Jennifer Brooks Hutchinson
Senior Counsel

nationalgrid

January 6, 2010

VIA HAND DELIVERY & ELECTRONIC MAIL

Luly E. Massaro, Commission Clerk
Rhode Island Public Utilities
89 Jefferson Boulevard
Warwick, RI 02888

RE: Docket 4111 – Review of Proposed Town of New Shoreham Project Pursuant to RI General Laws § 39-26.1-7
<u>Responses to Division Data Requests – Set 1</u>

Dear Ms. Massaro:

Enclosed please find ten (10) copies of the National Grid's[1] responses to the Division of Public Utilities and Carriers' (the "Division") First Set of Data Requests issued on December 22, 2009, in the above-captioned proceeding.

In this transmittal, which completes National Grid's responses to the Division's First Set of Data Requests, National Grid is providing responses to the following Division Data Requests: DIV 1-3; DIV 1-5; DIV 1-7; DIV 1-9; DIV 1-10; and DIV 1-11.

Thank you for your attention to this transmittal. If you have any questions, please feel free to contact me at (781) 907-2121.

Very truly yours,

Jennifer Brooks Hutchinson

Enclosures
cc: Docket 4111 Service List
Leo Wold, Esq.

[1] Submitted on behalf of The Narragansett Electric Company d/b/a National Grid ("Company").

Certificate of Service

I hereby certify that a copy of the cover letter and / or any materials accompanying this certificate has been electronically transmitted, sent via U.S. mail or hand-delivered to the individuals listed below.

___________________________________ January 6, 2010

Joanne M. Scanlon Date

National Grid – Review of Proposed Town of New Shoreham Project
Docket No. 4111 - Service List Updated 12/29/2009

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Original & nine (9) copies w/: Luly E. Massaro, Commission Clerk Public Utilities Commission 89 Jefferson Blvd. Warwick RI 02889	Lmassaro@puc.state.ri.us Cwilson@puc.state.ri.us Nucci@puc.state.ri.us Anault@puc.state.ri.us Sccamara@puc.state.ri.us	401-780-2017 401-941-1691
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Rep. Ehrhardt	rep-ehrhardt@rilin.state.ri.us	

Division Data Request 1-3

Request:

Please provide a one-line diagram of the National Grid transmission/distribution system in the areas where the Transmission Cable may interconnect showing all 69KV and 34.5KV facilities (lines and substations), including but not limited to the Narragansett, Wood River, Wakefield, and Bonnet substations and lines 3302 and 3307. Also provide a geographic map showing these same facilities, preferably in more detail than provided in Exhibit 3 of Mr. Glenning's testimony.

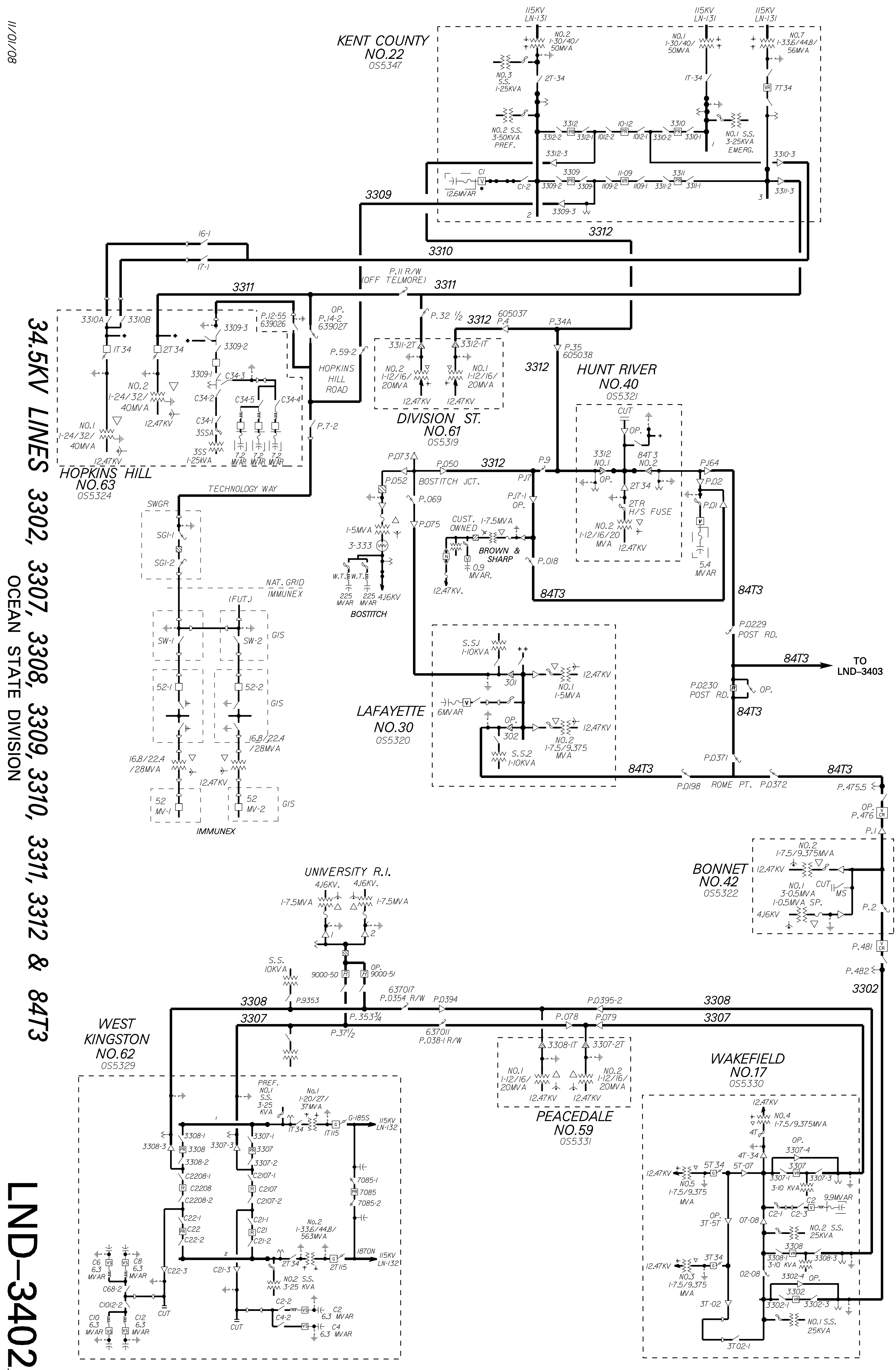
Response:

One line diagrams for the 34.5 kV lines in the study area (including the 3302 and 3307 lines) and the Bonnet #042, Wakefield #017, Peacedale #059, West Kingston #062, and Wood River #085 substations are attached to this response as Attachments DIV 1-3-1 through DIV 1-3-6, respectively. There are no 69 kV facilities (lines or substations) located in the study area. Presently, National Grid does not have a Narragansett substation; however, once the final interconnection point with the 3302 line is established, there will be a need for circuit breakers and other equipment to be installed. The location(s) of these circuit breakers and other equipment will be determined during the permitting process for the Transmission Cable.

Geographic maps showing the same facilities referred to above are attached to this response as Attachment DIV 1-3-7 through Attachment DIV 1-3-14. Attachment DIV 1-3-7 is the Geographic Overview Map for the study area (Narragansett and South Kingstown, Rhode Island). Attachment DIV 1-3-8 through Attachment DIV 1-3-14 are expanded views of the study area, shown as the red boxes on the Geographic Overview Map.

Prepared by or under the supervision of: Daniel Glenning

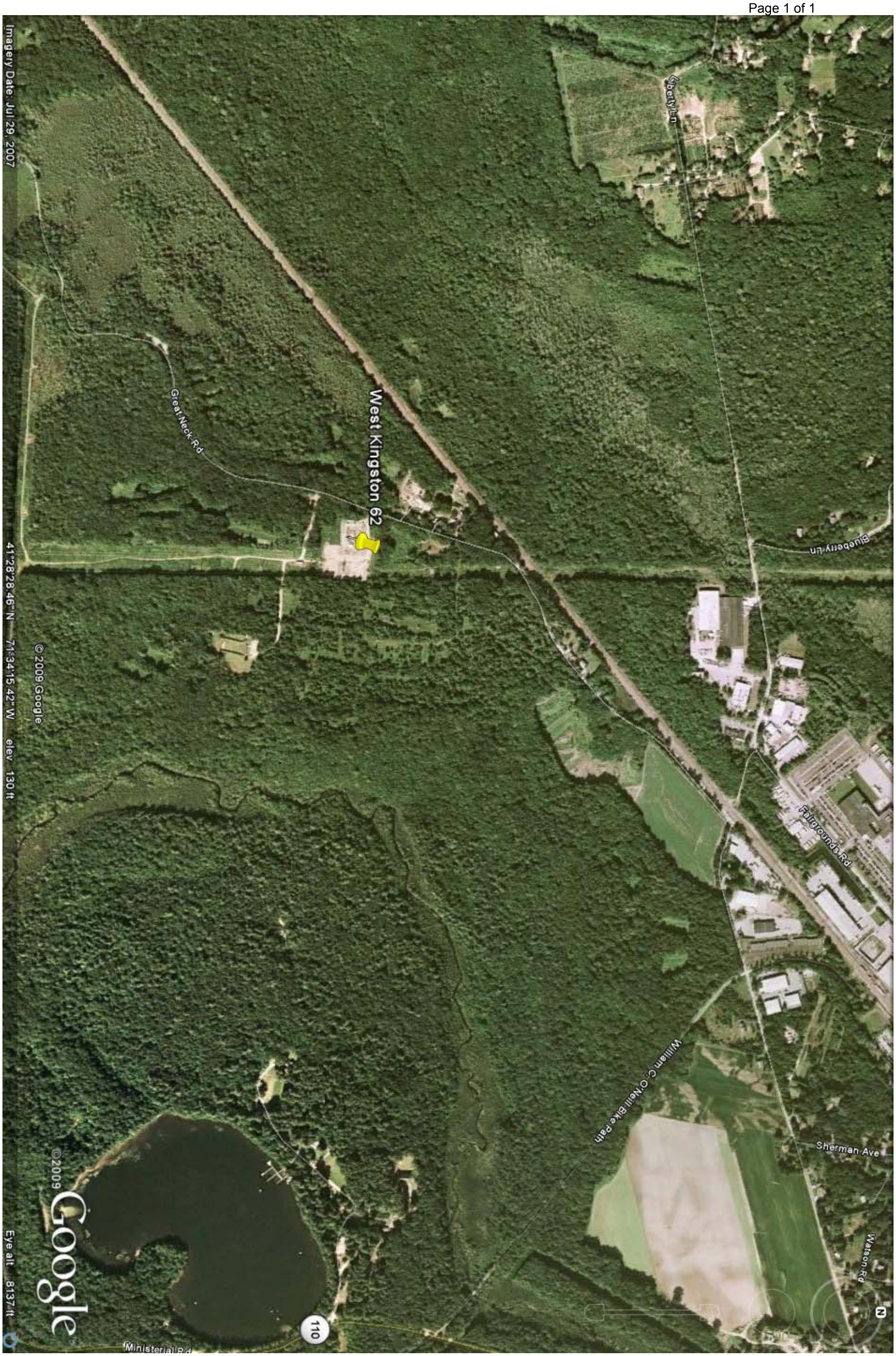
Attachment DIV 1-3-1
Docket No. 4111
Responses to Division - Set 1
Page 1 of 1



