

New Hampshire Optical Systems, Inc.
99 Pine Hill Rd.
Nashua, NH 03063
(603-821-6467)

Project #TID-80-PRI-1
Drawing #AC-GIL-RIV-1

Date: 10/26/11
Revision #

Proposed
Ashuelot River Crossing
Gilsun, NH

Location:
Gilsun Rd - Rt 10, Gilsun, NH
Nearest cross street-Centennial Rd.

Sheet 1 of 2



LOCUS MAP
(Not to Scale)



Spanmaster® Release 3.1 Sag / Tension Computations
09/01/11 Waveguide

Waveguide
River and Rail Crossings

	X-SECT AREA (sq.in)	EFF MODULUS (psi)	NOMINAL DIAM (in)	EFF.EXP. COEFF. (1/F)	CABLE WEIGHT (lb/ft)	E*A LOAD BEARING CAPACITY (lbs)	MAX. RATED LOAD (lbs)
Selected Cables							
1/4"6.6mEHS	0.0352	2.60E+07	0.250	5.60E-06	0.1210	914940	6650
ORF-O-288-LN	0.5782	2.70E+05	0.858	1.13E-05	0.1960	155982	651
Bundle			1.108		0.3170		

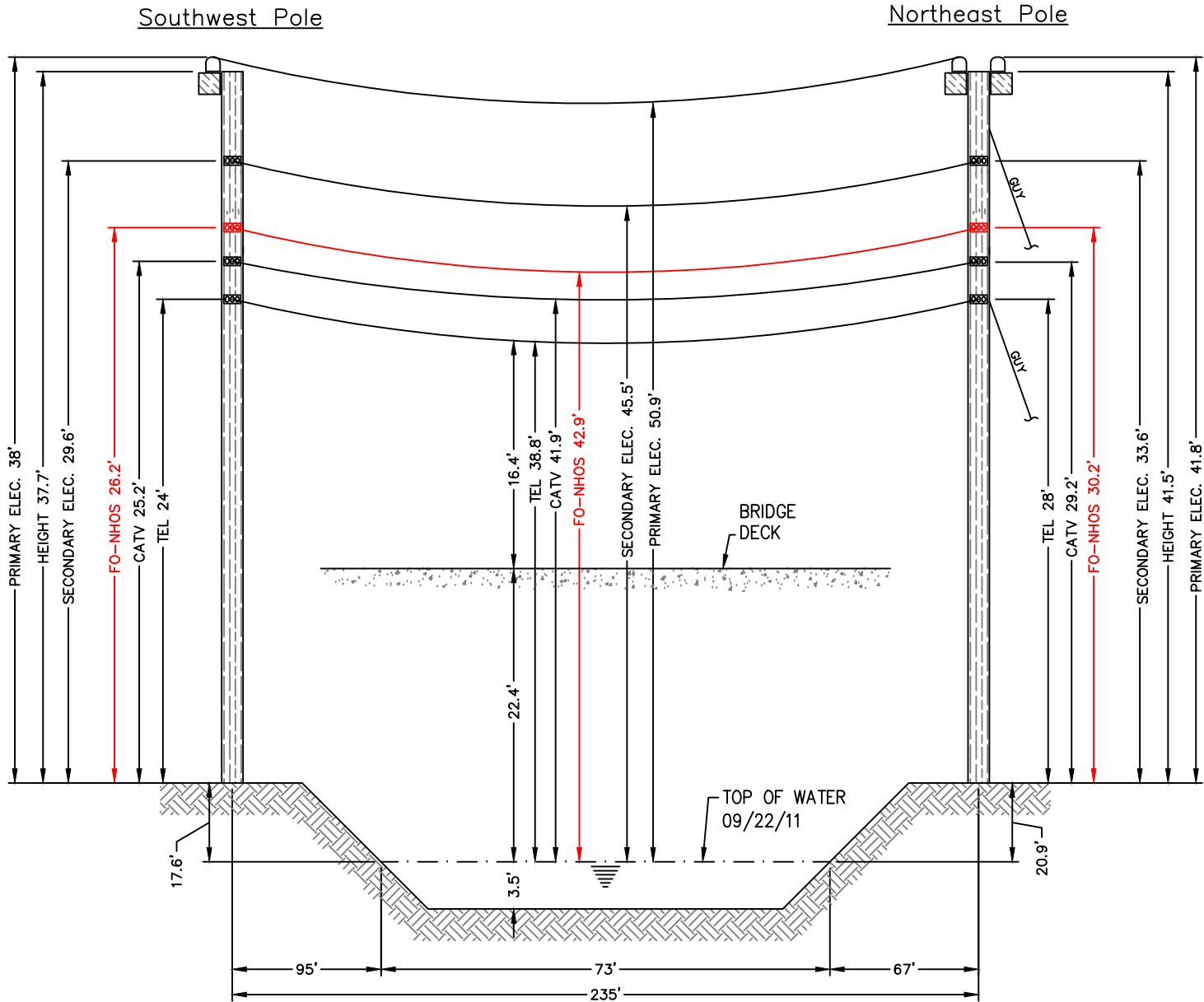
NESC RESULTS

Loading Condition	Temp. (F)	Ice Load lb/ft	Ice Thick in	Wind Constant lb/ft	Horz Wind Load lb/ft	Result Load + Const lb/ft	Sag ft	Tension lb	% Len Chg From Input Conditions	Sag @ Point 117.5 ft	Horz Sag Comp ft	Vert Sag Comp ft	Vector Angle Deg
Rule 251 - Heavy	0.0	1.000	.50	.3	4.0	1.793	5.35	2307	0.11	5.36	2.52	4.72	28.1
232A1	120.0	0.000	.00	.0	0.0	0.317	2.81	779	0.01	2.81	0.00	2.81	0.0

Span Length = 235.00 ft
Span Sag = 2.35 ft (28.2 in)
Span Tension = 931 lb
Max Load = 6,650 lb
Usable load (60%) = 3,990 lb
Catenary Length = 235.063 ft
Stress Free Length @
Installed Temperature = 234.824 ft

Unloaded Strand
Sag = 1.12 ft (13.5 in) 0.48 %
Tension = 743 lb

Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
-40.0	1.60	1,361	-0.01	N/A
-30.0	1.66	1,318	-0.01	N/A
-20.0	1.71	1,275	-0.01	N/A
-10.0	1.77	1,233	-0.01	N/A
.0	1.83	1,192	-0.01	N/A
10.0	1.90	1,151	-0.01	N/A
20.0	1.96	1,112	-0.01	N/A
30.0	2.04	1,073	-0.01	N/A
40.0	2.11	1,036	-0.01	N/A
50.0	2.19	999	0.00	N/A
60.0	2.27	964	0.00	N/A
70.0	2.35	930	0.00	N/A
80.0	2.44	897	0.00	N/A
90.0	2.53	865	0.00	N/A
100.0	2.62	835	0.01	N/A
110.0	2.71	806	0.01	N/A
120.0	2.81	779	0.01	N/A
130.0	2.91	752	0.01	N/A
140.0	3.01	727	0.02	N/A



E-29/139 - T-302X/170
(Existing joint owned utility
pole (PSNH/Fairpoint) in
existing Right-of-Way)

Not to Scale

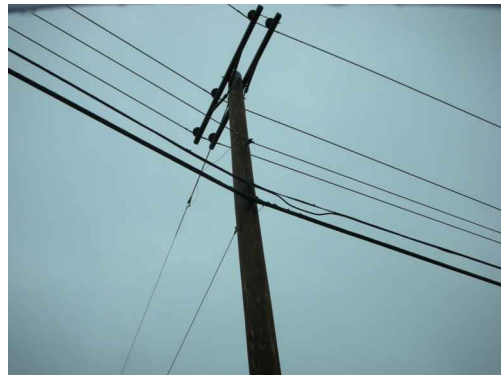
E-29/140 - T-302X/171
(Existing joint owned utility
pole (PSNH/Fairpoint) in
existing Right-of-Way)



E-29/139 - T-302X/170

Construction Notes:

NHOS proposes to install a 3/4 inch metal supporting strand between the existing utility poles shown above that will traverse the river. The strand will be installed at the proposed height (see above). The supporting strand will be secured to each pole using double dead end attachments to prevent any sag in the wire and maintain proper clearances. NHOS will lash a one inch diameter fiber optic cable (PVC jacket) to the strand using a dual lash method to provide security of the fiber over the right of way. The fiber will be tagged with twenty four hour contact information at each pole clamp. NHOS will employ the proper safety personnel during the crossing installation. The proposed install will meet all proper clearances from other Utilities. (see above). Additional pole guys will be added per NESC Rule 264 and as directed by pole owners.



E-29/140 - T-302X/171

Notes:

- The heights of structures shown hereon are based on field measurements taken with a Nikon 362 total station during a site survey on 09/22/11.
- The horizontal distance between the nearest bridge edge and the existing overhead wires is approximately 5.6'-6'.
- Because of the close horizontal proximity to the existing bridge structure, the simplified drawing is submitted with vertical distances measured to the structure. This process simplifies the preparation and review of the crossing without jeopardizing its intent to protect the safe usage of the waterway
- The smallest vertical distance from the top of existing bridge deck to the lowest existing overhead wires is 16.4'.
- The vertical distance between the top of water and bridge deck is approximately 22.4'.
- Vertical distances are representative of attachment heights after utility make ready moves are completed.



New Hampshire Optical Systems, Inc.
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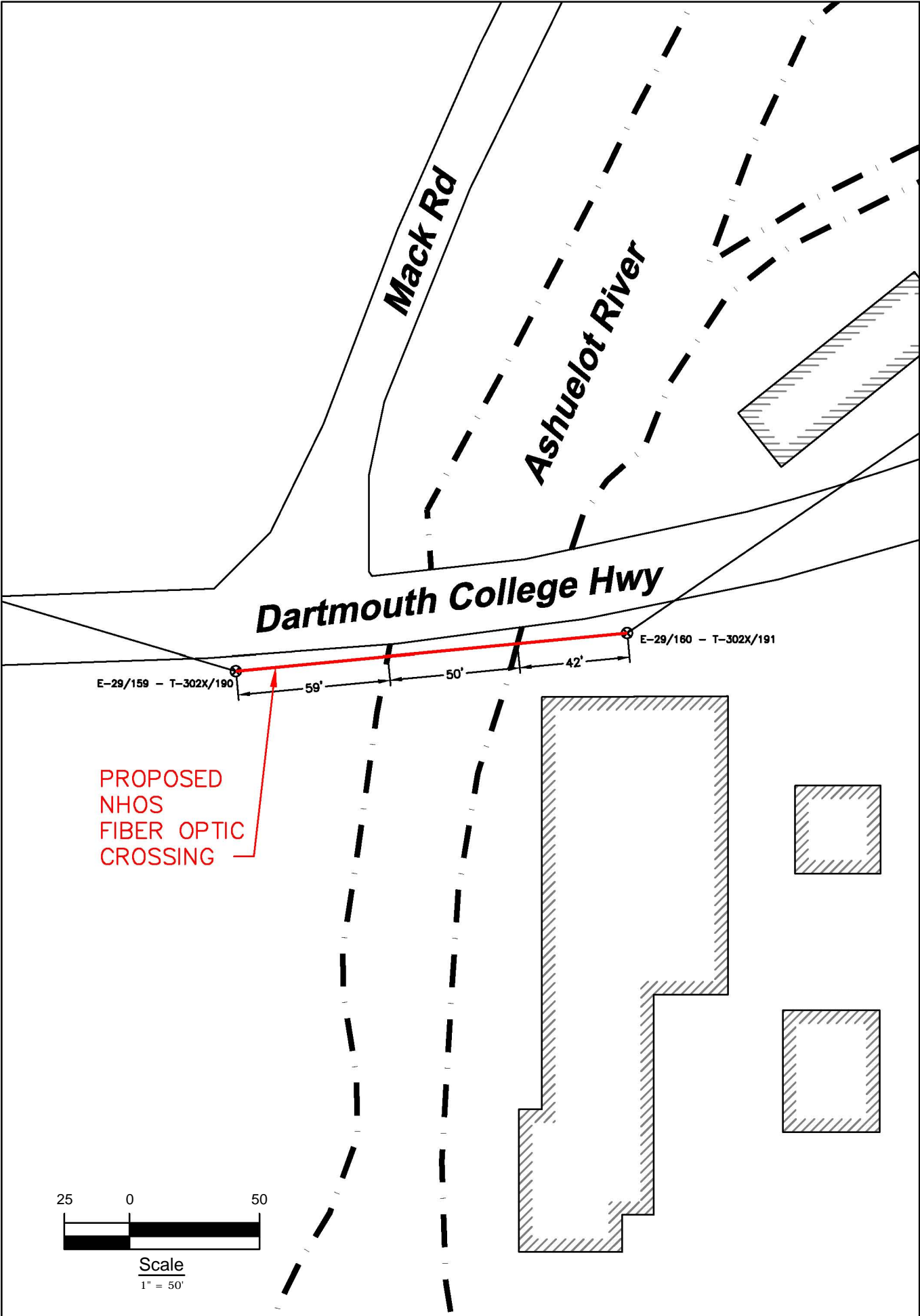
Project #TID-80-PRI-1
Drawing #AC-GIL-RIV-1

Date: 10/26/11
Revision #

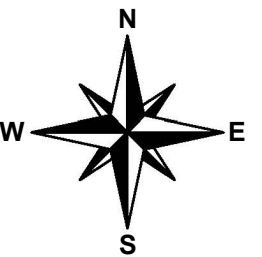
Proposed
Ashuelot River Crossing
Gilsum, NH

Location:
Gilsum Rd - Rt 10, Gilsum, NH
Nearest cross street-Centennial Rd.

Sheet 2 of 2



Proposed
River Crossing
Sullivan, NH



Project # TID-81 - Primary 1
Drawing # AC-SUL-RIV-1

Date: 10/25/11
Revision #

Proposed
River Crossing
Sullivan, NH

Location:
Gilsun Rd., Sullivan, NH
Nearest cross street- Mack Rd.



LOCUS MAP
(Not to Scale)



Spanmaster® Release 3.1 Sag / Tension Computations
09/01/11 Waveguide

Waveguide River and Rail Crossings

Selected Cables	X-SECT AREA (sq.in)	EFF MODULUS (psi)	NOMINAL DIAM (in)	EFF EXP. COEFF. (1/F)	CABLE WEIGHT (lb/ft)	E'A LOAD BEARING CAPACITY (lbs)	MAX. RATED LOAD (lbs)
1/4"6.6mEHS	0.0352	2.60E+07	0.250	5.60E-06	0.1210	914940	6650
ORF-O-288-LN	0.5782	2.70E+05	0.858	1.13E-05	0.1960	155982	651
Bundle			1.108		0.3170		

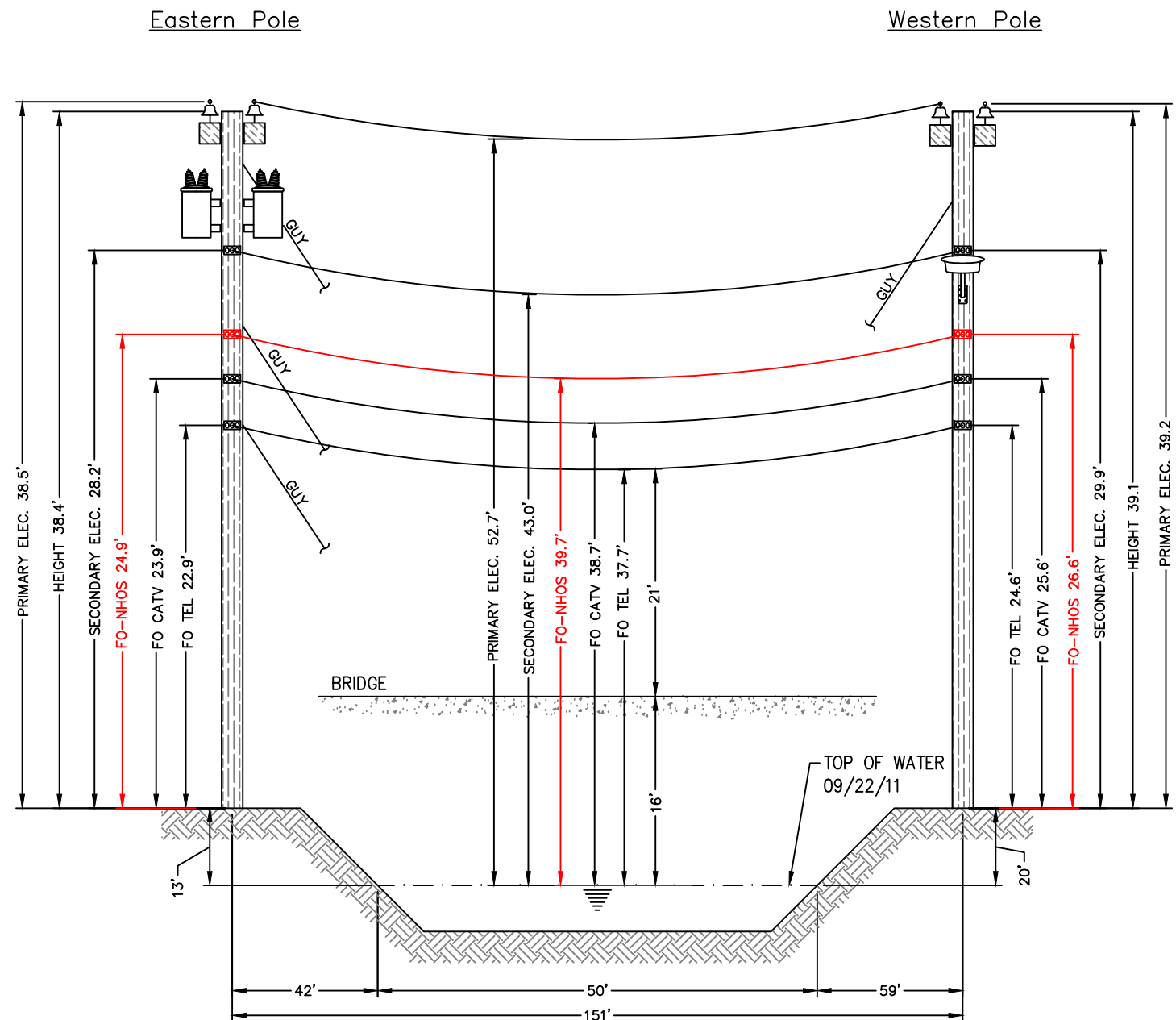
NESC RESULTS

Loading Condition	Temp. (F)	Ice Load lb/ft	Ice Thick in	Wind Constant lb/ft	Horz Load lb/sq ft	Result Load + Const lb/ft	Sag ft	Tension lb	% Len Chg From Input Conditions	Sag @	Horz Sag Comp ft	Vert Sag Comp ft	Vector Angle Deg
										Point 75.5 ft			
Rule 251 - Heavy	0.0	0.000	.50	.3	4.0	1.793	3.02	1888	0.08	3.03	1.42	2.67	28.1
232A1	120.0	1.000	.00	.0	4.0	0.317	1.89	479	0.01	1.89	0.00	1.89	0.0

Span Length = 151.00 ft
Span Sag = 1.51 ft (18.1 in)
Span Tension = 598 lb
Max Load = 6,650 lb
Usable load (60%) = 3,990 lb
Catenary Length = 151.040 ft
Stress Free Length @
Installed Temperature = 150.942 ft

Unloaded Strand
Sag = .81 ft (9.7 in) 0.54 %
Tension = 425 lb

Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
-40.0	.90	1,003	-0.02	N/A
-30.0	.94	960	-0.02	N/A
-20.0	.98	918	-0.02	N/A
-10.0	1.03	876	-0.01	N/A
.0	1.08	836	-0.01	N/A
10.0	1.13	798	-0.01	N/A
20.0	1.19	760	-0.01	N/A
30.0	1.25	725	-0.01	N/A
40.0	1.31	690	-0.01	N/A
50.0	1.37	658	0.00	N/A
60.0	1.44	627	0.00	N/A
70.0	1.51	598	0.00	N/A
80.0	1.58	571	0.00	N/A
90.0	1.66	545	0.01	N/A
100.0	1.73	521	0.01	N/A
110.0	1.81	499	0.01	N/A
120.0	1.89	479	0.01	N/A
130.0	1.96	460	0.02	N/A
140.0	2.04	442	0.02	N/A



E-29/160- T-302X/191

Construction Notes:

NHOS proposes to install a ¼ inch metal supporting strand between the existing utility poles shown above that will traverse the river. The strand will be installed at the proposed height (see above). The supporting strand will be secured to each pole using double dead end attachments to prevent any sag in the wire and maintain proper clearances. NHOS will use a one inch diameter fiber optic cable (PVC jacket) to the strand using a dual lash method to provide security of the fiber over the right of way. The fiber will be tagged with twenty four hour contact information at each pole clamp. NHOS will employ the proper safety personnel during the crossing installation. The proposed install will meet all proper clearances from other Utilities. (see above). Additional pole guys will be added per NESC Rule 264 and as directed by pole owners.



