# **STATE OF NEW HAMPSHIRE**

**Inter-Department Communication** 

**DATE:** February 27, 2017 **AT (OFFICE):** NHPUC

FROM:	Randy Knepper Director – Safety Division
SUBJECT:	Docket No. DE 15-460, DE 15-461, DE 15-462 and DE 15-463 Northern Pass Transmission Project Northern Pass Transmission, LLC (NPT) and Public Service Company of New Hampshire d/b/a Eversource Energy (ESE) <b>Staff Recommendation #3 regarding</b> <b>17 Licenses to Cross Public Waters and Lands</b>
TO:	Debra Howland, Executive Director Thomas Frantz, Director, Electric Division Leszek Stachow, Assistant Director, Electric Division Suzanne Amidon, Staff Attorney
cc:	Robert Wyatt, Assistant Director, Safety Division

# Public waters and lands crossings included in this recommendation

# Table 1 Zone 3 - List of NPT and ESE Crossings

Staff Zone- Map #	Water/ Land Name	DE 15-460 NPT Water Crossing/ License	DE 15-461 NPT Land Crossing/ License	DE 15-462 ESE Water Crossing/ License	DE 15-463 ESE Land Crossing/ License	Totals
3-13	Pemigewasset River	Bridgewater				1
3-14	Squam River	Ashland				1
3-15	NHDOT		New Hampton		New Hampton	2
3-15	Pemigewasset River	New Hampton		New Hampton		2
3-16	Pemigewasset River	Bristol		Bristol		2
3-17	Pemigewasset River	New Hampton		New Hampton		2
3-18	W.H. Thomas Forest		Hill			1
3-19	Northern Rail Trail		Franklin		Franklin(2)	3
3-19	Chance Pond	Franklin		Franklin (2)		3
Zone 3	Total Licenses	6 NPT Water	3NPT Land	5 ESE Water	3 ESE Land	17

# Staff Recommendation #3 for Zone 3 crossings

NPT filed petitions pursuant to RSA 371:17 in docket no. DE 15-460, DE 15-461, DE 15-462 and DE 15-463, for licenses to construct and maintain electric lines over, under and across public waters, lands and rails at 17 locations along the proposed path between Bridgewater and Franklin, New Hampshire (Zone 1). The proposed 320kV direct current high-voltage electric transmission line is referenced in the petitions as the DC Line. Other existing Eversource circuits along the project path that will require licenses to cross public waters or lands are identified by their assigned circuit numbers and operate at alternating current (AC).

The methodology used by Staff to determine how the analysis was performed is presented in the Overall Recommendation memorandum.

This Recommendation #3 is to provide the details examined that apply to Zone 3.

Within Zone 3 there are no underground proposed installations. All 17 remaining crossings are overhead for land, public waters, and rails. The 17 crossings are sequentially labeled from, north to south. All mapping and data collection tables are presented in and follow the same sequence.

Table 2 gives pertinent information tables provided in this Staff Recommendation regarding overhead crossing information that has been reviewed or otherwise analyzed as appropriate.

			TAI	BLE 2 ZONE	3 AERIA	L CROS	SINGS					
Staff			Type Crossing				Staff	Clearance		Required		
Zone- Map	Water/Land Name	Town	Land	Voltage/Type	NPT/ESE	Circuit	Calculated Clearance	Shown on Petition	Calculated Difference	Clearance	Span ft	Verification
#			Rail Water				SAG 10	Profile		NESC		
3-13	Pemigewasset River	Bridgewater	Water	320kV/DC	NPT	3270 3271	45	41	4	35.7	926.83	Good
3-14	Squam River	Ashland	Water	320kV/DC	NPT	3270 3271	47	47	0	35.7	644.42	Excellent
3-15	NHDOT	New Hampton	Land	320kV/DC	NPT	3270 3271	69	65	4	21.7	601.98	Good
3-15	NHDOT	New Hampton	Land	115kV/AC	ESE	E115	51	46	5	16.1	692.46	Good
3-15	Pemigewasset River	New Hampton	Water	320kV/DC	NPT	3270 3271	81	81	0	35.7	612.44	Excellent
3-15	Pemigewasset River	New Hampton	Water	115kV/AC	ESE	E115	76	77	-1	30.1	594.21	Excellent
3-16	Pemigewasset River	Bristol	Water	320kV/DC	NPT	3270 3271	67	66	1	35.7	1447.42	Excellent
3-16	Pemigewasset River	Bristol	Water	115kV/AC	ESE	E115	47	43	4	30.1	1397.38	Good
3-17	Pemigewasset River	New Hampton	Water	320kV/DC	NPT	3270 3271	108	107	1	35.7	1112.90	Excellent
3-17	Pemigewasset River	New Hampton	Water	115kV/AC	ESE	A111	50	65	-15	30.1	728.06	Adequate
3-18	W.H. Thomas Forest	Hill	Land	320kV/DC	NPT	3270 3271	36	32	4	21.7	776.80	Good
3-19	Northern Rail Trail	Franklin	Rail	320kV/DC	NPT	3270 3271		55		21.7	248.68	Not Verified
3-19	Northern Rail Trail	Franklin	Rail	115kV/AC	ESE	M127		41		16.1	180.92	Not Verified
3-19	Northern Rail Trail	Franklin	Rail	115kV/AC	ESE	F139		61		16.1	175.35	Not Verified
3-19	Chance Pond	Franklin	Water	320kV/DC	NPT	3270 3271	81	79	2	35.7	597.17	Excellent
3-19	Chance Pond	Franklin	Water	115kV/AC	ESE	M127	57	55	2	30.1	524.86	Excellent
3-19	Chance Pond	Franklin	Water	115kV/AC	ESE	F139	63	60	3	30.1	550.31	Excellent

Refer to 7 detailed PUC generated single-page maps using its GIS mapping software specific to each crossing location. Each detailed map depicted all circuits, (proposed and existing including those that

will be relocated and those that will remain in place). Support structures, Support structure identifications, support structure heights, ROW widths, proper orientation of circuits, dimensions of spans, parcel information known as line lists (which emanated from NPT and ESE's petitions) are all depicted. Typical elevation views within the Right of Way are shown including cross sections within the ROW are taken from Forward NH Plans located at www.northernpass.us/towns.htm. In addition to the above geographical information was also depicted such as roads, buildings, rivers, trees, neighborhoods, bridges, and town lines.

Refer to Appendix A for single-page tables of information specific to each crossing, with a comments, conclusions, conditions and recommendations. Staff designated Zone 3 has identified 17 public waters, rails, and lands crossings that will require licenses. Specific technical and information relevant to the crossing are identified in each Appendix A table.

#### Existing license(s) and permissions previously granted by the PUC for these locations

See Attachments A1, A2 or A3 of the Overall Recommendation for licenses previously granted. NPT and ESE petitions were for the new DC transmission line and only for relocated ESE transmission lines. ESE did not include licenses for those existing transmission lines that were not being altered.

#### Existing Circuits where ESE does not have a license.

In examining the eight locations Staff found 2 locations where existing licenses were never issued:

- 1. Pemigewasset River, Bridgewater E115 Circuit 115kV PUC detailed map 13
- 2. Squam River, Ashland E115 Circuit 115kV- PUC detailed map 14

Staff recommends ESE be required to submit petitions for granting of these licenses.

#### Safety Division Specific Recommendations with any applicable conditions:

See individual crossing details listed within Tables A.3.13.1, A.3.14.1, A.3.15a.1, A.3.15a.2, A3.15b.1, A.3.15b.2, A.3.16.1, A.31.16.2, A.3.17.1, A.3.17.2, A.3.18.1, A.3.19a.1, A.3.19a.2, A.3.19a.2b, A.3.19b.1, A.3.19b.2a, A.3.19b.2b located in Appendix A of Recommendation #3.

