND
- UTILIZE 1 VF DIFFERENTIAL BETWEEN POLES (FROM PSNH)
- UTILIZE LASHED CONDITIONS - NO HANGERS
- UTILIZE STEEL EHS & RS MESSENGER
- AVERAGE CONDUCTOR SIZE & WEIGHT FOR INPUT TO PROGRAM AS SUPPORTED CABLES:

AVG DIA = $\frac{0.98" + 1.32"}{2} = 1.15"$

AVG WEIGHT = $\frac{0.55 + 1.02}{2} = 0.79$ LB/FT

QUANTUM CONSTRUCTION CONSULTANTS, LLC

PROJECT ONB TDS
PROJECT NO. Q 296
CALCULATED BY UAB DATE 9/1/11
CHECKED BY DATE
SHEET NO. 3 OF 8

SUBJECT TDS COMM LINES OVER No. BRANCH RIVER

ANALYSIS (CONT'D)

- APPLY NESC K FACTOR ONLY TO THE MESSENGER
- DESIGN LIMITS APPLY AFTER ATTACHMENT
  - INITIAL TENSION = 2000 LBS (FROM TDS)
  - MAX STRENGTH = 10,000 LBS (FROM TDS)

COMPUTER MODELING

TRIAL ONE - INPUT DIRECTLY FOR NESC HEAVY LOAD ZONE

NOTE: FINAL TENSION (AFTER ATTACHMENT OF CABLES) @ 60°F = 2500 LB TENSION

THIS EXCEEDS TDS OPERATIONS OF 2000 LB.

TRAIL TWO - UTILIZE SPECIAL LOAD ZONE FEATURE TO MODIFY 60°F FINAL TENSION TO 2000 LBS. ALL OTHER DATA REMAINS UNCHANGED. RESULTS ARE AS ATTACHED.

3/31/2011

Quantum Construction Consultants, LLC.

Quantum Construction Consultants
Old North Branch over North Branch River
(Q217)
NESC Heavy, Steel Cable - EHS
NESC K Factor to Messenger Only,
Zero Hanger Ice Load Factor, Design limits

Conductor: 5/16x 7 Strand Steel EHS

Area = 0.0595 Sq. in Diameter = 0.312 in Weight = 0.205 lb/ft RTS = 10000 lb
Data from Chart No. 1-1293
English Units
Limits and Outputs in Average Tensions.

TRIAL ONE

Span = 115.0 Feet
Creep is NOT a Factor
NESC Heavy Load Zone

Design Points Temp °F	Ice in	Wind psf	K lb/ft	Weight lb/ft	Final Sag Ft	Final Tension lb	Initial Sag Ft	Initial Tension lb
-20.0	0.00	0.00	0.00	0.205			0.12	2946
0.0	0.00	0.00	0.00	0.205			0.12	2768
30.0	0.00	0.00	0.00	0.205			0.14	2501
60.0	0.00	0.00	0.00	0.205			0.15	2235
90.0	0.00	0.00	0.00	0.205			0.17	1970
120.0	0.00	0.00	0.00	0.205			0.20	1708
167.0	0.00	0.00	0.00	0.205			0.26	1308
212.0	0.00	0.00	0.00	0.205			0.36	945

Above: Initial Data Prior to Cable Installation

Below: 2 Non-Supporting Cable(s) Added, Dia= 1.150 in, Wt= 0.785lb/ft+0.000lb/ft								
0.0	0.50	4.00	0.30	5.018	2.09	3970	2.09	3970
32.0	0.50	0.00	0.00	4.332	2.01	3565	2.00	3590
-20.0	0.00	0.00	0.00	1.775	0.94	3114	0.92	3180
0.0	0.00	0.00	0.00	1.775	0.99	2954	0.97	3027
30.0	0.00	0.00	0.00	1.775	1.08	2721	1.05	2804
60.0	0.00	0.00	0.00	1.775	1.17	2500*	1.13	2590
90.0	0.00	0.00	0.00	1.775	1.28	2293	1.23	2386
120.0	0.00	0.00	0.00	1.775	1.40	2101	1.34	2196
167.0	0.00	0.00	0.00	1.775	1.60	1835	1.52	1927
212.0	0.00	0.00	0.00	1.775	1.81	1622	1.72	1707

* Design Condition

EXCEEDS TDS MOUNTING OPERATIONS

3/31/2011

Quantum Construction Consultants

Quantum Construction Consultants
Old North Branch over North Branch River
(Q217)
NESC Heavy, Steel Cable - EHS
NESC K Factor to Messenger Only,
Zero Hanger Ice Load Factor, Design limits

Conductor: 5/16x 7 Strand Steel EHS

Area = 0.0595 Sq. in Diameter = 0.312 in Weight = 0.205 lb/ft RTS = 10000 lb
Data from Chart No. 1-1293
English Units
Limits and Outputs in Average Tensions.