E-29/159 - T-302X/190



New Hampshire Optical Systems, Inc.
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(603-821-6467)

Proposed River Crossing Sullivan, NH

Notes:

1. The heights of structures shown hereon are based on field measurements taken with a Nikon 362 total station during a site survey on 09/22/11.
2. The horizontal distance between the nearest bridge edge and the existing overhead wires ranges from 7' to 8'.
3. Because of the close horizontal proximity to the existing bridge structure, the simplified drawing is submitted with vertical distances measured to the structure. This process simplifies the preparation and review of the crossing without jeopardizing its intent to protect the safe usage of the waterway
4. The smallest vertical distance from the top of existing bridge deck to the lowest existing overhead wires is 22'.
5. The vertical distance between the top of water and bridge deck is approximately 16'.
6. Vertical distances are representative of attachment heights after utility make ready moves are completed.

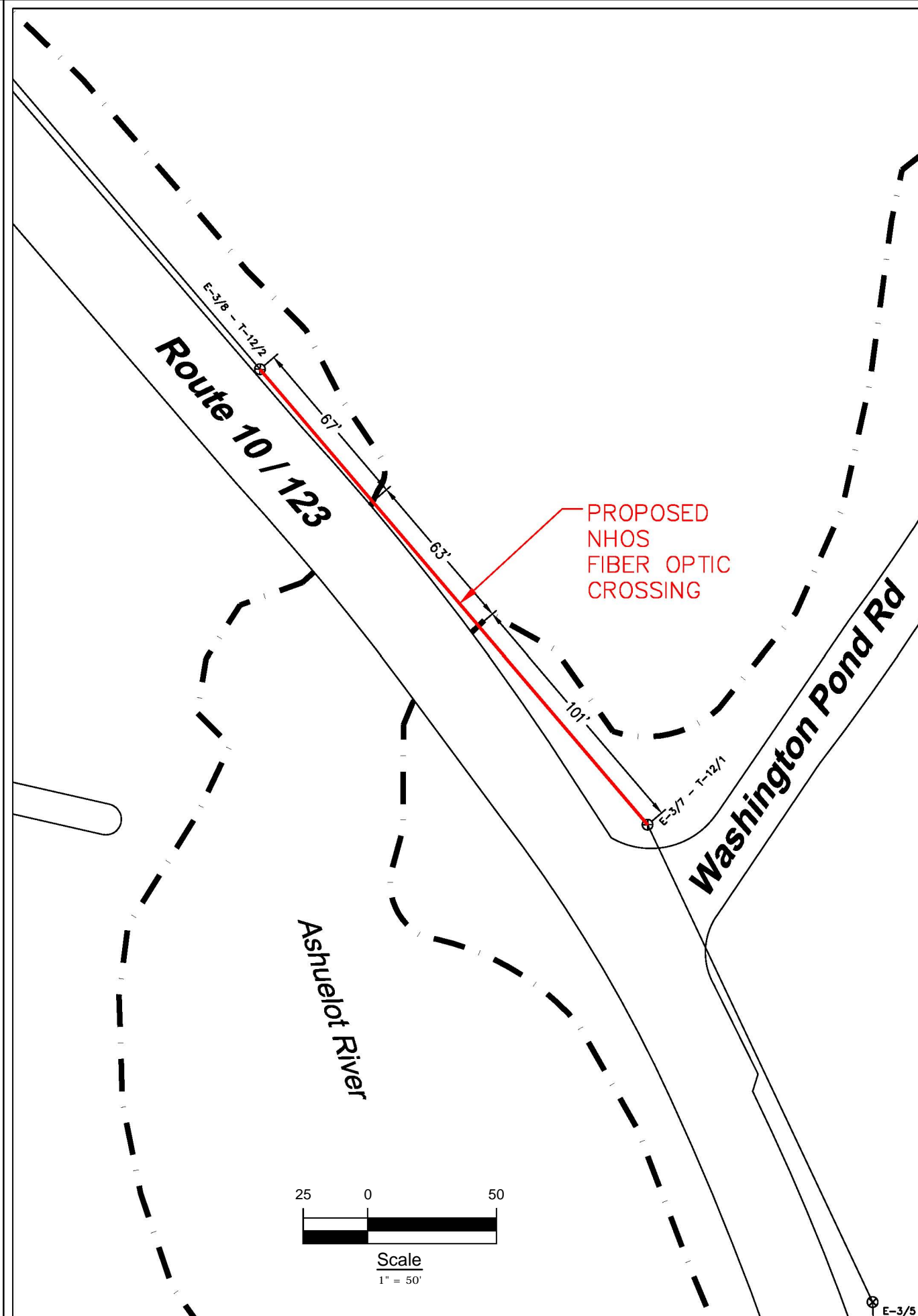
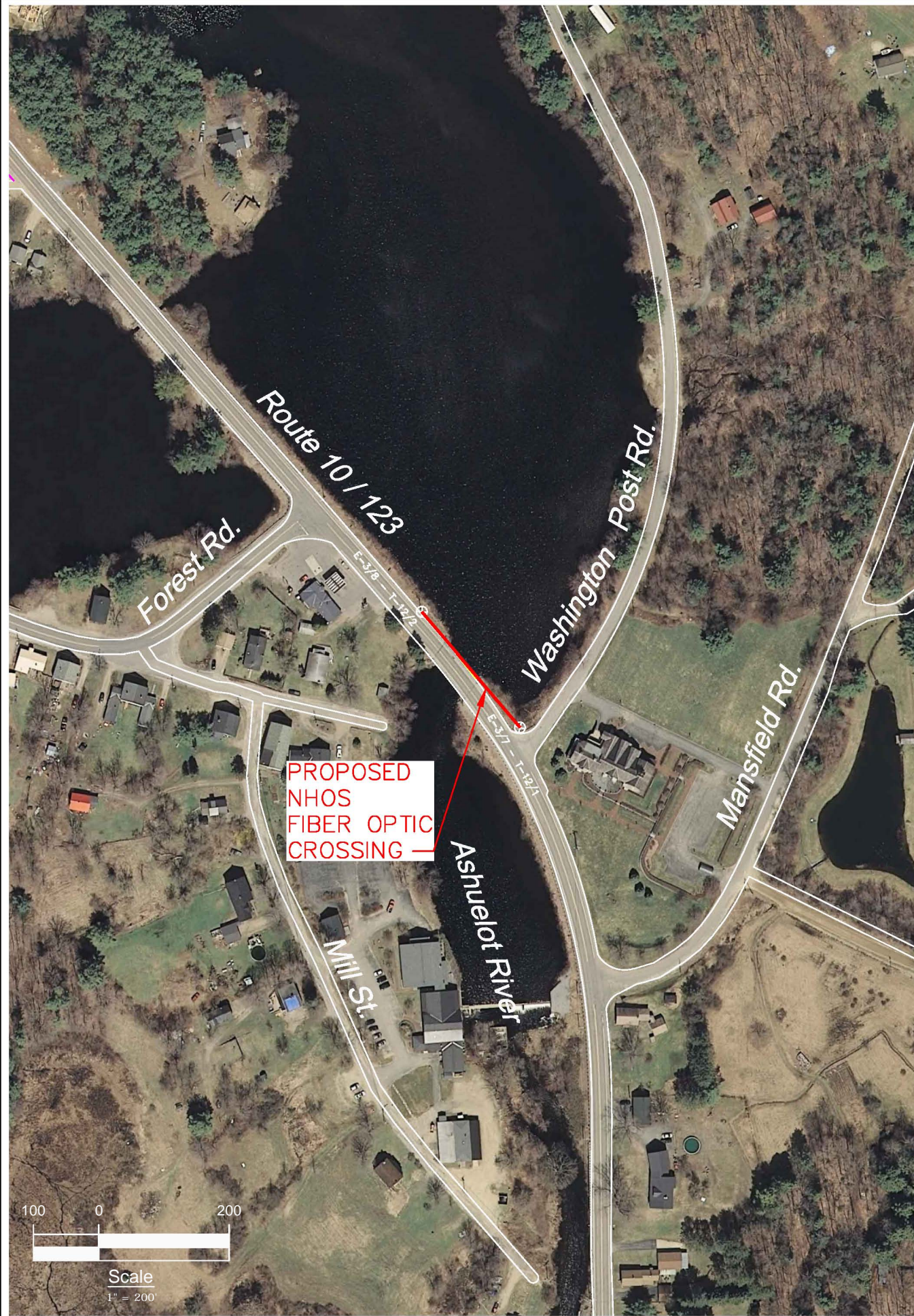
Project # TID-81 - Primary 1
Drawing # AC-SUL-RIV-1

Date: 10/25/11
Revision #

Proposed
River Crossing
Sullivan, NH

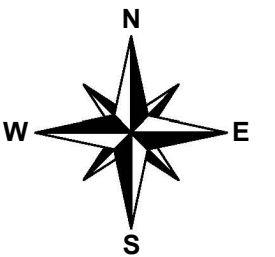
Location:
Gilsum Rd., Sullivan, NH
Nearest cross street- Mack Rd.

Sheet 2 of 2



NHOS
New Hampshire Optical Systems
New Hampshire Optical Systems, Inc.
99 Pine Hill Rd.
Nashua, NH 03063
(603-821-6467)

Proposed
River Crossing
Marlow, NH



Project # TID-83 - Primary 1
Drawing # AC-MARL-RIV-2

Date: 10/27/11
Revision #

Proposed
Stream Crossing
Marlow, NH

Location:
Route 10, Marlow, NH
Nearest cross street- Washington Post Rd.

Sheet 1 of 2



LOCUS MAP
(Not to Scale)



Spanmaster® Release 3.1 Sag / Tension Computations
09/01/11 Waveguide

Waveguide
River and Rail Crossings

Selected Cables	X-SECT AREA (sq.in)	EFF MODULUS (psi)	NOMINAL DIAM (in)	EFF.EXP. COEFF. (1/F)	CABLE WEIGHT (lb/ft)	E*A LOAD BEARING CAPACITY (lbs)	MAX. RATED LOAD (lbs)
1/4"6.6mEHS	0.0352	2.60E+07	0.250	5.60E-06	0.1210	914940	6650
ORF-O-288-LN	0.5782	2.70E+05	0.858	1.13E-05	0.1960	155982	651
Bundle			1.108		0.3170		

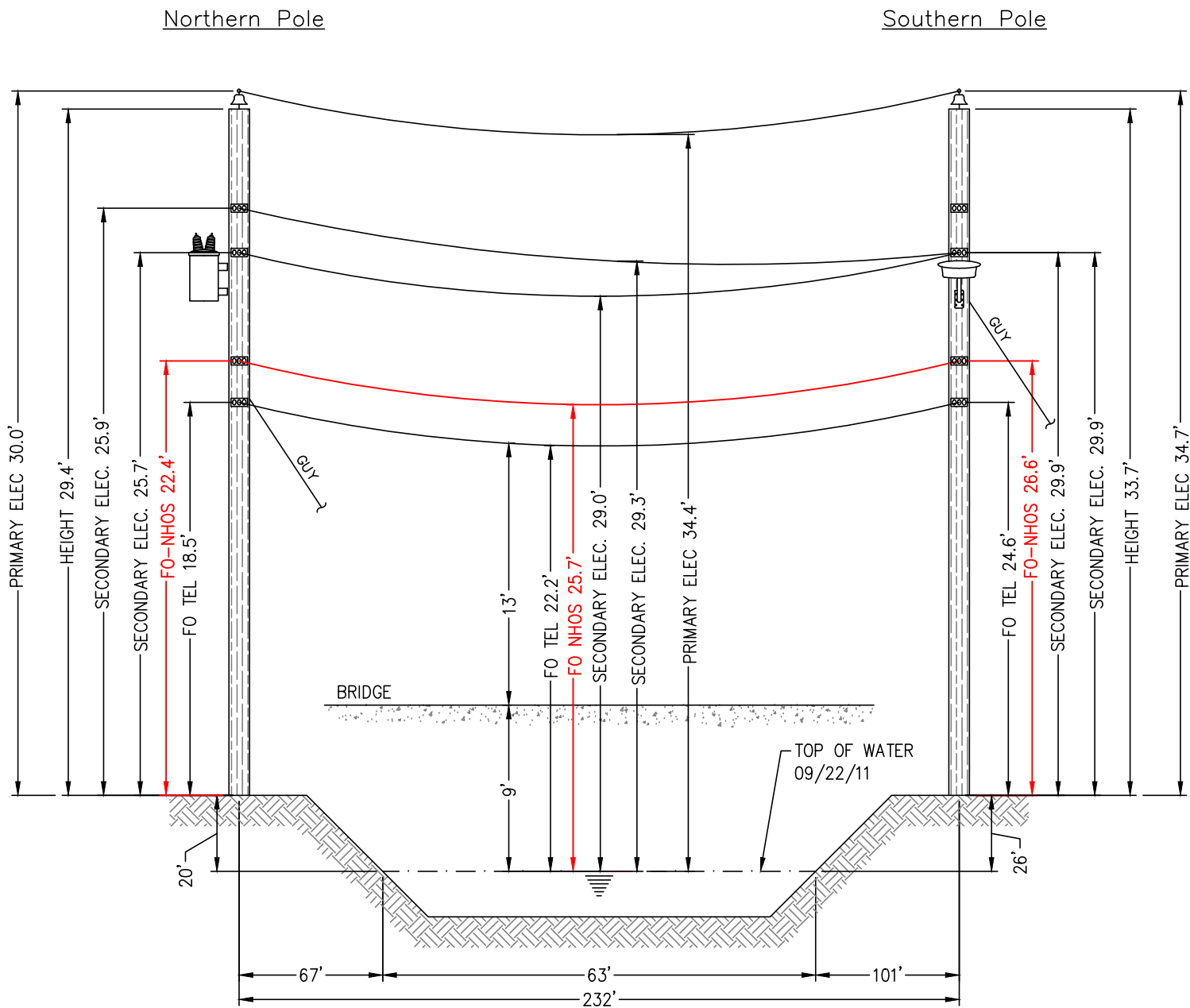
NESC RESULTS

Loading Condition	Temp. (F)	Ice Load lb/ft	Ice Thick in	Wind Constant lb/sq ft	Horz Wind Load lb/ft	Result Load + Const lb/ft	Sag ft	Tension lb	% Len Chg From Input Conditions	Sag @ Point 116 ft	Horz Sag Comp ft	Vert Sag Comp ft	Vector Angle Deg
Rule 251 - Heavy	0.0	1.000	.50	.3	4.0	1.793	5.26	2286	0.11	5.28	2.48	4.64	28.1
232A1	120.0	0.000	.00	.0	0.0	0.317	2.78	768	0.01	2.78	0.00	2.78	0.0

Span Length = 232.00 ft
Span Sag = 2.32 ft (27.8 in)
Span Tension = 919 lb
Max Load = 6,650 lb
Usable load (60%) = 3,990 lb
Catenary Length = 232.062 ft
Stress Free Length @
Installed Temperature = 231.829 ft

Unloaded Strand
Sag = 1.11 ft (13.4 in) 0.48 %
Tension = 731 lb

Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
-40.0	1.58	1,349	-0.01	N/A
-30.0	1.63	1,305	-0.01	N/A
-20.0	1.69	1,263	-0.01	N/A
-10.0	1.74	1,221	-0.01	N/A
.0	1.80	1,179	-0.01	N/A
10.0	1.87	1,139	-0.01	N/A
20.0	1.94	1,099	-0.01	N/A
30.0	2.01	1,061	-0.01	N/A
40.0	2.08	1,023	-0.01	N/A
50.0	2.16	987	0.00	N/A
60.0	2.24	952	0.00	N/A
70.0	2.32	918	0.00	N/A
80.0	2.41	885	0.00	N/A
90.0	2.49	854	0.00	N/A
100.0	2.59	824	0.01	N/A
110.0	2.68	795	0.01	N/A
120.0	2.78	768	0.01	N/A
130.0	2.87	742	0.01	N/A
140.0	2.97	717	0.02	N/A



E-3/8 - T-12/2
(Existing joint owned utility
pole (PSNH/Fairpoint) in
existing Right-of-Way)

E-3/7 - T-12/1
(Existing joint owned utility
pole (PSNH/Fairpoint) in
existing Right-of-Way)



E-3/8 - T-12/2

Construction Notes:

NHOS proposes to install a 1/4 inch metal supporting strand between the existing utility poles shown above that will traverse the river. The strand will be installed at the proposed height (see above). The supporting strand will be secured to each pole using double dead end attachments to prevent any sag in the wire and maintain proper clearances. NHOS will lash a one inch diameter fiber optic cable (PVC jacket) to the strand using a dual lash method to provide security of the fiber over the right of way. The fiber will be tagged with twenty four hour contact information at each pole clamp. NHOS will employ the proper safety personnel during the crossing installation. The proposed install will meet all proper clearances from other Utilities. (see above). Additional pole guys will be added per NESC Rule 264 and as directed by pole owners.



E-## - T-##



New Hampshire Optical Systems, Inc.
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(603-821-6467)

Proposed
River Crossing
Marlow, NH

Notes:

- The heights of structures shown hereon are based on field measurements taken with a Nikon 362 total station during a site survey on 09/22/11.
- The horizontal distance between the nearest bridge edge and the existing overhead wires ranges from 1' to 3'.
- Because of the close horizontal proximity to the existing bridge structure, the simplified drawing is submitted with vertical distances measured to the structure. This process simplifies the preparation and review of the crossing without jeopardizing its intent to protect the safe usage of the waterway
- The smallest vertical distance from the top of existing bridge deck to the lowest existing overhead wires is 13'.
- The vertical distance between the top of water and bridge deck is approximately 9'.
- Vertical distances are representative of attachment heights after utility make ready moves are completed.