# Pemigewasset River, Bridgewater, NH for NPT

General Information			Technical Information	
PUC Docket Number		DE 15-460	Voltage	320 kV, DC
PUC Zone		3	Circuit	3720/3731
PUC Map Number		13	Conductor Type	AAAC
Petitioner (NPT, ESE)		NPT	Code Name	None
Petitioner Line List # (for F	Parcels traversed)	5813.01	Conductor Size	2933 kcmil
Crossing Circuit Configura	tion	Overhead	Stranding	91
Public Crossing Type (Wat	er/Land)	Water	Conductor Horizontal Separation	28
Previous Public Crossing L	icense Issued by PUC (Yes/No)	No	Conductor Vertical Separation	NA
Relocated ESE Crossing (Ye	es/No/NA)	Yes	Cable Weight (Lbs/Ft)	2.769
Right of Way Width		225	Back Pole Number	DC-1100
Number of Circuits within		1 new (DC), 1 existing	Back Structure Height	110
Foreign Utilities within RO		None	Back Ground Elevation (Ft)	474.2
	anholes this circuit crossing	2	Back Conductor Height	85.5
First Structure Identification		DC-1099	Back Conductor Elev. at Pole	559.7
State Listed Public Waters		Yes	Forward Pole Number	DC-1101
Last Structure Identificatio		DC-1101	Forward Structure Height	95
	of crossing for License (Land only)	Not Applicable	Forward Ground Elevation	483.91
[Does Not apply to Water	or Rail]	P.P. COMP.	Forward Conductor Height	70.5
			Forward Conductor Elev. at Pole	554.41
			Span (Feet)	926.83
			Max Tension NESC Heavy lbs.	20,000
			Max Operating Temp (°F)	130
			Calc'd Horiz.Tension@MaxTemp	45
			Calc'd. Clearance (SAG 10)	45
			Clearance Shown on Profile	41 35.7
			Req'd Clearance (NESC)	35.7
Comments	elevations that are based on infor	rmation contained in flood	he water, the engineering design incorporations in the maps provided by FEMA. T	
	year flood elevation for this portion			
	<b>e</b> .	•	above the water for these open supply cor requirement (7.19 feet) brings the minimu	
Conclusions		ng will not substantially aff	ect the public rights in these waters, nor w	vill the proposed
conclusions	crossing substantially affect the fu			in the proposed
	The the proposed design for this	overhead crossing across p	ublic waters meets or exceeds NESC requir	rements for the
	expected recreational use by the	public.		
	That the Commission grant the lic	cense to construct, maintain	n and operate the electric and communica	tion lines over and
Staff Recommendation	across the public waters identified	d in the petition.		
	The license for this weblie water	receips is continent of	the Northern Dece Dreiest reserving - Cont	ificate of City and
	Facility from the SEC.	rossing is contingent upon	the Northern Pass Project receiving a Cert	incate of Site and
Staff Reccommended Conditions applied to License				

# Appendix A

#### Public Water/Land Crossing Name:

# Squam River, Ashland, NH for NPT

General Information				Technical Information	
PUC Docket Number		DE 15-460		Voltage	320 kV, DC
PUC Zone		3		Circuit	3720/3731
PUC Map Number		13		Conductor Type	AAAC
Petitioner (NPT, ESE)		NPT		Code Name	None
Petitioner Line List # (for Par	cels traversed)	5538, 5542		Conductor Size	2933 kcmil
Crossing Circuit Configuration	n	Overhead		Stranding	91
Public Crossing Type (Water/	/Land)	Water		Conductor Horizontal Separation	28
Previous Public Crossing Lice	nse Issued by PUC (Yes/No)	No		Conductor Vertical Separation	NA
Relocated ESE Crossing (Yes/	No/NA)	No		Cable Weight (Lbs/Ft)	2.769
Right of Way Width		225		Back Pole Number	DC-1113
Number of Circuits within RC	W	1 new (DC), 1 existing		Back Structure Height	80
Foreign Utilities within ROW		None		Back Ground Elevation (Ft)	477.23
Total Structures/Poles/Manh		2		Back Conductor Height	55.5
First Structure Identification	5	DC-1113		Back Conductor Elev. at Pole	532.73
State Listed Public Waters (Y	es/No/Not Applicable)	Yes		Forward Pole Number	DC-1114
Last Structure Identification		DC-1114		Forward Structure Height	80
	crossing for License (Land only)			Forward Ground Elevation	494.98
[Does Not apply to Water or		Not Applicable		Forward Conductor Height	55.5
				Forward Conductor Elev. at Pole	550.48
				Span (Feet)	644.42
				Max Tension NESC Heavy lbs.	20,000
				Max Operating Temp (°F)	130
				Calc'd Horiz.Tension@MaxTemp	
				Calc'd. Clearance (SAG 10)	47
				Clearance Shown on Profile	47
				Req'd Clearance (NESC)	35.7
Comments		formation contained in flo		water, the engineering design incorpor surance rate maps provided by FEMA.	
	The design incorporates NESC n flood data (28.5 feet) plus the a	ninimum required clearan additional NESC Rule 232.C	.1 rec	ove the water for these open supply co quirement (7.19 feet) brings the minimu	um clearance to 35.7 feet.
Conclusions	substantially affect the fuctiona	• ·		t the public rights in these waters, nor v waters.	vill the proposed crossing
	The the proposed design for thi recreational use by the public.	is overhead crossing acros	s pub	lic waters meets or exceeds NESC requi	rements for the expected
Staff Recommendation	That the Commission grant the across the public waters identif	,	tain a	nd operate the electric lines and comm	unication cables over
	The license for this public water from the SEC.	r crossing is contingent up	on th	e Northern Pass Project receiving a Cer	tificate of Site and Facility
Staff Reccommended Conditions applied to License					

# NH DOT ROW, New Hampton, NH for NPT

General Information			Technical Information	
PUC Docket Number		DE 15-461	Voltage	320 kV, DC
PUC Zone		3	Circuit	3720/3731
PUC Map Number		15	Conductor Type	AAAC
etitioner (NPT, ESE)		NPT	Code Name	None
etitioner Line List # (for Pa	arcels traversed)	6145	Conductor Size	2933 kcmil
Crossing Circuit Configuration	on	Overhead	Stranding	91
Public Crossing Type (Wate	r/Land)	Land	Conductor Horizontal Separation	28
	ense Issued by PUC (Yes/No)	No	Conductor Vertical Separation	NA
Relocated ESE Crossing (Yes	s/No/NA)	Yes	Cable Weight (Lbs/Ft)	2.769
light of Way Width	·	150	Back Pole Number	DC-1142
Jumber of Circuits within R	ROW	1 new (DC), 1 existing	Back Structure Height	110
oreign Utilities within ROV	V	None	Back Ground Elevation (Ft)	521.02
otal Structures/Poles/Mar	holes this circuit crossing	2	Back Conductor Height	86
irst Structure Identification		DC-1141	Back Conductor Elev. at Pole	607.02
tate Listed Public Waters (		NA	Forward Pole Number	DC-1143
ast Structure Identification		DC-1143	Forward Structure Height	105
UC Approximate Length of	f crossing for License (Land	m 2.002 ()	Forward Ground Elevation	480.2
only) [Does Not apply to W	•	~ 2,062 feet	Forward Conductor Height	80.5
	-		Forward Conductor Elev. at Pole	560.7
			Span (Feet)	601.98
			Max Tension NESC Heavy lbs.	20,000
			Max Operating Temp (°F)	130
			Calc'd Horiz.Tension@MaxTemp	7,865
			Calc'd. Clearance (SAG 10)	69
			Clearance Shown on Profile	65
			Req'd Clearance (NESC)	21.7
comments	highway and a NH State Po	blice firing range.	nent of Transportation. This crossing uses N the project's impact on this parcel.	
	type of use.	-	crossing across this ROW meets or exceeds	·
Conclusions	substantiall affect the fuct	ional use and safety in thes		
	Staff notes the the proposi expected use by the public		crossing across public lands meets or excee	ds NESC requirements fo
Staff Recommendation	That the Commission gran across the public lands ide		naintain and operate the electric and comm	unication lines over and
	The license for this public l Facility from the SEC.	and crossing is contingent	upon the Northern Pass Project receiving a C	Certificate of Site and
Staff Reccommended Conditions applied to License				

