STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
PUBLIC UTILITIES COMMISSION

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| THE NARRAGANSETT ELECTRIC COMPANY d/b/a NATIONAL GRID, Plaintiff, | : |
| v. | : |
| THE TOWN OF HOPKINTON; THOMAS E. BUCK; SYLVIA THOMPSON; BARBARA CAPALBO; BEVERLY KENNEY; and WILLIAM FELKNER, in their official capacities as members of the Hopkinton Town Council, Defendants. | : |
| and | Docket No. 4076 |
| THE NARRAGANSETT ELECTRIC COMPANY d/b/a NATIONAL GRID, Plaintiff, | : |
| v. | : |
| THE TOWN OF HOPKINTON and BRAD R. WARD, in his official capacity as the Building and Zoning Official of the Town of Hopkinton, Defendants. | : |

**PREFILED TESTIMONY OF ALAN T. LABARRE, P.E.**
**ON BEHALF OF THE NARRAGANSETT ELECTRIC COMPANY**
**D/B/A NATIONAL GRID**

September 24, 2009

Q. Please state your name and business address.

A. My name is Alan T. LaBarre. My business address is 40 Sylvan Road, Waltham, Massachusetts.

Q. By whom are you employed and in what position?

A. I am employed by National Grid USA Service Company as Manager of Capacity Planning in the Network Asset Planning Department.

Q. What are your responsibilities as Manager of Capacity Planning?

A. I am responsible for assigning, prioritizing, reviewing, and approving the work performed by engineers whose principal function is assessing the performance and planning the development of National Grid's electrical distribution infrastructure. My functional responsibility in this regard includes the New England and upstate New York service territory of National Grid.

Q. Please describe your education, training, and experience.

A. I have a Bachelor of Science Degree in Electrical Engineering from the University of Rhode Island. I am also a graduate of the Worcester Polytechnic Institute's School of Industrial Management. I am a registered Professional Engineer in the State of Rhode Island. I have 21 years of professional experience in the area of electrical distribution infrastructure planning at National Grid. During the first 12 years of this experience (1988 – 2000), I was directly responsible for the execution of area distribution system planning studies within the central and southeastern portions of National Grid's Massachusetts service territory. Over the remaining 9 years (2000 – present), I have managed engineering groups either responsible for the completion of area distribution planning reviews or the development of tools and analysis procedures used by planning engineers. These managerial positions were:

Manager of District Engineering for the Southeast District of Massachusetts Electric from 1/2000 – 5/2002, Manager of Distribution Planning and Engineering for The Narragansett Electric Company from 5/2002 - 4/2004, Manager of System Planning and Engineering for National Grid USA Service Company from 4/2004 - 4/2005, Manager of Network Planning and Reliability for National Grid USA Service Company from 4/2005 – 7/2008, and Manager of Capacity Planning from 7/2008 - present.

Q. Have you previously testified before the PUC or the EFSB?

A. Yes. I provided testimony before the PUC and the EFSB on the need for and benefits related to the development of National Grid's Tower Hill substation located in North Kingstown, RI. These proceedings took place in 2006.

Q. Are you familiar with National Grid's proposed new substation in Hopkinton, Rhode Island (the "Project")?

A. Yes, I am familiar with the Project.

Q. What is the scope of your testimony in this proceeding?

A. I will summarize the planning process by which National Grid identifies the need for electrical distribution system infrastructure development and describe the specific Study Area in which the Project is located. I will also explain the benefit of the Project to electric customers and explain how the Project was selected as the proper alternative among other options and why those alternatives are not viable. Finally, I will also explain the distribution circuit (feeder) system improvements that will be made as part of the Project.

Q. Please describe the process by which National Grid determines that distribution system improvements are necessary.

A. The Annual Capacity Plan is the primary means used to identify existing and long range needs of the distribution system and to recommend infrastructure development solutions that will provide reliable and economic electric delivery service to National Grid customers. The Annual Capacity Plan process reviews the electric infrastructure within specific geographic areas (Study Areas). The Annual Capacity Plan presently identifies distribution system infrastructure development requirements required to address facility loading concerns that are projected to occur within the next five years.

When conducting the Annual Capacity Planning process, Power Supply Area (PSA) forecasts, published by the National Grid Energy Portfolio Management Department, are used to project annual loads in the Study Area for the study period. To complement the PSA forecasts, the Study Area historical annual load growth rate is calculated and anticipated large spot loads are identified. Taking all these variables into consideration, annual peak loads are projected for all distribution feeders, distribution supply lines (sub-transmission lines), and substation supply transformers within a Study Area.

After distribution system loads are projected, we perform diagnostic analysis of equipment loading and system voltage performance, under both normal and contingency conditions. Service reliability is assessed to identify existing and anticipated problems. If the existing infrastructure is inadequate or will become inadequate before the end of the review period, infrastructure improvement plans are developed to resolve the area problems. The plans that are developed consider the establishment of new facilities and/or the expansion of existing facilities.

Q. Please describe the Study Area and geographic area to which the Project relates and why a comprehensive plan is required.

A. The South County West Study Area encompasses the towns of Charlestown, Hopkinton, Richmond, Westerly, and the western section of South Kingstown. The Study Area has approximately 31,000 customers with a summer peak load of approximately 95 MW. A comprehensive plan is required to address multiple existing and projected feeder, transformer, and distribution supply line loading issues in the Study Area.