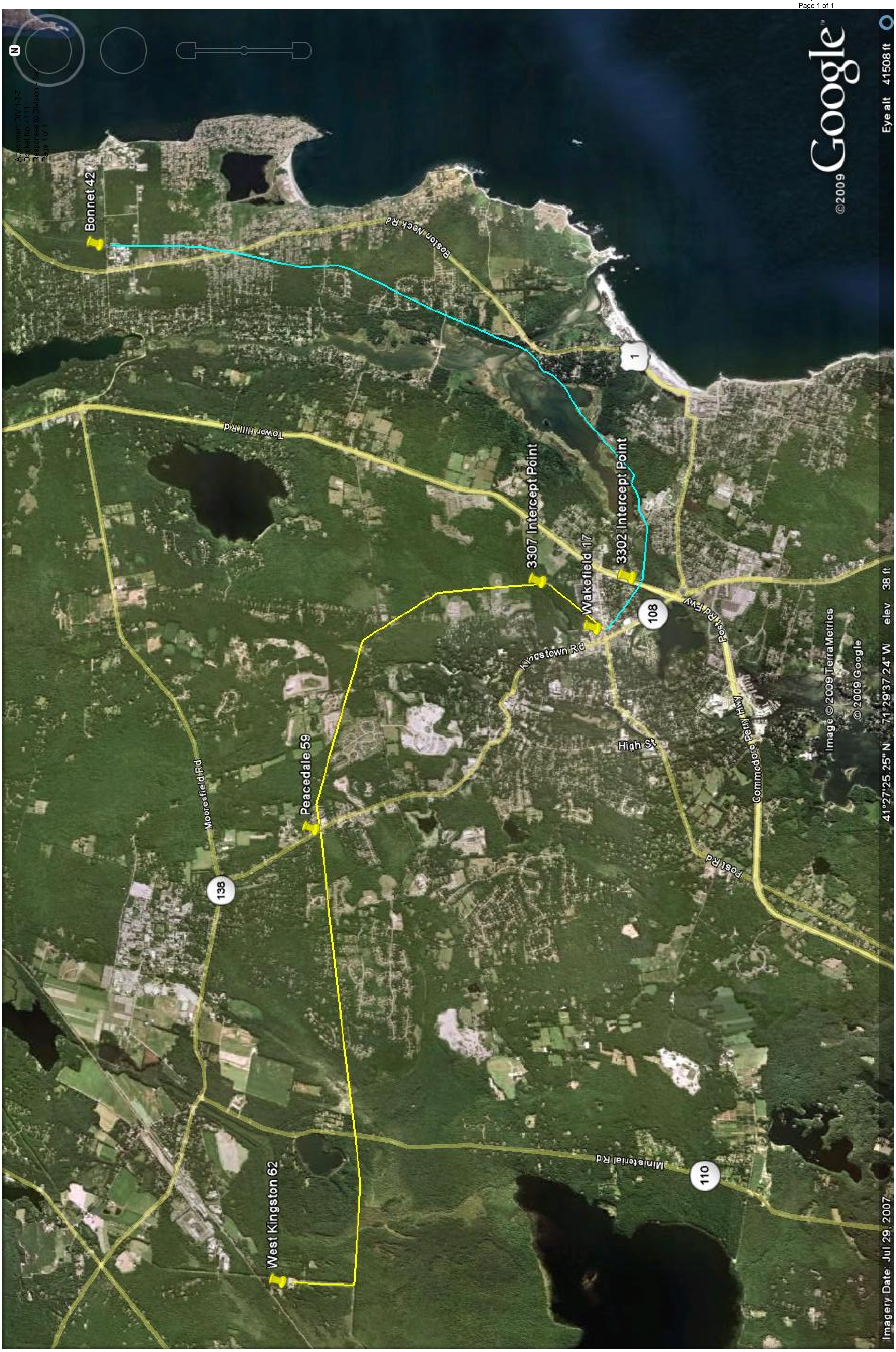

Imagery Date: Jul 29, 2007
Boston Neck Rd
Bridgetown Rd
Mitchell Rd
Celestial Dr
S Ferry Rd
Sextant Ln
Bonnet 42
Industrial Dr
Ray Trainor Dr
41°29'27.18" N 71°26'04.21" W elev 82 ft
© 2009 Europa Technologies
© 2009 Google
©2009 Google
Eye alt 2755 ft


Imagery Date: Jul 29, 2007
Robinson St
Hazard Ave
Main St
Chappell St
Caswell St
Holley St
Cherry Ln
Dale Carlia St
Kingstown Rd
Rhode Island 1A
William C. O'Neill Bike Path
Charles St
Wakefield 17
Shadow Farm Way
Patton Ave
Arnold St
41°26'26.43" N 71°29'07.42" W elev 87 ft
© 2009 Google
Pershing Ave
Narragansett Ave W
Audubon Dr
MacArthur Blvd
Tower Hill Rd
1
©2009 Google
Eye alt 3134 ft
Peckham Ave
Kelley Way
N


Imagery Date: Jul 29, 2007
Peacedale 59
Westwind Rd
Kingstown Rd
108
Rolens Dr
Zinns Dr
© 2009 Google
41°28'11.17" N 71°30'46.79" W elev 139 ft
©2009 Google
Eye alt 2267 ft


West Kingston 62
Great Neck Rd
Liberty Ln
Blueberry Ln
Fairgrounds Rd
William C. O'Neill Bike Path
Sherman Ave
Watson Rd
Ministerial Rd
110
Imagery Date: Jul 29, 2007
41°28'28.46" N 71°34'15.42" W elev 130 ft
© 2009 Google
Eye alt 8137 ft


Wood River 85
Gardner Rd
Shumankanuc Hill Rd
BIA Route 411
Imagery Date: Sep 30, 2006
© 2009 Google
Image © 2009 DigitalGlobe
41°25'35.90" N 71°42'02.67" W elev 88 ft
©2009 Google
Eye alt 4062 ft