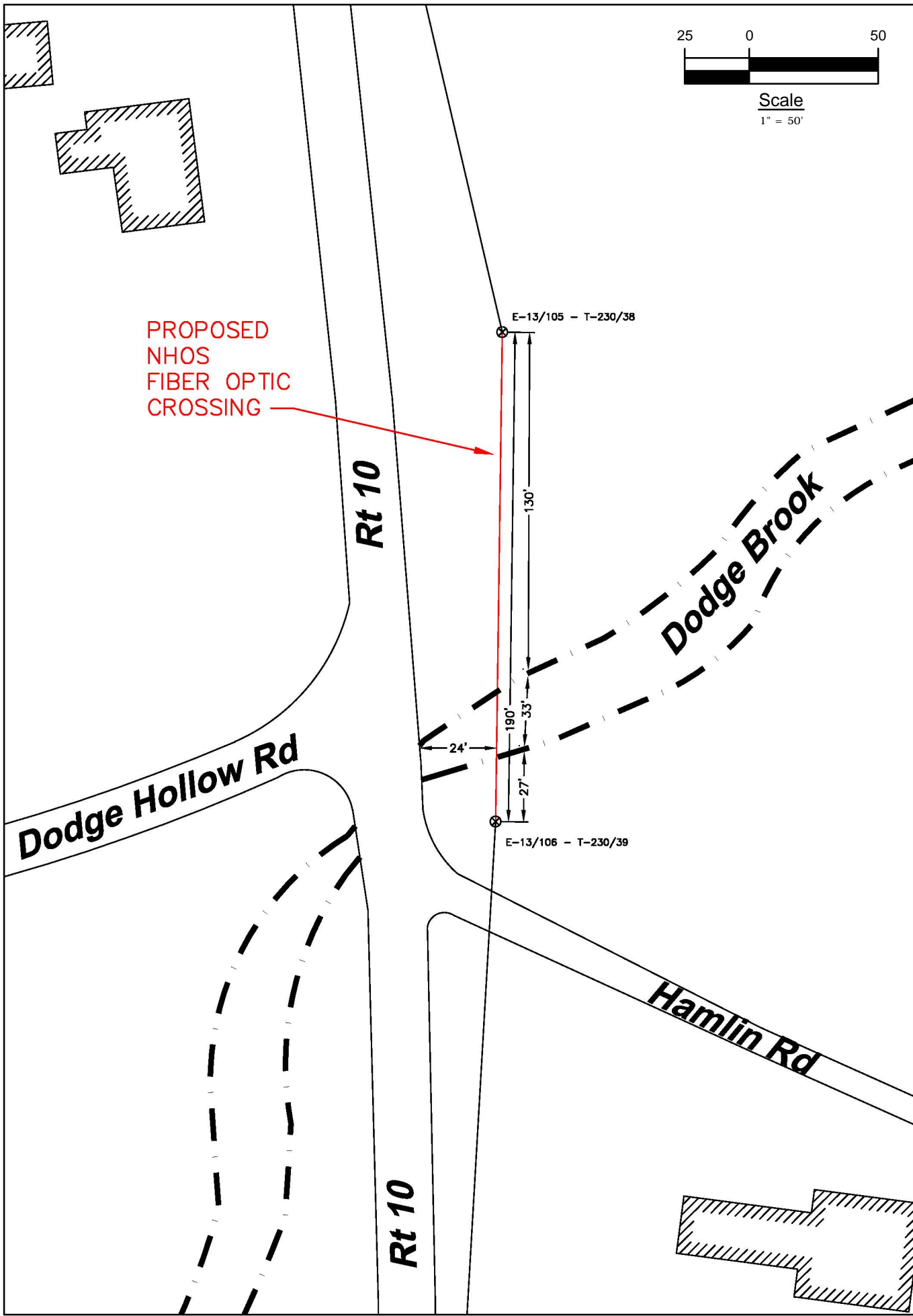
Project # TID-83 - Primary 1
Drawing # AC-MARL-RIV-2

Date: 10/27/11
Revision #

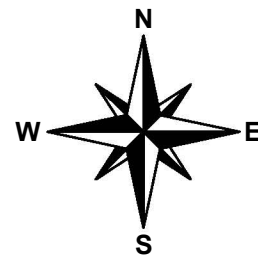
Proposed
Stream Crossing
Marlow, NH

Location:
Route 10, Marlow, NH
Nearest cross street- Washington Post Rd.

Sheet 2 of 2



Proposed Dodge
Brook Crossing
Lempster, NH

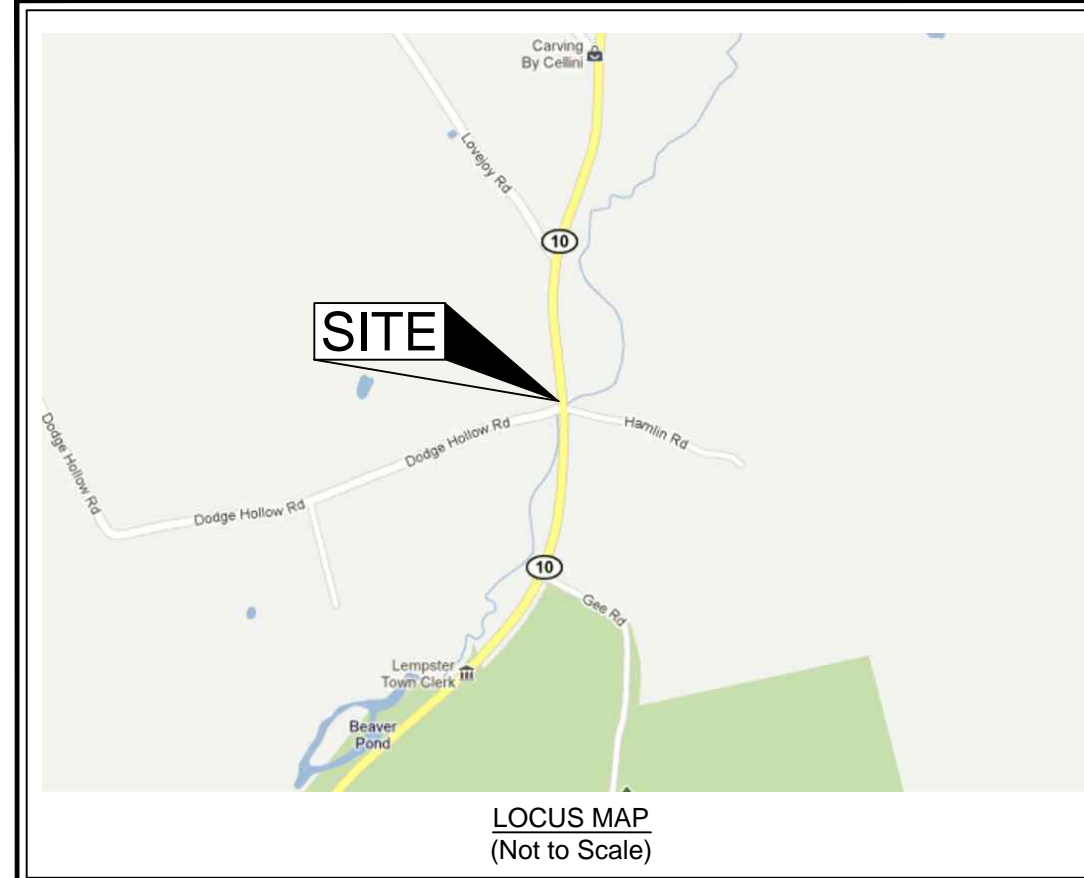


Project # TID-84-PRI-1
Drawing # AC-LEM-RIV-1

Date: 10/27/2011
Revision #

Proposed
Dodge Brook Crossing
Lempster, NH

Location:
Rt 10, Lempster, NH
Nearest cross street- Dodge Hollow Rd



Spanmaster® Release 3.1 Sag / Tension Computations
09/01/11 Waveguide

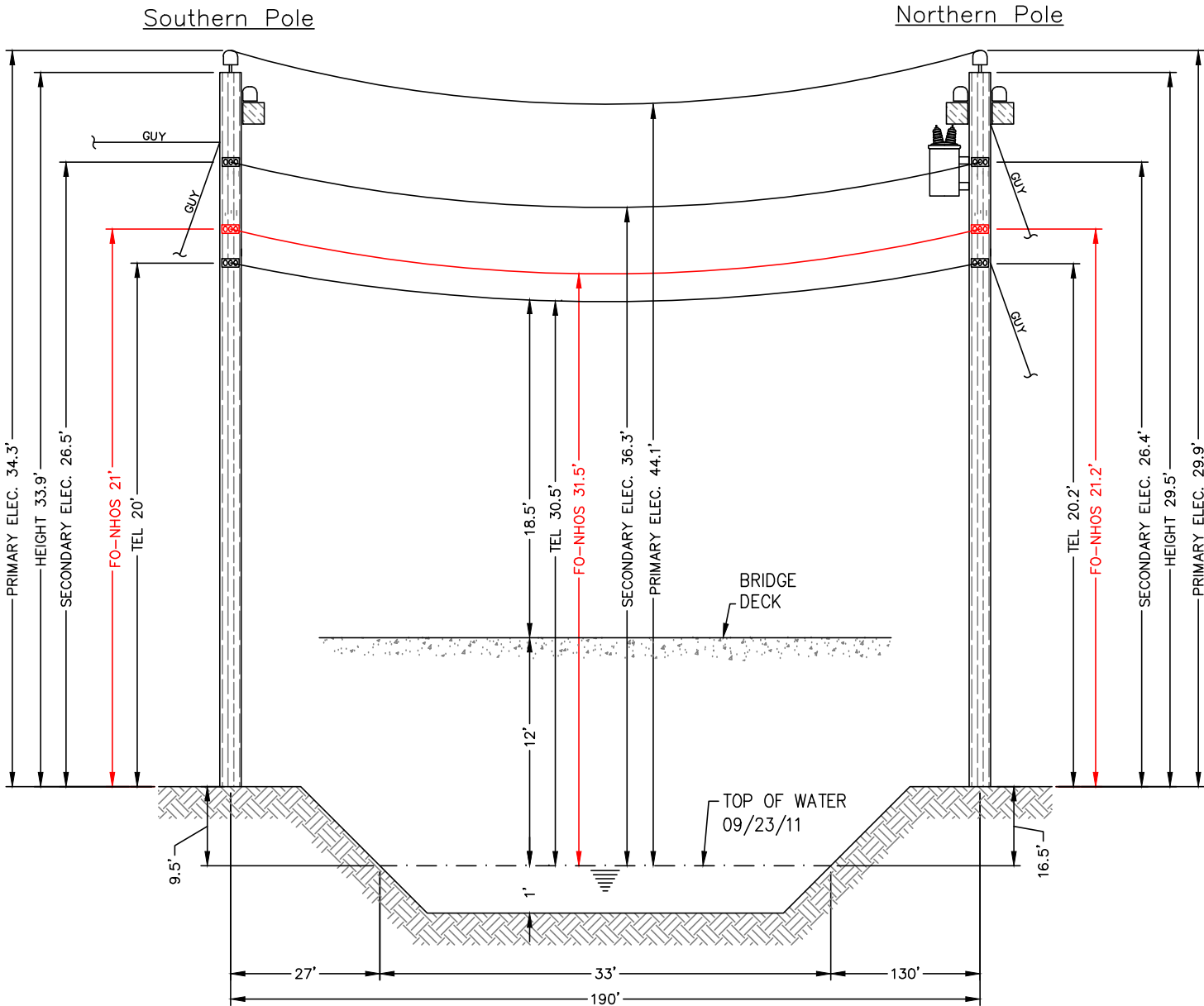
Waveguide
River and Rail Crossings

Selected Cables	X-SECT AREA (sq.in)	EFF MODULUS (psi)	NOMINAL DIAM (in)	EFF.EXP. COEFF. (1/F)	CABLE WEIGHT (lb/ft)	E*A LOAD BEARING CAPACITY (lbs)	MAX. RATED LOAD (lbs)
1/4"6.6mEHS	0.0352	2.60E+07	0.250	5.60E-06	0.1210	914940	6650
ORF-O-288-LN Bundle	0.5782	2.70E+05	0.858	1.13E-05	0.1960	155982	651
			1.108		0.3170		

NESC RESULTS

Loading Condition	Temp. (F)	Ice Load lb/ft	Ice Thick in	Wind Constant lb/sq ft	Horz Wind Load lb/sq ft	Result Load + Const lb/ft	Sag ft	Tension lb	% Len Chg From Input Conditions	Sag @ Point 95 ft	Horz Sag Comp ft	Vert Sag Comp ft	Vector Angle Deg
Rule 251 - Heavy 232A1	0.0	1,000	.50	.3	4.0	1.793	4.07	1984	0.10	4.08	1.92	3.59	28.1
	120.0	0.000	.00	.0	0.0	0.317	2.32	616	0.01	2.32	0.00	2.32	0.0

Span Length = 190.00 ft	Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
Span Sag = 1.90 ft (22.8 in)	-40.0	1.22	1,171	-0.02	N/A
Span Tension = 753 lb	-30.0	1.27	1,128	-0.01	N/A
Max Load = 6,650 lb	-20.0	1.32	1,085	-0.01	N/A
Usable load (60%) = 3,990 lb	-10.0	1.37	1,044	-0.01	N/A
Catenary Length = 190.051 ft	.0	1.42	1,003	-0.01	N/A
Stress Free Length @ Installed Temperature = 189.894 ft	10.0	1.48	963	-0.01	N/A
	20.0	1.54	925	-0.01	N/A
Unloaded Strand	30.0	1.61	888	-0.01	N/A
Sag = .96 ft (11.5 in) 0.50 %	40.0	1.68	852	-0.01	N/A
Tension = 571 lb	50.0	1.75	817	0.00	N/A
	60.0	1.82	784	0.00	N/A
	70.0	1.90	752	0.00	N/A
	80.0	1.98	722	0.00	N/A
	90.0	2.06	693	0.00	N/A
	100.0	2.15	666	0.01	N/A
	110.0	2.23	640	0.01	N/A
	120.0	2.32	616	0.01	N/A
	130.0	2.41	593	0.02	N/A
	140.0	2.50	572	0.02	N/A



E-13/106 - T-230/39
(Existing joint owned utility
pole (NHEC/Fairpoint) in
existing Right-of-Way)

Not to Scale

E-13/105 - T-230/38
(Existing joint owned utility
pole (NHEC/Fairpoint) in
existing Right-of-Way)



E-13/106 - T-230/39

Construction Notes:

NHOS proposes to install a ¼ inch metal supporting strand between the existing utility poles shown above that will traverse the brook. The strand will be installed at the proposed height (see above). The supporting strand will be secured to each pole using double dead end attachments to prevent any sag in the wire and maintain proper clearances. NHOS will lash a one inch diameter fiber optic cable (PVC jacket) to the strand using a dual lash method to provide security of the fiber over the right of way. The fiber will be tagged with twenty four hour contact information at each pole clamp. NHOS will employ the proper safety personnel during the crossing installation. The proposed install will meet all proper clearances from other Utilities. (see above). Additional pole guys will be added per NESC Rule 264 and as directed by pole owners.



E-13/105 - T-230/38



New Hampshire Optical Systems, Inc.
99 Pine Hill Rd.
Nashua, NH 03063
(603-821-6467)

Proposed Dodge
Brook Crossing
Lempster, NH

Notes:

The heights of structures shown hereon are based on field measurements taken with a Nikon 362 total station during a site survey on 9/23/11.

The horizontal distance between the nearest bridge edge and the existing overhead wires ranges from 23' to 24'.

The smallest vertical distance from the top of existing bridge deck to the lowest existing overhead wires is 18.5'.

The vertical distance between the top of water and bridge deck is approximately 12'.

The waterway is classified as not suitable for sail boating and per NESC Table 232-1 a vertical clearance of 14' must be maintained between the lowest conductor and 10 year floodplain.

Based on the FEMA Flood Insurance Rate Map for Sullivan County Map Number 33019C0405E Panel 405 of 445 dated 6/23/06 is no FEMA Flood Profile data available for the Dodge Brook as it does not reside in a flood zone. However with 30.5' of clearance from the stream to the lowest existing overhead wire the risk from a 10 year flood is negligible.

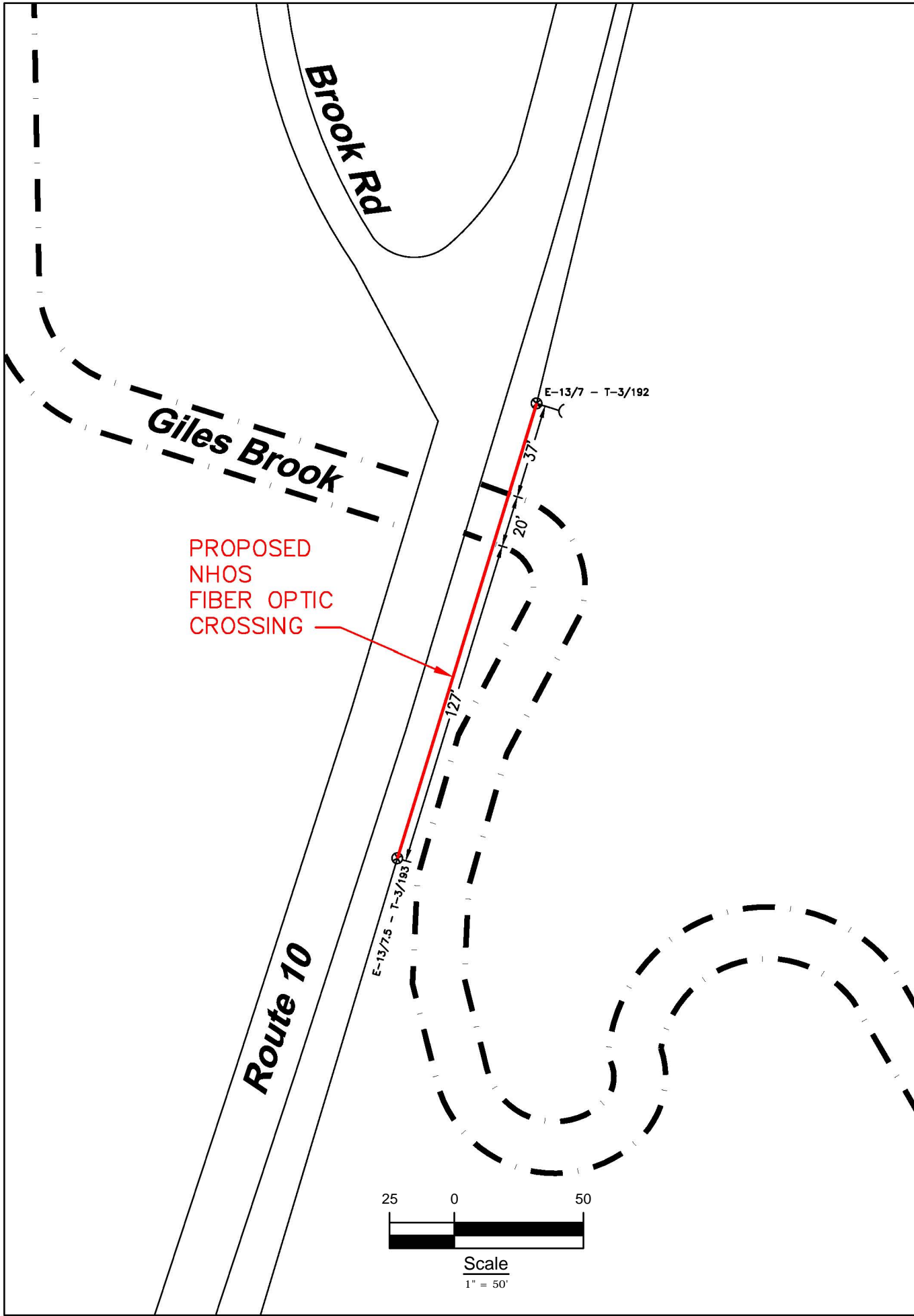
Vertical distances are representative of attachment heights after utility make ready moves are completed.

Project # TID-84-PRI-1
Drawing # AC-LEM-RIV-1

Date: 10/27/2011
Revision #

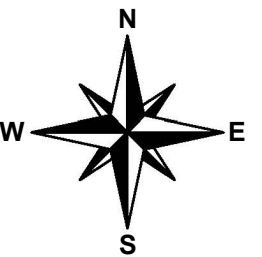
Proposed
Dodge Brook Crossing
Lempster, NH

Location:
Rt 10, Lempster, NH
Nearest cross street- Dodge Hollow Rd



NHOS
New Hampshire Optical Systems
New Hampshire Optical Systems, Inc.
99 Pine Hill Rd.
Nashua, NH 03063
(603-821-6467)

Proposed
River Crossing
Lempster, NH



Project # TID-85 - Primary 1
Drawing # AC-LEM-RIV-2

Date: 10/27/11
Revision #

Proposed
River Crossing
Lempster, NH

Location:
Route 10, Lempster NH
Nearest cross street- Giles Brook Rd.