# NH DOT ROW, New Hampton, NH for ESE

General Information			Technical Information	
PUC Docket Number		DE 15-463	Voltage	115 kV, AC
PUC Zone		3	Circuit	E115
PUC Map Number		15	Conductor Type	ACSR
Petitioner (NPT, ESE)		ESE	Code Name	Drake
Petitioner Line List # (for Pa	rcels traversed)	6145	Conductor Size	795 kcmil
Crossing Circuit Configuration	on	Overhead	Stranding	26/7
Public Crossing Type (Wate		Land	Conductor Horizontal Separation	NA
	ense Issued by PUC (Yes/No)	No	Conductor Vertical Separation	
Relocated ESE Crossing (Yes	5/No/NA)	Yes	Cable Weight (Lbs/Ft)	1.094
Right of Way Width	, -, ,	150	Back Pole Number	E115-170
Number of Circuits within R	OW	1 new (DC), 1 existing	Back Structure Height	115
oreign Utilities within ROV		None	Back Ground Elevation (Ft)	523.12
otal Structures/Poles/Mar		2	Back Conductor Height	77.57
irst Structure Identification		E115-171	Back Conductor Elev. at Pole	600.69
tate Listed Public Waters (		NA	Forward Pole Number	E115-169
ast Structure Identification		E115-169	Forward Structure Height	100
	f crossing for License (Land		Forward Ground Elevation	494.28
only) [Does Not apply to Wa	<b>e</b> ,	~ 515 feet	Forward Conductor Height	62.5
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			Forward Conductor Flev. at Pole	556.78
			Span (Feet)	692.46
			Max Tension NESC Heavy lbs.	9,000
			Max Operating Temp (°F)	285
			Calc'd Horiz.Tension@MaxTemp	2,772
			Calc'd. Clearance (SAG 10)	51
			Clearance Shown on Profile	46
				-
			Reg'd Clearance (NESC)	16.1
Crossing Comments, Conclu	usions, Conditions, and Staff This State-owned land is m highway and a NH State Pc	anaged by the NH Departm	Req'd Clearance (NESC)	
	This State-owned land is m highway and a NH State Pc	nanaged by the NH Departm lice firing range.		
Crossing Comments, Conclu Comments	This State-owned land is m highway and a NH State Pc	nanaged by the NH Departm lice firing range.	nent of Transportation. This crossing uses N	
	This State-owned land is m highway and a NH State Pc Staff received no comment	nanaged by the NH Departm olice firing range. ts from NH DOT related to t	nent of Transportation. This crossing uses N	H DOT ROW over a State
	This State-owned land is m highway and a NH State Pc Staff received no comment Staff notes the the propose type of use. The proposed public land c	hanaged by the NH Departm blice firing range. ts from NH DOT related to t ed design for this overhead	hent of Transportation. This crossing uses N the project's impact on this parcel. crossing across this ROW meets or exceeds ly affect the public rights in these lands, nor	H DOT ROW over a State
Comments	This State-owned land is m highway and a NH State Po Staff received no comment Staff notes the the propose type of use. The proposed public land o substantiall affect the fucti	hanaged by the NH Departm blice firing range. Its from NH DOT related to t ed design for this overhead crossing will not substantial ional use and safety in thes	hent of Transportation. This crossing uses N he project's impact on this parcel. crossing across this ROW meets or exceeds ly affect the public rights in these lands, nor e public lands.	H DOT ROW over a State NESC requirements for t will the proposed cross
Comments	This State-owned land is m highway and a NH State Po Staff received no comment Staff notes the the propose type of use. The proposed public land o substantiall affect the fucti	hanaged by the NH Departm blice firing range. Its from NH DOT related to t ed design for this overhead crossing will not substantial ional use and safety in thes ed design for this overhead	hent of Transportation. This crossing uses N the project's impact on this parcel. crossing across this ROW meets or exceeds ly affect the public rights in these lands, nor	H DOT ROW over a Stat NESC requirements for t will the proposed cross
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Comments	This State-owned land is m highway and a NH State Po Staff received no comment Staff notes the the propose type of use. The proposed public land o substantiall affect the fucti Staff notes the the propose expected use by the public That the Commission grant or across the public lands i	hanaged by the NH Departm blice firing range. Its from NH DOT related to t ed design for this overhead crossing will not substantial ional use and safety in thes ed design for this overhead the license to construct, m dentified in the petition.	hent of Transportation. This crossing uses N he project's impact on this parcel. crossing across this ROW meets or exceeds ly affect the public rights in these lands, nor e public lands. crossing across public lands meets or excee	H DOT ROW over a Stat NESC requirements for t will the proposed cross ds NESC requirements for unication lines over, und
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Comments Conclusions	This State-owned land is m highway and a NH State Po Staff received no comment Staff notes the the propose type of use. The proposed public land o substantiall affect the fucti Staff notes the the propose expected use by the public That the Commission grant or across the public lands i The license for this public l	hanaged by the NH Departm blice firing range. Its from NH DOT related to t ed design for this overhead crossing will not substantial ional use and safety in thes ed design for this overhead the license to construct, m dentified in the petition.	hent of Transportation. This crossing uses N he project's impact on this parcel. crossing across this ROW meets or exceeds ly affect the public rights in these lands, nor e public lands. crossing across public lands meets or excee	H DOT ROW over a State NESC requirements for t will the proposed cross ds NESC requirements fo
Comments Conclusions Staff Recommendation Staff Reccommended Conditions applied to	This State-owned land is m highway and a NH State Po Staff received no comment Staff notes the the propose type of use. The proposed public land o substantiall affect the fucti Staff notes the the propose expected use by the public That the Commission grant or across the public lands i The license for this public l	hanaged by the NH Departm blice firing range. Its from NH DOT related to t ed design for this overhead crossing will not substantial ional use and safety in thes ed design for this overhead the license to construct, m dentified in the petition.	hent of Transportation. This crossing uses N he project's impact on this parcel. crossing across this ROW meets or exceeds ly affect the public rights in these lands, nor e public lands. crossing across public lands meets or excee	H DOT ROW over a Stat NESC requirements for t will the proposed cross ds NESC requirements for unication lines over, und
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Comments Conclusions Staff Recommendation Staff Reccommended Conditions applied to	This State-owned land is m highway and a NH State Po Staff received no comment Staff notes the the propose type of use. The proposed public land o substantiall affect the fucti Staff notes the the propose expected use by the public That the Commission grant or across the public lands i The license for this public l	hanaged by the NH Departm blice firing range. Its from NH DOT related to t ed design for this overhead crossing will not substantial ional use and safety in thes ed design for this overhead the license to construct, m dentified in the petition.	hent of Transportation. This crossing uses N he project's impact on this parcel. crossing across this ROW meets or exceeds ly affect the public rights in these lands, nor e public lands. crossing across public lands meets or excee	H DOT ROW over a Stat NESC requirements for t will the proposed cross ds NESC requirements for unication lines over, und

# Pemigewasset River, New Hampton, NH for NPT

General Information			Technical Information	
PUC Docket Number		DE 15-460	Voltage	320 kV, DC
PUC Zone		3	Circuit	3720/3731
PUC Map Number		15	Conductor Type	AAAC
Petitioner (NPT, ESE)		NPT	Code Name	None
Petitioner Line List # (for Pa	arcels traversed)	6145.03	Conductor Size	2933 kcmil
Crossing Circuit Configurati	on	Overhead	Stranding	91
Public Crossing Type (Wate		Water	Conductor Horizontal Separation	28
	ense Issued by PUC (Yes/No)	No	Conductor Vertical Separation	NA
Relocated ESE Crossing (Yes		Yes	Cable Weight (Lbs/Ft)	2.769
Right of Way Width	,	150	Back Pole Number	DC-1144
Number of Circuits within R	ROW	1 new (DC), 1 existing	Back Structure Height	110
Foreign Utilities within ROV	-	None	Back Ground Elevation (Ft)	473.9
Total Structures/Poles/Mar		2	Back Conductor Height	85.5
First Structure Identification		DC-1144	Back Conductor Elev. at Pole	559.4
State Listed Public Waters (		Yes	Forward Pole Number	DC-1145
Last Structure Identification		DC-1145	Forward Structure Height	65
	f crossing for License (Land		Forward Ground Elevation	535.95
only) [Does Not apply to W		Not Applicable	Forward Conductor Height	40.5
	-		Forward Conductor Elev. at Pole	576.45
			Span (Feet)	612.44
			Max Tension NESC Heavy lbs.	20,000
			Max Operating Temp (°F)	130
			Calc'd Horiz.Tension@MaxTemp	
			Calc'd. Clearance (SAG 10)	81
			Clearance Shown on Profile	81
			Req'd Clearance (NESC)	35.7
	In order to determine the	minimum NESC clearance a	bove the water, the engineering design inc	orporates flood water
Comments	100-year flood elevation for	or this portion of the river.	flood insurance rate maps provided by FE	
			rance above the water for these open sup ale 232.C.1 requirement (7.19 feet) brings	
Conclusions		r crossing will not substanti ct the fuctional use and safe	ally affect the public rights in these waters, ity in these public waters.	nor will the proposed
	The the proposed design for expected recreational use		ross public waters meets or exceeds NESC	requirements for the
Staff Recommendation	That the Commission grant or across the public waters		naintain and operate the electric and comn	nunications lines over, und
	The license for this public v Facility from the SEC.	water crossing is contingen	upon the Northern Pass Project receiving	a Certificate of Site and
Staff Reccommended Conditions applied to License				