Bonnet 42
3307 Intercept Point
3302 Intercept Point
Wakefield 17
Peacedale 59
West Kingston 62
Boston Neck Rd
Tower Hill Rd
Kingstown Rd
High St
Post Rd
Post Rd Fwy
Commodore Perry Hwy
Mooresfield Rd
Ministerial Rd
1
108
138
110
©2009 Google
Image © 2009 TerraMetrics
© 2009 Google
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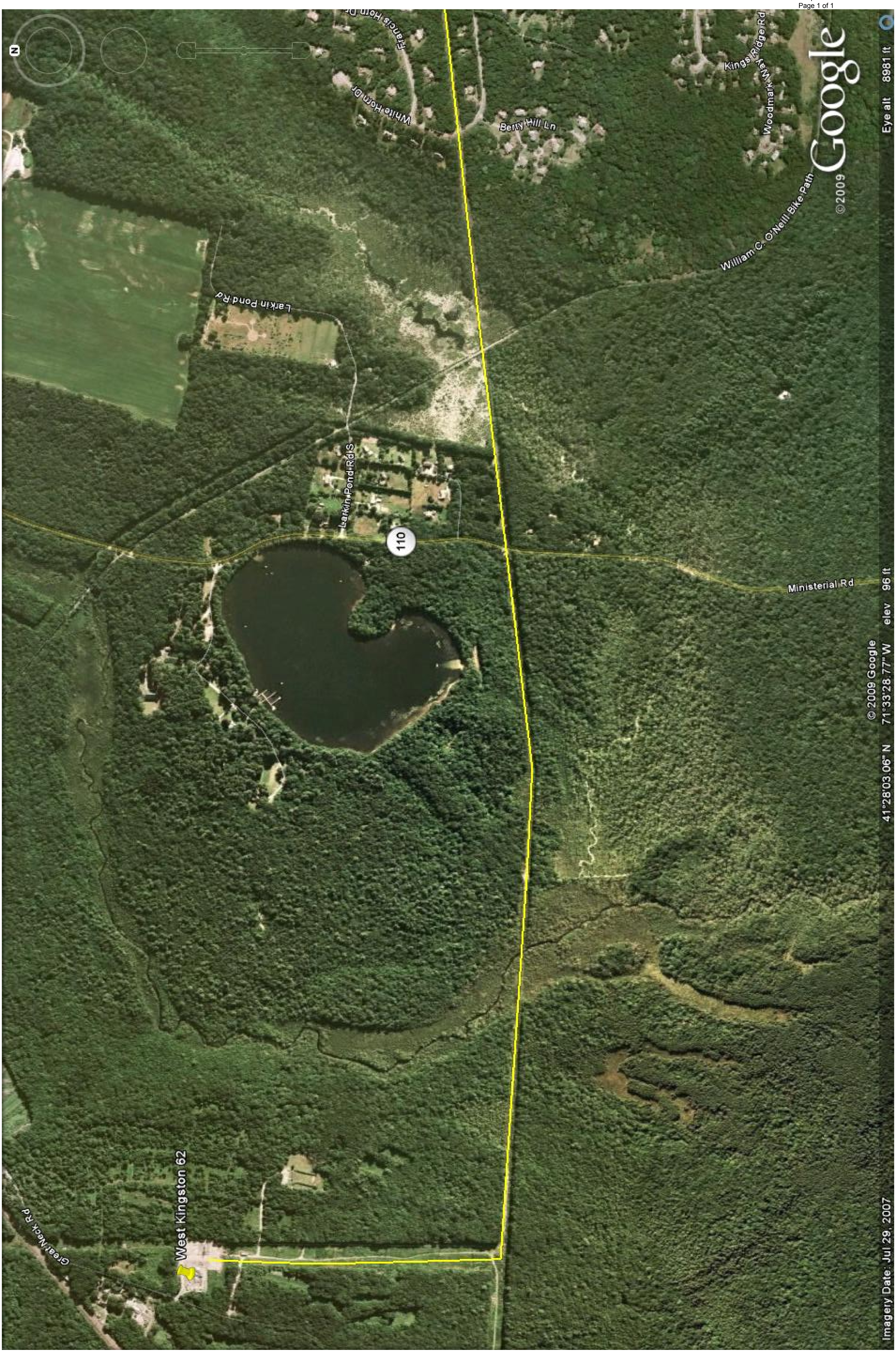
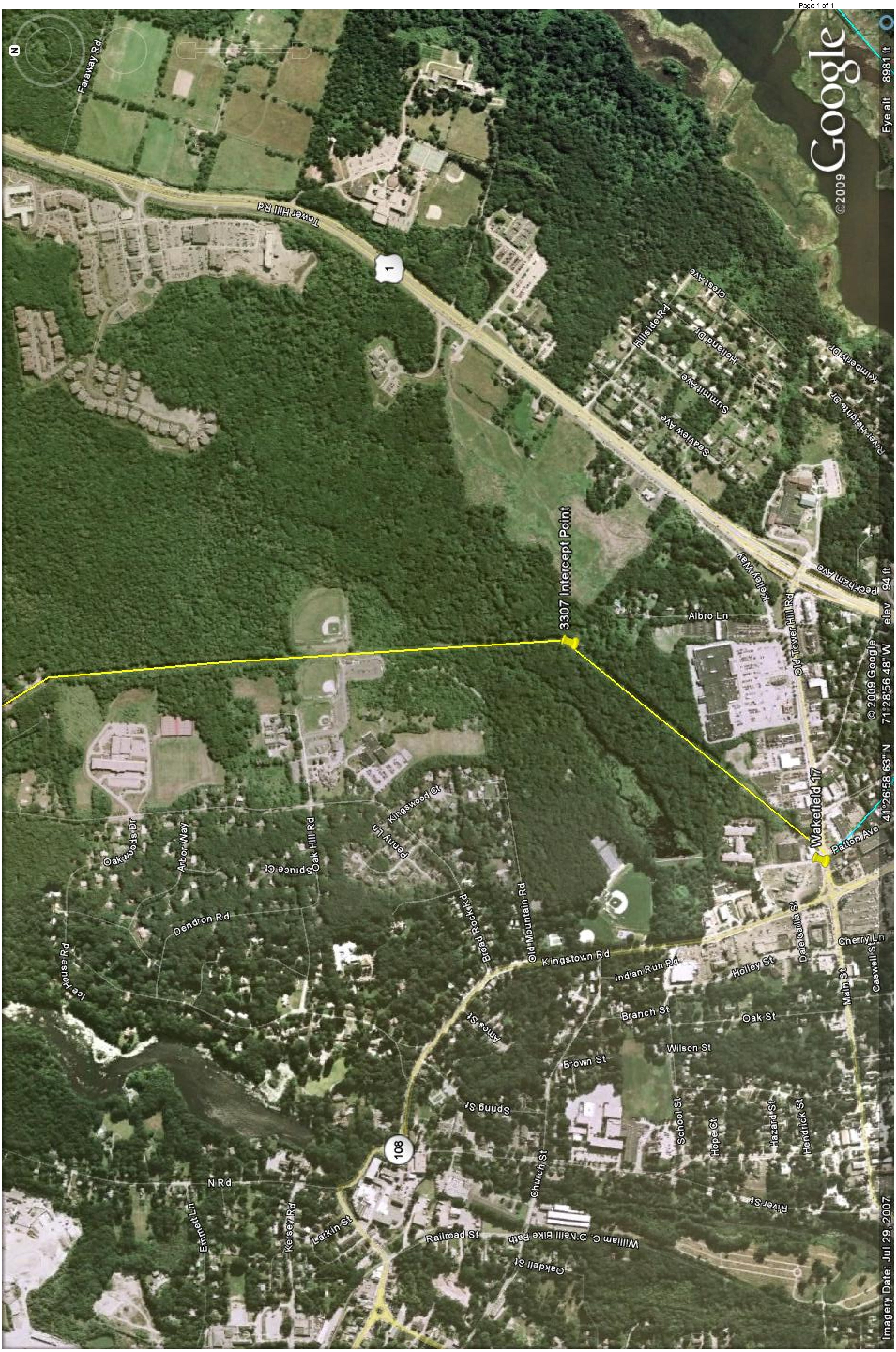
Imagery Date: Jul 29, 2007
Eye alt 41508 ft

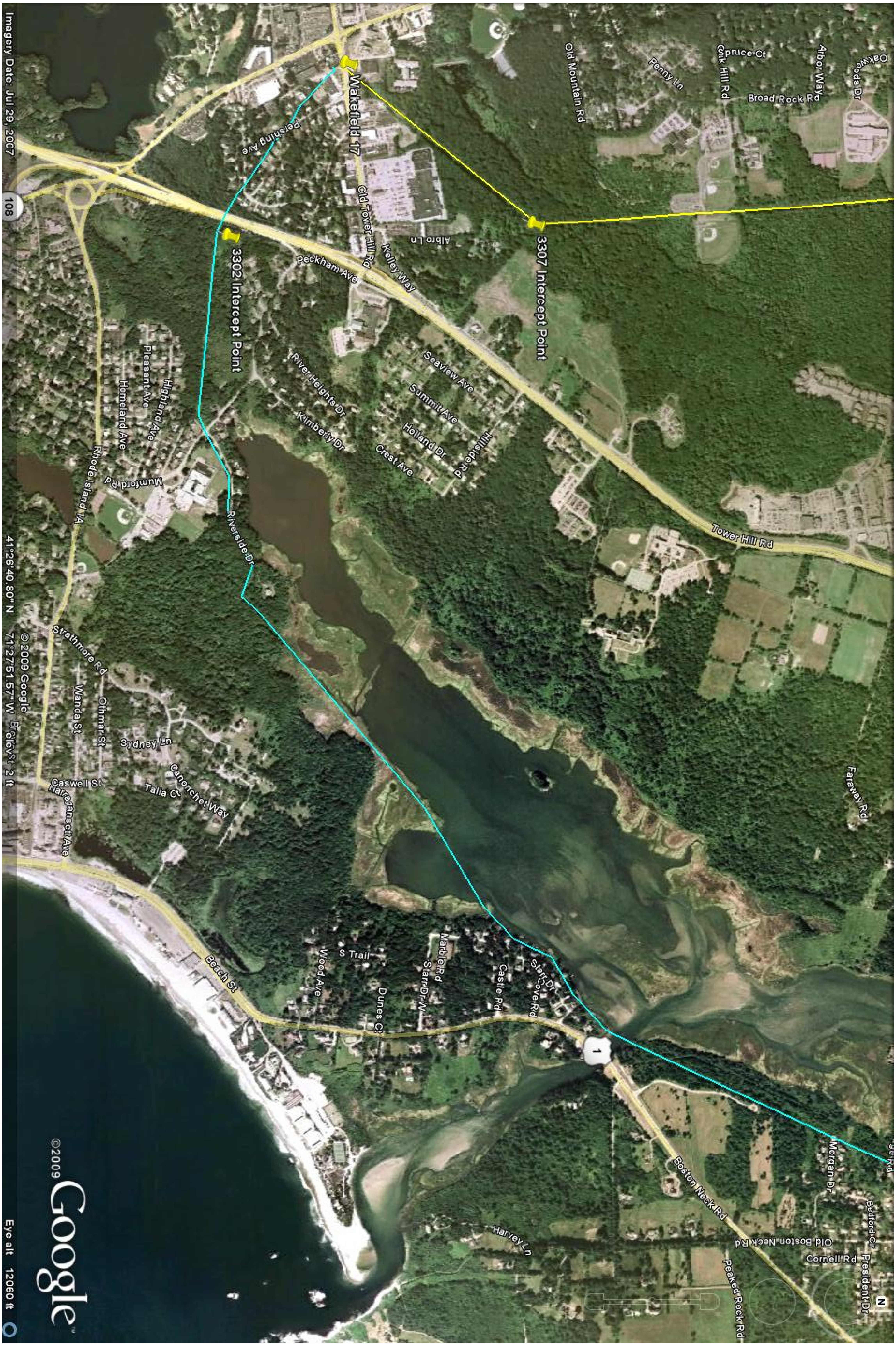

Francis Horn Dr
White Horn Dr
Berry Hill Ln
Kings Ridge Rd
Woodmark Way
William C. O'Neill Bike Path
©2009
Larkin Pond Rd
Larkin Pond Rd S
110
Ministerial Rd
West Kingston 62
Great Neck Rd
© 2009 Google
41°28'03.06" N 71°33'28.77" W elev 96 ft
Eye alt 8981 ft
Imagery Date: Jul 29, 2007