LOCUS MAP
(Not to Scale)



Spanmaster® Release 3.1 Sag / Tension Computations

Waveguide
River and Rail Crossings

09/01/11 Waveguide

Selected Cables	X-SECT AREA (sq.in)	EFF MODULUS (psi)	NOMINAL DIAM (in)	EFF.EXP. COEFF. (1/F)	CABLE WEIGHT (lb/ft)	E*A LOAD BEARING CAPACITY (lbs)	MAX. RATED LOAD (lbs)
1/4"6.6mEHS	0.0352	2.60E+07	0.250	5.60E-06	0.1210	914940	6650
ORF-O-288-LN	0.5782	2.70E+05	0.858	1.13E-05	0.1960	155982	651
Bundle			1.108		0.3170		

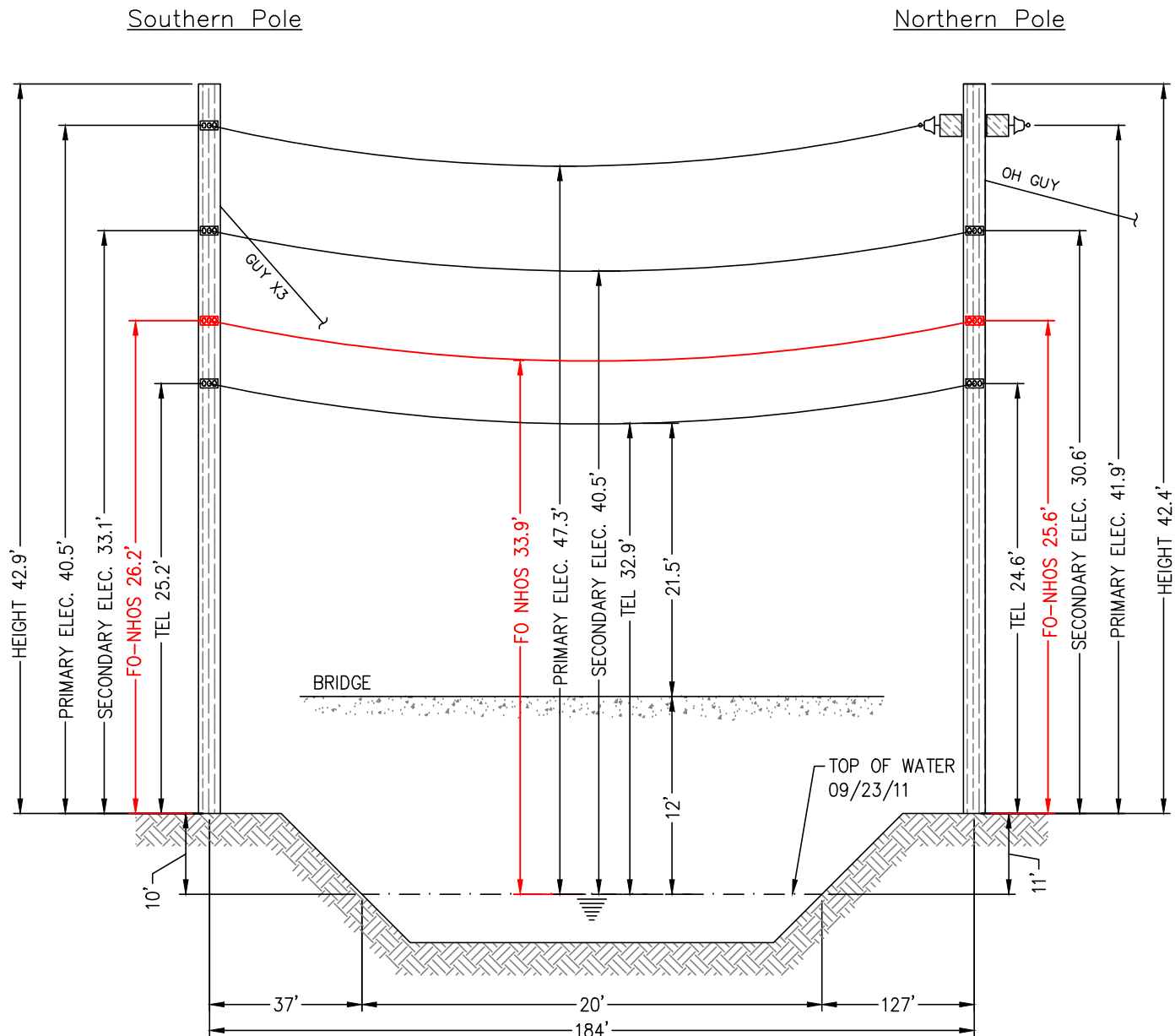
NESC RESULTS

Loading Condition	Temp. (F)	Ice Load (lb/ft)	Ice Thick in	Wind Constant lb/ft	Horz Wind Load lb/ft	Result Load + Const lb/ft	Sag ft	Tension lb	% Len Chg From Input Conditions	Sag @ Point 52 ft	Horz Sag Comp ft	Vert Sag Comp ft	Vector Angle Deg
Rule 251 - Heavy	0.0	1.000	.50	.3	4.0	1.793	3.90	1940	0.09	3.91	1.84	3.44	28.1
232A1	120.0	0.000	.00	.0	0.0	0.317	2.25	595	0.01	2.26	0.00	2.25	0.0

Span Length = 184.00 ft
Span Sag = 1.84 ft (22.1 in)
Span Tension = 729 lb
Max Load = 6,650 lb
Usable load (60%) = 3,990 lb
Catenary Length = 184.049 ft
Stress Free Length @
Installed Temperature = 183.903 ft

Unloaded Strand
Sag = .93 ft (11.2 in) 0.51 %
Tension = 546 lb

Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
-40.0	1.17	1,145	-0.02	N/A
-30.0	1.21	1,102	-0.02	N/A
-20.0	1.26	1,060	-0.01	N/A
-10.0	1.32	1,018	-0.01	N/A
.0	1.37	977	-0.01	N/A
10.0	1.43	938	-0.01	N/A
20.0	1.49	900	-0.01	N/A
30.0	1.55	863	-0.01	N/A
40.0	1.62	827	-0.01	N/A
50.0	1.69	793	0.00	N/A
60.0	1.76	760	0.00	N/A
70.0	1.84	728	0.00	N/A
80.0	1.92	698	0.00	N/A
90.0	2.00	670	0.00	N/A
100.0	2.08	644	0.01	N/A
110.0	2.17	618	0.01	N/A
120.0	2.25	595	0.01	N/A
130.0	2.34	573	0.02	N/A
140.0	2.43	552	0.02	N/A



E-13/7 - T-3/192
(Existing joint owned utility
pole (NHEC/Fairpoint) in
existing Right-of-Way)

E-13/7.5 - T-3/193
(Existing joint owned utility
pole (NHEC/Fairpoint) in
existing Right-of-Way)



E-13/7 - T-3/192

Construction Notes:

NHOS proposes to install a 1/4 inch metal supporting strand between the existing utility poles shown above that will traverse the river. The strand will be installed at the proposed height (see above). The supporting strand will be secured to each pole using double dead end attachments to prevent any sag in the wire and maintain proper clearances. NHOS will lash a one inch diameter fiber optic cable (PVC jacket) to the strand using a dual lash method to provide security of the fiber over the right of way. The fiber will be tagged with twenty four hour contact information at each pole clamp. NHOS will employ the proper safety personnel during the crossing installation. The proposed install will meet all proper clearances from other Utilities. (see above). Additional pole guys will be added per NESC Rule 264 and as directed by pole owners.



E-13/7.5 - T-3/193



New Hampshire Optical Systems, Inc.
99 Pine Hill Rd.
Nashua, NH 03063
(603-821-6467)

Proposed
River Crossing
Lempster, NH

Notes:

- The heights of structures shown hereon are based on field measurements taken with a Nikon 362 total station during a site survey on 09/23/11.
- The horizontal distance between the nearest bridge edge and the existing overhead wires ranges from 8' to 9'.
- Because of the close horizontal proximity to the existing bridge structure, the simplified drawing is submitted with vertical distances measured to the structure. This process simplifies the preparation and review of the crossing without jeopardizing its intent to protect the safe usage of the waterway
- The smallest vertical distance from the top of existing bridge deck to the lowest existing overhead wires is 21.5'.
- The vertical distance between the top of water and bridge deck is approximately 12'.
- Vertical distances are representative of attachment heights after utility make ready moves are completed.

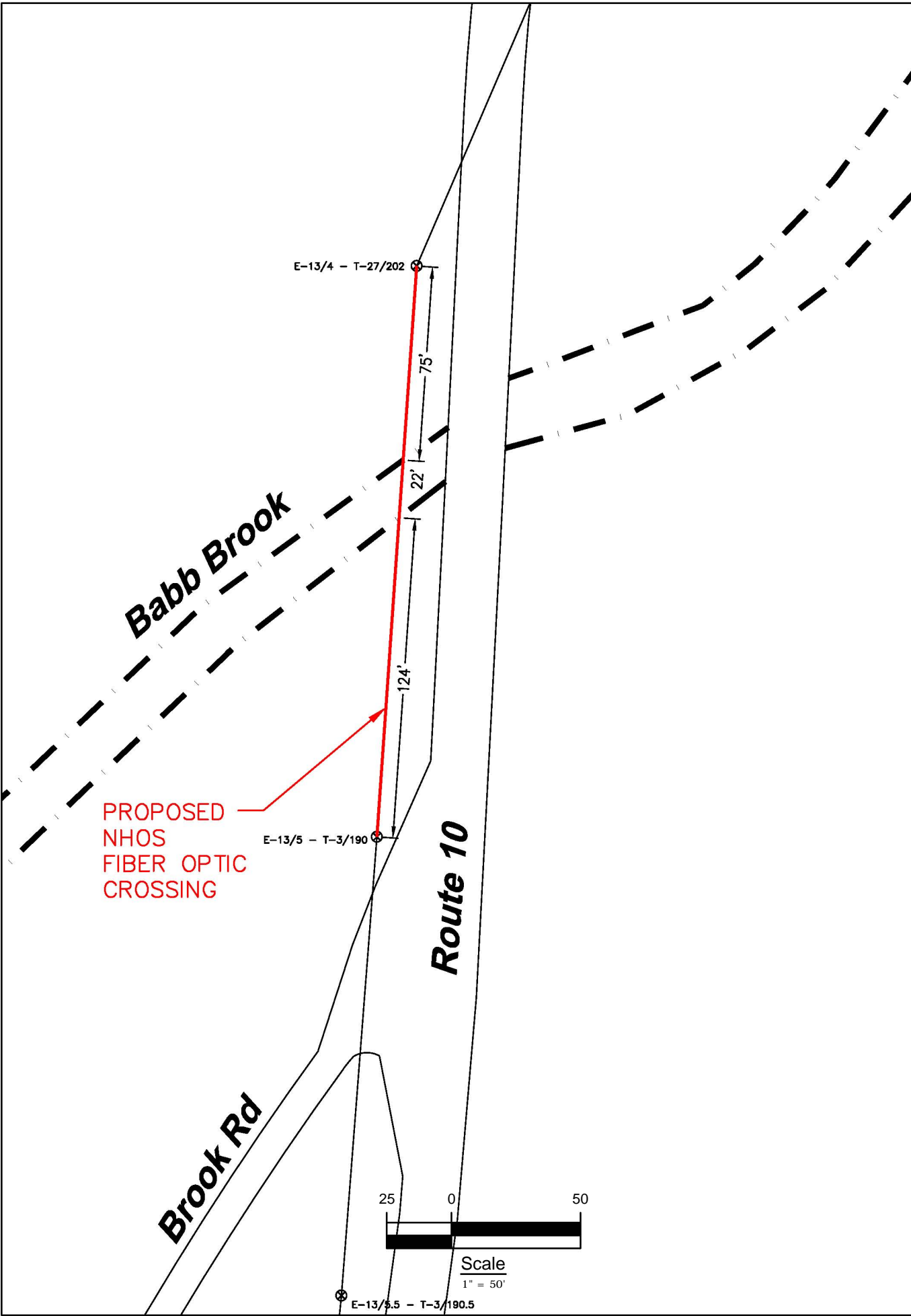
Project # TID-85 - Primary 1
Drawing # AC-LEM-RIV-2

Date: 10/27/11
Revision #

Proposed
River Crossing
Lempster, NH

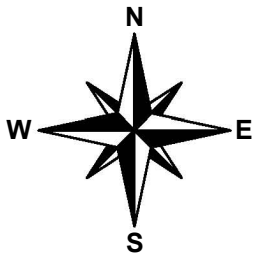
Location:
Route 10, Lempster NH
Nearest cross street- Giles Brook Rd.

Sheet 2 of 2



NHOS
New Hampshire Optical Systems
New Hampshire Optical Systems, Inc.
99 Pine Hill Rd.
Nashua, NH 03063
(603-821-6467)

Proposed
River Crossing
Lempster, NH



Project # TID-86 - Primary 1
Drawing # AC-LEM-RIV-3

Date: 10/27/11
Revision #

Proposed
River Crossing
Lempster, NH

Location:
Route 10, Lempster NH
Nearest cross street- Giles Brook Rd.



LOCUS MAP
(Not to Scale)



Spanmaster® Release 3.1 Sag / Tension Computations
09/01/11 Waveguide

Waveguide
River and Rail Crossings

Selected Cables	X-SECT AREA (sq.in)	EFF MODULUS (psi)	NOMINAL DIAM (in)	EFF.EXP. COEFF. (1/F)	CABLE WEIGHT (lb/ft)	E*A LOAD BEARING CAPACITY (lbs)	MAX. RATED LOAD (lbs)
1/4"6.mEHS	0.0352	2.60E+07	0.250	5.60E-06	0.1210	914940	6650
ORF-O-288-LN Bundle	0.5782	2.70E+05	0.858	1.13E-05	0.1960	155982	651

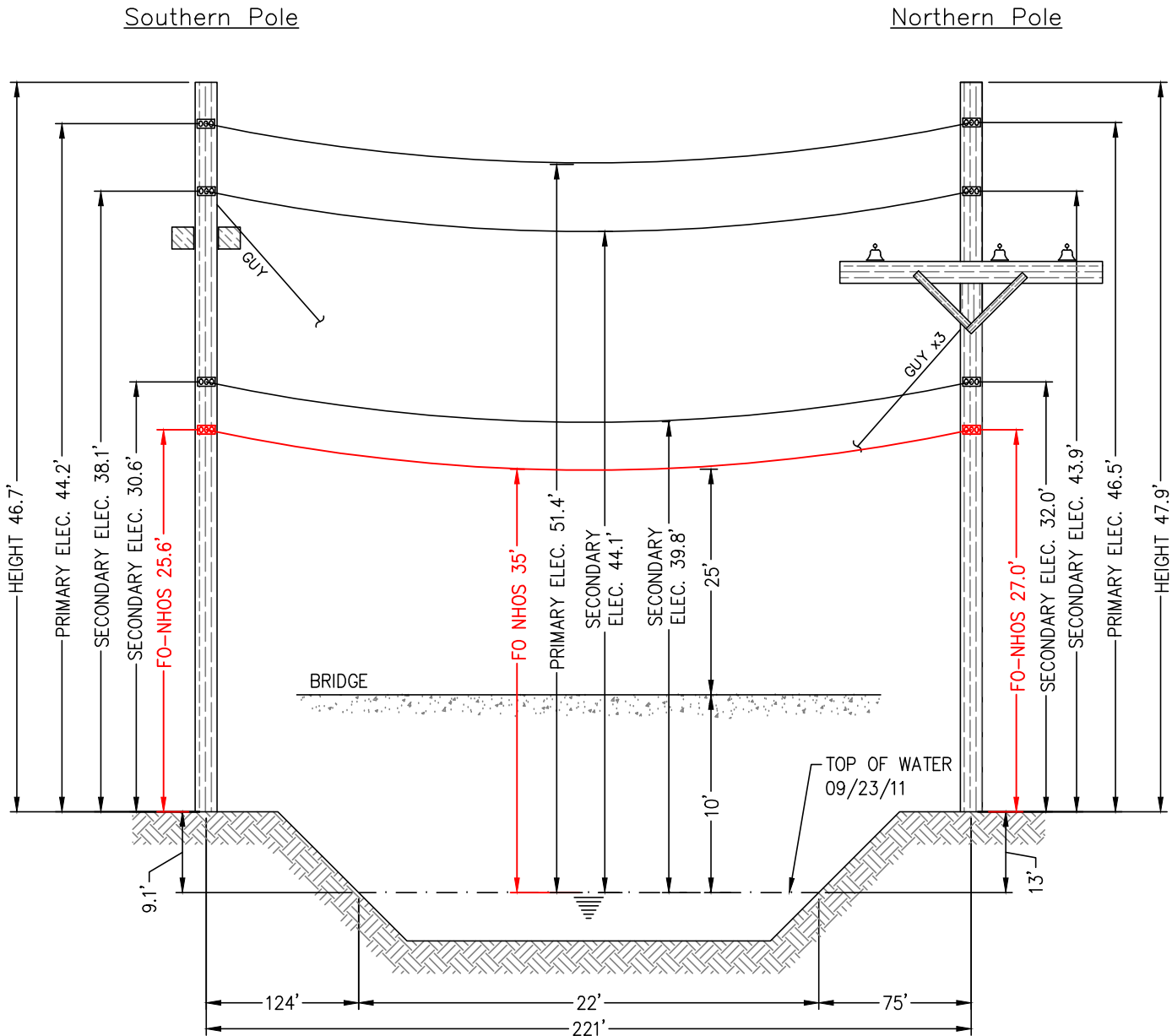
NESC RESULTS

Loading Condition	Temp. (F)	Ice Load lb/ft	Ice Thick in	Wind Constant lb/ft	Horz Wind Load lb/ft	Result Load + Const lb/ft	Sag ft	Tension lb	% Len Chg From Input Conditions	Sag @ Point 110.5 ft	Horz Sag Comp ft	Vert Sag Comp ft	Vector Angle Deg
Rule 251 - Heavy 232A1	0.0	1.000	.50	.3	4.0	1.793	4.94	2209	0.11	4.96	2.33	4.36	28.1
	120.0	0.000	.00	.0	0.0	0.317	2.66	728	0.01	2.66	0.00	2.66	0.0

Span Length = 221.00 ft
Span Sag = 2.21 ft (26.5 in)
Span Tension = 876 lb
Max Load = 6,650 lb
Usable load (60%) = 3,990 lb
Catenary Length = 221.059 ft
Stress Free Length @
Installed Temperature = 220.848 ft

Unloaded Strand
Sag = 1.07 ft (12.9 in) 0.49 %
Tension = 689 lb

Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
-40.0	1.48	1,302	-0.01	N/A
-30.0	1.53	1,259	-0.01	N/A
-20.0	1.59	1,216	-0.01	N/A
-10.0	1.64	1,174	-0.01	N/A
.0	1.70	1,133	-0.01	N/A
10.0	1.77	1,093	-0.01	N/A
20.0	1.83	1,054	-0.01	N/A
30.0	1.90	1,016	-0.01	N/A
40.0	1.97	979	-0.01	N/A
50.0	2.05	943	0.00	N/A
60.0	2.13	908	0.00	N/A
70.0	2.21	875	0.00	N/A
80.0	2.29	842	0.00	N/A
90.0	2.38	812	0.00	N/A
100.0	2.47	782	0.01	N/A
110.0	2.56	754	0.01	N/A
120.0	2.66	728	0.01	N/A
130.0	2.75	702	0.01	N/A
140.0	2.85	678	0.02	N/A



E-13/5 - T-3/190
(Existing joint owned utility
pole (NHEC/Fairpoint) in
existing Right-of-Way)

E-13/4 - T-27/202
(Existing joint owned utility
pole (NHEC/Fairpoint) in
existing Right-of-Way)



E-13/5 - T-3/190

Construction Notes:

NHOS proposes to install a 1/4 inch metal supporting strand between the existing utility poles shown above that will traverse the river. The strand will be installed at the proposed height (see above). The supporting strand will be secured to each pole using double dead end attachments to prevent any sag in the wire and maintain proper clearances. NHOS will lash a one inch diameter fiber optic cable (PVC jacket) to the strand using a dual lash method to provide security of the fiber over the right of way. The fiber will be tagged with twenty four hour contact information at each pole clamp. NHOS will employ the proper safety personnel during the crossing installation. The proposed install will meet all proper clearances from other Utilities. (see above). Additional pole guys will be added per NESC Rule 264 and as directed by pole owners.