Q. What need was identified in the South County West Study Area?

A. The 2007 Annual Capacity Plan first identified a number of thermal overloading concerns in the South County West Study Area and recommended the new Hopkinton substation to address these concerns. In its most recent update, the 2009 Annual Capacity Plan reaffirmed the extent of overloading concerns in the South County West Study Area. These concerns include one transformer and four feeders projected to be loaded above their summer normal rating. In addition to normal loading concerns, three transformers and two distribution supply lines are projected to exceed their summer emergency ratings. The 2009 Annual Capacity Plan incorporates the latest forecasts including the consequences of the recent economic downturn which we are experiencing.

Q. What does this mean for customers?

A. Maximum loading of electrical equipment is determined by National Grid and expressed as normal ratings or normal capabilities. This is the maximum loading considered acceptable for the equipment under normal operating conditions. Emergency ratings or capabilities are the maximum equipment loading considered acceptable during system contingency operations. These ratings are applied for relatively short periods of time, generally less than 24 hours.

The concerns identified in the 2009 Annual Capacity Plan indicate that electric system equipment loading is approaching normal capabilities and exceeds emergency capabilities during system contingencies at many locations. If equipment loading above capability is left unaddressed, it can lead to customer service interruptions resulting from equipment failure. To prevent equipment failure due to load in excess of capability, system operators may be required to interrupt service to certain customers during peak system load periods. In addition, heavily loaded equipment also reduces the flexibility system operators have to rearrange the distribution system during outages resulting from other causes such as tree contact with overhead lines, wind storm damage, motor vehicle pole hits, etc. When system operators cannot rearrange the distribution system to bypass damaged facilities, customer service restoration must wait until system repairs are made. Restoration of service via system rearrangement can typically be completed within 2-4 hours while restoration that must wait for system repairs can often take between 4-24 hours. It is also important to note that with equipment loading approaching normal capabilities it becomes more difficult to serve new customers in a timely, economic, and reliable manner.

Q. Please identify the specific transformers, feeders and other equipment that are projected to exceed their normal or emergency ratings.

A. Attached as attachments ATL-1 through 3 are listings of projected normal and contingency peak loads on all South County West Study Area distribution feeders, substation supply transformers and distribution supply lines, respectively, from the 2009 Annual Capacity Plan.

The projected system overloads of greatest concern are as follows:

- Existing peak loading on the Wood River transformer T10 exceeds and is projected to continue to exceed summer emergency rating in 2009 and beyond for the loss of the larger Wood River transformer T20 on peak.
- Existing peak loading on Westerly transformers T2 and T4 exceeds and is projected to continue to exceed summer emergency rating in 2009 for the loss of either transformer on peak.
- Loading on Ashaway transformer T1 is projected to exceed summer normal rating in 2015.
- Loading on Westerly feeders 16F1 and 16F2 is projected to exceed summer normal ratings by 2012.
- Loading on Kenyon feeder 42F1 is projected to exceed summer normal ratings by 2014.
- Loading on Ashaway feeder 43F1 is projected to exceed summer normal rating by 2015.
- Loading on Wood River supply line 85T2 is projected to exceed summer emergency rating by 2009 for the loss of either supply line 85T3 or Westerly transformer T4 on peak.
- Loading on Wood River supply line 85T3 is projected to exceed summer emergency rating by 2011 for the loss of either supply line 85T2 or Westerly transformer T2 on peak.

Q. How do overloads on transformers in Westerly and feeders in Charlestown affect customers in Hopkinton?

A. The electrical system is operated as an interconnected grid and customers in Hopkinton and other towns are served from facilities that are projected to be overloaded. The existing distribution system in the area is shown in Att. ATL-4. Operational response to system contingencies will include actions up to and including load shed (customer service interruptions) to prevent equipment damage and a wide area outage. This load shedding for a contingency would affect customers in Hopkinton as well as Charlestown and Westerly.

Q. What system operational problems could these thermal concerns result in?

A. Loss of the largest Wood River transformer on peak could result in unserved customer load of approximately 11 MVA in 2009 (growing to 20 MVA in 2015). Loss of either Westerly transformer on peak could result in unserved customer load of approximately 5 MVA in 2009 (growing to 12 MVA in 2015).

In the event the contingencies described occur, the operational response would be to install a mobile transformer to restore customer service. A conservative (not less than) estimate of the time required to install a mobile transformer is 24 hours. Furthermore, available mobile transformers do not have the same capabilities to regulate system voltage as the permanently installed units at Wood River substation. As such, system voltage performance concerns (which result in customer equipment operation problems) could remain even after customer service is restored.

Q. What solution did the Annual Capacity Plan identify for these problems?

A. The Annual Capacity Plan identified a need for new supply and distribution capacity. The Annual Plan recommended the installation of a new 115/12.47 kV substation and three distribution feeders in Hopkinton, Rhode Island. The site selected is land owned by The Narragansett Electric Company on Route 3 adjacent to an existing electric transmission line and right of way.

Q. Please explain the alternative that was considered.

A. The alternative considered the reinforcement and expansion of the existing 34.5 kV supply and 12.47 kV distribution system. It included the replacement of both Westerly transformers; the replacement of the smaller Wood River Supply transformer; development (capacity increases and reconfiguration) of the Westerly 16F4, 16F5 and 16F6 feeders; and upgrades to the Wood River supply lines.