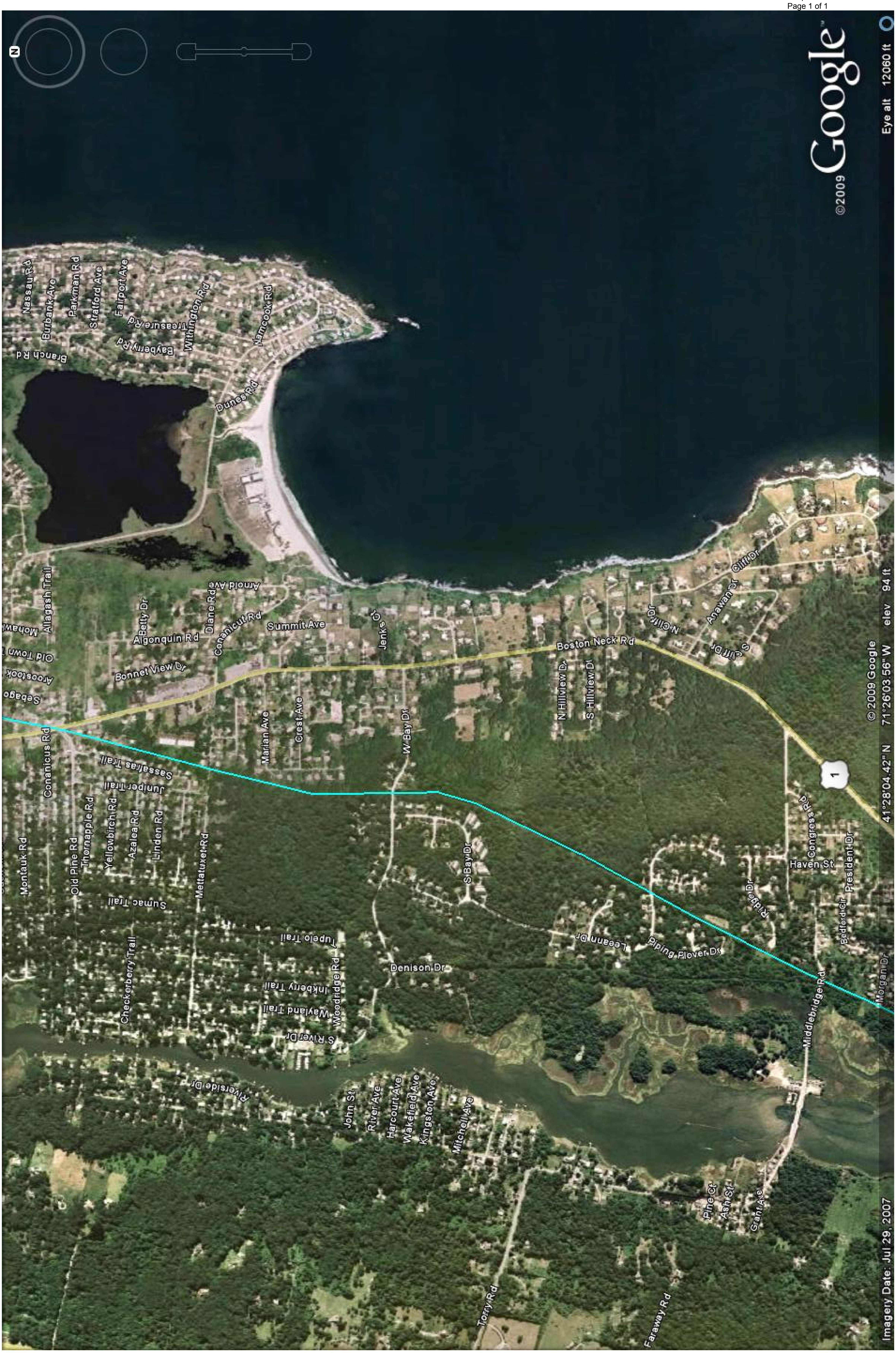

N
Peacedale 59
Zinns Dr
Alcides Dr
Overhill Rd
Paul Ave
Andre Ave
Greenwood Dr
Farm Rd
108
Wayside Ct
Westwind Rd
Conant Ln
E Park Ln
W Park Ln
Beverly Ln
Clark Ln
Locust Dr
Linden Dr
Asa Pond Rd
Curtis Corner Rd
S Rd
Kensington Ct N
Kensington Ct S
N Pasture Ln
Heritage Dr
Enterprise Terrace
Wingate Rd
Ventura Cir
High Meadow Ln
Higgins Dr
Biscuit City Rd
Nichols Rd
Spring Hill Rd
Springdale
Ridge Crest Ln
Stonehenge Rd
Deer Ridge Way
Watch Hill Way
Chestnut Hill Rd
Francis Horn Dr
Kings Ridge Rd
Woodmark Way
White Horn Dr
Betty Hill Ln
William C. O'Neill Bike Path
Larkin Pond Rd
©2009 Google
Google
Eye alt 8981 ft
41°28'01.23" N 71°31'44.68" W elev 219 ft
Imagery Date: Jul 29, 2007

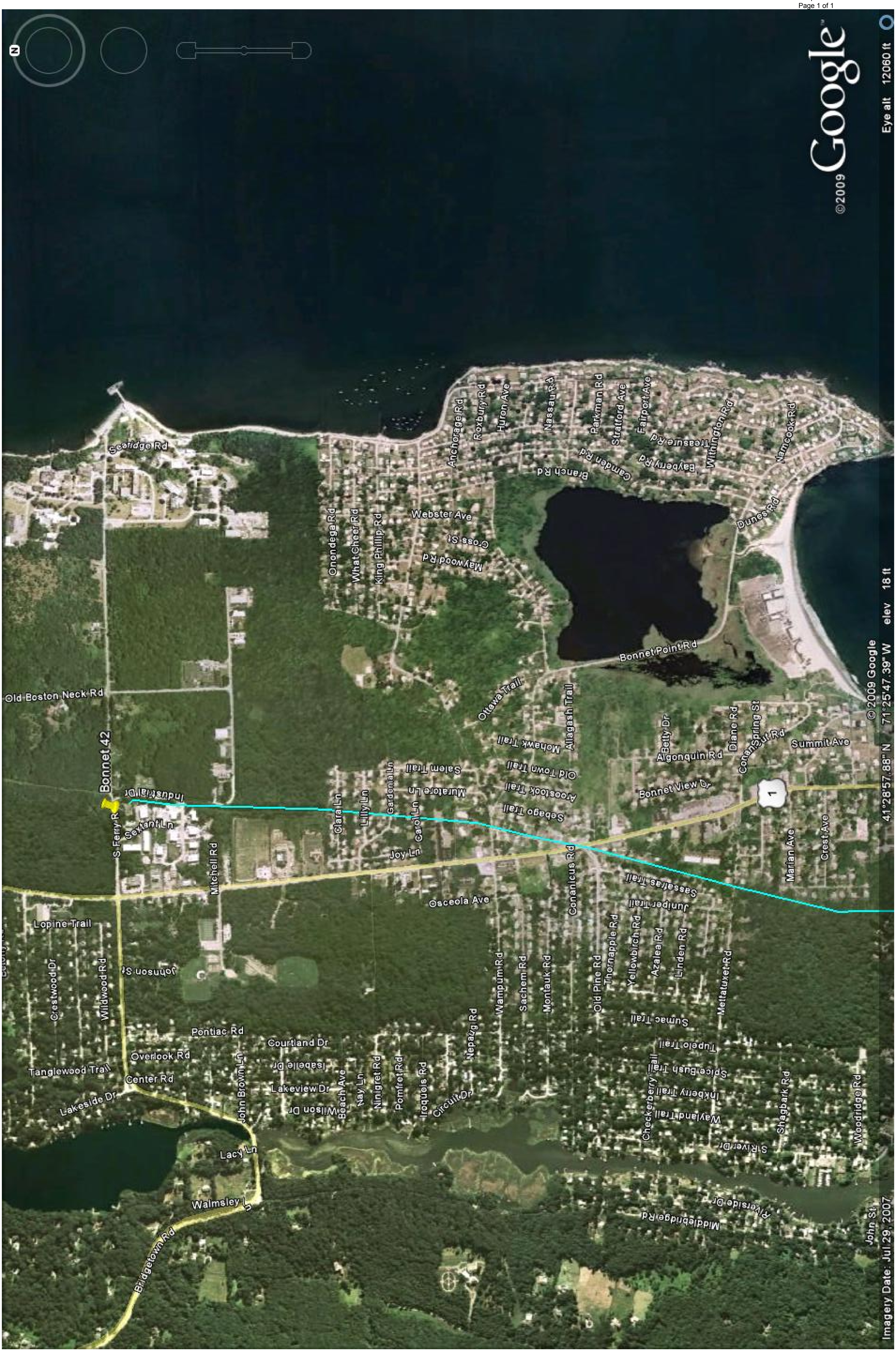

Broad Rock Rd
Lewis Ln
Oakwoods Dr
Arbor Way
Dendron Rd
Ice House Rd
Rose Hill Rd
Saugatucket Rd
Fiore Industrial Dr
Straw Ln
Petal Ln
Blossom Ct
Dawn Ct
Misty Ct
Emmett Ln
Samuel Rodman St
Dam St
108
Kingstown Rd
Rolens Dr
Peacedale 59
Zinns Dr
Greenwood Dr
Overhill Rd
Paul Ave
Andie Ave
Alcide Dr
Curtis Corner Rd
Asa Pond Rd
©2009 Google
Imagery Date: Jul 29, 2007
41°27'47.65" N 71°29'49.91" W elev 51 ft
Eye alt 8981 ft
© 2009 Google


3307 Intercept Point
Wakefield 17
Tower Hill Rd
1
Faraway Rd
Crest Ave
Hillside Rd
Holland Dr
Summit Ave
Seaview Ave
Kimberly Dr
River Heights Dr
Peckham Ave
Kelley Way
Albro Ln
Old Tower Hill Rd
Patton Ave
Kingswood Ct
Penny Ln
Oak Hill Rd
Spruce Ct
Oakwoods Dr
Arbor Way
Dendron Rd
Ice House Rd
Broad Rock Rd
Old Mountain Rd
Kingstown Rd
Indian Run Rd
Holley St
Dale Carlia St
Cherry Ln
Caswell St
Main St
Branch St
Oak St
Amos St
Wilson St
Brown St
Spring St
School St
Hope Ct
Hazard St
Hendrick St
108
Church St
N Rd
Emmett Ln
Kersey Rd
Larkin St
Railroad St
William C. O'Neill Bike Path
Oakdell St
River St
©2009 Google
Eye alt 8981 ft
© 2009 Google 41°26'58.63" N 71°28'56.48" W elev 94 ft
Imagery Date: Jul 29, 2007

Attachment DIV 1-3-12
Docket No. 4111
Responses to Division - Set 1




N
Nassau Rd
Burbank Ave
Parkman Rd
Stratford Ave
Fairport Ave
Treasure Rd
Bayberry Rd
Branch Rd
Withington Rd
Namcook Rd
Dunes Rd
Arnold Ave
Allagash Trail
Betty Dr
Diane Rd
Conanicut Rd
Summit Ave
Jenks Ct
Mohawk
Algonquin Rd
Old Town
Aroostook
Bonnet View Dr
Sebago
Boston Neck Rd
N Hillview Dr
S Hillview Dr
Cliff Dr
Anawan Dr
N Cliff Dr
S Cliff Dr
Marian Ave
Crest Ave
W Bay Dr
Conanicus Rd
Sassafras Trail
Juniper Trail
Montauk Rd
Old Pine Rd
Thornapple Rd
Yellowbirch Rd
Azalea Rd
Linden Rd
Mettatuxet Rd
S Bay Dr
Sumac Trail
Tupelo Trail
Leeann Dr
Piping Plover Dr
Congress Pl
Haven St
President Dr
Ridge Dr
Bedford Cir
Checkerberry Trail
Woodridge Rd
Inkberry Trail
Wayland Trail
S River Dr
Denison Dr
Middlebridge Rd
Morgan Dr
Riverside Dr
John St
River Ave
Harcourt Ave
Wakefield Ave
Kingston Ave
Mitchell Ave
Pine Ct
Ash St
Grant Ave
Torry Rd
Faraway Rd
1
©2009 Google
Eye alt 12060 ft
© 2009 Google
41°28'04.42" N 71°26'03.56" W elev 94 ft
Imagery Date: Jul 29, 2007