E-13/4 - T-27/202



New Hampshire Optical Systems, Inc.
99 Pine Hill Rd.
Nashua, NH 03063
(603-821-6467)

Proposed
River Crossing
Lempster, NH

Notes:

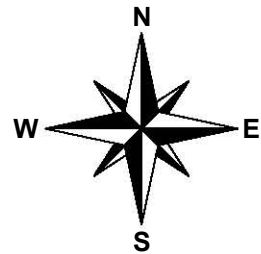
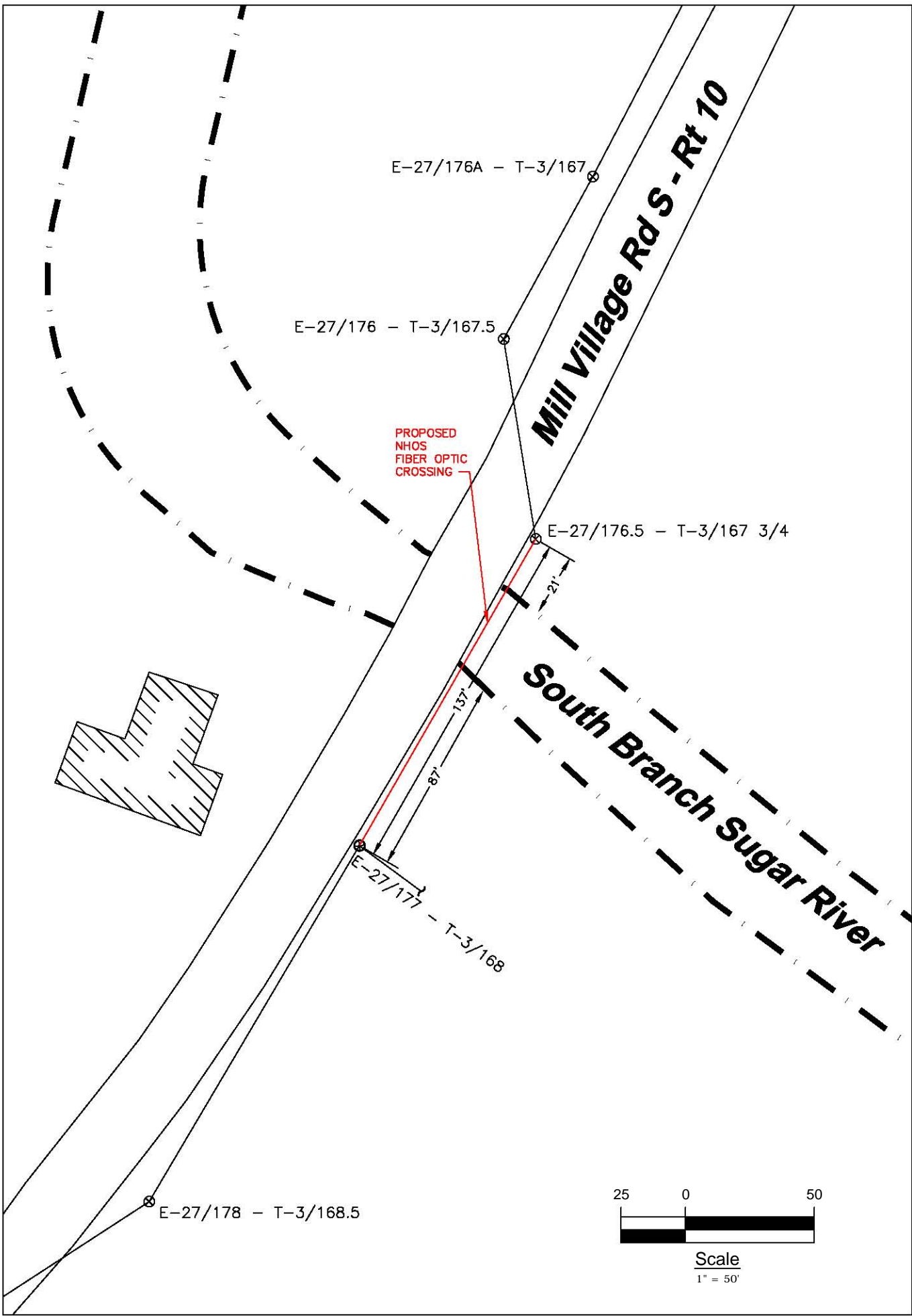
- The heights of structures shown hereon are based on field measurements taken with a Nikon 362 total station during a site survey on 09/23/11.
- The horizontal distance between the nearest bridge edge and the existing overhead wires ranges from 15' to 16'.
- Because of the close horizontal proximity to the existing bridge structure, the simplified drawing is submitted with vertical distances measured to the structure. This process simplifies the preparation and review of the crossing without jeopardizing its intent to protect the safe usage of the waterway
- The smallest vertical distance from the top of existing bridge deck to the lowest proposed overhead wire is 25'.
- The vertical distance between the top of water and bridge deck is approximately 10'.
- Based on the FEMA Flood Insurance Rate Map for Sullivan County (Map Number 33019C0320E) dated May 23, 2006 there is currently no flood information available for this area.
- Vertical distances are representative of attachment heights after utility make ready moves are completed.

Project # TID-86 - Primary 1
Drawing # AC-L-LEM-RIV-3

Date: 10/27/11
Revision #

Proposed
River Crossing
Lempster, NH

Location:
Route 10, Lempster NH
Nearest cross street- Giles Brook Rd.



NHOS
New Hampshire Optical Systems
New Hampshire Optical Systems, Inc.
99 Pine Hill Rd.
Nashua, NH 03063
(603-821-8487)

Project # TID-87
Drawing # AC-GOS-RIV-1

Date: 10/06/11
Revision #

Proposed Crossing
South Branch Sugar River
Goshen, NH

Location:
Mill Village Rd S, Goshen, NH
Nearest cross street-Mummy Rd E

Sheet 1 of 2



LOCUS MAP
(Not to Scale)



Spanmaster® Release 3.1 Sag / Tension Computations
09/01/11 Waveguide

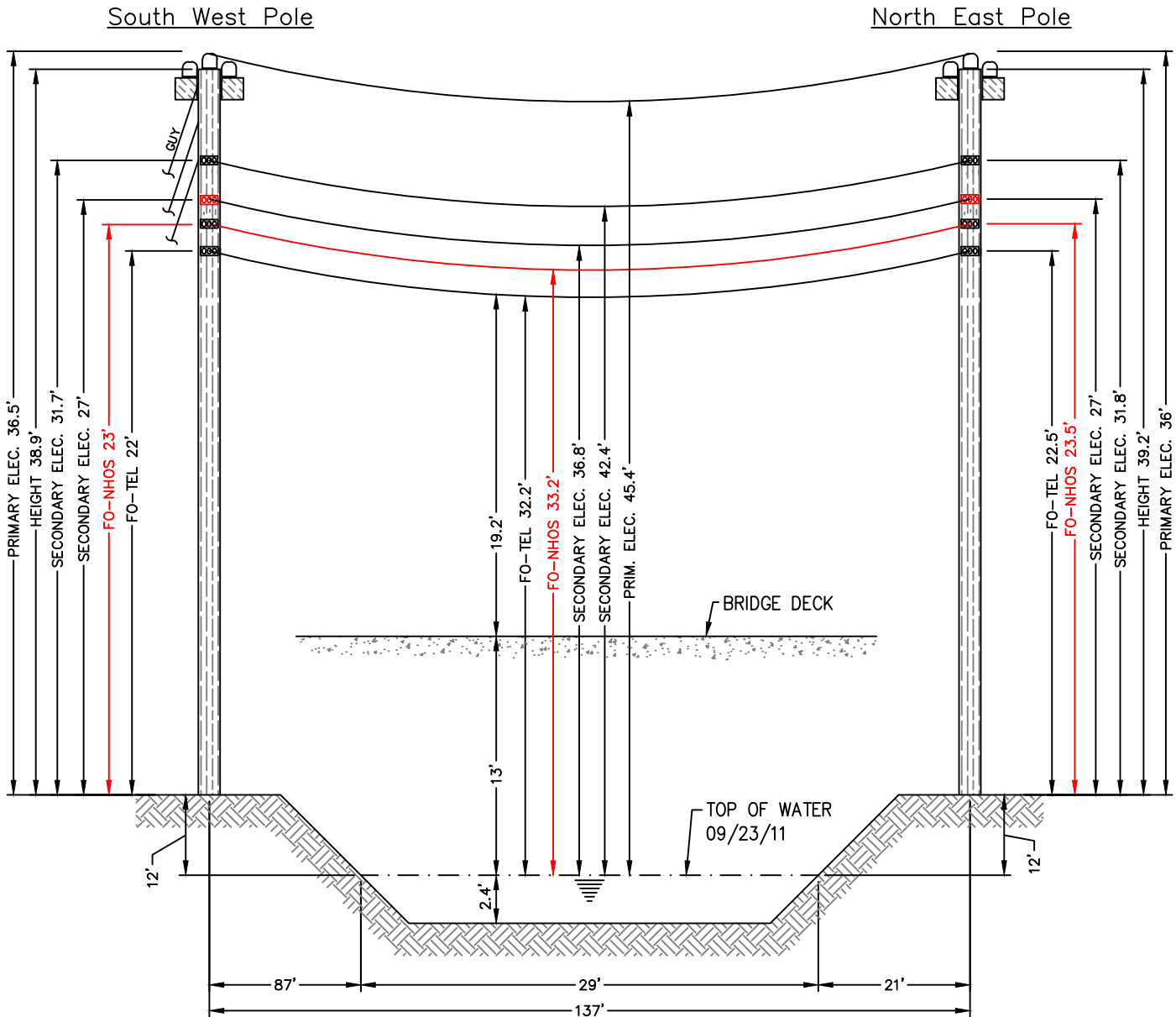
Waveguide
River and Rail Crossings

Selected Cables	X-SECT AREA (sq.in)	EFF MODULUS (psi)	NOMINAL DIAM (in)	EFF.EXP. COEFF. (1/F)	CABLE WEIGHT (lb/ft)	E'A LOAD BEARING CAPACITY (lbs)	MAX. RATED LOAD (lbs)
1/4"6.6mEHS	0.0352	2.60E+07	0.250	5.60E-06	0.1210	914940	6650
ORF-O-144-LN Bundle	0.4307	3.50E+05	0.741	1.09E-05	0.1520	150720	640
			0.991	0.2730			

NESC RESULTS

Loading Condition	Temp. (F)	Ice Load lb/ft	Ice Thick in	Wind Constant lb/sq ft	Horz Wind Load lb/sq ft	Result Load + Const lb/ft	Sag ft	Tension lb	% Len Chg From Input Conditions	Sag @ Point 66.5 ft	Horz Sag Comp ft	Vert Sag Comp ft	Vector Angle Deg
Rule 251 - Heavy 232A1	0.0	0.927	.50	.3	4.0	1.671	2.64	1485	0.07	2.64	1.28	2.31	28.9
	120.0	0.000	.00	.0	0.0	0.273	1.75	366	0.02	1.75	0.00	1.75	0.0

Span Length = 137.00 ft	Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
Span Sag = 1.37 ft (16.4 in)	-40.0	.74	858	-0.02	N/A
Span Tension = 468 lb	-30.0	.78	815	-0.02	N/A
Max Load = 6,650 lb	-20.0	.83	773	-0.02	N/A
Usable load (60%) = 3,990 lb	-10.0	.87	732	-0.02	N/A
Catenary Length = 137.037 ft	.0	.92	693	-0.01	N/A
Stress Free Length @	10.0	.98	655	-0.01	N/A
Installed Temperature = 136.967 ft	20.0	1.03	618	-0.01	N/A
Unloaded Strand	30.0	1.10	584	-0.01	N/A
Sag = .88 ft (10.5 in) 0.64 %	40.0	1.16	552	-0.01	N/A
Tension = 324 lb	50.0	1.23	522	-0.01	N/A
	60.0	1.30	493	0.00	N/A
	70.0	1.37	467	0.00	N/A
	80.0	1.44	443	0.00	N/A
	90.0	1.52	421	0.01	N/A
	100.0	1.60	401	0.01	N/A
	110.0	1.67	383	0.01	N/A
	120.0	1.75	366	0.02	N/A
	130.0	1.83	350	0.02	N/A
	140.0	1.90	336	0.02	N/A



E-27/177 - T-3/168
(Existing joint owned utility
pole (PSNH/Fairpoint) in
existing Right-of-Way)

(Not to Scale)

E-27/176.5 - T-3/167 3/4
(Existing joint owned utility
pole (PSNH/Fairpoint) in
existing Right-of-Way)



E-27/177 - T-3/168

Construction Notes:

NHOS proposes to install a 1/4 inch metal supporting strand between the existing utility poles shown above that will traverse the river. The strand will be installed at the proposed height (see above). The supporting strand will be secured to each pole using double dead end attachments to prevent any sag in the wire and maintain proper clearances. NHOS will lash a one inch diameter fiber optic cable (PVC jacket) to the strand using a dual lash method to provide security of the fiber over the right of way. The fiber will be tagged with twenty four hour contact information at each pole clamp. NHOS will employ the proper safety personnel during the crossing installation. The proposed install will meet all proper clearances from other Utilities. (see above). Additional pole guys will be added per NESC Rule 264 and as directed by pole owners.



E-27/176.5 - T-3/167 3/4

Notes:

- The heights of structures shown hereon are based on field measurements taken with a Nikon 362 total station during a site survey on 09/23/11.
- The horizontal distance between the existing bridge and the existing overhead wires ranges from 4.2' to 5.3'.
- Because of the close horizontal proximity to the existing bridge structure, the simplified drawing is submitted with vertical distances measured to the structure. This process simplifies the preparation and review of the crossing without jeopardizing its intent to protect the safe usage of the waterwa
- The smallest vertical distance from the top of existing bridge deck to the lowest existing overhead wires is 19.2'.
- The vertical distance between the top of water and bridge deck is approximately 13'.
- Vertical distances are representative of attachment heights after utility make ready moves are completed.



New Hampshire Optical Systems, Inc.
99 Pine Hill Rd.
Nashua, NH 03063
(603-821-6467)

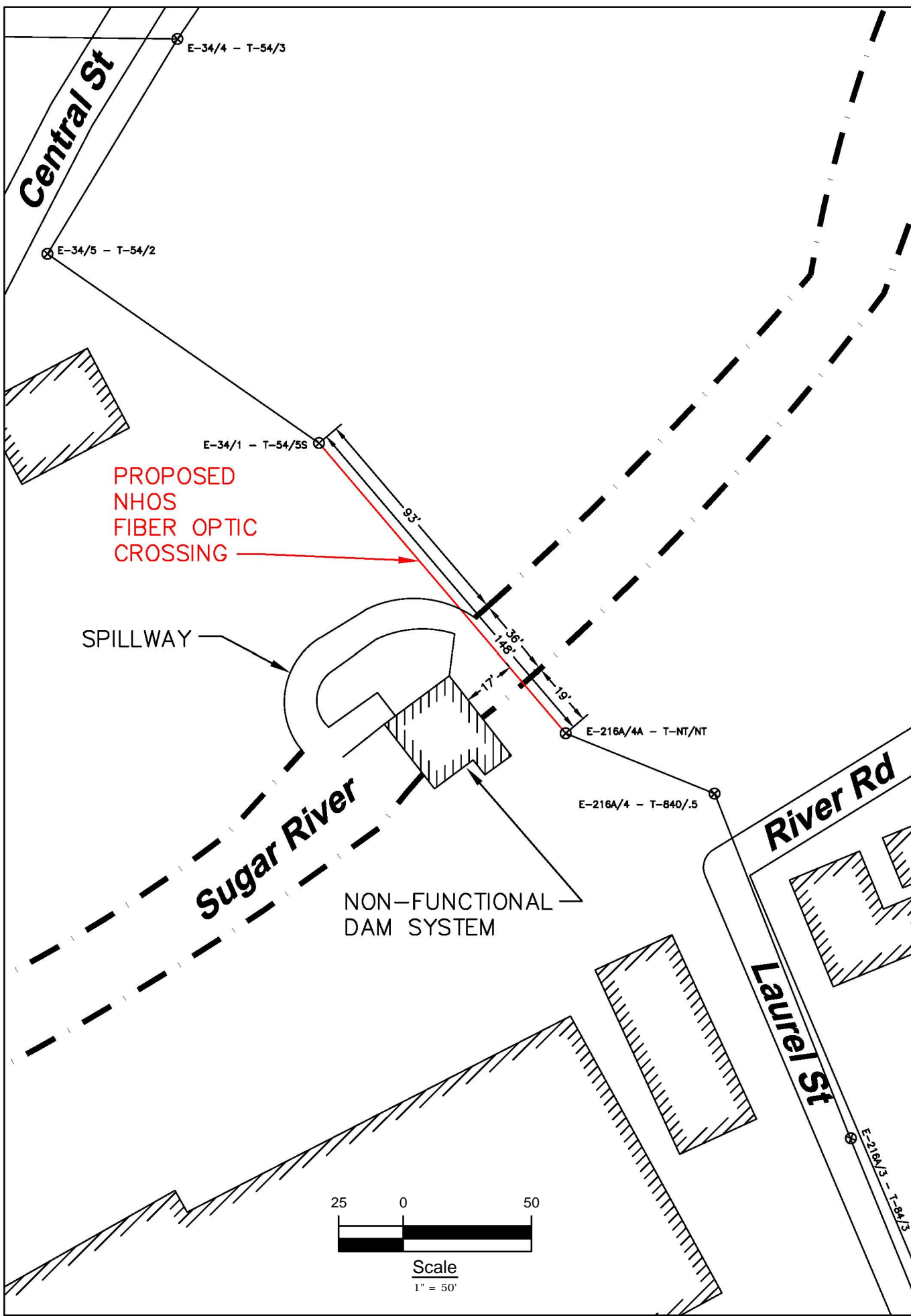
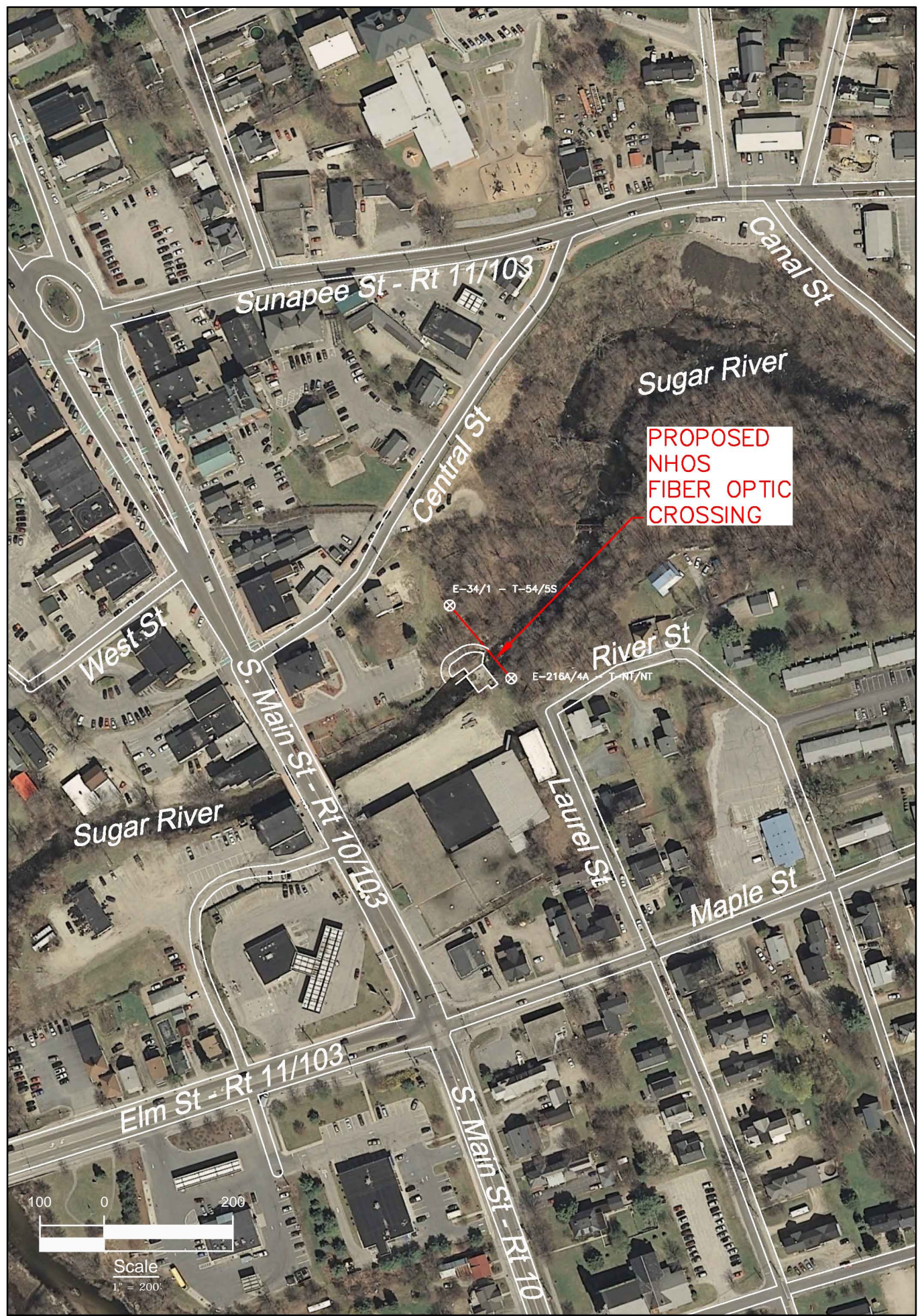
Project # TID-87
Drawing #AC-GOS-RIV-1