Q. What is the conclusion of your analysis?

A. The development of a new 115/12.47 kV substation on Route 3 in Hopkinton is the recommended plan. The recommended plan is superior to the alternative plan because it introduces new distribution capacity in a location where load is developing and where there is ready access to the existing distribution and transmission systems. The recommended plan provides much needed capacity to relieve heavily loaded distribution and supply circuits and improves customer service reliability in Hopkinton. As an added benefit, the recommended plan results in the retirement and removal of Ashaway substation. Ashaway is a small single feeder substation built in 1972 and supplied off the 34.5 kV distribution supply system. This substation is not suitable for expansion to address the Study Area concerns identified in the Annual Capacity Plan and will eventually require replacement of aged and outdated equipment. The condition of the substation's feeder circuit breaker was recently reviewed and it has been recommended for replacement. In addition, the conceptual estimated cost of the alternate plan exceeds twice that of the recommended plan. The alternative plan would reinforce existing supply and distribution capacity to sufficiently address existing and projected loading concerns. However, should significant, presently unanticipated, spot loads develop along Route 3, it would be more difficult and costly to serve this load without the proposed substation. The alternative plan only delays the need for new supply and distribution capacity in the vicinity of the existing transmission right of way in Hopkinton. The Company would have to return in the future with a new proposal to serve load growth in and around this area.

Q. Mr. LaBarre, how will the Hopkinton substation project solve these concerns?

A. The installation of a new 115/12.47 kV substation and three distribution feeders will resolve area transformer, feeder, and supply line overloads. New distribution feeders will support the retirement of Ashaway substation, relief of Wood River and Westerly substations, relief of the distribution supply system, and relief of area feeders. The reconfigured distribution supply system following construction of the Hopkinton Substation is shown in Att. ATL-5.

Q. What will these benefits mean for consumers?

A. The benefits are a more reliable electric system that should experience fewer outages than the existing system and one that will require significantly less time to restore when system contingencies do occur. The introduction of a new 115 kV source will allow for the capacity to support load growth and customer expansion in the Town of Hopkinton.

Q. Does this complete your testimony?

A. Yes, it does.

## ATTACHMENTS

| | |
|---|---|
| ATL-1 | 2009 Annual Plan Feeder Problem Identification Spreadsheet – South County West Study Area |
| ATL-2 | 2009 Annual Plan Transformer Problem Identification Spreadsheet – South County West Study Area |
| ATL-3 | 2009 Annual Plan Supply Line Problem Identification Spreadsheet – South County West Study Area |
| ATL-4 | Existing Supply Areas & Distribution Feeders, Hopkinton, RI |
| ATL-5 | Proposed Supply Areas & Distribution Feeders, Hopkinton, RI |

# 2009 Annual Plan Feeder Problem Identification Spreadsheet

South County West Study Area

| | | | | | | | | | Projected Load | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 2009 | | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | |
| **Substation** | **Voltage (kV)** | **Feeder** | **Normal Limiting Element** | **Normal Element Specifics** | **SN Rating (Amps)** | **Emergency Limiting Element** | **Emergency Element Specifics** | **SE Rating (Amps)** | **Amps** | **% SN** | **Amps** | **% SN** | **Amps** | **%SN** | **Amps** | **%SN** | **Amps** | **%SN** | **Amps** | **%SN** | **Amps** | **%SN** |
| ASHAWAY 43 | 12.47 | 43F1 | Transformer | 5.0/6.25 MVA | 388 | Transformer | 5.0/6.25 MVA | 423 | 324 | 83% | 333 | 86% | 345 | 89% | 359 | 93% | 371 | 96% | 381 | 98% | 390 | 100% |
| HOPE VALLEY 41 | 12.47 | 41F1 | Transformer | 5.0 MVA | 347 | Transformer | 5.0 MVA | 430 | 253 | 73% | 260 | 75% | 270 | 78% | 281 | 81% | 290 | 84% | 298 | 86% | 305 | 88% |
| KENYON 68 | 12.47 | 68F1 | UG Cable | 1C 1000Al XLPE DB | 512 | Relay/Fuse | 612 Amp Safe Carry | 612 | 359 | 70% | 369 | 72% | 383 | 75% | 398 | 78% | 412 | 80% | 422 | 82% | 432 | 84% |
| KENYON 68 | 12.47 | 68F2 | UG Cable | 1C 1000Al XLPE DB | 511 | Relay/Fuse | 612 Amp Safe Carry | 612 | 370 | 72% | 380 | 74% | 394 | 77% | 410 | 80% | 424 | 83% | 435 | 85% | 445 | 87% |
| KENYON 68 | 12.47 | 68F3 | UG Cable | 1C 1000Al XLPE DB | 512 | OH Line | 336.4 Al (TULIP) Bare | 515 | 442 | 86% | 454 | 89% | 471 | 92% | 490 | 96% | 506 | 99% | 519 | 101% | 531 | 104% |
| KENYON 68 | 12.47 | 68F4 | UG Cable | 1C 1000Al XLPE DB | 514 | Relay/Fuse | 612 Amp Safe Carry | 612 | 264 | 51% | 272 | 53% | 282 | 55% | 293 | 57% | 303 | 59% | 311 | 60% | 318 | 62% |
| KENYON 68 | 12.47 | 68F5 | Relay/Fuse | 612 Amp Safe Carry | 612 | Relay/Fuse | 612 Amp Safe Carry | 612 | 286 | 47% | 294 | 48% | 305 | 50% | 317 | 52% | 327 | 54% | 336 | 55% | 344 | 56% |
| LANGWORTHY CORNER 86 | 12.47 | 86F1 | Transformer | 5.6/7 MVA | 382 | Transformer | 5.6/7 MVA | 429 | 308 | 81% | 317 | 83% | 328 | 86% | 342 | 89% | 353 | 92% | 362 | 95% | 371 | 97% |
| WESTERLY 16 | 12.47 | 16F1 | OH Line | 336.4 Al (TULIP) Bare | 515 | OH Line | 336.4 Al (TULIP) Bare | 515 | 478 | 93% | 492 | 95% | 510 | 99% | 530 | 103% | 548 | 106% | 562 | 109% | 575 | 112% |
| WESTERLY 16 | 12.47 | 16F2 | OH Line | 336.4 Al (TULIP) Bare | 515 | OH Line | 336.4 Al (TULIP) Bare | 515 | 467 | 91% | 480 | 93% | 498 | 97% | 518 | 101% | 535 | 104% | 549 | 107% | 562 | 109% |
| WESTERLY 16 | 12.47 | 16F3 | OH Line | 336.4 Al (TULIP) Bare | 515 | OH Line | 336.4 Al (TULIP) Bare | 515 | 385 | 75% | 396 | 77% | 411 | 80% | 427 | 83% | 441 | 86% | 452 | 88% | 463 | 90% |
| WESTERLY 16 | 12.47 | 16F4 | OH Line | 477 Al (COSMOS) Bare | 645 | OH Line | 477 Al (COSMOS) Bare | 645 | 262 | 41% | 270 | 42% | 280 | 43% | 291 | 45% | 300 | 47% | 308 | 48% | 316 | 49% |