Google
©2009
Eye alt 12060 ft
elev 18 ft
41°28'57.88" N 71°25'47.39" W
© 2009 Google
Imagery Date: Jul 29, 2007
Bonnet 42
Seaside Rd
Old Boston Neck Rd
Industrial Dr
S Ferry Rd
Sextant Ln
Mitchell Rd
Johnson St
Lopine Trail
Crestwood Dr
Wildwood Rd
Pontiac Rd
Overlook Rd
Tanglewood Trail
Center Rd
Lakeside Dr
Courtland Dr
Isabelle Dr
Lakeview Dr
Wilson Dr
John Brown Ln
Lacy Ln
Walmsley Ln
Bridgetown Rd
Beach Ave
Nay Ln
Ninigret Rd
Pomfret Rd
Iroquois Rd
Circuit Dr
Nepaug Rd
Wampum Rd
Sachem Rd
Montauk Rd
Osceola Ave
Joy Ln
Clara Ln
Lilly Ln
Carol Ln
Gardenia Ln
Salem Trail
Muratore Ln
Onondega Rd
What Cheer Rd
King Phillip Rd
Webster Ave
Cross St
Maywood Rd
Anchorage Rd
Roxbury Rd
Huron Ave
Nassau Rd
Parkman Rd
Stratford Ave
Fairport Ave
Treasure Rd
Camden Rd
Branch Rd
Bayberry Rd
Withington Rd
Namcook Rd
Dunes Rd
Bonnet Point Rd
Ottawa Trail
Mohawk Trail
Old Town Trail
Aroostook Trail
Sebago Trail
Allagash Trail
Conanicus Rd
Sassafras Trail
Juniper Trail
Old Pine Rd
Thornapple Rd
Yellowbirch Rd
Azalea Rd
Linden Rd
Mettatuxet Rd
Sumac Trail
Tupelo Trail
Spice Bush Trail
Checkerberry Trail
Inkberry Trail
Wayland Trail
S River Dr
Riverside Dr
Middlebridge Rd
Shagbark Rd
Woodridge Rd
John St
Betty Dr
Diane Rd
Spring St
Algonquin Rd
Conanicut Rd
Bonnet View Dr
Summit Ave
Marian Ave
Crest Ave
1

Division Data Request 1-5

Request:

If the Transmission Cable is built at 69KV, please describe what type of cable will be used and provide what you believe will be its normal and emergency MVA ratings to be. If however the Transmission Cable is built at 34.5KV, please describe what type of cable will be used and what you believe will be its normal and emergency MVA ratings to be.

Response:

The Transmission Cable consists of a submarine portion and an upland underground portion. The submarine portion of the Transmission Cable would be a solid dielectric insulation three conductor cable with a steel wire armoring and an embedded fiber optic cable similar in design to the cables shown in Attachment DIV 1-5-1 (for 34.5 kV) and Attachment DIV 1-5-3 (for 69 kV). The upland underground cables would be a solid dielectric insulation single conductor cable similar in design to the cables shown in Attachment DIV 1-5-2 (for 34.5 kV) and Attachment DIV 1-5-4 (for 69 kV). The cables would be sized to match the peak output of the wind generation facility. Due to equipment risks and repair timeframes, emergency ratings are typically not used for a single circuit submarine cable installation.

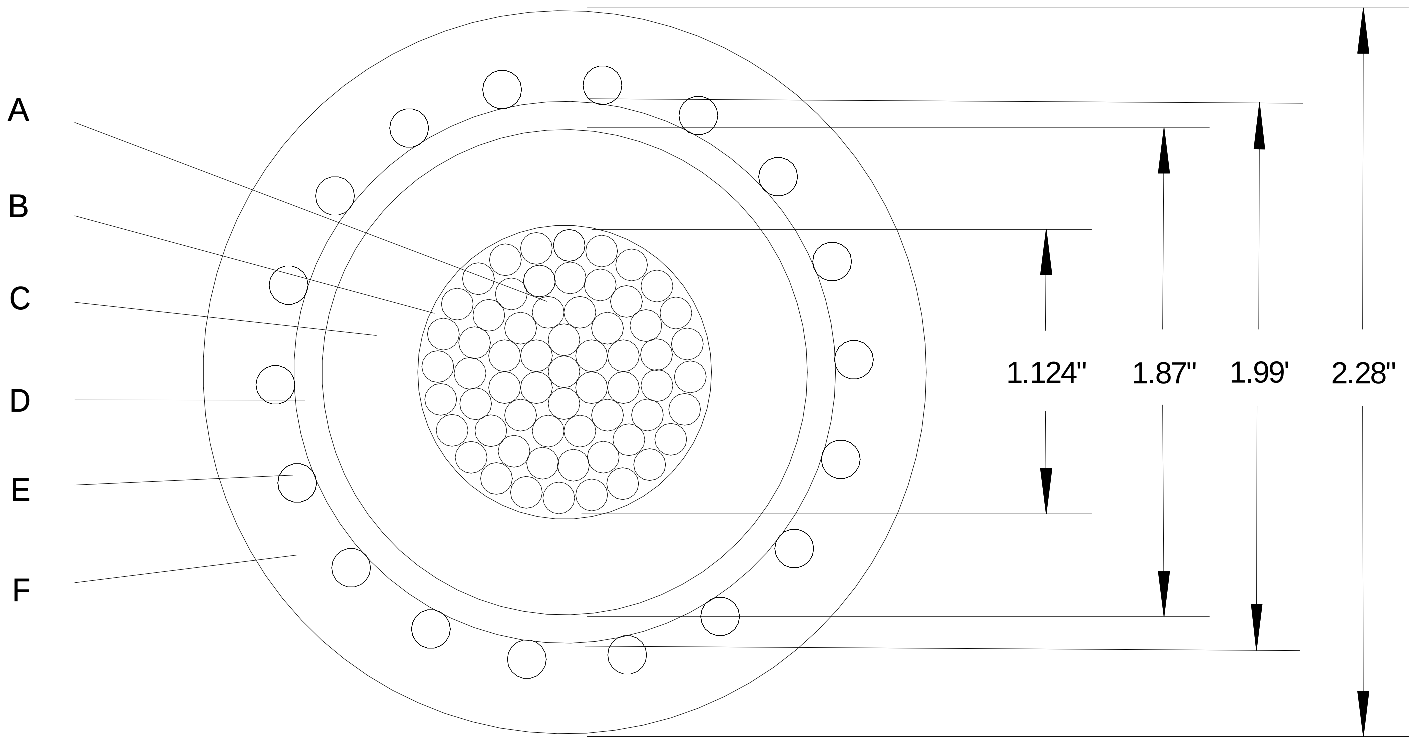
Prepared by or under the supervision of: Daniel Glenning

Appendix E

2.1. Cable design data – FXBTV 3×500 kcmil, 35 kV

Designation	FXBTV 3×500 kcmil
Rated voltage (133% insulation)	26/46 kV
Impulse level	250 kV
Conductor	
type	round compacted
material	copper
cross-section	3×500 kcmil
longitudinal water seal	filling compound
Conductor screen	
material	conductive PE
thickness	39.4 mils (1.0 mm)
Insulation	
type	dry cured, triple extruded
material	XLPE
thickness	433 mils (11 mm)
Insulation screen	
material	conductive PE
thickness	39.4 mils (1.0 mm)
Longitudinal water seal	
material	conductive swelling tape
Metallic sheath	
material	lead alloy
thickness	67 mils (1.7 mm)
Longitudinal water seal	
material	conductive swelling tape
Inner sheath	
material	conductive PE
thickness	63 mils (1.6 mm)
Assembling	
material 1	polymeric profiles
material 2	fibre optical cable (12 fibres)
material 3	grease
Cable core binder	
material	polymeric tape
Bedding	
material	bitumen impregnated jute tape
Armour	
material 1	Galvanized steel wires
material 2	Bitumen
wire diameter	238 mils (6.05 mm)
Armour	
material 1	Polypropylene yarns
material 2	Bitumen
Complete cable	
diameter	≈ 5.35 inches (136 mm)
weight	≈ 25.5 lbs/ft (38 kg/m)
Maximim continuous load current	**482 A**
burial depth	3.3 ft (1.0 m)
thermal resistivity of seabed sediments	100 K×cm/W
ambient temperature of seabed sediments	20°C

All data is indicative



A. 1000 KCM Class B Compressed, 61 str Copper with Strandseal(R)

B. Semi-conducting, thermosetting conductor shield
20 mils min point

C. EPR insulation, 35 kV 100%
330 mils min point

D. Semi-conducting, thermosetting insulation shield
55 mils min point
90 mils max point

E. 18 - #14 AWG bare copper concentric neutral wires with water-swellable powder

F. Black LLDPE Jacket
70 mils min point

Standards

AEIC CS8
ICEA S-94-649
National Grid MS-4168 (dated 09-2008)

Notes

1. Cable weights and dimensions are nominal and are subject to normal manufacturing tolerances.
2. Drawing is not to scale.
3. Minimum point insulation shield thickness does not include concentric neutral indent.

Cable Weight

14.51 lbs/ft (Parallel)

PRYSMIAN CABLES & SYSTEMS

Cable Type		Customer	
35 kV 1000 KCM URD			
Drawn By	Approved By	Date	Drawing Number
C. Lindler	C. Lindler	12/07/09	QXD174A

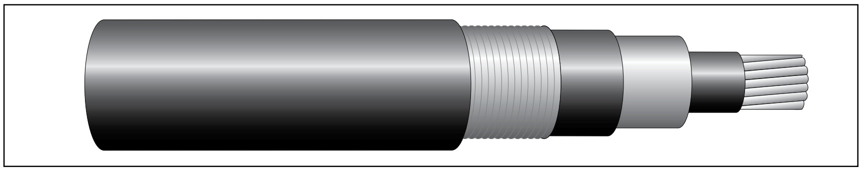
2.2. Cable design data – FXBTV 3×300 kcmil, 69 kV

Designation	FXCTV 3×250 kcmil
Rated voltage (133% insulation)	26/46 kV
Impulse level	250 kV
Conductor	
type	round solid
material	copper
cross-section	3×300 kcmil
Conductor screen	
material	conductive PE
thickness	39.4 mils (1.0 mm)
Insulation	
type	dry cured, triple extruded
material	XLPE
thickness	433 mils (11 mm)
Insulation screen	
material	conductive PE
thickness	39.4 mils (1.0 mm)
Longitudinal water seal	
material	conductive swelling tape
Metallic sheath	
material	lead alloy
thickness	79 mils (2 mm)
Longitudinal water seal	
material	conductive swelling tape
Inner sheath	
material	conductive PE
thickness	59 mils (1.5 mm)
Assembling	
material 1	polymeric profiles
material 2	fibre optical cable (12 fibres)
material 3	grease
Cable core binder	
material	polymeric tape
Bedding	
material	bitumen impregnated jute tape
Armour	
material 1	Galvanized steel wires
material 2	Bitumen
wire diameter	197 mils (5 mm)
Armour	
material 1	Polypropylene yarns
material 2	Bitumen
Complete cable	
diameter	≈ 4.9 inches (125 mm)
weight	≈ 21.5 lbs/ft (32 kg/m)
Maximum continuous load current	**375 A**
burial depth	3.3 ft (1.0 m)
thermal resistivity of seabed sediments	100K×cm/W
ambient temperature of seabed sediments	20°C