Date: 10/06/11
Revision #

Proposed Crossing
South Branch Sugar River
Goshen, NH

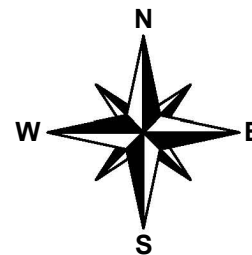
Location:
Mill Village Rd S, Goshen, NH
Nearest cross street-Mummery Rd E

Sheet 2 of 2



NHOS
New Hampshire Optical Systems
New Hampshire Optical Systems, Inc.
99 Pine Hill Rd.
Nashua, NH 03063
(603-821-6467)

Proposed Sugar
River Crossing
Newport, NH



Project # TID-88-PRI-1
Drawing # AC-NEW-RIV-1

Date: 11/21/2011
Revision #

Proposed Sugar
River Crossing
Newport, NH

Location:
Laurel St, Newport, NH
Nearest cross street- River St

Sheet 1 of 2



LOCUS MAP
(Not to Scale)



Spanmaster® Release 3.1 Sag / Tension Computations
09/01/11 Waveguide

Waveguide
River and Rail Crossings

Selected Cables	X-SECT AREA (sq.in)	EFF MODULUS (psi)	NOMINAL DIAM (in)	EFF.EXP. COEFF. (1/F)	CABLE WEIGHT (lb/ft)	E*A LOAD BEARING CAPACITY (lbs)	MAX. RATED LOAD (lbs)
1/4"6.6mEHS	0.0352	2.60E+07	0.250	5.60E-06	0.1210	914940	6650
ORF-O-144-LN	0.4307	3.50E+05	0.741	1.09E-05	0.1520	150720	640
Bundle			0.991		0.2730		

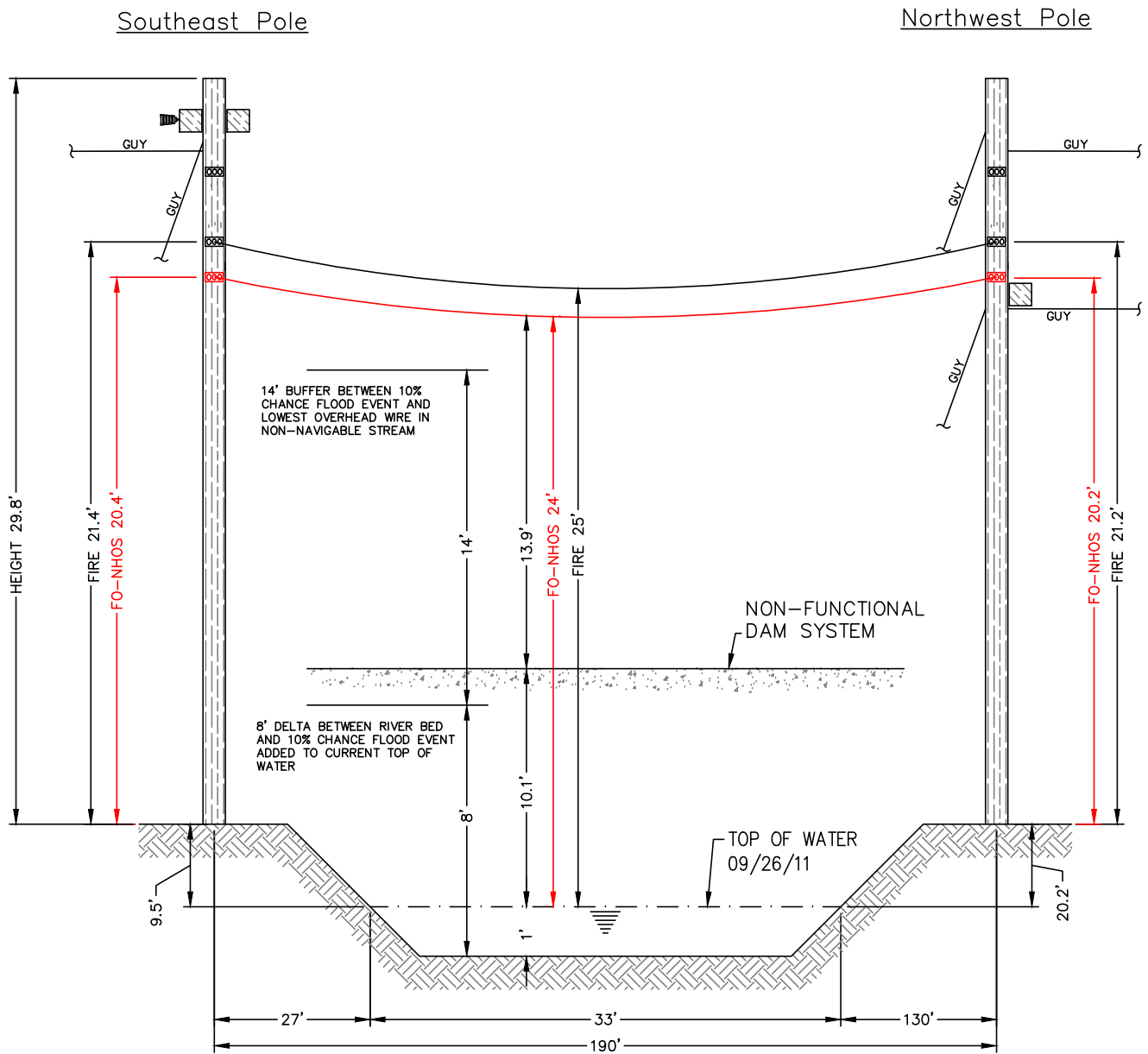
NESC RESULTS

Loading Condition	Temp. (F)	Ice Load lb/ft	Ice Thick in	Wind Constant lb/ft	Horz Wind Load lb/ft	Result Load + Const lb/ft	Sag ft	Tension lb	% Len Chg From Input Conditions	Sag @ Point 96 ft	Horz Sag Comp ft	Vert Sag Comp ft	Vector Angle Deg
Rule 251 - Heavy 232A1	0.0	0.927	.50	.3	4.0	1.671	4.04	1864	0.09	4.05	1.95	3.53	28.9
	120.0	0.000	.00	.0	0.0	0.273	2.36	523	0.01	2.36	0.00	2.36	0.0

Span Length = 190.00 ft
Span Sag = 1.90 ft (22.8 in)
Span Tension = 648 lb
Max Load = 6,650 lb
Usable load (60%) = 3,990 lb
Catenary Length = 190.051 ft
Stress Free Length @
Installed Temperature = 189.916 ft

Unloaded Strand
Sag = 1.12 ft (13.4 in) 0.59 %
Tension = 489 lb

Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
-40.0	1.16	1,058	-0.02	N/A
-30.0	1.21	1,015	-0.02	N/A
-20.0	1.26	972	-0.01	N/A
-10.0	1.32	931	-0.01	N/A
.0	1.38	891	-0.01	N/A
10.0	1.44	852	-0.01	N/A
20.0	1.51	814	-0.01	N/A
30.0	1.58	778	-0.01	N/A
40.0	1.66	743	-0.01	N/A
50.0	1.73	709	0.00	N/A
60.0	1.82	678	0.00	N/A
70.0	1.90	648	0.00	N/A
80.0	1.99	620	0.00	N/A
90.0	2.08	593	0.01	N/A
100.0	2.17	568	0.01	N/A
110.0	2.26	545	0.01	N/A
120.0	2.36	523	0.01	N/A
130.0	2.45	503	0.02	N/A
140.0	2.55	484	0.02	N/A



E-216A/4A - T-NT/NT
(Existing joint owned utility
pole (PSNH) in existing
Right-of-Way)

Not to Scale

E-34/1 - T-54/5S
(Existing joint owned utility
pole (PSNH/Fairpoint) in
existing Right-of-Way)



E-216A/4A - T-NT/NT

Construction Notes:

NHOS proposes to install a ¼ inch metal supporting strand between the existing utility poles shown above that will traverse the river. The strand will be installed at the proposed height (see above). The supporting strand will be secured to each pole using double dead end attachments to prevent any sag in the wire and maintain proper clearances. NHOS will lash a one inch diameter fiber optic cable (PVC jacket) to the strand using a dual lash method to provide security of the fiber over the right of way. The fiber will be tagged with twenty four hour contact information at each pole clamp. NHOS will employ the proper safety personnel during the crossing installation. The proposed install will meet all proper clearances from other Utilities. (see above). Additional pole guys will be added per NESC Rule 264 and as directed by pole owners.



E-34/1 - T-54/5S



New Hampshire Optical Systems, Inc.
99 Pine Hill Rd.
Nashua, NH 03063
(603-821-6467)

Proposed Sugar
River Crossing
Newport, NH

Notes:

- The heights of structures shown hereon are based on field measurements taken with a Nikon 362 total station during a site survey on 9/26/11.
- The horizontal distance between the non-functional dam system and the existing overhead wires is 17'.
- The smallest vertical distance from the top of existing dam to the lowest existing overhead wires is 13.9'.
- The waterway is classified as not suitable for sail boating and per NESC Table 232-1 a vertical clearance of 14' must be maintained between the lowest conductor and 10 year floodplain.
- Based on the FEMA Flood Profile for the Sugar River (Page 67P) a conservative 10 year flood elevation was calculated by adding the delta between the river bed and the 10 year flood elevation to the surveyed water level and then the 14' buffer (for non-navigable streams) was added to that.
- Vertical distances are representative of attachment heights after utility make ready moves are completed.

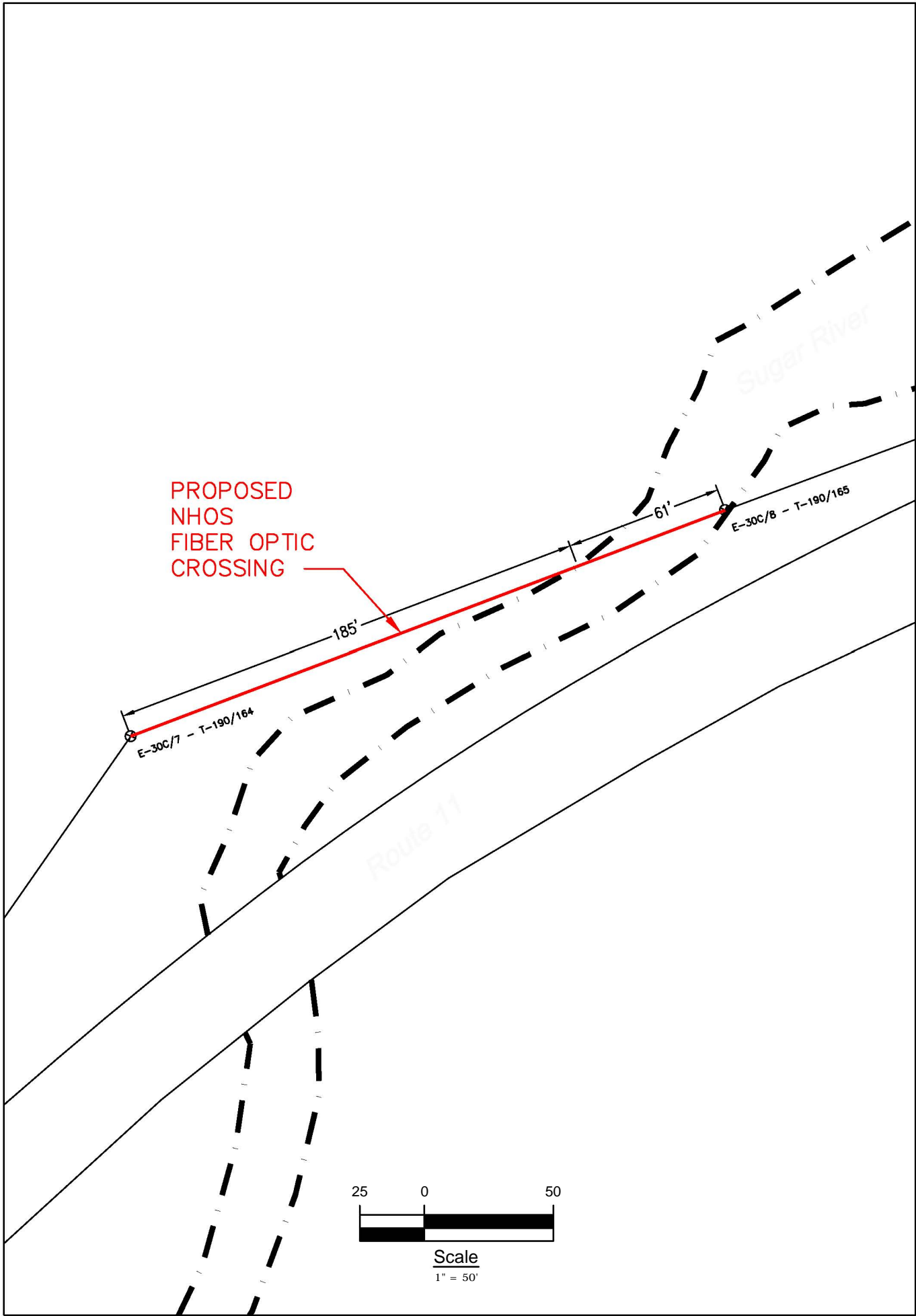
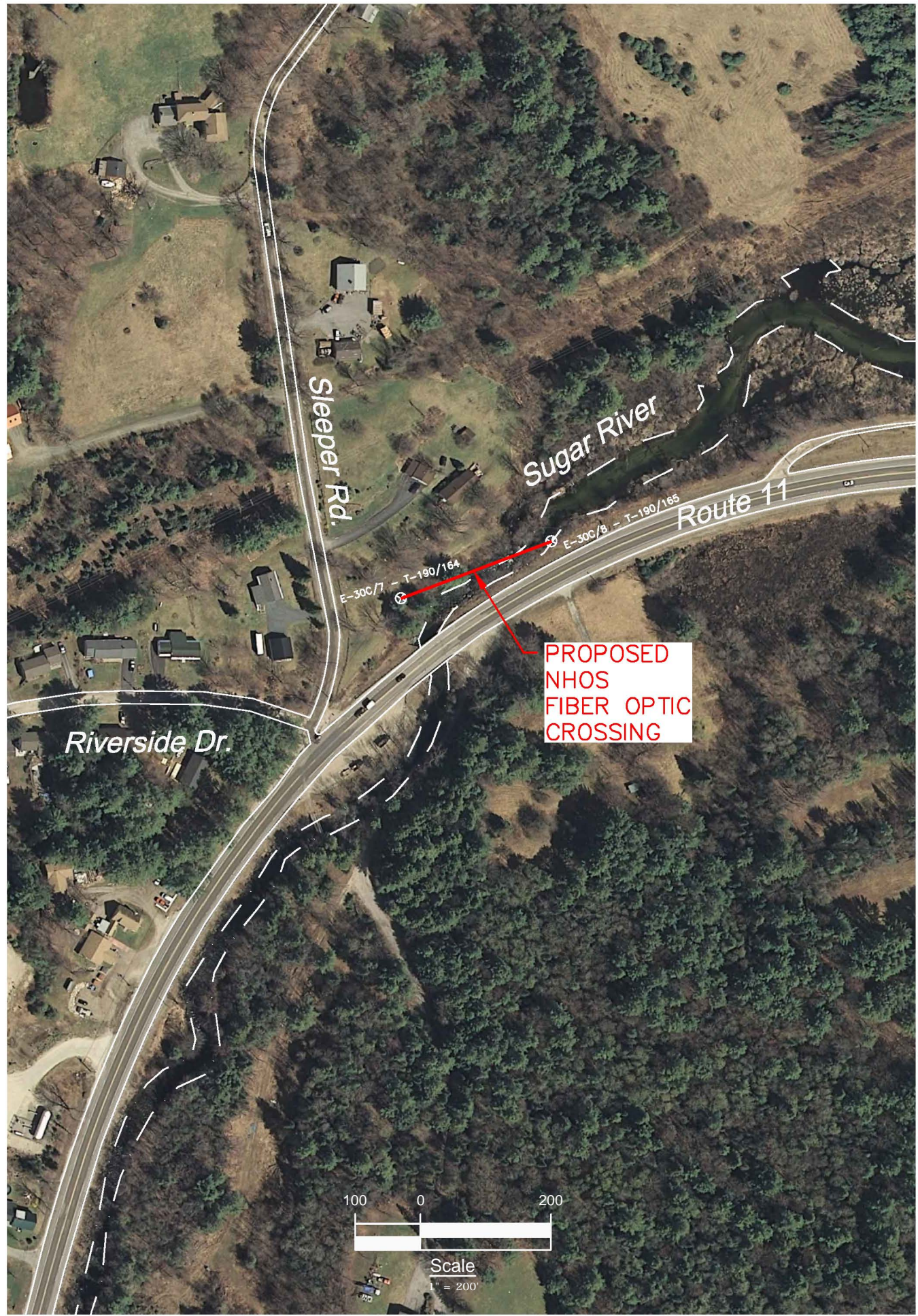
Project # TID-88-PRI-1
Drawing # AC-NEW-RIV-1

Date: 11/21/2011
Revision #

Proposed Sugar
River Crossing
Newport, NH

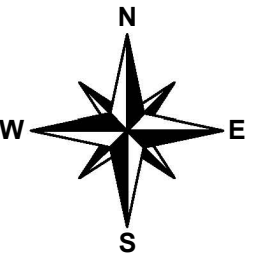
Location:
Laurel St, Newport, NH
Nearest cross street- River St

Sheet 2 of 2



NHOS
New Hampshire Optical Systems
New Hampshire Optical Systems, Inc.
99 Pine Hill Rd.
Nashua, NH 03063
(603-821-6467)

Proposed
River Crossing
Sunapee, NH



Project # TID-90 - Primary 1
Drawing # AC-SUN-RIV-1

Date: 10/31/11
Revision #

Proposed
River Crossing
Sunapee, NH

Location:
Route 11, Sunapee, NH
Nearest cross street - Sleeper Rd.