# 2009 Annual Plan Transfomer Problem Identification Spreadsheet

South County West Study Area

| | | System Voltage (kV) | | Maximum | Rating (MVA) | | Projected Load | | | | | | | | | | | | | | Projected Contingency | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2009 | | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | | 2009 | | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | |
| Substation | Tranf. ID. | From | To | Nameplate Rating | SN | SE | MVA | % SN | MVA | % SN | MVA | % SN | MVA | % SN | MVA | % SN | MVA | % SN | MVA | % SN | MVA | % SE | MVA | % SE | MVA | % SE | MVA | % SE | MVA | % SE | MVA | % SE | MVA | % SE |
| ASHAWAY 43 | 1 | 34.5 | 12.47 | 6.3 | 8.4 | 9.1 | 7.0 | 83% | 7.2 | 86% | 7.5 | 89% | 7.8 | 92% | 8.0 | 95% | 8.2 | 98% | 8.4 | 100% | 7.0 | 77% | 7.2 | 79% | 7.5 | 82% | 7.8 | 85% | 8.0 | 88% | 8.2 | 90% | 8.4 | 92% |
| HOPE VALLEY 41 | 1 | 34.5 | 12.47 | 5.0 | 7.3 | 9.3 | 5.5 | 75% | 5.6 | 78% | 5.8 | 80% | 6.1 | 84% | 6.3 | 86% | 6.4 | 89% | 6.6 | 91% | 5.5 | 59% | 5.6 | 61% | 5.8 | 63% | 6.1 | 65% | 6.3 | 67% | 6.4 | 69% | 6.6 | 71% |
| KENYON 68 | 1 | 115 | 12.47 | 40.0 | 49.7 | 53.7 | 22.3 | 45% | 22.9 | 46% | 23.8 | 48% | 24.7 | 50% | 25.5 | 51% | 26.2 | 53% | 26.8 | 54% | 35.6 | 66% | 36.6 | 68% | 37.9 | 71% | 39.5 | 73% | 40.8 | 76% | 41.8 | 78% | 42.8 | 80% |
| KENYON 68 | 2 | 115 | 12.47 | 40.0 | 49.7 | 53.7 | 13.3 | 27% | 13.7 | 27% | 14.2 | 29% | 14.7 | 30% | 15.2 | 31% | 15.6 | 31% | 16.0 | 32% | 35.6 | 66% | 36.6 | 68% | 37.9 | 71% | 39.5 | 73% | 40.8 | 76% | 41.8 | 78% | 42.8 | 80% |
| LANGWORTHY 86 | 1 | 34.5 | 12.47 | 5.6 | 8.2 | 9.3 | 6.7 | 81% | 6.8 | 83% | 7.1 | 86% | 7.4 | 90% | 7.6 | 92% | 7.8 | 95% | 8.0 | 97% | 6.7 | 72% | 6.8 | 74% | 7.1 | 77% | 7.4 | 80% | 7.6 | 82% | 7.8 | 84% | 8.0 | 86% |
| WESTERLY 16 | 2 | 34.5 | 12.47 | 20.0 | 25.6 | 26.7 | 18.1 | 71% | 18.6 | 73% | 19.3 | 75% | 20.1 | 78% | 20.7 | 81% | 21.3 | 83% | 21.8 | 85% | 31.8 | 120% | 32.7 | 123% | 34.0 | 127% | 35.3 | 132% | 36.5 | 137% | 37.4 | 140% | 38.3 | 144% |
| WESTERLY 16 | 4 | 34.5 | 12.47 | 20.0 | 25.6 | 26.7 | 15.4 | 60% | 15.9 | 62% | 16.5 | 64% | 17.1 | 67% | 17.7 | 69% | 18.1 | 71% | 18.6 | 73% | 31.8 | 120% | 32.7 | 123% | 34.0 | 127% | 35.3 | 132% | 36.5 | 137% | 37.4 | 140% | 38.3 | 144% |
| WOOD RIVER 85 | 10 | 115 | 34.5 | 40.0 | 48.2 | 52.4 | 39.0 | 81% | 39.6 | 82% | 40.5 | 84% | 41.5 | 86% | 42.3 | 88% | 43.0 | 89% | 43.6 | 91% | 63.3 | 121% | 64.6 | 123% | 66.4 | 127% | 68.4 | 130% | 70.2 | 134% | 71.6 | 136% | 72.9 | 139% |
| WOOD RIVER 85 | 20 | 115 | 34.5 | 80.0 | 91.2 | 106.6 | 24.3 | 27% | 25.0 | 27% | 25.9 | 28% | 27.0 | 30% | 27.9 | 31% | 28.6 | 31% | 29.3 | 32% | 63.3 | 59% | 64.6 | 61% | 66.4 | 62% | 68.4 | 64% | 70.2 | 66% | 71.6 | 67% | 72.9 | 68% |