All data is indicative

PowrMax® Fill Shielded HV Power Cable 69kV

Al or Cu Cond. EPR Insulation Longitudinally Applied Corrugated Tape LLDPE Jacket



LONGITUDINALLY APPLIED CORRUGATED TAPE SHIELDED POWER CABLE
69kV 100% INSULATION LEVEL–650 mils NOMINAL EPR INSULATION THICKNESS

COMPRESSED CONDUCTOR		APPROXIMATE O.D (1) INCHES					NOMINAL JACKET THKN. INCHES (1)	APPROX. WEIGHT (1) LB/1000 FT			AMPACITY (2)	
AL. AWG. OR kcmil	NO. OF WIRES	INS.	INS. SHIELD	LACT SHIELD THKN.	LACT SHIELD O.D.	LLDPE JACKET		AL. COND.	CU. SHIELD	TOTAL CABLE	DIRECT BURIED	IN DUCT
ALUMINUM CONDUCTOR CABLES												
500	37	2.215	2.307	0.008	2.457	2.690	0.110	469	314	3132	580	500
500	37	2.215	2.307	0.010	2.461	2.694	0.110	469	392	3210	580	500
750	61	2.402	2.494	0.008	2.644	2.943	0.140	704	335	3778	725	625
750	61	2.402	2.494	0.010	2.648	2.947	0.140	704	419	3862	725	625
1000	61	2.551	2.643	0.008	2.793	3.092	0.140	939	353	4247	850	735
1000	61	2.551	2.643	0.010	2.797	3.096	0.140	939	441	4335	850	735
1250	91	2.704	2.796	0.008	2.946	3.245	0.140	1173	370	4729	965	830
1250	91	2.704	2.796	0.010	2.950	3.249	0.140	1173	463	4822	965	830
1500	91	2.824	2.916	0.008	3.066	3.366	0.140	1408	384	5157	1060	915
1500	91	2.824	2.916	0.010	3.070	3.370	0.140	1408	480	5253	1060	915
1750	127	2.930	3.022	0.008	3.172	3.471	0.140	1643	397	5554	1150	990
1750	127	2.930	3.022	0.010	3.176	3.475	0.140	1643	496	5653	1150	990
2000	127	3.039	3.131	0.008	3.281	3.580	0.140	1877	409	5961	1230	1060
2000	127	3.039	3.131	0.010	3.285	3.584	0.140	1877	512	6063	1230	1060
2250	127	3.124	3.216	0.008	3.366	3.665	0.140	2135	419	6354	1300	1120
2250	127	3.124	3.216	0.010	3.370	3.669	0.140	2135	524	6459	1300	1120
2500	127	3.215	3.307	0.008	3.457	3.757	0.140	2348	430	6714	1370	1170
2500	127	3.215	3.307	0.010	3.461	3.761	0.140	2348	537	6821	1370	1170

(1) Cable designs are in accordance with ANSI/ICEA S-108-720 standard. Dimensions and weights are nominal and are subject to manufacturing tolerances.
(2) Ampacities are based on earth thermal resistivity of 90°C-cm/watt, 90°C conductor temperature, 20°C earth ambient temperature, 75% load factor and 36" depth of burial, one three-phase circuit operating 1/C per phase. Cables were assumed to be installed in a flat configuration either direct buried or in 3W x 1H concrete encased 5" PVC ducts. Cable center-to-center spacing was assumed at 12" for the two types of installations. Metallic shields were assumed to be single-point/cross-bonded.

Product Construction:

Complete Cable:

Cross-linked semi-conducting conductor shield, insulation and semi-conducting insulation shield are extruded over an aluminum or copper conductor and cured in a single operation. Corrugated copper tape shield and an extruded black jacket are applied over the cable core.

Conductor:

1/C Class B compressed concentric-lay-stranded 1350 Aluminum or Copper meeting the requirements of ANSI/ICEA S-108-720. Conductor is wrapped with a semi-conducting binder tape in order to provide additional conductor surface smoothness to effectively minimize stresses within the overlying insulation.

Conductor Shield:

Extruded semi-conducting thermosetting polymeric stress control layer fully bonded to the overlying insulation.

Insulation:

Extruded, ethylene propylene rubber (EPR) meeting or exceeding requirements of ANSI/ICEA S-108-720.

Insulation Shield:

Extruded semi-conducting thermosetting layer fully bonded to the underlying insulation.

Metallic Sheath:

Copper, 8 or 10 mils thick, longitudinally applied corrugated tape (LACT) with a minimum 375 mils overlap.

Jacket:

Black, non-conducting, linear low-density polyethylene (LLDPE).

Features and Benefits:

- Even distribution of fault current within LACT metallic shield with better heat dissipation
- LACT shield provides improved cable bending characteristics as compared to helically applied copper tape shields
- Conductor binder tape included for added conductor smoothness
- Triple extrusion process for clean interfaces
- Class 10,000 environment utilized for material handling
- Excellent moisture-resistant design
- Very high dielectric strength
- Low dielectric loss EPR insulation

Temperature Rating:

- Normal Operation. . . . . .90°C
- Emergency* Operation . . . . .130°C
- Short Circuit Operation . . . . .250°C

** Operation at the emergency overload temperature should not exceed 1500 hours cumulative during the lifetime of the cable.*

BICC® BRAND

General Cable

PowrMax® Fill Shielded HV Power Cable 69kV

Al or Cu Cond. EPR Insulation Longitudinally Applied Corrugated Tape LLDPE Jacket

Standards:

General Cable–BICC® Brand Electric Utility Products meet the latest requirements of ANSI/ICEA S-108-720 standard for Extruded Insulation Power Cables rated above 46kV through 345kV.

Applications:

PowrMax® Fill cables are intended for use in dry or wet locations for the transmission of three-phase high-voltage power. These cables may be installed in ducts or direct buried.

Options:

- Aluminum or copper conductors
- Supplemental concentric wire shielding in combination with LACT for higher fault current capability
- Concentric wire shield without LACT
- Helically applied copper tape with overlying copper wires
- Blocked cable core/metallic shield interface
- Sealed LACT overlap
- Blocked metallic shield/jacket interface
- Graphite jacket coating to facilitate field testing

For information on conductor sizes or voltage ratings not shown in the tables, phone BICC® Brand Electric Utility Products or contact us on the Web at info@generalcable.com.

LONGITUDINALLY APPLIED CORRUGATED TAPE SHIELDED POWER CABLE
69kV 100% INSULATION LEVEL–650 mils NOMINAL EPR INSULATION THICKNESS

COMPRESSED CONDUCTOR		APPROXIMATE O.D (1) INCHES					NOMINAL JACKET THKN. INCHES (1)	APPROX. WEIGHT (1) LB/1000 FT			AMPACITY (2)	
CU. AWG. OR kcmil	NO. OF WIRES	INS.	INS. SHIELD	LACT SHIELD THKN.	LACT SHIELD O.D.	LLDPE JACKET		CU. COND.	CU. SHIELD	TOTAL CABLE	DIRECT BURIED	IN DUCT
COPPER CONDUCTOR CABLES												
500	37	2.215	2.307	0.008	2.457	2.690	0.110	1542	314	4205	740	640
500	37	2.215	2.307	0.010	2.461	2.694	0.110	1542	392	4283	740	640
750	61	2.402	2.494	0.008	2.644	2.943	0.140	2316	335	5390	920	795
750	61	2.402	2.494	0.010	2.648	2.947	0.140	2316	419	5474	920	795
1000	61	2.551	2.643	0.008	2.793	3.092	0.140	3086	353	6394	1070	925
1000	61	2.551	2.643	0.010	2.797	3.096	0.140	3086	441	6482	1070	925

(1) Cable designs are in accordance with ANSI/ICEA S-108-720 standard. Dimensions and weights are nominal and are subject to manufacturing tolerances.
(2) Ampacities are based on earth thermal resistivity of 90°C-cm/watt, 90°C conductor temperature, 20°C earth ambient temperature, 75% load factor and 36" depth of burial, one three-phase circuit operating 1/C per phase. Cables were assumed to be installed in a flat configuration either direct buried or in 3W x 1H concrete encased 5" PVC ducts. Cable center-to-center spacing was assumed at 12" for the two types of installations. Metallic shields were assumed to be single-point/cross-bonded.

Division Data Request 1-7

Request:

Please state whether National Grid intends to seek the designation of the Transmission Cable as a Pool Transmission Facility ("PTF") and if so, please explain the reasons for seeking such designation and if not, the reasons why such a designation will not be sought.

Response:

No. In order to seek such designation, the facilities must meet the standards necessary to be designated PTF as defined in ISO-New England's Open Access Transmission Tariff ("OATT"), FERC Electric Tariff No. 3, an excerpt of which is attached. In this case, the standards are not met. A complete copy of the ISO New England OATT can be found at the following url address on the ISO-NE website:

http://www.iso-ne.com/regulatory/tariff/sect_2/oatt/12-16-09_sect_ii.pdf

Specifically, the Transmission Cable will be operated at a voltage below the minimum threshold of 115 kV for PTF designation (See Section II.49, Paragraph 4 at Sheet No. 612). Pursuant to Paragraph 4, additions to transmission facilities on and after January 1, 2004, must be rated at 115 kV or higher in order to be considered for PTF designation. Even if the Transmission Cable was rated 115 kV or above, it still would not qualify to be included in PTF (as defined in the OATT) for the following reasons:

1. The Transmission Cable does not qualify to be included in PTF as defined in Paragraph 1 of Section II.49 because it will be a radial facility that contributes little or no parallel capability to the PTF.

2. The Transmission Cable does not qualify to be included in PTF as defined in Paragraph 2 of Section II.49 because it does not constitute a parallel linkage in network stations owned by Participating Transmission Owners ("PTOs") interconnecting the lines which constitute PTF.

Division Data Request 1-7 (cont.)