LOCUS MAP
(Not to Scale)



Spanmaster® Release 3.1 Sag / Tension Computations

Waveguide
River and Rail Crossings

	X-SECT AREA (sq.in)	EFF MODULUS (psi)	NOMINAL DIAM (in)	EFF.EXP. COEFF. (1/F)	CABLE WEIGHT (lb/ft)	E*A LOAD BEARING CAPACITY (lbs)	MAX. RATED LOAD (lbs)
Selected Cables							
1/4"6.6mEHS	0.0352	2.60E+07	0.250	5.60E-06	0.1210	914940	6650
ORF-O-288-LN Bundle	0.5782	2.70E+05	0.858	1.13E-05	0.1960	155982	651

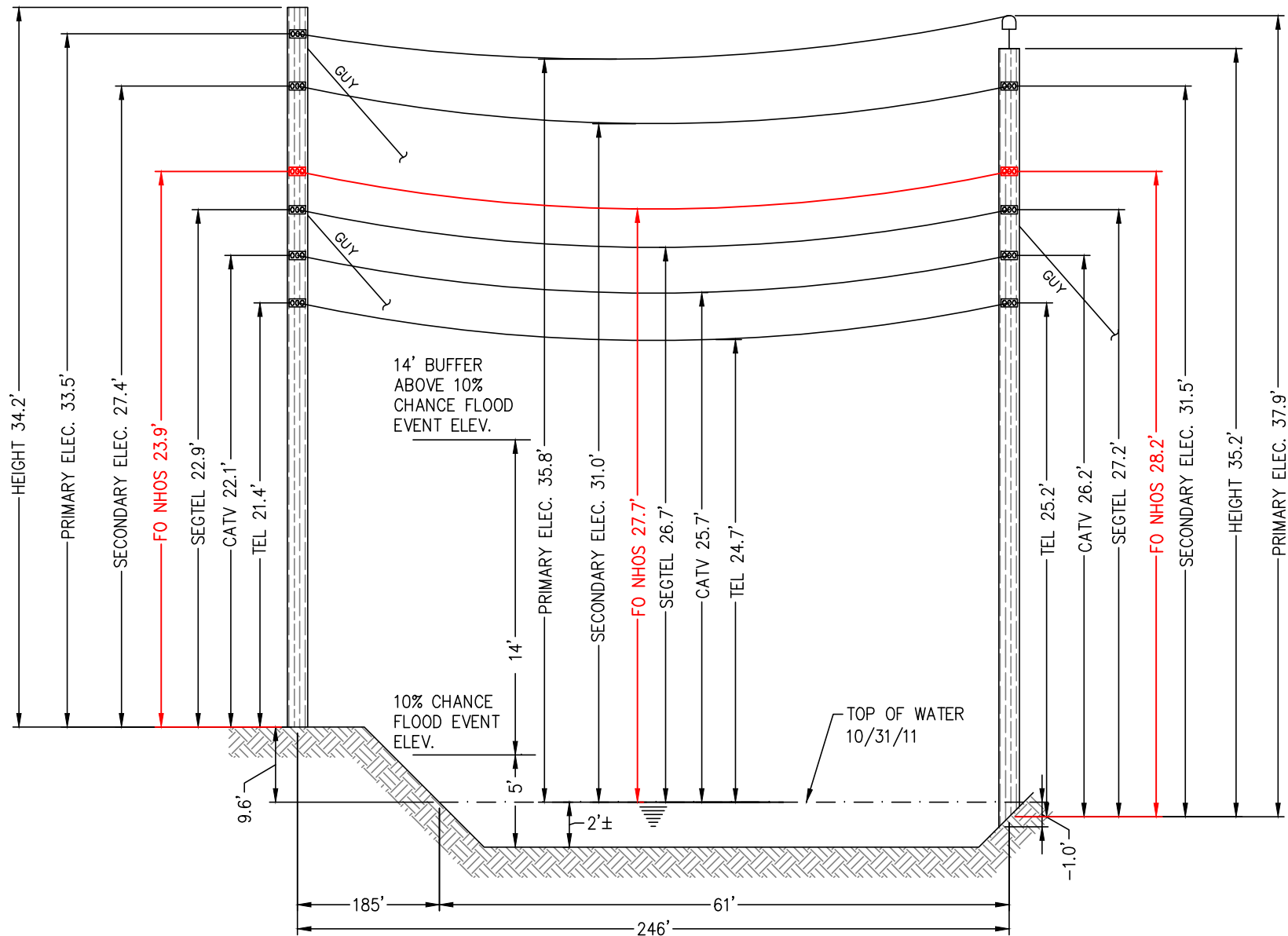
NESC RESULTS

Loading Condition	Temp. (F)	Ice Load lb/ft	Ice Thick in	Wind Constant lb/ft	Horz Wind Load lb/sq ft	Result Load + Const lb/ft	Sag ft	Tension lb	% Len Chg From Input Conditions	Sag @ Point 123 ft	Horz Sag Comp ft	Vert Sag Comp ft	Vector Angle Deg
Rule 251 - Heavy 232A1	0.0	1.000	.50	.3	4.0	1.793	5.67	2384	0.12	5.69	2.67	5.01	28.1
	120.0	0.000	.00	.0	0.0	0.317	2.93	819	0.01	2.93	0.00	2.93	0.0

Span Length = 246.00 ft
Span Sag = 2.46 ft (29.5 in)
Span Tension = 975 lb
Max Load = 6,650 lb
Usable load (60%) = 3,990 lb
Catenary Length = 246.066 ft
Stress Free Length @
Installed Temperature = 245.804 ft

Unloaded Strand
Sag = 1.17 ft (14.0 in) 0.47 %
Tension = 785 lb

Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
-40.0	1.70	1,408	-0.01	N/A
-30.0	1.75	1,364	-0.01	N/A
-20.0	1.81	1,321	-0.01	N/A
-10.0	1.87	1,279	-0.01	N/A
.0	1.93	1,238	-0.01	N/A
10.0	2.00	1,197	-0.01	N/A
20.0	2.07	1,157	-0.01	N/A
30.0	2.14	1,118	-0.01	N/A
40.0	2.22	1,080	-0.01	N/A
50.0	2.29	1,044	0.00	N/A
60.0	2.38	1,008	0.00	N/A
70.0	2.46	973	0.00	N/A
80.0	2.55	940	0.00	N/A
90.0	2.64	908	0.00	N/A
100.0	2.73	877	0.01	N/A
110.0	2.83	847	0.01	N/A
120.0	2.93	819	0.01	N/A
130.0	3.03	792	0.01	N/A
140.0	3.13	766	0.02	N/A



E-30C/7 - T-190/164
(Existing joint owned utility
pole (PSNH/Fairpoint) in
existing Right-of-Way)

Not to Scale

E-30C/8 - T-190/165
(Existing joint owned utility
pole (PSNH/Fairpoint) in
existing Right-of-Way)



E-30C/7 - T-190/164

Construction Notes:

NHOS proposes to install a 1/4 inch metal supporting strand between the existing utility poles shown above that will traverse the river. The strand will be installed at the proposed height (see above). The supporting strand will be secured to each pole using double dead end attachments to prevent any sag in the wire and maintain proper clearances. NHOS will lash a one inch diameter fiber optic cable (PVC jacket) to the strand using a dual lash method to provide security of the fiber over the right of way. The fiber will be tagged with twenty four hour contact information at each pole clamp. NHOS will employ the proper safety personnel during the crossing installation. The proposed install will meet all proper clearances from other Utilities. (see above). Additional pole guys will be added per NESC Rule 264 and as directed by pole owners.



E-30C/8 - T-190/165



New Hampshire Optical Systems, Inc.
99 Pine Hill Rd.
Nashua, NH 03063
(603-821-6467)

Proposed
River Crossing
Sunapee, NH

Notes:

- The heights of structures shown hereon are based on field measurements taken with a Nikon 362 total station during a site survey on 10/31/11.
- The waterway is classified as not suitable for sail boating and per NESC Table 232-1 a vertical clearance of 14' must be maintained between the lowest conductor and 10 year floodplain.
- Based on the FEMA Flood Profile for the Sugar River (Page 70P) Sullivan County, NH, the 10% chance Flood event elevation is 5' above the stream bed.
- Vertical distances are representative of attachment heights after utility make ready moves are completed.

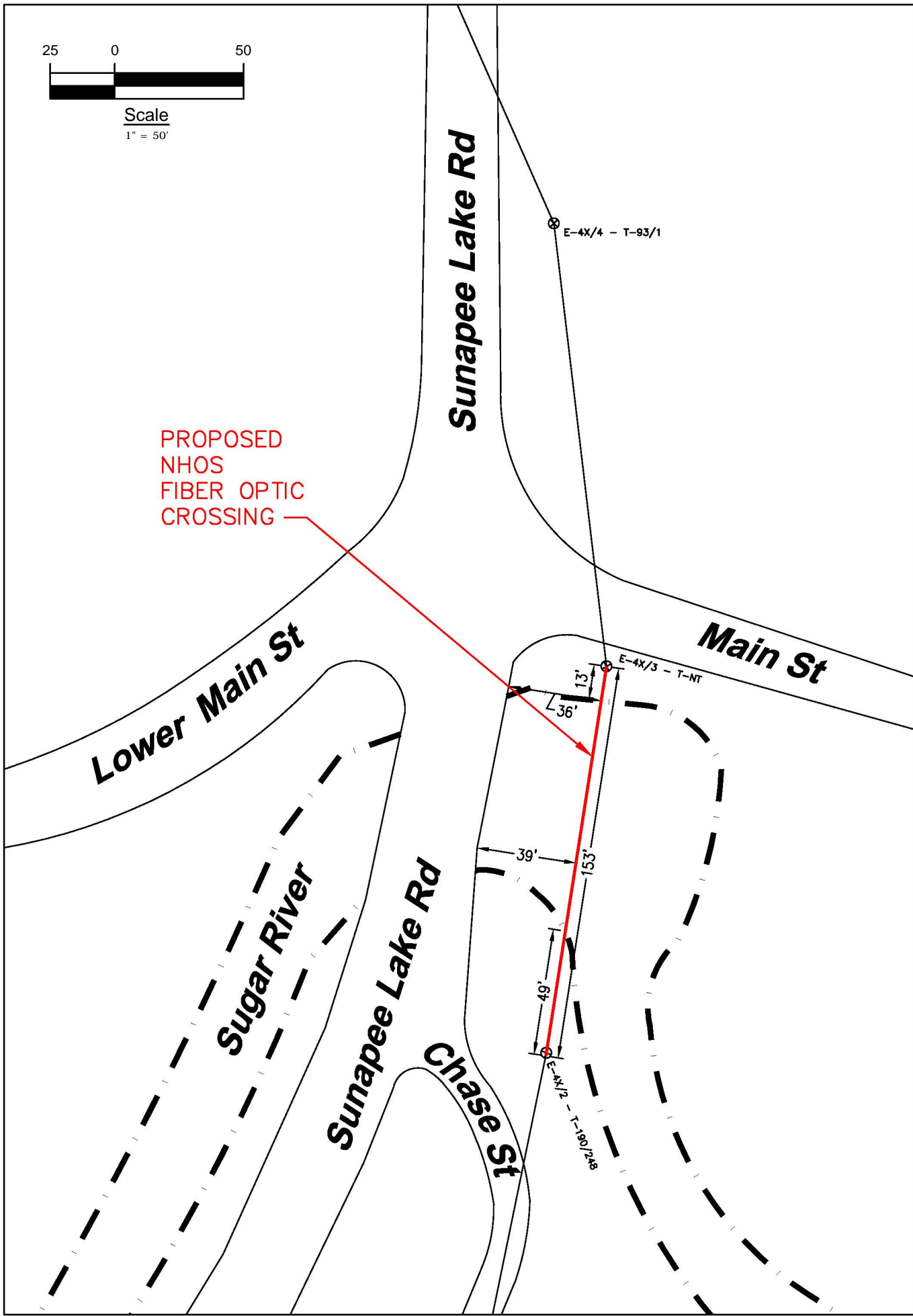
Project # TID-90 - Primary 1
Drawing # AC-SUN-RIV-1

Date: 10/31/11
Revision #

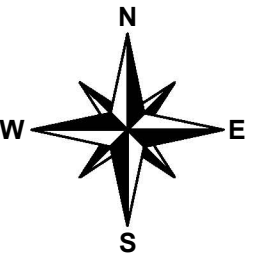
Proposed
River Crossing
Sunapee, NH

Location:
Route 11, Sunapee, NH
Nearest cross street- Sleeper Rd.

Sheet 2 of 2



Proposed Sugar
River Crossing
Sunapee, NH



Project # TID-91-PRI-1
Drawing # AC-SUN-RIV-2

Date: 11/3/2011
Revision #

Proposed Sugar
River Crossing
Sunapee, NH

Location:
Rt 11, Sunapee, NH
Nearest cross street- Main St.



LOCUS MAP
(Not to Scale)



Waveguide
River and Rail Crossings

	X-SECT AREA (sq.in)	EFF MODULUS (psi)	NOMINAL DIAM (in)	EFF.EXP. COEFF. (1/F)	CABLE WEIGHT (lb/ft)	E*A LOAD BEARING CAPACITY (lbs)	MAX. RATED LOAD (lbs)
Selected Cables							
1/4"6.6mEHS	0.0352	2.60E+07	0.250	5.60E-06	0.1210	914940	6650
ORF-O-288-LN	0.5782	2.70E+05	0.858	1.13E-05	0.1960	155982	651
Bundle			1.108		0.3170		

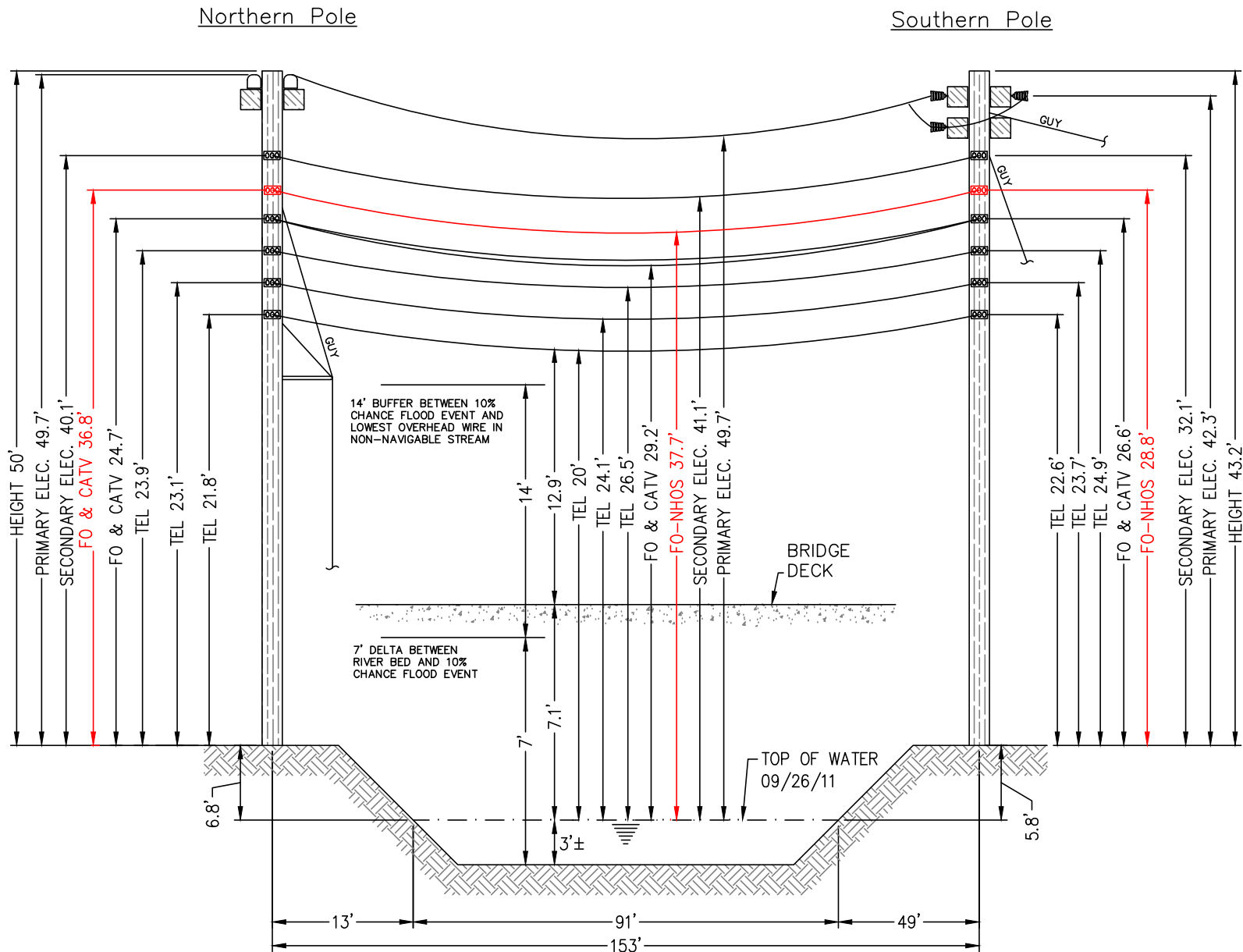
NESC RESULTS

Loading Condition	Temp. (F)	Ice Load lb/ft	Ice Thick in	Wind Constant lb/ft	Horz Wind Load lb/ft	Result Load +Const lb/ft	Sag ft	Tension lb	% Len Chg From Input Conditions	Sag @ Point 75.5 ft	Horz Sag Comp ft	Vert Sag Comp ft	Vector Angle Deg
Rule 251 - Heavy	0.0	1.000	.50	.3	4.0	1.793	3.07	1704	0.08	3.08	1.45	2.71	28.1
232A1	120.0	0.000	.00	.0	0.0	0.317	1.91	486	0.01	1.91	0.00	1.91	0.0

	Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
Span Length = 153.00 ft					
Span Sag = 1.53 ft (18.4 in)					
Span Tension = 606 lb					
Max Load = 6,650 lb					
Usable load (60%) = 3,990 lb					
Catenary Length = 153.041 ft					
Stress Free Length @					
Installed Temperature = 152.939 ft					

Unloaded Strand		
Sag = .82 ft (9.8 in)	0.54 %	
Tension = 432 lb		

Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
-40.0	.92	1,012	-0.02	N/A
-30.0	.96	969	-0.02	N/A
-20.0	1.00	926	-0.02	N/A
-10.0	1.05	885	-0.01	N/A
.0	1.10	845	-0.01	N/A
10.0	1.15	806	-0.01	N/A
20.0	1.20	769	-0.01	N/A
30.0	1.26	733	-0.01	N/A
40.0	1.33	699	-0.01	N/A
50.0	1.39	666	0.00	N/A
60.0	1.46	635	0.00	N/A
70.0	1.53	606	0.00	N/A
80.0	1.60	578	0.00	N/A
90.0	1.68	553	0.01	N/A
100.0	1.75	529	0.01	N/A
110.0	1.83	506	0.01	N/A
120.0	1.91	486	0.01	N/A
130.0	1.99	467	0.02	N/A
140.0	2.07	449	0.02	N/A



E-4X/3 - T-NT
(Existing joint owned utility
pole (PSNH/Fairpoint) in
existing Right-of-Way)

Not to Scale

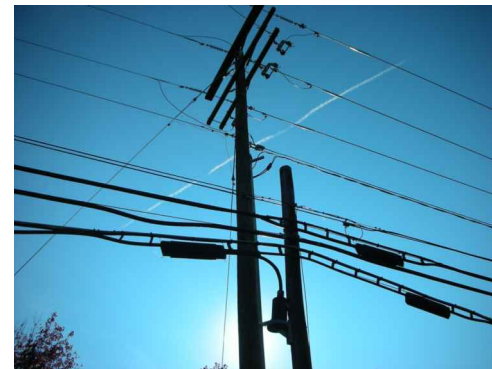
E-4X/2 - T-190/248
(Existing joint owned utility
pole (PSNH/Fairpoint) in
existing Right-of-Way)



E-4X/3 - T-NT

Construction Notes:

NHOS proposes to install a 1/4 inch metal supporting strand between the existing utility poles shown above that will traverse the river. The strand will be installed at the proposed height (see above). The supporting strand will be secured to each pole using double dead end attachments to prevent any sag in the wire and maintain proper clearances. NHOS will lash a one inch diameter fiber optic cable (PVC jacket) to the strand using a dual lash method to provide security of the fiber over the right of way. The fiber will be tagged with twenty four hour contact information at each pole clamp. NHOS will employ the proper safety personnel during the crossing installation. The proposed install will meet all proper clearances from other Utilities. (see above). Additional pole guys will be added per NESC Rule 264 and as directed by pole owners.