PUC Dkt. No. 4076

Attachment ATL-2

# 2009 Annual Plan Supply Line Problem Identification Spreadsheet

South County West Study Area

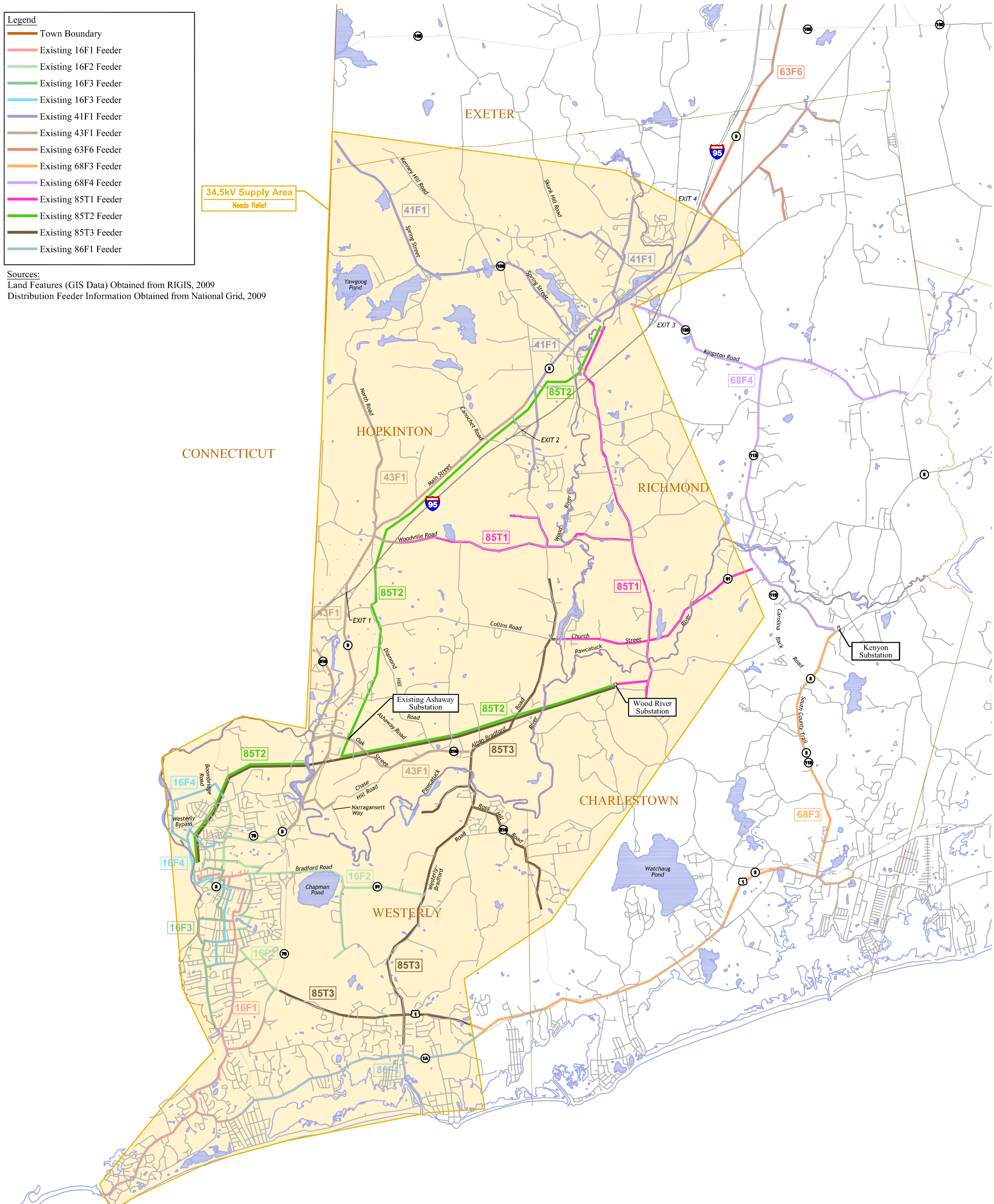
| | | | | Line Section | | Rating (MVA) | | Projected Load | | | | | | | | | | | | | | Projected Contingency | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 2009 | | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | | 2009 | | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | | |
| **Circuit** | **Voltage (kV)** | **Limiting Element** | **Element Specifics** | **From** | **To** | **SN** | **SE** | **MVA** | **%SN** | **MVA** | **%SN** | **MVA** | **%SN** | **MVA** | **%SN** | **MVA** | **%SN** | **MVA** | **%SN** | **MVA** | **%SN** | **MVA** | **% SE** | **MVA** | **% SE** | **MVA** | **% SE** | **MVA** | **% SE** | **MVA** | **% SE** | **MVA** | **% SE** | **MVA** | **% SE** | **Worst Contingency** |
| 85T1 | 34.5 | Recloser | 560A | Terminal Equipment | | 35.8 | 38.5 | 10.5 | 29% | 10.6 | 30% | 10.8 | 30% | 11.1 | 31% | 11.3 | 31% | 11.4 | 32% | 11.6 | 32% | 30.1 | 78% | 30.5 | 79% | 30.9 | 80% | 31.4 | 82% | 31.8 | 83% | 32.2 | 84% | 32.5 | 84% | 85T3 OOS |
| 85T1 | 34.5 | UG Cable | 750 Al | Wood River | P174 Riser | 30.7 | 43.9 | 10.5 | 34% | 10.6 | 35% | 10.8 | 35% | 11.1 | 36% | 11.3 | 37% | 11.4 | 37% | 11.6 | 38% | 30.1 | 69% | 30.5 | 69% | 30.9 | 70% | 31.4 | 72% | 31.8 | 73% | 32.2 | 73% | 32.5 | 74% | 85T3 OOS |
| 85T1 | 34.5 | OH Line | 795 Al | P174 Riser | Hope Valley | 53.2 | 53.2 | 10.5 | 20% | 10.6 | 20% | 10.8 | 20% | 11.1 | 21% | 11.3 | 21% | 11.4 | 21% | 11.6 | 22% | 30.1 | 57% | 30.5 | 57% | 30.9 | 58% | 31.4 | 59% | 31.8 | 60% | 32.2 | 60% | 32.5 | 61% | 85T3 OOS |
| 85T1 | 34.5 | OH Line | 477 Al Spca | P174 Riser | Hope Valley | 29.8 | 36.6 | 10.5 | 35% | 10.6 | 36% | 10.8 | 36% | 11.1 | 37% | 11.3 | 38% | 11.4 | 38% | 11.6 | 39% | 30.1 | 82% | 30.5 | 83% | 30.9 | 84% | 31.4 | 86% | 31.8 | 87% | 32.2 | 88% | 32.5 | 89% | 85T3 OOS |
| 85T1 | 34.5 | OH Line | 336.4 Al | P174 Riser | Hope Valley | 32.6 | 32.6 | 5.0 | 15% | 5.0 | 15% | 5.0 | 15% | 5.0 | 15% | 5.0 | 15% | 5.0 | 15% | 5.0 | 15% | 5.0 | 15% | 5.0 | 15% | 5.0 | 15% | 5.0 | 15% | 5.0 | 15% | 5.0 | 15% | 5.0 | 15% | SN |