3. Paragraph 3 provides an exception for facilities that do not qualify under Paragraphs 1 and 2 of Section II.49; however, the Transmission Cable still does not qualify to be included in PTF as defined in Paragraph 3 of Section II.49 because it is not rated 69 kV or above, it is not the principal transmission link between a PTO and the remainder of the PTF network, and it does not connect a PTO-owned distribution system and generation (in excess of 25 MW) to the PTF network.

4. The Transmission Cable does not qualify to be included in PTF as defined in Paragraph 4 of Section II.49 because it is a transmission facility and does not constitute a right of way or land owned by the PTO for the installation of facilities which constitute PTF.

Prepared by or under the supervision of: Edward Kremzier, Dana Walters, and Legal Department

II.H. OTHER TRANSMISSION PROVISIONS

II.49 Definition of PTF

PTF or Pool Transmission Facilities are the transmission facilities owned by PTOs, over which the ISO shall exercise Operating Authority in accordance with the terms set forth in the TOA, rated 69 kV or above required to allow energy from significant power sources to move freely on the New England Transmission System, and include:

1. All transmission lines and associated facilities owned by PTOs rated 69 kV and above, except for lines and associated facilities that contribute little or no parallel capability to the PTF (as defined in this OATT). The following do not constitute PTF:

    (a) Those lines and associated facilities which are required to serve local load only.

    (b) Generator leads, which are defined as radial transmission from a generation bus to the nearest point on the PTF.

    (c) Lines that are normally operated open.

(d) Lines and associated facilities that are classified as MTF or OTF.

2. Parallel linkages in network stations owned by PTOs (including substation facilities such as transformers, circuit breakers and associated equipment) interconnecting the lines which constitute PTF.

3. If a PTOs with significant generation in its transmission and distribution system (initially 25 MW) is connected to the New England Transmission System and none of the transmission facilities owned by the PTO qualify to be included in PTF as defined in (1) and (2) above, then such PTO's connection to PTF will constitute PTF if both of the following requirements are met for this connection:

(a) The connection is rated 69 kV or above.

(b) The connection is the principal transmission link between the PTO and the remainder of the PTF network.

4. Rights of way and land owned by PTOs required for the installation of facilities which constitute PTF under (1), (2) or (3) above.

The ISO shall review at least annually the status of transmission lines and related facilities and determine whether such facilities constitute PTF and shall prepare and keep current a schedule or catalogue of PTF facilities.

The following examples indicate the intent of the above definitions:

Radial tap lines to local load are excluded.

Lines which loop, from two geographically separate points on the PTF, the supply to a load bus from the PTF are included.

Lines which loop, from two geographically separate points on the PTF, the connections between a generator bus and the PTF are included.

Radial connections or connections from a generating station to a single substation or switching station on the PTF are excluded, unless the requirements of paragraph (3) above are met.

Transmission facilities owned or supported by a Related Person of a PTO which are rated 69 kV or above and are required to allow Energy from significant power sources to move freely on the New England Transmission System shall also constitute PTF provided (i) such Related Person files with the ISO its consent to such treatment; and (ii) the ISO determines that treatment of the facilities as PTF will facilitate accomplishment of the ISO's objectives. If such facilities constitute PTF pursuant to this paragraph, they shall be treated as "owned" or "supported," as applicable, by a PTO for purposes of this OATT and the other provisions of the TOA, including the ability to include the cost associated with such PTF and any Transmission Support Expenses for support of PTF made by its Related Person in that PTO's Annual Transmission Revenue Requirements, pursuant to Attachment F of the OATT.

Of those transmission facilities that are upgrades, modifications or additions, on and after January 1, 2004, to the transmission system administered by the ISO under the Interim Independent System Operator Agreement, or to the New England Transmission System on or after the Operations Date, only those that: (i) are rated 115kV or above, and (ii) otherwise meet the non-voltage criteria specified in Section II.49 shall be classified as PTF. Those transmission facilities that were PTF pursuant to the Restated NEPOOL Agreement on December 31, 2003, and any upgrades to such facilities that meet the criteria specified in Section II.49, shall remain classified as PTF for all purposes under this Tariff.

Division Data Request 1-9

Request:

Please explain why O&M expenses weren't included in the revenue requirements for the Transmission Cable and explain whether National Grid has an estimate of the O&M expenses for the Transmission Cable and if so, please provide such estimates.

Response:

The revenue requirement was provided largely for the purpose of estimating bill impacts to customers. While the O&M expenses would be recovered in transmission rates from customers, the annual O&M expenses were not included in the revenue requirement for the Transmission Cable because, absent an unexpected problem, they are likely to be too small to have a material impact on the bill impact analysis.

National Grid has estimated that O&M expenses for the Transmission Cable would primarily consist of periodic inspection and testing of the cable, duct system, vaults, and National Grid-owned substation equipment (such as circuit breakers and switches) as well as any necessary maintenance of these facilities. With respect to the submarine cable, the type and frequency of submarine cable burial depth surveys will depend, to some extent, on permit conditions, the burial depth of the cable at installation, and other factors. Assuming that no extraordinary efforts are required for burial depth surveys, O&M expenses for the Transmission Cable are projected to be less than $25,000 per year.

Prepared by or under the supervision of: Daniel Glenning and David E. Tufts

Division Data Request 1-10

Request:

Please provide the latest load forecast for Narragansett Electric showing annual peak load and energy consumption for any years from 2010 to 2032 that National Grid has developed such a forecast.

Response:

Attached as Attachment DIV 1-10-1 and Attachment DIV 1-10-2 are tabulations of summer and winter peak load forecasts for the years 2010-2022. To capture the uncertainty associated with peak-day weather conditions, peak demands are forecasted under both normal weather conditions (weather that has a 50% chance of occurring), and extreme weather conditions (weather that has only a 5% chance of occurring). The peak load forecast includes distribution losses, but not transmission losses. Transmission losses are estimated at 1.84%.

Also attached as Attachment DIV 1-10-3 is the latest forecast of energy deliveries for the years 2010-2015. This forecast is for delivered energy only (kWh billed at customer metering points), and does not include losses. Distribution losses are estimated at 4.83%, and transmission losses are estimated at 1.84%.

Please note that the forecast used in Exhibit DET-1 of Mr. Tufts' testimony in this proceeding was a prior forecast from that contained in Attachment DIV 1-10-3. However, the updated kWh forecast for the year 2013 is nearly identical to the kWh forecast numbers used by Mr. Tufts in Exhibit DET-1 of his testimony.

Prepared by or under the supervision of: Madison N. Milhous, Jr. and Alfred P. Morrissey, Jr.

PSA FORECAST 2009
NARRAGANSETT ELECTRIC COMPANY
COMPANY SUMMER PEAK DEMANDS WITH SPOT LOADS
(MW)

		With Actual History				With Weather Adjusted History					
Year	Mo	Extreme Weather Scenario	Growth Rate	Normal Weather Scenario	Growth Rate	Extreme Weather Scenario	Growth Rate	Normal Weather Scenario	Growth Rate	Spot Loads	% of Load
2001	8	1,663.324	12.7%	1,663.324	12.7%	1,610.309	1.8%	1,523.028	1.6%	0.000	0.0%
2002	8	1,687.100	1.4%	1,687.100	1.4%	1,683.134	4.5%	1,591.814	4.5%	0.000	0.0%
2003	6	1,555.950	(7.8%)	1,555.950	(7.8%)	1,717.490	2.0%	1,622.131	1.9%	0.000	0.0%
2004	8	1,601.714	2.9%	1,601.714	2.9%	1,746.249	1.7%	1,646.850	1.5%	0.000	0.0%
2005	8	1,787.842	11.6%	1,787.842	11.6%	1,802.576	3.2%	1,699.138	3.2%	0.000	0.0%
2006	8	1,931.975	8.1%	1,931.975	8.1%	1,824.533	1.2%	1,717.056	1.1%	0.000	0.0%
2007	8	1,760.051	(8.9%)	1,760.051	(8.9%)	1,844.013	1.1%	1,732.496	0.9%	0.000	0.0%
2008	6	1,781.256	1.2%	1,781.256	1.2%	1,847.227	0.2%	1,731.671	(0.0%)	0.000	0.0%
Forecast											
2009	8	1,839.190	3.3%	1,719.594	(3.5%)	1,839.190	(0.4%)	1,719.594	(0.7%)	0.000	0.0%
2010	8	1,869.951	1.7%	1,746.317	1.6%	1,869.951	1.7%	1,746.317	1.6%	0.000	0.0%
2011	8	1,914.560	2.4%	1,786.886	2.3%	1,914.560	2.4%	1,786.886	2.3%	0.000	0.0%
2012	8	1,965.610	2.7%	1,833.897	2.6%	1,965.610	2.7%	1,833.897	2.6%	0.000	0.0%
2013	8	2,007.399	2.1%	1,871.646	2.1%	2,007.399	2.1%	1,871.646	2.1%	0.000	0.0%
2014	8	2,039.585	1.6%	1,899.794	1.5%	2,039.585	1.6%	1,899.794	1.5%	0.000	0.0%
2015	8	2,069.823	1.5%	1,925.992	1.4%	2,069.823	1.5%	1,925.992	1.4%	0.000	0.0%
2016	8	2,099.122	1.4%	1,951.252	1.3%	2,099.122	1.4%	1,951.252	1.3%	0.000	0.0%
2017	8	2,127.889	1.4%	1,975.980	1.3%	2,127.889	1.4%	1,975.980	1.3%	0.000	0.0%
2018	8	2,155.411	1.3%	1,999.463	1.2%	2,155.411	1.3%	1,999.463	1.2%	0.000	0.0%
2019	8	2,182.843	1.3%	2,022.856	1.2%	2,182.843	1.3%	2,022.856	1.2%	0.000	0.0%
2020	8	2,211.020	1.3%	2,046.992	1.2%	2,211.020	1.3%	2,046.992	1.2%	0.000	0.0%
2021	8	2,239.214	1.3%	2,071.147	1.2%	2,239.214	1.3%	2,071.147	1.2%	0.000	0.0%
2022	8	2,267.228	1.3%	2,095.123	1.2%	2,267.228	1.3%	2,095.123	1.2%	0.000	0.0%

Compound Annual Growth

2003-2008 Five Year	2.7%	2.7%	1.5%	1.3%
2008-2013 Five Year	2.4%	1.0%	1.7%	1.6%
2008-2018 Ten Year	1.9%	1.2%	1.6%	1.4%
2008-2023 Fifteen Year	1.7%	1.2%	1.5%	1.4%

PSA FORECAST 2009
NARRAGANSETT ELECTRIC COMPANY
COMPANY WINTER PEAK DEMANDS WITH SPOT LOADS (MW)