# Pemigewasset River, New Hampton, NH for ESE

General Information		Technical Information	
PUC Docket Number	DE 15-462	Voltage	115 kV, AC
PUC Zone	3	Circuit	E115
PUC Map Number	15	Conductor Type	ACSR
Petitioner (NPT, ESE)	ESE	Code Name	Drake
Petitioner Line List # (for Parcels traversed)	6145.03	Conductor Size	795 kcmil
Crossing Circuit Configuration	Overhead	Stranding	26/7
Public Crossing Type (Water/Land)	Water	Conductor Horizontal Separation	12
Previous Public Crossing License Issued by PUC	No	Conductor Vertical Separation	NA
Relocated ESE Crossing (Yes/No/NA)	Yes	Cable Weight (Lbs/Ft)	1.094
Right of Way Width	150	Back Pole Number	E115-168
Number of Circuits within ROW	1 new (DC), 1 existing	Back Structure Height	125
Foreign Utilities within ROW	None	Back Ground Elevation (Ft)	467.8
Total Structures/Poles/Manholes this circuit crossing		Back Conductor Height	87.5
First Structure Identification	E115-168	Back Conductor Flev. at Pole	555.3
tate Listed Public Waters (Yes/No/Not Applicable)	Yes	Forward Pole Number	E115-167
ast Structure Identification	E115-167	Forward Structure Height	75
PUC Approximate Length of crossing for License (Lan	d	Forward Ground Elevation	536.88
only) [Does Not apply to Water or Rail]	Not Applicable	Forward Conductor Height	37.5
may [boos not apply to water of hail]		Forward Conductor Flev. at Pole	574.38
		Span (Feet)	594.21
		Max Tension NESC Heavy lbs.	20,000
		Max Operating Temp (°F)	130
		Calc'd Horiz.Tension@MaxTemp	2,587
		Calc'd. Clearance (SAG 10)	76
		Clearance Shown on Profile	77
		Reg'd Clearance (NESC)	30.1
			50.1
		ove the water, the engineering design incorpo	
	r this portion of the river.	ood insurance rate maps provided by FEMA.	The design uses the 100-
The design incorporate	s NESC minimum required cleara	nce above the water for these open supply c .C.1 requirement (1.59 feet) brings the minin	
	ater crossing will not substantiall fuctional use and safety in these	y affect the public rights in these waters, nor public waters.	will the proposed crossir
		oss public waters meets or exceeds NESC requ	uirements for the expecte
recreational use by the	-		
the public waters ident		intain and operate the electric and communi	
from the SEC.	lic water crossing is contingent u	pon the Northern Pass Project receiving a Ce	rtificate of Site and Facili
License			

# Pemigewasset River, Bristol, NH for NPT

General Information			Technical Information	
PUC Docket Number		DE 15-460	Voltage	320 kV, DC
PUC Zone		3	Circuit	3720/3731
PUC Map Number		16	Conductor Type	AAAC
Petitioner (NPT, ESE)		NPT	Code Name	None
Petitioner Line List # (for Par	cels traversed)	6441	Conductor Size	2933 kcmil
Crossing Circuit Configuratio	,	Overhead	Stranding	91
Public Crossing Type (Water,		Water	Conductor Horizontal Separation	36
Previous Public Crossing Lice		NA	Conductor Vertical Separation	NA
Relocated ESE Crossing (Yes/	, , , ,	Yes	Cable Weight (Lbs/Ft)	2.769
Right of Way Width		225	Back Pole Number	DC-1174
Number of Circuits within RC	)W	1 new (DC), 1 existing	Back Structure Height	100
Foreign Utilities within ROW		None	Back Ground Elevation (Ft)	530.1
Total Structures/Poles/Manh	oles this circuit crossing	2	Back Conductor Height	75.5
First Structure Identification		DC-1174	Back Conductor Elev. at Pole	605.6
State Listed Public Waters (Y	es/No/Not Applicable)	Yes	Forward Pole Number	DC-1175
Last Structure Identification	es/no/nornphicasie/	DC-1175	Forward Structure Height	125
PUC Approximate Length of	crossing for License (Land		Forward Ground Elevation	474.95
only) [Does Not apply to Wa		Not Applicable	Forward Conductor Height	100.5
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			Forward Conductor Elev. at Pole	575.45
			Span (Feet)	1447.42
			Max Tension NESC Heavy lbs.	20,000
			Max Operating Temp (°F)	130
			Calc'd Horiz.Tension@MaxTemp	10,494
			Calc'd. Clearance (SAG 10)	67
			Clearance Shown on Profile	66
			Reg'd Clearance (NESC)	35.7
	This section of the Pemige	wasset River is used recrea	tionally for boating, canoe and kayaking, fi	shing and swimming.
Comments	elevations that are based of 100-year flood elevation for The design incorporates N	on information contained in or this portion of the river. ESC minimum required clea	above the water, the engineering design inc n flood insurance rate maps provided by FE arance above the water for these open sup ule 232.C.1 requirement (7.19 feet) brings	MA. The design uses the oly conductors, using 100-
Conclusions	The proposed public water crossing substantially affect	t the fuctional use and safe		
	The the proposed design for expected recreational use	-	cross public waters meets or exceeds NESC	requirements for the
Staff Recommendation	That the Commission grant across the public waters id		naintain and operate the electric and comn	nunication lines over and
	The license for this public v Facility from the SEC.	water crossing is contingen	t upon the Northern Pass Project receiving	a Certificate of Site and
Staff Reccommended Conditions applied to License				

# Pemigewasset River, Bristol, NH for ESE

General Information			Technical Information	
PUC Docket Number		DE 15-462	Voltage	115 kV, AC
PUC Zone		3	Circuit	E115
PUC Map Number		16	Conductor Type	ACSR
Petitioner (NPT, ESE)		ESE	Code Name	Drake
Petitioner Line List # (for Pa	arcels traversed)	6441	Conductor Size	795 kcmil
Crossing Circuit Configurati	· · · · · · · · · · · · · · · · · · ·	Overhead	Stranding	26/7
Public Crossing Type (Wate		Water	Conductor Horizontal Separation	0
	ense Issued by PUC (Yes/No)	Yes	Conductor Vertical Separation	12
Relocated ESE Crossing (Yes		Yes	Cable Weight (Lbs/Ft)	1.094
Right of Way Width	,	225	Back Pole Number	E115-123
Number of Circuits within R	NOW	1 new (DC), 1 existing	Back Structure Height	120
Foreign Utilities within ROV		None	Back Ground Elevation (Ft)	521.08
Total Structures/Poles/Mar		2	Back Conductor Height	82.5
First Structure Identification		E115-123	Back Conductor Elev. at Pole	603.58
State Listed Public Waters (	Yes/No/Not Applicable)	Yes	Forward Pole Number	E115-122
Last Structure Identification		E115-122	Forward Structure Height	120
	f crossing for License (Land only)		Forward Ground Elevation	472.85
[Does Not apply to Water o	• • •	Not Applicable	Forward Conductor Height	82.5
	- 4		Forward Conductor Elev. at Pole	555.35
<u> </u>			Span (Feet)	1397.38
<b></b>			Max Tension NESC Heavy lbs.	9,000
<b></b>			Max Operating Temp (°F)	285
			Calc'd Horiz.Tension@MaxTemp	3,443
			Calc'd. Clearance (SAG 10)	47
			Clearance Shown on Profile	43
			Req'd Clearance (NESC)	30.1
				0011
Comments	elevations that are based on info year flood elevation for this por The design incorporates NESC m	ormation contained in flo tion of the river. ninimum required clearan	e the water, the engineering design incor od insurance rate maps provided by FEMA ce above the water for these open supply .1 requirement (1.59 feet) brings the min	A. The design uses the 100- conductors, using 100-year
Conclusions	The proposed public water cross substantially affect the fuctiona	sing will not substantially I use and safety in these p	affect the public rights in these waters, no ublic waters.	or will the proposed crossing
	recreational use by the public.		s public waters meets or exceeds NESC re	
Staff Recommendation	That the Commission grant the l the public waters identified in th		tain and operate the electric and commu	nication lines over and acros
Staff Reccommended	The license for this public water from the SEC.	crossing is contingent up	on the Northern Pass Project receiving a C	Certificate of Site and Facility
Conditions applied to License				