| 85T2 | 34.5 | Recloser | 560A | Terminal Equipment | | 35.8 | 38.5 | 25.1 | 70% | 25.8 | 72% | 26.7 | 75% | 27.8 | 78% | 28.7 | 80% | 29.5 | 82% | 30.2 | 84% | 39.3 | 102% | 40.4 | 105% | 41.9 | 109% | 43.6 | 113% | 45.0 | 117% | 46.2 | 120% | 47.3 | 123% | Westerly T4/85T3 OOS |
| 85T2 | 34.5 | UG Cable | 2-1000 Cu | Wood River | PTR P070 | 53.0 | 76.0 | 25.1 | 47% | 25.8 | 49% | 26.7 | 50% | 27.8 | 52% | 28.7 | 54% | 29.5 | 56% | 30.2 | 57% | 39.3 | 52% | 40.4 | 53% | 41.9 | 55% | 43.6 | 57% | 45.0 | 59% | 46.2 | 61% | 47.3 | 62% | Westerly T4/85T3 OOS |
| 85T2 | 34.5 | OH Line | 795 Al | Wood River | PTR P070 | 53.2 | 53.2 | 25.1 | 47% | 25.8 | 48% | 26.7 | 50% | 27.8 | 52% | 28.7 | 54% | 29.5 | 55% | 30.2 | 57% | 39.3 | 74% | 40.4 | 76% | 41.9 | 79% | 43.6 | 82% | 45.0 | 85% | 46.2 | 87% | 47.3 | 89% | Westerly T4/85T3 OOS |
| 85T2 | 34.5 | Recloser | 800A - VSA | PTR P070 | | 47.8 | 50.2 | 25.1 | 52% | 25.8 | 54% | 26.7 | 56% | 27.8 | 58% | 28.7 | 60% | 29.5 | 62% | 30.2 | 63% | 33.5 | 67% | 34.5 | 69% | 35.7 | 71% | 37.2 | 74% | 38.4 | 76% | 39.4 | 78% | 40.3 | 80% | Westerly T4/85T3 OOS |
| 85T2 | 34.5 | OH Line | 795 Al | PTR P070 | Westerly | 53.2 | 53.2 | 25.1 | 47% | 25.8 | 48% | 26.7 | 50% | 27.8 | 52% | 28.7 | 54% | 29.5 | 55% | 30.2 | 57% | 33.5 | 63% | 34.5 | 65% | 35.7 | 67% | 37.2 | 70% | 38.4 | 72% | 39.4 | 74% | 40.3 | 76% | Westerly T4/85T3 OOS |
| 85T3 | 34.5 | Bus conductor | 500 Cu | Terminal Equipment | | 53.9 | 58.3 | 34.9 | 65% | 35.4 | 66% | 36.2 | 67% | 37.1 | 69% | 37.9 | 70% | 38.5 | 71% | 39.1 | 73% | 51.4 | 88% | 52.4 | 90% | 53.9 | 92% | 55.5 | 95% | 56.9 | 97% | 58.0 | 99% | 59.1 | 101% | Westerly T2/85T2 OOS |
| 85T3 | 34.5 | UG Cable | 2-1000 Cu | Wood River | Langworthy Tap | 53.0 | 76.0 | 34.9 | 66% | 35.4 | 67% | 36.2 | 68% | 37.1 | 70% | 37.9 | 72% | 38.5 | 73% | 39.1 | 74% | 51.4 | 68% | 52.4 | 69% | 53.9 | 71% | 55.5 | 73% | 56.9 | 75% | 58.0 | 76% | 59.1 | 78% | Westerly T2/85T2 OOS |
| 85T3 | 34.5 | OH Line | 795 Al | Wood River | Langworthy Tap | 53.2 | 53.2 | 34.9 | 66% | 35.4 | 67% | 36.2 | 68% | 37.1 | 70% | 37.9 | 71% | 38.5 | 72% | 39.1 | 74% | 51.4 | 97% | 52.4 | 99% | 53.9 | 101% | 55.5 | 104% | 56.9 | 107% | 58.0 | 109% | 59.1 | 111% | Westerly T2/85T2 OOS |