		With Actual History				With Weather Adjusted History					
Year	Mo	Extreme Weather Scenario	Growth Rate	Normal Weather Scenario	Growth Rate	Extreme Weather Scenario	Growth Rate	Normal Weather Scenario	Growth Rate	Spot Loads	% of Load
2003	1	1,274.113	.	1,274.113	.	1,366.048	.	1,319.587	.	0.000	0.0%
2004	1	1,368.861	7.4%	1,368.861	7.4%	1,377.875	0.9%	1,331.020	0.9%	0.000	0.0%
2004	12	1,367.036	(0.1%)	1,367.036	(0.1%)	1,382.906	0.4%	1,335.658	0.3%	0.000	0.0%
2005	12	1,301.943	(4.8%)	1,301.943	(4.8%)	1,381.871	(0.1%)	1,334.228	(0.1%)	0.000	0.0%
2007	3	1,308.178	0.5%	1,308.178	0.5%	1,390.967	0.7%	1,342.930	0.7%	0.000	0.0%
2008	1	1,331.634	1.8%	1,331.634	1.8%	1,380.617	(0.7%)	1,332.186	(0.8%)	0.000	0.0%
Forecast											
2008	12	1,326.131	(0.4%)	1,298.874	(2.5%)	1,347.699	(2.4%)	1,298.874	(2.5%)	0.000	0.0%
2010	1	1,340.422	1.1%	1,291.203	(0.6%)	1,340.422	(0.5%)	1,291.203	(0.6%)	0.000	0.0%
2011	1	1,356.773	1.2%	1,307.160	1.2%	1,356.773	1.2%	1,307.160	1.2%	0.000	0.0%
2012	1	1,385.258	2.1%	1,335.251	2.1%	1,385.258	2.1%	1,335.251	2.1%	0.000	0.0%
2013	1	1,413.548	2.0%	1,363.147	2.1%	1,413.548	2.0%	1,363.147	2.1%	0.000	0.0%
2014	1	1,429.296	1.1%	1,378.502	1.1%	1,429.296	1.1%	1,378.502	1.1%	0.000	0.0%
2015	1	1,439.466	0.7%	1,388.278	0.7%	1,439.466	0.7%	1,388.278	0.7%	0.000	0.0%
2016	1	1,448.161	0.6%	1,396.579	0.6%	1,448.161	0.6%	1,396.579	0.6%	0.000	0.0%
2017	1	1,456.529	0.6%	1,404.553	0.6%	1,456.529	0.6%	1,404.553	0.6%	0.000	0.0%
2018	1	1,463.778	0.5%	1,411.408	0.5%	1,463.778	0.5%	1,411.408	0.5%	0.000	0.0%
2019	1	1,470.381	0.5%	1,417.617	0.4%	1,470.381	0.5%	1,417.617	0.4%	0.000	0.0%
2020	1	1,477.133	0.5%	1,423.975	0.4%	1,477.133	0.5%	1,423.975	0.4%	0.000	0.0%
2021	1	1,484.510	0.5%	1,430.958	0.5%	1,484.510	0.5%	1,430.958	0.5%	0.000	0.0%
2022	1	1,491.908	0.5%	1,437.962	0.5%	1,491.908	0.5%	1,437.962	0.5%	0.000	0.0%
2023	1	1,498.855	0.5%	1,444.516	0.5%	1,498.855	0.5%	1,444.516	0.5%	0.000	0.0%

Compound Annual Growth				
2003-2008 Five Year	0.9%	0.9%	0.2%	0.2%
2008-2013 Five Year	1.2%	0.5%	0.5%	0.5%
2008-2018 Ten Year	1.0%	0.6%	0.6%	0.6%
2007-2022 Fifteen Year	0.8%	0.5%	0.5%	0.5%

NARRAGANSETT ELECTRIC COMPANY FY2011 FORECAST -- CALENDAR YEAR GWH DELIVERIES

DATA=ACTUAL

Year	Residential	Growth Rate	Commercial	Growth Rate	Industrial	Growth Rate	Total	Growth Rate
1990	2,355.6	.	2,665.3	.	1,360.7	.	6,381.6	.
1991	2,347.2	(0.4%)	2,649.8	(0.6%)	1,366.4	0.4%	6,363.4	(0.3%)
1992	2,340.2	(0.3%)	2,662.3	0.5%	1,351.4	(1.1%)	6,354.0	(0.1%)
1993	2,388.5	2.1%	2,709.2	1.8%	1,411.0	4.4%	6,508.7	2.4%
1994	2,432.4	1.8%	2,727.6	0.7%	1,370.6	(2.9%)	6,530.5	0.3%
1995	2,414.8	(0.7%)	2,748.8	0.8%	1,346.1	(1.8%)	6,509.8	(0.3%)
1996	2,463.5	2.0%	2,774.2	0.9%	1,346.4	0.0%	6,584.1	1.1%
1997	2,457.1	(0.3%)	2,811.6	1.3%	1,383.5	2.8%	6,652.2	1.0%
1998	2,500.4	1.8%	2,901.5	3.2%	1,428.2	3.2%	6,830.0	2.7%
1999	2,633.8	5.3%	3,025.4	4.3%	1,414.1	(1.0%)	7,073.3	3.6%
2000	2,607.0	(1.0%)	3,152.1	4.2%	1,406.9	(0.5%)	7,166.0	1.3%
2001	2,689.2	3.2%	3,294.1	4.5%	1,357.9	(3.5%)	7,341.2	2.4%
2002	2,799.3	4.1%	3,390.4	2.9%	1,325.9	(2.4%)	7,515.6	2.4%
2003	2,955.3	5.6%	3,482.2	2.7%	1,256.6	(5.2%)	7,694.1	2.4%
2004	2,971.4	0.5%	3,553.5	2.0%	1,297.4	3.3%	7,822.3	1.7%
2005	3,129.7	5.3%	3,644.7	2.6%	1,211.0	(6.7%)	7,985.3	2.1%
2006	2,992.3	(4.4%)	3,598.6	(1.3%)	1,141.4	(5.7%)	7,732.3	(3.2%)
2007	3,074.0	2.7%	3,688.8	2.5%	1,116.8	(2.2%)	7,879.7	1.9%
2008	3,019.0	(1.8%)	3,678.5	(0.3%)	1,036.2	(7.2%)	7,733.6	(1.9%)

DATA=FORECAST

Year	Residential	Growth Rate	Commercial	Growth Rate	Industrial	Growth Rate	Total	Growth Rate
2009	2,900.8	(3.9%)	3,578.1	(2.7%)	943.7	(8.9%)	7,490.5	(3.1%)
2010	2,995.9	3.3%	3,596.7	0.5%	975.0	3.3%	7,567.6	1.0%
2011	3,013.9	0.6%	3,704.4	3.0%	988.8	1.4%	7,707.1	1.8%
2012	3,052.4	1.3%	3,855.7	4.1%	1,004.1	1.5%	7,912.2	2.7%
2013	3,105.6	1.7%	3,984.8	3.3%	1,016.9	1.3%	8,107.4	2.5%
2014	3,150.1	1.4%	4,066.8	2.1%	1,020.6	0.4%	8,237.5	1.6%
2015	3,189.2	1.2%	4,132.2	1.6%	1,021.6	0.1%	8,343.0	1.3%

Division Data Request 1-11

Request:

The testimony of Mr. Glenning states that National Grid would prefer to own the Transmission Cable, and that if ownership is transferred to National Grid, National Grid will file a tariff at FERC. Please describe whether the revenue requirements estimated by Mr. Tufts represent the recovery of an assumed $42.5 million payment to Deepwater Transmission from National Grid. Please explain how National Grid will recover these revenue requirements, and indicate whether there will there be a per kilowatt/hour charge assessed to all Rhode Island customers for the cable. Please describe in as much detail as possible National Grid's planned mechanism for recovery, including the impact of Block Island Power Company using some of the Transmission Cable's capacity.

Response:

Yes. The illustrative revenue requirement was intended to reflect an assumed $42.5 million payment to Deepwater Transmission from National Grid.

While details will still need to be refined, National Grid expects the transaction would be reflected in the transmission ratemaking process through the steps generally enumerated below.

NOTE: Because two National Grid entities are involved, the legal names of each National Grid company (Narragansett Electric and New England Power Company) are used in the description:

(1) Narragansett Electric would make a payment to Deepwater Transmission (i.e., the assumed $42.5 million) for the purchase of the transmission asset;
(2) Narragansett Electric would include the transmission asset in its FERC-jurisdictional transmission rate base, but account for it separately;
(3) The annual revenue requirement for the transmission asset would be calculated annually and New England Power Company ("NEP") would reimburse Narragansett Electric through the FERC-approved Integrated Facilities Agreement that currently exists;

Division Data Request 1-11 (cont.)

(4) An allocation of the annual revenue requirement would need to be determined to charge the annual revenue requirement to both Narragansett Electric and Block Island Power Company through FERC-jurisdictional transmission rates. This allocation would first be approved by the RIPUC, then included in an agreement to be filed at FERC for FERC approval, each of which would take place prior to construction of the cable;
(5) Block Island Power Company would enter into a transmission service agreement with NEP, agreeing to pay its allocated portion of the revenue requirement through transmission charges through a direct assignment charge (along with other transmission charges applicable to Block Island Power Company once it becomes interconnected to the transmission system);
(6) NEP would include in its transmission bill to Narragansett Electric a direct assignment of Narragansett Electric's allocated share of the cable in its transmission rates that it charges Narragansett Electric; and
(7) The charges assessed to Narragansett Electric will be recovered by Narragansett Electric from its customers, along with all other typically applicable transmission charges, through Narragansett Electric's existing RIPUC-jurisdictional Transmission Service Cost Adjustment Provision, in the same manner as all other transmission costs are recovered today.

It is important to note that, absent steps 4 through 6, Block Island Power Company and Deepwater Wind would be responsible for the cost of the undersea cable under existing FERC rules. As a practical matter, it does not appear reasonably possible for Block Island Power Company and its very small customer base on the island to bear a significant allocated portion of the cost of the transmission cable, even if as much as half was allocated to Deepwater. Further, to the extent costs were allocated to Deepwater, Deepwater would have to include the costs of its allocated portion in the power purchase agreement pricing that is charged to all customers on the mainland. For that reason, the special transmission arrangements summarized in steps 4 through 6 above are critical to allow the transmission component of the project to move forward. It also allows the costs of this renewable energy public policy initiative to be socialized across the entire state (excepting Pascoag).

An estimate of the cost impact on Block Island Power Company cannot be determined until the Rhode Island Commission determines the allocation between Narragansett Electric and Block Island Power Company.

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