# Pemigewasset River, New Hampton, NH for NPT

General Information			Technical Information	
PUC Docket Number		DE 15-460	Voltage	320 kV, DC
PUC Zone		3	Circuit	3720/3731
UC Map Number		17	Conductor Type	AAAC
etitioner (NPT, ESE)		NPT	Code Name	None
etitioner Line List # (for Pa	arcels traversed)	6182	Conductor Size	2933 kcmil
rossing Circuit Configurati	ion	Overhead	Stranding	91
ublic Crossing Type (Wate	er/Land)	Water	Conductor Horizontal Separation	36
	cense Issued by PUC (Yes/No)	No	Conductor Vertical Separation	NA
elocated ESE Crossing (Ye	s/No/NA)	Yes	Cable Weight (Lbs/Ft)	2.769
ight of Way Width		225	Back Pole Number	DC-1205
lumber of Circuits within F	ROW	1 new (DC), 1 existing	Back Structure Height	95
oreign Utilities within RO	N	None	Back Ground Elevation (Ft)	399.63
otal Structures/Poles/Mai	nholes this circuit crossing	2	Back Conductor Height	70.5
irst Structure Identificatio		DC-1205	Back Conductor Elev. at Pole	470.13
tate Listed Public Waters	(Yes/No/Not Applicable)	Yes	Forward Pole Number	DC-1206
ast Structure Identification	n	DC-1206	Forward Structure Height	95
UC Approximate Length o	f crossing for License (Land	Not Applicable	Forward Ground Elevation	415.37
nly) [Does Not apply to W		Not Applicable	Forward Conductor Height	70.5
			Forward Conductor Elev. at Pole	485.87
			Span (Feet)	1112.9
			Max Tension NESC Heavy lbs.	20,000
			Max Operating Temp (°F)	130
			Calc'd Horiz.Tension@MaxTemp	9,912
			Calc'd. Clearance (SAG 10)	108
			Clearance Shown on Profile	107
			Req'd Clearance (NESC)	35.7
rossing Comments, Concl	This section of the Pemigev		ionally for boating, canoe and kayaking, fis	hing and swimming.
	This section of the Pemiger	wasset River is used recreat ninimum NESC clearance a	bove the water, the engineering design inc	orporates flood water
Crossing Comments, Concl	This section of the Pemiger In order to determine the r elevations that are based of 100-year flood elevation for	wasset River is used recreat ninimum NESC clearance a n information contained in or this portion of the river.	bove the water, the engineering design inc flood insurance rate maps provided by FEI	orporates flood water MA. The design uses the
	This section of the Pemiger In order to determine the r elevations that are based o 100-year flood elevation fo The design incorporates NE	wasset River is used recreat minimum NESC clearance a on information contained in or this portion of the river. ESC minimum required clea	bove the water, the engineering design inc	orporates flood water MA. The design uses the ply conductors, using 100
Comments	This section of the Pemigev In order to determine the r elevations that are based of 100-year flood elevation fo The design incorporates NE year flood data (28.5 feet) 35.7 feet.	wasset River is used recreat minimum NESC clearance a on information contained in or this portion of the river. ESC minimum required clea plus the additional NESC Ru	bove the water, the engineering design inc flood insurance rate maps provided by FEI rance above the water for these open supp ile 232.C.1 requirement (7.19 feet) brings t ally affect the public rights in these waters,	orporates flood water MA. The design uses the ply conductors, using 100 the minimum clearance f
Comments	This section of the Pemiger In order to determine the r elevations that are based of 100-year flood elevation fo The design incorporates NB year flood data (28.5 feet) 35.7 feet. The proposed public water crossing substantially affec	wasset River is used recreat minimum NESC clearance a on information contained in or this portion of the river. ESC minimum required clea plus the additional NESC Ru crossing will not substantia t the fuctional use and safe or this overhead crossing ac	bove the water, the engineering design inc flood insurance rate maps provided by FEI rance above the water for these open supp ile 232.C.1 requirement (7.19 feet) brings t ally affect the public rights in these waters,	orporates flood water MA. The design uses the oly conductors, using 100 the minimum clearance f nor will the proposed
	This section of the Pemigev In order to determine the r elevations that are based of 100-year flood elevation fo The design incorporates NE year flood data (28.5 feet) 35.7 feet. The proposed public water crossing substantially affec The the proposed design fo expected recreational use l	wasset River is used recreat minimum NESC clearance a on information contained in or this portion of the river. ESC minimum required clea plus the additional NESC Ru crossing will not substantia t the fuctional use and safe or this overhead crossing ac by the public.	bove the water, the engineering design inc flood insurance rate maps provided by FEI rance above the water for these open supp ule 232.C.1 requirement (7.19 feet) brings t ally affect the public rights in these waters, ity in these public waters.	orporates flood water MA. The design uses the oly conductors, using 100 the minimum clearance f nor will the proposed requirements for the
Comments	This section of the Pemigev In order to determine the r elevations that are based of 100-year flood elevation fo The design incorporates NE year flood data (28.5 feet) 35.7 feet. The proposed public water crossing substantially affec The the proposed design fo expected recreational use I That the Commission grant across the public waters ide	wasset River is used recreat minimum NESC clearance a on information contained in or this portion of the river. ESC minimum required clea plus the additional NESC Ru crossing will not substantia t the fuctional use and safe or this overhead crossing ac by the public. : the license to construct, m entified in the petition.	bove the water, the engineering design inc flood insurance rate maps provided by FEI rance above the water for these open supp ale 232.C.1 requirement (7.19 feet) brings t ally affect the public rights in these waters, ity in these public waters.	orporates flood water MA. The design uses the oly conductors, using 100 the minimum clearance f nor will the proposed requirements for the nunication lines over and

#### Pemigewasset River, New Hampton, NH for ESE

General Information			Technical Information	
PUC Docket Number		DE 15-462	Voltage	115 kV, AC
PUC Zone		3	Circuit	A111
PUC Map Number		17	Conductor Type	ACSR
Petitioner (NPT, ESE)		ESE	Code Name	Linnet
Petitioner Line List # (for Par	cels traversed)	6182	Conductor Size	336 kcmil
Crossing Circuit Configuratio		Overhead	Stranding	26/7
Public Crossing Type (Water		Water	Conductor Horizontal Separation	14
Previous Public Crossing Lice		Yes	Conductor Vertical Separation	0
Relocated ESE Crossing (Yes)	, , , ,	Yes	Cable Weight (Lbs/Ft)	0.462
Right of Way Width	-1 1	225	Back Pole Number	A111-80A
Number of Circuits within R	2W	1 new (DC), 1 existing	Back Structure Height	65.5
Foreign Utilities within ROW	-	None	Back Ground Elevation (Ft)	378.06
Total Structures/Poles/Manl		2	Back Conductor Height	59.53
First Structure Identification		 A111-80A	Back Conductor Elev. at Pole	437.59
State Listed Public Waters (Y		Yes	Forward Pole Number	A111-80
Last Structure Identification		A111-80	Forward Structure Height	74.5
PUC Approximate Length of	crossing for License (Land		Forward Ground Elevation	325.19
only) [Does Not apply to Wa	• ·	Not Applicable	Forward Conductor Height	68.53
,,r,	-		Forward Conductor Elev. at Pole	393.72
			Span (Feet)	728.06
			Max Tension NESC Heavy lbs.	3,500
			Max Operating Temp (°F)	285
			Calc'd Horiz.Tension@MaxTemp	847
			Calc'd. Clearance (SAG 10)	50
			Clearance Shown on Profile	65
			Reg'd Clearance (NESC)	30.1
Comments	elevations that are based of 100-year flood elevation for	on information contained ir or this portion of the river.	bove the water, the engineering design inc flood insurance rate maps provided by FE	MA. The design uses the
			arance above the water for these open supp ule 232.C.1 requirement (1.59 feet) brings t	
Conclusions		r crossing will not substanti ct the fuctional use and safe	ally affect the public rights in these waters, ety in these public waters.	nor will the proposed
	The the proposed design for expected recreational use		cross public waters meets or exceeds NESC	requirements for the
Staff Recommendation	That the Commission gran across the public waters id		naintain and operate the electric and comn	nunication lines over and
	The license for this public v Facility from the SEC.	water crossing is contingen	t upon the Northern Pass Project receiving	a Certificate of Site and
Staff Reccommended Conditions applied to License				