TRIAL TWO

Span = 115.0 Feet Special Load Zone
Creep is NOT a Factor

Design Points					Final		Initial	
Temp °F	Ice in	Wind psf	K lb/ft	Weight lb/ft	Sag Ft	Tension lb	Sag Ft	Tension lb
-20.0	0.00	0.00	0.00	0.205			0.16	2115
0.0	0.00	0.00	0.00	0.205			0.17	1939
30.0	0.00	0.00	0.00	0.205			0.20	1677
60.0	0.00	0.00	0.00	0.205			0.24	1421
90.0	0.00	0.00	0.00	0.205			0.29	1171
120.0	0.00	0.00	0.00	0.205			0.36	933
167.0	0.00	0.00	0.00	0.205			0.56	601
212.0	0.00	0.00	0.00	0.205			0.91	375

Above: Initial Data Prior to Cable Installation

Below: 2 Non-Supporting Cable(s) Added, Dia= 1.150 in , Wt= 0.785lb/ft+0.000lb/ft

0.0	0.50	4.00	0.30	5.018	2.37	3503	2.37	3503
32.0	0.50	0.00	0.00	4.332	2.31	3108	2.30	3123
-20.0	0.00	0.00	0.00	1.775	1.20	2440	1.18	2496
0.0	0.00	0.00	0.00	1.775	1.27	2303	1.24	2363
30.0	0.00	0.00	0.00	1.775	1.39	2111	1.35	2174
60.0	0.00	0.00	0.00	1.775	1.52	1935	1.47	2000*
90.0	0.00	0.00	0.00	1.775	1.65	1778	1.59	1842
120.0	0.00	0.00	0.00	1.775	1.79	1638	1.73	1700
167.0	0.00	0.00	0.00	1.775	2.02	1453	1.95	1510
212.0	0.00	0.00	0.00	1.775	2.25	1309	2.16	1361

* Design Condition

PER T&S MOUNTING OPERATIONS

QUANTUM CONSTRUCTION CONSULTANTS, LLC

PROJECT ONB TDS
PROJECT NO. Q246
CALCULATED BY JAB DATE 4/1/11
CHECKED BY DATE
SHEET NO. 6 OF 8

SUBJECT TDS COMM LINES OVER NO. BRANCH RIVER

SAG CALCULATIONS:

#1 SEPARATION CHECK

UTILIZING PSNH NEUTRAL SAGGED @ NESC HEAVY AND TDS @ 30°F ONLY

DETERMINE SEPARATION BETWEEN THE LINES:

MOUNTING SEPARATION =	52"
- PSNH NEUTRAL @ HEAVY =	- 25.6" (2.13 VF PER PSNH)
	26.4"
+ TDS SAG @ 30°	16.2" (1.35 VF FROM TRIAL 2)
	42.6" (PETITION ITEM 11.A)

→ VALUE EXCEEDS 30.0" PUC REQUIREMENT O.K. GOOD.

#2A CLEARANCE OK - WATER

PSNH NEUTRAL @ NESC HEAVY =	36.0	(FROM PSNH)
+ PSNH SAG =	+ 2.13	(FROM PSNH)
PSNH CONNECTION ABOVE RIVER =	38.13	
LESS 52" TO TDS MTG.	- 4.33	
TDS MTG HEIGHT =	33.80	
LESS NESC HEAVY SAG	- 2.37	
RESULTING CLEARANCE	31.40 VF	(PETITION ITEM 10.A)

> 25.5' NESC REQUIREMENT

QUANTUM CONSTRUCTION CONSULTANTS, LLC

PROJECT ONB TDS
PROJECT NO. Q246
CALCULATED BY JAB DATE 4/1/11
CHECKED BY ____ DATE ____
SHEET NO. 7 OF 8

SUBJECT TDS COMM. LINES OVER NO. BRANCH RIVER

#2B CLEARANCE OVER ROAD

PSNA NEUTRAL @ NESC HEAVY CLEARANCE =	26.7 VF (FROM PSNH)
+ PSNH HEAVY SAG	+ 2.13 (FROM PSNH)
PSNH MTG HEIGHT ABOVE ROADWAY	28.83
LESS 52" MTG SEPARATION FOR TDS	−4.33
TDS MTG HEIGHT =	24.50
LESS TDS HEAVY SAG =	−2.37
ROADWAY CLEARANCE =	22.13 VF (PETITION ITEM 10.A)

> 15.5 NESC REQUIREMENT

#3A 120°F CLEARANCE OVER RIVER

TDS MTG HEIGHT (FROM #2A) =	33.80 VF
LESS SAG @ 120°F	−1.70 VF
RIVER CLEARANCE =	32.10 VF (PETITION ITEM 10.B)

#3B 120°F CLEARANCE OVER ROADWAY

TDS MTG HEIGHT (FROM #2B) =	24.50 VF
LESS SAG @ 120°F	−1.70 VF
ROADWAY CLEARANCE =	22.80 VF (PETITION ITEM 10.B)

QUANTUM CONSTRUCTION CONSULTANTS, LLC

PROJECT ONB TDS
PROJECT NO. Q246
CALCULATED BY JAB DATE 9/1/11
CHECKED BY DATE
SHEET NO. 8 OF 8

SUBJECT TDS Comm LINES OVER NO. BRANCH RIVER

#4 PSNH @ NESC HEAVY TO TDS @ NESC HEAVY

MOUNTING SEPARATION = 52"
LESS PSNH NEUTRAL @ HEAVY = -25.6" (2.13 VF SAG)
26.4"
PLUS TDS @ HEAVY = + 28.4" (2.37 VF SAG)
SEPARATION = 54.8" (PETITION ITEM 10.A)