| 85T3 | 34.5 | OH Line | 477 Al | Langworthy Tap | PTR P137-50 | 38.5 | 38.5 | 21.3 | 55% | 21.4 | 56% | 21.7 | 56% | 22.0 | 57% | 22.2 | 58% | 22.4 | 58% | 22.6 | 59% | 21.3 | 55% | 21.4 | 56% | 21.7 | 56% | 22.0 | 57% | 22.2 | 58% | 22.4 | 58% | 22.6 | 59% | SN |
| 85T3 | 34.5 | Recloser | RVE Recloser | PTR P137-50 | | 23.9 | 23.9 | 21.3 | 89% | 21.4 | 90% | 21.7 | 91% | 22.0 | 92% | 22.2 | 93% | 22.4 | 94% | 22.6 | 95% | 21.3 | 89% | 21.4 | 90% | 21.7 | 91% | 22.0 | 92% | 22.2 | 93% | 22.4 | 94% | 22.6 | 95% | SN |
| 85T3 | 34.5 | OH Line | 477 Al | PTR P137-50 | PTR P17 | 38.5 | 38.5 | 21.3 | 55% | 21.4 | 56% | 21.7 | 56% | 22.0 | 57% | 22.2 | 58% | 22.4 | 58% | 22.6 | 59% | 21.3 | 55% | 21.4 | 56% | 21.7 | 56% | 22.0 | 57% | 22.2 | 58% | 22.4 | 58% | 22.6 | 59% | SN |
| 85T3 | 34.5 | Recloser | RVE Recloser | PTR P17 | | 23.9 | 23.9 | 6.7 | 28% | 6.8 | 29% | 7.1 | 30% | 7.4 | 31% | 7.6 | 32% | 7.8 | 33% | 8.0 | 33% | 6.7 | 28% | 6.8 | 29% | 7.1 | 30% | 7.4 | 31% | 7.6 | 32% | 7.8 | 33% | 8.0 | 33% | SN |
| 85T3 | 34.5 | OH Line | 477 Al | PTR P17 | Langworthy Sub | 38.5 | 38.5 | 6.7 | 17% | 6.8 | 18% | 7.1 | 18% | 7.4 | 19% | 7.6 | 20% | 7.8 | 20% | 8.0 | 21% | 6.7 | 17% | 6.8 | 18% | 7.1 | 18% | 7.4 | 19% | 7.6 | 20% | 7.8 | 20% | 8.0 | 21% | SN |
| 85T3 | 34.5 | OH Line | 795 Al | Langworthy Tap | PTR P136 | 53.2 | 53.2 | 15.4 | 29% | 15.9 | 30% | 16.5 | 31% | 17.1 | 32% | 17.7 | 33% | 18.1 | 34% | 18.6 | 35% | 32.5 | 61% | 33.4 | 63% | 34.7 | 65% | 36.1 | 68% | 37.2 | 70% | 38.2 | 72% | 39.1 | 74% | Westerly T2/85T2 OOS |
| 85T3 | 34.5 | Recloser | 800A - VSA | PTR P136 | | 47.8 | 50.2 | 15.4 | 32% | 15.9 | 33% | 16.5 | 34% | 17.1 | 36% | 17.7 | 37% | 18.1 | 38% | 18.6 | 39% | 32.5 | 65% | 33.4 | 67% | 34.7 | 69% | 36.1 | 72% | 37.2 | 74% | 38.2 | 76% | 39.1 | 78% | Westerly T2/85T2 OOS |
| 85T3 | 34.5 | O/H Line | 795 Al | PTR P136 | Westerly Sub | 53.2 | 53.2 | 15.4 | 29% | 15.9 | 30% | 16.5 | 31% | 17.1 | 32% | 17.7 | 33% | 18.1 | 34% | 18.6 | 35% | 32.5 | 61% | 33.4 | 63% | 34.7 | 65% | 36.1 | 68% | 37.2 | 70% | 38.2 | 72% | 39.1 | 74% | Westerly T2/85T2 OOS |