# William H. Thomas State Forest, Hill, NH for NPT

General Information			Technical Information			
PUC Docket Number		DE 15-461	Voltage	320 kV, DC		
PUC Zone		3	Circuit	3720/3731		
PUC Map Number		18	Conductor Type	AAAC		
etitioner (NPT, ESE)		NPT	Code Name	None		
Petitioner Line List # (for Pa	arcels traversed)	6703, 6704, 6705	Conductor Size	2933 kcmil		
Crossing Circuit Configurati	ion	Overhead	Stranding	91		
Public Crossing Type (Wate		Land	Conductor Horizontal Separation	28		
Previous Public Crossing Lic	· · ·	NA	Conductor Vertical Separation	NA		
Relocated ESE Crossing (Ye	1	NA	Cable Weight (Lbs/Ft)	2.769		
Right of Way Width	-, -, ,	225	Back Pole Number	DC-1209		
lumber of Circuits within F	ROW	1 new (DC)	Back Structure Height	85		
oreign Utilities within ROV		None	Back Ground Elevation (Ft)	464.02		
2	nholes this circuit crossing	5	Back Conductor Height	61		
First Structure Identificatio		DC-1209	Back Conductor Elev. at Pole	525.02		
tate Listed Public Waters		NA	Forward Pole Number	DC-1210		
ast Structure Identification	, , , , , ,	DC-1213	Forward Structure Height	85		
	f crossing for License (Land		Forward Ground Elevation	456.49		
only) [Does Not apply to W	• ·	~ 4,142 feet	Forward Conductor Height	61		
			Forward Conductor Fley. at Pole	517.49		
			Span (Feet)	776.8		
			Max Tension NESC Heavy lbs.	20,000		
			Max Operating Temp (°F)	130		
			Calc'd Horiz.Tension@MaxTemp	8,812		
			Calc'd. Clearance (SAG 10)	36		
			Clearance Shown on Profile	30		
			Req'd Clearance (NESC)	21.7		
			Req d clearance (NESC)	21.7		
	This State-owned public land parcel is managed by DRED. DRED did not provide any information or concerns of negative impacts on the public use and enjoyment of this public land as a result of this proposed project.					
Comments			pans approximately 4,000 feet.			
Conclusions	The proposed public land substantiall affect the fuct	-	ally affect the public rights in these lands, no se public lands.	r will the proposed cross		
	The the proposed design f recreational use by the pu	-	of public lands meets or exceeds NESC requir	ements for the expected		
	That the Commission gran across the public lands ide		maintain and operate the electric and comm	unications lines overand		
taff Recommendation						
	The license for this public Facility from the SEC.	land crossing is contingent	upon the Northern Pass Project receiving a	Certificate of Site and		
itaff Reccommended Conditions applied to License		land crossing is contingent	upon the Northern Pass Project receiving a	Certificate of Site and		

# Appendix A

# Public Water/Land Crossing Name:

# Northern Rail Trail, NH Bureau of Rail and Transit, Franklin, NH for NPT

General Information			Technical Information	
PUC Docket Number		DE 15-461	Voltage	320 kV, DC
PUC Zone		3	Circuit	3720/3731
PUC Map Number		19	Conductor Type	AAAC
Petitioner (NPT, ESE)		NPT	Code Name	None
Petitioner Line List # (for Pa	rcels traversed)	7317.01	Conductor Size	2933 kcmil
Crossing Circuit Configuration	on	Overhead	Stranding	91
Public Crossing Type (Water	r/Land)	Land	Conductor Horizontal Separation	28
Previous Public Crossing Licensed Issued by PUC (Yes/No)		No	Conductor Vertical Separation	NA
Relocated ESE Crossing (Yes		Yes	Cable Weight (Lbs/Ft)	2.769
Right of Way Width		up to 375 feet	Back Pole Number	DC-1270
Number of Circuits within R	OW	1 new (DC), 1 existing	Back Structure Height	100
Foreign Utilities within ROW	V	None	Back Ground Elevation (Ft)	429.82
Total Structures/Poles/Man	holes this circuit crossing	2	Back Conductor Height	55 EST.
First Structure Identification	<u>ו</u>	DC-1270	Back Conductor Elev. at Pole	71 EST.
State Listed Public Waters (	Yes/No/Not Applicable)	NA	Forward Pole Number	DC-1271
Last Structure Identification		DC-1271	Forward Structure Height	90
PUC Approximate Length of	crossing for License (Land only)		Forward Ground Elevation	429.78
[Does Not apply to Water o		181 feet	Forward Conductor Height	55 EST.
	-		Forward Conductor Elev. at Pole	62 EST.
			Span (Feet)	248.68
			Max Tension NESC Heavy lbs.	20,000
			Max Operating Temp (°F)	130
			Calc'd Horiz.Tension@MaxTemp	
			Calc'd. Clearance (SAG 10)	DID NOT CALC
			Clearance Shown on Profile	55
			Req'd Clearance (NESC)	21.7
Comments	and Transit. In response to a N rail trail through this area for r The Northern Rail Trail follows snowmobiling, cross country s NESC requires a 21.7 minimum The NPT profile view displays a approximately 25 feet above t	NH PUC Staff inquiry, the N nore than ten years. The rail corridor through t kiing, walking, hiking, bikin n clearance between the co a 30-foot reference line t he 30 foot reference line.	onductor and the terrain surface for this pro racking above the surface terrain with the c Staff did not verify the clearance.	NH DRED has managed the reation activities including posed circuit specifications onductor tracking at
Conclusions	substantiall affect the fuctiona	Il use and safety in these prints overhead crossing of pu	ffect the public rights on this land, nor will t ublic lands. blic lands meets or exceeds NESC requireme	
Staff Recommendation	the public lands identified in th	ne petition.	ntain and operate the electric and communi-	
Staff Reccommended Conditions applied to	The license for this public land from the SEC.	crossing is contingent upo	n the Northern Pass Project receiving a Cert	ificate of Site and Facility
License				