E-4X/2 - T-190/248



New Hampshire Optical Systems, Inc.
99 Pine Hill Rd.
Nashua, NH 03063
(603-821-6467)

Proposed Sugar
River Crossing
Sunapee, NH

Notes:

- The heights of structures shown hereon are based on field measurements taken with a Nikon 362 total station during a site survey on 9/27/11.
- The horizontal distance between the nearest bridge edge and the existing overhead wires ranges from 36' to 39'.
- The smallest vertical distance from the top of existing bridge deck to the lowest existing overhead wires is 12.9'.
- The vertical distance between the top of water and bridge deck is approximately 7.1'.
- The waterway is classified as not suitable for sail boating and per NESC Table 232-1 a vertical clearance of 14' must be maintained between the lowest conductor and the 10% chance flood event.
- Based on the FEMA Flood Profile for the Sugar River (Page 71P) for Sullivan County the difference between the stream bed and the 10% chance flood event is 7'.
- Vertical distances are representative of attachment heights after utility make ready moves are completed.

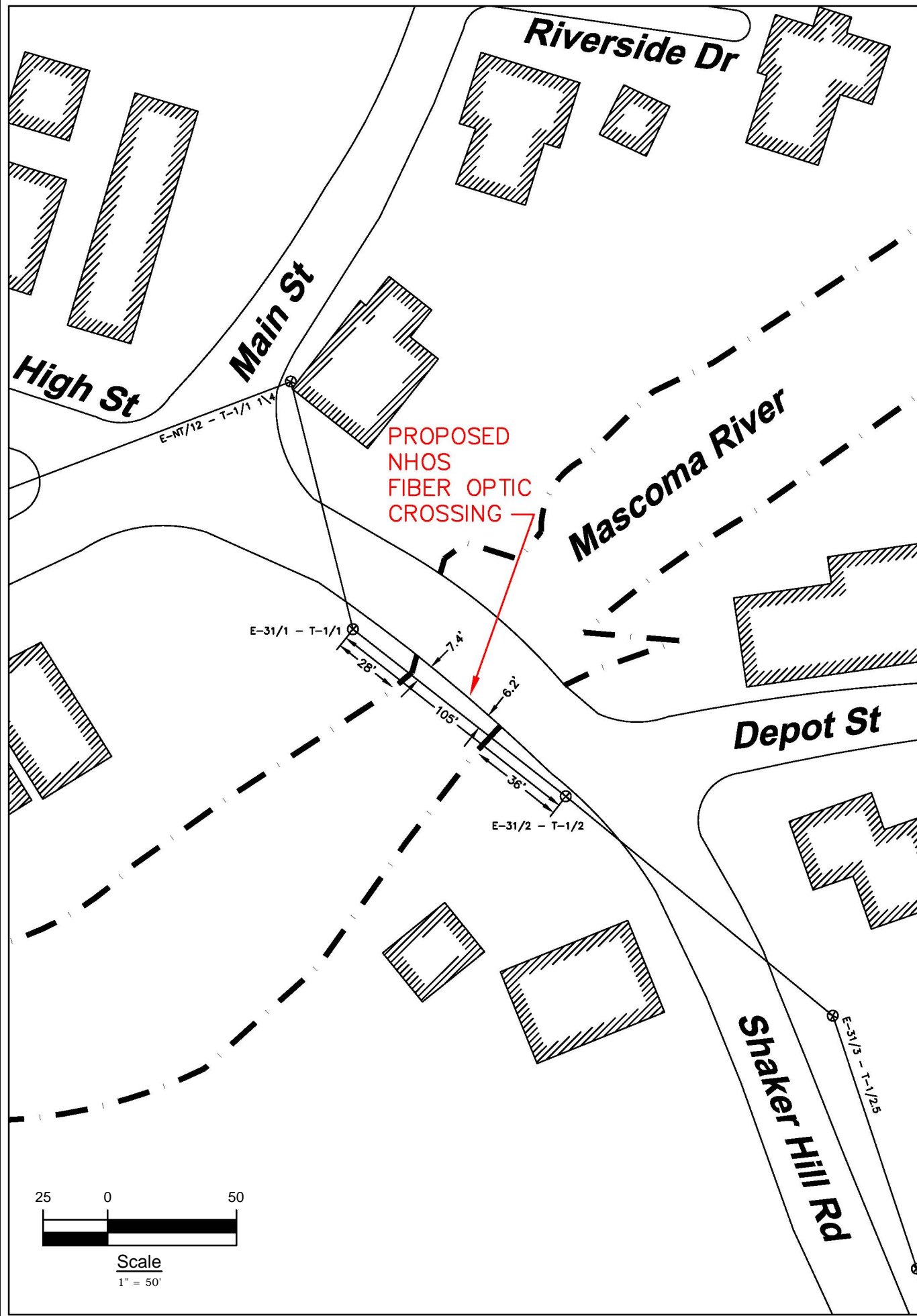
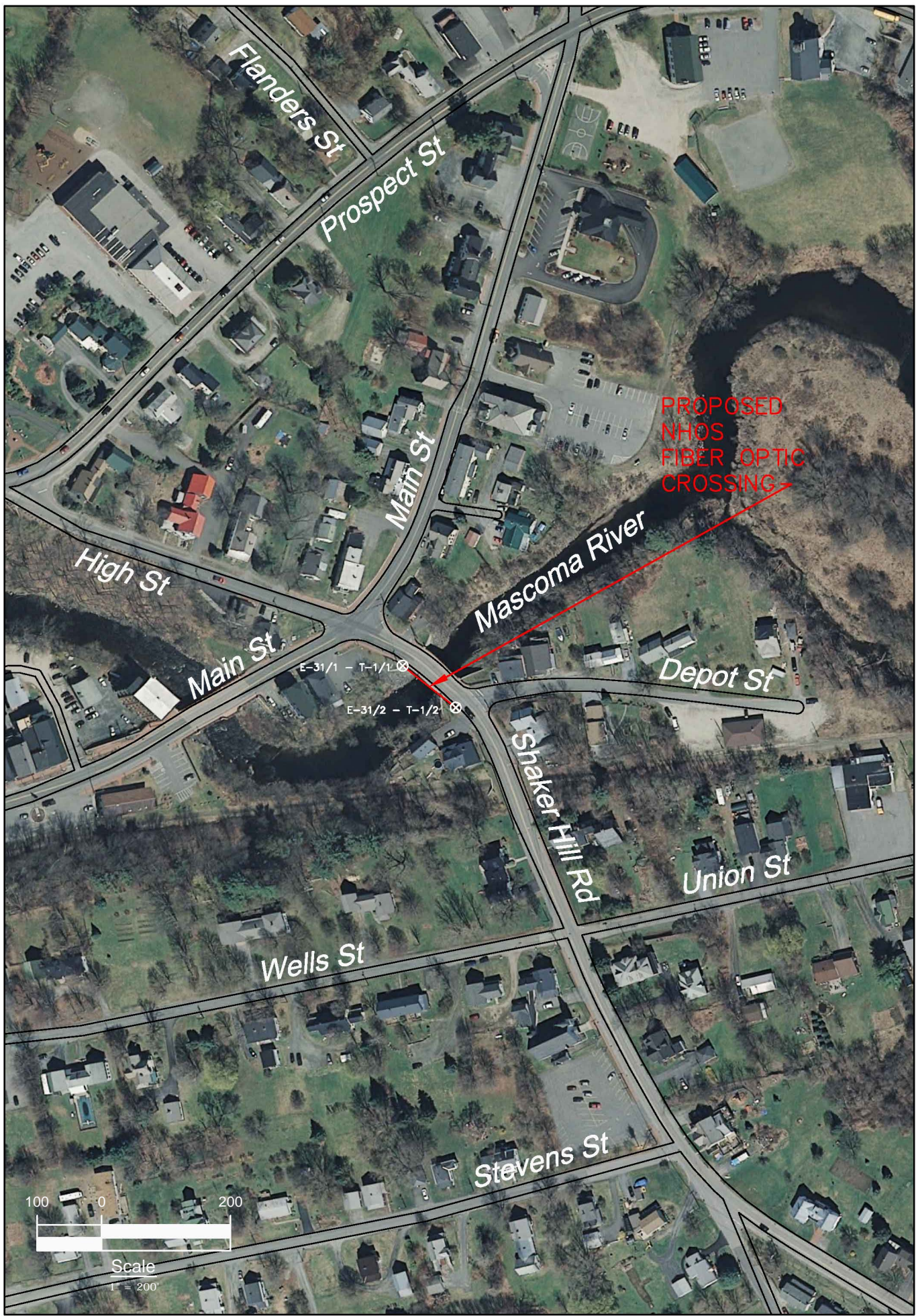
Project # TID-91-PRI-1
Drawing # AC-SUN-RIV-2

Date: 11/3/2011
Revision #

Proposed Sugar
River Crossing
Sunapee, NH

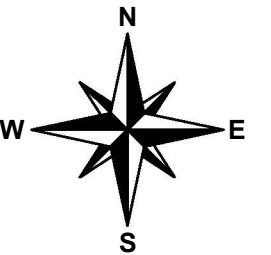
Location:
Rt 11, Sunapee, NH
Nearest cross street- Main St.

Sheet 2 of 2



NHOS
New Hampshire Optical Systems
New Hampshire Optical Systems, Inc.
99 Pine Hill Rd.
Nashua, NH 03063
(603-821-6467)

Proposed Mascoma
River Crossing
Enfield, NH



Project # TID-95-PRI-1
Drawing # AC-ENF-RIV-1

Date: 11/4/2011
Revision #

Proposed Mascoma
River Crossing
Enfield, NH

Location:
Shaker Hill Rd, Enfield, NH
Nearest cross street: Depot Rd

Sheet 1 of 2



LOCUS MAP
(Not to Scale)



Spanmaster® Release 3.1 Sag / Tension Computations
09/01/11 Waveguide

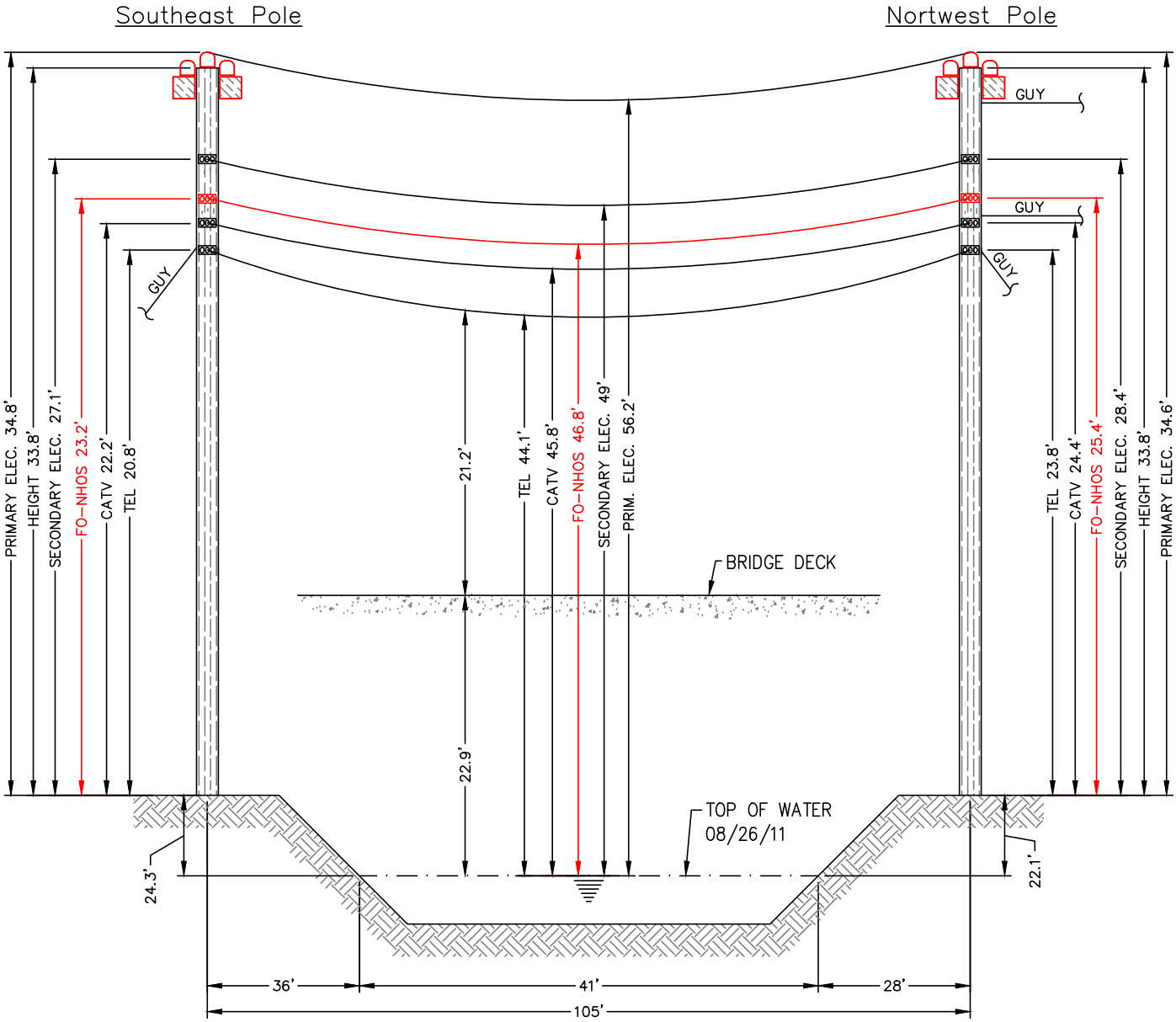
Waveguide
River and Rail Crossings

	X-SECT AREA (sq.in)	EFF MODULUS (psi)	NOMINAL DIAM (in)	EFF.EXP. COEFF. (1/F)	CABLE WEIGHT (lb/ft)	E*A LOAD BEARING CAPACITY (lbs)	MAX. RATED LOAD (lbs)
Selected Cables							
1/4"6.6mEHS	0.0352	2.60E+07	0.250	5.60E-06	0.1210	914940	6650
ORF-O-288-LN	0.5782	2.70E+05	0.858	1.13E-05	0.1960	155982	651
Bundle			1.108		0.3170		

NESC RESULTS

Loading Condition	Temp. (F)	Ice Load lb/ft	Ice Thick in	Wind Constant lb/ft	Horz Wind Load lb/ft	Result Load + Const lb/ft	Sag ft	Tension lb	% Len Chg From Input Conditions	Sag @ Point 52.5 ft	Horz Sag Comp ft	Vert Sag Comp ft	Vector Angle Deg
Rule 251 - Heavy	0.0	1.000	.50	.3	4.0	1.793	1.88	1312	0.06	1.88	0.89	1.66	28.1
232A1	120.0	0.000	.00	.0	0.0	0.317	1.36	322	0.02	1.36	0.00	1.36	0.0

	Temp (F)	Midspan Sag (ft)	Tension (lb)	% Length Change	Clearance
Span Length = 105.00 ft					
Span Sag = 1.05 ft (12.6 in)	-40.0	.54	801	-0.02	N/A
Span Tension = 416 lb	-30.0	.58	757	-0.02	N/A
Max Load = 6,650 lb	-20.0	.61	715	-0.02	N/A
Usable load (60%) = 3,990 lb	-10.0	.65	674	-0.02	N/A
Catenary Length = 105.028 ft	.0	.69	635	-0.02	N/A
Stress Free Length @	10.0	.73	597	-0.01	N/A
Installed Temperature = 104.980 ft	20.0	.78	562	-0.01	N/A
	30.0	.83	528	-0.01	N/A
Unloaded Strand	40.0	.88	497	-0.01	N/A
Sag = .64 ft (7.6 in) 0.61 %	50.0	.93	467	-0.01	N/A
Tension = 262 lb	60.0	.99	441	0.00	N/A
	70.0	1.05	416	0.00	N/A
	80.0	1.11	393	0.00	N/A
	90.0	1.17	373	0.01	N/A
	100.0	1.23	354	0.01	N/A
	110.0	1.29	338	0.01	N/A
	120.0	1.36	322	0.02	N/A
	130.0	1.42	309	0.02	N/A
	140.0	1.48	296	0.03	N/A



E-31/2 - T-1/2
(Existing joint owned utility
pole (PSNH/Fairpoint) in
existing Right-of-Way)

Not to Scale

E-31/1 - T-1/1
(Existing joint owned utility
pole (PSNH/Fairpoint) in
existing Right-of-Way)



E-31/2 - T-1/2

Construction Notes:

NHOS proposes to install a 1/4 inch metal supporting strand between the existing utility poles shown above that will traverse the river. The strand will be installed at the proposed height (see above). The supporting strand will be secured to each pole using double dead end attachments to prevent any sag in the wire and maintain proper clearances. NHOS will lash a one inch diameter fiber optic cable (PVC jacket) to the strand using a dual lash method to provide security of the fiber over the right of way. The fiber will be tagged with twenty four hour contact information at each pole clamp. NHOS will employ the proper safety personnel during the crossing installation. The proposed install will meet all proper clearances from other Utilities. (see above). Additional pole guys will be added per NESC Rule 264 and as directed by pole owners.



E-31/1 - T-1/1



New Hampshire Optical Systems, Inc.
99 Pine Hill Rd.
Nashua, NH 03063
(603-821-6467)

Proposed Mascoma
River Crossing
Enfield, NH

Notes:

The heights of structures shown hereon are based on field measurements taken with a Nikon 362 total station during a site survey on 08/26/11.

The horizontal distance between the nearest bridge edge and the existing overhead wires ranges from 6.2' to 7.4'.

Because of the close horizontal proximity to the existing bridge structure, the simplified drawing is submitted with vertical distances measured to the structure. This process simplifies the preparation and review of the crossing without jeopardizing its intent to protect the safe usage of the waterway.

The smallest vertical distance from the top of existing bridge deck to the lowest existing overhead wires is 21.2'.

The vertical distance between the top of water and bridge deck is approximately 22.9'.

Vertical distances are representative of attachment heights after utility make ready moves are completed.

Project # TID-95-PRI-1
Drawing # AC-ENF-RIV-1

Date: 11/4/2011
Revision #

Proposed Mascoma
River Crossing
Enfield, NH

Location:
Shaker Hill Rd, Enfield, NH
Nearest cross street: Depot Rd