PUC Dkt. No. 4076

Attachment ATL-3

# Existing Supply Areas & Distribution Feeders

## Hopkinton, Rhode Island




Sources:
Land Features (GIS Data) Obtained from RIGIS, 2009
Distribution Feeder Information Obtained from National Grid, 2009

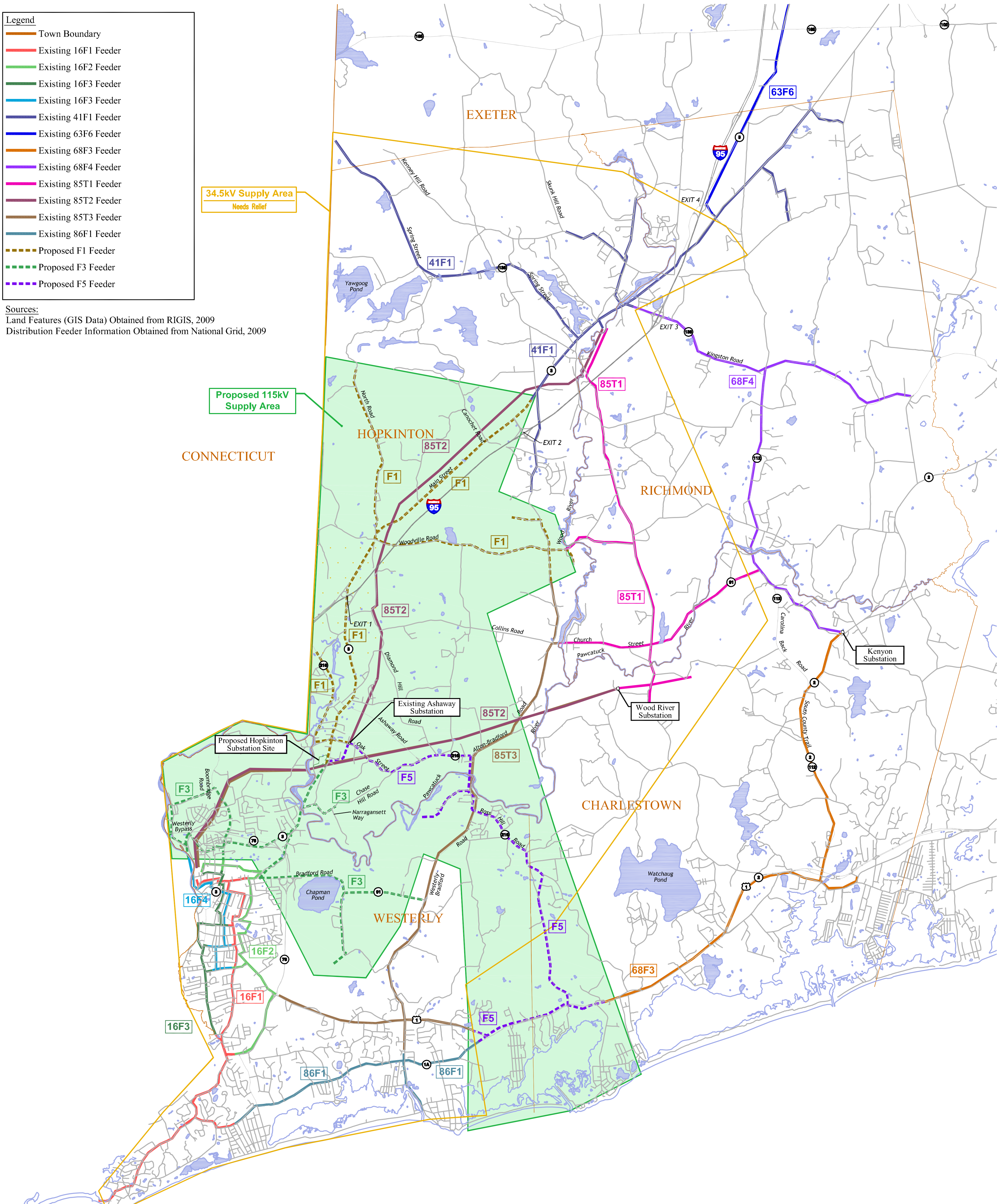
**PUC Dkt. No. 4076**
**Attachment ATL-4**

N
0 1 2 Miles

*Vanasse Hangen Brustlin, Inc.*

# Proposed Supply Areas & Distribution Feeders

## Hopkinton, Rhode Island




PUC Dkt. No. 4076
Attachment ATL-5

*Vanasse Hangen Brustlin, Inc.*

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