# Appendix A

# Public Water/Land Crossing Name:

# Northern Rail Trail, NH Bureau of Rail and Transit, Franklin, NH for ESE

General Information			Technical Information	
PUC Docket Number		DE 15-463	Voltage	115 kV, AC
PUC Zone		3	Circuit	M127
PUC Map Number		19	Conductor Type	ACSR
Petitioner (NPT, ESE)		ESE	Code Name	Drake
Petitioner Line List # (for Parcels traversed)		7317.01	Conductor Size	795 kcmil
Crossing Circuit Configuration		Overhead	Stranding	26/7
Public Crossing Type (Water/Land)		Land	Conductor Horizontal Separation	
	ensed Issued by PUC (Yes/No)	No	Conductor Vertical Separation	
Relocated ESE Crossing (Yes/	/No/NA)	Yes	Cable Weight (Lbs/Ft)	1.094
Right of Way Width		up to 375 feet	Back Pole Number	M127-1a
Number of Circuits within RC	W	1 new (DC), 3 existing	Back Structure Height	74.5
Foreign Utilities within ROW		None	Back Ground Elevation (Ft)	429.76
Total Structures/Poles/Manh	noles this circuit crossing	2	Back Conductor Height	>= 41
First Structure Identification		M127-1	Back Conductor Elev. at Pole	60 Est.
State Listed Public Waters (Y	es/No/Not Applicable)	NA	Forward Pole Number	M127-1
Last Structure Identification		M127-1A	Forward Structure Height	50.5
	crossing for License (Land only)	181 feet	Forward Ground Elevation	429.76
[Does Not apply to Water or		TOT IGGI	Forward Conductor Height	>= 41
			Forward Conductor Elev. at Pole	42 Est.
			Span (Feet)	180.92
			Max Tension NESC Heavy lbs.	9,000
			Max Operating Temp (°F)	285
			Calc'd Horiz.Tension@MaxTemp	
			Calc'd. Clearance (SAG 10)	
			Clearance Shown on Profile	41
			Req'd Clearance (NESC)	16.1
	Bureau of Rail and Transit. In managed the rail trail through	response to a NH PUC Sta this area for more than te	•	ts that noted the NH DRED has
Comments	Snowmobiling, cross country s		these parcels and is used for a variety of r ng, etc	ecreation activities including
	specifications. The ESE profile	view displays a 24-foot re	the closest conductor and the terrain surf fererence line tracking above the surface	terrain with the conductor
			rence line at the closest point. Staff did r	
Conclusions	The proposed public land cros substantiall affect the fuctiona	• ·	affect the public rights on this land, nor w public lands.	ill the proposed crossing
	The the proposed design for the recreational use by the public.		ublic lands meets or exceeds NESC require	ements for the expected
Staff Recommendation	the public lands identified in th	he petition.	ntain and operate the electric and comm representing a 41 foot clearance which is	
Staff Reccommended Conditions applied to License	The license for this public land from the SEC.	l crossing is contingent up	on the Northern Pass Project receiving a C	Certificate of Site and Facility

# Northern Rail Trail, NH Bureau of Rail and Transit, Franklin, NH for ESE

General Information			Technical Information	
PUC Docket Number		DE 15-463	Voltage	115 kV, AC
PUC Zone		3	Circuit	F139
PUC Map Number		19	Conductor Type	ACSR
Petitioner (NPT, ESE)		ESE	Code Name	Drake
Petitioner Line List # (for Parcels traversed)		7317.01	Conductor Size	795 kcmil
Crossing Circuit Configuration	,	Overhead	Stranding	26/7
Public Crossing Type (Water/L		Land	Conductor Horizontal Separation	20//
Previous Public Crossing Licen		Yes	Conductor Vertical Separation	
· · · ·	,	Yes	Cable Weight (Lbs/Ft)	1.094
Relocated ESE Crossing (Yes/N	NO/INA)		<b>0</b> ( ) )	F139-343
Right of Way Width	A./	up to 375 feet	Back Pole Number	
Number of Circuits within RON	VV	1 new (DC), 3 existing	Back Structure Height	70
oreign Utilities within ROW	1 11 1 1 1	None	Back Ground Elevation (Ft)	435.1
Total Structures/Poles/Manho	oles this circuit crossing	2	Back Conductor Height	>= 61
irst Structure Identification		F139-343	Back Conductor Elev. at Pole	60 Est.
tate Listed Public Waters (Ye	es/No/Not Applicable)	NA	Forward Pole Number	F139-342
ast Structure Identification		F139-342	Forward Structure Height	92.5
UC Approximate Length of cr	<b>,</b>	181 feet	Forward Ground Elevation	427.83
only) [Does Not apply to Wate	er or Rail]		Forward Conductor Height	>= 61
			Forward Conductor Elev. at Pole	65 Est.
			Span (Feet)	175.35
			Max Tension NESC Heavy lbs.	9,000
			Max Operating Temp ( <sup>o</sup> F)	285
			Calc'd Horiz.Tension@MaxTemp	
			Calc'd. Clearance (SAG 10)	
			Clearance Shown on Profile	61
			Req'd Clearance (NESC)	16.1
•	This relocated ESE crossing	g traverses State-owned lar	nd in this section of Franklin, NH. The land	<b>e</b> 1
	This relocated ESE crossing DOT, Bureau of Rail and Tr	g traverses State-owned lar	PUC Staff inquiry, the NH DOT provided c	• •
	This relocated ESE crossing DOT, Bureau of Rail and Tr NH DRED has managed the	g traverses State-owned lar ransit. In response to a NH e rail trail through this area	PUC Staff inquiry, the NH DOT provided c	omments that noted the
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#### Chance Pond, Franklin, NH for NPT

General Information			Technical Information	
PUC Docket Number		DE 15-460	Voltage	320 kV, DC
PUC Zone		3	Circuit	3720/3731
PUC Map Number		19	Conductor Type	AAAC
etitioner (NPT, ESE)		NPT	Code Name	None
etitioner Line List # (for I	Parcels traversed)	7315	Conductor Size	2933 kcmil
Crossing Circuit Configura	tion	Overhead	Stranding	91
ublic Crossing Type (Wat		Water	Conductor Horizontal Separation	28
Previous Public Crossing L		Yes	Conductor Vertical Separation	NA
Relocated ESE Crossing (Y	· · · · · · · · · · · · · · · · · · ·	Yes	Cable Weight (Lbs/Ft)	2.769
light of Way Width		up to 375 feet	Back Pole Number	DC-1271
Jumber of Circuits within	ROW/	1 new (DC), 3 existing	Back Structure Height	90
oreign Utilities within RC	-	None	Back Ground Elevation (Ft)	429.78
	anholes this circuit crossing	2		65.5
irst Structure Identificati		DC-1271	Back Conductor Height Back Conductor Elev. at Pole	495.28
	s (Yes/No/Not Applicable)	No	Forward Pole Number	DC-1272
ast Structure Identification	1 1 1	DC-1272	Forward Structure Height	110
		DC-1272	, , , , , , , , , , , , , , , , , , ,	
	of crossing for License (Land	Not Applicable	Forward Ground Elevation	412.82
only) [Does Not apply to V			Forward Conductor Height	85.5
			Forward Conductor Elev. at Pole Span (Feet)	498.32 597.17
			Max Tension NESC Heavy lbs.	20,000
			Max Operating Temp (°F) Calc'd Horiz.Tension@MaxTemp	7,833
				,
			Calc'd. Clearance (SAG 10)	81
			Clearance Shown on Profile	79
			Req'd Clearance (NESC)	35.7
Crossing Comments, Con	been listed as designated	Pond is used recreationally public waters by NH DES but	for boating, canoe and kayaking and fishir Staff recommends issuing a license becau C. Chance Pond has all the characteristics	se three existing ESE
Crossing Comments, Con	This section of the Chance been listed as designated crossings have been previo although DES does not cor	Pond is used recreationally public waters by NH DES but pusly licensed by the NH PU	Staff recommends issuing a license becau	se three existing ESE of a public water body
Crossing Comments, Con	This section of the Chance been listed as designated crossings have been previo although DES does not cor project. In order to determine the elevations that are based of	Pond is used recreationally public waters by NH DES but ously licensed by the NH PU nsider it because it is man m minimum NESC clearance al on information contained in	Staff recommends issuing a license becau C. Chance Pond has all the characteristics	se three existing ESE of a public water body ated as part of the NPT orporates flood water
	This section of the Chance been listed as designated crossings have been previo although DES does not cor project. In order to determine the elevations that are based o year flood elevation for th	Pond is used recreationally public waters by NH DES but ously licensed by the NH PU nsider it because it is man m minimum NESC clearance al on information contained in is portion of the river.	Staff recommends issuing a license becau C. Chance Pond has all the characteristics ade. Two existing circuits are being reloca bove the water, the engineering design inc flood insurance rate maps provided by FE	se three existing ESE of a public water body ated as part of the NPT orporates flood water MA. The design uses the :
	This section of the Chance been listed as designated crossings have been previo although DES does not cor project. In order to determine the elevations that are based o year flood elevation for th The design incorporates N	Pond is used recreationally public waters by NH DES but ously licensed by the NH PU nsider it because it is man m minimum NESC clearance al on information contained in is portion of the river. ESC minimum required clea	Staff recommends issuing a license becau C. Chance Pond has all the characteristics ade. Two existing circuits are being reloca bove the water, the engineering design inc flood insurance rate maps provided by FE rance above the water for these open sup	se three existing ESE of a public water body ated as part of the NPT orporates flood water MA. The design uses the : oly conductors, using 100-
	This section of the Chance been listed as designated crossings have been previous although DES does not cor project. In order to determine the elevations that are based of year flood elevation for th The design incorporates N year flood data (28.5 feet)	Pond is used recreationally public waters by NH DES but ously licensed by the NH PU nsider it because it is man m minimum NESC clearance al on information contained in is portion of the river. ESC minimum required clea	Staff recommends issuing a license becau C. Chance Pond has all the characteristics ade. Two existing circuits are being reloca bove the water, the engineering design inc flood insurance rate maps provided by FE	se three existing ESE of a public water body ated as part of the NPT orporates flood water MA. The design uses the : oly conductors, using 100-
	This section of the Chance been listed as designated   crossings have been previc although DES does not cor project. In order to determine the elevations that are based of year flood elevation for th The design incorporates N year flood data (28.5 feet) 35.7 feet.	Pond is used recreationally public waters by NH DES but ously licensed by the NH PU nsider it because it is man m minimum NESC clearance al on information contained in is portion of the river. ESC minimum required clea plus the additional NESC Ru	Staff recommends issuing a license becau C. Chance Pond has all the characteristics ade. Two existing circuits are being reloca bove the water, the engineering design inc flood insurance rate maps provided by FE rance above the water for these open sup alle 232.C.1 requirement (7.19 feet) brings to	se three existing ESE of a public water body ated as part of the NPT orporates flood water MA. The design uses the : bly conductors, using 100- the minimum clearance to
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Comments Conclusions Staff Recommendation Staff Reccommended Conditions applied to	This section of the Chance been listed as designated   crossings have been previo although DES does not cor project. In order to determine the elevations that are based of year flood elevation for th The design incorporates N year flood data (28.5 feet) 35.7 feet. The proposed public water crossing substantially affect The the proposed design fr expected recreational use That the Commission gran across the public waters id The license for this public	Pond is used recreationally public waters by NH DES but ously licensed by the NH PU nsider it because it is man m minimum NESC clearance al on information contained in is portion of the river. ESC minimum required clea plus the additional NESC Ru r crossing will not substantia ct the fuctional use and safe or this overhead crossing ac by the public. t the license to construct, m lentified in the petition.	EStaff recommends issuing a license becau C. Chance Pond has all the characteristics ade. Two existing circuits are being reloca bove the water, the engineering design inc flood insurance rate maps provided by FE rance above the water for these open supple 232.C.1 requirement (7.19 feet) brings to ally affect the public rights in these waters, ty in these public waters. ross public waters meets or exceeds NESC aintain and operate the electric and comm	se three existing ESE of a public water body ated as part of the NPT orporates flood water MA. The design uses the oly conductors, using 100- the minimum clearance to nor will the proposed requirements for the nunication lines over and
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#### Chance Pond, Franklin, NH for ESE

General Information		Technical Information	
PUC Docket Number	DE 15-462	Voltage	115 kV, AC
PUC Zone	3	Circuit	M127
PUC Map Number	19	Conductor Type	ACSR
Petitioner (NPT, ESE)	ESE	Code Name	Drake
Petitioner Line List # (for Parcels traversed)	7315	Conductor Size	795 kcmil
Crossing Circuit Configuration	Overhead	Stranding	26/7
Public Crossing Type (Water/Land)	Water	Conductor Horizontal Separation	14 ft (1), 20 ft (2)
Previous Public Crossing Licensed Issued by PUC	Yes	Conductor Vertical Separation	0 ft (1), 12 ft (2)
Relocated ESE Crossing (Yes/No/NA)	Yes	Cable Weight (Lbs/Ft)	1.094
Right of Way Width	up to 375 feet	Back Pole Number	M127-1
Number of Circuits within ROW	1 new (DC), 3 existing	Back Structure Height	50.5
Foreign Utilities within ROW	None	Back Ground Elevation (Ft)	430.06
Total Structures/Poles/Manholes this circuit crossing	2	Back Conductor Height	44.5
First Structure Identification	M127-1	Back Conductor Elev. at Pole	474.56
State Listed Public Waters (Yes/No/Not Applicable)	No	Forward Pole Number	M127-2
Last Structure Identification	M127-2	Forward Structure Height	83.5
PUC Approximate Length of crossing for License (Land		Forward Ground Elevation	414.57
only) [Does Not apply to Water or Rail]	Not Applicable	Forward Conductor Height	56
	† 1	Forward Conductor Elev. at Pole	470.57
	† 1	Span (Feet)	524.86
	1	Max Tension NESC Heavy lbs.	9,000
		Max Operating Temp (°F)	285
		Calc'd Horiz.Tension@MaxTemp	2,434
		Calc'd. Clearance (SAG 10)	57
		Clearance Shown on Profile	55
		Req'd Clearance (NESC)	30.1
project.           Comments         In order to determine the elevations that are based	minimum NESC clearance on information contained	made. Two existing circuits are being relo above the water, the engineering design ir in flood insurance rate maps provided by F	corporates flood water
The design incorporates N		earance above the water for these open su Rule 232.C.1 requirement (1.59 feet) bring:	, ,
		tially affect the public rights in these water fety in these public waters.	s, nor will the proposed
The the proposed design expected recreational use	-	across public waters meets or exceeds NES	C requirements for the
That the Commission gran across the public waters i Staff Recommendation		maintain and operate the electric and com	munication lines over and
The license for this public Facility from the SEC.	water crossing is continge	nt upon the Northern Pass Project receivin	g a Certificate of Site and
Staff Reccommended Conditions applied to License			

#### Chance Pond, Franklin, NH for ESE

			Technical Information	
PUC Docket Number		DE 15-462	Voltage	115 kV, AC
PUC Zone		3	Circuit	F139
PUC Map Number		19	Conductor Type	ACSR
Petitioner (NPT, ESE)		ESE	Code Name	Drake
Petitioner Line List # (for Pa	rcels traversed)	7315	Conductor Size	795 kcmil
Crossing Circuit Configuration		Overhead	Stranding	26/7
Public Crossing Type (Water		Water	Conductor Horizontal Separation	20
Previous Public Crossing Lice	. ,	Yes	Conductor Vertical Separation	12
Relocated ESE Crossing (Yes	1	Yes	Cable Weight (Lbs/Ft)	1.094
Right of Way Width		up to 375 feet	Back Pole Number	F139-342
Number of Circuits within R	OW/	1 new (DC), 3 existing	Back Structure Height	92.5
Foreign Utilities within ROW	-	None	Back Ground Elevation (Ft)	427.83
Total Structures/Poles/Man		2	Back Conductor Height	65
First Structure Identification		F139-342	Back Conductor Elev. at Pole	492.83
State Listed Public Waters (		No	Forward Pole Number	F139-341
Last Structure Identification	,	F139-341	Forward Structure Height	83.5
PUC Approximate Length of		1155-541	Forward Ground Elevation	414.71
only) [Does Not apply to Wa	<b>e</b> ,	Not Applicable	Forward Ground Elevation Forward Conductor Height	56
Juny [Dues Not apply to Wa			Forward Conductor Height	470.71
			Span (Feet)	550.31
			Max Tension NESC Heavy lbs.	9,000
			Max Operating Temp (°F)	285
			Calc'd Horiz.Tension@MaxTemp	2,492
			Calc'd. Clearance (SAG 10)	63
			Clearance Shown on Profile	60
			Req'd Clearance (NESC)	30.1
		1		50.1
Comments	crossings have been previous although DES does not comproject. In order to determine the elevations that are based of year flood elevation for th	usly licensed by the NH PU nsider it because it is man m minimum NESC clearance a on information contained in is portion of the river.	t Staff recommends issuing a license becau C. Chance Pond has all the characteristics hade. Two existing circuits are being reloca bove the water, the engineering design inco- flood insurance rate maps provided by FE rance above the water for these open sup	of a public water body ated as part of the NPT corporates flood water MA. The design uses the 10
Conclusions	30.1 feet. The proposed public water		ale 232.C.1 requirement (1.59 feet) brings a ally affect the public rights in these waters, with in these public waters.	
	The the proposed design for expected recreational use	•	cross public waters meets or exceeds NESC	requirements for the
Staff Recommendation	That the Commission gran across the public waters id		naintain and operate the electric and comn	nunication lines over and
	The license for this public Facility from the SEC.	water crossing is contingent	t upon the Northern Pass Project receiving	a Certificate of Site and
	racinty non the sec.			